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The TPRC Data Series

VOLUME 8

THERMAL RADIATIVE PROPERTIES

Nonmetallic Solids

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The TPRC Data Series published in 13 volumes plus a Master Index volume constitutes a permanent and valuable contribution to science and technology. This 17,000 page Data Series should form a necessary acquisition to all scientific and technological libraries and laboratories. These volumes contain an enormous amount of data and information for thermophysical properties on more than 5,000 different materials of interest to researchers in government laboratories and the defense industrial establishment.

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beryllia--beryllium oxides--tellurides--carbides--silicides--phosphates--phosphides--nitrides--carbon--graphites--bromides--chlorides--arsenates--arsenides--corning glasses--fused silica glass-silica glass--pyrex glass--soda lime glass-soda silica glass--iron oxides--kaolin--magnesium oxides--manganese oxides--marble-nickel oxides--obsidian--opal--opal glass-plexiglas--mylar--polyethylene--pyrocerams--quartz--resin--tuff--rutile--salt--silica--silicon oxides--zircon--zirconia--zircopax

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Volume 8. 'Thermal Radiative Properties - Nonmetallic Solids,'
Touloukian, Y. S. and DeWitt, D.P., 1890 pp., 1972.

Volume 8 in this 14 volume TPRC Data Series covers seven nonmetallic elements (including 18 varieties of graphite), 46 simple oxides, six groups of mixtures of simple oxides, 59 complex oxides and salts, 185 nonmetallic compounds, 19 groups of intermetallic compounds, 13 groups of cermets, nine groups of pressed nonmetal-metal powder mixtures, 14 groups ofmiscellaneous mixtures, 14 kinds of glasses, nine kinds of minerals and rocks, and 10 groups of polymers. Data for some of the materials have been critically evaluated and "analyzed data graphs" are presented in addition to the original experimental data.

1890 pages, 1972 $160.00 ($192.00 outside US)

THERMAL RADIATIVE PROPERTIES

Nonmetallic Solids

THERMOPHYSICAL PROPERTIES OF MATTER

The TPRC Data Series

A Comprehensive Compilation of Data by the
Thermophysical Properties Research Center (TPRC), Purdue University

Y. S. Touloukian, Series Editor
C. Y. Ho, Series Technical Editor

Volume 1. Thermal Conductivity–Metallic Elements and Alloys
Volume 2. Thermal Conductivity–Nonmetallic Solids
Volume 3. Thermal Conductivity–Nonmetallic Liquids and Gases
Volume 4. Specific Heat–Metallic Elements and Alloys
Volume 5. Specific Heat–Nonmetallic Solids
Volume 6. Specific Heat–Nonmetallic Liquids and Gases
Volume 7. Thermal Radiative Properties–Metallic Elements and Alloys
Volume 8. Thermal Radiative Properties–Nonmetallic Solids
Volume 9. Thermal Radiative Properties–Coatings
Volume 10. Thermal Diffusivity
Volume 11. Viscosity
Volume 12. Thermal Expansion–Metallic Elements and Alloys
Volume 13. Thermal Expansion–Nonmetallic Solids

New data on thermophysical properties are being constantly accumulated at TPRC. Contact TPRC and use its interim updating services for the most current information.

THERMOPHYSICAL PROPERTIES OF MATTER

VOLUME 8

THERMAL RADIATIVE PROPERTIES

Nonmetallic Solids

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and

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"In this work, when it shall be found that much is omitted, let it not be forgotten that much likewise is performed..."

SAMUEL JOHNSON, A.M.

From last paragraph of Preface to his two-volume *Dictionary of the English Language*, Vol. I, page 5, 1755, London, Printed by Strahan.

Preface

Thermophysical Properties of Matter, the TPRC Data Series, is the culmination of twelve years of pioneering effort in the generation of tables of numerical data for science and technology. It constitutes the restructuring, accompanied by extensive revision and expansion of coverage, of the original *TPRC Data Book*, first released in 1960 in loose-leaf format, 11″ × 17″ in size, and issued in June and December annually in the form of supplements. The original loose-leaf *Data Book* was organized in three volumes: (1) metallic elements and alloys, (2) nonmetallic elements, compounds, and mixtures which are solid at N.T.P., and (3) nonmetallic elements, compounds, and mixtures which are liquid or gaseous at N.T.P. Within each volume, each property constituted a chapter.

Because of the vast proportions the *Data Book* began to assume over the years of its growth and the greatly increased effort necessary in its maintenance by the user, it was decided in 1967 to change from the loose-leaf format to a conventional publication. Thus, the December 1966 supplement of the original *Data Book* was the last supplement disseminated by TPRC.

While the manifold physical, logistic, and economic advantages of the bound volume over the loose-leaf oversize format are obvious and welcome to all who have used the unwieldy original volumes, the assumption that this work will no longer be kept on a current basis because of its bound format would not be correct. Fully recognizing the need of many important research and development programs which require the latest available information, TPRC has instituted a *Data Update Plan* enabling the subscriber to inquire, by telephone if necessary, for specific information and receive, in many instances, same-day response on any new data processed or revision of published data since the latest edition. In this context, the TPRC Data Series departs drastically from the conventional handbook and giant multivolume classical works, which are no longer adequate media for the dissemination of numerical data of science and technology without a continuing activity on contemporary coverage. The loose-leaf arrangements of many works fully recognize this fact and attempt to develop a combination of bound volumes and loose-leaf supplement arrangements as the work becomes increasingly large. TPRC's *Data Update Plan* is indeed unique in this sense since it maintains the contents of the TPRC Data Series current and live on a day-to-day basis between editions. In this spirit, I strongly urge all purchasers of these volumes to complete in detail and return the *Volume Registration Certificate* which accompanies each volume in order to assure themselves of the continuous receipt of annual listing of corrigenda during the life of the edition.

The TPRC Data Series consists initially of 13 independent volumes. The initial ten volumes will be published in 1970, and the remaining three by 1972. It is also contemplated that subsequent to the first edition, each volume will be revised, updated, and reissued in a new edition approximately every fifth year. The organization of the TPRC Data Series makes each volume a self-contained entity available individually without the need to purchase the entire Series.

The coverage of the specific thermophysical properties represented by this Series constitutes the most comprehensive and authoritative collection of numerical data of its kind for science and technology.

Whenever possible, a uniform format has been used in all volumes, except when variations in presentation were necessitated by the nature of the property or the physical state concerned. In spite of the wealth of data reported in these volumes, it should be recognized that all volumes are not of the same degree of completeness. However, as additional data are processed at TPRC on a continuing basis, subsequent editions will become increasingly more complete and up to date. Each volume in the Series basically comprises three sections, consisting of a text, the body of numerical data with source references, and a material index.

The aim of the textual material is to provide a complementary or supporting role to the body of numerical data rather than to present a treatise on the subject of the property. The user will find a basic theoretical treatment, a comprehensive presentation of selected works which constitute reviews, or compendia of empirical relations useful in estimation of the property when there exists a paucity of data or when data are completely lacking. Established major experimental techniques are also briefly reviewed.

The body of data is the core of each volume and is presented in both graphical and tabular format for convenience of the user. Every single point of numerical data is fully referenced as to its original source and no secondary sources of information are used in data extraction. In general, it has not been possible to critically scrutinize all the original data presented in these volumes, except to eliminate perpetuation of gross errors. However, in a significant number of cases, such as for the properties of liquids and gases and the thermal conductivity of all the elements, the task of full evaluation, synthesis, and correlation has been completed. It is hoped that in subsequent editions of this continuing work, not only new information will be reported but the critical evaluation will be extended to increasingly broader classes of materials and properties.

The third and final major section of each volume is the material index. This is the key to the volume, enabling the user to exercise full freedom of access to its contents by any choice of substance name or detailed alloy and mixture composition, trade name, synonym, etc. Of particular interest here is the fact that in the case of those properties which are reported in separate companion volumes, the material index in each of the volumes also reports the contents of the other companion volumes.* The sets of companion volumes are as follows:

Thermal conductivity:	Volumes 1, 2, 3
Specific heat:	Volumes 4, 5, 6
Radiative properties:	Volumes 7, 8, 9
Thermal expansion:	Volumes 12, 13

The ultimate aims and functions of TPRC's Data Tables Division are to extract, evaluate, reconcile, correlate, and synthesize all available data for the thermophysical properties of materials with the result of obtaining internally consistent sets of property values, termed the "recommended reference values." In such work, gaps in the data often occur, for ranges of temperature, composition, etc. Whenever feasible, various techniques are used to fill in such missing information, ranging from empirical procedures to detailed theoretical calculations. Such studies are resulting in valuable new estimation methods being developed which have made it possible to estimate values for substances and/or physical conditions presently unmeasured or not amenable to laboratory investigation. Depending on the available information for a particular property and substance, the end product may vary from simple tabulations of isolated values to detailed tabulations with generating equations, plots showing the concordance of the different values, and, in some cases, over a range of parameters presently unexplored in the laboratory.

The TPRC Data Series constitutes a permanent and valuable contribution to science and technology. These constantly growing volumes are invaluable sources of data to engineers and scientists, sources in which a wealth of information heretofore unknown or not readily available has been made accessible. We look forward to continued improvement of both format and contents so that TPRC may serve the scientific and technological community with ever-increasing excellence in the years to come. In this connection, the staff of TPRC is most anxious to receive comments, suggestions, and criticisms from all users of these volumes. An increasing number of colleagues are making available at the earliest possible moment reprints of their papers and reports as well as pertinent information on the more obscure publications. I wish to renew my earnest request that this procedure become a universal practice since it will prove to be most helpful in making TPRC's continuing effort more complete and up to date.

It is indeed a pleasure to acknowledge with gratitude the multisource financial assistance received from over fifty of TPRC's sponsors which has made the continued generation of these tables possible. In particular, I wish to single out the sustained major support being received from the Air Force Materials Laboratory–Air Force Systems Command, the Office of Standard Reference Data–National Bureau of Standards, and the Office of Advanced Research and Technology–National Aeronautics and Space Administration. TPRC is indeed proud to have been designated as a National Information Analysis Center for the Department of Defense as well as a component of the National

*For the first edition of the Series, this arrangement was not feasible for Volume 7 due to the sequence and the schedule of its publication. This situation will be resolved in subsequent editions.

Foreword

In 1957, the Thermophysical Properties Research Center (TPRC) of Purdue University, under the leadership of its founder, Professor Y. S. Touloukian, began to develop a coordinated experimental, theoretical, and literature review program covering a set of properties of great importance to science and technology. Over the years, this program has grown steadily, producing bibliographies, data compilations and recommendations, experimental measurements, and other output. The series of volumes for which these remarks constitute a foreword is one of these many important products. These volumes are a monumental accomplishment in themselves, requiring for their production the combined knowledge and skills of dozens of dedicated specialists. The Thermophysical Properties Research Center deserves the gratitude of every scientist and engineer who uses these compiled data.

The individual nontechnical citizen of the United States has a stake in this work also, for much of the science and technology that contributes to his well-being relies on the use of these data. Indeed, recognition of this importance is indicated by a mere reading of the list of the financial sponsors of the Thermophysical Properties Research Center; leaders of the technical industry of the United States and agencies of the Federal Government are well represented.

Experimental measurements made in a laboratory have many potential applications. They might be used, for example, to check a theory, or to help design a chemical manufacturing plant, or to compute the characteristics of a heat exchanger in a nuclear power plant. The progress of science and technology demands that results be published in the open literature so that others may use them. Fortunately for progress, the useful data in any single field are not scattered throughout the tens of thousands of technical journals published throughout the world. In most fields, fifty percent of the useful work appears in no more than thirty or forty journals. However, in the case of TPRC, its field is so broad that about 100 journals are required to yield fifty percent. But that other fifty percent! It is scattered through more than 3500 journals and other documents, often items not readily identifiable or obtainable. Nearly 50,000 references are now in the files.

Thus, the man who wants to use existing data, rather than make new measurements himself, faces a long and costly task if he wants to assure himself that he has found all the relevant results. More often than not, a search for data stops after one or two results are found—or after the searcher decides he has spent enough time looking. Now with the appearance of these volumes, the scientist or engineer who needs these kinds of data can consider himself very fortunate. He has a single source to turn to; thousands of hours of search time will be saved, innumerable repetitions of measurements will be avoided, and several billions of dollars of investment in research work will have been preserved.

However, the task is not ended with the generation of these volumes. A critical evaluation of much of the data is still needed. Why are discrepant results obtained by different experimentalists? What undetected sources of systematic error may affect some or even all measurements? What value can be derived as a "recommended" figure from the various conflicting values that may be reported? These questions are difficult to answer, requiring the most sophisticated judgment of a specialist in the field. While a number of the volumes in this Series do contain critically evaluated and recommended data, these are still in the minority. The data are now being more intensively evaluated by the staff of TPRC as an integral part of the effort of the National Standard Reference Data System (NSRDS). The task of the National Standard Reference Data System is to organize and operate a comprehensive program to prepare compilations of critically evaluated data on the properties of substances. The NSRDS is administered by the National Bureau of Standards under a directive from the Federal Council for Science and Technology, augmented by special legislation of the Congress of the United States. TPRC is one of the national resources participating in the National Standard Reference Data System in a united effort to satisfy the needs of the technical community for readily accessible, critically evaluated data.

As a representative of the NBS Office of Standard Reference Data, I want to congratulate Professor Touloukian and his colleagues on the accomplishments represented by this Series of reference data books. Scientists and engineers the world over are indebted to them. The task ahead is still an awesome one and I urge the nation's private industries and all concerned Federal agencies to participate in fulfilling this national need of assuring the availability of standard numerical reference data for science and technology.

EDWARD L. BRADY
Associate Director for Information Programs
National Bureau of Standards

Introduction to Volume 8

This volume of *Thermophysical Properties of Matter*, the TPRC Data Series, follows the general format of the volumes on other properties except where departures and innovations were found necessary for the effective presentation of thermal radiative properties.

The volume consists of three major sections: the text on *theory, estimation, and measurement* together with its bibliography, the main body of *numerical data* and its references, and the *material index*.

The text material is intended to assume a role complementary to the main body of numerical data, the presentation of which is the primary purpose of this volume. It is felt that a moderately detailed discussion of the theoretical nature of the properties under consideration together with an overview of predictive procedures and recognized experimental techniques will be appropriate in a major reference work of this kind. The physics and basic concepts of thermal radiation are discussed in detail in the text material accompanying both Volumes 7 and 8. In Volume 8, the text focuses attention on treatment of nonmetallic materials—theory, estimation, and methods of measurement. Sufficient detail is given to make the text materials self-contained but it has been the practice to provide extensive reference citations to lead the interested reader to literature for detailed study.

The main body of the volume consists of the presentation of numerical data compiled over the years in a most comprehensive and meticulous manner. The scope of coverage includes the nonmetallic elements and their compounds, intermetallics, polymers, glasses, and minerals. The extraction of all data directly from their original sources ensures freedom from errors of transcription. Furthermore, some gross errors appearing in the original source documents have been corrected. The organization and presentation of the data together with other pertinent information in the use of the tables and figures are discussed in detail in the text of the section entitled *Numerical Data*.

In addition to the original data presentation in the *Numerical Data* section, the Analyzed Data Graphs will give the user an evaluative review of the data. This analysis work is first a filtering process: it identifies data which are felt to be reliably or typically identified with the materials and gives the user a good feeling of "relief" from the "spaghetti" type of presentation shown in the original or archival data graphs. The analyzed curves are based, in some instances, on experiences of the research team as well as the original data sources. This analysis work is an innovative feature of the radiative properties volumes and should not be considered as recommended reference values identified in other volumes of this Series; the work is intended to make the best reliable data available to the thermal designer.

As stated earlier, all data have been obtained from their original sources and each data set is so referenced. TPRC has in its files all documents cited in this volume. Those that cannot readily be obtained elsewhere are available from TPRC in microfiche form.

This volume has grown out of activities supported principally by the National Aeronautics and Space Administration, Office of Advanced Research and Technology under the monitorship of Mr. Conrad Mook. We wish to acknowledge the benefit of extensive discussions with Mr. D. W. Gates, Space Sciences Laboratory, NASA-MSFC, and Mr. W. F. Carroll, Materials Section, Jet Propulsion Laboratory, who have served in an advisory capacity throughout the progress of work on the thermal radiative properties of Volumes 7, 8, and 9 from the outset.

Over the past five years, many graduate students, research assistants, and technical staff have contributed to the preparation of this volume for varying periods under the authors' supervision. In chronological order of their association with TPRC, we wish to acknowledge the contributions of I. M. Yeyinmen, R. S. Hernicz, B. Compani-Tabrizi, M. C. Muinzer, P. Sioshansi, J. J. Hsia, C. K. Hsieh, R. L. Jones,

K. F. Sohn, and S. L. Miller. Special mention should be made of two of these contributors: Mrs. Sandra L. Miller was responsible for the coordination of data extraction, final organization of the tables, figures, and text, and for the data analysis. Mr. Hernicz participated in nearly all phases of the program since its outset and has made valuable contributions to the data analysis activity in particular.

The authors acknowledge the assistance of Mr. Joseph C. Richmond, National Bureau of Standards, who provided valuable suggestions relating to nomenclature and subproperty classification; many of the ideas in the text portion of Volumes 7 and 8 are a result of his direct contributions.

Inherent in the character of this work is the fact that in the preparation of this volume we have drawn most heavily upon the scientific literature and feel a debt of gratitude to the authors of the referenced articles. While their often discordant results have caused us much difficulty in reconciling their findings, we consider this to be our challenge and our contribution to negative entropy of information, as an effort is made to create from the randomly distributed data a condensed, more orderly state.

While this volume is primarily intended as a reference work for the designer, researcher, experimentalist, and theoretician, the teacher at the graduate level may also use it as a teaching tool to point out to his students the topography of the state of knowledge on the thermal radiative properties of nonmetals. We believe there is also much food for reflection by the specialist and the academician concerning the meaning of "original" investigation and its "information content."

The authors and their contributing associates are keenly aware of the possibility of many weaknesses in a work of this scope. We hope that we will not be judged too harshly and that we will receive the benefit of suggestions regarding major references omitted, additional material groups needing more detailed treatment, improvements in presentation or in recommended values, and, most important, any inadvertent errors. If the Volume Registration Certificate accompanying this volume is returned, the reader will assure himself of receiving annually a list of corrigenda as possible errors come to our attention.

Lafayette, Indiana
February 1971

Y. S. Touloukian
D. P. DeWitt

Contents

*The material index to Volume 9 (another thermal radiative properties companion volume) is not included here due to the sequence schedule of its publication.

3. MIXTURES OF SINGLE OXIDES (continued)

4. MULTIPLE OXIDES AND SALTS

Note: Figure number with "A" indicates analyzed data graph.
* No figure

2. SINGLE OXIDES (continued)

3. MIXTURES OF SINGLE OXIDES

Note: Figure number with "A" indicates analyzed data graph.
* No figure

1. ELEMENTS (continued)

2. SINGLE OXIDES

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1. ELEMENTS (continued)

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2. SINGLE OXIDES (continued)

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2. SINGLE OXIDES (continued)

Note: Figure number with "A" indicates analyzed data graph.
*No figure

5. NONOXIDE COMPOUNDS (continued)

Note: Figure number with "A" indicates analyzed data graph.
* No figure

4. MULTIPLE OXIDES AND SALTS (continued)

5. NONOXIDE COMPOUNDS

Note: Figure number with "A" indicates analyzed data graph.
* No figure

5. NONOXIDE COMPOUNDS (continued)

Note: Figure number with "A" indicates analyzed data graph.
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5. NONOXIDE COMPOUNDS (continued)

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5. NONOXIDE COMPOUNDS (continued)

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5. NONOXIDE COMPOUNDS (continued)

Note: Figure number with "A" indicates analyzed data graph.
* No figure

6. INTERMETALLIC COMPOUNDS

7. NONMETAL-METAL MIXTURES

A. Sintered Pressed Powders

Note: Figure number with "A" indicates analyzed data graph.
* No figure

7. NONMETAL-METAL MIXTURES (continued)

A. Sintered Pressed Powders (continued)

B. Pressed Powders

8. MISCELLANEOUS MIXTURES

* No figure

8. MISCELLANEOUS MIXTURES (continued)

9. GLASSES

* No figure

9. GLASSES (continued)

* No figure

9. GLASSES (continued)

10. MINERALS AND ROCKS

11. POLYMERS

* No figure

11. POLYMERS (continued)

Theory, Estimation, and Measurement

Notation

a	Absorption coefficient
c	Speed of light in a medium
c_0	Speed of light in a vacuum
c_1	Planck's first radiation constant, $2\pi c_0^2 h$
c_2	Planck's second radiation constant, $c_0 h/k$
C_p	Specific heat (constant pressure)
d	Thickness of slab sample
dA	Elemental area on radiating surface
e	Base of natural logarithms
E	Irradiance; Electric field strength
g	Solid angle of cone
h	Planck constant
H	Magnetic field strength
I	Radiant intensity
j	Imaginary unit, Volume spectral emissive power
k	Index of absorption; Boltzmann constant
K^*	Complex dielectric constant
K'	Relative permittivity or real dielectric constant, real part of K^*
K''	Relative loss factor, imaginary part of K^*
L	Radiance
m	Electronic mass
M	Sample mass; Radiant exitance
n	Index of refraction
N	Number density of free electrons
P	Degree of polarization
q	Electronic charge
Q	Radiant energy
R	Reflectance factor; Reflectivity, from Fresnel relations
s	Solar (wavelength distribution)
t	Time; Total (blackbody wavelength distribution)
T	Temperature (absolute); Internal transmittance or transmissivity
v	Volume
W	Radiant density
x	Distance
Z^*	Intrinsic impedance

α	Absorptance; Absorptivity; Plane half angle of right circular cone; Attenuation factor, real part of γ; Angle of incidence
α_s	Solar absorptance
β	Radiance factor; Phase factor, imaginary part of γ; Angle of refraction
γ	Complex propagation factor
ϵ	Emittance; Emissivity
ϵ_0	Permittivity of free space
ϵ^*	Complex permittivity
ϵ'	Real permittivity, real part of ϵ^*
ϵ''	Loss factor, imaginary part of ϵ^*
θ	Angle between surface normal and direction of incident flux, zenith angle, or colatitude
θ'	Angle between surface normal and direction of reflected or emitted flux
λ	Wavelength
$\bar{\lambda}$	Integrated (wavelength distribution)
μ_0	Permeability of free space
μ^*	Complex permeability
ν	Frequency
π	Constant, 3.14159...
ρ	Reflectance; Reflectivity
σ	Stefan–Boltzmann constant
τ	Transmittance
ϕ	Azimuthal angle of incident flux
ϕ'	Azimuthal angle of reflected or emitted flux
Φ	Radiant flux
ω	Solid angle of incident beam; $2\pi \times$ frequency
ω'	Solid angle of reflected or emitted beam

Subscripts

s	Perpendicular polarized component; Solar (spectral distribution)
p	Parallel polarized component
b	Blackbody conditions
λ	Spectral concentration
t	Total (blackbody wavelength distribution)

Thermal Radiative Properties of Nonmetallic Solids

1. INTRODUCTION

Radiation is one of the three fundamental modes of heat transfer, the others being conduction and convection. Radiation differs from the other modes in two important respects: first, no medium is required for the transport of energy by radiation and second, the rate of heat dissipation by radiation varies approximately as the fourth power of the absolute temperature, while that by the other modes varies approximately as the first power of temperature. For these reasons, radiation becomes the dominant mode of heat transfer at high temperatures and in the absence of an atmosphere.

The thermal radiative properties—emittance, reflectance, absorptance, and transmittance—are the parameters which are descriptive of the energy transported by the radiation mode. The properties can be prescribed in greater detail to account for the spectral or wavelength conditions and the geometrical or directional conditions in which the radiant energy interacts with the solid. This interaction can be phenomenologically described by other properties as well, such as the optical constants, complex dielectric constant, or propagation factor, each of which is especially convenient for studying various aspects of the interaction. If the designer is to make effective use of radiative properties data, it is helpful that he be aware of the various thermal radiative and optical properties describing the basic mechanisms of the radiant energy-matter interaction which models the radiative transport process.

There is a marked contrast between the radiative properties of metallic and nonmetallic solids. In the text of the companion Volume 7 [116] of this Series, considerable detail was presented showing that understanding of the basic mechanism of interaction between radiant energy and metallic solids is reasonably well developed. The behavior of the metallic solid is adequately described by the free electron models which indeed are only approximate, but do provide simple and useful tools to the designer. The more sophisticated theories, while not useful as yet for the prediction of numerical values from structural parameters, do provide a means for evaluation of test data and a basis for developing empirical relations to meet specific conditions. Our understanding of the theory of nonmetallic behavior is less well developed. The simplest model ascribes the nonmetallic behavior due to a combination of several types of free electrons and electrons bound to the lattice. The theory is quite useful for basic understanding of behavior but not tractable for direct computation of property values. The problem is further complicated by transparency, scattering phenomena, and temperature gradients within the solid, which can be usually treated only in a gross or oversimplified manner.

The magnitude of the radiative properties of the *metallic* solid is determined to a large extent by the surface condition; due to the large extinction coefficient, radiant energy will not travel more than a few hundred angstroms into the metal before being totally absorbed. As a result, surface roughness, oxide layer formations, structural defects due to mechanical stresses, etc., can be predominating influences on the property variations as a function of wavelength and temperature and most important is the dependence upon the environmental conditions. The *nonmetallic* or dielectric materials are known to be less sensitive to surface conditions; the absorption and emission processes are "bulk" or "volume" phenomena as a significant surface layer of the material is responsible for the behavior. This is a consequence of appreciable transparency of the nonmetallic solid to thermal radiation.

The difficulties of characterizing data—unambiguously relating the measured property data to the conditions of the specimen—and of understanding environmental influences have frequently required the designer to measure the desired property of the actual material (metallic and nonmetallic) as it will be used in the environment of the application. Much of such effort can be reduced through proper use of the extensive compendia presented in this volume; also, through the availability of such a bulk of data, it is likely that attention to the characterization of materials (surfaces) will increase.

The principal differences between developments in the metallic and nonmetallic properties are twofold: (1) the lack of theoretical tools and simplified models for nonmetallic solids as are available for metallic materials and (2) the contributions of the transparency of nonmetallic solids giving rise to "volume" effects rather than "surface" effects which predominate the behavior of metallic solids. In subsequent sections of this text, the more important consequences of these two nonmetallic characteristics will be treated. The presentations will frequently contain remarks contrasting the behavior of metallic and nonmetallic solids. This will be particularly important in the understanding of the property variations with temperature, wavelength, and angular or geometric conditions.

The purpose of this text material is to expose the user to some of the pitfalls and limitations, as well as advantages, in the use of existing data reported in the literature. The text follows along lines similar to that of Volume 7 of this series; the first seven sections are general in character, dealing with basic concepts, laws, definitions, and relations which are applicable to both nonmetallic and metallic solids. Where appropriate, additional remarks pertinent to nonmetallic solids, particularly arising as a consequence of their transparency, are included.

The exposition begins with Section 2 briefly defining the terms—processes, things, quantities, properties, and modifiers—used in discussing thermal radiation phenomena. Following this, Section 3 presents a more rigorous definition of the properties and the notion of their dependency upon wavelength, temperature, polarization, and geometric directions. Section 4 reviews the physics of thermal radiation; then Section 5 discusses the interaction of radiant energy with materials. The interrelations between the properties—as described by geometric and wavelength modifiers—need to be understood in order for the user to synthesize fragments of available data. Section 6 treats the subproperty descriptors and Section 7 discusses the important concepts in their interrelationships.

Theoretical models of nonmetallic solids, Section 8, are presented to relate the structure of the solid to its radiative properties. The simple dielectric solid is first introduced followed by treatment of semitransparent solids and those in which effects due to scattering and absorption are important. These theoretical results are primarily useful for correlation of or consistency checks on data. The problems of measuring the radiative properties of the nonmetallic solids are first discussed in Section 9. Also, a survey of methods of measurement particularly suited to nonmetallics is presented, repeating the treatment of those techniques described in Volume 7 of this Series, the majority of which are equally appropriate to nonmetallic solids. Other methods and apparatus are mentioned to inform the reader regarding conventional approaches used by the experimentalist. It is not the aim here to evaluate and recommend techniques but rather to briefly review the limitations and capability of the various techniques.

The depth of presentation is aimed at the reader with a background in the physics of thermal radiation. For his benefit, an attempt is made to provide general references, usually standard texts or extensive review articles, which are intended to complement the necessarily brief treatment of the subject in this volume. The development of thermal radiation studies over the past years can be followed through the series of conference proceedings, starting as an informal one in 1958 to the annual AIAA meetings in most recent years [4, 5, 8, 18, 57, 58, 68, 98, 105]. The data compilations of references [51, 113, 114] are most useful supplements for property coverage on materials not contained in the data sections of this volume and Volume 7. The TPRC's *Thermophysical Properties Research Literature Retrieval Guide* [115] permits rapid access to the literature on the thermal radiative properties—and eight other thermophysical properties—of all classes of materials. Through these references, the reader will have access to a vital portion of knowledge created in the field of thermal radiation and a better appreciation of the technical problems involved in the application of the basic principles to actual design situations.

2. DEFINITION OF TERMS [59]

A. Processes

Radiation. The process by which radiant energy is emitted by a body, also the process by which energy is transferred in the form of radiant energy.

Reflection. The process by which radiant energy incident on a surface or medium leaves that surface or medium from the incident side.

Transmission. The process by which radiant energy incident on a surface or medium leaves that surface or medium on a side other than the incident side.

Absorption. The process by which radiant energy is converted into another form of energy.

Refraction. The process by which a beam of radiant energy, on transmission through the interface between two media of different indices of refraction, is deviated toward the normal to the interface in the medium of higher index of refraction.

Propagation. The process or processes by which radiant energy is transferred from one point to another in space.

B. Things

Radiator. A source of radiant energy.

Thermal Radiator. A radiator that emits thermal radiant energy, as a consequence of its temperature only.

Blackbody. A body or surface that absorbs all of the radiant energy incident upon it, and emits the maximum possible amount of thermal radiant energy at each frequency for a body at its temperature.

Reflector. A body that reflects incident radiant energy.

Transmitter. A body that transmits incident radiant energy.

Transparent Body. A body which transmits radiant energy directly, without diffusion or scattering, and which has a relatively high transmittance.

Translucent Body. A body which transmits radiant energy principally by diffuse transmission. Objects are not seen distinctly through such a body.

Absorber. A body that absorbs incident radiant energy.

Retroreflector. A reflector that reflects incident radiant energy in directions close to the direction of incidence.

C. Quantities

Radiant Energy, Q. Energy in the form of electromagnetic waves or photons. Joules, ergs, or kilowatt-hours.

Thermal Radiant Energy, Q. Radiant energy that is emitted by a thermal radiator.

Radiant Density, W. $W = dQ/dv$. Radiant energy per unit volume. Joule per cubic meter, erg per cubic centimeter.

Radiant Flux, Φ. $\Phi = dQ/dt$. Time rate of flow of radiant energy. Erg per second, watt.

Radiant Intensity, I. $I = d\Phi/d\omega$. Flux per unit solid angle from a source. Watt per steradian.

Radiance, L. $L = d^2\Phi/d\omega\, dA \cos\theta$. Flux propagated in a given direction, per unit solid angle about that direction and per unit area projected normal to the direction.

Exitance, M. $M = d\Phi/dA$. Flux per unit area leaving a surface.

Irradiance, E. $E = d\Phi/dA$. Flux per unit area incident on a surface.

D. Properties*

Reflectance, ρ. The ratio of reflected flux to incident flux.

Absorptance, α. The ratio of absorbed flux to incident flux.

Transmittance, τ. The ratio of transmitted flux to incident flux.

Internal Transmittance, T. The ratio of the radiant flux reaching the exit surface to the flux which leaves the entry surface of a transparent body.

Emittance, ϵ. The ratio of the radiant exitance of a body at a given temperature to that of a blackbody radiator at the same temperature.

Reflectivity, ρ, ρ_∞. The reflectance of a specimen that has an optically smooth surface and is thick enough to be opaque.

Absorptivity, α, α_∞. The absorptance of a specimen that has an optically smooth surface and is thick enough to be opaque.

Emissivity, ϵ, ϵ_∞. The emittance of a specimen that has an optically smooth surface and is thick enough to be opaque.

Reflectance Factor, R. The ratio of the flux reflected by a specimen under specified conditions of irradiation and viewing to that reflected by the ideal completely reflecting, perfectly diffusing surface, identically irradiated and viewed.

Radiance Factor, β. The ratio of the reflected radiance of a specimen in a given direction under specified conditions of irradiation to that of the ideal completely reflecting, perfectly diffusing surface, identically irradiated.

E. Modifiers

Spectral. For a property, at a given wavelength, designated by (λ) following the symbol for the property. For a quantity, spectral concentration, designated by the subscript λ, such as $\Phi_\lambda = d\Phi/d\lambda$.

*Note: Properties ending in "ance" are properties of real specimens, regardless of thickness or surface condition. Properties ending in "ivity" are intrinsic properties of the material of which the specimen is composed, and can only be approached by values measured on real specimens that have clean optically smooth surfaces and are opaque.

*Total.** Refers to blackbody wavelength distribution. For a quantity, the spectral quantity is integrated and designated by the subscript t. For the property emittance, which is a ratio, the numerator and denominator are integrated separately and designated by the symbol (t) following the property symbol.

Solar. Having the spectral distribution of solar energy, or integrated over the solar spectrum. It is designated by the symbol (s) following the property symbol.

Integrated.† Having a spectral distribution prescribed by integration over some specified portion of the spectrum; designated by the symbol $(\bar{\lambda})$ following the symbol for the property and necessarily some comments regarding the spectrum must be given.

Directional. In a given direction. The direction is completely specified by two angles, θ and ϕ: θ is the angle between the specified direction and the normal to the surface, and ϕ is the azimuth of the specified direction measured from some fiducial mark on the specimen. For quantities, direction is denoted by the subscripts θ, ϕ (ϕ is only required when the surface structure has lay). For properties, the symbols θ, ϕ indicating direction are enclosed in parentheses following the symbol for the property as $(\theta, \phi : \theta', \phi')$, those indicating the incident direction first, followed by a semicolon, then the primed symbols indicating the direction of the reflected or transmitted rays.

Normal. A special case of directional where $\theta = 0°$; in the context of this volume, this modifier includes conditions where $\theta < 15°$, see Section 6.B.a for further detail.

Angular. A more general case of directional where $\theta > 0°$, that is, for cases other than normal; in the context of this volume, this modifier includes $\theta \geq 15°$, see Section 6.B.a for further detail.

Conical.‡ Over a finite solid angle smaller than a hemisphere. Both the size and direction of the solid angle must be specified. If the angle is a right circular cone, the direction is the axis of the cone and is designated by the symbols θ, ϕ as above, and the size is designated by the plane half angle of the cone, α. If the solid angle is not a right circular cone, it must be described in detail in the text and is designated by the symbol g. As above, primed symbols are used to indicate transmitted or reflected beams.

*Hemispherical.** Over a complete hemisphere, designated by the symbol 2π replacing the θ, ϕ, g or θ', ϕ', g' in parentheses following the symbol for the property or quantity.

Specular. In the direction of mirror reflection. Under these conditions, $\theta' = \theta$ and $\phi' = \phi + 180°$.

Diffuse. Applied to a reflector or transmitter: reflecting or transmitting in all directions over a hemisphere. Applied to incident radiant energy, incident from angles over a hemisphere.

Perfectly Diffuse. With equal radiance in all directions from a surface.

*Frequently the modifier *total* is used to include any wavelength distribution including blackbody; in this volume it refers only to blackbody conditions and as such is applicable only to the property emittance.

†This modifier is not in widespread usage but is most convenient for subproperty classification purposes in this volume.

‡Note: Unless otherwise indicated, it is assumed that the incident radiance is uniform over the specified solid angle for conical or hemispherical irradiation. No such assumption is made for emitted, reflected, or transmitted radiance.

3. THERMAL RADIATIVE PROPERTIES†

A. Interrelationships of Properties

All matter is continually emitting radiant energy as a result of the thermal vibration of the particles (electrons, ions, atoms, and molecules) of which it is composed. This process is called thermal radiation, and the radiant energy so emitted is called thermal radiant energy.

Each solid body is not only continually emitting thermal radiant energy, but it is also continually being bombarded by radiant energy from its surroundings, some of which is absorbed. The net rate of heat transfer by radiation to or from the body is equal to the difference in the rates of emission and absorption. Hence, the properties of the body that influence these rates are called thermal radiative properties.

When a body is irradiated, part of the incident radiant energy is reflected, part is absorbed, and the rest is transmitted. Nothing else can happen to it. The incident flux Φ_i is equal to the sum of the reflected flux Φ_r, the absorbed flux Φ_a, and the transmitted flux Φ_t:

$$\Phi_i = \Phi_r + \Phi_a + \Phi_t \tag{1}$$

*Note: Unless otherwise indicated, it is assumed that the incident radiance is uniform over the specified solid angle for conical or hemispherical irradiation. No such assumption is made for emitted, reflected, or transmitted radiance.

†References for general background review are [53, 104, 107, 109, 120].

The reflectance ρ is the ratio of reflected flux to incident flux; the absorptance α is the ratio of absorbed flux to incident flux; and the transmittance τ is the ratio of transmitted flux to incident flux. Dividing both sides of equation (1) by Φ_i gives

$$1 = \rho + \alpha + \tau \tag{2}$$

For opaque materials, $\tau = 0$, hence for such materials

$$\rho + \alpha = 1 \qquad (\tau = 0) \tag{3}$$

Kirchhoff's law states that the absorptance is equal to the emittance

$$\alpha = \epsilon \tag{4}$$

Thus, for an opaque material

$$\rho + \epsilon = 1 \tag{5}$$

and the thermal radiative properties of an opaque body are fully described by either the reflectance or the emittance. However, there are certain restrictions that apply to equations (2) through (5) which will be discussed later.

B. Blackbody Radiation

A blackbody radiator absorbs all radiant energy incident upon it and emits the maximum possible amount of flux per unit area at any given wavelength or wavelength interval for any body at its temperature.

The only true blackbody radiator that exists is a completely enclosed cavity with opaque walls at a uniform temperature. All real materials reflect part of the radiant energy incident upon them and emit less radiant energy than a blackbody radiator at the same temperature. Nevertheless, the concept of a blackbody radiator is indispensable to a discussion of thermal radiation processes. The radiant exitance M (the flux emitted per unit area) of a blackbody radiator is given by the Stefan–Boltzmann equation

$$M = \sigma T^4 \tag{6}$$

in units of watts per square meter, where σ is the Stefan–Boltzmann constant, $5.6697 \times 10^{-8}\ \mathrm{W \cdot m^{-2} \cdot K^{-4}}$ and T is temperature in kelvins. The spectral, or wavelength, distribution of this flux is given by the Planck equation

$$M_\lambda = c_1\lambda^{-5}[e^{c_2/\lambda T} - 1]^{-1} \tag{7}$$

in which M_λ is the spectral exitance in watts per square meter and meter wavelength interval, c_1 is the first radiation constant, $3.7415 \times 10^{-16}\ \mathrm{W \cdot m^2}$, c_2 is the second radiation constant, $1.43879 \times 10^{-2}\ \mathrm{m \cdot K}$, and e is the base of natural logarithms. The geometric distribution of this radiant exitance is given by Lambert's cosine law

$$I_\theta = I_0 \cos\theta \tag{8}$$

in which I_θ is the directional intensity of a plane source in the direction θ (measured from the normal to the surface) and I_0 is the intensity of the source in a direction normal to its surface.

While the radiation laws expressed in equations (6), (7), and (8) apply only to blackbody radiators,* they can be applied to real surfaces by using the emittance as a proportionality factor. For instance, the exitance M of a real specimen is given by

$$M = \epsilon(2\pi; t)\sigma T^4 \tag{9}$$

where $\epsilon(2\pi; t)$ is the hemispherical total emittance of the specimen at temperature T, and the spectral exitance M_λ is given by

$$M_\lambda = \epsilon(2\pi; \lambda)c_1\lambda^{-5}[e^{c_2/\lambda T} - 1]^{-1} \tag{10}$$

where $\epsilon(2\pi; \lambda)$ is the hemispherical spectral emittance of the specimen at wavelength λ and temperature T. The directional radiance L_θ, where θ is the angle from the given direction to the normal to the surface, is given by

$$L_\theta = \epsilon(\theta; t)\pi^{-1}\sigma T^4 \tag{11}$$

where $\epsilon(\theta; t)$ is the total directional emittance in direction θ at temperature T. The directional spectral radiance, $L_{\theta,\lambda}$, of a specimen is given by

$$L_{\theta,\lambda} = \epsilon(\theta; \lambda)\pi^{-1}c_1\lambda^{-5}[e^{c_2/\lambda T} - 1]^{-1} \tag{12}$$

where $\epsilon(\theta; \lambda)$ is the directional spectral emittance of the specimen at wavelength λ and temperature T in the direction θ.

Equations (9), (10), (11), and (12) suggest that the emittance of a specimen may change with wavelength, angle of incidence, and temperature. This is indeed the case. All thermal radiative properties vary with wavelength, direction (measured from the normal to the surface) of the incident or exitant radiant energy, temperature of the specimen, the degree of polarization, and, for polarized incident or exitant flux, with the angle between the plane of polarization and the plane of incidence. The plane of incidence is

*There is a further restriction. These equations apply rigorously only to the case where the blackbody is emitting into a vacuum. When emitting into a medium of index of refraction greater than unity, the emitted flux is increased by n^2, where n is the index of refraction of the medium. The increase in emitted energy when radiating into air ($n = 1.0003$ approx.) is too small to be detected in ordinary measurements.

the plane defined by the direction of the incident ray and the normal to the surface. The modifiers defined in the Definitions of Terms are used to indicate the conditions under which the properties or quantities were evaluated.

The variation of the thermal radiative properties with temperature, wavelength, and geometric conditions (including polarization) of irradiation and viewing poses certain restrictions on equations (2), (3), (4), and (5). For equations (2) and (3) to be valid, α, ρ, and τ must be evaluated under the same conditions, which means that the temperature of the specimen must be the same, and the spectral composition, direction, solid angle, and degree and direction of polarization of the incident radiant energy must be identical, and all of the reflected and transmitted radiant energy must be measured.

C. Kirchhoff's Law

Kirchhoff's law, equation (4), is derived for the condition that the specimen is irradiated in a blackbody cavity with walls at the same temperature as the specimen, which means that the specimen is uniformly irradiated over a hemisphere with unpolarized radiant energy having the spectral distribution of that of a blackbody radiator at the temperature of the specimen. However, it can be proved that equation (4) is also valid for the two conditions: (1) any solid angle less than a hemisphere if the direction and solid angle of the incident beam for the absorption evaluation is identical to the direction and solid angle (but opposite in sense) of the emitted beam for the emittance evaluation, and (2) for plane-polarized radiant energy with the plane of polarization at any given angle to the plane of measurement, provided that it is the same for the incident radiant energy for the absorption evaluation and the emitted radiant energy for the emittance evaluation. Even with these modifications, equation (4) applies strictly only provided the spectral composition of the incident radiant energy for the absorptance is that of blackbody radiant energy at the temperature of the specimen. This would appear to impose a severe restriction on the general applicability of equation (5). However, it can also be shown that equation (4) applies to any small wavelength band, as well as to total blackbody radiant energy. The properties of reflectance, absorptance, and transmittance do not vary with the amount of incident radiant energy until very high flux densities are reached. Within the narrow wavelength band used in measuring spectral thermal radiative properties the spectral distribution of radiant energy from almost any thermal source is approximately the same as that from a blackbody radiator at the temperature of the specimen. Also, polarization effects are completely absent for normally incident radiant energy and are negligible at angles near the normal. Hence equations (4) and (5) can be considered valid for normal spectral properties and can be used to convert normal hemispherical reflectance to normal emittance with but little error.

4. PHYSICS OF THERMAL RADIATION

A. The Nature of Radiant Energy

Radiant energy can be treated in two ways, as electromagnetic waves, or as photons. In both forms it travels in straight lines at the speed of light, which, in vacuum, is a fundamental constant of nature c_0, with a value of $2.997925 \times 10^{10}\ \mathrm{cm \cdot sec^{-1}}$.

Photons are particles of zero rest mass, each of which contains or consists of a fixed amount of energy, called a quantum. Quantum mechanical treatment of photons is the most convenient way of studying the generation and interaction of radiant energy with matter on a micro scale, but interactions on a macro scale are handled more readily by wave mechanics, in which radiant energy is considered as waves.

Electromagnetic waves are characterized by frequency or wavelength and amplitude. Frequency ν and wavelength λ are related by

$$c = \nu\lambda \tag{13}$$

The energy content of a wave is the square of the amplitude.

The frequency ν is constant, regardless of the medium through which the wave is propagated, but the speed and wavelength change with the index of refraction n of the medium

$$n = c_0/c_n = \lambda_0/\lambda_n \tag{14}$$

where λ_n and c_n are the wavelength and speed in the medium of index of refraction n, and λ_0 and c_0 are the corresponding values in vacuum.

Electromagnetic waves consist of magnetic (H) and electric (E) field vectors which successively oscillate in directions perpendicular to the direction of travel and to each other; this is a characteristic of transverse waves as described by the Maxwell equations governing electromagnetic wave phenomena. The plane of polarization of the wave is defined as the plane containing the electric field vector.

If the waves are oriented with their planes of polarization parallel, the beam is *plane polarized*. If the planes are randomly oriented, the wave is termed *unpolarized*. The terms *circularly* or *elliptically* polarized identify other conditions of amplitude and oscillation direction of the electric field. Most practical radiant energy sources and beams within optical systems—particularly after reflectance from a plane surface—are partially polarized; that is, there is a partial, but not complete, preferred orientation of the planes of polarization of the waves making up the beam.

The plane of polarization of such a partially polarized beam is taken as the plane of polarization for which the intensity of the beam is maximum. The degree of polarization P of such a beam is measured as

$$P = \frac{I_p - I_s}{I_p + I_s} \qquad (15)$$

where I_p is the intensity of the beam when polarized parallel to its plane of polarization, and I_s is the intensity when polarized normal to its plane of polarization.

The frequency, and hence the wavelength, of electromagnetic radiation theoretically can vary from zero to infinity. Thermal radiant energy, however, is generally restricted to the wavelength range of 0.1 μm to 1 mm. This overall range has been broken down into seven subranges [59], as follows:

Range	*Designation*	*Wavelength Range, μm*
Ultraviolet	UVC	0.1–0.28
	UVB	0.28–0.315
	UVA	0.315–0.400
Visible	VIS	0.380–0.780
Infrared	IRA	0.78–1.4
	IRB	1.4–3
	IRC	3–1000

B. Basic Laws

The Planck equation, (7), is the basis for all thermal radiation measurements. All of the other important relationships can be derived from this simple equation:

$$M_\lambda = c_1\lambda^{-5}[e^{c_2/\lambda T} - 1]^{-1} \qquad (7)$$

This equation was derived by quantum mechanics. The radiation constants c_1 and c_2 are related to more fundamental constants as follows:

$$c_1 = 2\pi c_0^2 h$$

$$c_2 = c_0 h/k$$

where c_0 is the speed of light in vacuum, h is the Planck constant, 6.6256×10^{-34} J · sec, and k is the Boltzmann constant, 1.38054×10^{-23} J · K^{-1}.

Since for a blackbody radiator, $L = M/\pi$, equation (7) can be rewritten to give spectral radiance:

$$L_\lambda = c_1\pi^{-1}\lambda^{-5}[e^{c_2/\lambda T} - 1]^{-1} \qquad (16)$$

An inspection of equation (16) shows that the right-hand side can be reduced to a single variable, λT, by multiplying both sides of the equation by T^{-5}:

$$L_\lambda T^{-5} = c_1\pi^{-1}(\lambda T)^{-5}[e^{c_2/\lambda T} - 1]^{-1} \qquad (17)$$

Equation (17) shows that the shape of the spectral distribution of the radiance of a blackbody radiator is a function of λT and not of λ and T separately. This is one form of Wien's displacement law, which states that the peak of the spectral distribution curve occurs at a wavelength that is inversely proportional to the absolute temperature. This is shown in Fig. 1. Setting $dL/d\lambda$ equal to zero and solving for $(\lambda T)_{max}$ gives

$$(\lambda T)_{max} = 2898\ \mu\text{m} \cdot \text{K} \qquad (18)$$

which is the Wien displacement equation.

Two other equations were developed prior to the Planck equation and are important not only for their historical significance but also because they are useful approximations in certain wavelength ranges. Both were developed by classical wave mechanics. The first is known as Wien's law, and in its original

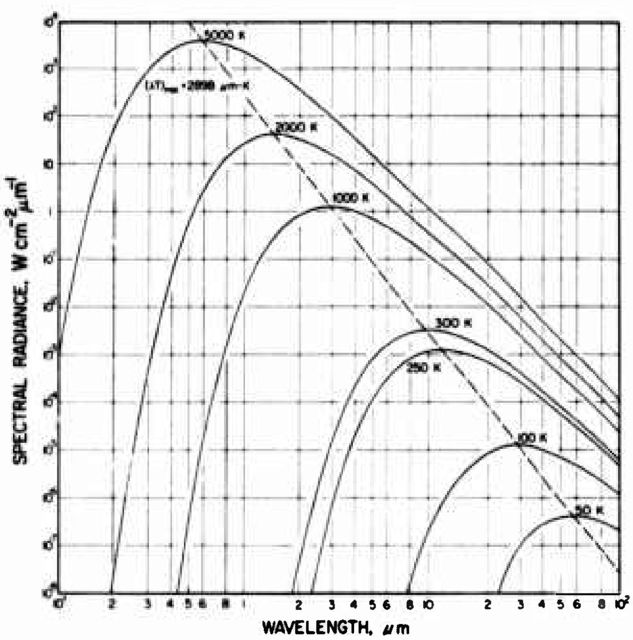


Fig. 1. The Planck distribution law, spectral radiance of blackbody radiation as a function of temperature and wavelength.

form was expressed as

$$L_\lambda = F(\lambda)e^{-f(\lambda)/T} \quad (19)$$

in which $F(\lambda)$ and $f(\lambda)$ were unknown functions of λ. It was later found that the true equation is

$$L_\lambda = c_1\pi^{-1}\lambda^{-5}e^{-c_2/\lambda T} \quad (20)$$

Note that it is identical to the Planck equation except for the minus one in the denominator. This equation is a useful approximation at short wavelengths, and is much used in optical pyrometry. It gives values of L_λ that are too low at long wavelengths. The error is less than 1 percent when λT is less than 2898 μm · K. The second important relation is the Rayleigh–Jeans law, and is expressed as

$$L_\lambda = \frac{c_1 T}{c_2 \pi \lambda^4} \quad (21)$$

Equation (21) is valid at very long wavelengths where $\lambda T > 10{,}000\ \mu$m · K with but small error.

If equation (7) is integrated over all wavelengths,

$$M = \int_0^\infty \frac{c_1\lambda^{-5}\,d\lambda}{e^{c_2/\lambda T}-1} = \frac{\pi^4 c_1}{15c_2^4}T^4 = \sigma T^4 \quad (22)$$

which is equation (6). Thus, σ, the Stefan–Boltzmann constant, is expressed in terms of other constants as

$$\sigma = \frac{\pi^4 c_1}{15c_2^4} = \frac{2k^4\pi^5}{15c_0^2h^3} \quad (23)$$

The fraction of the total exitance of a blackbody at temperature T that is emitted within the wavelength interval 0 to λ, may be obtained as follows. The exitance in the wavelength interval $M_{(0-\lambda)}$ can be expressed as a function of λT:

$$M_{(0-\lambda)} = \int_0^\lambda M_\lambda\,d\lambda = \int_0^\lambda \frac{c_1\lambda^{-5}\,d\lambda}{e^{c_2/\lambda T}-1}$$

$$= \int_0^\lambda \frac{T^5c_1(\lambda T)^{-5}\,d(\lambda T)}{e^{c_2/\lambda T}-1}$$

or

$$M(0-\lambda T) = \int_0^{\lambda T} \frac{T^4c_1(\lambda T)^{-5}\,d(\lambda T)}{e^{c_2/\lambda T}-1}$$

The total exitance is $M_t = \sigma T^4$, thus

$$M(0-\lambda T)/M_t = \int_0^{\lambda T} \frac{T^4c_1(\lambda T)^{-5}\,d(\lambda T)}{e^{c_2/\lambda T}-1} \Big/ \sigma T^4$$

$$= \frac{1}{\sigma}\int_0^{\lambda T} \frac{c_1(\lambda T)^{-5}\,d(\lambda T)}{e^{c_2/\lambda T}-1} \quad (24)$$

Substituting M_λ within the integral for its equivalent,

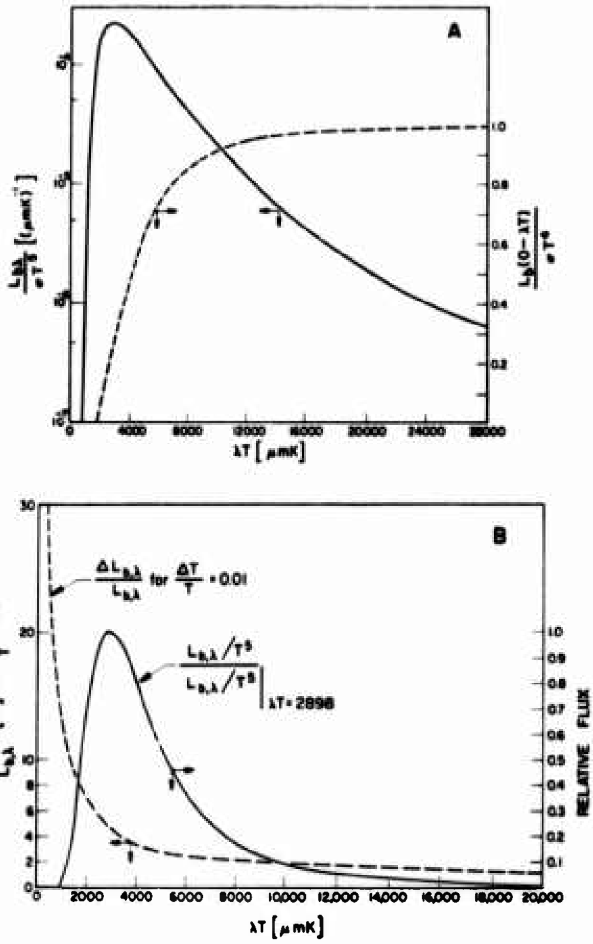


Fig. 2. (A) Relative spectral radiance of blackbody radiation as a function of λT, solid curve; and fraction of spectral radiance in the wavelength interval 0–λT, dashed curve. (B) Relative spectral radiance of blackbody radiation as a function of λT, solid curve; and percentage increase in spectral radiance produced by a 1% increase in absolute temperature as a function of λT, dashed curve.

$c_1\lambda^{-5}/(e^{c_2/\lambda T}-1)$, gives

$$M(0-\lambda T)/M_t = \frac{1}{\sigma T^5}\int_0^{\lambda T} M_{\lambda T}\,d(\lambda T) \quad (25)$$

Since for blackbody $M = \pi L$, then equation (25) is equally valid if L is substituted for M wherever it occurs.

The ratio $L(0-\lambda T)/L_t$ or $M(0-\lambda T)/M_t$ is given in Table I for various values of λT.* The fraction of the total exitance or radiance of a blackbody at temperature T, occurring in any wavelength interval λ_1 to λ_2 ($\lambda_2 > \lambda_1$) may be obtained by subtracting the value from the table for $\lambda_1 T$ from that for $\lambda_2 T$. The

*See also [96] for more detailed tables which, however, were computed with older set of radiation constants $c_1 = 3.7413 \times 10^{-16}$ W · m^2 and $c_2 = 1.4380 \times 10^{-2}$ m · K.

Table 1. Blackbody Radiation Functions

λT, $\mu m \cdot K$	$L_{b,\lambda}/\sigma T^5$, $m^{-1} \cdot K^{-1} \cdot sr^{-1}$		$\pi L_b(0 - \lambda T)/\sigma T^4$		$L_{b,\lambda}/(L_{b,\lambda})_{\lambda T = 2898}$	
	p	q	p	q	p	q
200	0.375195	−21	0.341796	−26	0.519451	−23
400	0.490424	−7	0.186468	−11	0.678981	−9
600	0.104056	−2	0.929299	−7	0.144064	−4
800	0.991183	−1	0.164351	−4	0.137277	−2
1000	0.118508	+1	0.320780	−3	0.164072	−1
1200	0.523935	+1	0.213431	−2	0.725376	−1
1400	0.134411	+2	0.779084	−2	0.186089	0
1600	0.249128	+2	0.197204	−1	0.344913	0
1800	0.375563	+2	0.393449	−1	0.519959	0
2000	0.493422	+2	0.667347	−1	0.683133	0
2200	0.589636	+2	0.100897	0	0.816338	0
2400	0.658848	+2	0.140268	0	0.912161	0
2600	0.701271	+2	0.183135	0	0.970894	0
2800	0.720216	+2	0.227908	0	0.997123	0
2898	0.722294	+2	0.250126	0	0.100000	+1
3000	0.720229	+2	0.273252	0	0.997142	0
3200	0.705948	+2	0.318124	0	0.977369	0
3400	0.681517	+2	0.361760	0	0.943546	0
3600	0.650369	+2	0.403633	0	0.900422	0
3800	0.615199	+2	0.443411	0	0.851730	0
4000	0.578040	+2	0.480907	0	0.800283	0
4200	0.540370	+2	0.516046	0	0.748131	0
4400	0.503231	+2	0.548830	0	0.696712	0
4600	0.467321	+2	0.579316	0	0.646996	0
4800	0.433089	+2	0.607597	0	0.599602	0
5000	0.400794	+2	0.633786	0	0.554890	0
5200	0.370562	+2	0.658011	0	0.513035	0
5400	0.342428	+2	0.680402	0	0.474084	0
5600	0.316361	+2	0.701090	0	0.437994	0
5800	0.292287	+2	0.720203	0	0.404664	0
6000	0.270108	+2	0.737864	0	0.373958	0
6200	0.249710	+2	0.754187	0	0.345718	0
6400	0.230973	+2	0.769282	0	0.319777	0
6600	0.213775	+2	0.783248	0	0.295967	0
6800	0.197997	+2	0.796180	0	0.274123	0
7000	0.183524	+2	0.808160	0	0.254085	0
7200	0.170247	+2	0.819270	0	0.235703	0
7400	0.158065	+2	0.829580	0	0.218837	0
7600	0.146883	+2	0.839157	0	0.203356	0
7800	0.136614	+2	0.848060	0	0.189139	0
8000	0.127177	+2	0.856344	0	0.176075	0
8500	0.106766	+2	0.874666	0	0.147816	0
9000	0.901414	+1	0.890090	0	0.124798	0
9500	0.765296	+1	0.903147	0	0.105953	0
10000	0.653243	+1	0.914263	0	0.904400	−1
10500	0.560490	+1	0.923775	0	0.775987	−1
11000	0.483294	+1	0.931956	0	0.669110	−1
11500	0.418701	+1	0.939027	0	0.579683	−1
12000	0.364373	+1	0.945167	0	0.504466	−1
13000	0.279441	+1	0.955210	0	0.386880	−1
14000	0.217628	+1	0.962970	0	0.301301	−1
15000	0.171855	+1	0.969056	0	0.237930	−1
16000	0.137421	+1	0.973890	0	0.190257	−1
18000	0.908187	0	0.980939	0	0.125736	−1
20000	0.623273	0	0.985683	0	0.862908	−2
25000	0.276458	0	0.992299	0	0.382750	−2
30000	0.140461	0	0.995427	0	0.194465	−2
40000	0.473862	−1	0.998057	0	0.656052	−3
50000	0.201592	−1	0.999045	0	0.279100	−3
75000	0.418572	−2	0.999807	0	0.579503	−4
100000	0.135744	−2	1.000000	0	0.187934	−4

Note: Value in each case is $p \times 10^q$.

value for the exitance $M([\lambda_1 - \lambda_2]T)$ may be obtained by multiplying the resulting value by σT^5, and the radiance $L([\lambda_1 - \lambda_2]T)$, by multiplying the value by $\sigma T^5/\pi$.

Figure 2A is a plot of the ratio $L_{(0-\lambda)T}/\sigma T^4$, dotted line, and $L_\lambda/\sigma T^5$, solid line, both plotted as a function of λT.

Another useful relationship is the fractional change in L_λ or M_λ produced by a fractional change in the temperature T of a blackbody radiator. Differentiating equation (16) with respect to T gives

$$\frac{dL_\lambda}{L_\lambda} \Bigg/ \frac{dT}{T} = (c_2/\lambda T)\frac{e^{c_2/\lambda T}}{e^{c_2/\lambda T} - 1} \tag{26}$$

This ratio is plotted as a function of λT in Fig. 2B, dotted line, and shows that the change in spectral radiance with temperature increases with decrease in λT, particularly at values of λT below 2898 $\mu m \cdot K$. The term on the right of equation (26) can be simplified to $c_2/\lambda T$ for use at $\lambda T < 2898$ $\mu m \cdot K$ with an error of considerably less than 1 percent. Again the equation applies to either spectral radiance L_λ or spectral exitance M_λ.

The value of the right side of equation (26) can be used for the exponent x in the relationship

$$L_\lambda \sim T^x \tag{27}$$

which is a good approximation when the change in temperature is a small fraction of T. Again M_λ can be substituted for L_λ in equation (27). The value of x is 5.0 at 2898 $\mu m \cdot K$, and varies as $1/\lambda T$, hence is about 10 at 1500 $\mu m \cdot K$, 15 at 1000 $\mu m \cdot K$, and 2.5 at 6000 $\mu m \cdot K$.

The relationship shown in equation (26) and plotted in Fig. 2B is extremely important to remember in making measurements of L_λ by direct comparison of the radiance of a hot specimen to that of a blackbody radiator at the same temperature; it shows the effect of a small temperature difference on the accuracy of the results obtained.

5. INTERACTION OF RADIANT ENERGY WITH MATTER

A. Wave Behavior [9, 40]

When an electromagnetic wave in vacuum is incident on the plane surface of an optically homogeneous specimen, interaction of the wave with the material of the specimen will occur. The electrical and magnetic properties of the specimen will be different from those of the vacuum, and as a result, there may be a change in the direction of propagation of the wave, its velocity, amplitude, wavelength, and phase, and it may be separated into two portions, one reflected and one transmitted. The transmitted portion will be partially or totally absorbed. The only property of the wave that never changes is its frequency.

Similar changes in the wave will occur whenever it is incident on an interface between two media of different properties. The changes can be computed from the properties of the material, or the differences in properties on the two sides of the interface, and from the direction of propagation of the wave relative to the interface and the direction of its plane of polarization relative to the plane containing the direction of incidence and the normal to the interface at the point of incidence.

B. Optical Properties [46]

The Maxwell equations describe the change in a wave as it crosses an interface and propagates into the material:

$$E = E_0 \exp(j\omega t - \gamma x) \tag{28}$$

where

$$\gamma = \alpha + j\beta \tag{29}$$

Equation (28) indicates that the electric field vector E_0 at the interface where $x = 0$ (x is the distance from the interface in the material) is attenuated on penetrating into the material by an amount α and that a phase change β has occurred in crossing the interface. Thus, two parameters (or one complex one) of the material are needed to define the changes in amplitude and phase which occur in crossing the interface.

Many different sets of parameters, called optical properties in this discussion, can be found in the literature, each having some merit in interpreting the interaction of a wave with a material. Table II presents several of the more commonly used optical properties, together with a brief description and summary of their interrelationship.

C. Thermal Radiative Properties

The optical properties describe the interaction of an electromagnetic wave with matter in terms of phase and amplitude, while the thermal radiative

Table II. Parameters and Relations Descriptive of Electromagnetic Wave–Material Interaction

Complex permittivity	$\epsilon^* = \epsilon' - j\epsilon''$	ϵ'—Real permittivity ϵ''—Loss factor
Complex permeability	$\mu^* = \mu_0$	Valid assumption for almost all applications
Complex propagation factor	$\gamma = \alpha + j\beta$	α—Attenuation factor β—Phase factor
Complex dielectric constant	$K^* = \dfrac{\epsilon^*}{\epsilon_0} = K' - jK''$	K'—Relative permittivity or real dielectric constant K''—Relative loss factor
Complex index of refraction	$n^* = n - jk$	n—Index of refraction, ratio of phase velocities k—Index of absorption
Intrinsic impedance	$Z^* = \sqrt{\dfrac{\mu^*}{\epsilon^*}}$	Z^*—Ratio of electric to magnetic field vectors
Normal spectral reflectivity	$\rho(0;\lambda) = \dfrac{(n-1)^2 + k^2}{(n+1)^2 + k^2}$	Ratio of squares of the electric field vector of reflected and incident waves
$\gamma = j\omega(\epsilon^*\mu^*)^{1/2}$	$n^* = \sqrt{K^*}$	$\epsilon^* = \epsilon_0\left(1 - j\dfrac{1}{\omega r}\right)$

properties describe the energy transfer during the interaction. It is obvious that the two types of properties, optical and thermal radiative, are related. In some cases the relationships are simple.

One situation in which the relation is not simple is that for the general case of a wave incident on an interface. By solving the Maxwell equations for the boundary conditions, the Fresnel relations for specular reflection can be derived. The specular reflectance at the interface (fraction of incident flux reflected in the direction of mirror reflectance) is given as

$$\rho_s(\theta) = \frac{a^2 + b^2 - 2a\cos\theta + \cos^2\theta}{a^2 + b^2 + 2a\cos\theta + \cos^2\theta} \tag{30}$$

$$\rho_p(\theta) = \rho_s(\theta)\frac{a^2 + b^2 - 2a\sin\theta\tan\theta + \sin^2\theta\tan^2\theta}{a^2 + b^2 + 2a\sin\theta\tan\theta + \sin^2\theta\tan^2\theta} \tag{31}$$

where

$$2a^2 = [(n^2 - k^2 - \sin^2\theta)^2 + 4n^2k^2]^{1/2} + (n^2 - k^2 - \sin^2\theta) \tag{32}$$

$$2b^2 = [(n^2 - k^2 - \sin^2\theta)^2 + 4n^2k^2]^{1/2} - (n^2 - k^2 - \sin^2\theta) \tag{33}$$

The angle θ is the angle between the incident ray and the normal to the interface, ρ_s is the reflectance for plane-polarized incident radiant energy with its plane of polarization normal to the plane of incidence (the plane containing the incident ray and the normal to the interface at the point of incidence), and ρ_p is the reflectance for plane-polarized incident radiant energy with its plane of polarization parallel to the plane of incidence.

If the incident radiant energy is completely unpolarized, it can be shown that

$$\rho(\theta) = \tfrac{1}{2}[\rho_s(\theta) + \rho_p(\theta)] \tag{34}$$

The Fresnel equations, (30) and (31), have been expressed in terms of n and k, but the relations are found in various forms in the literature. The simplest case occurs for normal incidence ($\theta = 0$), where the equations reduce to

$$\rho_p(0) = \rho_s(0) \tag{35}$$

and

$$a = n \qquad b = k \tag{36}$$

Hence, for radiant energy incident from vacuum or a medium of index of refraction of 1,

$$\rho(0) = \frac{(n-1)^2 + k^2}{(n+1)^2 + k^2} \tag{37}$$

The above relations express the energy transfer in terms of electromagnetic wave theory, and no specification of the material, other than its optical properties n and k, is necessary. As indicated previously, the reflected, absorbed, and transmitted flux sum to the incident flux, hence

$$\rho + \tau + \alpha = 1 \tag{2}$$

6. DETAILED DISCUSSION OF THERMAL RADIATIVE PROPERTIES

A. Primary Properties

The primary properties—emissivity, reflectivity, absorptivity and transmissivity—have been previously introduced. The suffix *ivity* denotes the property of the ideal material—optically smooth and homogeneous. For metallic materials that are neither smooth nor homogeneous, the radiative parameters are not unique properties of the bulk material, but rather are properties of the surface. In these more frequent situations the properties are denoted by the suffix *ance* and hereafter the properties are referred to and defined as follows:

- ϵ, emittance —Ratio of the radiant exitance of the specimen to that emitted by a blackbody radiator at the same temperature and under the same geometric and wavelength conditions.
- ρ, reflectance —Ratio of the reflected radiant flux to the incident flux.
- α, absorptance —Ratio of absorbed radiant flux to the incident flux.
- τ, transmittance—Ratio of some specified portion of the transmitted flux to the incident radiant flux.

For each of these primary properties, it is necessary to specify the geometric and wavelength conditions to which the particular property corresponds. Unfortunately, there is no generally accepted convention on the choice of symbols or terminology to describe these conditions. After due consideration and consultation, a nomenclature system suitable to classification needs in the organization of this compendium was adopted. To assist the reader, the system used in this volume will be fully explained and then related when appropriate to the various terminologies found in the literature [59, 67, 84, 117].

B. Subproperty Descriptors

a. Geometric Descriptors

Figure 3 shows the general case of reflection at a surface and indicates the necessary geometric parameters required to fully describe the incident and reflected fluxes. The beams representing the incident or viewed flux are described by the zenith angles for θ or θ' and by the beam solid angles ω or ω'. The longitudinal angles ϕ and ϕ' relate the axes of the beams to each other and some reference line on the specimen; as a practical matter very few measurements so specify this angular descriptor. It is the convention in this volume to distinguish three sets of conditions as follows:

Normal	—Conditions for incidence and/or viewing through a solid angle ω or ω', normal to the specimen; that is θ or $\theta' < 15°$.
Angular	—Conditions for incidence and/or viewing through a solid angle ω or ω' at some direction specified by θ or $\theta' \geq 15°$
Hemispherical	—Conditions for incidence and/or viewing of flux over a hemispherical region; that is ω or $\omega' = 2\pi$

The descriptors normal and angular do not fully describe the geometric conditions; ω and/or ω' and θ and/or θ' must be provided to fully specify the geometry.

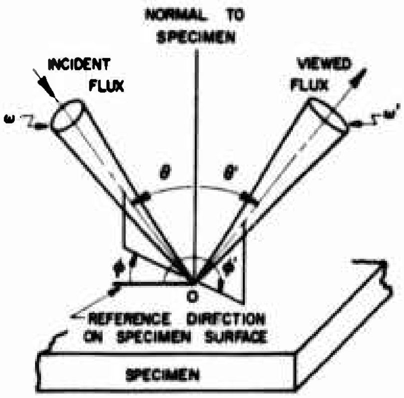


Fig. 3. Geometric parameters descriptive of reflection from a surface: θ is the zenith angle, or colatitude, in degrees; ϕ is the azimuthal angle, or longitude, in degrees; ω is the beam solid angle, in steradians; and the symbol $'$ refers to viewing conditions.

It has been suggested that other descriptors be used to indicate the two extreme conditions for ω or ω'. If the incident or viewed beam is parallel, then ω or $\omega' = 0$; this condition can be approximated in practice where ω or ω' is so small that slight increases have no influence. In this case, the term *directional* is used and when ω or ω' is not negligible, the term *conical* is applied. As a practical matter for categorization of subproperties, only the terms *normal*, *angular*, and *hemispherical* are separately distinguished in the subsequent data tables. Whenever information is given on ω or ω', it is reported in an appropriate column. To a great many thermophysicists details on ω or ω' may not be essential, but they should be fully aware that such information is available.

For the subproperties of emittance and absorptance, only one geometric descriptor is required to designate the conditions of viewing and incidence, respectively. For the subproperties of reflectance and transmittance, two geometric descriptors are required since both incidence and viewing conditions need to be specified. While the three descriptors selected for categorization are not fully descriptive, they give good practical resolution from a classification and retrieval viewpoint.

b. Wavelength Descriptors

These descriptors indicate spectral or wavelength conditions for which the subproperties are specified. Each of the four prime properties needs to be characterized by the wavelength conditions of the radiant flux—emitted, incident, reflected, or transmitted. The following terminology is used in this volume to refer to the common conditions:

Spectral	—For a very narrow band of wavelengths, also referred to as monochromatic; no maximum band width criteria has been established by convention; symbolically denoted by λ.
Total	—Refers to blackbody wavelength distribution; this descriptor is applicable only to emittance; symbolically denoted by t. The temperature of the black body should be given, since spectral distribution varies with temperature.

The properties, being dimensionless ratios, cannot be integrated. The term *integrated*, when applied to such ratios, means that the numerator and denominator are integrated separately, then divided. An "integrated" ratio can also be thought of as a weighted average, where the weighting factor is the spectral distribution of the source, or blackbody in the case of emittance.

Integrated—Relative to some specified wavelength distribution of the irradiating source or some specified broad band; for such subproperties it is necessary that details of the spectral characteristics of the source be fully presented; symbolically denoted by $\bar{\lambda}$.

Solar —Having the wavelength distribution of the sun; the solar distribution can be either natural or artificial—lamps, arcs, etc., in which case the nature of the source needs to be specified; symbolically denoted by s.

In a later section, interrelationships between the various wavelength conditions will be discussed with a view to exposing the reader to methods of computing the subproperties from fragments of other subproperty data.

c. Symbolic Representation

In subsequent discussion the various subproperties are expressed according to the following convention. The symbols for the four primary properties—ϵ, ρ, α, and τ—have already been presented. The geometric (incidence and viewing condition) and wavelength descriptors, in that same order, are symbolically represented within the parentheses being separated by semicolons. The most general case would be (using reflectance as an example):

$$\rho(\theta, \phi, \omega; \theta', \phi', \omega'; \lambda)$$

where the wavelength descriptors used in this text are λ, t, $\bar{\lambda}$, and s indicating spectral conditions previously defined.

As a practical matter not all the designations are always needed and many are omitted for convenience sake; usually ϕ and ϕ' are not used and, of course, for emittance and absorptance, the incidence and viewing geometry symbols, respectively, are not applicable.

C. Reflectance Factor

The *reflectance factor* R is defined as the ratio of the flux reflected by a specimen under specified geometric conditions of irradiation and viewing to that reflected by the ideal completely reflecting, perfectly diffusing surface, under identical conditions of irradiation and viewing [67]. A perfectly diffusing surface is defined as a surface whose reflected radiance is independent of direction of viewing and hence obeys Lambert's law.

Reflectance factor is relatively easy to measure because comparatively simple equipment can be used. Integrating sphere reflectometers are frequently used for these measurements. While the ideal completely reflecting, perfectly diffusing surface does not exist, several materials can be used that are reasonably close approximations to such a surface. Examples are freshly smoked magnesium oxide, magnesium carbonate, high-purity barium sulphate, sodium chloride, flowers of sulphur, and some good white paints [1, 50, 76]. For those conditions where the specimen is diffusely irradiated over a hemisphere, a high-quality first-surface mirror can be used as the reference standard. When integrating sphere reflectometers are used, the sphere coating itself may be used as the reference.

Integrating sphere reflectometers are generally restricted to operation over the solar range (0.25 to 2.5 μm) where conventional sphere coatings such as smoked magnesium oxide and barium sulphate have high reflectance. Operation has been extended farther into the infrared by use of flowers of sulfur and sodium chloride sphere coatings.

Reflectometers such as the hohlraum reflectometer, where the specimen is irradiated over a hemisphere, actually measure reflectance factor. This also applies to the ellipsoidal mirror, paraboloidal mirror, and Coblentz hemisphere reflectometers when used in the inverse mode, so that the specimen is irradiated over a hemisphere.

The primary distinction between true reflectance and reflectance factor measurements is that in true reflectance measurements the incident flux is measured directly, then the reflected flux is measured directly, and the reported reflectance is the ratio of the second measured value to the first. In reflectance factor measurements either (1) the incident flux is measured indirectly by measuring the flux reflected by a diffusely reflecting standard, or (2) the radiance of the flux incident on the specimen is measured over a small solid angle, either by viewing the source directly as in a hohlraum, or by viewing it indirectly by use of a mirror standard, as in the ellipsoidal mirror, paraboloidal mirror, or Coblentz hemisphere instruments.

Reflectance factor data are useful to the thermophysicist, because for a diffuse reflector the reflectance factor measured under any given geometric conditions of irradiation and viewing is a good estimate of the reflectance of the specimen measured under the same conditions of irradiation, but with hemispherical viewing. The error in the estimate is zero if the specimen is a perfectly diffuse reflector, and increases with both the departure of the specimen from a perfectly diffuse reflector and with the variation of the solid angle of viewing from a hemisphere.

The fundamental relationship by the use of which the various types of reflectance and reflectance factor can be related to each other is [35]

$$\frac{\rho(\theta_1, \phi_1, \omega_1 ; \theta_2, \phi_2, \omega_2)}{\cos \theta_2 \omega_2} = \frac{\rho(\theta_2, \phi_2, \omega_2 ; \theta_1, \phi_1, \omega_1)}{\cos \theta_1 \omega_1} \tag{38}$$

where the bidirectional reflectance, $\rho(\theta, \phi, d\omega ; \theta', \phi', d\omega')$ is defined as

$$\rho(\theta, \phi, d\omega ; \theta', \phi', d\omega') = \frac{L'(\theta', \phi') \cos \theta' \, d\omega'}{L(\theta, \phi) \cos \theta \, d\omega} \tag{39}$$

where L is the radiance of the beam incident on the specimen over the elementary solid angle $d\omega$ from direction θ, ϕ, and L' is the reflected radiance of the specimen over the elementary solid angle $d\omega'$ in the direction θ', ϕ'. The geometry for equations (38) and (39) is shown in Fig. 3.

The only restriction on the general application of equation (38) to solid angles of any size is that L, the incident radiance, must not vary with angle over the solid angle of incidence in either case.

By the use of equation (38) it can be shown that the following relationships hold:

$$R(2\pi ; \theta', \omega') = R(\theta, \omega ; 2\pi) \tag{40}$$

where $\theta = \theta'$ and $\omega = \omega'$.

$$\rho(2\pi ; 2\pi) = R(2\pi ; 2\pi) \tag{41}$$

$$\rho(\theta, \omega ; 2\pi) = R(\theta, \omega ; 2\pi) \tag{42}$$

where θ and ω are the same for ρ and R.

$$R(\theta_1, \omega_1 ; \theta_2, \omega_2) = R(\theta_2, \omega_2 ; \theta_1, \omega_1) \tag{43}$$

$$\rho(\theta, \omega ; \theta', \omega') = \frac{\omega' \cos \theta'}{\pi} R(\theta, \omega ; \theta', \omega') \tag{44}$$

where for large solid angles, $\omega' \cos \theta' = \int_{\omega'} \cos \theta' \cdot \sin \theta' \, d\theta' \, d\phi'$.

7. INTERRELATIONSHIP BETWEEN PROPERTIES

A. Geometric Relations

In many cases, the data required for a specific application will not be available in the literature. In some of these cases, it is possible to obtain the desired data from other subproperties that may be available for the same or a similar material by judicious use of the relationships previously mentioned and realistic estimates of the geometric distribution of the reflected or emitted radiant energy.

The geometric distribution of the radiant energy emitted or reflected from the surface of a nonmetal is nearly constant over the hemisphere. The emittance of a typical nonconductor, for either spectral or total wavelength conditions, is constant to an angle of incidence of nearly 70° and then drops off rapidly toward grazing conditions. The distribution is in general not affected by the surface roughness, since, as will be discussed in some detail later, the radiative behavior is dependent upon conditions at a plane below the surface, which is usually at some appreciable depth [39, 100]. The common notion that nonmetals are diffuse emitters is reasonable and follows directly from the simple theory of dielectric materials and the Fresnel relations. In contrast, the behavior of metals is quite the opposite. The radiance of a smooth metal surface increases with angle from the normal to a maximum somewhere less than 90° and then drops to zero at grazing conditions. Only for angles of 10 to 15° from the normal is it reasonable to assume that the geometric distribution of emitted or reflected flux is constant. As the metallic surface is roughened, the distribution changes markedly until it resembles a diffuse (not totally Lambertian) emitter or reflector. The high sensitivity of the radiative properties to surface effects is a characteristic of metals, but is not a serious consideration for nonmetals.

The two extremes for geometric distribution of reflected flux are specular and diffuse reflection; these are the useful limits for the treatment of real materials. The equations below can be applied for converting data from one set of geometric parameters to another. Additional detail is given in references [109] and [61]. Reference [67] treats the reflectance and reflectance-factor subproperties.

From Kirchhoff's law [equations (4) and (5)]

$$\epsilon = \alpha = 1 - \rho \tag{45}$$

Equation (45) is restricted by the geometric and wavelength distribution of the reflected and emitted radiant energy. Considering the geometric distribution only, for opaque specimens

$$\alpha(\theta, \omega) = 1 - \rho(\theta, \omega ; 2\pi) \tag{46}$$

where θ, ω are the same for α and ρ, and

$$\epsilon(\theta', \omega') = \alpha(\theta, \omega) \tag{47}$$

where $\theta = \theta'$ and $\omega = \omega'$. Equation (46) was derived on the basis of conservation of energy. Incident radiant energy that is not reflected must be absorbed and equation (47) is a statement of Kirchhoff's law. Equations (46) and (47) can be used to convert one type of data (subproperty) to another. If normal emittance data are not available, for instance, normal absorptance or normal hemispherical reflectance can be used to compute the desired values.

In the classification system used in the data section of this volume, reflectance and transmittance subproperties are grouped (geometrically) by common incidence conditions. The relations which can be used to compute one subproperty of reflectance from another for different geometric conditions are as follows:

For perfectly diffuse reflecting surfaces

$$\rho(\theta, \omega; 2\pi) = \text{constant, for all } \theta \tag{48}$$

$$\rho(\theta, \omega; 2\pi) = \frac{\pi}{\omega' \cos\theta'} \rho(\theta, \omega; \theta', \omega') \tag{49}$$

where θ and ω are the same on both sides of the equation.

$$R(\theta_1, \omega_1; \theta'_1, \omega'_1) = R(\theta_2, \omega_2; \theta'_2, \omega'_2) \tag{50}$$

where θ_1 and θ_2, θ'_1 and θ'_2, ω_1 and ω_2, ω'_1 and ω'_2 can have any values.

For perfectly specular reflecting surfaces

$$\rho(\theta, \phi, \omega; 2\pi) = \rho(\theta, \phi, \omega; \theta', \phi', \omega') \tag{51}$$

if and only if $\theta' = \theta$, $\phi' = \phi + \pi$ and $\omega' \geq \omega$.

To compute one subproperty of emittance from another, for different geometric conditions, the following equation may be used.

$$\epsilon(2\pi) = \frac{\int_{\theta=0}^{\pi/2} \int_{\phi=0}^{2\pi} L_b \epsilon(\theta', \phi', \omega') \cos\theta' \sin\theta' \, d\theta' \, d\phi'}{\pi L_b} \tag{52}$$

This equation is sometimes written

$$\epsilon(2\pi) = \frac{1}{\pi} \int_{\frown} \epsilon(\theta', \omega') \cos\theta' \, d\omega' \tag{53}$$

For a perfectly diffuse emitter, which may be approximated by the typical nonconductor or a roughened metal surface,

$$\epsilon(2\pi) = \epsilon(\theta', \omega') = \epsilon(0, \omega') \tag{54}$$

As a matter of convenience and practicality in much of the development for theoretical relations, little attention has been given to specification of the solid angles of irradiation or viewing (ω or ω'). Two cases appear in the literature distinguishing the importance of the relative size of the solid angle. The term *conical* is applied when the solid angle is sufficiently large that there is a variation of radiance across the front of the solid angle. In the limit when the solid angle is 2π, the term *hemispherical* has been used. The term *directional* is applied when the solid angle is so small that there is insignificant variation of the radiance within this solid angle. This concept is carried through the literature for bidirectional reflectance [$\rho(\theta, \omega; \theta', \omega')$ where $\omega = \omega' \cong 0$] and directional emittance [$\epsilon(\theta', \omega')$ where $\omega' \cong 0$].

More detailed considerations of angular or geometric relations for the reflectance (and transmittance) properties utilize the concept of a distribution function [79]. This function permits computation of any of the various geometric subproperties of reflectance. There are not too many instances where such a function is available in the literature and normally there are insufficient fragments of subproperty data available to permit one to formulate it.

B. Wavelength Relations

The four specific wavelength conditions identified in the data section of this volume have been defined earlier as: spectral (λ), total (t), integrated ($\bar{\lambda}$), and solar (s). Straightforward methods can be used to obtain one subproperty from another, although in some instances the calculations can be laborious.

The interrelation between *spectral* and *total* emittance which follows directly from their definitions is

$$\epsilon(t) = \frac{\int_0^\infty \epsilon(\lambda) M_b(\lambda, T) \, d\lambda}{\int_0^\infty M_b(\lambda, T) \, d\lambda} \tag{55}$$

If the function $\epsilon(\lambda)$ can be simply prescribed, the integration can be performed by a numerical technique on a high-speed computer. In practice, it is convenient to redefine the limits of integration to correspond to the wavelength limits between which some specific fraction of the total energy is found.

The Planck blackbody function indicates the distribution of energy throughout the spectrum. From such considerations, Fig. 4 is derived with the cross-hatched region indicating the wavelength band encompassing 99 percent of the flux emitted by a blackbody source at the specified temperature. For example, 99 percent of the energy emitted by a blackbody at 1000 K is in the wavelength band 2 to 28 μm. Hence, for this temperature, the integration limits of equation (55) above can be simplified with small error in the result.

In the process of computing total emittance data from spectral values, it is essential to identify the wavelength band over which most of the radiant energy is emitted. To do so permits one to assess the validity of a very common assumption used in heat-transfer calculations; namely, that the surface in question is a grey body which has no spectral variation in emittance. Another situation arises when it is necessary to evaluate the possible effect extrapolation of limited spectral data may have. An example of this arises when considering metallic conductors in which the spectral emittance in the visible and near infrared (say to 1 μm) is quite variable, but in the longer wavelength region is monotonic of a form approximated by the Hagen–Rubens relation. The spectral character of nonmetallic solids is usually not as simple, and hence care should be taken that all absorption bands are identified before making extrapolations.

The computations by integration of equation (55) can be done by finite wavelength intervals

$$\epsilon(t) = \frac{\sum_{\lambda_1}^{\lambda_2} \epsilon(\lambda) M_b(\lambda, T)\Delta\lambda}{\sum_{\lambda_1}^{\lambda_2} M_b(\lambda, T)\Delta\lambda} \tag{56}$$

where the limits λ_1 and λ_2 are selected to include substantially all of the flux emitted by a blackbody radiator at the temperature T.

In the Weighted Ordinate Method, uniform values of $\Delta\lambda$ are used, and each value of $\epsilon(\lambda)$ must be weighted by a factor proportional to $L_b(\lambda, T)$, the flux emitted per unit area, unit solid angle, and, within the wavelength interval λ and $(\lambda + \Delta\lambda)$, by a blackbody at the test temperature T. In the Selected Ordinate Method, the area under the blackbody spectral distribution curve is divided vertically into

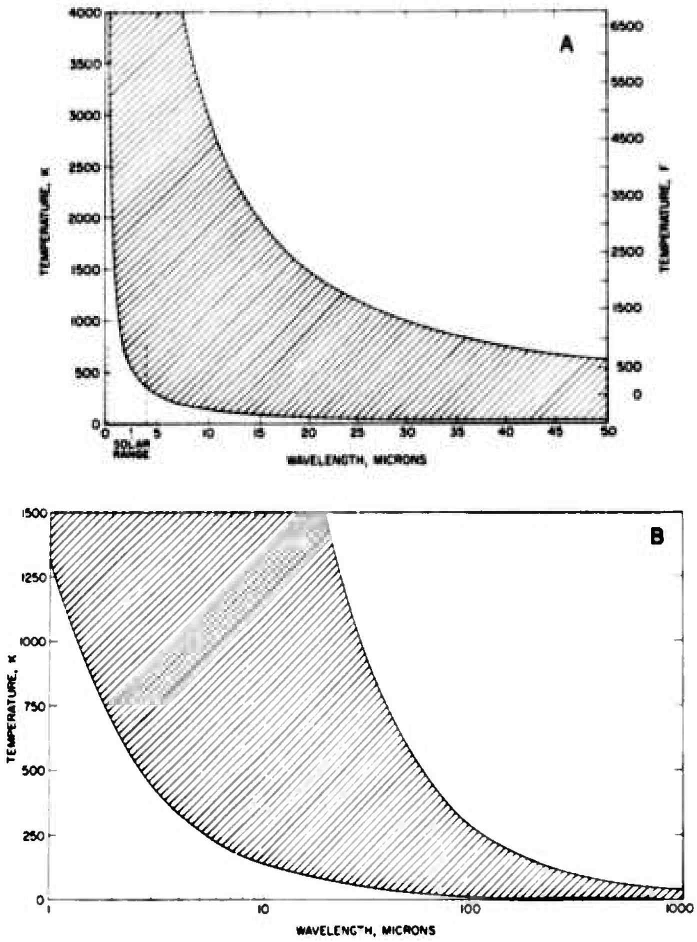


Fig. 4. Wavelength band containing 99% of the flux emitted by a blackbody at the indicated temperature: (A) for high temperatures and (B) for low temperatures.

X units of equal area. The X selected ordinates are then the X median wavelengths of the X areas. In this case, $\Delta\lambda$ varies, but the product $L(\lambda, T)\Delta\lambda$ is held constant and for $X = 100$ this is 0.01. Under these conditions then

$$\epsilon(t) \cong 0.01 \sum_{\lambda_1}^{\lambda_{100}} \epsilon(\lambda) \tag{57}$$

A high degree of precision in the computation of $\epsilon(t)$ can be attained using either the Weighted or Selected Ordinate Method by taking a large enough number of ordinates. With any given number of ordinates, the computation error will be smaller by the Selected Ordinate Method than by the Weighted Ordinate Method. Since the spectral emittance curves for solids do not normally have sharp peaks or valleys, the 100-Selected Ordinate Method gives values of adequate precision for most applications.

The wavelengths representing the 100 selected ordinates for the temperature range 600 to 1400 K are presented in Table III [99]. This table along with equation (55) should be most useful for computing total emittance from spectral emittance data.

The spectral subproperties of reflectance, absorptance, and transmittance are used to find the corresponding *integrated* values according to the relation (shown for absorptance)

$$\alpha(\bar{\lambda}) = \frac{\int_a^b \alpha(\lambda)E(\lambda)\,d\lambda}{\int_a^b E(\lambda)\,d\lambda} \tag{58}$$

where $E(\lambda)$ is the spectral irradiance of the irradiating source. The integration is performed over the wavelength interval or band denoted by the limits of a and b.

Should the source be a blackbody at some temperature T, the absorptance can be evaluated by use of an equation similar to equation (55). A special case of the integrated subproperty is where the irradiating source is that of the solar disc, natural or artificial. The solar absorptance is normally specified for the geometric condition of normal or angular incidence and can be determined from spectral data in the following manner.

$$\alpha(\theta; s) = \frac{\int_0^\infty \alpha(\theta; \lambda)E_s(\lambda)\,d\lambda}{\int_0^\infty E_s(\lambda)\,d\lambda} \tag{59}$$

where $E_s(\lambda)$ denotes the solar irradiance [66, 90]. Frequently, the solar absorptance is determined from room temperature reflectance data

$$\alpha(\theta; \lambda) = 1 - \rho(\theta; 2\pi; \lambda) \tag{60}$$

using Kirchhoff's law.

8. THEORY OF NONMETALLIC PROPERTIES

A. General Considerations

Metallic behavior is primarily characterized by the motion of free electrons under the influence of the radiation field. In the simplest case of metallic reflection, the free electrons are forced to oscillate at the frequency of the induced field and subjected to a viscous damping force proportional to the velocity of the accelerated electrons arising from collisions with the atomic lattice. The motion of those free electrons is described by two parameters—the number density of free electrons and a relaxation time indicating the average time between collisions of the electron and the lattice. When the time between collisions is much greater than the period of the induced electric field, or when the phase change arising from collisions is negligible, the motion of the free electrons and hence the radiative properties can be described by the single parameter: dc electrical conductivity. With this model, metallic behavior in the infrared and at elevated temperatures, conditions very common to many practical engineering problems, has been successfully explained. In the companion Volume 7, Section 8, the text "Theory, Estimation, and Measurement" describes the pitfalls in the use of this model and explains further the effects arising from several types of free electrons, bound electrons, and others which must be treated by quantum mechanical consideration.

Nonmetallic behavior is primarily characterized by the motion of electrons elastically bound to the lattice, said motion arising from the influence of the radiation field. These electrons, oscillating at the frequency of the induced field, are subjected to an elastic and a viscous damping force arising from the lattice. The equation of motion of these electrons is given as

$$m\ddot{y} + 2\pi m\frac{C}{\lambda_b}\dot{y} + K_b y = -qE_0 e^{-j\omega t} \tag{61}$$

where m and q are the mass and charge of the electron, respectively. The terms $\ddot{y}$, $\dot{y}$, and y relate to a coordinate system giving the acceleration, velocity, and displacement, respectively. The viscous damping parameter is λ_b and the elastic restoring force of the bound electrons is K_b. The resonant wavelength of the bound electrons, with no damping forces present, is given as

$$\lambda_0 = 2\pi c\left(\frac{m}{K_b}\right)^{1/2} \tag{62}$$

Table III. Wavelengths for Computation of Total Emittance from Spectral Data by the 100 Selected Ordinate Method [99]

		λ, μm, at various values of T								
%*	λT, μK	600 K	700 K	800 K	900 K	1000 K	1100 K	1200 K	1300 K	1400 K
0.5	1322	2.203	1.889	1.652	1.469	1.322	1.202	1.102	1.017	0.944
1.5	1534	2.557	2.191	1.918	1.704	1.534	1.395	1.278	1.180	1.096
2.5	1662	2.770	2.374	2.078	1.847	1.622	1.511	1.385	1.278	1.187
3.5	1762	2.937	2.517	2.202	1.958	1.762	1.602	1.468	1.355	1.258
4.5	1846	3.077	2.637	2.308	2.051	1.846	1.678	1.538	1.420	1.318
5.5	1920	3.200	2.743	2.400	2.133	1.920	1.745	1.600	1.477	1.371
6.5	1989	3.315	2.841	2.486	2.210	1.989	1.808	1.657	1.530	1.424
7.5	2052	3.420	2.931	2.565	2.280	2.052	1.865	1.710	1.578	1.466
8.5	2111	3.518	3.016	2.639	2.346	2.111	1.919	1.759	1.624	1.508
9.5	2168	3.613	3.097	2.710	2.409	2.168	1.971	1.806	1.668	1.549
10.5	2222	3.703	3.174	2.778	2.469	2.222	2.020	1.852	1.709	1.587
11.5	2274	3.790	3.249	2.842	2.527	2.274	2.067	1.895	1.749	1.624
12.5	2325	3.875	3.321	2.906	2.583	2.325	2.114	1.937	1.788	1.661
13.5	2374	3.957	3.391	2.968	2.638	2.374	2.158	1.978	1.826	1.696
14.5	2423	4.038	3.461	3.029	2.692	2.423	2.203	2.019	1.864	1.731
15.5	2470	4.117	3.529	3.088	2.744	2.470	2.245	2.058	1.900	1.764
16.5	2517	4.195	3.596	3.146	2.797	2.517	2.288	2.097	1.936	1.798
17.5	2563	4.271	3.662	3.204	2.848	2.563	2.330	2.136	1.972	1.831
18.5	2609	4.348	3.727	3.261	2.899	2.609	2.372	2.174	2.007	1.864
19.5	2654	4.423	3.792	3.318	2.949	2.654	2.413	2.212	2.042	1.896
20.5	2698	4.496	3.854	3.372	2.998	2.698	2.453	2.248	2.075	1.927
21.5	2743	4.571	3.919	3.429	3.048	2.743	2.494	2.286	2.110	1.959
22.5	2887	4.645	3.982	2.484	3.097	2.787	2.534	2.322	2.144	1.991
23.5	2831	4.718	4.044	3.539	3.146	2.831	2.574	2.359	2.178	2.022
24.5	2876	4.793	4.109	3.595	3.196	2.876	2.615	2.397	2.212	2.054
25.5	2920	4.866	4.172	2.650	3.244	2.920	2.655	2.433	2.246	2.086
26.5	2964	4.940	4.234	3.705	3.293	2.964	2.695	2.470	2.280	2.117
27.5	3008	5.013	4.297	3.760	3.342	3.008	2.735	2.507	2.314	2.149
28.5	3052	5.086	4.360	3.815	3.391	3.052	2.775	2.543	2.348	2.180
29.5	3097	5.161	4.424	3.871	3.441	3.097	2.815	2.581	2.382	2.212
30.5	3141	5.235	4.487	3.926	3.490	3.141	2.855	2.617	2.416	2.244
31.5	3186	5.310	4.552	3.982	3.540	3.186	2.896	2.655	2.451	2.275
32.5	3231	5.385	4.616	4.039	3.590	3.231	2.937	2.692	2.485	2.308
33.5	3277	5.461	4.682	4.096	3.641	3.277	2.979	2.731	2.521	2.341
34.5	3323	5.538	4.747	4.154	3.692	3.323	3.021	2.769	2.556	2.374
35.5	3369	5.615	4.813	4.211	3.743	3.369	3.063	2.807	2.592	2.406
36.5	3415	5.691	4.879	4.269	3.794	3.415	3.105	2.846	2.627	2.439
37.5	3462	5.770	4.946	4.328	3.847	3.462	3.147	2.885	2.663	2.473
38.5	3510	5.850	5.014	4.388	3.900	3.510	3.191	2.925	2.700	2.507
39.5	3558	5.930	5.083	4.448	3.953	3.558	3.235	2.965	2.737	2.542
40.5	3607	6.011	5.152	4.509	4.008	3.607	3.279	3.006	2.775	2.576
41.5	3656	6.093	5.223	4.570	4.062	3.656	3.324	3.047	2.812	2.611
42.5	3706	6.176	5.294	4.632	4.118	3.706	3.369	3.088	2.851	2.647
43.5	3757	6.261	5.367	4.696	4.174	3.757	3.415	3.131	2.890	2.684
44.5	3809	6.348	5.441	4.761	4.232	3.809	3.463	3.174	2.930	2.721
45.5	3861	6.435	5.516	4.826	4.290	3.861	3.510	3.217	2.970	2.758
46.5	3914	6.523	5.592	4.892	4.349	3.914	3.558	3.262	3.011	2.796
47.5	3968	6.613	5.669	4.960	4.409	3.968	3.607	3.307	3.052	2.834
48.5	4023	6.705	5.747	5.029	4.470	4.023	3.657	3.352	3.095	2.874
49.5	4079	6.798	5.827	5.099	4.532	4.079	3.708	3.399	3.138	2.914
50.5	4136	6.893	5.909	5.170	4.596	4.136	3.750	3.447	3.182	2.954
51.5	4194	6.990	5.992	5.242	4.660	4.194	3.813	3.495	3.226	2.996
52.5	4254	7.090	6.077	5.318	4.727	4.254	3.867	3.545	3.272	3.039

Table III (continued)

		λ, μm, at various values of T								
%*	λT, μK	600 K	700 K	800 K	900 K	1000 K	1100 K	1200 K	1300 K	1400 K
53.5	4314	7.190	6.163	5.392	4.793	4.314	3.922	3.595	3.318	3.081
54.5	4377	7.295	6.253	5.471	4.863	4.377	3.979	3.647	3.367	3.126
55.5	4440	7.400	6.343	5.550	4.933	4.440	4.036	3.700	3.415	3.171
56.5	4505	7.508	6.436	5.631	5.006	4.505	4.095	3.754	3.465	3.218
57.5	4572	7.620	6.532	5.715	5.080	4.572	4.156	3.810	3.517	3.266
58.5	4640	7.733	6.629	5.800	5.156	4.640	4.218	3.867	3.569	3.314
59.5	4710	7.856	6.729	5.888	5.233	4.710	4.282	3.925	3.623	3.364
60.5	4782	7.970	6.832	5.978	5.313	4.782	4.347	3.985	3.678	3.416
61.5	4856	8.093	6.937	6.070	5.396	4.856	4.415	4.047	3.735	3.469
62.5	4932	8.220	7.046	6.165	5.480	4.932	4.484	4.110	3.794	3.523
63.5	5010	8.350	7.157	6.262	5.567	5.010	4.555	4.175	3.854	3.579
64.5	5091	8.485	7.273	6.364	5.657	5.091	4.628	4.242	3.916	3.636
65.5	5175	8.625	7.393	6.469	5.750	5.175	4.705	4.312	3.981	3.696
66.5	5262	8.770	7.517	6.578	5.847	5.262	4.784	4.385	4.048	3.759
67.5	5351	8.918	7.644	6.689	5.945	5.351	4.865	4.459	4.116	3.822
68.5	5444	9.073	7.777	6.805	6.049	5.444	4.945	4.536	4.188	3.889
69.5	5541	9.235	7.916	6.926	6.157	5.541	5.037	4.617	4.262	3.958
70.5	5641	9.401	8.059	7.051	6.268	5.641	5.128	4.701	4.339	4.029
71.5	5745	9.575	8.207	7.181	6.383	5.745	5.223	4.787	4.419	4.105
72.5	5854	9.756	8.363	7.318	6.504	5.854	5.322	4.878	4.503	4.181
73.5	5968	9.946	8.526	7.460	6.631	5.968	5.425	4.923	4.591	4.263
74.5	6087	10.145	8.696	7.609	6.783	6.087	5.533	5.072	4.682	4.348
75.5	6212	10.353	8.874	7.765	6.902	6.212	5.647	5.176	4.778	4.437
76.5	6343	10.571	9.062	7.929	7.048	6.343	5.766	5.286	4.879	4.531
77.5	6482	10.803	9.260	8.102	7.202	6.482	5.893	5.401	4.986	4.630
78.5	6628	11.046	9.469	8.285	7.364	6.628	6.025	5.523	5.098	4.734
79.5	6783	11.304	9.690	8.479	7.537	6.783	6.166	5.652	5.218	4.845
80.5	6948	11.580	9.926	8.685	7.720	6.948	6.316	5.790	5.345	4.963
81.5	7123	11.871	10.176	8.904	7.914	7.123	6.475	5.936	5.479	5.088
82.5	7311	12.185	10.444	9.139	8.123	7.311	6.646	6.092	5.624	5.222
83.5	7514	12.523	10.735	9.392	8.349	7.514	6.831	6.261	5.780	5.367
84.5	7732	12.886	11.046	9.665	8.591	7.732	7.029	6.443	5.948	5.523
85.5	7969	13.281	11.385	9.961	8.854	7.969	7.245	6.641	6.130	5.692
86.5	8228	13.712	11.755	10.285	9.142	8.228	7.480	6.856	6.329	5.877
87.5	8513	14.188	12.162	10.641	9.459	8.513	7.739	7.094	6.548	6.081
88.5	8829	14.714	12.613	11.036	9.810	8.829	8.026	7.357	6.691	6.306
89.5	9183	15.304	13.119	11.479	10.203	9.183	8.348	7.652	7.064	6.559
90.5	9583	15.971	13.690	11.979	10.648	9.583	8.712	7.986	7.371	6.845
91.5	10042	16.746	14.346	12.552	11.158	10.042	9.129	8.386	7.726	7.173
92.5	10577	17.628	15.110	13.221	11.752	10.577	9.615	8.813	8.136	7.555
93.5	11215	18.524	16.022	14.019	12.461	11.215	10.195	9.345	8.627	8.011
94.5	11996	19.993	17.137	14.995	13.329	11.996	10.878	9.996	9.228	8.569
95.5	12990	21.649	18.558	16.238	14.433	12.990	11.809	10.825	9.992	9.278
96.5	14327	23.877	20.468	17.909	15.919	14.327	13.025	11.939	10.021	10.233
97.5	16295	27.157	23.279	20.369	18.105	16.295	14.814	13.579	12.535	11.639
98.5	19724	32.872	28.178	24.655	21.915	19.724	17.931	16.436	15.172	14.088
99.5	29372	48.951	41.961	36.715	32.635	29.372	26.702	24.476	22.594	20.980

*The wavelength λ is chosen so that the indicated percentage of blackbody radiation occurs at wavelengths shorter than the indicated wavelength.

The electric field is shown as a sinusoidal function of frequency ω. The motion of the bound electrons is described by three parameters—the number of electrons per unit volume N_b, the viscous damping factor λ_b (the relaxation wavelength, or alternately expressed as the relaxation time $\lambda_b/2\pi c$), and the elastic damping coefficient K_b.

Quantum theory allows free and bound electrons to exist in different energy states. As such they would react in differing degrees to the influence of an electric field induced by an incident radiation field. The classical model for the general case of the nonmetallic solid must then include the contributions of several types of bound and free electrons to properly describe the optical behavior. Hence, the parameters λ_b and K_b of equation (62) should be subscripted to indicate electron type. For the free electron types, the equation of motion would not include an elastic restoring force term.

From the equation of motion for j types of bound electrons and i types of free electrons, the complex dielectric constant K^* for the nonmetallic solid* is

$$K^* = 1 + \frac{q^2}{4\pi^2 m\epsilon_0 c^2}\sum_j \frac{N_{bj}\lambda_{0j}^2\lambda^2}{\lambda^2 - \lambda_{0j}^2 + j\dfrac{\lambda_{0j}}{\lambda_{bj}}\lambda_{0j}\lambda} - \frac{\lambda^2 q^2}{4\pi^2 m\epsilon_0 c^2}\sum_i \frac{N_{fi}\lambda_{fi}}{\lambda_{fi} - j\lambda} \tag{63A}$$

The second term represents the contribution of the bound electrons and the third term that of the free electrons; in each case, the contributions are summed over the number of types present. This relation has the same form as that postulated by Roberts [103] in his classical treatment of the optical properties of selected metallic solids.

$$K^* = 1 + \sum_m \frac{K_{om}\lambda^2}{\lambda^2 - \lambda_{sm}^2 + j\delta_m\lambda_{sm}\lambda} - \frac{\lambda^2}{2\pi c\epsilon_0}\sum_n \frac{\sigma_n}{\lambda_{rn} - j\lambda} \tag{63B}$$

The physical significance of the Roberts' parameters, not discussed in his work, can now be seen through intercomparison of equations (63A) and (63B). For the free electron types

$$\sigma_n = \frac{q^2 N_{fi}}{2\pi c m\lambda_{fi}} \tag{64}$$

represents the conductivity contribution; the summation of all types with $\lambda \to \infty$ gives the dc electrical conductivity. The Roberts' term λ_{rn} and the classical model λ_{fi} term are relaxation wavelengths. For the bound electrons

$$K_{om} = \frac{q^2 N_{bj}\lambda_{0j}}{4\pi m\epsilon_0 c^2} \tag{65}$$

is proportional to the ratio of the Couloumb repulsive force between bound electrons and the elastic restoring force. The resonance wavelength of bound electrons without damping forces present is λ_{sm} and identical to the classical model term λ_{0j}. The term δ_{sm} is equal to $\lambda_{0j}/\lambda_{bj}$, the ratio of resonance wavelength to relaxation wavelength under conditions where damping and restoring forces are respectively absent. Because of the complexity of the model, with its numerous parameters, it does not provide a practical approach to estimating properties but rather finds utility in evaluation of measurements and their comparison with a realistic theory of the nonmetallic solid.

In the classical treatment above, only the processes of refraction and absorption are present; the complex dielectric constant K^* is related to the complex index of refraction which is expressed as

$$n^* = n - ik \tag{66}$$

where n is the index of refraction and k is the index of absorption. The latter term follows from the relation

$$k = \frac{\lambda a}{4\pi} \tag{67}$$

where a is the absorption coefficient relating the attenuation e^{-ax} of spectral flux as it penetrates deeper into the medium a distance x. The simplest of the nonmetallic solids are the so-called dielectrics, in which the absorption process is negligible; this class of materials is typified by many glasses and optical materials. The most difficult to treat of the nonmetallic solids are those in which scattering is present during the absorption process. In the treatment above, scattering is not considered and hence it is important to distinguish between materials which are nonscattering and those in which scattering predominates.

Consider now the case of two simple dielectric media of different indices of refraction separated by an optically smooth interface. A beam of radiation passing through one medium and incident upon the interface is reflected according to the Fresnel relations

*The formalism for developing the expression for the complex dielectric constant from the equation of motion of the electrons and electromagnetic wave theory is given in Reference [118].

and is refracted into the second medium according to Snell's law.

$$n_1 \sin \theta_i = n_2 \sin \theta_r \qquad (68)$$

where n_1 and n_2 are the indices of refraction of the medium in which the beam is incident and refracted, respectively. The angles θ_i and θ_r are the angles of incidence and refraction measured from the normal to the interface. When $n_2 > n_1$ (for example, when a beam is incident in air or vacuum onto glass) the equation is valid for all values of θ_i and there always exists a refracted beam. When $n_2 < n_1$, the equation is valid for values of θ_i up to the critical angle defined as

$$\theta_c = \sin^{-1}\left(\frac{n_2}{n_1}\right) \qquad (69)$$

At $\theta_i = \theta_c$, the angle of refraction is 90° and total internal reflection occurs.

The Fresnel relation in its elementary form is

$$\rho = \frac{1}{2}\left[\frac{n_1 \cos\theta_i - n_2 \cos\theta_r}{n_1 \cos\theta_i + n_2 \cos\theta_r}\right]^2 + \frac{1}{2}\left[\frac{n_2 \cos\theta_i - n_1 \cos\theta_r}{n_2 \cos\theta_i + n_1 \cos\theta_r}\right]^2 \qquad (70)$$

where ρ is the reflectance of the interface for unpolarized incident flux. From substitution of n_1 or n_2 from equation (68), the reflectance is given as

$$\rho = \frac{1}{2}\left[\frac{\sin^2(\theta_i - \theta_r)}{\sin^2(\theta_i + \theta_r)}\right]^2 + \frac{1}{2}\left[\frac{\tan^2(\theta_i - \theta_r)}{\tan^2(\theta_i + \theta_r)}\right]^2 \qquad (71)$$

The first term of equations (70, 71) gives the reflectance ρ_s for radiation polarized in a plane perpendicular to the plane of incidence; the second term gives the reflectance ρ_p, for radiation polarized in a plane parallel to the plane of incidence. The plane of incidence is defined as the plane containing the normal to the interface and the direction of the incident flux.

In equation (71), the second term for the reflectance of the parallel component goes to zero when $(\theta_i + \theta_r) = \pi/2$. The angle θ_i at which this occurs is called Brewster's angle, θ_B, defined as

$$\theta_B = \tan^{-1}\frac{n_2}{n_1} \qquad (72)$$

For the air-glass interface with $n_1 = 1$ and $n_2 = 1.5$, Brewster's angle is approximately 56°. The consequence of this theory is that the polarization conditions of the reflected flux from a nonmetallic solid can be substantially different from the incident flux. This is to be contrasted with the behavior of metallics where, by comparison, polarization changes are modest. Figure 5 depicts the variation of the two reflectance components ρ_p and ρ_s for a simple dielectric material as a function of angle of incidence and for the two cases $n_1 < n_2$ and $n_1 > n_2$.

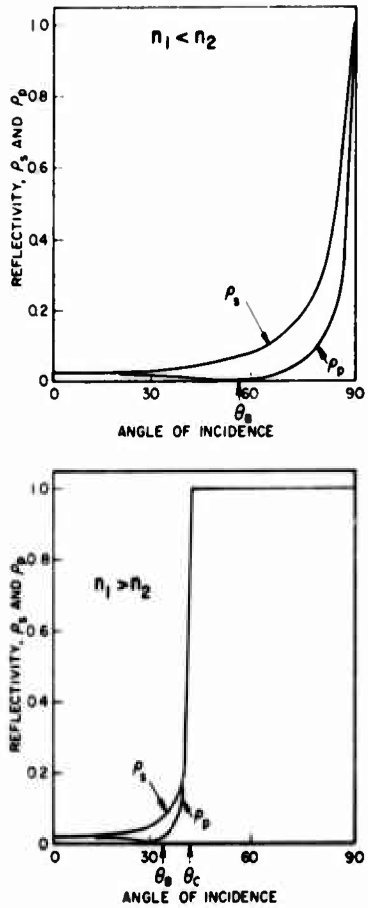


Fig. 5. The reflectivity components, ρ_p and ρ_s, of a simple dielectric as a function of angle of incidence for cases of external reflection ($n_1 < n_2$) and internal reflection ($n_1 > n_2$).

When the nonmetallic solid has appreciable absorption, the complex index of refraction including the absorption process must be used. For this case Snell's law and the Fresnel relation become complex in character and the treatment becomes less simple. In an earlier section, the relation between the reflectance (and its two polarization components) or emittance and the optical constants (n, k) was developed. From this relation, Fig. 6 shows the dependency of the normal emittance as a function of the index of refraction for typical values of the index of

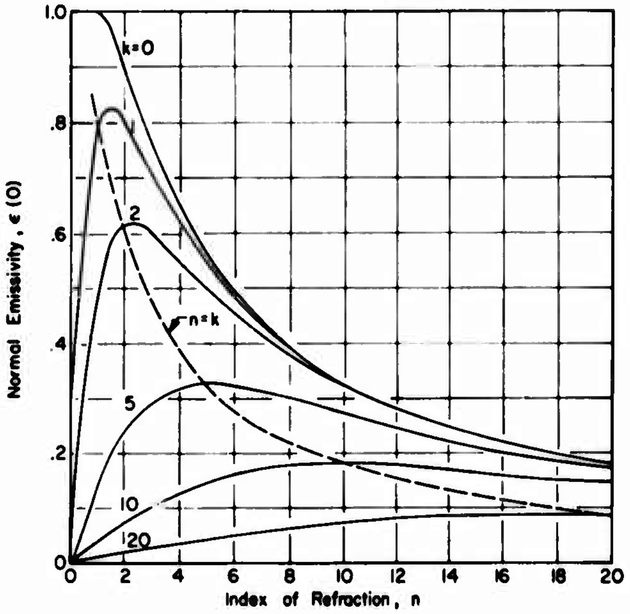


Fig. 6. Normal emissivity as a function of index of refraction for typical range of index of absorption [107].

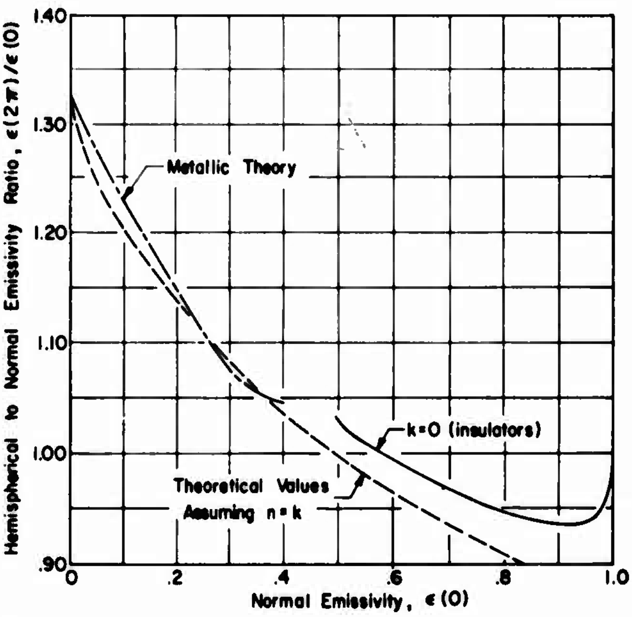


Fig. 8. Ratio of hemispherical to normal emissivity as a function of normal emissivity for nonmetals and metals [107].

absorption. The upper curve where $k = 0$ corresponds to the simple dielectrics and since most of such materials have low indices of refraction, it follows that they have high emissivity values. Metallic materials have, in general, high extinction coefficients and, consequently, lower emittance values.

From the Fresnel relations, the angular dependency as a function of the index of refraction can be

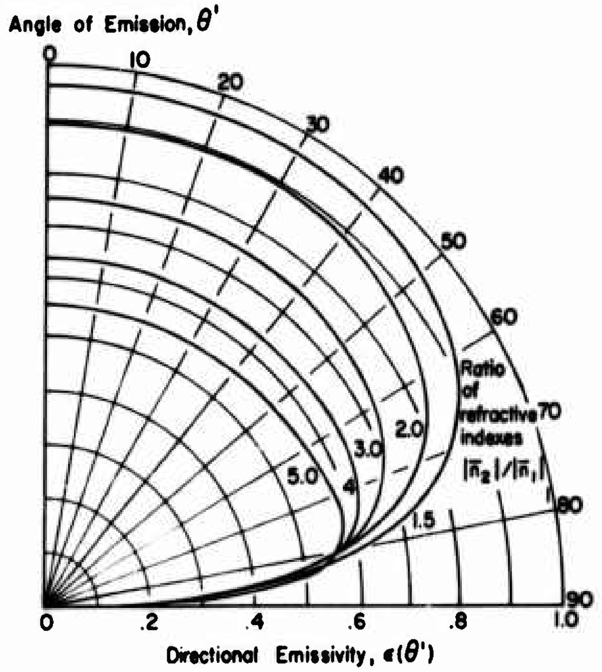


Fig. 7. Directional emissivity as a function of index of refraction [107].

seen. Figure 7 shows the directional emittance for several values of the index of refraction; these values are typical for the simple dielectric indicative of the nearly Lambertian distribution characteristic. By comparison, typical metallic directional emittance would be a much flatter distribution. Hence, it follows that the "diffuse" assumption of emissivity for nonmetallic solids has reasonable theoretical grounds.

Because of the convenience in measuring normal emissivity and the need for hemispherical emissivity, their ratio is an interesting factor to consider. By integration of the directional emissivity over the hemisphere, using the Fresnel relation to describe the angular dependency, this ratio can be determined easily for the simple dielectric. Figure 8 shows the ratio as a function of the normal emissivity; since the angular characteristics as shown in Fig. 7 are nearly Lambertian, this ratio is within nearly 5% of unity for most dielectrics. For metals, the ratio is always greater than unity and a strong function of the normal emissivity [63]. Two curves for the metallics are shown in Fig. 8. The curve labeled "Metallic Theory" is computed from the Schmidt–Eckert relations for hemispherical emissivity and the Foote relations for normal emissivity.* The curve labeled "$n = k$" is computed directly from the Fresnel relations with the assumption $n = k$, which makes the integration

*See Page 24a of Reference [116] for details on the Schmidt–Eckert and Foote relations for metallics.

possible in closed form but not without considerable difficulty [107].

B. Partially Transparent Material—Multiple Reflection Model

The simplest of the models to deal with the partially transparent nonscattering materials was developed by McMahon [80] in which the concept of a spectral emissive power and apparent reflectance and transmittance were introduced. The theory is limited to only the passage of radiant energy normal to the surface but is useful to the very common problem of interpretation of reflectance or transmittance spectra of a partially reflecting slab sample.

Kirchhoff's law in its simplest form relates the spectral emissivity to spectral reflectivity of an opaque material as

$$\epsilon(\lambda, T) = 1 - \rho(\lambda, T) \tag{73}$$

For a body which is partially transparent because of its low absorption coefficient and/or thickness, Kirchhoff's law cannot be applied directly. Recall that the law derives from the existence of an energy balance between the emission and absorption of a body in thermal equilibrium within a uniformly heated enclosure. When the body is opaque, the incident flux is absorbed or reflected. If the body is partially transparent, the incident flux is absorbed and a significant fraction appears as reflected and transmitted flux after having undergone many internal reflections. For the general expression of Kirchhoff's law it is necessary to include the influence of transmittance.

Consider a collimated beam of radiant flux incident normally on a semitransparent slab of thickness d and complex index of refraction n^*. The incident flux upon first striking the interface is partially reflected and the balance passes through the interface. The reflected portion is the reflectivity R computed from the Fresnel relations for normal incidence conditions†

$$R = \left(\frac{n^* - 1}{n^* + 1}\right)^2 \tag{74}$$

It is important to recognize that this reflectivity, R, is based upon a single reflection. The remaining flux that passes through the interface will traverse the thickness of the slab while being absorbed and eventually reach the back side. In the course of traversing the thickness of the slab, the radiant flux is diminished by a factor e^{-ad}, where a is the absorption coefficient as introduced earlier in equation (67). It is convenient to define the internal transmittance, T, as

$$T = e^{-ad} \tag{75}$$

which is the transmittance (frequently referred to as the transmissivity) within the material and is not effected by or inclusive of interface influences. Of the original flux striking the slab, the fraction $(1 - R)T$ has reached the near side of the slab upon first traversing the slab thickness. At this near interface, a fraction R is reflected and the balance passes through. This process of multiple reflection at the interfaces and traversing of the thickness must be considered to determine the overall transmittance and reflectance of the slab. Figure 9 represents the multiple processes occurring, giving the results

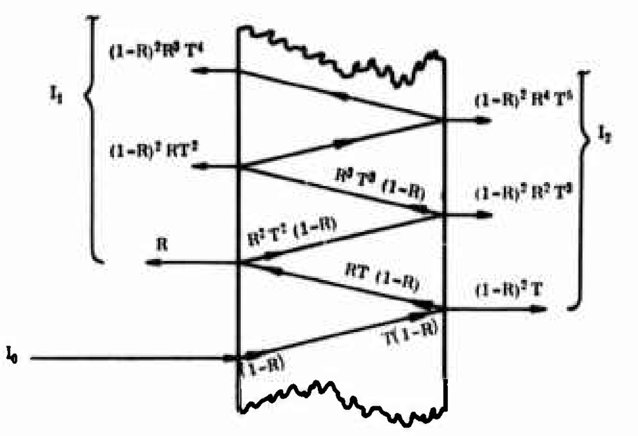
$$\rho = R\left[1 + \frac{T^2(1 - R)^2}{1 - R^2T^2}\right] \tag{76}$$

$$\tau = T\left[\frac{(1 - R)^2}{1 - R^2T^2}\right] \tag{77}$$

Several interesting conclusions follow from these relations. For a perfectly transmitting body, that is, when $T = 1.0$, the reflectivity

$$\rho = \frac{2R}{1 - R} \tag{78}$$

is nearly twice the Fresnel reflectivity for small values of R. It is only when $T = 0$ that the two reflectivity terms are identically equal. For a slab with reflecting



$$\rho = \frac{I_1}{I_0} = R + (1-R)^2RT^2 + (1-R)^2R^3T^4 + \ldots = R\left[1 + \frac{T^2(1-R)^2}{1-R^2T^2}\right]$$

$$\tau = \frac{I_2}{I_0} = (1-R)^2\left\{T + R^2T^3 + R^4T^5 + \ldots\right\} = T\,\frac{(1-R)^2}{1-R^2T^2}$$

Fig. 9. The reflectivity and transmissivity of a semitransparent slab.

†The reflectivity should be considered as a function of wavelength and temperature, but for convenience in the treatment this is not symbolically represented as $R(\lambda, T)$.

surfaces, the transmittance will be less than the internal transmittance because of reflection losses. A simple transmission measurement actually measures τ and will be in error if the result is interpreted as T, as is so often the case in the observation of absorption spectra. For a transparent substance like glass with a reflectance of 4%, the error in the transmittance can be as high as 8–10% depending upon the amount of absorption.

Within the transparent body, the processes of absorption, reflection, and emission are occurring simultaneously. Radiant flux generated within one region propagates toward the interface and is exponentially attenuated, and a fraction of the flux reaching the interface is reflected back into the interior according to the Fresnel law. The reflected fraction will traverse the slab and eventually be totally absorbed by the attenuation process or appear as a portion passing through the interface. Hence, the emitted radiant flux includes the effect of multiple reflections within the transparent material.

Consider a slab of total thickness d and optical properties $n(\lambda, T)$ and $k(\lambda, T)$. Define now the "volume spectral emissive power" $j(\lambda, T)$ which is the radiant flux generated per unit volume within the wavelength interval λ and $\lambda + d\lambda$ for the material at temperature T: for a unit solid angle, the flux will be $1/4\pi \cdot j(\lambda, T)$. The radiant flux generated by a layer dx thickness propagating in a direction normal to the interface within a small solid angle $d\omega$ is

$$\frac{1}{4\pi} j(\lambda, T)\, dx\, d\omega \tag{79}$$

If this layer is a distance x from the interface, the emitted flux will be attenuated by a factor e^{-ax} and the normal flux reaching the interface is

$$\frac{1}{4\pi} j(\lambda, T)\, e^{-ax}\, dx\, d\omega \tag{80}$$

The total normal radiation arriving at the surface from all layers within the slab, but neglecting contributions due to multiple reflections, is obtained by integration of equation (80) over the interval 0 to d, giving

$$\frac{j(\lambda, T)}{4\pi a(\lambda, T)}[1 - e^{-a(\lambda, T)d}]\, d\omega \tag{81}$$

The portion of this flux which passes through the interface is $1 - R(\lambda, T)$ where $R(\lambda, T)$ is the reflectivity, and hence the emitted flux is

$$\{1 - R(\lambda, T)\}\frac{j(\lambda, T)}{4\pi a(\lambda, T)}\{1 - T(\lambda, T)\}\, d\omega \tag{82}$$

where the term $\exp[-a(\lambda, T)d]$ has been replaced by the internal transmittance $T(\lambda, T)$. The criteria that this approach must be valid also for the opaque material is now used; for this condition $T(\lambda, T)$ becomes zero and the emitted flux of equation (82) is equal to the blackbody radiant flux $L_b(\lambda, T)$ times the emittance of the surface, hence

$$\{1 - R(\lambda, T)\}\frac{j(\lambda, T)}{4\pi a(\lambda, T)}\, d\omega = \{1 - R(\lambda, T)\}\frac{L(\lambda, T)}{2\pi} \tag{83}$$

From this, the volume spectral emissive power is related to the blackbody radiance as

$$j(\lambda, T) = 2a(\lambda, T)L_b(\lambda, T) \tag{84}$$

Now, the expression for the nonreflected portion of the flux generated within the interior and penetrating the surface, equation (82), can be written as

$$\{1 - R(\lambda, T)\}\frac{L_b(\lambda, T)}{2\pi}\{1 - T(\lambda, T)\}\, d\omega \tag{85}$$

The portion reflected back into the interior will traverse the thickness of the slab and appear as emitting flux at the front interface, diminished by a factor of $R^2(\lambda, T)T^2(\lambda, T)$: accounting for two reflections and transmission twice through the thickness of the slab. The total emitted flux will be determined by a series expression accounting for the multiple reflections and transmittance losses. Also, the emitted flux must include the components of radiation initially directed toward the rear surface but finally emerging at the front surface. The total emitted flux from the front surface is then given as an infinite series

$$\begin{aligned} L(\lambda, T)\frac{d\omega}{2\pi} = \sum_n R^n(\lambda, T) \\ \cdot T^n(\lambda, T)\{1 - R(\lambda, T)\}\frac{L_b(\lambda, T)}{2\pi} \\ \cdot \{1 - T(\lambda, T)\}\, d\omega \end{aligned} \tag{86}$$

where the even terms of n account for the radiation initially directed toward the front surface and the odd terms for the radiation initially directed toward the rear surface. The infinite series may be written in analytical form, and, by defining the emittance as

$$E(\lambda, T) = \frac{J(\lambda, T)}{J_b(\lambda, T)} \tag{87}$$

it follows that

$$E(\lambda, T) = \frac{\{1 - R(\lambda, T)\}\{1 - T(\lambda, T)\}}{1 - R(\lambda, T)T(\lambda, T)} \qquad (88)$$

This relation meets the test of Kirchhoff's law when $T(\lambda, T) = 0$; then it follows that

$$E(\lambda, T) = 1 - R(\lambda, T) \qquad (89)$$

the usual form for the opaque solid.

The three observable radiative properties of the transparent solid are given by the equations (76, 77, and 88) for the reflectance, transmittance, and emittance. It can be shown that the summation of these three terms is unity:

$$\rho(\lambda, T) + \tau(\lambda, T) + E(\lambda, T) = 1 \qquad (90)$$

which can be considered an expression of Kirchhoff's law for transparent materials.

C. Partially Transparent Material—Diffuse Model

Gardon [41, 42] has extended the theory of McMahon and the concept of volume spectral emissive power to include two important features of radiation within a transparent material. The first of these is to consider the diffuse character of the generated radiant flux, rather than only the unidirectional normal case, so that the hemispherical and directional emitted fluxes can be determined. Second, the dependence of the volume emissive power on the index of refraction of the material is treated.

The volume spectral emissive power $j(\lambda, T)$ is defined as in the previous section: the power radiated at a given temperature by a unit volume into a solid angle within a small spectral bandwidth. Referring to Fig. 10, the power generated by the unit volume at some distance within the semi-infinite material is

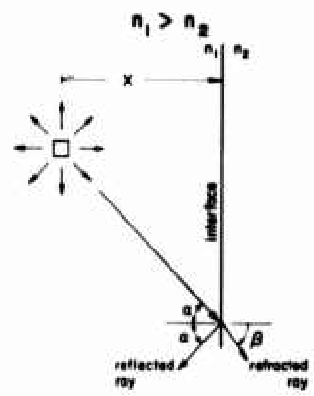


Fig. 10. Radiation emitted from an elemental volume within a transparent material [42].

attenuated by a factor $\exp[-ax]$ before reaching the surface. Gardon refers to this flux as the "primary radiation," indicative of the radiation within the material which is totally perceived as "emitted radiation" external to the material. The primary radiant intensity at the interior surface of the semi-infinite solid is determined from considerations of a suitable coordinate system to determine the contribution of all elemental volume elements and the attenuation factor $\exp[-(x/\cos\alpha)\cdot a]$ to the primary intensity in the direction defined by angle α

$$I = \frac{j(\lambda, T)}{a}\cos\alpha \qquad (91)$$

and the flux at the surface giving the contribution to the primary radiation from all angles is

$$\Phi = \pi\frac{j(\lambda, T)}{a} \qquad (92)$$

Equation (91) demonstrates the validity of Lambert's law showing that the intensity of primary radiation reaching the surface is proportional to the cosine of the angle of incidence.

To determine the fraction of the primary radiation at the interior surface which appears as emitted radiation, the processes of reflection and refraction at the surface must be treated. The intensity incident on the surface in the direction α measured normal to the surface is given by equation (91), and the portion that is reflected is given by R, the Fresnel reflectivity as discussed earlier for equation (74); fraction $(1 - R)$ is then refracted across the interface to appear as emitted radiation. The reflected fraction is

$$R = \tfrac{1}{2}(R_p + R_s) \qquad (93)$$

where

$$R_p = \frac{\tan^2(\beta - \alpha)}{\tan^2(\beta + \alpha)} \qquad (94)$$

$$R_s = \frac{\sin^2(\beta - \alpha)}{\sin^2(\beta + \alpha)} \qquad (95)$$

with α, β as the angles of incidence and refraction as shown in Fig. 10, and are related according to Snell's law as

$$n_1 \sin\alpha = n_2 \sin\beta \qquad (96)$$

The angular distribution of reflected and refracted intensities is illustrated in Fig. 11. This is a polar diagram showing the distribution at the interface of the primary incident intensity, the reflected portion which returns to the interior, and the refracted

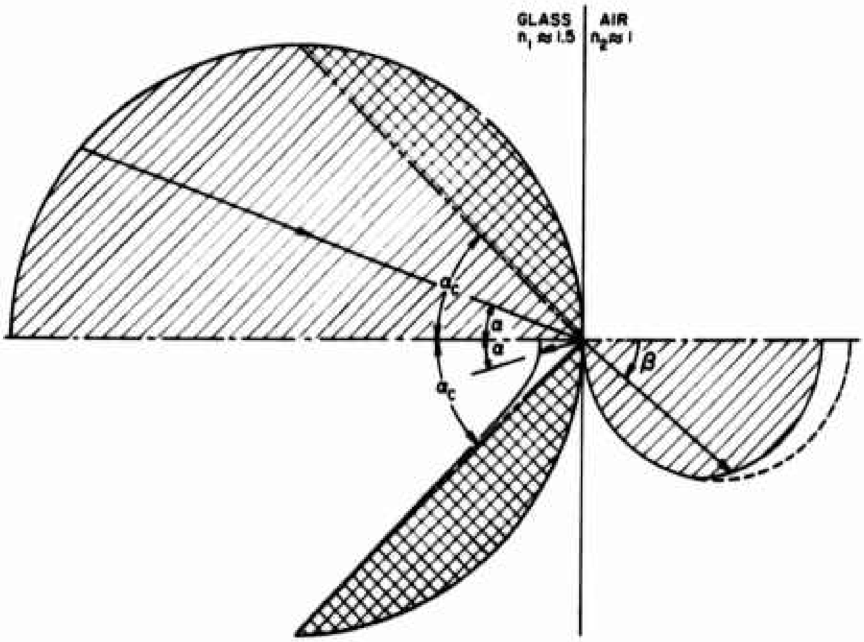


Fig. 11. Distribution of radiant intensities at the interface of a semi-infinite transparent radiator [41].

portion which passes through the interface to appear as emitted radiant intensity. On the interior side, as shown in this figure, the directional intensity has a cosine distribution as determined by equation (91). When the angle of incidence α is less than the critical angle as defined in equation (69), the incidence flux is reflected and refracted according to the relations (93 to 95). When the angle of incidence is equal to, or greater than, the critical angle, internal reflection occurs and none of the incident flux passes through the interface. Hence, the portion which appears as emitted radiation, $(1 - R)$, originated within a solid cone defined by the critical angle, emerges to fill the entire hemisphere in the space outside the material, and has an intensity

$$I = \frac{j(\lambda, T)}{a}\frac{(1 - R)}{n^2}\cos\beta \qquad (97)$$

Recall that the primary radiation at the interior surface has a Lambertian distribution, whereas the emitted radiation has an angular distribution which deviates from the cosine law to the extent the factor $(1 - R)$ is a function of the angle of incidence (or refraction). From previous discussions on the angular characteristics (see for example Fig. 5), the reflectivity is nearly constant for values up to 55°, whereupon the departure begins to fall off rather rapidly. It follows then that the model predicts that the distribution of emitted radiation will follow the cosine relation except for relatively large angles of emission.

In the limit of great thickness and high absorption, the model of the transparent material must agree with the more familiar treatment of the opaque surface. The spectral flux of the transparent material is obtained by integration of the spectral intensity over the hemisphere as prescribed by equation (97). This in turn would be equal to the emissive power of an opaque radiator in terms of the emittance and the radiance of a blackbody, $L_b(\lambda, T)$. By comparison the spectral volume emissive power, in terms of blackbody radiance, the optical properties of the material (n_1 and a) and the index of refraction (n_2) of the medium into which the emitted radiation passes, is

$$j(\lambda, T) = \frac{1}{\pi}a\left(\frac{n_1}{n_2}\right)^2 L_b(\lambda, T) \qquad (98)$$

This result shows the spectral volume emissive power to be $(n_1/n_2)^2$ times larger than that derived by McMahon. Gardon explains that McMahon's final results are correct by reason of neglecting the angular distribution of intensity which provides a canceling effect.

With the volume emissive power in terms of the optical properties and the blackbody distribution

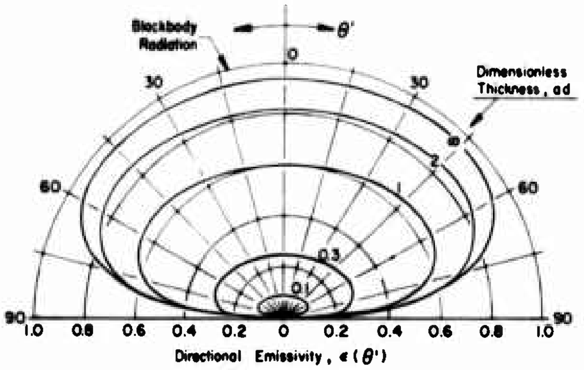


Fig. 12. Angular variation in the directional emissivity of transparent sheets as a function of dimensionless thickness [41].

function. Gardon computes the hemispherical and directional emittance of isothermal sheets of finite thickness. For the special case of $n_2 = 1.0$ and $n_1 = 1.5$, typical of glasses, the directional emittance is shown in Fig. 12 as a function of the dimensional thickness *ad*. The distribution for infinite thickness corresponds to the case discussed during presentation of the Fresnel relation for the opaque nonmetallic; see, for example, Fig. 7. As the thickness is decreased, the directional emittance likewise decreases, but the distribution becomes flatter with relatively larger amounts being emitted in the oblique directions. Hence, the ratio of hemispherical to normal emittance increases as the thickness is reduced. Figure 13 shows the variation of hemispherical emissivity as a function of the dimensionless thickness again for the special case where $n = 1.5$. This curve shows a leveling off as the dimensionless thickness reaches a value in the neighborhood of 3.5; hence, the value of infinite thickness can be realistically defined.

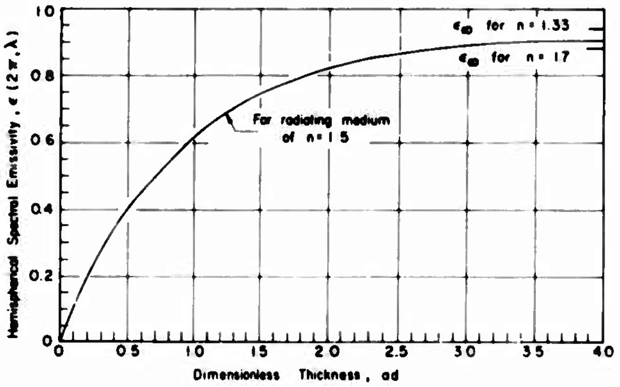


Fig. 13. Hemispherical emissivity of transparent sheets as a function of dimensionless thickness [41].

D. Scattering Phenomena [101]

In the treatment of the absorbing but nonscattering material, the path of individual rays as they undergo multiple reflections and refractions can be modeled and through summation of such rays the optical properties can be determined. The scattering process occurs in most polycrystalline materials and then the processes of reflection and refraction become complex and it is no longer feasible to follow the individual rays. The scattering occurs by reflection and refraction whenever the index of refraction of the material changes along the path of the ray. Such a material is said to be optically inhomogeneous as a result of pores, grain boundaries, and inclusions typical of crystalline materials.

Consider a specimen of very large area, so that edge effects may be neglected, that is irradiated diffusely over its entire area. Under steady-state conditions, the incident flux not reflected at the surface will penetrate into the specimen at an intensity diminishing with the depth of penetration; the amount of the diminution at any point along a plane parallel to the surface will be a function only of the distance of the plane from the surface. Under these conditions a one-dimensional analysis can be used. All flux lost by lateral scattering will be compensated by an equal gain through similar scattering from the surrounding area.

The flux is separated into two portions: I, traveling outward from the interior of the specimen, and J, traveling inward from the surface, both traveling normal to the plane of the surface. Both are attenuated by scattering and absorption. A diffuse absorption coefficient K is defined by equating $KI\,dx$ to the reduction in I by absorption within an infinitesimal layer dx. It should be noted that the diffuse absorption coefficient K is exactly twice the absorption coefficient a referred to previously. A diffuse backscattering coefficient S is similarly defined by equating $SI\,dx$ to the flux scattered backwards from I and added to J in the layer dx.

Within the distance dx the flux I will be diminished by absorption and backscattering, and reinforced by the flux backscattered by J. Hence we can write:

$$dI/dx = -(K + S)I + SJ \tag{99}$$

$$dJ/dx = (K + S)J - SI \tag{100}$$

These are the basic differential equations used by Kubelka [77], Hamaker [52], and others.

Klein [72] derives the following equations for those materials where there is essentially no specular reflection at the surface. These equations should apply to most unglazed ceramic specimens, particularly if the surface is not polished:

$$\rho = \frac{(1 - \beta_0^2)\sinh \sigma_0 D}{(1 + \beta^2)\sinh \sigma_0 D + 2\beta_0 \cosh \sigma_0 D} \quad (101)$$

$$\alpha = \frac{2\beta_0(\beta_0 \sinh \sigma_0 D + \cosh \sigma_0 D - 1)}{(1 + \beta_0^2)\sinh \sigma_0 D + 2\beta_0 \cosh \sigma_0 D}$$

$$\tau = \frac{2\beta_0}{(1 + \beta_0^2)\sinh \sigma_0 D + 2\beta_0 \cosh \sigma_0 D}$$

in which

$$\beta_0 = [K/(K + 2S)]^{1/2}$$

$$\sigma_0 = [K(K + 2S)]^{1/2}$$

$$D = \text{thickness of specimen}$$

Equation (101) has been further developed [97] to include the effects of external specular reflectance of the specimen and internal specular reflection at both surfaces of the specimen. The final equation is

$$\rho(2\pi;2\pi) = \rho_e + (1 - \rho_e)(1 - \rho_i) \cdot \frac{(1 - \beta_0)Me^{\sigma_0 D} - (1 + \beta_0)Oe^{-\sigma_0 D}}{MNe^{\sigma_0 D} - OPe^{-\sigma_0 D}} \quad (102)$$

where $\rho(2\pi;2\pi)$ is the hemispherical reflectance of the specimen for completely diffuse irradiation, ρ_e is the specular reflectance of the specimen front surface for externally incident diffuse flux, ρ_i is the specular reflectance of the specimen front surface for internally incident diffuse flux, ρ_s is the specular reflectance of the specimen back surface for internally incident diffuse flux, and

$$M = (1 + \beta_0) - \rho_s(1 - \beta_0)$$

$$N = (1 + \beta_0) - \rho_i(1 - \beta_0)$$

$$O = (1 - \beta_0) - \rho_s(1 + \beta_0)$$

$$P = (1 - \beta_0) - \rho_i(1 + \beta_0) \quad (103)$$

For a specimen thick enough to be completely opaque, equation (102) reduces to

$$\rho(2\pi;2\pi) = \rho_e + \frac{(1 - \rho_e)(1 - \rho_i)(1 - \beta_0)}{(1 + \beta_0) - \rho_i(1 - \beta_0)} \quad (104)$$

and for such a specimen

$$\epsilon(2\pi) = 1 - \rho(2\pi;2\pi) \quad (105)$$

which states that the hemispherical emittance is equal to one minus the hemispherical reflectance for diffuse irradiation

The *absorption coefficient*, either a or K, is primarily a function of composition rather than structure. However, for some impurities, the effect on the absorption coefficient will depend upon whether they are present in solution in the crystals of the primary constituent or as separate crystallites at grain boundaries, and if present as crystallites, upon their size. The *scattering coefficient* is markedly affected by the structure particularly by the characteristics grain size and porosity.

Table IV shows typical values for the coefficients β_0, σ_0, S, and K for three different types of polycrystalline materials. In general, K can vary from zero, for materials composed of highly transparent crystals, to a value as high as 50,000 mm^{-1} for certain metals at some wavelengths. S will vary from near zero for an optically homogeneous material such as an optical glass or a metal to a high of approximately 1000 mm^{-1} for some white paints. It should be emphasized that for light scattering materials, the reflectivity is related to β_0 which is a function of the ratio of K to S, and not to the absolute value of either K or S. The extinction coefficient which determines the opacity of a material is related to the product SK.

Table IV. Typical Values of Absorption and Scattering Coefficients of Intensely Scattering Materials [101]

Material description	ρ	β_0	σ_0, mm^{-1}	S, mm^{-1}	K, mm^{-1}
Opaque white porcelain enamel	0.9	0.05	50	500	2.5
Polycrystalline ceramic (opaque at 3 mm)	0.82	0.1	1.67	8.25	0.167
Typical opalescent glass (opaque at 25 mm)	0.6	0.25	0.2	0.375	0.05

The usual laws of reflection and refraction at an interface between two materials of different indices of refraction, equations (68) and (71), above, apply only if there is a finite thickness of material, the same order of magnitude or larger as the wavelength of the radiation involved, on each side of the interface. The phenomenon can be explained quantitatively in terms of frustrated internal reflectance [112]. If two 45° totally reflecting prisms are placed so that their totally reflecting surfaces are parallel, and are then brought slowly together, the totally reflecting surfaces will begin to transmit as they approach each other. The transmission for polarized radiation with its electric vector in the plane of incidence is given by

$$\frac{\rho}{\tau} = \frac{(N^2 - 1)^2}{N^2(N^2 - 2)} \sinh^2 \left[\pi \frac{\sqrt{2}d}{\lambda} \sqrt{N^2 - 2} \right] \quad (106)$$

where ρ is the reflectance of the interface, τ is its transmittance ($\rho + \tau = 1$), N is the index of refraction ratio, d is the distance separating the prisms and λ is the wavelength of the radiation involved. For these conditions, $\rho/\tau = \frac{1}{4}$ that given in equation (106) when the electric vector is normal to the plane of incidence. The index of refraction ratio is $N = n_1/n_2$, where n_1 is the index of the prisms and n_2 is that of the layer. When the layer is vacuum, $N = n_1$. When it is air, $N = n_1$ with an error of about 3 parts in 10,000.

Because of this phenomenon, there is a marked effect of the size of particles (such as inclusions or crystallites) or pores on the scattering efficiency of each particle. The scattering efficiency per particle will decrease markedly with diameter below a critical diameter. As a rough approximation, the total scattering power will be proportional to the total interface area, and from this standpoint the scattering particles should be as small as possible. The net result of the two effects is that there is an optimum size for scattering efficiency. A study of rutile pigments in paint [13] has shown that in this case the optimum diameter of the pigment particles is about 0.4 times the wavelength of the light being scattered.

The scattering power of a particle diminishes as the distance separating it from its nearest neighbors becomes less than the critical distance mentioned above. On this basis the maximum scattering power per particle would occur when particles of the optimum size are separated by a distance at least equal to their diameter. If spherical particles were arranged in a cubic array this would occur at volume concentrations of particles of less than about 6.6%. Actually the total scattering for all particles increases as the number of particles increases, because of the increase in total interface area, until the particles get so closely packed that the decrease in effective interface area is greater than the increase in total interface area. Reference [13] indicates that for the rutile pigment studied, the maximum total scattering occurred at a pigment volume concentration of about 25%.

For the case where temperature gradients are appreciable in the scattering, optically inhomogeneous nonmetallic, treatment becomes even more complex. Hamaker [52] and Klein [72] have considered the heat transfer within and from such materials for the condition, with no specular reflection at the surface. Reference [97] reviews further developments in this field relating the emittance of scattering materials to their various optical properties.

9. METHODS OF MEASUREMENT

A. Basic Techniques

Many experimental techniques for measuring the thermal radiative properties of materials have been described in the literature. It is obviously impossible to describe all of the methods in detail here. Instead, the general principles involved will be discussed briefly, and a few general methods will be outlined. The reader is referred to the original references for detailed descriptions of the methods.

In selecting a method for evaluating a given property, it is well to keep in mind the equations previously discussed which can be used to compute one property from another. It frequently happens that the desired property data can be obtained more easily by computation from data obtained by direct measurement of another property than by direct measurement of the desired property.

Methods of evaluating radiant flux fall into two general categories, calorimetric and radiometric. In calorimetric techniques the radiant flux absorbed or emitted by a sample is evaluated in terms of the heat lost or gained by the sample. In radiometric techniques, the radiant flux is measured directly or comparatively. In general, calorimetric techniques tend to be relatively simple and free from systematic error, but of relatively low precision. Radiometric techniques, on the other hand, tend to require more elaborate equipment, and, while capable of relatively high precision, are subject to systematic errors that may be difficult to evaluate.

Calorimetric techniques are used to measure absorptance and emittance; they are not suitable for direct measurement of reflectance. In essence, a sample is placed in an environment where all heat transfer to or from it is by radiation, or is in a form such that it can be evaluated directly in power units (a heater imbedded in the sample for example), or heat loss in terms of the rate of boiling of a liquid such as water or nitrogen. If a steady-state condition is achieved, the heat input can be equated to the heat output, and the net radiant heat transfer can be related to the temperature of the sample. If the temperature of the sample is changing, the net heat transfer to or from the sample can be related to the temperature and rate of temperature change. The desired thermal radiative properties can be computed from the measured rate of radiant heat transfer, the geometry of the system, and the temperature of the sample and its surroundings.

In radiometric techniques the emitted incident and/or reflected radiant flux is measured directly and the desired property is computed as the ratio of measured fluxes. Rather elaborate optical systems may be required to collect the radiant flux from the source and focus it onto the sample for reflectance measurements and to collect the flux reflected or emitted by the specimen and focus it onto the detector for reflectance and emittance measurements. If spectral measurements are made, a monochromator must be included in the optical path. The major errors in radiometric determinations arise from flux losses in the optical system.

The physical properties of nonmetallic materials —their low thermal conductivity and high total emittance—give rise to thermal gradients which create serious problems in the measurement and use of their thermal radiative properties. These materials in general tend to be somewhat translucent and hence emit and absorb radiant energy within a surface layer of appreciable thickness. The thermal gradients tend to be normal to the emitting or absorbing surface, and frequently even are nonlinear very close to the surface. For such a condition—a large gradient across a radiating or absorbing layer of appreciable thickness—it is not possible to define a unique temperature and hence the emittance, defined as the ratio of the flux emitted by the sample to that emitted by a blackbody radiator *at the same temperature*, is difficult to evaluate. For such a nonisothermal condition it is necessary to define an "effective temperature" as that of an isothermal sample which emits at the same rate as the nonisothermal one does. This is not a totally satisfying solution for several reasons, the principal one being that the resulting emittance value has only significance to the peculiar details of the test rather than being a fundamental property of the material. Because of these considerations, all measurements of emittance of nonmetallics should be made when thermal gradients are as small as possible.

B. Reflectance Techniques [30]

The more important techniques for measuring reflectance are summarized in Table V. Only methods that measure essentially all of the reflected radiant energy are included in the table, since methods that measure only a portion of the reflected radiant energy have only limited application. Goniometric reflectance methods, which measure the geometric distribution of the reflected radiant energy are described in a separate section.

Five separate techniques are described in the following sections: they are: (a) heated cavity reflectometers, (b) integrating sphere reflectometers, (c) integrating mirror reflectometers, (d) specular reflectometers, and (e) gonioreflectometers.

a. Heated Cavity Reflectometers

The Gier–Dunkle reflectometer [45] is shown in Figs. 14A and B. The sample forms part of the wall of a blackbody cavity and is irradiated over a hemisphere by blackbody radiation from the hot cavity walls. Images of the sample and a spot on the cavity wall are alternately focused by the optical system onto the entrance slit of the monochromator. The output of the monochromator is the ratio of the radiances in the two beams, which is a measure of the hemispherical directional reflectance factor $R(2\pi; \theta', \omega')$ of the specimen.

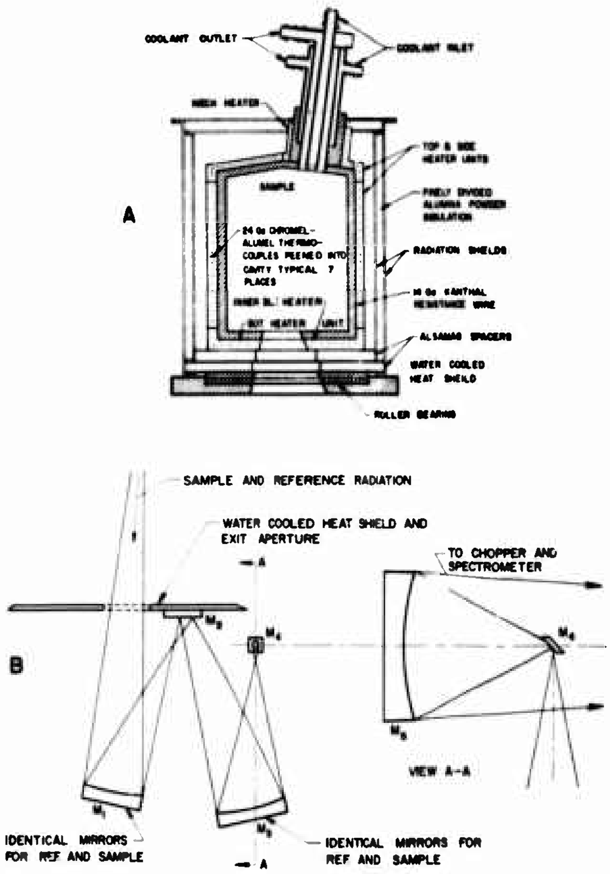


Fig. 14. Schematic of the heated cavity (Hohlraum) reflectometer—the cavity and specimen arrangement. (A) cavity and sample arrangement. (B) auxiliary optics—sample and reference beam viewing.

The sample is usually viewed at an angle of about 4° from the normal, so that the specular component is included in the measured value. If desired, the sample can be viewed normally, so that the specular component is not included in the measured value.

The double-beam monochromator frequently used with the hohlraum reflectometer is a prism instrument with a thermocouple detector that covers the wavelength range of 1 to 35 μm. The wavelength range is set primarily by the energy available for measurement and the sensitivity of the detector.

Because $R(2\pi; \theta', \omega') = \rho(\theta, \omega; 2\pi)$, the results are frequently reported as the directional hemispherical reflectance and are reported as such in the data compilation of this volume, with a footnote to the effect that $R(2\pi; \theta', \omega')$ was actually measured.

There are many sources of error in heated cavity reflectance measurements which have been discussed in detail in the literature [25, 60, 110]. The principal sources of error arise due to nonuniform irradiance of the sample over the hemisphere as a result of the aperture and thermal gradients in the cavity, emission from the sample due to heating, and failure of the radiance of the spot viewed on the cavity wall to represent the average radiance of the cavity walls, again due to thermal gradients in the cavity.

The hohlraum reflectometer irradiates the sample over nearly a complete hemisphere with nearly uniform radiance, hence the measured values are nearly independent of the geometric distribution of flux reflected by the sample. The instrument can be used to measure both specularly and diffusely

Table V. Primary Reflectance Techniques

Type of reflectometer	Property	Wavelength range, μm	Temperature range, K	References	Remarks
Heated Cavity (Hohlraum)	$\rho(0; 2\pi)$	2–35	300–900	45	A versatile infrared instrument; in widespread use.
Integrating Spheres					
Substitution comparative type	$R(0; 2\pi)$	0.3–2.6	300	49, 62	Sample mounted at sphere surface; technique used in many commercial spectrophotometers; may be sensitive to sample texture.
Absolute	$\rho(\theta; 2\pi)$	0.2–2.6	300	31	Sample mounted at sphere center; suitable for sample of arbitrary reflection distribution function.
Laser source	$R(0; 2\pi)$	0.63, 1.15	300–2500	74	Laser used as conventional source.
Integrating Mirrors					
Coblentz hemisphere	$\rho(\theta; 2\pi)$	1–15	300–600	20, 64	Sample and detector or source are located at conjugate focal points of a hemispherical mirror; aberrations are a serious source of error.
Paraboloidal	$\rho(\theta; 2\pi)$	2–100	300	25, 92	Suitable for samples of arbitrary reflection distribution function.
Ellipsoidal	$\rho(\theta; 2\pi)$	1–15	300–400	29	Aberrations are reduced by using an ellipsoidal mirror with true focal points instead of a hemispherical mirror.
Multiple Reflection					
Strong technique	$\rho(0; 0)$	0.3–35	300	43, 111	For specular reflectors only.
Bennett–Koehler modification	$\rho(0; 0)$	0.2–35	300	2	Errors minimized by unique optical design, accuracy state of the art ± 0.001 unit.

reflecting samples. It is not recommended that measurements be made on heated samples since it is not possible to separate the radiant energy reflected and emitted by the sample.

Several versions of the heated cavity reflectometer have been built and the reader is referred to the literature for details. One major advance [26] has been to place the water-cooled specimen at the center of the cavity, away from the walls, so that the angle of viewing can be varied from normal to near grazing. This modification has the further advantage that cooling of the cavity walls by the cooling water for the specimen is virtually eliminated, hence thermal gradients within the cavity are usually much smaller than for the type of cavity shown in Fig. 14A.

b. Integrating Sphere Reflectometers

Integrating sphere reflectometers are used in greater numbers than any other type, and many different commercial instruments of this type are available. The reflectometer uses an integrating sphere to collect the radiant energy reflected by a sample. The reflected flux is distributed uniformly over the surface of the sphere, where it can be sampled by a detector. The sphere has an inside surface that has a high uniform reflectance and is a near-perfect diffuse reflector. There are several apertures in the sphere, one for the incident beam, one for the detector, and one for the sample. There may also be one for the comparison standard.

The theory of the integrating sphere is based on two fundamental laws of radiation: (1) the flux received by an elemental area from a point source is inversely proportional to the square of the distance from the source and directly proportional to the cosine of the angle between the normal to the surface and the direction of incidence, and (2) the flux reflected by a perfect diffuser follows the cosine distribution law, which means that the flux per unit solid angle reflected from a unit surface area in a given direction is proportional to the cosine of the angle between the normal to the surface and the given direction. Thus, for a sphere having an inner surface of uniform perfectly diffuse reflectance, the flux reflected by an area on the sphere wall is uniformly distributed over the surface of the sphere.

Integrating sphere instruments can be operated in the direct or indirect mode. In the direct mode the sample is irradiated directly, and the detector views an area on the sphere wall. A similar reading is then taken on a comparison standard of known reflectance under the same conditions. The measured directional-hemispherical reflectance factor $R(\theta, \omega; 2\pi)$ is then the ratio of the sample reading to the standard reading times the known reflectance of the standard.

In the indirect mode the beam from the source is first incident on the sphere wall, and the sample is irradiated uniformly over the hemisphere. The detector views the sample directly. A similar reading is then taken on a comparison standard of known reflectance under the same conditions. The measured hemispherical-directional reflectance factor $R(2\pi; \theta', \omega')$ is then the ratio of the sample reading to the standard reading times the known reflectance of the standard. The measured reflectance factors $R(\theta, \omega; 2\pi)$ and $R(2\pi; \theta', \omega')$ are each equal to the directional hemispherical reflectance $\rho(\theta, \omega; 2\pi)$ and are frequently reported as such.

The sample may be removed and replaced by the standard (substitution method), or there may be separate sample and standard apertures which are alternately irradiated or viewed (comparison method). Practically all double-beam recording instruments use the comparison method. In this method the sample and standard apertures should be, and usually are, located symmetrically with respect to the entrance aperture, the detector aperture, and the area of sphere wall viewed by the detector or irradiated by the source.

Errors which may be significant for some specimens can be avoided if there is an internal shield in the sphere which prevents the radiant energy reflected by this specimen, in direct-mode operation, from falling directly onto the area of sphere wall viewed by the detector, or, in indirect-mode operation, that prevents the radiant energy reflected by the sphere wall on the first reflection from falling on the specimen.

Integrating sphere reflectometers frequently include a monochromator, which usually is located in the incident beam between the source and the sphere in instruments operated in the direct mode, and between the sphere and the detector instruments operated in the indirect mode.

The wavelength range over which an integrating sphere reflectometer can be used is determined by the reflectance characteristics of the sphere walls. For the most commonly used wall coatings, magnesium oxide and barium sulfate [86], the spectral range is about 0.25 to 2.5 μm. There are many reports [1, 85] in the literature on the techniques of preparing smoked magnesium oxide, and its reflectance properties. A recent report [50] indicates that high-purity barium sulfate may be superior to smoked magnesium oxide as a sphere coating. Other materials that have been used at longer wavelengths include flowers of sulfur [76], sprayed sodium chloride [74], and coated roughened glass [28]. Such materials have not found extensive use in integrating sphere reflectometers, but have been used in flux-averaging spheres in the infrared [27].

Comparison standards of reflectance are required for most integrating sphere reflectometers. The working standard that is used routinely is usually a piece of white vitrolite glass or white porcelain enamel that has been calibrated against freshly smoked magnesium oxide, MgO [91]. The measured relative reflectance (actually the reflectance factor) may be reported relative to MgO or as "absolute" reflectance, which is the reflectance relative to MgO times the reflectance of MgO. In many cases, the values have been reported simply as reflectance, with no further designation. A second standard frequently used is a block of magnesium carbonate, $MgCO_3$, the surface of which is scraped from time to time to provide a fresh layer of material. Both MgO and $MgCO_3$ have reflectances greater than 0.95 over most of the wavelength range where they are used. Hence, for most engineering purposes, no serious error is introduced if the reflectance of the reference standard is considered to be 1.0 instead of 0.95 to 0.99, as it will be in the visible and near infrared. However, the reflectance of MgO and $MgCO_3$ is low in the ultraviolet, and significant errors can be introduced if it is taken as 1.0 in the wavelength range of 0.25 to 0.4 μm.

Goebel *et al.* [47] have shown how to obtain reflectance of a coating directly through the use of an auxiliary sphere with an integrating sphere reflectometer. Kneissl and Richmond [74] have shown that, in an integrating sphere in which the area viewed by the detector is shielded from the specimen, the ratio of the signal when the specimen is irradiated to that when an area on the sphere wall not in the area viewed by the detector and not shielded from that area is irradiated is the absolute reflectance of the specimen, except for small errors due to flux losses out of the apertures in the sphere.

Errors in integrating sphere reflectometers are due to (1) flux losses out of the apertures of the sphere, (2) direct impingement of radiant energy reflected by the specimen or standard onto the area viewed by the detector, (3) direct impingement of radiant energy reflected by the sample onto the detector, and (4) variations in the reflectance of the sphere coating and deviations of the sphere coating from a perfectly diffuse reflector. Error 1 can be minimized by reducing the ratio of the total area of the apertures to the area of the sphere wall. Errors 2 and 3 can be virtually eliminated by use of suitable radiation shields in the sphere. Error 4 can be reduced by care in the choice and application of the sphere coating. For well-designed spheres, carefully maintained, the errors should not exceed 2 or 3 percent. If the sample and comparison standard have the same geometric distribution of reflected radiant energy, the flux losses cancel out, and there is no error. The error for any particular sample is a function of the geometric distribution of reflected radiant energy for the sample.

The integrating sphere developed by Edwards *et al.* [31] is unusual in that it is designed to measure directional-hemispherical reflectance at angles of incidence from 0° (normal) to 80° from the normal. This instrument is illustrated in Figs. 15A and B. The specimen is irradiated with monochromatic radiant energy through port *E*, and the detector is located at port *C*. For absolute reflectance measurements the sphere wall, of coated magnesium oxide, is used as the reference. This is accomplished by translation and rotation of the sphere so that the incident beam misses the sample and strikes the sphere wall as shown in Fig. 15C. For relative measurements, a calibrated standard is attached to the back of the specimen holder as shown in the figures.

A recent development is the use of a laser-source integrating sphere reflectometer [73, 74] to measure directional-hemispherical reflectance of samples at temperatures up to 2500 K. The instrument is used at wavelengths of 0.6328, 1.15, and 3.39 μm. The high-intensity narrow-bandwidth chopped source, a spike filter in front of the detector that transmits only at the laser wavelength, and synchronous amplification of the signal from the detector combine to produce a good signal-to-noise ratio in the presence of the large amount of radiant energy emitted by the hot specimen.

While not an integrating sphere reflectometer, the technique of McNicholas [82] and Martin [83] gives data equivalent to those obtained with such an instrument. In this type of reflectometer, the specimen is located at the center of curvature of a hemispherical source and is viewed directionally through a small hole in the hemispherical source. Hemispherical illumination of the sample is achieved by distributed light sources about the exterior of the translucent hemisphere.

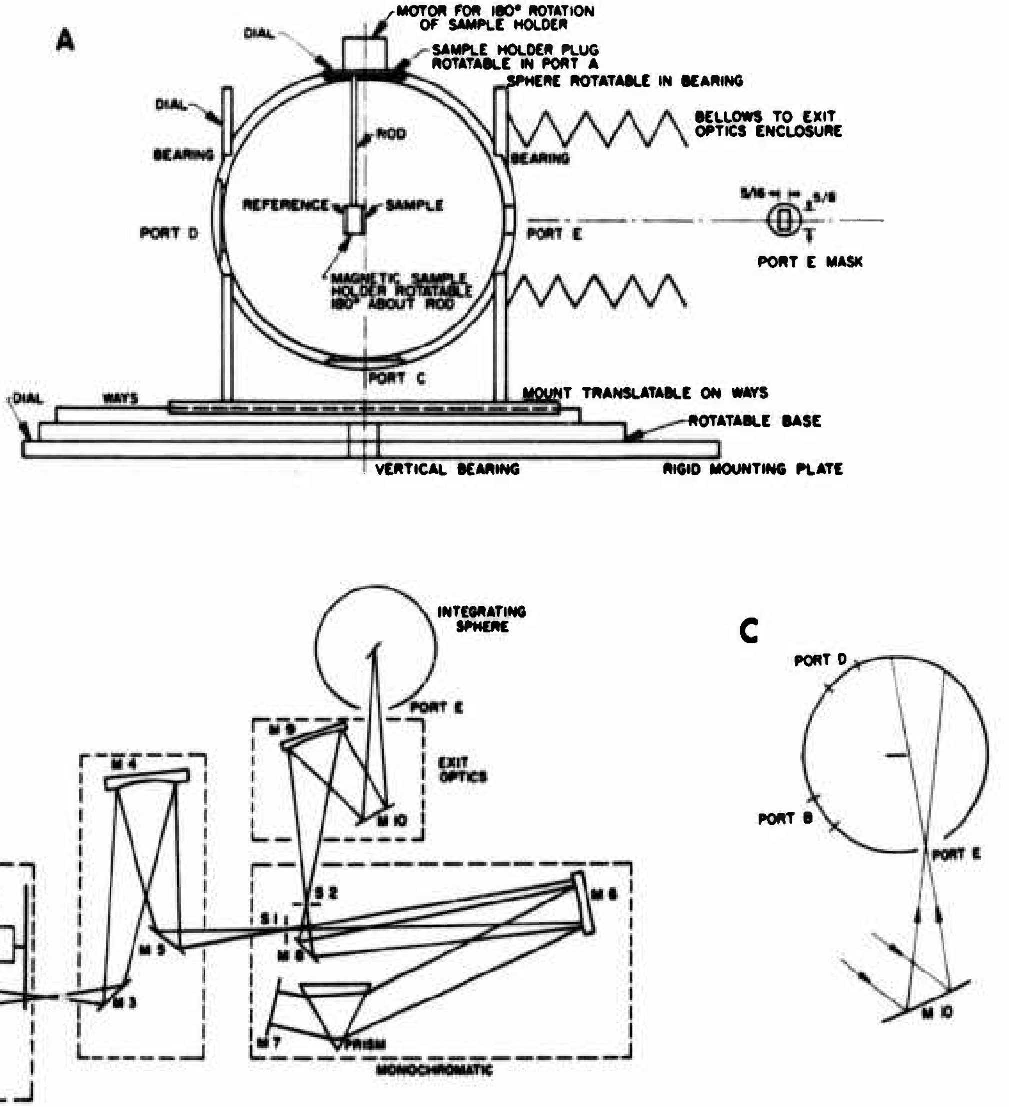


Fig. 15. Integrating sphere reflectometer, after Edwards *et al.* [31]. (A) the sphere. (B) auxiliary optics. (C) top view in the reference position for absolute reflectance measurements.

c. Integrating Mirror Reflectometers

An alternative to the integrating sphere is to replace the sphere with an integrating mirror. There are both advantages and disadvantages to this approach. Mirrors in general have high reflectance in the infrared and are much more efficient than integrating spheres, hence are highly advantageous in the infrared where energy is low. On the other hand, it is physically impossible to collect the radiant energy, reflected by a sample into a hemisphere, into a parallel beam of small cross section. For this reason, an integrating mirror reflectometer requires either a large area detector, a detector that is equally responsive to energy incident on it from different directions within a large solid angle, or a flux-averaging device [28] in front of the detector.

Three types of integrating mirrors have been used: hemispherical, ellipsoidal, and paraboloidal.*

(i) *Hemispherical Mirror Reflectometers.* The hemispherical or Coblentz [20] mirror reflectometer was one of the earliest reflectance techniques developed. A diagram of the instrument is shown in Fig. 16. The operation of hemispherical mirror

*This discussion does not include the arc-image-type apparatus [94, 121] which employ extensive integrating mirrors. Such apparatus are most useful for measurements on nonmetallic materials and for elevated temperatures in the 2500 to 3700 K range.

reflectometers is based on the fact that radiant energy leaving a point source in the plane of the edge of the hemisphere will be focused into a small image surrounding a second point in the same plane, diametrically opposite the source, and at the same distance as the source from the center of the hemisphere [10]. These two points are called conjugate focal points. The size of the image is determined by spherical aberrations, which for any hemisphere increase with the distance from the source to the center.

In the Coblentz instrument the sample is centered on one conjugate focal point, and the detector is centered on the other. The two conjugate focal points selected are close to the center, and thus to each other. The sample is irradiated directionally through a small hole in the hemisphere. An enlarged image of the irradiated area of the sample is focused onto the detector. The detector can be moved to the first focal point to measure the incident flux directly, or a standard of known reflectance can be measured to evaluate the incident flux. The ratio of the reflected flux to the measured incident flux, corrected for system losses, is the directional hemispherical reflectance $\rho(\theta; 2\pi)$. When a standard of known reflectance is used to evaluate the incident flux, the instrument measures the normal-hemispherical reflectance factor $R(\theta; 2\pi)$.

Major losses in the system are the absorptance of the mirror, flux lost out of the entrance aperture, atmospheric absorption, and flux that misses the detector due to aberrations. Additional errors are due to failure of the detector to sense equally flux incident from different angles (angular sensitivity)

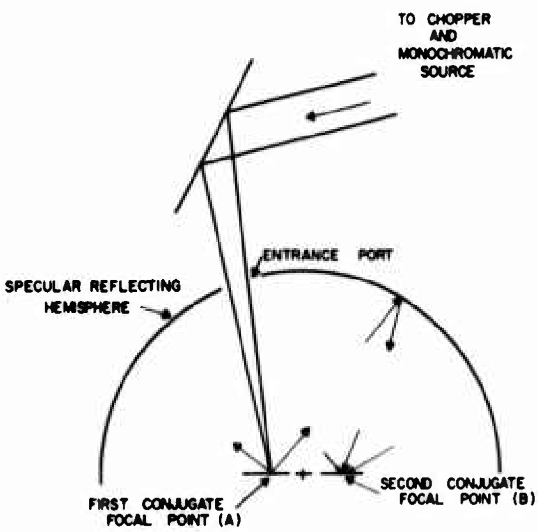


Fig. 16. The Coblentz hemisphere.

and on different portions of the sensitive area (areal sensitivity).

Janssen and Torborg [64] modified the original Coblentz instrument as illustrated in Fig. 17. A diffuser at one conjugate focal point is irradiated through a hole in the mirror, and the sample at the second conjugate focal point is irradiated hemispherically by the reflected flux from the diffuser. The specimen is viewed directionally near normal through a second hole in the mirror. This modification permits heating of the sample without affecting the detector, which could not be done with the original Coblentz instrument. A comparison standard is required to evaluate the incident flux. The instrument operated over the wavelength range of 0.4 to 20 μm and at sample temperatures up to 300 C.

White [119] designed an automatic recording double-beam instrument employing a hemispherical reflector. A Nichrome wire source is located at the first focal point, and the sample at the second. The source and specimen are viewed through a single large hole in the hemisphere, by optical systems that focus images on the entrance slits for the two beams of a double-beam spectrometer. The wavelength range is 2.5 to 22.5 μm. A unique internal chopper is provided, so that measurements can be made on heated specimens at temperatures up to 1000 C. Measurements have also been made on specimens at temperatures as low as −196 C [69].

Birkebak and Hartnett [7] extended the hemisphere to about three-fourths of a sphere, which permitted the sample and detector to be tilted so that the reflectance could be evaluated for different angles of incidence. Kozyrev and Vershinin [75] used baffles within the hemisphere to measure the flux reflected into preselected solid angles. Other variations of the hemispherical mirror instrument are described in references [23, 106].

(ii) *Paraboloidal Mirror Reflectometers.* The paraboloidal mirror reflectometer [25] is shown in Fig. 18. The basic principle of the instrument is the same as for the hemispherical mirror reflectometer. The movable mirror between the two paraboloids permits the sample to be irradiated at any desired angle. Neher and Edwards [92] used off-axis paraboloids, as shown in Fig. 19. In this case the sample is irradiated hemispherically by a large-area source, and is viewed directionally. The mirrors designated *FM* in the figure are filter mirrors that reflect only in the infrared and absorb at wavelengths

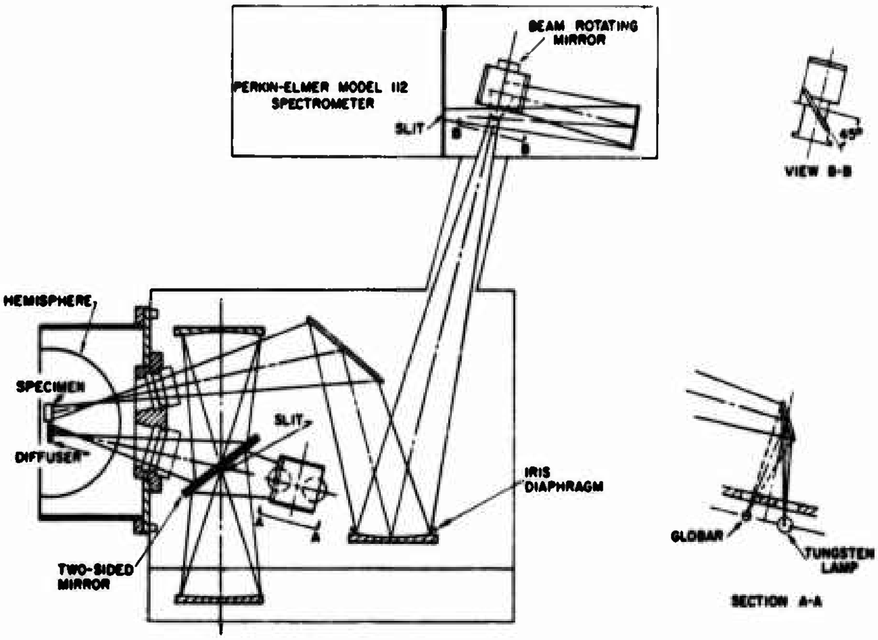


Fig. 17. The Janssen–Torborg hemispherical reflectometer [64].

below 2 μm, thus reducing errors due to stray radiant energy. The instrument operates in the 2 to 100 μm range.

(iii) *Ellipsoidal Mirror Reflectometers.* Aberrations in the optical system are reduced when the hemispherical mirror is replaced with a prolate ellipsoidal mirror, which has true focal points. If an ellipsoid of low eccentricity is cut along a plane through the major axis, one half can be used to replace the hemisphere in a hemispherical mirror instrument, with reduced aberrations in the image and improved operation. Neu [93] and Heinisch [56] have constructed instruments of this type.

If a prolate ellipsoid of appreciable eccentricity is cut in a plane normal to the major axis that

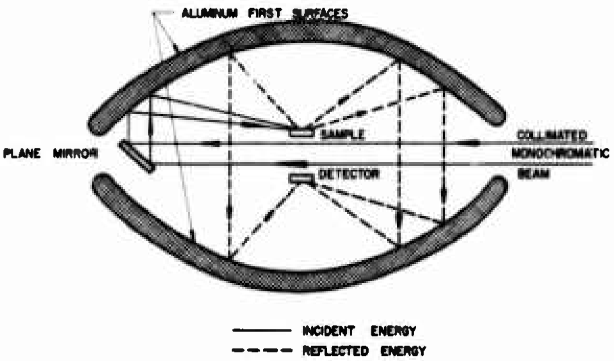


Fig. 18. The paraboloidal reflectometer.

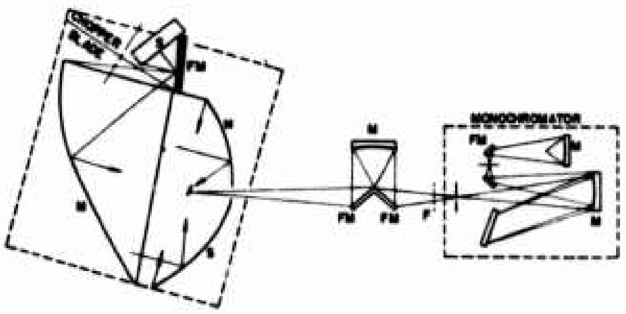


Fig. 19. Neher–Edwards paraboloidal reflectometer [92].

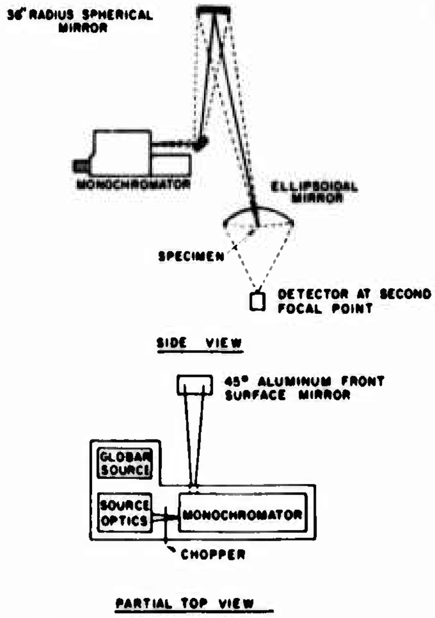


Fig. 20. Ellipsoidal mirror reflectometer.

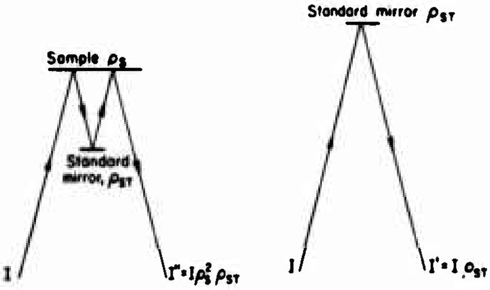
contains one focal point, the smaller portion of the ellipsoid can be used in an instrument of the configuration shown in Fig. 20 [29]. In this case, the sample is located at the first focal point, and irradiated by a small chopped monochromatic beam through a hole in the mirror. An enlarged image of the irradiated area of the sample is formed at the second focal point where the detector is located. Because the image is blurred, a flux-averaging device [28], usually an integrating sphere coated with μ-sulfur or sodium chloride, is used in front of the detector. Shields can be placed in the first focal plane to confine the measured flux to that reflected by the specimen into any desired solid angle. Corrections can thus be made for all flux losses on the basis of the actual geometric distribution of reflected radiant energy from the sample being measured, and the final error can be reduced to less than one per percent. A high-quality mirror of known reflectance is used as the reference standard. The useful range of the instrument used in this manner is about 0.4 to 8.0 μm with the long-wavelength limit being imposed by the low efficiency of the averaging sphere. Detector scanning devices [102] can be used to extend the wavelength range to 15 μm.

An improved version of this instrument [102] employs a large area source surrounding the second focal point, which irradiates a sample at the first focal point uniformly over a hemisphere. The specimen is viewed through a small hole in the mirror, and the reflected beam is passed through a monochromator in front of the detector. When used in this mode, satisfactory operation was attained at wavelengths out to beyond 30 μm.

The ellipsoidal mirror reflectometer measures directional-hemispherical reflectance factor $R(\theta, \omega : 2\pi)$ when used in the direct mode (detector at second focal point) and hemispherical directional reflectance factor $R(2\pi : \theta', \omega')$ when used in the inverse mode (source at the second focal point).

d. Specular Reflectometers

For high-quality mirrors the multiple-reflection technique [34, 43, 111] is simple and accurate. Figure 21 shows a schematic of the optical path. The reflectance is computed as the square root of the ratio of two measured fluxes, hence the uncertainty in the reflectance is about half that in the measured ratio. Very accurate alignment of the mirrors, and optically flat mirrors, are required to maintain the same beam geometry for the two configurations. The major source of error is due to slight displacement of the reflected beam on the detector, since for most detectors the output varies with the position of the incident beam on the detector. Flux-averaging devices in front of the detector can help to minimize this error [2].



$$\rho_S = \left(\frac{I''}{I'}\right)^{\frac{1}{2}}$$

Fig. 21. The Strong multiple-reflection technique.

Bennett and Koehler [2] have improved the optical system to reduce the errors due to slight shifts in the alignment of the sample mirror, or slight deviations of the sample from optical flatness. They report accuracies of ± 0.001 reflectance units over the wavelength range of 0.45 to 22.5 μm.

e. Gonioreflectometers

A gonioreflectometer measures bidirectional reflectance as a function of the angle of reflectance for any given angle of incidence. Several instruments [12, 48, 74] have been constructed to measure bidirectional reflectance in the plane of incidence. More elaborate instruments [11, 22, 87] have been developed to measure bidirectional reflectance over the entire hemisphere. The latter instruments permit scanning over nearly the entire hemisphere for any given direction of incidence, and the angle of incidence can be varied from normal to near grazing. In addition, the measurements can be made with monochromatic incident radiant energy over the wavelength range of about 0.5 to 1.0 μm. Reference [89] describes an infrared technique for measuring the angular scattering of transmitted flux of polycrystalline materials.

C. Radiometric Emittance Techniques

Thermal emittance may be measured directly by measuring the ratio of the radiance of a sample to that of a blackbody radiator at the same temperature and under the same geometric and wavelength conditions of viewing. The measured property is then the directional emittance of the sample, either total, if all wavelengths are measured at once with a nonselective detector, or spectral, if the measurement is confined to a narrow spectral band.

a. General Considerations

The comparison blackbody may be either an integral blackbody cavity, whose walls are formed by the sample [24] or a separate blackbody controlled at the temperature of the sample [99]. The integral blackbody is preferred when working at very high temperatures, where temperature measurement and control may be difficult, or at very short wavelengths, where extremely close temperature control is required for accurate measurements. The blackbody cavity should be sufficiently deep to appear "black" and yet be isothermal; these are difficult requirements to satisfy in many nonmetallic samples. The isothermal requirement can be better satisfied by a shallow cavity which then requires a correction for deviation from an emittance of unity, according to the extensive studies of Kelly and Moore *et al.* [70, 88].

The integral blackbody technique is particularly suitable when measuring samples that are heated in a vacuum or in controlled atmospheres, where they must be viewed through a window. The transmittance of the window may be changed as a result of the condensation on its inner surface of material volatilized from the hot specimen. Such change in transmittance can cause serious errors, which are compensated when both the sample and comparison blackbody are viewed through the same window. The separate blackbody technique is most accurate at temperatures below 1800 K, where temperature measurement and control by use of conventional thermocouples present no serious problems.

Spectral emittance is usually desired at all wavelengths where significant amounts of radiant energy are emitted. This range was shown as a function of temperature in Fig. 4. As a practical matter, most measurements are made in the 1 to 15 μm range, with a few being extended out to 30 or 35 μm. Measurements in wavelengths below about 1 μm are difficult because of temperature control problems; measurements at long wavelengths are difficult because of the low energy available for measurement.

The change in temperature required to change the spectral radiance of a blackbody radiator by 0.5% is given in Table VI for several wavelengths and temperatures. These data indicate the degree of temperature control that is required for accurate emittance measurements, particularly by the separate blackbody technique.

b. Rotating Cylindrical Sample Technique

The alternate heating and viewing of a moving sample is an approach for reducing and controlling the thermal gradients. The sample is enclosed in a furnace where it is heated then moved in front of a cooled port where it is viewed briefly. It may also involve alternate heating by radiation and viewing of a stationary sample, where the periods of heating and viewing are controlled by rotating shutters. Movable specimens have been tested in the form of a rotating disc [19, 71, 81, 108], a rotating cylinder [17, 33], or as discs mounted on an oscillating beam [3]. Stationary specimens have been heated in an arc-image furnace [21, 32, 94, 121] and in a solar furnace [78].

In the case of a moving specimen that is alternately heated and cooled, the specimen will reach a steady-rate temperature, and if the motion is rapid enough that the viewing time is short, the temperature fluctuation of the viewed surface will be so small that it can be neglected.

Photon conduction does not generate a thermal gradient in a material. The photons pass through the material without affecting it in any way until they are absorbed. As a result, a specimen that is heated by radiation tends to have a small thermal gradient

Table VI. Allowable Temperature Variation for a ±½% Variation of Blackbody Radiance

	Temperature differences, ΔT (K)					
T (K)	$\lambda = 0.4\ \mu$m	$\lambda = 0.5\ \mu$m	$\lambda = 0.75\ \mu$m	$\lambda = 1.0\ \mu$m	$\lambda = 5\ \mu$m	$\lambda = 15\ \mu$m
500	0.035	0.043	0.065	0.087	0.433	1.112
1000	0.139	0.174	0.261	0.348	1.640	3.215
1500	0.313	0.391	0.586	0.782	3.335	5.538
2000	0.556	0.695	1.042	1.389	5.302	7.949
2500	0.869	1.086	1.628	2.164	7.425	10.389
3000	1.251	1.564	2.343	3.102	9.639	12.848

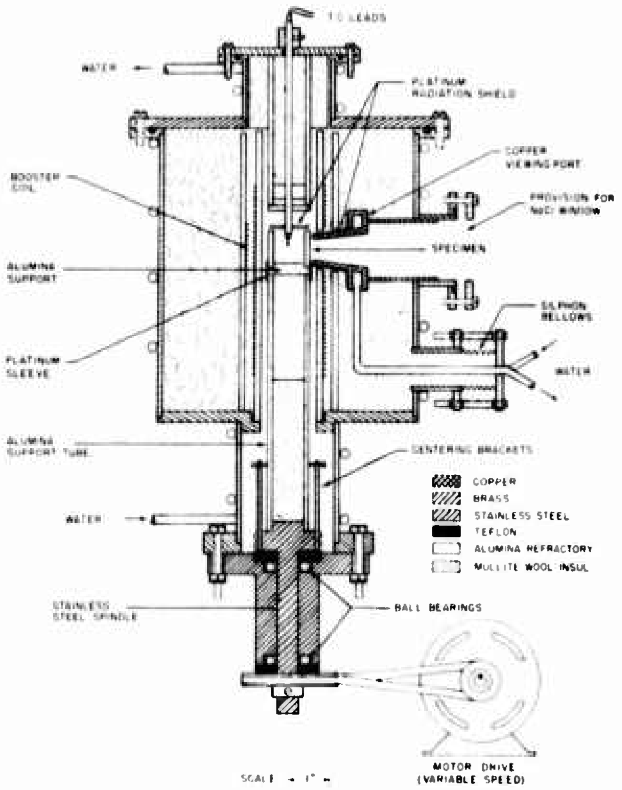


Fig. 22. Cross-sectional view of the rotating specimen furnace used in measuring normal spectral emittance of nonmetals [17].

normal to the heated surface. The radiation is absorbed within the surface layer from which the emitted radiation originates, and after the specimen has reached a steady-state condition, there is little phonon conduction within the surface layer. If the time periods during which the specimen is alternately heated and viewed are brief, the temperature fluctuation of the specimen will be small. Usually these periods are only a fraction of a second. With both moving specimens and radiantly heated stationary specimens the thermal gradients normal to the surface can be reduced to a point where they do not introduce a significant error into the measurement.

The rotating cylinder method used at the National Bureau of Standards [17] will be described briefly and should serve to illustrate the basis for the radiometric techniques of emittance determinations. The specimen was a hollow cylinder 25 mm (1 in.) in diameter and 25 mm (1 in.) high, with an outer surface ground to be round to about 0.05 mm (0.002 in.). A cross-sectional view of the furnace is shown in Fig. 22. The specimen was mounted on top of an alumina pedestal which revolved inside a platinum-wound resistance furnace. The winding of the furnace was designed so that there was no axial thermal gradient along the specimen. The specimen revolved in front of a water-cooled viewing port. A theoretical analysis [95], confirmed by temperature measurements at a point near the surface of a rotating specimen, indicated (1) that the temperature drop at a point on the surface of the rotating specimen as it passed in front of the viewing port was inversely proportional to the speed of rotation of the specimen, and was only about 2 K at a speed of 50 rpm, and (2) that the temperature measured by a stationary, radiation-shielded thermocouple located at the center of the hollow rotating specimen was the same, within about 1 K, as that measured by the thermocouple imbedded near the surface of the rotating specimen.

The flux from the hot specimen was focused on the entrance slit of one beam of a double-beam infrared spectrometer, and the flux from a laboratory blackbody furnace was focused on the entrance slit of the second beam of the spectrometer. The blackbody furnace was controlled to the same temperature as the specimen. The spectrometer automatically scanned over the spectral range of 1 to 15 μm, and plotted the ratio of the signals from the two beams, which after correction for spectrometer errors, was the normal spectral emittance of the specimen.

D. Calorimetric Techniques

In calorimetric techniques the emittance or absorptance is measured in terms of the heat lost or gained by the specimen through radiant heat transfer. The ratio of the observed rate of heat transfer to the computed rate of radiant heat transfer for a blackbody surface under the same conditions gives the emittance or absorptance. This technique is only suitable for total emittance, and, usually, hemispherical total emittance, but can be used for absorptance for incident radiant energy of any desired spectral distribution, including narrow spectral bands.

One common factor in all calorimetric methods is that the sample is thermally isolated from its surroundings so that essentially all heat transfer to or from it is by radiation. The rate of heat transfer is evaluated in terms of the rate of temperature change of the sample, or the power input or output to or from the specimen is in a form such that it can be accurately evaluated. This assures that when the sample reaches an equilibrium temperature, the radiant heat transfer can be equated to the heat transfer by other means.

a. Measurements in the Range 270 *to* 500 K

In this temperature range the heat input is frequently by radiation [38, 44]. The sample may be heated by a beam from a solar simulator, and the $\alpha(s)/\epsilon(2\pi:t)$ ratio computed from the equilibrium temperature attained by use of the equation [14]

$$\alpha(s)/\epsilon(2\pi:t) = A_2\sigma(T_1^4 - T_2^4)/EA_1 \qquad (107)$$

or during heating by use of the equation

$$\alpha(s) = [\epsilon(2\pi:t)A_2\sigma(T_1^4 - T_2^4) + MC_p\, dT_1/dt]/EA_1 \qquad (108)$$

where $\alpha(s)$ is the solar absorptance, $\epsilon(2\pi:t)$ is the hemispherical total emittance, A_2 is the total surface area of the sample, σ is the Stefan–Boltzmann constant, T_1 is the temperature of the sample, T_2 is the temperature of the chamber walls, E is the irradiance on the sample, A_1 is the irradiated area of the sample, M is the mass of the sample, C_p is the specific heat of the sample, and dT_1/dt is the rate of temperature change of the sample. The source is then turned off, and the sample is allowed to cool. The hemispherical total

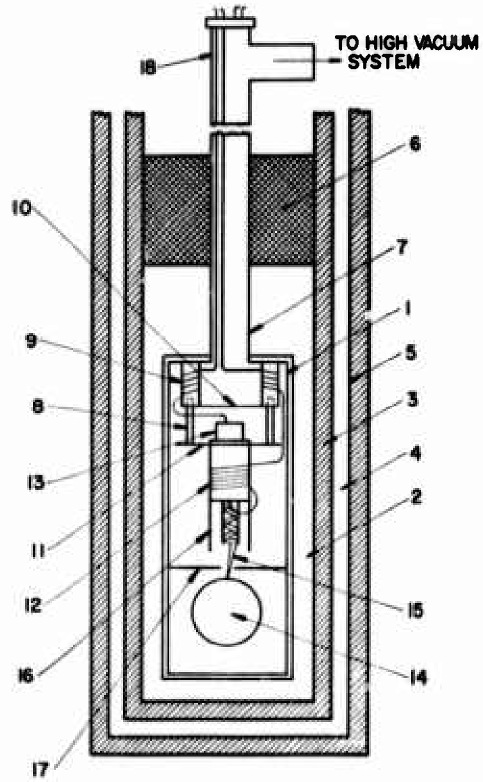


Fig. 23. Concentric sphere technique for low-temperature hemispherical total emittance [15]: 1) sample container, 2) liquid helium space, 3) super-insulated dewar, 4) liquid nitrogen space, 5) dewar, 6) heat exchanger, 7) support tube, 8) nylon studs, 9) copper posts, 10) copper plate, 11) copper plate, 12) copper block, 13) germanium resistance thermometer, 14) sample, 15) differential thermocouple, 16) radiation shield, 17) radiation shield, 18) hermetic seal.

emittance can then be computed by the equation

$$\epsilon(2\pi:t) = \frac{MC_p\, dT_1/dt}{\sigma A_2(T_1^4 - T_2^4)} \qquad (109)$$

c. Measurements below 270 K

For measurements at temperatures below 270 K the chamber walls may be cooled by liquid helium [14, 65] and the $\alpha(s)/\epsilon(2\pi:t)$ ratio measured by the procedures outlined above. For steady-state measurements, the heat input may be electrical [15, 36, 37]. Figure 23 shows a helium-cooled chamber used for measurements at temperatures in the 20 to 300 K range, in which electrical heating is employed. The hemispherical total emittance can be computed from the net heat-transfer rate between two parallel plates held at different temperatures. Figure 24 is one such type of apparatus [54, 55] in which two samples of the same material are used. The lower sample, 8 in. in diameter, is electrically heated and maintained at about 290 K, and the upper sample, 4 in. in diameter, is cooled by the liquid nitrogen to about 80 K. The net heat-transfer rate is measured by the rate of boil-off of the liquid nitrogen from the inner dewar. The emittance, ϵ, is computed from

$$\Phi = \sigma\frac{\epsilon}{2-\epsilon}A(T_1^4 - T_2^4) \qquad (110)$$

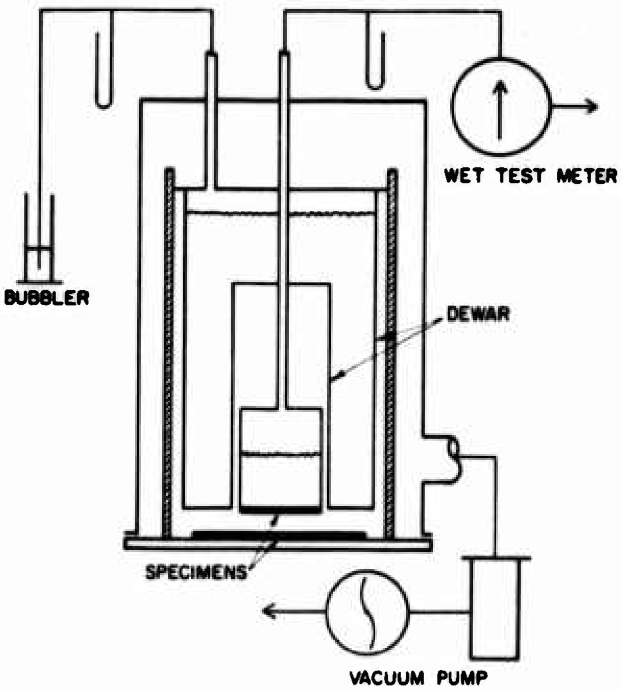


Fig. 24. Flat-plate technique for averaged hemispherical total emittance, low-temperature region [55].

where Φ is the measured heat-transfer rate, A is the area of the cold (upper) sample, T_1 is the temperature of the hot sample, and T_2 is the temperature of the cold sample. The measured emittance, ϵ, is an average hemispherical total emittance for the sample material at the two temperatures. The factor $\epsilon/(2 - \epsilon)$ in the equation arises from the geometrical view factor between infinite parallel plates. This condition is closely approximated by the small separation between the plates, $\frac{1}{4}$ in., and the larger size of the lower plate. Caren [16] describes an instrument for the range 10 to 300 K of a similar nature.

Biondi [6] measured the spectral absorptance and reflectance of specularly reflecting samples at 4.2 K. The sample and a black absorber are thermally bonded to copper stages of appreciable thermal mass, which are in turn thermally connected to the liquid helium sink through heat leads of the proper thermal conductivity to give the stage a thermal time constant of about 10. The black absorber is positioned to receive the radiant energy specularly reflected by the sample. The stages can also be electrically heated. The sample is irradiated with a beam of monochromatic radiant energy of known irradiance and allowed to come to thermal equilibrium. The temperature of the copper stages is then measured, as well as that of the liquid helium sink. The source is then turned off, and the copper stages are heated electrically to the same temperature observed during irradiation. The radiant flux absorbed by the sample and black absorber is then equated to the electrical power required to maintain each stage at its respective temperature, and the reflectance and absorptance of the specimen is computed.

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Numerical Data

Data Presentation and Related General Information

1. SCOPE OF COVERAGE

Included in this volume are data on 7 nonmetallic elements, 46 oxides, 59 multiple oxides and salts, 185 nonoxide compounds, 13 groups of cermets, and many entries of other classes of materials, including intermetallics, mixtures, glasses, minerals, rocks, and polymers. Materials within each group are arranged in alphabetical order by name, as listed in the *Grouping of Materials and List of Figures and Tables* in the front of the volume. In all, this volume reports 4705 sets of data on 782 materials, which are listed in the *Material Index* at the end of the volume. The *Material Index* lists also the materials contained in Volume 7.

These data were obtained by systematically examining over 1500 documents on radiative properties (journals, reports, theses, etc.) dated from 1970 back to the early 1900's. Striking a compromise between completeness of coverage, broad representation of available data, and economy of time and effort, it was necessary to limit the references containing useful data. 455 references have been included in this volume as data sources and 75% of these have been published since 1963. The documents were collected, organized, and coded by TPRC's Scientific Documentation Division which scans, on a continuing basis, the world literature through abstracting journals and a large number of primary technical and scientific journals.

Since the major area of interest in thermal radiative properties is on materials in their solid state, the data presented cover only the temperature range from near 0 K to the melting point of the materials presented.

The four primary properties covered in this work, as defined in an earlier section, are emittance, reflectance, absorptance, and transmittance. The suffix *ance* is used to indicate that the radiative parameters are not unique properties of the bulk material, but rather depend strongly on the character of the surface. This contrasts with the use of the suffix *ivity*, which denotes the property of the ideal optically smooth, and homogenous material. Application of the geometric and wavelength descriptors to these four primary properties results in the 33 subproperties listed in Table VII.

The thermal radiation spectrum of engineering importance includes a relatively small portion of the total electromagnetic wave spectrum. Typically, the interval runs from 0.3 to 50 μm. However, there are many applications where there exist significant amounts of energy outside these conventional limits. For this reason, spectral data in this volume cover the expanded wavelength range 0.05 to 1000 μm.

2. PRESENTATION OF DATA

For each material, subproperty data are separately presented in graphical and tabular form, accompanied by a table presenting details of the test conditions and specimen preparation and characterization.

The format for the presentation of the thermal radiative properties is designed specifically to supply the reader with the aspects of the properties in a comprehensive yet concise form. Each presentation consists of four sections,* analyzed data graph, original data plot, specification table, and data table, in that order.

The analyzed data graph presents a new and powerful approach to increasing the effectiveness of literature data. It is an evaluative review identifying and "recommending" reliable or typical data for various surface or environmental conditions. Where the data are well characterized or highly reliable, it is represented by a solid curve; where there exists some speculation, the data are represented by dashed lines or a shaded band.

*In certain cases where there exists only a small amount of data, the graphical presentation is omitted.

Table VII. Subproperty Designation

Emittance
Hemispherical total emittance
Normal total emittance
Angular total emittance
Hemispherical spectral emittance
Normal spectral emittance
Angular spectral emittance
Reflectance*
Hemispherical integrated reflectance
Normal integrated reflectance
Angular integrated reflectance
Hemispherical spectral reflectance
Normal spectral reflectance
Angular spectral reflectance
Hemispherical solar reflectance
Normal solar reflectance
Angular solar reflectance
Absorptance
Hemispherical integrated absorptance
Normal integrated absorptance
Angular integrated absorptance
Hemispherical spectral absorptance
Normal spectral absorptance
Angular spectral absorptance
Hemispherical solar absorptance
Normal solar absorptance
Angular solar absorptance
Transmittance*
Hemispherical integrated transmittance
Normal integrated transmittance
Angular integrated transmittance
Hemispherical spectral transmittance
Normal spectral transmittance
Angular spectral transmittance
Hemispherical solar transmittance
Normal solar transmittance
Angular solar transmittance

*The geometry descriptors refer to the conditions of the incident radiant flux.

The original data plot is a graphical representation which presents most of the tabulated data. In overcrowded figures some of the data which are repetitive in nature are omitted. Occasionally comments on the test conditions are included to add clarity to the presentation.

The specification table gives the most important information concerning a set of data: the curve number for correlating the information on the specification table with that of the figures and data table, the reference number corresponding to the number given in the listed references, the year of the publication from which the data were extracted, independent variable range (temperature or wavelength), geometric descriptors (θ, θ', ω, ω'), and the error (%) reported by the author.

The "Composition (weight percent), Specifications and Remarks" column of the specification table provides all the available pertinent information about the specimen and test conditions. The presentation is standardized in the following order:

(1) trade name of material if applicable
(2) composition (weight percent)
(3) film or foil thickness
(4) specimen preparation processes
(5) surface conditions (roughness, etc.)
(6) environment
(7) form in which data were presented in original source document (smooth curve, tabular, raw data, etc.)
(8) reference standard used in data observation or reduction
(9) other pertinent information
(10) author's sample designation

With regard to item (8), the phrase "MgO reference standard" is frequently used to mean the reported reflectance data are relative to MgO; no mention is made of a reference standard if the author converts the data into "absolute" reflectance values.

Following the specification table is the data table, a tabular presentation of all the property values shown or not shown on the figure and described in the Specification Table.

Table VII lists the grouping of the various subproperties that are presented in this volume. It shows the 33 subproperties which are classified for organizational and retrieval purposes. The amount of existing data for some of these subproperties is quite small, but there are good reasons to present the data using this generalized scheme. First, clarity of presentation is better served by not grouping together data which logically are unrelated. Also, this scheme lends itself especially well to the systematic updating and expansion contemplated for this continuing work.

3. CLASSIFICATION OF MATERIALS

The classification scheme for materials in Volume 8, shown in Table VIII, is based upon bulk composition rather than surface composition which may be dependent upon environmental effects, etc. The scheme is mainly for the convenience of material grouping and data organization, and is not intended to be used as basic definitions for the various material groups.

4. SYMBOLS AND ABBREVIATIONS USED IN THE FIGURES AND TABLES

ϵ	Emittance
ρ	Reflectance
α	Absorptance
τ	Transmittance
λ	Wavelength, μm
T	Temperature, K
M.P.	Melting point
θ, θ'	Zenith angle, degrees
ϕ, ϕ'	Azimuthal angle, degrees
ω, ω'	Solid angle, steradians
′ (prime)	Viewing conditions
$>$	Greater than
$<$	Less than
$\sim$	Approximately
③	Curve number
$\boxed{4}$	Single data point number

5. CONVENTION FOR BIBLIOGRAPHIC CITATIONS

For the following types of documents the bibliographic information is cited in the sequences given below.

Journal Articles

a. Author(s)—The names and initials of all authors are given. The last name is written first, followed by initials.
b. Title of article.
c. Journal title—The abbreviated title of the journal as used in *Chemical Abstracts* is given.
d. Series, volume, and number—If the series is designated by a letter, no comma is used between the letter for series and the numeral for volume, and they are underlined together. In case series is also designated by a numeral, a comma is used between the numeral for series and the numeral for volume, and only the numeral representing volume is underlined. No comma is used between the numerals representing volume and number. The numeral for number is enclosed in parentheses.
e. Pages—The inclusive page numbers of the article.
f. Year—The year of publication.

Reports

a. Author(s).
b. Title of report.
c. Name of the responsible organization—the name of the organization that executed the research, if different, is not given.
d. Report, or bulletin, circular, technical note, etc.
e. Number.
f. Part.

Table VIII. Classification of Materials

Classification		Limits of Composition (weight percent)*			
		X_1	$X_1 + X_2$	X_2	X_3
1. Elements		>99.5	—	<0.2	<0.2
2. Mixtures (or Solutions) of Elements or of Elements and Compounds	A. Binary	—	≥ 99.5	≥ 0.2	≤ 0.2
	B. Multiple	—	≥ 99.5	>0.2	>0.2
		—	<99.5	≥ 0.2	≤ 0.2
		—	<99.5	>0.2	>0.2
		≤ 99.5	—	<0.2	<0.2
3. Compounds		>95.0	—	<2.0	<2.0
4. Mixtures (or Solutions) of Compounds	A. Binary	—	≥ 95.0	≥ 2.0	≤ 2.0
	B. Multiple	—	≥ 95.0	>2.0	>2.0
		—	<95.0	≥ 2.0	≤ 2.0
		—	<95.0	>2.0	>2.0
		≤ 95.0	—	<2.0	<2.0

*X_1 is the major constituent, X_2 is the second highest constituent, X_3 is the third highest constituent, etc.

g. Pages.
h. Year.
i. ASTIA's AD number—this is given in square brackets whenever available.

Books

a. Author(s).
b. Title.
c. Volume.
d. Edition.
e. Publisher.
f. Place.
g. Pages.
h. Year.

Theses

a. Author.
b. Title.
c. University.
d. Department.
e. Degree—Ph.D. (or Sc.D., M.S., etc.) Thesis.
f. Pages.
g. Year.

6. CRYSTAL STRUCTURES, TRANSITION TEMPERATURES, AND OTHER PERTINENT PHYSICAL CONSTANTS OF THE ELEMENTS

Table XI of Volume 7 contains information on the crystal structures, transition temperatures, and certain pertinent physical constants of the elements. No attempt was made to critically evaluate the temperatures and constants given in that table and they should not be considered recommended values.

The user is referred to companion Volume 7, pp. 52a–58a, for the physical constants of the non-metallic elements.

7. CONVERSION FACTORS

Wavelength

1 micrometer (μm) = 10^{-6} meter (m)
= 10^{-4} centimeter (cm)
= 10^{-3} millimeter (mm)
= 10^{3} nanometers (nm)
= 10^{3} millimicrometers (mμm)
= 10^{4} angstroms (Å)
= 3.937×10^{-5} inch
= 10^{4}/wave number (cm^{-1})
= 1.24/photon energy (eV)
= 2.998×10^{14}/frequency (cps)

Temperature

$C = K - 273.2$
$F = (9/5)(K - 273.2) + 32$
$R = (9/5)K$

where

C = degrees Centigrade,
F = degrees Fahrenheit,
R = degrees Rankine,
K = degrees Kelvin.

Numerical Data on Thermal Radiative Properties of Nonmetallic Solids

1. ELEMENTS

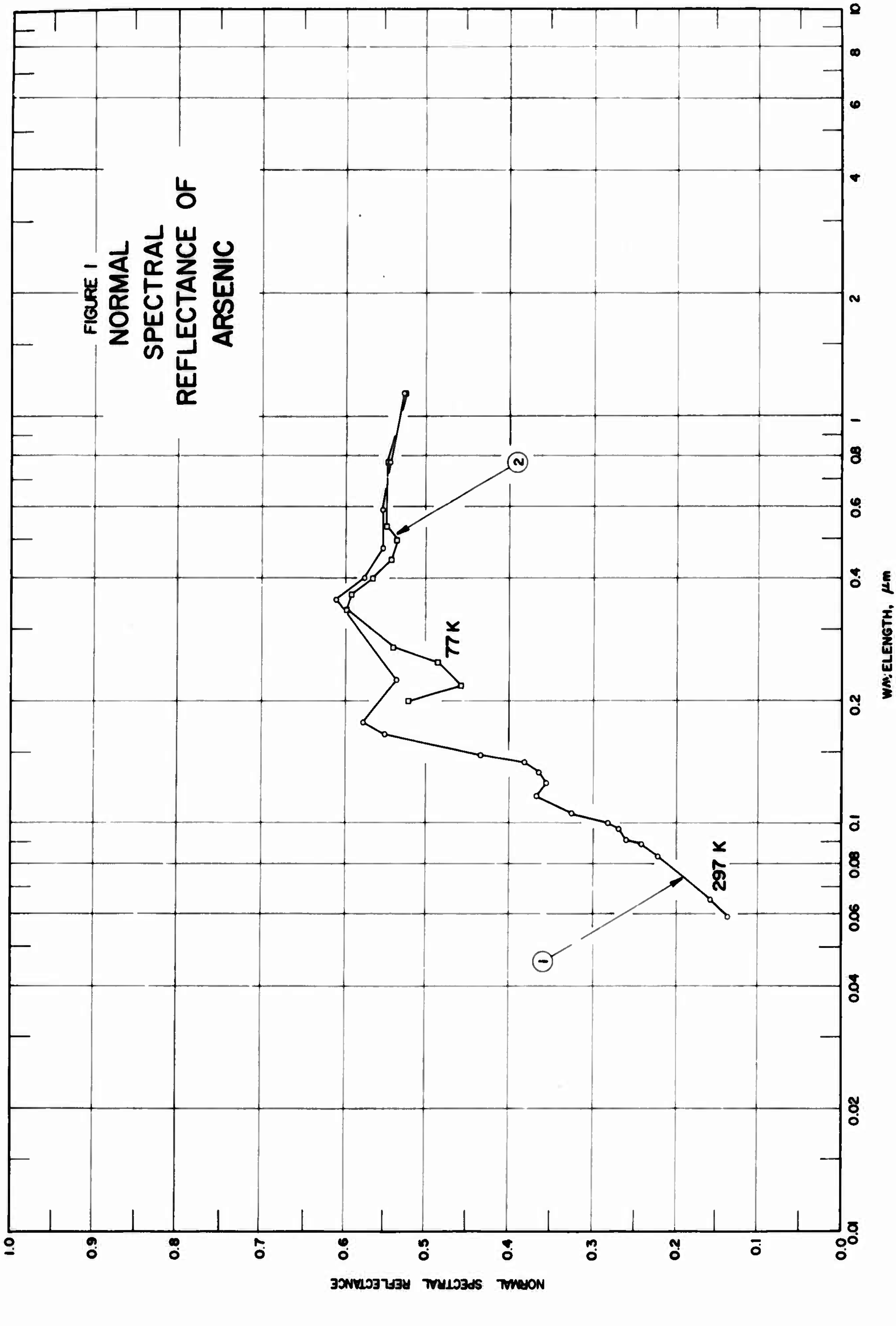

FIGURE 1
NORMAL SPECTRAL REFLECTANCE OF ARSENIC

SPECIFICATION TABLE NO. 1 NORMAL SPECTRAL REFLECTANCE OF ARSENIC

Curve No.	Ref. No.	Year	Temperature K	Wavelength Range, μm	Geometry θ	θ'	ω'	Reported Error, %	Composition (weight percent), Specifications and Remarks
1	74	1964	297	0.0590-1.127	~0°	~0°			Single crystal; cleaved; data extracted from smooth curve.
2	74	1964	77	0.200-1.127	~0°	~0°			Above specimen and conditions.

DATA TABLE NO. 1 NORMAL SPFCTRAL REFLECTANCE OF ARSENIC

[Wavelength, λ, μm; Reflectance, ρ; Temperature, T, K]

CURVE 1
T = 297

λ	ρ
0.0590	0.134
0.0653	0.155
0.0827	0.222
0.0886	0.241
0.0905	0.260
0.0969	0.269
0.100	0.281
0.105	0.326
0.116	0.367
0.125	0.354
0.133	0.363
0.141	0.380
0.148	0.432
0.165	0.549
0.177	0.577
0.225	0.535

CURVE 1 (cont.)

λ	ρ
0.354	0.611
0.400	0.575
0.477	0.551
0.590	0.551
0.775	0.542
1.127	0.526

CURVE 2
T = 77

λ	ρ
0.200	0.520
0.218	0.457
0.248	0.484
0.270	0.539
0.335	0.598
0.365	0.592
0.400	0.564

CURVE 2 (cont.)

λ	ρ
0.443	0.540
0.496	0.535
0.539	0.547
0.775	0.543
1.127	0.525

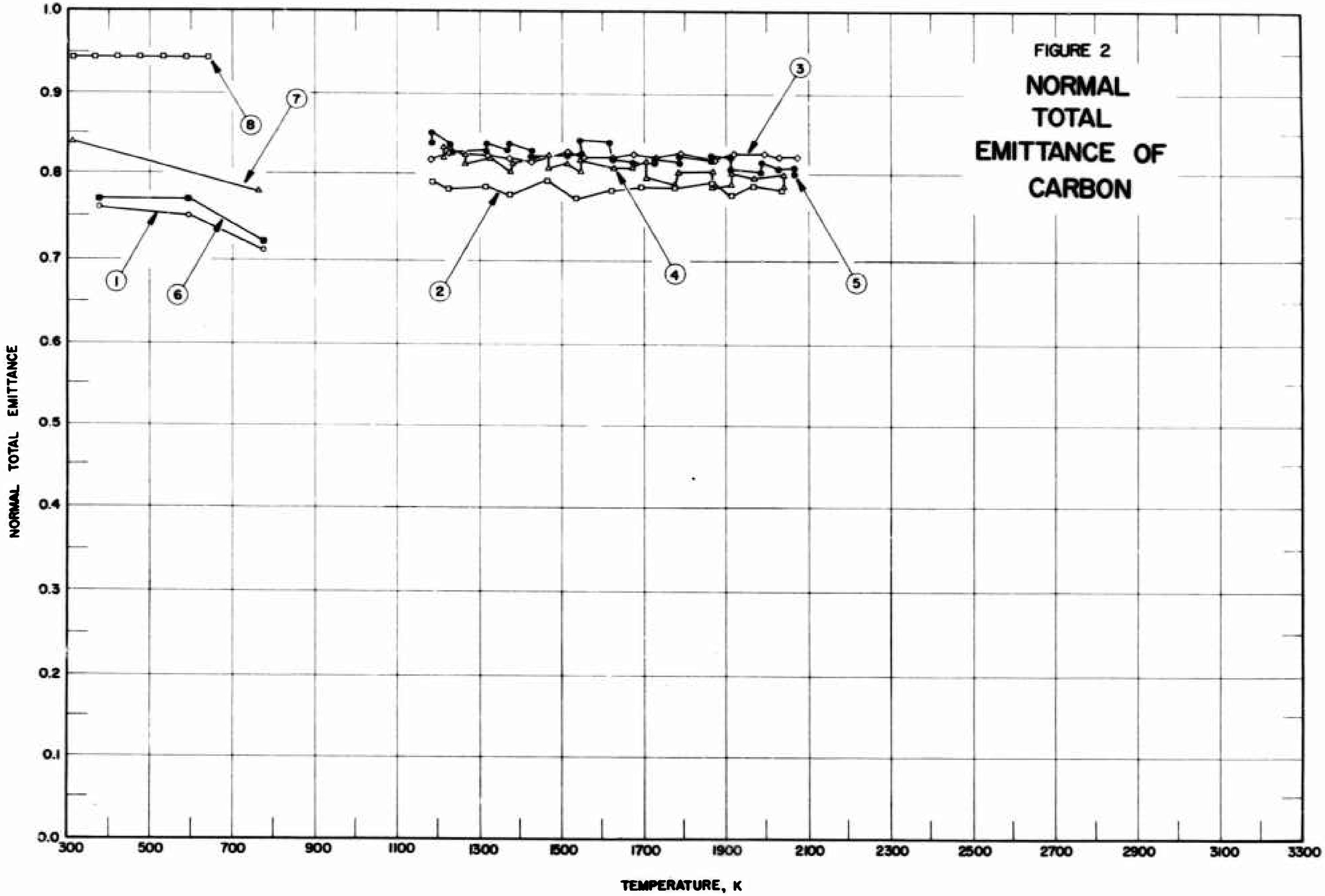
FIGURE 2
NORMAL TOTAL EMITTANCE OF CARBON
NORMAL TOTAL EMITTANCE
TEMPERATURE, K
1.0
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0.0
300
500
700
900
1100
1300
1500
1700
1900
2100
2300
2500
2700
2900
3100
3300
1
2
3
4
5
6
7
8

SPECIFICATION TABLE NO. 2 NORMAL TOTAL EMITTANCE OF CARBON

Curve No.	Ref. No.	Year	Temperature Range, K	Geometry θ'	Reported Error, %	Composition (weight percent), Specifications and Remarks
1	1	1947	373-773	~0°		Rough plate; graphitized.
2	2	1959	1181-2037	~0°		National Carbon Co. G. A. carbon; measured in vacuum (3 x 10^{-6} to 5 x 10^{-4} mm Hg); computed from spectral data (0.2 to 3.5 μm).
3	2	1959	1180-2072	~0°		Similar to the above specimen and conditions except rough surface.
4	2	1959	1212-2040	~0°		Similar to the above specimen and conditions except smooth (320 grit); computed from spectral data (0.2 to 10 μm).
5	2	1959	1181-2064	~0°		Similar to the above specimen and conditions except rough surface.
6	1	1947	373-773	~0°		Rough plate.
7	1	1947	373-773	~0°		Lampblack; rough deposit.
8	9	1929	310-643	~0°		Lampblack

DATA TABLE NO. 2 NORMAL TOTAL EMITTANCE OF CARBON

[Temperature, T, K; Emittance, ϵ]

T	ϵ
CURVE 1	
373	0.76
593	0.75
773	0.71
CURVE 2	
1181	0.791
1254	0.782
1317	0.785
1372	0.776
1461	0.791
1539	0.771
1620	0.780
1693	0.785
1773	0.784
1864	0.790
1914	0.777
1964	0.787
2037	0.781
CURVE 3	
1180	0.819
1225	0.826
1321	0.824
1371	0.820
1423	0.816
1515	0.828
1554	0.820
1621	0.820
1675	0.825
1729	0.820
1787	0.827
1871	0.818
1920	0.826
1995	0.826
2027	0.821
2072	0.821
CURVE 4	
1212	0.822
1212	0.833
1264	0.826
1264	0.813
1325	0.820
1377	0.804

T	ϵ
CURVE 4 (cont.)	
1380	0.814
1467	0.823
1467	0.808
1516	0.813
1547	0.804
1547	0.819
1623	0.809
1673	0.809
1701	0.816
1701	0.796
1778	0.786
1781	0.802
1868	0.803
1868	0.787
1916	0.802
1916	0.789
1968	0.789
1968	0.796
2040	0.800
2040	0.786
CURVE 5	
1181	0.839
1181	0.852
1226	0.837
1228	0.826
1319	0.828
1319	0.837
1367	0.830
1371	0.838
1423	0.829
1423	0.822
1511	0.824
1550	0.825
1548	0.841
1617	0.838
1621	0.818
1672	0.814
1725	0.814
1725	0.819
1786	0.815
1786	0.824
1865	0.818
1865	0.824
1910	0.821

T	ϵ
CURVE 5 (cont.)	
1910	0.807
1985	0.804
1987	0.817
2028	0.808
2064	0.809
2064	0.801
CURVE 6	
373	0.77
593	0.77
773	0.72
CURVE 7	
373	0.84
773	0.78
CURVE 8	
310	0.945
366	0.945
421	0.945
477	0.945
532	0.945
588	0.945
643	0.945

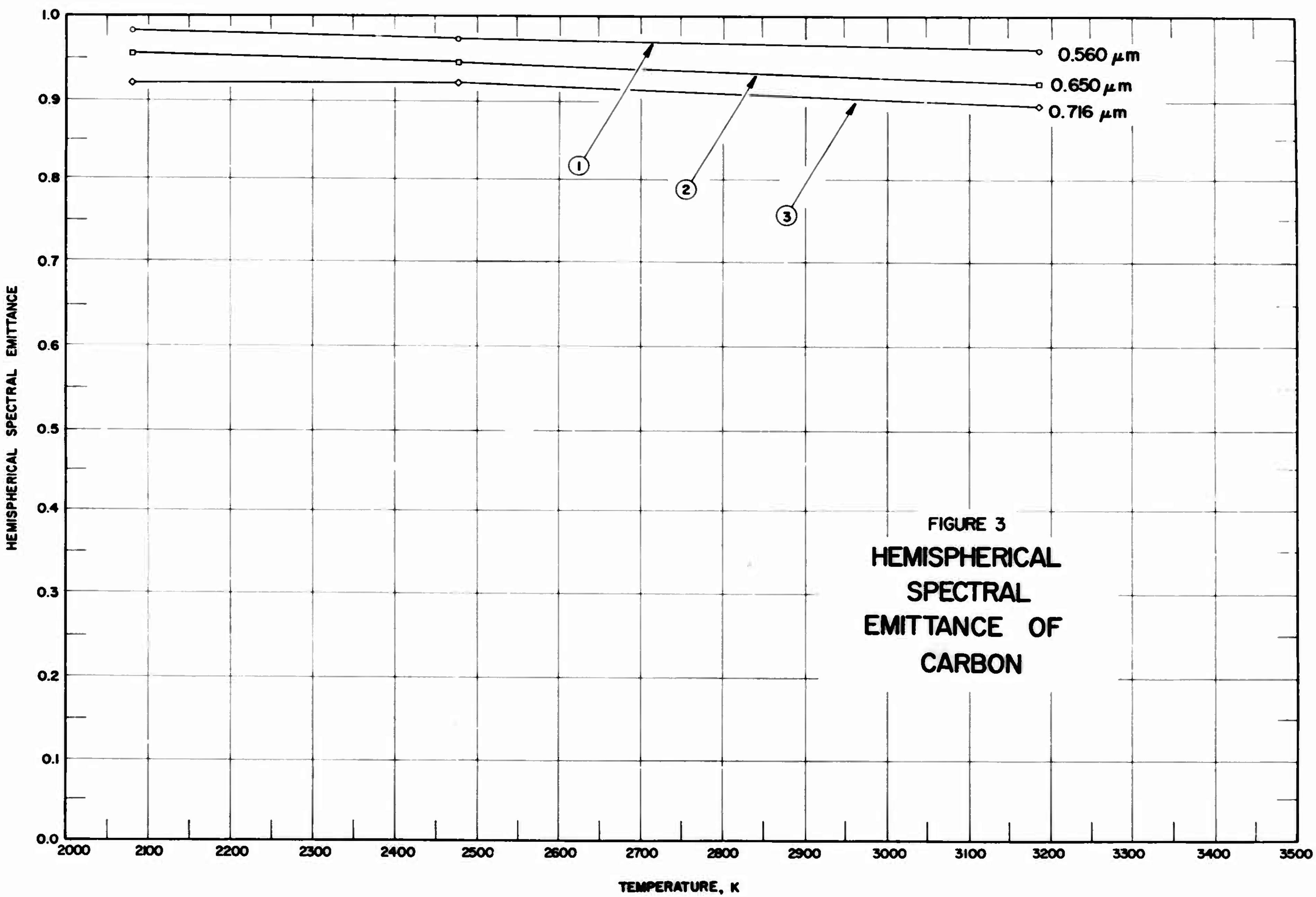

FIGURE 3
HEMISPHERICAL SPECTRAL EMITTANCE OF CARBON

SPECIFICATION TABLE NO. 3 HEMISPHERICAL SPECTRAL EMITTANCE OF CARBON

Curve No.	Ref. No.	Year	Wavelength μm	Temperature Range, K	Geometry ω'	Reported Error, %	Composition (weight percent), Specifications and Remarks
1	4	1965	0.560	2080-3186	2π		L113SP carbon (National Carbon Co.); high-purity spectrscopic grade; mechanically polished with emery paper; oxidized in air; peak to valley roughnes 50 μm; computed from $1-\rho(2\pi, 2\pi)$.
2	4	1965	0.650	2080-3186	2π		Similar to the above specimen and conditions.
3	4	1965	0.716	2080-3186	2π		Similar to the above specimen and conditions.

DATA TABLE NO. 3 HEMISPHERICAL SPECTRAL EMITTANCE OF CARBON

[Wavelength, λ, μm; Emittance, ϵ; Temperature, T, K]

T	ϵ
CURVE 1	
$\lambda = 0.560$	
2080	0.982
2478	0.973
3186	0.960
CURVE 2	
$\lambda = 0.650$	
2080	0.955
2478	0.945
3186	0.920
CURVE 3	
$\lambda = 0.716$	
2080	0.920
2478	0.920
3186	0.892

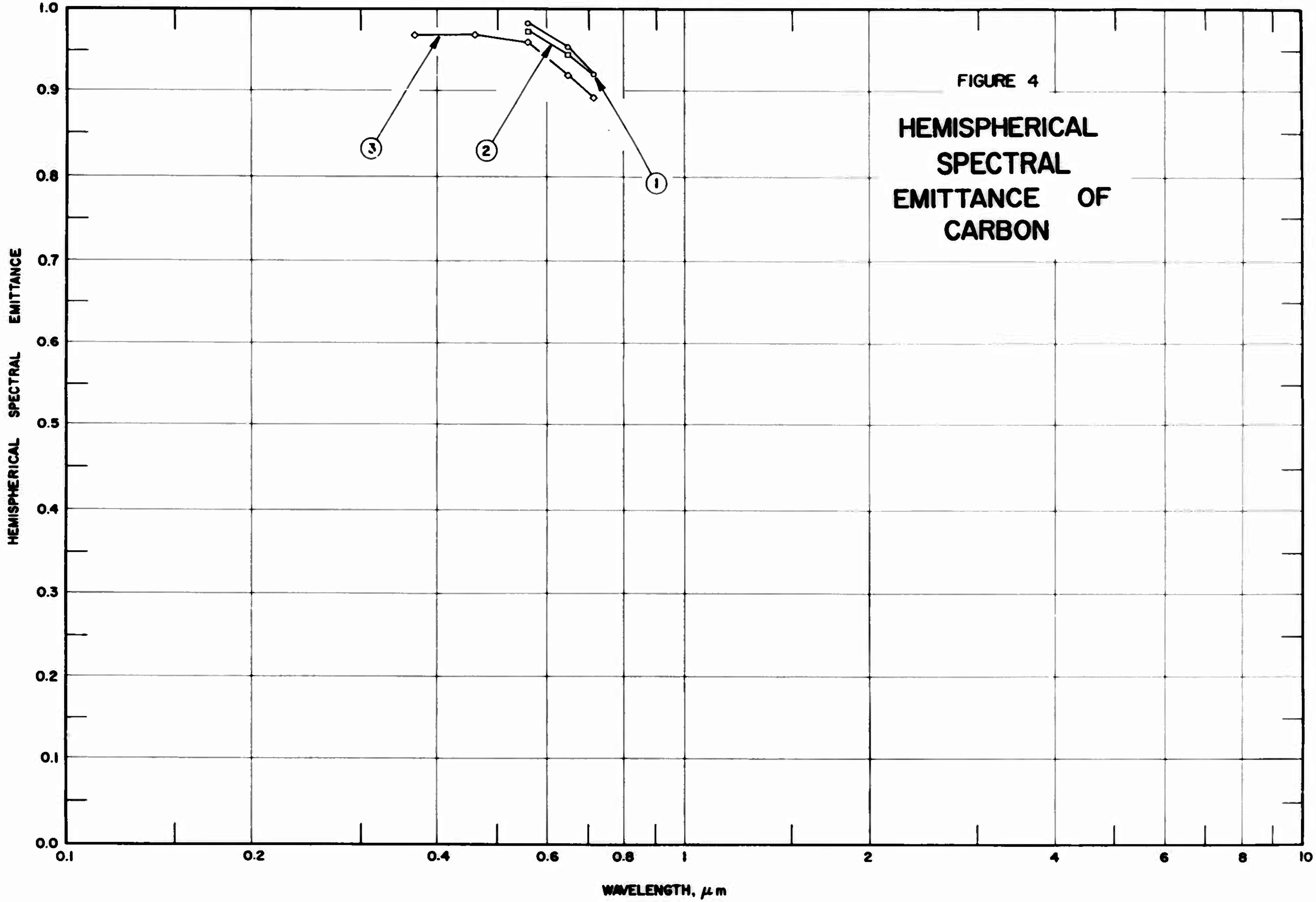

FIGURE 4

HEMISPHERICAL SPECTRAL EMITTANCE OF CARBON

SPECIFICATION TABLE NO. 4 HEMISPHERICAL SPECTRAL EMITTANCE OF CARBON

Curve No.	Ref. No.	Year	Temperature K	Wavelength Range, μm	Geometry ω'	Reported Error, %	Composition (weight percent), Specifications and Remarks
1	4	1965	2080	0.560-0.716	2π		L113SP carbon (National Carbon Co.); high-purity spectroscopic grade; mechanically polished with emery paper; oxidized in air; peak to valley roughness 50 μm; computed from 1-ρ(2π, 2π).
2	4	1965	2478	0.560-0.716	2π		Similar to the above specimen and conditions.
3	4	1965	3186	0.367-0.716	2π		Similar to the above specimen and conditions.

DATA TABLE NO. 4 HEMISPHERICAL SPECTRAL EMITTANCE OF CARBON

[Temperature, T, K; Emittance, ϵ; Wavelength, λ, μm]

λ	ϵ
CURVE 1	
T = 2080	
0.560	0.982
0.650	0.955
0.716	0.920
CURVE 2	
T = 2478	
0.560	0.973
0.650	0.945
0.716	0.920*
CURVE 3	
T = 3186	
0.367	0.970
0.460	0.970
0.560	0.960
0.650	0.920
0.716	0.892

*Not shown on plot

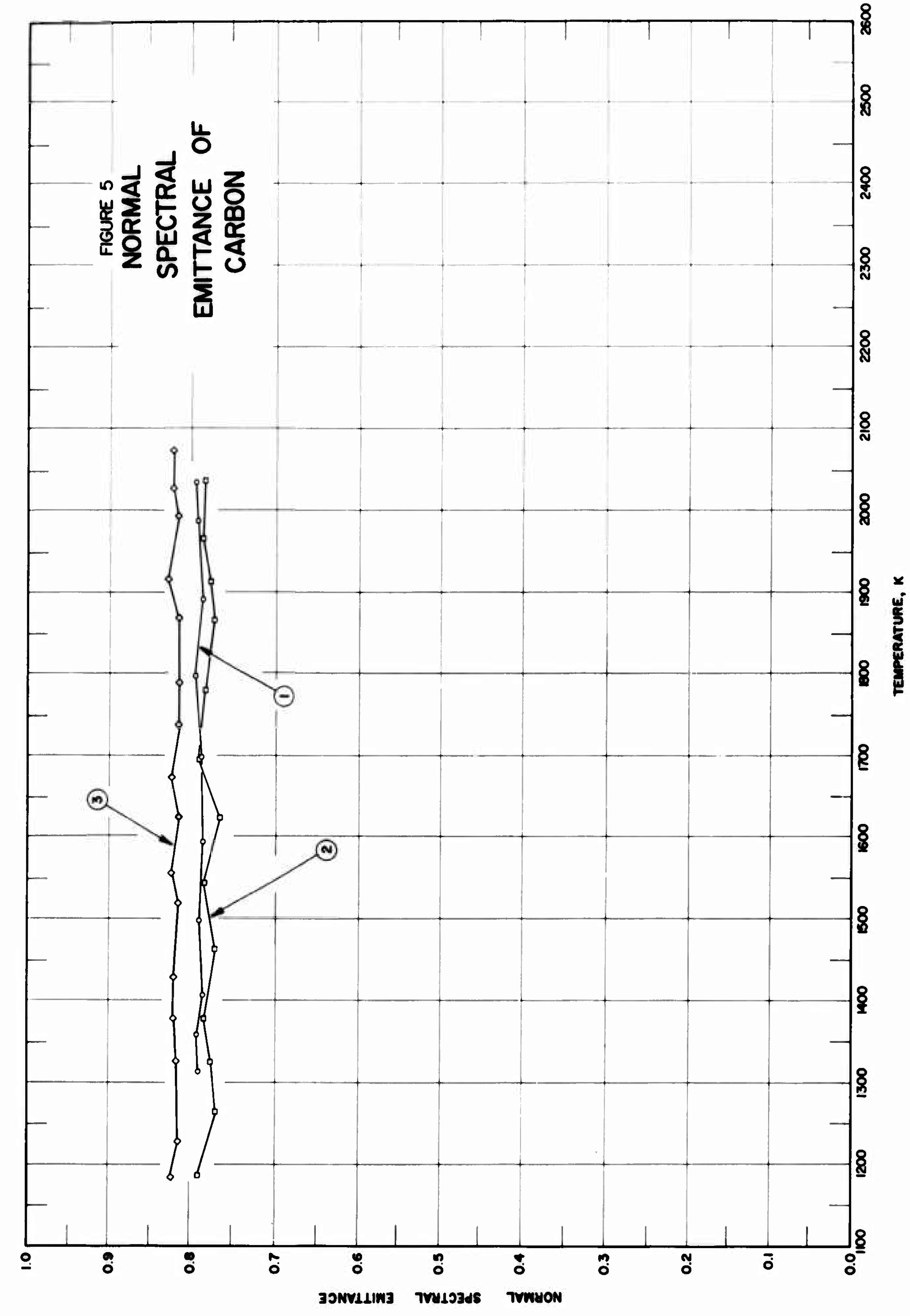

FIGURE 5
NORMAL SPECTRAL EMITTANCE OF CARBON

SPECIFICATION TABLE NO. 5 NORMAL SPECTRAL EMITTANCE OF CARBON

Curve No.	Ref. No.	Year	Wavelength μm	Temperature Range, K	Geometry θ'	Reported Error, %	Composition (weight percent), Specifications and Remarks
1	3	1953	0.653	1313-2034	~0°		Polished; heated at ~1800 K for ~3 hrs; measured in vacuum (5 x 10^{-6} mm Hg).
2	2	1959	0.665	1185-2037	~0°		National Carbon Co. G. A. carbon; smooth (320 grit); measured in vacuum (3 x 10^{-6} to 5 x 10^{-6} mm Hg).
3	2	1959	0.665	1183-2073	~0°		Similar to the above specimen and conditions except rough surface.

DATA TABLE NO. 5 NORMAL SPECTRAL EMITTANCE OF CARBON

[Temperature, T, K; Emittance, ∈; Wavelength, λ, μm]

T	∈	T	∈	T	∈
CURVE 1 λ = 0.653		CURVE 2 (cont.)		CURVE 3 (cont.)	
1313	0.791	1695	0.790	1868	0.817
1357	0.794	1779	0.782	1915	0.829
1406	0.787	1864	0.772	1992	0.817
1498	0.791	1912	0.777	2028	0.824
1593	0.786	1965	0.787	2073	0.824
1698	0.788	2037	0.784		
1797	0.796	CURVE 3 λ = 0.665			
1890	0.787	1183	0.825		
1987	0.792	1228	0.817		
2034	0.795	1325	0.819		
CURVE 2 λ = 0.665		1377	0.822		
1185	0.791	1428	0.822		
1263	0.770	1518	0.817		
1323	0.777	1554	0.826		
1376	0.785	1624	0.817		
1461	0.771	1673	0.825		
1542	0.784	1738	0.817		
1623	0.766	1787	0.817		

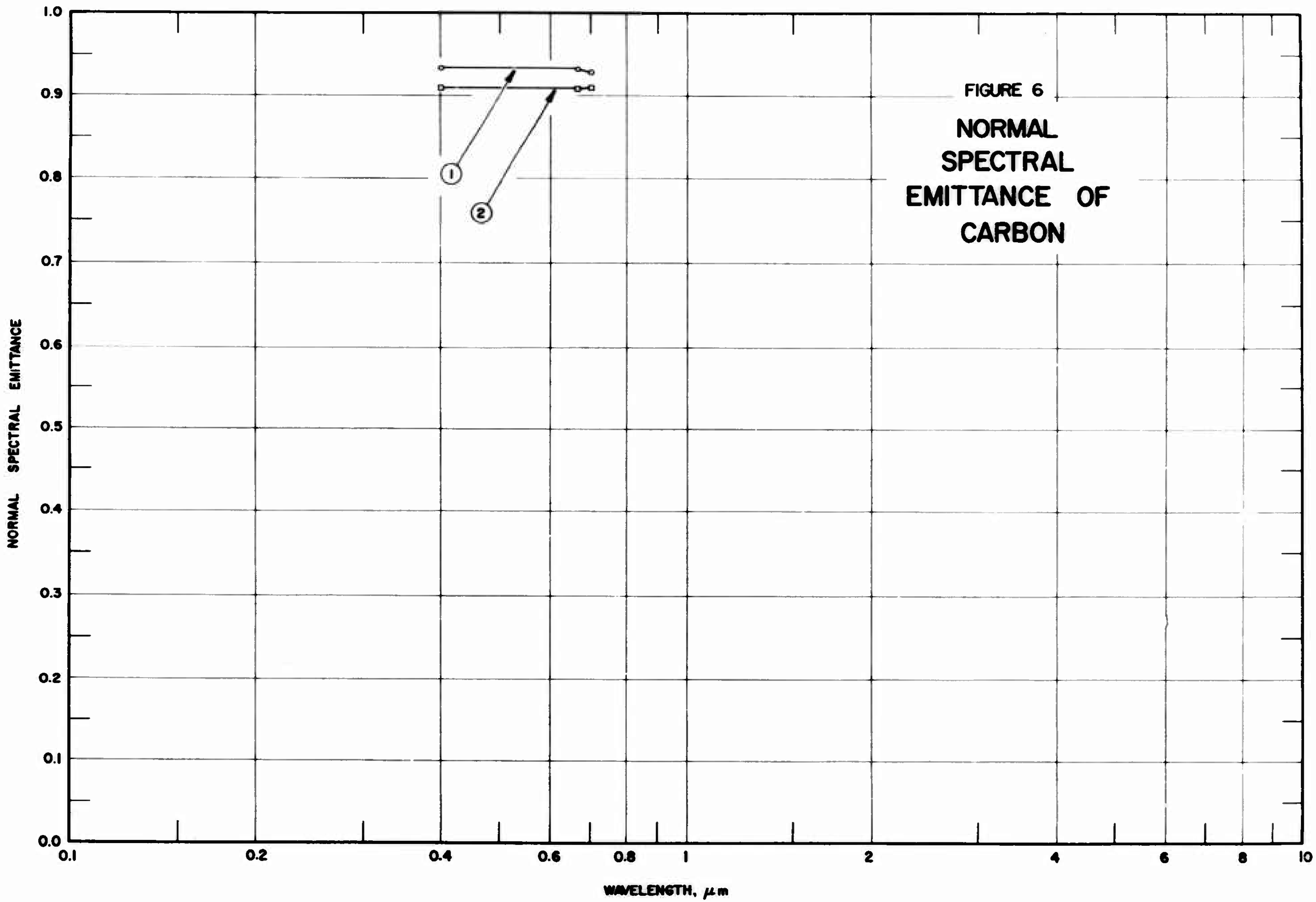

FIGURE 6
NORMAL SPECTRAL EMITTANCE OF CARBON

SPECIFICATION TABLE NO. 6 NORMAL SPECTRAL EMITTANCE OF CARBON

Curve No.	Ref. No.	Year	Temperature K	Wavelength Range, μm	Geometry θ'	Reported Error, %	Composition (weight percent), Specifications and Remarks
1	2	1959	298	0.400-0.700	~0°		Smooth surface (325 grit); measured in vacuum (3×10^{-6} to 5×10^{-4} mm Hg).
2	2	1959	298	0.400-0.700	~0°		Similar to the above specimen and conditions except rough surface (10 mil cut).

DATA TABLE NO. 6 NORMAL SPECTRAL EMITTANCE OF CARBON

[Wavelength, λ, μm; Emittance, ϵ; Temperature, T, K]

λ	ϵ
CURVE 1 T = 298	
0.400	0.935
0.665	0.933
0.700	0.930
CURVE 2 T = 298	
0.400	0.910
0.665	0.910
0.700	0.910

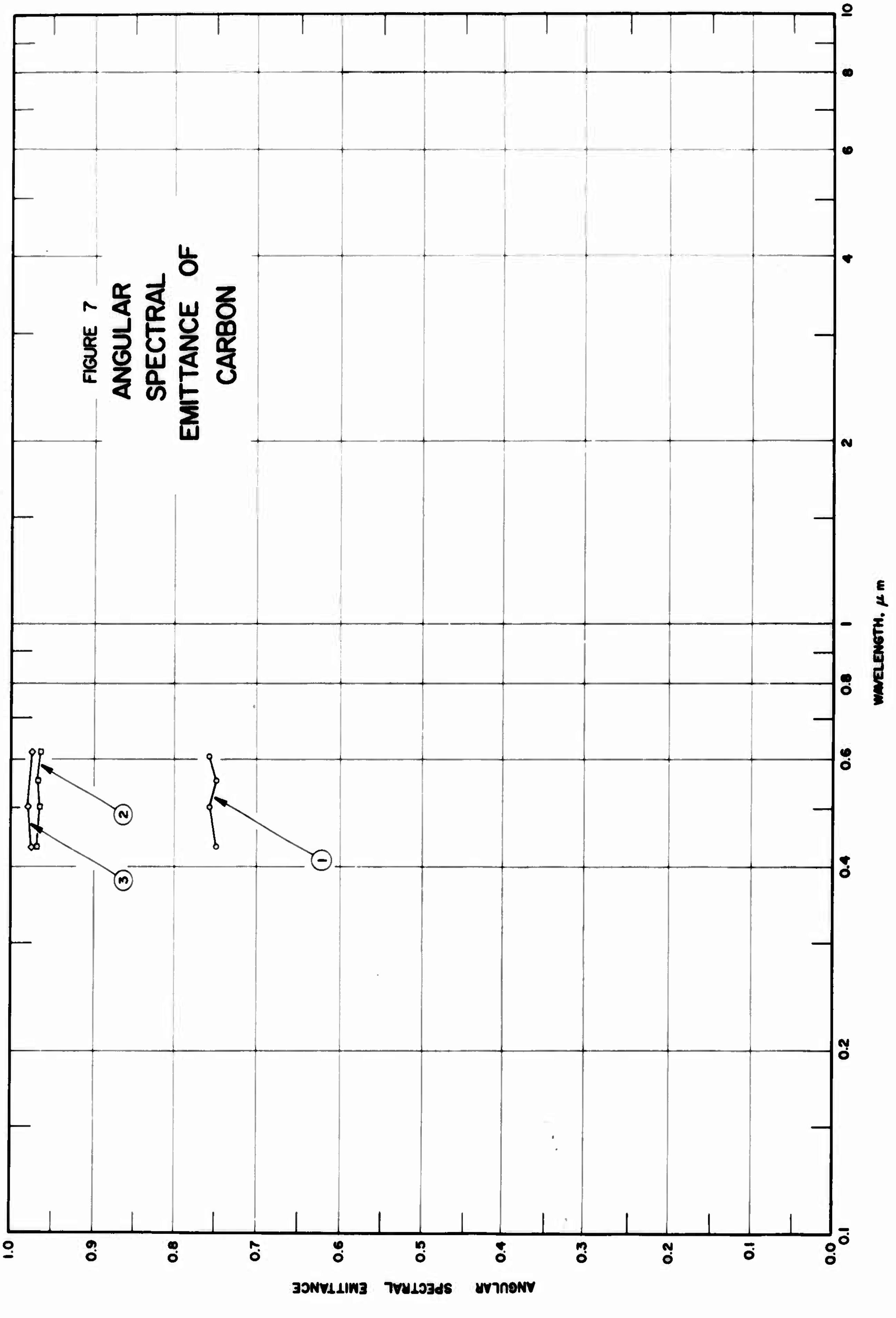

FIGURE 7
ANGULAR SPECTRAL EMITTANCE OF CARBON

SPECIFICATION TABLE NO. 7 ANGULAR SPECTRAL EMITTANCE OF CARBON

Curve No.	Ref. No.	Year	Temperature K	Wavelength Range, μm	Geometry θ'	Reported Error, %	Composition (weight percent), Specifications and Remarks
1	5	1963	1230	0.4305-0.6080	45°		L113SP carbon (National Carbon Co.); final polish with 4/0 Buehler emery polishing paper; measured in argon.
2	5	1963	1250	0.4305-0.6080	45°		Similar to the above specimen and conditions except roughened with 80 grit garnet paper.
3	6	1963	3800	0.4305-0.6080	45°		L113SP carbon; bulk density 1.45 g cm^{-1}; resistivity 0.0025 ohm-in.; maximum ash 10 ppm; computed from 1-R(2π, 45°).

DATA TABLE NO. 7 ANGULAR SPECTRAL EMITTANCE OF CARBON

[Wavelength, λ, μm; Emittance, ε; Temperature, T, K]

λ	ε
CURVE 1	
T = 1230	
0.4305	0.749
0.5010	0.757
0.5545	0.749
0.6080	0.757
CURVE 2	
T = 1250	
0.4305	0.970
0.5010	0.967
0.5545	0.969
0.6080	0.965
CURVE 3	
T = 3800	
0.4305	0.976
0.5010	0.980
0.6080	0.976

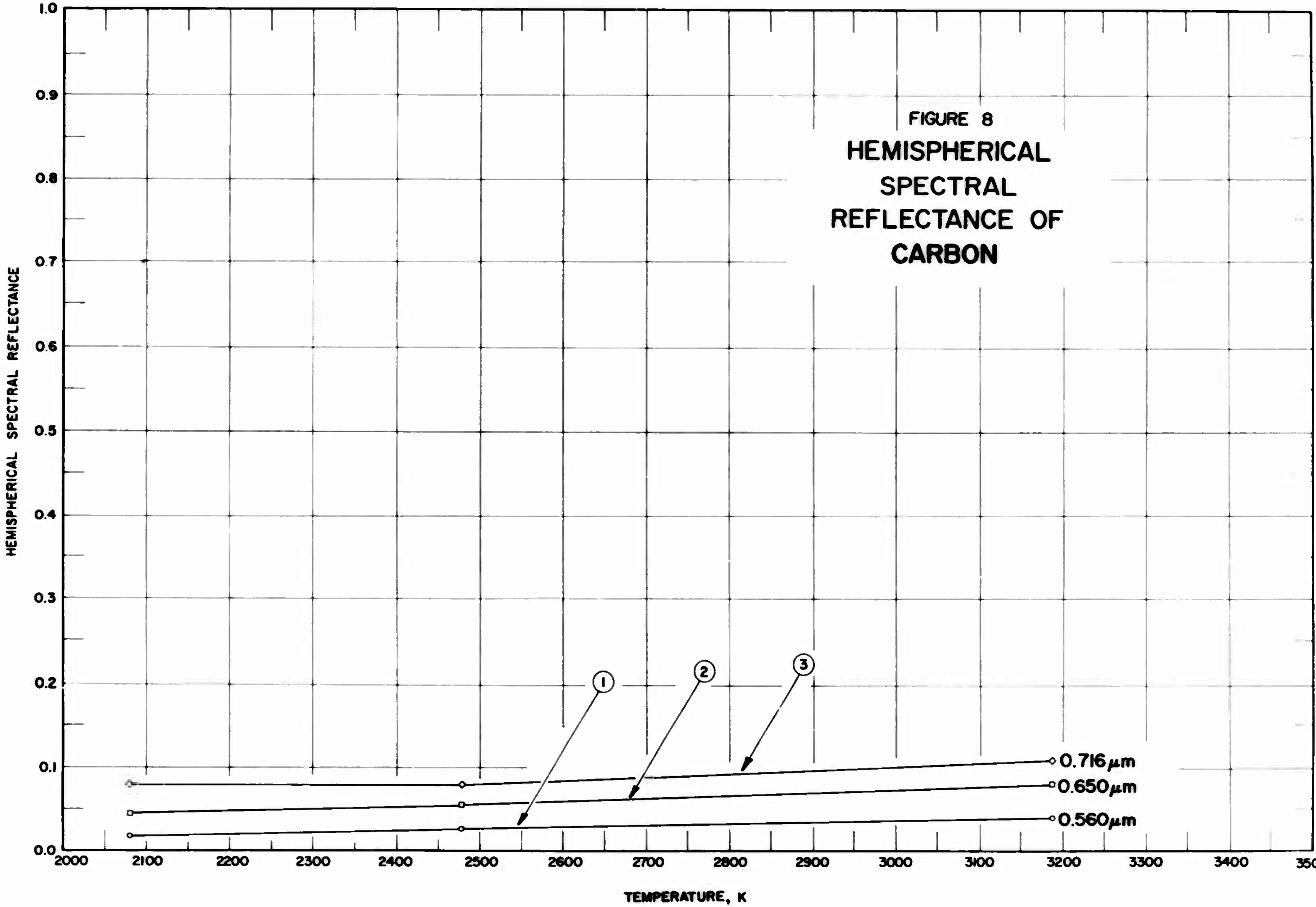

FIGURE 8
HEMISPHERICAL SPECTRAL REFLECTANCE OF CARBON

SPECIFICATION TABLE NO. 8 HEMISPHERICAL SPECTRAL REFLECTANCE OF CARBON

Curve No.	Ref. No.	Year	Wavelength μm	Temperature Range, K	Geometry ω	θ'	ω'	Reported Error, %	Composition (weight percent), Specifications and Remarks
1	4	1965	0.560	2080-3186	2π		2π		L113SP carbon (National Carbon Co.); high-purity spectroscopic grade; mechanically polished with emery paper; oxidized in air; peak to valley roughness 50 μm.
2	4	1965	0.650	2080-3186	2π		2π		Similar to the above specimen and conditions.
3	4	1965	0.716	2080-3186	2π		2π		Similar to the above specimen and conditions.

DATA TABLE NO. 8 HEMISPHERICAL SPECTRAL REFLECTANCE OF CARBON

[Temperature, T, K; Reflectance, ρ; Wavelength, λ, μm]

T	ρ
CURVE 1	
λ = 0.560	
2080	0.018
2478	0.027
3186	0.040
CURVE 2	
λ = 0.650	
2080	0.045
2478	0.055
3186	0.080
CURVE 3	
λ = 0.716	
2080	0.080
2478	0.080
3186	0.108

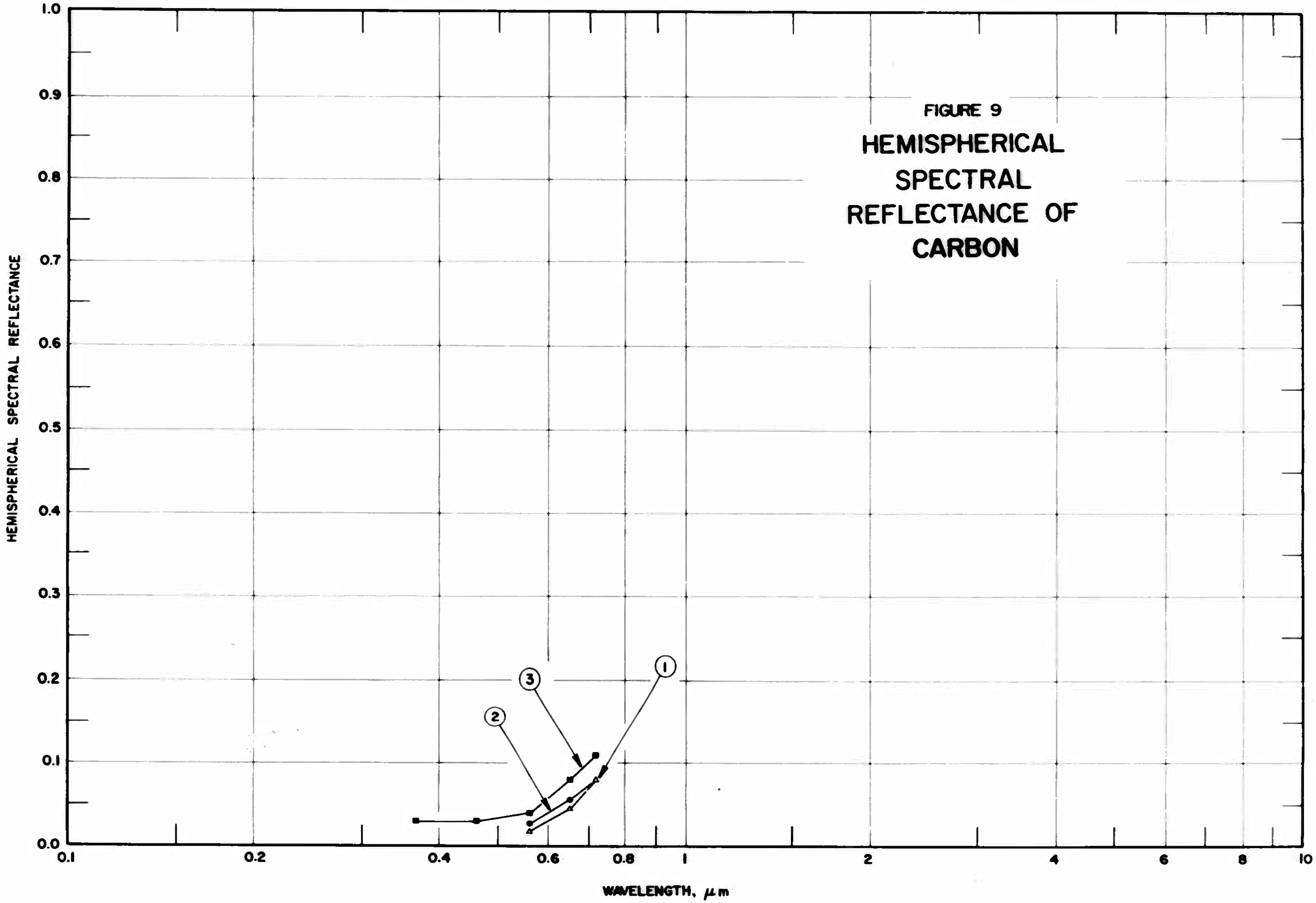

FIGURE 9
HEMISPHERICAL SPECTRAL REFLECTANCE OF CARBON

SPECIFICATION TABLE NO. 9 HEMISPHERICAL SPECTRAL REFLECTANCE OF CARBON

Curve No.	Ref. No.	Year	Temperature K	Wavelength Range, μm	Geometry ω	θ'	ω'	Reported Error, %	Composition (weight percent), Specifications and Remarks
1	4	1965	2080	0.560-0.716	2π		2π		L113SP carbon (National Carbon Co.); high-purity spectroscopic grade; mechanically polished with emery paper; oxidized in air; peak to valley roughness 50 μm.
2	4	1965	2478	0.560-0.716	2π		2π		Similar to the above specimen and conditions.
3	4	1965	3186	0.367-0.716	2π		2π		Similar to the above specimen and conditions.

DATA TABLE NO. 9 HEMISPHERICAL SPECTRAL REFLECTANCE OF CARBON

[Wavelength, λ, μm; Reflectance, ρ; Temperature, T, K]

λ	ρ
CURVE 1	
T = 2080	
0.560	0.018
0.650	0.045
0.716	0.080
CURVE 2	
T = 2478	
0.560	0.027
0.650	0.055
0.716	0.080*
CURVE 3	
T = 3186	
0.367	0.030
0.460	0.030
0.560	0.040
0.650	0.080
0.716	0.108

* Not shown on plot

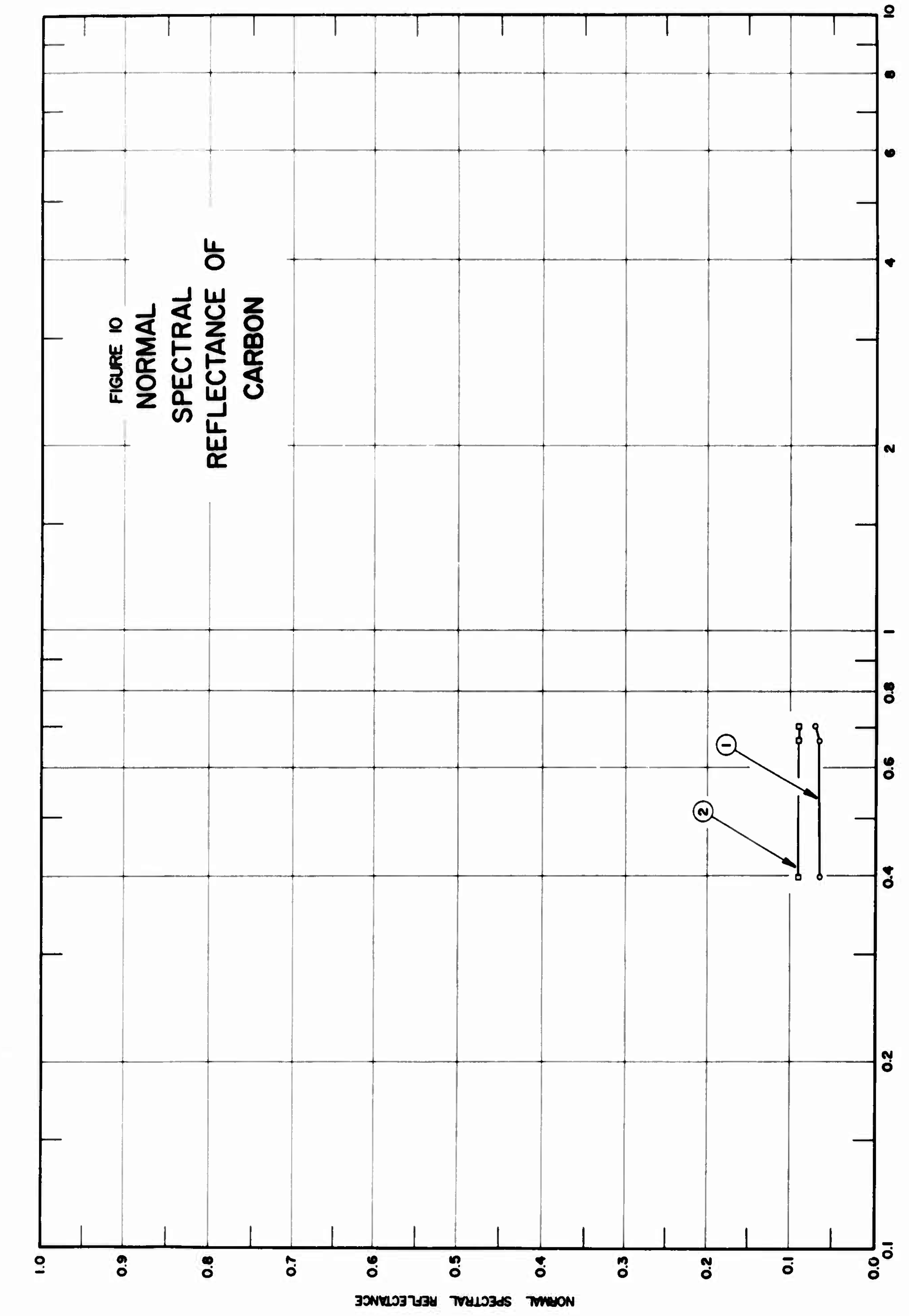

FIGURE 10 NORMAL SPECTRAL REFLECTANCE OF CARBON

SPECIFICATION TABLE NO. 10 NORMAL SPECTRAL REFLECTANCE OF CARBON

Curve No.	Ref. No.	Year	Temperature K	Wavelength Range, μm	Geometry θ	θ'	ω'	Reported Error, %	Composition (weight percent), Specifications and Remarks
1	2	1959	298	0.400-0.700	~0°		2π		Smooth surface (325 grit); measured in vacuum (3×10^{-6} to 5×10^{-4} mm Hg).
2	2	1959	298	0.400-0.700	~0°		2π		Similar to the above specimen and conditions except rough surface (10 mil cut).

DATA TABLE NO. 10 NORMAL SPECTRAL REFLECTANCE OF CARBON

[Wavelength, λ, μm; Reflectance, ρ; Temperature, T, K]

λ	ρ
CURVE 1	
T = 298	
0.400	0.065
0.665	0.067
0.700	0.070
CURVE 2	
T = 298	
0.400	0.090
0.665	0.090
0.700	0.090

SPECIFICATION TABLE NO. 11 ANGULAR SPECTRAL REFLECTANCE OF CARBON

Curve No.	Ref. No.	Year	Wavelength μm	Temperature Range, K	Geometry θ	θ'	ω'	Reported Error, %	Composition (weight percent), Specifications and Remarks
1*	5	1963	0.5545	2709	45°		2π		Grade L113SP; extruded and cut with grain; 80-grit surface finish; thermal conductivity 0.064 cal-sec^{-1} cm^{-1} K^{-1}; bulk density 1.45 g-cm^{-3}; measured in argon.
2*	5	1963	0.5545	2838	45°		2π		Similar to the above specimen and conditions; thermal conductivity 0.071 cal-sec^{-1} cm^{-1} K^{-1}.
3*	5	1963	0.5545	2743	45°		2π		Similar to the above specimen and conditions; thermal conductivity 0.074 cal-sec^{-1} cm^{-1} K^{-1}.

DATA TABLE NO. 11 ANGULAR SPECTRAL REFLECTANCE OF CARBON

[Temperature, T, K; Reflectance, ρ; Wavelength, λ, μm]

T	ρ
CURVE 1*	
λ = 0.5545	
2709	0.064
CURVE 2*	
λ = 0.5545	
2838	0.054
CURVE 3*	
λ = 0.5545	
2743	0.035

* No plot given

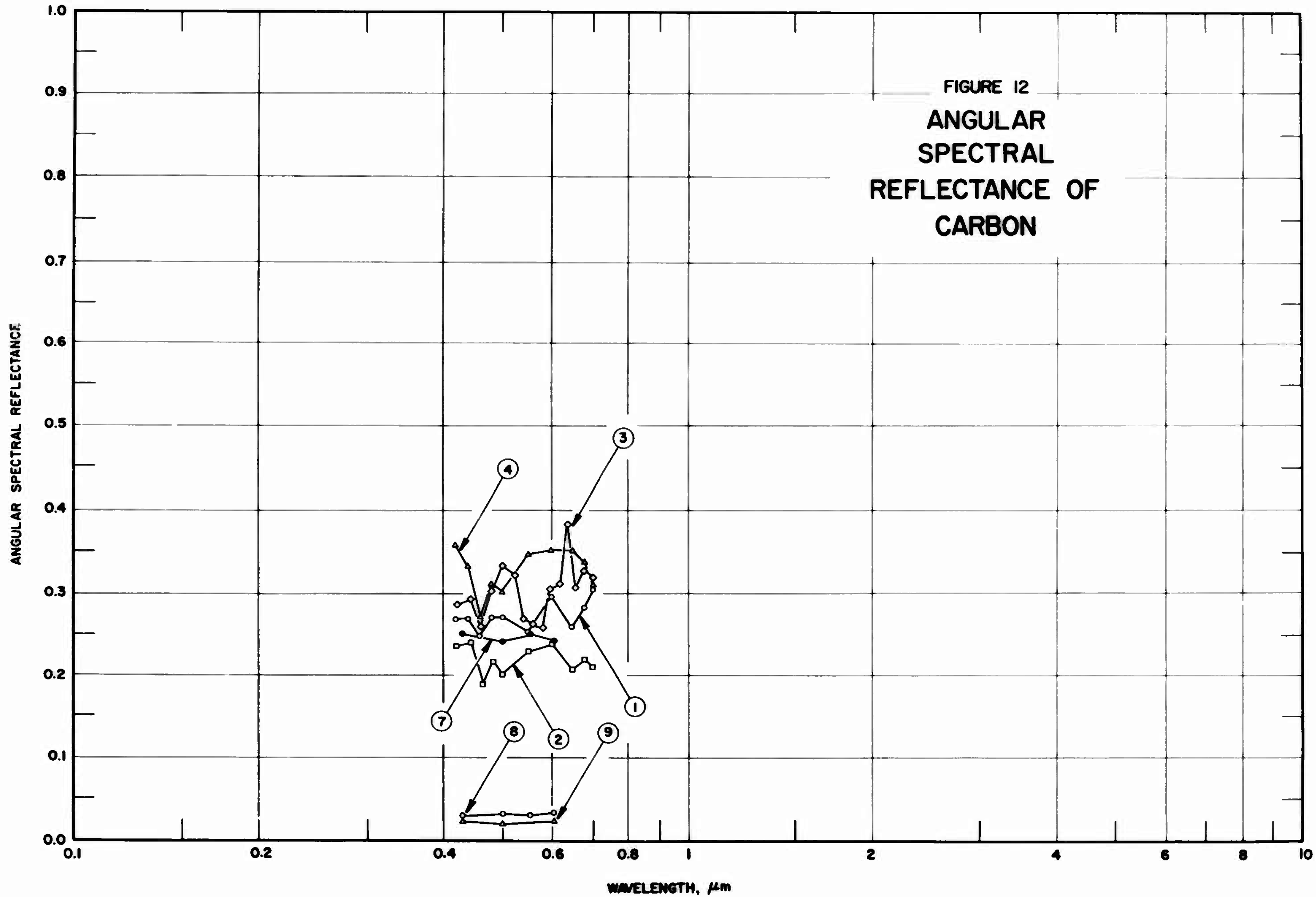

FIGURE 12
ANGULAR SPECTRAL REFLECTANCE OF CARBON

SPECIFICATION TABLE NO. 12 ANGULAR SPECTRAL REFLECTANCE OF CARBON

Curve No.	Ref. No.	Year	Temperature K	Wavelength Range, μm	Geometry θ	θ'	ω'	Reported Error, %	Composition (weight percent), Specifications and Remarks
1	10	1960	550	0.420-0.700	45°		2π	±15	L113SP.
2	10	1960	2600	0.422-0.700	45°		2π	±15	L113SP.
3	10	1960	3775	0.422-0.700	45°		2π	±25	L113SP.
4	10	1960	550	0.418-0.700	45°		2π	±15	RW Spektral II.
5*	10	1960	2590	0.421-0.683	45°		2π	±15	RW Spektral II.
6*	10	1960	3775	0.421-0.682	45°		2π	±25	RW Spektral II.
7	5	1963	1230	0.4305-0.6080	45°		2π		L113SP carbon (National Carbon Co.); final polish with 4/0 Buehler emery polishing paper; measured in argon.
8	5	1963	1250	0.4305-0.6080	45°		2π		Similar to the above specimen and conditions except roughened with 80 grit garnet paper.
9	6	1963	3800	0.4305-0.6080	45°		2π		L113SP carbon; bulk density 1.45 g cm^{-3}; resistivity 0.0025 ohm-in.; maximum ash 10 ppm.

DATA TABLE NO. 12 ANGULAR SPECTRAL REFLECTANCE OF CARBON

[Wavelength, λ, μm; Reflectance, ρ; Temperature, T, K]

CURVE 1
T = 550

λ	ρ
0.420	0.269
0.439	0.269
0.459	0.249
0.480	0.271
0.500	0.271
0.549	0.253
0.600	0.296
0.648	0.260
0.679	0.282
0.700	0.304

CURVE 2
T = 2600

λ	ρ
0.422	0.236
0.443	0.241
0.463	0.189

CURVE 2 (cont.)

λ	ρ
0.481	0.217
0.500	0.200
0.550	0.230
0.600	0.239
0.648	0.206
0.679	0.220
0.700	0.210

CURVE 3
T = 3775

λ	ρ
0.422	0.287
0.443	0.293
0.460	0.260
0.480	0.304
0.500	0.335
0.521	0.323
0.540	0.270

CURVE 3 (cont.)

λ	ρ
0.559	0.262
0.580	0.259
0.598	0.306
0.619	0.313
0.639	0.382
0.657	0.308
0.679	0.329
0.700	0.320

CURVE 4
T = 550

λ	ρ
0.418	0.359
0.438	0.333
0.460	0.273
0.479	0.311
0.500	0.301
0.550	0.349

CURVE 4 (cont.)

λ	ρ
0.599	0.352
0.649	0.352
0.680	0.339
0.700	0.311

CURVE 5*
T = 2590

λ	ρ
0.421	0.218
0.441	0.240
0.460	0.196
0.479	0.211
0.500	0.211
0.549	0.208
0.600	0.236
0.650	0.230
0.683	0.254

CURVE 6*
T = 3775

λ	ρ
0.421	0.249
0.440	0.275
0.460	0.311
0.480	0.255
0.500	0.280
0.519	0.310
0.540	0.263
0.562	0.291
0.581	0.252
0.601	0.261
0.619	0.304
0.641	0.335
0.661	0.348
0.682	0.311

CURVE 7
T = 1230

λ	ρ
0.4305	0.251
0.5010	0.243
0.5545	0.251*
0.6080	0.243

CURVE 8
T = 1250

λ	ρ
0.4305	0.030
0.5010	0.033
0.5545	0.031
0.6080	0.035

CURVE 9
T = 3800

λ	ρ
0.4305	0.024
0.5010	0.020
0.6080	0.024

* Not shown on plot

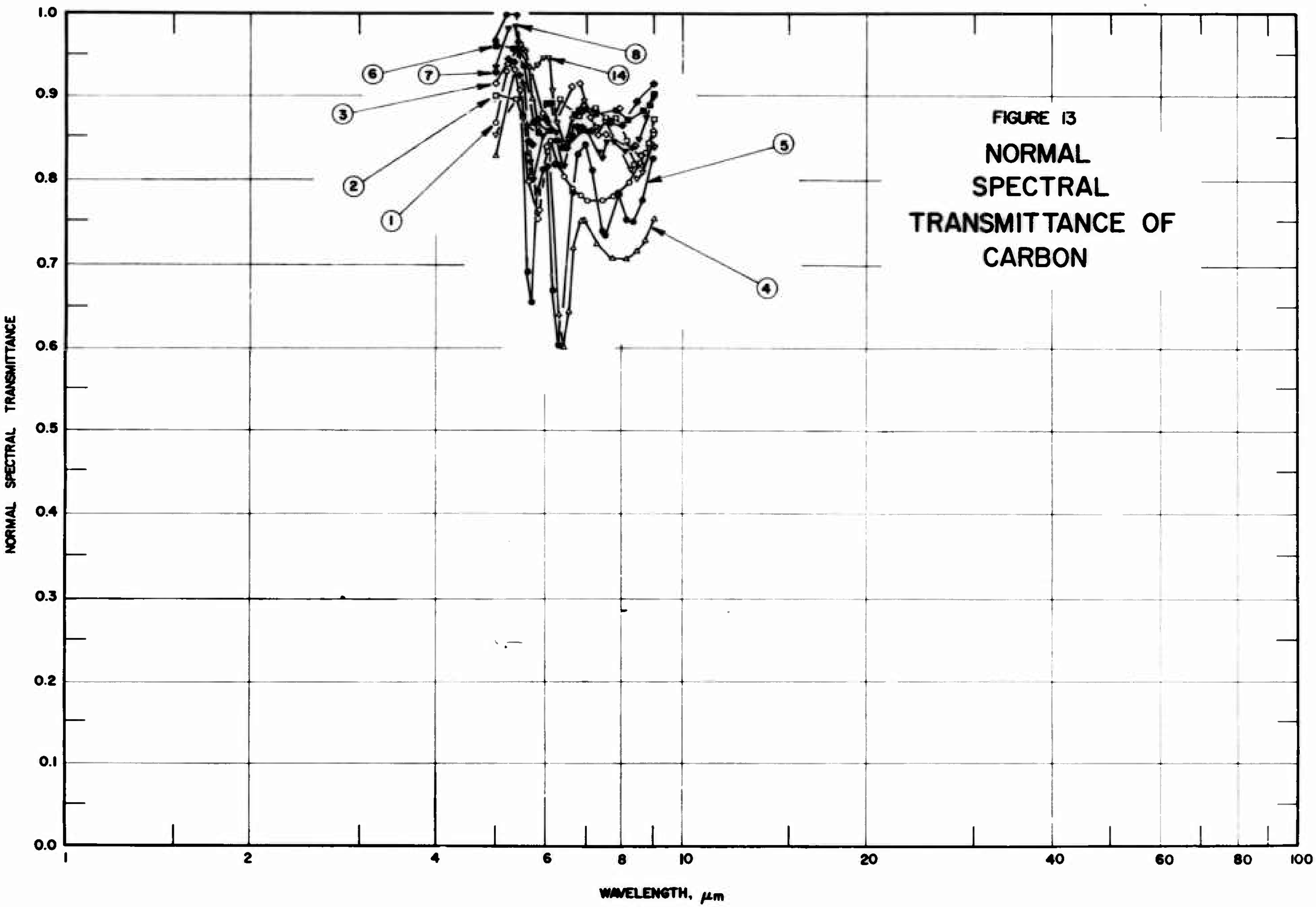

FIGURE 13
NORMAL SPECTRAL TRANSMITTANCE OF CARBON

SPECIFICATION TABLE NO. 13   NORMAL SPECTRAL TRANSMITTANCE OF CARBON

Curve No.	Ref. No.	Year	Temperature K	Wavelength Range, μm	Geometry θ θ' ω	Reported Error, %	Composition (weight percent), Specifications and Remarks
1	278	1966	~298	5.0-9.0	~0° ~0°		Very thin film deposited on an Irtran disk by pyrolysis of a carbon suboxide polymer; measurements made "in situ" with transmittance of uncoated Irtran disk used as 100% line; data extracted from smooth curve.
2	278	1966	~298	5.0-9.0	~0° ~0°		Similar to curve 1 specimen and conditions except treated with O_3 and O_2 for 6 hrs at 760 mm Hg at 298 K.
3	278	1966	~298	5.0-9.0	~0° ~0°		Similar to curve 1 specimen and conditions except treated with O_3 + O_2 mixture for 18 hrs at 760 mm Hg at 298 K.
4	278	1966	~298	5.0-9.0	~0° ~0°		Similar to curve 1 specimen and conditions except treated with NO for 4 hrs at 500 mm Hg at 298 K.
5	278	1966	~298	5.0-9.0	~0° ~0°		Similar to curve 1 specimen and conditions except treated with NO for 4 hrs at 500 mm Hg at 573 K.
6	278	1966	~298	5.0-9.0	~0° ~0°		Similar to curve 1 specimen and conditions except treated with O_2 for 35 hrs at 760 mm Hg at 298 K.
7	278	1966	~298	5.0-9.0	~0° ~0°		Similar to curve 1 specimen and conditions except treated with O_2 for 3 hrs at 500 mm Hg at 573 K.
8	278	1966	~298	5.0-9.0	~0° ~0°		Similar to curve 1 specimen and conditions except treated with O_2 for 0.5 hr at 100 mm Hg at 773 K.
9*	278	1966	~298	5.0-9.0	~0° ~0°		Similar to curve 1 specimen and conditions except treated with N_2O for 17 hrs at 500 mm Hg at 793 K.
10*	278	1966	~298	5.0-9.0	~0° ~0°		Similar to curve 1 specimen and conditions except treated with H_2O for 12 hrs at 8 mm Hg at 383 K.
11*	278	1966	~298	5.0-9.0	~0° ~0°		Similar to curve 1 specimen and conditions except treated with H_2O for 3 hrs at 15 mm Hg at 703 K.
12*	278	1966	~298	5.0-9.0	~0° ~0°		Similar to curve 1 specimen and conditions except treated with H_2O for 4 hrs at 15 mm Hg at 863 K.
13*	278	1966	~298	5.0-9.0	~0° ~0°		Similar to curve 1 specimen and conditions except treated with H_2O for 12 hrs at 12 mm Hg at 953 K.
14	278	1966	~298	5.0-9.0	~0° ~0°		Similar to curve 1 specimen and conditions except treated with 30% H_2O_2 for 2 hrs at 25 mm Hg at 298 K.
15*	278	1966	~298	5.0-9.0	~0° ~0°		Similar to curve 1 specimen and conditions except treated with 25% H_2O_2 for 12 hrs at 25 mm Hg at 648 K.

* Not shown on plot

DATA TABLE NO. 13 NORMAL SPECTRAL TRANSMITTANCE OF CARBON

[Wavelength, λ, μm; Transmittance, τ; Temperature, T, K]

CURVE 1
T ~ 298

λ	τ
5.00	0.868
5.20	0.930
5.36	0.957
5.48	0.964
5.58	0.956
5.95	0.879
6.12	0.846
6.30	0.818
6.47	0.802
6.65	0.789
6.87	0.780
7.02	0.775
7.45	0.775
7.71	0.780
7.90	0.784
8.21	0.797
8.54	0.820
8.75	0.832
9.00	0.853

CURVE 2
T ~ 298

λ	τ
5.00	0.900
5.37	0.896
5.52	0.875
5.70	0.802
5.83	0.784
6.05	0.835
6.35	0.896
6.81	0.877
7.23	0.850
7.54	0.874
7.83	0.874
8.11	0.846
8.38	0.819
8.59	0.819
8.81	0.843
9.00	0.872

CURVE 3
T ~ 298

λ	τ
5.00	0.915
5.22	0.940
5.35	0.932
5.47	0.908
5.69	0.798
5.83	0.754
5.88	0.764
6.04	0.840
6.65	0.911
6.83	0.916
7.11	0.873
7.35	0.853
7.54	0.853
7.99	0.885
8.41	0.840
8.60	0.828
8.87	0.843
9.00	0.857

CURVE 4
T ~ 298

λ	τ
5.00	0.828
5.41	0.949
5.53	0.958
5.66	0.937
5.72	0.897
5.84	0.867
6.01	0.875
6.09	0.858
6.31	0.641
6.42	0.600
6.54	0.644
6.69	0.719
6.87	0.751
6.95	0.751
7.29	0.724
7.71	0.707
8.14	0.707
8.45	0.716
8.74	0.729
9.00	0.754

CURVE 5
T ~ 298

λ	τ
5.00	0.969
5.20	1.000
5.39	1.000
5.44	0.966
5.53	0.878
5.63	0.691
5.70	0.656
5.83	0.756
5.97	0.812
6.07	0.817
6.18	0.670
6.32	0.601
6.66	0.786
6.80	0.830
6.98	0.842
7.17	0.811
7.44	0.738
7.54	0.734
7.91	0.783
8.11	0.752
8.32	0.750
8.61	0.776
9.00	0.825

CURVE 6
T ~ 298

λ	τ
5.00	0.962
5.32	0.958
5.53	0.937
5.72	0.868
5.82	0.855
6.06	0.891
6.14	0.891
6.27	0.847
6.43	0.838
6.62	0.853
6.70	0.878
6.81	0.884
6.98	0.884
7.22	0.877
7.88	0.884

CURVE 6 (cont.)

λ	τ
8.19	0.871
8.63	0.882
8.83	0.889
9.00	0.901

CURVE 7
T ~ 298

λ	τ
5.00	0.929
5.24	0.946
5.35	0.942
5.47	0.925
5.64	0.847
5.72	0.842
5.87	0.871
6.02	0.871
6.13	0.858
6.29	0.818
6.50	0.838
6.78	0.863
6.93	0.863
7.18	0.859
7.68	0.868
8.01	0.865
8.45	0.894
9.00	0.915

CURVE 8
T ~ 298

λ	τ
5.00	0.935
5.24	0.982
5.38	0.986
5.46	0.966
5.52	0.914
5.61	0.864
5.67	0.821
5.74	0.800
5.95	0.851
6.08	0.867
6.22	0.856
6.38	0.818
6.44	0.818

CURVE 8 (cont.)

λ	τ
6.58	0.843
6.81	0.858
7.03	0.858
7.31	0.832
7.41	0.826
7.58	0.846
7.79	0.846
8.10	0.834
8.31	0.838
8.50	0.849
8.77	0.875
9.00	0.900

CURVE 9*
T ~ 298

λ	τ
5.00	0.910
5.57	0.921
5.82	0.913
5.97	0.919
6.12	0.908
6.21	0.882
6.33	0.789
6.47	0.768
6.63	0.797
7.40	0.794
7.73	0.783
8.13	0.793
8.70	0.823
9.00	0.857

CURVE 10*
T ~ 298

λ	τ
5.00	0.894
5.26	0.906
5.51	0.921
5.66	0.904
5.81	0.851
5.94	0.860
6.05	0.834
6.13	0.785
6.19	0.711

CURVE 10 (cont.)*

λ	τ
6.28	0.674
6.38	0.663
6.49	0.695
6.56	0.731
6.70	0.751
7.17	0.751
7.94	0.719
8.59	0.690
8.88	0.690
9.00	0.708

CURVE 11*
T ~ 298

λ	τ
5.00	0.901
5.58	0.929
5.70	0.914
5.79	0.859
5.88	0.846
6.03	0.838
6.12	0.793
6.20	0.721
6.27	0.681
6.38	0.677
6.69	0.740
6.89	0.714
7.04	0.686
7.19	0.674
7.33	0.696
7.57	0.741
7.67	0.741
8.10	0.705
8.52	0.682
8.75	0.686
9.00	0.705

CURVE 12*
T ~ 298

λ	τ
5.00	0.927
5.46	0.945
5.74	0.937
5.94	0.942

CURVE 12 (cont.)*

λ	τ
6.00	0.945
6.13	0.934
6.20	0.850
6.34	0.789
6.51	0.810
6.80	0.830
6.93	0.796
7.11	0.757
7.25	0.719
7.36	0.711
7.52	0.779
7.70	0.785
8.47	0.749
8.76	0.746
9.00	0.756

CURVE 13*
T ~ 298

λ	τ
5.00	0.881
5.35	0.890
5.72	0.915
5.91	0.910
6.13	0.885
6.27	0.826
6.38	0.806
6.59	0.841
6.77	0.830
7.07	0.765
7.26	0.716
7.31	0.716
7.42	0.751
7.60	0.779
7.87	0.783
8.24	0.758
8.46	0.763
9.00	0.797

CURVE 14
T ~ 298

λ	τ
5.00	0.853
5.82	0.939

CURVE 14 (cont.)

λ	τ
5.99	0.949
6.09	0.949
6.18	0.908
6.29	0.868
6.45	0.843
6.53	0.849
6.67	0.874
6.94	0.894
7.10	0.882
7.28	0.862
7.39	0.861
7.53	0.870
7.68	0.870
8.28	0.813
8.45	0.800
8.62	0.809
9.00	0.840

CURVE 15*
T ~ 298

λ	τ
5.00	0.851
5.97	0.955
6.07	0.958
6.12	0.946
6.16	0.911
6.25	0.880
6.35	0.860
6.41	0.865
6.54	0.904
6.71	0.923
6.82	0.923
7.23	0.884
7.42	0.877
7.59	0.888
7.72	0.892
7.84	0.892
8.16	0.838
8.30	0.826
8.46	0.822
9.00	0.873

* Not shown on plot

SPECIFICATION TABLE NO. 14 HEMISPHERICAL TOTAL EMITTANCE OF CARBON (GRAPHITE)

Curve No.	Ref. No.	Year	Temperature Range, K	Reported Error, %	Composition (weight percent), Specifications and Remarks
1*	19	1964	2018-2593		Thin film of pyrolytic graphite (~100 μm thick) on ATJ graphite tube; temp calculated using median thermal conductivity of graphite tube.
2*	19	1964	2053-2643		Above specimen and conditions except temp calculated using the high thermal conductivity of graphite tube.

DATA TABLE NO. 14 HEMISPHERICAL TOTAL EMITTANCE OF CARBON (GRAPHITE)

[Temperature, T, K; Emittance, ϵ]

T	ϵ
CURVE 1*	
2018	0.650
2133	0.650
2223	0.680
2273	0.686
2473	0.690
2593	0.740
CURVE 2*	
2053	0.600
2193	0.600
2273	0.625
2323	0.630
2513	0.625
2643	0.660

* No plot given

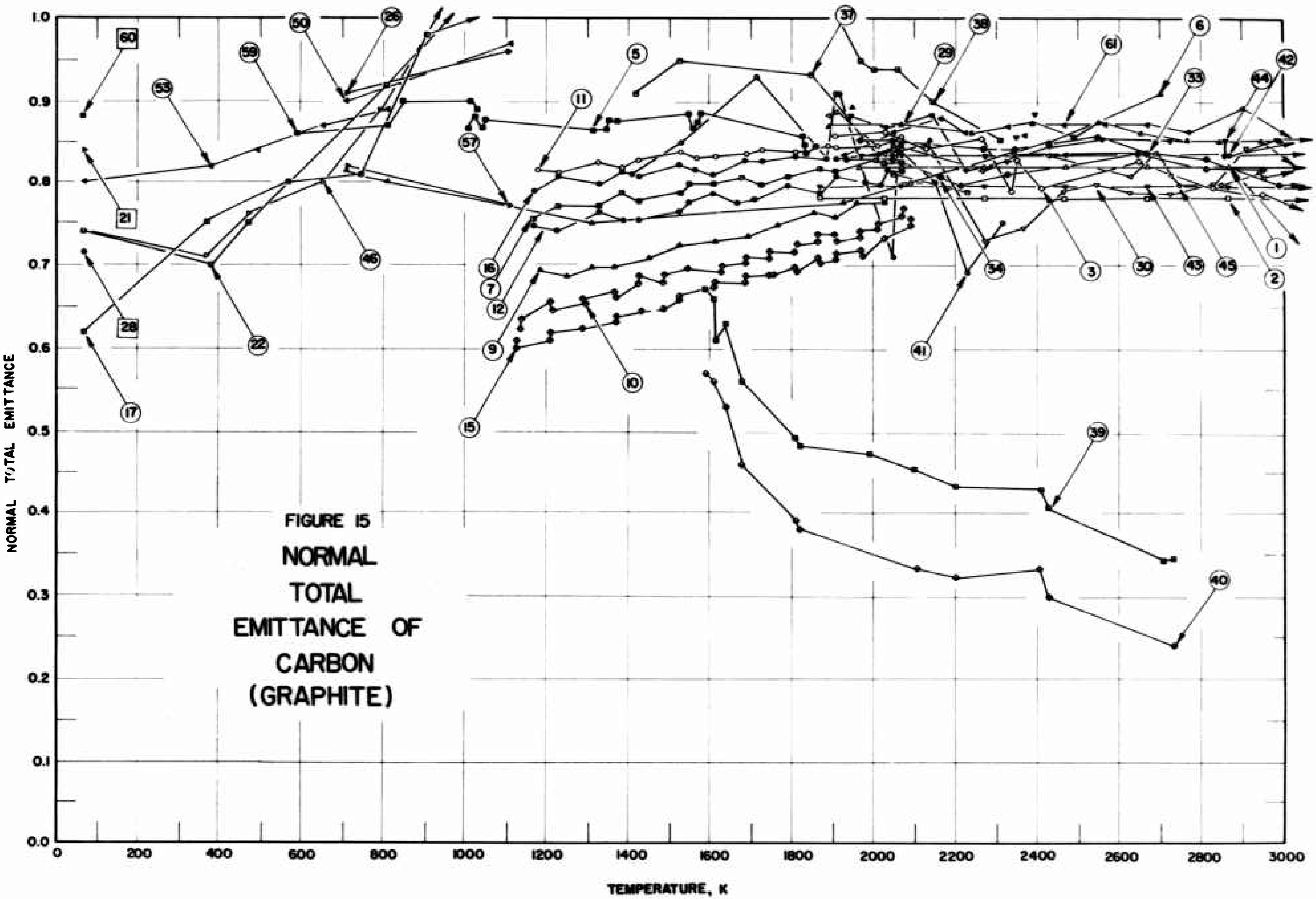

FIGURE 15
NORMAL
TOTAL
EMITTANCE OF
CARBON
(GRAPHITE)

SPECIFICATION TABLE NO. 15 NORMAL TOTAL EMITTANCE OF CARBON (GRAPHITE)

Curve No.	Ref. No.	Year	Temperature Range, K	Geometry θ'	Reported Error, %	Composition (weight percent), Specifications and Remarks
1	33	1962	1972-3173	~0°		AGX graphite; machined surface; for T <2273 K, measured in vacuum; for T >2273 K, measured in argon (760 mm Hg); data extracted from smooth curve.
2	33	1962	1873-3172	~0°		Above specimen and conditions except final polished with silk cloth and chromic acid compound.
3	35	1959	1903-3103	~0°		AGX graphite (National Carbon Co.); machined surface; for T <2273 K, measured in vacuum; for T >2273 K, measured in argon (760 mm Hg); [Authors' designation: first sample].
4*	35	1959	1950-3103	~0°		Similar to the above specimen and conditions; [Authors' designation: second sample].
5	24	1960	1015-1860	0°	± 5	ATJ graphite; measured in 90 Ar + 10 H_2 at 78 cm Hg.
6	30	1962	711-2700	~0°		ATJ graphite; ground to a smooth finish; measured in dried argon or helium; data extracted from smooth curve.
7*	2	1959	1173-2067	~0°		National Carbon Co. A. U. C. graphite; polished with 80 grit emery cloth; measured in vacuum (3×10^{-6} to 5×10^{-4} mm Hg); computed from spectral data (0.2 to 3.5 μm).
8*	2	1959	1176-2066	~0°		Similar to the above specimen and conditions except polished with 180 grit emery cloth.
9	2	1959	1182-2036	~0°		Similar to the above specimen and conditions except polished with 320 grit emery cloth.
10	2	1959	1139-2067	~0°		Similar to the above specimen and conditions except burnished and polished with ground glass.
11	2	1959	1180-2071	~0°		Similar to the above specimen and conditions except oxidized in air at 1173 K for 12 min; sandblasted.
12	2	1959	1173-2073	~0°		National Carbon Co. A. U. C. graphite; polished with 80 grit emery cloth; measured in vacuum (3×10^{-6} to 5×10^{-4} mm Hg); computed from spectral data (0.2 to 10 μm).
13*	2	1959	1181-2072	~0°		Similar to the above specimen and conditions except polished with 180 grit emery cloth.
14*	2	1959	1191-2036	~0°		Similar to the above specimen and conditions except polished with 320 grit emery cloth.
15	2	1959	1133-2094	~0°		Similar to the above specimen and conditions except burnished and polished with ground glass.
16	2	1959	1176-2073	~0°		Similar to the above specimen and conditions except oxidized in air at 1173 K for 12 min; sandblasted.
17	21	1958	75-1075	~0°		National Graphite GBE; measured in air; increasing temp, cycle 1.
18*	21	1958	339-811	~0°		Above specimen and conditions except decreasing temp, cycle 1.
19*	21	1958	589-1019	~0°		Above specimen and conditions except increasing temp, cycle 2.
20*	21	1958	644	~0°		Above specimen and conditions except decreasing temp, cycle 2.
21	23	1956	77	~0°		National GBE Graphite.
22	21	1958	75-1061	~0°		National Graphite GBH; measured in air; increasing temp, cycle 1.
23*	21	1958	366-602	~0°		Above specimen and conditions except decreasing temp, cycle 1.
24*	21	1958	644-1075	~0°		Above specimen and conditions except increasing temp, cycle 2.
25*	21	1958	422-755	~0°		Above specimen and conditions except decreasing temp, cycle 2.

* Not shown on plot

SPECIFICATION TABLE NO. 15 (continued)

Curve No.	Ref. No.	Year	Temperature Range, K	Geometry θ'	Reported Error, %	Composition (weight percent), Specifications and Remarks
26	21	1958	714-1103	~0°		Above specimen and conditions except increasing temp, cycle 3.
27*	21	1958	380-491	~0°		Above specimen and conditions except decreasing temp, cycle 3.
28	23	1956	77	~0°		National GBH Graphite.
29	33	1962	1894-3169	~0°		H1LM graphite (Great Lakes Carbon Co.); machined surface; for T <2273 K, measured in vacuum; for T >2273 K, measured in argon (760 mm Hg); data extracted from smooth curve; [Authors' designation: first sample].
30	33	1962	2053-3086	~0°		Above specimen and conditions except polished with silk cloth and chromic acid compound.
31*	33	1962	1964-3128	~0°		Similar to curve 29 specimen and conditions; [Authors' designation: second sample].
32*	33	1962	1988-3086	~0°		Above specimen and conditions except polished with silk cloth and chromic acid compound.
33	33	1962	1967-3088	~0°		H3LM graphite (Great Lakes Carbon Co.); machined surface; for T <2273 K, measured in vacuum; for T >2273 K, measured in argon (760 mm Hg); data extracted from smooth curve; [Authors' designation: first sample].
34	33	1962	1938-2959	~0°		Above specimen and conditions except polished with silk cloth and chromic acid compound.
35*	33	1962	2053-3083	~0°		Similar to Curve 33 specimen and conditions; [Authors' designation: second sample].
36*	33	1962	2042-2996	~0°		Above specimen and conditions except polished with silk cloth and chromic acid compound.
37	32	1963	1420-2230	~0°		Pyrolytic graphite; polished; c-plane; computed from spectral data.
38	32	1963	1710-2315	~0°		Similar to the above specimen and conditions except measured in vacuum (5×10^{-6} mm Hg).
39	32	1963	1587-2737	~0°		Pyrolytic graphite; polished; a-b plane; measured in vacuum (5×10^{-6} mm Hg); computed from spectral data.
40	37	1964	1590-2735	~0°		Pyrolytic; 5 ppm Si, 3 ppm Fe, 1 ppm Al, 1 ppm Mg, C balance; a-b crystal plane radiating; density 2.194 g cm^{-3}; measured in vacuum (10^{-6} mm Hg); computed from spectral data (0.4 to 5.0 μm).
41	37	1964	1409-2319	~0°		Above specimen and conditions except c crystal plane radiating.
42	33	1962	1973-3173	~0°		Speer 580; machined surface; for T <2273 K, measured in vacuum; for T >2273 K, measured in argon (760 mm Hg); data extracted from smooth curve.
43	33	1962	1873-3173	~0°		Above specimen and conditions except final polished with silk cloth and chromic acid compound.
44	35	1959	1953-3147	~0°		Speer 580 (National Carbon Co.); machined surface; for T <2273 K, measured in vacuum; for T >2273 K, measured in argon (760 mm Hg); [Authors' designation: first sample].
45	35	1959	1892-3147	~0°		Similar to the above specimen and conditions; [Authors' designation: second sample].
46	21	1958	75-1075	~0°		Speer Graphite 3474 D; measured in air; increasing temp, cycle 1.
47*	21	1958	380-602	~0°		Above specimen and conditions except decreasing temp, cycle 1.
48*	21	1958	436-755	~0°		Above specimen and conditions except increasing temp, cycle 2.
49*	21	1958	436-755	~0°		Above specimen and conditions except decreasing temp, cycle 2.

* Not shown on plot

SPECIFICATION TABLE NO. 15 (continued)

Curve No.	Ref. No.	Year	Temperature Range, K	Geometry θ'	Reported Error, %	Composition (weight percent), Specifications and Remarks
50	21	1958	714-1116	~0°		Above specimen and conditions except increasing temp, cycle 3.
51*	21	1958	380-491	~0°		Above specimen and conditions except decreasing temp, cycle 3.
52*	23	1956	77	~0°		Speer 3474 D graphite.
53	21	1958	75-1075	~0°		Speer Graphite 7087; measured in air; increasing temp, cycle 1.
54*	21	1958	644-1089	~0°		Above specimen and conditions except decreasing temp, cycle 1.
55*	21	1958	644-1089	~0°		Above specimen and conditions except increasing temp, cycle 2.
56*	21	1958	422-755	~0°		Above specimen and conditions except decreasing temp, cycle 2.
57	21	1958	714-1103	~0°		Above specimen and conditions except increasing temp, cycle 3.
58*	21	1958	380-505	~0°		Above specimen and conditions except decreasing temp, cycle 3.
59	21	1958	589-1033	~0°		Speer Graphite 7087; measured in nitrogen.
60	23	1956	77	~0°		Speer 7087 graphite.
61	33	1962	1937-3076	~0°		Speer 7100; machined surface; for T <2273 K, measured in vacuum; for T >2273 K, measured in argon (760 mm Hg); [Authors' designation: first sample].
62*	33	1962	1932-3043	~0°		Above specimen and conditions except final polished with silk cloth and chromic acid compound.
63*	33	1962	1947-3105	~0°		Similar to curve 61 specimen and conditions; [Authors' designation: second sample].
64*	33	1962	1886-3115	~0°		Above specimen and conditions except final polished with silk cloth and chromic acid compound.
65*	22	1960	1026-1856	~0°		Highly rough surface; measured in argon-hydrogen.
66*	25	1960	644-1644	~0°	± 20	Preoxidized electrode graphite; measured in demoisturized He.
67*	30	1962	817-1611	~0°		Sandpaper finished (400 grit); N_2 purge.
68*	31	1961	1034-1427	~0°		Measured in vacuum (10^{-6} mm Hg).
69*	31	1961	1050-1488	~0°		Measured in vacuum (10^{-6} mm Hg); data extracted from smooth curve.
70*	31	1961	1193-1208	~0°		Measured in vacuum (10^{-6} mm Hg).
71*	36	1962	819-1608	~0°		Sandpaper finished (400 grit); measured in nitrogen.

* Not shown on plot

DATA TABLE NO. 15 NORMAL TOTAL EMITTANCE OF CARBON (GRAPHITE)

[Temperature, T, K; Emittance, ϵ]

T	ϵ
CURVE 1	
1972	0.820
2070	0.820
2272	0.820
2472	0.820
2674	0.820
2871	0.820
3075	0.820*
3173	0.820*
CURVE 2	
1873	0.780
2030	0.780
2273	0.780
2472	0.780
2673	0.780
2872	0.780
3073	0.780*
3173	0.780*
CURVE 3	
1903	0.859
2029	0.861
2134	0.842
2262	0.803
2339	0.788
2343	0.828
2413	0.791
2648	0.828
2828	0.792
2952	0.785
3028	0.772*
3103	0.769*
CURVE 4*	
1950	0.808
2009	0.789
2054	0.822
2165	0.777
2229	0.794
2326	0.826
2482	0.837
2567	0.822
2662	0.838
CURVE 4 (cont.)*	
2739	0.814
2858	0.784
3001	0.828
3050	0.841
3103	0.811
CURVE 5	
1015	0.867
1024	0.881
1042	0.867
1048	0.878
1319	0.865
1344	0.866
1348	0.879
1368	0.879
1555	0.884
1560	0.868
1576	0.873
1579	0.886
1830	0.858
1835	0.849
1839	0.838
1860	0.844
CURVE 6	
711	0.815
811	0.800
1311	0.750
1922	0.775
2089	0.800
2422	0.850
2700	0.910
CURVE 7*	
1173	0.755
1235	0.770
1322	0.770
1381	0.784
1426	0.776
1525	0.787
1553	0.798
1613	0.798
1680	0.802
CURVE 7 (cont.)*	
1725	0.797
1792	0.806
1872	0.819
1911	0.815
2001	0.829
2031	0.824
2067	0.825
CURVE 8*	
1176	0.739
1234	0.736
1327	0.753
1369	0.748
1435	0.768
1509	0.761
1558	0.767
1618	0.780
1683	0.774
1727	0.781
1802	0.794
1881	0.794
1912	0.796
1985	0.803
2005	0.812
2066	0.817
CURVE 9	
1182	0.692
1258	0.685
1313	0.699
1363	0.699
1456	0.708
1531	0.723
1619	0.727
1697	0.732
1764	0.749
1859	0.761
1904	0.758
1960	0.773
2036	0.773
CURVE 10	
1139	0.626
1140	0.636
1215	0.657
1219	0.649
1289	0.655
1286	0.660
1371	0.668
1376	0.663
1430	0.678
1430	0.685
1483	0.677
1491	0.683
1544	0.696
1625	0.693
1625	0.697
1689	0.703
1689	0.709
1746	0.709
1746	0.715
1804	0.715
1805	0.724
1862	0.729
1861	0.734
1911	0.734
1912	0.727
1973	0.732
1973	0.739
2015	0.744
2014	0.750
2066	0.757
2067	0.768
CURVE 11	
1180	0.814
1236	0.812
1332	0.826
1383	0.819
1431	0.827
1530	0.837
1568	0.830
1619	0.831
1690	0.835
1727	0.840
1808	0.838
1885	0.846
1913	0.842
2014	0.846
2071	0.858
CURVE 12	
1173	0.746
1231	0.740
1325	0.761
1385	0.752
1423	0.752
1526	0.763
1555	0.774
1613	0.784
1673	0.773
1727	0.778
1794	0.795
1873	0.785
1915	0.806
2010	0.798
2038	0.814
2073	0.814
CURVE 13*	
1811	0.704
1238	0.725
1334	0.718
1375	0.736
1434	0.730
1514	0.739
1566	0.752
1622	0.758
1693	0.758
1737	0.758
1805	0.778
1886	0.777
1923	0.779
2001	0.794
2018	0.787
2072	0.796
CURVE 14*	
1191	0.652
1262	0.657
1320	0.660
1374	0.678
1460	0.680
1536	0.694
1618	0.703
1687	0.714
CURVE 14 (cont.)*	
1775	0.718
1867	0.729
1908	0.740
1968	0.740
2036	0.761
CURVE 15	
1133	0.610
1133	0.600
1207	0.610
1207	0.620
1290	0.626
1375	0.633
1375	0.640
1437	0.647
1485	0.649
1533	0.657
1533	0.661
1617	0.672
1617	0.678
1685	0.678
1685	0.684
1742	0.689
1753	0.689
1801	0.699
1803	0.693
1863	0.709
1865	0.703
1909	0.707
1909	0.713
1973	0.717
1975	0.711
2023	0.731
2094	0.748
2094	0.751
CURVE 16	
1176	0.789
1235	0.805
1335	0.798
1382	0.811
1432	0.807
1524	0.822
1563	0.816
CURVE 16 (cont.)	
1612	0.810
1687	0.827
1725	0.827
1806	0.832
1883	0.830
1913	0.830
2002	0.844*
2011	0.835
2073	0.849
CURVE 17	
75	0.62
366	0.75
575	0.80
741	0.81
908	0.98
1075	1.01*
CURVE 18*	
811	0.91
505	0.87
339	0.86
CURVE 19*	
589	0.88
852	0.93
1019	0.99
CURVE 20*	
644	0.83
CURVE 21	
77	0.840
CURVE 22	
75	0.74
380	0.70
477	0.75
811	0.92
977	1.04*
1061	1.03*
CURVE 23*	
602	0.89
366	0.87
CURVE 24*	
644	0.90
866	0.93
1075	1.03*
CURVE 25*	
755	0.91
422	0.89
CURVE 26	
714	0.91
1103	0.96
CURVE 27*	
491	0.87
380	0.80
CURVE 28	
77	0.715
CURVE 29	
1894	0.870
1945	0.893
2076	0.871
2140	0.852
2240	0.862
2384	0.873
2489	0.859
2549	0.874
2659	0.861
2764	0.851
2853	0.851
2955	0.851
2990	0.851
3169	0.730*

*Not shown on plot

DATA TABLE NO. 15 (continued)

T	∈
CURVE 30	
2053	0.838
2139	0.847
2278	0.728
2362	0.741
2461	0.788
2554	0.798
2626	0.789
2724	0.787
2828	0.799
2911	0.844
3086	0.718*
CURVE 31*	
1964	0.853
2093	0.861
2143	0.861
2247	0.843
2346	0.832
2435	0.852
2564	0.852
2648	0.842
2739	0.842
2810	0.842
2940	0.852
3064	0.832
3128	0.790
CURVE 32*	
1988	0.846
2042	0.846
2138	0.819
2248	0.828
2317	0.818
2337	0.798
2377	0.780
2520	0.797
2685	0.808
2829	0.797
2974	0.808
3086	0.798
CURVE 33	
1967	0.853
2052	0.853

T	∈
CURVE 33 (cont.)	
2270	0.841
2341	0.841
2556	0.859
2665	0.839
2814	0.830
2987	0.799
3088	0.790*
CURVE 34	
1938	0.830
2053	0.830
2163	0.808
2217	0.799
2327	0.810
2473	0.819*
2656	0.838
2818	0.819
2959	0.819
CURVE 35*	
2053	0.872
2124	0.872
2255	0.850
2352	0.850
2476	0.860
2538	0.860
2667	0.860
2774	0.850
2873	0.850
2990	0.828
3083	0.798
CURVE 36*	
2042	0.830
2167	0.819
2265	0.819
2364	0.819
2480	0.760
2619	0.770
2849	0.770
2996	0.770

T	∈
CURVE 37	
1420	0.910
1533	0.950
1855	0.933
2055	0.810
2230	0.787
CURVE 38	
1710	1.030*
1910	1.010*
1975	0.950
2000	0.940
2060	0.940
2145	0.900
2315	0.852
CURVE 39	
1587	0.670
1610	0.660
1623	0.610
1640	0.630
1680	0.560
1810	0.493
1820	0.482
1993	0.472
2100	0.453
2200	0.433
2410	0.430
2430	0.405
2713	0.342
2737	0.343
CURVE 40	
1590	0.57
1611	0.56
1640	0.53
1680	0.46
1808	0.39
1820	0.38
2105	0.33
2200	0.32
2404	0.33
2430	0.30
2735	0.24

T	∈
CURVE 41	
1409	0.81
1531	0.85
1718	0.93
1882	0.83
1914	0.91
1920	0.91
1980	0.80
2054	0.71
2060	0.84
2149	0.80
2225	0.69
2319	0.75
CURVE 42	
1973	0.835
2074	0.835
2272	0.835
2473	0.835
2674	0.835*
2873	0.835
3073	0.835*
3173	0.835*
CURVE 43	
1873	0.795
2075	0.795
2273	0.795
2472	0.795
2670	0.795
2872	0.795
3072	0.795*
3173	0.795*
CURVE 44	
1953	0.881
2030	0.866
2143	0.882
2236	0.816
2325	0.828
2356	0.858
2399	0.885
2438	0.848
2560	0.854
2726	0.852

T	∈
CURVE 44 (cont.)	
2860	0.852
2860	0.833
2986	0.852
3011	0.852*
3055	0.823*
3147	0.832*
CURVE 45	
1892	0.883
1914	0.888
2027	0.834
2059	0.849
2149	0.833
2263	0.817
2341	0.834
2434	0.834
2554	0.798*
2624	0.808
2693	0.839
2736	0.809
2748	0.799
2846	0.799
2879	0.830
2945	0.815
2958	0.807
3087	0.835*
3095	0.803*
3106	0.791*
3147	0.832*
CURVE 46	
75	0.74*
366	0.71
477	0.76
658	0.80
797	0.89
977	1.06*
1075	1.06*
CURVE 47*	
602	0.82
380	0.85

T	∈
CURVE 48*	
658	0.94
866	0.98
1089	1.00
CURVE 49*	
755	0.93
436	0.89
CURVE 50	
714	0.90
1116	0.97
CURVE 51*	
491	0.89
380	0.81
CURVE 52*	
77	0.840
CURVE 53	
75	0.80
380	0.82
491	0.84
658	0.87
811	0.89
964	1.03*
1075	1.01*
CURVE 54*	
602	0.89
366	0.82
CURVE 55*	
644	0.89
866	0.92
1089	0.92
CURVE 56*	
755	0.80
422	0.82

T	∈
CURVE 57	
714	0.82
1103	0.77
CURVE 58*	
505	0.83
380	0.81
CURVE 59	
589	0.86
811	0.87
852	0.90
1019	0.90
1033	0.89
CURVE 60	
77	0.882
CURVE 61	
1937	0.831
2058	0.861
2161	0.880
2226	0.861
2332	0.870
2366	0.860
2464	0.872
2562	0.872
2664	0.872
2764	0.813
2905	0.891
3016	0.862*
3076	0.812*
CURVE 62*	
1932	0.799
2016	0.769
2133	0.781
2239	0.740
2343	0.719
2457	0.829
2538	0.810
2632	0.820
2727	0.809

T	∈
CURVE 62 (cont.)*	
2832	0.830
3043	0.849
CURVE 63*	
1947	0.863
2030	0.863
2140	0.862
2286	0.852
2372	0.844
2475	0.832
2519	0.853
2576	0.831
2691	0.841
2839	0.844
2989	0.822
3105	0.773
CURVE 64*	
1886	0.849
1955	0.849
2143	0.774
2149	0.819
2265	0.790
2318	0.790
2457	0.790
2634	0.780
2809	0.771
2932	0.799
3115	0.791
CURVE 65*	
1026	0.867
1033	0.882
1051	0.868
1055	0.878
1323	0.866
1346	0.866
1349	0.880
1370	0.878
1552	0.884
1558	0.867
1574	0.873
1578	0.885
1828	0.858

*Not shown on plot

DATA TABLE NO. 15 (continued)

T	∈	T	∈
CURVE 65 (cont.)*		CURVE 71 (cont.)*	
1831	0.847	1102	0.976
1836	0.838	1349	0.997
1856	0.845	1379	1.00
		1608	1.00
CURVE 66*			
644	0.59		
811	0.67		
1089	0.82		
1367	0.94		
1644	0.99		
CURVE 67*			
817	0.920		
828	0.960		
1094	0.975		
1350	0.995		
1378	0.995		
1611	0.995		
CURVE 68*			
1034	0.920		
1168	0.930		
1427	0.965		
CURVE 69*			
1050	0.920		
1180	0.931		
1488	0.965		
CURVE 70*			
1193	0.932		
1193	0.932		
1198	0.932		
1198	0.932		
1206	0.932		
1208	0.932		
CURVE 71*			
819	0.910		
837	0.952		

*Not shown on plot

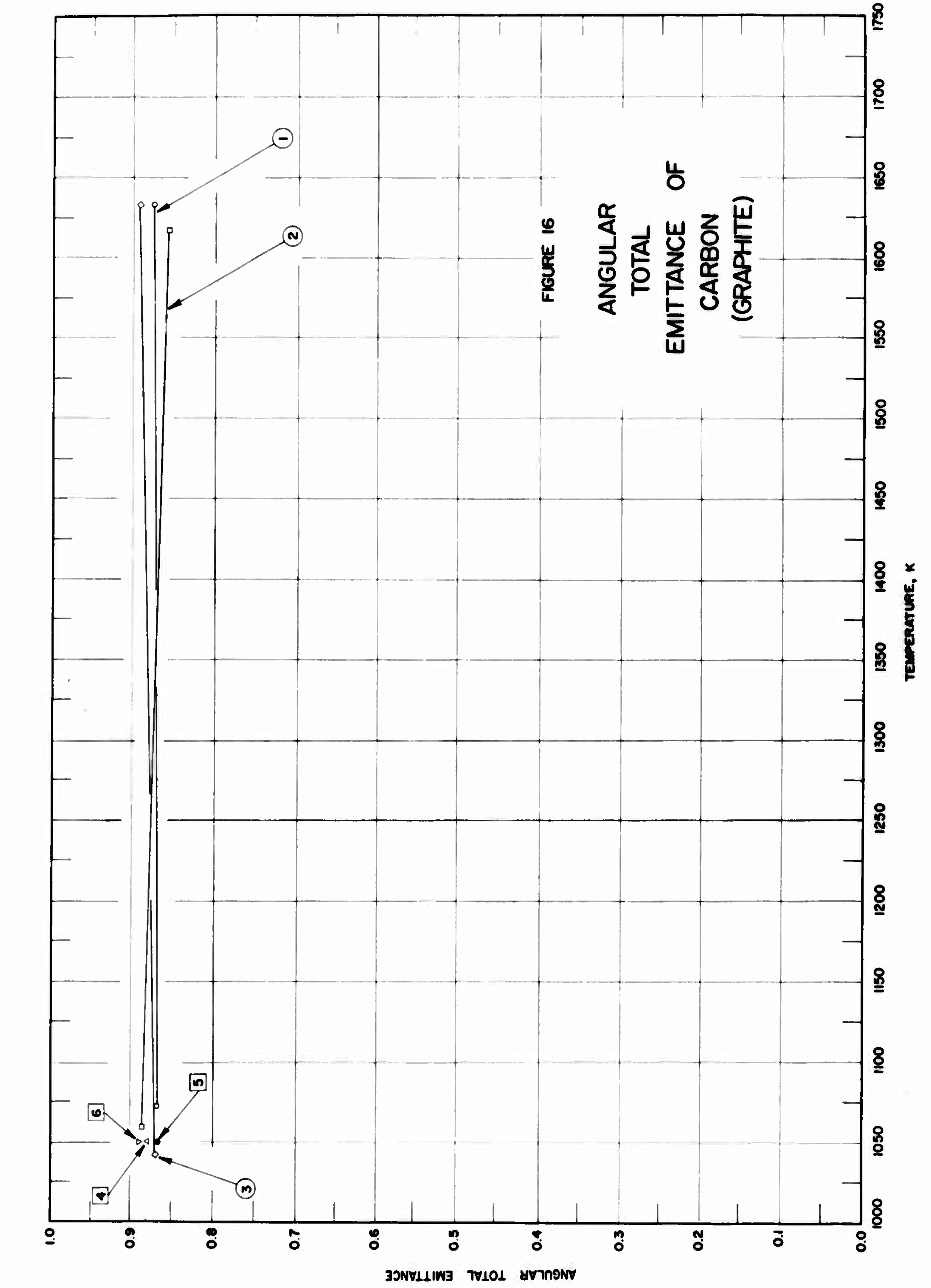
FIGURE 16
ANGULAR TOTAL EMITTANCE OF CARBON (GRAPHITE)
ANGULAR TOTAL EMITTANCE
TEMPERATURE, K
0.0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
1.0
1000
1050
1100
1150
1200
1250
1300
1350
1400
1450
1500
1550
1600
1650
1700
1750
1
2
3
4
5
6

SPECIFICATION TABLE NO. 16 ANGULAR TOTAL EMITTANCE OF CARBON (GRAPHITE)

Curve No.	Ref. No.	Year	Temperature Range, K	Geometry θ'	Reported Error, %	Composition (weight percent), Specifications and Remarks
1	24	1960	1072-1633	30°	± 5	ATJ graphite; measured in 90 Ar + 10H_2 (780 mm Hg).
2	24	1960	1060-1616	45°	± 5	Above specimen and conditions.
3	24	1960	1043-1633	60°	± 5	Above specimen and conditions.
4	22	1960	1050	0°		Highly rough surface; measured in argon-hydrogen.
5	22	1960	1050	30°		Above specimen and conditions.
6	22	1960	1050	45°		Above specimen and conditions.
7*	22	1960	1050	60°		Above specimen and conditions.

DATA TABLE NO. 16 ANGULAR TOTAL EMITTANCE OF CARBON (GRAPHITE)

[Temperature, T, K; Emittance, ϵ]

T	ϵ
CURVE 1	
1072	0.866
1633	0.872
CURVE 2	
1060	0.885
1616	0.857
CURVE 3	
1043	0.869
1633	0.890
CURVE 4	
1050	0.879
CURVE 5	
1050	0.868
CURVE 6	
1050	0.889
CURVE 7*	
1050	0.871

*Not shown on plot

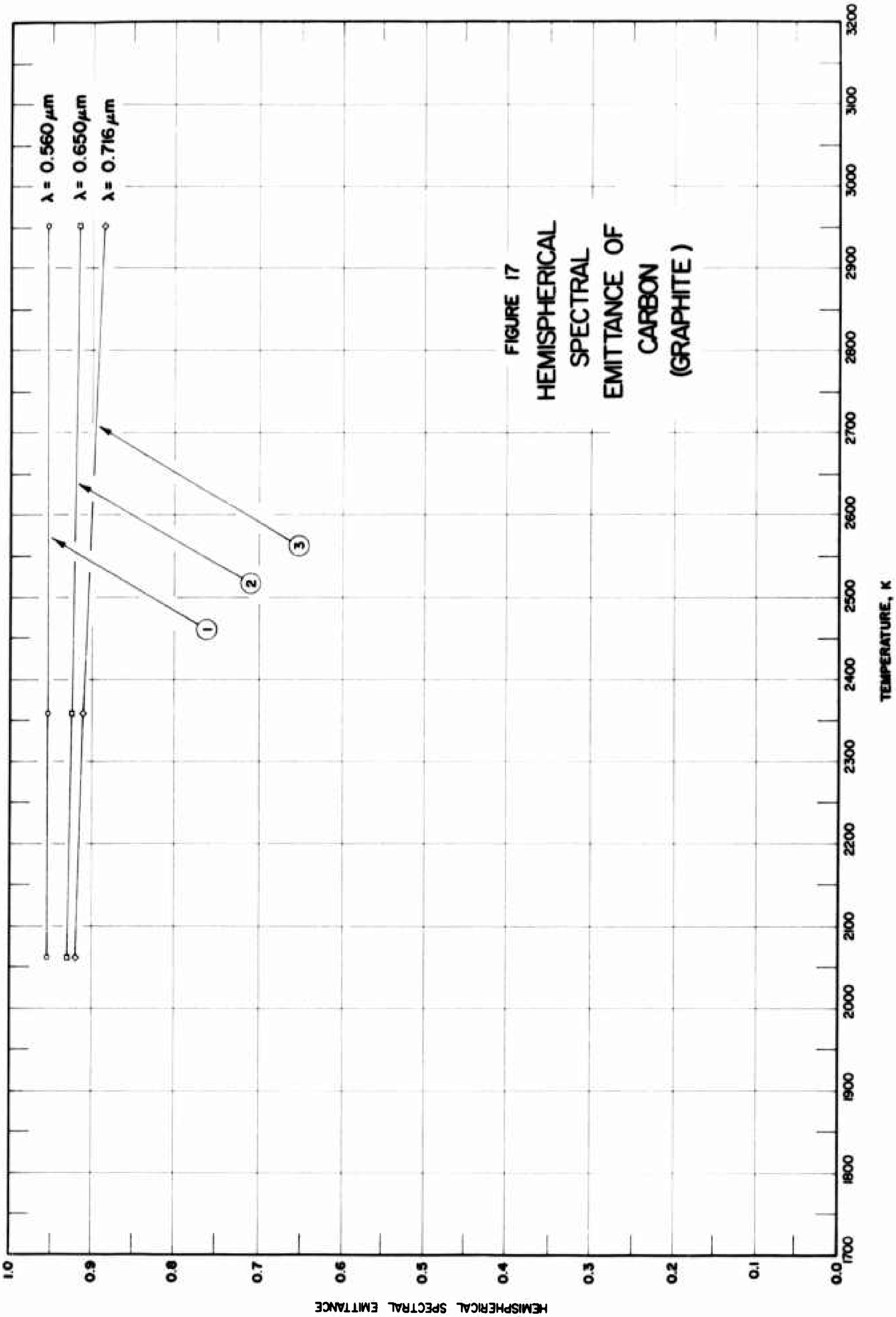

FIGURE 17
HEMISPHERICAL SPECTRAL EMITTANCE OF CARBON (GRAPHITE)

SPECIFICATION TABLE NO. 17 HEMISPHERICAL SPECTRAL EMITTANCE OF CARBON (GRAPHITE)

Curve No.	Ref. No.	Year	Wavelength µm	Temperature Range, K	Reported Error, %	Composition (weight percent), Specification and Remarks
1	4	1965	0.560	2061-2953		AGKSP graphite (National Carbon Co.); high-purity spectroscopic grade; mechanically polished with emery paper; oxidized in air; peak to valley roughness 50 µm; computed from $1-\rho(2\pi, 2\pi)$.
2	4	1965	0.650	2061-2953		Similar to the above specimen and conditions.
3	4	1965	0.716	2061-2953		Similar to the above specimen and conditions.

DATA TABLE NO. 17 HEMISPHERICAL SPECTRAL EMITTANCE OF CARBON (GRAPHITE)

[Temperature, T, K; Emittance, ϵ; Wavelength, λ, µm]

T	ϵ
CURVE 1	
$\lambda = 0.560$	
2061	0.955
2358	0.955
2953	0.955
CURVE 2	
$\lambda = 0.650$	
2061	0.930
2358	0.925
2953	0.915
CURVE 3	
$\lambda = 0.716$	
2061	0.920
2358	0.910
2953	0.885

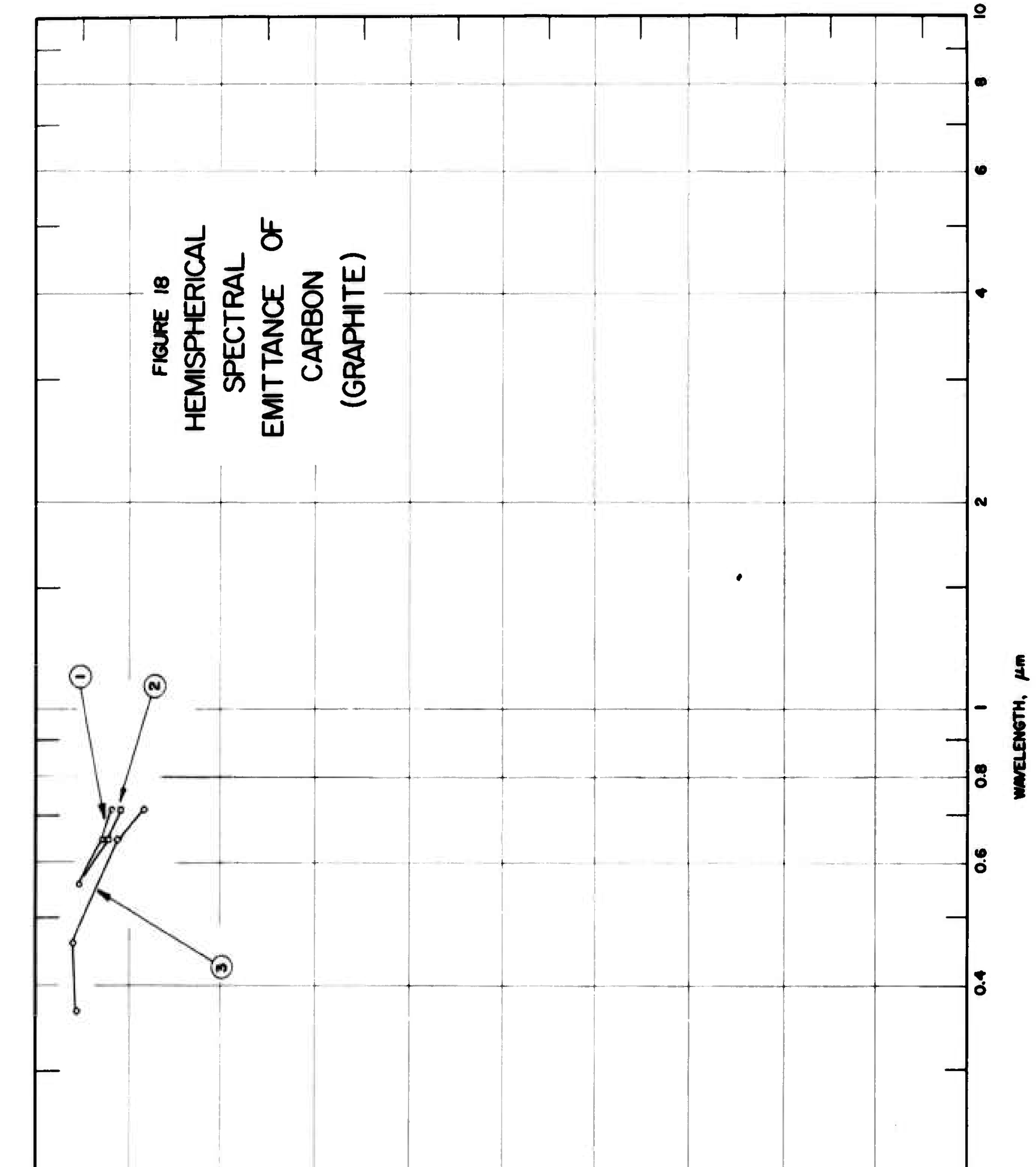

FIGURE 18
HEMISPHERICAL SPECTRAL EMITTANCE OF CARBON (GRAPHITE)

SPECIFICATION TABLE NO. 18 HEMISPHERICAL SPECTRAL EMITTANCE OF CARBON (GRAPHITE)

Curve No.	Ref. No.	Year	Temperature K	Wavelength Range, μm	Reported Error, %	Composition (weight percent), Specifications and Remarks
1	4	1965	2061	0.560-0.716		AGKSP graphite (National Carbon Co.); high-purity spectroscopic grade; mechanically polished with emery paper; oxidized in air; peak to valley roughness 50 μm; computed from 1-ρ (2π, 2π).
2	4	1965	2358	0.560-0.716		Similar to the above specimen and conditions.
3	4	1965	2953	0.367-0.716		Similar to the above specimen and conditions.

DATA TABLE NO. 18 HEMISPHERICAL SPECTRAL EMITTANCE OF CARBON (GRAPHITE)

[Wavelength, λ, μm; Emittance, ϵ; Temperature, T, K]

λ	ϵ
CURVE 1 T = 2061	
0.560	0.955
0.650	0.930
0.716	0.920
CURVE 2 T = 2358	
0.560	0.955*
0.650	0.925
0.716	0.910
CURVE 3 T = 2953	
0.367	0.957
0.460	0.960
0.560	0.955*
0.650	0.915
0.716	0.885

*Not shown on plot

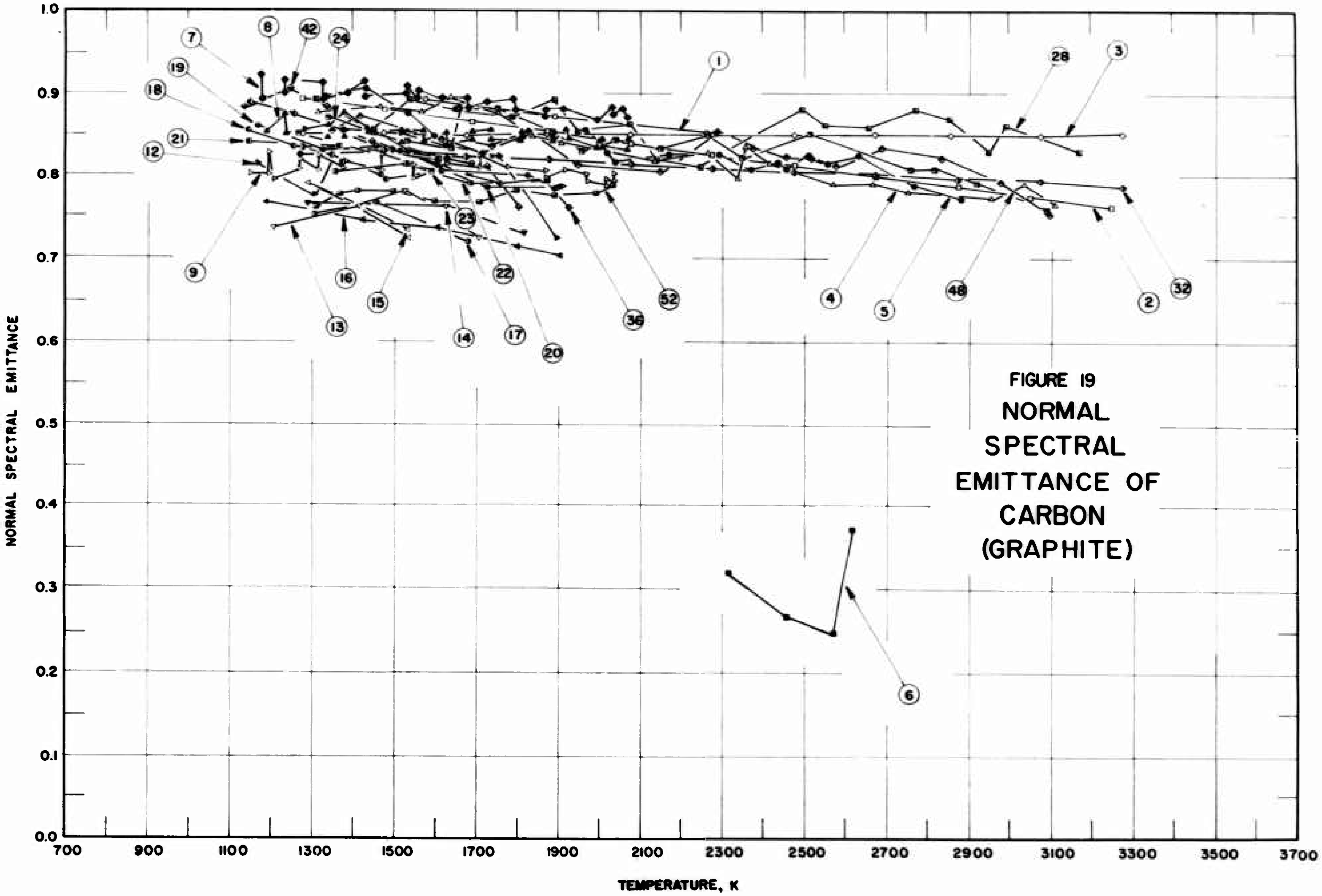

FIGURE 19
NORMAL SPECTRAL EMITTANCE OF CARBON (GRAPHITE)

SPECIFICATION TABLE NO. 19 NORMAL SPECTRAL EMITTANCE OF CARBON (GRAPHITE)

Curve No.	Ref. No.	Year	Wavelength μm	Temperature Range, K	Geometry θ'	Reported Error, %	Composition (weight percent), Specifications, and Remarks
1	40	1928	0.660	1575-2260	0°		Acheson graphite.
2*	33	1962	0.65	1273-3272	~0°		AGX graphite; machined surface; for T < 2273 K, measured in vacuum; for T > 2273 K, measured in argon (760 mm Hg); data extracted from smooth curve.
3	33	1962	0.65	1273-3273	~0°		Above specimen and conditions except final polished with silk cloth and chromic acid compound.
4	35	1959	0.65	1313-3109	~0°		AGX graphite (National Carbon Co.); machined surface; for T < 2273 K, measured in vacuum; for T > 2273 K, measured in argon (760 mm Hg); [Authors' designation: first sample].
5	35	1959	0.65	1330-2880	~0°		Similar to the above specimen and conditions; [Authors' designation: second sample].
6	30	1962	0.69	2311-2617	~0°		ATJ graphite; ground to a smooth finish; measured in dry argon or helium.
7	2	1959	0.665	1172-2062	~0°		National Carbon Co. AUC graphite; polished with 80 grit emery cloth; measured in vacuum (3×10^{-5} to 5×10^{-4} mm Hg).
8	2	1959	0.665	1186-2065	~0°		Similar to the above specimen and conditions except polished with 180 grit emery cloth.
9	2	1959	0.665	1149-2034	~0°		Similar to the above specimen and conditions except polished with 320 grit emery cloth.
10*	2	1959	0.665	1149-2072	~0°		Similar to the above specimen and conditions except burnished and polished with ground glass.
11*	2	1959	0.665	1176-2062	~0°		Similar to the above specimen and conditions except oxidized in air at 1173 K for 12 min; sandblasted.
12	39	1957	0.665	1169-1891	~0°		GBE graphite (National Carbon Co.); as received; measured in vacuum (5×10^{-4} mm Hg); increasing temp, cycle 1.
13	39	1957	0.665	1202-1702	~0°		Above specimen and conditions except decreasing temp, cycle 1.
14	39	1957	0.665	1289-1814	~0°		Above specimen and conditions except increasing temp, cycle 2.
15	39	1957	0.665	1289-1536	~0°		Above specimen and conditions except decreasing temp, cycle 2.
16	39	1957	0.665	1189-1902	~0°		Above specimen and conditions except increasing temp, cycle 3.
17	39	1957	0.665	1302-1677	~0°		Above specimen and conditions except decreasing temp, cycle 3.
18	39	1957	0.665	1144-1894	~0°		GBH graphite (National Carbon Co.); as received; measured in vacuum (5×10^{-4} mm Hg); increasing temp, cycle 1.
19	39	1957	0.665	1166-1689	~0°		Above specimen and conditions except decreasing temp, cycle 1.
20	39	1957	0.665	1266-1900	~0°		Above specimen and conditions except increasing temp, cycle 2.
21	39	1957	0.665	1144-1602	~0°		Above specimen and conditions except decreasing temp, cycle 2.
22	39	1957	0.665	1355-1869	~0°		Above specimen and conditions except increasing temp, cycle 3.
23	39	1957	0.665	1269-1589	~0°		Above specimen and conditions except decreasing temp, cycle 3.

* Not shown on plot

SPECIFICATION TABLE NO. 19 (continued)

Curve No.	Ref. No.	Year	Wavelength μm	Temperature Range, K	Geometry θ'	Reported Error, %	Composition (weight percent), Specifications, and Remarks
24	33	1962	0.65	1338-3088	~0°		H1LM graphite (Great Lakes Corp); machined surface; for T <2273 K, measured in vacuum; for T >2273 K, measured in argon (760 mm Hg); [Authors' designation: first sample].
25	33	1962	0.65	1336-3088	~0°		Above specimen and conditions except polished with silk cloth and chromic acid compound.
26	33	1962	0.65	1326-3083	~0°		Similar to curve 24 specimen and conditions; [Authors' designation: second sample].
27	33	1962	0.65	1364-3109	~0°		Above specimen and conditions except polished with silk cloth and chromic acid compound.
28	33	1962	0.65	1309-3164	~0°		H3LM graphite (Great Lakes Corp); machined surface; for T <2273 K, measured in vacuum; for T >2273 K, measured in argon (760 mm Hg); [Authors' designation: first sample].
29	33	1962	0.65	1307-2958	~0°		Above specimen and conditions except polished with silk cloth and chromic acid compound.
30	33	1962	0.65	1313-3121	~0°		Similar to curve 28 specimen and conditions; [Authors' designation: second sample].
31	33	1962	0.65	1326-3132	~0°		Above specimen and conditions except final polished with silk cloth and chromic acid compound.
32	33	1962	0.65	1273-3272	~0°		Speer 580; machined surface; for T <2273 K, measured in vacuum; for T >2273 K, measured in argon (760 mm Hg); data extracted from smooth curve.
33	33	1962	0.65	1273-3273	~0°		Above specimen and conditions except final polished with silk cloth and chromic acid compound.
34	35	1959	0.65	1357-3191	~0°		Speer 580 graphite; machined surface; for T <2273 K, measured in vacuum; for T >2273 K, measured in argon (760 mm Hg); [Authors' designation: first sample].
35	35	1959	0.65	1289-3155	~0°		Similar to the above specimen and conditions; [Authors' designation: second sample].
36	39	1957	0.665	1147-1922	~0°		3474D graphite (Speer Carbon Co.); as received; measured in vacuum (5 x 10^{-4} mm Hg); increasing temp, cycle 1.
37	39	1957	0.665	1233-1644	~0°		Above specimen and conditions except decreasing temp, cycle 1.
38	39	1957	0.665	1347-1911	~0°		Above specimen and conditions except increasing temp, cycle 2.
39	39	1957	0.665	1155-1677	~0°		Above specimen and conditions except decreasing temp, cycle 2.
40	39	1957	0.665	1422-1877	~0°		Above specimen and conditions except increasing temp, cycle 3.
41	39	1957	0.665	1177-1447	~0°		Above specimen and conditions except decreasing temp, cycle 3.
42	39	1957	0.665	1133-1800	~0°		7087 graphite (Speer Carbon Co.); as received; measured in vacuum (5 x 10^{-4} mm Hg); increasing temp, cycle 1.
43	39	1957	0.665	1091-1722	~0°		Above specimen and conditions except decreasing temp, cycle 1.
44	39	1957	0.665	1122-1747	~0°		Above specimen and conditions except increasing temp, cycle 2.
45	39	1957	0.665	1136-1458	~0°		Above specimen and conditions except decreasing temp, cycle 2.
46	39	1957	0.665	1211-1736	~0°		Above specimen and conditions except increasing temp, cycle 3.

SPECIFICATION TABLE NO. 19 (continued)

Curve No.	Ref. No.	Year	Wavelength μm	Temperature Range, K	Geometry θ'	Reported Error, %	Composition (weight percent), Specifications, and Remarks
47	39	1957	0.665	1177-1500	~0°		Above sperimen and conditions except decreasing temp. cycle 3.
48	33	1962	0.65	1344-3096	~0°		Speer 7100; machined surface; for T <2273 K, measured in vacuum; for T >2273 K, measured in argon (760 mm Hg); [Authors' designation: first sample].
49	33	1962	0.65	1365-3123	~0°		Above specimen and conditions except final polished with silk cloth and chromic acid compound.
50	33	1962	0.65	1326-3131	~0°		Similar to curve 48 specimen and conditions; [Authors' designation: second sample].
51	33	1962	0.65	1379-3122	~0°		Above specimen and conditions except final polished with silk cloth and chromic acid compound.
52	3	1953	0.653	1309-2030	~0°		High purity, medium density graphite; polished; heated at ~1800 K for ~3 hrs; measured in vacuum (5×10^{-4} mm Hg).
53	3	1953	0.653	1480	~0°	±1.16	High purity, medium density graphite; polished with plates ground with 95 Aloxite; measured in vacuum (5×10^{-4} mm Hg).
54	3	1953	0.653	1480	~0°	±1.15	Above specimen and conditions except repolished with 95 Aloxite plates.
55	3	1953	0.653	1480	~0°	±1.15	Above specimen and conditions except polished with plates ground with sapphire powder.

DATA TABLE NO. 19 NORMAL SPECTRAL EMITTANCE OF CARBON (GRAPHITE)

[Temperature, T, K; Emittance, ϵ; Wavelength, λ, μm]

T	ϵ
CURVE 1	**λ = 0.660**
1575	0.892
1890	0.873
2260	0.852
CURVE 2*	**λ = 0.65**
1273	0.894
1473	0.881
1674	0.866
1876	0.854
2075	0.839
2276	0.826
2473	0.813
2671	0.800
2873	0.786
3073	0.772
3272	0.761
CURVE 3	**λ = 0.65**
1273	0.850
1473	0.850
1674	0.849
1870	0.850
2071	0.850
2273	0.850
2476	0.850
2675	0.850
2878	0.850
3075	0.849
3273	0.850
CURVE 4	**λ = 0.65**
1313	0.879
1463	0.885
1562	0.879
1639	0.897
1751	0.878
1839	0.848
1903	0.839
2030	0.841
CURVE 4 (cont.)	
2134	0.819
2263	0.828
2339	0.798
2357	0.836
2414	0.817
2569	0.790
2662	0.790
2751	0.780
2957	0.771
3033	0.789
3109	0.765
CURVE 5	**λ = 0.65**
1330	0.897
1430	0.905
1531	0.877
1598	0.848
1714	0.827
1810	0.848
1965	0.856
2019	0.828
2035	0.817
2168	0.827
2290	0.827
2370	0.809
2436	0.818
2456	0.809
2506	0.826
2553	0.817
2631	0.825
2761	0.787
2880	0.770
CURVE 6	**λ = 0.69**
2311	0.320
2455	0.270
2567	0.250
2617	0.375
CURVE 7	**λ = 0.665**
1172	0.922
1174	0.892
1231	0.901
1231	0.916
1325	0.913
1325	0.892
1385	0.900
1426	0.915
1429	0.897
1527	0.900
1530	0.909
1556	0.896
1557	0.904
1617	0.895
1677	0.896
1679	0.882
1723	0.890
1789	0.895
1792	0.881
1867	0.874
1868	0.882
1910	0.883
1996	0.869
2027	0.885
2028	0.873
2058	0.883
2062	0.872
CURVE 8	**λ = 0.665**
1186	0.852
1235	0.876
1235	0.850
1338	0.847
1339	0.861
1376	0.878
1376	0.848
1434	0.858
1438	0.852
1515	0.855
1515	0.840
1569	0.841
1568	0.854
1626	0.801
CURVE 8 (cont.)	
1626	0.837
1689	0.842
1689	0.854
1734	0.856
1734	0.844
1806	0.841
1808	0.854
1883	0.848
1883	0.842
1919	0.857
1922	0.845
1991	0.833
1995	0.840
2006	0.843
2006	0.834
2064	0.831
2065	0.844
CURVE 9	**λ = 0.665**
1149	0.802
1191	0.802
1191	0.829
1200	0.796
1207	0.796
1265	0.809
1266	0.820
1318	0.806
1319	0.825
1375	0.810
1380	0.818
1467	0.806
1467	0.828
1546	0.812
1546	0.797
1628	0.815
1703	0.810
1703	0.826
1779	0.810
1867	0.807
1867	0.798
1902	0.787
1914	0.809
1964	0.802
1968	0.793
CURVE 9 (cont.)	
2012	0.789
2012	0.796
2034	0.794
2034	0.803
CURVE 10*	**λ = 0.665**
1149	0.786
1149	0.815
1218	0.786
1219	0.810
1291	0.808
1291	0.798
1291	0.787
1291	0.778
1372	0.781
1373	0.790
1373	0.797
1430	0.789
1444	0.789
1444	0.795
1479	0.807
1479	0.801
1479	0.793
1480	0.786
1534	0.790
1534	0.802
1534	0.809
1623	0.809
1623	0.802
1623	0.795
1682	0.805
1684	0.798
1687	0.792
1763	0.798
1762	0.803
1763	0.808
1784	0.793
1797	0.781
1801	0.787
1301	0.801
1877	0.800
1903	0.801
1903	0.793
1966	0.807
CURVE 10 (cont.)*	
2010	0.802
2061	0.794
2060	0.785
2073	0.785
2072	0.792
CURVE 11*	**λ = 0.665**
1176	0.924
1176	0.938
1237	0.931
1237	0.917
1331	0.915
1331	0.929
1385	0.933
1384	0.912
1435	0.918
1435	0.907
1530	0.901
1531	0.918
1570	0.914
1571	0.914
1615	0.920
1615	0.905
1689	0.910
1689	0.904
1718	0.908
1721	0.915
1809	0.904
1810	0.886
1882	0.893
1882	0.905
1912	0.901
1911	0.894
1999	0.898
1997	0.885
2010	0.890
2010	0.897
2062	0.897
2062	0.884
CURVE 12	**λ = 0.665**
1169	0.815
1302	0.775
CURVE 12 (cont.)	
1380	0.855
1514	0.850
1622	0.835
1758	0.825
1891	0.725
CURVE 13	**λ = 0.665**
1702	0.725
1525	0.780
1411	0.760
1202	0.735
CURVE 14	**λ = 0.665**
1289	0.765
1622	0.760
1814	0.730
CURVE 15	**λ = 0.665**
1536	0.735
1289	0.790
CURVE 16	**λ = 0.665**
1189	0.765
1422	0.745
1602	0.735
1800	0.715
1902	0.705
CURVE 17	**λ = 0.665**
1677	0.720
1455	0.765
1302	0.750
CURVE 18	**λ = 0.665**
1144	0.855
1255	0.835
1347	0.825
1466	0.800
1480	0.795
1611	0.805
1822	0.800
1894	0.785
CURVE 19	**λ = 0.665**
1689	0.815
1458	0.835
1322	0.830
1166	0.860
CURVE 20	**λ = 0.665**
1266	0.825
1514	0.830
1725	0.785
1900	0.785
CURVE 21	**λ = 0.665**
1602	0.820
1377	0.815
1366	0.835
1144	0.840
CURVE 22	**λ = 0.665**
1355	0.805
1525	0.815
1680	0.790
1869	0.795
CURVE 23	**λ = 0.665**
1589	0.805
1269	0.850

*Not shown on plot

DATA TABLE NO. 19 (continued)

T	ε
CURVE 24	**λ = 0.65**
1388	0.870
1445	0.851
1527	0.841
1635	0.832
1656	0.882
1750	0.882
1881	0.851
1959	0.830
2039	0.841
2146	0.832
2262	0.850
2342	0.822
2510	0.850
2667	0.850
2758	0.809
2817	0.809
2918	0.790
3088	0.759
CURVE 25	**λ = 0.65**
1336	0.810
1423	0.840
1526	0.830
1652	0.830
1721	0.851
1849	0.851
2057	0.844
2369	0.854
2386	0.819
2463	0.854
2563	0.843
2634	0.834
3020	0.852
3088	0.834
CURVE 26	**λ = 0.65**
1326	0.870
1421	0.851
1532	0.841
1632	0.871
1837	0.871
1949	0.860
CURVE 26 (cont.)	
2036	0.873
2121	0.820
2351	0.861
2536	0.861
2663	0.872
2773	0.830
2970	0.830
2994	0.840
3083	0.821
3083	0.811
CURVE 27	**λ = 0.65**
1364	0.888
1424	0.867
1536	0.899
1711	0.889
1988	0.901
2058	0.900
2465	0.853
2554	0.872
2722	0.872
2878	0.880
3008	0.852
3109	0.850
CURVE 28	**λ = 0.65**
1309	0.893
1449	0.854*
1539	0.894
1647	0.881
1783	0.872
1890	0.795
1943	0.853
2071	0.863
2138	0.820
2245	0.811
2491	0.882
2548	0.862
2658	0.860
2766	0.882
2850	0.870
2944	0.830
2984	0.861
3164	0.830
CURVE 29	**λ = 0.65**
1307	0.779
1455	0.739
1516	0.800
1652	0.792
1749	0.761
1821	0.809
1940	0.789
2057	0.809
2164	0.771
2225	0.750
2334	0.770
2479	0.741
2818	0.769
2958	0.759
CURVE 30	**λ = 0.65**
1313	0.881
1333	0.849
1437	0.843
1549	0.842
1747	0.820
1837	0.860
1960	0.809
2019	0.821
2138	0.821
2339	0.832
2438	0.821
2560	0.832
2561	0.852
2738	0.841
2810	0.820
2937	0.820
3059	0.810
3121	0.790
CURVE 31	**λ = 0.65**
1326	0.791
1412	0.808
1541	0.808
1650	0.761
1728	0.799
1820	0.789
1922	0.809
CURVE 31 (cont.)	
2042	0.790
2283	0.750
2333	0.798
2472	0.770
2603	0.760
2752	0.769
2901	0.748
3132	0.758
CURVE 32	**λ = 0.65**
1273	0.834
1471	0.830
1672	0.823
1875	0.820
2073	0.815
2273	0.810
2472	0.807
2674	0.801
2872	0.796
3073	0.793
3272	0.787
CURVE 33	**λ = 0.65**
1273	0.847
1472	0.846
1672	0.847
1871	0.846
2071	0.846
2275	0.846
2471	0.847
2671	0.846
2872	0.846
3077	0.847
3273	0.846
CURVE 34	**λ = 0.65**
1357	0.828
1515	0.789
1635	0.799
1752	0.777
1940	0.778
2029	0.780
CURVE 34 (cont.)	
2270	0.809
2344	0.780
2553	0.780
2648	0.789
2664	0.813
2674	0.799
2754	0.779
2758	0.792
2842	0.783
2849	0.810
2995	0.753
3005	0.797
3099	0.770
3191	0.811
3191	0.779
CURVE 35	**λ = 0.65**
1289	0.347
1450	0.869
1562	0.807
1663	0.837
1797	0.849
1933	0.807
2123	0.809
2230	0.842
2329	0.818
2498	0.810
2696	0.810
2745	0.801
2854	0.830
2877	0.790
3051	0.800
3093	0.839
3155	0.812
CURVE 36	**λ = 0.665**
1147	0.890
1258	0.875
1377	0.855
1491	0.830
1602	0.815
1758	0.790
1866	0.795*
1922	0.760
CURVE 37	**λ = 0.665**
1644	0.825
1400	0.860
1233	0.890
CURVE 38	**λ = 0.665**
1347	0.855
1569	0.815
1800	0.790
1911	0.775
CURVE 39	**λ = 0.665**
1677	0.800
1511	0.835
1311	0.865
1155	0.880
CURVE 40	**λ = 0.665**
1422	0.850
1647	0.805
1877	0.775
CURVE 41	**λ = 0.665**
1447	0.830
1177	0.895
CURVE 42	**λ = 0.665**
1133	0.885
1247	0.905
1333	0.850
1447	0.840
1536	0.830
1622	0.820
1722	0.810
1800	0.760
CURVE 43	**λ = 0.665**
1722	0.820
1477	0.840
1344	0.870
1247	0.880
1091	0.895
CURVE 44	**λ = 0.665**
1122	0.875
1377	0.845
1580	0.835
1747	0.810
CURVE 45	**λ = 0.665**
1458	0.830
1288	0.855
1136	0.875
CURVE 46	**λ = 0.665**
1211	0.890
1422	0.860
1600	0.810
1736	0.795
CURVE 47	**λ = 0.665**
1500	0.840
1310	0.865
1177	0.890
CURVE 48	**λ = 0.65**
1344	0.852
1417	0.871
1530	0.852
1615	0.843
1737	0.835
1825	0.853
1944	0.813
2145	0.805
CURVE 48 (cont.)	
2283	0.853
2374	0.834
2456	0.823
2512	0.822
2572	0.812
2686	0.833
2833	0.821
2978	0.792
3096	0.752
CURVE 49	**λ = 0.65**
1365	0.825
1429	0.769
1573	0.819
1647	0.840
1735	0.819
1878	0.841
2021	0.841
2142	0.841
2310	0.843
2451	0.801
2632	0.822
2801	0.803
2931	0.793
3123	0.821
CURVE 50	**λ = 0.65**
1326	0.883
1418	0.891
1532	0.872
1641	0.862
1779	0.852
1835	0.834
1957	0.822
2043	0.813
2122	0.812
2247	0.813
2359	0.843
2447	0.832
2558	0.784
2651	0.814
2826	0.812
2964	0.812
3111	0.782
3131	0.782

* Not shown on plot

DATA TABLE NO. 19 (continued)

T	ϵ
CURVE 51	
$\lambda = 0.65$	
1379	0.827
1463	0.789
1525	0.800
1674	0.841
1727	0.830
1944	0.822
2165	0.822
2254	0.814
2338	0.843
2534	0.812
2690	0.831
2840	0.831
2993	0.822
3122	0.830
CURVE 52	
$\lambda = 0.653$	
1309	0.760
1361	0.778
1406	0.780
1497	0.780
1599	0.768
1702	0.766
1798	0.782
1888	0.776
1987	0.779
2030	0.788
CURVE 53	
$\lambda = 0.653$	
1480	0.777
CURVE 54	
$\lambda = 0.653$	
1480	0.784
CURVE 55	
$\lambda = 0.653$	
1480	0.780

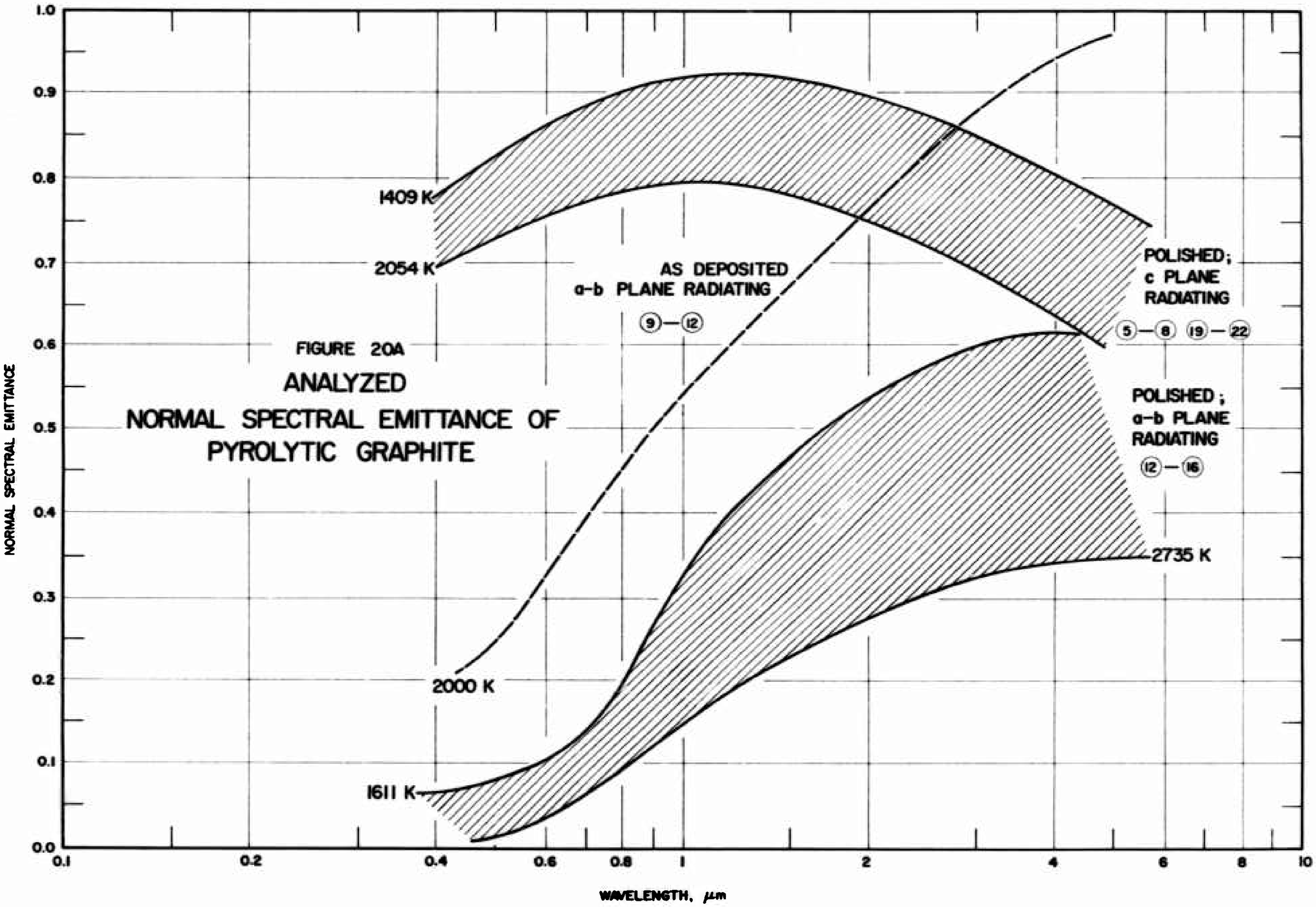

FIGURE 20A
ANALYZED
NORMAL SPECTRAL EMITTANCE OF
PYROLYTIC GRAPHITE

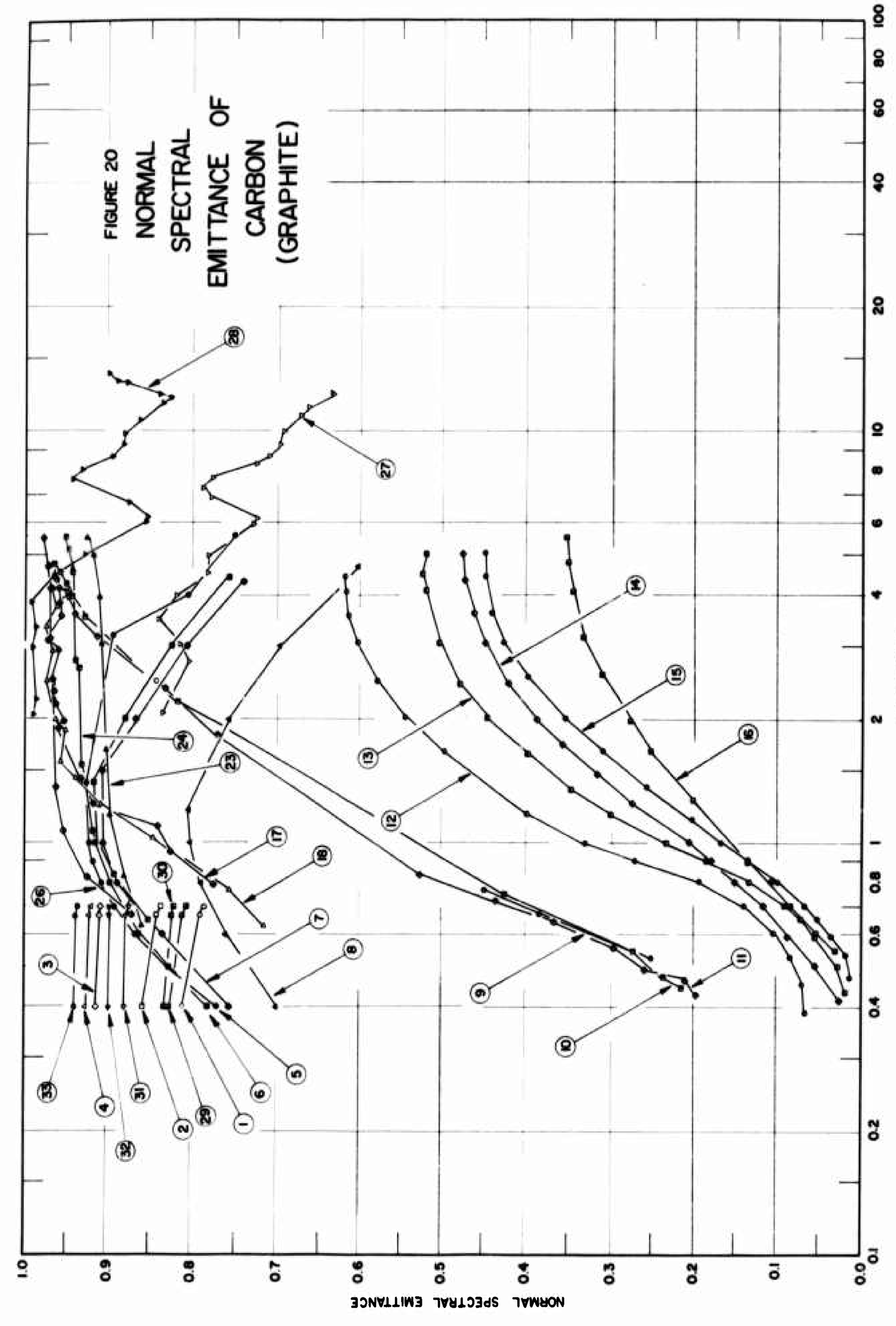

FIGURE 20 NORMAL SPECTRAL EMITTANCE OF CARBON (GRAPHITE)

SPECIFICATION TABLE NO. 20 NORMAL SPECTRAL EMITTANCE OF CARBON (GRAPHITE)

Curve No.	Ref. No.	Year	Temperature K	Wavelength Range, μm	Geometry θ'	Reported Error, %	Composition (weight percent), Specifications, and Remarks
1	2	1959	298	0.400-0.700	~0°		Pyrolytic graphite; deposited on A. U. C. graphite disc at 2373 K; surface roughness 200 to 300 μin.; measured in vacuum (3×10^{-6} to 5×10^{-4} mm Hg); [Authors' designation: Sample 1].
2	2	1959	298	0.400-0.700	~0°		Similar to the above specimen and conditions except machine ground; surface roughness 30 to 70 μin.; [Authors' designation: Sample 2].
3	2	1959	298	0.400-0.700	~0°		Similar to the above specimen and conditions except surface roughness 40 to 60 μin.; [Authors' designation: Sample 3].
4	2	1959	298	0.400-0.700	~0°		Similar to the above specimen and conditions except metallurgically polished; surface roughness 4 to 6 μin..
5	32	1963	1409	0.4-5.6	~0°		Pyrolytic graphite; polished; c-plane; measured in vacuum (5×10^{-6} mm Hg); data extracted from smooth curve.
6	32	1963	1531	0.4-4.4	~0°		Above specimen and conditions.
7	32	1963	1882	0.4-4.3	~0°		Above specimen and conditions.
8	32	1963	2054	0.4-4.7	~0°		Above specimen and conditions.
9	37	1964	2000	0.524-2.460	~0°		Pyrolytic; 5 ppm Si, 3 ppm Fe, 1 ppm Al, 1 ppm Mg, C balance as deposited; "a-b" crystal plane radiating; density 2.194 g cm^{-3}; measured in argon (1.14×10^{3} mm Hg); run 1.
10	37	1964	2000	0.445-4.770	~0°		Above specimen and conditions; run 2.
11	37	1964	2000	0.428-4.350	~0°		Above specimen and conditions; run 3.
12	37	1964	1611	0.389-4.450	~0°		Similar to curve 9 specimen and conditions except polished; data extracted from smooth curve.
13	37	1964	1680	0.433-5.070	~0°		Above specimen and conditions.
14	37	1964	1808	0.417-5.050	~0°		Above specimen and conditions.
15	37	1964	2404	0.476-5.090	~0°		Above specimen and conditions.
16	37	1964	2735	0.547-5.530	~0°		Above specimen and conditions.
17	37	1964	1718	0.799-4.160	~0°		Similar to curve 9 specimen and conditions except c-plane radiating; measured in vacuum (2×10^{-6} mm Hg).
18	37	1964	1914	0.626-4.130	~0°		Above specimen and conditions.
19*	37	1964	1409	0.403-4.440	~0°		Similar to the above specimen and conditions.
20	37	1964	1531	0.394-5.650	~0°		Above specimen and conditions.
21	37	1964	1882	0.403-4.330	~0°		Above specimen and conditions.
22	37	1964	2054	0.402-4.740	~0°		Above specimen and conditions.
23	41	1967	1273	0.63-5.50	~0°		Speer Grade 866 S; measured in argon; data extracted from smooth curve.

* Not shown on plot

SPECIFICATION TABLE NO. 20 (continued)

Curve No.	Ref. No.	Year	Temperature K	Wavelength Range, μm	Geometry θ'	Reported Error, %	Composition (weight percent), Specifications, and Remarks
24	41	1967	1473	0.65-5.50	~0°		Above specimen and conditions.
25	41	1967	1673	0.66-5.50	~0°		Above specimen and conditions.
26	41	1967	1873	0.67-5.50	~0°		Above specimen and conditions.
27	22	1960	1105	2.07-12.27	~0°		Pure; measured in 90 Ar + 10 H_2; data extracted from smooth curve.
28	22	1960	1420	2.05-13.98	~0°		Above specimen and conditions.
29	2	1959	298	0.400-0.700	~0°		Polished; measured in vacuum (3×10^{-6} to 5×10^{-4} mm Hg).
30	2	1959	298	0.400-0.700	~0°		Polished with 320 grit emery cloth; measured in vacuum (3×10^{-6} to 5×10^{-4} mm Hg).
31	2	1959	298	0.400-0.700	~0°		Polished with 180 grit emery cloth; measured in vacuum (3×10^{-6} to 5×10^{-4} mm Hg).
32	2	1959	298	0.400-0.700	~0°		Polished with 80 grit emery cloth; measured in vacuum (3×10^{-6} to 5×10^{-4} mm Hg).
33	2	1959	298	0.400-0.700	~0°		Oxidized in air at 1173 K for 12 min; lightly sandblasted with 10 mesh abrasive particles; measured in vacuum (3×10^{-6} to 5×10^{-4} mm Hg).

DATA TABLE NO. 20 NORMAL SPECTRAL EMITTANCE OF CARBON (GRAPHITE)

[Wavelength, λ, μm; Emittance, ε; Temperature, T, K]

λ	ε
CURVE 1, T = 298	
0.400	0.810
0.665	0.790
0.700	0.785
CURVE 2, T = 298	
0.400	0.855
0.665	0.840
0.700	0.835
CURVE 3, T = 298	
0.400	0.911
0.665	0.908
0.700	0.907
CURVE 4, T = 298	
0.400	0.925
0.665	0.920
0.700	0.918
CURVE 5, T = 298	
0.4	0.770
0.5	0.828
0.6	0.865
0.7	0.890
0.8	0.906
0.9	0.917
1.0	0.920
1.4	0.923
3.2	0.893
4.0	0.805
5.6	0.750
CURVE 6, T = 1531	
0.4	0.780
0.5	0.826
CURVE 6 (cont.)	
0.6	0.860
0.8	0.897
1.0	0.912
1.4	0.913
2.0	0.878
3.0	0.823
4.4	0.756
CURVE 7, T = 1882	
0.4	0.755
0.6	0.833
0.8	0.880
1.0	0.903
1.5	0.905
2.0	0.865
3.0	0.808
4.3	0.740
CURVE 8, T = 2054	
0.4	0.700
0.6	0.760
0.8	0.790
1.0	0.800
1.2	0.802
2.0	0.757
3.0	0.697
4.7	0.602
CURVE 9, T = 2000	
0.524	0.250
0.676	0.383
0.770	0.447
2.460	0.842
CURVE 10, T = 2000	
0.445	0.215
0.475	0.236
0.544	0.272
CURVE 10 (cont.)	
0.753	0.423
2.200	0.816
3.540	0.927
3.970	0.941
4.230	0.950
4.510	0.958
4.770	0.965
CURVE 11, T = 2000	
0.428	0.197
0.465	0.210
0.498	0.259
0.557	0.297
0.641	0.365
0.721	0.434
0.839	0.525
1.830	0.770
2.370	0.830
3.170	0.911
3.600	0.938
3.980	0.948
4.350	0.962
CURVE 12, T = 1611	
0.389	0.064
0.456	0.068
0.527	0.082
0.601	0.102
0.703	0.138
0.803	0.192
0.905	0.270
1.000	0.333
1.170	0.399
1.660	0.497
2.010	0.544
2.480	0.579
3.070	0.603
3.590	0.614
4.060	0.617
4.450	0.619
CURVE 13, T = 1680	
0.433	0.018
0.501	0.027
0.597	0.052
0.656	0.070
0.701	0.089
0.803	0.131
0.905	0.183
1.00	0.233
1.17	0.300
1.34	0.346
1.64	0.399
2.01	0.442
2.43	0.477
3.06	0.501
4.06	0.519
4.51	0.522
5.07	0.519
CURVE 14, T = 1808	
0.417	0.025
0.501	0.053
0.599	0.085
0.701	0.115
0.805	0.149
0.909	0.178
1.00	0.205
1.25	0.274
1.47	0.318
1.73	0.356
2.00	0.386
2.44	0.420
3.05	0.448
3.61	0.462
4.36	0.472
5.05	0.474
CURVE 15, T = 2404	
0.476	0.012
0.537	0.018
0.599	0.033
0.656	0.050
CURVE 15 (cont.)	
0.701	0.065
0.801	0.098
0.909	0.133
1.00	0.166
1.13	0.201
1.37	0.257
1.68	0.310
2.01	0.352
2.54	0.397
3.06	0.425
3.61	0.439
4.45	0.447
5.09	0.447
CURVE 16, T = 2735	
0.547	0.030
0.601	0.051
0.701	0.081
0.803	0.105
0.905	0.133
1.26	0.200
1.67	0.251
2.00	0.277
2.56	0.311
3.19	0.333
4.08	0.345
4.80	0.350
5.53	0.351
CURVE 17, T = 1718	
0.799	0.774
0.952	0.824
1.10	0.838
1.24	0.916
1.44	0.930
1.90	0.959
1.99	0.951
2.16	0.961
2.50	0.966
2.93	0.960
3.10	0.971
3.55	0.957
CURVE 17 (cont.)	
3.82	0.957
4.16	0.959
CURVE 18, T = 1914	
0.626	0.715
0.770	0.756
1.02	0.846
1.24	0.906
1.44	0.938
1.59	0.957
1.88	0.950
2.00	0.962
2.48	0.974
2.92	0.967
3.35	0.975
3.75	0.961
4.11	0.946
4.13	0.969
CURVE 19*, T = 1409	
0.403	0.777
0.506	0.825
0.605	0.856
0.704	0.878
0.809	0.893
0.908	0.901
1.01	0.907
1.10	0.907
1.31	0.904
1.57	0.894
2.00	0.871
3.00	0.819
4.01	0.773
4.44	0.753
CURVE 20, T = 1531	
0.394	0.763
0.504	0.825
0.606	0.862
0.706	0.885
CURVE 20 (cont.)	
0.807	0.902
0.908	0.911
1.01	0.914
1.11	0.918
1.39	0.912
1.88	0.893
2.41	0.868
3.00	0.841
4.00	0.802
5.65	0.746
CURVE 21, T = 1882	
0.403	0.754
0.506	0.797
0.606	0.830
0.704	0.857
0.805	0.876
0.906	0.889
1.00	0.897
1.13	0.900
1.30	0.897
1.53	0.888
2.00	0.861
2.99	0.803
4.33	0.736
CURVE 22, T = 2054	
0.402	0.700
0.503	0.733
0.605	0.759
0.703	0.776
0.805	0.788
0.908	0.796
1.06	0.799
1.20	0.797
1.58	0.778
2.00	0.754
2.39	0.730
3.00	0.695
4.00	0.638
4.74	0.601
CURVE 23, T = 1273	
0.63	0.857
0.83	0.879
1.17	0.895
1.69	0.900
3.04	0.906
3.98	0.907
5.00	0.917
5.50	0.925
CURVE 24, T = 1473	
0.65	0.849
0.84	0.890
1.07	0.916
1.55	0.929
2.65	0.933
3.79	0.938
4.57	0.940
5.18	0.946
5.50	0.950
CURVE 25, T = 1673	
0.66	0.848
0.83	0.898
1.08	0.935
1.40	0.952
2.42	0.952
3.26	0.956
4.14	0.964
4.98	0.971
5.50	0.971
CURVE 26, T = 1873	
0.67	0.870
0.83	0.921
1.06	0.951
1.36	0.961
2.33	0.964
3.11	0.970
4.13	0.970

*Not shown on plot

DATA TABLE NO. 20 (continued)

λ	ε
CURVE 26 (cont.)	
T = 1823	
4.74	0.973
5.50	0.979
CURVE 27	
T = 1105	
2.07	0.834
2.76	0.803
3.08	0.815
3.49	0.840
4.00	0.819
4.54	0.782
5.00	0.781
5.56	0.750
5.99	0.729
6.13	0.725
6.97	0.777
7.28	0.788
7.66	0.776
8.38	0.727
8.77	0.710
9.36	0.697
10.00	0.692
10.99	0.672
11.42	0.662
12.13	0.632
12.27	0.634
CURVE 28	
T = 1420	
2.05	0.990
2.23	0.988
3.00	0.990
3.33	0.987
3.84	0.992
4.41	0.964
5.01	0.926
6.02	0.855
6.20	0.853
6.76	0.875
7.69	0.940
8.04	0.929
8.67	0.893
9.31	0.880
9.85	0.880

λ	ε
CURVE 28 (cont.)	
10.59	0.863
11.63	0.835
12.01	0.825
12.46	0.838
13.03	0.876
13.42	0.897
13.98	0.899
CURVE 29	
T = 298	
0.400	0.825
0.665	0.810
0.700	0.805
CURVE 30	
T = 298	
0.400	0.830
0.665	0.822
0.700	0.820
CURVE 31	
T = 298	
0.400	0.878
0.665	0.875
0.700	0.872
CURVE 32	
T = 298	
0.400	0.898
0.665	0.896
0.700	0.895
CURVE 33	
T = 298	
0.400	0.937
0.665	0.936
0.700	0.934

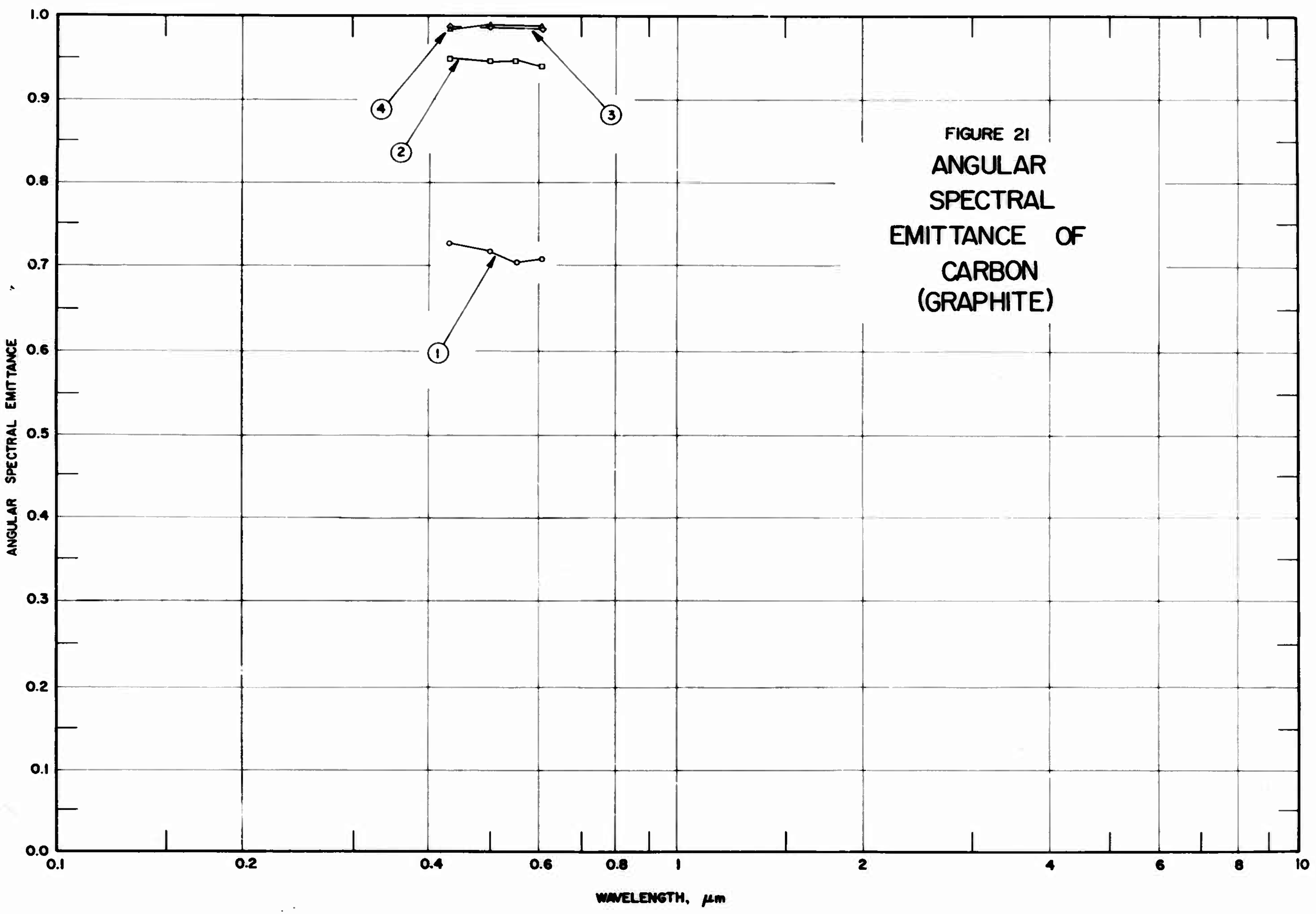
FIGURE 21
ANGULAR SPECTRAL EMITTANCE OF CARBON (GRAPHITE)
ANGULAR SPECTRAL EMITTANCE
WAVELENGTH, μm
1.0
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0.0
0.1
0.2
0.4
0.6
0.8
1
2
4
6
8
10
1
2
3
4

SPECIFICATION TABLE NO. 21 ANGULAR SPECTRAL EMITTANCE OF CARBON (GRAPHITE)

Curve No.	Ref. No.	Year	Temperature K	Wavelength Range, μm	Geometry θ'	Reported Error, %	Composition (weight percent), Specifications, and Remarks
1	5	1963	1180	0.4305-0.6080	45°		AGKSP graphite (National); final polished on 4/0 Buehler emery polishing paper; measured in argon; computed from 1 - R (2π, 45°).
2	5	1963	1220	0.4305-0.6080	45°		Similar to the above specimen and conditions except roughened by 80 grit garnet paper.
3	6	1963	3800	0.4305-0.6080	45°		AGKSP graphite; bulk density 1.61 g cm^{-3}; resistivity 0.00025 ohm in.; max ash 10 ppm; measured in argon; computed from 1 - R (2π, 45°).
4	6	1963	3800	0.4305-0.6080	45°		SPK graphite; bulk resistivity 1.90 g cm^{-3}; resistivity 0.00045 ohm in.; max ash 10 ppm; measured in argon; computed from 1 - R (2π, 45°).

DATA TABLE NO. 21 ANGULAR SPECTRAL EMITTANCE OF CARBON (GRAPHITE)

[Wavelength, λ, μm; Emittance, ϵ; Temperature, T, K]

λ	ϵ	λ	ϵ
CURVE 1 T = 1180		CURVE 4 T = 3800	
0.4305	0.727	0.4305	0.986
0.5010	0.716	0.5010	0.989
0.5545	0.703	0.6080	0.988
0.6080	0.708		
CURVE 2 T = 1220			
0.4305	0.950		
0.5010	0.946		
0.5545	0.947		
0.6080	0.941		
CURVE 3 T = 3800			
0.4305	0.987		
0.5010	0.988		
0.6080	0.986		

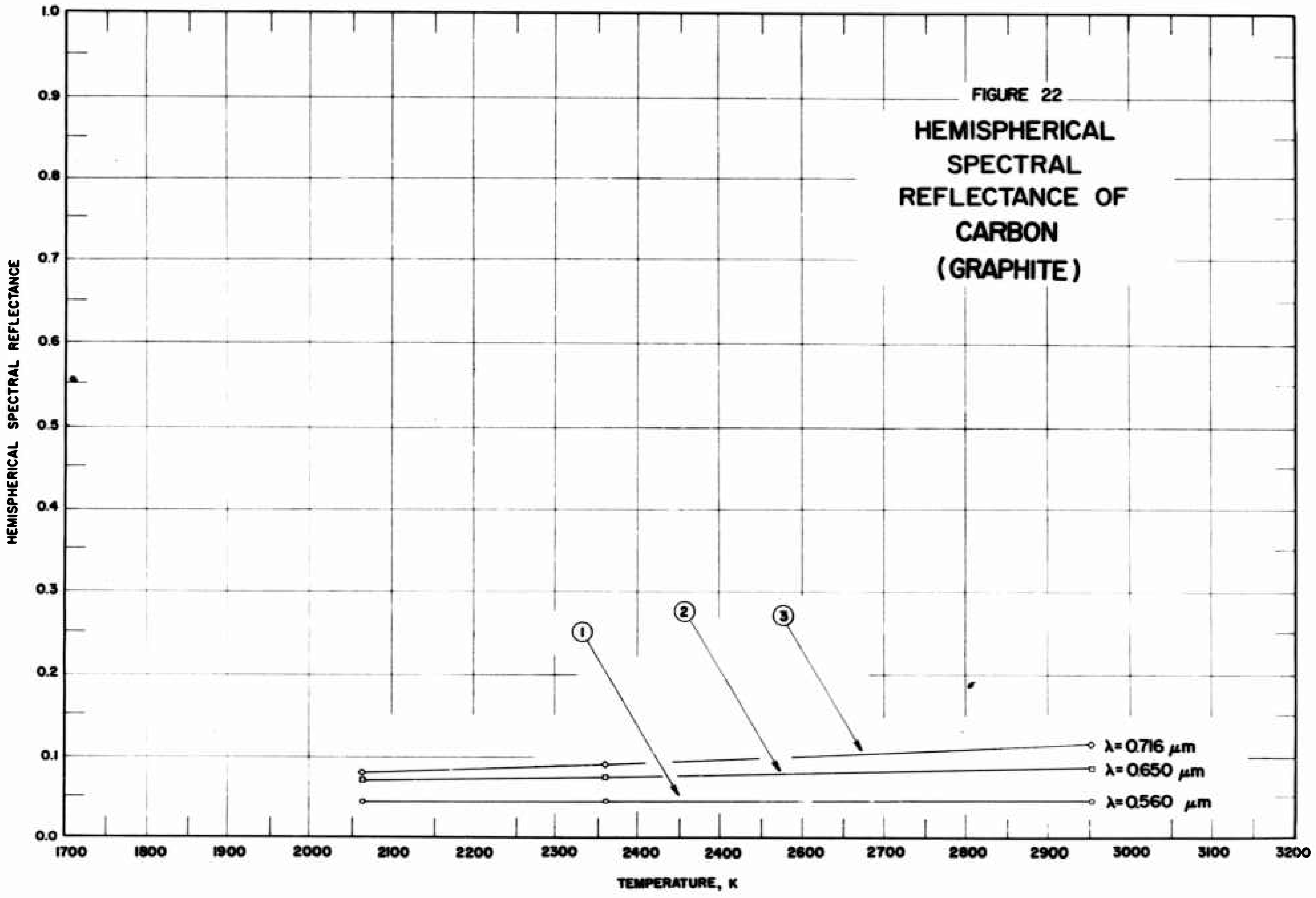

FIGURE 22

HEMISPHERICAL SPECTRAL REFLECTANCE OF CARBON (GRAPHITE)

SPECIFICATION TABLE NO. 22 HEMISPHERICAL SPECTRAL REFLECTANCE OF CARBON (GRAPHITE)

Curve No.	Ref. No.	Year	Wavelength μm	Temperature Range, K	Geometry ω	Geometry θ'	Geometry ω'	Reported Error, %	Composition (weight percent), Specifications, and Remarks
1	4	1965	0.560	2061-2953	2π		2π		AGKSP graphite (National Carbon Co.); high-purity spectroscopic grade; mechanically polished with emery paper; oxidized in air; peak to valley roughness 50 μm.
2	4	1965	0.650	2061-2953	2π		2π		Similar to the above specimen and conditions.
3	4	1965	0.716	2061-2953	2π		2π		Similar to the above specimen and conditions.

DATA TABLE NO. 22 HEMISPHERICAL SPECTRAL REFLECTANCE OF CARBON (GRAPHITE)

[Temperature, T, K; Reflectance, ρ; Wavelength, λ, μm]

T	ρ
CURVE 1 $\lambda = 0.560$	
2061	0.045
2358	0.045
2953	0.045
CURVE 2 $\lambda = 0.650$	
2061	0.070
2358	0.075
2953	0.085
CURVE 3 $\lambda = 0.716$	
2061	0.080
2358	0.090
2953	0.115

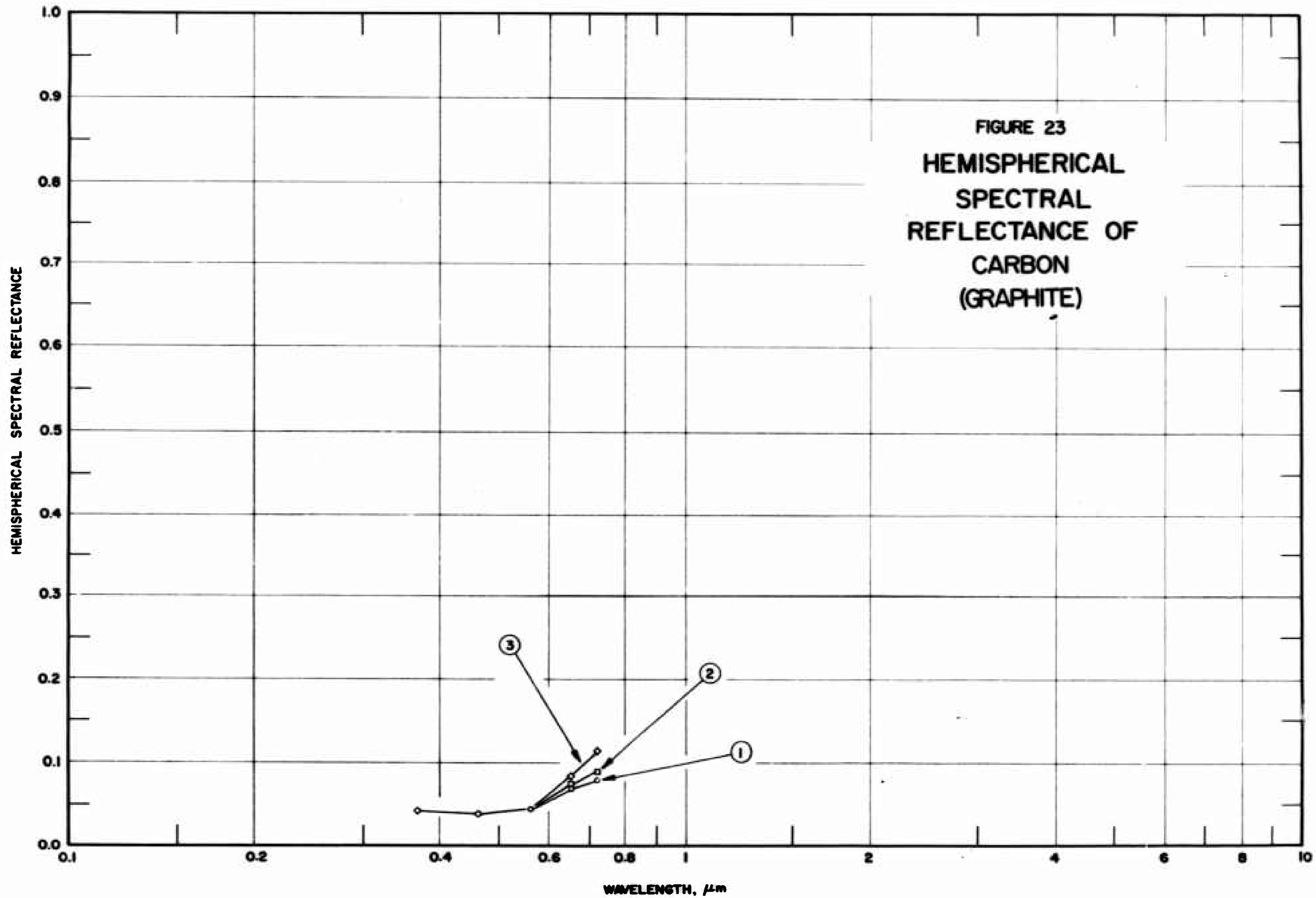
FIGURE 23
HEMISPHERICAL SPECTRAL REFLECTANCE OF CARBON (GRAPHITE)
HEMISPHERICAL SPECTRAL REFLECTANCE
WAVELENGTH, μm
1.0
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0.0
0.1
0.2
0.4
0.6
0.8
1
2
4
6
8
10
1
2
3

SPECIFICATION TABLE NO. 23 HEMISPHERICAL SPECTRAL REFLECTANCE OF CARBON (GRAPHITE)

Curve No.	Ref. No.	Year	Temperature K	Wavelength Range, μm	Geometry ω	Geometry θ'	Geometry ω'	Reported Error, %	Composition (weight percent), Specifications, and Remarks
1	4	1965	2061	0.560-0.716	2π		2π		AGKSP graphite (National Carbon Co.); high-purity spectroscopic grade; mechanically polished with emery paper; oxidized in air; peak to valley roughness 50 μm.
2	4	1965	2358	0.560-0.716	2π		2π		Similar to the above specimen and conditions.
3	4	1965	2953	0.367-0.716	2π		2π		Similar to the above specimen and conditions.

DATA TABLE NO. 23 HEMISPHERICAL SPECTRAL REFLECTANCE OF CARBON (GRAPHITE)

[Wavelength, λ, μm; Reflectance, ρ; Temperature, T, K]

λ	ρ
CURVE 1	
T = 2061	
0.560	0.045
0.650	0.070
0.716	0.080
CURVE 2	
T = 2358	
0.560	0.045*
0.650	0.075
0.716	0.090
CURVE 3	
T = 2953	
0.367	0.043
0.460	0.040
0.560	0.045*
0.650	0.085
0.716	0.115

*Not shown on plot

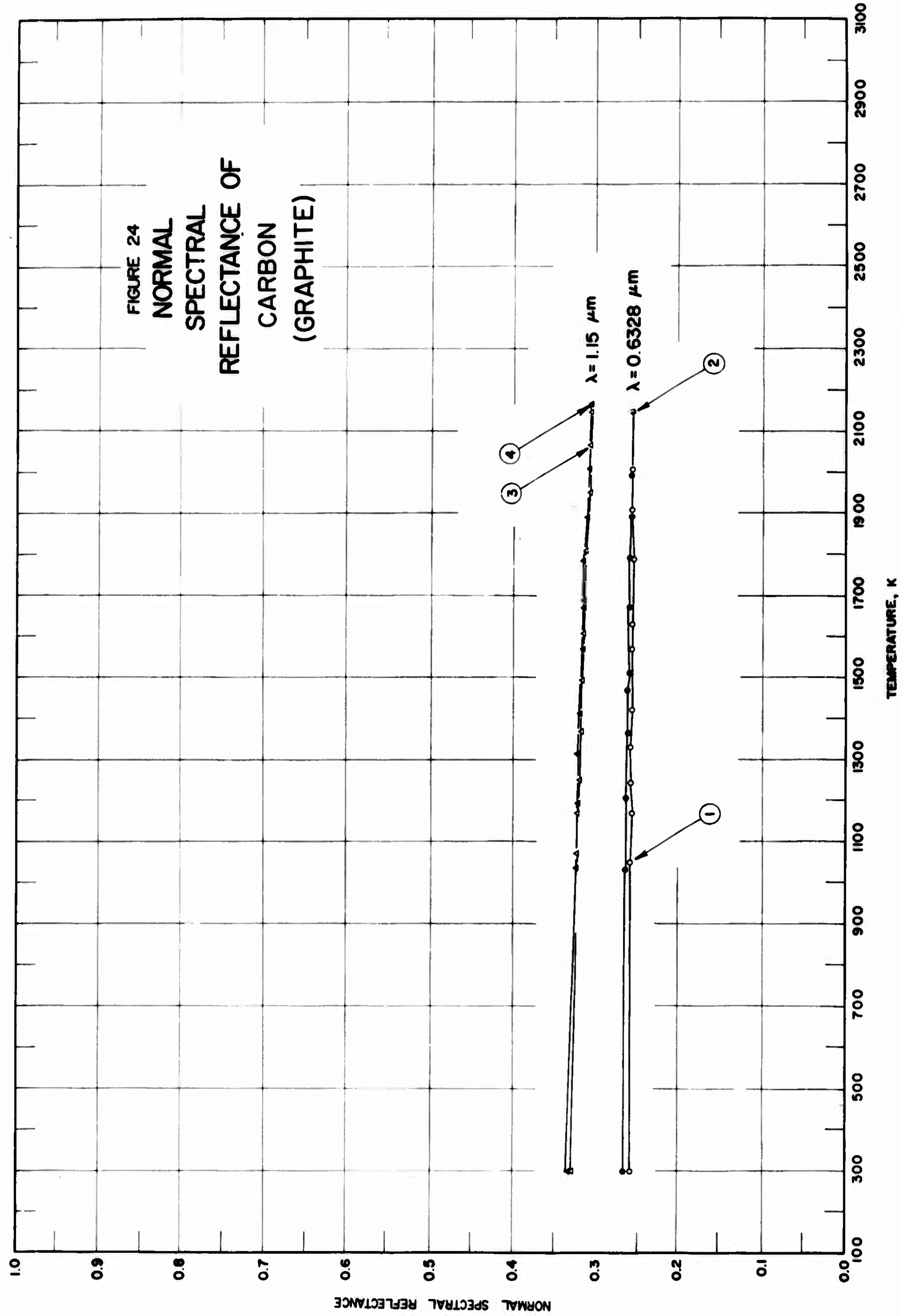

FIGURE 24 NORMAL SPECTRAL REFLECTANCE OF CARBON (GRAPHITE)

SPECIFICATION TABLE NO. 24 NORMAL SPECTRAL REFLECTANCE OF CARBON (GRAPHITE)

Curve No.	Ref. No.	Year	Wavelength μm	Temperature Range, K	Geometry θ	θ'	ω'	Reported Error, %	Composition (weight percent), Specifications, and Remarks
1	300	1968	0.6328	300-2005	12°		2π		Grade UT6; arithmetic avg roughness 0.29 μm; porosity 21% by volume; max grain size 0.003 in.; polished; first heating cycle.
2	300	1968	0.6328	300-2141	12°		2π		Above specimen and conditions except second heating cycle.
3	300	1968	1.15	300-2144	12°		2π		Above specimen and conditions except third heating cycle.
4	300	1968	1.15	300-2161	12°		2π		Above specimen and conditions except fourth heating cycle.

DATA TABLE NO. 24 NORMAL SPECTRAL REFLECTANCE OF CARBON (GRAPHITE)

[Temperature, T, K; Reflectance, ρ; Wavelength, λ, μm]

T	ρ
CURVE 1	
λ = 0.6328	
300	0.2577
1052	0.2593
1175	0.2589
1226	0.2590
1326	0.2595
1420	0.2584
1544	0.2584
1629	0.2581
1782	0.2575
1902	0.2578
2005	0.2583
CURVE 2	
λ = 0.6328	
300	0.2629
1038	0.2625
1205	0.2622
1343	0.2614
1464	0.2611
1516	0.2608
1668	0.2603
CURVE 2 (cont.)	
1792	0.2601
1894	0.2596
1997	0.2592
2141	0.2587
CURVE 3	
λ = 1.15	
300	0.3301
1076	0.3234
1167	0.3217
1249	0.3206
1366	0.3191
1497	0.3172
1609	0.3156
1689	0.3137
1809	0.3114
1949	0.3088
2062	0.3076
2144	0.3045
CURVE 4	
λ = 1.15	
300	0.3310
1039	0.3249
1195	0.3227
1309	0.3210
1417	0.3200
1566	0.3169
1673	0.3152
1792	0.3131
1897	0.3109
2003	0.3086
2161	0.3054

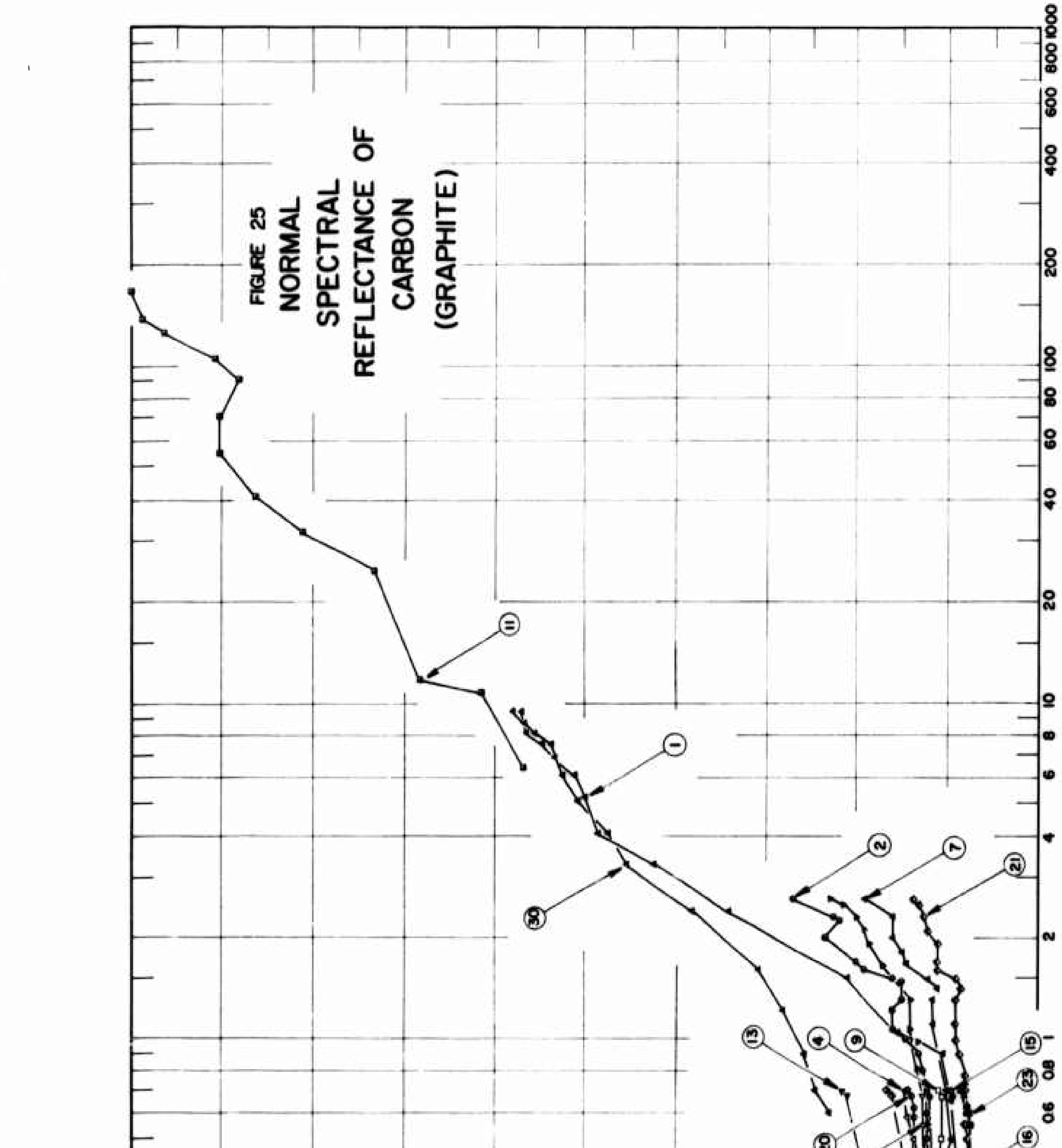

FIGURE 25 NORMAL SPECTRAL REFLECTANCE OF CARBON (GRAPHITE)

SPECIFICATION TABLE NO. 25 NORMAL SPECTRAL REFLECTANCE OF CARBON (GRAPHITE)

Curve No.	Ref. No.	Year	Temperature K	Wavelength Range, μm	Geometry θ	θ'	ω'	Reported Error, %	Composition (weight percent), Specifications, and Remarks
1	44	1911	298	0.65-9.40	15°	15°		≤3	Acheson graphite; polished.
2	39	1957	298	0.30-2.60	9°		2π	<4	GBE graphite (National Carbon Co.); front side; data extracted from smooth curve.
3*	39	1957	298	0.30-2.60	9°		2π	<4	Above specimen and conditions except back side.
4	42	1956	~298	0.38-0.70	9°		2π		Type GBE; as received; data extracted from smooth curve; front side.
5*	42	1956	~298	0.38-0.70	9°		2π		Above specimen and conditions.
6*	42	1956	~298	0.38-0.70	9°		2π		Above specimen and conditions except back side.
7	39	1957	298	0.30-2.60	9°		2π	<4	GBH graphite (National Carbon Co.); as received; data extracted from smooth curve.
8*	39	1957	298	0.30-2.60	9°		2π	<4	Similar to the above specimen and conditions except milled.
9	42	1956	~298	0.38-0.70	9°		2π		Type GBH; as received; data extracted from smooth curve.
10	42	1956	~298	0.38-0.70	9°		2π		Similar to the above specimen and conditions except milled.
11	160	1968	~298	6.4-168.3	~0°	~0°			Pyrolytic graphite (from High-Temperature Materials Co.); as deposited graphite with heat treatment at 2473 K and annealed at 3273 K for 2 hrs in chlorine or Freon; c-axis of individual crystallites aligned to no better than ~9 degrees; aluminum mirror reference standard; data extracted from smooth curve.
12	43	1960	298	0.090-0.281	5°	5°			Pyrolytic graphite; rather poor polish; face perpendicular to z-axis; data extracted from smooth curve.
13	2	1959	298	0.400-0.700	~0°		2π		Pyrolytic graphite; deposited on A. U. C. graphite disc at 2373 K; surface roughness 200 to 300 μin.; measured in vacuum (3×10^{-5} to 5×10^{-4} mm Hg); [Authors' designation: Sample 1].
14	2	1959	298	0.400-0.700	~0°		2π		Similar to the above specimen and conditions except machine ground (30 to 70 μin.); [Authors' designation: Sample 2].
15	2	1959	298	0.400-0.700	~0°		2π		Similar to the above specimen and conditions except surface roughness 40 to 60 μin.); [Authors' designation: Sample 3].
16	2	1959	298	0.400-0.700	~0°		2π		Similar to the above specimen and conditions except metallurgically polished (4 μin.); [Authors' designation: Sample 4].
17	39	1957	298	0.30-2.60	9°		2π	<4	3474 D graphite (Speer Carbon Co.); as received; data extracted from smooth curve.
18*	39	1957	298	0.30-2.60	9°		2π	<4	Similar to the above specimen and conditions except milled.
19	42	1956	~298	0.38-0.70	9°		2π		Type 3474 D; as received; data extracted from smooth curve.
20*	42	1956	298	0.38-0.70	9°		2π		Similar to the above specimen and conditions except milled.
21	39	1957	298	0.30-2.60	9°		2π	<4	7087 graphite (Speer Carbon Co.); as received; data extracted from smooth curve.
22*	39	1957	298	0.30-2.60	9°		2π	<4	Similar to the above specimen and conditions except milled.
23	42	1956	~298	0.38-0.70	9°		2π		Type 7087; as received; data extracted from smooth curve.

* Not shown on plot

SPECIFICATION TABLE NO. 25 (continued)

Curve No.	Ref. No.	Year	Temperature K	Wavelength Range, μm	Geometry θ	θ'	ω'	Reported Error, %	Composition (weight percent), Specifications, and Remarks
24*	42	1956	~298	0.38-0.70	9°		2π		Similar to the above specimen and conditions except milled.
25*	2	1959	298	0.400-0.700	~0°		2π		Polished; measured in vacuum (3×10^{-6} to 5×10^{-4} mm Hg).
26*	2	1959	298	0.400-0.700	~0°		2π		320 grit; measured in vacuum (3×10^{-6} to 5×10^{-4} mm Hg).
27*	2	1959	298	0.400-0.700	~0°		2π		180 grit; measured in vacuum (3×10^{-6} to 5×10^{-4} mm Hg).
28*	2	1959	298	0.400-0.700	~0°		2π		80 grit; measured in vacuum (3×10^{-6} to 5×10^{-4} mm Hg).
29*	2	1959	298	0.400-0.700	~0°		2π		Oxidized; measured in vacuum (3×10^{-6} to 5×10^{-4} mm Hg).
30	44	1911	298	0.60-9.40	15°	15°		≤ 3	Natural mineral from Siberia; polished on a semi-matte piece of plate glass.

* Not shown on plot

DATA TABLE NO. 25 NORMAL SPECTRAL REFLECTANCE OF CARBON (GRAPHITE)

[Wavelength, λ, μm; Reflectance, ρ; Temperature, T, K]

CURVE 1
T = 298

λ	ρ
0.65	0.095
0.90	0.105
1.15	0.155
1.60	0.210
2.40	0.345
3.30	0.425
4.03	0.485
5.20	0.500
6.05	0.510
7.55	0.545
8.05	0.565
9.40	0.570

CURVE 2
T = 298

λ	ρ
0.30	0.150
0.40	0.130
0.50	0.120
0.60	0.120
0.70	0.120
0.80	0.125
0.90	0.130
1.00	0.145
1.10	0.150*
1.16	0.160
1.20	0.160
1.26	0.160*
1.30	0.150
1.36	0.150*
1.40	0.150*
1.46	0.150
1.50	0.160
1.60	0.190
1.70	0.200
1.80	0.210*
1.90	0.220*
2.00	0.235
2.06	0.230*
2.10	0.225*
2.16	0.220*
2.20	0.220*
2.26	0.220
2.30	0.225
2.40	0.240*

CURVE 1 (cont.)

λ	ρ
2.50	0.260*
2.60	0.270

CURVE 3*
T = 298

λ	ρ
0.30	0.125
0.40	0.115
0.44	0.110
0.50	0.110
0.60	0.110
0.70	0.110
0.80	0.120
0.90	0.120
1.00	0.120
1.10	0.130
1.20	0.135
1.30	0.130
1.40	0.130
1.44	0.130
1.50	0.140
1.60	0.165
1.62	0.170
1.70	0.170
1.80	0.170
1.90	0.180
2.00	0.180
2.10	0.190
2.20	0.195
2.26	0.200
2.30	0.205
2.40	0.210
2.50	0.230
2.60	0.240

CURVE 4
T ~ 298

λ	ρ
0.38	0.137
0.42	0.138
0.46	0.136*
0.50	0.137
0.54	0.139*
0.58	0.141
0.62	0.143*
0.66	0.145*
0.70	0.147

CURVE 5*
T ~ 298

λ	ρ
0.38	0.150
0.42	0.148
0.46	0.146
0.50	0.146
0.54	0.148
0.58	0.150
0.62	0.152
0.66	0.154
0.70	0.156

CURVE 6*
T ~ 298

λ	ρ
0.38	0.122
0.42	0.119
0.46	0.117
0.50	0.118
0.54	0.119*
0.58	0.120
0.62	0.122
0.66	0.123
0.70	0.125

CURVE 7
T = 298

λ	ρ
0.30	0.115
0.34	0.100
0.36	0.095
0.40	0.100
0.44	0.100
0.50	0.095
0.60	0.100*
0.70	0.100
0.80	0.105*
0.90	0.105*
1.00	0.110*
1.10	0.115
1.20	0.115*
1.30	0.115
1.40	0.110
1.50	0.120
1.60	0.140*
1.64	0.145
1.70	0.150*

CURVE 7 (cont.)

λ	ρ
1.80	0.150
1.90	0.155*
2.00	0.160
2.10	0.160*
2.20	0.160*
2.30	0.160
2.40	0.170*
2.50	0.180*
2.60	0.190

CURVE 8*
T = 298

λ	ρ
0.30	0.120
0.36	0.110
0.40	0.105
0.50	0.100
0.60	0.105
0.70	0.100*
0.80	0.100
0.90	0.110*
1.00	0.115
1.10	0.120
1.20	0.120*
1.30	0.120*
1.40	0.120
1.50	0.130
1.60	0.145
1.70	0.160
1.80	0.165
1.90	0.165*
2.00	0.165
2.10	0.170
2.20	0.170*
2.30	0.170
2.40	0.180
2.50	0.190
2.60	0.200

CURVE 9
T ~ 298

λ	ρ
0.38	0.106
0.42	0.106
0.46	0.104*
0.50	0.104
0.54	0.104*

CURVE 9 (cont.)

λ	ρ
0.58	0.104*
0.62	0.106
0.66	0.107*
0.70	0.109

CURVE 10
T ~ 298

λ	ρ
0.38	0.115
0.42	0.117*
0.46	0.115*
0.50	0.115*
0.54	0.116*
0.58	0.117*
0.62	0.118
0.66	0.119
0.70	0.121

CURVE 11
T ~ 298

λ	ρ
6.4	0.569
10.9	0.616
17.3	0.684
24.7	0.738
32.3	0.812
41.0	0.364
57.0	0.901
72.6	0.901
91.2	0.882
104.5	0.908
125.9	0.968
139.3	0.990
168.3	1.000

CURVE 12
T = 298

λ	ρ
0.090	0.067*
0.095	0.070*
0.100	0.067
0.125	0.029
0.129	0.018
0.138	0.018
0.145	0.009
0.150	0.008

CURVE 12 (cont.)

λ	ρ
0.157	0.006
0.165	0.013
0.177	0.051
0.189	0.101
0.210	0.214
0.220	0.271
0.230	0.320
0.234	0.334*
0.240	0.339
0.243	0.337*
0.250	0.318
0.260	0.277
0.264	0.261
0.270	0.239
0.276	0.228*
0.281	0.221

CURVE 13
T = 298

λ	ρ
0.400	0.190
0.665	0.210
0.700	0.215

CURVE 14
T = 298

λ	ρ
0.400	0.145
0.665	0.160
0.700	0.165*

CURVE 15
T = 298

λ	ρ
0.400	0.089
0.665	0.092
0.700	0.093

CURVE 16
T = 298

λ	ρ
0.400	0.075
0.665	0.080
0.700	0.082

CURVE 17
T = 298

λ	ρ
0.30	0.120
0.50	0.120*
0.58	0.120
0.70	0.125*
0.82	0.130
0.90	0.130*
0.98	0.130
1.06	0.140
1.10	0.140*
1.30	0.140
1.46	0.150*
1.50	0.150*
1.64	0.170
1.70	0.175*
1.76	0.180*
1.90	0.185
2.00	0.190*
2.10	0.190
2.30	0.200
2.38	0.200*
2.50	0.215
2.60	0.230

CURVE 18*
T = 298

λ	ρ
0.30	0.140
0.36	0.130
0.50	0.140
0.76	0.140
0.90	0.140
1.02	0.150
1.10	0.150
1.30	0.150
1.42	0.160
1.50	0.190
1.70	0.195
1.76	0.200
1.82	0.200
1.90	0.205
2.10	0.210
2.30	0.215
2.40	0.220
2.50	0.230
2.60	0.250

CURVE 19
T ~ 298

λ	ρ
0.38	0.122
0.42	0.122
0.46	0.120*
0.50	0.120*
0.54	0.121
0.58	0.122*
0.62	0.124
0.66	0.125*
0.70	0.126*

CURVE 20*
T ~ 298

λ	ρ
0.38	0.135
0.40	0.136
0.42	0.136*
0.46	0.134
0.50	0.134*
0.54	0.135*
0.58	0.136
0.62	0.138
0.66	0.139
0.70	0.141

CURVE 21
T = 298

λ	ρ
0.30	0.080
0.34	0.060
0.38	0.060*
0.44	0.075
0.50	0.075
0.58	0.080
0.70	0.080
0.76	0.080
0.90	0.085
0.96	0.090
1.10	0.090
1.30	0.090
1.40	0.085
1.50	0.090
1.60	0.110
1.70	0.110
1.90	0.110
2.10	0.120

*Not shown on plot

DATA TABLE NO. 25 (continued)

CURVE 21 (cont.)
T = 298

λ	ρ
2.30	0.125
2.50	0.130
2.60	0.135

CURVE 22*
T = 298

λ	ρ
0.30	0.090
0.34	0.070
0.38	0.070
0.42	0.080
0.50	0.080
0.58	0.085
0.62	0.090
0.70	0.090
0.90	0.090
1.10	0.100
1.30	0.100
1.38	0.095
1.50	0.100
1.62	0.120
1.70	0.120
1.80	0.120
1.90	0.125
2.10	0.125
2.18	0.130
2.30	0.130
2.38	0.140
2.58	0.145
2.60	0.150

CURVE 23
T ~ 298

λ	ρ
0.38	0.078
0.42	0.078*
0.46	0.078*
0.48	0.077*
0.50	0.077*
0.52	0.078*
0.56	0.078
0.60	0.078
0.62	0.079
0.66	0.080*
0.70	0.082*

CURVE 24*
T ~ 298

λ	ρ
0.38	0.084
0.42	0.086
0.46	0.084
0.50	0.084
0.54	0.084
0.58	0.085
0.62	0.086
0.66	0.088
0.70	0.089

CURVE 25*
T = 298

λ	ρ
0.400	0.175
0.665	0.190
0.700	0.195

CURVE 26*
T = 298

λ	ρ
0.400	0.170
0.665	0.178
0.700	0.180

CURVE 27*
T = 298

λ	ρ
0.400	0.122
0.665	0.125
0.700	0.128

CURVE 28*
T = 298

λ	ρ
0.400	0.102
0.665	0.104
0.700	0.105

CURVE 29*
T = 298

λ	ρ
0.400	0.063
0.665	0.064
0.700	0.066

CURVE 30
T = 298

λ	ρ
0.60	0.230
0.70	0.243
0.90	0.257
1.20	0.280
1.60	0.310
2.40	0.385
3.30	0.453
4.05	0.475
5.17	0.505
6.07	0.523
6.85	0.530
7.55	0.535
8.07	0.555
8.70	0.567
9.40	0.580

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*Not shown on plot

SPECIFICATION TABLE NO. 26 ANGULAR SPECTRAL REFLECTANCE OF CARBON (GRAPHITE)

Curve No.	Ref. No.	Year	Wavelength μm	Temperature Range, K	Geometry θ	Geometry θ'	Geometry ω'	Reported Error, %	Composition (weight percent), Specifications, and Remarks
1*	5	1963	0.5545	2597	45°		2π		AGKSP graphite (National Carbon Co.); extruded and cut with grain; 80-grit surface finish; bulk density 1.61 g cm^{-3}; thermal conductivity 0.117 cal sec^{-1} cm^{-1} K^{-1}; measured in argon; MgO reference standard.
2*	5	1963	0.5545	2694	45°		2π		Similar to the above specimen and conditions; thermal conductivity 0.122 cal sec^{-1} cm^{-1} K^{-1}.
3*	5	1963	0.5545	2583	45°		2π		Similar to the above specimen and conditions; thermal conductivity 0.127 cal sec^{-1} cm^{-1} K^{-1}.
4*	5	1963	0.5545	2568	45°		2π		Similar to the above specimen and conditions; thermal conductivity 0.131 cal sec^{-1} cm^{-1} K^{-1}.
5*	5	1963	0.5545	2668	45°		2π		Similar to the above specimen and conditions; thermal conductivity 0.133 cal sec^{-1} cm^{-1} K^{-1}.
6*	5	1963	0.5545	2572	45°		2π		Similar to the above specimen and conditions; thermal conductivity 0.136 cal sec^{-1} cm^{-1} K^{-1}.
7*	5	1963	0.5545	2438	45°		2π		Similar to the above specimen and conditions; thermal conductivity 0.149 cal sec^{-1} cm^{-1} K^{-1}.
8*	5	1963	0.5545	2416	45°		2π		Similar to the above specimen and conditions; thermal conductivity 0.175 cal sec^{-1} cm^{-1} K^{-1}.
9*	5	1963	0.5545	2709	45°		2π		ATJ graphite; molded and cut with grain; 80-grit surface finish; thermal conductivity 0.077 cal sec^{-1} cm^{-1} K^{-1}; bulk density 1.73 g cm^{-3}; measured in argon; MgO reference standard.
10*	5	1963	0.5545	2543	45°		2π		Similar to the above specimen and conditions except molded and cut across grain; thermal conductivity 0.084 cal sec^{-1} cm^{-1} K^{-1}.
11*	5	1963	0.5545	2526	45°		2π		Similar to the above specimen and conditions; thermal conductivity 0.103 cal sec^{-1} cm^{-1} K^{-1}.
12*	5	1963	0.5545	2455	45°		2π		ATJ graphite; cut with grain; surface prepared on 80-grit garnet paper; thermal conductivity 0.051 cal sec^{-1} cm^{-1} K^{-1}; diffusivity 0.057 cm^2 sec^{-1}; measured in argon.
13*	5	1963	0.5545	2568	45°		2π		Similar to the above specimen and conditions; bulk density 1.73 g cm^{-3}; thermal conductivity 0.100 cal sec^{-1} cm^{-1} K^{-1}; diffusivity 0.111 cm^2 sec^{-1}.
14*	5	1963	0.5545	2547	45°		2π		Similar to the above specimen and conditions except cut across grain; thermal conductivity 0.032 cal sec^{-1} cm^{-1} K^{-1}; diffusivity 0.036 cm^2 sec^{-1}.
15*	5	1963	0.5545	2650	45°		2π		Similar to the above specimen and conditions; thermal conductivity 0.086 cal sec^{-1} cm^{-1} K^{-1}.
16*	5	1963	0.5545	2473	45°		2π		ATJ graphite; cut with grain; sandblasted; thermal conductivity 0.093 cal sec^{-1} cm^{-1} K^{-1}; diffusivity 0.103 cm^2 sec^{-1}; measured in argon.
17*	5	1963	0.5545	2615	45°		2π		Similar to the above specimen and conditions; bulk density 1.73 g cm^{-3}; thermal conductivity 0.102 cal sec^{-1} cm^{-1} K^{-1}; diffusivity 0.113 cm^2 sec^{-1}.
18*	5	1963	0.5545	2501	45°		2π		Similar to the above specimen and conditions except cut across grain; thermal conductivity 0.067 cal sec^{-1} cm^{-1} K^{-1}; diffusivity 0.074 cm^2 sec^{-1}.
19*	5	1963	0.5545	2625	45°		2π		Similar to the above specimen and conditions; thermal conductivity 0.099 cal sec^{-1} cm^{-1} K^{-1}; diffusivity 0.110 cm^2 sec^{-1}.
20*	5	1963	0.5545	2753	45°		2π		Grade CEP-isotropic; surface prepared on 80-grit garnet paper; thermal conductivity 0.046 cal sec^{-1} cm^{-1} K^{-1}; diffusivity 0.058 cm^2 sec^{-1}; measured in argon; MgO reference standard.

*No plot given

SPECIFICATION TABLE NO. 26 (continued)

Curve No.	Ref. No.	Year	Wavelength μm	Temperature Range, K	Geometry θ	θ'	ω'	Reported Error, %	Composition (weight percent), Specifications, and Remarks
21*	5	1963	0.5545	2836	45°		2π		Similar to the above specimen and conditions; bulk density 1.55 g cm^{-3}; thermal conductivity 0.062 cal sec^{-1} cm^{-1} K^{-1}; diffusivity 0.078 cm^2 sec^{-1}.
22*	5	1963	0.5545	2748	45°		2π		Similar to the above specimen and conditions except sandblasted; thermal conductivity 0.041 cal sec^{-1} cm^{-1} K^{-1}; diffusivity 0.052 cm^2 sec^{-1}.
23*	5	1963	0.5545	2810	45°		2π		Similar to the above specimen and conditions; bulk density 1.55 g cm^{-3}; thermal conductivity 0.062 cal sec^{-1} cm^{-1} K^{-1}; diffusivity 0.078 cm^2 sec^{-1}.
24*	5	1963	0.5545	2870	45°		2π		Grade CEP; molded and cut with grain; 80-grit surface finish; thermal conductivity 0.069 cal sec^{-1} cm^{-1} K^{-1}; bulk density 1.55 g cm^{-3}; measured in argon; MgO reference standard.
25*	5	1963	0.5545	2845	45°		2π		Similar to the above specimen and conditions except cut across grain; thermal conductivity 0.064 cal sec^{-1} cm^{-1} K^{-1}.
26*	5	1963	0.5545	2895	45°		2π		Similar to the above specimen and conditions; thermal conductivity 0.066 cal sec^{-1} cm^{-1} K^{-1}.
27*	5	1963	0.5545	2897	45°		2π		Similar to the above specimen and conditions; thermal conductivity 0.067 cal sec^{-1} cm^{-1} K^{-1}.
28*	5	1963	0.5545	2691	45°		2π		Similar to the above specimen and conditions; thermal conductivity 0.076 cal sec^{-1} cm^{-1} K^{-1}.
29*	5	1963	0.5545	2767	45°		2π		Similar to the above specimen and conditions; thermal conductivity 0.081 cal sec^{-1} cm^{-1} K^{-1}.
30*	5	1963	0.5500	500-1800	45°		2π		Pyrolytic graphite; metallographically polished and then cleaned; layer planes parallel to surface; measured in flowing argon gas; MgO reference standard; [Authors' designation: Sample 1].
31*	5	1963	0.5500	500-1800	45°		2π		Similar to the above specimen and conditions; [Authors' designation: Sample 2].
32*	5	1963	0.5500	500-1800	45°		2π		Similar to the above specimen and conditions; [Authors' designation: Sample 3].
33*	5	1963	0.5500	500-1800	45°		2π		Similar to the above specimen and conditions except layer planes perpendicular to surface and to plane of incidence; [Authors' designation: Sample 4].
34*	5	1963	0.5500	500-1800	45°		2π		Similar to the above specimen and conditions; [Authors' designation: Sample 5].
35*	5	1963	0.5500	500-1800	45°		2π		Similar to the above specimen and conditions; [Authors' designation: Sample 6].
36*	5	1963	0.5500	500-1800	45°		2π		Similar to the above specimen and conditions except layer planes perpendicular to surface and parallel to plane of incidence; [Authors' designation: Sample 4].
37*	5	1963	0.5500	500-1800	45°		2π		Similar to the above specimen and conditions; [Authors' designation: Sample 5].
38*	5	1963	0.5500	500-1800	45°		2π		Similar to the above specimen and conditions; [Authors' designation: Sample 6].
39*	5	1963	0.5545	2539	45°		2π		SPK graphite; extruded and cut with grain; 80-grit surface finish; thermal conductivity 0.129 cal sec^{-1} cm^{-1} K^{-1}; bulk density 1.90 g cm^{-3}; measured in argon; MgO reference standard.
40*	5	1963	0.5545	2399	45°		2π		Similar to the above specimen and conditions; thermal conductivity 0.141 cal sec^{-1} cm^{-1} K^{-1}.
41*	5	1963	0.5545	2394	45°		2π		Similar to the above specimen and conditions; thermal conductivity 0.145 cal sec^{-1} cm^{-1} K^{-1}.

*No plot given

DATA TABLE NO. 26 ANGULAR SPECTRAL REFLECTANCE OF CARBON (GRAPHITE)

[Temperature, T, K; Reflectance, ρ; Wavelength, λ, μm]

T	ρ
CURVE 1* λ = 0.5545	
2597	0.074
CURVE 2* λ = 0.5545	
2694	0.075
CURVE 3* λ = 0.5545	
2583	0.058
CURVE 4* λ = 0.5545	
2568	0.064
CURVE 5* λ = 0.5545	
2668	0.069
CURVE 6* λ = 0.5545	
2572	0.038
CURVE 7* λ = 0.5545	
2438	0.040
CURVE 8* λ = 0.5545	
2416	0.070
CURVE 9* λ = 0.5545	
2709	0.086
CURVE 10* λ = 0.5545	
2543	0.077
CURVE 11* λ = 0.5545	
2526	0.062
CURVE 12* λ = 0.5545	
2455	0.070
CURVE 13* λ = 0.5545	
2568	0.072
CURVE 14* λ = 0.5545	
2547	0.066
CURVE 15* λ = 0.5545	
2650	0.070
CURVE 16* λ = 0.5545	
2473	0.063
CURVE 17* λ = 0.5545	
2615	0.064
CURVE 18* λ = 0.5545	
2501	0.055
CURVE 19* λ = 0.5545	
2625	0.056
CURVE 20* λ = 0.5545	
2753	0.041
CURVE 21* λ = 0.5545	
2836	0.048
CURVE 22* λ = 0.5545	
2748	0.035
CURVE 23* λ = 0.5545	
2810	0.040
CURVE 24* λ = 0.5545	
2870	0.056
CURVE 25* λ = 0.5545	
2845	0.062
CURVE 26* λ = 0.5545	
2895	0.046
CURVE 27* λ = 0.5545	
2897	0.047
CURVE 28* λ = 0.5545	
2691	0.063
CURVE 29* λ = 0.5545	
2767	0.040
CURVE 30* λ = 0.5500	
500	0.263
1800	0.263
CURVE 31* λ = 0.5500	
500	0.250
1800	0.250
CURVE 32* λ = 0.5500	
500	0.248
1800	0.248
CURVE 33* λ = 0.5500	
500	0.207
1800	0.207
CURVE 34* λ = 0.5500	
500	0.186
1800	0.186
CURVE 35* λ = 0.5500	
500	0.213
1800	0.213
CURVE 36* λ = 0.5500	
500	0.165
1800	0.165
CURVE 37* λ = 0.5500	
500	0.176
1800	0.176
CURVE 38* λ = 0.5500	
500	0.202
1800	0.202
CURVE 39* λ = 0.5545	
2539	0.069
CURVE 40* λ = 0.5545	
2399	0.062
CURVE 41* λ = 0.5545	
2394	0.050

*No plot given

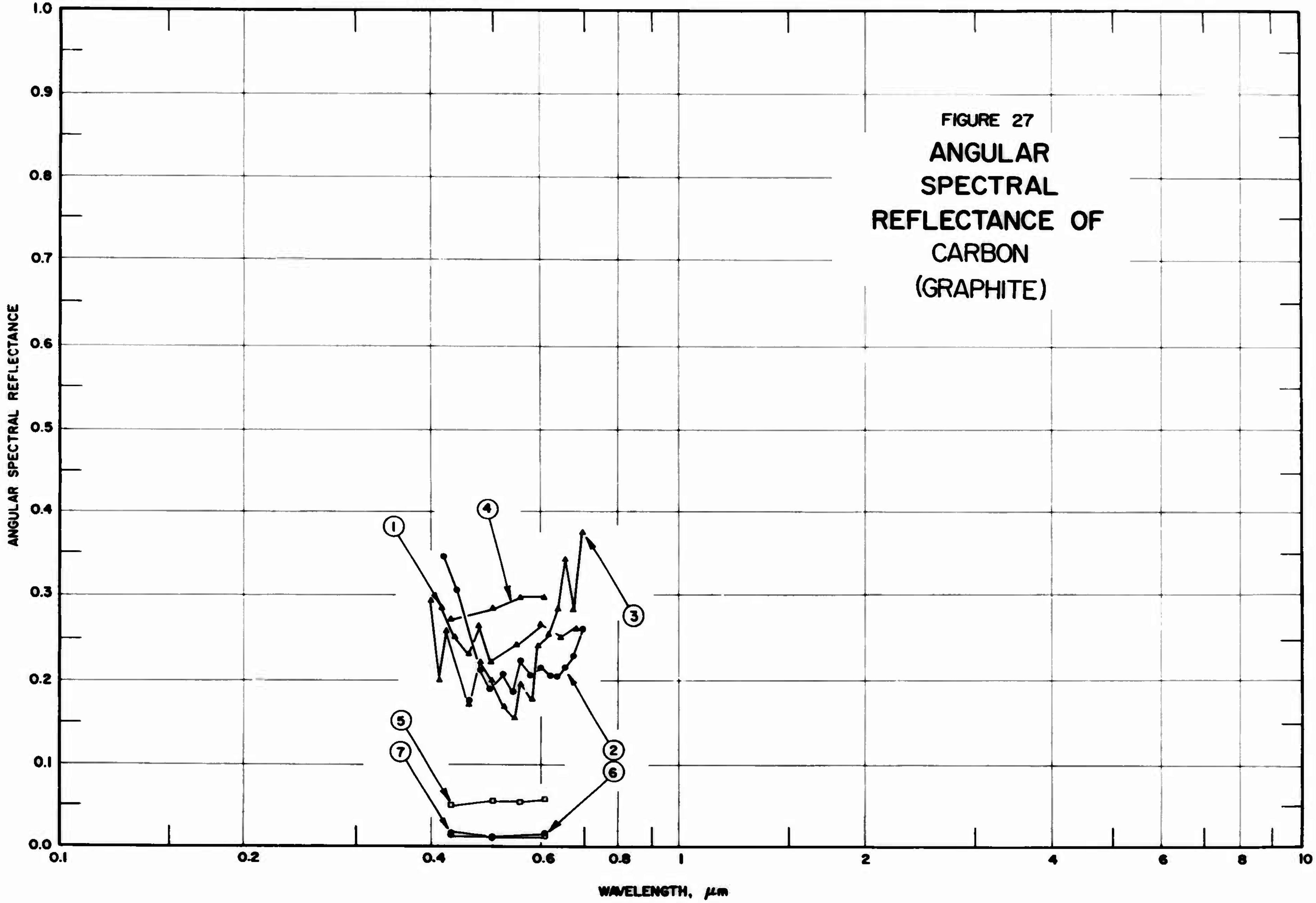


FIGURE 27
ANGULAR SPECTRAL REFLECTANCE OF CARBON (GRAPHITE)

SPECIFICATION TABLE NO. 27 ANGULAR SPECTRAL REFLECTANCE OF CARBON (GRAPHITE)

Curve No.	Ref. No.	Year	Temperature K	Wavelength Range, μm	Geometry θ	Geometry θ'	Geometry ω'	Reported Error, %	Composition (weight percent), Specifications, and Remarks
1	10	1960	550	0.419–0.682	45°		2π	± 15	AGKSP graphite; MgO reference standard.
2	10	1960	2210	0.420–0.700	45°		2π	± 15	AGKSP graphite; MgO reference standard.
3	10	1960	3806	0.400–0.700	45°		2π	± 15	AGKSP graphite; MgO reference standard.
4	5	1963	1180	0.4305–0.6080	45°		2π		AGKSP graphite (National); final polished on 4/0 Buehler emery polishing paper; measured in argon; MgO reference standard.
5	5	1963	1220	0.4305–0.6080	45°		2π		AGKSP graphite (National); roughened with 80 grit garnet paper; measured in argon; MgO reference standard.
6	6	1963	3800	0.4305–0.6080	45°		2π	≤ 0.004	AGKSP graphite; bulk density 1.61 g cm^{-3}; resistivity 0.00025 ohm in.; max ash 10 ppm; measured in argon; MgO reference standard.
7	6	1963	3800	0.4305–0.6080	45°		2π		SPK graphite; bulk density 1.90 g cm^{-3}; resistivity 0.00045 ohm in.; max ash 10 ppm; measured in argon; MgO reference standard.

DATA TABLE NO. 27 ANGULAR SPECTRAL REFLECTANCE OF CARBON (GRAPHITE)

[Wavelength, λ, μm; Reflectance, ρ; Temperature, T, K]

λ	ρ
CURVE 1	
T = 550	
0.419	0.287
0.438	0.251
0.459	0.232
0.479	0.265
0.500	0.224
0.550	0.245
0.600	0.268
0.649	0.251
0.682	0.262
CURVE 2	
T = 2210	
0.420	0.345
0.440	0.303
0.460	0.177
0.480	0.211
0.499	0.190
CURVE 2 (cont.)	
0.520	0.209
0.540	0.188
0.559	0.225
0.578	0.207
0.600	0.214
0.620	0.204
0.638	0.204
0.658	0.216
0.678	0.230
0.700	0.261
CURVE 3	
T = 3806	
0.400	0.292
0.424	0.200
0.441	0.260
0.460	0.171
0.483	0.222
CURVE 3 (cont.)	
0.500	0.200
0.523	0.170
0.541	0.156
0.559	0.197
0.580	0.179
0.598	0.242
0.618	0.257
0.640	0.284
0.659	0.343
0.679	0.298
0.700	0.373
CURVE 4	
T = 1180	
0.4305	0.273
0.5010	0.284
0.5545	0.297
0.6080	0.297
CURVE 5	
T = 1220	
0.4305	0.050
0.5010	0.054
0.5545	0.053
0.6080	0.059
CURVE 6	
T = 3800	
0.4305	0.013
0.5010	0.012
0.6080	0.014
CURVE 7	
T = 3800	
0.4305	0.014
0.5010	0.011
0.6080	0.012

SPECIFICATION TABLE NO. 28 HEMISPHERICAL INTEGRATED ABSORPTANCE OF CARBON (GRAPHITE)

Curve No.	Ref. No.	Year	Temperature Range, K	Reported Error, %	Composition (weight percent), Specifications and Remarks
1*	5	1963	2568		ATJ graphite; cut with grain; surface prepared on 80-grit garnet paper; bulk density 1.73 g cm^{-3}; measured in argon.
2*	5	1963	2615		Similar to the above specimen and conditions except sandblasted.
3*	5	1963	2650		Similar to curve 1 specimen and conditions except cut across grain.
4*	5	1963	2625		Similar to the above specimen and conditions except sandblasted.
5*	5	1963	2836		Grade CEP-isotropic; surface prepared on 80-grit garnet paper; bulk density 1.55 g cm^{-3}; measured in argon.
6*	5	1963	2810		Similar to the above specimen and conditions except sandblasted.

DATA TABLE NO. 28 HEMISPHERICAL INTEGRATED ABSORPTANCE OF CARBON (GRAPHITE)

[Temperature, T, K; Absorptance, α]

T	α
CURVE 1*	
2568	0.91
CURVE 2*	
2615	0.91
CURVE 3*	
2650	0.91
CURVE 4*	
2625	0.91
CURVE 5*	
2836	0.925
CURVE 6*	
2810	0.925

*No plot given

SPECIFICATION TABLE NO. 29 NORMAL SOLAR ABSORPTANCE OF CARBON (GRAPHITE)

Curve No.	Ref. No.	Year	Temperature Range, K	Geometry θ	Reported Error, %	Composition (weight percent), Specifications and Remarks
1*	39	1957	298	9°		GBE graphite (National Carbon Co.); computed from spectral reflectance; at sea level; front side.
2*	39	1957	298	9°		Above specimen and conditions; back side.
3*	39	1957	298	9°		Similar to curve 1 specimen and conditions except above atmosphere.
4*	39	1957	298	9°		Above specimen and conditions; back side.
5*	39	1957	298	9°		GBH graphite (National Carbon Co.); as received; computed from spectral reflectance at sea level.
6*	39	1957	298	9°		Similar to the above specimen and conditions except above atmosphere.
7*	39	1957	298	9°		Similar to curve 5 specimen and conditions except milled.
8*	39	1957	298	9°		Similar to the above specimen and conditions except above atmosphere.
9*	39	1957	298	9°		Type 3474 D (Speer Carbon Co.); as received; computed from spectral reflectance; at sea level.
10*	39	1957	298	9°		Similar to the above specimen and conditions except above atmosphere.
11*	39	1957	298	9°		Similar to curve 9 specimen and conditions except milled.
12*	39	1957	298	9°		Similar to the above specimen and conditions except above atmosphere.
13*	39	1957	298	9°		Type 7087 (Speer Carbon Co.); as received; computed from spectral reflectance; at sea level.
14*	39	1957	298	9°		Similar to the above specimen and conditions except above atmosphere.
15*	39	1957	298	9°		Similar to curve 13 specimen and conditions except milled.
16*	39	1957	298	9°		Similar to the above specimen and conditions except above atmosphere.

*No plot given

DATA TABLE NO. 29   NORMAL SOLAR ABSORPTANCE OF CARBON (GRAPHITE)

[Temperature, T, K; Absorptance, α]

T	α	T	α
CURVE 1*		CURVE 13*	
298	0.863	298	0.918
CURVE 2*		CURVE 14*	
298	0.877	298	0.916
CURVE 3*		CURVE 15*	
298	0.850	298	0.911
CURVE 4*		CURVE 16*	
298	0.869	298	0.908
CURVE 5*			
298	0.891		
CURVE 6*			
298	0.885		
CURVE 7*			
298	0.887		
CURVE 8*			
298	0.881		
CURVE 9*			
298	0.871		
CURVE 10*			
298	0.866		
CURVE 11*			
298	0.858		
CURVE 12*			
298	0.853		

*No plot given

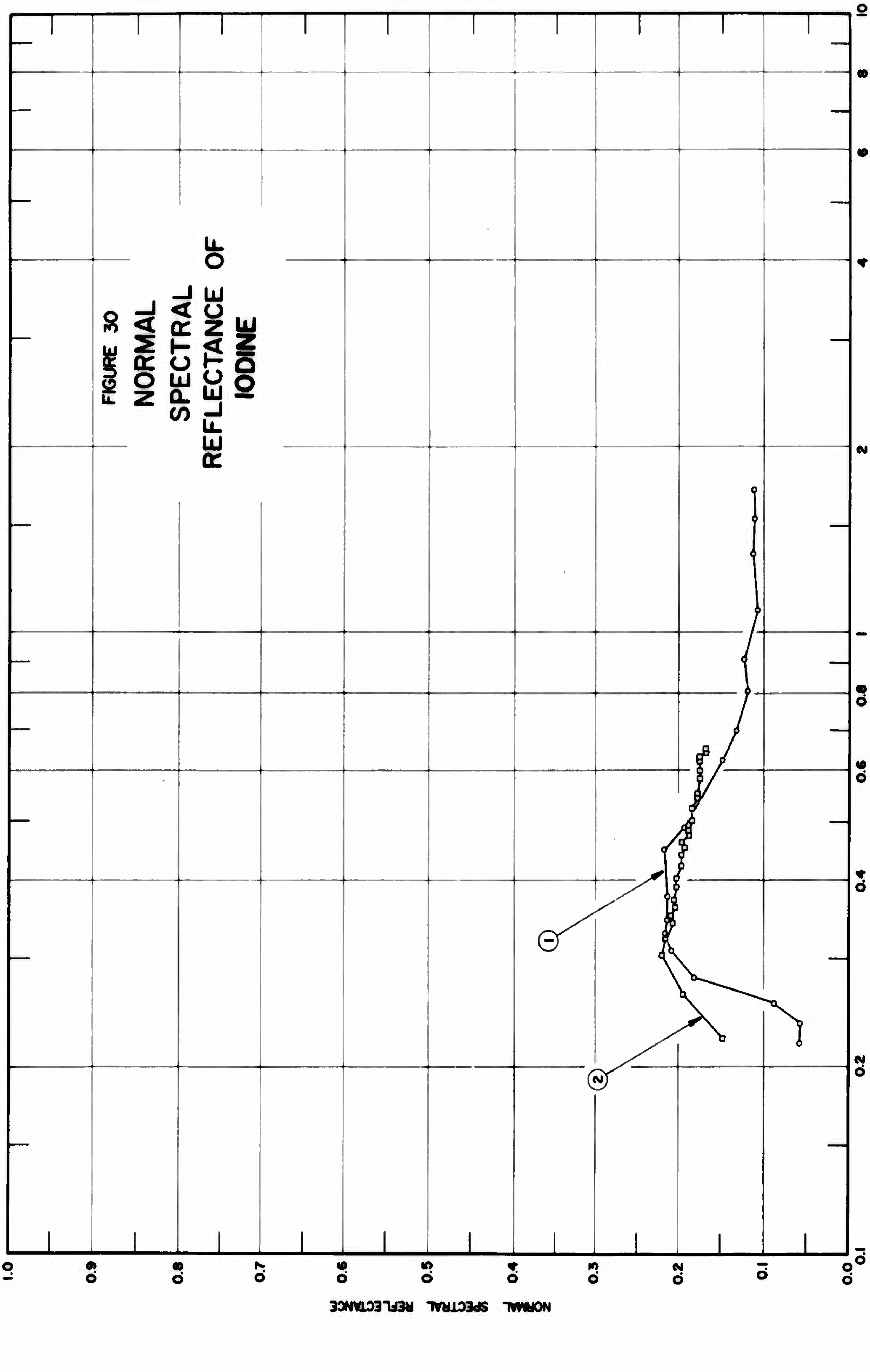


FIGURE 30 NORMAL SPECTRAL REFLECTANCE OF IODINE

SPECIFICATION TABLE NO. 30 NORMAL SPECTRAL REFLECTANCE OF IODINE

Curve No.	Ref. No.	Year	Temperature K	Wavelength Range, μm	Geometry θ θ' ω'	Reported Error, %	Composition (weight percent), Specifications and Remarks
1	45	1963	298	0.219-1.70	~0° ~0°		Single crystals grown from vapor phase of resublimated iodine; aluminum and germanium references; data extracted from smooth curve.
2	136	1967	~298	0.221-0.650	0° 45°		I_2 (Judactan analytical reagent); magnesium carbonate reference.

DATA TABLE NO. 30 NORMAL SPECTRAL REFLECTANCE OF IODINE

[Wavelength, λ, μm; Reflectance, ρ; Temperature, T, K]

λ	ρ	λ	ρ	λ	ρ
CURVE 1 T = 298		CURVE 2 T ~298		CURVE 2 (cont.)	
0.219	0.058	0.221	0.148	0.550	0.176
0.235	0.058	0.261	0.194	0.581	0.173
0.254	0.088	0.301	0.220	0.600	0.173
0.278	0.180	0.321	0.214	0.620	0.173
0.308	0.209	0.340	0.207	0.630	0.173
0.329	0.216	0.350	0.209	0.640	0.168
0.344	0.214	0.361	0.203	0.650	0.168
0.376	0.213	0.371	0.204		
0.448	0.217	0.390	0.202		
0.488	0.193	0.402	0.202		
0.621	0.148	0.421	0.196		
0.697	0.131	0.440	0.196		
0.805	0.119	0.451	0.192		
0.903	0.123	0.460	0.196		
1.01	0.110	0.471	0.188		
1.09	0.108	0.481	0.188		
1.34	0.112	0.500	0.184		
1.53	0.111	0.521	0.182		
1.70	0.111	0.541	0.176		

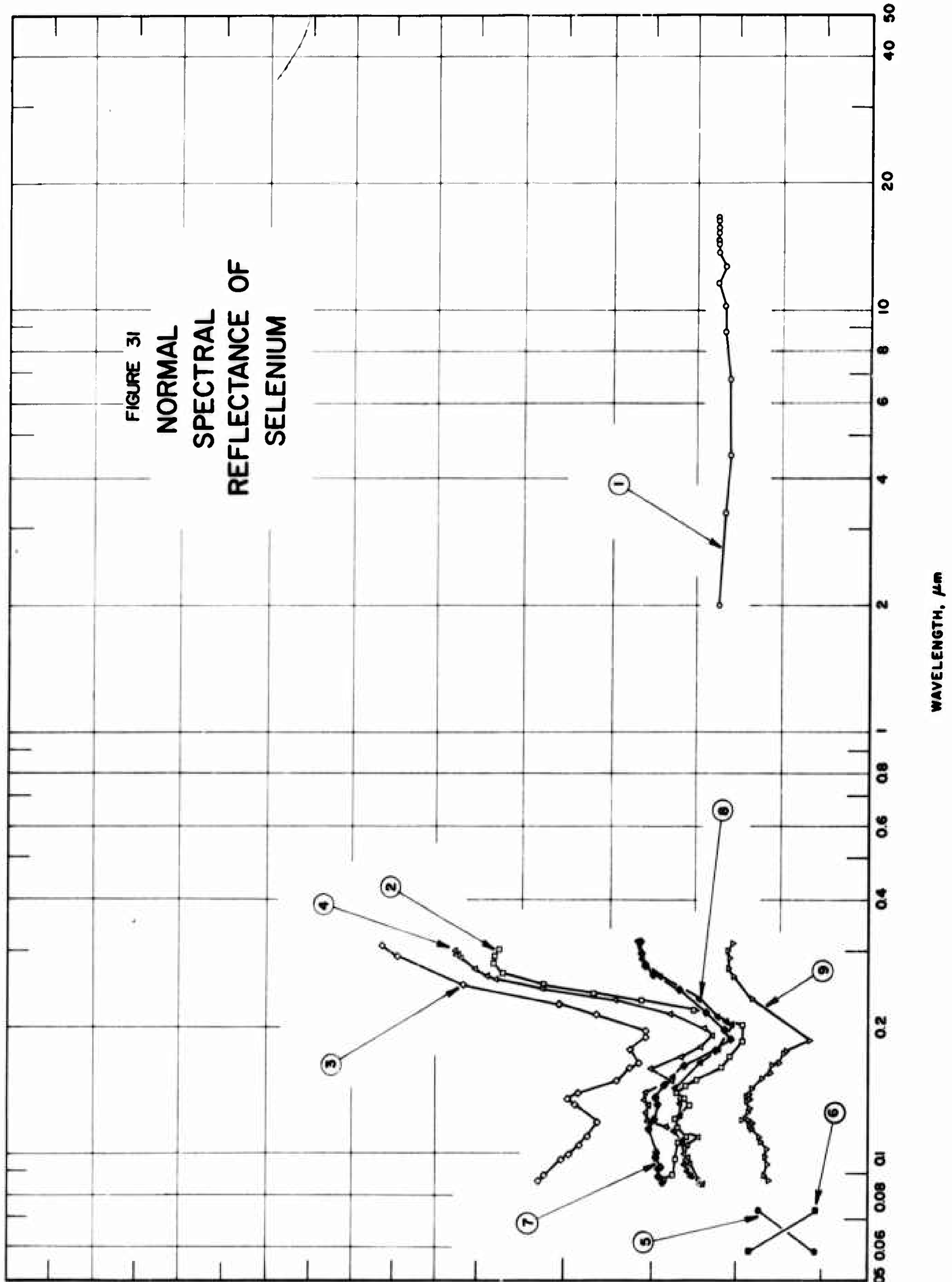


FIGURE 31
NORMAL SPECTRAL REFLECTANCE OF SELENIUM

SPECIFICATION TABLE NO. 31 NORMAL SPECTRAL REFLECTANCE OF SELENIUM

Curve No.	Ref. No.	Year	Temperature K	Wavelength Range, μm	Geometry θ	θ'	ω'	Reported Error, %	Composition (weight percent), Specifications and Remarks
1	46	1965	298	2.00-16.60	~10°	~10°			Amorphous selenium; impurities (ppm) 0.1 Na, 1 As, 1±0.5 S, 0.5±0.5 Cl; optically perfectly homogeneous; measured in air; data extracted from smooth curve.
2	157	1968	298	0.0871-0.305	20°	20°			Trigonal selenium grown from the melt; measured with incident radiation polarized perpendicular to c-axis.
3	157	1968	298	0.0861-0.312	20°	20°			Trigonal selenium grown from the melt; measured with incident radiation polarized parallel to c-axis; data extracted from smooth curve.
4	157	1968	298	0.0859-0.302	20°	20°			Trigonal selenium grown from the melt; measured with unpolarized radiation from $(10\bar{1}0)$ face parallel to c-axis.
5	161	1968	298	0.0585-0.0738	20°	20°			Trigonal selenium grown from the melt; measured with incident radiation polarized parallel to c-axis.
6	161	1968	298	0.0585-0.0738	20°	20°			Trigonal selenium grown from the melt; measured with incident radiation polarized perpendicular to c-axis.
7	158	1968	298	0.0862-0.320	20°	20°			Amorphous selenium film (50 μm thick); evaporated unto polished aluminum substrate using 99.9 pure Se (from Canadian Copper Refiners) at 1200 Å min^{-1} in vacuum ($<3 \times 10^{-4}$ mm Hg); measured in vacuum (5×10^{-4} mm Hg); fresh film; data extracted from smooth curve.
8	158	1968	298	0.0859-0.320	20°	20°			Similar to above specimen and conditions except aged for nine months.
9	158	1968	298	0.0866-0.317	20°	20°			α-Monoclinic selenium; obtained from a collage of single crystal platelets oriented with (101) face perpendicular to incident beam; measured in vacuum (5×10^{-4} mm Hg); data extracted from smooth curve.

DATA TABLE NO. 31 NORMAL SPECTRAL REFLECTANCE OF SELENIUM

[Wavelength, λ, μm; Reflectance, ρ; Temperature, T, K]

CURVE 1
T = 298

λ	ρ
2.00	0.172
3.30	0.167
4.55	0.160
6.87	0.160
8.87	0.167
10.30	0.167
11.62	0.174
12.76	0.167
13.71	0.174
14.42	0.174
14.89	0.174
15.38	0.174
15.85	0.174
16.22	0.174
16.60	0.174

CURVE 2
T = 298

λ	ρ
0.0871	23.7
0.0883	22.2
0.0895	22.6
0.0905	22.4
0.0918	22.3
0.0933	22.6
0.0952	22.2
0.0967	22.1
0.0975	22.4
0.0985	22.5
0.0997	22.3
0.101	22.2
0.102	22.0*
0.103	22.1*
0.104	22.2*
0.106	22.0
0.108	21.3*
0.110	21.0
0.111	21.1*
0.113	21.2*
0.114	21.4*
0.114	21.8*
0.115	22.1

CURVE 2 (cont.)

λ	ρ
0.117	22.3*
0.118	22.5*
0.119	22.7*
0.121	22.3
0.122	22.4*
0.123	22.0*
0.124	21.5*
0.126	20.8*
0.127	20.7*
0.130	20.7
0.133	21.1*
0.135	21.3
0.136	21.7*
0.137	21.9*
0.139	22.3*
0.140	22.3
0.143	22.1*
0.145	21.2
0.148	20.5*
0.149	20.3*
0.150	19.9
0.151	19.2*
0.152	19.0*
0.152	18.6*
0.153	18.1*
0.158	16.9*
0.160	16.8
0.163	16.5*
0.166	16.4*
0.168	16.2*
0.170	15.8
0.172	15.5*
0.176	14.5*
0.179	14.5*
0.183	14.1*
0.185	14.3
0.188	14.2*
0.193	14.0*
0.197	14.1*
0.202	14.3
0.206	14.8*
0.208	15.8*
0.211	16.9*

CURVE 2 (cont.)

λ	ρ
0.213	17.9*
0.217	18.8*
0.220	20.1
0.223	21.5*
0.226	23.1*
0.229	24.8*
0.231	26.3
0.234	28.4*
0.238	30.1*
0.240	31.9
0.244	33.3*
0.246	34.9*
0.249	36.2*
0.252	37.5
0.254	39.2*
0.257	40.0*
0.261	40.8*
0.263	41.4*
0.269	42.1
0.272	42.3*
0.276	42.5*
0.282	42.5*
0.282	42.8*
0.283	43.1
0.283	43.4*
0.292	43.6*
0.295	43.0
0.302	43.0*
0.305	42.6

CURVE 3
T = 298

λ	ρ
0.0861	38.0
0.0873	37.7*
0.0882	37.5*
0.0895	37.2
0.0902	36.9*
0.0913	36.6*
0.0941	35.9*
0.0974	35.3
0.0982	35.0*
0.100	34.6

CURVE 3 (cont.)

λ	ρ
0.101	34.4*
0.103	34.0*
0.104	33.9*
0.104	33.8*
0.105	33.5
0.110	32.6
0.114	32.1*
0.119	31.5
0.124	34.7
0.126	34.4
0.128	34.5
0.131	34.0
0.132	34.3*
0.134	34.8*
0.135	34.8
0.140	33.6
0.144	32.3*
0.147	29.5*
0.150	29.1
0.160	37.8
0.165	36.7
0.167	35.9*
0.174	28.3*
0.178	27.7
0.183	27.9*
0.190	25.9
0.193	25.6*
0.196	25.9
0.215	31.6
0.228	35.8
0.253	46.7
0.272	51.6*
0.295	54.6
0.312	56.4

CURVE [illegible]
T = 298

λ	ρ
0.0859	19.4
0.0870	19.5
0.0886	19.8*
0.0903	19.8*
0.0912	20.2*

CURVE 4 (cont.)

λ	ρ
0.0923	20.1*
0.0937	20.2*
0.0955	20.6
0.0971	20.8*
0.0980	20.8
0.0989	21.0*
0.100	21.2
0.101	21.2*
0.103	21.1*
0.103	20.6*
0.105	20.9
0.107	20.6*
0.109	19.9*
0.110	19.5
0.112	19.9*
0.113	20.7*
0.116	23.3
0.117	24.5*
0.119	25.3*
0.120	25.7
0.121	26.1*
0.122	26.0*
0.122	26.2*
0.123	26.4*
0.124	26.2*
0.125	25.8
0.127	25.6*
0.128	25.5*
0.131	25.4
0.132	25.6*
0.133	25.9*
0.134	25.8*
0.135	26.0
0.137	26.1*
0.139	26.1*
0.140	25.9
0.141	25.1*
0.144	25.0*
0.146	23.6*
0.148	22.7*
0.150	22.8
0.152	23.1*
0.153	23.3*

CURVE 4 (cont.)

λ	ρ
0.154	24.0*
0.158	25.2*
0.159	25.4*
0.160	25.2
0.163	24.2*
0.164	24.6*
0.167	23.8*
0.170	21.6
0.173	19.9*
0.176	19.2*
0.180	19.1
0.183	19.0*
0.186	18.5*
0.189	18.2*
0.191	17.8
0.195	17.9*
0.197	18.2*
0.200	18.9
0.203	19.3*
0.206	19.9*
0.209	21.1*
0.213	22.0*
0.215	23.0
0.219	24.1*
0.222	25.3*
0.224	26.2*
0.228	27.9*
0.231	29.3
0.234	31.3*
0.237	32.8*
0.239	34.6*
0.242	36.3*
0.246	37.7
0.249	39.0*
0.252	40.3*
0.253	41.1*
0.257	42.0*
0.260	42.8
0.263	43.4*
0.265	43.9
0.268	44.4*
0.273	45.0*
0.275	45.4

CURVE 4 (cont.)

λ	ρ
0.277	45.7*
0.281	45.9*
0.284	46.4*
0.288	46.6*
0.292	47.0
0.297	47.3*
0.297	47.6
0.302	47.6

CURVE 5
T = 298

λ	ρ
0.0585	0.0590
0.0738	0.124

CURVE 6
T = 298

λ	ρ
0.0585	0.137
0.0738	0.0585

CURVE 7
T = 298

λ	ρ
0.0862	0.238
0.0881	0.242
0.0920	0.242
0.0933	0.241
0.0982	0.247
0.101	0.246
0.103	0.251
0.115	0.254
0.118	0.248
0.121	0.249
0.123	0.247
0.131	0.243
0.136	0.247
0.147	0.237
0.162	0.213
0.176	0.175
0.188	0.158
0.196	0.163
0.217	0.187

CURVE 7 (cont.)

λ	ρ
0.245	0.220
0.266	0.250
0.281	0.260
0.300	0.264
0.320	0.265

CURVE 8
T = 298

λ	ρ
0.0859	0.189
0.0887	0.205
0.0908	0.209
0.0948	0.212
0.106	0.215
0.114	0.224
0.117	0.222*
0.124	0.218
0.131	0.218
0.144	0.223
0.153	0.216
0.165	0.193
0.177	0.171
0.185	0.143*
0.202	0.156
0.206	0.163
0.212	0.171
0.234	0.195
0.263	0.241
0.281	0.260*
0.290	0.264
0.320	0.266

CURVE 9
T = 298

λ	ρ
0.0866	0.113
0.0892	0.119
0.0943	0.115
0.0983	0.118
0.104	0.116
0.107	0.122
0.110	0.123
0.115	0.133

*Not shown on plot

DATA TABLE NO. 31 (continued)

λ	ρ
CURVE 9 (cont.)	
T = 298	
0.117	0.135
0.119	0.134
0.121	0.137
0.121	0.143
0.125	0.137
0.128	0.136
0.133	0.139
0.135	0.136
0.137	0.139
0.139	0.136
0.144	0.132
0.151	0.121
0.156	0.112
0.162	0.110
0.165	0.101
0.174	0.096
0.177	0.093
0.187	0.067
0.233	0.133
0.262	0.155
0.277	0.160
0.291	0.159
0.302	0.161
0.317	0.155

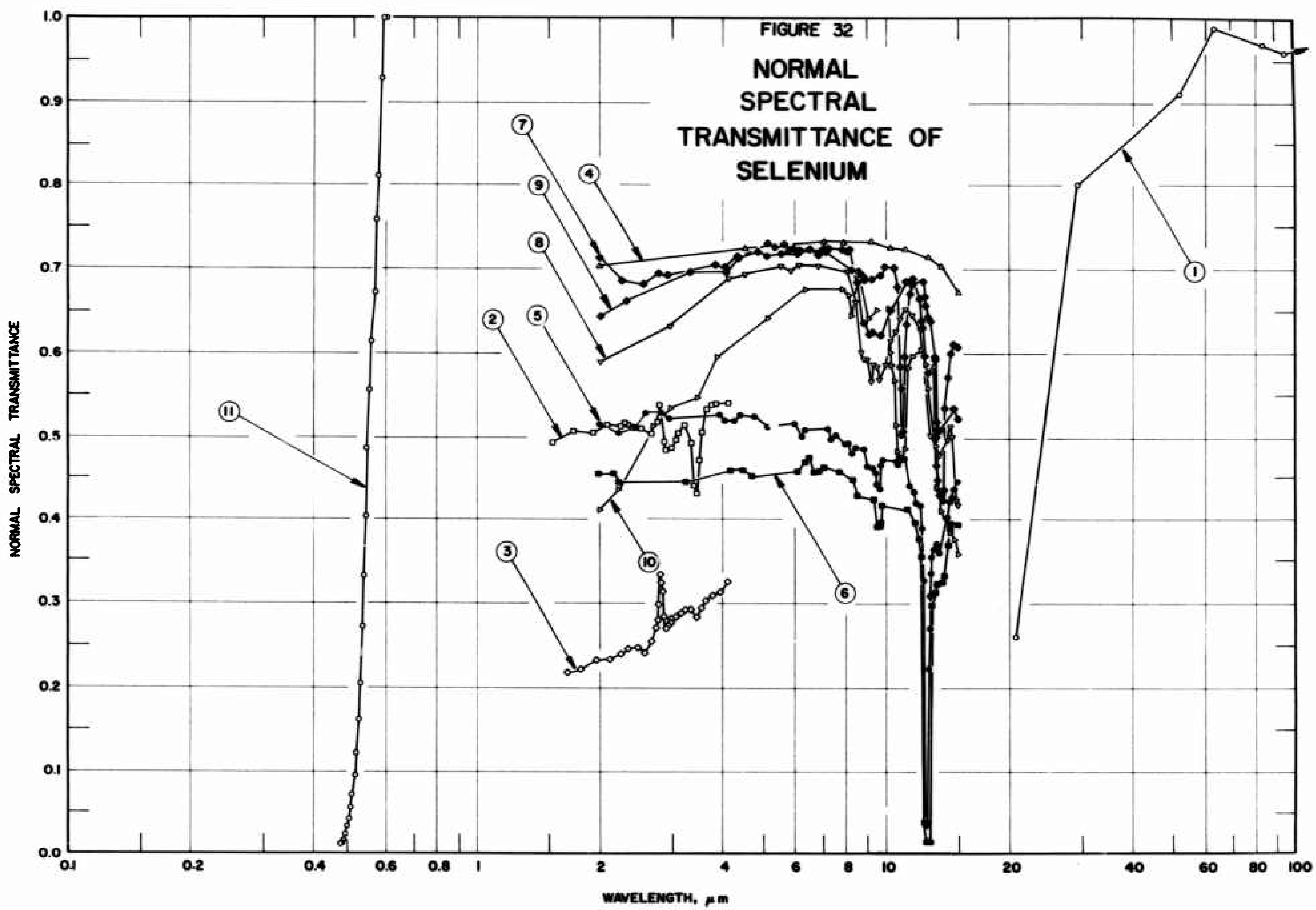


FIGURE 32
NORMAL SPECTRAL TRANSMITTANCE OF SELENIUM
NORMAL SPECTRAL TRANSMITTANCE
WAVELENGTH, μm
0.0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
1.0
0.1
0.2
0.4
0.6
0.8
1
2
4
6
8
10
20
40
60
80
100
1
2
3
4
5
6
7
8
9
10
11

SPECIFICATION TABLE NO. 32 NORMAL SPECTRAL TRANSMITTANCE OF SELENIUM

Curve No.	Ref. No.	Year	Temperature K	Wavelength Range, μm	Geometry θ	θ' ω'	Reported Error, %	Composition (weight percent), Specifications and Remarks
1	47	1940	298	20.7-152	~0°	~0°		No details given; [Author's designation: Sample No. 16].
2	48	1962	298	1.53-4.10	~0°	~0°		Single crystal; prepared by sublimation in vacuum; contains 60 ppm (by weight) chlorine.
3	48	1962	298	1.67-4.09	~0°	~0°		Similar to the above specimen and conditions except 1 ppm (by weight) chlorine content.
4	49	1963	298	2.00-15.0	0°	0°		99.99⁺ pure; purified; amorphous state; ground and polished; data extracted from smooth curve.
5	49	1963	298	2.00-15.0	0°	0°		0.05 As_2O_3 added to amorphous Se; melts heated at 823 K for 3 to 4 hrs and then heated at 343 K overnight; ground and polished; data extracted from smooth curve.
6	49	1963	298	2.00-15.0	0°	0°		Similar to the above specimen and conditions except 0.10 As_2O_3 added.
7	49	1963	298	2.00-15.0	0°	0°		0.05 TeO_2 added to amorphous Se; melts heated at 823 K for 3 to 4 hrs and then heated at 343 K overnight; ground and polished; data extracted from smooth curve.
8	49	1963	298	2.00-15.0	0°	0°		Similar to the above specimen and conditions except 0.10 TeO_2 added.
9	49	1963	298	2.00-15.0	0°	0°		0.05 SeO_2 added to amorphous Se; melts heated at 823 K for 3 to 4 hrs and then heated at 343 K overnight; ground and polished; data extracted from smooth curve.
10	49	1963	298	2.00-15.0	0°	0°		Similar to the above specimen and conditions except 0.10 SeO_2 added.
11	159	1969	~298	0.376-0.599	~0°	~0°		α-Monoclinic Se (4102±61 Å thick) grown on quartz window by controlled evaporation of saturated solution of CS_2 (99.99 pure); [Author's designation: Sample SeO4].

DATA TABLE NO. 32 NORMAL SPECTRAL TRANSMITTANCE OF SELENIUM

[Wavelength, λ, μm; Transmittance, τ; Temperature, T, K]

λ	τ
CURVE 1	**T = 298**
20.7	0.26
29.4	0.80
52	0.91
63	0.99
83	0.97
94	0.96
117	0.97*
152	0.87*
CURVE 2	**T = 298**
1.53	0.495
1.58	0.495*
1.67	0.496*
1.72	0.507
1.79	0.500*
1.84	0.500*
1.91	0.505
1.97	0.512*
2.04	0.513*
2.09	0.515
2.14	0.515*
2.19	0.515*
2.25	0.513
2.30	0.517
2.35	0.516
2.40	0.513
2.44	0.514*
2.47	0.513*
2.51	0.510
2.56	0.506*
2.61	0.502*
2.68	0.504
2.71	0.518*
2.74	0.518*
2.76	0.518
2.79	0.526*
2.80	0.538
2.82	0.552*
2.84	0.547*
2.86	0.514*
2.88	0.495
CURVE 2 (cont.)	
2.90	0.485
2.92	0.479*
2.94	0.484*
2.96	0.486
2.98	0.484*
2.99	0.487
3.02	0.492*
3.03	0.499*
3.06	0.498
3.08	0.499*
3.10	0.503
3.13	0.507*
3.16	0.514*
3.21	0.514
3.24	0.515*
3.27	0.515*
3.31	0.510*
3.35	0.493
3.37	0.484*
3.38	0.466*
3.40	0.439
3.41	0.426*
3.43	0.419*
3.45	0.430
3.47	0.448*
3.48	0.461*
3.50	0.471
3.52	0.479*
3.55	0.506
3.59	0.528*
3.63	0.532*
3.65	0.532
3.69	0.532*
3.72	0.538*
3.75	0.538
3.78	0.538*
3.85	0.539
3.91	0.541*
3.97	0.538*
4.04	0.538*
4.10	0.540
CURVE 3	**T = 298**
1.67	0.219
1.80	0.221
1.96	0.232
2.11	0.234
2.25	0.240
2.34	0.246
2.46	0.248
2.57	0.241
2.67	0.255
2.73	0.271
2.78	0.280
2.79	0.299
2.81	0.333
2.83	0.323
2.85	0.313
2.87	0.284
2.90	0.270
2.91	0.272*
2.93	0.272
2.96	0.272*
2.98	0.273
2.99	0.280
3.02	0.280*
3.03	0.280*
3.06	0.282
3.07	0.278*
3.09	0.283*
3.13	0.285*
3.17	0.288
3.20	0.288*
3.24	0.291
3.27	0.290*
3.31	0.291
3.34	0.288*
3.37	0.283*
3.42	0.283
3.44	0.283*
3.46	0.286*
3.48	0.284*
3.49	0.289*
3.52	0.294
3.54	0.298*
3.56	0.300*
CURVE 3 (cont.)	
3.59	0.299*
3.62	0.302
3.65	0.305*
3.71	0.307*
3.79	0.309
3.85	0.313*
3.93	0.311
4.01	0.323*
4.09	0.325
CURVE 4	**T = 298**
2.00	0.702
4.53	0.725
7.03	0.734
7.94	0.734
9.21	0.733
10.13	0.727
11.03	0.726
12.70	0.715
13.60	0.703
15.00	0.673
CURVE 5	**T = 298**
2.00	0.515
2.24	0.505
2.42	0.511
2.59	0.529
2.82	0.529
2.95	0.522
3.91	0.526
4.01	0.519
4.23	0.519
4.40	0.526
4.78	0.523
5.13	0.512
6.00	0.516
6.23	0.500
6.35	0.509
7.21	0.510
7.36	0.499
CURVE 5 (cont.)	
7.57	0.503
8.00	0.491
8.11	0.492
8.24	0.480
8.48	0.488
8.82	0.486
9.05	0.465
9.38	0.464
9.47	0.457
9.51	0.441
9.70	0.436
9.76	0.466
9.84	0.471
10.53	0.470
10.65	0.466
10.87	0.477
11.01	0.474
11.47	0.439
11.79	0.432
11.86	0.420
12.09	0.417
12.24	0.389
12.35	0.326
12.55	0.036
12.62	0.038
12.67	0.221
12.69	0.270
12.74	0.308
12.82	0.334
12.92	0.353
13.05	0.361
13.25	0.369
13.58	0.358
14.03	0.402
14.31	0.421
14.54	0.426
14.65	0.437
15.00	0.440
CURVE 6	**T = 298**
2.00	0.454
2.15	0.454
CURVE 6 (cont.)	
2.21	0.443
3.24	0.443
4.14	0.459
4.47	0.459
4.68	0.451
6.06	0.458
6.32	0.469
6.52	0.473
6.66	0.457
6.82	0.457
7.07	0.463
7.72	0.458
8.35	0.446
8.56	0.428
9.36	0.423
9.53	0.390
9.72	0.390
9.77	0.396
9.79	0.416
11.23	0.412
11.79	0.395
12.00	0.375
12.10	0.353
12.43	0.038
12.49	0.015
12.74	0.015
12.84	0.271
12.88	0.297
13.08	0.312
13.36	0.322
13.72	0.324
13.92	0.342
14.08	0.368
14.21	0.386
14.40	0.394
15.00	0.392
CURVE 7	**T = 298**
2.00	0.714
2.26	0.686
2.56	0.682
2.78	0.695
CURVE 7 (cont.)	
2.93	0.692
3.83	0.705
4.05	0.701
4.34	0.716
4.87	0.721
5.11	0.717
5.55	0.719
5.95	0.726
6.08	0.718
6.49	0.725
6.82	0.718
7.01	0.726
7.18	0.721
7.28	0.726
7.88	0.727
8.07	0.721
8.19	0.722
8.59	0.686
8.87	0.637
9.13	0.623
9.34	0.626
9.71	0.624
10.28	0.652
11.07	0.685
11.69	0.688
12.01	0.666
12.10	0.640
12.24	0.632
12.40	0.598
12.76	0.577
13.15	0.544
13.31	0.518
13.47	0.508
14.64	0.544
15.00	0.521
CURVE 8	**T = 298**
2.00	0.589
2.96	0.631
4.14	0.687
4.52	0.693
5.59	0.701
CURVE 8 (cont.)	
5.86	0.697
6.17	0.704
6.84	0.701
8.03	0.696
8.44	0.660
8.76	0.601
8.88	0.594
9.01	0.593
9.23	0.567
9.38	0.587
9.53	0.583
9.67	0.569
10.00	0.586
10.30	0.615
10.67	0.637
10.91	0.641
11.39	0.652
11.72	0.647
12.02	0.628
12.97	0.501
13.50	0.478
14.04	0.498
14.35	0.512
14.59	0.500
14.82	0.432
14.87	0.422
15.00	0.416
CURVE 9	**T = 298**
2.00	0.643
2.33	0.662
3.31	0.696
4.04	0.696
4.37	0.715
5.13	0.731
5.38	0.727
5.63	0.730
5.83	0.723
6.16	0.724
7.01	0.722
8.02	0.721
8.29	0.699

DATA TABLE NO. 32 (continued)

λ	τ
CURVE 9 (cont.) T = 298	
8.68	0.699
8.82	0.691
9.13	0.689
9.64	0.693
9.90	0.702
10.48	0.700
10.64	0.679
10.71	0.585
10.84	0.558
10.88	0.504
10.97	0.507
11.08	0.597
11.23	0.637
11.28	0.671
11.38	0.683
12.13	0.686
12.20	0.669
12.31	0.656
12.52	0.645
12.73	0.640
13.08	0.595
13.33	0.500
13.39	0.463
13.39	0.447
13.47	0.428
13.64	0.422
13.81	0.435
13.97	0.534
14.19	0.570
14.27	0.600
14.53	0.611
15.00	0.609
CURVE 10 T = 298	
2.00	0.411
2.22	0.435
2.70	0.512
2.98	0.534
3.48	0.546
3.87	0.597
5.17	0.642
6.36	0.676
7.84	0.676

λ	τ
CURVE 10 (cont.)	
8.11	0.670
8.21	0.646
9.16	0.642
9.53	0.651
10.18	0.651
10.31	0.601
10.39	0.586
10.55	0.568
10.59	0.514
10.58	0.482
10.76	0.472
10.97	0.472
11.07	0.486
11.41	0.583
11.61	0.598
12.14	0.603
12.50	0.589
12.79	0.558
13.14	0.490
13.28	0.438
13.61	0.410
14.48	0.384
14.80	0.373
15.00	0.358
CURVE 11 T ~ 298	
0.376	0.0003*
0.378	0.0003*
0.383	0.0003*
0.389	0.0004*
0.394	0.0004*
0.397	0.0005*
0.403	0.0006*
0.408	0.0008*
0.413	0.0009*
0.419	0.0011*
0.423	0.0013*
0.428	0.0016*
0.434	0.0019*
0.438	0.0023*
0.443	0.0030*
0.448	0.0039*
0.453	0.0053*
0.458	0.0075*

λ	τ
CURVE 11 (cont.)	
0.463	0.0104
0.468	0.0140
0.473	0.0187
0.477	0.0254
0.482	0.0340
0.488	0.0419
0.492	0.0560
0.498	0.0708
0.502	0.0959
0.508	0.1213
0.512	0.1614
0.519	0.2051
0.521	0.2729
0.528	0.3311
0.532	0.4036
0.539	0.4875
0.546	0.5572
0.554	0.6166
0.561	0.6730
0.569	0.7586
0.577	0.8128
0.585	0.9290
0.593	1.0000
0.599	1.0000

SPECIFICATION TABLE NO. 33 NORMAL TOTAL EMITTANCE OF SILICON

Curve No.	Ref. No.	Year	Temperature Range, K	Geometry θ'	Reported Error, %	Composition (weight percent), Specifications and Remarks
1*	50	1961	100-251	~0°		IRC solar cell specimen; data extracted from smooth curve.

DATA TABLE NO. 33 NORMAL TOTAL EMITTANCE OF SILICON

[Temperature, T, K; Emittance, ϵ]

T	ϵ
CURVE 1*	
100	0.187
137	0.192
178	0.208
212	0.222
251	0.235

* No plot given

SPECIFICATION TABLE NO. 34   NORMAL SPECTRAL EMITTANCE OF SILICON

Curve No.	Ref. No.	Year	Wavelength μm	Temperature Range, K	Geometry θ'	Reported Error, %	Composition (weight percent), Specifications and Remarks
1*	51	1957	0.65	1000-1688	• ~0°	±10	Etched; measured in vacuum (10^{-7} to 10^{-8} mm Hg).

DATA TABLE NO. 34   NORMAL SPECTRAL EMITTANCE OF SILICON

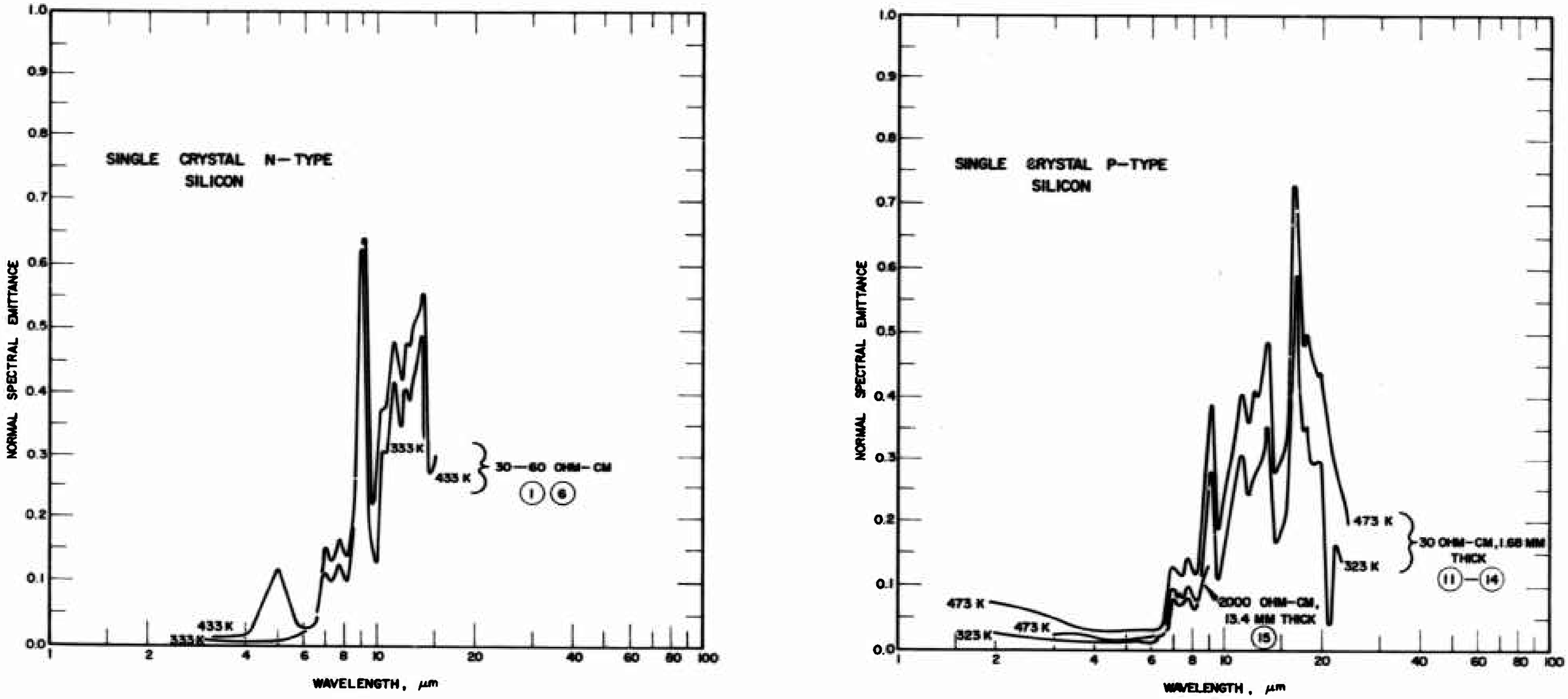
[Temperature, T, K; Emittance, ϵ; Wavelength, λ, μm]

T	ϵ
CURVE 1*	
λ = 0.65	
1000	0.64
1100	0.62
1200	0.60
1300	0.57
1400	0.54
1500	0.50
1600	0.48
1688	0.46

*No plot given

FIGURE 35A

ANALYZED NORMAL SPECTRAL EMITTANCE OF SILICON



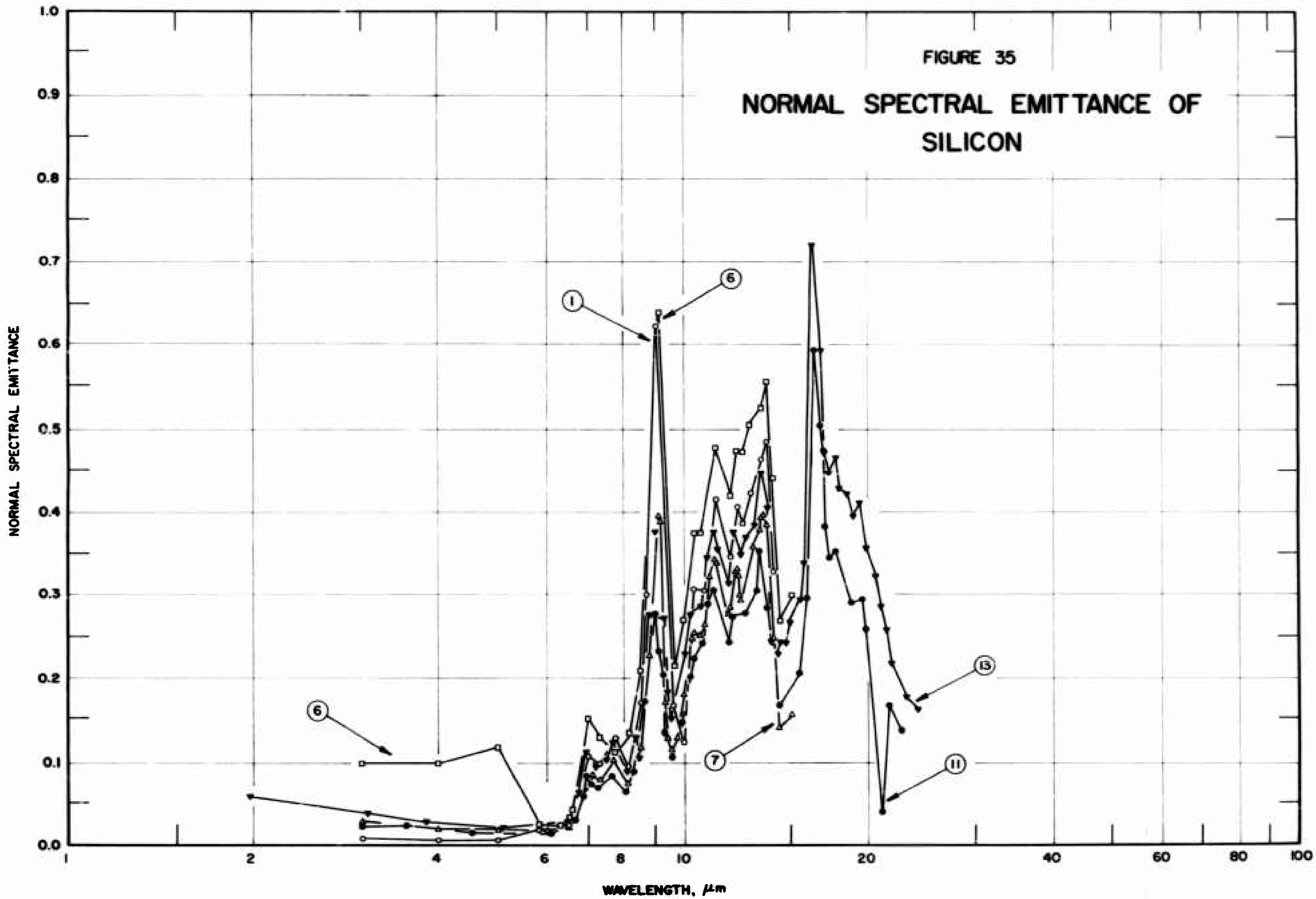


FIGURE 35
NORMAL SPECTRAL EMITTANCE OF SILICON
NORMAL SPECTRAL EMITTANCE
WAVELENGTH, μm
1.0
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0.0
1
2
4
6
8
10
20
40
60
80
100
1
6
6
7
11
13

SPECIFICATION TABLE NO. 35 NORMAL SPECTRAL EMITTANCE OF SILICON

Curve No.	Ref. No.	Year	Temperature K	Wavelength Range, μm	Geometry θ'	Reported Error, %	Composition (weight percent), Specifications and Remarks
1	52	1961	333	3.0-14.0	~0°		n-type single crystal silicon; resistivity 30-60 ohm cm; ground and polished; measured in vacuum; data extracted from smooth curve.
2	52	1961	353	3.0-15.0	~0°		Above specimen and conditions.
3	52	1961	375	3.0-14.9	~0°		Above specimen and conditions.
4	52	1961	393	3.0-15.0	~0°		Above specimen and conditions.
5	52	1961	413	3.0-15.0	~0°		Above specimen and conditions.
6	52	1961	433	3.0-15.0	~0°		Above specimen and conditions.
7	52	1961	313	3.0-15.0	~0°		p-type single crystal silicon; ground and polished; measured in vacuum; data extracted from smooth curve.
8	52	1961	353	3.0-15.0	~0°		Above specimen and conditions.
9	52	1961	393	3.0-15.0	~0°		Above specimen and conditions.
10	52	1961	433	3.0-15.0	~0°		Above specimen and conditions.
11	53	1962	323	3.00-22.69	~0°		p-type single crystal silicon (1.68 mm thick); data extracted from smooth curve.
12	53	1962	373	2.29-24.00	~0°		Above specimen and conditions.
13	53	1962	423	1.94-24.01	~0°		Above specimen and conditions.
14	53	1962	473	1.94-23.99	~0°		Above specimen and conditions.
15	53	1962	473	2.00-8.94	~0°		Similar to the above specimen and conditions except 13.4 mm thick.
16	50	1961	298	1.18-15.97	~0°		IRC solar cell specimen; data extracted from smooth curve.
17	54	1967	300	2.8-35.1	~0°		n-type; single-crystal; doped with arsenic; electron carrier concentration 8.5×10^{19} electrons cm^{-3}; surface optically polished and etched; width of ridges produced by polishing about 0.5 μm; measured in air; data extracted from smooth curve.
18	54	1967	882	3.7-14.8	~0°		Similar to above specimen and conditions.
19	54	1967	1074	3.4-14.8	~0°	±4-7	Similar to above specimen and conditions.
20	54	1967	300	2.6-35.0	~0°		Similar to above specimen and conditions except electron carrier concentration 3.7×10^{19} electrons cm^{-3}.
21	54	1967	882	2.6-14.7	~0°	±4-7	Similar to above specimen and conditions.
22	54	1967	1074	5.0-14.8	~0°	±4-7	Similar to above specimen and conditions.
23	54	1967	300	2.5-35.0	~0°		Similar to above specimen and conditions except electron carrier concentration 2.2×10^{19} electrons cm^{-3}.
24	54	1967	882	3.5-14.8	~0°	±4-7	Similar to above specimen and conditions.
25	54	1967	1074	3.5-14.7	~0°	±4-7	Similar to above specimen and conditions.
26	54	1967	300	2.7-34.9	~0°		Similar to above specimen and conditions except p-type; doped with boron, hole carrier concentration 1.4×10^{20} holes cm^{-3}.

SPECIFICATION TABLE NO. 35 (continued)

Curve No.	Ref. No.	Year	Temperature K	Wavelength Range, μm	Geometry θ'	Reported Error, %	Composition (weight percent), Specifications and Remarks
27	54	1967	882	2.6-14.7	$\sim 0^\circ$	±4-7	Similar to above specimen and conditions.
28	54	1967	1074	3.6-14.8	$\sim 0^\circ$	±4-7	Similar to above specimen and conditions.
29	54	1967	300	2.6-35.0	$\sim 0^\circ$		Similar to above specimen and conditions except hole carrier concentration 6.2×10^{19} holes cm^{-3}.
30	54	1967	882	3.6-14.7	$\sim 0^\circ$	±4-7	Similar to above specimen and conditions.
31	54	1967	1074	2.6-14.7	$\sim 0^\circ$	±4-7	Similar to above specimen and conditions.
32*	274	1966	373	15.9-41.3	0°		n-type crystal (2 mm thick); data extracted from smooth curve.
33*	274	1966	202	16.0-41.8	0°		Similar to above specimen and conditions.
34*	274	1966	77	16.0-41.4	0°		Similar to above specimen and conditions.

*Not shown on plot

DATA TABLE NO. 35 NORMAL SPECTRAL EMITTANCE OF SILICON

[Wavelength, λ, μm; Emittance, ∈; Temperature, T, K]

CURVE 1
T = 333

λ	∈
3.0	0.010
4.0	0.008
5.0	0.008
5.8	0.020
6.5	0.026
7.0	0.110
7.3	0.100
7.8	0.129
8.1	0.097
8.5	0.170
8.7	0.300
9.0	0.625
9.6	0.166
10.0	0.125
10.4	0.308
10.6	0.305
11.3	0.411
11.9	0.348
12.3	0.408
12.5	0.388
12.8	0.422
13.4	0.465
13.6	0.488
14.0	0.330

CURVE 2
T = 353

λ	∈
3.0	0.010
4.0	0.009
5.0	0.010
5.8	0.021
6.5	0.028
7.0	0.115
7.3	0.102
7.8	0.131
8.1	0.102
8.5	0.170
8.7	0.300
9.1	0.625
9.6	0.162
10.0	0.130
10.4	0.315
10.6	0.310

CURVE 2 (cont.)

λ	∈
11.3	0.425
11.9	0.360
12.3	0.427
12.5	0.400
12.8	0.436
13.6	0.488
14.0	0.350
14.2	0.250
14.5	0.230
15.0	0.235

CURVE 3
T = 375

λ	∈
3.0	0.010
4.0	0.009
5.0	0.010
5.8	0.022
6.5	0.029
7.0	0.125
7.3	0.110
7.8	0.141
8.2	0.113
8.5	0.175
8.7	0.300
9.1	0.626
9.6	0.175
10.0	0.240
10.4	0.332
10.6	0.330
11.3	0.442
11.9	0.375
12.3	0.434
12.5	0.410
12.8	0.450
13.4	0.475
13.6	0.505
14.0	0.355
14.4	0.215
14.9	0.254

CURVE 4
T = 393

λ	∈
3.0	0.010
4.0	0.010

CURVE 4 (cont.)

λ	∈
5.0	0.010
5.8	0.024
6.5	0.030
7.0	0.130
7.3	0.113
7.8	0.148
8.2	0.117
8.5	0.180
8.7	0.300
9.1	0.625
9.6	0.190
10.0	0.250
10.4	0.345
10.6	0.338
11.3	0.452
11.9	0.390
12.3	0.450
12.5	0.425
12.9	0.478
13.4	0.482
13.6	0.510
14.0	0.360
14.2	0.270
14.5	0.254
15.0	0.264

CURVE 5
T = 413

λ	∈
3.0	0.010
4.0	0.010
5.0	0.012
5.8	0.025
6.5	0.030
7.0	0.140
7.3	0.122
7.8	0.155
8.2	0.125
8.5	0.200
8.7	0.300
9.2	0.630
9.7	0.205
10.0	0.265
10.4	0.365
10.7	0.365
11.4	0.475

CURVE 5 (cont.)

λ	∈
11.9	0.415
12.2	0.472
12.5	0.465
12.8	0.500
13.1	0.505
13.4	0.522
13.6	0.548
14.0	0.410
14.2	0.280
14.4	0.261
15.0	0.280

CURVE 6
T = 433

λ	∈
3.0	0.010
4.0	0.010
5.0	0.120
5.8	0.027
6.3	0.025
6.5	0.034
6.6	0.043
7.0	0.150
7.3	0.130
7.8	0.165
8.2	0.133
8.5	0.210
8.7	0.300
9.1	0.640
9.7	0.217
10.0	0.270
10.4	0.375
10.7	0.375
11.4	0.480
11.9	0.420
12.2	0.476
12.5	0.475
12.8	0.505
13.4	0.524
13.6	0.555
14.0	0.440
14.4	0.269
15.0	0.300

CURVE 7
T = 313

λ	∈
3.0	0.030
4.0	0.021
5.0	0.020
6.0	0.020
6.5	0.024
7.1	0.088
7.3	0.080
7.7	0.103
8.1	0.076
8.5	0.120
8.8	0.230
9.1	0.398
9.2	0.390
9.3	0.170
9.4	0.130
9.6	0.118
9.7	0.130
10.0	0.180
10.3	0.250
10.4	0.255
10.6	0.252
10.7	0.265
11.0	0.323
11.2	0.344
11.3	0.340
11.8	0.278
12.0	0.286
12.2	0.330
12.3	0.333
12.3	0.325
12.4	0.300
12.4	0.294
13.0	0.360
13.3	0.380
13.4	0.395
13.5	0.398
13.7	0.385
14.0	0.250
14.3	0.140
15.0	0.155

CURVE 8
T = 353

λ	∈
3.0	0.033
4.0	0.022

CURVE 8 (cont.)

λ	∈
5.0	0.021
6.0	0.022
6.5	0.025
7.1	0.108
7.3	0.090
7.7	0.120
8.1	0.086
8.5	0.150
8.8	0.240
9.1	0.405
9.15	0.390
9.4	0.200
9.5	0.150
9.6	0.140
9.8	0.150
10.0	0.186
10.3	0.270
10.4	0.282
10.6	0.273
10.7	0.287
11.3	0.285
11.8	0.315
11.9	0.310
12.0	0.316
12.3	0.370
12.4	0.355
12.5	0.359
12.8	0.375
13.0	0.390
13.3	0.404
13.4	0.404
13.4	0.405
13.6	0.433
14.0	0.265
14.3	0.171
14.4	0.175
14.6	0.171
15.0	0.185

CURVE 9
T = 393

λ	∈
3.0	0.030
4.0	0.026
5.0	0.023
6.0	0.025

CURVE 9 (cont.)

λ	∈
6.5	0.032
7.1	0.115
7.30	0.100
7.75	0.128
8.1	0.099
8.5	0.160
9.0	0.400
9.1	0.412
9.2	0.400
9.4	0.200
9.5	0.170
9.7	0.152
9.8	0.162
10.0	0.190
10.4	0.295
10.5	0.300
10.7	0.298
10.8	0.305
11.0	0.375
11.2	0.400
11.4	0.408
11.5	0.395
11.8	0.350
11.9	0.345
12.0	0.350
12.3	0.404
12.4	0.395
12.5	0.383
12.7	0.385
12.8	0.420
13.0	0.425
13.2	0.420
13.6	0.480
14.0	0.365
14.4	0.185
14.6	0.205
15.0	0.222

CURVE 10
T = 433

λ	∈
3.0	0.040
4.0	0.027
5.0	0.023
6.0	0.027
6.5	0.038

CURVE 10 (cont.)

λ	∈
7.1	0.133
7.4	0.110
7.8	0.142
8.2	0.110
8.8	0.280
9.0	0.400
9.1	0.412
9.2	0.400
9.4	0.240
9.5	0.200
9.7	0.179
9.8	0.190
10.4	0.320
10.5	0.322
10.7	0.320
10.8	0.340
11.0	0.390
11.2	0.420
11.3	0.425
11.5	0.420
11.8	0.380
11.9	0.362
12.0	0.370
12.2	0.410
12.4	0.418
12.5	0.408
12.6	0.404
12.7	0.408
12.8	0.450
13.0	0.460
13.2	0.460
13.3	0.458
13.6	0.488
14.0	0.375
14.3	0.240
14.5	0.210
14.8	0.190
15.0	0.194

CURVE 11
T = 323

λ	∈
3.00	0.024
3.53	0.025
4.52	0.016
6.08	0.016

DATA TABLE NO. 35 (continued)

λ	ε
CURVE 11 (cont.) T = 323	
6.66	0.030
6.87	0.060
6.93	0.085
7.06	0.074
7.24	0.070
7.64	0.085
8.05	0.065
8.27	0.090
8.63	0.171
9.01	0.278
9.08	0.233
9.21	0.203
9.29	0.135
9.54	0.108
9.90	0.146
10.20	0.201
10.40	0.226
10.72	0.242
10.99	0.290
11.20	0.307
11.80	0.243
12.11	0.273
12.59	0.278
13.02	0.305
13.36	0.354
13.65	0.285
14.31	0.166
15.45	0.206
15.82	0.297
16.27	0.594
16.66	0.505
16.83	0.177
17.01	0.382
17.30	0.347
17.66	0.353
18.89	0.291
19.52	0.296
19.95	0.259
21.03	0.041
21.72	0.166
22.69	0.138
CURVE 12 T = 373	
2.29	0.027
2.78	0.031
3.66	0.028
4.70	0.021
6.14	0.019
6.67	0.037
6.94	0.089
7.15	0.078
7.46	0.083
7.74	0.098
8.06	0.076
8.31	0.101
9.00	0.328
9.32	0.148
9.62	0.125
10.25	0.227
10.50	0.240
11.14	0.323
11.80	0.292
12.08	0.311
12.33	0.298
12.68	0.324
13.07	0.334
13.43	0.385
13.68	0.292
13.94	0.231
14.25	0.189
14.54	0.201
14.72	0.198
15.03	0.212
15.46	0.236
15.79	0.296
15.98	0.513
16.31	0.650
16.67	0.567
16.91	0.427
17.38	0.380
17.75	0.396
18.54	0.340
19.11	0.327
19.42	0.342
20.12	0.291
20.56	0.269
21.75	0.191
22.63	0.152
CURVE 12 (cont.)	
23.59	0.131
24.00	0.123
CURVE 13 T = 423	
1.94	0.059
3.06	0.039
3.82	0.029
5.10	0.022
6.45	0.030
6.72	0.063
6.96	0.114
7.19	0.096
7.48	0.104
7.68	0.123
8.07	0.090
8.36	0.130
8.84	0.277
9.00	0.377
9.25	0.271
9.41	0.181
9.55	0.150
10.10	0.230
10.39	0.275
10.70	0.286
10.97	0.347
11.22	0.376
11.47	0.355
11.85	0.315
12.15	0.377
12.45	0.350
12.63	0.370
13.11	0.386
13.48	0.448
13.70	0.406
13.90	0.244
14.27	0.230
14.48	0.245
14.71	0.242
14.95	0.266
15.51	0.296
15.69	0.339
16.29	0.720
16.75	0.592
16.93	0.472
CURVE 13 (cont.)	
17.25	0.447
17.63	0.467
17.94	0.429
18.50	0.421
18.90	0.395
19.45	0.411
19.98	0.356
20.57	0.325
21.00	0.286
21.45	0.259
21.86	0.219
23.12	0.176
24.01	0.160
CURVE 14 T = 473	
1.94	0.073
2.70	0.058
3.35	0.040
4.44	0.029
6.48	0.034
6.97	0.128
7.44	0.115
7.77	0.144
8.08	0.117
8.36	0.140
8.65	0.240
9.07	0.389
9.33	0.290
9.56	0.185
10.03	0.252
10.16	0.289
10.72	0.319
10.87	0.343
11.23	0.408
11.90	0.360
12.22	0.411
12.39	0.405
12.68	0.426
12.94	0.431
13.48	0.489
13.92	0.375
14.31	0.273
15.44	0.313
15.68	0.347
15.88	0.524
CURVE 14 (cont.)	
16.20	0.729
16.75	0.637
17.30	0.480
17.65	0.506
18.57	0.450
19.19	0.431
19.51	0.438
21.44	0.302
23.08	0.235
23.99	0.200
CURVE 15 T = 473	
2.00	0.024
2.87	0.016
4.15	0.012
5.13	0.011
5.34	0.013
5.63	0.014
5.83	0.015
6.07	0.017
6.23	0.021
6.51	0.024
6.58	0.032
6.89	0.095
7.11	0.083
7.25	0.085
7.40	0.082
7.71	0.098
7.87	0.092
8.18	0.079
8.46	0.106
8.94	0.128
CURVE 16 T = 298	
1.18	0.962
1.79	0.968
2.75	0.952
3.61	0.849
4.27	0.755
4.50	0.706
4.95	0.606
5.87	0.512
CURVE 16 (cont.)	
8.55	0.341
8.96	0.328
9.41	0.341
9.86	0.358
11.82	0.278
12.86	0.295
14.08	0.280
15.02	0.263
15.97	0.255
CURVE 17 T = 300	
2.8	0.707
6.5	0.808
6.9	0.775
8.1	0.565
9.2	0.461
10.2	0.381
11.4	0.327
12.9	0.286
15.6	0.243
19.8	0.213
24.1	0.196
35.1	0.195
CURVE 18 T = 882	
3.7	0.721
4.8	0.771
5.6	0.785
6.5	0.769
7.2	0.775
9.7	0.652
11.7	0.526
13.3	0.473
14.8	0.441
CURVE 19 T = 1074	
3.4	0.700
4.2	0.747
5.3	0.775
7.0	0.770
CURVE 19 (cont.)	
8.3	0.725
12.6	0.540
13.8	0.495
14.8	0.495
CURVE 20 T = 300	
2.6	0.699
4.7	0.723
6.5	0.773
7.4	0.785
9.5	0.780
12.2	0.560
13.8	0.462
15.5	0.384
17.6	0.334
24.9	0.265
29.5	0.249
35.0	0.236
CURVE 21 T = 882	
2.6	0.689
7.0	0.758
7.9	0.806
9.0	0.806
9.4	0.790
10.2	0.790
12.6	0.713
14.7	0.621
CURVE 22 T = 1074	
5.0	0.729
6.1	0.725
8.0	0.762
9.1	0.785
14.8	0.658
CURVE 23 T = 300	
2.5	0.698
CURVE 23 (cont.)	
4.8	0.700
10.3	0.778
11.8	0.775
13.1	0.732
14.7	0.643
17.5	0.476
20.3	0.401
24.4	0.347
30.4	0.304
35.0	0.286
CURVE 24 T = 882	
3.5	0.661
10.1	0.795
11.5	0.782
13.8	0.733
14.8	0.700
CURVE 25 T = 1074	
3.5	0.649
7.6	0.724
9.6	0.759
12.0	0.746
14.7	0.687
CURVE 26 T = 300	
2.7	0.694
3.7	0.742
4.7	0.786
5.9	0.800
6.5	0.747
8.0	0.543
9.2	0.447
11.1	0.360
12.8	0.308
16.2	0.257
23.0	0.201
29.2	0.168
34.9	0.154

DATA TABLE NO. 35 (continued)

λ	ε
CURVE 27 T = 882	
2.6	0.719
5.8	0.776
7.5	0.737
13.2	0.514
14.7	0.494
CURVE 28 T = 1074	
3.6	0.694
4.4	0.722
6.3	0.741
7.6	0.728
9.4	0.658
11.1	0.598
12.8	0.554
14.8	0.515
CURVE 29 T = 300	
2.6	0.686
4.0	0.717
5.6	0.769
7.3	0.784
8.4	0.768
9.8	0.687
11.6	0.544
13.4	0.463
15.4	0.407
19.5	0.323
25.0	0.263
30.3	0.233
35.0	0.219
CURVE 30 T = 882	
3.6	0.728
5.8	0.786
8.1	0.815
9.2	0.815
11.0	0.767
14.7	0.626

λ	ε
CURVE 31 T = 1074	
2.6	0.691
6.5	0.777
8.7	0.791
10.8	0.770
13.2	0.708
14.7	0.647
CURVE 32* T = 373	
15.9	0.361
16.4	0.616
16.5	0.583
17.2	0.408
17.4	0.398
18.0	0.398
18.6	0.365
19.1	0.326
19.9	0.315
21.8	0.213
24.2	0.155
27.2	0.109
30.2	0.085
34.7	0.080
38.0	0.083
41.3	0.079
CURVE 33* T = 202	
16.0	0.361
16.2	0.553
16.4	0.560
17.3	0.286
17.8	0.289
19.0	0.222
19.5	0.229
20.2	0.203
21.6	0.116
22.7	0.091
27.4	0.066
31.1	0.061
36.7	0.047
41.8	0.040

λ	ε
CURVE 34* T = 77	
16.0	0.323
16.3	0.452
16.5	0.476
17.0	0.276
17.2	0.220
17.9	0.238
18.4	0.205
18.9	0.176
19.5	0.187
20.1	0.147
20.7	0.109
21.5	0.080
22.6	0.057
27.8	0.035
34.7	0.025
41.4	0.028

*Not shown on plot

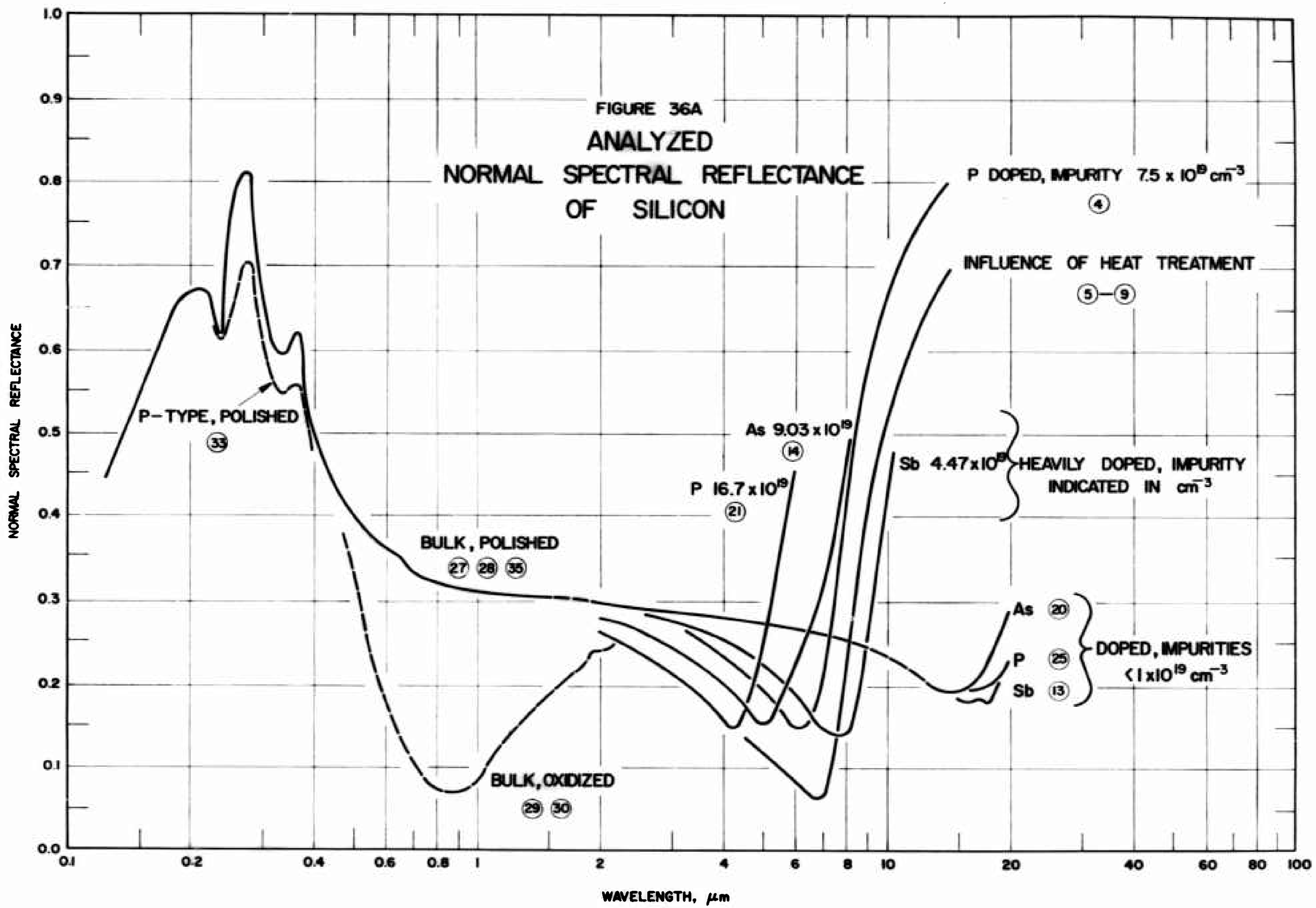


FIGURE 36A
ANALYZED
NORMAL SPECTRAL REFLECTANCE
OF SILICON
P DOPED, IMPURITY 7.5 x 10^19 cm^-3
4
INFLUENCE OF HEAT TREATMENT
5—9
P-TYPE, POLISHED
33
As 9.03 x 10^19
14
P 16.7 x 10^19
21
Sb 4.47 x 10^19
HEAVILY DOPED, IMPURITY INDICATED IN cm^-3
BULK, POLISHED
27 28 35
BULK, OXIDIZED
29 30
As 20
P 25
Sb 13
DOPED, IMPURITIES < 1 x 10^19 cm^-3
NORMAL SPECTRAL REFLECTANCE
WAVELENGTH, μm
1.0
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0.0
0.1
0.2
0.4
0.6
0.8
1
2
4
6
8
10
20
40
60
80
100

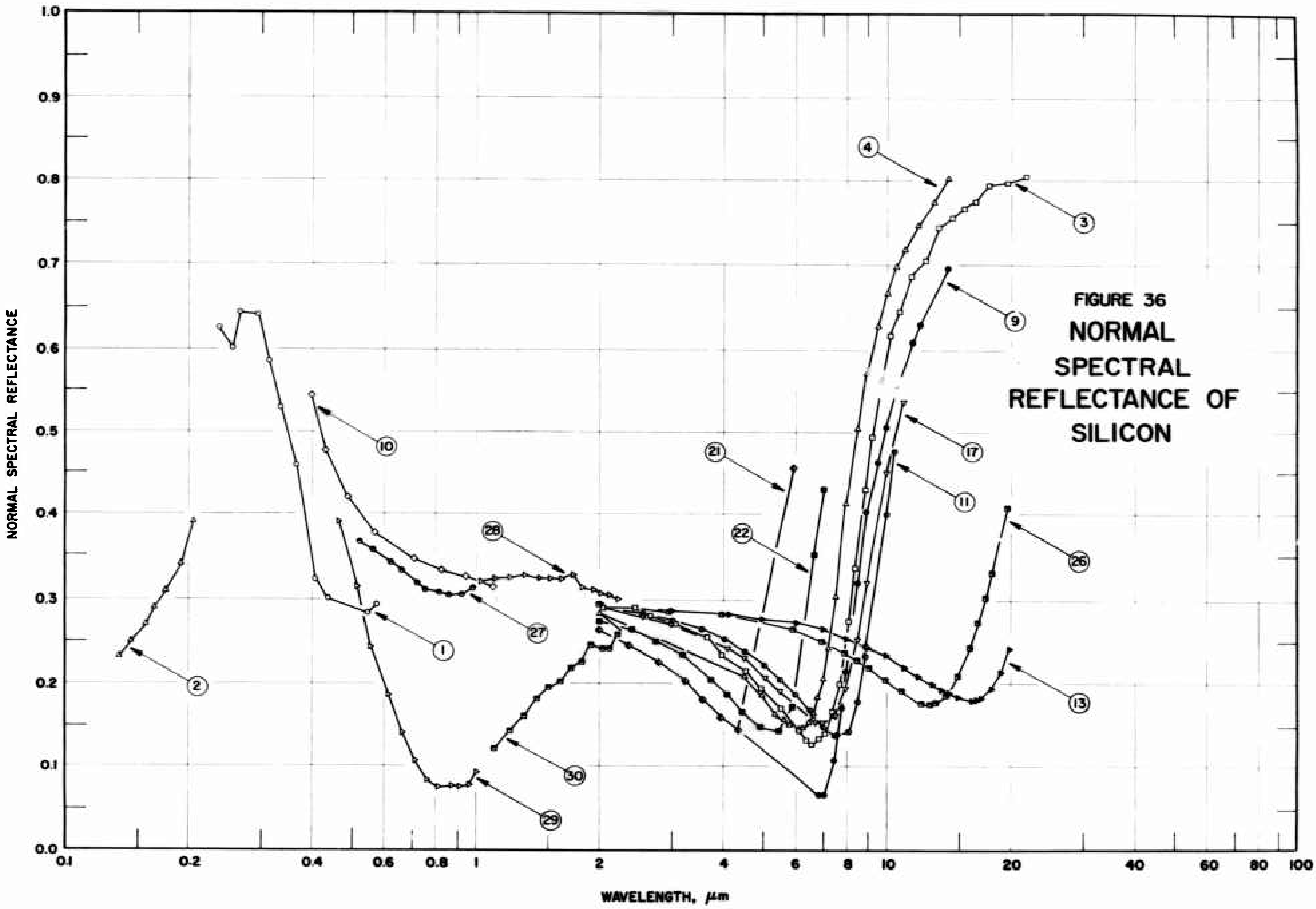


FIGURE 36
NORMAL SPECTRAL REFLECTANCE OF SILICON

SPECIFICATION TABLE NO. 36 NORMAL SPECTRAL REFLECTANCE OF SILICON

Curve No.	Ref. No.	Year	Temperature K	Wavelength Range, μm	Geometry θ	θ'	ω'	Reported Error, %	Composition (weight percent), Specifications and Remarks
1	11	1934	298	0.2350-0.5780	~0°	~0°			Cold worked; annealed in an inert gas for 6 to 24 hrs; polished; stored in dilute solutions of NaOH, NaOH + NaF, and HNO_3.
2	14	1941	298	0.1347-0.2026	~0°	~0°			Polished with tin oxide; surface somewhat pitted and scratched; measured in vacuum (0.001 mm Hg).
3	55	1966	298	2.03-21.60	~0°	~0°		<4	n-type silicon.
4	56	1964	298	2.00-14.03	~0°	~0°			Phosphorous doped ($N = 7.5 \times 10^{19}$ cm^{-3}); polished; measured in vacuum ($<10^{-7}$ mm Hg).
5	56	1964	298	2.00-14.05	~0°	~0°			Above specimen and conditions except heat treated at 1310 K for 30 min.
6	56	1964	298	2.00-13.09	~0°	~0°			Above specimen and conditions except heat treated for 1 hr at 1310 K.
7	56	1964	298	2.00-14.03	~0°	~0°			Above specimen and conditions except heat treated at 1310 K for 1.5 hrs.
8	56	1964	298	1.99-14.04	~0°	~0°			Above specimen and conditions except heat treated at 1310 K for 2 hrs.
9	56	1964	298	1.99-14.04	~0°	~0°			Above specimen and conditions except heat treated at 1310 K for 3.5 hrs.
10	57	1966	298	0.399-1.101	~0°	~0°			n-type silicon photocell (concentration 4×10^{20} atoms cm^{-3}); data extracted from smooth curve; silicon photocell and aluminized mirror reference standards.
11	58	1962	298	2.05-10.47	~0°	~0°			n-type silicon doped with antimony; carrier concentration $N = 4.47 \times 10^{19}$ cm^{-3}; aluminum mirror reference standard.
12	58	1962	298	2.03-14.46	~0°	~0°			Similar to the above specimen and conditions except carrier concentration $N = 1.66 \times 10^{19}$ cm^{-3}.
13	58	1962	298	2.03-19.99	~0°	~0°			Similar to the above specimen and conditions except carrier concentration $N = 0.832 \times 10^{19}$ cm^{-3}.
14	58	1962	298	2.00-8.06	~0°	~0°			Similar to the above specimen and conditions except doped with arsenic; carrier concentration $N = 9.03 \times 10^{19}$ cm^{-3}.
15	58	1962	298	2.00-8.01	~0°	~0°			Similar to the above specimen and conditions except carrier concentration $N = 7.92 \times 10^{19}$ cm^{-3}.
16	58	1962	298	2.01-10.03	~0°	~0°			Similar to the above specimen and conditions except carrier concentration $N = 6.37 \times 10^{19}$ cm^{-3}.
17	58	1962	298	2.02-11.01	~0°	~0°			Similar to the above specimen and conditions except carrier concentration $N = 5.05 \times 10^{19}$ cm^{-3}.
18	58	1962	298	2.01-13.99	~0°	~0°			Similar to the above specimen and conditions except carrier concentration $N = 3.48 \times 10^{19}$ cm^{-3}.
19	58	1962	298	2.01-13.99	~0°	~0°			Similar to the above specimen and conditions except carrier concentration $N = 2.84 \times 10^{19}$ cm^{-3}.
20	58	1962	298	1.99-20.00	~0°	~0°			Similar to the above specimen and conditions except carrier concentration $N = 0.877 \times 10^{19}$ cm^{-3}.

SPECIFICATION TABLE NO. 36 (continued)

Curve No.	Ref. No.	Year	Temperature K	Wavelength Range, μm	Geometry θ	θ'	ω'	Reported Error, %	Composition (weight percent), Specifications and Remarks
21	58	1962	298	2.00-5.94	~0°	~0°			Similar to the above specimen and conditions except doped with phosphorous; carrier concentration N = 16.7 x 10^{19} cm^{-3}.
22	58	1962	298	2.01-7.02	~0°	~0°			Similar to the above specimen and conditions except carrier concentration N = 10.22 x 10^{19} cm^{-3}.
23	58	1962	298	2.01-11.96	~0°	~0°			Similar to the above specimen and conditions except carrier concentration N = 4.38 x 10^{19} cm^{-3}.
24	58	1962	298	2.03-14.94	~0°	~0°			Similar to the above specimen and conditions except carrier concentration N = 2.05 x 10^{19} cm^{-3}.
25	58	1962	298	2.01-20.00	~0°	~0°			Similar to the above specimen and conditions except carrier concentration N = 0.74 x 10^{19} cm^{-3}.
26	58	1962	298	2.01-19.67	~0°	~0°			Similar to the above specimen and conditions except carrier concentration N = 1.27 x 10^{19} cm^{-3}.
27	59	1960	298	0.52-0.98	~0°		2π	<3	MgO reference.
28	59	1960	298	1.02-2.21	~0°	~0°			Above specimen and conditions except different apparatus used for measurement.
29	59	1960	298	0.46-1.00	~0°		2π	<3	Oxidized silicon; MgO reference.
30	59	1960	298	1.11-2.21	~0°	~0°			Above specimen and conditions except different apparatus used for measurement.
31	60	1962	298	0.38-25.01	~0°	~0°			IRC silicon solar cell; data extracted from smooth curve.
32	50	1961	298	1.17-15.98	~0°	~0°			IRC solar cell specimen; data extracted from smooth curve.
33	61	1963	298	0.394-0.228	~0°	~0°			p-type silicon; sliced to 1-1.5 cm thickness; ground and polished with diamond paste, then final polished with Al_2O_3 on flannel; etched and cleaned; impurity 10^{20} B atoms cm^{-3}.
34	61	1963	298	0.376-0.353	~0°	~0°			Similar to the above specimen and conditions.
35	61	1963	298	0.282-0.262	~0°	~0°			Similar to the above specimen and conditions.
36	61	1963	298	0.376-0.353	~0°	~0°			Similar to the above specimen and conditions except impurity 3.7 x 10^{19} B atom cm^{-3}.
37	61	1963	298	0.282-0.263	~0°	~0°			Similar to the above specimen and conditions.
38	61	1963	298	0.376-0.353	~0°	~0°			Similar to the above specimen and conditions except n-type sample; impurity 10^{20} B atoms cm^{-3}.
39	61	1963	298	0.282-0.262	~0°	~0°			Similar to the above specimen and conditions.
40	61	1963	298	0.376-0.353	~0°	~0°			Similar to the above specimen and conditions except impurity 5 x 10^{19} B atoms cm^{-3}.
41	61	1963	298	0.282-0.263	~0°	~0°			Similar to the above specimen and conditions.
42	61	1963	298	0.377-0.354	~0°	~0°			Similar to the above specimen and conditions except impurity <10^{14} B atoms cm^{-3}.
43	61	1963	298	0.282-0.263	~0°	~0°			Similar to the above specimen and conditions.

SPECIFICATION TABLE NO. 36 (continued)

Curve No.	Ref. No.	Year	Temperature K	Wavelength Range, μm	Geometry θ	θ'	ω'	Reported Error, %	Composition (weight percent), Specifications and Remarks
44	62	1968	~298	5.00-11.01	10.5°	10.5°			n-type silicon wafers; diffused with antimony using deposit and slumping method; ambient atmospheres, nitrogen for deposition, and dry oxygen for slumping.
45	63	1968	~298	0.124-1.823	~0°	~0°			Bulk silicon.
46	64	1967	~298	14.15-37.35	~0°	~0°			Sample conductivity 0.0086 $ohm^{-1} cm^{-1}$; thickness mm.
47	65	1967	~298	1.01-7.05	~0°	~0°			Standard photocell with an untreated polished front surface and a ground rear surface coated with nickel; data extracted from smooth curve.
48	65	1967	~298	1.00-7.06	~0°	~0°			Undoped; carrier concentration 10^{16} cm^{-3}; polished on both sides; data extracted from smooth curve.
49	65	1967	~298	1.00-5.21	~0°	~0°			Similar to the above specimen and conditions except rear face coated with aluminum.
50	65	1967	~298	1.00-6.91	~0°	~0°			Standard silicon photocell; rear face polished and the rear contact removed; data extracted from smooth curve.
51	65	1967	~298	1.00-6.91	~0°	~0°			Similar to the above specimen and conditions except rear side coated with aluminum.
52	65	1967	~298	0.97-7.00	~0°	~0°			Silicon photocell produced by ion bombardment; both surfaces polished, rear contact removed; data extracted from smooth curve.
53	65	1967	~298	0.97-4.60	~0°	~0°			Similar to the above specimen and conditions except rear side coated with aluminum.
54*	273	1966	~298	1.78-25.0	10°	10°			Phosphor doped 10^{17} cm^{-3}; wafer (0.3 mm thick); data extracted from smooth curve.
55*	299	1963	~298	0.0590-3.10	~0°	~0°			Etched; minimal exposure to air; measured under poor vacuum; data extracted from smooth curve.

* Not shown on plot

DATA TABLE NO. 36 NORMAL SPECTRAL REFLECTANCE OF SILICON

[Wavelength, λ, μm; Reflectance, ρ; Temperature, T, K]

CURVE 1
T = 298

λ	ρ
0.2350	0.623
0.2537	0.601
0.2650	0.642
0.2930	0.640
0.3125	0.587
0.3340	0.528
0.3660	0.456
0.4060	0.322
0.4355	0.301
0.5460	0.283
0.5780	0.294

CURVE 2
T = 298

λ	ρ
0.1347	0.23
0.1438	0.25
0.1570	0.27
0.1640	0.29
0.1757	0.31
0.1901	0.34
0.2026	0.39

CURVE 3
T = 298

λ	ρ
2.03	0.289
2.43	0.289
2.65	0.281
3.05	0.271
3.67	0.255
3.99	0.234
4.55	0.216
4.96	0.195
5.56	0.170
6.10	0.146
6.36	0.132
6.56	0.128
6.85	0.134
7.08	0.141
7.39	0.167
7.64	0.200
8.08	0.275
8.40	0.337

CURVE 3 (cont.)

λ	ρ
8.88	0.430
9.22	0.494
9.78	0.560
10.21	0.618
10.83	0.646
11.55	0.688
12.43	0.704
13.34	0.743
14.36	0.755
15.32	0.767
16.32	0.774
17.83	0.794
19.80	0.798
21.80	0.804

CURVE 4
T = 298

λ	ρ
2.00	0.284
4.50	0.210
4.99	0.186
5.36	0.163
5.62	0.157
5.80	0.151
6.21	0.148
6.44	0.154
6.60	0.165
6.79	0.184
7.00	0.208
7.19	0.242
7.49	0.305
7.95	0.412
8.47	0.504
8.98	0.571
9.50	0.629
10.00	0.668
10.47	0.696
11.02	0.719
11.98	0.748
13.00	0.776
14.03	0.802

CURVE 5
T = 298

λ	ρ
2.00	0.284
5.82	0.124
6.01	0.111
6.18	0.105
6.60	0.105
6.79	0.109
7.02	0.123
7.22	0.150
7.40	0.179
7.60	0.220
7.99	0.306
8.50	0.407
9.00	0.486
9.52	0.545
9.99	0.585
10.53	0.621
11.05	0.666
11.53	0.676
12.02	0.697
13.05	0.727
14.05	0.765

CURVE 6
T = 298

λ	ρ
2.00	0.285
6.43	0.089
7.01	0.103
7.23	0.124
7.40	0.148
7.58	0.181
7.77	0.220
7.98	0.263
8.48	0.361
9.01	0.443
9.48	0.499
10.00	0.548
11.52	0.636
12.02	0.655
13.00	0.692

CURVE 7
T = 298

λ	ρ
2.00	0.285
6.82	0.069
7.21	0.092
7.39	0.122
7.78	0.186
8.48	0.336
8.97	0.422
9.49	0.480
10.00	0.531
10.51	0.567
11.03	0.600
11.51	0.620
12.02	0.640
14.03	0.721

CURVE 8
T = 298

λ	ρ
1.99	0.284
6.82	0.067
7.02	0.067
7.41	0.108
7.58	0.140
7.78	0.171
7.95	0.216
8.47	0.320
8.96	0.402
9.48	0.462
9.98	0.507
10.50	0.552
11.52	0.609
12.03	0.630
14.04	0.696

CURVE 9
T = 298

λ	ρ
1.99	0.284
6.82	0.067
7.02	0.067
7.41	0.108
7.58	0.140
7.78	0.171
7.95	0.216

CURVE 9 (cont.)

λ	ρ
8.47	0.320
8.96	0.402
9.48	0.462
9.98	0.507
10.50	0.552
11.52	0.609
12.03	0.630
14.04	0.696

CURVE 10
T = 298

λ	ρ
0.399	0.542
0.432	0.475
0.488	0.419
0.571	0.374
0.706	0.344
0.825	0.332
0.955	0.325
1.101	0.313

CURVE 11
T = 298

λ	ρ
2.05	0.292
2.53	0.283
3.01	0.276
3.52	0.265
4.03	0.252
4.50	0.238
5.04	0.222
5.52	0.206
5.99	0.186
6.52	0.168
7.00	0.149
7.48	0.139
8.03	0.143
8.52	0.178
8.97	0.234
8.97	0.244
10.02	0.400
10.47	0.475

CURVE 12
T = 298

λ	ρ
2.03	0.291
2.94	0.283
3.52	0.275
4.01	0.269
4.53	0.267
5.02	0.264
5.47	0.258
6.00	0.253
6.52	0.243
6.97	0.236
7.50	0.228
7.96	0.218
8.48	0.210
9.01	0.203
9.50	0.194
9.98	0.183
10.51	0.175
10.99	0.164
11.50	0.160
12.00	0.160
12.49	0.163
13.02	0.175
13.52	0.193
13.97	0.214
14.46	0.237

CURVE 13
T = 298

λ	ρ
2.03	0.291
2.98	0.287
4.06	0.283
4.99	0.277
6.02	0.272
7.00	0.265
8.00	0.254
9.01	0.244
9.98	0.234
10.99	0.221
11.98	0.210
12.98	0.200
13.45	0.193
14.02	0.189
14.95	0.183

CURVE 13 (cont.)

λ	ρ
16.02	0.180
16.50	0.180
16.96	0.182
18.00	0.195
18.99	0.216
19.99	0.242

CURVE 14
T = 298

λ	ρ
2.00	0.279
2.50	0.262
2.98	0.243
3.52	0.221
4.01	0.200
4.48	0.178
5.03	0.157
7.04	0.327
8.06	0.491

CURVE 15
T = 298

λ	ρ
2.00	0.287
2.55	0.275
2.98	0.257
3.52	0.236
4.02	0.213
4.48	0.192
5.03	0.173
5.56	0.157
6.50	0.184
7.00	0.258
8.01	0.432

CURVE 16
T = 298

λ	ρ
2.01	0.290
2.50	0.276
2.94	0.267
3.27	0.259
4.04	0.237
4.48	0.215
4.96	0.193

CURVE 16 (cont.)

λ	ρ
5.49	0.175
6.72	0.163
7.06	0.173
7.51	0.216
8.03	0.288
8.99	0.442
10.03	0.547

CURVE 17
T = 298

λ	ρ
2.02	0.289
2.53	0.279
2.98	0.271
4.04	0.242
4.52	0.231
5.03	0.208
5.51	0.190
6.70	0.154
6.99	0.154
7.48	0.162
7.99	0.194
8.53	0.252
9.00	0.320
10.06	0.450
11.01	0.537

CURVE 18
T = 298

λ	ρ
2.01	0.288
2.48	0.280
2.95	0.277
3.51	0.270
4.04	0.266
4.47	0.248
4.98	0.240
5.49	0.231
5.95	0.216
6.43	0.200
7.00	0.187
7.50	0.174
7.96	0.164
8.45	0.163
8.98	0.164

DATA TABLE NO. 36 (continued)

CURVE 18 (cont.)
T = 298

λ	ρ
10.03	0.235
11.05	0.331
12.02	0.427
13.99	0.551

CURVE 19
T = 298

λ	ρ
2.01	0.289
2.52	0.279
3.01	0.275
3.50	0.276
4.02	0.266
4.46	0.259
4.98	0.250
5.52	0.239
5.96	0.230
6.47	0.220
6.98	0.208
7.52	0.196
8.52	0.177
8.97	0.171
9.52	0.170
10.01	0.170
10.54	0.185
11.03	0.201
11.50	0.230
12.02	0.268
12.52	0.307
13.01	0.348
13.99	0.419

CURVE 20
T = 298

λ	ρ
1.99	0.291
2.98	0.286
4.04	0.281
5.04	0.273
5.99	0.268
7.01	0.261
7.99	0.249
8.52	0.245
9.00	0.239
10.00	0.226

CURVE 20 (cont.)

λ	ρ
11.05	0.213
12.03	0.203
13.01	0.194
13.50	0.193
13.99	0.191
14.50	0.191
14.98	0.193
15.54	0.193
15.99	0.197
17.00	0.213
18.03	0.235
20.00	0.292

CURVE 21
T = 298

λ	ρ
2.00	0.264
2.35	0.247
2.79	0.227
3.22	0.203
3.57	0.181
3.95	0.160
4.37	0.146
5.94	0.456

CURVE 22
T = 298

λ	ρ
2.01	0.274
2.40	0.263
2.73	0.250
3.19	0.234
3.74	0.205
4.11	0.187
4.45	0.166
4.94	0.149
5.45	0.145
5.87	0.172
6.65	0.350
7.02	0.430

CURVE 23
T = 298

λ	ρ
2.01	0.294
2.97	0.282

CURVE 23 (cont.)

λ	ρ
3.44	0.269
3.97	0.257
4.54	0.242
5.36	0.221
5.79	0.209
6.36	0.192
6.93	0.172
7.50	0.157
8.21	0.153
8.80	0.168
10.00	0.275
10.54	0.339
10.98	0.400
11.49	0.451
11.96	0.496

CURVE 24
T = 298

λ	ρ
2.03	0.294
3.01	0.281
3.97	0.275
4.45	0.267
5.17	0.260
5.60	0.252
6.21	0.243
6.73	0.234
7.34	0.221
8.00	0.206
8.59	0.193
9.15	0.182
9.77	0.173
10.34	0.170
10.92	0.170
11.39	0.175
11.98	0.191
12.91	0.242
13.50	0.284
14.01	0.318
14.94	0.397

CURVE 25
T = 298

λ	ρ
2.01	0.294
2.97	0.289

CURVE 25 (cont.)

λ	ρ
3.93	0.282
4.96	0.279
5.95	0.273
6.96	0.266
7.97	0.260
8.98	0.254
9.96	0.241
11.03	0.236
11.47	0.229
11.96	0.224
12.46	0.218
13.00	0.211
13.98	0.200
14.94	0.198
15.76	0.194
16.14	0.194
16.75	0.195
17.50	0.201
17.99	0.206
18.49	0.210
18.96	0.220
20.00	0.237

CURVE 26
T = 298

λ	ρ
2.01	0.295
2.96	0.286
3.98	0.282
5.91	0.264
6.99	0.250
7.96	0.237
8.45	0.228
9.04	0.220
9.96	0.204
10.96	0.191
12.13	0.177
12.77	0.176
13.19	0.177
13.99	0.185
14.94	0.211
15.98	0.243
16.58	0.273
17.25	0.302
18.00	0.331
19.67	0.408

CURVE 27
T = 298

λ	ρ
0.52	0.363
0.56	0.354
0.62	0.341
0.66	0.332
0.72	0.319
0.75	0.311
0.81	0.308
0.86	0.304
0.92	0.305
0.98	0.312

CURVE 28
T = 298

λ	ρ
1.02	0.320
1.11	0.323
1.21	0.325
1.31	0.328
1.42	0.325
1.52	0.324
1.62	0.323
1.72	0.328
1.81	0.315
1.92	0.311
2.01	0.308
2.11	0.305
2.21	0.301

CURVE 29
T = 298

λ	ρ
0.46	0.389
0.51	0.314
0.55	0.242
0.61	0.183
0.66	0.141
0.71	0.106
0.76	0.082
0.81	0.074
0.87	0.076
0.91	0.076
0.96	0.077
1.00	0.091

CURVE 30
T = 298

λ	ρ
1.11	0.121
1.21	0.142
1.31	0.160
1.41	0.180
1.51	0.194
1.61	0.201
1.70	0.218
1.81	0.225
1.91	0.246
2.02	0.241
2.10	0.241
2.21	0.258

CURVE 31
T = 298

λ	ρ
0.38	0.091
0.53	0.053
0.75	0.033
0.96	0.033
1.16	0.063
1.56	0.077
2.55	0,076
3.24	0.058
3.99	0.119
4.75	0.281
5.98	0.480
6.41	0.532
7.00	0.558
7.55	0.596
8.03	0.629
8.96	0.623
9.33	0.596
10.27	0.658
10.84	0.680
11.91	0.711
13.81	0.743
16.49	0.761
20.81	0.773
21.88	0.763
25.01	0.764

CURVE 32
T = 298

λ	ρ
1.17	0.042
1.76	0.036
2.74	0.052
3.45	0.135
4.23	0.248
4.46	0.298
4.80	0.375
5.24	0.436
6.29	0.526
8.59	0.665
8.97	0.676
9.41	0.660
9.88	0.645
11.94	0.724
12.87	0.709
13.96	0.723
14.93	0.740
15.98	0.749

CURVE 33
T = 298

λ	ρ
0.394	0.479
0.392	0.489
0.389	0.502
0.383	0.517
0.380	0.530
0.376	0.540
0.372	0.548
0.367	0.557
0.360	0.599
0.356	0.558
0.349	0.549
0.339	0.548
0.330	0.548
0.324	0.552
0.318	0.560
0.313	0.570
0.310	0.577
0.306	0.587
0.303	0.599
0.300	0.611
0.297	0.625
0.295	0.635
0.292	0.647

CURVE 33 (cont.)

λ	ρ
0.292	0.659
0.290	0.671
0.286	0.683
0.283	0.694
0.277	0.701
0.272	0.703
0.266	0.697
0.263	0.687
0.259	0.676
0.256	0.667
0.253	0.658
0.251	0.648
0.248	0.639
0.245	0.630
0.243	0.622
0.238	0.613
0.235	0.613
0.231	0.621
0.228	0.629

CURVE 34
T = 298

λ	ρ
0.376	0.969
0.375	0.977
0.374	0.979
0.373	0.984
0.372	0.987
0.371	0.990
0.370	0.992
0.369	0.991
0.368	0.992
0.367	0.995
0.366	1.000
0.365	0.999
0.365	0.999
0.364	1.002
0.363	1.002
0.362	0.997
0.361	0.997
0.360	1.000
0.359	0.996
0.359	0.997
0.358	0.995
0.357	0.989
0.356	0.995
0.355	0.997

DATA TABLE NO. 36 (continued)

λ	ρ
CURVE 34 (cont.) T ≈ 298	
0.355	0.992
0.354	0.991
0.353	0.991
CURVE 35 T = 298	
0.282	0.977
0.281	0.976
0.280	0.980
0.279	0.982
0.279	0.984
0.278	0.987
0.277	0.989
0.277	0.989
0.276	0.993
0.275	0.996
0.275	0.996
0.274	1.000
0.274	1.002
0.273	1.000
0.272	1.001
0.272	1.001
0.271	1.000
0.271	1.000
0.270	1.002
0.270	1.001
0.269	0.999
0.269	0.996
0.268	0.996
0.267	0.993
0.267	0.994
0.266	0.992
0.266	0.992
0.265	0.990
0.265	0.988
0.264	0.987
0.264	0.982
0.263	0.981
0.263	0.982
0.262	0.978

λ	ρ
CURVE 36 T = 298	
0.376	0.963
0.375	0.969
0.374	0.973
0.373	0.976
0.372	0.977
0.371	0.982
0.370	0.990
0.370	0.992
0.369	0.997
0.368	0.998
0.366	0.999
0.366	1.005
0.365	1.000
0.364	1.001
0.363	1.004
0.362	1.005
0.362	1.005
0.361	1.001
0.360	1.000
0.359	0.999
0.358	0.998
0.357	0.993
0.357	0.989
0.356	0.991
0.355	0.986
0.354	0.982
0.353	0.978
CURVE 37 T = 298	
0.282	0.973
0.281	0.974
0.280	0.978
0.280	0.977
0.279	0.985
0.278	0.985
0.278	0.986
0.277	0.990
0.276	0.994
0.276	0.996
0.275	0.998
0.274	0.997
0.274	1.002
0.274	1.000

λ	ρ
CURVE 37 (cont.)	
0.273	1.002
0.272	1.000
0.272	1.002
0.271	1.002
0.271	0.998
0.270	0.999
0.269	0.998
0.269	0.999
0.268	0.999
0.268	0.997
0.267	0.996
0.267	0.993
0.266	0.989
0.265	0.990
0.265	0.987
0.265	0.981
0.264	0.981
0.264	0.979
0.263	0.975
0.263	0.970
CURVE 38 T = 298	
0.376	0.967
0.375	0.969
0.374	0.970
0.373	0.975
0.372	0.981
0.371	0.985
0.370	0.992
0.370	0.993
0.369	0.996
0.367	0.996
0.366	1.001
0.366	0.999
0.365	0.999
0.364	1.002
0.363	1.000
0.362	0.999
0.362	0.997
0.360	1.001
0.360	0.997
0.359	0.992
0.358	0.992
0.357	0.993
0.357	0.994

λ	ρ
CURVE 38 (cont.)	
0.356	0.987
0.355	0.991
0.354	0.986
0.353	0.987
CURVE 39 T = 298	
0.282	0.970
0.281	0.978
0.280	0.983
0.279	0.984
0.279	0.984
0.278	0.988
0.277	0.990
0.277	0.992
0.276	0.996
0.276	0.997
0.275	0.996
0.274	0.997
0.274	0.999
0.273	1.001
0.272	1.000
0.272	1.001
0.271	1.000
0.271	1.001
0.270	0.998
0.270	0.999
0.269	0.996
0.268	0.998
0.268	0.996
0.267	0.992
0.267	0.992
0.266	0.991
0.266	0.989
0.265	0.984
0.264	0.980
0.264	0.978
0.263	0.976
0.263	0.968
0.262	0.969
CURVE 40 T = 298	
0.376	0.959

λ	ρ
CURVE 40 (cont.)	
0.375	0.964
0.374	0.971
0.373	0.975
0.372	0.980
0.371	0.981
0.370	0.987
0.369	0.991
0.368	0.991
0.367	0.996
0.366	0.995
0.366	0.996
0.365	1.001
0.364	1.001
0.363	0.997
0.362	0.997
0.362	1.001
0.361	0.997
0.360	0.994
0.359	0.993
0.358	0.987
0.357	0.989
0.357	0.987
0.356	0.983
0.355	0.980
0.354	0.976
0.353	0.975
CURVE 41 T = 298	
0.282	0.973
0.281	0.977
0.280	0.980
0.279	0.984
0.279	0.987
0.278	0.985
0.278	0.989
0.277	0.992
0.276	0.994
0.276	0.992
0.275	0.996
0.275	0.996
0.274	0.997
0.273	0.999
0.273	1.002
0.272	1.000

λ	ρ
CURVE 41 (cont.)	
0.271	1.000
0.271	1.000
0.270	0.998
0.270	0.998
0.269	0.998
0.269	0.996
0.268	0.994
0.268	0.995
0.267	0.992
0.266	0.990
0.266	0.982
0.265	0.983
0.265	0.982
0.265	0.977
0.264	0.975
0.264	0.970
0.263	0.970
0.263	0.964
CURVE 42 T = 298	
0.377	0.944
0.376	0.950
0.375	0.954
0.374	0.961
0.373	0.970
0.372	0.974
0.371	0.977
0.370	0.983
0.369	0.987
0.368	0.993
0.367	1.001
0.366	1.002
0.366	1.001
0.365	1.002
0.364	1.002
0.363	1.003
0.362	0.999
0.362	0.997
0.360	0.995
0.360	0.989
0.359	0.988
0.358	0.984
0.357	0.979
0.356	0.979

λ	ρ
CURVE 42 (cont.)	
0.356	0.976
0.355	0.970
0.354	0.968
CURVE 43 T = 298	
0.282	0.968
0.281	0.970
0.280	0.971
0.279	0.975
0.279	0.976
0.278	0.981
0.278	0.982
0.277	0.986
0.276	0.988
0.275	0.988
0.275	0.994
0.274	0.995
0.274	0.995
0.273	0.997
0.273	0.998
0.272	1.000
0.272	0.999
0.271	0.998
0.270	0.995
0.270	0.998
0.269	0.998
0.269	0.995
0.268	0.995
0.268	0.991
0.267	0.989
0.266	0.988
0.266	0.986
0.265	0.983
0.265	0.982
0.264	0.979
0.264	0.978
0.264	0.974
0.263	0.968
0.263	0.966
CURVE 44 T ~ 298	
5.00	0.258

λ	ρ
CURVE 44 (cont.)	
6.00	0.221
7.01	0.196
7.60	0.175
8.00	0.184
9.01	0.219
9.99	0.279
11.01	0.335
CURVE 45 T ~ 298	
0.124	0.449
0.138	0.500
0.155	0.560
0.177	0.639
0.191	0.668
0.206	0.670
0.225	0.670
0.229	0.650
0.234	0.620
0.239	0.671
0.245	0.719
0.249	0.770
0.254	0.782
0.258	0.796
0.263	0.804
0.268	0.808
0.273	0.810
0.278	0.808
0.283	0.780
0.289	0.758
0.293	0.719
0.298	0.682
0.306	0.641
0.317	0.610
0.327	0.600
0.336	0.598
0.346	0.598
0.356	0.615
0.366	0.624
0.371	0.610
0.373	0.582
0.383	0.545
0.391	0.511
0.403	0.498
0.413	0.475

DATA TABLE NO. 36 (continued)

CURVE 45 (cont.)
T ~ 298

λ	ρ
0.420	0.462
0.430	0.452
0.449	0.435
0.469	0.418
0.494	0.403
0.516	0.389
0.532	0.379
0.558	0.371
0.587	0.365
0.635	0.350
0.681	0.338
0.700	0.334
0.729	0.331
0.770	0.328
0.810	0.322
0.861	0.319
0.911	0.316
0.961	0.314
1.050	0.311
1.117	0.309
1.240	0.308
1.319	0.305
1.425	0.305
1.610	0.301
1.823	0.301

CURVE 46
T ~ 298

λ	ρ
14.15	0.417
14.49	0.433
14.84	0.440
15.48	0.441
15.87	0.425
16.36	0.351
17.01	0.389
17.67	0.397
18.30	0.398
19.08	0.414
24.55	0.453
27.03	0.461
28.00	0.445
28.61	0.454
29.23	0.465
30.13	0.467

CURVE 46 (cont.)

λ	ρ
32.74	0.439
34.35	0.414
35.47	0.410
37.35	0.426

CURVE 47
T ~ 298

λ	ρ
1.01	0.316
2.34	0.312
2.77	0.300
3.21	0.279
3.93	0.226
4.45	0.218
4.86	0.244
6.39	0.503
7.05	0.583

CURVE 48
T ~ 298

λ	ρ
1.00	0.000
1.01	0.378
1.19	0.432
1.33	0.445
7.06	0.433

CURVE 49
T ~ 298

λ	ρ
1.00	0.000
1.03	0.497
1.07	0.674
1.15	0.745
1.33	0.778
1.79	0.800
5.21	0.800

CURVE 50
T ~ 298

λ	ρ
1.00	0.000
1.06	0.295
1.10	0.312
2.45	0.309
2.83	0.289

CURVE 50 (cont.)

λ	ρ
4.16	0.211
4.48	0.208
4.88	0.232
5.22	0.279
6.91	0.564

CURVE 51
T ~ 298

λ	ρ
1.00	0.000
1.02	0.323
1.14	0.354
1.29	0.373
1.62	0.379
2.24	0.358
2.75	0.331
4.21	0.210
4.46	0.207
4.48	0.232
5.22	0.279
6.91	0.564

CURVE 52
T ~ 298

λ	ρ
0.97	0.000
1.00	0.300
2.41	0.300
3.02	0.305
3.38	0.328
3.97	0.373
4.74	0.431
5.41	0.469
6.10	0.508
7.00	0.538

CURVE 53
T ~ 298

λ	ρ
0.97	0.000
1.05	0.723
1.38	0.727
3.09	0.607
3.54	0.600
4.00	0.591
4.60	0.594

CURVE 54*
T ~ 298

λ	ρ
1.78	0.200
1.97	0.350
2.16	0.440
2.33	0.468
2.59	0.473
2.94	0.446
3.16	0.476
4.10	0.467
4.29	0.438
4.63	0.463
5.42	0.456
6.00	0.432
6.25	0.448
6.69	0.425
6.96	0.446
7.97	0.457
8.95	0.446
11.63	0.446
13.00	0.457
13.95	0.458
14.03	0.469
14.14	0.453
14.22	0.467
14.33	0.449
14.47	0.464
14.54	0.448
14.68	0.461
14.77	0.450
14.89	0.473
15.09	0.490
15.23	0.445
15.38	0.465
15.51	0.444
15.62	0.465
15.74	0.443
15.87	0.473
15.99	0.424
16.16	0.456
16.27	0.409
16.44	0.450
16.58	0.411
16.77	0.461
16.90	0.435
17.04	0.489
17.21	0.430

CURVE 54 (cont.)*

λ	ρ
17.34	0.484
17.52	0.423
17.69	0.479
17.83	0.426
18.03	0.488
18.21	0.427
18.35	0.490
18.53	0.418
18.74	0.500
18.93	0.421
19.14	0.507
19.35	0.428
19.54	0.509
19.78	0.423
19.99	0.497
20.16	0.410
20.43	0.508
20.63	0.424
20.88	0.514
21.06	0.416
21.33	0.499
21.56	0.415
21.82	0.499
22.03	0.436
22.35	0.521
22.58	0.452
22.88	0.525
22.99	0.485
23.11	0.462
23.42	0.515
23.77	0.469
24.04	0.502
24.15	0.496
24.31	0.469
24.67	0.501
25.00	0.491

CURVE 55*
T ~ 298

λ	ρ
0.0590	0.022
0.0609	0.029
0.0622	0.035
0.0640	0.044
0.0655	0.054
0.0669	0.064

CURVE 55 (cont.)*

λ	ρ
0.0685	0.076
0.0688	0.078
0.0726	0.107
0.0771	0.139
0.0827	0.178
0.0891	0.223
0.0973	0.277
0.107	0.341
0.121	0.417
0.134	0.480
0.153	0.550
0.166	0.596
0.172	0.619
0.177	0.630
0.194	0.636
0.218	0.632
0.226	0.622
0.235	0.604
0.271	0.715
0.303	0.600
0.322	0.565
0.340	0.560
0.362	0.589
0.386	0.501
0.422	0.439
0.464	0.400
0.596	0.351
0.827	0.324
1.48	0.307
3.10	0.301

* Not shown on plot

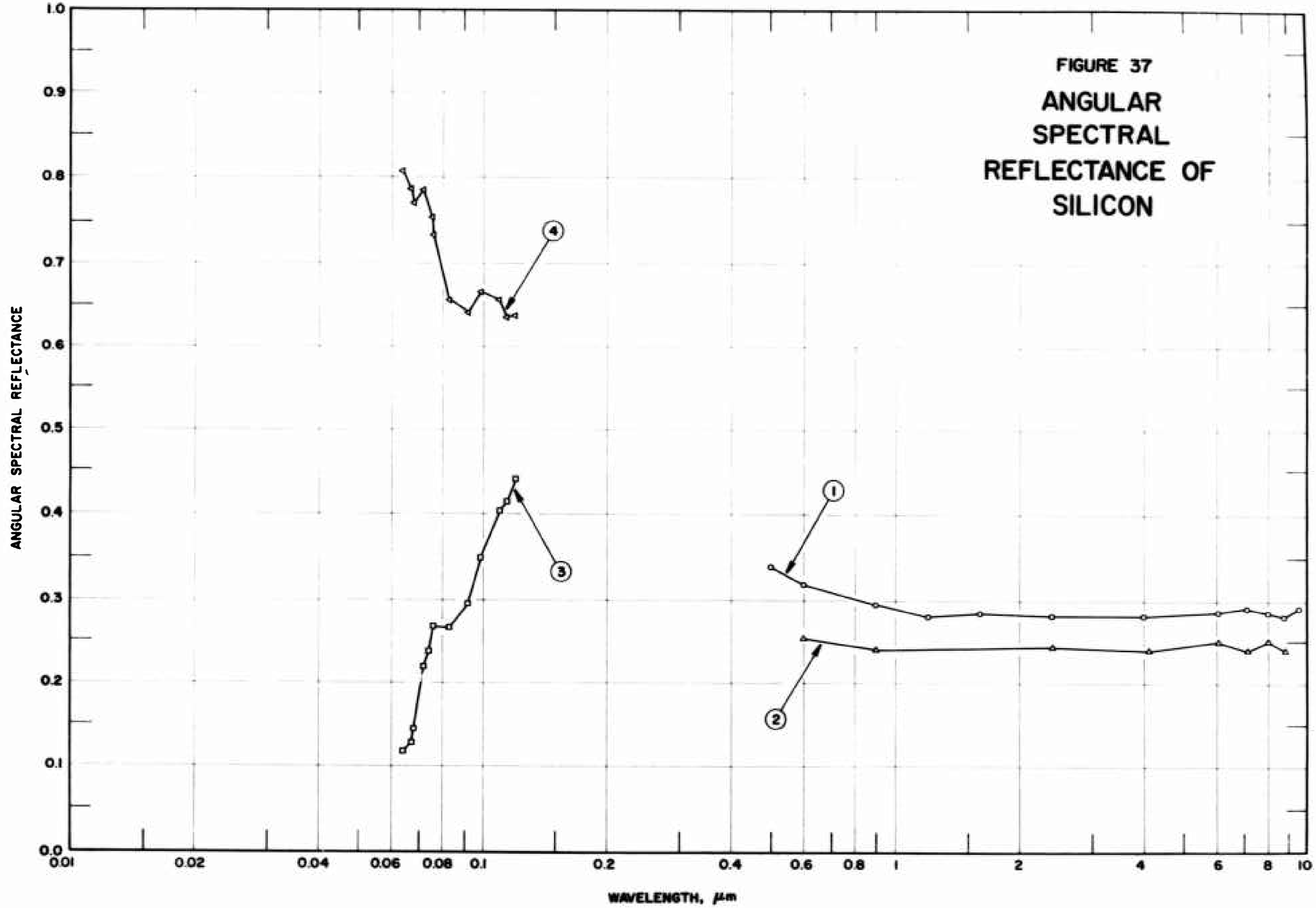


FIGURE 37
ANGULAR SPECTRAL REFLECTANCE OF SILICON

SPECIFICATION TABLE NO. 37 ANGULAR SPECTRAL REFLECTANCE OF SILICON

Curve No.	Ref. No.	Year	Temperature K	Wavelength Range, μm	Geometry θ	θ'	ω'	Reported Error, %	Composition (weight percent), Specifications and Remarks
1	44	1911	298	0.50-9.50	15°	15°		≤3	Obtained from Kahlbaum; polished with a fine grade of emery paper covered with a mixture of tin oxide and a little graphite; free from scratches; silvered glass mirror reference.
2	44	1911	298	0.60-8.80	15°	15°		≤3	Obtained from Carborundum Co.; similar to the above specimen and conditions; took a poor polish.
3	66	1962	298	0.064-0.120	20°	20°		<10	n-type single crystal cut along the (111) plane; polished mechanically; soaked with HF for 90 sec, rinsed several times with acetone; mounted immediately after rinsing, evacuated.
4	66	1962	298	0.064-0.120	70°	70°		<5	Above specimen and conditions.
5	67	1963	~298	2.0-50.0	30°	30°			Specimen 1 cm thick; data extracted from smooth curve; aluminum mirror standard.

DATA TABLE NO. 37 ANGULAR SPECTRAL REFLECTANCE OF SILICON

[Wavelength, λ, μm; Reflectance, ρ; Temperature, T, K]

CURVE 1
T = 298

λ	ρ
0.50	0.340
0.60	0.320
0.90	0.295
1.20	0.280
1.60	0.283
2.40	0.280
4.00	0.280
6.05	0.285
7.10	0.290
8.00	0.283
8.75	0.280
9.50	0.290

CURVE 2
T = 298

λ	ρ
0.60	0.253
0.90	0.240
2.40	0.245
4.10	0.240
6.03	0.240
7.10	0.240
8.00	0.250
8.80	0.240

CURVE 3
T = 298

λ	ρ
0.064	0.118
0.067	0.128
0.068	0.144
0.072	0.219
0.074	0.238

CURVE 3 (cont.)

λ	ρ
0.076	0.267
0.083	0.264
0.092	0.294
0.099	0.350
0.109	0.402
0.114	0.414
0.120	0.440

CURVE 4
T = 298

λ	ρ
0.064	0.808
0.067	0.788
0.068	0.771
0.072	0.786
0.075	0.756
0.076	0.735
0.083	0.654

CURVE 4 (cont.)

λ	ρ
0.092	0.641
0.099	0.667
0.109	0.657
0.114	0.636
0.120	0.638

CURVE 5
T = 298

λ	ρ
2.0	0.342
5.5	0.382
7.1	0.310
8.0	0.327
8.6	0.299
9.6	0.319
11.4	0.284
13.0	0.303
17.5	0.353

CURVE 5 (cont.)

λ	ρ
21.8	0.355
25.1	0.366
31.9	0.341
36.0	0.336
42.3	0.349
45.4	0.364
48.5	0.426
50.0	0.399

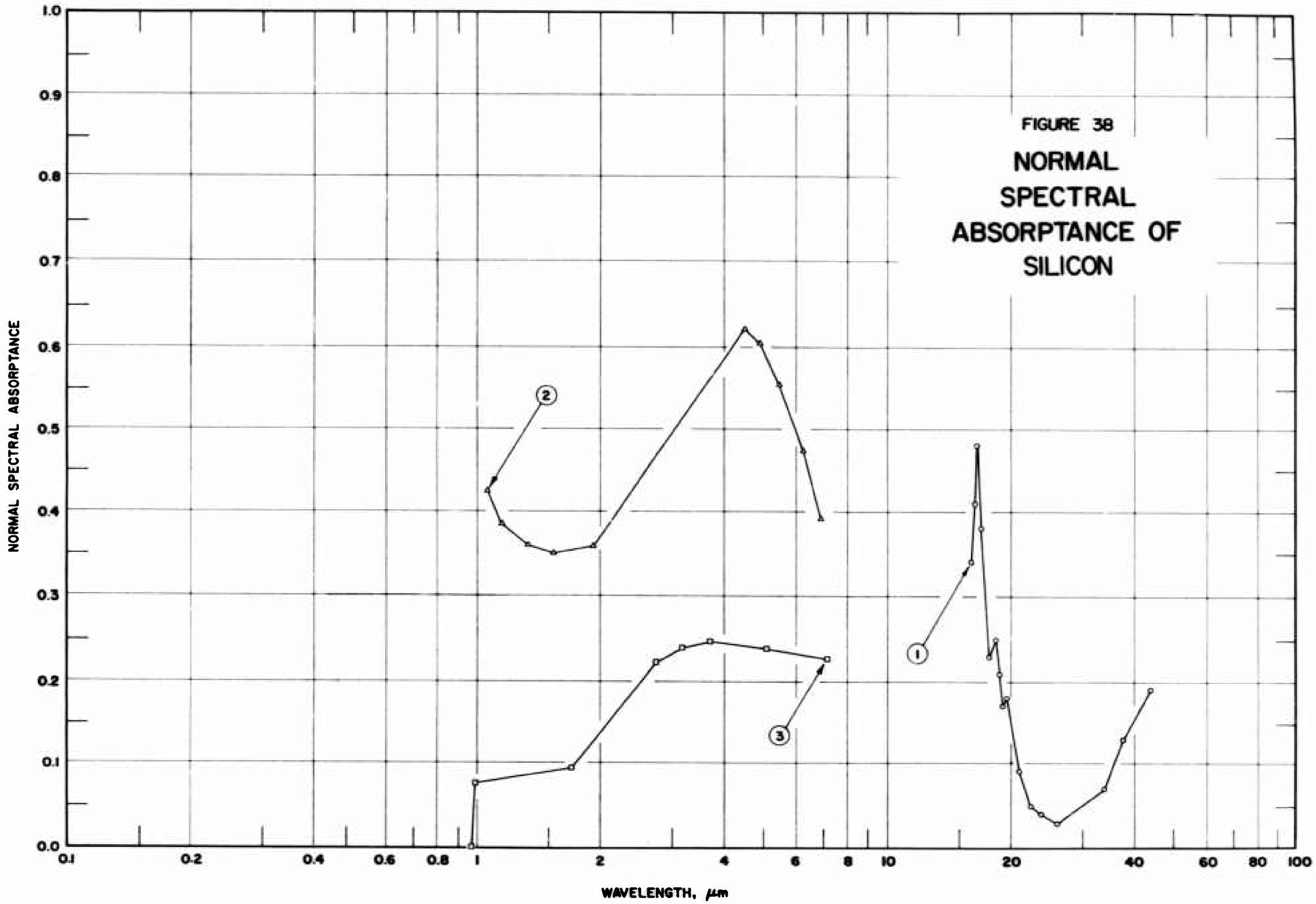


FIGURE 38
NORMAL SPECTRAL ABSORPTANCE OF SILICON
NORMAL SPECTRAL ABSORPTANCE
1.0
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0.0
0.1
0.2
0.4
0.6
0.8
1
2
4
6
8
10
20
40
60
80
100
WAVELENGTH, μm
1
2
3

SPECIFICATION TABLE NO. 38 NORMAL SPECTRAL ABSORPTANCE OF SILICON

Curve No.	Ref. No.	Year	Temperature K	Wavelength Range, µm	Geometry θ	Reported Error, %	Composition (weight percent), Specifications and Remarks
1	68	1963	77	16.0–44.0	0°		n-type silicon 2 mm thick; measured in vacuum; data extracted from smooth curve.
2	65	1967	~298	1.06–6.90	~0°		Standard silicon photocell; rear face polished and the rear contact removed; data extracted from smooth curve.
3	65	1967	~298	0.97–7.06	~0°		Silicon photocell produced by ion bombardment; both surfaces polished, rear contact removed; data extracted from smooth curve.

DATA TABLE NO. 38 NORMAL SPECTRAL ABSORPTANCE OF SILICON

[Wavelength, λ, µm; Absorptance, α; Temperature, T, K]

λ	α	λ	α	λ	α
CURVE 1 T = 77		**CURVE 2** T ~ 298		**CURVE 3 (cont.)**	
				1.69	0.092
16.0	0.34	1.06	0.424	2.73	0.220
16.4	0.41	1.15	0.384	3.17	0.240
16.6	0.48	1.33	0.359	3.70	0.247
17.0	0.38	1.54	0.349	5.08	0.239
17.7	0.23	1.92	0.357	7.06	0.227
18.4	0.25	4.49	0.622		
18.8	0.21	4.90	0.605		
19.1	0.17	5.46	0.554		
19.6	0.18	6.22	0.472		
21.0	0.09	6.90	0.391		
22.3	0.05				
23.9	0.04	**CURVE 3** T ~ 298			
26.0	0.03				
33.9	0.07				
37.7	0.13	0.97	0.000		
44.0	0.19	0.99	0.075		

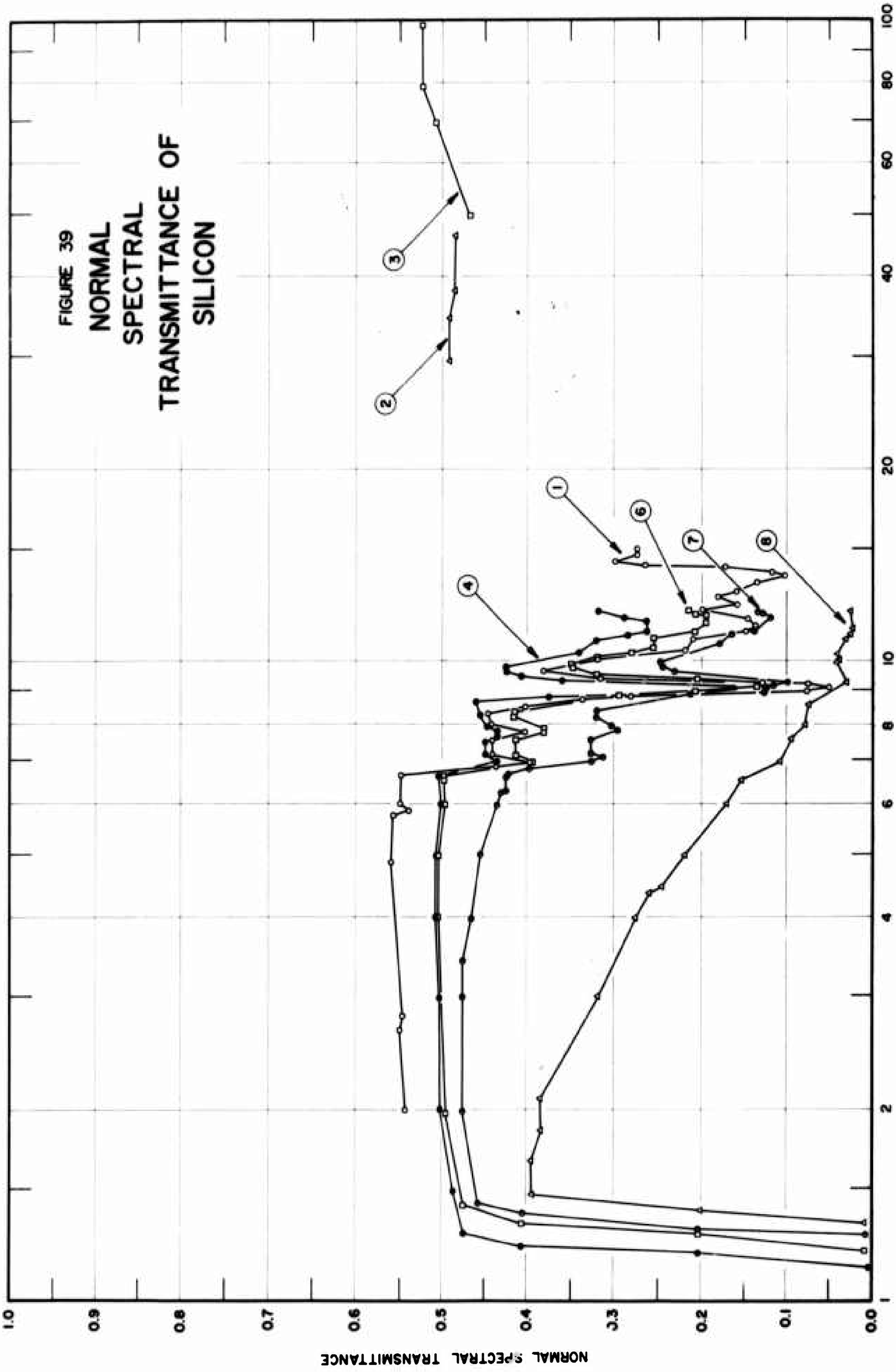


FIGURE 39
NORMAL SPECTRAL TRANSMITTANCE OF SILICON

SPECIFICATION TABLE NO. 39 NORMAL SPECTRAL TRANSMITTANCE OF SILICON

Curve No.	Ref. No.	Year	Temperature K	Wavelength Range, μm	Geometry θ	θ'	ω'	Reported Error, %	Composition (weight percent), Specifications and Remarks
1	69	1963	298	2-15	~0°	~0°			6 ppb boron and approx 20 ppb phosphorous from Knapic Electro-Physics, Inc.; both surfaces polished optically flat to within 5 green mercury fringes; refractive index 3.453; data extracted from smooth curve.
2	70	1965	298	29.5-46.2	~0°	~0°			Electrical resistivity 15 ohm cm.
3	70	1965	298	49.8-98.7	~0°	~0°			Electrical resistivity 200 ohm cm.
4	12	1964	298	1.14-11.98	~0°	~0°			n-type silicon; 6 ppb B and 20 ppb P; single crystal; electrical resistivity 5 ohm cm; polished; data extracted from smooth curve.
5*	12	1964	373	1.16-11.98	~0°	~0°			Above specimen and conditions.
6	12	1964	473	1.21-12.00	~0°	~0°			Above specimen and conditions.
7	12	1964	573	1.27-11.98	~0°	~0°			Above specimen and conditions.
8	12	1964	673	1.32-12.00	~0°	~0°			Above specimen and conditions.
9	67	1963	~298	2.0-50.0	0°	0°			Specimen 1 cm thick; data extracted from smooth curve.
10	71	1963	298	40.9-98.5	0°	0°			p-type silicon 0.28 mm thick; doped with In; resistivity 0.9 ohm cm.
11	71	1963	298	40.8-98.4	0°	0°			Similar to the above specimen and conditions except thickness 0.48 mm.
12	71	1963	298	40.8-98.6	0°	0°			Similar to the above specimen and conditions except thickness 1.1 mm.
13	72	1951	298	12.5-38.4	~0°	~0°			Optically polished; thickness 2 mm; uncorrected for reflection losses.
14	73	1965	300	18.1-225.4	~0°	~0°			Thickness 2 mm; data extracted from smooth curve.
15	64	1967	~298	14.00-37.48	~0°	~0°			Sample conductivity 0.0086 $ohm^{-1} cm^{-1}$; thickness 1 mm.
16	64	1967	~298	6.00-37.63	~0°	~0°			Conductivity 0.0086 $ohm^{-1} cm^{-1}$; thickness 1.0 mm.
17	65	1967	~298	1.00-6.98	~0°	~0°			Undoped; carrier concentration 10^{16} cm^{-3}; polished on both sides; data extracted from smooth curve.
18	65	1967	~298	1.00-7.40	~0°	~0°			Standard silicon photocell; rear face polished and the rear contact removed; data extracted from smooth curve.
19	65	1967	~298	0.97-6.97	~0°	~0°			Silicon photocell produced by ion bombardment; both surfaces polished, rear contact removed; data extracted from smooth curve.
20*	89	1967	~298	6.25-15.06	0°	0°			Wafer; mechanically polished to mirror finish; data extracted from smooth curve.
21*	310	1961	~298	0.84-14.94	0°	0°			High purity (1.5 mm thick); float zone refined; specimen supplied by Texas Instruments; data extracted from smooth curve.
22*	288	1965	298	1.16-12.00	0°	0°			n-type silicon manufactured by Knapic Electro-Physics, Inc. (2.80 mm thick); polished optically flat to within five green mercury fringes and a parallelism tolerance of ± 2.5 μm; impurities have been given as approx 6 ppb boron and 20 ppb phosphorous; data extracted from smooth curve; resistivity 5 ohm cm.
23*	288	1965	373	1.16-12.00	0°	0°			Above specimen and conditions.

*Not shown on plot

SPECIFICATION TABLE NO. 39 (continued)

Curve No.	Ref. No.	Year	Temperature K	Wavelength Range, μm	Geometry θ	Geometry θ'	Geometry ω'	Reported Error, %	Composition (weight percent), Specifications and Remarks
24*	288	1965	473	1.22-12.00	0°	0°			Above specimen and conditions.
25*	288	1965	573	1.25-12.00	0°	0°			Above specimen and conditions.
26*	288	1965	673	1.32-12.00	0°	0°			Above specimen and conditions.

*Not shown on plot

DATA TABLE NO. 39 NORMAL SPECTRAL TRANSMITTANCE OF SILICON

[Wavelength, λ, μm; Transmittance, τ; Temperature, T, K]

CURVE 1
T = 298

λ	τ
2.00	0.542
2.67	0.550
2.80	0.548
4.88	0.560
5.76	0.558
5.85	0.539
6.03	0.550
6.66	0.549
6.97	0.396
7.18	0.440
7.53	0.440
7.78	0.402
8.01	0.442
8.29	0.447
8.48	0.401
8.73	0.337
8.82	0.251
8.98	0.078
9.08	0.050
9.18	0.077
9.37	0.317
9.67	0.381
10.02	0.319
10.36	0.219
10.76	0.211
11.10	0.149
11.36	0.136
11.66	0.148
12.06	0.199
12.26	0.158
12.39	0.158
12.58	0.181
12.76	0.159
13.41	0.134
13.64	0.101
13.88	0.118
14.04	0.173
14.19	0.265
14.40	0.299
14.69	0.273
15.00	0.273

CURVE 2
T = 298

λ	τ
29.5	0.492
34.5	0.492
38.0	0.488
46.2	0.487

CURVE 3
T = 298

λ	τ
49.8	0.468
69.2	0.509
79.1	0.524
98.7	0.525

CURVE 4

λ	τ
1.14	0.002
1.19	0.202
1.24	0.404
1.28	0.474
1.49	0.487
2.00	0.501
2.99	0.503
4.00	0.508
5.01	0.507
6.02	0.501
6.63	0.504
6.88	0.437
6.99	0.436
7.16	0.449
7.49	0.449
7.64	0.434
7.81	0.434
7.97	0.448
8.25	0.455
8.65	0.410
8.79	0.374
8.99	0.127
9.09	0.123
9.33	0.360
9.49	0.408
9.63	0.424
9.78	0.424
10.28	0.340
10.73	0.321

CURVE 4 (cont.)

λ	τ
10.99	0.284
11.16	0.263
11.60	0.263
11.70	0.289
11.98	0.318

CURVE 5*
T = 373

λ	τ
1.16	0.007
1.20	0.203
1.29	0.459
1.34	0.469
1.99	0.498
2.99	0.502
3.98	0.508
5.02	0.508
6.01	0.500
6.64	0.501
6.91	0.412
6.99	0.414
7.10	0.431
7.49	0.433
7.71	0.414
7.84	0.414
7.99	0.428
8.27	0.437
8.80	0.348
8.85	0.310
8.99	0.208
9.10	0.134
9.35	0.315
9.49	0.373
9.71	0.394
10.00	0.373
10.24	0.325
10.50	0.297
10.74	0.297
11.00	0.259
11.12	0.237
11.23	0.226
11.60	0.229
11.76	0.251
11.98	0.266

CURVE 6
T = 473

λ	τ
1.21	0.008
1.27	0.202
1.33	0.405
1.42	0.473
1.97	0.495
4.01	0.505
5.00	0.505
6.00	0.498
6.52	0.498
6.61	0.498
6.97	0.395
7.13	0.412
7.56	0.412
7.77	0.380
7.88	0.380
8.18	0.416
8.34	0.416
8.85	0.294
8.97	0.208
9.10	0.136
9.20	0.129
9.35	0.206
9.52	0.320
9.76	0.348
9.87	0.350
10.11	0.319
10.32	0.279
10.50	0.257
10.80	0.257
11.18	0.209
11.53	0.196
11.75	0.196
11.79	0.208
12.00	0.217

CURVE 7
T = 573

λ	τ
1.27	0.007
1.30	0.203
1.37	0.405
1.44	0.457
1.98	0.475
3.00	0.475

CURVE 7 (cont.)

λ	τ
3.42	0.475
3.98	0.463
5.02	0.453
5.99	0.434
6.24	0.431
6.28	0.425
6.61	0.424
6.65	0.422
6.80	0.398
6.96	0.326
7.07	0.312
7.17	0.327
7.56	0.327
7.83	0.297
7.98	0.302
8.[illegible]	0.320
8.37	0.320
8.89	0.212
9.12	0.117
9.24	0.099
9.61	0.231
7.76	0.245
9.98	0.248
10.63	0.179
11.00	0.167
11.19	0.138
11.71	0.119
11.88	0.128
11.98	0.134

CURVE 8
T = 673

λ	τ
1.32	0.008
1.39	0.201
1.47	0.394
1.66	0.395
1.86	0.383
2.08	0.383
3.00	0.319
3.99	0.276
4.35	0.260
4.46	0.247
5.01	0.220
6.00	0.171

CURVE 8 (cont.)

λ	τ
6.53	0.153
6.99	0.108
7.57	0.095
7.98	0.078
8.56	0.075
9.22	0.030
9.98	0.042
10.08	0.038
10.24	0.040
10.85	0.031
11.01	0.025
11.75	0.023
12.00	0.026

CURVE 9
T = 298

λ	τ
2.0	0.432
4.9	0.434
6.6	0.410
6.8	0.360
7.4	0.378
7.8	0.273
8.4	0.362
8.4	0.002
9.1	0.002
9.5	0.277
11.0	0.047
11.9	0.090
12.4	0.042
13.0	0.061
13.5	0.052
13.8	0.142
14.6	0.173
15.2	0.129
16.4	0.026
17.1	0.047
17.7	0.047
18.4	0.068
18.9	0.044
20.4	0.096
23.6	0.199
27.8	0.223
31.2	0.223
37.5	0.194

CURVE 9 (cont.)

λ	τ
45.2	0.094
50.0	0.054

CURVE 10
T = 298

λ	τ
40.9	0.280
42.4	0.292
45.0	0.283
48.6	0.292
51.4	0.274
51.4	0.285
54.5	0.285
57.4	0.273
60.4	0.273
60.4	0.243
63.4	0.266
63.4	0.293
67.4	0.276
71.9	0.295
79.2	0.210
82.0	0.214
85.1	0.205
89.1	0.197
91.9	0.204
98.5	0.224

CURVE 11
T = 298

λ	τ
40.8	0.201
42.3	0.201
45.0	0.163
48.7	0.163
51.4	0.172
54.5	0.172
54.5	0.154
57.4	0.154
57.4	0.162
60.4	0.155
63.5	0.173
63.5	0.182
67.4	0.134
71.8	0.113
79.2	0.105

CURVE 11 (cont.)

λ	τ
82.1	0.105
85.0	0.103
89.1	0.103
91.9	0.104
98.4	0.142

CURVE 12
T = 298

λ	τ
40.8	0.079
42.4	0.063
45.0	0.070
48.7	0.034
51.4	0.042
51.4	0.062
54.6	0.062
54.6	0.042
57.4	0.042
57.4	0.053
60.4	0.053
60.4	0.042
63.5	0.062
63.4	0.074
67.4	0.025
79.2	0.025
82.2	0.000
85.2	0.022
89.2	0.024
98.6	0.010

CURVE 13
T = 298

λ	τ
38.4	0.36
37.0	0.37
35.7	0.37
34.4	0.39
33.3	0.38
31.2	0.37
29.4	0.37
27.7	0.37
26.3	0.37
25.0	0.36
23.8	0.36
22.7	0.36

DATA TABLE NO. 39 (continued)

CURVE 13 (cont.) T = 298

λ	τ
21.7	0.37
20.8	0.28
20.0	0.25
19.3	0.14
19.2	0.20
18.5	0.20
17.8	0.17
17.2	0.18
16.6	0.05
16.3	0.03
16.1	0.05
15.6	0.27
15.1	0.30
14.7	0.32
14.2	0.36
13.8	0.25
13.5	0.18
13.5	0.18
13.1	0.19
12.8	0.22
12.5	0.25

CURVE 14 T = 300

λ	τ
18.1	0.223
18.8	0.271
19.5	0.241
21.7	0.394
23.5	0.442
25.0	0.442
27.2	0.423
29.3	0.486
30.4	0.494
33.4	0.457
42.2	0.480
44.7	0.468
51.1	0.407
59.8	0.426
186.6	0.433
225.4	0.446

CURVE 15 T ~ 298

λ	τ
14.00	0.495
14.25	0.533
14.57	0.541
15.06	0.535
15.64	0.506
15.80	0.472
16.20	0.262
16.43	0.249
16.88	0.415
17.09	0.434
17.47	0.443
18.22	0.444
22.33	0.565
23.32	0.581
24.26	0.586
25.42	0.581
27.17	0.571
28.23	0.584
29.18	0.583
29.84	0.580
30.78	0.584
32.47	0.595
33.99	0.585
34.80	0.589
35.67	0.584
36.57	0.571
37.48	0.567

CURVE 16 T ~ 298

λ	τ
6.00	0.509
6.79	0.502
7.44	0.493
8.13	0.495
8.58	0.487
9.06	0.462
9.61	0.492
10.88	0.423
11.35	0.410
12.41	0.420
13.40	0.410
14.36	0.538
15.84	0.502
16.44	0.233

CURVE 16 (cont.)

λ	τ
16.86	0.352
17.05	0.416
17.37	0.439
17.81	0.434
19.35	0.482
22.07	0.547
24.15	0.558
25.34	0.572
29.93	0.573
32.66	0.589
33.92	0.581
35.15	0.587
36.82	0.569
37.63	0.567

CURVE 17 T ~ 298

λ	τ
1.00	0.000
1.05	0.492
1.36	0.526
1.70	0.537
2.14	0.544
6.98	0.544

CURVE 18 T ~ 298

λ	τ
1.00	0.000
1.06	0.295
1.10	0.317
1.25	0.334
1.52	0.341
2.00	0.324
4.15	0.183
5.25	0.120
7.40	0.000

CURVE 19 T ~ 298

λ	τ
0.97	0.000
1.00	0.599
1.22	0.615
1.89	0.564
3.17	0.426

CURVE 19 (cont.)

λ	τ
3.91	0.367
5.00	0.304
6.35	0.237
6.97	0.206

CURVE 20* T ~ 298

λ	τ
6.25	0.532
6.53	0.532
6.60	0.513
6.68	0.513
6.72	0.526
6.83	0.491
6.96	0.514
7.35	0.510
7.42	0.522
7.71	0.509
8.01	0.522
8.54	0.510
8.90	0.484
9.51	0.503
9.88	0.495
10.25	0.476
10.71	0.482
11.08	0.449
11.48	0.443
11.81	0.461
12.30	0.449
13.05	0.442
14.16	0.474
15.06	0.481

CURVE 21* T ~ 298

λ	τ
0.84	0.000
1.00	0.019
1.06	0.043
1.12	0.500
1.22	0.529
1.57	0.542
2.44	0.549
6.52	0.549
6.78	0.533
6.94	0.508

CURVE 21 (cont.)*

λ	τ
7.20	0.522
7.35	0.528
7.76	0.505
8.00	0.517
8.25	0.522
8.67	0.492
8.94	0.447
9.13	0.363
9.24	0.395
9.42	0.460
9.76	0.499
10.11	0.476
10.49	0.433
10.74	0.423
10.91	0.423
11.16	0.391
11.34	0.381
12.06	0.428
12.37	0.395
12.70	0.414
13.13	0.398
13.68	0.356
14.49	0.468
14.94	0.458

CURVE 22* T = 298

λ	τ
1.16	0.000
1.22	0.383
1.26	0.459
1.47	0.483
2.95	0.496
6.65	0.490
6.98	0.389
7.01	0.425
7.16	0.438
7.52	0.438
7.77	0.411
8.03	0.438
8.47	0.438
8.76	0.378
8.94	0.237
9.06	0.112
9.15	0.111
9.25	0.247

CURVE 22 (cont.)*

λ	τ
9.35	0.339
9.48	0.391
9.62	0.405
9.82	0.405
10.28	0.323
10.53	0.309
10.79	0.308
11.18	0.242
11.56	0.242
11.67	0.269
12.00	0.296

CURVE 23* T = 373

λ	τ
1.16	0.000
1.22	0.383
1.26	0.459
1.47	0.483
2.95	0.496
6.65	0.490
6.98	0.398
7.12	0.418
7.63	0.418
7.82	0.395
8.04	0.416
8.39	0.423
8.82	0.339
8.96	0.190
9.06	0.109
9.18	0.115
9.29	0.233
9.46	0.331
9.53	0.361
9.71	0.377
9.89	0.377
10.30	0.301
10.52	0.281
10.79	0.281
11.26	0.208
11.61	0.208
12.00	0.249

CURVE 24* T = 473

λ	τ
1.22	0.000

CURVE 24 (cont.)*

λ	τ
1.29	0.380
1.33	0.422
1.46	0.475
4.97	0.490
6.65	0.490
7.03	0.383
7.21	0.395
7.63	0.395
7.79	0.366
7.90	0.366
8.18	0.395
8.45	0.395
8.85	0.304
9.13	0.117
9.23	0.117
9.40	0.188
9.51	0.285
9.64	0.319
9.90	0.334
10.12	0.311
10.33	0.265
10.54	0.240
10.86	0.240
11.13	0.193
11.62	0.182
12.00	0.193

CURVE 25* T = 573

λ	τ
1.25	0.000
1.33	0.344
1.42	0.448
1.83	0.468
3.68	0.464
5.94	0.429
6.76	0.413
7.04	0.300
7.21	0.314
7.65	0.314
7.96	0.288
8.23	0.309
8.42	0.309
8.82	0.229
9.14	0.120
9.27	0.089

CURVE 25 (cont.)*

λ	τ
9.41	0.097
9.58	0.190
9.75	0.228
10.07	0.233
10.65	0.165
10.96	0.159
11.27	0.123
11.72	0.105
12.00	0.115

CURVE 26* T = 673

λ	τ
1.32	0.000
1.43	0.361
1.52	0.393
1.69	0.393
1.85	0.379
2.11	0.379
2.59	0.339
4.36	0.258
6.66	0.142
7.10	0.091
7.70	0.091
8.05	0.073
8.65	0.073
9.21	0.023
10.06	0.031
11.03	0.020
12.00	0.011

*Not shown on plot

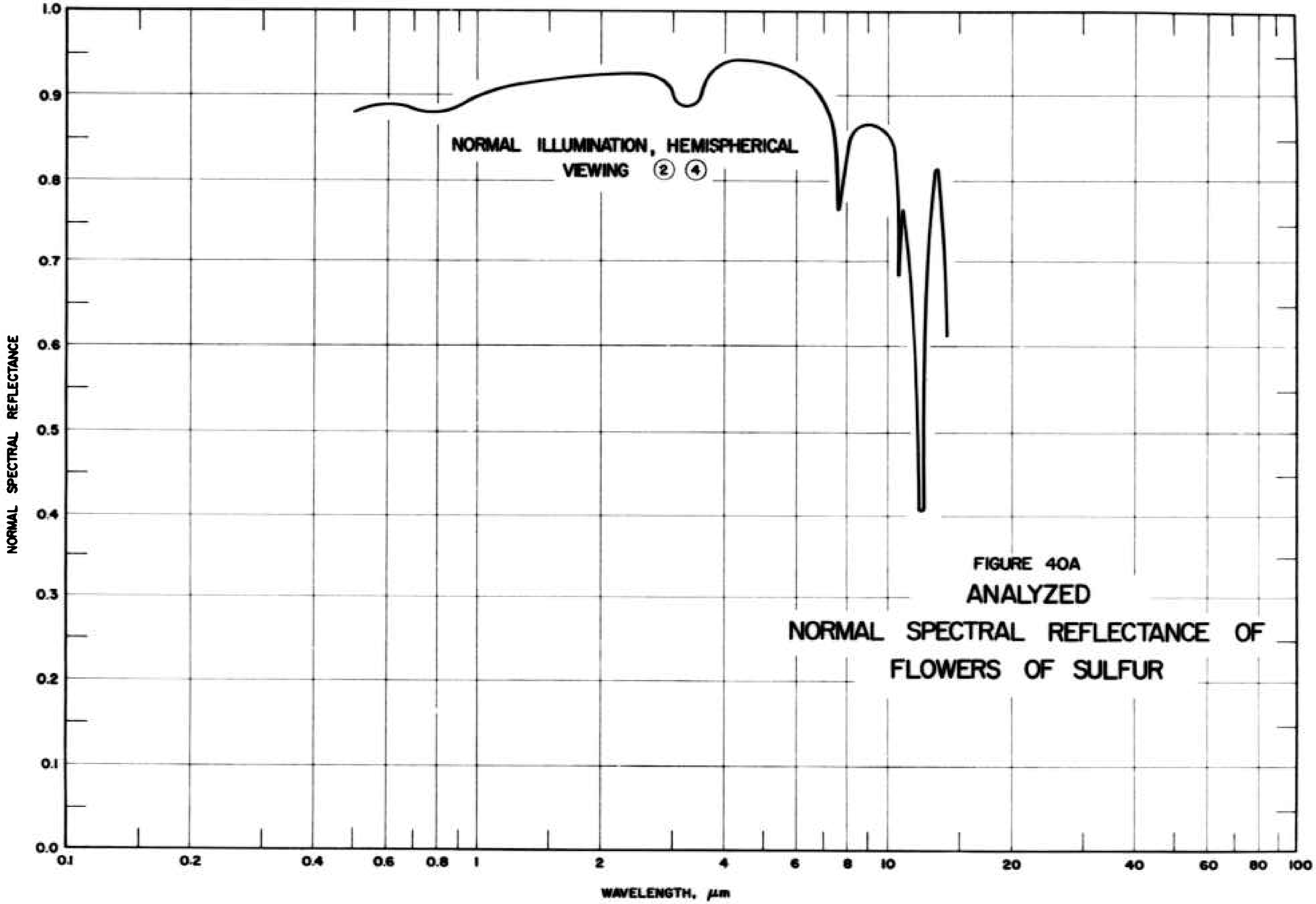


FIGURE 40A
ANALYZED
NORMAL SPECTRAL REFLECTANCE OF
FLOWERS OF SULFUR

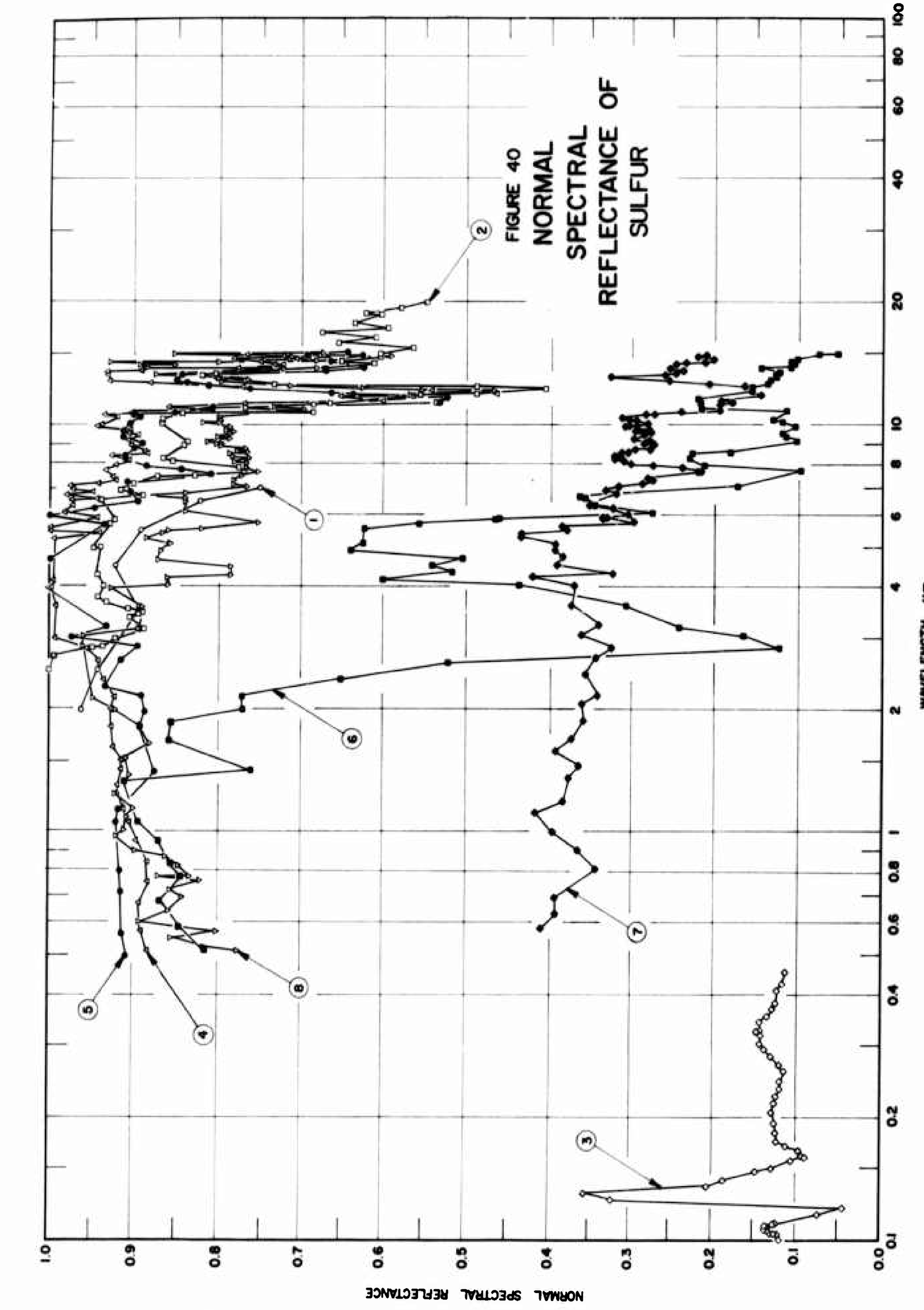


FIGURE 40 NORMAL SPECTRAL REFLECTANCE OF SULFUR

SPECIFICATION TABLE NO. 40 NORMAL SPECTRAL REFLECTANCE OF SULFUR

Curve No.	Ref. No.	Year	Temperature K	Wavelength Range, μm	Geometry ϑ	θ'	ω'	Reported Error, %	Composition (weight percent), Specifications and Remarks
1	75	1965	298	2.0-7.0	7°		2π		Crystex sulfur.
2	76	1967	298	2.50-20.00	0°		2π		Flowers of sulfur; powder (4 mm thick) on aluminum flat; data extracted from smooth curve.
3	135	1969	~298	0.0846-0.454	2°	2°			Orthorhombic sulfur, S_8, grown by evaporation of carbon disulphide from a saturated sulphur solution; measured in vacuum (3×10^{-6} mm Hg); reflectance measured from natural (111) face.
4	178	1963	298	0.51-14.74	10°		2π		Flowers of sulfur (Fisher Catalog No. S-591); pressed into sample holder at 16,000 psi; magnesium oxide reference standard (used constant correction factor of 1.80 for data above 2.45 μm); average of four curves.
5	178	1963	298	0.50-15.00	10°		2π		Christex sulfur (from Stauffer Chemical Co.); vaporized and quenched; pressed into sample holder at 16,000 psi; magnesium oxide reference standard (used constant correction factor of 1.80 for data above 2.45 μm).
6	178	1963	298	0.51-14.98	10°		2π		Colloidal sulfur, microrhombic (Fisher Catalog No. S-597); pressed into sample holder at 16,000 psi; magnesium oxide reference standard (used constant correction factor of 1.80 for data above 2.45 μm).
7	178	1963	298	0.58-14.69	10°		2π		Natural sulfur crystal; magnesium oxide reference standard (used constant correction factor of 1.80 for data above 2.45 μm)
8	178	1963	298	0.51-14.99	10°		2π		Same as curve 4 specimen and conditions except used constant correction factor of 1.70 beyond 2.45 μm.

DATA TABLE NO. 40 NORMAL SPECTRAL REFLECTANCE OF SULFUR

[Wavelength, λ, μm; Reflectance, ρ; Temperature, T, K]

λ	ρ
CURVE 1	
T = 298	
2.0	0.964
2.5	0.944
3.5	0.894
4.5	0.923
5.5	0.893
6.5	0.825
7.0	0.752
CURVE 2	
T = 298	
2.50	1.000
2.70	0.995
2.82	0.949
2.85	0.936
2.99	0.920
3.13	0.890
3.36	0.904
3.41	0.895
3.46	0.890
3.52	0.907
3.66	0.932
3.79	0.942
4.00	0.936
4.27	0.943
5.00	0.939
5.00	0.947
5.71	0.929
5.85	0.923
6.54	0.939
6.67	0.890
6.90	0.918
7.04	0.903
7.19	0.900
7.41	0.873
7.46	0.830
7.63	0.773
7.81	0.780
8.13	0.855
8.26	0.868
8.85	0.844
9.09	0.839
10.00	0.869
10.31	0.869
CURVE 2 (cont.)	
10.53	0.845
10.75	0.686
10.99	0.774
11.11	0.686
11.36	0.665
11.49	0.537
11.76	0.555
11.90	0.489
12.20	0.407
12.35	0.487
12.50	0.736
13.16	0.821
13.33	0.807
13.70	0.672
14.08	0.612
14.29	0.651
14.71	0.604
14.93	0.604
15.38	0.564
15.87	0.655
16.39	0.609
16.95	0.676
17.24	0.595
17.86	0.636
18.52	0.601
18.87	0.621
19.23	0.579
20.00	0.548
CURVE 3	
T ~298	
0.0846	0.111*
0.0862	0.110*
0.0880	0.109*
0.0900	0.108*
0.0916	0.110*
0.0936	0.115*
0.0955	0.115*
0.0961	0.115*
0.0971	0.116*
0.0978	0.121*
0.0988	0.121*
0.0999	0.121*
0.101	0.119
CURVE 3 (cont.)	
0.103	0.121
0.103	0.125
0.104	0.131
0.105	0.134
0.106	0.137
0.107	0.133
0.108	0.135
0.109	0.126
0.110	0.124
0.111	0.113*
0.112	0.109*
0.113	0.099*
0.114	0.090*
0.114	0.085*
0.115	0.072
0.116	0.056*
0.117	0.046*
0.118	0.038*
0.119	0.037*
0.120	0.043
0.121	0.069*
0.122	0.120*
0.123	0.197*
0.123	0.276*
0.124	0.314*
0.125	0.321
0.126	0.324*
0.127	0.333*
0.128	0.332*
0.129	0.346*
0.130	0.355
0.131	0.351
0.229	0.120*
0.233	0.119
0.238	0.117*
0.242	0.119*
0.245	0.119
0.248	0.115*
0.252	0.121*
0.258	0.120*
0.260	0.114
0.262	0.118*
0.266	0.117*
0.269	0.120
0.273	0.124*
CURVE 3 (cont.)	
0.277	0.127*
0.281	0.129
0.284	0.133*
0.287	0.136*
0.294	0.137
0.298	0.141*
0.303	0.141
0.312	0.141*
0.316	0.141
0.323	0.139*
0.326	0.142
0.334	0.141*
0.342	0.141
0.348	0.136*
0.353	0.133
0.359	0.130*
0.366	0.128
0.375	0.126*
0.382	0.124
0.394	0.123*
0.407	0.123
0.416	0.120*
0.422	0.117
0.435	0.115*
0.454	0.114
CURVE 4	
T = 298	
0.51	0.882
0.57	0.890
0.67	0.893
0.76	0.882
0.85	0.884
0.95	0.897
1.06	0.904
1.14	0.913
1.31	0.918
1.43	0.915
1.52	0.915
1.64	0.924
1.82	0.926
2.00	0.926
2.15	0.922
2.37	0.937
CURVE 4 (cont.)	
2.61	0.942
2.81	0.954
3.01	0.995
3.58	0.995
4.00	0.999
4.17	0.996
4.27	0.996*
4.46	0.996*
4.69	0.996*
5.00	0.996*
5.09	0.996*
5.24	0.996
5.39	0.939
5.48	1.000
5.60	1.000
5.78	0.927*
5.92	0.943
6.06	0.985
6.20	1.004*
6.31	0.976
6.48	0.976
6.59	0.942
6.69	0.982
6.82	0.950
6.93	0.975
7.09	0.979
7.19	0.942
7.30	0.921
7.39	0.926
11.99	0.472*
12.01	0.527*
12.11	0.542
12.17	0.630*
12.24	0.719*
12.34	0.766
12.41	0.824*
12.46	0.863*
12.53	0.881
12.57	0.884*
12.63	0.897*
12.80	0.930
12.84	0.910*
12.89	0.926*
12.94	0.902*
12.99	0.956*
CURVE 4 (cont.)	
13.03	0.932*
13.10	0.932
13.18	0.968*
13.24	0.968*
13.28	0.935*
13.32	0.926*
13.40	0.932
13.43	0.916*
13.49	0.892
13.53	0.845*
13.58	0.806*
13.62	0.806*
13.71	0.781
13.74	0.730*
13.79	0.751*
13.91	0.742*
14.00	0.725
14.00	0.737
14.10	0.743*
14.17	0.735*
14.21	0.753
14.23	0.801*
14.31	0.807*
14.34	0.786
14.38	0.748*
14.43	0.729*
14.50	0.707
14.53	0.692
14.61	0.725*
14.64	0.777*
14.74	0.771
CURVE 5	
T = 298	
0.50	0.908
0.56	0.911
0.71	0.914
0.80	0.914
0.89	0.914*
0.96	0.902*
1.05	0.920
1.14	0.917
1.33	0.892
1.40	0.876
CURVE 5 (cont.)	
1.54	0.879*
1.64	0.888*
1.80	0.894
1.99	0.880
2.16	0.892
2.27	0.933
2.63	0.916
2.85	0.896
3.00	0.975
3.20	0.932
3.58	1.003*
4.00	1.008*
4.69	1.[illegible]90
5.20	1.012*
5.49	0.981*
5.62	0.935
5.77	0.973*
6.00	1.000
6.20	0.946
6.32	0.954*
6.44	0.896
6.57	0.720*
6.69	0.693*
6.80	0.905
7.04	0.893*
7.20	0.908
7.25	0.888*
7.37	0.861*
7.55	0.812
7.67	0.800*
7.75	0.847
7.87	0.863*
7.93	0.887
8.04	0.890*
8.15	0.910
8.27	0.910*
8.39	0.910
8.47	0.905*
8.64	0.891*
8.75	0.902
8.76	0.885*
8.85	0.895*
8.93	0.885*
9.00	0.892
9.13	0.910*
CURVE 5 (cont.)	
9.19	0.921*
9.25	0.913
9.38	0.913*
9.46	0.913*
9.52	0.898*
9.60	0.914
9.71	0.914*
9.97	0.906*
10.01	0.906
10.11	0.888*
10.23	0.895
10.31	0.905*
10.42	0.905*
10.50	0.902
10.51	0.868*
10.61	0.868*
10.70	0.855
10.76	0.838*
10.83	0.816*
10.94	0.812*
11.00	0.810
11.11	0.782*
11.17	0.818*
11.28	0.724*
11.31	0.713
11.40	0.534
11.48	0.510*
11.60	0.522
11.62	0.581*
11.68	0.609*
11.75	0.644*
11.80	0.639
11.90	0.665
12.01	0.697*
12.13	0.732*
12.23	0.767
12.31	0.805*
12.41	0.814
12.51	0.840*
12.58	0.837*
12.66	0.840
12.72	0.863*
12.87	0.863*
12.90	0.851
13.02	0.849*

* Not shown on plot

DATA TABLE NO. 40 (continued)

λ	ρ
CURVE 5 (cont.)	
T = 298	
13.13	0.847*
13.23	0.847
13.34	0.835*
13.42	0.761*
13.52	0.721
13.63	0.626*
13.73	0.602*
13.80	0.623
13.92	0.640*
14.01	0.640*
14.09	0.670*
14.21	0.665*
14.32	0.634*
14.40	0.665
14.53	0.665*
14.63	0.672*
14.74	0.677*
14.85	0.695
14.91	0.626
15.00	0.642
CURVE 6	
T = 298	
0.51	0.817
0.58	0.846
0.67	0.868
0.76	0.844
0.84	0.856
0.95	0.870
1.05	0.893
1.14	0.915*
1.33	0.910
1.41	0.762
1.49	0.852
1.66	0.859
1.87	0.856
2.00	0.773
2.15	0.775
2.39	0.650
2.66	0.520
2.84	0.121
3.02	0.164
3.19	0.240
3.60	0.305

λ	ρ
CURVE 6 (cont.)	
4.02	0.434
4.16	0.600
4.31	0.516
4.50	0.540
4.69	0.502
4.95	0.639
5.10	0.623
5.24	0.680*
5.38	0.661*
5.52	0.621
5.66	0.557
5.81	0.464
5.92	0.460
6.06	0.272
6.21	0.200*
6.35	0.345
6.46	0.392*
6.60	0.357
6.70	0.362
6.82	0.257*
6.94	0.208*
7.05	0.172
7.21	0.163*
7.28	0.179*
7.38	0.196*
7.57	0.200*
7.68	0.196
7.76	0.206*
7.88	0.228*
7.99	0.210
8.08	0.239*
8.17	0.210*
8.23	0.228
8.36	0.217*
8.41	0.223
8.54	0.179
8.61	0.193*
8.74	0.134*
8.87	0.138*
8.97	0.117*
9.12	0.100
9.24	0.108*
9.35	0.115
9.51	0.120
9.61	0.135*
9.68	0.112*

λ	ρ
CURVE 6 (cont.)	
9.81	0.103
9.97	0.116*
10.10	0.119
10.30	0.129
10.40	0.155*
10.48	0.192*
10.61	0.196*
10.70	0.213
10.79	0.220*
10.92	0.215
11.01	0.215*
11.11	0.219*
11.25	0.215
11.41	0.178*
11.55	0.178
11.65	0.194*
11.73	0.179*
11.91	0.161*
12.00	0.153
12.20	0.153
12.29	0.157*
12.37	0.151*
12.51	0.134
12.57	0.147*
12.81	0.135
12.87	0.131
13.01	0.126
13.14	0.126
13.30	0.127*
13.49	0.121
13.60	0.108
13.82	0.111*
14.00	0.107
14.20	0.109
14.39	0.101
14.63	0.097*
14.73	0.092
14.82	0.089*
14.91	0.075
14.98	0.053
CURVE 7	
T = 298	
0.58	0.410
0.63	0.391

λ	ρ
CURVE 7 (cont.)	
0.69	0.391
0.81	0.343
0.90	0.365
1.00	0.398
1.12	0.418
1.19	0.383
1.35	0.377
1.45	0.363
1.58	0.394
1.70	0.372
1.88	0.358
2.06	0.360
2.19	0.340
2.45	0.353
2.67	0.343
2.85	0.324
3.03	0.361
3.21	0.340
3.61	0.374
4.01	0.369
4.20	0.420
4.30	0.324
4.51	0.392
4.73	0.385
4.95	0.393
5.09	0.393
5.24	0.432
5.39	0.432
5.49	0.378
5.61	0.385
5.77	0.296
5.95	0.430
5.98	0.336
6.05	0.303
6.21	0.321
6.33	0.351
6.59	0.359*
6.69	0.359*
6.80	0.318
6.93	0.333
7.03	0.315
7.20	0.283
7.30	0.272
7.40	0.279
7.55	0.255
7.66	0.218

λ	ρ
CURVE 7 (cont.)	
7.76	0.213
7.86	0.236
7.95	0.272
8.03	0.300
8.13	0.309
8.25	0.320
8.36	0.312
8.40	0.321
8.50	0.311
8.60	0.302
8.72	0.296
8.77	0.276
8.86	0.273
8.99	0.271
9.01	0.283
9.12	0.276
9.16	0.296*
9.24	0.299
9.35	0.277*
9.42	0.283
9.52	0.275
9.62	0.295
9.72	0.277
9.81	0.293
9.88	0.307
9.99	0.304
10.01	0.279
10.12	0.294
10.21	0.301
10.32	0.311
10.41	0.271
10.45	0.281
10.52	0.238
10.61	0.192
10.78	0.192*
10.95	0.217*
11.13	0.192
11.16	0.179
11.25	0.190
11.32	0.157*
11.42	0.171*
11.45	0.158*
11.80	0.143
12.17	0.163
12.51	0.206
12.81	0.253

λ	ρ
CURVE 7 (cont.)	
13.10	0.327
13.25	0.258
13.35	0.244
13.45	0.237
13.55	0.252
13.65	0.222*
13.73	0.230*
13.86	0.196*
14.00	0.196
14.15	0.231
14.24	0.211
14.33	0.200
14.46	0.191*
14.52	0.220
14.69	0.210
CURVE 8	
T = 298	
0.51	0.780
0.52	0.816
0.55	0.855
0.57	0.802
0.60	0.893
0.64	0.859
0.69	0.843
0.72	0.857
0.76	0.821
0.78	0.871
0.78	0.836
0.83	0.847
0.87	0.861
0.90	0.898
0.97	0.919
1.02	0.910
1.09	0.909
1.15	0.900
1.23	0.921
1.38	0.904
1.51	0.908
1.65	0.880
1.81	0.893
2.00	0.922
2.14	0.950
2.86	0.961
3.00	0.860

λ	ρ
CURVE 8 (cont.)	
3.17	0.893
3.58	0.890
3.99	0.929
4.03	0.860
4.20	0.860
4.29	0.790
4.48	0.890
4.69	0.873
4.96	0.870
5.11	0.858
5.22	0.888
5.40	0.868
5.50	0.860
5.58	0.822
5.79	0.755
6.19	0.841
6.43	0.841
6.59	0.841
6.69	0.890
6.78	0.840
6.91	0.840*
7.04	0.770
7.18	0.788
7.29	0.788
7.37	0.788*
7.52	0.724
7.64	0.754
7.83	0.771
7.94	0.771*
8.03	0.771
8.11	0.788
8.36	0.768
8.38	0.789
8.50	0.791
8.58	0.769
8.67	0.783
8.72	0.772
8.83	0.800
8.94	0.800
8.99	0.806
9.08	0.801*
9.16	0.818
9.25	0.791
9.34	0.784*
9.39	0.804
9.47	0.790

λ	ρ
CURVE 8 (cont.)	
9.59	0.788
9.69	0.795
9.81	0.790
9.84	0.817*
10.00	0.800
10.10	0.822
10.21	0.800
10.31	0.800
10.39	0.801*
10.51	0.801*
10.61	0.801*
10.71	0.737*
10.75	0.699
10.77	0.750*
10.89	0.750*
11.00	0.737
11.08	0.680*
11.24	0.699
11.28	0.627*
11.41	0.600*
11.44	0.524*
11.55	0.527
11.61	0.552*
11.65	0.569
11.76	0.553*
11.79	0.469*
11.88	0.443*
11.94	0.453*
12.00	0.465
12.09	0.552
12.13	0.583*
12.20	0.627
12.31	0.670*
12.37	0.718
12.39	0.763*
12.51	0.769*
12.56	0.786*
12.63	0.800
12.71	0.786*
12.77	0.769
12.82	0.783
12.91	0.801
12.97	0.791*
13.00	0.800
13.12	0.827*
13.17	0.842*

*Not shown on plot

DATA TABLE NO. 40 (continued)

λ	ρ
CURVE 8 (cont.) T = 298	
13.23	0.865
13.25	0.779
13.32	0.784*
13.34	0.734*
13.46	0.732*
13.52	0.725
13.58	0.695*
13.62	0.683*
13.66	0.669*
13.73	0.681
13 78	0.786*
13.83	0 888
13.89	0.857*
13.95	0.853
13.98	0.870*
14.00	0.895
14.08	0.906*
14.12	0.930
14.17	0.804
14.22	0.683*
14.32	0.664*
14.37	0.680
14.42	0.649*
14.47	0.668*
14.54	0.686*
14.61	0.702*
14.74	0.715
14.82	0.591
14.93	0.856
14.99	0.674

*Not shown on plot

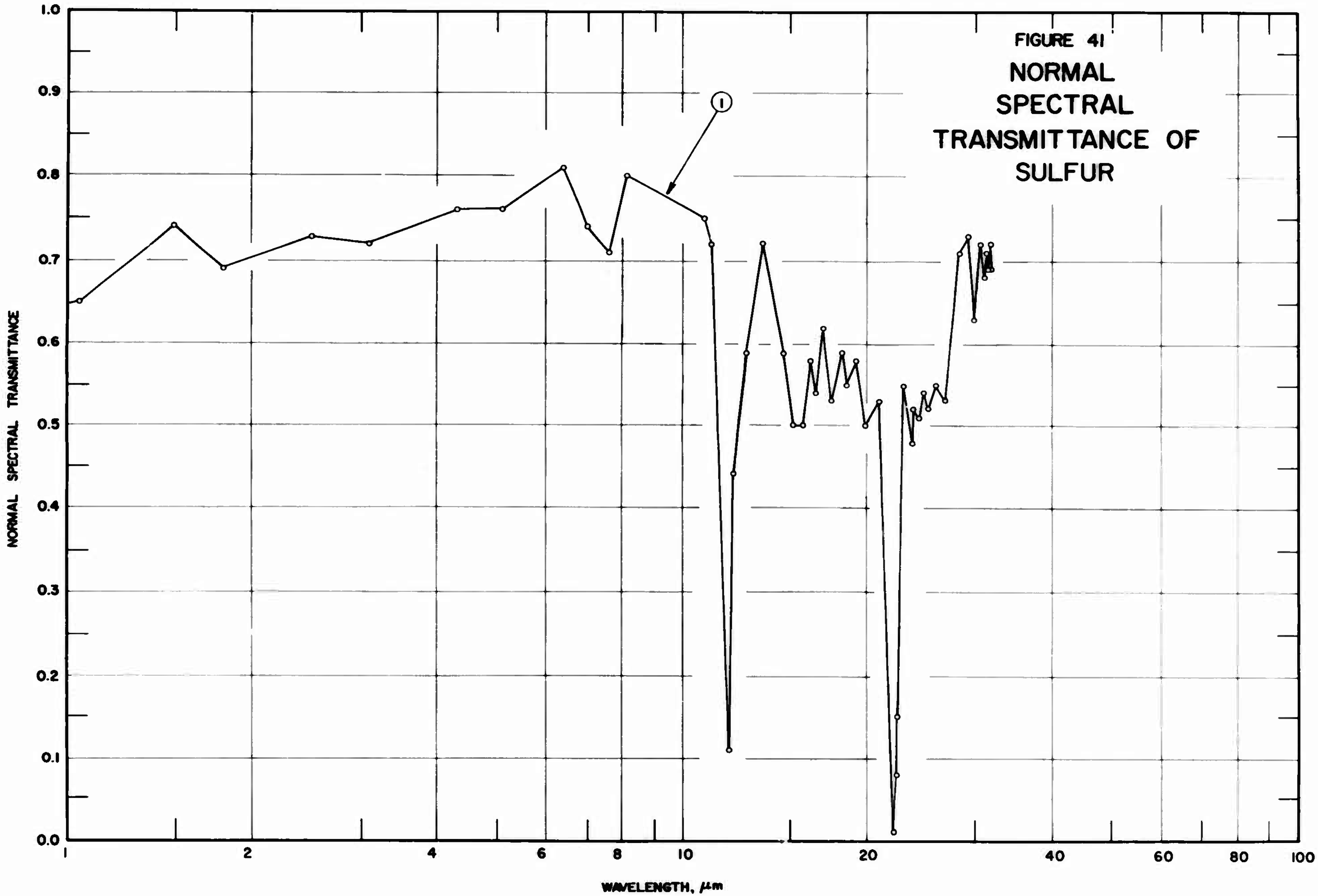


FIGURE 41
NORMAL SPECTRAL TRANSMITTANCE OF SULFUR
1
NORMAL SPECTRAL TRANSMITTANCE
1.0
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0.0
1
2
4
6
8
10
20
40
60
80
100
WAVELENGTH, μm

SPECIFICATION TABLE NO. 41 NORMAL SPECTRAL TRANSMITTANCE OF SULFUR

Curve No.	Ref. No.	Year	Temperature K	Wavelength Range, μm	Geometry θ θ' ω'	Reported Error, %	Composition (weight percent), Specifications and Remarks
1	77	1963	298	0.6–31.8	~0° ~0°		Rhombic sulfur crystal; surfaces were (111) planes; polished; data extracted from smooth curve.

DATA TABLE NO. 41 NORMAL SPECTRAL TRANSMITTANCE OF SULFUR

[Wavelength, λ, μm; Transmittance, τ; Temperature, T, K]

λ	τ	λ	τ	λ	τ
CURVE 1	T = 298	CURVE 1 (cont.)		CURVE 1 (cont.)	
		12.7	0.74	22.9	0.55
0.6	0.62*	13.5	0.72	23.7	0.48
1.1	0.65	14.6	0.59	23.8	0.52
1.5	0.74	15.2	0.50	24.4	0.51
1.8	0.69	15.7	0.50	24.7	0.54
2.5	0.73	16.1	0.58	25.1	0.52
3.1	0.72	16.5	0.54	25.9	0.55
4.3	0.76	16.9	0.62	26.8	0.53
5.1	0.76	17.5	0.53	28.1	0.71
6.4	0.81	18.2	0.59	29.1	0.73
7.0	0.74	18.5	0.55	29.9	0.63
7.6	0.71	19.2	0.58	30.6	0.72
8.1	0.80	19.9	0.50	31.0	0.68
10.8	0.75	21.0	0.53	31.2	0.71
11.3	0.62	22.0	0.01	31.4	0.69
11.9	0.11	22.2	0.08	31.7	0.72
12.1	0.44	22.3	0.25	31.8	0.69

* Not shown on plot

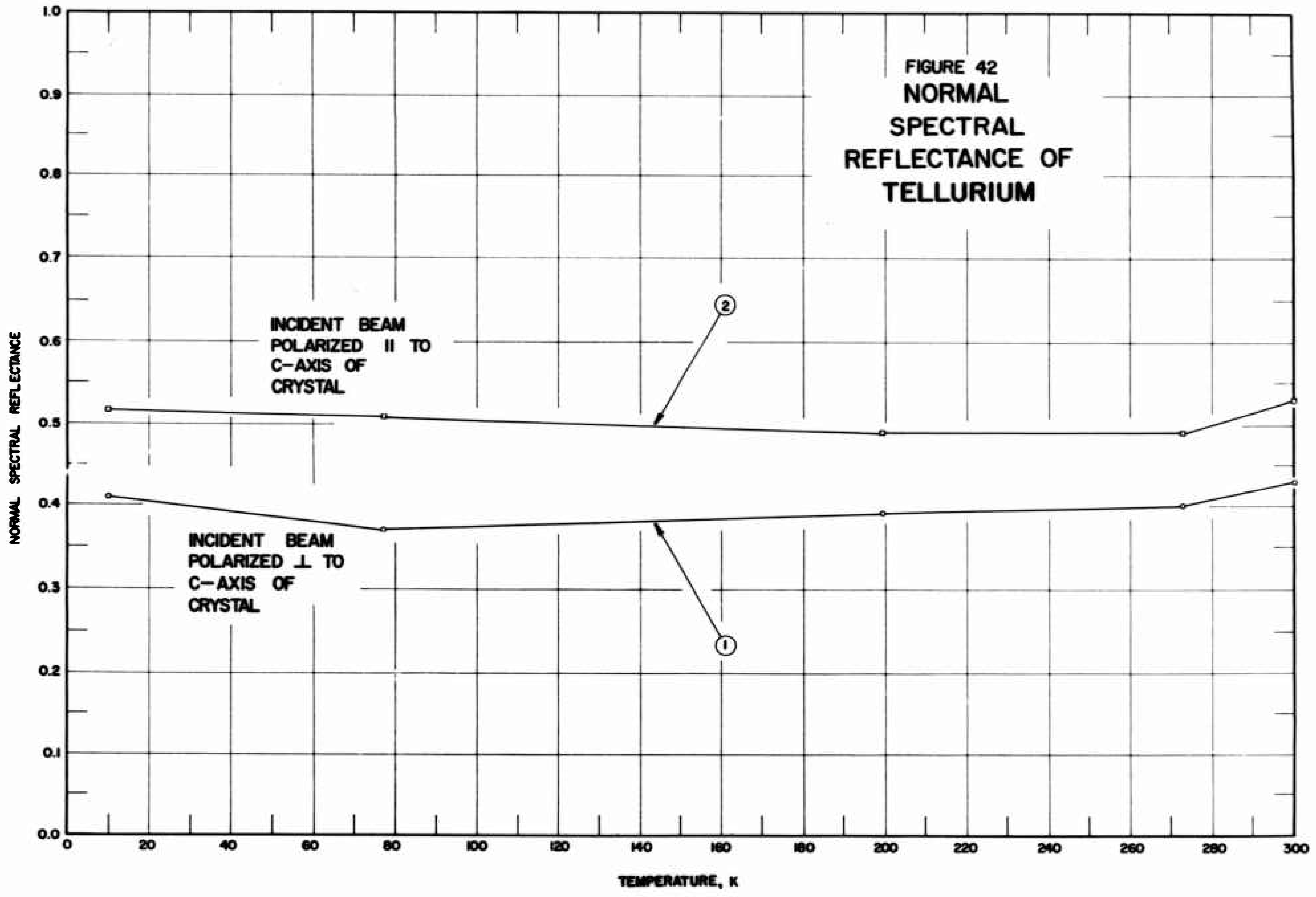


FIGURE 42
NORMAL SPECTRAL REFLECTANCE OF TELLURIUM
INCIDENT BEAM POLARIZED II TO C-AXIS OF CRYSTAL
INCIDENT BEAM POLARIZED ⊥ TO C-AXIS OF CRYSTAL
2
1
NORMAL SPECTRAL REFLECTANCE
TEMPERATURE, K
0.0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
1.0
0
20
40
60
80
100
120
140
160
180
200
220
240
260
280
300

SPECIFICATION TABLE NO. 42 NORMAL SPECTRAL REFLECTANCE OF TELLURIUM

Curve No.	Ref. No.	Year	Wavelength μm	Temperature Range, K	Geometry θ	θ'	ω'	Reported Error, %	Composition (weight percent), Specifications and Remarks
1	90	1969	4.13	10-300	5°	5°		<± 10	Single crystal grown by the Czochralski process in hydrogen atm.; total impurity content less than 6 ppm; hole concentration at 77 K 8×10^{13} cm^{-3}; prepared by cleaving crystal along $(10\bar{1}0)$ plane and polishing with a methanol solution of bromine; incident light polarized perpendicular to c-axis; degree of polarization better than 95%; data extracted from smooth curve; average values from four most flawless specimens.
2	90	1969	4.13	10-300	5°	5°		<± 10	Above specimen and conditions except incident light polarized parallel to c-axis.

DATA TABLE NO. 42 NORMAL SPECTRAL REFLECTANCE OF TELLURIUM

[Wavelength, λ, μm; Reflectance, ρ; Temperature T, K]

T	ρ
CURVE 1	
λ = 4.13 μm	
10	0.41
77	0.37
196	0.39
273	0.40
300	0.43
CURVE 2	
λ = 4.13 μm	
10	0.52
77	0.51
196	0.49
273	0.49
300	0.53

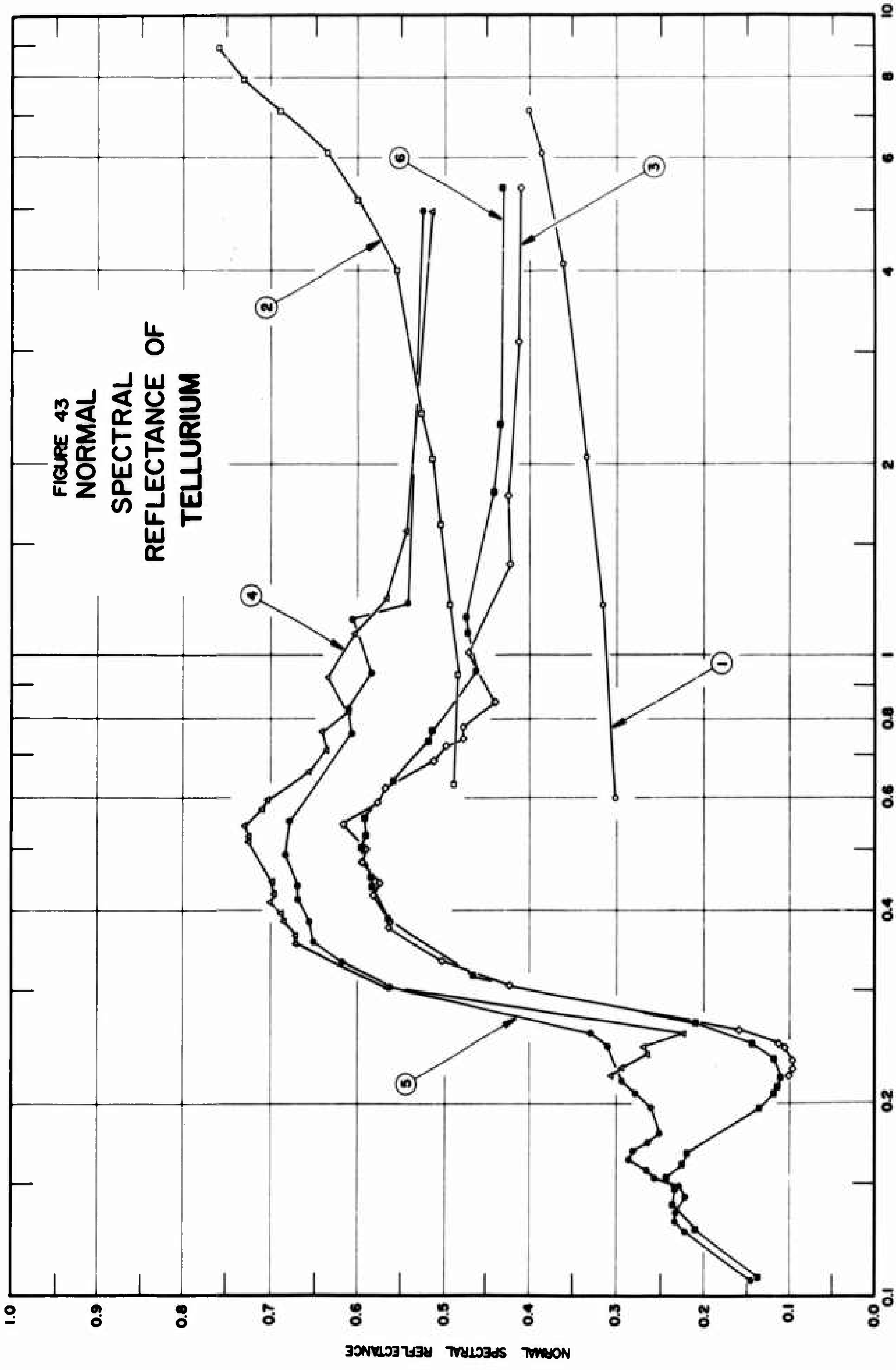


FIGURE 43
NORMAL SPECTRAL REFLECTANCE OF TELLURIUM

SPECIFICATION TABLE NO. 43 NORMAL SPECTRAL REFLECTANCE OF TELLURIUM

Curve No.	Ref. No.	Year	Temperature K	Wavelength Range, μm	Geometry θ	θ'	ω'	Reported Error, %	Composition (weight percent), Specifications and Remarks
1	44	1911	298	0.60-7.10	≤15°	≤15°		≤ 3	Polished.
2	44	1911	298	0.63-8.90	≤15°	≤15°		≤ 3	Prepared by cathode discharge in hydrogen.
3	90	1969	10	0.221-5.39	5°	5°		<±10	Single crystal grown by the Czochralski process in hydrogen atm.; total impurity content less than 6 ppm; hole concentration at 77 K 8 x 10^{13} cm^{-3}; prepared by cleaving crystal along $(10\bar{1}0)$ plane and polishing with a methanol solution of bromine; incident light polarized perpendicular to c-axis; degree of polarization better than 95%; used 20° angle of incidence below 0.225 μm; data extracted from smooth curve; average values from four most flawless specimens.
4	90	1969	10	0.221-4.96	5°	5°		<±10	Curve 3 specimen and conditions except incident light polarized parallel to c-axis.
5	90	1969	300	0.106-4.96	5°	5°		<±10	Above specimen and conditions.
6	90	1969	300	0.107-5.39	5°	5°		<±10	Above specimen and conditions except incident light polarized perpendicular to c-axis.

DATA TABLE NO. 43 NORMAL SPECTRAL REFLECTANCE OF TELLURIUM

[Wavelength, λ, μm; Reflectance, ρ; Temperature, T, K]

λ	ρ
CURVE 1 T = 298	
0.60	0.300
1.20	0.317
2.05	0.335
4.10	0.360
6.10	0.385
7.10	0.400
CURVE 2 T = 298	
0.63	0.490
0.93	0.485
1.20	0.495
1.60	0.505
2.03	0.515
2.40	0.527
4.00	0.557
5.15	0.600
6.10	0.637
7.10	0.690
7.95	0.730
8.90	0.760
CURVE 3 T = 10	
0.221	0.100
0.227	0.096
0.234	0.096
0.245	0.105
0.248	0.112
0.260	0.159
0.305	0.423
0.333	0.502
0.377	0.566
0.384	0.565
0.423	0.583
0.441	0.576
0.477	0.596
0.500	0.591
0.546	0.618
0.590	0.579
0.620	0.570
0.685	0.513
CURVE 3 (cont.)	
0.721	0.499
0.743	0.479
0.775	0.479
0.849	0.440
1.01	0.472
1.39	0.423
1.77	0.426
3.10	0.414
5.39	0.411
CURVE 4 T = 10	
0.221	0.305
0.227	0.294
0.239	0.265
0.245	0.269
0.256	0.324
0.303	0.568
0.355	0.673
0.367	0.673
0.385	0.687
0.397	0.689
0.412	0.700
0.426	0.696
0.443	0.698
0.512	0.723
0.523	0.723
0.541	0.729
0.577	0.709
0.596	0.702
0.660	0.658
0.713	0.636
0.761	0.642
0.816	0.610
0.925	0.635
1.08	0.602
1.23	0.569
1.57	0.543
4.96	0.515
CURVE 5 T = 300	
0.106	0.146
0.126	0.222
0.131	0.233
0.135	0.233
0.143	0.221
0.148	0.229
0.153	0.258
0.157	0.265
0.163	0.287
0.168	0.281
0.174	0.264
0.180	0.251
0.197	0.261
0.207	0.278
0.216	0.294
0.245	0.310
0.257	0.330
0.303	0.564
0.332	0.619
0.359	0.652
0.383	0.657
0.416	0.670
0.436	0.670
0.490	0.684
0.551	0.679
0.756	0.606
0.821	0.610
0.939	0.585
1.14	0.605
2.21	0.541
4.96	0.525
CURVE 6 T = 300	
0.107	0.137
0.127	0.210
0.139	0.237
0.147	0.233
0.153	0.245
0.161	0.226
0.167	0.220
0.197	0.135
0.207	0.119
CURVE 6 (cont.)	
0.212	0.113
0.220	0.110
0.235	0.118
0.248	0.142
0.266	0.210
0.316	0.464
0.386	0.565
0.435	0.584
0.451	0.585
0.502	0.595
0.525	0.592
0.559	0.592
0.639	0.579
0.734	0.518
0.765	0.513
0.947	0.461
1.08	0.472
1.15	0.474
1.80	0.440
2.30	0.435
5.39	0.431

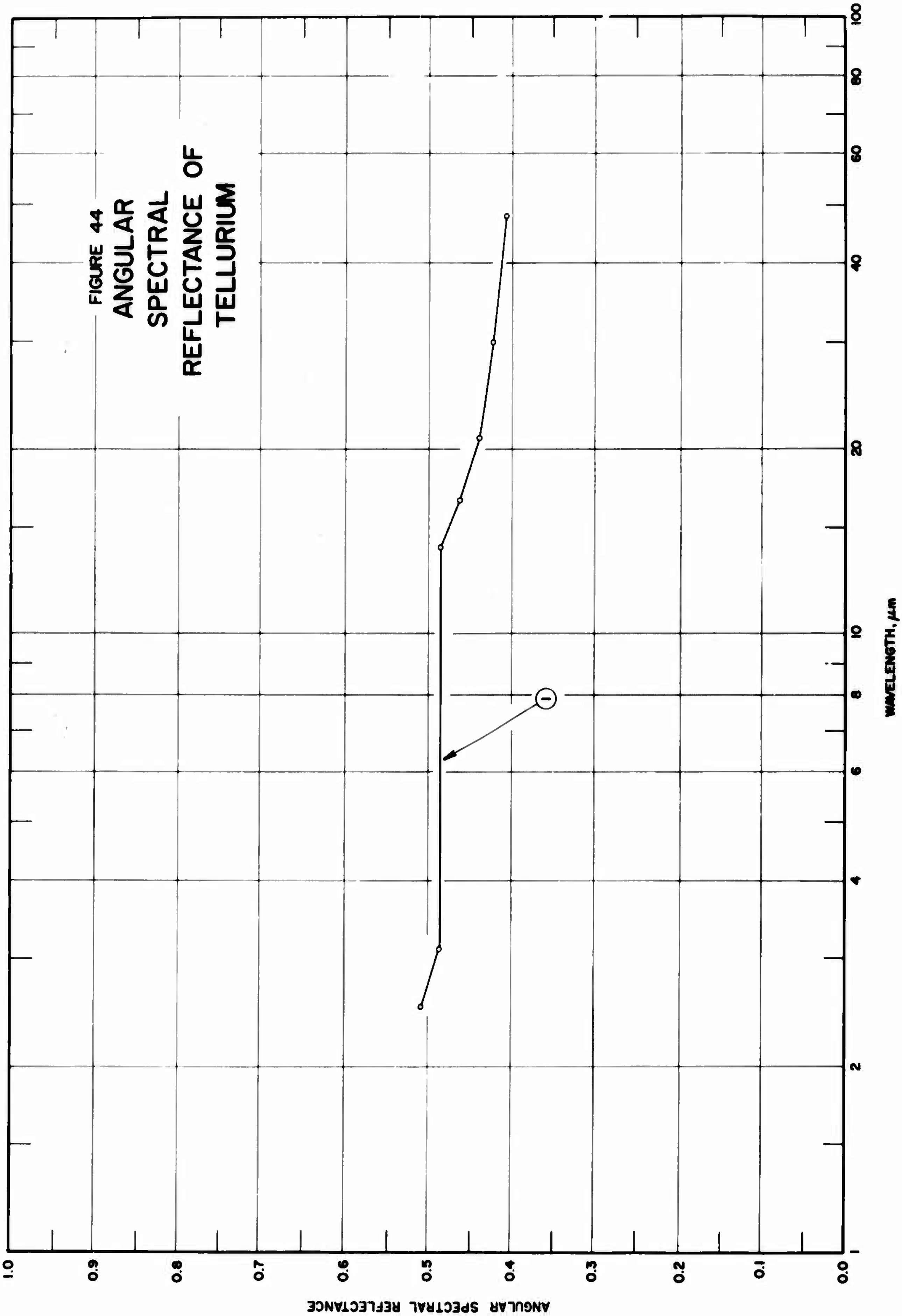


FIGURE 44
ANGULAR SPECTRAL REFLECTANCE OF TELLURIUM

SPECIFICATION TABLE NO. 44 ANGULAR SPECTRAL REFLECTANCE OF TELLURIUM

Curve No.	Ref. No.	Year	Temperature K	Wavelength Range, μm	Geometry θ	θ'	ω'	Reported Error, %	Composition (weight percent), Specifications and Remarks
1	78	1967	313	2.5-47.7	30°	30°			Polycrystalline (3.5 mm thick); ground and polished to 5 fringes or better; data extracted from smooth curve.

DATA TABLE NO. 44 ANGULAR SPECTRAL REFLECTANCE OF TELLURIUM

[Wavelength, λ, μm; Reflectance, ρ; Temperature T, K]

λ	ρ
CURVE 1 T = 313	
2.5	0.509
3.1	0.487
13.8	0.487
16.5	0.462
20.9	0.440
29.9	0.426
47.7	0.408

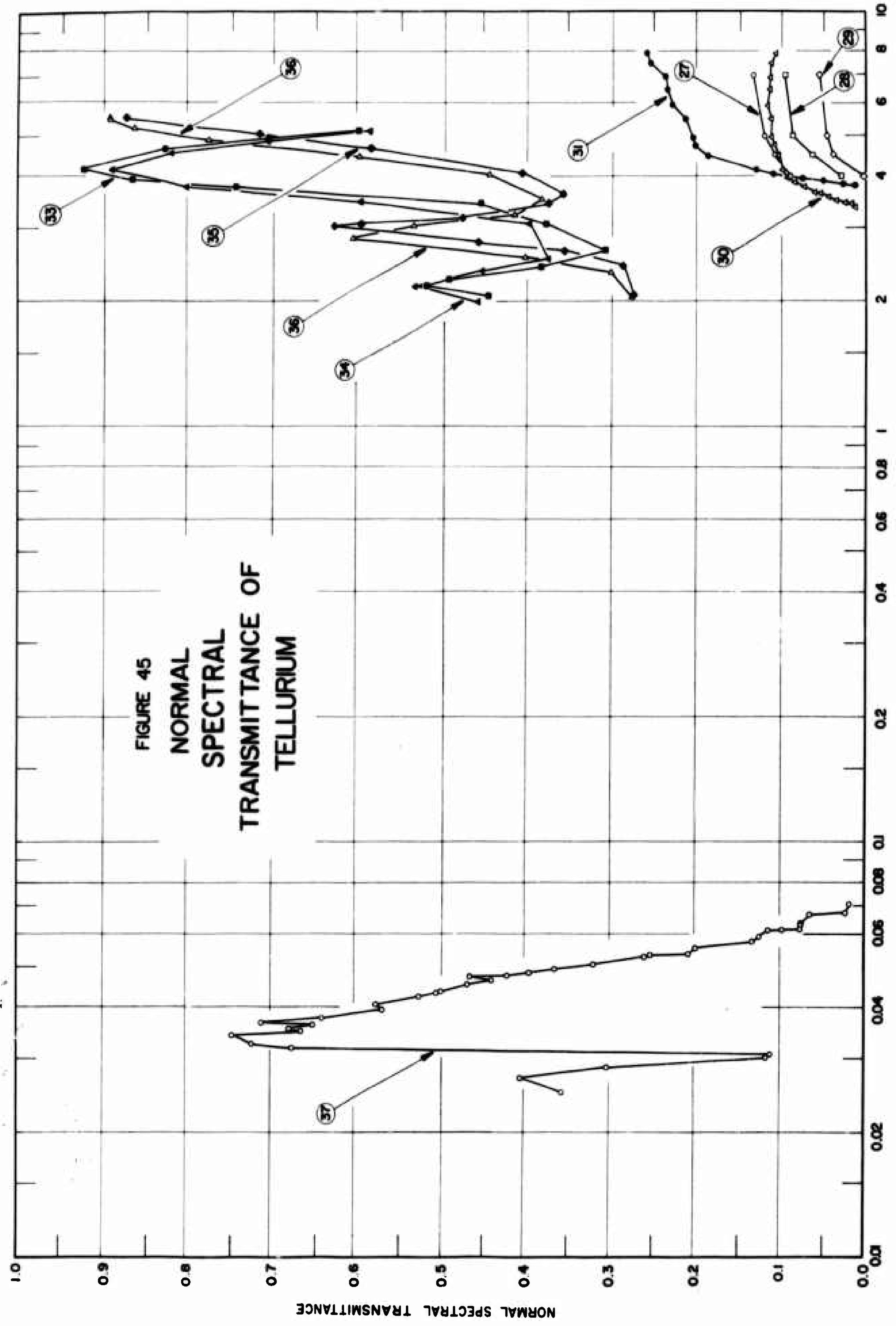


FIGURE 45
NORMAL SPECTRAL TRANSMITTANCE OF TELLURIUM

SPECIFICATION TABLE NO. 45 NORMAL SPECTRAL TRANSMITTANCE OF TELLURIUM

Curve No.	Ref. No.	Year	Temperature K	Wavelength Range, μm	Geometry θ	θ'	ω'	Reported Error, %	Composition (weight percent), Specifications and Remarks
1*	79	1953	298	5	~0°		2π		Single crystal; impurity concentration ~10^{18} cm^{-3}, barely in the intrinsic range at room temp; resistivity ~0.3 ohm cm parallel to c-axis; ground and polished; angle between c-axis and $\bar{E}$ vector of polarized radiation 345 degrees.
2*	79	1953	298	5	~0°		2π		Above specimen and conditions except angle between c-axis and $\bar{E}$ vector of polarized radiation 350 degrees.
3*	79	1953	298	5	~0°		2π		Above specimen and conditions except angle between c-axis and $\bar{E}$ vector of polarized radiation 355 degrees.
4*	79	1953	298	5	~0°		2π		Above specimen and conditions except angle between c-axis and $\bar{E}$ vector of polarized radiation 0 degree.
5*	79	1953	298	5	~0°		2π		Above specimen and conditions except angle between c-axis and $\bar{E}$ vector of polarized radiation 5 degrees.
6*	79	1953	298	5	~0°		2π		Above specimen and conditions except angle between c-axis and $\bar{E}$ vector of polarized radiation 10 degrees.
7*	79	1953	298	5	~0°		2π		Above specimen and conditions except angle between c-axis and $\bar{E}$ vector of polarized radiation 15 degrees.
8*	79	1953	298	5	~0°		2π		Above specimen and conditions except angle between c-axis and $\bar{E}$ vector of polarized radiation 20 degrees.
9*	79	1953	298	5	~0°		2π		Above specimen and conditions except angle between c-axis and $\bar{E}$ vector of polarized radiation 25 degrees.
10*	79	1953	298	5	~0°		2π		Above specimen and conditions except angle between c-axis and $\bar{E}$ vector of polarized radiation 30 degrees.
11*	79	1953	298	5	~0°		2π		Above specimen and conditions except angle between c-axis and $\bar{E}$ vector of polarized radiation 35 degrees.
12*	79	1953	298	5	~0°		2π		Above specimen and conditions except angle between c-axis and $\bar{E}$ vector of polarized radiation 40 degrees.
13*	79	1953	298	5	~0°		2π		Above specimen and conditions except angle between c-axis and $\bar{E}$ vector of polarized radiation 45 degrees.
14*	79	1953	298	5	~0°		2π		Above specimen and conditions except angle between c-axis and $\bar{E}$ vector of polarized radiation 50 degrees.
15*	79	1953	298	5	~0°		2π		Above specimen and conditions except angle between c-axis and $\bar{E}$ vector of polarized radiation 55 degrees.
16*	79	1953	298	5	~0°		2π		Above specimen and conditions except angle between c-axis and $\bar{E}$ vector of polarized radiation 60 degrees.
17*	79	1953	298	5	~0°		2π		Above specimen and conditions except angle between c-axis and $\bar{E}$ vector of polarized radiation 65 degrees.

*Not shown on plot

SPECIFICATION TABLE NO. 45 (continued)

Curve No.	Ref. No.	Year	Temperature K	Wavelength Range, μm	Geometry θ	θ'	ω'	Reported Error, %	Composition (weight percent), Specifications and Remarks
18*	79	1953	298	5	~0°		2π		Above specimen and conditions except angle between c-axis and $\bar{E}$ vector of polarized radiation 70 degrees.
19*	79	1953	298	5	~0°		2π		Above specimen and conditions except angle between c-axis and $\bar{E}$ vector of polarized radiation 75 degrees.
20*	79	1953	298	5	~0°		2π		Above specimen and conditions except angle between c-axis and $\bar{E}$ vector of polarized radiation 80 degrees.
21*	79	1953	298	5	~0°		2π		Above specimen and conditions except angle between c-axis and $\bar{E}$ vector of polarized radiation 85 degrees.
22*	79	1953	298	5	~0°		2π		Above specimen and conditions except angle between c-axis and $\bar{E}$ vector of polarized radiation 90 degrees.
23*	79	1953	298	5	~0°		2π		Above specimen and conditions except angle between c-axis and $\bar{E}$ vector of polarized radiation 95 degrees.
24*	79	1953	298	5	~0°		2π		Above specimen and conditions except angle between c-axis and $\bar{E}$ vector of polarized radiation 100 degrees.
25*	79	1953	298	5	~0°		2π		Above specimen and conditions except angle between c-axis and $\bar{E}$ vector of polarized radiation 105 degrees.
26*	79	1953	298	5	~0°		2π		Above specimen and conditions except angle between c-axis and $\bar{E}$ vector of polarized radiation 110 degrees.
27	79	1953	298	4.0-7.0	~0°		2π		Single crystal (0.065 cm thick); impurity concentration ~10^{18} cm^{-3}; barely in the intrinsic range at room temp; resistivity ~0.3 ohm cm parallel to c-axis; polished and ground; $\bar{E}$ vector perpendicular to c axis.
28	79	1953	298	4.0-7.0	~0°		2π		Similar to the above specimen and conditions except specimen thickness 0.094 cm.
29	79	1953	298	4.0-7.0	~0°		2π		Similar to the above specimen and conditions except specimen thickness 0.140 cm.
30	79	1953	298	3.11-7.93	~0°		2π		Single crystal; impurity concentration ~10^{18} cm^{-3}; barely in the intrinsic range at room temp; resistivity ~0.3 ohm cm parallel to c-axis; ground and polished; $\bar{E}$ vector parallel to c axis.
31	79	1953	298	3.74-7.94	~0°		2π		Similar to the above specimen and conditions.
32*	79	1953	298	3.09-5.46	~0°		2π		Similar to the above specimen and conditions.
33	80	1965	~298	2.06-5.12	~0°		2π	±1	Thickness 2.1 μm; prepared by evaporation in vacuum (1 to 5 x 10^{-5} mm Hg); measured immediately after preparation; data extracted from smooth curve.
34	80	1965	~298	2.00-5.12	~0°		2π	±1	Above specimen and conditions except aged 4 months in air.
35	80	1965	~298	2.07-5.51	~0°		2π	±1	Thickness 2.85 μm; prepared by evaporation in vacuum (1 to 5 x 10^{-5} mm Hg); measured immediately after preparation; data extracted from smooth curve.
36	80	1965	~298	2.06-5.50	~0°		2π	±1	Above specimen and conditions except aged 4 months in air.

*Not shown on plot

SPECIFICATION TABLE NO. 45 (continued)

Curve No.	Ref. No.	Year	Temperature K	Wavelength Range, μm	Geometry θ	θ'	ω'	Reported Error, %	Composition (weight percent), Specifications and Remarks
37	81	1965	298	0.0250-0.0705	~0°	~0°			99.9 Te; Al backed Te film (550 ± 50 Å thick); Al evaporated on glass slide, then Be evaporated over that; evaporations at 2 x 10^{-6} mm Hg in 10-15 sec; error ~10% for $\lambda < 0.035\ \mu$ and <25% for $\lambda < 0.035\ \mu$; data corrected for transmittance of Al and glass.
38*	87	1968	313	2.6-49.6	~0°	~0°			Te (3.5 mm thick); synthetic polycrystal; flat to ten fringes or better; data extracted from smooth curve.
39*	87	1968	313	2.7-49.6	30°	30°			Te (3.5 mm thick); synthetic polycrystal; flat to ten fringes or better; data extracted from smooth curve; aluminum mirror standard.

*Not shown on plot

DATA TABLE NO. 45 NORMAL SPECTRAL TRANSMITTANCE OF TELLURIUM

[Temperature, T, K; Transmittance, τ; Wavelength, λ, μm]

λ	τ
CURVE 1* T = 298	
5	0.0479
CURVE 2* T = 298	
5	0.0454
CURVE 3* T = 298	
5	0.0434
CURVE 4* T = 298	
5	0.0434
CURVE 5* T = 298	
5	0.0455
CURVE 6* T = 298	
5	0.0467
CURVE 7* T = 298	
5	0.0498
CURVE 8* T = 298	
5	0.0515
CURVE 9* T = 298	
5	0.0582
CURVE 10* T = 298	
5	0.0628
CURVE 11* T = 298	
5	0.0706
CURVE 12* T = 298	
5	0.0764
CURVE 13* T = 298	
5	0.0832
CURVE 14* T = 298	
5	0.0873
CURVE 15* T = 298	
5	0.0962
CURVE 16* T = 298	
5	0.0982
CURVE 17* T = 298	
5	0.1029
CURVE 18* T = 298	
5	0.1054
CURVE 19* T = 298	
5	0.1081
CURVE 20* T = 298	
5	0.1107
CURVE 21* T = 298	
5	0.1104
CURVE 22* T = 298	
5	0.1092
CURVE 23* T = 298	
5	0.1081
CURVE 24* T = 298	
5	0.1061
CURVE 25* T = 298	
5	0.1039
CURVE 26* T = 298	
5	0.1000
CURVE 27 T = 298	
4.0	0.0895
4.5	0.108
5.0	0.120
7.0	0.133
CURVE 28 T = 298	
4.0	0.0292
4.5	0.0643
5.0	0.0863
7.0	0.0951
CURVE 29 T = 298	
4.0	0.0108
4.5	0.0386
5.0	0.0468
7.0	0.0568
CURVE 30 T = 298	
3.11	0.000527*
3.14	0.00107*
3.22	0.00208*
3.27	0.00412*
3.32	0.00697*
3.36	0.0114
3.42	0.0161
3.46	0.0237
3.50	0.0334
3.56	0.0436
3.62	0.0532
3.65	0.0617
3.78	0.0743
3.87	0.0838
3.99	0.0916
4.11	0.0988
4.50	0.104
4.79	0.108
4.99	0.112
5.49	0.112
5.96	0.118
6.45	0.114
6.94	0.113
7.44	0.111
7.93	0.107
CURVE 31 T = 298	
3.74	0.00195*
3.76	0.00367*
3.80	0.0106
3.84	0.0271
3.90	0.0504
3.96	0.0750
4.04	0.110
4.12	0.131
4.49	0.185
4.76	0.200
4.96	0.202
5.46	0.213
5.94	0.228
6.46	0.233
6.96	0.236
7.44	0.254
7.94	0.259
CURVE 32* T = 298	
3.09	0.00111
3.15	0.00158
3.19	0.00245
3.24	0.00363
3.28	0.0054
3.33	0.00728
3.37	0.0109
3.43	0.0142
3.48	0.0174
3.53	0.0208
3.58	0.0236
3.64	0.0255
3.67	0.0278
3.73	0.0403
3.77	0.0625
3.82	0.0851
3.86	0.115
3.91	0.134
3.96	0.153
4.02	0.163
4.08	0.173
4.46	0.212
4.76	0.229
CURVE 32 (cont.)*	
4.99	0.230
5.46	0.241
CURVE 33 T ~ 298	
2.06	0.444
2.19	0.520
2.26	0.494
2.42	0.381
2.67	0.306
3.07	0.376
3.45	0.552
3.77	0.746
3.91	0.869
4.14	0.927
4.62	0.830
4.92	0.706
5.12	0.599
CURVE 34 T ~ 298	
2.00	0.457
2.17	0.532
2.38	0.451
2.54	0.374
2.73	0.344
3.08	0.397
3.46	0.596
3.77	0.801
4.12	0.893
4.57	0.823
4.89	0.707
5.12	0.585
CURVE 35 T ~ 298	
2.07	0.273
2.43	0.286
2.63	0.354
2.79	0.457
3.01	0.628
3.09	0.595
CURVE 35 (cont.)	
3.17	0.476
3.42	0.372
3.61	0.356
4.06	0.403
4.68	0.583
5.01	0.718
5.51	0.877
CURVE 36 T ~ 298	
2.06	0.275*
2.35	0.300
2.56	0.401
2.83	0.604
3.01	0.536
3.22	0.413
3.51	0.381
4.01	0.442
4.46	0.599
4.90	0.779
5.20	0.868
5.42	0.896
5.50	0.896
CURVE 37 T = 298	
0.0250	0.356
0.0270	0.404
0.0288	0.302
0.0302	0.177
0.0308	0.111
0.0320	0.678
0.0329	0.725
0.0341	0.749
0.0350	0.668
0.0356	0.680
0.0364	0.652
0.0368	0.712
0.0379	0.641
0.0392	0.568
0.0403	0.573
0.0422	0.526
0.0431	0.507
CURVE 37 (cont.)	
0.0437	0.500
0.0453	0.469
0.0464	0.439
0.0473	0.466
0.0479	0.420
0.0484	0.393
0.0494	0.363
0.0508	0.319
0.0523	0.259
0.0530	0.252
0.0539	0.206
0.0559	0.199
0.0577	0.134
0.0593	0.124
0.0602	0.113
0.0611	0.096
0.0617	0.076
0.0629	0.076
0.0636	0.076
0.0663	0.065
0.0689	0.021
0.0705	0.017
CURVE 38* T = 313	
2.6	0.000
3.8	0.000
4.1	0.029
4.1	0.064
4.7	0.081
5.4	0.093
7.0	0.103
9.1	0.108
15.0	0.110
17.0	0.106
19.1	0.110
20.5	0.103
22.9	0.078
24.8	0.053
25.8	0.059
28.3	0.027
29.8	0.040
32.1	0.002
49.6	0.000

* Not shown on plot

DATA TABLE NO. 45 (continued)

λ	τ
CURVE 39*	
$T = 313$	
2.7	0.505
3.4	0.486
14.2	0.487
15.0	0.476
16.3	0.462
18.5	0.449
20.6	0.438
23.8	0.430
28.4	0.425
33.7	0.420
41.0	0.409
49.6	0.405

* Not shown on plot

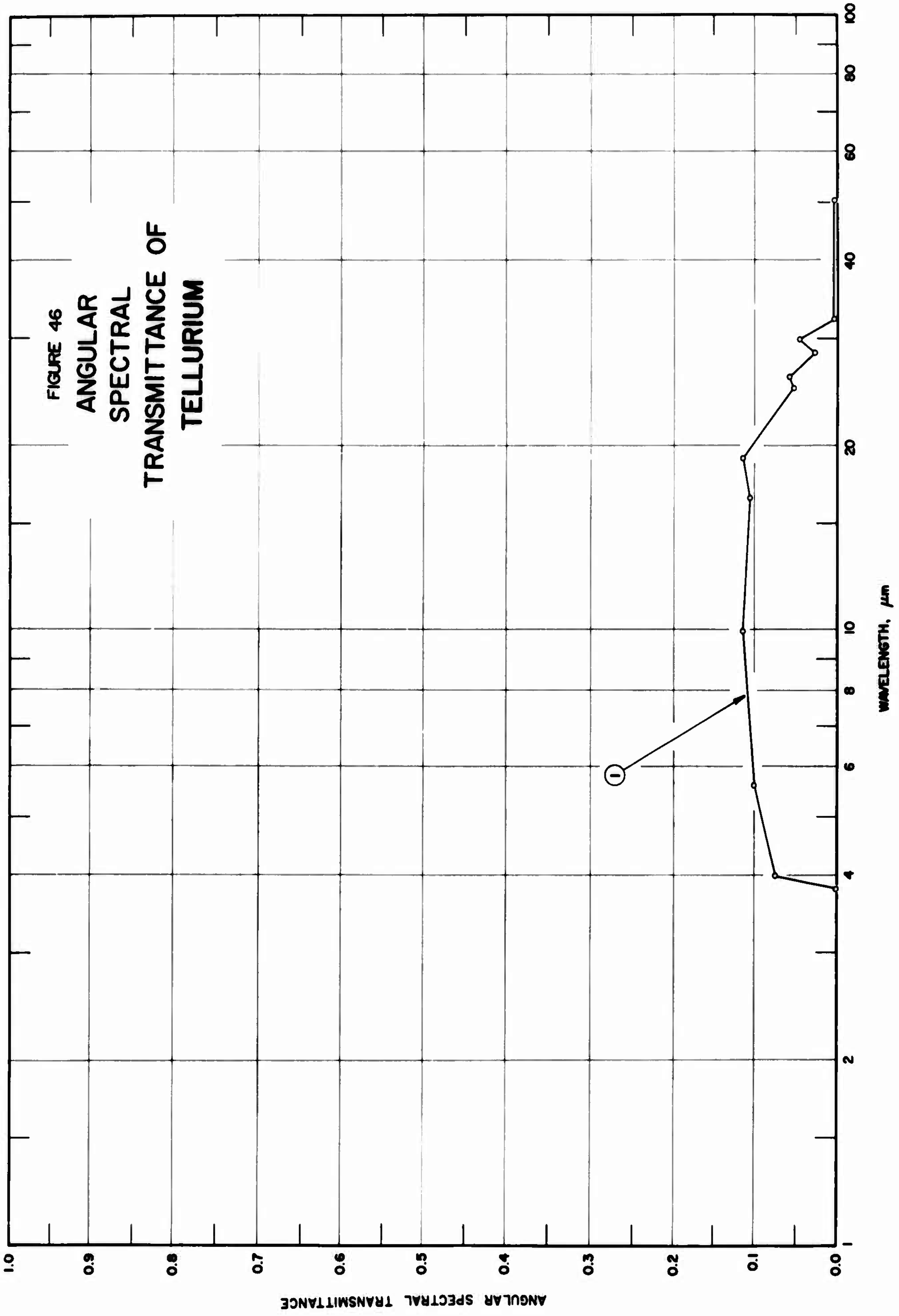


FIGURE 46
ANGULAR SPECTRAL TRANSMITTANCE OF TELLURIUM

SPECIFICATION TABLE NO. 46 ANGULAR SPECTRAL TRANSMITTANCE OF TELLURIUM

Curve No.	Ref. No.	Year	Temperature K	Wavelength Range, μm	Geometry θ	θ'	ω'	Reported Error, %	Composition (weight percent), Specifications and Remarks
1	78	1967	313	3.8-50.0	30°	30°			Polycrystalline (3.5 mm thick); ground and polished to 5 fringes or better; data extracted from smooth curve.

DATA TABLE NO. 46 ANGULAR SPECTRAL TRANSMITTANCE OF TELLURIUM

[Temperature, T, K; Transmittance, τ; Wavelength, λ, μm]

λ	τ
CURVE 1 T = 313	
3.8	0.000
4.0	0.074
5.6	0.100
9.9	0.114
16.4	0.106
19.0	0.114
24.6	0.051
25.8	0.059
28.1	0.027
29.8	0.045
32.0	0.003
50.0	0.003

2. SINGLE OXIDES

SPECIFICATION TABLE NO. 47 HEMISPHERICAL TOTAL EMITTANCE OF ALUMINUM OXIDE Al_2O_3

Curve No.	Ref. No.	Year	Temperature Range, K	Reported Error, %	Composition (weight percent), Specifications and Remarks
1*	105	1965	2000		No details given.

DATA TABLE NO. 47 HEMISPHERICAL TOTAL EMITTANCE OF ALUMINUM OXIDE Al_2O_3

[Temperature, T, K; Emittance, ϵ]

T	ϵ
CURVE 1*	
2000	0.28

* No plot given

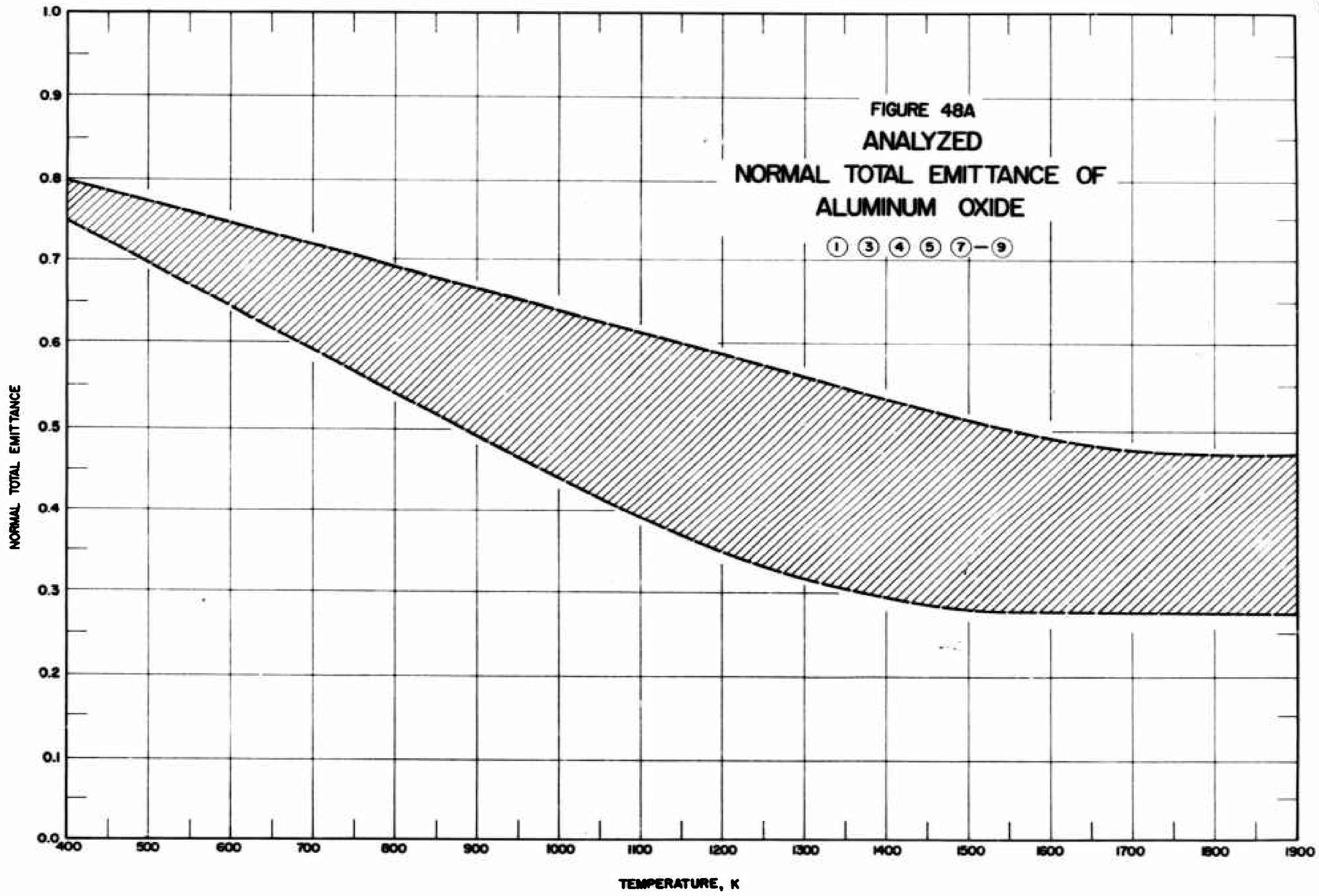


FIGURE 48A
ANALYZED
NORMAL TOTAL EMITTANCE OF
ALUMINUM OXIDE
1 3 4 5 7—9
NORMAL TOTAL EMITTANCE
0.0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
1.0
400
500
600
700
800
900
1000
1100
1200
1300
1400
1500
1600
1700
1800
1900
TEMPERATURE, K

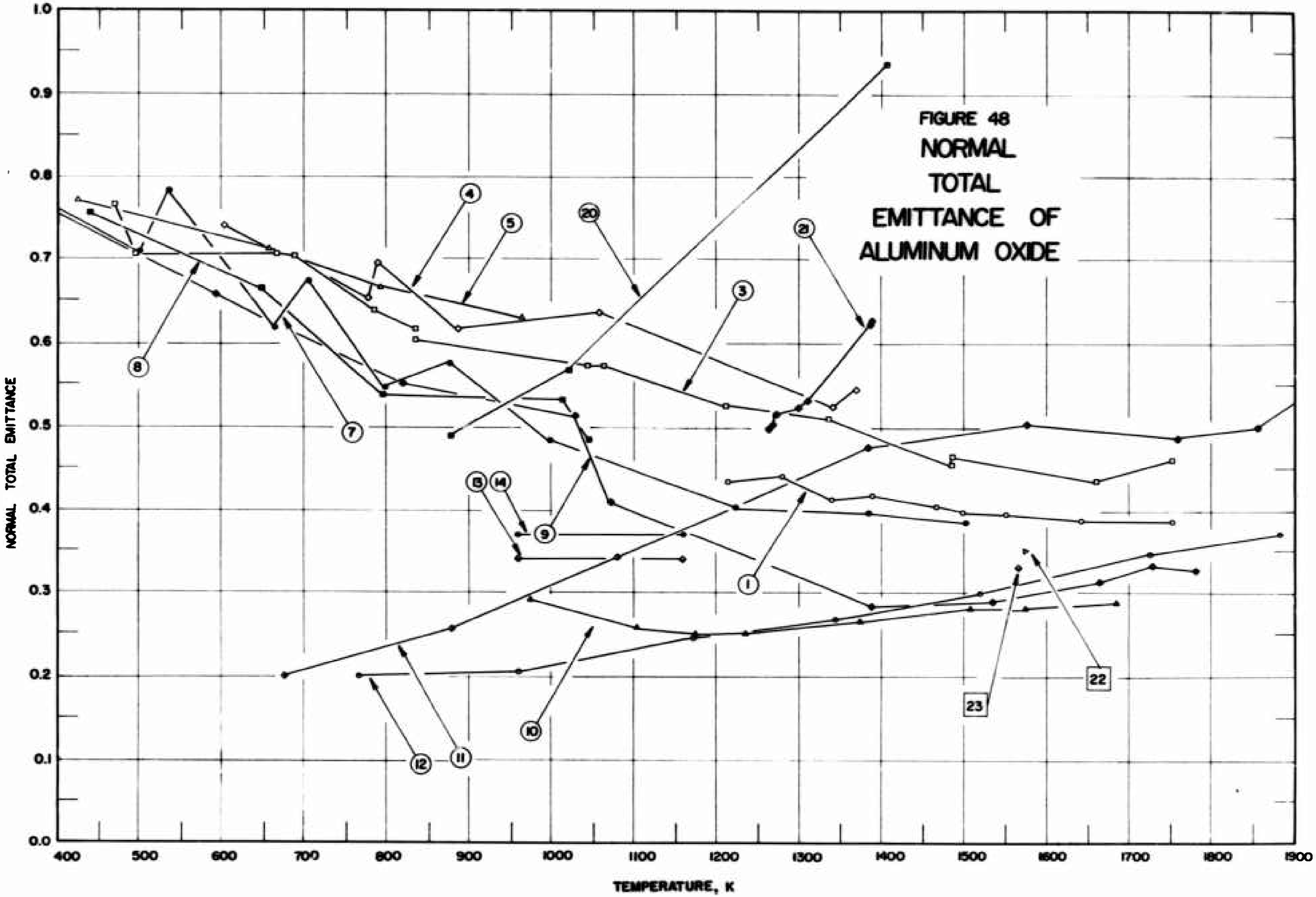


FIGURE 48
NORMAL
TOTAL
EMITTANCE OF
ALUMINUM OXIDE
NORMAL TOTAL EMITTANCE
TEMPERATURE, K
0.0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
1.0
400
500
600
700
800
900
1000
1100
1200
1300
1400
1500
1600
1700
1800
1900
1
3
4
5
7
8
9
10
11
12
13
14
20
21
22
23

SPECIFICATION TABLE NO. 48 NORMAL TOTAL EMITTANCE OF ALUMINUM OXIDE Al_2O_3

Curve No.	Ref. No.	Year	Temperature Range, K	Geometry θ'	Reported Error, %	Composition (weight percent), Specifications and Remarks
1	182	1955	1213-1751	~0°	1	Sintered alumina.
2	106	1959	68.7	~0°		Norton LA 603 aluminum oxide; measured in air; Cycle one.
3	106	1959	470-1751	~0°		Above specimen and conditions.
4	106	1959	603-1369	~0°		Curve 2 specimen and conditions; Cycle two.
5	106	1959	425-961	~0°		Curve 2 specimen and conditions; Cycle three.
6	106	1959	73.2	~0°		Norton RA 4213 aluminum oxide; measured in air; Cycle one.
7	106	1959	362-1500	~0°		Above specimen and conditions.
8	106	1959	441-1044	~0°		Curve 6 specimen and conditions; Cycle two.
9	106	1959	336-1780	~0°		Curve 6 specimen and conditions; Cycle three.
10	183	1955	973-1683	~0°		Cylinder formed from dense alumina; measured in vacuum; average of values from two different methods.
11	184	1960	675-1930	0°	~10	Frenchtown alumina 4402; ground to size, ultrasonically cleaned, polished with 1-5 μm diamond polishing compound until normally mat surface began to reflect light; cleaned, polished with cloth charged with a paste of cerium oxide and kerosene; measured in vacuum.
12	184	1960	765-1881	0°	~10	Coors alumina AD 99; ground to size, ultrasonically cleaned, surface polished with 1-5 μm diamond polishing compound until normally mat surface began to reflect light; cleaned, polished with cloth charged with a paste of cerium oxide and kerosene; measured in vacuum.
13	185	1964	958-1158	~0°		Cold pressed and sintered at 1973 K; porosity 9.7%.
14	185	1964	958-1158	~0°		Cold pressed and sintered at 1973 K; porosity 14%.
15*	185	1964	958-1158	~0°		Cold pressed and sintered at 1973 K; porosity 19%.
16*	185	1964	958-1158	~0°		Cold pressed and sintered at 1973 K; porosity 23%.
17*	185	1964	958-1158	~0°		Cold pressed and sintered at 1973 K; porosity 30%.
18*	185	1964	958-1158	~0°		Cold pressed and sintered at 1973 K; surface roughness < 20 μ in.
19*	185	1964	958-1158	~0°		Cold pressed and sintered at 1973 K; surface roughness > 20 μ in.
20	31	1961	875-1408	~0°		Polycrystalline; cleaned; measured in vacuum (10^{-5} mm Hg); each value is the average of several measurements.
21	31	1961	1263-1389	~0°		Polycrystalline; measured in vacuum (10^{-5} mm Hg).
22	186	1965	1573	~0°		Pure.
23	186	1965	1563	~0°		Pure.

*Not shown on plot

DATA TABLE NO. 48 NORMAL TOTAL EMITTANCE OF ALUMINUM OXIDE Al_2O_3

[Temperature, T, K; Emittance, ∈]

T	∈
CURVE 1	
1213	0.435
1278	0.441
1538	0.413
1389	0.418
1466	0.403
1498	0.399
1550	0.395
1641	0.388
1751	0.387
CURVE 2	
68.7	0.724
CURVE 3	
470	0.766
496	0.707
666	0.705
687	0.703
782	0.639
833	0.618
833	0.602
1042	0.574
1061	0.574
1210	0.525
1334	0.510
1484	0.452
1485	0.465
1660	0.437
1751	0.460
CURVE 4	
603	0.740
778	0.651
789	0.696
884	0.618
1056	0.637
1340	0.523
1369	0.545
CURVE 5	
425	0.771
656	0.711
791	0.666
961	0.630
CURVE 6	
73.2	0.700
CURVE 7	
362	0.770*
500	0.709
536	0.783
664	0.618
703	0.672
799	0.548
875	0.578
999	0.484
1221	0.403
1384	0.398
1500	0.385
CURVE 8	
441	0.756
647	0.664
794	0.538
1011	0.531
1044	0.484
CURVE 9	
336	0.778*
594	0.659
819	0.551
1070	0.410
1387	0.332
1532	0.289
1663	0.311
1728	0.331
1780	0.327
CURVE 10	
973	0.290
1101	0.258
1173	0.250
1233	0.250
1373	0.264
1505	0.280
1573	0.280
1683	0.286
CURVE 11	
675	0.200
876	0.257
1079	0.342
1383	0.475
1575	0.502
1758	0.486
1855	0.500
1930	0.545*
CURVE 12	
765	0.200
959	0.203
1170	0.247
1344	0.268
1518	0.299
1725	0.347
1881	0.370
CURVE 13	
958	0.34
1158	0.34
CURVE 14	
958	0.37
1158	0.37
CURVE 15*	
958	0.34
1158	0.34
CURVE 16*	
958	0.35
1158	0.35
CURVE 17*	
958	0.35
1158	0.35
CURVE 18*	
958	0.35
1158	0.35
CURVE 19*	
958	0.36
1158	0.36
CURVE 20	
875	0.489
1020	0.569
1408	0.936
CURVE 21	
1263	0.499
1268	0.502
1271	0.516
1299	0.522
1310	0.530
1386	0.622
1389	0.626
CURVE 22	
1573	0.35
CURVE 23	
1573	0.35

* Not shown on plot

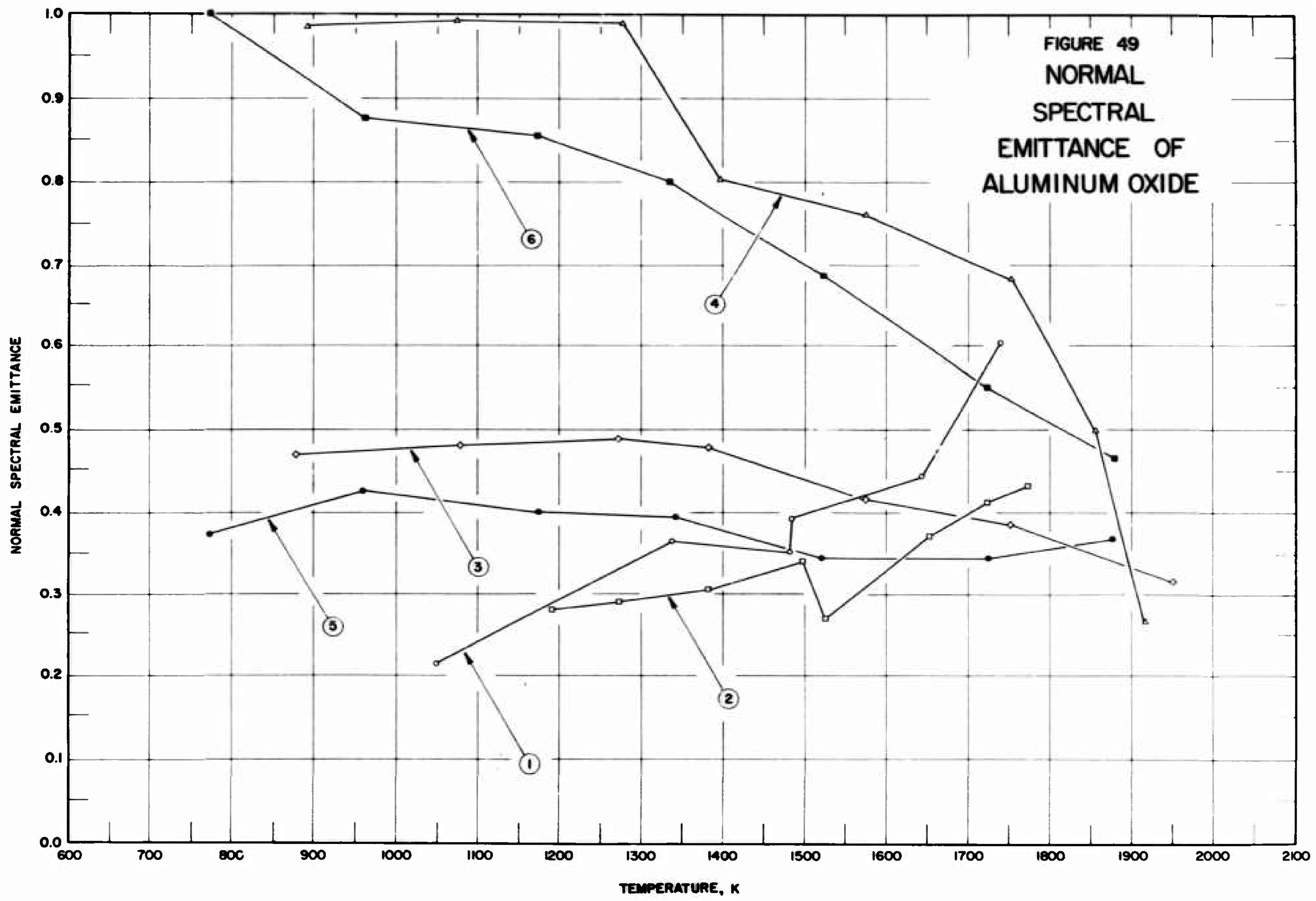


FIGURE 49
NORMAL
SPECTRAL
EMITTANCE OF
ALUMINUM OXIDE

SPECIFICATION TABLE NO. 49 NORMAL SPECTRAL EMITTANCE OF ALUMINUM OXIDE Al_2O_3

Curve No.	Ref. No.	Year	Wavelength, μm	Temperature Range, K	Geometry θ'	Reported Error, %	Composition (weight percent), Specifications, and Remarks
1	106	1959	0.665	1050-1740	~0°		Norton LA 603 aluminum oxide.
2	106	1959	0.665	1191-1773	~0°		Norton RA 4213 aluminum oxide.
3	184	1960	0.640	878-1953	0°	~10	Frenchtown alumina 4402; ground to size, ultrasonically cleaned, surface polished with 1-5 μm diamond polishing compound until normally mat surface began to reflect light; cleaned, polished with cloth charged with a paste of cerium oxide and kerosene; measured in vacuum.
4	184	1960	1	891-1919	0°	~10	Above specimen and conditions.
5	184	1960	0.640	773-1878	0°	~10	Coors alumina AD 99; ground to size, ultrasonically cleaned, surface polished with 1-5 μm diamond polishing compound until normally mat surface began to reflect light; cleaned, polished with cloth charged with a paste of cerium oxide and kerosene; measured in vacuum.
6	184	1960	1	773-1880	0°	~10	Above specimen and conditions.

DATA TABLE NO. 49 NORMAL SPECTRAL EMITTANCE OF ALUMINUM OXIDE Al_2O_3

[Temperature, T, K; Emittance, ∈; Wavelength, λ, μm]

T	∈	T	∈	T	∈	T	∈
CURVE 1		CURVE 2 (cont.)		CURVE 4		CURVE 5 (cont.)	
λ = 0.665		1724	0.414	λ = 1		1521	0.347
		1773	0.434			1726	0.347
1050	0.213			891	0.985	1878	0.370
1339	0.366	CURVE 3		1075	0.992		
1482	0.353	λ = 0.640		1278	0.990	CURVE 6	
1485	0.394			1397	0.803	λ = 1	
1645	0.445	878	0.468	1576	0.762		
1740	0.603	1079	0.480	1754	0.681	773	1.000
		1272	0.489	1858	0.500	962	0.876
CURVE 2		1384	0.479	1919	0.267	1173	0.857
λ = 0.665		1576	0.418			1335	0.800
		1751	0.388	CURVE 5		1524	0.687
1191	0.280	1953	0.319	λ = 0.640		1724	0.550
1273	0.290					1880	0.468
1382	0.307			773	0.372		
1499	0.341			960	0.425		
1526	0.270			1175	0.400		
1654	0.372			1342	0.395		

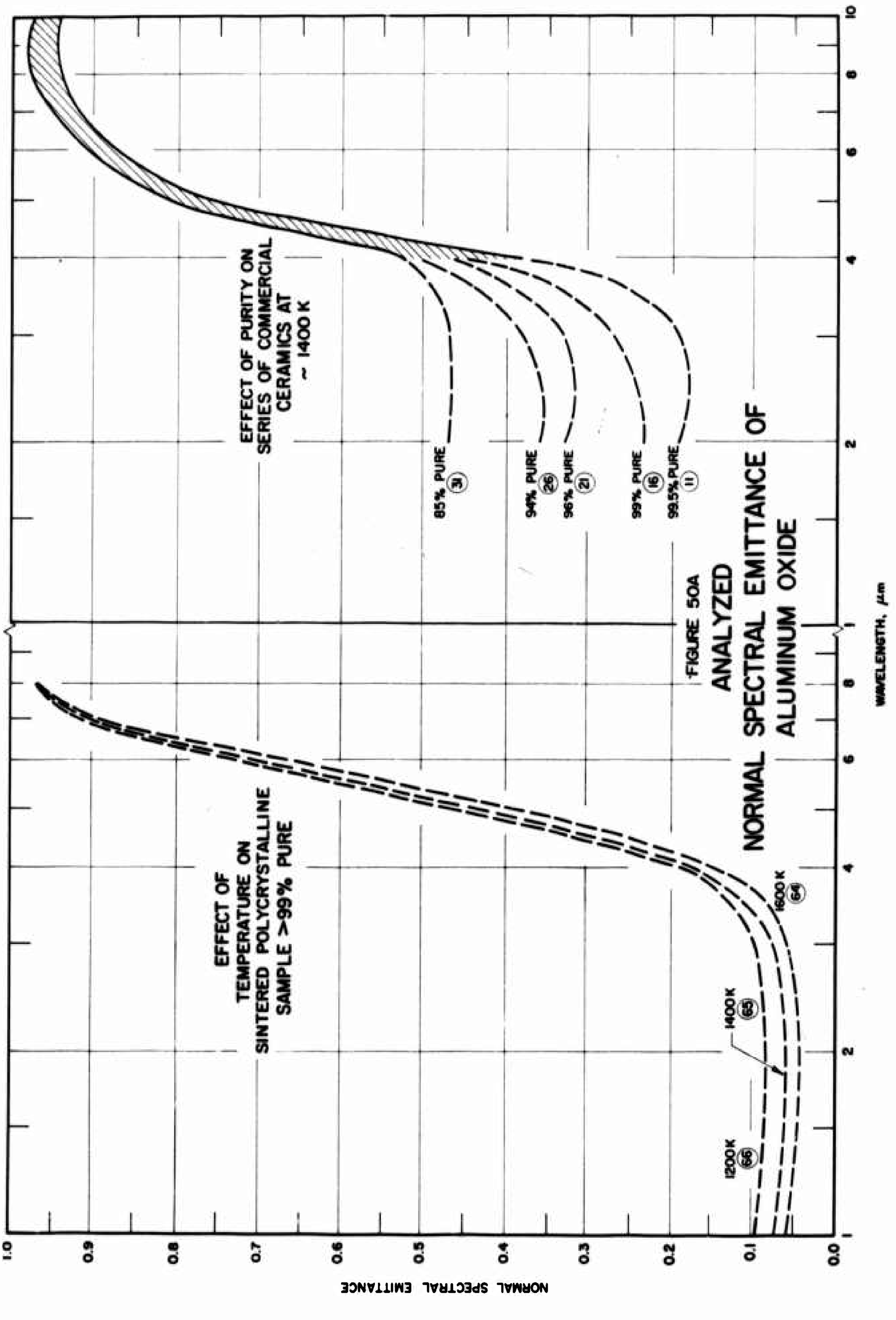


FIGURE 50A
ANALYZED
NORMAL SPECTRAL EMITTANCE OF
ALUMINUM OXIDE

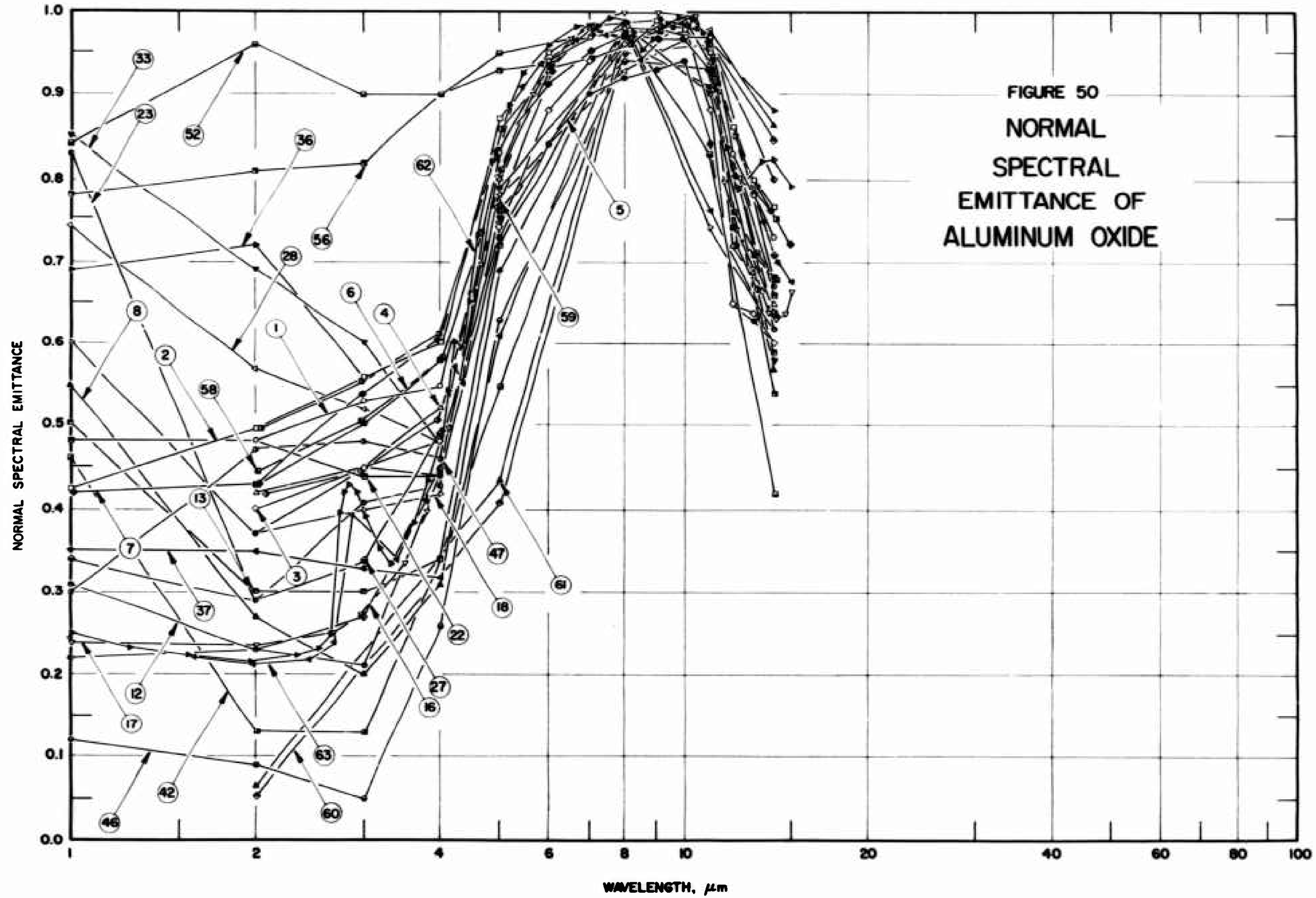


FIGURE 50
NORMAL SPECTRAL EMITTANCE OF ALUMINUM OXIDE

SPECIFICATION TABLE NO. 50 NORMAL SPECTRAL EMITTANCE OF ALUMINUM OXIDE Al_2O_3

Curve No.	Ref. No.	Year	Temperature, K	Wavelength Range, μm	Geometry θ'	Reported Error, %	Composition (weight percent), Specifications, and Remarks
1	109	1960	873	2.0-14.0	$\sim 0°$	±4	Coors alumina AD 85; measured in air.
2	109	1960	1303	1.0-14.0	$\sim 0°$	±4	Above specimen and conditions.
3	109	1960	873	2.0-14.0	$\sim 0°$	±4	Coors alumina AD 99; 99 Al_2O_3; measured in air.
4	109	1960	1303	2.0-14.0	$\sim 0°$	±4	Above specimen and conditions.
5	109	1960	873	2.0-14.0	$\sim 0°$	±4	Norton A 402 TWA No. 2; 98.56 Al_2O_3; measured in air.
6	109	1960	1323	2.0-14.0	$\sim 0°$	±4	Above specimen and conditions.
7	187	1963	823	1.01-14.9	$\sim 0°$		Norton 5190 alumina.
8	188	1964	814	1-14	$\sim 0°$	~~0.5~~ 10	Coors AD 995; 99.5 Al_2O_3.
9*	188	1964	1055	1-14	$\sim 0°$	~~0.5~~ 10	Above specimen and conditions.
10*	188	1964	1127	1-14	$\sim 0°$	~~0.5~~ 10	Above specimen and conditions.
11*	188	1964	1410	1-14	$\sim 0°$	~~0.5~~ 10	Above specimen and conditions.
12	188	1964	1592	1-14	$\sim 0°$	~~0.5~~ 10	Above specimen and conditions.
13	188	1964	813	1-14	$\sim 0°$	~~0.5~~ 10	Coors AD 99; 99 Al_2O_3.
14*	188	1964	1053	1-14	$\sim 0°$	~~0.5~~ 10	Above specimen and conditions.
15*	188	1964	1188	1-14	$\sim 0°$	~~0.5~~ 10	Above specimen and conditions.
16	188	1964	1423	1-14	$\sim 0°$	~~0.5~~ 10	Above specimen and conditions.
17	188	1964	1423	1.00-15.0	$\sim 0°$	~~0.5~~ 10	Coors AD 99; data extracted from smooth curve.
18	188	1964	822	1-14	$\sim 0°$	~~0.5~~ 10	Coors AD 96; 96 Al_2O_3.
19*	188	1964	1063	1-14	$\sim 0°$	~~0.5~~ 10	Above specimen and conditions.
20*	188	1964	1183	1-14	$\sim 0°$	~~0.5~~ 10	Above specimen and conditions.
21*	188	1964	1401	1-14	$\sim 0°$	~~0.5~~ 10	Above specimen and conditions.
22	188	1964	1526	1-14	$\sim 0°$	~~0.5~~ 10	Above specimen and conditions.
23	188	1964	813	1-14	$\sim 0°$	~~0.5~~ 10	Coors AD 94; 94 Al_2O_3.
24*	188	1964	1035	1-14	$\sim 0°$	~~0.5~~ 10	Above specimen and conditions.
25*	188	1964	1220	1-14	$\sim 0°$	~~0.5~~ 10	Above specimen and conditions.
26*	188	1964	1423	1-14	$\sim 0°$	~~0.5~~ 10	Above specimen and conditions.
27	188	1964	1591	1-14	$\sim 0°$	~~0.5~~ 10	Above specimen and conditions.
28	188	1964	811	1-14	$\sim 0°$	~~0.5~~ 10	Coors AD 85; 85 Al_2O_3.
29*	188	1964	1053	1-14	$\sim 0°$	~~0.5~~ 10	Above specimen and conditions.
30*	188	1964	1208	1-14	$\sim 0°$	~~0.5~~ 10	Above specimen and conditions.

* Not shown on plot

SPECIFICATION TABLE NO. 50 (continued)

Curve No.	Ref. No.	Year	Temperature K	Wavelength Range, μm	Geometry θ'	Reported Error, %	Composition (weight percent), Specifications, and Remarks
31*	188	1964	1413	1-14	$\sim 0°$	~~0.5~~ 10	Above specimen and conditions.
32	188	1964	1513	1-14	$\sim 0°$	~~0.5~~ 10	Above specimen and conditions.
33	188	1964	813	1-14	$\sim 0°$	~~0.5~~ 10	Coors AD 96 +1% $CoCO_3$ Linde single crystal.
34*	188	1964	1053	1-14	$\sim 0°$	~~0.5~~ 10	Above specimen and conditions.
35*	188	1964	1188	1-14	$\sim 0°$	~~0.5~~ 10	Above specimen and conditions.
36	188	1964	1423	1-14	$\sim 0°$	~~0.5~~ 10	Above specimen and conditions.
37	188	1964	822	1-14	$\sim 0°$	~~0.5~~ 10	McDanel AP-35, slip cast; 99 Al_2O_3.
38*	188	1964	1063	1-14	$\sim 0°$	~~0.5~~ 10	Above specimen and conditions.
39*	188	1964	1183	1-14	$\sim 0°$	~~0.5~~ 10	Above specimen and conditions.
40*	188	1964	1401	1-14	$\sim 0°$	~~0.5~~ 10	Above specimen and conditions.
41	188	1964	1523	1-14	$\sim 0°$	~~0.5~~ 10	Above specimen and conditions.
42	188	1964	833	1-14	$\sim 0°$	~~0.5~~ 10	McDanel AP-35, isostatically pressed; 99 Al_2O_3.
43*	188	1964	1037	1-14	$\sim 0°$	~~0.5~~ 10	Above specimen and conditions.
44*	188	1964	1208	1-14	$\sim 0°$	~~0.5~~ 10	Above specimen and conditions.
45*	188	1964	1395	1-14	$\sim 0°$	~~0.5~~ 10	Above specimen and conditions.
46	188	1964	1572	1-14	$\sim 0°$	~~0.5~~ 10	Above specimen and conditions.
47	188	1964	814	1-14	$\sim 0°$	~~0.5~~ 10	McDanel AV-30; vitrified Alumina; 96 Al_2O_3.
48*	188	1964	1053	1-14	$\sim 0°$	~~0.5~~ 10	Above specimen and conditions.
49*	188	1964	1125	1-14	$\sim 0°$	~~0.5~~ 10	Above specimen and conditions.
50*	188	1964	1408	1-14	$\sim 0°$	~~0.5~~ 10	Above specimen and conditions.
51	188	1964	1592	1-14	$\sim 0°$	~~0.5~~ 10	Above specimen and conditions.
52	188	1964	813	1-14	$\sim 0°$	~~0.5~~ 10	GE Lucalox; cold-pressed and sintered; MgO added to control grain growth.
53*	188	1964	1034	1-14	$\sim 0°$	~~0.5~~ 10	Above specimen and conditions.
54*	188	1964	1220	1-14	$\sim 0°$	~~0.5~~ 10	Above specimen and conditions.
55*	188	1964	1413	1-14	$\sim 0°$	~~0.5~~ 10	Above specimen and conditions.
56	188	1964	1595	1-14	$\sim 0°$	~~0.5~~ 10	Above specimen and conditions.
57	111	1964	1303	0.92-14.0	0°	≤ 4	Coors AD 85, 85 Al_2O_3; ultrasonically machined; measured in air.
58	111	1964	1303	2.02-14.0	0°	≤ 4	Coors AD 99, 99 Al_2O_3; ultrasonically machined; measured in air.
59	111	1964	1323	2.07-14.0	0°	≤ 4	Norton TWA No. 2, A 402; 98.5 Al_2O_3; ultrasonically machined; measured in air.
60	189	1965	1400	2-14	0°		No details given.

*Not shown on plot

SPECIFICATION TABLE NO. 50 (continued)

Curve No.	Ref. No.	Year	Temperature K	Wavelength Range, μm	Geometry θ'	Reported Error, %	Composition (weight percent), Specifications, and Remarks
61	189	1965	1400	2-14	0°		No details given.
62	328	1966	~298	1.00-15.0	0°		AD-5 alumina; data extracted from smooth curve.
63	328	1966	~298	1.00-15.0	0°		Above specimen and conditions except grit blasted.
64*	338	1966	1600	1.0-15.0	$\sim 0^\circ$		Polycrystal cylinder > 99 pure (0.1875 in wall thickness); outer surface smooth but not polished; sintered at 1865 K for 27 hrs; porosity 30 percent by volume; average of two readings on each of three specimens.
65*	338	1966	1400	1.0-15.0	$\sim 0^\circ$		Above specimens and conditions.
66*	338	1966	1200	1.0-15.0	$\sim 0^\circ$		Above specimens and conditions.
67*	394	1966	1255	1.00-14.5	$\sim 0^\circ$		Al_2O_3 pure slab; 8.13 mm thick, data extracted from smooth curve.
68	362	1964	885	1.00-15.0	$\sim 0^\circ$		Al_2O_3; 99.9% pure powder (1 μm partical size), Linde Co.; sintered 2 hrs at 2023 K; data extracted from smooth curve.
69	362	1964	993	1.00-15.0	$\sim 0^\circ$		Above specimen and conditions.
70	362	1964	1148	1.00-15.0	$\sim 0^\circ$		Above specimen and conditions.
71	362	1964	1273	1.00-15.0	$\sim 0^\circ$		Above specimen and conditions.
72	362	1964	373	1.00-15.0	$\sim 0^\circ$		Above specimen and conditions except calculated from spectral reflectance.
73	382	1965	1273	1.00-15.0	$\sim 0^\circ$		Al_2O_3; sintered 1 hr at 1973 K; data extracted from smooth curve.
74	382	1965	1273	1.00-15.0	$\sim 0^\circ$		Above specimen and conditions except heated at 1273 K in measuring apparatus for 1 hr total.
75	382	1965	1273	1.00-15.0	0°		Above specimen and conditions except heated at 1273 K in measuring apparatus for 2 hrs total.
76	382	1965	1273	1.00-15.0	0°		Above specimen and conditions except heated at 1273 K in measuring apparatus for 4 hrs total.

*Not shown on plot

DATA TABLE NO. 50 NORMAL SPECTRAL EMITTANCE OF ALUMINUM OXIDE

[Wavelength, λ, μm; Emittance, ∈; Temperature, T, K]

λ	∈
CURVE 1 T = 873	
2.0	0.48
3.0	0.53
4.0	0.55
5.0	0.83
6.0	0.94
7.0	0.97
8.0	0.98
9.0	0.98
10.0	0.97
11.0	0.97
12.0	0.83
13.0	0.78
14.0	0.73
CURVE 2 T = 1303	
1.0	0.425
2.0	0.495
3.0	0.560
4.0	0.600
5.0	0.870
6.0	0.950
7.0	0.970*
8.0	0.980*
9.0	0.990
10.0	0.980
11.0	0.950
12.0	0.860
13.0	0.800
14.0	0.765
CURVE 3 T = 873	
2.0	0.40
3.0	0.45
4.0	0.48
5.0	0.74
6.0	0.88
7.0	0.94
8.0	0.96
9.0	0.98*
CURVE 3 (cont.)	
10.0	0.98*
11.0	0.88
12.0	0.65
13.0	0.64
14.0	0.60
CURVE 4 T = 1303	
2.0	0.42
3.0	0.45*
4.0	0.52
5.0	0.80
6.0	0.93
7.0	0.98
8.0	0.97
9.0	0.99*
10.0	0.99
11.0	0.94
12.0	0.72
13.0	0.68
14.0	0.65
CURVE 5 T = 873	
2.0	0.37
3.0	0.45*
4.0	0.44
5.0	0.73
6.0	0.84
7.0	0.90
8.0	0.92
9.0	0.93
10.0	0.94
11.0	0.84
12.0	0.65*
13.0	0.63
14.0	0.60*
CURVE 6 T = 1323	
2.0	0.43
3.0	0.50
CURVE 6 (cont.)	
4.0	0.58
5.0	0.83*
6.0	0.94*
7.0	0.90*
8.0	0.97*
9.0	0.99*
10.0	0.99*
11.0	0.94*
12.0	0.74
13.0	0.71
14.0	0.68
CURVE 7 T = 823	
1.01	0.421
2.01	0.481
2.99	0.539
3.97	0.602
4.97	0.831
6.00	0.912
7.01	0.952
8.00	0.971
9.02	0.968
9.97	0.969
10.9	0.931
12.0	0.805
13.0	0.781
13.9	0.760
14.9	0.722
CURVE 8 T = 814	
1	0.55
2	0.27
3	0.20
4	0.31
5	0.69
8	0.98*
11	0.88*
14	0.57
CURVE 9* T = 1055	
1	0.40
2	0.21
3	0.19
4	0.35
5	0.72
8	0.98
11	0.91
14	0.60
CURVE 10* T = 1127	
1	0.32
2	0.19
3	0.18
4	0.37
5	0.75
8	0.97
11	0.92
14	0.68
CURVE 11* T = 1410	
1	0.27
2	0.19
3	0.19
4	0.39
5	0.77
8	0.97
11	0.94
14	0.59
CURVE 12 T = 1592	
1	0.31
2	0.23
3	0.21
4	0.44*
5	0.79
8	0.96*
11	0.94*
14	0.62
CURVE 13 T = 813	
1	0.50
2	0.30
3	0.30
4	0.34
5	0.72
8	0.98*
11	0.90
14	0.59
CURVE 14* T = 1053	
1	0.36
2	0.30
3	0.29
4	0.38
5	0.77
8	0.96
11	0.94
14	0.64
CURVE 15* T = 1188	
1	0.29
2	0.26
3	0.17
4	0.39
5	0.78
8	0.98
11	0.94
14	0.63
CURVE 16 T = 1423	
1	0.22
2	0.23*
3	0.27
4	0.45
5	0.79*
8	0.98*
11	0.96
14	0.80
CURVE 17 T = 1423	
1.00	0.240
2.00	0.237
2.65	0.251
2.97	0.271
3.50	0.336
3.80	0.399
4.13	0.497
4.65	0.698
4.99	0.801
5.68	0.900
6.51	0.968
7.00	0.983
8.00	1.000
9.33	1.000
10.0	0.996
11.0	0.948
11.6	0.799
12.0	0.739
12.9	0.691
13.7	0.640
14.0	0.631
14.5	0.639
15.0	0.662
CURVE 18 T = 822	
1	0.60
2	0.37*
3	0.40
4	0.42
5	0.72*
8	0.98*
11	0.74
14	0.62*
CURVE 19* T = 1063	
1	0.63
2	0.34
3	0.38
4	0.43
5	0.74
CURVE 19 (cont.)*	
8	0.98
11	0.92
14	0.65
CURVE 20* T = 1183	
1	0.41
2	0.33
3	0.34
4	0.45
5	0.69
8	0.98
11	0.95
14	0.69
CURVE 21* T = 1401	
1	0.29
2	0.33
3	0.33
4	0.46
5	0.81
8	0.98
11	0.95
14	0.74
CURVE 22 T = 1526	
1	0.48
2	0.48*
3	0.44
4	0.44*
5	0.80*
8	0.98*
11	0.93
14	0.66
CURVE 23 T = 813	
1	0.83
2	0.39
CURVE 23 (cont.)	
3	0.41
4	0.43
5	0.76
8	0.96*
11	0.91
14	0.67
CURVE 24* T = 1035	
1	0.46
2	0.29
3	0.40
4	0.45
5	0.75
8	0.96
11	0.93
14	0.66
CURVE 25* T = 1220	
1	0.39
2	0.28
3	0.38
4	0.38
5	0.76
8	0.95
11	0.92
14	0.67
CURVE 26* T = 1423	
1	0.32
2	0.30
3	0.37
4	0.37
5	0.77
8	0.94
11	0.93
14	0.72

* Not shown on plot

DATA TABLE NO. 50 (continued)

λ	ε
CURVE 27	
T = 1591	
1	0.34
2	0.29*
3	0.34
4	0.49
5	0.79*
8	0.94
11	0.93*
14	0.71
CURVE 28	
T = 811	
1	0.74
2	0.57
3	0.52
4	0.48*
5	0.78
8	0.93
11	0.98
14	0.68*
CURVE 29*	
T = 1053	
1	0.65
2	0.52
3	0.51
4	0.51
5	0.80
8	0.98
11	0.98
14	0.73
CURVE 30*	
T = 1208	
1	0.47
2	0.50
3	0.59
4	0.51
5	0.81
8	0.98
11	0.98
14	0.70

λ	ε
CURVE 31*	
T = 1413	
1	0.36
2	0.47
3	0.47
4	0.52
5	0.82
8	0.97
11	0.93
14	0.72
CURVE 32	
T = 1513	
1	0.32
2	0.43
3	0.44
4	0.51
5	0.81
8	0.97
11	0.93
14	0.73
CURVE 33	
T = 813	
1	0.85
2	0.69
3	0.60
4	0.48*
5	0.75
8	0.98*
11	0.95*
14	0.58
CURVE 34*	
T = 1053	
1	0.57
2	0.72
3	0.59
4	0.52
5	0.77
8	0.99
11	0.95
14	0.72

λ	ε
CURVE 35*	
T = 1188	
1	0.60
2	0.70
3	0.57
4	0.52
5	0.78
8	0.97
11	0.95
14	0.71
CURVE 36	
T = 1423	
1	0.69
2	0.72
3	0.56*
4	0.58*
5	0.79*
8	0.98*
11	0.96*
14	0.88
CURVE 37	
T = 822	
1	0.35
2	0.35
3	0.33
4	0.32
5	0.61
8	0.98*
11	0.76
14	0.62*
CURVE 38*	
T = 1063	
1	0.54
2	0.29
3	0.29
4	0.33
5	0.60
8	0.98
11	0.83
14	0.65

λ	ε
CURVE 39*	
T = 1183	
1	0.44
2	0.29
3	0.31
4	0.34
5	0.64
8	0.98
11	0.95
14	0.67
CURVE 40*	
T = 1401	
1	0.34
2	0.27
3	0.31
4	0.31
5	0.65
8	0.98
11	0.95
14	0.70
CURVE 41	
T = 1523	
1	0.30
2	0.25
3	0.33
4	0.32
5	0.67
8	0.98
11	0.97
14	0.68
CURVE 42	
T = 833	
1	0.46
2	0.18
3	0.13
4	0.34*
5	0.55
8	0.96*
11	0.93*
14	0.64

λ	ε
CURVE 43*	
T = 1037	
1	0.43
2	0.18
3	0.18
4	0.28
5	0.60
8	0.96
11	0.93
14	0.62
CURVE 44*	
T = 1208	
1	0.35
2	0.17
3	0.18
4	0.28
5	0.71
8	0.97
11	0.94
14	0.64
CURVE 45*	
T = 1395	
1	0.21
2	0.13
3	0.15
4	0.29
5	0.63
8	0.95
11	0.94
14	0.59
CURVE 46	
T = 1572	
1	0.12
2	0.09
3	0.05
4	0.26
5	0.63
8	0.95
11	0.96*
14	0.57*

λ	ε
CURVE 47	
T = 814	
1	0.30
2	0.47
3	0.48
4	0.46
5	0.76*
8	0.98*
11	0.95*
14	0.58*
CURVE 48*	
T = 1053	
1	0.50
2	0.43
3	0.46
4	0.47
5	0.77
8	0.98
11	0.94
14	0.61
CURVE 49*	
T = 1125	
1	0.46
2	0.39
3	0.40
4	0.46
5	0.78
8	0.97
11	0.92
14	0.66
CURVE 50*	
T = 1408	
1	0.34
2	0.40
3	0.40
4	0.49
5	0.78
8	0.97
11	0.93
14	0.60

λ	ε
CURVE 51	
T = 1592	
1	0.30
2	0.36
3	0.39
4	0.50
5	0.80
8	0.96
11	0.91
14	0.62
CURVE 52	
T = 813	
1	0.84
2	0.96
3	0.90
4	0.90
5	0.95
8	0.98*
11	0.83
14	0.42
CURVE 53*	
T = 1034	
1	0.86
2	0.90
3	0.83
4	0.90
5	0.94
8	0.95
11	0.90
14	0.49
CURVE 54*	
T = 1220	
1	0.89
2	0.86
3	0.83
4	0.89
5	0.95
8	0.95
11	0.89
14	0.45

λ	ε
CURVE 55*	
T = 1413	
1	0.84
2	0.85
3	0.83
4	0.89
5	0.94
8	0.94
11	0.90
14	0.49
CURVE 56	
T = 1595	
1	0.78
2	0.81
3	0.82
4	0.90*
5	0.93
8	0.95*
11	0.93*
14	0.54
CURVE 57	
T = 1303	
0.92	0.424*
2.04	0.497
2.96	0.556
3.99	0.611
5.01	0.859
6.06	0.931
7.07	0.941
8.17	0.960
9.07	0.991
10.0	0.988
11.0	0.941
12.0	0.850
13.1	0.492
14.0	0.750
CURVE 58	
T = 1303	
2.02	0.446
2.99	0.503

* Not shown on plot

DATA TABLE NO. 50 (continued)

CURVE 58 (cont.) T = 1303

λ	ε
4.03	0.581
5.03	0.811
6.08	0.939
7.03	0.981
8.13	0.969
9.10	0.979
10.0	0.981*
11.0	0.929
12.0	0.759
13.1	0.711
14.0	0.679

CURVE 59 T = 1323

λ	ε
2.07	0.420
2.96	0.447
3.97	0.504
4.99	0.763
6.09	0.930
7.08	0.972
8.13	0.964*
9.13	0.981
10.1	0.983*
11.0	0.912
12.0	0.720
13.1	0.667
14.0	0.633

CURVE 60 T = 1400

λ	ε
2	0.053
5	0.410
8	0.969*
11	0.964*
14	0.845

CURVE 61 T = 1400

λ	ε
2	0.066
5	0.436
8	0.976
11	0.975
14	0.861

CURVE 62 T ~ 298

λ	ε
1.00	0.251
1.24	0.234
1.55	0.224
1.96	0.217
2.32	0.223
2.52	0.231
2.66	0.251
2.73	0.397
2.78	0.421
2.83	0.431
2.92	0.422
3.01	0.391
3.18	0.353
3.31	0.336
3.61	0.384
3.81	0.436
4.01	0.491
4.13	0.545
4.21	0.602
4.34	0.595
4.46	0.652
4.60	0.732
4.86	0.822
5.19	0.888
5.48	0.927
6.00	0.959
6.66	0.982
7.21	0.992
7.57	0.994
8.02	0.988
8.27	0.976
8.51	0.954
8.86	0.969
9.38	0.988
9.76	0.994
10.3	0.994
10.7	0.977
11.0	0.953*
11.3	0.907
11.6	0.837
12.1	0.791
12.3	0.789
13.4	0.822
14.0	0.825
15.0	0.791

CURVE 63 T ~ 298

λ	ε
1.00	0.245
1.57	0.221
1.98	0.212
2.45	0.218
2.66	0.240
2.86	0.394
3.39	0.341
3.77	0.414
4.00	0.491*
4.21	0.572
4.35	0.553
4.53	0.662
4.68	0.736
4.98	0.825
5.42	0.910
5.84	0.939
6.68	0.967
7.44	0.976
7.99	0.986
8.49	0.942
9.08	0.971*
9.57	0.983
10.0	0.986*
10.4	0.982
10.8	0.963
11.3	0.914
12.1	0.808*
12.6	0.770*
13.3	0.747
14.2	0.700
15.0	0.675

CURVE 64* T = 1600

λ	ε
1.0	0.097
1.5	0.088
2.0	0.085
2.5	0.089
3.0	0.097
3.5	0.125
4.0	0.177
4.5	0.316
5.0	0.459
5.5	0.595
6.0	0.715

CURVE 64 (cont.)*

λ	ε
6.5	0.832
7.0	0.912
7.5	0.955
8.0	0.973
8.5	0.944
9.0	0.967
9.5	0.981
10.0	0.986
10.5	0.986
11.0	0.971
11.5	0.921
12.0	0.873
12.5	0.856
13.0	0.852
13.5	0.852
14.0	0.846
14.5	0.833
15.0	0.813

CURVE 65* T = 1400

λ	ε
1.0	0.073
1.5	0.063
2.0	0.061
2.5	0.065
3.0	0.075
3.5	0.106
4.0	0.169
4.5	0.287
5.0	0.431
5.5	0.572
6.0	0.696
6.5	0.821
7.0	0.910
7.5	0.956
8.0	0.975
8.5	0.947
9.0	0.973
9.5	0.985
10.0	0.989
10.5	0.987
11.0	0.972
11.5	0.909
12.0	0.860
12.5	0.848
13.0	0.849

CURVE 65 (cont.)*

λ	ε
13.5	0.848
14.0	0.841
14.5	0.830
15.0	0.813

CURVE 66* T = 1200

λ	ε
1.0	0.060
1.5	0.046
2.0	0.042
2.5	0.045
3.0	0.058
3.5	0.080
4.0	0.141
4.5	0.248
5.0	0.389
5.5	0.530
6.0	0.653
6.5	0.789
7.0	0.892
7.5	0.945
8.0	0.968
8.5	0.939
9.0	0.965
9.5	0.978
10.0	0.984
10.5	0.982
11.0	0.958
11.5	0.885
12.0	0.836
12.5	0.833
13.0	0.833
13.5	0.833
14.0	0.828
14.5	0.814
15.0	0.799

CURVE 67* T = 1255

λ	ε
1.00	0.132
1.27	0.130
2.04	0.094
2.55	0.081
2.95	0.087
3.27	0.107

CURVE 67 (cont.)*

λ	ε
3.85	0.183
4.28	0.326
4.40	0.361
4.59	0.380
5.11	0.401
5.41	0.423
5.66	0.448
5.87	0.481
6.13	0.531
6.28	0.573
6.47	0.649
6.53	0.715
6.63	0.781
6.85	0.870
7.15	0.936
7.39	0.965
7.69	0.981
8.02	0.990
8.55	0.993
8.93	0.978
9.39	0.976
9.86	0.980
10.1	0.979
10.5	0.966
10.8	0.941
11.1	0.906
11.4	0.859
11.6	0.840
11.9	0.830
12.4	0.824
13.3	0.823
14.1	0.810
14.5	0.799

CURVE 68 T = 885

λ	ε
1.00	0.104
3.09	0.104
3.78	0.113
3.98	0.134
4.11	0.166
4.92	0.425
5.26	0.521
6.16	0.722
6.35	0.753
7.08	0.832

CURVE 68 (cont.)

λ	ε
7.78	0.849
8.79	0.862
9.19	0.875
10.4	0.882
10.6	0.868
10.8	0.846
11.0	0.805
11.4	0.674
11.6	0.593
11.7	0.575
12.5	0.579
12.8	0.605
13.7	0.587
14.0	0.570
14.8	0.561
15.0	0.551

CURVE 69 T = 993

λ	ε
1.00	0.104
3.09	0.104
3.59	0.112
3.74	0.122
3.98	0.163
4.13	0.206
4.78	0.423
5.57	0.633
5.95	0.708
6.59	0.796
6.83	0.816
7.08	0.832
7.78	0.849
8.79	0.862
9.19	0.875
10.4	0.882
10.6	0.875
10.8	0.849
11.0	0.799
11.4	0.683
11.6	0.639
11.8	0.613
12.5	0.616
13.0	0.623
13.5	0.608
14.1	0.597
14.7	0.571
15.0	0.551

CURVE 70 T = 1148

λ	ε
1.00	0.104
3.09	0.104
3.33	0.115
3.59	0.126
3.87	0.170
4.59	0.456
5.14	0.606
5.71	0.733
6.18	0.808
6.75	0.864
7.42	0.888
10.4	0.914
10.7	0.901
11.1	0.836
11.3	0.787
11.5	0.722
11.7	0.690
12.0	0.655
12.9	0.658
14.0	0.647
14.7	0.608
15.0	0.601

CURVE 71 T = 1273

λ	ε
1.00	0.104
3.09	0.109
3.30	0.115
3.60	0.140
3.78	0.163
4.01	0.240
4.62	0.504
5.00	0.613
5.43	0.713
6.15	0.826
6.65	0.870
7.24	0.896
9.46	0.916
10.4	0.923
10.6	0.917
11.1	0.847
11.6	0.727
11.8	0.703
12.0	0.687
12.3	0.673
13.8	0.665

* Not shown on plot

DATA TABLE NO. 50 (continued)

CURVE 71 (cont.)
T = 1273

λ	∈
14.5	0.641
15.0	0.614

CURVE 72
T = 373

λ	∈
1.00	0.183
3.35	0.174
4.04	0.189
4.26	0.216
4.91	0.384
5.21	0.458
5.51	0.568
5.79	0.671
6.15	0.773
6.41	0.820
6.68	0.857
7.00	0.872
7.67	0.894
10.3	0.908
10.6	0.867
10.8	0.821
11.4	0.566
11.5	0.526
11.6	0.504
11.8	0.504
12.3	0.596
12.6	0.606
13.4	0.600
14.2	0.528
15.0	0.440

CURVE 73
T = 1273

λ	∈
1.00	0.100
2.99	0.102
3.29	0.113
3.51	0.146
3.75	0.196
4.02	0.282
4.32	0.460
4.67	0.595
5.08	0.724
5.48	0.806

CURVE 73 (cont.)

λ	∈
6.17	0.898
6.52	0.925
7.30	0.953
9.52	0.953
10.4	0.965
11.0	0.952
11.2	0.900
11.4	0.817
11.5	0.781
11.8	0.752
12.3	0.719
13.3	0.705
13.7	0.686
14.3	0.641
15.0	0.590

CURVE 74
T = 1273

λ	∈
1.00	0.100
3.01	0.101
3.33	0.111
3.63	0.145
3.92	0.208
4.08	0.273
4.45	0.466
4.72	0.577
5.19	0.694
5.75	0.790
6.38	0.866
6.91	0.903
7.54	0.924
10.1	0.946
10.5	0.938
10.9	0.914
11.0	0.896
11.5	0.773
12.0	0.696
12.3	0.669
13.4	0.662
13.9	0.641
14.7	0.595
15.0	0.561

CURVE 75
T = 1273

λ	∈
1.00	0.100
3.01	0.101
3.33	0.111
3.63	0.145
3.92	0.208
4.08	0.273
4.45	0.466
4.72	0.577
5.19	0.694
5.75	0.790
6.38	0.866
6.91	0.903
7.54	0.924
10.1	0.946
10.5	0.938
10.9	0.914
11.0	0.896
11.5	0.773
12.0	0.696
12.3	0.669
13.4	0.662
13.9	0.641
14.7	0.595
15.0	0.561

CURVE 76
T = 1273

λ	∈
1.00	0.100
3.30	0.100
3.54	0.114
3.89	0.174
4.24	0.309
4.65	0.498
5.13	0.631
5.66	0.741
6.35	0.826
7.01	0.880
7.65	0.896
10.2	0.904
10.7	0.896
11.0	0.866
11.7	0.701
11.9	0.666
12.3	0.639

CURVE 76 (cont.)

λ	∈
13.2	0.629
13.8	0.614
14.5	0.569
15.0	0.539

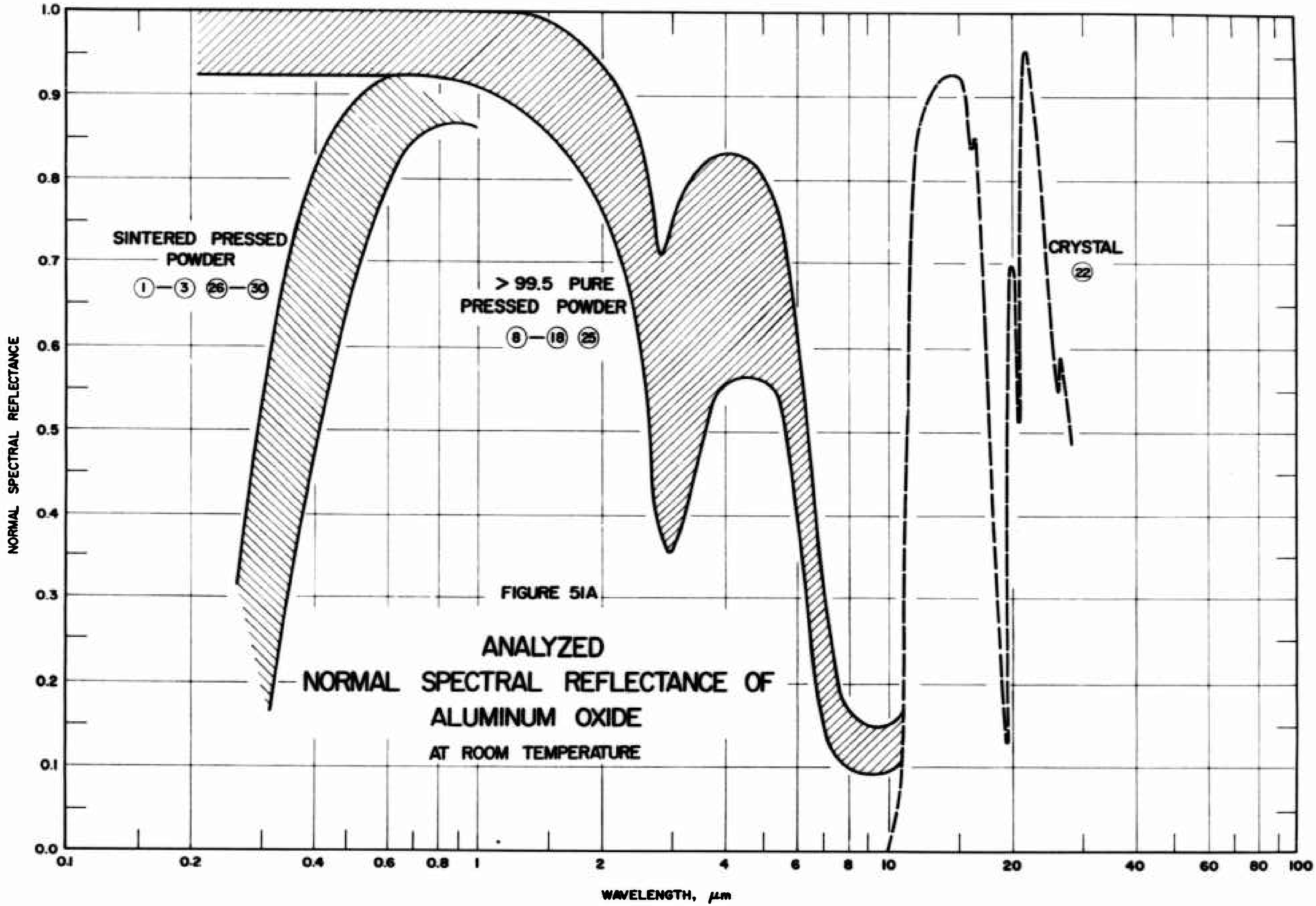


FIGURE 51A

ANALYZED NORMAL SPECTRAL REFLECTANCE OF ALUMINUM OXIDE AT ROOM TEMPERATURE

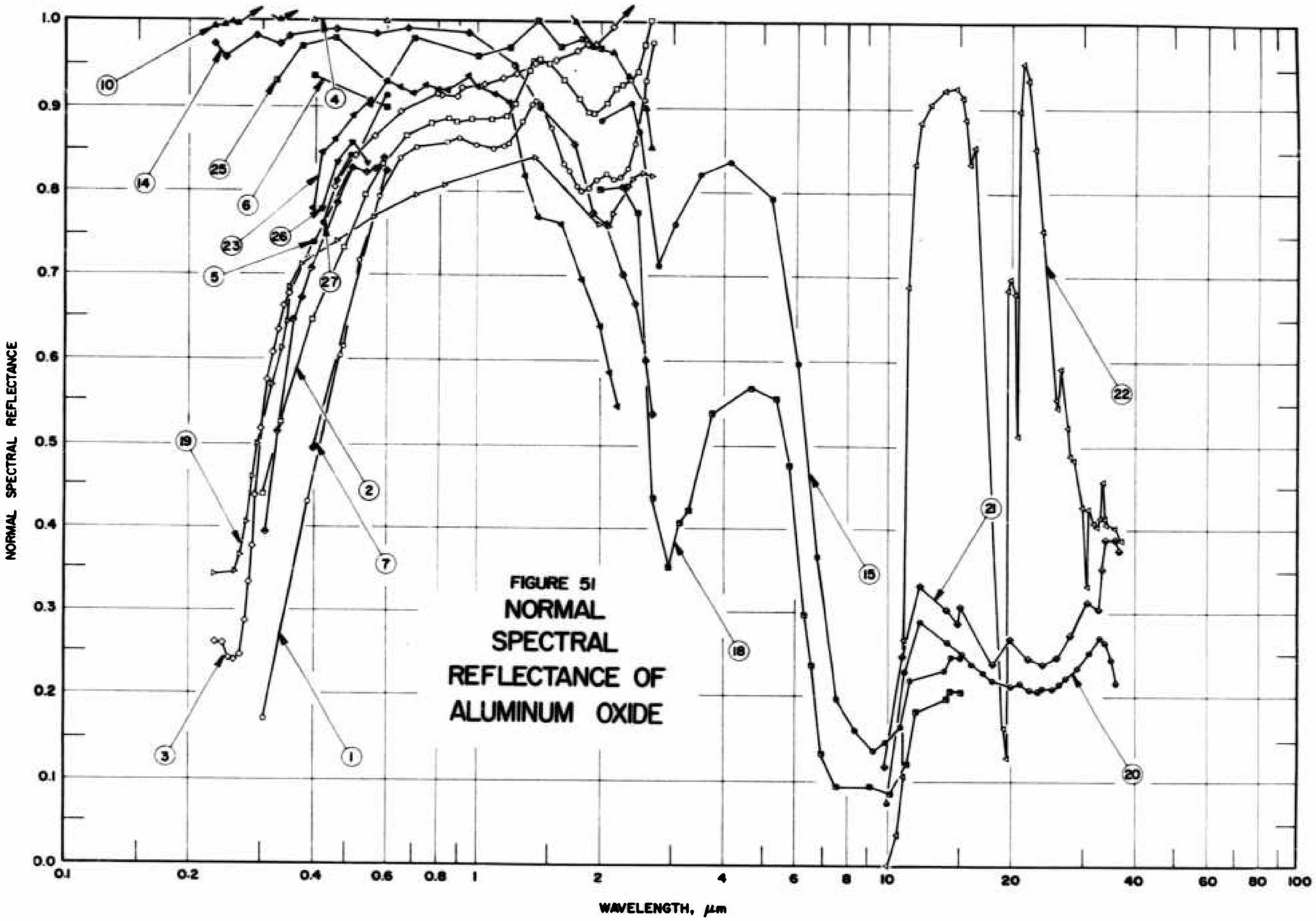


FIGURE 51
NORMAL
SPECTRAL
REFLECTANCE OF
ALUMINUM OXIDE

SPECIFICATION TABLE NO. 51 NORMAL SPECTRAL REFLECTANCE OF ALUMINUM OXIDE Al_2O_3

Curve No.	Ref. No.	Year	Temperature K	Wavelength Range, μm	Geometry θ	θ'	ω'	Reported Error, %	Composition (weight percent), Specifications, and Remarks
1	106	1959	298	0.304-2.69	9°		2π	4	Norton LA603.
2	106	1959	298	0.301-2.65	9°		2π	4	Norton RA 4213.
3	28	1963	298	0.231-2.65	~0°		2π		Sintered at 1923 K for 1 hr (setter material Al_2O_3); density 3.45 g cm^{-3}, theoretical density 3.97 g cm^{-3}; MgO reference standard; [Authors' designation: Sample No. 112].
4	82	1963	298	0.440-0.600	~0°		2π		Alucer MC (alpha) supplied by Gulton Industries; compacted powder at 10 000 psi.
5	82	1963	298	0.440-0.600	~0°		2π		Above specimen and conditions except exposed to uv irradiation; 180 ESH with solar factor 3.
6	82	1963	298	0.440-0.600	~0°		2π		Alucer MA (gamma) supplied by Gulton Industries; compacted powder at 10 000 psi.
7	82	1963	298	0.440-0.600	~0°		2π		Above specimen and conditions except exposed to UV irradiation; 75 ESH with solar factor 1.5.
8*	34	1966	298	0.230-2.65	0°		2π		>99 pure; compacted powder; compaction pressure 290 psi; MgO reference standard; data extracted from smooth curve.
9*	34	1966	298	0.230-2.65	0°		2π		Similar to above specimen and conditions except compacted at 1150 psi.
10	34	1966	298	0.230-2.65	0°		2π		Similar to above specimen and conditions except compacted at 2880 psi.
11*	34	1966	298	0.230-2.65	0°		2π		Similar to above specimen and conditions except compacted at 5760 psi.
12	34	1966	298	0.230-2.65	0°		2π		Similar to above specimen and conditions except compacted at 11 500 psi.
13*	34	1966	298	0.230-2.65	0°		2π		Similar to above specimen and conditions except compacted at 20 200 psi.
14	34	1966	298	0.230-2.65	0°		2π		Similar to above specimen and conditions except compacted at 28 800 psi.
15	34	1966	298	2.00-15.0	0°		2π		>99 pure; compacted powder; compaction pressure 700 psi; data extracted from smooth curve.
16*	34	1966	298	2.00-15.0	0°		2π		Similar to above specimen and conditions except compacted at 7000 psi.
17*	34	1966	298	2.00-15.0	0°		2π		Similar to above specimen and conditions except compacted at 28 000 psi.
18	34	1966	298	2.00-15.0	0°		2π		Similar to above specimen and conditions except compacted at 42 000 psi.
19	91	1967	298	0.230-2.65	0°		2π		Powder; commercially pure; -230 to +270 mesh, pressed at 24 300 Newtons cm^{-2}; 1.6 mm thick on stainless steel; MgO reference standard; data extracted from smooth curve.
20	146	1966	~298	10.0-36.0	~0°	~0°			Clear film; electron beam deposited at normal incidence on glass (423 K) at 2 to 8 x 10^{-6} mm Hg; rate of deposit 1 quarterwave min^{-1} at λ = 0.5 μm; optical film thickness (index of refraction times thickness) 10 $\lambda/4$ at 2.3 μm.
21	146	1966	~298	9.9-36.9	~0°	~0°			Clear film; electron beam deposited at normal incidence on glass (588 K) at 2 to 8 x 10^{-6} mm Hg; rate of deposit 1 quarterwave min^{-1} at λ = 0.5 μm; optical film thickness (index of refraction times thickness) 10 $\lambda/4$ at 2.2 μm.
22	146	1966	~298	10.0-37.0	~0°	~0°			Crystal; polished; data extracted from smooth curve.

*Not shown on plot

SPECIFICATION TABLE NO. 51 (continued)

Curve No.	Ref. No.	Year	Temperature K	Wavelength Range, μm	Geometry θ	θ'	ω'	Reported Error, %	Composition (weight percent), Specifications, and Remarks
23	120	1962	298	0.4-2.2	0°		2π		Authors' designation: SpecimenX 64.
24*	122	1940	298	0.28-0.32	0°		2π		Powder; packed in a shallow steel cell; data obtained for the wavelength band 0.28 to 0.32 μm.
25	92	1964	298	0.325-1.2	~0°		2π		Compacted powder; MgO reference standard; [Authors' designation: Sample 34].
26	283	1966	~298	0.4260-0.5400	0°		2π		Sintered; MgO reference standard; converted from R (2π, 0°); [Author's designation: Reflector No. VIII].
27	283	1966	~298	0.4260-0.5400	0°		2π		Above specimen and conditions except exposed for 10 days to 323 K water.
28	283	1966	~298	0.3058-0.5916	0°		2π		Curve 26 specimen and conditions except converted from R (0°, 2π).
29*	382	1965	~298	0.231-2.65	0°		2π		Sintered 15 hrs at 1273 K; density 1.58; data extracted from smooth curve; MgO reference standard.
30*	382	1965	~298	0.230-2.65	0°		2π		Above specimen and conditions except sintered an additional 2 hrs at 1923 K; density changed to 3.34.

* Not shown on plot

DATA TABLE NO. 51 NORMAL SPECTRAL REFLECTANCE OF ALUMINUM OXIDE Al_2O_3

[Wavelength, λ, μm; Reflectance, ρ; Temperature, T, K]

CURVE 1
T = 298

λ	ρ
0.304	0.171
0.389	0.429
0.462	0.603
0.473	0.616
0.519	0.717
0.849	0.859
0.900	0.863
0.999	0.857
1.09	0.851
1.16	0.855
1.19	0.858
1.29	0.884
1.35	0.904
1.39	0.909
1.43	0.904
1.51	0.877
1.63	0.834
1.66	0.827
1.75	0.806
1.79	0.801
1.87	0.805
1.95	0.817
2.07	0.822
2.14	0.817
2.21	0.819
2.30	0.829
2.41	0.859
2.53	0.910
2.57	0.933
2.69	0.977

CURVE 2
T = 298

λ	ρ
0.301	0.437
0.334	0.524
0.398	0.645
0.472	0.733
0.533	0.796
0.588	0.834
0.678	0.868
0.779	0.881
0.852	0.886
0.887	0.884
0.970	0.887

CURVE 2 (cont.)

λ	ρ
1.08	0.887
1.17	0.890
1.22	0.905
1.31	0.944
1.36	0.955
1.40	0.959
1.50	0.952
1.63	0.933
1.77	0.911
1.87	0.896
1.93	0.895
2.06	0.906
2.17	0.924
2.26	0.928
2.35	0.933
2.42	0.942
2.55	0.974
2.65	1.000

CURVE 3
T = 298

λ	ρ
0.231	0.260
0.241	0.259
0.250	0.242
0.258	0.238
0.266	0.246
0.274	0.285
0.280	0.333
0.285	0.375
0.290	0.435
0.300	0.517
0.310	0.573
0.320	0.608
0.330	0.634
0.340	0.662
0.350	0.678
0.450	0.805
0.503	0.844
0.561	0.867
0.651	0.895
0.800	0.917
0.815	0.914
0.890	0.913
0.912	0.923
1.04	0.928

CURVE 3 (cont.)

λ	ρ
1.15	0.934
1.24	0.940
1.39	0.952
1.55	0.956
1.75	0.968
1.84	0.976
1.95	0.976
2.15	0.995
2.24	1.00*
2.44	1.01*
2.55	1.26*
2.65	1.05*

CURVE 4
T = 298

λ	ρ
0.440	1.000
0.600	1.000

CURVE 5
T = 298

λ	ρ
0.440	0.740
0.600	0.915

CURVE 6
T = 298

λ	ρ
0.440	0.935
0.600	0.900

CURVE 7
T = 298

λ	ρ
0.440	0.495
0.600	0.825

CURVE 8*
T = 298

λ	ρ
0.230	1.000
0.243	1.000
0.270	1.012
0.280	1.021
0.289	1.033
0.318	1.020

CURVE 8 (cont.)*

λ	ρ
0.347	1.020
0.350	1.022
0.571	1.031
0.849	1.030
1.01	1.038
1.15	1.034
1.47	1.036
1.69	1.047
1.90	1.038
2.26	1.047
2.43	1.042
2.51	1.044
2.65	1.029

CURVE 9*
T = 298

λ	ρ
0.230	0.995
0.249	0.996
0.260	1.000
0.281	1.017
0.295	1.023
0.319	1.010
0.344	1.011
0.350	1.013
0.459	1.020
0.654	1.028
0.763	1.021
0.978	1.023
1.24	1.027
1.44	1.019
1.55	1.025
1.72	1.025
1.88	1.014
2.07	1.020
22.0	1.011
2.30	1.012
2.45	1.000
2.65	0.972

CURVE 10
T = 298

λ	ρ
0.230	0.994
0.243	0.995
0.254	0.999

CURVE 10 (cont.)

λ	ρ
0.262	0.997
0.280	1.015*
0.293	1.019*
0.311	1.006*
0.331	1.000
0.350	1.001*
0.459	1.013*
0.810	1.015*
1.15	1.013*
1.41	1.001*
1.72	0.999
1.90	0.972
2.12	0.966
2.33	0.937
2.55	0.900
2.65	0.854

CURVE 11*
T = 298

λ	ρ
0.230	0.984
0.239	0.990
0.252	0.983
0.260	0.994
0.270	0.989
0.288	1.002
0.310	0.991
0.344	0.990
0.350	0.995
0.421	1.001
0.500	1.001
0.641	1.006
0.956	1.006
1.26	1.001
1.43	0.989
1.69	0.981
1.87	0.956
2.03	0.949
2.36	0.913
2.56	0.869
2.65	0.837

CURVE 12
T = 298

λ	ρ
0.230	0.980
0.259	0.968
0.284	0.986
0.298	0.981
0.330	0.977
0.343	0.981
0.350	0.985
0.461	0.995
0.662	1.003
0.782	1.000
0.839	0.992
1.00	0.990
1.29	0.968
1.54	0.938
1.77	0.901
1.92	0.866
2.07	0.846
2.46	0.749
2.55	0.740
2.65	0.680

CURVE 13*
T = 298

λ	ρ
0.230	0.977
0.246	0.964
0.256	0.967
0.284	0.983
0.305	0.978
0.330	0.974
0.350	0.981
0.442	0.992
0.652	0.997
0.809	0.985
1.15	0.969
1.46	0.921
1.73	0.874
1.89	0.833
2.11	0.796
2.20	0.770
2.35	0.741
2.51	0.708
2.59	0.686
2.65	0.654

CURVE 14
T = 298

λ	ρ
0.230	0.973
0.253	0.959
0.291	0.982
0.331	0.973
0.350	0.981
0.453	0.991
0.563	0.986
0.679	0.991
0.958	0.987
1.23	0.950
1.46	0.900
1.71	0.857
1.91	0.778
2.06	0.763
2.26	0.700
2.40	0.667
2.57	0.600
2.65	0.537

CURVE 15
T = 298

λ	ρ
2.00	0.887
2.36	0.906
2.47	0.874
2.76	0.712
3.01	0.764
3.50	0.821
4.17	0.827
5.21	0.794
6.04	0.598
6.73	0.365
7.53	0.196
8.35	0.162
9.27	0.137
9.98	0.148
10.6	0.166
11.2	0.219
13.7	0.230
14.0	0.246
15.0	0.246

CURVE 16*
T = 298

λ	ρ
2.00	0.865
2.25	0.872
2.48	0.826
2.86	0.580
3.45	0.698
4.02	0.714
4.62	0.709
5.15	0.682
5.58	0.598
6.22	0.345
6.56	0.285
6.89	0.195
7.35	0.131
8.01	0.108
10.0	0.106
11.0	0.134
11.5	0.208
13.8	0.226
14.1	0.235
15.0	0.235

CURVE 17*
T = 298

λ	ρ
2.00	0.828
2.34	0.822
2.49	0.757
2.66	0.489
2.87	0.390
3.23	0.454
3.63	0.570
4.51	0.600
5.31	0.589
5.71	0.525
6.31	0.307
6.62	0.249
7.20	0.119
8.01	0.096
10.0	0.130
11.5	0.191
13.8	0.205
14.1	0.221
15.0	0.219

* Not shown on plot

DATA TABLE NO. 51 (continued)

λ	ρ
CURVE 18	
T = 298	
2.00	0.801
2.26	0.807
2.45	0.778
2.66	0.435
2.91	0.352
3.11	0.406
3.28	0.420
3.74	0.536
4.65	0.566
5.35	0.543
5.78	0.475
6.23	0.295
6.52	0.235
6.95	0.132
7.51	0.092
9.01	0.092
10.0	0.085
11.0	0.120
11.6	0.182
13.9	0.198
14.0	0.208
15.0	0.206
CURVE 19	
T = 298	
0.230	0.342
0.259	0.344
0.266	0.364
0.274	0.406
0.285	0.459
0.294	0.500
0.316	0.569
0.335	0.613
0.346	0.643
0.350	0.684
0.373	0.711
0.456	0.741
0.560	0.770
0.708	0.797
0.838	0.809
1.39	0.841
1.99	0.762
2.07	0.762
2.14	0.777

λ	ρ
CURVE 19 (cont.)	
2.30	0.809
2.39	0.816
2.51	0.823
2.65	0.821
CURVE 20	
T ~ 298	
10.0	0.073
11.0	0.229
12.0	0.288
14.0	0.263
15.1	0.250
16.0	0.238
17.1	0.228
18.0	0.219
20.0	0.212
21.0	0.216
22.1	0.209
23.1	0.207
23.9	0.210
25.1	0.210
26.1	0.215
27.0	0.221
29.0	0.234
31.0	0.252
32.9	0.270
33.9	0.263
35.0	0.244
36.0	0.216
CURVE 21	
T ~ 298	
9.9	0.119
10.8	0.248
12.0	0.331
13.9	0.301
14.7	0.287
15.0	0.307
18.0	0.239
19.9	0.268
21.9	0.245
23.9	0.238
25.9	0.247
27.9	0.272

λ	ρ
CURVE 21 (cont.)	
30.5	0.313
32.5	0.305
33.1	0.352
33.9	0.288
35.9	0.288
36.9	0.275
CURVE 22	
T ~ 298	
10.0	0.000
10.5	0.036
10.8	0.106
11.0	0.267
11.3	0.689
11.7	0.837
12.0	0.883
12.7	0.907
13.7	0.924
14.6	0.926
15.1	0.913
15.4	0.888
15.8	0.836
16.2	0.856
19.2	0.164
19.5	0.129
19.7	0.685
20.0	0.698
20.4	0.680
20.8	0.512
20.9	0.899
21.3	0.955
21.9	0.935
23.0	0.854
23.9	0.757
25.6	0.556
25.9	0.547
26.3	0.591
27.2	0.522
27.9	0.489
28.5	0.483
29.8	0.427
30.5	0.431
30.9	0.426
31.6	0.408
32.3	0.406

λ	ρ
CURVE 22 (cont.)	
32.8	0.415
33.1	0.456
33.4	0.413
34.0	0.407
35.8	0.402
37.0	0.388
CURVE 23	
T = 298	
0.4	0.78
0.42	0.846
0.45	0.863
0.5	0.889
0.55	0.908
0.55	0.904
0.6	0.930
0.65	0.923
0.7	0.918
0.75	0.927
0.8	0.92
0.85	0.92
0.9	0.914
0.95	0.937
1.0	0.925
1.1	0.917
1.2	0.906
1.3	0.82
1.4	0.771
1.6	0.761
1.8	0.695
2.0	0.639
2.1	0.585
2.2	0.544
CURVE 24*	
T = 298	
0.28	0.55
0.32	0.55
CURVE 25	
T = 298	
0.325	0.93
0.375	0.97

λ	ρ
CURVE 25 (cont.)	
0.450	0.98
0.600	0.93*
0.700	0.98
1.0	0.96
1.2	0.97
1.4	1.00
1.6	0.97
1.8	0.98
2.0	0.97
CURVE 26	
T ~ 298	
0.4260	0.779
0.4570	0.835
0.4950	0.859
0.5400	0.832
CURVE 27	
T ~ 298	
0.4260	0.762
0.4570	0.813
0.4950	0.844
0.5400	0.832*
CURVE 28	
T ~ 298	
0.3058	0.391
0.3265	0.514
0.3589	0.646
0.3721	0.671
0.3967	0.708
0.4525	0.789
0.4984	0.829
0.5381	0.822
0.5644	0.828
0.5916	0.840
CURVE 29*	
T ~ 298	
0.231	0.073
0.235	0.084
0.237	0.104

λ	ρ
CURVE 29 (cont.)	
0.244	0.280
0.246	0.310
0.252	0.335
0.275	0.381
0.315	0.446
0.328	0.472
0.343	0.519
0.347	0.538
0.350	0.562
0.361	0.630
0.371	0.669
0.380	0.729
0.388	0.752
0.407	0.836
0.427	0.869
0.504	0.911
0.565	0.932
0.654	0.943
0.777	0.962
0.866	0.990
1.16	1.03
1.29	1.05
1.40	1.04
1.60	1.05
1.75	1.07
1.95	1.03
2.06	1.06
2.15	1.08
2.25	1.08
2.65	1.00
CURVE 30*	
T ~ 298	
0.230	0.165
0.243	0.160
0.247	0.151
0.253	0.146
0.262	0.150
0.268	0.165
0.274	0.188
0.281	0.249
0.301	0.542
0.307	0.599
0.315	0.641
0.326	0.684

λ	ρ
CURVE 30 (cont.)*	
0.342	0.743
0.347	0.769
0.361	0.811
0.464	0.921
0.497	0.934
0.550	0.927
0.584	0.937
0.751	0.973
0.863	0.981
0.928	0.979
1.52	1.03
1.80	1.06
1.96	1.07
2.07	1.09
2.17	1.09
2.36	1.11
2.65	1.11

* Not shown on plot

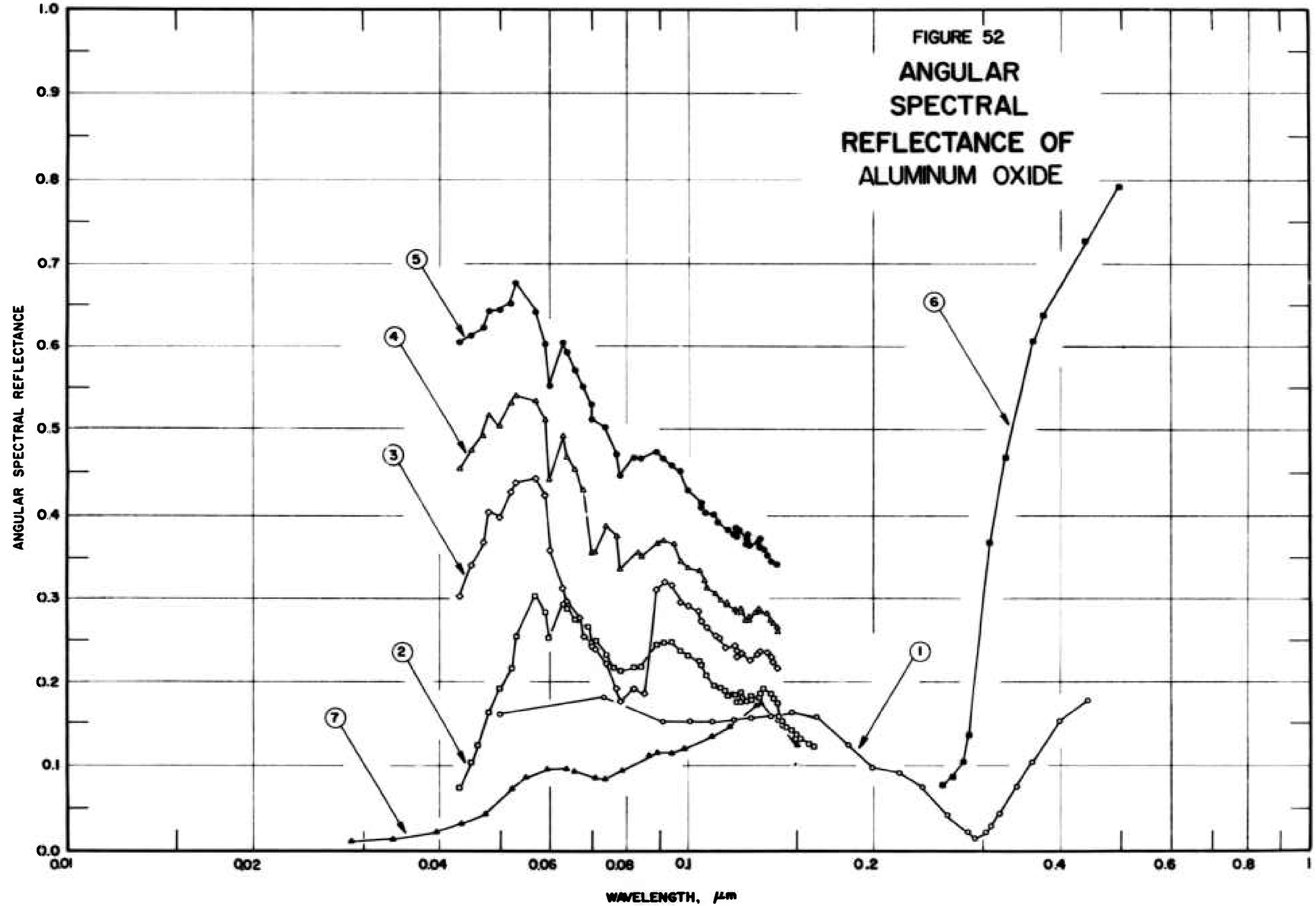


FIGURE 52
ANGULAR SPECTRAL REFLECTANCE OF ALUMINUM OXIDE
ANGULAR SPECTRAL REFLECTANCE
WAVELENGTH, μm
1.0
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0.0
0.01
0.02
0.04
0.06
0.08
0.1
0.2
0.4
0.6
0.8
1
1
2
3
4
5
6
7

SPECIFICATION TABLE NO. 52 ANGULAR SPECTRAL REFLECTANCE OF ALUMINUM OXIDE Al_2O_3

Curve No.	Ref. No.	Year	Temperature K	Wavelength Range, μm	Geometry θ	θ'	ω'	Reported Error, %	Composition (weight percent), Specifications, and Remarks
1	151	1959	~298	0.0579-0.440	~18°	~18°			Al_2O_3 on SiO coated glass; both films were effectively λ/4 thick at 3000 Å.
2	190	1968	~298	0.043-0.158	20°	20°		2	Single crystal corundum; cut with the optic axis parallel to the reflecting surface; polished using 6 μm diamond paste, followed by a final polish using 0.5 μm diamond paste on a Buehler microcloth wheel.
3	190	1968	~298	0.043-0.139	50°	50°		2	Above specimen and conditions.
4	190	1968	~298	0.043-0.139	60°	60°		2	Above specimen and conditions.
5	190	1968	~298	0.043-0.139	70°	70°		2	Above specimen and conditions.
6	283	1966	~298	0.2578-0.4956	45°	0°			Sintered aluminum oxide; data extracted from smooth curve; MgO powder reference standard; geometry of data is for reflectance factor; [Author's designation: Reflector No. VIII].
7	147	1967	298	0.0288-0.150	20°	20°			Corundum; specimen cut perpendicular to the optic axis; measured in vacuum; data extracted from smooth curve.

DATA TABLE NO. 52 ANGULAR SPECTRAL REFLECTANCE OF ALUMINUM OXIDE Al_2O_3

[Wavelength, λ, μm; Reflectance, ρ; Temperature, T, K]

λ	ρ
CURVE 1 T ~ 298	
0.0579	0.160
0.0731	0.181
0.0907	0.151
0.100	0.151
0.109	0.151
0.118	0.153
0.126	0.155
0.136	0.158
0.147	0.163
0.160	0.157
0.181	0.123
0.199	0.099
0.219	0.091
0.239	0.076
0.260	0.043
0.280	0.022
0.290	0.017
0.300	0.022
0.308	0.030
0.318	0.044
0.339	0.076
0.359	0.104
0.399	0.151
0.440	0.178
CURVE 2 T ~ 298	
0.0433	0.073
0.0450	0.102
0.0469	0.123
0.0480	0.162
0.0506	0.191
0.0525	0.216
0.0536	0.253
0.0576	0.302
0.0596	0.283
0.0607	0.251
0.0632	0.293
0.0642	0.288
0.0666	0.274
0.0692	0.267
0.0700	0.248
0.0712	0.250
CURVE 2 (cont.)	
0.0742	0.232
0.0765	0.217
0.0784	0.213
0.0826	0.218
0.0849	0.218
0.0892	0.244
0.0911	0.247
0.0946	0.248
0.0976	0.238
0.100	0.231
0.104	0.225
0.105	0.220
0.107	0.209
0.110	0.196
0.113	0.193
0.115	0.190
0.116	0.182
0.118	0.183
0.120	0.175
0.122	0.175
0.122	0.188
0.124	0.176
0.127	0.179
0.127	0.181
0.130	0.180
0.131	0.185
0.133	0.192
0.136	0.187
0.137	0.180
0.139	0.174
0.140	0.158
0.142	0.151
0.144	0.145
0.147	0.142
0.149	0.137
0.149	0.131
0.153	0.131
0.156	0.127
0.158	0.123
CURVE 3 T ~ 298	
0.0433	0.301
0.0452	0.341
CURVE 3 (cont.)	
0.0471	0.368
0.0482	0.403
0.0508	0.398
0.0527	0.428
0.0539	0.439
0.0574	0.442
0.0596	0.423
0.0607	0.359
0.0632	0.412
0.0642	0.396
0.0670	0.377
0.0688	0.355
0.0700	0.342
0.0712	0.338
0.0742	0.322
0.0770	0.291
0.0789	0.276
0.0821	0.291
0.0855	0.287
0.0892	0.311
0.0918	0.320
0.0946	0.316
0.0976	0.296
0.100	0.291
0.104	0.286
0.105	0.272
0.107	0.267
0.111	0.256
0.113	0.252
0.115	0.240
0.118	0.243
0.120	0.238
0.120	0.230
0.122	0.233
0.126	0.225
0.129	0.233
0.131	0.237
0.134	0.236
0.136	0.230
0.137	0.224
0.139	0.217
CURVE 4 T ~ 298	
0.0433	0.464
0.0454	0.477
0.0471	0.492
0.0482	0.518
0.0506	0.502
0.0527	0.531
0.0539	0.540
0.0576	0.534
0.0596	0.511
0.0607	0.441
0.0632	0.493
0.0645	0.469
0.0666	0.452
0.0688	0.430
0.0700	0.406
0.0712	0.406
0.0742	0.388
0.0770	0.365
0.0784	0.336
0.0832	0.357
0.0849	0.351
0.0898	0.368
0.0918	0.370
0.0953	0.366
0.0976	0.345
0.100	0.339
0.104	0.330
0.106	0.321
0.107	0.312
0.110	0.307
0.113	0.299
0.116	0.297
0.119	0.288
0.120	0.284
0.122	0.284
0.122	0.288
0.124	0.273
0.126	0.275
0.126	0.277
0.127	0.283
0.130	0.288
0.131	0.284
0.134	0.281
0.136	0.275
CURVE 4 (cont.)	
0.137	0.270
0.139	0.266
0.139	0.260
CURVE 5 T ~ 298	
0.0433	0.605
0.0454	0.613
0.0471	0.623
0.0482	0.641
0.0508	0.642
0.0527	0.652
0.0539	0.678
0.0579	0.642
0.0596	0.601
0.0607	0.552
0.0635	0.602
0.0642	0.593
0.0666	0.571
0.0688	0.551
0.0700	0.530
0.0708	0.511
0.0742	0.501
0.0770	0.471
0.0784	0.447
0.0826	0.467
0.0849	0.467
0.0898	0.475
0.0911	0.466
0.0946	0.458
0.0976	0.451
0.100	0.430
0.105	0.416
0.105	0.410
0.107	0.402
0.110	0.401
0.112	0.393
0.116	0.383
0.118	0.378
0.119	0.387
0.120	0.376
0.121	0.383
0.124	0.372
0.124	0.366
CURVE 5 (cont.)	
0.125	0.378
0.126	0.363
0.129	0.369
0.131	0.372
0.131	0.362
0.133	0.360
0.134	0.354
0.137	0.348
0.139	0.343
CURVE 6 T ~ 298	
0.2578	0.079
0.2674	0.087
0.2768	0.105
0.2825	0.135
0.3063	0.369
0.3255	0.468
0.3605	0.606
0.3732	0.638
0.4365	0.729
0.4956	0.791
CURVE 7 T = 298	
0.0288	0.012
0.0336	0.015
0.0395	0.022
0.0443	0.032
0.0474	0.044
0.0522	0.073
0.0555	0.087
0.0597	0.094
0.0640	0.097
0.0658	0.094
0.0713	0.085
0.0738	0.085
0.0786	0.094
0.0867	0.113
0.0896	0.116
0.0941	0.116
0.0985	0.120
0.109	0.134
CURVE 7 (cont.)	
0.116	0.146
0.128	0.172
0.131	0.175
0.150	0.127

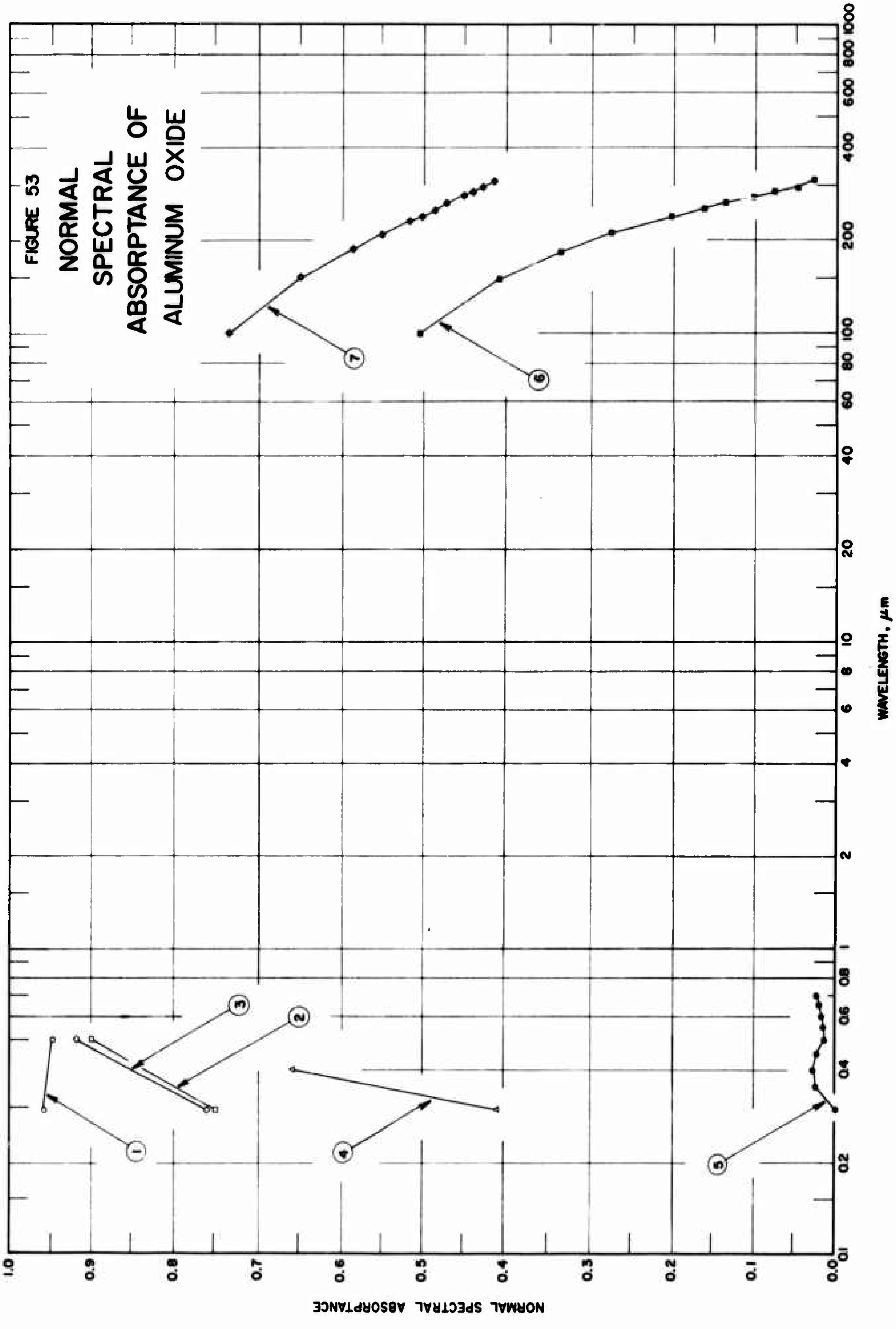


FIGURE 53 NORMAL SPECTRAL ABSORPTANCE OF ALUMINUM OXIDE

SPECIFICATION TABLE NO. 53 NORMAL SPECTRAL ABSORPTANCE OF ALUMINUM OXIDE Al_2O_3

Curve No.	Ref. No.	Year	Temperature K	Wavelength Range, µm	Geometry θ	Reported Error, %	Composition (weight percent), Specifications, and Remarks
1	191	1964	298	0.3-0.5	0°		High purity V-Al_2O_3; measured in vacuum.
2	191	1964	298	0.3-0.5	0°		Above specimen and conditions except subjected to 50 solar hrs.
3	191	1964	298	0.3-0.5	0°		High purity V-Al_2O_3; slurried with 0.02 mole % H_2SO_4, dried, pressed into a pellet; measured in vacuum.
4	191	1964	298	0.3-0.5	0°		Above specimen and conditions except subjected to 50 solar hrs.
5	192	1966	~298	0.300-0.700	~0°		Alvcer MC compacted powder.
6	280	1969	~298	100-310	~0°		250 µm thick; data extracted from smooth curve.
7	280	1969	~298	100-310	~0°		625 µm thick; data extracted from smooth curve.

DATA TABLE NO. 53 NORMAL SPECTRAL ABSORPTANCE OF ALUMINUM OXIDE Al_2O_3

[Wavelength, λ, µm; Absorptance, α; Temperature, T, K]

λ	α
CURVE 1	**T = 298**
0.3	0.96
0.5	0.95
CURVE 2	**T = 298**
0.3	0.75
0.5	0.90
CURVE 3	**T = 298**
0.3	0.76
0.5	0.92
CURVE 4	**T = 298**
0.3	0.41
0.4	0.66
CURVE 5	**T ~ 298**
0.300	0.000
0.351	0.024
0.400	0.027
0.450	0.022
0.500	0.013
0.550	0.015
0.600	0.017
0.650	0.020
0.700	0.024
CURVE 6	**T ~ 298**
100	0.505
149	0.409
182	0.338
210	0.276
237	0.203
251	0.163
262	0.135
274	0.102
285	0.077
298	0.048
310	0.029
CURVE 7	**T ~ 298**
100	0.737
152	0.651
CURVE 7 (cont.)	
188	0.589
209	0.551
230	0.518
239	0.502
250	0.486
261	0.471
276	0.451
285	0.441
297	0.429
310	0.417

SPECIFICATION TABLE NO. 54 NORMAL SOLAR ABSORPTANCE OF ALUMINUM OXIDE Al_2O_3

Curve No.	Ref. No.	Year	Temperature Range, K	Geometry θ	Reported Error, %	Composition (weight percent), Specifications and Remarks
1*	106	1959	298	9°		Norton LA 603; computed from spectral reflectance data (0.3 to 3 μm) for above-atmosphere conditions.
2*	106	1959	298	9°		Above specimen and conditions except computed for sea level conditions.
3*	106	1959	298	9°		Norton RA 4213; computed from spectral reflectance data (0.3 to 3 μm) for above-atmosphere conditions.
4*	106	1959	298	9°		Above specimen and conditions except computed for sea level conditions.
5*	277	1966	~298	~0°		Alucer MC-α powder; as received; compacted at 50 psi; calculated from spectral reflectance data.
6*	277	1966	~298	~0°		Above specimen and conditions except exposed to 500 ESH uv radiation.
7*	277	1966	~298	~0°		Similar to curve 5 specimen and conditions except powder calcined 1 hr at 1273 K before compacting; avg of 2 measurements.
8*	277	1966	~298	~0°		Above specimen and conditions except exposed to 500 ESH uv radiation.
9*	277	1966	~298	~0°		Similar to curve 5 specimen and conditions except calcined 1 hr at 1893 K before compacting; avg of 2 measurements.
10*	277	1966	~298	~0°		Above specimen and conditions except exposed to 500 ESH uv radiation.

DATA TABLE NO. 54 NORMAL SOLAR ABSORPTANCE OF ALUMINUM OXIDE Al_2O_3

[Temperature, T, K; Absorptance, α]

T	α	T	α	T	α
CURVE 1*		CURVE 5*		CURVE 9*	
298	0.232	298	0.063	298	0.031
CURVE 2*		CURVE 6*		CURVE 10*	
298	0.210	298	0.153	298	0.143
CURVE 3*		CURVE 7*			
298	0.168	298	0.048		
CURVE 4*		CURVE 8*			
298	0.156	298	0.147		

*No plot given

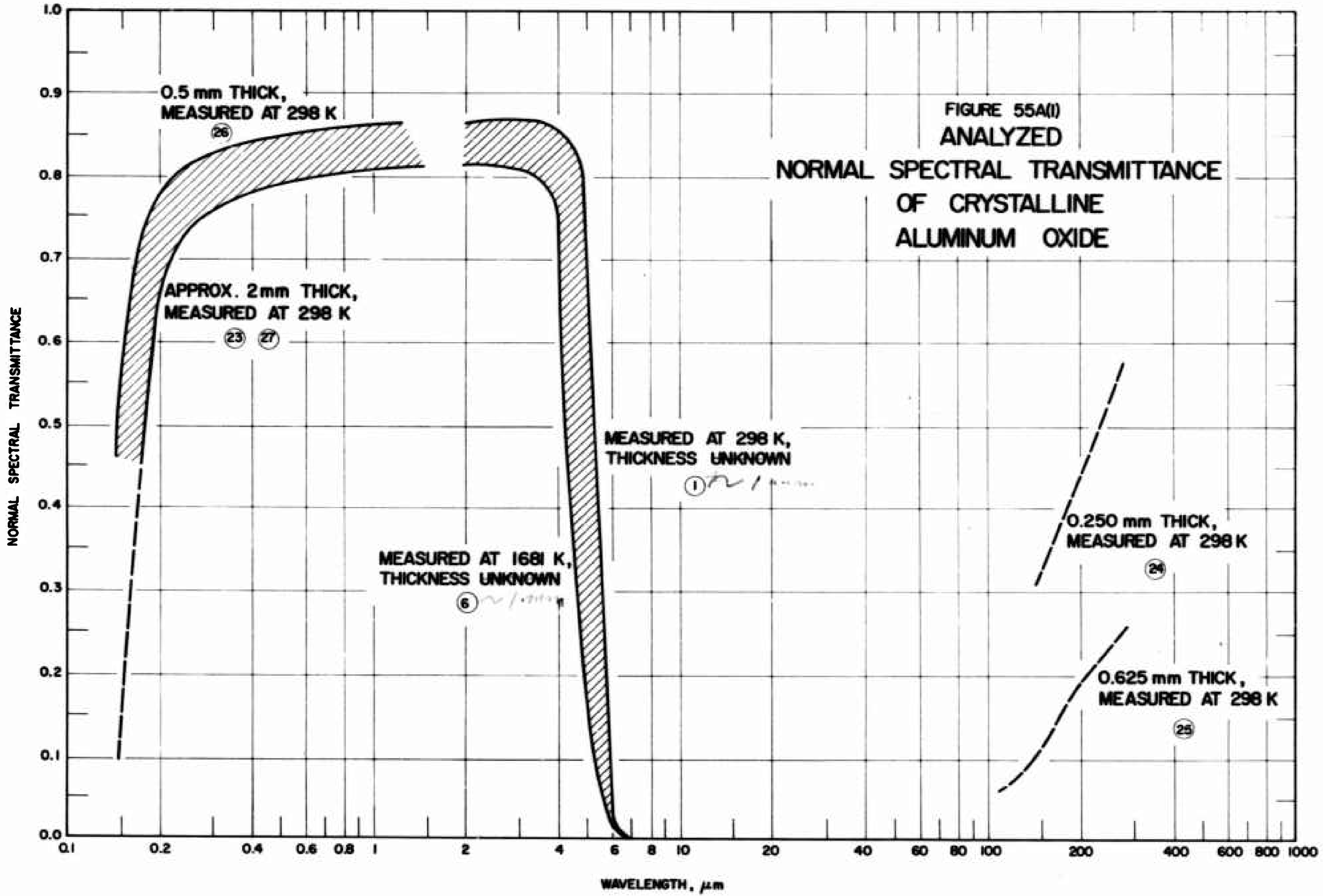


FIGURE 55A(I)
ANALYZED
NORMAL SPECTRAL TRANSMITTANCE
OF CRYSTALLINE
ALUMINUM OXIDE
0.5 mm THICK,
MEASURED AT 298 K
26
APPROX. 2 mm THICK,
MEASURED AT 298 K
23 27
MEASURED AT 1681 K,
THICKNESS UNKNOWN
6
MEASURED AT 298 K,
THICKNESS UNKNOWN
1
0.250 mm THICK,
MEASURED AT 298 K
24
0.625 mm THICK,
MEASURED AT 298 K
25
NORMAL SPECTRAL TRANSMITTANCE
WAVELENGTH, μm
1.0
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0.0
0.1
0.2
0.4
0.6
0.8
1
2
4
6
8
10
20
40
60
80
100
200
400
600
800
1000

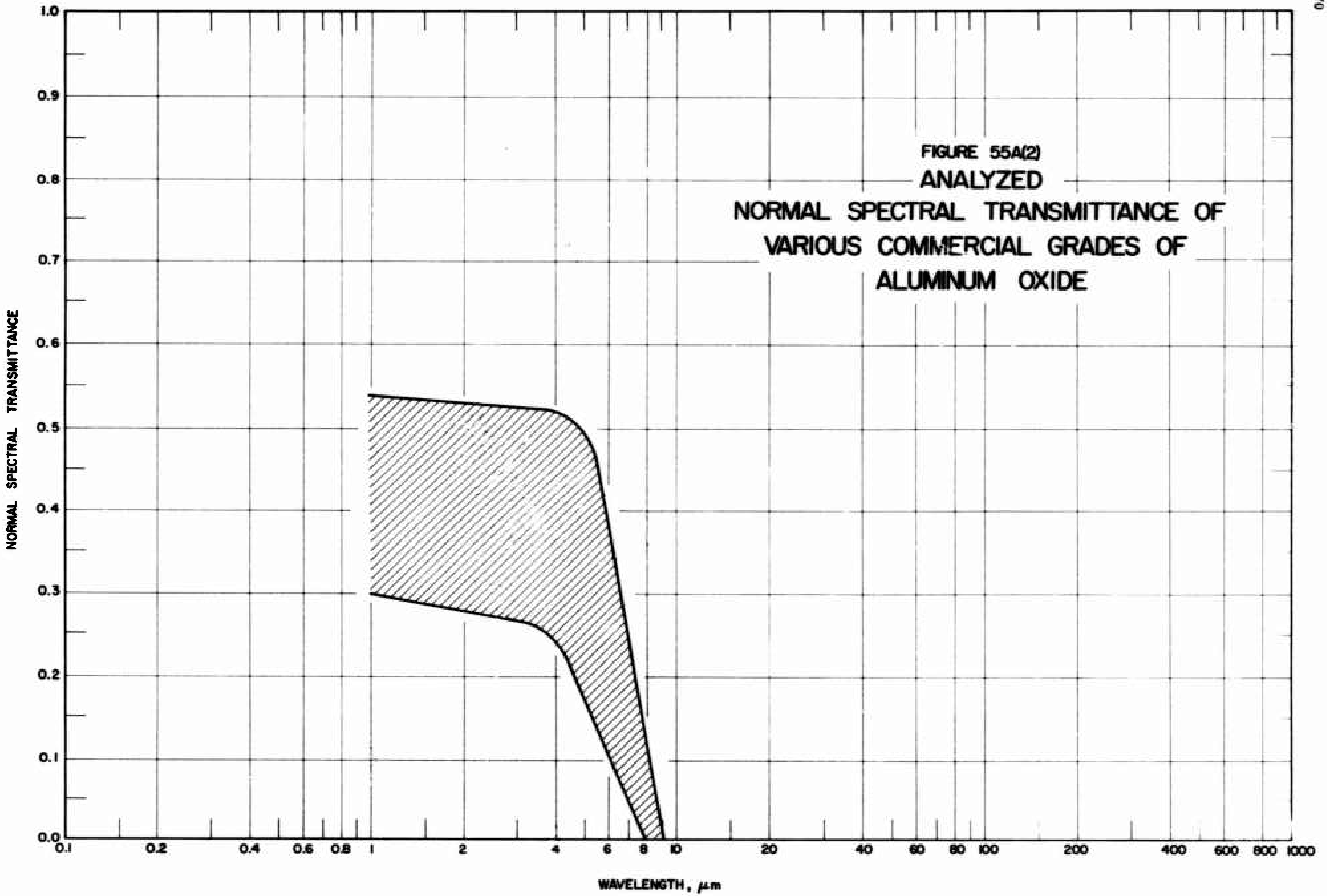


FIGURE 55A(2)
ANALYZED
NORMAL SPECTRAL TRANSMITTANCE OF
VARIOUS COMMERCIAL GRADES OF
ALUMINUM OXIDE

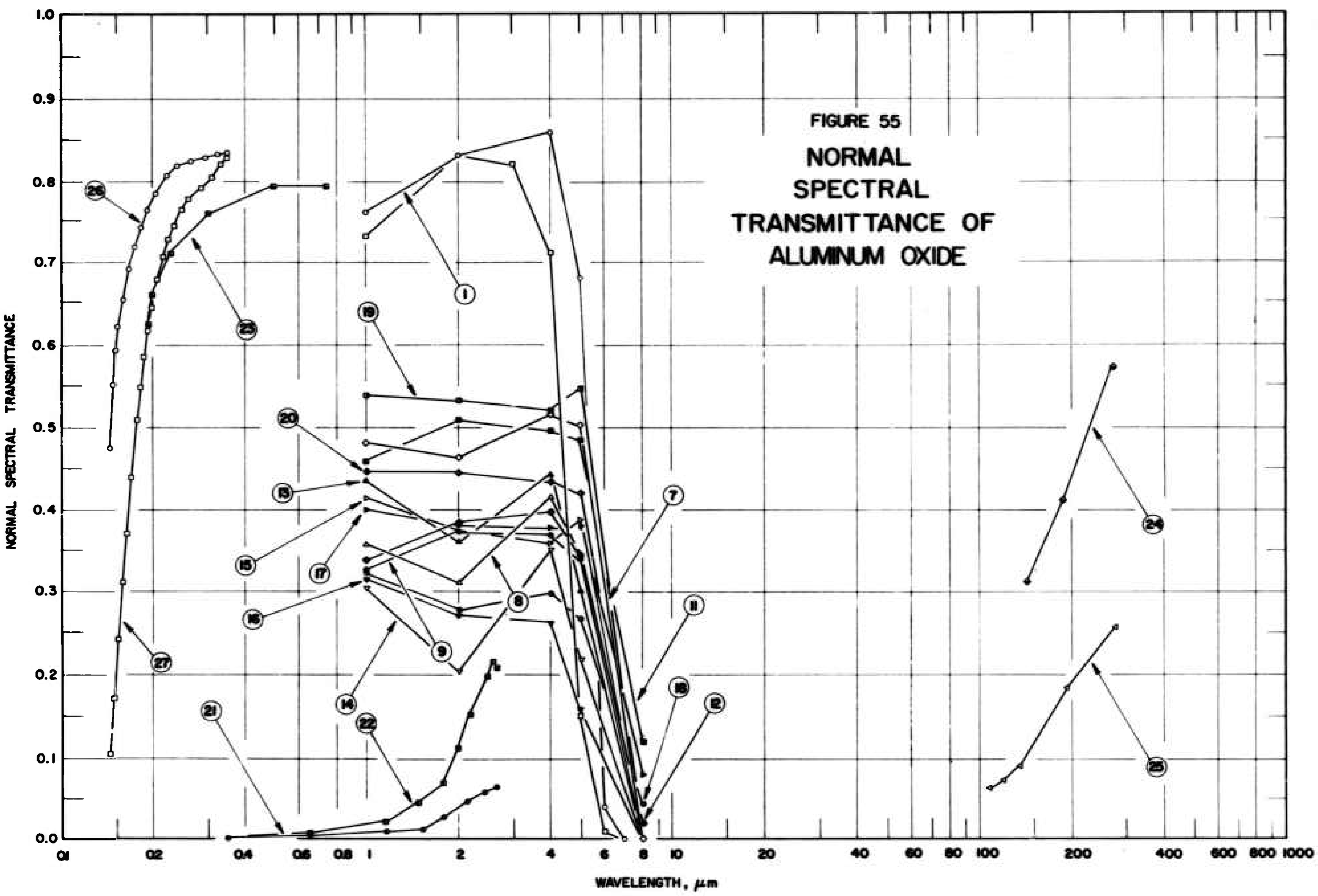


FIGURE 55
NORMAL SPECTRAL TRANSMITTANCE OF ALUMINUM OXIDE
NORMAL SPECTRAL TRANSMITTANCE
WAVELENGTH, μm
1.0
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0.0
0.1
0.2
0.4
0.6
0.8
1
2
4
6
8
10
20
40
60
80
100
200
400
600
800
1000
1
7
8
9
11
12
13
14
15
16
17
18
19
20
21
22
23
24
25
26
27

SPECIFICATION TABLE NO. 55 NORMAL SPECTRAL TRANSMITTANCE OF ALUMINUM OXIDE Al_2O_3

Curve No.	Ref. No.	Year	Temperature K	Wavelength Range, μm	Geometry θ	Geometry θ'	Geometry ω'	Reported Error, %	Composition (weight percent), Specifications, and Remarks
1	188	1964	298	1-7	~0°	~0°		± 5	Single crystal from Linde.
2*	188	1964	785	1-7	~0°	~0°		± 5	Above specimen and conditions.
3*	188	1964	960	1-7	~0°	~0°		± 5	Above specimen and conditions.
4*	188	1964	1177	1-7	~0°	~0°		± 5	Above specimen and conditions.
5*	188	1964	1411	1-7	~0°	~0°		± 5	Above specimen and conditions.
6	188	1964	1681	1-7	~0°	~0°		± 5	Above specimen and conditions.
7	188	1964	298	1-8	~0°	~0°		± 5	96 Al_2O_3; McDanel AV 30 vitrified alumina (0.127 mm thick).
8	188	1964	298	1-8	~0°	~0°		± 5	Similar to the above specimen and conditions except 0.254 mm thick.
9	188	1964	298	1-8	~0°	~0°		± 5	99 Al_2O_3; slip-cast McDanel AP 35 (0.127 mm thick).
10	188	1964	298	1-8	~0°	~0°		± 5	Similar to the above specimen and conditions except 0.254 mm thick.
11	188	1964	298	1-8	~0°	~0°		± 5	99 Al_2O_3; isostatically pressed McDanel AP 35 (0.127 mm thick).
12	188	1964	298	1-8	~0°	~0°		± 5	Similar to the above specimen and conditions except 0.254 mm thick.
13	188	1964	298	1-8	~0°	~0°		± 5	85 Al_2O_3; Coors AD-85 (0.127 mm thick).
14	188	1964	298	1-8	~0°	~0°		± 5	Similar to the above specimen and conditions except 0.254 mm thick.
15	188	1964	298	1-8	~0°	~0°		± 5	94 Al_2O_3; Coors AD-94 (0.127 mm thick).
16	188	1964	298	1-8	~0°	~0°		± 5	Similar to the above specimen and conditions except 0.254 mm thick.
17	188	1964	298	1-8	~0°	~0°		± 5	96 Al_2O_3; Coors AD-96 (0.127 mm thick).
18	188	1964	298	1-8	~0°	~0°		± 5	Similar to the above specimen and conditions except 0.254 mm thick.
19	188	1964	298	1-8	~0°	~0°		± 5	99 Al_2O_3; Coors AD-99 (0.127 mm thick).
20	188	1964	298	1-8	~0°	~0°		± 5	Similar to the above specimen and conditions except 0.254 mm thick.
21	34	1966	298	0.350-2.650	0°		2π		>99 pure; compacted powder (0.0185 in. thick); compaction pressure 11 800 psi; data extracted from smooth curve.
22	34	1966	298	0.350-2.650	0°		2π		Similar to the above specimen and conditions except compacted at 75 500 psi.
23	193	1966	298	0.193-0.738	0°	0°			High purity (1.57 mm thick); c-axis 60° from the normal of the specimen surface; polished, notched and annealed in air for 1 hr at 1273 K; data extracted from smooth curve.
24	280	1969	~298	134-271	~0°	~0°			0.250 mm thick.
25	280	1969	~298	107-276	~0°	~0°			0.625 mm thick.
26	404	1965	~298	0.144-0.350	~0°	~0°			0.5 mm thick; data extracted from smooth curve.
27	404	1965	~298	0.144-0.350	~0°	~0°			2 mm thick; data extracted from smooth curve.

*Not shown on plot

DATA TABLE NO. 55 NORMAL SPECTRAL TRANSMITTANCE OF ALUMINUM OXIDE Al_2O_3

[Wavelength, λ, μm; Transmittance, τ; Temperature, T, K]

CURVE 1 T = 298

λ	τ
1	0.76
2	0.83
3	0.84
4	0.86
5	0.68
6	0.04
7	0.00

CURVE 2* T = 785

λ	τ
1	0.76
2	0.83
3	0.84
4	0.81
5	0.40
6	0.03
7	0.00

CURVE 3* T = 960

λ	τ
1	0.76
2	0.83
3	0.82
4	0.80
5	0.33
6	0.01
7	0.00

CURVE 4* T = 1177

λ	τ
1	0.73
2	0.83
3	0.81
4	0.78
5	0.28
6	0.01
7	0.00

CURVE 5* T = 1411

λ	τ
1	0.73
2	0.83
3	0.82
4	0.71
5	0.15
6	0.01
7	0.00

CURVE 6 T = 1681

λ	τ
1	0.73
2	0.83*
3	0.82
4	0.71
5	0.15
6	0.01
7	0.00*

CURVE 7 T = 298

λ	τ
1	0.480
2	0.463
4	0.517
5	0.501
8	0.000

CURVE 8 T = 298

λ	τ
1	0.357
2	0.310
4	0.416
5	0.348
8	0.000*

CURVE 9 T = 298

λ	τ
1	0.325
2	0.371
4	0.368
5	0.339
8	0.000*

CURVE 10 T = 298

λ	τ
1	0.325
2	0.371
4	0.368
5	0.339
8	0.000

CURVE 11 T = 298

λ	τ
1	0.458
2	0.509
4	0.495
5	0.483
8	0.119

CURVE 12 T = 298

λ	τ
1	0.338
2	0.383
4	0.397
5	0.346
8	0.020

CURVE 13 T = 298

λ	τ
1	0.435
2	0.360
4	0.443
5	0.300
8	0.000*

CURVE 14 T = 298

λ	τ
1	0.303
2	0.202
4	0.350
5	0.218
8	0.000*

CURVE 15 T = 298

λ	τ
1	0.414
2	0.373
4	0.358
5	0.388
8	0.000*

CURVE 16 T = 298

λ	τ
1	0.312
2	0.270
4	0.261
5	0.259
8	0.000*

CURVE 17 T = 298

λ	τ
1	0.400
2	0.380
4	0.378
5	0.380
8	0.080

CURVE 18 T = 298

λ	τ
1	0.322
2	0.276
4	0.296
5	0.268
8	0.043

CURVE 19 T = 298

λ	τ
1	0.539
2	0.531
4	0.519
5	0.548
8	0.000*

CURVE 20 T = 298

λ	τ
1	0.446
2	0.445
4	0.433
5	0.420
8	0.000*

CURVE 21 T = 298

λ	τ
0.350	0.000
0.650	0.004
1.149	0.009
1.508	0.011
1.780	0.027
2.148	0.046
2.419	0.058
2.650	0.064

CURVE 22 T = 298

λ	τ
0.350	0.000*
0.649	0.006
1.147	0.021
1.475	0.045
1.765	0.079
1.984	0.110
2.185	0.151
2.479	0.199
2.593	0.215
2.650	0.208

CURVE 23 T = 298

λ	τ
0.193	0.624
0.200	0.659
0.229	0.708
0.305	0.759
0.492	0.794
0.738	0.794

CURVE 24 T ~ 298

λ	τ
134	0.312
189	0.412
271	0.575

CURVE 25 T ~ 298

λ	τ
107	0.062
120	0.071
135	0.090
193	0.185
276	0.259

CURVE 26 T ~ 298

λ	τ
0.144	0.476
0.147	0.552
0.149	0.595
0.152	0.621
0.158	0.656
0.165	0.691
0.173	0.718
0.182	0.744
0.191	0.764
0.204	0.786
0.222	0.808
0.239	0.819
0.266	0.825
0.301	0.829
0.326	0.833
0.350	0.835

CURVE 27 T ~ 298

λ	τ
0.144	0.107
0.147	0.171
0.152	0.243
0.157	0.311
0.162	0.370
0.169	0.443
0.176	0.509
0.181	0.550

CURVE 27 (cont.)

λ	τ
0.187	0.587
0.192	0.617
0.198	0.646
0.206	0.678
0.215	0.707
0.223	0.728
0.233	0.746
0.248	0.766
0.261	0.779
0.289	0.793
0.311	0.806
0.333	0.821
0.350	0.829

* Not shown on plot

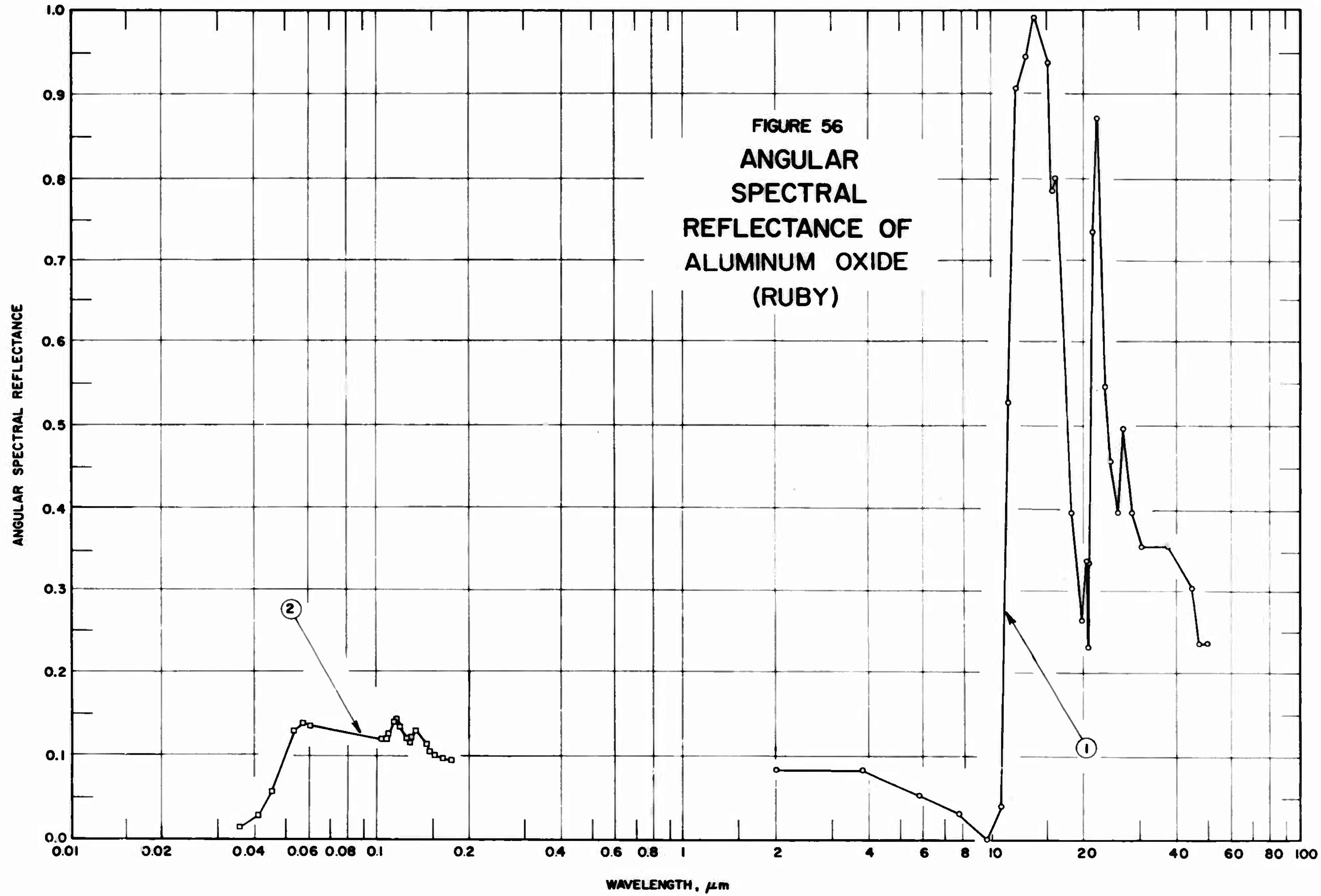


FIGURE 56
ANGULAR
SPECTRAL
REFLECTANCE OF
ALUMINUM OXIDE
(RUBY)
ANGULAR SPECTRAL REFLECTANCE
WAVELENGTH, μm
1.0
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0.0
0.01
0.02
0.04
0.06
0.08
0.1
0.2
0.4
0.6
0.8
1
2
4
6
8
10
20
40
60
80
100
1
2

SPECIFICATION TABLE NO. 56 ANGULAR SPECTRAL REFLECTANCE OF ALUMINUM OXIDE (RUBY) Al_2O_3

Curve No.	Ref. No.	Year	Temperature, K	Wavelength Range, μm	Geometry θ	Geometry θ'	Geometry ω'	Reported Error, %	Composition (weight percent), Specifications, and Remarks
1	102	1965	~298	2.0-50.0	30°	30°			Al_2O_3 + 0.005% Cr (6.10 mm thick); data extracted from smooth curve; aluminum mirror standard.
2	147	1967	298	0.0303-0.1753	20°	20°			1.4 Cr; specimen cut perpendicular to the optic axis; measured in vacuum; data extracted from smooth curve.

DATA TABLE NO. 56 ANGULAR SPECTRAL REFLECTANCE OF ALUMINUM OXIDE (RUBY)

[Wavelength, λ, μm; Reflectance, ρ; Temperature, T, K]

λ	ρ
CURVE 1	
T ~298	
2.0	0.084
3.8	0.084
5.8	0.052
7.8	0.031
9.7	0.000
10.6	0.040
11.3	0.528
12.1	0.909
13.0	0.946
13.9	0.991
15.2	0.939
15.9	0.787
16.2	0.801
18.2	0.398
19.6	0.264
20.2	0.340
20.5	0.230
20.7	0.337
21.2	0.737
22.0	0.871
23.2	0.549
24.1	0.458
25.8	0.398

λ	ρ
CURVE 1 (cont.)	
26.7	0.498
28.3	0.398
30.8	0.357
37.2	0.357
44.2	0.303
47.7	0.234
50.0	0.235
CURVE 2	
T = 298	
0.0303	0.005*
0.0355	0.013
0.0410	0.028
0.0452	0.057
0.0536	0.129
0.0572	0.138
0.0608	0.134
0.1040	0.119
0.1064	0.119
0.1086	0.125
0.1125	0.140
0.1152	0.142
0.1175	0.133

λ	ρ
CURVE 2 (cont.)	
0.1239	0.120
0.1272	0.115
0.1298	0.121
0.1326	0.129
0.1421	0.113
0.1482	0.106
0.1545	0.101
0.1639	0.099
0.1753	0.096

* Not shown on plot

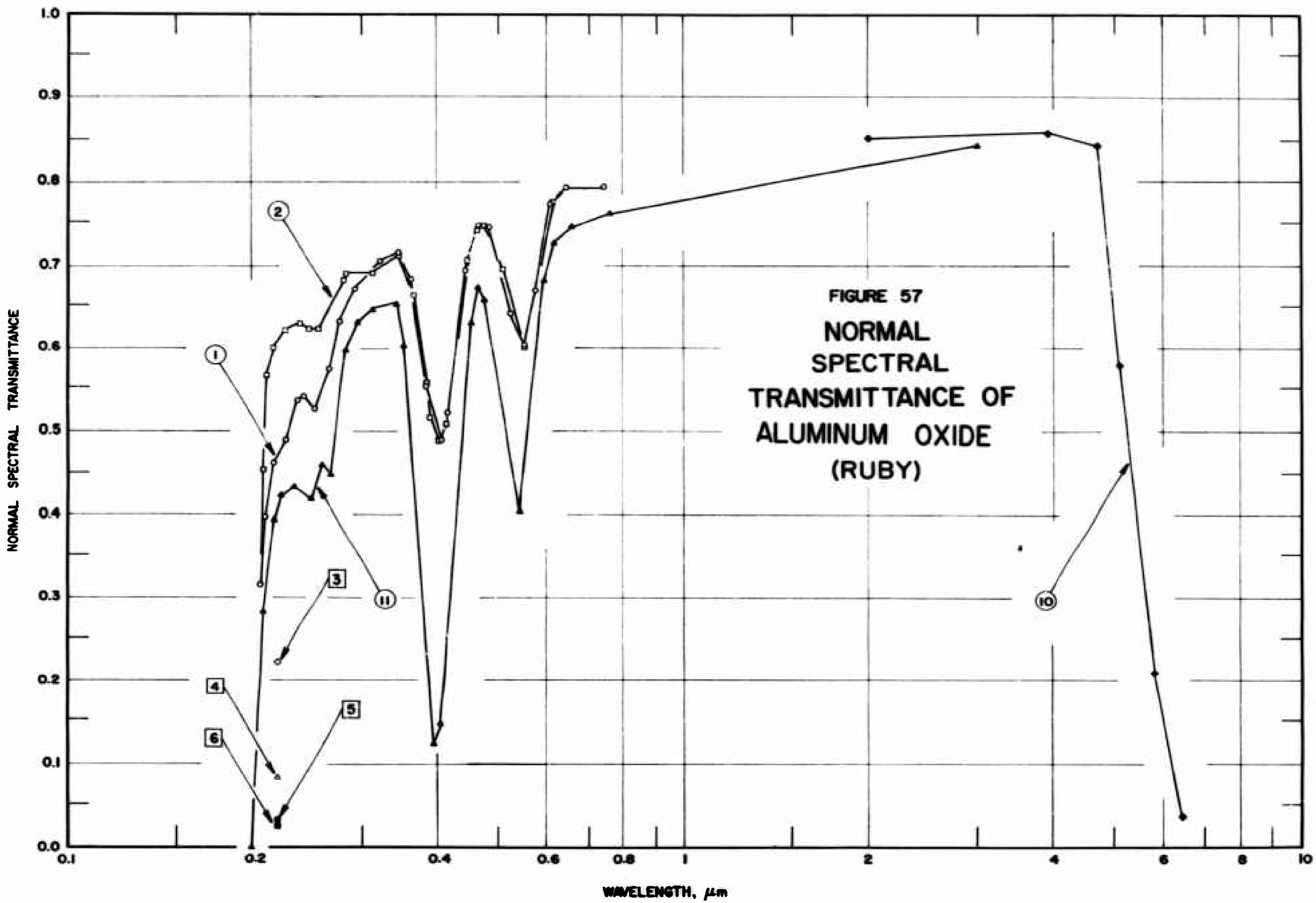


FIGURE 57
NORMAL
SPECTRAL
TRANSMITTANCE OF
ALUMINUM OXIDE
(RUBY)
NORMAL SPECTRAL TRANSMITTANCE
WAVELENGTH, μm
1.0
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0.0
0.1
0.2
0.4
0.6
0.8
1
2
4
6
8
10
1
2
3
4
5
6
10
11

SPECIFICATION TABLE NO. 57 NORMAL SPECTRAL TRANSMITTANCE OF ALUMINUM OXIDE (RUBY) Al_2O_3

Curve No.	Ref. No.	Year	Temperature, K	Wavelength Range, μm	Geometry θ	θ'	ω'	Reported Error, %	Composition (weight percent), Specifications, and Remarks
1	193	1966	298	0.2067-0.7425	0°	0°			0.05 Cr (1.57 mm thick); c-axis 60° from the normal of the specimen surface; polished, notched and annealed in air for 1 hr. at 1273 K; data extracted from smooth curve.
2	193	1966	298	0.2067-0.7425	0°	0°			0.05 Cr (1.57 mm thick); c-axis 60° from the normal of the specimen surface; polished and notched; data extracted from smooth curve.
3	193	1966	298	0.22	0°	0°			0.05 Cr (1.57 mm thick); c-axis 60° from the normal of the specimen surface; polished, notched, and annealed at 1273 K in air for 1 hr.; irradiated with x-ray(0.04 x 10^6 roentgens) in air at room temperature.
4	193	1966	298	0.22	0°	0°			Similar to the above specimen and conditions except irradiated with x-rays (0.14 x 10^6 roentgens) in air at room temperature.
5	193	1966	298	0.22	0°	0°			Similar to the above specimen and conditions except irradiated with x-rays (0.42 x 10^6 roentgens) in air at room temperature.
6	193	1966	298	0.22	0°	0°			Similar to the above specimen and conditions except irradiated with x-rays (0.85 x 10^6 roentgens) in air at room temperature.
7*	193	1966	298	0.22	0°	0°			Similar to the above specimen and conditions except irradiated with x-rays (1.7 x 10^6 roentgens) in air at room temperature.
8*	193	1966	298	0.22	0	0°			Similar to the above specimen and conditions except irradiated with x-rays (2.4 x 10^6 roentgens) in air at room temperature.
9*	193	1966	298	0.22	0°	0°			Similar to the above specimen and conditions except irradiated with x-rays (3.4 x 10^6 roentgens) in air at room temperature.
10	102	1965	~298	2.0-6.9	0°	0°			Al_2O_3 + 0.05 Cr; (6.10 mm thick); data extracted from smooth curve.
11	94	1967	298	0.200-4.00	~0°	~0°		±2	Al_2O_3 - 0.05 Cr (6.10 mm thick); single crystal; polished; data extracted from smooth curve.

*Not shown on plot

DATA TABLE NO. 57 NORMAL SPECTRAL TRANSMITTANCE OF ALUMINUM OXIDE (RUBY) Al_2O_3

[Wavelength, λ, μm; Transmittance, τ; Temperature, T, K]

λ	τ
CURVE 1 T = 298	
0.2067	0.316
0.2109	0.398
0.2175	0.462
0.2263	0.490
0.2385	0.535
0.2431	0.540
0.2536	0.524
0.2672	0.573
0.2793	0.632
0.2945	0.671
0.3238	0.705
0.3464	0.715
0.3615	0.682
0.3839	0.551
0.4052	0.491
0.4161	0.520
0.4444	0.695
0.4662	0.748
0.4682	0.746
0.5277	0.641
0.5536	0.603
0.5767	0.670
0.6108	0.774
0.6492	0.794
0.7425	0.794
CURVE 2 T = 298	
0.2067	0.316*
0.2081	0.455
0.2127	0.566
0.2172	0.600
0.2279	0.621
0.2403	0.630
0.2480	0.624
0.2562	0.624
0.2818	0.682
0.2847	0.690
0.3139	0.692
0.3473	0.711
0.3669	0.664

λ	τ
CURVE 2 (cont.)	
0.3839	0.556
0.3899	0.515
0.4039	0.490
0.4133	0.508
0.4477	0.705
0.4627	0.741
0.4769	0.748
0.5103	0.695
0.5536	0.601
0.6139	0.774
0.6492	0.794*
0.7425	0.794*
CURVE 3 T = 298	
0.22	0.224
CURVE 4 T = 298	
0.22	0.0832
CURVE 5 T = 298	
0.22	0.0316
CURVE 6 T = 298	
0.22	0.0269
CURVE 7* T = 298	
0.22	0.0269
CURVE 8* T = 298	
0.22	0.0269

λ	τ
CURVE 9*	
0.22	0.0269
CURVE 10 T ~ 298	
2.0	0.853
3.9	0.859
4.7	0.843
5.1	0.579
5.8	0.209
6.4	0.036
6.9	0.009*
CURVE 11 T = 298	
0.200	0.000
0.208	0.281
0.216	0.394
0.223	0.422
0.234	0.432
0.250	0.419
0.260	0.460
0.269	0.549
0.283	0.598
0.298	0.631
0.314	0.647
0.344	0.652
0.352	0.602
0.394	0.123
0.403	0.147
0.454	0.631
0.465	0.673
0.479	0.659
0.543	0.404
0.597	0.682
0.619	0.727
0.660	0.747
0.763	0.763
3.006	0.845

* Not shown on plot

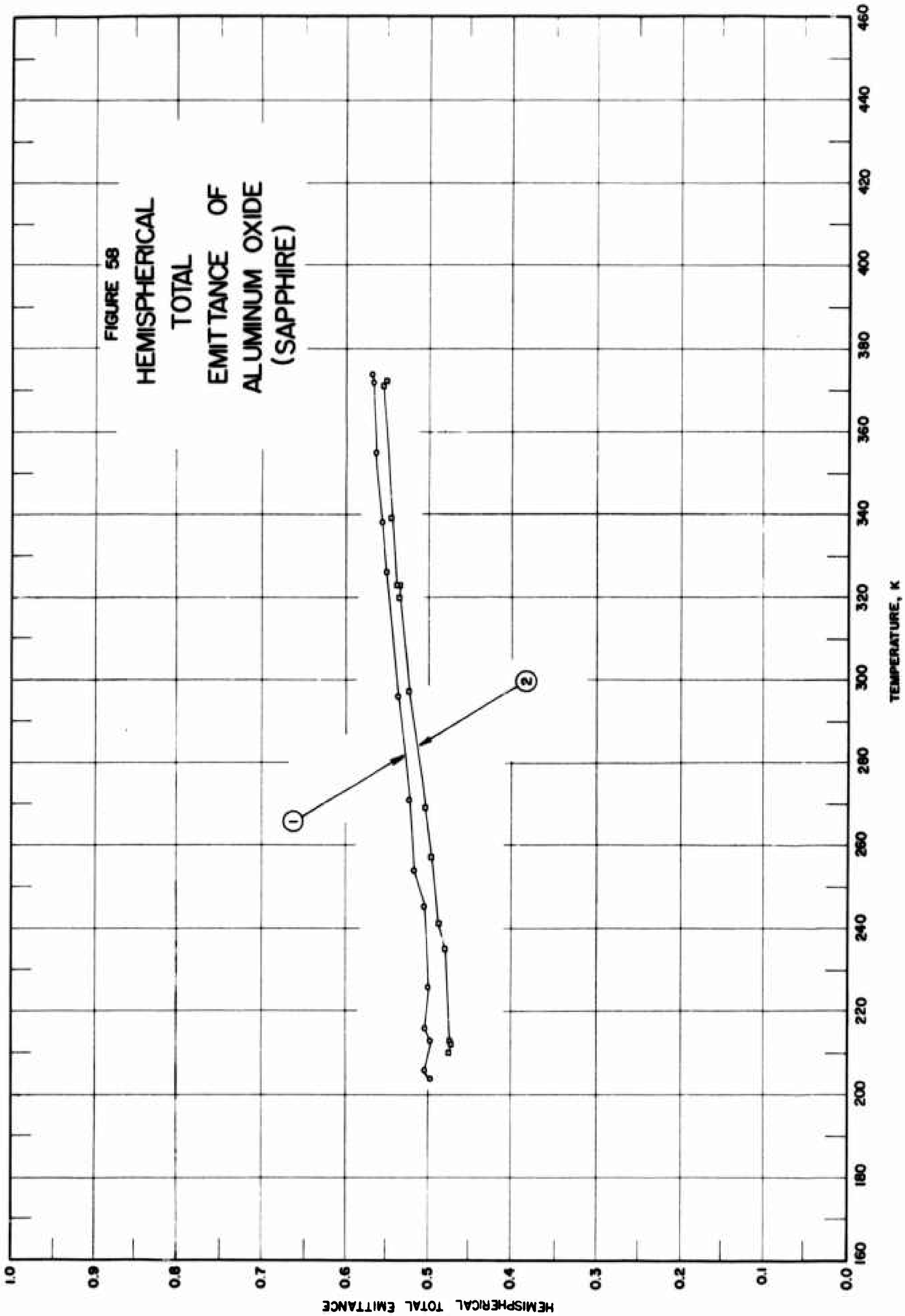


FIGURE 58
HEMISPHERICAL TOTAL EMITTANCE OF ALUMINUM OXIDE (SAPPHIRE)

SPECIFICATION TABLE NO. 58 HEMISPHERICAL TOTAL EMITTANCE OF ALUMINUM OXIDE (SAPPHIRE) Al_2O_3

Curve No.	Ref. No.	Year	Temperature Range, K	Reported Error, %	Composition (weight percent), Specifications and Remarks
1	284	1965	204-374	±3	Manufactured by Linde (1 mm thick); polished flat to better than two fringes per inch; impurity concentration < 300 ppm; measured in vacuum (10^{-7} mm Hg); c-axis parallel to surface normal.
2	284	1965	210-372	±3	Above specimen and conditions except c-axis perpendicular to surface normal.

DATA TABLE NO. 58 HEMISPHERICAL TOTAL EMITTANCE OF ALUMINUM OXIDE (SAPPHIRE) Al_2O_3

[Temperature, T, K; Emittance, ∈]

T	∈	T	∈
CURVE 1		CURVE 2 (cont.)	
204	0.497	320	0.533
206	0.503	323	0.533
213	0.499	323	0.535
216	0.503	339	0.542
226	0.500	371	0.553
245	0.504	372	0.550
254	0.518		
271	0.524		
296	0.537		
326	0.550		
338	0.556		
355	0.564		
372	0.566		
374	0.569		
CURVE 2			
210	0.474		
212	0.471		
213	0.473		
235	0.480		
241	0.487		
257	0.496		
269	0.504		
297	0.524		

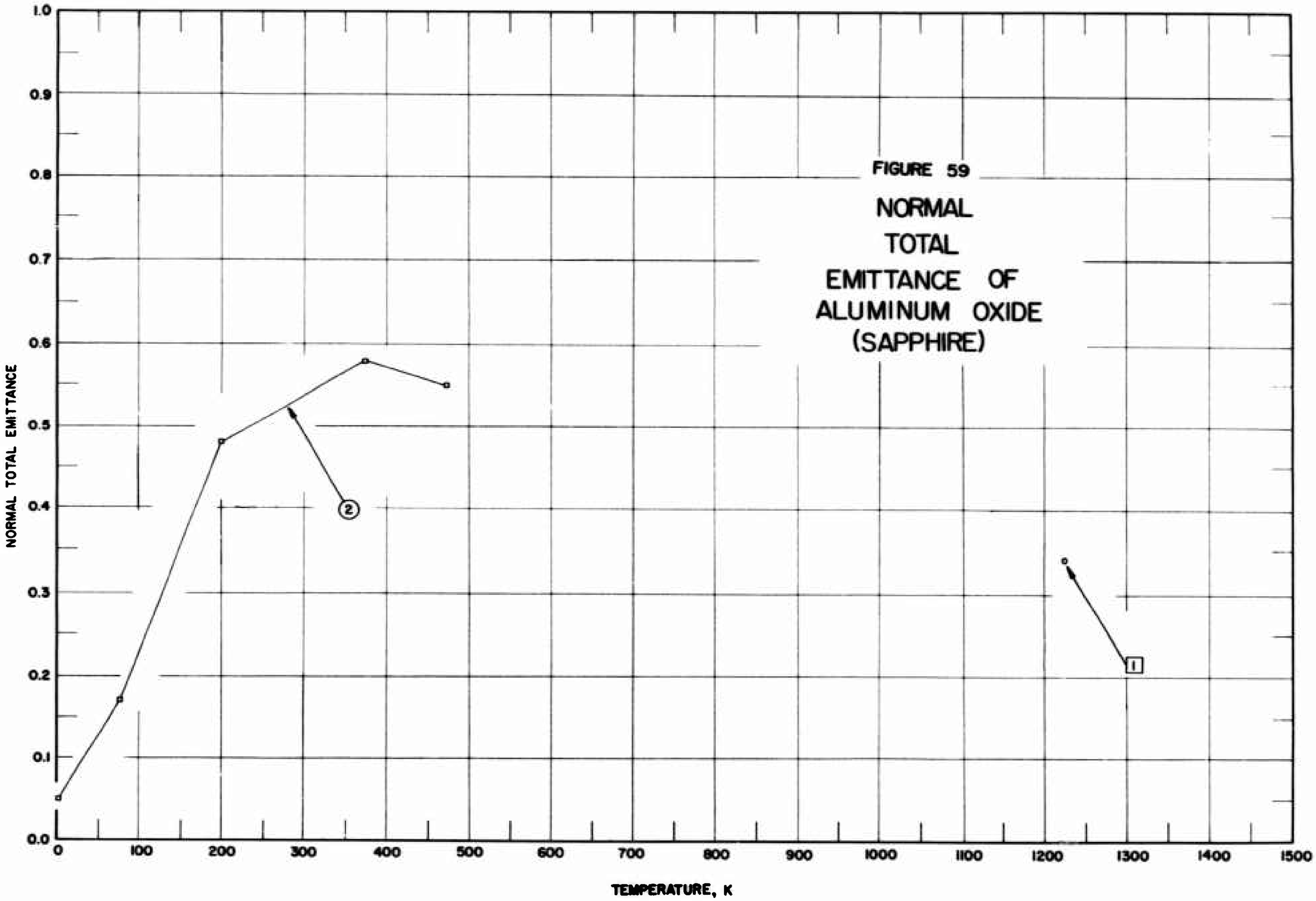


FIGURE 59
NORMAL TOTAL EMITTANCE OF ALUMINUM OXIDE (SAPPHIRE)

SPECIFICATION TABLE NO. 59 NORMAL TOTAL EMITTANCE OF ALUMINUM OXIDE (SAPPHIRE) Al_2O_3

Curve No.	Ref. No.	Year	Temperature Range, K	Geometry θ'	Reported Error, %	Composition (weight percent), Specifications and Remarks
1	28	1963	1223	~0°		Sintered at 2023 K for 2 hrs (setter material Al_2O_3); density 3.35 g cm^{-3}; theoretical density 3.97 g cm^{-3}; x-ray structure corundum; integrated from spectral data (1-15 μm). [Authors' designation: Sample No. 113].
2	156	1966	4.2-473	0°		0.79 mm thick; computed from spectral data.

DATA TABLE NO. 59 NORMAL TOTAL EMITTANCE OF ALUMINUM OXIDE (SAPPHIRE) Al_2O_3

[Temperature, T, K; Emittance, ϵ]

T	ϵ
CURVE 1	
1223	0.34
CURVE 2	
4.2	0.05
77	0.17
200	0.48
373	0.58
473	0.55

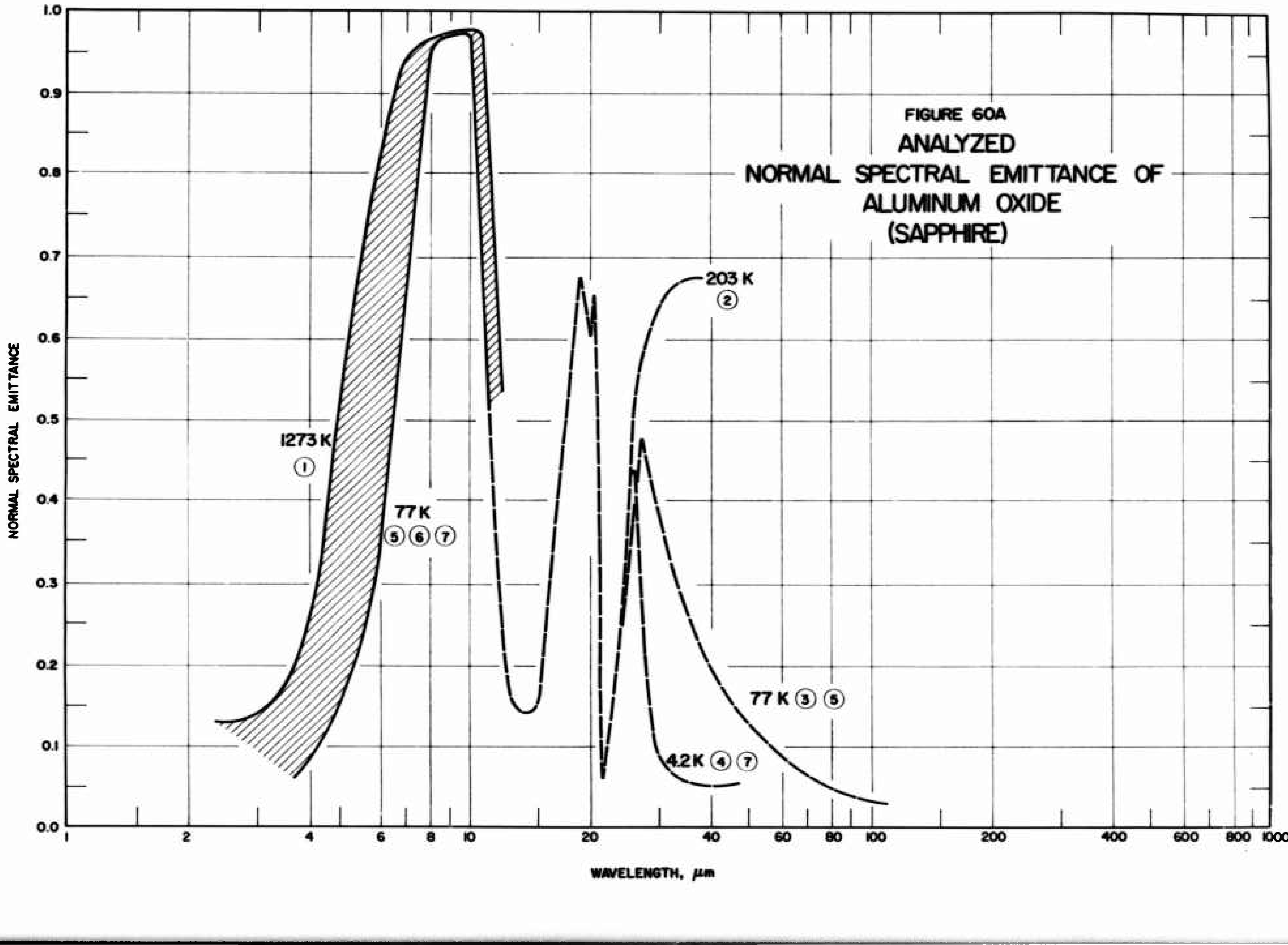


FIGURE 60A
ANALYZED
NORMAL SPECTRAL EMITTANCE OF
ALUMINUM OXIDE
(SAPPHIRE)
NORMAL SPECTRAL EMITTANCE
WAVELENGTH, μm
1.0
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0.0
1
2
4
6
8
10
20
40
60
80
100
200
400
600
800
1000
1273 K (1)
77 K (5) (6) (7)
203 K (2)
77 K (3) (5)
4.2 K (4) (7)

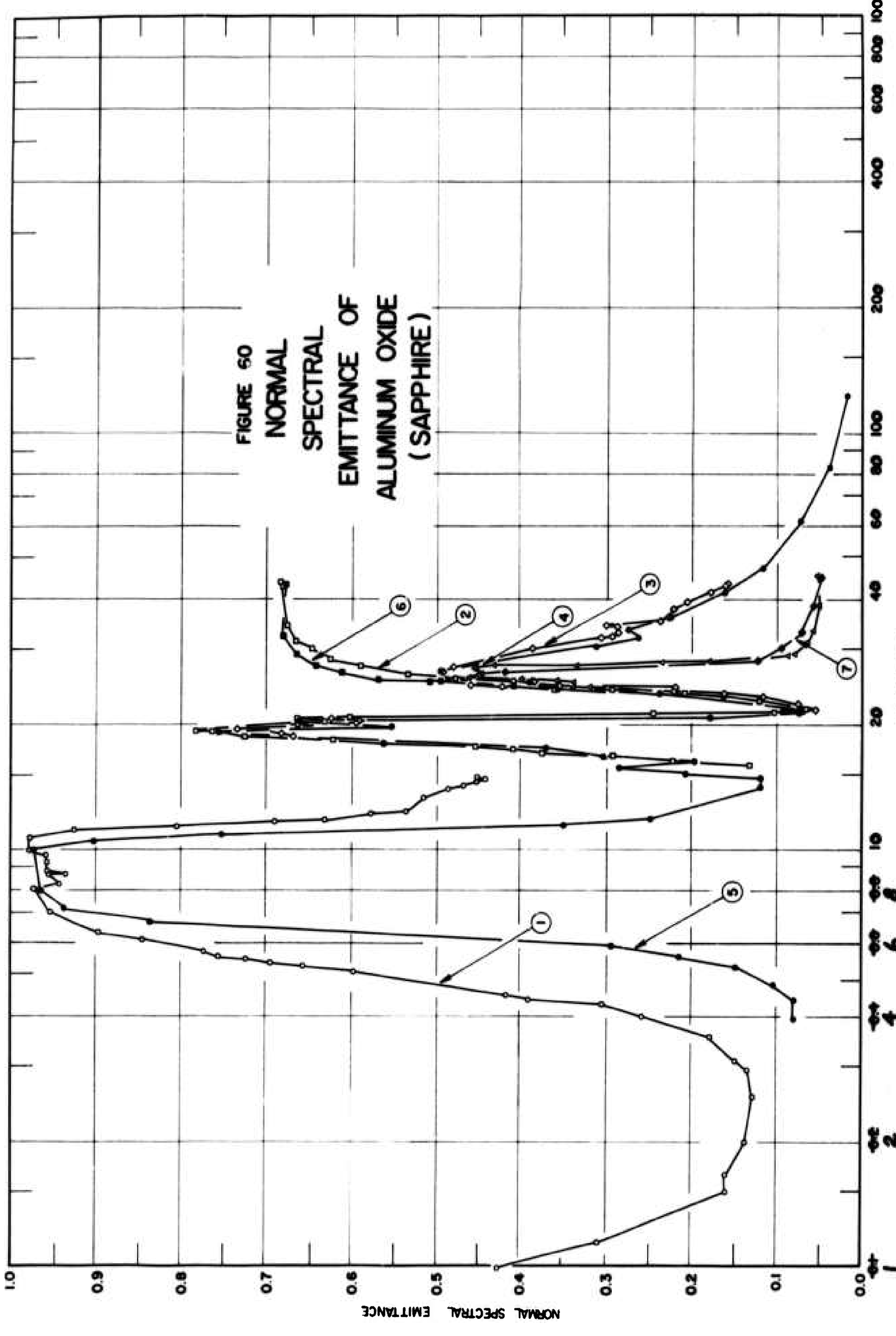


FIGURE 60 NORMAL SPECTRAL EMITTANCE OF ALUMINUM OXIDE (SAPPHIRE)

SPECIFICATION TABLE NO. 60 NORMAL SPECTRAL EMITTANCE OF ALUMINUM OXIDE (SAPPHIRE) Al_2O_3

Curve No.	Ref. No.	Year	Temperature, K	Wavelength Range, μm	Geometry θ'	Reported Error, %	Composition (weight percent), Specifications, and Remarks
1	28	1963	1273	1.00-15.00	$\sim 0^\circ$		Sintered at 2023 K for 2 hrs (setter material Al_2O_3); density 3.35 g cm^{-3}, theoretical density 3.97 g cm^{-3}; x-ray structure corundum; data extracted from smooth curve. [Authors' designation: Sample No. 113].
2	156	1966	203	16.0-44.0	0°		Crystal (0.79 mm thick); data extracted from smooth curve.
3	156	1966	77	16.0-43.6	0°		Above specimen and conditions.
4	156	1966	4.2	16.0-45.6	0°		Above specimen and conditions.
5	274	1966	77	3.97-122	0°		0.79 mm thick; data extracted from smooth curve.
6	274	1963	200	3.97-43.2	0°		Above specimen and conditions.
7	274	1963	4.2	3.97-45.3	0°		Above specimen and conditions.

DATA TABLE NO. 60 NORMAL SPECTRAL EMITTANCE OF ALUMINUM OXIDE (SAPPHIRE) Al_2O_3

[Wavelength, λ, μm; Emittance, ϵ; Temperature, T, K]

CURVE 1
T = 1273

λ	ϵ
1.00	0.425
1.15	0.308
1.51	0.159
1.66	0.159
2.00	0.136
2.56	0.129
2.99	0.134
3.12	0.149
3.59	0.176
4.00	0.258
4.23	0.304
4.39	0.388
4.49	0.417
5.04	0.599
5.22	0.657
5.33	0.695
5.42	0.723
5.53	0.752
5.66	0.772
6.04	0.844
6.39	0.899
7.01	0.954
8.02	0.975
8.32	0.942
8.70	0.957
8.78	0.934
8.94	0.959
9.36	0.959
9.77	0.959
10.00	0.979
10.63	0.979
11.01	0.923
11.35	0.803
11.66	0.690
11.79	0.631
12.01	0.577
12.36	0.534
13.20	0.514
14.00	0.485
14.15	0.467
14.67	0.450
14.84	0.440
15.00	0.450

CURVE 2
T = 203

λ	ϵ
16.0	0.132
16.4	0.221
16.7	0.293
17.0	0.371
17.4	0.409
17.6	0.452
18.3	0.623
18.9	0.725
19.3	0.761
19.4	0.783
20.0	0.662
20.2	0.633
20.6	0.663
20.8	0.601
21.1	0.244
21.4	0.102
21.6	0.070
21.9	0.067
22.8	0.121
23.3	0.161
23.7	0.210
24.1	0.294
24.4	0.358
25.1	0.383
25.3	0.408
25.7	0.478
26.3	0.533
27.6	0.590
28.8	0.626
30.2	0.649
31.8	0.666
34.8	0.676
43.0	0.680
44.0	0.683

CURVE 3
T = 77

λ	ϵ
16.0	0.132*
16.4	0.221*
16.7	0.293*
17.0	0.371*
17.4	0.409*

CURVE 3 (cont.)

λ	ϵ
17.6	0.452*
18.3	0.623*
18.6	0.670
19.0	0.684
19.5	0.733
20.1	0.596
20.2	0.592
20.7	0.627
21.1	0.244*
21.4	0.102*
21.5	0.072
21.8	0.053
22.4	0.075
23.2	0.118
23.7	0.161
24.0	0.221
24.5	0.319
24.8	0.352
25.3	0.381
25.7	0.422
25.9	0.459
26.4	0.449
26.9	0.491
27.4	0.480
30.2	0.384
32.1	0.308
32.6	0.293
33.3	0.287
34.2	0.286
34.9	0.251
35.5	0.236
36.3	0.227
38.0	0.221
39.2	0.206
41.4	0.178
43.0	0.161
43.6	0.159

CURVE 4
T = 4.2

λ	ϵ
16.0	0.132*
16.4	0.221*
16.7	0.293*

CURVE 4 (cont.)

λ	ϵ
17.0	0.371*
17.4	0.409*
17.6	0.452*
18.3	0.623*
18.6	0.670*
19.0	0.684*
19.5	0.733*
20.1	0.596*
20.2	0.592*
20.7	0.627*
21.1	0.244*
21.4	0.102*
21.5	0.072*
21.8	0.053*
22.4	0.075*
23.2	0.118*
23.7	0.161*
24.0	0.221*
24.5	0.319
24.7	0.338
25.2	0.337
25.5	0.354
25.8	0.399
26.0	0.459
26.5	0.447
27.2	0.452
27.6	0.430
27.9	0.333
28.1	0.233
28.2	0.179
28.6	0.122
29.1	0.085
29.8	0.078
31.5	0.064
33.9	0.057
38.5	0.050
45.6	0.051

CURVE 5
T = 77

λ	ϵ
3.97	0.078
4.36	0.078
4.79	0.104

CURVE 5 (cont.)

λ	ϵ
5.21	0.148
5.57	0.214
5.83	0.294
6.79	0.835
7.23	0.937
8.00	0.966
10.0	0.972
10.5	0.901
10.8	0.750
11.4	0.347
11.9	0.249
14.1	0.120
14.9	0.120
15.3	0.207
15.9	0.285
16.2	0.197
16.8	0.304
17.5	0.368
18.0	0.561
19.3	0.753
19.7	0.551
20.4	0.661
20.9	0.179
21.3	0.071
21.7	0.070
23.7	0.236
24.2	0.353
24.6	0.354
25.1	0.389
25.6	0.487
26.8	0.497
30.8	0.311
32.4	0.262
33.9	0.275
36.1	0.224
41.4	0.161
47.9	0.118
61.5	0.071
83.0	0.038
122	0.019

CURVE 6
T = 200

λ	ϵ
3.97	0.078*
4.36	0.078*
4.79	0.104*
5.21	0.148*
5.57	0.214*
5.83	0.294*
6.79	0.835*
7.23	0.937*
8.00	0.966*
10.0	0.972*
10.5	0.901*
10.8	0.750
11.4	0.347*
11.9	0.249*
14.1	0.120*
14.9	0.120*
15.3	0.207*
15.9	0.285*
16.2	0.197*
16.8	0.304*
17.5	0.368*
18.0	0.561*
19.3	0.753*
19.7	0.551*
20.4	0.661*
20.9	0.179*
21.3	0.071*
21.8	0.070*
23.7	0.236*
24.2	0.353*
24.9	0.408
25.2	0.496
25.2	0.508
25.8	0.568
26.6	0.611
27.8	0.641
29.5	0.665
32.7	0.680
43.2	0.679

CURVE 7
T = 4.2

λ	ϵ
3.97	0.078
4.36	0.078
4.79	0.104
5.21	0.148
5.57	0.214
5.83	0.294
6.79	0.835
7.23	0.937
8.00	0.966
10.0	0.972
10.5	0.901
10.8	0.750
11.4	0.347
11.9	0.249
14.1	0.120
14.9	0.120
15.3	0.207
15.9	0.285
16.2	0.197
16.8	0.304
17.5	0.368
18.0	0.561
19.3	0.753
19.7	0.551*
20.4	0.661*
20.9	0.179*
21.3	0.071*
21.7	0.070*
23.7	0.236*
24.2	0.353*
24.9	0.408*
25.2	0.496*
26.7	0.419
28.5	0.124
30.3	0.094
33.1	0.070
38.4	0.056
45.3	0.049

* Not shown on plot

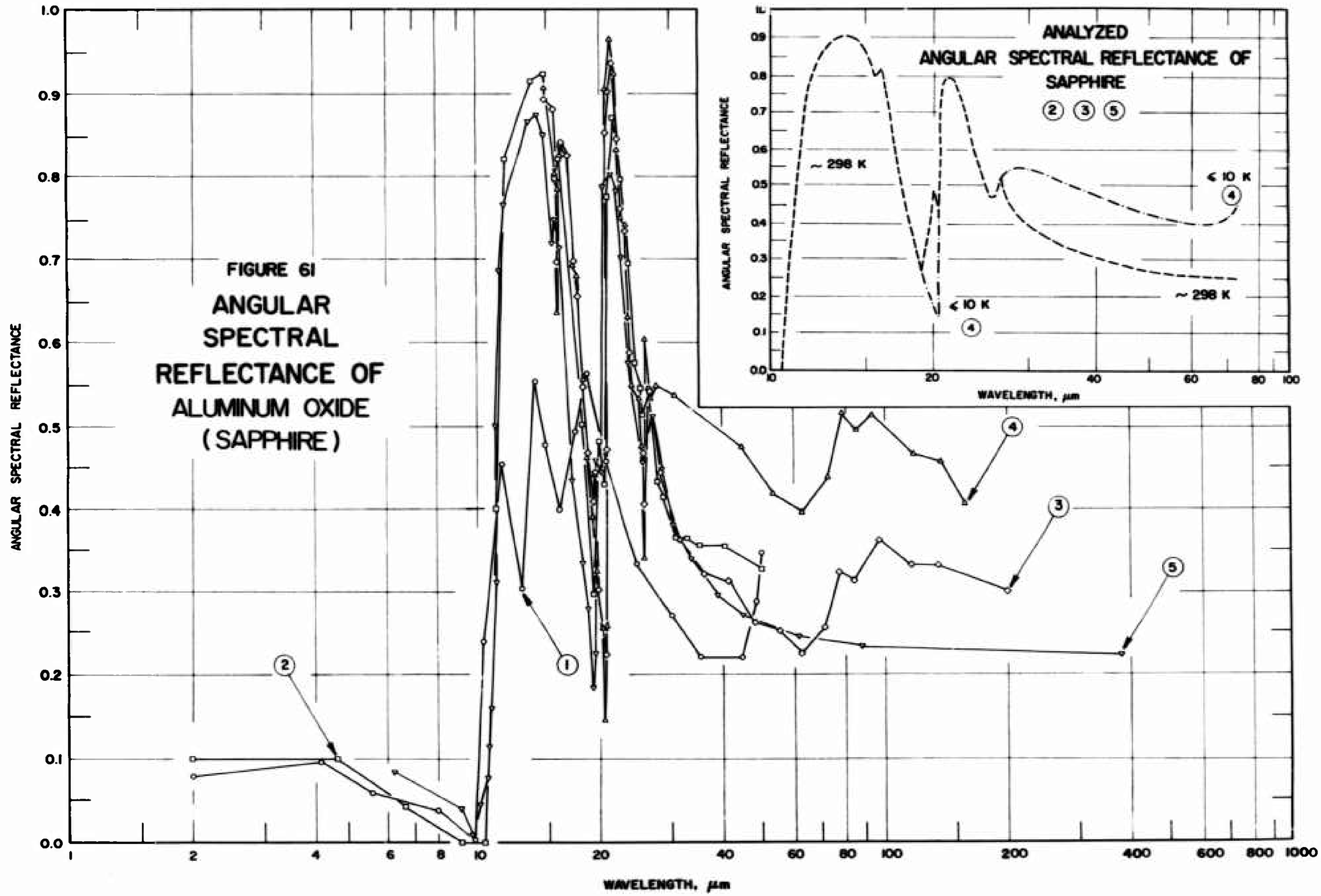


FIGURE 61
ANGULAR SPECTRAL REFLECTANCE OF ALUMINUM OXIDE (SAPPHIRE)
ANGULAR SPECTRAL REFLECTANCE
WAVELENGTH, μm
ANALYZED ANGULAR SPECTRAL REFLECTANCE OF SAPPHIRE
2 3 5
~ 298 K
≤ 10 K
4
~ 298 K
≤ 10 K
4
1
2
3
4
5

SPECIFICATION TABLE NO. 61 ANGULAR SPECTRAL REFLECTANCE OF ALUMINUM OXIDE (SAPPHIRE) Al_2O_3

Curve No.	Ref. No.	Year	Temperature, K	Wavelength Range, μm	Geometry θ	θ'	ω'	Reported Error, %	Composition (weight percent), Specifications, and Remarks
1	67	1963	~298	2.0-50.0	30°	30°			2 mm thick; data extracted from smooth curve; aluminum mirror standard.
2	102	1965	~298	2.0-50.0	30°	30°			3.0 mm thick; data extracted from smooth curve; aluminum mirror standard.
3	141	1964	298	14.8-200	45°	45°		±5	Z-cut sapphire; optic axis perpendicular to the plane of the crystal to minimize polarization effects; data extracted from smooth curve.
4	141	1964	≤10	14.8-156	45°	45°		±5	Above specimen and conditions.
5	194	1967	~298	6.25-384	~15°	~15°			Two faces polished; data extracted from smooth curve.
6*	362	1964	~298	0.230-2.65	~0°		2π		Sapphire single crystal (1.02 mm thick); polished; data extracted from smooth curve; MgO reference standard.

*Not shown on plot

DATA TABLE NO. 61 ANGULAR SPECTRAL REFLECTANCE OF ALUMINUM OXIDE (SAPPHIRE) Al_2O_3

[Wavelength, λ, μm; Reflectance, ρ; Temperature, T, K]

CURVE 1
T = 298

λ	ρ
2.0	0.078
4.1	0.095
5.5	0.058
8.0	0.038
9.8	0.002
10.4	0.239
11.5	0.452
12.8	0.303
13.9	0.554
14.7	0.478
16.0	0.400
17.3	0.494
18.6	0.562
20.9	0.458
24.6	0.333
30.0	0.270
35.4	0.220
44.6	0.220
48.4	0.287
50.0	0.347

CURVE 2
T ~ 298

λ	ρ
2.0	0.100
4.5	0.100
6.6	0.042
9.1	0.000
10.4	0.000
11.1	0.400
11.7	0.822
13.6	0.917
14.6	0.925
15.7	0.799
16.0	0.822
18.1	0.501
19.2	0.298
20.0	0.480
20.5	0.429
21.0	0.776
21.7	0.872
22.6	0.798
23.6	0.696
24.5	0.575
25.1	0.546
25.5	0.515
26.5	0.541
27.7	0.431
28.8	0.414
30.7	0.367
32.8	0.367
35.0	0.356
40.5	0.356
50.0	0.327

CURVE 3
T = 298

λ	ρ
14.8	0.893
15.5	0.831
15.7	0.798
15.8	0.697
16.1	0.825
16.3	0.843
16.6	0.828
17.4	0.699
17.8	0.657
18.2	0.549
18.7	0.466
19.4	0.409
19.5	0.442
19.9	0.303
20.7	0.222
20.8	0.470
20.9	0.853
21.1	0.902
21.6	0.938
22.4	0.847
22.7	0.762
23.2	0.737
23.7	0.589
25.6	0.467
25.9	0.406
26.4	0.544
28.1	0.442
31.2	0.362
36.4	0.320
41.6	0.311
48.0	0.261
55.2	0.251
62.5	0.225
71.4	0.256
77.5	0.324
84.7	0.313
97.0	0.363
116	0.331
135	0.331
200	0.300

CURVE 4
T ≤ 10

λ	ρ
14.8	0.909
15.6	0.803
15.8	0.638
15.9	0.785
16.2	0.840
16.6	0.827
17.3	0.693
17.7	0.680
18.1	0.557
18.6	0.462
19.3	0.390
19.5	0.440
19.8	0.323
20.2	0.253
20.5	0.147
20.7	0.256
20.8	0.905
21.4	0.966
21.9	0.925
22.4	0.834
22.6	0.752
23.1	0.744
23.5	0.631
24.0	0.550
25.0	0.533
25.4	0.476
25.7	0.340
25.9	0.604
26.6	0.535
27.9	0.550
31.3	0.539
44.6	0.474
53.1	0.418
62.8	0.398
72.4	0.438
79.3	0.517
85.4	0.496
93.4	0.516
117	0.466
138	0.458
156	0.407

CURVE 5
T ~ 298

λ	ρ
6.25	0.084
9.12	0.040
9.68	0.009
10.3	0.046
10.5	0.078
10.7	0.116
10.8	0.160
11.0	0.313
11.1	0.502
11.4	0.688
11.7	0.769
13.6	0.867
14.2	0.876
14.7	0.851
15.4	0.721
15.7	0.750
16.0	0.715
17.1	0.434
18.2	0.334
18.7	0.279
19.3	0.184
19.6	0.223
19.9	0.459
20.4	0.443
20.7	0.788
21.2	0.801
22.1	0.784
22.9	0.701
23.8	0.576
25.8	0.456
27.0	0.512
28.4	0.447
30.3	0.382
33.6	0.338
39.0	0.296
45.4	0.271
60.9	0.245
88.4	0.231
384	0.222

CURVE 6*
T ~ 298

λ	ρ
0.230	0.120
0.252	0.121
0.264	0.126
0.277	0.122
0.335	0.121
0.341	0.117
0.471	0.120
0.547	0.117
0.834	0.119
1.15	0.112
1.76	0.110
1.84	0.105
2.05	0.105
2.09	0.107
2.16	0.106
2.42	0.112
2.65	0.112

* Not shown on plot

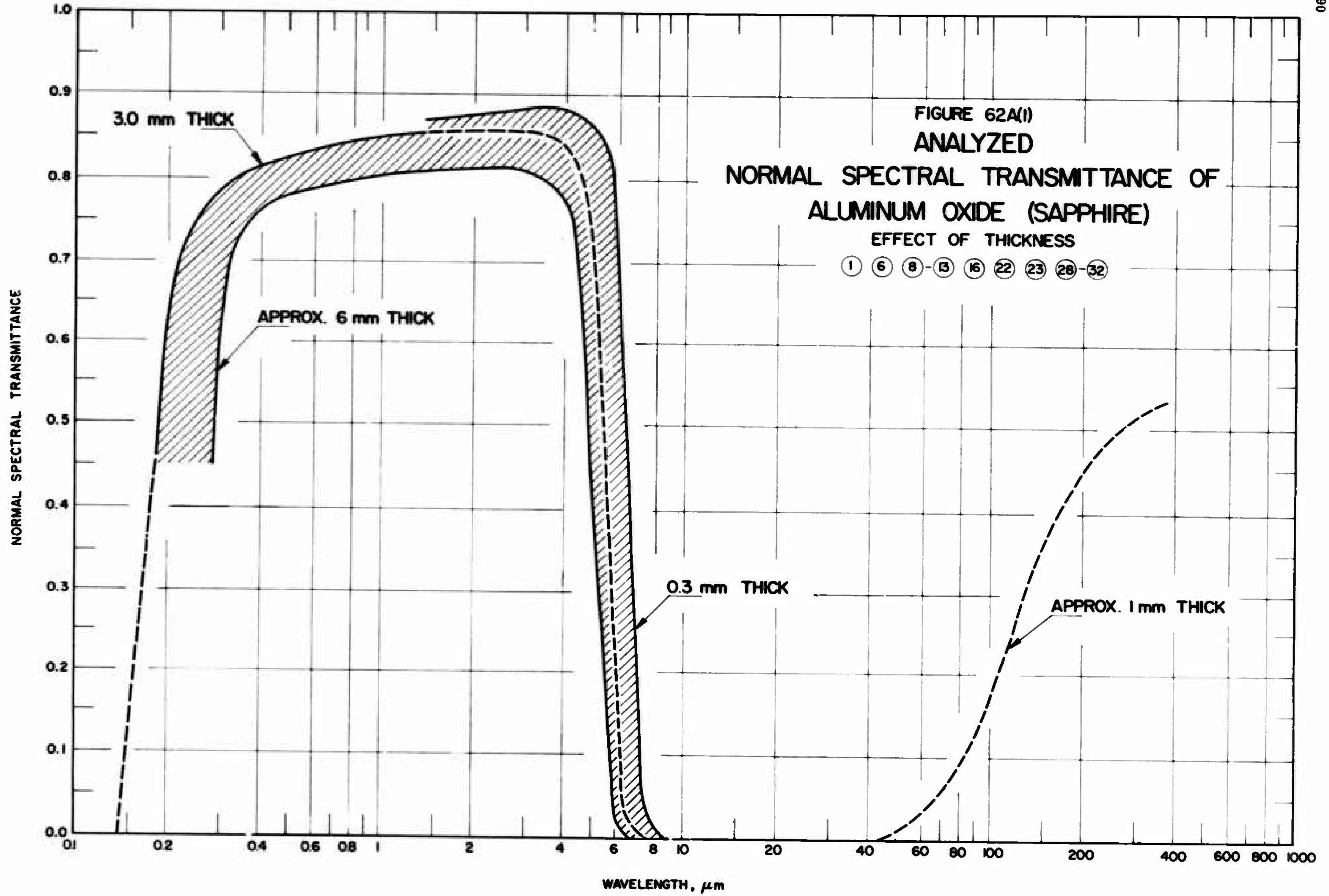


FIGURE 62A(1)
ANALYZED
NORMAL SPECTRAL TRANSMITTANCE OF
ALUMINUM OXIDE (SAPPHIRE)

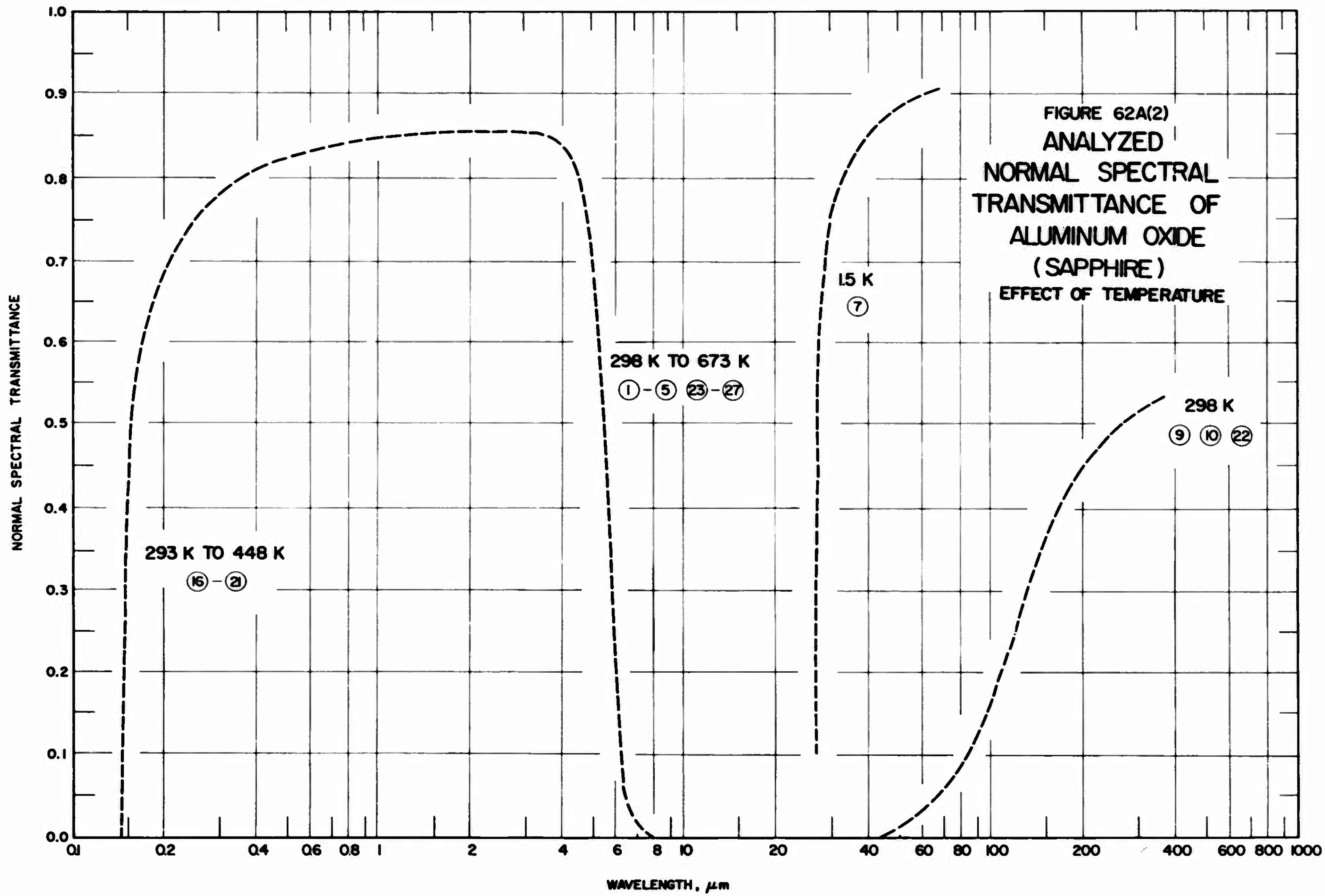


FIGURE 62A(2)
ANALYZED
NORMAL SPECTRAL
TRANSMITTANCE OF
ALUMINUM OXIDE
(SAPPHIRE)
EFFECT OF TEMPERATURE

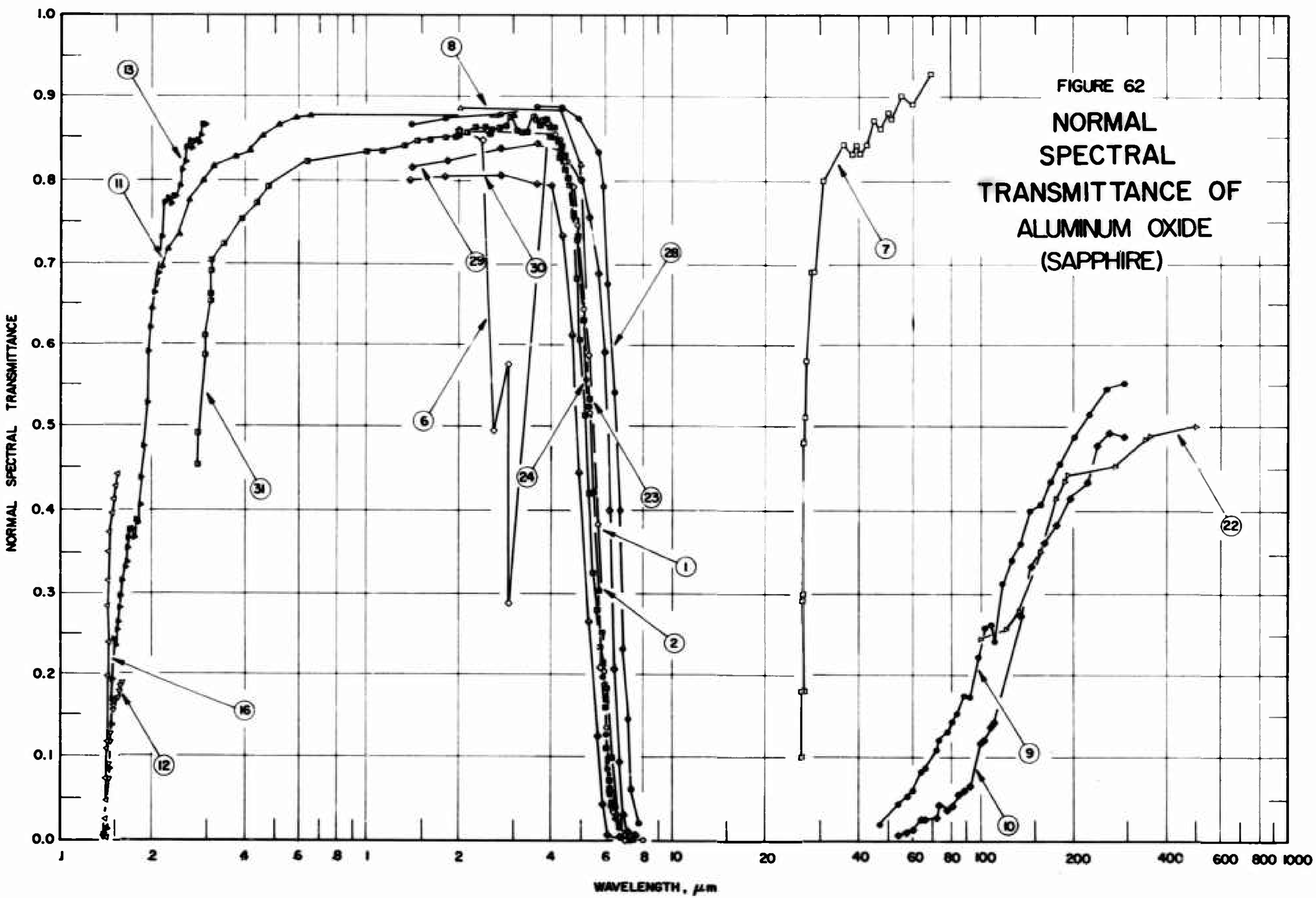


FIGURE 62
NORMAL SPECTRAL TRANSMITTANCE OF ALUMINUM OXIDE (SAPPHIRE)

SPECIFICATION TABLE NO. 62 NORMAL SPECTRAL TRANSMITTANCE OF ALUMINUM OXIDE (SAPPHIRE) Al_2O_3

Curve No.	Ref. No.	Year	Temperature, K	Wavelength Range, μm	Geometry θ	θ'	ω'	Reported Error, %	Composition (weight percent), Specifications, and Remarks
1	12	1964	298	2.00-8.00	~0°	~0°			Manufactured by the Linde Co. (2.79 mm thick); polished; data extracted from smooth curve.
2	12	1964	373	2.00-8.00	~0°	~0°			Above specimen and conditions.
3*	12	1964	473	2.00-8.00	~0°	~0°			Above specimen and conditions.
4*	12	1964	573	2.00-8.00	~0°	~0°			Above specimen and conditions.
5*	12	1964	673	2.00-8.00	~0°	~0°			Above specimen and conditions.
6	67	1963	~298	2.0-50.0	0°	0°			2 mm thick; data extracted from smooth curve.
7	195	1966	1.5	26.3-69.9	~0°	~0°			0.5 mm thick optical flat.
8	102	1965	~298	2.0-7.3	0°	0°			3.0 mm thick; data extracted from smooth curve.
9	196	1962	298	47.5-291	0°	0°			Synthetic sapphire (0.986 mm thick); optic axis parallel to specimen surface; measured with electric field perpendicular to the optic axis.
10	96	1962	298	54.6-293	0°	0°			Above specimen and condition except measured with electric field parallel to the optic axis.
11	94	1967	298	0.200-3.00	~0°	~0°			Single crystal (3.0 mm thick); polished; data extracted from smooth curve.
12	190	1968	~298	0.139-0.158	~0°	~0°			Single crystal; cut with the optic axis parallel to the reflecting surface; polished using 6 μm diamond paste, followed by a final polish using 0.5 μm diamond paste on a Buehler microcloth wheel.
13	291	1966	~298	0.1443-0.3000	0°	0°			Linde polished UV grade synthetic sapphire (α- Al_2O_3, 6.41 mm thick); measured in vacuum.
14*	291	1966	~298	0.1444-0.3000	0°	0°			Above specimen and conditions except irradiated with 10^{14} electrons cm^{-2} at 1.0 Mev and 2.0 Mev; angle of c-axis with electron beam 60°; turned a beige color.
15*	291	1966	~298	0.1448-0.3000	0°	0°			Similar to above specimen and conditions except irradiated with 2 x 10^{14} electrons cm^{-2} at 1.0 Mev and 7 x 10^{14} electrons cm^{-2} at 2.0 Mev.
16	282	1965	293	0.1410-0.1509	0°	0°			α- Al_2O_3, synthetic sapphire (0.32 mm thick) from Adolph Meller Co.; data extracted from smooth curve; measured in vacuum.
17*	282	1965	317	0.1416-0.1509	0°	0°			Above specimen and conditions.
18*	282	1965	342	0.1423-0.1509	0°	0°			Above specimen and conditions.
19*	282	1965	377	0.1430-0.1509	0°	0°			Above specimen and conditions.
20*	282	1965	416	0.1443-0.1509	0°	0°			Above specimen and conditions.
21*	282	1965	448	0.1456-0.1509	0°	0°			Above specimen and conditions.
22	281	1969	~298	100-500	~0°	~0°			Al_2O_3 (1.000 μm thick); data extracted from smooth curve.
23	288	1965	298	2.00-8.00	0°	0°			Sapphire manufactured by Linde Co. (2.80 mm thick); polished optically flat to within five green mercury fringes and a parallelism tolerance of ± 2.5 μm; data extracted from smooth curve.

* Not shown on plot

SPECIFICATION TABLE NO. 62 (Continued)

Curve No.	Ref. No.	Year	Temperature, K	Wavelength Range, μm	Geometry θ	θ'	ω'	Reported Error, %	Composition (weight percent), Specifications, and Remarks
24	288	1965	373	2.00-8.00	0°	0°			Above specimen and conditions.
25*	288	1965	473	2.00-8.00	0°	0°			Above specimen and conditions.
26*	288	1965	573	2.00-8.00	0°	0°			Above specimen and conditions.
27*	288	1965	673	2.00-8.00	0°	0°			Above specimen and conditions.
28	285	1965	~298	1.40-8.22	0°	0°			Manufactured by Linde (0.028 mm thick).
29	285	1965	~298	1.40-7.54	0°	0°			Manufactured by Linde (0.813 mm thick).
30	285	1965	~298	1.38-7.13	0°	0°			Manufactured by Linde (6.35 mm thick).
31	298	1936	~298	0.280-5.47	~0°	~0°			Synthetic white sapphire (5.45 mm thick); amorphous.
32*	362	1964	~298	0.230-2.65	~0°	~0°			Sapphire single crystal (1.02 mm thick); polished; data extracted from smooth curve; relative to air.

* Not shown on plot

DATA TABLE NO. 62 NORMAL SPECTRAL TRANSMITTANCE OF ALUMINUM OXIDE (SAPPHIRE) Al_2O_3

[Wavelength, λ, μm; Transmittance, τ; Temperature, T, K]

λ	τ
CURVE 1	
T = 298	
2.00	0.857
2.49	0.857
4.10	0.855
4.29	0.848
4.50	0.821
4.83	0.747
5.10	0.644
5.37	0.515
5.64	0.383
6.00	0.202
6.10	0.133
6.28	0.059
6.68	0.027
7.00	0.007
7.27	0.002
8.00	0.000
CURVE 2	
T = 373	
2.00	0.855
2.52	0.855
4.08	0.852
4.34	0.839
4.56	0.802
4.82	0.733
5.08	0.630
5.30	0.523
5.48	0.421
5.74	0.302
6.02	0.159
6.21	0.070
6.31	0.046
6.65	0.021
6.92	0.004
8.00	0.000*
CURVE 3*	
T = 473	
2.00	0.857
2.54	0.856
4.11	0.851

λ	τ
CURVE 3 (cont.)*	
4.35	0.835
4.56	0.790
4.82	0.709
5.10	0.581
5.32	0.462
5.59	0.315
5.87	0.178
6.13	0.070
6.29	0.037
6.60	0.017
6.99	0.003
8.00	0.000
CURVE 4*	
T = 573	
2.00	0.857
2.52	0.857
4.04	0.852
4.27	0.841
4.40	0.817
4.63	0.753
4.82	0.679
5.14	0.515
5.38	0.369
5.63	0.227
6.00	0.095
6.23	0.035
6.50	0.018
6.85	0.007
7.14	0.003
8.00	0.000
CURVE 5*	
T = 673	
2.00	0.855
2.67	0.853
3.84	0.853
4.19	0.834
4.47	0.783
4.68	0.712
4.90	0.606
5.14	0.476

λ	τ
CURVE 5 (cont.)*	
5.39	0.320
5.65	0.173
5.94	0.077
6.24	0.021
6.55	0.010
6.99	0.003
8.00	0.000
CURVE 6	
T = 298	
2.0	0.858
2.4	0.848
2.6	0.494
2.9	0.575
2.9	0.286
3.9	0.866
4.7	0.792
5.3	0.587
5.8	0.209
6.4	0.033
7.0	0.000
50.0	0.000
CURVE 7	
T = 1.5	
26.3	0.10
26.4	0.18
26.5	0.18
26.5	0.29
26.6	0.30
26.7	0.48
27.0	0.51
27.1	0.58
28.5	0.69
28.7	0.69
31.0	0.80
36.4	0.84
38.5	0.83
39.7	0.84
40.7	0.83
43.5	0.84
45.5	0.87

λ	τ
CURVE 7 (cont.)	
47.8	0.86
50.0	0.88
51.3	0.87
55.9	0.90
60.0	0.89
69.9	0.93
CURVE 8	
T ~ 298	
2.0	0.883
4.3	0.883
5.0	0.819
6.4	0.055
7.3	0.000
CURVE 9	
T = 298	
47.5	0.019
50.9	0.030
54.5	0.044
58.0	0.052
60.2	0.059
64.6	0.081
66.6	0.085
72.4	0.108
73.1	0.119
78.2	0.129
81.0	0.141
84.8	0.152
89.0	0.175
93.1	0.172
99.9	0.220
104	0.259
108	0.262
111	0.240
119	0.313
127	0.344
135	0.361
145	0.400
157	0.409
170	0.433
184	0.455

λ	τ
CURVE 9 (cont.)	
203	0.486
225	0.515
255	0.545
291	0.552
CURVE 10	
T = 298	
54.6	0.005
57.9	0.009
60.4	0.011
64.4	0.025
66.8	0.025
72.4	0.027
73.3	0.042
78.0	0.036
81.1	0.041
85.1	0.054
89.0	0.058
93.5	0.064
100	0.115
103	0.118
108	0.135
110	0.140
135	0.272
147	0.334
161	0.361
177	0.384
198	0.417
221	0.434
240	0.477
261	0.491
293	0.488
CURVE 11	
T = 298	
0.200	0.644
0.213	0.697
0.223	0.719
0.242	0.735
0.264	0.775
0.294	0.800
0.318	0.816
0.376	0.826

λ	τ
CURVE 11 (cont.)	
0.413	0.834
0.458	0.852
0.516	0.866
0.587	0.875
0.645	0.877
3.00	0.877
CURVE 12	
T ~ 298	
0.139	0.003
0.140	0.005
0.144	0.070
0.144	0.088
0.145	0.115
0.145	0.125
0.149	0.152
0.149	0.159
0.151	0.164
0.153	0.168
0.155	0.177
0.156	0.183
0.158	0.186
CURVE 13	
T ~ 298	
0.1443	0.012
0.1453	0.084
0.1468	0.138
0.1470	0.167
0.1488	0.192
0.1498	0.242
0.1513	0.233
0.1526	0.253
0.1539	0.264
0.1554	0.280
0.1568	0.296
0.1599	0.315
0.1621	0.331
0.1629	0.337
0.1644	0.355
0.1671	0.366
0.1699	0.376

λ	τ
CURVE 13 (cont.)	
0.1727	0.377
0.1748	0.366
0.1774	0.389
0.1798	0.385
0.1824	0.406
0.1847	0.438
0.1875	0.475
0.1901	0.527
0.1946	0.590
0.1998	0.621
0.2047	0.664
0.2099	0.688
0.2149	0.730
0.2198	0.773
0.2249	0.779
0.2298	0.772
0.2348	0.781
0.2397	0.780
0.2448	0.793
0.2496	0.810
0.2549	0.820
0.2597	0.836
0.2647	0.844
0.2695	0.836
0.2744	0.843
0.2795	0.844
0.2840	0.841
0.2891	0.852
0.2937	0.865
0.3000	0.865
CURVE 14*	
T ~ 298	
0.1444	0.011
0.1457	0.103
0.1467	0.145
0.1480	0.175
0.1494	0.223
0.1523	0.252
0.1535	0.268
0.1549	0.280
0.1567	0.299
0.1589	0.313

λ	τ
CURVE 14 (cont.)*	
0.1614	0.319
0.1634	0.333
0.1655	0.355
0.1684	0.365
0.1700	0.369
0.1726	0.377
0.1750	0.371
0.1772	0.388
0.1797	0.398
0.1819	0.415
0.1850	0.457
0.1875	0.488
0.1897	0.544
0.1950	0.625
0.1999	0.662
0.2050	0.691
0.2100	0.694
0.2151	0.739
0.2200	0.762
0.2248	0.758
0.2301	0.752
0.2349	0.763
0.2397	0.779
0.2449	0.794
0.2497	0.809
0.2548	0.819
0.2600	0.828
0.2647	0.831
0.2695	0.814
0.2748	0.817
0.2795	0.834
0.2840	0.832
0.2890	0.832
0.2940	0.838
0.3000	0.834
CURVE 15*	
T ~ 298	
0.1448	0.035
0.1460	0.119
0.1465	0.145
0.1476	0.163
0.1476	0.189

* Not shown on plot

DATA TABLE NO. 62 (Continued)

λ	τ
CURVE 15 (cont.)*	
0.1489	0.218
0.1520	0.264
0.1539	0.288
0.1547	0.290
0.1556	0.299
0.1571	0.316
0.1591	0.327
0.1613	0.341
0.1633	0.351
0.1653	0.376
0.1680	0.392
0.1698	0.387
0.1749	0.388
0.1797	0.401
0.1848	0.466
0.1875	0.496
0.1889	0.511
0.1897	0.561
0.1949	0.653
0.1999	0.703
0.2049	0.722
0.2098	0.727
0.2150	0.737
0.2247	0.766
0.2299	0.768
0.2346	0.773
0.2399	0.779
0.2447	0.787
0.2497	0.787
0.2546	0.798
0.2646	0.795
0.2696	0.810
0.2743	0.802
0.2796	0.815
0.2841	0.818
0.2889	0.821
0.2939	0.818
0.3000	0.815
CURVE 16 T = 293	
0.1410	0.008
0.1413	0.024
0.1416	0.047
0.1419	0.070
CURVE 16 (cont.)	
0.1422	0.106
0.1426	0.165
0.1429	0.197
0.1434	0.238
0.1440	0.281
0.1449	0.313
0.1461	0.350
0.1470	0.372
0.1483	0.395
0.1495	0.411
0.1504	0.427
0.1509	0.441
CURVE 17* T = 317	
0.1416	0.008
0.1420	0.024
0.1423	0.039
0.1426	0.060
0.1428	0.090
0.1433	0.149
0.1437	0.192
0.1443	0.252
0.1449	0.289
0.1455	0.326
0.1462	0.353
0.1467	0.365
0.1470	0.372
0.1483	0.395
0.1495	0.411
0.1504	0.427
0.1509	0.441
CURVE 18* T = 342	
0.1423	0.007
0.1426	0.015
0.1429	0.026
0.1431	0.038
0.1435	0.080
0.1439	0.133
0.1443	0.195
0.1445	0.228
0.1449	0.264
CURVE 18 (cont.)*	
0.1452	0.289
0.1457	0.317
0.1461	0.337
0.1466	0.356
0.1474	0.381
0.1483	0.395
0.1495	0.411
0.1504	0.427
0.1509	0.441
CURVE 19* T = 377	
0.1430	0.007
0.1433	0.013
0.1436	0.021
0.1438	0.033
0.1441	0.048
0.1444	0.071
0.1446	0.098
0.1451	0.171
0.1457	0.240
0.1458	0.260
0.1462	0.301
0.1467	0.331
0.1471	0.355
0.1480	0.392
0.1483	0.396
0.1495	0.411
0.1504	0.427
0.1509	0.441
CURVE 20* T = 416	
0.1443	0.007
0.1448	0.017
0.1450	0.026
0.1453	0.037
0.1457	0.074
0.1462	0.125
0.1467	0.195
0.1472	0.266
0.1476	0.311
0.1479	0.342
0.1482	0.357
CURVE 20 (cont.)*	
0.1487	0.381
0.1495	0.407
0.1504	0.427
0.1509	0.441
CURVE 21* T = 448	
0.1456	0.005
0.1459	0.018
0.1462	0.035
0.1465	0.046
0.1467	0.065
0.1469	0.085
0.1471	0.102
0.1473	0.129
0.1475	0.174
0.1479	0.233
0.1482	0.282
0.1484	0.308
0.1487	0.342
0.1492	0.373
0.1496	0.398
0.1504	0.427
0.1509	0.441
CURVE 22 T ~ 298	
100	0.243
121	0.257
134	0.278
156	0.352
177	0.416
186	0.434
192	0.442
271	0.452
340	0.483
356	0.488
500	0.500
CURVE 23 T = 298	
2.00	0.857*
3.96	0.851
CURVE 23 (cont.)	
4.23	0.847
4.40	0.829
4.59	0.795
4.85	0.729
5.33	0.531
5.89	0.252
6.12	0.109
6.25	0.060
6.43	0.039
6.76	0.015
6.98	0.004*
7.40	0.000
8.00	0.000*
CURVE 24 T = 373	
2.00	0.857*
3.96	0.851*
4.23	0.847*
4.44	0.821
4.75	0.756
5.20	0.557
5.91	0.198
6.08	0.124
6.17	0.084
6.25	0.057
6.38	0.042
6.57	0.027
6.97	0.004*
7.40	0.000*
8.00	0.000*
CURVE 25* T = 473	
2.00	0.857
3.96	0.851
4.23	0.847
4.43	0.820
4.55	0.787
4.78	0.721
5.23	0.502
5.62	0.284
5.97	0.128
6.11	0.070
CURVE 25 (cont.)*	
6.24	0.044
6.35	0.028
6.56	0.016
6.97	0.004
7.40	0.000
8.00	0.000
CURVE 26* T = 573	
2.00	0.857
3.96	0.844
4.25	0.838
4.36	0.817
4.55	0.768
4.78	0.683
5.17	0.495
.49	0.292
5.71	0.192
5.96	0.099
6.09	0.061
6.18	0.040
6.33	0.021
6.54	0.010
6.97	0.004
7.40	0.000
8.00	0.000
CURVE 27* T = 673	
2.00	0.857
3.92	0.848
4.13	0.838
4.32	0.809
4.54	0.756
4.78	0.662
5.18	0.446
5.40	0.302
5.63	0.181
5.81	0.115
5.95	0.073
6.11	0.039
6.28	0.017
6.51	0.007
6.97	0.004
CURVE 27 (cont.)*	
7.40	0.000
8.00	0.000
CURVE 28 T ~ 298	
1.40	0.865
1.82	0.871
2.75	0.878
3.61	0.880
4.35	0.887
4.98	0.873
5.67	0.831
5.97	0.794
6.19	0.674
6.44	0.540
6.70	0.400
6.92	0.230
7.15	0.145
7.35	0.060
7.79	0.020
8.22	0.029
CURVE 29 T ~ 298	
1.40	0.814
1.83	0.821
2.75	0.836
3.62	0.841
4.34	0.834
5.00	0.890
5.33	0.757
5.68	0.587
6.00	0.590
6.22	0.400
6.46	0.207
6.73	0.092
6.92	0.030
7.13	0.010
7.54	0.006
CURVE 30 T ~ 298	
1.38	0.800
1.80	0.803
2.75	0.805
3.60	0.799
4.00	0.795
4.34	0.733
4.64	0.611
4.98	0.444
5.32	0.267
5.66	0.122
5.96	0.042
6.20	0.006
6.71	0.003
7.13	0.008*
CURVE 31 T ~ 298	
0.280	0.451
0.280	0.490
0.300	0.587
0.300	0.610
0.310	0.652
0.310	0.662
0.310	0.690
0.310	0.703
0.340	0.722
0.390	0.753
0.430	0.772
0.470	0.792
0.630	0.821
1.00	0.831
1.12	0.831
1.32	0.838
1.45	0.846
1.61	0.847
1.80	0.850
1.97	0.851
2.13	0.856
2.27	0.862
2.43	0.862
2.56	0.858
2.71	0.861
2.82	0.862
2.93	0.874

* Not shown on plot

DATA TABLE NO. 62 (Continued)

λ	τ
CURVE 31 (cont.)	
3.10	0.859
3.23	0.857
3.35	0.857
3.51	0.875
3.60	0.870
3.70	0.865
3.78	0.870
3.89	0.870
3.96	0.863
4.07	0.863
4.26	0.826
4.46	0.811
4.70	0.760
4.85	0.661
4.99	0.606
5.16	0.512
5.34	0.420
5.47	0.325
5.67	0.278
5.80	0.232
5.94	0.213
6.07	0.182
6.37	0.099
CURVE 32* $T \sim 298$	
0.230	0.879
0.246	0.878
0.253	0.881
0.267	0.877
0.280	0.883
0.293	0.880
0.372	0.876
0.450	0.866
0.508	0.866
0.648	0.874
0.936	0.869
1.00	0.873
1.86	0.872
2.15	0.873
2.25	0.876
2.35	0.874
2.40	0.880
2.48	0.882
2.50	0.889
2.65	0.889

* Not shown on plot

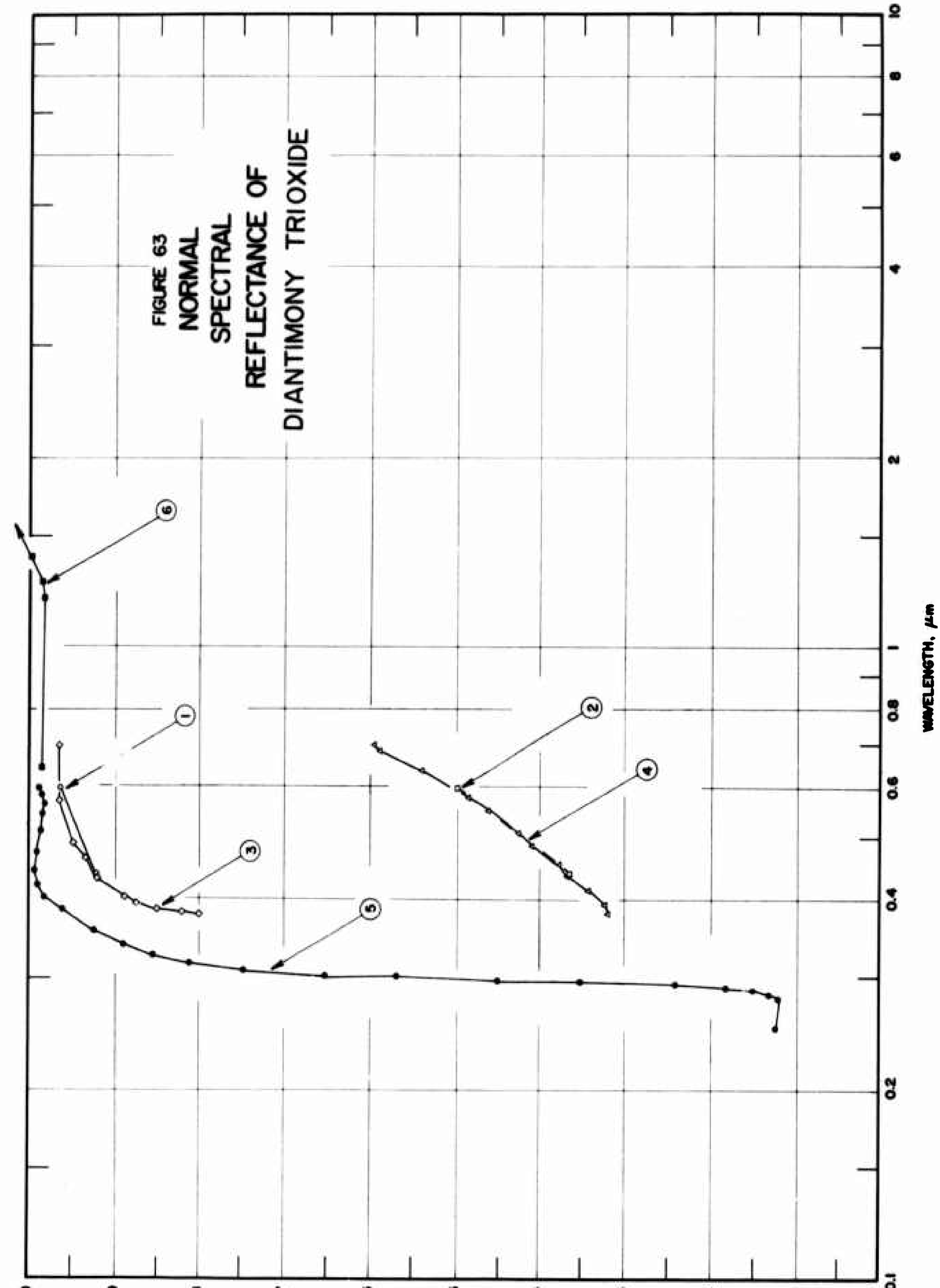


FIGURE 63 NORMAL SPECTRAL REFLECTANCE OF DIANTIMONY TRIOXIDE

SPECIFICATION TABLE NO. 63 NORMAL SPECTRAL REFLECTANCE OF DIANTIMONY TRIOXIDE Sb_2O_3

Curve No.	Ref. No.	Year	Temperature K	Wavelength Range,	Geometry θ	Geometry θ'	Geometry ω'	Reported Error, %	Composition (weight percent), Specifications, and Remarks
1	82	1963	298	0.440-0.600	~0°		2π		Powder; supplied by National Lead Co.; compacted at 10 000 psi.
2	82	1963	298	0.440-0.600	~0°		2π		Above specimen and conditions except exposed to 75 ESH uv irradiation with solar factor 1.5.
3	82	1963	~298	0.380-0.700	~0°		2π		Powder; compacted at 10 000 psi; data extracted from smooth curve.
4	82	1963	~298	0.380-0.700	~0°		2π		Above specimen and conditions except exposed in vacuum (10^{-6} mm Hg) to 75 ESH with solar factor 1.5.
5	121	1964	~298	0.250-0.600	~0°		2π		KP; 99.7 pure powder, Harshaw Chemical Co.; compacted; data extracted from smooth curve; $BaSO_4$ reference standard.
6	121	1964	~298	0.646-2.55	~0°		2π		Similar to the above specimen and conditions.

DATA TABLE NO. 63 NORMAL SPECTRAL REFLECTANCE OF DIANTIMONY TRIOXIDE Sb_2O_3

[Wavelength, λ, μm; Reflectance, ρ; Temperature, T, K]

CURVE 1
T = 298

λ	ρ
0.440	0.925
0.600	0.965

CURVE 2
T = 298

λ	ρ
0.440	0.365
0.600	0.500

CURVE 3
T ~ 298

λ	ρ
0.380	0.800
0.383	0.822
0.389	0.852
0.398	0.879
0.404	0.891
0.434	0.923
0.467	0.937
0.491	0.950
0.573	0.967
0.700	0.967

CURVE 4
T ~ 298

λ	ρ
0.380	0.320
0.391	0.324
0.414	0.342
0.439	0.368
0.453	0.377
0.488	0.410
0.510	0.427
0.553	0.464
0.580	0.489
0.640	0.540
0.688	0.590
0.700	0.596

CURVE 5
T ~ 298

λ	ρ
0.250	0.126
0.279	0.123
0.282	0.134
0.286	0.151
0.290	0.183
0.293	0.241

CURVE 5 (cont.)

λ	ρ
0.297	0.352
0.298	0.452
0.301	0.570
0.303	0.654
0.310	0.749
0.319	0.814
0.329	0.859
0.340	0.891
0.358	0.926
0.385	0.963
0.403	0.982
0.422	0.991
0.444	0.995
0.477	0.992
0.513	0.988
0.548	0.986
0.565	0.984
0.585	0.987
0.600	0.990

CURVE 6
T ~ 298

λ	ρ
0.646	0.988
1.20	0.984
1.27	0.988
1.39	1.00
1.44	1.02*
1.52	1.02*
1.57	1.01*
1.67	1.01*
1.79	1.02*
1.83	1.04*
1.87	1.06*
1.90	1.08*
1.96	1.15*
1.99	1.14*
2.02	1.13*
2.08	1.11*
2.17	1.09*
2.24	1.09*
2.29	1.10*
2.39	1.15*
2.46	1.20*
2.49	1.22*
2.55	1.25*

*Not shown on plot

SPECIFICATION TABLE NO. 64 NORMAL SOLAR ABSORPTANCE OF DIANTIMONY TRIOXIDE Sb_2O_3

Curve No.	Ref. No.	Year	Temperature Range, K	Geometry θ	Reported Error, %	Composition (weight percent), Specifications and Remarks
1*	121	1964	~298	~0°		99.7 pure powder; KP, Harshaw Chemical Co.; compacted; integrated from spectral reflectance data.
2*	121	1964	~298	~0°		Similar to above specimen and conditions except exposed to 100 ESH uv irradiation.

DATA TABLE NO. 64 NORMAL SOLAR ABSORPTANCE OF DIANTIMONY TRIOXIDE Sb_2O_3

[Temperature, T, K; Absorptance, α]

T	α
CURVE 1*	
298	0.036
CURVE 2*	
298	0.284

*No plot given

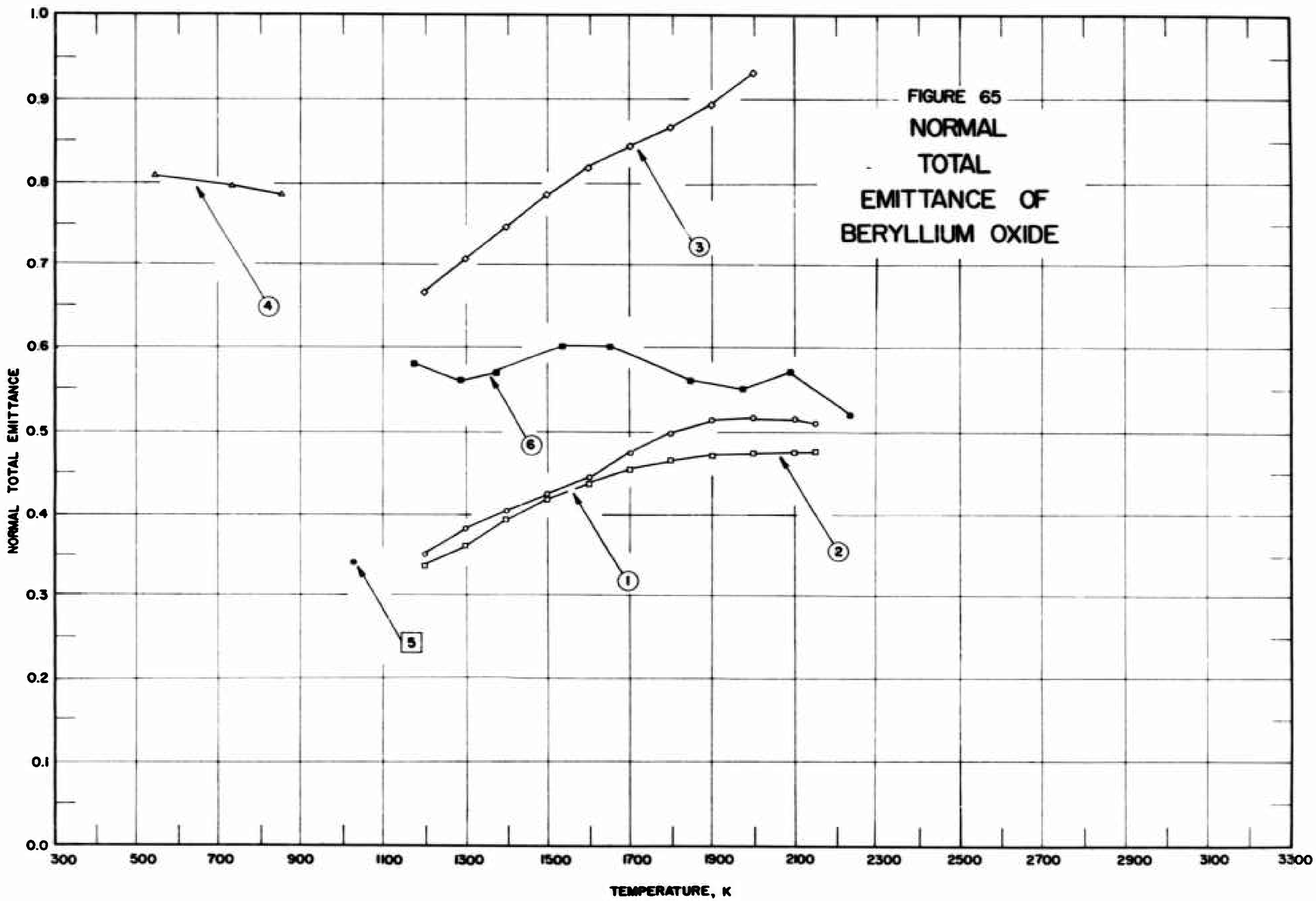


FIGURE 65
NORMAL
TOTAL
EMITTANCE OF
BERYLLIUM OXIDE
1.0
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0.0
NORMAL TOTAL EMITTANCE
300
500
700
900
1100
1300
1500
1700
1900
2100
2300
2500
2700
2900
3100
3300
TEMPERATURE, K
1
2
3
4
5
6

SPECIFICATION TABLE NO. 65 NORMAL TOTAL EMITTANCE OF BERYLLIUM OXIDE BeO

Curve No.	Ref. No.	Year	Temperature Range, K	Geometry θ'	Reported Error, %	Composition (weight percent), Specifications and Remarks
1	197	1943	1200-2150	~0°	20	Brush S. P. powdered beryllia; fabricated by hot-pressing; density 2.844 g cm^{-3}; ground parallel and polished on No. 500 carborundum paper; heat treated in air and in vacuum.
2	197	1943	1200-2150	~0°	20	Similar to the above specimen and conditions except fabricated blocks were annealed by ceramic firing after being formed by hot-pressing.
3	197	1943	1200-2000	~0°	20	High fired beryllia powder; fabricated by hot-pressing in graphite forms; density 2.85 g cm^{-3}; ground parallel and polished on No. 500 carborundum paper; heat-treated in air and in vacuum.
4	106	1959	548-859	~0°		Measured in air.
5	28	1963	1023	~0°		Sintered at 1973 K for 2 hrs (setter material BeO); density 1.84 g cm^{-3}, theoretical density 3.01 g cm^{-3}; integrated from spectral data (1-15 μm); [Authors' designation: Sample No. 114].
6	17	1962	1171-2210	~0°	10	Pressed and sintered; measured in argon; specimen started to smoke at 2231 K.

DATA TABLE NO. 65 NORMAL TOTAL EMITTANCE OF BERYLLIUM OXIDE BeO

[Temperature, T, K; Emittance, ∈]

T	∈
CURVE 1	
1200	0.351
1300	0.383
1400	0.405
1500	0.425
1600	0.447
1700	0.474
1800	0.499
1900	0.513
2000	0.517
2100	0.514
2150	0.509
CURVE 2	
1200	0.336
1300	0.361
1400	0.392
1500	0.420
1600	0.439
1700	0.453
1800	0.463

T	∈
CURVE 2 (cont.)	
1900	0.470
2000	0.474
2100	0.475
2150	0.475
CURVE 3	
1200	0.665
1300	0.706
1400	0.746
1500	0.785
1600	0.819
1700	0.843
1800	0.867
1900	0.894
2000	0.931
CURVE 4	
548	0.809
735	0.798
859	0.786

T	∈
CURVE 5	
1023	0.34
CURVE 6	
1171	0.58
1281	0.56
1371	0.57
1534	0.60
1652	0.60
1843	0.56
1973	0.55
2086	0.57
2231	0.52
2150	0.79*
2176	0.88*
2210	0.88*

*Not shown on plot

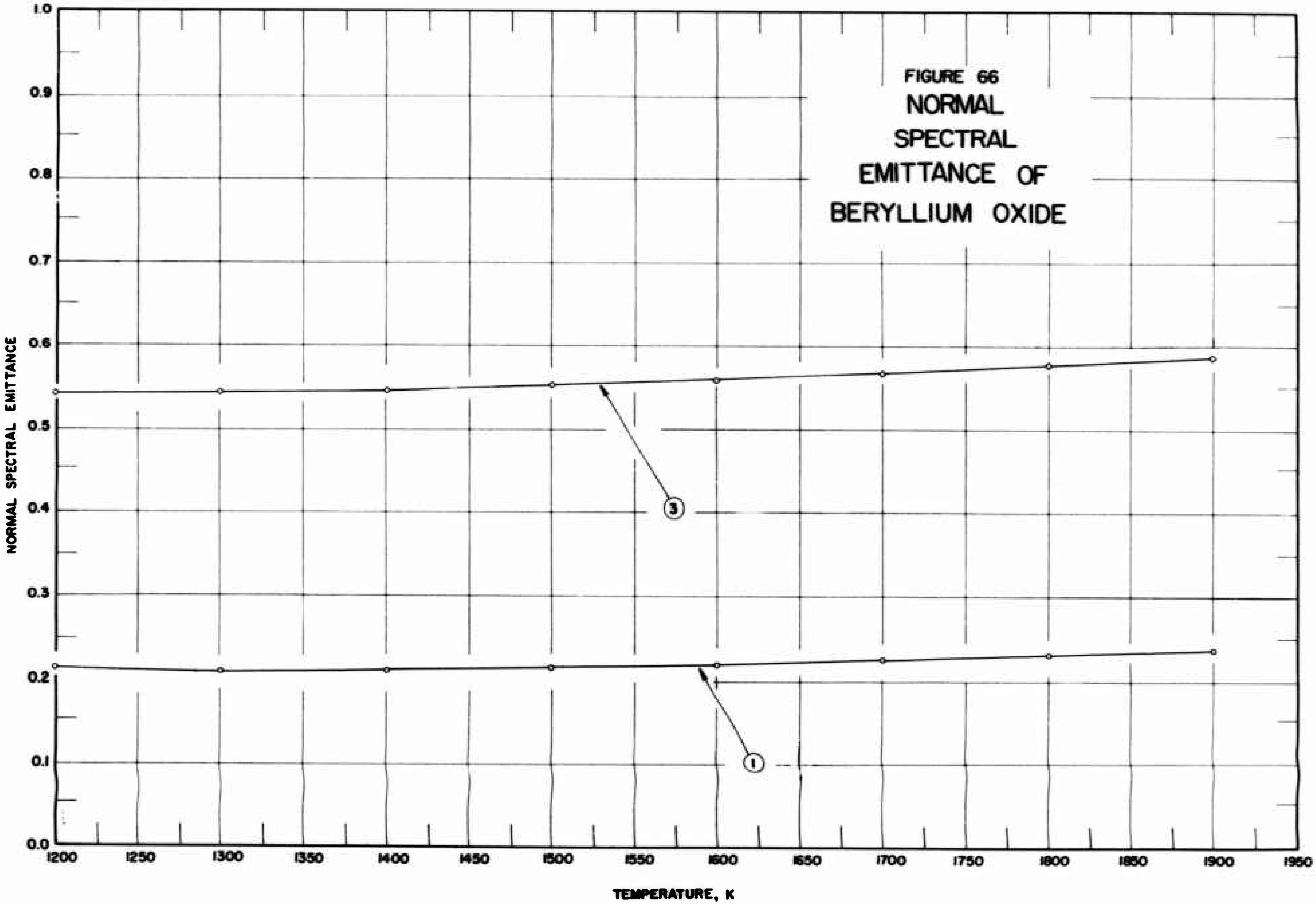


FIGURE 66
NORMAL
SPECTRAL
EMITTANCE OF
BERYLLIUM OXIDE

SPECIFICATION TABLE NO. 66 NORMAL SPECTRAL EMITTANCE OF BERYLLIUM OXIDE BeO

Curve No.	Ref. No.	Year	Wavelength μm	Temperature Range, K	Geometry θ'	Reported Error, %	Composition (weight percent), Specifications, and Remarks
1	197	1943	0.665	1200-1900	~0°	10	Brush S. P. powdered beryllia; fabricated by hot-pressing; density 2.844 g cm^{-3}; ground parallel and polished on No. 500 carborundum paper; treated in air and in vacuum.
2*	197	1943	0.665	1200-1900	~0°	10	Similar to the above specimen and conditions except fabricated blocks were annealed by ceramic firing after being formed by hot-pressing.
3	197	1943	0.665	1200-1900	~0°	10	High fired beryllia powder; fabricated by hot-pressing in graphite forms; density 2.85 g cm^{-3}; ground parallel and polished on No. 500 carborundum paper; heat treated in air and in vacuum.

DATA TABLE NO. 66 NORMAL SPECTRAL EMITTANCE OF BERYLLIUM OXIDE BeO

[Temperature, T, K; Emittance, ∈; Wavelength, λ, μm]

T	∈	T	∈
CURVE 1 $\lambda = 0.665$		CURVE 3 $\lambda = 0.665$	
1200	0.212	1200	0.542
1300	0.209	1300	0.543
1400	0.210	1400	0.546
1500	0.213	1500	0.552
1600	0.217	1600	0.559
1700	0.222	1700	0.568
1800	0.228	1800	0.577
1900	0.235	1900	0.587
CURVE 2* $\lambda = 0.665$			
1200	0.212		
1300	0.209		
1400	0.210		
1500	0.213		
1600	0.217		
1700	0.222		
1800	0.228		
1900	0.235		

*Not shown on plot

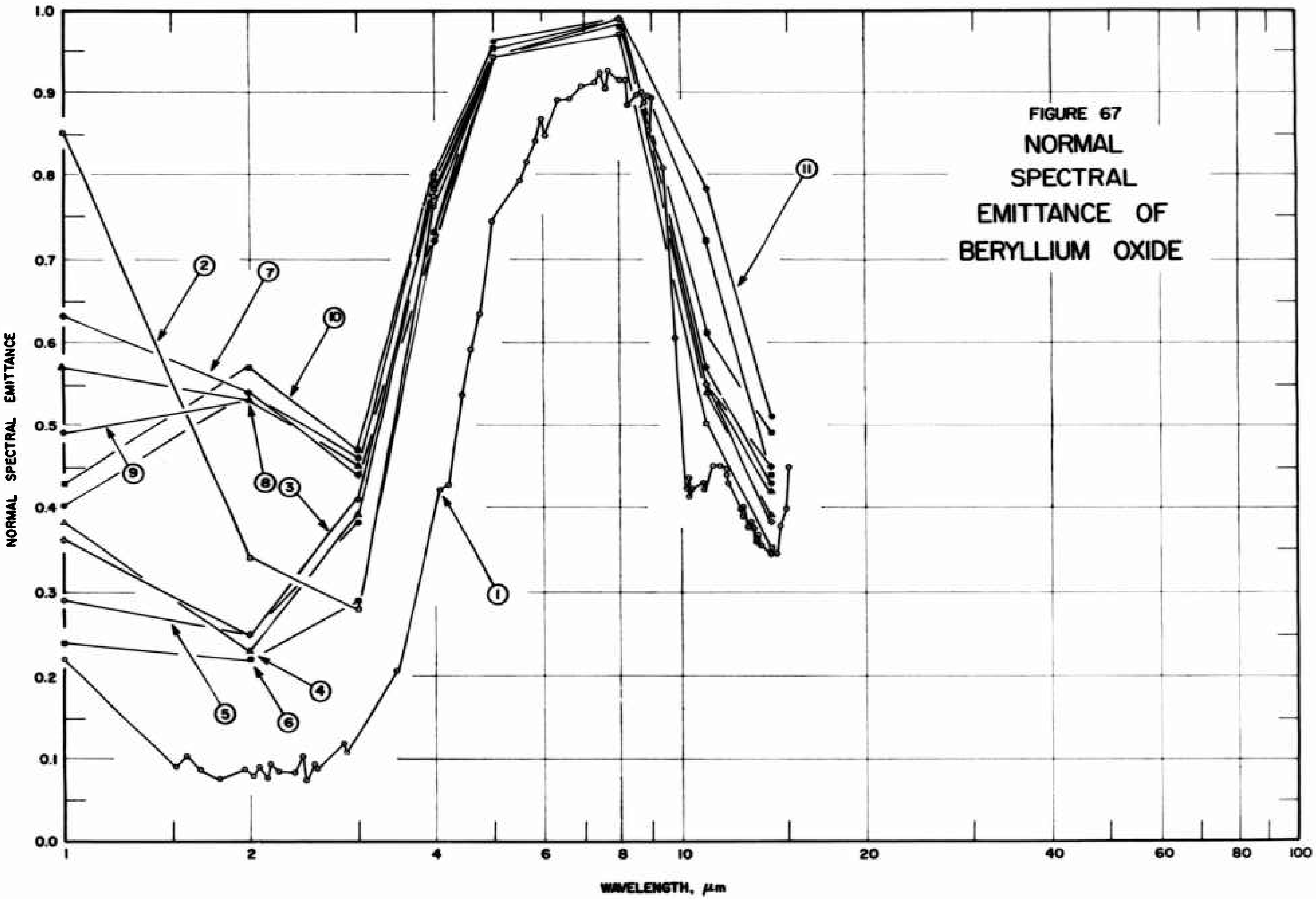


FIGURE 67
NORMAL SPECTRAL EMITTANCE OF BERYLLIUM OXIDE

SPECIFICATION TABLE NO. 67 NORMAL SPECTRAL EMITTANCE OF BERYLLIUM OXIDE BeO

Curve No.	Ref. No.	Year	Temperature K	Wavelength Range, μm	Geometry θ'	Reported Error, %	Composition (weight percent), Specifications, and Remarks
1	28	1963	1023	1.00-15.0	~0°		Sintered at 1973 K for 2 hrs (setter material BeO); density 1.84 g cm^{-3}, theoretical density 3.01 g cm^{-3}; data extracted from smooth curve; [Authors' designation: Sample No. 114].
2	188	1964	812	1-14	~0°	0.5	Beryllia, Coors BD 98; 98 pure.
3	188	1964	1066	1-14	~0°	0.5	Above specimen and conditions.
4	188	1964	1194	1-14	~0°	0.5	Above specimen and conditions.
5	188	1964	1394	1-14	~0°	0.5	Above specimen and conditions.
6	188	1964	1586	1-14	~0°	0.5	Above specimen and conditions.
7	188	1964	827	1-14	~0°	0.5	Coors BD 96 beryllia + 1 $CoCO_3$.
8	188	1964	1073	1-14	~0°	0.5	Above specimen and conditions.
9	188	1964	1195	1-14	~0°	0.5	Above specimen and conditions.
10	188	1964	1393	1-14	~0°	0.5	Above specimen and conditions.
11	188	1964	1587	1-14	~0°	0.5	Above specimen and conditions.

DATA TABLE NO. 67 NORMAL SPECTRAL EMITTANCE OF BERYLLIUM OXIDE BeO

[Wavelength, λ, μm; Emittance, ϵ; Temperature, T, K]

CURVE 1
T = 1023

λ	ϵ
1.00	0.220
1.52	0.090
1.58	0.102
1.66	0.088
1.79	0.077
1.96	0.087
2.02	0.079
2.07	0.090
2.13	0.078
2.15	0.094
2.22	0.084
2.37	0.084
2.43	0.101
2.46	0.074
2.53	0.094
2.57	0.089
2.82	0.119
2.87	0.108
3.46	0.206
4.06	0.422
4.21	0.428
4.41	0.538
4.59	0.591
4.73	0.634
4.97	0.741
5.50	0.791
5.66	0.817
5.84	0.840
5.98	0.866
6.03	0.847
6.34	0.890
6.65	0.891
6.91	0.906
7.29	0.911
7.41	0.922
7.59	0.904
7.65	0.924
8.00	0.914
8.16	0.914
8.22	0.884
8.50	0.898
8.63	0.900
8.76	0.888
8.84	0.896
8.90	0.852
8.97	0.894
9.36	0.807
9.77	0.605
10.2	0.423
10.3	0.437
10.3	0.413
10.4	0.423
10.8	0.431
10.8	0.422
11.3	0.451
11.6	0.451
11.8	0.440
11.8	0.446
11.9	0.430
12.5	0.399
12.6	0.388
12.6	0.400
12.8	0.375
13.0	0.381
13.1	0.373
13.2	0.358
13.3	0.366
13.5	0.353
14.0	0.345
14.3	0.345
14.5	0.376
14.8	0.399
15.0	0.450

CURVE 2
T = 812

λ	ϵ
1	0.85
2	0.34
3	0.38
4	0.76
5	0.94
8	0.97
11	0.50
14	0.35

CURVE 3
T = 1066

λ	ϵ
1	0.36
2	0.25
3	0.41
4	0.77
5	0.94*
8	0.99
11	0.55
14	0.38

CURVE 4
T = 1194

λ	ϵ
1	0.38
2	0.23
3	0.39
4	0.78
5	0.94*
8	0.99*
11	0.54
14	0.39

CURVE 5
T = 1394

λ	ϵ
1	0.29
2	0.25*
3	0.38
4	0.79
5	0.94*
8	0.99*
11	0.57
14	0.43

CURVE 6
T = 1586

λ	ϵ
1	0.24
2	0.22
3	0.39
4	0.73
5	0.94*
8	0.98
11	0.72
14	0.44

CURVE 7
T = 827

λ	ϵ
1	0.63
2	0.54
3	0.44
4	0.72
5	0.94*
8	0.98*
11	0.55*
14	0.45

CURVE 8
T = 1073

λ	ϵ
1	0.57
2	0.53
3	0.45
4	0.80
5	0.94*
8	0.99*
11	0.55*
14	0.42

CURVE 9
T = 1195

λ	ϵ
1	0.49
2	0.53*
3	0.44*
4	0.76*
5	0.94*
8	0.99*
11	0.57*
14	0.43*

CURVE 10
T = 1393

λ	ϵ
1	0.43
2	0.57
3	0.47
4	0.80*
5	0.95
8	0.99*
11	0.61
14	0.49

CURVE 11
T = 1587

λ	ϵ
1	0.40
2	0.54*
3	0.46
4	0.73*
5	0.96
8	0.99
11	0.78
14	0.51

*Not shown on plot

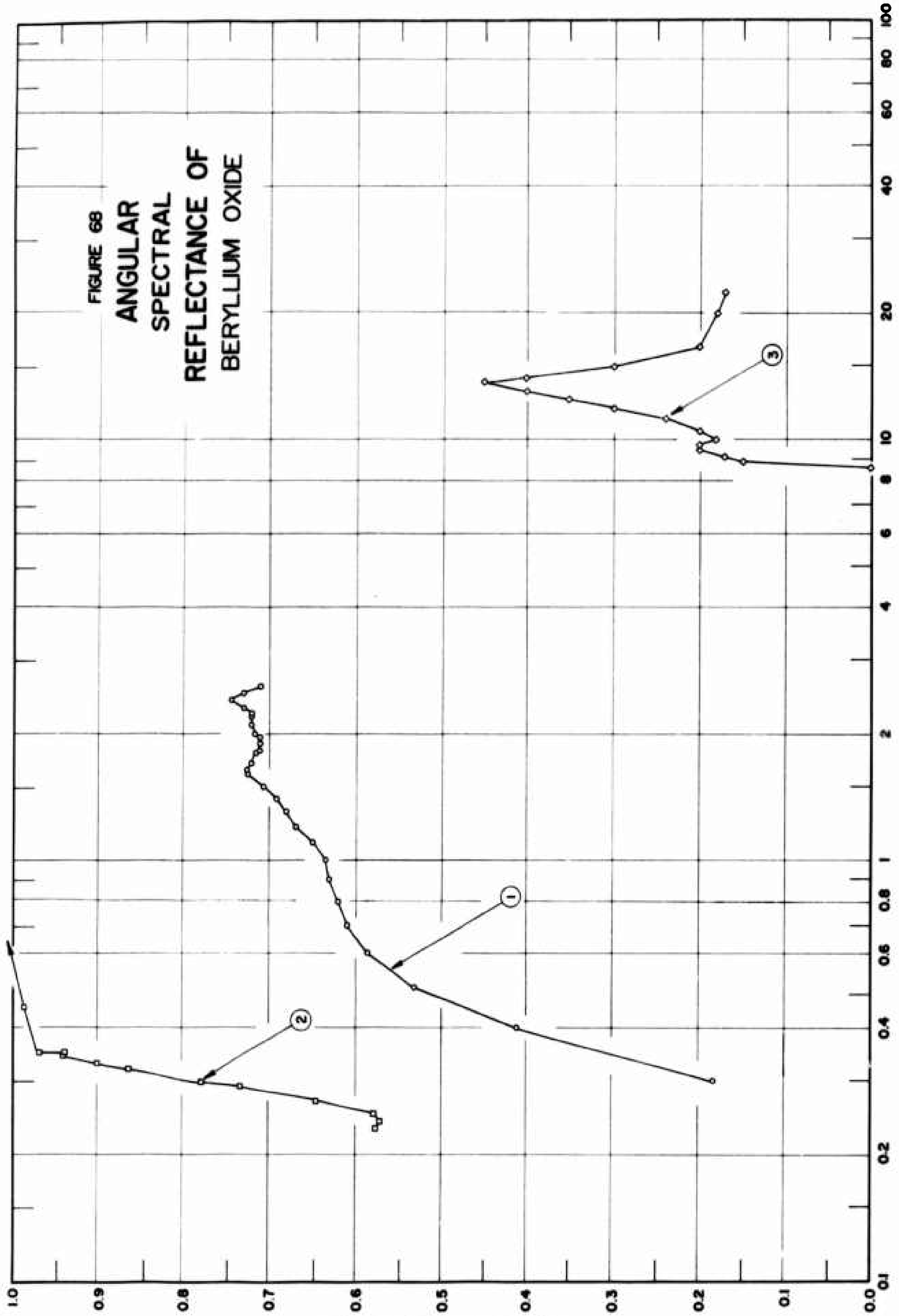


FIGURE 68
ANGULAR SPECTRAL REFLECTANCE OF BERYLLIUM OXIDE

SPECIFICATION TABLE NO. 68 ANGULAR SPECTRAL REFLECTANCE OF BERYLLIUM OXIDE BeO

Curve No.	Ref. No.	Year	Temperature K	Wavelength Range, μm	Geometry θ	Geometry θ'	Geometry ω'	Reported Error, %	Composition (weight percent), Specifications, and Remarks
1	39	1957	298	0.300-2.60	9°		2π	±4	Refractory, Bureau of Standards; as received; data extracted from smooth curve.
2	28	1963	298	0.230-2.65	~0°		2π		Sintered at 1973 K for 2 hrs (setter material BeO); density 1.84 g cm^{-3}, theoretical density 3.01 g cm^{-3}; MgO reference standard; data extracted from smooth curve; [Authors' designation: Sample No. 114].
3	198	1962	298	8.58-22.2	45°	45°			99.8 pure; principal impurities: Al_2O_3 and SiO_2; aluminum reference standard.

DATA TABLE NO. 68 ANGULAR SPECTRAL REFLECTANCE OF BERYLLIUM OXIDE BeO

[Wavelength, λ, μm; Reflectance, ρ; Temperature, T, K]

CURVE 1
T = 298

λ	ρ
0.300	0.180
0.400	0.410
0.500	0.530
0.600	0.585
0.700	0.610
0.800	0.620
0.900	0.630
1.00	0.635
1.10	0.650
1.20	0.670
1.30	0.680
1.40	0.690
1.50	0.705
1.60	0.725
1.64	0.725
1.70	0.720
1.80	0.715
1.82	0.710
1.90	0.710
1.96	0.710
2.00	0.715
2.10	0.720
2.20	0.720

CURVE 1 (cont.)

λ	ρ
2.22	0.720
2.30	0.730
2.40	0.745
2.50	0.730
2.60	0.710

CURVE 2
T = 298

λ	ρ
0.230	0.576
0.240	0.571
0.250	0.579
0.269	0.645
0.290	0.731
0.299	0.780
0.320	0.867
0.330	0.900
0.343	0.941
0.350	0.940
0.350	0.968
0.448	0.986
0.648	1.01*
0.851	1.02*
1.05	1.03*

CURVE 2 (cont.)

λ	ρ
1.25	1.05*
1.45	1.07*
1.65	1.10*
1.85	1.12*
2.15	1.16*
2.35	1.18*
2.45	1.20*
2.59	1.22*
2.65	1.25*

CURVE 3
T = 298

λ	ρ
8.58	0.00
8.85	0.15
9.09	0.17
9.43	0.20
9.71	0.20
10.0	0.18
10.5	0.20
11.1	0.24
11.9	0.30
12.5	0.35
13.0	0.40

CURVE 3 (cont.)

λ	ρ
13.6	0.45
14.0	0.40
14.9	0.30
16.6	0.20
20.0	0.18
22.2	0.17

*Not shown on plot

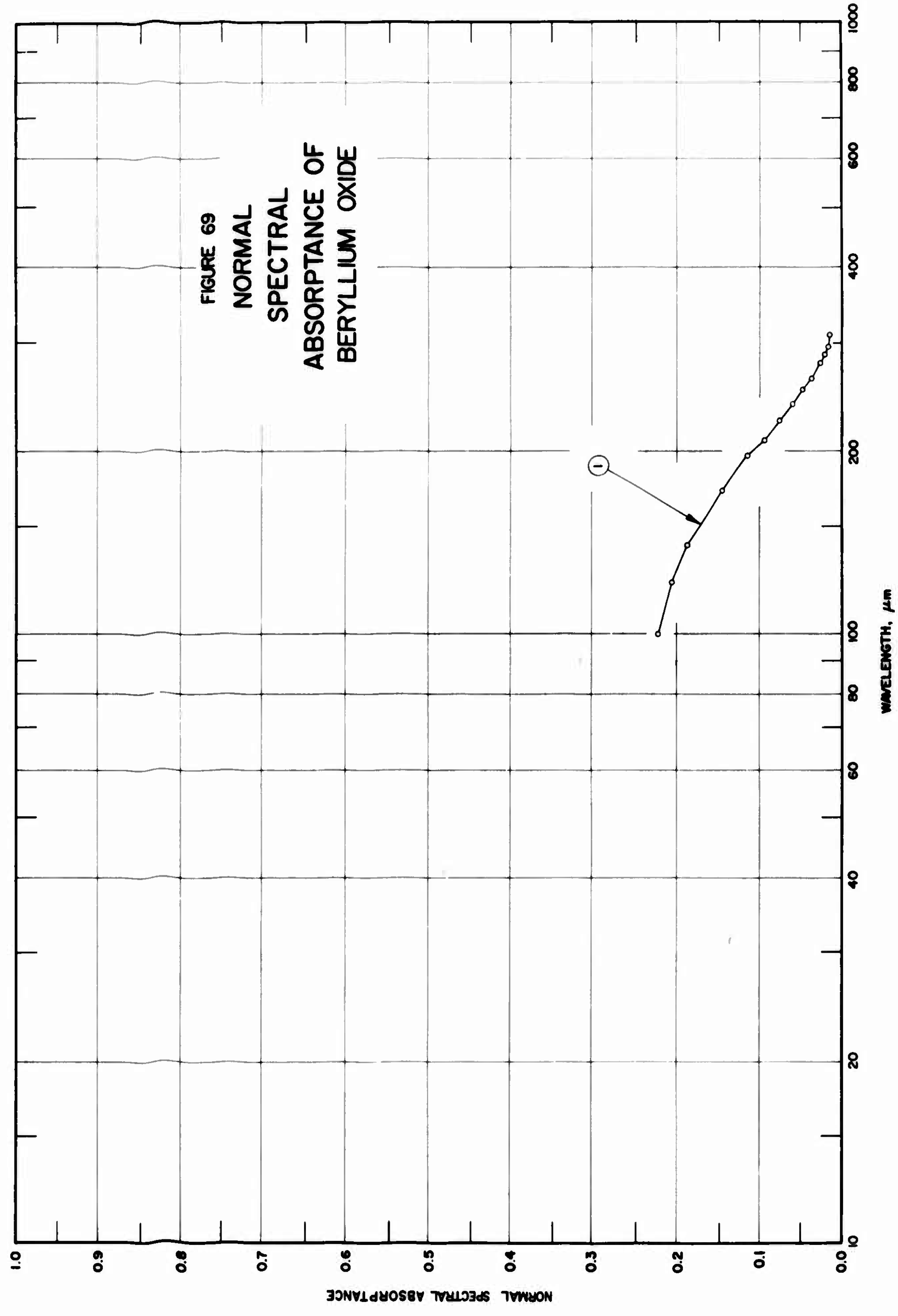


FIGURE 69 NORMAL SPECTRAL ABSORPTANCE OF BERYLLIUM OXIDE

SPECIFICATION TABLE NO. 69 NORMAL SPECTRAL ABSORPTANCE OF BERYLLIUM OXIDE BeO

Curve No.	Ref. No.	Year	Temperature K	Wavelength Range, μm	Geometry θ	Reported Error, %	Composition (weight percent), Specifications, and Remarks
1	280	1969	~298	100-310	~0°		625 μm thick; data extracted from smooth curve.

DATA TABLE NO. 69 NORMAL SPECTRAL ABSORPTANCE OF BERYLLIUM OXIDE BeO

[Wavelength, λ, μm; Absorptance, α; Temperature, T, K]

λ	α
CURVE 1	
T ~ 298	
100	0.222
122	0.206
140	0.189
173	0.146
197	0.114
209	0.095
223	0.078
239	0.060
251	0.048
262	0.037
279	0.025
287	0.020
296	0.017
310	0.015

SPECIFICATION TABLE NO. 70 NORMAL SOLAR ABSORPTANCE OF BERYLLIUM OXIDE BeO

Curve No.	Ref. No.	Year	Temperature Range, K	Geometry θ	Reported Error, %	Composition (weight percent), Specifications and Remarks
1*	39	1957	298	9°		Refractory; Bureau of Standards; as received; computed from spectral data for sea level conditions.
2*	39	1957	298	9°		Above specimen and conditions except calculated for conditions above atmosphere.
3*	367	1964	~298	~0°		Calculated from normal solar reflectance data.

DATA TABLE NO. 70 NORMAL SOLAR ABSORPTANCE OF BERYLLIUM OXIDE BeO

[Temperature, T, K; Absorptance, α]

T	α
CURVE 1*	
298	0.405
CURVE 2*	
298	0.421
CURVE 3*	
298	0.115

*No plot given

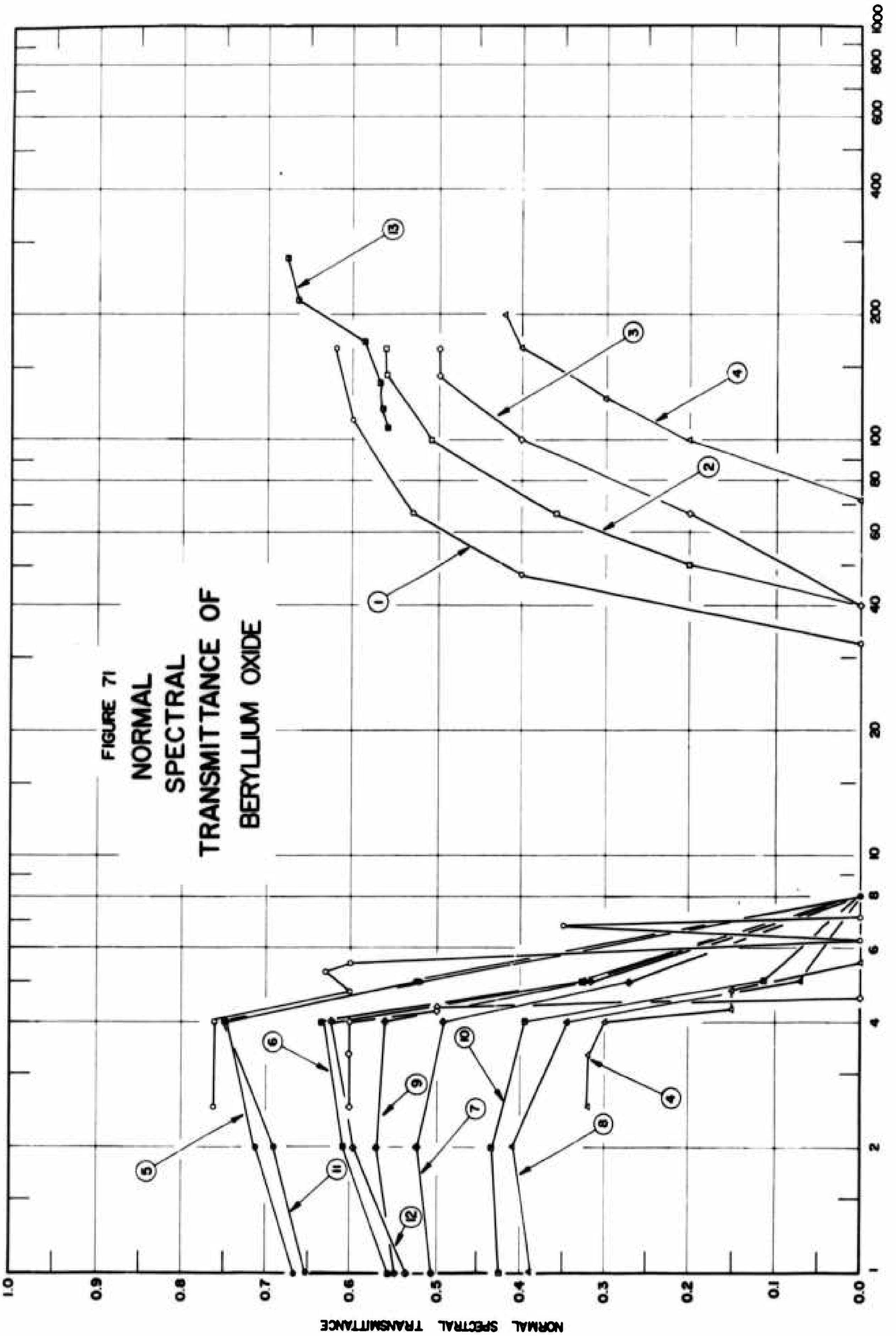


FIGURE 71
NORMAL SPECTRAL TRANSMITTANCE OF BERYLLIUM OXIDE

SPECIFICATION TABLE NO. 71 NORMAL SPECTRAL TRANSMITTANCE OF BERYLLIUM OXIDE BeO

Curve No.	Ref. No.	Year	Temperature K	Wavelength Range, μm	Geometry θ	θ'	ω'	Reported Error, %	Composition (weight percent), Specifications, and Remarks
1	198	1962	298	2.50-167	~0°	~0°		± 5	Pure single crystal (0.1 mm thick); grown from magnesium fluoride solution.
2	198	1962	298	40.0-167	~0°	~0°		± 5	Pure single crystal (0.6 mm thick); grown from lithium molybdate.
3	198	1962	298	2.50-167	~0°	~0°		± 5	98 BeO, 1 MgO; pressed plate (0.3 mm thick); density 99.5% that of a single crystal.
4	198	1962	298	2.50-200	~0°	~0°		± 5	Similar to above specimen and conditions except 1 mm thick.
5	188	1964	298	1-8	~0°	~0°		± 5	Beryllia; No. S from Atomics International; 0.127 mm thick.
6	188	1964	298	1-8	~0°	~0°		± 5	Similar to the above specimen and conditions except 0.254 mm thick.
7	188	1964	298	1-8	~0°	~0°		± 5	Coors BD 98; 98 pure; 0.127 mm thick.
8	188	1964	298	1-8	~0°	~0°		± 5	Similar to the above specimen and conditions except 0.254 mm thick.
9	188	1964	298	1-8	~0°	~0°		± 5	Coors BD 96; 96 BeO + 1 $CoCO_3$; 0.127 mm thick.
10	188	1964	298	1-8	~0°	~0°		± 5	Similar to the above specimen and conditions except 0.254 mm thick.
11	188	1964	298	1-8	~0°	~0°		± 5	Beryllia; No. R from Atomics International; 0.127 mm thick.
12	188	1964	298	1-8	~0°	~0°		± 5	Similar to the above specimen and conditions except 0.254 mm thick.
13	280	1969	~298	106-276	~0°	~0°			Thickness 625 μm.

DATA TABLE NO. 71 NORMAL SPECTRAL TRANSMITTANCE OF BERYLLIUM OXIDE BeO

[Wavelength, λ, μm; Transmittance, τ; Temperature, T, K]

λ	τ
CURVE 1	
T = 298	
2.50	0.76
4.00	0.76
4.76	0.60
5.26	0.63
5.55	0.60
6.25	0.00
6.80	0.35
7.14	0.00
32.2	0.00
47.6	0.40
66.7	0.53
111	0.60
167	0.62
CURVE 2	
T = 298	
40.0	0.00
50.0	0.20
66.7	0.36
100	0.51
143	0.56
167	0.56
CURVE 3	
T = 298	
2.50	0.60
3.33	0.60
4.00	0.60
4.25	0.50
4.34	0.50
4.54	0.00
40.0	0.00*
66.6	0.20
100	0.40
142	0.50
166	0.50
CURVE 4	
T = 298	
2.50	0.32
3.33	0.32

λ	τ
CURVE 4 (cont.)	
4.00	0.30
4.26	0.15
4.76	0.15
5.56	0.00
71.4	0.00
100	0.20
125	0.30
166	0.40
200	0.42
CURVE 5	
T = 298	
1	0.666
2	0.711
4	0.748
5	0.524
8	0.000
CURVE 6	
T = 298	
1	0.552
2	0.608
4	0.635
5	0.329
8	0.000*
CURVE 7	
T = 298	
1	0.505
2	0.521
4	0.491
5	0.270
8	0.000*
CURVE 8	
T = 298	
1	0.388
2	0.409
4	0.345
5	0.070
8	0.000*

λ	τ
CURVE 9	
T = 298	
1	0.547
2	0.568
4	0.558
5	0.316
8	0.000*
CURVE 10	
T = 298	
1	0.422
2	0.432
4	0.394
5	0.114
8	0.000
CURVE 11	
T = 298	
1	0.651
2	0.690
4	0.749
5	0.520
8	0.000*
CURVE 12	
T = 298	
1	0.534
2	0.595
4	0.622
5	0.326
8	0.000*
CURVE 13	
T ~ 298	
106	0.558
119	0.563
136	0.566
171	0.584
217	0.665
276	0.678

*Not shown on plot

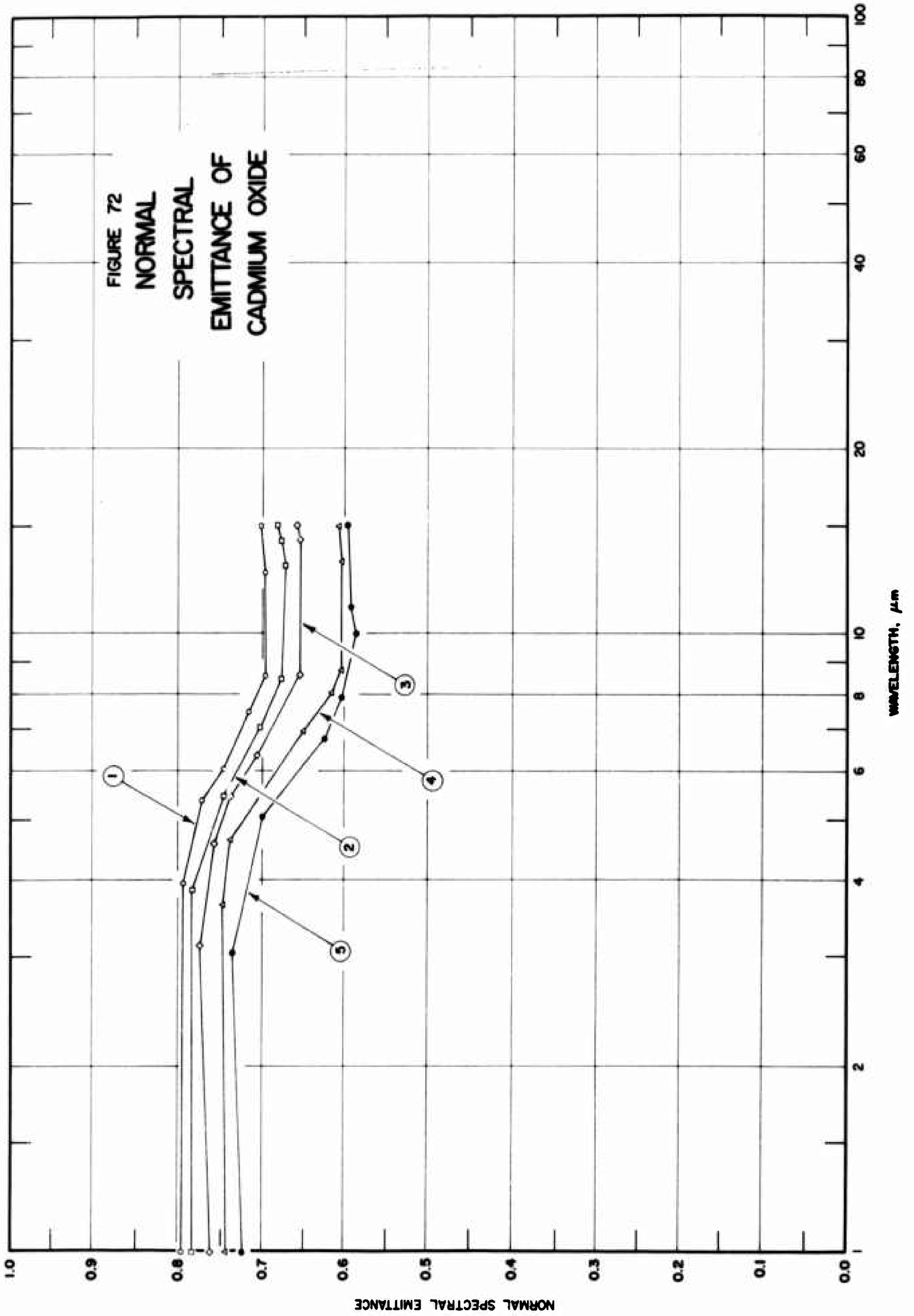


FIGURE 72 NORMAL SPECTRAL EMITTANCE OF CADMIUM OXIDE

SPECIFICATION TABLE NO. 72 NORMAL SPECTRAL EMITTANCE OF CADMIUM OXIDE CdO

Curve No.	Ref. No.	Year	Temperature K	Wavelength Range, μm	Geometry θ'	Reported Error, %	Composition (weight percent), Specifications, and Remarks
1	382	1965	1273	1.00-15.0	0°		Sintered 2 hrs at 1273 K; data extracted from smooth curve.
2	382	1965	1273	1.00-15.0	0°		Above specimen and conditions except heated at 1273 K in measuring apparatus for 0.5 hr total.
3	382	1965	1273	1.00-15.0	0°		Above specimen and conditions except heated 1 hr total.
4	382	1965	1273	1.00-15.0	0°		Above specimen and conditions except heated 2 hrs total.
5	382	1965	1273	1.00-15.0	0°		Above specimen and conditions except heated 4 hrs total.

DATA TABLE NO. 72 NORMAL SPECTRAL EMITTANCE OF CADMIUM OXIDE CdO

[Wavelength, λ, μm; Emittance, ϵ; Temperature, T, K]

λ	ϵ	λ	ϵ	λ	ϵ
CURVE 1		CURVE 3		CURVE 5	
T = 1273		T = 1273		T = 1273	
1.00	0.795	1.00	0.761	1.00	0.723
3.93	0.795	3.12	0.774	4.03	0.737
5.36	0.771	4.58	0.759	5.06	0.700
6.03	0.747	5.45	0.739	6.75	0.625
7.48	0.716	6.37	0.707	7.79	0.603
8.53	0.697	8.55	0.654	9.99	0.588
12.6	0.697	14.2	0.655	11.0	0.593
15.0	0.702	15.0	0.659	15.0	0.597
CURVE 2		CURVE 4			
T = 1273		T = 1273			
1.00	0.782	1.00	0.742		
3.85	0.782	3.64	0.748		
5.47	0.748	4.62	0.739		
7.03	0.703	6.96	0.650		
8.42	0.677	8.01	0.616		
13.0	0.673	8.70	0.604		
14.6	0.678	13.1	0.604		
15.0	0.681	15.0	0.608		

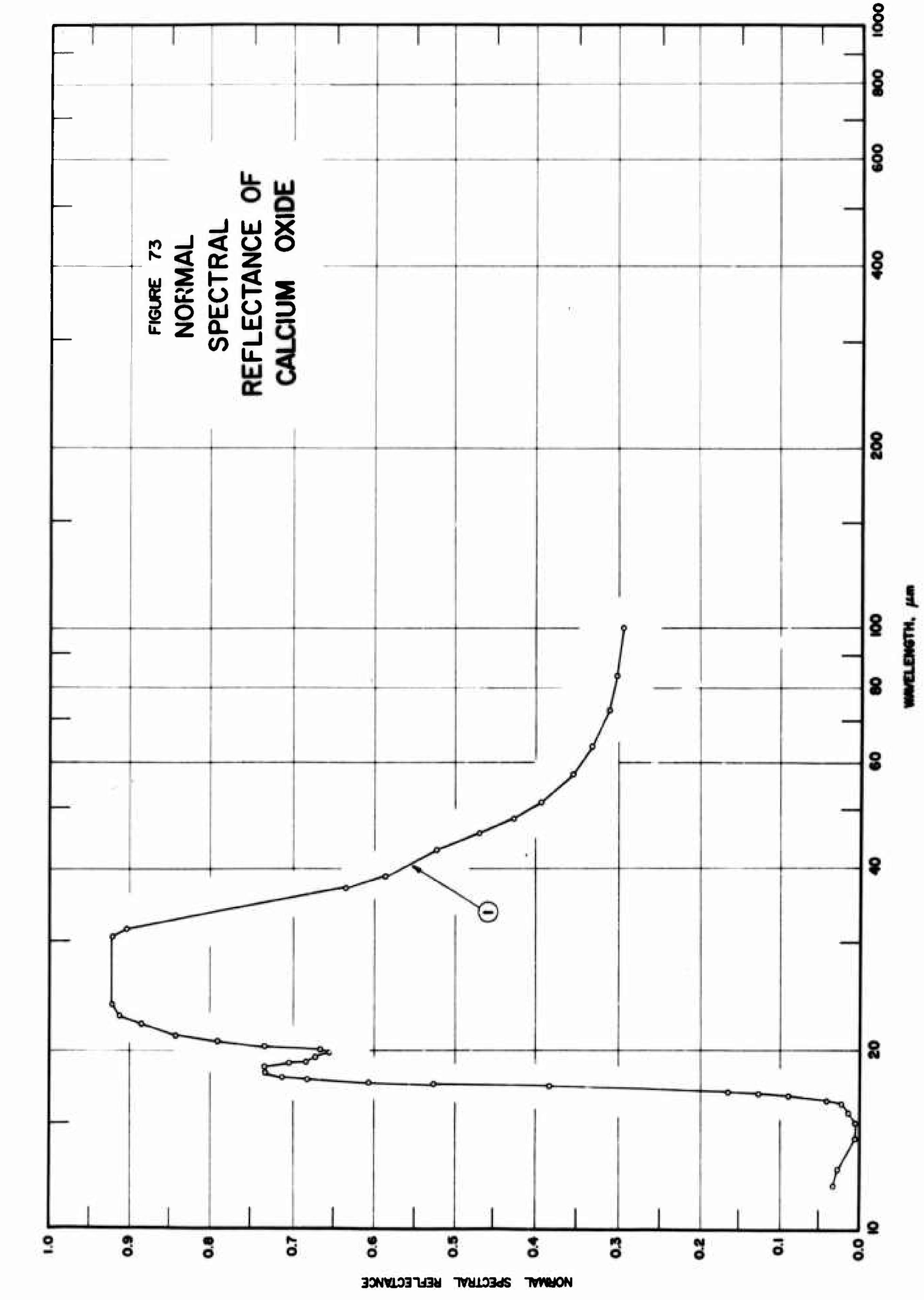


FIGURE 73 NORMAL SPECTRAL REFLECTANCE OF CALCIUM OXIDE

SPECIFICATION TABLE NO. 73 NORMAL SPECTRAL REFLECTANCE OF CALCIUM OXIDE CaO

Curve No.	Ref. No.	Year	Temperature K	Wavelength Range, μm	Geometry θ θ' ω'	Reported Error, %	Composition (weight percent), Specifications, and Remarks
1	199	1968	300	11.8-100	~0° ~0°		Single crystal; polished with 0.3 μm polishing powder, etched in a dilute solution of HCl in ethanol, washed in xylene and gently dried on a felt polishing cloth; measured in vacuum; data extracted from smooth curve.

DATA TABLE NO. 73 NORMAL SPECTRAL REFLECTANCE OF CALCIUM OXIDE CaO

[Wavelength, λ, μm; Reflectance, ρ; Temperature, T, K]

λ	ρ	λ	ρ
CURVE 1	T = 300	CURVE 1 (cont.)	
		20.6	0.791
11.8	0.035	21.1	0.842
12.7	0.028	22.0	0.887
14.3	0.008	22.8	0.913
15.1	0.008	23.8	0.923
15.7	0.015	30.9	0.923
16.2	0.024	31.7	0.906
16.4	0.042	37.0	0.638
16.7	0.090	38.7	0.589
16.9	0.128	42.9	0.523
17.0	0.167	45.8	0.470
17.4	0.384	48.3	0.428
17.5	0.528	51.5	0.395
17.6	0.607	57.1	0.356
17.8	0.684	63.7	0.332
18.0	0.713	73.0	0.313
18.3	0.735	83.3	0.303
18.7	0.735	100	0.297
19.0	0.705		
19.1	0.685		
19.5	0.674		
19.8	0.658		
20.0	0.669		
20.2	0.735		

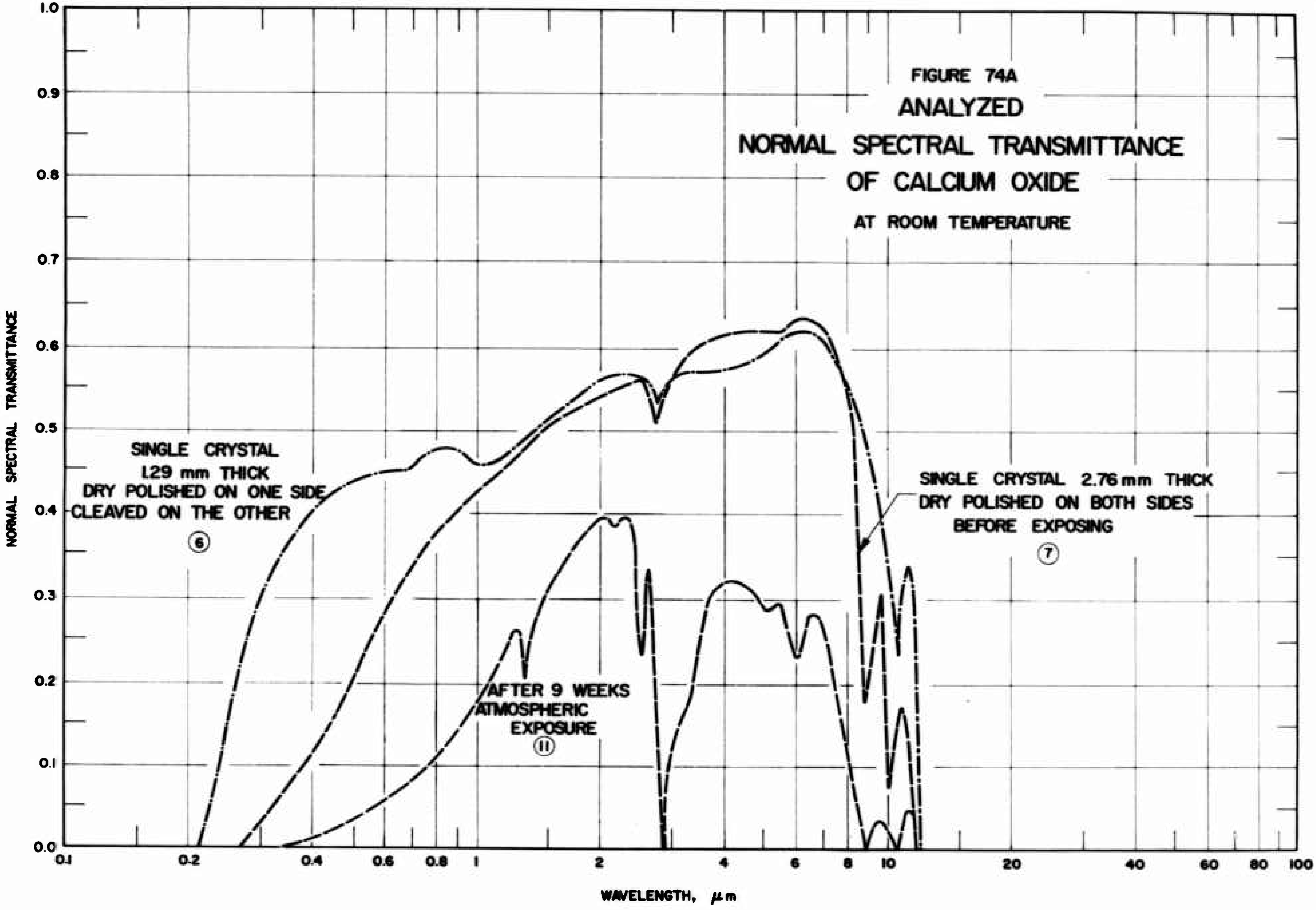


FIGURE 74A
ANALYZED
NORMAL SPECTRAL TRANSMITTANCE
OF CALCIUM OXIDE
AT ROOM TEMPERATURE

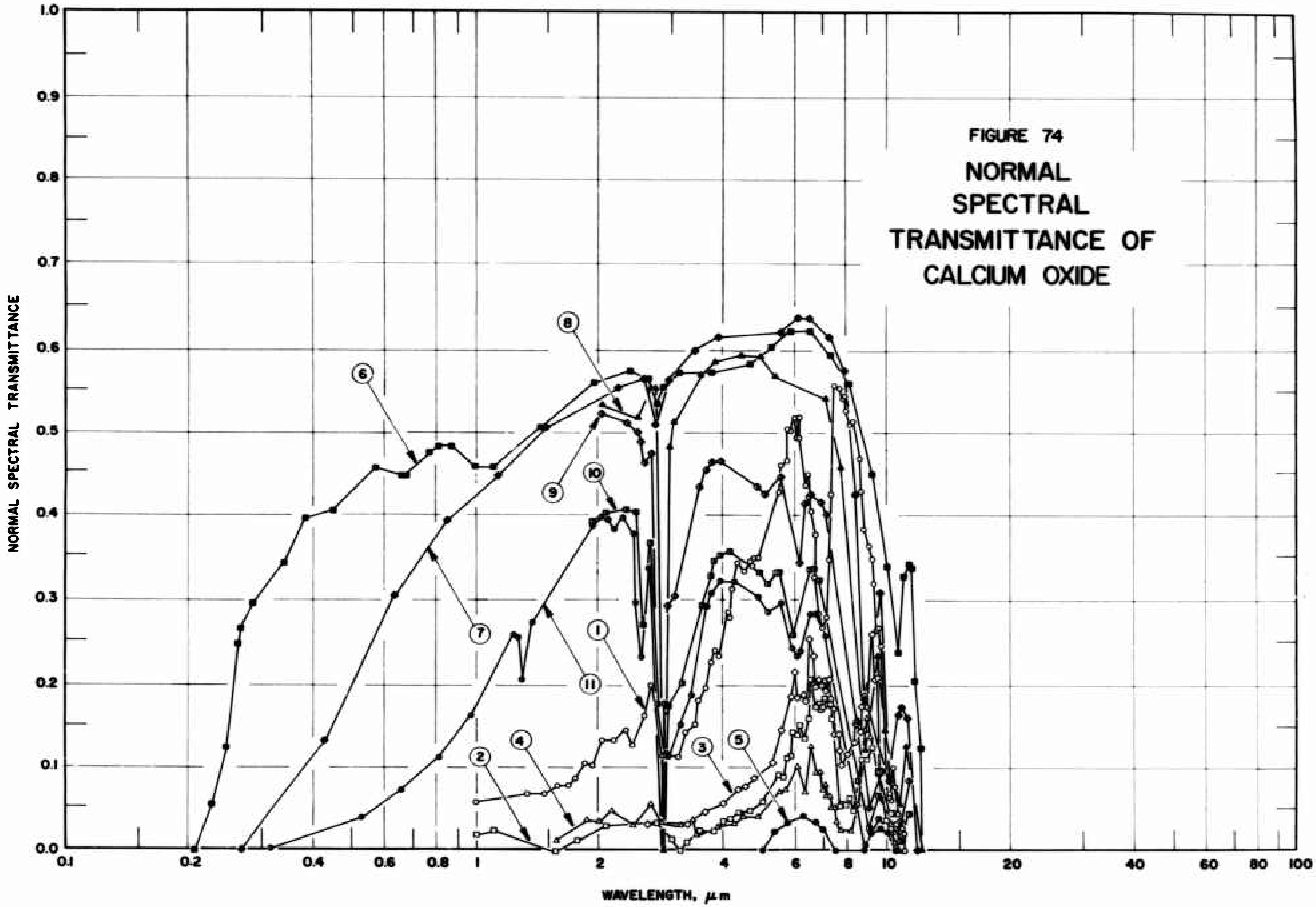


FIGURE 74
NORMAL SPECTRAL TRANSMITTANCE OF CALCIUM OXIDE
NORMAL SPECTRAL TRANSMITTANCE
WAVELENGTH, μm
1.0
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0.0
0.1
0.2
0.4
0.6
0.8
1
2
4
6
8
10
20
40
60
80
100
1
2
3
4
5
6
7
8
9
10
11

SPECIFICATION TABLE NO. 74 NORMAL SPECTRAL TRANSMITTANCE OF CALCIUM OXIDE CaO

Curve No.	Ref. No.	Year	Temperature K	Wavelength Range, μm	Geometry θ	θ'	ω'	Reported Error, %	Composition (weight percent), Specifications, and Remarks
1	335	1969	~298	1.00-11.0	~0°	~0°			Reagent grade powder, Mallinckrodt; vacuum hot-pressed at 1473 K; data extracted from smooth curve.
2	335	1969	~298	1.00-11.0	~0°	~0°			Above specimen and conditions except subsequently air-fired for 1 hr at 1478 K.
3	335	1969	~298	2.61-11.0	~0°	~0°			Above specimen and conditions except subsequently air-fired for 1 hr at 1598 K.
4	335	1969	~298	1.57-10.7	~0°	~0°			Above specimen and conditions except subsequently air-fired for 1 hr at 1698 K.
5	335	1969	~298	5.00-10.5	~0°	~0°			Above specimen and conditions except subsequently air-fired for 2 hrs at 1813 K.
6	372	1969	~298	0.207-12.1	~0°	~0°			Single crystal; 1.29 mm thick; dry-polished on one side and cleaved on the other; data extracted from smooth curve; [Author's designation: Crystal B].
7	372	1969	~298	0.270-11.8	~0°	~0°			Single crystal; 2.76 mm thick; dry-polished with emory cloth on both sides; data extracted from smooth curve; [Author's designation: Crystal A].
8	372	1969	~298	2.02-12.0	~0°	~0°			Curve 7 specimen and conditions except measured after 1 wk exposure to 45% relative humidity at 294 K.
9	372	1969	~298	2.02-12.0	~0°	~0°			Curve 7 specimen and conditions except measured after 5 wks exposure to 45% relative humidity at 294 K.
10	372	1969	~298	1.93-12.0	~0°	~0°			Curve 7 specimen and conditions except measured after 8 wks exposure to 45% relative humidity at 294 K.
11	372	1969	~298	0.318-12.0	~0°	~0°			Curve 7 specimen and conditions except measured after 9 wks exposure to 45% relative humidity at 294 K.

DATA TABLE NO. 74 NORMAL SPECTRAL TRANSMITTANCE OF CALCIUM OXIDE CaO

[Wavelength, λ, μm; Transmittance, τ; Temperature, T, K]

CURVE 1
T ~ 298

λ	τ
1.00	0.058
1.34	0.068
1.48	0.068
1.58	0.078
1.69	0.078
1.75	0.086
1.85	0.105
1.92	0.101
2.02	0.134
2.19	0.134
2.31	0.146
2.40	0.129
2.58	0.164
2.67	0.200
2.85	0.114
2.90	0.119
3.10	0.113
3.25	0.144
3.41	0.152
3.49	0.181
3.62	0.197
3.71	0.226
3.80	0.240
3.90	0.233
4.12	0.285
4.15	0.278
4.20	0.314
4.37	0.342
4.50	0.332
4.61	0.345
4.69	0.340
4.76	0.349
4.87	0.349
5.48	0.428
5.58	0.460
5.71	0.465
5.78	0.505
5.85	0.501
6.00	0.519
6.05	0.494
6.12	0.494
6.16	0.469
6.35	0.435
6.43	0.449
6.47	0.421

CURVE 1 (cont.)

λ	τ
6.55	0.405
6.69	0.327
6.75	0.277
6.83	0.283
7.00	0.269
7.15	0.280
7.21	0.348
7.33	0.425
7.49	0.558
7.71	0.554
7.85	0.541
7.92	0.543
8.00	0.527
8.20	0.510
8.30	0.513
8.62	0.468
8.78	0.428
8.89	0.382
9.10	0.362
9.25	0.349
9.35	0.320
9.45	0.263
9.54	0.266
9.77	0.146
10.1	0.063
10.1	0.068
10.2	0.060
10.4	0.100
10.4	0.077
10.7	0.043
10.9	0.026
11.0	0.020
11.0	0.000

CURVE 2
T ~ 298

λ	τ
1.00	0.019
1.10	0.023
1.56	0.000
1.77	0.011
2.09	0.030
2.75	0.032
3.00	0.013
3.11	0.000
3.27	0.010

CURVE 2 (cont.)

λ	τ
3.50	0.024
3.80	0.024
4.00	0.035
4.15	0.038
4.39	0.045
4.65	0.048
5.00	0.059
5.47	0.090
5.60	0.089
5.77	0.112
5.87	0.115
5.94	0.145
6.05	0.140
6.14	0.151
6.30	0.137
6.42	0.160
6.53	0.208
6.75	0.173
6.85	0.178
6.95	0.170
7.00	0.174
7.08	0.183
7.20	0.177
7.30	0.177
7.39	0.160
7.75	0.052
7.80	0.055
7.99	0.055
8.12	0.063
8.30	0.048
8.77	0.110
9.00	0.110
9.28	0.125
9.58	0.097
10.0	0.036
10.2	0.027
10.5	0.031
11.0	0.000*

CURVE 3
T ~ 298

λ	τ
2.61	0.032
3.28	0.032
3.61	0.047
4.00	0.055

CURVE 3 (cont.)

λ	τ
4.33	0.073
4.57	0.077
4.75	0.088
5.27	0.106
5.59	0.146
5.87	0.188
6.00	0.216
6.05	0.183
6.30	0.188
6.34	0.181
6.48	0.254
6.65	0.235
6.75	0.198
6.89	0.209
7.00	0.200
7.07	0.206
7.10	0.193
7.23	0.209
7.33	0.184
7.44	0.171
7.49	0.141
7.61	0.141
7.66	0.121
7.80	0.103
8.01	0.117
8.35	0.131
8.43	0.153
8.63	0.245
8.74	0.274
8.85	0.287
8.93	0.273
9.24	0.260
9.48	0.206
9.57	0.210
10.2	0.043
10.4	0.045
11.0	0.000*

CURVE 4
T ~ 298

λ	τ
1.57	0.011
1.86	0.037
2.00	0.035
2.13	0.049
2.41	0.030

CURVE 4 (cont.)

λ	τ
2.67	0.056
2.84	0.034
3.15	0.021
3.36	0.027
3.43	0.019
3.86	0.027
4.23	0.031
4.49	0.040
4.84	0.040
5.49	0.070
5.63	0.072
6.05	0.100
6.30	0.070
6.55	0.128
6.75	0.094
6.84	0.094
7.00	0.071
7.09	0.079
7.16	0.065
7.26	0.065
7.32	0.051
7.46	0.051
7.55	0.035
7.76	0.023
8.20	0.023
8.51	0.056
8.82	0.147
8.93	0.160
9.15	0.137
9.56	0.094
10.0	0.034
10.2	0.023
10.4	0.010
10.7	0.000

CURVE 5
T ~ 298

λ	τ
5.00	0.000
5.32	0.022
5.74	0.033
6.29	0.040
6.73	0.033
7.00	0.025
7.43	0.000
8.88	0.000

CURVE 5 (cont.)

λ	τ
9.15	0.021
9.63	0.026
10.0	0.021
10.5	0.000

CURVE 6
T ~ 298

λ	τ
0.207	0.000
0.228	0.054
0.246	0.123
0.262	0.246
0.269	0.265
0.289	0.295
0.340	0.341
0.383	0.395
0.449	0.403
0.568	0.455
0.650	0.446
0.671	0.446
0.769	0.473
0.807	0.481
0.873	0.481
0.995	0.457
1.10	0.457
1.43	0.506
1.95	0.560
2.39	0.573
2.63	0.565
2.79	0.533
2.86	0.555
3.11	0.571
3.77	0.571
4.67	0.583
5.24	0.601
5.81	0.621
6.59	0.621
7.35	0.594
8.11	0.549
9.25	0.446
10.0	0.339
10.6	0.236
11.0	0.328
11.3	0.341
11.5	0.336

CURVE 6 (cont.)

λ	τ
11.6	0.204
12.0	0.122
12.1	0.000*

CURVE 7
T ~ 298

λ	τ
0.270	0.000
0.424	0.132
0.631	0.304
0.841	0.392
1.12	0.447
1.49	0.507
2.21	0.553
2.59	0.565
2.72	0.510
2.97	0.564
3.41	0.599
3.90	0.615
5.57	0.620
6.15	0.636
6.52	0.636
7.28	0.615
7.98	0.575
8.41	0.423
8.83	0.183
9.68	0.308
10.1	0.084
10.6	0.164
10.8	0.172
11.2	0.160
11.8	0.000

CURVE 8
T ~ 298

λ	τ
2.02	0.533
2.49	0.519
2.67	0.554
2.72	0.554
2.85	0.000
2.96	0.481
3.03	0.512
3.52	0.570
3.82	0.585
4.44	0.593

CURVE 8 (cont.)

λ	τ
4.99	0.592
6.38	0.568
7.11	0.540
7.89	0.456
8.89	0.121
9.55	0.233
9.95	0.145
10.6	0.055
11.1	0.126
12.0	0.000

CURVE 9
T ~ 298

λ	τ
2.02	0.522
2.34	0.512
2.49	0.500
2.52	0.489
2.59	0.461
2.69	0.473
2.85	0.000*
2.92	0.291
3.03	0.303
3.50	0.432
3.64	0.454
3.78	0.464
3.98	0.464
4.82	0.432
5.04	0.425
5.52	0.445
6.11	0.343
6.37	0.414
6.58	0.424
6.97	0.415
7.15	0.400
8.43	0.154
9.04	0.050
9.57	0.096
9.68	0.096
10.1	0.083*
10.7	0.037
11.2	0.083
12.0	0.000*

* Not shown on plot

DATA TABLE NO. 74 (continued)

λ	τ	λ	τ
CURVE 10		**CURVE 11 (cont.)**	
T ~ 298		2.18	0.381
1.93	0.391	2.29	0.397
2.08	0.401	2.41	0.377
2.33	0.407	2.44	0.296
2.45	0.403	2.52	0.232
2.54	0.270	2.61	0.337
2.65	0.366	2.85	0.000*
2.77	0.179	2.94	0.115
2.88	0.179	3.15	0.151
2.89	0.116	3.31	0.188
2.94	0.175	3.65	0.291
3.18	0.201	3.75	0.308
3.54	0.293	3.94	0.321
3.71	0.329	4.27	0.321
3.80	0.345	4.85	0.302
3.93	0.351	5.14	0.285
4.13	0.356	5.53	0.297
4.94	0.332	5.82	0.243
5.18	0.320	6.05	0.233
5.40	0.332	6.18	0.240
5.48	0.332	6.52	0.284
5.98	0.258	6.70	0.284
6.52	0.337	7.03	0.259
6.64	0.337	8.85	0.007
6.85	0.324	9.59	0.038
8.53	0.084	10.7	0.011*
9.02	0.026	11.2	0.044*
9.57	0.067	12.0	0.000*
10.6	0.011		
11.3	0.043		
12.0	0.000*		
CURVE 11			
T ~ 298			
0.318	0.002		
0.522	0.039		
0.659	0.071		
0.818	0.112		
0.968	0.162		
1.23	0.258		
1.26	0.255		
1.29	0.208		
1.36	0.274		
1.93	0.389		
2.02	0.398		
2.10	0.394		

*Not shown on plot

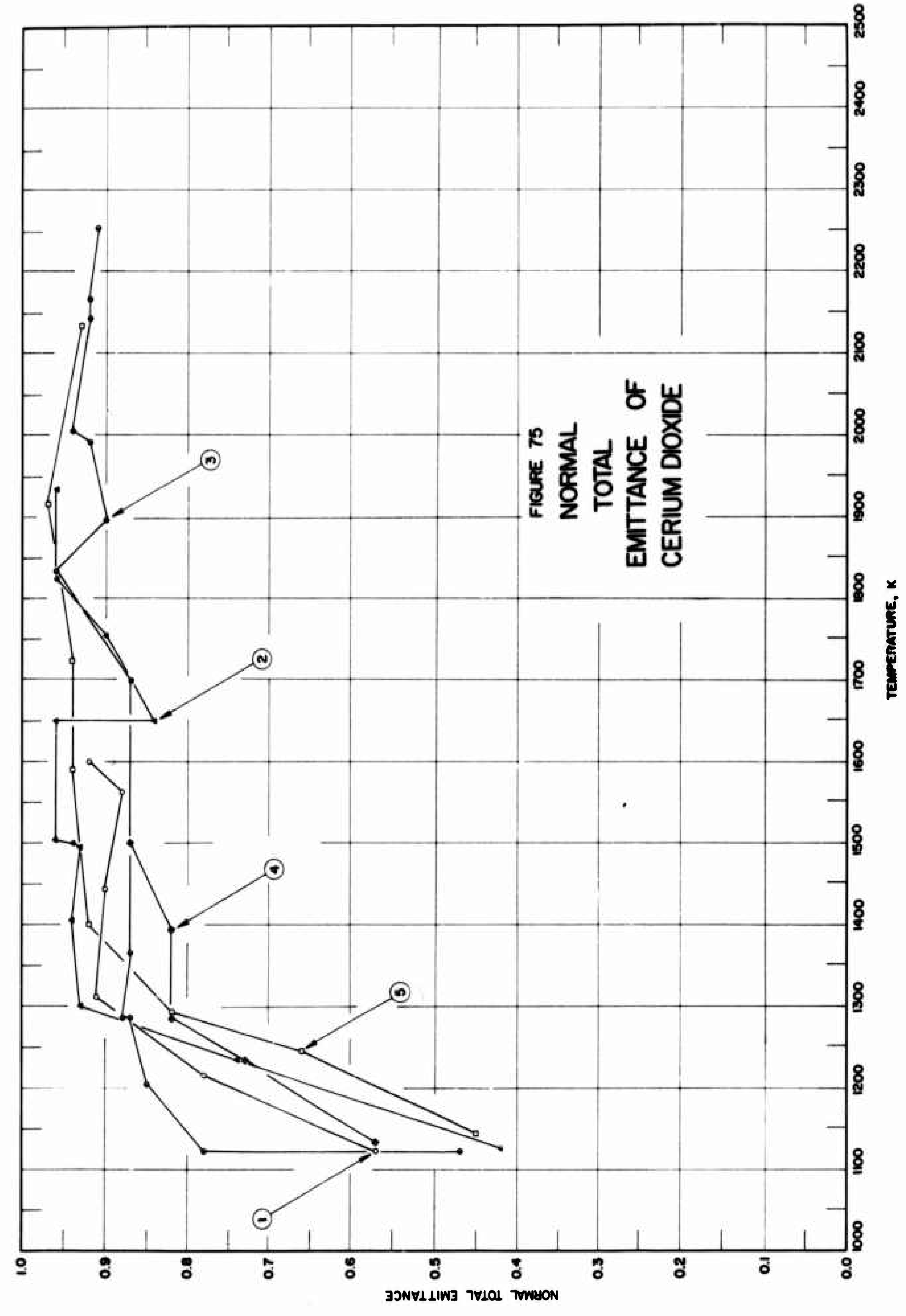


FIGURE 75 NORMAL TOTAL EMITTANCE OF CERIUM DIOXIDE

SPECIFICATION TABLE NO. 75 NORMAL TOTAL EMITTANCE OF CERIUM DIOXIDE CeO_2

Curve No.	Ref. No.	Year	Temperature Range, K	Geometry θ'	Reported Error, %	Composition (weight percent), Specifications and Remarks
1	17	1962	1122-1600	~0°	10	Pressed and sintered; specimen cracked at 1217 K; measured in argon; [Author's designation: Specimen 1].
2	17	1962	1128-1933	~0°	10	Pressed and sintered; specimen cracked at 1500 K; measured in argon; [Author's designation: Specimen 2].
3	17	1962	1122-2255	~0°	10	Pressed and sintered; specimen cracked at 1288 K; measured in argon; [Author's designation: Specimen 3].
4	17	1962	1133-1500	~0°	10	Pressed and sintered; specimen cracked at 1500 K; measured in argon; [Author's designation: Specimen 4].
5	17	1962	1144-2133	~0°	10	Pressed and sintered; measured in argon; [Author's designation: Specimen 5].

DATA TABLE NO. 75 NORMAL TOTAL EMITTANCE OF CERIUM DIOXIDE CeO_2

[Temperature, T, K; Emittance, ϵ]

T	ϵ	T	ϵ	T	ϵ
CURVE 1		CURVE 3		CURVE 4 (cont.)	
1122	0.57	1128	0.42*	1283	0.82
1217	0.78	1122	0.47	1394	0.82
1311	0.91	1122	0.78	1500	0.87
1444	0.90	1205	0.85		
1561	0.88	1288	0.87	CURVE 5	
1600	0.92	1288	0.88		
		1366	0.87	1144	0.45
CURVE 2		1600	0.92*	1245	0.66
		1700	0.87	1293	0.82
1128	0.42	1833	0.96	1400	0.92
1233	0.74	1899	0.90	1492	0.93*
1300	0.93	1994	0.92	1590	0.94
1405	0.94	2050	0.94	1722	0.94
1505	0.96	2144	0.92	1918	0.97
1650	0.96	2167	0.92	2133	0.93
1500	0.94	2255	0.91		
1494	0.93				
1650	0.84	CURVE 4			
1755	0.90				
1822	0.96	1133	0.57		
1933	0.96	1233	0.73		

*Not shown on plot

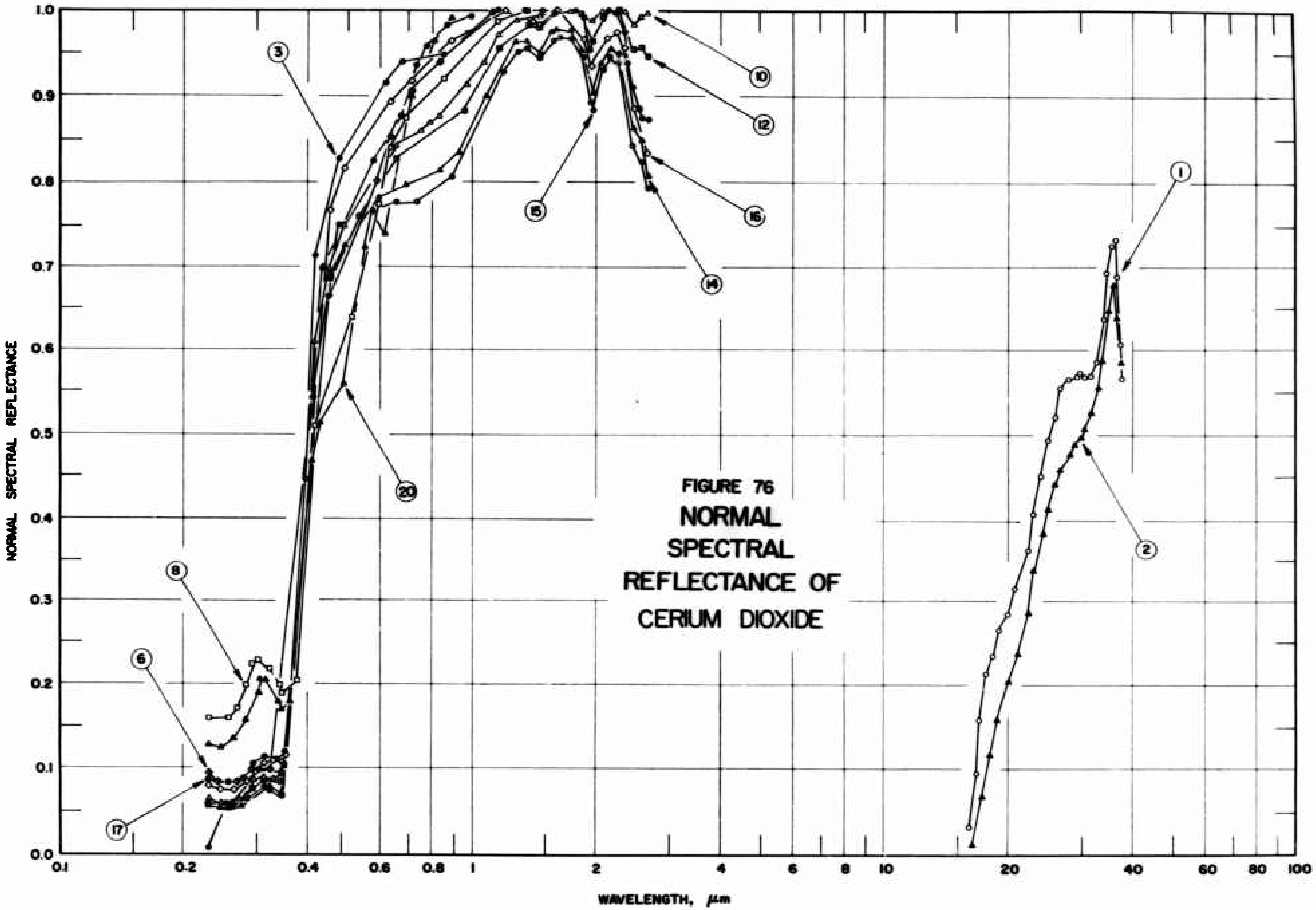


FIGURE 76
NORMAL
SPECTRAL
REFLECTANCE OF
CERIUM DIOXIDE

SPECIFICATION TABLE NO. 76 NORMAL SPECTRAL REFLECTANCE OF CERIUM DIOXIDE CeO_2

Curve No.	Ref. No.	Year	Temperature K	Wavelength Range, μm	Geometry θ	θ'	ω'	Reported Error, %	Composition (weight percent), Specifications, and Remarks
1	146	1966	~298	16.0-37.9	~0°	~0°			Film; optical thickness 10 quarterwaves at $\lambda = 2.6$ μm; electron beam deposited in vacuum (1.8×10^{-4} mm Hg with O_2 bleed) at normal incidence onto glass substrate heated to 588 K; rate of depositing 1 quarterwave per min at $\lambda = 0.5$ μm; film exhibited strong scattering in optical region.
2	146	1966	~298	16.2-37.5	~0°	~0°			Film; optical thickness 10 quarterwaves at $\lambda = 3.2$ μm; electron beam deposited in vacuum (1.8×10^{-4} mm Hg with O_2 bleed) at normal incidence onto glass substrate heated to 423 K; rate of depositing 1 quarterwave per min at $\lambda = 0.5$ μm; film exhibited medium scattering in optical region.
3	340	1968	298	0.230-2.65	~0°		2π		Powder; compacted without binder at 18 900 psi data extracted from smooth curve; freshly smoked MgO reference standard.
4*	340	1968	298	0.230-2.65	~0°		2π		Above specimen and conditions except sintered at 673 K in air for 1 hr.
5*	340	1968	298	0.230-2.65	~0°		2π		Above specimen and conditions except subsequently sintered at 1273 K in air for 1 hr.
6	340	1968	298	0.230-2.65	~0°		2π		Above specimen and conditions except subsequently sintered at 1523 K in air for 1 hr.
7*	340	1968	298	0.230-2.65	~0°		2π		Above specimen and conditions except subsequently sintered at 1673 K in air for 1 hr.
8	340	1968	298	0.230-2.65	~0°		2π		Above specimen and conditions except subsequently sintered at 1773 K in air for 1 hr.
9*	342	1968	~298	0.230-2.65	0°		2π		Powder; compacted at 11 800 psi; data extracted from smooth curve; MgO reference standard.
10	362	1964	~298	0.230-2.65	0°		2π		99.9 pure powder, Am. Potash and Chem. Corp.; mesh size 325; compacted at 1150 psi with highly polished stainless steel ram; data extracted from smooth curve; MgO reference standard.
11*	362	1964	~298	0.230-2.65	~0°		2π		Similar to above specimen and conditions except compacted at 2880 psi.
12	362	1964	~298	0.230-2.65	~0°		2π		Similar to above specimen and conditions except compacted at 5760 psi.
13*	362	1964	~298	0.230-2.65	~0°		2π		Similar to above specimen and conditions except compacted at 11 500 psi.
14	362	1964	~298	0.230-2.65	~0°		2π		Similar to above specimen and conditions except compacted at 20 200 psi.
15	362	1964	~298	0.230-2.65	~0°		2π		Similar to above specimen and conditions except compacted at 28 800 psi.
16	341	1966	~298	0.230-2.65	~0°		2π		Powder; compacted at 18 900 psi; data extracted from smooth curve; MgO reference standard.
17	341	1966	~298	0.230-2.65	~0°		2π		Similar to above specimen and conditions except sintered 1 hr at 1273 K.
18*	341	1966	~298	0.230-2.65	~0°		2π		Similar to above specimen and conditions except sintered 1 hr at 1523 K.
19*	341	1966	~298	0.230-2.65	~0°		2π		Similar to above specimen and conditions except sintered 1 hr at 1723 K.
20	341	1966	~298	0.230-2.65	~0°		2π		Similar to above specimen and conditions except sintered 1 hr at 1873 K.

*Not shown on plot

DATA TABLE NO. 76 NORMAL SPECTRAL REFLECTANCE OF CERIUM DIOXIDE CeO_2

[Wavelength, λ, μm; Reflectance, ρ; Temperature, T, K]

λ	ρ
CURVE 1	**T ~ 298**
16.0	0.031
16.6	0.094
17.0	0.157
17.6	0.214
18.1	0.234
19.0	0.264
20.0	0.282
20.9	0.315
22.1	0.361
23.0	0.406
24.0	0.450
25.0	0.492
26.0	0.520
26.9	0.552
28.0	0.562
29.1	0.568
29.9	0.572
30.9	0.568
31.9	0.569
32.9	0.585
34.0	0.636
34.9	0.693
35.6	0.729
36.1	0.733
36.5	0.689
37.1	0.603
37.9	0.565
CURVE 2	**T ~ 298**
16.2	0.012
17.1	0.069
18.0	0.117
18.9	0.157
20.0	0.201
21.0	0.236
22.1	0.284
23.0	0.337
24.1	0.382
25.0	0.411
26.0	0.440
26.9	0.458
28.1	0.475

λ	ρ
CURVE 2 (cont.)	
29.0	0.487
30.0	0.497
30.9	0.508
31.9	0.525
33.0	0.552
33.8	0.588
35.0	0.646
36.0	0.679
36.6	0.639
37.5	0.581
CURVE 3	**T = 298**
0.230	0.070
0.251	0.057
0.262	0.059
0.305	0.096
0.348	0.092
0.350	0.102
0.391	0.445
0.418	0.711
0.479	0.828
0.615	0.913
0.679	0.938
0.848	0.947
1.15	1.009
1.32	1.030
1.38	1.002*
1.43	1.007*
1.49	1.026
1.66	1.029*
1.78	1.017
1.86	0.992
1.91	0.951
2.14	1.00
2.22	0.999
2.32	0.973
2.38	0.939
2.44	0.910
2.52	0.886
2.58	0.876
2.65	0.874

λ	ρ
CURVE 4*	**T = 298**
0.230	0.070
0.251	0.057
0.262	0.059
0.305	0.096
0.348	0.092
0.350	0.102
0.391	0.445
0.418	0.711
0.468	0.820
0.540	0.903
0.601	0.943
0.745	0.985
1.03	1.029
1.19	1.057
1.30	1.057
1.39	1.039
1.64	1.062
1.75	1.064
1.81	1.053
1.87	1.021
1.91	0.987
1.97	0.984
2.18	1.041
2.22	1.049
2.28	1.049
2.34	1.017
2.38	0.985
2.43	0.966
2.58	0.933
2.65	0.900
CURVE 5*	**T = 298**
0.230	0.070
0.251	0.057
0.262	0.059
0.305	0.096
0.348	0.092
0.350	0.102
0.391	0.445
0.443	0.683
0.574	0.833
0.668	0.901

λ	ρ
CURVE 5 (cont.)*	
0.806	0.946
1.04	0.993
1.26	1.034
1.34	1.034
1.39	1.022
1.47	1.022
1.71	1.063
1.75	1.063
1.90	1.021
1.98	1.016
2.17	1.058
2.23	1.064
2.38	1.012
2.45	0.990
2.55	0.965
2.65	0.950
CURVE 6	**T = 298**
0.230	0.092
0.243	0.082
0.270	0.082
0.293	0.098
0.322	0.098
0.348	0.092*
0.350	0.102*
0.405	0.540
0.443	0.662
0.582	0.800
0.634	0.852
0.704	0.905
0.839	0.939
1.12	0.999
1.46	1.024*
1.65	1.033*
1.83	1.039*
1.86	1.030*
1.95	1.014*
2.17	1.059*
2.23	1.063*
2.47	1.041*
2.65	1.032*

λ	ρ
CURVE 7*	**T = 298**
0.230	0.129
0.259	0.129
0.269	0.136
0.282	0.156
0.300	0.187
0.311	0.191
0.348	0.160
0.351	0.171
0.391	0.437
0.421	0.539
0.526	0.711
0.628	0.848
0.665	0.883
0.704	0.905
0.839	0.939
1.10	0.985
1.25	0.996
1.52	1.006
1.81	1.021
1.88	1.021
1.94	1.015
1.99	1.014
2.17	1.059
2.23	1.063
2.30	1.063
2.47	1.041
2.65	1.032
CURVE 8	**T = 298**
0.230	0.158
0.235	0.159*
0.249	0.159*
0.258	0.158
0.270	0.170
0.284	0.198
0.294	0.221
0.305	0.226
0.321	0.218
0.343	0.198
0.347	0.188
0.377	0.201
0.416	0.509

λ	ρ
CURVE 8 (cont.)	
0.507	0.636
0.595	0.773
0.629	0.840
0.692	0.874
0.856	0.920
1.15	0.988
1.31	1.013*
1.65	1.036*
1.95	1.045*
2.21	1.059*
2.32	1.061*
2.39	1.058*
2.53	1.066*
2.65	1.067*
CURVE 9*	**T ~ 298**
0.230	0.074
0.237	0.074
0.253	0.071
0.267	0.076
0.280	0.081
0.292	0.095
0.303	0.098
0.319	0.100
0.330	0.094
0.344	0.087
0.348	0.089
0.350	0.100
0.371	0.311
0.400	0.438
0.445	0.484
0.505	0.542
0.552	0.600
0.573	0.650
0.622	0.726
0.656	0.752
0.714	0.772
0.934	0.796
1.15	0.798
1.40	0.796
1.53	0.792
1.71	0.795
1.90	0.793

λ	ρ
CURVE 9 (cont.)*	
2.15	0.800
2.33	0.798
2.48	0.792
2.65	0.769
CURVE 10	**T ~ 298**
0.230	0.062
0.249	0.059
0.271	0.062
0.285	0.067
0.297	0.085
0.312	0.088
0.330	0.086
0.345	0.090
0.350	0.100
0.416	0.607
0.447	0.699
0.489	0.750
0.650	0.842
0.657	0.853*
0.746	0.860
0.766	0.870*
0.786	0.870
0.807	0.878*
0.836	0.878
0.972	0.913
1.06	0.938
1.15	0.971
1.28	0.990
1.35	1.000
1.46	0.995
1.74	1.017
1.95	0.990
2.07	1.012
2.24	1.027*
2.35	1.015
2.47	0.985
2.55	0.994
2.65	0.996

λ	ρ
CURVE 11*	**T ~ 298**
0.230	0.063
0.249	0.057
0.270	0.061
0.291	0.080
0.305	0.087
0.314	0.084
0.343	0.089
0.347	0.090
0.350	0.100
0.452	0.689
0.498	0.750
0.585	0.804
0.650	0.842
0.691	0.844
0.715	0.842
0.927	0.882
1.15	0.955
1.35	0.984
1.52	0.990
1.61	1.005
1.74	1.006
1.95	0.975
2.07	0.998
2.26	1.012
2.36	0.991
2.46	0.969
2.65	0.969
CURVE 12	**T ~ 298**
0.230	0.062*
0.249	0.057*
0.250	0.060*
0.261	0.055
0.270	0.061*
0.286	0.068*
0.292	0.073
0.297	0.085*
0.312	0.084
0.341	0.082
0.349	0.089*
0.350	0.100*
0.454	0.688

*Not shown on plot

DATA TABLE NO. 76 (continued)

CURVE 12 (cont.)
T ~ 298

λ	ρ
0.524	0.760
0.650	0.829
0.959	0.883
1.15	0.955
1.36	0.984
1.45	0.980
1.59	0.998
1.72	1.001*
1.82	0.997
1.96	0.962
2.07	0.993
2.26	1.009
2.46	0.953
2.56	0.954
2.65	0.946

CURVE 13*
T ~ 298

λ	ρ
0.230	0.057
0.233	0.050
0.245	0.050
0.252	0.055
0.258	0.050
0.265	0.056
0.280	0.061
0.300	0.081
0.348	0.079
0.350	0.100
0.457	0.689
0.584	0.778
0.682	0.800
0.782	0.808
0.918	0.839
0.950	0.844
1.10	0.918
1.26	0.965
1.35	0.976
1.53	0.986
1.65	1.000
1.97	0.960
2.08	0.987
2.24	0.996
2.46	0.939
2.54	0.939
2.65	0.926

CURVE 14
T ~ 298

λ	ρ
0.230	0.055
0.247	0.052
0.253	0.056*
0.256	0.054*
0.258	0.051
0.265	0.057*
0.276	0.054
0.299	0.076*
0.321	0.078
0.328	0.073*
0.349	0.070
0.350	0.100*
0.457	0.690
0.492	0.727
0.591	0.781
0.682	0.798
0.697	0.797*
0.836	0.813
0.926	0.836
1.08	0.900
1.26	0.963
1.35	0.963
1.45	0.950
1.55	0.975
1.60	0.980
1.73	0.979
1.85	0.951
1.96	0.902
2.05	0.939
2.17	0.955
2.27	0.950
2.45	0.861
2.56	0.850
2.65	0.809

CURVE 15
T ~ 298

λ	ρ
0.230	0.056
0.247	0.052*
0.254	0.055*
0.265	0.050*
0.275	0.059*
0.286	0.062
0.299	0.072*
0.312	0.079

CURVE 15 (cont.)

λ	ρ
0.324	0.072
0.349	0.069
0.350	0.100
0.458	0.685
0.577	0.750
0.658	0.779
0.734	0.779
0.893	0.806
1.19	0.928
1.28	0.950
1.35	0.955
1.45	0.941
1.58	0.964
1.61	0.969
1.72	0.969
1.85	0.942
1.93	0.891
1.95	0.885
2.07	0.930
2.15	0.944
2.26	0.939
2.44	0.841
2.58	0.823
2.65	0.793

CURVE 16
T ~ 298

λ	ρ
0.230	0.077
0.247	0.074
0.269	0.074
0.285	0.081
0.300	0.095
0.313	0.105
0.330	0.107
0.349	0.104
0.354	0.115
0.452	0.768
0.490	0.815
0.633	0.892
0.704	0.916
0.897	0.963
1.20	1.00
1.34	1.01*
1.40	0.986
1.45	0.983
1.60	1.01*

CURVE 16 (cont.)

λ	ρ
1.74	1.00*
1.80	0.998*
1.88	0.968
1.94	0.933
1.99	0.933*
2.11	0.969
2.16	0.973*
2.24	0.973
2.31	0.955
2.47	0.885
2.65	0.832

CURVE 17
T ~ 298

λ	ρ
0.230	0.085
0.259	0.081
0.280	0.086
0.297	0.104
0.312	0.112
0.335	0.110
0.349	0.105*
0.354	0.119
0.436	0.697
0.578	0.825
0.665	0.877
0.735	0.934
0.765	0.956
0.863	0.982
0.993	0.994
1.21	1.019*
1.32	1.024*
1.41	1.018*
1.69	1.036*
1.84	1.020*
1.91	0.996*
2.19	1.041*
2.26	1.041*
2.49	0.989*
2.65	0.970*

CURVE 18*
T ~ 298

λ	ρ
0.230	0.105
0.263	0.108
0.276	0.115

CURVE 18 (cont.)*

λ	ρ
0.289	0.130
0.300	0.152
0.314	0.158
0.330	0.149
0.343	0.139
0.347	0.139
0.359	0.146
0.425	0.621
0.556	0.773
0.727	0.940
0.791	0.983
0.926	1.001
1.19	1.030
1.44	1.030
1.56	1.044
1.66	1.060
1.82	1.065
1.94	1.043
2.15	1.068
2.29	1.068
2.38	1.057
2.45	1.038
2.52	1.031
2.65	1.031

CURVE 19*
T ~ 298

λ	ρ
0.230	0.115
0.265	0.115
0.280	0.125
0.300	0.157
0.309	0.163
0.322	0.162
0.335	0.151
0.343	0.148
0.348	0.152
0.363	0.163
0.425	0.623
0.562	0.778
0.762	0.965
0.802	0.986
0.989	1.021
1.11	1.033
1.21	1.034
1.34	1.048
1.36	1.042

CURVE 19 (cont.)*

λ	ρ
1.43	1.042
1.64	1.061
1.96	1.069
2.15	1.080
2.30	1.094
2.65	1.091

CURVE 20
T ~ 298

λ	ρ
0.230	0.128
0.247	0.124
0.264	0.133
0.282	0.155
0.301	0.189
0.309	0.201
0.316	0.201
0.340	0.177
0.348	0.169
0.363	0.176
0.408	0.466
0.428	0.511
0.483	0.558
0.550	0.722
0.572	0.769
0.609	0.740
0.719	0.900
0.802	0.965
0.884	0.994
1.33	1.048*
1.56	1.065*
1.74	1.102*
1.89	1.101*
2.65	1.103*

*Not shown on plot

SPECIFICATION TABLE NO. 77 NORMAL TOTAL EMITTANCE OF CHROMIUM OXIDES

Curve No.	Ref. No.	Year	Temperature Range, K	Geometry θ'	Reported Error, %	Composition (weight percent), Specifications and Remarks
1*	28	1963	1023	~0°		Cr_2O_3; sintered at 2173 K for 2 hrs (setter material Cr_2O_3); density 3.15 g cm^{-3}, theoretical density 5.21 g cm^{-3}; integrated from spectral data (1-15 μm); [Authors' designation: Sample No. 115].
2*	200	1962	1273	~0°		Cr_2O_3; 99.5 pure; 1.3 mm thick plate; sintered at 2123 K for 2 hrs.
3*	362	1964	873-1273	0°		Cr_2O_3; 99.5 pure powder, McGean Chemical Co.; sintered 2 hrs at 2173 K.
4*	362	1964	873-1273	0°		Cr_2O_3; similar to above specimen and conditions except calculated from spectral data (1-15 μm).

DATA TABLE NO. NORMAL TOTAL EMITTANCE OF CHROMIUM OXIDE

[Temperature, T, K; Emittance, ϵ]

T	ϵ
CURVE 1*	
1023	0.91
CURVE 2*	
1273	0.69
CURVE 3*	
873	0.85
1073	0.90
1273	0.80
CURVE 4*	
873	0.86
1073	0.91
1273	0.82

* No plot given

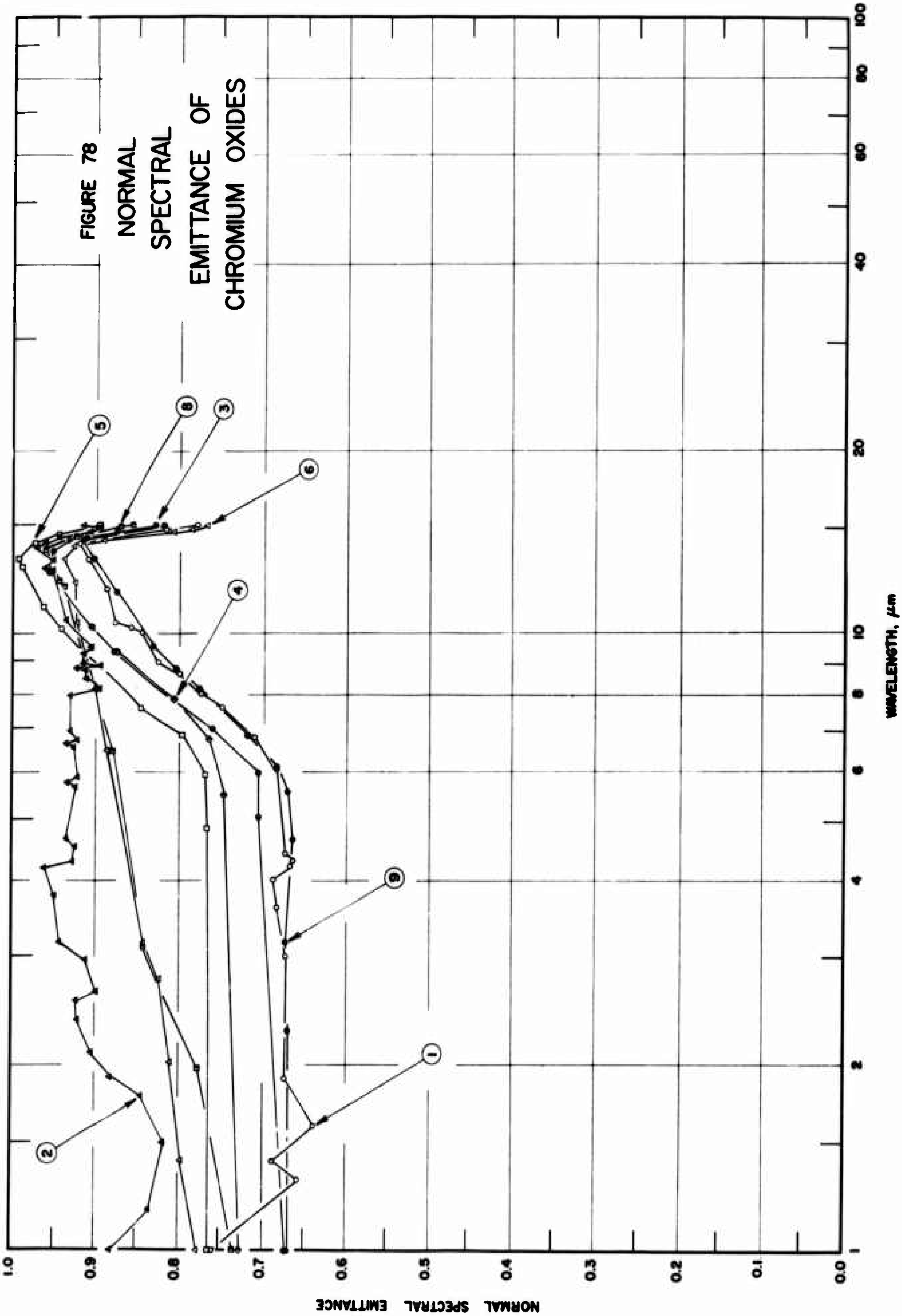


FIGURE 78 NORMAL SPECTRAL EMITTANCE OF CHROMIUM OXIDES

SPECIFICATION TABLE NO. 78 NORMAL SPECTRAL EMITTANCE OF CHROMIUM OXIDES

Curve No.	Ref. No.	Year	Temperature K	Wavelength Range, μm	Geometry θ'	Reported Error, %	Composition (weight percent), Specifications, and Remarks
1	200	1962	1273	1.00-15.0	~0°		Cr_2O_3; 99.5 pure; 1.3 mm thick plate; sintered at 2123 K for 2 hrs; data extracted from smooth curve.
2	28	1963	1023	1.00-15.0	~0°		Cr_2O_3; sintered at 2173 K for 2 hrs (setter material Cr_2O_3); density 3.15 g cm^{-3}, theoretical density 5.21 g cm^{-3}; data extracted from smooth curve; [Authors' designation: Sample No. 115].
3	382	1965	1273	1.00-15.0	0°		Cr_2O_3; sintered 15 hrs at 1273 K; density 2.05; data extracted from smooth curve.
4	382	1965	1273	1.00-15.0	0°		Above specimen and conditions except sintered additionally 2 hrs at 1373 K, 2 hrs at 1473 K, and 2 hrs at 1573 K; density increased to 2.87.
5	382	1965	1273	1.00-15.0	0°		Above specimen and conditions except sintered an additional 2 hrs at 1923 K; density decreased to 2.23.
6	362	1964	878	1.00-15.0	~0°		Cr_2O_3; 99.5 pure powder, McGean Chemical Co.; sintered 2 hrs at 2173 K; data extracted from smooth curve.
7*	362	1964	1073	1.00-15.0	~0°		Above specimen and conditions.
8	362	1964	1273	1.00-15.00	~0°		Above specimen and conditions.
9	393	1966	1273	1.00-15.00	~0°		Cr_2O_3; cold pressed and sintered at 2123 K for 2 hrs; 2 or 3 wt. percent polyvinyl binder; density 3.29 g cm^{-3}; data extracted from smooth curve.

*Not shown on plot

DATA TABLE NO. 78 NORMAL SPECTRAL EMITTANCE OF CHROMIUM OXIDES

[Wavelength, λ, μm; Emittance, ε; Temperature, T, K]

CURVE 1
T = 1273

λ	ε
1.00	0.760
1.30	0.660
1.40	0.640
1.60	0.640
1.90	0.675
3.00	0.675
3.60	0.685
4.00	0.690
4.20	0.670
4.30	0.665
4.40	0.675
6.00	0.685
6.80	0.710
7.60	0.750
8.00	0.775
8.60	0.800
9.00	0.825
10.0	0.845
10.2	0.860
10.4	0.860*
10.4	0.880
11.8	0.890
13.2	0.910
14.0	0.920
14.1	0.920*
14.7	0.815
14.9	0.780*
15.0	0.780

CURVE 2
T = 1023

λ	ε
1.00	0.885
1.16	0.835
1.50	0.816
1.78	0.846
1.92	0.881
2.10	0.905
2.38	0.922
2.54	0.922
2.62	0.900
2.96	0.913
3.16	0.947
3.79	0.952

CURVE 2 (cont.)

λ	ε
4.16	0.965
4.27	0.930
4.50	0.927
4.62	0.937
5.62	0.924
5.72	0.935
5.88	0.921
6.52	0.927
6.65	0.938
6.72	0.922
6.99	0.931
7.98	0.931
8.13	0.899
8.29	0.899*
8.43	0.911
8.74	0.911
8.80	0.922
8.88	0.896
8.98	0.915
9.26	0.915
9.50	0.906
9.78	0.916*
10.0	0.923*
10.5	0.938
11.5	0.948*
12.7	0.955
12.8	0.965
13.0	0.956
13.4	0.968*
13.8	0.973
14.0	0.962
14.2	0.950*
14.4	0.945
14.7	0.907
14.9	0.896
15.0	0.915

CURVE 3
T = 1273

λ	ε
1.00	0.671
5.05	0.706
5.99	0.706
7.00	0.761
9.37	0.880

CURVE 3 (cont.)

λ	ε
10.3	0.908
12.7	0.957
13.7	0.954
14.2	0.933
14.6	0.879
15.0	0.828

CURVE 4
T = 1273

λ	ε
1.00	0.726
5.46	0.749
6.77	0.765
7.83	0.805
9.31	0.879
10.3	0.908*
12.7	0.957*
13.7	0.954*
14.2	0.933*
14.6	0.879*
15.0	0.828*

CURVE 5
T = 1273

λ	ε
1.00	0.763
4.81	0.767
5.90	0.770
6.87	0.799
7.55	0.848
9.18	0.912*
10.1	0.944
11.0	0.966
12.8	0.991
13.3	0.994
14.0	0.979
14.5	0.948
15.0	0.897

CURVE 6
T = 878

λ	ε
1.00	0.779
1.40	0.798
2.01	0.810

CURVE 6 (cont.)

λ	ε
2.76	0.823
3.11	0.841
6.46	0.890
8.11	0.900
10.4	0.923
12.1	0.925
13.2	0.940
13.6	0.937*
13.8	0.926
14.1	0.892
14.6	0.805
14.7	0.784
15.0	0.769

CURVE 7*
T = 1073

λ	ε
1.00	0.863
2.00	0.867
2.63	0.889
5.12	0.907
6.44	0.913
7.41	0.926
8.54	0.926
12.7	0.973
14.0	0.980
14.2	0.953
14.5	0.901
14.7	0.875
15.0	0.856

CURVE 8
T = 1273

λ	ε
1.00	0.735
1.97	0.778
3.11	0.841
6.43	0.882
8.11	0.900*
10.4	0.924*
11.9	0.940
12.2	0.947
13.3	0.954*
13.7	0.962
13.9	0.963*

CURVE 8 (cont.)

λ	ε
14.4	0.926
14.9	0.873
15.0	0.856

CURVE 9
T = 1273

λ	ε
1.00	0.670
2.28	0.672
3.16	0.674
4.61	0.667
5.53	0.671
6.08	0.685
6.86	0.719
8.14	0.777
8.77	0.803
9.56	0.830
11.6	0.879
13.3	0.904
14.1	0.918
14.3	0.911
14.6	0.877*
15.0	0.817

*Not shown on plot

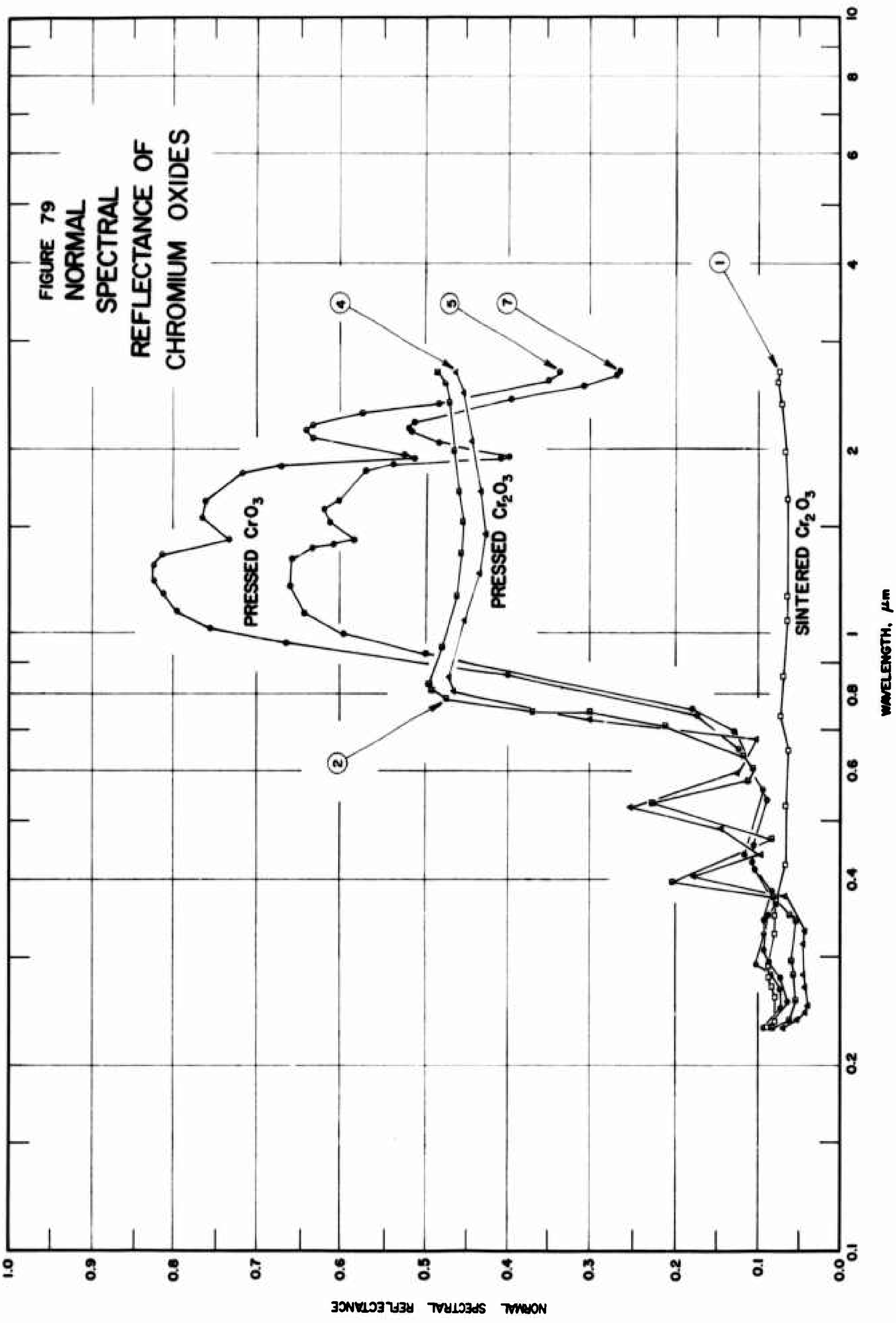


FIGURE 79
NORMAL
SPECTRAL
REFLECTANCE OF
CHROMIUM OXIDES
PRESSED CrO_3
PRESSED Cr_2O_3
SINTERED Cr_2O_3
1
2
4
5
7
NORMAL SPECTRAL REFLECTANCE
WAVELENGTH, μm
0.0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
1.0
0.1
0.2
0.4
0.6
0.8
1
2
4
6
8
10

SPECIFICATION TABLE NO. 79 NORMAL SPECTRAL REFLECTANCE OF CHROMIUM OXIDES

Curve No.	Ref. No.	Year	Temperature K	Wavelength Range, μm	Geometry θ	Geometry θ'	Geometry ω'	Reported Error, %	Composition (weight percent), Specifications, and Remarks
1	28	1963	298	0.230-2.65	~0°		2π		Cr_2O_3; sintered at 2173 K for 2 hrs (setter material Cr_2O_3): density 3.15 g cm^{-3}, theoretical density 5.21 g cm^{-3}; MgO reference standard; data extracted from smooth curve; [Authors' designation: Sample No. 115].
2	362	1964	~298	0.230-2.65	0°		2π		Cr_2O_3; 99.5 pure powder, McGean Chemical Corp; mesh size 325; compacted at 11 500 psi with highly polished stainless steel ram; data extracted from smooth curve; MgO reference standard.
3*	362	1964	~298	0.230-2.65	~0°		2π		Similar to above specimen and conditions except compacted at 23 200 psi.
4	362	1964	~298	0.230-2.65	~0°		2π		Similar to above specimen and conditions except compacted at 34 600 psi.
5	362	1964	~298	0.230-2.65	0°		2π		CrO_3; 99.6 pure powder, Fisher Scientific Co.; mesh size 325; compacted at 11 500 psi with highly polished stainless steel ram; data extracted from smooth curve; MgO reference standard.
6*	362	1964	~298	0.230-2.65	~0°		2π		Similar to above specimen and conditions except compacted at 23 200 psi.
7	362	1964	~298	0.230-2.65	~0°		2π		Similar to above specimen and conditions except compacted at 34 600 psi.

*Not shown on plot

DATA TABLE NO. 79 NORMAL SPECTRAL REFLECTANCE OF CHROMIUM OXIDES

[Wavelength, λ, μm; Reflectance, ρ; Temperature, T, K]

CURVE 1
T = 298

λ	ρ
0.230	0.090
0.235	0.080
0.259	0.080
0.269	0.082
0.274	0.084*
0.278	0.088
0.290	0.088
0.322	0.085*
0.326	0.080
0.340	0.080*
0.350	0.080
0.370	0.079
0.421	0.067
0.529	0.067
0.649	0.064
0.733	0.071
0.850	0.070
1.05	0.065
1.15	0.065
1.65	0.065
1.97	0.068
2.35	0.072
2.55	0.077
2.65	0.075

CURVE 2
T ~ 298

λ	ρ
0.230	0.081
0.237	0.061
0.255	0.055
0.280	0.058
0.296	0.060
0.344	0.053
0.350	0.061
0.374	0.081
0.399	0.204
0.466	0.082
0.531	0.227
0.579	0.112
0.602	0.108
0.631	0.119
0.710	0.211
0.748	0.300

CURVE 2 (cont.)

λ	ρ
0.748	0.369
0.789	0.479
0.810	0.495
0.828	0.496
0.950	0.483
1.15	0.461
1.35	0.458
1.52	0.455
1.70	0.460
1.99	0.467
2.37	0.473
2.55	0.479
2.65	0.489

CURVE 3*
T ~ 298

λ	ρ
0.230	0.081
0.238	0.061
0.256	0.056
0.280	0.059
0.295	0.055
0.350	0.053
0.381	0.072
0.412	0.186
0.464	0.091
0.481	0.100
0.529	0.242
0.598	0.122
0.719	0.250
0.805	0.477
0.821	0.488
0.844	0.489
1.08	0.461
1.25	0.448
1.65	0.440
1.85	0.447
2.27	0.459
2.51	0.461
2.65	0.473

CURVE 4
T ~ 298

λ	ρ
0.230	0.070
0.237	0.051
0.244	0.042
0.250	0.040
0.269	0.042
0.280	0.045
0.313	0.045
0.330	0.043
0.350	0.044*
0.377	0.067
0.405	0.179
0.440	0.097
0.484	0.145
0.525	0.252
0.593	0.126
0.674	0.201
0.726	0.300
0.808	0.469
0.847	0.473
1.05	0.451
1.25	0.434
1.45	0.428
1.70	0.432
2.05	0.444
2.45	0.452
2.65	0.464

CURVE 5
T ~ 298

λ	ρ
0.230	0.094
0.248	0.071
0.265	0.072
0.280	0.084
0.291	0.101
0.326	0.093
0.344	0.093
0.350	0.089
0.383	0.082
0.440	0.117
0.560	0.094
0.650	0.124
0.739	0.173
0.859	0.400

CURVE 5 (cont.)

λ	ρ
0.966	0.668
1.02	0.757
1.08	0.798
1.16	0.814
1.22	0.826
1.29	0.826
1.34	0.815
1.42	0.735
1.54	0.769
1.64	0.763
1.82	0.717
1.87	0.673
1.93	0.511
1.95	0.524
2.09	0.637
2.13	0.645
2.18	0.638
2.27	0.579
2.37	0.488
2.57	0.350
2.62	0.337*
2.65	0.337

CURVE 6*
T ~ 298

λ	ρ
0.230	0.092
0.256	0.067
0.287	0.089
0.299	0.098
0.307	0.093
0.346	0.092
0.350	0.082
0.368	0.077
0.436	0.117
0.570	0.095
0.673	0.134
0.772	0.209
0.876	0.426
0.985	0.668
1.04	0.762
1.19	0.804
1.32	0.810
1.38	0.778
1.42	0.707

CURVE 6 (cont.)*

λ	ρ
1.44	0.700
1.45	0.709
1.48	0.735
1.52	0.747
1.59	0.752
1.67	0.746
1.80	0.699
1.85	0.678
1.92	0.469
1.94	0.460
1.96	0.468
2.09	0.596
2.14	0.599
2.20	0.595
2.26	0.558
2.33	0.493
2.44	0.400
2.61	0.290
2.65	0.283

CURVE 7
T ~ 298

λ	ρ
0.230	0.090*
0.254	0.064
0.277	0.071
0.294	0.089
0.309	0.093
0.347	0.090*
0.366	0.077
0.415	0.104
0.429	0.108
0.452	0.106
0.537	0.090
0.692	0.130
0.753	0.180
0.922	0.500
0.991	0.599
1.07	0.647
1.19	0.661
1.32	0.660
1.37	0.638
1.39	0.610
1.42	0.588
1.51	0.615

CURVE 7 (cont.)

λ	ρ
1.59	0.621
1.74	0.601
1.84	0.573
1.88	0.540
1.92	0.410
1.94	0.400
2.04	0.489
2.11	0.517
2.15	0.520
2.20	0.512
2.40	0.399
2.51	0.309
2.61	0.270
2.65	0.266

* Not shown on plot

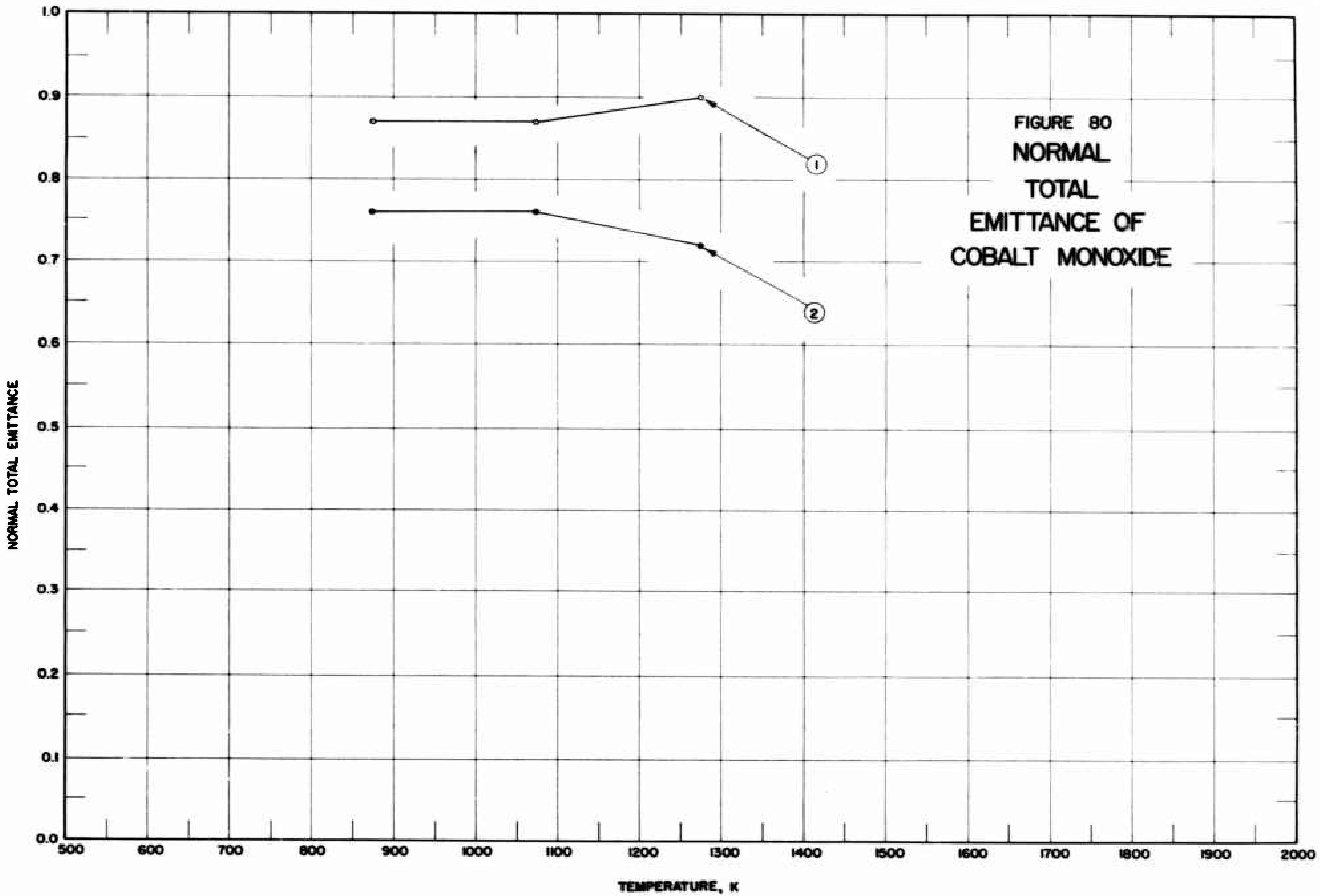


FIGURE 80 NORMAL TOTAL EMITTANCE OF COBALT MONOXIDE

SPECIFICATION TABLE NO. 80 NORMAL TOTAL EMITTANCE OF COBALT MONOXIDE CoO

Curve No.	Ref. No.	Year	Temperature Range, K	Geometry θ'	Reported Error, %	Composition (weight percent), Specifications and Remarks
1	362	1964	873-1273	0°		99 pure powder, Varlacoid Chemical Co.; sintered 2 hrs at 1773 K.
2	362	1964	873-1273	0°		Similar to above specimen and conditions except integrated from spectral data (1-15 μm).

DATA TABLE NO. 80 NORMAL TOTAL EMITTANCE OF COBALT MONOXIDE CoO

[Temperature, T, K; Emittance, ϵ]

T	ϵ
CURVE 1	
873	0.87
1073	0.87
1273	0.90
CURVE 2	
873	0.76
1073	0.76
1273	0.72

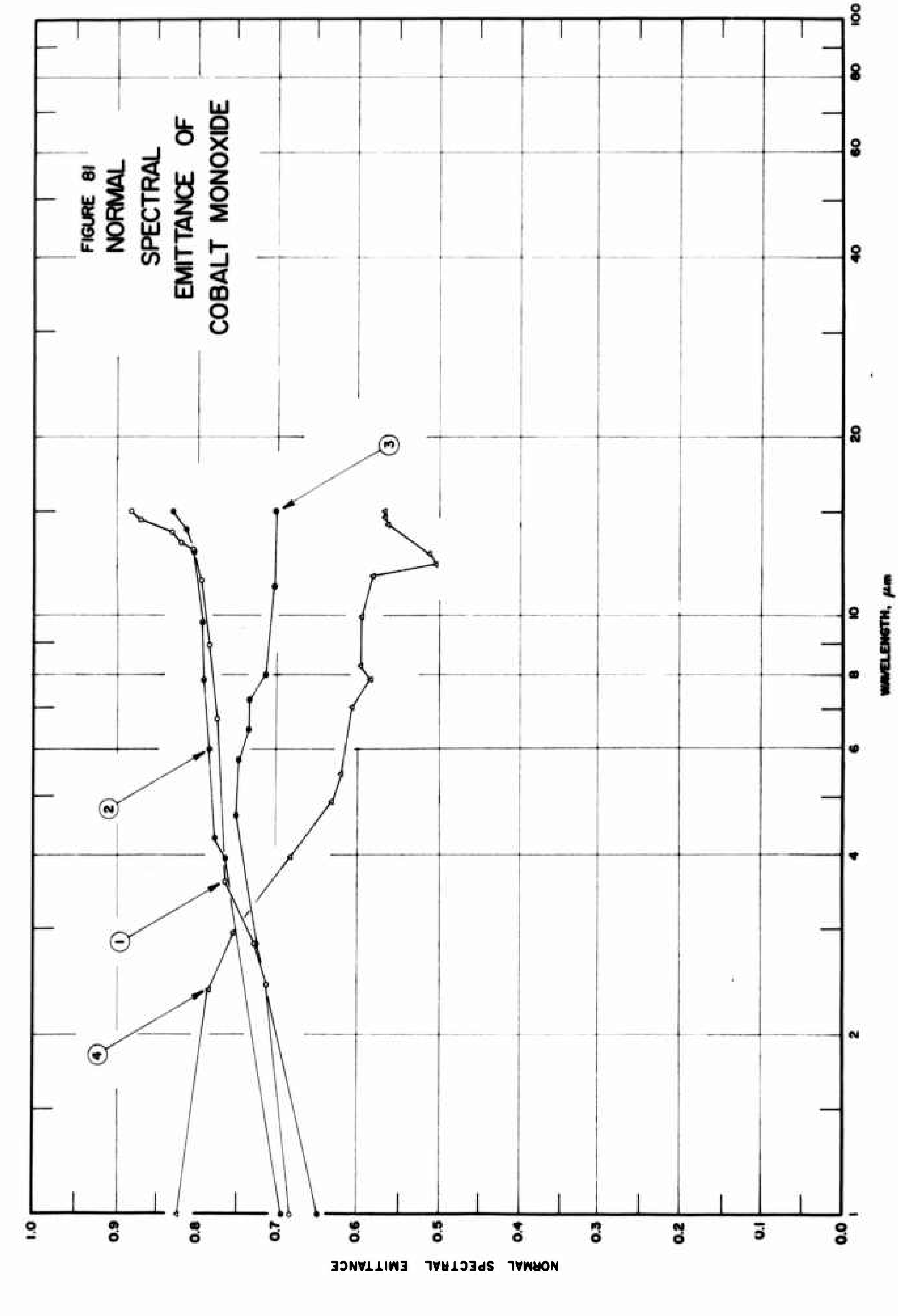


FIGURE 81 NORMAL SPECTRAL EMITTANCE OF COBALT MONOXIDE

SPECIFICATION TABLE NO. 81 NORMAL SPECTRAL EMITTANCE OF COBALT MONOXIDE CoO

Curve No.	Ref. No.	Year	Temperature K	Wavelength Range, μm	Geometry θ'	Reported Error, %	Composition (weight percent), Specifications, and Remarks
1	362	1964	873	1.00-15.0	~0°		99 pure powder, Varlacoid Chemical Co.; sintered 2 hrs at 1773 K; data extracted from smooth curve.
2	362	1964	1073	1.00-15.0	~0°		Above specimen and conditions.
3	362	1964	1273	1.00-15.0	~0°		Above specimen and conditions.
4	362	1964	373	1.00-15.0	~0°		Above specimen and conditions except calculated from spectral reflectance data.

DATA TABLE NO. 81 NORMAL SPECTRAL EMITTANCE OF COBALT MONOXIDE CoO

[Wavelength, λ, μm; Emittance, ϵ; Temperature, T, K]

λ	ϵ	λ	ϵ	λ	ϵ
CURVE 1 T = 873		CURVE 3 T = 1273		CURVE 4 (cont.)	
1.00	0.683	1.00	0.650	12.7	0.615
2.41	0.713	2.83	0.729	13.2	0.619
2.82	0.730	4.66	0.753	14.3	0.668
4.60	0.768	5.74	0.750	14.7	0.670
6.76	0.779	6.49	0.738	15.0	0.670
8.91	0.789	7.22	0.736		
11.5	0.799	8.00	0.715		
13.0	0.809	11.2	0.705		
13.3	0.821	15.0	0.702		
13.8	0.835				
14.5	0.872	CURVE 4 T = 373			
15.0	0.883				
CURVE 2 T = 1073		1.00	0.826		
		2.39	0.789		
		2.96	0.758		
1.00	0.694	3.99	0.685		
3.92	0.768	4.90	0.631		
4.26	0.780	5.43	0.621		
6.00	0.786	7.04	0.609		
7.81	0.793	7.84	0.587		
9.77	0.795	8.29	0.599		
12.9	0.805	9.99	0.598		
14.0	0.816	11.7	0.583		
15.0	0.831	12.3	0.607		

SPECIFICATION TABLE NO. 82 NORMAL SPECTRAL REFLECTANCE OF COBALT MONOXIDE CoO

Curve No.	Ref. No.	Year	Temperature K	Wavelength Range, μm	Geometry θ θ' ω'	Reported Error, %	Composition (weight percent), Specifications, and Remarks
1*	289	1967	~298	14.3-33.3	~0° ~0°		Crystal; grown by flame fusion.

DATA TABLE NO. 82 NORMAL SPECTRAL REFLECTANCE OF COBALT MONOXIDE CoO

[Wavelength, λ, μm; Reflectance, ρ; Temperature, T, K]

λ	ρ
CURVE 1*	
T ~ 298	
14.3	0.046
16.7	0.037
17.3	0.234
17.9	0.501
18.5	0.620
19.2	0.669
20.0	0.712
20.8	0.731
21.8	0.734
22.7	0.738
23.8	0.753
24.9	0.774
26.9	0.811
29.4	0.704
33.3	0.519

*No plot given

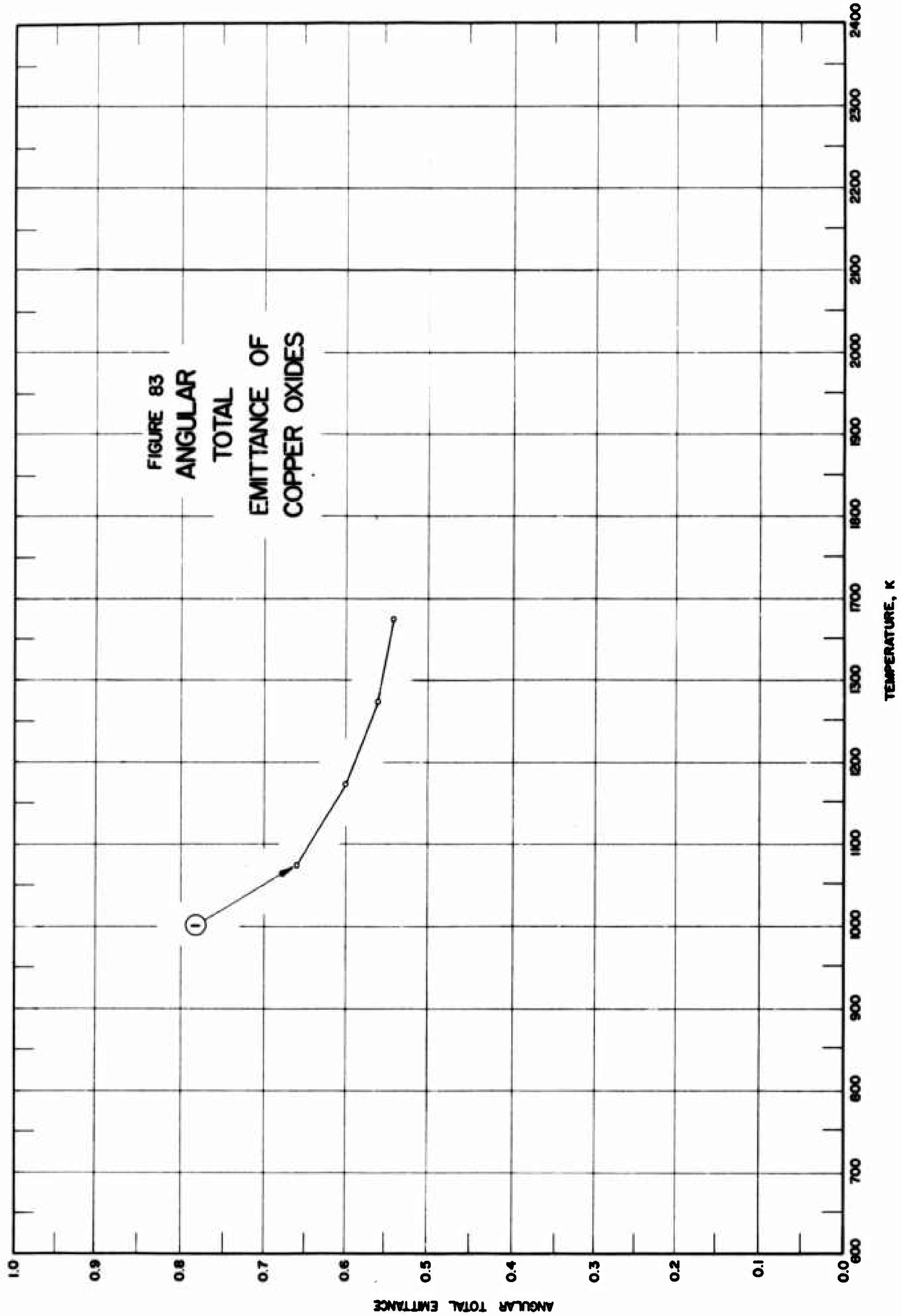


FIGURE 83 ANGULAR TOTAL EMITTANCE OF COPPER OXIDES

SPECIFICATION TABLE NO. 83 ANGULAR TOTAL EMITTANCE OF COPPER OXIDES

Curve No.	Ref. No.	Year	Temperature Range, K	Geometry θ'	Reported Error, %	Composition (weight percent), Specifications and Remarks
1	201	1909	1073-1373	25-30°		Cu_2O; measured in air.

DATA TABLE NO. 83 ANGULAR TOTAL EMITTANCE OF COPPER OXIDES

[Temperature, T, K; Emittance, ϵ]

T	ϵ
CURVE 1	
1073	0.66
1173	0.60
1273	0.56
1373	0.54

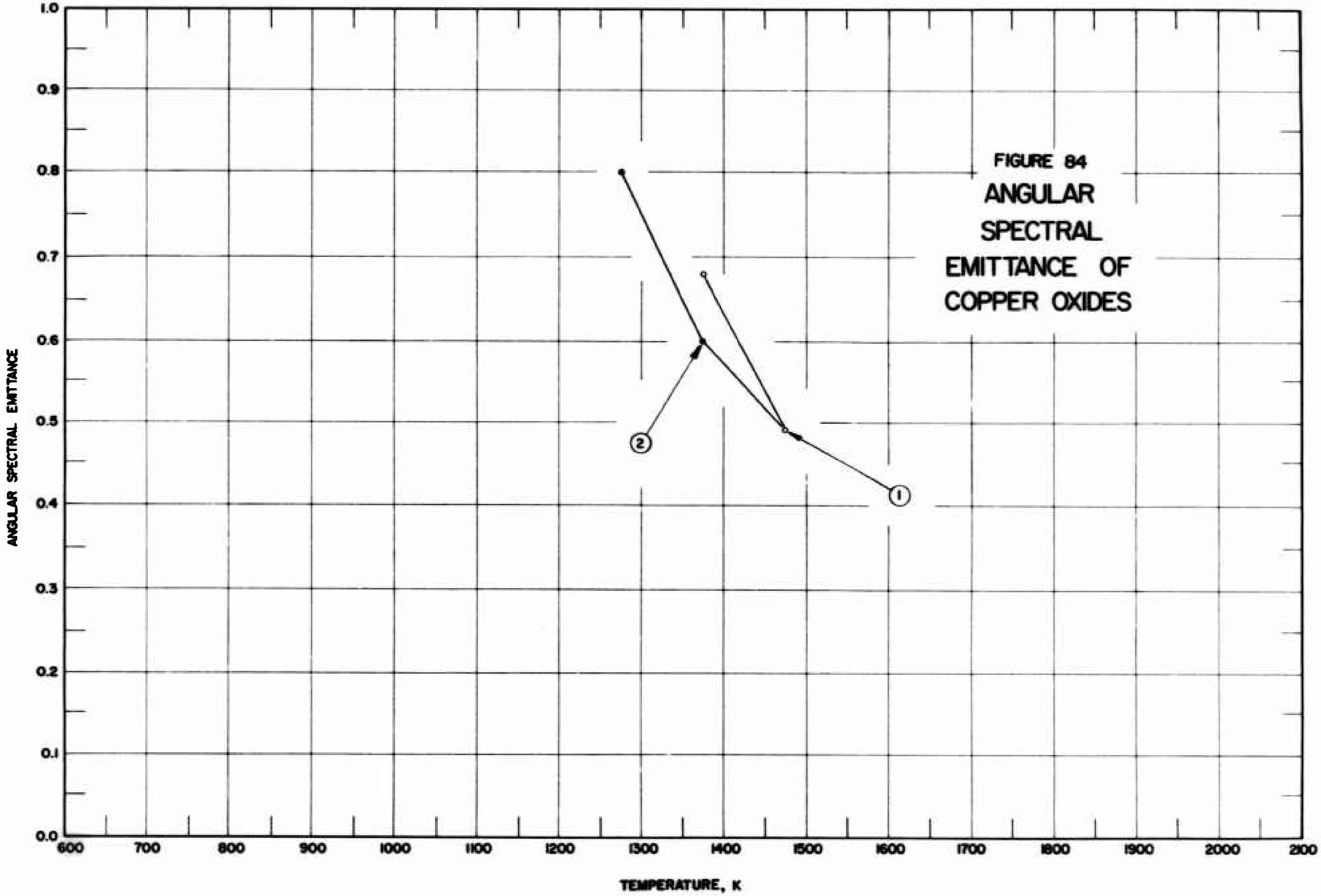


FIGURE 84
ANGULAR SPECTRAL EMITTANCE OF COPPER OXIDES

SPECIFICATION TABLE NO. 84 ANGULAR SPECTRAL EMITTANCE OF COPPER OXIDES

Curve No.	Ref. No.	Year	Wavelength μm	Temperature Range, K	Geometry θ'	Reported Error, %	Composition (weight percent), Specifications, and Remarks
1	201	1909	0.55	1373-1473	25-30°		Cu_2O; measured in air.
2	201	1909	0.65	1273-1473	25-30°		Above specimen and conditions.

DATA TABLE NO. 84 ANGULAR SPECTRAL EMITTANCE OF COPPER OXIDES

[Temperature, T, K; Emittance, ϵ; Wavelength, λ, μm]

T	ϵ
CURVE 1	
$\lambda = 0.55$	
1373	0.68
1473	0.49
CURVE 2	
$\lambda = 0.65$	
1273	0.80
1373	0.60
1473	0.49

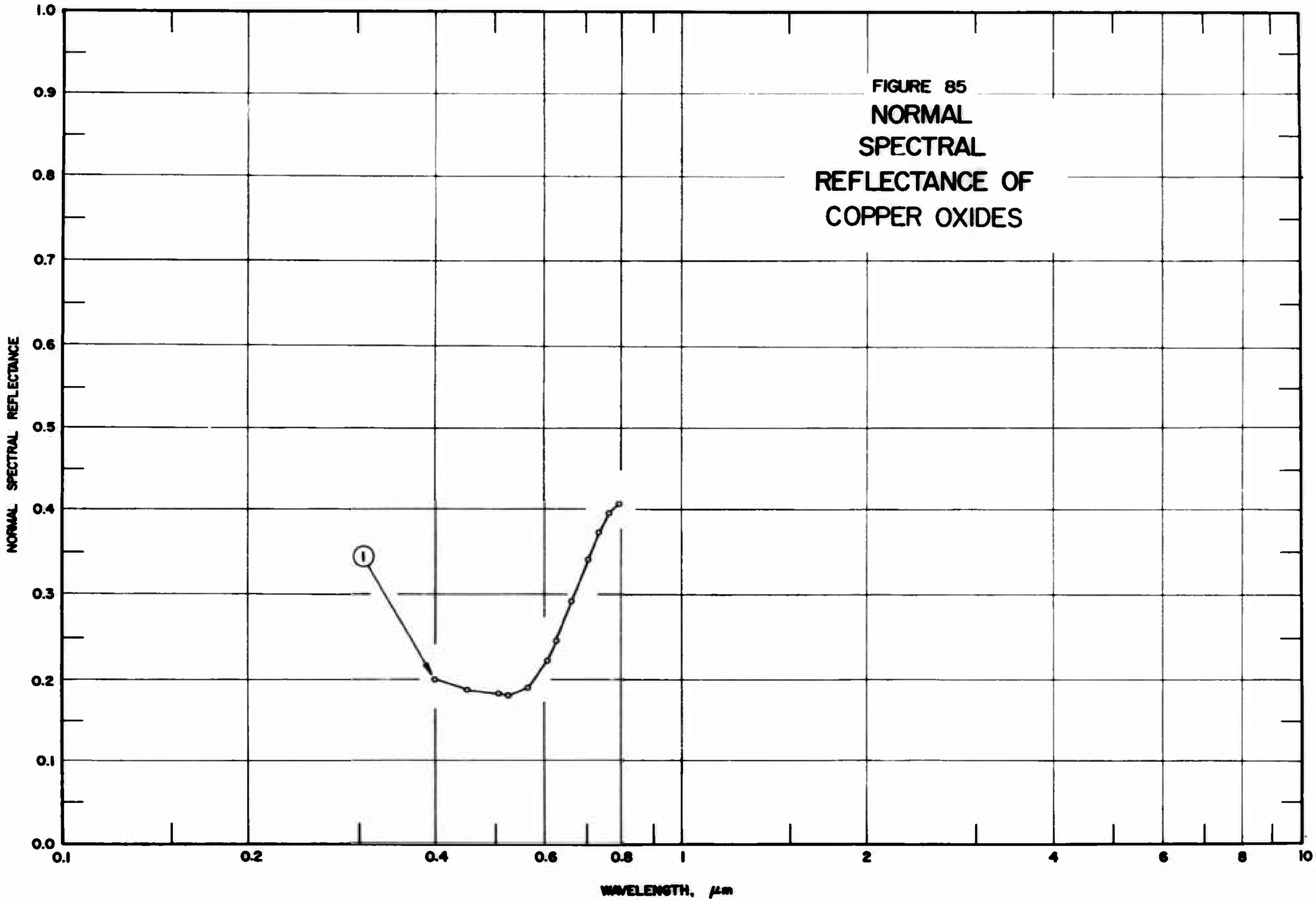


FIGURE 85
NORMAL SPECTRAL REFLECTANCE OF COPPER OXIDES

SPECIFICATION TABLE NO. 85 NORMAL SPECTRAL REFLECTANCE OF COPPER OXIDES

Curve No.	Ref. No.	Year	Temperature K	Wavelength Range, μm	Geometry θ	Geometry θ'	Geometry ω'	Reported Error, %	Composition (weight percent), Specifications, and Remarks
1	202	1966	298	0.400–0.792	0°	0°			CuO; film; thickness 0.088 μm; measured in air; data extracted from smooth curve.

DATA TABLE NO. 85 NORMAL SPECTRAL REFLECTANCE OF COPPER OXIDES

[Wavelength, λ, μm; Reflectance, ρ; Temperature, T, K]

λ	ρ
CURVE 1 T = 298	
0.400	0.200
0.450	0.189
0.509	0.182
0.525	0.180
0.562	0.190
0.609	0.222
0.628	0.246
0.662	0.292
0.704	0.340
0.736	0.371
0.768	0.397
0.792	0.407

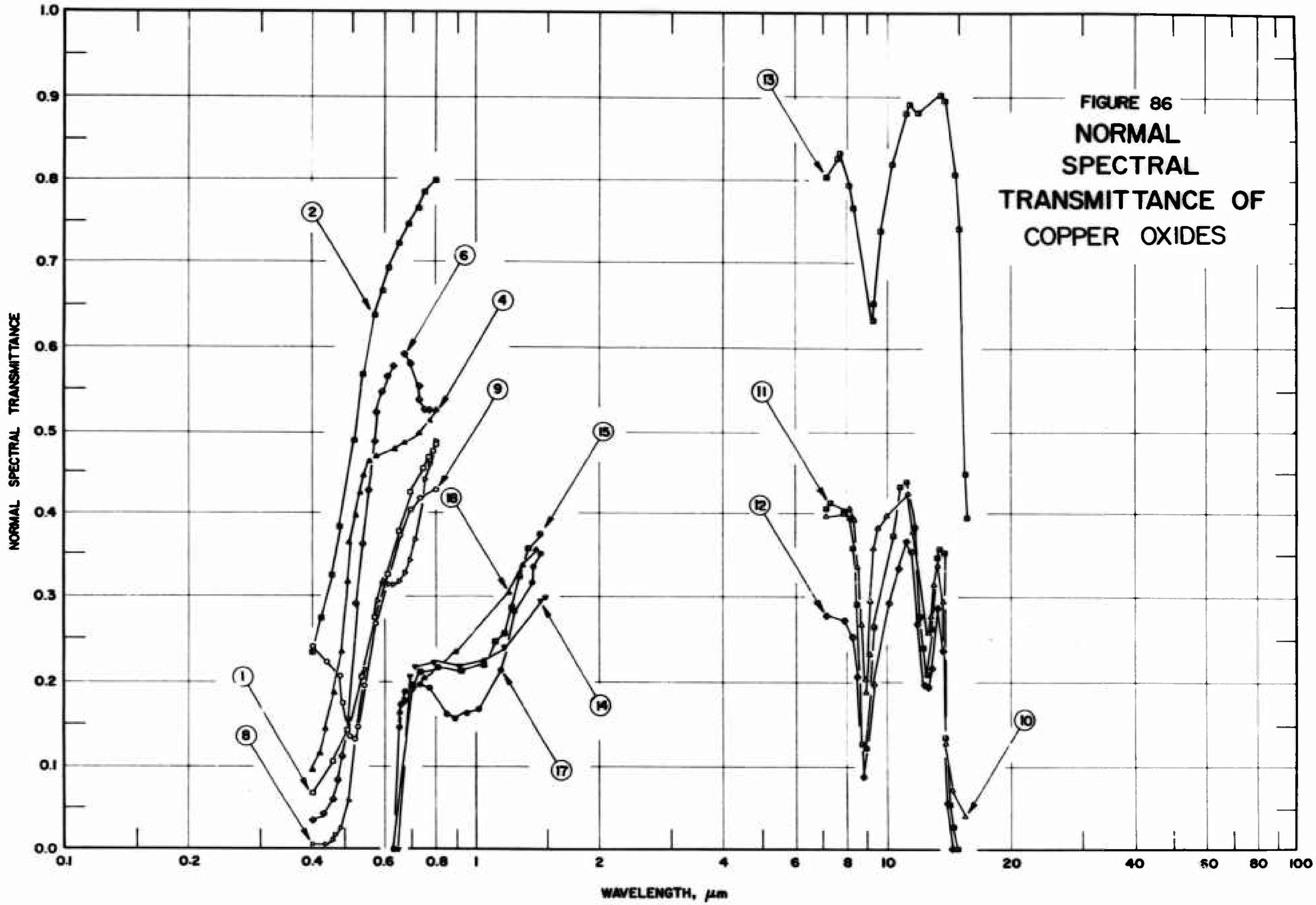


FIGURE 86 NORMAL SPECTRAL TRANSMITTANCE OF COPPER OXIDES

SPECIFICATION TABLE NO. 86 NORMAL SPECTRAL TRANSMITTANCE OF COPPER OXIDES

Curve No.	Ref. No.	Year	Temperature K	Wavelength Range, μm	Geometry θ	θ'	ω'	Reported Error, %	Composition (weight percent), Specifications, and Remarks
1	202	1966	298	0.400-0.791	0°	0°			CuO; film thickness 0.08 μm; measured in air; data extracted from smooth curve.
2	202	1966	298	0.400-0.800	0°	0°			$CuO_{0.67}$, a stable phase gross defect structure formed from oxidation of Cu film; film thicknes 0.0392 μm; measured in air; data extracted from smooth curve.
3*	202	1966	298	0.400-0.800	0°	0°			Similar to the above specimen and conditions except film thickness 0.0755 μm.
4	202	1966	298	0.400-0.800	0°	0°			Similar to the above specimen and conditions except film thickness 0.088 μm.
5*	202	1966	298	0.400-0.800	0°	0°			Similar to the above specimen and conditions except film thickness 0.11 μm.
6	202	1966	298	0.400-0.800	0°	0°			Similar to the above specimen and conditions except film thickness 0.1445 μm.
7*	202	1966	298	0.400-0.800	0°	0°			Similar to the above specimen and conditions except film thickness 0.194 μm.
8	202	1966	298	0.400-0.800	0°	0°			Similar to the above specimen and conditions except film thickness 0.2335 μm.
9	202	1966	298	0.400-0.800	0°	0°			Similar to the above specimen and conditions except film thickness 0.11 μm.
10	203	1967	298	7.14-15.4	~0°	~0°			Cu_2O; p-type single crystal; 0.049 mm thick; polished and chemically etched; conductivity 6.8 x 10^{-4} ohm^{-1} cm^{-1}; carrier concentration 4.1 x 10^{13} cm^{-3}; mobility 103 cm^2 $volt^{-1}$ sec^{-1}; data extracted from smooth curve; [Authors' designation: Specimen HF-40].
11	203	1967	298	7.14-14.8	~0°	~0°			Cu_2O, 0.5 Si; p-type single crystal; 0.047 mm thick; polished and chemically etched; conductivity 3.8 x 10^{-4} ohm^{-1} cm^{-1}; carrier concentration 0.6 x 10^{13} cm^{-3}; mobility 42 cm^2 v^{-1} sec^{-1}; data extracted from smooth curve; [Authors' designation: Specimen HF-43].
12	203	1967	298	7.14-14.3	~0°	~0°			Cu_2O, 3.0 Si; p-type single crystal; 0.055 mm thick; polished and chemically etched; conductivity 1.0 x 10^{-4} ohm^{-1} cm^{-1}; carrier concentration 0.1 x 10^{13} cm^{-3}; mobility 57 cm^2 v^{-1} sec^{-1}; data extracted from smooth curve; [Authors' designation: Specimen HF-44].
13	203	1967	298	7.14-15.4	~0°	~0°			Cu_2O; Si-doped powder dispersed in KBr-pellet (prepared at the conditions of 170 kg cm^{-2}); data extracted from smooth curve.
14	204	1967	298	0.641-1.48	0°	0°			Cu_2O; single crystal; grown from 99.999 pure Cu; annealed at 1233 K in oxygen at low pressure (0.5 mm Hg); highly polished surface obtained by etching with a warm (313 K) concentrated (12%) solution of sodium cyanide; data extracted from smooth curve.
15	204	1967	298	0.630-1.430	0°	0°			Similar to the above specimen and conditions except annealed under 0.1 mm Hg pressure.
16*	204	1967	298	0.626-1.578	0°	0°			Similar to the above specimen and conditions except annealed under 0.04 mm Hg pressure.
17	204	1967	298	0.632-1.434	0°	0°			Similar to the above specimen and conditions except annealed under 0.01 mm Hg pressure.
18	204	1967	298	0.640-1.400	0°	0°			Similar to the above specimen and conditions except annealed under 0.002 mm Hg pressure.

* Not shown on plot

DATA TABLE NO. 86 NORMAL SPECTRAL TRANSMITTANCE OF COPPER OXIDES

[Wavelength, λ, μm; Transmittance, τ; Temperature, T, K]

CURVE 1
T = 298

λ	τ
0.400	0.069
0.445	0.105
0.485	0.141
0.500	0.161
0.525	0.205
0.568	0.273
0.607	0.325
0.650	0.378
0.699	0.425
0.741	0.455
0.771	0.467
0.791	0.474

CURVE 2
T = 298

λ	τ
0.400	0.235
0.420	0.273
0.441	0.323
0.464	0.381
0.501	0.488
0.530	0.567
0.569	0.638
0.591	0.666
0.617	0.694
0.656	0.722
0.695	0.747
0.726	0.766
0.759	0.786
0.800	0.800

CURVE 3*
T = 298

λ	τ
0.400	0.140
0.415	0.161
0.433	0.200
0.450	0.247
0.472	0.306
0.486	0.366
0.507	0.400
0.520	0.430
0.540	0.459
0.563	0.482
0.592	0.501

CURVE 3 (cont.)*

λ	τ
0.628	0.522
0.661	0.538
0.704	0.552
0.739	0.562
0.767	0.571
0.800	0.577

CURVE 4
T = 298

λ	τ
0.400	0.095
0.419	0.113
0.436	0.144
0.456	0.185
0.470	0.233
0.485	0.316
0.493	0.363
0.505	0.395
0.520	0.423
0.535	0.447
0.553	0.461
0.574	0.469
0.624	0.476
0.676	0.486
0.723	0.499
0.761	0.513
0.800	0.526

CURVE 5*
T = 298

λ	τ
0.400	0.068
0.422	0.095
0.435	0.120
0.452	0.156
0.461	0.193
0.471	0.222
0.480	0.263
0.488	0.315
0.504	0.396
0.522	0.462
0.542	0.522
0.560	0.557
0.581	0.551
0.602	0.545
0.618	0.540

CURVE 5 (cont.)*

λ	τ
0.642	0.534
0.679	0.528
0.726	0.526
0.800	0.530

CURVE 6
T = 298

λ	τ
0.400	0.034
0.424	0.042
0.446	0.060
0.460	0.082
0.474	0.111
0.489	0.154
0.512	0.290
0.525	0.361
0.544	0.428
0.562	0.486
0.578	0.522
0.593	0.547
0.604	0.564
0.621	0.579
0.638	0.587*
0.671	0.591
0.696	0.580
0.721	0.553
0.735	0.539
0.749	0.529
0.767	0.526
0.800	0.526

CURVE 7*
T = 298

λ	τ
0.400	0.018
0.421	0.018
0.438	0.025
0.449	0.034
0.458	0.046
0.473	0.082
0.489	0.125
0.508	0.215
0.524	0.289
0.549	0.360
0.579	0.428
0.609	0.491

CURVE 7 (cont.)*

λ	τ
0.639	0.544
0.668	0.589
0.694	0.623
0.717	0.646
0.753	0.669
0.764	0.671
0.784	0.668
0.800	0.651

CURVE 8
T = 298

λ	τ
0.400	0.006
0.429	0.006
0.442	0.010
0.455	0.017
0.466	0.025
0.476	0.037*
0.489	0.059
0.539	0.214
0.570	0.294
0.577	0.307*
0.587	0.315
0.599	0.316
0.617	0.313
0.633	0.313
0.651	0.319
0.666	0.327
0.681	0.342
0.702	0.369
0.755	0.440
0.773	0.460
0.800	0.488

CURVE 9
T = 298

λ	τ
0.400	0.240
0.434	0.223
0.461	0.208
0.477	0.173
0.493	0.135
0.504	0.132
0.516	0.147
0.535	0.195
0.569	0.267

CURVE 9 (cont.)

λ	τ
0.605	0.327*
0.646	0.372
0.693	0.401
0.739	0.417
0.800	0.429

CURVE 10
T = 298

λ	τ
7.14	0.398
7.88	0.400
8.15	0.409
8.34	0.392
8.56	0.336
8.68	0.268
8.82	0.202
8.88	0.189
9.03	0.232
9.17	0.297
9.34	0.357
9.54	0.382
9.79	0.385*
10.0	0.397
11.1	0.424
11.5	0.379
12.6	0.258
12.8	0.277
13.0	0.314
13.2	0.337
13.6	0.295
13.9	0.129
14.3	0.071
15.4	0.040

CURVE 11
T = 298

λ	τ
7.14	0.406
7.25	0.412
7.87	0.402
8.09	0.395
8.38	0.357
8.48	0.291
8.77	0.127
8.86	0.123
9.32	0.265

CURVE 11 (cont.)

λ	τ
10.3	0.371
10.8	0.432
11.1	0.439
11.6	0.381
12.0	0.276
12.2	0.240
12.5	0.210
12.9	0.261
13.2	0.347
13.3	0.356
13.6	0.301
13.9	0.134
14.1	0.055
14.4	0.028
14.8	0.000

CURVE 12
T = 298

λ	τ
7.14	0.277
7.96	0.271
8.23	0.253
8.46	0.208
8.80	0.089
8.88	0.089*
9.30	0.197
10.1	0.292
10.7	0.333
11.2	0.367
11.5	0.353
11.9	0.268
12.3	0.199
12.6	0.194
12.9	0.216
13.2	0.286
13.6	0.237
13.8	0.130*
14.0	0.054
14.3	0.000

CURVE 13
T = 298

λ	τ
7.14	0.802
7.60	0.829
7.73	0.833

CURVE 13 (cont.)

λ	τ
8.12	0.795
8.34	0.769
9.21	0.633
9.36	0.651
9.74	0.740
9.75	0.760*
10.2	0.820
10.4	0.836*
11.1	0.881
11.4	0.891
11.9	0.883
13.5	0.901
13.9	0.897
14.6	0.808
15.0	0.741
15.3	0.449
15.4	0.394

CURVE 14
T = 298

λ	τ
0.641	0.000
0.693	0.208
0.717	0.218
0.787	0.222
0.906	0.219
1.05	0.225
1.18	0.240
1.43	0.294
1.48	0.299

CURVE 15
T = 298

λ	τ
0.630	0.000
0.700	0.197
0.738	0.212
0.803	0.217
0.920	0.213
1.05	0.220
1.11	0.248
1.17	0.256
1.21	0.287
1.27	0.323
1.34	0.356
1.43	0.373

CURVE 16*
T = 298

λ	τ
0.626	0.000
0.671	0.174
0.719	0.189
0.810	0.198
0.916	0.200
1.02	0.212
1.17	0.237
1.31	0.300
1.39	0.321
1.57	0.344

CURVE 17
T = 298

λ	τ
0.632	0.000*
0.647	0.146
0.657	0.171
0.677	0.187
0.731	0.196
0.776	0.191
0.844	0.161
0.892	0.156
0.948	0.162
1.01	0.168
1.15	0.213
1.24	0.281
1.31	0.317
1.38	0.335
1.43	0.350

CURVE 18
T = 298

λ	τ
0.640	0.000*
0.655	0.164
0.670	0.178
0.742	0.204
0.892	0.233
1.20	0.305
1.30	0.336
1.40	0.355

* Not shown on plot

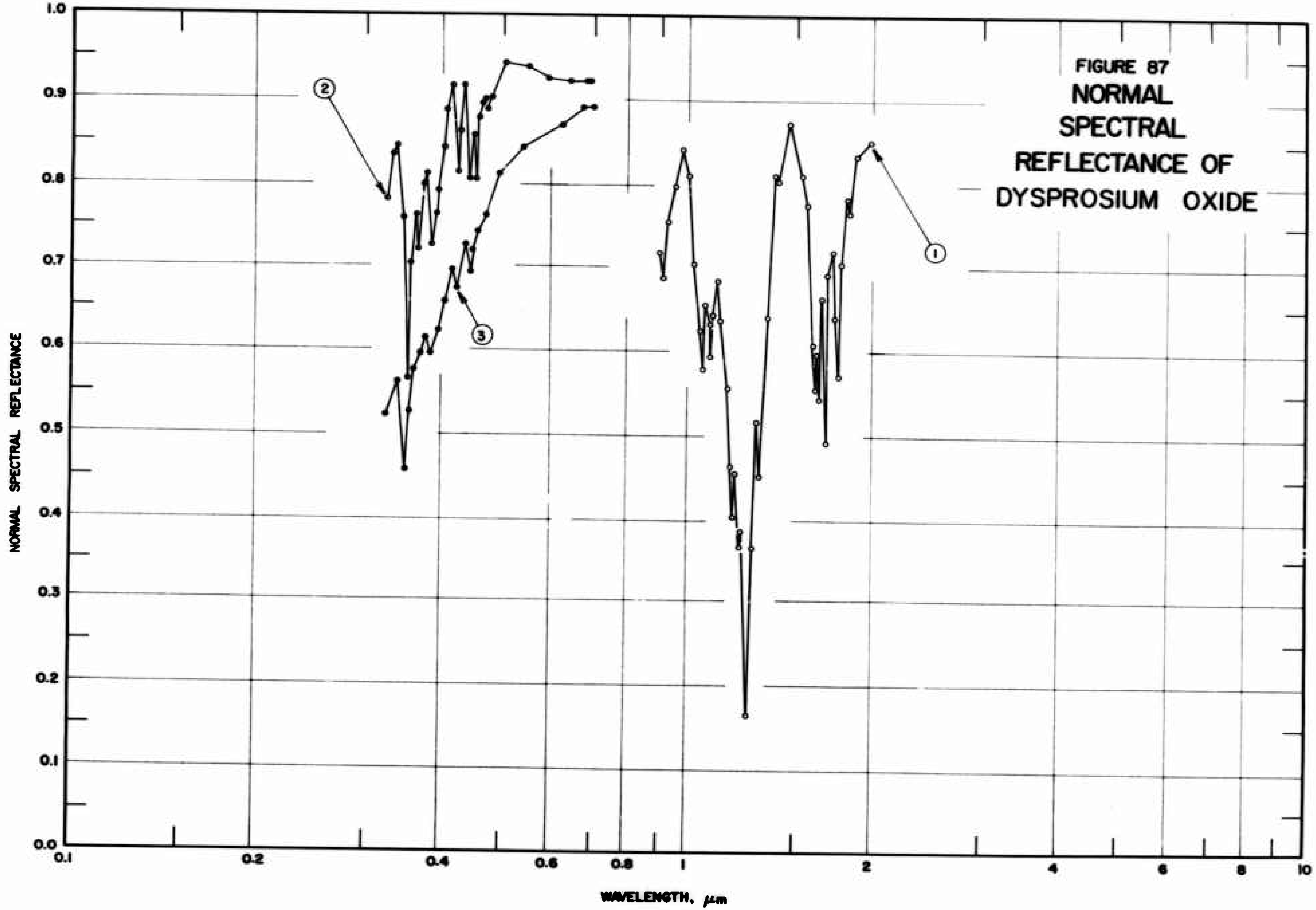


FIGURE 87 NORMAL SPECTRAL REFLECTANCE OF DYSPROSIUM OXIDE

SPECIFICATION TABLE NO. 87 NORMAL SPECTRAL REFLECTANCE OF DYSPROSIUM OXIDE Dy_2O_3

Curve No.	Ref. No.	Year	Temperature	Wavelength Range, μm	Geometry θ θ' ω'	Reported Error, %	Composition (weight percent), Specifications, and Remarks
1	367	1964	~298	0.900-1.99	~0° ~0°		Compacted powder; data extracted from smooth curve.
2	367	1964	~298	0.326-0.696	~0° ~0°		Compacted powder; data extracted from smooth curve.
3	367	1964	~298	0.325-0.700	~0° ~0°		Above specimen and conditions except after exposed in vacuum to 230 ESH of uv radiation at solar factor 8.5.

DATA TABLE NO. 87 NORMAL SPECTRAL REFLECTANCE OF DYSPROSIUM OXIDE Dy_2O_3

[Wavelength, λ, μm; Reflectance, ρ; Temperature, T, K]

λ	ρ	λ	ρ	λ	ρ	λ	ρ	λ	ρ	λ	ρ	λ	ρ	λ	ρ
CURVE 1 T ~ 298		CURVE 1 (cont.)		CURVE 1 (cont.)		CURVE 1 (cont.)		CURVE 2 (cont.)		CURVE 2 (cont.)		CURVE 3 (cont.)		CURVE 3 (cont.)	
		1.181	0.508*	1.611	0.590*	1.812	0.779	0.376	0.804*	0.464	0.898	0.360	0.578	0.498	0.814
0.900	0.719	1.187	0.464	1.610	0.575*	1.818	0.783	0.379	0.815	0.468	0.893*	0.363	0.571*	0.544	0.848
0.911	0.688	1.193	0.404	1.614	0.559	1.832	0.767	0.385	0.727	0.470	0.900	0.366	0.594*	0.613	0.872*
0.917	0.725*	1.196	0.417*	1.619	0.597	1.858	0.821*	0.389	0.747*	0.473	0.890	0.370	0.596	0.268	0.872
0.925	0.757	1.202	0.457	1.622	0.590*	1.882	0.837	0.389	0.759*	0.476	0.892*	0.378	0.614	0.640	0.881*
0.953	0.800	1.211	0.434*	1.626	0.597	1.939	0.848*	0.391	0.764	0.478	0.904*	0.383	0.596	0.687	0.892
0.980	0.843	1.219	0.423*	1.641	0.543	1.973	0.851*	0.393	0.780*	0.480	0.904	0.392	0.613*	0.700	0.892
1.005	0.812	1.224	0.400*	1.648	0.609*	1.996	0.855	0.393	0.792	0.492	0.940	0.393	0.624*		
1.021	0.772*	1.230	0.369	1.656	0.661			0.396	0.776*	0.494	0.943*	0.396	0.624		
1.039	0.705	1.236	0.387	1.672	0.616*	CURVE 2		0.400	0.841*	0.501	0.945	0.398	0.646*		
1.049	0.681*	1.261	0.163	1.680	0.562*	T ~ 298		0.401	0.845	0.512	0.942*	0.399	0.653*		
1.058	0.625	1.282	0.366	1.684	0.492			0.403	0.842*	0.550	0.940	0.403	0.657		
1.066	0.580	1.297	0.488*	1.686	0.554*	0.326	0.781	0.405	0.868*	0.591	0.929	0.405	0.675*		
1.079	0.654	1.308	0.517	1.690	0.570*	0.332	0.837	0.409	0.890	0.643	0.923	0.413	0.697*		
1.090	0.632	1.319	0.451	1.690	0.637	0.335	0.844*	0.413	0.917*	0.668	0.925*	0.417	0.699		
1.096	0.595	1.324	0.474*	1.695	0.672*	0.339	0.849	0.415	0.917	0.684	0.925	0.423	0.673		
1.106	0.642	1.328	0.515*	1.695	0.685*	0.343	0.843*	0.419	0.903*	0.687	0.924*	0.430	0.717*		
1.110	0.639*	1.355	0.640	1.698	0.691	0.347	0.760	0.425	0.816	0.696	0.923	0.433	0.724*		
1.113	0.661*	1.386	0.792*	1.703	0.688*	0.351	0.568	0.426	0.854*			0.439	0.728		
1.116	0.656*	1.393	0.812	1.710	0.704*	0.356	0.702	0.429	0.864	CURVE 3		0.443	0.720*		
1.123	0.681	1.402	0.806	1.718	0.699*	0.360	0.734*	0.433	0.919	T ~ 298		0.445	0.693		
1.127	0.659*	1.427	0.846*	1.733	0.720	0.362	0.762	0.442	0.902*			0.449	0.720		
1.127	0.646*	1.447	0.966*	1.747	0.640	0.365	0.720	0.446	0.808	0.325	0.524	0.454	0.702*		
1.132	0.639	1.461	0.875	1.761	0.571	0.366	0.778*	0.450	0.861	0.340	0.562	0.456	0.729*		
1.137	0.667*	1.486	0.865*	1.771	0.677*	0.368	0.782*	0.454	0.808	0.344	0.542*	0.459	0.745		
1.149	0.676*	1.543	0.812	1.774	0.700*	0.370	0.775*	0.456	0.813*	0.350	0.459	0.462	0.751*		
1.161	0.658*	1.568	0.777	1.779	0.703	0.372	0.795*	0.459	0.880	0.351	0.482*	0.467	0.754*		
1.167	0.646*	1.594	0.693*	1.788	0.693*	0.373	0.800	0.460	0.876*	0.353	0.488*	0.471	0.762		
1.176	0.557	1.606	0.609	1.803	0.747*	0.374	0.813*	0.462	0.895*	0.354	0.528	0.472	0.755*		
										0.356	0.544*	0.478	0.772*		

*Not shown on plot

SPECIFICATION TABLE NO. 88 NORMAL SOLAR ABSORPTANCE OF DYSPROSIUM OXIDE Dy_2O_3

Curve No.	Ref. No.	Year	Temperature Range, K	Geometry θ	Reported Error, %	Composition (weight percent), Specifications and Remarks
1*	367	1964	~298	~0°		Compacted powder; measured in vacuum ($<10^{-6}$ mm Hg); calculated from spectral reflectance data; [Authors' designation: Sample No. 7031].
2*	367	1964	~298	~0°		Above specimen and conditions except exposed in vacuum to 230 ESH of uv irradiation.

DATA TABLE NO. 88 NORMAL SOLAR ABSORPTANCE OF DYSPROSIUM OXIDE Dy_2O_3

[Temperature, T, K; Absorptance, α]

T	α
CURVE 1*	
298	0.206
CURVE 2*	
298	0.249

*No plot given

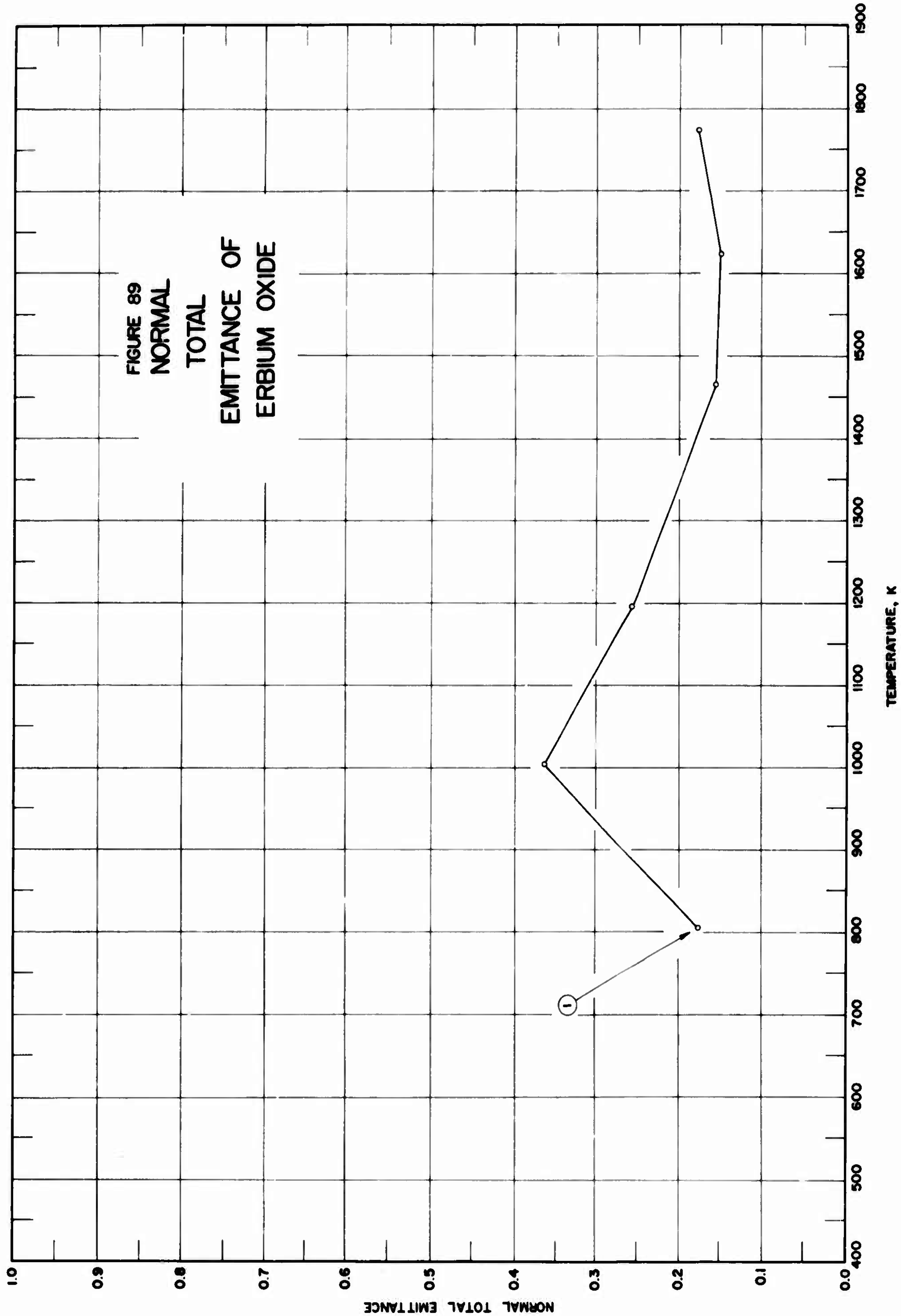


FIGURE 89 NORMAL TOTAL EMITTANCE OF ERBIUM OXIDE

SPECIFICATION TABLE NO. 89 NORMAL TOTAL EMITTANCE OF ERBIUM OXIDE Er_2O_3

Curve No.	Ref. No.	Year	Temperature Range, K	Geometry θ'	Reported Error, %	Composition (weight percent), Specifications and Remarks
1	184	1960	806-1773	0°	~10	99.9 pure powder; compacted at 3500 psi; fired at 2123 K for 1 hr and cooled at the rate of 673 K per hr; density 7.35 g cm^{-3}; sample ground to size and ultrasonically cleaned; surface polished with 1-5 μm diamond polishing compound until normally mat surface began to reflect light, then cleaned and polished again with cloth charged with a paste of cerium oxide and kerosene; measured in vacuum.

DATA TABLE NO. 89 NORMAL TOTAL EMITTANCE OF ERBIUM OXIDE Er_2O_3

[Temperature, T, K; Emittance, ϵ]

T	ϵ
CURVE 1	
806	0.177
1002	0.369
1198	0.259
1465	0.156
1622	0.150
1773	0.178

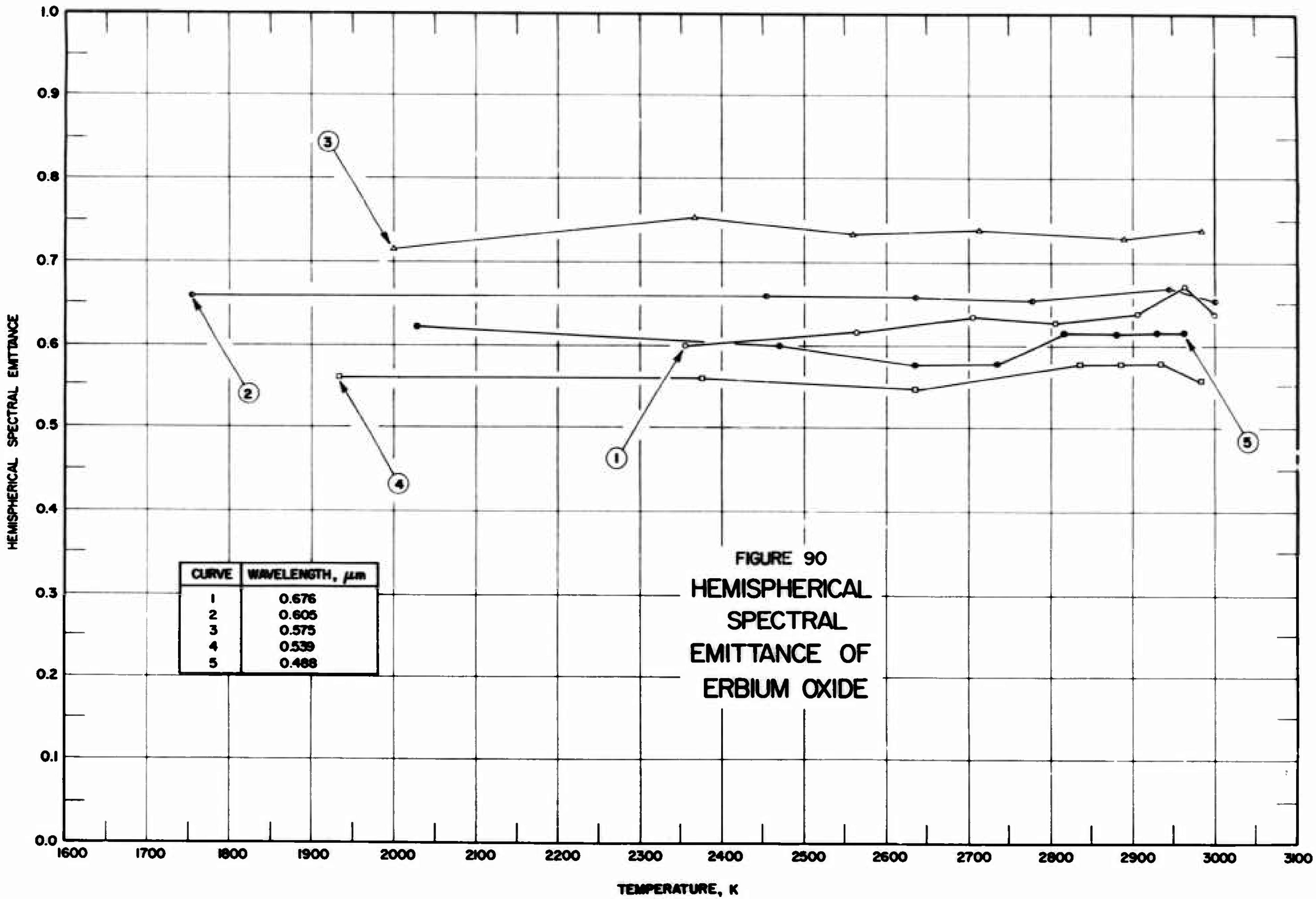


FIGURE 90
HEMISPHERICAL SPECTRAL EMITTANCE OF ERBIUM OXIDE

SPECIFICATION TABLE NO. 90 HEMISPHERICAL SPECTRAL EMITTANCE OF ERBIUM OXIDE Er_2O_3

Curve No.	Ref. No.	Year	Wavelength µm	Temperature Range, K	Reported Error, %	Composition (weight percent), Specifications and Remarks
1	334	1968	0.676	2354-3000		Powder; dry pressed at 3000 psi with subsequent hydrostatic pressing at 50 000 psi; specimen fused by heating a few min; calculated from spectral reflectance data.
2	334	1968	0 605	1753-3000		Above specimen and conditions.
3	334	1968	0.575	2000-2984		Above specimen and conditions.
4	334	1968	0.539	1931-2982		Above specimen and conditions.
5	334	1968	0.488	2028-2961		Above specimen and conditions.

DATA TABLE NO. 90 HEMISPHERICAL SPECTRAL EMITTANCE OF ERBIUM OXIDE Er_2O_3

[Temperature, T, K; Emittance, ϵ; Wavelength, λ, µm]

T	ϵ	T	ϵ	T	ϵ
CURVE 1 $\lambda = 0.676$		CURVE 3 $\lambda = 0.575$		CURVE 5 $\lambda = 0.488$	
2354	0.600	2000	0.714	2028	0.621
2564	0.617	2367	0.757	2470	0.600
2704	0.632	2560	0.732	2635	0.576
2803	0.629	2712	0.738	2735	0.578
2905	0.639	2890	0.729	2817	0.616
2961	0.670	2984	0.739	2880	0.615
3000	0.638			2930	0.617
		CURVE 4 $\lambda = 0.539$		2961	0.617
CURVE 2 $\lambda = 0.605$					
		1931	0.560		
1753	0.660	2378	0.560		
2454	0.660	2636	0.545		
2638	0.659	2839	0.578		
2779	0.652	2882	0.579		
2945	0.669	2935	0.578		
3000	0.651	2982	0.558		

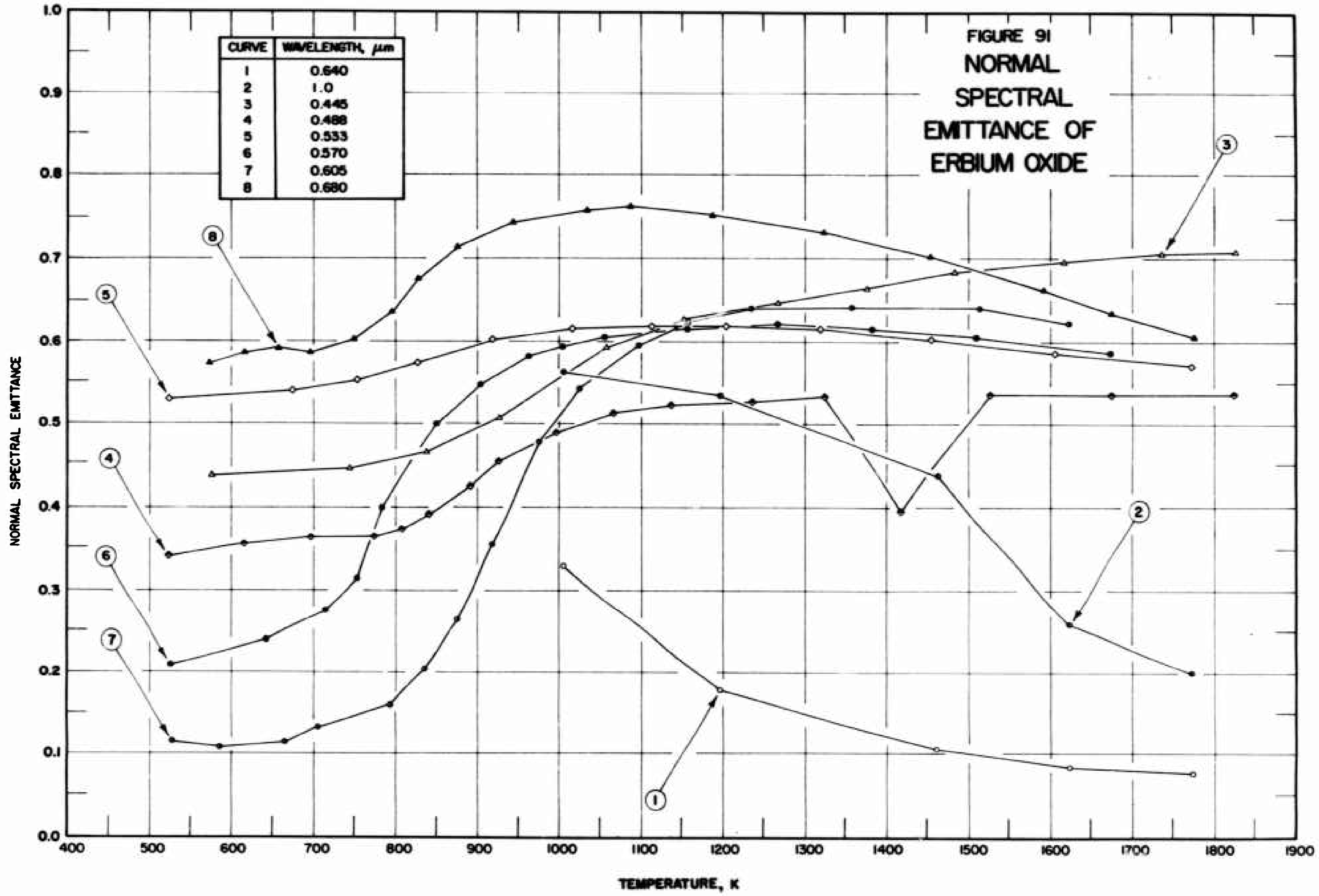


FIGURE 91
NORMAL
SPECTRAL
EMITTANCE OF
ERBIUM OXIDE
CURVE | WAVELENGTH, μm
1 | 0.640
2 | 1.0
3 | 0.445
4 | 0.488
5 | 0.533
6 | 0.570
7 | 0.605
8 | 0.680
NORMAL SPECTRAL EMITTANCE
TEMPERATURE, K
0.0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
1.0
400
500
600
700
800
900
1000
1100
1200
1300
1400
1500
1600
1700
1800
1900

SPECIFICATION TABLE NO. 91 NORMAL SPECTRAL EMITTANCE OF ERBIUM OXIDE Er_2O_3

Curve No.	Ref. No.	Year	Wavelength μm	Temperature Range, K	Geometry θ'	Reported Error, %	Composition (weight percent), Specifications, and Remarks
1	184	1960	0.640	1005-1773	0°	~10	99.9 pure powder; compacted at 3500 psi; fired at 2123 K for 1 hr and cooled at the rate of 673 K per hr; density 7.35 g cm^{-3}; sample ground to size and ultrasonically cleaned; surface polished with 1-5 μm diamond polishing compound until normally mat surface began to reflect light, then cleaned and polished again with cloth charged with a paste of cerium oxide and kerosene; measured in vacuum.
2	184	1960	1.0	1005-1773	0°	~10	Above specimen and conditions.
3	205	1963	0.445	577-1828	~0°		Powder; dry pressed at 75 000 psi; fired at 1773 K for 24 hrs, then ground; calculated from reflectance data; data extracted from smooth curve.
4	205	1963	0.488	523-1822	~0°		Above specimen and conditions.
5	205	1963	0.533	523-1773	~0°		Above specimen and conditions.
6	205	1963	0.570	528-1673	~0°		Above specimen and conditions.
7	205	1963	0.605	528-1621	~0°		Above specimen and conditions.
8	205	1963	0.680	573-1771	~0°		Above specimen and conditions.

DATA TABLE NO. 91 NORMAL SPECTRAL EMITTANCE OF ERBIUM OXIDE Er_2O_3

[Temperature, T, K; Emittance, ε; Wavelength, λ, μm]

T	ε	T	ε	T	ε	T	ε	T	ε	T	ε	T	ε
CURVE 1		CURVE 3		CURVE 4 (cont.)		CURVE 5		CURVE 6 (cont.)		CURVE 7 (cont.)		CURVE 8	
λ = 0.640		λ = 0.445		616	0.355	λ = 0.533		715	0.275	664	0.113	λ = 0.680	
1005	0.329	577	0.439	697	0.361	523	0.530	752	0.313	704	0.131	573	0.572
1199	0.176	743	0.445	771	0.363	675	0.540	784	0.400	792	0.160	616	0.587
1460	0.103	838	0.464	808	0.372	753	0.551	850	0.500	832	0.202	658	0.591
1622	0.081	927	0.507	840	0.391	826	0.575	904	0.549	874	0.26[illegible]	696	0.588
1773	0.075	1004	0.561*	890	0.424	918	0.602	962	0.581	918	0.353	750	0.602
CURVE 2		1058	0.594	927	0.452	1014	0.616	1002	0.595	975	0.477	795	0.637
λ = 1		1151	0.627	997	0.489	1111	0.620	1055	0.606	1023	0.541	827	0.676
1005	0.562	1267	0.649	1066	0.513	1203	0.620	1158	0.619	1098	0.599	875	0.715
1199	0.534	1374	0.666	1138	0.523	1320	0.616	1269	0.621	1159	0.625	944	0.744
1462	0.439	1483	0.683	1239	0.528	1455	0.604	1383	0.618	1233	0.641	1035	0.760
1622	0.259	1619	0.699	1324	0.531	1606	0.589	1510	0.607	1359	0.642	1089	0.764
1773	0.200	1737	0.709	1419	0.396	1773	0.570	1673	0.589	1511	0.642	1189	0.754
		1828	0.710	1527	0.535	CURVE 6		CURVE 7		1621	0.623	1322	0.732
		CURVE 4		1675	0.535	λ = 0.570		λ = 0.605				1454	0.701
		λ = 0.488		1822	0.535	528	0.210	528	0.115			1592	0.663
		523	0.340			641	0.240	585	0.108			1675	0.638
												1777	0.607

*Not shown on plot

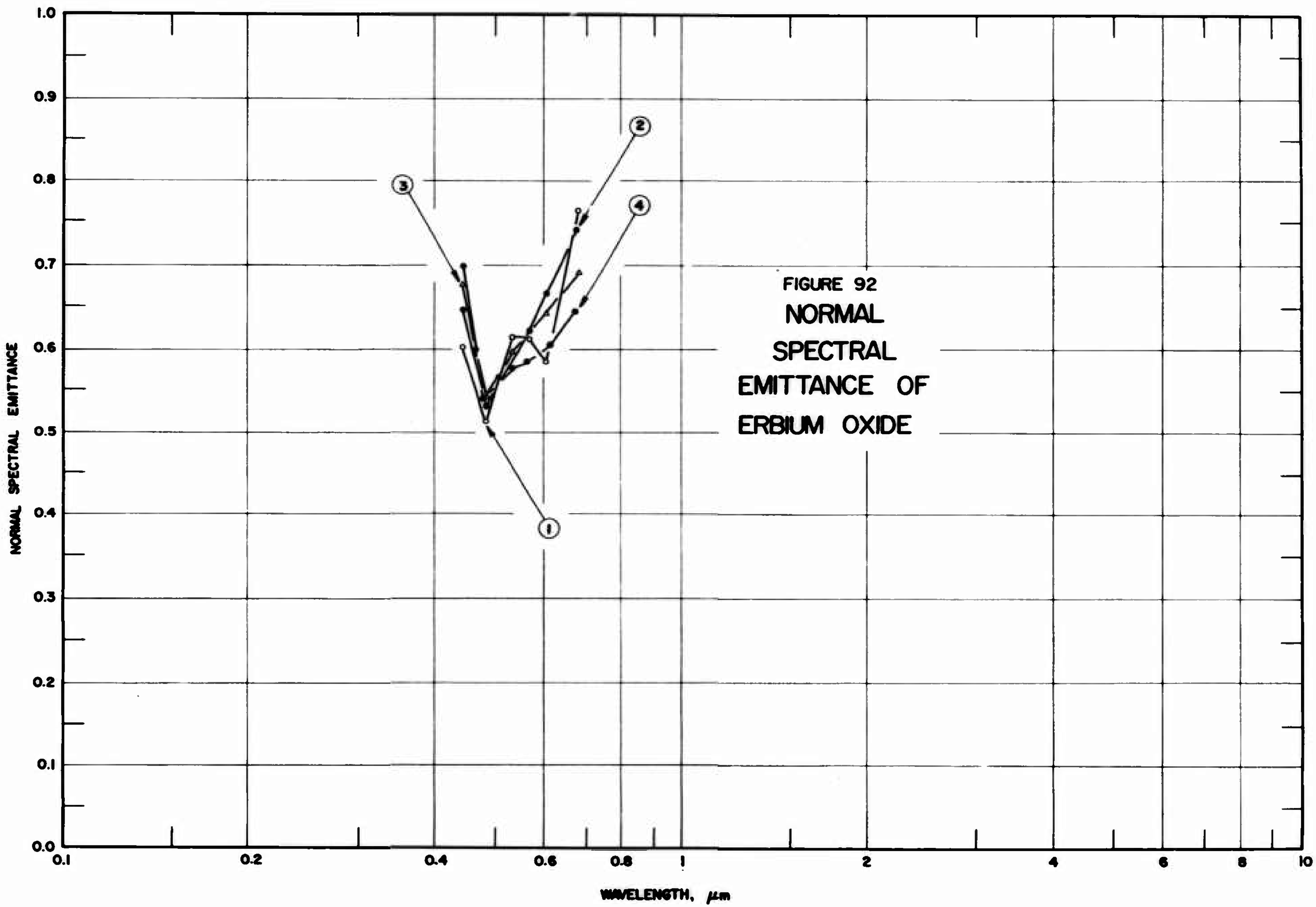


FIGURE 92 NORMAL SPECTRAL EMITTANCE OF ERBIUM OXIDE

SPECIFICATION TABLE NO. 92 NORMAL SPECTRAL EMITTANCE OF ERBIUM OXIDE Er_2O_3

Curve No.	Ref. No.	Year	Temperature K	Wavelength Range, μm	Geometry θ'	Reported Error, %	Composition (weight percent), Specifications, and Remarks
1	205	1963	1073	0.445-0.681	~0°		Powder; dry pressed at 75 000 psi; fired at 1773 K for 24 hrs, then ground; calculated from reflectance data.
2	205	1963	1273	0.445-0.680	~0°		Above specimen and conditions.
3	205	1963	1473	0.445-0.681	~0°		Above specimen and conditions.
4	205	1963	1643	0.445-0.679	~0°		Above specimen and conditions.

DATA TABLE NO. 92 NORMAL SPECTRAL EMITTANCE OF ERBIUM OXIDE Er_2O_3

[Wavelength, λ, μm; Emittance, ϵ; Temperature, T, K]

λ	ϵ	λ	ϵ
CURVE 1 T = 1073		CURVE 4 T = 1673	
0.445	0.602	0.445	0.700
0.486	0.515	0.466	0.600
0.533	0.614	0.488	0.540
0.570	0.613	0.535	0.577
0.609	0.586	0.569	0.586
0.681	0.762	0.613	0.606
		0.679	0.646
CURVE 2 T = 1273			
0.445	0.649		
0.486	0.531		
0.534	0.614*		
0.570	0.622		
0.606	0.666		
0.680	0.740		
CURVE 3 T = 1473			
0.445	0.679		
0.488	0.541		
0.535	0.598		
0.570	0.614*		
0.608	0.642		
0.681	0.692		

*Not shown on plot

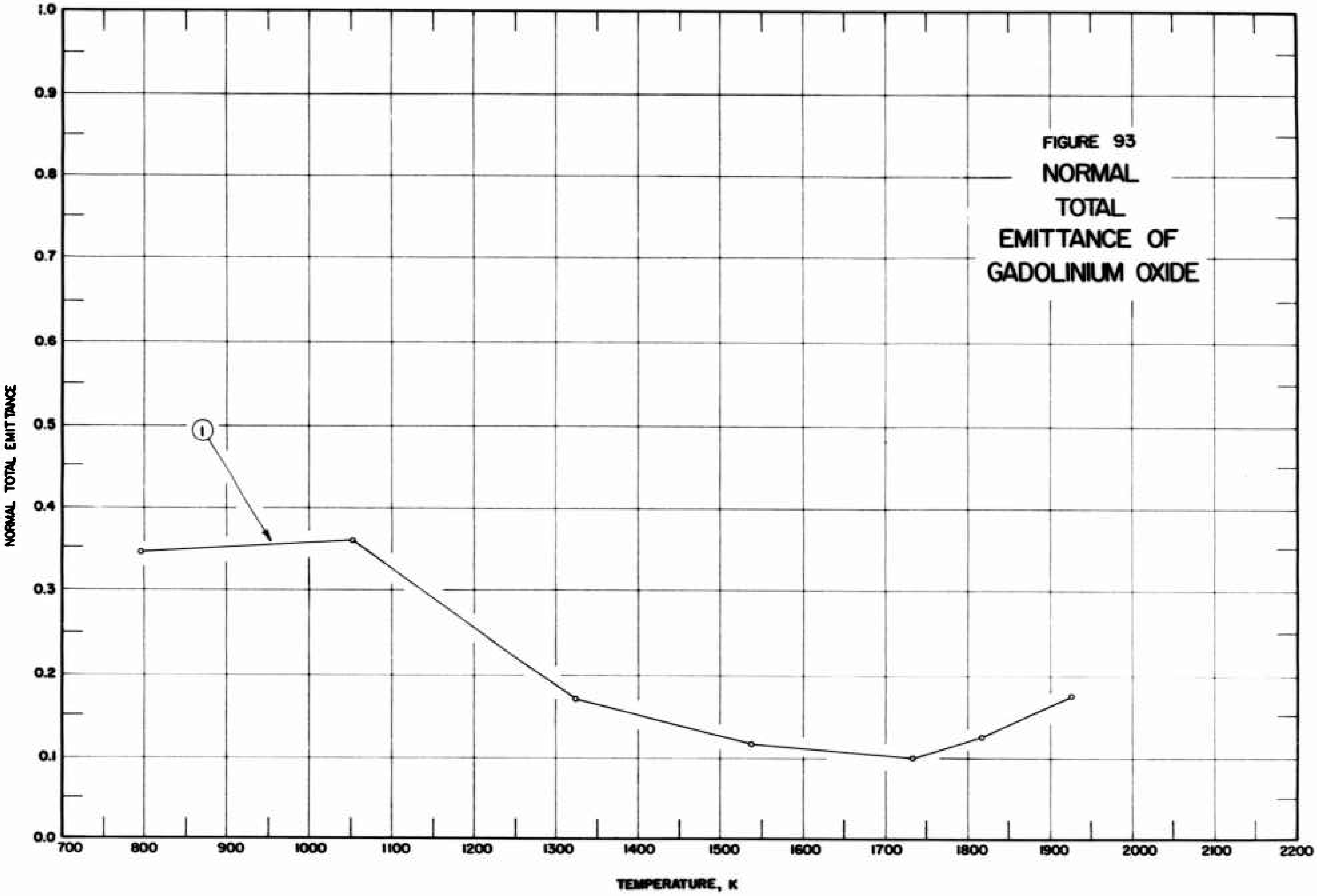


FIGURE 93
NORMAL
TOTAL
EMITTANCE OF
GADOLINIUM OXIDE

SPECIFICATION TABLE NO. 93 NORMAL TOTAL EMITTANCE OF GADOLINIUM OXIDE Gd_2O_3

Curve No.	Ref. No.	Year	Temperature Range, K	Geometry θ'	Reported Error, %	Composition (weight percent), Specifications and Remarks
1	184	1960	798-1928	0°	~10	Powder; 99.9 pure; compacted at 3500 psi, fired at 2123 K for 1 hr and cooled at the rate of 673 K per hr; density 7.08 g cm^{-3}; sample ground to size and ultrasonically cleaned; surface polished with 1-5 μm diamond polishing compound until normally mat surface began to reflect light, then cleaned and polished again with cloth charged with a paste of cerium oxide and kerosene; measured in vacuum.

DATA TABLE NO. 93 NORMAL TOTAL EMITTANCE OF GADOLINIUM OXIDE Gd_2O_3

[Temperature, T, K; Emittance, ϵ]

T	ϵ
CURVE 1	
798	0.345
1052	0.359
1323	0.170
1539	0.119
1732	0.100
1818	0.124
1928	0.173

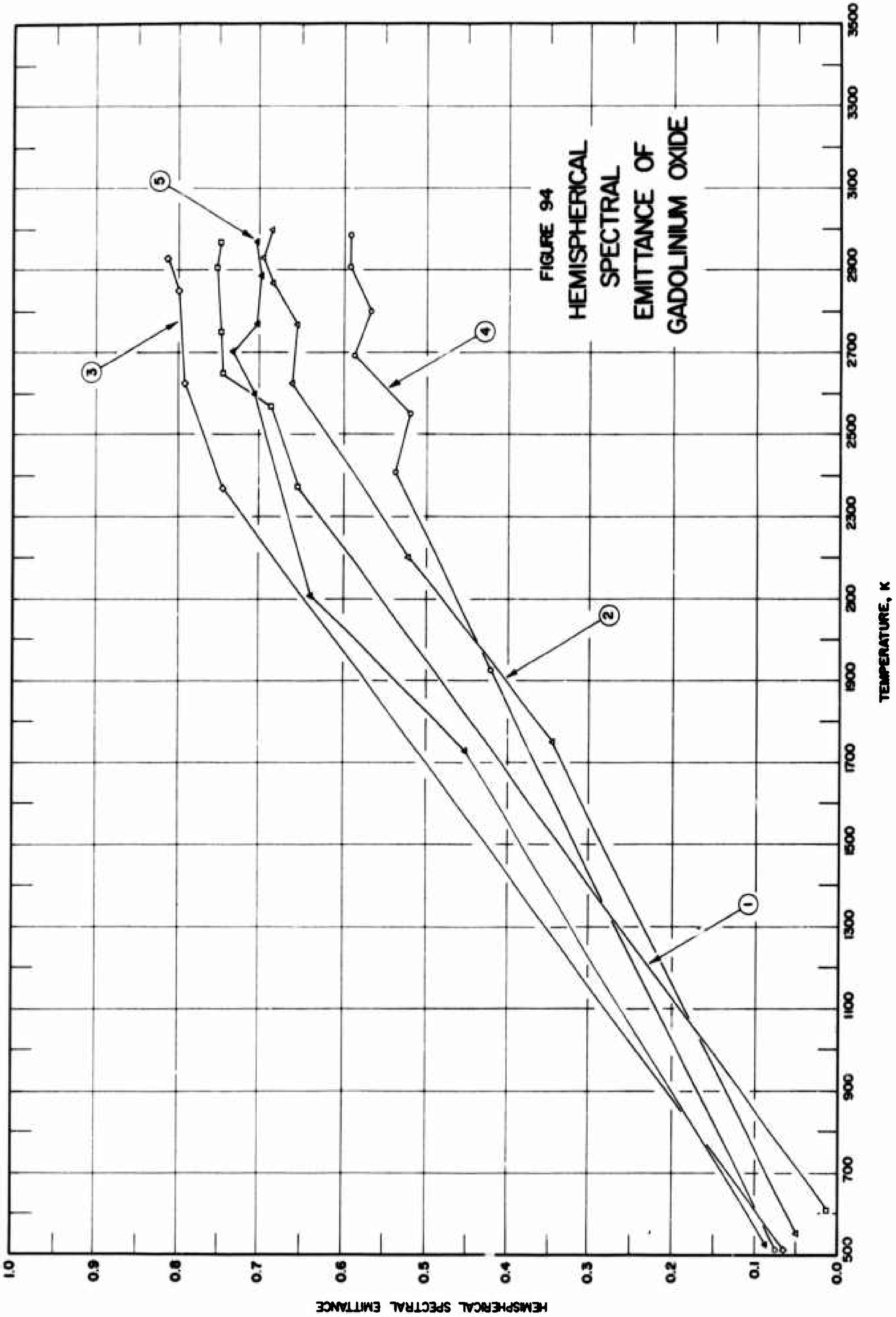


FIGURE 94
HEMISPHERICAL
SPECTRAL
EMITTANCE OF
GADOLINIUM OXIDE

SPECIFICATION TABLE NO. 94 HEMISPHERICAL SPECTRAL EMITTANCE OF GADOLINIUM OXIDE Gd_2O_3

Curve No.	Ref. No.	Year	Wavelength, μm	Temperature Range, K	Reported Error, %	Composition (weight percent), Specifications and Remarks
1	334	1968	0.676	608-2963		Dry pressed at 3000 psi with subsequent hydrostatic pressing at 50 000 psi; specimen fused by heating a few min; MgO reference standard; calculated from reflectance data.
2	334	1968	0.605	558-3000		Above specimen and conditions.
3	334	1968	0.575	518-2931		Above specimen and conditions.
4	334	1968	0.539	514-2981		Above specimen and conditions.
5	334	1968	0.488	523-2975		Above specimen and conditions.

DATA TABLE NO. 94 HEMISPHERICAL SPECTRAL EMITTANCE OF GADOLINIUM OXIDE Gd_2O_3

[Temperature, T, K; Emittance, ϵ; Wavelength, λ, μm]

T	ϵ	T	ϵ	T	ϵ
CURVE 1		**CURVE 3**		**CURVE 5**	
λ = 0.676		λ = 0.575		λ = 0.488	
608	0.012	518	0.064	523	0.089
2379	0.652	2371	0.747	1733	0.452
2563	0.684	2622	0.792	2102	0.640
2650	0.745	2853	0.800	2600	0.704
2749	0.748	2931	0.812	2700	0.733
2903	0.751			2773	0.702
2963	0.749	**CURVE 4**		2886	0.699
		λ = 0.539		2975	0.702
CURVE 2					
λ = 0.605		514	0.072		
		1925	0.421		
558	0.050	2413	0.537		
1746	0.346	2553	0.520		
2200	0.522	2697	0.588		
2622	0.660	2800	0.569		
2764	0.655	2905	0.591		
2874	0.682	2981	0.591		
2934	0.694				
3000	0.685				

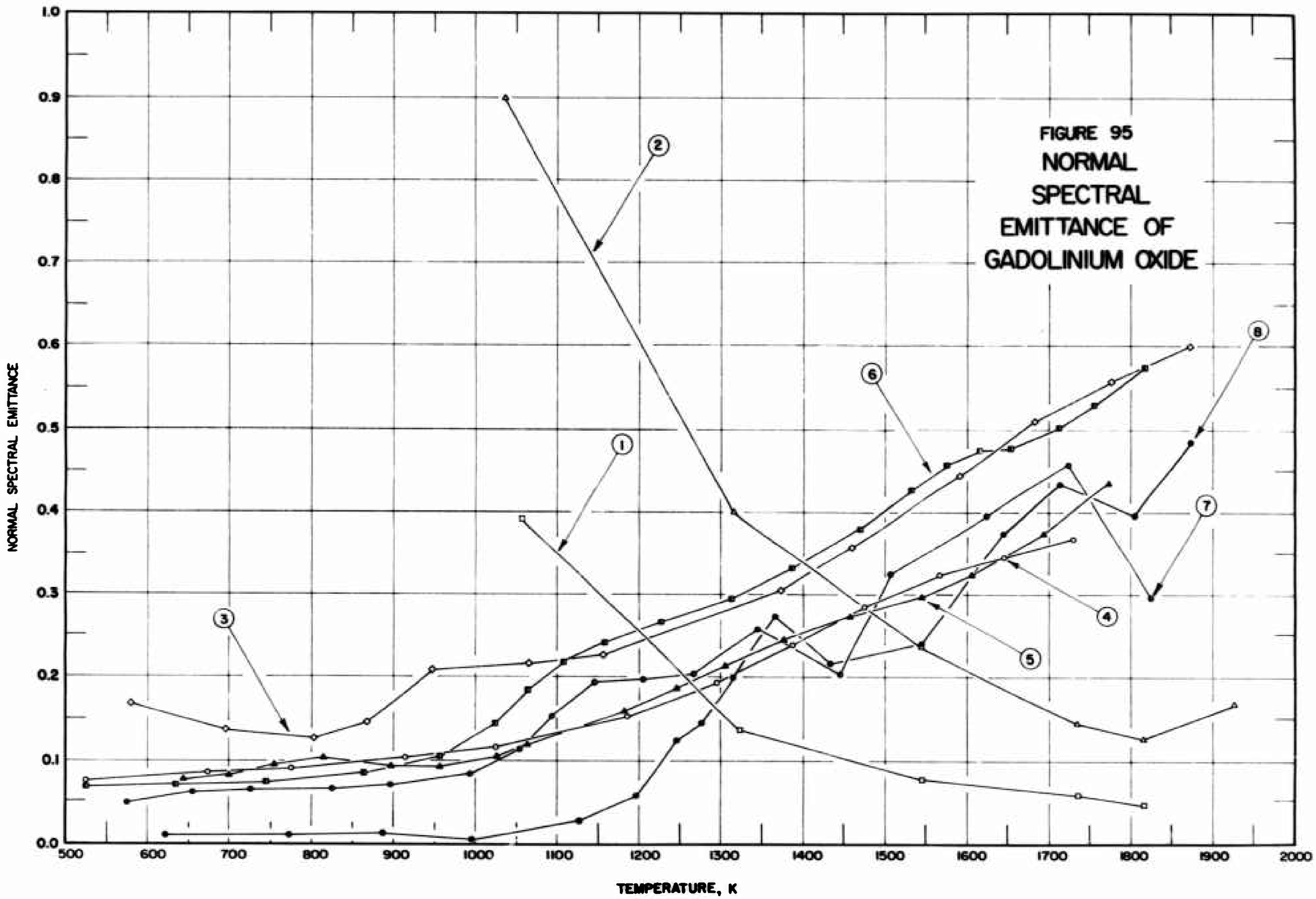


FIGURE 95
NORMAL
SPECTRAL
EMITTANCE OF
GADOLINIUM OXIDE

SPECIFICATION TABLE NO. 95 NORMAL SPECTRAL EMITTANCE OF GADOLINIUM OXIDE Gd_2O_3

Curve No.	Ref. No.	Year	Wavelength, μm	Temperature Range, K	Geometry θ'	Reported Error, %	Composition (weight percent), Specifications, and Remarks
1	184	1960	0.640	1059-1818	0°	~10	Powder; 99.9 pure; compacted at 3500 psi; fired at 2123 K for 1 hr, cooled at the rate of 673 K per hr; density 7.08 g cm^{-3}; sample ground to size and ultrasonically cleaned; surface polished with 1-5 μm diamond polishing compound until normally mat surface began to reflect light, then cleaned and polished again with cloth charged with a paste of cerium oxide and kerosene; measured in vacuum.
2	184	1960	1	1038-1927	0°	~10	Above specimen and conditions.
3	205	1963	0.445	580-1873	~0°		Powder; dry pressed at 75000 psi; fired at 1773 K for 24 hrs, then ground; calculated from reflectance data; data extracted from smooth curve.
4	205	1963	0.488	526-1730	~0°		Above specimen and conditions.
5	205	1963	0.533	525-1776	~0°		Above specimen and conditions.
6	205	1963	0.570	525-1819	~0°		Above specimen and conditions.
7	205	1963	0.605	574-1824	~0°		Above specimen and conditions.
8	205	1963	0.680	621-1872	~0°		Above specimen and conditions.

DATA TABLE NO. 95 NORMAL SPECTRAL EMITTANCE OF GADOLINIUM OXIDE Gd_2O_3

[Temperature, T, K; Emittance, ϵ; Wavelength, λ, μm]

CURVE 1
$\lambda = 0.640$

T	ϵ
1059	0.391
1321	0.137
1543	0.079
1735	0.057
1818	0.045

CURVE 2
$\lambda = 1$

T	ϵ
1038	0.900
1317	0.400
1546	0.234
1734	0.143
1815	0.124
1927	0.169

CURVE 3
$\lambda = 0.445$

T	ϵ
580	0.168
696	0.138
801	0.176
869	0.197
949	0.209
1064	0.214
1167	0.224
1372	0.305
1460	0.359
1591	0.446
1687	0.510
1777	0.559
1873	0.600

CURVE 4
$\lambda = 0.488$

T	ϵ
526	0.076
672	0.084
775	0.090
914	0.101
1026	0.115
1184	0.152
1297	0.193
1389	0.238
1474	0.282
1569	0.321
1644	0.345
1730	0.369

CURVE 5
$\lambda = 0.533$

T	ϵ
525	0.077*
644	0.079
700	0.081
755	0.095
814	0.101
899	0.091
956	0.091
1027	0.103
1062	0.119
1182	0.160
1247	0.187
1308	0.212
1378	0.243
1459	0.271
1546	0.297

CURVE 5 (cont.)

T	ϵ
1606	0.321
1693	0.373
1776	0.437

CURVE 6
$\lambda = 0.570$

T	ϵ
525	0.068
635	0.070
743	0.072
862	0.084
958	0.105
1023	0.144
1063	0.185
1109	0.218

CURVE 6 (cont.)

T	ϵ
1157	0.240
1228	0.264
1311	0.295
1388	0.331
1470	0.381
1531	0.428
1576	0.458
1615	0.475
1653	0.479
1712	0.501
1754	0.530
1819	0.576

CURVE 7
$\lambda = 0.605$

T	ϵ
574	0.049

CURVE 7 (cont.)

T	ϵ
653	0.061
727	0.063
825	0.066
899	0.070
992	0.084
1053	0.111
1094	0.153
1145	0.195
1204	0.199
1266	0.201
1345	0.258
1444	0.201
1507	0.324
1623	0.395
1723	0.458
1824	0.297

CURVE 8
$\lambda = 0.680$

T	ϵ
621	0.010
771	0.010
888	0.011
999	0.005
1128	0.028
1197	0.058
1245	0.122
1275	0.145
1314	0.200
1364	0.271
1432	0.216
1544	0.238
1642	0.375
1712	0.434
1805	0.398
1872	0.485

*Not shown on plot

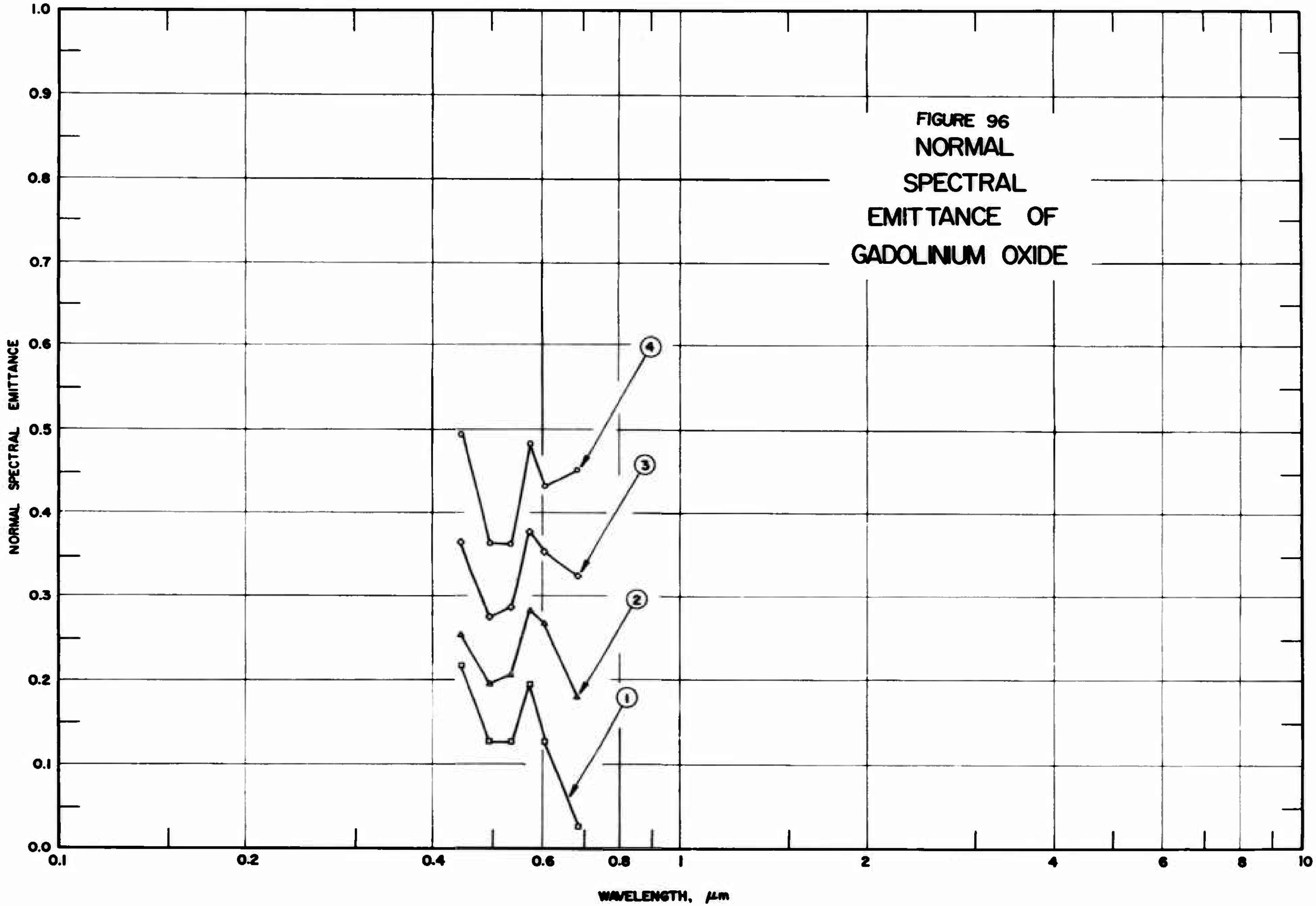


FIGURE 96
NORMAL
SPECTRAL
EMITTANCE OF
GADOLINIUM OXIDE

SPECIFICATION TABLE NO. 96 NORMAL SPECTRAL EMITTANCE OF GADOLINIUM OXIDE Gd_2O_3

Curve No.	Ref. No.	Year	Temperature K	Wavelength Range, μm	Geometry θ'	Reported Error, %	Composition (weight percent), Specifications, and Remarks
1	205	1963	1073	0.445-0.683	~0°		Powder; dry pressed 75000 psi; specimen fired at 1773 K for 24 hrs, then ground; calculated from reflectance data.
2	205	1963	1273	0.445-0.683	~0°		Above specimen and conditions.
3	205	1963	1473	0.445-0.683	~0°		Above specimen and conditions.
4	205	1963	1673	0.445-0.683	~0°		Above specimen and conditions.

DATA TABLE NO. 96 NORMAL SPECTRAL EMITTANCE OF GADOLINIUM OXIDE Gd_2O_3

[Wavelength, λ, μm; Emittance, ϵ; Temperature, T, K]

λ	ϵ	λ	ϵ
CURVE 1 T = 1073		CURVE 3 T = 1473	
0.445	0.217	0.445	0.366
0.496	0.129	0.496	0.276
0.535	0.129	0.535	0.289
0.571	0.193	0.571	0.377
0.607	0.129	0.607	0.354
0.683	0.028	0.683	0.327
CURVE 2 T = 1273		CURVE 4 T = 1673	
0.445	0.254	0.445	0.497
0.496	0.194	0.496	0.363
0.535	0.204	0.535	0.362
0.571	0.281	0.571	0.486
0.607	0.269	0.607	0.433
0.683	0.179	0.683	0.451

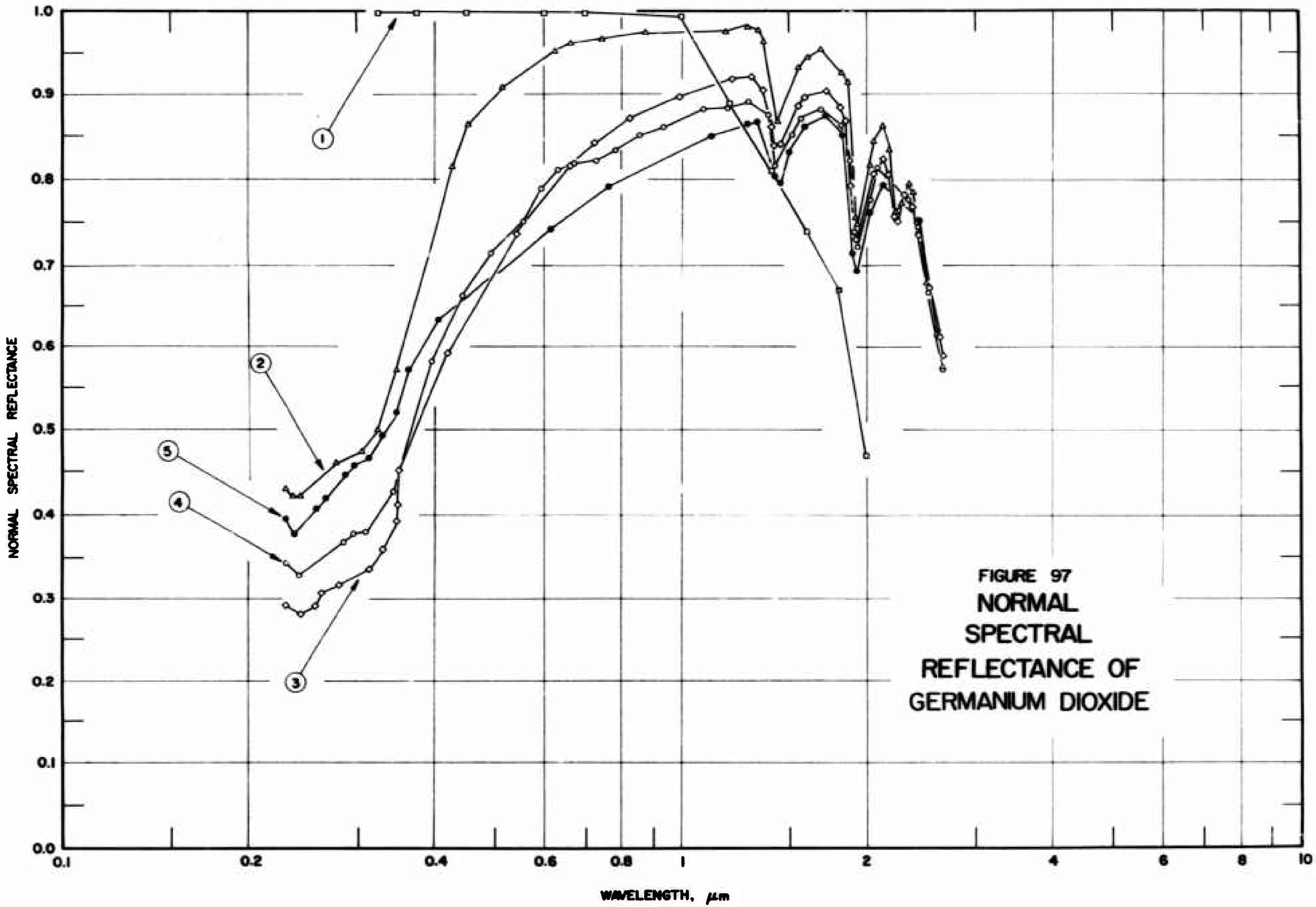


FIGURE 97
NORMAL SPECTRAL REFLECTANCE OF GERMANIUM DIOXIDE

SPECIFICATION TABLE NO. 97 NORMAL SPECTRAL REFLECTANCE OF GERMANIUM DIOXIDE GeO_2

Curve No.	Ref. No.	Year	Temperature K	Wavelength Range, μm	Geometry θ	θ'	ω'	Reported Error, %	Composition (weight percent), Specifications, and Remarks
1	92	1964	298	0.325-2.0	~0°		2π		Compacted powder; MgO reference standard; [Authors' designation: Sample No. 7].
2	362	1964	~298	0.230-2.65	0°		2π		>99.9% pure powder; Varlacoid Chemical Co.; mesh size 325; compacted at 70600 psi with highly polished stainless steel ram; data extracted from smooth curve; MgO reference standard.
3	362	1964	~298	0.230-2.65	0°		2π		Above specimen and conditions except heated 0.5 hr at 673 K.
4	362	1964	~298	0.230-2.65	0°		2π		Above specimen and conditions except heated 1 hr total.
5	362	1964	~298	0.230-2.65	0°		2π		Above specimen and conditions except heated 2 hrs total.

DATA TABLE NO. 97 NORMAL SPECTRAL REFLECTANCE OF GERMANIUM DIOXIDE GeO_2

[Wavelength, λ, μm; Reflectance, ρ; Temperature, T, K]

CURVE 1, T = 298

λ	ρ
0.325	>1.00
0.375	>1.00
0.450	>1.00
0.600	>1.00
0.700	>1.00
1.0	0.98
1.2	0.89
1.4	0.81
1.6	0.74
1.8	0.67
2.0	0.47

CURVE 2, T ~ 298

λ	ρ
0.230	0.431
0.234	0.424*
0.237	0.421
0.241	0.421
0.279	0.460
0.305	0.476
0.313	0.483*
0.324	0.500
0.348	0.573
0.424	0.816
0.452	0.865
0.516	0.910
0.624	0.954
0.663	0.963
0.743	0.970
0.874	0.977
1.17	0.979
1.27	0.985
1.34	0.980
1.36	0.969
1.44	0.870
1.55	0.936
1.60	0.949
1.67	0.957
1.83	0.930
1.85	0.917
1.92	0.758
1.93	0.750
1.96	0.760*
2.03	0.818
2.07	0.847
2.11	0.864
2.13	0.864*
2.18	0.835
2.22	0.763
2.25	0.761*
2.28	0.773
2.34	0.798
2.38	0.787
2.50	0.679*
2.60	0.617
2.65	0.577

CURVE 3, T ~ 298

λ	ρ
0.230	0.293
0.235	0.285*
0.243	0.283
0.257	0.291
0.273	0.309
0.280	0.319
0.311	0.337
0.330	0.360
0.348	0.393
0.349	0.411
0.350	0.451
0.420	0.593
0.541	0.737
0.661	0.817
0.727	0.843
0.823	0.872
0.997	0.899
1.21	0.921
1.30	0.923
1.36	0.906
1.40	0.861
1.43	0.840
1.45	0.841
1.55	0.889
1.59	0.899
1.72	0.903
1.81	0.888
1.85	0.870
1.88	0.794
1.91	0.740
1.93	0.731
1.94	0.731*
2.05	0.807
2.09	0.823*
2.12	0.825
2.16	0.808
2.21	0.759
2.22	0.756*
2.24	0.756
2.30	0.782
2.33	0.785*
2.37	0.770
2.43	0.738
2.51	0.673
2.61	0.612
2.65	0.590

CURVE 4, T ~ 298

λ	ρ
0.230	0.344
0.235	0.333*
0.241	0.330
0.253	0.332*
0.273	0.353*
0.285	0.369
0.297	0.378
0.310	0.380
0.323	0.394*
0.341	0.428
0.349	0.444*
0.398	0.581
0.443	0.662
0.495	0.714
0.558	0.752
0.595	0.790
0.634	0.811
0.673	0.820
0.730	0.823
0.786	0.834
0.856	0.851
0.939	0.861
0.984	0.863*
1.08	0.881
1.19	0.884
1.29	0.891
1.34	0.888*
1.37	0.878
1.41	0.825*
1.43	0.818
1.45	0.818*
1.51	0.852
1.56	0.871
1.62	0.881*
1.67	0.883
1.78	0.875*
1.83	0.865
1.87	0.822
1.90	0.757*
1.92	0.724*
1.94	0.721
2.02	0.777
2.09	0.813
2.13	0.814*
2.21	0.752*
2.24	0.751*
2.31	0.779
2.36	0.774*
2.42	0.748
2.51	0.669
2.60	0.620*
2.65	0.573

CURVE 5, T ~ 298

λ	ρ
0.230	0.395
0.233	0.379*
0.238	0.379
0.247	0.389*
0.259	0.408
0.267	0.420
0.277	0.439*
0.287	0.448
0.299	0.459
0.313	0.467
0.330	0.492
0.339	0.507*
0.347	0.520
0.350	0.538*
0.361	0.572
0.408	0.633
0.614	0.743
0.763	0.793
1.12	0.851
1.27	0.866
1.33	0.868
1.35	0.861*
1.41	0.803
1.45	0.799
1.50	0.833
1.59	0.862
1.71	0.876
1.81	0.861*
1.83	0.852
1.90	0.715
1.93	0.694
2.02	0.761
2.06	0.787*
2.12	0.794
2.20	0.753*
2.23	0.750*
2.31	0.779*
2.36	0.772*
2.42	0.751
2.51	0.669*
2.60	0.620
2.65	0.573*

* Not shown on plot

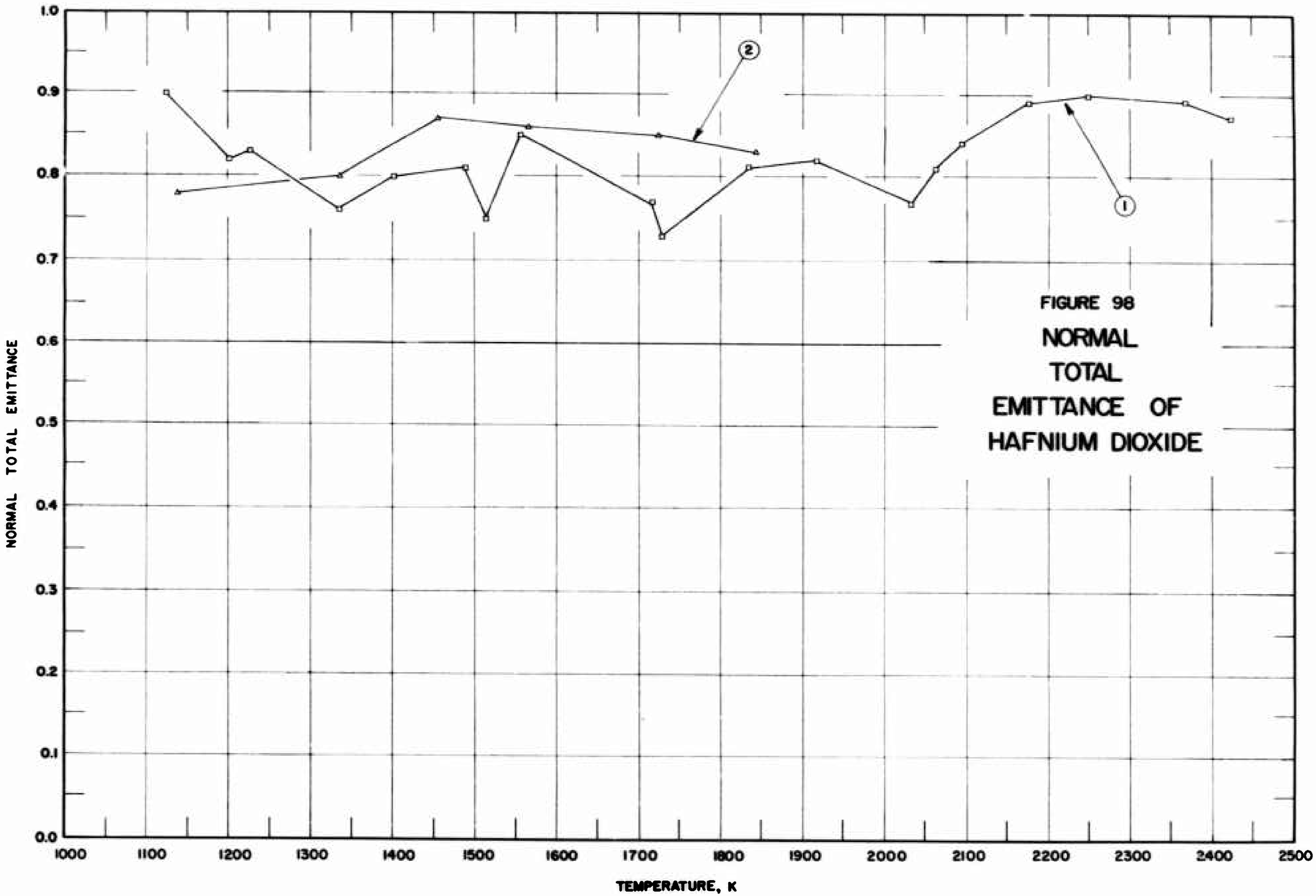


FIGURE 98
NORMAL
TOTAL
EMITTANCE OF
HAFNIUM DIOXIDE
1
2
1.0
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0.0
NORMAL TOTAL EMITTANCE
1000
1100
1200
1300
1400
1500
1600
1700
1800
1900
2000
2100
2200
2300
2400
2500
TEMPERATURE, K

SPECIFICATION TABLE NO. 98 NORMAL TOTAL EMITTANCE OF HAFNIUM DIOXIDE HfO_2

Curve No.	Ref. No.	Year	Temperature Range, K	Geometry θ'	Reported Error, %	Composition (weight percent), Specifications and Remarks
1	17	1962	1122-2422	~0°	10	Pressed and sintered; measured in argon; run 1; [Author's designation: Specimen 1].
2	17	1962	1139-1844	~0°	10	Similar to the above specimen and conditions; [Author's designation: Specimen 2].

DATA TABLE NO. 98 NORMAL TOTAL EMITTANCE OF HAFNIUM DIOXIDE HfO_2

[Temperature, T, K; Emittance, ϵ]

T	ϵ	T	ϵ
CURVE 1		**CURVE 2**	
1122	0.90	1139	0.78
1200	0.82	1335	0.80
1333	0.76	1452	0.87
1400	0.80	1564	0.86
1489	0.81	1722	0.85
1555	0.85	1844	0.83
1717	0.77		
1833	0.81		
1511	0.85		
1228	0.83		
1728	0.73		
1917	0.82		
2033	0.77		
2061	0.81		
2094	0.84		
2178	0.89		
2255	0.90		
2367	0.89		
2422	0.87		

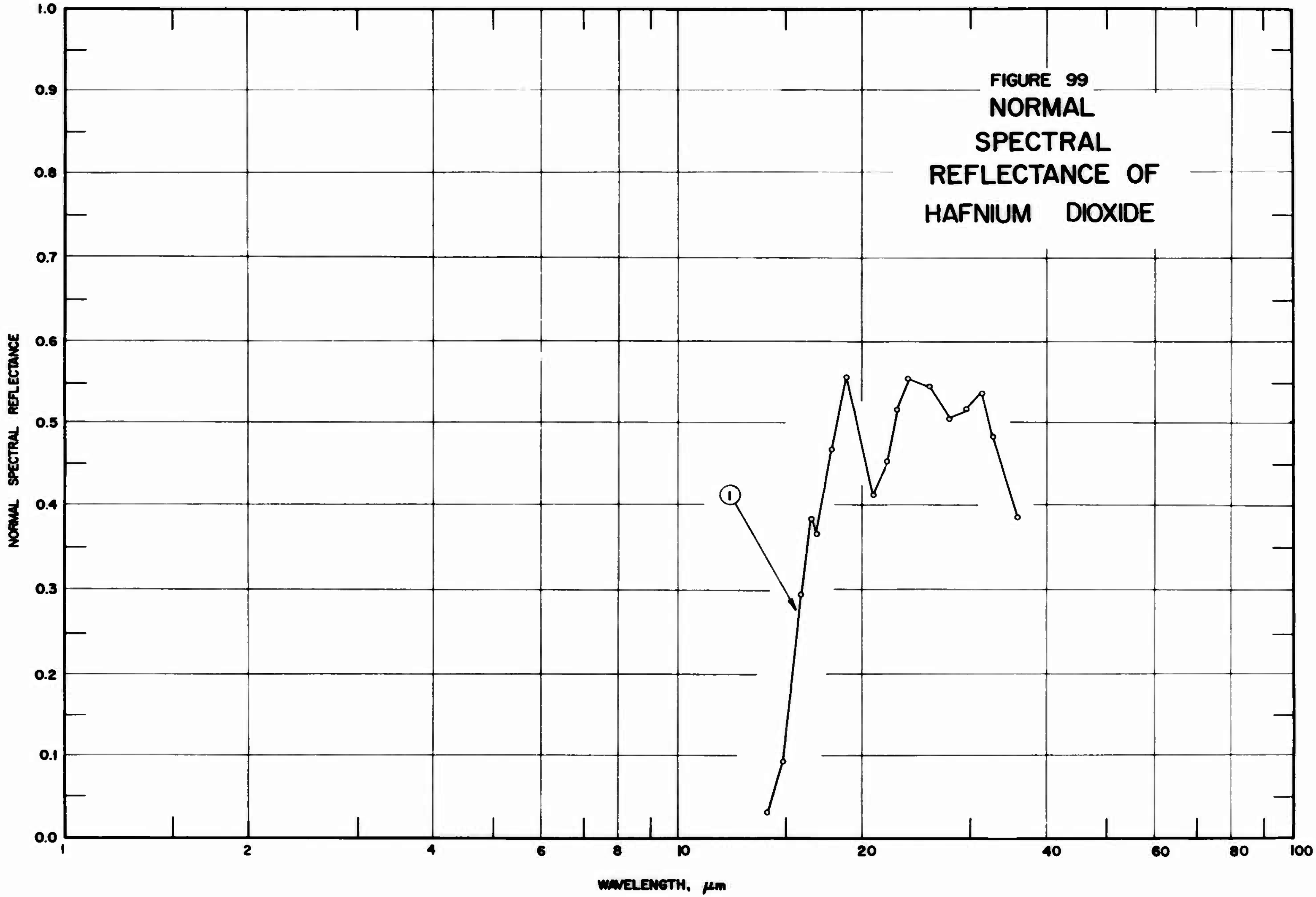


FIGURE 99
NORMAL
SPECTRAL
REFLECTANCE OF
HAFNIUM DIOXIDE
1
NORMAL SPECTRAL REFLECTANCE
WAVELENGTH, μm
1.0
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0.0
1
2
4
6
8
10
20
40
60
80
100

SPECIFICATION TABLE NO. 99 NORMAL SPECTRAL REFLECTANCE OF HAFNIUM DIOXIDE HfO_2

Curve No.	Ref. No.	Year	Temperature K	Wavelength Range, μm	Geometry θ	θ'	ω'	Reported Error, %	Composition (weight percent), Specifications, and Remarks
1	146	1966	~298	14.0-35.8	~0°	~0°			Film; optical thickness 10 quarterwaves at λ = 2.5 μm; electron beam deposited in vacuum (2-8 x 10^{-6} mm Hg) at normal incidence onto glass substrate heated to 588 K; rate of depositing 1 quarterwave per min at λ = 0.5 μm; film appeared clear with slight cracking.

DATA TABLE NO. 99 NORMAL SPECTRAL REFLECTANCE OF HAFNIUM DIOXIDE HfO_2

[Wavelength, μm; Reflectance, ρ; Temperature, T, K]

λ	ρ
CURVE 1	
T ~ 298	
14.0	0.030
14.9	0.091
15.9	0.296
16.5	0.381
16.9	0.364
17.8	0.469
18.9	0.559
20.9	0.411
22.0	0.453
22.9	0.517
23.8	0.555
25.9	0.544
27.8	0.502
29.7	0.517
31.4	0.537
32.8	0.482
35.8	0.384

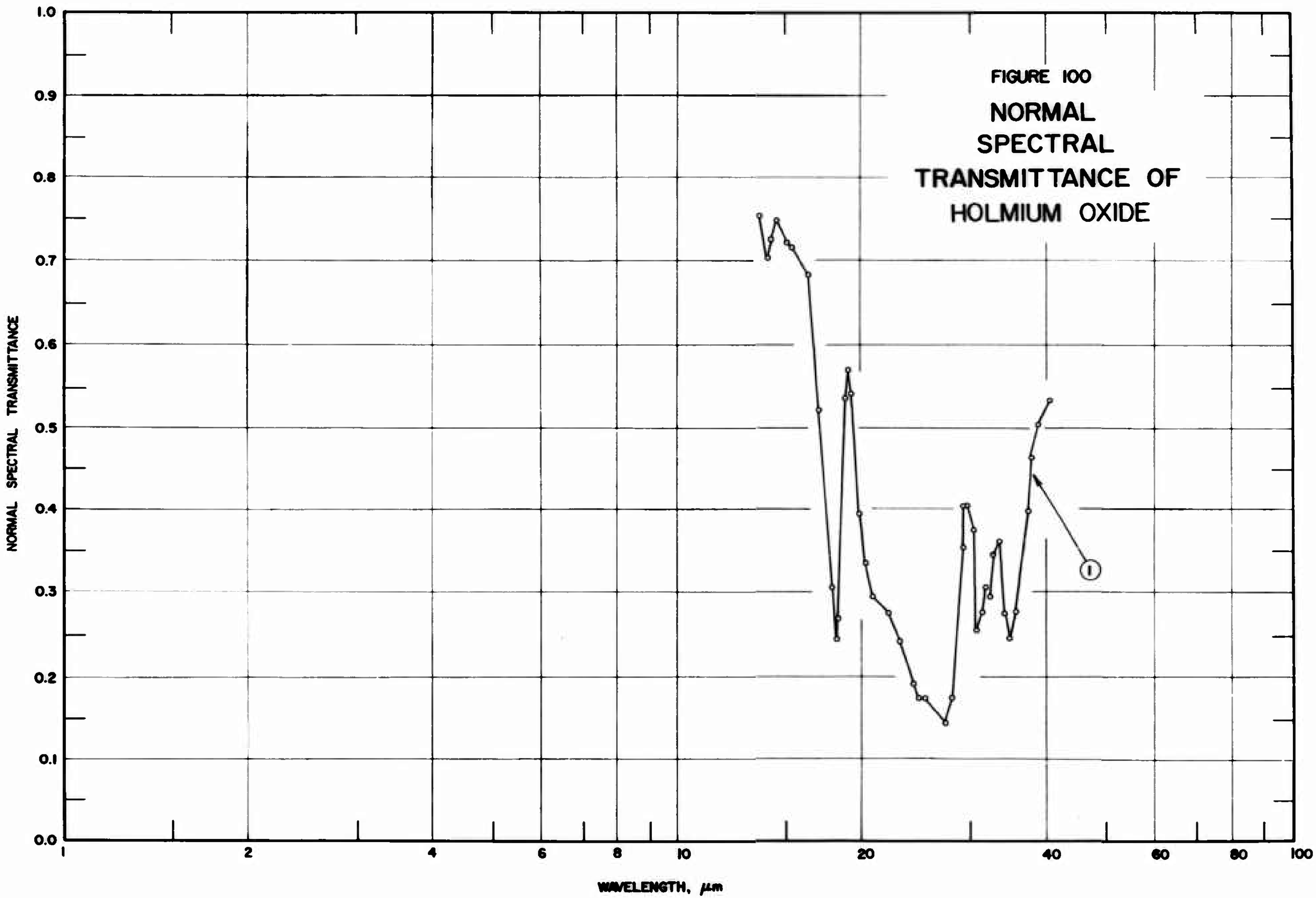


FIGURE 100
NORMAL SPECTRAL TRANSMITTANCE OF HOLMIUM OXIDE

SPECIFICATION TABLE NO. 100 NORMAL SPECTRAL TRANSMITTANCE OF HOLMIUM OXIDE Ho_2O_3

Curve No.	Ref. No.	Year	Temperature K	Wavelength Range, μm	Geometry θ θ' ω'	Reported Error, %	Composition (weight percent), Specifications, and Remarks
1	207	1963	~298	13.6-40.3	~0° ~0°		Film; ground (dry) for 1 min in a vibrator, then mulled with Nujol for an additional 1 min period; data extracted from smooth curve.

DATA TABLE NO. 100 NORMAL SPECTRAL TRANSMITTANCE OF HOLMIUM OXIDE Ho_2O_3

[Wavelength, λ, μm; Transmittance, τ; Temperature, T, K]

λ	τ	λ	τ	λ	τ
CURVE 1		CURVE 1 (cont.)		CURVE 1 (cont.)	
T ~ 298		20.9	0.296	35.5	0.278
13.6	0.752	22.0	0.276	36.5	0.291*
14.0	0.702	23.0	0.241	37.1	0.399
14.1	0.725	24.3	0.191	37.8	0.462
14.2	0.741*	24.8	0.175	38.7	0.505
14.5	0.749	25.3	0.175	40.3	0.532
15.1	0.720	27.2	0.143		
15.7	0.717	28.0	0.175		
16.1	0.706	29.2	0.351		
16.4	0.681	29.2	0.400		
16.8	0.603*	29.8	0.400		
17.0	0.521	30.2	0.373		
17.7	0.304	30.4	0.254		
18.1	0.246	31.2	0.277		
18.2	0.270	31.7	0.303		
18.3	0.287*	32.1	0.294		
18.7	0.538	32.7	0.346		
19.0	0.571	33.3	0.360		
19.3	0.541	33.6	0.346*		
19.9	0.394	34.0	0.276		
20.3	0.333	34.7	0.249		

* Not shown on plot

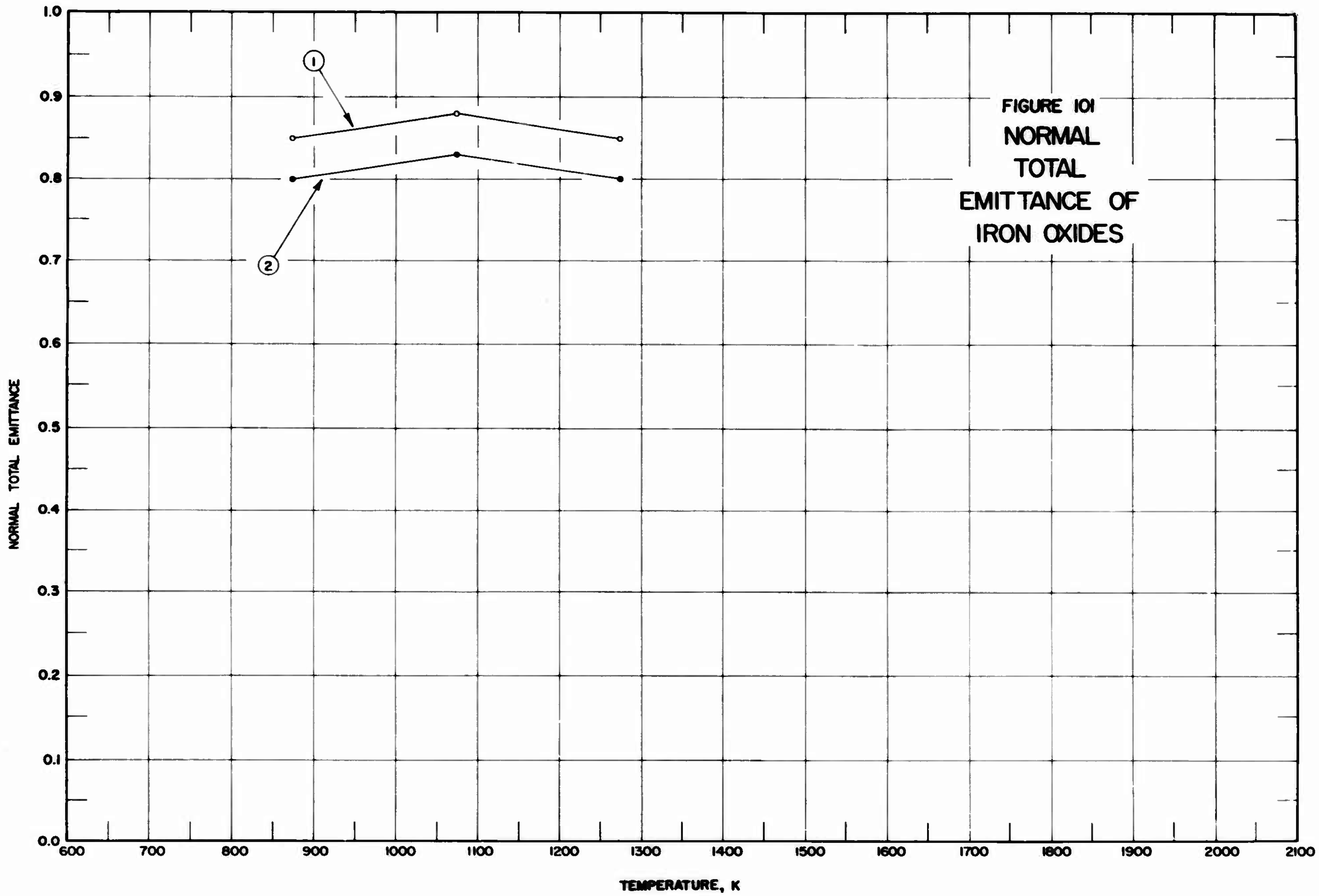


FIGURE 101
NORMAL
TOTAL
EMITTANCE OF
IRON OXIDES
1
2
NORMAL TOTAL EMITTANCE
1.0
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0.0
600
700
800
900
1000
1100
1200
1300
1400
1500
1600
1700
1800
1900
2000
2100
TEMPERATURE, K

SPECIFICATION TABLE NO. 101 NORMAL TOTAL EMITTANCE OF IRON OXIDES

Curve No.	Ref. No.	Year	Temperature Range, K	Geometry θ'	Reported Error, %	Composition (weight percent), Specifications and Remarks
1	362	1964	873-1273	0°		Fe_2O_3; 99% pure powder, Columbian Carbon Co.; sintered 4 hrs at 1573 K.
2	362	1964	873-1273	0°		Above specimen and conditions except integrated from spectral data (1-15 μm).

DATA TABLE NO. 101 NORMAL TOTAL EMITTANCE OF IRON OXIDES

[Temperature, T, K; Emittance, ϵ]

T	ϵ
CURVE 1	
873	0.85
1073	0.88
1273	0.85
CURVE 2	
873	0.80
1073	0.83
1273	0.80

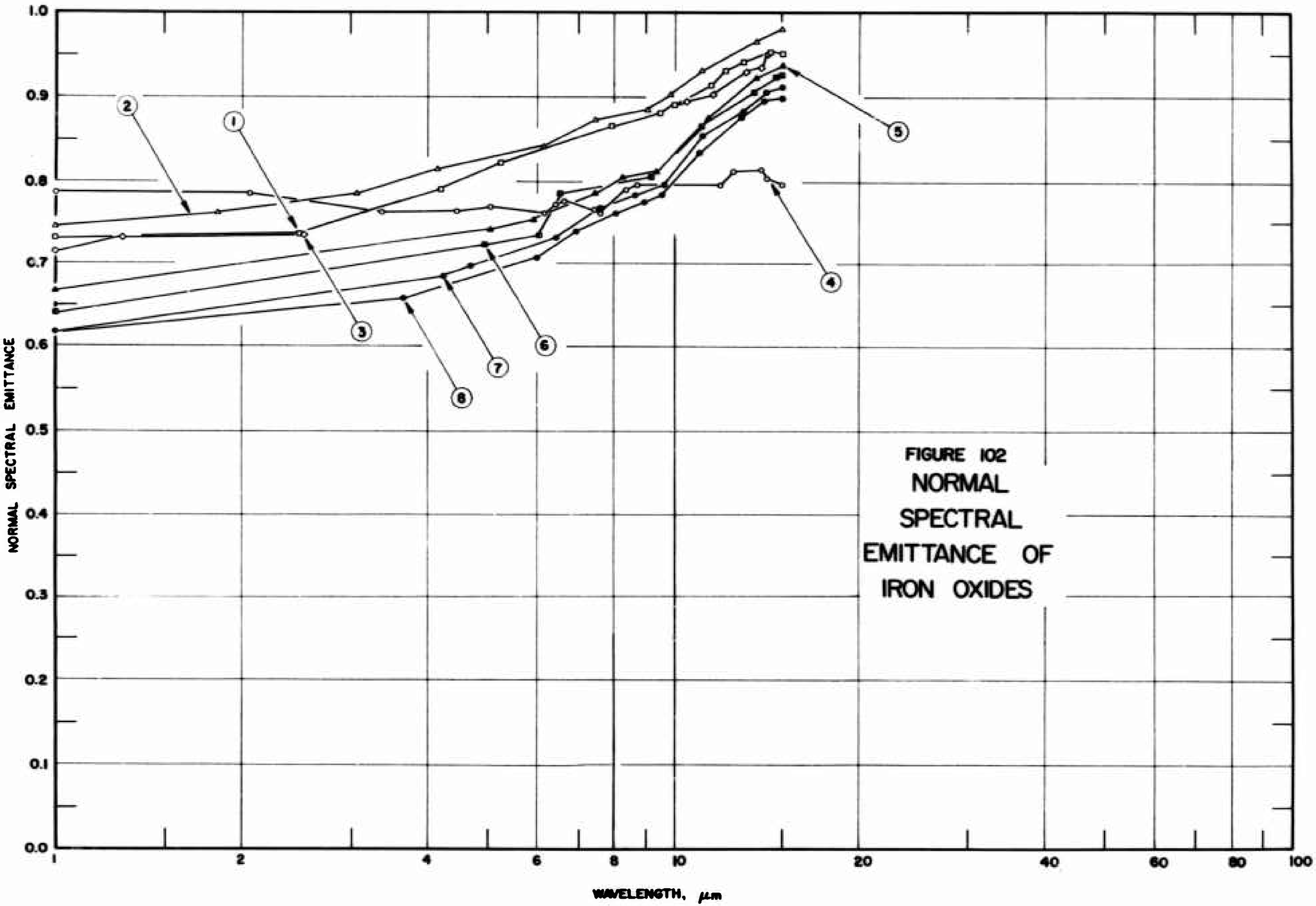


FIGURE 102
NORMAL SPECTRAL EMITTANCE OF IRON OXIDES

SPECIFICATION TABLE NO. 102 NORMAL SPECTRAL EMITTANCE OF IRON OXIDES

Curve No.	Ref. No.	Year	Temperature K	Wavelength Range, μm	Geometry θ'	Reported Error, %	Composition (weight percent), Specifications, and Remarks
1	362	1964	873	1.00-15.0	~0°		Fe_2O_3; 99% pure powder, Columbian Carbon Co.; sintered 4 hrs at 1573 K; data extracted from smooth curve.
2	362	1964	1023	1.00-15.0	~0°		Above specimen and conditions.
3	362	1964	1253	1.00-15.0	~0°		Above specimen and conditions.
4	362	1964	373	1.00-15.0	~0°		Above specimen and conditions except calculated from spectral reflectance.
5	382	1965	1273	1.00-15.0	0°		Fe_3O_4; sintered 0.5 hr at 1502 K; data extracted from smooth curve.
6	382	1965	1273	1.00-15.0	0°		Above specimen and conditions except heated at 1273 K in measuring apparatus for 1 hr total.
7	382	1965	1273	1.00-15.0	0°		Above specimen and conditions except heated at 1273 K in measuring apparatus for 4 hrs total.
8	382	1965	1273	1.00-15.0	0°		Above specimen and conditions except heated at 1273 K in measuring apparatus for 6 hrs total.

DATA TABLE NO. 102 NORMAL SPECTRAL EMITTANCE OF IRON OXIDES

[Wavelength, λ, μm; Emittance, ∈; Temperature, T, K]

CURVE 1
T = 873

λ	∈
1.00	0.732
2.49	0.737
4.20	0.791
5.26	0.824
7.91	0.869
9.50	0.881
10.0	0.893
11.5	0.915
12.1	0.931
13.0	0.942
14.4	0.953
15.0	0.951

CURVE 2
T = 1023

λ	∈
1.00	0.748
1.84	0.762
3.09	0.789
4.16	0.818
5.26	0.824*
6.16	0.842
7.49	0.875
9.01	0.888
9.81	0.902
11.1	0.933
13.6	0.969
15.0	0.983

CURVE 3
T = 1253

λ	∈
1.00	0.716
1.28	0.732
2.51	0.737
5.26	0.825*
7.91	0.869*
9.50	0.881*
10.5	0.897
11.6	0.902
13.1	0.931
13.7	0.937
14.3	0.952
15.0	0.951

CURVE 4
T = 373

λ	∈
1.00	0.788
2.06	0.787
3.37	0.763
4.47	0.764
5.03	0.770
6.15	0.[illegible]2
6.41	0.772
6.57	0.772*
6.67	0.777
7.44	0.768
7.60	0.761
8.38	0.791
8.70	0.797
11.9	0.797
12.5	0.811
13.9	0.814
14.2	0.806
15.0	0.799

CURVE 5
T = 1273

λ	∈
1.00	0.668
5.04	0.741
5.97	0.755
7.41	0.789
8.26	0.808
9.37	0.813
11.4	0.879
13.6	0.923
15.0	0.940

CURVE 6
T = 1273

λ	∈
1.00	0.640
4.95	0.722
6.05	0.736
7.54	0.789
9.12	0.807

CURVE 6 (cont.)

λ	∈
11.3	0.867
13.5	0.908
14.6	0.924
15.0	0.928

CURVE 7
T = 1273

λ	∈
1.00	0.618
4.25	0.684
4.70	0.698
6.46	0.731
7.50	0.769
8.68	0.783
9.67	0.797
11.2	0.855
13.0	0.884
14.2	0.908
15.0	0.911

CURVE 8
T = 1273

λ	∈
1.0	0.614*
3.67	0.659
6.00	0.707
6.99	0.740
8.01	0.762
8.99	0.776
9.51	0.785
11.0	0.836
12.8	0.879
14.0	0.897
15.0	0.900

*Not shown on plot

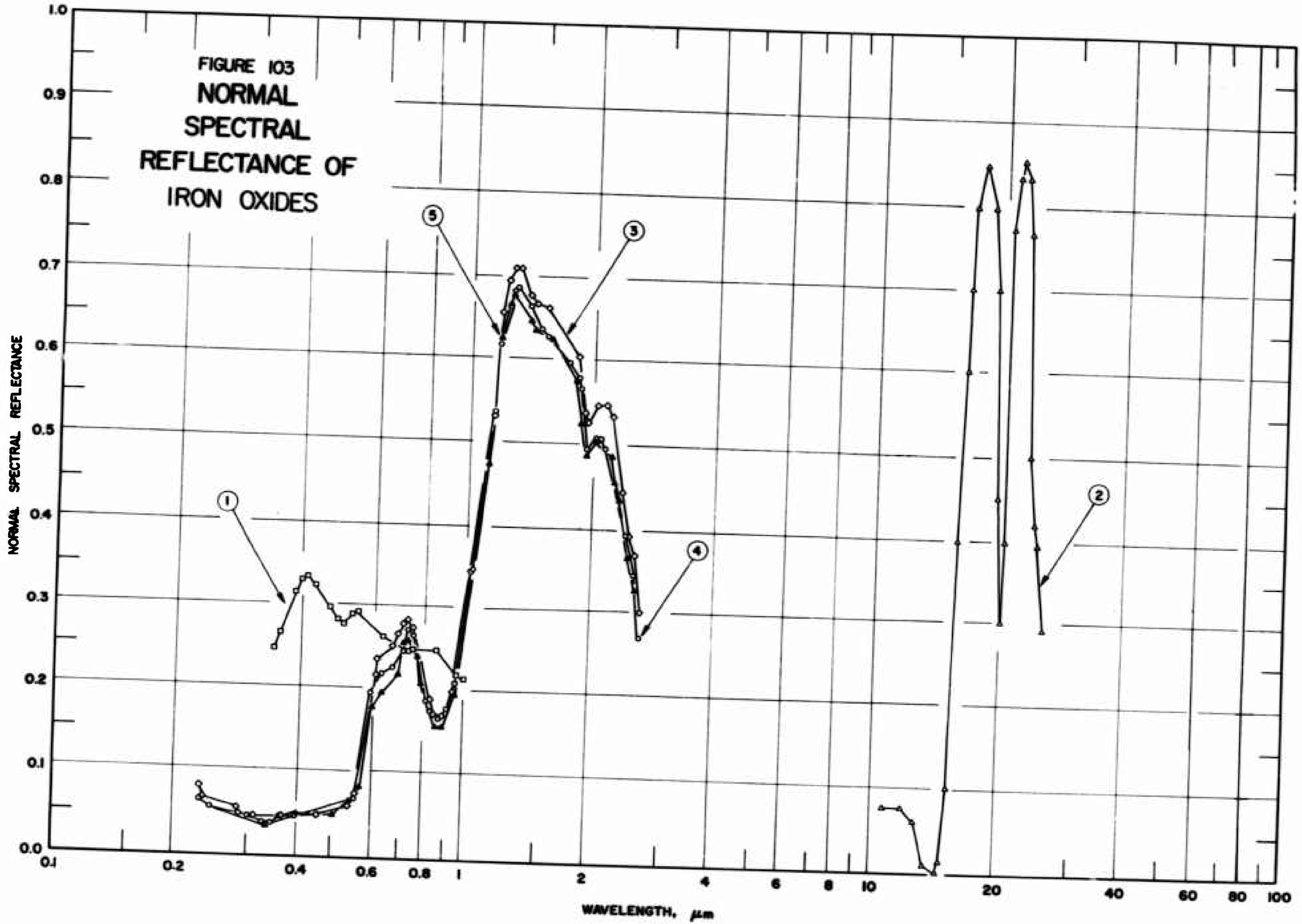


FIGURE 103
NORMAL SPECTRAL REFLECTANCE OF IRON OXIDES
NORMAL SPECTRAL REFLECTANCE
WAVELENGTH, μm
0.0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
1.0
0.1
0.2
0.4
0.6
0.8
1
2
4
6
8
10
20
40
60
80
100
1
2
3
4
5

SPECIFICATION TABLE NO. 103 NORMAL SPECTRAL REFLECTANCE OF IRON OXIDES

Curve No.	Ref. No.	Year	Temperature K	Wavelength Range, μm	Geometry θ	θ'	ω'	Reported Error, %	Composition (weight percent), Specifications, and Remarks
1	209	1960	298	0.344-1.000	~0°	~0°			Fe_2O_3; single crystal grown parallel to c phase; (111) plane; measured in air; data extracted from smooth curve.
2	209	1960	298	16.7-25.9	~0°	~0°			Fe_2O_3; hematite crystal, α phase; polished section of unknown orientation; measured in air; data extracted from smooth curve.
3	362	1964	~298	0.230-2.65	0°		2π		Fe_2O_3; 99% pure powder; Columbia Carbide Co.; mesh size 325; compacted at 11 500 psi with highly polished stainless steel ram; data extracted from smooth curve; MgO reference standard.
4	362	1964	~298	0.230-2.65	~0°		2π		Similar to above specimen and conditions except compacted at 23 200 psi.
5	362	1964	~298	0.230-2.65	~0°		2π		Similar to above specimen and conditions except compacted at 34 600 psi.

DATA TABLE NO. 103 NORMAL SPECTRAL REFLECTANCE OF IRON OXIDES

[Wavelength, λ, μm; Reflectance, ρ; Temperature, T, K]

λ	ρ
CURVE 1	
T = 298	
0.344	0.244
0.357	0.262
0.384	0.313
0.400	0.330
0.416	0.332
0.434	0.323
0.465	0.295
0.487	0.280
0.503	0.275
0.537	0.288
0.547	0.290
0.637	0.260
0.735	0.246
0.750	0.245
0.826	0.249*
0.858	0.246
0.960	0.217
1.000	0.212
CURVE 2	
T = 298	
10.7	0.075
11.9	0.075
12.7	0.060
13.5	0.010
14.5	0.000
14.9	0.015
15.2	0.100
15.7	0.400
16.1	0.600
16.4	0.700
16.8	0.800
17.7	0.850
18.5	0.800
19.1	0.700
19.8	0.450
20.1	0.300
20.4	0.400
20.8	0.775
21.2	0.835
21.7	0.855
22.4	0.835
23.0	0.770

λ	ρ
CURVE 2 (cont.)	
23.5	0.500
24.1	0.420
24.7	0.395
25.9	0.290
CURVE 3	
T ~ 298	
0.230	0.078
0.235	0.066
0.247	0.058*
0.275	0.053*
0.285	0.052
0.290	0.047
0.308	0.049*
0.314	0.034
0.348	0.035*
0.368	0.045
0.441	0.047
0.530	0.058
0.548	0.072
0.606	0.216
0.614	0.233
0.668	0.250
0.683	0.264
0.706	0.266*
0.711	0.277
0.721	0.281
0.746	0.273
0.821	0.188
0.848	0.170
0.870	0.168*
0.896	0.168
0.940	0.198
1.03	0.344
1.14	0.530
1.19	0.654
1.22	0.695
1.26	0.710
1.30	0.710
1.37	0.692*
1.39	0.677
1.43	0.668
1.52	0.661
1.82	0.602

λ	ρ
CURVE 3 (cont.)	
1.90	0.533
1.94	0.525
2.03	0.544
2.14	0.545
2.21	0.532
2.39	0.443
2.49	0.392
2.57	0.370
2.65	0.300
CURVE 4	
T ~ 298	
0.230	0.061
0.245	0.052
0.301	0.043
0.330	0.037
0.346	0.037
0.393	0.046
0.463	0.049*
0.528	0.057*
0.550	0.068
0.598	0.192
0.618	0.214*
0.637	0.218
0.652	0.218*
0.667	0.224
0.670	0.234*
0.701	0.242
0.704	0.261*
0.721	0.270
0.746	0.263
0.818	0.184
0.835	0.171
0.867	0.164
0.889	0.164*
0.917	0.176
0.953	0.207
1.03	0.347
1.15	0.533
1.18	0.618
1.22	0.662
1.25	0.681
1.28	0.686
1.37	0.663

λ	ρ
CURVE 4 (cont.)	
1.46	0.637
1.51	0.629
1.57	0.626*
1.72	0.594
1.81	0.577
1.84	0.563
1.86	0.527*
1.91	0.493
1.96	0.493*
2.02	0.509
2.08	0.509
2.12	0.504
2.19	0.497
2.42	0.393
2.49	0.351*
2.55	0.345
2.57	0.331*
2.65	0.269
CURVE 5	
T ~ 298	
0.230	0.061*
0.245	0.052*
0.301	0.043*
0.330	0.037*
0.338	0.033
0.347	0.034*
0.361	0.044
0.400	0.047
0.489	0.047
0.539	0.063
0.561	0.080
0.600	0.176
0.630	0.192
0.699	0.215
0.715	0.253
0.737	0.255
0.768	0.239
0.782	0.204
0.805	0.181*
0.860	0.153
0.952	0.191
1.11	0.471
1.18	0.625

λ	ρ
CURVE 5 (cont.)	
1.22	0.664
1.25	0.678
1.28	0.687*
1.39	0.644
1.42	0.635
1.47	0.635*
1.51	0.628*
1.57	0.625
1.30	0.571
1.86	0.522
1.92	0.484
1.96	0.485*
2.03	0.503
2.09	0.503*
2.21	0.483
2.27	0.453
2.32	0.432
2.46	0.364
2.51	0.344*
2.58	0.326
2.65	0.269*

*Not shown on plot

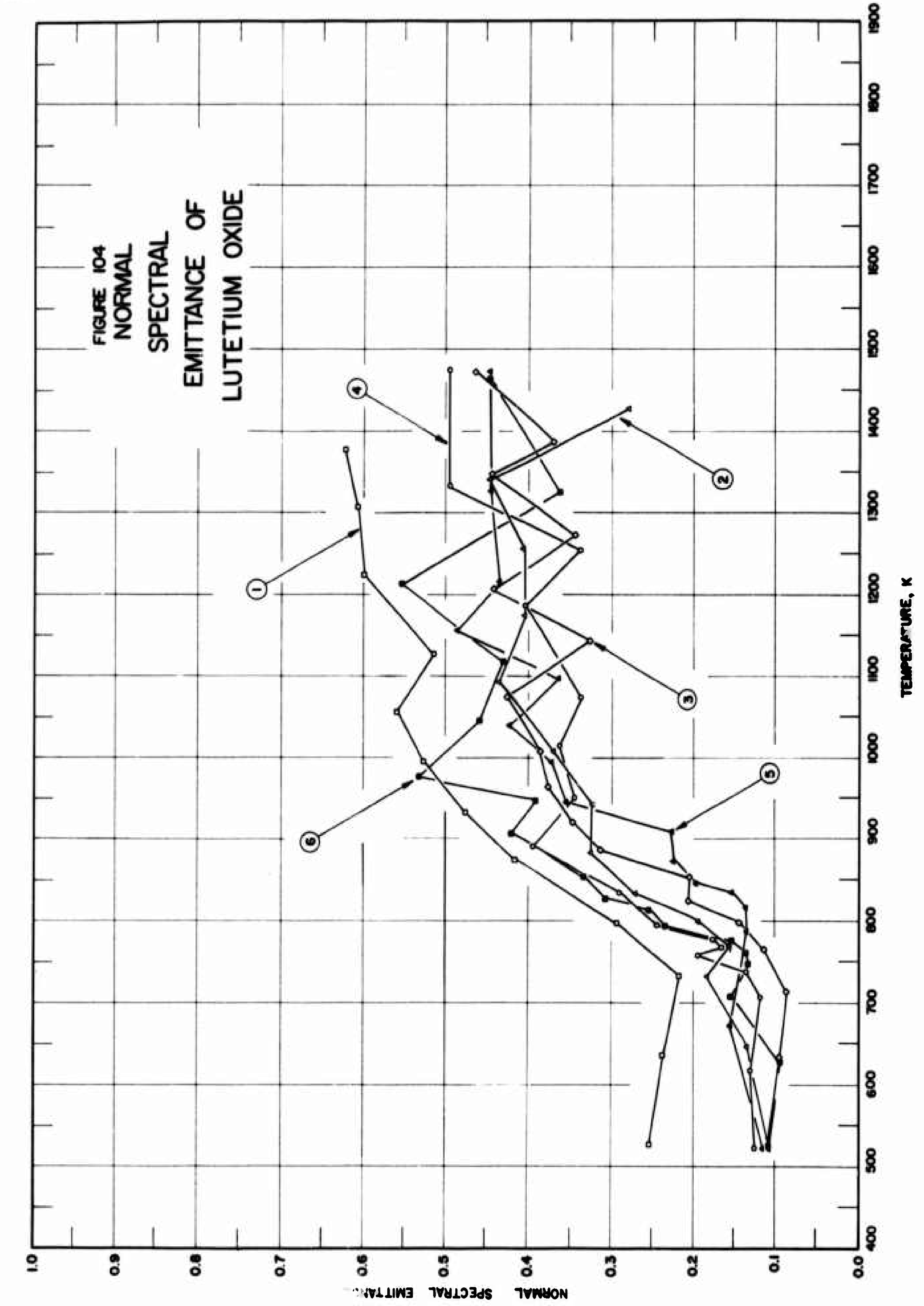


FIGURE 104
NORMAL
SPECTRAL
EMITTANCE OF
LUTETIUM OXIDE
NORMAL SPECTRAL EMITTANCE
TEMPERATURE, K
1
2
3
4
5
6
0.0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
1.0
400
500
600
700
800
900
1000
1100
1200
1300
1400
1500
1600
1700
1800
1900

SPECIFICATION TABLE NO. 104 NORMAL SPECTRAL EMITTANCE OF LUTETIUM OXIDE Lu_2O_3

Curve No.	Ref. No.	Year	Wavelength μm	Temperature Range, K	Geometry θ'	Reported Error, %	Composition (weight percent), Specifications, and Remarks
1	205	1963	0.445	528-1378	~0°		Powder; dry pressed at 75000 psi; fired at 1773 K for 24 hrs, then ground; calculated from reflectance data; data extracted from smooth curve.
2	205	1963	0.488	521-1428	~0°		Above specimen and conditions.
3	205	1963	0.533	524-1473	~0°		Above specimen and conditions.
4	205	1963	0.570	521-1473	~0°		Above specimen and conditions.
5	205	1963	0.605	522-1473	~0°		Above specimen and conditions.
6	205	1963	0.680	523-1461	~0°		Above specimen and conditions.

DATA TABLE NO. 104 NORMAL SPECTRAL EMITTANCE OF LUTETIUM OXIDE Lu_2O_3

[Temperature, T, K; Emittance, ϵ; Wavelength, λ, μm]

CURVE 1
$\lambda = 0.445$

T	ϵ
528	0.251
636	0.239
731	0.219
799	0.292
874	0.414
933	0.475
995	0.528
1056	0.560
1127	0.515
1223	0.600
1310	0.609
1378	0.622

CURVE 2
$\lambda = 0.488$

T	ϵ
521	0.108
646	0.134
731	0.181
770	0.158

CURVE 2 (cont.)

T	ϵ
800	0.192
833	0.270
881	0.324
942	0.322
1008	0.370
1091	0.436
1173	0.403
1257	0.408
1340	0.448
1428	0.280

CURVE 3
$\lambda = 0.533$

T	ϵ
524	0.108*
631	0.095
712	0.088
763	0.111
799	0.144
823	0.207
852	0.205

CURVE 3 (cont.)

T	ϵ
887	0.313
920	0.348
962	0.379
1008	0.387
1074	0.426
1144	0.329
1208	0.441
1271	0.344
1349	0.445
1386	0.370
1473	0.462

CURVE 4
$\lambda = 0.570$

T	ϵ
521	0.125
618	0.130
706	0.119
738	0.139
759	0.194
768	0.165

CURVE 4 (cont.)

T	ϵ
776	0.174
794	0.245
834	0.290
890	0.396
950	0.344
1015	0.362
1072	0.336
1186	0.403
1253	0.338
1331	0.495
1473	0.496

CURVE 5
$\lambda = 0.605$

T	ϵ
522	0.114
672	0.155
789	0.135
816	0.138
833	0.153
846	0.198

CURVE 5 (cont.)

T	ϵ
872	0.226
910	0.229
947	0.355
995	0.371
1040	0.421
1098	0.455
1156	0.363
1216	0.486
1329	0.496
1473	0.498

CURVE 6
$\lambda = 0.680$

T	ϵ
523	0.107
629	0.093
709	0.154
748	0.132
760	0.136
775	0.154
793	0.234

CURVE 6 (cont.)

T	ϵ
811	0.255
827	0.307
853	0.331
907	0.420
948	0.391
979	0.532
1046	0.458
1118	0.430
1213	0.553
1324	0.361
1461	0.447

*Not shown on plot

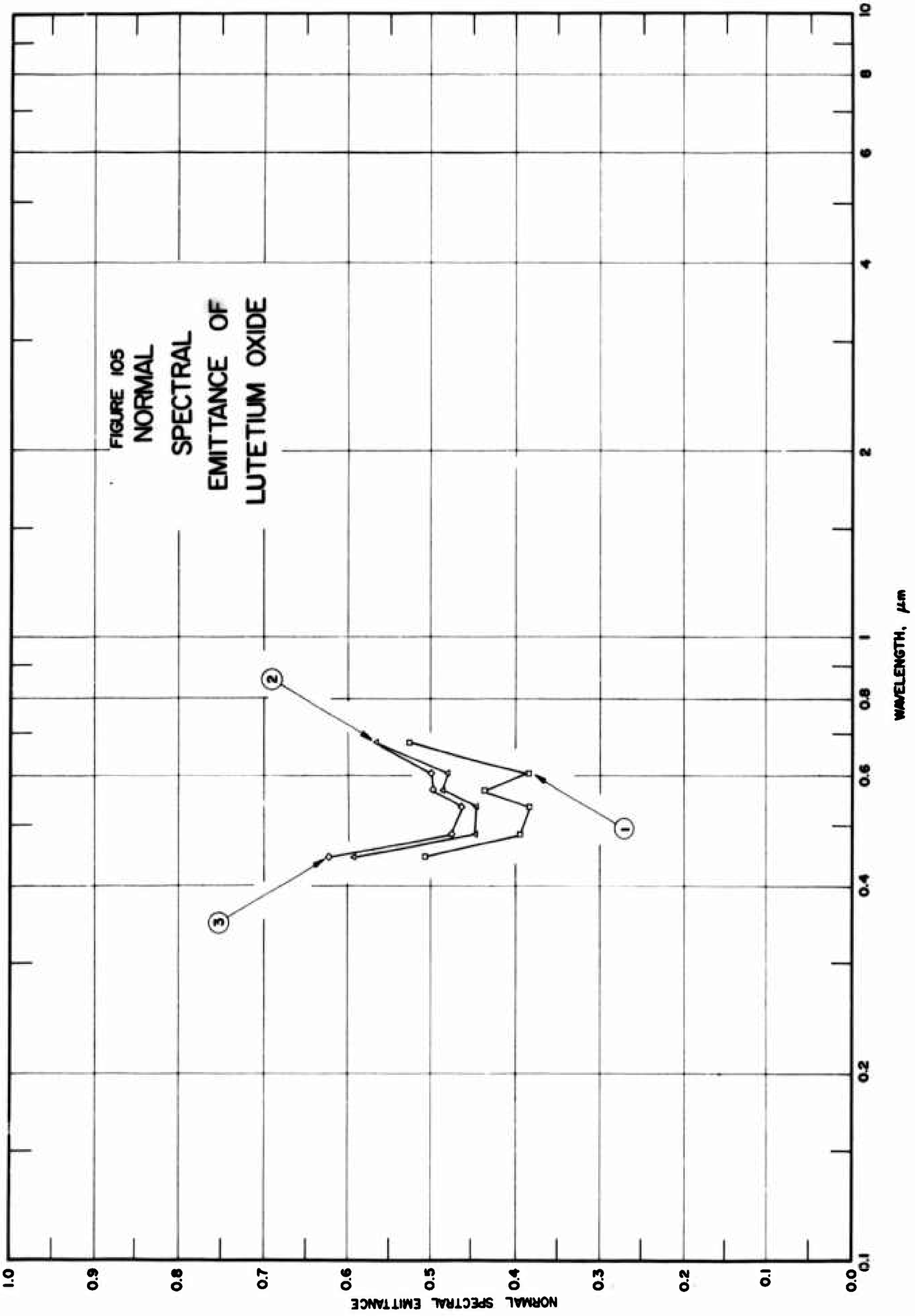


FIGURE 105 NORMAL SPECTRAL EMITTANCE OF LUTETIUM OXIDE

SPECIFICATION TABLE NO. 105 NORMAL SPECTRAL EMITTANCE OF LUTETIUM OXIDE Lu_2O_3

Curve No.	Ref. No.	Year	Temperature K	Wavelength Range, μm	Geometry θ'	Reported Error, %	Composition (weight percent), Specifications, and Remarks
1	205	1963	973	0.445-0.680	~0°		Powder; dry pressed at 75000 psi; fired at 1773 K for 24 hrs, then ground; calculated from reflectance data.
2	205	1963	1173	0.445-0.680	~0°		Above specimen and conditions.
3	205	1963	1373	0.445-0.680	~0°		Above specimen and conditions.

DATA TABLE NO. 105 NORMAL SPECTRAL EMITTANCE OF LUTETIUM OXIDE Lu_2O_3

[Wavelength, λ, μm; Emittance, ∈; Temperature, T, K]

λ	∈	λ	∈
CURVE 1		**CURVE 3**	
T = 973		T = 1373	
0.445	0.508	0.445	0.623
0.485	0.395	0.485	0.474
0.535	0.386	0.535	0.461
0.570	0.436	0.570	0.499
0.605	0.385	0.605	0.500
0.680	0.526	0.680	0.565*
CURVE 2			
T = 1173			
0.445	0.593		
0.485	0.447		
0.535	0.444		
0.570	0.486		
0.605	0.480		
0.680	0.565		

*Not shown on plot

SPECIFICATION TABLE NO. 106 HEMISPHERICAL TOTAL EMITTANCE OF MAGNESIUM OXIDE MgO

Curve No.	Ref. No.	Year	Temperature Range, K	Reported Error, %	Composition (weight percent), Specifications and Remarks
1*	105	1965	2000		No details given.

DATA TABLE NO. 106 HEMISPHERICAL TOTAL EMITTANCE OF MAGNESIUM OXIDE MgO

[Temperature, T, K; Emittance, ϵ]

T	ϵ
CURVE 1*	
2000	0.32

*No plot given

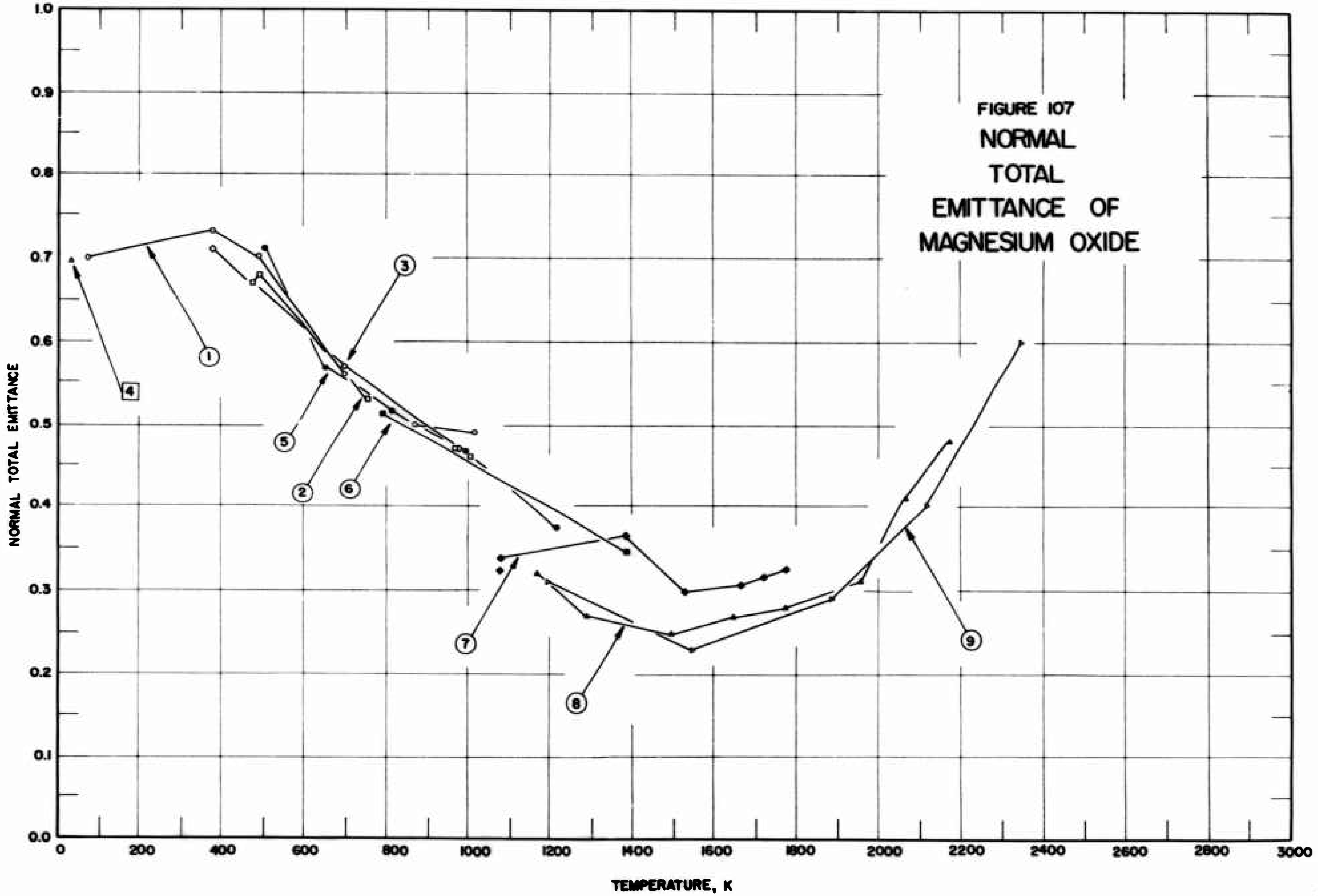


FIGURE 107
NORMAL
TOTAL
EMITTANCE OF
MAGNESIUM OXIDE
NORMAL TOTAL EMITTANCE
1.0
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0.0
TEMPERATURE, K
0
200
400
600
800
1000
1200
1400
1600
1800
2000
2200
2400
2600
2800
3000
1
2
3
4
5
6
7
8
9

SPECIFICATION TABLE NO. 107 NORMAL TOTAL EMITTANCE OF MAGNESIUM OXIDE MgO

Curve No.	Ref. No.	Year	Temperature Range, K	Geometry θ'	Reported Error, %	Composition (weight percent), Specifications and Remarks
1	21	1958	75.2-1019	~0°		Refractory magnesium oxide; cycle 1.
2	21	1958	477-1005	~0°		Above specimen and conditions; cycle 2.
3	21	1958	380-977	~0°		Above specimen and conditions; cycle 3.
4	106	1959	38.2	~0°		Fused; measured in air; cycle 1.
5	106	1959	502-1214	~0°		Above specimen and conditions.
6	106	1959	796-1383	~0°		Above specimen and conditions; cycle 2.
7	106	1959	1078-1776	~0°		Above specimen and conditions; cycle 3.
8	17	1962	1168-2171	~0°	10-20	Pressed and sintered; measured in argon; [Author's designation: Specimen 1].
9	17	1962	1198-2344	~0°	10	Similar to the above specimen and conditions; [Author's designation: Specimen 2].

DATA TABLE NO. 107 NORMAL TOTAL EMITTANCE OF MAGNESIUM OXIDE MgO

[Temperature, T, K; Emittance, ϵ]

T	ϵ	T	ϵ	T	ϵ	T	ϵ
CURVE 1		CURVE 4		CURVE 7 (cont.)		CURVE 9 (cont.)	
75.2	0.70	38.2	0.697	1529	0.299	1882	0.29
380	0.73			1662	0.306	2117	0.40
491	0.70	CURVE 5		1720	0.316	2344	0.60
700	0.56			1776	0.327		
866	0.50	502	0.710				
1019	0.49	655	0.568	CURVE 8			
		814	0.518				
CURVE 2		993	0.467	1168	0.32		
		1214	0.373	1289	0.27		
477	0.67			1494	0.25		
491	0.68	CURVE 6		1644	0.27		
755	0.53			1777	0.28		
964	0.47	796	0.513	1958	0.31		
1005	0.46	1383	0.346	2064	0.41		
				2171	0.48		
CURVE 3		CURVE 7					
				CURVE 9			
380	0.71	1078	0.323				
700	0.57	1079	0.339	1198	0.31		
977	0.47	1384	0.364	1542	0.23		

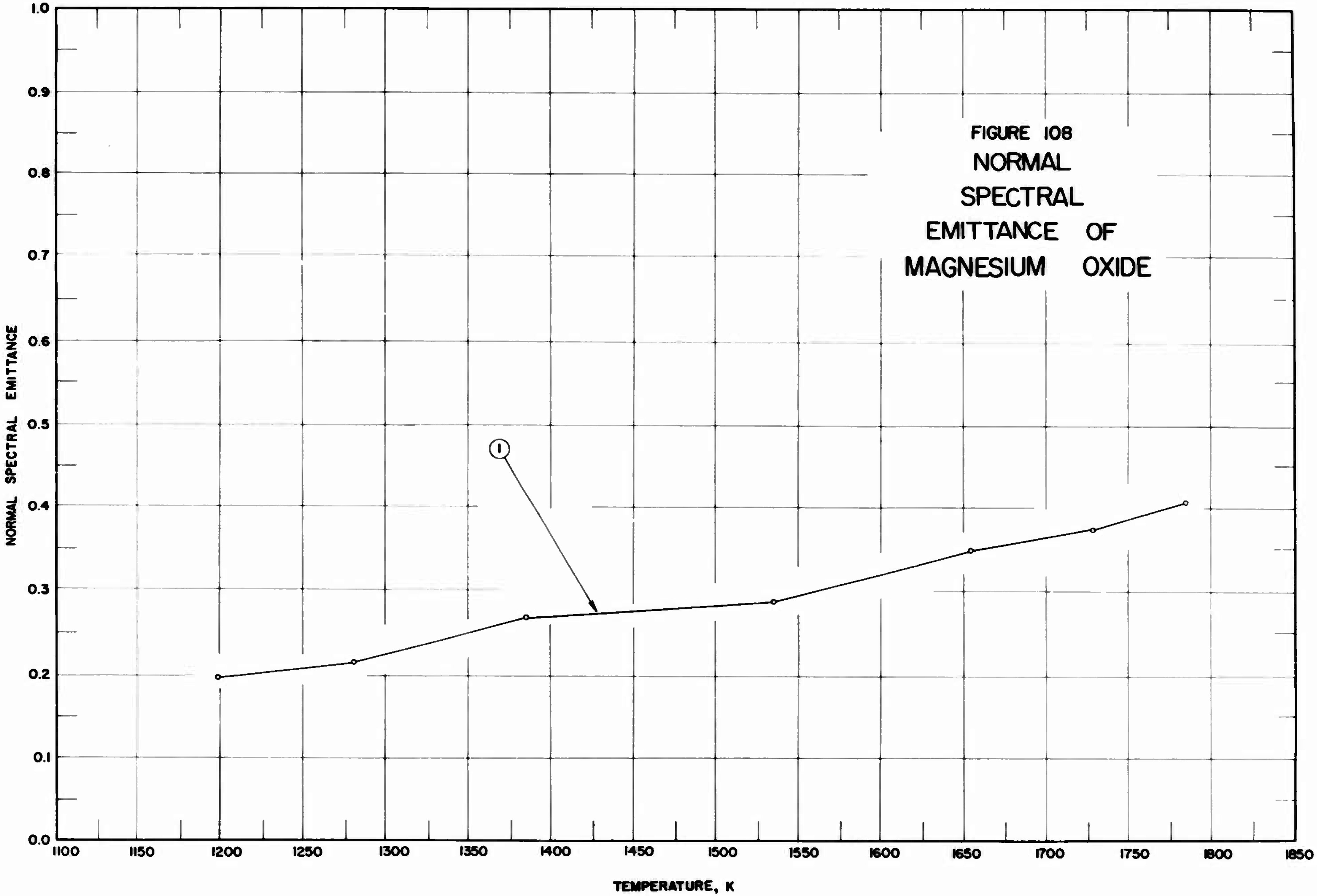


FIGURE 108
NORMAL
SPECTRAL
EMITTANCE OF
MAGNESIUM OXIDE
NORMAL SPECTRAL EMITTANCE
TEMPERATURE, K
1.0
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0.0
1100
1150
1200
1250
1300
1350
1400
1450
1500
1550
1600
1650
1700
1750
1800
1850
1

SPECIFICATION TABLE NO. 108 NORMAL SPECTRAL EMITTANCE OF MAGNESIUM OXIDE MgO

Curve No.	Ref. No.	Year	Wavelength μm	Temperature Range, K	Geometry θ'	Reported Error, %	Composition (weight percent), Specifications, and Remarks
1	106	1959	0.665	1198-1785	~0°		Fused.

DATA TABLE NO. 108 NORMAL SPECTRAL EMITTANCE OF MAGNESIUM OXIDE MgO

[Temperature, T, K; Emittance, ϵ; Wavelength, λ, μm]

T	ϵ
CURVE 1	
λ = 0.665	
1198	0.198
1280	0.216
1385	0.269
1535	0.286
1655	0.349
1728	0.372
1785	0.406

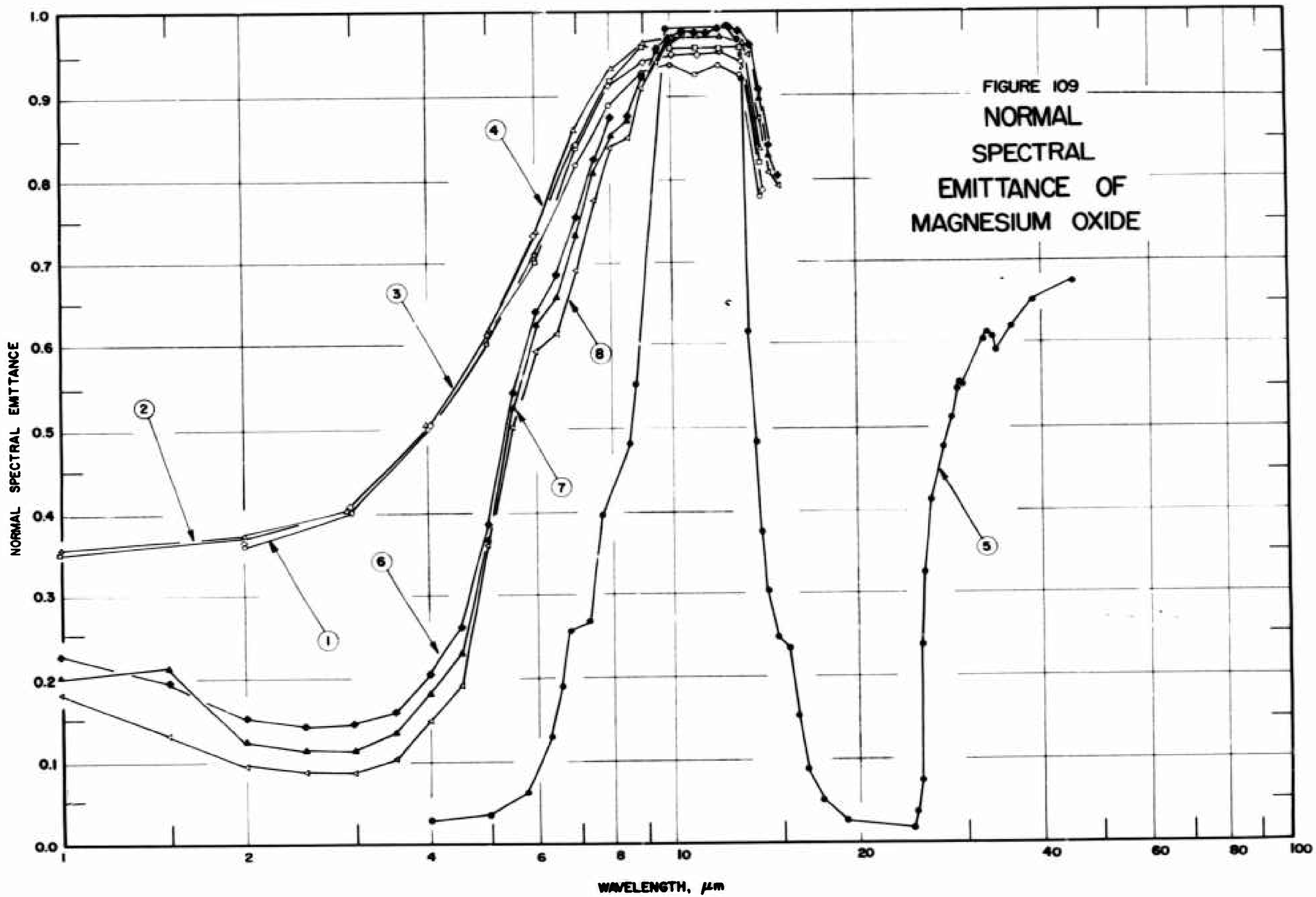


FIGURE 109
NORMAL
SPECTRAL
EMITTANCE OF
MAGNESIUM OXIDE
NORMAL SPECTRAL EMITTANCE
WAVELENGTH, μm
1.0
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0.0
1
2
4
6
8
10
20
40
60
80
100
1
2
3
4
5
6
7
8

SPECIFICATION TABLE NO. 109 NORMAL SPECTRAL EMITTANCE OF MAGNESIUM OXIDE MgO

Curve No.	Ref. No.	Year	Temperature K	Wavelength Range, μm	Geometry θ'	Reported Error, %	Composition (weight percent), Specifications, and Remarks
1	109	1960	873	2.0-14.0	~0°	±4	Norton Co. RM-4473; 97 MgO and 1.3-1.5 CaO; measured in air.
2	109	1960	1298	1.0-14.0	~0°	±4	Above specimen and conditions.
3	111	1964	873	2.00-14.1	0°	≤4	Norton RM-4473; 97 MgO and 1.3-1.5 CaO; ultrasonically machined; measured in air.
4	111	1964	1298	1.02-14.1	0°	≤4	Above specimen and conditions.
5	156	1966	77	4.00-45.0	0°		Irtran 5 (2.11 mm thick); data extracted from smooth curve.
6	338	1966	1600	1.0-15.0	~0°		Polycrystalline cylinder; 99.2 MgO (0.1875 in. wall thickness); outer surface smooth but not polished; sintered at 1865 K for 27 hrs; porosity 30% by volume; avg of two readings on each of three specimens.
7	338	1966	1400	1.0-15.0	~0°		Above specimen and conditions.
8	338	1966	1200	1.0-15.0	~0°		Above specimen and conditions.

DATA TABLE NO. 109 NORMAL SPECTRAL EMITTANCE OF MAGNESIUM OXIDE MgO

[Wavelength, λ, μm; Emittance, ϵ; Temperature, T, K]

λ	ϵ
CURVE 1	
T = 873	
2.0	0.36
3.0	0.40
4.0	0.50
5.0	0.60
6.0	0.71
7.0	0.82
8.0	0.89
9.0	0.93
10.0	0.94
11.0	0.93
12.0	0.94
13.0	0.93
14.0	0.78
CURVE 2	
T = 1298	
1.0	0.35
2.0	0.37
3.0	0.40*
4.0	0.50*
5.0	0.60*
6.0	0.70
7.0	0.84
8.0	0.92
9.0	0.96
10.0	0.96
11.0	0.96
12.0	0.96
13.0	0.96
14.0	0.82
CURVE 3	
T = 873	
2.00	0.363
2.96	0.409
4.03	0.506
5.00	0.612
5.99	0.734
7.00	0.845
7.99	0.917
9.04	0.944
10.0	0.952
CURVE 3 (cont.)	
11.0	0.952
12.0	0.956
13.0	0.946
14.1	0.788
CURVE 4	
T = 1298	
1.02	0.355
2.00	0.371
2.95	0.404
3.99	0.506
5.01	0.615
6.01	0.737
6.99	0.863
8.01	0.937
9.08	0.965
10.0	0.971
11.0	0.971
12.0	0.971
13.1	0.965
14.1	0.839
CURVE 5	
T = 77	
4.00	0.028
5.00	0.033
5.72	0.062
6.30	0.129
6.58	0.190
6.78	0.254
7.26	0.266
7.68	0.398
8.50	0.481
8.71	0.550
9.85	0.981
12.4	0.984
12.9	0.970
13.1	0.925
13.3	0.616
13.5	0.484
13.9	0.376
14.2	0.303
14.7	0.246
CURVE 5 (cont.)	
15.4	0.232
15.7	0.153
16.4	0.090
17.4	0.050
19.0	0.026
24.4	0.019
24.8	0.037
25.0	0.076
25.2	0.236
25.6	0.323
26.3	0.413
27.5	0.478
28.4	0.512
29.0	0.548
29.3	0.556
29.8	0.552
32.1	0.603
32.7	0.613
33.3	0.608
33.9	0.594
35.7	0.620
38.8	0.651
45.0	0.675
CURVE 6	
T = 1600	
1.0	0.227
1.5	0.196
2.0	0.151
2.5	0.141
3.0	0.144
3.5	0.160
4.0	0.205
4.5	0.260
5.0	0.388
5.5	0.546
6.0	0.640
6.5	0.687
7.0	0.755
7.5	0.827
8.0	0.878
8.5	0.879
9.0	0.929
9.5	0.959
CURVE 6 (cont.)	
10.0	0.970
10.5	0.978
11.0	0.977
11.5	0.977
12.0	0.980
12.5	0.982
13.0	0.979
13.5	0.962
14.0	0.910
14.5	0.842
15.0	0.805
CURVE 7	
T = 1400	
1.0	0.201
1.5	0.162
2.0	0.124
2.5	0.114
3.0	0.114
3.5	0.133
4.0	0.181
4.5	0.229
5.0	0.368
5.5	0.526
6.0	0.623
6.5	0.659
7.0	0.732
7.5	0.809
8.0	0.855
8.5	0.871
9.0	0.926
9.5	0.958
10.0	0.972*
10.5	0.978*
11.0	0.981*
11.5	0.981*
12.0	0.982*
12.5	0.985*
13.0	0.983*
13.5	0.962*
14.0	0.899
14.5	0.830
15.0	0.804*
CURVE 8	
T = 1200	
1.0	0.182
1.5	0.131
2.0	0.095
2.5	0.088
3.0	0.088
3.5	0.102
4.0	0.149
4.5	0.191
5.0	0.336
5.5	0.502
6.0	0.593
6.5	0.613
7.0	0.692
7.5	0.777
8.0	0.840
8.5	0.852
9.0	0.911
9.5	0.947
10.0	0.966
10.5	0.976
11.0	0.975
11.5	0.976
12.0	0.983
12.5	0.983
13.0	0.979
13.5	0.951
14.0	0.875
14.5	0.809
15.0	0.793

* Not shown on plot

SPECIFICATION TABLE NO. 110 HEMISPHERICAL INTEGRATED REFLECTANCE OF MAGNESIUM OXIDE

Curve No.	Ref. No.	Year	Temperature Range, K	Geometry ω	θ'	ω'	Reported Error, %	Composition (weight percent), Specifications and Remarks
1*	295	1965	298	0°		2π		Powder.

DATA TABLE NO. 110 HEMISPHERICAL INTEGRATED REFLECTANCE OF MAGNESIUM OXIDE

[Temperature, T, K; Reflectance, ρ]

T	ρ
CURVE 1*	
298	0.97

*No plot given

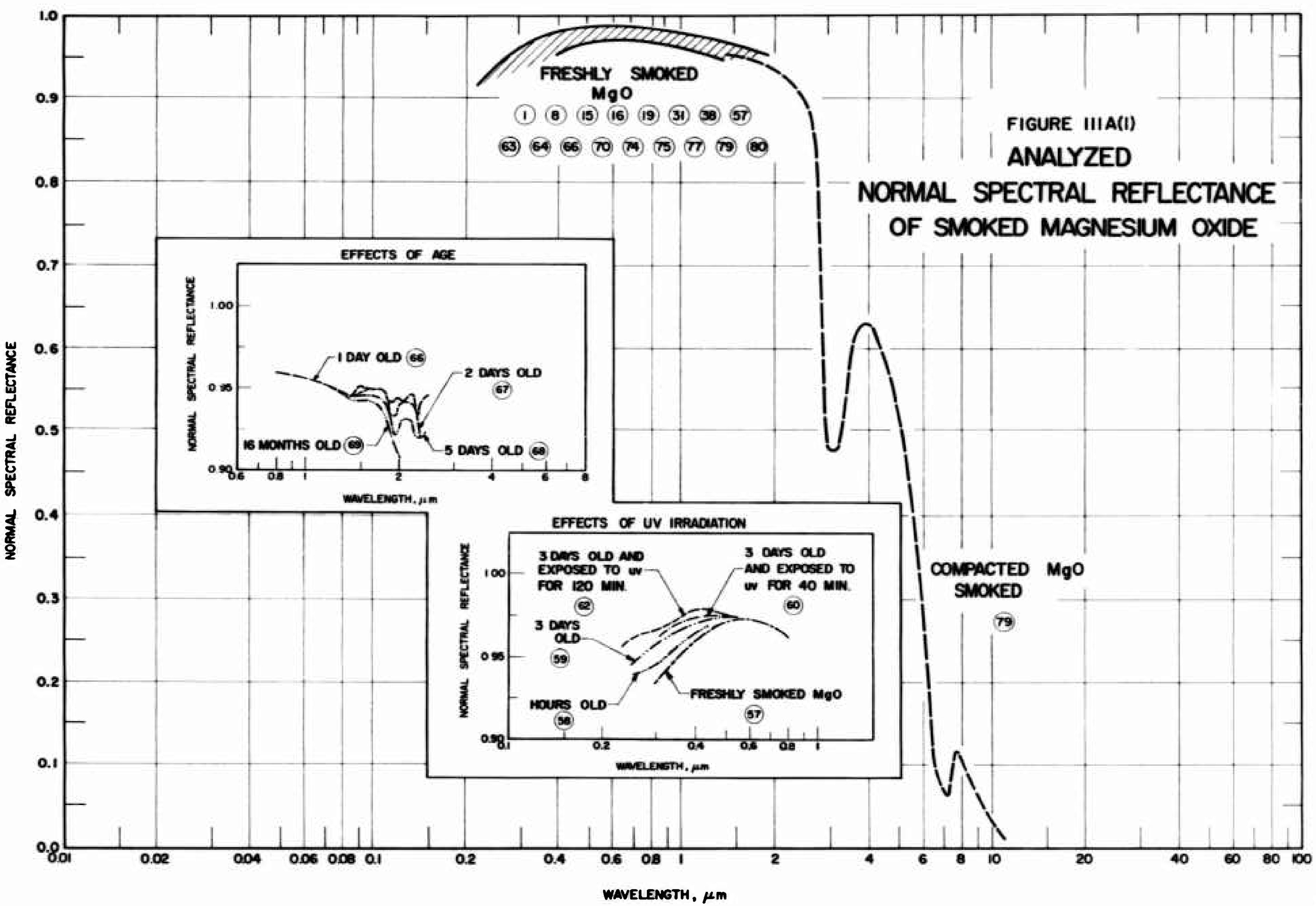


FIGURE III A(I)
ANALYZED
NORMAL SPECTRAL REFLECTANCE
OF SMOKED MAGNESIUM OXIDE
FRESHLY SMOKED MgO
1 8 15 16 19 31 38 57
63 64 66 70 74 75 77 79 80
COMPACTED MgO SMOKED
79
EFFECTS OF AGE
1 DAY OLD 66
2 DAYS OLD 67
16 MONTHS OLD 69
5 DAYS OLD 68
EFFECTS OF UV IRRADIATION
3 DAYS OLD AND EXPOSED TO uv FOR 120 MIN. 62
3 DAYS OLD AND EXPOSED TO uv FOR 40 MIN. 60
3 DAYS OLD 59
HOURS OLD 58
FRESHLY SMOKED MgO 57
NORMAL SPECTRAL REFLECTANCE
WAVELENGTH, μm

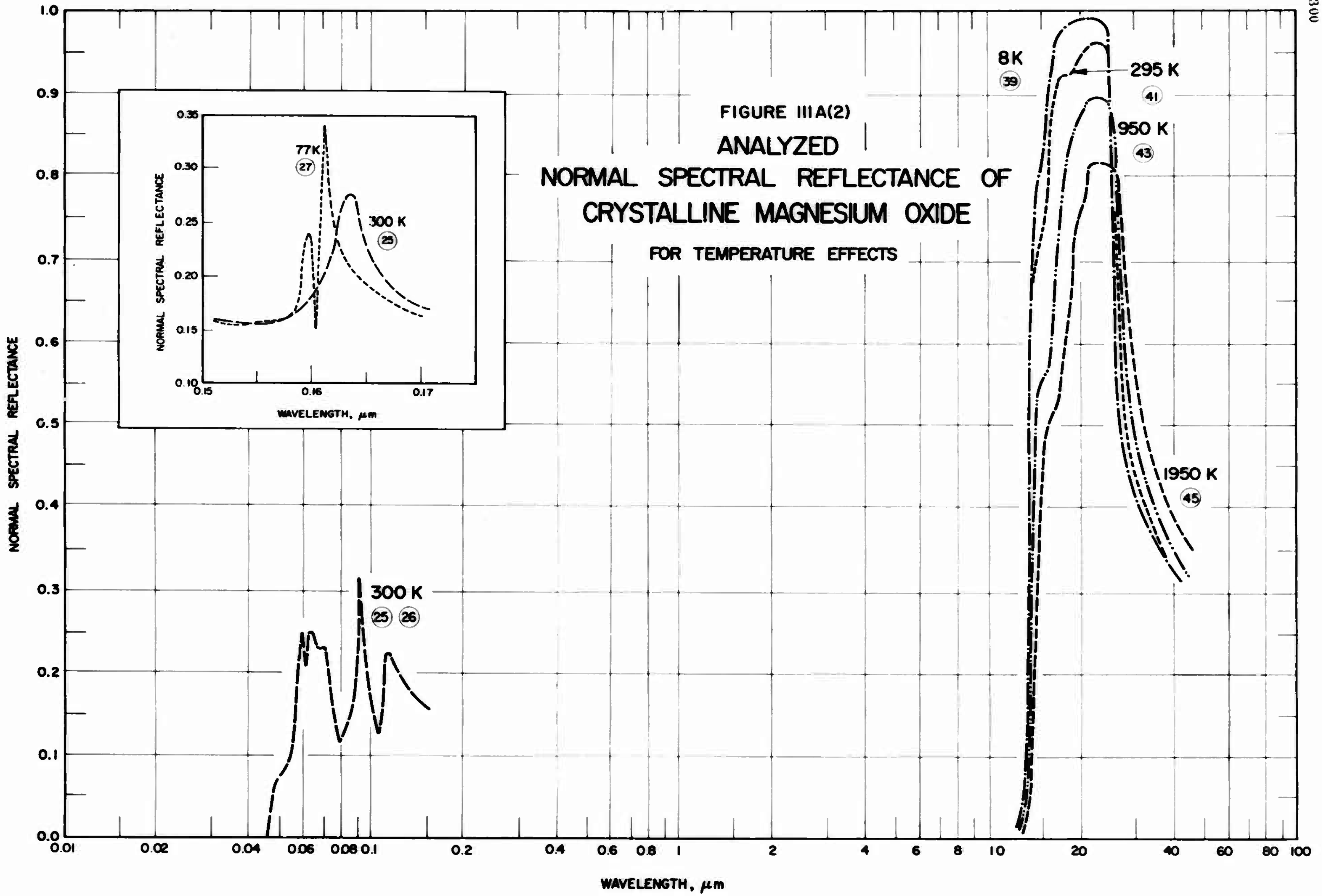


FIGURE IIIA(2)
ANALYZED
NORMAL SPECTRAL REFLECTANCE OF
CRYSTALLINE MAGNESIUM OXIDE
FOR TEMPERATURE EFFECTS

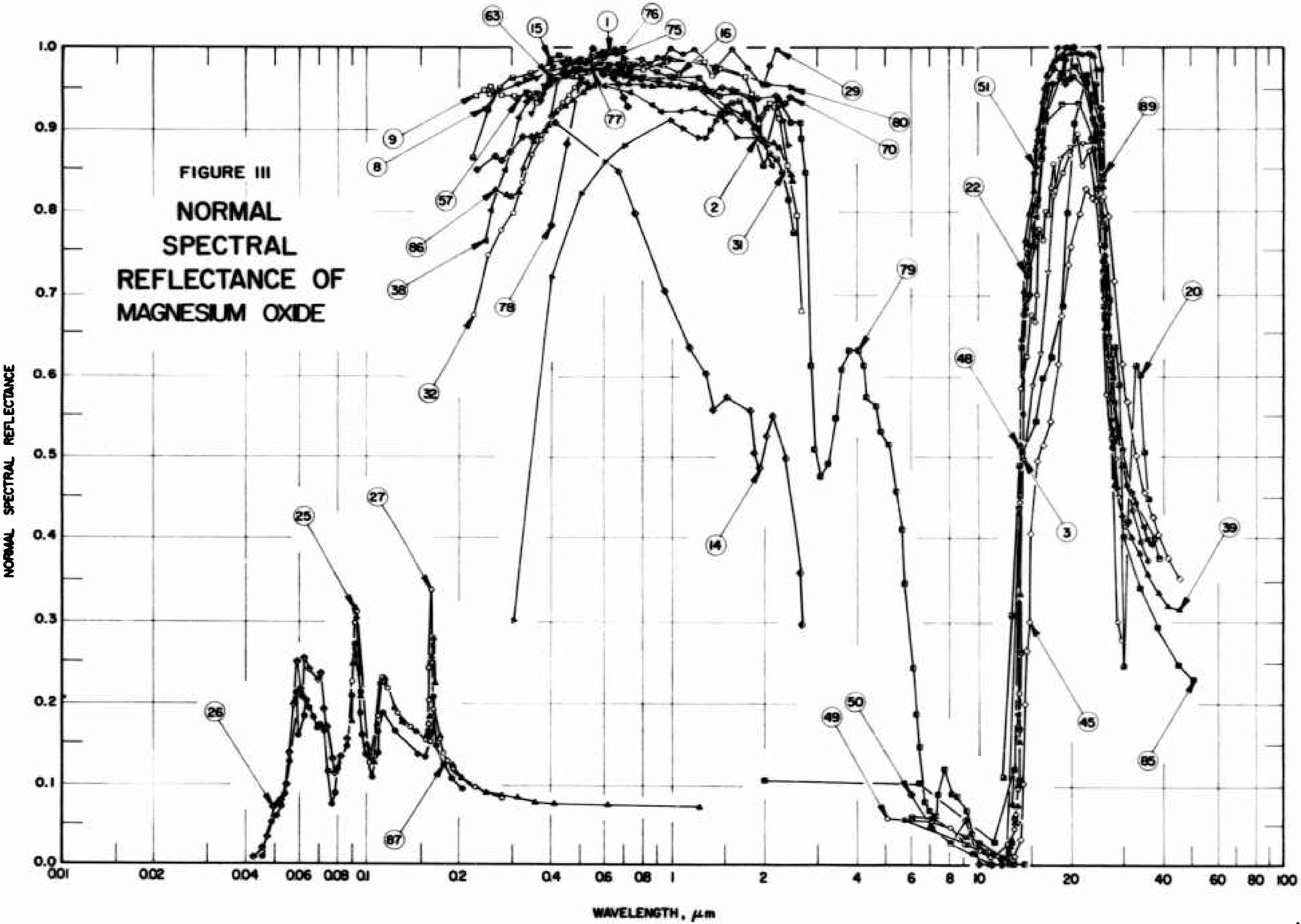


FIGURE III

NORMAL SPECTRAL REFLECTANCE OF MAGNESIUM OXIDE

SPECIFICATION TABLE NO. 111 NORMAL SPECTRAL REFLECTANCE OF MAGNESIUM OXIDE MgO

Curve No.	Ref. No.	Year	Temperature K	Wavelength Range, µm	Geometry θ	θ'	ω'	Reported Error, %	Composition (weight percent), Specifications, and Remarks
1	123	1947	298	0.458-0.625	~0°		2π		Formed by burning a Mg ribbon and allowing the smoke to deposit on a block of machined $MgCO_3$.
2	39	1957	298	0.30-2.40	9°		2π	±4	Refractory (Bureau of Standards); $MgCO_3$ reference standard; data extracted from smooth curve.
3	211	1963	298	13.1-30.0	~0°	~0°			No details given.
4*	82	1963	298	0.440-0.600	~0°		2π		Reagent-grade powder supplied by Mallinckrodt; compacted powder at 10 000 psi.
5*	82	1963	298	0.440-0.600	~0°		2π		Above specimen and conditions except exposed to uv irradiation 75 ESH with solar factor 1.5.
6*	82	1963	298	0.440-0.600	~0°		2π		Sintered piece supplied by Corning Glass Co.; compacted powder at 10 000 psi.
7*	82	1963	298	0.440-0.600	~0°		2π		Above specimen and conditions except exposed to uv irradiation; 300 ESH with solar factor 3.
8	125	1931	298	0.248-0.404	~5°		2π		Smoked MgO.
9	34	1966	298	0.230-2.65	0°		2π		>99 pure, compacted powder; compaction pressure 290 psi; MgO reference standard; data extracted from smooth curve.
10*	34	1966	298	0.230-2.65	0°		2π		Similar to the above specimen and conditions except compacted at 1150 psi.
11*	34	1966	298	0.230-2.65	0°		2π		Similar to the above specimen and conditions except compacted at 2880 psi.
12*	34	1966	298	0.220-2.65	0°		2π		Similar to the above specimen and conditions except compacted at 5760 psi.
13*	34	1966	298	0.230-2.65	0°		2π		Similar to the above specimen and conditions except compacted at 20 200 psi.
14	34	1966	298	0.230-2.65	0°		2π		Similar to the above specimen and conditions except compacted at 28 800 psi.
15	212	1966	298	0.40-0.75	0°		2π		Freshly smoked (1.0 mm thick); avg value of 20 measurements.
16	212	1966	298	0.73-1.08	0°		2π		Freshly smoked (1.0 mm thick); avg value of 18 specimens.
17*	212	1966	298	0.40-0.75	0°		2π		Reagent-grade (5 mm thick); avg value of 30 specimens.
18*	212	1966	298	0.73-1.08	0°		2π		Reagent-grade (5 mm thick); pressed.
19*	212	1966	298	0.40-0.75	0°		2π		Smoked; prepared in an argon-oxygen atm; best results obtained.
20	146	1966	~298	12.0-35.8	~0°	~0°			Clear, slightly cracking film deposited at normal incidence on glass (588 K) at 2 to 8×10^{-6} mm Hg; rate of firing 1 quarterwave per min at λ = 0.5 µm; optical film thickness 4.2 µm.
21*	146	1966	~298	12.0-36.9	~0°	~0°			Slight scatter seen; film deposited at normal incidence on glass (423 K) at 2 to 8×10^{-6} mm Hg; rate of firing 1 quarterwave per min at λ = 0.5 µm; optical film thickness 2.5 µm.
22	146	1966	~298	5.70-35.6	~0°	~0°			Crystal; polished; data extracted from smooth curve.
23*	213	1967	300	0.0861-0.310	8°	8°			Single crystal; freshly cleaved (exposed to air for about 2 min); measured in vacuum ($<10^{-7}$ mm Hg); data extracted from smooth curve.

* Not shown on plot

SPECIFICATION TABLE NO. 111 (continued)

Curve No.	Ref. No.	Year	Temperature K	Wavelength Range, μm	Geometry θ	θ'	ω'	Reported Error, %	Composition (weight percent), Specifications, and Remarks
24*	213	1967	77	0.106-0.170	8°	8°			Above specimen and conditions.
25	214	1967	300	0.0885-1.240	~8°	~8°		2	Single crystal; cleaved; exposed to air; measured in vacuum (10^{-6} mm Hg); additional data received from authors; hydrogen discharge source.
26	214	1967	300	0.0420-0.0885	~8°	~8°		2	Above specimen and conditions except argon discharge source.
27	214	1967	77	0.0886-1.240	~8°	~8°		2	Curve 25 specimen and conditions.
28*	214	1967	77	0.0420-0.0885	~8°	~8°		2	Above specimen and conditions except argon discharge source.
29	120	1962	298	0.4-2.2	0°		2π		Smoked; converted from R (2π,~0°).
30*	120	1962	298	0.4-2.2	0°		2π		Authors' designation: Specimen X74.
31	252	1968	~298	0.225-2.500	~0°		2π		Freshly smoked; avg of 15 samples.
32	252	1968	~298	0.225-0.520	~0°		2π		Similar to the above specimen and conditions except aged in air for 2 mos.
33*	252	1968	~298	0.200-0.800	~0°		2π		Freshly smoked; data extracted from smooth curve; relative to pressed $BaSO_4$ powder.
34*	252	1968	~298	0.200-0.800	~0°		2π		Similar to curve 33 specimen and conditions except aged in air for 4 days.
35*	252	1968	~298	0.200-0.800	~0°		2π		Similar to curve 33 specimen and conditions except aged 30 days in air.
36*	252	1968	~298	0.225-0.800	~0°		2π		Pressed powder; data extracted from smooth curve; relative to pressed $BaSO_4$.
37*	252	1968	~298	0.225-0.800	~0°		2π		Above specimen and conditions except exposed to 2.93 x 10^{21} ergs/cm^2 radiation from xenon arc source.
38	293	1964	~298	0.248-2.11	7°		2π		Freshly smoked; data extracted from smooth curve.
39	297	1966	8	12.5-45.5	~11°	~11°			Single crystal; high purity; polished to 0.5-wave at sodium d line; annealed in vacuum for 2 days at a temp of about 0.75 the melting temp of crystal; measured in inert atm; aluminized mirror reference standard.
40*	297	1966	85	12.6-45.5	~11°	~11°			Above specimen and conditions.
41*	297	1966	295	12.5-45.5	~11°	~11°			Above specimen and conditions.
42*	297	1966	545	12.7-45.5	~11°	~11°			Above specimen and conditions.
43*	297	1966	950	12.8-45.5	~11°	~11°			Above specimen and conditions.
44*	297	1966	1410	12.6-45.5	~11°	~11°			Above specimen and conditions.
45	297	1966	1950	12.7-45.5	~11°	~11°			Above specimen and conditions.
46*	283	1966	~298	0.4260-0.5400	0°		2π		Powder (2 mm thick) contained in a double walled plexiglas container; MgO reference standard; converted from R (2π, 0°); [Author's designation: Reflector No. VII].
47*	283	1966	~298	0.3019-0.5972	0°		2π		Above specimen and conditions except converted from R (0°, 2π).
48	315	1965	~298	8.00-38.8	0°	0°			Polycrystalline; prepared by hot compaction of analytical reagent grade magnesia powder from Mallinckrodt Chemical Works; contained traces of Fe and Ca; data extracted from smooth curve.

* Not shown on plot

SPECIFICATION TABLE NO. 111 (continued)

Curve No.	Ref. No.	Year	Temperature K	Wavelength Range, μm	Geometry θ	θ'	ω'	Reported Error, %	Composition (weight percent), Specifications, and Remarks
49	365	1964	~298	5.00-29.0	~0°	~0°			Single crystal from Semi-Elements; reflectance measured off a freshly cleaved face; bulk density 3.5833 g cm^{-3} at 298 K; rhodium mirror reference standard (ρ assumed to be 0.97 for $\lambda > 1$ μm.
50	365	1964	~298	5.00-28.0	~0°	~0°			Polycrystalline; hot-pressed; polished; grain size ~5 μm; bulk density 3.5803 g cm^{-3} at 298 K; rhodium mirror reference (ρ assumed to be 0.97 for $\lambda > 1$ μm.)
51	365	1964	~298	5.00-27.0	~0°	~0°			Polycrystalline (prepared at Alfred University); polished; rhodium mirror reference (ρ assumed to be 0.97 for $\lambda > 1$ μm).
52*	442	1951	~298	0.440-0.641	~0°		2π		Smoked; judged adequate by eye; polished silver plated on brass.
53*	442	1951	~298	0.440-0.640	~0°		2π		Above specimen and conditions except smoked further.
54*	442	1951	~298	0.441-0.641	~0°		2π		Above specimen and conditions except smoked further.
55*	442	1951	~298	0.441-0.621	~0°		2π		Above specimen and conditions except smoked further.
56*	442	1951	~298	0.441-0.621	~0°		2π		Above specimen and conditions except smoked further.
57	442	1951	~298	0.311-0.821	~0°		2π		Prepared by NBS method of burning magnesium turnings in zirconium silicate dish and raking into a clinker before smoke is allowed to impinge on surface to be coated; smoked until reflectance at 0.52 μm increased no further; polished silver plated on brass substrate; measured immediately after formation.
58*	442	1951	~298	0.247-0.800	~0°		2π		Above specimen and conditions except measured a short time later.
59*	442	1951	~298	0.239-0.526	~0°		2π		Above specimen and conditions except measured 3 days later.
60*	442	1951	~298	0.321-0.501	~0°		2π		Above specimen and conditions except measured after exposure to direct light from mercury and for 40 min.
61*	442	1951	~298	0.319-0.803	~0°		2π		Above specimen and conditions except measured after direct exposure to the mercury arc for 65 min.
62*	442	1951	~298	0.243-0.751	~0°		2π		Above specimen and conditions except measured after direct exposure to the mercury for 120 min.
63	442	1951	~298	0.401-0.731	~0°		2π		Prepared from short lengths (~10 cm) of magnesium ribbon burned ~15 cm below surface to be coated; smoked until reflectance at 0.52 μm increased no further; polished silver plated on brass substrate.
64*	442	1951	~298	0.360-0.700	~0°		2π		Similar to the above specimen and conditions; best surface obtained.
65*	442	1951	~298	0.309-0.700	~0°		2π		Above specimen and conditions except measured after 19 days.
66*	443	1953	~298	0.650-2.45	~0°		2π		Magnesium smoked until the reflectance at 0.52 μm increased no further; 1 day old.
67*	443	1953	~298	0.600-2.35	~0°		2π		Similar to the above specimen and conditions except 2 days old.
68*	443	1953	~298	0.707-2.40	~0°		2π		Similar to the above specimen and conditions except 5 days old.
69*	443	1953	~298	0.833-1.99	~0°		2π		Similar to the above specimen and conditions except 16 mos. old.

* Not shown on plot

SPECIFICATION TABLE NO. 111 (continued)

Curve No.	Ref. No.	Year	Temperature K	Wavelength Range, µm	Geometry θ	θ'	ω'	Reported Error, %	Composition (weight percent), Specifications, and Remarks
70	443	1953	~298	0.600-2.44	~0°		2π		Magnesium smoked until the reflectance at 0.52 µm increased no further; avg of three surfaces 1 day old; data extracted from smooth curve.
71*	446	1953	298	0.44-0.70	~0°		2π		Smoke electrostatically deposited on glass (0.2 mm thick).
72*	446	1953	298	0.44-0.70	~0°		2π		Similar to the above specimen and conditions except 0.6 mm thick.
73*	446	1953	298	0.44-0.70	~0°		2π		Similar to the above specimen and conditions except 1 mm thick.
74*	446	1953	298	0.44-0.70	~0°		2π		Similar to the above specimen and conditions except 6 mm thick.
75	446	1953	298	0.44-0.70	~0°		2π		Similar to the above specimen and conditions except 8 mm thick.
76	124	1956	298	0.350-0.700	~0°		2π		Magnesium oxide coating (1 mm thick) on magnesium oxide with acryl resin and magnesium carbonate substrates.
77	444	1952	298	0.40-0.72	~0°		2π		Freshly smoked surface of magnesium oxide prepared on a silver-plated copper disc, from burning ribbon (coating 1 mm thick).
78	444	1952	298	0.40-0.72	~0°		2π		Freshly smoked surface of magnesium oxide prepared on a silver-plated copper disc, from burning ribbon (coating >1 mm thick).
79	447	1965	~298	0.750-14.0	~0°		2π		Smoke from cleaned Mg ribbon accumulated and compacted; front-surface Al mirror reference standard.
80	215	1961	298	0.35-2.46	15°		2π	<2	Smoked MgO (2.8 mm thick); ~3 hrs old.
81*	215	1961	298	0.35-2.25	15°		2π	<2	Similar to the above specimen and conditions except ~6 days old.
82*	215	1961	298	0.32-2.50	15°		2π	<2	Smoked MgO (4.3 mm thick); 1 mo. old.
83*	216	1965	298	0.087-0.360	15°	15°			Single crystal; data extracted from smooth curve.
84*	216	1965	298	0.084-1.190	45°	45°			Above specimen and conditions.
85	102	1965	~298	2.00-50.0	30°	30°			Irtran 5 (1.0 mm thick); pressed and sintered; data extracted from smooth curve; aluminum mirror reference standard.
86	217	1967	~298	0.266-2.495	25°		2π		Smoked MgO.
87	218	1967	298	0.043-0.203	15°	15°			Single crystal (3.1 mm thick); 0.0057 Fe; cleaved in the (100) plane.
88*	283	1966	~298	0.2844-0.4829	45°	0°			MgO powder (A 5866, 2 mm thick) contained in a double-walled plexiglas container; MgO reference standard; geometry of data is for reflectance factor; data extracted from smooth curve; [Author's designation: No. VII].
89	450	1948	~298	11.9-36.8	~0°	~0°			Freshly cleaved crystal from the Norton Co.; data extracted from smooth curve; Al mirror reference standard.

* Not shown on plot

DATA TABLE NO. 111 NORMAL SPECTRAL REFLECTANCE OF MAGNESIUM OXIDE MgO

[Wavelength, λ, μm; Reflectance, ρ; Temperature, T, K]

λ	ρ
CURVE 1 T = 298	
0.458	0.982
0.485	0.983
0.513	0.987
0.545	0.990
0.555	0.991*
0.580	0.992*
0.625	0.995
CURVE 2 T = 298	
0.30	0.30
0.40	0.72
0.50	0.82
0.60	0.86
0.70	0.88
0.90	0.88
1.00	0.91
1.10	0.90
1.22	0.89
1.30	0.89
1.35	0.90
1.40	0.91
1.45	0.92
1.50	0.91
1.64	0.89
1.70	0.89*
1.90	0.89
1.98	0.88*
2.04	0.88
2.10	0.90*
2.20	0.93
2.30	0.91
2.40	0.88
CURVE 3 T = 298	
13.1	0.052
14.0	0.496
15.0	0.587
16.0	0.627
17.0	0.724
17.9	0.818
CURVE 3 (cont.)	
18.9	0.862
20.0	0.877
22.0	0.881
24.9	0.882
25.9	0.696
27.0	0.569
28.0	0.496
28.9	0.450
30.0	0.413
CURVE 4* T = 298	
0.440	0.985
0.600	0.985
CURVE 5* T = 298	
0.440	0.710
0.600	0.925
CURVE 6* T = 298	
0.440	0.830
0.600	0.960
CURVE 7* T = 298	
0.440	0.610
0.600	0.845
CURVE 8 T = 298	
0.248	0.928
0.265	0.946
0.313	0.959
0.366	0.963
0.404	0.978
CURVE 9 T = 298	
0.230	0.943
0.245	0.950
0.253	0.946
0.257	0.953
0.279	0.944
0.308	0.943
0.328	0.946*
0.345	0.946
0.350	0.938*
0.365	0.933
0.411	0.962
0.496	0.967
0.624	0.980
0.707	0.975
0.754	0.979*
0.809	0.974
0.984	0.982
1.30	0.982
1.38	0.968
1.45	0.974
1.55	0.976*
1.79	0.964
1.84	0.944
1.92	0.905
2.10	0.933
2.25	0.911
2.40	0.854
2.57	0.794
2.65	0.679
CURVE 10* T = 298	
0.230	0.935
0.238	0.940
0.243	0.936
0.251	0.947
0.277	0.938
0.285	0.932
0.336	0.940
0.345	0.936
0.350	0.943
0.425	0.966
0.609	0.971
CURVE 10 (cont.)	
0.790	0.953
0.875	0.950
0.944	0.941
1.01	0.941
1.14	0.922
1.27	0.908
1.38	0.870
1.55	0.861
1.81	0.814
1.86	0.784
1.93	0.736
2.06	0.755
2.23	0.736
2.33	0.679
2.55	0.587
2.60	0.556
2.61	0.507
2.62	0.472
2.65	0.445
CURVE 11* T = 298	
0.230	0.934
0.238	0.938
0.243	0.934
0.252	0.946
0.283	0.931
0.337	0.939
0.344	0.935
0.350	0.942
0.462	0.965
0.643	0.963
0.843	0.941
0.920	0.938
1.30	0.895
1.38	0.862
1.46	0.862
1.82	0.798
1.86	0.763
1.92	0.723
2.06	0.746
2.14	0.742
2.26	0.698
2.35	0.643
CURVE 11 (cont.)*	
2.42	0.616
2.49	0.580
2.56	0.551
2.58	0.523
2.59	0.487
2.62	0.448
2.65	0.409
CURVE 12* T = 298	
0.230	0.906
0.243	0.902
0.257	0.918
0.279	0.906
0.313	0.912
0.347	0.915
0.350	0.910
0.415	0.935
0.512	0.942
0.745	0.923
0.869	0.892
0.918	0.888
1.29	0.796
1.38	0.748
1.58	0.720
1.81	0.669
1.88	0.598
1.93	0.585
2.03	0.603
2.11	0.611
2.21	0.600
2.33	0.539
2.42	0.514
2.50	0.480
2.57	0.464
2.65	0.339
CURVE 13* T = 298	
0.230	0.887
0.234	0.887
0.238	0.880
0.246	0.886
CURVE 13 (cont.)*	
0.249	0.910
0.256	0.917
0.279	0.906
0.295	0.902
0.339	0.909
0.347	0.916
0.350	0.910
0.438	0.927
0.517	0.922
0.646	0.912
0.993	0.790
1.09	0.742
1.26	0.689
1.34	0.644
1.38	0.614
1.70	0.577
1.79	0.570
1.85	0.533
1.91	0.499
2.01	0.532
2.15	0.552
2.27	0.528
2.33	0.501
2.56	0.453
2.59	0.415
2.62	0.348
2.65	0.300
CURVE 14 T = 298	
0.230	0.850
0.265	0.868
0.279	0.866
0.296	0.870
0.326	0.890
0.350	0.890
0.417	0.907
0.669	0.849
0.753	0.799
0.949	0.702
1.15	0.634
1.30	0.602
1.37	0.559
1.51	0.571
CURVE 14 (cont.)	
1.81	0.556
1.86	0.501
1.92	0.483
2.02	0.524
2.13	0.550
2.20	0.544*
2.32	0.498
2.55	0.445*
2.61	0.359
2.65	0.295
CURVE 15 T = 298	
0.40	0.9886
0.43	0.9916
0.49	0.9909*
0.55	0.9892
0.61	0.9889*
0.67	0.9874
0.72	0.9861*
0.75	0.9851
CURVE 16 T = 298	
0.73	0.9871
0.75	0.9860*
0.80	0.9832
0.85	0.9613*
0.90	0.9802*
0.95	0.9812
1.00	0.9798*
1.05	0.9767*
1.08	0.9758
CURVE 17* T = 298	
0.40	0.9841
0.43	0.9877
0.49	0.9902
0.55	0.9908
0.61	0.9914
0.67	0.9920
CURVE 17 (cont.)*	
0.72	0.9912
0.75	0.9913
CURVE 18* T = 298	
0.73	0.9936
0.75	0.9937
0.80	0.9941
0.85	0.9934
0.90	0.9925
0.95	0.9882
1.00	0.9913
1.05	0.9913
1.08	0.9909
CURVE 19* T = 298	
0.40	0.9931
0.43	0.9934
0.49	0.9970
0.55	0.9954
0.61	0.9950
0.67	0.9948
0.72	0.9943
0.75	0.9949
CURVE 20 T ~ 298	
12.0	0.109
12.9	0.309
13.5	0.488
13.9	0.634
15.4	0.749
15.6	0.775*
15.8	0.812
16.8	0.915
17.9	0.952*
18.8	0.963
19.8	0.971*
20.8	0.976
21.9	0.964*
22.8	0.959

*Not shown on plot

DATA TABLE NO. 111 (continued)

λ	ρ
CURVE 20 (cont.) T ~ 298	
23.9	0.911
25.9	0.684
27.3	0.598
27.9	0.635
28.8	0.589
29.2	0.487
29.5	0.316*
29.9	0.244
30.9	0.417
31.7	0.564*
32.7	0.611
33.7	0.600
34.8	0.502
35.8	0.448
CURVE 21* T ~ 298	
12.0	0.093
12.5	0.210
12.8	0.286
13.5	0.457
14.9	0.623
15.9	0.754
16.9	0.861
17.9	0.906
19.0	0.920
19.9	0.929
20.8	0.931
22.1	0.932
22.8	0.925
23.4	0.859
23.9	0.820
24.4	0.774
25.9	0.692
27.9	0.537
28.8	0.572
29.8	0.592
30.7	0.545
31.9	0.451
32.8	0.376
33.9	0.286
35.0	0.238
35.9	0.285
36.9	0.318

λ	ρ
CURVE 22 T ~ 298	
5.70	0.055
9.20	0.024
11.6	0.006
12.4	0.012
12.8	0.028
13.1	0.061
14.0	0.551
14.2	0.686
14.5	0.720
15.2	0.752
15.8	0.806
16.2	0.869
16.9	0.920
17.9	0.958
20.7	0.964
22.9	0.958*
23.5	0.943
23.9	0.911*
25.2	0.738
25.8	0.667*
26.4	0.624
27.4	0.572*
28.4	0.524
29.4	0.490*
30.5	0.462
31.6	0.433
33.9	0.393
35.6	0.371
CURVE 23* T = 300	
0.0861	0.142
0.0881	0.170
0.0891	0.200
0.0916	0.318
0.0936	0.274
0.0960	0.200
0.0976	0.170
0.101	0.143
0.103	0.129
0.106	0.127
0.106	0.140
0.110	0.221
0.112	0.228

λ	ρ
CURVE 23 (cont.)*	
0.115	0.217
0.121	0.192
0.127	0.180
0.134	0.174
0.154	0.162
0.157	0.161
0.164	0.276
0.166	0.210
0.171	0.165
0.176	0.145
0.188	0.126
0.202	0.111
0.223	0.100
0.258	0.090
0.310	0.084
CURVE 24* T = 77	
0.106	0.138
0.107	0.184
0.110	0.226
0.114	0.228
0.115	0.219
0.122	0.195
0.127	0.180*
0.133	0.175
0.140	0.171
0.152	0.163
0.155	0.165
0.158	0.177
0.160	0.230
0.161	0.371
0.162	0.299
0.164	0.277
0.166	0.210*
0.170	0.168
CURVE 25 T = 300	
0.0885	0.176
0.0892	0.194*
0.0898	0.225*
0.0901	0.246
0.0911	0.298*

λ	ρ
CURVE 25 (cont.)	
0.0915	0.313*
0.0918	0.316
0.0921	0.312*
0.0925	0.304
0.0932	0.286*
0.0935	0.277*
0.0953	0.216*
0.0957	0.206
0.0968	0.184*
0.0984	0.162*
0.1000	0.147
0.1024	0.130*
0.1033	0.126*
0.1042	0.124
0.1050	0.125*
0.1064	0.134*
0.1078	0.172
0.1087	0.192*
0.1097	0.210*
0.1107	0.222
0.1112	0.225*
0.1117	0.226*
0.1127	0.227
0.1137	0.225*
0.1148	0.221*
0.1180	0.206*
0.1215	0.192
0.1265	0.180*
0.1278	0.178*
0.1305	0.175
0.1333	0.172*
0.1377	0.170*
0.1458	0.164*
0.1512	0.161*
0.1530	0.159*
0.1550	0.157*
0.1559	0.157
0.1569	0.158*
0.1579	0.160*
0.1583	0.162*
0.1589	0.167*
0.1600	0.181
0.1610	0.200*
0.1614	0.211*
0.1618	0.222*
0.1623	0.238*

λ	ρ
CURVE 25 (cont.)	
0.1625	0.246*
0.1627	0.256
0.1629	0.265*
0.1631	0.271*
0.1633	0.274*
0.1635	0.276
0.1638	0.275*
0.1640	0.273*
0.1642	0.267*
0.1644	0.256*
0.1646	0.246*
0.1648	0.238*
0.1653	0.225
0.1657	0.216*
0.1664	0.205*
0.1675	0.190*
0.1687	0.179*
0.1698	0.171*
0.1722	0.157
0.1771	0.141*
0.1722	0.157
0.1771	0.141*
0.1907	0.121
0.2066	0.107
0.2254	0.0972*
0.2480	0.0905
0.2755	0.0857
0.3100	0.0818
0.3542	0.0788
0.4133	0.0764
0.6200	0.0728
1.240	0.0705
CURVE 26 T = 300	
0.0420	0.0064
0.0427	0.0088*
0.0435	0.0116*
0.0442	0.0155*
0.0450	0.0200
0.0459	0.0260*
0.0467	0.0330
0.0476	0.0420*
0.0486	0.0540*
0.0497	0.0700

λ	ρ
CURVE 26 (cont.)	
0.0500	0.0730*
0.0502	0.0750
0.0504	0.0740*
0.0508	0.0710*
0.0510	0.0705*
0.0512	0.0710*
0.0516	0.0760*
0.0521	0.0800
0.0525	0.0830*
0.0534	0.0890*
0.0536	0.0910*
0.0539	0.0940*
0.0541	0.100
0.0551	0.139
0.0563	0.198
0.0571	0.230*
0.0576	0.241*
0.0579	0.245*
0.0582	0.248*
0.0584	0.250
0.0587	0.249*
0.0590	0.246*
0.0593	0.240*
0.0596	0.231*
0.0601	0.217
0.0604	0.211*
0.0607	0.207*
0.0610	0.209
0.0613	0.218*
0.0616	0.232*
0.0620	0.246*
0.0623	0.250*
0.0626	0.252
0.0629	0.251*
0.0632	0.250*
0.0642	0.240
0.0645	0.238*
0.0652	0.237*
0.0656	0.236*
0.0663	0.236*
0.0666	0.235*
0.0670	0.233*
0.0681	0.227
0.0688	0.224*
0.0692	0.224*
0.0696	0.227*

λ	ρ
CURVE 26 (cont.)	
0.0700	0.233*
0.0702	0.234
0.0704	0.233*
0.0708	0.227*
0.0712	0.218*
0.0720	0.191
0.0729	0.181*
0.0733	0.178*
0.0738	0.170
0.0746	0.143*
0.0756	0.130
0.0765	0.122*
0.0775	0.115*
0.0779	0.113*
0.0784	0.112
0.0789	0.113*
0.0800	0.119*
0.0810	0.127*
0.0821	0.132
0.0837	0.139*
0.0867	0.154
0.0879	0.164*
0.0885	0.176*
CURVE 27 T = 77	
0.0886	0.176*
0.0892	0.194*
0.0898	0.225
0.0902	0.246*
0.0912	0.298
0.0915	0.313*
0.0918	0.316*
0.0922	0.312
0.0925	0.304*
0.0932	0.286*
0.0936	0.277*
0.0954	0.216*
0.0957	0.206*
0.0969	0.184*
0.0984	0.162*
0.1000	0.147*
0.1025	0.130*
0.1033	0.126*
0.1042	0.124

λ	ρ
CURVE 27 (cont.)	
0.1051	0.125*
0.1064	0.134*
0.1078	0.182
0.1088	0.204*
0.1097	0.223*
0.1107	0.229*
0.1117	0.230
0.1127	0.229*
0.1138	0.226*
0.1159	0.218
0.1181	0.208*
0.1240	0.188
0.1265	0.182*
0.1305	0.176*
0.1378	0.170
0.1459	0.166*
0.1494	0.162*
0.1512	0.158*
0.1531	0.155
0.1550	0.155
0.1559	0.157*
0.1569	0.160*
0.1579	0.160*
0.1586	0.172*
0.1589	0.188*
0.1592	0.202
0.1594	0.215*
0.1596	0.231
0.1598	0.241
0.1600	0.227*
0.1602	0.190*
0.1603	0.159*
0.1604	0.152
0.1606	0.179*
0.1607	0.205*
0.1608	0.248*
0.1609	0.270*
0.1610	0.300*
0.1611	0.337*
0.1612	0.339
0.1614	0.310*
0.1617	0.282*
0.1621	0.248
0.1625	0.232*
0.1632	0.217*
0.1642	0.202*

* Not shown on plot

DATA TABLE NO. 111 (continued)

λ	ρ
CURVE 27 (cont.) T = 77	
0.1653	0.191
0.1676	0.175*
0.1699	0.163*
0.1722	0.154
0.1771	0.139
0.1823	0.129*
0.1908	0.118
0.2067	0.105*
0.2254	0.0970
0.2480	0.0905*
0.2756	0.0857*
0.3100	0.0818*
0.3543	0.0788*
0.4133	0.0764*
0.6200	0.0728*
1.240	0.0705*
CURVE 28* T = 77	
0.0420	0.0064
0.0427	0.0088
0.0435	0.0116
0.0442	0.0155
0.0450	0.0200
0.0459	0.0260
0.0467	0.0330
0.0476	0.0420
0.0486	0.0540
0.0497	0.0700
0.0500	0.0730
0.0502	0.0750
0.0504	0.0740
0.0506	0.0710
0.0510	0.0705
0.0512	0.0710
0.0516	0.0760
0.0521	0.0800
0.0525	0.0830
0.0534	0.0890
0.0536	0.0910
0.0539	0.0940
0.0541	0.100
0.0551	0.139
0.0563	0.198

λ	ρ
CURVE 28 (cont.)*	
0.0571	0.230
0.0576	0.241
0.0579	0.245
0.0582	0.248
0.0584	0.250
0.0587	0.249
0.0590	0.246
0.0593	0.240
0.0596	0.231
0.0601	0.217
0.0604	0.211
0.0607	0.207
0.0610	0.209
0.0613	0.218
0.0616	0.232
0.0620	0.246
0.0623	0.250
0.0626	0.252
0.0629	0.251
0.0632	0.250
0.0642	0.240
0.0645	0.238
0.0652	0.237
0.0656	0.236
0.0663	0.236
0.0666	0.235
0.0670	0.233
0.0681	0.227
0.0688	0.224
0.0692	0.224
0.0696	0.227
0.0700	0.233
0.0702	0.234
0.0704	0.233
0.0708	0.227
0.0712	0.218
0.0720	0.191
0.0729	0.181
0.0733	0.178
0.0738	0.170
0.0746	0.143
0.0756	0.130
0.0765	0.122
0.0775	0.115
0.0779	0.113
0.0784	0.112
0.0789	0.113
0.0800	0.119

λ	ρ
CURVE 28 (cont.)*	
0.0810	0.127
0.0821	0.132
0.0837	0.139
0.0867	0.154
0.0879	0.164
0.0885	0.176
CURVE 29 T = 298	
0.4	0.915
0.42	0.96
0.45	0.966*
0.5	0.985
0.55	0.98*
0.55	0.985*
0.6	0.988
0.65	0.99
0.7	0.988
0.75	0.9825*
0.8	0.985
0.85	0.98
0.9	0.988
0.95	0.987
1.0	0.99
1.1	0.992
1.2	0.99
1.3	0.983*
1.4	0.972
1.6	0.99
1.8	0.975
2.0	0.955
2.1	0.978
2.2	0.99
CURVE 30* T = 298	
0.4	0.83
0.42	0.827
0.45	0.868
0.5	0.914
0.55	0.945
0.55	0.93
0.6	0.937
0.65	0.937

λ	ρ
CURVE 30 (cont.)*	
0.7	0.945
0.75	0.935
0.8	0.9375
0.85	0.934
0.9	0.942
0.95	0.94
1.0	0.945
1.1	0.942
1.2	0.932
1.3	0.88
1.4	0.89
1.6	0.895
1.8	0.845
2.0	0.735
2.1	0.71
2.2	0.65
CURVE 31 T ~ 298	
0.225	0.865
0.250	0.926
0.275	0.951
0.300	0.965
0.325	0.967*
0.350	0.970
0.375	0.978*
0.400	0.982
0.420	0.984*
0.440	0.986*
0.460	0.987*
0.480	0.987*
0.500	0.986*
0.520	0.986*
0.540	0.986
0.560	0.983*
0.580	0.982
0.600	0.981*
0.620	0.981*
0.640	0.981*
0.660	0.981*
0.680	0.981*
0.700	0.981
0.800	0.978*
0.900	0.972
1.000	0.966

λ	ρ
CURVE 31 (cont.)	
1.100	0.965*
1.200	0.957
1.300	0.956*
1.400	0.939*
1.500	0.922
1.600	0.934
1.700	0.935
1.800	0.921
1.900	0.881*
2.000	0.854
2.100	0.870
2.200	0.861
2.300	0.847
2.400	0.814
2.500	0.773
CURVE 32 T ~ 298	
0.225	0.672
0.250	0.746
0.275	0.775
0.300	0.799
0.325	0.832
0.350	0.869
0.375	0.887
0.400	0.906*
0.420	0.922
0.440	0.933
0.460	0.942
0.480	0.951
0.500	0.957
0.520	0.963*
CURVE 33* T ~ 298	
0.200	0.963
0.223	0.941
0.232	0.937
0.244	0.934
0.280	0.962
0.310	0.987
0.329	1.000
0.371	0.994
0.408	0.990

λ	ρ
CURVE 33 (cont.)*	
0.459	0.990
0.520	0.994
0.583	0.992
0.655	0.996
0.688	0.998
0.800	0.998
CURVE 34* T ~ 298	
0.200	0.800
0.219	0.750
0.223	0.744
0.233	0.752
0.252	0.796
0.273	0.856
0.290	0.910
0.303	0.945
0.314	0.963
0.322	0.974
0.338	0.984
0.365	0.984
0.420	0.979
0.485	0.987
0.544	0.987
0.582	0.980
0.621	0.980
0.672	0.991
0.715	0.996
0.800	0.996
CURVE 35* T ~ 298	
0.200	0.777
0.216	0.809
0.224	0.821
0.236	0.821
0.254	0.811
0.271	0.815
0.279	0.824
0.295	0.853
0.318	0.895
0.331	0.916
0.341	0.923
0.360	0.925

λ	ρ
CURVE 35 (cont.)*	
0.380	0.918
0.399	0.915
0.418	0.917
0.502	0.952
0.659	0.979
0.800	0.979
CURVE 36* T ~ 298	
0.225	0.622
0.234	0.809
0.239	0.845
0.245	0.867
0.249	0.879
0.259	0.889
0.288	0.889
0.303	0.898
0.313	0.909
0.324	0.920
0.347	0.924
0.367	0.938
0.400	0.969
0.422	0.978
0.451	0.980
0.538	0.977
0.666	0.980
0.728	0.983
0.800	0.988
CURVE 37* T ~ 298	
0.225	0.755
0.235	0.815
0.244	0.864
0.253	0.881
0.265	0.889
0.285	0.889
0.308	0.907
0.329	0.926
0.362	0.945
0.408	0.956
0.479	0.959
0.545	0.976
0.666	0.980

λ	ρ
CURVE 37 (cont.)*	
0.728	0.983
0.800	0.988
CURVE 38 T ~ 298	
0.248	0.762
0.255	0.800
0.281	0.850
0.299	0.874*
0.316	0.915
0.336	0.935
0.358	0.948*
0.441	0.966
0.466	0.961*
0.522	0.959
0.545	0.958*
0.572	0.959*
0.600	0.955
0.739	0.949
0.867	0.931
0.882	0.926*
0.927	0.922
1.09	0.924
1.21	0.929
1.29	0.921
1.45	0.918
1.51	0.923*
1.55	0.921
1.70	0.910
1.80	0.915
1.95	0.900
2.03	0.884*
2.08	0.863*
2.11	0.853
CURVE 39 T = 8	
45.5	0.314
43.5	0.318*
41.7	0.319
40.0	0.327*
38.5	0.335
37.2	0.346*
35.7	0.356

* Not shown on plot

DATA TABLE NO. 111 (continued)

λ	ρ
CURVE 39 (cont.) T = 8	
34.6	0.369*
33.4	0.381
32.4	0.390*
31.3	0.400
30.4	0.417*
29.4	0.428
28.7	0.445*
27.8	0.464
27.1	0.511
26.4	0.576*
25.8	0.658
25.1	0.827
24.5	0.974
23.9	0.991
23.3	0.991*
22.8	0.991*
22.3	0.991*
21.8	0.992*
21.3	0.992
20.9	0.992*
20.5	0.992*
20.1	0.992
19.7	0.992*
19.3	0.990
18.9	0.991*
18.6	0.987
18.2	0.984*
17.9	0.978
17.6	0.972*
17.3	0.972*
17.0	0.968
16.7	0.960*
16.4	0.935
16.2	0.923*
15.9	0.900
15.6	0.872
15.4	0.855*
15.2	0.828
14.9	0.799
14.7	0.792*
14.5	0.783*
14.3	0.761
14.1	0.753*
14.0	0.703
13.9	0.644

λ	ρ
CURVE 39 (cont.)	
13.7	0.332
13.5	0.152
13.3	0.100
13.1	0.072
13.0	0.052
12.8	0.036*
12.6	0.027*
12.5	0.020
CURVE 40* T = 85	
45.5	0.310
43.7	0.311
41.8	0.322
40.0	0.330
38.5	0.337
37.0	0.347
35.7	0.362
34.5	0.372
33.3	0.383
32.3	0.393
31.2	0.406
30.4	0.421
29.4	0.443
28.7	0.461
27.9	0.484
27.1	0.531
26.4	0.621
25.7	0.700
25.0	0.911
24.4	0.964
23.8	0.975
23.3	0.980
22.7	0.977
22.2	0.979
21.8	0.979
21.3	0.979
20.9	0.979
20.4	0.980
20.0	0.977
19.6	0.979
19.3	0.979
18.9	0.972
18.6	0.972
18.2	0.969

λ	ρ
CURVE 40 (cont.)*	
17.9	0.964
17.5	0.959
17.2	0.953
16.9	0.943
16.7	0.943
16.4	0.913
16.2	0.895
15.9	0.867
15.6	0.837
15.4	0.806
15.2	0.788
14.9	0.777
14.7	0.761
14.5	0.753
14.3	0.700
14.1	0.700
13.9	0.451
13.7	0.228
13.5	0.140
13.3	0.090
13.1	0.069
13.0	0.044
12.8	0.030
12.6	0.019
CURVE 41* T = 295	
45.5	0.314
43.5	0.312
41.8	0.321
40.2	0.329
38.5	0.339
37.2	0.349
35.8	0.363
34.6	0.375
33.4	0.388
32.4	0.400
31.3	0.420
30.4	0.438
29.5	0.460
28.7	0.485
27.8	0.525
27.1	0.575
26.4	0.645
25.8	0.756

λ	ρ
CURVE 41 (cont.)*	
25.1	0.905
24.5	0.954
23.9	0.958
23.4	0.960
22.8	0.965
22.3	0.965
21.8	0.956
21.4	0.960
20.9	0.955
20.5	0.951
20.0	0.945
19.6	0.940
19.3	0.935
18.9	0.930
18.6	0.928
18.2	0.930
17.9	0.928
17.6	0.920
17.3	0.915
16.9	0.912
16.7	0.884
16.4	0.863
16.1	0.836
15.9	0.795
15.6	0.762
15.4	0.741
15.2	0.726
14.9	0.727
14.7	0.715
14.5	0.702
14.3	0.686
14.1	0.576
13.9	0.336
13.7	0.173
13.5	0.106
13.3	0.072
13.2	0.044
13.0	0.035
12.8	0.027
12.6	0.019
12.5	0.012

λ	ρ
CURVE 42* T = 545	
45.5	0.322
43.7	0.325
41.8	0.334
40.0	0.343
38.5	0.356
37.0	0.365
35.7	0.375
34.5	0.388
33.3	0.400
32.3	0.419
31.2	0.433
30.4	0.453
29.4	0.477
28.7	0.507
27.9	0.548
27.1	0.600
26.4	0.681
25.7	0.800
25.0	0.837
24.4	0.920
23.8	0.931
23.3	0.934
22.7	0.934
22.2	0.931
21.8	0.928
21.3	0.930
20.9	0.916
20.4	0.917
20.0	0.909
19.6	0.901
19.3	0.899
18.9	0.890
18.6	0.886
18.2	0.879
17.9	0.868
17.5	0.859
17.2	0.838
16.9	0.819
16.7	0.800
16.4	0.759
16.2	0.725
15.9	0.674
15.6	0.648
15.4	0.635
15.2	0.629

λ	ρ
CURVE 42 (cont.)*	
14.9	0.630
14.7	0.625
14.5	0.604
14.3	0.581
14.1	0.500
13.9	0.300
13.5	0.155
13.3	0.074
13.2	0.044
13.0	0.030
12.8	0.023
12.7	0.013
CURVE 43* T = 950	
45.5	0.322
43.5	0.333
41.8	0.344
40.2	0.354
38.6	0.362
37.2	0.374
35.8	0.394
34.7	0.403
33.4	0.418
32.5	0.434
31.3	0.454
30.4	0.474
29.5	0.503
28.7	0.554
27.9	0.603
27.1	0.674
26.5	0.776
25.7	0.852
25.1	0.878
24.5	0.891
23.9	0.895
23.3	0.900
22.8	0.906
22.3	0.906
21.8	0.903
21.4	0.892
20.9	0.887
20.4	0.881
20.1	0.874
19.7	0.866

λ	ρ
CURVE 43 (cont.)*	
19.3	0.853
18.9	0.844
18.5	0.827
18.2	0.813
17.9	0.794
17.6	0.769
17.3	0.730
17.0	0.697
16.7	0.656
16.4	0.614
16.2	0.592
15.9	0.580
15.6	0.567
15.4	0.563
15.2	0.558
14.9	0.553
14.7	0.533
14.5	0.508
14.3	0.479
14.1	0.388
13.9	0.234
13.7	0.113
13.5	0.079
13.3	0.054
13.2	0.037
13.0	0.026
12.8	0.022
CURVE 44* T = 1410	
45.5	0.337
43.5	0.347
41.7	0.356
40.2	0.367
38.5	0.377
37.2	0.387
35.7	0.407
34.6	0.429
33.4	0.441
32.4	0.462
31.3	0.486
30.4	0.514
29.5	0.549
28.7	0.616
27.9	0.683

λ	ρ
CURVE 44 (cont.)*	
27.1	0.749
26.5	0.800
25.8	0.827
25.1	0.844
24.4	0.848
23.9	0.855
23.4	0.851
22.8	0.859
22.3	0.853
21.8	0.848
21.3	0.840
20.9	0.826
20.4	0.814
20.1	0.798
19.6	0.778
19.3	0.760
18.9	0.739
18.6	0.710
18.2	0.683
17.9	0.649
17.6	0.604
17.3	0.579
17.0	0.560
16.7	0.546
16.4	0.536
16.2	0.531
15.9	0.525
15.6	0.520
15.4	0.505
15.2	0.490
14.9	0.469
14.7	0.439
14.5	0.399
14.3	0.361
14.1	0.294
13.9	0.182
13.7	0.078
13.5	0.050
13.3	0.031
13.2	0.023
13.0	0.018
12.8	0.012
12.6	0.005

* Not shown on plot

DATA TABLE NO. 111 (continued)

λ	ρ
CURVE 45	**T = 1950**
45.5	0.353
43.5	0.368*
41.8	0.377
40.0	0.394*
38.5	0.401
37.0	0.423
35.8	0.437*
34.5	0.454
33.3	0.478*
32.3	0.500
31.3	0.535*
30.4	0.567
29.5	0.614
28.7	0.662*
27.9	0.715
27.1	0.763*
26.4	0.792
25.8	0.804*
25.1	0.815
24.4	0.815*
23.9	0.815*
23.3	0.814
22.8	0.816*
22.3	0.823
21.8	0.818*
21.3	0.796
20.9	0.777*
20.4	0.762*
20.0	0.752
19.6	0.733
19.2	0.696*
18.9	0.671
18.6	0.641*
18.2	0.615
17.9	0.593*
17.5	0.563*
17.2	0.543
16.9	0.526*
16.7	0.521*
16.4	0.519*
16.1	0.513
15.9	0.501*
15.6	0.492
15.4	0.467*
15.2	0.442*
CURVE 45 (cont.)	
14.9	0.404
14.7	0.356*
14.5	0.300
14.3	0.265
14.0	0.200
13.9	0.102
13.7	0.056*
13.5	0.031
13.3	0.015*
13.1	0.012*
13.0	0.010
12.8	0.005*
12.7	0.003
CURVE 46*	**T = 298**
0.4260	0.947
0.4570	0.949
0.4950	0.952
0.5400	0.952
CURVE 47*	**T ~ 298**
0.3019	0.611
0.3108	0.729
0.3188	0.798
0.3268	0.833
0.3397	0.868
0.3543	0.900
0.3697	0.917
0.3964	0.930
0.4397	0.939
0.5972	0.930
CURVE 48	**T ~ 298**
8.00	0.028
9.50	0.011
10.6	0.000
12.5	0.000
13.0	0.054
13.3	0.113
13.4	0.167
13.6	0.261
13.6	0.439
13.7	0.511
CURVE 48 (cont.)	
13.9	0.633*
14.1	0.698
14.3	0.732
14.5	0.767*
15.2	0.767
15.6	0.793*
16.1	0.861
16.9	0.909
19.0	0.933
21.1	0.933
23.7	0.888
24.8	0.824
25.7	0.725
26.7	0.647
27.8	0.568*
29.1	0.507
31.5	0.455
37.3	0.399
38.8	0.375
CURVE 49	**T ~ 298**
5.00	0.057
6.00	0.057
7.00	0.054
8.00	0.047
9.00	0.024
10.0	0.018
10.9	0.009
11.9	0.008
12.4	0.022
12.6	0.025*
13.0	0.044
13.2	0.096
13.5	0.214
13.7	0.444
13.9	0.584
13.9	0.621*
14.0	0.623
14.4	0.666*
14.9	0.672
15.1	0.664
15.3	0.666*
15.5	0.700
15.7	0.740*
15.9	0.779
CURVE 49 (cont.)	
16.0	0.762
16.4	0.800
16.7	0.793*
17.0	0.795
17.2	0.806*
17.4	0.826
17.7	0.857
17.8	0.849*
17.9	0.822
18.0	0.842*
19.0	0.848
20.0	0.866
21.0	0.893
22.0	0.854
23.0	0.871
24.0	0.810
25.0	0.759
26.0	0.578
27.0	0.520
28.0	0.300
29.0	0.276
CURVE 50	**T ~ 298**
5.00	0.057*
6.00	0.087
7.00	0.047
8.00	0.028*
9.00	0.053
10.0	0.000
11.0	0.000
11.9	0.000
12.9	0.022
13.9	0.051*
14.0	0.671
14.1	0.680*
14.7	0.700
15.0	0.753*
15.1	0.779
15.3	0.807*
15.4	0.847
15.9	0.854*
16.1	0.878
16.4	0.922*
16.7	0.925*
CURVE 50 (cont.)	
16.8	0.950
17.8	0.976
19.0	0.970
19.0	0.986
19.2	0.957
19.7	0.961*
20.0	0.962
20.0	0.962
20.3	0.962*
20.7	1.00
21.0	0.963*
22.0	0.965
23.0	0.953*
24.0	0.903
24.4	0.888
25.0	0.927
25.1	0.829*
25.2	0.792
25.3	0.775*
25.4	0.756*
25.6	0.743
25.8	0.718*
26.0	0.696
27.0	0.531
28.0	0.460
CURVE 51	**T ~ 298**
5.00	0.057*
6.00	0.060
7.00	0.056
8.00	0.045*
9.00	0.032
10.0	0.028
11.0	0.014
12.1	0.007
12.6	0.020*
13.0	0.058*
14.2	0.682
15.7	0.854
15.9	0.887
17.0	0.958
18.0	0.984
19.0	0.990*
19.0	0.986*
CURVE 51 (cont.)	
19.6	0.970
20.0	1.00
20.2	0.979*
20.4	0.976*
20.5	0.979*
21.0	0.978*
22.0	0.991
23.0	0.994
24.0	0.935
24.1	0.938*
24.3	0.957
24.4	0.926*
24.6	0.924*
25.0	0.873
25.3	0.835
25.5	0.788*
25.7	0.752*
26.0	0.731
26.0	0.675
27.0	0.548
27.0	0.510
CURVE 52*	**T ~ 298**
0.440	0.9491
0.461	0.9493
0.480	0.9493
0.499	0.9480
0.521	0.9465
0.540	0.9458
0.560	0.9450
0.580	0.9449
0.600	0.9441
0.620	0.9438
0.641	0.9434
CURVE 53*	**T ~ 298**
0.440	0.9541
0.461	0.9540
0.481	0.9543
0.501	0.9535
0.520	0.9542
0.521	0.9535
CURVE 53 (cont.)*	
0.521	0.9530
0.541	0.9523
0.561	0.9518
0.582	0.9520
0.600	0.9500
0.621	0.9500
0.640	0.9514
CURVE 54*	**T ~ 298**
0.441	0.9552
0.460	0.9552
0.480	0.9565
0.501	0.9569
0.522	0.9577
0.521	0.9569
0.541	0.9569
0.560	0.9551
0.581	0.9564
0.601	0.9553
0.621	0.9544
0.641	0.9554
CURVE 55*	**T ~ 298**
0.441	0.9655
0.460	0.9655
0.481	0.9664
0.501	0.9657
0.521	0.9665
0.541	0.9659
0.560	0.9656
0.580	0.9644
0.601	0.9641
0.621	0.9629
CURVE 56*	**T ~ 298**
0.441	0.9686
0.462	0.9684
0.482	0.9703
0.501	0.9705
0.522	0.9717
CURVE 56 (cont.)*	
0.522	0.9713
0.541	0.9716
0.561	0.9714
0.582	0.9716
0.602	0.9717
0.621	0.9714
CURVE 57	**T ~ 298**
0.311	0.9383
0.324	0.9417*
0.326	0.9462*
0.334	0.9462
0.337	0.9432*
0.341	0.9400
0.351	0.9426*
0.361	0.9441
0.372	0.9353
0.372	0.9467*
0.383	0.9524
0.383	0.9531*
0.392	0.9567*
0.421	0.9615*
0.441	0.9631*
0.441	0.9651*
0.461	0.9672
0.481	0.9704*
0.502	0.9716*
0.522	0.9717
0.540	0.9734*
0.563	0.9734*
0.581	0.9726
0.641	0.9709*
0.661	0.9704
0.661	0.9698*
0.680	0.9685*
0.700	0.9673
0.722	0.9666*
0.741	0.9657*
0.760	0.9650
0.760	0.9638*
0.780	0.9634*
0.800	0.9642*
0.821	0.9642

*Not shown on plot

DATA TABLE NO. 111 (continued)

CURVE 58*
T ~ 298

λ	ρ
0.247	0.9336
0.2[illegible]7	0.9410
0.257	0.9385
0.260	0.9408
0.270	0.9404
0.272	0.9431
0.280	0.9409
0.282	0.9426
0.293	0.9418
0.300	0.9438
0.307	0.9445
0.317	0.9445
0.337	0.9545
0.367	0.9583
0.408	0.9636
0.440	0.9679
0.580	0.9741
0.699	0.9683
0.750	0.9664
0.800	0.9631

CURVE 59*
T ~ 298

λ	ρ
0.239	0.9424
0.250	0.9441
0.250	0.9449
0.250	0.9457
0.261	0.9473
0.264	0.9473
0.268	0.9473
0.283	0.9512
0.283	0.9518
0.305	0.9558
0.316	0.9576
0.335	0.9603
0.366	0.9642
0.366	0.9651
0.405	0.9703
0.409	0.9684
0.439	0.9719
0.526	0.9745

CURVE 60*
T ~ 298

λ	ρ
0.321	0.9650
0.330	0.9658
0.341	0.9661
0.341	0.9672
0.341	0.9685
0.352	0.9676
0.352	0.9681
0.352	0.9687
0.361	0.9705
0.372	0.9721
0.372	0.9726
0.383	0.9744
0.401	0.9749
0.451	0.9761
0.501	0.9756

CURVE 61*
T ~ 298

λ	ρ
0.319	0.9680
0.342	0.9724
0.354	0.9737
0.373	0.9768
0.401	0.9789
0.450	0.9781
0.498	0.9765
0.551	0.9748
0.599	0.9718
0.650	0.9697
0.700	0.9679
0.752	0.9651
0.803	0.9622

CURVE 62*
T ~ 298

λ	ρ
0.243	0.9551
0.251	0.9588
0.260	0.9618
0.268	0.9633
0.277	0.9644
0.284	0.9644
0.300	0.9639
0.301	0.9659
0.306	0.9671
0.313	0.9714

CURVE 62 (cont.)*

λ	ρ
0.322	0.9714
0.331	0.9723
0.335	0.9708
0.346	0.9738
0.351	0.9748
0.361	0.9763
0.367	0.9756
0.371	0.9791
0.382	0.9801
0.385	0.9779
0.391	0.9804
0.451	0.9793
0.499	0.9769
0.550	0.9754
0.599	0.9729
0.653	0.9716
0.699	0.9694
0.699	0.9665
0.751	0.9677
0.751	0.9651

CURVE 63
T ~ 298

λ	ρ
0.401	0.9659
0.440	0.9708
0.460	0.9731*
0.480	0.9747
0.500	0.9753
0.520	0.9759*
0.541	0.9769*
0.560	0.9762*
0.580	0.9755*
0.601	0.9746*
0.621	0.9751
0.641	0.9743*
0.670	0.9725*
0.681	0.9727
0.700	0.9714*
0.700	0.9707*
0.721	0.9694
0.731	0.9732

CURVE 64*
T ~ 298

λ	ρ
0.360	0.9709
0.379	0.9679
0.399	0.9738
0.401	0.9726
0.419	0.9746
0.419	0.9762
0.440	0.9757
0.440	0.9768
0.459	0.9778
0.480	0.9787
0.501	0.9797
0.520	0.9791
0.520	0.9801
0.539	0.9797
0.560	0.9797
0.580	0.9787
0.600	0.9784
0.619	0.9781
0.619	0.9767
0.639	0.9767
0.660	0.9754
0.679	0.9757
0.700	0.9713

CURVE 65*
T ~ 298

λ	ρ
0.309	0.9520
0.329	0.9532
0.329	0.9543
0.340	0.9551
0.340	0.9563
0.349	0.9560
0.349	0.9571
0.360	0.9563
0.360	0.9582
0.369	0.9590
0.369	0.9600
0.378	0.9619
0.379	0.9630
0.379	0.9640
0.391	0.9662
0.400	0.9662
0.419	0.9671
0.419	0.9691

CURVE 65 (cont.)*

λ	ρ
0.420	0.9662
0.439	0.9674
0.439	0.9713
0.440	0.9702
0.460	0.9721
0.479	0.9743
0.500	0.9763
0.519	0.9762
0.540	0.9771
0.559	0.9771
0.579	0.9762
0.599	0.9762
0.620	0.9752
0.639	0.9752
0.660	0.9741
0.679	0.9741
0.700	0.9720

CURVE 66*
T ~ 298

λ	ρ
0.650	0.9649
0.710	0.9612
0.747	0.9599
0.801	0.9588
1.40	0.9458
1.45	0.9488
1.50	0.9513
1.55	0.9511
1.70	0.9494
1.80	0.9484
1.80	0.9470
1.85	0.9444
1.85	0.9419
1.90	0.9447
1.90	0.9423
1.94	0.9423
2.00	0.9440
2.10	0.9443
2.19	0.9474
2.19	0.9452
2.30	0.9395
2.30	0.9334
2.35	0.9390
2.40	0.9456
2.45	0.9449

CURVE 67*
T ~ 298

λ	ρ
0.600	0.9728
0.702	0.9671
0.903	0.9560
1.20	0.9523
1.30	0.9512
1.51	0.9481
1.55	0.9490
1.60	0.9495
1.70	0.9480
1.80	0.9461
1.85	0.9437
1.90	0.9342
1.95	0.9368
2.00	0.9423
2.10	0.9424
2.20	0.9425
2.25	0.9412
2.30	0.9315
2.35	0.9191

CURVE 68*
T ~ 298

λ	ρ
0.707	0.9625
1.10	0.9535
1.35	0.9492
1.45	0.9468
1.48	0.9459
1.55	0.9459
1.60	0.9459
1.70	0.9441
1.80	0.9422
1.85	0.9382
1.90	0.9254
1.95	0.9225
2.00	0.9262
2.05	0.9311
2.10	0.9304
2.15	0.9310
2.20	0.9277
2.25	0.9311
2.30	0.9199
2.35	0.9199
2.39	0.9229
2.40	0.9246

CURVE 69*
T ~ 298

λ	ρ
0.833	0.9600
1.00	0.9561
1.20	0.9518
1.30	0.9492
1.40	0.9423
1.50	0.9434
1.59	0.9434
1.69	0.9387
1.80	0.9337
1.89	0.9187
1.99	0.9113

CURVE 70
T ~ 298

λ	ρ
0.600	0.9708
0.802	0.9632*
0.904	0.9601
1.00	0.9580*
1.11	0.9557*
1.19	0.9540*
1.30	0.9525
1.39	0.9497
1.49	0.9518
1.52	0.9518*
1.60	0.9501
1.66	0.9492*
1.73	0.9492*
1.76	0.9487*
1.79	0.9473*
1.88	0.9422*
1.91	0.9400
1.94	0.9400*
2.00	0.9433*
2.20	0.9433
2.24	0.9402*
2.31	0.9341*
2.36	0.9327
2.39	0.9341*
2.41	0.9365*
2.44	0.9419

CURVE 71*
T = 298

λ	ρ
0.44	0.765
0.46	0.750
0.48	0.725
0.50	0.740
0.52	0.735
0.54	0.730
0.56	0.720
0.58	0.715
0.60	0.710
0.62	0.700
0.64	0.690
0.68	0.680
0.70	0.680

CURVE 72*
T = 298

λ	ρ
0.44	0.900
0.46	0.899
0.48	0.895
0.50	0.890
0.52	0.885
0.54	0.880
0.56	0.875
0.58	0.870
0.60	0.868
0.62	0.861
0.64	0.858
0.66	0.852
0.68	0.850
0.70	0.850

CURVE 73*
T = 298

λ	ρ
0.44	0.956
0.46	0.953
0.48	0.951
0.50	0.950
0.52	0.948
0.54	0.946
0.56	0.945
0.58	0.941
0.60	0.939
0.62	0.935

*Not shown on plot

DATA TABLE NO. 111 (continued)

CURVE 73 (cont.)*
T = 298

λ	ρ
0.64	0.933
0.66	0.930
0.68	0.928
0.70	0.924

CURVE 74*
T = 298

λ	ρ
0.44	0.975
0.46	0.978
0.48	0.979
0.50	0.980
0.52	0.982
0.54	0.984
0.56	0.985
0.58	0.986
0.60	0.987
0.62	0.988
0.64	0.988
0.66	0.988
0.68	0.988
0.70	0.988

CURVE 75
T = 298

λ	ρ
0.44	0.983
0.46	0.984*
0.48	0.985*
0.50	0.988*
0.52	0.989
0.54	0.990*
0.56	0.991*
0.58	0.992
0.60	0.992
0.62	0.992*
0.64	0.993*
0.66	0.994
0.68	0.995*
0.70	0.996

CURVE 76
T = 298

λ	ρ
0.350	0.920
0.380	0.943
0.400	0.959
0.450	0.977
0.500	0.984*
0.550	0.985*
0.600	0.995
0.650	1.00*
0.700	1.00

CURVE 77
T = 298

λ	ρ
0.40	0.962
0.45	0.969*
0.50	0.973*
0.55	0.975
0.60	0.975*
0.65	0.973
0.70	0.972*
0.72	0.972

CURVE 78
T = 298

λ	ρ
0.40	0.781
0.45	0.882
0.50	0.965
0.55	1.00
0.60	0.990*
0.65	0.964
0.70	0.940
0.72	0.930

CURVE 79
T ~ 298

λ	ρ
0.750	0.966
1.03	0.966
1.25	0.966
1.45	0.941
1.64	0.949
1.83	0.938
1.92	0.912
2.02	0.927

CURVE 79 (cont.)

λ	ρ
2.22	0.938
2.41	0.909
2.65	0.909
2.65	0.887
2.72	0.848
2.81	0.612
2.90	0.509
3.01	0.475
3.22	0.490
3.41	0.549
3.60	0.609
3.80	0.630
4.02	0.630
4.21	0.612
4.39	0.572
4.62	0.561
4.80	0.530
5.04	0.515
5.18	0.489*
5.40	0.458
5.60	0.410
5.79	0.348
6.03	0.241
6.21	0.188
6.40	0.147
6.61	0.078
6.78	0.067*
6.98	0.067
7.20	0.060
7.36	0.088
7.62	0.119
7.79	0.119*
8.01	0.088
8.50	0.085
9.01	0.066
9.50	0.039
10.0	0.022
10.4	0.013
10.9	0.000*
12.0	0.000*
13.0	0.000
14.0	0.000

CURVE 80
T = 298

λ	ρ
0.35	0.962
0.50	0.982
0.60	0.988*
0.70	0.984*
1.00	0.986
1.43	0.976
2.06	0.958
2.46	0.955

CURVE 81*
T = 298

λ	ρ
0.35	0.950
0.50	0.978
0.70	0.888
1.55	0.969
1.07	0.944
2.25	0.930

CURVE 82*
T = 298

λ	ρ
0.32	0.945
0.33	0.950
0.41	0.962
0.42	0.964
0.48	0.970
0.49	0.972
0.51	0.974
0.52	0.976
0.53	0.978
0.56	0.980
0.57	0.980
0.59	0.982
0.60	0.984
0.61	0.981
0.65	0.984
0.67	0.984
0.70	0.984
0.72	0.985
0.74	0.984
0.78	0.986
0.79	0.985
0.81	0.984
0.85	0.982

CURVE 82 (cont.)*

λ	ρ
0.86	0.983
0.91	0.986
0.93	0.984
0.96	0.984
1.00	0.982
1.04	0.984
1.08	0.980
1.12	0.980
1.18	0.978
1.23	0.977
1.30	0.974
1.36	0.970
1.36	0.968
1.36	0.967
1.44	0.964
1.44	0.961
1.54	0.960
1.66	0.956
1.81	0.948
2.00	0.934
2.05	0.933
2.10	0.928
2.20	0.926
2.25	0.924
2.30	0.921
2.40	0.924
2.45	0.922
2.50	0.920

CURVE 83*
T = 298

λ	ρ
0.087	0.083
0.087	0.107
0.089	0.150
0.092	0.228
0.095	0.178
0.099	0.132
0.105	0.099
0.109	0.136
0.112	0.162
0.116	0.169
0.127	0.145
0.139	0.129
0.153	0.123
0.159	0.114

CURVE 83 (cont.)*

λ	ρ
0.165	0.220
0.171	0.155
0.181	0.119
0.205	0.091
0.245	0.081
0.360	0.075

CURVE 84*
T = 298

λ	ρ
0.084	0.160
0.087	0.180
0.089	0.122
0.091	0.310
0.095	0.220
0.100	0.156
0.105	0.128
0.107	0.143
0.109	0.182
0.113	0.200
0.119	0.187
0.126	0.165
0.137	0.150
0.151	0.140
0.159	0.129
0.165	0.237
0.170	0.165
0.175	0.144
0.192	0.114
0.225	0.097
0.308	0.087
0.525	0.085
1.19	0.083

CURVE 85
T ~ 298

λ	ρ
2.00	0.105
6.40	0.101
11.2	0.029
13.0	0.118
14.0	0.504
15.5	0.544
16.1	0.597
17.5	0.621
19.0	0.684

CURVE 85 (cont.)

λ	ρ
19.8	0.796
20.6	0.907
22.9	0.967
25.1	0.894
25.8	0.755
27.2	0.518
29.9	0.400
33.4	0.341
38.5	0.290
44.9	0.247
50.0	0.229

CURVE 86
T ~ 298

λ	ρ
0.266	0.824
0.271	0.821*
0.284	0.819
0.295	0.818
0.306	0.819*
0.317	0.822
0.322	0.827*
0.329	0.851
0.355	0.886
0.364	0.892
0.382	0.899
0.392	0.906
0.403	0.918
0.412	0.921
0.447	0.930
0.472	0.937
0.508	0.948
0.533	0.952
0.559	0.954
0.597	0.956*
0.679	0.957
0.724	0.959
0.758	0.958*
0.811	0.956
0.879	0.955
1.10	0.954
1.19	0.952
1.28	0.950*
1.34	0.947
1.41	0.939*
1.53	0.930

CURVE 86 (cont.)

λ	ρ
1.74	0.919
1.80	0.915*
1.87	0.900
1.92	0.894*
2.00	0.888
2.09	0.885*
2.16	0.883
2.21	0.879
2.43	0.842
2.49	0.835

CURVE 87
T = 298

λ	ρ
0.043	0.009
0.044	0.016*
0.045	0.020*
0.047	0.035
0.048	0.052
0.050	0.060
0.052	0.071
0.053	0.087
0.055	0.126
0.057	0.195*
0.058	0.202
0.059	0.160
0.060	0.167*
0.062	0.184
0.063	0.202
0.064	0.194
0.066	0.182
0.068	0.169
0.070	0.171
0.072	0.169*
0.072	0.166
0.074	0.113
0.076	0.075
0.077	0.075*
0.078	0.088
0.080	0.116
0.082	0.130*
0.083	0.131*
0.084	0.131*
0.086	0.148
0.087	0.151*
0.089	0.207

*Not shown on plot

DATA TABLE NO. 111 (continued)

λ	ρ	λ	ρ	λ	ρ
CURVE 87 (cont.) T = 298		CURVE 88 (cont.)*		CURVE 89 (cont.)	
		0.3014	0.507	34.2	0.412
0.090	0.248*	0.3034	0.564	35.7	0.397
0.091	0.259	0.3068	0.605	36.8	0.391
0.091	0.271	0.3120	0.650		
0.092	0.260*	0.3260	0.700		
0.095	0.211	0.3515	0.752		
0.095	0.188	0.3693	0.772		
0.096	0.173*	0.3881	0.787		
0.096	0.164*	0.4829	0.800		
0.096	0.160				
0.098	0.145*	CURVE 89 T ~ 298			
0.099	0.135				
0.100	0.124*				
0.103	0.109	11.9	0.000*		
0.105	0.121*	12.6	0.022*		
0.107	0.137	12.9	0.073		
0.107	0.158*	13.3	0.187		
0.107	0.165	14.2	0.671		
0.109	0.182*	14.5	0.735*		
0.111	0.188	14.6	0.759		
0.116	0.175*	14.8	0.779*		
0.121	0.164	15.5	0.791		
0.129	0.152*	15.9	0.856*		
0.145	0.135	16.3	0.896		
0.153	0.131	17.0	0.948		
0.158	0.140*	17.6	0.982*		
0.161	0.163	18.2	1.00		
0.161	0.187*	19.1	1.02*		
0.161	0.219*	20.0	1.02		
0.161	0.209	21.2	1.03*		
0.163	0.199*	23.0	1.03*		
0.163	0.172*	23.9	1.03*		
0.167	0.159*	24.4	1.01*		
0.169	0.146	24.8	1.00		
0.179	0.121	25.1	0.974		
0.187	0.106	25.5	0.903		
0.203	0.094	25.7	0.842		
		25.9	0.778		
CURVE 88* T ~ 298		26.5	0.692		
		27.1	0.619		
		27.7	0.568		
0.2844	0.000	28.1	0.530		
0.2888	0.007	28.7	0.507*		
0.2919	0.024	29.6	0.485*		
0.2941	0.062	30.8	0.462*		
0.2981	0.200	32.2	0.441		

* Not shown on plot

SPECIFICATION TABLE NO. 112 ANGULAR SPECTRAL REFLECTANCE OF MAGNESIUM OXIDE MgO

Curve No.	Ref. No.	Year	Temperature K	Wavelength, μm	Angular Range	Geometry θ	θ'	ω'	Reported Error, %	Composition (weight percent), Specifications and Remarks
1*	307	1966	298	0.5	9.8-80.0	θ	0°			99.9 MgO from Minneapolis-Honeywell Regulator Co.; polished and ground with 5.0 μm aluminum oxide; surface roughness measured with stylus 0.23 μm (rms); density 3.557 g cm^{-3}; avg grain size 46 μm; data is ratio of $\rho(\theta, 0°)$ to $\rho(10°, 0°)$ where normalization is $\rho(10°, 0°) = 0.30$; $\omega = \omega' = \pi/1024$; [Authors' designation: Case 12].
2*	307	1966	298	0.5	10.0-79.8	θ	0°			Similar to the above specimen and conditions except ground with 22.5 μm aluminum oxide; surface roughness measured with stylus 0.76 μm(rms); [Authors' designation: Case 13].
3*	307	1966	298	0.5	9.9-80.3	θ	0°			Similar to the above specimen and conditions except ground with 31 μm aluminum oxide; surface roughness measured with stylus 1.9 μm(rms); [Authors' designation: Case 14].
4*	307	1966	298	0.5	9.9-80.2	θ	0°			Similar to the above specimen and conditions except ground with 165 μm aluminum oxide; surface roughness measured with stylus 5.8 μm(rms); [Authors' designation: Case 15].
5*	307	1966	298	2.0	9.9-79.8	θ	0°			Curve 3 specimen and conditions except used globar source and $\rho(10°, 0°) = 0.22$; [Authors' designation: Case 16].
6*	307	1966	298	4.0	10.0-80.0	θ	0°			Above specimen and conditions except $\rho(10°, 0°) = 0.14$; [Authors' designation: Case 17].
7*	307	1966	298	0.5	0.0-87.0	10°	θ'			99.9 MgO from Minneapolis-Honeywell Regulator Co.; polished and ground with 5.0 μm aluminum oxide; surface roughness measured with stylus 0.23 μm (rms); density 3.557 g cm^{-3}; avg grain size 46 μm; data is ratio of $\rho(\theta, \theta')$ to specular reflectance $\rho(\theta, \theta)$; $\omega = \omega' = \pi/1024$.
8*	307	1966	298	0.5	0.0-86.4	45°	θ'			Above specimen and conditions.
9*	307	1966	298	0.5	0.0-86.2	60°	θ'			Above specimen and conditions.
10*	307	1966	298	0.5	0.0-88.0	75°	θ'			Above specimen and conditions.
11*	307	1966	298	0.5	0.0-85.1	10°	θ'			Similar to the above specimen and conditions except ground with 22.5 μm aluminum oxide; surface roughness measured with stylus 0.76 μm(rms).
12*	307	1966	298	0.5	0.0-86.1	[illegible]5°	θ'			Above specimen and conditions.
13*	307	1966	298	0.5	0.1-87.7	52.[illegible]°	θ'			Above specimen and conditions.
14*	307	1966	298	0.5	0.0-87.7	57°	θ'			Above specimen and conditions.
15*	307	1966	298	0.5	0.0-87.5	60°	θ'			Above specimen and conditions.
16*	307	1966	298	0.5	0.3-86.9	75°	θ'			Above specimen and conditions.
17*	307	1966	298	0.5	0.0-85.2	10°	θ'			Similar to the above specimen and conditions except ground with 31 μm aluminum oxide; surface roughness measured with stylus 1.9 μm(rms).
18*	307	1966	298	0.5	0.0-85.4	30°	θ'			Above specimen and conditions.

* Not shown on plot

SPECIFICATION TABLE NO. 112 (continued)

Curve No.	Ref. No.	Year	Temperature K	Wavelength, μm	Angular Range	Geometry θ	θ'	ω'	Reported Error, %	Composition (weight percent), Specifications and Remarks
19*	307	1966	298	0.5	0.0-86.3	45°	θ'			Above specimen and conditions.
20*	307	1966	298	0.5	0.0-87.2	55°	θ'			Above specimen and conditions.
21*	307	1966	298	0.5	0.0-89.3	60°	θ'			Above specimen and conditions.
22*	307	1966	298	0.5	0.0-89.1	75°	θ'			Above specimen and conditions.
23*	307	1966	298	2.0	0.0-82.2	10°	θ'			Above specimen and conditions except used globar source.
24*	307	1966	298	2.0	0.0-82.1	45°	θ'			Above specimen and conditions.
25*	307	1966	298	2.0	0.0-85.4	60°	θ'			Above specimen and conditions.
26*	307	1966	298	2.0	0.0-88.2	75°	θ'			Above specimen and conditions.
27*	307	1966	298	3.0	0.0-87.4	75°	θ'			Above specimen and conditions.
28*	307	1966	298	4.0	0.0-82.8	10°	θ'			Above specimen and conditions.
29*	307	1966	298	4.0	0.0-80.3	45°	θ'			Above specimen and conditions.
30*	307	1966	298	4.0	0.0-85.2	60°	θ'			Above specimen and conditions.
31*	307	1966	298	4.0	0.0-87.2	75°	θ'			Above specimen and conditions.
32*	307	1966	298	0.5	0.0-88.0	10°	θ'			Similar to curve 7 specimen and conditions except ground with 165 μm aluminum oxide; surface roughness measured with stylus 5.8 μm(rms).
33*	307	1966	298	0.5	0.0-89.0	45°	θ'			Above specimen and conditions.
34*	307	1966	298	0.5	0.0-88.9	60°	θ'			Above specimen and conditions.
35*	307	1966	298	0.5	0.0-88.9	75°	θ'			Above specimen and conditions.
36*	296	1967	~298	0.546	-60-60	θ	0°			2 mm thick; prepared by burning purified magnesium ribbon from J. T. Baker Chemical Co. onto Al substrate; data extracted from smooth curve; reflectance values are arbitrary units.
37*	296	1967	~298	0.546	-60-60	θ	30°			Above specimen and conditions.
38*	296	1967	~298	0.546	-60-60	θ	60°			Above specimen and conditions.
39*	296	1967	~298	2.0	-60-60	θ	0°			Above specimen and conditions.
40*	296	1967	~298	2.0	-60-60	θ	30°			Above specimen and conditions.
41*	296	1967	~298	2.0	-60-60	θ	60°			Above specimen and conditions.

* Not shown on plot

DATA TABLE NO. 112 ANGULAR SPECTRAL REFLECTANCE OF MAGNESIUM OXIDE MgO

[Angle, °; Reflectance, ρ; Temperature, T, K; Wavelength, λ, μm]

CURVE 1*
T = 298
λ = 0.5

θ	ρ
9.8	1.000
20.0	0.904
29.9	0.868
40.0	0.851
44.8	0.844
50.0	0.831
60.0	0.816
69.9	0.769
75.1	0.712
80.0	0.617

CURVE 2*
T = 298
λ = 0.5

θ	ρ
10.0	0.886
19.9	0.857
29.8	0.843
39.8	0.832
44.8	0.831
50.0	0.821
59.8	0.806
70.0	0.769
75.4	0.736
79.8	0.676

CURVE 3*
T = 298
λ = 0.5

θ	ρ
9.9	0.837
19.9	0.832
29.8	0.822
40.0	0.822
44.9	0.822
49.7	0.813
59.9	0.805
70.2	0.769
75.3	0.759
80.3	0.732

CURVE 4*
T = 298
λ = 0.5

θ	ρ
9.9	0.806
19.9	0.806
30.0	0.806
40.0	0.811
44.8	0.816
49.9	0.816
60.1	0.803
69.8	0.788
75.2	0.777
80.2	0.774

CURVE 5*
T = 298
λ = 2.0

θ	ρ
9.9	1.000
19.9	1.000
29.9	0.994
39.8	0.994
45.0	1.003
49.8	1.003
60.4	1.004
69.9	0.990
75.0	0.948
79.8	0.868

CURVE 6*
T = 298
λ = 4.0

θ	ρ
10.0	0.999
20.0	0.997
29.9	0.990
39.7	0.997
45.0	1.002
50.0	1.007
59.9	1.007
69.8	0.990
75.0	0.938
80.0	0.836

CURVE 7*
T = 298
λ = 0.5

θ'	ρ
0.0	0.800
4.8	0.888
9.9	1.001
14.8	0.898
19.9	0.815
29.7	0.743
39.7	0.705
49.8	0.683
59.9	0.653
70.4	0.613
75.3	0.568
80.3	0.479
82.3	0.421
84.1	0.354
85.3	0.302
86.2	0.249
87.0	0.168

CURVE 8*
T = 298
λ = 0.5

θ'	ρ
0.0	0.339
9.9	0.347
19.8	0.371
29.8	0.420
39.9	0.642
41.9	0.779
43.3	0.933
45.0	1.000
46.3	0.923
47.7	0.825
49.9	0.717
60.0	0.502
70.2	0.404
75.3	0.362
80.0	0.306
82.4	0.259
84.0	0.221
85.1	0.192
86.4	0.167

CURVE 9*
T = 298
λ = 0.5

θ'	ρ
0.0	0.062
10.0	0.065
19.7	0.069
29.8	0.072
40.0	0.086
50.0	0.161
54.9	0.330
57.0	0.547
58.1	0.753
59.0	0.919
60.3	1.000
61.2	0.923
62.4	0.783
63.1	0.655
65.1	0.523
70.5	0.345
75.2	0.255
80.0	0.183
82.6	0.155
84.4	0.121
85.1	0.095
86.2	0.076

CURVE 10*
T = 298
λ = 0.5

θ'	ρ
0.0	0.000
9.9	0.000
19.8	0.000
29.7	0.000
39.9	0.000
50.1	0.000
64.7	0.034
70.3	0.121
72.2	0.297
73.2	0.530
74.3	0.833
75.2	1.000
76.2	0.821
77.2	0.552
78.2	0.323
80.1	0.213

CURVE 10 (cont.)*

θ'	ρ
82.3	0.150
83.9	0.119
84.8	0.091
85.9	0.072
86.9	0.048
88.0	0.032

CURVE 11*
T = 298
λ = 0.5

θ'	ρ
0.0	0.965
4.8	0.979
9.6	1.001
14.8	0.982
19.8	0.957
30.0	0.928
40.4	0.909
50.1	0.893
59.8	0.883
70.1	0.852
75.2	0.826
80.2	0.763
82.8	0.716
85.1	0.585

CURVE 12*
T = 298
λ = 0.5

θ'	ρ
0.0	0.794
9.8	0.798
20.0	0.820
29.8	0.852
40.0	0.926
45.0	1.000
49.9	0.981
54.9	0.989
60.4	0.967
70.2	0.969
75.3	0.972
80.1	0.974
82.3	0.969
84.1	0.954
86.1	0.752

CURVE 13*
T = 298
λ = 0.5

θ'	ρ
0.1	0.650
9.8	0.659
19.8	0.678
29.8	0.707
39.9	0.766
45.0	0.837
49.9	0.943
52.7	1.002
54.8	0.993
60.2	0.971
65.2	0.972
70.3	0.984
75.6	1.015
80.2	1.045
82.9	1.036
87.7	0.611

CURVE 14*
T = 298
λ = 0.5

θ'	ρ
0.0	0.482
10.0	0.487
19.8	0.498
29.8	0.508
39.9	0.571
44.9	0.640
50.0	0.738
54.9	0.928
57.1	0.994
60.3	1.017
65.5	1.031
70.5	1.064
75.0	1.124
80.0	1.182
82.7	1.159
85.3	1.033
87.7	0.661

CURVE 15*
T = 298
λ = 0.5

θ'	ρ
0.0	0.461
10.0	0.461
19.8	0.464
30.2	0.478
40.1	0.521
45.0	0.559
50.0	0.628
55.0	0.769
60.3	1.007
65.3	1.077
70.3	1.155
75.3	1.262
78.0	1.344
80.2	1.366
82.2	1.377
84.1	1.343
85.1	1.295
86.0	1.133
87.1	0.748
87.5	0.614

CURVE 16*
T = 298
λ = 0.5

θ'	ρ
0.3	0.044
10.2	0.046
19.9	0.046
29.9	0.054
40.0	0.054
50.2	0.074
60.1	0.126
65.4	0.215
70.2	0.437
73.5	0.758
75.0	0.997
77.9	1.360
80.0	1.602
81.0	1.679
82.1	1.717
83.2	1.708
84.3	1.651
85.1	1.563

CURVE 16 (cont.)*

θ'	ρ
86.1	1.504
86.9	1.300

CURVE 17*
T = 298
λ = 0.5

θ'	ρ
0.0	0.985
5.0	0.996
9.7	0.997
14.9	0.997
20.0	0.982
30.0	0.973
49.9	0.963
60.1	0.947
70.0	0.918
75.1	0.902
80.0	0.866
83.1	0.820
85.2	0.722

CURVE 18*
T = 298
λ = 0.5

θ'	ρ
0.0	0.930
9.9	0.943
20.3	0.958
24.9	0.975
30.1	1.001
34.7	0.980
40.0	0.980
60.2	0.970
70.1	0.968
74.9	0.958
80.1	0.935
82.6	0.897
85.4	0.794

CURVE 19*
T = 298
λ = 0.5

θ'	ρ
0.0	0.865
9.9	0.879

*Not shown on plot

DATA TABLE NO. 112 (continued)

CURVE 19 (cont.)* T = 298, λ = 0.5

θ'	ρ
20.0	0.907
30.1	0.925
45.2	0.995
50.0	1.001
60.1	1.026
70.0	1.048
75.4	1.065
79.9	1.077
82.1	1.098
84.3	1.087
86.3	0.985

CURVE 20* T = 298, λ = 0.5

θ'	ρ
0.0	0.729
10.1	0.741
20.1	0.745
30.0	0.770
40.2	0.821
49.9	0.908
52.4	0.958
55.1	0.998
57.2	0.998
60.1	1.006
70.0	1.075
75.2	1.153
80.2	1.267
82.3	1.322
83.9	1.350
86.2	1.303
87.2	1.120

CURVE 21* T = 298, λ = 0.5

θ'	ρ
0.0	0.649
9.6	0.655
20.1	0.677
29.8	0.694
39.6	0.737
49.6	0.824

CURVE 21 (cont.)*

θ'	ρ
55.2	0.895
60.0	0.995
65.1	1.063
69.9	1.175
75.3	1.333
80.1	1.574
82.1	1.692
83.9	1.828
85.2	1.861
86.0	1.841
87.2	1.691
88.5	1.340
89.3	0.646

CURVE 22* T = 298, λ = 0.5

θ'	ρ
0.0	0.140
9.8	0.140
20.0	0.146
30.0	0.157
40.0	0.169
50.2	0.197
60.0	0.275
64.9	0.379
70.3	0.587
75.1	0.995
78.2	1.447
80.0	1.918
80.8	2.177
82.2	2.560
83.5	2.994
84.6	3.438
85.7	3.889
86.8	4.184
87.9	4.099
88.7	3.374
89.1	1.679

CURVE 23* T = 298, λ = 2.0

θ'	ρ
0.0	0.960
4.8	0.981

CURVE 23 (cont.)*

θ'	ρ
10.0	1.009
14.9	0.983
19.9	0.963
30.1	0.939
39.8	0.931
49.9	0.913
60.3	0.889
70.5	0.863
75.4	0.822
80.2	0.717
82.2	0.639

CURVE 24* T = 298, λ = 2.0

θ'	ρ
0.0	0.844
10.0	0.844
19.9	0.860
29.8	0.893
39.5	0.951
44.9	1.002
49.9	0.987
60.2	0.962
70.1	0.945
75.2	0.929
80.2	0.849
82.1	0.762

CURVE 25* T = 298, λ = 2.0

θ'	ρ
0.0	0.528
9.7	0.528
20.1	0.538
29.9	0.550
39.8	0.578
49.9	0.673
55.0	0.790
60.3	1.003
65.1	1.060
70.1	1.137
74.8	1.217
80.3	1.289
82.5	1.225

CURVE 25 (cont.)*

θ'	ρ
84.2	1.022
85.4	0.863

CURVE 26* T = 298, λ = 2.0

θ'	ρ
0.0	0.014
9.7	0.014
19.8	0.014
29.7	0.019
40.0	0.025
50.1	0.030
60.1	0.043
65.5	0.085
70.0	0.211
72.2	0.341
73.3	0.510
74.2	0.730
74.1	0.764
75.0	1.000
75.5	1.021
76.1	1.008
76.5	0.986
77.1	0.894
77.7	0.767
78.8	0.739
81.5	0.719
82.0	0.706
83.1	0.699
84.2	0.635
85.5	0.578
86.3	0.475
87.3	0.353
88.2	0.235

CURVE 27* T = 298, λ = 3.0

θ'	ρ
0.0	0.000
9.7	0.000
19.7	0.000
30.2	0.000
39.9	0.000
50.0	0.007

CURVE 27 (cont.)*

θ'	ρ
60.2	0.014
70.3	0.104
72.2	0.206
73.4	0.424
74.2	0.728
74.4	0.764
75.1	1.002
76.3	0.817
77.1	0.564
78.3	0.325
80.3	0.284
82.4	0.253
84.1	0.202
85.4	0.175
86.3	0.130
87.4	0.090

CURVE 28* T = 298, λ = 4.0

θ'	ρ
0.0	0.900
9.8	1.000
19.8	0.927
29.9	0.886
40.0	0.872
50.3	0.854
60.6	0.813
70.4	0.738
80.3	0.561
82.8	0.460

CURVE 29* T = 298, λ = 4.0

θ'	ρ
0.0	0.728
9.9	0.743
19.9	0.764
29.8	0.807
39.8	0.891
45.1	1.000
50.2	0.939
60.2	0.866
70.4	0.835
80.3	0.766

CURVE 30* T = 298, λ = 4.0

θ'	ρ
0.0	0.228
10.1	0.229
20.2	0.234
30.1	0.241
39.9	0.264
49.9	0.325
55.1	0.430
57.0	0.530
58.2	0.665
59.3	0.863
60.1	1.000
61.2	0.927
62.1	0.811
63.5	0.683
65.6	0.642
70.1	0.626
75.3	0.608
80.3	0.554
82.5	0.472
84.3	0.384
85.2	0.323

CURVE 31* T = 298, λ = 4.0

θ'	ρ
0.0	0.000
9.9	0.000
19.7	0.000
29.7	0.000
40.0	0.009
49.7	0.012
60.1	0.015
70.5	0.055
72.3	0.144
73.2	0.375
74.2	0.741
75.1	1.000
76.3	0.771
77.3	0.455
78.3	0.172
80.2	0.125
82.4	0.105
84.4	0.081
85.2	0.066

CURVE 31 (cont.)*

θ'	ρ
86.0	0.051
87.2	0.035

CURVE 32* T = 298, λ = 0.5

θ'	ρ
0.0	1.000
4.5	1.000
9.5	1.000
14.4	1.000
19.5	1.000
39.8	0.986
49.8	0.983
54.9	0.981
59.8	0.977
70.3	0.962
75.2	0.950
80.0	0.916
81.7	0.889
83.7	0.852
84.7	0.826
85.7	0.790
87.0	0.625
88.0	0.337

CURVE 33* T = 298, λ = 0.5

θ'	ρ
0.0	0.960
9.7	0.964
19.6	0.974
29.7	0.990
40.0	0.998
45.1	1.007
49.8	1.014
60.1	1.042
70.2	1.072
75.0	1.093
80.0	1.112
81.9	1.122
84.1	1.131
85.7	1.143
86.9	1.109
87.8	0.893
89.0	0.475

CURVE 34* T = 298, λ = 0.5

θ'	ρ
0.0	0.849
9.7	0.857
19.7	0.859
29.7	0.883
39.9	0.907
50.0	0.943
60.1	0.992
65.1	1.035
75.0	1.157
79.9	1.258
82.9	1.368
85.0	1.454
86.0	1.489
87.1	1.558
87.8	1.496
88.9	0.793

CURVE 35* T = 298, λ = 0.5

θ'	ρ
0.0	0.449
10.1	0.468
19.8	0.473
29.8	0.490
39.9	0.513
50.3	0.552
60.2	0.631
70.4	0.811
75.2	1.000
80.0	1.359
81.1	1.458
82.0	1.598
82.8	1.750
83.7	1.927
84.9	2.155
85.9	2.452
87.0	2.824
87.8	3.102
88.9	1.998

*Not shown on plot

DATA TABLE NO. 112 (continued)

CURVE 36*
T ~ 298
λ = 0.546

θ	ρ
-60.0	3.00
-41.0	4.76
-32.6	5.42
-25.4	5.92
-20.6	6.14
-14.5	6.33
- 6.7	6.52
- 4.4	6.59
- 1.4	6.86
0.0	7.00
3.0	6.77
5.7	6.56
11.2	6.34
19.9	5.99
29.8	5.46
36.3	5.02
46.2	4.27
53.1	3.70
56.8	3.30
60.0	2.93

CURVE 37*
T ~ 298
λ = 0.546

θ	ρ
-60.0	3.14
-50.0	4.35
-40.1	5.38
-35.4	5.87
-34.1	6.03
-32.6	6.43
-30.6	7.09
-29.1	6.57
-26.8	6.31
-24.0	6.36
-14.0	6.63
- 6.1	6.84
- 0.7	6.91
3.5	6.88
10.7	6.73
19.6	6.41
27.5	5.96
37.9	5.29
48.8	4.44
60.0	3.54

CURVE 38*
T ~ 298
λ = 0.546

θ	ρ
-60.0	7.27
-57.4	6.03
-54.6	5.31
-51.5	4.83
-49.8	4.64
-48.7	4.55
-46.8	4.55
-39.5	5.07
-32.0	5.50
-25.8	5.75
-16.9	5.95
- 4.5	6.14
8.1	6.14
16.5	6.06
23.8	5.93
34.5	5.59
46.5	4.98
60.0	4.10

CURVE 39*
T ~ 298
λ = 2.0

θ	ρ
-60.0	4.00
-55.4	4.76
-47.2	5.81
-36.5	7.01
-26.7	8.00
-16.1	9.04
- 2.7	10.20
0.0	11.24
0.9	10.67
2.6	10.29
10.1	9.57
25.8	8.11
36.2	6.98
48.9	5.41
60.0	4.00

CURVE 40*
T ~ 298
λ = 2.0

θ	ρ
-60.0	4.23
-47.1	5.93

CURVE 40 (cont.)*

θ	ρ
-39.0	6.95
-32.9	7.70
-32.1	8.11
-30.0	10.74
-28.9	10.01
-25.9	8.45
-25.0	8.36
-14.1	8.93
- 5.0	9.32
- 0.4	9.40
5.4	9.33
10.1	9.21
16.1	8.97
23.7	8.53
30.3	8.02
38.2	7.25
48.8	6.02
60.0	4.62

CURVE 41*
T ~ 298
λ = 2.0

θ	ρ
-60.0	11.07
-57.6	7.67
-56.4	6.57
-55.1	6.31
-53.2	6.47
-51.3	6.75
-49.6	7.09
-47.9	7.50
-46.8	8.01
-45.5	8.67
-40.4	9.28
-33.7	9.85
-26.7	10.38
-20.7	10.72
-13.8	10.96
- 7.5	11.00
1.9	10.95
5.5	10.73
8.4	10.62
12.1	10.50
16.1	10.43
20.3	10.40
36.3	9.65
44.8	9.17

CURVE 41 (cont.)*

θ	ρ
51.8	8.68
56.2	8.20
60.0	7.68

* Not shown on plot

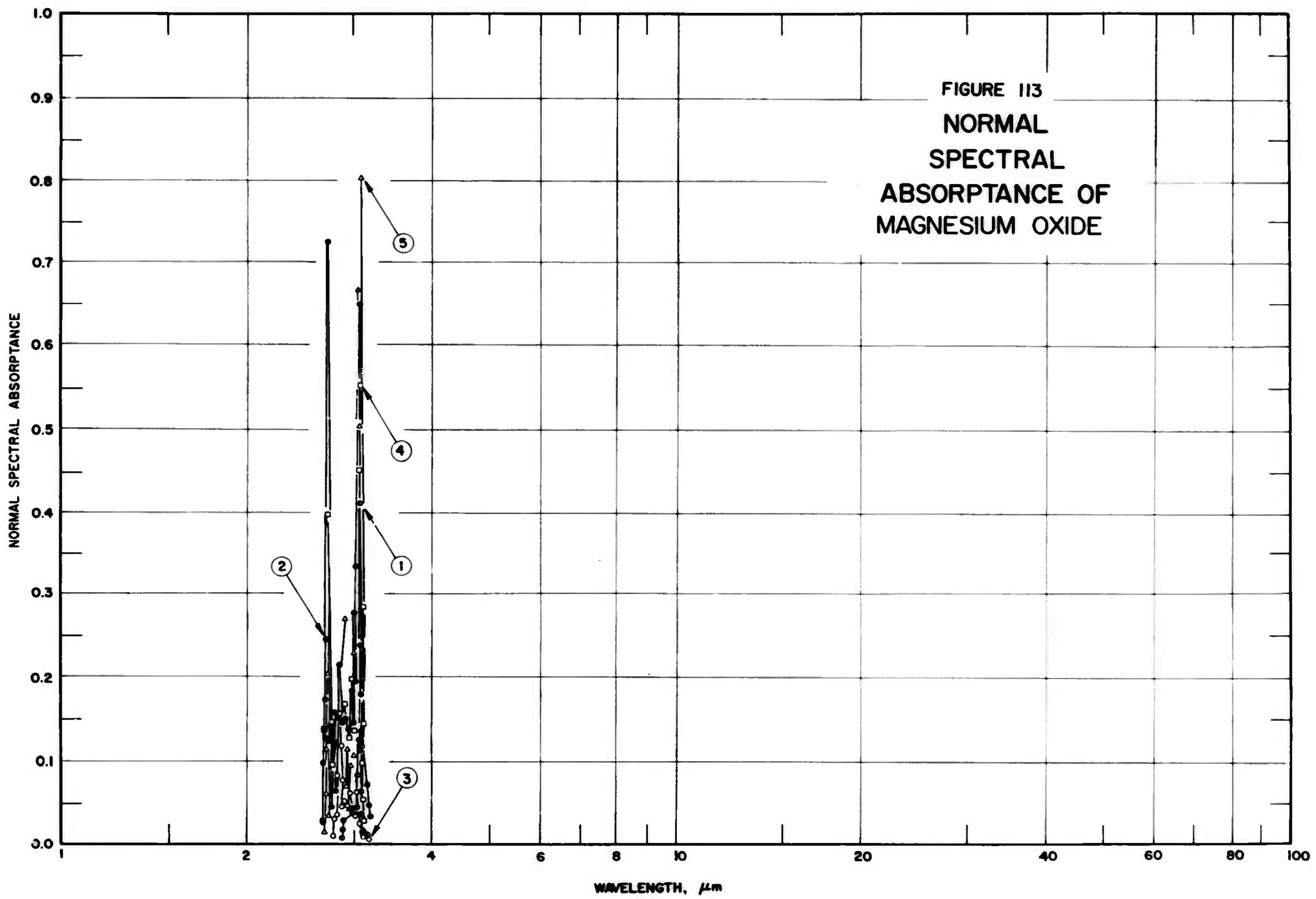


FIGURE 113
NORMAL
SPECTRAL
ABSORPTANCE OF
MAGNESIUM OXIDE
NORMAL SPECTRAL ABSORPTANCE
WAVELENGTH, μm
1.0
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0.0
1
2
4
6
8
10
20
40
60
80
100
1
2
3
4
5

SPECIFICATION TABLE NO. 113 NORMAL SPECTRAL ABSORPTANCE OF MAGNESIUM OXIDE MgO

Curve No.	Ref. No.	Year	Temperature K	Wavelength Range, μm	Geometry θ	Reported Error, %	Composition (weight percent), Specifications, and Remarks
1	220	1967	300	2.857-3.125	0°		Single crystal (1.25 cm thick); author attributes all absorption bands to OH^- impurity; data extracted from smooth curve; [Authors' designation: Specimen U1].
2	220	1967	300	2.665-3.165	0°		Single crystal (0.90 cm thick); author attributes all absorption bands to OH^- impurity, data extracted from smooth curve; [Authors' designation: Specimen U7].
3	220	1967	300	2.765-3.125	0°		Single crystal doped with Cr (0.77 cm thick); author attributes all absorption bands to OH^- impurity; data extracted from smooth curve.
4	220	1967	300	2.671-3.104	0°		Single crystal doped with Co (0.64 cm thick); author attributes all absorption bands to OH^- impurity; data extracted from smooth curve.
5	220	1967	300	2.672-3.196	0°		Above specimen and conditions except quenched from 1273 K to room temp.

DATA TABLE NO. 113 NORMAL SPECTRAL ABSORPTANCE OF MAGNESIUM OXIDE MgO

[Wavelength, λ, μm; Absorptance, α; Temperature, T, K]

λ	α
CURVE 1	**T = 300**
2.857	0.007
2.869	0.017
2.880	0.029
2.948	0.039*
2.973	0.044
2.985	0.039*
3.007	0.046
3.015	0.083
3.023	0.174
3.029	0.113
3.036	0.412
3.048	0.108
3.056	0.066
3.074	0.037
3.093	0.018
3.125	0.011
CURVE 2	**T = 300**
2.665	0.029
2.671	0.097
2.675	0.128
2.683	0.133
2.687	0.172
2.692	0.244
2.698	0.724
2.710	0.127
2.718	0.140
2.727	0.046
2.739	0.157
2.742	0.067
2.748	0.087*
2.762	0.077*
2.787	0.094*
2.813	0.150
2.826	0.151*
2.836	0.215
2.846	0.145
2.899	0.150
2.936	0.138
2.952	0.147*
2.966	0.182
2.972	0.147
CURVE 2 (cont.)	
2.985	0.274
3.995	0.195
3.002	0.333
3.011	0.239*
3.015	0.329*
3.020	0.284*
3.032	0.650
3.043	0.237
3.047	0.178
3.057	0.135
3.086	0.113*
3.116	0.071
3.136	0.049
3.165	0.034
CURVE 3	**T = 300**
2.765	0.010
2.778	0.010*
2.787	0.030
2.792	0.023*
2.797	0.034
2.803	0.081
2.814	0.206
2.818	0.119
2.823	0.079
2.834	0.064*
2.849	0.046
2.859	0.049*
2.869	0.048*
2.880	0.052
2.906	0.046
2.927	0.058*
2.933	0.057*
2.943	0.062
2.963	0.042*
2.986	0.040*
3.004	0.033
3.017	0.107*
3.020	0.064
3.029	0.086*
3.035	0.038*
3.047	0.026
3.070	0.015*
3.096	0.010
3.125	0.008
CURVE 4	**T = 300**
2.671	0.028
2.691	0.133
2.701	0.399
2.708	0.125*
2.721	0.125
2.730	0.147
2.736	0.147*
2.757	0.119*
2.796	0.097
2.828	0.102*
2.844	0.112
2.862	0.112*
2.871	0.149*
2.877	0.142*
2.885	0.168
2.896	0.144*
2.912	0.136*
2.926	0.129
2.945	0.164*
2.958	0.160*
2.967	0.199
2.977	0.136
2.992	0.137*
3.002	0.178*
3.008	0.239*
3.018	0.452
3.022	0.355*
3.032	0.552
3.037	0.283
3.042	0.141
3.050	0.095
3.071	0.054
3.104	0.028
CURVE 5	**T = 300**
2.672	0.016
2.685	0.062
2.693	0.115*
2.700	0.201*
2.701	0.090*
2.709	0.042*
2.720	0.036
CURVE 5 (cont.)	
2.731	0.062*
2.740	0.035*
2.787	0.032*
2.830	0.050*
2.850	0.076*
2.859	0.104*
2.870	0.189
2.876	0.168*
2.885	0.257
2.890	0.206*
2.900	0.070
2.909	0.114
2.916	0.066*
2.925	0.043
2.946	0.132*
2.954	0.096
2.970	0.230
2.976	0.108
2.992	0.088*
3.004	0.166*
3.015	0.668
3.022	0.505
3.033	0.806
3.036	0.751
3.037	0.190
3.041	0.139*
3.046	0.078
3.064	0.030
3.196	0.014

*Not shown on plot

SPECIFICATION TABLE NO. 114 NORMAL SOLAR ABSORPTANCE OF MAGNESIUM OXIDE MgO

Curve No.	Ref. No.	Year	Temperature Range, K	Geometry θ	Reported Error, %	Composition (weight percent), Specifications and Remarks
1*	39	1957	298	9°		Refractory (Bureau of Standards); as received; computed from spectral data for sea level conditions.
2*	39	1957	298	9°		Above specimen and conditions except computed for above atmosphere conditions.

DATA TABLE NO. 114 NORMAL SOLAR ABSORPTANCE OF MAGNESIUM OXIDE MgO

[Temperature, T, K; Absorptance, α]

T	α
CURVE 1*	
298	0.141
CURVE 2*	
298	0.168

*No plot given

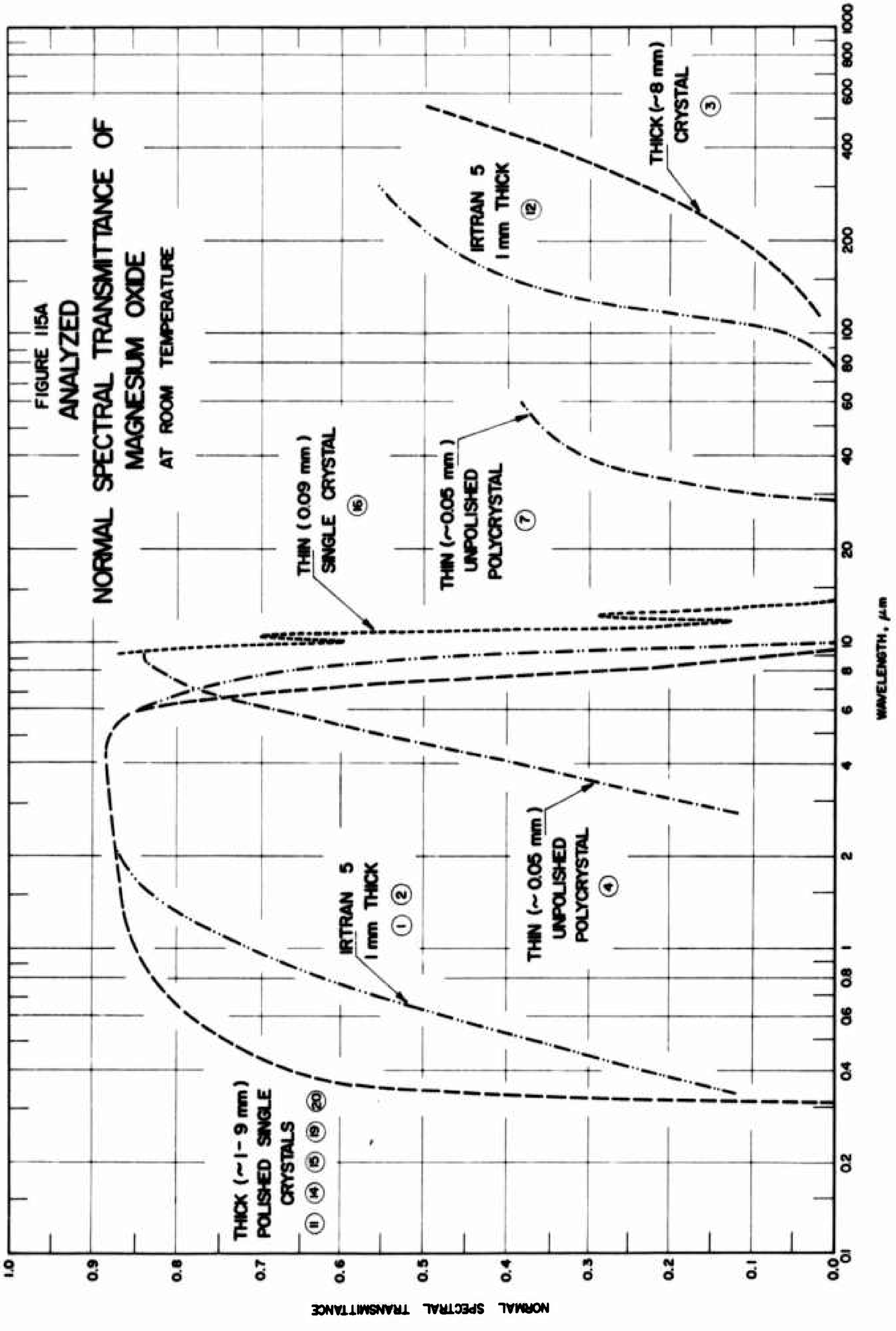


FIGURE 115A
ANALYZED
NORMAL SPECTRAL TRANSMITTANCE OF
MAGNESIUM OXIDE
AT ROOM TEMPERATURE
THICK (~1-9 mm) POLISHED SINGLE CRYSTALS
11 14 15 19 20
IRTRAN 5 1 mm THICK
1 2
THIN (~0.05 mm) UNPOLISHED POLYCRYSTAL
4
THIN (0.09 mm) SINGLE CRYSTAL
16
THIN (~0.05 mm) UNPOLISHED POLYCRYSTAL
7
IRTRAN 5 1 mm THICK
12
THICK (~8 mm) CRYSTAL
3
NORMAL SPECTRAL TRANSMITTANCE
WAVELENGTH, μm
0.0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
1.0
0.1
0.2
0.4
0.6
0.8
1
2
4
6
8
10
20
40
60
80
100
200
400
600
800
1000

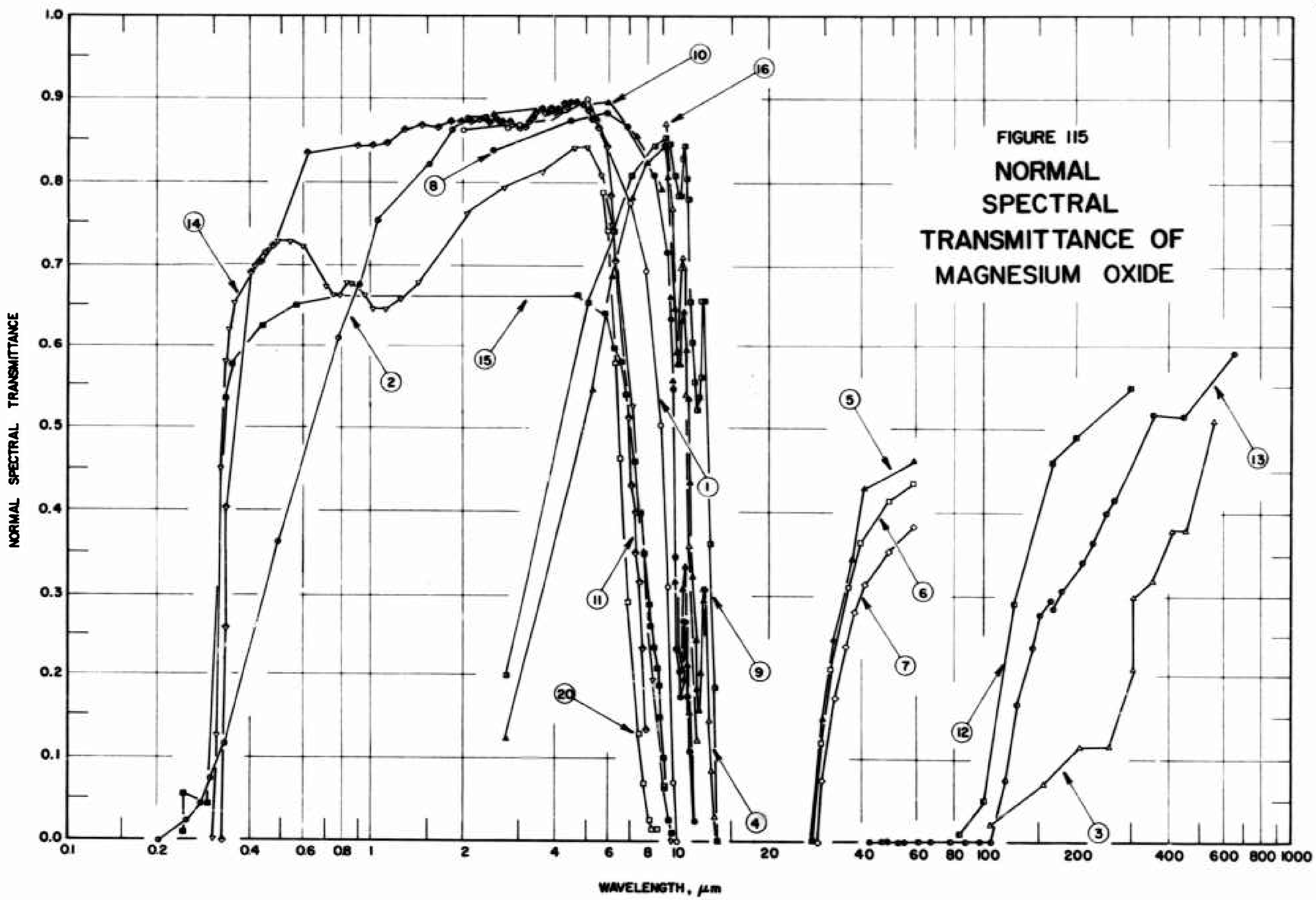


FIGURE 115
NORMAL SPECTRAL TRANSMITTANCE OF MAGNESIUM OXIDE
NORMAL SPECTRAL TRANSMITTANCE
WAVELENGTH, μm
1.0
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0.0
01
0.2
0.4
0.6
0.8
1
2
4
6
8
10
20
40
60
80
100
200
400
600
800
1000
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
20

SPECIFICATION TABLE NO. 115 NORMAL SPECTRAL TRANSMITTANCE OF MAGNESIUM OXIDE MgO

Curve No.	Ref. No.	Year	Temperature K	Wavelength Range, μm	Geometry θ θ' ω'	Reported Error, %	Composition (weight percent), Specifications, and Remarks
1	102	1965	~298	2.00-10.0	0° 0°		Irtran 5 (1.0 mm thick); pressed and sintered; data extracted from smooth curve.
2	94	1967	298	0.208-3.00	~0° ~0°	±2	Irtran 5 (1.00 mm thick); polished; data extracted from smooth curve.
3	292	1950	~298	104-560	~0° ~0°		8.00 mm thick.
4	315	1965	~298	2.73-13.3	0° 0°		Polycrystalline (0.055 ± 0.003 mm thick) prepared by hot compaction of analytical reagent grade magnesia powder from Mallinckrodt Chemical Works; contained traces of Fe and Ca; heated in air at 428 K for 6 hrs; polished; mean grain surface area 24.78 μm^2; mean grain dia 5.62 μm; data extracted from smooth curve; [Author's designation: Type I].
5	315	1965	~298	27.7-59.5	0° 0°		Similar to curve 4 specimen and conditions except 0.015 ± 0.002 mm thick.
6	315	1965	~298	27.9-59.5	0° 0°		Similar to curve 4 specimen and conditions except 0.022 ± 0.002 mm thick.
7	315	1965	298	28.2-59.5	0° 0°		Similar to curve 4 specimen and conditions.
8	315	1965	~298	2.50-11.3	0° 0°		Polycrystalline (0.284 ± 0.002 mm thick); prepared by hot compaction of analytical reagent grade magnesia powder from Mallinckrodt Chemical Works; contained traces of Fe and Ca; heated in air at 773 K for 6 hrs; polished; mean grain surface area 42.25 μm^2; mean grain dia 7.34 μm; data extracted from smooth curve; [Author's designation: Type II].
9	315	1965	~298	2.74-13.6	0° 0°		Polycrystalline (0.015 ± 0.002 mm thick); prepared by hot compaction of analytical reagent grade magnesia powder from Mallinckrodt Chemical Works; contained traces of Fe and Ca; heated in air at 1273 K for 6 hrs; polished; mean grain surface area 47.05 μm^2; mean grain dia 7.74 μm; data extracted from smooth curve; [Author's designation: Type III].
10	315	1965	~298	2.50-11.3	0° 0°		Single crystal (0.302 ± 0.001 mm thick) from Norton Co.; polished; data extracted from smooth curve; [Author's designation: Type IV].
11	298	1936	~298	0.320-7.97	~0° ~0°		Synthetic periclase (5.45 mm thick); cubic crystal.
12	314	1966	300	83.3-300	~0° ~0°		Irtran 5 (1 mm thick) from Eastman Kodak Co.
13	313	1966	~298	42.2-654	~0° ~0°		Irtran 5 (2.0 mm thick); fabricated by Eastman Kodak Co.
14	372	1969	~298	0.303-9.73	~0° ~0°		Cleaved single crystal (2.62 mm thick) from Norton Co.; data extracted from smooth curve; [Author's designation: Crystal B].
15	449	1964	~298	0.240-9.74	~0° ~0°		Single crystal (1.6 mm thick); surface "as-cleaved" (100) plane.
16	450	1948	~298	9.24-13.3	~0° ~0°		Cleaved plate (0.09 mm thick) from the Norton Co.; data extracted from smooth curve.
17*	450	1948	~298	8.33-11.2	~0° ~0°		Similar to the above specimen and conditions except 0.30 mm thick.
18*	450	1948	~298	6.60-9.90	~0° ~0°		Similar to the above specimen and conditions except 1.0 mm thick.
19*	450	1948	~298	7.52-9.39	~0° ~0°		Similar to the above specimen and conditions except 2.5 mm thick.
20	450	1948	~298	5.72-8.63	~0° ~0°		Similar to the above specimen and conditions except 9.2 mm thick.

* Not shown on plot

DATA TABLE NO. 115 NORMAL SPECTRAL TRANSMITTANCE OF MAGNESIUM OXIDE MgO

[Wavelength, λ, μm; Transmittance, τ; Temperature, T, K]

CURVE 1
T ~ 298

λ	τ
2.00	0.862
3.80	0.873
5.20	0.900
7.00	0.778
7.90	0.693
8.80	0.504
9.40	0.313
9.80	0.070
10.0	0.000

CURVE 2
T = 298

λ	τ
0.208	0.000
0.246	0.023
0.271	0.045
0.298	0.074
0.325	0.115
0.485	0.363
0.763	0.601
0.918	0.677
1.15	0.753
1.52	0.822
1.86	0.862
2.09	0.875
2.39	0.879
2.79	0.867
3.00	0.869

CURVE 3
T ~ 298

λ	τ
104	0.02
158	0.07
204	0.14
251	0.14
304	0.21
304	0.30
354	0.32
406	0.38
459	0.38
560	0.51

CURVE 4
T ~ 298

λ	τ
2.73	0.123
5.21	0.547
6.11	0.689
7.15	0.781
7.92	0.826
9.07	0.844
9.17	0.847
9.34	0.807
9.80	0.649
10.0	0.591
10.1	0.579
10.2	0.579
10.4	0.631
10.5	0.646
10.6	0.595
10.8	0.554
10.9	0.536
11.0	0.438
11.2	0.323
11.4	0.243
11.6	0.182
11.7	0.158
11.8	0.158*
12.0	0.203
12.2	0.292
12.2	0.309
12.3	0.309
12.7	0.146
12.9	0.085
13.3	0.000

CURVE 5
T ~ 298

λ	τ
27.7	0.000
29.9	0.149
32.5	0.245
37.2	0.347
42.6	0.403
59.5	0.462

CURVE 6
T ~ 298

λ	τ
27.9	0.000
29.6	0.119
31.7	0.209
36.1	0.313
39.8	0.365
48.5	0.415
59.5	0.439

CURVE 7
T ~ 298

λ	τ
28.2	0.000
29.9	0.074
32.9	0.172
35.8	0.237
38.0	0.280
41.5	0.316
48.8	0.352
59.5	0.384

CURVE 8
T ~ 298

λ	τ
2.50	0.839
4.44	0.873
5.95	0.885
6.81	0.869
8.51	0.809
9.29	0.718
9.54	0.636
9.69	0.547
9.87	0.349
10.0	0.231
10.1	0.202
10.2	0.172
10.3	0.193
10.4	0.270
10.6	0.270
10.8	0.172
11.0	0.109
11.3	0.024

CURVE 9
T ~ 298

λ	τ
2.74	0.200
5.51	0.654
6.22	0.741
7.11	0.809
8.52	0.842
9.20	0.851
9.47	0.845
9.87	0.809
10.1	0.783
10.2	0.783
10.5	0.829
10.6	0.842
10.7	0.805
10.9	0.788
11.2	0.654
11.4	0.605
11.5	0.554
11.7	0.521
11.9	0.537
12.0	0.562
12.2	0.654
12.4	0.654
12.9	0.361
13.3	0.184
13.6	0.000

CURVE 10
T ~ 298

λ	τ
2.50	0.882
5.95	0.898
7.40	0.854
8.89	0.792
9.47	0.661
9.70	0.558
9.99	0.318
10.1	0.231
10.2	0.208
10.5	0.309
10.6	0.335
10.8	0.212
11.0	0.153
11.3	0.024*

CURVE 11
T ~ 298

λ	τ
0.320	0.000
0.360	0.260
0.360	0.402
0.400	0.691
0.430	0.703
0.470	0.726
0.610	0.835
0.900	0.844
1.01	0.844
1.12	0.846
1.29	0.862
1.46	0.869
1.65	0.866
1.82	0.871
1.98	0.871
2.14	0.871
2.29	0.874
2.42	0.871
2.58	0.877
2.69	0.872
2.82	0.872
3.07	0.868
3.19	0.868
3.29	0.873
3.38	0.878
3.48	0.884
3.61	0.889
3.70	0.885
3.79	0.885
3.88	0.890
4.00	0.883
4.08	0.889
4.18	0.885
4.28	0.893
4.39	0.891
4.49	0.896
4.66	0.896
4.88	0.893
5.06	0.888
5.21	0.879
5.36	0.876
5.54	0.866
5.84	0.844
6.11	0.785

CURVE 11 (cont.)

λ	τ
6.38	0.708
6.90	0.513
7.12	0.432
7.36	0.351
7.56	0.319
7.79	0.235
7.97	0.134

CURVE 12
T = 300

λ	τ
83.3	<0.01
100.0	0.05
125.0	0.29
166.7	0.46
200.0	0.49
300.0	0.55

CURVE 13
T ~ 298

λ	τ
42.2	0.000
46.2	0.000
48.1	0.000
52.6	0.000
54.8	0.000
61.5	0.000
69.9	0.000
76.9	0.000
87.3	0.000
97.5	0.000
105	0.000
118	0.073
128	0.165
143	0.235
152	0.276
166	0.293
169	0.283
180	0.307
210	0.343
225	0.363
250	0.400
268	0.415
357	0.518
446	0.517
654	0.592

CURVE 14
T ~ 298

λ	τ
0.303	0.000
0.309	0.125
0.319	0.452
0.331	0.582
0.340	0.621
0.357	0.655
0.413	0.700
0.444	0.717
0.485	0.729
0.533	0.730
0.585	0.724
0.703	0.672
0.746	0.665
0.782	0.665
0.828	0.679
0.863	0.679
0.953	0.655
1.01	0.649
1.11	0.649
1.24	0.660
1.41	0.679
2.07	0.763
2.73	0.797
3.65	0.813
4.65	0.842
5.04	0.842
5.60	0.810
6.15	0.749
7.16	0.527
8.45	0.195
9.18	0.068
9.73	0.000

CURVE 15
T ~ 298

λ	τ
0.240	0.010
0.240	0.056
0.290	0.044
0.330	0.535
0.350	0.579
0.430	0.626
0.560	0.651
0.780	0.666*
4.68	0.666

CURVE 15 (cont.)

λ	τ
5.79	0.644
6.26	0.599
6.58	0.582
6.86	0.540
7.27	0.460
7.60	0.403
7.79	0.352
8.09	0.239
8.22	0.264
8.49	0.235
8.68	0.211
8.80	0.189
8.93	0.150
9.08	0.102
9.23	0.065
9.43	0.021
9.52	0.015*
9.63	0.012*
9.74	0.010

CURVE 16
T ~ 298

λ	τ
9.24	0.870
9.42	0.849*
9.69	0.771
9.97	0.600
10.0	0.594
10.1	0.604
10.4	0.698
10.5	0.700
10.5	0.698
11.0	0.357
11.1	0.280*
11.5	0.130*
11.7	0.120
11.8	0.140*
12.1	0.283*
12.2	0.293*
12.3	0.283*
12.4	0.267*
12.4	0.210*
12.7	0.123*
12.9	0.068*
13.3	0.029

* Not shown on plot

DATA TABLE NO. 115 (continued)

λ	τ
CURVE 17*	
T ~ 298	
8.33	0.836
8.53	0.817
8.79	0.777
9.04	0.728
9.20	0.688
9.47	0.561
9.67	0.427
9.88	0.252
9.99	0.146
10.0	0.139
10.1	0.146
10.3	0.264
10.4	0.280
10.5	0.289
10.5	0.280
10.6	0.199
10.8	0.098
11.0	0.055
11.2	0.015
CURVE 18*	
T ~ 298	
6.60	0.814
6.82	0.788
7.21	0.763
7.48	0.745
7.60	0.727
7.74	0.675
7.83	0.640
7.99	0.608
8.23	0.571
8.53	0.537
8.72	0.503
8.87	0.471
9.48	0.157
9.68	0.062
9.78	0.032
9.90	0.015
CURVE 19*	
T ~ 298	
7.52	0.512
7.62	0.474

λ	τ
CURVE 19 (cont.)*	
7.92	0.352
8.12	0.308
8.38	0.270
8.60	0.238
8.80	0.154
8.96	0.105
9.16	0.058
9.39	0.015
CURVE 20	
T ~ 298	
5.72	0.789
5.92	0.743
6.09	0.692
6.34	0.580
6.53	0.465
6.95	0.292
7.50	0.129
7.73	0.069
7.92	0.042
8.11	0.024
8.36	0.015
8.63	0.015

*Not shown on plot

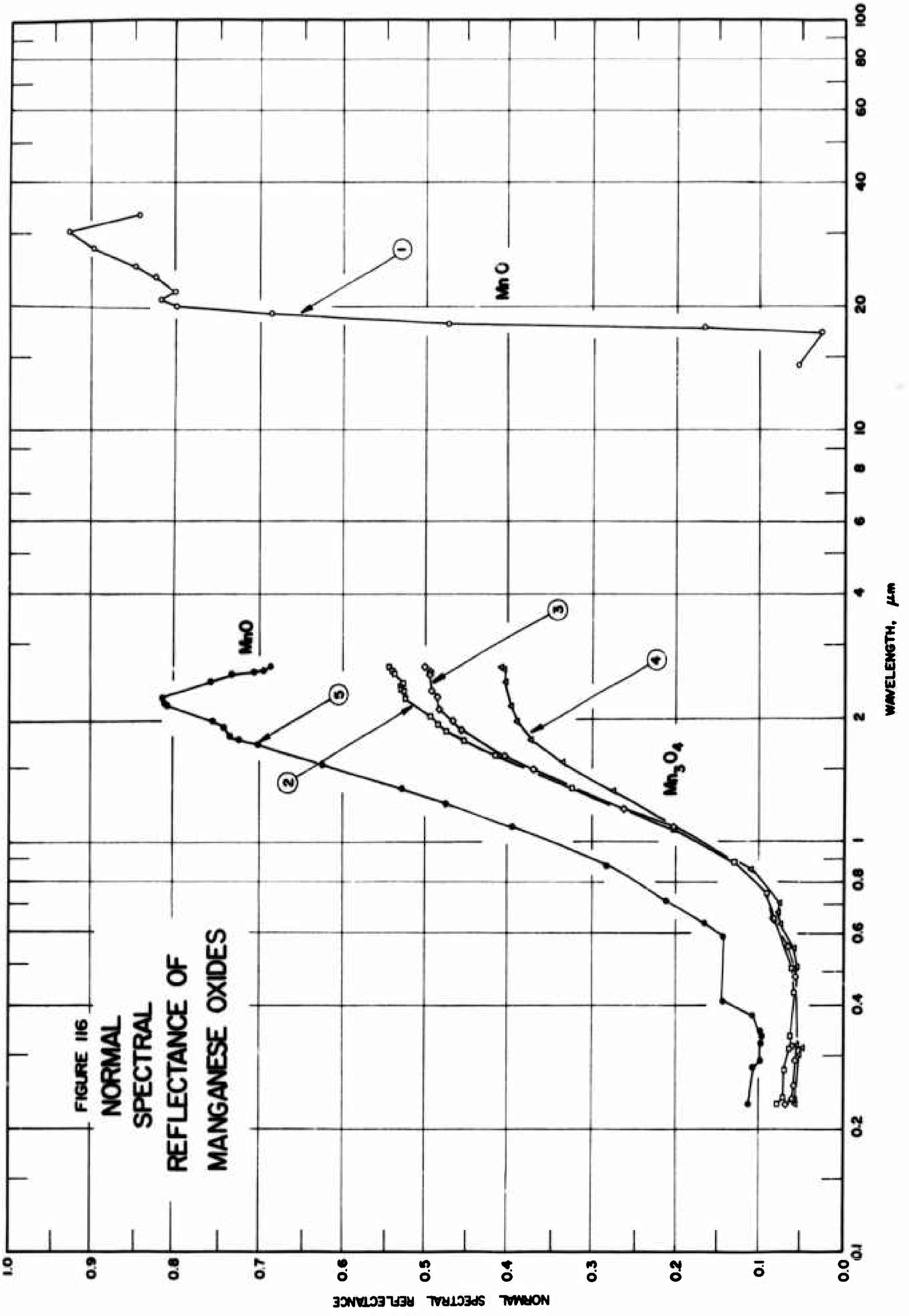


FIGURE 116 NORMAL SPECTRAL REFLECTANCE OF MANGANESE OXIDES

SPECIFICATION TABLE NO. 116 NORMAL SPECTRAL REFLECTANCE OF MANGANESE OXIDES

Curve No.	Ref. No.	Year	Temperature K	Wavelength Range, μm	Geometry θ	θ'	ω'	Reported Error, %	Composition (weight percent), Specifications, and Remarks
1	289	1967	~298	14.3-33.3	~0°	~0°			MnO; crystal grown by flame fusion.
2	362	1964	~298	0.230-2.65	0°		2π		Mn_3O_4; 99.5 pure powder, Varlacoid Co.; mesh size 325; compacted at 11 500 psi with highly polished stainless steel ram; data extracted from smooth curve; MgO reference standard.
3	362	1964	~298	0.230-2.65	~0°		2π		Similar to above specimen and conditions except compacted at 23 200 psi.
4	362	1964	~298	0.230-2.65	~0°		2π		Similar to above specimen and conditions except compacted at 34 600 psi.
5	393	1966	~298	0.230-2.65	~0°		2π		MnO; powder compacted at 35 300 psi; data extracted from smooth curve; MgO reference standard.

DATA TABLE NO. 116 NORMAL SPECTRAL REFLECTANCE OF MANGANESE OXIDES

[Wavelength, λ, μm; Reflectance, ρ; Temperature, T, K]

CURVE 1 T ~ 298

λ	ρ
14.3	0.051
17.2	0.027
17.8	0.167
18.2	0.471
19.2	0.688
20.0	0.779
20.9	0.818
21.9	0.800
23.8	0.824
25.0	0.849
27.8	0.899
30.3	0.929
33.3	0.843

CURVE 2 T ~ 298

λ	ρ
0.230	0.077
0.239	0.070
0.279	0.068
0.314	0.061
0.319	0.058
0.336	0.060

CURVE 2 (cont.)

λ	ρ
0.427	0.055
0.493	0.058
0.648	0.080
0.748	0.090
0.889	0.129
1.06	0.201
1.35	0.326
1.61	0.414
1.75	0.451
1.85	0.474
1.92	0.483
2.01	0.492
2.22	0.523
2.31	0.525
2.33	0.529
2.39	0.529
2.41	0.526
2.55	0.538
2.60	0.540
2.65	0.545

CURVE 3 T ~ 298

λ	ρ
0.230	0.066
0.236	0.059
0.255	0.057
0.292	0.054
0.318	0.052
0.466	0.054
0.553	0.063
0.649	0.081
0.748	0.090*
0.889	0.129*
1.07	0.201
1.20	0.263
1.50	0.370
1.61	0.402
1.88	0.455
1.99	0.466
2.10	0.483
2.25	0.485
2.31	0.491
2.52	0.495
2.58	0.494
2.65	0.500

CURVE 4 T ~ 298

λ	ρ
0.230	0.055
0.234	0.056
0.301	0.050
0.315	0.047
0.318	0.052
0.495	0.051
0.549	0.056
0.626	0.072
0.672	0.075
0.712	0.073
0.853	0.110
1.32	0.275
1.56	0.336
1.77	0.371
1.97	0.389
2.12	0.396
2.44	0.401
2.61	0.402
2.65	0.406

CURVE 5 T ~ 298

λ	ρ
0.230	0.111
0.281	0.106
0.294	0.099
0.321	0.099
0.339	0.097
0.347	0.099
0.376	0.108
0.509	0.140
0.581	0.140
0.633	0.165
0.712	0.210
0.870	0.281
1.09	0.394
1.22	0.475
1.34	0.528
1.54	0.636
1.71	0.701
1.77	0.728
1.80	0.737
1.90	0.743
1.96	0.755
2.12	0.808
2.17	0.811

CURVE 5 (cont.)

λ	ρ
2.22	0.814
2.44	0.758
2.53	0.734
2.58	0.708
2.60	0.696
2.65	0.688

*Not shown on plot

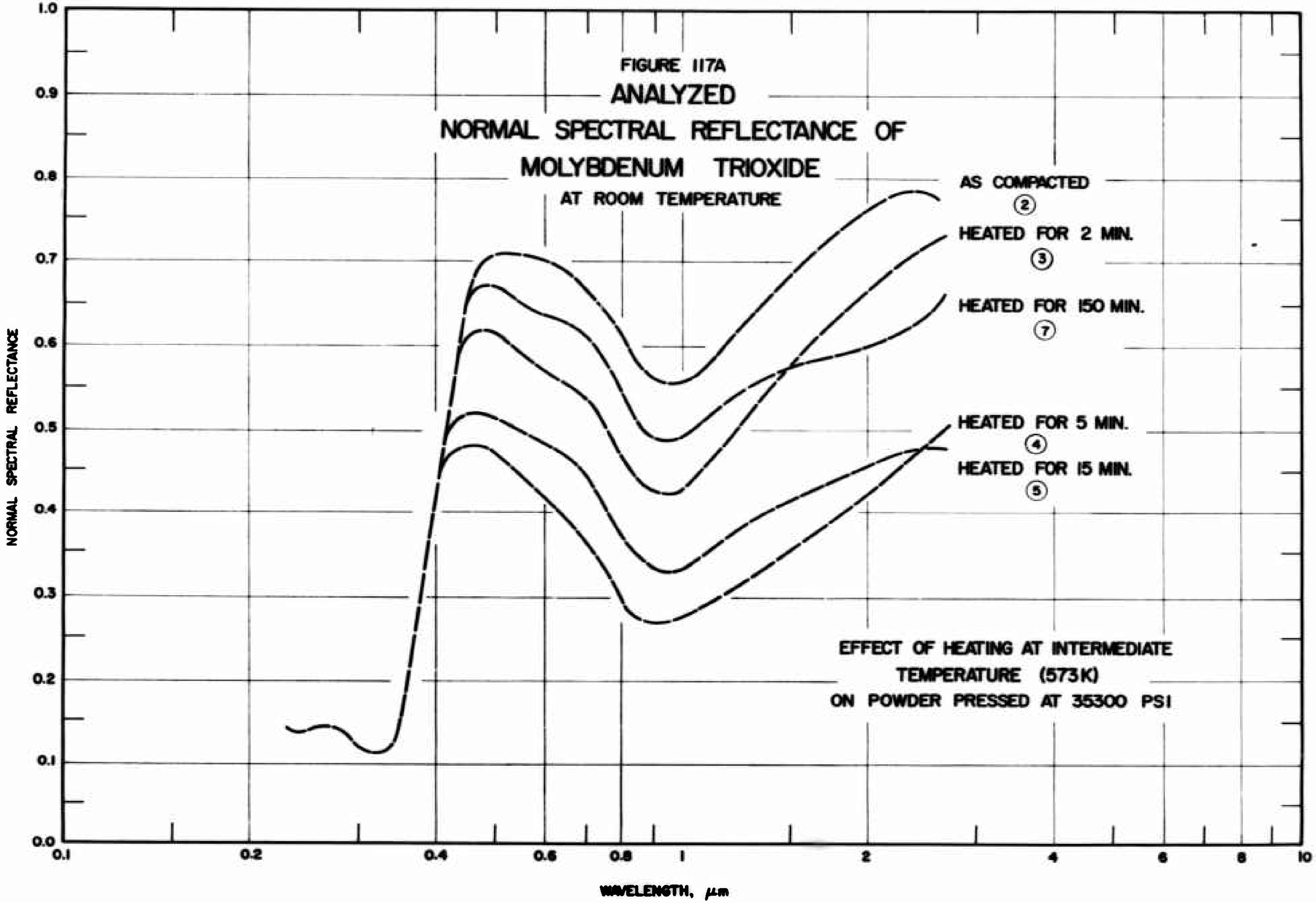


FIGURE 117A
ANALYZED
NORMAL SPECTRAL REFLECTANCE OF
MOLYBDENUM TRIOXIDE
AT ROOM TEMPERATURE
AS COMPACTED
2
HEATED FOR 2 MIN.
3
HEATED FOR 150 MIN.
7
HEATED FOR 5 MIN.
4
HEATED FOR 15 MIN.
5
EFFECT OF HEATING AT INTERMEDIATE
TEMPERATURE (573K)
ON POWDER PRESSED AT 35300 PSI
NORMAL SPECTRAL REFLECTANCE
1.0
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0.0
0.1
0.2
0.4
0.6
0.8
1
2
4
6
8
10
WAVELENGTH, μm

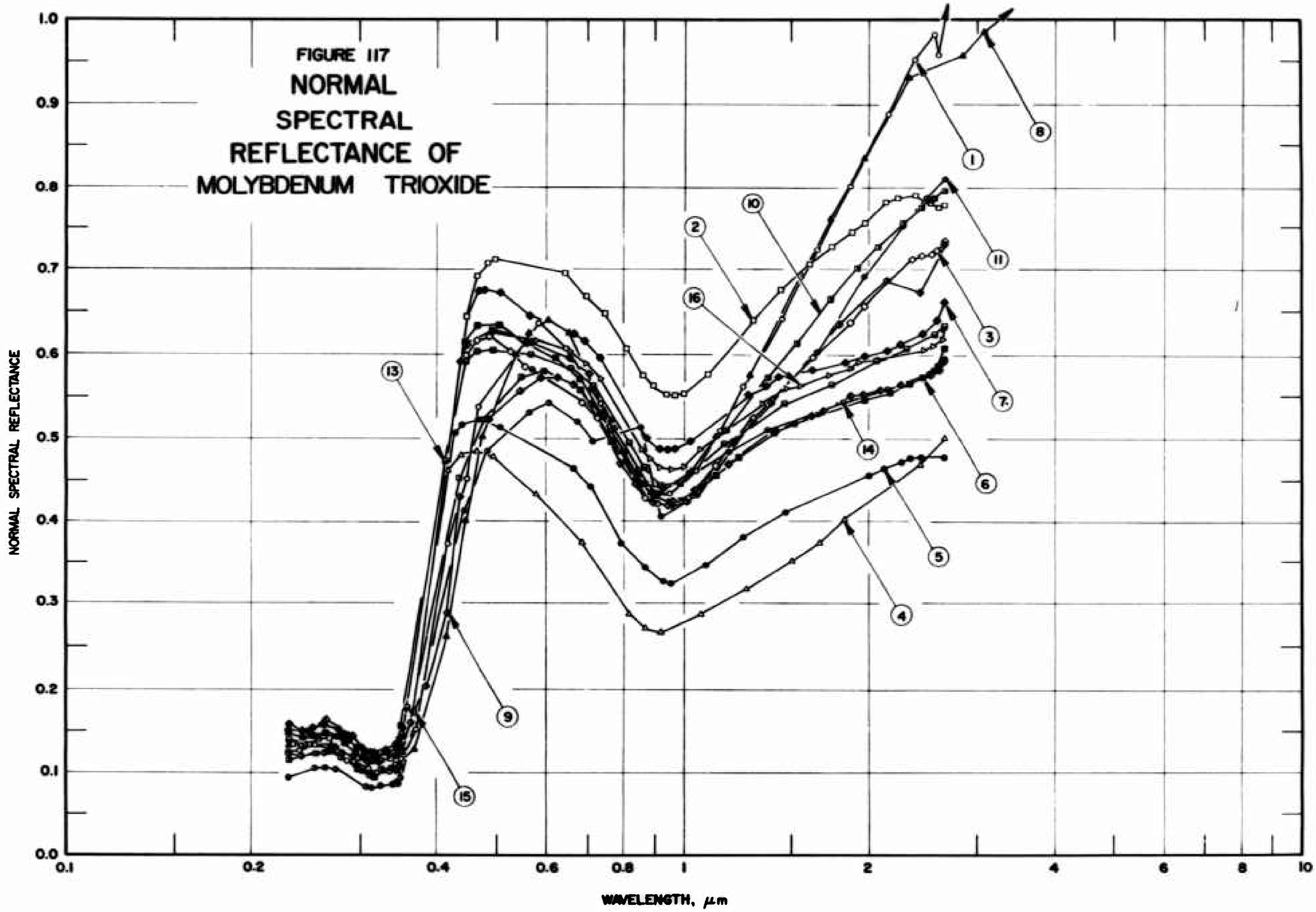


FIGURE 117
NORMAL
SPECTRAL
REFLECTANCE OF
MOLYBDENUM TRIOXIDE
NORMAL SPECTRAL REFLECTANCE
WAVELENGTH, μm
1.0
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0.0
0.1
0.2
0.4
0.6
0.8
1
2
4
6
8
10
1
2
3
4
5
6
7
8
9
10
11
13
14
15
16

SPECIFICATION TABLE NO. 117 NORMAL SPECTRAL REFLECTANCE OF MOLYBDENUM TRIOXIDE MoO_3

Curve No.	Ref. No.	Year	Temperature K	Wavelength Range, μm	Geometry θ	θ'	ω'	Reported Error, %	Composition (weight percent), Specifications, and Remarks
1	28	1963	298	0.230-2.65	~0°		2π		Sintered at 873 K for 1 hr (setter material MoO_3); density 2.98 g cm^{-3}, theoretical density 4.69 g cm^{-3}; MgO reference standard; data extracted from smooth curve; [Authors' designation: Sample No. 117].
2	342	1968	~298	0.230-2.65	0°		2π		Powder; compacted at 35 300 psi; data extracted from smooth curve; MgO reference standard.
3	342	1968	~298	0.230-2.65	0°		2π		Similar to curve 2 specimen and conditions except heated at 573 K for 2 min.
4	342	1968	~298	0.230-2.65	0°		2π		Similar to curve 2 specimen and conditions except heated at 573 K for 5 min.
5	342	1968	~298	0.230-2.65	0°		2π		Similar to curve 2 specimen and conditions except heated at 573 K for 15 min.
6	342	1968	~298	0.230-2.65	0°		2π		Similar to curve 2 specimen and conditions except heated at 573 K for 60 min.
7	342	1968	~298	0.230-2.65	0°		2π		Similar to curve 2 specimen and conditions except heated at 573 K for 150 min.
8	393	1966	~298	0.230-2.65	~0°		2π		Powder; cold pressed and sintered at 1723 K for 2 hrs; 2 or 3 wt. percent polyvinyl binder; data extracted from smooth curve; MgO reference standard.
9	393	1966	~298	0.230-2.65	~0°		2π		Powder; compacted at 35 300 psi; data extracted from smooth curve; MgO reference standard.
10	341	1966	~298	0.230-2.65	~0°		2π		Powder; compacted at 23 500 psi; data extracted from smooth curve; MgO reference standard.
11	341	1966	~298	0.230-2.65	~0°		2π		Above specimen and conditions except exposed to vacuum (10^{-6} mm Hg) for 960 min.
12	362	1964	~298	0.230-2.65	~0°		2π		>99.9 pure powder, Fisher Scientific Co.; mesh size -325; compacted at 70 600 psi with highly polished stainless steel ram; data extracted from smooth curve; MgO reference standard.
13	362	1964	~298	0.230-2.65	0°		2π		Above specimen and conditions except heated 0.5 hr at 673 K.
14	362	1964	~298	0.230-2.65	0°		2π		Above specimen and conditions except heated 1 hr total.
15	362	1964	~298	0.230-2.65	0°		2π		Above specimen and conditions except heated 2 hrs total.
16	362	1964	~298	0.230-2.65	0°		2π		Above specimen and conditions except heated 3 hrs total.
17*	362	1964	~298	0.230-2.65	0°		2π		Above specimen and conditions except heated 3.5 hrs total.

* Not shown on plot

DATA TABLE NO. 117 NORMAL SPECTRAL REFLECTANCE OF MOLYBDENUM TRIOXIDE MoO_3

[Wavelength, λ, μm; Reflectance, ρ; Temperature, T, K]

λ	ρ
CURVE 1	
T = 298	
0.230	0.125
0.240	0.127
0.253	0.133
0.270	0.129
0.286	0.112
0.294	0.112
0.300	0.104
0.310	0.104
0.320	0.100
0.335	0.100
0.343	0.109
0.348	0.109
0.350	0.115
0.370	0.151
0.418	0.372
0.448	0.451
0.468	0.538
0.584	0.638
0.648	0.608
0.736	0.541
0.793	0.469
0.875	0.431
0.950	0.435
1.05	0.461
1.15	0.510
1.25	0.563
1.45	0.642
1.65	0.723
1.87	0.802
2.15	0.890
2.38	0.953
2.55	0.983
2.59	1.00
2.65	1.02
CURVE 2	
T ~ 298	
0.230	0.138
0.235	0.135
0.242	0.132
0.248	0.133
0.256	0.141
0.262	0.144
0.267	0.142
CURVE 2 (cont.)	
0.298	0.117
0.314	0.113
0.336	0.116
0.345	0.123
0.347	0.127
0.350	0.147
0.447	0.644
0.465	0.691
0.481	0.708
0.499	0.711
0.543	0.696
0.699	0.668
0.747	0.649
0.809	0.607
0.859	0.576
0.891	0.563
0.933	0.553
0.969	0.551
1.00	0.554
1.09	0.578
1.30	0.640
1.44	0.675
1.60	0.708
1.74	0.728
1.88	0.747
1.97	0.757
2.12	0.780
2.21	0.788
2.39	0.791
2.51	0.781
2.59	0.776
2.65	0.778
CURVE 3	
T ~ 298	
0.230	0.138*
0.235	0.135*
0.242	0.132*
0.248	0.133*
0.256	0.141*
0.262	0.144*
0.267	0.142*
0.298	0.117*
0.314	0.113*
0.336	0.116*
CURVE 3 (cont.)	
0.345	0.123*
0.347	0.127*
0.350	0.147*
0.446	0.600
0.465	0.619
0.488	0.622
0.526	0.604
0.556	0.587
0.686	0.543
0.729	0.526
0.768	0.499
0.832	0.448
0.870	0.430
0.905	0.422
0.942	0.420
1.02	0.430
1.13	0.469
1.30	0.526
1.62	0.598
1.86	0.639
1.97	0.656
2.13	0.684
2.35	0.711
2.43	0.716
2.52	0.718
2.59	0.722
2.65	0.735
CURVE 4	
T ~ 298	
0.230	0.138*
0.235	0.135*
0.242	0.132*
0.248	0.133*
0.256	0.141*
0.262	0.144*
0.267	0.142*
0.298	0.117*
0.314	0.113*
0.336	0.116*
0.345	0.123*
0.347	0.127*
0.350	0.147*
0.419	0.462
0.439	0.480
CURVE 4 (cont.)	
0.462	0.485
0.493	0.479
0.577	0.434
0.688	0.375
0.817	0.288
0.867	0.270
0.913	0.266
1.07	0.287
1.26	0.318
1.50	0.351
1.66	0.374
1.83	0.401
2.41	0.470
2.65	0.500
CURVE 5	
T ~ 298	
0.230	0.138*
0.235	0.135*
0.242	0.132*
0.248	0.133*
0.256	0.141*
0.262	0.144*
0.267	0.142*
0.298	0.117*
0.314	0.113*
0.336	0.116*
0.345	0.123*
0.347	0.127*
0.350	0.147*
0.428	0.506
0.439	0.516
0.465	0.522
0.508	0.513
0.665	0.464
0.708	0.441
0.795	0.374
0.866	0.343
0.921	0.326
0.956	0.323
1.08	0.348
1.25	0.380
1.46	0.411
2.00	0.457
2.11	0.465
CURVE 5 (cont.)	
2.25	0.472
2.33	0.477
2.43	0.478
2.65	0.478
CURVE 6	
T ~ 298	
0.230	0.148
0.242	0.142
0.253	0.144
0.264	0.148
0.276	0.143
0.284	0.135
0.297	0.122
0.305	0.119
0.318	0.118
0.330	0.122
0.342	0.128
0.346	0.133
0.350	0.156
0.444	0.618
0.465	0.634
0.502	0.634
0.559	0.613
0.620	0.597
0.681	0.571
0.734	0.530
0.846	0.449
0.898	0.431
0.945	0.424
1.02	0.430*
1.13	0.456
1.23	0.478
1.40	0.506
1.51	0.519
1.96	0.547
2.16	0.555
2.32	0.567
2.45	0.574
2.54	0.581
2.59	0.588
2.65	0.608
CURVE 7	
T ~ 298	
0.230	0.157
0.242	0.150
0.251	0.153
0.263	0.156
0.276	0.151
0.281	0.146
0.289	0.137
0.297	0.130
0.305	0.125
0.316	0.124
0.330	0.127
0.342	0.134
0.346	0.141
0.350	0.156
0.447	0.644*
0.469	0.672
0.479	0.674
0.508	0.670
0.565	0.646
0.667	0.625
0.690	0.617
0.732	0.596
0.870	0.500
0.912	0.489
0.940	0.487
0.969	0.489
1.02	0.496
1.27	0.551
1.36	0.564
1.43	0.573
1.61	0.581
1.83	0.591
1.96	0.599
2.13	0.605
2.25	0.613
2.43	0.627
2.58	0.640
2.65	0.660
CURVE 8	
T ~ 298	
0.230	0.133
0.269	0.133
0.296	0.108
CURVE 8 (cont.)	
0.303	0.100
0.345	0.100
0.350	0.117*
0.368	0.128
0.414	0.261
0.444	0.400
0.472	0.501
0.532	0.600
0.561	0.627
0.604	0.640
0.641	0.627
0.762	0.521
0.798	0.484
0.834	0.454
0.888	0.435
0.919	0.435
1.03	0.460
1.13	0.501
1.28	0.577
1.74	0.761
1.95	0.836
2.31	0.931
2.42	0.958
2.54	0.989
2.65	1.02*
CURVE 9	
T ~ 298	
0.230	0.121
0.242	0.119
0.263	0.124
0.273	0.130
0.280	0.122
0.295	0.119
0.310	0.111
0.323	0.111
0.341	0.120
0.349	0.130
0.361	0.159
0.382	0.202
0.417	0.288
0.435	0.431
0.485	0.523
0.541	0.558
0.588	0.573
CURVE 9 (cont.)	
0.622	0.573
0.663	0.564
0.708	0.540
0.794	0.470
0.847	0.440
0.892	0.424
0.952	0.420
1.01	0.426
1.06	0.442
1.20	0.496
1.38	0.544
1.79	0.636
2.14	0.688
2.40	0.721
2.65	0.731
CURVE 10	
T ~ 298	
0.230	0.115
0.255	0.122
0.268	0.123
0.280	0.118
0.299	0.103
0.311	0.097
0.316	0.095
0.325	0.101
0.338	0.103
0.348	0.107
0.350	0.125
0.433	0.454
0.478	0.522
0.548	0.573
0.595	0.580
0.681	0.559
0.762	0.497
0.868	0.444
0.921	0.440
1.02	0.459
1.17	0.510
1.37	0.574
1.53	0.614
1.74	0.663
1.91	0.700
2.07	0.729
2.27	0.757

* Not shown on plot

DATA TABLE NO. 117 (continued)

λ	ρ
CURVE 10 (cont.)	
2.42	0.775
2.50	0.783
2.55	0.786
2.65	0.798
CURVE 11	
T ~ 298	
0.230	0.095
0.254	0.103
0.263	0.105
0.274	0.102
0.306	0.082
0.314	0.081
0.323	0.083
0.338	0.087
0.342	0.088
0.344	0.087
0.348	0.093
0.441	0.414
0.484	0.487
0.563	0.531
0.608	0.542
0.677	0.520
0.714	0.497
0.850	0.414
0.915	0.405
1.05	0.434
1.30	0.520
1.65	0.604
1.97	0.691
2.27	0.756
2.48	0.789
2.65	0.812
CURVE 12*	
T ~ 298	
0.230	0.139
0.241	0.140
0.252	0.146
0.258	0.151
0.279	0.151
0.297	0.128
0.310	0.122
0.329	0.118
0.338	0.122

λ	ρ
CURVE 12 (cont.)*	
0.345	0.124
0.349	0.134
0.359	0.178
0.412	0.472
0.445	0.594
0.476	0.619
0.499	0.613
0.553	0.583
0.660	0.530
0.725	0.486
0.787	0.432
0.847	0.389
0.902	0.375
0.948	0.372
1.02	0.387
1.27	0.462
1.55	0.539
1.71	0.588
1.85	0.639
1.96	0.654
2.15	0.718
2.31	0.751
2.50	0.773
2.65	0.770
CURVE 13	
T ~ 298	
0.230	0.139
0.244	0.134
0.256	0.144
0.263	0.148*
0.276	0.146
0.285	0.141
0.296	0.125*
0.307	0.116
0.324	0.113
0.341	0.118*
0.346	0.122*
0.349	0.134*
0.359	0.178
0.412	0.472
0.445	0.594
0.461	0.601
0.494	0.605
0.568	0.600
0.659	0.585

λ	ρ
CURVE 13 (cont.)	
0.714	0.564
0.817	0.495
0.864	0.466
0.915	0.445
0.982	0.449
1.17	0.493
1.46	0.541
1.74	0.567
2.05	0.594
2.30	0.609
2.56	0.625
2.65	0.633
CURVE 14	
T ~ 298	
0.230	0.139*
0.244	0.134*
0.256	0.144*
0.263	0.148*
0.276	0.146*
0.285	0.141*
0.296	0.125*
0.307	0.116*
0.324	0.113*
0.341	0.118*
0.346	0.122*
0.349	0.134*
0.359	0.178*
0.412	0.472*
0.445	0.594*
0.561	0.601*
0.494	0.605*
0.570	0.593
0.663	0.564*
0.743	0.526
0.804	0.484
0.845	0.455
0.906	0.435
0.951	0.435*
1.18	0.484
1.37	0.511
1.81	0.543
2.15	0.560
2.51	0.579
2.59	0.587
2.65	0.597

λ	ρ
CURVE 15	
T ~ 298	
0.230	0.150
0.249	0.149
0.265	0.164
0.293	0.144
0.301	0.130
0.311	0.124
0.319	0.120
0.334	0.121
0.343	0.123*
0.349	0.134*
0.366	0.173
0.437	0.592
0.446	0.613
0.494	0.629
0.570	0.615
0.658	0.596
0.701	0.578
0.710	0.559
0.774	0.512
0.842	0.461
0.899	0.433
0.960	0.424
1.04	0.438
1.18	0.470
1.41	0.510
1.61	0.529
1.69	0.533
1.87	0.551
1.96	0.552
2.09	0.559
2.25	0.565
2.51	0.578
2.60	0.584
2.65	0.595
CURVE 16	
T ~ 298	
0.230	0.150*
0.249	0.149*
0.265	0.164*
0.293	0.144*
0.301	0.130*
0.311	0.124*
0.319	0.120*
0.334	0.121*

λ	ρ
CURVE 16 (cont.)	
0.343	0.123*
0.349	0.134*
0.366	0.173*
0.437	0.592*
0.446	0.613*
0.491	0.628
0.578	0.617
0.657	0.603
0.699	0.590
0.735	0.572
0.857	0.486
0.882	0.475
0.913	0.466
0.956	0.463
1.00	0.468
1.07	0.487
1.16	0.509
1.34	0.541
1.47	0.560
1.55	0.564
1.72	0.577
1.86	0.585
1.93	0.591
2.08	0.595
2.45	0.607
2.54	0.611
2.62	0.620
2.65	0.633
CURVE 17*	
T ~ 298	
0.230	0.150
0.249	0.149
0.265	0.164
0.269	0.164
0.293	0.144
0.303	0.132
0.322	0.127
0.333	0.130
0.342	0.133
0.347	0.139
0.350	0.146
0.366	0.173
0.437	0.592
0.446	0.613
0.460	0.644

λ	ρ
CURVE 17 (cont.)*	
0.473	0.653
0.497	0.660
0.582	0.642
0.630	0.638
0.671	0.627
0.809	0.538
0.841	0.512
0.882	0.492
0.925	0.483
0.982	0.483
1.04	0.493
1.13	0.521
1.26	0.548
1.43	0.569
1.57	0.579
1.82	0.596
2.00	0.602
2.17	0.610
2.40	0.616
2.55	0.623
2.63	0.634
2.65	0.641

*Not shown on plot

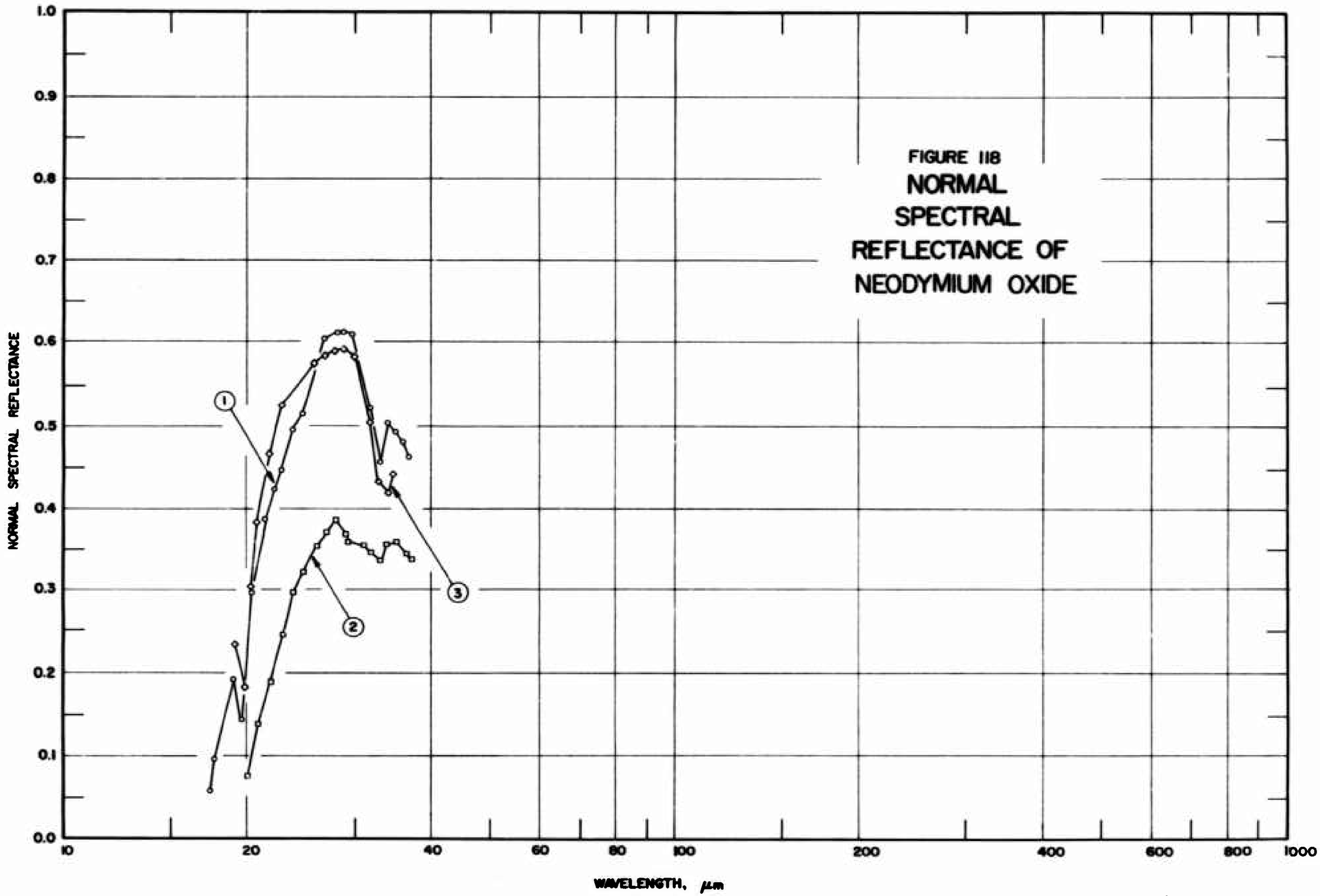


FIGURE 118
NORMAL SPECTRAL REFLECTANCE OF NEODYMIUM OXIDE

SPECIFICATION TABLE NO. 118 NORMAL SPECTRAL REFLECTANCE OF NEODYMIUM OXIDE Nd_2O_3

Curve No.	Ref. No.	Year	Temperature K	Wavelength Range, μm	Geometry θ θ' ω'	Reported Error, %	Composition (weight percent), Specifications, and Remarks
1	146	1966	~298	17.4-36.8	~0° ~0°		Film; optical thickness 10 quarterwaves at λ = 2.5 μm; electron beam deposited in vacuum (2-8 x 10^{-6} mm Hg) at normal incidence onto glass substrate heated to 588 K; rate of depositing 1 quarterwave per min at λ = 0.5 μm.
2	146	1966	~298	20.0-37.1	~0° ~0°		Film; optical thickness 10 quarterwaves at λ = 3.1 μm; electron beam deposited in vacuum (2-8 x 10^{-6} mm Hg) at normal incidence onto glass substrate heated to 423 K; rate of depositing 1 quarterwave per min at λ = 0.5 μm; film clear bluish in appearance.
3	146	1966	~298	19.1-34.5	~0° ~0°		Film; optical thickness 10 quarterwaves at λ = 2.8 μm; electron beam deposited in vacuum (1.8 x 10^{-4} mm Hg with O_2 bleed) at normal incidence onto glass substrate heated to 588 K; rate of depositing 1 quarterwave per min at λ = 0.5 μm; annealed in air at 773 K for 2 hrs.

DATA TABLE NO. 118 NORMAL SPECTRAL REFLECTANCE OF NEODYMIUM OXIDE Nd_2O_3

[Wavelength, λ, μm; Reflectance, ρ; Temperature, T, K]

λ	ρ	λ	ρ	λ	ρ
CURVE 1		CURVE 2		CURVE 3	
T ~ 298		T ~ 298		T ~ 298	
17.4	0.060	20.0	0.076	19.1	0.231
17.6	0.097	20.9	0.139	19.9	0.183
19.0	0.191	21.9	0.190	20.3	0.304
19.7	0.145	22.9	0.245	20.8	0.384
20.4	0.297	23.9	0.296	21.9	0.468
21.4	0.389	24.6	0.321	22.9	0.528
22.1	0.423	26.0	0.355	25.9	0.578
22.8	0.449	27.0	0.371	26.9	0.585
23.9	0.497	27.9	0.386	27.9	0.590
24.6	0.516	29.0	0.370	28.9	0.591
26.9	0.603	29.3	0.360	30.0	0.584
28.6	0.611	31.0	0.355	31.8	0.505
28.9	0.611	31.9	0.347	32.9	0.434
29.9	0.610	33.0	0.337	34.0	0.419
31.9	0.524	33.9	0.358	34.5	0.442
33.0	0.458	35.0	0.360		
34.0	0.504	36.4	0.345		
35.0	0.494	37.1	0.336		
36.0	0.481				
36.8	0.462				

SPECIFICATION TABLE NO. 119 NORMAL TOTAL EMITTANCE OF NICKEL OXIDES

Curve No.	Ref. No.	Year	Temperature Range, K	Geometry θ'	Reported Error, %	Composition (weight percent), Specifications and Remarks
1*	28	1963	1023	~0°		NiO; sintered at 1673 K for 2 hrs (setter material Al_2O_3); density 5.32 g cm^{-3}, theoretical density 7.45 g cm^{-3}; x-ray structure bunsenite; integrated from spectral data (1-15 μm); [Authors' desingation: Sample No. 119].

DATA TABLE NO. 119 NORMAL TOTAL EMITTANCE OF NICKEL OXIDES

[Temperature, T, K; Emittance, ϵ]

T	ϵ
CURVE 1*	
1023	0.78

*No plot given

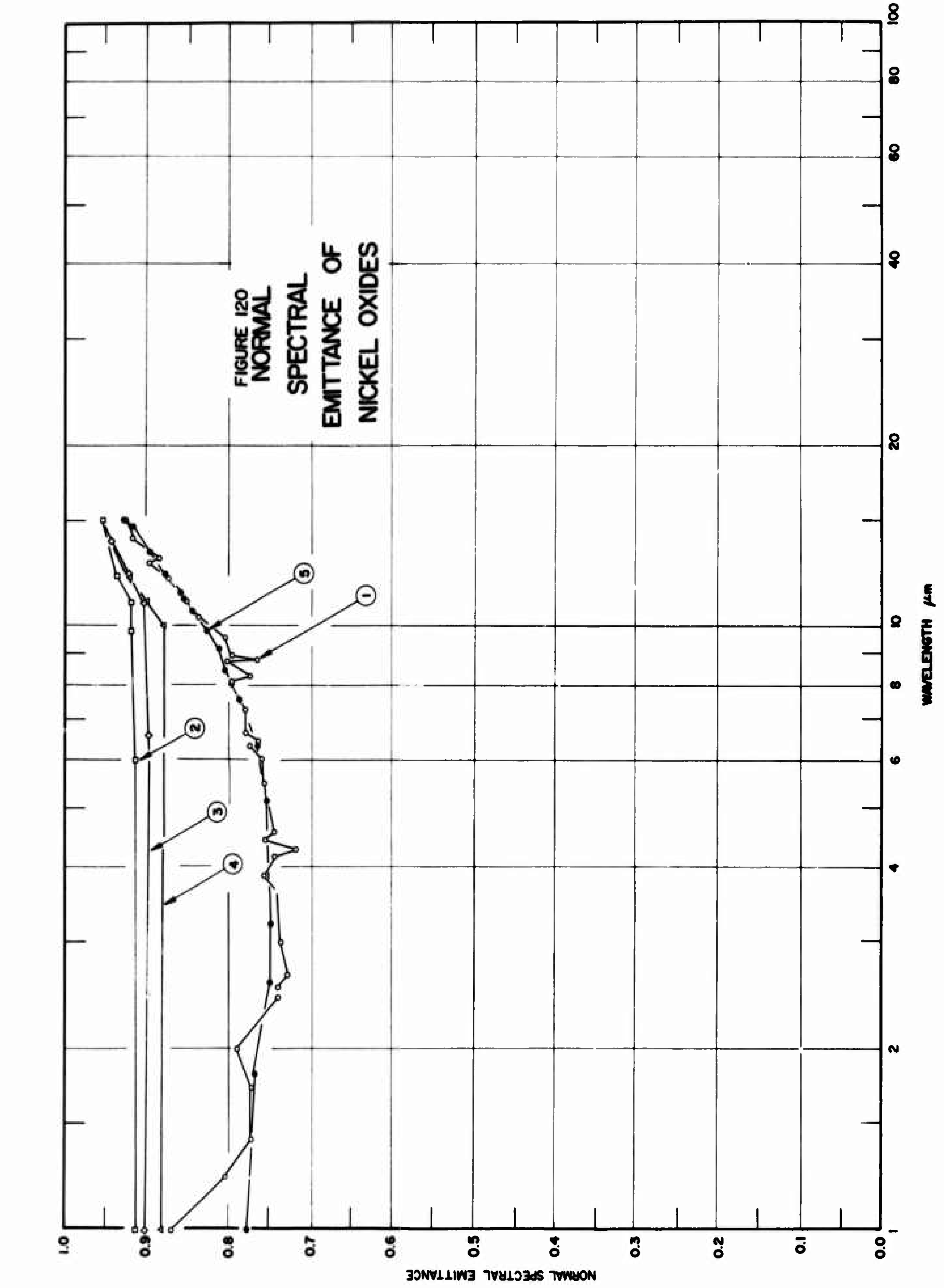


FIGURE 120 NORMAL SPECTRAL EMITTANCE OF NICKEL OXIDES

SPECIFICATION TABLE NO. 120 NORMAL SPECTRAL EMITTANCE OF NICKEL OXIDES

Curve No.	Ref. No.	Year	Temperature K	Wavelength Range, µm	Geometry θ'	Reported Error, %	Composition (weight percent), Specifications, and Remarks
1	28	1963	1023	1.00-15.0	~0°		NiO; sintered at 1673 K for 2 hrs (setter material Al_2O_3); density 5.32 g cm^{-3}, theoretical density 7.45 g cm^{-3}; x-ray structure bunsenite; data extracted from smooth curve; [Authors' designation: Sample No. 119].
2	382	1965	1273	1.00-15.0	0°		NiO; sintered 2 hrs at 1673 K; data extracted from smooth curve.
3	382	1965	1273	1.00-15.0	0°		Above specimen and conditions except heated at 1273 K in measuring apparatus for 1 hr total.
4	382	1965	1273	1.00-15.0	0°		Above specimen and conditions except heated at 1273 K in measuring apparatus for 4 hrs total.
5	393	1966	1273	1.00-15.0	~0°		NiO; cold pressed and sintered at 1673 K for 2 hrs; 2 or 3 wt percent polyvinyl binder; density 5.32 g cm^{-3}; data extracted from smooth curve.

DATA TABLE NO. 120 NORMAL SPECTRAL EMITTANCE OF NICKEL OXIDES

[Wavelength, λ, µm; Emittance, ϵ; Temperature, T, K]

CURVE 1
T = 1023

λ	ϵ
1.00	0.870
1.23	0.801
1.41	0.770
1.72	0.770
2.00	0.789
2.42	0.737
2.52	0.737
2.64	0.727
3.00	0.734
3.65	0.739
3.86	0.755
4.16	0.741
4.29	0.717
4.42	0.753
4.56	0.742
5.50	0.754
6.01	0.758
6.31	0.772
6.46	0.762
6.68	0.779
7.26	0.779

CURVE 1 (cont.)

λ	ϵ
8.02	0.795
8.09	0.795
8.22	0.772
8.72	0.801
8.79	0.763
8.94	0.797
9.59	0.804
10.3	0.838
11.0	0.852
12.0	0.875
12.7	0.899
13.0	0.887
14.0	0.918
15.0	0.925

CURVE 2
T = 1273

λ	ϵ
1.00	0.912
6.67	0.914
9.83	0.919
10.9	0.919

CURVE 2 (cont.)

λ	ϵ
12.1	0.936
15.0	0.953

CURVE 3
T = 1273

λ	ϵ
1.00	0.900
6.60	0.898
10.9	0.903
12.0	0.921
13.8	0.942
15.0	0.953*

CURVE 4
T = 1273

λ	ϵ
1.00	0.881
10.0	0.880
11.0	0.900
12.0	0.921
13.8	0.942*
15.0	0.953*

CURVE 5
T = 1273

λ	ϵ
1.00	0.775
1.82	0.766
2.57	0.749
3.22	0.745
5.15	0.751
6.33	0.763
7.56	0.788
8.43	0.804
9.15	0.811
9.80	0.828
10.6	0.846
11.1	0.856
11.4	0.860
12.2	0.878
13.3	0.896
14.6	0.917
15.0	0.927

*Not shown on plot

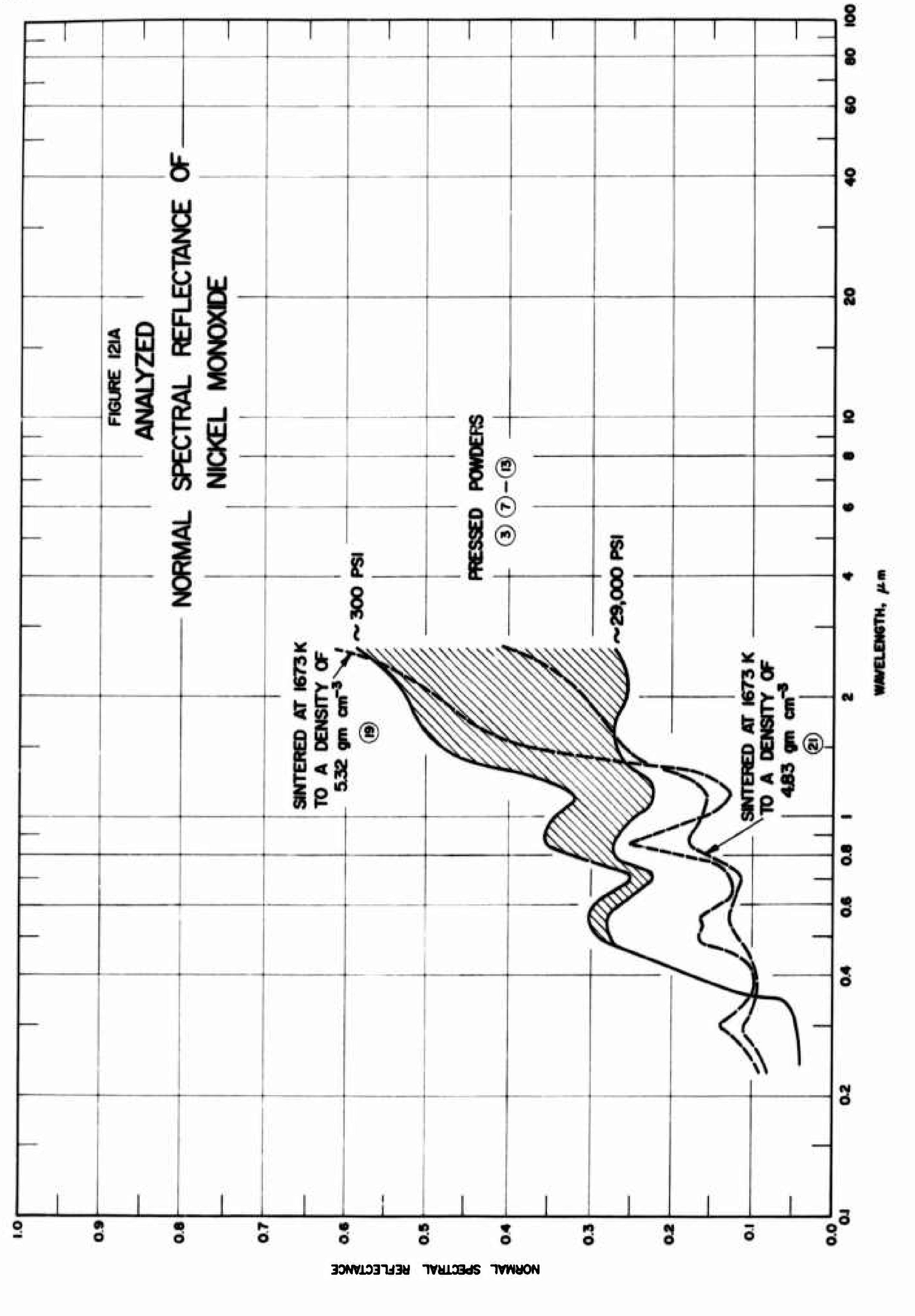


FIGURE 121A
ANALYZED
NORMAL SPECTRAL REFLECTANCE OF
NICKEL MONOXIDE

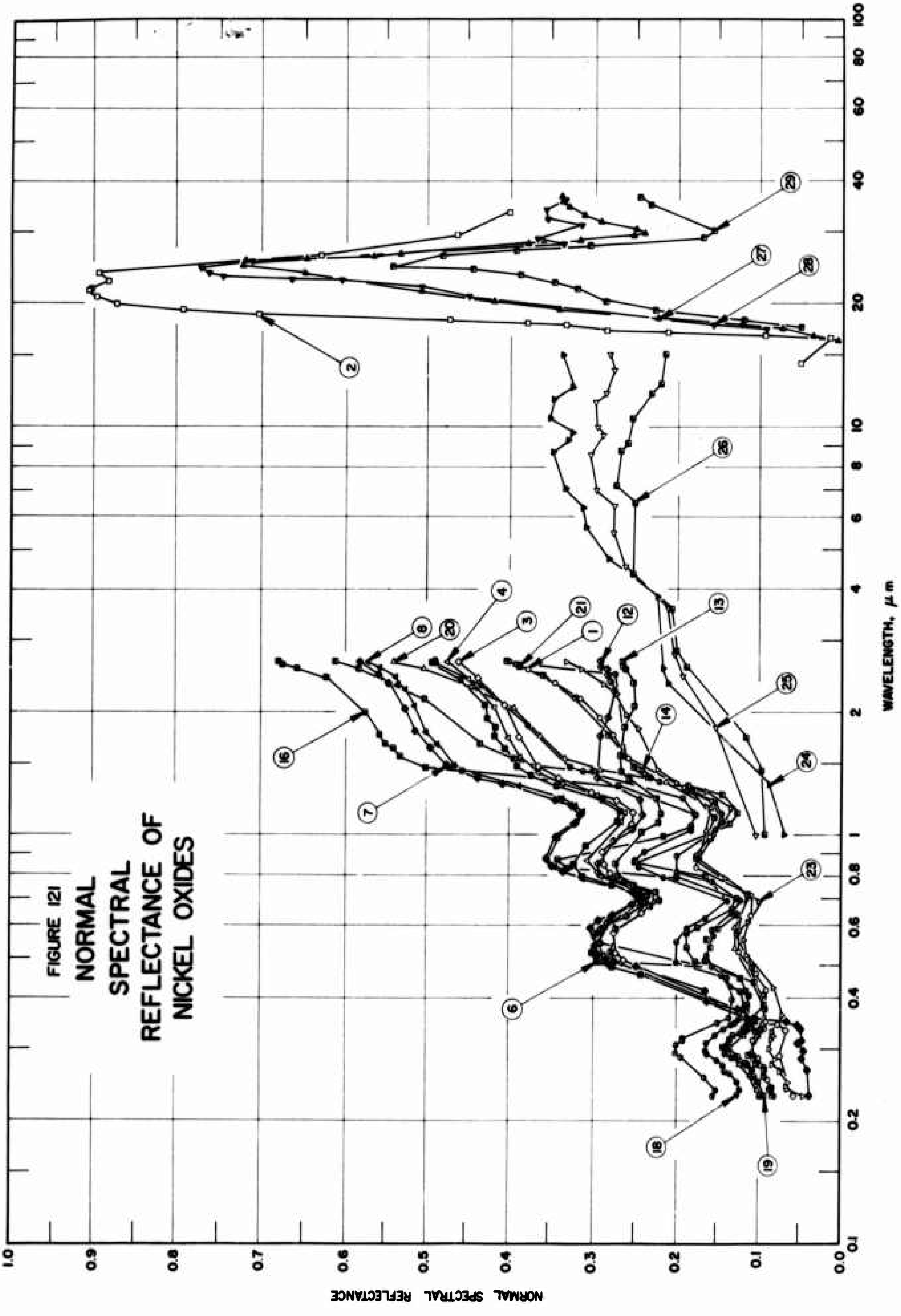


FIGURE 121
NORMAL SPECTRAL REFLECTANCE OF NICKEL OXIDES

SPECIFICATION TABLE NO. 121 NORMAL SPECTRAL REFLECTANCE OF NICKEL OXIDES

Curve No.	Ref. No.	Year	Temperature K	Wavelength Range,	Geometry θ	θ'	ω'	Reported Error, %	Composition (weight percent), Specifications, and Remarks
1	28	1963	298	0.230-2.65	~0°		2π		NiO; sintered at 1773 K for 2 hrs (setter material NiO); density 4.81 g cm^{-3}, theoretical density 7.45 g cm^{-3}; MgO reference standard; data extracted from smooth curve; [Authors' designation: Sample No. 118].
2	289	1967	~298	14.3-33.3	~0°	~0°			NiO; crystalan; grown by flame fusion.
3	341	1966	~298	0.230-2.65	~0°		2π		NiO powder; compacted at 23 500 psi; data extracted from smooth curve; reference standard MgO.
4	341	1966	~298	0.230-2.65	~0°		2π		Above specimen and conditions except exposed to vacuum (10^{-5} mm Hg) for 25 min.
5	341	1966	~298	0.230-2.65	~0°		2π		Above specimen and conditions except exposed to vacuum (10^{-4} mm Hg) for 105 min.
6	341	1966	~298	0.230-2.65	~0°		2π		Above specimen and conditions except exposed to vacuum (10^{-5} mm Hg) for 960 min.
7	362	1964	~298	0.230-2.65	0°		2π		NiO; 99.9 pure powder, Fisher Scientific Co.; mesh size 325; compacted at 290 psi with highly polished stainless steel ram; data extracted from smooth curve; MgO reference standard.
8	362	1964	~298	0.230-2.65	~0°		2π		Similar to above specimen and conditions except compacted at 1150 psi.
9*	362	1964	~298	0.230-2.65	~0°		2π		Similar to above specimen and conditions except compacted at 2880 psi.
10*	362	1964	~298	0.230-2.65	~0°		2π		Similar to above specimen and conditions except compacted at 5760 psi.
11*	362	1964	~298	0.230-2.65	~0°		2π		Similar to above specimen and conditions except compacted at 11 500 psi.
12	362	1964	~298	0.230-2.65	~0°		2π		Similar to above specimen and conditions except compacted at 20 200 psi.
13	362	1964	~298	0.230-2.65	~0°		2π		Similar to above specimen and conditions except compacted at 28 800 psi.
14	362	1964	~298	0.230-2.65	0°		2π		NiO; powder; compacted at 12 000 psi with highly polished stainless steel ram, then sintered at 1673 K for 1 hr; data extracted from smooth curve; MgO reference standard.
15*	362	1964	~298	0.230-2.65	0°		2π		Similar to above specimen and conditions except sintered for 2 hrs.
16	362	1964	~298	0.230-2.65	0°		2π		NiO; powder; compacted at 18 000 psi with highly polished stainless steel ram, then sintered for 2 hrs at 1573 K; data extracted from smooth curve; MgO reference standard.
17*	362	1964	~298	0.230-2.65	0°		2π		Similar to above specimen and conditions except compacted at 12 000 psi.
18	362	1964	~298	0.230-2.65	0°		2π		Similar to above specimen and conditions except compacted at 6000 psi.
19	362	1964	~298	0.230-2.65	0°		2π		NiO; powder; sintered at 1673 K; density 5.32 g cm^{-3}; data extracted from smooth curve; MgO reference standard.
20	362	1964	~298	0.230-2.65	0°		2π		Similar to above specimen and conditions except sintered at 1723 K; density 5.02 g cm^{-3}.
21	362	1964	~298	0.230-2.65	0°		2π		Similar to above specimen and conditions except sintered at 1673 K; density 4.83 g cm^{-3}.
22*	362	1964	~298	0.230-2.65	0°		2π		Similar to above specimen and conditions except sintered at 1773 K; density 4.81 g cm^{-3}.
23	362	1964	~298	0.230-2.65	0°		2π		Similar to above specimen and conditions except sintered at 1623 K; density 4.81 g cm^{-3}.

* Not shown on plot

SPECIFICATION TABLE NO. 121 (continued)

Curve No.	Ref. No.	Year	Temperature K	Wavelength Range, μm	Geometry θ	Geometry θ'	Geometry ω'	Reported Error, %	Composition (weight percent), Specifications, and Remarks
24	362	1964	~298	1.00-15.0	0°		2π		NiO; sintered 2 hrs at 1673 K (sintered sample of a partially sintered sample); machine grooved to surface roughness 20-35 $\mu in.$; data extracted from smooth curve; converted from $R(2\pi, 0°)$.
25	362	1964	~298	1.00-15.0	0°		2π		Similar to above specimen and conditions except surface roughness 250-350 $\mu in.$.
26	362	1964	~298	1.00-15.0	0°		2π		Similar to above specimen and conditions except surface roughness 800-1000 $\mu in.$.
27	146	1966	~298	16.1-36.8	~0°	~0°			Ni_2O_3; film; optical thickness 10 quarterwaves at $\lambda = 2.5\ \mu m$; electron beam deposited in vacuum ($2\text{-}8 \times 10^{-6}$ mm Hg) at normal incidence onto glass substrate heated to 423 K; rate of depositing 1 quarterwave per min at $\lambda = 0.5\ \mu m$; film clear brown in appearance.
28	146	1966	~298	17.1-35.9	~0°	~0°			Above specimen and conditions except measured after baking.
29	146	1966	~298	17.4-36.2	~0°	~0°			Ni_2O_3; film; optical thickness 10 quarterwaves at $\lambda = 2.8\ \mu m$; electron beam deposited in vacuum ($2\text{-}8 \times 10^{-6}$ mm Hg) at normal incidence onto glass substrate heated to 588 K; rate of depositing 1 quarterwave per min at $\lambda = 0.5\ \mu m$.

DATA TABLE NO. 121 NORMAL SPECTRAL REFLECTANCE OF NICKEL OXIDES

[Wavelength, λ, μm; Reflectance, ρ; Temperature, T, K]

CURVE 1
T = 298

λ	ρ
0.230	0.081
0.251	0.088
0.271	0.093
0.273	0.098
0.285	0.100
0.290	0.106
0.310	0.108
0.337	0.091
0.350	0.090
0.419	0.090
0.459	0.101
0.519	0.124
0.580	0.124
0.632	0.109
0.713	0.109
0.832	0.176
0.891	0.176
0.983	0.160
1.09	0.145
1.21	0.156
1.30	0.190
1.38	0.231
1.54	0.260
1.75	0.276
1.94	0.293
2.15	0.316
2.35	0.345
2.55	0.377
2.65	0.400

CURVE 2
T ~ 298

λ	ρ
14.3	0.051
16.3	0.018
16.7	0.095
17.0	0.214
17.2	0.287
17.6	0.335
17.9	0.379
18.2	0.472
18.8	0.703
19.2	0.794
20.0	0.873
20.7	0.899

CURVE 2 (cont.)

λ	ρ
21.5	0.906
21.8	0.905
22.7	0.885
23.8	0.845
26.4	0.631
29.5	0.462
33.3	0.400

CURVE 3
T ~ 298

λ	ρ
0.230	0.057
0.290	0.073
0.334	0.066
0.343	0.076
0.348	0.093
0.493	0.264
0.514	0.273
0.578	0.275
0.641	0.243
0.704	0.225
0.808	0.280
0.850	0.288
0.905	0.288
1.07	0.255
1.13	0.253
1.21	0.271
1.28	0.301
1.38	0.340
1.49	0.364
1.74	0.388
2.09	0.405
2.41	0.436
2.65	0.460

CURVE 4
T ~ 298

λ	ρ
0.230	0.057*
0.290	0.073*
0.334	0.066*
0.343	0.076*
0.348	0.093*
0.487	0.267
0.505	0.286
0.544	0.291

CURVE 4 (cont.)

λ	ρ
0.600	0.285
0.694	0.237
0.743	0.257
0.794	0.290
0.866	0.308
1.07	0.266
1.14	0.261
1.25	0.295
1.33	0.335
1.41	0.363
1.55	0.386
1.72	0.400
2.05	0.416
2.40	0.447
2.65	0.473

CURVE 5
T ~ 298

λ	ρ
0.230	0.057
0.290	0.073
0.334	0.066
0.343	0.076
0.348	0.093
0.456	0.243
0.477	0.277
0.490	0.295
0.516	0.300
0.576	0.297
0.621	0.279
0.702	0.241
0.753	0.277
0.791	0.300
0.823	0.312
0.870	0.317
1.08	0.271
1.13	0.268
1.22	0.289
1.32	0.342
1.39	0.372
1.49	0.398
1.64	0.416
1.87	0.433
2.02	0.439
2.21	0.454
2.41	0.476
2.65	0.505

CURVE 6
T ~ 298

λ	ρ
0.230	0.057*
0.290	0.073*
0.334	0.066*
0.343	0.076*
0.348	0.093*
0.456	0.243
0.477	0.277
0.490	0.295
0.516	0.300
0.576	0.297
0.621	0.279
0.702	0.2[illegible]1
0.753	0.277
0.797	0.312
0.846	0.324
0.940	0.309
1.08	0.271
1.13	0.268
1.22	0.289
1.32	0.342
1.40	0.371
1.48	0.390
1.62	0.405
1.75	0.416
1.83	0.416
1.93	0.424
2.09	0.428
2.40	0.459
2.65	0.494

CURVE 7
T ~ 298

λ	ρ
0.230	0.038
0.266	0.041
0.283	0.048
0.297	0.046
0.310	0.051
0.313	0.048
0.335	0.049
0.342	0.052
0.350	0.067
0.353	0.103
0.374	0.125
0.390	0.161

CURVE 7 (cont.)

λ	ρ
0.413	0.165
0.472	0.250
0.490	0.283
0.510	0.294
0.536	0.299
0.596	0.301
0.614	0.294
0.629	0.276
0.673	0.255
0.710	0.249
0.728	0.254
0.814	0.335
0.840	0.348
0.876	0.353
0.988	0.343
1.06	0.321
1.11	0.317
1.17	0.326
1.22	0.342
1.33	0.408
1.37	0.436
1.49	0.475
1.63	0.496
1.80	0.512
2.03	0.525
2.35	0.547
2.46	0.559
2.65	0.584

CURVE 8
T ~ 298

λ	ρ
0.230	0.038*
0.266	0.041*
0.283	0.048*
0.297	0.046*
0.310	0.051*
0.313	0.048*
0.335	0.049*
0.342	0.052*
0.350	0.067*
0.353	0.103*
0.374	0.125*
0.390	0.161*
0.413	0.165*
0.472	0.250*

CURVE 8 (cont.)

λ	ρ
0.490	0.283*
0.510	0.294*
0.536	0.299*
0.596	0.301*
0.614	0.294*
0.629	0.276*
0.673	0.255*
0.710	0.249*
0.728	0.254*
0.792	0.312
0.833	0.344
0.874	0.353
0.988	0.343
1.06	0.321
1.13	0.316
1.18	0.322
1.22	0.336
1.31	0.386
1.39	0.435
1.49	0.465
1.66	0.485
1.79	0.500
2.07	0.512
2.28	0.526
2.33	0.533
2.41	0.536
2.57	0.558
2.65	0.571

CURVE 9*
T ~ 298

λ	ρ
0.230	0.038
0.266	0.041
0.283	0.048
0.297	0.046
0.310	0.051
0.313	0.048
0.335	0.049
0.342	0.052
0.350	0.067
0.353	0.103
0.374	0.125
0.390	0.161
0.413	0.165
0.472	0.250

CURVE 9 (cont.)*

λ	ρ
0.490	0.283
0.510	0.294
0.536	0.299
0.596	0.301
0.614	0.294
0.629	0.276
0.673	0.255
0.710	0.249
0.728	0.254
0.791	0.311
0.824	0.334
0.879	0.339
0.931	0.336
1.07	0.298
1.13	0.295
1.18	0.301
1.23	0.316
1.28	0.336
1.36	0.385
1.44	0.410
1.61	0.436
1.71	0.440
1.79	0.448
1.97	0.450
2.22	0.461
2.34	0.472
2.43	0.473
2.48	0.481
2.56	0.483
2.65	0.496

CURVE 10*
T ~ 298

λ	ρ
0.230	0.038
0.266	0.041
0.283	0.048
0.297	0.046
0.310	0.051
0.313	0.048
0.335	0.049
0.342	0.052
0.350	0.067
0.353	0.103
0.374	0.125
0.390	0.161

CURVE 10 (cont.)*

λ	ρ
0.413	0.165
0.472	0.250
0.496	0.286
0.547	0.291
0.587	0.290
0.607	0.284
0.638	0.260
0.664	0.248
0.710	0.240
0.747	0.259
0.815	0.315
0.836	0.322
0.863	0.325
0.902	0.325
0.974	0.308
1.00	0.296
1.04	0.286
1.09	0.280
1.14	0.279
1.18	0.281
1.25	0.303
1.40	0.364
1.48	0.377
1.62	0.389
2.01	0.387
2.44	0.382
2.59	0.397
2.65	0.396

CURVE 11*
T ~ 298

λ	ρ
0.230	0.038
0.266	0.041
0.283	0.048
0.297	0.046
0.310	0.051
0.313	0.048
0.335	0.049
0.342	0.052
0.350	0.067
0.353	0.103
0.374	0.125
0.390	0.161
0.413	0.165
0.472	0.250

*Not shown on plot

DATA TABLE NO. 121 (continued)

CURVE 11 (cont.)* T ~ 298

λ	ρ
0.496	0.286
0.547	0.291
0.587	0.290
0.607	0.284
0.638	0.260
0.667	0.244
0.683	0.239
0.709	0.237
0.738	0.246
0.817	0.303
0.887	0.306
0.925	0.296
1.04	0.271
1.10	0.261
1.13	0.256
1.17	0.256
1.22	0.264
1.35	0.307
1.40	0.319
1.56	0.328
1.62	0.324
2.05	0.318
2.28	0.319
2.48	0.327
2.59	0.339
2.65	0.341

CURVE 12 T ~ 298

λ	ρ
0.230	0.038*
0.266	0.041*
0.283	0.048*
0.297	0.046*
0.310	0.051*
0.313	0.048*
0.335	0.049*
0.342	0.052*
0.350	0.067*
0.353	0.103*
0.374	0.125*
0.390	0.161*
0.413	0.165*
0.472	0.250*
0.496	0.286
0.547	0.291

CURVE 12 (cont.)

λ	ρ
0.587	0.290
0.607	0.284
0.638	0.260
0.667	0.244
0.683	0.239
0.709	0.237
0.738	0.246
0.803	0.294
0.854	0.294
0.965	0.276
1.04	0.253
1.11	0.242
1.21	0.245
1.38	0.295
1.75	0.291
1.95	0.283
2.25	0.277
2.39	0.280
2.45	0.284
2.54	0.284
2.58	0.291
2.65	0.291

CURVE 13 T ~ 298

λ	ρ
0.230	0.038*
0.266	0.041*
0.283	0.048*
0.297	0.046*
0.310	0.051*
0.313	0.048*
0.335	0.049*
0.342	0.052*
0.350	0.067*
0.353	0.103*
0.374	0.125*
0.390	0.161*
0.413	0.165*
0.472	0.250*
0.484	0.274
0.516	0.278
0.588	0.272
0.664	0.233
0.692	0.222
0.729	0.227
0.752	0.252

CURVE 13 (cont.)

λ	ρ
0.799	0.270
0.856	0.272
1.01	0.244
1.07	0.222
1.12	0.220
1.22	0.225
1.36	0.259
1.42	0.267
1.56	0.269
1.83	0.263
2.06	0.253
2.35	0.253
2.54	0.263
2.59	0.267
2.65	0.267

CURVE 14 T ~ 298

λ	ρ
0.230	0.155
0.236	0.151
0.255	0.167
0.286	0.193
0.292	0.200
0.306	0.200
0.312	0.191
0.317	0.191
0.349	0.150
0.359	0.135
0.396	0.131
0.447	0.139
0.478	0.157
0.502	0.161
0.565	0.155
0.581	0.156
0.647	0.131
0.695	0.123
0.766	0.157
0.813	0.200
0.881	0.200
1.03	0.152
1.06	0.144
1.12	0.145
1.20	0.152
1.29	0.186
1.35	0.221
1.43	0.244

CURVE 14 (cont.)

λ	ρ
1.56	0.264
2.01	0.319
2.47	0.375
2.65	0.400*

CURVE 15* T ~ 298

λ	ρ
0.230	0.113
0.232	0.109
0.242	0.111
0.249	0.119
0.256	0.121
0.261	0.129
0.272	0.132
0.278	0.157
0.289	0.171
0.305	0.174
0.350	0.135
0.366	0.126
0.413	0.127
0.447	0.139
0.471	0.168
0.494	0.196
0.561	0.192
0.628	0.151
0.692	0.132
0.740	0.152
0.823	0.271
0.855	0.282
0.913	0.261
1.04	0.174
1.12	0.163
1.18	0.173
1.25	0.206
1.40	0.349
1.49	0.400
1.55	0.419
1.60	0.422
1.62	0.430
1.65	0.432
1.67	0.438
1.99	0.472
2.39	0.533
2.48	0.550
2.52	0.558
2.62	0.583
2.65	0.586

CURVE 16 T ~ 298

λ	ρ
0.230	0.098
0.256	0.104
0.266	0.107
0.271	0.113
0.277	0.114
0.282	0.131
0.291	0.139
0.302	0.141
0.317	0.134
0.322	0.130
0.329	0.121
0.335	0.118
0.344	0.109
0.350	0.107
0.385	0.112
0.406	0.110
0.416	0.115
0.444	0.121
0.493	0.177
0.529	0.187
0.573	0.186
0.598	0.174
0.659	0.131
0.700	0.127
0.782	0.200
0.836	0.330
0.869	0.340
0.997	0.218
1.05	0.182
1.11	0.177
1.31	0.270
1.43	0.456
1.47	0.500
1.56	0.532
1.63	0.540
1.69	0.550
1.76	0.558
2.00	0.575
2.41	0.624
2.58	0.659
2.61	0.676
2.65	0.680

CURVE 17* T ~ 298

λ	ρ
0.230	0.109
0.247	0.109
0.264	0.120
0.276	0.123
0.282	0.131
0.291	0.139
0.302	0.141
0.317	0.134
0.322	0.130
0.329	0.121
0.335	0.118
0.344	0.109
0.350	0.107
0.385	0.112
0.406	0.110
0.416	0.115
0.441	0.128
0.498	0.191
0.529	0.187
0.573	0.186
0.693	0.131
0.806	0.246
0.849	0.272
0.918	0.256
0.997	0.218
1.07	0.183
1.11	0.181
1.28	0.239
1.36	0.310
1.44	0.350
1.50	0.369
1.77	0.402
2.10	0.431
2.49	0.489
2.60	0.513
2.62	0.524
2.65	0.526

CURVE 18 T ~ 298

λ	ρ
0.230	0.127
0.239	0.124
0.248	0.126
0.260	0.134
0.262	0.140

CURVE 18 (cont.)

λ	ρ
0.271	0.141
0.280	0.150
0.290	0.162
0.299	0.164
0.310	0.162
0.322	0.152
0.335	0.141
0.343	0.132
0.348	0.129
0.356	0.122
0.359	0.114
0.380	0.117
0.416	0.121
0.422	0.132
0.455	0.146
0.491	0.200
0.546	0.200
0.595	0.188
0.624	0.163
0.695	0.137
0.793	0.217
0.838	0.246
0.868	0.250
0.916	0.240
1.04	0.181
1.12	0.170
1.22	0.193
1.39	0.254
1.42	0.312
1.47	0.327
1.86	0.377
2.31	0.431
2.62	0.489
2.65	0.489

CURVE 19 T ~ 298

λ	ρ
0.230	0.092
0.249	0.100
0.267	0.109*
0.286	0.125
0.301	0.134
0.331	0.119*
0.336	0.110
0.340	0.113
0.350	0.110

CURVE 19 (cont.)

λ	ρ
0.382	0.094
0.434	0.104
0.491	0.165
0.530	0.159
0.556	0.162
0.586	0.148
0.633	0.122
0.709	0.114
0.791	0.164
0.860	0.250
1.06	0.135
1.13	0.126
1.25	0.144
1.31	0.185
1.42	0.300
1.47	0.362*
1.52	0.392
1.67	0.431
2.15	0.501
2.55	0.582
2.65	0.613

CURVE 20 T ~ 298

λ	ρ
0.230	0.092*
0.237	0.100
0.259	0.110
0.275	0.121
0.289	0.129
0.301	0.135
0.326	0.119
0.344	0.107
0.350	0.104
0.407	0.094
0.522	0.127
0.595	0.129
0.711	0.113
0.833	0.178*
1.01	0.161
1.16	0.158
1.33	0.214
1.43	0.292
1.53	0.332
1.72	0.361
2.04	0.393
2.30	0.444
2.54	0.501
2.65	0.539

* Not shown on plot

DATA TABLE NO. 121 (continued)

CURVE 21
T ~ 298

λ	ρ
0.230	0.082
0.238	0.086
0.240	0.083
0.256	0.093
0.266	0.092
0.274	0.103
0.282	0.105
0.290	0.112
0.317	0.109
0.323	0.100
0.330	0.102
0.334	0.095
0.373	0.091
0.475	0.109
0.575	0.126
0.713	0.114
0.873	0.177
1.10	0.152
1.28	0.181
1.39	0.235
1.46	0.252
1.77	0.281
2.16	0.321
2.45	0.358
2.58	0.387
2.65	0.402

CURVE 22*
T ~ 298

λ	ρ
0.230	0.071
0.234	0.074
0.239	0.072
0.245	0.080
0.261	0.085
0.266	0.092
0.283	0.100
0.306	0.100
0.325	0.090
0.334	0.090
0.342	0.085
0.409	0.081
0.520	0.119
0.583	0.124
0.696	0.104
0.783	0.151

CURVE 22 (cont.)*

λ	ρ
0.888	0.176
1.08	0.148
1.18	0.154
1.31	0.196
1.43	0.241
1.56	0.256
1.88	0.282
2.17	0.301
2.48	0.345
2.65	0.379

CURVE 23
T ~ 298

λ	ρ
0.230	0.047
0.240	0.063
0.243	0.064
0.246	0.062
0.262	0.074
0.265	0.073
0.275	0.081
0.281	0.079
0.300	0.086
0.316	0.083
0.321	0.080
0.330	0.082
0.362	0.070
0.421	0.080
0.508	0.115
0.552	0.118
0.611	0.112
0.686	0.099
0.788	0.140
0.876	0.175
0.971	0.159
1.16	0.133
1.27	0.163
1.34	0.200
1.44	0.223
1.82	0.249
1.99	0.261
2.21	0.274
2.34	0.288
2.55	0.313
2.65	0.331

CURVE 24
T ~ 298

λ	ρ
1.00	0.069
1.32	0.086
2.35	0.211
2.56	0.218
3.82	0.223
4.73	0.281
5.69	0.309
6.32	0.312
7.01	0.334
8.70	0.347
9.22	0.330
9.65	0.326
10.5	0.350
11.6	0.347
12.5	0.326
15.0	0.336

CURVE 25
T ~ 298

λ	ρ
1.00	0.104
1.83	0.151
2.43	0.193
2.79	0.202
3.60	0.211
4.52	0.263
5.48	0.277
6.40	0.277
7.00	0.299
8.51	0.305
9.51	0.289
10.0	0.299
11.5	0.300
12.0	0.286
13.7	0.277
15.0	0.282

CURVE 26
T ~ 298

λ	ρ
1.00	0.093
1.43	0.098
1.72	0.116
2.57	0.189
2.81	0.201
3.59	0.208

CURVE 26 (cont.)

λ	ρ
4.38	0.254
6.49	0.252
7.16	0.274
8.73	0.269
9.07	0.261
10.5	0.256
12.0	0.234
12.6	0.221
15.0	0.216

CURVE 27
T ~ 298

λ	ρ
16.1	0.009
16.7	0.038
17.2	0.072
17.8	0.121
18.4	0.225
19.4	0.340
20.2	0.419
21.3	0.507
23.6	0.650
24.9	0.723
25.4	0.720
25.7	0.649
26.0	0.567
26.3	0.532
28.0	0.378
28.4	0.319
29.1	0.255
29.6	0.241
3C.3	0.252
31.8	0.293
32.9	0.314
34.3	0.330
35.5	0.338
36.8	0.339

CURVE 28
T ~ 298

λ	ρ
17.1	0.092
17.7	0.157
20.9	0.449
21.9	0.507
22.9	0.608
22.9	0.665

CURVE 28 (cont.)

λ	ρ
23.4	0.748
23.8	0.764
24.4	0.774
25.4	0.714
27.9	0.336
28.9	0.268
31.0	0.317
32.0	0.353
33.9	0.356
35.9	0.337

CURVE 29
T ~ 298

λ	ρ
17.4	0.050
18.1	0.120
19.1	0.229
20.1	0.287
21.6	0.321
22.5	0.347
23.5	0.387
24.1	0.442
24.8	0.542
26.0	0.481
26.9	0.392
27.7	0.306
28.9	0.169
30.0	0.156
34.8	0.234
36.2	0.247

*Not shown on plot

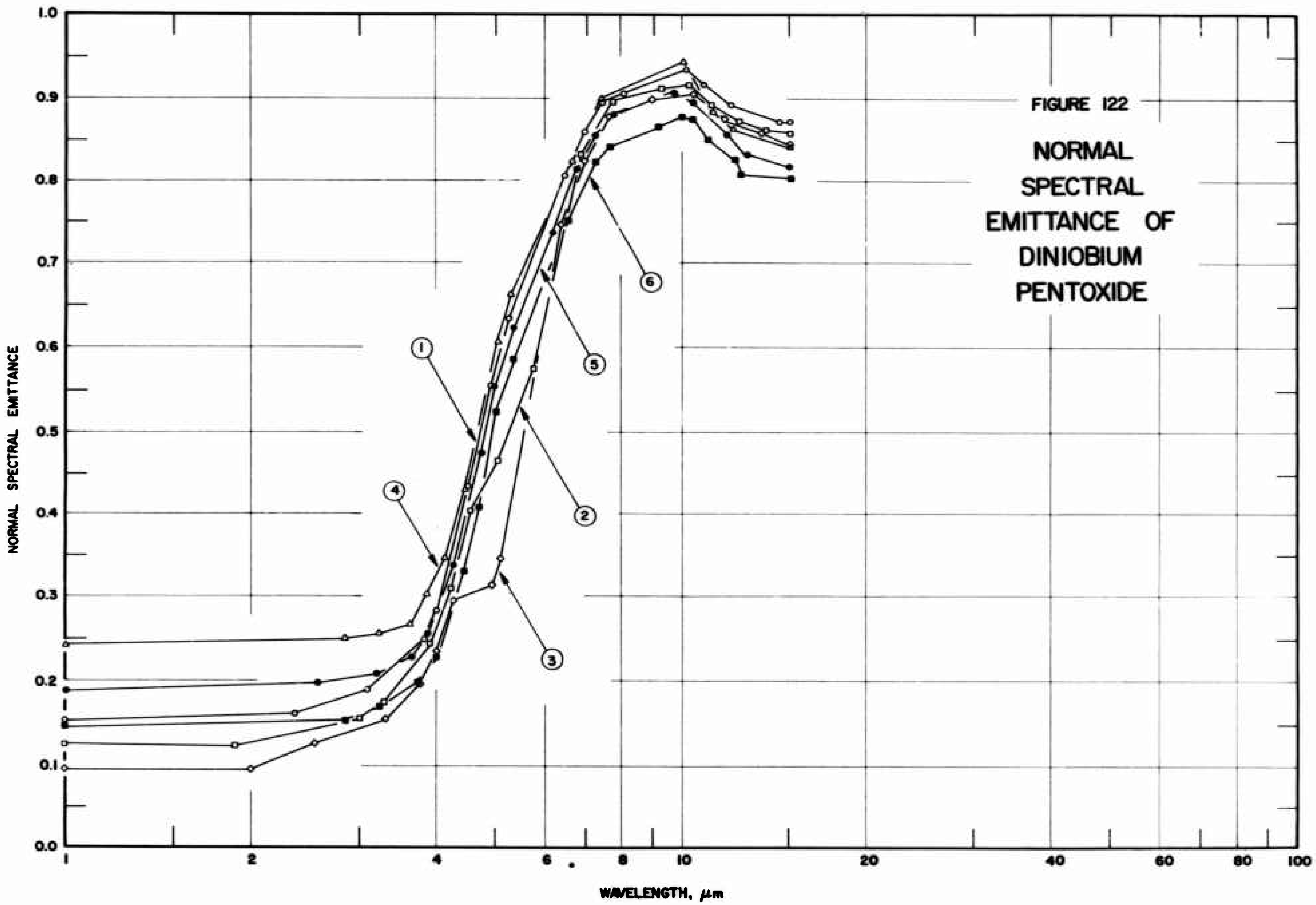


FIGURE 122
NORMAL SPECTRAL EMITTANCE OF DINIOBIUM PENTOXIDE
NORMAL SPECTRAL EMITTANCE
WAVELENGTH, μm
1.0
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0.0
1
2
4
6
8
10
20
40
60
80
100
1
2
3
4
5
6

SPECIFICATION TABLE NO. 122 NORMAL SPECTRAL EMITTANCE OF DINIOBIUM PENTOXIDE Nb_2O_5

Curve No.	Ref. No.	Year	Temperature K	Wavelength Range, μm	Geometry θ'	Reported Error, %	Composition (weight percent), Specifications, and Remarks
1	382	1965	1273	1.00-15.0	0°		Powder; sintered 2 hrs at 1273 K; density 2.43 g cm^{-3}; data extracted from smooth curve.
2	382	1965	1273	1.00-15.0	0°		Above specimen and conditions except heated at 1273 K in measuring apparatus for 2 hrs total.
3	382	1965	1273	1.00-15.0	0°		Above specimen and conditions except heated at 1273 K in measuring apparatus for 6 hrs total; final density 3.06.
4	382	1965	1273	1.00-15.0	0°		Similar to curve 1 specimen and conditions except sintered 2 hrs at 1573 K; density 3.02.
5	382	1965	1273	1.00-15.0	0°		Above specimen and conditions except heated at 1273 K in measuring apparatus for 2 hrs total.
6	382	1965	1273	1.00-15.0	0°		Above specimen and conditions except heated at 1273 K in measuring apparatus for 6 hrs total; final density 3.91.

DATA TABLE NO. 122 NORMAL SPECTRAL EMITTANCE OF DINIOBIUM PENTOXIDE Nb_2O_5

[Wavelength, λ, μm; Emittance, ϵ; Temperature, T, K]

λ	ϵ	λ	ϵ	λ	ϵ	λ	ϵ	λ	ϵ	λ	ϵ
CURVE 1		CURVE 2		CURVE 3		CURVE 4		CURVE 5		CURVE 6	
T = 1273		T = 1273		T = 1273		T = 1273		T = 1273		T = 1273	
1.00	0.154	1.00	0.126	1.00	0.097	1.00	0.241	1.00	0.189	1.00	0.146
2.35	0.162	1.88	0.126	2.00	0.097	2.84	0.250	2.56	0.199	2.85	0.154
3.09	0.190	3.00	0.157	2.54	0.128	3.21	0.257	3.20	0.209	3.22	0.170
3.81	0.250	3.29	0.177	3.30	0.155	3.61	0.268	3.64	0.229	3.72	0.199
4.00	0.284	3.90	0.245	3.76	0.196	3.86	0.301	3.89	0.257	4.00	0.229
4.50	0.435	4.21	0.310	4.00	0.235	4.12	0.346	4.27	0.337	4.44	0.330
4.90	0.556	4.54	0.403	4.27	0.297	4.46	0.431	4.72	0.477	4.70	0.409
5.21	0.635	5.01	0.566	4.91	0.514	5.01	0.608	4.98	0.554	5.00	0.524
6.49	0.808	5.72	0.676	5.07	0.547	5.29	0.662	5.32	0.624	5.33	0.586
6.97	0.860	6.87	0.831	6.36	0.747	6.65	0.824	6.19	0.736	6.53	0.750
7.43	0.897	7.74	0.896	6.98	0.825	7.40	0.899	6.78	0.815	7.27	0.823
8.03	0.907	9.29	0.911	7.64	0.879	10.0	0.945	7.23	0.856	7.67	0.840
10.2	0.935	10.3	0.917	8.95	0.899	11.3	0.885	7.77	0.880	9.17	0.867
10.8	0.916	11.2	0.892	10.4	0.905	12.1	0.863	9.70	0.908	10.0	0.878
12.0	0.892	12.4	0.872	11.7	0.876	15.0	0.841	10.4	0.895	10.4	0.875
14.4	0.871	13.7	0.862	13.5	0.859			11.8	0.857	11.0	0.850
15.0	0.871	15.0	0.859	15.0	0.846			12.7	0.831	12.2	0.826
								15.0	0.819	12.5	0.808
										15.0	0.801

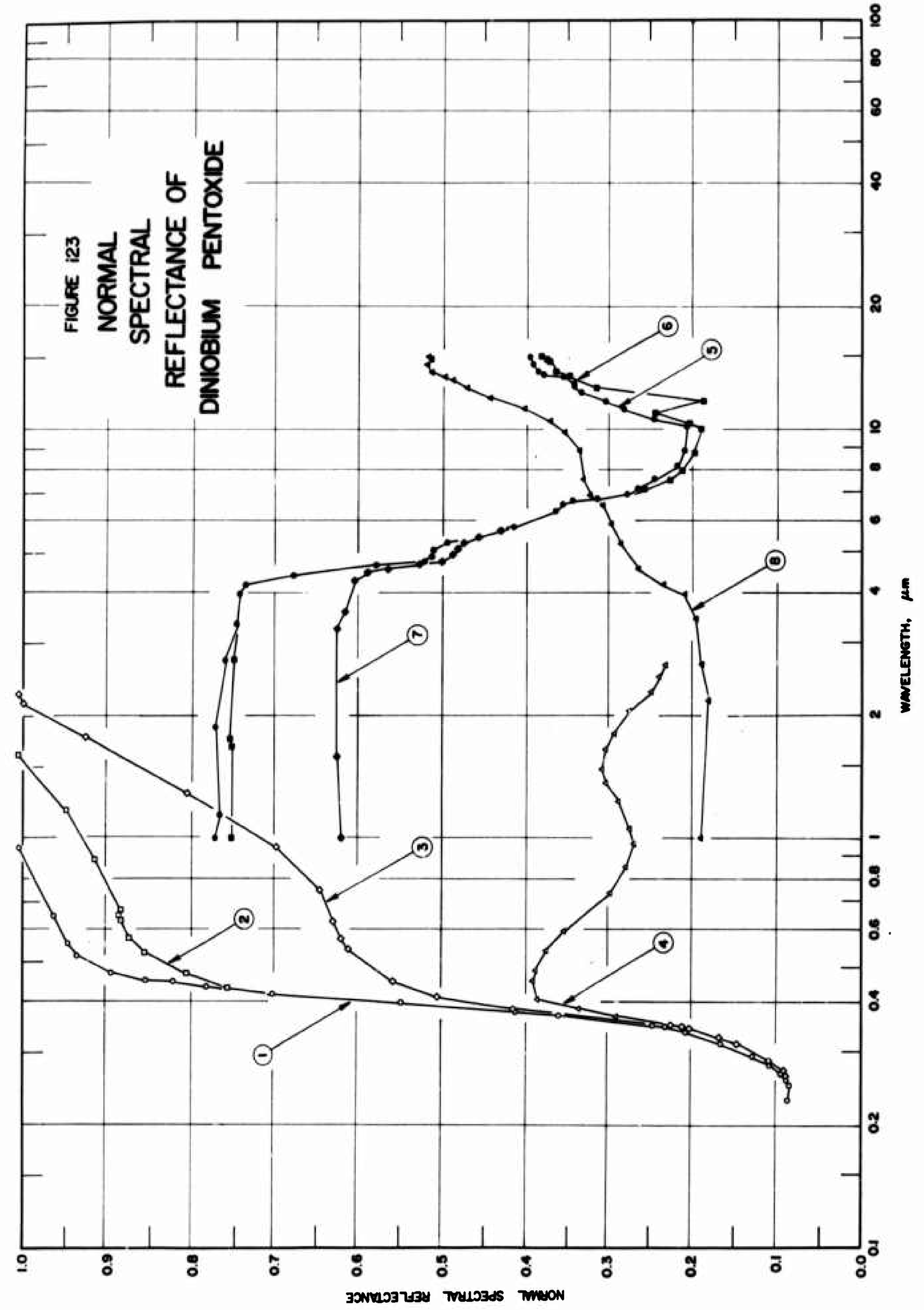


FIGURE 123 NORMAL SPECTRAL REFLECTANCE OF DINIOBIUM PENTOXIDE

SPECIFICATION TABLE NO. 123 NORMAL SPECTRAL REFLECTANCE OF DINIOBIUM PENTOXIDE Nb_2O_5

Curve No.	Ref. No.	Year	Temperature K	Wavelength Range, μm	Geometry θ	θ'	ω'	Reported Error, %	Composition (weight percent), Specifications, and Remarks
1	341	1966	~298	0.230-2.65	~0°		2π		Powder; sintered 3 hrs at 1573 K; measured in vacuum (10^{-6} mm Hg); data extracted from smooth curve; MgO reference standard.
2	341	1966	~298	0.230-2.65	~0°		2π		Above specimen and conditions except after 15 min in vacuum (10^{-6} mm Hg) at 298 K.
3	341	1966	~298	0.230-2.65	~0°		2π		Above specimen and conditions except heated 1 min at 1200 K in vacuum (10^{-6} mm Hg).
4	341	1966	~298	0.230-2.65	~0°		2π		Above specimen and conditions except heated 2 min total at 1200 K.
5	341	1966	~298	1.00-15.0	~0°		2π		Powder; sintered 3 hrs at 1573 K; measured in vacuum (10^{-6} mm Hg); data extracted from smooth curve; converted from $R(2\pi, 0°)$.
6	341	1966	~298	1.00-15.0	~0°		2π		Above specimen and conditions except after 15 min in vacuum (10^{-6} mm Hg) at 298 K.
7	341	1966	~298	1.00-15.0	0°		2π		Above specimen and conditions except heated in vacuum (10^{-6} mm Hg) for 1 min at 1200 K.
8	341	1966	~298	1.00-15.0	~0°		2π		Above specimen and conditions except heated for 2 min total at 1200 K.

DATA TABLE NO. 123 NORMAL SPECTRAL REFLECTANCE OF DINIOBIUM PENTOXIDE Nb_2O_5

[Wavelength, λ, μm; Reflectance, ρ; Temperature, T, K]

CURVE 1
T ~ 298

λ	ρ
0.230	0.085
0.250	0.083
0.256	0.086
0.266	0.092
0.280	0.106
0.294	0.126
0.316	0.163
0.336	0.205
0.349	0.229
0.350	0.243
0.370	0.359
0.377	0.412
0.396	0.546
0.417	0.700
0.433	0.784
0.443	0.821
0.446	0.855
0.470	0.892
0.518	0.934
0.551	0.945
0.643	0.961
0.945	1.00*
1.23	1.03*
1.64	1.06*
1.97	1.08*
2.13	1.09*
2.21	1.08*
2.23	1.07*
2.31	1.08*
2.36	1.10*
2.40	1.10*
2.45	1.10*
2.51	1.10*
2.65	1.12*

CURVE 2
T ~ 298

λ	ρ
0.230	0.085*
0.250	0.083*
0.256	0.086*
0.266	0.092*
0.280	0.106*
0.294	0.126*
0.316	0.163*

CURVE 2 (cont.)

λ	ρ
0.336	0.205*
0.349	0.229*
0.350	0.243*
0.370	0.359*
0.377	0.412*
0.396	0.546*
0.417	0.700*
0.438	0.757
0.468	0.806
0.522	0.855
0.570	0.873
0.629	0.882
0.645	0.884
0.667	0.882
0.887	0.914
1.17	0.948
1.60	1.00*
1.70	1.02*
2.13	1.06*
2.15	1.07*
2.22	1.06*
2.33	1.09*
2.41	1.10*
2.52	1.10*
2.65	1.12*

CURVE 3
T ~ 298

λ	ρ
0.230	0.085*
0.250	0.083*
0.256	0.086*
0.261	0.087
0.270	0.090
0.288	0.109
0.313	0.145
0.326	0.165
0.344	0.201
0.348	0.210
0.350	0.224
0.381	0.415
0.409	0.505
0.443	0.556
0.536	0.610
0.567	0.619
0.621	0.628

CURVE 3 (cont.)

λ	ρ
0.746	0.643
0.954	0.697
1.29	0.807
1.76	0.925
2.12	0.999
2.25	1.01*
2.35	1.04*
2.44	1.05*
2.56	1.07*
2.65	1.09*

CURVE 4
T ~ 298

λ	ρ
0.230	0.085*
0.250	0.083*
0.256	0.086*
0.261	0.087*
0.270	0.090*
0.288	0.109*
0.313	0.145*
0.326	0.165*
0.344	0.201*
0.348	0.210*
0.350	0.224*
0.366	0.288
0.383	0.335
0.404	0.383
0.441	0.390
0.473	0.387
0.530	0.374
0.592	0.352
0.736	0.297
0.848	0.276
0.962	0.267
1.05	0.271
1.22	0.286
1.37	0.301
1.48	0.307
1.65	0.301
1.80	0.291
2.03	0.272
2.29	0.248
2.49	0.238
2.65	0.230

CURVE 5
T ~ 298

λ	ρ
1.00	0.772
1.14	0.769
1.86	0.774
2.71	0.760
3.34	0.748
3.95	0.744
4.16	0.737
4.40	0.678
4.65	0.578
4.79	0.520
4.87	0.511
5.05	0.511
5.25	0.495
5.52	0.452
5.79	0.417
6.29	0.365
6.56	0.355
6.65	0.344
6.76	0.312
6.91	0.277
7.15	0.264
7.51	0.243
8.19	0.217
8.84	0.210
10.1	0.206
10.5	0.245
11.1	0.280
11.6	0.304
12.2	0.334
12.6	0.341
12.9	0.341
13.3	0.356
13.5	0.379
13.8	0.385
14.4	0.391
15.0	0.396

CURVE 6
T ~ 298

λ	ρ
1.00	0.752
1.66	0.752
1.74	0.754
2.73	0.750
3.34	0.748*

CURVE 6 (cont.)

λ	ρ
3.95	0.744*
4.16	0.737*
4.40	0.678*
4.65	0.578*
4.79	0.520*
4.87	0.511*
5.05	0.511*
5.25	0.495*
5.52	0.452*
5.79	0.417*
6.29	0.365*
6.56	0.355*
6.65	0.344*
6.76	0.312*
6.91	0.277*
7.11	0.256
7.50	0.225
7.97	0.211
8.75	0.197
10.0	0.189
10.3	0.201
10.9	0.244
11.6	0.285
12.5	0.314
13.4	0.348
13.8	0.365
14.5	0.371
14.7	0.373
15.0	0.381

CURVE 7
T ~ 298

λ	ρ
1.00	0.619
1.59	0.625
3.27	0.625
3.60	0.613
4.26	0.603
4.47	0.587
4.58	0.562
4.66	0.525
4.74	0.500
4.92	0.488
5.09	0.481
5.27	0.473
5.41	0.456

CURVE 7 (cont.)

λ	ρ
5.66	0.430
5.79	0.417*
6.29	0.365*
6.56	0.355*
6.65	0.344*
6.76	0.312*
6.91	0.277*
7.15	0.264*
7.51	0.243*
8.19	0.217*
8.84	0.210*
10.1	0.206*
10.5	0.245*
11.1	0.280*
11.6	0.304*
12.2	0.334*
12.6	0.341*
12.8	0.341*
13.3	0.356*
13.5	0.379*
13.8	0.385*
14.4	0.391*
15.0	0.396*

CURVE 8
T ~ 298

λ	ρ
1.00	0.187
2.17	0.179
2.68	0.186
3.41	0.194
3.91	0.209
4.19	0.233
4.58	0.262
5.21	0.283
5.85	0.296
6.49	0.306
6.89	0.321
7.59	0.330
8.84	0.335
9.82	0.352
10.4	0.370
11.1	0.402
11.9	0.443
12.5	0.470
13.1	0.487

CURVE 8 (cont.)

λ	ρ
13.4	0.499
13.8	0.513
14.3	0.518
14.8	0.513
15.0	0.517

* Not shown on plot

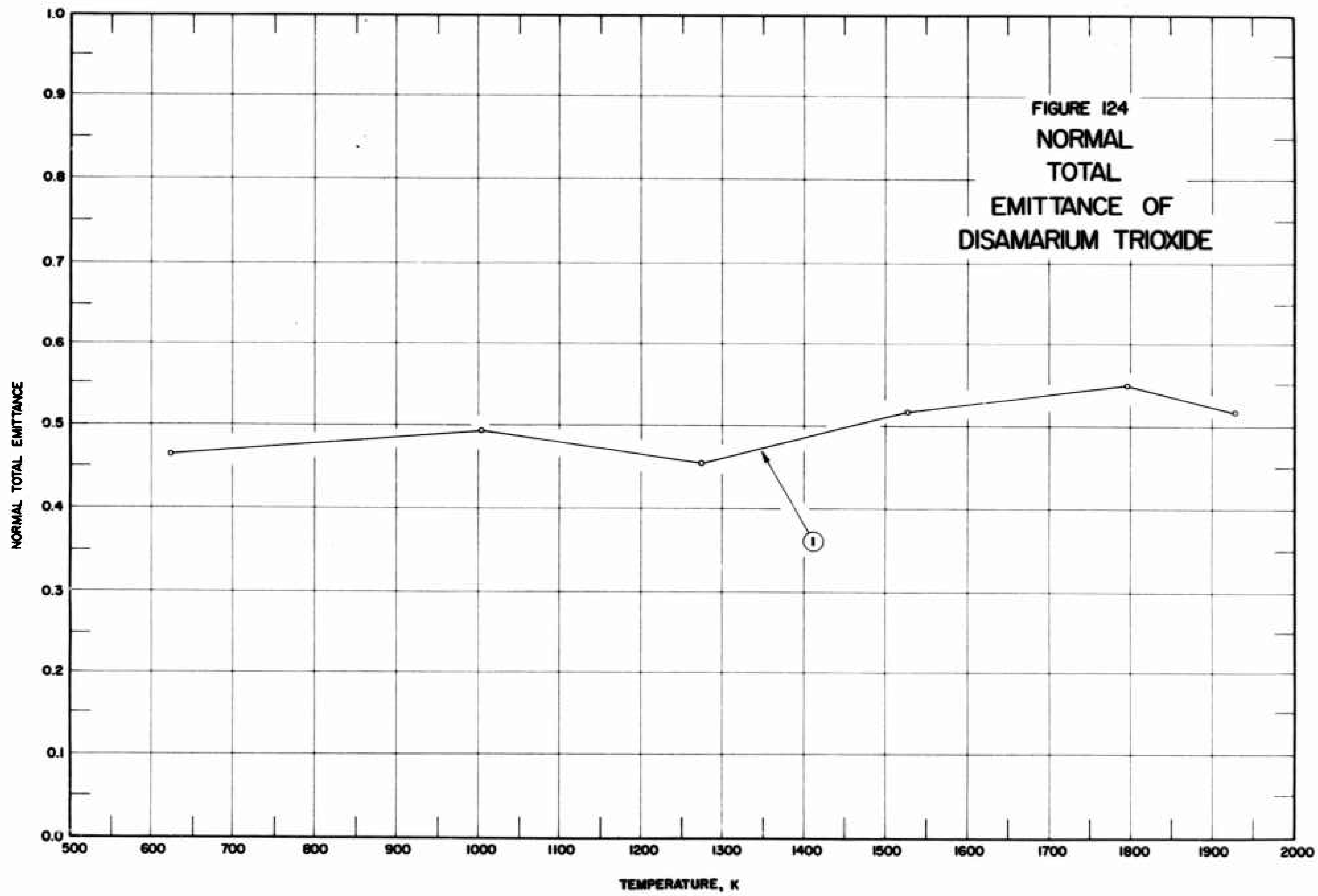


FIGURE 124
NORMAL
TOTAL
EMITTANCE OF
DISAMARIUM TRIOXIDE
NORMAL TOTAL EMITTANCE
TEMPERATURE, K
1.0
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0.0
500
600
700
800
900
1000
1100
1200
1300
1400
1500
1600
1700
1800
1900
2000
1

SPECIFICATION TABLE NO. 124 NORMAL TOTAL EMITTANCE OF DISAMARIUM TRIOXIDE Sm_2O_3

Curve No.	Ref. No.	Year	Temperature Range, K	Geometry θ'	Reported Error, %	Composition (weight percent), Specifications and Remarks
1	184	1960	624-1929	0°	~10	Powder, 99.9 pure; compacted at 3500 psi; fired at 2123 K for 1 hr and cooled at the rate of 673 K per hr; density 7.62 g cm^{-3}; ground to size and ultrasonically cleaned; surface polished with 1-5 μm diamond polishing compound until normally mat surface began to reflect light, then cleaned and polished again with cloth charged with a paste of cerium oxide and kerosene; measured in vacuum.

DATA TABLE NO. 124 NORMAL TOTAL EMITTANCE OF DISAMARIUM TRIOXIDE Sm_2O_3

[Temperature, T, K; Emittance, ϵ]

T	ϵ
CURVE 1	
624	0.463
1004	0.492
1273	0.454
1529	0.518
1797	0.548
1929	0.516

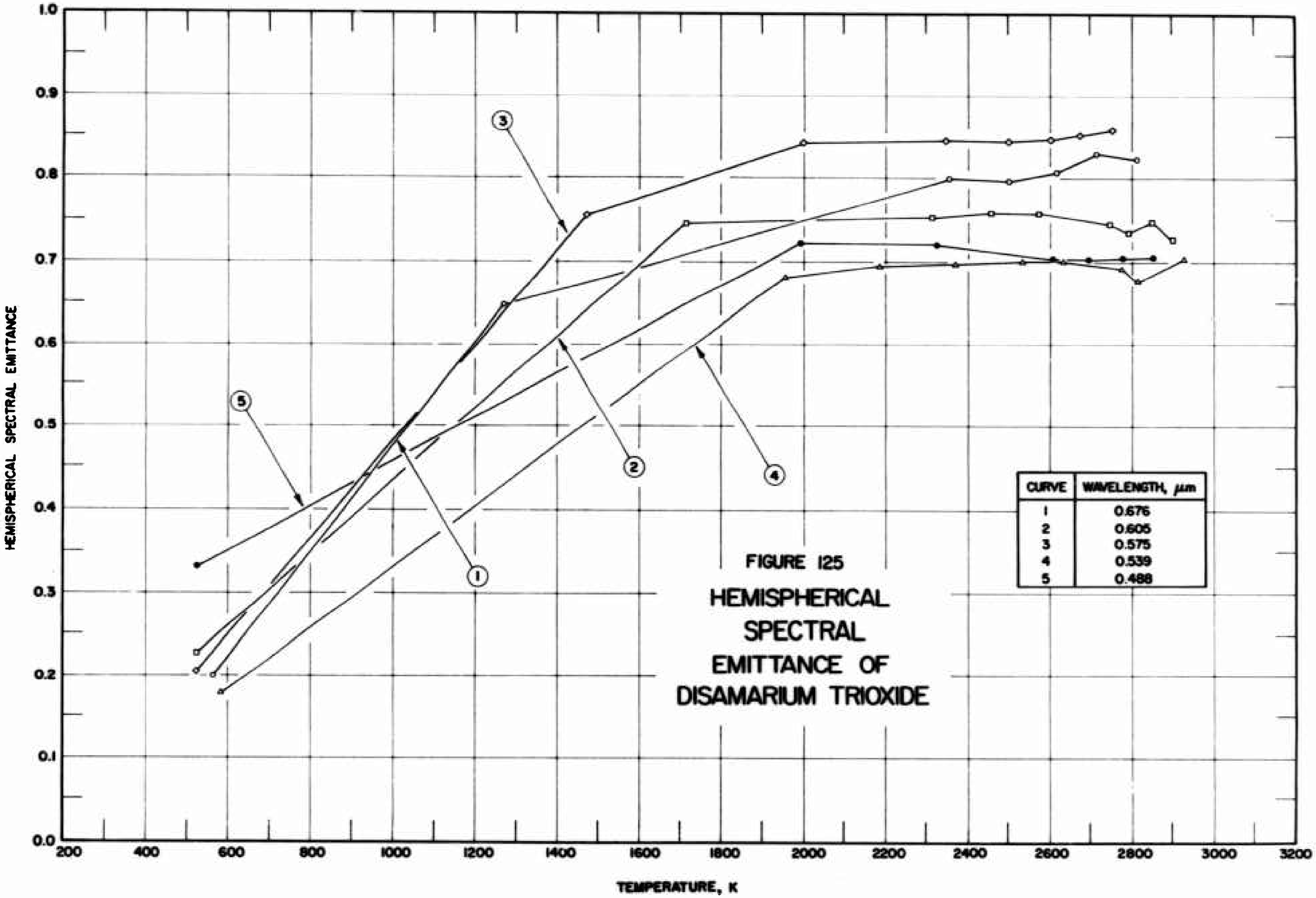


FIGURE 125
HEMISPHERICAL SPECTRAL EMITTANCE OF DISAMARIUM TRIOXIDE

SPECIFICATION TABLE NO. 125 HEMISPHERICAL SPECTRAL EMITTANCE OF DISAMARIUM TRIOXIDE Sm_2O_3

Curve No.	Ref. No.	Year	Wavelength µm	Temperature Range, K	Reported Error, %	Composition (weight percent), Specifications and Remarks
1	334	1968	0.676	562-2811		Dry pressed at 3000 psi with subsequent hydrostatic pressing at 50 000 psi; specimen fused by heating a few min; calculated from reflectance data.
2	334	1968	0.605	521-2900		Above specimen and conditions.
3	334	1968	0.575	525-2752		Above specimen and conditions.
4	334	1968	0.539	582-2929		Above specimen and conditions.
5	334	1968	0.488	522-2851		Above specimen and conditions.

DATA TABLE NO. 125 HEMISPHERICAL SPECTRAL EMITTANCE OF DISAMARIUM TRIOXIDE Sm_2O_3

[Temperature, T, K; Emittance, ϵ; Wavelength, λ, µm]

T	ϵ
CURVE 1 $\lambda = 0.676$	
562	0.200
1270	0.648
2357	0.800
2500	0.797
2619	0.806
2717	0.829
2811	0.821
CURVE 2 $\lambda = 0.605$	
521	0.228
1714	0.744
2314	0.752
2459	0.758
2572	0.758
2744	0.743
2793	0.732
2848	0.748
2900	0.727
CURVE 3 $\lambda = 0.575$	
525	0.205
1472	0.756
2000	0.840
2349	0.844
2500	0.842
2600	0.843
2673	0.850
2752	0.857
CURVE 4 $\lambda = 0.539$	
582	0.179
1955	0.680
2182	0.695
2369	0.698
2534	0.700
2632	0.700
2777	0.691
2813	0.676
2929	0.702
CURVE 5 $\lambda = 0.488$	
522	0.331
1991	0.722
2322	0.720
2604	0.704
2698	0.704
2779	0.707
2851	0.706

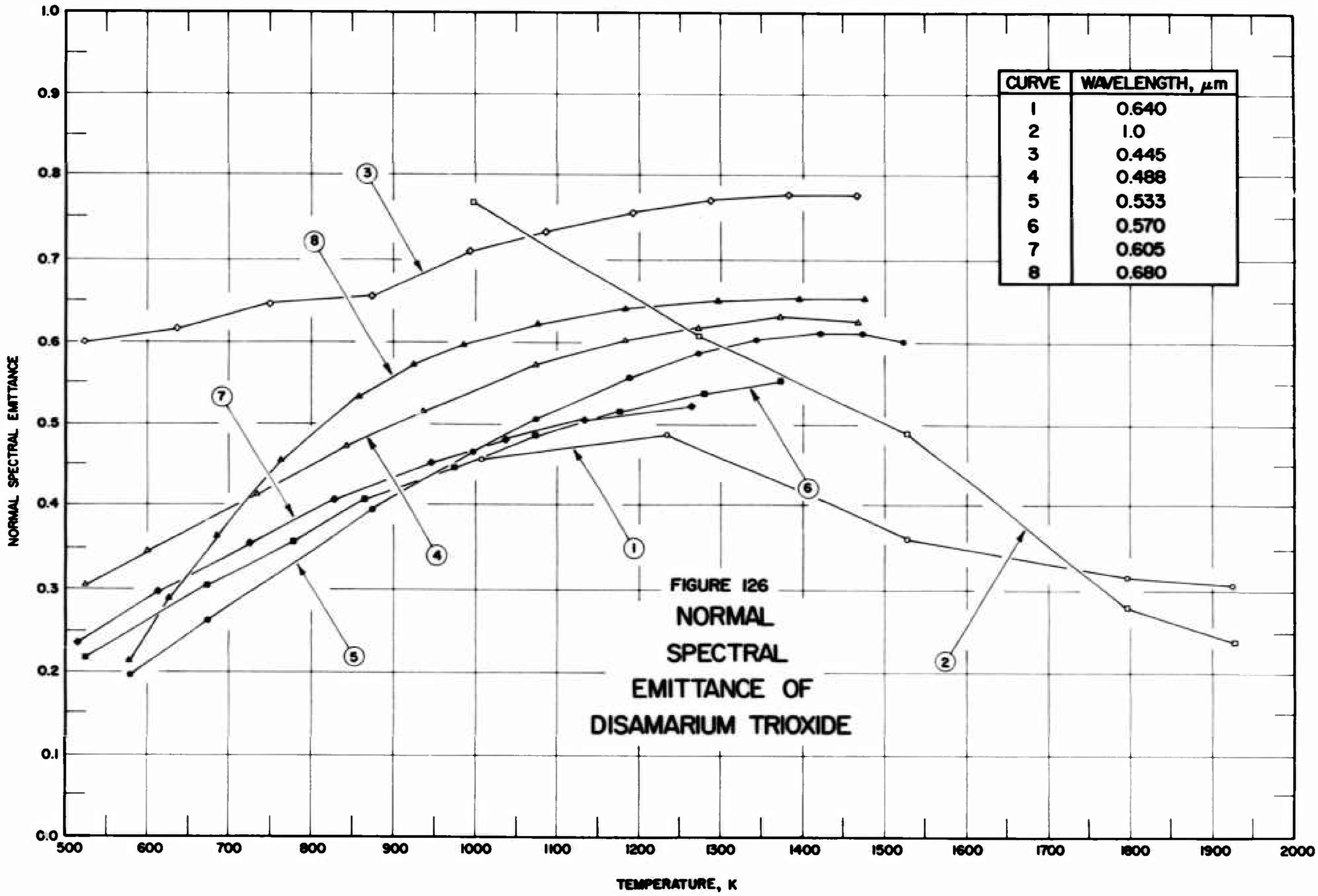


FIGURE 126 NORMAL SPECTRAL EMITTANCE OF DISAMARIUM TRIOXIDE

SPECIFICATION TABLE NO. 126 NORMAL SPECTRAL EMITTANCE OF DISAMARIUM TRIOXIDE Sm_2O_3

Curve No.	Ref. No.	Year	Wavelength μm	Temperature Range, K	Geometry θ'	Reported Error, %	Composition (weight percent), Specifications, and Remarks
1	184	1960	0.640	1007-1925	0°	~10	Powder; 99.9 pure; compacted at 3500 psi; fired at 2123 K for 1 hr and cooled at the rate of 673 K per hr; density 7.62 g cm^{-3}; ground to size and ultrasonically cleaned; surface polished with 1-5 μm diamond polishing compound until normally mat surface began to reflect light, then cleaned and polished again with cloth charged with a paste of cerium oxide and kerosene; measured in vacuum.
2	184	1960	1	999-1929	0°	~10	Above specimen and conditions.
3	205	1963	0.445	523-1468	~0°		Powder; dry pressed at 75000 psi; specimen fired at 1773 K for 24 hrs, then ground; calculated from reflectance data; data extracted from smooth curve.
4	205	1963	0.488	523-1469	~0°		Above specimen and conditions.
5	205	1963	0.533	580-1523	~0°		Above specimen and conditions.
6	205	1963	0.570	523-1373	~0°		Above specimen and conditions.
7	205	1963	0.605	514-1264	~0°		Above specimen and conditions.
8	205	1963	0.680	578-1475	~0°		Above specimen and conditions.

DATA TABLE NO. 126 NORMAL SPECTRAL EMITTANCE OF DISAMARIUM TRIOXIDE Sm_2O_3

[Temperature, T, K; Emittance, ϵ; Wavelength, λ, μm]

CURVE 1, λ = 0.640

T	ϵ
1007	0.456
1269	0.486
1529	0.361
1796	0.316
1925	0.306

CURVE 2, λ = 1

T	ϵ
999	0.767
1273	0.609
1529	0.489
1798	0.280
1929	0.239

CURVE 3, λ = 0.445

T	ϵ
523	0.600
637	0.619
750	0.646
873	0.655
993	0.710
1088	0.732
1191	0.755
1289	0.770
1383	0.777
1468	0.776

CURVE 4, λ = 0.488

T	ϵ
523	0.306
600	0.349
732	0.414
841	0.472
935	0.517
1073	0.571
1181	0.602
1273	0.620
1372	0.631
1469	0.627

CURVE 5, λ = 0.533

T	ϵ
580	0.196
674	0.263
874	0.394
998	0.466
1073	0.506
1189	0.558
1273	0.587
1344	0.604
1421	0.612
1473	0.611
1523	0.604

CURVE 6, λ = 0.570

T	ϵ
523	0.219
673	0.305
769	0.359
865	0.406
974	0.448
1071	0.486
1177	0.516
1280	0.538
1373	0.552

CURVE 7, λ = 0.605

T	ϵ
514	0.237
612	0.298
725	0.356
829	0.406
947	0.452
1037	0.481
1133	0.505
1264	0.524

CURVE 8, λ = 0.680

T	ϵ
578	0.213
626	0.290
684	0.365
763	0.457
859	0.535
924	0.571
985	0.598
1077	0.624
1182	0.642
1297	0.650
1397	0.652
1475	0.652

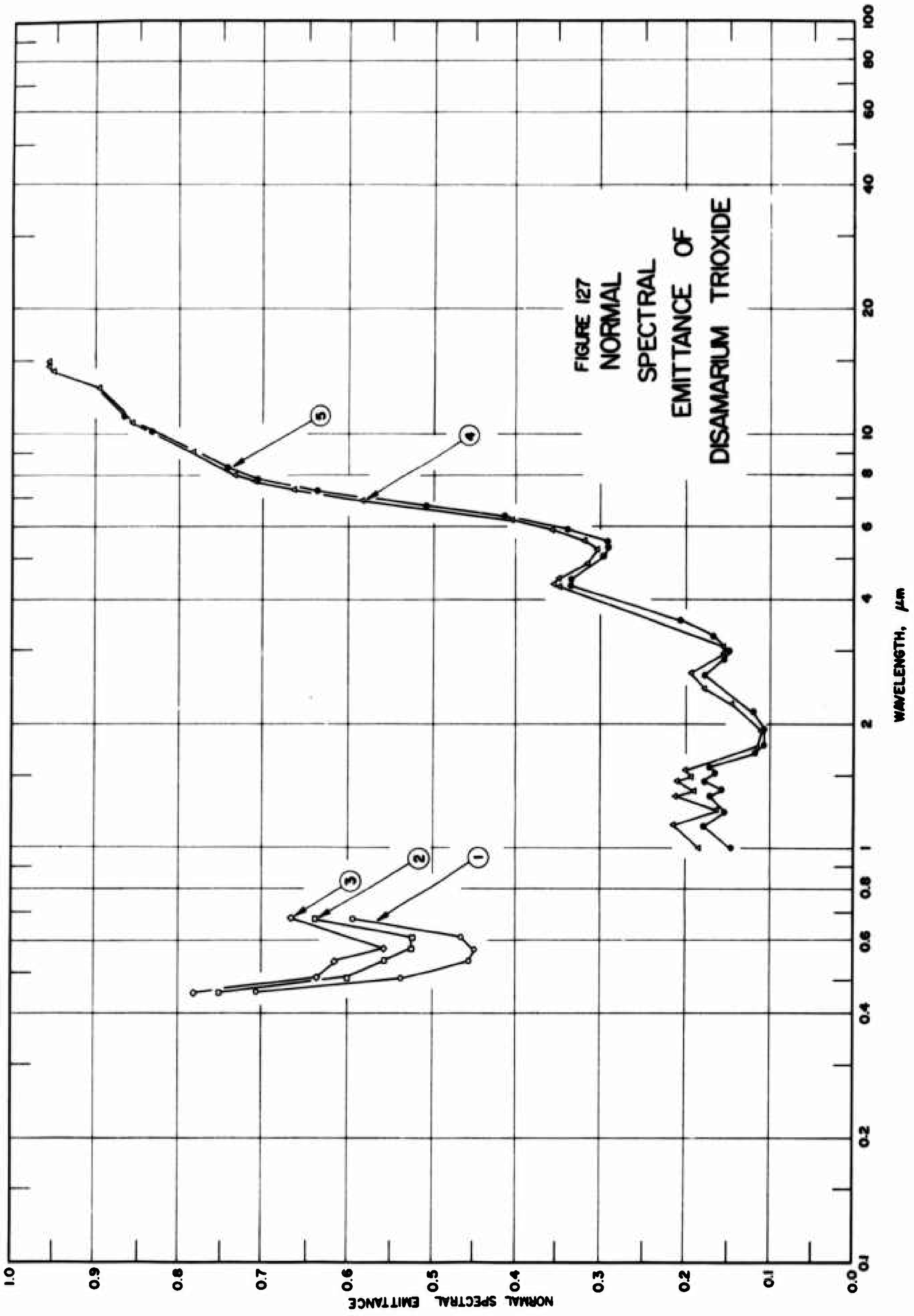


FIGURE 127 NORMAL SPECTRAL EMITTANCE OF DISAMARIUM TRIOXIDE

SPECIFICATION TABLE NO. 127 NORMAL SPECTRAL EMITTANCE OF DISAMARIUM TRIOXIDE Sm_2O_3

Curve No.	Ref. No.	Year	Temperature K	Wavelength Range, μm	Geometry θ'	Reported Error, %	Composition (weight percent), Specifications, and Remarks
1	205	1963	973	0.445-0.678	~0°		Powder; pressed at 75000 psi; fired at 1773 K for 24 hrs then ground; calculated from spectral reflectance data.
2	205	1963	1173	0.445-0.678	~0°		Above specimen and conditions.
3	205	1963	1373	0.445-0.680	~0°		Above specimen and conditions.
4	382	1965	1273	1.00-15.0	0°		Sintered 10 hrs at 1373 K; data extracted from smooth curve.
5	382	1965	1273	1.00-15.0	0°		Above specimen and conditions except heated at 1273 K in measuring apparatus for 2 hrs total.

DATA TABLE NO. 127 NORMAL SPECTRAL EMITTANCE OF DISAMARIUM TRIOXIDE Sm_2O_3

[Wavelength, λ, μm; Emittance, ϵ; Temperature, T, K]

CURVE 1 T = 973

λ	ϵ
0.445	0.705
0.483	0.535
0.534	0.454
0.570	0.448
0.604	0.463
0.678	0.594

CURVE 2 T = 1173

λ	ϵ
0.445	0.750
0.487	0.600
0.534	0.556
0.570	0.522
0.605	0.521
0.678	0.639

CURVE 3 T = 1373

λ	ϵ
0.445	0.782
0.488	0.637
0.535	0.614
0.570	0.556
0.680	0.663

CURVE 4 T = 1273

λ	ϵ
1.00	0.182
1.13	0.213
1.23	0.162
1.33	0.211
1.38	0.189
1.45	0.210
1.49	0.191
1.55	0.200
1.75	0.115
1.91	0.110
2.22	0.144
2.42	0.176

CURVE 4 (cont.)

λ	ϵ
2.64	0.192
2.96	0.153
3.07	0.153
4.24	0.346
4.32	0.352
4.48	0.347
4.83	0.314
5.29	0.302
5.54	0.317
5.88	0.355
6.20	0.404
6.96	0.583
7.34	0.665
7.71	0.709
8.00	0.734
9.04	0.784
10.6	0.858
13.0	0.898
14.1	0.950
14.6	0.957
15.0	0.956

CURVE 5 T = 1273

λ	ϵ
1.00	0.145
1.13	0.178
1.22	0.151
1.33	0.170
1.38	0.156
1.45	0.176
1.51	0.163
1.56	0.170
1.70	0.118
1.77	0.106
1.94	0.106
2.14	0.120
2.61	0.177
2.85	0.154
3.00	0.147
3.25	0.167
3.55	0.205
4.29	0.333
4.42	0.333
5.05	0.297
5.30	0.290

CURVE 5 (cont.)

λ	ϵ
5.48	0.290
5.86	0.337
6.31	0.413
6.73	0.509
7.28	0.637
7.80	0.706
8.36	0.741
10.1	0.832
11.0	0.868
13.0	0.898*
14.1	0.950*
14.6	0.957*
15.0	0.956*

*Not shown on plot

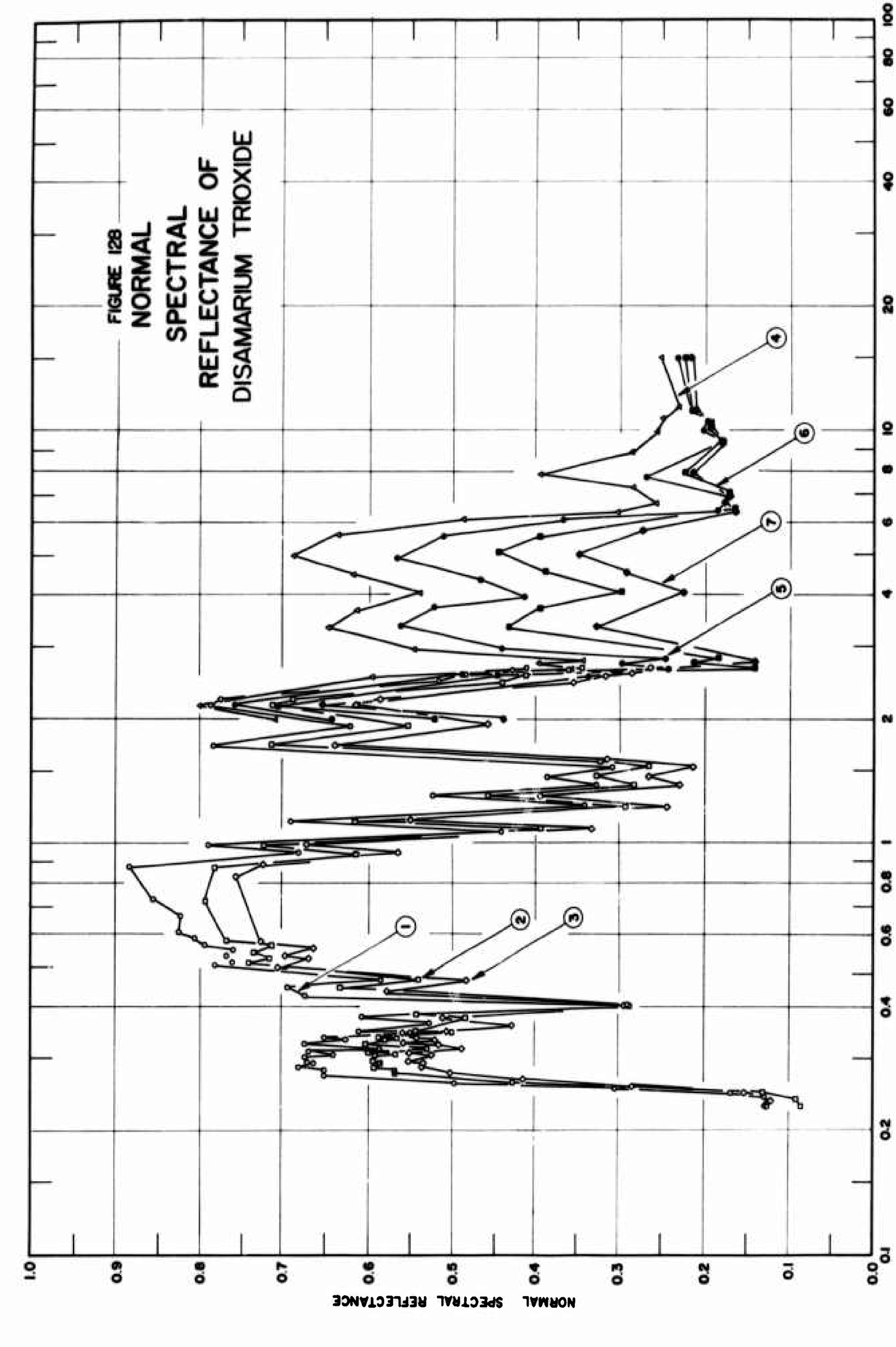


FIGURE 128
NORMAL
SPECTRAL
REFLECTANCE OF
DISAMARIUM TRIOXIDE
NORMAL SPECTRAL REFLECTANCE
WAVELENGTH, μm
0.0 0.1 0.2 0.3 0.4 0.5 0.6 0.7 0.8 0.9 1.0
0.1 0.2 0.4 0.6 0.8 1 2 4 6 8 10 20 40 60 80 100
1 2 3 4 5 6 7

SPECIFICATION TABLE NO. 128 NORMAL SPECTRAL REFLECTANCE OF DISAMARIUM TRIOXIDE Sm_2O_3

Curve No.	Ref. No.	Year	Temperature K	Wavelength Range, µm	Geometry θ	θ'	ω'	Reported Error, %	Composition (weight percent), Specifications, and Remarks
1	34	1966	298	0.230-2.65	0°		2π		Powder, >99 pure; compacted at 17600 psi; MgO reference standard; data extracted from smooth curve.
2	34	1966	298	0.230-2.65	0°		2π		Similar to the above specimen and conditions except compacted at 29400 psi.
3	34	1966	298	0.230-2.65	0°		2π		Similar to the above specimen and conditions except compacted at 70500 psi.
4	34	1966	298	2.00-15.0	0°		2π		Powder; >99 pure; compacted at 700 psi; data extracted from smooth curve.
5	34	1966	298	2.00-15.0	0°		2π		Similar to the above specimen and conditions except compacted at 7000 psi.
6	34	1966	298	2.00-15.0	0°		2π		Similar to the above specimen and conditions except compacted at 21000 psi.
7	34	1966	298	2.00-15.0	0°		2π		Similar to the above specimen and conditions except compacted at 42000 psi.

DATA TABLE NO. 128 NORMAL SPECTRAL REFLECTANCE OF DISAMARIUM TRIOXIDE Sm_2O_3

[Wavelength, λ, μm; Reflectance, ρ; Temperature, T, K]

λ	ρ
CURVE 1	
T = 298	
0.230	0.126
0.241	0.129
0.249	0.167
0.255	0.303
0.262	0.499
0.273	0.650
0.281	0.650
0.286	0.680
0.292	0.662
0.294	0.670
0.301	0.672
0.307	0.638
0.311	0.668
0.318	0.588
0.326	0.674
0.334	0.626
0.339	0.650
0.349	0.550
0.350	0.611
0.366	0.529
0.380	0.608
0.405	0.289
0.427	0.673
0.445	0.692
0.469	0.586
0.501	0.782
0.518	0.760
0.532	0.769
0.551	0.760
0.562	0.795
0.588	0.806
0.604	0.826
0.664	0.825
0.734	0.856
0.878	0.834
0.947	0.681
0.993	0.791
1.07	0.441
1.13	0.690
1.23	0.340
1.30	0.525
1.39	0.327
1.45	0.386
1.53	0.307
1.72	0.785
CURVE 1 (cont.)	
1.94	0.621
2.16	0.789
2.23	0.778
2.46	0.518
2.56	0.484
2.61	0.429
2.65	0.411
CURVE 2	
T = 298	
0.230	0.086
0.240	0.091
0.249	0.131
0.262	0.428
0.276	0.568
0.280	0.568
0.285	0.593
0.292	0.586
0.296	0.595
0.303	0.593
0.307	0.568
0.310	0.600
0.319	0.530
0.326	0.603
0.331	0.580
0.335	0.566
0.339	0.589
0.342	0.547
0.348	0.500
0.350	0.545
0.377	0.483
0.383	0.542
0.404	0.288
0.442	0.632
0.464	0.540
0.511	0.742
0.522	0.715
0.540	0.735
0.564	0.713
0.580	0.769
0.723	0.795
0.875	0.783
0.940	0.615
0.990	0.722
1.08	0.392
CURVE 2 (cont.)	
1.13	0.619
1.23	0.291
1.30	0.459
1.39	0.281
1.45	0.327
1.53	0.265
1.58	0.321
1.72	0.714
1.94	0.552
2.17	0.712
2.24	0.688
2.45	0.440
2.55	0.411
2.61	0.360
2.65	0.343
CURVE 3	
T = 298	
0.230	0.127
0.237	0.122
0.248	0.153
0.258	0.283
0.266	0.415
0.278	0.502
0.286	0.537
0.291	0.534
0.298	0.551
0.307	0.525
0.310	0.550
0.319	0.488
0.323	0.518
0.326	0.559
0.334	0.521
0.338	0.543
0.348	0.459
0.350	0.506
0.361	0.429
0.378	0.512
0.402	0.291
0.437	0.579
0.462	0.482
0.500	0.704
0.521	0.669
0.537	0.697
0.559	0.663
CURVE 3 (cont.)	
0.578	0.727
0.824	0.758
0.881	0.723
0.946	0.565
0.997	0.672
1.07	0.331
1.14	0.550
1.23	0.243
1.30	0.392
1.39	0.230
1.45	0.265
1.53	0.214
1.60	0.313
1.72	0.639
1.95	0.459
2.17	0.615
2.24	0.588
2.45	0.354
2.54	0.315
2.59	0.283
2.65	0.263
CURVE 4	
T = 298	
2.00	0.709
2.16	0.801
2.52	0.597
2.63	0.357
2.71	0.397
2.78	0.342
2.95	0.547
3.33	0.647
3.67	0.615
4.03	0.540
4.44	0.620
5.00	0.689
5.60	0.638
6.09	0.488
6.38	0.301
6.62	0.256
7.21	0.283
7.86	0.395
8.97	0.285
9.97	0.257
10.7	0.250
CURVE 4 (cont.)	
11.4	0.231
15.0	0.251
CURVE 5	
T = 298	
2.00	0.642
2.17	0.760
2.56	0.488
2.64	0.242
2.72	0.296
2.80	0.246
2.99	0.441
3.36	0.562
3.71	0.523
3.99	0.413
4.38	0.468
4.93	0.567
5.55	0.512
6.05	0.368
6.40	0.185
6.98	0.173
7.76	0.269
9.41	0.179
10.0	0.202
10.5	0.198
11.1	0.214*
15.0	0.232
CURVE 6	
T = 298	
2.00	0.521
2.15	0.705
2.53	0.447
2.65	0.141
2.72	0.214
2.80	0.184
3.33	0.432
3.70	0.395
4.09	0.299
4.59	0.388
5.06	0.446
5.54	0.395
6.43	0.164
7.01	0.170
CURVE 6 (cont.)	
7.96	0.225
9.42	0.180
10.1	0.196
10.5	0.193
11.1	0.216
15.0	0.225
CURVE 7	
T = 298	
2.00	0.439
2.18	0.652
2.52	0.335
2.74	0.141
3.38	0.326
4.04	0.226
4.52	0.290
5.00	0.347
5.76	0.272
6.36	0.163
6.68	0.177
6.97	0.170
7.97	0.216
9.38	0.180
10.3	0.193
11.2	0.212
15.0	0.218

*Not shown on plot

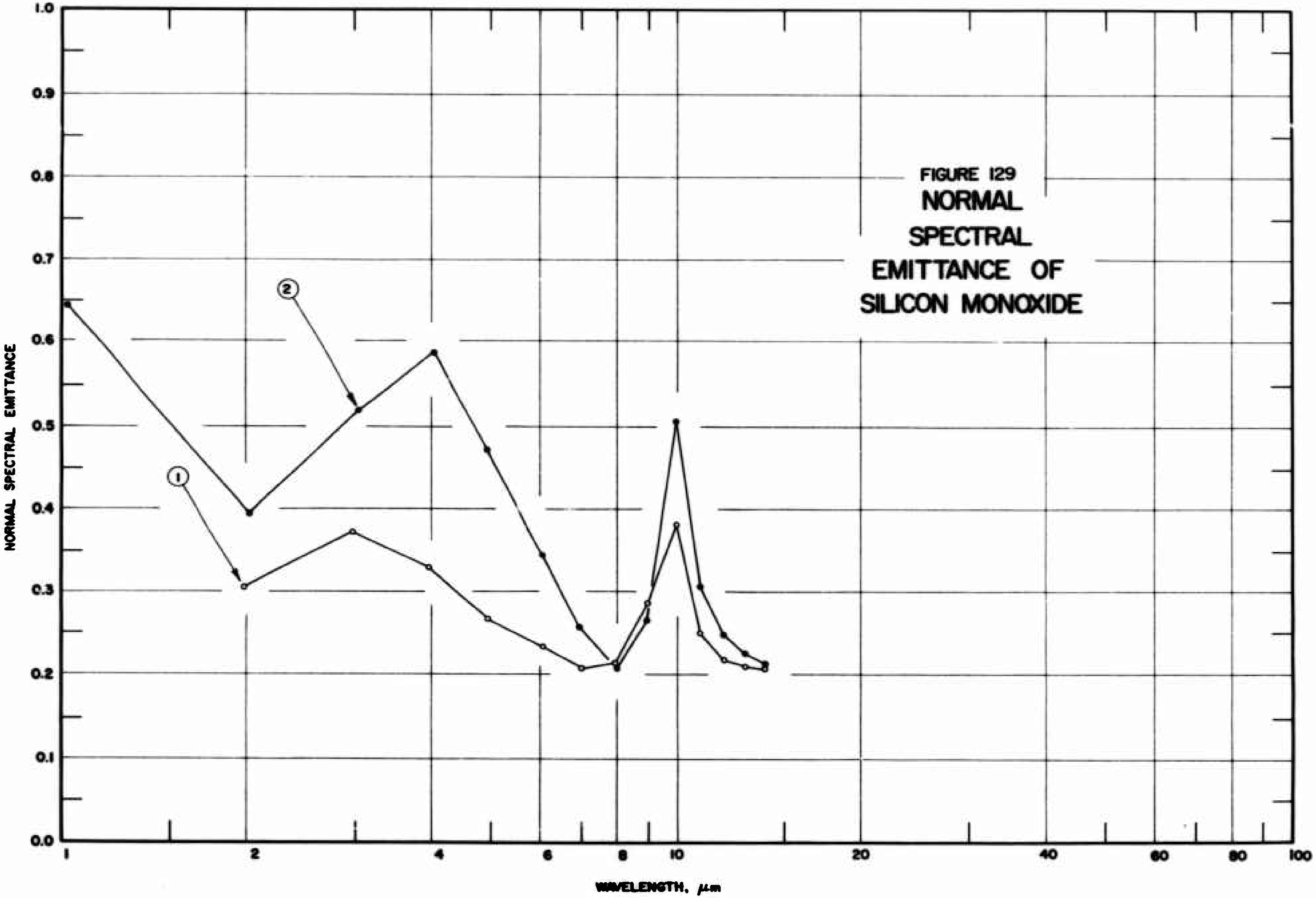


FIGURE 129
NORMAL
SPECTRAL
EMITTANCE OF
SILICON MONOXIDE

SPECIFICATION TABLE NO. 129 NORMAL SPECTRAL EMITTANCE OF SILICON MONOXIDE SiO

Curve No.	Ref. No.	Year	Temperature, K	Wavelength Range, μm	Geometry θ'	Reported Error, %	Composition (weight percent), Specifications, and Remarks
1	111	1964	873	1.99-13.94	0°	≤ 4	SiO on polished Pt; vacuum evaporated, thickness 1000 Å; measured in air.
2	111	1964	1273	1.03-13.96	0°	≤ 4	SiO on polished inconel; thickness 1000 Å; measured in air.

DATA TABLE NO. 129 NORMAL SPECTRAL EMITTANCE OF SILICON MONOXIDE SiO

[Wavelength, λ, μm; Emittance, ϵ; Temperature, T, K]

λ	ϵ
CURVE 1	
T = 873	
1.99	0.305
2.99	0.374
3.97	0.330
4.92	0.267
6.03	0.231
7.00	0.207
7.98	0.211
8.94	0.288
9.96	0.382
10.98	0.250
11.99	0.218
12.99	0.210
13.94	0.208
CURVE 2	
T = 1273	
1.03	0.643
2.02	0.395
3.04	0.520
4.01	0.588
4.92	0.472
6.05	0.345
6.97	0.258
CURVE 2 (cont.)	
8.00	0.207
8.95	0.265
9.97	0.506
10.98	0.306
11.99	0.249
12.97	0.225
13.96	0.211

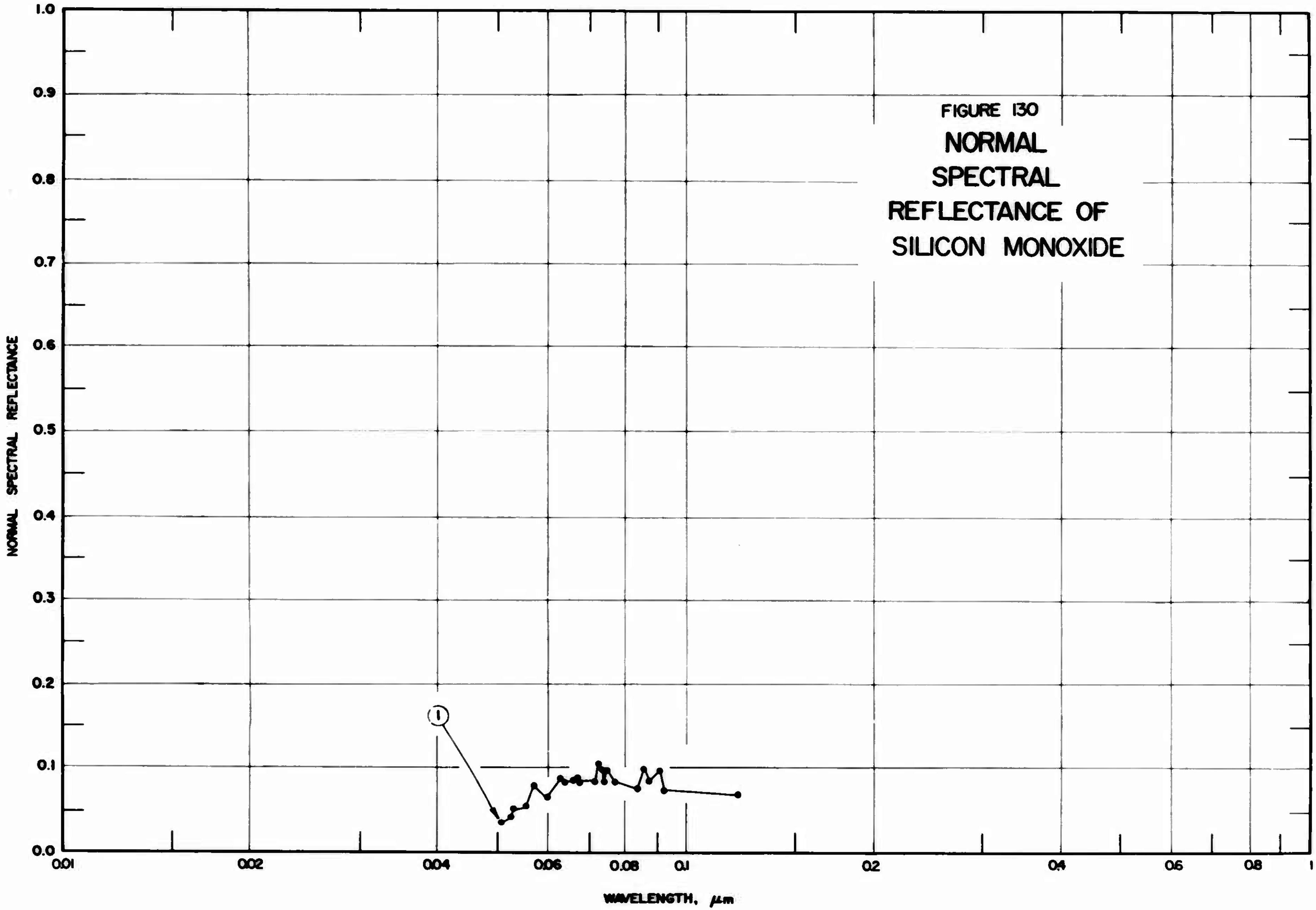


FIGURE 130
NORMAL SPECTRAL REFLECTANCE OF SILICON MONOXIDE

SPECIFICATION TABLE NO. 130 NORMAL SPECTRAL REFLECTANCE OF SILICON MONOXIDE SiO

Curve No.	Ref. No.	Year	Temperature K	Wavelength Range, μm	Geometry θ	θ'	ω'	Reported Error, %	Composition (weight percent), Specifications, and Remarks
1	222	1964	298	0.0509-0.122	0°	0°			99.9 pure; unbacked SiO film (0.137 μm thick); evaporation rate 20 Å sec^{-1}.

DATA TABLE NO. 130 NORMAL SPECTRAL REFLECTANCE OF SILICON MONOXIDE SiO

[Wavelength, λ, μm; Reflectance, ρ; Temperature, T, K]

λ	ρ
CURVE 1	
T = 298	
0.0509	0.0395
0.0527	0.0447
0.0535	0.0527
0.0553	0.0571
0.0579	0.0806
0.0602	0.0688
0.0634	0.0889
0.0640	0.0839
0.0665	0.0846
0.0671	0.0880
0.0679	0.0827*
0.0717	0.0849
0.0723	0.1019
0.0733	0.0990
0.0740	0.0853
0.0747	0.0971
0.0770	0.0833
0.0834	0.0772
0.0853	0.0991
0.0873	0.0956*
0.0877	0.0835
0.0881	0.0845*
0.0901	0.0965
0.0920	0.0744
0.0932	0.0736*
0.122	0.0703

*Not shown on plot

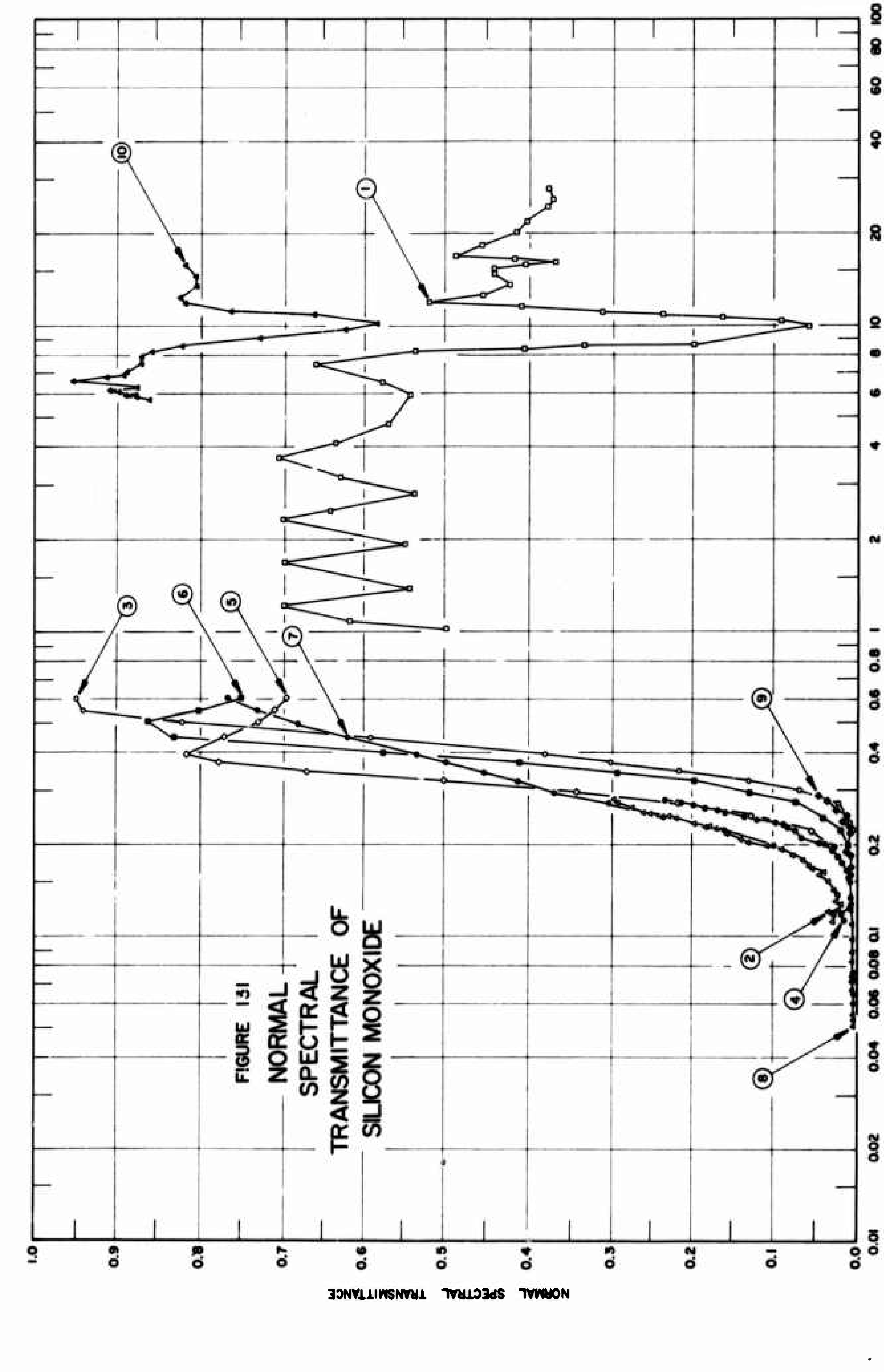


FIGURE 131
NORMAL SPECTRAL TRANSMITTANCE OF SILICON MONOXIDE

SPECIFICATION TABLE NO. 131 NORMAL SPECTRAL TRANSMITTANCE OF SILICON MONOXIDE SiO

Curve No.	Ref. No.	Year	Temperature K	Wavelength Range, μm	Geometry θ	Geometry θ'	Geometry ω'	Reported Error, %	Composition (weight percent), Specifications, and Remarks
1	221	1961	298	1.03-28.03	~0°	~0°			Silicon monox coating (15,500 Å thick) from Kemet Co. ; silicon substrate; prepared by vacuum depositing (2×10^{-6} mm Hg).
2	222	1964	298	0.111-0.280	0°	0°			99.9 pure; unbacked film (45 nm thick), evaporation rate 20 Å sec^{-1}.
3	222	1964	298	0.255-0.601	0°	0°			Similar to the above specimen and conditions except 136 nm thick.
4	222	1964	298	0.113-0.280	0°	0°			Similar to the above specimen and conditions except 116 nm thick.
5	222	1964	298	0.199-0.601	0°	0°			Above specimen and conditions.
6	222	1964	298	0.200-0.601	0°	0°			Similar to the above specimen and conditions except 121 nm thick.
7	222	1964	298	0.200-0.602	0°	0°			Similar to the above specimen and conditions except 45 nm thick.
8	222	1964	298	0.0510-0.121	0°	0°			Similar to the above specimen and conditions except 137 nm thick.
9	222	1964	298	0.169-0.279	0°	0°			Above specimen and conditions.
10	222	1964	298	5.69-15.9	0°	0°			Above specimen and conditions except data extracted from smooth curve.

DATA TABLE NO. 131 NORMAL SPECTRAL TRANSMITTANCE OF SILICON MONOXIDE SiO

[Wavelength, λ, μm; Transmittance, τ; Temperature, T, K]

CURVE 1
T = 298

λ	τ
1.03	0.499
1.09	0.620
1.22	0.702
1.39	0.545
1.71	0.702
1.94	0.550
2.34	0.705
2.48	0.645
2.81	0.539
3.24	0.631
3.71	0.709
4.18	0.639
4.79	0.571
5.98	0.544
6.58	0.580
7.42	0.663
8.25	0.537
8.40	0.452*
8.48	0.407
8.64	0.338
8.75	0.248*
8.75	0.200
10.0	0.059
10.3	0.091
10.7	0.164
10.9	0.238
11.1	0.314
11.4	0.358*
11.6	0.411
12.0	0.521
12.7	0.456
13.6	0.423
14.8	0.444
15.5	0.444
15.9	0.406
16.2	0.370
16.6	0.421
17.0	0.488
17.8	0.478*
18.5	0.457
19.2	0.428*
20.2	0.417
21.0	0.416*
22.0	0.403

CURVE 1 (cont.)

λ	τ
23.5	0.393*
24.5	0.380
25.9	0.374
27.0	0.378*
28.0	0.379

CURVE 2
T = 298

λ	τ
0.111	0.0288
0.113	0.0254*
0.115	0.0254*
0.117	0.0270
0.119	0.0335
0.121	0.0220
0.123	0.0224*
0.125	0.0199*
0.127	0.0190
0.131	0.0249
0.133	0.0233*
0.136	0.0244*
0.137	0.0226
0.139	0.0238*
0.141	0.0276
0.143	0.0262*
0.145	0.0262*
0.147	0.0290*
0.149	0.0290*
0.151	0.0325
0.153	0.0349*
0.155	0.0372*
0.157	0.0349*
0.159	0.0433
0.161	0.0426*
0.163	0.0387
0.165	0.0466*
0.167	0.0512
0.169	0.0507*
0.171	0.0566
0.173	0.0601*
0.175	0.0608*
0.177	0.0633
0.179	0.0650*
0.184	0.0754
0.185	0.0747*

CURVE 2 (cont.)

λ	τ
0.187	0.0840*
0.189	0.0862*
0.191	0.0899
0.193	0.0947*
0.195	0.0939*
0.198	0.0939*
0.199	0.107
0.201	0.119*
0.203	0.129
0.208	0.129*
0.209	0.139
0.212	0.138*
0.214	0.145*
0.216	0.154*
0.218	0.158
0.220	0.161*
0.222	0.164*
0.224	0.170*
0.226	0.170
0.228	0.184
0.230	0.177
0.232	0.188*
0.234	0.188*
0.235	0.199
0.238	0.199*
0.240	0.209*
0.242	0.212*
0.244	0.219
0.246	0.223*
0.248	0.228
0.249	0.226*
0.252	0.252
0.254	0.262
0.256	0.256*
0.258	0.259*
0.260	0.264*
0.262	0.264*
0.264	0.276
0.266	0.272*
0.268	0.281*
0.270	0.281
0.272	0.280*
0.274	0.293
0.276	0.291*
0.277	0.296*
0.280	0.299

CURVE 3
T = 298

λ	τ
0.225	0.004
0.249	0.009
0.274	0.032
0.301	0.068
0.324	0.129
0.350	0.216
0.374	0.302
0.399	0.382
0.450	0.593
0.501	0.821
0.551	0.945
0.601	0.952

CURVE 4
T = 298

λ	τ
0.113	0.0166
0.115	0.0144*
0.117	0.0181
0.119	0.0133*
0.123	0.0088
0.127	0.0064
0.129	0.0088*
0.136	0.0072
0.141	0.0072*
0.143	0.0072*
0.151	0.0083
0.153	0.0097*
0.155	0.0086*
0.157	0.0097
0.159	0.0084
0.161	0.0101*
0.163	0.0102*
0.165	0.0113
0.167	0.0136*
0.169	0.0136*
0.171	0.0136*
0.174	0.0182*
0.175	0.0182
0.177	0.0152*
0.179	0.0172*
0.181	0.0180*
0.183	0.0222
0.185	0.0222*

CURVE 4 (cont.)

λ	τ
0.187	0.0256*
0.189	0.0272*
0.191	0.0295
0.193	0.0281*
0.195	0.0286*
0.197	0.0276
0.199	0.0374*
0.201	0.0395
0.203	0.0468
0.205	0.0407*
0.207	0.0426*
0.209	0.0479*
0.211	0.0537*
0.213	0.0559
0.216	0.0608*
0.218	0.0599*
0.220	0.0644*
0.221	0.0698*
0.224	0.0728
0.225	0.0726*
0.225	0.0725*
0.228	0.0803
0.229	0.0789*
0.231	0.0861*
0.234	0.0879
0.236	0.0945*
0.237	0.0978
0.240	0.1021*
0.241	0.1069*
0.243	0.1197
0.246	0.1258*
0.248	0.1342
0.249	0.1359*
0.252	0.1487*
0.254	0.1592
0.256	0.1568*
0.258	0.1599*
0.260	0.1673
0.262	0.1715*
0.264	0.1840
0.265	0.1857*
0.268	0.1951*
0.270	0.1985
0.271	0.2045*
0.274	0.2135

CURVE 4 (cont.)

λ	τ
0.276	0.2175*
0.278	0.2321*
0.280	0.2332

CURVE 5
T = 298

λ	τ
0.199	0.031
0.224	0.054
0.248	0.126
0.274	0.216
0.298	0.346
0.324	0.500
0.349	0.671
0.374	0.779
0.398	0.816
0.450	0.773
0.501	0.731
0.550	0.712
0.601	0.698

CURVE 6
T = 298

λ	τ
0.200	0.010
0.224	0.018
0.249	0.040
0.275	0.073
0.299	0.128
0.324	0.197
0.349	0.293
0.375	0.411
0.400	0.579
0.450	0.830
0.501	0.862
0.551	0.803
0.601	0.751

CURVE 7
T = 298

λ	τ
0.200	0.100
0.224	0.160
0.249	0.234
0.274	0.304

CURVE 7 (cont.)

λ	τ
0.299	0.370
0.324	0.413
0.349	0.453
0.375	0.494
0.399	0.533
0.451	0.621
0.500	0.684
0.552	0.733
0.602	0.769

CURVE 8
T = 298

λ	τ
0.0510	0.0035
0.0528	0.0033*
0.0536	0.0031
0.0556	0.0034
0.0579	0.0031*
0.0601	0.0031
0.0637	0.0029*
0.0642	0.0029
0.0663	0.0036
0.0668	0.0033*
0.0676	0.0037*
0.0718	0.0036
0.0722	0.0033
0.0728	0.0035*
0.0740	0.0040
0.0744	0.0038*
0.0767	0.0032
0.0834	0.0038
0.0852	0.0037*
0.0869	0.0037*
0.0873	0.0039*
0.0876	0.0037*
0.0899	0.0041
0.0919	0.0044*
0.0928	0.0043
0.108	0.0045
0.121	0.0075

CURVE 9
T = 298

λ	τ
0.169	0.0059
0.175	0.0060*
0.180	0.0072*
0.184	0.0072
0.190	0.0120
0.219	0.0072
0.229	0.0070
0.240	0.0174
0.250	0.0108
0.260	0.0249
0.269	0.0346
0.279	0.0457

CURVE 10
T = 298

λ	τ
5.69	0.861
5.72	0.862*
5.77	0.877*
5.84	0.877
5.91	0.892
5.96	0.877
6.05	0.899
6.16	0.913
6.32	0.903*
6.31	0.874
6.58	0.959
6.64	0.943*
6.65	0.916*
6.77	0.915
6.82	0.893
6.93	0.899*
6.98	0.889*
7.11	0.889
7.18	0.882*
7.25	0.887*
7.51	0.870
7.86	0.870
7.90	0.862*
8.20	0.859
8.41	0.848*
8.60	0.822
9.17	0.730
9.78	0.624

* Not shown on plot

DATA TABLE NO. 131 (continued)

λ	τ
CURVE 10 (cont.)	
10.2	0.585
10.8	0.665
11.3	0.765
11.9	0.818
12.4	0.824
13.4	0.805
14.6	0.805
15.9	0.819

SPECIFICATION TABLE NO. 132 NORMAL TOTAL EMITTANCE OF SILICON DIOXIDE (Crystalline) SiO_2

Curve No.	Ref. No.	Year	Temperature Range, K	Geometry θ'	Reported Error, %	Composition (weight percent), Specifications and Remarks
1*	28	1963	1023	~0°		Sintered at 1823 K for 1 hr (setter material SiO_2); density 1.53 g cm^{-3}; theoretical density 2.3 g cm^{-3}; x-ray structure alpha cristobalite; integrated from spectral data (1-15 μm); [Authors' designation: Sample No. 121].

DATA TABLE NO. 132 NORMAL TOTAL EMITTANCE OF SILICON DIOXIDE (Crystalline) SiO_2

[Temperature, T, K; Emittance, ϵ]

T	ϵ
CURVE 1*	
1023	0.37

*No plot given

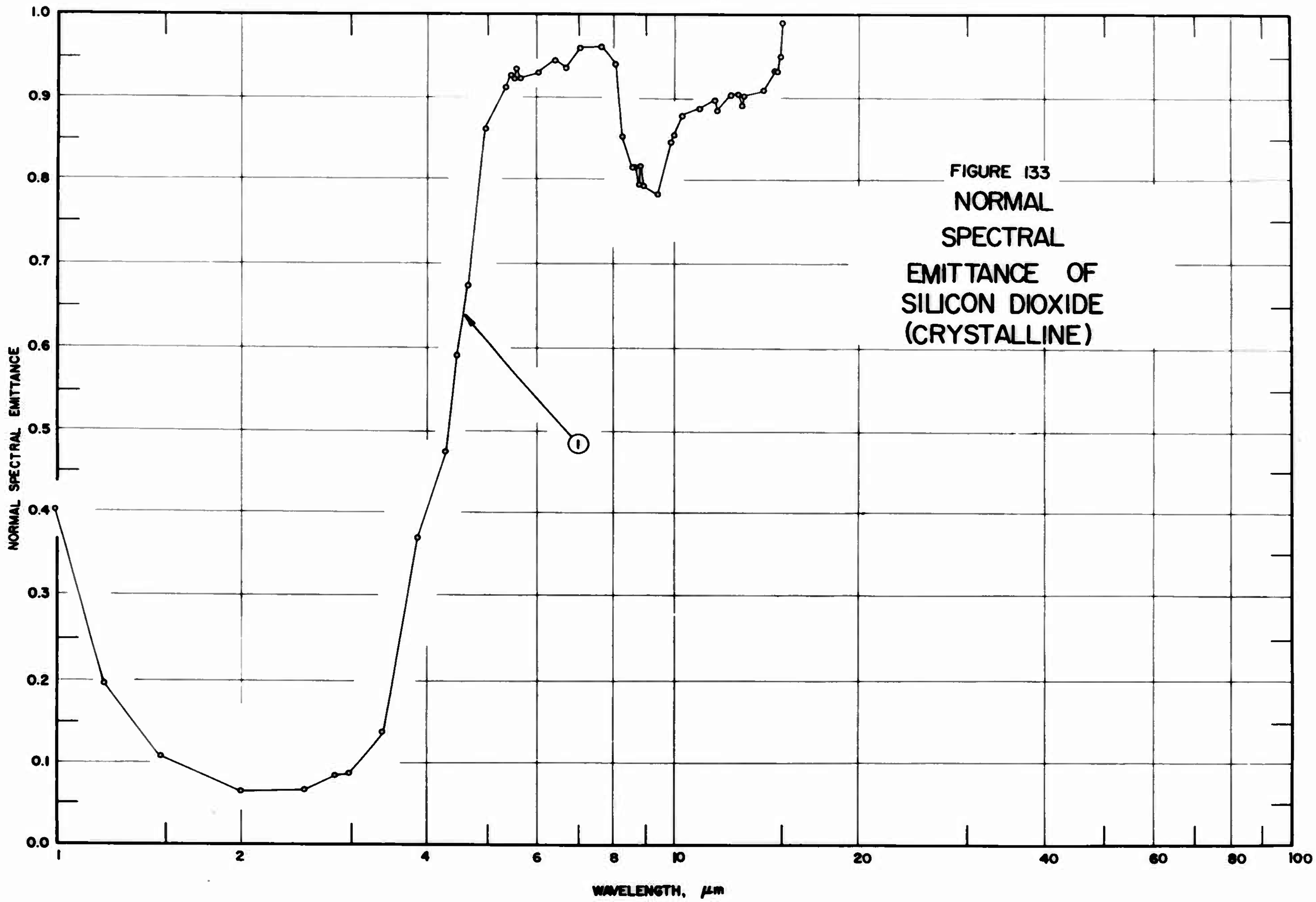


FIGURE 133
NORMAL
SPECTRAL
EMITTANCE OF
SILICON DIOXIDE
(CRYSTALLINE)

SPECIFICATION TABLE NO. 133 NORMAL SPECTRAL EMITTANCE OF SILICON DIOXIDE (Crystalline) SiO_2

Curve No.	Ref. No.	Year	Temperature K	Wavelength Range, μm	Geometry θ'	Reported Error, %	Composition (weight percent), Specifications, and Remarks
1	28	1963	1023	1.00-15.0	~0°		Sintered at 1823 K for 1 hr (setter material SiO_2); density 1.53 g cm^{-3}, theoretical density 2.3 g cm^{-3}; x-ray structure alpha cristobalite; data extracted from smooth curve; [Authors' designation: Sample No. 121].

DATA TABLE NO. 133 NORMAL SPECTRAL EMITTANCE OF SILICON DIOXIDE (Crystalline) SiO_2

[Wavelength, λ, μm; Emittance, ϵ; Temperature, T, K]

λ	ϵ	λ	ϵ
CURVE 1 T = 1023		CURVE 1 (cont.)	
		8.29	0.852
1.00	0.400	8.57	0.815
1.20	0.196	8.66	0.815
1.48	0.108	8.76	0.793
2.00	0.063	8.81	0.818
2.54	0.064	8.92	0.791
2.83	0.081	9.40	0.781
2.99	0.085	9.88	0.846
3.39	0.137	10.0	0.854
3.85	0.369	10.3	0.879
4.28	0.474	11.0	0.889
4.45	0.591	11.6	0.899
4.65	0.673	11.7	0.887
4.99	0.862	12.4	0.904
5.35	0.914	12.7	0.904
5.45	0.929	12.9	0.891
5.51	0.925	13.0	0.902
6.01	0.931	14.0	0.910
6.42	0.946	14.6	0.934
6.70	0.938	14.7	0.934
7.01	0.960	14.9	0.951
7.62	0.962	15.0	0.990
8.01	0.943		

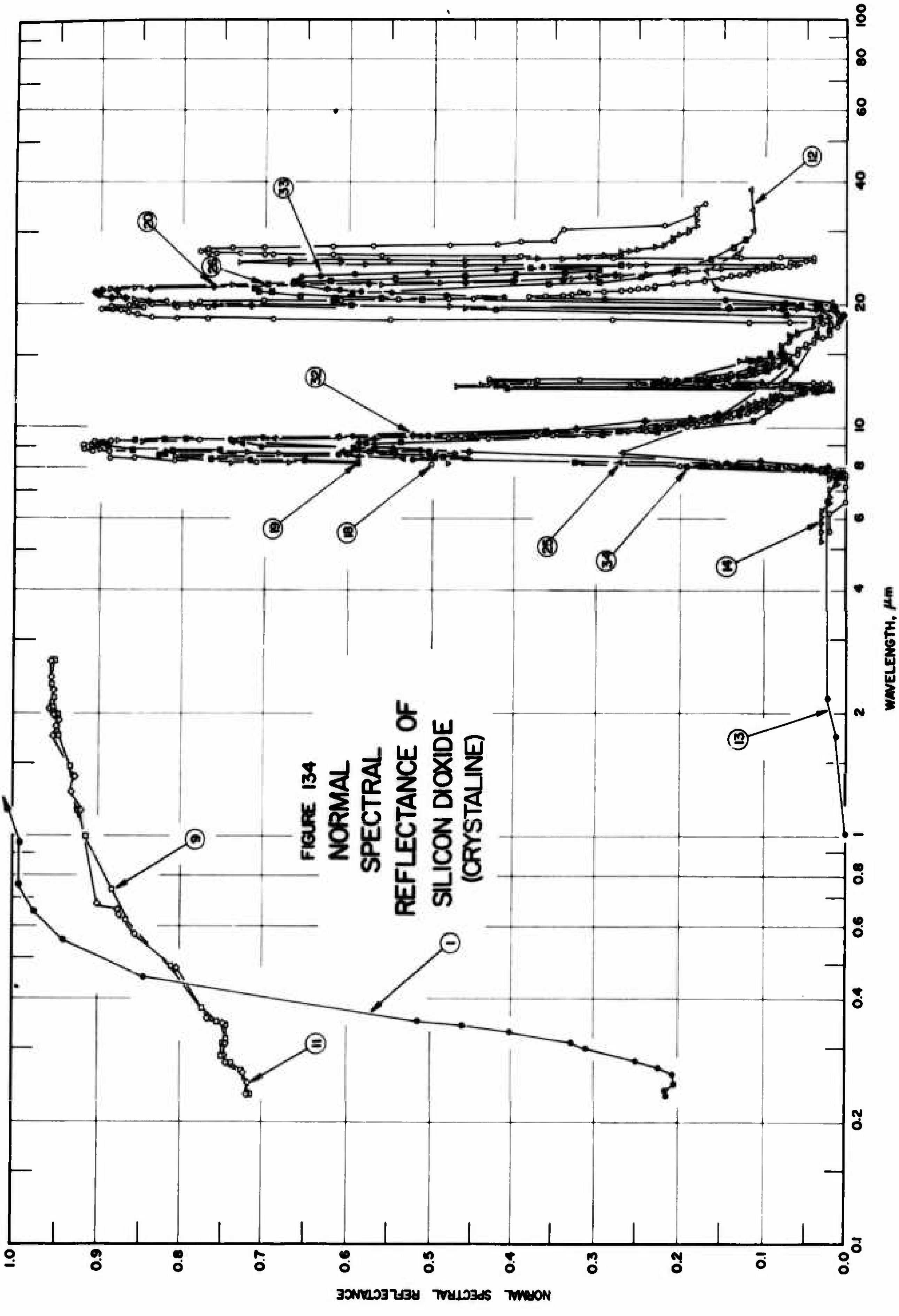


FIGURE 134 NORMAL SPECTRAL REFLECTANCE OF SILICON DIOXIDE (CRYSTALINE)

SPECIFICATION TABLE NO. 134 NORMAL SPECTRAL REFLECTANCE OF SILICON DIOXIDE (Crystalline) SiO_2

Curve No.	Ref. No.	Year	Temperature K	Wavelength Range, μm	Geometry θ	θ'	ω'	Reported Error, %	Composition (weight percent), Specifications, and Remarks
1	28	1963	298	0.230-2.65	~0°		2π		Sintered at 1823 K for 2 hrs (setter material SiO_2); density 1.46 g cm^{-3}, theoretical density 2.3 g cm^{-3}; MgO reference standard; data extracted from smooth curve; [Authors' designation: Sample No. 120].
2*	82	1963	298	0.440-0.600	~0°		2π		Ottawa special supplied by Ottawa Silica; compacted powder at 10 000 psi.
3*	82	1963	298	0.440-0.600	~0°		2π		Above specimen and conditions except exposed to UV irradiation; 75 ESH with solar factor 1.5.
4*	82	1963	298	0.440-0.600	~0°		2π		Diatomaceous earth, Dicalite WB-5; supplied by Great Lakes Carbon Co.; compacted powder at 10 000 psi.
5*	82	1963	298	0.440-0.600	~0°		2π		Above specimen and conditions except exposed to UV irradiation; 180 ESH with solar factor 3.
6*	82	1963	298	0.440-0.600	~0°		2π		No. 7900 Vycor supplied by Corning Glass Co.; compacted powder at 10 000 psi.
7*	82	1963	298	0.440-0.600	~0°		2π		Above specimen and conditions except exposed to UV irradiation; 200 ESH with solar factor 3.
8*	342	1968	~298	0.230-2.65	0°		2π		-230 +270 mesh powder; compacted at 23 500 psi; data extracted from smooth curve; MgO reference standard.
9	91	1967	298	0.230-2.65	0°		2π		Powder; commercially pure; -230 +270 mesh; pressed at 16 200 Newtons cm^{-2}; 1.6 mm thick on stainless steel; MgO reference standard; data extracted from smooth curve.
10*	91	1967	298	0.230-2.65	0°		2π		Powder; commercially pure; -230 +270 mesh; pressed at 16 200 Newtons cm^{-2}; 1.6 mm thick on stainless steel; MgO reference standard; data extracted from smooth curve.
11	91	1967	298	0.230-2.65	0°		2π		Powder; commercially pure; -230 +270 mesh; pressed at 24 300 Newtons cm^{-2}; 1.6 mm thick on stainless steel; MgO reference standard; data extracted from smooth curve.
12	146	1966	~298	7.70-38.0	~0°	~0°			Film; optical thickness 10 quarterwaves at λ = 2.5 μm; electron beam deposited in vacuum (2-8 x 10^{-6} mm Hg) at normal incidence onto glass substrate heated to 588 K; rate of depositing 1 quarterwave per min at λ = 0.5 μm; film clear in optical region.
13	273	1966	~298	1.00-14.0	10°	10°			Crystalline quartz; data extracted from smooth curve.
14	455	1961	297	5.2-32.0	<6°	<6°			Natural α-quartz; opaque plate; Z-cut (optical axis perpendicular to specimen surface); prepared by optical polishing and etched in HF; measured with unpolarized incident radiation; data is for ordinary ray (electric field perpendicular to optic axis).
15*	455	1961	297	5.2-32.0	<6°	<6°			Synthetic α-quartz; opaque plate; Z-cut (optic axis perpendicular to specimen surface); prepared by optical polishing; measured with unpolarized incident radiation; data is for ordinary ray (electric field perpendicular to optic axis).
16*	455	1961	297	5.2-32.0	<6°	<6°			Rose α-quartz (impurity 0.088 Al, trace Li, Na, Cu, Mg, Be, and Ti); opaque plate; Z-cut (optic axis perpendicular to specimen surface); prepared by optical polishing; measured with unpolarized incident radiation; data is for ordinary ray (electric field perpendicular to optic axis).

*Not shown on plot

SPECIFICATION TABLE NO. 134 (continued)

Curve No.	Ref. No.	Year	Temperature K	Wavelength Range, μm	Geometry θ θ' ω'	Reported Error, %	Composition (weight percent), Specifications, and Remarks
17*	455	1961	297	5.2-32.0	<6° <6°		Natural α-quartz; opaque rectangular plate; X-cut (optic axis parallel to specimen surface) with one edge of the specimen aligned with the optic axis; measured with polarized incident radiation; data is for ordinary ray (electric field perpendicular to optic axis).
18	455	1961	297	5.2-32.0	<6° <6°		Natural α-quartz; opaque rectangular plate; X-cut (optic axis parallel to specimen surface) with one edge of the specimen aligned with the optic axis; measured with polarized incident radiation; data is for extraordinary ray (electric field parallel to optic axis).
19	381	1965	293	7.51-15.0	~7° ~7°		Z-cut quartz; polished; data extracted from smooth curve.
20	381	1965	293	18.4-23.4	~7° ~7°		Above specimen and conditions.
21*	381	1965	477	7.50-15.0	~7° ~7°		Above specimen and conditions.
22*	381	1965	493	19.2-23.4	~7° ~7°		Above specimen and conditions.
23*	381	1965	622	7.60-15.0	~7° ~7°		Above specimen and conditions.
24*	381	1965	656	19.3-23.4	~7° ~7°		Above specimen and conditions.
25	381	1965	795	7.65-15.0	~7° ~7°		Above specimen and conditions.
26	381	1965	831	19.5-24.6	~7° ~7°		Above specimen and conditions.
27*	381	1965	851	19.3-24.6	~7° ~7°		Above specimen and conditions.
28*	381	1965	862	19.6-24.5	~7° ~7°		Above specimen and conditions.
29*	381	1965	887	7.68-15.0	~7° ~7°		Above specimen and conditions.
30*	381	1965	1083	19.6-24.6	~7° ~7°		Above specimen and conditions.
31*	381	1965	1139	7.65-15.0	~7° ~7°		Above specimen and conditions.
32	381	1965	1378	7.68-15.0	~7° ~7°		Above specimen and conditions.
33	381	1965	1418	19.6-24.6	~7° ~7°		Above specimen and conditions.
34	261	1967	573	7.72-28.5	~0° ~0°		β-Cristobalite; polycrystalline; data extracted from smooth curve.
35*	131	1965	293	7.14-11.2	~20°~20°		α-quartz (1 mm thick); cut and polished natural sample; data extracted from smooth curve; gold mirror reference standard; radiation polarized parallel to optic axis.
36*	131	1965	~100	7.14-11.2	~20°~20°		Above specimen and conditions.
37*	131	1965	~ 14	7.14-11.2	~20°~20°		Above specimen and conditions.
38*	131	1965	293	11.1-32.8	~20°~20°		Above specimen and conditions.
39*	131	1965	~100	11.1-32.6	~20°~20°		Above specimen and conditions.
40*	131	1965	~ 14	11.1-32.6	~20°~20°		Above specimen and conditions.
41*	131	1965	293	6.67-30.1	~20°~20°		Similar to the above specimen and conditions.

*Not shown on plot

SPECIFICATION TABLE NO. 134 (continued)

Curve No.	Ref. No.	Year	Temperature K	Wavelength Range, μm	Geometry θ	θ'	ω'	Reported Error, %	Composition (weight percent), Specifications, and Remarks
42*	131	1965	~100	6.67-30.6	~20°	~20°			Above specimen and conditions.
43*	131	1965	293	7.14-11.9	~20°	~20°			Similar to the above specimen and conditions except radiation polarized perpendicular to the optic axis.
44*	131	1965	~100	7.68-11.9	~20°	~20°			Above specimen and conditions.
45*	131	1965	~ 14	7.68-11.9	~20°	~20°			Above specimen and conditions.
46*	131	1965	293	11.1-33.2	~20°	~20°			Above specimen and conditions.
47*	131	1965	~100	11.1-32.3	~20°	~20°			Above specimen and conditions.
48*	131	1965	~ 14	11.1-32.3	~20°	~20°			Above specimen and conditions.
49*	131	1965	293	6.67-30.4	~20°	~20°			Similar to the above specimen and conditions.
50*	131	1965	~100	6.67-30.2	~0°	~0°			Above specimen and conditions.

*Not shown on plot

DATA TABLE NO. 134 NORMAL SPECTRAL REFLECTANCE OF SILICON DIOXIDE (Crystalline) SiO_2

[Wavelength, λ, μm; Reflectance, ρ; Temperature, T, K]

λ	ρ
CURVE 1 T = 298	
0.230	0.213
0.237	0.213
0.249	0.202
0.260	0.204
0.270	0.221
0.280	0.249
0.300	0.309
0.310	0.327
0.330	0.400
0.341	0.461
0.350	0.513
0.450	0.845
0.548	0.940
0.649	0.977
0.748	0.994
0.951	0.994
1.15	1.01*
1.35	1.04*
1.64	1.09*
1.94	1.14*
2.15	1.17*
2.34	1.21*
2.45	1.22*
2.54	1.23*
2.65	1.25*
CURVE 2* T = 298	
0.440	0.885
0.600	0.925
CURVE 3* T = 298	
0.440	0.775
0.600	0.900
CURVE 4* T = 298	
0.440	0.920
0.600	0.935

λ	ρ
CURVE 5* T = 296	
0.440	0.875
0.600	0.930
CURVE 6* T = 298	
0.440	0.940
0.600	0.950
CURVE 7* T = 298	
0.440	0.430
0.600	0.445
CURVE 8* T ~ 298	
0.230	0.716
0.236	0.718
0.247	0.717
0.262	0.724
0.267	0.727
0.280	0.742
0.293	0.749
0.306	0.746
0.316	0.740
0.343	0.744
0.350	0.758
0.595	0.856
0.650	0.871
0.777	0.889
0.951	0.906
1.13	0.920
1.37	0.924
1.56	0.943
1.66	0.947
1.90	0.945
1.99	0.949
2.05	0.953
2.15	0.950
2.20	0.952
2.65	0.955

λ	ρ
CURVE 9 T = 298	
0.230	0.713
0.262	0.724
0.274	0.739
0.288	0.749
0.306	0.746
0.314	0.743
0.340	0.743
0.346	0.754
0.374	0.773
0.477	0.811
0.615	0.868
0.735	0.883
0.983	0.915
1.13	0.924
1.46	0.934
1.73	0.949
1.95	0.950
2.04	0.955
2.17	0.953
2.31	0.955
2.65	0.955
CURVE 10* T = 298	
0.230	0.676
0.266	0.684
0.287	0.705
0.300	0.713
0.348	0.737
0.389	0.763
0.542	0.832
0.682	0.881
0.812	0.907
0.960	0.929
1.06	0.937
1.20	0.940
1.71	0.964
1.85	0.967
1.95	0.971
2.02	0.977
2.43	0.983
2.65	0.982

λ	ρ
CURVE 11 T = 298	
0.230	0.716
0.245	0.715
0.260	0.721
0.273	0.742
0.288	0.747
0.306	0.744
0.343	0.747
0.352	0.767
0.467	0.805
0.568	0.856
0.635	0.874
0.650	0.877
0.871	0.900
1.13	0.923
1.26	0.931
1.38	0.929
1.72	0.953
1.82	0.950
1.90	0.947
1.97	0.952
2.01	0.959
2.27	0.954
2.41	0.958
2.65	0.956
CURVE 12 T ~ 298	
7.70	0.009
8.60	0.269
10.5	0.151
12.6	0.097
18.0	0.009
20.0	0.018
21.5	0.156
24.0	0.169
26.4	0.131
30.0	0.113
33.9	0.115
38.0	0.117
CURVE 13 T ~ 298	
1.00	0.000

λ	ρ
CURVE 13 (cont.)	
1.74	0.011
2.15	0.023
6.59	0.023
7.41	0.011
7.96	0.053
8.06	0.144
8.27	0.523
8.53	0.613
8.75	0.513
8.93	0.702
9.23	0.742
9.40	0.700
9.49	0.598
9.66	0.355
9.76	0.270
9.90	0.213
10.3	0.153
11.7	0.073
12.3	0.032
12.6	0.231
12.7	0.206
12.9	0.205
13.1	0.159
13.3	0.123
14.0	0.081
CURVE 14 T = 297	
5.2	0.03
5.5	0.03
5.8	0.03
6.0	0.03
6.2	0.03
6.5	0.02
6.7	0.02
7.0	0.02
7.2	0.01
7.4	0.02
7.6	0.02
7.7	0.03
7.8	0.04
7.8	0.05
7.9	0.07
8.0	0.15
8.1	0.48

λ	ρ
CURVE 14 (cont.)	
8.2	0.67
8.2	0.74
8.4	0.81
8.5	0.83
8.6	0.68
8.6	0.47
8.6	0.72
8.7	0.82*
8.8	0.90
8.9	0.91*
9.0	0.91
9.2	0.88
9.2	0.85
9.4	0.61
9.5	0.45
9.6	0.36
9.7	0.29
9.7	0.26
9.9	0.24
10.0	0.22
10.1	0.20
10.1	0.19*
10.3	0.18
10.6	0.15
10.8	0.13
11.0	0.12
11.2	0.12
11.4	0.11
11.5	0.10
11.6	0.09
11.7	0.09
11.7	0.07
11.8	0.08
12.0	0.05
12.1	0.05
12.2	0.03
12.3	0.03
12.3	0.11
12.4	0.26
12.4	0.41
12.5	0.47
12.6	0.44
12.6	0.37
12.7	0.25
12.8	0.20
12.9	0.17

λ	ρ
CURVE 14 (cont.)	
13.0	0.15
13.1	0.14*
13.1	0.13
13.4	0.11
13.6	0.11
13.8	0.10
13.9	0.09
14.1	0.08
14.2	0.07
14.3	0.09
14.3	0.11
14.3	0.13
14.5	0.12
14.7	0.09
15.0	0.09
15.2	0.08
15.5	0.08
15.7	0.08
16.0	0.07
16.2	0.07
16.4	0.07
16.5	0.07
16.7	0.06
17.0	0.06
17.5	0.04
18.0	0.04
18.5	0.02
19.2	0.03
19.3	0.06
19.4	0.09
19.6	0.46
19.7	0.48
20.0	0.79
20.2	0.84
20.4	0.86
20.6	0.87
20.7	0.88*
20.9	0.90
21.1	0.90
21.3	0.90*
21.5	0.90
21.8	0.88
22.0	0.86
22.2	0.74
22.4	0.56
22.5	0.49*

λ	ρ
CURVE 14 (cont.)	
22.7	0.40
23.0	0.33
23.2	0.30
23.4	0.27
23.6	0.24
23.8	0.21
24.0	0.19
24.2	0.15
24.4	0.11
24.5	0.10
24.6	0.09
24.6	0.06
24.7	0.09
24.8	0.24
24.8	0.26
24.9	0.46
25.0	0.50
25.0	0.58
25.1	0.61
25.1	0.67
25.2	0.73
25.3	0.67
25.4	0.61
25.4	0.55
25.6	0.46
25.7	0.41
25.8	0.37
25.8	0.34
26.0	0.32
26.0	0.31
26.2	0.29
26.4	0.27
26.6	0.27
26.8	0.26
27.0	0.25
27.5	0.23
27.9	0.22
28.5	0.21
29.0	0.21
29.5	0.20
30.0	0.19
30.4	0.19
31.0	0.18
32.0	0.18

* Not shown on plot

DATA TABLE NO. 134 (continued)

λ	ρ
CURVE 15* T = 297	
5.2	0.03
5.5	0.03
5.8	0.03
6.0	0.03
6.2	0.03
6.5	0.02
6.7	0.02
7.0	0.02
7.2	0.01
7.4	0.02
7.6	0.02
7.7	0.03
7.8	0.04
7.8	0.05
7.9	0.07
8.0	0.15
8.1	0.48
8.2	0.67
8.2	0.74
8.4	0.81
8.5	0.83
8.6	0.68
8.6	0.47
8.6	0.72
8.7	0.82
8.8	0.90
8.9	0.91
9.0	0.91
9.2	0.88
9.2	0.85
9.4	0.61
9.5	0.45
9.6	0.36
9.7	0.29
9.7	0.26
9.9	0.24
10.0	0.22
10.1	0.20
10.1	0.19
10.3	0.18
10.6	0.15
10.8	0.13
11.0	0.12
11.2	0.12
11.4	0.11
11.5	0.10

λ	ρ
CURVE 15 (cont.)*	
11.6	0.09
11.7	0.09
11.7	0.07
11.8	0.08
12.0	0.05
12.1	0.05
12.2	0.03
12.3	0.03
12.3	0.11
12.4	0.26
12.4	0.41
12.5	0.47
12.6	0.44
12.6	0.37
12.7	0.25
12.8	0.20
12.9	0.17
13.0	0.15
13.1	0.14
13.1	0.13
13.4	0.11
13.6	0.11
13.8	0.10
13.9	0.09
14.1	0.08
14.2	0.07
14.3	0.09
14.3	0.11
14.3	0.13
14.5	0.12
14.7	0.09
15.0	0.09
15.2	0.08
15.5	0.08
15.7	0.08
16.0	0.07
16.2	0.07
16.4	0.07
16.5	0.07
16.7	0.06
17.0	0.06
17.5	0.04
18.0	0.04
18.5	0.02
19.2	0.03
19.3	0.06
19.4	0.09

λ	ρ
CURVE 15 (cont.)*	
19.6	0.46
19.7	0.48
20.0	0.79
20.2	0.84
20.4	0.86
20.6	0.87
20.7	0.88
20.9	0.90
21.1	0.90
21.3	0.90
21.5	0.90
21.8	0.88
22.0	0.86
22.2	0.74
22.4	0.56
22.5	0.49
22.7	0.40
23.0	0.33
23.2	0.30
23.4	0.27
23.6	0.24
23.8	0.21
24.0	0.19
24.2	0.15
24.4	0.11
24.5	0.10
24.6	0.09
24.6	0.06
24.7	0.09
24.8	0.24
24.8	0.26
24.9	0.46
25.0	0.50
25.0	0.58
25.1	0.61
25.1	0.67
25.2	0.73
25.3	0.67
25.4	0.61
25.4	0.55
25.6	0.46
25.7	0.41
25.8	0.37
25.8	0.34
26.0	0.32
26.0	0.31
26.2	0.29

λ	ρ
CURVE 15 (cont.)*	
26.4	0.27
26.6	0.27
26.8	0.26
27.0	0.25
27.5	0.23
27.9	0.22
28.5	0.21
29.0	0.21
29.5	0.20
30.0	0.19
30.4	0.19
31.0	0.18
32.0	0.18
CURVE 16* T = 297	
5.2	0.03
5.5	0.03
5.8	0.03
6.0	0.03
6.2	0.03
6.5	0.02
6.7	0.02
7.0	0.02
7.2	0.01
7.4	0.02
7.6	0.02
7.7	0.03
7.8	0.04
7.8	0.05
7.9	0.07
8.0	0.15
8.1	0.48
8.2	0.67
8.2	0.74
8.4	0.81
8.5	0.83
8.6	0.68
8.6	0.47
8.6	0.72
8.7	0.82
8.8	0.90
8.9	0.91
9.0	0.91
9.2	0.88
9.2	0.85

λ	ρ
CURVE 16 (cont.)*	
9.4	0.61
9.5	0.45
9.6	0.36
9.7	0.29
9.7	0.26
9.9	0.24
10.0	0.22
10.1	0.20
10.1	0.19
10.3	0.18
10.6	0.15
10.8	0.13
11.0	0.12
11.2	0.12
11.4	0.11
11.5	0.10
11.6	0.09
11.7	0.09
11.7	0.07
11.8	0.08
12.0	0.05
12.1	0.05
12.2	0.03
12.3	0.03
12.3	0.11
12.4	0.26
12.4	0.41
12.5	0.47
12.6	0.44
12.6	0.37
12.7	0.25
12.8	0.20
12.9	0.17
13.0	0.15
13.1	0.14
13.1	0.13
13.4	0.11
13.6	0.11
13.8	0.10
13.9	0.09
14.1	0.08
14.2	0.07
14.3	0.09
14.3	0.11
14.3	0.13
14.5	0.12
14.7	0.09

λ	ρ
CURVE 16 (cont.)*	
15.0	0.09
15.2	0.08
15.5	0.08
15.7	0.08
16.0	0.07
16.2	0.07
16.4	0.07
16.5	0.07
16.7	0.06
17.0	0.06
17.5	0.04
18.0	0.04
18.5	0.02
19.2	0.03
19.3	0.06
19.4	0.09
19.6	0.46
19.7	0.48
20.0	0.79
20.2	0.84
20.4	0.86
20.6	0.87
20.7	0.88
20.9	0.90
21.1	0.90
21.3	0.90
21.5	0.90
21.8	0.88
22.0	0.86
22.2	0.74
22.4	0.56
22.5	0.49
22.7	0.40
23.0	0.33
23.2	0.30
23.4	0.27
23.6	0.24
23.8	0.21
24.0	0.19
24.2	0.15
24.4	0.11
24.5	0.10
24.6	0.09
24.6	0.06
24.7	0.09
24.8	0.24
24.8	0.26
24.9	0.46

λ	ρ
CURVE 16 (cont.)*	
25.0	0.50
25.0	0.58
25.1	0.61
25.1	0.67
25.2	0.73
25.3	0.67
25.4	0.61
25.4	0.55
25.6	0.46
25.7	0.41
25.8	0.37
25.8	0.34
26.0	0.32
26.0	0.31
26.2	0.29
26.4	0.27
26.6	0.27
26.8	0.26
27.0	0.25
27.5	0.23
27.9	0.22
28.5	0.21
29.0	0.21
29.5	0.20
30.0	0.19
30.4	0.19
31.0	0.18
32.0	0.18
CURVE 17* T = 297	
5.2	0.03
5.5	0.03
5.8	0.03
6.0	0.03
6.2	0.03
6.5	0.02
6.7	0.02
7.0	0.02
7.2	0.01
7.4	0.02
7.6	0.02
7.7	0.03
7.8	0.04
7.8	0.05
7.9	0.07

λ	ρ
CURVE 17 (cont.)*	
8.0	0.15
8.1	0.48
8.2	0.67
8.2	0.74
8.4	0.81
8.5	0.83
8.6	0.68
8.6	0.47
8.6	0.72
8.7	0.82
8.8	0.90
8.9	0.91
9.0	0.91
9.2	0.88
9.2	0.85
9.4	0.61
9.5	0.45
9.6	0.36
9.7	0.29
9.7	0.26
9.9	0.24
10.0	0.22
10.1	0.20
10.1	0.19
10.3	0.18
10.6	0.15
10.8	0.13
11.0	0.12
11.2	0.12
11.4	0.11
11.5	0.10
11.6	0.09
11.7	0.09
11.7	0.07
11.8	0.08
12.0	0.05
12.1	0.05
12.2	0.03
12.3	0.03
12.3	0.11
12.4	0.26
12.4	0.41
12.5	0.47
12.6	0.44
12.6	0.37
12.7	0.25
12.8	0.20

*Not shown on plot

DATA TABLE NO. 134 (continued)

CURVE 17 (cont.)* T = 297

λ	ρ
12.9	0.17
13.0	0.15
13.1	0.14
13.1	0.13
13.4	0.11
13.6	0.11
13.8	0.10
13.9	0.09
14.1	0.08
14.2	0.07
14.3	0.09
14.3	0.11
14.3	0.13
14.5	0.12
14.7	0.09
15.0	0.09
15.2	0.08
15.5	0.08
15.7	0.08
16.0	0.07
16.2	0.07
16.4	0.07
16.5	0.07
16.7	0.06
17.0	0.06
17.5	0.04
18.0	0.04
18.5	0.02
19.2	0.03
19.3	0.06
19.4	0.09
19.6	0.46
19.7	0.48
20.0	0.79
20.2	0.84
20.4	0.86
20.6	0.87
20.7	0.88
20.9	0.90
21.1	0.90
21.3	0.90
21.5	0.90
21.8	0.88
22.0	0.86
22.2	0.74
22.4	0.56

CURVE 17 (cont.)*

λ	ρ
22.5	0.49
22.7	0.40
23.0	0.33
23.2	0.30
23.4	0.27
23.6	0.24
23.8	0.21
24.0	0.19
24.2	0.15
24.4	0.11
24.5	0.10
24.6	0.09
24.6	0.06
24.7	0.09
24.8	0.24
24.8	0.26
24.9	0.46
25.0	0.50
25.0	0.58
25.1	0.61
25.1	0.67
25.2	0.73
25.3	0.67
25.4	0.61
25.4	0.55
25.6	0.46
25.7	0.41
25.8	0.37
25.8	0.34
26.0	0.32
26.0	0.31
26.2	0.29
26.4	0.27
26.6	0.27
26.8	0.26
27.0	0.25
27.5	0.23
27.9	0.22
28.5	0.21
29.0	0.21
29.5	0.20
30.0	0.19
30.4	0.19
31.0	0.18
32.0	0.18

CURVE 18 T = 297

λ	ρ
5.5	0.02
6.1	0.02
6.5	0.00
7.1	0.00
7.5	0.00
7.6	0.00
7.7	0.02
7.8	0.03
7.9	0.09
8.0	0.20
8.1	0.50
8.2	0.71
8.3	0.81
8.4	0.86
8.4	0.89
8.7	0.89
8.7	0.91
8.9	0.92
9.0	0.92
9.1	0.91
9.2	0.89
9.3	0.78
9.3	0.73
9.4	0.48
9.4	0.46
9.4	0.43
9.5	0.37
9.5	0.35
9.5	0.31
9.7	0.26*
9.8	0.24
9.9	0.21
10.0	0.19
10.1	0.18
10.2	0.17
10.2	0.16
10.4	0.15
10.5	0.14
10.6	0.13
10.7	0.12
10.9	0.11
11.2	0.10
11.4	0.09
11.6	0.09
11.7	0.08
11.8	0.07*

CURVE 18 (cont.)

λ	ρ
11.9	0.08*
12.0	0.06
12.1	0.06
12.2	0.05
12.3	0.04
12.4	0.03
12.5	0.02
12.6	0.04
12.6	0.08
12.7	0.18
12.7	0.22
12.8	0.38
12.8	0.43
12.9	0.43
12.9	0.37
13.0	0.32
13.0	0.22
13.1	0.17
13.2	0.14
13.3	0.12
13.4	0.11
13.5	0.11*
13.7	0.10*
13.7	0.09*
14.0	0.09*
14.3	0.08
14.5	0.08
14.6	0.07
14.7	0.07
14.9	0.06
15.1	0.06
15.3	0.06
15.6	0.05
15.8	0.05
16.0	0.04
16.2	0.04
16.3	0.03
16.6	0.02
16.8	0.02
17.0	0.02
17.2	0.02
17.3	0.02
17.5	0.01
17.6	0.02
17.7	0.02
17.8	0.03
17.9	0.07

CURVE 18 (cont.)

λ	ρ
17.9	0.12
18.1	0.28
18.2	0.55
18.3	0.69
18.4	0.77
18.4	0.81
18.5	0.84
18.8	0.86
18.9	0.87
19.0	0.87
19.1	0.88
19.2	0.90
19.4	0.89
19.5	0.89
19.5	0.85
19.6	0.81
19.6	0.77
19.7	0.79
19.7	0.84
19.8	0.87
20.0	0.86
20.1	0.84
20.1	0.82
20.1	0.78
20.3	0.70
20.3	0.61
20.4	0.54
20.5	0.48
20.5	0.45
20.6	0.41
20.7	0.38
20.8	0.36
20.9	0.34
21.0	0.33
21.1	0.32
21.1	0.31
21.2	0.29
21.4	0.27
21.5	0.26
21.6	0.25
21.7	0.24
21.8	0.23
22.0	0.23
22.2	0.21
22.4	0.19
22.5	0.17
22.8	0.17
23.0	0.15

CURVE 18 (cont.)

λ	ρ
23.2	0.14
23.3	0.13
23.5	0.12
23.8	0.12
24.0	0.11
24.1	0.10
24.3	0.09
24.5	0.08
24.7	0.07
25.0	0.07
25.1	0.07
25.2	0.05
25.3	0.04
25.4	0.04
25.6	0.04
25.7	0.08
25.8	0.13
25.8	0.28
26.0	0.39
26.1	0.56
26.2	0.62
26.3	0.69
26.4	0.70
26.5	0.73
26.6	0.76
26.8	0.77
26.9	0.78
27.1	0.77
27.3	0.74
27.4	0.70
27.5	0.62
27.6	0.57
27.8	0.48
27.9	0.42
28.2	0.39
28.5	0.35
30.1	0.24
31.0	0.22
33.0	0.18
34.0	0.18
35.0	0.17

CURVE 19 T = 293

λ	ρ
7.51	0.008
7.75	0.024

CURVE 19 (cont.)

λ	ρ
7.89	0.050
7.98	0.083
8.03	0.153
8.19	0.589
8.22	0.651
8.28	0.718
8.35	0.766
8.48	0.825
8.52	0.828
8.54	0.822
8.63	0.504
8.67	0.542
8.70	0.755
8.74	0.813
8.79	0.861
8.87	0.894
8.99	0.908
9.11	0.896
9.26	0.858
9.32	0.824
9.35	0.797
9.47	0.505
9.62	0.358
9.75	0.272
9.91	0.227
10.1	0.198
10.4	0.155
10.7	0.130
11.1	0.109
11.5	0.090
11.8	0.068
12.0	0.053
12.1	0.035
12.2	0.018
12.3	0.040
12.4	0.408
12.5	0.422
12.7	0.224
12.8	0.179
13.0	0.143
13.3	0.113
13.6	0.097
14.0	0.080*
14.2	0.069
14.3	0.078
14.4	0.117
14.5	0.107

CURVE 19 (cont.)

λ	ρ
14.8	0.090*
15.0	0.092

CURVE 20 T = 293

λ	ρ
18.4	0.006
18.7	0.002
19.0	0.012
19.2	0.039
19.3	0.079
19.4	0.141
19.7	0.715
19.8	0.762
19.9	0.811
20.1	0.842
20.3	0.874
20.5	0.889
20.9	0.902
21.2	0.907
21.5	0.900
21.6	0.881
21.8	0.841
22.0	0.763
22.3	0.577
22.6	0.460
22.7	0.399
23.0	0.340
23.1	0.307
23.4	0.276

CURVE 21* T = 477

λ	ρ
7.50	0.005
7.80	0.026
7.93	0.061
8.05	0.136
8.09	0.246
8.29	0.625
8.41	0.726
8.47	0.752
8.55	0.751
8.57	0.716
8.60	0.583
8.65	0.578
8.72	0.764

*Not shown on plot

DATA TABLE NO. 134 (continued)

λ	ρ
CURVE 21 (cont.)*	
T = 477	
8.84	0.832
8.94	0.860
9.02	0.866
9.13	0.854
9.28	0.812
9.34	0.767
9.53	0.432
9.75	0.276
9.95	0.227
10.5	0.151
11.1	0.113
11.8	0.073
12.2	0.030
12.3	0.061
12.5	0.280
12.6	0.3[illegible]
12.6	0.260
12.8	0.192
12.9	0.149
13.1	0.133
13.5	0.106
14.0	0.089
14.2	0.076
14.4	0.109
15.0	0.088
CURVE 22*	
T = 493	
19.2	0.009
19.3	0.034
19.5	0.078
19.6	0.150
19.9	0.611
20.0	0.668
20.1	0.718
20.3	0.767
20.6	0.812
21.1	0.838
21.4	0.847
21.6	0.842
21.9	0.802
22.1	0.748
22.4	0.623
22.8	0.426

λ	ρ
CURVE 22 (cont.)*	
23.1	0.350
23.4	0.291
CURVE 23*	
T = 622	
7.60	0.008
7.93	0.048
8.04	0.099
8.12	0.228
8.28	0.521
8.35	0.587
8.49	0.660
8.56	0.672
8.60	0.661
8.67	0.580
8.72	0.678
8.81	0.752
8.95	0.794
9.08	0.807
9.28	0.780
9.41	0.710
9.63	0.376
9.94	0.233
10.1	0.202
10.6	0.145
11.1	0.112
11.8	0.072
12.2	0.036
12.5	0.244
12.6	0.265
13.4	0.108
13.7	0.107
13.8	0.090
14.0	0.093
14.0	0.081
14.4	0.089
14.4	0.082
15.0	0.082
CURVE 24*	
T = 656	
19.3	0.014
19.5	0.050
19.6	0.107

λ	ρ
CURVE 24 (cont.)*	
19.7	0.151
20.0	0.510
20.2	0.621
20.5	0.698
20.7	0.740
20.9	0.764
21.2	0.781
21.5	0.783
21.8	0.769
22.2	0.720
22.3	0.674
22.9	0.448
23.4	0.318
CURVE 25	
T = 795	
7.65	0.005
7.93	0.043
8.08	0.131
8.17	0.272
8.39	0.535
8.48	0.589
8.54	0.602
8.61	0.607
8.66	0.577
8.70	0.643
8.85	0.689
9.03	0.727
9.18	0.739
9.34	0.686
9.44	0.611
9.92	0.247
11.0	0.118
11.8	0.069*
12.2	0.038*
12.5	0.148
12.7	0.219
15.0	0.081
CURVE 26	
T = 831	
19.5	0.018
19.6	0.032
19.7	0.055

λ	ρ
CURVE 26 (cont.)	
19.8	0.078
20.4	0.512
20.5	0.560
20.7	0.616
20.9	0.658
21.2	0.690
21.5	0.707
21.8	0.712
22.2	0.696
22.5	0.660
22.7	0.623
23.0	0.543
23.3	0.460
23.5	0.397
23.8	0.338
24.2	0.296
24.3	0.277
24.6	0.270
CURVE 27*	
T = 851	
19.3	0.013
19.6	0.027
19.8	0.047
19.9	0.082
20.4	0.406
20.5	0.476
20.7	0.534
20.9	0.593
21.1	0.633
21.4	0.668
21.6	0.682
22.0	0.687
22.5	0.665
22.9	0.626
23.1	0.588
23.3	0.558
23.4	0.491
23.7	0.396
23.9	0.352
24.2	0.320
24.4	0.304
24.6	0.301

λ	ρ
CURVE 28*	
T = 862	
19.6	0.017
19.9	0.053
20.0	0.094
20.5	0.391
20.6	0.464
20.7	0.509
20.9	0.551
21.0	0.582
21.2	0.613
21.4	0.634
21.6	0.652
21.8	0.660
22.3	0.660
22.5	0.653
22.8	0.647
23.0	0.629
23.1	0.608
23.3	0.581
23.7	0.495
24.2	0.410
24.6	0.355
CURVE 29*	
T = 887	
7.68	0.008
7.91	0.035
8.12	0.150
8.46	0.521
8.53	0.562
8.60	0.594
8.76	0.632
9.01	0.660
9.18	0.667
9.39	0.610
9.82	0.298
15.0	0.081
CURVE 30*	
T = 1083	
19.6	0.015
19.9	0.046
20.1	0.092
22.0	0.136

λ	ρ
CURVE 30 (cont.)*	
20.4	0.316
20.6	0.413
20.8	0.488
21.1	0.560
21.4	0.606
21.6	0.633
21.9	0.655
22.4	0.661
23.0	0.664
23.2	0.656
23.3	0.635
23.5	0.593
23.8	0.513
24.2	0.421
24.6	0.364
CURVE 31*	
T = 1139	
7.65	0.004
7.89	0.030
8.09	0.108
8.48	0.444
8.61	0.522
8.76	0.581
8.96	0.612
9.19	0.630
9.35	0.606
9.48	0.498
9.58	0.394
12.3	0.028
12.5	0.068
12.8	0.167
15.0	0.081
CURVE 32	
T = 1378	
7.68	0.000*
7.93	0.021
8.20	0.103
8.65	0.455
8.73	0.505
8.83	0.544
8.96	0.569
9.17	0.588

λ	ρ
CURVE 32 (cont.)	
9.39	0.566
9.51	0.522
9.86	0.324
10.1	0.241
10.4	0.187
10.7	0.151
11.0	0.126
11.7	0.085
12.5	0.059
12.7	0.104
12.9	0.161
12.9	0.167
13.6	0.119
14.2	0.096
15.0	0.077
CURVE 33	
T = 1418	
19.6	0.015
19.9	0.038
20.0	0.076
20.2	0.147
20.5	0.290
20.7	0.411
21.0	0.484
21.2	0.549
21.4	0.586
21.6	0.611
21.8	0.629
22.2	0.655
22.6	0.668
22.9	0.667
23.2	0.656
23.3	0.635
23.5	0.593
23.8	0.507
24.2	0.421
24.6	0.364
CURVE 34	
T = 573	
7.72	0.016
7.82	0.050
7.97	0.191

λ	ρ
CURVE 34 (cont.)	
8.16	0.327
8.43	0.486
8.64	0.576
8.85	0.594
9.01	0.578
9.13	0.536
9.51	0.291
9.68	0.227
9.87	0.175
10.2	0.138
10.9	0.095
12.4	0.052
12.8	0.077
13.9	0.061
16.9	0.036
17.9	0.021
18.4	0.031
18.6	0.073
19.3	0.421
19.9	0.599
20.4	0.619
21.0	0.596
22.0	0.356
22.3	0.297
23.0	0.246
24.0	0.202
25.7	0.162
27.2	0.138
28.5	0.124
CURVE 35*	
T = 293	
7.14	0.030
7.64	0.036
7.71	0.043
7.79	0.059
7.84	0.078
7.91	0.124
7.97	0.178
8.00	0.243
8.07	0.466
8.16	0.660
8.28	0.816
8.36	0.874
8.50	0.927

*Not shown on plot

DATA TABLE NO. 134 (continued)

CURVE 35 (cont.)*
T = 293

λ	ρ
8.61	0.927
8.75	0.960
8.91	0.965
9.09	0.945
9.19	0.913
9.28	0.863
9.36	0.641
9.45	0.468
9.52	0.389
9.63	0.332
9.74	0.289
9.87	0.258
10.1	0.222
10.4	0.181
10.8	0.156
11.2	0.134

CURVE 36*
T ~ 100

λ	ρ
7.14	0.000
7.45	0.007
7.65	0.023
7.80	0.042
7.86	0.068
7.92	0.107
7.86	0.164
8.00	0.223
8.09	0.511
8.15	0.637
8.20	0.724
8.26	0.789
8.38	0.858
8.46	0.889
8.63	0.893
8.87	0.925
8.99	0.925
9.12	0.899
9.18	0.879
9.27	0.834
9.30	0.779
9.34	0.676
9.37	0.578
9.42	0.462
9.47	0.395
9.54	0.341

CURVE 36 (cont.)*

λ	ρ
9.62	0.301
9.72	0.265
9.80	0.240
9.91	0.221
10.1	0.199
10.4	0.166
10.8	0.133
11.2	0.101

CURVE 37*
T ~ 14

λ	ρ
7.14	0.000
7.45	0.007
7.65	0.023
7.80	0.042
7.86	0.068
7.92	0.107
7.97	0.164
8.00	0.223
8.09	0.511
8.15	0.637
8.19	0.690
8.3[illegible]	0.773
8.41	0.836
8.47	0.861
8.54	0.868
8.64	0.871
8.99	0.897
9.12	0.899
9.18	0.879
9.27	0.834
9.30	0.779
9.34	0.676
9.37	0.578
9.42	0.462
9.47	0.395
9.54	0.341
9.62	0.301
9.72	0.265
9.80	0.240
9.91	0.221
10.1	0.199
10.4	0.166
10.8	0.133
11.2	0.101

CURVE 38*
T = 293

λ	ρ
11.1	0.138
12.2	0.088
12.4	0.067
12.6	0.053
12.6	0.080
12.7	0.315
12.8	0.509
12.8	0.503
13.0	0.353
13.0	0.288
13.0	0.248
13.1	0.210
13.3	0.181
13.6	0.139
14.0	0.117
14.8	0.090
15.7	0.075
16.7	0.035
17.2	0.000
17.6	0.000
17.9	0.043
18.0	0.085
18.2	0.676
18.3	0.726
18.6	0.802
19.1	0.865
19.4	0.817
19.6	0.750
19.8	0.829
20.6	0.401
20.9	0.345
21.5	0.266
22.4	0.208
23.5	0.153
24.7	0.065
24.9	0.105
25.3	0.144
25.8	0.157
26.2	0.514
26.6	0.610
27.0	0.642
27.2	0.637
27.9	0.420
28.3	0.368
28.9	0.317
29.9	0.262

CURVE 38 (cont.)*

λ	ρ
30.9	0.238
31.7	0.228
32.8	0.223

CURVE 39*
T ~ 100

λ	ρ
11.1	0.113
12.0	0.067
12.2	0.044
12.5	0.000
12.6	0.000
12.6	0.057
12.7	0.495
12.8	0.636
12.9	0.496
13.0	0.338
13.0	0.272
13.1	0.217
13.2	0.178
13.4	0.146
13.7	0.124
14.1	0.106
15.6	0.076
16.5	0.045
16.7	0.035
17.2	0.000
17.5	0.000
17.7	0.048
17.8	0.110
18.1	0.789
18.1	0.831
18.5	0.909
18.8	0.951
19.2	0.965
19.3	0.958
19.5	0.581
19.7	0.879
19.8	0.900
20.3	0.502
20.5	0.396
20.9	0.326
21.7	0.231
22.4	0.172
23.0	0.142
23.8	0.116
24.2	0.085

CURVE 39 (cont.)*

λ	ρ
24.4	0.055
24.8	0.055
24.9	0.155
25.2	0.189
25.4	0.196
25.8	0.196
26.1	0.603
26.5	0.710
27.0	0.746
27.4	0.721
27.9	0.490
28.2	0.401
28.9	0.312
30.4	0.254
31.2	0.236
31.7	0.230
32.6	0.230

CURVE 40*
T ~ 14

λ	ρ
11.1	0.113
12.0	0.067
12.2	0.044
12.5	0.000
12.6	0.000
12.6	0.057
12.7	0.495
12.8	0.636
12.9	0.496
13.0	0.338
13.0	0.272
13.1	0.217
13.2	0.173
13.4	0.146
13.7	0.124
14.1	0.106
15.6	0.076
16.5	0.045
16.7	0.035
17.2	0.000
17.5	0.000
17.7	0.046
17.8	0.110
18.1	0.789
18.3	0.851
18.7	0.911

CURVE 40 (cont.)*

λ	ρ
19.2	0.944
19.3	0.914
19.5	0.581
19.7	0.865
19.8	0.838
20.3	0.468
20.5	0.418
20.9	0.326
21.7	0.231
22.4	0.172
23.0	0.142
23.8	0.116
24.2	0.085
24.4	0.055
24.8	0.055
24.9	0.144
25.3	0.165
25.8	0.157
26.1	0.584
26.4	0.704
26.9	0.755
27.2	0.753
27.4	0.737
27.6	0.641
27.9	0.490
28.2	0.401
28.9	0.336
29.8	0.285
30.9	0.249
31.8	0.239
32.6	0.230

CURVE 41*
T = 293

λ	ρ
6.67	0.030
7.20	0.026
7.43	0.029
7.66	0.037
7.82	0.073
7.94	0.141
8.18	0.742
8.26	0.833
8.33	0.882
8.41	0.914
8.53	0.932
8.58	0.917

CURVE 41 (cont.)*

λ	ρ
8.61	0.943
8.68	0.957
8.87	0.969
9.07	0.950
9.20	0.889
9.47	0.430
9.59	0.353
9.76	0.290
9.96	0.240
10.2	0.208
10.6	0.178
11.4	0.132
12.2	0.092
12.5	0.054
12.7	0.503
13.1	0.218
13.3	0.176
13.7	0.133
15.4	0.089
16.3	0.056
17.3	0.000
17.5	0.000
17.9	0.053
18.3	0.791
19.0	0.867
19.5	0.716
19.6	0.832
20.8	0.361
21.6	0.246
23.7	0.137
24.6	0.073
25.0	0.168
25.6	0.150
26.2	0.576
26.5	0.629
27.0	0.644
29.1	0.297
30.1	0.251

CURVE 42*
T ~ 100

λ	ρ
6.67	0.017
7.45	0.017
7.65	0.030
7.73	0.042
7.81	0.056

CURVE 42 (cont.)*

λ	ρ
7.86	0.072
7.96	0.141
8.15	0.685
8.24	0.787
8.40	0.887
8.49	0.903
8.55	0.903
8.60	0.884
8.68	0.919
8.78	0.934
8.92	0.934
9.10	0.916
9.19	0.880
9.31	0.757
9.41	0.498
9.55	0.354
9.78	0.259
10.0	0.216
10.4	0.170
11.4	0.118
12.0	0.074
12.4	0.036
12.5	0.014
12.7	0.034
12.7	0.695
13.2	0.224
13.3	0.168
13.7	0.134
14.3	0.111
15.3	0.089
16.4	0.056
17.4	0.000
17.7	0.020
18.0	0.524
18.3	0.899
19.0	0.972
19.3	0.972
19.6	0.686
19.8	0.903
20.9	0.349
22.0	0.203
23.0	0.142
24.0	0.113
24.6	0.053
25.3	0.193
25.7	0.206
26.6	0.734

*Not shown on plot

DATA TABLE NO. 134 (continued)

CURVE 42 (cont.)*
T ~ 100

λ	ρ
27.2	0.749
28.5	0.369
29.5	0.296
30.6	0.254

CURVE 43*
T = 293

λ	ρ
7.14	0.013
7.65	0.013
7.79	0.029
7.87	0.051
7.98	0.101
8.03	0.172
7.98	0.338
8.14	0.624
8.19	0.746
8.30	0.847
8.45	0.923
8.50	0.903
8.55	0.818
8.59	0.471
8.63	0.601
8.67	0.844
8.73	0.947
8.81	0.989
8.89	1.00
9.04	1.00
9.25	0.969
9.32	0.927
9.37	0.842
9.43	0.610
9.50	0.500
9.55	0.429
9.65	0.357
9.75	0.307
9.87	0.263
10.2	0.198
10.5	0.161
11.9	0.072

CURVE 44*
T ~ 100

λ	ρ
7.68	0.013
7.84	0.021
7.92	0.044
7.97	0.084
8.03	0.222
8.12	0.629
8.18	0.743
8.32	0.844
8.39	0.868
8.49	0.880
8.53	0.846
8.56	0.704
8.59	0.305
8.61	0.218
8.64	0.696
8.67	0.813
8.72	0.875
8.77	0.918
8.83	0.939
8.90	0.942
9.05	0.923
9.12	0.911
9.23	0.907
9.28	0.897
9.30	0.875
9.35	0.785
9.42	0.587
9.47	0.478
9.52	0.406
9.60	0.339
9.67	0.289
9.76	0.247
9.85	0.215
10.0	0.182
10.2	0.153
10.4	0.130
10.8	0.098
11.4	0.063
11.9	0.028

CURVE 45*
T ~ 14

λ	ρ
7.68	0.013
7.84	0.021

CURVE 45 (cont.)*

λ	ρ
7.92	0.044
7.97	0.084
8.03	0.222
8.12	0.629
8.18	0.743
8.32	0.844
8.39	0.868
8.49	0.880
8.53	0.846
8.56	0.704
8.59	0.305
8.61	0.218
8.64	0.696
8.67	0.813
8.72	0.898
8.77	0.941
8.83	0.968
8.90	0.976
9.05	0.951
9.13	0.940
9.23	0.932
9.28	0.916
9.30	0.875
9.35	0.785
9.42	0.587
9.47	0.478
9.52	0.406
9.60	0.339
9.67	0.289
9.76	0.247
9.85	0.215
10.0	0.182
10.2	0.153
10.4	0.130
10.8	0.098
11.4	0.063
11.9	0.028

CURVE 46*
T = 293

λ	ρ
11.1	0.119
11.8	0.083
12.0	0.060
12.3	0.000
12.5	0.483

CURVE 46 (cont.)*

λ	ρ
12.5	0.524
12.5	0.471
12.6	0.332
12.7	0.249
12.8	0.207
13.2	0.144
14.2	0.070
14.4	0.116
14.5	0.160
15.1	0.108
16.5	0.052
18.7	0.000
19.1	0.016
19.3	0.056
19.6	0.385
19.8	0.628
20.1	0.702
20.6	0.750
21.2	0.765
21.8	0.724
22.1	0.659
22.3	0.465
22.7	0.347
23.6	0.203
24.4	0.074
24.6	0.015
25.0	0.739
25.4	0.418
26.3	0.240
26.9	0.195
27.9	0.175
31.2	0.153
33.2	0.153

CURVE 47*
T ~ 100

λ	ρ
11.1	0.078
11.6	0.052
11.9	0.026
12.1	0.000
12.3	0.000
12.4	0.416
12.5	0.605
12.5	0.512
12.6	0.247

CURVE 47 (cont.)*

λ	ρ
12.7	0.160
12.8	0.126
13.0	0.104
13.3	0.089
13.7	0.076
13.9	0.061
14.1	0.045
14.2	0.000
14.2	0.030
14.3	0.237
14.4	0.110
14.5	0.088
14.9	0.065
15.3	0.047
16.8	0.027
17.8	0.000
17.9	0.269
18.0	0.000
18.9	0.000
19.1	0.043
19.2	0.101
19.4	0.311
19.7	0.737
19.8	0.763
20.1	0.758
20.5	0.763
21.0	0.776
21.3	0.776
21.6	0.761
21.9	0.725
22.1	0.681
22.4	0.419
23.0	0.241
23.5	0.181
24.2	0.102
24.6	0.015
25.0	0.739
25.4	0.418
26.1	0.246
26.5	0.202
27.2	0.175
29.5	0.166
32.3	0.181

CURVE 48*
T ~ 14

λ	ρ
11.1	0.078
11.6	0.052
11.9	0.026
12.1	0.000
12.3	0.000
12.4	0.416
12.5	0.605
12.5	0.512
12.6	0.247
12.7	0.160
12.8	0.126
13.0	0.104
13.3	0.089
13.7	0.076
13.9	0.061
14.1	0.045
14.2	0.000
14.2	0.030
14.3	0.237
14.4	0.110
14.5	0.088
14.9	0.065
15.3	0.047
16.8	0.027
17.8	0.000
17.9	0.269
18.0	0.000
18.9	0.000
19.1	0.043
19.2	0.101
19.4	0.311
19.7	0.737
19.8	0.781
20.3	0.781
20.5	0.781
20.9	0.790
21.4	0.790
21.8	0.769
21.9	0.725
22.1	0.681
22.4	0.419
23.0	0.241
23.5	0.181
24.2	0.102
24.6	0.015

CURVE 48 (cont.)*

λ	ρ
25.0	0.739
25.4	0.418
26.1	0.246
26.5	0.202
27.2	0.175
29.5	0.166
32.3	0.181

CURVE 49*
T = 293

λ	ρ
6.67	0.022
7.61	0.010
7.81	0.033
7.88	0.054
7.95	0.074
8.01	0.124
8.20	0.737
8.29	0.812
8.46	0.902
8.55	0.821
8.60	0.468
8.69	0.908
8.82	0.976
8.90	0.985
9.25	0.949
9.30	0.922
9.51	0.465
9.63	0.360
9.78	0.297
9.97	0.240
10.3	0.191
10.6	0.154
11.3	0.109
11.8	0.083
12.3	0.022
12.5	0.513
12.6	0.266
12.8	0.209
12.9	0.181
13.6	0.113
14.3	0.065
14.4	0.147
15.2	0.103
16.8	0.048
18.2	0.018

CURVE 49 (cont.)*

λ	ρ
18.9	0.011
19.1	0.023
19.7	0.643
20.2	0.713
20.7	0.737
21.1	0.752
21.9	0.684
22.8	0.299
24.6	0.053
25.1	0.585
26.0	0.245
26.7	0.198
27.6	0.173
29.2	0.159
30.4	0.159

CURVE 50*
T ~ 100

λ	ρ
6.67	0.009
7.64	0.000
7.82	0.013
7.91	0.026
7.97	0.084
8.04	0.161
8.12	0.613
8.21	0.753
8.28	0.824
8.37	0.852
8.49	0.863
8.53	0.826
8.61	0.306
8.66	0.797
8.72	0.867
8.78	0.910
8.86	0.923
9.01	0.913
9.05	0.899
9.23	0.886
9.45	0.486
9.58	0.331
9.76	0.239
9.95	0.185
10.2	0.151
10.6	0.117
11.5	0.061

* Not shown on plot

DATA TABLE NO. 134 (continued)

λ	ρ
CURVE 50 (cont.)* T ~ 100	
12.2	0.010
12.3	0.021
12.4	0.606
12.7	0.191
12.8	0.131
13.1	0.101
13.7	0.081
13.9	0.054
14.2	0.024
14.2	0.198
14.5	0.088
14.9	0.060
15.7	0.041
17.5	0.021
18.1	0.000
18.6	0.000
19.2	0.099
19.8	0.750
20.2	0.748
20.9	0.767
21.8	0.728
23.2	0.211
24.2	0.100
24.6	0.018
25.3	0.646
26.2	0.244
26.6	0.189
27.2	0.174
28.3	0.162
29.2	0.162
30.2	0.171

*Not shown on plot

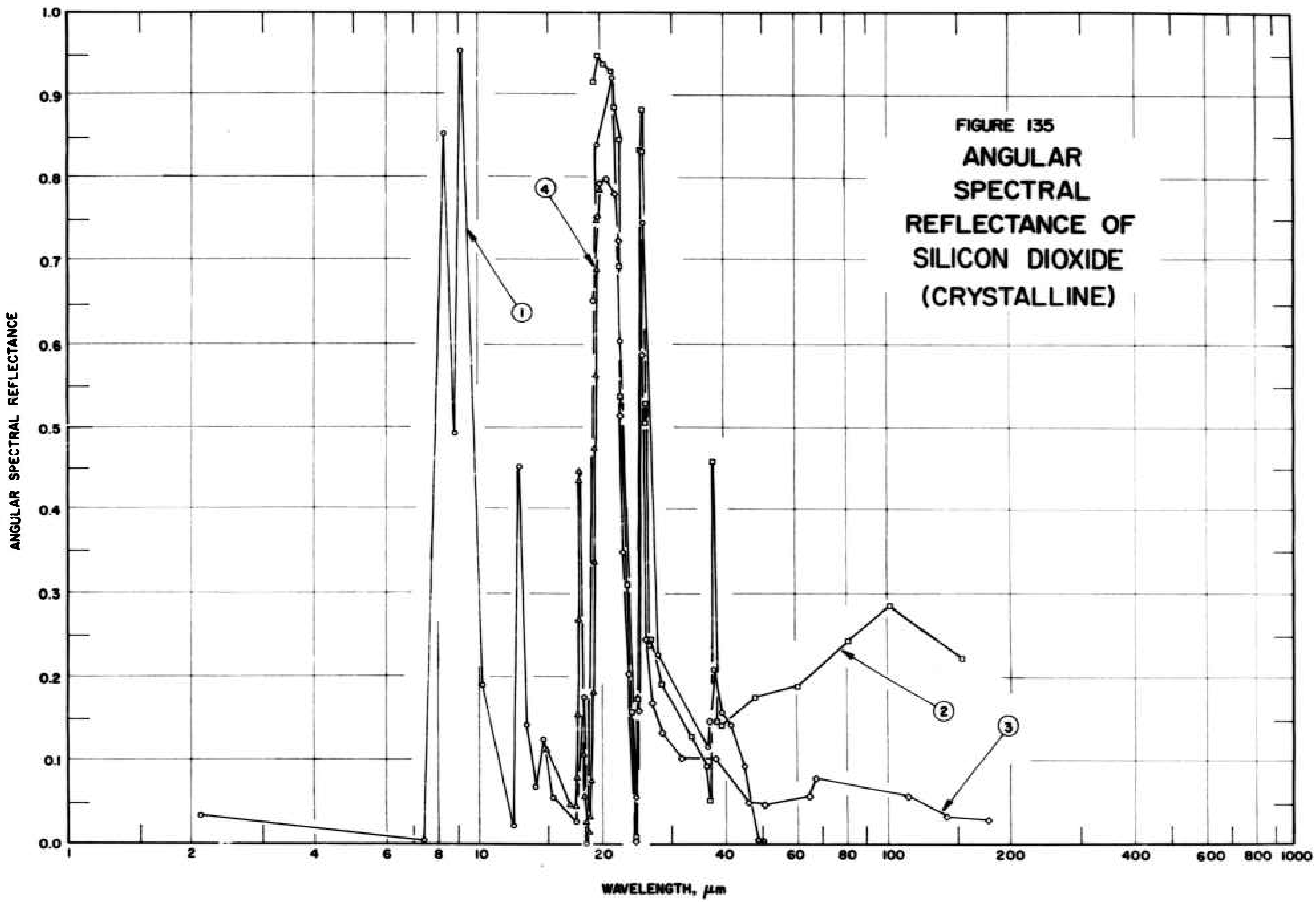


FIGURE 135
ANGULAR
SPECTRAL
REFLECTANCE OF
SILICON DIOXIDE
(CRYSTALLINE)
ANGULAR SPECTRAL REFLECTANCE
WAVELENGTH, μm
1.0
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0.0
1
2
4
6
8
10
20
40
60
80
100
200
400
600
800
1000
1
2
3
4

SPECIFICATION TABLE NO. ~~105~~ 136 ANGULAR SPECTRAL REFLECTANCE OF SILICON DIOXIDE (Crystalline) SiO_2

Curve No.	Ref. No.	Year	Temperature K	Wavelength, μm	Angular Range	Geometry θ	Geometry θ'	Geometry ω'	Reported Error, %	Composition (weight percent), Specifications and Remarks
1*	215	1961	298	0.49	0-70	θ		2π	<6	Quartz plate.
2*	230	1968	~298	0.214	10.0-83.3	θ	θ			Quartz semicylinder, radius 2.54 cm; reflectance measured for incident beam internally reflected from flat face; $\theta = \theta'$; measured in vacuum; data extracted from smooth curve.
3*	231	1968	298	0.2537	13.5-91.4	θ	θ			Suprasil-quartz; measured in vacuum; $\theta = \theta'$; $\phi = 0°$, $\phi' = 180°$.
4*	231	1968	298	0.2537	8.9-86.9	θ	θ			Above specimen and conditions except $\phi = 180°$, $\phi' = 0°$.

DATA TABLE NO. ~~135~~ 136 ANGULAR SPECTRAL REFLECTANCE OF SILICON DIOXIDE (Crystalline) SiO_2

[Angle, ~~τ~~ θ, °; Reflectance, ρ; Temperature, T, K; Wavelength, λ, μm]

CURVE 1* T = 298, λ = 0.49

θ	ρ
0	0.070
10	0.070
20	0.070
30	0.075
40	0.085
50	0.110
55	0.125
60	0.160
65	0.220
70	0.290

CURVE 2* T ~ 298, λ = 0.214

θ	ρ
10.0	0.104
26.0	0.114
31.3	0.125
34.0	0.145
36.1	0.171
37.7	0.212
39.9	0.306

CURVE 2 (cont.)*

θ	ρ
41.7	0.467
42.6	0.702
43.1	1.00
83.3	1.00

CURVE 3* T = 298, λ = 0.2537

θ	ρ
13.5	0.000
14.6	0.038
32.6	0.050
36.5	0.065
39.7	0.125
41.6	0.200
42.3	0.269
44.3	0.957
44.9	0.975
59.6	0.974
74.0	0.981
89.9	0.963
91.4	0.418

CURVE 4* T = 298, λ = 0.2537

θ	ρ
8.9	0.000
10.1	0.040
28.9	0.053
36.2	0.090
38.8	0.142
40.8	0.271
42.7	0.986
55.3	0.990
72.1	0.990
85.7	0.986
86.9	0.660

*No plot given

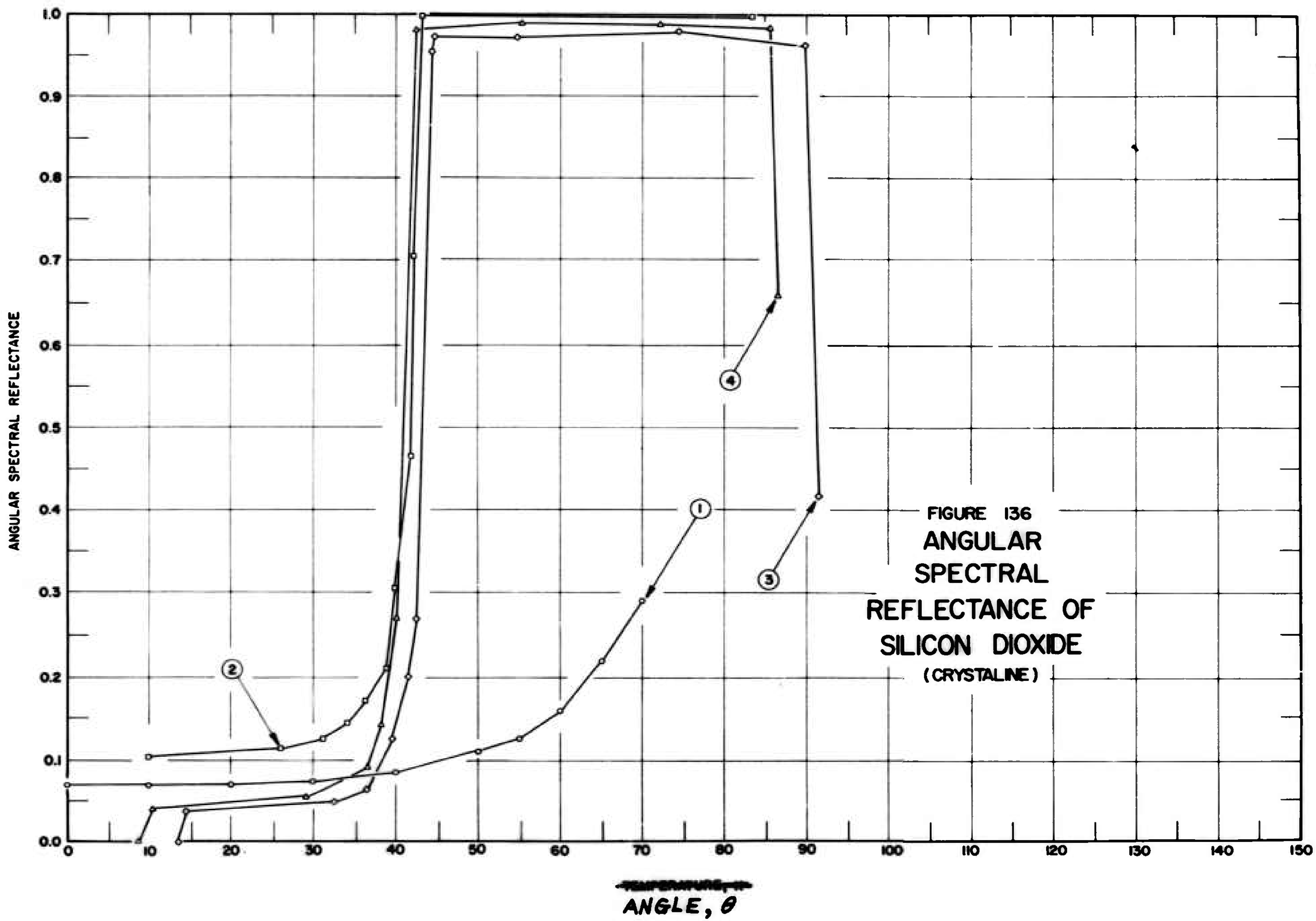


FIGURE 136
ANGULAR
SPECTRAL
REFLECTANCE OF
SILICON DIOXIDE
(CRYSTALINE)

SPECIFICATION TABLE NO. ~~400~~ 135 ANGULAR SPECTRAL REFLECTANCE OF SILICON DIOXIDE (Crystalline) SiO_2

Curve No.	Ref. No.	Year	Temperature K	Wavelength Range, μm	Geometry θ	θ'	ω	Reported Error, %	Composition (weight percent), Specifications, and Remarks
1	67	1963	~298	2.10-50	30°	30°			Quartz (1 cm thick); data extracted from smooth curve; aluminum mirror reference standard.
2	141	1964	6.5	19.4-151	45°	45°		± 5	Z-cut quartz; optic axis is perpendicular to the plane of the crystal to minimize polarization effects; data extracted from smooth curve.
3	141	1964	298	19.4-178	45°	45°		± 5	Above specimen and conditions.
4	229	1966	6.5	14.7-20.0	45°	45°			Z-cut quartz; data extracted from smooth curve.

DATA TABLE NO. ~~136~~ 135 ANGULAR SPECTRAL REFLECTANCE OF SILICON DIOXIDE (Crystalline) SiO_2

[Wavelength, λ, μm; Reflectance, ρ; Temperature, T, K]

CURVE 1
T ~ 298

λ	ρ
2.10	0.034
7.40	0.002
8.30	0.853
8.80	0.498
9.10	0.952
10.2	0.199
12.4	0.021
12.6	0.451
13.1	0.142
13.9	0.068
14.5	0.127
15.3	0.055
17.5	0.028
18.1	0.175
18.5	0.000
19.8	0.840
21.5	0.920
22.4	0.604
24.5	0.057
25.2	0.746
27.5	0.227
36.8	0.116
37.6	0.210

CURVE 1 (cont.)

λ	ρ
39.9	0.156
41.9	0.143
45.0	0.091
48.5	0.002
50.0	0.001

CURVE 2
T = 6.5

λ	ρ
19.4	0.915
19.9	0.949
20.4	0.936
21.4	0.928
21.9	0.887
22.1	0.847
22.1	0.694
22.4	0.536
23.1	0.310
23.9	0.159
24.5	0.008
24.6	0.173
25.0	0.834
25.2	0.884
25.3	0.831

CURVE 2 (cont.)

λ	ρ
25.7	0.506
25.8	0.529
26.2	0.238
26.5	0.244
28.4	0.190
33.3	0.130
36.2	0.091
37.0	0.051
37.5	0.459
38.4	0.149
39.6	0.142
47.8	0.175
60.2	0.189
80.6	0.244
102	0.287
151	0.223

CURVE 3
T = 298

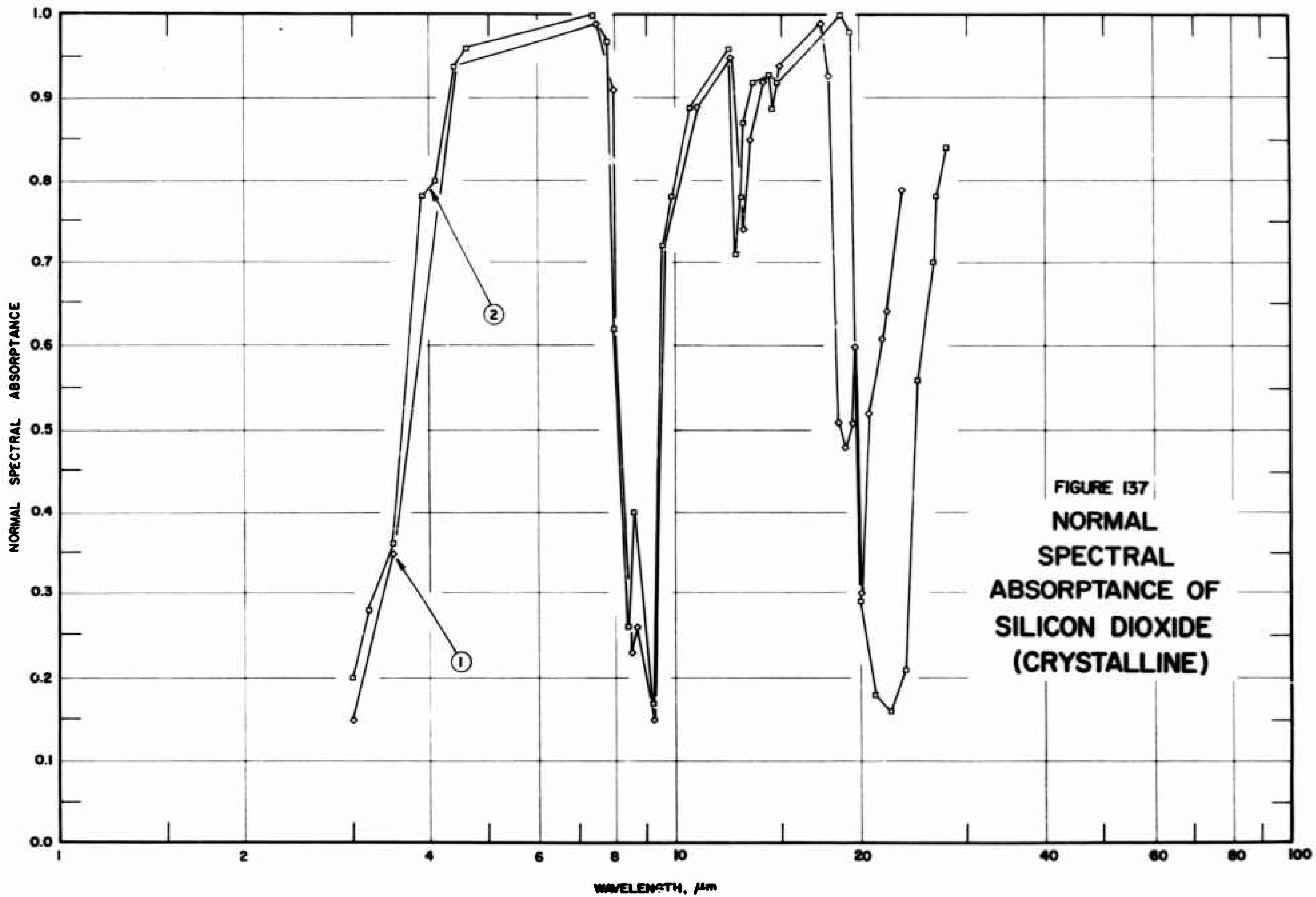
λ	ρ
19.4	0.654
19.7	0.751
20.0	0.793
20.7	0.799

CURVE 3 (cont.)

λ	ρ
21.7	0.781
22.1	0.722
22.3	0.515
22.7	0.347
23.4	0.204
24.5	0.001
24.8	0.160
25.1	0.589
25.8	0.244
26.6	0.169
28.2	0.133
31.4	0.102
37.0	0.046
38.1	0.101
46.0	0.050
50.5	0.046
64.9	0.057
86.2	0.079
112	0.057
140	0.033
178	0.030

CURVE 4
T = 6.5

λ	ρ
14.7	0.114
16.9	0.048
17.4	0.045
17.5	0.079
17.6	0.153
17.7	0.269
17.8	0.446
17.8	0.434
18.1	0.107
18.2	0.057
18.3	0.027
18.6	0.013
18.8	0.032
19.0	0.075
19.1	0.180
19.2	0.336
19.3	0.474
19.5	0.562
19.6	0.690
19.7	0.748
20.0	0.787


1.0
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0.0
NORMAL SPECTRAL ABSORPTANCE
1
2
4
6
8
10
20
40
60
80
100
WAVELENGTH, μm
1
2
FIGURE 137
NORMAL
SPECTRAL
ABSORPTANCE OF
SILICON DIOXIDE
(CRYSTALLINE)

SPECIFICATION TABLE NO. 137 NORMAL SPECTRAL ABSORPTANCE OF SILICON DIOXIDE (Crystalline) SiO_2

Curve No.	Ref. No.	Year	Temperature K	Wavelength Range, μm	Geometry θ	Reported Error, %	Composition (weight percent), Specifications, and Remarks
1	68	1963	373	3.00-23.5	0°		X-cut crystalline quartz (optic axis parallel to the surface); measured for extraordinary ray (the optic axis parallel to the plane of polarization).
2	68	1963	373	3.00-23.9	0°		X-cut crystalline quartz (optic axis parallel to the surface); measured for ordinary ray (the optic axis perpendicular to the plane of polarization).

DATA TABLE NO. 137 NORMAL SPECTRAL ABSORPTANCE OF SILICON DIOXIDE (Crystalline) SiO_2

[Wavelength, λ, μm; Absorptance, α; Temperature, T, K]

λ	α	λ	α	λ	α
CURVE 1		CURVE 1 (cont.)		CURVE 2 (cont.)	
T = 373		19.5	0.51	9.20	0.17
3.00	0.15	19.6	0.60	9.60	0.72
3.50	0.35	20.1	0.30	9.90	0.78
4.40	0.94*	20.7	0.52	10.6	0.89
7.50	0.99	21.9	0.61	12.3	0.96
8.00	0.91	22.1	0.64	12.6	0.71
8.00	0.62*	23.5	0.79	12.8	0.78
8.50	0.23			13.0	0.87
8.70	0.26	CURVE 2		13.5	0.92
9.20	0.15	T = 373		14.2	0.93
9.60	0.72*			14.5	0.89
10.9	0.89	3.00	0.20	14.7	0.92
12.4	0.95	3.20	0.28	18.7	1.00
13.0	0.74	3.50	0.36	19.4	0.98
13.3	0.85	3.90	0.78	20.1	0.29
14.0	0.92	4.10	0.80	20.6	0.18
14.4	0.93*	4.40	0.94	21.2	0.16
14.7	0.92*	4.60	0.96	21.9	0.21
14.9	0.94	7.40	1.00	22.5	0.56
17.4	0.99	7.80	0.97	23.2	0.70
17.9	0.93	8.00	0.62	23.4	0.78
18.5	0.51	8.40	0.26	23.9	0.84
19.0	0.48	8.60	0.40		

* Not shown on plot

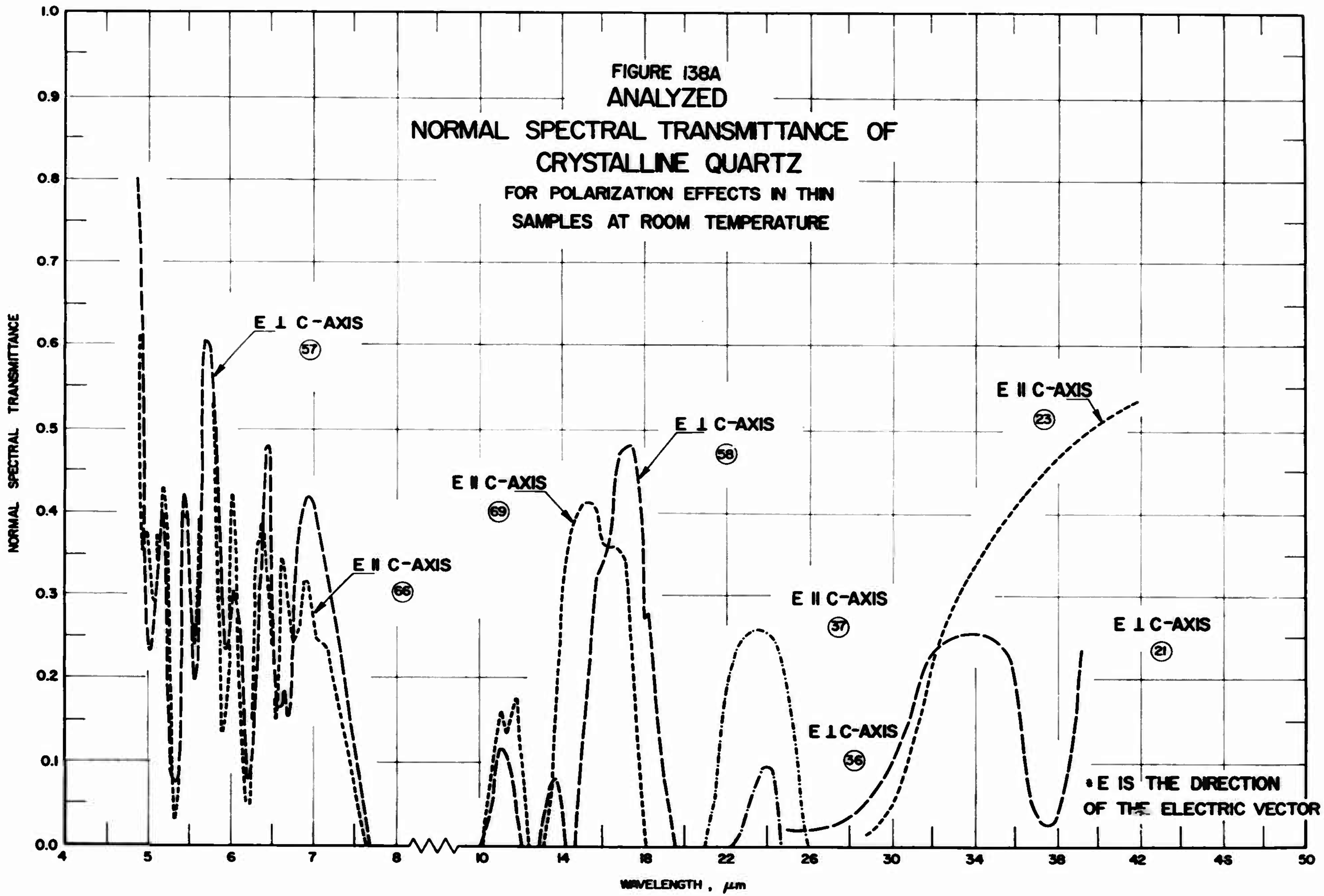


FIGURE 138A
ANALYZED
NORMAL SPECTRAL TRANSMITTANCE OF
CRYSTALLINE QUARTZ
FOR POLARIZATION EFFECTS IN THIN
SAMPLES AT ROOM TEMPERATURE

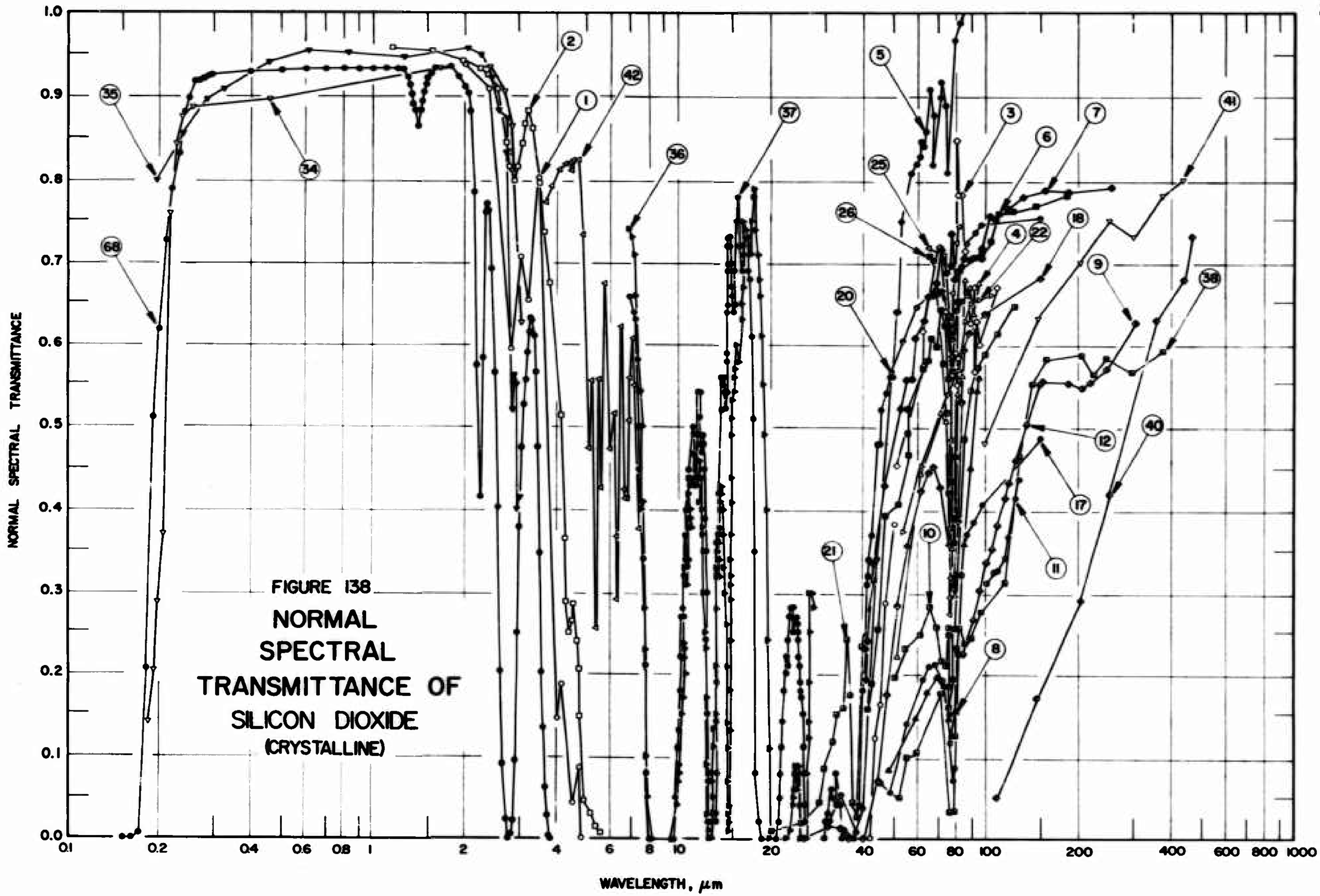


FIGURE 138
NORMAL SPECTRAL TRANSMITTANCE OF SILICON DIOXIDE (CRYSTALLINE)

SPECIFICATION TABLE NO. 138 NORMAL SPECTRAL TRANSMITTANCE OF SILICON DIOXIDE (Crystalline) SiO_2

Curve No.	Ref. No.	Year	Temperature K	Wavelength Range, μm	Geometry θ	θ'	ω'	Reported Error, %	Composition (weight percent), Specifications, and Remarks
1	67	1963	~298	2.00-50.0	0°	0°			Quartz (1 cm thick); data extracted from smooth curve.
2	294	1906	~298	1.14-5.51	~0°	~0°			Quartz crystal (1.30 mm thick).
3	71	1963	298	50.4-95.1	0°	0°		±12	Crystal quartz (0.52 mm thick); cut perpendicularly to the axis.
4	71	1963	298	50.4-95.1	0°	0°		±16	Crystal quartz (1.65 mm thick); cut perpendicularly to the axis.
5	195	1966	1.5	29.8-107	~0°	~0°			6 mm thick slug of crystalline quartz; wedged and sooted.
6	196	1962	298	41.1-240	0°	0°			Brazilian quartz crystal (1.03 mm thick); specimen surface parallel to the optic axis in the plane of (1010); measured for ordinary ray (electric field perpendicular to optic axis).
7	196	1962	298	40.9-253	0°	0°			Above specimen and conditions except measured for extraordinary ray (electric field parallel to optic axis).
8	232	1966	300	48.7-95.2	0°	0°			Synthetic crystalline quartz; 99.983 pure (major impurities: Na_2O and Al_2O_3); 5 mm thick; specimen cut perpendicular to the optic axis (Z-cut); data extracted from smooth curve.
9	232	1966	300	153-301	0°	0°			Similar to the above specimen and conditions except 10 mm thick.
10	232	1966	123	50.0-124	0°	0°			Above specimen and conditions.
11	232	1966	300	100-128.5	0°	0°			Synthetic crystalline quartz; 99.983 pure (major impurities: Na_2O and Al_2O_3); 10 mm thick; specimen cut parallel to the optic axis of the crystal (X-cut); measured with E vector perpendicular to the optic axis; data extracted from smooth curve.
12	232	1966	300	84.9-150	0°	0°			Above specimen and conditions except measured with E vector parallel to the optic axis.
13*	232	1966	300	101-256	0°	0°			Synthetic crystalline quartz; 99.983 pure (major impurities: Na_2O and Al_2O_3); 0.258 mm thick; specimen cut perpendicular to the optic axis (Z-cut); data extracted from smooth curve.
14*	232	1966	123	114-151	0°	0°			Above specimen and conditions.
15*	232	1966	300	166-238	0°	0°			Synthetic crystalline quartz; 99.983 pure (major impurities: Na_2O and Al_2O_3); 0.255 mm thick; specimen cut parallel to the optic axis (X-cut); measured with E vector perpendicular to the optic axis of the crystal; data extracted from smooth curve.
16*	232	1966	300	166-234	0°	0°			Above specimen and conditions except measured with E vector parallel to the optic axis of the crystal.
17	226	1967	300	48.6-150	~0°	~0°			α-quartz plate from Madagascar (4 mm thick); electric vector E perpendicular to c-axis; data extracted from smooth curve.
18	226	1967	300	25.5-150	~0°	~0°			Similar to the above specimen and conditions except 2 mm thick.
19*	226	1967	300	25.5-150	~0°	~0°			Similar to the above specimen and conditions except 1 mm thick.
20	226	1967	300	25.5-150	~0°	~0°			Similar to the above specimen and conditions except 0.5 mm thick.

*Not shown on plot

SPECIFICATION TABLE NO. 138 (continued)

Curve No.	Ref. No.	Year	Temperature K	Wavelength Range, μm	Geometry θ θ' ω'	Reported Error, %	Composition (weight percent), Specifications, and Remarks
21	226	1967	300	20.0-40.3	~0° ~0°		Similar to the above specimen and conditions except 225 μm thick.
22	226	1967	300	53.7-103	~0° ~0°		α-quartz plate from Madagascar (2 mm thick); electric vector E parallel to c-axis; data extracted from smooth curve.
23*	226	1967	300	23.7-41.7	~0° ~0°		Similar to the above specimen and conditions except 225 μm thick.
24*	226	1967	300	65.2-81.8	~0° ~0°		α-quartz plate (2 mm thick); electric vector E perpendicular to c-axis; data extracted from smooth curve.
25	226	1967	4.2	65.2-81.7	~0° ~0°		Above specimen and conditions.
26	226	1967	77	65.2-82.1	~0° ~0°		Above specimen and conditions.
27*	226	1967	300	26.4-49.9	~0° ~0°		α-quartz plate (230 μm thick); electric vector E perpendicular to c-axis; data extracted from smooth curve.
28*	226	1967	77	20.0-49.9	~0° ~0°		Above specimen and conditions.
29*	226	1967	4.2	20.0-49.9	~0° ~0°		Above specimen and conditions.
30*	226	1967	300	25.6-152	~0° ~0°		Powdered α-cristobalite dispersed in paraffin at 300 K; electric vector E perpendicular to c-axis; data extracted from smooth curve.
31*	226	1967	300	5.3-40.0	~0° ~0°		Powdered α-cristobalite dispersed in KBr at 300 K; electric vector E perpendicular to c-axis; data extracted from smooth curve.
32*	226	1967	300	25.2-148	~0° ~0°		Powdered α-tridymite dispersed in paraffin at 300 K; data extracted from smooth curve.
33*	226	1967	300	5.30-39.3	~0° ~0°		Powdered α-tridymite dispersed in KBr at 300 K; data extracted from smooth curve.
34	94	1967	298	0.182-3.00	~0° ~0°	± 2	Natural quartz of unknown origin (1.0 mm thick); single crystal; polished; data extracted from smooth curve.
35	94	1967	298	0.196-3.00	~0° ~0°	± 2	Synthetic quartz (6.35 mm thick); single crystal; polished; data extracted from smooth curve.
36	455	1961	297	6.86-27.03	~0° ~0°		Natural α-quartz (26 ± 1.2 μm thick); X-cut (optic axis parallel to specimen surface); incident radiation polarized perpendicular to the optic axis.
37	455	1961	297	6.92-26.07	~0° ~0°		Above specimen and conditions except incident radiation polarized parallel to the optic axis.
38	234	1961	293	45.3-371	0° 0°	± 5	Crystalline plate (5 mm thick); cut perpendicular to the optical axis.
39*	234	1961	98	45.4-365	0° 0°	± 5	Above specimen and conditions.
40	292	1950	~298	107-462	~0° ~0°		Crystal quartz (40 mm thick).
41	292	1950	~298	99-538	~0° ~0°		Crystal quartz (4.55 mm thick).
42	385	1965	~298	3.70-7.40	~0° ~0°		α-quartz ($32 \pm 2 \times 10^{-3}$ mm thick); not polished; crystalline plate cut parallel to the optic axis; data extracted from smooth curve.
43*	385	1965	~298	7.14-20.0	~0° ~0°		Above specimen and conditions.
44*	385	1965	~298	17.9-58.5	~0° ~0°		Above specimen and conditions.

*Not shown on plot

SPECIFICATION TABLE NO. 138 (continued)

Curve No.	Ref. No.	Year	Temperature K	Wavelength Range, µm	Geometry θ	θ'	ω'	Reported Error, %	Composition (weight percent), Specifications, and Remarks
45*	385	1965	~298	58.8-103	~0°	~0°			Above specimen and conditions.
46*	385	1965	~298	102-200	~0°	~0°			Above specimen and conditions.
47*	219	1963	298	8.11-10.7	~0°	~0°			Quartz.
48*	131	1965	293	14.3-40.0	~0°	~0°			20 mg ground natural quartz in 2 gram polyethylene binder; data extracted from smooth curve.
49*	131	1965	293	5.00-6.64	~0°	~0°			Above specimen and conditions.
50*	131	1965	293	6.94-11.9	~0°	~0°			Above specimen and conditions.
51*	131	1965	293	14.3-39.9	~0°	~0°			Similar to the above specimen and conditions except 50 mg quartz suspended in the binder.
52*	131	1965	293	5.00-6.67	~0°	~0°			Above specimen and conditions.
53*	131	1965	293	6.88-15.3	~0°	~0°			Above specimen and conditions.
54*	131	1965	293	14.3-40	~0°	~0°			Similar to the above specimen and conditions except 2.5 mg quartz suspended in the binder.
55*	131	1965	293	7.66-10.4	~0°	~0°			Similar to the above specimen and conditions except 5 mg quartz suspended in the binder.
56*	131	1965	293	18.8-23.0	~0°	~0°			Similar to the above specimen and conditions except 10 mg quartz suspended in the binder; sample thinner than others.
57*	131	1965	293	4.88-7.71	~0°	~0°			Synthetic α-quartz (78 µm thick) from Valpey Co.; data extracted from smooth curve; radiation polarized perpendicular to the optic axis.
58*	131	1965	293	10.1-39.5	~0°	~0°			Above specimen and conditions.
59*	131	1965	~100	4.87-7.74	~0°	~0°			Above specimen and conditions.
60*	131	1965	100	9.76-39.7	~0°	~0°			Above specimen and conditions.
61*	131	1965	293	10.2-39.7	~0°	~0°			Above specimen and conditions.
62*	131	1965	~ 14	23.0-24.6	~0°	~0°			Above specimen and conditions.
63*	131	1965	293	16.7-22.2	~0°	~0°			Similar to the above specimen and conditions; X-cut; radiation polarized perpendicular to optic axis.
64*	131	1965	293	16.7-22.2	~0°	~0°			Similar to the above specimen and conditions except Y-cut crystal.
65*	131	1965	293	16.7-22.2	~0°	~0°			Similar to the above specimen and conditions except Z-cut crystal.
66*	131	1965	293	4.88-7.65	~0°	~0°			Curve 57 specimen and conditions except radiation polarized parallel to the optic axis.
67*	131	1965	293	10.1-39.2	~0°	~0°			Above specimen and conuitions.
68	452	1968	~298	0.15-3.85	~0°	~0°			Dynasil 1000 (2.54 cm thick).

*Not shown on plot

DATA TABLE NO. 138 NORMAL SPECTRAL TRANSMITTANCE OF SILICON DIOXIDE (Crystalline) SiO_2

[Wavelength, λ, μm; Transmittance, τ; Temperature, T, K]

CURVE 1
T ~ 298

λ	τ
2.00	0.939
2.40	0.910
2.80	0.595
3.00	0.706
3.20	0.654
3.50	0.803
4.00	0.145
4.10	0.189
4.50	0.042
4.70	0.087
4.80	0.000
42.0	0.060
43.4	0.112
45.2	0.161
47.7	0.286
50.0	0.382

CURVE 2
T ~ 298

λ	τ
1.14	0.960
1.58	0.957
1.97	0.944
2.24	0.936
2.38	0.929
2.54	0.910
2.63	0.888
2.71	0.846
2.78	0.835
2.78	0.818
2.88	0.800
2.97	0.818
3.06	0.845
3.12	0.866
3.23	0.881
3.36	0.861
3.50	0.799
3.64	0.736
3.79	0.674
4.04	0.511
4.21	0.365
4.27	0.288
4.37	0.250
4.43	0.265

CURVE 2 (cont.)

λ	τ
4.49	0.285
4.60	0.239
4.69	0.204
4.73	0.146
4.85	0.048
5.13	0.023
5.26	0.014
5.51	0.008

CURVE 3
T = 298

λ	τ
50.4	0.454
50.4	0.531
60.9	0.574
60.9	0.617
70.9	0.719
73.9	0.641
77.0	0.562
79.0	0.590
80.0	0.850
80.5	0.783
83.1	0.783
85.8	0.715
88.4	0.627
90.4	0.670
92.0	0.568
93.4	0.629
95.1	0.600

CURVE 4
T = 298

λ	τ
50.4	0.220
60.9	0.445
70.8	0.517
73.9	0.506
77.0	0.354
79.0	0.299
80.0	0.539
80.5	0.533
83.3	0.561
85.7	0.680
86.4	0.661
88.4	0.670
90.4	0.637
95.1	0.676

CURVE 5
T = 1.5

λ	τ
29.8	0.00
30.0	0.02
30.3	0.03
31.2	0.06
31.4	0.05
32.2	0.08
32.9	0.04
33.5	0.04
34.0	0.00
34.3	0.01
34.6	0.00
37.2	0.00
37.5	0.00
38.5	0.04
39.7	0.18
40.1	0.23
40.7	0.31
41.2	0.32
41.4	0.34
42.6	0.37
44.4	0.48
44.9	0.48
45.6	0.52
47.1	0.54
48.4	0.56
49.2	0.56
50.1	0.64
50.8	0.64
52.6	0.75
56.5	0.81
59.2	0.82
60.1	0.83
61.4	0.85
62.4	0.84
63.8	0.86
65.3	0.91
66.1	0.82
67.8	0.88
68.6	0.91
70.2	0.90
71.4	0.92
73.5	0.89
74.1	0.81
75.9	0.15

CURVE 5 (cont.)

λ	τ
78.6	0.97
82.0	0.99
84.0	1.08*
86.1	1.10*
88.2	1.15*
91.5	1.07*
95.1	1.11*
99.9	1.10*
103	1.14*
106	1.13*
107	1.14*

CURVE 6
T = 298

λ	τ
41.05	0.155
42.19	0.189
44.07	0.253
47.48	0.393
50.68	0.408
53.25	0.469
55.07	0.494
58.34	0.522
60.46	0.571
64.31	0.581
66.31	0.607
68.59	0.599
70.37	0.642
73.75	0.623
75.36	0.558
77.40	0.391
78.25	0.361
79.43	0.465
80.71	0.654
82.10	0.690
86.73	0.713
91.91	0.707
97.75	0.712
104.38	0.726
110.38	0.760
122.85	0.764
145.77	0.771
183.15	0.781
240.38	0.793

CURVE 7
T = 298

λ	τ
40.9	0.194
41.9	0.239
43.8	0.333
46.6	0.430
50.2	0.479
52.6	0.520
54.7	0.556
56.8	0.570
59.4	0.607
63.0	0.629
65.4	0.659
67.1	0.661
69.0	0.676
71.9	0.719
74.2	0.689
76.2	0.699
76.9	0.737
78.0	0.683
78.6	0.680
80.9	0.705
85.2	0.705
90.7	0.706
96.0	0.718
102	0.758
107	0.752
119	0.769
132	0.780
156	0.790
189	0.785
253	0.791

CURVE 8
T = 300

λ	τ
48.7	0.084
59.7	0.143
64.1	0.178
69.6	0.197
72.7	0.185
74.5	0.144
76.9	0.121
79.3	0.154
80.3	0.227
85.2	0.359

CURVE 8 (cont.)

λ	τ
89.3	0.451
94.8	0.542
95.2	0.559

CURVE 9
T = 300

λ	τ
153	0.554
185	0.552
201	0.547
218	0.552
245	0.570
301	0.627

CURVE 10
T = 123

λ	τ
50.0	0.197
54.4	0.230
60.1	0.247
65.2	0.281
69.2	0.256
71.4	0.216
73.8	0.210
75.5	0.256
79.3	0.356
84.5	0.488
89.7	0.543
94.8	0.572
99.3	0.589
109	0.615
124	0.648

CURVE 11
T = 300

λ	τ
100	0.313
105	0.325
109	0.326
115	0.341
118	0.367
124	0.416
128	0.439

CURVE 12
T = 300

λ	τ
84.9	0.224
90.1	0.267
95.5	0.304
100	0.337
104	0.353
109	0.384
115	0.415
119	0.435
125	0.461
134	0.503
150	0.551

CURVE 13*
T = 300

λ	τ
101	0.717
109	0.803
114	0.688
120	0.830
127	0.692
134	0.842
142	0.681
145	0.686
152	0.936
155	0.918
162	0.692
166	0.697
177	0.828
196	0.686
200	0.695
217	0.918
230	0.762
236	0.747
241	0.765
256	0.858

CURVE 14*
T = 123

λ	τ
114	0.902
120	0.973
126	0.820
134	0.975
136	0.961

CURVE 14 (cont.)*

λ	τ
141	0.770
143	0.770
151	0.885

CURVE 15*
T = 300

λ	τ
166	0.749
177	0.833
178	0.841
184	0.807
193	0.740
197	0.711
201	0.732
210	0.855
213	0.867
215	0.857
220	0.805
229	0.697
234	0.641
238	0.609

CURVE 16*
T = 300

λ	τ
166	0.727
169	0.703
172	0.707
184	0.803
187	0.796
190	0.783
194	0.690
197	0.666
201	0.659
205	0.697
212	0.763
219	0.801
222	0.789
229	0.704
234	0.654

CURVE 17
T = 300

λ	τ
48.6	0.056
55.7	0.138

*Not shown on plot

DATA TABLE NO. 138 (continued)

CURVE 17 (cont.)
T = 300

λ	τ
62.0	0.193
65.3	0.210
68.2	0.211
71.9	0.192
74.1	0.154
76.0	0.115
78.0	0.070
79.0	0.087
80.3	0.225
82.9	0.321
86.1	0.370
90.1	0.385
97.3	0.407
150	0.487

CURVE 18
T = 300

λ	τ
25.5	0.000
30.4	0.015
33.5	0.011
35.8	0.000
39.9	0.000
44.5	0.077
47.8	0.175
51.0	0.283
55.1	0.357
61.2	0.423
65.0	0.447
67.4	0.452
71.8	0.429
75.6	0.355
77.6	0.306
80.1	0.389
82.2	0.528
84.7	0.594
88.7	0.617
99.0	0.638
150	0.681

CURVE 19*
T = 300

λ	τ
25.5	0.000
30.4	0.015

CURVE 19 (cont.)*

λ	τ
33.5	0.011
35.8	0.000
38.6	0.000
40.0	0.018
42.6	0.097
45.1	0.317
48.0	0.415
52.0	0.486
60.2	0.553
66.1	0.579
69.2	0.585
71.8	0.568
77.4	0.492
79.7	0.524
83.1	0.633
86.5	0.672
90.5	0.691
97.6	0.698
150	0.721

CURVE 20
T = 300

λ	τ
25.5	0.000*
30.5	0.020
33.6	0.053
37.9	0.008
39.4	0.036
41.9	0.158*
44.0	0.340
49.6	0.565
53.4	0.605
59.8	0.646
68.8	0.669
72.0	0.665
75.9	0.636
77.9	0.607
83.0	0.695
86.7	0.722
92.4	0.738
96.9	0.746
150	0.753

CURVE 21
T = 300

λ	τ
20.0	0.010
25.0	0.019
28.4	0.044
29.6	0.086
31.6	0.217
32.9	0.250
34.1	0.256
35.2	0.241
36.0	0.172
36.6	0.044
37.7	0.027
39.2	0.233
40.3	0.317

CURVE 22
T = 300

λ	τ
53.7	0.373
61.7	0.453
74.1	0.536
81.3	0.569
85.6	0.629
89.7	0.650
95.2	0.656
103	0.661

CURVE 23*
T = 300

λ	τ
23.7	0.000
27.8	0.016
29.9	0.039
30.7	0.072
31.5	0.175
32.4	0.261
35.8	0.401
39.4	0.503
41.7	0.535

CURVE 24*
T = 300

λ	τ
65.2	0.311
67.5	0.395
69.3	0.428

CURVE 24 (cont.)*

λ	τ
70.4	0.435
72.2	0.404
74.9	0.324
77.3	0.173
77.8	0.153
79.0	0.279
80.0	0.414
81.1	0.491
81.8	0.523

CURVE 25
T = 4.2

λ	τ
65.2	0.719
72.0	0.709
73.8	0.688
74.5	0.635
75.3	0.380
75.4	0.297
75.6	0.273
75.9	0.318
76.2	0.485
76.7	0.585
77.4	0.665
78.1	0.695
79.6	0.725
81.7	0.743

CURVE 26
T = 77

λ	τ
65.2	0.709
67.4	0.703
69.6	0.665
72.9	0.578
74.0	0.516
74.7	0.421
75.1	0.247
75.5	0.185
75.8	0.159
76.1	0.194
76.8	0.436
77.7	0.569
78.4	0.623
79.5	0.642
82.1	0.654

CURVE 27*
T = 300

λ	τ
26.4	0.000
27.8	0.055
32.5	0.299
33.3	0.310
33.9	0.305
34.7	0.269
36.5	0.134
37.3	0.108
38.0	0.131
38.5	0.191
40.1	0.472
40.5	0.449
41.1	0.611
41.8	0.501
42.4	0.642
42.6	0.661
42.8	0.650
43.2	0.519
44.0	0.731
44.9	0.537
46.0	0.813
46.9	0.537
47.7	0.756
48.6	0.576
79.7	0.727
49.9	0.733

CURVE 28*
T = 77

λ	τ
20.0	0.008
21.7	0.067
22.5	0.065
25.0	0.032
25.5	0.056
29.3	0.465
29.8	0.493
30.0	0.481
30.2	0.510
30.3	0.472
30.7	0.527
30.9	0.508
31.2	0.572
31.5	0.514
31.8	0.599

CURVE 28 (cont.)*

λ	τ
32.2	0.552
32.4	0.621
32.8	0.585
33.2	0.634
33.5	0.583
33.8	0.641
34.1	0.540
34.4	0.601
34.9	0.491
35.4	0.510
36.2	0.232
36.9	0.151
37.4	0.214
38.6	0.522
38.8	0.512
39.2	0.664
39.6	0.521
40.1	0.748
40.5	0.611
41.2	0.780
41.9	0.621
42.2	0.850
42.6	0.864
43.4	0.656
44.0	0.844
45.0	0.625
45.5	0.811
45.8	0.829
46.6	0.607
47.0	0.598
48.4	0.752
49.9	0.865

CURVE 29*
T = 4.2

λ	τ
20.0	0.055
21.3	0.068
22.7	0.060
24.8	0.004
25.3	0.022
27.4	0.350
29.6	0.605
29.8	0.584
30.0	0.600
30.2	0.567

CURVE 29 (cont.)*

λ	τ
30.5	0.613
30.8	0.587
31.1	0.637
31.4	0.587
31.7	0.665
31.9	0.603
32.3	0.681
32.7	0.621
33.0	0.691
33.4	0.604
33.7	0.723
34.1	0.610
34.4	0.664
34.8	0.555
35.3	0.574
36.9	0.150
38.5	0.600
38.8	0.540
39.1	0.683
39.5	0.548
40.1	0.740
40.3	0.728
40.6	0.597
41.0	0.800
41.3	0.811
41.9	0.590
42.6	0.828
42.9	0.801
43.3	0.598
44.0	0.848
45.0	0.576
45.9	0.818
46.8	0.568
47.6	0.832
47.8	0.862
48.4	0.640
48.8	0.616
49.2	0.635
49.9	0.796

CURVE 30*
T = 300

λ	τ
25.6	0.481
27.0	0.437
29.6	0.599

CURVE 30 (cont.)*

λ	τ
31.5	0.625
33.7	0.596
34.1	0.407
35.3	0.552
39.1	0.621
40.9	0.694
45.8	0.769
51.3	0.831
57.8	0.867
63.8	0.875
68.6	0.838
77.6	0.876
87.0	0.899
96.8	0.911
152	0.945

CURVE 31*
T = 300

λ	τ
5.3	0.505
6.2	0.462
6.7	0.052
7.3	0.018
8.1	0.029
9.1	0.019
10.6	0.528
11.4	0.549
12.3	0.532
12.4	0.109
13.1	0.129
14.9	0.657
16.0	0.621
16.4	0.286
17.9	0.535
18.7	0.509
19.3	0.068
20.1	0.031
25.2	0.250
26.2	0.186
29.7	0.515
32.1	0.551
32.8	0.534
33.7	0.283
35.4	0.500
36.1	0.550
38.1	0.572
40.0	0.619

* Not shown on plot

DATA TABLE NO. 138 (continued)

CURVE 32*
T = 300

λ	τ
25.2	0.438
25.9	0.387
27.4	0.525
28.4	0.556
30.9	0.576
32.7	0.569
34.0	0.531
34.7	0.554
36.0	0.590
44.1	0.676
50.2	0.715
56.5	0.731
62.8	0.723
70.2	0.696
73.5	0.711
82.9	0.763
90.4	0.791
109	0.826
123	0.843
138	0.850
148	0.850

CURVE 33*
T = 300

λ	τ
5.30	0.413
6.70	0.034
7.40	0.022
9.00	0.028
10.2	0.488
11.0	0.499
11.5	0.474
12.4	0.092
14.7	0.644
15.7	0.530
17.0	0.539
18.2	0.521
20.0	0.060
22.6	0.199
24.2	0.237
25.8	0.222
29.3	0.488
30.0	0.519
31.2	0.524
32.7	0.511

CURVE 33 (cont.)*

λ	τ
34.0	0.480
35.2	0.529
37.1	0.568
39.3	0.610

CURVE 34
T = 298

λ	τ
0.182	0.139
0.190	0.201
0.198	0.287
0.203	0.370
0.215	0.759
0.223	0.843
0.235	0.875
0.257	0.888
0.457	0.899
1.69	0.935
2.41	0.937
2.70	0.907
2.83	0.864
2.88	0.809
2.89	0.562
3.00	0.626

CURVE 35
T = 298

λ	τ
0.196	0.800
0.236	0.856
0.287	0.896
0.322	0.909
0.451	0.940
0.606	0.955
0.826	0.952
1.28	0.947
2.04	0.959
2.29	0.950
2.49	0.922
2.64	0.883
2.74	0.833
2.81	0.520
2.85	0.531
2.90	0.400
3.00	0.417

CURVE 36
T = 297

λ	τ
6.86	0.734
6.97	0.728
7.11	0.717
7.23	0.659
7.34	0.584
7.42	0.537
7.46	0.498
7.55	0.407
7.59	0.418
7.69	0.279
7.68	0.265
7.79	0.106
7.87	0.057
7.99	0.022
8.09	0.000
9.53	0.000
9.65	0.016
9.79	0.044
9.85	0.074
9.98	0.088
10.04	0.102
10.13	0.155
10.21	0.179
10.29	0.211
10.34	0.236
10.34	0.291
10.42	0.274
10.45	0.283
10.51	0.337
10.60	0.311
10.66	0.343
10.72	0.425
10.83	0.449
10.89	0.395
10.99	0.386
11.04	0.406
11.08	0.432
11.11	0.489
11.19	0.477
11.24	0.440
11.34	0.414
11.41	0.417
11.51	0.447
11.60	0.465
11.67	0.444

CURVE 36 (cont.)

λ	τ
11.70	0.407
11.79	0.387
11.88	0.378
11.95	0.355
12.01	0.306
12.07	0.252
12.07	0.238
12.15	0.170
12.23	0.099
12.28	0.040
12.28	0.018
12.39	0.000
12.76	0.000
12.76	0.021
12.86	0.033
12.88	0.055
12.93	0.074
12.94	0.092
13.01	0.120
13.05	0.139
13.09	0.155
13.13	0.220
13.18	0.286
13.23	0.322
13.27	0.333
13.37	0.326
13.45	0.337
13.48	0.345
13.53	0.365
13.56	0.406
13.62	0.420
13.69	0.440
13.77	0.425
13.82	0.403
13.86	0.377
13.94	0.335
13.96	0.306
14.06	0.263
14.14	0.214
14.17	0.149
14.19	0.114
14.23	0.077
14.28	0.036
14.32	0.014
14.38	0.021
14.49	0.031

CURVE 36 (cont.)

λ	τ
14.53	0.050
14.56	0.133
14.60	0.184
14.65	0.248
14.75	0.296
14.78	0.314
14.79	0.329
14.79	0.349
14.79	0.371
14.88	0.413
14.91	0.443
14.98	0.496
15.01	0.517
15.04	0.529
15.12	0.546
15.13	0.564
15.17	0.574
15.27	0.602
15.50	0.576
15.71	0.585
15.95	0.637
15.95	0.651
16.07	0.674
16.18	0.714
16.21	0.724
16.40	0.754
16.58	0.742
16.86	0.712
17.07	0.715
17.27	0.756
17.48	0.791
17.67	0.800
17.87	0.752
18.09	0.711
18.31	0.679
18.50	0.663
18.71	0.614
18.88	0.555
19.05	0.500
19.26	0.409
19.44	0.249
19.62	0.112
19.81	0.000
22.35	0.000
22.53	0.007
22.71	0.010

CURVE 36 (cont.)

λ	τ
22.87	0.019
23.02	0.030
23.16	0.047
23.36	0.060
23.44	0.070
23.64	0.091
23.83	0.091
23.96	0.099
24.09	0.099
24.23	0.095
24.39	0.086
24.39	0.074
24.51	0.041
24.65	0.008
24.85	0.000
25.60	0.000
25.85	0.041
25.95	0.089
26.13	0.130
26.26	0.152
26.41	0.199
26.51	0.256
26.63	0.308
26.81	0.306
26.97	0.304
27.03	0.283

CURVE 37
T = 297

λ	τ
6.92	0.663
7.08	0.639
7.21	0.629
7.34	0.501
7.40	0.446
7.53	0.340
7.65	0.206
7.74	0.078
7.81	0.047
7.96	0.000
9.51	0.000
9.72	0.042
9.81	0.085
9.87	0.110
9.98	0.128
10.06	0.174

CURVE 37 (cont.)

λ	τ
10.15	0.223
10.15	0.267
10.22	0.278
10.29	0.267
10.35	0.316
10.44	0.369
10.51	0.332
10.60	0.340
10.67	0.403
10.79	0.454
10.86	0.432
10.92	0.404
10.95	0.432
11.03	0.435
11.09	0.486
11.12	0.497
11.23	0.485
11.26	0.444
11.36	0.431
11.43	0.452
11.51	0.491
11.55	0.539
11.69	0.545
11.73	0.511
11.80	0.481
11.87	0.464
11.96	0.475
12.04	0.490
12.09	0.452
12.18	0.392
12.23	0.348
12.30	0.304
12.35	0.238
12.42	0.145
12.50	0.066
12.53	0.011
12.61	0.000
12.96	0.000
13.03	0.006
13.06	0.022
13.16	0.073
13.22	0.137
13.27	0.192
13.34	0.275
13.39	0.342
13.40	0.365

CURVE 37 (cont.)

λ	τ
13.51	0.370
13.55	0.382
13.57	0.422
13.69	0.472
13.72	0.510
13.73	0.555
13.84	0.563
13.92	0.557
14.02	0.548
14.10	0.543
14.12	0.519
14.21	0.535
14.28	0.559
14.28	0.577
14.38	0.594
14.38	0.638
14.46	0.655
14.53	0.685
14.55	0.706
14.57	0.719
14.58	0.733
14.67	0.733
14.79	0.729
14.83	0.715
14.85	0.697
14.89	0.667
15.00	0.658
15.06	0.658
15.10	0.640
15.16	0.656
15.21	0.692
15.51	0.752
15.71	0.783
15.91	0.725
16.18	0.687
16.38	0.710
16.59	0.733
16.81	0.733
17.03	0.690
17.23	0.676
17.45	0.607
17.67	0.505
17.84	0.345
17.95	0.064
18.24	0.008
18.50	0.000

* Not shown on plot

DATA TABLE NO. 138 (continued)

λ	τ
CURVE 37 (cont.) T = 297	
20.84	0.000
21.04	0.007
21.19	0.019
21.37	0.046
21.52	0.077
21.69	0.102
21.88	0.135
21.98	0.183
22.20	0.206
22.36	0.218
22.51	0.213
22.64	0.244
22.79	0.272
22.99	0.283
23.14	0.280
23.30	0.269
23.37	0.247
23.58	0.251
23.75	0.261
23.89	0.261
24.04	0.264
24.16	0.259
24.33	0.252
24.42	0.240
24.46	0.224
24.60	0.210
24.79	0.193
24.93	0.180
25.10	0.166
25.20	0.148
25.38	0.108
25.51	0.075
25.64	0.040
25.76	0.015
25.93	0.003
26.07	0.003
CURVE 38 T = 293	
45.2	0.069
52.2	0.065
55.6	0.100
59.2	0.105
71.2	0.176
74.1	0.155*

λ	τ
CURVE 38 (cont.)	
75.0	0.117
75.5	0.032
78.1	0.032
79.4	0.122
80.3	0.230
81.6	0.256
85.3	0.237
89.5	0.244
96.9	0.277
113	0.313
127	0.466
140	0.550
156	0.582
202	0.587
222	0.561
243	0.584
294	0.566
371	0.591
CURVE 39* T = 98	
45.3	0.293
47.3	0.298
49.2	0.293
51.1	0.333
54.0	0.387
56.3	0.400
59.0	0.406
61.7	0.408
68.8	0.443
71.4	0.425
72.4	0.336
75.7	0.056
78.2	0.477
79.8	0.488
83.5	0.410
89.2	0.435
97.7	0.470
116	0.639
140	0.715
176	0.715
216	0.699
242	0.707
292	0.739
365	0.739

λ	τ
CURVE 40 T ~ 298	
107	0.05
145	0.17
201	0.29
250	0.42
356	0.63
439	0.68
462	0.73
CURVE 41 T ~ 298	
99	0.48
148	0.63
201	0.70
250	0.75
300	0.73
373	0.78
538	0.80
CURVE 42 T ~ 298	
3.70	0.774
3.84	0.793
4.05	0.813
4.25	0.821
4.41	0.821
4.46	0.811
4.52	0.826
4.72	0.826
4.87	0.733
5.05	0.475
5.17	0.555
5.33	0.255
5.43	0.556
5.56	0.428
5.73	0.675
5.99	0.473
6.10	0.515
6.23	0.368
6.30	0.290
6.48	0.621
6.60	0.424
6.64	0.413
6.70	0.413
6.84	0.507

λ	τ
CURVE 42 (cont.)	
6.87	0.559
7.01	0.608
7.18	0.549
7.40	0.378
CURVE 43* T ~ 298	
7.14	0.589
7.27	0.514
7.68	0.101
7.79	0.043
7.96	0.012
8.13	0.000
9.74	0.000
10.0	0.022
10.5	0.182
10.6	0.211
10.7	0.242
10.8	0.273
10.9	0.293
11.1	0.298
11.3	0.306
11.6	0.283
11.8	0.219
12.1	0.083
12.3	0.000
12.9	0.000
13.6	0.252
14.3	0.000
14.4	0.000
15.0	0.346
15.3	0.470
15.6	0.510
16.0	0.543
16.3	0.576
16.5	0.620
16.9	0.636
16.9	0.665
17.2	0.670
17.8	0.659
18.0	0.623
18.2	0.497
18.5	0.532
18.8	0.488
20.0	0.000

λ	τ
CURVE 44* T ~ 298	
17.9	0.647
18.1	0.631
18.3	0.500
18.5	0.532
18.8	0.458
19.3	0.284
19.6	0.090
20.0	0.000
23.3	0.000
23.8	0.049
24.2	0.061
25.3	0.005
26.2	0.054
27.0	0.142
28.5	0.429
28.8	0.435
29.1	0.431
29.9	0.501
30.6	0.550
31.4	0.515
32.3	0.559
33.0	0.611
33.4	0.625
35.1	0.593
36.5	0.507
37.3	0.357
38.2	0.111
39.2	0.445
40.7	0.690
41.3	0.639
41.8	0.629
43.5	0.720
45.5	0.814
46.7	0.827
47.8	0.800
49.5	0.691
50.0	0.632
51.5	0.615
53.5	0.646
56.2	0.763
58.5	0.876

λ	τ
CURVE 45* T ~ 298	
58.8	0.833
60.3	0.886
61.2	0.904
62.3	0.908
63.1	0.895
64.0	0.874
65.3	0.854
66.3	0.838
66.8	0.813
67.6	0.760
68.6	0.719
69.6	0.703
72.4	0.675
75.9	0.706
78.6	0.752
80.3	0.797
81.8	0.849
83.8	0.878
84.6	0.900
86.2	0.913
86.7	0.927
87.6	0.928
89.7	0.916
90.6	0.903
91.3	0.890
92.8	0.878
95.4	0.820
98.0	0.715
100	0.642
102	0.631
103	0.631
CURVE 46* T ~ 298	
102	0.737
104	0.710
105	0.710
109	0.654
112	0.647
115	0.654
118	0.645
123	0.680
125	0.709
130	0.698
132	0.744

λ	τ
CURVE 46 (cont.)*	
134	0.772
138	0.787
143	0.763
144	0.770
146	0.791
148	0.793
152	0.853
157	0.870
159	0.890
164	0.900
166	0.920
167	0.968
168	0.978
169	0.984
172	0.958
174	0.965
175	1.00
181	0.978
185	1.00
192	0.954
200	0.964
CURVE 47* T = 298	
8.11	0.728
8.16	0.720
8.21	0.715
8.25	0.723
8.35	0.730
8.48	0.727
8.80	0.701
8.85	0.681
8.92	0.605
8.98	0.570
9.03	0.554
9.06	0.561
9.11	0.600
9.16	0.651
9.23	0.666
9.36	0.698
9.45	0.691
9.55	0.686
9.67	0.672
9.75	0.666
9.80	0.618
9.92	0.613

λ	τ
CURVE 47 (cont.)*	
9.95	0.578
9.96	0.567
10.0	0.610
10.1	0.622
10.2	0.623
10.3	0.612
10.4	0.605
10.5	0.599
10.6	0.595
10.7	0.591
CURVE 48* T = 293	
14.3	0.803
14.4	0.797
14.4	0.797
14.5	0.813
14.6	0.845
14.7	0.886
14.8	0.924
15.1	0.961
15.3	0.973
16.1	0.973
17.1	0.962
17.9	0.946
18.2	0.930
18.6	0.852
19.3	0.587
19.4	0.594
19.7	0.644
19.8	0.651
20.0	0.651
20.4	0.624
20.9	0.573
21.3	0.504
21.5	0.504
23.0	0.739
24.1	0.871
24.2	0.871
24.5	0.818
24.7	0.687
24.9	0.659
25.3	0.741
25.4	0.744
25.6	0.737
25.7	0.717

* Not shown on plot

DATA TABLE NO. 138 (continued)

λ	τ
CURVE 48 (cont.)*	
T = 293	
25.9	0.728
26.0	0.722
26.3	0.667
26.6	0.652
27.1	0.673
27.7	0.728
28.4	0.828
28.7	0.850
31.9	0.888
34.8	0.901
35.6	0.901
37.7	0.847
38.1	0.861
38.7	0.872
40.0	0.872
CURVE 49*	
T = 293	
5.00	1.00
5.69	0.976
6.64	0.944
CURVE 50*	
T = 293	
6.94	0.970
7.01	0.937
7.08	0.915
7.14	0.915
7.22	0.948
7.26	0.954
7.32	0.954
7.88	0.826
8.05	0.785
8.24	0.713
8.39	0.617
8.45	0.541
8.51	0.518
8.62	0.499
8.73	0.487
8.83	0.463
9.19	0.246
9.23	0.245
9.35	0.299
9.43	0.366

λ	τ
CURVE 50 (cont.)*	
9.46	0.424
10.8	0.839
11.1	0.895
11.4	0.929
11.6	0.960
11.9	0.987
CURVE 51*	
T = 293	
14.3	0.500
14.4	0.447
14.9	0.672
15.3	0.810
15.7	0.859
16.1	0.890
16.6	0.899
17.3	0.867
18.1	0.809
18.2	0.788
18.5	0.505
18.6	0.426
19.1	0.215
19.3	0.176
19.5	0.168
19.8	0.178
19.9	0.190
20.2	0.129
20.7	0.059
21.1	0.034
21.5	0.032
21.6	0.044
22.1	0.128
22.4	0.233
23.6	0.592
23.7	0.604
24.0	0.604
24.3	0.558
24.6	0.445
24.8	0.303
25.0	0.265
25.5	0.423
25.7	0.403
25.8	0.418
26.0	0.346
26.2	0.309
26.5	0.298

λ	τ
CURVE 51 (cont.)*	
26.8	0.306
27.0	0.338
27.2	0.480
27.5	0.598
28.0	0.656
28.6	0.686
29.8	0.712
30.4	0.742
30.9	0.784
32.3	0.823
34.0	0.847
35.2	0.852
36.3	0.839
36.7	0.802
37.5	0.735
38.1	0.790
39.9	0.817
CURVE 52*	
T = 293	
5.00	0.834
5.21	0.817
5.27	0.784
5.32	0.776
5.36	0.795
5.39	0.817
6.42	0.669
6.54	0.605
6.58	0.605
6.67	0.658
CURVE 53*	
T = 293	
6.88	0.540
6.92	0.513
6.97	0.513
7.04	0.534
7.10	0.534
7.14	0.527
7.46	0.439
7.91	0.293
7.97	0.265
8.06	0.149
8.14	0.079
8.33	0.000

λ	τ
CURVE 53 (cont.)*	
9.79	0.000
9.94	0.040
10.7	0.388
11.6	0.701
11.7	0.719
11.9	0.724
12.0	0.699
12.3	0.363
12.5	0.021
12.6	0.092
12.8	0.055
13.4	0.705
14.1	0.541
14.3	0.455
14.7	0.659
14.8	0.709
15.0	0.739
15.3	0.758
CURVE 54*	
T = 293	
14.3	0.920
14.4	0.908
14.5	0.955
14.7	0.970
16.6	0.990
17.5	0.979
18.1	0.968
18.5	0.949
18.8	0.907
19.1	0.819
19.2	0.790
19.5	0.782
19.8	0.811
20.0	0.827
20.3	0.827
20.4	0.814
20.6	0.697
20.8	0.635
21.3	0.586
21.3	0.579
21.7	0.585
21.8	0.595
22.2	0.751
22.8	0.841
23.6	0.921

λ	τ
CURVE 54 (cont.)*	
23.7	0.930
24.1	0.917
24.4	0.888
24.9	0.752
25.4	0.851
26.5	0.737
26.7	0.738
27.2	0.848
27.3	0.919
27.4	0.931
27.9	0.937
28.5	0.952
40.0	0.956
CURVE 55*	
T = 293	
7.66	0.991
7.89	0.917
7.98	0.891
8.18	0.845
8.31	0.825
8.45	0.817
8.64	0.817
8.84	0.799
9.16	0.747
9.28	0.788
9.46	0.845
9.71	0.895
10.0	0.938
10.2	0.968
10.4	0.989
CURVE 56*	
T = 293	
18.8	0.963
19.1	0.947
19.3	0.925
19.5	0.917
19.7	0.937
19.9	0.976
20.0	0.993
20.2	0.988
20.3	0.993
20.7	0.943
21.1	0.913

λ	τ
CURVE 56 (cont.)*	
21.5	0.816
21.7	0.790
21.9	0.805
22.0	0.852
22.1	0.896
22.2	0.916
22.4	0.927
22.5	0.947
22.6	0.947
23.0	0.918
CURVE 57*	
T = 293	
4.88	0.807
4.90	0.716
4.92	0.626
4.94	0.484
4.97	0.287
4.99	0.246
5.01	0.232
5.04	0.245
5.08	0.287
5.14	0.371
5.16	0.391
5.20	0.399
5.21	0.377
5.22	0.232
5.24	0.159
5.27	0.119
5.29	0.090
5.32	0.077
5.34	0.077
5.36	0.097
5.38	0.118
5.40	0.175
5.41	0.363
5.42	0.390
5.44	0.423
5.45	0.423
5.50	0.347
5.53	0.255
5.55	0.209
5.57	0.196
5.60	0.214
5.62	0.271
5.64	0.349

λ	τ
CURVE 57 (cont.)*	
5.67	0.550
5.69	0.598
5.71	0.605
5.74	0.595
5.81	0.521
5.87	0.413
5.90	0.290
5.92	0.251
5.94	0.233
5.96	0.233
6.00	0.271
6.04	0.305
6.06	0.305
6.09	0.277
6.13	0.233
6.17	0.138
6.19	0.093
6.20	0.079
6.23	0.079
6.25	0.093
6.35	0.269
6.44	0.487
6.49	0.334
6.52	0.232
6.54	0.187
6.57	0.169
6.61	0.164
6.66	0.186
6.69	0.155
6.74	0.223
6.79	0.333
6.85	0.395
6.89	0.414
6.95	0.422
7.01	0.403
7.71	0.000
CURVE 58*	
T = 293	
10.1	0.000
10.3	0.012
10.6	0.058
10.7	0.090
11.0	0.118
11.2	0.118
11.5	0.093

λ	τ
CURVE 58 (cont.)*	
11.9	0.033
12.1	0.000
13.0	0.000
13.2	0.051
13.4	0.073
13.6	0.083
13.8	0.083
13.9	0.059
14.1	0.033
14.2	0.000
14.6	0.000
15.5	0.295
15.7	0.324
16.0	0.340
16.3	0.371
16.7	0.458
16.9	0.477
17.1	0.484
17.4	0.484
17.7	0.450
18.0	0.374
18.1	0.270
18.2	0.286
18.7	0.155
19.0	0.080
19.3	0.029
19.6	0.000
25.2	0.000
25.9	0.031
26.5	0.076
27.1	0.144
28.1	0.306
29.3	0.397
29.8	0.362
30.3	0.467
30.9	0.362
31.8	0.528
32.9	0.381
33.3	0.542
34.2	0.411
34.5	0.292
35.2	0.248
36.1	0.209
36.6	0.085
37.6	0.000
38.6	0.103
38.8	0.254
39.5	0.316

* Not shown on plot

DATA TABLE NO. 138 (continued)

λ	τ
CURVE 59*	
T ~ 100	
4.87	0.809
4.90	0.680
4.94	0.477
4.96	0.287
4.98	0.203
5.09	0.302
5.16	0.397
5.18	0.404
5.20	0.393
5.21	0.284
5.25	0.091
5.29	0.065
5.33	0.059
5.37	0.085
5.41	0.388
5.44	0.478
5.49	0.371
5.56	0.159
5.61	0.203
5.62	0.262
5.68	0.740
5.74	0.669
5.79	0.554
5.85	0.445
5.92	0.191
6.03	0.370
6.06	0.394
6.09	0.370
6.13	0.233
6.17	0.101
6.20	0.059
6.26	0.111
6.32	0.254
6.39	0.519
6.44	0.544
6.46	0.526
6.54	0.154
6.55	0.176
6.61	0.177
6.63	0.190
6.66	0.213
6.70	0.157
6.78	0.410
6.85	0.483
6.92	0.517

λ	τ
CURVE 59 (cont.)*	
7.01	0.521
7.09	0.492
7.25	0.379
7.37	0.280
7.55	0.187
7.74	0.000
CURVE 60*	
T = 100	
9.76	0.000
10.8	0.361
11.0	0.369
11.3	0.330
11.5	0.313
11.7	0.248
12.0	0.097
12.1	0.000
13.0	0.000
13.2	0.171
13.3	0.200
13.8	0.211
14.0	0.129
14.2	0.000
14.5	0.000
14.9	0.261
15.0	0.399
15.1	0.380
15.2	0.529
15.4	0.521
15.6	0.628
15.8	0.591
16.0	0.636
16.2	0.600
16.5	0.686
16.7	0.669
16.8	0.707
17.0	0.691
17.2	0.708
17.4	0.708
17.6	0.675
17.8	0.579
18.0	0.265
18.3	0.535
19.4	0.000
23.0	0.000

λ	τ
CURVE 60 (cont.)*	
23.6	0.189
23.8	0.208
24.1	0.186
24.6	0.000
25.8	0.000
27.0	0.373
27.2	0.337
27.5	0.449
27.8	0.372
28.1	0.570
28.5	0.400
28.9	0.650
29.3	0.432
29.9	0.779
30.6	0.471
31.2	0.800
32.2	0.499
33.0	0.783
34.1	0.418
34.7	0.646
35.3	0.316
35.7	0.447
37.6	0.000
38.3	0.512
38.9	0.252
39.7	0.413
CURVE 61*	
T = 293	
10.2	0.000
10.8	0.113
11.1	0.122
11.5	0.098
12.0	0.033
12.1	0.000
13.0	0.000
13.2	0.059
13.5	0.082
13.8	0.088
13.9	0.065
14.2	0.000
14.5	0.000
15.4	0.283
15.6	0.319
16.1	0.351

λ	τ
CURVE 61 (cont.)*	
16.4	0.397
16.7	0.463
17.0	0.486
17.4	0.486
17.7	0.454
17.9	0.404
18.1	0.113
18.2	0.177
18.4	0.203
19.3	0.000
25.8	0.000
26.4	0.061
27.4	0.193
28.5	0.348
29.2	0.400
29.5	0.361
29.9	0.466
30.6	0.360
31.3	0.528
32.5	0.375
33.1	0.546
34.2	0.315
34.6	0.374
35.6	0.216
36.1	0.224
36.4	0.080
37.6	0.000
38.6	0.249
38.9	0.249
39.7	0.314
CURVE 62*	
T ~ 14	
23.0	0.000
23.6	0.271
23.8	0.282
24.0	0.275
24.6	0.000
CURVE 63*	
T = 293	
16.7	0.724
17.4	0.772
17.5	0.772

λ	τ
CURVE 63 (cont.)*	
17.8	0.754
18.1	0.724
18.5	0.676
18.7	0.610
18.8	0.566
19.0	0.512
19.2	0.455
19.3	0.351
19.4	0.272
19.6	0.098
19.7	0.013
22.2	0.013
CURVE 64*	
T = 293	
16.7	0.724
17.4	0.772
17.5	0.772
17.8	0.754
18.1	0.724
18.5	0.676
18.7	0.610
18.8	0.566
19.0	0.512
19.2	0.455
19.3	0.351
19.4	0.272
19.6	0.098
19.7	0.013
22.2	0.013
CURVE 65*	
T = 293	
16.7	0.724
17.4	0.772
17.5	0.773
17.7	0.762
17.9	0.650
18.1	0.566
18.2	0.566
18.3	0.631
18.4	0.671
18.5	0.676
18.7	0.610

λ	τ
CURVE 65 (cont.)*	
18.8	0.566
19.0	0.512
19.2	0.455
19.3	0.351
19.4	0.272
19.6	0.098
19.7	0.013
22.2	0.013
CURVE 66*	
T = 293	
4.88	0.725
4.90	0.660
4.91	0.505
4.92	0.388
4.93	0.351
4.97	0.378
5.00	0.378
5.03	0.344
5.06	0.270
5.08	0.292
5.10	0.343
5.11	0.375
5.13	0.359
5.17	0.393
5.19	0.433
5.21	0.405
5.25	0.192
5.27	0.118
5.32	0.033
5.35	0.033
5.38	0.077
5.40	0.168
5.41	0.323
5.45	0.404
5.46	0.404
5.52	0.333
5.56	0.252
5.57	0.239
5.60	0.274
5.63	0.361
5.67	0.555
5.69	0.598
5.71	0.605
5.74	0.595

λ	τ
CURVE 66 (cont.)*	
5.76	0.557
5.84	0.321
5.92	0.137
5.96	0.172
5.99	0.230
6.01	0.377
6.03	0.423
6.06	0.360
6.10	0.216
6.12	0.146
6.17	0.069
6.20	0.041
6.25	0.060
6.27	0.111
6.34	0.350
6.36	0.377
6.38	0.390
6.45	0.307
6.54	0.152
6.57	0.199
6.61	0.283
6.63	0.347
6.72	0.265
6.78	0.245
6.84	0.266
6.88	0.319
6.91	0.319
7.03	0.248
7.15	0.242
7.65	0.000
CURVE 67*	
T = 293	
10.1	0.000
10.3	0.043
10.8	0.119
11.1	0.161
11.4	0.134
11.8	0.177
12.1	0.103
12.4	0.000
13.2	0.000
13.5	0.057
14.1	0.306
14.5	0.370

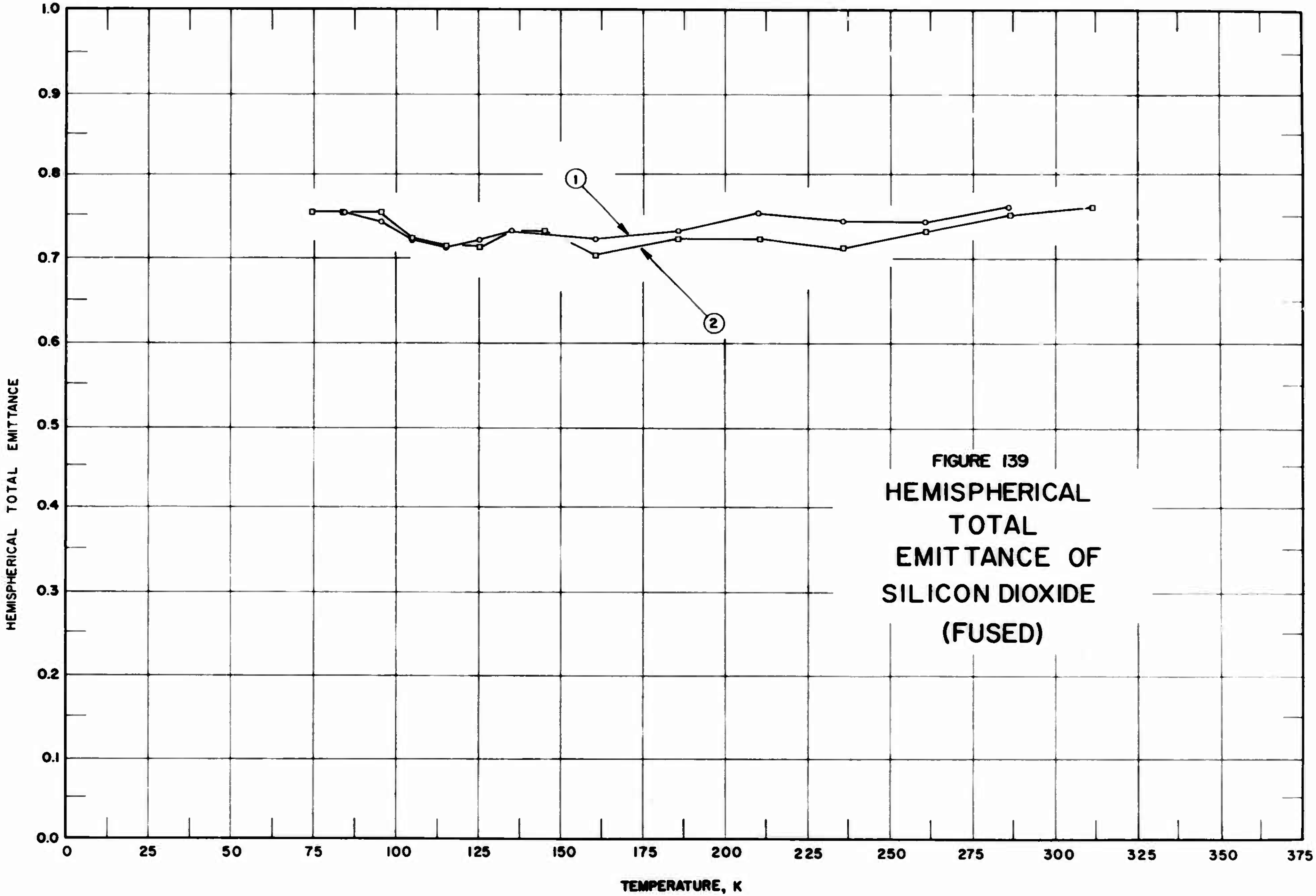
λ	τ
CURVE 67 (cont.)*	
15.0	0.410
15.4	0.417
15.8	0.403
16.0	0.373
16.6	0.373
17.0	0.350
18.1	0.000
28.2	0.000
28.9	0.072
29.7	0.192
30.4	0.383
30.7	0.362
31.0	0.494
31.4	0.403
32.1	0.592
32.7	0.430
33.3	0.644
34.1	0.448
34.7	0.547
35.5	0.578
36.4	0.468
37.5	0.704
38.8	0.469
39.2	0.459
CURVE 68	
T ~ 298	
0.15	0.000
0.16	0.000
0.17	0.006
0.18	0.205
0.19	0.510
0.20	0.618
0.21	0.727
0.22	0.789
0.23	0.843
0.24	0.881
0.25	0.899
0.26	0.919
0.27	0.920
0.28	0.923
0.29	0.925
0.30	0.926
0.40	0.930
0.50	0.932

*Not shown on plot

DATA TABLE NO. 138 (continued)

λ	τ	λ	τ
CURVE 68 (cont.)		CURVE 68 (cont.)	
T ~ 298			
		2.95	0.249
0.60	0.933	3.00	0.380
0.70	0.934	3.05	0.475
0.80	0.934	3.10	0.526
0.90	0.934	3.15	0.556
1.00	0.935	3.20	0.590
1.10	0.935	3.25	0.615
1.20	0.935	3.29	0.631
1.25	0.934	3.30	0.629
1.27	0.934*	3.35	0.611
1.30	0.926	3.40	0.565
1.32	0.914	3.45	0.477
1.34	0.902	3.50	0.348
1.36	0.892	3.55	0.201
1.38	0.883	3.60	0.133
1.40	0.876	3.65	0.062
1.42	0.886	3.70	0.028
1.44	0.897	3.75	0.002
1.46	0.906	3.80	0.000
1.48	0.914	3.85	0.000
1.50	0.922		
1.55	0.929		
1.60	0.936		
1.70	0.937		
1.80	0.938		
1.90	0.926		
2.00	0.913		
2.05	0.905		
2.10	0.884		
2.15	0.787		
2.20	0.576		
2.25	0.417		
2.30	0.583		
2.35	0.761		
2.375	0.772		
2.40	0.766		
2.45	0.693		
2.50	0.565		
2.55	0.403		
2.60	0.202		
2.65	0.091		
2.70	0.022		
2.75	0.000		
2.80	0.004		
2.85	0.021		
2.90	0.097		

*Not shown on plot


1.0
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0.0
HEMISPHERICAL TOTAL EMITTANCE
0
25
50
75
100
125
150
175
200
225
250
275
300
325
350
375
TEMPERATURE, K
1
2
FIGURE 139
HEMISPHERICAL
TOTAL
EMITTANCE OF
SILICON DIOXIDE
(FUSED)

SPECIFICATION TABLE NO. 139 HEMISPHERICAL TOTAL EMITTANCE OF SILICON DIOXIDE (Fused) SiO_2

Curve No.	Ref. No.	Year	Temperature Range, K	Reported Error, %	Composition (weight percent), Specifications and Remarks
1	132	1966	84.9-286	± 5	Fused quartz crystal (0.33 cm thick); measured in vacuum (10^{-9} mm Hg).
2	132	1966	74.9-312	± 5	Similar to the above specimen and conditions except 0.64 cm thick.

DATA TABLE NO. 139 HEMISPHERICAL TOTAL EMITTANCE OF SILICON DIOXIDE (Fused) SiO_2

[Temperature, T, K; Emittance, ϵ]

T	ϵ	T	ϵ
CURVE 1		CURVE 2 (cont.)	
84.9	0.753	104	0.722
95.5	0.742	115	0.714
104	0.721	125	0.713
115	0.713	135	0.732*
125	0.721	145	0.732
135	0.732	161	0.703
161	0.722	186	0.723
186	0.732	211	0.723
210	0.752	236	0.713
236	0.743	262	0.731
261	0.742	287	0.751
286	0.760	312	0.760
CURVE 2			
74.9	0.753		
84.8	0.753		
95.3	0.753		

*Not shown on plot

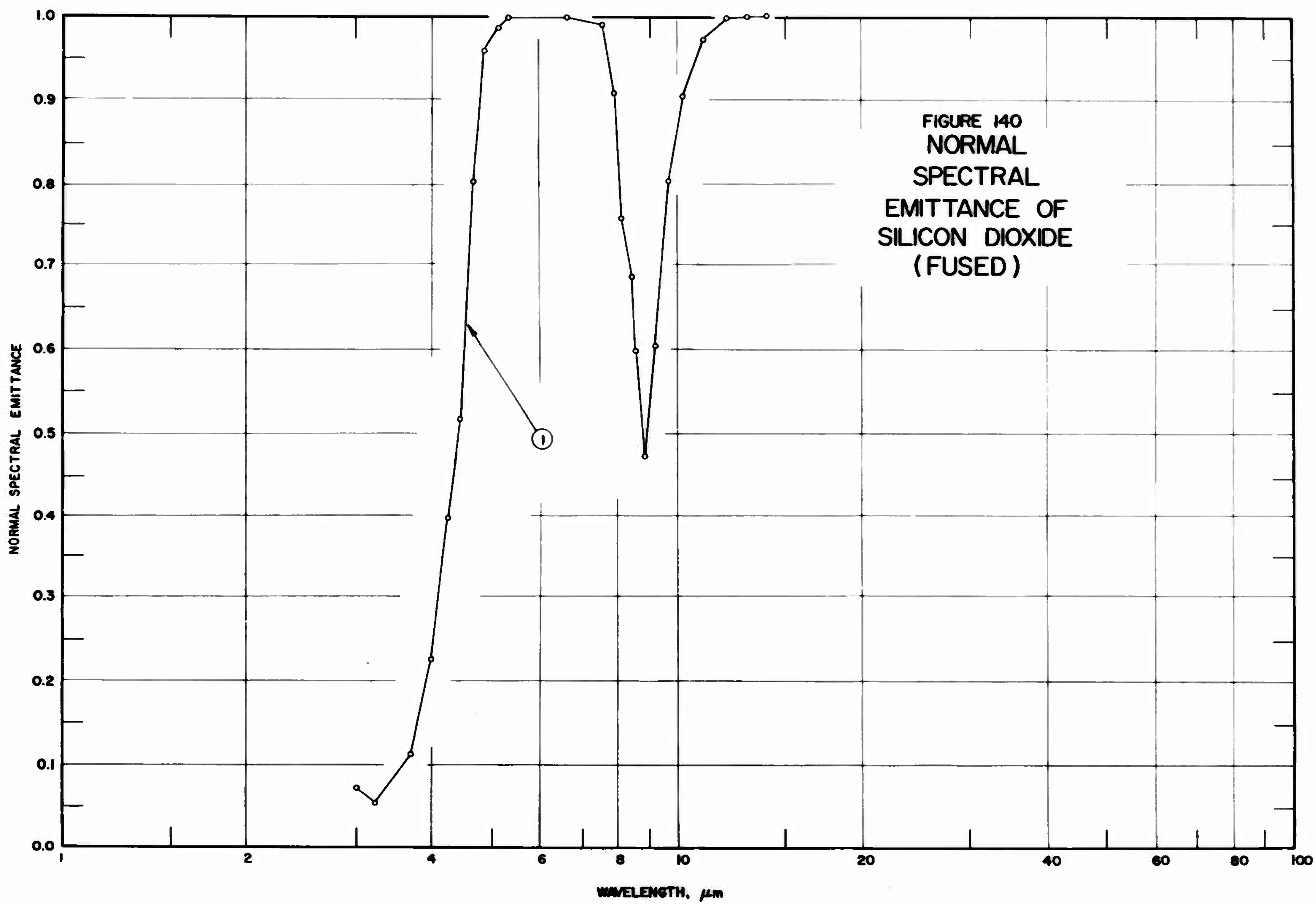


FIGURE 140 NORMAL SPECTRAL EMITTANCE OF SILICON DIOXIDE (FUSED)

SPECIFICATION TABLE NO. 140 NORMAL SPECTRAL EMITTANCE OF SILICON DIOXIDE (Fused) SiO_2

Curve No.	Ref. No.	Year	Temperature K	Wavelength Range, μm	Geometry θ'	Reported Error, %	Composition (weight percent), Specifications, and Remarks
1	52	1961	313	3.00-14.0	~0°		Fused quartz plate (0.84 mm thick); measured in vacuum; data extracted from smooth curve.

DATA TABLE NO. 140 NORMAL SPECTRAL EMITTANCE OF SILICON DIOXIDE (Fused) SiO_2

[Wavelength, λ, μm; Emittance, ϵ; Temperature, T, K]

λ	ϵ	λ	ϵ
CURVE 1 T = 313		CURVE 1 (cont.)	
		9.17	0.603
3.00	0.071	9.67	0.803
3.21	0.054	10.2	0.905
3.67	0.114	11.0	0.973
3.97	0.227	12.0	0.999
4.23	0.398	13.0	1.00
4.43	0.517	14.0	1.00
4.68	0.801		
4.87	0.958		
5.12	0.986		
5.33	0.999		
6.64	0.999		
7.56	0.990		
7.90	0.909		
8.10	0.756		
8.41	0.684		
8.54	0.598		
8.84	0.374		

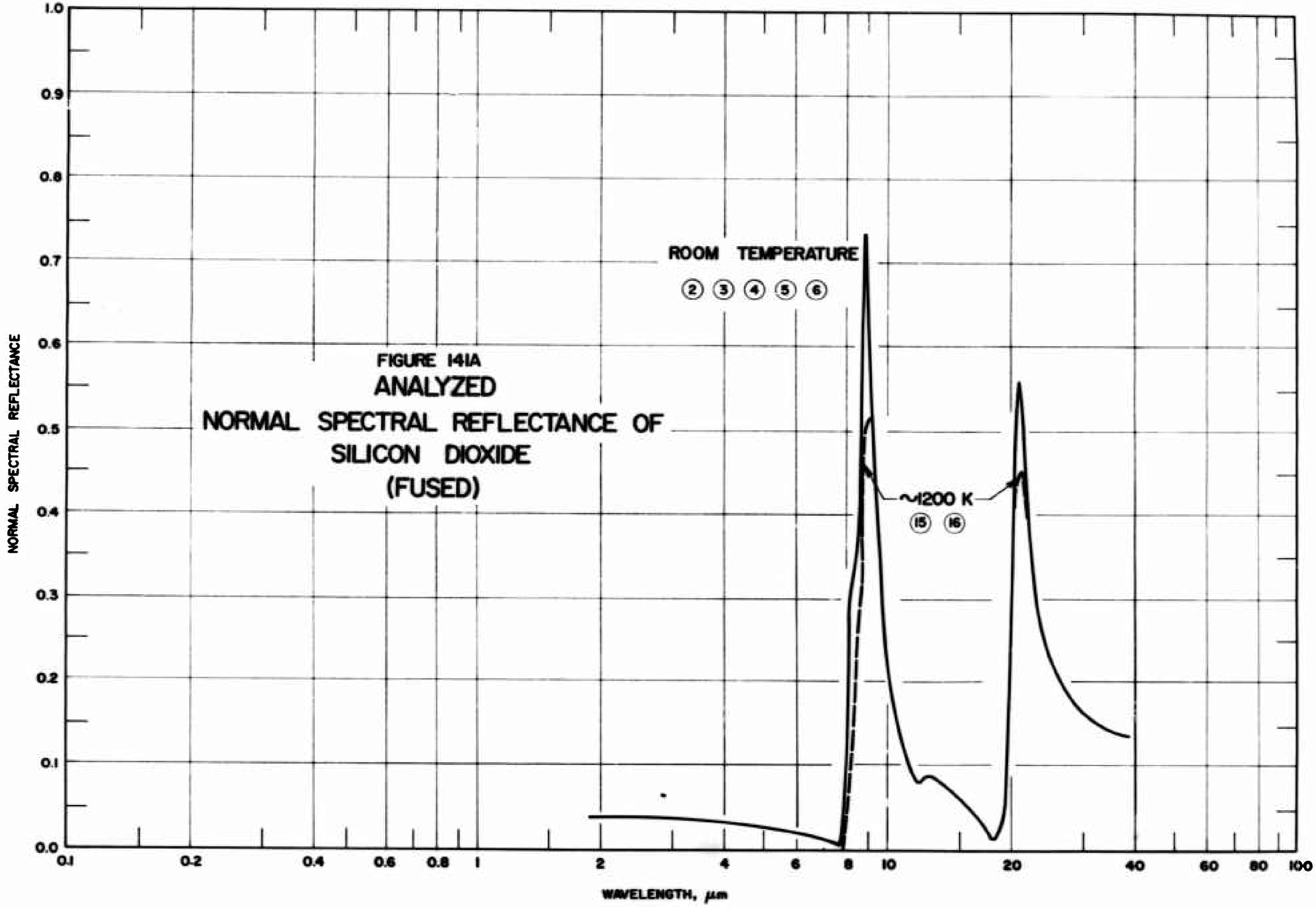


FIGURE 141A
ANALYZED
NORMAL SPECTRAL REFLECTANCE OF
SILICON DIOXIDE
(FUSED)
ROOM TEMPERATURE
2 3 4 5 6
~1200 K
15 16
NORMAL SPECTRAL REFLECTANCE
1.0
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0.0
0.1
0.2
0.4
0.6
0.8
1
2
4
6
8
10
20
40
60
80
100
WAVELENGTH, μm

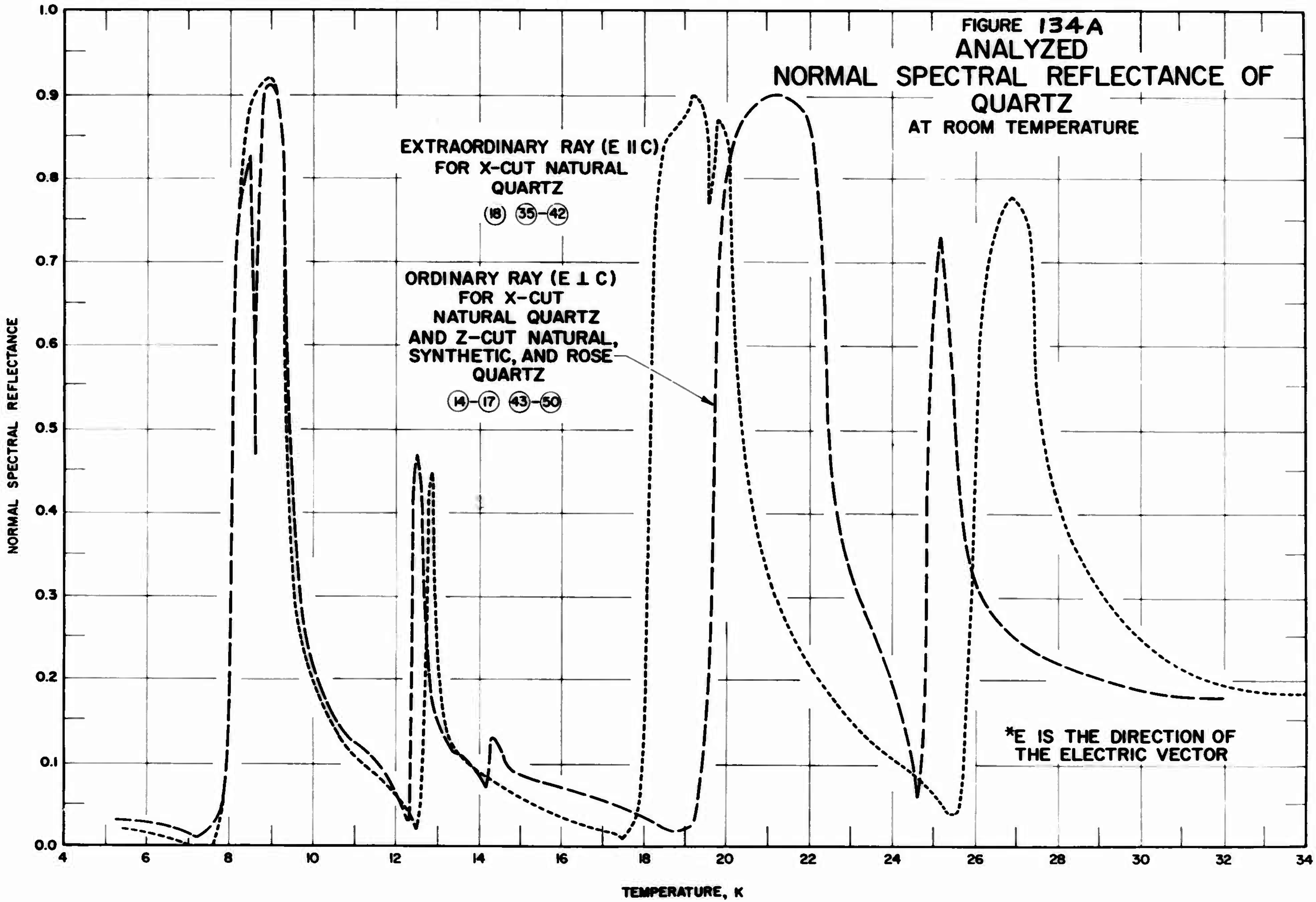


FIGURE 134A
ANALYZED
NORMAL SPECTRAL REFLECTANCE OF
QUARTZ
AT ROOM TEMPERATURE
EXTRAORDINARY RAY (E ∥ C)
FOR X-CUT NATURAL
QUARTZ
(18) (35)-(42)
ORDINARY RAY (E ⊥ C)
FOR X-CUT
NATURAL QUARTZ
AND Z-CUT NATURAL,
SYNTHETIC, AND ROSE
QUARTZ
(14)-(17) (43)-(50)
*E IS THE DIRECTION OF
THE ELECTRIC VECTOR
NORMAL SPECTRAL REFLECTANCE
TEMPERATURE, K
1.0
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0.0
4
6
8
10
12
14
16
18
20
22
24
26
28
30
32
34

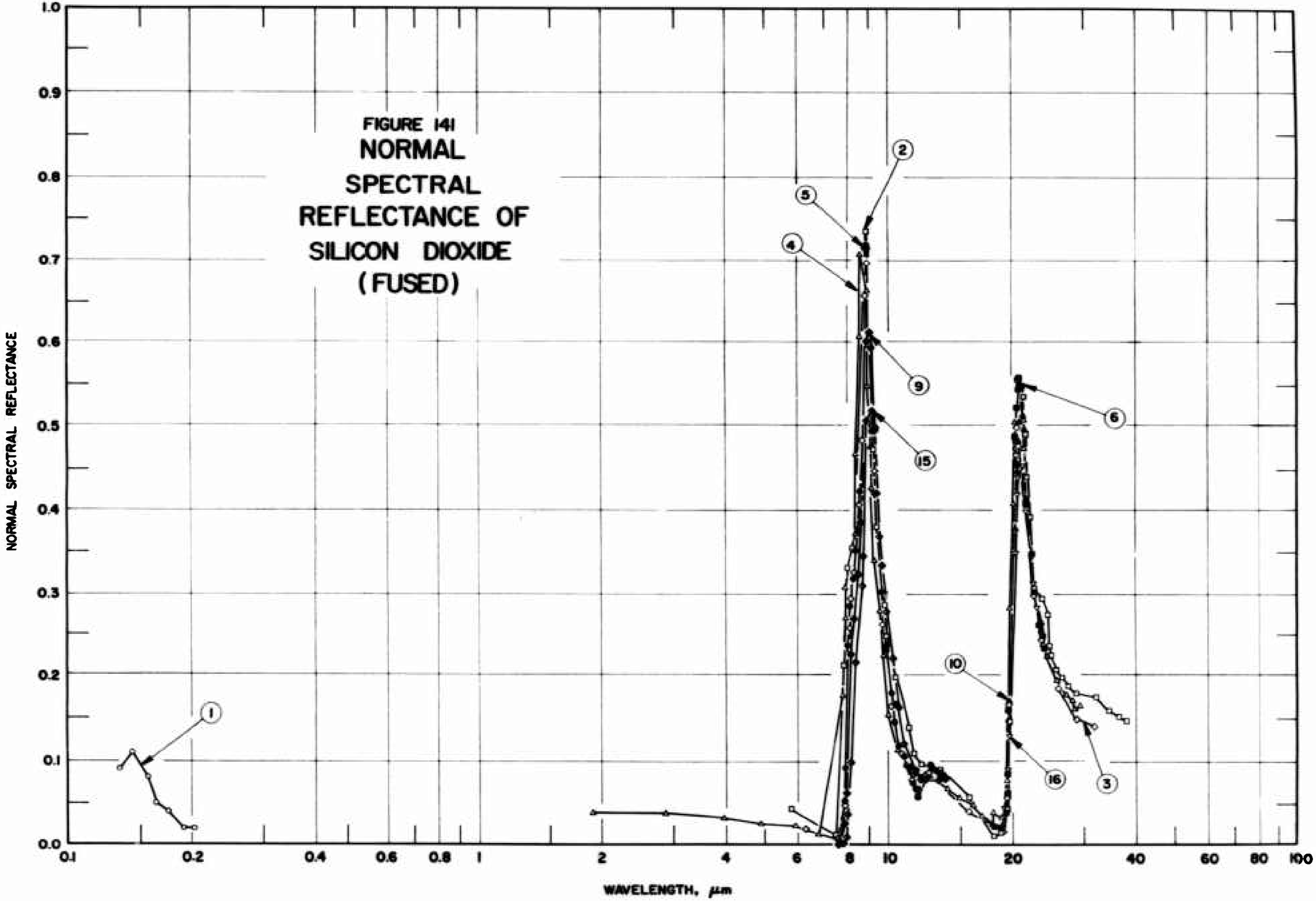


FIGURE 141
NORMAL SPECTRAL REFLECTANCE OF SILICON DIOXIDE (FUSED)

SPECIFICATION TABLE NO. 141 NORMAL SPECTRAL REFLECTANCE OF SILICON DIOXIDE (Fused) SiO_2

Curve No.	Ref. No.	Year	Temperature K	Wavelength Range, μm	Geometry θ	θ'	ω'	Reported Error, %	Composition (weight percent), Specifications, and Remarks
1	14	1941	298	0.1347-0.2026	~0°	~0°			Fused quartz; reflecting surface polished, back surface ground; measured in vacuum (0.001 mm Hg).
2	146	1966	~298	5.80-38.0	~0°	~0°			Fused quartz; data extracted from smooth curve.
3	194	1967	~298	6.25-31.7	~15°	~15°			Fused quartz; two faces polished; data extracted from smooth curve.
4	221	1961	298	1.90-29.0	~0°	~0°			Vitreous silica; aluminum mirror reference standard.
5	381	1965	293	7.51-13.5	~7°	~7°			Vitreous silica; data extracted from smooth curve.
6	381	1965	293	18.0-24.0	~7°	~7°			Above specimen and conditions.
7*	381	1965	480	7.49-13.5	~7°	~7°			Above specimen and conditions.
8*	381	1965	475	19.7-21.8	~7°	~7°			Above specimen and conditions.
9	381	1965	636	7.56-13.5	~7°	~7°			Above specimen and conditions.
10	381	1965	630	19.7-21.8	~7°	~7°			Above specimen and conditions.
11*	381	1965	796	7.64-13.5	~7°	~7°			Above specimen and conditions.
12*	381	1965	805	19.7-21.8	~7°	~7°			Above specimen and conditions.
13	381	1965	1035	7.67-13.5	~7°	~7°			Above specimen and conditions.
14*	381	1965	958	19.7-22.8	~7°	~7°			Above specimen and conditions.
15	381	1965	1179	7.66-13.5	~7°	~7°			Above specimen and conditions.
16	381	1965	1233	19.1-23.0	~7°	~7°			Above specimen and conditions.

*Not shown on plot

DATA TABLE NO. 141 NORMAL SPECTRAL REFLECTANCE OF SILICON DIOXIDE (Fused) SiO_2

[Wavelength, λ, μm; Reflectance, ρ; Temperature, T, K]

λ	ρ
VE 1	
= 298	
.1347	0.09
0.1438	0.11
0.1570	0.08
0.1640	0.05
0.1757	0.04
0.1901	0.02
0.2026	0.02
CURVE 2	
T ~ 298	
5.80	0.042
7.40	0.011
7.80	0.212
8.00	0.330
8.20	0.353
8.40	0.466
8.90	0.736
9.20	0.473
9.40	0.379
9.80	0.285
9.90	0.247
10.4	0.198
11.1	0.139
11.5	0.109
12.0	0.095
13.3	0.088
15.7	0.056
18.0	0.010
18.8	0.012
19.3	0.042
19.7	0.145
20.4	0.468
20.7	0.555
21.2	0.533
21.6	0.490
21.8	0.440
22.1	0.390
22.8	0.306
23.6	0.293
24.2	0.273
24.7	0.235
25.0	0.225
25.7	0.208
26.5	0.197

λ	ρ
CURVE 2 (cont.)	
27.5	0.186
28.8	0.178
32.0	0.171
34.4	0.157
36.2	0.150
38.0	0.145
CURVE 3	
T ~ 298	
6.25	0.019
7.47	0.007
7.82	0.049
8.02	0.257
8.11	0.294
8.33	0.325
8.56	0.405
8.68	0.483
8.81	0.656
8.91	0.698
9.25	0.447
9.70	0.261
10.1	0.162
10.8	0.108
11.4	0.075
11.8	0.065
12.5	0.085
15.7	0.040
18.9	0.015
19.4	0.056
19.8	0.164
20.6	0.498
20.8	0.479
22.5	0.298
23.7	0.241
26.0	0.183
28.9	0.148
31.7	0.140
CURVE 4	
T = 298	
1.90	0.039
2.86	0.037
3.99	0.031
4.89	0.025

λ	ρ
CURVE 4 (cont.)	
5.92	0.021
6.76	0.011
7.79	0.174
7.89	0.259
7.89	0.306
8.33	0.371
8.37	0.468
8.56	0.606
8.59	0.707
8.91	0.662
8.94	0.547
9.04	0.475
9.08	0.427
9.33	0.338
9.53	0.278
9.78	0.224
10.0	0.151
10.5	0.111
11.4	0.081
12.2	0.081
12.9	0.088
13.9	0.065
14.9	0.055
16.0	0.047
16.9	0.035
17.9	0.025
17.9	0.039
18.9	0.031
19.3	0.075
19.6	0.146
19.9	0.280
20.2	0.406
20.3	0.503
20.7	0.554
21.2	0.508
21.4	0.475
21.8	0.405
23.5	0.264
23.9	0.236
24.4	0.222
25.9	0.191
27.0	0.175
28.0	0.169
28.4	0.158
29.0	0.161

λ	ρ
CURVE 5	
T = 293	
7.51	0.005
7.73	0.023
7.82	0.051
7.88	0.090
8.00	0.237
8.09	0.284
8.20	0.318
8.38	0.351
8.45	0.374
8.55	0.422
8.87	0.716
8.92	0.720
8.95	0.716
9.19	0.496
9.33	0.420
9.68	0.301
9.89	0.230
10.1	0.179
10.3	0.144
10.6	0.119
11.0	0.094
11.4	0.073
11.8	0.057
12.2	0.078
12.6	0.095
13.0	0.088
13.3	0.080
13.5	0.078
CURVE 6	
T = 293	
18.0	0.024
18.8	0.024
19.1	0.040
19.3	0.061
19.4	0.084
19.7	0.159
20.4	0.489
20.5	0.522
20.7	0.543
20.9	0.558
21.0	0.549
21.8	0.409
22.3	0.348

λ	ρ
CURVE 6 (cont.)	
22.8	0.303
23.4	0.262
23.7	0.247
24.0	0.236
CURVE 7*	
T = 480	
7.49	0.003
7.76	0.026
7.91	0.086
8.06	0.232
8.15	0.275
8.42	0.341
8.55	0.387
8.62	0.431
8.89	0.646
8.96	0.652
9.02	0.643
9.08	0.595
9.32	0.434
9.73	0.284
9.98	0.212
10.2	0.162
10.6	0.122
11.4	0.078
11.8	0.060
12.2	0.078
12.7	0.094
13.0	0.088
13.3	0.081
13.5	0.078
CURVE 8*	
T = 475	
19.7	0.167
20.3	0.410
20.5	0.494
20.7	0.523
20.9	0.531
21.1	0.522
21.8	0.414

λ	ρ
CURVE 9	
T = 636	
7.56	0.000
7.82	0.026
7.92	0.061
8.12	0.226
8.23	0.270
8.42	0.324
8.60	0.385
8.92	0.602
9.01	0.615
9.07	0.595
9.21	0.495
9.36	0.420
9.62	0.333
9.93	0.234
10.3	0.164
10.9	0.107
11.2	0.091
11.8	0.065
12.2	0.078
12.6	0.091
13.0	0.088
13.3	0.081
13.5	0.078
CURVE 10	
T = 630	
19.7	0.167
20.2	0.378
20.5	0.447
20.6	0.483
20.8	0.503
21.0	0.511
21.2	0.497
21.8	0.411
CURVE 11*	
T = 796	
7.64	0.000
7.92	0.043
8.06	0.134
8.16	0.207
8.26	0.251
8.49	0.313

λ	ρ
CURVE 11 (cont.)*	
8.62	0.365
8.76	0.433
9.00	0.559
9.08	0.565
9.13	0.553
9.42	0.413
9.73	0.307
10.0	0.209
10.4	0.150
11.8	0.073
12.2	0.078
12.6	0.089
13.0	0.088
13.3	0.081
13.5	0.078
CURVE 12*	
T = 805	
19.7	0.153
20.0	0.244
20.4	0.399
20.5	0.427
20.7	0.459
20.9	0.484
21.0	0.491
21.3	0.473
21.6	0.442
21.8	0.412
CURVE 13	
T = 1035	
7.67	0.000
7.86	0.019
8.01	0.068
8.24	0.199
8.51	0.296
8.74	0.385
9.01	0.516
9.10	0.531
9.17	0.520
9.36	0.452
9.79	0.297
10.0	0.228
10.3	0.171

λ	ρ
CURVE 13 (cont.)	
10.7	0.128
11.2	0.099
11.7	0.075
12.2	0.078
12.6	0.088
13.0	0.088
13.3	0.081
13.5	0.078
CURVE 14*	
T = 958	
19.7	0.138
19.9	0.245
20.5	0.404
20.6	0.436
20.8	0.460
20.9	0.474
21.0	0.478
21.3	0.466
21.6	0.435
22.0	0.383
22.4	0.324
22.8	0.298
CURVE 15	
T = 1179	
7.66	0.000
7.83	0.009
7.95	0.037
8.10	0.099
8.31	0.216
8.63	0.309
8.74	0.345
9.06	0.505
9.16	0.518
9.26	0.497
9.59	0.368
9.88	0.278
10.1	0.220
10.5	0.160
10.9	0.120
11.5	0.087
11.9	0.078
12.2	0.078

*Not shown on plot

DATA TABLE NO. 141 (continued)

λ	ρ
CURVE 15 (cont.) T = 1179	
12.7	0.088*
13.0	0.088*
13.3	0.0788
13.5	0.078*
CURVE 16 T = 1233	
19.1	0.042
19.5	0.087
19.6	0.128
20.4	0.349
20.7	0.417
20.8	0.439
21.1	0.454
21.4	0.441
21.8	0.397
22.2	0.346
22.6	0.311
23.0	0.280

n on plot

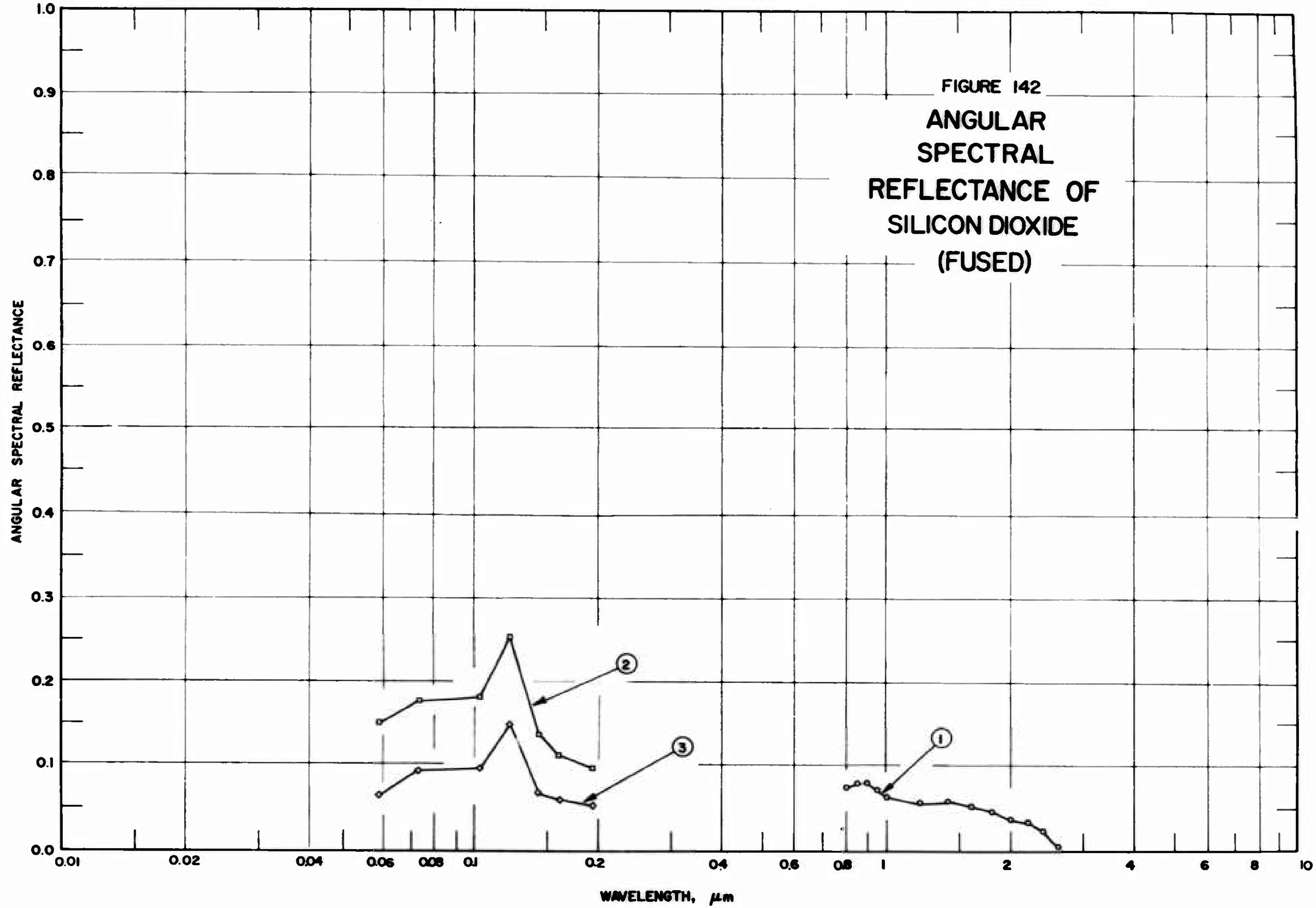


FIGURE 142
ANGULAR SPECTRAL REFLECTANCE OF SILICON DIOXIDE (FUSED)

SPECIFICATION TABLE NO. 142 ANGULAR SPECTRAL REFLECTANCE OF SILICON DIOXIDE (Fused) SiO_2

Curve No.	Ref. No.	Year	Temperature K	Wavelength Range, μm	Geometry θ	θ'	ω'	Reported Error, %	Composition (weight percent), Specifications, and Remarks
1	224	1964	298	0.800-2.60	45°	45°			Fused quartz; clear; aluminum mirror reference standard.
2	228	1965	~298	0.0584-0.1930	45°	45°			Silica (6 mm thick); measured in vacuum with the plane of incidence perpendicular to exit slit of the monochrometer.
3	228	1965	~298	0.0584-0.1930	45°	45°			Above specimen and conditions except measured with the plane of incidence parallel to exit slit of the monochrometer.

DATA TABLE NO. 142 ANGULAR SPECTRAL REFLECTANCE OF SILICON DIOXIDE (Fused) SiO_2

[Wavelength, λ, μm; Reflectance, ρ; Temperature, T, K]

λ	ρ	λ	ρ
CURVE 1	T = 298	**CURVE 2**	T ~ 298
0.800	0.074	0.0584	0.150
0.850	0.078	0.0736	0.176
0.900	0.079	0.1026	0.180
0.950	0.070	0.1216	0.252
1.00	0.062	0.1436	0.136
1.20	0.056	0.1606	0.110
1.40	0.058	0.1930	0.093
1.60	0.052		
1.80	0.047	**CURVE 3**	
2.00	0.038	T ~ 298	
2.20	0.035		
2.40	0.025	0.0584	0.062
2.60	0.007	0.0736	0.091
		0.1026	0.095
		0.1216	0.149
		0.1436	0.067
		0.1606	0.058
		0.1930	0.051

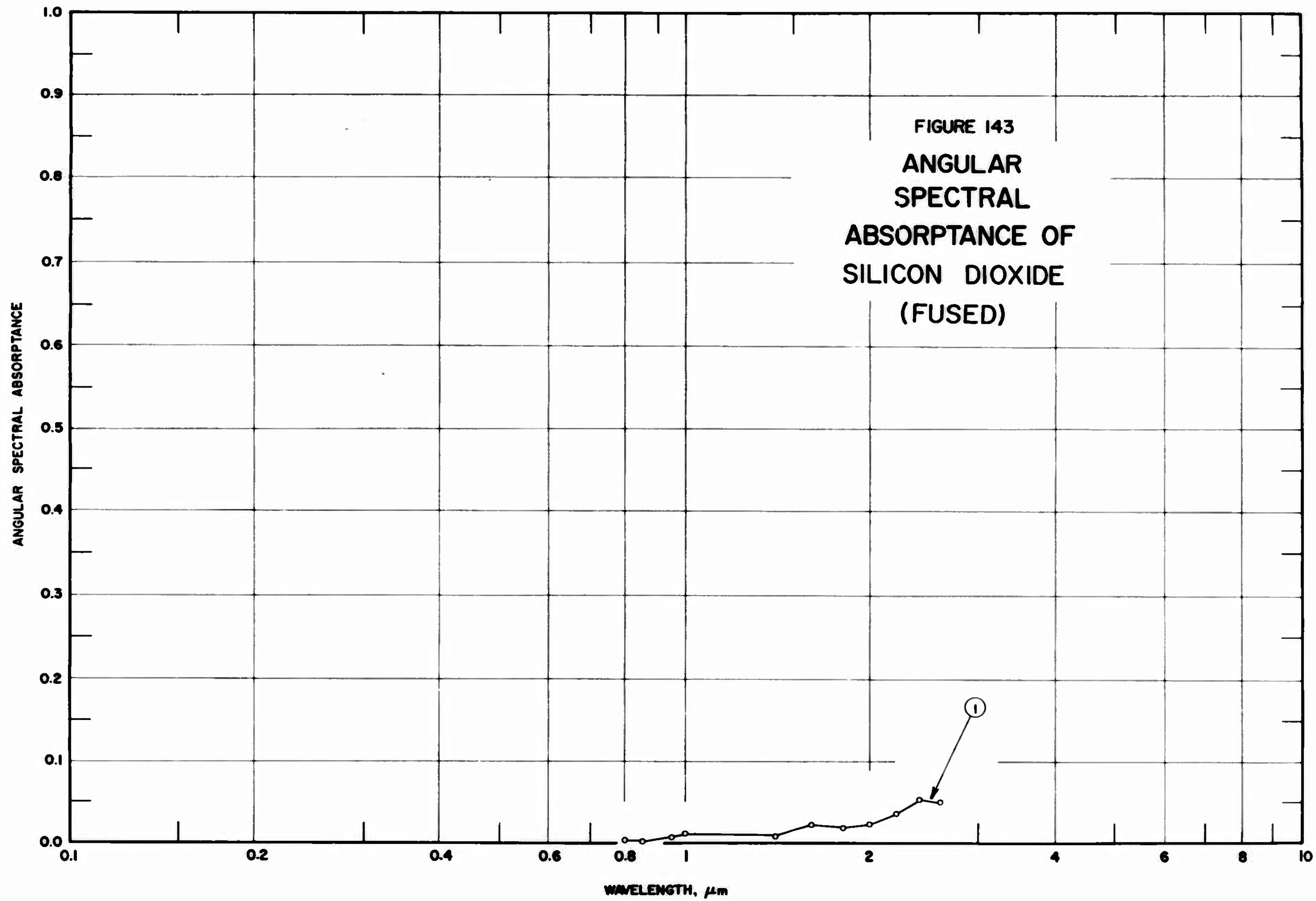


FIGURE 143
ANGULAR SPECTRAL ABSORPTANCE OF SILICON DIOXIDE (FUSED)

SPECIFICATION TABLE NO. 143 ANGULAR SPECTRAL ABSORPTANCE OF SILICON DIOXIDE (Fused) SiO_2

Curve No.	Ref. No.	Year	Temperature K	Wavelength Range, μm	Geometry θ	Reported Error, %	Composition (weight percent), Specifications, and Remarks
1	224	1964	298	0.80-2.60	45°		Fused quartz; clear; author assumed $\alpha(45°) = 1 - \rho(45°, 45°) - \tau(0°, 0°)$.

DATA TABLE NO. 143 ANGULAR SPECTRAL ABSORPTANCE OF SILICON DIOXIDE (Fused) SiO_2

[Wavelength, λ, μm; Absorptance, α; Temperature, T, K]

λ	α
CURVE 1	
T = 298	
0.80	0.003
0.85	0.002
0.95	0.007
1.00	0.011
1.40	0.008
1.60	0.021
1.80	0.019
2.00	0.023
2.20	0.037
2.40	0.051
2.60	0.050

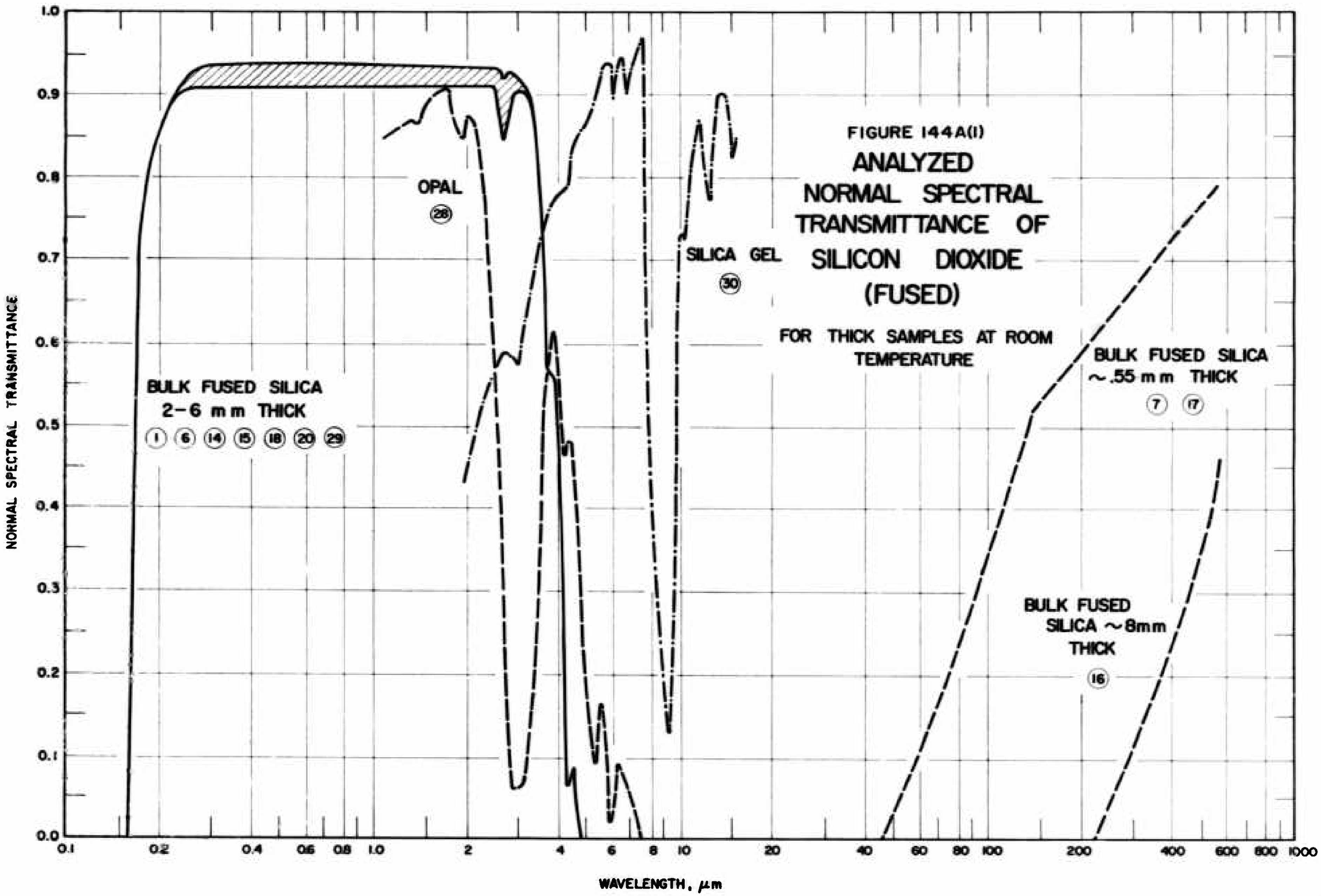


FIGURE 144A(I) ANALYZED NORMAL SPECTRAL TRANSMITTANCE OF SILICON DIOXIDE (FUSED)

FOR THICK SAMPLES AT ROOM TEMPERATURE

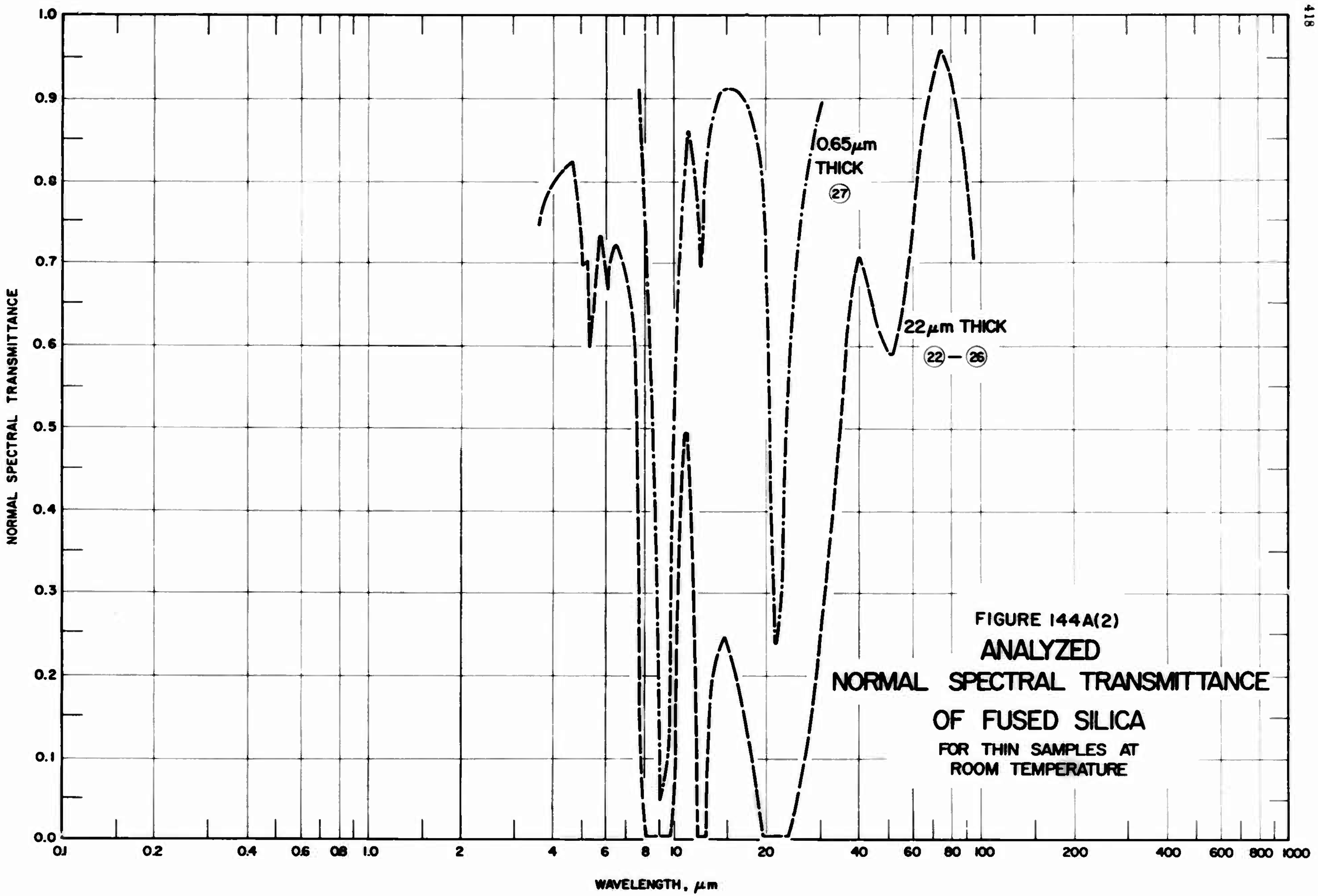


FIGURE 144A(2)
ANALYZED
NORMAL SPECTRAL TRANSMITTANCE
OF FUSED SILICA
FOR THIN SAMPLES AT
ROOM TEMPERATURE

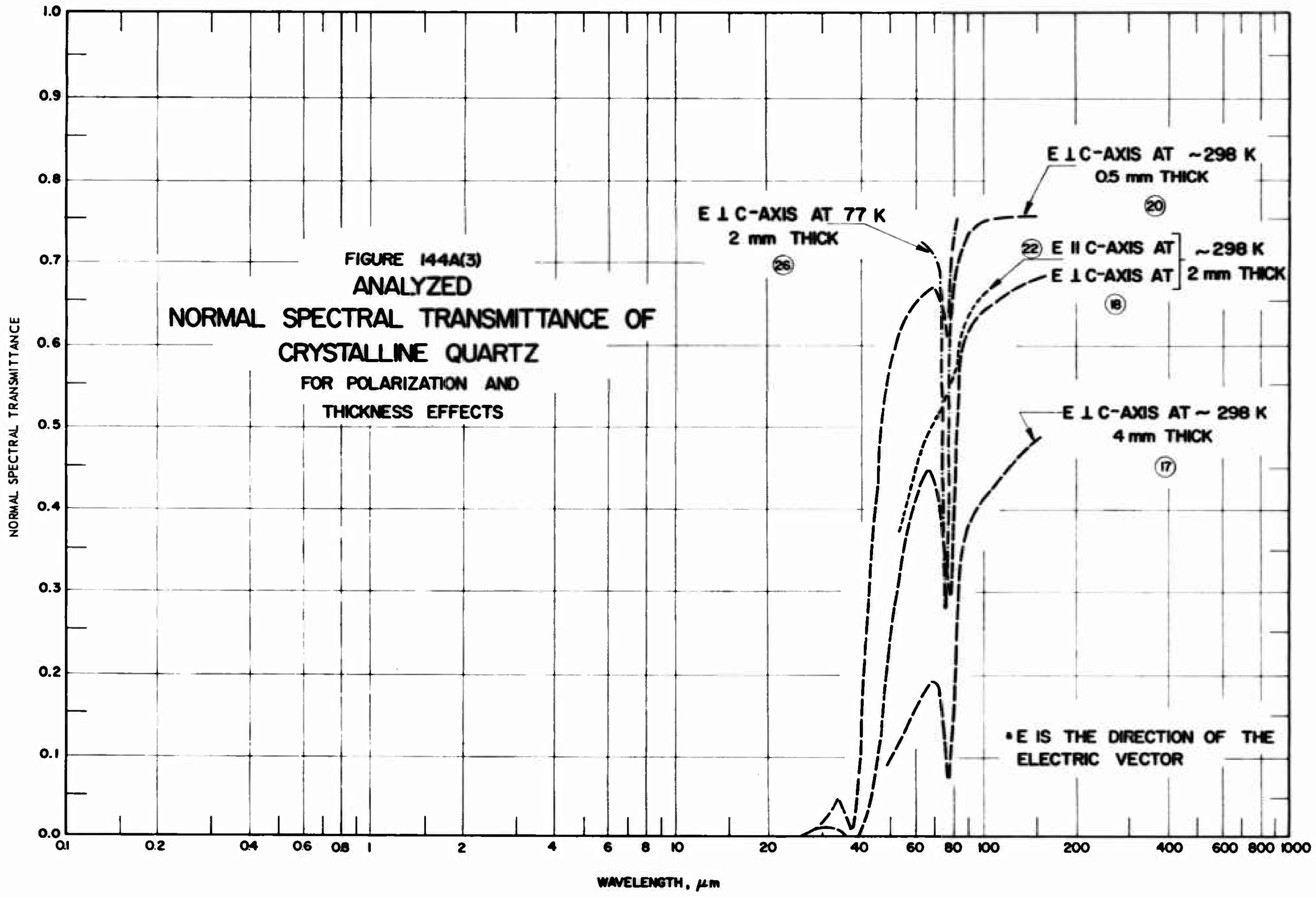


FIGURE 144A(3)
ANALYZED
NORMAL SPECTRAL TRANSMITTANCE OF
CRYSTALLINE QUARTZ
FOR POLARIZATION AND
THICKNESS EFFECTS
E ⊥ C-AXIS AT ~298 K
0.5 mm THICK
20
E ⊥ C-AXIS AT 77 K
2 mm THICK
26
22 E ∥ C-AXIS AT
E ⊥ C-AXIS AT
~298 K
2 mm THICK
18
E ⊥ C-AXIS AT ~ 298 K
4 mm THICK
17
• E IS THE DIRECTION OF THE ELECTRIC VECTOR
NORMAL SPECTRAL TRANSMITTANCE
WAVELENGTH, μm
1.0
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0.0
0.1
0.2
0.4
0.6
0.8
1
2
4
6
8
10
20
40
60
80
100
200
400
600
800
1000

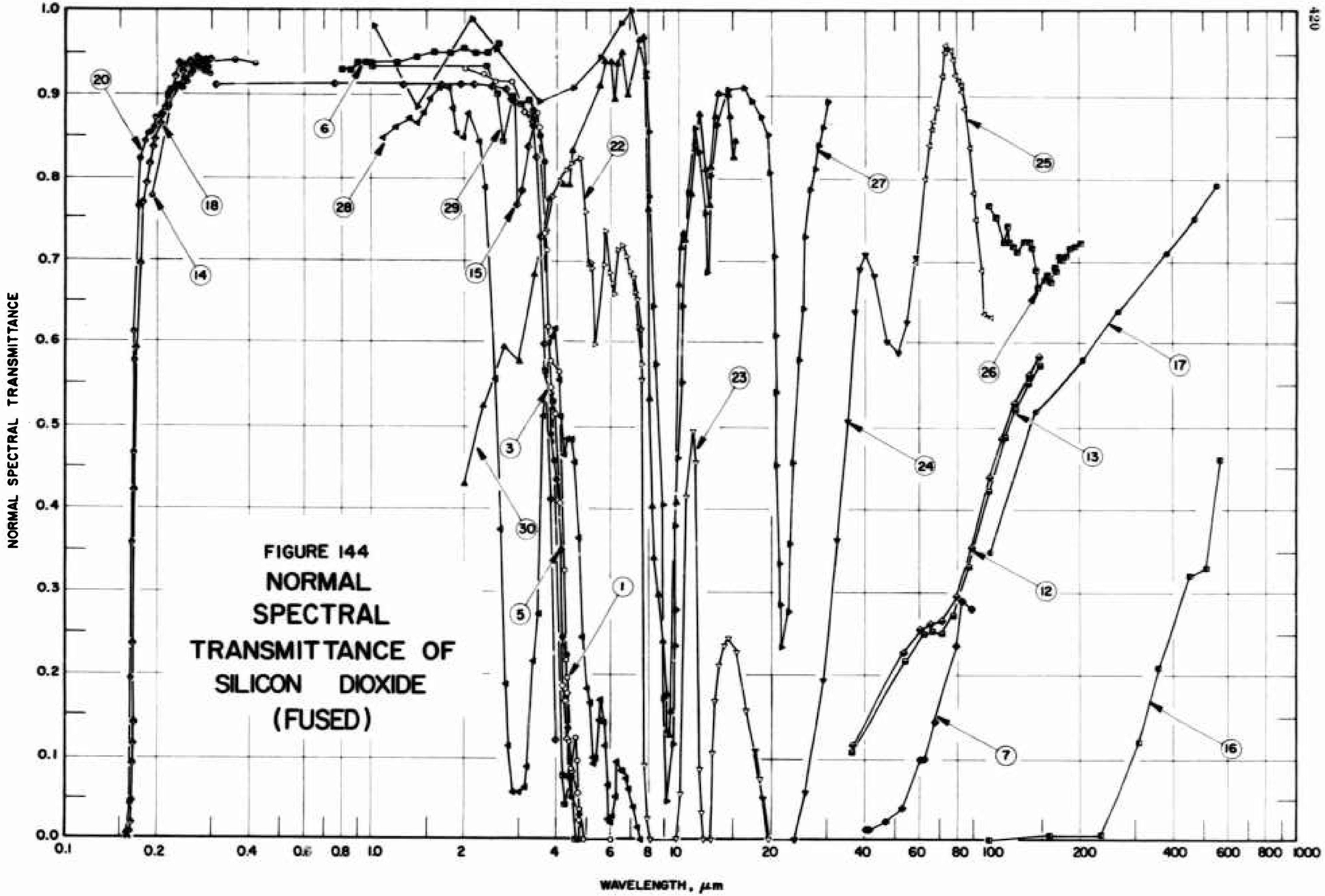


FIGURE 144
NORMAL
SPECTRAL
TRANSMITTANCE OF
SILICON DIOXIDE
(FUSED)

SPECIFICATION TABLE NO. 144 NORMAL SPECTRAL TRANSMITTANCE OF SILICON DIOXIDE (Fused) SiO_2

Curve No.	Ref. No.	Year	Temperature K	Wavelength Range, µm	Geometry θ	θ'	ω'	Reported Error, %	Composition (weight percent), Specifications, and Remarks
1	288	1965	298	2.00-6.00	0°	0°			Fused quartz, GE type 106 (2.8 mm thick); polished optically flat to within five green mercury fringes and a parallelism tolerance of ± 2.5 µm; data extracted from smooth curve.
2*	288	1965	373	2.00-6.00	0°	0°			Above specimen and conditions.
3	288	1965	473	2.00-6.00	0°	0°			Above specimen and conditions.
4*	288	1965	573	2.00-6.00	0°	0°			Above specimen and conditions.
5	288	1965	673	2.00-6.00	0°	0°			Above specimen and conditions.
6	224	1964	298	0.800-2.60	0°	0°			Clear fused quartz (~1.6 mm thick).
7	71	1963	298	40.9-88.7	0°	0°		± 30	Fused quartz (0.53 mm thick).
8*	225	1966	298	0.190-0.300	0°	0°			Fused silica; two 0.0625 in.-thick air-spaced Suprasil II fused silica disks (from Amersil Quartz Div., Engelhard Industries, Inc.).
9*	225	1966	298	0.190-0.300	0°	0°			Similar to the above specimen except cemented by 0.0002-in.-thick d-xylose obtained from Difco Labs, Detroit.
10*	226	1967	4.2	47.8-98.8	~0°	~0°			Fused quartz plate (0.4 mm thick); heated for 16 hrs at 1725 K and was substantially devitrified into crystalline α-cristobalite; electric vector E perpendicular to c-axis; data extracted from smooth curve.
11*	226	1967	300	40.0-149	~0°	~0°			Above specimen and conditions.
12	226	1967	4.2	36.8-149	~0°	~0°			Fused quartz plate (0.4 mm thick); data extracted from smooth curve.
13	226	1967	300	37.5-149	~0°	~0°			Above specimen and conditions.
14	227	1966	298	0.191-0.418	0°	0°			Fused quartz (2 mm thick); surfaces plane-parallel; data extracted from smooth curve.
15	298	1936	~298	0.310-3.97	~0°	~0°			Synthetic fused quartz (5.45 mm thick).
16	292	1950	~298	101-569	~0°	~0°			Fused quartz (8.30 mm thick).
17	292	1950	~298	103-559	~0°	~0°			Fused quartz (0.560 mm thick).
18	291	1966	~298	0.1601-0.3000	0°	0°			Dynasil optical grade high-purity fused silica (6.46 mm thick); measured in vacuum.
19*	291	1966	~298	0.1601-0.3000	0°	0°			Above specimen and conditions except irradiated with 10^{14} electrons cm^{-2} at 1.0 MeV and 2.0 MeV.
20	291	1966	~298	0.1598-0.3000	0°	0°			Fused silica (2.04 mm thick) from Dynasil; transmission limit 1850 Å; measured in vacuum.
21*	291	1966	~298	0.1599-0.3000	0°	0°			Above specimen and conditions except irradiated with 10^{14} electrons cm^{-2} at 2.0 MeV incident through a sapphire shield (6.4 mm thick).
22	385	1965	~298	3.70-7.52	~0°	~0°			Fused silica (22 ± 2 x 10^{-3} mm thickness); cut and ground but not polished; data extracted from smooth curve.
23	385	1965	~298	7.14-19.5	~0°	~0°			Above specimen and conditions.

*Not shown on plot

SPECIFICATION TABLE NO. 144 (continued)

Curve No.	Ref. No.	Year	Temperature K	Wavelength Range, μm	Geometry θ	θ'	ω'	Reported Error, %	Composition (weight percent), Specifications, and Remarks
24	385	1965	~298	17.9-58.5	~0°	~0°			Above specimen and conditions.
25	385	1965	~298	58.8-103	~0°	~0°			Above specimen and conditions.
26	385	1965	~298	102-200	~0°	~0°			Above specimen and conditions.
27	221	1961	298	1.03-30.42	~0°	~0°			Vitreous silica (6500 Å thick).
28	294	1906	~298	1.07-7.49	~0°	~0°			Opal, $SiO_2 \cdot xH_2O$, massive, transparent; thickness 0.12 mm.
29	137	1965	298	1.00-4.62	0°	0°			Fused silica (3.18 mm thick); data extracted from smooth curve.
30	233	1964	298	2.0-15.0	~0°	~0°			Silica gel.
31*	131	1965	293	5.88-39.1	~0°	~0°			50 mg crushed fused quartz in 2 gm polyethylene binder; data extracted from smooth curve.

*Not shown on plot

DATA TABLE NO. 144 NORMAL SPECTRAL TRANSMITTANCE OF SILICON DIOXIDE (Fused) SiO_2

[Wavelength, λ, μm; Transmittance, τ; Temperature, T, K]

λ	τ
CURVE 1	**T = 298**
2.00	0.933
2.31	0.928
2.53	0.919
2.84	0.919
3.15	0.881
3.49	0.881
3.72	0.715
3.77	0.620
3.84	0.578
4.03	0.565
4.22	0.328
4.30	0.318
4.34	0.196
4.40	0.119
4.48	0.085
4.60	0.125
4.66	0.097
4.76	0.038
4.86	0.000
6.00	0.000
CURVE 2*	**T = 373**
2.00	0.933
2.30	0.929
2.52	0.919
2.84	0.919
3.14	0.881
3.49	0.881
3.61	0.799
3.72	0.697
3.77	0.620
3.86	0.562
3.94	0.562
4.02	0.549
4.16	0.403
4.22	0.318
4.28	0.308
4.33	0.201
4.37	0.130
4.48	0.084
4.60	0.100
4.71	0.060

λ	τ
CURVE 2 (cont.)*	
4.76	0.028
4.86	0.000
6.00	0.000
CURVE 3	**T = 473**
2.00	0.933*
2.31	0.928*
2.52	0.919*
2.84	0.919*
3.14	0.881
3.52	0.862
3.68	0.734
3.84	0.549
3.98	0.516
4.10	0.406
4.20	0.287
4.30	0.268
4.35	0.176
4.38	0.124
4.48	0.084
4.70	0.058
4.76	0.024
4.86	0.000*
6.00	0.000*
CURVE 4*	**T = 573**
2.00	0.933
2.31	0.928
2.52	0.919
2.84	0.919
3.14	0.881
3.52	0.863
3.68	0.734
3.82	0.544
4.02	0.473
4.07	0.440
4.15	0.348
4.20	0.274
4.29	0.256
4.34	0.168
4.37	0.114

λ	τ
CURVE 4 (cont.)*	
4.44	0.076
4.72	0.043
4.78	0.022
4.86	0.000
6.00	0.000
CURVE 5	**T = 673**
2.00	0.933*
2.30	0.928*
2.52	0.919*
2.84	0.919*
3.14	0.881*
3.37	0.872
3.52	0.852
3.67	0.721
3.83	0.490
3.90	0.459
4.00	0.437
4.11	0.352
4.19	0.248
4.31	0.224
4.35	0.136
4.39	0.077
4.47	0.052
4.71	0.031
4.78	0.000
6.00	0.000*
CURVE 6	**T = 298**
0.800	0.931
0.850	0.931
0.900	0.940
0.950	0.940
1.00	0.940
1.20	0.940
1.40	0.946
1.60	0.951
1.80	0.951
2.00	0.956
2.20	0.951
2.40	0.951
2.60	0.962

λ	τ
CURVE 7	**T = 298**
40.9	0.012
41.8	0.012
46.9	0.022
52.9	0.040
60.9	0.100
62.0	0.100
67.8	0.146
79.6	0.237
83.6	0.287
88.7	0.280
CURVE 8*	**T = 298**
0.190	0.695
0.200	0.768
0.210	0.831
0.220	0.864
0.250	0.887
0.300	0.909
CURVE 9*	**T = 298**
0.190	0.739
0.200	0.761
0.210	0.800
0.220	0.817
0.250	0.840
0.300	0.851
CURVE 10*	**T = 4.2**
47.8	0.454
50.8	0.454
56.3	0.418
59.6	0.361
61.9	0.250
63.1	0.153
64.7	0.124
66.0	0.142
67.7	0.321
70.4	0.422

λ	τ
CURVE 10 (cont.)*	
73.4	0.496
75.4	0.529
80.0	0.573
84.7	0.597
94.1	0.626
98.8	0.637
CURVE 11*	**T = 300**
40.0	0.143
47.6	0.269
52.4	0.318
54.7	0.326
58.5	0.297
62.6	0.213
70.0	0.029
72.2	0.057
74.1	0.121
77.4	0.300
82.0	0.401
89.5	0.492
97.0	0.555
108	0.616
132	0.711
141	0.735
149	0.751
CURVE 12	**T = 4.2**
36.8	0.117
53.9	0.229
60.6	0.257
65.5	0.264
71.8	0.267
79.4	0.295
89.5	0.357
101	0.440
110	0.487
123	0.530
137	0.564
149	0.583

λ	τ
CURVE 13	**T = 300**
37.5	0.109
54.1	0.219
62.2	0.252
66.5	0.255
71.7	0.252
77.3	0.272
87.5	0.332
101	0.422
113	0.488
124	0.524
136	0.553
149	0.574
CURVE 14	**T = 298**
0.191	0.777
0.216	0.889
0.243	0.921
0.291	0.942
0.358	0.942
0.418	0.939
CURVE 15	**T ~ 298**
0.310	0.912
0.750	0.914
1.26	0.915
1.69	0.915
1.93	0.915
2.17	0.915
2.46	0.914
2.73	0.909
2.85	0.899
2.93	0.893
2.98	0.767
3.09	0.785
3.22	0.838
3.39	0.864
3.45	0.826
3.57	0.730
3.69	0.599
3.81	0.411
3.97	0.121

λ	τ
CURVE 16 (cont.)	
101	0.00
159	0.04
231	0.04
308	0.12
360	0.21
450	0.32
510	0.33
569	0.46
CURVE 17	**T ~ 298**
103	0.35
144	0.52
204	0.58
262	0.64
380	0.71
463	0.75
559	0.79
CURVE 18	**T ~ 298**
0.1601	0.000
0.1612	0.008
0.1620	0.018
0.1628	0.045
0.1636	0.091
0.1639	0.117
0.1641	0.141
0.1652	0.238
0.1671	0.421
0.1697	0.591
0.1748	0.696
0.1795	0.769
0.1849	0.795
0.1896	0.817
0.1946	0.837
0.1997	0.846
0.2045	0.867
0.2097	0.877
0.2148	0.886
0.2196	0.901
0.2247	0.907
0.2298	0.924
0.2348	0.939

λ	τ
CURVE 18 (cont.)	
0.2400	0.929
0.2449	0.936
0.2497	0.936
0.2550	0.941
0.2598	0.928
0.2649	0.934
0.2697	0.945
0.2748	0.932
0.2798	0.936
0.2848	0.935
0.2898	0.942
0.2949	0.941
0.3000	0.942
CURVE 19*	**T ~ 298**
0.1601	0.000
0.1614	0.002
0.1628	0.029
0.1641	0.071
0.1652	0.148
0.1667	0.265
0.1699	0.437
0.1748	0.584
0.1799	0.650
0.1848	0.698
0.1897	0.725
0.1948	0.738
0.1997	0.749
0.2046	0.735
0.2097	0.740
0.2146	0.750
0.2197	0.756
0.2247	0.784
0.2298	0.793
0.2347	0.817
0.2396	0.841
0.2448	0.855
0.2498	0.869
0.2549	0.888
0.2599	0.890
0.2648	0.891
0.2697	0.913
0.2748	0.916
0.2799	0.930

* Not shown on plot

DATA TABLE NO. 144 (continued)

λ	τ
CURVE 19 (cont.)	
T ~ 298	
0.2848	0.928
0.2899	0.929
0.2951	0.925
0.3000	0.929
CURVE 20	
T ~ 298	
0.1598	0.004
0.1607	0.044
0.1631	0.193
0.1647	0.359
0.1656	0.469
0.1667	0.578
0.1667	0.612
0.1701	0.763
0.1749	0.824
0.1803	0.845
0.1850	0.853
0.1901	0.855
0.1952	0.861
0.1999	0.872
0.2053	0.875
0.2102	0.886
0.2150	0.899
0.2200	0.905
0.2249	0.903
0.2300	0.912
0.2350	0.912
0.2400	0.908
0.2453	0.921
0.2500	0.918
0.2550	0.928
0.2600	0.936
0.2648	0.939
0.2704	0.940
0.2751	0.942
0.2796	0.928*
0.2850	0.929
0.2902	0.937
0.2946	0.942*
0.3000	0.927

λ	τ
CURVE 21*	
T ~ 298	
0.1599	0.011
0.1606	0.045
0.1631	0.193
0.1649	0.359
0.1667	0.580
0.1667	0.612
0.1702	0.762
0.1750	0.849
0.1799	0.869
0.1850	0.875
0.1904	0.881
0.1951	0.886
0.1999	0.890
0.2051	0.894
0.2100	0.902
0.2149	0.909
0.2200	0.909
0.2250	0.901
0.2301	0.910
0.2351	0.922
0.2399	0.914
0.2450	0.921
0.2498	0.919
0.2550	0.927
0.2599	0.923
0.2648	0.923
0.2701	0.927
0.2752	0.924
0.2799	0.927
0.2853	0.929
0.2902	0.929
0.2948	0.926
0.3000	0.907
CURVE 22	
T = 298	
3.70	0.739
3.89	0.778
4.03	0.799
4.22	0.810
4.44	0.819
4.75	0.825
4.91	0.759
5.03	0.699

λ	τ
CURVE 22 (cont.)	
5.14	0.699
5.19	0.691
5.31	0.597
5.60	0.696
5.69	0.737
5.94	0.686
6.07	0.673
6.14	0.661
6.37	0.713
6.44	0.719
6.76	0.706
6.95	0.687
7.15	0.663
7.34	0.619
7.52	0.574
CURVE 23	
T ~ 298	
7.14	0.680
7.29	0.654
7.43	0.617
7.51	0.556
7.79	0.090
7.91	0.026
8.04	0.000
9.94	0.000
10.1	0.057
10.6	0.413
11.2	0.493
11.4	0.456
11.7	0.087
11.8	0.034
12.0	0.000
12.6	0.000
12.8	0.106
13.1	0.168
13.5	0.212
14.0	0.236
14.7	0.245
15.5	0.229
16.9	0.158
18.2	0.075
19.5	0.000

λ	τ
CURVE 24	
T ~ 298	
17.9	0.110
18.7	0.051
19.6	0.000
23.8	0.000
25.8	0.059
29.1	0.193
32.7	0.363
35.3	0.507
37.5	0.640
38.8	0.690
40.5	0.708
43.3	0.682
47.8	0.601
51.5	0.588
54.9	0.625
58.5	0.705
CURVE 25	
T ~ 298	
58.8	0.700
63.1	0.800
65.0	0.840
66.1	0.860
67.4	0.870
69.9	0.889
72.0	0.926
73.4	0.955
73.9	0.962
76.1	0.956
77.3	0.944
78.2	0.928
80.5	0.920
82.1	0.917
83.4	0.906
85.5	0.886
88.0	0.837
90.7	0.782
92.7	0.750
96.1	0.689
98.7	0.637
103	0.631

λ	τ
CURVE 26	
T ~ 298	
102	0.768
107	0.752
113	0.724
116	0.744
118	0.724
122	0.719
125	0.711
131	0.725
136	0.725
140	0.716
144	0.690
147	0.669
153	0.678
157	0.683
161	0.675
166	0.692
169	0.689
171	0.707
176	0.701
181	0.706
185	0.716
192	0.719
200	0.721
CURVE 27	
T = 298	
1.03	0.983
1.40	0.886
2.13	0.992
2.53	0.956
3.51	0.894
4.51	0.910
5.50	0.948
6.45	0.987
7.02	1.00
7.71	0.931
7.93	0.858
7.99	0.777
8.23	0.646
8.42	0.574
8.85	0.403
8.85	0.170
9.10	0.049
9.54	0.116

λ	τ
CURVE 27 (cont.)	
9.69	0.236
9.71	0.278
9.85	0.380
9.99	0.461
10.06	0.552
10.16	0.646
10.80	0.782
11.46	0.862
11.78	0.831
12.09	0.758
12.48	0.686
12.95	0.803
13.41	0.866
14.47	0.908
16.37	0.911
17.37	0.895
18.85	0.878
19.61	0.853
19.92	0.807
20.23	0.706
20.47	0.608
20.76	0.544
20.96	0.453
21.20	0.338
21.38	0.284
21.65	0.235
22.36	0.276
22.87	0.360
23.43	0.456
24.42	0.580
25.04	0.644
25.89	0.730
26.98	0.786
27.55	0.811
28.35	0.840
29.04	0.861
30.42	0.895
CURVE 28	
T ~ 298	
1.07	0.850
1.19	0.862
1.32	0.874
1.40	0.869
1.48	0.880

λ	τ
CURVE 28 (cont.)	
1.55	0.897
1.68	0.910
1.79	0.910
1.83	0.884
1.89	0.855
1.97	0.850
2.08	0.880
2.24	0.844
2.34	0.789
2.52	0.558
2.61	0.375
2.72	0.189
2.77	0.114
2.86	0.059
3.00	0.059
3.11	0.064
3.20	0.089
3.34	0.217
3.47	0.373
3.62	0.512
3.82	0.608
3.94	0.618
4.06	0.556
4.10	0.512
4.21	0.467
4.33	0.485
4.47	0.485
4.58	0.457
4.74	0.367
4.85	0.247
5.00	0.182
5.11	0.165
5.22	0.100
5.27	0.091
5.33	0.100
5.46	0.146
5.55	0.168
5.65	0.143
5.74	0.114
5.82	0.068
5.94	0.024
6.00	0.020
6.14	0.029
6.25	0.052
6.35	0.096
6.45	0.084

λ	τ
CURVE 28 (cont.)	
6.56	0.084
6.74	0.076
6.84	0.062
7.07	0.041
7.31	0.015
7.49	0.000
CURVE 29	
T = 298	
1.00	0.938
2.39	0.936
2.58	0.902
2.67	0.843
2.81	0.900
3.02	0.891
3.28	0.896
3.37	0.882
3.67	0.567
3.88	0.531
4.15	0.079
4.26	0.043
4.49	0.077
4.62	0.000
CURVE 30	
T = 298	
2.0	0.430
2.3	0.525
2.7	0.594
3.0	0.578
3.4	0.683
3.8	0.775
4.2	0.793
4.4	0.791
4.5	0.832
5.5	0.914
5.7	0.943
6.0	0.942
6.2	0.896
6.3	0.941
6.5	0.954
6.8	0.901
7.4	0.968
7.6	0.971

*Not shown on plot

DATA TABLE NO. 144 (continued)

λ	τ	λ	τ
CURVE 30 (cont.)		CURVE 31 (cont.)*	
7.8	0.927	10.6	0.502
7.9	0.762	10.8	0.613
8.0	0.533	10.9	0.748
8.2	0.405	11.0	0.722
8.3	0.344	11.4	0.751
8.6	0.297	11.6	0.681
8.9	0.241	11.9	0.554
9.1	0.175	12.1	0.457
9.2	0.132	12.4	0.431
9.3	0.127	12.5	0.444
9.4	0.157	12.8	0.643
9.8	0.407	13.0	0.720
10.0	0.672	13.2	0.810
10.1	0.719	13.2	0.898
10.3	0.735	15.1	0.800
10.5	0.726	17.2	0.685
11.0	0.780	18.5	0.597
11.3	0.835	19.5	0.467
11.8	0.880	19.9	0.348
12.3	0.812	20.2	0.099
12.6	0.767	20.4	0.013
12.9	0.814	21.4	0.013
13.2	0.877	22.1	0.065
13.5	0.903	23.0	0.202
14.5	0.901	28.2	0.822
14.9	0.878	29.6	0.839
15.1	0.827	34.5	0.863
15.2	0.847	39.1	0.863
CURVE 31*			
T = 293			
5.88	0.684		
6.51	0.659		
6.95	0.625		
7.29	0.578		
7.52	0.521		
7.67	0.466		
7.82	0.392		
7.97	0.297		
8.22	0.095		
8.33	0.041		
8.47	0.017		
9.76	0.017		
9.85	0.074		
9.97	0.185		

*Not shown on plot

SPECIFICATION TABLE NO. 145 NORMAL SOLAR TRANSMITTANCE OF SILICON DIOXIDE (Fused) SiO_2

Curve No.	Ref. No.	Year	Temperature Range, K	Geometry θ	θ'	ω'	Reported Error, %	Composition (weight percent), Specifications and Remarks
1*	276	1968	~298	~0°	~0°			Thermal American Spectrasil B fused silica; thickness 0.794 mm; pitch-polished 80-50 on both sides.
2*	276	1968	~298	~0°	~0°			Above specimen and conditions except exposed to 500 ESH uv radiation at solar factor 10 suns at 700 K.
3*	276	1968	~298	~0°	~0°			General Electric 151 fused silica; thickness 0.794 mm, pitch-polished 80-50 on both sides.
4*	276	1968	~298	~0°	~0°			Above specimen and conditions except exposed to 500 ESH uv radiation at solar factor 10 suns at 700 K.
5*	276	1968	~298	~0°	~0°			Suprasil II (mfgr, Amersil) fused silica; thickness 0.794 mm; pitch-polished 80-50 on both sides.
6*	276	1968	~298	~0°	~0°			Above specimen and conditions except exposed to 500 ESH uv radiation at solar factor 10 suns at 700 K.

DATA TABLE NO. 145 NORMAL SOLAR TRANSMITTANCE OF SILICON DIOXIDE (Fused) SiO_2

[Temperature, T, K; Transmittance, τ]

T	τ	T	τ
CURVE 1*		CURVE 5*	
298	0.936	298	0.937
CURVE 2*		CURVE 6*	
298	0.931	298	0.932
CURVE 3*			
298	0.941		
CURVE 4*			
298	0.929		

* No plot given

SPECIFICATION TABLE NO. 146 NORMAL TOTAL EMITTANCE OF TANTALUM OXIDE Ta_2O_5

Curve No.	Ref. No.	Year	Temperature Range, K	Geometry θ'	Reported Error, %	Composition (weight percent), Specifications and Remarks
1*	28	1963	1023	~0°		Sintered at 1673 K for 2 hrs (setter material Ta_2O_5); density 6.51 g cm^{-3}, theoretical density 8.73 g cm^{-3}; integrated from spectral data (1-15 μm); [Authors' designation: Sample No. 123].

DATA TABLE NO. 146 NORMAL TOTAL EMITTANCE OF TANTALUM OXIDE Ta_2O_5

[Temperature, T, K; Emittance, ϵ]

T	ϵ
CURVE 1*	
1023	0.29

*No plot given

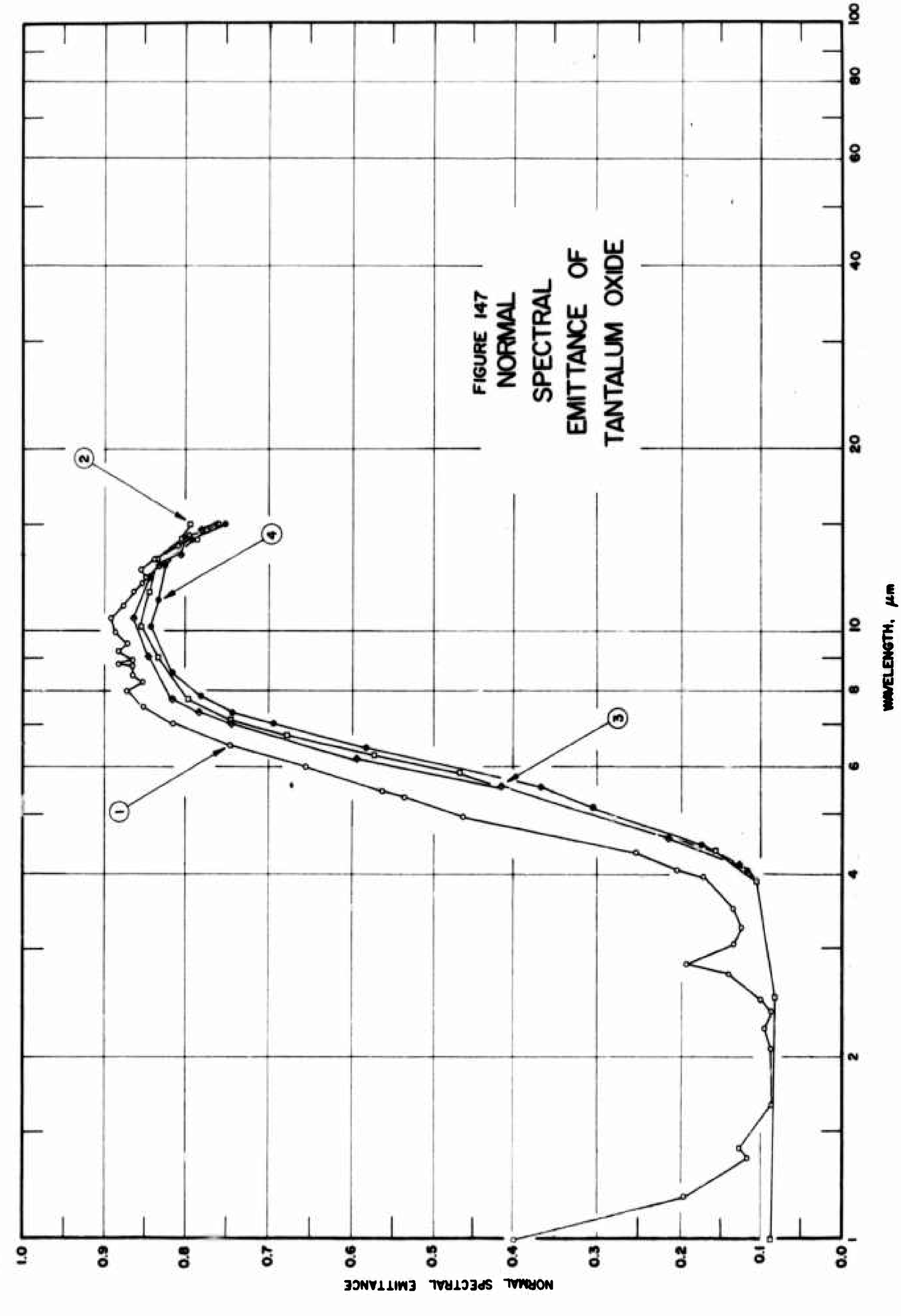


FIGURE 147 NORMAL SPECTRAL EMITTANCE OF TANTALUM OXIDE

SPECIFICATION TABLE NO. 147 NORMAL SPECTRAL EMITTANCE OF TANTALUM OXIDE Ta_2O_5

Curve No.	Ref. No.	Year	Temperature K	Wavelength Range, μm	Geometry θ'	Reported Error, %	Composition (weight percent), Specifications, and Remarks
1	28	1963	1023	1.00-15.0	~0°		Sintered at 1673 K for 2 hrs (setter material Ta_2O_5); density 6.51 g cm^{-3}, theoretical density 8.73 g cm^{-3}; data extracted from smooth curve; [Authors' designation: Sample No. 123].
2	382	1965	1273	1.00-15.0	0°		Sintered 15 hrs at 1273 K; density 4.17; data extracted from smooth curve.
3	382	1965	1273	1.00-15.0	0°		Above specimen and conditions except sintered an additional 2 hrs at 1373 K; density changed to 4.23.
4	382	1967	1273	1.00-15.0	0°		Above specimen and conditions except sintered additionally 2 hrs at 1473 K, 2 hrs at 1573 K, and 2 hrs at 1673 K; density changed to 5.20.

DATA TABLE NO. 147 NORMAL SPECTRAL EMITTANCE OF TANTALUM OXIDE Ta_2O_5

[Wavelength, λ, μm; Emittance, ε; Temperature, T, K]

CURVE 1
T = 1023

λ	ε
1.00	0.400
1.17	0.198
1.36	0.117
1.42	0.128
1.66	0.086
2.07	0.089
2.21	0.095
2.37	0.087
2.49	0.100
2.71	0.140
2.83	0.192
3.06	0.134
3.27	0.124
3.50	0.133
3.94	0.171
4.03	0.201
4.20	0.213*
4.31	0.252
4.99	0.461
5.36	0.537
5.47	0.563
6.00	0.657

CURVE 1 (cont.)

λ	ε
6.50	0.748
7.01	0.815
7.50	0.853
8.00	0.873
8.25	0.853
8.42	0.869
8.76	0.869
8.87	0.883
8.96	0.867
9.29	0.883
9.51	0.871
9.98	0.889
10.5	0.892
10.7	0.877*
11.0	0.879
11.6	0.864
12.0	0.854
12.1	0.864
12.3	0.850
12.4	0.856*
12.6	0.856
13.0	0.843*
13.2	0.838

CURVE 1 (cont.)

λ	ε
13.3	0.825*
13.5	0.825*
13.8	0.810
14.1	0.786
14.3	0.788*
14.4	0.796
14.5	0.782*
14.5	0.789*
14.6	0.773
15.0	0.760

CURVE 2
T = 1273

λ	ε
1.00	0.089
2.50	0.081
3.89	0.104
4.39	0.158
5.86	0.467
6.27	0.574
6.75	0.678
7.17	0.747
7.75	0.799

CURVE 2 (cont.)

λ	ε
9.05	0.834
10.2	0.856
11.6	.844
13.2	0.835
14.2	0.805
15.0	0.793

CURVE 3
T = 1273

λ	ε
1.00	0.089*
2.50	0.081*
3.89	0.104*
4.11	0.126
4.59	0.215
5.56	0.415
6.15	0.595
7.01	0.744
7.32	0.782
7.76	0.818
9.04	0.847
10.5	0.865
12.3	0.846

CURVE 3 (cont.)

λ	ε
12.9	0.831
13.4	0.806
14.2	0.800
14.6	0.780
15.0	0.761

CURVE 4
T = 1273

λ	ε
1.00	0.089*
2.50	0.081*
3.89	0.104*
4.07	0.117
4.49	0.174
5.11	0.301
5.52	0.366
6.43	0.585
7.01	0.695
7.39	0.742
7.83	0.780
8.53	0.815
10.2	0.842
11.3	0.834

CURVE 4 (cont.)

λ	ε
12.9	0.828
13.5	0.803*
14.1	0.792
14.6	0.775*
15.0	0.751

*Not shown on plot

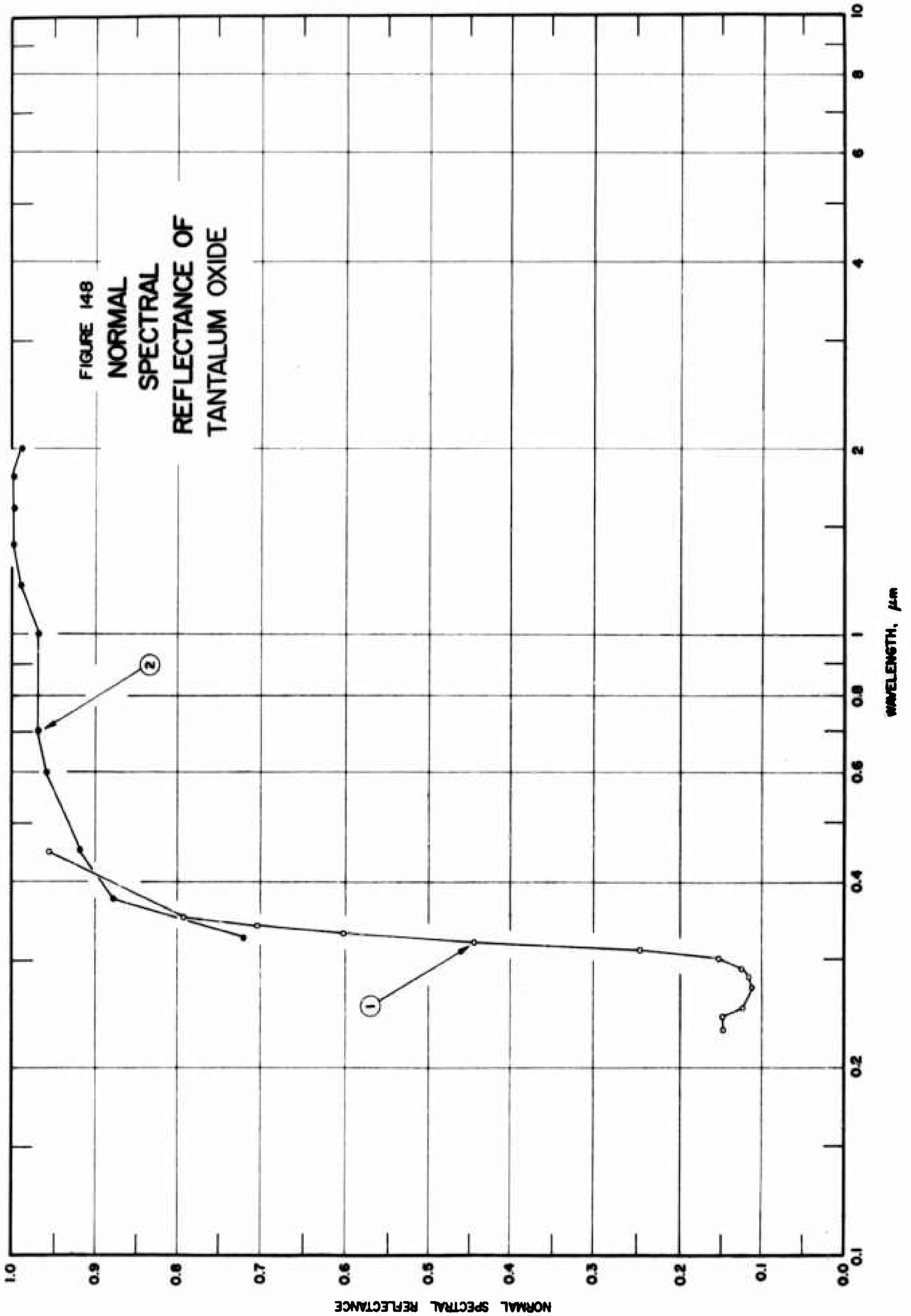


FIGURE 148 NORMAL SPECTRAL REFLECTANCE OF TANTALUM OXIDE

SPECIFICATION TABLE NO. 148 NORMAL SPECTRAL REFLECTANCE OF TANTALUM OXIDE Ta_2O_5

Curve No.	Ref. No.	Year	Temperature K	Wavelength Range, μm	Geometry θ	θ'	ω'	Reported Error, %	Composition (weight percent), Specifications, and Remarks
1	28	1963	298	0.230-2.65	~0°		2π		Sintered at 1573 K for 2 hrs (setter material Ta_2O_5); density 4.63 g cm^{-3}, theoretical density 8.73 g cm^{-3}; MgO reference standard; data extracted from smooth curve; [Authors' designation: Sample No. 122].
2	32	1964	298	0.325-2.0	~0°		2π		Compacted powder; MgO reference standard; [Authors' designation: Sample 6].

DATA TABLE NO. 148 NORMAL SPECTRAL REFLECTANCE OF TANTALUM OXIDE Ta_2O_5

[Wavelength, λ, μm; Reflectance, ρ; Temperature, T, K]

λ	ρ	λ	ρ	λ	ρ
CURVE 1 T = 298		CURVE 1 (cont.)		CURVE 2 T = 298	
		1.14	1.04*		
0.230	0.148	1.34	1.06*	0.325	0.72
0.241	0.149	1.46	1.06*	0.375	0.88
0.250	0.123	1.74	1.10*	0.450	0.92
0.270	0.111	1.84	1.10*	0.600	0.96
0.280	0.115	1.86	1.09*	0.100	0.97
0.290	0.124	2.04	1.12*	1.0	0.97
0.300	0.151	2.15	1.12*	1.2	0.99
0.310	0.249	2.19	1.11*	1.4	>1.00
0.320	0.443	2.32	1.13*	1.6	1.00
0.330	0.602	2.45	1.15*	1.8	1.00
0.340	0.704	2.54	1.14*	2.0	0.99
0.350	0.791	2.65	1.14*		
0.449	0.959				
0.548	1.01*				
0.650	1.02*				
0.371	1.02*				
1.05	1.04*				

*Not shown on plot

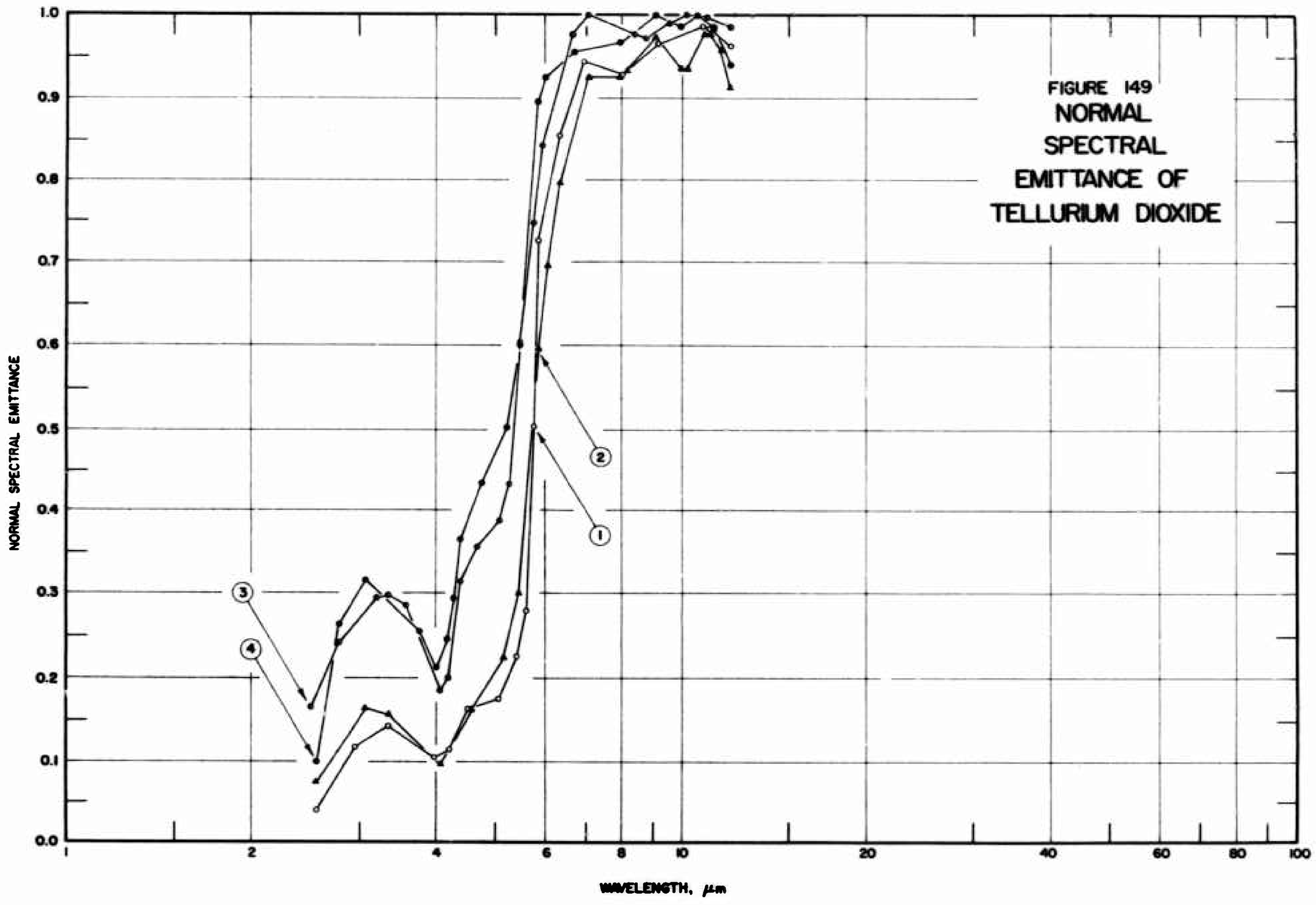


FIGURE 149 NORMAL SPECTRAL EMITTANCE OF TELLURIUM DIOXIDE

SPECIFICATION TABLE NO. 149 NORMAL SPECTRAL EMITTANCE OF TELLURIUM DIOXIDE TeO_2

Curve No.	Ref. No.	Year	Temperature K	Wavelength Range, μm	Geometry θ'	Reported Error, %	Composition (weight percent), Specifications, and Remarks
1	235	1960	533	2.55-12.0	~0°		General Electric Co. RIR-2; 3.05 mm thick plate; data extracted from smooth curve.
2	235	1960	643	2.55-12.00	~0°		Above specimen and conditions; sample deteriorated when heated to measurement temp; author states data questionable.
3	235	1960	533	2.50-11.99	~0°		General Electric Co. RIR-2; 7.65 mm thick plate; data extracted from smooth curve.
4	235	1960	643	2.55-12.00	~0°		Above specimen and conditions; sample deteriorated when heated to measurement temp; author states data questionable.

DATA TABLE NO. 149 NORMAL SPECTRAL EMITTANCE OF TELLURIUM DIOXIDE TeO_2

[Wavelength, λ, μm; Emittance, ϵ; Temperature, T, K]

λ	ϵ	λ	ϵ	λ	ϵ	λ	ϵ
CURVE 1 T = 533		CURVE 2 T = 643		CURVE 3 T = 533		CURVE 4 T = 640	
2.55	0.040	2.55	0.075	2.50	0.165	2.55	0.100
2.95	0.119	3.06	0.164	2.78	0.242	2.79	0.264
3.31	0.142	3.32	0.159	3.20	0.295	3.06	0.318
3.97	0.103	4.06	0.097	3.33	0.299	3.58	0.286*
4.20	0.115	4.54	0.161	3.59	0.287	3.73	0.255
4.50	0.162	5.15	0.224	4.05	0.185	4.00	0.211
5.06	0.175	5.44	0.300	4.18	0.200	4.17	0.247
5.40	0.225	5.87	0.599	4.39	0.315	4.29	0.295
5.60	0.280	6.03	0.699	4.66	0.356	4.39	0.365
5.78	0.502	6.33	0.797	5.05	0.387	4.74	0.435
5.88	0.725	7.05	0.929	5.28	0.431	5.20	0.501
6.36	0.857	7.98	0.929	5.49	0.601	5.47	0.600
6.97	0.945	8.17	0.934	5.71	0.747	5.81	0.898
8.00	0.930	9.06	0.973	5.99	0.841	6.00	0.929
9.19	0.966	9.98	0.938	6.67	0.979	6.70	0.956
10.7	0.989	10.2	0.938	7.05	1.000	7.99	0.969
11.1	0.985	10.9	0.978	8.40	0.977	9.03	1.000
12.0	0.961	11.2	0.979	8.79	0.971	9.93	0.987
		11.6	0.959	9.52	0.990	10.6	1.000
		12.0	0.914	10.2	1.000	11.3	0.983
				11.0	0.999	12.0	0.940
				12.0	0.985		

* Not shown on plot

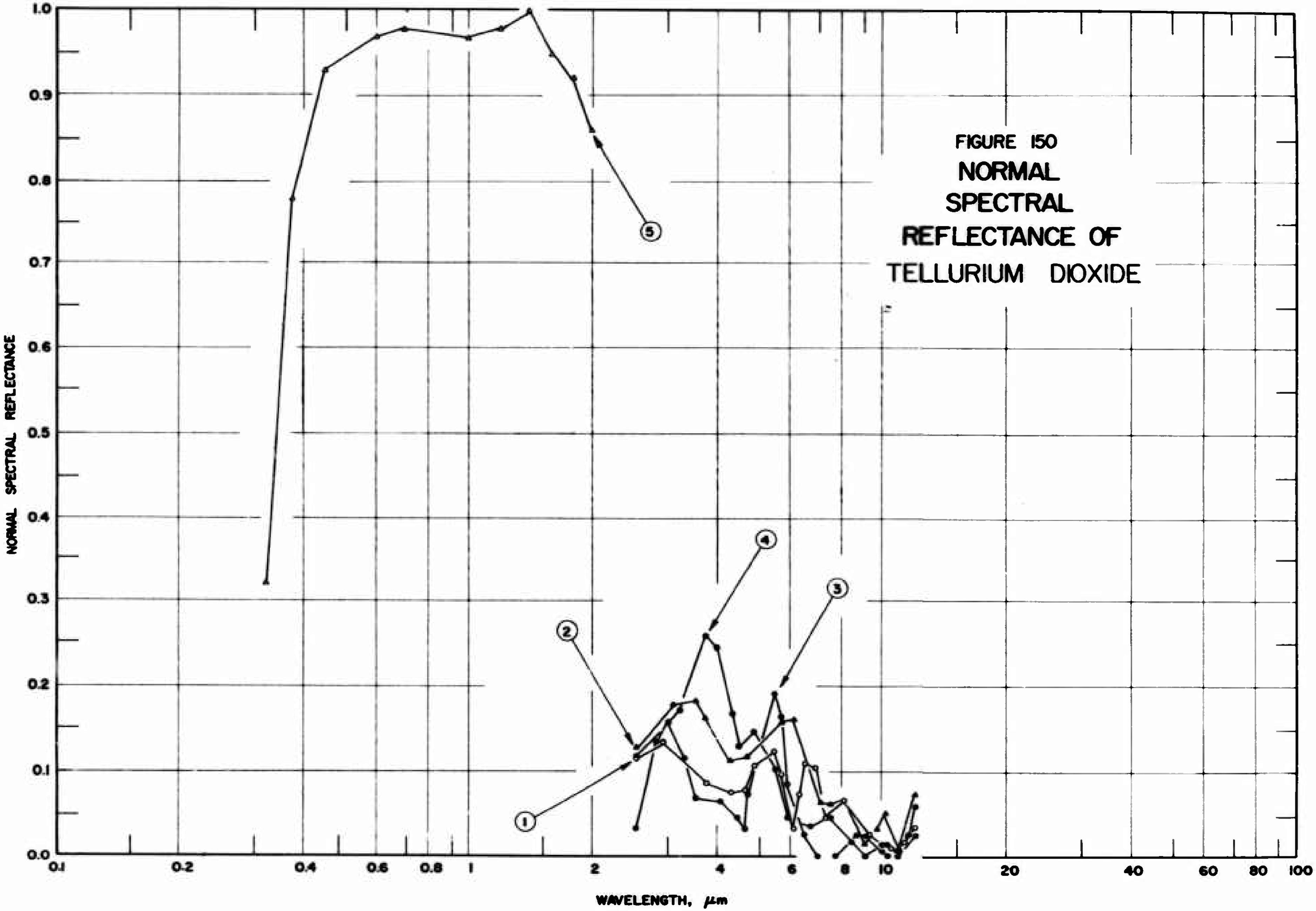


FIGURE 150 NORMAL SPECTRAL REFLECTANCE OF TELLURIUM DIOXIDE

SPECIFICATION TABLE NO. 150 NORMAL SPECTRAL REFLECTANCE OF TELLURIUM DIOXIDE TeO_2

Curve No.	Ref. No.	Year	Temperature K	Wavelength Range, μm	Geometry θ	θ'	ω'	Reported Error, %	Composition (weight percent), Specifications, and Remarks
1	235	1960	533	2.55-12.0	~0°	~0°			General Electric Co. RIR-2; 3.05 mm thick plate; data extracted from smooth curve.
2	235	1960	643	2.55-12.0	~0°	~0°			Above specimen and conditions; sample deteriorated when heated to measurement temp; author states data questionable.
3	235	1960	533	2.55-12.00	~0°	~0°			General Electric Co. RIR-2; 7.65 mm thick plate; data extracted from smooth curve.
4	235	1960	643	2.55-12.00	~0°	~0°			Above specimen and conditions; sample deteriorated when heated to measurement temp; author states data questionable.
5	92	1964	298	0.325-2.0	~0°		2π		Compacted powder; MgO reference standard; [Authors' designation: Sample 33].

DATA TABLE NO. 150 NORMAL SPECTRAL REFLECTANCE OF TELLURIUM DIOXIDE TeO_2

[Wavelength, λ, μm; Reflectance, ρ; Temperature, T, K]

λ	ρ	λ	ρ	λ	ρ	λ	ρ	λ	ρ
CURVE 1 T = 533		**CURVE 2** T = 643		**CURVE 3 (cont.)**		**CURVE 4** T = 643		**CURVE 5** T = 298	
				3.32	0.115				
2.55	0.115	2.55	0.129	3.51	0.070	2.55	0.117	0.325	0.32
2.98	0.135	3.11	0.176	4.03	0.116	3.26	0.220	0.375	0.78
3.79	0.089	3.51	0.182	4.44	0.047	3.74	0.259	0.450	0.93
4.30	0.078	3.74	0.161	4.61	0.032	4.00	0.244	0.600	0.97
4.65	0.080	4.30	0.112	4.79	0.074	4.38	0.166	0.700	0.98
4.99	0.109	4.77	0.117	5.50	0.190	4.55	0.130	1.0	0.97
5.50	0.123	5.79	0.159	5.74	0.161	4.98	0.146	1.2	0.98
5.74	0.098	6.17	0.160	5.96	0.087	5.59	0.101	1.4	1.00
6.03	0.033	7.18	0.065	6.46	0.026	5.92	0.047	1.6	0.95
6.33	0.074	7.55	0.063	7.00	0.000	6.75	0.038	1.8	0.92
6.52	0.110	8.06	0.069*	7.79	0.000	7.43	0.049	2.0	0.86
6.98	0.054	9.09	0.015	8.68	0.027	8.49	0.019		
7.37	0.046	9.76	0.033	9.20	0.025*	9.17	0.000		
8.08	0.069	10.1	0.051	10.0	0.006	10.0	0.014		
9.24	0.029	11.0	0.009	10.3	0.000	10.3	0.014		
10.5	0.010	12.0	0.075	10.9	0.000	10.9	0.000*		
10.9	0.008			12.0	0.026	11.6	0.029		
11.4	0.018	**CURVE 3** T = 533				12.0	0.060		
12.0	0.035								
		2.55	0.033						
		2.85	0.134						
		3.05	0.157						

*Not shown on plot

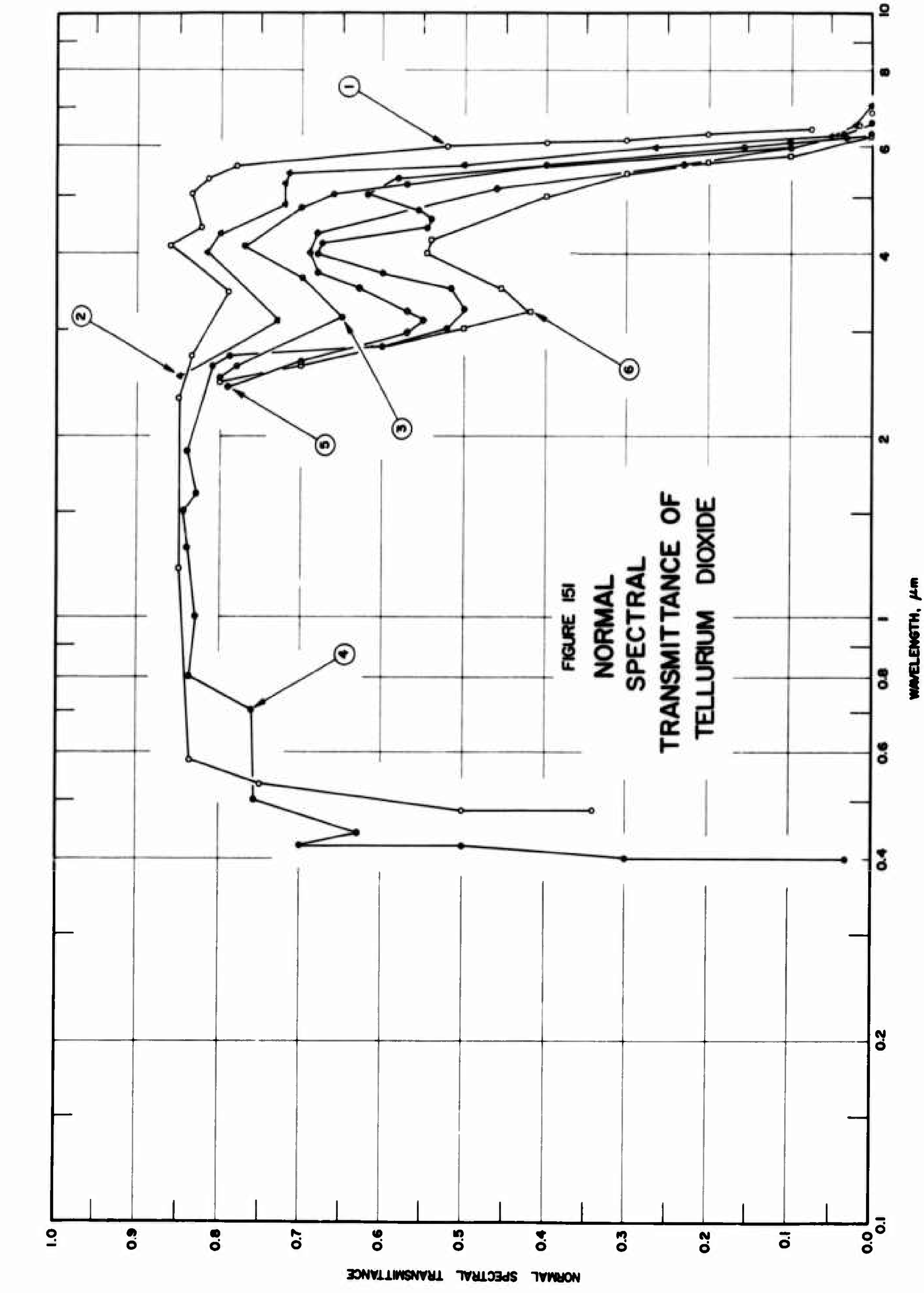


FIGURE 151 NORMAL SPECTRAL TRANSMITTANCE OF TELLURIUM DIOXIDE

SPECIFICATION TABLE NO. 151 NORMAL SPECTRAL TRANSMITTANCE OF TELLURIUM DIOXIDE TeO_2

Curve No.	Ref. No.	Year	Temperature K	Wavelength Range, μm	Geometry θ	θ'	ω'	Reported Error, %	Composition (weight percent), Specifications, and Remarks
1	235	1960	298	0.480-6.80	~0°	~0°			General Electric Co. RIR-2; 3.05 mm thick plate; data extracted from smooth curve.
2	235	1960	533	2.50-7.00	~0°	~0°			Above specimen and conditions.
3	235	1960	643	2.50-6.30	~0°	~0°			Above specimen and conditions; sample deteriorated when heated to measurement temp; author states data questionable.
4	235	1960	298	0.400-6.55	~0°	~0°			General Electric Co. RIR-2; 7.65 mm thick plate; data extracted from smooth curve.
5	235	1960	533	2.40-6.30	~0°	~0°			Above specimen and conditions.
6	235	1960	643	2.45-6.25	~0°	~0°			Above specimen and conditions; sample deteriorated when heated to temp of measurement; author states data questionable.

DATA TABLE NO. 151 NORMAL SPECTRAL TRANSMITTANCE OF TELLURIUM DIOXIDE TeO_2

[Wavelength, λ, μm; Transmittance, τ; Temperature, T, K]

CURVE 1
T = 298

λ	τ
0.480	0.340
0.480	0.500
0.530	0.750
0.580	0.835
1.20	0.850
2.30	0.850
2.70	0.835
3.45	0.790
4.10	0.860
4.40	0.822
5.00	0.835
5.30	0.815
5.58	0.780
6.00	0.520
6.10	0.400
6.17	0.300
6.30	0.200
6.40	0.075
6.50	0.015
6.80	0.000

CURVE 2
T = 533

λ	τ
2.50	0.85
3.10	0.73
4.00	0.818
4.30	0.800
4.80	0.720
5.20	0.720
5.40	0.715
5.60	0.500
6.00	0.265
6.25	0.050
6.50	0.020
7.00	0.000

CURVE 3
T = 643

λ	τ
2.50	0.80
2.60	0.78
3.12	0.65
3.62	0.70

CURVE 3 (cont.)

λ	τ
4.10	0.77
4.72	0.70
5.00	0.66
5.20	0.57
5.60	0.40
6.00	0.155
6.10	0.100
6.20	0.030
6.30	0.000

CURVE 4
T = 298

λ	τ
0.400	0.030
0.400	0.300
0.420	0.500
0.440	0.630
0.420	0.700
0.500	0.756
0.700	0.760
0.800	0.838

CURVE 4 (cont.)

λ	τ
1.00	0.830
1.30	0.840
1.50	0.845
1.60	0.830
1.88	0.840
2.60	0.810
2.70	0.790
2.80	0.600
3.00	0.520
3.22	0.500
3.50	0.515
3.70	0.600
4.00	0.680
4.15	0.675
4.40	0.545
4.55	0.540
4.70	0.555
5.00	0.620
5.30	0.580
5.60	0.400*
6.00	0.100

CURVE 4 (cont.)

λ	τ
6.30	0.035
6.55	0.000

CURVE 5
T = 533

λ	τ
2.40	0.79
2.64	0.70
2.95	0.57
3.10	0.55
3.20	0.57
3.50	0.63
3.80	0.68
4.00	0.69
4.30	0.68
5.10	0.46
5.60	0.23
6.30	0.000*

CURVE 6
T = 643

λ	τ
2.45	0.800
2.60	0.700
3.00	0.500
3.20	0.420
3.50	0.455
4.00	0.545
4.20	0.540
4.95	0.400
5.40	0.300
5.65	0.200
5.80	0.100
6.25	0.000

*Not shown on plot

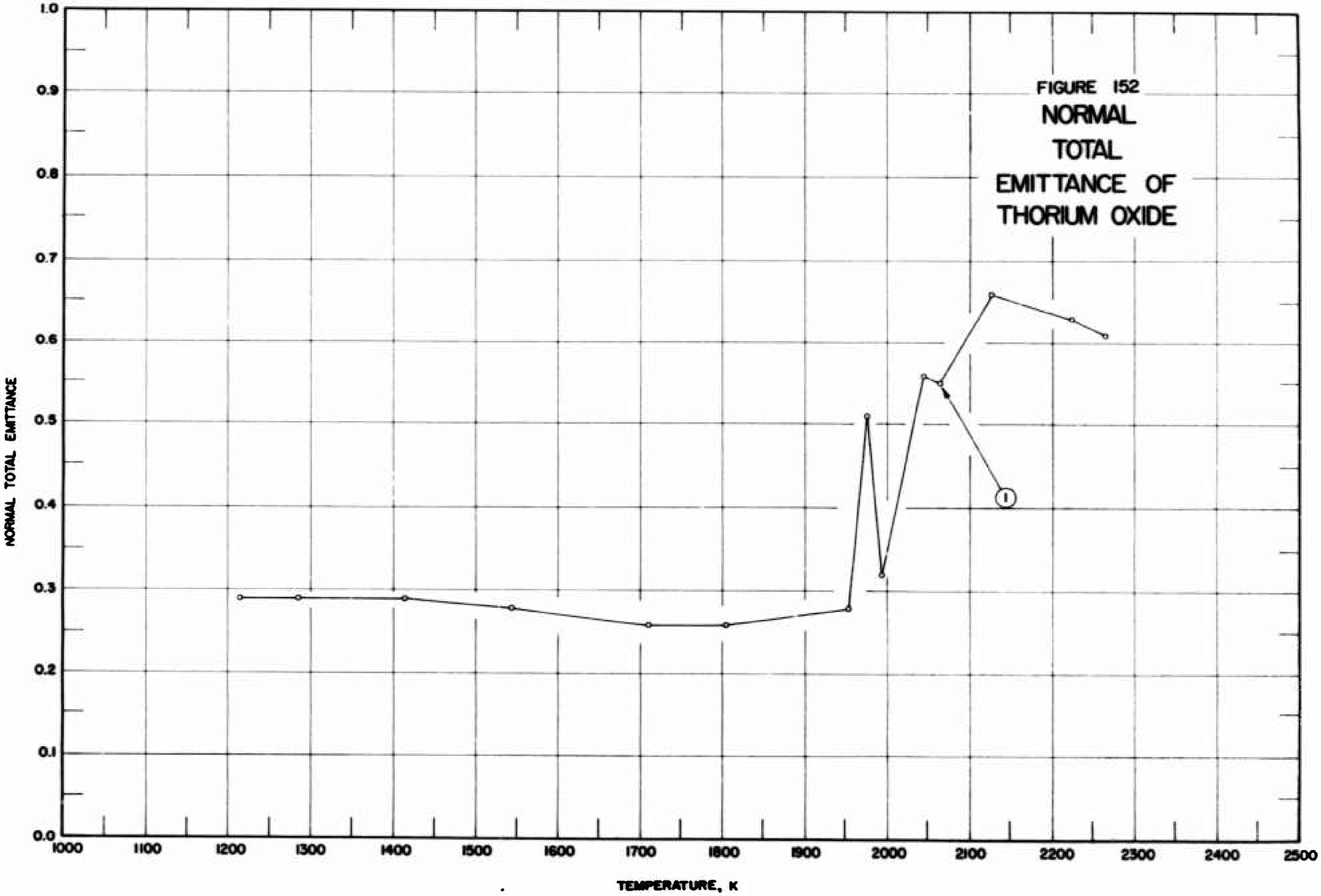


FIGURE 152
NORMAL
TOTAL
EMITTANCE OF
THORIUM OXIDE

SPECIFICATION TABLE NO. 152 NORMAL TOTAL EMITTANCE OF THORIUM OXIDE ThO_2

Curve No.	Ref. No.	Year	Temperature Range, K	Geometry θ'	Reported Error, %	Composition (weight percent), Specifications and Remarks
1	17	1962	1213-2266	~0°	10-20	Pressed and sintered; measured in argon; specimen began to smoke slightly at ~1950 K.

DATA TABLE NO. 152 NORMAL TOTAL EMITTANCE OF THORIUM OXIDE ThO_2

[Temperature, T, K; Emittance, ϵ]

T	ϵ
CURVE 1	
1213	0.29
1284	0.29
1413	0.29
1543	0.28
1710	0.26
1803	0.26
1953	0.28
1993	0.32
1975	0.51
2045	0.56
2065	0.55
2128	0.66
2224	0.63
2266	0.61

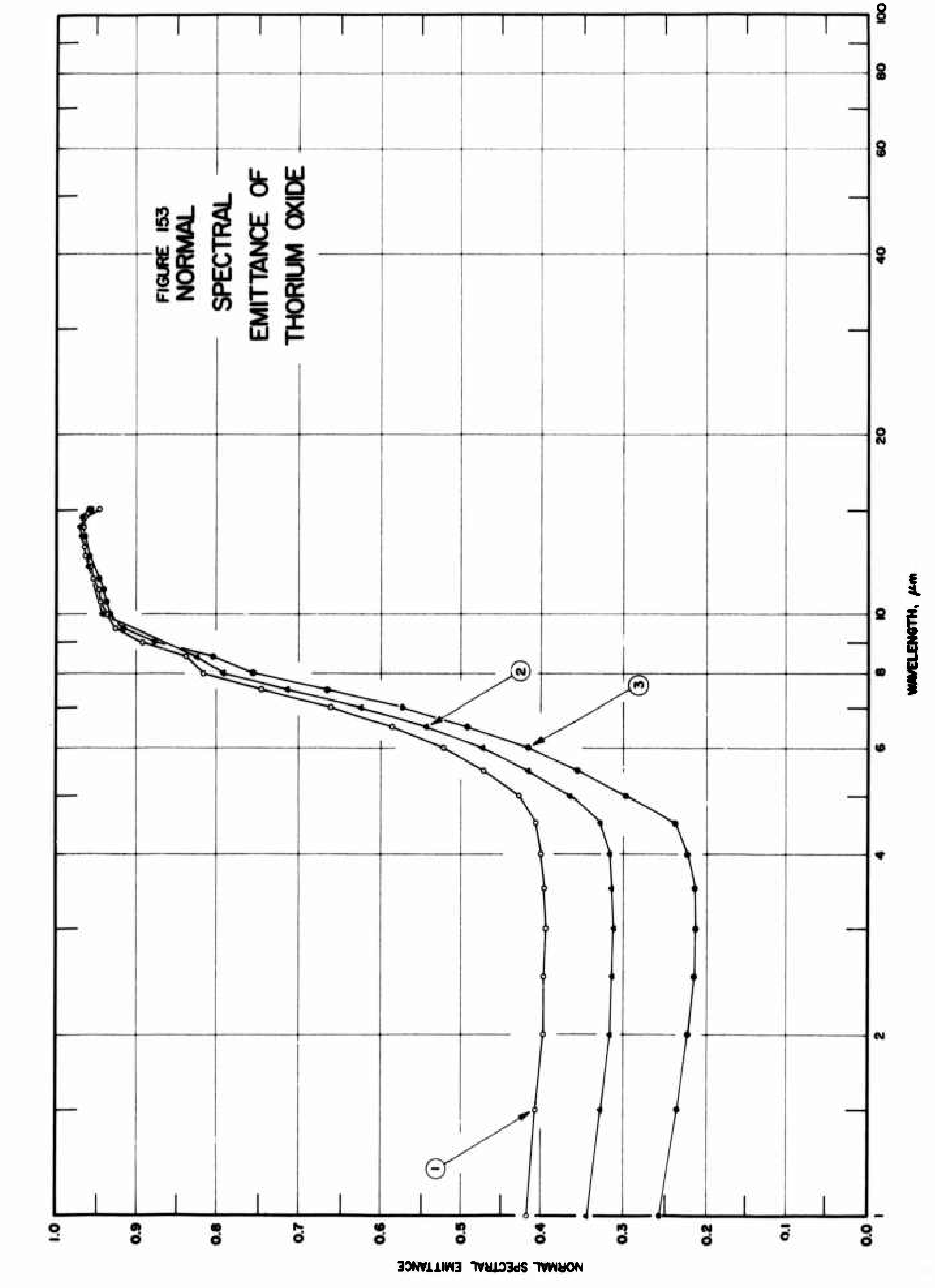


FIGURE 153 NORMAL SPECTRAL EMITTANCE OF THORIUM OXIDE

SPECIFICATION TABLE NO. 153 NORMAL SPECTRAL EMITTANCE OF THORIUM OXIDE ThO_2

Curve No.	Ref. No.	Year	Temperature K	Wavelength Range, μm	Geometry θ'	Reported Error, %	Composition (weight percent), Specifications, and Remarks
1	338	1966	1600	1.0-15.0	~0°		Polycrystalline; >99% pure; cylinder of 0.1875 in. wall thickness; sintered at 1865 K for 27 hrs; porosity 13% by volume; outer surface smooth but not polished; average of two readings on each of three specimens.
2	338	1966	1400	1.0-15.0	~0°		Above specimen and conditions.
3	338	1966	1200	1.0-15.0	~0°		Above specimen and conditions.

DATA TABLE NO. 153 NORMAL SPECTRAL EMITTANCE OF THORIUM OXIDE ThO_2

[Wavelength, λ, μm; Emittance, ϵ; Temperature, T, K]

λ	ϵ	λ	ϵ	λ	ϵ	λ	ϵ
CURVE 1 T = 1600		CURVE 1 (cont.)		CURVE 2 (cont.)		CURVE 3 (cont.)	
		13.5	0.966*	10.0	0.942	6.5	0.491
1.0	0.418	14.0	0.966	10.5	0.946*	7.0	0.575
1.5	0.407	14.5	0.964	11.0	0.949*	7.5	0.667
2.0	0.399	15.0	0.948	11.5	0.954*	8.0	0.757
2.5	0.398			12.0	0.960	8.5	0.802
3.0	0.395	CURVE 2 T = 1400		12.5	0.963*	9.0	0.878
3.5	0.396			13.0	0.967*	9.5	0.918
4.0	0.400			13.5	0.970	10.0	0.934
4.5	0.406	1.0	0.347	14.0	0.971	10.5	0.939
5.0	0.429	1.5	0.330	14.5	0.966*	11.0	0.941
5.5	0.471	2.0	0.319	15.0	0.955	11.5	0.947
6.0	0.521	2.5	0.314			12.0	0.954*
6.5	0.586	3.0	0.311	CURVE 3 T = 1200		12.5	0.959
7.0	0.662	3.5	0.314			13.0	0.962*
7.5	0.747	4.0	0.318			13.5	0.964
8.0	0.817	4.5	0.330	1.0	0.259	14.0	0.967
8.5	0.838	5.0	0.366	1.5	0.235	14.5	0.965
9.0	0.894	5.5	0.416	2.0	0.223	15.0	0.958
9.5	0.928	6.0	0.473	2.5	0.216		
10.0	0.939	6.5	0.544	3.0	0.214		
10.5	0.946	7.0	0.624	3.5	0.215		
11.0	0.949	7.5	0.714	4.0	0.223		
11.5	0.953	8.0	0.793	4.5	0.238		
12.0	0.957	8.5	0.825	5.0	0.297		
12.5	0.962	9.0	0.893*	5.5	0.359		
13.0	0.964	9.5	0.929*	6.0	0.416		

*Not shown on plot

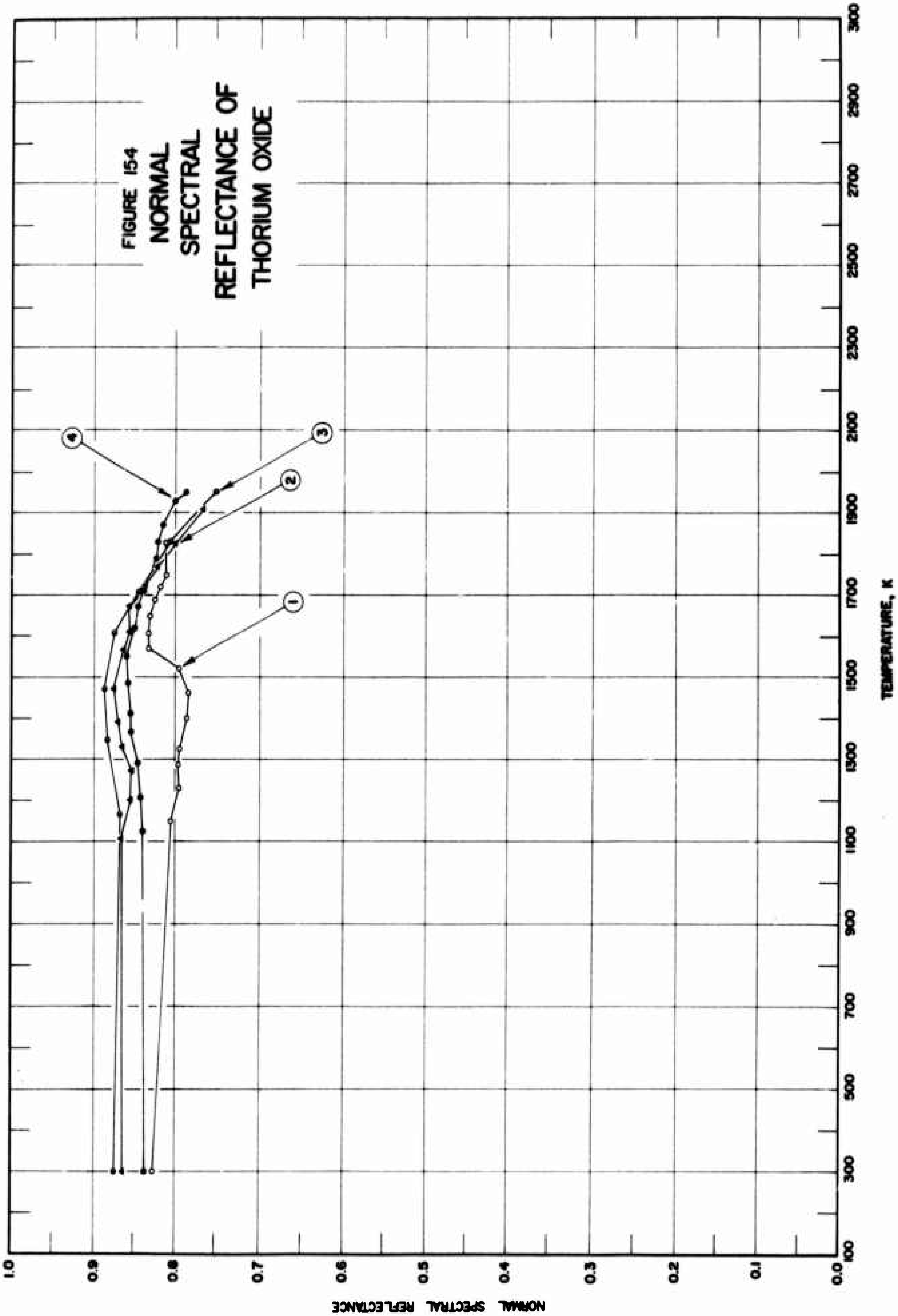


FIGURE 154 NORMAL SPECTRAL REFLECTANCE OF THORIUM OXIDE

SPECIFICATION TABLE NO. 154 NORMAL SPECTRAL REFLECTANCE OF THORIUM OXIDE ThO_2

Curve No.	Ref. No.	Year	Wavelength µm	Temperature Range, K	Geometry θ	θ'	ω'	Reported Error, %	Composition (weight percent), Specifications, and Remarks
1	300	1968	0.6328	300-1825	12°		2π		99 ThO_2, 0.05 SiO_2, 0.05 MgO and trace CaO: porosity 13% by volume; arithmetic average roughness 2.3 µm; measured under partial vacuum; first heating cycle.
2	300	1968	0.6328	300-1909	12°		2π		Above specimen and conditions except second heating cycle.
3	300	1968	0.6328	300-1952	12°		2π		Curve 1 specimen and conditions except third heating cycle.
4	300	1968	1.15	300-1952	12°		2π		Curve 1 specimen and conditions except fourth heating cycle.

DATA TABLE NO. 154 NORMAL SPECTRAL REFLECTANCE OF THORIUM OXIDE ThO_2

[Temperature, T, K; Reflectance, ρ; Wavelength, λ, µm]

T	ρ	T	ρ	T	ρ
CURVE 1		**CURVE 2 (cont.)**		**CURVE 4**	
λ = 0.6328				λ = 1.15	
		1473	0.875		
300	0.829	1561	0.862	300	0.837
1156	0.803	1611	0.856	1124	0.840
1230	0.796	1673	0.856	1208	0.842
1283	0.797	1722	0.839	1292	0.848
1327	0.795	1769	0.821	1369	0.853
1400	0.786	1827	0.800	1415	0.855
1460	0.783	1909	0.766	1481	0.859
1520	0.796			1557	0.860
1569	0.832	**CURVE 3**		1610	0.850
1609	0.832	λ = 0.6328		1676	0.846
1649	0.831			1716	0.840
1687	0.828	300	0.873	1789	0.825
1720	0.820	1173	0.869	1833	0.823
1748	0.811	1345	0.881	1873	0.815
1825	0.811	1473	0.886	1926	0.800
		1602	0.873	1952	0.786
CURVE 2		1705	0.845		
λ = 0.6328		1837	0.806		
		1952	0.750		
300	0.864				
1101	0.866				
1200	0.855				
1274	0.854				
1331	0.865				
1396	0.870				

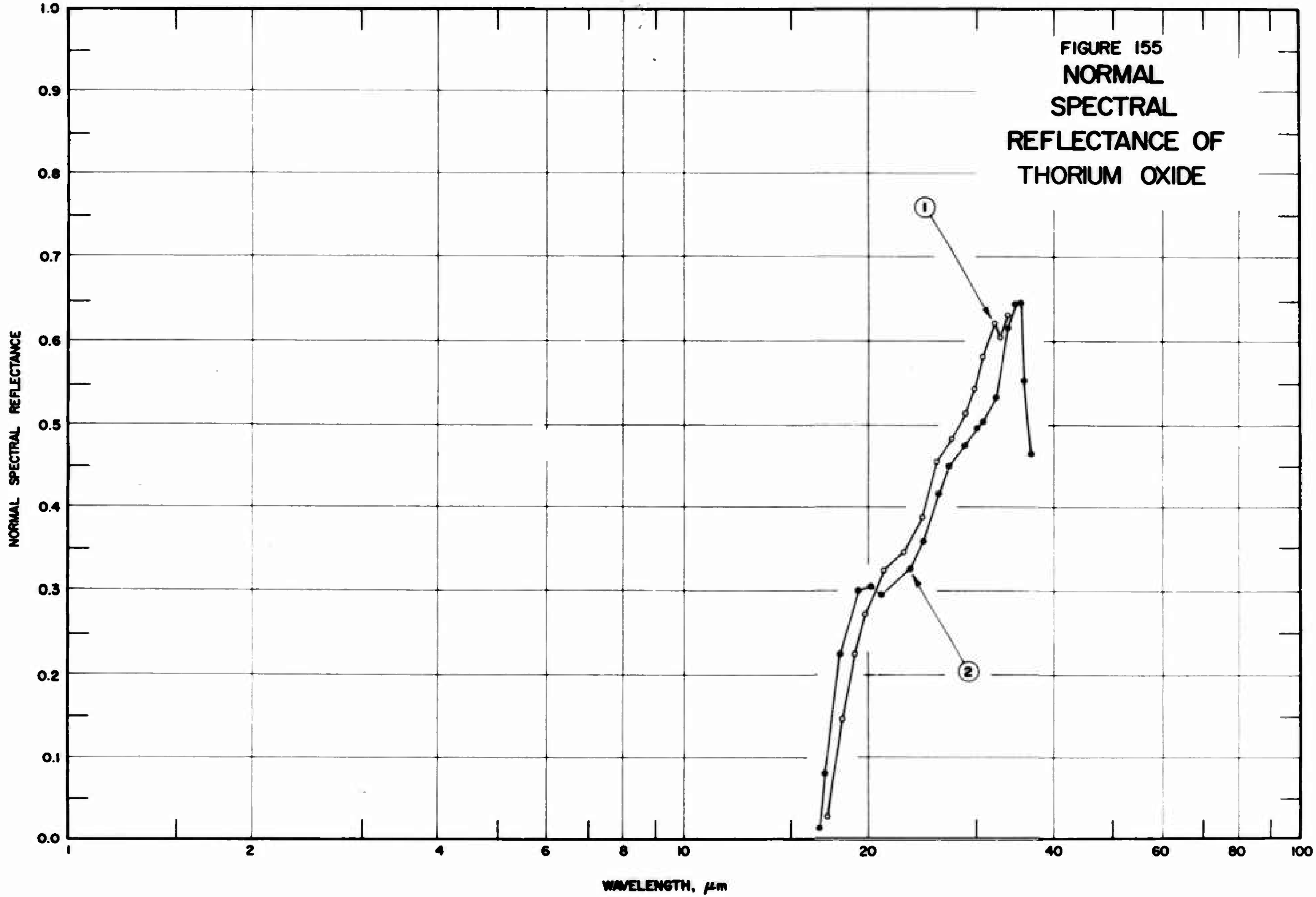


FIGURE 155
NORMAL
SPECTRAL
REFLECTANCE OF
THORIUM OXIDE
NORMAL SPECTRAL REFLECTANCE
WAVELENGTH, μm
1
2
1.0
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0.0
1
2
4
6
8
10
20
40
60
80
100

SPECIFICATION TABLE NO. 155 NORMAL SPECTRAL REFLECTANCE OF THORIUM OXIDE ThO_2

Curve No.	Ref. No.	Year	Temperature K	Wavelength Range, μm	Geometry θ θ' ω'	Reported Error, %	Composition (weight percent), Specifications, and Remarks
1	146	1966	~298	17.1-33.6	~0° ~0°		Film; optical thickness 10 quarterwaves at $\lambda = 5.0$ μm; electron beam deposited in vacuum ($2-8 \times 10^{-5}$ mm Hg) at normal incidence onto glass substrate heated to 423 K; rate of depositing 1 quarterwave per min at $\lambda = 0.5$ μm; film exhibited slight scattering of light.
2	146	1966	~298	16.6-36.9	~0° ~0°		Similar to above specimen and conditions except substrated heated to 588 K during depositing.

DATA TABLE NO. 155 NORMAL SPECTRAL REFLECTANCE OF THORIUM OXIDE ThO_2

[Wavelength, λ, μm; Reflectance, ρ; Temperature, T, K]

λ	ρ
CURVE 1 T ~ 298	
17.1	0.027
18.1	0.148
19.0	0.224
19.9	0.272
21.1	0.322
22.9	0.344
24.4	0.387
25.9	0.455
27.1	0.481
28.9	0.513
29.9	0.544
30.9	0.583
32.0	0.623
32.9	0.602
33.6	0.632
CURVE 2 T ~ 298	
16.6	0.012
17.0	0.080
18.0	0.225
19.2	0.300
20.1	0.305
21.0	0.298
23.1	0.324
CURVE 2 (cont.)	
24.5	0.358
26.0	0.417
27.0	0.450
24.3	0.467
28.9	0.475
30.0	0.496
30.9	0.502
32.4	0.531
33.8	0.618
11.6	0.625
34.7	0.647
35.1	0.649
35.8	0.553
36.9	0.461

SPECIFICATION TABLE NO. 156 NORMAL SOLAR ABSORPTANCE OF THORIUM OXIDE ThO_2

Curve No.	Ref. No.	Year	Temperature Range, K	Geometry θ	Reported Error, %	Composition (weight percent), Specifications and Remarks
1*	367	1964	~298	~0°		Sintered block; yellowing, possibly from iron impurities introduced during fabrication; calculated from reflectance data.

DATA TABLE NO. 156 NORMAL SOLAR ABSORPTANCE OF THORIUM OXIDE ThO_2

[Temperature, T, K; Absorptance, α]

T	α
CURVE 1*	
~298	0.182

*Nc plot given

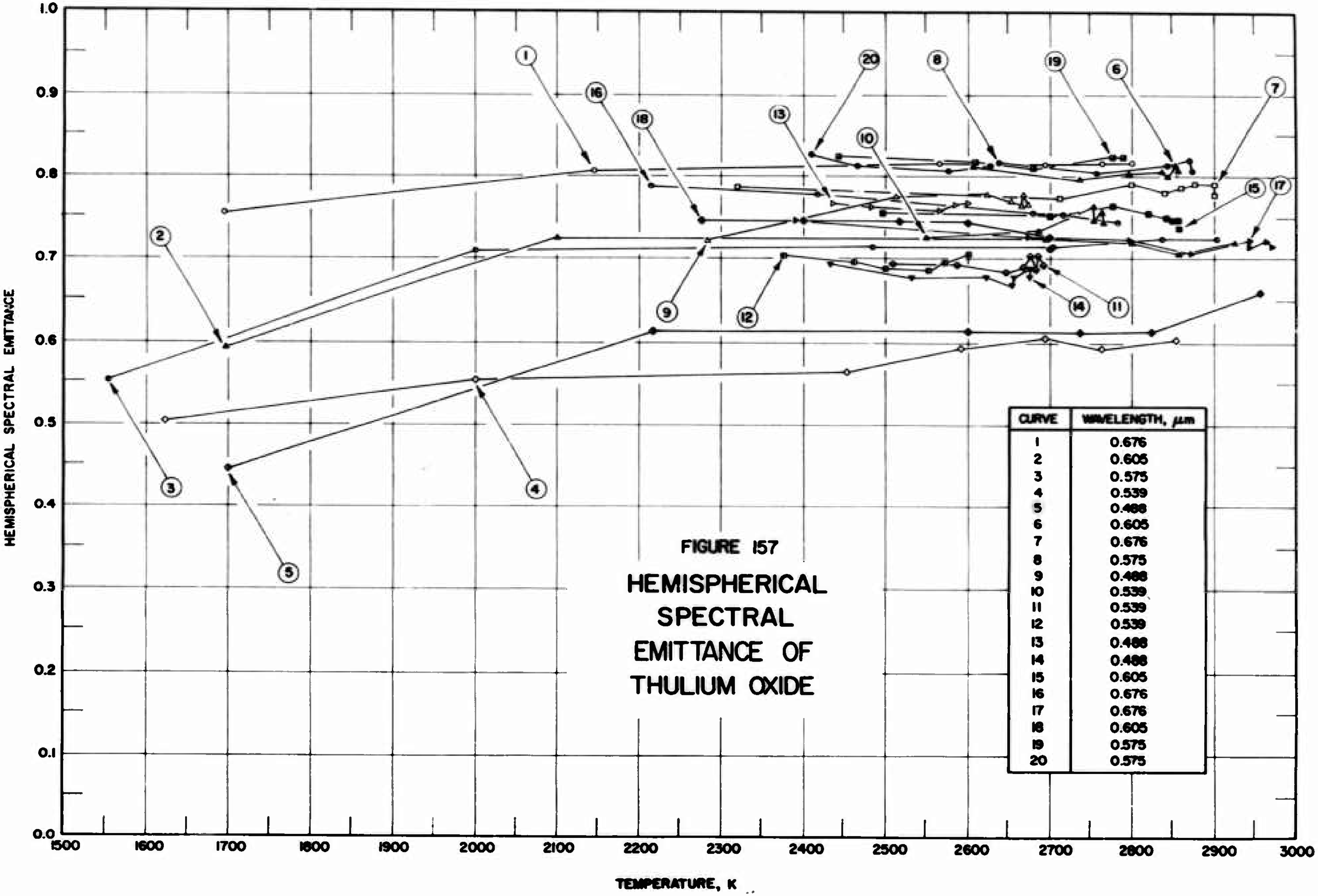


FIGURE 157
HEMISPHERICAL SPECTRAL EMITTANCE OF THULIUM OXIDE

SPECIFICATION TABLE NO. 157 HEMISPHERICAL SPECTRAL EMITTANCE OF THULIUM OXIDE Tm_2O_3

Curve No.	Ref. No.	Year	Wavelength μm	Temperature Range, K	Reported Error, %	Composition (weight percent), Specifications and Remarks
1	334	1968	0.676	1696-2800		Dry pressed at 3000 psi with subsequent hydrostatic pressing at 50 000 psi; specimen fused by heating a few minutes; calculated from reflectance data.
2	334	1968	0.605	1698-2924		Above specimen and conditions.
3	334	1968	0.575	1554-2903		Above specimen and conditions.
4	334	1968	0.539	1624-2854		Above specimen and conditions.
5	334	1968	0.488	1700-2958		Above specimen and conditions.
6	311	1967	0.605	2608-2859	± 10	99.5 pure; supplied by Ames Laboratory; dry pressed at 5430 psi then hydrostatically pressed at 50 000 psi; 55 to 65% of theoretical density; calculated from reflectance data; initial run; [Authors' designation: Sample No. 1].
7	311	1967	0.676	2320-2900		Above specimen and conditions; repeat run.
8	311	1967	0.575	2639-2871		Similar to above specimen and conditions; [Authors' designation: Sample No. 2].
9	311	1967	0.488	2281-2671		Similar to above specimen and conditions; initial run; [Authors' designation: Sample No. 3].
10	311	1967	0.539	2550-2764		Above specimen and conditions; repeat run.
11	311	1967	0.539	2510-2693		Similar to above specimen and conditions; initial run; [Authors' designation: Sample No. 4].
12	311	1967	0.539	2378-2600		Above specimen and conditions; repeat run.
13	311	1967	0.488	2436-2600		Similar to above specimen and conditions; initial run; [Authors' designation: Sample No. 5].
14	311	1967	0.488	2423-2677		Above specimen and conditions; repeat run.
15	311	1967	0.605	2499-2859		Similar to above specimen and conditions; initial run; [Authors' designation: Sample No. 6].
16	311	1967	0.676	2213-2781		Above specimen and conditions; repeat run.
17	311	1967	0.676	2390-2970		Above specimen and conditions; repeat run.
18	311	1967	0.605	2278-2700		Above specimen and conditions; repeat run.
19	311	1967	0.575	2442-2790		Similar to above specimen and conditions; initial run; [Authors' designation: Sample No. 7].
20	311	1967	0.575	2410-2629		Above specimen and conditions; repeat run.

DATA TABLE NO. 157 HEMISPHERICAL SPECTRAL EMITTANCE OF THULIUM OXIDE Tm_2O_3

[Temperature, T, K; Emittance, ϵ; Wavelength, λ, μm]

T	ϵ
CURVE 1	
λ = 0.676	
1696	0.755
2145	0.807
2569	0.815
2696	0.815
2763	0.816
2800	0.816
CURVE 2	
λ = 0.605	
1698	0.595
2100	0.725
2695	0.725
2800	0.720
2859	0.707
2924	0.720
CURVE 3	
λ = 0.575	
1554	0.551
2000	0.710
2485	0.714
2702	0.717
2839	0.724
2903	0.724
CURVE 4	
λ = 0.539	
1624	0.504
2000	0.551
2452	0.565
2594	0.594
269[illegible]	0.607
2762	0.595
2854	0.605
CURVE 5	
λ = 0.488	
1700	0.448
2218	0.613
2600	0.613
CURVE 5 (cont.)	
2738	0.613
2822	0.615
2953	0.660
CURVE 6	
λ = 0.676	
2608	0.812
2738	0.799
2798	0.804
2839	0.806
2843	0.800
2853	0.812
2859	0.809
CURVE 7	
λ = 0.676	
2320	0.786
2711	0.777
2800	0.790
2840	0.780
2860	0.785
2879	0.790
2900	0.790
2900	0.779
CURVE 8	
λ = 0.575	
2639	0.817
2759	0.803
2841	0.814
2859	0.809*
2870	0.820
2871	0.806
CURVE 9	
λ = 0.488	
2281	0.772
2511	0.774
2622	0.779
2651	0.770
2656	0.767*
CURVE 9 (cont.)	
2665	0.765
2667	0.779
2671	0.765
CURVE 10	
λ = 0.539	
2550	0.726
2688	0.733
2754	0.762
2754	0.747
2763	0.756
2764	0.743
CURVE 11	
λ = 0.539	
2510	0.693
2589	0.691
2648	0.682
2669	0.690
2676	0.702
2685	0.702
2684	0.687
2693	0.691
CURVE 12	
λ = 0.539	
2378	0.702
2461	0.697
2500	0.689
2551	0.685
2571	0.695
2609	0.706
CURVE 13	
λ 0.488	
2436	0.769
2485	0.762
2567	0.759
2585	0.766
2600	0.767
CURVE 14	
λ = 0.488	
2423	0.694
2531	0.676
2621	0.676
2652	0.668
2653	0.676
2677	0.686
2677	0.676
CURVE 15	
λ = 0.676	
2499	0.756
2700	0.752
2779	0.763
2820	0.754
2841	0.750
2850	0.794
2859	0.749
2859	0.738
CURVE 16	
λ = 0.676	
2213	0.787
2419	0.779
2600	0.767*
2680	0.755
2718	0.752
2760	0.743*
2781	0.743
CURVE 17	
λ = 0.605	
2390	0.749
2671	0.727
2799	0.723
2871	0.709
2922	0.721*
2941	0.723
2941	0.715
2961	0.722
2970	0.716
CURVE 18	
λ = 0.605	
2278	0.748
2400	0.747
2519	0.746
2600	0.742
2700	0.726
2700	0.711
CURVE 19	
λ = 0.575	
2442	0.825
2610	0.819
2680	0.810
2761	0.816*
2779	0.823
2790	0.823
CURVE 20	
λ = 0.575	
2410	0.826
2468	0.812
2579	0.809
2629	0.811

*Not shown on plot

SPECIFICATION TABLE NO. 158 HEMISPHERICAL SPECTRAL EMITTANCE OF THULIUM OXIDE Tm_2O_3

Curve No.	Ref. No.	Year	Temperature K	Wavelength Range, µm	Reported Error, %	Composition (weight percent), Specifications and Remarks
1*	311	1967	2773	0.488-0.676		99.5 pure; supplied by Ames Laboratory; dry pressed at 5430 psi, then hydrostatically pressed at 50 000 psi; 55-65% of theoretical density; calculated from reflectance data.

DATA TABLE NO. 158 HEMISPHERICAL SPECTRAL EMITTANCE OF THULIUM OXIDE Tm_2O_3

[Wavelength, λ, µm; Emittance, ϵ; Temperature, T, K]

λ	ϵ
CURVE 1* T = 2773	
0.488	0.736
0.539	0.713
0.575	0.820
0.605	0.756
0.676	0.767

*No plot given

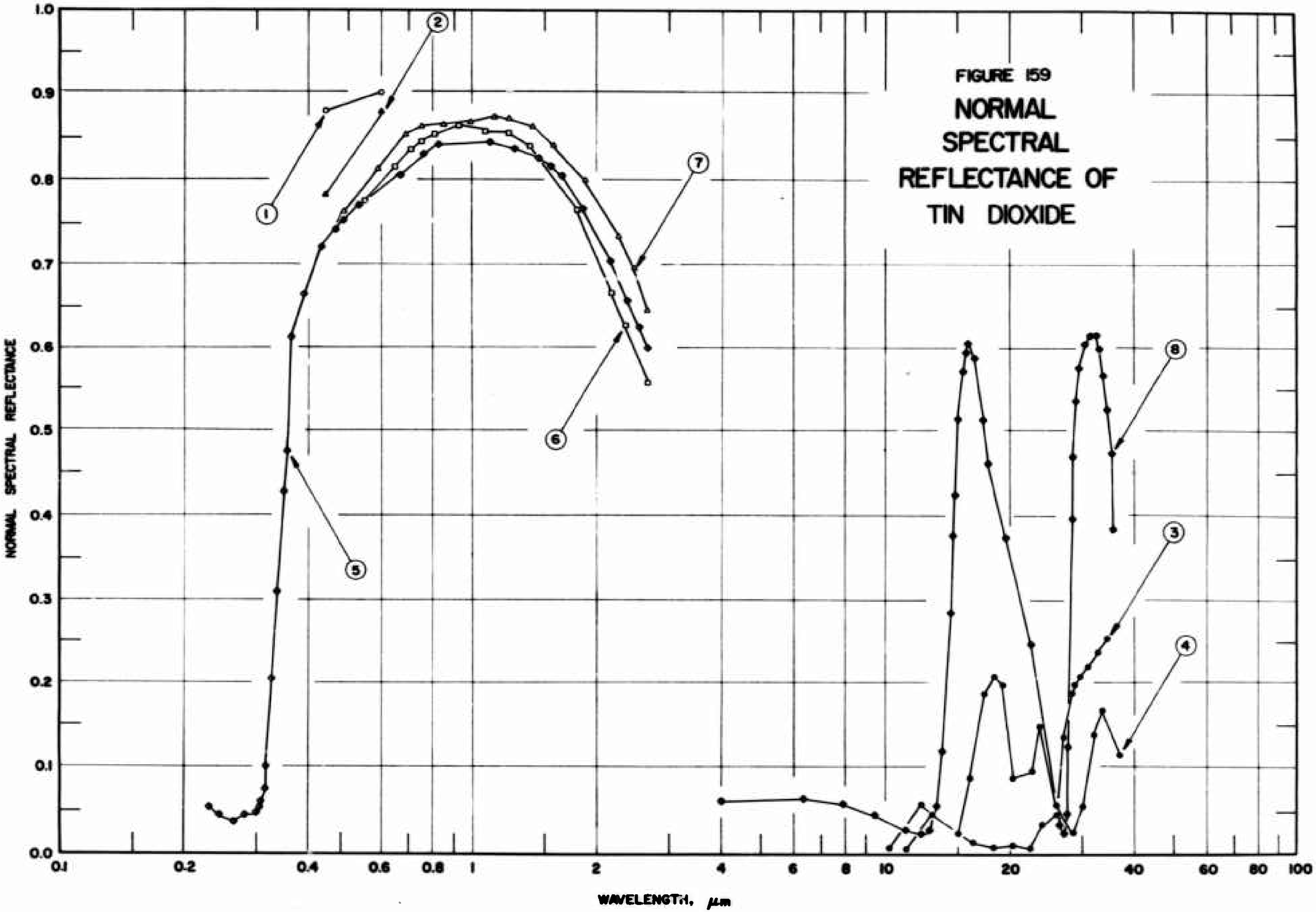


FIGURE 159
NORMAL SPECTRAL REFLECTANCE OF TIN DIOXIDE
NORMAL SPECTRAL REFLECTANCE
WAVELENGTH, μm
0.0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
1.0
0.1
0.2
0.4
0.6
0.8
1
2
4
6
8
10
20
40
60
80
100
1
2
3
4
5
6
7
8

SPECIFICATION TABLE NO. 159 NORMAL SPECTRAL REFLECTANCE OF TIN DIOXIDE SnO_2

Curve No.	Ref. No.	Year	Temperature K	Wavelength Range, µm	Geometry θ	θ'	ω'	Reported Error, %	Composition (weight percent), Specifications, and Remarks
1	82	1963	298	0.440-0.600	~0°		2π		CP powder; supplied by Fisher; compacted at 10 000 psi.
2	82	1963	298	0.440-0.600	~0°		2π		Above specimen and conditions except exposed to 300 ESH uv irradiation at solar factor 3.
3	146	1966	~298	11.2-34.9	~0°	~0°			Film; optical thickness 10 quarterwaves at $\lambda = 3.2$ µm; electron beam deposited in vacuum (1.8×10^{-4} mm Hg with O_2 bleed) at normal incidence onto glass substrate heated to 588 K; rate of depositing 1 quarterwave per min at $\lambda = 0.5$ µm; film had medium brown, powdery appearance.
4	146	1966	~298	10.1-37.0	~0°	~0°			Above specimen and conditions except measured after baking.
5	342	1968	~298	0.230-2.65	0°		2π		Powder; compacted at 35 300 psi; data extracted from smooth curve; MgO reference standard.
6	342	1968	~298	0.230-2.65	0°		2π		Similar to curve 1 specimen and conditions except heated at 1073 K for 5 min.
7	342	1968	~298	0.230-2.65	0°		2π		Similar to curve 1 specimen and conditions except heated at 1073 K for 60 min.
8	146	1966	~298	4.10-35.8	~0°	~0°			Cassiterite; data extracted from smooth curve.

DATA TABLE NO. 159 NORMAL SPECTRAL REFLECTANCE OF TIN DIOXIDE SnO_2

[Wavelength, λ, μm; Reflectance, ρ; Temperature, T, K]

λ	ρ
CURVE 1	
T = 298	
0.440	0.880
0.600	0.900
CURVE 2	
T = 298	
0.440	0.785
0.600	0.880
CURVE 3	
T ~ 298	
11.2	0.005
13.0	0.045
16.1	0.011
18.1	0.009
20.1	0.010
22.6	0.005
24.0	0.033
26.0	0.046
27.0	0.132
28.1	0.186
28.9	0.197
29.9	0.209
31.0	0.220
32.9	0.238
34.9	0.251
CURVE 4	
T ~ 298	
10.1	0.007
12.1	0.058
15.0	0.021
16.0	0.086
17.2	0.185
18.2	0.209
19.1	0.197
20.1	0.085
22.6	0.091
23.8	0.148
26.0	0.053
28.1	0.024
30.0	0.053
CURVE 4 (cont.)	
32.0	0.137
33.6	0.165
37.0	0.113
CURVE 5	
T ~ 298	
0.230	0.053
0.244	0.043
0.265	0.038
0.280	0.044
0.300	0.047
0.304	0.052
0.308	0.060
0.311	0.073
0.316	0.100
0.328	0.203
0.339	0.310
0.350	0.428
0.357	0.473
0.363	0.611
0.390	0.665
0.434	0.721
0.461	0.743
0.482	0.751
0.536	0.770
0.661	0.806
0.760	0.830
0.837	0.841
1.10	0.843
1.27	0.839
1.45	0.827
1.55	0.818
1.63	0.806
1.85	0.767
2.16	0.705
2.38	0.658
2.54	0.623
2.65	0.600
CURVE 6	
T ~ 298	
0.230	0.053*
0.244	0.043*
CURVE 6 (cont.)	
0.265	0.038*
0.280	0.044*
0.300	0.047*
0.304	0.053*
0.308	0.060*
0.311	0.073*
0.316	0.100*
0.328	0.203*
0.339	0.310*
0.350	0.428*
0.357	0.473*
0.363	0.611*
0.390	0.665*
0.434	0.721*
0.461	0.743*
0.482	0.751*
0.544	0.777
0.643	0.816
0.703	0.836
0.754	0.846
0.812	0.853
0.934	0.861
1.06	0.859
1.22	0.855
1.38	0.840
1.55	0.816*
1.80	0.764
2.19	0.669
2.35	0.628
2.65	0.557
CURVE 7	
T ~ 298	
0.230	0.053*
0.244	0.043*
0.265	0.038*
0.280	0.044*
0.300	0.047*
0.304	0.053*
0.308	0.060*
0.311	0.073*
0.316	0.100*
0.328	0.203*
0.339	0.310*
CURVE 7 (cont.)	
0.350	0.428*
0.357	0.473*
0.363	0.611*
0.390	0.665*
0.434	0.721*
0.461	0.743*
0.489	0.762
0.584	0.814
0.690	0.851
0.753	0.861
0.855	0.865
0.999	0.868
1.12	0.873
1.22	0.872
1.40	0.861
1.59	0.841
1.89	0.800
2.26	0.736
2.45	0.696
2.65	0.646
CURVE 8	
T ~ 298	
4.10	0.060
6.30	0.062
7.90	0.056
9.40	0.044
11.1	0.027
12.1	0.022
12.7	0.029
13.2	0.055
13.6	0.119
14.3	0.283
14.5	0.379
14.8	0.424
15.0	0.512
15.3	0.570
15.6	0.594
15.9	0.606
16.4	0.588
17.1	0.511
17.7	0.460
19.7	0.374
22.3	0.247
CURVE 8 (cont.)	
26.3	0.032
27.0	0.022
27.3	0.048
27.6	0.122
28.1	0.399
28.4	0.466
29.0	0.534
29.5	0.574
30.3	0.603
31.3	0.615
32.2	0.615
33.0	0.600
33.9	0.564
34.5	0.525
35.1	0.472
35.8	0.385

* Not shown on plot

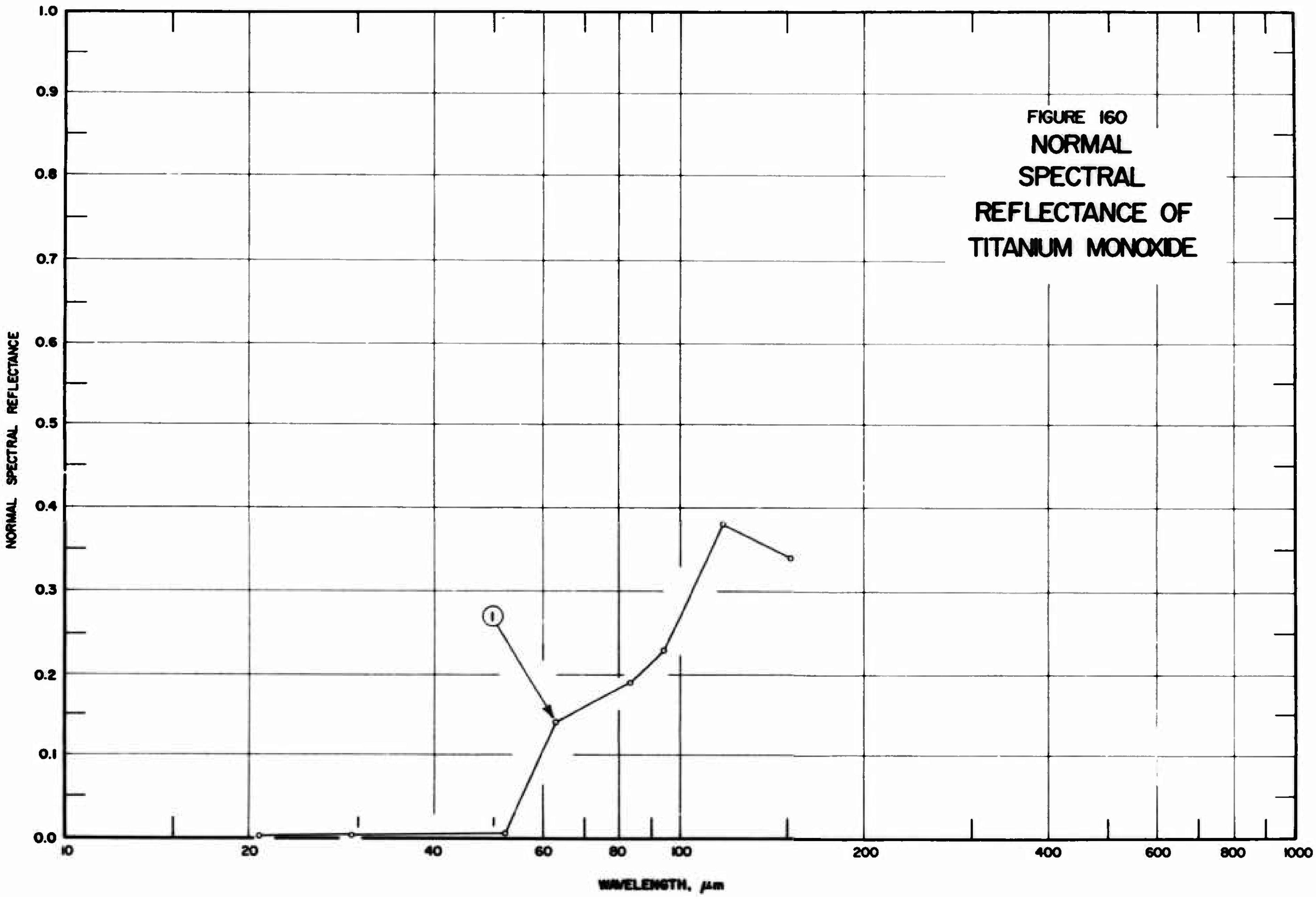


FIGURE 160
NORMAL
SPECTRAL
REFLECTANCE OF
TITANIUM MONOXIDE
1
1.0
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0.0
NORMAL SPECTRAL REFLECTANCE
10
20
40
60
80
100
200
400
600
800
1000
WAVELENGTH, μm

SPECIFICATION TABLE NO. 160 NORMAL SPECTRAL REFLECTANCE OF TITANIUM MONOXIDE TiO

Curve No.	Ref. No.	Year	Temperature K	Wavelength Range, μm	Geometry θ	θ'	ω'	Reported Error, %	Composition (weight percent), Specifications, and Remarks
1	47	1940	298	20.7-152	~0°	~0°			Plate (6.00 mm thick); obtained from Westinghouse; [Authors' designation: Sample No. 26].

DATA TABLE NO. 160 NORMAL SPECTRAL REFLECTANCE OF TITANIUM MONOXIDE TiO

[Wavelength, λ, μm; Reflectance, ρ; Temperature, T, K]

λ	ρ
CURVE 1	
T = 298	
20.7	0.01
29.4	0.03
52	0.07
63	0.14
83	0.19
94	0.23
117	0.38
152	0.34

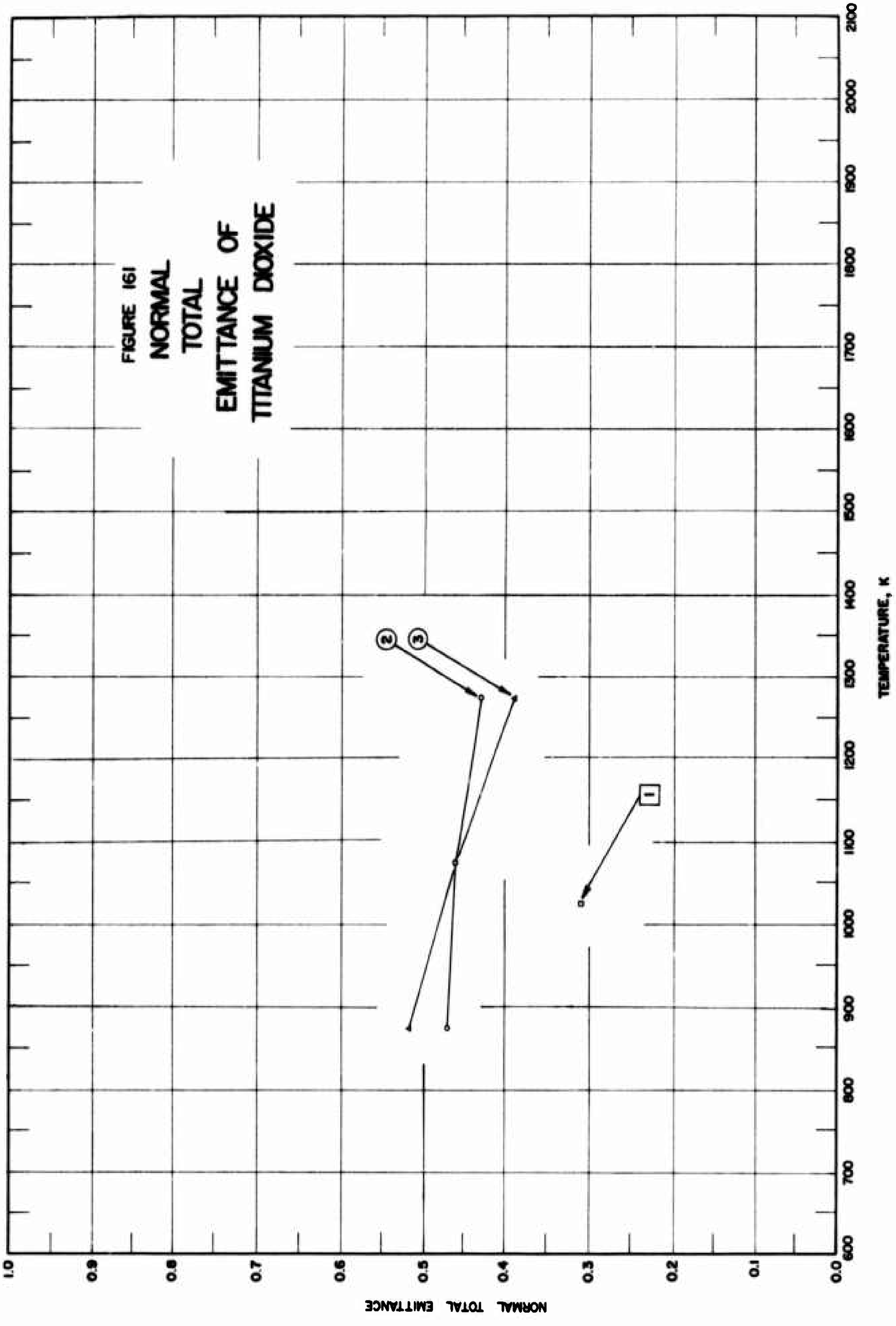


FIGURE 161 NORMAL TOTAL EMITTANCE OF TITANIUM DIOXIDE

SPECIFICATION TABLE NO. 161 NORMAL TOTAL EMITTANCE OF TITANIUM DIOXIDE TiO_2

Curve No.	Ref. No.	Year	Temperature Range, K	Geometry θ'	Reported Error, %	Composition (weight percent), Specifications and Remarks
1	28	1963	1023	~0°		Sintered at 1673 K for 2 hrs (setter material TiO_2); theoretical density 4.2 g cm^{-3}; integrated from spectral data (1-15 μm); [Authors' designation: Sample No. 125].
2	362	1964	873-1273	0°		99.9 pure powder, J.T. Baker Co.; sintered 4 hrs at 1723 K.
3	362	1964	873-1273	0°		Similar to above specimen and conditions except integrated from spectral data (1-15 μm).

DATA TABLE NO. 161 NORMAL TOTAL EMITTANCE OF TITANIUM DIOXIDE TiO_2

[Temperature, T, K; Emittance, ε]

T	ε
CURVE 1	
1023	0.31
CURVE 2	
873	0.47
1073	0.46
1273	0.43
CURVE 3	
873	0.52
1073	0.46
1273	0.39

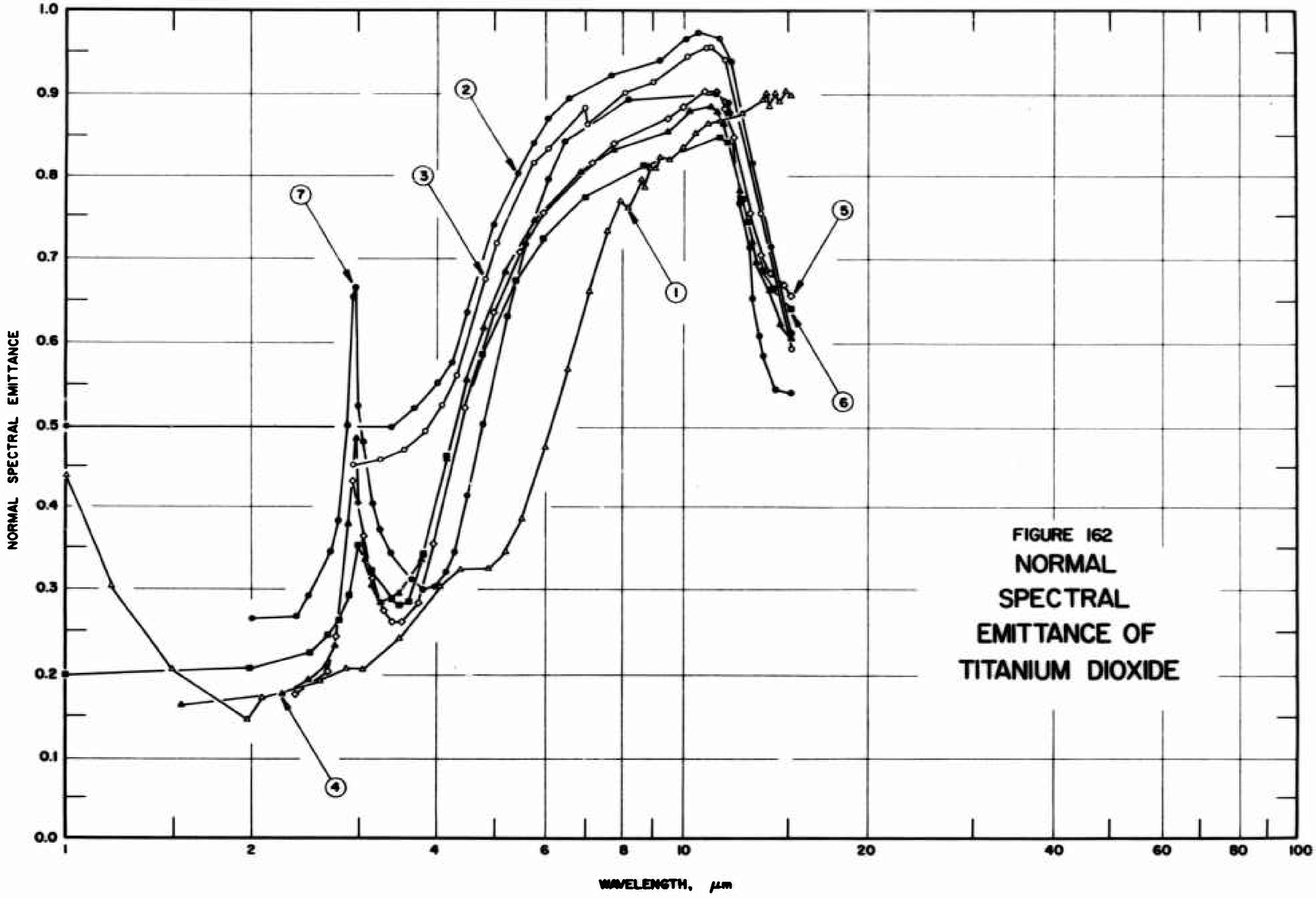


FIGURE 162
NORMAL
SPECTRAL
EMITTANCE OF
TITANIUM DIOXIDE

SPECIFICATION TABLE NO. 162 NORMAL SPECTRAL EMITTANCE OF TITANIUM DIOXIDE TiO_2

Curve No.	Ref. No.	Year	Temperature K	Wavelength Range, μm	Geometry θ'	Reported Error, %	Composition (weight percent), Specifications, and Remarks
1	28	1963	1023	1.00-15.0	~0°		Sintered at 1673 K for 2 hrs (setter material TiO_2); theoretical density 4.2 g cm^{-3}; data extracted from smooth curve; [Authors' designation: Sample No. 125].
2	382	1965	1273	1.00-15.0	0°		Powder; sintered 2 hrs at 1573 K; data extracted from smooth curve.
3	382	1965	1273	1.00-15.0	0°		Above specimen and conditions except heated at 1273 K in measuring apparatus for 3 hrs total.
4	362	1964	873	1.54-15.0	~0°		99.9 pure powder, J.T. Baker Co.; sintered 4 hrs at 1723 K; data extracted from smooth curve; author says peak in emittance may be due to the presence of trace amounts of water.
5	362	1964	1073	1.54-15.0	~0°		Above specimen and conditions.
6	362	1964	1273	1.00-15.0	~0°		Above specimen and conditions.
7	362	1964	373	2.00-15.0	~0°		Above specimen and conditions except calculated from spectral reflectance data.

DATA TABLE NO. 162 NORMAL SPECTRAL EMITTANCE OF TITANIUM DIOXIDE TiO_2

[Wavelength, λ, μm; Emittance, ϵ; Temperature, T, K]

CURVE 1
T = 1023

λ	ϵ
1.00	0.440
1.18	0.303
1.49	0.209
1.96	0.148
2.09	0.171
2.59	0.193
2.85	0.208
3.01	0.207
3.49	0.243
4.04	0.305
4.36	0.326
4.85	0.326
5.17	0.347
5.50	0.386
6.00	0.476
6.50	0.570
7.01	0.661
7.51	0.734
7.99	0.770
8.19	0.761
8.56	0.799
8.68	0.787
8.81	0.810
9.00	0.810
9.14	0.824
9.52	0.821
10.0	0.838
10.5	0.854
11.0	0.867
11.5	0.870
12.0	0.878*
12.5	0.880
13.0	0.887*
13.5	0.893
13.6	0.901
13.8	0.889
14.2	0.902
14.4	0.893
14.7	0.903
15.0	0.900

CURVE 2
T = 1273

λ	ϵ
1.00	0.500
3.37	0.500
3.66	0.521
4.00	0.552
4.21	0.578
4.46	0.638
4.97	0.740
5.40	0.802
5.73	0.841
6.09	0.871
6.59	0.897
7.67	0.924
9.17	0.941
10.1	0.967
10.6	0.974
11.5	0.968
12.0	0.940
13.0	0.818
13.9	0.713
15.0	0.611

CURVE 3
T = 1273

λ	ϵ
1.00	0.440*
2.92	0.451
3.24	0.460
3.51	0.472
3.81	0.496
4.09	0.527
4.30	0.562
4.80	0.676
5.00	0.719
5.73	0.817
6.02	0.835
6.99	0.885
8.09	0.901
8.98	0.917
10.2	0.947
10.7	0.956
11.2	0.956
11.7	0.941
13.4	0.753
15.0	0.594

CURVE 4
T = 873

λ	ϵ
1.54	0.164
2.24	0.178
2.48	0.195
2.61	0.210
2.71	0.234
2.87	0.380
2.95	0.489
2.99	0.404
3.05	0.337
3.14	0.305
3.24	0.288
3.48	0.297
3.79	0.337
4.15	0.460
4.47	0.559
4.76	0.620
5.16	0.685
5.71	0.748
6.84	0.803
7.74	0.833
9.42	0.859
10.3	0.883
11.1	0.889
11.4	0.882
11.7	0.868
12.4	0.783
13.0	0.720
13.2	0.695
13.8	0.662
14.4	0.625
15.0	0.607

CURVE 5
T = 1073

λ	ϵ
1.54	0.164*
2.35	0.177
2.56	0.190*
2.65	0.205
2.73	0.245
2.88	0.379*
2.91	0.433
2.95	0.431*
3.03	0.365

CURVE 5 (cont.)

λ	ϵ
3.13	0.313
3.29	0.276
3.39	0.262
3.50	0.262
3.72	0.286
3.96	0.356
4.42	0.523
4.97	0.638
5.45	0.709
5.96	0.755
7.11	0.817
7.76	0.840
9.49	0.872
10.0	0.889
10.7	0.904
11.4	0.904
11.7	0.885
12.1	0.850
12.9	0.754
13.4	0.703
13.9	0.683
14.6	0.670
15.0	0.658

CURVE 6
T = 1273

λ	ϵ
1.00	0.200
1.99	0.209
2.48	0.226
2.65	0.247
2.76	0.264
2.88	0.294
2.98	0.354
3.12	0.324
3.36	0.290
3.49	0.282
3.60	0.287
3.80	0.342
4.14	0.463
4.72	0.588
5.39	0.676
5.99	0.724
6.97	0.775
8.69	0.814

CURVE 6 (cont.)

λ	ϵ
9.52	0.821*
10.5	0.855*
11.5	0.850
11.8	0.842
12.5	0.771
12.7	0.744
13.5	0.688
14.0	0.665
15.0	0.642

CURVE 7
T = 373

λ	ϵ
2.00	0.266
2.36	0.270
2.48	0.295
2.68	0.347
2.75	0.384
2.85	0.501
2.91	0.656
2.94	0.667
2.97	0.654*
2.98	0.526
3.01	0.483
3.15	0.402
3.22	0.371
3.36	0.343
3.61	0.313
3.80	0.300
3.98	0.304
4.11	0.321
4.26	0.346
4.48	0.415
4.72	0.503
5.20	0.631
5.59	0.718
6.02	0.796
6.44	0.844
7.00	0.865
8.19	0.896
11.4	0.903
11.8	0.892
11.9	0.880
12.4	0.768
12.7	0.714

CURVE 7 (cont.)

λ	ϵ
13.0	0.654
13.3	0.610
13.5	0.587
14.1	0.547
15.0	0.543

*Not shown on plot

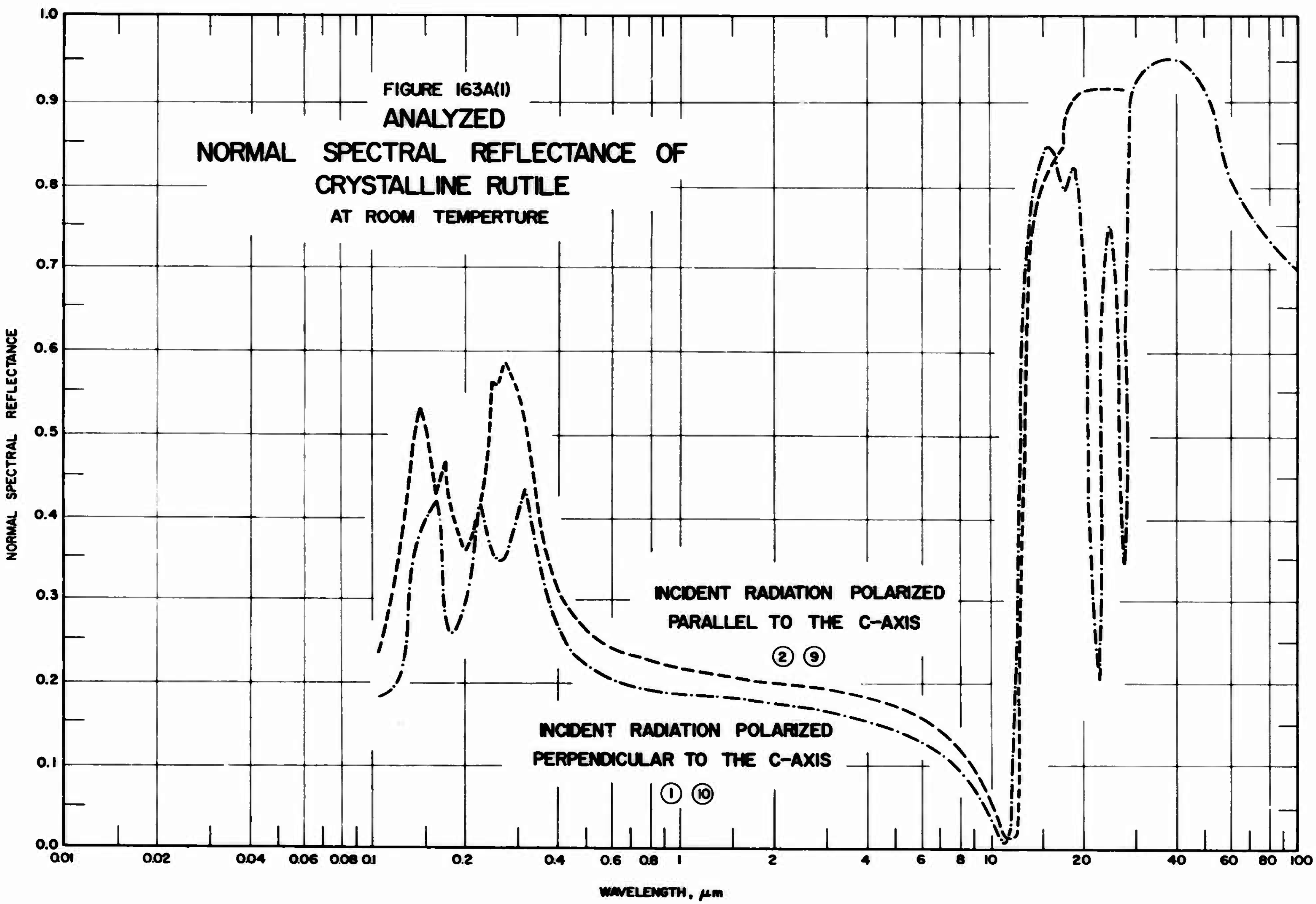


FIGURE 163A(I)
ANALYZED
NORMAL SPECTRAL REFLECTANCE OF
CRYSTALLINE RUTILE
AT ROOM TEMPERTURE
INCIDENT RADIATION POLARIZED
PARALLEL TO THE C-AXIS
2 9
INCIDENT RADIATION POLARIZED
PERPENDICULAR TO THE C-AXIS
1 10
NORMAL SPECTRAL REFLECTANCE
WAVELENGTH, μm
0.0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
1.0
0.01
0.02
0.04
0.06
0.08
0.1
0.2
0.4
0.6
0.8
1
2
4
6
8
10
20
40
60
80
100

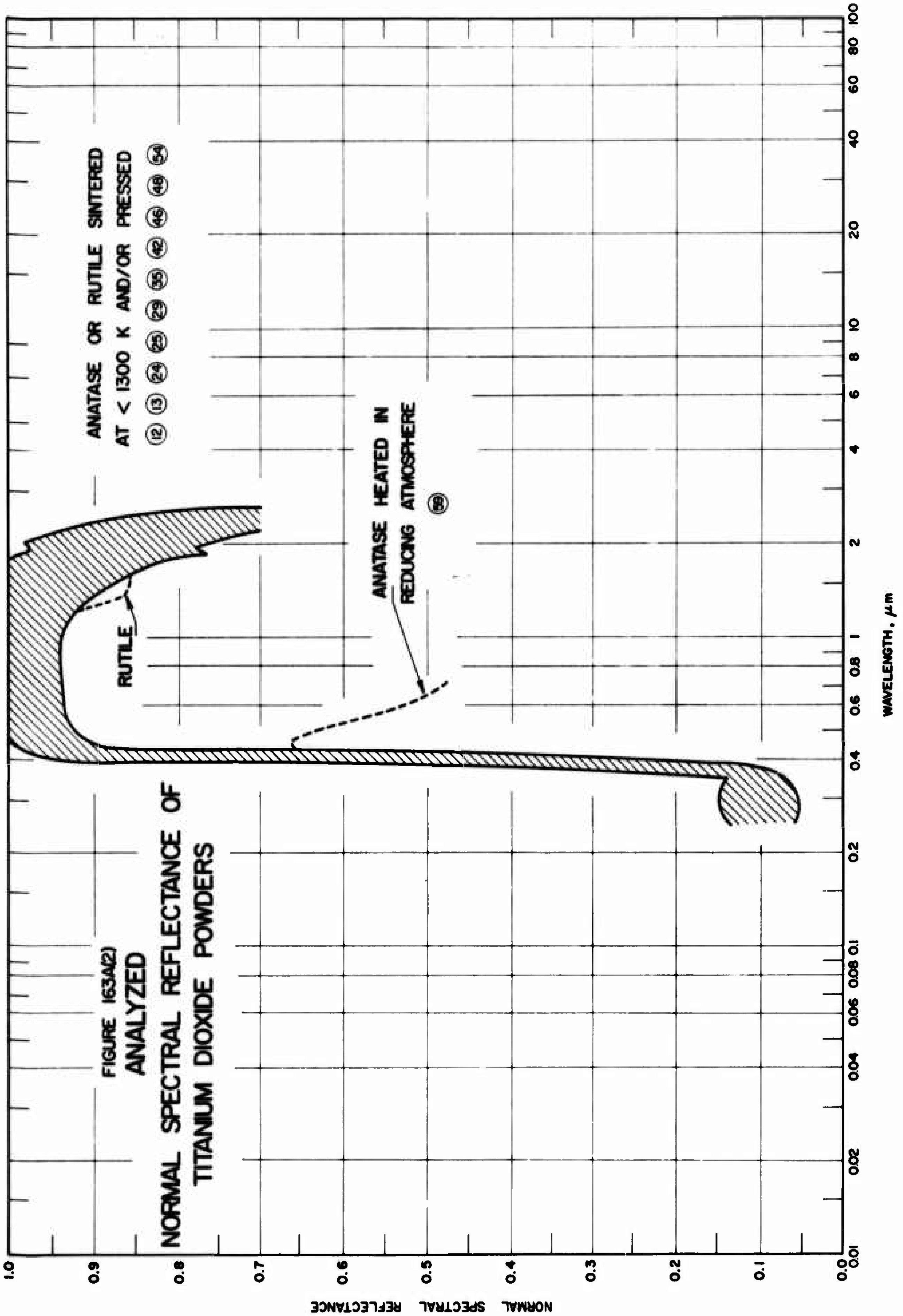


FIGURE 163A(2)
ANALYZED
NORMAL SPECTRAL REFLECTANCE OF
TITANIUM DIOXIDE POWDERS

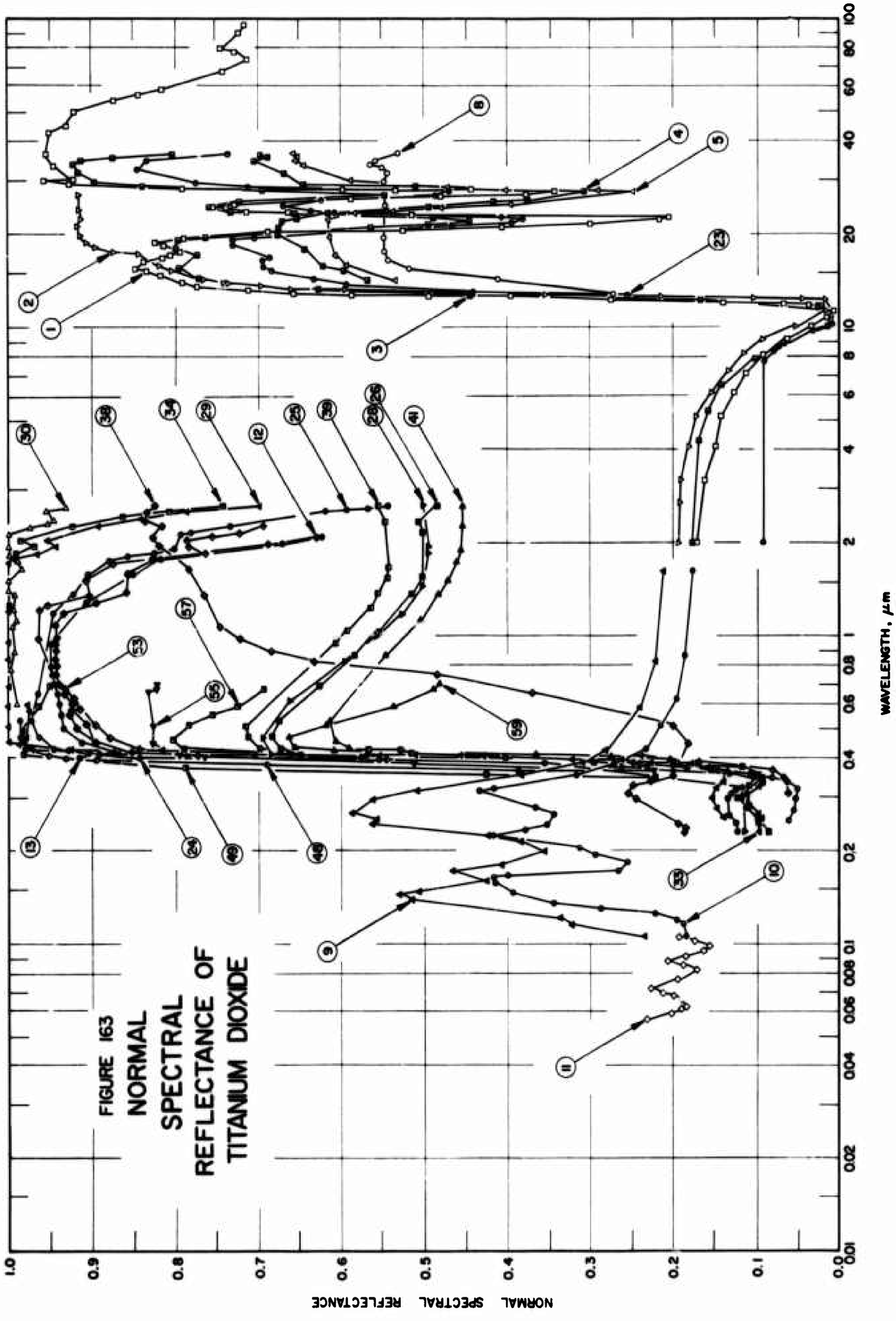


FIGURE 163 NORMAL SPECTRAL REFLECTANCE OF TITANIUM DIOXIDE

SPECIFICATION TABLE NO. 163 NORMAL SPECTRAL REFLECTANCE OF TITANIUM DIOXIDE TiO_2

Curve No.	Ref. No.	Year	Temperature K	Wavelength Range, μm	Geometry θ	θ'	ω'	Reported Error, %	Composition (weight percent), Specifications, and Remarks
1	237	1962	297	2.00-130	<6°	<6°			Rutile; undoped synthetic crystal; grown by flame fusion; optically polished; incident beam polarized with E perpendicular to optic axis (ordinary ray).
2	237	1962	297	2.00-27.0	<6°	<6°			Above specimen and conditions except incident beam polarized with E parallel to optic axis (extra-ordinary ray).
3	176	1963	298	2.00-36.1	0°		2π		Single crystal; supplied by Titanium Alloy Mfg. Div., National Lead Co.; data extracted from smooth curve.
4	146	1966	~298	14.1-36.0	~0°	~0°			Film; optical thickness 10 quarterwaves at λ = 2.6 μm; electron beam deposited in vacuum (1.8 x 10^{-4} mm Hg with O_2 bleed) at normal incidence onto glass substrate heated to 588 K; rate of depositing 1 quarterwave per min at λ = 0.5 μm; prepared from Ti_2O_3 with O_2; film exhibited slight scattering in optical region.
5	146	1966	~298	14.1-36.7	~0°	~0°			Film; optical thickness 10 quarterwaves at λ = 3.1 μm: electron beam deposited in vacuum (1.8 x 10^{-4} mm Hg with O_2 bleed) at normal incidence onto glass substrate heated to 588 K; rate of depositing 1 quarterwave per min at λ = 0.5 μm; prepared from TiO with O_2; film exhibited medium scattering in optical region.
6*	146	1966	~298	10.9-36.5	~0°	~0°			Film; optical thickness 10 quarterwaves at λ = 2.6 μm; electron beam deposited in vacuum (1.8 x 10^{-4} mm Hg with O_2 bleed) at normal incidence onto glass substrate heated to 563 K; rate of depositing 1 quarterwave per min at λ = 0.5 μm; prepared from TiO with O_2; film exhibited medium scattering in optical region.
7*	146	1966	~298	10.9-36.9	~0°	~0°			Film; optical thickness 10 quarterwaves at λ = 2.5 μm; electron beam deposited in vacuum (1.8 x 10^{-4} mm Hg with O_2 bleed) at normal incidence onto glass substrate heated to 523 K; rate of depositing 1 quarterwave per min at λ = 0.5 μm; prepared from TiO with O_2; film exhibited slight scattering in optical region.
8	146	1966	~298	10.9-36.9	~0°	~0°			Film; optical thickness 10 quarterwaves at λ = 2.5 μm; electron beam deposited in vacuum (1.8 x 10^{-4} mm Hg with O_2 bleed) at normal incidence onto glass substrate heated to 423 K; rate of depositing 1 quarterwave per min at λ = 0.5 μm; prepared from TiO with O_2; film clear in appearance.
9	390	1965	297	0.105-1.61	~0°	~0°			Rutile single crystals; obtained from NBS; cleaved; birefringent; measured with light polarized parallel to the c-axis; data extracted from smooth curve.
10	390	1965	297	0.105-1.61	~0°	~0°			Similar to the above specimen and conditions except with light polarized perpendicular to the c-axis.
11	390	1965	297	0.0564-0.104	~0°	~0°			Similar to the above specimen except for unpolarized light.
12	120	1962	298	0.4-2.1	0°		2π		Rutile; [Authors' designation: Specimen X84].
13	120	1962	298	0.4-2.1	0°		2π		Anatase; [Authors' designation: Specimen Y 13].
14*	28	1963	298	0.230-2.65	~0°		2π		Sintered at 1673 K for 2 hrs (setter material TiO_2); density 3.87 g cm^{-3}, theoretical density 4.2 g cm^{-3}; MgO reference standard; data extracted from smooth curve; [Authors' designation: Sample No. 124].
15*	341	1966	~298	0.230-2.65	0°		2π		Sintered 2 hrs at 1648 K: measured in vacuum (10^{-5} mm Hg): data extracted from smooth curve; MgO reference standard.

*Not shown on plot

SPECIFICATION TABLE NO. 163 (continued)

Curve No.	Ref. No.	Year	Temperature K	Wavelength Range, μm	Geometry θ	θ'	ω'	Reported Error, %	Composition (weight percent), Specifications, and Remarks
16*	341	1966	~298	0.230-2.65	0°		2π		Above specimen and conditions except after 15 min in vacuum (10^{-5} mm Hg) at 298 K.
17*	341	1966	~298	0.230-2.65	0°		2π		Above specimen and conditions except heated in vacuum (10^{-5} mm Hg) for 1 min at 1200 K.
18*	341	1966	~298	0.230-2.65	0°		2π		Above specimen and conditions except heated 2 min total at 1200 K.
19*	341	1966	~298	1.00-15.0	0°		2π		Sintered 2 hrs at 1648 K; measured in vacuum (10^{-5} mm Hg); data extracted from smooth curve; converted from R(2π, 0°).
20*	341	1966	~298	1.00-15.0	0°		2π		Above specimen and conditions except after 15 min in vacuum (10^{-5} mm Hg) at 298 K.
21*	341	1966	~298	1.00-15.0	0°		2π		Above specimen and conditions except heated in vacuum (10^{-5} mm Hg) for 1 min at 1200 K.
22*	341	1966	~298	1.00-15.0	0°		2π		Above specimen and conditions except heated 2 min total at 1200 K.
23	176	1963	298	2.00-36.1	0°		2π		Pressed powder; supplied by Titanium Alloy Mfg. Div., National Lead Co.; data extracted from smooth curve.
24	236	1962	298	0.308-2.28	~0°	~0°			Rutile; compacted; data extracted from smooth curve.
25	342	1968	~298	0.230-2.65	0°		2π		Powder; compacted at 11 800 psi; data extracted from smooth curve; MgO reference standard.
26	91	1967	298	0.230-2.65	0°		2π		Powder; commercially pure; -230 +270 mesh; pressed at 16 200 Newtons cm^{-2}; 1.6 mm thick on stainless steel substrate; MgO reference standard; data extracted from smooth curve.
27	91	1967	298	0.230-2.65	0°		2π		Similar to the above specimen and conditions except pressed at 24 300 newtons cm^{-2}.
28	91	1967	298	0.230-2.65	0°		2π		Similar to the above specimen and conditions except pressed at 48 600 newtons cm^{-2}.
29	121	1964	~298	0.259-0.600	~0°		2π		Unitane or 342 (Amer. Cyanamid Co.) powder; 97 pure; compacted; $BaSO_4$ reference standard; data extracted from smooth curve.
30	121	1964	~298	0.600-2.60	~0°		2π		Similar to above specimen and conditions.
31*	121	1964	~298	0.249-0.600	~0°		2π		Unitane or 640 (Amer. Cyanamid Co.) powder; 94 pure; compacted; $BaSO_4$ reference standard; data extracted from smooth curve.
32*	121	1964	~298	0.600-2.60	~0°		2π		Similar to above specimen and conditions.
33	340	1968	298	0.230-2.65	~0°		2π		Compacted without binder at 18 900 psi; data extracted from smooth curve; freshly smoked MgO reference standard.
34	340	1968	298	0.230-2.65	~0°		2π		Similar to the above specimen and conditions except sintered at 773 K in air for 1 hr.
35*	340	1968	298	0.230-2.65	~0°		2π		Similar to the above specimen and conditions except sintered at 1273 K in air for 1 hr.
36*	340	1968	298	0.230-2.65	~0°		2π		Similar to the above specimen and conditions except sintered at 1373 K in air for 1 hr.
37*	340	1968	298	0.230-2.65	~0°		2π		Similar to the above specimen and conditions except sintered at 1523 K in air for 1 hr.
38	340	1968	298	0.230-2.65	~0°		2π		Similar to the above specimen and conditions except sintered at 1823 K in air for 1 hr.

* Not shown on plot

SPECIFICATION TABLE NO. 163 (continued)

Curve No.	Ref. No.	Year	Temperature K	Wavelength Range, μm	Geometry θ	θ'	ω'	Reported Error, %	Composition (weight percent), Specifications, and Remarks
39	342	1968	~298	0.230-2.65	0°		2π		Powder; particle size 37 μm to 105 μm; compacted at 35 300 psi; data extracted from smooth curve; MgO reference standard.
40*	342	1968	~298	0.230-2.65	0°		2π		Similar to above specimen and conditions except particle size 30 μm to 37 μm.
41	342	1968	~298	0.230-2.65	0°		2π		Similar to above specimen and conditions except particle size <30 μm.
42*	341	1966	~298	0.230-2.65	~0°		2π		Powder; compacted at 23 500 psi; data extracted from smooth curve; MgO reference standard.
43*	341	1966	~298	0.230-2.65	~0°		2π		Above specimen and conditions except exposed to vacuum (10^{-3} mm Hg) for 5 min.
44*	341	1966	~298	0.230-2.65	~0°		2π		Above specimen and conditions except exposed to vacuum (10^{-3} mm Hg) for 30 min.
45*	341	1966	~298	0.230-2.65	~0°		2π		Above specimen and conditions except exposed to vacuum (10^{-3} mm Hg) for 1680 min.
46*	341	1966	~298	0.230-2.65	~0°		2π		TiO_2 powder; compacted at 23 500 psi; data extracted from smooth curve; MgO reference standard.
47*	341	1966	~298	0.230-2.65	~0°		2π		Above specimen and conditions except surface contaminated by exposure to atomized oil.
48	386	1967	~298	0.250-0.700	~0°	~45°			Anatase-type TiO_2; solid angle of viewing is a ring of 14° wide centered at θ = 45°; data extracted from smooth curve; CaF_2 reference standard.
49	130	1965	~298	0.348-0.684	~0°	~0°			100 anatase from General Chemical Div., Allied Chemical Co. lot R163; loosely packed; data extracted from smooth curve.
50*	130	1965	~298	0.356-0.682	~0°	~0°			Similar to the above specimen and conditions except heat treated in air and then quenched with some transformation to rutile leaving 85% anatase.
51*	130	1965	~298	0.361-0.651	~0°	~0°			Similar to curve 49 specimen and conditions except heat treated in air and then quenched with some transformation to rutile leaving 70% anatase.
52*	130	1965	~298	0.363-0.666	~0°	~0°			Similar to curve 49 specimen and conditions except heat treated in air and then quenched with some transformation to rutile leaving 50% anatase.
53	130	1965	~298	0.363-0.666	~0°	~0°			Similar to curve 49 specimen and conditions except heat treated in air and then quenched with some transformation to rutile leaving 20% anatase.
54*	130	1965	~298	0.365-0.700	~0°	~0°			100 anatase from General Chemical Div., Allied Chemical Co. lot R 163; loosely packed; data extracted from smooth curve.
55	130	1965	~298	0.368-0.700	~0°	~0°			Similar to the above specimen and conditions except transformed in $10H_2$-$90N_2$ for 30 min at 1020 K yielding rutile and 92% untransformed anatase: sample darker than samples transformed in air.
56*	130	1965	~298	0.372-0.670	~0°	~0°			Similar to curve 54 specimen and conditions except transformed in $10H_2$-$90N_2$ for 30 min at 1250 K yielding rutile and 68% untransformed anatase: sample darker than sample transformed in air.
57	130	1965	~298	0.375-0.671	~0°	~0°			Similar to curve 54 specimen and conditions except transformed in $10H_2$-$90N_2$ for 30 min at 1257 K yielding rutile and 60% untransformed anatase; sample darker than sample transformed in air.

* Not shown on plot

SPECIFICATION TABLE NO. 163 (continued)

Curve No.	Ref. No.	Year	Temperature K	Wavelength Range, μm	Geometry θ	Geometry θ'	Geometry ω'	Reported Error, %	Composition (weight percent), Specifications, and Remarks
58	130	1965	~298	0.366-0.675	~0°	~0°			Similar to curve 54 specimen and conditions except transformed in $10H_2$-$90N_2$ for 30 min at 1278 K yielding rutile and 21% untransformed anatase; sample darker than sample transformation in air.
59	130	1965	~298	0.366-0.700	~0°	~0°			Similar to curve 54 specimen and conditions except transformed in $10H_2$-$90N_2$ for 30 min at 1291 K yielding rutile and 3% untransformed anatase; sample darker than sample transformed in air.

DATA TABLE NO. 163 NORMAL SPECTRAL REFLECTANCE OF TITANIUM DIOXIDE TiO_2

[Wavelength, λ, μm; Reflectance, ρ; Temperature, T, K]

CURVE 1
T = 297

λ	ρ
2.00	0.170
3.20	0.162
4.10	0.150
5.10	0.142
6.10	0.129
7.10	0.113
8.10	0.094
8.60	0.08[illegible]
9.10	0.07[illegible]
9.10	0.064
9.40	0.055*
10.0	0.034
10.7	0.015
10.9	0.012*
11.1	0.008
11.6	0.016*
11.7	0.036
11.8	0.069
12.0	0.140
12.2	0.275
12.4	0.399
12.6	0.499
12.9	0.587
13.0	0.659
13.2	0.712
13.4	0.753*
13.6	0.774
13.7	0.780*
13.9	0.784*
14.0	0.791
14.2	0.798*
14.6	0.811*
14.9	0.819
15.0	0.827*
15.2	0.834
15.3	0.844*
15.6	0.847*
15.7	0.850
16.0	0.847*
16.4	0.838
16.6	0.830*
16.7	0.822*
17.0	0.815
17.2	0.806
17.5	0.795*

CURVE 1 (cont.)

λ	ρ
17.8	0.795
18.0	0.799*
18.6	0.813
19.0	0.821
19.0	0.815*
19.5	0.790
20.1	0.688
20.6	0.524
21.0	0.406
21.6	0.300
22.1	0.216
22.3	0.204
22.6	0.266*
23.0	0.514
23.6	0.661
23.7	0.686*
23.8	0.714
23.9	0.728*
24.2	0.739
24.4	0.744*
24.6	0.751
24.8	0.741*
25.0	0.729
25.2	0.711*
26.0	0.588
26.4	0.480
26.6	0.428*
26.9	0.379
27.1	0.346
27.3	0.350*
27.4	0.446
27.6	0.532
27.7	0.599
28.0	0.792
28.0	0.823*
29.0	0.928
30.0	0.945*
30.0	0.959
30.0	0.921
33.1	0.946
36.7	0.954
40.2	0.953*
43.1	0.950
45.0	0.931
47.0	0.936*
50.0	0.921

CURVE 1 (cont.)

λ	ρ
54.4	0.873
57.1	0.847
58.1	0.832*
59.9	0.815
64.4	0.773*
67.2	0.741
70.0	0.741*
74.1	0.713
78.0	0.729
80.0	0.744
85.2	0.737*
90.0	0.722
95.2	0.717
100	0.698*
105	0.703*
110	0.687*
120	0.702*
130	0.663*

CURVE 2
T = 297

λ	ρ
2.00	0.194
2.70	0.193
3.20	0.191
4.10	0.181
5.10	0.172
6.10	0.153
7.20	0.133
8.20	0.115
9.10	0.096
10.0	0.053
11.2	0.016
11.4	0.007*
11.8	0.012*
12.1	0.016
12.3	0.046
12.4	0.105
12.6	0.215*
12.8	0.356
13.0	0.499*
13.2	0.596
13.4	0.660
13.6	0.698
13.8	0.712*
14.0	0.736

CURVE 2 (cont.)

λ	ρ
14.1	0.757*
14.4	0.766
14.6	0.779*
14.8	0.797*
15.4	0.805
16.0	0.819
16.5	0.819*
17.5	0.845
17.9	0.875
18.4	0.897
19.0	0.908
19.5	0.913*
20.0	0.915
20.4	0.916*
21.0	0.917*
21.5	0.918
22.0	0.914*
22.5	0.913
23.0	0.915*
23.5	0.915*
24.0	0.915
24.4	0.915*
24.9	0.915*
25.4	0.915*
26.0	0.915*
26.5	0.915*
27.0	0.915

CURVE 3
T = 298

λ	ρ
2.00	0.173
4.31	0.169
5.39	0.159
6.45	0.141
7.81	0.1[illegible]3
8.94	0.[illegible]6
10.0	0.012
11.2	0.004*
11.6	0.020
12.1	0.166
12.6	0.447
13.3	0.627
14.0	0.740
14.5	0.771
15.1	0.790*

CURVE 3 (cont.)

λ	ρ
15.6	0.796
16.2	0.794*
17.1	0.773
17.5	0.773*
18.0	0.800
18.5	0.814*
18.9	0.814*
19.2	0.797
19.6	0.762
21.0	0.563
21.4	0.495
22.0	0.447
22.5	0.486
23.2	0.654
23.8	0.731
24.2	0.754*
24.6	0.757
25.1	0.748*
25.5	0.722
26.9	0.549
27.2	0.552*
27.8	0.694
28.1	0.787*
28.6	0.839
29.3	0.879*
29.9	0.897
31.9	0.916
32.7	0.921*
33.4	0.921
34.2	0.912
35.1	0.874
36.1	0.803

CURVE 4
T ~ 298

λ	ρ
14.1	0.568
15.1	0.597
15.9	0.621
17.0	0.635*
18.0	0.646
19.0	0.656*
20.0	0.675
21.0	0.675
22.0	0.670
22.5	0.652

CURVE 4 (cont.)

λ	ρ
23.1	0.616
24.3	0.494
25.2	0.419
25.6	0.377
26.0	0.373*
27.1	0.308
27.5	0.342*
28.1	0.510
28.4	0.596*
29.0	0.647
30.1	0.653*
31.1	0.668
32.8	0.688*
34.1	0.705
35.1	0.689
36.0	0.697

CURVE 5
T ~ 298

λ	ρ
14.1	0.534
16.0	0.592
17.2	0.609
18.1	0.610*
18.9	0.612*
19.6	0.612
20.9	0.612*
22.1	0.614
23.2	0.582
23.7	0.537
24.1	0.480
25.0	0.398
27.1	0.250
27.6	0.290
27.8	0.401
28.1	0.472
30.0	0.589
31.1	0.618*
33.1	0.649
34.9	0.655
35.6	0.653
36.7	0.657

CURVE 6*
T ~ 298

λ	ρ
10.9	0.054

CURVE 6 (cont.)*

λ	ρ
11.5	0.183
12.2	0.314
13.1	0.420
13.9	0.487
14.5	0.529
15.[illegible]	0.547
16.1	0.554
18.8	0.542
19.7	0.531
20.3	0.515
21.6	0.455
22.3	0.444
22.9	0.458
23.3	0.472
24.7	0.478
25.7	0.473
26.4	0.460
27.0	0.441
27.3	0.451
28.0	0.498
29.2	0.583
30.2	0.617
31.4	0.641
32.7	0.660
34.1	0.666
35.5	0.665
36.5	0.662

CURVE 7*
T ~ 298

λ	ρ
10.9	0.042
12.6	0.273
14.2	0.411
15.5	0.519
16.5	0.541
17.7	0.548
19.5	0.548
25.8	0.546
29.7	0.548
31.3	0.544
32.4	0.550
33.2	0.563
34.8	0.559
36.2	0.546
36.9	0.530

CURVE 8
T ~ 298

λ	ρ
10.9	0.042
12.6	0.273
14.2	0.411
15.5	0.519
16.5	0.541
17.7	0.548
19.5	0.548
25.8	0.546
29.7	0.548
31.3	0.544
32.4	0.550
33.2	0.563
34.8	0.559
36.2	0.546*
36.9	0.530

CURVE 9
T = 297

λ	ρ
0.105	0.236
0.114	0.322
0.116	0.328*
0.120	0.339
0.139	0.516
0.143	0.530
0.147	0.509
0.152	0.501*
0.160	0.428
0.172	0.469
0.180	0.409
0.200	0.356
0.215	0.384
0.225	0.426
0.249	0.562
0.255	0.559
0.267	0.588
0.276	0.577*
0.292	0.562
0.315	0.510
0.352	0.384
0.387	0.310
0.428	0.281
0.473	0.266*
0.590	0.241
0.827	0.223
1.61	0.213

* Not shown on plot

DATA TABLE NO. 163 (continued)

λ	ρ
CURVE 10	
T = 297	
0.105	0.184
0.114	0.187
0.119	0.196
0.124	0.221
0.130	0.289
0.134	0.349
0.145	0.393
0.159	0.316
0.162	0.319
0.167	0.300
0.172	0.267
0.183	0.258
0.193	0.295
0.204	0.313
0.223	0.419
0.227	0.415*
0.234	0.380
0.243	0.354
0.261	0.347
0.270	0.356*
0.277	0.367
0.288	0.376*
0.311	0.436
0.320	0.419
0.355	0.319
0.384	0.271
0.431	0.235
0.508	0.216
0.629	0.197
0.873	0.186
1.61	0.178
CURVE 11	
T = 297	
0.0564	0.231
0.0596	0.201
0.0612	0.190
0.0628	0.186
0.0651	0.190
0.0676	0.200
0.0695	0.214
0.0712	0.227
0.0761	0.195
0.0826	0.170

λ	ρ
CURVE 11 (cont.)	
0.0856	0.187
0.0884	0.208
0.0917	0.185
0.0944	0.163
0.0983	0.156
0.102	0.172
0.104	0.193
CURVE 12	
T = 298	
0.4	0.577
0.42	0.853
0.45	0.897
0.5	0.92
0.55	0.929
0.55	0.92*
0.6	0.926
0.65	0.934
0.7	0.94
0.75	0.944
0.8	0.942
0.85	0.944
0.9	0.944
0.95	0.95
1.0	0.943
1.1	0.944
1.2	0.936
1.3	0.897
1.4	0.86
1.6	0.859
1.8	0.827
2.0	0.689
2.1	0.63
CURVE 13	
T = 298	
0.4	0.913
0.42	0.875
0.45	0.912
0.5	0.935
0.55	0.937
0.55	0.933*
0.6	0.94
0.65	0.941

λ	ρ
CURVE 13 (cont.)	
0.7	0.944
0.75	0.945*
0.8	0.95
0.85	0.944*
0.9	0.946*
0.95	0.95
1.0	0.943
1.1	0.944*
1.2	0.936*
1.3	0.909
1.4	0.86*
1.6	0.852
1.8	0.819
2.0	0.67
2.1	0.625
CURVE 14*	
T = 298	
0.230	0.105
0.240	0.105
0.260	0.109
0.270	0.114
0.279	0.128
0.298	0.161
0.307	0.165
0.314	0.163
0.320	0.154
0.330	0.150
0.340	0.148
0.350	0.140
0.400	0.355
0.419	0.401
0.468	0.452
0.514	0.503
0.647	0.730
0.744	0.865
0.833	0.875
0.966	0.916
1.11	0.926
1.24	0.926
1.34	0.942
1.55	0.952
1.79	0.956
2.15	0.995
2.35	1.025

λ	ρ
CURVE 14 (cont.)*	
2.55	1.058
2.65	1.085
CURVE 15*	
T ~ 298	
0.230	0.189
0.251	0.189
0.266	0.191
0.285	0.200
0.303	0.202
0.319	0.197
0.332	0.183
0.349	0.168
0.416	0.166
0.441	0.220
0.466	0.443
0.483	0.487
0.515	0.535
0.555	0.572
0.609	0.595
0.710	0.679
0.855	0.767
0.924	0.793
1.29	0.842
1.51	0.862
1.68	0.875
1.82	0.887
1.97	0.905
2.44	0.919
2.65	0.926
CURVE 16*	
T ~ 298	
0.230	0.189
0.251	0.189
0.266	0.191
0.285	0.200
0.303	0.202
0.307	0.200
0.334	0.174
0.350	0.164
0.374	0.193
0.391	0.285
0.409	0.408

λ	ρ
CURVE 16 (cont.)*	
0.446	0.477
0.512	0.548
0.589	0.600
0.731	0.674
0.878	0.770
0.926	0.794
1.12	0.827
1.43	0.863
1.60	0.879
1.91	0.911
2.12	0.927
2.45	0.945
2.65	0.960
CURVE 17*	
T ~ 298	
0.230	0.189
0.251	0.189
0.270	0.209
0.289	0.213
0.307	0.211
0.329	0.192
0.350	0.173
0.382	0.188
0.402	0.262
0.407	0.287
0.436	0.327
0.525	0.388
0.645	0.460
0.838	0.522
0.959	0.544
1.23	0.578
1.32	0.590
1.56	0.640
1.82	0.693
2.05	0.742
2.26	0.777
2.42	0.806
2.65	0.839
CURVE 18*	
T ~ 298	
0.230	0.180
0.250	0.180

λ	ρ
CURVE 18 (cont.)*	
0.261	0.195
0.280	0.208
0.304	0.222
0.320	0.209
0.344	0.180
0.350	0.174
0.389	0.180
0.407	0.207
0.456	0.210
0.651	0.193
0.749	0.191
0.804	0.184
1.20	0.172
1.50	0.172
1.70	0.179
1.84	0.186
2.10	0.196
2.15	0.199
2.19	0.199
2.50	0.223
2.65	0.236
CURVE 19*	
T ~ 298	
1.00	0.612
1.63	0.617
2.06	0.617
2.23	0.622
2.43	0.618
2.51	0.569
2.64	0.449
2.69	0.390
2.73	0.374
2.78	0.419
2.91	0.500
2.97	0.511
3.02	0.493
3.09	0.447
3.17	0.464
3.18	0.493
3.30	0.570
3.41	0.611
3.53	0.637
4.15	0.609
4.52	0.526

λ	ρ
CURVE 19 (cont.)*	
4.77	0.476
5.22	0.417
5.71	0.285
6.01	0.243
6.22	0.237
6.67	0.234
6.89	0.223
7.78	0.221
8.49	0.202
9.34	0.191
11.0	0.195
11.7	0.205
12.1	0.241
12.5	0.288
12.8	0.329
13.3	0.434
14.1	0.495
14.5	0.530
15.0	0.536
CURVE 20*	
T ~ 298	
1.00	0.649
2.06	0.654
2.45	0.660
2.53	0.623
2.73	0.417
2.78	0.432
2.84	0.501
2.90	0.541
2.98	0.569
3.04	0.569
3.11	0.528
3.20	0.544
3.32	0.623
3.43	0.661
3.62	0.669
3.87	0.652
4.09	0.638
4.52	0.556
4.80	0.497
5.28	0.418
5.68	0.333
5.95	0.276
6.16	0.257

λ	ρ
CURVE 20 (cont.)*	
7.13	[illegible]38
7.79	0.225
8.42	0.206
9.04	0.194
11.0	0.195
11.7	0.205
12.1	0.241
12.4	0.269
12.8	0.337
13.4	0.475
13.6	0.501
13.9	0.521
15.0	0.537
CURVE 21*	
T ~ 298	
1.00	0.569
2.48	0.569
2.63	0.535
2.74	0.456
2.82	0.492
2.88	0.526
2.98	0.547
3.14	0.548
3.26	0.578
3.34	0.608
3.73	0.625
4.16	0.608
4.74	0.486
5.23	0.406
5.58	0.335
5.75	0.302
6.12	0.270
6.67	0.270
7.27	0.245
8.01	0.230
8.48	0.216
9.77	0.209
10.7	0.216
11.7	0.235
11.9	0.254
12.2	0.277
12.8	0.386
13.3	0.480
13.5	0.505

* Not shown on plot

DATA TABLE NO. 163 (continued)

CURVE 21 (cont.)*
T ~ 298

λ	ρ
13.9	0.546
14.4	0.570
15.0	0.581

CURVE 22*
T ~ 298

λ	ρ
1.00	0.200
1.65	0.209
2.14	0.222
3.05	0.264
3.33	0.297
3.66	0.317
3.99	0.334
4.08	0.349
4.15	0.383
4.31	0.396
5.06	0.347
5.59	0.290
6.09	0.255
6.70	0.246
7.11	0.239
7.51	0.239
8.13	0.212
9.68	0.207
9.89	0.219
10.4	0.205
10.8	0.205
11.4	0.227
11.5	0.222
11.9	0.240
12.4	0.297
13.0	0.406
13.4	0.481
13.6	0.506
13.9	0.533
14.3	0.546
14.4	0.556
15.0	0.562

CURVE 23
T = 298

λ	ρ
2.00	0.094
7.69	0.091

CURVE 23 (cont.)

λ	ρ
8.36	0.080
8.91	0.063*
9.61	0.031
10.1	0.009
11.2	0.006*
11.6	0.025
12.6	0.258
13.0	0.444
13.9	0.592
14.3	0.632
15.2	0.631
15.9	0.694
16.5	0.694
17.0	0.685
18.6	0.730
19.1	0.730
19.5	0.703
20.8	0.525*
21.1	0.467
21.9	0.394
22.2	0.381
22.5	0.408
23.4	0.607
23.7	0.639
24.2	0.662*
24.6	0.669
25.2	0.665*
25.7	0.624
26.9	0.486
27.2	0.470
27.9	0.597*
28.3	0.712
28.6	0.744*
29.1	0.775
29.7	0.796*
32.5	0.848
33.5	0.845*
34.3	0.832
35.1	0.801*
36.1	0.736

CURVE 24
T = 298

λ	ρ
0.308	0.062
0.346	0.069

CURVE 24 (cont.)

λ	ρ
0.368	0.081
0.387	0.169
0.400	0.842
0.417	0.893
0.515	0.909
0.567	0.925
0.579	0.916
0.749	0.947
0.989	0.966
1.23	0.966
1.28	0.953
1.32	0.908*
1.36	0.901
1.54	0.909
1.73	0.876
1.75	0.873*
1.86	0.763
1.95	0.785
2.02	0.789
2.10	0.756
2.14	0.723
2.28	0.695

CURVE 25
T ~ 298

λ	ρ
0.230	0.122
0.238	0.123*
0.247	0.124
0.260	0.131
0.270	0.130*
0.295	0.133
0.301	0.133*
0.307	0.130
0.313	0.126
0.320	0.119
0.330	0.113*
0.346	0.109*
0.350	0.118*
0.385	0.359
0.398	0.553
0.406	0.572*
0.417	0.904
0.428	0.948
0.464	0.965
0.531	0.974

CURVE 25 (cont.)

λ	ρ
0.659	0.967
1.20	0.948
1.31	0.935*
1.38	0.923
1.45	0.916
1.60	0.906
1.78	0.880
1.83	0.858
1.87	0.825
1.91	0.801
2.04	0.799*
2.12	0.797
2.17	0.781
2.28	0.734
2.53	0.620
2.57	0.593
2.60	0.567
2.65	0.541

CURVE 26
T = 298

λ	ρ
0.230	0.087
0.299	0.123
0.347	0.095
0.358	0.109
0.382	0.200
0.408	0.650
0.430	0.671
0.478	0.683
0.526	0.674
0.699	0.627
0.874	0.584
1.02	0.555
1.37	0.516
1.57	0.502
2.17	0.502
2.31	0.509
2.48	0.508*
2.65	0.485

CURVE 27*
T = 298

λ	ρ
0.230	0.100
0.265	0.106

CURVE 27 (cont.)*

λ	ρ
0.290	0.113
0.323	0.103
0.336	0.095
0.349	0.097
0.358	0.107
0.402	0.392
0.408	0.666
0.442	0.680
0.527	0.677
0.848	0.585
1.01	0.560
1.15	0.538
1.21	0.524
1.34	0.518
1.58	0.505
2.30	0.505
2.47	0.500
2.65	0.483

CURVE 28
T = 298

λ	ρ
0.230	0.115
0.300	0.118
0.344	0.104
0.350	0.112*
0.358	0.131
0.364	0.200
0.379	0.263
0.416	0.685
0.461	0.696
0.620	0.662
0.823	0.598
1.00	0.558
1.19	0.528
1.45	0.505
1.88	0.498
1.96	0.498
2.65	0.503

CURVE 29
T ~ 298

λ	ρ
0.259	0.140
0.274	0.149
0.297	0.152

CURVE 29 (cont.)

λ	ρ
0.320	0.149
0.335	0.140
0.348	0.133*
0.357	0.132*
0.365	0.136
0.371	0.146*
0.376	0.157
0.381	0.177
0.386	0.202*
0.389	0.228
0.393	0.264
0.396	0.322
0.401	0.430
0.403	0.458
0.403	0.512
0.406	0.570
0.410	0.708
0.417	0.870
0.421	0.931
0.423	0.952*
0.427	0.965*
0.432	0.974
0.439	0.979*
0.449	0.983
0.467	0.980
0.568	0.977
0.600	0.979

CURVE 30
T ~ 298

λ	ρ
0.600	0.991
0.773	0.999
0.893	0.994
1.08	0.998
1.13	0.991
1.23	0.996
1.37	0.994
1.41	1.00
1.43	1.01*
1.46	1.02*
1.52	1.01
1.69	0.987
1.76	0.990
1.83	1.00
1.88	1.02*

CURVE 30 (cont.)

λ	ρ
1.94	1.04*
1.95	1.05
2.02	1.04*
2.08	1.03*
2.13	1.01
2.22	0.975
2.30	0.953
2.35	0.947
2.43	0.952*
2.52	0.956
2.55	0.952*
2.58	0.941*
2.60	0.931

CURVE 31*
T ~ 298

λ	ρ
0.249	0.123
0.267	0.136
0.283	0.144
0.305	0.144
0.313	0.140
0.329	0.134
0.348	0.124
0.356	0.121
0.363	0.124
0.372	0.137
0.380	0.158
0.386	0.183
0.392	0.223
0.397	0.283
0.402	0.380
0.406	0.518
0.407	0.527
0.407	0.541
0.407	0.554
0.411	0.691
0.414	0.759
0.418	0.822
0.421	0.865
0.427	0.905
0.431	0.920
0.435	0.925
0.440	0.929
0.454	0.929
0.473	0.919

CURVE 31 (cont.)*

λ	ρ
0.496	0.914
0.580	0.918
0.600	0.922

CURVE 32*
T = 298

λ	ρ
0.600	0.936
0.686	0.923
0.842	0.952
1.01	0.930
1.28	0.925
1.40	0.934
1.47	0.962
1.50	0.958
1.55	0.947
1.69	0.943
1.76	0.941
1.90	0.967
1.93	0.983
1.96	1.01
2.01	0.986
2.09	0.974
2.13	0.959
2.20	0.938
2.26	0.921
2.32	0.914
2.36	0.917
2.42	0.924
2.47	0.933
2.51	0.937
2.55	0.933
2.58	0.924
2.60	0.914

CURVE 33
T = 298

λ	ρ
0.230	0.100
0.245	0.100
0.254	0.096
0.261	0.100
0.270	0.106*
0.280	0.110
0.302	0.113
0.321	0.100

*Not shown on plot

DATA TABLE NO. 163 (continued)

CURVE 33 (cont.)
T = 298

λ	ρ
0.339	0.094
0.346	0.091*
0.350	0.115
0.403	0.240
0.408	0.553
0.421	0.816
0.424	0.862*
0.425	0.927
0.441	0.990
0.458	1.01
0.504	1.02
0.587	1.03
0.689	1.03
0.847	1.03
0.960	1.03
1.06	1.03*
1.22	1.02
1.39	1.01*
1.70	1.01*
1.76	1.00
1.82	0.996
1.87	0.969
1.92	0.947*
1.97	0.944
2.06	0.954
2.15	0.942*
2.28	0.894
2.40	0.840
2.51	0.789
2.65	0.700

CURVE 34
T = 298

λ	ρ
0.230	0.100*
0.245	0.100*
0.254	0.096*
0.261	0.100*
0.270	0.106*
0.280	0.110*
0.302	0.113*
0.321	0.100*
0.339	0.094*
0.346	0.091*
0.350	0.115*

CURVE 34 (cont.)

λ	ρ
0.403	0.240*
0.408	0.553*
0.421	0.816*
0.424	0.862*
0.425	0.927*
0.441	0.990*
0.458	1.01*
0.504	1.02*
0.587	1.03*
0.689	1.03*
0.774	1.03*
0.983	1.05*
1.26	1.06
1.35	1.05*
1.44	1.03*
1.54	1.04*
1.71	1.05*
1.79	1.04*
1.85	1.02
1.89	0.981
1.94	0.973*
1.99	0.970
2.08	0.987
2.16	0.972*
2.28	0.924
2.42	0.864
2.54	0.807
2.65	0.742

CURVE 35*
T = 298

λ	ρ
0.230	0.113
0.246	0.110
0.284	0.124
0.314	0.122
0.327	0.113
0.339	0.102
0.346	0.102
0.350	0.117
0.402	0.272
0.413	0.515
0.416	0.610
0.422	0.867
0.438	0.974
0.514	0.995

CURVE 35 (cont.)*

λ	ρ
0.733	1.02
0.987	1.05
1.22	1.07
1.38	1.06
1.65	1.07
1.78	1.07
1.85	1.04
1.92	1.02
1.95	1.02
2.00	1.02
2.06	1.04
2.10	1.04
2.18	1.03
2.31	0.996
2.44	0.937
2.56	0.889
2.65	0.828

CURVE 36*
T = 298

λ	ρ
0.230	0.203
0.247	0.201
0.288	0.244
0.303	0.252
0.315	0.250
0.327	0.235
0.341	0.206
0.350	0.188
0.392	0.200
0.408	0.451
0.416	0.709
0.481	0.818
0.514	0.853
0.556	0.900
0.650	0.945
0.777	0.993
0.888	1.02
1.06	1.04
1.24	1.05
1.45	1.06
1.59	1.07
1.71	1.09
1.78	1.09
1.89	1.08
1.95	1.08

CURVE 36 (cont.)*

λ	ρ
2.03	1.09
2.10	1.10
2.14	1.10
2.23	1.09
2.27	1.09
2.33	1.09
2.41	1.08
2.56	1.08
2.65	1.09

CURVE 37*
T = 298

λ	ρ
0.230	0.290
0.239	0.285
0.253	0.292
0.265	0.290
0.282	0.332
0.297	0.351
0.307	0.356
0.315	0.349
0.327	0.327
0.337	0.309
0.348	0.278
0.350	0.240
0.396	0.236
0.416	0.439
0.470	0.560
0.533	0.670
0.574	0.769
0.650	0.849
0.736	0.906
0.794	0.931
0.923	0.956
1.43	0.986
1.65	1.01
1.78	1.02
1.96	1.01
2.09	1.02
2.23	1.02
2.38	1.02
2.52	1.02
2.65	1.03

CURVE 38
T = 298

λ	ρ
0.230	0.188
0.234	0.186
0.243	0.194
0.293	0.248
0.308	0.256
0.324	0.250
0.339	0.228
0.350	0.200
0.441	0.181
0.501	0.200
0.650	0.372
0.741	0.485
0.839	0.635
0.896	0.685
0.982	0.723
1.08	0.747
1.36	0.767
1.68	0.789
1.98	0.820
2.10	0.829
2.17	0.829*
2.27	0.818
2.36	0.839
2.51	0.834
2.65	0.826

CURVE 39
T ~ 298

λ	ρ
0.230	0.100*
0.247	0.098*
0.251	0.100
0.274	0.112
0.302	0.116*
0.324	0.110
0.339	0.097*
0.345	0.095*
0.350	0.100
0.382	0.117
0.409	0.242
0.416	0.456*
0.416	0.515
0.424	0.527
0.424	0.569
0.434	0.700

CURVE 39 (cont.)

λ	ρ
0.463	0.714
0.501	0.717
0.955	0.609
1.05	0.591
1.24	0.563
1.38	0.554
1.54	0.545
1.69	0.543
2.12	0.546*
2.32	0.549
2.44	0.552*
2.65	0.554

CURVE 40*
T ~ 298

λ	ρ
0.230	0.100
0.247	0.098
0.251	0.100
0.274	0.112
0.302	0.116
0.324	0.110
0.339	0.097
0.345	0.095
0.350	0.100
0.382	0.117
0.409	0.242
0.416	0.456
0.416	0.515
0.424	0.527
0.424	0.569
0.431	0.663
0.457	0.693
0.486	0.702
0.574	0.688
0.939	0.594
1.16	0.558
1.28	0.546
1.43	0.534
1.66	0.524
1.80	0.523
2.03	0.524
2.18	0.523
2.31	0.525
2.65	0.532

CURVE 41
T ~ 298

λ	ρ
0.230	0.100*
0.247	0.098*
0.251	0.100*
0.274	0.112*
0.302	0.116*
0.324	0.110*
0.339	0.097*
0.345	0.095*
0.350	0.100*
0.382	0.117*
0.409	0.242*
0.416	0.456*
0.416	0.515*
0.424	0.527*
0.424	0.569*
0.436	0.590
0.455	0.607
0.489	0.614*
0.532	0.615
0.875	0.549
1.13	0.506
1.38	0.483
1.54	0.473
1.76	0.461
1.90	0.459
2.04	0.458*
2.29	0.456
2.65	0.456

CURVE 42*
T ~ 298

λ	ρ
0.230	0.086
0.252	0.089
0.264	0.095
0.280	0.098
0.284	0.101
0.305	0.101
0.319	0.095
0.330	0.086
0.346	0.083
0.350	0.091
0.409	0.851
0.424	0.911
0.447	0.921

CURVE 42 (cont.)*

λ	ρ
0.546	0.935
0.694	0.949
0.851	0.954
0.931	0.953
1.01	0.957
1.04	0.955
1.10	0.957
1.16	0.954
1.28	0.956
1.34	0.954
1.41	0.944
1.54	0.955
1.65	0.953
1.77	0.945
1.85	0.923
1.91	0.907
1.96	0.907
2.00	0.913
2.04	0.923
2.17	0.899
2.55	0.773
2.65	0.708

CURVE 43*
T ~ 298

λ	ρ
0.230	0.100
0.248	0.100
0.261	0.106
0.286	0.113
0.299	0.115
0.313	0.108
0.327	0.103
0.335	0.094
0.347	0.092
0.350	0.097
0.414	0.849
0.437	0.887
0.474	0.902
0.542	0.917
0.646	0.929
0.719	0.936
0.812	0.942
1.01	0.947
1.15	0.945
1.23	0.948

* Not shown on plot

DATA TABLE NO. 163 (continued)

λ	ρ
CURVE 43 (cont.)*	
T ~ 298	
1.28	0.950
1.33	0.949
1.39	0.939
1.47	0.942
1.57	0.949
1.68	0.946
1.77	0.942
1.85	0.923
1.91	0.907
1.96	0.907
2.00	0.913
2.04	0.923
2.17	0.899
2.55	0.773
2.65	0.708
CURVE 44*	
T ~ 298	
0.230	0.092
0.238	0.090
0.251	0.096
0.260	0.099
0.278	0.105
0.284	0.103
0.294	0.106
0.310	0.105
0.324	0.099
0.335	0.090
0.342	0.087
0.347	0.088
0.350	0.095
0.416	0.850
0.446	0.886
0.508	0.905
0.582	0.914
0.732	0.918
0.807	0.917
1.28	0.920
1.43	0.905
1.59	0.913
1.67	0.911
1.75	0.906
1.81	0.892
1.93	0.863

λ	ρ
CURVE 44 (cont.)*	
1.97	0.862
2.01	0.872
2.05	0.873
2.13	0.861
2.43	0.768
2.53	0.734
2.58	0.705
2.65	0.652
CURVE 45*	
T ~ 298	
0.230	0.092
0.238	0.090
0.251	0.096
0.260	0.099
0.278	0.105
0.284	0.103
0.294	0.106
0.310	0.105
0.324	0.099
0.335	0.090
0.342	0.087
0.347	0.088
0.350	0.095
0.409	0.768
0.474	0.841
0.520	0.865
0.581	0.878
0.665	0.890
0.823	0.898
1.05	0.898
1.19	0.901
1.31	0.895
1.40	0.886
1.44	0.886
1.53	0.893
1.63	0.891
1.69	0.885
1.78	0.875
1.84	0.852
1.90	0.840
1.96	0.834
2.02	0.839
2.08	0.835
2.44	0.720

λ	ρ
CURVE 45 (cont.)*	
2.58	0.667
2.65	0.617
CURVE 46*	
T ~ 298	
0.230	0.090
0.301	0.102
0.321	0.097
0.344	0.083
0.349	0.087
0.390	0.372
0.398	0.601
0.394	0.666
0.407	0.786
0.425	0.836
0.467	0.875
0.520	0.898
0.583	0.917
0.671	0.931
0.825	0.936
1.28	0.937
1.41	0.926
1.48	0.936
1.64	0.934
1.72	0.927
1.78	0.927
1.81	0.920
1.89	0.900
1.95	0.894
2.06	0.898
2.23	0.854
2.41	0.799
2.55	0.750
2.65	0.682
CURVE 47*	
T ~ 298	
0.230	0.084
0.301	0.098
0.315	0.093
0.343	0.079
0.348	0.081
0.390	0.372
0.398	0.601

λ	ρ
CURVE 47 (cont.)*	
0.394	0.666
0.407	0.786
0.425	0.836
0.467	0.875
0.520	0.898
0.583	0.917
0.671	0.931
0.825	0.936
1.28	0.937
1.41	0.926
1.48	0.936
1.62	0.931
1.66	0.917
1.72	0.903
1.81	0.910
1.90	0.891
2.05	0.896
2.14	0.876
2.21	0.844
2.31	0.735
2.37	0.721
2.44	0.722
2.54	0.723
2.59	0.699
2.65	0.671
CURVE 48	
T ~ 298	
0.250	0.062
0.270	0.056
0.294	0.054
0.319	0.052
0.333	0.064
0.345	0.081
0.356	0.110*
0.361	0.145
0.367	0.389
0.381	0.690
0.394	0.896
0.400	0.933
0.409	0.951
0.419	0.965*
0.432	0.973*
0.447	0.980
0.475	0.987

λ	ρ
CURVE 48 (cont.)	
0.535	0.987
0.700	0.992*
CURVE 49	
T ~ 298	
0.348	0.221
0.356	0.429
0.372	0.799
0.388	0.919*
0.400	0.973*
0.407	0.980*
0.419	0.983
0.456	0.983*
0.490	0.985
0.569	0.971*
0.584	0.965
0.651	0.965*
0.684	0.950
CURVE 50*	
T ~ 298	
0.356	0.227
0.365	0.442
0.382	0.608
0.396	0.823
0.404	0.900
0.417	0.909
0.441	0.913
0.485	0.927
0.649	0.953
0.682	0.945
CURVE 51*	
T ~ 298	
0.361	0.261
0.375	0.426
0.385	0.555
0.397	0.790
0.409	0.885
0.418	0.894
0.495	0.917
0.651	0.945

λ	ρ
CURVE 52*	
T ~ 298	
0.363	0.149
0.378	0.181
0.388	0.250
0.397	0.546
0.407	0.775
0.409	0.812
0.419	0.861
0.440	0.881
0.485	0.902
0.624	0.929
0.666	0.939
CURVE 53	
T ~ 298	
0.363	0.149*
0.378	0.181
0.388	0.250
0.397	0.546
0.407	0.775
0.409	0.812*
0.413	0.819*
0.423	0.844
0.436	0.866*
0.465	0.880
0.505	0.897
0.625	0.923
0.666	0.934
CURVE 54*	
T ~ 298	
0.365	0.225
0.378	0.497
0.385	0.687
0.399	0.877
0.413	0.962
0.434	0.986
0.515	0.988
0.551	0.974
0.630	0.967
0.669	0.967
0.700	0.957

λ	ρ
CURVE 55	
T ~ 298	
0.368	0.223
0.384	0.513
0.407	0.768
0.417	0.849
0.443	0.863
0.513	0.878
0.643	0.878
0.660	0.882
0.677	0.874
0.700	0.872
CURVE 56*	
T ~ 298	
0.372	0.223
0.391	0.398
0.415	0.710
0.421	0.798
0.433	0.815
0.454	0.821
0.505	0.810
0.575	0.768
0.620	0.751
0.642	0.739
0.670	0.731
CURVE 57	
T ~ 298	
0.375	0.231
0.386	0.296
0.400	0.401
0.412	0.662
0.424	0.776*
0.432	0.791
0.444	0.804*
0.460	0.804
0.508	0.784
0.552	0.755
0.596	0.726
0.629	0.712*
0.671	0.694

λ	ρ
CURVE 58*	
T ~ 298	
0.366	0.151
0.380	0.171
0.393	0.202
0.399	0.239
0.404	0.277
0.409	0.409
0.416	0.576
0.424	0.686
0.427	0.711
0.444	0.736
0.457	0.736
0.479	0.725
0.503	0.708
0.541	0.672
0.579	0.638
0.616	0.612
0.649	0.594
0.675	0.584
CURVE 59	
T ~ 298	
0.366	0.151
0.380	0.171*
0.393	0.202
0.399	0.239*
0.404	0.277
0.412	0.367
0.422	0.610
0.428	0.641*
0.439	0.656
0.447	0.661*
0.463	0.661
0.509	0.620
0.572	0.563*
0.599	0.538
0.641	0.506*
0.671	0.490
0.684	0.482*
0.700	0.481

* Not shown on plot

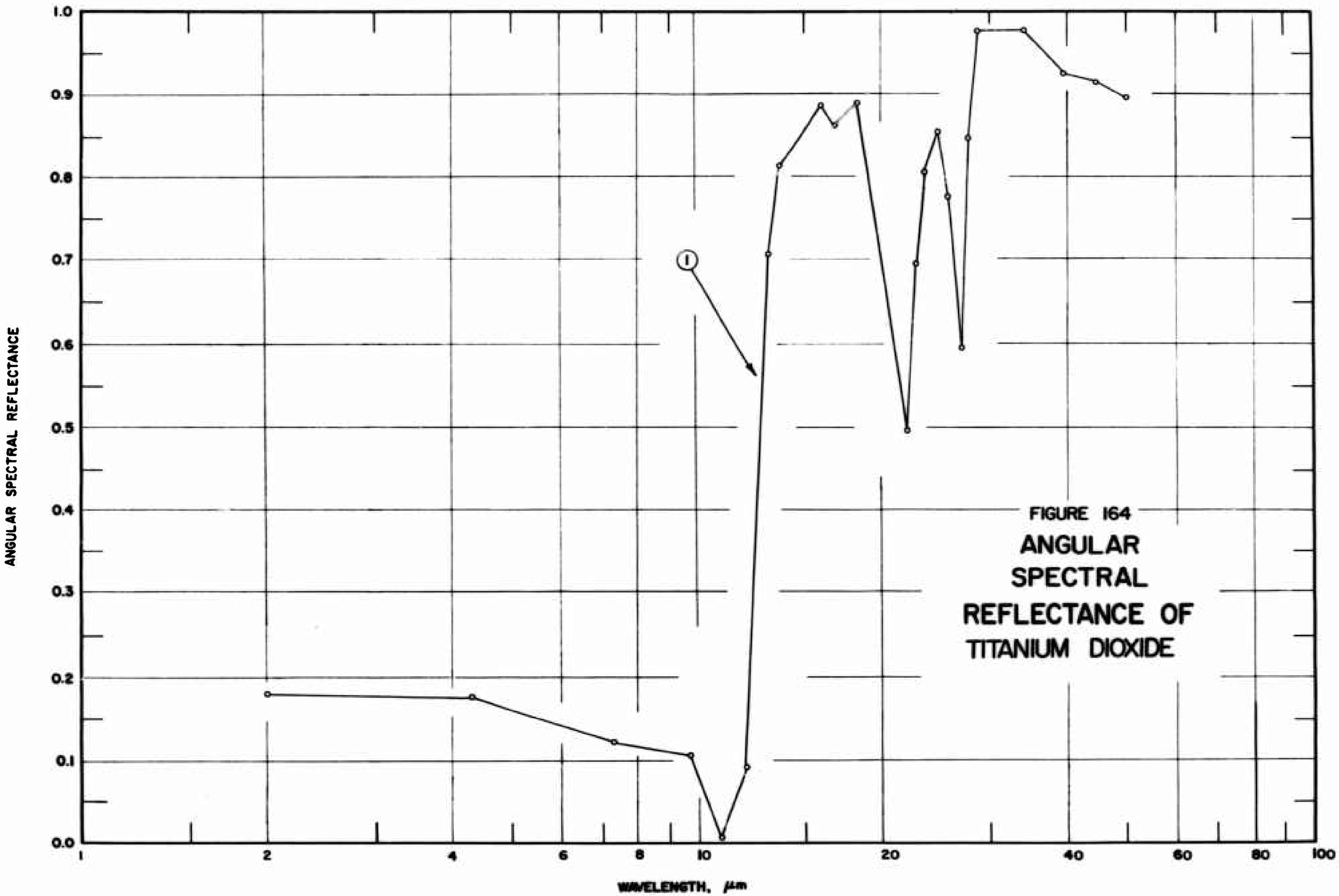


FIGURE 164
ANGULAR SPECTRAL REFLECTANCE OF TITANIUM DIOXIDE

SPECIFICATION TABLE NO. 164 ANGULAR SPECTRAL REFLECTANCE OF TITANIUM DIOXIDE TiO_2

Curve No.	Ref. No.	Year	Temperature K	Wavelength Range, μm	Geometry θ	θ'	ω'	Reported Error, %	Composition (weight percent), Specifications, and Remarks
1	102	1965	~298	2.0-50.0	30°	30°			Specimen 5 mm thick; data extracted from smooth curve; aluminum mirror standard.

DATA TABLE NO. 164 ANGULAR SPECTRAL REFLECTANCE OF TITANIUM DIOXIDE TiO_2

[Wavelength, λ, μm; Reflectance, ρ; Temperature, T, K]

λ	ρ	λ	ρ
CURVE 1		CURVE 1 (cont.)	
T ~ 298			
		34.2	0.976
2.0	0.180	39.6	0.925
4.3	0.177	44.8	0.916
7.3	0.121	50.0	0.896
9.7	0.058		
10.8	0.007		
12.0	0.092		
13.1	0.705		
13.7	0.814		
16.0	0.887		
16.8	0.865		
18.4	0.890		
22.0	0.497		
22.8	0.695		
23.5	0.808		
24.7	0.856		
25.9	0.776		
27.0	0.596		
27.6	0.850		
28.8	0.976		

SPECIFICATION TABLE NO. 165 NORMAL SOLAR ABSORPTANCE OF TITANIUM DIOXIDE TiO_2

Curve No.	Ref. No.	Year	Temperature Range, K	Geometry θ	Reported Error, %	Composition (weight percent), Specifications and Remarks
1*	121	1964	~298	~0°		Powder, Unitane or 640 (Amer. Cyanamid Co.), 94 pure; compacted; computed from spectral reflectance data.
2*	121	1961	~298	~0°		Similar to above specimen and conditions except exposed to 100 ESH.
3*	121	1964	~298	~0°		Powder, Unitane or 342 (Amer. Cyanamid Co.); 97 pure; compacted; computed from spectral reflectance data.
4*	121	1961	~298	~0°		Similar to above specimen and conditions except exposed to 100 ESH.

DATA TABLE NO. 165 NORMAL SOLAR ABSORPTANCE OF TITANIUM DIOXIDE TiO_2

[Temperature, T, K; Absorptance, α]

T	α
CURVE 1*	
298	0.127
CURVE 2*	
298	0.142
CURVE 3*	
298	0.073
CURVE 4*	
298	0.106

*No plot given

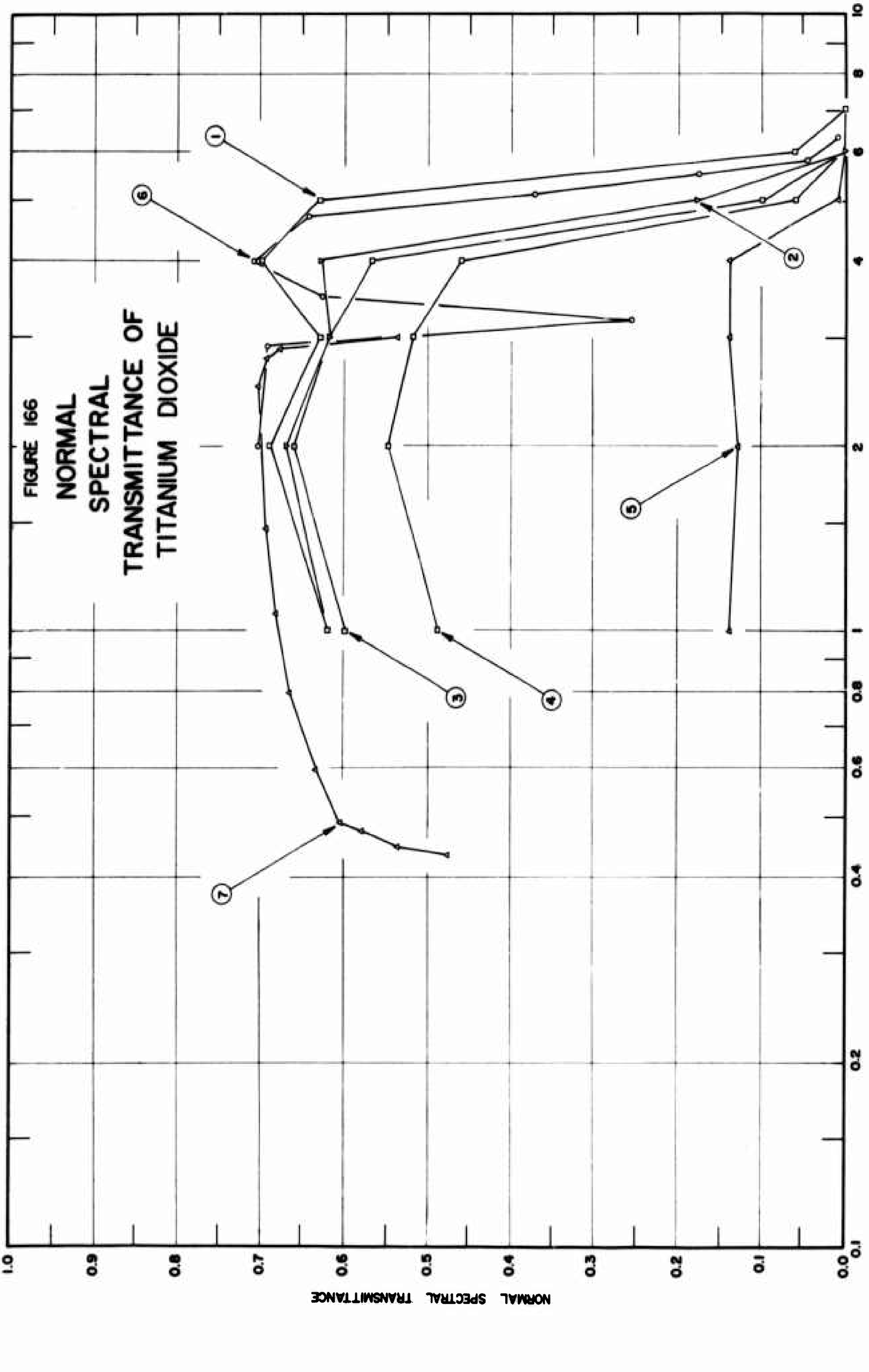


FIGURE 166 NORMAL SPECTRAL TRANSMITTANCE OF TITANIUM DIOXIDE

SPECIFICATION TABLE NO. 166 NORMAL SPECTRAL TRANSMITTANCE OF TITANIUM DIOXIDE TiO_2

Curve No.	Ref. No.	Year	Temperature K	Wavelength Range, μm	Geometry θ θ' ω'	Reported Error, %	Composition (weight percent), Specifications, and Remarks
1	188	1964	298	1-7	~0° ~0°	± 5	Single crystal obtained from Linde.
2	188	1964	770	1-7	~0° ~0°	± 5	Above specimen and conditions.
3	188	1964	961	1-7	~0° ~0°	± 5	Above specimen and conditions.
4	188	1964	1166	1-7	~0° ~0°	± 5	Above specimen and conditions.
5	188	1964	1360	1-7	~0° ~0°	± 5	Above specimen and conditions.
6	102	1965	~ 298	2.00-6.30	0° 0°		Specimen 5 mm thick; data extracted from smooth curve.
7	94	1967	298	0.415-3.00	~0° ~0°	± 2	Single crystal (5.0 mm thick); polished; data extracted from smooth curve.

DATA TABLE NO. 166 NORMAL SPECTRAL TRANSMITTANCE OF TITANIUM DIOXIDE TiO_2

[Wavelength, λ, μm; Transmittance, τ; Temperature, T, K]

λ	τ	λ	τ	λ	τ	λ	τ
CURVE 1 T = 298		CURVE 3 T = 961		CURVE 5 T = 1360		CURVE 7 T = 298	
1	0.62	1	0.60	1	0.14	0.415	0.000
2	0.69	2	0.66	2	0.13	0.431	0.477
3	0.63	3	0.62*	3	0.14	0.446	0.539
4	0.70	4	0.57	4	0.14	0.471	0.582
5	0.63	5	0.10	5	0.01	0.490	0.607
6	0.06	6	0.00*	6	0.00*	0.597	0.635
7	0.00	7	0.00*	7	0.00*	0.796	0.665
CURVE 2 T = 770		CURVE 4 T = 1166		CURVE 6 T ~ 298		1.07	0.682
						1.47	0.694
						2.50	0.701
						2.77	0.695
1	0.62*	1	0.49	2.00	0.702	2.87	0.677
2	0.67	2	0.55	2.90	0.693	3.00	0.538
3	0.62	3	0.52	3.20	0.258		
4	0.63	4	0.46	3.50	0.628		
5	0.18	5	0.06	4.00	0.710		
6	0.00	6	0.00*	4.70	0.642		
7	0.00*	7	0.00*	5.10	0.372		
				5.50	0.178		
				5.80	0.045		
				6.30	0.010		

* Not shown on plot

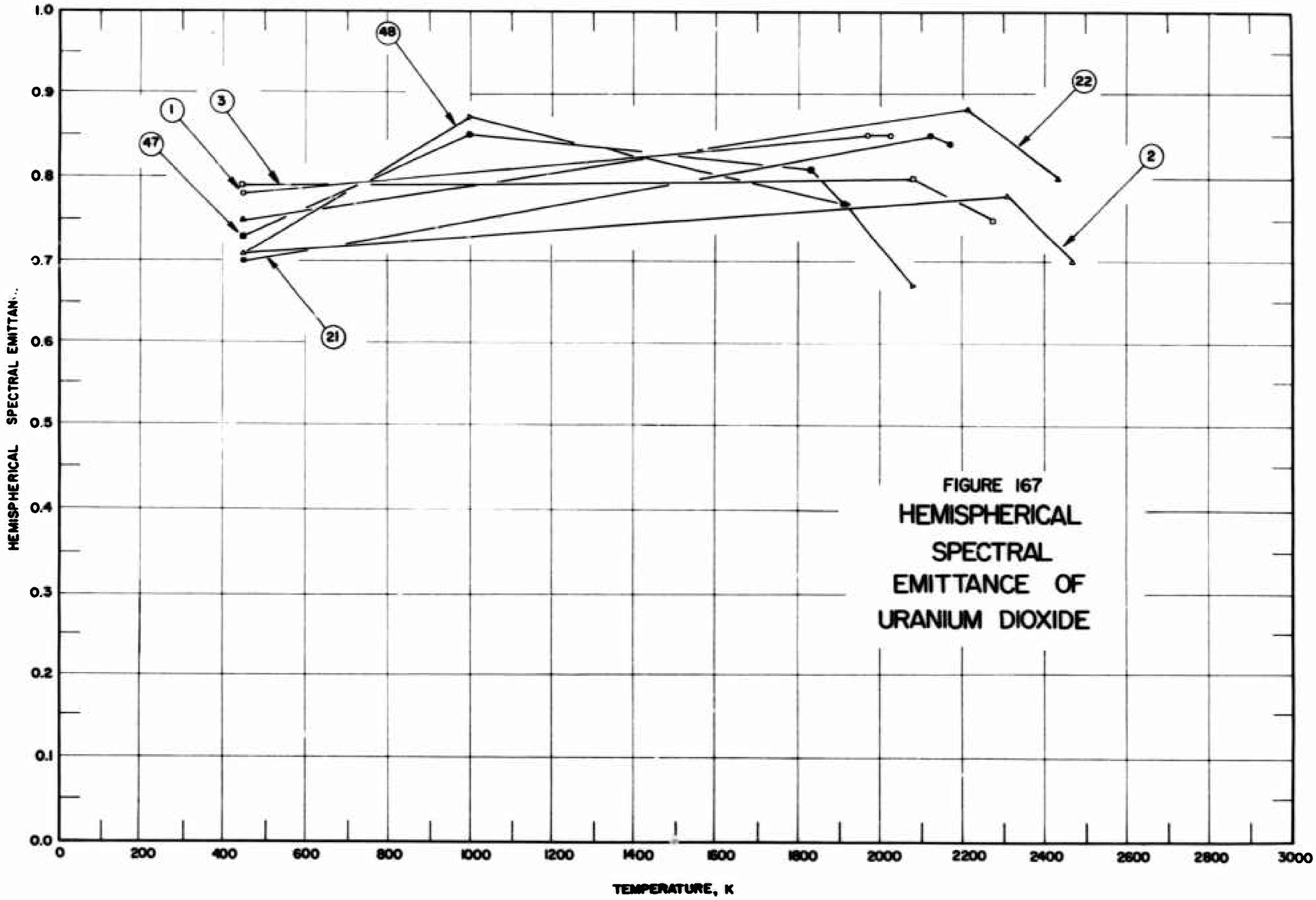


FIGURE 167
HEMISPHERICAL SPECTRAL EMITTANCE OF URANIUM DIOXIDE

SPECIFICATION TABLE NO. 167 HEMISPHERICAL SPECTRAL EMITTANCE OF URANIUM DIOXIDE UO_2

Curve No.	Ref. No.	Year	Wavelength μm	Temperature Range, K	Reported Error, %	Composition (weight percent), Specifications and Remarks
1	360	1969	0.656	450-2030		Powder, 25 ppm Fe, <10 ppm other metallic impurity; pressed at 45000 psi and sintered in helium at temp from 1573 K to 2273 K for 4 hrs; ground flat on 600 mesh SiC paper and polished with 1 to 3 μm α-alumina; bulk density 9.948 g cm^{-3}; O/U ratio 2.04; apparent porosity 16.4%; [Authors' designation: Sample No. 1-1].
2	360	1969	0.656	450-2479		Similar to the above specimen and conditions except bulk density 10.412 g cm^{-3}; O/U ratio 2.14; apparent porosity 10.5%; [Authors' designation: Sample No. 1-2].
3*	360	1969	0.656	450-2275		Similar to the above specimen and conditions except bulk density 9.859 g cm^{-3}; O/U ratio 2.06; apparent porosity 15.4%; [Authors' designation: Sample No. 1-3].
4*	360	1969	0.656	450-2199		Similar to the above specimen and conditions except bulk density 10.221 g cm^{-3}; O/U ratio 2.07; apparent porosity 16.9%; [Authors' designation: Sample No. 1-4].
5*	360	1969	0.656	450-2269		Similar to the above specimen and conditions except bulk density 10.455 g cm^{-3}; O/U ratio 2.02; apparent porosity 12.1%; [Authors' designation: Sample No. 1-5].
6*	360	1969	0.656	450-2288		Similar to the above specimen and conditions except bulk density 10.364 g cm^{-3}; O/U ratio 2.05; apparent porosity 7.3%; [Authors' designation: Sample No. 1-6].
7*	360	1969	0.656	450-2288		Similar to the above specimen and conditions except bulk density 9.808 g cm^{-3}; O/U ratio 2.09; apparent porosity 18.0%; [Authors' designation: Sample No. 1-7].
8*	360	1969	0.656	450-2300		Similar to the above specimen and conditions except bulk density 9.562 g cm^{-3}; O/U ratio 2.10; apparent porosity 19.0%; [Authors' designation: Sample No. 1-8].
9*	360	1969	0.656	450-2418		Similar to the above specimen and conditions except bulk density 10.071 g cm^{-3}; O/U ratio 1.96; apparent porosity 10.7%; [Authors' designation: Sample No. 1-9].
10*	360	1969	0.656	450-2399		Similar to the above specimen and conditions except bulk density 10.326 g cm^{-3}; O/U ratio 2.02; apparent porosity 10.9%; [Authors' designation: Sample No. 1-10].
11*	360	1969	0.656	450-2439		Similar to the above specimen and conditions except bulk density 10.412 g cm^{-3}; O/U ratio 2.01; apparent porosity 10.9%; [Authors' designation: Sample No. 1-11].
12*	360	1969	0.656	450-2449		Similar to the above specimen and conditions except bulk density 10.299 g cm^{-3}; O/U ratio 2.03; apparent porosity 9.2%; [Authors' designation: Sample No. 1-12].
13*	360	1969	0.656	450-2294		Similar to the above specimen and conditions except bulk density 8.378 g cm^{-3}; O/U ratio 2.12; apparent porosity 7.9%; [Authors' designation: Sample No. 1-13].
14*	360	1969	0.656	450-2557		Similar to the above specimen and conditions except bulk density 9.332 g cm^{-3}; O/U ratio 2.16; apparent porosity 5.7%; [Authors' designation: Sample No. 1-14].
15*	360	1969	0.656	450-2363		Similar to the above specimen and conditions except bulk density 9.227 g cm^{-3}; O/U ratio 2.10; apparent porosity 16.4%; [Authors' designation: Sample No. 1-15].
16*	360	1969	0.656	450-2454		Similar to the above specimen and conditions except bulk density 8.275 g cm^{-3}; O/U ratio 2.18; apparent porosity 4.6%; [Authors' designation: Sample No. 1-16].
17*	360	1969	0.656	450-2181		Similar to the above specimen and conditions except bulk density 9.524 g cm^{-3}; O/U ratio 2.08; apparent porosity 17.8%; [Authors' designation: Sample No. 1-17].

*Not shown on plot

SPECIFICATION TABLE NO. 167 (continued)

Curve No.	Ref. No.	Year	Wavelength μm	Temperature Range, K	Reported Error, %	Composition (weight percent), Specifications and Remarks
18*	360	1969	0.656	450-2283		Similar to the above specimen and conditions except bulk density not measured; O/U ratio 2.21; [Authors' designation: Sample No. 1-18].
19*	360	1969	0.656	450-2448		Similar to the above specimen and conditions except bulk density not measured; O/U ratio 2.21; [Authors' designation: Sample No. 1-19].
20*	360	1969	0.656	450-2184		Similar to the above specimen and conditions except bulk density not measured; O/U ratio 2.24; [Authors' designation: Sample No. 1-20].
21	360	1969	0.656	450-2185		Powder, 0.0025 Fe, <0.0010 other metallic impurities; pressed to 2700 psi, repressed isostatically at 50 000 psi, then sintered in flowing nitrogen between 1473 K and 1673 K for 4 hrs; reduced in hydrogen at either 1273 K for 0.5 hr or 1373 K for 1 hr; ground flat on 600 mesh SiC paper and polished with 1 to 3 μm α-alumina; bulk density 10.019 g cm^{-3}; O/U ratio 1.95; apparent porosity 0.82%; [Authors' designation: Sample No. 2-1].
22	360	1969	0.656	450-2436		Similar to the above specimen and conditions except bulk density 10.023 g cm^{-3}; O/U ratio 2.00; apparent porosity 0.52%; [Authors' designation: Sample No. 2-2].
23*	360	1969	0.656	450-2165		Similar to the above specimen and conditions except bulk density 10.017 g cm^{-3}; O/U ratio 2.00; apparent porosity 0.96%; [Authors' designation: Sample No. 2-3].
24*	360	1969	0.656	450-2380		Similar to the above specimen and conditions except bulk density 10.024 g cm^{-3}; O/U ratio 2.01; apparent porosity 0.48%; [Authors' designation: Sample No. 2-4].
25*	360	1969	0.656	450-1987		Similar to the above specimen and conditions except bulk density 9.965 g cm^{-3}; O/U ratio 2.25; apparent porosity 0.93%; [Authors' designation: Sample No. 2-5].
26*	360	1969	0.656	450-2349		Similar to the above specimen and conditions except bulk density 10.186 g cm^{-3}; O/U ratio 2.01; apparent porosity 0.71%; [Authors' designation: Sample No. 2-6].
27*	360	1969	0.656	450		Similar to the above specimen and conditions except bulk density 10.192 g cm^{-3}; O/U ratio 2.22; apparent porosity 0.50%; [Authors' designation: Sample No. 2-7].
28*	360	1969	0.656	450-2284		Similar to the above specimen and conditions except bulk density 9.946 g cm^{-3}; O/U ratio 1.99; apparent porosity 0.24%; [Authors' designation: Sample No. 2-8].
29*	360	1969	0.656	450-2424		Similar to the above specimen and conditions except bulk density 9.185 g cm^{-3}; O/U ratio 2.00; apparent porosity 0.48%; [Authors' designation: Sample No. 2-9].
30*	360	1969	0.656	450-1919		Similar to the above specimen and conditions except bulk density 10.026 g cm^{-3}; O/U ratio 2.29; apparent porosity 0.26%; [Authors' designation: Sample No. 2-10].
31*	360	1969	0.656	450-2349		Similar to the above specimen and conditions except bulk density 9.972 g cm^{-3}; O/U ratio 2.00; apparent porosity 0.32%; [Authors' designation: Sample No. 2-11].
32*	360	1969	0.656	450-2488		Similar to the above specimen and conditions except bulk density 9.911 g cm^{-3}; O/U ratio 1.96; apparent porosity 0.46%; [Authors' designation: Sample No. 2-12].
33*	360	1969	0.656	450-2358		Similar to the above specimen and conditions except bulk density 9.988 g cm^{-3}; O/U ratio 2.01; apparent porosity 0.37%; [Authors' designation: Sample No. 2-13].
34*	360	1969	0.656	450-2171		Similar to the above specimen and conditions except bulk density 10.157 g cm^{-3}; O/U ratio 2.01; apparent porosity 0.50%; [Authors' designation: Sample No. 2-14]

* Not shown on plot

SPECIFICATION TABLE NO. 167 (continued)

Curve No.	Ref. No.	Year	Wavelength μm	Temperature Range, K	Reported Error, %	Composition (weight percent), Specifications and Remarks
35*	360	1969	0.656	450-2284		Similar to the above specimen and conditions except bulk density 9.978 g cm^{-3}; O/U ratio 2.01; apparent porosity 0.18%; [Authors' designation: Sample No. 2-15].
36*	360	1969	0.656	450		Similar to the above specimen and conditions except bulk density 10.047 g cm^{-3}; O/U ratio 2.24; apparent porosity 0.36%; [Authors' designation: Sample No. 2-16].
37*	360	1969	0.70	1000-1968		Similar to the above specimen and conditions except bulk density 9.965 g cm^{-3}; O/U ratio 2.25; apparent porosity 0.93%; [Authors' designation: Sample No. 2-5].
38*	360	1969	0.70	1000-2100		Similar to the above specimen and conditions except bulk density 10.157 g cm^{-3}; O/U ratio 2.01; apparent porosity 0.50%; [Authors' designation: Sample No. 2-14].
39*	360	1969	0.70	1000-1896		Similar to the above specimen and conditions except bulk density 10.047 g cm^{-3}; O/U ratio 2.24; apparent porosity 0.36%; [Authors' designation: Sample No. 2-16].
40*	360	1969	0.656	450		Powder, 0.0025 Fe, <0.0010 other metallic impurities; pressed to 2700 psi, repressed isostatically at 50000 psi, and then sintered in flowing nitrogen between 1473 K and 1673 K for 4 hrs; reduced in flowing hydrogen for 1 hr in pairs starting at 773 K and proceeding for 4 hrs at 1673 K; ground flat on 600 mesh SiC paper and polished with 1 to 3 μm α-alumina; bulk density 10.318 g cm^{-3}; O/U ratio 2.19; apparent porosity 3.56%; [Authors' designation: Sample No. 3-1].
41*	360	1969	0.656	450-1888		Similar to the above specimen and conditions except bulk density 10.458 g cm^{-3}; O/U ratio 2.19; apparent porosity 5.14%; [Authors' designation: Sample No. 3-2].
42*	360	1969	0.656	450-1888		Similar to the above specimen and conditions except bulk density 10.407 g cm^{-3}; O/U ratio 2.18; apparent porosity 4.37%; [Authors' designation: Sample No. 3-3].
43*	360	1969	0.656	450-1917		Similar to the above specimen and conditions except bulk density 10.518 g cm^{-3}; O/U ratio 2.17; apparent porosity 0.55%; [Authors' designation: Sample No. 3-4].
44*	360	1969	0.656	450-1955		Similar to the above specimen and conditions except bulk density 10.542 g cm^{-3}; O/U ratio 2.18; apparent porosity 0.26%; [Authors' designation: Sample No. 3-5].
45*	360	1969	0.656	450-1944		Similar to the above specimen and conditions except bulk density 10.307 g cm^{-3}; O/U ratio 2.16; apparent porosity 3.59%; [Authors' designation: Sample No. 3-6].
46*	360	1969	0.656	450-1847		Similar to the above specimen and conditions except bulk density 10.654 g cm^{-3}; O/U ratio 2.17; apparent porosity 0.07%; [Authors' designation: Sample No. 3-7].
47	360	1969	0.656	450-1915		Similar to the above specimen and conditions except bulk density 10.574 g cm^{-3}; O/U ratio 2.19; apparent porosity 10.09%; [Authors' designation: Sample No. 3-8].
48	360	1969	0.656	450-2082		Similar to the above specimen and conditions except bulk density 10.166 g cm^{-3}; O/U ratio 2.18; apparent porosity 3.47%; [Authors' designation: Sample No. 3-9].
49*	360	1969	0.656	450-1941		Similar to the above specimen and conditions except bulk density 10.385 g cm^{-3}; O/U ratio 2.93; apparent porosity 0.56%; [Authors' designation: Sample No. 3-10].
50*	360	1969	0. [illegible]6	450-1966		Similar to the above specimen and conditions except bulk density 10.392 g cm^{-3}; O/U ratio 2.06; apparent porosity 0.50%; [Authors' designation: Sample No. 2-11].

*Not shown on plot

SPECIFICATION TABLE NO. 167 (continued)

Curve No.	Ref. No.	Year	Wavelength μm	Temperature Range, K	Reported Error, %	Composition (weight percent), Specifications and Remarks
51*	360	1969	0.656	450-2150		Similar to the above specimen and conditions except bulk density 10.101 g cm^{-3}; O/U ratio 2.01; apparent porosity 4.17%; [Authors' designation: Sample No. 3-12].
52*	360	1969	0.656	450-2182		Similar to the above specimen and conditions except bulk density 10.109 g cm^{-3}; O/U ratio 2.01; apparent porosity 3.94%; [Authors' designation: Sample No. 3-13].
53*	360	1969	0.656	450-2250		Similar to the above specimen and conditions except bulk density 10.398 g cm^{-3}; O/U ratio 2.02; apparent porosity 0.47%; [Authors' designation: Sample No. 3-14].
54*	360	1969	0.656	450-2278		Similar to the above specimen and conditions except bulk density 10.344 g cm^{-3}; O/U ratio 2.02; apparent porosity 10.14%; [Authors' designation: Sample No. 3-15].
55*	360	1969	0.70	1000-2036		Similar to the above specimen and conditions except bulk density 10.574 g cm^{-3}; O/U ratio 2.19; apparent porosity 10.09%; [Authors' designation: Sample No. 3-8].
56*	360	1969	0.70	1000-1960		Similar to the above specimen and conditions except bulk density 10.392 g cm^{-3}; O/U ratio 2.06; apparent porosity 0.50%; [Authors' designation: Sample No. 3-11].
57*	360	1969	0.70	1000-2262		Similar to the above specimen and conditions except bulk density 10.344 g cm^{-3}; O/U ratio 2.02; apparent porosity 10.14%; [Authors' designation: Sample No. 3-15].
58*	360	1969	0.70	1000-1992		Similar to the above specimen and conditions except bulk density 10.542 g cm^{-3}; O/U ratio 2.18; apparent porosity 0.26%; [Authors' designation: Sample No. 3-5].

*Not shown on plot

DATA TABLE NO. 167 HEMISPHERICAL SPECTRAL EMITTANCE OF URANIUM DIOXIDE UO_2

[Temperature, T, K; Emittance, ϵ; Wavelength, λ, μm]

T	ϵ
CURVE 1 λ = 0.656	
450	0.78
1973	0.85
2030	0.85
CURVE 2 λ = 0.656	
450	0.71
2309	0.78
2479	0.70
CURVE 3* λ = 0.656	
450	0.79
2082	0.80
2275	0.75
CURVE 4* λ = 0.656	
450	0.79
1993	0.86
2199	0.80
CURVE 5* λ = 0.656	
450	0.76
2070	0.86
2269	0.77
CURVE 6* λ = 0.656	
450	0.73
2069	0.83
2288	0.75
CURVE 7* λ = 0.656	
450	0.80
2067	0.84
2288	0.74
CURVE 8* λ = 0.656	
450	0.80
2115	0.88
2300	0.84
CURVE 9* λ = 0.656	
450	0.74
2220	0.78
2418	0.70
CURVE 10* λ = 0.656	
450	0.78
2198	0.82
2399	0.75
CURVE 11* λ = 0.656	
450	0.76
2202	0.81
2439	0.73
CURVE 12* λ = 0.656	
450	0.75
2283	0.77
2449	0.71
CURVE 13* λ = 0.656	
450	0.82
2095	0.87
2294	0.82
CURVE 14* λ = 0.656	
450	0.83
2294	0.83
2557	0.72
CURVE 15* λ = 0.656	
450	0.83
2263	0.85
2363	0.82
CURVE 16* λ = 0.656	
450	0.82
2037	0.79
2454	0.74
CURVE 17* λ = 0.656	
450	0.82
2006	0.85
2181	0.81
CURVE 18* λ = 0.656	
450	0.82
2266	0.82
2283	0.83
CURVE 19* λ = 0.656	
450	0.79
2233	0.82
2448	0.75
CURVE 20* λ = 0.656	
450	0.83
2082	0.88
2184	0.85
CURVE 21 λ = 0.656	
450	0.70
2124	0.85
2185	0.84
CURVE 22 λ = 0.656	
450	0.75
2215	0.88
2436	0.80
CURVE 23* λ = 0.656	
450	0.72
1938	0.83
2165	0.75
CURVE 24* λ = 0.656	
450	0.70
2187	0.79
2380	0.72
CURVE 25* λ = 0.656	
450	0.68
1976	0.84
1987	0.86
CURVE 26* λ = 0.656	
450	0.78
2208	0.81
2349	0.76
CURVE 27* λ = 0.656	
450	0.72
CURVE 28* λ = 0.656	
450	0.70
2145	0.80
2284	0.75
CURVE 29* λ = 0.656	
450	0.75
2233	0.79
2424	0.74
CURVE 30* λ = 0.656	
450	0.71
1919	0.88
CURVE 31* λ = 0.656	
450	0.72
2203	0.80
2349	0.75
CURVE 32* λ = 0.656	
450	0.73
2220	0.78
2488	0.68
CURVE 33* λ = 0.656	
450	0.71
2248	0.77
2358	0.74
CURVE 34* λ = 0.656	
450	0.72
2064	0.79
2171	0.72
CURVE 35* λ = 0.656	
450	0.73
2163	0.75
2284	0.67
CURVE 36* λ = 0.656	
450	0.71
CURVE 37* λ = 70	
1000	0.91
1916	0.93
1968	0.88
CURVE 38* λ = 70	
1000	0.91
1990	0.87
2100	0.85
CURVE 39* λ = 70	
1000	0.89
1868	0.95
1898	0.92
CURVE 40* λ = 0.656	
450	0.71
CURVE 41* λ = 0.656	
450	0.75
1888	0.88
CURVE 42* λ = 0.656	
450	0.73
1805	0.84
1888	0.82
CURVE 43* λ = 0.656	
450	0.68
1900	0.86
1917	0.89
CURVE 44* λ = 0.656	
450	0.71
1931	0.86
1955	0.85
CURVE 45* λ = 0.656	
450	0.73
1905	0.84
1944	0.83
CURVE 46* λ = 0.656	
450	0.69
1000	0.85
1843	0.86
1847	0.86
CURVE 47 λ = 0.656	
450	0.73
1000	0.85
1834	0.81
1915	0.77
CURVE 48 λ = 0.656	
450	0.71
1000	0.87
1922	0.77
2082	0.65
CURVE 49* λ = 0.656	
450	0.69
1000	0.86
1764	0.83
1941	0.76
CURVE 50* λ = 0.656	
450	0.73
1000	0.86
1966	0.70
1971	0.74
CURVE 51* λ = 0.656	
450	0.74
1000	0.86
2083	0.72
2150	0.67
CURVE 52* λ = 0.656	
450	0.75
1000	0.85
2068	0.78
2182	0.69
CURVE 53* λ = 0.656	
450	0.68
1000	0.86
2000	0.76
2250	0.64
CURVE 54* λ = 0.656	
450	0.71
1000	0.87
2070	0.73
2278	0.64

*Not shown on plot

DATA TABLE NO. 167 (continued)

T	ϵ
CURVE 55*	
$\lambda = 0.70$	
1000	0.91
1919	0.90
2036	0.90
CURVE 56*	
$\lambda = 0.70$	
1000	0.89
1946	0.88
1960	0.83
CURVE 57*	
$\lambda = 0.70$	
1000	0.90
2099	0.85
2262	0.79
CURVE 58*	
$\lambda = 0.70$	
1000	0.91
1917	0.94
1992	0.92

*Not shown on plot

SPECIFICATION TABLE NO. 168 NORMAL SPECTRAL EMITTANCE OF URANIUM DIOXIDE UO_2

Curve No.	Ref. No.	Year	Wavelength μm	Temperature Range, K	Geometry θ'	Reported Error, %	Composition (weight percent), Specifications, and Remarks
1*	238	1958	0.65	2173-2373	~0°	± 0.03	Powdered material; measured in vacuum.
2*	238	1958	0.65	2173-2373	~0°	± 0.02	Solid material; polished; measured in vacuum.

DATA TABLE NO. 168 NORMAL SPECTRAL EMITTANCE OF URANIUM DIOXIDE UO_2

[Temperature, T, K; Emittance, ϵ; Wavelength, λ, μm]

T	ϵ
CURVE 1* $\lambda = 0.65$	
2173	0.51
2373	0.51
CURVE 2* $\lambda = 0.65$	
2173	0.40
2373	0.40

*No plot given

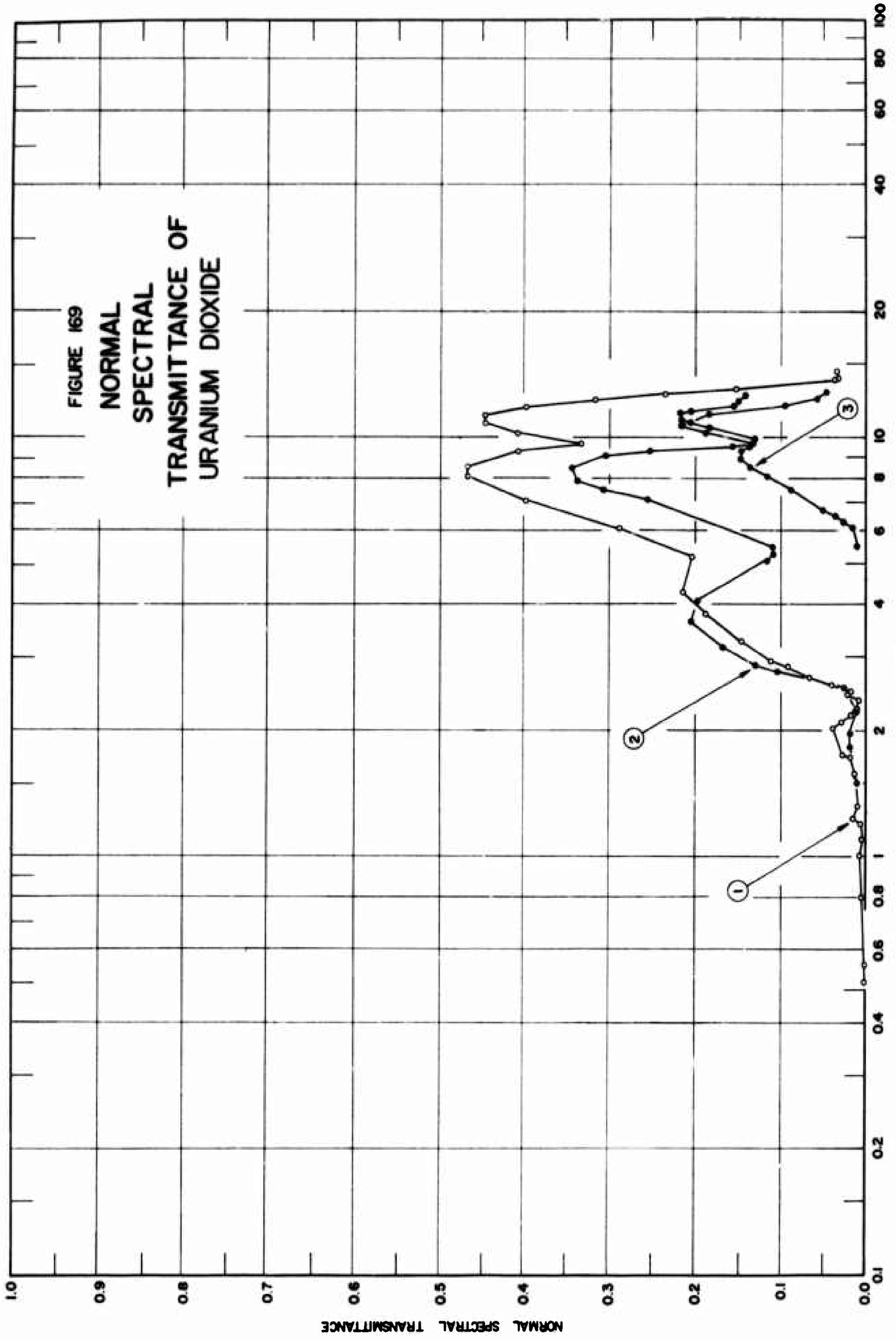


FIGURE 169
NORMAL SPECTRAL TRANSMITTANCE OF URANIUM DIOXIDE

SPECIFICATION TABLE NO. 169 NORMAL SPECTRAL TRANSMITTANCE OF URANIUM DIOXIDE UO_2

Curve No.	Ref. No.	Year	Temperature K	Wavelength Range, μm	Geometry θ θ' ω'	Reported Error, %	Composition (weight percent), Specifications, and Remarks
1	343	1965	~298	0.50-14.4	~0° ~0°		Single crystal (0.06 mm thick); final surface prepared with 600 grit metallographic paper; data extracted from smooth curve.
2	343	1965	~298	1.50-12.8	~0° ~0°		Single crystal (0.15 mm thick); final surface prepared with 600 grit metallographic paper; annealed at 1998 K for 12 hrs in commercial grade hydrogen; O/U = 2.001; data extracted from smooth curve.
3	343	1965	~298	5.48-12.4	~0° ~0°		Polycrystal (0.06 mm thick); sintered at 1998 K in commercial hydrogen; O/U = 2.001; data extracted from smooth curve.

DATA TABLE NO. 169 NORMAL SPECTRAL TRANSMITTANCE OF URANIUM DIOXIDE UO_2

[Wavelength, λ, μm; Transmittance, τ; Temperature, T, K]

λ	τ	λ	τ	λ	τ	λ	τ	λ	τ
CURVE 1 T ~ 298		CURVE 1 (cont.)		CURVE 1 (cont.)		CURVE 2 (cont.)		CURVE 3 T ~ 298	
		2.19	0.0174	11.3	0.446	3.18	0.169		
0.50	0.0000126	2.25	0.0102	11.8	0.398	3.64	0.204	5.48	0.0100
0.50	0.0000935*	2.28	0.0107*	12.2	0.316	4.07	0.199	6.06	0.0153
0.55	0.0000457	2.36	0.00893	12.6	0.234	5.08	0.116	6.26	0.0245
0.63	0.00178*	2.42	0.0200	13.0	0.151	5.25	0.110	6.44	0.0340
0.73	0.00155*	2.49	0.0182	13.6	0.0364	5.46	0.110	6.74	0.0500
0.80	0.00214	2.57	0.0398	13.7	0.0339*	7.06	0.254	7.56	0.0893
0.87	0.00138*	2.69	0.0645	13.9	0.0316	7.49	0.306	8.03	0.117
0.91	0.00263*	2.81	0.0909	14.2	0.0316*	7.95	0.336	8.48	0.139
1.00	0.00602	2.91	0.112	14.4	0.0339	8.56	0.341	8.88	0.148
1.05	0.00219*	3.26	0.148			9.02	0.303	9.33	0.148
1.10	0.00182	3.80	0.186	CURVE 2 T ~ 298		9.24	0.251	9.59	0.139
1.15	0.00513	4.27	0.214			9.50	0.157	9.70	0.132*
1.23	0.0126	5.20	0.204			9.72	0.133	9.93	0.132
1.31	0.00909	6.03	0.288	1.50	0.0100	9.92	0.133*	10.5	0.183
1.57	0.0115	7.09	0.398	1.59	0.0142*	10.2	0.187	10.8	0.206
1.61	0.0100*	8.02	0.467	1.83	0.0192	10.6	0.216	11.0	0.217
1.67	0.0182*	3.59	0.467	1.97	0.0192	10.9	0.216*	11.3	0.217
1.72	0.0182	9.21	0.408	2.02	0.0180*	11.3	0.183	11.5	0.205
1.75	0.0263	9.61	0.331	2.24	0.0100	11.9	0.0952	11.9	0.158
2.02	0.0372	9.85	0.331*	2.54	0.0247	12.3	0.0568	12.1	0.150
2.10	0.0288	10.3	0.408	2.79	0.104	12.4	0.0524*	12.4	0.142
		10.9	0.446	2.87	0.130	12.8	0.0498		

*Not shown on plot

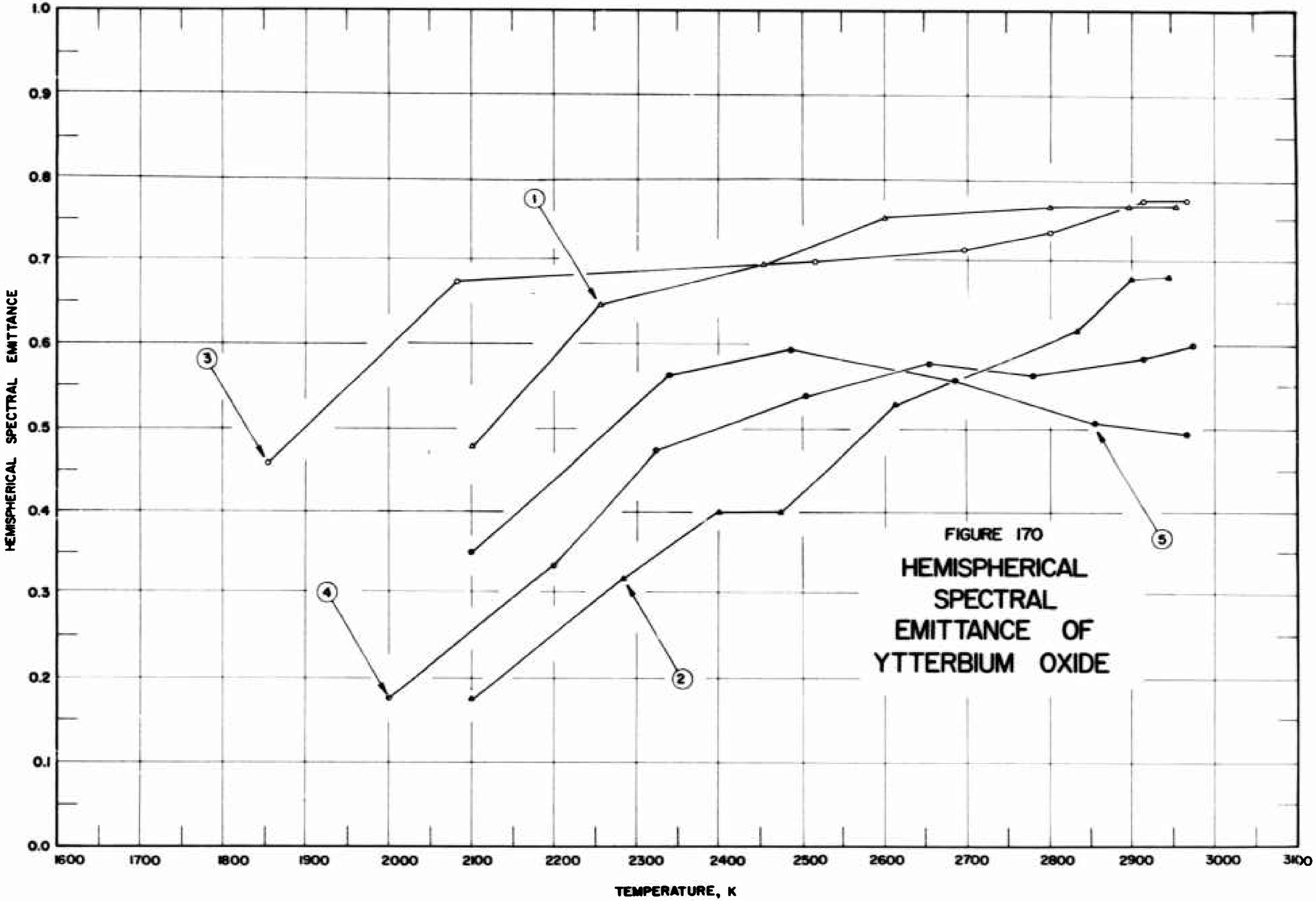


FIGURE 170
HEMISPHERICAL SPECTRAL EMITTANCE OF YTTERBIUM OXIDE

SPECIFICATION TABLE NO. 170 HEMISPHERICAL SPECTRAL EMITTANCE OF YTTERBIUM OXIDE Yb_2O_3

Curve No.	Ref. No.	Year	Wavelength μm	Temperature Range, K	Reported Error, %	Composition (weight percent), Specifications and Remarks
1	334	1968	0.676	2100-2951		Dry pressed at 3000 psi with subsequent hydrostatic pressing at 50 000 psi; specimen fused by heating a few min; calculated from reflectance data.
2	334	1968	0.605	2100-2947		Above specimen and conditions.
3	334	1968	0.575	1852-2968		Above specimen and conditions.
4	334	1968	0.539	2000-2975		Above specimen and conditions.
5	334	1968	0.488	2100-2969		Above specimen and conditions.

DATA TABLE NO. 170 HEMISPHERICAL SPECTRAL EMITTANCE OF YTTERBIUM OXIDE Yb_2O_3

[Temperature, T, K; Emittance, ε; Wavelength, λ, μm]

CURVE 1
λ = 0.676

T	ε
2100	0.478
2254	0.648
[illegible]	0.694
2600	0.752
2800	0.265
2898	0.767
2951	0.767

CURVE 2
λ = 0.605

T	ε
2100	0.174
2282	0.317
2400	0.400
2473	0.400
2613	0.528
2831	0.618
2900	0.676
2947	0.680

CURVE 3
λ = 0.575

T	ε
1852	0.458
2084	0.671
2515	0.699
2696	0.712
2800	0.734
2912	0.772
2968	0.772

CURVE 4
λ = 0.539

T	ε
2000	0.174
2200	0.332
2324	0.473
2507	0.539
2653	0.577
2780	0.562
2912	0.584
2975	0.600

CURVE 5
λ = 0.488

T	ε
2100	0.350
2340	0.562
2488	0.593
2688	0.557
2855	0.507
2969	0.493

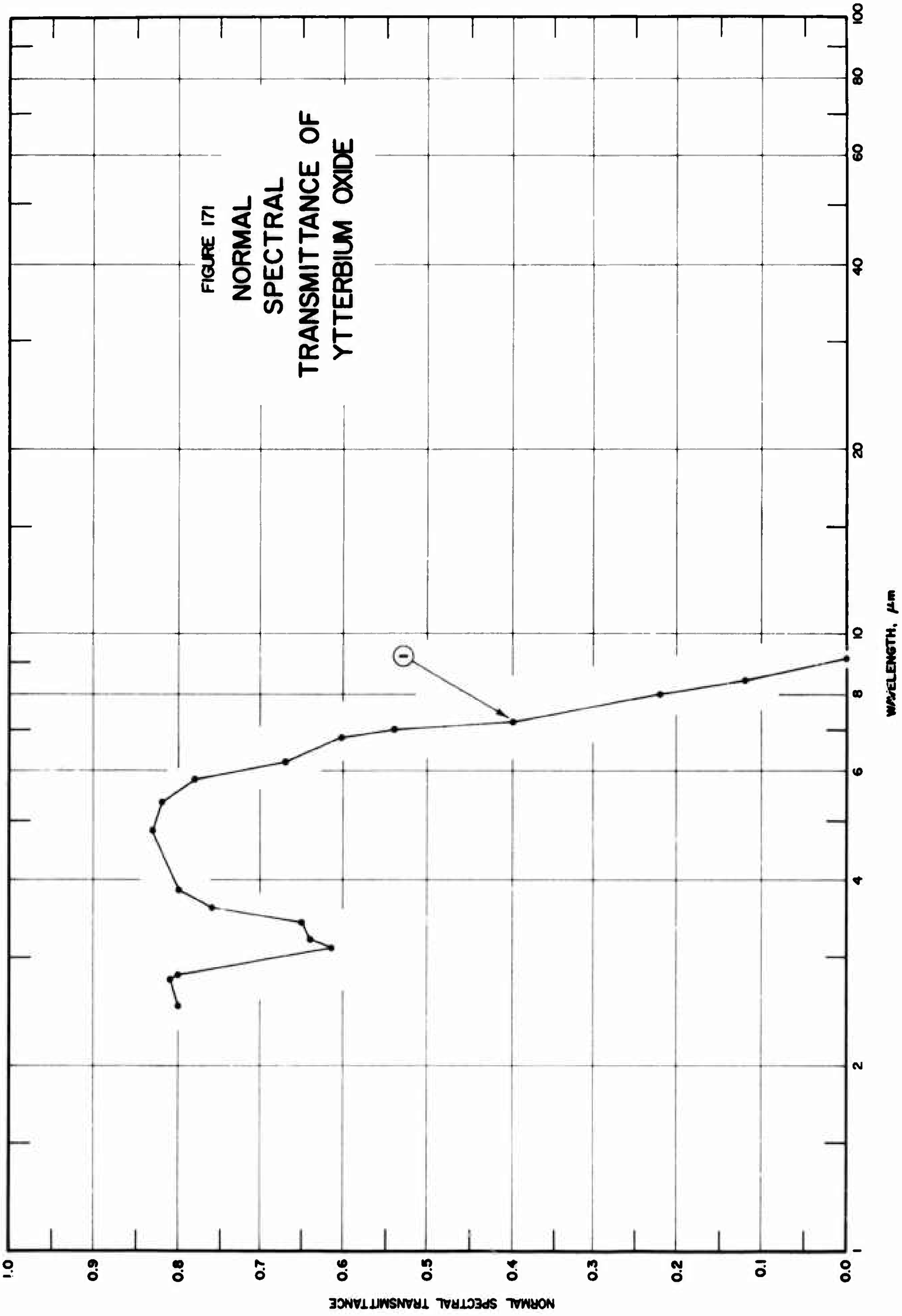


FIGURE 171
NORMAL SPECTRAL TRANSMITTANCE OF YTTERBIUM OXIDE

SPECIFICATION TABLE NO. 171 NORMAL SPECTRAL TRANSMITTANCE OF YTTERBIUM OXIDE Yb_2O_3

Curve No.	Ref. No.	Year	Temperature K	Wavelength Range, μm	Geometry θ θ' ω'	Reported Error, %	Composition (weight percent), Specifications, and Remarks
1	[illegible]	1961	298	2.50-9.10	~0° ~0°		Single crystal; 1.89 ± 0.02 mm thick; data extracted from smooth curve.

DATA TABLE NO. 171 NORMAL SPECTRAL TRANSMITTANCE OF YTTERBIUM OXIDE Yb_2O_3

[Wavelength, λ, μm; Transmittance, τ; Temperature, T, K]

λ	τ
CURVE 1	
T = 298	
2.50	0.800
2.75	0.810
2.80	0.800
3.10	0.615
3.20	0.640
3.40	0.650
3.60	0.760
3.85	0.800
4.80	0.830
5.35	0.820
5.80	0.780
6.20	0.670
6.80	0.600
7.00	0.540
7.20	0.400
8.00	0.220
8.40	0.120
9.10	0.000

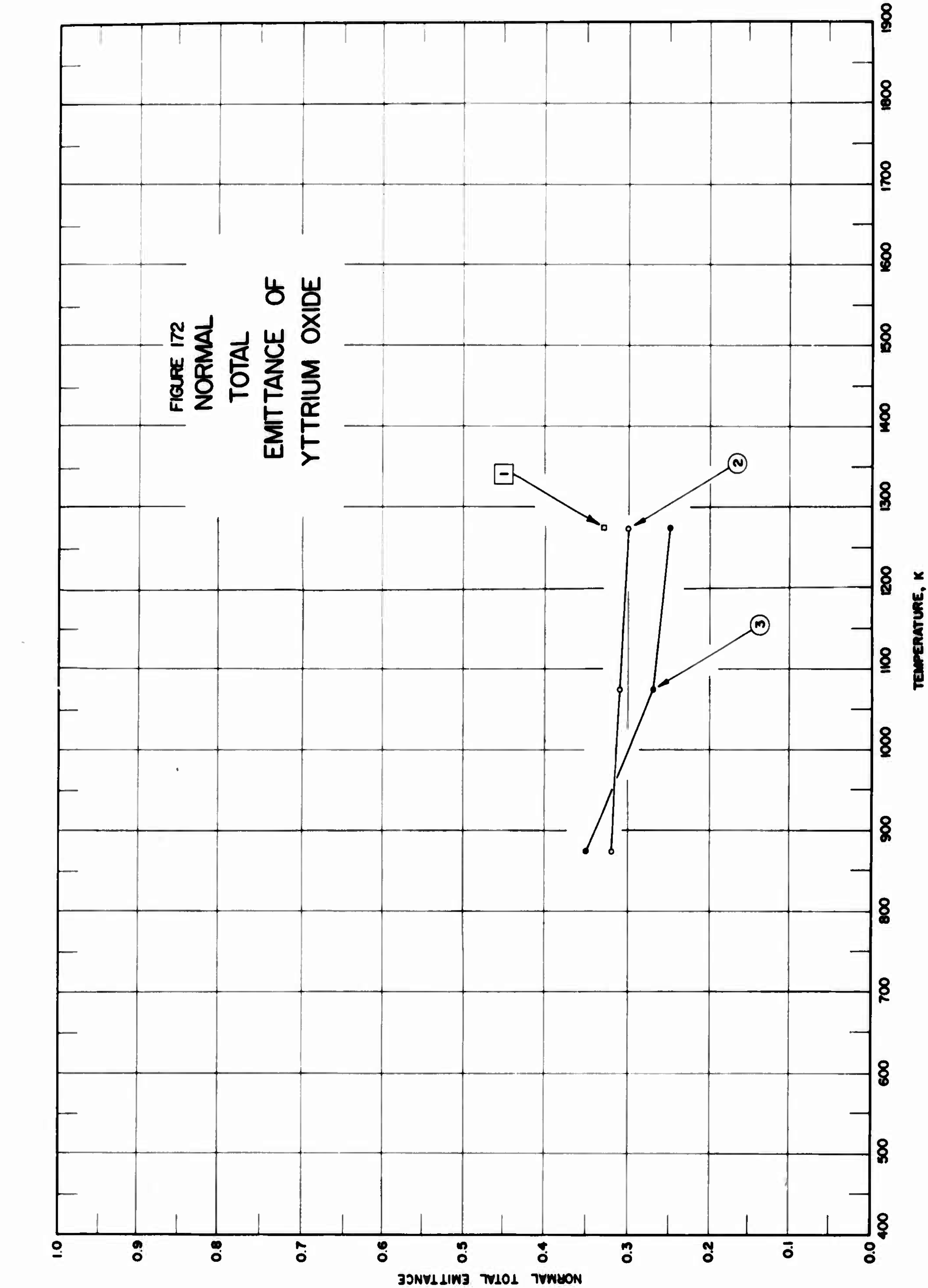


FIGURE 172 NORMAL TOTAL EMITTANCE OF YTTRIUM OXIDE

SPECIFICATION TABLE NO. 172 NORMAL TOTAL EMITTANCE OF YTTRIUM OXIDE Y_2O_3

Curve No.	Ref. No.	Year	Temperature Range, K	Geometry θ'	Reported Error, %	Composition (weight percent), Specifications and Remarks
1	200	1962	1273	~0°		99.5 pure; sintered at 2023 K for 2 hrs; computed from spectral data.
2	362	1964	873-1273	0°		99.9 pure powder, American Potash and Chemical Corp; sintered 2 hrs at 1773 K.
3	362	1964	873-1273	0°		Similar to the above specimen and conditions except calculated from spectral data (1-15 μm).

DATA TABLE NO. 172 NORMAL TOTAL EMITTANCE OF YTTRIUM OXIDE Y_2O_3

[Temperature, T, K; Emittance, ϵ]

T	ϵ
CURVE 1	
1273	0.33
CURVE 2	
873	0.32
1073	0.31
1273	0.30
CURVE 3	
873	0.35
1073	0.27
1273	0.25

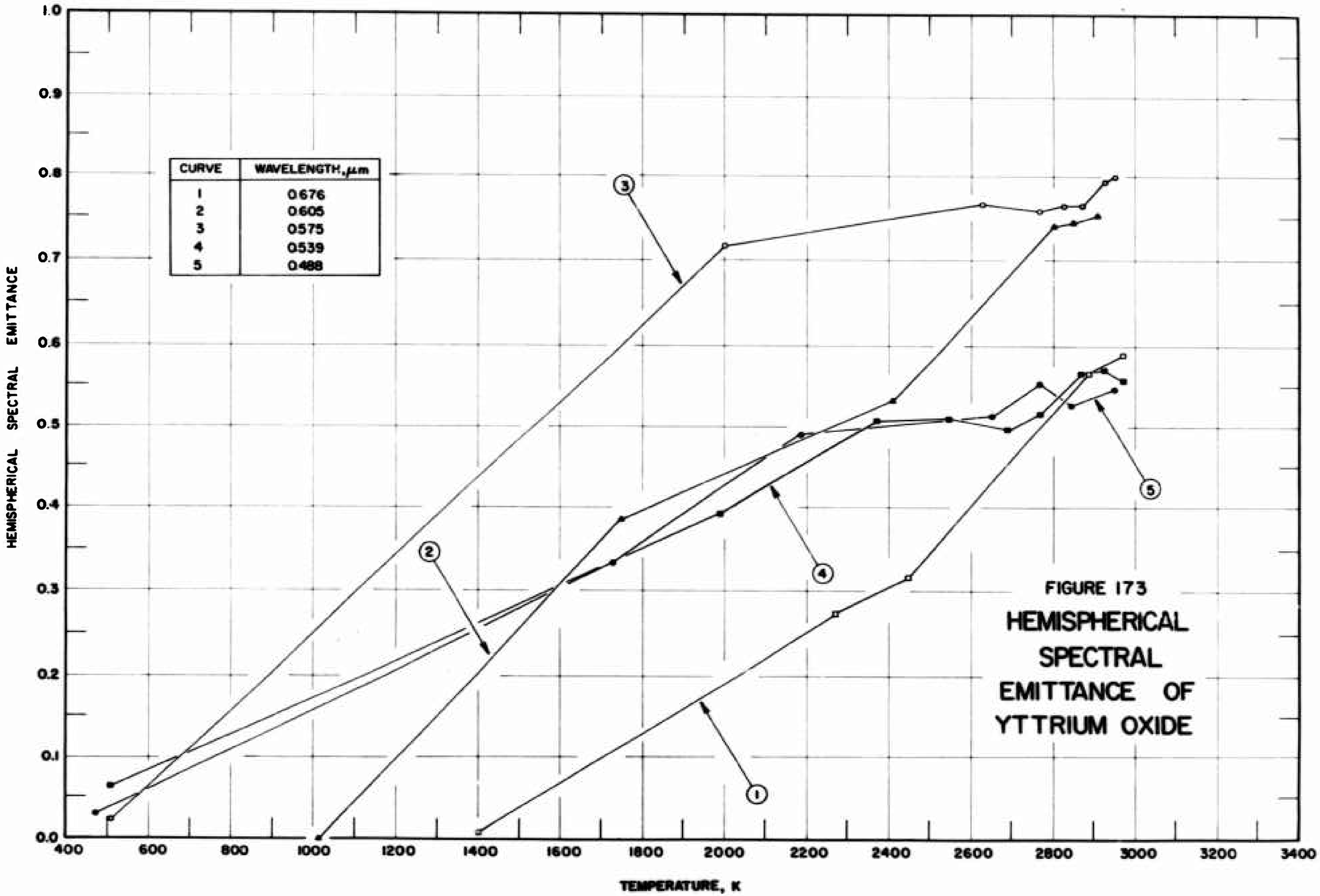


FIGURE 173
HEMISPHERICAL SPECTRAL EMITTANCE OF YTTRIUM OXIDE
CURVE | WAVELENGTH, µm
1 | 0.676
2 | 0.605
3 | 0.575
4 | 0.539
5 | 0.488
HEMISPHERICAL SPECTRAL EMITTANCE
TEMPERATURE, K
0.0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
1.0
400
600
800
1000
1200
1400
1600
1800
2000
2200
2400
2600
2800
3000
3200
3400
1
2
3
4
5

SPECIFICATION TABLE NO. 173 HEMISPHERICAL SPECTRAL EMITTANCE OF YTTRIUM OXIDE Y_2O_3

Curve No.	Ref. No.	Year	Wavelength μm	Temperature Range, K	Reported Error, %	Composition (weight percent), Specifications and Remarks
1	334	1968	0.676	1443-2970		Powder; dry pressed at 3000 psi with subsequent hydrostatic pressing at 50 000 psi; specimen fused by heating a few min; calculated from reflectance data.
2	334	1968	0.605	1016-2906		Above specimen and conditions.
3	334	1968	0.575	510-2954		Above specimen and conditions.
4	334	1968	0.539	509-2974		Above specimen and conditions.
5	334	1968	0.488	471-2956		Above specimen and conditions.

DATA TABLE NO. 173 HEMISPHERICAL SPECTRAL EMITTANCE OF YTTRIUM OXIDE Y_2O_3

[Temperature, T, K; Emittance, ϵ; Wavelength, λ, μm]

T	ϵ
CURVE 1 $\lambda = 0.676$	
1443	0.008
2266	0.274
2443	0.318
2889	0.565
2970	0.590
CURVE 2 $\lambda = 0.605$	
1016	0.000
1746	0.387
2409	0.531
2800	0.740
2852	0.743
2906	0.751
CURVE 3 $\lambda = 0.575$	
510	0.022
2000	0.718
2627	0.767
2766	0.769
2827	0.765
CURVE 3 (cont.)	
2878	0.765
2921	0.791
2954	0.800
CURVE 4 $\lambda = 0.539$	
509	0.064
1983	0.393
2377	0.508
2548	0.510
2682	0.499
2778	0.518
2869	0.566
2921	0.570
2974	0.557
CURVE 5 $\lambda = 0.488$	
471	0.030
1729	0.335
2182	0.490
2655	0.513
CURVE 5 (cont.)	
2762	0.552
2846	0.529
2956	0.546

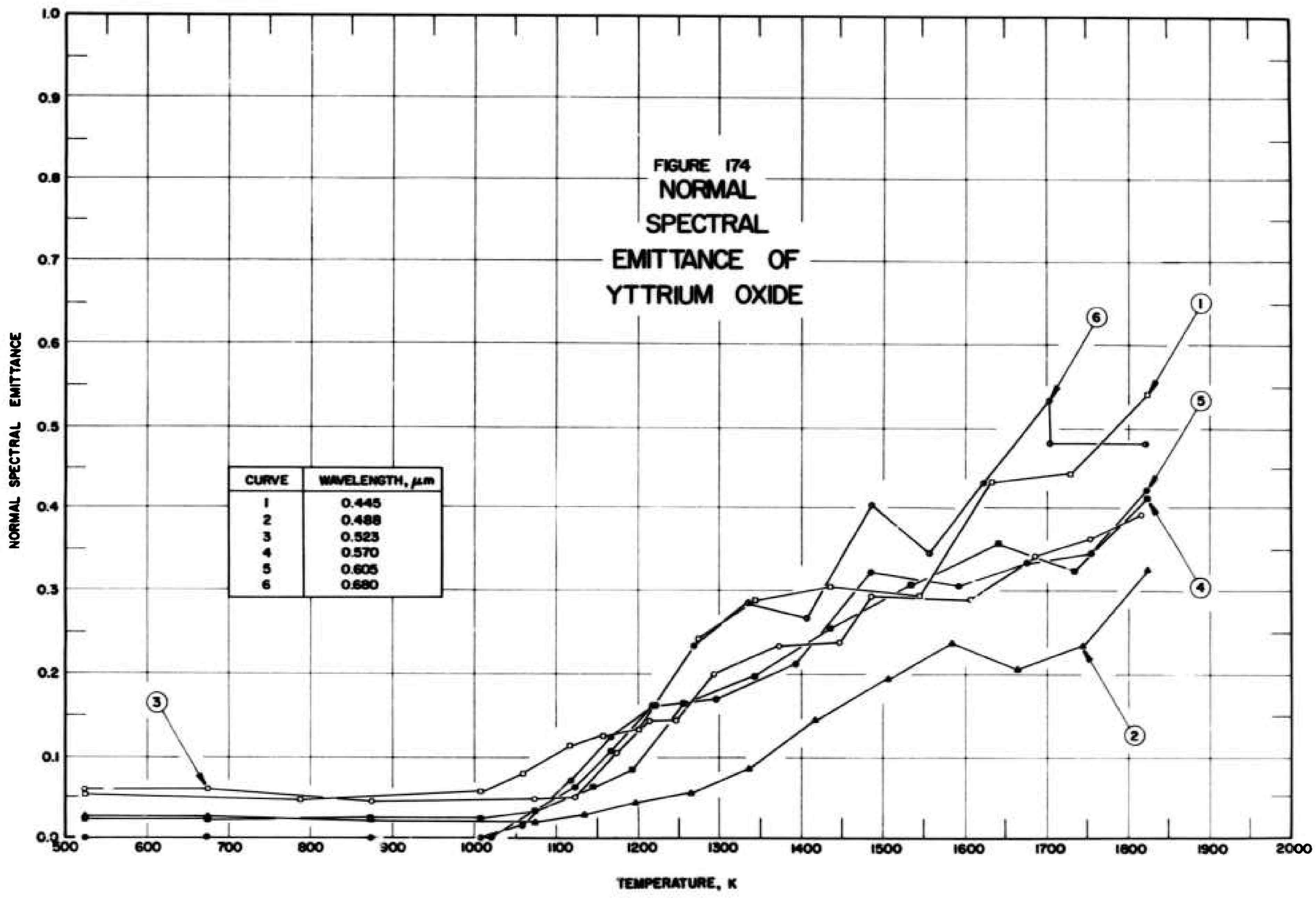


FIGURE 174
NORMAL
SPECTRAL
EMITTANCE OF
YTTRIUM OXIDE
CURVE
WAVELENGTH, µm
1 0.445
2 0.488
3 0.523
4 0.570
5 0.605
6 0.680
NORMAL SPECTRAL EMITTANCE
TEMPERATURE, K
1.0
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0.0
500
600
700
800
900
1000
1100
1200
1300
1400
1500
1600
1700
1800
1900
2000
1
2
3
4
5
6

SPECIFICATION TABLE NO. 174 NORMAL SPECTRAL EMITTANCE OF YTTRIUM OXIDE Y_2O_3

Curve No.	Ref. No.	Year	Wavelength μm	Temperature Range, K	Geometry θ'	Reported Error, %	Composition (weight percent), Specifications, and Remarks
1	205	1963	0.445	523-1822	~0°		Powder; dry pressed under a pressure of 75000 psi; specimen fired at 1773 K for 24 hrs, then ground; calculated from reflectance; data extracted from smooth curve.
2	205	1963	0.488	523-1823	~0°		Above specimen and conditions.
3	205	1963	0.523	523-1818	~0°		Above specimen and conditions.
4	205	1963	0.570	523-1823	~0°		Above specimen and conditions.
5	205	1963	0.605	523-1823	~0°		Above specimen and conditions.
6	205	1963	0.680	523-1822	~0°		Above specimen and conditions.

DATA TABLE NO. 174 NORMAL SPECTRAL EMITTANCE OF YTTRIUM OXIDE Y_2O_3

[Temperature, T, K; Emittance, ϵ; Wavelength, λ, μm]

T	ϵ	T	ϵ	T	ϵ	T	ϵ	T	ϵ
CURVE 1 λ = 0.445		CURVE 2 (cont.)		CURVE 3 (cont.)		CURVE 5 λ = 0.605		CURVE 6 (cont.)	
523	0.052	1198	0.041	1536	0.295	523	0.000	1057	0.014
788	0.045	1265	0.054	1609	0.290	672	0.000	1119	0.070
1009	0.056	1337	0.088	1688	0.342	871	0.000	1164	0.124
1059	0.080	1417	0.147	1754	0.362	1020	0.000	1220	0.162
1116	0.112	1507	0.195	1818	0.392	1073	0.018*	1269	0.235
1158	0.125	1585	0.239	CURVE 4 λ = 0.570		1121	0.061	1333	0.285
1200	0.132	1665	0.206	523	0.021	1166	0.109	1404	0.268
1274	0.241	1747	0.233	672	0.021	1218	0.161	1486	0.404
1346	0.287	1823	0.328	872	0.021	1296	0.170	1559	0.348
1435	0.302	CURVE 3 λ = 0.523		1007	0.021	1391	0.211	1622	0.432
1546	0.291	523	0.060	1073	0.032	1484	0.321	1702	0.533
1631	0.435	674	0.060	1144	0.062	1591	0.304	1702	0.482
1730	0.445	874	0.043	1193	0.084	1679	0.335	1822	0.482
1822	0.540	1071	0.048	1255	0.165	1755	0.348		
CURVE 2 λ = 0.488		1121	0.050	1341	0.198	1823	0.422		
523	0.025	1171	0.104	1435	0.256	CURVE 6 λ = 0.680			
674	0.025	1213	0.144	1534	0.307	523	0.000*		
872	0.020	1248	0.145	1640	0.358	673	0.000*		
1073	0.018	1291	0.200	1736	0.325	872	0.000*		
1135	0.027	1371	0.232	1823	0.412	1008	0.000		
		1449	0.239						

*Not shown on plot

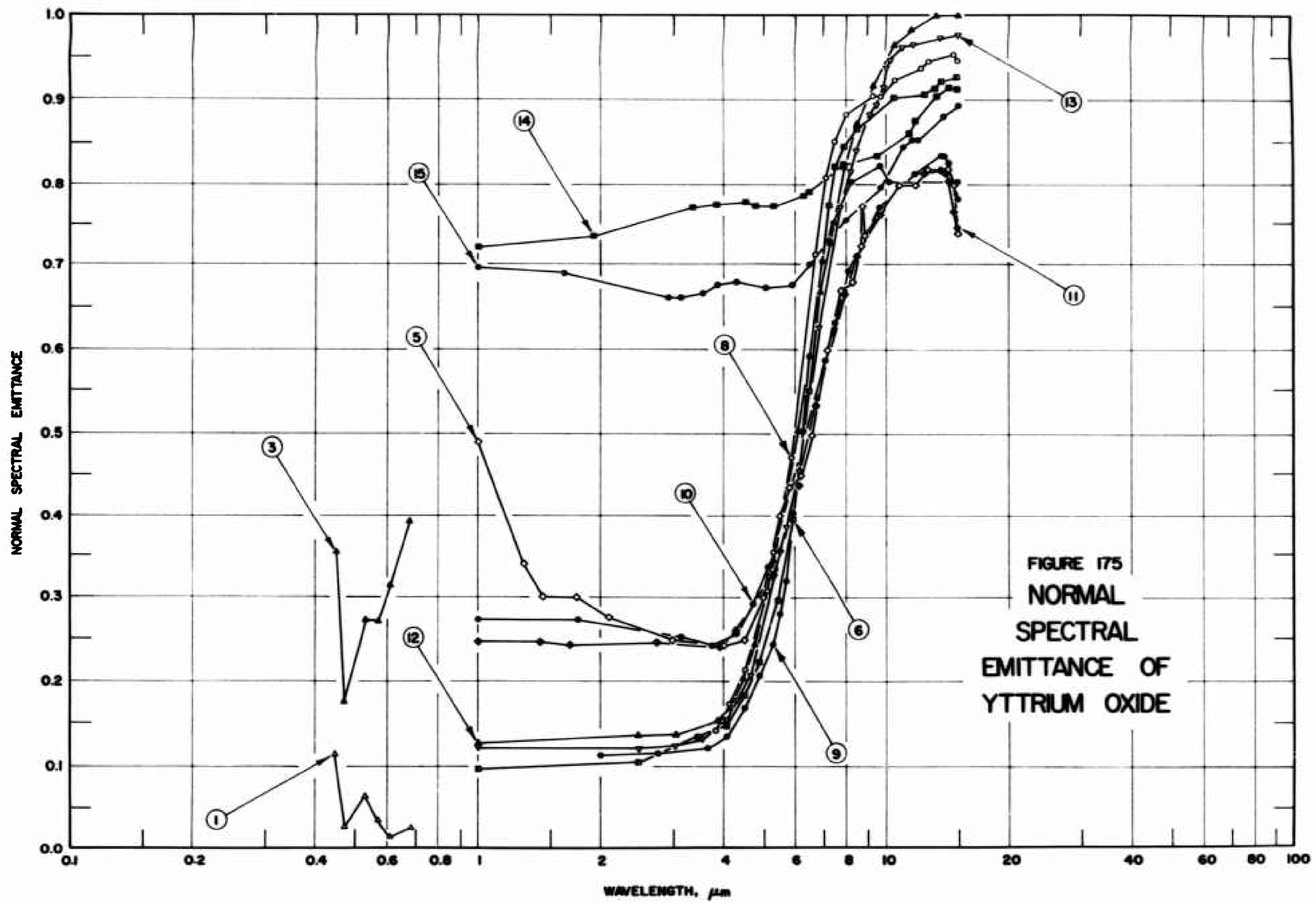


FIGURE 175 NORMAL SPECTRAL EMITTANCE OF YTTRIUM OXIDE

SPECIFICATION TABLE NO. 175 NORMAL SPECTRAL EMITTANCE OF YTTRIUM OXIDE Y_2O_3

Curve No.	Ref. No.	Year	Temperature K	Wavelength Range, μm	Geometry θ'	Reported Error, %	Composition (weight percent), Specifications, and Remarks
1	205	1963	1073	0.445-0.681	~0°		Powder; dry pressed under a pressure of 75000 psi; fired at 1773 K for 24 hrs, then ground; calculated from reflectance data.
2*	205	1963	1273	0.445-0.680	~0°		Above specimen and conditions.
3	205	1963	1473	0.446-0.680	~0°		Above specimen and conditions.
4*	205	1963	1673	0.445-0.680	~0°		Above specimen and conditions.
5	200	1962	1273	1.00-15.0	~0°		99.9 pure; sintered at 2023 K for 2 hrs; data extracted from smooth curve.
6	362	1964	873	1.00-15.0	~0°		99.9 pure powder, American Potash and Chemical Corp; sintered 2 hrs at 1773 K; data extracted from smooth curve.
7*	362	1964	1073	1.00-15.0	~0°		Above specimen and conditions.
8	362	1964	1273	1.00-15.0	~0°		Above specimen and conditions.
9	362	1964	373	2.00-15.0	~0°		Above specimen and conditions except calculated from spectral reflectance.
10	393	1966	1273	1.00-15.0	~0°		Powder; cold pressed and sintered at 2023 K for 2 hrs; 2 or 3 wt. percent polyvinyl binder; density 4.00 g cm^{-3}; data extracted from smooth curve.
11	393	1966	1273	1.00-15.0	~0°		Powder; cold pressed and sintered; 2 or 3 wt. percent polyvinyl binder; data extracted from smooth curve.
12	393	1966	1273	1.00-15.0	~0°		Similar to the above specimen and conditions except 0.36 TiO_2 added.
13	393	1966	1273	1.00-15.0	~0°		Similar to curve 11 specimen and conditions except 0.45 Al_2O_3 added.
14	393	1966	1273	1.00-15.0	~0°		Similar to curve 11 specimen and conditions except 1.01 Cr_2O_3 added.
15	393	1966	1273	1.00-15.0	~0°		Similar to curve 11 specimen and conditions except 0.33 NiO added.

*Not shown on plot

DATA TABLE NO. 175 NORMAL SPECTRAL EMITTANCE OF YTTRIUM OXIDE Y_2O_3

[Wavelength, λ, μm; Emittance, ε; Temperature, T, K]

CURVE 1
T = 1073

λ	ε
0.445	0.115
0.478	0.028
0.534	0.065
0.570	0.035
0.604	0.014
0.681	0.026

CURVE 2*
T = 1273

λ	ε
0.445	0.240
0.479	0.076
0.532	0.193
0.571	0.173
0.605	0.212
0.680	0.237

CURVE 3
T = 1473

λ	ε
0.446	0.355
0.476	0.175
0.533	0.271
0.571	0.270
0.603	0.313
0.680	0.392

CURVE 4*
T = 1673

λ	ε
0.445	0.466
0.476	0.282
0.529	0.342
0.569	0.369
0.599	0.392
0.680	0.473

CURVE 5
T = 1273

λ	ε
1.00	0.490
1.30	0.340
1.45	0.300
1.75	0.300
2.10	0.275

CURVE 5 (cont.)

λ	ε
3.00	0.250
4.00	0.243
4.50	0.250
5.00	0.300
5.50	0.400
5.80	0.435
6.20	0.450
6.60	0.500
7.20	0.600
7.80	0.670
8.30	0.680
8.70	0.725
8.80	0.775
8.82	0.737
10.8	0.800
11.8	0.800
12.6	0.820
14.3	0.820
14.6	0.800
14.8	0.750*
15.0	0.740

CURVE 6
T = 873

λ	ε
1.00	0.098
2.48	0.105
3.46	0.135
4.02	0.149
4.51	0.182
4.99	0.222
5.48	0.298
5.97	0.395
6.54	0.550
7.29	0.774
7.59	0.823
7.99	0.849
8.50	0.869
10.5	0.902
12.5	0.908
13.2	0.913
13.7	0.922
15.0	0.928

CURVE 7*
T = 1073

λ	ε
1.00	0.098
2.48	0.105
3.28	0.116
3.76	0.122
4.08	0.135
4.69	0.181
5.21	0.237
5.70	0.324
6.04	0.408
6.62	0.563
7.12	0.708
7.49	0.780
7.63	0.797
8.22	0.818
11.0	0.882
12.0	0.889
14.1	0.909
15.0	0.905

CURVE 8
T = 1073

λ	ε
1.00	0.098*
2.48	0.105*
3.48	0.134*
3.82	0.142
4.13	0.172
4.51	0.214
5.14	0.307
5.36	0.352
5.84	0.472
6.71	0.711
7.19	0.810
7.49	0.852
8.00	0.885
9.32	0.904
9.74	0.904
10.5	0.923
12.1	0.938
12.9	0.946
14.6	0.953
15.0	0.948

CURVE 9
T = 373

λ	ε
2.00	0.113
2.79	0.117
3.67	0.121
4.06	0.135
4.50	0.169
4.96	0.207
5.33	0.244
5.56	0.280
5.74	0.320
5.92	0.402
6.22	0.502
6.53	0.591
7.00	0.702
7.49	0.751
8.26	0.803
9.79	0.825
10.1	0.804
15.0	0.804

CURVE 10
T = 1273

λ	ε
1.00	0.272
1.78	0.272
3.14	0.251
3.74	0.243
4.08	0.246*
4.32	0.257
4.74	0.292
5.18	0.337
7.07	0.588
7.50	0.633
8.13	0.693
8.64	0.723*
9.77	0.773
10.7	0.801*
11.7	0.814
13.6	0.836
14.0	0.836
14.2	0.829
15.0	0.782

CURVE 11
T = 1273

λ	ε
1.00	0.248
1.41	0.248
1.69	0.244
2.74	0.247
3.93	0.242
4.31	0.260
5.01	0.305*
5.30	0.329
5.51	0.356
6.04	0.437
6.73	0.531
7.90	0.668
8.48	0.710
9.64	0.763
10.8	0.800*
11.6	0.812*
12.5	0.818
13.6	0.820
14.0	0.817
14.4	0.805
14.7	0.787*
14.7	0.767
15.0	0.745

CURVE 12
T = 1273

λ	ε
1.00	0.128
2.49	0.136
3.03	0.137
3.89	0.152
4.13	0.168
4.45	0.201
4.79	0.245
5.29	0.344
6.02	0.502
6.86	0.670
7.25	0.729
7.91	0.823
8.55	0.872
9.35	0.917
10.5	0.966
11.5	0.985
13.2	1.000
15.0	1.000

CURVE 13
T = 1273

λ	ε
1.00	0.121
2.49	0.121
3.03	0.125
3.51	0.132
3.88	0.144*
4.06	0.154
4.32	0.177
4.62	0.209
5.35	0.325
5.76	0.385
6.16	0.455
6.38	0.507*
6.86	0.629
7.79	0.771
8.20	0.818
8.44	0.842
9.13	0.884
9.47	0.896
9.75	0.904*
9.88	0.916
10.0	0.938
10.2	0.949
11.0	0.964
11.6	0.968
13.6	0.975
15.0	0.979

CURVE 14
T = 1273

λ	ε
1.00	0.721
1.92	0.736
3.39	0.771
3.85	0.779
4.57	0.780
4.80	0.775
5.32	0.775
6.26	0.787
6.44	0.791
7.05	0.809*
7.99	0.824
9.49	0.837
11.4	0.862
11.9	0.878
13.4	0.903

CURVE 14 (cont.)
T = 1273

λ	ε
14.4	0.914
15.0	0.913

CURVE 15
T = 1273

λ	ε
1.00	0.696
1.62	0.690
2.93	0.661
3.13	0.651
3.58	0.669
3.88	0.677
4.37	0.680
5.04	0.673
5.97	0.678
6.58	0.700
7.22	0.730
8.00	0.756
9.71	0.799
11.0	0.848
11.5	0.854
12.0	0.854
13.9	0.881
15.0	0.894

*Not shown on plot

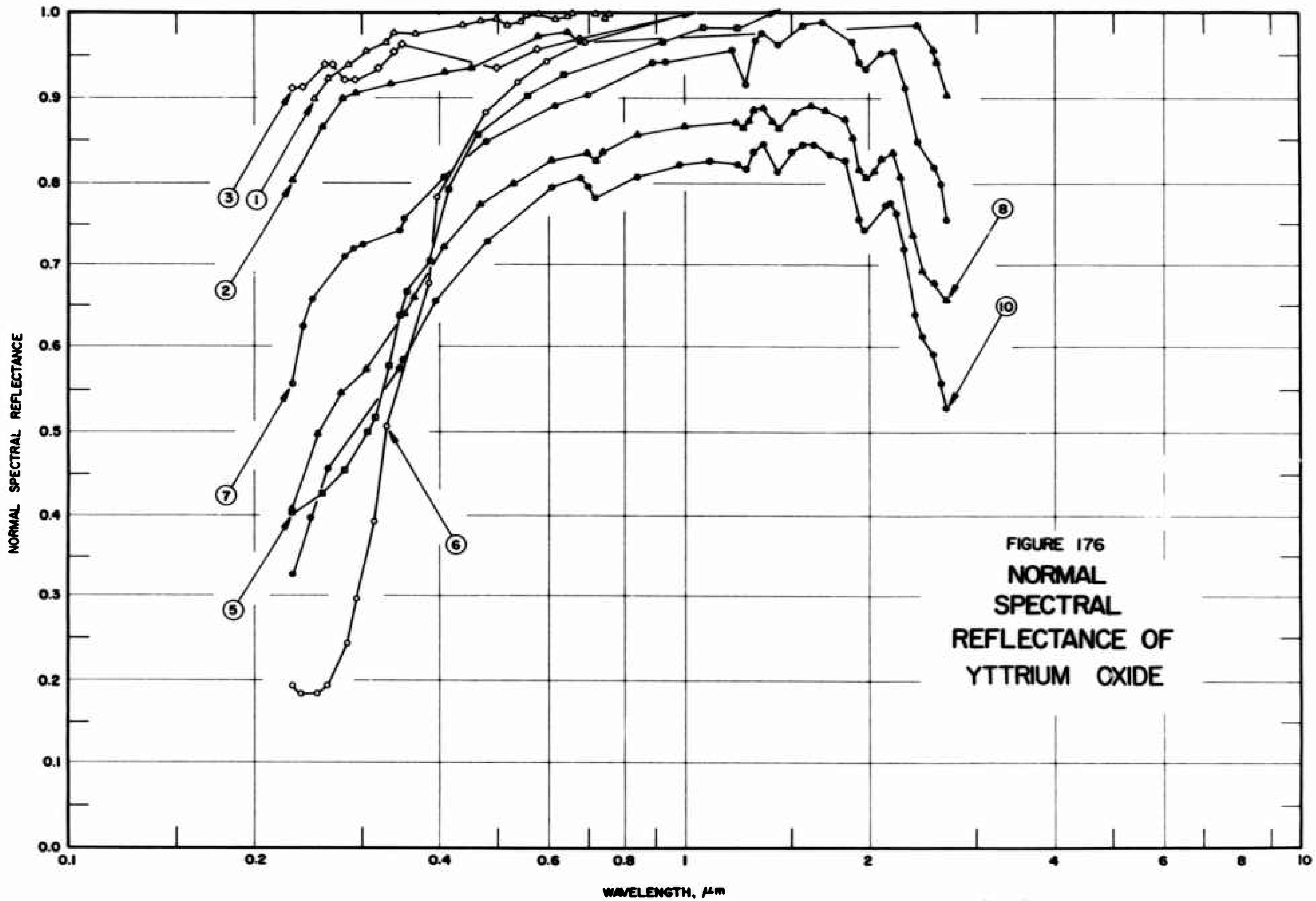


FIGURE 176
NORMAL
SPECTRAL
REFLECTANCE OF
YTTRIUM CXIDE

SPECIFICATION TABLE NO. 176 NORMAL SPECTRAL REFLECTANCE OF YTTRIUM OXIDE Y_2O_3

Curve No.	Ref. No.	Year	Temperature K	Wavelength Range, μm	Geometry θ	θ'	ω'	Reported Error, %	Composition (weight percent), Specifications, and Remarks
1	206	1967	298	0. 250-0. 750	0°		2π		CaF_2 reference standard; data extracted from smooth curve.
2	340	1968	298	0. 230-2. 65	~0°		2π		Powder; compacted without binder at 18 900 psi; data extracted from smooth curve; freshly smoked MgO reference standard.
3	340	1968	298	0. 230-2. 65	~0°		2π		Similar to the above specimen and conditions except sintered at 1273 K in air for 1 hr.
4*	340	1968	298	0. 230-2. 65	~0°		2π		Similar to the above specimen and conditions except sintered at 1523 K in air for 1 hr.
5	340	1968	298	0. 230-2. 65	~0°		2π		Similar to the above specimen and conditions except sintered at 1723 K in air for 1 hr.
6	340	1968	298	0. 230-2. 65	~0°		2π		Similar to the above specimen and conditions except sintered at 1823 K in air for 1 hr.
7	362	1964	~298	0. 230-2. 65	0°		2π		99. 9 pure powder, American Potash and Chemical Corp; mesh size 325; compacted at 23 500 psi with highly polished stainless steel ram; data extracted from smooth curve; MgO reference standard.
8	362	1964	~298	0. 230-2. 65	~0°		2π		Similar to above specimen and conditions except compacted at 47 000 psi.
9*	362	1964	~298	0. 230-2. 65	~0°		2π		Similar to above specimen and conditions except compacted at 58 800 psi.
10	362	1964	~298	0. 230-2. 65	~0°		2π		Similar to above specimen and conditions except compacted at 70 600 psi.

* Not shown on plot

DATA TABLE NO. 176 NORMAL SPECTRAL REFLECTANCE OF YTTRIUM OXIDE Y_2O_3

[Wavelength, λ, μm; Reflectance, ρ; Temperature, T, K]

λ	ρ
CURVE 1	**T = 298**
0.250	0.900
0.263	0.924
0.272	0.925*
0.284	0.940
0.301	0.956
0.328	0.966
0.339	0.978
0.363	0.976
0.374	0.979*
0.433	0.987
0.447	0.988*
0.462	0.991
0.493	0.994
0.512	0.987
0.526	0.987*
0.540	0.990
0.550	0.999
0.578	1.00
0.613	0.995
0.637	0.997*
0.647	0.998
0.652	1.00
0.668	0.997*
0.680	1.00*
0.716	1.00
0.728	0.997*
0.740	0.996
0.750	1.00
CURVE 2	**T = 298**
0.230	0.801
0.258	0.867
0.279	0.900
0.291	0.908
0.331	0.919
0.407	0.931
0.450	0.938
0.577	0.974
0.641	0.978
0.679	0.967
1.03	1.01*
1.15	1.02*
CURVE 2 (cont.)	
1.24	1.01*
1.28	1.02*
1.35	1.03*
1.41	1.02*
1.56	1.03*
1.65	1.04*
1.75	1.05*
1.81	1.04*
1.90	1.01*
1.96	1.01*
2.07	1.03*
2.09	1.03*
2.15	1.03*
2.21	1.02*
2.32	0.989
2.51	0.956
2.55	0.944
2.65	0.901
CURVE 3	**T = 298**
0.230	0.911
0.240	0.912
0.262	0.940
0.268	0.940
0.280	0.921
0.291	0.921
0.319	0.937
0.336	0.955
0.349	0.962
0.496	0.938
0.576	0.959
0.671	0.970
1.02	1.01*
1.44	1.04*
1.77	1.08*
1.82	1.08*
1.89	1.06*
1.94	1.05*
2.19	1.09*
2.36	1.07*
2.65	1.01*
CURVE 4*	**T = 298**
0.230	0.402
0.271	0.472
0.280	0.489
0.299	0.541
0.315	0.605
0.330	0.662
0.343	0.733
0.352	0.780
0.443	0.874
0.500	0.905
0.568	0.932
0.690	0.954
0.924	0.984
0.985	0.987
1.17	1.00
1.42	1.01
1.52	1.02
1.65	1.03
1.75	1.03
2.02	1.04
2.21	1.07
2.56	1.07
2.65	1.06
CURVE 5	**T = 298**
0.230	0.402
0.257	0.438
0.280	0.455
0.305	0.500
0.313	0.519
0.330	0.577
0.344	0.638
0.352	0.666
0.385	0.702
0.413	0.792
0.460	0.858
0.556	0.901
0.671	0.930
0.911	0.967
1.07	0.982
1.21	0.982
1.37	1.00*
CURVE 5 (cont.)	
1.84	1.02*
2.05	1.04*
2.38	1.07*
2.52	1.08*
2.65	1.08*
CURVE 6	**T = 298**
0.230	0.194
0.239	0.185
0.252	0.185
0.261	0.193
0.281	0.241
0.294	0.296
0.312	0.391
0.329	0.507
0.382	0.678
0.396	0.784
0.472	0.885
0.532	0.920
0.596	0.945
0.684	0.966
1.01	1.01*
1.32	1.03*
1.76	1.06*
1.94	1.07*
2.15	1.10*
2.28	1.11*
2.65	1.14*
CURVE 7	**T ~ 298**
0.230	0.557
0.240	0.625
0.249	0.659
0.280	0.710
0.290	0.720
0.300	0.724
0.330	0.739*
0.344	0.742
0.350	0.758
0.404	0.809
0.474	0.850
CURVE 7 (cont.)	
0.613	0.891
0.691	0.903
0.882	0.942
0.926	0.943
1.19	0.959
1.25	0.918
1.30	0.970
1.33	0.977
1.37	0.972*
1.41	0.962
1.55	0.988
1.66	0.990
1.79	0.986*
1.86	0.969
1.91	0.943
1.96	0.938
2.09	0.951
2.16	0.954
2.27	0.913
2.38	0.850
2.54	0.820
2.60	0.800
2.65	0.758
CURVE 8	**T ~ 298**
0.230	0.406
0.252	0.499
0.276	0.547
0.301	0.573
0.350	0.640
0.361	0.660
0.404	0.721
0.465	0.774
0.523	0.800
0.602	0.829
0.691	0.835
0.717	0.828
0.731	0.837
0.838	0.857
0.995	0.867
1.21	0.871
1.24	0.867
1.27	0.874
CURVE 8 (cont.)	
1.29	0.889
1.34	0.890
1.38	0.872
1.42	0.865
1.50	0.885
1.60	0.893
1.69	0.888
1.82	0.878
1.86	0.853
1.91	0.816
1.97	0.808
2.01	0.813
2.08	0.830
2.16	0.836
2.24	0.808
2.33	0.737
2.42	0.693
2.52	0.679
2.57	0.659*
2.65	0.609
CURVE 9*	**T ~ 298**
0.230	0.360
0.247	0.438
0.259	0.479
0.271	0.504
0.336	0.590
0.347	0.600
0.350	0.624
0.404	0.700
0.440	0.743
0.547	0.800
0.611	0.823
0.651	0.829
0.677	0.830
0.717	0.822
0.741	0.830
0.859	0.852
1.05	0.862
1.19	0.870
1.22	0.863
1.26	0.856
1.29	0.877
CURVE 9 (cont.)*	
1.34	0.884
1.39	0.860
1.42	0.858
1.54	0.881
1.62	0.888
1.79	0.873
1.85	0.858
1.90	0.811
1.98	0.800
2.01	0.809
2.08	0.821
2.15	0.825
2.20	0.814
2.28	0.767
2.34	0.712
2.45	0.675
2.54	0.651
2.60	0.627
2.65	0.593
CURVE 10	**T ~ 298**
0.230	0.329
0.246	0.399
0.263	0.457
0.344	0.574
0.349	0.585
0.394	0.655
0.476	0.730
0.602	0.796
0.679	0.806
0.699	0.798
0.712	0.781
0.831	0.809
0.976	0.821
1.09	0.826
1.22	0.824
1.25	0.818
1.29	0.838
1.34	0.847
1.41	0.814
1.49	0.838
1.55	0.846
1.61	0.848
CURVE 10 (cont.)	
1.72	0.835
1.81	0.829
1.84	0.822*
1.91	0.758
1.95	0.745
2.11	0.772
2.15	0.775
2.20	0.764
2.26	0.720
2.36	0.640
2.43	0.611
2.53	0.591
2.60	0.560
2.65	0.530

* Not shown on plot

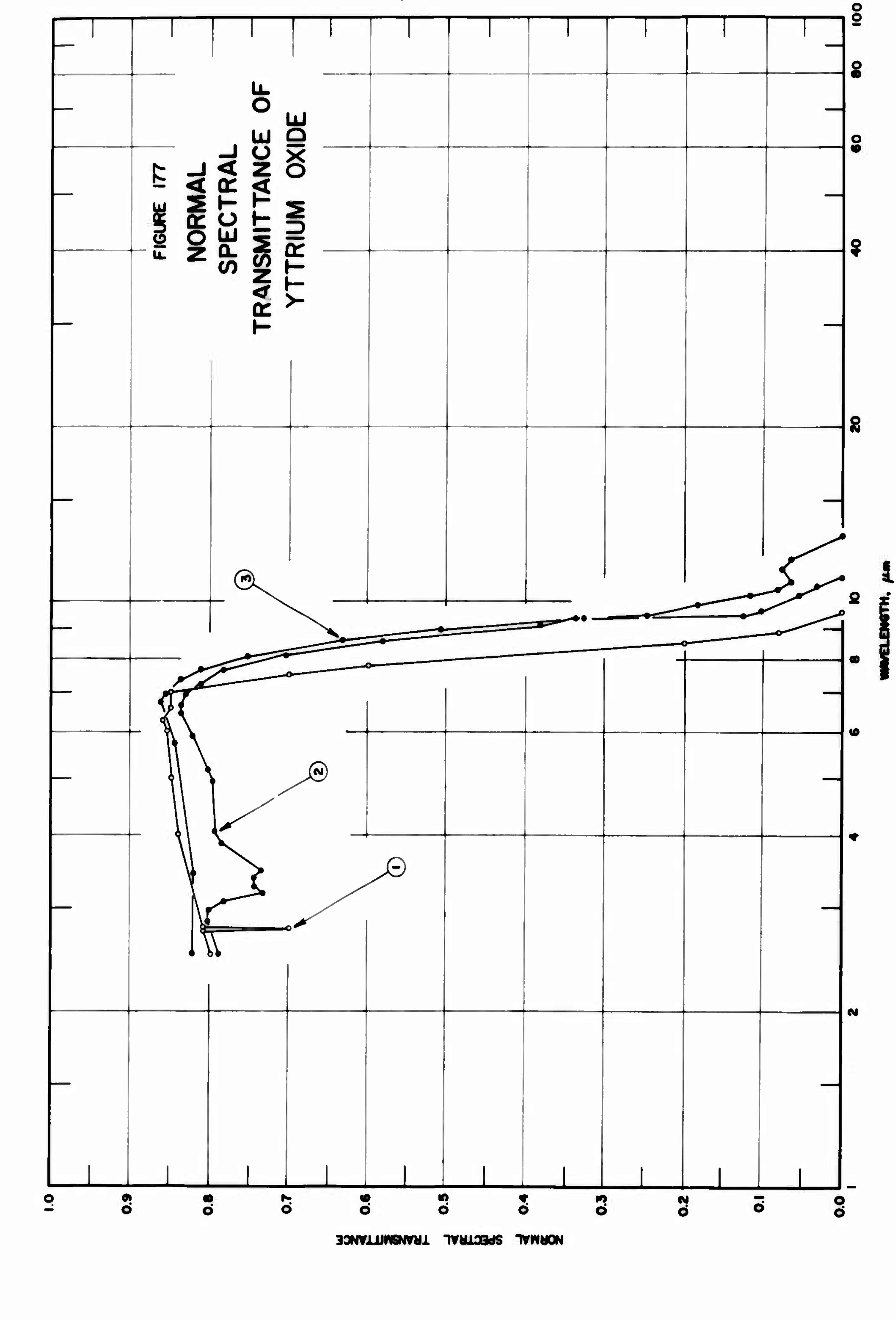


FIGURE 177
NORMAL SPECTRAL TRANSMITTANCE OF YTTRIUM OXIDE
NORMAL SPECTRAL TRANSMITTANCE
WAVELENGTH, μm
1.0
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0.0
1
2
4
6
8
10
20
40
60
80
100
1
2
3

SPECIFICATION TABLE NO. 177 NORMAL SPECTRAL TRANSMITTANCE OF YTTRIUM OXIDE Y_2O_3

Curve No.	Ref. No.	Year	Temperature K	Wavelength Range, μm	Geometry θ θ' ω'	Reported Error, %	Composition (weight percent), Specifications, and Remarks
1	240	1961	298	2.50-9.60	~0° ~0°		Single crystal; 1.89 ± 0.02 mm thick; data extracted from smooth curve.
2	361	1968	~298	2.50-11.0	~0° ~0°		Thin plate composed of 2 or 3 grains of single crystal; material made by pressing 99.9 pure powder and fusing in a solar furnace; specimen ground and polished; data extracted from smooth curve.
3	361	1968	~298	2.50-13.0	~0° ~0°		Similar to the above specimen and conditions except made from 99.999 pure powder.

DATA TABLE NO. 177 NORMAL SPECTRAL TRANSMITTANCE OF YTTRIUM OXIDE Y_2O_3

[Wavelength, λ, μm; Transmittance, τ; Temperature, T, K]

λ	τ	λ	τ	λ	τ
CURVE 1		CURVE 2 (cont.)		CURVE 3	
T = 298				T ~ 298	
		3.19	0.733		
2.50	0.800	3.28	0.746	2.50	0.821
2.74	0.810	3.37	0.746	3.41	0.821
2.75	0.700	3.46	0.737	5.73	0.846
2.76	0.810	3.86	0.787	6.74	0.862
4.00	0.840	4.02	0.795	6.99	0.856
5.00	0.850	4.93	0.797	7.34	0.838
6.00	0.855	5.19	0.801	7.69	0.813
6.22	0.860	5.90	0.824	8.05	0.752
6.60	0.850	6.43	0.837	8.57	0.633
7.00	0.800	6.67	0.837	8.95	0.509
7.50	0.700	6.99	0.831	9.32	0.327
7.80	0.600	7.29	0.813	9.47	0.246
8.50	0.200	7.61	0.784	9.89	0.184
8.85	0.080	8.10	0.702	10.3	0.115
9.60	0.000	8.53	0.581	10.5	0.081
		9.10	0.382	10.6	0.066*
CURVE 2		9.36	0.239	10.8	0.066
T ~ 298		9.48	0.123	11.1	0.076*
		9.62	0.100	11.4	0.076
2.50	0.790	10.3	0.058	11.8	0.065
2.84	0.802	10.6	0.032	13.0	0.000
2.97	0.801	11.0	0.000		
3.07	0.781				

* Not shown on plot

SPECIFICATION TABLE NO. 178 HEMISPHERICAL TOTAL EMITTANCE OF ZINC OXIDE ZnO

Curve No.	Ref. No.	Year	Temperature Range, K	Reported Error, %	Composition (weight percent), Specifications and Remarks
1*	241	1954	1140-1330		Crystal; measured in vacuum.

DATA TABLE NO. 178 HEMISPHERICAL TOTAL EMITTANCE OF ZINC OXIDE ZnO

[Temperature, T, K; Emittance, ϵ]

T	ϵ
CURVE 1*	
1140	0.91
1240	0.81
1330	0.82

* No plot given

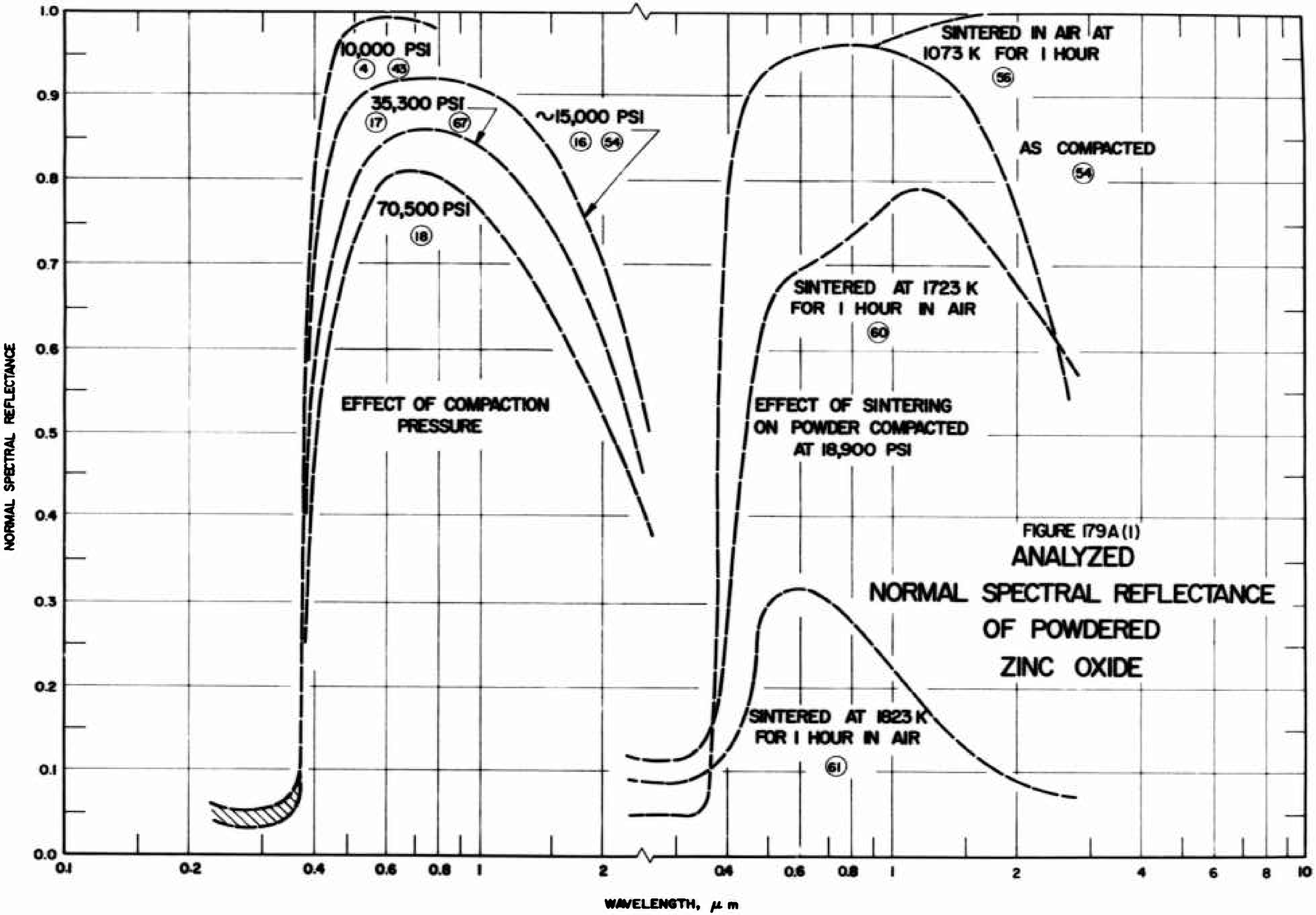


FIGURE 179A (1)
ANALYZED
NORMAL SPECTRAL REFLECTANCE
OF POWDERED
ZINC OXIDE

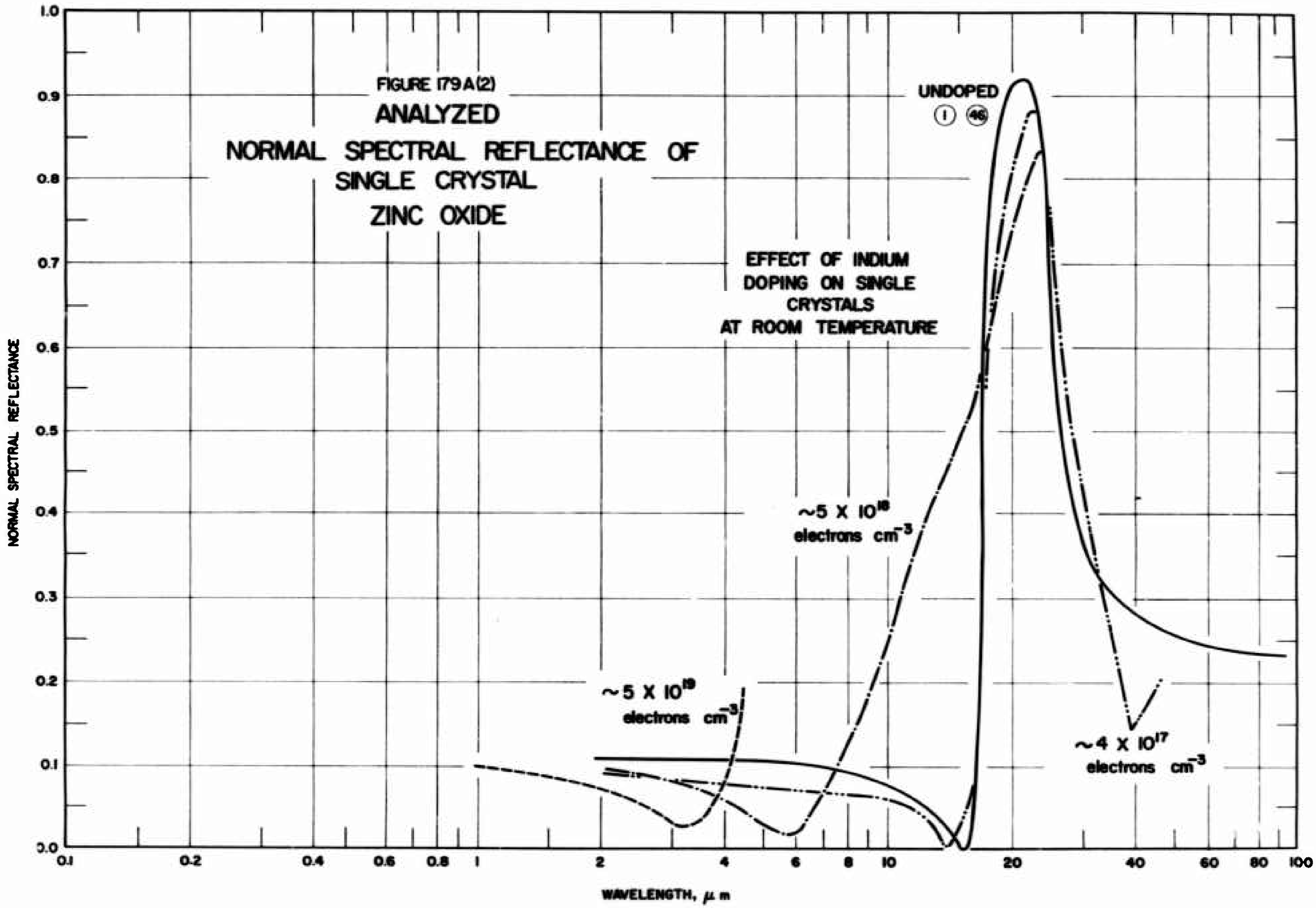


FIGURE 179A(2)
ANALYZED
NORMAL SPECTRAL REFLECTANCE OF SINGLE CRYSTAL ZINC OXIDE

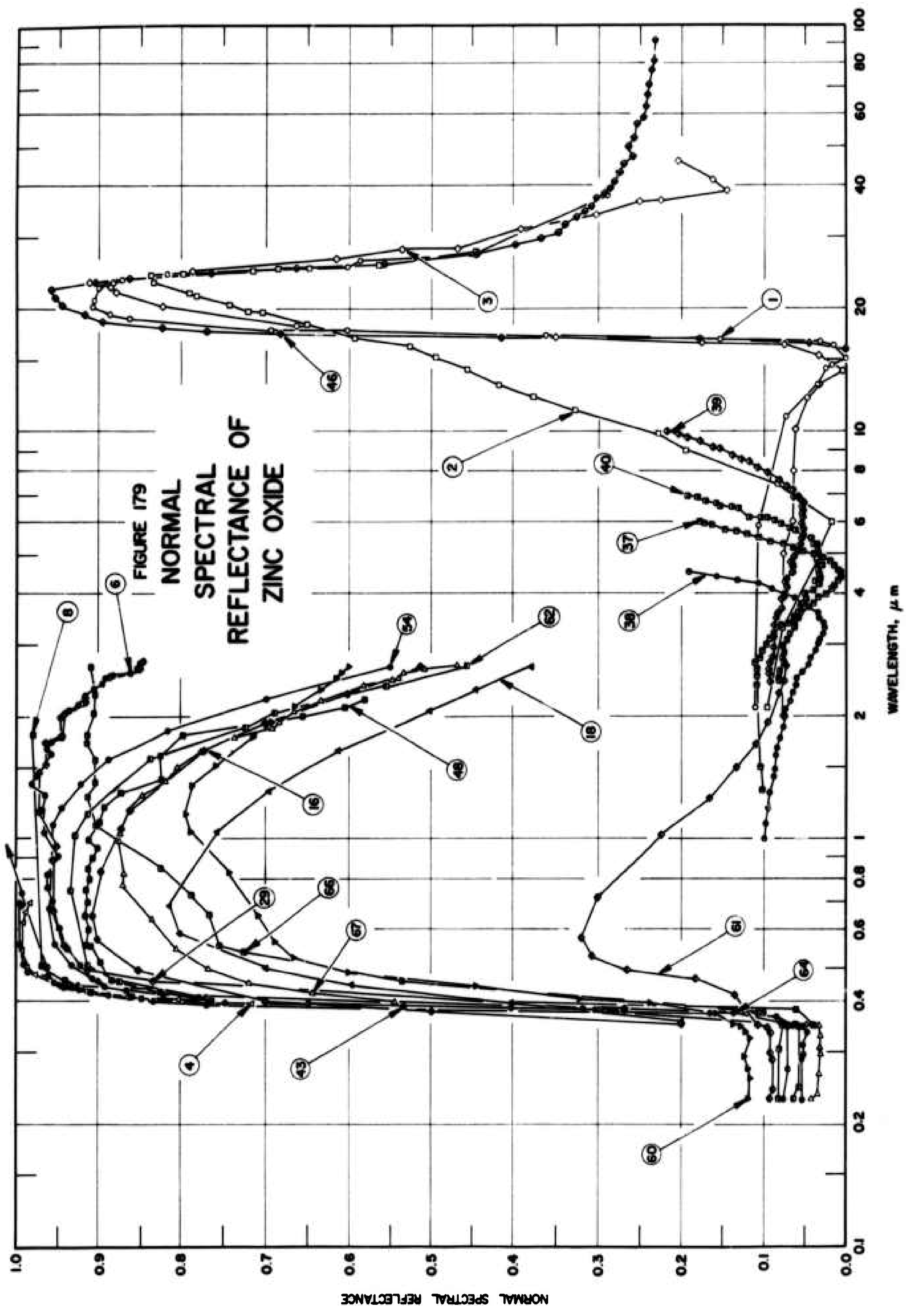


FIGURE 179
NORMAL SPECTRAL REFLECTANCE OF ZINC OXIDE

SPECIFICATION TABLE NO. 179 NORMAL SPECTRAL REFLECTANCE OF ZINC OXIDE ZnO

Curve No.	Ref. No.	Year	Temperature K	Wavelength Range, μm	Geometry θ	Geometry θ'	Geometry ω'	Reported Error, %	Composition (weight percent), Specifications, and Remarks
1	242	1959	298	2.10-38.0	8°	8°			Single crystal; measured in air; freshly evaporated aluminum film reference standard.
2	242	1959	298	2.10-27.3	8°	8°			Single crystal; indium-doped containing 5.0×10^{18} electrons cm^{-3}; etched, ground and polished, several microns removed before steady-state surface conditions were reached; measured in air; freshly evaporated aluminum film reference standard.
3	242	1959	298	2.00-46.0	8°	8°			Similar to the above specimen and conditions except containing 3.7×10^{17} electrons cm^{-3}.
4	82	1963	~298	0.380-0.700	~0°		2π		SP 500 powder; compacted at 10 000 psi; data extracted from smooth curve.
5*	82	1963	~298	0.380-0.700	~0°		2π		Above specimen and conditions except exposed in vacuum (10^{-5} mm Hg) to 75 ESH with solar factor 1.5.
6	82	1963	~298	0.378-2.70	~0°		2π		SP 500 pigment, calcined at 973 K for 16 hrs and compacted at 10 000 psi; data extracted from smooth curve.
7*	82	1963	~298	0.379-2.70	~0°		2π		Above specimen and conditions except exposed in vacuum (10^{-5} mm Hg) to 1670 ESH.
8	243	1966	298	0.350-1.80	~0°	~0°			Sintered at 873 K in air (same results obtained for sintered in nitrogen or argon); data extracted from smooth curve; [Author's designation: specimen TP-14872AB].
9*	243	1966	298	0.350-1.80	~0°	~0°			Above specimen and conditions except ultraviolet-irradiated in vacuum for 860 sun-hrs; measured less than 1 hr after exposed to air.
10*	243	1966	298	0.350-1.80	~0°	~0°			Sintered at 873 K in air; ultraviolet-irradiated in vacuum for 860 sun-hrs; measured 120 hrs after exposed to air; data extracted from smooth curve; [Author's designation: Specimen TP-14507 AB].
11*	243	1966	298	0.350-1.80	~0°	~0°			Sintered at 873 K in air; ultraviolet-irradiated in vacuum for 950 sun-hrs; measured less than 2 hrs after exposed to air; data extracted from smooth curve; [Author's designation: Specimen TP-14507 AA].
12*	243	1966	534	0.380-2.40	~0°		2π		Ultraviolet-irradiated in vacuum (4×10^{-5} N m^{-2}) for 52 hrs; measured in vacuum chamber.
13*	243	1966	294	0.380-2.40	~0°		2π		Above specimen and conditions after another 42 hrs in vacuum (4×10^{-5} N m^{-2}) without irradiation; measured in vacuum chamber.
14*	243	1966	294	0.390-2.41	~0°		2π		The above specimen 5.5 hrs after the pressure in the vacuum chamber was raised to 10.7 N m^{-2}; measured in vacuum chamber.
15*	243	1966	294	0.370-2.40	~0°		2π		The above specimen after another 17 hrs in the vacuum chamber (10.7 N m^{-2}); measured in vacuum chamber.
16	34	1966	298	0.350-2.65	0°		2π		> 99% pure; powder compacted at 11 800 psi; data extracted from smooth curve.
17*	34	1966	298	0.350-2.65	0°		2π		Similar to the above specimen and conditions except with 35 300 psi compaction pressure.
18	34	1966	298	0.351-2.65	0°		2π		Similar to the above specimen and conditions except with 70 500 psi compaction pressure.
19*	244	1964	~298	0.440-0.600	~0°		2π		AZO-33, compacted powder; purity, 99.20% ; particle size 0.20 μm.

*Not shown on plot

SPECIFICATION TABLE NO. 179 (continued)

Curve No.	Ref. No.	Year	Temperature K	Wavelength Range, μm	Geometry θ	θ'	ω'	Reported Error, %	Composition (weight percent), Specifications, and Remarks
20*	244	1964	~298	0.440-0.600	~0°		2π		Above specimen and conditions except irradiated in vacuum (10^{-6} mm Hg) with 300 ESH at solar factor 3.
21*	244	1964	~298	0.440-0.600	~0°		2π		AZO-66, compacted powder; purity 99.80%; particle size, 0.20 μm.
22*	244	1964	~298	0.440-0.600	~0°		2π		Above specimen and conditions except irradiated in vacuum (10^{-6} mm Hg) with 200 ESH at solar factor 3.
23*	244	1964	~298	0.440-0.600	~0°		2π		AZO-55LO, compacted powder; purity 99.20%; particle size, 0.40 μm.
24*	244	1964	~298	0.440-0.600	~0°		2π		Above specimen and conditions except irradiated in vacuum (10^{-6}mm Hg) with 1720 ESH at solar factor 10.2.
25*	244	1964	~298	0.440-0.600	~0°		2π		AZO-55LO, calcined at 973 K for 16 hrs, compacted powder.
26*	244	1964	~298	0.440-0.600	~0°		2π		Above specimen and conditions except irradiated in vacuum (10^{-6} mm Hg) with 1720 ESH at solar factor 10.2.
27*	244	1964	~298	0.440-0.609	~0°		2π		SP500, compacted powder; purity > 99.90%; particle size, 0.30 μm.
28*	244	1964	~298	0.440-0.600	~0°		2π		Above specimen and conditions except irradiated in vacuum (10^{-6} mm Hg) with 75 ESH at solar factor 1.5.
29	244	1964	~298	0.380-2.71	~0°		2π		SP500, compacted powder; calcined at 973 K for 16 hrs; data extracted from smooth curve.
30*	244	1964	~298	0.380-2.70	~0°		2π		Above specimen and conditions except exposed in vacuum (10^{-6} mm Hg) to 1670 ESH.
31*	244	1964	~298	0.440-0.600	~0°		2π		SP500, compacted powder.
32*	244	1964	~298	0.440-0.600	~0°		2π		Above specimen and conditions except irradiated in vacuum (10^{-6}mm Hg) with 1720 ESH at solar factor 10.2.
33*	244	1964	~298	0.440-0.600	~0°		2π		SP500, compacted powder.
34*	244	1964	~298	0.440-0.600	~0°		2π		Above specimen and conditions except irradiated in vacuum (10^{-6} mm Hg) with 3100 ESH at solar factor 10.
35*	244	1964	~298	0.440-0.600	~0°		2π		USP-12, compacted powder; purity, 99.80%; particle size, 0.30 μm.
36*	244	1964	~298	0.440-0.600	~0°		2π		Above specimen and conditions except irradiated in vacuum (10^{-6} mm Hg) with 300 ESH at solar factor 3.
37	245	1966	~298	1.31-6.00	~0°	~0°			Single crystal; indium-doped, 5.04 x 10^{19} electrons cm^{-3}; rough-cut plate (~0.05 cm thick); mechanically polished; unetched; aluminum front-surface mirror reference standard; [Author's designation: Sample No. 104].
38	245	1966	~298	1.00-4.52	~0°	~0°			Above specimen and conditions except etched for 30 sec in concentrated H_3PO_4.
39	245	1966	~298	2.42-10.00	~0°	~0°			Single crystal; indium-doped, 1.02 x 10^{19} electrons cm^{-3}; rough-cut plate (~0.05 cm thick); mechanically polished, then etched for 30 sec in concentrated H_3PO_4; highly doped in indium; [Author's designation: No. 111].

* Not shown on plot

SPECIFICATION TABLE NO. 179 (continued)

Curve No.	Ref. No.	Year	Temperature K	Wavelength Range, μm	Geometry θ	θ'	ω'	Reported Error, %	Composition (weight percent), Specifications, and Remarks
40	245	1966	~298	2.41-6.98	~0°	~0°			Similar to above specimen and conditions except electron concentration 2.33 x 10^{19} cm^{-3}; [Author's designation: No. 110].
41*	245	1966	~298	0.98-4.53	~0°	~0°			Similar to above specimen and conditions except electron concentration 5.04 x 10^{19} cm^{-3}; [Author's designation: No. 104].
42*	245	1966	~298	1.02-8.25	~0°	~0°			Single crystal; lithium-doped, < 10^2 electrons cm^{-3}; rough-cut plate (~0.05 cm thick); mechanically polished, then etched for 30 sec in concentrated H_3PO_4.
43	246	1962	298	0.380-0.698	0°		2π		SP500, powder; compact pressure 10^4 psi; specific surface 3.0-4.3 $m^2 gm^{-1}$; surface mean diameter 0.25-0.35 μm; data extracted from smooth curve; [Author's designation: Sample F].
44*	246	1962	298	0.380-0.700	0°		2π		Above specimen and conditions except exposed to simulated solar radiation at 1.5 suns for 50 hrs.
45*	246	1962	298	0.380-0.698	0°		2π		Above specimen and conditions except subsequently exposed to simulated solar radiation at 4 suns for 67 hrs.
46	247	1967	298	15.8-91.7	0°	0°			Single crystal; grown from the vapor phase and doped with lithium; c-axis parallel to the specimen surface; mechanically polished; measured with radiation polarized perpendicular to the c-axis.
47*	247	1967	298	16.4-91.7	0°	0°			Above specimen and conditions except measured with radiation polarized parallel to the c-axis.
48	120	1962	298	0.4-2.2	0°		2π		Authors' designation: Specimen X63.
49*	92	1964	298	0.325-2.0	~0°		2π		Compacted powder; MgO reference standard; [Authors' designation: Sample 1].
50*	121	1964	~298	0.250-0.600	~0°		2π		SP500 from New Jersey Zinc Co; compacted powder; purity > 99.9%; data extracted from smooth curve; $BaSO_4$ reference standard.
51*	121	1964	~298	0.600-2.50	~0°		2π		Similar to above specimen and conditions.
52*	121	1964	~298	0.250-0.600	~0°		2π		Kodox 515 from New Jersey Zinc Co; compacted powder; purity 98%; data extracted from smooth curve; $BaSO_4$ reference standard.
53*	121	1964	~298	0.600-2.60	~0°		2π		Similar to above specimen and conditions.
54	340	1968	298	0.230-2.65	~0°		2π		Compacted without binder at 18 900 psi; data extracted from smooth curve; freshly smoked MgO standard.
55*	340	1968	298	0.230-2.65	~0°		2π		Similar to the above specimen and conditions except sintered at 773 K in air for 1 hr.
56*	340	1968	298	0.230-2.65	~0°		2π		Similar to the above specimen and conditions except sintered at 1073 K in air for 1 hr; density = 2.80.
57*	340	1968	298	0.230-2.65	~0°		2π		Similar to the above specimen and conditions except sintered at 1273 K in air for 1 hr; density = 2.68.
58*	340	1968	298	0.230-2.65	~0°		2π		Similar to the above specimen and conditions except sintered at 1373 K in air for 1 hr; density = 2.80.

*Not shown on plot

SPECIFICATION TABLE NO. 179 (continued)

Curve No.	Ref. No.	Year	Temperature K	Wavelength Range, μm	Geometry θ	θ'	ω'	Reported Error, %	Composition (weight percent), Specifications, and Remarks
59*	340	1968	298	0.230-2.65	~0°		2π		Similar to the above specimen and conditions except sintered at 1523 K in air for 1 hr; density = 2.80.
60	340	1968	298	0.230-2.65	~0°		2π		Similar to the above specimen and conditions except sintered at 1723 K in air for 1 hr; density = 4.47.
61	340	1968	298	0.230-2.65	~0°		2π		Similar to the above specimen and conditions except sintered at 1823 K in air for 1 hr; density = 4.96.
62	340	1968	298	0.230-2.65	~0°		2π		Similar to curve 54 specimen and conditions except sintered at 673 K in air for 1 hr.
63*	340	1968	298	0.230-2.65	~0°		2π		Above specimen and conditions except successively sintered at 1273 K in air for 1 hr.
64	340	1968	298	0.230-2.65	~0°		2π		Above specimen and conditions except successively sintered at 1523 K in air for 1 hr.
65*	340	1968	298	0.230-2.65	~0°		2π		Above specimen and conditions except successively sintered at 1673 K in air for 1 hr.
66	340	1968	298	0.230-2.65	~0°		2π		Above specimen and conditions except successively sintered at 1773 K in air for 1 hr.
67	342	1968	~298	0.230-2.65	0°		2π		Powder compacted at 35 300 psi; data extracted from smooth curve; MgO reference standard.
68*	342	1968	~298	0.230-2.65	0°		2π		Similar to curve 67 specimen and conditions except heated at 773 K for 2 min.
69*	342	1968	~298	0.230-2.65	0°		2π		Similar to curve 67 specimen and conditions except heated at 773 K for 15 min.
70*	342	1968	~298	0.230-2.65	0°		2π		Similar to curve 67 specimen and conditions except heated at 773 K for 60 min.

*Not shown on plot

DATA TABLE NO. 179 NORMAL SPECTRAL REFLECTANCE OF ZINC OXIDE ZnO

[Wavelength, λ, μm; Reflectance, ρ; Temperature, T, K]

CURVE 1
T = 298

λ	ρ
2.10	0.110
5.90	0.108
10.9	0.072
13.0	0.035
14.1	0.025
14.5	0.018
15 0	0.000
16.1	0.015
16.5	0.032
16.8	0.152
17.1	0.361
17.6	0.604
17.6	0.695
19.0	0.864
19.5	0.880
20.2	0.909
21.0	0.907
22.6	0.900
23.7	0.872
24.3	0.818
25.3	0.602
26 2	0.586
27.1	0.447
38.0	0.289

CURVE 2
T = 298

λ	ρ
2.10	0.096
3.30	0.078
4.80	0.032
6 00	0.017
7.40	0.084
9.00	0.194
9.90	0.229
11 2	0.329
12.1	0.376
13.0	0.418
14.1	0.455
15 1	0.494
16.1	0.526
17.0	0.593
18.4	0.650
19.7	0.705

CURVE 2 (cont.)

λ	ρ
19.9	0.722
20.5	0.744
21.6	0.784
21.9	0.791
23.2	0.836
24.1	0.838
24.5	0.799
24.9	0.715
25.0	0.688
25.1	0.648
25.8	0.565
27.3	0.445

CURVE 3
T = 298

λ	ρ
2.00	0.076
5.00	0.076
6.00	0.065
8.00	0.065
10.1	0.063
12.0	0.049
13.0	0.032
14.0	0.003
15.0	0.000
15.3	0.035
16.1	0.075
16.5	0.177
17.0	0.350
18.1	0.664
20.1	0.823
22.0	0.880
22.6	0.886
23.2	0.912
23.2	0.884
24.9	0.786
26.4	0.616
28.0	0.536
28.0	0.469
31.4	0.391
34.0	0.303
36.7	0.251
36.8	0.227
39.0	0.146
41.3	0.164
46.0	0.204

CURVE 4
T ~ 298

λ	ρ
0.380	0.300
0.395	0.716
0.402	0.800
0.410	0.865
0.421	0.917
0.433	0.943
0.462	0.976
0.484	0.988
0.535	0.993
0.623	0.992
0.661	0.989
0.700	0.984

CURVE 5*
T ~ 298

λ	ρ
0.380	0.300
0.395	0.716
0.402	0.798
0.412	0.864
0.420	0.900
0.428	0.922
0.435	0.939
0.451	0.959
0.463	0.972
0.476	0.979
0.489	0.985
0.519	0.987
0.529	0.990
0.566	0.992
0.671	0.992
0.700	0.991

CURVE 6
T ~ 298

λ	ρ
0.378	0.268
0.414	0.821
0.425	0.867
0.435	0.892
0.458	0.909
0.491	0.924
0.540	0.937
0.604	0.948
0.711	0.955

CURVE 6 (cont.)

λ	ρ
0.766	0.961
0.820	0.961
0.908	0.949
1.05	0.967
1.19	0.968
1.29	0.967
1.37	0.981
1.43	0.978
1.62	0.957
1.68	0.963
1.73	0.958
1.79	0.945
2.00	0.946
2.07	0.937
2.14	0.925
2.26	0.918
2.34	0.907
2.40	0.896
2.49	0.891
2.53	0.881
2.57	0.861
2.61	0.853
2.70	0.850

CURVE 7*
T ~ 298

λ	ρ
0.378	0.268
0.414	0.821
0.427	0.867
0.446	0.896
0.491	0.924
0.553	0.944
0.614	0.954
0.710	0.958
0.805	0.953
0.906	0.961
1.03	0.960
1.11	0.954
1.21	0.977
1.30	0.958
1.37	0.989
1.40	0.993
1.43	0.986
1.49	0.951
1.53	0.941

CURVE 7 (cont.)

λ	ρ
1.59	0.937
1.71	0.941
1.83	0.923
1.95	0.911
2.00	0.901
2.12	0.872
2.21	0.867
2.28	0.848
2.42	0.795
2.50	0.789
2.54	0.770
2.61	0.745
2.70	0.740

CURVE 8
T = 298

λ	ρ
0.350	0.04
0.380	0.06
0.410	0.86
0.420	0.91
0.450	0.94
0.490	0.9[illegible]
1.80	0.98

CURVE 9*
T = 298

λ	ρ
0.350	0.04
0.380	0.06
0.410	0.70
0.420	0.76
0.450	0.83
0.500	0.88
0.560	0.90
0.610	0.92
0.970	0.93
1.21	0.93
1.40	0.91
1.80	0.83

CURVE 10*
T = 298

λ	ρ
0.350	0.04
0.380	0.06

CURVE 10 (cont.)*

λ	ρ
0.410	0.83
0.440	0.88
0.510	0.92
0.610	0.93
1.23	0.96
1.57	0.95
1.80	0.93

CURVE 11*
T = 298

λ	ρ
0.350	0.04
0.380	0.06
0.410	0.78
0.440	0.85
0.480	0.89
0.540	0.92
0.860	0.94
1.24	0.94
1.45	0.92
1.57	0.91
1.80	0.87

CURVE 12*
T = 534

λ	ρ
0.380	0.04
0.390	0.06
0.420	0.09
0.420	0.44
0.460	0.60
0.470	0.62
0.480	0.63
0.500	0.62
0.520	0.66
0.590	0.66
0.620	0.71
0.650	0.70
0.910	0.74
1.10	0.78
1.31	0.80
1.50	0.79
1.61	0.77
1.70	0.75
1.80	0.74
1.90	0.73

CURVE 12 (cont.)*

λ	ρ
2.00	0.71
2.10	0.70
2.30	0.66
2.40	0.62

CURVE 13*
T = 294

λ	ρ
0.380	0.03
0.380	0.04
0.390	0.26
0.400	0.54
0.410	0.58
0.420	0.60
0.430	0.62
0.450	0.65
0.460	0.65
0.490	0.70
0.520	0.72
0.550	0.73
0.570	0.71
0.600	0.72
0.620	0.79
0.650	0.79
0.640	0.73
0.910	0.80
1.10	0.82
1.31	0.86
1.51	0.85
1.51	0.81
1.61	0.81
1.81	0.78
1.91	0.76
2.00	0.73
2.10	0.72
2.31	0.68
2.40	0.67

CURVE 14*
T = 294

λ	ρ
0.390	0.33
0.410	0.62
0.420	0.62
0.430	0.64
0.440	0.66

CURVE 14 (cont.)*

λ	ρ
0.450	0.69
0.460	0.69
0.470	0.68
0.480	0.70
0.490	0.69
0.490	0.66
0.500	0.68
0.520	0.69
0.540	0.69
0.570	0.75
0.590	0.77
0.640	0.84
0.640	0.72
0.910	0.77
1.10	0.80
1.31	0.84
1.51	0.83
1.61	0.79
1.71	0.78
1.81	0.77
1.91	0.77
2.00	0.75
2.10	0.75
2.30	0.70
2.41	0.65

CURVE 15*
T = 294

λ	ρ
0.370	0.06
0.380	0.13
0.390	0.38
0.400	0.57
0.410	0.65
0.410	0.67
0.430	0.66
0.440	0.71
0.440	0.71
0.450	0.71
0.470	0.72
0.480	0.76
0.490	0.75
0.520	0.75
0.540	0.78
0.560	0.79
0.590	0.80

*Not shown on plot

DATA TABLE NO. 179 (continued)

CURVE 15 (cont.)*
T = 294

λ	ρ
0.640	0.81
0.910	0.85
1.10	0.90
1.30	0.90
1.50	0.89
1.60	0.85
1.70	0.85
1.80	0.84
1.90	0.82
2.00	0.81
2.10	0.79
2.31	0.76
2.40	0.72

CURVE 16
T = 298

λ	ρ
0.350	0.200
0.378	0.500
0.398	0.700
0.476	0.852
0.567	0.900
0.649	0.908
0.831	0.896
1.06	0.871
1.18	0.862
1.64	0.771
1.92	0.700
2.27	0.601
2.65	0.513

CURVE 17*
T = 298

λ	ρ
0.350	0.200
0.381	0.401
0.400	0.600
0.423	0.699
0.470	0.800
0.618	0.880
0.957	0.836
1.15	0.796
1.65	0.682
1.97	0.584
2.30	0.500
2.65	0.423

CURVE 18
T = 298

λ	ρ
0.351	0.200
0.397	0.400
0.436	0.599
0.480	0.700
0.582	0.800
0.688	0.813
1.03	0.757
1.30	0.698
1.64	0.613
2.07	0.501
2.31	0.445
2.64	0.379

CURVE 19*
T ~ 298

λ	ρ
0.440	0.880
0.600	0.950

CURVE 20*
T ~ 298

λ	ρ
0.440	0.865
0.600	0.935

CURVE 21*
T ~ 298

λ	ρ
0.440	0.930
0.600	0.990

CURVE 22*
T ~ 298

λ	ρ
0.440	0.910
0.600	0.980

CURVE 23*
T ~ 298

λ	ρ
0.440	0.865
0.600	0.935

CURVE 24*
T ~ 298

λ	ρ
0.440	0.835
0.600	0.920

CURVE 25*
T ~ 298

λ	ρ
0.440	0.900
0.600	0.955

CURVE 26*
T ~ 298

λ	ρ
0.440	0.885
0.600	0.950

CURVE 27*
T ~ 298

λ	ρ
0.440	0.950
0.600	0.990

CURVE 28*
T ~ 298

λ	ρ
0.440	0.950
0.600	0.990

CURVE 29
T ~ 298

λ	ρ
0.380	0.268
0.430	0.835
0.480	0.912
0.550	0.941
0.670	0.955
0.890	0.955
0.960	0.951
1.16	0.974
1.46	0.974
1.52	0.964
1.71	0.664
1.80	0.943
2.04	0.943
2.18	0.918
2.25	0.918
2.50	0.885

CURVE 29 (cont.)

λ	ρ
2.64	0.851
2.71	0.848

CURVE 30*
T ~ 298

λ	ρ
0.380	0.268
0.430	0.835
0.480	0.912
0.550	0.941
0.670	0.955
1.01	0.959
1.12	0.950
1.21	0.974
1.31	0.956
1.41	0.993
1.54	0.937
1.75	0.937
1.99	0.905
2.13	0.869
2.23	0.864
2.45	0.787
2.51	0.787
2.60	0.741
2.70	0.736

CURVE 31*
T ~ 298

λ	ρ
0.440	0.935
0.600	0.980

CURVE 32*
T ~ 298

λ	ρ
0.440	0.905
0.600	0.960

CURVE 33*
T ~ 298

λ	ρ
0.440	0.950
0.600	0.990

CURVE 34*
T ~ 298

λ	ρ
0.440	0.910
0.600	0.980

CURVE 35*
T ~ 298

λ	ρ
0.440	0.935
0.600	0.980

CURVE 36*
T ~ 298

λ	ρ
0.440	0.920
0.600	0.975

CURVE 37
T ~ 298

λ	ρ
1.31	0.101
1.50	0.104
2.39	0.110
2.50	0.109
2.60	0.109
2.70	0.110
2.79	0.105
2.90	0.101
3.00	0.096
3.09	0.093
3.20	0.087
3.32	0.078
3.39	0.070
3.50	0.063
3.60	0.055
3.80	0.039
3.90	0.032
4.00	0.024
4.09	0.018
4.18	0.015
4.28	0.009
4.38	0.005
4.48	0.005
4.59	0.010
4.69	0.014
4.80	0.018
4.89	0.028
5.00	0.038
5.09	0.051
5.19	0.065

CURVE 37 (cont.)

λ	ρ
5.29	0.076
5.39	0.091
5.50	0.106
5.60	0.120
5.69	0.133
5.79	0.148
5.90	0.163
5.94	0.171
6.00	0.179

CURVE 38
T ~ 298

λ	ρ
1.00	0.100
1.09	0.099
1.19	0.096
1.30	0.093
1.41	0.089
1.49	0.088
1.60	0.085
1.68	0.085
1.78	0.080
1.89	0.076
2.00	0.075
2.09	0.073
2.19	0.068
2.29	0.065
2.39	0.060
2.49	0.060
2.59	0.052
2.67	0.048
2.79	0.043
2.90	0.038
3.00	0.034
3.09	0.031
3.19	0.029
3.30	0.026
3.39	0.027
3.49	0.031
3.60	0.034
3.70	0.043
3.79	0.054
3.90	0.061
4.00	0.075
4.09	0.091
4.21	0.107
4.31	0.132

CURVE 38 (cont.)

λ	ρ
4.40	0.157
4.52	0.190

CURVE 39
T ~ 298

λ	ρ
2.42	0.092
2.52	0.093
2.60	0.095
2.70	0.092
2.80	0.089
2.94	0.089
3.11	0.088
3.32	0.087
3.46	0.085
3.56	0.083
3.68	0.079
3.83	0.079
3.92	0.077
4.11	0.072
4.22	0.073
4.33	0.071
4.48	0.065
4.62	0.065
4.67	0.065
4.77	0.066
4.90	0.063
5.07	0.058
5.24	0.055
5.41	0.054
5.55	0.052
5.72	0.051
5.92	0.055
6.11	0.053
6.27	0.054
6.39	0.052
6.49	0.054
6.62	0.051
6.80	0.054
6.88	0.057
6.97	0.063
7.17	0.064
7.36	0.072
7.57	0.081
7.97	0.096
8.18	0.108
8.41	0.118

CURVE 39 (cont.)

λ	ρ
8.58	0.127
8.78	0.138
9.01	0.153
9.18	0.162
9.41	0.178
9.62	0.192
9.81	0.204
10.0	0.219

CURVE 40
T ~ 298

λ	ρ
2.41	0.083
2.47	0.083
2.56	0.081
2.70	0.077
2.77	0.078
2.86	0.075
2.99	0.078
3.06	0.072
3.19	0.069
3.30	0.064
3.38	0.064
3.48	0.059
3.60	0.059
3.67	0.057
3.75	0.052
3.85	0.048
4.00	0.050
4.06	0.040
4.20	0.033
4.26	0.038
4.36	0.032
4.47	0.033
4.57	0.033
4.68	0.029
4.75	0.035
4.88	0.035
4.95	0.030
4.98	0.033
5.07	0.033
5.15	0.036
5.28	0.035
5.28	0.039
5.42	0.043
5.59	0.054*
5.70	0.061

*Not shown on plot

DAT TABLE NO. 179 (continued)

CURVE 40 (cont.) T ~ 298

λ	ρ
5.78	0.069
5.91	0.078
6.01	0.086
6.12	0.096
6.18	0.103
6.28	0.118
6.42	0.130
6.50	0.138
6.58	0.153
6.66	0.157
6.79	0.171
6.90	0.181
6.98	0.193

CURVE 41* T ~ 298

λ	ρ
0.98	0.100
1.07	0.097
1.15	0.095
1.25	0.093
1.37	0.088
1.46	0.086
1.57	0.085
1.69	0.084
1.75	0.080
1.83	0.075
1.98	0.074
2.04	0.072
2.17	0.070
2.28	0.065
2.35	0.060
2.47	0.056
2.57	0.051
2.68	0.050
2.79	0.044
2.86	0.039
2.95	0.036
3.06	0.029
3.22	0.025
3.28	0.025
3.39	0.025
3.50	0.030
3.58	0.034
3.69	0.043
3.89	0.060

CURVE 41 (cont.)*

λ	ρ
3.98	0.076
4.09	0.092
4.20	0.108
4.31	0.133
4.39	0.155
4.53	0.191

CURVE 42* T ~ 298

λ	ρ
1.02	0.108
1.22	0.105
1.40	0.104
1.62	0.103
1.79	0.102
1.99	0.102
2.21	0.102
2.39	0.100
2.59	0.100
2.80	0.100
3.00	0.100
3.16	0.100
3.38	0.100
3.59	0.100
3.78	0.100
3.99	0.099
4.20	0.098
4.40	0.098
4.59	0.098
4.79	0.097
4.97	0.097
5.20	0.096
5.38	0.095
5.59	0.094
5.81	0.094
5.98	0.093
6.21	0.093
6.39	0.092
6.58	0.091
6.79	0.090
6.99	0.090
7.20	0.089
7.39	0.088
7.60	0.086
7.81	0.086
8.01	0.086
8.25	0.081

CURVE 43 T ~ 298

λ	ρ
0.380	0.302
0.882	0.319
0.385	0.402
0.388	0.534
0.392	0.648
0.397	0.747
0.407	0.848
0.414	0.886
0.426	0.924
0.434	0.942
0.461	0.977
0.477	0.986
0.495	0.991
0.556	0.995
0.693	0.995
0.698	0.996

CURVE 44* T = 298

λ	ρ
0.380	0.302
0.382	0.322
0.385	0.414
0.395	0.657
0.398	0.734
0.403	0.788
0.412	0.861
0.419	0.890
0.427	0.921
0.433	0.934
0.440	0.944
0.460	0.972
0.470	0.979
0.477	0.978
0.484	0.984
0.509	0.989
0.555	0.995
0.578	0.993
0.670	0.993
0.684	0.991
0.692	0.989
0.700	0.989

CURVE 45* T = 298

λ	ρ
0.380	0.302
0.383	0.319
0.391	0.472
0.393	0.529
0.406	0.762
0.414	0.825
0.425	0.878
0.430	0.894
0.437	0.909
0.460	0.939
0.473	0.946
0.504	0.957
0.523	0.964
0.560	0.969
0.572	0.975
0.698	0.979

CURVE 46 T = 298

λ	ρ
15.8	0.000
16.4	0.045
16.7	0.179
17.0	0.414
17.3	0.683
17.7	0.770
18.0	0.825
18.6	0.396
19.4	0.919
20.3	0.945
21.1	0.953
22.3	0.959
23.3	0.906
23.9	0.865
24.5	0.765
25.1	0.665
25.9	0.558
27.4	0.445
28.9	0.396
29.9	0.367
30.8	0.349
32.0	0.340
33.5	0.328
34.6	0.318

CURVE 46 (cont.)

λ	ρ
35.5	0.309
37.1	0.302
38.3	0.291
39.5	0.285
41.1	0.280
43.2	0.274
45.4	0.270
47.3	0.259
50.0	0.263
52.3	0.258
56.1	0.253
58.8	0.248
62.5	0.244
67.1	0.241
70.9	0.240
76.3	0.236
81.3	0.234
91.7	0.232

CURVE 47* T = 298

λ	ρ
16.4	0.006
16.7	0.036
17.0	0.104
17.3	0.349
17.7	0.605
17.9	0.719
18.7	0.822
19.4	0.885
20.4	0.912
21.1	0.934
22.3	0.934
23.3	0.914
23.8	0.906
24.6	0.893
25.2	0.883
25.9	0.875
26.6	0.762
27.4	0.628
28.9	0.495
29.9	0.456
30.8	0.432
32.0	0.415
33.3	0.400
34.3	0.379
35.4	0.364

CURVE 47 (cont.)*

λ	ρ
36.9	0.350
38.6	0.336
41.4	0.316
43.1	0.313
45.8	0.295
48.0	0.290
50.2	0.286
53.1	0.280
55.8	0.277
58.8	0.275
62.5	0.275
66.6	0.272
71.4	0.262
77.5	0.259
83.3	0.257
91.7	0.255

CURVE 48 T = 298

λ	ρ
0.4	0.761
0.42	0.825
0.45	0.883
0.5	0.896
0.55	0.909
0.55	0.914
0.6	0.911
0.65	0.916
0.7	0.912
0.75	0.913
0.8	0.910
0.85	0.913
0.9	0.906
0.95	0.900
1.0	0.911
1.1	0.899
1.2	0.892
1.3	0.872
1.4	0.824
1.6	0.825
1.8	0.798
2.0	0.653
2.1	0.605
2.2	0.58

CURVE 49* T = 298

λ	ρ
0.325	0.04
0.375	0.05
0.450	0.98
0.600	0.98
0.700	0.99
1.0	0.98
1.2	0.99
1.4	>1.00
1.6	0.99
1.8	0.99
2.0	0.99

CURVE 50* T ~ 298

λ	ρ
0.250	0.019
0.350	0.016
0.362	0.019
0.369	0.022
0.373	0.029
0.376	0.048
0.378	0.075
0.380	0.115
0.383	0.177
0.385	0.271
0.391	0.557
0.395	0.705
0.398	0.781
0.399	0.815
0.402	0.842
0.406	0.868
0.412	0.913
0.416	0.937
0.424	0.963
0.429	0.977
0.437	0.990
0.444	0.999
0.456	1.008
0.470	1.012
0.490	1.015
0.528	1.016
0.584	1.014
0.600	1.012

CURVE 51* T ~ 298

λ	ρ
0.600	1.039
0.936	1.043
1.00	1.046
1.05	1.040
1.09	1.049
1.14	1.041
1.17	1.047
1.24	1.051
1.36	1.056
1.39	1.073
1.45	1.108
1.49	1.103
1.58	1.088
1.66	1.092
1.76	1.105
1.80	1.114
1.85	1.125
1.87	1.140
1.89	1.169
1.93	1.255
1.94	1.258
2.06	1.193
2.12	1.189
2.25	1.158
2.32	1.176
2.38	1.201
2.42	1.230
2.50	1.308
2.54	1.332
2.60	1.332

CURVE 52* T ~ 298

λ	ρ
0.250	0.076
0.345	0.073
0.362	0.078
0.367	0.085
0.372	0.099
0.374	0.113
0.376	0.149
0.378	0.200
0.383	0.384
0.387	0.579
0.393	0.762
0.396	0.829

*Not shown on plot

DATA TABLE NO. 179 (continued)

CURVE 52 (cont.)*
T ~ 298

λ	ρ
0.398	0.853
0.399	0.858
0.402	0.880
0.407	0.907
0.411	0.925
0.418	0.936
0.425	0.951
0.435	0.961
0.446	0.970
0.600	0.970

CURVE 53*
T ~ 298

λ	ρ
0.600	0.978
0.829	0.985
1.39	0.989
1.47	1.019
1.51	1.015
1.55	1.003
1.78	1.011
1.82	1.020
1.87	1.023
1.90	1.044
1.95	1.094
1.98	1.097
2.09	1.067
2.25	1.051
2.35	1.054
2.42	1.075
2.50	1.118
2.56	1.133
2.60	1.130

CURVE 54
T = 298

λ	ρ
0.230	0.052
0.289	0.054
0.295	0.051
0.311	0.051
0.337	0.047
0.347	0.051
0.350	0.063
0.368	0.084
0.374	0.165

CURVE 54 (cont.)

λ	ρ
0.395	0.700*
0.390	0.769
0.400	0.834
0.447	0.900
0.492	0.933
0.557	0.951
0.677	0.959
0.892	0.957*
1.094	0.955
1.20	0.945
1.37	0.924
1.57	0.889
1.83	0.816
2.20	0.700
2.65	0.550

CURVE 55*
T = 298

λ	ρ
0.230	0.052
0.289	0.054
0.295	0.051
0.311	0.051
0.337	0.047
0.347	0.051
0.350	0.063
0.368	0.084
0.374	0.165
0.395	0.700
0.390	0.769
0.400	0.834
0.447	0.900
0.492	0.933
0.557	0.951
0.677	0.959
0.892	0.957
1.09	0.955
1.20	0.945
1.37	0.924
1.57	0.889
1.83	0.816
2.20	0.700
2.65	0.550

CURVE 56*
T = 298

λ	ρ
0.230	0.052
0.289	0.054
0.295	0.051
0.311	0.051
0.337	0.047
0.347	0.051
0.350	0.063
0.368	0.084
0.374	0.165
0.395	0.700
0.390	0.769
0.400	0.834
0.447	0.900
0.492	0.933
0.557	0.951
0.677	0.959
0.895	0.964
1.08	0.972
1.16	0.981
1.53	0.995
1.65	1.000
1.74	1.014
1.81	1.019
1.91	1.010
2.08	1.020
2.22	1.029
2.37	1.017
2.52	1.009
2.58	1.007
2.65	1.008

CURVE 57*
T = 298

λ	ρ
0.230	0.052
0.289	0.054
0.295	0.051
0.311	0.051
0.337	0.047
0.347	0.051
0.350	0.063
0.368	0.084
0.374	0.165
0.395	0.700
0.390	0.769
0.400	0.834

CURVE 57 (cont.)

λ	ρ
0.427	0.907
0.453	0.949
0.495	0.969
0.554	0.937
0.650	1.000
0.782	1.006
0.966	1.025
1.21	1.047
1.29	1.060
1.36	1.062
1.51	1.062
1.58	1.068
1.78	1.097
2.04	1.109
2.29	1.112
2.48	1.107
2.61	1.111
2.65	1.111

CURVE 58*
T = 298

λ	ρ
0.230	0.068
0.290	0.066
0.324	0.062
0.333	0.058
0.350	0.067
0.369	0.088
0.383	0.452
0.399	0.700
0.395	0.781
0.404	0.839
0.459	0.907
0.498	0.935
0.566	0.951
0.650	0.959
0.734	0.976
0.818	1.010
1.00	1.033
1.15	1.041
1.54	1.046
1.63	1.054
1.70	1.076
1.81	1.101
1.92	1.100
2.15	1.117
2.25	1.126

CURVE 58 (cont.)*

λ	ρ
2.36	1.129
2.50	1.138
2.65	1.141

CURVE 59*
T = 298

λ	ρ
0.230	0.072
0.291	0.070
0.344	0.067
0.350	0.069
0.369	0.088
0.383	0.452
0.399	0.700
0.395	0.781
0.404	0.839
0.458	0.937
0.526	0.967
0.624	0.981
0.891	1.007
1.04	1.020
1.22	1.029
1.57	1.043
1.73	1.065
1.95	1.080
2.21	1.104
2.38	1.120
2.51	1.136
2.65	1.166

CURVE 60
T = 298

λ	ρ
0.230	0.119
0.259	0.117
0.272	0.119
0.291	0.121
0.324	0.117
0.339	0.121
0.346	0.127
0.350	0.135
0.372	0.157
0.398	0.238
0.404	0.321
0.434	0.443
0.470	0.600
0.510	0.666

CURVE 60 (cont.)

λ	ρ
0.560	0.689
0.650	0.708
0.829	0.741
1.04	0.788
1.15	0.794
1.30	0.786
1.51	0.759
1.78	0.715
1.95	0.695
2.11	0.666
2.32	0.635
2.48	0.616
2.55	0.610
2.65	0.600

CURVE 61
T = 298

λ	ρ
0.230	0.092
0.241	0.089
0.288	0.089
0.300	0.092
0.334	0.091
0.344	0.095
0.350	0.106
0.411	0.133
0.450	0.182
0.476	0.265
0.515	0.307
0.566	0.320
0.720	0.300
1.02	0.225
1.25	0.166
1.50	0.131
1.70	0.110
1.93	0.096
2.27	0.081
2.41	0.076
2.65	0.073

CURVE 62
T = 298

λ	ρ
0.230	0.061
0.245	0.057
0.345	0.057
0.350	0.061

CURVE 62 (cont.)

λ	ρ
0.372	0.107
0.403	0.769
0.442	0.872
0.489	0.912
0.757	0.934
1.02	0.929
1.15	0.913
1.58	0.838
1.89	0.722
2.02	0.690
2.37	0.554
2.65	0.457

CURVE 63*
T = 298

λ	ρ
0.230	0.075
0.272	0.070
0.347	0.070
0.353	0.079
0.372	0.135
0.424	0.911
0.433	0.935
0.447	0.952
0.483	0.960
0.740	0.993
1.00	1.016
1.56	1.046
1.67	1.076
2.01	1.110
2.16	1.129
2.43	1.143
2.65	1.160

CURVE 64
T = 298

λ	ρ
0.230	0.075
0.272	0.070
0.347	0.070
0.353	0.079
0.372	0.135
0.424	0.911
0.433	0.935
0.447	0.952
0.483	0.960
0.740	0.993
1.00	1.016*
1.12	1.024*

CURVE 64 (cont.)

λ	ρ
1.30	1.015*
1.45	1.015*
1.58	1.009*
1.66	1.023*
1.77	1.046*
1.87	1.060*
1.97	1.063*
2.26	1.090*
2.50	1.109*
2.65	1.111*

CURVE 65*
T = 298

λ	ρ
0.230	0.079
0.264	0.074
0.347	0.070
0.353	0.079
0.372	0.135
0.400	0.345
0.419	0.602
0.492	0.806
0.547	0.878
0.592	0.883
0.757	0.905
0.947	0.947
1.06	0.962
1.14	0.967
1.25	0.955
1.41	0.953
1.53	0.953
1.65	0.966
1.85	1.003
2.15	1.010
2.65	1.063

CURVE 66
T = 298

λ	ρ
0.230	0.081
0.305	0.081
0.350	0.078
0.372	0.100
0.446	0.536
0.523	0.726
0.543	0.752
0.648	0.765

*Not shown on plot

DATA TABLE NO. 179 (continued)

CURVE 66 (cont.)
T = 298

λ	ρ
0.729	0.788
0.843	0.824
1.08	0.903
1.15	0.913*
1.26	0.913
1.37	0.904
1.57	0.904
1.71	0.915
1.80	0.915
2.04	0.907
2.28	0.904
2.65	0.910

CURVE 67
T ~ 298

λ	ρ
0.230	0.041
0.237	0.035
0.265	0.032
0.298	0.030
0.308	0.032
0.330	0.030
0.346	0.032
0.348	0.036
0.350	0.049
0.396	0.544
0.418	0.643
0.440	0.720
0.480	0.767
0.538	0.805
0.638	0.837
0.778	0.870
0.820	0.868
0.983	0.875
1.04	0.874
1.18	0.863*
1.28	0.849
1.38	0.819
1.50	0.804
1.63	0.778
1.78	0.738
1.89	0.694
1.92	0.685
2.05	0.666
2.19	0.634
2.37	0.581

CURVE 67 (cont.)

λ	ρ
2.45	0.549
2.48	0.540
2.55	0.533
2.60	0.507
2.65	0.468

CURVE 68*
T ~ 298

λ	ρ
0.230	0.041
0.237	0.035
0.265	0.032
0.298	0.030
0.308	0.032
0.330	0.030
0.346	0.032
0.348	0.036
0.350	0.049
0.396	0.544
0.418	0.643
0.433	0.721
0.441	0.757
0.493	0.804
0.549	0.832
0.689	0.890
0.750	0.903
0.988	0.903
1.10	0.895
1.20	0.892
1.26	0.884
1.32	0.866
1.38	0.843
1.54	0.830
1.69	0.796
1.74	0.783
1.80	0.770
1.85	0.746
1.92	0.727
1.99	0.716
2.15	0.686
2.32	0.634
2.41	0.603
2.44	0.593
2.54	0.572
2.57	0.561
2.60	0.531
2.65	0.500

CURVE 69*
T ~ 298

λ	ρ
0.230	0.041
0.237	0.035
0.265	0.032
0.298	0.030
0.308	0.032
0.330	0.030
0.346	0.032
0.348	0.036
0.350	0.049
0.396	0.544
0.412	0.763
0.440	0.837
0.452	0.854
0.479	0.862
0.573	0.884
0.653	0.911
0.724	0.926
0.850	0.932
1.08	0.916
1.26	0.898
1.37	0.874
1.48	0.860
1.56	0.852
1.75	0.814
1.83	0.787
1.89	0.768
1.99	0.747
2.11	0.730
2.24	0.697
2.47	0.618
2.55	0.591
2.59	0.567
2.62	0.531
2.65	0.526

CURVE 70*
T ~ 298

λ	ρ
0.230	0.053
0.238	0.046
0.245	0.044
0.266	0.041
0.281	0.039
0.291	0.041
0.314	0.038
0.340	0.036

CURVE 70 (cont.)*

λ	ρ
0.346	0.035
0.348	0.039
0.350	0.049
0.396	0.544
0.412	0.763
0.440	0.864
0.465	0.876
0.554	0.891
0.624	0.909
0.709	0.929
0.850	0.932
1.08	0.922
1.29	0.900
1.35	0.889
1.40	0.875
1.60	0.860
1.79	0.821
1.86	0.800
1.91	0.779
1.97	0.768
2.03	0.765
2.08	0.760
2.31	0.700
2.41	0.660
2.50	0.639
2.57	0.606
2.65	0.552

* Not shown on plot

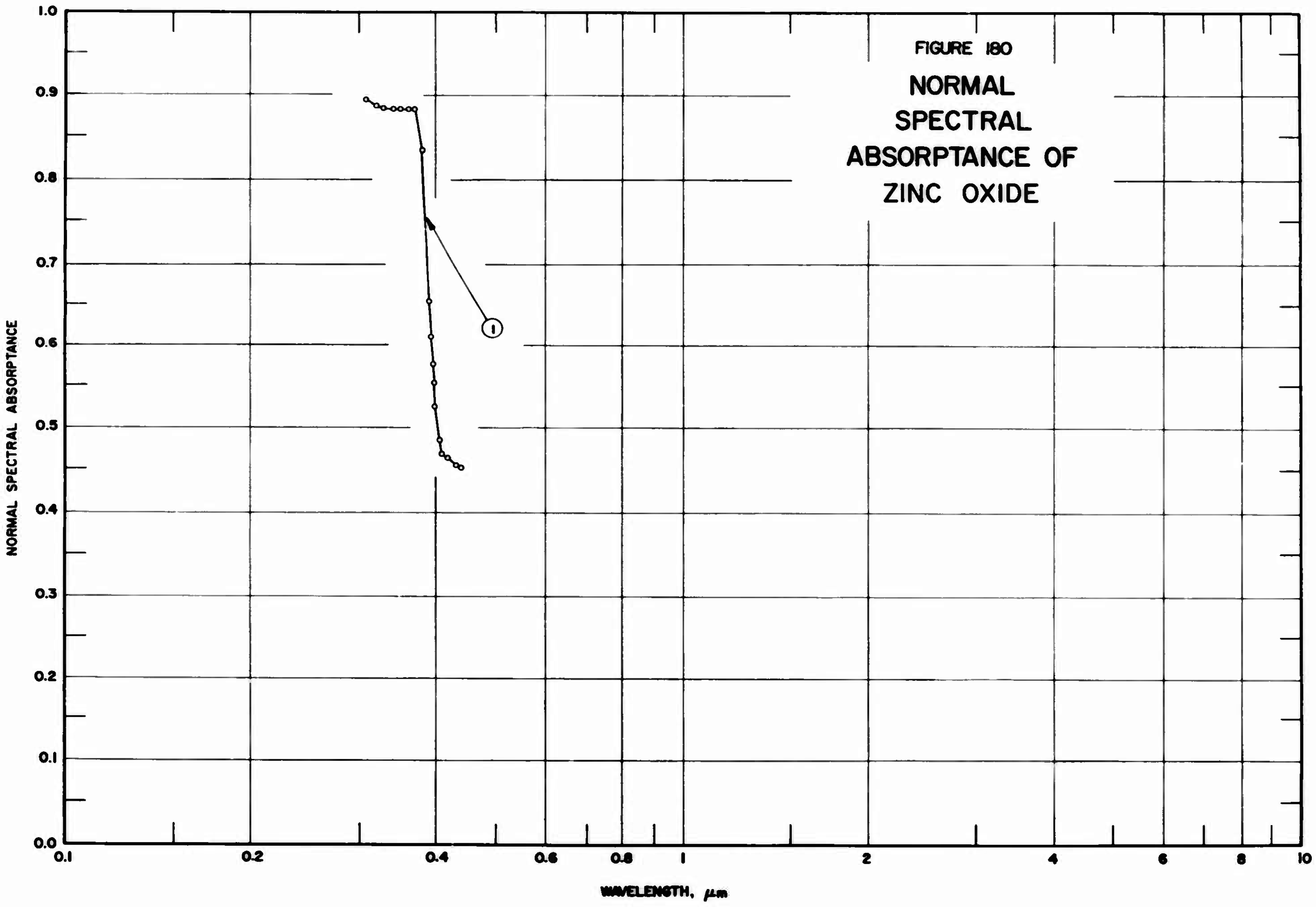


FIGURE 180
NORMAL SPECTRAL ABSORPTANCE OF ZINC OXIDE
NORMAL SPECTRAL ABSORPTANCE
WAVELENGTH, μm
1.0
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0.0
0.1
0.2
0.4
0.6
0.8
1
2
4
6
8
10
1

SPECIFICATION TABLE NO. 180 NORMAL SPECTRAL ABSORPTANCE OF ZINC OXIDE ZnO

Curve No.	Ref. No.	Year	Temperature K	Wavelength Range, μm	Geometry θ	Reported Error, %	Composition (weight percent), Specifications, and Remarks
1	248	1967	298	0.3096–0.4399	0°		Single crystal; grown by heating zinc sulphide (99.99 pure) in a controlled oxygen atmosphere (~10^{-3} atm) at about 1446 K for 48–50 hrs then followed by a slow cooling.

DATA TABLE NO. 180 NORMAL SPECTRAL ABSORPTANCE OF ZINC OXIDE ZnO

[Wavelength, λ, μm; Absorptance, α; Temperature, T, K]

λ	α
CURVE 1	
T = 298	
0.309	0.892
0.320	0.887
0.329	0.884
0.340	0.881
0.350	0.881
0.360	0.881
0.369	0.881
0.379	0.834
0.389	0.654
0.391	0.610
0.393	0.577
0.395	0.554
0.397	0.523
0.404	0.486
0.409	0.470
0.419	0.464
0.429	0.456
0.439	0.453

SPECIFICATION TABLE NO. 181 NORMAL SOLAR ABSORPTANCE OF ZINC OXIDE

Curve No.	Ref. No.	Year	Temperature Range, K	Geometry θ	Reported Error, %	Composition (weight percent), Specifications and Remarks
1*	121	1964	~298	~0°		SP500, New Jersey Zinc Co; compacted powder; purity 99.9%; calculated from spectral reflectance data.
2*	121	1964	~298	~0°		Similar to the above specimen and conditions except exposed to 100 ESH.
3*	121	1964	~298	~0°		Kodox 515, New Jersey Zinc Co; compacted powder; purity 98%; calculated from spectral reflectance data.
4*	121	1964	~298	~0°		Similar to the above specimen and conditions except exposed to 100 ESH.
5*	367	1964	~298	~0°		SP500; heated to 973 K for 16 hrs; pressure level less than 10^{-6} mm Hg; calculated from N-Sol-R; [Authors' designation: Sample No. 7030].
6*	367	1964	~298	~0°		Above specimen and conditions except exposed to 230 ESH of uv irradiation; solar factor 8.5.

DATA TABLE NO. 181 NORMAL SOLAR ABSORPTANCE OF ZINC OXIDE

[Temperature, T, K; Absorptance, α]

T	α	T	α
CURVE 1*		CURVE 6*	
298	0.053	298	0.138
CURVE 2*			
298	0.133		
CURVE 3*			
298	0.132		
CURVE 4*			
298	0.109		
CURVE 5*			
298	0.151		

* No plot given

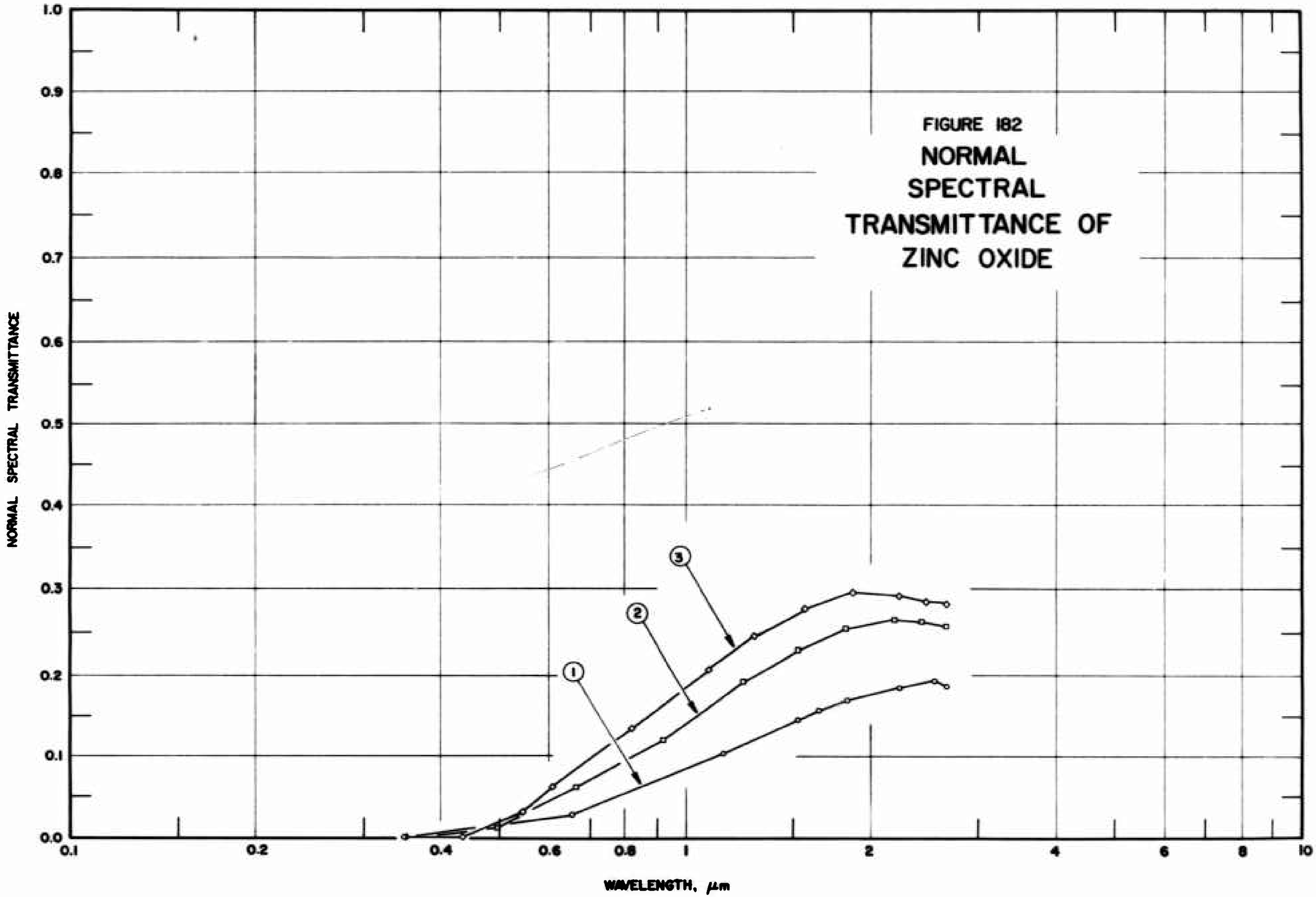


FIGURE 182
NORMAL
SPECTRAL
TRANSMITTANCE OF
ZINC OXIDE
NORMAL SPECTRAL TRANSMITTANCE
WAVELENGTH, μm
1.0
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0.0
0.1
0.2
0.4
0.6
0.8
1
2
4
6
8
10
1
2
3

SPECIFICATION TABLE NO. 182 NORMAL SPECTRAL TRANSMITTANCE OF ZINC OXIDE ZnO

Curve No.	Ref. No.	Year	Temperature K	Wavelength Range, μm	Geometry θ	θ'	ω'	Reported Error, %	Composition (weight percent), Specifications, and Remarks
1	34	1966	298	0.350-2.65	0°		2π		>99% pure powder compacted at 11 800 psi (76 μm thick); specimen placed between single crystals of Al_2O_3 and MgO for support; data extracted from smooth curve.
2	34	1966	298	0.350-2.65	0°		2π		Similar to the above specimen and conditions except compacted at 35 300 psi.
3	34	1966	298	0.351-2.65	0°		2π		Similar to the above specimen and conditions except compacted at 70 500 psi.

DATA TABLE NO. 182 NORMAL SPECTRAL TRANSMITTANCE OF ZINC OXIDE ZnO

[Wavelength, λ, μm; Transmittance, τ; Temperature, T, K]

λ	τ	λ	τ
CURVE 1 T = 298		**CURVE 3** T = 298	
0.350	0.000	0.351	0.000
0.651	0.028	0.436	0.000
1.15	0.102	0.544	0.031
1.52	0.146	0.609	0.063
1.64	0.157	0.818	0.135
1.82	0.170	1.08	0.207
2.21	0.184	1.29	0.246
2.54	0.191	1.56	0.279
2.65	0.186	1.87	0.296
		2.21	0.294
CURVE 2 T = 298		2.47	0.288
		2.65	0.283
0.350	0.000*		
0.496	0.014		
0.664	0.062		
0.913	0.120		
1.24	0.191		
1.52	0.230		
1.81	0.254		
2.19	0.265		
2.41	0.262		
2.65	0.258		

*Not shown on plot

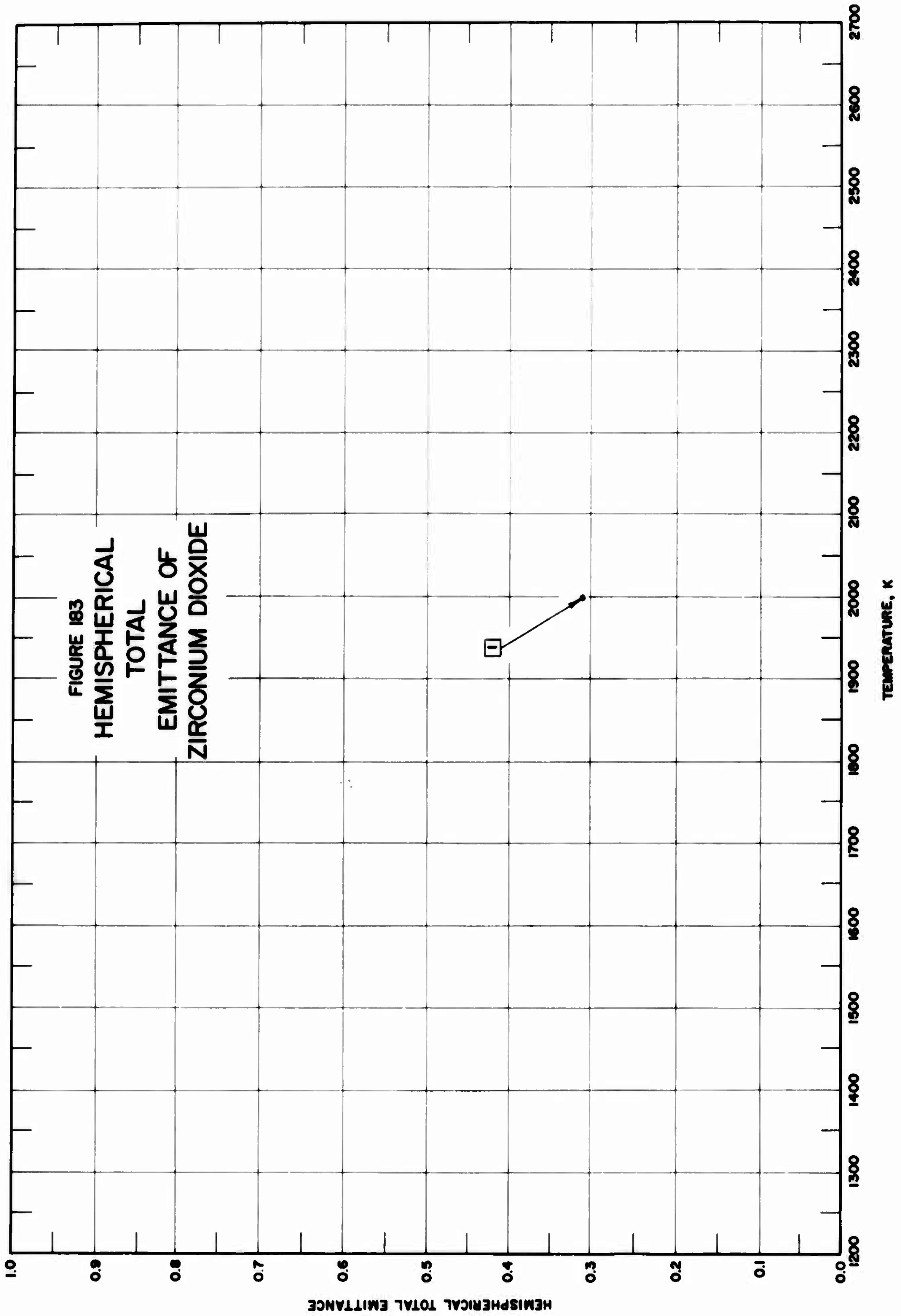


FIGURE 183
HEMISPHERICAL
TOTAL
EMITTANCE OF
ZIRCONIUM DIOXIDE

SPECIFICATION TABLE NO. 183 HEMISPHERICAL TOTAL EMITTANCE OF ZIRCONIUM DIOXIDE ZrO_2

Curve No.	Ref. No.	Year	Temperature Range, K	Reported Error, %	Composition (weight percent), Specifications and Remarks
1*	105	1965	2000		No details given.

DATA TABLE NO. 183 HEMISPHERICAL TOTAL EMITTANCE OF ZIRCONIUM DIOXIDE ZrO_2

[Temperature, T, K; Emittance, ϵ]

T	ϵ
CURVE 1	
2000	0.31

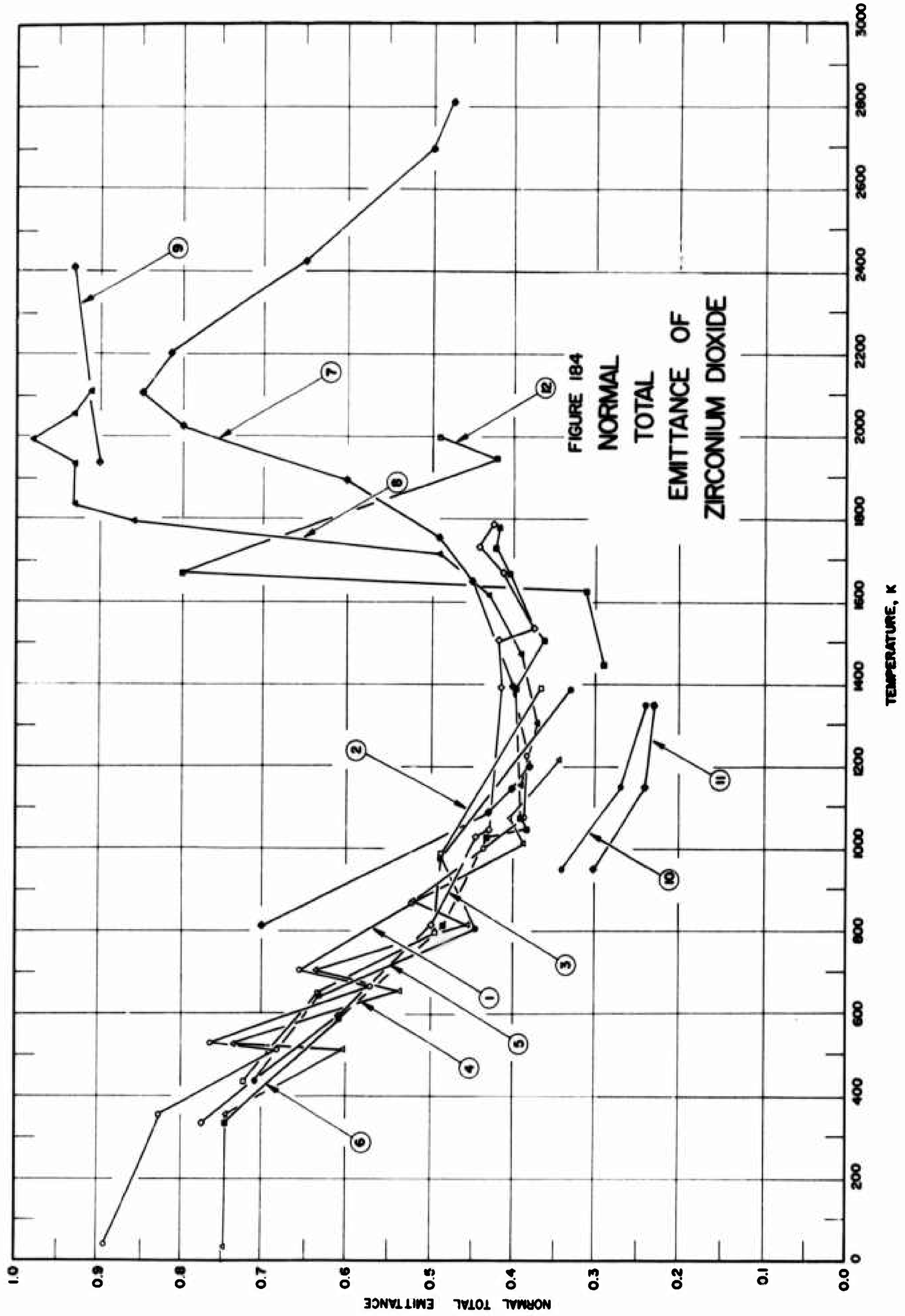


FIGURE 184 NORMAL TOTAL EMITTANCE OF ZIRCONIUM DIOXIDE

SPECIFICATION TABLE NO. 184 NORMAL TOTAL EMITTANCE OF ZIRCONIUM DIOXIDE ZrO_2

Curve No.	Ref. No.	Year	Temperature Range, K	Geometry θ'	Reported Error, %	Composition (weight percent), Specifications, and Remarks
1	106	1959	40.4-1222	~0°		Ca stabilized; measured in air; Cycle one.
2	106	1959	434-1389	~0°		Above specimen and condition; Cycle two.
3	106	1959	336-1786	~0°		Curve 1 specimen and conditions; Cycle three.
4	106	1959	35.4-1219	~0°		Mg stabilized; measured in air; Cycle one.
5	106	1959	438-1384	~0°		Above specimen and conditions; Cycle two.
6	106	1959	338-1780	~0°		Curve 4 specimen and conditions; Cycle three.
7	30	1962	811-2811	~0°		Ground to a smooth finish; measured in dried argon or helium; data extracted from smooth curve.
8	17	1962	1153-2109	~0°	10	Pressed and sintered; measured in argon; [Author's designation: Specimen 1].
9	17	1962	1938-2408	~0°	10	Similar to the above specimen and conditions; [Author's designation: Specimen 2].
10	362	1964	873-1273	0°		95 ZrO_2, 5 CaO; sintered by National Beryllia Corp.
11	362	1964	873-1273	0°		Similar to above specimen and conditions except calculated from spectral data (1-15 μm).
12	17	1962	1443-1999	~0°	10	Pressed and sintered; measured in air; [Author's designation: Specimen 3].

DATA TABLE NO. 184 NORMAL TOTAL EMITTANCE OF ZIRCONIUM DIOXIDE ZrO_2

[Temperature, T, K; Emittance, ε]

T	ε
CURVE 1	
40.4	0.891
358	0.829
511	0.681
530	0.762
665	0.570
704	0.655
868	0.524
1000	0.438
1078	0.386
1222	0.384
CURVE 2	
434	0.721
649	0.634
798	0.495
985	0.489
1389	0.367
CURVE 3	
336	0.775
594	0.609
817	0.500
1028	0.447
1044	0.430
1391	0.414
1504	0.419
1533	0.375
1670	0.413
1733	0.443
1786	0.425
CURVE 4	
35.4	0.746
358	0.745
510	0.602
525	0.735
658	0.536
701	0.637
818	0.455
867	0.522
1012	0.388
1072	0.404
1219	0.343
CURVE 5	
438	0.708
640	0.631
804	0.446
977	0.489
1384	0.330
CURVE 6	
338	0.745
586	0.609
812	0.484
1025	0.433
1041	0.382
1073	0.390
1386	0.396
1502	0.362
1533	0.375*
1662	0.403
1728	0.421
1780	0.418
CURVE 7	
811	0.700
1089	0.430
1144	0.400
1200	0.380
1394	0.400
1644	0.450
1755	0.490
1894	0.600
2022	0.800
2105	0.850
2200	0.815
2422	0.650
2700	0.500
2811	0.475
CURVE 8	
1153	0.39
1301	0.37
1472	0.39
1616	0.43
1718	0.49
1796	0.86
CURVE 8 (cont.)	
1836	0.93
1934	0.93
1990	0.98
2055	0.93
2109	0.91
CURVE 9	
1938	0.90
2408	0.93
CURVE 10	
873	0.30
1073	0.24
1273	0.23
CURVE 11	
873	0.34
1073	0.27
1273	0.24
CURVE 12	
1443	0.29
1625	0.31
1667	0.80
1944	0.42
1999	0.49

* Not shown on plot

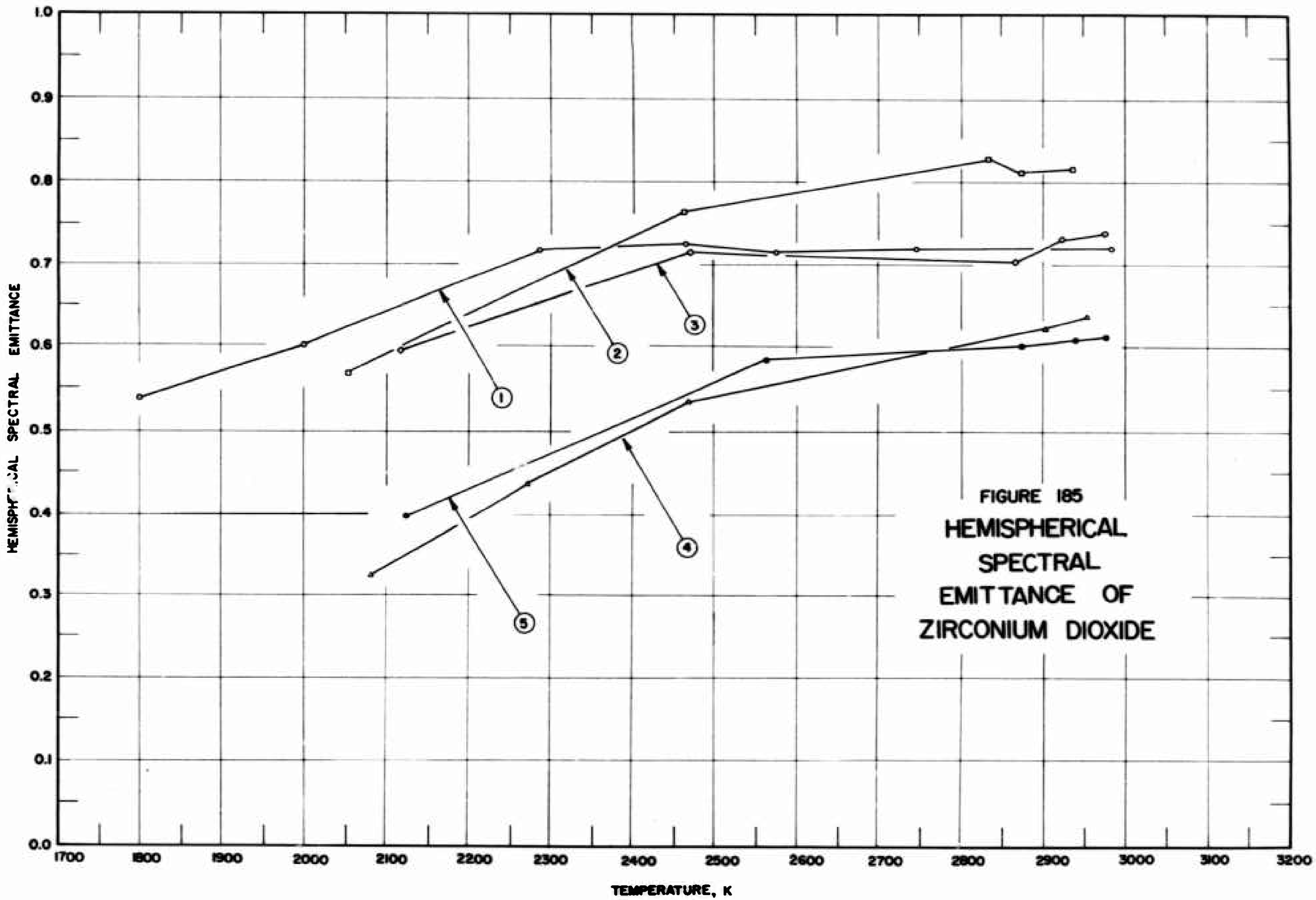


FIGURE 185
HEMISPHERICAL SPECTRAL EMITTANCE OF ZIRCONIUM DIOXIDE

SPECIFICATION TABLE NO. 185 HEMISPHERICAL SPECTRAL EMITTANCE OF ZIRCONIUM DIOXIDE ZrO_2

Curve No.	Ref. No.	Year	Wavelength μm	Temperature Range, K	Reported Error, %	Composition (weight percent), Specifications and Remarks
1	334	1968	0.676	1800-2984		Dry pressed at 3000 psi with subsequent hydrostatic pressing at 50 000 psi; fused by heating a few minutes; MgO on metallic substrate reference standard; calculated from reflectance.
2	334	1968	0.605	2054-2937		Above specimen and conditions.
3	334	1968	0.575	2116-2977		Above specimen and conditions.
4	334	1968	0.539	2080-2954		Above specimen and conditions.
5	334	1968	0.488	2124-2978		Above specimen and conditions.

DATA TABLE NO. 185 HEMISPHERICAL SPECTRAL EMITTANCE OF ZIRCONIUM DIOXIDE ZrO_2

[Temperature, T, K; Emittance, ∈; Wavelength, λ, μm]

T	∈	T	∈	T	∈
CURVE 1		**CURVE 3**		**CURVE 5**	
λ = 0.676		λ = 0.575		λ = 0.488	
1800	0.537	2116	0.594	2124	0.396
2000	0.600	2470	0.715	2563	0.584
2288	0.717	2868	0.703	2875	0.600
2465	0.725	2923	0.730	2940	0.608
2577	0.716	2977	0.737	2978	0.610
2746	0.720				
2984	0.720	**CURVE 4**			
		λ = 0.539			
CURVE 2		2080	0.324		
λ = 0.605		2271	0.437		
2054	0.566	2469	0.533		
2462	0.763	2902	0.621		
2833	0.828	2954	0.637		
2873	0.811				
2937	0.817				

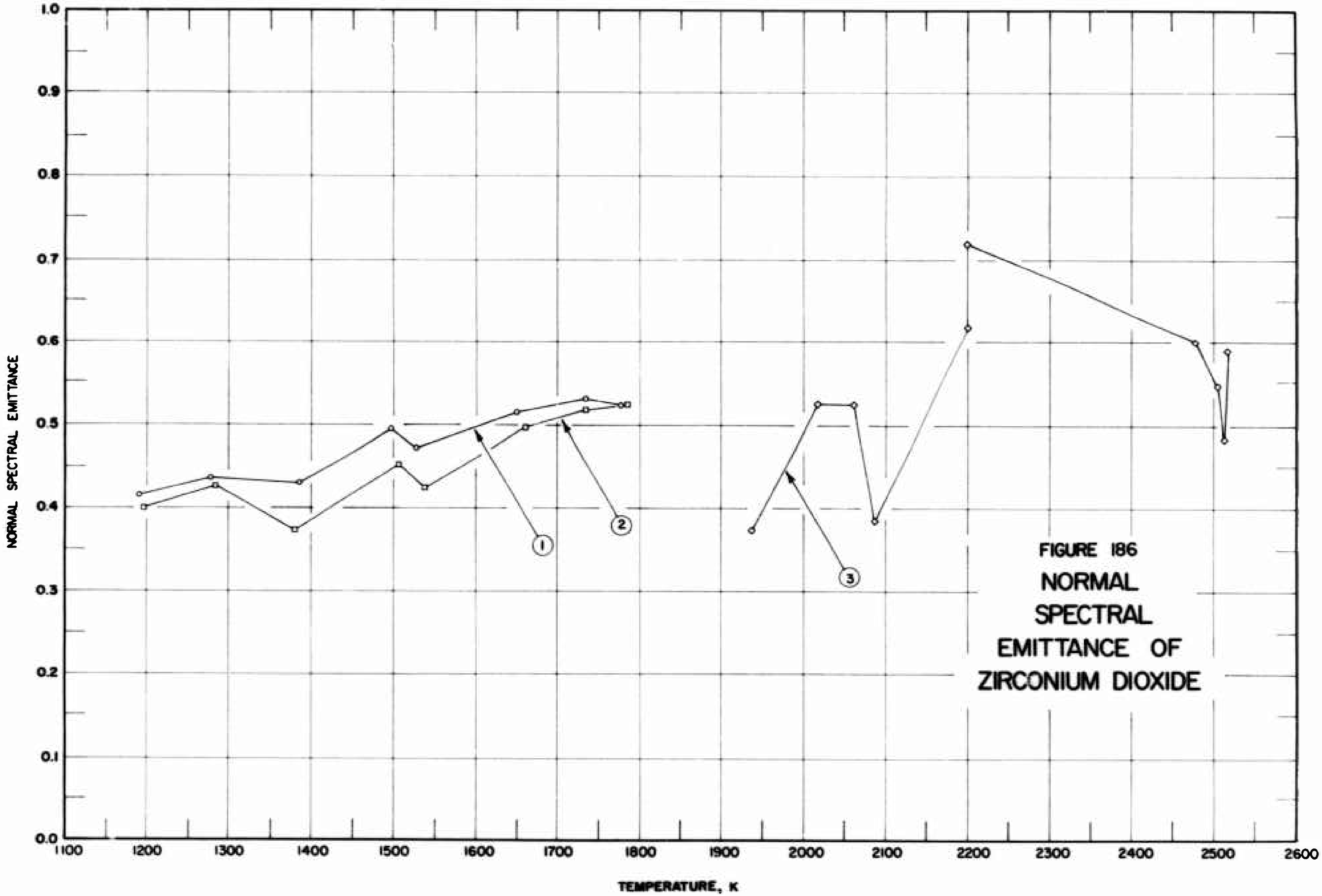


FIGURE 186
NORMAL
SPECTRAL
EMITTANCE OF
ZIRCONIUM DIOXIDE

SPECIFICATION TABLE NO. 186 NORMAL SPECTRAL EMITTANCE OF ZIRCONIUM DIOXIDE ZrO_2

Curve No.	Ref. No.	Year	Wavelength, μm	Temperature Range, K	Geometry θ'	Reported Error, %	Composition (weight percent), Specifications, and Remarks
1	106	1959	0.665	1192-1778	$\sim 0^\circ$		Ca stabilized.
2	106	1959	0.665	1196-1785	$\sim 0^\circ$		Mg stabilized.
3	30	1962	0.69	1939-2517	$\sim 0^\circ$		Ground to a smooth finish; measured in dried argon or helium.

DATA TABLE NO. 186 NORMAL SPECTRAL EMITTANCE OF ZIRCONIUM DIOXIDE ZrO_2

[Temperature, T, K; Emittance, ϵ; Wavelength, λ, μm]

T	ϵ	T	ϵ
CURVE 1 $\lambda = 0.665$		CURVE 3 $\lambda = 0.69$	
1192	0.416	1939	0.375
1278	0.439	2017	0.525
1385	0.431	2061	0.525
1498	0.495	2089	0.385
1527	0.474	2200	0.620
1650	0.515	2200	0.720
1734	0.530	2478	0.600
1778	0.523	2505	0.545
		2511	0.485
CURVE 2 $\lambda = 0.665$		2517	0.590
1196	0.400		
1284	0.428		
1380	0.372		
1507	0.452		
1539	0.426		
1660	0.498		
1734	0.519		
1785	0.525		

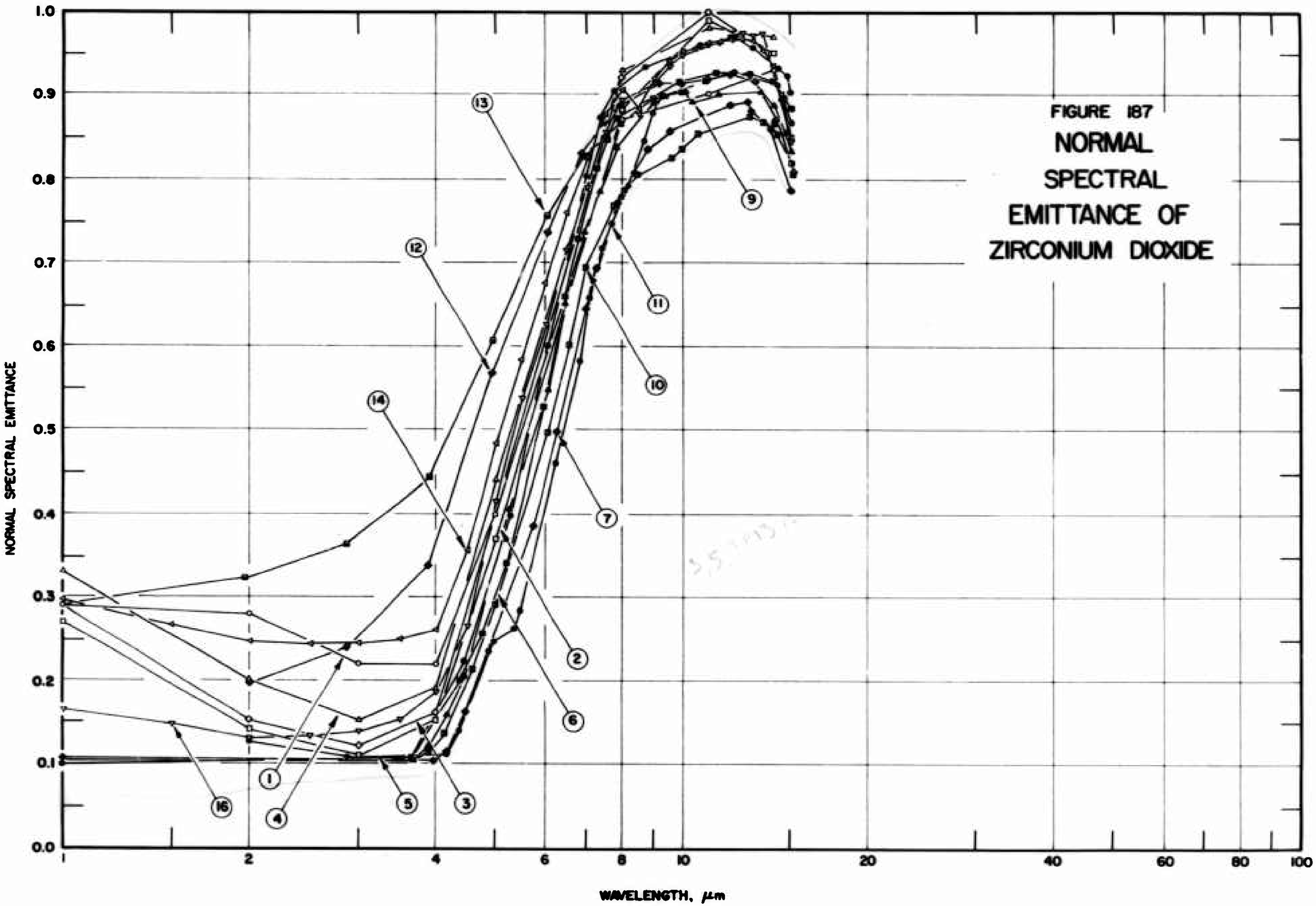


FIGURE 187
NORMAL
SPECTRAL
EMITTANCE OF
ZIRCONIUM DIOXIDE

SPECIFICATION TABLE NO. 187 NORMAL SPECTRAL EMITTANCE OF ZIRCONIUM DIOXIDE ZrO_2

Curve No.	Ref. No.	Year	Temperature K	Wavelength Range, μm	Geometry θ'	Reported Error, %	Composition (weight percent), Specifications, and Remarks
1	188	1964	867	1-14	~0°	0.5	Stabilized Zirconia-H from Norton Co.; prepared by grinding and leaching and slip casting; fired at 2023 K.
2	188	1964	1048	1-14	~0°	0.5	Above specimen and conditions.
3	188	1964	1183	1-14	~0°	0.5	Above specimen and conditions.
4	188	1964	1298	1-14	~0°	0.5	Above specimen and conditions.
5	382	1965	1273	1.00-15.0	0°		Sintered 15 hrs at 1273 K; density 3.06 g cm^{-3}; data extracted from smooth curve.
6	382	1965	1273	1.00-15.0	0°		Above specimen and conditions except sintered additionally 2 hrs at 1373 K and 2 hrs at 1473 K; density changed to 4.12.
7	362	1964	881	1.00-15.00	~0°		95 ZrO_2, 5 CaO; sintered by National Beryllia Corp; data extracted from smooth curve.
8*	362	1964	1073	1.00-15.0	~0°		Above specimen and conditions.
9	362	1964	1273	1.00-15.0	~0°		Above specimen and conditions.
10	362	1964	1498	1.00-15.0	~0°		Above specimen and conditions.
11	362	1964	373	2.00-15.0	~0°		Above specimen and conditions except calculated from spectral reflectance.
12	111	1964	873	2.00-15.07	0°	< 4	Norton RZ 5601, 92 ZrO_2, 4.5 CaO; ultrasonically machined; measured in air.
13	111	1964	1298	0.94-15.04	0°	≤ 4	Above specimen and conditions.
14	338	1966	1600	1.0-15.0	~0°		Polycrystalline cylinder (0.1875 inch wall thickness); 94.2 ZrO_2 + HfO_2, 4.5 CaO; outer surface smooth but not polished; sintered at 1865 K for 27 hrs; porosity 20 percent by volume; average of two readings on each of three specimens.
15*	338	1966	1400	1.0-15.0	~0°		Above specimen and conditions.
16	338	1966	1200	1.0-15.0	~0°		Above specimen and conditions.

*Not shown on plot

DATA TABLE NO. 187   NORMAL SPECTRAL EMITTANCE OF ZIRCONIUM DIOXIDE ZrO_2

[Wavelength, λ, μm; Emittance, ∈ Temperature, T, K]

λ	∈
CURVE 1	T = 867
1	0.29
2	0.28
3	0.22
4	0.22
5	0.40
8	0.87
11	1.00
14	0.93
CURVE 2	T = 1048
1	0.27
2	0.14
3	0.11
4	0.15
5	0.37
8	0.88
11	0.99
14	0.95
CURVE 3	T = 1183
1	0.29*
2	0.15
3	0.12
4	0.16
5	0.40*
8	0.92
11	1.00
14	0.95*
CURVE 4	T = 1298
1	0.33
2	0.20
3	0.15
4	0.19
5	0.44
8	0.93
11	0.98
14	0.97

λ	∈
CURVE 5	T = 1273
1.00	0.098
3.64	0.106
4.42	0.222
5.29	0.399
6.09	0.600
6.99	0.805
7.38	0.872
7.76	0.903
8.70	0.932
10.6	0.960
12.1	0.972
13.0	0.957
14.3	0.932
14.7	0.922
15.0	0.901
CURVE 6	T = 1273
1.00	0.098*
3.64	0.106*
4.37	0.200
4.77	0.257
5.20	0.340
5.96	0.527
6.47	0.666
6.79	0.730
7.29	0.813
7.58	0.848
7.87	0.871
9.85	0.915
11.3	0.928
12.9	0.927
14.0	0.916
14.6	0.896
15.0	0.883
CURVE 7	T = 881
1.00	0.104
3.96	0.104
4.16	0.114
4.47	0.161

λ	∈
CURVE 7 (cont.)	
5.73	0.385
6.29	0 498
6.98	0.645
7.27	0.694
7.86	0.771
8.34	0.809
8.74	0 835
9.54	0.856
11.99	0.887
12.68	0.891
12.95	0.880
13.94	0.860
15.00	0 788
CURVE 8*	T = 1073
1.00	0.104
3.68	0.104
3.84	0.113
4.03	0.136
4.36	0.190
4.60	0.229
4.99	0.323
5.66	0.443
6.43	0.604
6.98	0.695
7.32	0.748
7.99	0.812
8.98	0.860
9.82	0.979
11.01	0.899
12.81	0.903
13.77	0.875
14.27	0.854
15.00	0.820
CURVE 9	T = 1273
1.00	0.104*
3.68	0.104
3.89	0.120
4.16	0.157
4.42	0.205

λ	∈
CURVE 9 (cont.)	
5.27	0.406
6.06	0.549
6.49	0.652
6.99	0.739
7.36	0.786
7.89	0.838
8.99	0.890
9 32	0.898
10.01	0.902
10.42	0.891
11.49	0.900
13.46	0.901
14.00	0.889
14.67	0.855
15.00	0.835
CURVE 10	T = 1498
1.00	0.104*
3.68	0.104*
3.89	0.114
4.11	0.135
4.57	0.213
4.98	0.291
6.02	0.496
6.56	0.601
6.99	0.695
7.73	0.769
8.03	0.788
8.41	0.806
9.51	0.826
10.00	0.837
10.51	0.854
12.88	0.874
13.50	0.867
14.32	0.853
15.00	0.820
CURVE 11	T = 373
2.00	0.127
2.89	0.108
3.98	0.104*

λ	∈
CURVE 11 (cont.)	
4.17	0.111
4.36	0 139
4.87	0.234
4.98	0.248
5.33	0.263
5.47	0.285
6.21	0.459
6.82	0 583
7.06	0.659
7.40	0.717
7.68	0.747
8.12	0.792
8.66	0.846
8.98	0.878
9.28	0.898
12.02	0.926
14.23	0.911
15.00	0.866
CURVE 12	T = 873
2.00	0.298
2.86	0.338
3.89	0.438
4.94	0.569
6.03	0.736
6.89	0.831
7.93	0.886
9.00	0.914
9.93	0.914
11.0	0.919
11.9	0.925
13.0	0.916
14.1	0.870
15.0	0.810
CURVE 13	T = 1298
0.94	0.292
1.97	0.324
2.88	0.363
3.90	0.444
4.94	0.608

λ	∈
CURVE 13 (cont.)	
6.01	0.757
6.93	0.829
7.95	0.867
8.95	0.893
9.96	0.902
10.96	0.919
11.95	0.923*
13.04	0.916*
14.09	0.869
15.04	0.809
CURVE 14	T = 1600
1.0	0.297
1.5	0.269
2.0	0.247
2.5	0.243
3.0	0.244
3.5	0.250
4.0	0.262
4.5	0.356
5.0	0.482
5.5	0.585
6.0	0.676
6.5	0.760
7.0	0.826
7.5	0.876
8.0	0.906
8.5	0.882
9.0	0.919
9.5	0.940
10.0	0.952
10.5	0.957
11.0	0.962
11.5	0.965
12.0	0.968
12.5	0.969
13.0	0.967
13.5	0.955
14.0	0.935
14.5	0.900
15.0	0.850

λ	∈
CURVE 15*	T = 1400
1.0	0.207
1.5	0.192
2.0	0.172
2.5	0.172
3.0	0.177
3.5	0.188
4.0	0.222
4.5	0.308
5.0	0.448
5.5	0.572
6.0	0.654
6.5	0.744
7.0	0.818
7.5	0.872
8.0	0.902
8 5	0.885
9.0	0.920
9.5	0.942
10.0	0.954
10.5	0.960
11.0	0.965
11.5	0.968
12.0	0.973
12.5	0.977
13.0	0.973
13.5	0.962
14.0	0.938
14.5	0.902
15.0	0.852
CURVE 16	T = 1200
1.0	0.163
1.5	0.148
2.0	0.129
2.5	0.131
3.0	0.137
3.5	0.150
4.0	0.187
4.5	0.266
5.0	0.416
5.5	0.537
6.0	0.626

λ	∈
CURVE 16 (cont.)	
6.5	0.713
7.0	0.791
7.5	0.855
8.0	0.892
8.5	0.876
9.0	0.913
9.5	0.935
10.0	0.949
10.5	0.957*
11.0	0.961
11.5	0.964
12.0	0.970
12.5	0.974
13.0	0.972
13.5	0.975
14.0	0.935*
14.5	0.893
15.0	0.844

* Not shown on plot

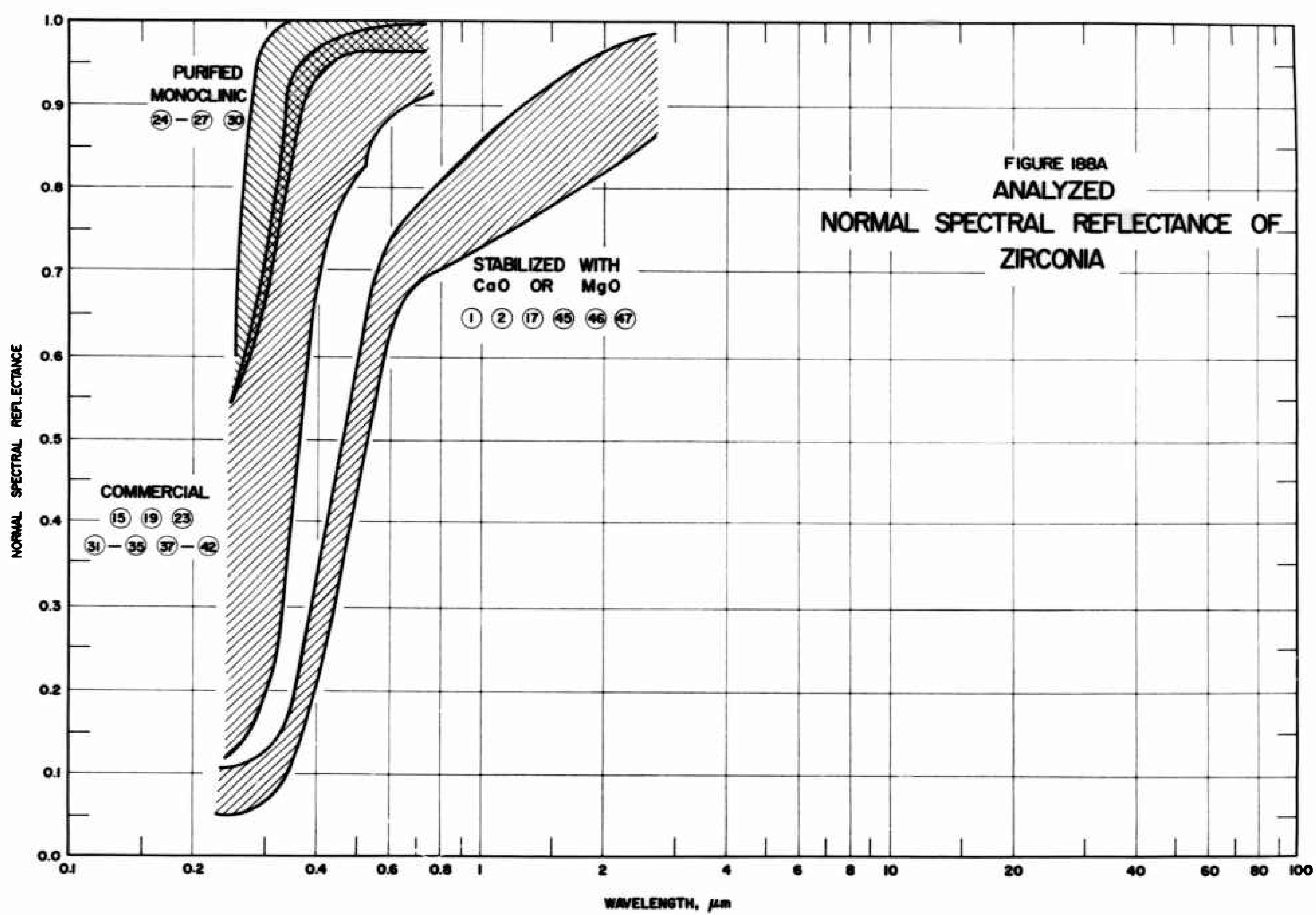


FIGURE 188A
ANALYZED
NORMAL SPECTRAL REFLECTANCE OF
ZIRCONIA
PURIFIED
MONOCLINIC
24 — 27 30
COMMERCIAL
15 19 23
31 — 35 37 — 42
STABILIZED WITH
CaO OR MgO
1 2 17 45 46 47
NORMAL SPECTRAL REFLECTANCE
1.0
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0.0
0.1
0.2
0.4
0.6
0.8
1
2
4
6
8
10
20
40
60
80
100
WAVELENGTH, μm

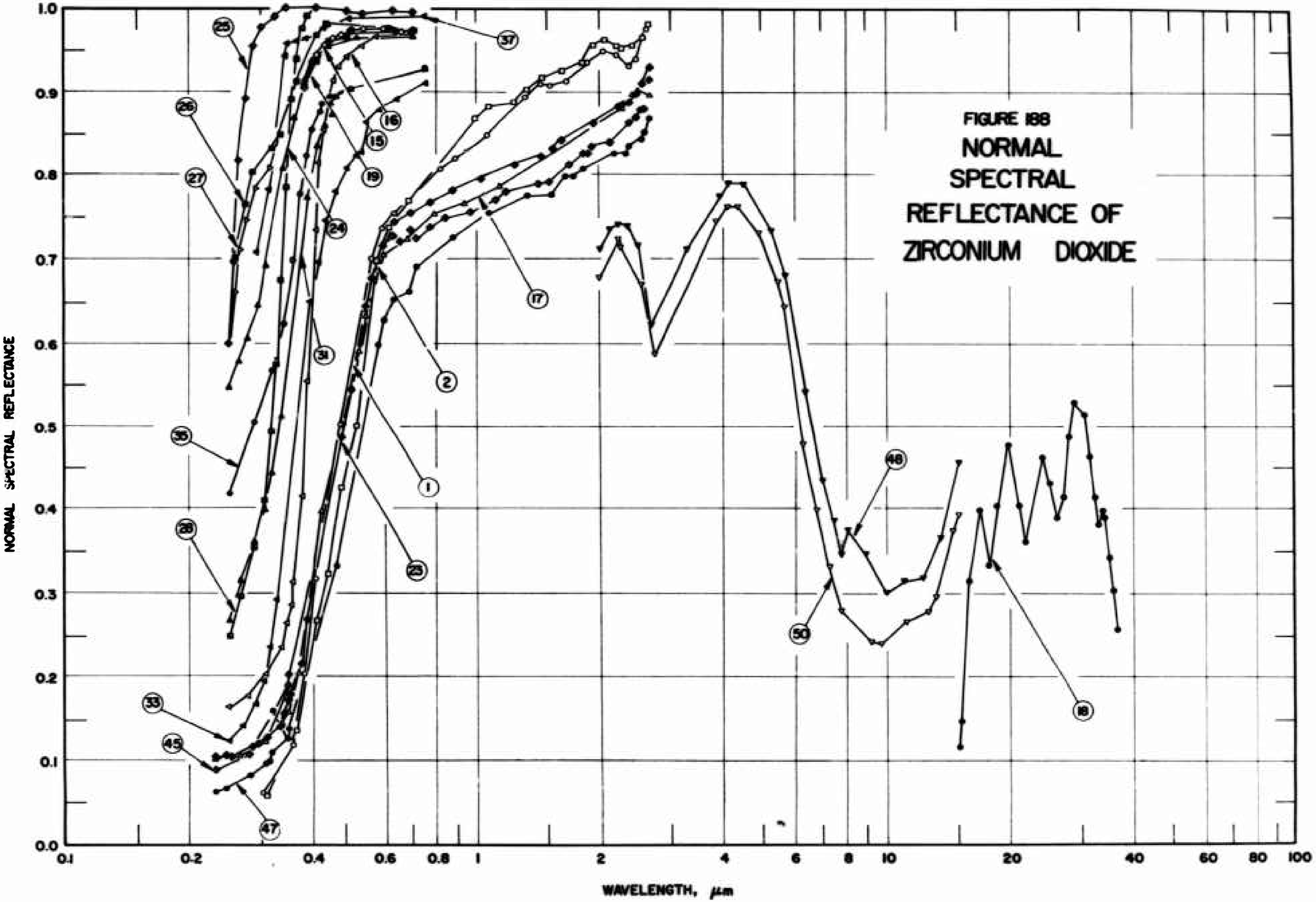


FIGURE 188
NORMAL SPECTRAL REFLECTANCE OF ZIRCONIUM DIOXIDE
NORMAL SPECTRAL REFLECTANCE
WAVELENGTH, μm
0.0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
1.0
0.1
0.2
0.4
0.6
0.8
1
2
4
6
8
10
20
40
60
80
100
1
2
15
16
17
18
19
24
25
26
27
28
31
33
35
37
45
47
48
50

SPECIFICATION TABLE NO. 188 NORMAL SPECTRAL REFLECTANCE OF ZIRCONIUM DIOXIDE ZrO_2

Curve No.	Ref. No.	Year	Temperature K	Wavelength Range, μm	Geometry θ	Geometry θ'	Geometry ω'	Reported Error, %	Composition (weight percent), Specifications, and Remarks
1	106	1959	298	0.300-2.60	9°		2π	4	Ca stabilized; data extracted from smooth curve.
2	106	1959	298	0.307-2.61	9°		2π	4	Mg stabilized; data extracted from smooth curve.
3*	82	1963	298	0.440-0.600	~0°		2π		High purity; supplied by Titanium Alloy Mfg.; compacted powder at 10000 psi.
4*	82	1963	298	0.440-0.600	~0°		2π		Above specimen and conditions except exposed to UV irradiation; 75 ESH with solar factor 1.5.
5*	82	1963	298	0.440-0.600	~0°		2π		Commercially pure; supplied by Titanium Alloy Mfg.; compacted powder at 10 000 psi.
6*	82	1963	298	0.440-0.600	~0°		2π		Above specimen and conditions except exposed to UV irradiation; 75 ESH with solar factor 1.5.
7*	82	1963	298	0.440-0.600	~0°		2π		Commercially pure; supplied by Fairmount; compacted powder at 10 000 psi.
8*	82	1963	298	0.440-0.600	~0°		2π		Above specimen and conditions except exposed to UV irradiation; 75 ESH with solar factor 1.5.
9*	82	1963	298	0.440-0.600	~0°		2π		Commercially pure; supplied by Titanium-Zirconium Co.: compacted powder at 10 000 psi.
10*	82	1963	298	0.440-0.600	~0°		2π		Above specimen and conditions except exposed to UV irradiation; 180 ESH with solar factor 3.
11*	82	1963	298	0.440-0.600	~0°		2π		CMC-6-CP; supplied by Carborundum Co.; compacted powder at 10 000 psi.
12*	82	1963	298	0.440-0.600	~0°		2π		Above specimen and conditions except exposed to UV irradiation; 180 ESH with solar factor 3.
13*	82	1963	298	0.440-0.600	~0°		2π		Cubic; supplied by Titanium Alloy Mfg.; compacted powder at 10 000 psi.
14*	82	1963	298	0.440-0.600	~0°		2π		Above specimen and conditions except exposed to UV irradiation; 180 ESH with solar factor 3.
15	82	1963	~298	0.380-0.700	~0°		2π		Compacted powder at 10 000 psi; data extracted from smooth curve.
16*	82	1963	~298	0.380-0.700	~0°		2π		Above specimen and conditions except exposed in vacuum (10^{-5} mm Hg) to 75 ESH at solar factor 1.5.
17	91	1967	298	0.230-2.65	0°		2π		Powder; commercially pure; -230+270 mesh; pressed at 24 300 Newtons cm^{-2}; MgO reference standard; data extracted from smooth curve.
18	146	1966	~298	15.0-36.1	~0°	~0°			Film; optical thickness 10 quarterwaves at λ = 2.6 μm; electron beam deposited in vacuum (1.8×10^{-4} mm Hg with O_2 bleed) at normal incidence onto glass substrate heated to 588 K; rate of depositing 1 quarterwave per min at λ = 0.5 μm.
19	246	1962	298	0.380-0.700	0°		2π		Commercially pure; powder compacted at 10^4 psi; data extracted from smooth curve; [Author's designation: Sample M].
20*	246	1962	298	0.380-0.700	0°		2π		Above specimen and conditions except exposed to simulated solar radiation at 1.5 suns for 50 hrs.

*Not shown on plot

SPECIFICATION TABLE NO. 188 (continued)

Curve No.	Ref. No.	Year	Temperature K	Wavelength Range, μm	Geometry θ	Geometry θ'	Geometry ω'	Reported Error, %	Composition (weight percent), Specifications, and Remarks
21*	122	1940	298	0.28-0.32	0°		2π		Compacted powder; data obtained for band from 0.28 to 0.32 μm.
22*	122	1940	298	0.28-0.32	0°		2π		Commercially pure; compacted powder; data obtained for band from 0.28 to 0.32 μm.
23	342	1968	~298	0.230-2.65	0°		2π		-230+270 mesh powder; compacted at 35 300 psi; data extracted from smooth curve; MgO reference standard.
24	386	1967	~298	0.250-0.700	~0°	~45°			Sample prepared by igniting the as-received TAM high-purity zirconium oxychloride solution; solid angle of viewing is a ring of 14° wide centered at θ = 45°; data extracted from smooth curve; CaF_2 reference standard.
25	386	1967	~298	0.250-0.700	~0°	~45°			Sample prepared from the recrystallized oxychloride; solid angle of viewing is a ring of 14° wide centered at θ = 45°; data extracted from smooth curve; CaF_2 reference standard.
26	386	1967	~298	0.250-0.700	~0°	~45°			Sample prepared by alkoxide process; solid angle of viewing is a ring of 14° wide centered at θ = 45°; data extracted from smooth curve; CaF_2 reference standard.
27	386	1967	~298	0.250-0.700	~0°	~45°			Sample prepared from mandelic acid process; solid angle of viewing is a ring of 14° wide centered at θ = 45°; data extracted from smooth curve; CaF_2 reference standard.
28	386	1967	~298	0.250-0.700	~0°	~45°			High purity ZrO_2 doped with 800 ppm TiO_2;solid angle of viewing is a ring of 14° wide centered at θ = 45°; data extracted from smooth curve; CaF_2 reference standard.
29	386	1967	~298	0.250-0.700	~0°	~45°			High purity ZrO_2 doped with 500 ppm Fe; solid angle of viewing is a ring of 14° wide centered at θ = 45°; data extracted from smooth curve; CaF_2 reference standard.
30*	386	1967	~298	0.250-0.750	~0°	~45°			Calcined recrystallized TAM $ZrOCl_2 - 8H_2O$; solid angle of viewing is a ring of 14° wide centered at θ = 45°; data extracted from smooth curve; CaF_2 reference standard.
31	386	1967	~298	0.250-0.750	~0°	~45°			Carborundum Metals, Grade A; solid angle of viewing is a ring of 14° wide centered at θ = 45°; data extracted from smooth curve; CaF_2 reference standard.
32*	386	1967	~298	0.250-0.750	~0°	~45°			Carborundum Metals, commercially pure; solid angle of viewing is a ring of 14° wide centered at θ = 45°; data extracted from smooth curve; CaF_2 reference standard.
33	386	1967	~298	0.250-0.750	~0°	~45°			Zircoa ZrO_2 - A; solid angle of viewing is a ring of 14° wide centered at θ = 45°; data extracted from smooth curve; CaF_2 reference standard.
34*	386	1967	~298	0.250-0.750	~0°	~45°			Dairihi Kigenso Chemicals, Inc.; solid angle of viewing is a ring of 14° wide centered at θ = 45°; data extracted from smooth curve; CaF_2 reference standard.

*Not shown on plot

SPECIFICATION TABLE NO. 188 (continued)

Curve No.	Ref. No.	Year	Temperature K	Wavelength Range, μm	Geometry θ	θ'	ω'	Reported Error, %	Composition (weight percent), Specifications, and Remarks
35	386	1967	~298	0.250-0.750	~0°	~45°			Zircoa (AH-C), hafnium free; solid angle of viewing is a ring of 14° wide centered at θ = 45°; data extracted from smooth curve.
36*	386	1967	~298	0.250-0.750	~0°	~45°			Calcined TAM hydrous zirconium carbonate; solid angle of viewing is a ring of 14° wide centered at θ = 45°; data extracted from smooth curve.
37	386	1967	~298	0.250-0.750	~0°	~45°			Harshaw, electric grade; solid angle of viewing is a ring of 14° wide centered at θ = 45°; data extracted from smooth curve.
38*	386	1967	~298	0.250-0.750	~0°	~45°			TAM, R65595-3; high purity; solid angle of viewing is a ring of 14° wide centered at θ = 45°; data extracted from smooth curve; CaF_2 reference standard.
39*	386	1967	~298	0.250-0.750	~0°	~45°			TAM, R72351; high purity; solid angle of viewing is a ring of 14° wide centered at θ = 45°; data extracted from smooth curve; CaF_2 reference standard.
40*	386	1967	~298	0.250-0.750	~0°	~45°			TAM, R73918; high purity; solid angle of viewing is a ring of 14° wide centered at θ = 45°; data extracted from smooth curve; CaF_2 reference standard.
41*	386	1967	~298	0.250-0.750	~0°	~45°			TAM, commercially pure lot 40; solid angle of viewing is a ring of 14° wide centered at θ = 45°; data extracted from smooth curve; CaF_2 reference standard.
42*	386	1967	~298	0.250-0.750	~0°	~45°			TAM, commercially pure lot 64; solid angle of viewing is a ring of 14° wide centered at θ = 45°; data extracted from smooth curve; CaF_2 reference standard.
43*	386	1967	~298	0.250-0.750	~0°	~45°			TAM, electro-fused; porcelain mill; solid angle of viewing is a ring of 14° wide centered at θ = 45°; data extracted from smooth curve; CaF_2 reference standard.
44*	386	1967	~298	0.250-0.750	~0°	~45°			TAM, electro-fused; steel mill, HCl; solid angle of viewing is a ring of 14° wide centered at θ = 45°; data extracted from smooth curve; CaF_2 reference standard.
45	362	1964	~298	0.230-2.65	0°		2π		91ZrO_2, 5CaO, 2HfO_2 powder (lime stabilized Zirnorite, Norton Co.) particle size 53-63 μm; compacted at 23 500 psi with highly polished stainless steel ram; data extracted from smooth curve; MgO reference standard.
46*	362	1964	~298	0.230-2.65	~0°		2π		Similar to above specimen and conditions except particle size 63-74 μm.
47	362	1964	~298	0.230-2.65	~0°		2π		Similar to above specimen and conditions except particle size > 74 μm.
48	362	1964	~298	2.00-15.0	0°		2π		91ZrO_2, 5CaO, 2HfO_2 powder (lime stabilized Zirnorite, Norton Co.) particle size ~74 μm; compacted at 21 000 psi with highly polished stainless steel ram; data extracted from smooth curve; converted from reflectance factor.
49*	362	1964	~298	2.00-15.0	~0°		2π		Similar to above specimen and conditions except particle size ~88 μm.
50	362	1964	~298	2.00-15.0	~0°		2π		Similar to above specimen and conditions except particle size 105 μm.

*Not shown on plot

DATA TABLE NO. 188 NORMAL SPECTRAL REFLECTANCE OF ZIRCONIUM DIOXIDE ZrO_2

[Wavelength, λ, μm; Reflectance, ρ; Temperature, T, K]

λ	ρ
CURVE 1 T = 298	
0.300	0.060
0.356	0.119
0.380	0.203
0.404	0.319
0.465	0.501
0.555	0.700
0.584	0.736
0.630	0.754
0.819	0.807
0.882	0.820
1.07	0.849
1.31	0.893
1.43	0.910
1.51	0.908
1.66	0.913
1.87	0.935
2.03	0.949
2.20	0.944
2.37	0.931
2.46	0.939
2.60	0.976
CURVE 2 T = 298	
0.307	0.056
0.362	0.136
0.405	0.267
0.431	0.323
0.467	0.425
0.508	0.500
0.570	0.699
0.607	0.737
0.681	0.767
0.999	0.868
1.06	0.884
1.23	0.889
1.32	0.904
1.45	0.918
1.61	0.925
1.82	0.935
1.93	0.957
2.05	0.964
2.20	0.956

λ	ρ
CURVE 2 (cont.)	
2.27	0.954
2.40	0.957
2.52	0.967
2.61	0.982
CURVE 3* T = 298	
0.440	0.925
0.600	0.970
CURVE 4* T = 298	
0.440	0.655
0.600	0.905
CURVE 5* T = 298	
0.440	0.960
0.600	0.975
CURVE 6* T = 298	
0.440	0.755
0.600	0.925
CURVE 7* T = 298	
0.440	0.890
0.600	0.950
CURVE 8* T = 298	
0.440	0.755
0.600	0.925
CURVE 9* T = 298	
0.440	0.880
0.600	0.905

λ	ρ
CURVE 10* T = 298	
0.440	0.655
0.600	0.800
CURVE 11* T = 298	
0.440	0.935
0.600	0.970
CURVE 12* T = 298	
0.440	0.490
0.600	0.725
CURVE 13* T = 298	
0.440	0.880
0.600	0.955
CURVE 14* T = 298	
0.440	0.330
0.600	0.735
CURVE 15 T ~ 298	
0.380	0.905
0.407	0.943
0.424	0.955
0.443	0.964
0.468	0.969
0.483	0.969
0.499	0.975
0.524	0.976
0.593	0.976
0.659	0.971
0.700	0.973

λ	ρ
CURVE 16* T ~ 298	
0.380	0.638
0.392	0.658
0.417	0.714
0.443	0.766
0.471	0.808
0.503	0.853
0.522	0.874
0.548	0.897
0.568	0.913
0.610	0.931
0.626	0.935
0.641	0.941
0.670	0.947
0.700	0.948
CURVE 17 T = 298	
0.230	0.101
0.264	0.105
0.303	0.122
0.334	0.145
0.347	0.158
0.369	0.203
0.418	0.395
0.512	0.590
0.537	0.632
0.593	0.703
0.677	0.723
0.790	0.751
0.931	0.766
1.13	0.786
2.26	0.881
2.40	0.899
2.47	0.902
2.65	0.897
CURVE 18 T ~ 298	
15.0	0.116
15.1	0.147
15.9	0.316
16.9	0.398

λ	ρ
CURVE 18 (cont.)	
17.7	0.333
18.5	0.401
19.9	0.477
21.0	0.403
21.6	0.360
24.0	0.461
25.0	0.430
26.0	0.388
27.0	0.413
27.9	0.487
28.9	0.530
30.2	0.515
31.2	0.462
32.1	0.414
32.9	0.379
33.5	0.397
34.0	0.388
34.9	0.342
35.5	0.304
36.1	0.257
CURVE 19 T = 298	
0.380	0.907
0.404	0.936
0.434	0.960
0.484	0.968
0.493	0.974
0.632	0.973
0.696	0.974
0.700	0.974
CURVE 20* T = 298	
0.380	0.635
0.417	0.715
0.442	0.761
0.498	0.844
0.534	0.885
0.571	0.914
0.599	0.927
0.659	0.944
0.700	0.949

λ	ρ
CURVE 21* T = 298	
0.28	0.41
0.32	0.41
CURVE 22* T = 298	
0.28	0.78
0.32	0.78
CURVE 23 T ~ 298	
0.230	0.104
0.244	0.106
0.252	0.105
0.281	0.116
0.294	0.120
0.309	0.126
0.330	0.140
0.340	0.157
0.348	0.171
0.350	0.179
0.371	0.215
0.385	0.269
0.468	0.485
0.497	0.543
0.535	0.643
0.552	0.679
0.627	0.744
0.691	0.754
0.775	0.767
0.876	0.781
1.02	0.796
1.24	0.814
1.43	0.824
1.53	0.833
1.61	0.842
1.92	0.863
2.21	0.883
2.28	0.886
2.36	0.889
2.46	0.899
2.54	0.912
2.65	0.931

λ	ρ
CURVE 24 T ~ 298	
0.250	0.547
0.262	0.578
0.277	0.607
0.291	0.646
0.306	0.693
0.338	0.809
0.360	0.869
0.384	0.914
0.400	0.936
0.432	0.954
0.506	0.964
0.700	0.968
CURVE 25 T ~ 298	
0.250	0.600
0.256	0.698
0.264	0.819
0.274	0.894
0.288	0.954
0.300	0.979
0.321	0.990
0.344	1.000
0.405	1.000
0.481	0.997
0.522	0.994
0.621	0.998
0.700	0.997
CURVE 26 T ~ 298	
0.250	0.600*
0.258	0.700
0.271	0.763
0.285	0.802
0.319	0.832
0.332	0.848
0.365	0.914
0.404	0.969
0.426	0.981
0.601	0.977
0.700	0.977*

λ	ρ
CURVE 27 T ~ 298	
0.250	0.600*
0.257	0.662
0.264	0.710
0.274	0.746
0.290	0.783
0.311	0.809
0.332	0.848*
0.365	0.914*
0.404	0.969*
0.426	0.981*
0.601	0.977*
0.700	0.977*
CURVE 28 T ~ 298	
0.250	0.250
0.267	0.296
0.287	0.354
0.301	0.410
0.315	0.494
0.324	0.573
0.334	0.677
0.342	0.784
0.354	0.891
0.364	0.939
0.377	0.978
0.388	0.991
0.405	1.000*
0.481	0.997*
0.522	0.994*
0.621	0.998*
0.700	0.997*
CURVE 29 T ~ 298	
0.250	0.165
0.277	0.178
0.306	0.202
0.333	0.235
0.344	0.263
0.352	0.285
0.358	0.313

*Not shown on plot

DATA TABLE NO. 188 (continued)

CURVE 29 (cont.)

λ	ρ
0.375	0.414
0.388	0.553
0.403	0.734
0.414	0.816
0.423	0.854
0.436	0.890
0.450	0.915
0.463	0.930
0.483	0.940
0.526	0.955
0.570	0.967
0.700	0.970

CURVE 30* T ~ 298

λ	ρ
0.250	0.546
0.269	0.853
0.283	0.929
0.302	0.981
0.316	0.983
0.350	1.000
0.430	1.000
0.490	0.989
0.750	0.994

CURVE 31 T ~ 298

λ	ρ
0.250	0.266
0.266	0.316
0.289	0.360
0.304	0.399
0.319	0.442
0.335	0.512
0.388	0.773
0.405	0.836
0.414	0.858
0.423	0.872
0.439	0.887
0.459	0.895
0.498	0.904
0.750	0.929

CURVE 32* T ~ 298

λ	ρ
0.250	0.457
0.268	0.524
0.336	0.711
0.349	0.758
0.383	0.869
0.397	0.903
0.410	0.928
0.436	0.948
0.467	0.960
0.506	0.963
0.538	0.961
0.555	0.975
0.750	0.984

CURVE 33 T ~ 298

λ	ρ
0.250	0.125
0.271	0.142
0.290	0.168
0.302	0.195
0.314	0.237
0.327	0.294
0.393	0.653
0.406	0.698
0.430	0.746
0.455	0.780
0.485	0.809
0.511	0.825
0.525	0.827
0.551	0.860
0.582	0.878
0.640	0.891
0.750	0.911

CURVE 34* T ~ 298

λ	ρ
0.250	0.441
0.268	0.513
0.296	0.603
0.350	0.817
0.366	0.859
0.393	0.916
0.411	0.948
0.433	0.962

CURVE 34 (cont.)*

λ	ρ
0.490	0.976
0.583	0.986
0.750	0.994

CURVE 35 T ~ 298

λ	ρ
0.250	0.418
0.288	0.505
0.316	0.567
0.340	0.622
0.359	0.699
0.373	0.778
0.385	0.823
0.396	0.853
0.409	0.877
0.420	0.886
0.440	0.895
0.498	0.904
0.750	0.929

CURVE 36* T ~ 298

λ	ρ
0.250	0.266
0.329	0.744
0.361	0.873
0.382	0.923
0.406	0.961
0.427	0.975
0.490	0.989
0.750	0.994

CURVE 37 T ~ 298

λ	ρ
0.250	0.546
0.294	0.708
0.312	0.782
0.342	0.941
0.349	0.957
0.367	0.960
0.387	0.965
0.426	0.979
0.490	0.989
0.750	0.994

CURVE 38* T ~ 298

λ	ρ
0.250	0.283
0.269	0.355
0.311	0.475
0.341	0.586
0.399	0.799
0.414	0.857
0.440	0.890
0.515	0.924
0.622	0.949
0.750	0.962

CURVE 39* T ~ 298

λ	ρ
0.250	0.315
0.269	0.375
0.313	0.492
0.349	0.604
0.363	0.668
0.407	0.877
0.425	0.916
0.440	0.932
0.475	0.947
0.544	0.954
0.649	0.950
0.750	0.952

CURVE 40* T ~ 298

λ	ρ
0.250	0.482
0.258	0.573
0.266	0.629
0.279	0.666
0.315	0.726
0.334	0.769
0.374	0.872
0.391	0.913
0.406	0.936
0.429	0.954
0.459	0.962
0.589	0.971
0.750	0.972

CURVE 41* T ~ 298

λ	ρ
0.250	0.324
0.264	0.379
0.285	0.435
0.298	0.490
0.328	0.674
0.359	0.810
0.396	0.913
0.409	0.934
0.426	0.955
0.514	0.978
0.633	0.989
0.750	0.992

CURVE 42* T ~ 298

λ	ρ
0.250	0.573
0.256	0.613
0.266	0.659
0.320	0.803
0.358	0.884
0.400	0.955
0.420	0.972
0.460	0.979
0.519	0.982
0.750	0.992

CURVE 43* T ~ 298

λ	ρ
0.250	0.142
0.279	0.174
0.291	0.192
0.299	0.214
0.310	0.259
0.347	0.470
0.365	0.534
0.395	0.577
0.449	0.641
0.496	0.669
0.583	0.688
0.668	0.678
0.750	0.678

CURVE 44* T ~ 298

λ	ρ
0.250	0.110
0.275	0.131
0.293	0.156
0.303	0.184
0.315	0.228
0.338	0.339
0.356	0.415
0.383	0.487
0.493	0.696
0.510	0.719
0.527	0.738
0.555	0.800
0.566	0.813
0.694	0.880
0.725	0.884
0.750	0.884

CURVE 45 T ~ 298

λ	ρ
0.230	0.089
0.279	0.108
0.304	0.124*
0.348	0.188
0.349	0.201
0.471	0.506
0.589	0.714
0.621	0.726
0.656	0.726
0.685	0.735
0.715	0.723
0.775	0.737
0.840	0.749
0.970	0.755
1.10	0.770
1.19	0.780
1.26	0.780
1.42	0.790
1.50	0.792
1.69	0.814
1.82	0.829
1.88	0.829
1.92	0.836
2.11	0.842
2.38	0.865
2.47	0.870

CURVE 45 (cont.)

λ	ρ
2.50	0.880
2.57	0.882
2.65	0.918

CURVE 46* T ~ 298

λ	ρ
0.230	0.048
0.240	0.057
0.276	0.071
0.288	0.091
0.306	0.099
0.329	0.127
0.337	0.135
0.342	0.147
0.348	0.149
0.349	0.171
0.364	0.201
0.547	0.583
0.588	0.647
0.629	0.659
0.680	0.669
0.703	0.698
0.737	0.708
0.934	0.728
1.24	0.752
1.31	0.761
1.44	0.761
1.46	0.758
1.52	0.773
1.57	0.777
1.62	0.790
1.75	0.793
1.84	0.804
2.04	0.821
2.21	0.835
2.46	0.854
2.57	0.858
2.65	0.887

CURVE 47 T ~ 298

λ	ρ
0.230	0.062
0.245	0.066
0.280	0.082
0 306	0.097

CURVE 47 (cont.)

λ	ρ
0.313	0.100
0.317	0.110
0.347	0.126
0.349	0.137
0.349	0.160
0.454	0.331
0.575	0.599
0.599	0.629
0.631	0.653
0.681	0.661
0.719	0.691
0.877	0.725
1.07	0.752
1.32	0.776
1.53	0.777
1.64	0.798
1.72	0.798
1.80	0.809
2.16	0.827
2.30	0.829
2.35	0.837
2.53	0.844
2.58	0.851
2.65	0.869

CURVE 48 T ~ 298

λ	ρ
2.00	0.712
2.13	0.735
2.24	0.741
2.35	0.739
2.48	0.716
2.67	0.623
3.27	0.711
3.91	0.773
4.12	0.780
4.50	0.780
5.24	0.733
5.68	0.682
6.38	0.542
7.00	0.733
7.41	0.383
7.77	0.347
8.03	0.327
8.89	0.298
10.0	0.301

*Not shown on plot

DATA TABLE NO. 188 (continued)

λ	ρ
CURVE 48 (cont.)	
T ~ 298	
11.0	0.316
12.2	0.320
13.5	0.366
15.0	0.457
CURVE 49*	
T ~ 298	
2.00	0.685
2.21	0.725
2.35	0.734
2.50	0.697
2.68	0.616
3.28	0.705
3.98	0.772
4.36	0.776
5.04	0.736
5.57	0.679
6.65	0.456
7.00	0.400
7.41	0.343
7.77	0.315
9.01	0.263
9.53	0.258
11.2	0.278
12.4	0.288
13.5	0.334
14.5	0.389
15.0	0.404
CURVE 50	
T ~ 298	
2.00	0.680
2.23	0.722
2.42	0.713
2.52	0.672
2.72	0.589
3.87	0.746
4.10	0.761
4.35	0.761
4.85	0.731
5.45	0.675
5.62	0.645
6.27	0.478
6.74	0.399

λ	ρ
CURVE 50 (cont.)	
7.23	0.333
7.78	0.280
9.15	0.244
9.66	0.242
11.0	0.269
12.5	0.279
13.0	0.297
14.5	0.375
15.0	0.392

*Not shown on plot

SPECIFICATION TABLE NO. 189 NORMAL SOLAR ABSORPTANCE OF ZIRCONIUM OXIDE

Curve No.	Ref. No.	Year	Temperature Range, K	Geometry θ	Reported Error, %	Composition (weight percent), Specifications and Remarks
1*	106	1959	298	9°		Ca stabilized; computed from spectral reflectance data (0.3 to 3 μm) for above atm conditions.
2*	106	1959	298	9°		Above specimen and conditions except computed for sea level conditions.
3*	106	1959	298	9°		Mg stabilized; computed from spectral reflectance data (0.3 to 3μm) for above atm conditions.
4*	106	1959	298	9°		Above specimen and conditions except computed for sea level conditions.
5*	121	1964	~298	~0°		Titanium Zirconium Co.; compacted powder; computed from spectral reflectance data.
6*	121	1961	~298	~0°		Similar to above specimen and conditions except exposed to 100 ESH.
7*	367	1964	~298	~0°		Calculated from reflectance data; [Authors' designation: Sample No. 7033].
8*	367	1964	~298	~0°		Above specimen and conditions except exposed to 230 ESH at solar factor 8.5 in vacuum (< 10^{-6} mm Hg).

DATA TABLE NO. 189 NORMAL SOLAR ABSORPTANCE OF ZIRCONIUM OXIDE

[Temperature, T, K; Absorptance, α]

T	α	T	α
CURVE 1*		CURVE 5*	
298	0.294	298	0.083
CURVE 2*		CURVE 6*	
298	0.269	298	0.262
CURVE 3*		CURVE 7*	
298	0.299	298	0.102
CURVE 4*		CURVE 8*	
298	0.275	298	0.169

* No plot given

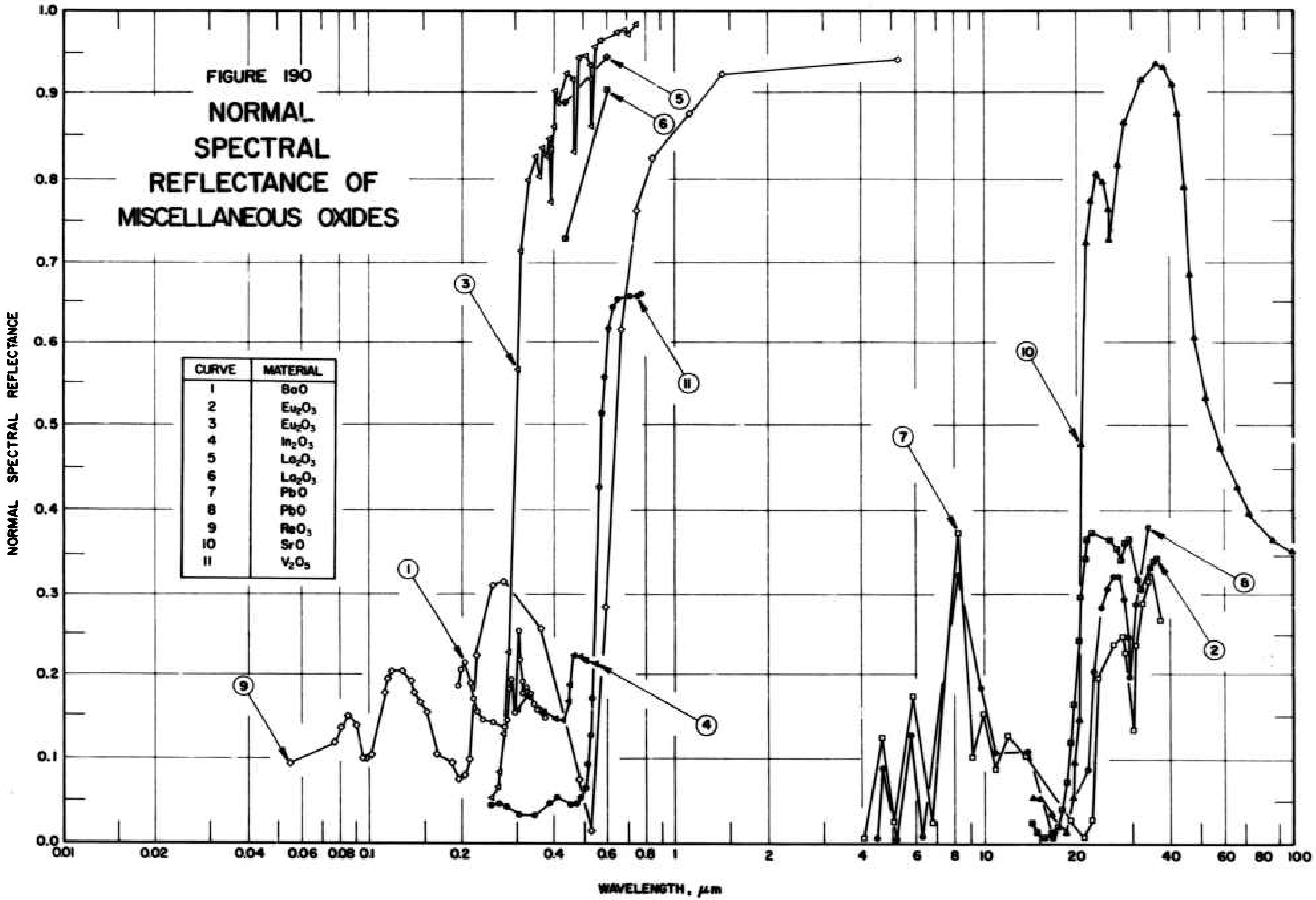


FIGURE 190
NORMAL SPECTRAL REFLECTANCE OF MISCELLANEOUS OXIDES

SPECIFICATION TABLE NO. 190 NORMAL SPECTRAL REFLECTANCE OF MISCELLANEOUS OXIDES

Curve No.	Ref. No.	Year	Temperature K	Wavelength Range, µm	Geometry θ	θ'	ω'	Reported Error, %	Composition (weight percent), Specifications, and Remarks
1	312	1957	91	0.195-0.373	0°	0°			BARIUM OXIDE, BaO; single crystal; grown by vapor-phase deposition; surface freshly cleaved; measured in vacuum (2×10^{-7} mm Hg); aluminum reference standard.
2	146	1966	~298	14.1-36.3	~0°	~0°			DIEUROPIUM TRIOXIDE, Eu_2O_3; clear film; optical thickness 10 quarterwaves at $\lambda = 0.2$ µm; electron beam deposited in vacuum ($2\text{-}8 \times 10^{-5}$ mm Hg) at normal incidence onto glass substrate heated to 588 K; rate of depositing 1 quarterwave per min at $\lambda = 0.5$ µm.
3	206	1967	298	0.250-0.744	0°		2π		DIEUROPIUM TRIOXIDE, Eu_2O_3; data extracted from smooth curve.
4	208	1966	298	0.302-0.551	~0°	~0°			DIINDIUM TRIOXIDE, In_2O_3; single crystal; thickness 30-100 µm; grown from vapor phase on fused quartz substrate; Al reference standard; pale yellow in color.
5	82	1963	298	0.440-0.600	~0°		2π		DILANTHANUM TRIOXIDE, La_2O_3; powder, Code 528, Lindsay Chemical Co.; calcined 16 hrs at 1273 K and compacted at 10 000 psi.
6	82	1963	298	0.440-0.600	~0°		2π		Above specimen and conditions except exposed to 180 ESH of uv irradiation at solar factor 3.
7	146	1966	~298	4.1-37.1	~0°	~0°			LEAD OXIDE, PbO; film; optical thickness 10 quarterwaves at $\lambda = 5.2$ µm; electron beam deposited in vacuum (1.8×10^{-4} mm Hg with O_2 bleed) at normal incidence onto glass substrate heated to 588 K; rate of depositing 1 quarterwave per min at $\lambda = 0.5$ µm; film had yellow powdery appearance.
8	146	1966	~298	4.5-34.0	~0°	~0°			LEAD OXIDE, PbO; film; optical thickness 10 quarterwaves at $\lambda = 5.1$ µm; electron beam deposited in vacuum ($2\text{-}8 \times 10^{-5}$ mm Hg) at normal incidence onto glass substrate heated to 588 K; rate of depositing 1 quarterwave per min at $\lambda = 0.5$ µm; film had green powdery appearance.
9	433	1968	~298	0.0569-5.39	~0°	~0°		0.5	RHENIUM TRIOXIDE, ReO_3; crystal (2 mm cube); grown by a vapor-transport technique and shows good stoichiometry; data extracted from smooth curve.
10	199	1968	300	14.2-100	~0°	~0°			STRONTIUM OXIDE, SrO; single crystal; polished with 0.3 µm polishing powder; etched in a dilute solution of HCl in ethanol; washed in xylene and gently dried on a felt polishing cloth; measured in vacuum; data extracted from smooth curve.
11	206	1967	298	0.250-0.773	0°		2π		DIVANADIUM PENTAOXIDE, V_2O_5; data extracted from smooth curve.

DATA TABLE NO. 190 NORMAL SPECTRAL REFLECTANCE OF MISCELLANEOUS OXIDES

[Wavelength, λ, μm; Reflectance, ρ; Temperature, T, K]

CURVE 1 (T ~ 298)

λ	ρ
0.195	0.1889
0.196	0.1960*
0.200	0.2065
0.204	0.2140*
0.206	0.2155
0.209	0.2135*
0.216	0.1908
0.220	0.1703
0.226	0.1567
0.233	0.1462
0.238	0.1423*
0.250	0.1415
0.259	0.1398*
0.276	0.1385
0.279	0.1401*
0.280	0.1450
0.282	0.1639*
0.286	0.1830
0.290	0.1959
0.292	0.1950*
0.297	0.1613*
0.300	0.1554
0.303	0.1560*
0.307	0.2542
0.310	0.2190
0.312	0.2019*
0.315	0.1834*
0.317	0.1796
0.319	0.1914
0.322	0.1864
0.329	0.1818*
0.333	0.1768
0.344	0.1650
0.353	0.1577
0.361	0.1535*
0.373	0.1485

CURVE 2 (T ~ 298)

λ	ρ
14.1	0.024
14.8	0.014
15.6	0.009
16.3	0.012

CURVE 2 (cont.)

λ	ρ
17.2	0.020
17.9	0.040
18.5	0.072
19.0	0.119
19.6	0.165
20.2	0.241
20.5	0.299
21.2	0.346
21.7	0.369
22.1	0.376
23.3	0.367*
25.7	0.367
27.0	0.359
27.7	0.344
28.2	0.347*
28.8	0.363
29.4	0.366
31.4	0.319
32.0	0.309
34.2	0.333
35.2	0.341
36.3	0.344

CURVE 3 (T = 298)

λ	ρ
0.250	0.053
0.262	0.065
0.269	0.083
0.275	0.128
0.282	0.228
0.304	0.567
0.315	0.713
0.320	0.718*
0.336	0.800
0.355	0.826
0.363	0.802
0.371	0.835
0.382	0.826
0.390	0.849
0.390	0.814*
0.396	0.772
0.399	0.832
0.401	0.860
0.405	0.867*

CURVE 3 (cont.)

λ	ρ
0.409	0.902
0.416	0.889
0.422	0.914*
0.441	0.926
0.458	0.925*
0.462	0.918
0.467	0.830
0.470	0.917*
0.471	0.928*
0.479	0.933*
0.494	0.945
0.513	0.948
0.524	0.937
0.526	0.918
0.530	0.920*
0.534	0.860
0.536	0.893*
0.539	0.906*
0.542	0.949*
0.547	0.958
0.576	0.966
0.652	0.975
0.697	0.978
0.712	0.973
0.730	0.975*
0.744	0.984

CURVE 4 (T = 298)

λ	ρ
0.302	0.158
0.308	0.164*
0.313	0.169*
0.320	0.175*
0.327	0.176
0.336	0.172*
0.345	0.166*
0.355	0.161*
0.365	0.157*
0.375	0.153
0.386	0.151*
0.401	0.147
0.416	0.145*
0.430	0.145
0.436	0.151*

CURVE 4 (cont.)

λ	ρ
0.441	0.168
0.447	0.189
0.450	0.207*
0.455	0.215*
0.466	0.222
0.476	0.223*
0.492	0.221
0.510	0.219
0.532	0.215*
0.551	0.214

CURVE 5 (T = 298)

λ	ρ
0.440	0.890
0.600	0.945

CURVE 6 (T = 298)

λ	ρ
0.440	0.730
0.600	0.905

CURVE 7 (T ~ 298)

λ	ρ
4.1	0.008
4.7	0.124
5.1	0.025
5.9	0.173
6.8	0.024
8.3	0.375
9.2	0.101
10.0	0.154
10.9	0.089
12.0	0.126
13.6	0.105
19.0	0.029
21.0	0.008
22.1	0.029
23.4	0.197
26.5	0.237
27.3	0.245*
28.0	0.249
28.9	0.227

CURVE 7 (cont.)

λ	ρ
30.1	0.132
31.1	0.237
32.5	0.288
34.0	0.317
35.0	0.336*
37.1	0.268

CURVE 8 (T ~ 298)

λ	ρ
4.5	0.007
4.7	0.089
5.2	0.005
5.8	0.126
6.3	0.008
8.3	0.325
9.8	0.185
10.9	0.107
13.7	0.109
16.8	0.007
21.4	0.012
21.9	0.089
22.8	0.202
24.0	0.281
25.0	0.309
26.1	0.321
27.1	0.321
28.4	0.291
29.1	0.247
29.9	0.199
31.0	0.286
34.0	0.382

CURVE 9 (T ~ 298)

λ	ρ
0.0569	0.0953
0.0751	0.119
0.0815	0.135
0.0850	0.150
0.0875	0.150*
0.0902	0.139
0.0952	0.105*
0.0960	0.100
0.0985	0.100

CURVE 9 (cont.)

λ	ρ
0.101	0.104
0.111	0.179
0.113	0.194
0.117	0.203
0.129	0.203
0.136	0.191
0.140	0.178
0.145	0.165
0.152	0.152
0.167	0.105
0.169	0.102*
0.184	0.0989
0.198	0.0759
0.205	0.0807
0.212	0.100
0.224	0.222
0.253	0.311
0.274	0.317
0.363	0.257
0.482	0.0755
0.525	0.0158
0.596	0.283
0.667	0.618
0.743	0.763
0.849	0.824
1.13	0.879
1.44	0.922
5.39	0.941

CURVE 10 (T = 300)

λ	ρ
14.2	0.055
15.1	0.053
16.6	0.035
18.3	0.011
18.8	0.014*
19.2	0.029*
19.6	0.054
19.9	0.097
20.2	0.147
20.4	0.206*
20.7	0.341*
20.9	0.479
21.7	0.723

CURVE 10 (cont.)

λ	ρ
22.1	0.775
22.5	0.797*
23.3	0.806
24.3	0.798
25.0	0.763
25.5	0.729*
25.9	0.727
27.1	0.816
28.3	0.862
32.4	0.916
36.3	0.936
38.3	0.932
40.9	0.910
42.9	0.874
44.8	0.790
46.2	0.686
48.7	0.604
53.1	0.530
59.5	0.472
67.1	0.429
74.6	0.397
86.2	0.367
100	0.354

CURVE 11 (T = 298)

λ	ρ
0.250	0.044
0.264	0.047
0.280	0.043
0.306	0.034
0.344	0.033
0.383	0.048
0.410	0.053
0.458	0.046
0.478	0.047
0.494	0.054
0.506	0.065
0.516	0.092
0.524	0.126
0.532	0.170
0.560	0.429
0.572	0.513
0.582	0.556
0.595	0.589*

CURVE 11 (cont.)

λ	ρ
0.613	0.619
0.635	0.645
0.651	0.653
0.671	0.654*
0.681	0.653*
0.719	0.657
0.747	0.658
0.773	0.661

* Not shown on plot

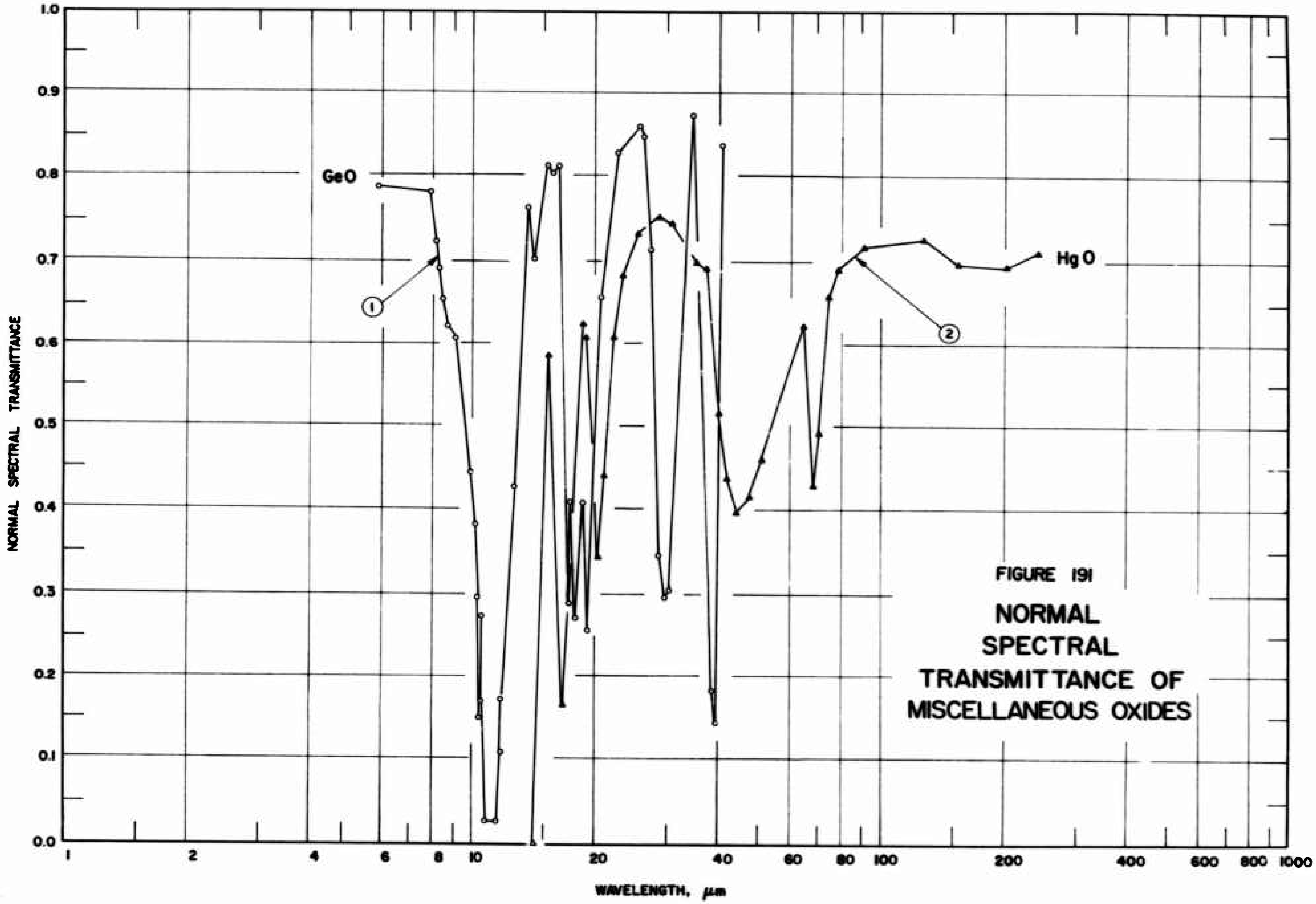


FIGURE 191
NORMAL
SPECTRAL
TRANSMITTANCE OF
MISCELLANEOUS OXIDES

SPECIFICATION TABLE NO. 191 NORMAL SPECTRAL TRANSMITTANCE OF MISCELLANEOUS OXIDES

Curve No.	Ref. No.	Year	Temperature K	Wavelength Range, μm	Geometry θ θ' ω'	Reported Error, %	Composition (weight percent), Specifications, and Remarks
1	131	1965	293	5.88-41.2	~0° ~0°		GERMANIUM MONOXIDE, GeO; powder from Kern Chemical Co. suspended in polyethylene binder at 5 mg cm^{-3}; data extracted from smooth curve.
2	379	1965	~298	14.3-244	~0° ~0°		MERCURY MONOXIDE, HgO; 10% yellow HgO powder in polyethylene matrix; pressed between hot (353 K) plates to 4 tons $in.^{-2}$ and cooled under pressure; 254 μm thick; data extracted from smooth curve.

DATA TABLE NO. 191 NORMAL SPECTRAL TRANSMITTANCE OF MISCELLANEOUS OXIDES

[Wavelength, λ, μm; Transmittance, τ; Temperature, T, K]

λ	τ	λ	τ	λ	τ	λ	τ	λ	τ
CURVE 1 T = 293		CURVE 1 (cont.)		CURVE 1 (cont.)		CURVE 2 (cont.)		CURVE 2 (cont.)	
		13.5	0.688*	25.7	0.860	18.1	0.564*	137	0.728
5.88	0.787	13.6	0.757*	26.1	0.848	18.4	0.619*	154	0.699
7.96	0.781	13.7	0.764	27.2	0.714	18.7	0.625	164	0.569
8.11	0.724*	14.1	0.709	28.8	0.344	19.0	0.609	204	0.695
8.23	0.691*	14.2	0.709*	29.9	0.248	20.3	0.342	244	0.712
8.42	0.655*	15.2	0.811*	30.3	0.304	21.0	0.439		
8.70	0.622*	15.4	0.811	31.3	0.614*	22.1	0.608		
8.91	0.607	15.7	0.802	34.6	0.873	23.4	0.683		
9.04	0.607	16.0	0.811*	38.8	0.180	25.4	0.733		
9.85	0.442	16.2	0.811	39.8	0.141	28.6	0.752		
10.2	0.380	16.3	0.796*	41.2	0.836	30.9	0.746		
10.3	0.296	16.7	0.506*			35.2	0.699		
10.4	0.149	17.1	0.289	CURVE 2 T ~ 298		37.2	0.642		
10.5	0.272	17.3	0.409			40.0	0.514		
10.5	0.166	17.9	0.271			42.0	0.435		
10.7	0.091*	18.1	0.262*	14.3	0.000	44.2	0.397		
10.8	0.026	18.3	0.271*	14.6	0.104*	47.8	0.415		
11.5	0.026	18.8	0.406	14.9	0.358*	50.8	0.459		
11.7	0.045*	19.2	0.257	15.4	0.585	64.5	0.624		
11.8	0.106	19.4	0.278*	15.9	0.340	68.5	0.478		
11.8	0.170	20.0	0.527*	16.1	0.253*	70.4	0.490		
12.7	0.427	20.7	0.657	16.4	0.191*	74.1	0.659		
13.2	0.553*	22.2	0.799*	16.7	0.163	78.1	0.691		
13.4	0.634*	22.8	0.829	17.1	0.265*	91.7	0.718		

*Not shown on plot

3. MIXTURES OF SINGLE OXIDES

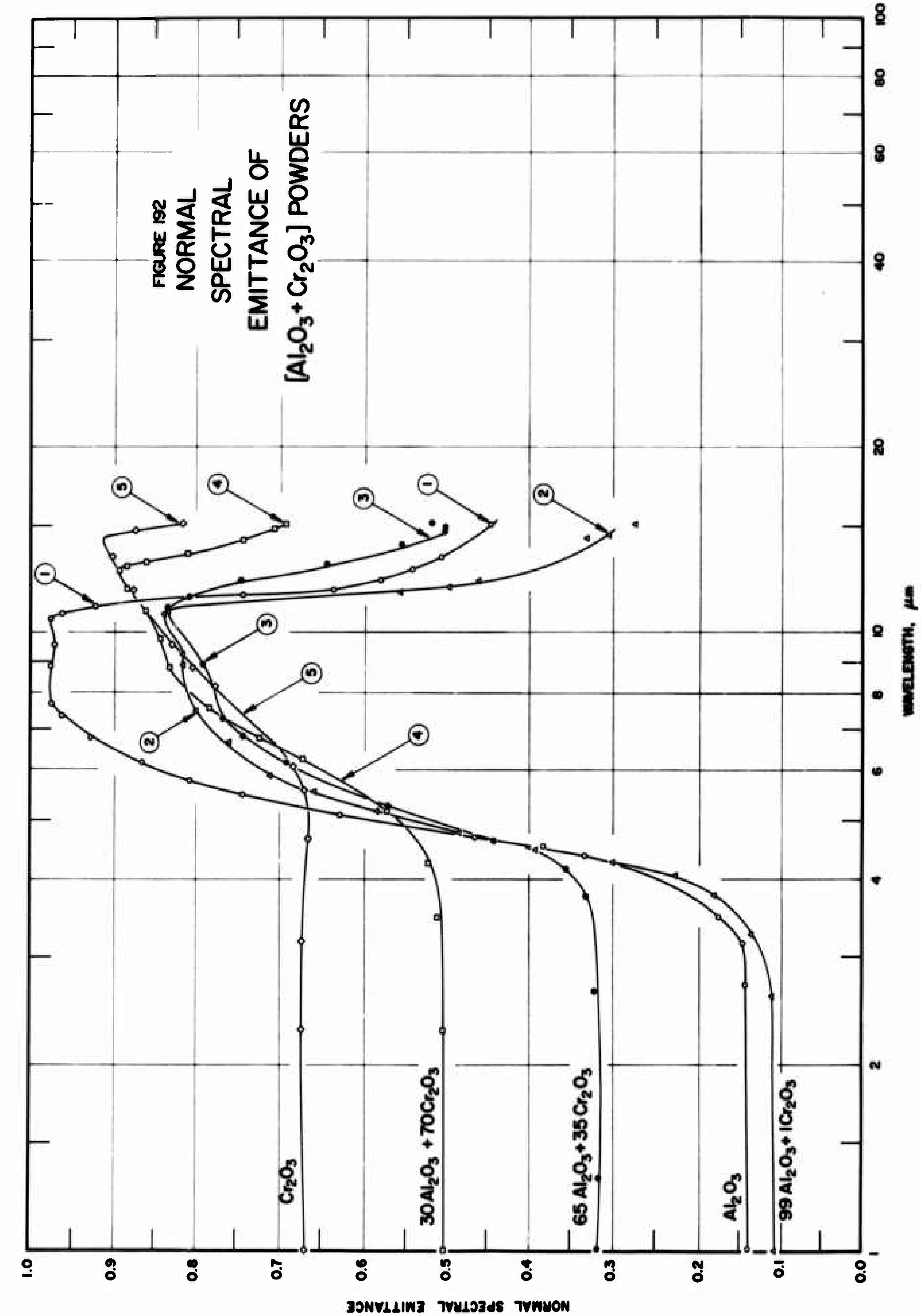


FIGURE 192
NORMAL
SPECTRAL
EMITTANCE OF
[Al_2O_3 + Cr_2O_3] POWDERS
Cr_2O_3
30 Al_2O_3 + 70 Cr_2O_3
65 Al_2O_3 + 35 Cr_2O_3
Al_2O_3
99 Al_2O_3 + 1 Cr_2O_3
NORMAL SPECTRAL EMITTANCE
WAVELENGTH, μm
1.0 0.9 0.8 0.7 0.6 0.5 0.4 0.3 0.2 0.1 0.0
1 2 4 6 8 10 20 40 60 80 100

SPECIFICATION TABLE NO. 192 NORMAL SPECTRAL EMITTANCE OF [Al_2O_3 + Cr_2O_3] POWDERS

Curve No.	Ref. No.	Year	Temperature, K	Wavelength Range, μm	Geometry θ'	Reported Error, %	Composition (weight percent), Specifications, and Remarks
1	393	1966	1273	1.00-15.0	~0°		Al_2O_3;cold pressed and sintered at 2023 K for 2 hrs; 2 or 3 wt. percent polyvinyl binder; density 3.35 g cm^{-3}; data extracted from smooth curve.
2	393	1966	1273	1.00-15.0	~0°		99 Al_2O_3, 1 Cr_2O_3; cold pressed and sintered at 2023 K for 2 hrs; 2 or 3 wt. percent polyvinyl binder; density 3.82 g cm^{-3}; data extracted from smooth curve.
3	393	1966	1273	1.00-15.0	~0°		65 Al_2O_3, 35 Cr_2O_3; cold pressed and sintered at 2123 K for 2 hrs; 2 or 3 wt. percent polyvinyl binder; density 3.86 g cm^{-3}; data extracted from smooth curve.
4	393	1966	1273	1.00-15.0	~0°		30 Al_2O_3, 70 Cr_2O_3; cold pressed and sintered at 2123 K for 2 hrs; 2 or 3 wt. percent polyvinyl binder; density 3.56 g cm^{-3}; data extracted from smooth curve.
5	393	1966	1273	1.00-15.0	~0°		Cr_2O_3; cold pressed and sintered at 2123 K for 2 hrs; 2 or 3 wt. percent polyvinyl binder; density 3.29 g cm^{-3}; data extracted from smooth curve.

DATA TABLE NO. 192 NORMAL SPECTRAL EMITTANCE OF [Al_2O_3 + Cr_2O_3] POWDERS

[Wavelength, λ, μm; Emittance, ϵ; Temperature, T, K]

CURVE 1
T = 1273

λ	ϵ
1.00	0.140
2.68	0.142
3.11	0.147
3.45	0.177
4.33	0.334
4.50	0.382
4.66	0.468
5.05	0.630
5.43	0.745
5.75	0.809
6.18	0.867
6.77	0.930
7.33	0.964
7.65	0.977
8.80	0.979
9.53	0.972
10.5	0.977
10.7	0.963
11.0	0.922
11.5	0.744
11.7	0.638
12.1	0.583
12.6	0.544
13.3	0.510
15.0	0.448

CURVE 2
T = 1273

λ	ϵ
1.00	0.107
2.59	0.112
3.24	0.137
3.76	0.181
4.04	0.229
4.25	0.300
4.43	0.393
4.73	0.487
5.12	0.589
5.51	0.660
5.88	0.711
6.62	0.760
7.43	0.800
8.32	0.817

CURVE 2 (cont.)

λ	ϵ
9.18	0.817
10.1	0.834
10.7	0.840
10.8	0.835
11.6	0.560
11.8	0.500
12.2	0.462
14.1	0.332
14.4	0.306
15.0	0.275

CURVE 3
T = 1273

λ	ϵ
1.00	0.318
1.31	0.316
2.62	0.321
3.75	0.331
4.12	0.356
4.60	0.442
5.21	0.573
5.66	0.633
6.18	0.691
6.80	0.743
7.25	0.766
8.86	0.792
10.9	0.835
11.4	0.808
12.1	0.746
12.8	0.644
13.8	0.557
14.5	0.502
14.7	0.502
15.0	0.520

CURVE 4
T = 1273

λ	ϵ
1.00	0.505
2.26	0.508
3.45	0.514
4.22	0.525
5.13	0.575
5.66	0.620

CURVE 4 (cont.)

λ	ϵ
6.23	0.673
6.75	0.724
7.57	0.783
8.06	0.812
8.72	0.831
9.76	0.845
10.7	0.862
11.7	0.888
12.6	0.896
12.8	0.888
13.0	0.861
13.4	0.810
14.1	0.745
14.7	0.707
15.0	0.694

CURVE 5
T = 1273

λ	ϵ
1.00	0.670
2.28	0.672
3.16	0.674
4.61	0.667
5.53	0.671
6.08	0.685
6.86	0.719
8.14	0.777
8.77	0.803
9.56	0.830
11.6	0.879
13.3	0.904
14.1	0.918
14.3	0.911
14.6	0.877
15.0	0.817

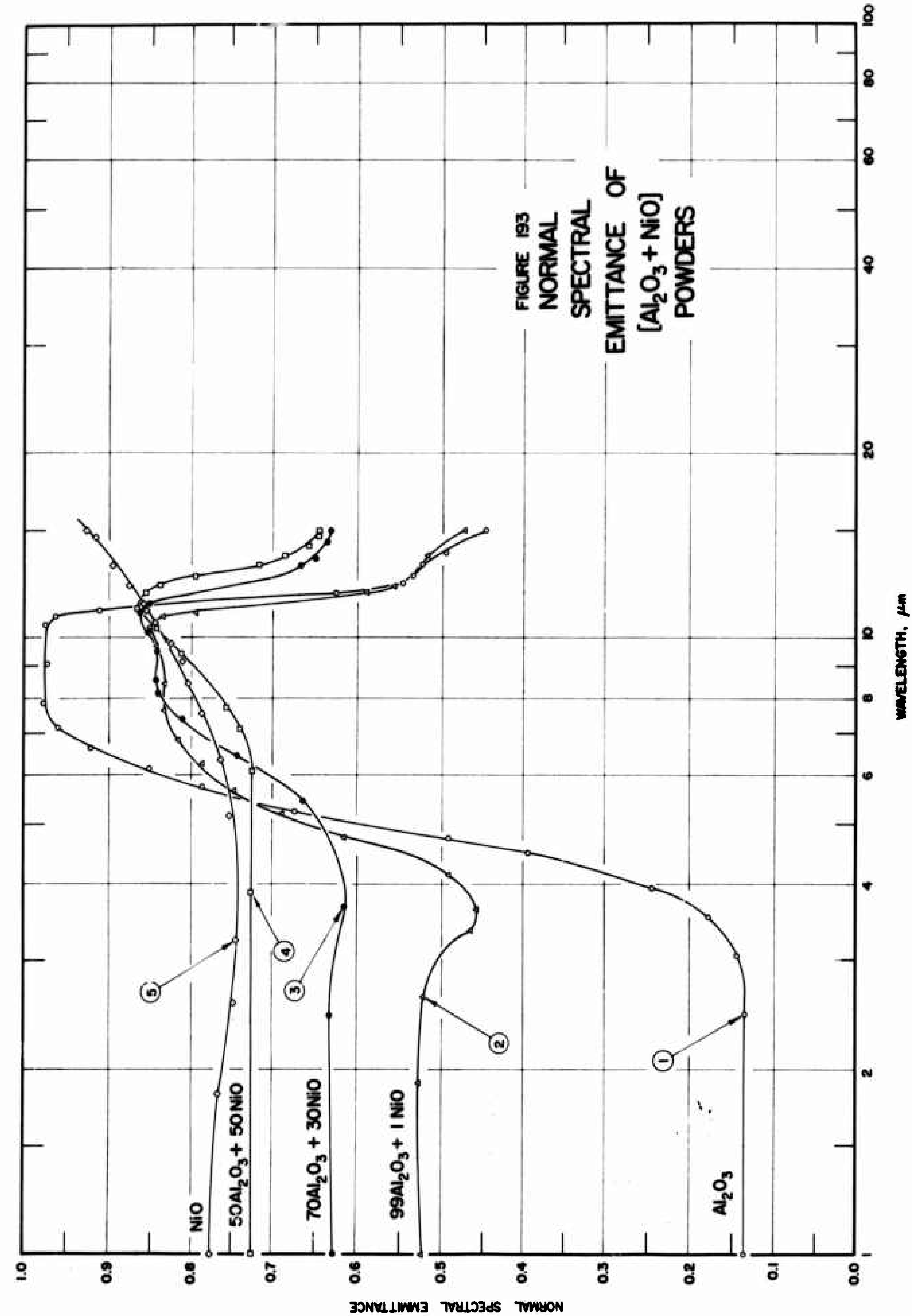


FIGURE 193 NORMAL SPECTRAL EMITTANCE OF $[Al_2O_3 + NiO]$ POWDERS

SPECIFICATION TABLE NO. 193 NORMAL SPECTRAL EMITTANCE OF [Al_2O_3 + NiO] POWDERS

Curve No.	Ref. No.	Year	Temperature, K	Wavelength Range, μm	Geometry θ'	Reported Error, %	Composition (weight percent), Specifications, and Remarks
1	393	1966	1273	1.00-15.0	~0°		Al_2O_3 cold pressed and sintered at 2023 K for 2 hrs; 2 or 3 wt. percent polyvinyl binder; density 3.35 g cm^{-3}; data extracted from smooth curve.
2	393	1966	1273	1.00-15.0	~0°		99 Al_2O_3, 1 NiO; cold pressed and sintered at 2023 K for 2 hrs; 2 or 3 wt. percent polyvinyl binder: density 3.89 g cm^{-3}; data extracted from smooth curve.
3	393	1966	1273	1.00-15.0	~0°		70 Al_2O_3, 30 NiO; cold pressed and sintered at 2023 K for 2 hrs; 2 or 3 wt. percent polyvinyl binder; density 3.84 g cm^{-3}; data extracted from smooth curve.
4	393	1966	1273	1.00-15.0	~0°		50 Al_2O_3, 50 NiO; cold pressed and sintered at 2023 K for 2 hrs; 2 or 3 wt. percent polyvinyl binder; density 4.39 g cm^{-3}; data extracted from smooth curve.
5	393	1966	1273	1.00-15.0	~0°		NiO; cold pressed and sintered at 1673 K for 2 hrs; 2 or 3 wt. percent polyvinyl binder; density 5.32 g cm^{-3}; data extracted from smooth curve.

DATA TABLE NO. 193 NORMAL SPECTRAL EMITTANCE OF [Al_2O_3 + NiO] POWDERS

[Wavelength, λ, μm; Emittance, ε; Temperature, T, K]

CURVE 1 T = 1273

λ	ε
1.00	0.135
2.46	0.135
3.06	0.145
3.51	0.178
3.94	0.243
4.50	0.395
4.72	0.492
5.24	0.673
5.72	0.786
6.15	0.852
6.64	0.921
7.19	0.960
7.82	0.976
9.09	0.973
10.5	0.975
10.8	0.962
11.1	0.912
11.8	0.626
12.3	0.549
12.6	0.535
13.2	0.523
13.7	0.497
15.0	0.449

CURVE 2 T = 1273

λ	ε
1.00	0.521
1.90	0.526
2.61	0.521
3.38	0.464
3.64	0.458
4.12	0.491
4.79	0.617
5.20	0.690
5.68	0.748
6.23	0.789
6.82	0.819
7.65	0.834
8.42	0.833
9.70	0.845
10.4	0.852
10.8	0.839
11.0	0.795
11.9	0.590
12.2	0.559
13.6	0.519
15.0	0.472

CURVE 3 T = 1273

λ	ε
1.00	0.627
2.44	0.631
3.67	0.616
5.46	0.664
6.46	0.741
7.40	0.812
8.12	0.841
8.57	0.845
9.58	0.842
10.3	0.855
11.0	0.865
11.4	0.852
13.1	0.669
13.5	0.650
14.4	0.638
15.0	0.632

CURVE 4 T = 1273

λ	ε
1.00	0.722
3.89	0.726
6.10	0.723
7.15	0.740

CURVE 4 (cont.)

λ	ε
7.75	0.758
9.44	0.813
10.4	0.846
11.2	0.869
11.8	0.859
12.2	0.840
12.6	0.797
13.2	0.717
13.6	0.689
14.2	0.659
14.7	0.648
15.0	0.647

CURVE 5 T = 1273

λ	ε
1.00	0.775
1.82	0.766
2.57	0.749
3.22	0.745
5.15	0.751
6.33	0.763
7.50	0.788
8.43	0.804
9.15	0.811

CURVE 5 (cont.)

λ	ε
9.80	0.828
10.6	0.846
11.1	0.856
11.4	0.860
12.2	0.878
13.3	0.896
14.6	0.917
15.0	0.927

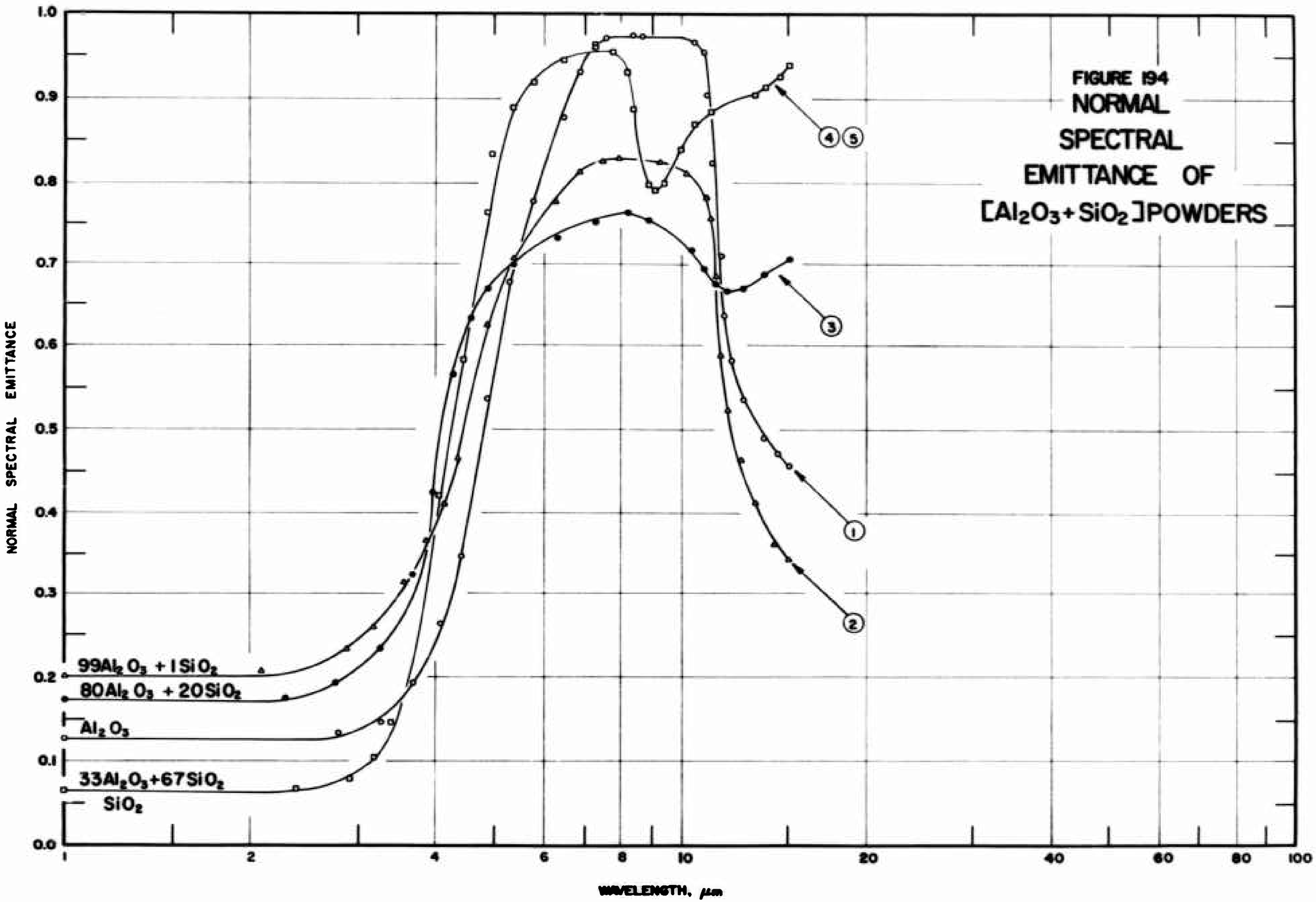


FIGURE 194 NORMAL SPECTRAL EMITTANCE OF $[Al_2O_3+SiO_2]$ POWDERS

SPECIFICATION TABLE NO. 194 NORMAL SPECTRAL EMITTANCE OF [$Al_2O_3 + SiO_2$] POWDERS

Curve No.	Ref. No.	Year	Temperature, K	Wavelength Range, μm	Geometry θ	Reported Error, %	Composition (weight percent), Specifications, and Remarks
1	393	1966	1273	1.00-15.0	~0°		Al_2O_3; cold pressed and sintered at 2023 K for 2 hrs; 2 or 3 wt. percent polyvinyl binder; density 3.35 g cm^{-3}; data extracted from smooth curve.
2	393	1966	1273	1.00-15.0	~0°		99 Al_2O_3, 1 SiO_2; cold pressed and sintered at 2023 K for 2 hrs; 2 or 3 wt. percent polyvinyl binder; density 3.47 g cm^{-3}; data extracted from smooth curve.
3	393	1966	1273	1.00-15.0	~0°		80 Al_2O_3, 20 SiO_2; cold pressed and sintered at 1973 K for 2 hrs; 2 or 3 wt. percent polyvinyl binder; density 2.89 g cm^{-3}; data extracted from smooth curve.
4	393	1966	1273	1.00-15.0	~0°		33 Al_2O_3, 67 SiO_2; cold pressed and sintered at 1823 K for 1 hr; 2 or 3 wt. percent polyvinyl binder; density 1.64 g cm^{-3}; data extracted from smooth curve.
5	393	1966	1273	1.00-15.0	~0°		SiO_2; cold pressed and sintered at 1823 K for 1 hr; 2 or 3 wt. percent polyvinyl binder; data extracted from smooth curve.

DATA TABLE NO. 194 NORMAL SPECTRAL EMITTANCE OF [$Al_2O_3 + SiO_2$] POWDERS

[Wavelength, λ, μm; Emittance, ε; Temperature, T, K]

λ	ε	λ	ε	λ	ε	λ	ε	λ	ε
CURVE 1	T = 1273	CURVE 2	T = 1273	CURVE 3	T = 1273	CURVE 4	T = 1273	CURVE 5	T = 1273
1.00	0.126	1.00	0.200	1.00	0.171	1.00	0.064	1.00	0.064
2.77	0.132	2.09	0.206	2.28	0.174	2.37	0.066	2.37	0.066
3.24	0.146	2.86	0.234	2.85	0.193	2.90	0.079	2.90	0.079
3.69	0.192	3.18	0.260	3.23	0.234	3.17	0.102	3.17	0.102
4.08	0.263	3.54	0.315	3.69	0.324	3.39	0.146	3.39	0.146
4.40	0.348	3.89	0.367	3.98	0.426	4.02	0.421	4.02	0.421
4.85	0.537	4.12	0.411	4.26	0.566	4.42	0.584	4.42	0.584
5.29	0.677	4.34	0.468	4.59	0.633	4.84	0.775	4.84	0.775
5.72	0.778	4.83	0.626	4.88	0.670	4.94	0.835	4.94	0.835
6.42	0.879	5.33	0.708	5.32	0.700	5.32	0.890	5.32	0.890
6.85	0.932	6.23	0.777	6.30	0.734	5.79	0.920	5.79	0.920
7.26	0.960	6.87	0.812	7.28	0.751	6.49	0.949	6.49	0.949
7.55	0.971	7.43	0.828	8.18	0.763	7.26	0.961	7.26	0.961
8.37	0.975	7.97	0.830	8.86	0.755	7.79	0.954	7.79	0.954
9.63	0.974	9.20	0.825	10.4	0.717	8.12	0.931	8.12	0.931
10.5	0.966	10.2	0.811	10.8	0.693	8.38	0.888	8.38	0.888
10.8	0.955	11.0	0.783	11.4	0.674	8.89	0.798	8.89	0.798
11.0	0.903	11.2	0.758	11.8	0.667	9.01	0.791	9.01	0.791
11.3	0.822	11.4	0.683	12.6	0.670	9.38	0.800	9.38	0.800
11.6	0.710	11.6	0.590	13.6	0.686	9.93	0.840	9.93	0.840
11.7	0.636	11.9	0.522	15.0	0.706	10.5	0.870	10.5	0.870
12.1	0.581	12.5	0.464			11.2	0.885	11.2	0.885
12.6	0.536	13.2	0.413			13.2	0.903	13.2	0.903
13.6	0.491	14.2	0.361			13.7	0.913	13.7	0.913
14.4	0.471	15.0	0.345			14.5	0.927	14.5	0.927
15.0	0.458					15.0	0.940	15.0	0.940

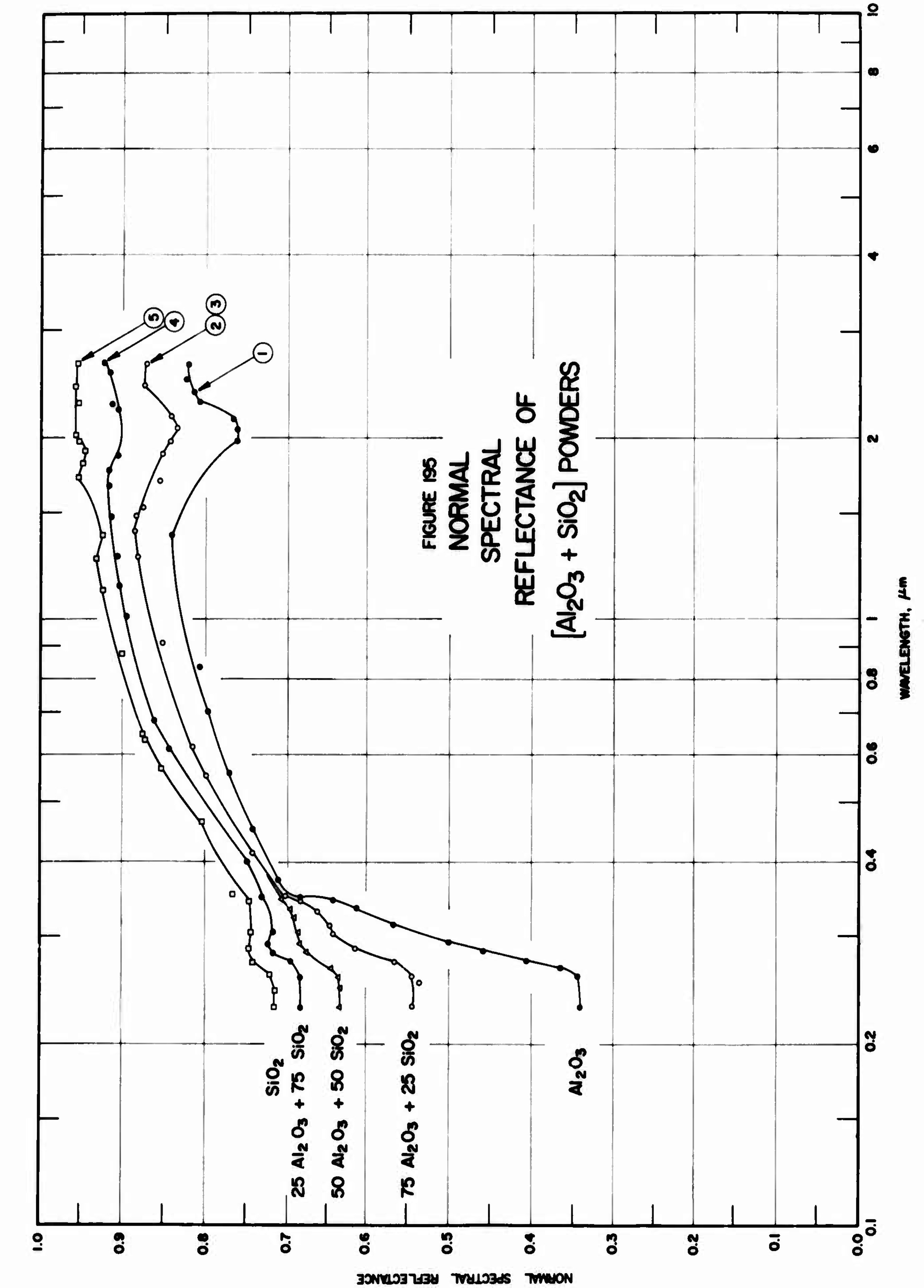


FIGURE 195 NORMAL SPECTRAL REFLECTANCE OF [Al$_2$O$_3$ + SiO$_2$] POWDERS

SPECIFICATION TABLE NO. 195 NORMAL SPECTRAL REFLECTANCE OF [Al_2O_3 + SiO_2] POWDERS

Curve No.	Ref. No.	Year	Temperature, K	Wavelength Range, μm	Geometry θ	Geometry θ'	Geometry ω'	Reported Error, %	Composition (weight percent), Specifications, and Remarks
1	91	1967	298	0.230-2.65	0°		2 π		Al_2O_3; commercially pure; -230 +270 mesh; pressed at 24300 Newtons cm^{-2}; 1.6 mm thick on stainless steel; MgO reference standard; data extracted from smooth curve.
2	91	1967	298	0.230-2.65	0°		2 π		75 Al_2O_3, 25 SiO_2; commercially pure; -230 +270 mesh; pressed at 24300 Newtons cm^{-2}; 1.6 mm thick on stainless steel; surface area: Al_2O_3 64%, SiO_2 36%; MgO reference standard; data extracted from smooth curve.
3	91	1967	298	0.230-2.65	0°		2 π		50 Al_2O_3, 50 SiO_2; commercially pure; -230 +270 mesh; pressed at 24300 Newtons cm^{-2}; 1.6 mm thick on stainless steel; surface area: Al_2O_3 37%, SiO_2 63%; MgO reference standard; data extracted from smooth curve.
4	91	1967	298	0.230-2.65	0°		2 π		25 Al_2O_3, 75 SiO_2; commercially pure; -230 +270 mesh; pressed at 24300 Newtons cm^{-2}; 1.6 mm thick on stainless steel; surface area: Al_2O_3 16%, SiO_2 84%; MgO reference standard; data extracted from smooth curve.
5	91	1967	298	0.230-2.65	0°		2 π		SiO_2; commercially pure; -230 +270 mesh; pressed at 24300 Newtons cm^{-2}; 1.6 mm thick on stainless steel; MgO reference standard; data extracted from smooth curve.

DATA TABLE NO. 195 NORMAL SPECTRAL REFLECTANCE OF [Al_2O_3 + SiO_2] POWDERS

[Wavelength, λ, μm; Reflectance, ρ; Temperature, T, K]

CURVE 1
T = 298

λ	ρ
0.230	0.342
0.259	0.344
0.266	0.364
0.274	0.406
0.285	0.459
0.294	0.500
0.316	0.569
0.335	0.613
0.346	0.643
0.350	0.684
0.373	0.711
0.456	0.741
0.560	0.770
0.708	0.797
0.838	0.809
1.39	0.841
1.99	0.762
2.07	0.762
2.14	0.777
2.30	0.809
2.39	0.816
2.51	0.823
2.65	0.824

CURVE 2
T = 298

λ	ρ
0.230	0.544
0.252	0.536
0.259	0.544
0.271	0.568
0.288	0.614
0.302	0.641
0.312	0.649
0.330	0.661
0.341	0.682
0.350	0.704
0.411	0.744
0.552	0.800
0.619	0.818
0.911	0.853
1.27	0.883
1.40	0.888
1.48	0.887

CURVE 2 (cont.)

λ	ρ
1.54	0.879
1.70	0.858
1.88	0.853
1.98	0.843
2.09	0.838
2.16	0.841
2.19	0.845*
2.44	0.875
2.65	0.874

CURVE 3
T = 298

λ	ρ
0.230	0.636
0.246	0.635
0.257	0.637
0.267	0.648
0.283	0.676
0.293	0.685
0.306	0.688
0.324	0.691
0.333	0.697
0.349	0.706
0.411	0.744
0.552	0.800
0.619	0.818
0.911	0.853
1.27	0.883
1.40	0.888
1.48	0.887
1.54	0.879
1.70	0.858
1.88	0.853
1.98	0.843
2.09	0.838
2.16	0.841
2.19	0.845
2.44	0.875
2.65	0.874

CURVE 4
T = 298

λ	ρ
0.230	0.682
0.259	0.683

CURVE 4 (cont.)

λ	ρ
0.272	0.698
0.281	0.719
0.292	0.723
0.308	0.719
0.350	0.731
0.400	0.750
0.611	0.844
0.682	0.862
1.01	0.897
1.14	0.904
1.27	0.909
1.48	0.914
1.66	0.918
1.77	0.918
1.88	0.908
2.23	0.909
2.28	0.914
2.57	0.919
2.65	0.923

CURVE 5
T = 298

λ	ρ
0.230	0.716
0.245	0.715
0.260	0.721
0.273	0.742
0.288	0.747
0.306	0.744
0.343	0.747
0.352	0.767
0.467	0.805
0.568	0.856
0.635	0.874
0.650	0.877
0.871	0.900
1.13	0.923
1.26	0.931
1.38	0.929
1.72	0.953
1.82	0.950
1.90	0.947
1.97	0.952
2.01	0.959
2.27	0.954

CURVE 5 (cont.)

λ	ρ
2.41	0.958
2.65	0.956

*Not shown on plot

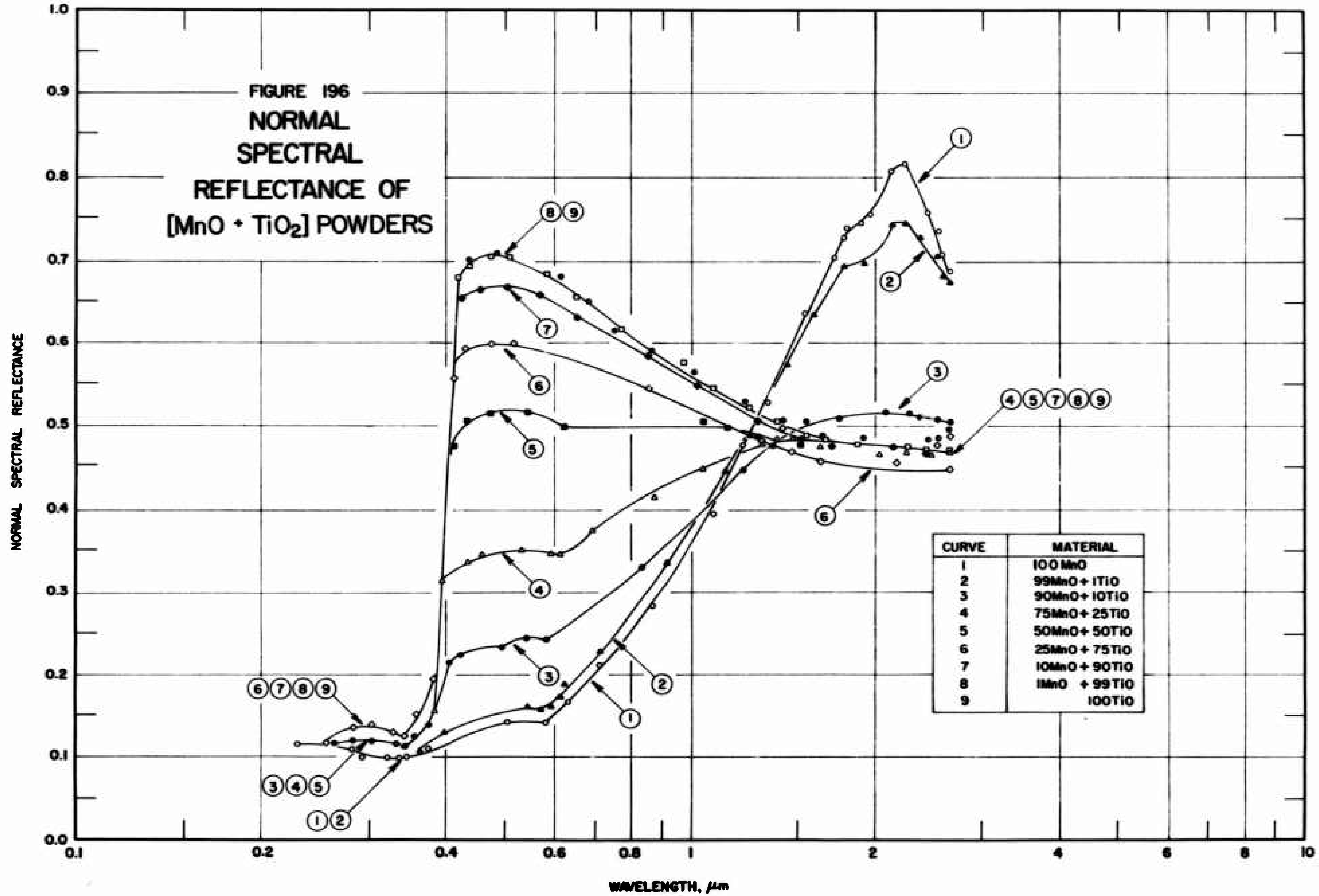


FIGURE 196
NORMAL SPECTRAL REFLECTANCE OF $[MnO + TiO_2]$ POWDERS

SPECIFICATION TABLE NO. 196 NORMAL SPECTRAL REFLECTANCE OF [$MnO + TiO_2$] POWDERS

Curve No.	Ref. No.	Year	Temperature K	Wavelength Range, μm	Geometry θ	θ'	ω'	Reported Error, %	Composition (weight percent), Specifications, and Remarks
1	393	1966	~298	0.230-2.65	~0°		2π		MnO; powder compacted at 35300 psi; data extracted from smooth curve; MgO reference standard.
2	393	1966	~298	0.230-2.65	~0°		2π		99 MnO, 1 TiO_2; powder compacted at 35300 psi; data extracted from smooth curve; MgO reference standard.
3	393	1956	~298	0.230-2.65	~0°		2π		90 MnO, 10 TiO_2; powder compacted at 35300 psi; data extracted from smooth curve; MgO reference standard.
4	393	1966	~298	0.230-2.65	~0°		2π		75 MnO, 25 TiO_2; powder compacted at 35300 psi; data extracted from smooth curve; MgO reference standard.
5	393	1966	~298	0.230-2.65	~0°		2π		50 MnO, 50 TiO_2; powder compacted at 35300 psi; data extracted from smooth curve; MgO reference standard.
6	393	1966	~298	0.230-2.65	~0°		2π		25 MnO, 75 TiO_2; powder compacted at 35300 psi; data extracted from smooth curve; MgO reference standard.
7	393	1966	~298	0.230-2.65	~0°		2π		10 MnO, 90 TiO_2; powder compacted at 35300 psi; data extracted from smooth curve; MgO reference standard.
8	393	1966	~298	0.230-2.65	~0°		2π		1 MnO, 99 TiO_2; powder compacted at 35300 psi; data extracted from smooth curve; MgO reference standard.
9	393	1966	~298	0.230-2.65	~0°		2π		TiO_2; powder compacted at 35300 psi; data extracted from smooth curve; MgO reference standard; converted from reflectance factor.

DATA TABLE NO. 196 NORMAL SPECTRAL REFLECTANCE OF [$MnO + TiO_2$] POWDERS

[Wavelength, λ, μm; Reflectance, ρ; Temperature, T, K]

CURVE 1
T ~ 298

λ	ρ
0.230	0.111
0.281	0.106
0.294	0.099
0.321	0.099
0.339	0.097
0.347	0.099
0.376	0.108
0.509	0.140
0.581	0.140
0.633	0.165
0.712	0.210
0.870	0.281
1.09	0.394
1.22	0.475
1.34	0.528
1.54	0.636
1.71	0.701
1.77	0.728
1.80	0.737
1.90	0.743
1.96	0.755
2.12	0.808
2.17	0.811
2.22	0.814
2.44	0.758
2.53	0.734
2.58	0.708
2.60	0.696
2.65	0.688

CURVE 2
T ~ 298

λ	ρ
0.230	0.111
0.281	0.106
0.294	0.099
0.321	0.099
0.339	0.097
0.347	0.099
0.365	0.105
0.400	0.127
0.546	0.160
0.574	0.156
0.599	0.160

CURVE 2 (cont.)

λ	ρ
0.618	0.172
0.627	0.188
0.714	0.228
0.941	0.336
1.14	0.443
1.25	0.488
1.34	0.525
1.44	0.574
1.59	0.634
1.78	0.694
1.92	0.699
2.14	0.741
2.23	0.741
2.38	0.726
2.52	0.705
2.59	0.680
2.65	0.673

CURVE 3
T ~ 298

λ	ρ
0.230	0.113
0.263	0.113
0.281	0.117
0.305	0.117
0.334	0.112
0.345	0.110
0.349	0.115
0.359	0.121
0.379	0.136
0.407	0.211
0.424	0.221
0.497	0.232
0.542	0.243
0.589	0.242
0.834	0.330
1.22	0.444
1.36	0.474
1.55	0.504
1.75	0.509
2.09	0.515
2.27	0.514
2.36	0.510
2.52	0.508
2.65	0.501

CURVE 4
T ~ 298

λ	ρ
0.230	0.113
0.263	0.113
0.281	0.117
0.305	0.117
0.334	0.112
0.345	0.110
0.349	0.115
0.359	0.121
0.379	0.136
0.385	0.154
0.398	0.312
0.433	0.335
0.460	0.345
0.531	0.350
0.597	0.345
0.611	0.345
0.698	0.374
0.871	0.414
1.05	0.446
1.31	0.478
1.38	0.482
1.47	0.482
1.63	0.471
2.03	0.461
2.25	0.464
2.49	0.462
2.65	0.464

CURVE 5
T ~ 298

λ	ρ
0.230	0.113
0.263	0.113
0.281	0.117
0.305	0.117
0.334	0.112
0.345	0.110
0.349	0.115
0.359	0.121
0.379	0.136
0.385	0.154
0.411	0.473
0.432	0.502
0.471	0.512

CURVE 5 (cont.)

λ	ρ
0.542	0.513
0.627	0.498
1.05	0.501
1.15	0.497
1.29	0.486
1.51	0.477
1.63	0.471
2.03	0.461
2.25	0.464
2.49	0.462
2.65	0.464

CURVE 6
T ~ 298

λ	ρ
0.230	0.114
0.256	0.114
0.282	0.132
0.304	0.137
0.330	0.129
0.344	0.122
0.349	0.128
0.360	0.150
0.383	0.191
0.411	0.556
0.430	0.591
0.475	0.597
0.516	0.597
0.852	0.541
1.14	0.499
1.31	0.480
1.46	0.467
1.64	0.453
2.17	0.453
2.65	0.449

CURVE 7
T ~ 298

λ	ρ
0.230	0.114
0.256	0.114
0.282	0.132
0.304	0.137
0.330	0.129
0.344	0.122

CURVE 7 (cont.)

λ	ρ
0.349	0.128
0.360	0.150
0.383	0.191
0.423	0.653
0.456	0.664
0.501	0.667
0.570	0.657
0.653	0.630
0.852	0.582
1.03	0.549
1.28	0.503
1.42	0.496
1.52	0.484
1.70	0.473
2.14	0.472
2.28	0.465
2.41	0.465
2.52	0.474
2.65	0.487

CURVE 8
T ~ 298

λ	ρ
0.230	0.114
0.256	0.114
0.282	0.132
0.304	0.137
0.330	0.129
0.344	0.122
0.349	0.128
0.360	0.150
0.383	0.191
0.420	0.679
0.438	0.693
0.471	0.701
0.507	0.701
0.585	0.682
0.653	0.654
0.776	0.619
0.972	0.575
1.09	0.543
1.25	0.520
1.38	0.503
1.55	0.487
1.66	0.481

CURVE 8 (cont.)

λ	ρ
1.88	0.477
2.27	0.475
2.42	0.470
2.65	0.470

CURVE 9
T ~ 298

λ	ρ
0.230	0.114
0.256	0.114
0.282	0.132
0.304	0.137
0.330	0.129
0.344	0.122
0.349	0.128
0.360	0.150
0.383	0.191
0.420	0.679
0.439	0.700
0.484	0.708
0.619	0.680
0.685	0.650
0.758	0.615
0.863	0.590
1.02	0.565
1.23	0.529
1.41	0.506
1.65	0.486
1.92	0.483
2.45	0.481
2.53	0.484
2.65	0.495

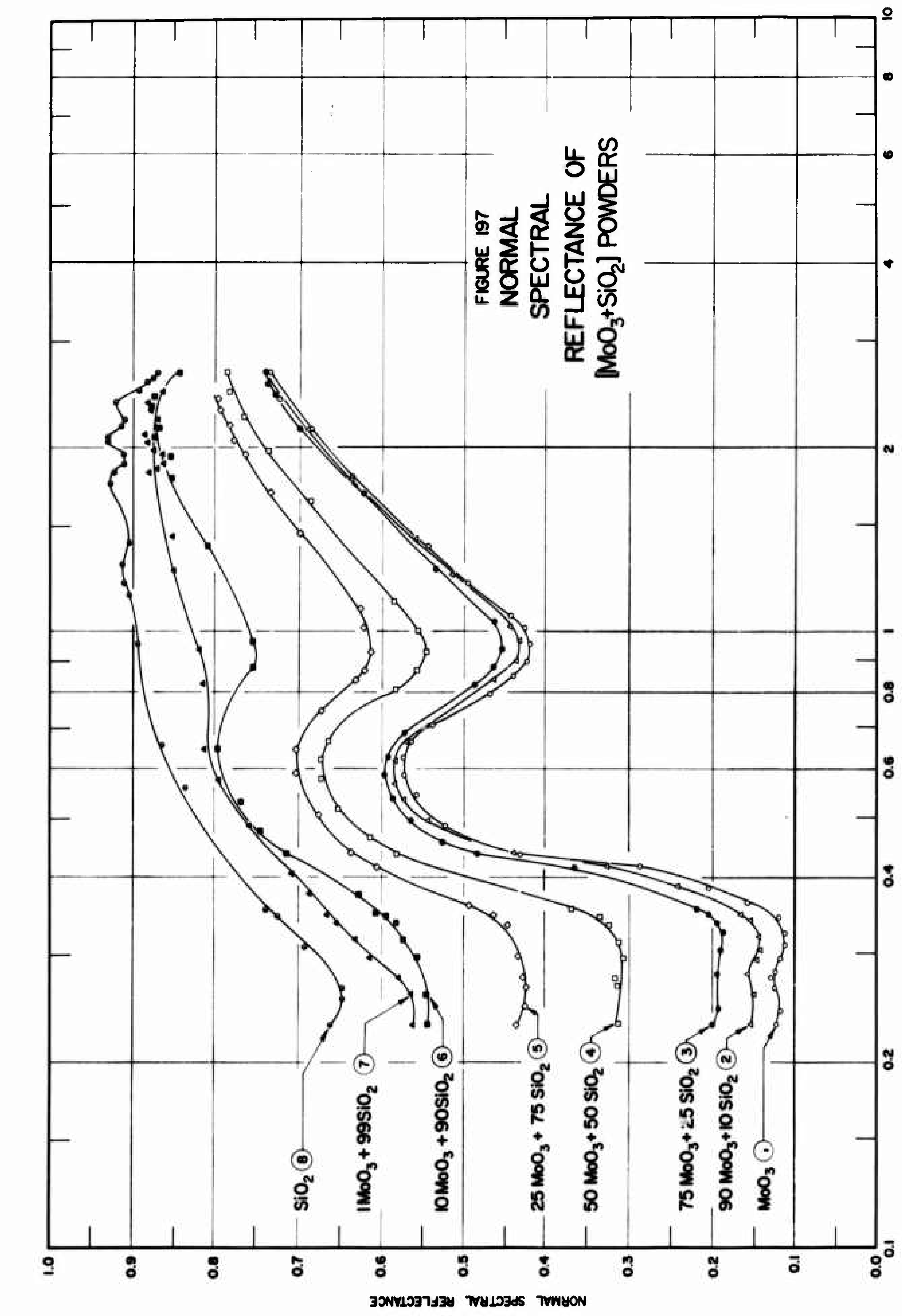


FIGURE 197 NORMAL SPECTRAL REFLECTANCE OF [MoO_3+SiO_2] POWDERS

SPECIFICATION TABLE NO. 197 NORMAL SPECTRAL REFLECTANCE OF [MoO_3 + SiO_2] POWDERS

Curve No.	Ref. No.	Year	Temperature K	Wavelength Range, µm	Geometry θ	θ'	ω'	Reported Error, %	Composition (weight percent), Specifications, and Remarks
1	393	1966	~298	0.230-2.65	~0°		2π		MoO_3; powder compacted at 35300 psi; data extracted from smooth curve; MgO reference standard.
2	393	1966	~298	0.230-2.65	~0°		2π		90 MoO_3, 10 SiO_2; powder compacted at 35300 psi; data extracted from smooth curve; MgO reference standard.
3	393	1966	~298	0.230-2.65	~0°		2π		75 MoO_3, 25 SiO_2; powder compacted at 35300 psi; data extracted from smooth curve; MgO reference standard.
4	393	1966	~298	0.230-2.65	~0°		2π		50 MoO_3, 50 SiO_2; powder compacted at 35300 psi; data extracted from smooth curve; MgO reference standard.
5	393	1966	~298	0.230-2.65	~0°		2π		25 MoO_3, 75 SiO_2; powder compacted at 35300 psi; data extracted from smooth curve; MgO reference standard.
6	393	1966	~298	0.230-2.65	~0°		2π		10 MoO_3, 90 SiO_2; powder compacted at 35300 psi; data extracted from smooth curve; MgO reference standard.
7	393	1966	~298	0.230-2.65	~0°		2π		1 MoO_3, 99 SiO_2; powder compacted at 35300 psi; data extracted from smooth curve; MgO reference standard.
8	393	1966	~298	0.230-2.65	~0°		2π		SiO_2; powder compacted at 35300 psi; data extracted from smooth curve; MgO reference standard.

DATA TABLE NO. 197 NORMAL SPECTRAL REFLECTANCE OF [MoO_3 + SiO_2] POWDERS

[Wavelength, λ, μm; Reflectance, ρ; Temperature, T, K]

λ	ρ
CURVE 1	
T ~ 298	
0.230	0.121
0.242	0.119
0.263	0.124
0.273	0.130
0.280	0.122
0.295	0.119
0.310	0.111
0.323	0.111
0.341	0.120
0.349	0.130*
0.361	0.159
0.382	0.202
0.417	0.288
0.435	0.431
0.485	0.523
0.541	0.558
0.588	0.573
0.622	0.573
0.663	0.564
0.708	0.540
0.794	0.470
0.847	0.440
0.892	0.424
0.952	0.420
1.01	0.426
1.06	0.442
1.20	0.496
1.38	0.544
1.79	0.636
2.14	0.688
2.40	0.721
2.65	0.731
CURVE 2	
T ~ 298	
0.230	0.153
0.259	0.150
0.278	0.159
0.293	0.149
0.305	0.141
0.320	0.143
0.340	0.153
0.346	0.158
CURVE 2 (cont.)	
0.349	0.166
0.386	0.242
0.419	0.327
0.438	0.440
0.494	0.544
0.532	0.573
0.568	0.585
0.618	0.585
0.663	0.569
0.834	0.462
0.895	0.436
0.965	0.431
1.02	0.443
1.24	0.516
1.41	0.560
1.78	0.637
2.14	0.690
2.40	0.721
2.65	0.731
CURVE 3	
T ~ 298	
0.230	0.200
0.243	0.191
0.276	0.194
0.302	0.190
0.325	0.186
0.338	0.194
0.347	0.203
0.352	0.220
0.412	0.362
0.436	0.482
0.455	0.526
0.494	0.564
0.539	0.587
0.584	0.596
0.623	0.592
0.684	0.572
0.820	0.489
0.877	0.465
0.931	0.455
0.995	0.453
1.04	0.463
1.26	0.534
CURVE 3 (cont.)	
1.68	0.623
2.15	0.700
2.41	0.727
2.53	0.735
2.65	0.738
CURVE 4	
T ~ 298	
0.230	0.312
0.264	0.312
0.272	0.315
0.295	0.307
0.312	0.311
0.331	0.323
0.341	0.333
0.347	0.341
0.354	0.369
0.435	0.581
0.461	0.614
0.515	0.651
0.579	0.675
0.620	0.675
0.663	0.666
0.806	0.582
0.862	0.559
0.926	0.548
1.00	0.556
1.12	0.585
1.64	0.687
1.99	0.734
2.23	0.763
2.29	0.772
2.46	0.781
2.65	0.784
CURVE 5	
T ~ 298	
0.230	0.435
0.246	0.426
0.263	0.424
0.273	0.428
0.299	0.434
0.331	0.449
CURVE 5 (cont.)	
0.348	0.464
0.360	0.493
0.416	0.608
0.438	0.637
0.504	0.677
0.590	0.703
0.645	0.703
0.741	0.673
0.832	0.631
0.862	0.621
0.921	0.615
1.02	0.621
1.09	0.629
1.45	0.700
1.69	0.732
1.95	0.761
2.05	0.779
2.17	0.781
2.30	0.795
2.40	0.796
2.65	0.784
CURVE 6	
T ~ 298	
0.230	0.544
0.258	0.547
0.297	0.558
0.316	0.573
0.338	0.581
0.347	0.596
0.350	0.608
0.374	0.627
0.438	0.712
0.477	0.744
0.530	0.769
0.646	0.796
0.873	0.752
0.965	0.752
1.38	0.810
1.79	0.854
1.94	0.857
2.03	0.871
2.09	0.874
2.15	0.870
CURVE 6 (cont.)	
2.23	0.871
2.33	0.880
2.41	0.876
2.65	0.843
CURVE 7	
T ~ 298	
0.230	0.562
0.259	0.564
0.274	0.580
0.297	0.615
0.318	0.631
0.339	0.655
0.346	0.667
0.374	0.689
0.406	0.708
0.483	0.758
0.571	0.796
0.649	0.813
0.824	0.815
0.935	0.820
1.26	0.852
1.43	0.855
1.82	0.881
1.85	0.873
1.89	0.868
1.95	0.868
1.99	0.877
2.02	0.883
2.10	0.887
2.21	0.872
2.30	0.880
2.36	0.882
2.48	0.867
2.65	0.843
CURVE 8	
T ~ 298	
0.230	0.662
0.251	0.649
0.262	0.649
0.309	0.693
0.345	0.724
CURVE 8 (cont.)	
0.351	0.738
0.560	0.838
0.655	0.866
0.953	0.895
1.15	0.905
1.20	0.911
1.29	0.914
1.40	0.906
1.75	0.930
1.82	0.925
1.89	0.911
1.95	0.911
2.04	0.931
2.09	0.931
2.17	0.916
2.21	0.911
2.37	0.922
2.49	0.895
2.56	0.884
2.60	0.879
2.65	0.871

* Not shown on plot

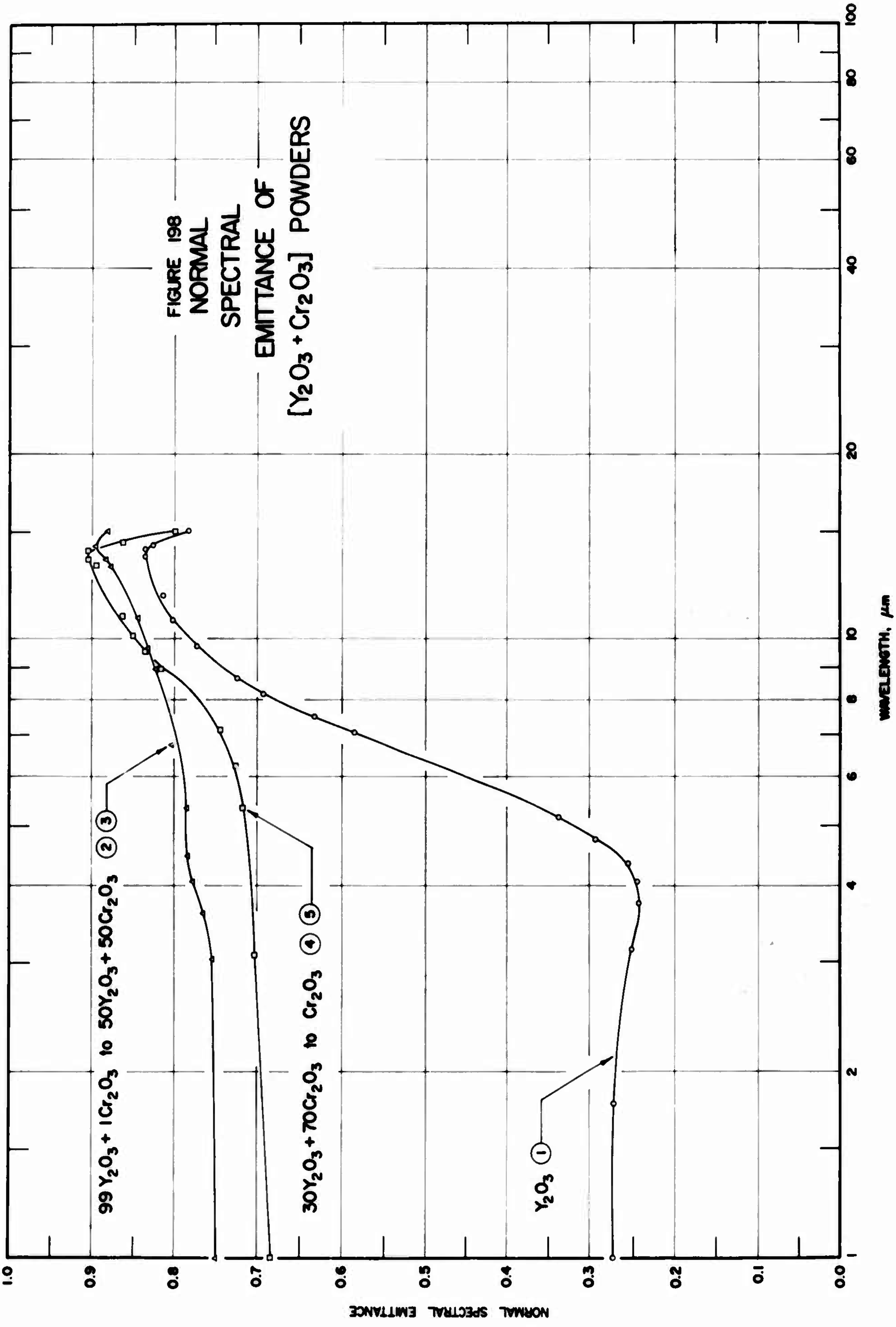


FIGURE 198 NORMAL SPECTRAL EMITTANCE OF $[Y_2O_3 + Cr_2O_3]$ POWDERS

SPECIFICATION TABLE NO. 198 NORMAL SPECTRAL EMITTANCE OF [Y_2O_3 + Cr_2O_3] POWDERS

Curve No.	Ref. No.	Year	Temperature K	Wavelength Range, μm	Geometry θ'	Reported Error, %	Composition (weight percent), Specifications, and Remarks
1	393	1966	1273	1.00-15.0	~0°		Y_2O_3; cold pressed and sintered at 2023 K for 2 hrs; 2 or 3 wt. percent polyvinyl binder; density 4.00 g cm^{-3}; data extracted from smooth curve.
2	393	1966	1273	1.00-15.0	~0°		99 Y_2O_3, 1 Cr_2O_3; cold pressed and sintered at 2023 K for 2 hrs; 2 or 3 wt. percent polyvinyl binder; density 4.70 g cm^{-3}; data extracted from smooth curve.
3*	393	1966	1273	1.00-15.0	~0°		50 Y_2O_3, 50 Cr_2O_3; cold pressed and sintered at 2123 K for 2 hrs; 2 or 3 wt. percent polyvinyl binder; density 4.70 g cm^{-3}; data extracted from smooth curve.
4	393	1966	1273	1.00-15.0	~0°		30 Y_2O_3, 70 Cr_2O_3; cold pressed and sintered at 2073 K for 2 hrs; 2 or 3 wt. percent polyvinyl binder; density 3.23 g cm^{-3}; data extracted from smooth curve.
5	393	1966	1273	1.00-15.0	~0°		Cr_2O_3; cold pressed and sintered at 2123 K for 2 hrs; 2 or 3 wt. percent polyvinyl binder; density 3.29 g cm^{-3}; data extracted from smooth curve.

DATA TABLE NO. 198 NORMAL SPECTRAL EMITTANCE OF [Y_2O_3 + Cr_2O_3] POWDERS

[Wavelength, λ, μm; Emittance, ε; Temperature, T, K]

λ	ε	λ	ε	λ	ε	λ	ε	λ	ε
CURVE 1	T = 1273	CURVE 2	T = 1273	CURVE 3*	T = 1273	CURVE 4	T = 1273	CURVE 5	T = 1273
1.00	0.272	1.00	0.749	1.00	0.749	1.00	0.681	1.00	0.681
1.78	0.272	3.03	0.752	3.03	0.752	3.09	0.701	3.09	0.701
3.14	0.251	3.60	0.765	3.60	0.765	5.31	0.716	5.31	0.716
3.74	0.243	4.02	0.779	4.02	0.779	6.23	0.725	6.23	0.725
4.08	0.246	4.49	0.784	4.49	0.784	7.12	0.744	7.12	0.744
4.32	0.257	5.32	0.784	5.32	0.784	8.91	0.818	8.91	0.818
4.74	0.292	6.79	0.804	6.79	0.804	9.53	0.837	9.53	0.837
5.18	0.337	8.91	0.823	8.91	0.823	10.1	0.851	10.1	0.851
7.07	0.588	9.65	0.832	9.65	0.832	10.9	0.866	10.9	0.866
7.50	0.633	10.7	0.849	10.7	0.849	13.0	0.896	13.0	0.896
8.13	0.693	13.1	0.880	13.1	0.880	13.5	0.906	13.5	0.906
8.64	0.723	13.5	0.885	13.5	0.885	13.9	0.906	13.9	0.906
9.77	0.773	13.8	0.897	13.8	0.897	14.4	0.868	14.4	0.868
10.7	0.801	14.2	0.898	14.2	0.898	15.0	0.800	15.0	0.800
11.7	0.814	15.0	0.883	15.0	0.883				
13.6	0.836								
14.0	0.836								
14.2	0.829								
15.0	0.782								

*Not shown on plot

4. MULTIPLE OXIDES AND SALTS

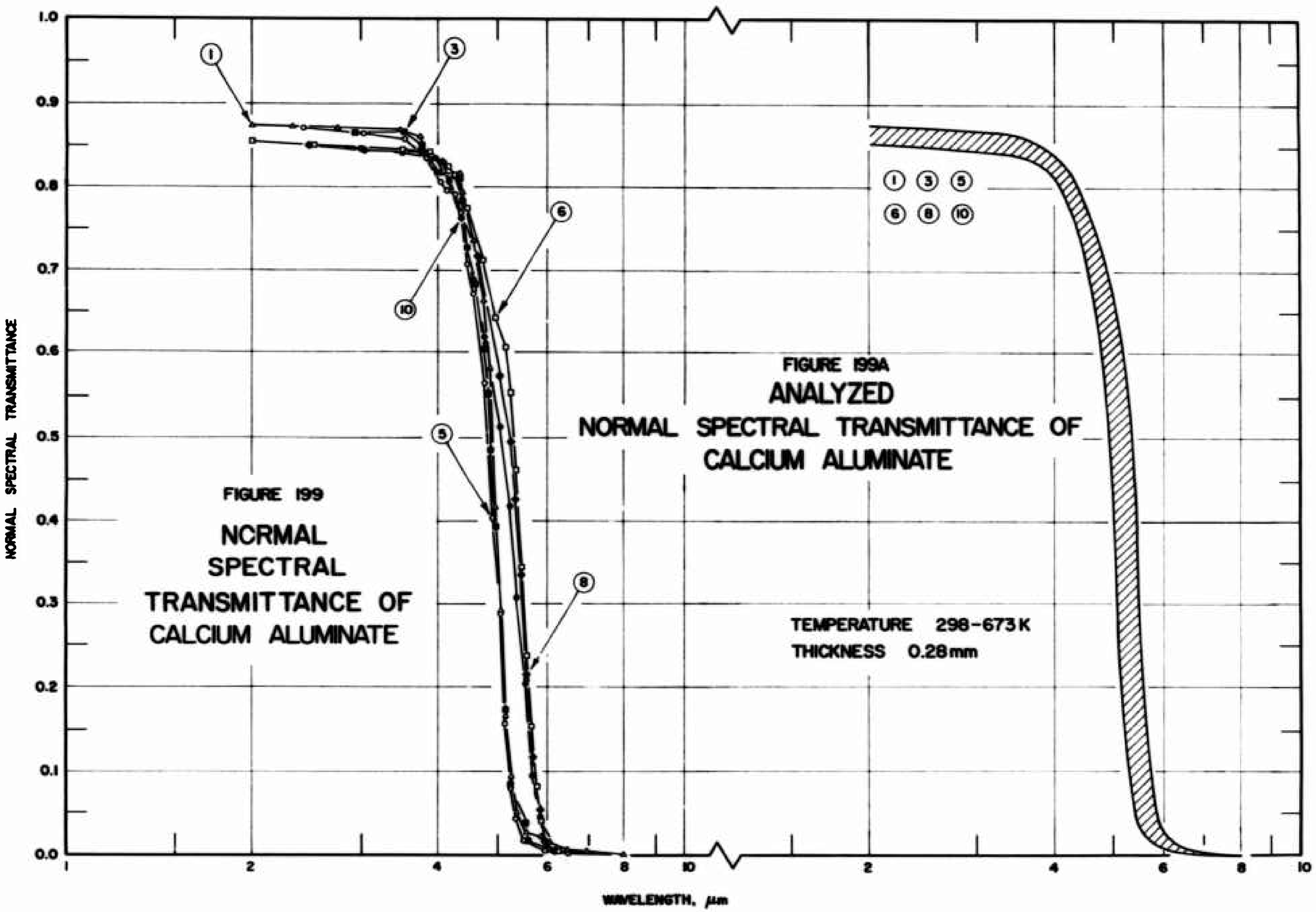


FIGURE 199
NCRMAL SPECTRAL TRANSMITTANCE OF CALCIUM ALUMINATE

FIGURE 199A
ANALYZED
NORMAL SPECTRAL TRANSMITTANCE OF CALCIUM ALUMINATE

SPECIFICATION TABLE NO. 199 NORMAL SPECTRAL TRANSMITTANCE OF CALCIUM ALUMINATE

Curve No.	Ref. No.	Year	Temperature K	Wavelength Range, μm	Geometry θ θ' ω'	Reported Error, %	Composition (weight percent), Specifications, and Remarks
1	12	1964	298	2.00-8.00	~0° ~0°		Calcium aluminate, Type 37A (0.28 mm thick) from Barr and Stroud, England; polished; data extracted from smooth curve.
2*	12	1964	373	2.00-8.00	~0° ~0°		Above specimen and conditions.
3	12	1964	473	2.00-8.00	~0° ~0°		Above specimen and conditions.
4*	12	1964	573	2.00-8.00	~0° ~0°		Above specimen and conditions.
5	12	1964	673	2.00-8.00	~0° ~0°		Above specimen and conditions.
6	12	1964	298	2.00-8.00	~0° ~0°		Calcium aluminate, Type 39A (0.28 mm thick) from Barr and Stroud, England; polished; data extracted from smooth curve.
7*	12	1964	373	2.00-8.00	~0° ~0°		Above specimen and conditions.
8	12	1964	473	2.00-8.00	~0° ~0°		Above specimen and conditions.
9*	12	1964	573	2.00-8.00	~0° ~0°		Above specimen and conditions.
10	12	1964	673	2.00-8.00	~0° ~0°		Above specimen and conditions.

*Not shown on plot

DATA TABLE NO. 199 NORMAL SPECTRAL TRANSMITTANCE OF CALCIUM ALUMINATE

[Wavelength, λ, μm; Transmittance, τ; Temperature, T, K]

CURVE 1
T = 298

λ	τ
2.00	0.875
2.33	0.875
2.74	0.872
3.47	0.870
3.73	0.863
3.89	0.835
4.03	0.819
4.33	0.819
4.38	0.795
4.54	0.736
4.72	0.665
4.83	0.581
4.95	0.418
5.04	0.291
5.14	0.168
5.24	0.094
5.36	0.050
5.55	0.027
5.86	0.021
6.07	0.014
6.49	0.007
6.99	0.004
8.00	0.000

CURVE 2*
T = 373

λ	τ
2.00	0.875
2.34	0.875
2.73	0.871
2.99	0.869
3.46	0.870
3.70	0.863
3.84	0.844
4.04	0.820
4.30	0.816
4.36	0.802
4.47	0.750
4.60	0.700
4.72	0.654
4.83	0.584
4.90	0.483
5.02	0.293
5.12	0.188
5.24	0.086
5.37	0.043

CURVE 2 (cont.)

λ	τ
5.54	0.026
5.88	0.022
6.14	0.011
7.00	0.004
8.00	0.000

CURVE 3
T = 473

λ	τ
2.00	0.875*
2.35	0.873*
2.94	0.867
3.51	0.869
3.77	0.853
4.00	0.819
4.34	0.810
4.39	0.785
4.50	0.729
4.60	0.683
4.75	0.603
4.83	0.553
4.88	0.488
4.96	0.395
5.02	0.289*
5.12	0.173
5.23	0.084
5.36	0.039
5.60	0.018
6.01	0.007*
6.99	0.002*
8.00	0.000*

CURVE 4*
T = 573

λ	τ
2.00	0.875
2.33	0.872
2.53	0.871
3.04	0.867
3.52	0.868
3.68	0.861
3.96	0.821
4.10	0.808
4.33	0.796
4.45	0.737
4.58	0.673

CURVE 4 (cont.)*

λ	τ
4.72	0.603
4.89	0.465
4.97	0.351
5.04	0.255
5.14	0.141
5.26	0.070
5.47	0.027
5.71	0.015
6.50	0.003
7.00	0.002
8.00	0.000

CURVE 5
T = 673

λ	τ
2.00	0.873*
2.42	0.871
3.04	0.867
3.53	0.860
3.84	0.834
4.02	0.806
4.11	0.798
4.27	0.791
4.34	0.770
4.46	0.709
4.56	0.672
4.74	0.566
4.84	0.487*
4.90	0.403
5.01	0.290
5.12	0.159
5.22	0.081
5.32	0.043
5.51	0.019
5.98	0.006
6.50	0.003
8.00	0.000*

CURVE 6
T = 298

λ	τ
2.00	0.857
2.51	0.851
3.50	0.849
3.89	0.846
4.18	0.826

CURVE 6 (cont.)

λ	τ
4.28	0.818
4.46	0.776
4.71	0.711
4.98	0.642
5.12	0.607
5.24	0.553
5.35	0.461
5.46	0.345
5.56	0.238
5.65	0.154
5.76	0.082
5.88	0.040
6.03	0.014*
6.28	0.004
8.00	0.000*

CURVE 7*
T = 373

λ	τ
2.00	0.858
2.50	0.853
2.99	0.849
3.69	0.850
4.00	0.840
4.23	0.821
4.33	0.807
4.40	0.787
4.55	0.752
4.76	0.693
5.00	0.625
5.17	0.566
5.29	0.506
5.41	0.401
5.48	0.314
5.58	0.213
5.65	0.156
5.74	0.092
5.90	0.038
6.04	0.014
6.18	0.004
8.00	0.001

CURVE 8
T = 473

λ	τ
2.00	0.858*
2.48	0.851
3.02	0.847
3.75	0.848
4.08	0.832
4.26	0.812*
4.37	0.780
4.62	0.717
4.78	0.663*
5.04	0.573
5.23	0.497
5.34	0.426
5.47	0.335
5.58	0.214
5.70	0.117
5.84	0.052
5.98	0.019
6.18	0.004
8.00	0.000*

CURVE 9*
T = 573

λ	τ
2.00	0.856
2.43	0.852
3.65	0.846
4.10	0.826
4.26	0.801
4.39	0.764
4.56	0.708
4.88	0.599
5.14	0.498
5.31	0.399
5.45	0.292
5.58	0.181
5.70	0.090
5.90	0.032
6.18	0.004
8.00	0.000

CURVE 10
T= 673

λ	τ
2.00	0.856*
2.49	0.850*

CURVE 10 (cont.)

λ	τ
3.00	0.847
3.50	0.844
3.99	0.835
4.19	0.809
4.35	0.765
4.58	0.690
4.74	0.620
5.03	0.513
5.22	0.418
5.38	0.309
5.53	0.201
5.68	0.095
5.83	0.043
6.00	0.013
6.18	0.002*
8.00	0.000*

* Not shown on plot

SPECIFICATION TABLE NO. 200 NORMAL SPECTRAL REFLECTANCE OF MAGNESIUM ALUMINATE $MgAl_2O_4$

Curve No.	Ref. No.	Year	Temperature K	Wavelength Range, μm	Geometry θ	θ'	ω'	Reported Error, %	Composition (weight percent), Specifications, and Remarks
1*	82	1963	298	0.440-0.600	~0°		2π		Spinel, from Linde; compacted powder at 10 000 psi.
2*	82	1963	298	0.440-0.600	~0°		2π		Above specimen and conditions except exposed to uv irradiation; 75 ESH with solar factor 1.5.

DATA TABLE NO. 200 NORMAL SPECTRAL REFLECTANCE OF MAGNESIUM ALUMINATE $MgAl_2O_4$

[Wavelength, λ. ρ; Reflectance, ρ; Temperature, T, K]

λ	ρ
CURVE 1*	
T = 298	
0.440	0.975
0.600	0.970
CURVE 2*	
T = 298	
0.440	0.700
0.600	0.925

* No plot given

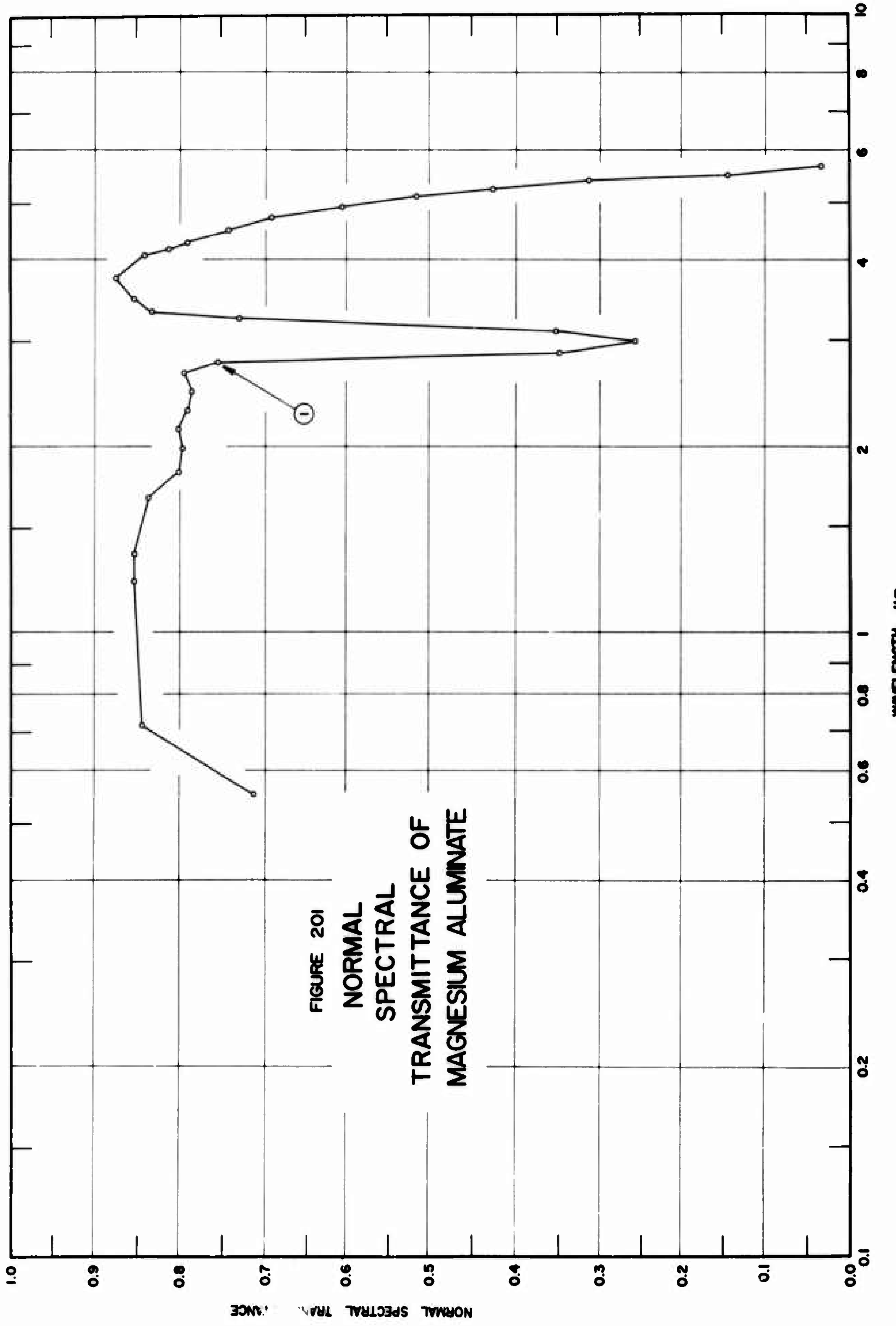


FIGURE 201 NORMAL SPECTRAL TRANSMITTANCE OF MAGNESIUM ALUMINATE

SPECIFICATION TABLE NO. 201 NORMAL SPECTRAL TRANSMITTANCE OF MAGNESIUM ALUMINATE $MgAl_2O_4$

Curve No.	Ref. No.	Year	Temperature K	Wavelength Range, μm	Geometry θ	θ'	ω'	Reported Error, %	Composition (weight percent), Specifications, and Remarks
1	298	1936	~298	0.550-5.65	~0°	~0°			Synthetic spinel (5.45 mm thick); amorphous.

DATA TABLE NO. 201 NORMAL SPECTRAL TRANSMITTANCE OF MAGNESIUM ALUMINATE $MgAl_2O_4$

[Wavelength, λ, μm; Transmittance, τ; Temperature, T, K]

λ	τ	λ	τ
CURVE 1		CURVE 1 (cont.)	
T ~ 298		4.27	0.791
0.550	0.714	4.37	0.781*
0.710	0.846	4.48	0.743
1.21	0.855	4.68	0.694
1.34	0.855	4.85	0.609
1.65	0.837	5.02	0.517
1.81	0.801	5.20	0.429
1.97	0.799	5.34	0.313
2.13	0.801	5.49	0.145
2.29	0.792	5.65	0.034
2.44	0.789		
2.61	0.798		
2.73	0.759		
2.82	0.350		
2.96	0.258		
3.07	0.354		
3.22	0.731		
3.30	0.834		
3.46	0.856		
3.72	0.875		
4.07	0.841		
4.17	0.814		

*Not shown on plot

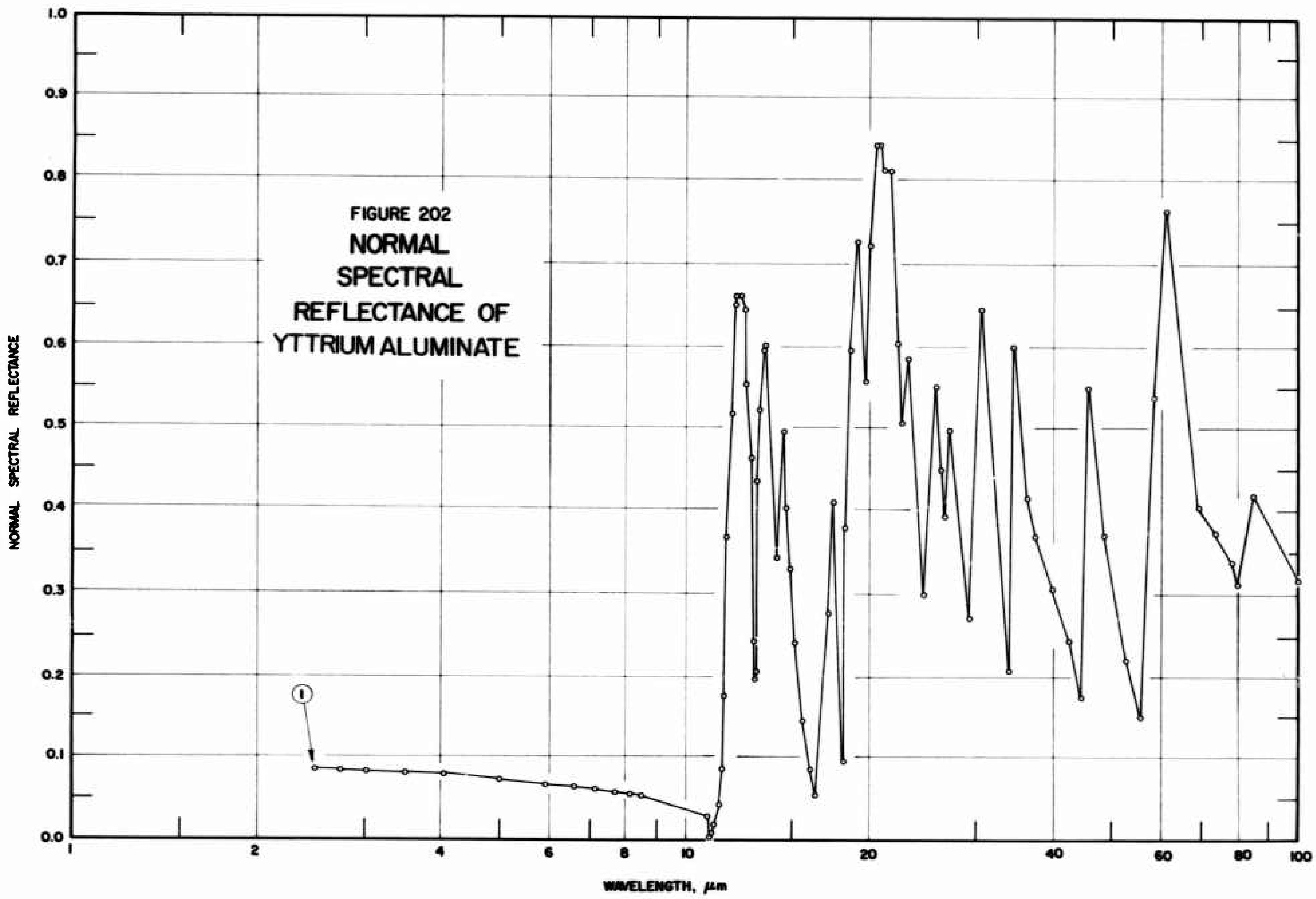


FIGURE 202
NORMAL SPECTRAL REFLECTANCE OF YTTRIUM ALUMINATE

SPECIFICATION TABLE NO. 202 NORMAL SPECTRAL REFLECTANCE OF YTTRIUM ALUMINATE $Y_3Al_2(AlO_4)_3$

Curve No.	Ref. No.	Year	Temperature K	Wavelength Range, μm	Geometry θ θ' ω'	Reported Error, %	Composition (weight percent), Specifications, and Remarks
1	445	1968	~298	2.50-100	~0° ~0°		Yttrium aluminum garnet (YAG); crystalline.

DATA TABLE NO. 202 NORMAL SPECTRAL REFLECTANCE OF YTTRIUM ALUMINATE $Y_3Al_2(AlO_4)_3$

[Wavelength, λ, μm; Reflectance, ρ; Temperature, T, K]

λ	ρ	λ	ρ	λ	ρ	λ	ρ
CURVE 1 T ~ 298		CURVE 1 (cont.)		CURVE 1 (cont.)		CURVE 1 (cont.)	
		12.2	0.664	17.5	0.410	36.3	0.414
2.50	0.0839	12.4	0.664	18.2	0.095	37.3	0.369
2.75	0.0839	12.5	0.649	18.3	0.379	40.5	0.304
3.03	0.0824	12.6	0.554	18.7	0.598	42.4	0.245
3.52	0.0798	12.8	0.462	19.2	0.729	44.3	0.174
4.05	0.0766	12.9	0.245	19.8	0.559	45.5	0.555
5.00	0.0713	13.0	0.159	20.1	0.721	48.3	0.370
5.92	0.0668	13.1	0.208	20.7	0.842	52.4	0.221
6.62	0.0632	13.2	0.435	20.9	0.842	55.6	0.150
7.14	0.0605	13.3	0.521	21.2	0.812	58.5	0.538
7.69	0.0570	13.5	0.597	21.6	0.812	61.3	0.760
8.13	0.0538	13.5	0.605	22.2	0.605	69.0	0.403
8.47	0.0508	13.6	0.605	22.7	0.507	73.5	0.372
10.9	0.0276	14.1	0.343	23.2	0.586	78.1	0.339
11.0	0.0018	14.5	0.495	24.6	0.297	80.0	0.312
11.1	0.0065	14.6	0.402	25.7	0.550	84.7	0.417
11.2	0.018	14.8	0.330	26.2	0.449	100	0.317
11.4	0.043	15.2	0.242	26.6	0.392		
11.5	0.086	15.6	0.143	27.0	0.497		
11.6	0.172	16.0	0.084	29.2	0.271		
11.7	0.368	16.3	0.052	30.4	0.647		
11.9	0.517	16.8	0.00[illegible]	33.8	0.208		
12.2	0.653	17.2	0.27[illegible]	34.6	0.601		

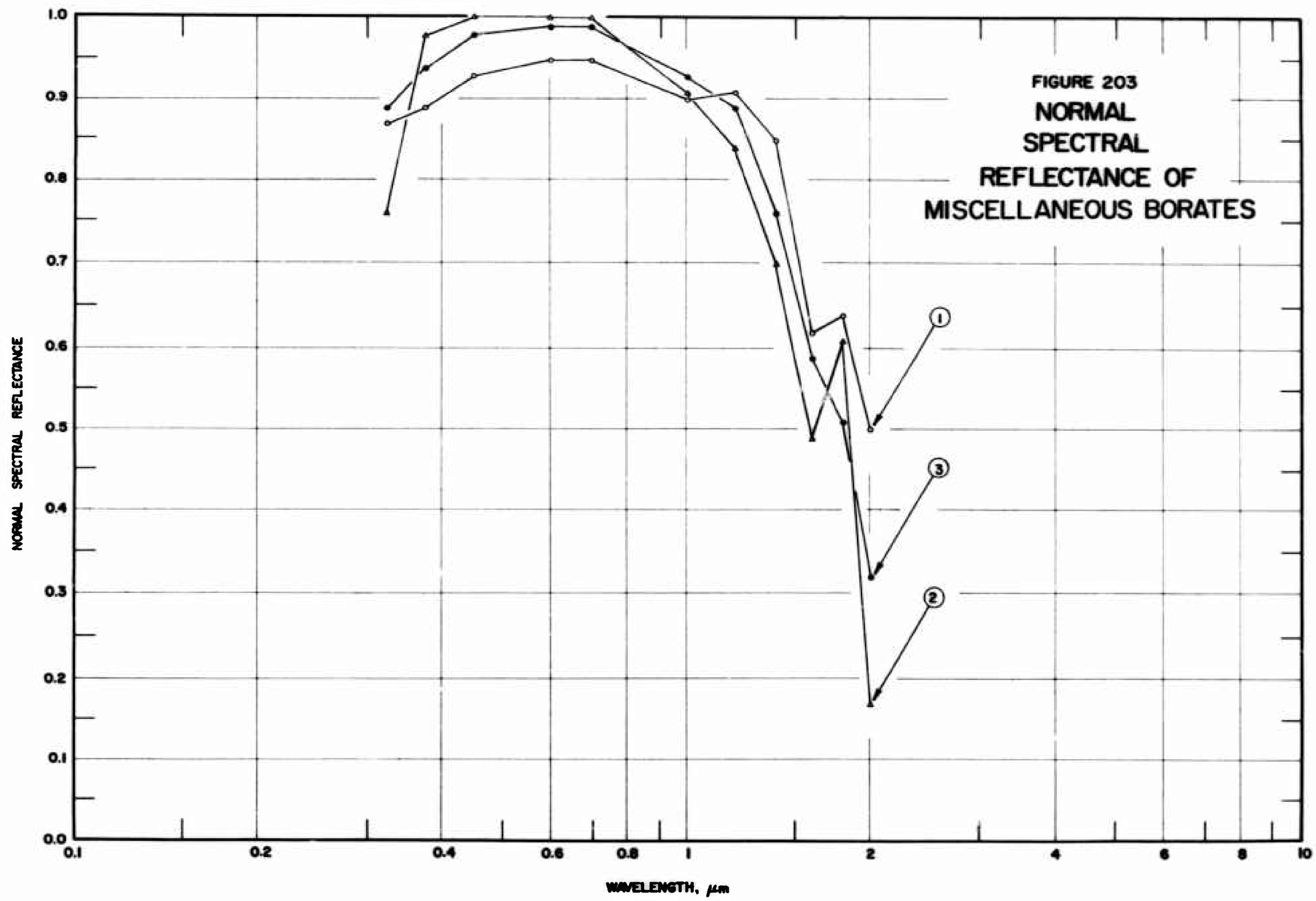


FIGURE 203
NORMAL
SPECTRAL
REFLECTANCE OF
MISCELLANEOUS BORATES
NORMAL SPECTRAL REFLECTANCE
WAVELENGTH, μm
1.0
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0.0
0.1
0.2
0.4
0.6
0.8
1
2
4
6
8
10
1
2
3

SPECIFICATION TABLE NO. 203 NORMAL SPECTRAL REFLECTANCE OF MISCELLANEOUS BORATES

Curve No.	Ref. No.	Year	Temperature K	Wavelength Range, μm	Geometry θ	Geometry θ'	Geometry ω'	Reported Error, %	Composition (weight percent), Specifications, and Remarks
1	92	1964	298	0.325-2.0	~0°		2π		LITHIUM BORATE, $LiBO_2 \cdot H_2O$; compacted powder; [Authors' designation: Sample 22].
2	92	1964	298	0.325-2.0	~0°		2π		SODIUM BORATE, $NaBO_2 \cdot 4H_2O$; compacted powder; [Authors' designation: Sample 17].
3	92	1964	298	0.325-2.0	~0°		2π		SODIUM BORATE, $Na_2B_4O_7 \cdot 10H_2O$; compacted powder; [Authors' designation: Sample 18].

DATA TABLE NO. 203 NORMAL SPECTRAL REFLECTANCE OF MISCELLANEOUS BORATES

[Wavelength, λ, μm; Reflectance, ρ; Temperature, T, K]

λ	ρ
CURVE 1 T = 298	
0.325	0.87
0.375	0.89
0.450	0.93
0.600	0.95
0.700	0.95
1.0	0.90
1.2	0.91
1.4	0.85
1.6	0.62
1.8	0.64
2.0	0.50
CURVE 2 T = 298	
0.325	0.76
0.375	0.98
0.450	>1.00
0.600	1.00
0.700	1.00
1.0	0.91
1.2	0.84
CURVE 2 (cont.)	
1.4	0.70
1.6	0.49
1.8	0.61
2.0	0.17
CURVE 3 T = 298	
0.325	0.89
0.375	0.94
0.450	0.98
0.600	0.99
0.700	0.99
1.0	0.93
1.2	0.89
1.4	0.76
1.6	0.59
1.8	0.51
2.0	0.32

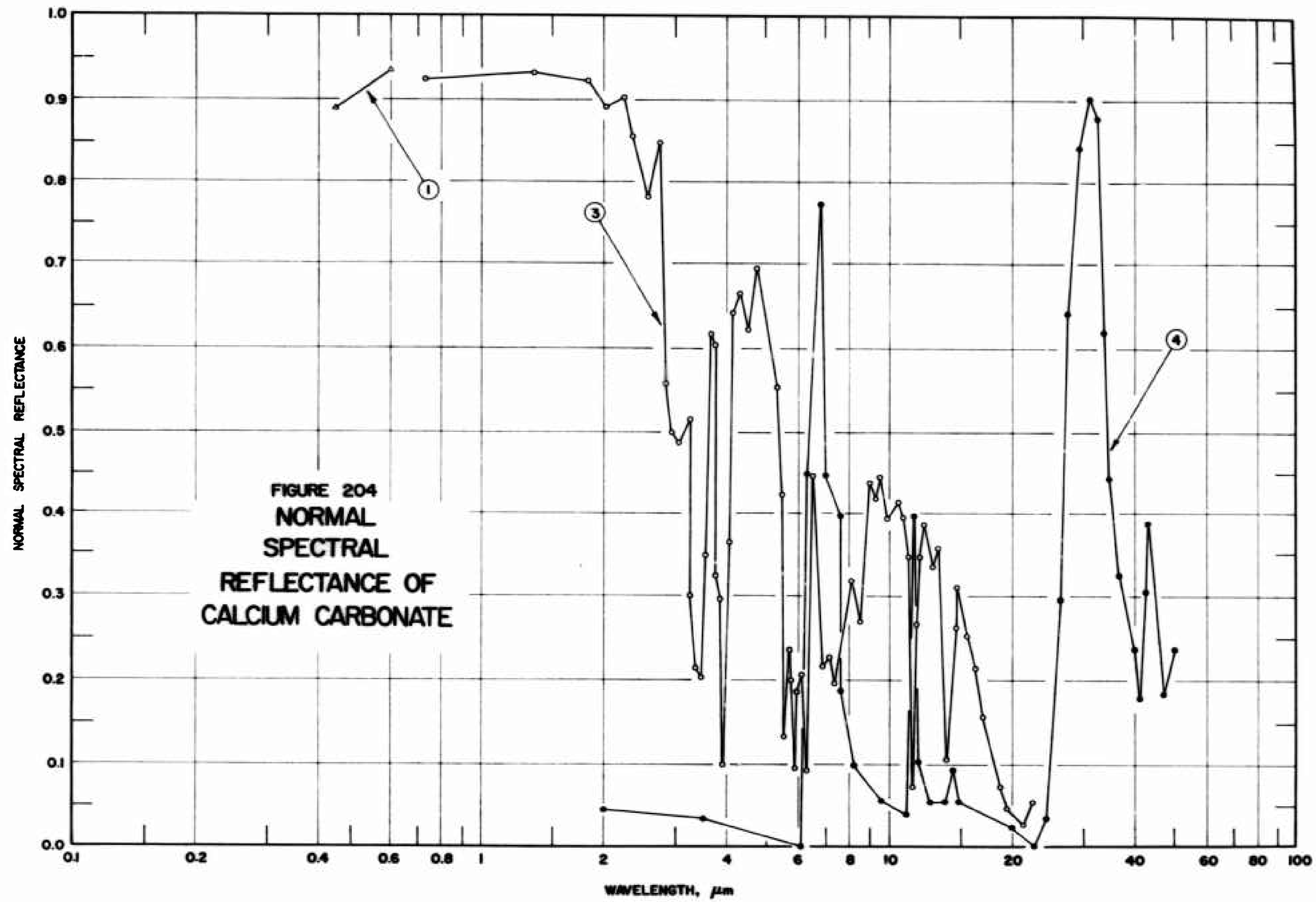


FIGURE 204
NORMAL
SPECTRAL
REFLECTANCE OF
CALCIUM CARBONATE
NORMAL SPECTRAL REFLECTANCE
WAVELENGTH, μm
1
3
4
1.0
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0.0
0.1
0.2
0.4
0.6
0.8
1
2
4
6
8
10
20
40
60
80
100

SPECIFICATION TABLE NO. 204 NORMAL SPECTRAL REFLECTANCE OF CALCIUM CARBONATE $CaCO_3$

Curve No.	Ref. No.	Year	Temperature K	Wavelength Range, μm	Geometry θ	θ'	ω'	Reported Error, %	Composition (weight percent), Specifications, and Remarks
1	82	1963	298	0.440-0.600	~0°		2π		Calcite; supplied by Whittaker, Clark, and Daniels; compacted powder at 10 000 psi.
2*	82	1963	298	0.400-0.600	~0°		2π		Above specimen and conditions except exposed to uv irradiation; 180 ESH with solar factor 3.
3	308	1966	~298	0.730-22.6	0°		2π		Calcite; data extracted from smooth curve.
4	102	1965	~298	2.00-50.0	30°	30°			Natural calcite; bi-refringent; flat to ten fringes or better; data extracted from smooth curve, Al mirror reference standard.

DATA TABLE NO. 204 NORMAL SPECTRAL REFLECTANCE OF CALCIUM CARBONATE $CaCO_3$

[Wavelength, λ, μm; Reflectance, ρ; Temperature, T, K]

CURVE 1
T = 298

λ	ρ
0.440	0.890
0.600	0.935

CURVE 2*
T = 298

λ	ρ
0.440	0.705
0.600	0.895

CURVE 3
T ~ 298

λ	ρ
0.730	0.925
1.34	0.931
1.81	0.923
2.01	0.891
2.25	0.901
2.34	0.858
2.45	0.854*
2.57	0.781
2.71	0.850
2.83	0.557
2.93	0.500
3.05	0.489

CURVE 3 (cont.)

λ	ρ
3.27	0.515
3.26	0.300
3.38	0.214
3.46	0.202
3.52	0.348
3.67	0.618
3.73	0.604
3.71	0.323
3.82	0.298
3.90	0.100
4.05	0.361
4.17	0.642
4.35	0.666
4.44	0.654*
4.52	0.621
4.69	0.649*
4.79	0.695
5.03	0.626*
5.14	0.584*
5.33	0.553
5.42	0.426
5.52	0.135
5.63	0.235
5.67	0.200
5.79	0.167*

CURVE 3 (cont.)

λ	ρ
5.86	0.096
5.99	0.184
6.14	0.207
6.23	0.158*
6.29	0.092
6.58	0.447
6.93	0.219
7.13	0.227
7.28	0.197
7.60	0.255*
8.02	0.319
8.21	0.311*
8.51	0.270
9.00	0.437
9.27	0.41[illegible]
9.44	0.428*
9.51	0.445
9.78	0.400*
9.90	0.391
10.3	0.411*
10.4	0.412
10.7	0.387*
10.8	0.394
11.1	0.348
11.3	0.072

CURVE 3 (cont.)

λ	ρ
11.6	0.266
11.7	0.254*
11.9	0.318*
11.9	0.344
12.0	0.376*
12.2	0.384
12.5	0.373*
12.8	0.333
13.1	0.356
13.4	0.342*
13.9	0.107
14.5	0.262
14.7	0.310
15.1	0.298*
15.4	0.251
16.1	0.215
17.0	0.156
18.8	0.073
19.5	0.048
20.3	0.036*
21.3	0.028
21.9	0.034*
22.6	0.053

CURVE 4
T ~ 298

λ	ρ
2.00	0.045
3.50	0.034
6.10	0.000
6.30	0.450
6.80	0.772
7.00	0.447
7.60	0.399
7.60	0.188
8.20	0.100
9.60	0.056
11.0	0.040
11.5	0.397
11.8	0.101
12.6	0.055
13.8	0.055
14.3	0.091
14.8	0.053
20.0	0.021
22.8	0.000
24.3	0.034
26.1	0.298
27.3	0.641
29.1	0.843
31.0	0.902

CURVE 4 (cont.)

λ	ρ
32.1	0.880
33.7	0.620
34.7	0.444
36.8	0.325
40.0	0.239
41.0	0.180
42.1	0.303
43.6	0.388
47.8	0.183
50.0	0.236

*Not shown on plot

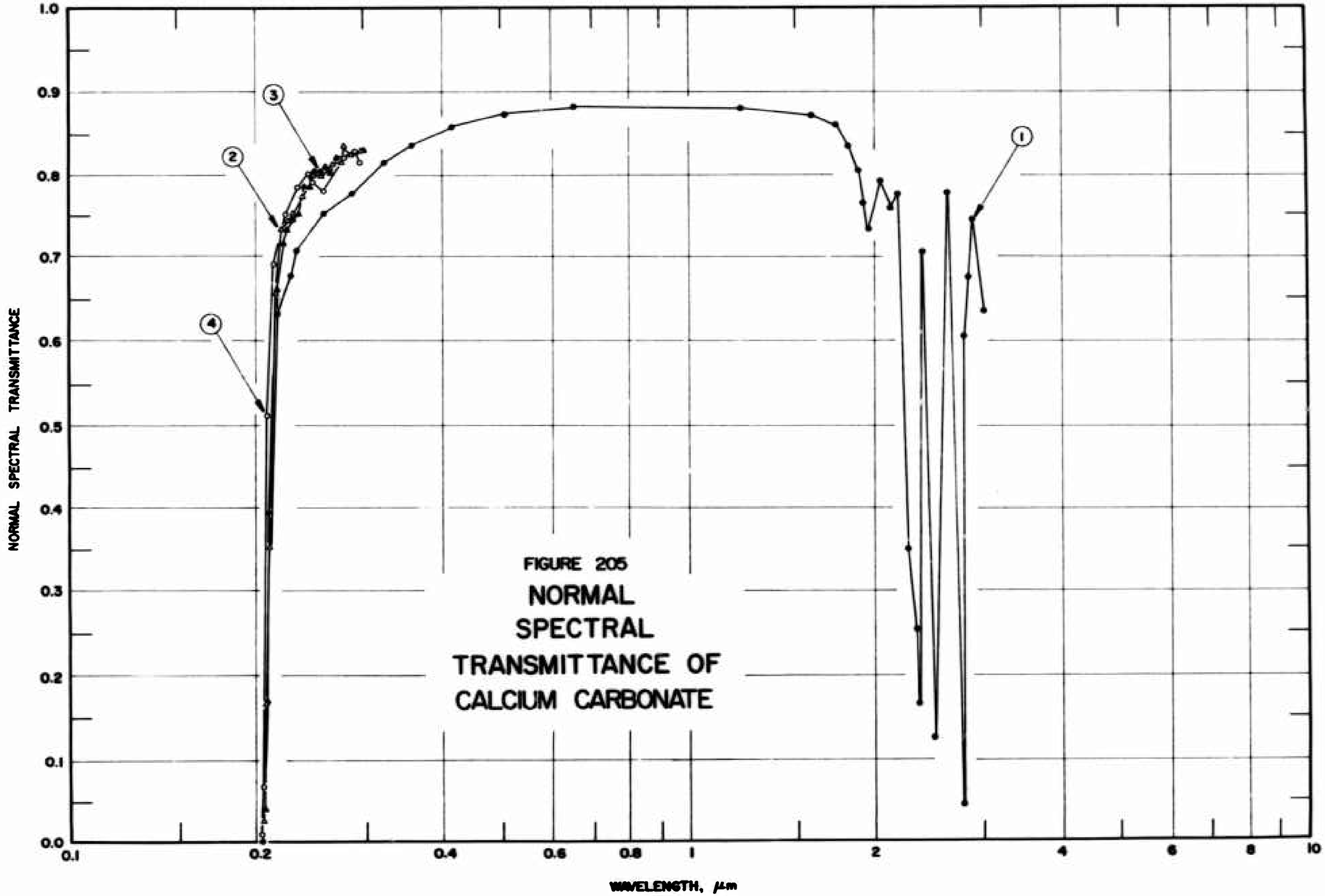


FIGURE 205
NORMAL SPECTRAL TRANSMITTANCE OF CALCIUM CARBONATE

SPECIFICATION TABLE NO. 205 NORMAL SPECTRAL TRANSMITTANCE OF CALCIUM CARBONATE $CaCO_3$

Curve No.	Ref. No.	Year	Temperature K	Wavelength Range, μm	Geometry θ θ' ω'	Reported Error, %	Composition (weight percent), Specifications, and Remarks
1	94	1967	298	0.204-3.00	~0° ~0°	± 2	Calcite; single crystal (33.3 mm thick); polished; data extracted from smooth curve.
2	97	1967	~298	0.2055-0.2997	~0° ~0°		High purity crystal (3.18 mm thick) from Harshaw Chemical Co.; optically polished; measured in vacuum.
3	97	1967	~298	0.2056-0.2997	~0° ~0°		Above specimen and conditions except measured after irradiation by a total flux of 8.25×10^{10} protons cm^{-2} evenly distributed over 3, 3.8, and 4.6 MeV; maintained in vacuum.
4	291	1966	~298	0.2030-0.2949	0° 0°		High optical quality crystal (2.25 mm thick); optically polished; measured in vacuum.
5*	291	1966	~298	0.2032-0.2947	0° 0°		Above specimen and conditions except irradiated with 10^{14} electrons cm^{-2} at 2.0 MeV incident through a sapphire shield (6.4 mm thick); angle of c-axis with electron beam 45 degrees.

DATA TABLE NO. 205 NORMAL SPECTRAL TRANSMITTANCE OF CALCIUM CARBONATE $CaCO_3$

[Wavelength, λ, μm; Transmittance, τ; Temperature, T, K]

λ	τ	λ	τ	λ	τ	λ	τ	λ	τ	λ	τ
CURVE 1	T = 298	CURVE 1 (cont.)		CURVE 2 (cont.)		CURVE 3	T ~ 298	CURVE 4	T ~ 298	CURVE 5*	T ~ 298
		2.18	0.777	0.2200	0.733						
0.204	0.000	2.23	0.755*	0.2251	0.744	0.2056	0.043	0.2030	0.010	0.2032	0.004
0.218	0.633	2.25	0.350	0.2300	0.753	0.2078	0.170	0.2050	0.069	0.2051	0.053
0.226	0.678	2.32	0.254	0.2349	0.764*	0.2103	0.395	0.2098	0.511	0.2099	0.469
0.233	0.708	2.35	0.169	0.2399	0.774	0.2152	0.660	0.2147	0.691	0.2147	0.691
0.258	0.751	2.39	0.706	0.2449	0.787	0.2200	0.717	0.2196	0.737*	0.2196	0.737
0.288	0.788	2.49	0.127	0.2499	0.800	0.2250	0.733	0.2247	0.752	0.2247	0.752
0.323	0.819	2.61	0.779	0.2548	0.800	0.2299	0.745	0.2297	0.764*	0.2297	0.764
0.358	0.839	2.78	0.047	0.2599	0.802*	0.2349	0.753	0.2347	0.786	0.2348	0.770
0.416	0.860	2.79	0.607	0.2646	0.816	0.2400	0.785	0.2397	0.795*	0.2396	0.775
0.508	0.875	2.83	0.677	0.2697	0.816*	0.2448	0.785	0.2447	0.801	0.2445	0.776
0.659	0.884	2.88	0.748	0.2747	0.819	0.2499	0.805	0.2497	0.792	0.2495	0.780
1.22	0.882	3.00	0.638	0.2796	0.837	0.2549	0.805	0.2547	0.798*	0.2546	0.782
1.58	0.875			0.2848	0.829	0.2598	0.813	0.2596	0.780	0.2596	0.802
1.73	0.862	CURVE 2		0.2896	0.830*	0.2648	0.803	0.2646	0.787*	0.2646	0.807
1.81	0.838	T ~ 298		0.2947	0.832*	0.2697	0.824	0.2697	0.815*	0.2696	0.819
1.88	0.808			0.2997	0.832	0.2746	0.821*	0.2745	0.817*	0.2746	0.824
1.91	0.766	0.2055	0.026			0.2797	0.816*	0.2797	0.821	0.2797	0.822
1.95	0.734	0.2078	0.169			0.2848	0.822*	0.2847	0.830*	0.2844	0.841
2.03	0.796	0.2102	0.351			0.2896	0.830*	0.2900	0.830	0.2900	0.831
2.11	0.760	0.2152	0.659			0.2946	0.823*	0.2949	0.818	0.2947	0.842
						0.2997	0.831				

* Not shown on plot

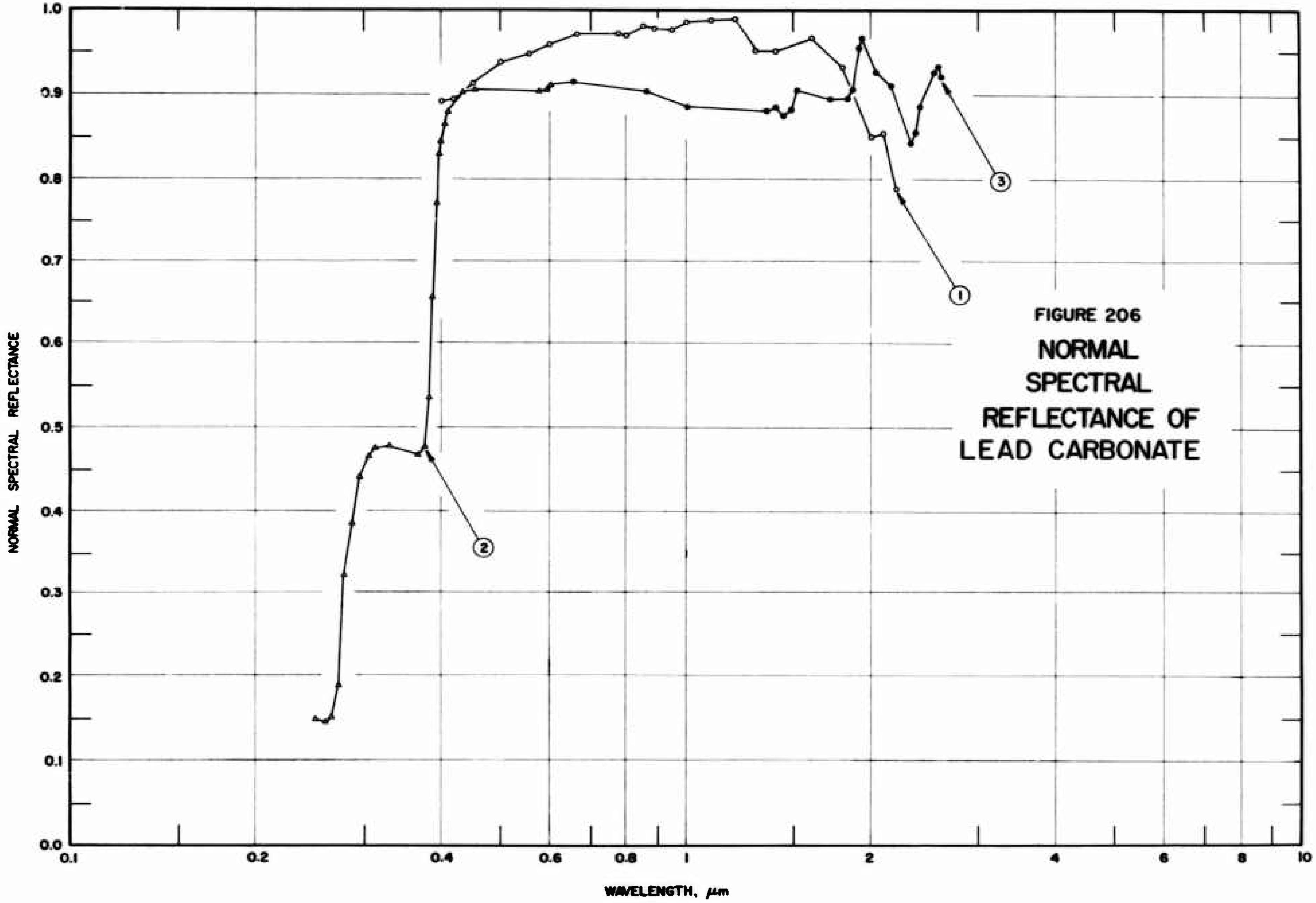


FIGURE 206
NORMAL SPECTRAL REFLECTANCE OF LEAD CARBONATE

SPECIFICATION TABLE NO. 206 NORMAL SPECTRAL REFLECTANCE OF LEAD CARBONATE $PbCO_3$

Curve No.	Ref. No.	Year	Temperature K	Wavelength Range, µm	Geometry θ	θ'	ω'	Reported Error, %	Composition (weight percent), Specifications, and Remarks
1	120	1962	298	0.4-2.2	~0°		2π		Authors' designation: Specimen X 81.
2	121	1964	~298	0.250-0.600	0°		2π		Eagle-Picher Co. designation AAA; compacted powder; 65 pure, 35 $Pb(OH)_2$ additive; $BaSO_4$ reference standard; data extracted from smooth curve.
3	121	1964	~298	0.600-2.600	~0°		2π		Similar to above specimen and conditions.

DATA TABLE NO. 206 NORMAL SPECTRAL REFLECTANCE OF LEAD CARBONATE $PbCO_3$

[Wavelength, λ, µm; Reflectance, ρ; Temperature, T, K]

λ	ρ	λ	ρ	λ	ρ	λ	ρ
CURVE 1		CURVE 1 (cont.)		CURVE 2 (cont.)		CURVE 3 (cont.)	
T = 298							
		2.1	0.857	0.382	0.538	1.446	0.879
0.4	0.893	2.2	0.79	0.388	0.658	1.473	0.885
0.42	0.896			0.392	0.773	1.520	0.909
0.45	0.914	CURVE 2		0.397	0.831	1.721	0.896
0.5	0.94	T ~ 298		0.400	0.849	1.831	0.899
0.55	0.95			0.405	0.867	1.863	0.909
0.55	0.953*	0.250	0.150	0.410	0.881	1.897	0.929*
0.6	0.96	0.260	0.147	0.420	0.893*	1.930	0.957
0.65	0.971	0.264	0.152	0.431	0.903	1.949	0.967
0.7	0.972*	0.268	0.169*	0.451	0.907	1.969	0.960*
0.75	0.973	0.271	0.190	0.576	0.906	2.040	0.927
0.8	0.971	0.279	0.323	0.593	0.908	2.068	0.922*
0.85	0.982	0.286	0.389	0.600	0.911	2.157	0.911
0.9	0.978	0.295	0.441			2.218	0.897*
0.95	0.979	0.298	0.452*	CURVE 3		2.316	0.844
1.0	0.989	0.304	0.469	T ~ 298		2.339	0.841*
1.1	0.990	0.311	0.478			2.363	0.855
1.2	0.991	0.330	0.480	0.600	0.911*	2.405	0.888
1.3	0.952	0.358	0.471*	0.654	0.916	2.433	0.901*
1.4	0.951	0.369	0.470	0.860	0.905	2.527	0.927
1.6	0.969	0.374	0.473*	1.009	0.889	2.573	0.933
1.8	0.934	0.376	0.480	1.356	0.883	2.600	0.922
2.0	0.8525	0.379	0.498*	1.409	0.889		

*Not shown on plot

SPECIFICATION TABLE NO. 207 NORMAL SOLAR ABSORPTANCE OF LEAD CARBONATE $PbCO_3$

Curve No.	Ref. No.	Year	Temperature Range, K	Geometry θ	Reported Error, %	Composition (weight percent), Specifications and Remarks
1*	121	1964	~298	~0°		Eagle-Picher Co. designation: AAA; compacted powder; 65 pure, 35 $Pb(OH)_2$ additive; computed from spectral reflectance data.
2*	121	1964	~298	~0°		Above specimen and conditions except exposed to 100 ESH.

DATA TABLE NO. 207 NORMAL SOLAR ABSORPTANCE OF LEAD CARBONATE $PbCO_3$

[Temperature, T, K; Absorptance, α]

T	α
CURVE 1*	
298	0.109
CURVE 2*	
298	0.209

*No plot given

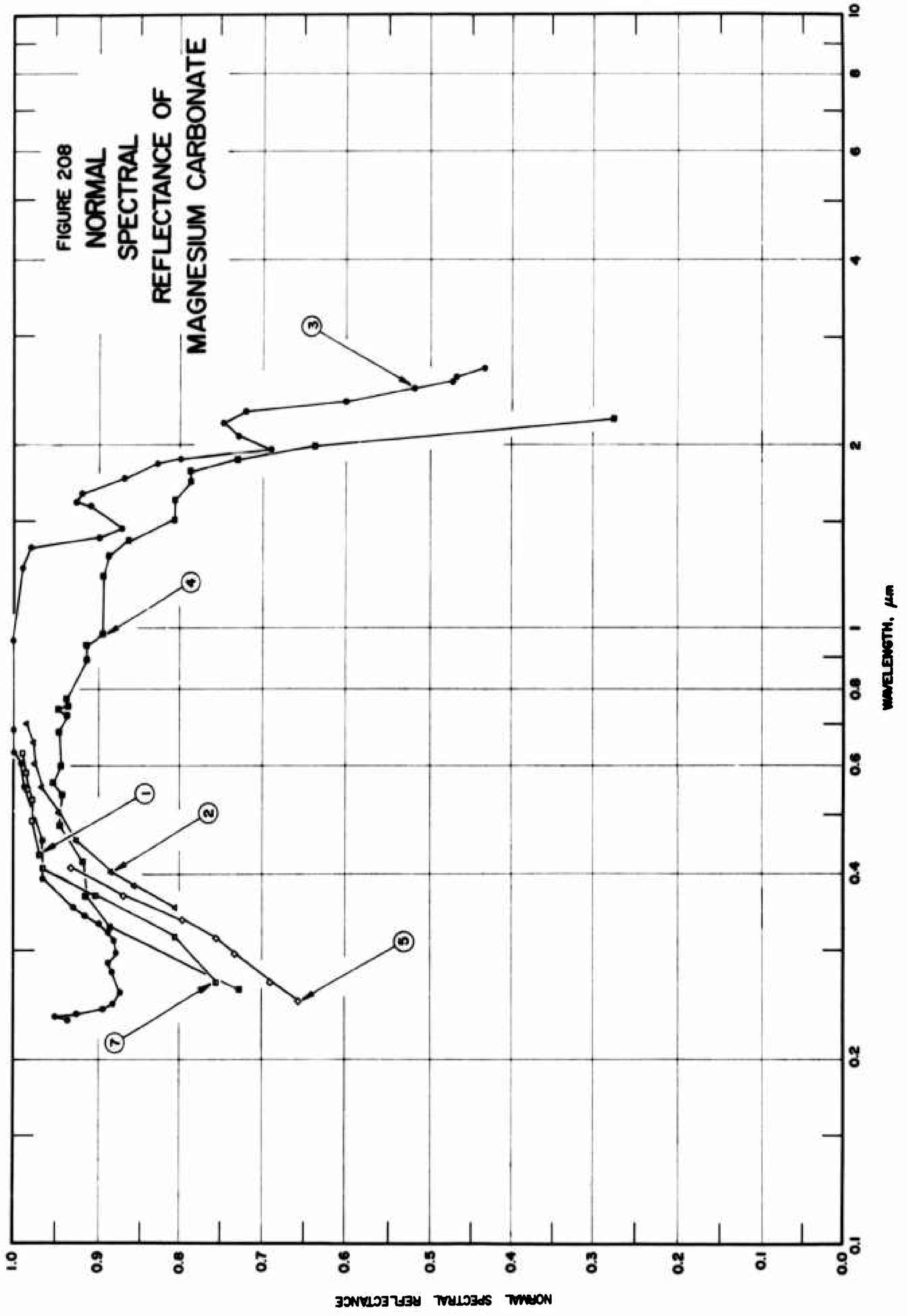


FIGURE 208
NORMAL
SPECTRAL
REFLECTANCE OF
MAGNESIUM CARBONATE
1
2
3
4
5
7
NORMAL SPECTRAL REFLECTANCE
1.0
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0.0
WAVELENGTH, μm
0.1
0.2
0.4
0.6
0.8
1
2
4
6
8
10

SPECIFICATION TABLE NO. 208 NORMAL SPECTRAL REFLECTANCE OF MAGNESIUM CARBONATE $MgCO_3$

Curve No.	Ref. No.	Year	Temperature K	Wavelength Range, μm	Geometry θ	θ'	ω'	Reported Error, %	Composition (weight percent), Specifications, and Remarks
1	123	1947	298	0.428-0.625	~0°		2π		Block; surface machined.
2	124	1956	298	0.350-0.700	~0°		2π		Block.
3	28	1963	298	0.230-2.65	~0°		2π	< 5	Block; samples rubbed against each other; MgO reference standard; data extracted from smooth curve.
4	369	1966	~298	0.259-2.20	~7°		2π		Freshly shaved block; data extracted from smooth curve; data measured for both R(~7°, 2π) and R(2π, ~7°).
5	125	1931	298	0.248-0.403	~5°		2π		Block.
6*	122	1940	298	0.28-0.32	0°		2π		Powder packed in a shallow steel cell; data is the average over the band 0.28 to 0.32 μm.
7	125	1931	298	0.265-0.404	~5°		2π		Compacted powder of purified $MgCO_3$.

DATA TABLE NO. 208 NORMAL SPECTRAL REFLECTANCE OF MAGNESIUM CARBONATE $MgCO_3$

[Wavelength, λ, μm; Reflectance, ρ; Temperature, T, K]

λ	ρ
CURVE 1	**T = 298**
0.428	0.970
0.485	0.979
0.512	0.979
0.545	0.982
0.580	0.984
0.625	0.990
CURVE 2	**T = 298**
0.350	0.804
0.380	0.859
0.400	0.886
0.450	0.926
0.500	0.949
0.550	0.966
0.600	0.975
0.650	0.978
0.700	0.987
CURVE 3	**T = 298**
0.230	0.935
0.232	0.950
0.234	0.925
0.240	0.895
0.245	0.883
0.255	0.875
0.260	0.874*
0.264	0.880*
0.275	0.885
0.284	0.890
0.299	0.880
0.305	0.882*
0.310	0.882
0.320	0.890
0.330	0.900
0.340	0.915
0.345	0.927*
0.350	0.930
0.390	0.965
CURVE 3 (cont.)	
0.450	0.967
0.550	0.988
0.600	0.990
0.630	1.00
0.680	1.00
0.850	1.05*
0.950	1.00
1.05	1.00
1.15	1.05
1.25	0.990
1.35	0.980
1.40	0.900
1.45	0.873
1.57	0.910
1.60	0.926
1.65	0.920
1.75	0.870
1.85	0.830
1.87	0.800
1.95	0.690
CURVE 3 (cont.)	
2.05	0.730
2.15	0.747
2.25	0.720
2.33	0.600
2.45	0.520
2.51	0.473
2.57	0.470
2.65	0.434
CURVE 4	**T ~ 298**
0.259	0.728
0.325	0.889
0.365	0.914
0.418	0.919
0.478	0.946
0.532	0.942
0.560	0.952
0.599	0.944
CURVE 4 (cont.)	
0.676	0.948
0.720	0.938
0.734	0.948
0.747	0.937
0.768	0.939
0.883	0.913
0.933	0.915
0.972	0.895
1.22	0.897
1.31	0.890
1.39	0.864
1.50	0.807
1.62	0.807
1.74	0.787
1.80	0.789
1.89	0.730
1.98	0.639
2.20	0.274
CURVE 5	**T = 298**
0.248	0.656
0.265	0.690
0.295	0.731
0.312	0.755
0.333	0.799
0.365	0.870
0.403	0.932
CURVE 6*	**T = 298**
0.28	0.81
0.32	0.81
CURVE 7	**T = 298**
0.265	0.756
0.313	0.806
CURVE 7 (cont.)	
0.366	0.903
0.404	0.964

* Not shown on plot

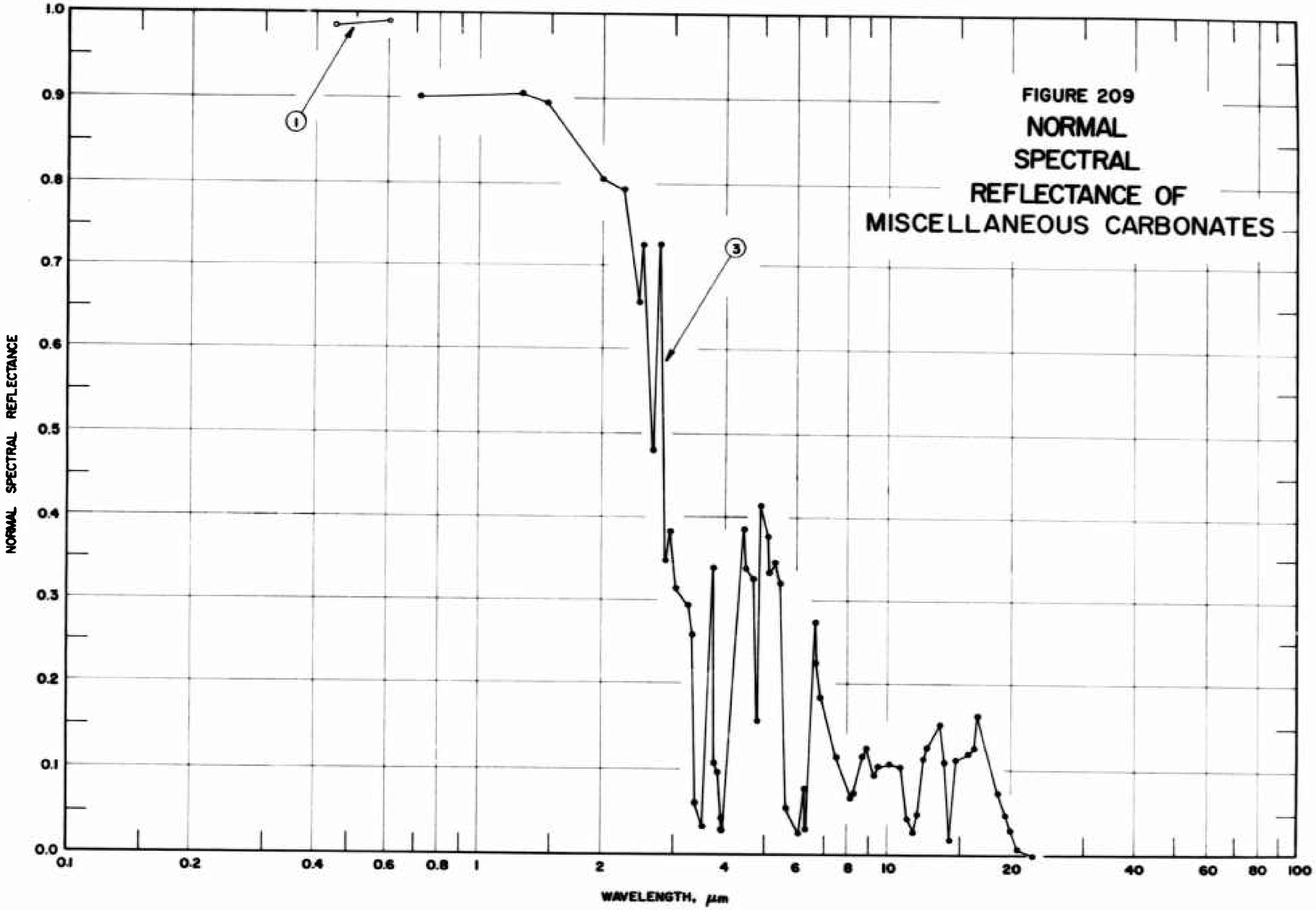


FIGURE 209
NORMAL
SPECTRAL
REFLECTANCE OF
MISCELLANEOUS CARBONATES
1
3
NORMAL SPECTRAL REFLECTANCE
1.0
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0.0
0.1
0.2
0.4
0.6
0.8
1
2
4
6
8
10
20
40
60
80
100
WAVELENGTH, μm

SPECIFICATION TABLE NO. 209 NORMAL SPECTRAL REFLECTANCE OF MISCELLANEOUS CARBONATES

Curve No.	Ref. No.	Year	Temperature K	Wavelength Range, μm	Geometry θ	θ'	ω'	Reported Error, %	Composition (weight percent), Specifications, and Remarks
1	82	1963	298	0.440-0.600	~0°		2π		BARIUM CARBONATE, $BaCO_3$; reagent grade; supplied by Allied Chemical Co.; compacted powder at 10 000 psi.
2	82	1963	298	0.440-0.600	~0°		2π		Above specimen and conditions except exposed to uv irradiation; 200 ESH with solar factor 3.
3	308	1966	~298	0.710-22.7	0°		2π		SODIUM CARBONATE, Na_2CO_3; data extracted from smooth curve.

DATA TABLE NO. 209 NORMAL SPECTRAL REFLECTANCE OF MISCELLANEOUS CARBONATES

[Wavelength, λ, μm; Reflectance, ρ; Temperature, T, K]

λ	ρ	λ	ρ	λ	ρ	λ	ρ
CURVE 1		CURVE 3 (cont.)		CURVE 3 (cont.)		CURVE 3 (cont.)	
T = 298							
		2.94	0.381	6.33	0.030	14.7	0.101*
0.440	0.985	3.06	0.312	6.64	0.273	14.8	0.111
0.600	0.990	3.28	0.291	6.73	0.224	15.0	0.116*
		3.35	0.257	6.84	0.184	15.8	0.120
CURVE 2*		3.40	0.060	7.48	0.115	16.2	0.126
T = 298		3.51	0.031	8.16	0.069	16.6	0.162
		3.75	0.339	8.29	0.073	18.7	0.073
0.440	0.710	3.79	0.108	8.57	0.106*	19.4	0.050
0.600	0.935	3.88	0.097	8.77	0.117	20.0	0.030
		3.94	0.041	8.92	0.125	20.9	0.007
CURVE 3		3.99	0.029	9.23	0.093	22.7	0.000
T ~ 298		4.41	0.389	9.58	0.105		
		4.55	0.339	10.1	0.108		
0.710	0.900	4.74	0.326	10.7	0.103		
1.26	0.905	4.80	0.155	11.1	0.043		
1.47	0.894	4.98	0.415	11.5	0.027		
2.00	0.805	5.08	0.376	11.8	0.050		
2.25	0.794	5.16	0.333	12.2	0.115		
2.46	0.655	5.28	0.344	12.4	0.127		
2.50	0.728	5.41	0.320	12.9	0.133*		
2.64	0.480	5.63	0.054	13.4	0.151		
2.78	0.728	6.02	0.025	13.8	0.110		
2.89	0.347	6.26	0.077	14.2	0.019		

* Not shown on plot

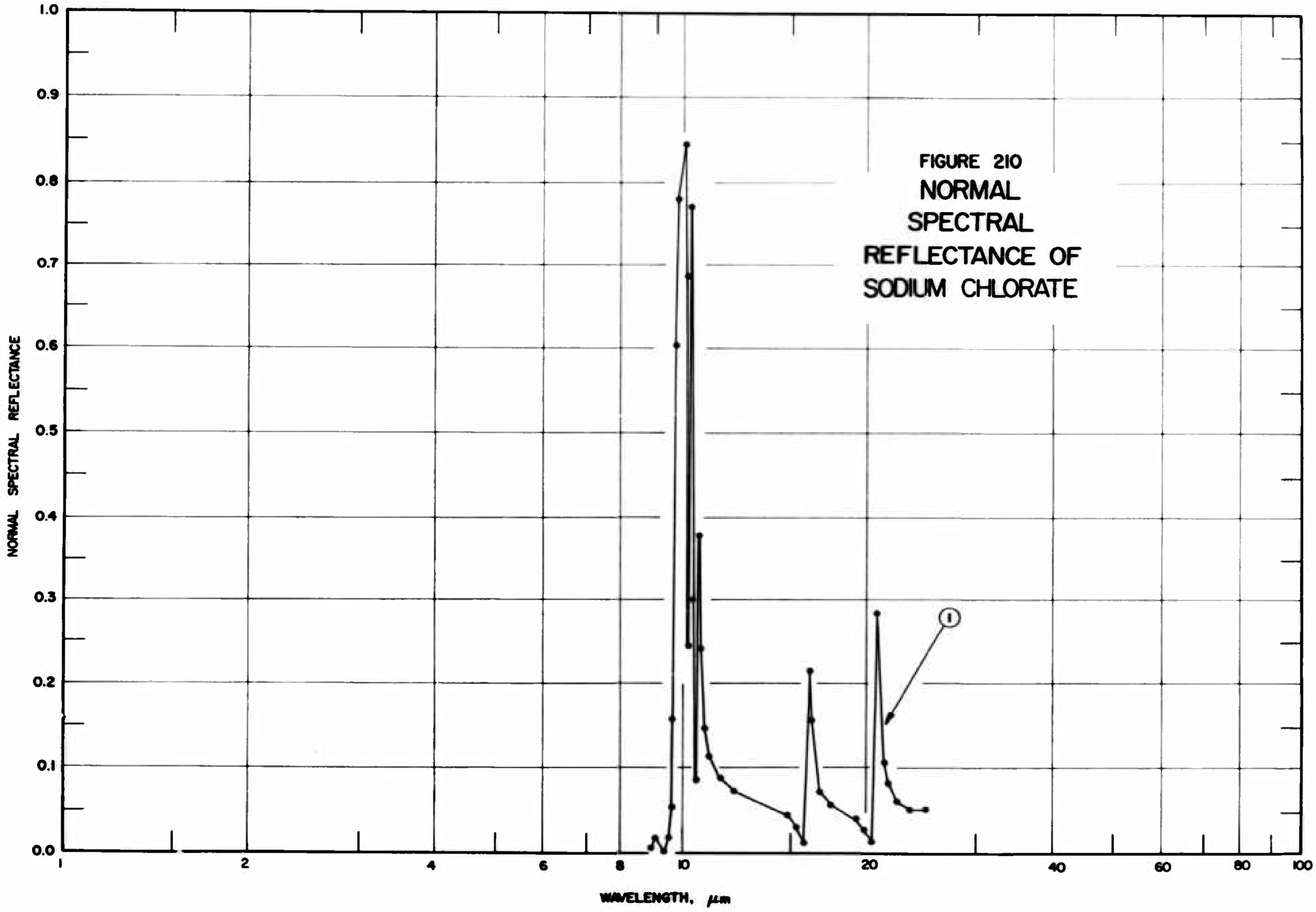


FIGURE 210
NORMAL
SPECTRAL
REFLECTANCE OF
SODIUM CHLORATE

SPECIFICATION TABLE NO. 210 NORMAL SPECTRAL REFLECTANCE OF SODIUM CHLORATE $NaClO_3$

Curve No.	Ref. No.	Year	Temperature K	Wavelength Range, μm	Geometry θ θ' ω'	Reported Error, %	Composition (weight percent), Specifications, and Remarks
1	138	1967	298	9.09-25.0	~0° ~0°		Single crystal; grown out of aqueous solution; measured at (100) face of the crystal; data extracted from smooth curve.

DATA TABLE NO. 210 NORMAL SPECTRAL REFLECTANCE OF SODIUM CHLORATE $NaClO_3$

[Wavelength, λ, μm; Reflectance, ρ; Temperature, T, K]

λ	ρ	λ	ρ
CURVE 1		CURVE 1 (cont.)	
T = 298		12.2	0.073
9.09	0.017	14.9	0.044
8.93	0.003	15.4	0.030
9.37	0.000	15.7	0.011
9.51	0.017	16.0	0.214
9.61	0.053	16.1	0.156
9.67	0.159	16.2	0.113*
9.77	0.602	16.6	0.071
9.85	0.781	17.5	0.058
10.0	0.849	19.2	0.040
10.1	0.818*	19.7	0.028
10.1	0.686	20.3	0.011
10.1	0.242	20.7	0.284
10.3	0.773	21.1	0.105
10.3	0.730*	21.4	0.081
10.4	0.300	22.3	0.061
10.6	0.085	23.5	0.050
10.6	0.379	25.0	0.050
10.7	0.259*		
10.7	0.240		
10.8	0.177*		
10.9	0.145		
11.2	0.112		
11.6	0.089		

*Not shown on plot

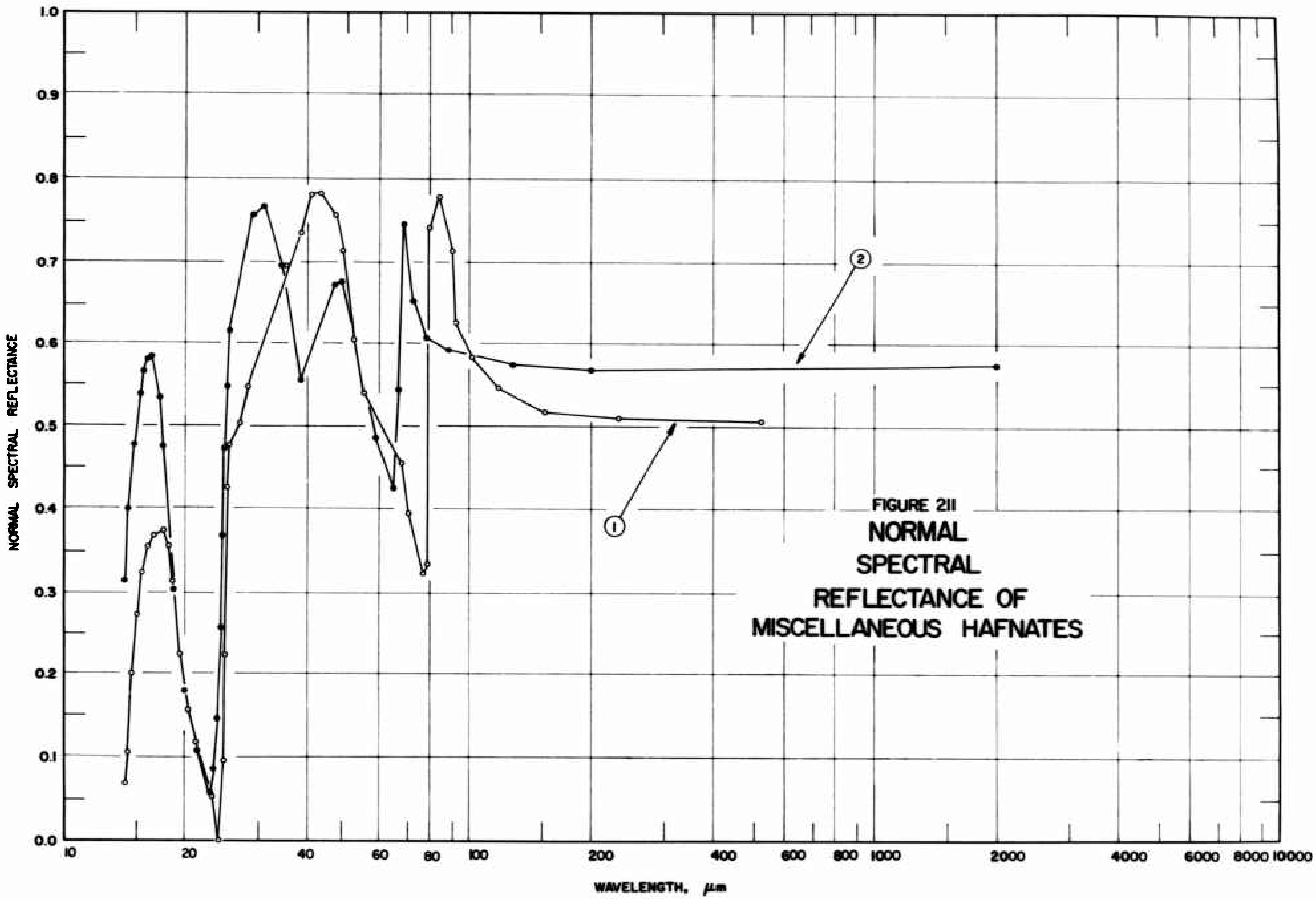


FIGURE 211
NORMAL
SPECTRAL
REFLECTANCE OF
MISCELLANEOUS HAFNATES

SPECIFICATION TABLE NO. 211 NORMAL SPECTRAL REFLECTANCE OF MISCELLANEOUS HAFNATES

Curve No.	Ref. No.	Year	Temperature K	Wavelength Range, μm	Geometry θ θ' ω'	Reported Error, %	Composition (weight percent), Specifications, and Remarks
1	167	1965	~298	14.2-526	~0° ~0°		LEAD HAFNATE, $PbHfO_3$ (<2 mm thick); data extracted from smooth curve.
2	167	1965	~238	14.2-2000	~0° ~0°		STRONTIUM HAFNATE, $SrHfO_3$ (<2 mm thick); data extracted from smooth curve.

DATA TABLE NO. 211 NORMAL SPECTRAL REFLECTANCE OF MISCELLANEOUS HAFNATES

[Wavelength, λ, μm; Reflectance, ρ; Temperature, T, K]

λ	ρ	λ	ρ	λ	ρ	λ	ρ
CURVE 1 T ~ 298		CURVE 1 (cont.)		CURVE 2 T ~ 298		CURVE 2 (cont.)	
		38.6	0.738			31.1	0.768
14.2	0.069	40.6	0.781	14.2	0.314	32.5	0.756*
14.4	0.105	43.8	0.784	14.5	0.400	34.8	0.697
14.7	0.200	46.9	0.758	15.0	0.478	38.7	0.554
15.1	0.271	49.0	0.713	15.5	0.537	46.7	0.672
15.6	0.326	52.0	0.605	15.8	0.565	48.5	0.677
16.1	0.354	55.8	0.539	16.1	0.580	59.8	0.485
16.9	0.369	68.0	0.453	16.4	0.583	65.3	0.424
17.7	0.372	71.9	0.395	17.2	0.532	67.1	0.542
18.2	0.356	77.5	0.323	17.6	0.474	68.4	0.633*
18.6	0.314	78.7	0.335	18.7	0.302	68.9	0.746
19.4	0.223	80.0	0.742	19.3	0.224*	73.5	0.651
20.3	0.154	84.7	0.780	20.0	0.179	78.7	0.609
21.1	0.119	90.9	0.713	21.4	0.107	88.4	0.591
23.1	0.052	92.5	0.626	23.0	0.057	128	0.573
24.2	0.000	101	0.581	23.4	0.084	200	0.566
25.0	0.094	119	0.547	24.0	0.144	2000	0.572
25.0	0.222	153	0.519	24.5	0.256		
25.3	0.424	232	0.510	24.8	0.368		
25.7	0.479	526	0.507	25.0	0.471		
27.2	0.501			25.3	0.548		
28.9	0.547			25.9	0.615		
35.8	0.698			29.5	0.758		

*Not shown on plot

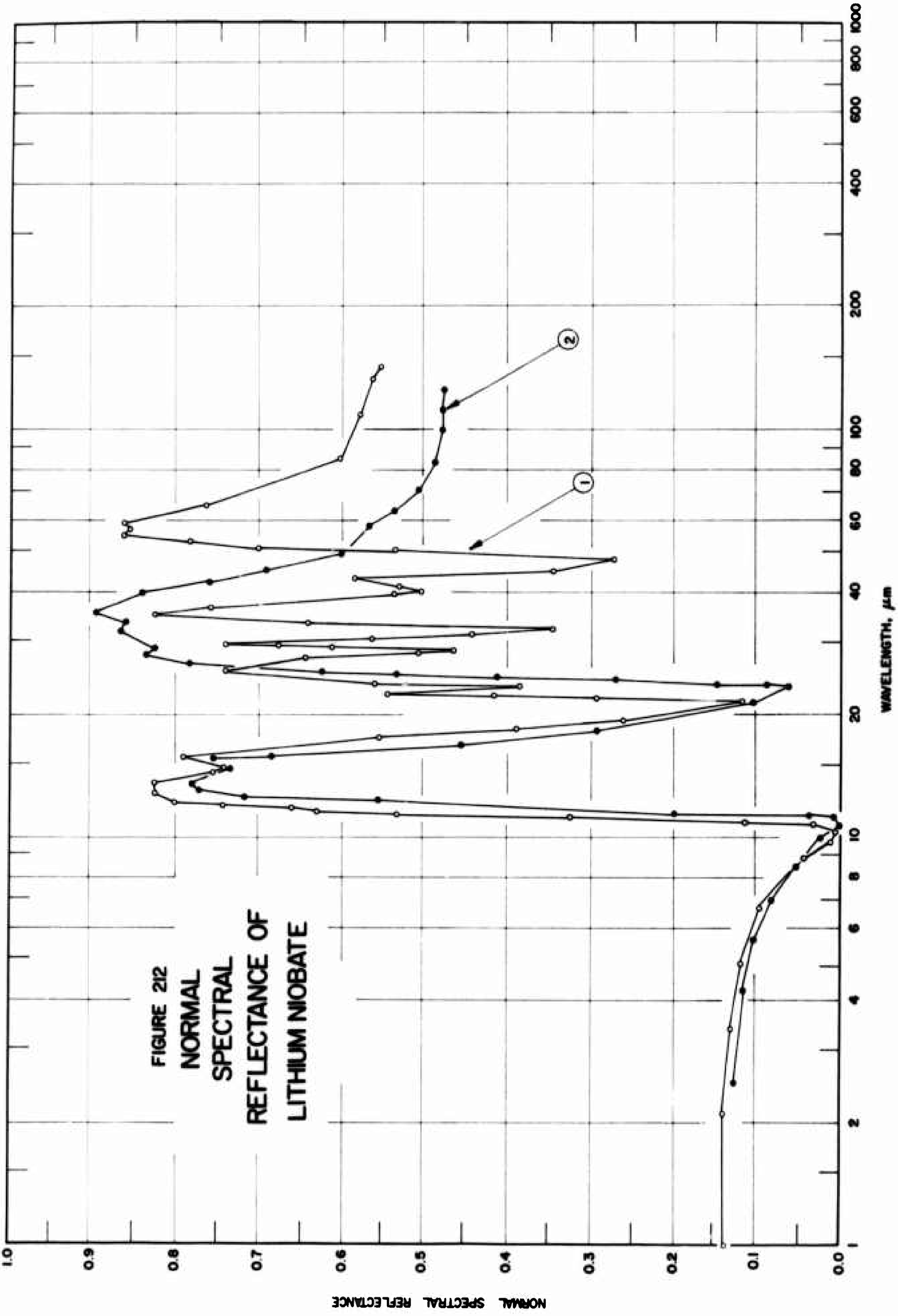


FIGURE 212 NORMAL SPECTRAL REFLECTANCE OF LITHIUM NIOBATE

SPECIFICATION TABLE NO. 212 NORMAL SPECTRAL REFLECTANCE OF LITHIUM NIOBATE $LiNbO_3$

Curve No.	Ref. No.	Year	Temperature K	Wavelength Range, μm	Geometry θ θ' ω'	Reported Error, %	Composition (weight percent), Specifications, and Remarks
1	173	1967	300	1.00-142	~0° ~0°		Single crystal (0.1 cm thick); grown by Bell Telephone Laboratories; polished with water slurrys of Buehler 303.5, then 305, then Linde C grinding compounds; electric vector E perpendicular to c-axis.
2	173	1967	300	2.50-125	~0° ~0°		Above specimen and condition except electric vector E parallel to c-axis.

DATA TABLE NO. 212 NORMAL SPECTRAL REFLECTANCE OF LITHIUM NIOBATE $LiNbO_3$

[Wavelength, λ, μm; Reflectance, ρ; Temperature, T, K]

λ	ρ	λ	ρ	λ	ρ	λ	ρ	λ	ρ	λ	ρ	λ	ρ
CURVE 1		CURVE 1 (cont.)		CURVE 1 (cont.)		CURVE 1 (cont.)		CURVE 2 (cont.)		CURVE 2 (cont.)		CURVE 2 (cont.)	
T = 300													
		15.3	0.789*	28.2	0.507	48.0	0.276	5.60	0.101	23.1	0.062	49.9	0.603
1.00	0.137	15.9	0.791	28.6	0.464	49.8	0.335*	7.00	0.082	23.3	0.088	51.6	0.596*
2.10	0.139	16.3	0.743*	28.9	0.550*	50.3	0.532	8.50	0.054	23.7	0.149	54.8	0.589*
3.40	0.130	17.5	0.554	29.1	0.617	51.7	0.701	10.0	0.026	24.2	0.271	58.0	0.568
4.90	0.118	18.4	0.390	29.3	0.680	53.0	0.787	10.6	0.003	24.6	0.414	63.0	0.539
6.70	0.099	19.4	0.262	29.7	0.743	54.3	0.863	11.0	0.010	25.0	0.533	71.7	0.508
8.90	0.045	20.8	0.162*	30.4	0.649*	56.9	0.857	11.2	0.040	25.4	0.628	83.6	0.489
9.70	0.013	21.5	0.116	30.5	0.565	59.7	0.863	11.4	0.200	25.7	0.697	91.7	0.480*
10.4	0.008	21.7	0.190*	31.3	0.442	62.7	0.836*	12.2	0.556	26.1	0.737*	100	0.480
10.7	0.034	22.0	0.298	32.3	0.347	65.6	0.779	12.5	0.720	26.8	0.789	111	0.480
10.9	0.112	22.2	0.419	33.0	0.497*	73.4	0.676*	13.0	0.774	27.5	0.830*	125	0.477
11.1	0.327	22.4	0.544	33.2	0.644	84.9	0.609	13.5	0.782	28.0	0.838		
11.3	0.531	22.7	0.486*	34.0	0.764*	98.5	0.588*	14.0	0.765*	29.0	0.829		
11.5	0.633	22.9	0.413*	35.0	0.829	109	0.580	14.3	0.751*	30.4	0.856*		
11.7	0.663	23.4	0.389	36.7	0.760	123	0.567*	14.7	0.738	32.2	0.869		
11.8	0.705*	23.6	0.466*	37.8	0.641*	132	0.564	15.1	0.759*	33.8	0.862		
12.0	0.745	23.8	0.560	39.2	0.539	142	0.554	15.6	0.759	35.8	0.898		
12.2	0.801	24.1	0.674*	40.0	0.503			15.9	0.688	36.5	0.873*		
12.8	0.827	24.6	0.732*	41.5	0.530	CURVE 2		16.1	0.635*	38.7	0.862*		
13.5	0.827	25.5	0.741	42.5	0.489	T = 300		16.7	0.455	39.9	0.841		
14.1	0.797*	26.8	0.709*	44.4	0.423*			18.1	0.296	42.0	0.762		
14.4	0.759	27.4	0.648	45.9	0.348	2.50	0.126	20.1	0.163*	44.5	0.694		
14.9	0.745	27.7	0.579*	46.6	0.296*	4.20	0.115	21.5	0.104	48.1	0.637*		

*Not shown on plot

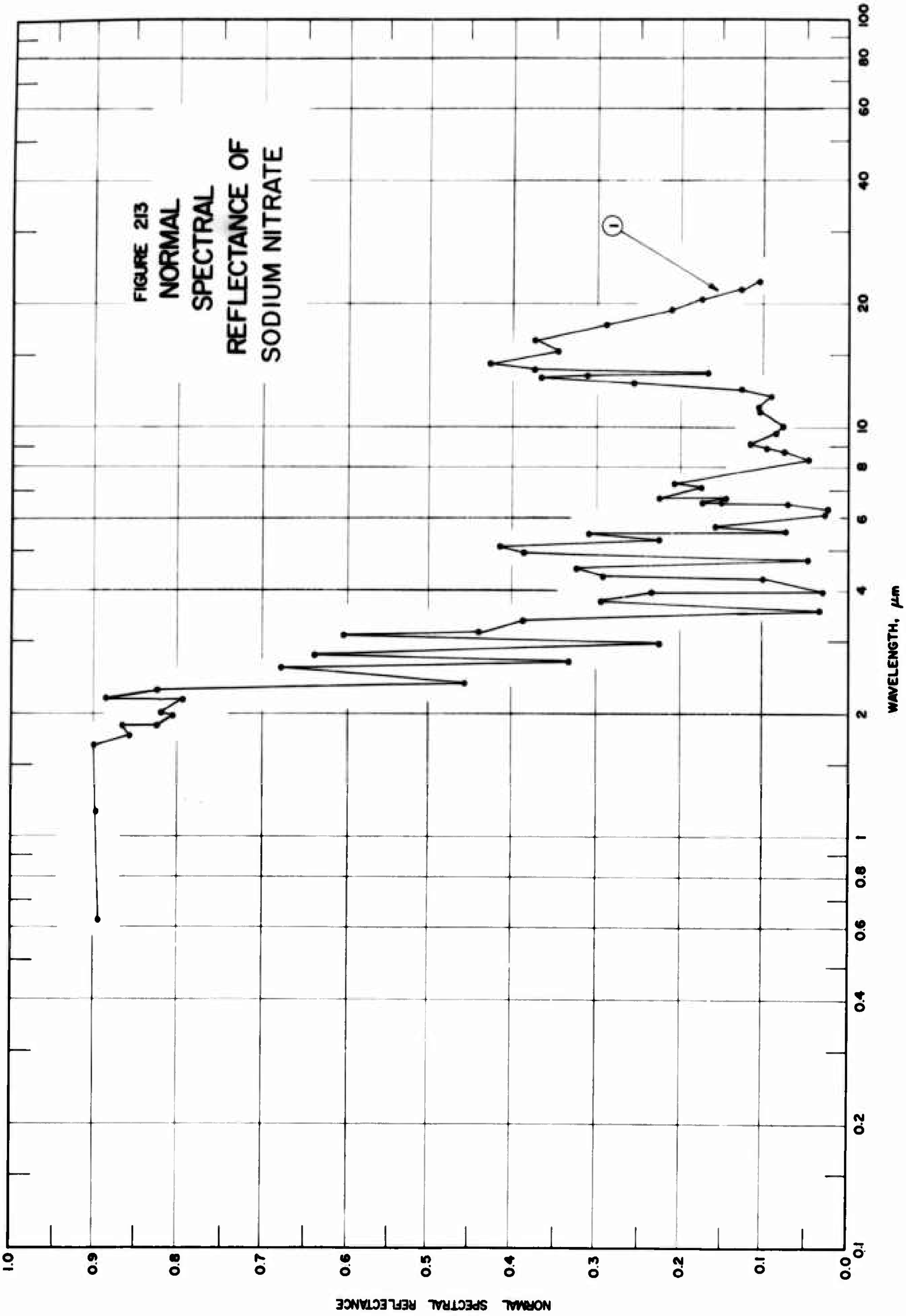


FIGURE 213 NORMAL SPECTRAL REFLECTANCE OF SODIUM NITRATE

SPECIFICATION TABLE NO. 213 NORMAL SPECTRAL REFLECTANCE OF SODIUM NITRATE $NaNO_3$

Curve No.	Ref. No.	Year	Temperature K	Wavelength Range, μm	Geometry θ	Geometry θ'	Geometry ω'	Reported Error, %	Composition (weight percent), Specifications, and Remarks
1	308	1966	~298	0.620-22.6	0°		2π		Data extracted from smooth curve.

DATA TABLE NO. 213 NORMAL SPECTRAL REFLECTANCE OF SODIUM NITRATE $NaNO_3$

[Wavelength, λ, μm; Reflectance, ρ; Temperature, T, K]

λ	ρ
CURVE 1	
T ~ 298	
0.620	0.893
1.15	0.898
1.66	0.900
1.74	0.858
1.86	0.825
1.86	0.864
2.00	0.820
1.98	0.804
2.15	0.796
2.15	0.887
2.15	0.829*
2.28	0.825
2.37	0.454
2.53	0.679
2.69	0.331
2.76	0.640
2.93	0.226
3.10	0.604
3.13	0.438
3.26	0.426*
3.38	0.389
3.59	0.033

λ	ρ
CURVE 1 (cont.)	
3.75	0.295
3.93	0.236
3.97	0.030
4.21	0.100
4.36	0.293
4.50	0.325
4.78	0.049
4.99	0.389
5.13	0.415
5.24	0.351*
5.30	0.227
5.43	0.310
5.45	0.141*
5.59	0.071
5.70	0.158
6.07	0.028
6.21	0.025
6.36	0.030*
6.42	0.070
6.40	0.119*
6.45	0.150
6.52	0.173
6.69	0.146

λ	ρ
CURVE 1 (cont.)	
6.79	0.227
7.02	0.212*
7.09	0.175
7.29	0.210
7.34	0.145*
8.25	0.049*
8.37	0.047
8.77	0.074
8.88	0.096
9.04	0.117
9.63	0.084
10.0	0.078
10.9	0.102
11.2	0.106
11.4	0.103*
11.8	0.090
12.1	0.111*
12.3	0.127
12.7	0.259
13.1	0.368
13.2	0.311
13.5	0.167
13.7	0.292*

λ	ρ
CURVE 1 (cont.)	
13.9	0.374
14.2	0.427
14.5	0.414*
15.1	0.347
15.5	0.365*
16.1	0.373
16.9	0.344*
17.9	0.290
19.3	0.211
20.5	0.174
21.7	0.129
22.6	0.109

*Not shown on plot

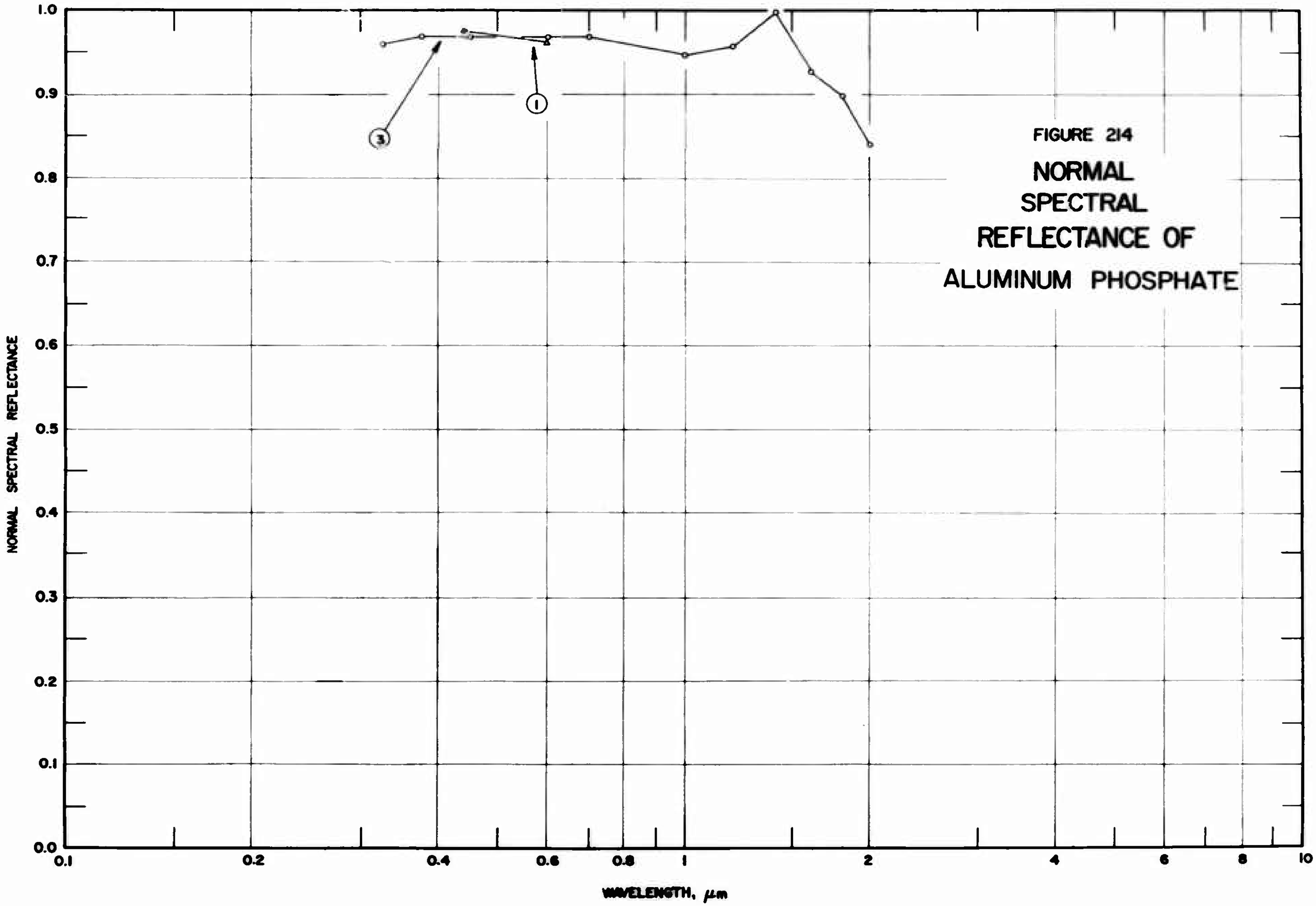


FIGURE 214 NORMAL SPECTRAL REFLECTANCE OF ALUMINUM PHOSPHATE

SPECIFICATION TABLE NO. 214 NORMAL SPECTRAL REFLECTANCE OF ALUMINUM PHOSPHATES

Curve No.	Ref. No.	Year	Temperature K	Wavelength Range, μm	Geometry θ	θ'	ω'	Reported Error, %	Composition (weight percent), Specifications, and Remarks
1	82	1963	298	0.440-0.600	~0°		2π		$Al_2O_3 \cdot 3P_2O_5$; from Victor Chemical Co.; compacted powder at 10 000 psi.
2*	82	1963	298	0.440-0.600	~0°		2π		Above specimen and conditions except exposed to uv irradiation; 180 ESH with solar factor 3.
3	92	1964	298	0.325-2.0	~0°		2π		$AlPO_4 \cdot 2H_2O$; compacted powder; MgO reference standard; [Authors' designation: Sample 9].

DATA TABLE NO. 214 NORMAL SPECTRAL REFLECTANCE OF ALUMINUM PHOSPHATES

[Wavelength, λ, μm; Reflectance, ρ; Temperature, T, K]

λ	ρ
CURVE 1 T = 298	
0.440	0.975
0.600	0.965
CURVE 2* T = 298	
0.440	0.615
0.600	0.800
CURVE 3 T = 298	
0.325	0.96
0.375	0.97
0.450	0.97
0.600	0.97
0.700	0.97
1.0	0.95
1.2	0.96
1.4	1.00
1.6	0.93
1.8	0.90
2.0	0.84

*Not shown on plot

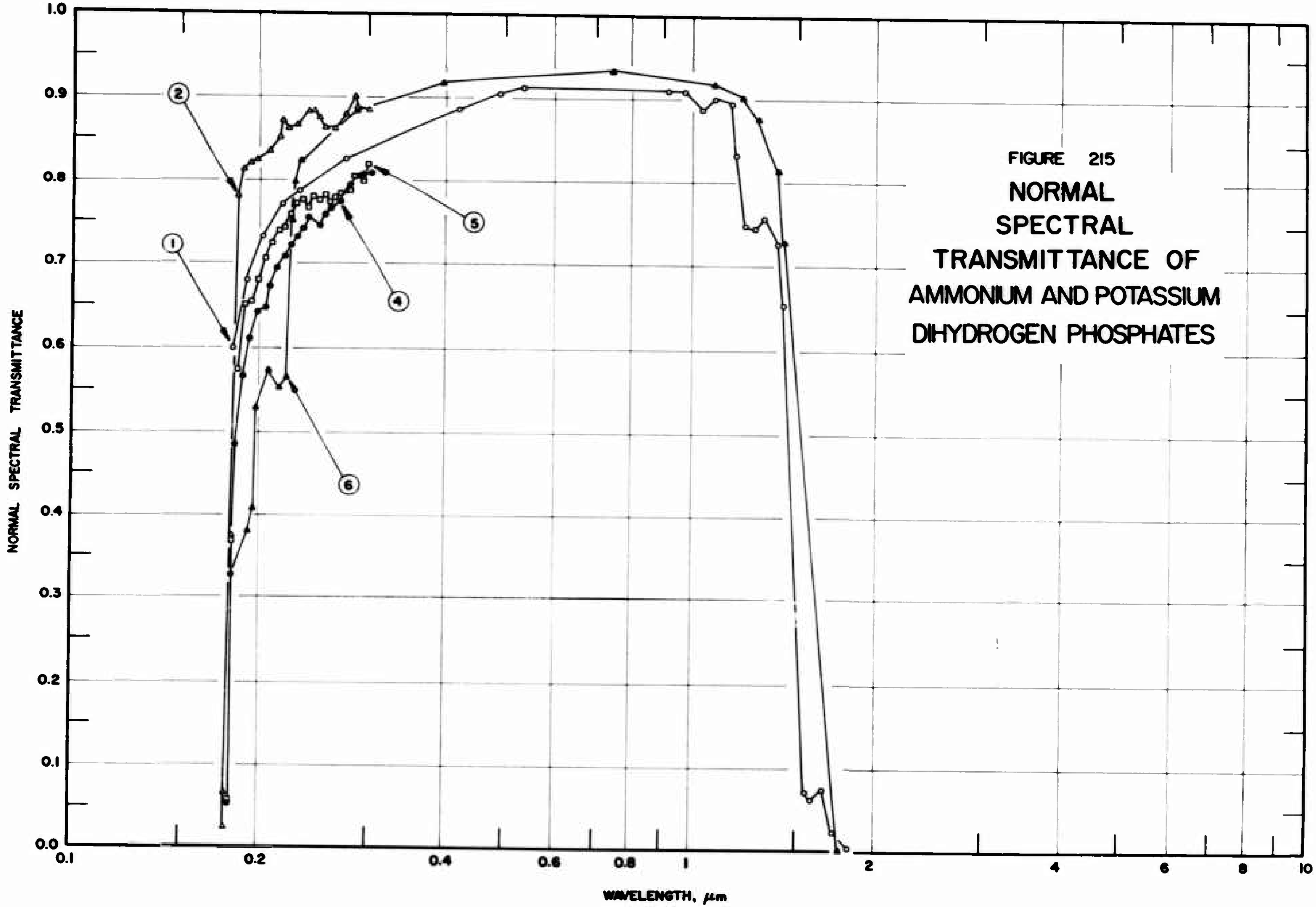


FIGURE 215
NORMAL
SPECTRAL
TRANSMITTANCE OF
AMMONIUM AND POTASSIUM
DIHYDROGEN PHOSPHATES

SPECIFICATION TABLE NO. 215 NORMAL SPECTRAL TRANSMITTANCE OF AMMONIUM AND POTASSIUM DIHYDROGEN PHOSPHATES

Curve No.	Ref. No.	Year	Temperature K	Wavelength Range, μm	Geometry θ	θ'	ω'	Reported Error, %	Composition (weight percent), Specifications, and Remarks
1	94	1967	298	0.182-1.82	~0°	~0°		± 2	AMMONIUM DIHYDROGEN PHOSPHATE (ADP), $NH_4H_2PO_4$; single crystal (1.65 mm thick); cut along the [101] axis; polished; data extracted from smooth curve.
2	291	1966	~298	0.1783-0.3000	0°	0°			AMMONIUM DIHYDROGEN PHOSPHATE (ADP), $NH_4H_2PO_4$; crystal grown by Harshaw Chemical Co. (2.99 mm thick); polished; measured in vacuum.
3*	291	1966	~298	0.1779-0.3000	0°	0°			Above specimen and conditions except irradiated with 10^{14} electrons cm^{-2} at 2.0 MeV incident through a sapphire shield (6.4 mm thick); angle of c-axis with electron beam 0 degree.
4	97	1967	~298	0.1800-0.3011	~0°	~0°			AMMONIUM DIHYDROGEN PHOSPHATE (ADP), $NH_4H_2PO_4$; grown and optically polished by Harshaw Chemical Co. (3.18 mm thick).
5	97	1967	~298	0.1801-0.3010	~0°	~0°			Above specimen and conditions except measured after irradiation by a total flux of 8.25×10^{10} protons cm^{-2} evenly distributed over 3, 3.8, and 4.6 MeV.
6	94	1967	298	0.182-1.76	~0°	~0°		± 2	POTASSIUM DIHYDROGEN PHOSPHATE (KDP), KH_2PO_4; single crystal (1.65 mm thick); cut along the [100] axis; polished; data extracted from smooth curve.

*Not shown on plot

DATA TABLE NO. 215 NORMAL SPECTRAL TRANSMITTANCE OF AMMONIUM AND POTASSIUM DIHYDROGEN PHOSPHATES

[Wavelength, λ, μm; Transmittance, τ; Temperature, T, K]

CURVE 1
T = 298

λ	τ
0.182	0.600
0.191	0.680
0.203	0.732
0.217	0.770
0.231	0.787
0.275	0.829
0.420	0.889
0.490	0.907
0.533	0.913
0.918	0.912
0.975	0.911
1.04	0.890
1.09	0.901
1.15	0.896
1.19	0.837
1.23	0.750
1.27	0.746
1.33	0.759
1.39	0.728
1.42	0.653
1.55	0.072
1.58	0.063
1.65	0.075
1.73	0.022
1.82	0.002

CURVE 2
T ~ 298

λ	τ
0.1783	0.023
0.1798	0.067
0.1820	0.374
0.1854	0.782
0.1896	0.815
0.1948	0.824
0.1997	0.828
0.2050	0.834*
0.2098	0.839
0.2152	0.854
0.2197	0.874
0.2246	0.866
0.2300	0.869
0.2347	0.878*
0.2400	0.885

CURVE 2 (cont.)

λ	τ
0.2448	0.885
0.2502	0.878
0.2550	0.865
0.2600	0.865*
0.2650	0.865
0.2700	0.872*
0.2749	0.882
0.2801	0.887*
0.2850	0.904
0.2899	0.890
0.2952	0.897*
0.3000	0.889

CURVE 3*
T ~ 298

λ	τ
0.1779	0.019
0.1797	0.074
0.1818	0.378
0.1853	0.733
0.1897	0.774
0.1947	0.793
0.2000	0.800
0.2048	0.812
0.2099	0.829
0.2146	0.836
0.2198	0.851
0.2246	0.859
0.2299	0.863
0.2348	0.865
0.2397	0.853
0.2448	0.857
0.2499	0.867
0.2524	0.855
0.2548	0.853
0.2599	0.856
0.2649	0.857
0.2699	0.851
0.2749	0.866
0.2800	0.881
0.2850	0.888
0.2901	0.888
0.2952	0.874
0.3000	0.880

CURVE 4
T ~ 298

λ	τ
0.1800	0.053
0.1824	0.327
0.1848	0.486
0.1897	0.569
0.1947	0.610
0.1998	0.643
0.2050	0.648
0.2099	0.671
0.2149	0.694
0.2200	0.708
0.2250	0.721
0.2300	0.733
0.2351	0.741
0.2402	0.756
0.2453	0.749*
0.2502	0.749
0.2553	0.760
0.2603	0.766
0.2654	0.770*
0.2705	0.775
0.2756	0.788*
0.2807	0.797
0.2857	0.797*
0.2908	0.808
0.2957	0.810
0.3011	0.810

CURVE 5
T ~ 298

λ	τ
0.1801	0.059
0.1825	0.368
0.1849	0.577
0.1898	0.651
0.1950	0.654
0.1999	0.681
0.2049	0.705
0.2099	0.725
0.2151	0.740
0.2201	0.745
0.2251	0.759
0.2301	0.772
0.2351	0.778
0.2403	0.768

CURVE 5 (cont.)

λ	τ
0.2453	0.780
0.2503	0.777
0.2553	0.783
0.2604	0.774
0.2654	0.779
0.2706	0.785
0.2756	0.789*
0.2809	0.789
0.2857	0.807
0.2907	0.807*
0.2959	0.798
0.3010	0.822

CURVE 6
T = 298

λ	τ
0.182	0.327*
0.194	0.380
0.196	0.409
0.199	0.528
0.208	0.574
0.216	0.552
0.221	0.566
0.226	0.752
0.228	0.800
0.234	0.828
0.253	0.863*
0.288	0.887
0.396	0.920
0.744	0.935
0.916	0.934*
1.09	0.920
1.21	0.904
1.29	0.877
1.38	0.815
1.43	0.730
1.76	0.000

* Not shown on plot

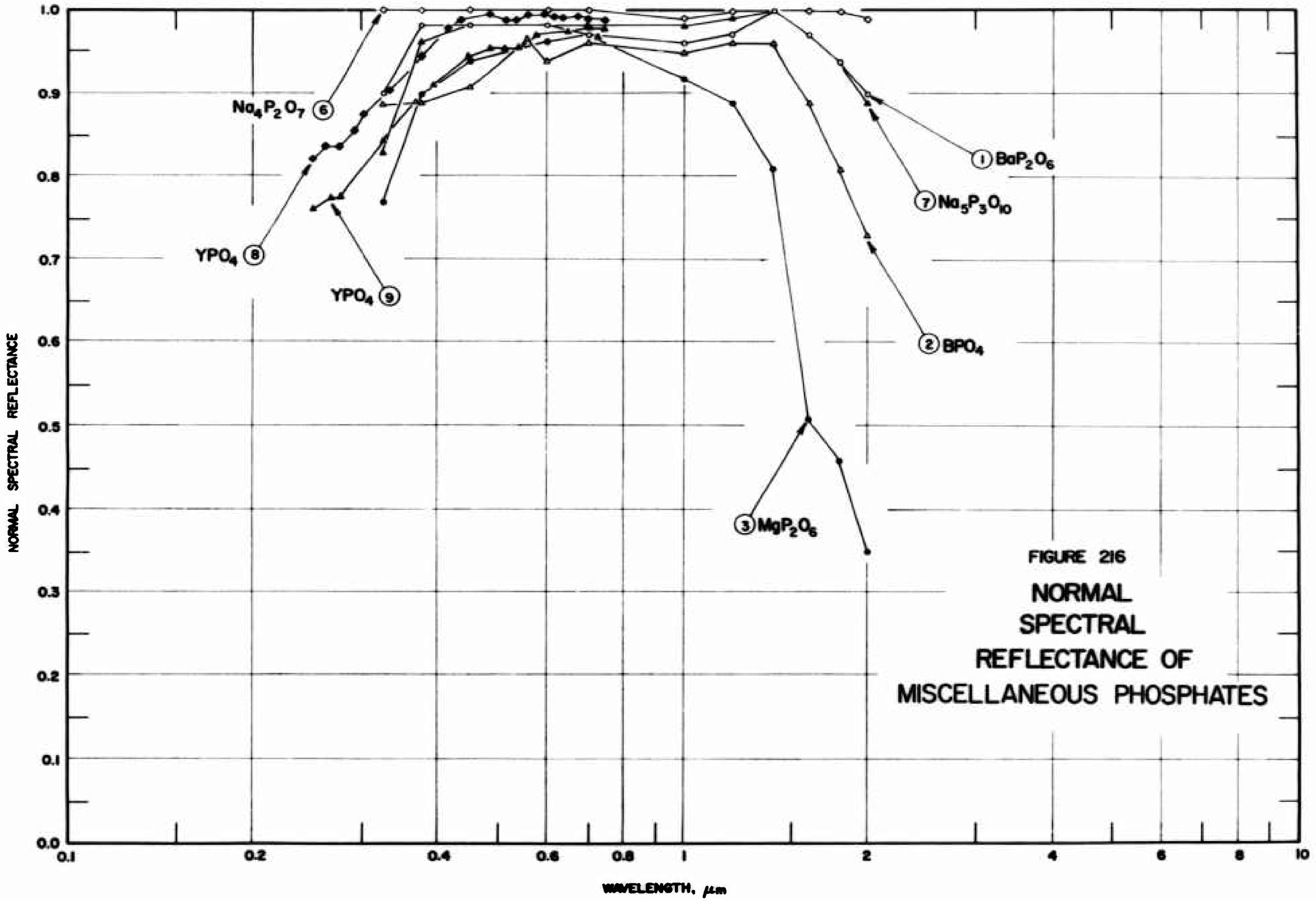


FIGURE 216
NORMAL SPECTRAL REFLECTANCE OF MISCELLANEOUS PHOSPHATES

SPECIFICATION TABLE NO. 216 NORMAL SPECTRAL REFLECTANCE OF MISCELLANEOUS PHOSPHATES

Curve No.	Ref. No.	Year	Temperature K	Wavelength Range, μm	Geometry θ	θ'	ω'	Reported Error, %	Composition (weight percent), Specifications, and Remarks
1	92	1964	298	0.325-2.0	~0°		2π		BARIUM PHOSPHATE, BaP_2O_6; compacted powder; MgO reference standard; [Authors' designation: Sample 4].
2	92	1964	298	0.325-2.0	~0°		2π		BORON PHOSPHATE, BPO_4; compacted powder; MgO reference standard; [Authors' designation: Sample 31].
3	92	1964	298	0.325-2.0	~0°		2π		MAGNESIUM PHOSPHATE, MgP_2O_6; compacted powder; MgO reference standard; [Authors' designation: Sample 18].
4*	82	1963	298	0.440-0.600	~0°		2π		POTASSIUM PHOSPHATE, $K_2O \cdot P_2O_5$; supplied by Victor Chemical Co.; compacted powder at 10 000 psi.
5*	82	1963	298	0.440-0.600	~0°		2π		Above specimen and conditions except exposed to uv irradiation; 180 ESH with solar factor 3.
6	92	1964	298	0.325-1.2	~0°		2π		SODIUM PHOSPHATE, $Na_4P_2O_7 \cdot 10H_2O$; compacted powder; MgO reference standard; [Authors' designation: Sample 19].
7	92	1964	298	0.325-2.0	~0°		2π		SODIUM TRIPOLYPHOSPHATE, $Na_5P_3O_{10}$; compacted powder; MgO reference standard; [Authors' designation: Sample 20].
8	206	1967	298	0.250-0.748	0°		2π		YTTRIUM PHOSPHATE, YPO_4; prepared by blending the mixed Y_2O_3 with P_2O_5 or NH_4PO_3 and fired at 1273 K for several hrs then cooled and ground; data extracted from smooth curve.
9	206	1967	423	0.250-0.748	0°		2π		Above specimen and conditions.

*Not shown on plot

DATA TABLE NO. 216 NORMAL SPECTRAL REFLECTANCE OF MISCELLANEOUS PHOSPHATES

[Wavelength, λ, μm; Reflectance, ρ; Temperature, T, K]

CURVE 1
T ~ 298

λ	ρ
0.325	0.90
0.375	0.98
0.450	0.98
0.600	0.98
0.700	0.97
1.0	0.96
1.2	0.97
1.4	1.00
1.6	0.97
1.8	0.94
2.0	0.90

CURVE 2
T = 298

λ	ρ
0.325	0.88
0.375	0.89
0.450	0.91
0.600	0.94
0.700	0.96
1.0	0.95
1.2	0.96
1.4	0.96
1.6	0.89
1.8	0.81
2.0	0.73

CURVE 3
T = 298

λ	ρ
0.325	0.77
0.375	0.90
0.450	0.94
0.600	0.96
0.700	0.97*
1.0	0.92
1.2	0.89
1.4	0.81
1.6	0.51
1.8	0.46
2.0	0.35

CURVE 4*
T = 298

λ	ρ
0.440	0.995
0.600	0.990

CURVE 5*
T = 298

λ	ρ
0.440	0.650
0.600	0.875

CURVE 6
T = 298

λ	ρ
0.325	1.00
0.375	1.00
0.450	1.00
0.600	1.00
0.700	>1.00
1.0	0.99
1.2	1.00
1.4	>1.00*
1.6	>1.00
1.8	>1.00
2.0	0.99

CURVE 7
T = 298

λ	ρ
0.325	0.83
0.375	0.96
0.450	0.98*
0.600	0.98*
0.700	0.98
1.0	0.98
1.2	0.99
1.4	>1.00*
1.6	0.97*
1.8	0.94*
2.0	0.89

CURVE 8
T = 298

λ	ρ
0.250	0.821
0.263	0.839
0.276	0.838

CURVE 8 (cont.)

λ	ρ
0.292	0.856
0.301	0.874
0.332	0.904
0.375	0.946
0.414	0.978
0.437	0.989
0.486	0.994
0.515	0.986
0.535	0.987
0.560	0.994
0.594	0.995
0.619	0.992
0.638	0.990
0.676	0.992
0.700	0.990*
0.721	0.983*
0.735	0.986*
0.748	0.988

CURVE 9
T = 423

λ	ρ
0.250	0.7[illegible]
0.267	0.776
0.278	0.776
0.324	0.844
0.367	0.891
0.391	0.912
0.449	0.944
0.488	0.953
0.511	0.953
0.523	0.951*
0.540	0.954
0.557	0.964
0.577	0.970
0.650	0.972
0.681	0.971*
0.702	0.979
0.711	0.970*
0.724	0.967
0.737	0.970*
0.748	0.975

* Not shown on plot

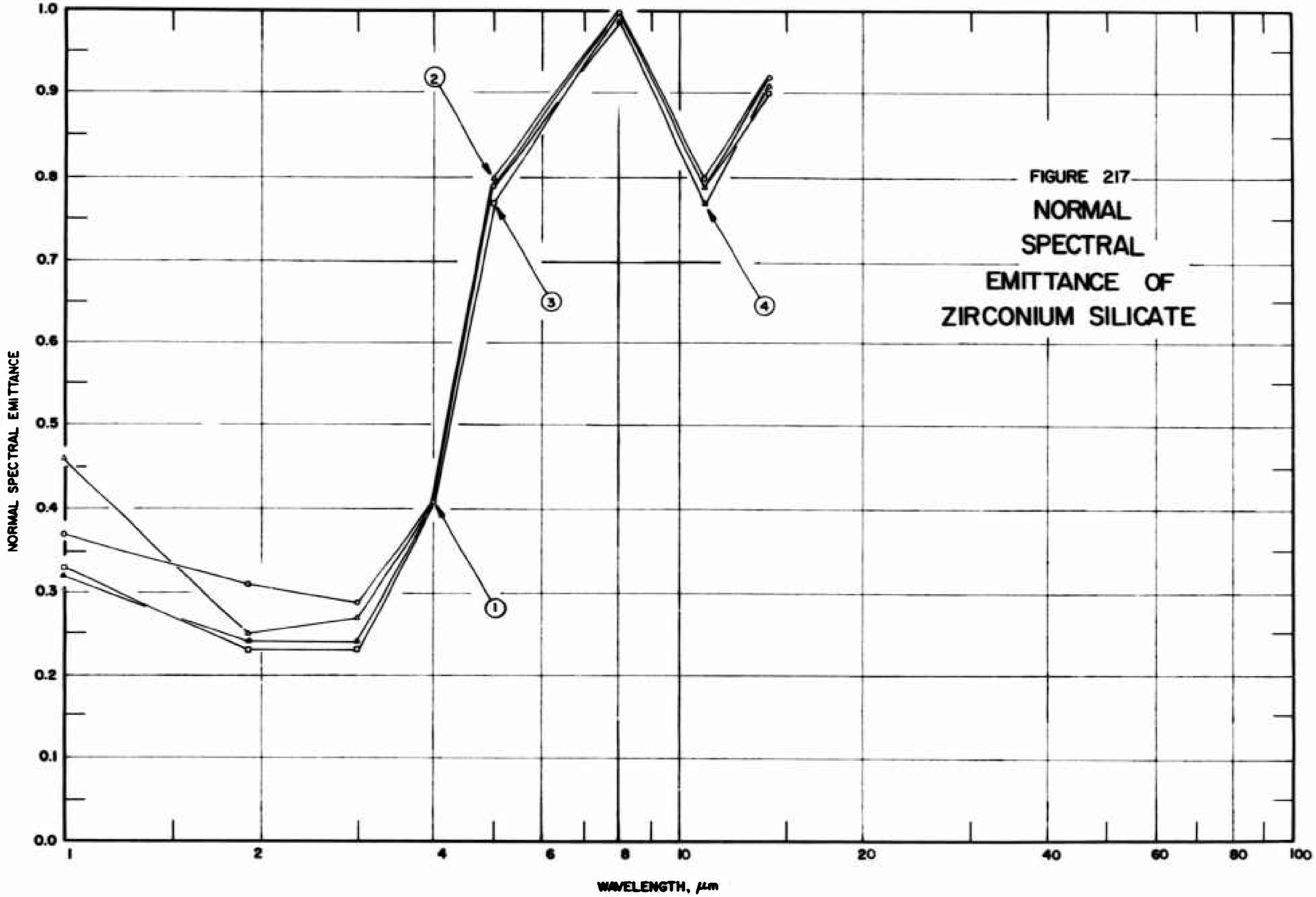


FIGURE 217
NORMAL SPECTRAL EMITTANCE OF ZIRCONIUM SILICATE

SPECIFICATION TABLE NO. 217 NORMAL SPECTRAL EMITTANCE OF ZIRCONIUM SILICATE $ZrSiO_4$

Curve No.	Ref. No.	Year	Temperature K	Wavelength Range, μm	Geometry θ'	Reported Error, %	Composition (weight percent), Specifications, and Remarks
1	188	1964	867	1-14	~0°	0.5	Zircopax; prepared by slip-casting; National Lead Co.; fired at 1773 K.
2	188	1964	1048	1-14	~0°	0.5	Above specimen and conditions.
3	188	1964	1153	1-14	~0°	0.5	Above specimen and conditions.
4	188	1964	1263	1-14	~0°	0.5	Above specimen and conditions.

DATA TABLE NO. 217 NORMAL SPECTRAL EMITTANCE OF ZIRCONIUM SILICATE $ZrSiO_4$

[Wavelength, λ, μm; Emittance, ε; Temperature, T, K]

λ	ε	λ	ε
CURVE 1 T = 867		CURVE 3 T = 1153	
1	0.37	1	0.33
2	0.31	2	0.23
3	0.29	3	0.23
4	0.41	4	0.41*
5	0.79	5	0.77
8	1.00	8	1.00*
11	0.80	11	0.79*
14	0.92	14	0.90
CURVE 2 T = 1048		CURVE 4 T = 1263	
1	0.46	1	0.32
2	0.25	2	0.24
3	0.27	3	0.24
4	0.41*	4	0.41*
5	0.80	5	0.79*
8	1.00*	8	0.99
11	0.79	11	0.77
14	0.92*	14	0.91

*Not shown on plot

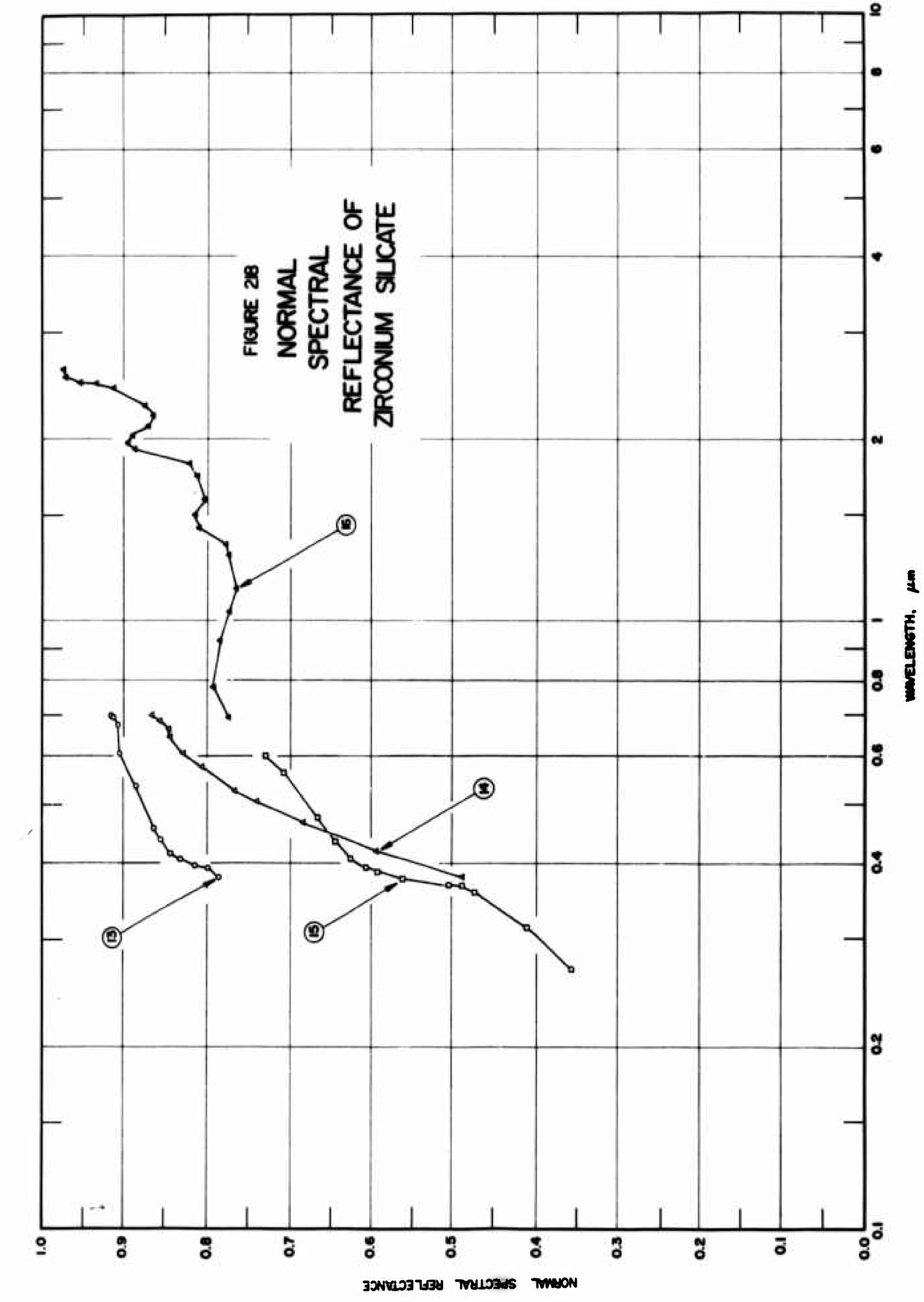


FIGURE 218 NORMAL SPECTRAL REFLECTANCE OF ZIRCONIUM SILICATE

SPECIFICATION TABLE NO. 218 NORMAL SPECTRAL REFLECTANCE OF ZIRCONIUM SILICATE $ZrSiO_4$

Curve No.	Ref. No.	Year	Temperature K	Wavelength Range, μm	Geometry θ	θ'	ω'	Reported Error, %	Composition (weight percent), Specifications, and Remarks
1*	82	1963	298	0.440-0.600	~0°		2π		Milled zircon; supplied by Titanium Alloy Mfg; compacted powder at 10 000 psi.
2*	82	1963	298	0.440-0.600	~0°		2π		Above specimen and conditions except exposed to UV irradiation; 75 ESH with solar factor 1.5.
3*	82	1963	298	0.440-0.600	~0°		2π		Superpax; supplied by Titanium Alloy Mfg; compacted powder at 10 000 psi.
4*	82	1963	298	0.440-0.600	~0°		2π		Above specimen and conditions except exposed to UV irradiation; 180 ESH with solar factor 3.
5*	82	1963	298	0.440-0.600	~0°		2π		Superpax A; supplied by Titanium Alloy Mfg; compacted powder at 10 000 psi.
6*	82	1963	298	0.440-0.600	~0°		2π		Above specimen and conditions except exposed to UV irradiation; 180 ESH with solar factor 3.
7*	82	1963	298	0.440-0.600	~0°		2π		Superpax A (HCl-leached); supplied by Titanium Alloy Mfg; compacted powder at 10 000 psi.
8*	82	1963	298	0.440-0.600	~0°		2π		Above specimen and conditions except exposed to UV irradiation; 180 ESH with solar factor 3.
9*	82	1963	298	0.440-0.600	~0°		2π		CP; supplied by Titanium-Zirconium; compacted powder at 10 000 psi.
10*	82	1963	298	0.440-0.600	~0°		2π		Above specimen and conditions except exposed to UV irradiation; 180 ESH with solar factor 3.
11*	82	1963	298	0.440-0.600	~0°		2π		Ultrox 1000W; supplied by Metal-Thermit; compacted powder at 10 000 psi.
12*	82	1963	298	0.440-0.600	~0°		2π		Above specimen and conditions except exposed to UV irradiation; 75 ESH with solar factor 1.5.
13	246	1962	298	0.380-0.700	0°		2π		Superpax A zircon; powder compacted at 10^4 psi; data extracted from smooth curve; [Author's designation: Sample d].
14	246	1962	298	0.380-0.700	0°		2π		Above specimen and conditions except exposed to simulated solar radiation at 4 suns for 60 hrs.
15	121	1964	~298	0.266-0.600	~0°		2π		Zircon; Foote Mineral Co.; compacted powder; 66.4 pure; data extracted from smooth curve; $BaSO_4$ reference standard.
16	121	1964	~298	0.600-2.50	~0°		2π		Similar to above specimen and conditions.

*Not shown on plot

DATA TABLE NO. 218 NORMAL SPECTRAL REFLECTANCE OF ZIRCONIUM SILICATE $ZrSiO_4$

[Wavelength, λ, μm; Reflectance, ρ; Temperature, T, K]

λ	ρ
CURVE 1* T = 298	
0.440	0.870
0.600	0.935
CURVE 2* T = 298	
0.440	0.800
0.600	0.935
CURVE 3*	
0.440	0.865
0.600	0.925
CURVE 4* T = 298	
0.440	0.650
0.600	0.845
CURVE 5* T = 298	
0.440	0.855
0.600	0.905
CURVE 6* T = 298	
0.440	0.640
0.600	0.825
CURVE 7* T = 298	
0.440	0.890
0.600	0.925
CURVE 8* T = 298	
0.440	0.570
0.600	0.755
CURVE 9* T = 298	
0.440	0.755
0.600	0.840
CURVE 10* T = 298	
0.440	0.555
0.600	0.715
CURVE 11* T = 298	
0.440	0.860
0.600	0.935
CURVE 12* T = 298	
0.440	0.780
0.600	0.905
CURVE 13 T = 298	
0.380	0.789
0.391	0.800
0.399	0.815
0.406	0.832
0.415	0.841
0.431	0.853*
0.439	0.855
0.448	0.854*
0.456	0.862
0.535	0.885
0.607	0.904
0.678	0.909
0.687	0.911*
0.693	0.911
0.700	0.914
CURVE 14 T = 298	
0.380	0.489
0.420	0.594
CURVE 14 (cont.)	
0.464	0.686
0.501	0.740
0.527	0.767
0.573	0.808
0.604	0.830
0.646	0.845
0.663	0.847
0.671	0.852*
0.684	0.858
0.700	0.865
CURVE 15 T ~ 298	
0.266	0.356
0.311	0.411
0.359	0.472
0.366	0.488
0.369	0.501
0.374	0.528*
0.379	0.563
0.386	0.592
0.391	0.607
0.409	0.628
0.431	0.644
0.479	0.669
0.562	0.708
0.600	0.730
CURVE 16 T ~ 298	
0.600	0.730*
0.693	0.774
0.780	0.793
0.928	0.788
1.03	0.773
1.13	0.767
1.29	0.774
1.33	0.779
1.42	0.810
1.50	0.815
1.58	0.804
1.75	0.812
1.82	0.821
1.93	0.887
CURVE 16 (cont.)	
1.96	0.896
2.01	0.890
2.10	0.870
2.19	0.866
2.26	0.873
2.29	0.878*
2.41	0.912
2.46	0.938
2.48	0.958
2.53	0.971
2.60	0.975

*Not shown on plot

SPECIFICATION TABLE NO. 219 NORMAL SOLAR ABSORPTANCE OF ZIRCONIUM SILICATE $ZrSiO_4$

Curve No.	Ref. No.	Year	Temperature Range, K	Geometry θ	Reported Error, %	Composition (weight percent), Specifications and Remarks
1*	121	1964	~298	~0°		Zircon (Foote Mineral Co.); compacted powder; purity 66.4; computed from spectral reflectance data.
2*	121	1961	~298	~0°		Above specimen and conditions except exposed to 100 ESH.

DATA TABLE NO. 219 NORMAL SOLAR ABSORPTANCE OF ZIRCONIUM SILICATE $ZrSiO_4$

[Temperature, T, K; Absorptance, α]

T	α
CURVE 1*	
298	0.268
CURVE 2*	
298	0.337

*No plot given

SPECIFICATION TABLE NO. 220 NORMAL SOLAR ABSORPTANCE OF ZIRCONIUM SILICATE COMPOUNDS

Curve No.	Ref. No.	Year	Temperature Range, K	Geometry θ	Reported Error, %	Composition (weight percent), Specifications and Remarks
1*	277	1966	~298	~0°		BARIUM ZIRCONIUM SILICATE, $BaZrSiO_5$ powder, "as received"; compacted at 50-60 psi; computed from spectral reflectance data; [Authors' designation: Specimen 7196].
2*	277	1966	~298	~0°		Above specimen and conditions except exposed to 2000 ESH UV radiation at solar factor 5 suns.
3*	277	1966	~298	~0°		CALCIUM ZIRCONIUM SILICATE, $CaZrSiO_5$ powder, "as received"; compacted at 50-60 psi; computed from spectral reflectance data; [Authors' designation: Specimen 7195].
4*	277	1966	~298	~0°		Above specimen and conditions except exposed to 2000 ESH UV radiation at solar factor 5 suns.
5*	277	1966	~298	~0°		MAGNESIUM ZIRCONIUM SILICATE, $MgZrSiO_5$ powder, "as received"; compacted at 50-60 psi; computed from spectral reflectance data; [Authors' designation: Specimen 7197].
6*	277	1966	~298	~0°		Above specimen and conditions except exposed to 2000 ESH UV radiation at solar factor 5 suns.
7*	277	1966	~298	~0°		ZINC ZIRCONIUM SILICATE, $ZnZrSiO_5$ powder; "as received"; compacted at 50-60 psi; computed from spectral reflectance data; [Authors' designation: Specimen 7194].
8*	277	1966	~298	~0°		Above specimen and conditions except exposed to 2000 ESH UV radiation at solar factor 5 suns.

DATA TABLE NO. 220 NORMAL SOLAR ABOSRPTANCE OF ZIRCONIUM SILICATE COMPOUNDS

[Temperature, T, K; Absorptance, α]

T	α	T	α
CURVE 1*		CURVE 5*	
298	0.161	298	0.102
CURVE 2*		CURVE 6*	
298	0.273	298	0.160
CURVE 3*		CURVE 7*	
298	0.115	298	0.123
CURVE 4*		CURVE 8*	
298	0.159	298	0.181

*No plot given

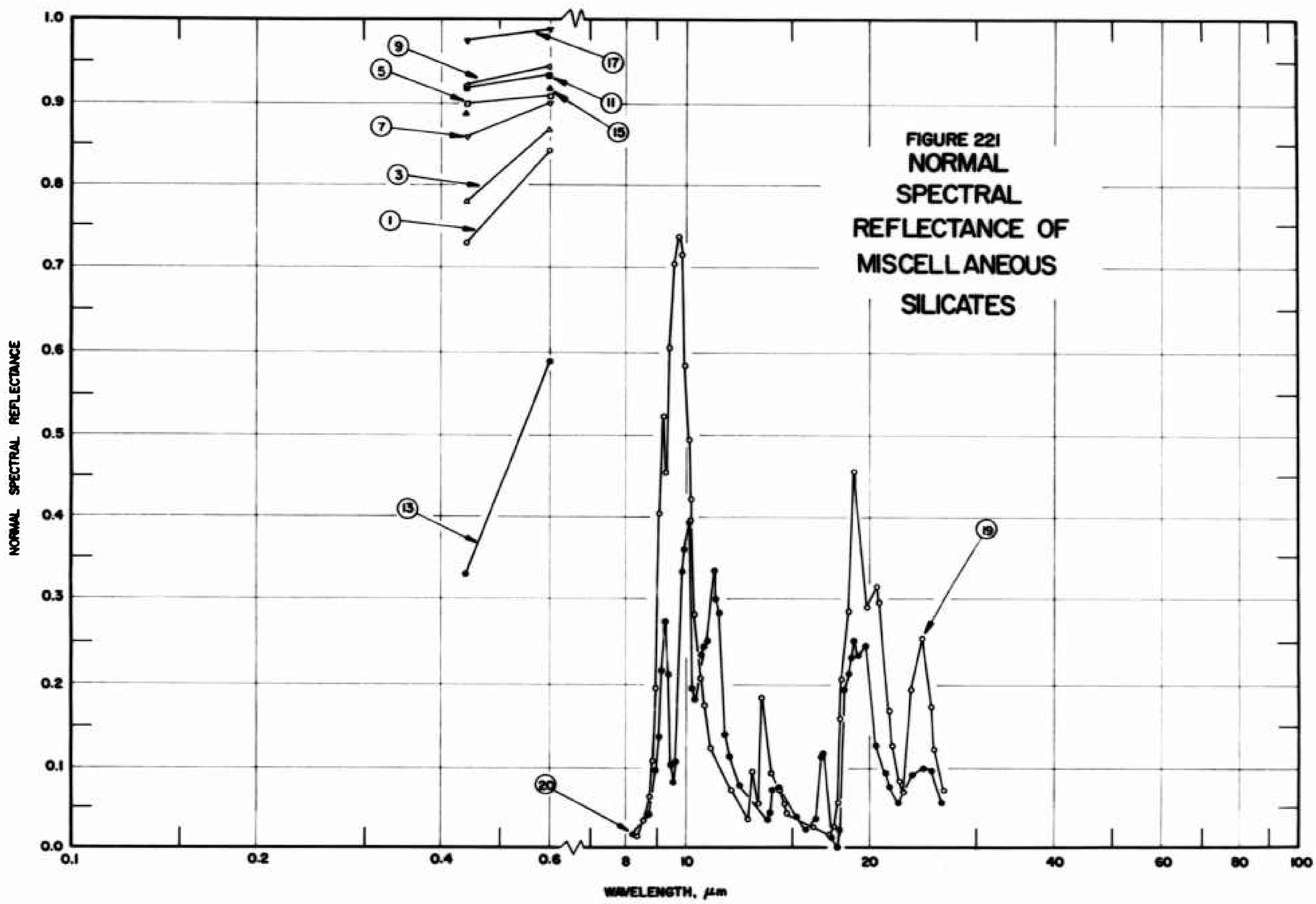


FIGURE 221
NORMAL SPECTRAL REFLECTANCE OF MISCELLANEOUS SILICATES
NORMAL SPECTRAL REFLECTANCE
WAVELENGTH, μm
1.0
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0.0
0.1
0.2
0.4
0.6
8
10
20
40
60
80
100
1
3
5
7
9
11
13
15
17
19
20

SPECIFICATION TABLE NO. 221 NORMAL SPECTRAL REFLECTANCE OF MISCELLANEOUS SILICATES

Curve No.	Ref. No.	Year	Temperature K	Wavelength Range, μm	Geometry θ	θ'	ω'	Reported Error, %	Composition (weight percent), Specifications, and Remarks
1	82	1963	298	0.440-0.600	~0°		2π		ALUMINUM SILICATE, $Al_2O_3 \cdot 2SiO_2 \cdot 2H_2O$; Ajax P kaolin supplied by Georgia Kaolin Co.; compacted powder at 10 000 psi.
2*	82	1963	298	0.440-0.600	~0°		2π		Above specimen and conditions except exposed to UV irradiation; 180 ESH with solar factor 3.
3	82	1963	298	0.440-0.600	~0°		2π		ALUMINUM SILICATE, $Al_2O_3 \cdot 2SiO_2$; Ajax SC kaolin supplied by Georgia Kaolin Co.; compacted powder at 10 000 psi.
4*	82	1963	298	0.440-0.600	~0°		2π		Above specimen and conditions except exposed to UV irradiation; 200 ESH with solar factor 3.
5	82	1963	298	0.440-0.600	~0°		2π		ALUMINUM SILICATE, $3Al_2O_3 \cdot 2SiO_2$; Mullite; supplied by Carborundum Co.; compacted powder at 10 000 psi.
6*	82	1963	298	0.440-0.600	~0°		2π		Above specimen and conditions except exposed to UV irradiation; 200 ESH with solar factor 3.
7	82	1963	298	0.440-0.600	~0°		2π		CALCIUM SILICATE, $CaSiO_3$; synthetic; supplied by Johns-Manville; compacted powder at 10 000 psi.
8*	82	1963	298	0.440-0.600	~0°		2π		Above specimen and conditions except exposed to UV irradiation; 75 ESH with solar factor 1.5.
9	82	1963	298	0.440-0.600	~0°		2π		CALCIUM SILICATE, $CaSiO_3$; Wollastonite C-1; supplied by Cabot; compacted powder at 10 000 psi.
10*	82	1963	298	0.440-0.600	~0°		2π		Above specimen and conditions except exposed to UV irradiation; 75 ESH with solar factor 1.5.
11	82	1963	298	0.440-0.600	~0°		2π		CALCIUM SILICATE, $CaSiO_3$; Wollastonite C-6; supplied by Cabot; compacted powder at 10 000 psi.
12*	82	1963	298	0.440-0.600	~0°		2π		Above specimen and conditions except exposed to UV irradiation; 180 ESH with solar factor 3.
13	82	1963	298	0.440-0.600	~0°		2π		MAGNESIUM SILICATE, $2MgO \cdot SiO_2$; AlSi Mag 243; supplied by American Lava Co.; compacted powder at 10 000 psi.
14*	82	1963	298	0.440-0.600	~0°		2π		Above specimen and conditions except exposed to UV irradiation; 1036 ESH with solar factor 15.
15	82	1963	298	0.440-0.600	~0°		2π		MAGNESIUM SILICATE, $MgSiO_3 \cdot nH_2O$; No. 140 Alabama talc; supplied by Whittaker, Clark, and Daniels; compacted powder at 10 000 psi.
16*	82	1963	298	0.440-0.600	~0°		2π		Above specimen and conditions except exposed to UV irradiation; 180 ESH with solar factor 3.
17	82	1963	298	0.440-0.600	~0°		2π		MAGNESIUM TRISILICATE; USP; supplied by Mallinckrodt; compacted powder at 10 000 psi.
18*	82	1963	298	0.440-0.600	~0°		2π		Above specimen and conditions except exposed to UV irradiation; 200 ESH with solar factor 3.

*Not shown on plot

SPECIFICATION TABLE NO. 221 (continued)

Curve No.	Ref. No.	Year	Temperature K	Wavelength Range, μm	Geometry θ	θ'	ω'	Reported Error, %	Composition (weight percent), Specifications, and Remarks
19	261	1967	573	8.36-26.3	~0°	~0°			SODIUM DISILICATE, $Na_2Si_2O_5$; polycrystalline; data extracted from smooth curve.
20	261	1967	573	8.41-26.1	~0°	~0°			SODIUM METASILICATE, Na_2SiO_3; polycrystalline; data extracted from smooth curve.

DATA TABLE NO. 221 NORMAL SPECTRAL REFLECTANCE OF MISCELLANEOUS SILICATES

[Wavelength, λ, μm; Reflectance, ρ; Temperature, T, K]

CURVE 1
T = 298

λ	ρ
0.440	0.730
0.600	0.845

CURVE 2*
T = 298

λ	ρ
0.440	0.465
0.600	0.600

CURVE 3
T = 298

λ	ρ
0.440	0.780
0.600	0.870

CURVE 4*
T = 298

λ	ρ
0.440	0.650
0.600	0.810

CURVE 5
T = 298

λ	ρ
0.440	0.900
0.600	0.910

CURVE 6*
T = 298

λ	ρ
0.440	0.690
0.600	0.865

CURVE 7
T = 298

λ	ρ
0.440	0.860
0.600	0.900

CURVE 8*
T = 298

λ	ρ
0.440	0.580
0.600	0.810

CURVE 9
T = 298

λ	ρ
0.440	0.925
0.600	0.945

CURVE 10*
T = 298

λ	ρ
0.440	0.810
0.600	0.915

CURVE 11
T = 298

λ	ρ
0.440	0.920
0.600	0.935

CURVE 12*
T = 298

λ	ρ
0.440	0.700
0.600	0.865

CURVE 13
T = 298

λ	ρ
0.440	0.330
0.600	0.590

CURVE 14*
T = 298

λ	ρ
0.440	0.355
0.600	0.600

CURVE 15
T = 298

λ	ρ
0.440	0.890
0.600	0.920

CURVE 16*
T = 298

λ	ρ
0.440	0.620
0.600	0.735

CURVE 17
T = 298

λ	ρ
0.440	0.975
0.600	0.990

CURVE 18*
T = 298

λ	ρ
0.440	0.185
0.600	0.445

CURVE 19
T = 573

λ	ρ
8.36	0.015
8.57	0.035
8.73	0.066
8.82	0.109
8.91	0.195
9.08	0.402
9.20	0.525
9.29	0.454
9.40	0.606
9.55	0.704
9.72	0.738
9.82	0.714
9.92	0.587
10.0	0.497
10.2	0.399
10.2	0.421
10.4	0.281
10.5	0.208
10.6	0.175
10.8	0.138*
11.0	0.123
11.9	0.071
12.6	0.038
12.8	0.096
13.1	0.053
13.4	0.186
13.8	0.093
14.0	0.071
14.5	0.054
15.4	0.045
16.3	0.027
17.0	0.018

CURVE 19 (cont.)

λ	ρ
17.5	0.029
17.7	0.059
17.9	0.160
18.0	0.204
18.5	0.289
18.8	0.459
19.8	0.291
20.4	0.317
20.8	0.299
21.5	0.170
21.7	0.127
22.4	0.083
22.7	0.070
23.4	0.194
24.3	0.256
25.0	0.173
25.5	0.123
26.3	0.071

CURVE 20
T = 573

λ	ρ
8.41	0.018
8.58	0.030*
8.71	0.042
8.85	0.066*
8.97	0.099
9.02	0.137
9.10	0.217
9.16	0.250*
9.29	0.274
9.38	0.212
9.46	0.102
9.55	0.082
9.65	0.107
9.84	0.332
9.95	0.360
10.1	0.395
10.3	0.195
10.4	0.182
10.6	0.237
10.7	0.246
10.8	0.253
11.0	0.334
11.2	0.300

CURVE 20 (cont.)

λ	ρ
11.3	0.285
11.6	0.140
11.8	0.113
12.3	0.080
13.5	0.036
13.6	0.043
13.8	0.072
14.0	0.075
14.3	0.073*
15.1	0.040
15.7	0.024
16.0	0.027*
15.2	0.038
16.5	0.113
16.7	0.118
17.0	0.114*
17.4	0.011
17.7	0.000
17.8	0.022
18.2	0.193
18.5	0.213
18.6	0.231
18.9	0.252
19.2	0.236
19.6	0.247
20.5	0.127
21.0	0.093
21.4	0.076
22.0	0.057
23.5	0.091
24.5	0.100
25.1	0.097
26.1	0.057

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*Not shown on plot

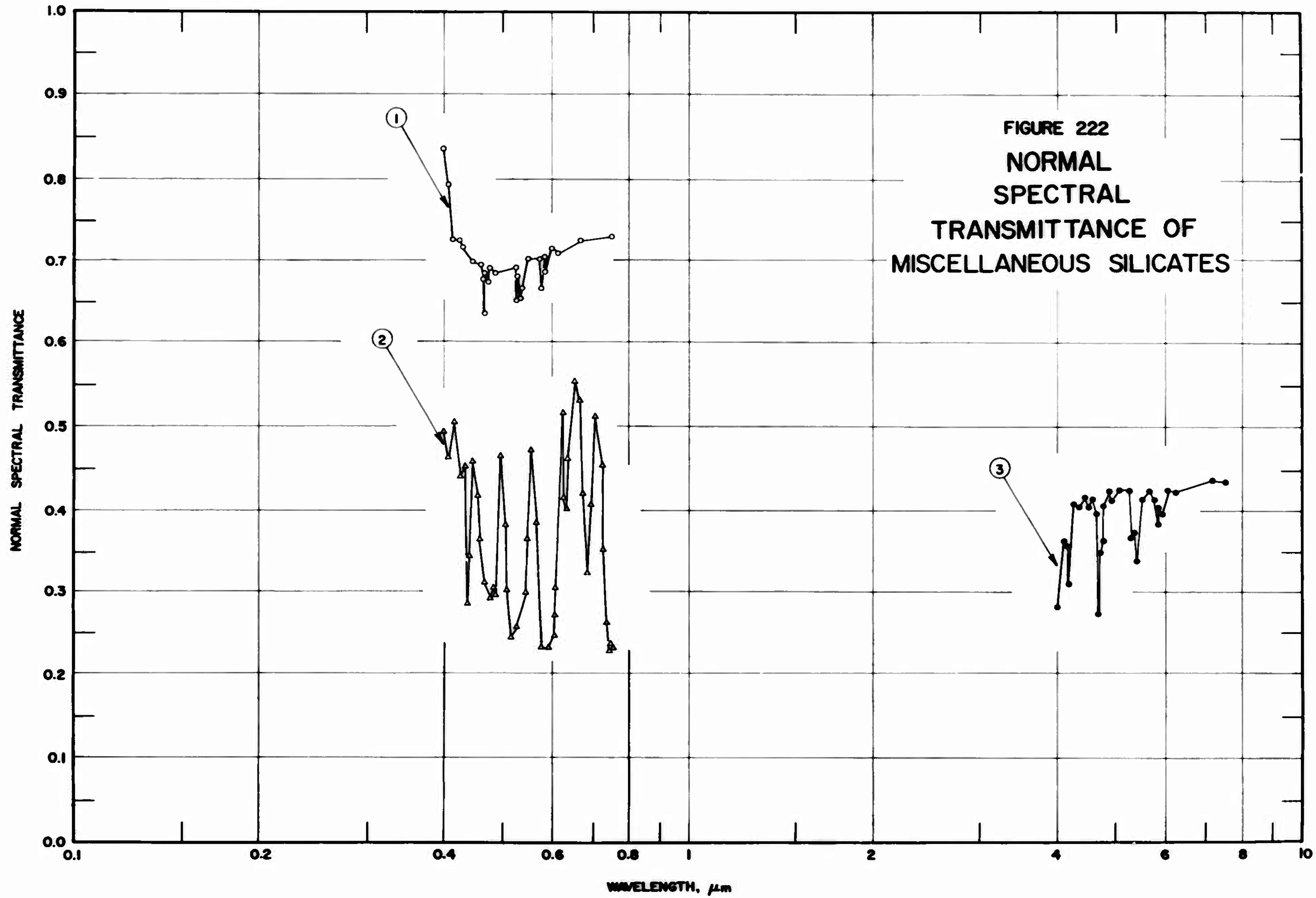


FIGURE 222
NORMAL
SPECTRAL
TRANSMITTANCE OF
MISCELLANEOUS SILICATES
NORMAL SPECTRAL TRANSMITTANCE
WAVELENGTH, μm
1.0
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0.0
0.1
0.2
0.4
0.6
0.8
1
2
4
6
8
10
1
2
3

SPECIFICATION TABLE NO. 222 NORMAL SPECTRAL TRANSMITTANCE OF MISCELLANEOUS SILICATES

Curve No.	Ref. No.	Year	Temperature K	Wavelength Range, μm	Geometry θ	θ'	ω'	Reported Error, %	Composition (weight percent), Specifications, and Remarks
1	260	1966	298	0.400-0.750	0°	0°			EUROPIUM SILICATE, $Eu_2O_3 \cdot SiO_2$; single crystal; 85.42 Eu_2O_3, 14.58 SiO_2 (5% Gd_2O_3 impurity in SiO_2); data extracted from smooth curve.
2	260	1966	298	0.400-0.750	0°	0°			NEODYMIUM SILICATE, $Nd_2O_3 \cdot SiO_2$; single crystal (84.84 Nd_2O_3, 15.16 SiO_2); data extracted from smooth curve.
3	260	1966	298	0.400-0.750	0°	0°			SAMARIUM SILICATE, $Sm_2O_3 \cdot 2SiO_2$; single crystal (74.1 Sm_2O_3, 25.9 SiO_2); data extracted from smooth curve.

DATA TABLE NO. 222 NORMAL SPECTRAL TRANSMITTANCE OF MISCELLANEOUS SILICATES

[Wavelength, λ, μm; Transmittance, τ; Temperature, T, K]

CURVE 1
T = 298

λ	τ
0.400	0.838
0.408	0.795
0.414	0.729
0.425	0.729
0.430	0.719
0.448	0.700
0.460	0.696
0.463	0.679
0.467	0.637
0.469	0.685
0.471	0.675
0.479	0.692
0.487	0.688
0.524	0.694
0.527	0.652
0.528	0.682
0.531	0.655
0.536	0.667
0.539	0.662*
0.545	0.701*
0.550	0.703
0.574	0.703

CURVE 1 (cont.)

λ	τ
0.577	0.669
0.581	0.705
0.585	0.689
0.600	0.716
0.613	0.710
0.617	0.717*
0.670	0.727
0.710	0.729*
0.750	0.731

CURVE 2
T = 298

λ	τ
0.400	0.496
0.408	0.464
0.419	0.509
0.427	0.441
0.432	0.453
0.434	0.432*
0.437	0.288
0.438	0.327*
0.440	0.349
0.447	0.460

CURVE 2 (cont.)

λ	τ
0.451	0.460
0.456	0.420
0.459	0.366
0.468	0.312
0.472	0.317*
0.478	0.293
0.481	0.304
0.483	0.298
0.498	0.468
0.502	0.382
0.503	0.347*
0.508	0.303
0.517	0.245
0.525	0.258
0.530	0.240*
0.536	0.257*
0.542	0.300
0.546	0.366
0.549	0.441*
0.556	0.473
0.568	0.386
0.577	0.232
0.591	0.232

CURVE 2 (cont.)

λ	τ
0.601	0.248
0.605	0.273
0.608	0.307
0.611	0.307*
0.621	0.518
0.626	0.417
0.629	0.420*
0.631	0.404
0.636	0.462
0.653	0.555
0.659	0.553*
0.666	0.531
0.673	0.421
0.681	0.324
0.687	0.324*
0.697	0.410
0.707	0.514
0.713	0.511*
0.721	0.455
0.729	0.353
0.736	0.263
0.741	0.229
0.745	0.235
0.750	0.232

CURVE 3
T = 298

λ	τ
0.400	0.281
0.410	0.364
0.413	0.358
0.418	0.310
0.426	0.410
0.432	0.406
0.442	0.418
0.447	0.416*
0.450	0.406
0.456	0.417
0.462	0.395
0.468	0.273
0.470	0.350
0.474	0.363
0.476	0.409
0.484	0.424
0.490	0.414
0.505	0.427
0.521	0.427
0.525	0.414*
0.527	0.367
0.531	0.372

CURVE 3 (cont.)

λ	τ
0.534	0.345*
0.539	0.339
0.550	0.416
0.564	0.426
0.576	0.426*
0.578	0.415
0.581	0.382
0.585	0.405
0.589	0.394*
0.594	0.396
0.606	0.427
0.618	0.423*
0.621	0.426
0.711	0.437
0.750	0.436

*Not shown on plot

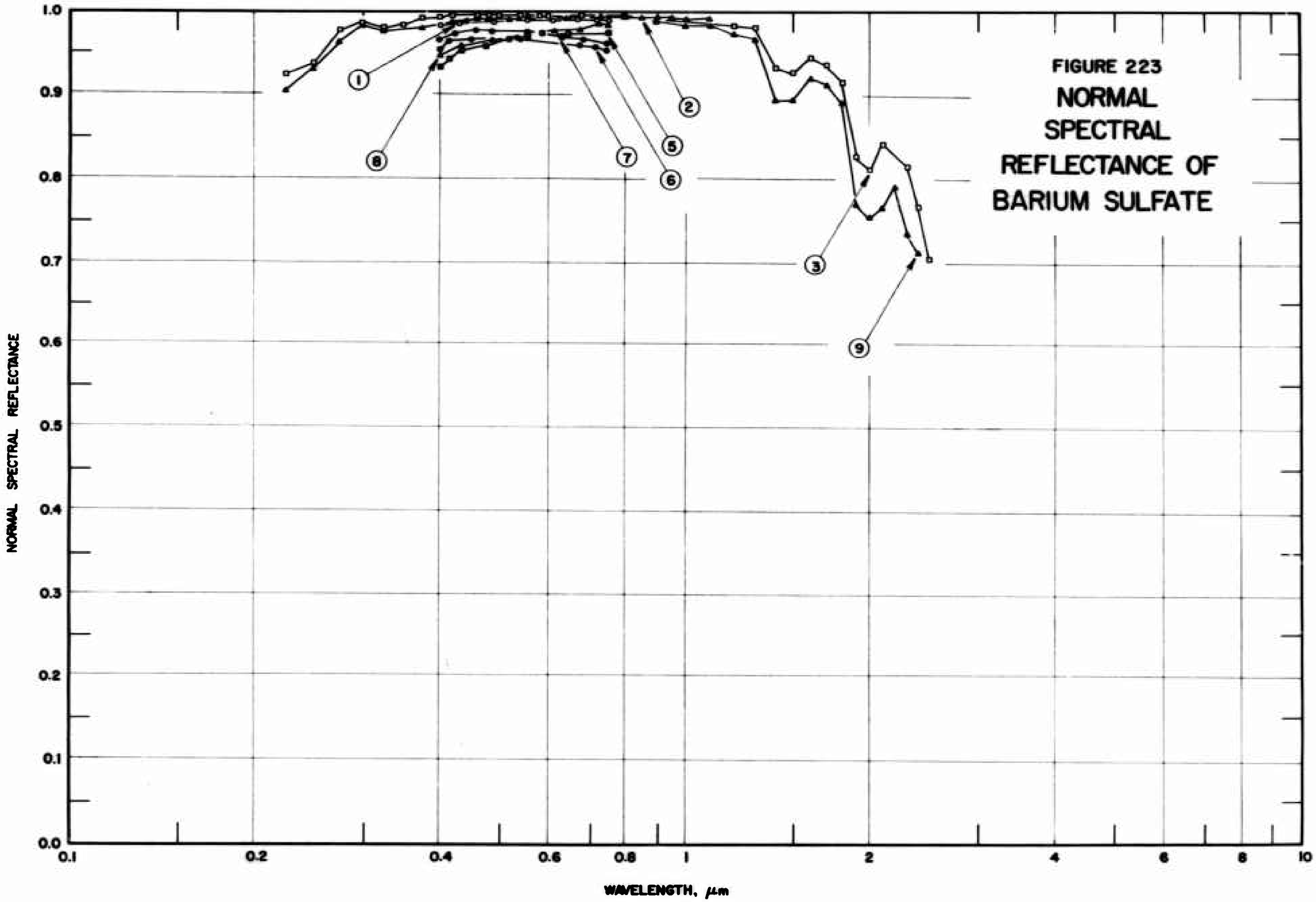


FIGURE 223
NORMAL SPECTRAL REFLECTANCE OF BARIUM SULFATE

SPECIFICATION TABLE NO. 223 NORMAL SPECTRAL REFLECTANCE OF BARIUM SULFATE $BaSO_4$

Curve No.	Ref. No.	Year	Temperature K	Wavelength Range, μm	Geometry θ	θ'	ω'	Reported Error, %	Composition (weight percent), Specifications, and Remarks
1	212	1966	298	0.40-0.75	~0°		2π		Reagent-grade; 5 mm thick; pressed; avg values of 21 specimens; powder from four supplies.
2	212	1966	298	0.73-1.08	~0°		2π		Reagent-grade; 5 mm thick; pressed; avg values of two specimens; powder from two suppliers.
3	252	1968	~298	0.225-2.500	~0°		2π		Pressed powder; packing density ~2.3 g cm^{-3}; specially purified grade; avg of 15 samples.
4*	252	1968	~298	0.200-0.800	~0°		2π		Pressed powder; specially purified grade; crystal size 0.05-3.0 μm; packing density ~2.3 g cm^{-3}; data extracted from smooth curve; relative to freshly smoked MgO.
5	428	1960	~298	0.400-0.750	0°		2π	0.1	Particle size 1.4 μm; data extracted from smooth curve.
6	428	1960	~298	0.400-0.748	0°		2π	0.1	Particle size 0.3 μm; data extracted from smooth curve.
7	428	1960	~298	0.400-0.748	0°		2π	0.1	Particle size 0.2 μm; data extracted from smooth curve.
8	286	1968	~298	0.400-0.750	0°		2π		Data extracted from smooth curve.
9	252	1968	~298	0.225-2.500	~0°		2π		Specially purified grade; thickness 1.0 mm; binder, purified polyvinyl alcohol; PBR 100:1; poured onto flat aluminum substrate, air dried, and scraped with glass edge to assure flatness; avg of 15 samples.
10*	448	1967	~298	0.391-0.750	~0°		2π	0.1	Binder, carboxy-methyl-cellulose; % by weight with respect to pigment - 1st coat; 3 binder, 300 distilled H_2O, 11th and final coat; 0.0 binder, 196 distilled H_2O; coating thickness, 0.7 mm; spray application; specimen measured was the inner coating of a 5 meter integrating sphere; paint surface aged 10 mo. before measurement; data extracted from smooth curve.

*Not shown on plot

DATA TABLE NO. 223 NORMAL SPECTRAL REFLECTANCE OF BARIUM SULFATE $BaSO_4$

[Wavelength, λ, μm; Reflectance, ρ; Temperature, T, K]

CURVE 1
T = 298

λ	ρ
0.40	0.9828
0.43	0.9857
0.49	0.9894
0.55	0.9906
0.61	0.9901
0.67	0.9905
0.72	0.9906
0.75	0.9908

CURVE 2
T = 298

λ	ρ
0.73	0.9956
0.75	0.9942*
0.80	0.9946
0.85	0.9944
0.90	0.9946
0.95	0.9945
1.00	0.9924
1.05	0.9936*
1.08	0.9938

CURVE 3
T ~ 298

λ	ρ
0.225	0.925
0.250	0.939
0.275	0.979
0.300	0.987
0.325	0.980
0.350	0.985
0.375	0.992
0.400	0.995
0.420	0.999
0.440	0.999
0.460	0.999
0.480	0.999
0.500	0.998
0.520	0.998*
0.540	0.998
0.560	0.998*
0.580	0.998
0.600	0.998
0.620	0.998*

CURVE 3 (cont.)

λ	ρ
0.640	0.998*
0.660	0.998*
0.700	0.997*
0.800	0.996
0.900	0.995*
1.00	0.991
1.10	0.992*
1.20	0.983
1.30	0.980
1.40	0.932
1.50	0.929
1.60	0.944
1.70	0.939
1.80	0.915
1.90	0.829
2.00	0.811
2.10	0.842
2 20	0.842*
2.30	0.816
2.40	0.768
2.50	0.703

CURVE 4*
T ~ 298

λ	ρ
0.200	1.100
0.204	1.117*
0.209	0.121*
0.215	0.110
0.229	1.046
0.234	1.033
0.241	1.022
0.250	1.016
0.269	1.018
0.298	1.025
0.307	1.025
0.333	1.014
0.433	1.014
0.466	1.011
0.602	1.015
0.800	1.020

CURVE 5
T ~ 298

λ	ρ
0.400	0.9332
0.412	0.9418
0.421	0.9473*
0.434	0.9518
0.445	0.9546*
0.472	0.9596
0.519	0.9662
0.555	0.9701
0.583	0.9720
0.648	0.9723
0.668	0.9732*
0.750	0.9735

CURVE 6
T ~ 298

λ	ρ
0.400	0.9536
0.406	0.9593*
0.413	0.9625
0.428	0.9652*
0.454	0.9667
0.540	0.9667
0.582	0.9646*
0.678	0.9593
0.716	0.9575
0.735	0.9556*
0.748	0.9527

CURVE 7
T ~ 298

λ	ρ
0.400	0.9659
0.410	0.9707*
0.422	0.9737
0.437	0.9755*
0.458	0.9762
0.485	0.9751
0.513	0.9743*
0.557	0.9737
0.630	0.9693
0.685	0.9666
0.717	0.9644*
0.744	0.9620*
0.748	0.9609

CURVE 8
T ~ 298

λ	ρ
0.400	0.9470
0.431	0.9579
0.489	0.9631
0.550	0.9692*
0.611	0.9769
0.675	0.9784
0.725	0.9840
0.750	0.9831

CURVE 9
T ~ 298

λ	ρ
0.225	0.905
0.250	0.932
0.275	0.962
0.300	0.983
0.325	0.978
0.350	0.982*
0.375	0.980
0.400	0.986*
0.420	0.988
0.440	0.989
0.460	0.993
0.480	0.993
0.500	0.992*
0.520	0.992
0.540	0.993*
0.560	0.992*
0.580	0.992*
0.600	0.992*
0.620	0.992*
0.640	0.992
0.660	0.992*
0.680	0.992*
0.700	0.992*
0.800	0.992*
0.900	0.989
1.00	0.983
1.10	0.982
1.20	0.973
1.30	0.966
1.40	0.895
1.50	0.896
1.60	0.920

CURVE 9 (cont.)

λ	ρ
1.70	0.913
1.80	0.892
1.90	0.770
2.00	0.754
2.10	0.765
2.20	0.792
2.30	0.735
2.40	0.713
2.50	0.650

CURVE 10*
T ~ 298

λ	ρ
0.391	0.9338
0.400	0.9396
0.411	0.9440
0.420	0.9474
0.440	0.9527
0.459	0.9558
0.479	0.9581
0.500	0.9598
0.549	0.9619
0.600	0.9622
0.650	0.9616
0.700	0.9603
0.750	0.9587

* Not shown on plot

SPECIFICATION TABLE NO. 224 NORMAL SOLAR ABSORPTANCE OF BARIUM SULFATE $BaSO_4$

Curve No.	Ref. No.	Year	Temperature Range, K	Geometry θ	Reported Error, %	Composition (weight percent), Specifications and Remarks
1*	121	1964	~298	~0°		Compacted powder; computed from spectral reflectance data.
2*	121	1964	~298	~0°		Similar to above specimen and conditions except exposed to 100 ESH.

DATA TABLE NO. 224 NORMAL SOLAR ABSORPTANCE OF BARIUM SULFATE $BaSO_4$

[Temperature, T, K; Absorptance, α]

T	α
CURVE 1*	
298	0.021
CURVE 2*	
298	0.088

*No plot given

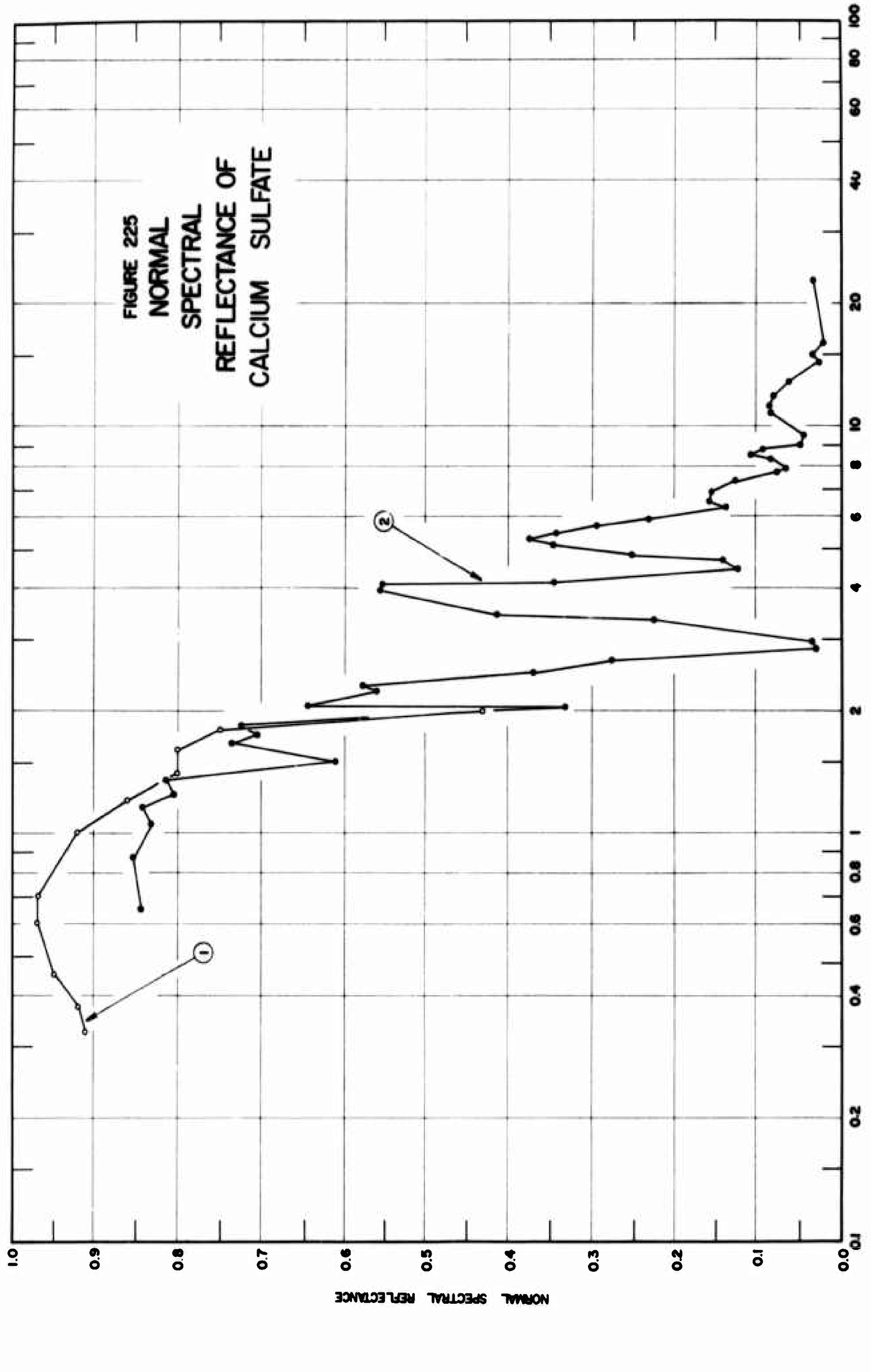


FIGURE 225
NORMAL
SPECTRAL
REFLECTANCE OF
CALCIUM SULFATE

SPECIFICATION TABLE NO. 225 NORMAL SPECTRAL REFLECTANCE OF CALCIUM SULFATE

Curve No.	Ref. No.	Year	Temperature K	Wavelength Range, μm	Geometry θ	Geometry θ'	Geometry ω'	Reported Error, %	Composition (weight percent), Specifications, and Remarks
1	92	1964	298	0.325-2.0	~0°		2π		$CaSO_4 \cdot 2H_2O$; compated powder; MgO reference standard; [Authors' designation: Sample 24].
2	308	1966	~298	0.650-22.7	0°		2π		Data extracted from smooth curve.

DATA TABLE NO. 225 NORMAL SPECTRAL REFLECTANCE OF CALCIUM SULFATE

[Wavelength, λ, μm; Reflectance, ρ; Temperature, T, K]

λ	ρ	λ	ρ	λ	ρ
CURVE 1		CURVE 2 (cont.)		CURVE 2 (cont.)	
T = 298		1.72	0.704	6.56	0.159
0.325	0.91	1.84	0.726	6.83	0.154
0.375	0.92	2.04	0.331	7.09	0.149*
0.450	0.95	2.05	0.649	7.34	0.126
0.600	0.97	2.23	0.560	7.67	0.076
0.700	0.97	2.30	0.577	7.97	0.067
1.0	0.92	2.48	0.370	8.34	0.083
1.2	0.86	2.64	0.279	8.57	0.108
1.4	0.80	2.83	0.030	8.80	0.091
1.6	0.80	2.99	0.035	9.00	0.050
1.8	0.75	3.31	0.224	9.23	0.045
2.0	0.43	3.42	0.413	10.8	0.082
		3.91	0.557	11.2	0.086
CURVE 2		4.02	0.552	11.9	0.080
T ~ 298		4.14	0.345	12.9	0.061
		4.46	0.122	14.3	0.027
0.650	0.843	4.63	0.140	14.9	0.034*
0.870	0.852	4.80	0.252	15.0	0.036
1.05	0.831	5.05	0.348	15.3	0.032*
1.15	0.842	5.24	0.372	15.8	0.024*
1.24	0.805	5.41	0.343	16.0	0.021
1.35	0.816	5.72	0.296	16.8	0.029*
1.50	0.612	5.97	0.231	22.7	0.034
1.66	0.788	6.16	0.136		

*Not shown on plot

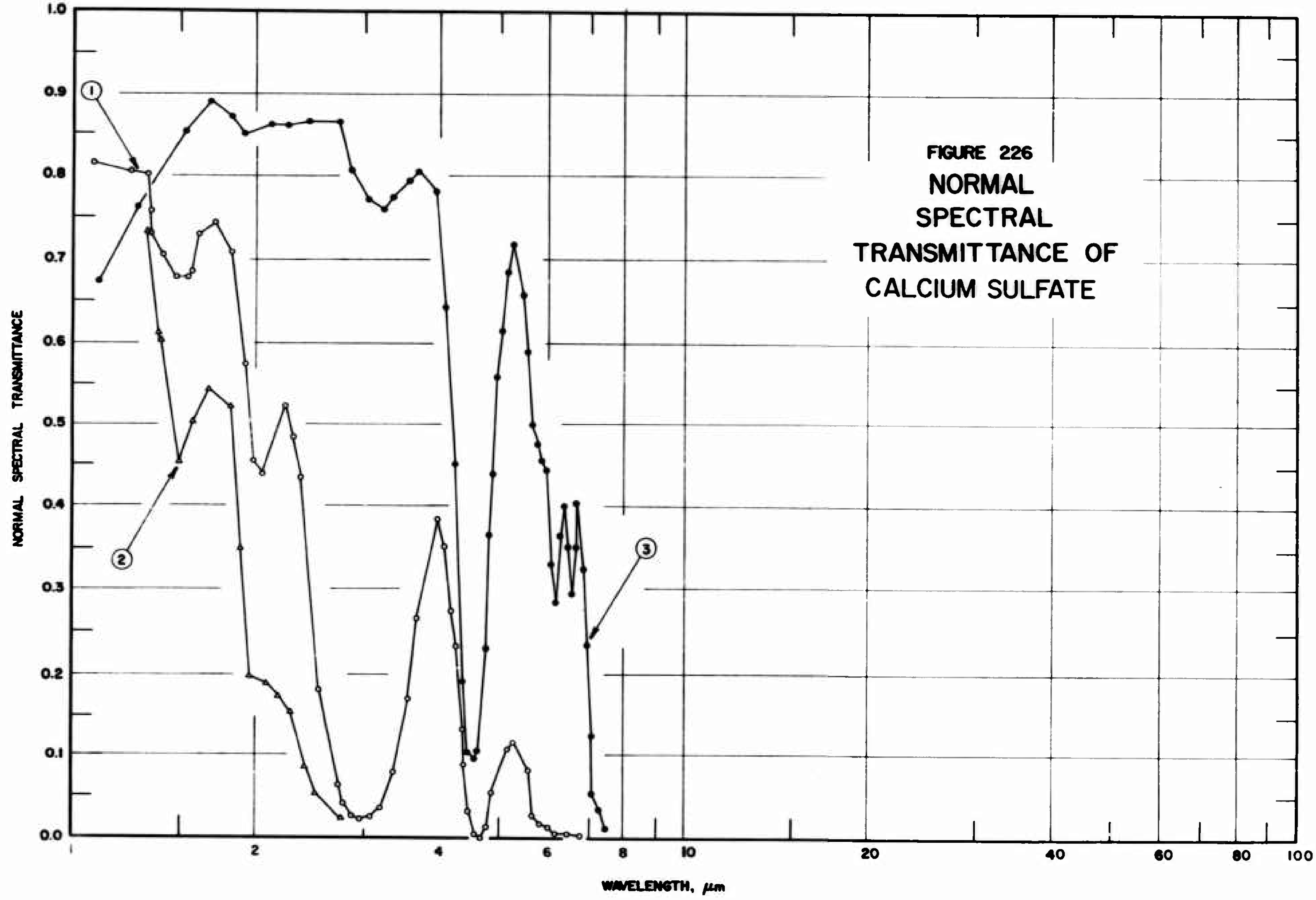


FIGURE 226
NORMAL SPECTRAL TRANSMITTANCE OF CALCIUM SULFATE

SPECIFICATION TABLE NO. 226 NORMAL SPECTRAL TRANSMITTANCE OF CALCIUM SULFATE

Curve No.	Ref. No.	Year	Temperature K	Wavelength Range, μm	Geometry θ θ' ω'	Reported Error, %	Composition (weight percent), Specifications, and Remarks
1	294	1906	~298	1.08-6.78	~0° ~0°		$CaSO_4 \cdot 2H_2O$ (0.648 mm thick); selenite, hydrated, monoclinic crystal; cleavage parallel to b-axis.
2	294	1906	~298	1.33-2.75	~0° ~0°		Similar to curve 1 specimen and conditions except thickness 2.57 mm.
3	294	1906	~298	1.11-7.47	~0° ~0°		$CaSO_4$ (0.656 mm thick); anhydrite, orthorhombic crystal, cleavage parallel to c-axis.

DATA TABLE NO. 226 NORMAL SPECTRAL TRANSMITTANCE OF CALCIUM SULFATE

[Wavelength, λ, μm; Transmittance, τ; Temperature, T, K]

λ	τ	λ	τ	λ	τ	λ	τ	λ	τ	λ	τ
CURVE 1		CURVE 1 (cont.)		CURVE 1 (cont.)		CURVE 3		CURVE 3 (cont.)		CURVE 3 (cont.)	
T ~ 298						T ~ 298					
		2.89	0.029	5.80	0.019			4.53	0.099	6.85	0.329
1.08	0.817	2.98	0.024	6.00	0.015	1.11	0.676	4.60	0.106	6.93	0.237
1.25	0.808	3.08	0.027	6.14	0.009	1.28	0.765	4.74	0.231	7.04	0.126
1.33	0.801	3.20	0.037	6.43	0.006	1.33	0.801*	4.80	0.366	7.09	0.052
1.35	0.760	3.35	0.080	6.78	0.003	1.54	0.856	4.89	0.440	7.26	0.036
1.35	0.734	3.53	0.171			1.69	0.893	4.95	0.562	7.47	0.012
1.41	0.709	3.66	0.269	CURVE 2		1.83	0.872	5.02	0.617		
1.49	0.680	3.97	0.386	T ~ 298		1.92	0.851	5.13	0.688		
1.55	0.680	4.07	0.354			2.12	0.863	5.26	0.720		
1.58	0.689	4.19	0.277	1.33	0.735	2.26	0.863	5.44	0.660		
1.61	0.731	4.23	0.233	1.39	0.613	2.43	0.867	5.51	0.591		
1.71	0.746	4.36	0.134	1.40	0.604	2.74	0.869	5.64	0.500		
1.84	0.710	4.38	0.090	1.50	0.454	2.88	0.827	5.76	0.477		
1.93	0.579	4.44	0.031	1.58	0.505	3.06	0.773	5.87	0.459		
1.96	0.456	4.56	0.006	1.66	0.549	3.23	0.763	5.95	0.448		
2.05	0.440	4.69	0.000	1.81	0.524	3.34	0.778	6.07	0.338		
2.08	0.444*	4.74	0.014	1.88	0.351	3.54	0.797	6.14	0.289		
2.23	0.523	4.87	0.056	1.95	0.200	3.68	0.808	6.27	0.369		
2.30	0.486	5.13	0.110	2.08	0.192	3.94	0.781	6.39	0.401		
2.37	0.436	5.24	0.119	2.18	0.178	4.07	0.649	6.49	0.355		
2.52	0.183	5.44	0.119*	2.27	0.156	4.22	0.452	6.56	0.299		
2.71	0.065	5.58	0.081	2.40	0.089	4.34	0.194	6.65	0.353		
2.79	0.042	5.66	0.027	2.50	0.055	4.44	0.105	6.69	0.408		
				2.75	0.024						

*Not shown on plot

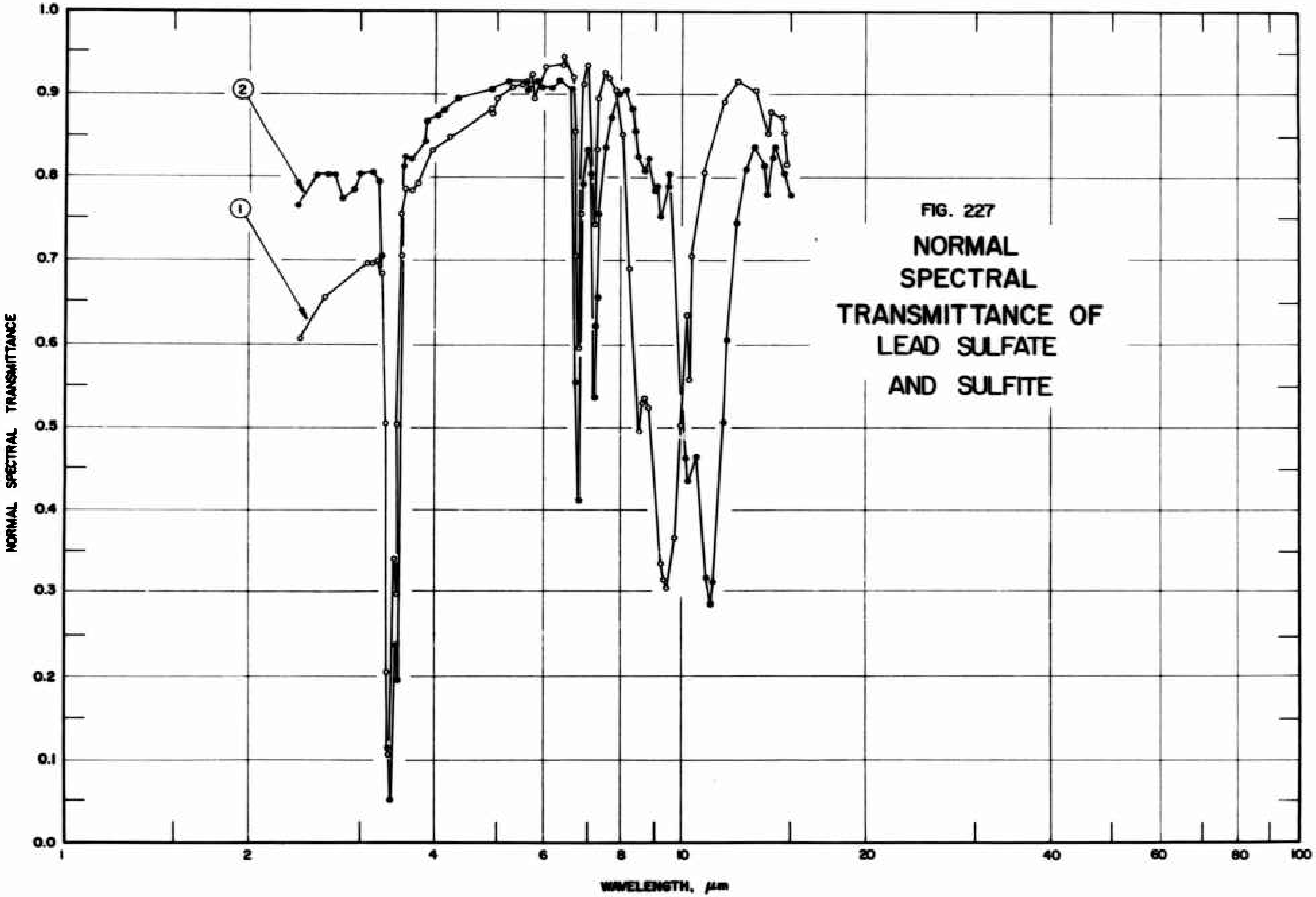


FIG. 227 NORMAL SPECTRAL TRANSMITTANCE OF LEAD SULFATE AND SULFITE

SPECIFICATION TABLE NO. 227 NORMAL SPECTRAL TRANSMITTANCE OF LEAD SULFATE AND SULFITE

Curve No.	Ref. No.	Year	Temperature K	Wavelength Range, μm	Geometry θ θ' ω'	Reported Error, %	Composition (weight percent), Specifications, and Remarks
1	26	1962	298	2.41-15.0	~0° ~0°		LEAD SULFATE, $PbSO_4$; data extracted from smooth curve.
2	26	1962	298	2.40-15.0	~0° ~0°		LEAD SULFITE, $PbSO_3$; data extracted from smooth curve.

DATA TABLE NO. 227 NORMAL SPECTRAL TRANSMITTANCE OF LEAD SULFATE AND SULFITE

[Wavelength, λ, μm; Transmittance, τ; Temperature, T, K]

λ	τ	λ	τ	λ	τ	λ	τ	λ	τ	λ	τ	λ	τ	λ	τ
CURVE 1		CURVE 1 (cont.)		CURVE 1 (cont.)		CURVE 1 (cont.)		CURVE 2 (cont.)		CURVE 2 (cont.)		CURVE 2 (cont.)		CURVE 2 (cont.)	
T = 298		4.91	0.883	7.65	0.920	14.0	0.880	3.38	0.050	6.62	0.909	8.58	0.809*	13.4	0.834*
2.41	0.607	4.95	0.879	7.67	0.912*	14.3	0.880*	3.45	0.240	6.67	0.898*	8.72	0.809	13.5	0.813
2.47	0.608*	5.02	0.896	7.85	0.906	14.3	0.876*	3.46	0.195	6.71	0.856*	8.76	0.822*	13.6	0.813*
2.65	0.654	5.31	0.910	8.03	0.853	14.6	0.874	3.48	0.504*	6.72	0.805*	8.88	0.822	13.8	0.780
3.10	0.698	5.51	0.912	8.23	0.690	14.6	0.856	3.52	0.704*	6.76	0.705*	9.01	0.785	14.0	0.822
3.17	0.698	5.61	0.926*	8.51	0.496	14.8	0.841*	3.53	0.753*	6.77	0.555	9.18	0.790	14.2	0.839
3.21	0.700	5.73	0.926	8.55	0.490*	15.0	0.817	3.56	0.811	6.79	0.476*	9.28	0.765*	14.4	0.836*
3.27	0.681	5.80	0.896	8.60	0.494*			3.59	0.826	6.82	0.412	9.29	0.751	14.8	0.806
3.29	0.652*	6.04	0.933	8.68	0.530	CURVE 2		3.66	0.822	6.96	0.792	9.44	0.784*	15.0	0.780
3.31	0.505	6.42	0.936	8.76	0.535	T = 298		3.85	0.846	7.02	0.834	9.51	0.790		
3.33	0.202	6.45	0.946	8.86	0.523			3.87	0.870	7.07	0.833*	9.57	0.803		
3.36	0.106	6.61	0.943*	9.28	0.334	2.40	0.767	4.01	0.878	7.12	0.805	9.76	0.762*		
3.44	0.340	6.70	0.921	9.35	0.313	2.58	0.801	4.13	0.881	7.24	0.536	10.2	0.461		
3.46	0.298	6.74	0.856	9.45	0.302	2.67	0.802	4.22	0.882*	7.26	0.623	10.3	0.434		
3.49	0.502	6.77	0.704	9.71	0.366	2.74	0.801	4.35	0.897	7.31	0.655	10.4	0.434*		
3.52	0.704	6.82	0.599	10.0	0.502	2.82	0.775	4.93	0.908	7.37	0.755	10.5	0.463		
3.52	0.756	6.90	0.756	10.2	0.634	2.97	0.787	5.25	0.915	7.52	0.838	11.0	0.318		
3.57	0.782*	6.97	0.911	10.3	0.560	3.03	0.802	5.63	0.917	7.65	0.842*	11.2	0.289		
3.59	0.789	7.07	0.938	10.4	0.705	3.18	0.806	5.66	0.907	7.77	0.873	11.3	0.311		
3.67	0.785	7.16	0.933*	10.9	0.805	3.24	0.796	5.76	0.917*	7.99	0.900	11.7	0.508		
3.76	0.793	7.23	0.742	11.7	0.891	3.29	0.703	5.85	0.917	8.13	0.906	11.9	0.608		
3.96	0.832	7.30	0.834	12.4	0.917	3.31	0.507*	5.98	0.910	8.39	0.883	12.3	0.745		
4.21	0.850	7.35	0.897	13.3	0.909	3.32	0.203*	6.19	0.910	8.47	0.859	12.7	0.810		
4.28	0.866*	7.54	0.927	13.8	0.855	3.35	0.114	6.38	0.917	8.50	0.825	13.2	0.839		

*Not shown on plot

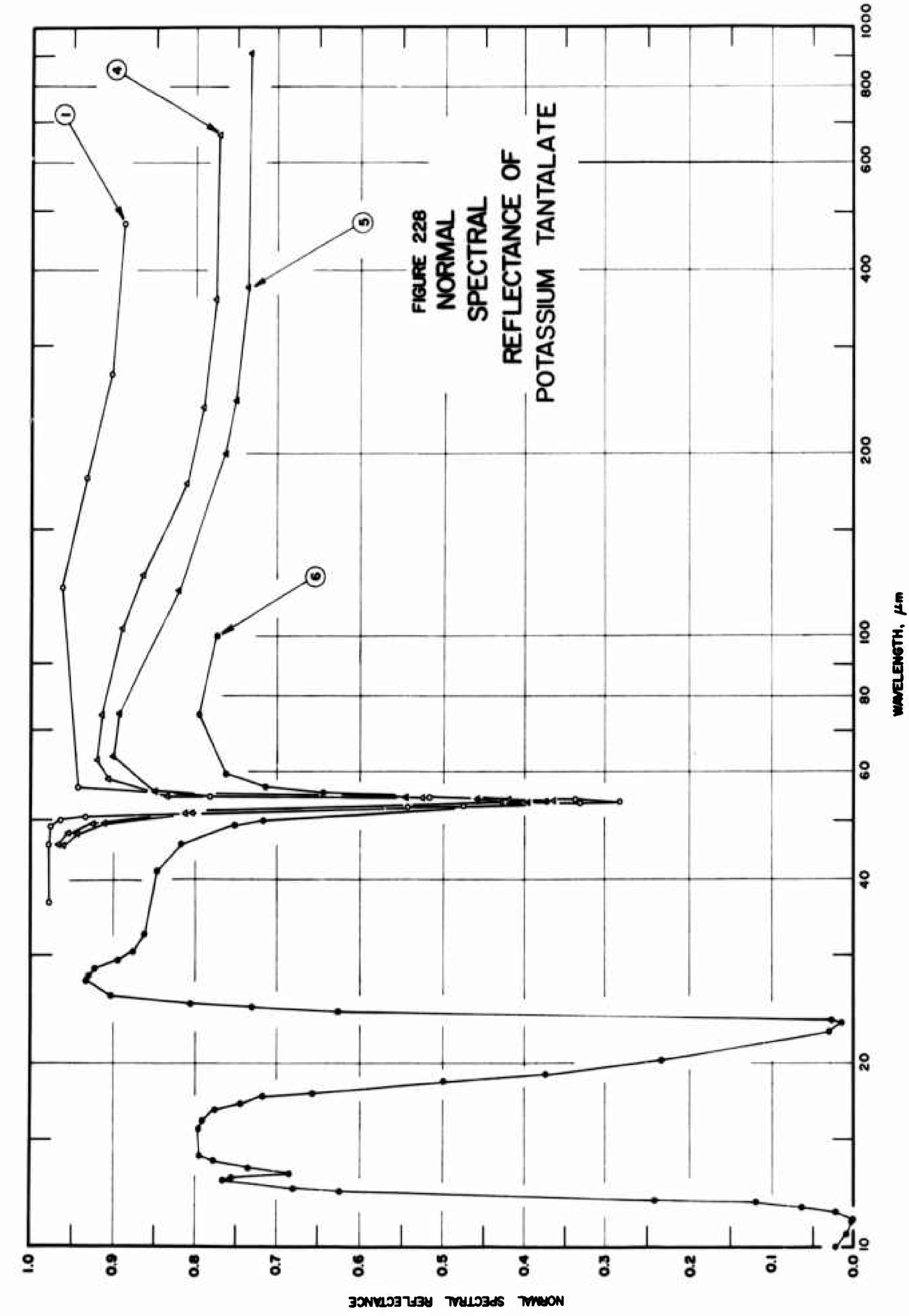


FIGURE 228
NORMAL
SPECTRAL
REFLECTANCE OF
POTASSIUM TANTALATE
NORMAL SPECTRAL REFLECTANCE
WAVELENGTH, μm
1.0
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0.0
10
20
40
60
80
100
200
400
600
800
1000
1
4
5
6

SPECIFICATION TABLE NO. 228 NORMAL SPECTRAL REFLECTANCE OF POTASSIUM TANTALATE $KTaO_3$

Curve No.	Ref. No.	Year	Temperature K	Wavelength Range, μm	Geometry θ θ' ω'	Reported Error, %	Composition (weight percent), Specifications, and Remarks
1	413	1967	12	38.6-476	10° 10°	± 2	Single crystal; measured in vacuum; data extracted from smooth curve.
2	413	1967	126	38.6-555	10° 10°	± 2	Above specimen and conditions.
3	413	1967	232	38.6-500	10° 10°	± 2	Above specimen and conditions.
4	413	1967	295	38.6-666	10° 10°	± 2	Above specimen and conditions.
5	413	1967	463	38.6-909	10° 10°	± 2	Above specimen and conditions.
6	289	1967	~298	10.0-100	~0° ~0°		Crystals grown from nonstoichiometric melt method; data extracted from smooth curve.

DATA TABLE NO. 228 NORMAL SPECTRAL REFLECTANCE OF POTASSIUM TANTALATE $KTaO_3$

[Wavelength, λ, μm; Reflectance, ρ; Temperature, T, K]

CURVE 1, T = 12

λ	ρ
38.6	0.980
45.4	0.980
49.0	0.978
50.0	0.966
50.7	0.937
52.6	0.545
52.9	0.473
53.4	0.332
53.7	0.283
54.0	0.339
54.3	0.517
54.6	0.548*
54.9	0.782
55.5	0.866*
56.4	0.945
58.4	0.959*
120	0.962
181	0.935
270	0.904
476	0.890

CURVE 2*, T = 126

λ	ρ
38.6	0.980
45.4	0.977
48.0	0.973
49.5	0.959
50.5	0.918
51.5	0.782
52.6	0.545
52.9	0.470
53.4	0.351
53.7	0.322
54.0	0.345
54.3	0.469
54.6	0.548
54.9	0.782
55.5	0.866
56.4	0.945
58.4	0.962
77.5	0.965
114	0.950
166	0.908
217	0.875
322	0.852
555	0.843

CURVE 3*, T = 232

λ	ρ
38.6	0.980
45.4	0.972
48.3	0.961
49.5	0.940
51.2	0.798
52.6	0.545
53.1	0.467
53.4	0.383
53.7	0.344
54.0	0.370
54.6	0.517
55.8	0.885
58.1	0.915
60.2	0.930
73.5	0.934
108	0.911
140	0.883
192	0.837
243	0.820
370	0.805
500	0.800

CURVE 4, T = 295

λ	ρ
38.6	0.980*
45.4	0.970
47.8	0.958
49.2	0.929
51.2	0.816
52.6	0.545*
53.4	0.430
53.7	0.366
54.0	0.421
54.3	0.527
54.6	0.838
55.8	0.885*
58.1	0.910
62.5	0.921
74.6	0.917
103	0.892
126	0.867
178	0.812
238	0.791
357	0.777
666	0.771

CURVE 5, T = 463

λ	ρ
38.6	0.980*
45.4	0.965
47.3	0.948
49.2	0.913
51.2	0.806
52.6	0.545*
53.4	0.399
54.0	0.459
54.3	0.548
55.5	0.851
58.1	0.876*
63.6	0.901
74.6	0.896
119	0.823
200	0.764
243	0.752
370	0.739
909	0.733

CURVE 6, T ~ 298

λ	ρ
10.0	0.022
10.5	0.010
11.0	0.002
11.1	0.000
11.3	0.008*
11.4	0.021
11.6	0.066
11.8	0.120
11.9	0.242
12.4	0.625
12.5	0.680
12.9	0.768
13.0	0.758
13.1	0.734*
13.3	0.685
13.5	0.737
13.8	0.778
14.1	0.797
14.4	0.799*
15.6	0.799
16.1	0.793
16.5	0.785*
16.7	0.778
17.3	0.746

CURVE 6 (cont.)

λ	ρ
17.6	0.717
17.9	0.659
18.6	0.500
19.2	0.374
20.2	0.232
22.5	0.030
23.2	0.015
23.4	0.028
24.3	0.627
24.6	0.732
25.0	0.809
25.9	0.906
27.1	0.935
27.8	0.933
28.6	0.925
29.5	0.899
30.4	0.878
32.6	0.863
37.0	0.856*
41.3	0.850
45.7	0.820
49.0	0.753
50.0	0.718
53.2	0.371

CURVE 6 (cont.)

λ	ρ
55.2	0.644
56.8	0.713
59.9	0.761
63.7	0.783*
69.4	0.795*
74.6	0.798
100	0.775

* Not shown on plot

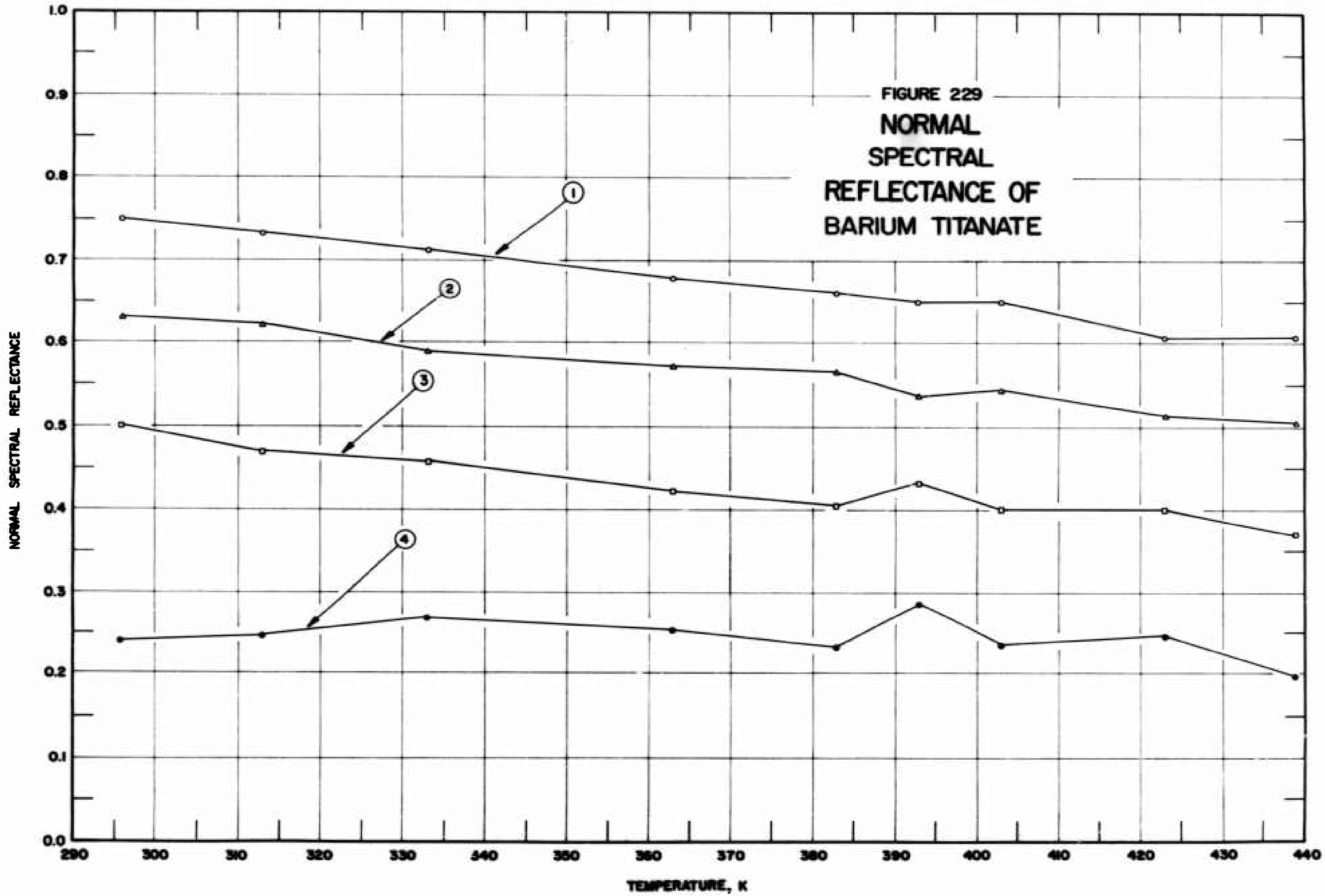


FIGURE 229
NORMAL
SPECTRAL
REFLECTANCE OF
BARIUM TITANATE
NORMAL SPECTRAL REFLECTANCE
TEMPERATURE, K
1.0
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0.0
290
300
310
320
330
340
350
360
370
380
390
400
410
420
430
440
1
2
3
4

SPECIFICATION TABLE NO. 229 NORMAL SPECTRAL REFLECTANCE OF BARIUM TITANATE $BaTiO_3$

Curve No.	Ref. No.	Year	Wavelength, μm	Temperature Range, K	Geometry θ	θ'	ω'	Reported Error, %	Composition (weight percent), Specifications, and Remarks
1	375	1966	16.7	296-439	~0°	~0°			C domain crystal of sample (185 μm thick); grown by Remeika's method; etched at a temperature above the Curie point, followed by d.c. poling.
2	375	1966	15.4	296-439	~0°	~0°			Above specimen and conditions.
3	375	1966	14.7	296-439	~0°	~0°			Above specimen and conditions.
4	375	1966	14.4	296-439	~0°	~0°			Above specimen and conditions.

DATA TABLE NO. 229 NORMAL SPECTRAL REFLECTANCE OF BARIUM TITANATE $BaTiO_3$

[Temperature, T, K; Reflectance, ρ; Wavelength, λ, μm]

T	ρ	T	ρ	T	ρ	T	ρ
CURVE 1 λ = 16.7		CURVE 2 λ = 15.4		CURVE 3 λ = 14.7		CURVE 4 λ = 14.4	
296	0.750	296	0.630	296	0.501	296	0.240
313	0.732	313	0.621	313	0.470	313	0.248
333	0.712	333	0.589	333	0.459	333	0.258
363	0.679	363	0.581	363	0.423	363	0.253
383	0.662	383	0.564	383	0.405	383	0.231
393	0.650	393	0.537	393	0.433	393	0.287
403	0.650	403	0.544	403	0.400	403	0.235
423	0.608	423	0.515	423	0.400	423	0.246
439	0.607	439	0.506	439	0.357	439	0.199

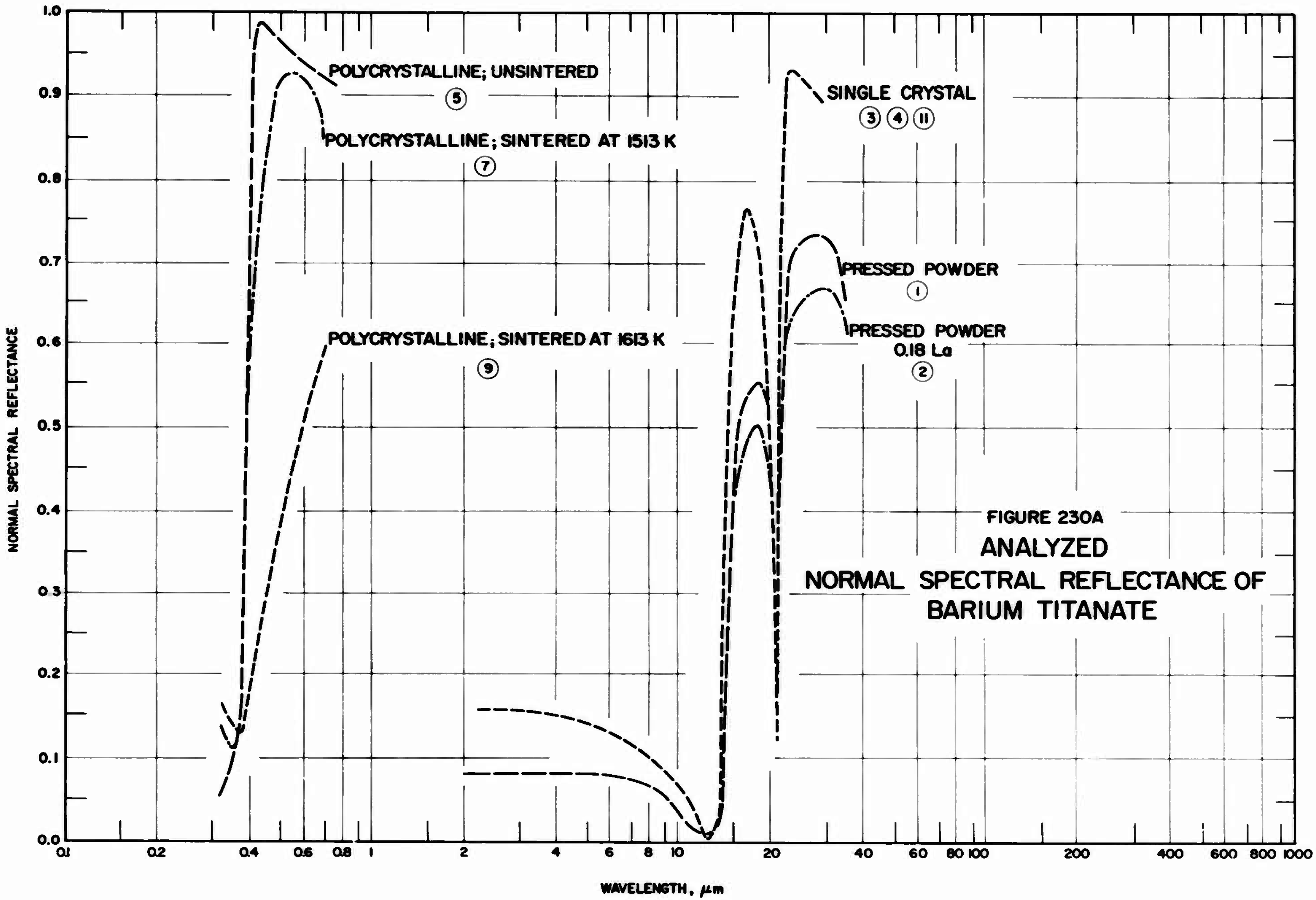


FIGURE 230A
ANALYZED
NORMAL SPECTRAL REFLECTANCE OF
BARIUM TITANATE

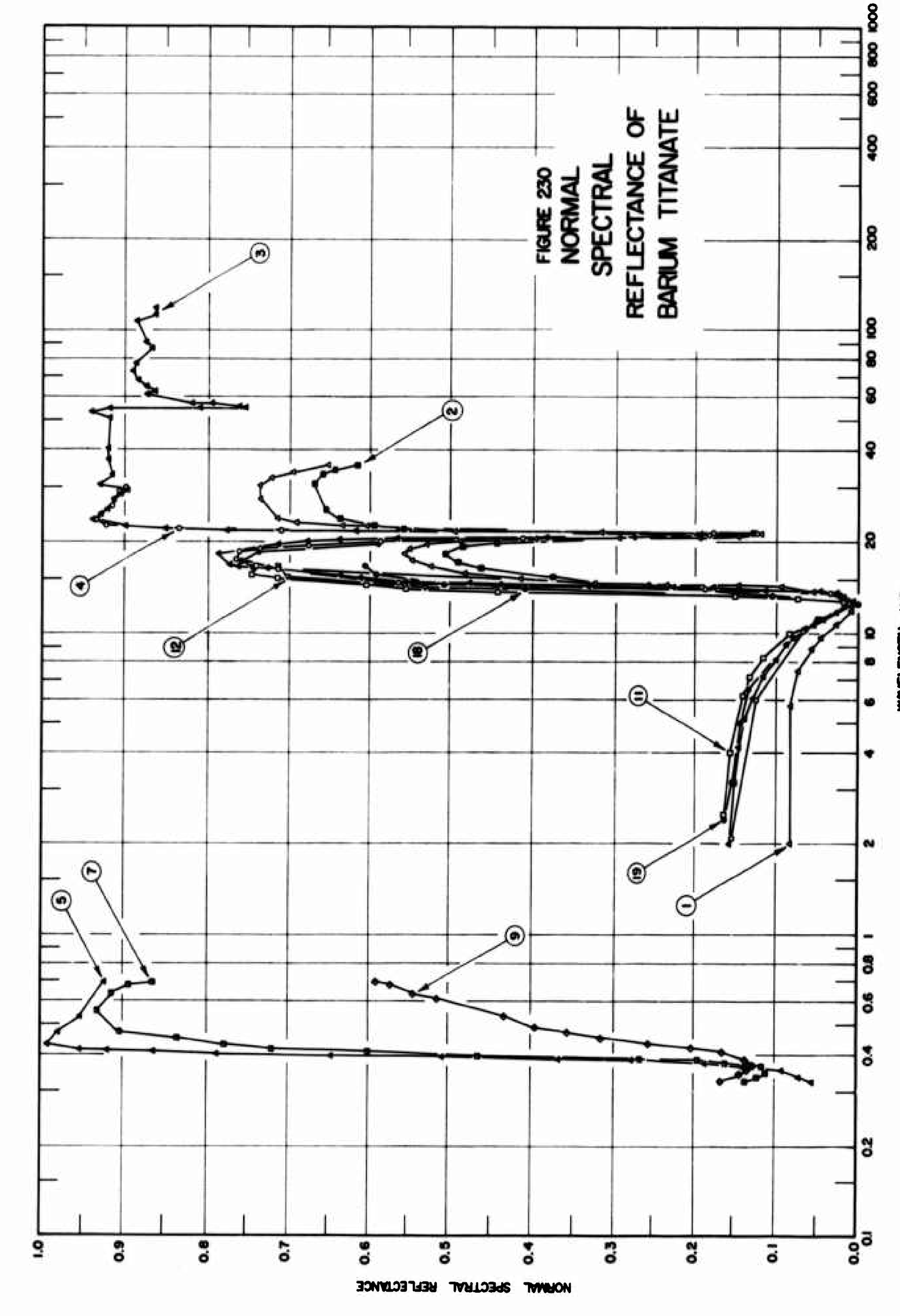


FIGURE 230
NORMAL
SPECTRAL
REFLECTANCE OF
BARIUM TITANATE

SPECIFICATION TABLE NO. 230 NORMAL SPECTRAL REFLECTANCE OF BARIUM TITANATE $BaTiO_3$

Curve No.	Ref. No.	Year	Temperature, K	Wavelength Range, μm	Geometry θ	θ'	ω'	Reported Error, %	Composition (weight percent), Specifications, and Remarks
1	176	1963	298	2.00-36.0	0°		2 π		Pressed, from National Lead Co; data extracted from smooth curve.
2	176	1963	298	2.00-36.0	0°		2 π		99.82 $BaTiO_3$, 0.18 La from National Lead Co; pressed; data extracted from smooth curve.
3	237	1962	297	2.00-119	< 6°	< 6°			Undoped, synthetic single crystal; grown by Remeika method; clear crystal plate with clean surface; etched in concentrated H_3PO_4 at 428 K; thickness about the order of 10^{-2} cm; converted to c-domain plate (optic axis perpendicular to the specimen surface) by dc poling in water; measured with unpolarized, incident radiation; data for ordinary ray (electric field perpendicular to the optix axis).
4	237	1962	297	2.10-30.0	< 6°	< 6°			Undoped, synthetic single crystal; grown by Remeika method; clear crystal plate with clean surface; etched in concentrated H_3PO_4 at 428 K; thickness about the order of 10^{-2} cm; about 50% of the crystal volume converted to a-domain (optic axis parallel to the specimen surface); measured with the electric vector in the beam polarized parallel to the optic axis (extraordinary ray).
5	376	1968	~298	0.325-0.694	~0°		2 π		Polycrystalline; data extracted from smooth curve.
6*	376	1968	~298	0.325-0.694	~0°		2 π		Similar to the above specimen and conditions except sintered at 1473 K.
7	376	1968	~298	0.325-0.694	~0°		2 π		Similar to the above specimen and conditions except sintered at 1513 K.
8*	376	1968	~298	0.325-0.697	~0°		2 π		Similar to the above specimen and conditions except sintered at 1553 K.
9	376	1968	~298	0.325-0.697	~0°		2 π		Similar to the above specimen and conditions except sintered at 1613 K.
10*	376	1968	~298	0.325-0.696	~0°		2 π		Similar to the above specimen and conditions except sintered at 1633 K.
11	375	1966	293	2.50-16.7	~0°	~0°			C domain crystal, (185 μm thick); grown by Remeika's method; etched at a temp above the Curie point, followed by d.c. poling; extracted from smooth curve.
12	375	1966	313	2.50-16.7	~0°	~0°			Above specimen and conditions.
13*	375	1966	333	2.50-16.7	~0°	~0°			Above specimen and conditions.
14*	375	1966	363	2.50-16.7	~0°	~0°			Above specimen and conditions.
15*	375	1966	383	2.50-16.7	~0°	~0°			Above specimen and conditions.
16*	375	1966	403	2.50-16.7	~0°	~0°			Above specimen and conditions.
17*	375	1966	423	2.50-16.7	~0°	~0°			Above specimen and conditions.
18	375	1966	453	2.50-16.7	~0°	~0°			Above specimen and conditions.
19	375	1966	293	2.42-19.9	~0°	~0°			Above specimen and conditions.

* Not shown on plot

DATA TABLE NO. 230 NORMAL SPECTRAL REFLECTANCE OF BARIUM TITANATE $BaTiO_3$

[Wavelength, λ, μm; Reflectance, ρ; Temperature, T, K]

CURVE 1, T = 298

λ	ρ
2.00	0.082
5.74	0.081
7.42	0.072
8.91	0.057
9.73	0.046
10.7	0.027
11.9	0.009
12.8	0.007
13.3	0.018
13.7	0.054
14.1	0.094
14.2	0.148
14.4	0.234
14.7	0.324
15.2	0.415
15.9	0.481
16.6	0.522
17.4	0.549
18.3	0.558
19.0	0.550
19.6	0.527
20.0	0.489
20.4	0.399
20.7	0.299
20.8	0.195
21.0	0.147
21.3	0.119
21.5	0.129*
21.8	0.495
22.1	0.605
22.2	0.633
22.5	0.666*
23.0	0.691
23.9	0.714
25.8	0.730*
27.7	0.739
30.7	0.739
31.7	0.735*
32.8	0.721
34.0	0.699
36.0	0.651

CURVE 2, T = 298

λ	ρ
2.00	0.082*
5.74	0.081*
7.42	0.072*
8.91	0.057*
9.73	0.046*
10.7	0.027*
11.9	0.009*
12.8	0.007*
13.3	0.018*
13.7	0.054*
14.1	0.094*
14.2	0.148*
14.4	0.234*
14.7	0.324*
15.2	0.379
16.4	0.464
17.1	0.490
18.1	0.504
18.7	0.504*
19.3	0.485
19.9	0.447
20.4	0.399*
20.7	0.299*
20.8	0.195*
21.0	0.147*
21.3	0.119*
21.5	0.129*
21.8	0.495*
22.0	0.559
22.4	0.596
22.9	0.613*
23.9	0.639
25.2	0.655
27.7	0.667*
31.0	0.670
33.2	0.660
34.6	0.643
36.0	0.616

CURVE 3, T = 297

λ	ρ
2.00	0.156
3.20	0.150
4.20	0.145
5.20	0.138
6.10	0.129
7.20	0.115
8.20	0.100
9.20	0.088
10.4	0.064
10.7	0.054
11.1	0.042
11.4	0.034*
11.7	0.028
12.0	0.019*
12.4	0.015*
12.9	0.007
13.3	0.011*
13.4	0.020*
13.6	0.025
13.7	0.048
13.8	0.071*
13.9	0.112
14.1	0.178
14.1	0.227
14.2	0.267*
14.3	0.332
14.5	0.395*
14.6	0.441
14.7	0.478
14.7	0.555
15.2	0.612
15.3	0.622*
15.4	0.638
15.8	0.669*
16.3	0.729
16.7	0.765
17.0	0.773
17.9	0.779*
18.3	0.787
19.2	0.767*
19.7	0.713

CURVE 3 (cont.)

λ	ρ
20.0	0.680
20.2	0.639
20.4	0.568
20.6	0.485*
20.8	0.385
20.9	0.278
21.1	0.193
21.2	0.129*
21.5	0.129*
21.7	0.318
21.8	0.618
21.9	0.778
22.0	0.853
22.3	0.900
22.4	0.911*
22.8	0.936*
23.4	0.941
23.5	0.937*
24.7	0.932
25.5	0.924
26.0	0.927*
26.8	0.925*
27.6	0.914
28.2	0.905*
28.8	0.905
29.3	0.899
31.0	0.934
33.6	0.917
34.9	0.919*
37.5	0.921
40.4	0.921
43.5	0.920*
45.6	0.921*
48.4	0.920*
51.4	0.920
53.7	0.943
54.2	0.939*
54.4	0.920
55.2	0.810
55.2	0.790*
55.2	0.754
55.8	0.761

CURVE 3 (cont.)

λ	ρ
56.4	0.755*
56.6	0.798
57.4	0.820
57.6	0.835*
60.4	0.861*
60.4	0.872
62.4	0.866
65.1	0.875
68.2	0.884
70.4	0.884*
72.9	0.890
77.2	0.888
79.8	0.881*
83.4	0.873*
87.9	0.867
91.6	0.875
106	0.886
111	0.863
119	0.863

CURVE 4, T = 297

λ	ρ
2.10	0.151
6.00	0.124
10.1	0.068
12.6	0.010
13.0	0.006*
13.5	0.033
14.0	0.188
14.7	0.565
16.1	0.714
16.5	0.761*
17.4	0.769
18.0	0.764*
18.5	0.762
19.0	0.737
19.5	0.679
20.0	0.589
20.5	0.411
21.1	0.182
21.2	0.122

CURVE 4 (cont.)

λ	ρ
21.5	0.178
21.6	0.121*
21.9	0.710
22.0	0.836
22.6	0.925
23.1	0.939
24.0	0.936*
25.1	0.927*
26.1	0.918
27.1	0.915*
28.2	0.915*
29.1	0.907
30.0	0.900

CURVE 5, T ~ 298

λ	ρ
0.325	0.055
0.339	0.070
0.352	0.090
0.359	0.110*
0.367	0.138
0.371	0.159*
0.374	0.186
0.381	0.279
0.386	0.368
0.393	0.506
0.397	0.645
0.400	0.788
0.402	0.863
0.408	0.920
0.416	0.956
0.421	0.975*
0.428	0.988*
0.435	0.995
0.448	0.995*
0.465	0.981
0.471	0.972*
0.526	0.954
0.653	0.934*
0.694	0.924

CURVE 6*, T ~ 298

λ	ρ
0.325	0.096
0.338	0.089
0.344	0.089
0.352	0.100
0.360	0.116
0.367	0.140
0.371	0.163
0.379	0.211
0.385	0.291
0.391	0.444
0.394	0.584
0.398	0.654
0.408	0.744
0.418	0.808
0.437	0.879
0.460	0.922
0.486	0.944
0.513	0.948
0.595	0.940
0.632	0.926
0.673	0.900
0.694	0.876

CURVE 7, T = 298

λ	ρ
0.325	0.136
0.336	0.120
0.347	0.110
0.355	0.110*
0.362	0.115
0.370	0.130
0.378	0.160
0.383	0.196
0.389	0.267
0.396	0.465
0.404	0.600
0.417	0.720
0.428	0.778
0.443	0.834
0.461	0.879*

CURVE 7 (cont.)

λ	ρ
0.476	0.903
0.496	0.918*
0.556	0.931
0.599	0.929*
0.636	0.914
0.668	0.893
0.694	0.864

CURVE 8*, T ~ 298

λ	ρ
0.325	0.175
0.338	0.156
0.358	0.141
0.370	0.135
0.376	0.140
0.382	0.159
0.388	0.196
0.391	0.230
0.397	0.344
0.401	0.396
0.411	0.460
0.422	0.513
0.436	0.553
0.451	0.585
0.484	0.625
0.550	0.670
0.633	0.735
0.697	0.782

CURVE 9, T ~ 273

λ	ρ
0.325	0.165
0.342	0.141
0.355	0.132
0.369	0.126
0.383	0.134
0.404	0.162
0.420	0.202
0.437	0.256
0.450	0.314

* Not shown on plot

DATA TABLE NO. 230 (Continued)

λ	ρ
CURVE 9 (cont.)	
0.467	0.358
0.489	0.396
0.533	0.434
0.609	0.512
0.638	0.543
0.670	0.573
0.697	0.590
CURVE 10*	
T ~ 298	
0.325	0.113
0.339	0.104
0.363	0.107
0.377	0.107
0.386	0.117
0.394	0.128
0.398	0.148
0.409	0.242
0.417	0.299
0.432	0.356
0.442	0.387
0.463	0.426
0.496	0.455
0.552	0.505
0.617	0.567
0.675	0.618
0.696	0.625
CURVE 11	
T = 293	
2.50	0.162
4.00	0.155
6.25	0.140
7.14	0.131
8.33	0.116
10.0	0.083
12.5	0.000
12.7	0.019
13.0	0.073
13.3	0.150
13.7	0.445
14.0	0.555
14.3	0.605
15.2	0.715
15.7	0.748
16.7	0.741
CURVE 12	
T = 313	
2.50	0.162
4.00	0.155
6.25	0.140
7.14	0.131
8.33	0.116
10.0	0.083
12.5	0.000
12.7	0.019*
13.0	0.073*
13.3	0.150*
13.8	0.441*
14.1	0.530
15.4	0.701
16.0	0.711
16.7	0.713
CURVE 13*	
T = 333	
2.50	0.162
4.00	0.155
6.25	0.140
7.14	0.131
8.33	0.116
10.0	0.083
12.5	0.000
12.7	0.019
13.0	0.073
13.3	0.150
13.8	0.441
14.1	0.530
15.4	0.701
16.0	0.709
16.7	0.711
CURVE 14*	
T = 363	
2.50	0.162
4.00	0.155
6.25	0.140
7.14	0.131
8.33	0.116
10.0	0.083
12.5	0.000
12.7	0.019
13.0	0.073
CURVE 14 (cont.)	
13.3	0.150
14.0	0.443
14.2	0.551
14.7	0.607
15.7	0.677
16.1	0.685
16.7	0.681
CURVE 15*	
T = 383	
2.50	0.162
4.00	0.155
6.25	0.140
7.14	0.131
8.33	0.116
10.0	0.083
12.5	0.000
12.7	0.019
13.0	0.073
13.3	0.150
14.0	0.443
14.2	0.551
14.7	0.607
15.7	0.677
16.0	0.687
16.7	0.679
CURVE 16*	
T = 403	
2.50	0.162
4.00	0.155
6.25	0.140
7.14	0.131
8.33	0.116
10.0	0.083
12.5	0.000
12.7	0.019
13.0	0.073
13.3	0.150
14.0	0.441
14.4	0.524
15.2	0.626
15.7	0.659
16.1	0.669
16.7	0.669
CURVE 17*	
T = 423	
2.50	0.162
4.00	0.155
6.25	0.140
7.14	0.131
8.33	0.116
10.0	0.083
12.5	0.000
12.7	0.019
13.0	0.073
13.3	0.150
14.0	0.441
14.4	0.524
15.2	0.616
15.7	0.633
16.7	0.639
CURVE 18	
T = 453	
2.50	0.162
4.00	0.155
6.25	0.140
7.14	0.131
8.33	0.116
10.0	0.083
12.5	0.000
12.7	0.019*
13.0	0.073*
13.3	0.150*
14.0	0.410
14.5	0.508
15.6	0.591
16.1	0.603
16.7	0.605
CURVE 19	
T = 293	
2.42	0.162
3.20	0.152
5.01	0.142
6.54	0.133
9.72	0.078
11.2	0.050
12.5	0.000
13.4	0.107
14.1	0.258
CURVE 19 (cont.)	
14.3	0.516
16.7	0.747
17.5	0.760
18.7	0.739
19.9	0.589

* Not shown on plot

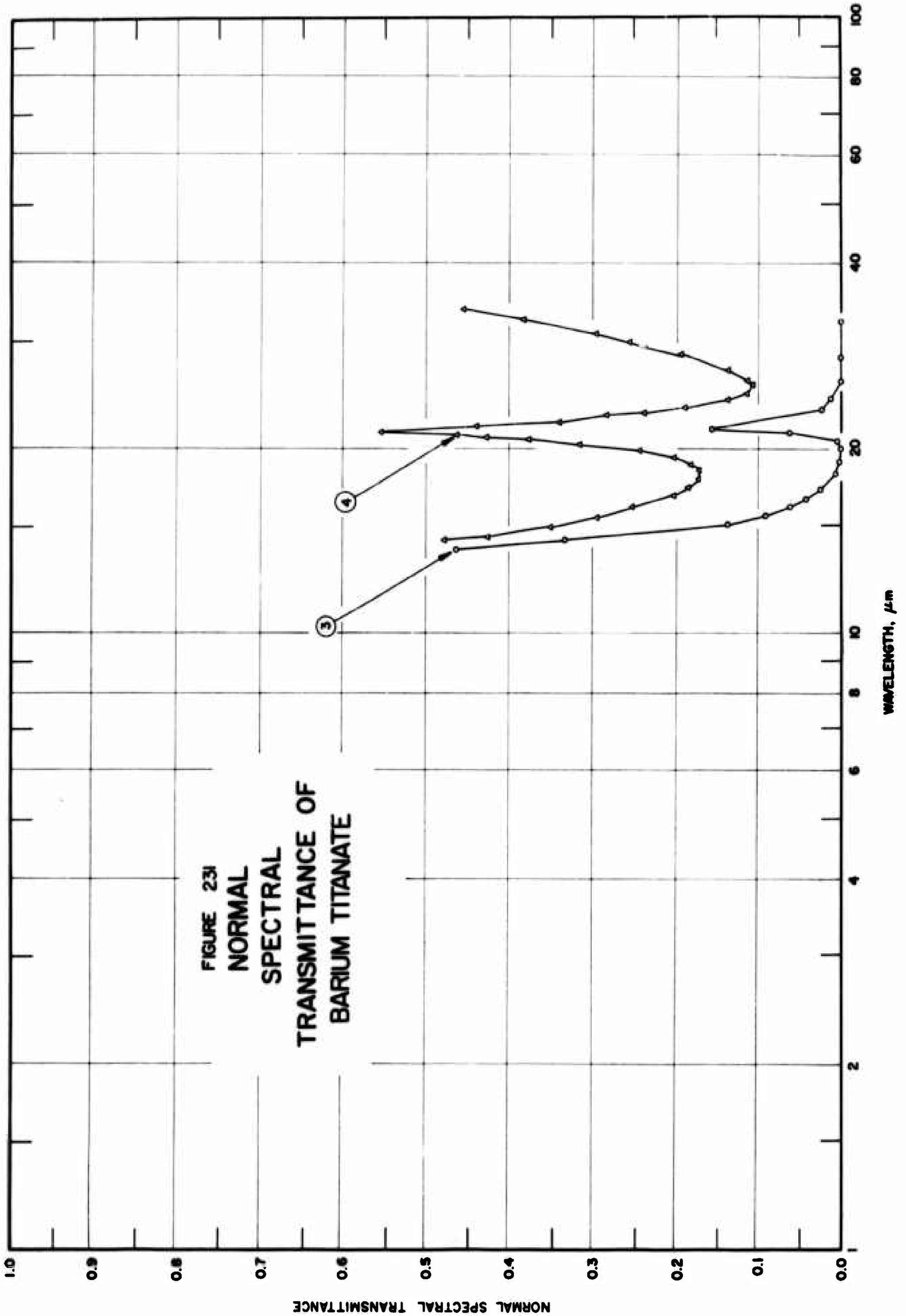


FIGURE 231 NORMAL SPECTRAL TRANSMITTANCE OF BARIUM TITANATE

SPECIFICATION TABLE NO. 231 NORMAL SPECTRAL TRANSMITTANCE OF BARIUM TITANATE $BaTiO_3$

Curve No.	Ref. No.	Year	Temperature K	Wavelength Range, μm	Geometry θ	θ'	ω'	Reported Error, %	Composition (weight percent), Specifications, and Remarks
1*	412	1967	78	0.430-13.3	~0°	~0°			Single crystal; grown by KF-flux method; data extracted from smooth curve.
2*	412	1967	78	0.460-13.3	~0°	~0°			Above specimen and conditions except heating in the atmosphere of dry hydrogen at 1073 K for 5 hrs; etched in phosphoric acid at 413-423 K for 5 to 10 min. to remove the insulating surface layer; data extracted from smooth curve.
3	237	1962	297	13.6-32.0	0°				Undoped, synthetic single crystal; grown by Remeika method; clear crystal plate with clean surface; etched in hot H_3PO_4 slightly above the Curie temperature (120°C); 5.0 ± 0.5 μm thick; converted to c-domained plate (optic axis perpendicular to the specimen surface) by dc poling in water; measured with unpolarized, incident radiation; data for ordinary ray (electric field perpendicular to the optic axis).
4	237	1962	297	14.1-33.6	0°				Undoped powder (grain size of the order of 1 μm) in a KBr pellet; measured with unpolarized, incident radiation; data given for ordinary ray (electric field perpendicular to the optic axis).

DATA TABLE NO. 231 NORMAL SPECTRAL TRANSMITTANCE OF BARIUM TITANATE $BaTiO_3$

[Wavelength, λ, μm; Transmittance, τ; Temperature, T, K]

λ	τ
CURVE 1*	**T = 78**
0.430	0.000
0.470	0.098
0.490	0.160
0.510	0.307
0.520	0.448
0.530	0.521
0.580	0.555
0.700	0.591
0.850	0.610
1.20	0.627
1.94	0.627
2.48	0.636
3.21	0.652
4.51	0.675
6.00	0.687
6.27	0.677
6.43	0.651
6.90	0.600
7.33	0.632
7.89	0.353

λ	τ
CURVE 1 (cont.)	
8.53	0.588
9.25	0.473
9.38	0.280
9.75	0.167
9.86	0.090
10.2	0.050
11.5	0.018
13.3	0.000
CURVE 2*	**T = 78**
0.460	0.000
0.500	0.037
0.550	0.131
0.560	0.171
0.650	0.286
0.690	0.304
0.750	0.304
0.830	0.204

λ	τ
CURVE 2 (cont.)	
0.910	0.160
1.07	0.120
1.29	0.087
1.65	0.066
1.98	0.055
2.43	0.059
2.74	0.069
3.27	0.100
3.92	0.144
4.59	0.209
5.37	0.304
6.00	0.357
6.58	0.351
6.90	0.324
7.55	0.347
7.67	0.253
8.09	0.202
8.37	0.310
8.83	0.328
9.38	0.280

λ	τ
CURVE 2 (cont.)	
9.75	0.167
9.86	0.090
10.2	0.050
11.5	0.017
13.3	0.000
CURVE 3	**T = 297**
13.6	0.465
14.1	0.336
15.0	0.135
15.5	0.091
16.0	0.063
16.5	0.043
17.1	0.026
18.1	0.008
19.0	0.001
20.0	0.000
20.5	0.004

λ	τ
CURVE 3 (cont.)	
21.1	0.063
21.4	0.158
23.0	0.023
24.0	0.011
25.8	0.000
28.0	0.000
30.0	0.000*
32.0	0.000
CURVE 4	**T = 297**
14.1	0.480
14.3	0.429
14.9	0.351
15.4	0.298
16.0	0.251
16.7	0.201
17.2	0.188
17.8	0.173
18.4	0.173

λ	τ
CURVE 4 (cont.)	
18.9	0.182
19.4	0.203
19.8	0.243
20.3	0.318
20.6	0.377
20.8	0.430
21.0	0.464
21.1	0.558
21.3	0.555*
21.7	0.440
22.0	0.342
22.5	0.283
22.8	0.239
23.1	0.190
24.0	0.137
24.5	0.112
25.2	0.107
25.9	0.111
26.8	0.136
28.4	0.196

λ	τ
CURVE 4 (cont.)	
29.9	0.259
30.7	0.299
32.3	0.382
33.6	0.458

* Not shown on plot

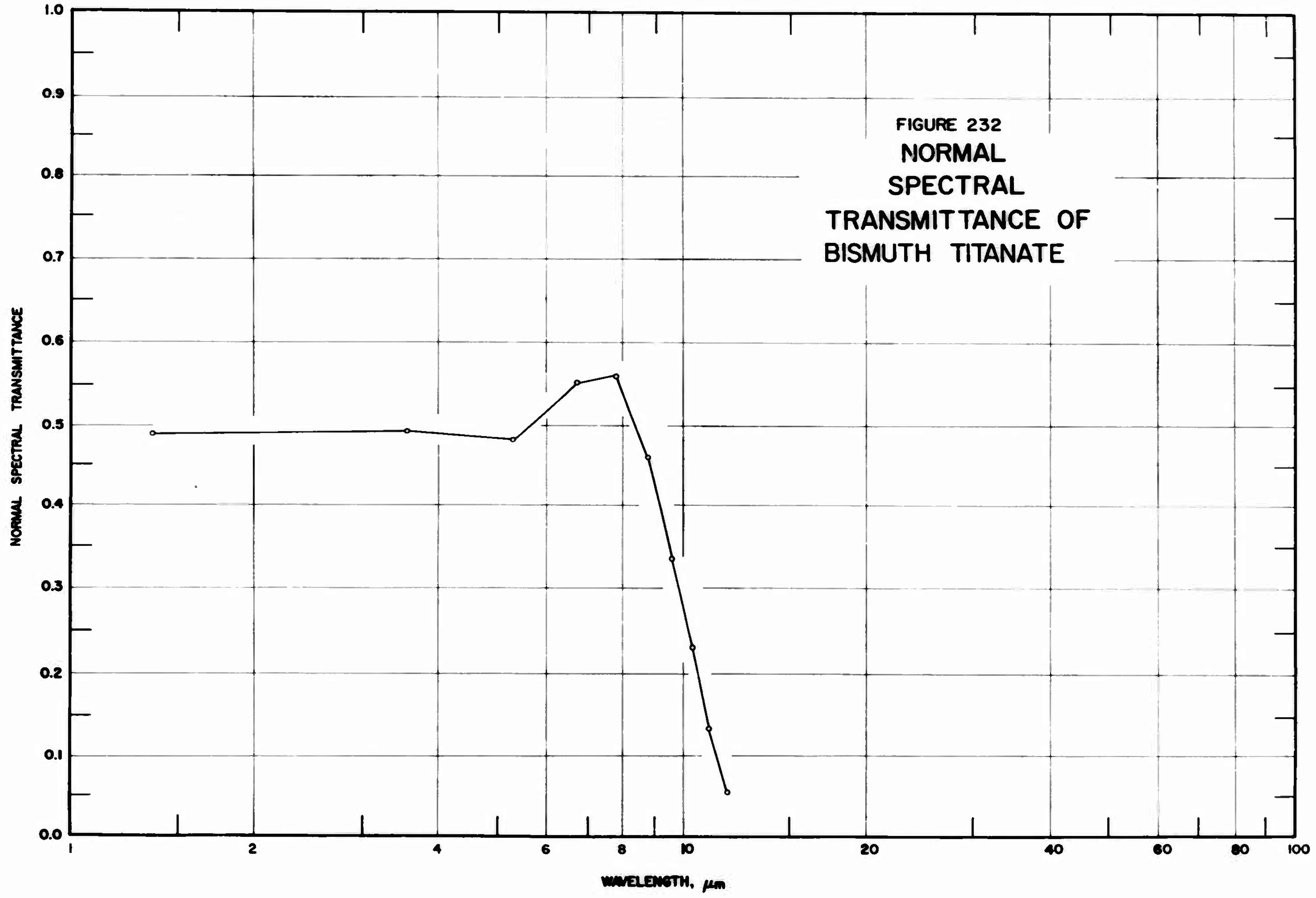


FIGURE 232
NORMAL
SPECTRAL
TRANSMITTANCE OF
BISMUTH TITANATE
NORMAL SPECTRAL TRANSMITTANCE
WAVELENGTH, μm
1.0
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0.0
1
2
4
6
8
10
20
40
60
80
100

SPECIFICATION TABLE NO. 232 NORMAL SPECTRAL TRANSMITTANCE OF BISMUTH TITANATE $Bi_4Ti_3O_{12}$

Curve No.	Ref. No.	Year	Temperature, K	Wavelength Range, μm	Geometry θ	θ'	ω'	Reported Error, %	Composition (weight percent), Specifications, and Remarks
1	285	1965	~298	1.37-11.8	0°	0°			Single crystal (50.8 μm thick); c-axis perpendicular to crystal faces.

DATA TABLE NO. 232 NORMAL SPECTRAL TRANSMITTANCE OF BISMUTH TITANATE $Bi_4Ti_3O_{12}$

[Wavelength, λ, μm; Transmittance, τ; Temperature, T, K]

λ	τ
CURVE 1	
T ~298	
1.37	0.490
3.55	0.494
5.29	0.484
6.74	0.554
7.80	0.562
8.80	0.460
9.62	0.335
10.4	0.232
11.1	0.134
11.8	0.053

SPECIFICATION TABLE NO. 233 NORMAL INTEGRATED REFLECTANCE OF LEAD TITANATE $PbTiO_3$

Curve No.	Ref. No.	Year	Temperature Range, K	Geometry θ	Geometry ω'	Reported Error, %	Composition (weight percent), Specifications and Remarks
1*	122	1940	298	0	2π		Powder; packed in a shallow steel cell; data extracted for the band from 0.28 to 0.32 μm.

DATA TABLE NO. 233 NORMAL INTEGRATED REFLECTANCE OF LEAD TITANATE $PbTiO_3$

[Temperature, T, K; Reflectance, ρ]

T	ρ
CURVE 1*	
298	0.06

* No plot given

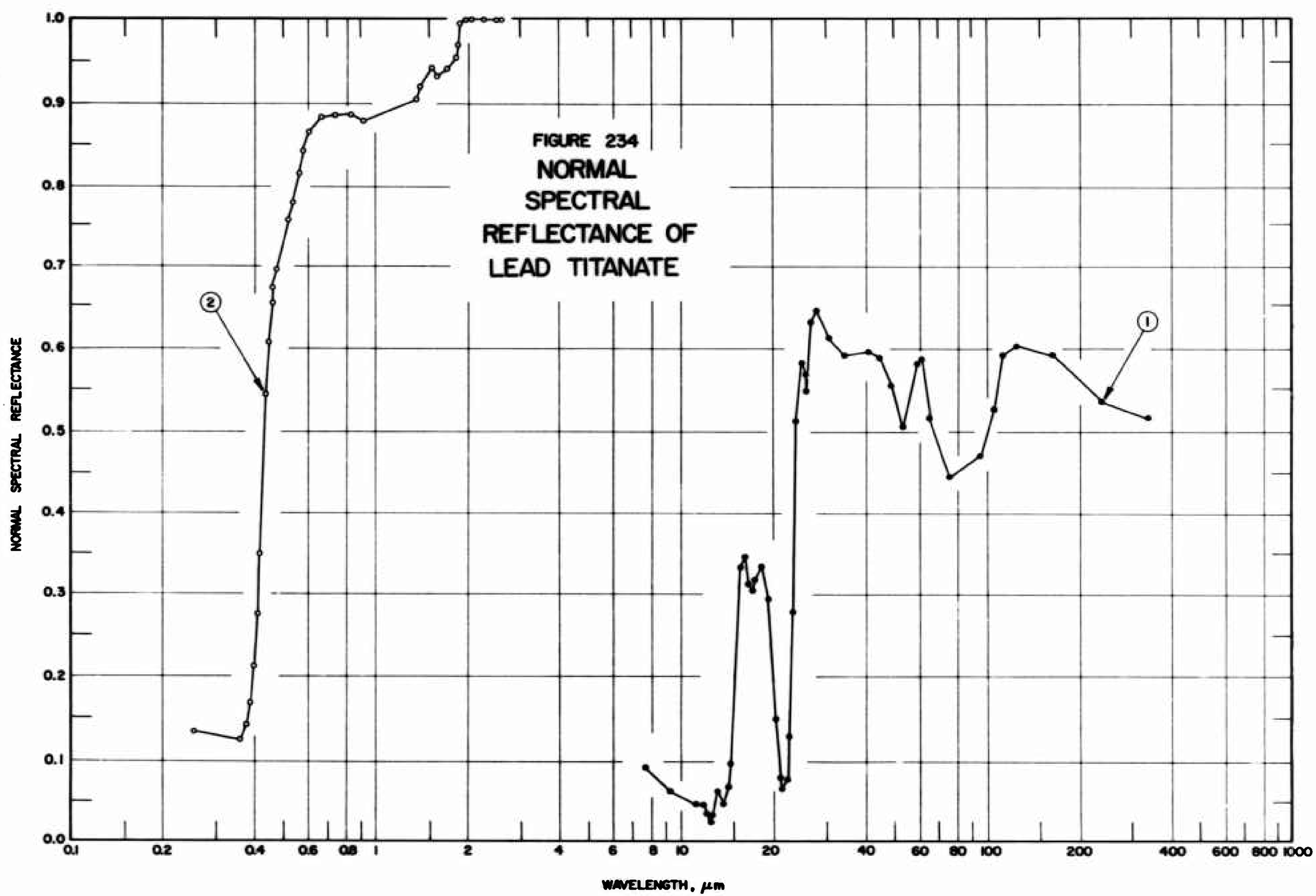


FIGURE 234
NORMAL
SPECTRAL
REFLECTANCE OF
LEAD TITANATE
NORMAL SPECTRAL REFLECTANCE
WAVELENGTH, μm
1.0
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0.0
0.1
0.2
0.4
0.6
0.8
1
2
4
6
8
10
20
40
60
80
100
200
400
600
800
1000
1
2

SPECIFICATION TABLE NO. 234 NORMAL SPECTRAL REFLECTANCE OF LEAD TITANATE $PbTiO_3$

Curve No.	Ref. No.	Year	Temperature, K	Wavelength Range, μm	Geometry θ	Geometry θ'	Geometry ω'	Reported Error, %	Composition (weight percent), Specifications, and Remarks
1	167	1965	~298	7.6-333.3	~0°	~0°			>2 mm thick; data extracted from smooth curve.
2	121	1964	~298	0.250-0.600	0°		2 π		Ticon P, from Titanium Alloy Mfg. Co; 73.18 pure compacted powder; data extracted from smooth curve; $BaSO_4$ reference standard.
3	121	1964	~298	0.600-2.60	~0°		2 π		Above specimen and condition.

DATA TABLE NO. 234 NORMAL SPECTRAL REFLECTANCE OF LEAD TITANATE $PbTiO_3$

[Wavelength, λ, μm; Reflectance, ρ; Temperature, T, K]

λ	ρ	λ	ρ	λ	ρ	λ	ρ	λ	ρ
CURVE 1 T ~ 298		CURVE 1 (cont.)		CURVE 1 (cont.)		CURVE 2 (cont.)		CURVE 3 (cont.)	
7.6	0.091	22.1	0.076	85.4	0.444*	0.464	0.698	1.87	0.972
9.2	0.062	22.4	0.127	95.2	0.472	0.477	0.717*	1.90	0.996
11.2	0.047	23.0	0.279	105.2	0.526	0.514	0.758	1.94	1.044*
11.8	0.047	23.8	0.512	113.6	0.593	0.529	0.780	1.98	1.052
12.1	0.035	24.5	0.581*	125.0	0.602	0.551	0.816	2.02	1.041*
12.5	0.024	24.8	0.584	163.9	0.594	0.571	0.841	2.07	1.018
12.7	0.032	25.5	0.570	238.0	0.538	0.596	0.865*	2.14	1.006*
13.1	0.061	25.7	0.550	333.3	0.517	0.600	0.867	2.29	1.006
13.7	0.048	26.1	0.554*					2.37	1.036*
14.2	0.069	26.8	0.631	CURVE 2 T ~ 298		CURVE 3 T ~ 298		2.50	1.098
14.4	0.099	27.9	0.649					2.55	1.112*
15.7	0.333	30.7	0.614	0.250	0.132	0.600	0.863	2.60	1.105
16.1	0.348	34.2	0.592	0.357	0.121	0.654	0.885		
16.4	0.343*	38.4	0.594*	0.363	0.125*	0.730	0.888		
16.8	0.312	41.6	0.597	0.373	0.142	0.825	0.888		
17.1	0.305	44.8	0.590	0.381	0.168	0.917	0.881		
17.5	0.317	48.7	0.556	0.391	0.211	1.36	0.906		
18.4	0.335	53.7	0.506	0.402	0.274	1.40	0.921		
18.7	0.328*	58.8	0.583	0.412	0.350	1.44	0.939*		
19.1	0.293	61.3	0.589	0.434	0.546	1.52	0.943		
20.2	0.150	65.7	0.519	0.440	0.609	1.60	0.936		
21.1	0.080	75.7	0.448	0.446	0.653	1.71	0.942		
21.5	0.064			0.452	0.672	1.82	0.958		

* Not shown on plot

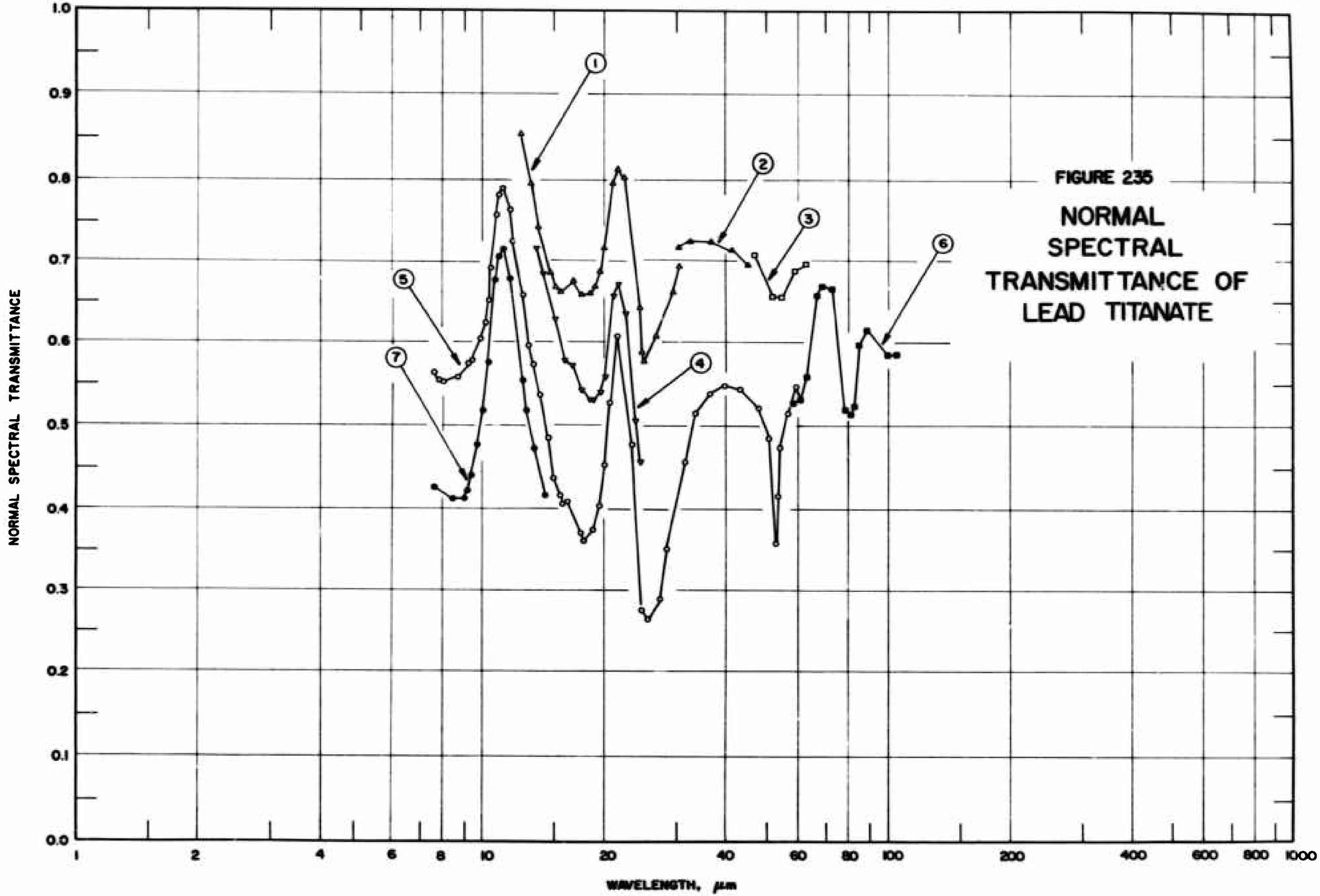


FIGURE 235

NORMAL SPECTRAL TRANSMITTANCE OF LEAD TITANATE

SPECIFICATION TABLE NO. 235 NORMAL SPECTRAL TRANSMITTANCE OF LEAD TITANATE $PbTiO_3$

Curve No.	Ref. No.	Year	Temperature, K	Wavelength Range, μm	Geometry θ	θ'	ω'	Reported Error, %	Composition (weight percent), Specifications, and Remarks
1	167	1965	~298	12.5-30.9	< 15°	< 15°			Polyethylene (0.15 mm thick) doped with ~0.7 mg cm^{-2} sintered powder of $PbTiO_3$; data extracted from smooth curve.
2	167	1965	~298	30.2-45.4	< 15°	< 15°			Above specimen and conditions.
3	167	1965	~298	46.5-62.5	< 15°	< 15°			Above specimen and conditions.
4	167	1965	~298	13.6-24.6	< 15°	< 15°			Polyethylene (0.15 mm thick) doped with ~1.4 mg cm^{-2} sintered powder of $PbTiO_3$; data extracted from smooth curve.
5	167	1965	~298	7.68-62.5	< 15°	< 15°			Polyethylene (0.15 mm thick) doped with ~1.7 mg cm^{-2} sintered powder of $PbTiO_3$; data extracted from smooth curve.
6	167	1965	~298	58.1-105.	< 15°	< 15°			Above specimen and conditions.
7	167	1965	~298	7.6-14.2	< 15°	< 15°			Polyethylene (0.15 mm thick) doped with ~3 mg cm^{-2} sintered powder of $PbTiO_3$; data extracted from smooth curve.

DATA TABLE NO. 235 NORMAL SPECTRAL TRANSMITTANCE OF LEAD TITANATE $PbTiO_3$

[Wavelength, λ, μm; Transmittance, τ; Temperature, T, K]

CURVE 1 T ~ 298

λ	τ
12.5	0.854
13.1	0.796
13.7	0.743
14.7	0.685
15.1	0.669
15.6	0.660
16.0	0.660
16.8	0.673
17.6	0.657
18.5	0.859
19.0	0.667
19.5	0.686
20.0	0.716
21.0	0.798
21.6	0.813
22.3	0.802
24.3	0.641
24.6	0.588
25.0	0.578
26.6	0.606
29.4	0.660
30.9	0.692

CURVE 2 T ~ 298

λ	τ
30.2	0.719
32.7	0.725
36.4	0.723
40.9	0.713
45.4	0.694

CURVE 3 T ~ 298

λ	τ
46.5	0.709
47.8	0.704*
52.0	0.655
54.3	0.655
59.1	0.689
62.5	0.695

CURVE 4 T ~ 298

λ	τ
13.6	0.717
14.2	0.684
15.2	0.629
16.0	0.577
16.7	0.571
17.5	0.541
18.3	0.530
18.9	0.530
19.6	0.539
20.2	0.559
21.2	0.657
21.7	0.670
22.6	0.634
23.9	0.505
24.6	0.457

CURVE 5 T ~ 298

λ	τ
7.68	0.562
7.86	0.553
8.08	0.551
8.73	0.557
9.22	0.572
9.46	0.578
9.96	0.602
10.1	0.621
10.3	0.650
10.5	0.690
10.9	0.759
11.0	0.782
11.2	0.790
11.5	0.784*
11.7	0.763
11.9	0.724
12.5	0.658
13.0	0.595
13.3	0.571
13.9	0.536
14.5	0.486
15.0	0.436
15.5	0.418
15.9	0.409
16.1	0.410
17.3	0.370
17.9	0.360
18.6	0.372
19.4	0.403
20.0	0.452
20.7	0.526
21.5	0.609
21.9	0.606*
23.2	0.479
24.8	0.273
25.5	0.261
27.1	0.289
28.6	0.350
31.5	0.458
33.6	0.513
36.1	0.537
39.2	0.546
43.2	0.541
48.0	0.520
50.2	0.484
52.9	0.358
53.4	0.416
54.0	0.473
56.1	0.513
59.8	0.546
62.5	0.557*

CURVE 6 T ~ 298

λ	τ
58.1	0.526
60.9	0.530
62.8	0.559
67.1	0.657
69.4	0.668
72.9	0.664
78.7	0.519
81.3	0.512
83.3	0.521
84.7	0.598
89.2	0.615
100	0.584
105	0.584

CURVE 7 T ~ 298

λ	τ
7.6	0.426
7.9	0.425*
8.5	0.411
9.0	0.411
9.2	0.422
9.4	0.440
9.7	0.478
10.0	0.518
10.3	0.574
10.7	0.675
11.0	0.705
11.3	0.715
11.4	0.713*
11.8	0.677
12.6	0.551
12.9	0.517
13.3	0.471
13.6	0.450*
14.2	0.417

* Not shown on plot

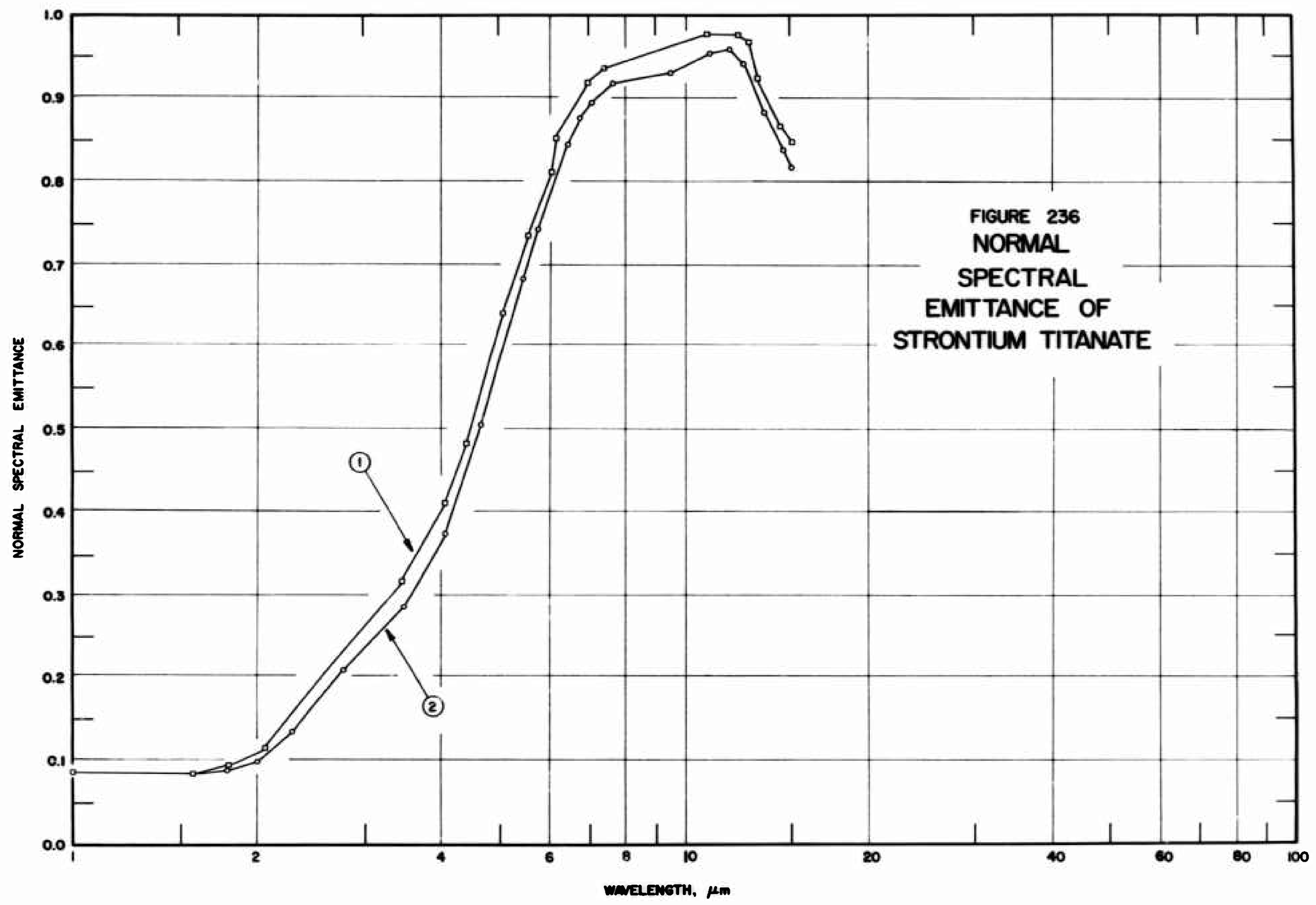


FIGURE 236
NORMAL
SPECTRAL
EMITTANCE OF
STRONTIUM TITANATE
NORMAL SPECTRAL EMITTANCE
WAVELENGTH, μm
1.0
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0.0
1
2
4
6
8
10
20
40
60
80
100
1
2

SPECIFICATION TABLE NO. 236 NORMAL SPECTRAL EMITTANCE OF STRONTIUM TITANATE $SrTiO_3$

Curve No.	Ref. No.	Year	Temperature, K	Wavelength Range, μm	Geometry θ'	Reported Error, %	Composition (weight percent), Specifications, and Remarks
1	382	1965	1273	1.00-15.0	0°		Sintered 1 hr at 1502 K; density 2.54; data extracted from smooth curve.
2	382	1965	1273	1.00-15.0	0°		Above specimen and conditions except heated at 1273 K in measuring apparatus for 4 hrs total; final density 2.55.

DATA TABLE NO. 236 NORMAL SPECTRAL EMITTANCE OF STRONTIUM TITANATE $SrTiO_3$

[Wavelength, λ, μm; Emittance, ϵ; Temperature, T, K]

λ	ϵ	λ	ϵ
CURVE 1		CURVE 2	
T = 1273		T = 1273	
1.00	0.085	1.00	0.085*
1.57	0.082	1.57	0.082*
1.80	0.092	1.79	0.088
2.06	0.113	2.00	0.099
3.46	0.318	2.28	0.132
4.05	0.410	2.75	0.204
4.40	0.481	3.48	0.285
5.06	0.640	4.05	0.373
5.54	0.735	4.68	0.505
6.04	0.810	5.46	0.681
6.28	0.851	5.78	0.741
6.94	0.918	6.49	0.843
7.40	0.935	6.76	0.876
10.8	0.976	7.08	0.895
12.3	0.976	7.69	0.917
12.7	0.969	9.10	0.930
13.2	0.923	11.0	0.952
14.4	0.866	11.8	0.959
15.0	0.849	12.5	0.940
		13.5	0.883
		14.5	0.837
		15.0	0.818

* Not shown on plot

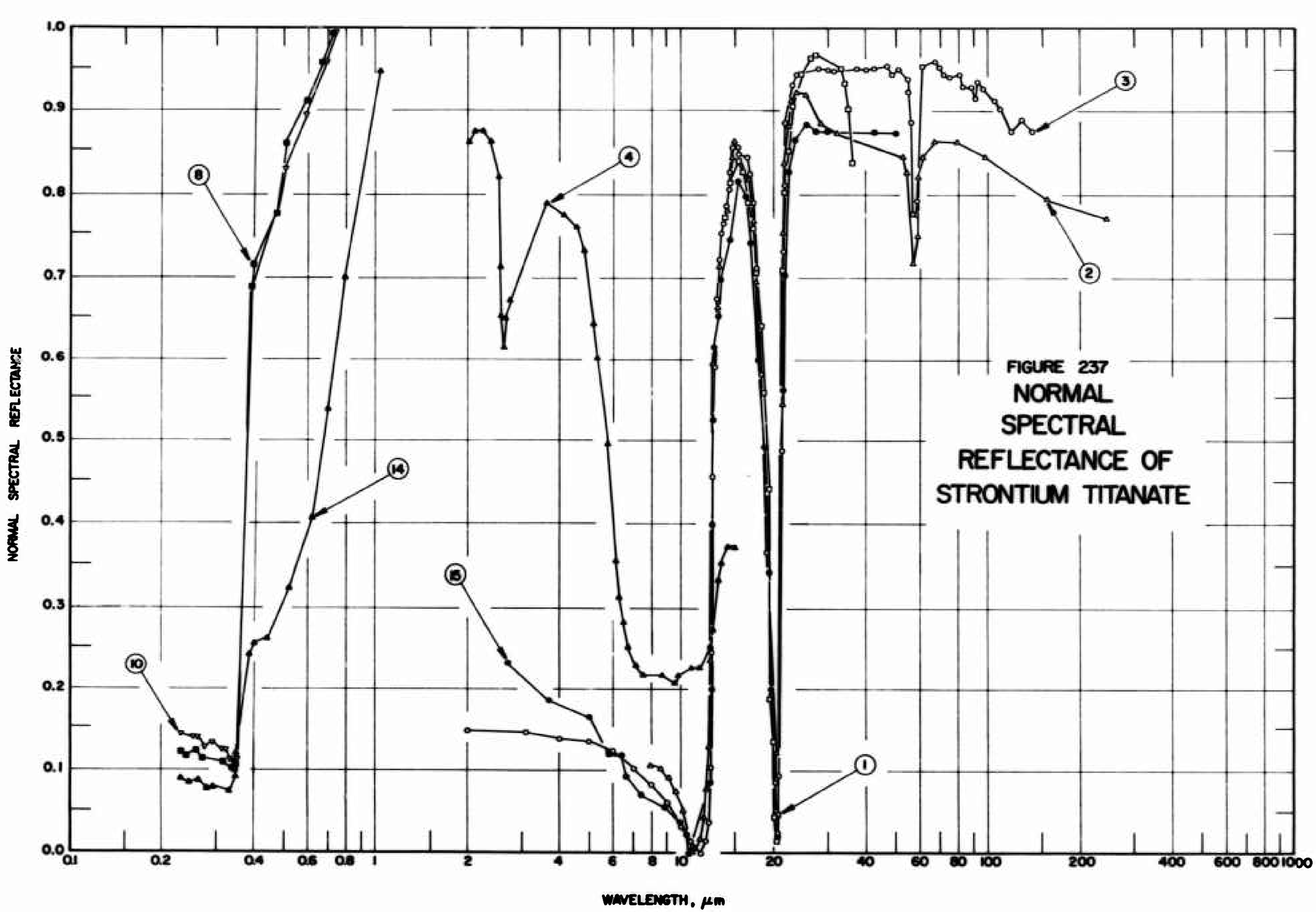


FIGURE 237
NORMAL SPECTRAL REFLECTANCE OF STRONTIUM TITANATE
NORMAL SPECTRAL REFLECTANCE
WAVELENGTH, μm
1.0
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0.0
0.1
0.2
0.4
0.6
0.8
1
2
4
6
8
10
20
40
60
80
100
200
400
600
800
1000
1
2
3
4
8
10
14
15

SPECIFICATION TABLE NO. 237 NORMAL SPECTRAL REFLECTANCE OF STRONTIUM TITANATE $SrTiO_3$

Curve No.	Ref. No.	Year	Temperature, K	Wavelength Range, μm	Geometry θ	θ'	ω'	Reported Error, %	Composition (weight percent), Specifications, and Remarks
1	83	1962	298	14.0-36.5	0°		2 π		Single crystal, from National Lead Co.; data extracted from smooth curve.
2	167	1965	~298	7.99-243	~0°	~0°			Single crystal (> 2 mm thick); data extracted from smooth curve.
3	237	1962	297	2.00-140	< 6°	< 6°			Undoped, synthetic crystal; grown by flame fusion; prepared by optical polishing; measured with unpolarized radiation.
4	362	1964	~298	2.00-15.0	0°		2 π		Sintered at 1373 K for 1 hr.; independent of surface roughness (50-1700 μm); data extracted from smooth curve; converted from reflectance factor.
5*	362	1964	~298	0.230-2.65	0°		2 π		2% polyvinyl alcohol binder (DuPont grade 70-05); cold pressed at 12 600 psi; sintered 2 hrs. at 1698 K; data extracted from smooth curve; MgO reference standard.
6	362	1964	~298	0.230-2.65	0°		2 π		Similar to above specimen and conditions except 4% binder.
7*	362	1964	~298	0.230-2.65	0°		2 π		Similar to above specimen and conditions except 8% binder.
8	362	1964	~298	0.230-2.65	0°		2 π		Cold pressed at 6,600 psi; sintered 1 hr. at 1498 K; data extracted from smooth curve; MgO reference standard.
9*	362	1964	~298	0.230-2.65	0°		2 π		Similar to above specimen and conditions except cold pressed at 10 700 psi.
10	362	1964	~298	0.230-2.65	0°		2 π		Similar to above specimen and conditions except cold pressed at 18 800 psi.
11*	362	1964	~298	0.230-2.65	0°		2 π		Cold pressed at 18 800 psi; sintered 2 hrs. at 1498 K; data extracted from smooth curve; MgO reference standard.
12*	362	1964	~298	0.230-2.65	0°		2 π		Similar to above specimen and conditions except sintered at 1598 K.
13*	362	1964	~298	0.230-2.65	0°		2 π		Similar to above specimen and conditions except sintered at 1698 K.
14	362	1964	~298	0.230-2.65	0°		2 π		Similar to above specimen and conditions except sintered at 1748 K.
15	87	1968	313	2.70-50.0	30°	30°			Synthetic single crystal; (1.0 mm thick); flat to ten fringes or better; data extracted from smooth curve; aluminum mirror reference standard.

* Not shown on plot

DATA TABLE NO. 237 NORMAL SPECTRAL REFLECTANCE OF STRONTIUM TITANATE $SrTiO_3$

[Wavelength, λ, μ; Reflectance, ρ; Temperature, T, K]

CURVE 1
T = 298

λ	ρ
14.0	0.775
14.6	0.816
15.1	0.836*
15.5	0.840
16.0	0.829
16.8	0.793
17.3	0.760
17.8	0.709
18.3	0.641
18.7	0.560
19.1	0.443
19.4	0.243*
19.5	0.189
19.7	0.172*
20.0	0.133
20.3	0.045
20.5	0.015
20.8	0.018*
20.9	0.046
21.4	0.710
21.5	0.752*
21.7	0.804
22.1	0.853
22.5	0.887*
23.0	0.909
23.7	0.927*
24.6	0.947
26.6	0.967
27.5	0.972
33.0	0.967*
33.8	0.953
34.4	0.936
35.3	0.902
35.9	0.873*
36.5	0.839

CURVE 2
T ~ 298

λ	ρ
7.99	0.107
8.64	0.101
9.12	0.090
9.62	0.074
10.1	0.052
10.9	0.003
11.3	0.006
11.5	0.019
11.8	0.044
12.0	0.077
12.2	0.128
12.4	0.236
12.9	0.598
13.1	0.666
13.3	0.715
13.6	0.747*
14.1	0.781
14.4	0.819*
14.7	0.849
15.0	0.864
15.5	0.864*
16.8	0.820
17.3	0.770
17.7	0.699
20.2	0.120
20.7	0.043*
21.1	0.543
21.2	0.753
21.5	0.836
22.1	0.882
22.8	0.913
23.9	0.925
25.1	0.921
28.4	0.888
32.2	0.873
52.6	0.848
54.0	0.827
57.4	0.719
58.4	0.750
58.8	0.821
61.7	0.846
67.5	0.862
79.3	0.862
98.0	0.848
156	0.799
243	0.772

CURVE 3
T = 297

λ	ρ
2.00	0.146
3.10	0.145
4.00	0.139
5.00	0.133
6.00	0.121
7.00	0.102
8.00	0.081
9.00	0.060
10.0	0.032
10.5	0.020*
10.7	0.015
10.9	0.011*
11.3	0.003*
11.6	0.000
11.8	0.005*
12.0	0.014
12.2	0.038
12.4	0.102
12.6	0.249
12.7	0.458
13.0	0.592
13.2	0.674
13.4	0.722
13.5	0.751
13.7	0.764*
13.9	0.767
13.9	0.775*
14.1	0.786
14.3	0.808
14.4	0.828
14.7	0.845*
14.8	0.835*
14.8	0.856
15.1	0.856*
15.4	0.857
15.4	0.850
15.7	0.850*
16.0	0.846*
16.3	0.846*
16.5	0.845
16.8	0.840*
17.0	0.825
17.4	0.791
17.9	0.711
18.4	0.582
19.0	0.365
20.1	0.121*
20.3	0.085
20.5	0.049*
20.6	0.023
20.8	0.010*
21.0	0.018*
21.0	0.093
21.3	0.487
21.4	0.731
21.6	0.812
21.9	0.886
23.0	0.934
23.9	0.947
25.9	0.947*
28.0	0.954
30.0	0.952
31.9	0.951
32.9	0.954*
34.8	0.953*
37.5	0.953
40.1	0.952
42.5	0.953*
43.5	0.954
44.8	0.958*
46.5	0.958
48.2	0.946
51.1	0.951
52.8	0.951*
54.2	0.940
55.4	0.926
56.0	0.887
57.3	0.779
58.3	0.773
58.4	0.793
58.5	0.907*
59.6	0.923*
60.9	0.956
65.3	0.957*
67.5	0.961
70.0	0.954
72.7	0.946
75.2	0.942
77.8	0.943*
80.1	0.945
82.8	0.932
85.1	0.936*
88.1	0.931
90.2	0.919
92.5	0.939
95.4	0.932*
97.6	0.930
100	0.930*
105	0.913
110	0.901
120	0.874
130	0.890
140	0.879

CURVE 4
T ~ 298

λ	ρ
2.00	0.863
2.12	0.878
2.26	0.878
2.40	0.863
2.52	0.822
2.57	0.712
2.57	0.655
2.61	0.614
2.66	0.651
2.71	0.673
3.65	0.791
3.85	0.794*
4.18	0.776
4.37	0.776*
4.57	0.761
4.80	0.732
5.10	0.646
5.24	0.601
5.73	0.496
6.10	0.359
6.27	0.313
6.43	0.281
6.71	0.253
7.12	0.230
7.49	0.219
8.78	0.219
9.41	0.209
9.79	0.219
10.7	0.226
11.5	0.226
12.5	0.253
12.7	0.275
13.3	0.335
13.5	0.354
14.2	0.371
15.0	0.371

CURVE 5*
T ~ 298

λ	ρ
0.230	0.120
0.261	0.121
0.271	0.118
0.294	0.112
0.328	0.112
0.350	0.130
0.397	0.389
0.459	0.462
0.532	0.591
0.588	0.633
0.692	0.776
0.792	0.865
0.963	0.924
1.09	1.017
1.35	1.105
1.58	1.147
1.84	1.175
2.07	1.188
2.24	1.191
2.33	1.180
2.48	1.171
2.65	1.152

CURVE 6*
T ~ 298

λ	ρ
0.250	0.120
0.261	0.121
0.271	0.118
0.294	0.112
0.328	0.112
0.350	0.130
0.397	0.389
0.459	0.462
0.532	0.591
0.588	0.633
0.692	0.776
0.793	0.871
0.974	0.945
1.10	1.031
1.29	1.098
1.47	1.137
1.76	1.175
1.84	1.186
2.04	1.196
2.19	1.202
2.45	1.185
2.65	1.167

CURVE 7*
T ~ 298

λ	ρ
0.230	0.103
0.309	0.094
0.331	0.100
0.347	0.113
0.350	0.130
0.396	0.433
0.532	0.591
0.588	0.633
0.692	0.776
0.776	0.886
0.965	0.985
1.15	1.064
1.35	1.121
1.47	1.147
1.66	1.178
1.80	1.191
1.96	1.197
2.10	1.210
2.21	1.214
2.36	1.211
2.50	1.196
2.65	1.185

CURVE 8
T ~ 298

λ	ρ
0.230	0.120
0.236	0.119*
0.241	0.115
0.259	0.121
0.270	0.112
0.314	0.109
0.329	0.101
0.343	0.101
0.350	0.106
0.394	0.689
0.397	0.716
0.467	0.778
0.505	0.861
0.597	0.913
0.660	0.962
0.720	0.998
0.766	1.018
1.02	1.071
1.35	1.116
1.40	1.113
1.64	1.139
1.81	1.152
1.88	1.145
1.95	1.137
2.19	1.171
2.28	1.174
2.65	1.125

CURVE 9*
T ~ 298

λ	ρ
0.230	0.137
0.239	0.129
0.254	0.132
0.264	0.129
0.277	0.120
0.299	0.126
0.307	0.119

* Not shown on plot

DATA TABLE NO. 237 (Continued)

CURVE 9 (cont.)

λ	ρ
0.318	0.117
0.332	0.109
0.342	0.107
0.350	0.112
0.394	0.689
0.397	0.716
0.467	0.778
0.553	0.882
0.688	0.969
0.742	1.006
0.954	1.046
1.35	1.106
1.41	1.102
1.65	1.135
1.77	1.140
1.85	1.135
1.92	1.122
2.17	1.157
2.26	1.161
2.46	1.135
2.65	1.087

CURVE 10
T ~ 298

λ	ρ
0.230	0.143
0.247	0.135
0.252	0.139
0.262	0.139
0.276	0.126
0.294	0.131
0.315	0.122
0.322	0.122
0.332	0.111
0.343	0.109
0.350	0.113
0.394	0.689
0.501	0.831
0.598	0.897
0.687	0.963
0.841	0.999
1.34	1.066
1.43	1.068
1.62	1.093
1.73	1.104
1.85	1.107

CURVE 10 (cont.)

λ	ρ
1.91	1.086
2.18	1.124
2.26	1.129
2.46	1.100
2.65	1.051

CURVE 11*
T ~ 298

λ	ρ
0.230	0.150
0.265	0.153
0.312	0.139
0.339	0.137
0.348	0.147
0.395	0.675
0.399	0.731
0.455	0.783
0.531	0.858
0.717	0.967
1.01	1.032
1.35	1.084
1.40	1.082
1.53	1.104
1.80	1.124
1.95	1.103
2.16	1.141
2.24	1.146
2.46	1.115
2.65	1.077

CURVE 12*
T ~ 298

λ	ρ
0.230	0.090
0.263	0.090
0.287	0.080
0.294	0.083
0.330	0.079
0.338	0.083
0.347	0.094
0.350	0.110
0.402	0.677
0.477	0.757
0.529	0.836
0.691	0.955
0.883	1.022

CURVE 12 (cont.)

λ	ρ
1.21	1.090
1.54	1.121
1.85	1.150
1.93	1.133
2.12	1.169
2.28	1.182
2.51	1.158
2.65	1.151

CURVE 13*
T ~ 298

λ	ρ
0.230	0.123
0.255	0.120
0.262	0.123
0.278	0.115
0.286	0.119
0.324	0.110
0.350	0.130
0.389	0.359
0.453	0.436
0.525	0.551
0.592	0.607
0.767	0.844
0.923	0.936
1.01	0.973
1.23	1.074
1.42	1.119
1.66	1.157
1.85	1.180
1.94	1.180
2.12	1.198
2.34	1.211
2.63	1.213
2.65	1.200

CURVE 14
T ~ 298

λ	ρ
0.230	0.088
0.245	0.083
0.263	0.087
0.280	0.076
0.293	0.079
0.330	0.072
0.347	0.091

CURVE 14 (cont.)

λ	ρ
0.350	0.117
0.385	0.243
0.399	0.257
0.443	0.262
0.514	0.324
0.617	0.408
0.695	0.537
0.786	0.701
1.04	0.951
1.16	1.033
1.33	1.091
1.58	1.139
1.94	1.170
2.09	1.186
2.32	1.195
2.44	1.196
2.50	1.178
2.65	1.178

CURVE 15
T = 313

λ	ρ
2.70	0.232
3.70	0.186
5.00	0.164
5.80	0.118
6.40	0.118
6.60	0.091
7.40	0.070
8.90	0.058
10.0	0.037
10.4	0.022
10.6	0.000
11.7	0.000*
12.1	0.035*
12.4	0.084
12.6	0.200
12.6	0.400
12.3	0.524
12.9	0.616
13.3	0.654
13.5	0.700
14.3	0.746
15.3	0.818
16.3	0.800
17.0	0.741

CURVE 15 (cont.)

λ	ρ
18.0	0.600
18.7	0.491
19.4	0.344
19.9	0.200
20.2	0.084*
20.7	0.019
21.3	0.561
21.7	0.705
22.4	0.829
23.1	0.864
24.6	0.879*
25.8	0.885
27.5	0.879
30.0	0.876
43.5	0.876
50.0	0.874

* Not shown on plot

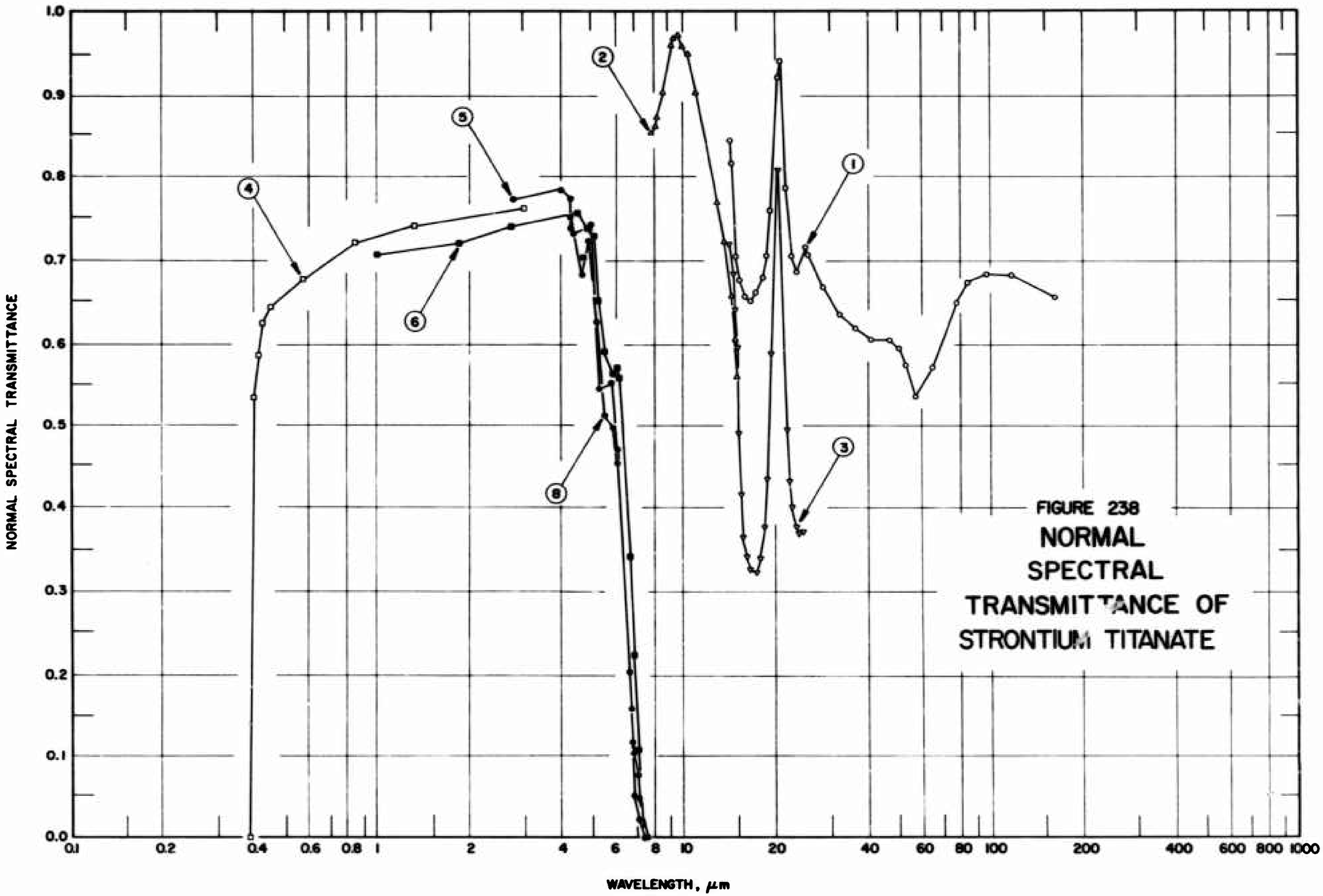


FIGURE 238 NORMAL SPECTRAL TRANSMITTANCE OF STRONTIUM TITANATE

SPECIFICATION TABLE NO. 238 NORMAL SPECTRAL TRANSMITTANCE OF STRONTIUM TITANATE $SrTiO_3$

Curve No.	Ref. No.	Year	Temperature, K	Wavelength Range, µm	Geometry θ	Geometry θ'	Geometry ω'	Reported Error, %	Composition (weight percent), Specifications, and Remarks
1	167	1965	~298	14.2-161	15°	< 15°			Polyethylene (~0.1524 mm thick); doped with ~0.3 mg cm^{-2} powdered $SrTiO_3$; data extracted from smooth curve.
2	167	1965	~298	7.99-15.2	< 15°	< 15°			Polyethylene (~0.1524 mm thick); doped with ~0.5 mg cm^{-2} powdered $SrTiO_3$; data extracted from smooth curve.
3	167	1965	~298	14.2-24.5	< 15°	< 15°			Above specimen and conditions.
4	94	1967	298	0.382-3.00	> 15°	> 15°		± 2	Synthetic crystal (1.0 mm thick); polished; data extracted from smooth curve.
5	87	1968	313	2.8-7.4	~0°	~0°			Synthetic single crystal (1.0 mm thick); flat to ten fringes or better; data extracted from smooth curve.
6	430	1964	50	1.00-7.34	0°	0°			1.02 mm thick; data extracted from smooth curve.
7*	430	1964	85	1.00-7.32	0°	0°			Above specimen and conditions.
8	430	1964	300	1.00-7.51	0°	0°			Above specimen and conditions.

* Not shown on plot

DATA TABLE NO. 238 NORMAL SPECTRAL TRANSMITTANCE OF STRONTIUM TITANATE $SrTiO_3$

[Wavelength, λ, μm; Transmittance, τ; Temperature, T, K]

CURVE 1
T ~298

λ	τ
14.2	0.843
14.4	0.816
15.0	0.705
15.4	0.677
16.0	0.659
16.8	0.653
17.5	0.662
18.2	0.680
18.6	0.708
19.1	0.760
20.2	0.928
20.4	0.945
21.6	0.789
22.4	0.706
23.3	0.689
25.0	0.716
25.9	0.708
28.9	0.668
32.7	0.636
36.4	0.620
40.9	0.608
47.3	0.608
50.0	0.599
53.7	0.577
56.8	0.534
59.1	0.534*
64.1	0.572
76.9	0.650
84.7	0.672
98.0	0.683
119	0.682
161	0.658

CURVE 2
T ~298

λ	τ
7.99	0.856
8.22	0.863
8.39	0.874
8.74	0.907
9.29	0.964
9.50	0.973
9.77	0.976

CURVE 2 (cont.)

λ	τ
10.1	0.965
10.5	0.945
11.2	0.906
13.1	0.771
13.7	0.726
14.5	0.659
14.9	0.608
15.2	0.563

CURVE 3
T ~298

λ	τ
14.2	0.721
14.7	0.684
15.0	0.642
15.2	0.599
15.3	0.490
15.5	0.417
15.8	0.366
16.1	0.342
16.7	0.328
17.4	0.323
18.0	0.341
18.5	0.379
18.9	0.436
19.6	0.590
20.5	0.808
21.9	0.496
22.2	0.432
22.6	0.400
23.3	0.378
23.8	0.369
24.5	0.371

CURVE 4
T = 298

λ	τ
0.382	0.000
0.395	0.536
0.402	0.588
0.420	0.625
0.441	0.645
0.565	0.679
0.851	0.721

CURVE 4 (cont.)

λ	τ
1.31	0.742
3.00	0.763

CURVE 5
T = 313

λ	τ
2.8	0.774
4.0	0.786
4.3	0.775
4.3	0.740
4.4	0.733
5.0	0.744
5.3	0.547
5.8	0.552
6.1	0.470
6.8	0.116
6.9	0.050
7.1	0.020
7.4	0.000

CURVE 6
T = 50

λ	τ
1.00	0.707
1.86	0.721
2.72	0.742
4.43	0.757
4.52	0.746*
4.71	0.704
4.75	0.731*
4.84	0.740
5.04	0.740*
5.11	0.730
5.29	0.652
5.37	0.608*
5.44	0.593
5.52	0.581*
5.67	0.566*
5.84	0.566
5.97	0.572*
6.09	0.572
6.20	0.560
6.37	0.492*
6.67	0.345

CURVE 6 (cont.)

λ	τ
6.87	0.225
7.12	0.108
7.34	0.000*

CURVE 7*
T = 85

λ	τ
1.00	0.707
1.86	0.721
2.72	0.742
4.43	0.757
4.52	0.746
4.71	0.704
4.75	0.731
4.84	0.740
5.04	0.740
5.11	0.730
5.29	0.652
5.37	0.608
5.44	0.593
5.52	0.581
5.65	0.560
6.15	0.555
6.34	0.465
6.61	0.337
6.83	0.214
7.10	0.108
7.32	0.000

CURVE 8
T = 300

λ	τ
1.00	0.707*
1.86	0.721*
2.72	0.742*
4.43	0.752
4.51	0.746*
4.62	0.695*
4.68	0.685
4.72	0.703*
4.82	0.716*
4.94	0.724
5.06	0.709*
5.20	0.628

CURVE 8 (cont.)

λ	τ
5.38	0.557*
5.52	0.512
5.66	0.493*
5.89	0.499
6.03	0.492*
6.17	0.452
6.61	0.201
6.71	0.160
6.88	0.104
7.04	0.074
7.16	0.049
7.51	0.000

* Not shown on plot

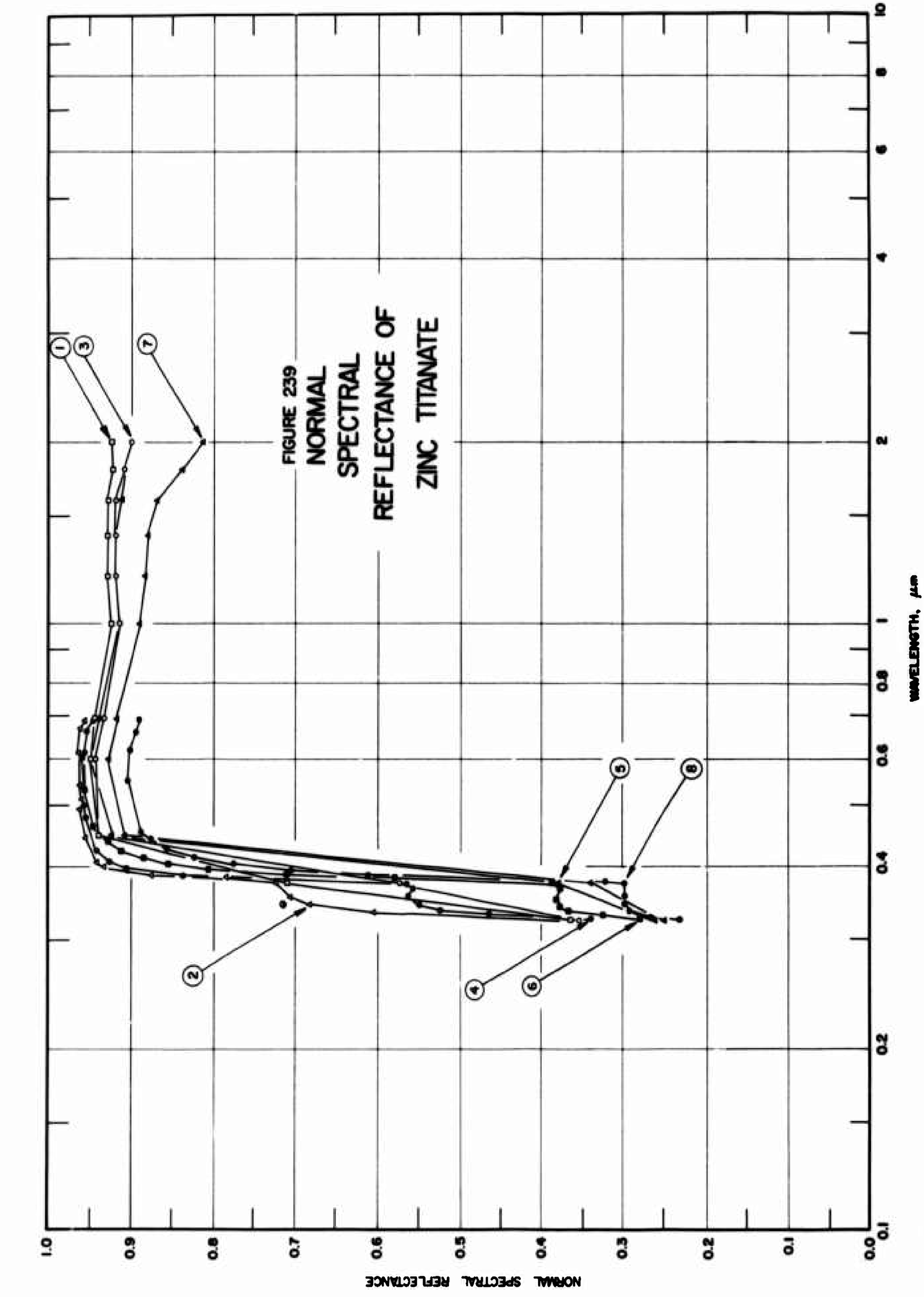


FIGURE 239 NORMAL SPECTRAL REFLECTANCE OF ZINC TITANATE

SPECIFICATION TABLE NO. 239 NORMAL SPECTRAL REFLECTANCE OF ZINC TITANATE $ZnTiO_3$

Curve No.	Ref. No.	Year	Temperature, K	Wavelength Range, μm	θ	Geometry θ'	ω'	Reported Error, %	Composition (weight percent), Specifications, and Remarks
1	367	1964	~298	0.325-2.0	~0°	~0°			Contains both unreacted zinc oxide and titania; from New Jersey Zinc Co; MgO reference standard; [Authors' designation: Sample A-54-2].
2	367	1964	~298	0.325-0.696	~0°	~0°			Above specimen and conditions.
3	367	1964	~298	0.325-2.0	~0°	~0°			No excess ZnO or TiO_2; from New Jersey Zinc Co; MgO reference standard; [Authors' designation: Sample 602-26-1M].
4	367	1964	~298	0.326-0.695	~0°	~0°			Above specimen and conditions.
5	367	1964	~298	0.325-2.0	~0°	~0°			50% excess ZnO; from New Jersey Zinc Co; MgO reference standard; [Authors' designation: Sample 602-26-2M].
6	367	1964	~298	0.326-0.696	~0°	~0°			Above specimen and conditions.
7	367	1964	~298	0.325-2.0	~0°	~0°			10% excess ZnO; from New Jersey Zinc Co; MgO reference standard; [Authors' designation: Sample 602-26-3M].
8	367	1964	~298	0.326-0.695	~0°	~0°			Above specimen and conditions.

DATA TABLE NO. 239 NORMAL SPECTRAL REFLECTANCE OF ZINC TITANATE $ZnTiO_3$

[Wavelength, λ; μm; Reflectance, ρ; Temperature, T, K]

λ	ρ
CURVE 1	T ~ 298
0.325	0.365
0.375	0.710
0.450	0.940
0.600	0.950
0.700	0.945
1.0	0.925
1.2	0.930
1.4	0.930
1.6	0.930
1.8	0.925
2.0	0.925
CURVE 2	T ~ 298
0.325	0.367*
0.335	0.604
0.345	0.681
0.355	0.706
0.358	0.710*
0.371	0.715*

λ	ρ
CURVE 2 (cont.)	
0.375	0.723
0.381	0.783
0.386	0.877
0.391	0.908
0.400	0.934
0.408	0.941
0.443	0.957
0.499	0.962
0.513	0.961
0.525	0.963*
0.541	0.962
0.614	0.963
0.672	0.961
0.696	0.958
CURVE 3	T ~ 298
0.325	0.355
0.375	0.575
0.450	0.940*
0.600	0.945

λ	ρ
CURVE 3 (cont.)	
0.700	0.935
1.0	0.915
1.2	0.920
1.4	0.920
1.6	0.920
1.8	0.910
2.0	0.900
CURVE 4	T ~ 298
0.326	0.340
0.332	0.463
0.338	0.526
0.344	0.550
0.352	0.559*
0.359	0.562
0.367	0.559
0.372	0.564
0.374	0.578*
0.386	0.838
0.390	0.878*

λ	ρ
CURVE 4 (cont.)	
0.398	0.907
0.409	0.927
0.424	0.941
0.440	0.951*
0.449	0.953*
0.457	0.955*
0.480	0.955
0.502	0.958
0.553	0.955*
0.614	0.957
0.669	0.954
0.687	0.951*
0.695	0.948
CURVE 5	T ~ 298
0.325	0.26
0.375	0.38
0.450	0.925
0.600	0.95*
0.700	0.94

λ	ρ
CURVE 5 (cont.)	
1.0	0.915*
1.2	0.920*
1.4	0.920*
1.6	0.915
1.8	0.910*
2.0	0.90*
CURVE 6	T ~ 298
0.326	0.269
0.331	0.325
0.338	0.368
0.343	0.378
0.352	0.381
0.368	0.378
0.372	0.380*
0.375	0.388
0.382	0.580
0.387	0.710
0.395	0.806
0.403	0.856

λ	ρ
CURVE 6 (cont.)	
0.412	0.886
0.425	0.913
0.440	0.930
0.455	0.941*
0.469	0.948
0.501	0.953*
0.534	0.958
0.607	0.960
0.669	0.958*
0.696	0.956*
CURVE 7	T ~ 298
0.325	0.25
0.375	0.34
0.450	0.91
0.600	0.93
0.700	0.92
1.0	0.89
1.2	0.885
1.4	0.88

λ	ρ
CURVE 7 (cont.)	
1.6	0.87
1.8	0.84
2.0	0.815
CURVE 8	T ~ 298
0.326	0.231
0.330	0.266
0.337	0.291
0.345	0.299
0.358	0.299
0.368	0.297*
0.372	0.299
0.375	0.307*
0.377	0.322
0.386	0.611
0.392	0.705
0.401	0.774
0.412	0.825
0.426	0.857
0.442	0.878

λ	ρ
CURVE 8 (cont.)	
0.458	0.890
0.483	0.893*
0.552	0.903
0.620	0.901
0.663	0.896
0.695	0.892

* Not shown on plot

SPECIFICATION TABLE NO. 240 NORMAL SPECTRAL ABSORPTANCE OF ZINC TITANATE $ZnTiO_3$

Curve No.	Ref. No.	Year	Temperature Range, K	Geometry θ	Reported Error, %	Composition (weight percent), Specifications and Remarks
1*	277	1966	~298	~0°		Powder "as received"; from New Jersey Zinc Co; compacted at 50-60 psi; computed from spectral reflectance data; [Authors' designation: specimen 7210].
2*	277	1966	~298	~0°		Above specimen and conditions except exposed to 1000 ESH uv radiation at solar factor 5 suns.
3*	277	1966	~298	~0°		Powder "as received"; from New Jersey Zinc Co; compacted at 50-60 psi; computed from spectral reflectance data; [Authors' designation: specimen 7208].
4*	277	1966	~298	~0°		Above specimen and conditions except exposed to 1000 ESH uv radiation at solar factor 5 suns.

DATA TABLE NO. 240 NORMAL SPECTRAL ABSORPTANCE OF ZINC TITANATE $ZnTiO_3$

[Temperature, T, K; Absorptance, α]

T	α
CURVE 1*	
298	0.147
CURVE 2*	
298	0.192
CURVE 3*	
298	0.111
CURVE 4*	
298	0.191

* No plot given

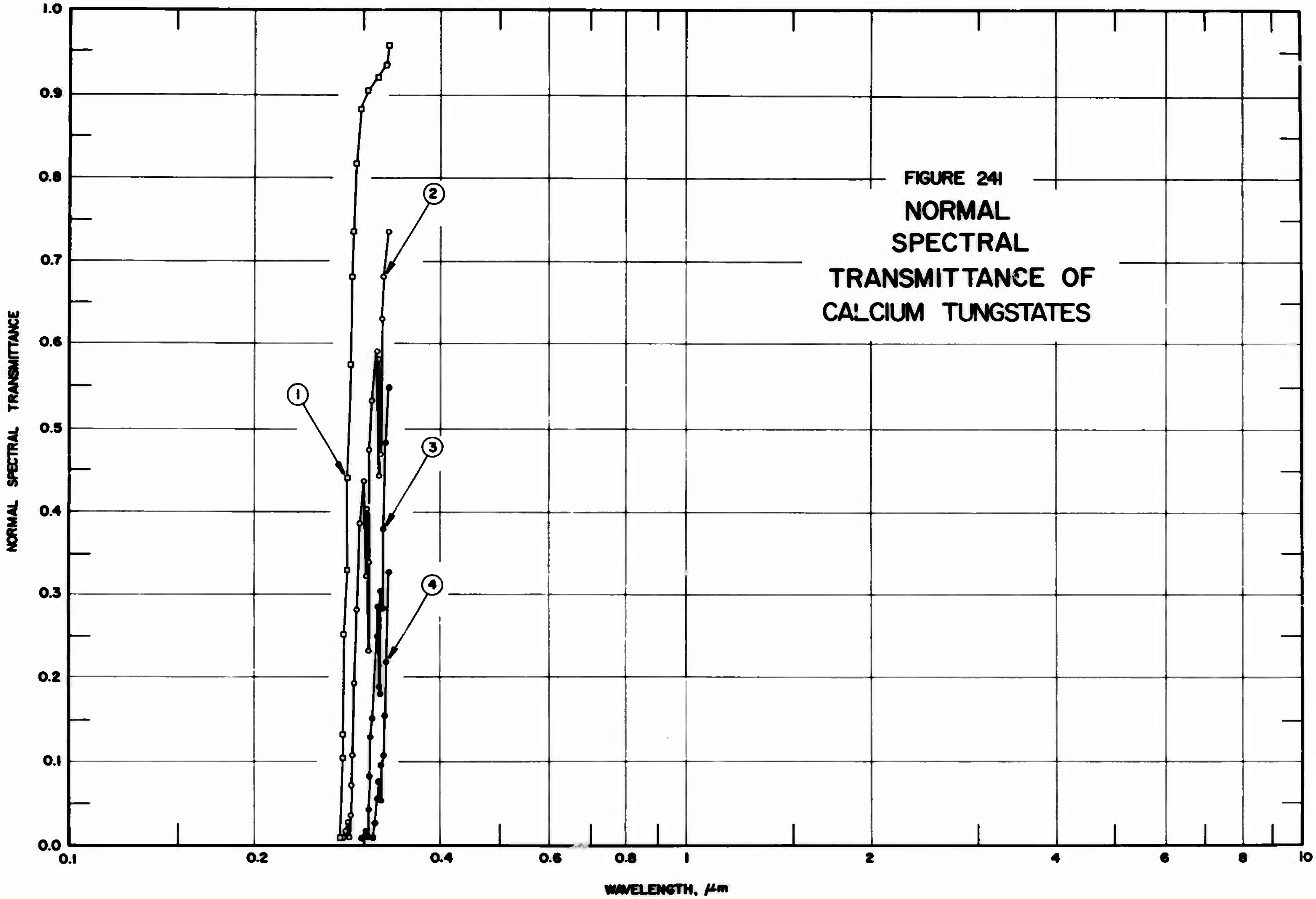


FIGURE 241
NORMAL
SPECTRAL
TRANSMITTANCE OF
CALCIUM TUNGSTATES
NORMAL SPECTRAL TRANSMITTANCE
WAVELENGTH, μm
1.0
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0.0
0.1
0.2
0.4
0.6
0.8
1
2
4
6
8
10
1
2
3
4

SPECIFICATION TABLE NO. 241 NORMAL SPECTRAL TRANSMITTANCE OF CALCIUM TUNGSTATES

Curve No.	Ref. No.	Year	Temperature, K	Wavelength Range, μm	Geometry θ	Geometry θ'	Geometry ω'	Reported Error, %	Composition (weight percent), Specifications, and Remarks
1	150	1967	77	0.2743-0.3306	~0°	~0°			$CaWO_4$; crystal grown from melt of optical-grade commercial $CaWO_4$ powder; 6 mm thickness; optically ground and polished; data extracted from smooth curve.
2	150	1967	77	0.2794-0.3300	~0°	~0°			$Ca_{0.99}Tb_{0.1}Nb_{0.1}W_{0.99}O_4$ (6 mm thick); crystal grown from melts of optical-grade commercial $CaWO_4$ powder, 99.9 pure Tb_2O_3, and optical-grade Nb_2O_5; optically ground and polished; data extracted from smooth curve.
3	150	1967	77	0.2996-0.3300	~0°	~0°			$Ca_{0.98}Tb_{0.01}Na_{0.01}WO_4$ (6 mm thick); crystal grown from melts of optical-grade commercial $CaWO_4$ powder, 99.9 pure Tb_2O_3 and reagent grade $Na_2(WO_4)_3$; optically ground and polished; data extracted from smooth curve.
4	150	1967	77	0.3105-0.3309	~0°	~0°			$Ca_{0.985}Tb_{0.01}X_{0.005}WO_4$ (X = vacancy); 6 mm thick; crystal grown from melts of optical-grade commercial $CaWO_4$ powder and 99.9 pure Tb_2O_3; vacancy charge-compensated; 6 mm thickness; optically ground and polished; data extracted from smooth curve.

DATA TABLE NO. 241 NORMAL SPECTRAL TRANSMITTANCE OF CALCIUM TUNGSTATES

[Wavelength, λ, μm; Transmittance, τ; Temperature, T, K]

λ	τ	λ	τ	λ	τ	λ	τ	λ	τ	λ	τ	λ	τ
CURVE 1 T = 77		CURVE 2 T = 77		CURVE 2 (cont.)		CURVE 2 (cont.)		CURVE 3 (cont.)		CURVE 3 (cont.)		CURVE 4 (cont.)	
				0.2980	0.389	0.3188	0.526*	0.3023	0.0102*	0.3202	0.180	0.3193	0.0682*
0.2743	0.0101	0.2794	0.0102	0.2999	0.428*	0.3189	0.583	0.3024	0.0107	0.3206	0.303	0.3197	0.0682*
0.2772	0.104	0.2799	0.0136*	0.3009	0.436	0.3195	0.439*	0.3026	0.0112*	0.3210	0.284	0.3200	0.0546
0.2778	0.133	0.2802	0.0161	0.3016	0.435*	0.3198	0.593*	0.3030	0.0105*	0.3213	0.316*	0.3201	0.0679*
0.2787	0.190*	0.2806	0.0191*	0.3017	0.321	0.3204	0.470	0.3032	0.0224*	0.3227	0.380	0.3205	0.0611*
0.2798	0.252	0.2813	0.0245*	0.3018	0.344*	0.3206	0.589*	0.3036	0.0321*	0.3248	0.436*	0.3205	0.0912*
0.2811	0.330	0.2821	0.0286	0.3023	0.404	0.3214	0.598*	0.3042	0.0448	0.3271	0.483	0.3207	0.0951
0.2824	0.394*	0.2827	0.0102	0.3024	0.231	0.3216	0.632	0.3056	0.0668*	0.3300	0.550	0.3211	0.0927*
0.2834	0.442	0.2833	0.0271*	0.3024	0.266*	0.3237	0.681	0.3065	0.0838			0.3214	0.108
0.2851	0.525*	0.2845	0.0118*	0.3026	0.265*	0.3260	0.703*	0.3079	0.106*	CURVE 4 T = 77		0.3220	0.132*
0.2862	0.578	0.2845	0.0351	0.3027	0.299*	0.3282	0.721*	0.3093	0.130			0.3229	0.156
0.2874	0.630*	0.2849	0.0302*	0.3030	0.340	0.3300	0.738	0.3105	0.151			0.3244	0.186*
0.2887	0.682	0.2850	0.0469*	0.3032	0.385*			0.3122	0.179*	0.3105	0.0103	0.3260	0.219
0.2903	0.736	0.2852	0.0711	0.3036	0.414*	CURVE 3 T = 77		0.3139	0.208*	0.3113	0.0155*	0.3281	0.266*
0.2923	0.785*	0.2858	0.0769*	0.3044	0.451*			0.3162	0.250	0.3118	0.0192*	0.3309	0.329
0.2942	0.820	0.2865	0.0735*	0.3057	0.475			0.3183	0.286	0.3127	0.0254		
0.2969	0.859*	0.2880	0.109	0.3078	0.511*	0.2996	0.0101	0.3187	0.275*	0.3138	0.0344*		
0.2999	0.885	0.2889	0.145*	0.3102	0.535	0.3003	0.0141*	0.3190	0.188	0.3150	0.0452*		
0.3056	0.908	0.2906	0.192	0.3173	0.592	0.3006	0.0165*	0.3191	0.291*	0.3165	0.0596		
0.3119	0.920*	0.2918	0.229*	0.3180	0.556*	0.3014	0.0170	0.3193	0.297*	0.3180	0.0745*		
0.3192	0.923	0.2937	0.281	0.3185	0.493*	0.3017	0.0153*	0.3195	0.178*	0.3186	0.0769		
0.3270	0.938	0.2958	0.337*	0.3186	0.444	0.3019	0.0103*	0.3199	0.281*	0.3192	0.0555*		
0.3306	0.959												

* Not shown on plot

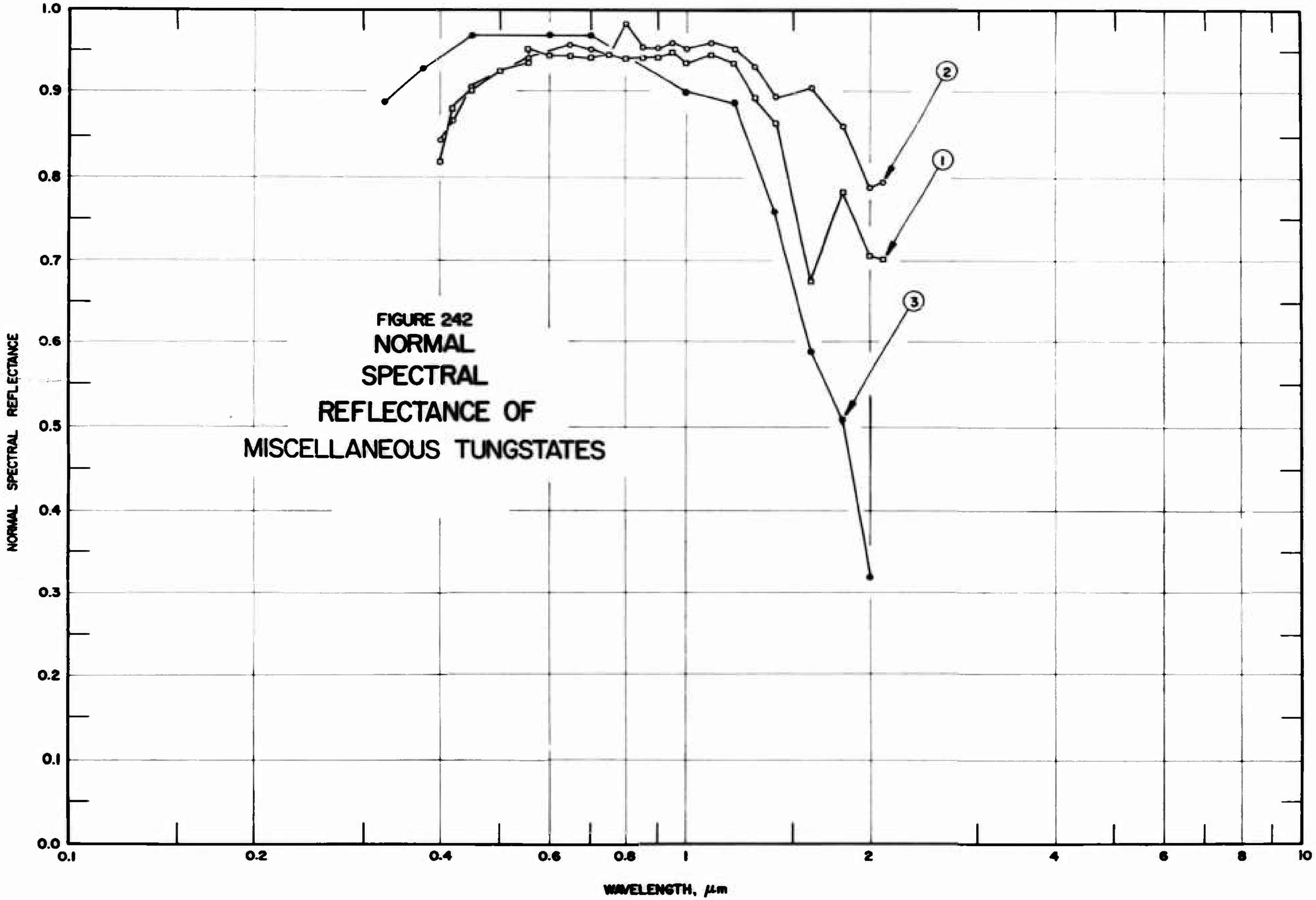


FIGURE 242
NORMAL
SPECTRAL
REFLECTANCE OF
MISCELLANEOUS TUNGSTATES

SPECIFICATION TABLE NO. 242 NORMAL SPECTRAL REFLECTANCE OF MISCELLANEOUS TUNGSTATES

Curve No.	Ref. No.	Year	Temperature, K	Wavelength Range, μm	θ	Geometry θ'	ω'	Reported Error, %	Composition (weight percent), Specifications, and Remarks
1	120	1962	298	0.4-2.1	0°		2π		BARIUM TUNGSTATE, $BaWO_4$; converted from R(2π, 0°); [Authors' designation: Sample No. X 53].
2	120	1962	298	0.4-2.1	0°		2π		LEAD TUNGSTATE, $PbWO_4$; converted from R(2π, 0°); [Authors' designation: Sample No. Y 11].
3	92	1964	298	0.325-2.0	~0°		2π		SODIUM TUNGSTATE, $Na_2WO_4 \cdot H_2O$; compacted powder; MgO reference standard; [Authors' designation: sample 27].

DATA TABLE NO. 242 NORMAL SPECTRAL REFLECTANCE OF MISCELLANEOUS TUNGSTATES

[Wavelength, λ, μm; Reflectance, ρ; Temperature, T, K]

λ	ρ	λ	ρ	λ	ρ
CURVE 1 T = 298		CURVE 2 T = 298		CURVE 3 T = 298	
0.4	0.82	0.4	0.848	0.325	0.89
0.42	0.884	0.42	0.87	0.375	0.93
0.45	0.901	0.45	0.907	0.450	0.97
0.5	0.927	0.5	0.927*	0.600	0.97
0.55	0.936	0.55	0.936*	0.700	0.97
0.55	0.952	0.55	0.952*	1.0	0.90
0.55	0.928*	0.55	0.941	1.2	0.89
0.6	0.949	0.6	0.949*	1.4	0.76
0.65	0.948	0.65	0.958	1.6	0.59
0.7	0.943	0.7	0.953	1.8	0.51
0.75	0.948	0.75	0.948*	2.0	0.32
0.8	0.943	0.8	0.985		
0.85	0.946	0.85	0.955		
0.9	0.944	0.9	0.953		
0.95	0.950	0.95	0.960		
1.0	0.938	1.0	0.953		
1.1	0.949	1.1	0.960		
1.2	0.937	1.2	0.952		
1.3	0.894	1.3	0.931		
1.4	0.869	1.4	0.898		
1.6	0.676	1.6	0.907		
1.8	0.785	1.8	0.864		
2.0	0.708	2.0	0.790		
2.1	0.703	2.1	0.797		

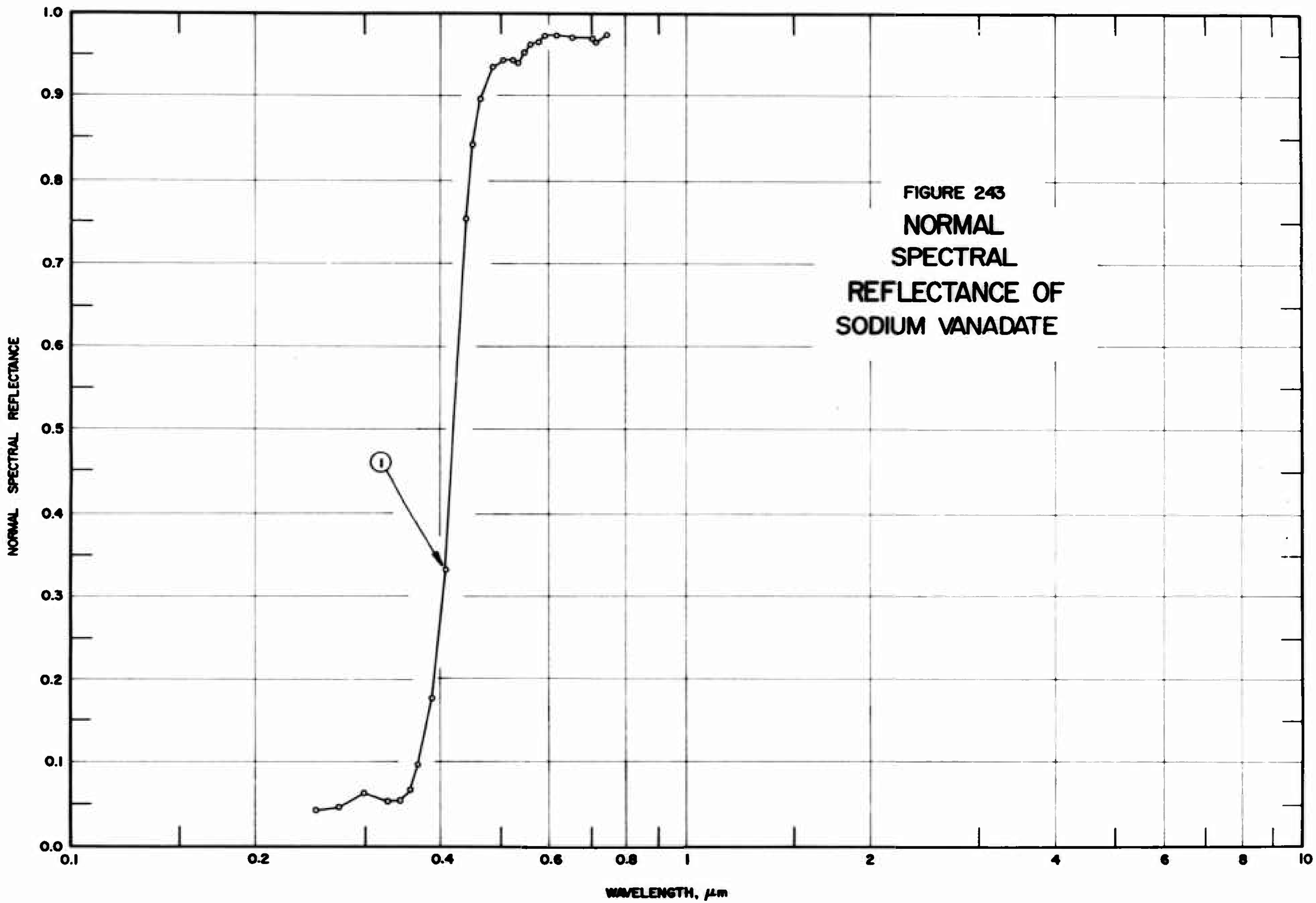


FIGURE 243
NORMAL SPECTRAL REFLECTANCE OF SODIUM VANADATE

SPECIFICATION TABLE NO. 243 NORMAL SPECTRAL REFLECTANCE OF SODIUM VANADATE $NaVO_3$

Curve No.	Ref. No.	Year	Temperature, K	Wavelength Range, μm	Geometry θ	θ'	ω'	Reported Error, %	Composition (weight percent), Specifications, and Remarks
1	206	1967	298	0.250-0.741	0°		2 π		Data extracted from smooth curve.

DATA TABLE NO. 243 NORMAL SPECTRAL REFLECTANCE OF SODIUM VANADATE $NaVO_3$

[Wavelength, λ, μm; Reflectance, ρ; Temperature, T, K]

λ	ρ
CURVE 1 T = 298	
0.250	0.044
0.273	0.048
0.300	0.062
0.328	0.053
0.343	0.054
0.356	0.068
0.368	0.098
0.386	0.178
0.407	0.333
0.440	0.754
0.450	0.843
0.462	0.898
0.489	0.937
0.505	0.944
0.521	0.944
0.531	0.942
0.546	0.955
0.560	0.963
0.577	0.967
0.590	0.974
0.615	0.974
0.619	0.970*
0.626	0.975*
CURVE 1 (cont.)	
0.656	0.972
0.701	0.972
0.712	0.968
0.729	0.970*
0.741	0.975

* Not shown on plot.

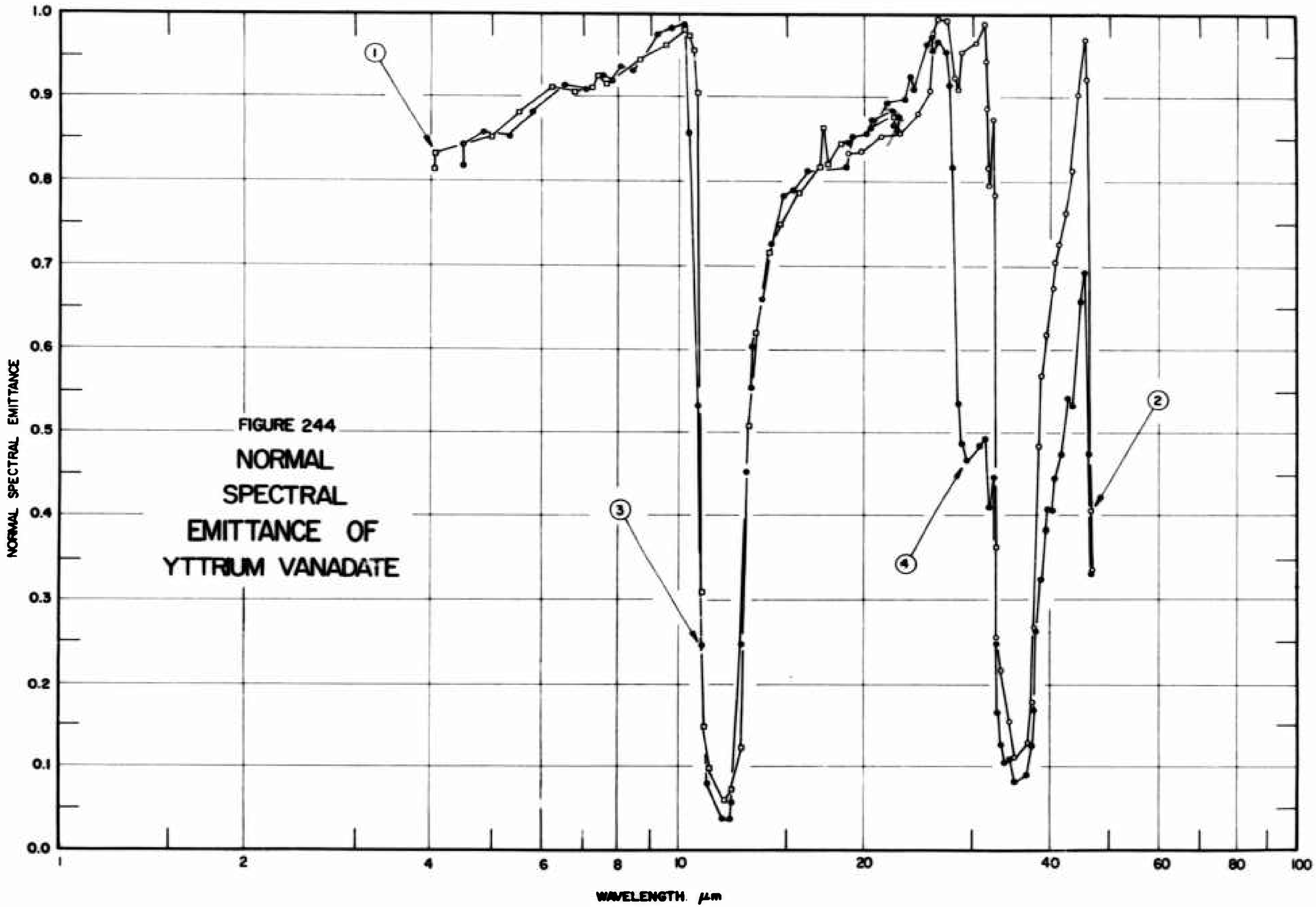


FIGURE 244
NORMAL SPECTRAL EMITTANCE OF YTTRIUM VANADATE

SPECIFICATION TABLE NO. 244 NORMAL SPECTRAL EMITTANCE OF YTTRIUM VANADATE YVO_4

Curve No.	Ref. No.	Year	Temperature, K	Wavelength Range, μm	Geometry θ	Reported Error, %	Composition (weight percent), Specifications, and Remarks
1	374	1968	77	4.05-22.2	0°		Single crystals from Vinor Laboratories; cut perpendicular to the c-axis; polished.
2	374	1968	77	18.8-46.6	0°		Above specimen and condition.
3	374	1968	77	4.50-22.7	0°		Similar to the above specimen and conditions except crystal cut parallel to c-axis.
4	374	1963	77	18.9-46.4	0°		Above specimen and conditions.

DATA TABLE NO. 244 NORMAL SPECTRAL EMITTANCE OF YTTRIUM VANADATA YVO_4

[Wavlength, λ, μm; Emittance, ϵ; Temperature, T, K]

λ	ϵ
CURVE 1	**T = 77**
4.05	0.814
4.0[illegible]	0.832
5.00	0.851
5.51	0.881
6.27	0.912
6.80	0.907
7.26	0.912
7.42	0.927
7.69	0.917
8.68	0.948
9.51	0.964
10.2	0.983
10.4	0.979
10.5	0.958
10.6	0.905
10.8	0.310
11.0	0.149
11.2	0.097
11.8	0.060
12.3	0.071
12.6	0.121
13.0	0.509
13.4	0.620
14.0	0.715
CURVE 1 (cont.)	
14.6	0.750
15.6	0.788
17.0	0.818
17.0	0.861
17.1	0.820
18.4	0.843
22.2	0.876
CURVE 2	**T = 77**
18.8	0.833
19.8	0.835
21.3	0.852
22.9	0.857
24.3	0.880
25.5	0.908
25.7	0.880
26.3	0.899
27.1	0.894
28.0	0.922
28.2	0.910
28.9	0.955
30.2	0.968
31.1	0.990
CURVE 2 (cont.)	
31.3	0.944
31.5	0.888
31.6	0.814
31.8	0.796
32.1	0.873
32.3	0.783
32.7	0.362
32.9	0.255
33.1	0.219
34.2	0.151
35.0	0.110
36.8	0.127
37.1	0.179
37.4	0.268
38.2	0.482
38.8	0.570
39.4	0.619
40.3	0.673
40.7	0.678*
40.8	0.706
41.4	0.725
42.0	0.762
42.7	0.774*
43.2	0.811
44.1	0.901
CURVE 2 (cont.)	
44.7	0.919*
45.4	0.971
45.7	0.921
46.4	0.405
46.6	0.336
CURVE 3	**T = 77**
4.50	0.819
4.50	0.841
4.81	0.857
5.31	0.852
5.80	0.881
6.56	0.915
7.10	0.910
7.58	0.928
7.85	0.920
8.05	0.938
8.41	0.932
9.25	0.979
9.77	0.985
10.3	0.990
10.4	0.856
10.7	0.532
CURVE 3 (cont.)	
10.8	0.245
10.9	0.144*
11.1	0.080
11.7	0.039
12.0	0.039
12.2	0.057
12.6	0.246
12.9	0.452
13.1	0.555
13.3	0.602
13.6	0.660
14.2	0.726
14.8	0.781
15.4	0.790
16.2	0.812
17.3	0.818*
18.7	0.818
19.1	0.851
20.3	0.856
20.5	0.871
20.8	0.867*
21.6	0.884*
22.1	0.885
22.2	0.864
22.6	0.860
22.7	0.878
CURVE 4	**T = 77**
18.9	0.846
20.5	0.861
21.7	0.894
22.2	0.867*
23.2	0.897
23.8	0.926
24.0	0.910
25.1	0.965
25.6	0.978
25.9	0.957
26.2	0.970
27.0	0.958
27.3	0.914
27.6	0.819
28.4	0.535
28.8	0.487
29.3	0.468
30.7	0.485
31.2	0.492
31.8	0.410
32.3	0.449
32.6	0.248
32.9	0.163
33.2	0.124
CURVE 4 (cont.)	
33.7	0.101
34.3	0.108
35.0	0.082
36.5	0.090
37.0	0.124
37.5	0.169
37.8	0.262
38.5	0.325
39.3	0.382
39.5	0.409
40.0	0.407
40.6	0.426*
40.7	0.445
41.8	0.474
42.9	0.541
43.1	0.532
44.9	0.658
45.3	0.693
46.0	0.474
46.4	0.331

* Not shown on plot

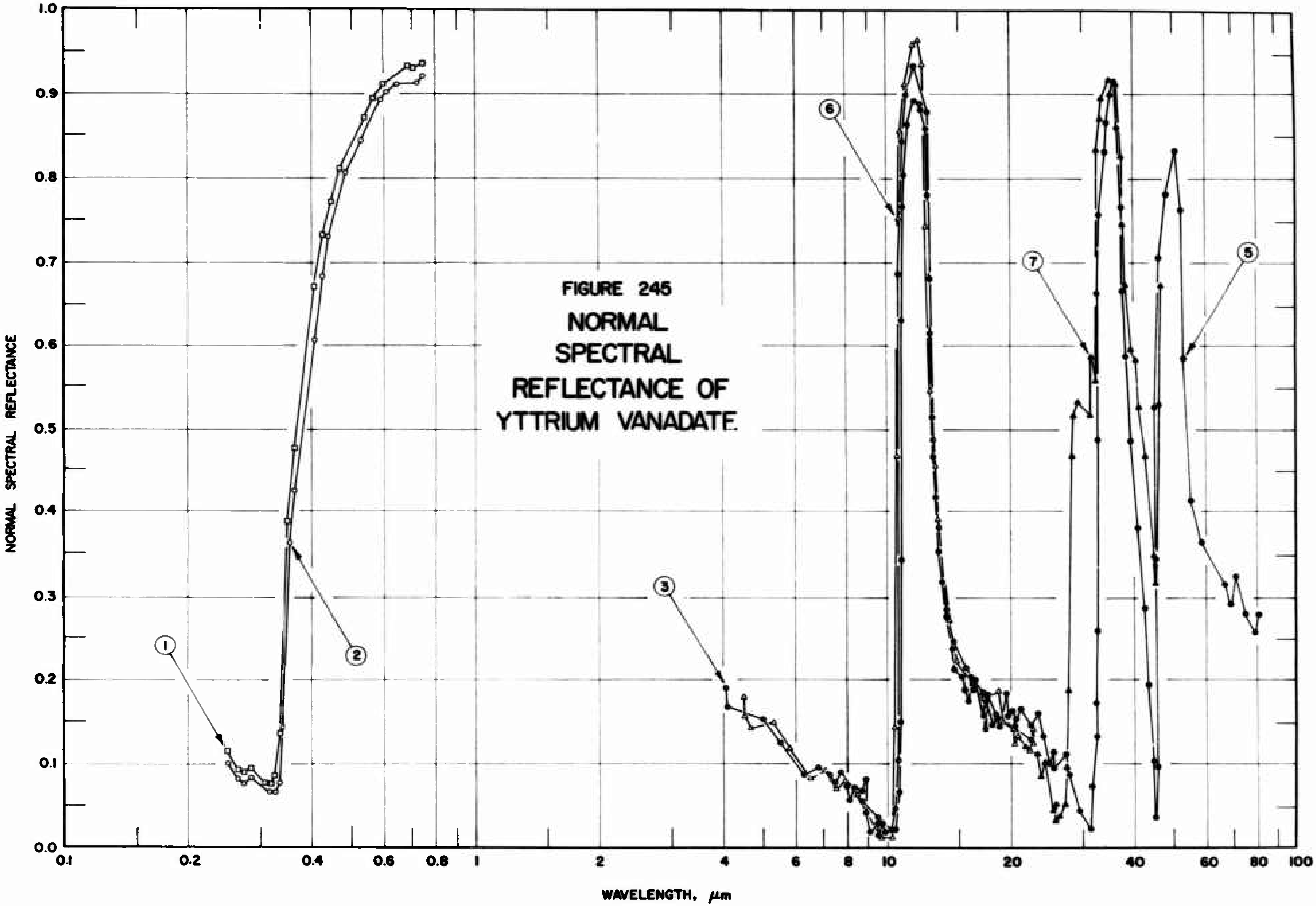


FIGURE 245
NORMAL
SPECTRAL
REFLECTANCE OF
YTTRIUM VANADATE
NORMAL SPECTRAL REFLECTANCE
WAVELENGTH, μm
1.0
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0.0
0.1
0.2
0.4
0.6
0.8
1
2
4
6
8
10
20
40
60
80
100
1
2
3
5
6
7

SPECIFICATION TABLE NO. 245 NORMAL SPECTRAL REFLECTANCE OF YTTRIUM VANADATE YVO_4

Curve No.	Ref. No.	Year	Temperature, K	Wavelength Range, μm	Geometry θ	θ'	ω'	Reported Error, %	Composition (weight percent), Specifications, and Remarks
1	206	1967	298	0.250-0.748	0°		2 π		Prepared by blending the mixed Y_2O_3 with V_2O_5 or NH_4VO_3 and fixed at 1273 K for several hrs then cooled and ground; data extracted from smooth curve.
2	206	1967	423	0.250-0.751	0°		2 π		Above specimen and conditions.
3	374	1968	77	4.05-22.2	0°	0°			Single crystal from Vinor Laboratory; cut perpendicular to the optic axis; polished; author measured ϵ and assumed $\rho = 1-\epsilon$.
4*	374	1968	77	18.8-46.6	0°	0°			Above specimen and conditions.
5	374	1968	77	8.00-80.6	0°	0°			Above specimen and conditions except reflectance measured directly.
6	374	1968	350	4.50-22.7	0°	0°			Similar to curve 3 specimen and conditions except cut parallel to c-axis.
7	374	1968	350	18.9-46.4	0°	0°			Above specimen and conditions.

* Not shown on plot

DATA TABLE NO. 245 NORMAL SPECTRAL REFLECTANCE OF YTTRIUM VANADATE YVO_4

[Wavelength, λ, μm; Reflectance, ρ; Temperature, T, K]

CURVE 1
T = 298

λ	ρ
0.250	0.115
0.265	0.092
0.272	0.090
0.283	0.094
0.308	0.079
0.319	0.077
0.325	0.086
0.333	0.136
0.350	0.389
0.364	0.477
0.407	0.671
0.428	0.733
0.445	0.771
0.469	0.812
0.492	0.839*
0.540	0.873
0.566	0.896
0.600	0.913
0.631	0.918*
0.648	0.925*
0.674	0.928*
0.699	0.935
0.713	0.931
0.735	0.932*
0.748	0.938

CURVE 2
T = 423

λ	ρ
0.250	0.100
0.263	0.083
0.272	0.078
0.283	0.082
0.312	0.067
0.325	0.067
0.331	0.078
0.340	0.143
0.354	0.361
0.363	0.425
0.404	0.607
0.422	0.683
0.440	0.731
0.459	0.771*
0.484	0.807
0.506	0.828*
0.532	0.845
0.555	0.874*
0.593	0.895
0.599	0.895*
0.610	0.901
0.627	0.902*
0.647	0.912
0.674	0.911*
0.698	0.917*
0.726	0.913
0.740	0.919*
0.751	0.922

CURVE 3
T = 77

λ	ρ
4.05	0.190
4.06	0.169
5.00	0.152
5.51	0.126
6.27	0.087
6.80	0.096
7.26	0.087
7.42	0.077
7.69	0.090
8.68	0.056
9.51	0.038
10.2	0.021
10.4	0.026*
10.5	0.049
10.6	0.101
10.8	0.689
11.0	0.845
11.2	0.900
11.8	0.935
12.3	0.926*
12.6	0.880
13.0	0.489
13.4	0.380
14.0	0.286
14.6	0.248
15.6	0.213
17.0	0.185
17.0	0.142
17.1	0.183
18.4	0.160
22.2	0.130

CURVE 4*
T = 77

λ	ρ
18.8	0.175
19.8	0.170
21.3	0.159
22.9	0.151
24.3	0.130
25.5	0.097
25.7	0.125
26.3	0.108
27.1	0.113
28.0	0.085
28.2	0.094
28.9	0.048
30.2	0.033
31.1	0.011
31.3	0.048
31.5	0.113
31.6	0.189
31.8	0.203
32.1	0.131
32.3	0.211
32.7	0.647
32.9	0.761
33.1	0.789
34.2	0.862
35.0	0.896
36.8	0.884
37.1	0.836
37.4	0.752
38.2	0.533
38.8	0.437
39.4	0.384
40.3	0.325
40.7	0.330
40.8	0.300
41.4	0.288
42.0	0.243
42.7	0.231
43.2	0.196
44.1	0.109
44.7	0.096
45.4	0.039
45.7	0.081
46.4	0.604
46.6	0.674

CURVE 5
T = 77

λ	ρ
8.00	0.074
8.10	0.057
8.19	0.059*
8.30	0.065*
8.38	0.072
8.48	0.071*
8.59	0.071*
8.68	0.068
8.78	0.068*
8.88	0.081
8.98	0.041
9.07	0.020
9.17	0.019*
9.28	0.020*
9.36	0.025*
9.51	0.030
9.57	0.017
9.68	0.030
9.79	0.028*
9.88	0.026*
9.99	0.020
10.1	0.021*
10.2	0.021*
10.3	0.021
10.4	0.033*
10.5	0.036*
10.6	0.066
10.7	0.150
10.8	0.344
10.9	0.632
11.0	0.766
11.1	0.806
11.1	0.816*
11.2	0.829*
11.3	0.865
11.4	0.865*
11.5	0.871*
11.6	0.878*
11.7	0.893
11.8	0.893*
11.9	0.897*
12.0	0.895*
12.1	0.890
12.2	0.881
12.3	0.891*
12.3	0.880*
12.5	0.860
12.6	0.836*
12.7	0.783
12.8	0.681
12.9	0.618
13.0	0.514
13.0	0.468
13.2	0.418
13.3	0.406*
13.4	0.352
13.6	0.345*
13.6	0.329*
13.7	0.320
13.8	0.309*
13.9	0.284*
14.0	0.279
14.1	0.262*
14.2	0.264*
14.3	0.243*
14.4	0.237
14.6	0.233*
14.6	0.211
14.7	0.219*
14.9	0.219*
15.1	0.204*
15.2	0.201
15.3	0.198*
15.5	0.189
15.6	0.193*
15.8	0.197*
15.9	0.175
16.0	0.201
16.1	0.187
16.3	0.200
16.3	0.161*
16.6	0.182*
16.7	0.160*
17.0	0.185*
17.1	0.157
17.4	0.174
17.8	0.173*
18.0	0.148
18.1	0.156*
18.1	0.141*
18.5	0.151
18.7	0.145*
18.8	0.161*
18.9	0.144
19.2	0.176*
19.4	0.176*
19.6	0.182
19.9	0.157
20.2	0.162
20.6	0.160*
20.8	0.164*
20.8	0.153
21.3	0.165
21.3	0.155*
22.0	0.153*
22.3	0.146
22.6	0.155*
22.7	0.142*
23.0	0.136*
23.4	0.144*
23.6	0.160
24.0	0.133
24.1	0.144*
24.3	0.133*
25.0	0.131*
25.0	0.100
25.5	0.114
25.5	0.096
26.0	0.115*
26.5	0.109*
27.2	0.113
27.7	0.089
27.7	0.107*
28.2	0.096*
28.2	0.068*
29.2	0.045
30.3	0.033*
31.3	0.021
31.5	0.039*
31.5	0.073
32.4	0.132
31.9	0.146*
32.3	0.171*
32.1	0.171
32.1	0.214*
32.7	0.260
32.8	0.489
32.8	0.664
33.0	0.759
33.2	0.796*
33.7	0.814*
34.1	0.831
34.6	0.852*
34.0	0.869
34.7	0.869
34.7	0.884*
34.7	0.889*
35.3	0.900
36.0	0.918
36.6	0.899*
36.9	0.893*
36.8	0.860
37.2	0.849*
37.5	0.768
38.0	0.719*
37.9	0.669
38.3	0.614*
38.3	0.587
38.6	0.577*
38.8	0.544*
38.9	0.518*
39.5	0.486
40.2	0.456*
40.7	0.426*
40.8	0.397*
41.2	0.380
41.8	0.348*
42.0	0.328*
42.2	0.314*
42.2	0.288
42.9	0.264*
43.3	0.243*
43.3	0.221*
43.3	0.193
44.1	0.172*
43.9	0.138*
44.1	0.103
44.1	0.070*
44.1	0.042*
44.8	0.037
45.3	0.199
45.5	0.346
45.5	0.526
45.5	0.613*
45.7	0.662*
45.7	0.692*
46.5	0.707
47.4	0.741*
48.1	0.783
48.8	0.831*
51.0	0.835
52.4	0.762
53.2	0.585
54.6	0.436*
55.9	0.412
58.8	0.380*
58.1	0.363
61.3	0.343*
62.9	0.327*

* Not shown on plot

DATA TABLE NO. 245 (Continued)

λ	ρ	λ	ρ	λ	ρ
CURVE 5 (cont.)		CURVE 6 (cont.)		CURVE 7 (cont.)	
66.7	0.327*	20.3	0.141	40.0	0.596*
66.2	0.317	20.5	0.125	40.6	0.582
71.4	0.326	20.8	0.133	40.7	0.554*
69.9	0.312*	21.6	0.121*	41.8	0.529
69.4	0.291	22.1	0.117	42.9	0.467
75.8	0.280	22.2	0.133*	43.1	0.473*
80.6	0.280	22.6	0.141	44.9	0.350
79.4	0.259	22.7	0.126	45.3	0.318
				46.0	0.530
CURVE 6 T = 77		CURVE 7 T = 77		46.4	0.672
4.50	0.180	18.9	0.159*		
4.50	0.158	20.5	0.147		
4.81	0.143	21.7	0.120		
5.31	0.150	22.2	0.144*		
5.80	0.120	23.2	0.112		
6.56	0.083	23.8	0.085		
7.10	0.091	24.0	0.101		
7.58	0.070	25.1	0.046		
7.85	0.080	25.6	0.032		
8.05	0.066*	25.9	0.052		
8.41	0.064	26.2	0.039		
9.25	0.025*	27.0	0.051		
9.77	0.011	27.3	0.096		
10.3	0.011	27.6	0.189		
10.4	0.144	28.4	0.466		
10.7	0.469	28.8	0.516		
10.8	0.753	29.3	0.533		
10.9	0.858	30.7	0.525*		
11.1	0.913	31.2	0.517		
11.7	0.960	31.8	0.587		
12.0	0.967	32.3	0.558		
12.2	0.939	32.6	0.758*		
12.6	0.744	32.9	0.836		
12.9	0.546	33.2	0.872		
13.1	0.454	33.7	0.897		
13.3	0.390	34.3	0.894*		
13.6	0.338*	35.0	0.920		
14.2	0.272	36.5	0.914		
14.8	0.221	37.0	0.874*		
15.4	0.208*	37.5	0.829		
16.2	0.190*	37.8	0.746		
17.3	0.178	38.5	0.674		
18.7	0.186	39.3	0.619*		
19.1	0.151	39.5	0.597		

* Not shown on plot

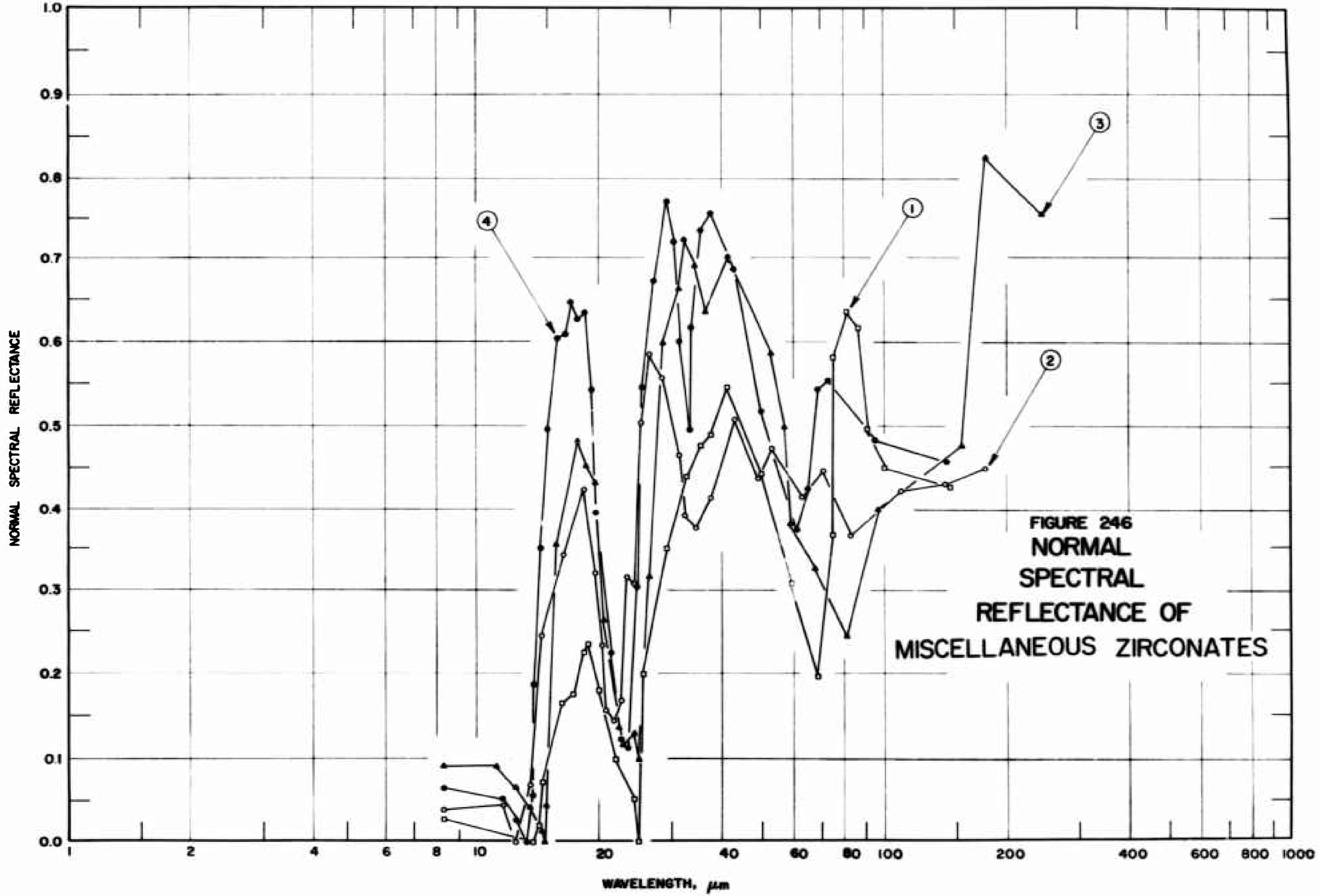


FIGURE 246
NORMAL
SPECTRAL
REFLECTANCE OF
MISCELLANEOUS ZIRCONATES

SPECIFICATION TABLE NO. 246 NORMAL SPECTRAL REFLECTANCE OF MISCELLANEOUS ZIRCONATES

Curve No.	Ref. No.	Year	Temperature, K	Wavelength Range, μm	Geometry θ	Geometry θ'	Geometry ω'	Reported Error, %	Composition (weight percent), Specifications, and Remarks
1	78	1965	~298	8.33-145	~0°	~0°			BARIUM ZIRCONATE, $BaZrO_3$; polished polycrystalline ceramic sample; front-aluminized mirror reference standard; data extracted from smooth curve.
2	78	1965	~298	8.33-357	~0°	~0°			CALCIUM ZIRCONATE, $CaZrO_3$; polished polycrystalline ceramic sample; front-aluminized mirror reference standard; data extracted from smooth curve.
3	78	1965	~298	8.33-244	~0°	~0°			LEAD ZIRCONATE, $PbZrO_3$; polished polycrystalline ceramic sample (>2 mm thick); front-aluminized mirror reference standard; data extracted from smooth curve.
4	78	1965	~298	8.33-141	~0°	~0°			STRONTIUM ZIRCONATE, $SrZrO_3$; polished polycrystalline ceramic sample (>2 mm thick); front-aluminized mirror reference standard; data extracted from smooth curve.

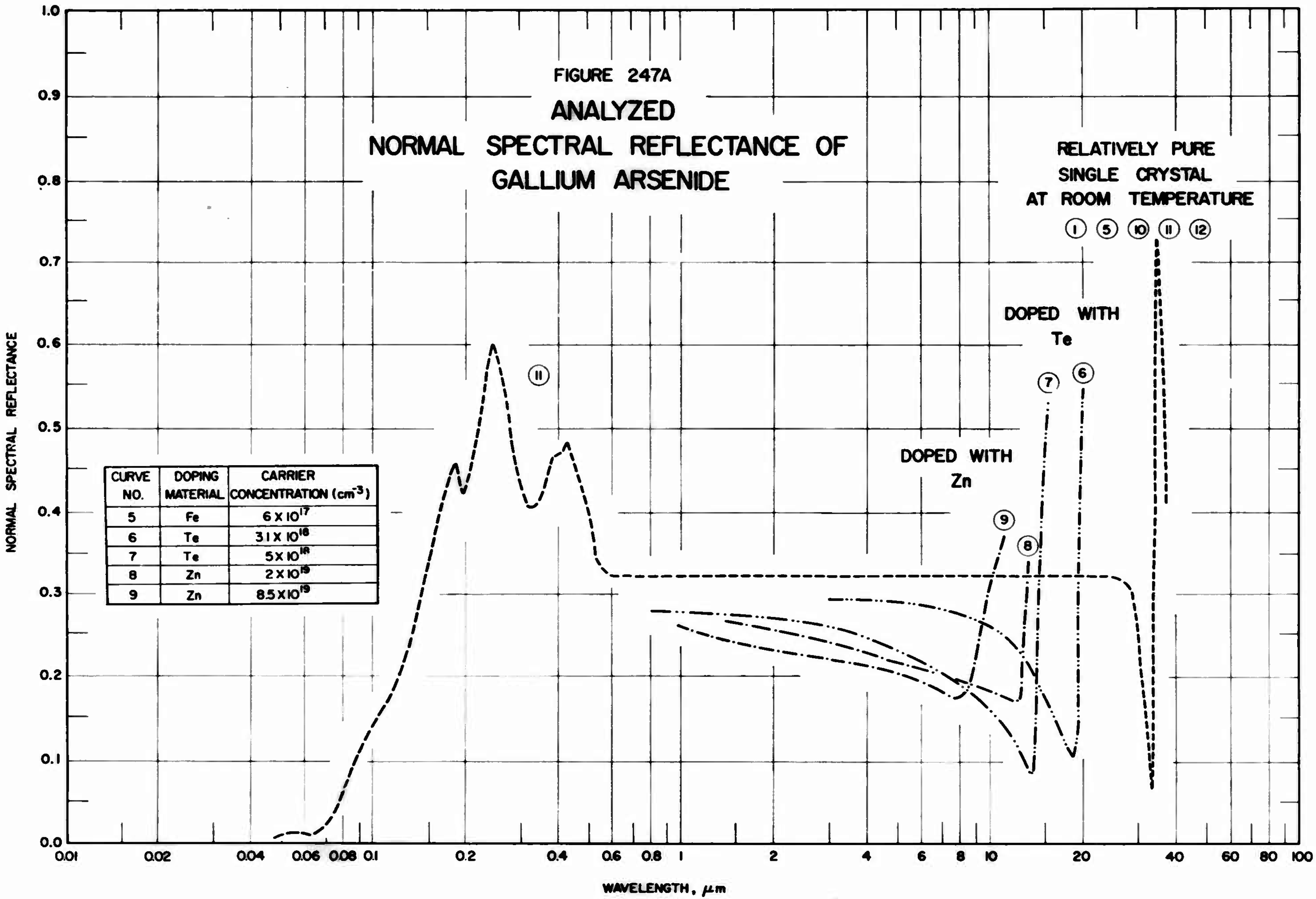
DATA TABLE NO. 246 NORMAL SPECTRAL REFLECTANCE OF MISCELLANEOUS ZIRCONATES

[Wavelength, λ, μm; Reflectance, ρ; Temperature, T, K]

λ	ρ	λ	ρ	λ	ρ	λ	ρ	λ	ρ	λ	ρ
CURVE 1		CURVE 1 (cont.)		CURVE 2 (cont.)		CURVE 3 (cont.)		CURVE 3 (cont.)		CURVE 4 (cont.)	
T ~ 298		81.3	0.636	25.2	0.502	12.5	0.068	68.0	0.326	19.6	0.394
8.33	0.028	86.2	0.619	26.5	0.585	13.4	0.043	80.6	0.245	21.4	0.224
13.8	0.000	91.7	0.499	28.7	0.557	14.3	0.015	96.2	0.400	22.8	0.123
14.2	0.020	100	0.450	31.2	0.464	14.7	0.000	154	0.478	23.2	0.115
14.5	0.071	145	0.426	32.5	0.390	14.9	0.044	179	0.827	24.8	0.301
16.1	0.166			34.6	0.376	15.7	0.335	244	0.755	25.4	0.548
17.2	0.174	CURVE 2		37.6	0.413	17.8	0.483			27.2	0.671
18.3	0.226	T ~ 298		41.7	0.502*	18.5	0.452	CURVE 4		29.3	0.772
18.9	0.236			43.5	0.508	19.5	0.432	T ~ 298		30.4	0.721
20.0	0.180	8.33	0.040	49.0	0.437	20.5	0.263			31.2	0.600
22.0	0.100	11.7	0.045	53.8	0.472	22.3	0.137	8.33	0.065	33.3	0.494
24.2	0.051	12.5	0.000	62.9	0.415	23.0	0.119	11.5	0.052	33.8	0.619
25.0	0.000	13.1	0.000	70.4	0.449	24.2	0.130	12.5	0.027	35.3	0.739
25.6	0.200	13.5	0.070	82.6	0.416	25.0	0.100	13.3	0.000	37.7	0.758
29.1	0.350	14.3	0.245	110	0.471	26.5	0.316	13.6	0.057	42.6	0.687
32.8	0.440	16.3	0.341	141	0.480	28.9	0.600	13.9	0.186	50.0	0.519
35.1	0.476	18.3	0.423	179	0.450	31.2	0.665	14.3	0.350	61.7	0.372
37.5	0.490	19.6	0.320	357	0.434	32.2	0.726	15.0	0.496	65.8	0.424
41.8	0.546	20.2	0.233			34.2	0.692	15.9	0.605	69.9	0.545
50.0	0.442	20.9	0.156	CURVE 3		36.5	0.637	16.5	0.610	73.5	0.553
59.2	0.307	21.6	0.143	T ~ 298		41.7	0.702	17.0	0.646	94.3	0.483
68.5	0.190	22.6	0.168			52.1	0.587	17.7	0.628	141	0.457
75.2	0.369	23.3	0.314	8.33	0.091	57.1	0.500	18.4	0.635		
75.2	0.582	24.2	0.308	11.1	0.091	58.8	0.382	19.1	0.542		

* Not shown on plot

5. NONOXIDE COMPOUNDS



CURVE NO.	DOPING MATERIAL	CARRIER CONCENTRATION (cm^{-3})
5	Fe	6×10^{17}
6	Te	3.1×10^{18}
7	Te	5×10^{18}
8	Zn	2×10^{19}
9	Zn	8.5×10^{19}

FIGURE 247A
ANALYZED
NORMAL SPECTRAL REFLECTANCE OF
GALLIUM ARSENIDE

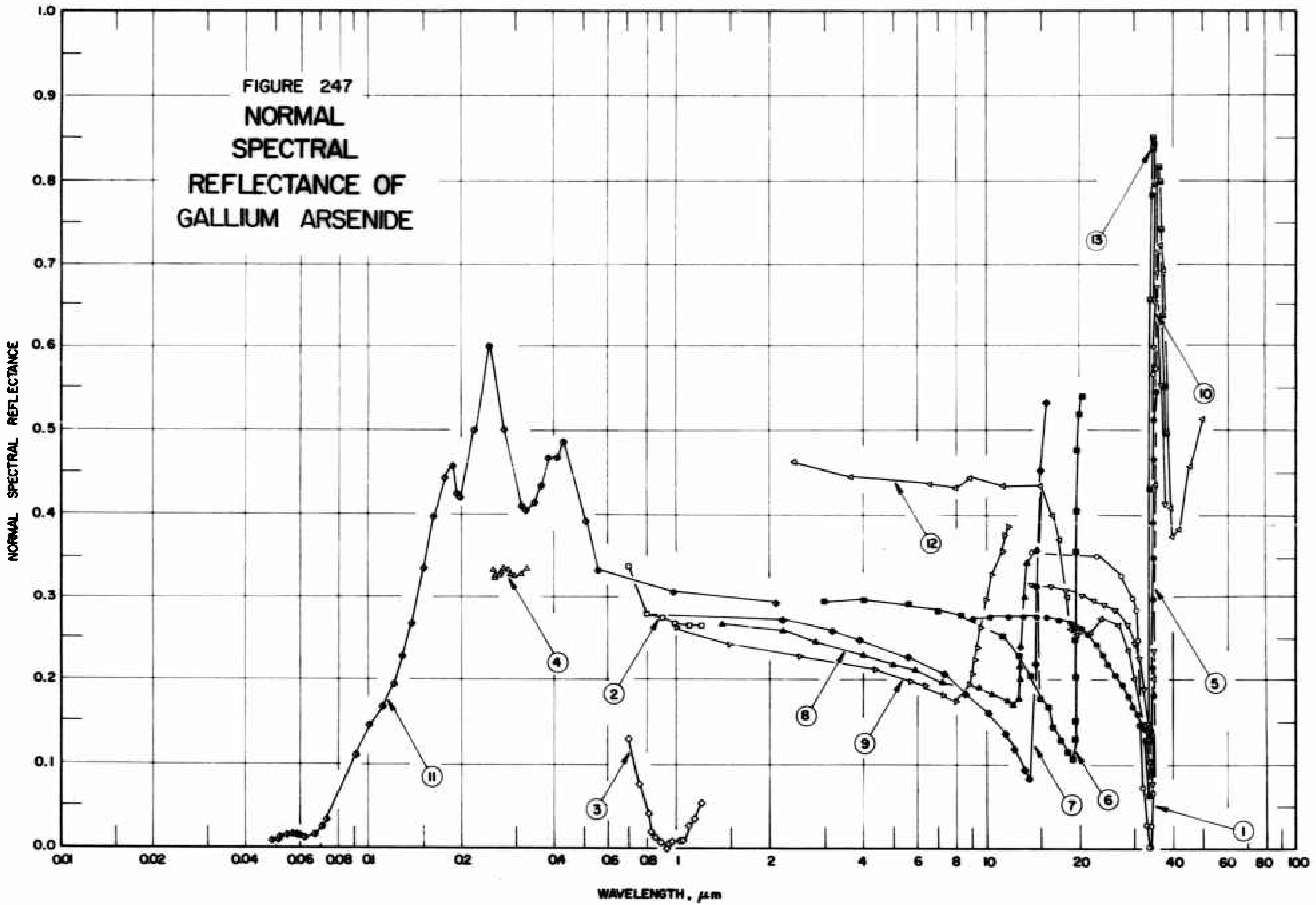


FIGURE 247
NORMAL SPECTRAL REFLECTANCE OF GALLIUM ARSENIDE
NORMAL SPECTRAL REFLECTANCE
WAVELENGTH, μm
0.0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
1.0
0.01
0.02
0.04
0.06
0.08
0.1
0.2
0.4
0.6
0.8
1
2
4
6
8
10
20
40
60
80
100
1
2
3
4
5
6
7
8
9
10
11
12
13

SPECIFICATION TABLE NO. 247 NORMAL SPECTRAL REFLECTANCE OF GALLIUM ARSENIDE GaAs

Curve No.	Ref. No.	Year	Temperature K	Wavelength Range, μm	Geometry θ	θ'	ω	Reported Error, %	Composition (weight percent), Specifications and Remarks
1	83	1962	298	14.0-38.9	~0°	~0°			Data extracted from smooth curve.
2	15	1966	~298	0.700-1.20	~0°	~0°			Zinc doped crystal; polished.
3	15	1966	~298	0.700-1.20	~0°	~0°			Same conditions as above except coated with film of titanium and silicon dioxide mixture, 0.225 μm thickness, index of refraction 1.85.
4	84	1967	290	0.254-0.325	~0°	~0°			Single crystal.
5	85	1967	~298	9.10-35.3	~0°	~0°			n-type single crystal (2 mm thick); doped with Fe; carrier density 6 x 10^{17} cm^{-3}; ground and polished.
6	85	1967	~298	3.00-20.3	~0°	~0°			n-type single crystal (2 mm thick); doped with Te; carrier density 3.1 x 10^{18} cm^{-3}; ground and polished.
7	85	1967	~298	0.800-15.7	~0°	~0°			n-type single crystal (2 mm thick); doped with Te; carrier density 5 x 10^{18} cm^{-3}; ground and polished.
8	85	1967	~298	1.40-14.5	~0°	~0°			p-type single crystal (2 mm thick); doped with Zn; carrier density 2 x 10^{19} cm^{-3}; ground and polished.
9	85	1967	~298	1.00-11.8	~0°	~0°			Similar to above specimen and conditions except carrier density 8.5 x 10^{19} cm^{-3}.
10	86	1965	~298	14.0-37.9	~0°	~0°			Single crystal.
11	299	1963	~298	0.0486-2.10	~0°	~0°			Etched; mineral exposure to air; measured under poor vacuum; data extracted from smooth curve.
12	87	1968	313	2.40-50.0	30°	30°			Synthetic single crystal (0.5 mm thick); flat to ten fringes or better; data extracted from smooth curve; aluminum mirror reference standard.
13	418	1962	~ 4.2	32.3-38.5	10°	10°			Crystal; polished to mirror finish; data extracted from smooth curve.

DATA TABLE NO. 247 NORMAL SPECTRAL REFLECTANCE OF GALLIUM ARSENIDE GaAs

[Wavelength, λ, μm; Reflectance, ρ; Temperature, T, K;

CURVE 1
T = 298

λ	ρ
14.0	0.356
22.8	0.351
27.1	0.327
29.8	0.299
30.3	0.281
30.6	0.248
31.4	0.146
32.0	0.070
32.6	0.028
33.1	0.000
33.7	0.000
34.0	0.027
34.1	0.065
34.7	0.567
35.1	0.775
35.3	0.817
35.6	0.842
35.9	0.861
36.3	0.871
36.7	0.866
37.2	0.842
37.4	0.809
37.8	0.690
38.4	0.464
38.9	0.358

CURVE 2
T ~ 298

λ	ρ
0.700	0.340
0.800	0.278
0.899	0.275
0.997	0.269
1.10	0.267
1.20	0.264

CURVE 3
T ~ 298

λ	ρ
0.700	0.129
0.752	0.075
0.802	0.034
0.826	0.019
0.852	0.011
0.876	0.008

CURVE 3 (cont.)

λ	ρ
0.898	0.005
0.925	0.000
0.949	0.004
0.975	0.006
1.00	0.010
1.05	0.019
1.10	0.026
1.14	0.035
1.20	0.051

CURVE 4
T = 290

λ	ρ
0.254	0.333
0.255	0.328*
0.256	0.322
0.257	0.323*
0.258	0.325*
0.259	0.326
0.261	0.326*
0.262	0.326*
0.264	0.327*
0.266	0.328
0.268	0.331*
0.270	0.331
0.273	0.335*
0.275	0.336
0.278	0.337*
0.279	0.337*
0.282	0.335
0.284	0.332*
0.287	0.330*
0.289	0.328
0.291	0.325*
0.293	0.325*
0.299	0.326
0.303	0.325*
0.308	0.327*
0.314	0.329
0.325	0.337

CURVE 5
T ~ 298

λ	ρ
9.10	0.274
10.2	0.275

CURVE 5 (cont.)

λ	ρ
11.8	0.275
13.1	0.275
14.5	0.275
15.6	0.274
17.1	0.271
18.9	0.268
20.2	0.261
21.1	0.255
22.7	0.240
23.6	0.229
24.9	0.219
26.0	0.205
27.3	0.193
28.6	0.180
29.8	0.167
30.7	0.159
31.5	0.148
32.3	0.140
33.1	0.132
34.0	0.138
34.1	0.181
34.1	0.215
34.2	0.299
34.3	0.350
34.3	0.390
34.4	0.466
34.9	0.512
35.3	0.547

CURVE 6
T ~ 298

λ	ρ
3.00	0.293
4.00	0.296
5.60	0.290
7.00	0.282
8.30	0.277
11.2	0.252
12.7	0.229
13.9	0.205
14.9	0.179
15.7	0.166
16.2	0.141
17.2	0.126
18.1	0.113
19.0	0.106

CURVE 6 (cont.)

λ	ρ
19.3	0.129
19.3	0.151
19.3	0.203
19.3	0.248
19.3	0.311
19.4	0.357
19.5	0.405
19.6	0.477
20.0	0.520
20.3	0.540

CURVE 7
T ~ 298

λ	ρ
0.800	0.278
2.20	0.272
3.20	0.259
3.90	0.249
5.60	0.226
7.30	0.208
8.60	0.183
10.1	0.160
11.5	0.135
12.2	0.117
13.1	0.094
13.7	0.081
14.5	0.219
14.5	0.314
15.0	0.452
15.7	0.531

CURVE 8
T ~ 298

λ	ρ
1.40	0.266
2.20	0.259
2.80	0.245
4.00	0.229
5.00	0.218
5.90	0.211
7.20	0.196
9.50	0.190
10.4	0.183

CURVE 8 (cont.)

λ	ρ
11.6	0.174
12.1	0.170
12.7	0.179
12.8	0.200
12.8	0.217
12.9	0.240
13.2	0.300
13.5	0.343
14.5	0.360

CURVE 9
T ~ 298

λ	ρ
1.00	0.263
2.50	0.241
3.50	0.227
4.40	0.212
5.70	0.198
6.40	0.192
7.30	0.181
8.00	0.174
8.80	0.195
9.00	0.208
9.20	0.224
9.40	0.239
9.60	0.263
10.0	0.296
10.3	0.328
11.1	0.357
11.4	0.376
11.8	0.388

CURVE 10
T ~ 298

λ	ρ
14.0	0.315
16.1	0.312
18.0	0.309
20.1	0.301
22.1	0.292
24.0	0.289
26.0	0.281
28.2	0.267
30.0	0.244
31.0	0.224
32.0	0.189

CURVE 10 (cont.)

λ	ρ
33.0	0.147
34.0	0.075
34.5	0.233
35.0	0.598
35.4	0.652
35.9	0.670
36.9	0.553
37.9	0.412

CURVE 11
T ~ 298

λ	ρ
0.0486	0.006
0.0503	0.009
0.0518	0.011
0.0540	0.013
0.0562	0.015
0.0574	0.015*
0.0584	0.015
0.0592	0.015*
0.0600	0.014
0.0608	0.012*
0.0620	0.011
0.0643	0.013*
0.0667	0.016
0.0688	0.020*
0.0704	0.024
0.0714	0.028*
0.0726	0.032
0.0726	0.033*
0.0906	0.110
0.101	0.145
0.110	0.166
0.120	0.193
0.129	0.228
0.138	0.268
0.150	0.336
0.162	0.398
0.176	0.443
0.187	0.458
0.192	0.424
0.199	0.420
0.221	0.500
0.248	0.600
0.273	0.500
0.312	0.410

CURVE 11 (cont.)

λ	ρ
0.324	0.404
0.345	0.414
0.364	0.433
0.382	0.466
0.409	0.468
0.428	0.483
0.502	0.391
0.653	0.333
0.984	0.306
2.10	0.291

CURVE 12
T = 313

λ	ρ
2.40	0.462
3.70	0.445
6.60	0.437
8.00	0.431
8.90	0.445
11.4	0.435
15.0	0.435
16.3	0.400
17.3	0.370
18.2	0.300
18.8	0.261
19.7	0.253
21.7	0.259
23.5	0.274
26.7	0.266
28.7	0.232
30.0	0.200
32.3	0.143
33.5	0.103
34.1	0.065
34.4	0.200
35.0	0.437
35.6	0.689
36.0	0.716
36.5	0.722
37.3	0.691
39.4	0.408
40.0	0.375
42.0	0.382
45.9	0.458
50.0	0.513

CURVE 13
T ~ 4.2

λ	ρ
32.2	0.128
33.4	0.061
33.6	0.128
33.7	0.431
33.9	0.657
34.1	0.784
34.2	0.837
34.5	0.852
34.7	0.843
35.1	0.798
36.1	0.818
36.5	0.800
36.8	0.744
37.0	0.638
37.6	0.552
38.5	0.498

*Not shown on plot

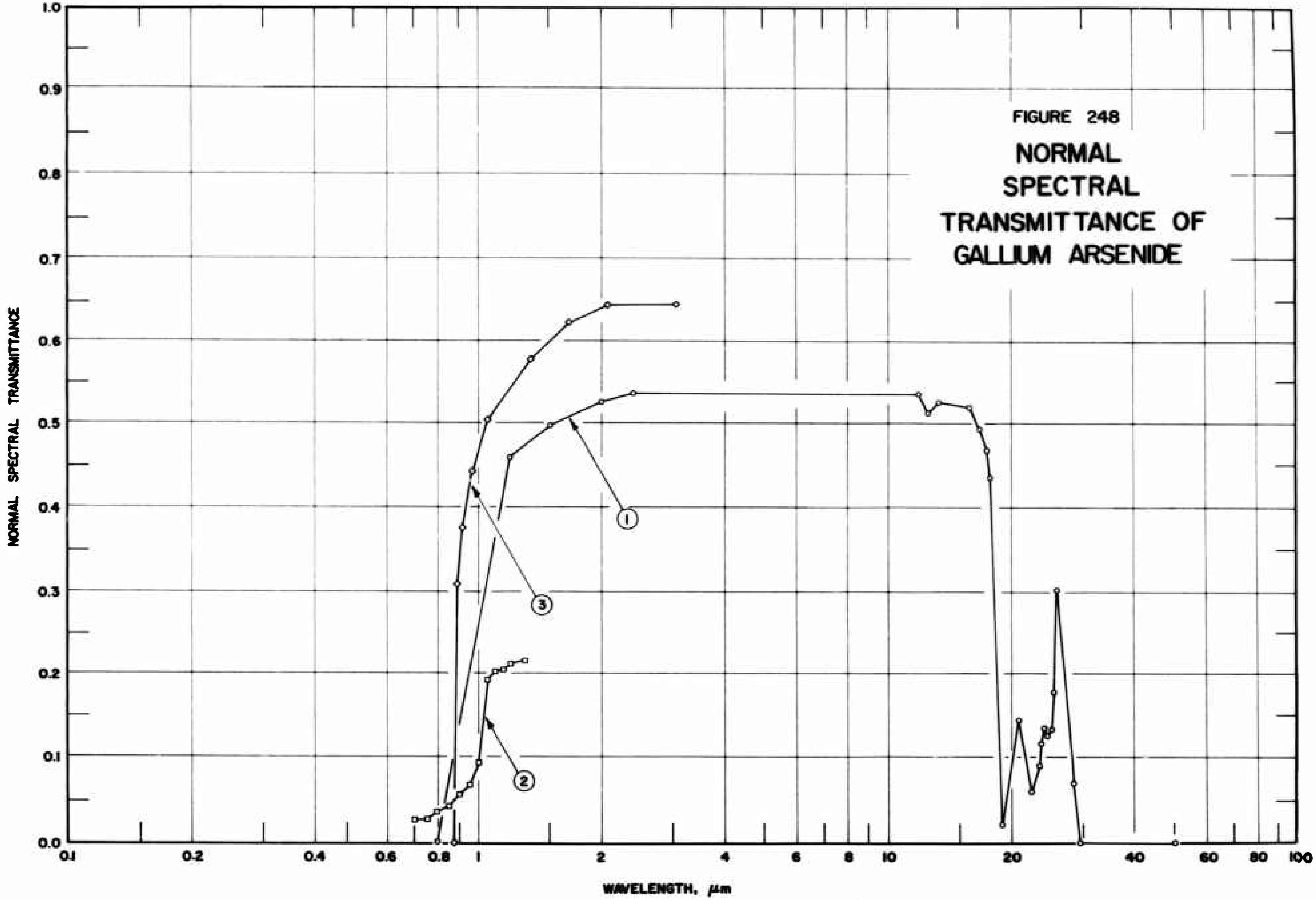


FIGURE 248
NORMAL
SPECTRAL
TRANSMITTANCE OF
GALLIUM ARSENIDE
NORMAL SPECTRAL TRANSMITTANCE
WAVELENGTH, μm
1.0
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0.0
0.1
0.2
0.4
0.6
0.8
1
2
4
6
8
10
20
40
60
80
100
1
2
3

SPECIFICATION TABLE NO. 248 NORMAL SPECTRAL TRANSMITTANCE OF GALLIUM ARSENIDE GaAs

Curve No.	Ref. No.	Year	Temperature K	Wavelength Range, μm	Geometry θ θ' ω'	Reported Error, %	Composition (weight percent), Specifications and Remarks
1	87	1968	313	0.800-50.0	~0° ~0°		Synthetic single crystal (0.5 mm thick); flat to ten fringes or better; data extracted from smooth curve.
2	88	1967	298	0.700-1.30	~0° ~0°		Evaporated film (99.9999 pure) at $<10^{-6}$ mm Hg onto optically polished quartz.
3	373	1968	~298	0.873-3.03	~0° ~0°		Synthetic single crystal (0.25 mm thick); data extracted from smooth curve.

DATA TABLE NO. 248 NORMAL SPECTRAL TRANSMITTANCE OF GALLIUM ARSENIDE GaAs

[Temperature, T, K; Transmittance, τ; Wavelength, λ, μm]

λ	τ
CURVE 1	**T = 313**
0.800	0.000
1.20	0.458
1.50	0.497
2.00	0.524
2.40	0.533
11.9	0.533
12.5	0.511
13.2	0.524
15.8	0.519
16.7	0.491
17.4	0.467
17.7	0.435
19.0	0.022
20.9	0.143
22.3	0.060
23.2	0.090
23.6	0.118
24.0	0.134
24.3	0.126
CURVE 1 (cont.)	
25.0	0.232
25.4	0.278
25.9	0.302
28.3	0.070
29.3	0.000
50.0	0.000
CURVE 2	**T = 298**
0.700	0.026
0.750	0.026
0.799	0.036
0.850	0.041
0.900	0.055
0.950	0.066
1.00	0.091
1.05	0.190
1.10	0.201
1.15	0.205
1.20	0.211
1.30	0.216
CURVE 3	**T ~ 298**
0.873	0.000
0.895	0.309
0.914	0.375
0.966	0.440
1.05	0.502
1.34	0.578
1.66	0.622
2.07	0.644
3.03	0.644

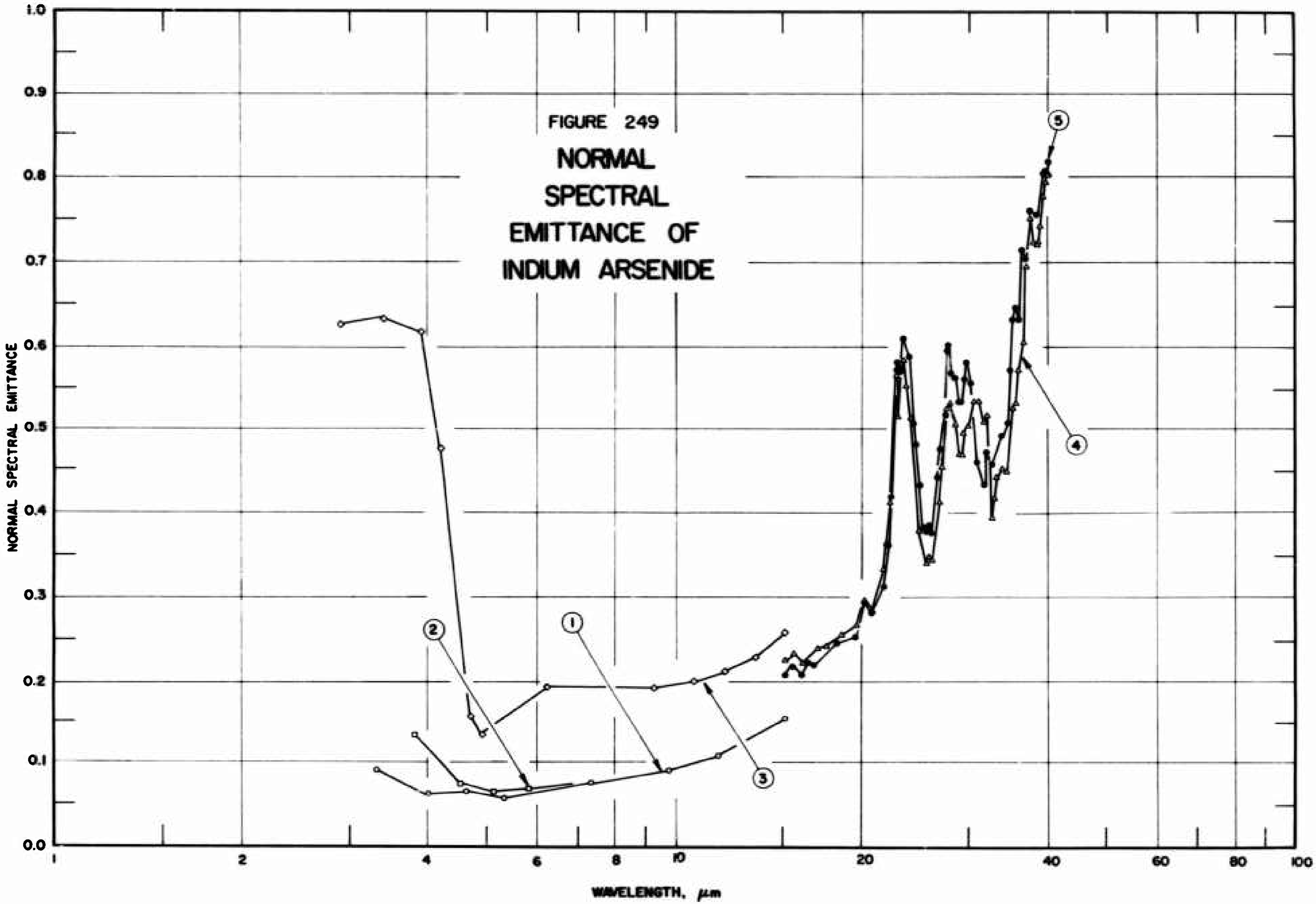


FIGURE 249
NORMAL SPECTRAL EMITTANCE OF INDIUM ARSENIDE

SPECIFICATION TABLE NO. 249 NORMAL SPECTRAL EMITTANCE OF INDIUM ARSENIDE InAs

Curve No.	Ref. No.	Year	Temperature K	Wavelength Range, μm	Geometry θ'	Reported Error, %	Composition (weight percent), Specifications and Remarks
1	370	1965	77	3.30-15.0	~0°		0.4 mm thick; ground and mechanically polished to a parallel sided slab; data measured at 10^{-6} mm Hg; data extracted from smooth curve.
2	370	1965	203	3.80-15.0	~0°		Above specimen and conditions.
3	370	1965	373	2.90-15.0	~0°		Above specimen and conditions.
4	370	1965	77	15.0-40.0	~0°		Above specimen and conditions.
5	370	1965	203	15.0-40.0	~0°		Above specimen and conditions.

DATA TABLE NO. 249 NORMAL SPECTRAL EMITTANCE OF INDIUM ARSENIDE InAs

[Wavelength, λ, μm; Emittance, ϵ; Temperature, T, K]

λ	ϵ	λ	ϵ	λ	ϵ	λ	ϵ	λ	ϵ	λ	ϵ
CURVE 1		CURVE 3 (cont.)		CURVE 4 (cont.)		CURVE 4 (cont.)		CURVE 5 (cont.)		CURVE 5 (cont.)	
T = 77		3.90	0.619	22.6	0.569	33.6	0.451	23.3	0.610	34.3	0.506
3.30	0.091	4.20	0.476	22.9	0.513	34.1	0.449	23.9	0.590	34.8	0.574
4.00	0.064	4.70	0.156	23.1	0.573	35.0	0.526	24.3	0.508	35.0	0.633
4.60	0.065	4.90	0.132	23.3	0.586	35.4	0.531	24.5	0.481	35.3	0.648
5.30	0.059	6.20	0.192	23.5	0.553	35.8	0.573	24.9	0.433		
7.30	0.076	9.20	0.192	24.0	0.513	36.4	0.606	25.1	0.392		
9.70	0.090	10.7	0.200	24.8	0.379	36.9	0.695	25.3	0.378		
11.7	0.109	12.0	0.212	25.4	0.340			25.7	0.385		
15.0	0.154	13.5	0.230	25.6	0.349	CURVE 5		25.9	0.377		
		15.0	0.259	25.9	0.343	T = 203		26.4	0.412		
CURVE 2				26.5	0.412			26.7	0.477		
T = 203		CURVE 4		26.9	0.454	15.0	0.209	27.1	0.516		
		T = 77		27.4	0.525	15.4	0.220	27.3	0.597		
3.80	0.132			27.7	0.531	15.9	0.209	27.4	0.603		
4.50	0.074	15.0	0.225	28.4	0.505	16.3	0.223	27.7	0.570		
5.10	0.065	15.5	0.233	28.8	0.468	16.6	0.220	28.1	0.565		
5.80	0.069	16.0	0.220	29.0	0.468	18.2	0.248	28.5	0.532		
9.70	0.090*	16.9	0.240	29.3	0.494	19.5	0.253	28.8	0.532		
11.7	0.109*	17.5	0.242	29.8	0.502	20.2	0.293	29.2	0.562		
15.0	0.154*	18.5	0.257	30.2	0.432	20.7	0.282	29.6	0.583		
		19.6	0.267	30.9	0.432	21.6	0.313	30.0	0.558		
CURVE 3		20.2	0.297	31.5	0.409	22.0	0.362	30.9	0.460		
T = 373		20.7	0.284	31.9	0.416	22.2	0.420	31.5	0.433		
		21.6	0.333	32.4	0.395	22.6	0.574	31.8	0.471		
2.90	0.628	21.8	0.363	32.7	0.419	22.7	0.583	32.5	0.457		
3.40	0.634	22.1	0.411	33.0	0.441	23.0	0.572	33.6	0.491		

*Not shown on plot

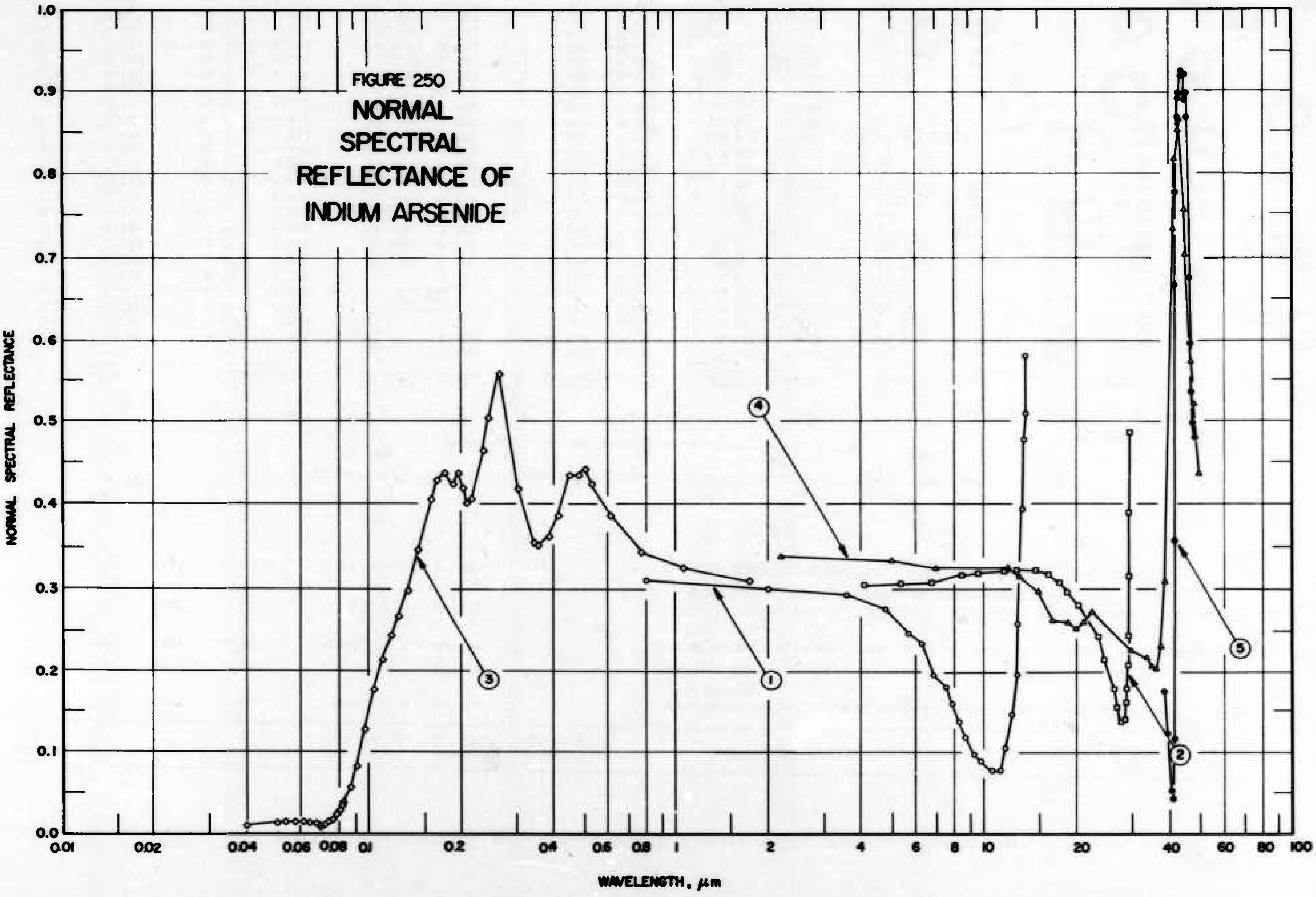


FIGURE 250 NORMAL SPECTRAL REFLECTANCE OF INDIUM ARSENIDE

SPECIFICATION TABLE NO. 250 NORMAL SPECTRAL REFLECTANCE OF INDIUM ARSENIDE InAs

Curve No.	Ref. No.	Year	Temperature K	Wavelength Range, μm	Geometry θ	θ'	ω'	Reported Error, %	Composition (weight percent), Specifications and Remarks
1	85	1967	~298	0.800-13.8	~0°	~0°			n-type single crystal (2 mm thick); doped with Te; carrier density 9 x 10^{18} cm^{-3}; ground and polished.
2	85	1967	~298	4.10-30.1	~0°	~0°			Similar to above specimen and conditions except carrier density 4.5 x 10^{17} cm^{-3}.
3	299	1963	~298	0.0485-1.75	~0°	~0°			Etched; minimal exposure to air; measured under poor vacuum; data extracted from smooth curve.
4	87	1968	313	2.2-50.0	30°	30°			Synthetic single crystal (0.17 mm thick); flat to ten fringes or better; data extracted from smooth curve; aluminum mirror reference standard.
5	418	1962	~ 4.2	38.3-48.5	10°	10°			Crystal; polished to mirror finish; data extracted from smooth curve.

DATA TABLE NO. 250 NORMAL SPECTRAL REFLECTANCE OF INDIUM ARSENIDE InAs

[Wavelength, λ, μm; Reflectance, ρ; Temperature, T, K]

λ	ρ	λ	ρ	λ	ρ	λ	ρ	λ	ρ	λ	ρ	λ	ρ
CURVE 1 T ~ 298		CURVE 2 T ~ 298		CURVE 2 (cont.)		CURVE 3 (cont.)		CURVE 3 (cont.)		CURVE 4 (cont.)		CURVE 5 (cont.)	
0.800	0.301	4.10	0.305	29.9	0.389	0.0974	0.127	0.482	0.434	35.0	0.207	41.8	0.778
2.00	0.300	5.40	0.306	30.1	0.485	0.104	0.176	0.504	0.441	36.1	0.202	42.2	0.866
3.60	0.291	6.80	0.308	CURVE 3 T ~ 298		0.110	0.215	0.539	0.424	37.3	0.230	42.4	0.891
4.80	0.277	8.50	0.316	0.0485	0.010	0.117	0.243	0.620	0.385	38.3	0.309	42.6	0.897
5.70	0.248	9.60	0.319	0.0504	0.012	0.124	0.268	0.775	0.345	41.0	0.735	42.9	0.897
6.30	0.233	11.6	0.320	0.0531	0.013	0.134	0.299	1.07	0.323	41.5	0.819	43.5	0.919
6.90	0.196	12.8	0.321	0.0575	0.015	0.144	0.347	1.75	0.310	42.2	0.854	43.9	0.927
7.50	0.180	14.7	0.321	0.0610	0.015	0.160	0.405	CURVE 4 T = 313		42.8	0.865	44.1	0.921
7.90	0.159	16.1	0.317	0.0639	0.014	0.169	0.428	2.20	0.339	44.1	0.757	44.6	0.889
8.30	0.135	17.6	0.308	0.0668	0.013	0.177	0.436	5.00	0.333	44.9	0.763	45.2	0.899
8.70	0.117	18.6	0.296	0.0684	0.012	0.188	0.422	7.00	0.324	47.1	0.577	45.5	0.866
9.30	0.097	20.1	0.280	0.0700	0.009	0.196	0.436	12.0	0.324	48.0	0.521	46.1	0.677
9.80	0.088	23.3	0.243	0.0720	0.011	0.201	0.419	13.1	0.314	50.0	0.437	46.5	0.597
10.5	0.076	24.5	0.215	0.0739	0.014	0.210	0.400	15.0	0.298	CURVE 5 T ~ 4.2		47.2	0.534
11.3	0.076	26.1	0.179	0.0762	0.018	0.218	0.405	16.7	0.264	38.3	0.175	47.8	0.499
11.7	0.104	26.8	0.155	0.0784	0.023	0.236	0.463	18.9	0.261	39.5	0.120	48.5	0.480
12.2	0.145	27.7	0.135	0.0803	0.029	0.248	0.503	20.0	0.253	40.3	0.051		
12.8	0.196	28.4	0.139	0.0823	0.034	0.269	0.559	21.0	0.261	40.5	0.042		
12.9	0.260	28.8	0.161	0.0827	0.037	0.308	0.418	22.3	0.273	41.0	0.115		
13.4	0.394	28.9	0.178	0.0873	0.056	0.347	0.354	30.0	0.225	41.2	0.357		
13.5	0.478	29.2	0.209	0.0919	0.082	0.359	0.352	33.7	0.218	41.5	0.668		
13.8	0.510	29.3	0.245			0.390	0.361						
13.8	0.581	29.6	0.316			0.413	0.386						
						0.451	0.434						

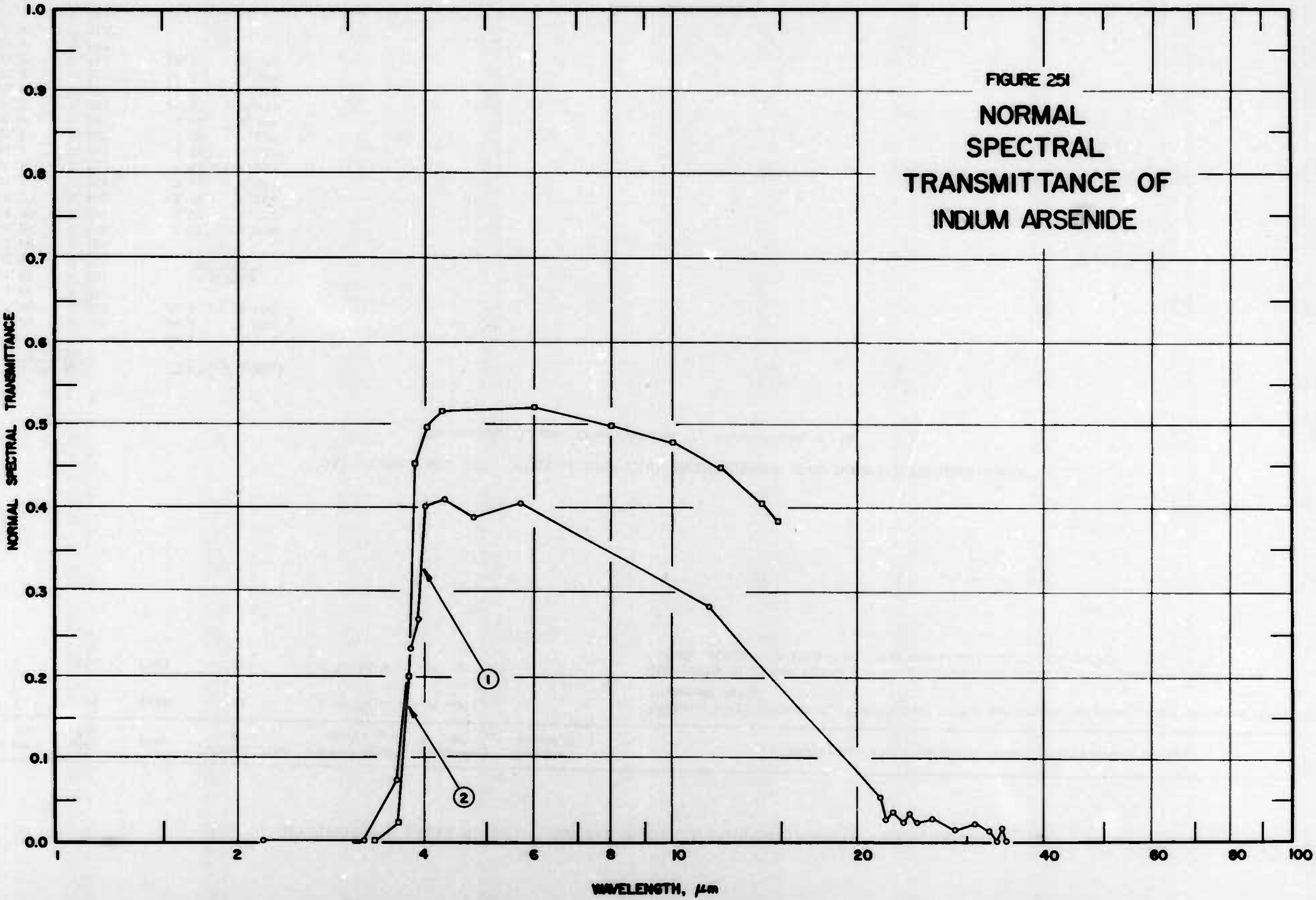


FIGURE 251
NORMAL SPECTRAL TRANSMITTANCE OF INDIUM ARSENIDE

SPECIFICATION TABLE NO. 251 NORMAL SPECTRAL TRANSMITTANCE OF INDIUM ARSENIDE InAs

Curve No.	Ref. No.	Year	Temperature K	Wavelength Range, μm	Geometry θ θ' ω'	Reported Error, %	Composition (weight percent), Specifications and Remarks
1	87	1968	313	2.20-50.0	~0° ~0°		Synthetic single crystal (0.17 mm thick); flat to ten fringes or better; data extracted from smooth curve.
2	310	1961	~298	3.31-14.8	0° 0°		High purity (0.21 mm thick); cut from commercial material from Ohio Semiconductors (cat. designation InAs-3-n); data extracted from smooth curve.

DATA TABLE NO. 251 NORMAL SPECTRAL TRANSMITTANCE OF INDIUM ARSENIDE InAs

[Wavelength, λ, μm; Transmittance, τ; Temperature, T, K]

λ	τ	λ	τ
CURVE 1 T = 313		CURVE 1 (cont.)	
		34.1	0.018
2.20	0.000	34.6	0.000
3.20	0.000	50.0	0.000
3.60	0.073		
3.80	0.234	CURVE 2 T ~ 298	
3.90	0.368		
4.00	0.400		
4.30	0.409	3.31	0.000
4.80	0.387	3.61	0.022
5.70	0.403	3.76	0.200
11.5	0.284	3.85	0.451
21.8	0.052	4.01	0.497
22.1	0.027	4.25	0.516
22.8	0.037	6.00	0.520
23.6	0.024	8.00	0.499
24.2	0.033	10.0	0.478
25.0	0.022	12.0	0.446
26.4	0.028	14.0	0.403
28.8	0.015	14.8	0.384
31.0	0.021		
32.8	0.013		
33.5	0.000		

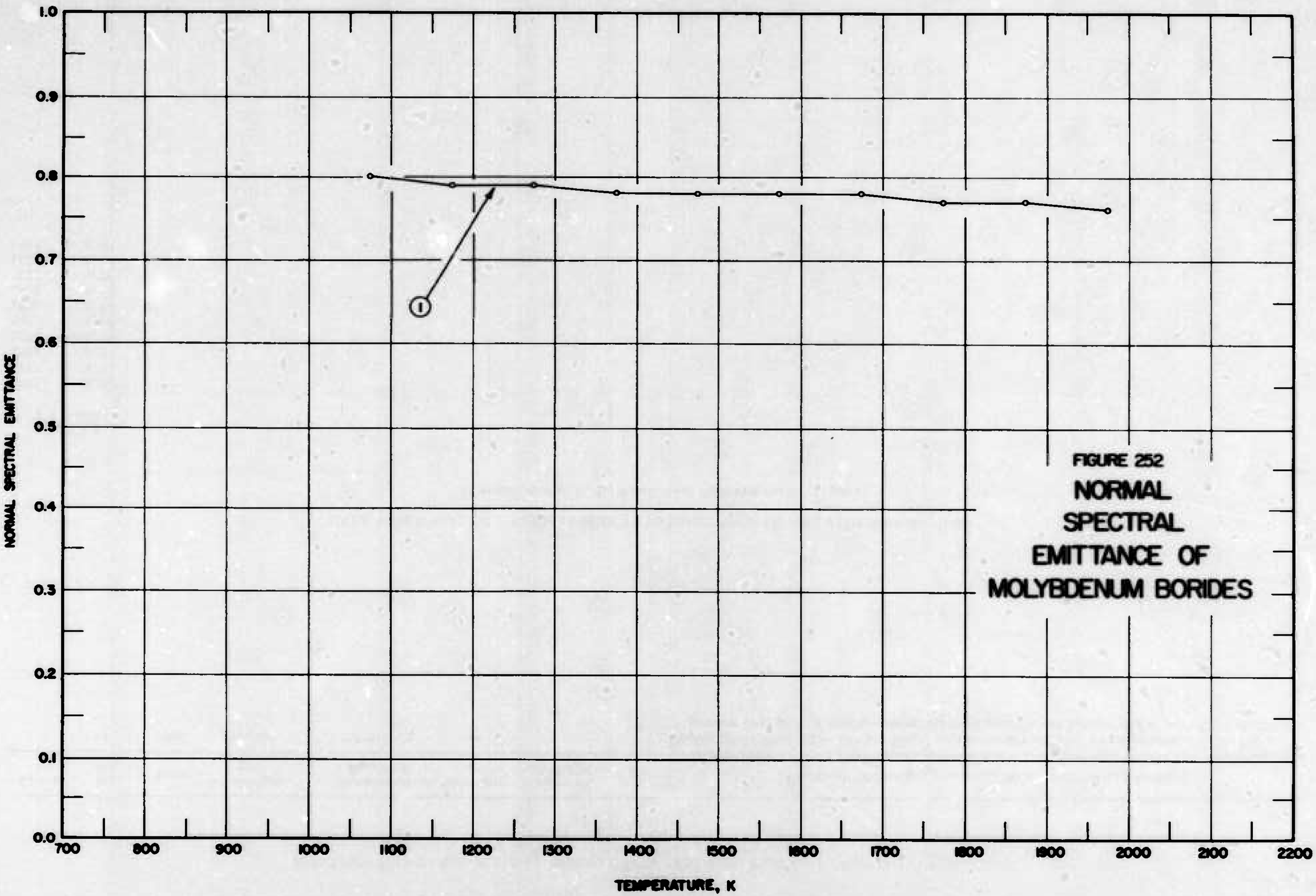


FIGURE 252
NORMAL
SPECTRAL
EMITTANCE OF
MOLYBDENUM BORIDES

SPECIFICATION TABLE NO. 252 NORMAL SPECTRAL EMITTANCE OF MOLYBDENUM BORIDES

Curve No.	Ref. No.	Year	Wavelength, µm	Temperature Range, K	Geometry θ'	Reported Error, %	Composition (weight percent), Specifications and Remarks
1	13	1962	0.650	1073-1973	~0°		Mo_2B_5; layer of paste (~100 µm thick) on tantalum cylinder; paste prepared from fine powder (2-3 µm) of Mo_2B_5 suspended in nitrocellulose binder and dried at 313 to 333 K.

DATA TABLE NO. 252 NORMAL SPECTRAL EMITTANCE OF MOLYBDENUM BORIDES

[Temperature, T, K; Emittance, ϵ; Wavelength, λ, µm]

T	ϵ
CURVE 1	
$\lambda = 0.650$	
1073	0.80
1173	0.79
1273	0.79
1373	0.78
1473	0.78
1573	0.78
1673	0.78
1773	0.77
1873	0.77
1973	0.76

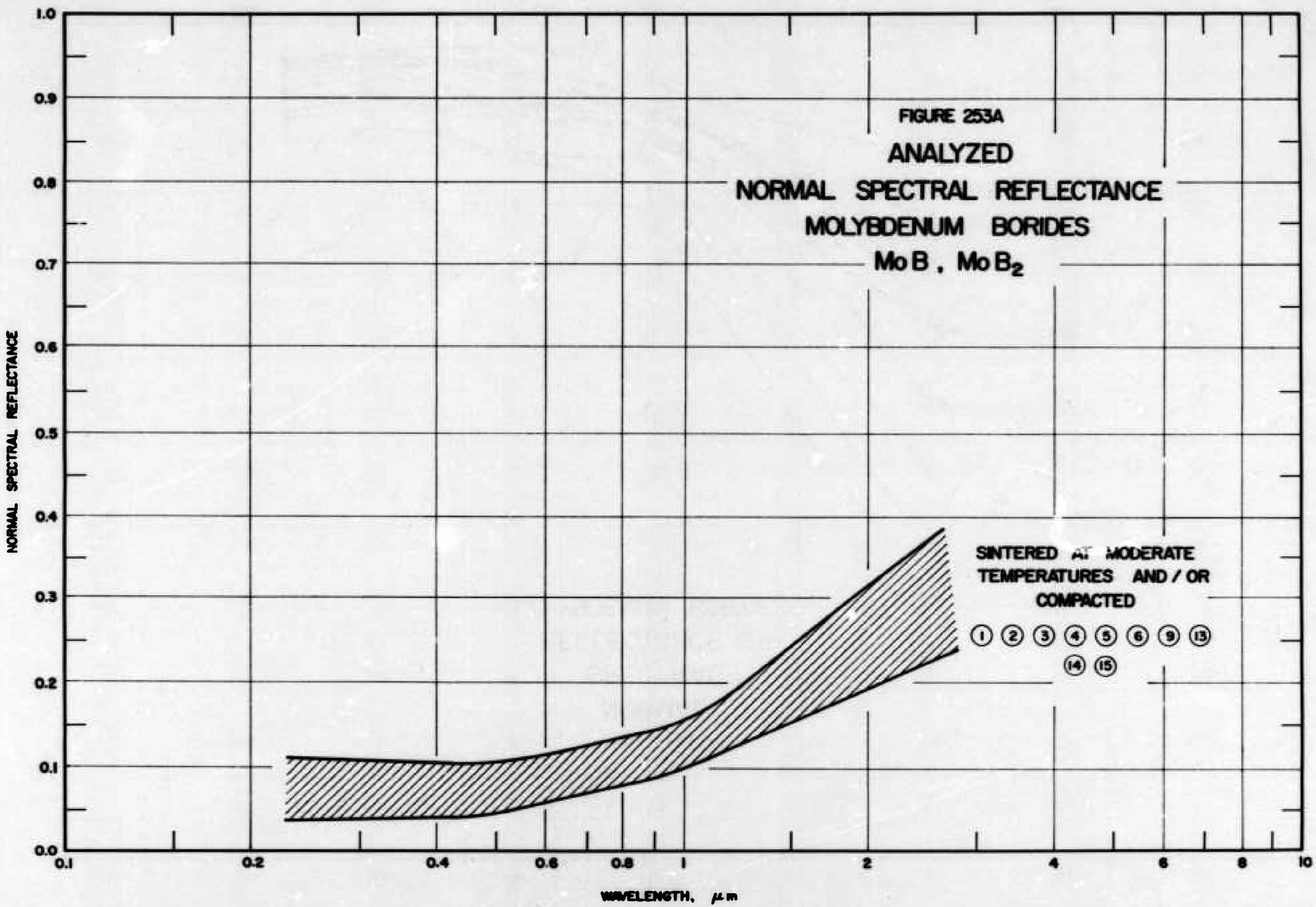


FIGURE 253A
ANALYZED
NORMAL SPECTRAL REFLECTANCE
MOLYBDENUM BORIDES
MoB , MoB2
SINTERED AT MODERATE TEMPERATURES AND / OR COMPACTED
1 2 3 4 5 6 9 13 14 15
NORMAL SPECTRAL REFLECTANCE
WAVELENGTH, μm
0.0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
1.0
0.1
0.2
0.4
0.6
0.8
1
2
4
6
8
10

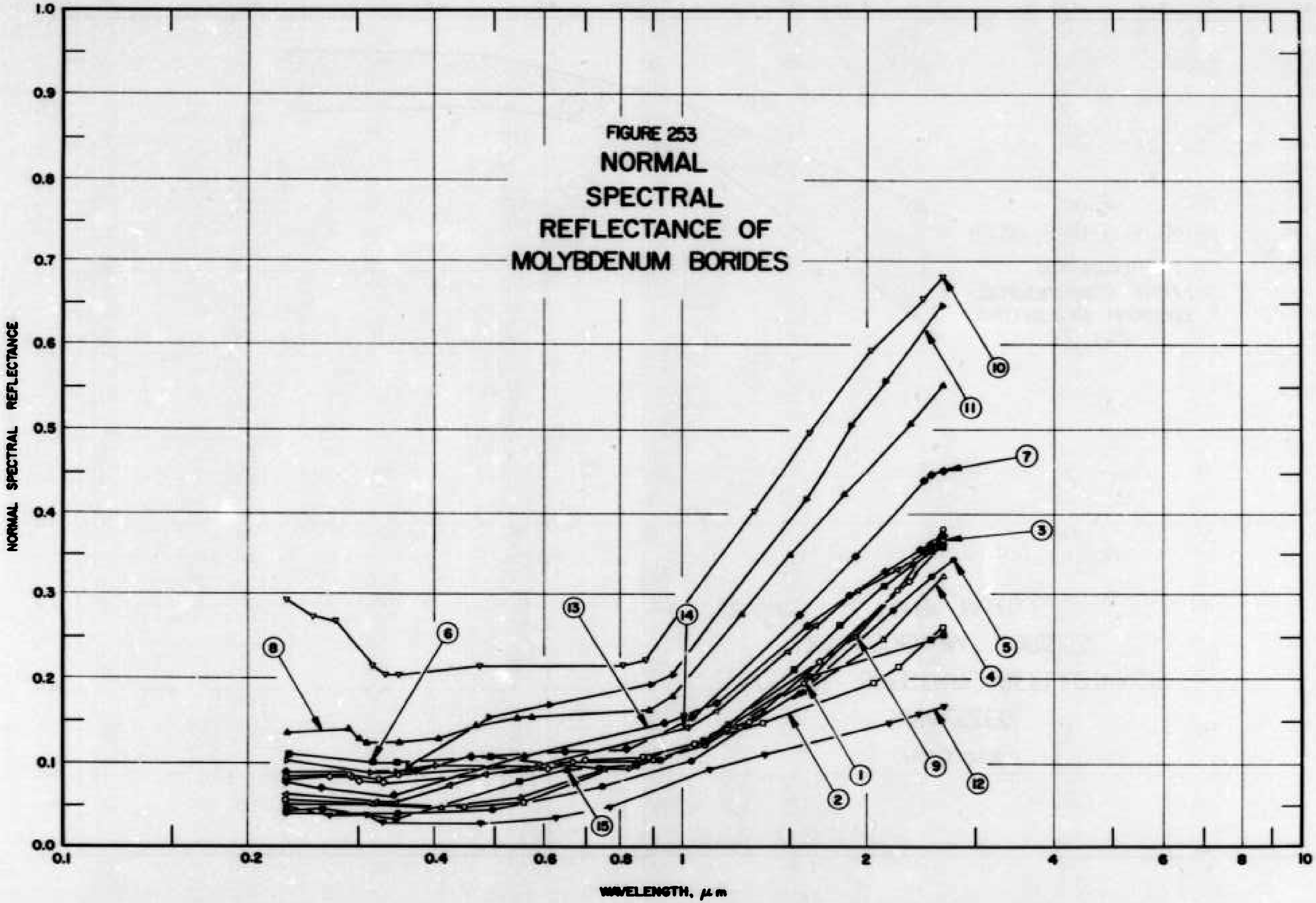


FIGURE 253
NORMAL
SPECTRAL
REFLECTANCE OF
MOLYBDENUM BORIDES
NORMAL SPECTRAL REFLECTANCE
WAVELENGTH, μm
0.0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
1.0
0.1
0.2
0.4
0.6
0.8
1
2
4
6
8
10
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15

SPECIFICATION TABLE NO. 253 NORMAL SPECTRAL REFLECTANCE OF MOLYBDENUM BORIDES

Curve No.	Ref. No.	Year	Temperature, K	Wavelength Range, μm	Geometry θ	θ'	ω'	Reported Error, %	Composition (weight percent), Specifications and Remarks
1	382	1965	~298	0.230-2.65	~0°		2π		MoB; powder compacted at 35,300 psi using polished stainless steel ram; data extracted from smooth curve; MgO reference standard.
2	382	1965	~298	0.230-2.65	~0°		2π		Above specimen and conditions except heated at 773 K for 120 min.
3	382	1965	~298	0.230-2.65	~0°		2π		Similar to curve 1 specimen and conditions.
4	382	1965	~298	0.230-2.65	~0°		2π		Above specimen and conditions except heated at 973 K for 30 min.
5	382	1965	~298	0.230-2.65	~0°		2π		Above specimen and conditions except heated at 973 K for 240 min.
6	382	1965	~298	0.231-2.65	~0°		2π		Similar to curve 1 specimen and conditions.
7	382	1965	~298	0.230-2.65	~0°		2π		Above specimen and conditions except heated at 1173 K for 30 min.
8	382	1965	~298	0.230-2.65	~0°		2π		Above specimen and conditions except heated at 1173 K for 180 min.
9	382	1965	~298	0.230-2.65	~0°		2π		Similar to curve 1 specimen and conditions.
10	382	1965	~298	0.230-2.65	~0°		2π		Above specimen and conditions except heated at 1373 K for 15 min.
11	382	1965	~298	0.230-2.65	~0°		2π		Above specimen and conditions except heated at 1373 K for 60 min.
12	382	1965	~298	0.230-2.65	~0°		2π		Above specimen and conditions except heated at 1373 K for 120 min.
13	382	1965	~298	0.230-2.65	~0°		2π		MoB_2; powder manufactured by U.S. Borax Research; 99.5% pure; compacted at 70,500 psi; data extracted from smooth curve; MgO reference standard.
14	382	1965	~298	0.230-2.65	~0°		2π		Similar to above specimen and conditions except compacted at 35,250 psi.
15	382	1965	~298	0.230-2.65	~0°		2π		Similar to above specimen and conditions except compacted at 2,350 psi.

DATA TABLE NO. 253 NORMAL SPECTRAL REFLECTANCE OF MOLYBDENUM BORIDES

[Wavelength, λ, μm; Reflectance, ρ; Temperature, T, K]

λ	ρ
CURVE 1	
T~298	
0.230	0.082
0.292	0.084
0.325	0.080
0.349	0.085
0.668	0.101
0.900	0.103
1.09	0.122
1.57	0.194
2.23	0.303
2.57	0.365
2.65	0.380
CURVE 2	
T~298	
0.230	0.055
0.447	0.048
0.555	0.052
0.865	0.109
1.05	0.122
1.35	0.147
2.04	0.194
2.24	0.214
2.65	0 260
CURVE 3	
T~298	
0.230	0.080
0.270	0.083
0.293	0.083
0.303	0.079
0.330	0.076
0.608	0.093
0.700	0.102
0.883	0.107
1.28	0.149
1.67	0.220
2.33	0.316
2.65	0.368
CURVE 4	
T~298	
0.230	0.050
0.318	0.050
0.410	0.046
0.550	0.060
0.751	0.093
1.22	0.142
1.57	0.181
2.11	0.246
2.65	0.321
CURVE 5	
T~298	
0.230	0.040
0.349	0.040
0.497	0.043
0.745	0.073
1.04	0.102
1.55	0.182
2.20	0.280
2.55	0.322
2.65	0.341
CURVE 6	
T~298	
0.231	0.110
0.318	0.100
0.348	0.100
0.491	0.108
0.737	0.094
0.843	0.098
1.09	0.123
1.61	0.201
2.54	0.346
2.65	0.352
CURVE 7	
T~298	
0.230	0.089
0.372	0.090
0.458	0.108
0.649	0.113
CURVE 7 (cont.)	
0.811	0.117
1.04	0.151
1.55	0.274
1.91	0.347
2.46	0.440
2.53	0.449
2.65	0.452
CURVE 8	
T~298	
0.230	0.134
0.290	0.139
0.301	0.129
0.310	0.122
0.350	0.122
0.404	0.129
0.466	0.143
0.541	0.151
0.771	0.152
0.884	0.161
0.962	0.178
1.25	0.276
1.50	0.349
1.84	0.422
2.34	0.508
2.65	0.551
CURVE 9	
T~298	
0.230	0.102
0.315	0.088
0.347	0.090
0.401	0.097
0.589	0.096
0.823	0.094
1.07	0.121
1.87	0.250
2.65	0.362
CURVE 10	
T~298	
0.230	0.292
CURVE 10 (cont.)	
0.254	0.273
0.276	0.268
0.318	0.214
0.332	0.203
0.350	0.203
0.472	0.213
0.806	0.215
0.872	0.222
1.31	0.402
1.61	0.497
2.03	0.594
2.48	0.656
2.65	0.680
CURVE 11	
T~298	
0.230	0.102*
0.315	0.088*
0.347	0.090*
0.363	0.096
0.490	0.151
0.611	0.169
0.893	0.192
0.967	0.204
1.59	0.418
1.88	0.504
2.14	0.557
2.65	0.647
CURVE 12	
T~298	
0.230	0.048
0.273	0.036
0.310	0.038
0.330	0.029
0.475	0.028
0.628	0.034
0.770	0.047
1.11	0.091
1.35	0.110
2.17	0.147
2.41	0.156
2.65	0.167
CURVE 13	
T~298	
0.230	0.078
0.263	0.070
0.342	0.062
0.559	0.109
0.932	0.146
1.14	0.170
1.60	0.261
1.87	0.299
2.14	0.328
2.42	0.355
2.53	0.361
2.65	0.372
CURVE 14	
T~298	
0.230	0.062
0.322	0.051
0.346	0.051
0.422	0.074
0.483	0.087
0.559	0.093
1.02	0.141
1.14	0.160
1.48	0.231
1.65	0.262
1.94	0.303
2.23	0.330
2.51	0.354
2.65	0.366
CURVE 15	
T~298	
0.230	0.042
0.262	0.043
0.345	0.034
0.547	0.078
0.652	0.091
0.916	0.104
1.08	0.126
1.19	0.145
1.52	0.210
1.80	0.262
CURVE 15 (cont.)	
2.14	0.310
2.37	0.337
2.54	0.352
2.65	0.359

*Not shown on plot.

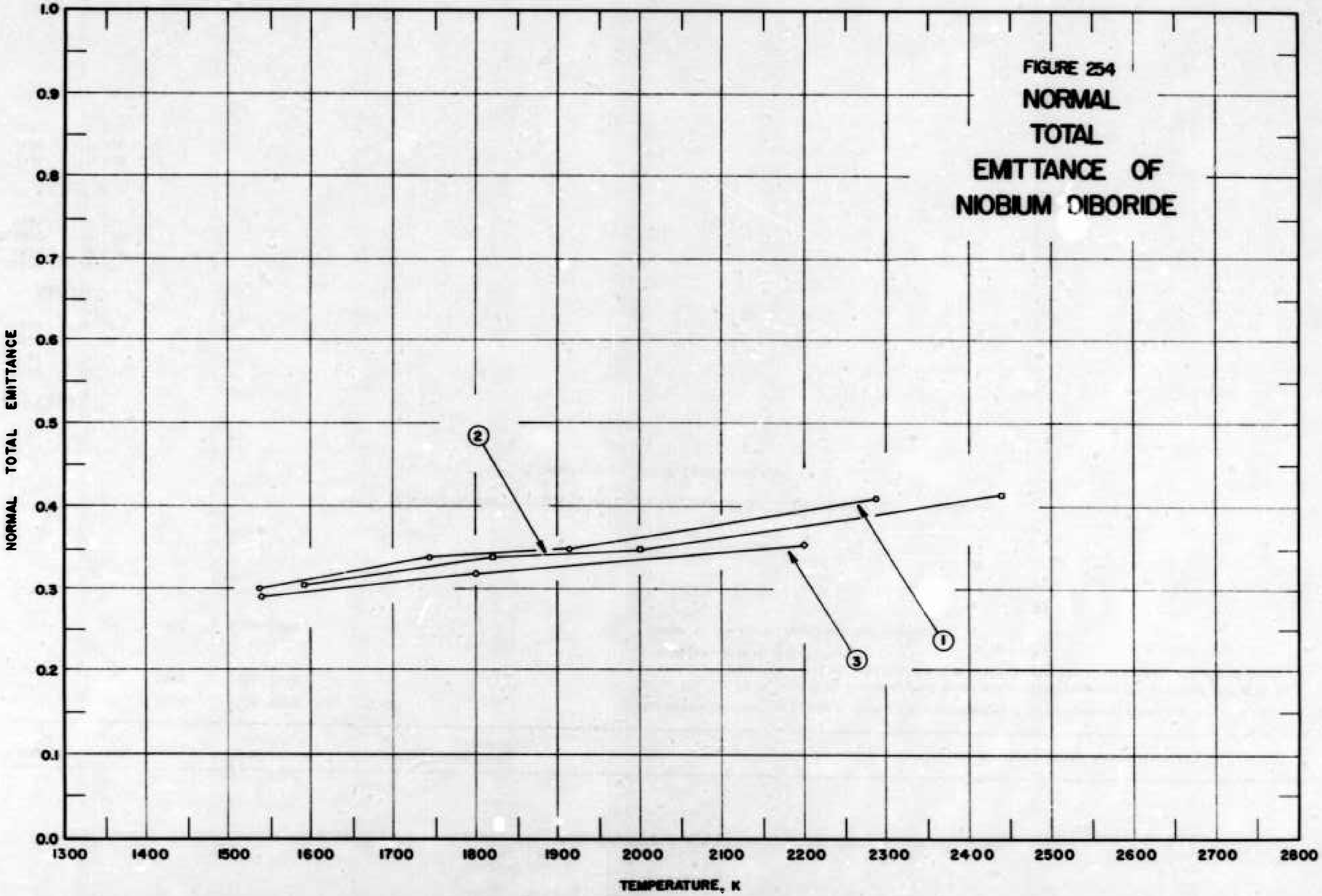


FIGURE 254
NORMAL
TOTAL
EMITTANCE OF
NIOBIUM DIBORIDE

SPECIFICATION TABLE NO. 254 NORMAL TOTAL EMITTANCE OF NIOBIUM DIBORIDE NbB_2

Curve No.	Ref. No.	Year	Temperature Range, K	Geometry θ'	Reported Error, %	Composition (weight percent), Specifications and Remarks
1	37	1964	1536-2289	~0°		Measured in argon at 1.5 to 2 atmospheres; integrated from spectral data (0.4 to 5.0 μm).
2	38	1962	1590-2440	~0°		79.07 Nb, 19.09 B, and 0.26 Fe; prepared from micronized powder; hot pressed at > 2273 K; sintered, polished, etched, and degassed at ~973 K; measured in argon; integrated from spectral data (0.4 to 5.0 μm).
3	38	1962	1540-2200	~0°		Similar to the above specimen and conditions.

DATA TABLE NO. 254 NORMAL TOTAL EMITTANCE OF NIOBIUM DIBORIDE NbB_2

[Temperature, T, K; Emittance, ε]

T	ε
CURVE 1	
1536	0.30
1744	0.34
1913	0.35
2289	0.41
CURVE 2	
1590	0.305
1820	0.340
2000	0.350
2440	0.415
CURVE 3	
1540	0.290
1800	0.320
2200	0.355

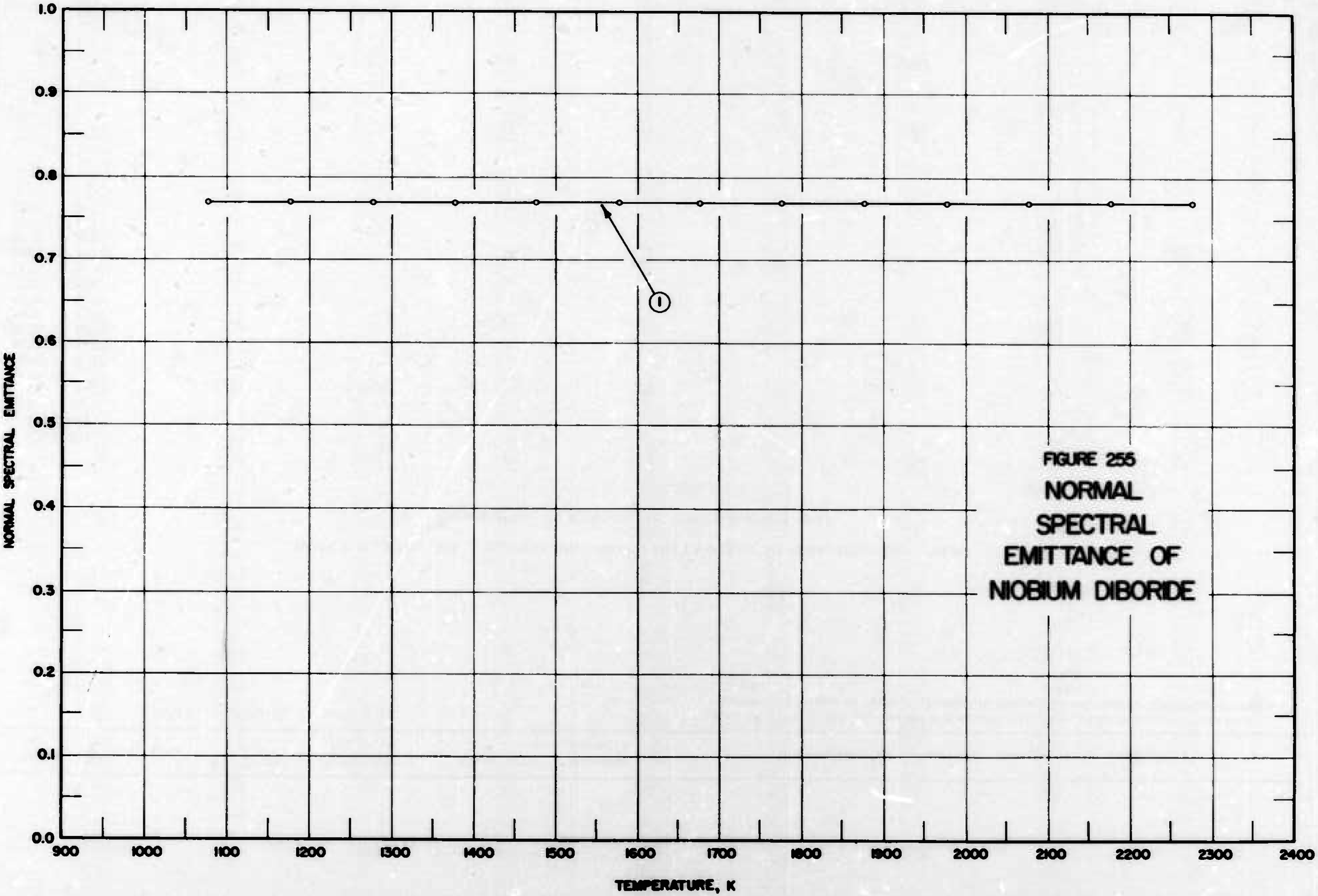


FIGURE 255
NORMAL
SPECTRAL
EMITTANCE OF
NIOBIUM DIBORIDE

SPECIFICATION TABLE NO. 255 NORMAL SPECTRAL EMITTANCE OF NIOBIUM DIBORIDE NbB_2

Curve No.	Ref. No.	Year	Wavelength, μm	Temperature Range, K	Geometry θ	Reported Error, %	Composition (weight percent), Specifications, and Remarks
1	13	1962	0.650	1073-2273	~0°		Layer of paste (~100 μm thick) on tantalum cylinder; paste prepared from fine powder (2-3 μm) of NbB_2 suspended in nitrocellulose binder and dried at 313 to 333 K.

DATA TABLE NO. 255 NORMAL SPECTRAL EMITTANCE OF NIOBIUM DIBORIDE NbB_2

[Temperature, T, K; Emittance, ϵ; Wavelength, λ, μm]

T	ϵ
CURVE 1 $\lambda = 0.650$	
1073	0.77
1173	0.77
1273	0.77
1373	0.77
1473	0.77
1573	0.77
1673	0.77
1773	0.77
1873	0.77
1973	0.77
2073	0.77
2173	0.77
2273	0.77

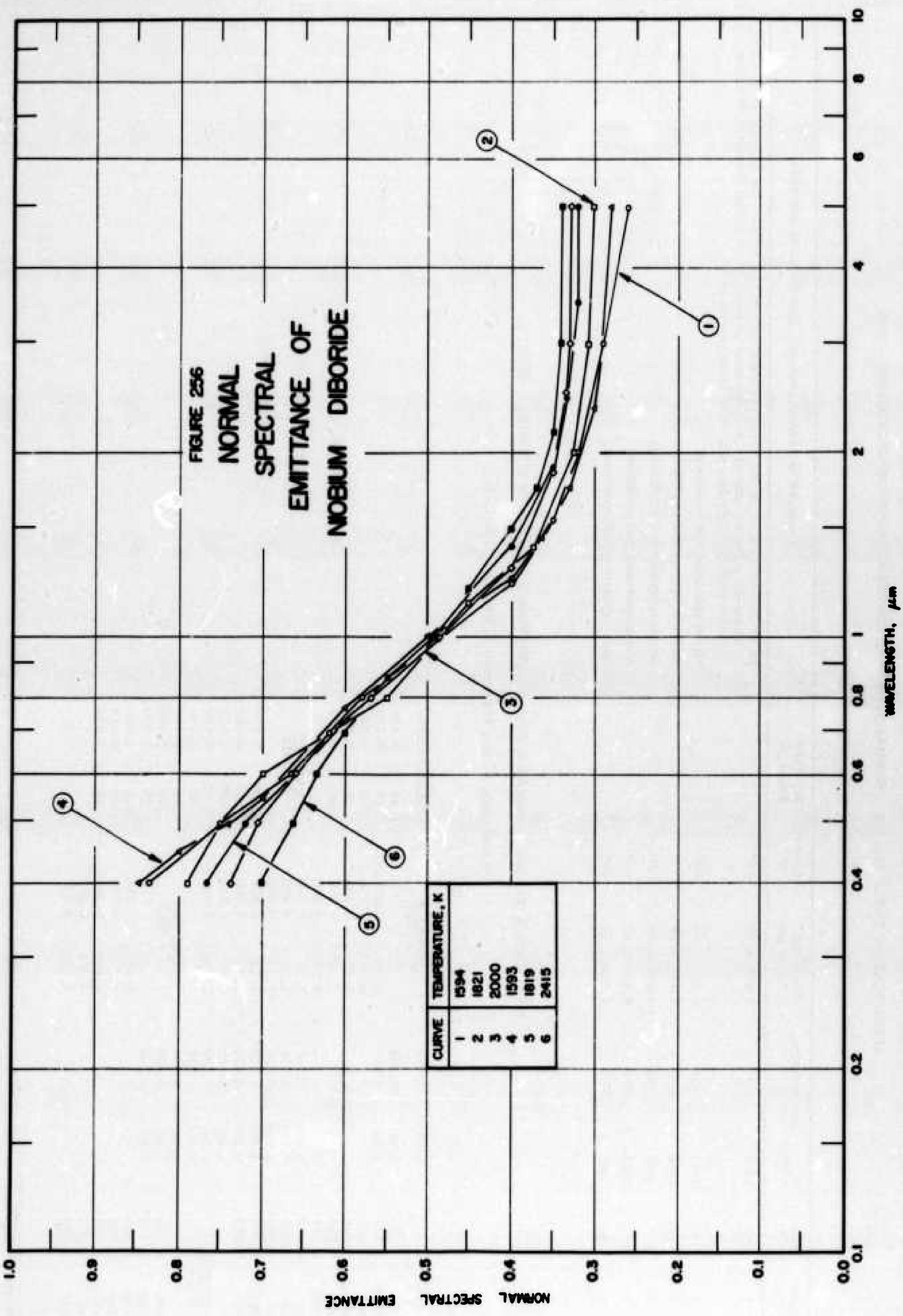


FIGURE 256
NORMAL
SPECTRAL
EMITTANCE OF
NIOBIUM DIBORIDE
CURVE | TEMPERATURE, K
1 | 1594
2 | 1821
3 | 2000
4 | 1593
5 | 1819
6 | 2415
NORMAL SPECTRAL EMITTANCE
WAVELENGTH, μm
0.0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
1.0
0.1
0.2
0.4
0.6
0.8
1
2
4
6
8
10
1
2
3
4
5
6

SPECIFICATION TABLE NO. 256 NORMAL SPECTRAL EMITTANCE OF NIOBIUM DIBORIDE NbB_2

Curve No.	Ref. No.	Year	Temperature, K	Wavelength Range, μm	Geometry θ'	Reported Error, %	Composition (weight percent), Specifications and Remarks
1	38	1962	1594	0.400-5.00	~0°		79.07 Nb, 19.09 B, 0.26 Fe; prepared from micronized powder, hot pressed at >2273 K; sintered, polished, etched, then degassed by heating to ~973 K; measured in argon (1140-1520 mm Hg); data extracted from smooth curve.
2	38	1962	1821	0.400-5.00	~0°		Above specimen and conditions.
3	38	1962	2000	0.400-5.00	~0°		Above specimen and conditions.
4	38	1962	1593	0.400-5.00	~0°		Above specimen and conditions.
5	38	1962	1819	0.400-5.00	~0°		Above specimen and conditions.
6	38	1962	2415	0.400-5.00	~0°		Above specimen and conditions.

DATA TABLE NO. 256 NORMAL SPECTRAL EMITTANCE OF NIOBIUM DIBORIDE NbB_2

[Wavelength, λ, μm; Emittance, ∈; Temperature, T, K]

CURVE 1
T = 1594

λ	∈
0.400	0.835
0.500	0.750
0.600	0.665
0.700	0.620
0.800	0.580
1.22	0.400
1.55	0.350
2.00	0.320
3.00	0.290
5.00	0.260

CURVE 2
T = 1821

λ	∈
0.400	0.790
0.500	0.750*
0.600	0.700
0.800	0.580
1.13	0.450
1.40	0.375
2.00	0.326

CURVE 2 (cont.)

λ	∈
3.00	0.308
5.00	0.300

CURVE 3
T = 2000

λ	∈
0.400	0.737
0.500	0.705
0.600	0.660
0.700	0.620*
0.800	0.570
1.00	0.485
1.30	0.400
1.85	0.350
2.50	0.334
3.00	0.330
5.00	0.329

CURVE 4
T = 1593

λ	∈
0.400	0.846
0.450	0.800
0.500	0.740
0.550	0.700
0.770	0.600
1.00	0.500
1.25	0.400
1.45	0.365
1.75	0.330
2.35	0.300
3.00	0.290*
5.00	0.280

CURVE 5
T = 1819

λ	∈
0.400	0.765
0.500	0.720
0.600	0.660*
0.860	0.550
1.00	0.492

CURVE 5 (cont.)

λ	∈
1.40	0.400
1.88	0.350
2.45	0.333
3.50	0.320
5.00	0.320

CURVE 6
T = 2415

λ	∈
0.400	0.700
0.500	0.663
0.600	0.635
0.700	0.600
1.00	0.490
1.20	0.450
1.50	0.400
1.75	0.370
2.15	0.350
3.00	0.340
6.00	0.338

*Not shown on plot.

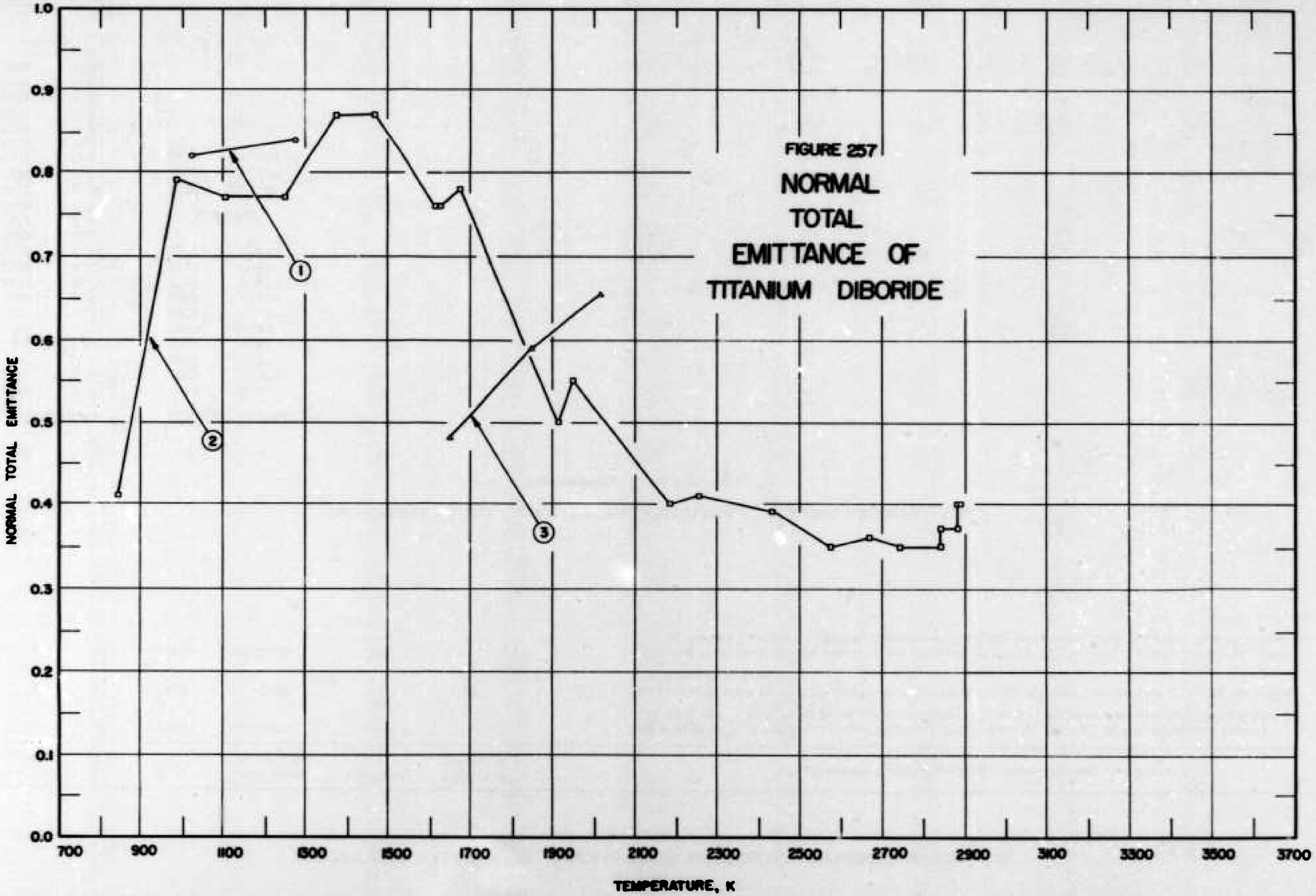


FIGURE 257 NORMAL TOTAL EMITTANCE OF TITANIUM DIBORIDE

SPECIFICATION TABLE NO. 257 NORMAL TOTAL EMITTANCE OF TITANIUM DIBORIDE TiB_2

Curve No.	Ref. No.	Year	Temperature Range, K	Geometry θ'	Reported Error, %	Composition (weight percent), Specifications and Remarks
1	28	1963	1023-1273	~0°		Sintered at 2073 K for 1 hr (setter material TiB_2); density 2.79 g cm^{-3}; theoretical density 4.52 g cm^{-3}; integrated from spectral data (1-15 μm); [Authors' designation: Sample No. 1].
2	17	1962	847-2977	~0°	10	Hot pressed; dark spots appeared ~2090 K and smoking accured for the last 3 points recorded; measured in argon.
3	38	1962	1650-2015	~0°		Prepared from micronized powder, hot pressed at > 2273 K; sintered, polished, etched, then degassed by heating to ~973 K; measured in argon; integrated from spectral data (0.4-5 μm).

DATA TABLE NO. 257 NORMAL TOTAL EMITTANCE OF TITANIUM DIBORIDE TiB_2

[Temperature, T, K; Emittance, ε]

T	ε	T	ε
CURVE 1		CURVE 2 (cont.)	
1023	0.82	2844	0.35
1273	0.84	2883	0.37
		2844	0.37
CURVE 2		2883	0.40
		2889	0.40
847	0.41	2884	0.46*
986	0.79	2811	0.51*
1105	0.77	2705	0.63*
1250	0.77	2722	0.61*
1339	0.87	2977	0.42*
1467	0.87		
1617	0.76	CURVE 3	
1678	0.78		
1622	0.76	1650	0.480
1950	0.55	1850	0.590
1917	0.50	2015	0.655
2183	0.40		
2255	0.41		
2433	0.39		
2578	0.35		
2672	0.36		
2744	0.35		

*Not shown on plot.

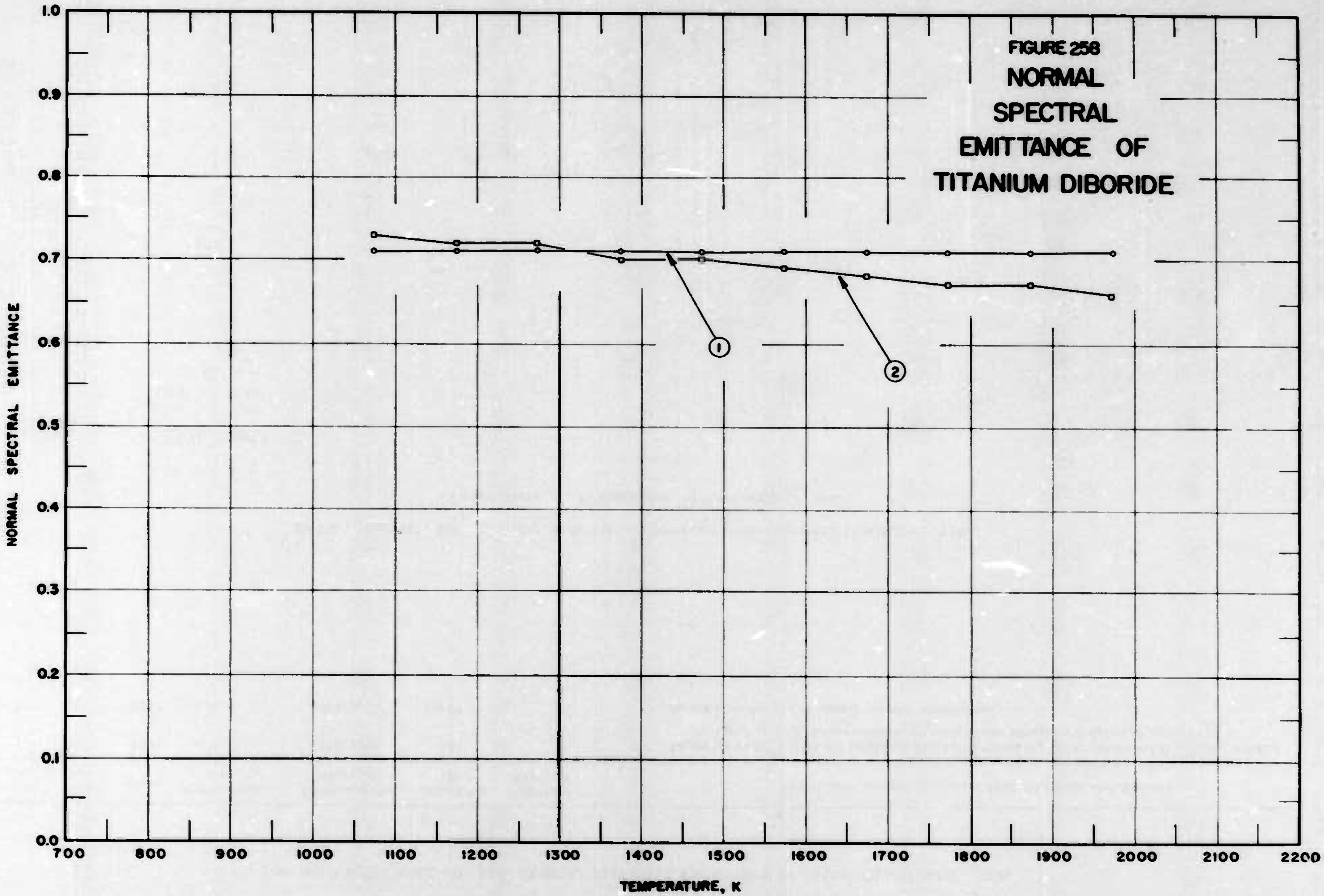


FIGURE 258
NORMAL SPECTRAL EMITTANCE OF TITANIUM DIBORIDE

SPECIFICATION TABLE NO. 258 NORMAL SPECTRAL EMITTANCE OF TITANIUM DIBORIDE TiB_2

Curve No.	Ref. No.	Year	Wavelength, µm	Temperature Range, µm	Geometry θ'	Reported Error, %	Composition (weight percent), Specifications and Remarks
1	13	1962	0.650	1073-1973	~0°		Layer of paste (~100 µm thick) on tantalum cylinder; paste prepared from fine powder (2-3 µm) of TiB_2 suspended in nitrocellulose binder and dried at 313 to 333 K.
2	13	1962	0.650	1073-1973	~0°		Similar to the above specimen and conditions.

DATA TABLE NO. 258 NORMAL SPECTRAL EMITTANCE OF TITANIUM DIBORIDE TiB_2

[Temperature, T, K; Emittance, ϵ; Wavelength, λ, µm]

T	ϵ	T	ϵ
CURVE 1 λ = 0.650		**CURVE 2 (cont.)**	
1073	0.71	1873	0.67
1173	0.71	1973	0.66
1273	0.71		
1373	0.71		
1473	0.71		
1573	0.71		
1673	0.71		
1773	0.71		
1873	0.71		
1973	0.71		
CURVE 2 λ = 0.650			
1073	0.73		
1173	0.72		
1273	0.72		
1373	0.70		
1473	0.70		
1573	0.69		
1673	0.68		
1773	0.67		

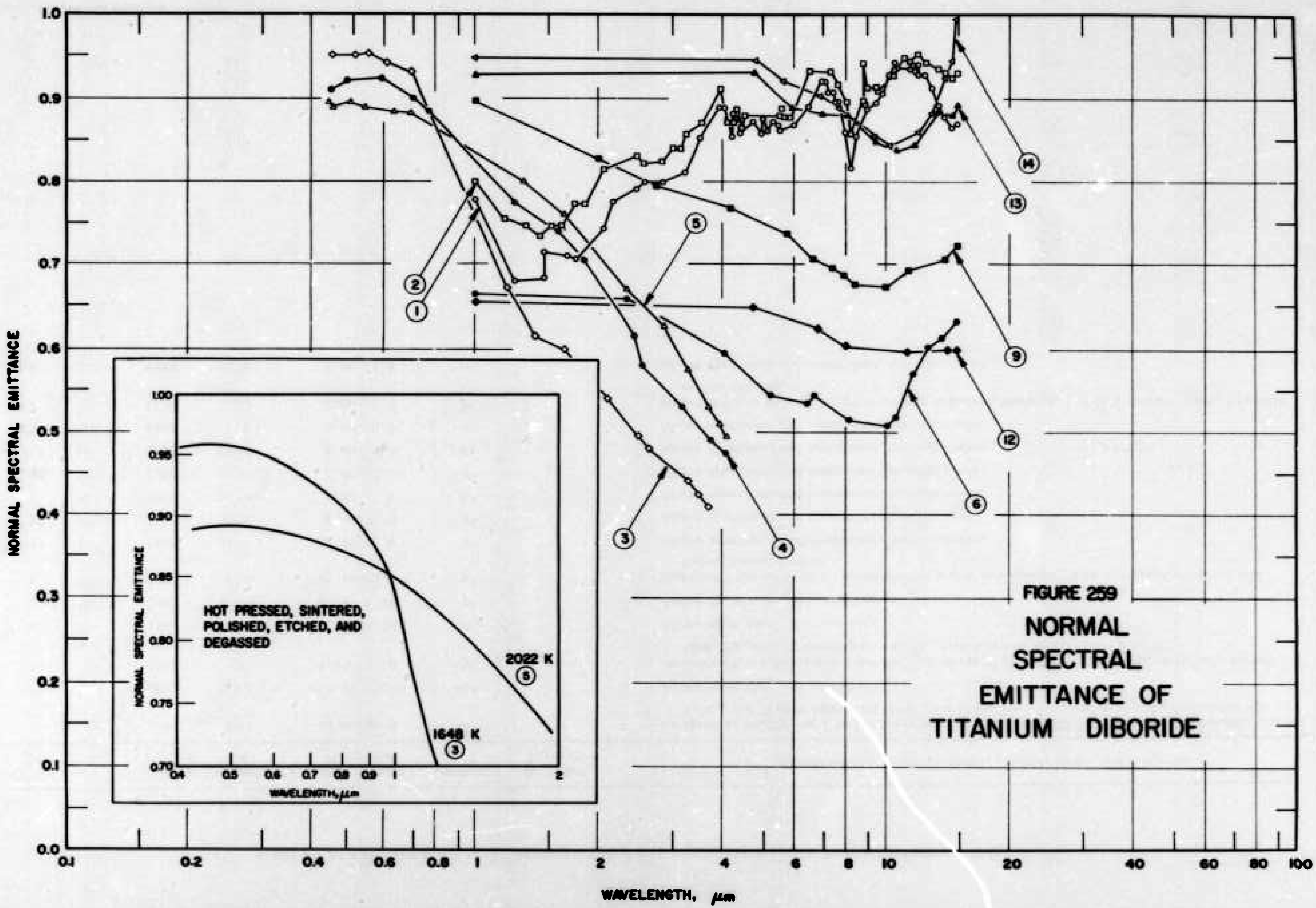


FIGURE 259
NORMAL SPECTRAL EMITTANCE OF TITANIUM DIBORIDE

SPECIFICATION TABLE NO. 259 NORMAL SPECTRAL EMITTANCE OF TITANIUM DIBORIDE TiB_2

Curve No.	Ref. No.	Year	Temperature, K	Wavelength Range, μm	Geometry θ'	Reported Error, %	Composition (weight percent), Specifications and Remarks
1	28	1963	1023	1.00-15.0	~0°		Sintered at 2073 K for 1 hr (setter material TiB_2); density 2.79 g cm^{-3}; theoretical density 4.52 g cm^{-3}; data extracted from smooth curve; [Authors' designation: Sample No. 1].
2	28	1963	1273	1.00-15.0	~0°		Above specimen and conditions.
3	38	1962	1648	0.450-3.70	~0°		Prepared from micronized powder; hot pressed at >2273 K; sintered, polished, etched, then degassed by heating to ~973 K; measured in argon (1140 mm Hg).
4	38	1962	1850	0.451-4.10	~0°		Above specimen and conditions.
5	38	1962	2022	0.440-4.10	~0°		Above specimen and conditions.
6	382	1965	873	1.00-15.0	0°		Sintered 2 hrs at 1623 K; measured in argon atmosphere; data extracted from smooth curve; heating cycle.
7*	382	1965	1073	1.00-15.0	0°		Above specimen and conditions; heating cycle.
8*	382	1965	1273	1.00-15.0	0°		Above specimen and conditions; heating cycle.
9	382	1965	1423	1.00-15.0	0°		Above specimen and conditions; heating cycle.
10*	382	1965	1273	1.00-15.0	0°		Above specimen and conditions; cooling cycle.
11*	382	1965	1073	1.00-15.0	0°		Above specimen and conditions; cooling cycle.
12	382	1965	873	1.00-15.0	0°		Above specimen and conditions; cooling cycle.
13	382	1965	1273	1.00-15.0	0°		Sintered 2 hrs at 1673 K; measured in argon-H_2 atmosphere; data extracted from smooth curve; 1st run.
14	382	1965	1273	1.00-15.0	0°		Above specimen and conditions; 4th run.

*Not shown on plot

DATA TABLE NO. 259 NORMAL SPECTRAL EMITTANCE OF TITANIUM DIBORIDE TiB_2

[Wavelength, λ, μm; Emittance, ϵ; Temperature, T, K]

λ	ϵ
CURVE 1 T = 1023	
1.00	0.779
1.25	0.679
1.49	0.682
1.49	0.716
1.69	0.710
1.77	0.706
2.05	0.744
2.18	0.777
2.48	0.791
2.60	0.800
2.89	0.800
3.25	0.814
3.53	0.854
3.92	0.890
4.05	0.890
4.21	0.855
4.25	0.882
4.36	0.882
4.41	0.859
4.79	0.873
5.00	0.858
5.05	0.878
5.13	0.861
5.34	0.873
5.49	0.869
5.57	0.862
6.00	0.869
6.50	0.891
7.00	0.920
7.16	0.920
7.21	0.909
7.45	0.909
7.51	0.898
7.68	0.898
8.00	0.860
8.23	0.819
8.50	0.856
9.01	0.889
9.50	0.896
9.81	0.906
10.2	0.929
10.5	0.932
10.5	0.941
CURVE 1 (cont.)	
10.6	0.934
11.5	0.934
11.7	0.938
11.8	0.933
12.0	0.939
12.0	0.929
12.5	0.929
13.0	0.913
13.5	0.893
14.0	0.879
14.5	0.866
15.0	0.870
CURVE 2 T = 1273	
1.00	0.800
1.17	0.753
1.32	0.747
1.44	0.733
1.53	0.747
1.62	0.747
1.75	0.773
1.87	0.773
2.05	0.817
2.48	0.832
2.58	0.823
2.85	0.827
3.03	0.842
3.19	0.842
3.28	0.858
3.58	0.871
3.98	0.912
4.10	0.872
4.27	0.872
4.32	0.888
4.46	0.866
4.56	0.880
5.54	0.880
5.60	0.890
5.66	0.879
5.82	0.879
6.55	0.932
7.35	0.932
CURVE 2 (cont.)	
7.69	0.917
8.01	0.897
8.21	0.859
8.82	0.899
8.87	0.940
8.96	0.894
9.06	0.914
9.54	0.914
9.58	0.910
10.4	0.939
11.1	0.946
11.5	0.943
12.0	0.951
12.5	0.941
13.5	0.935
14.0	0.930
14.5	0.925
15.0	0.930
CURVE 3 T = 1648	
0.450	0.950
0.510	0.950
0.550	0.951
0.610	0.940
0.700	0.930
1.20	0.671
1.40	0.615
1.65	0.600
2.10	0.540
2.50	0.495
2.65	0.480
3.30	0.441
3.50	0.426
3.70	0.410
CURVE 4 T = 1850	
0.451	0.910
0.495	0.920
0.595	0.922
0.710	0.900
CURVE 4 (cont.)	
0.770	0.886
1.26	0.775
1.60	0.740
1.86	0.705
2.47	0.615
2.57	0.580
3.20	0.530
3.75	0.490
4.10	0.471
CURVE 5 T = 2022	
0.440	0.895
0.450	0.890
0.500	0.895
0.540	0.890
0.635	0.885
0.700	0.883
1.31	0.800
1.65	0.760
2.35	0.670
2.90	0.626
3.30	0.575
3.70	0.530
3.95	0.510
4.10	0.495
CURVE 6 T = 873	
1.00	0.663
2.34	0.659
4.01	0.597
5.24	0.544
6.47	0.535
6.77	0.545
8.12	0.515
10.0	0.509
10.5	0.519
11.7	0.570
12.8	0.602
13.8	0.614
15.0	0.632
CURVE 7* T = 1073	
1.00	0.902
1.74	0.894
2.63	0.829
3.14	0.777
3.57	0.743
4.49	0.709
5.76	0.666
6.47	0.657
7.27	0.693
7.82	0.693
8.51	0.649
8.76	0.628
10.3	0.625
11.0	0.636
13.0	0.725
14.3	0.767
15.0	0.787
CURVE 8* T = 1273	
1.00	0.933
1.75	0.918
3.74	0.810
4.95	0.740
5.68	0.705
6.53	0.701
7.33	0.730
7.92	0.743
8.73	0.728
9.15	0.709
11.2	0.709
11.9	0.723
12.8	0.777
13.5	0.809
14.5	0.830
15.0	0.842
CURVE 9 T = 1423	
1.00	0.896
2.00	0.828
CURVE 9 (cont.)	
2.76	0.795
4.20	0.769
5.79	0.737
6.61	0.708
7.41	0.696
7.92	0.688
8.41	0.677
10.0	0.673
11.3	0.693
14.0	0.707
15.0	0.724
CURVE 10* T = 1273	
1.00	0.787
1.76	0.794
2.76	0.795
4.20	0.769
5.79	0.737
6.61	0.708
7.41	0.696
7.92	0.688
8.41	0.677
10.0	0.673
11.3	0.693
14.0	0.707
15.0	0.724
CURVE 11* T = 1073	
1.00	0.742
4.27	0.728
6.07	0.700
6.51	0.692
7.75	0.652
9.01	0.625
10.3	0.625
11.0	0.635
12.2	0.651
15.0	0.660
CURVE 12 T = 873	
1.00	0.653
4.75	0.648
6.86	0.624
8.00	0.605
11.2	0.599
14.2	0.600
15.0	0.600
CURVE 13 T = 1273	
1.00	0.927
4.80	0.930
5.98	0.890
7.00	0.881
8.01	0.880
9.50	0.849
10.6	0.839
11.9	0.844
13.4	0.884
14.6	0.930
15.0	0.942
CURVE 14 T = 1273	
1.00	0.946
4.85	0.945
5.65	0.920
6.99	0.902
7.78	0.890
9.41	0.853
10.2	0.846
12.0	0.860
13.0	0.882
14.0	0.927
14.5	0.943
15.0	0.950

*Not shown on plot.

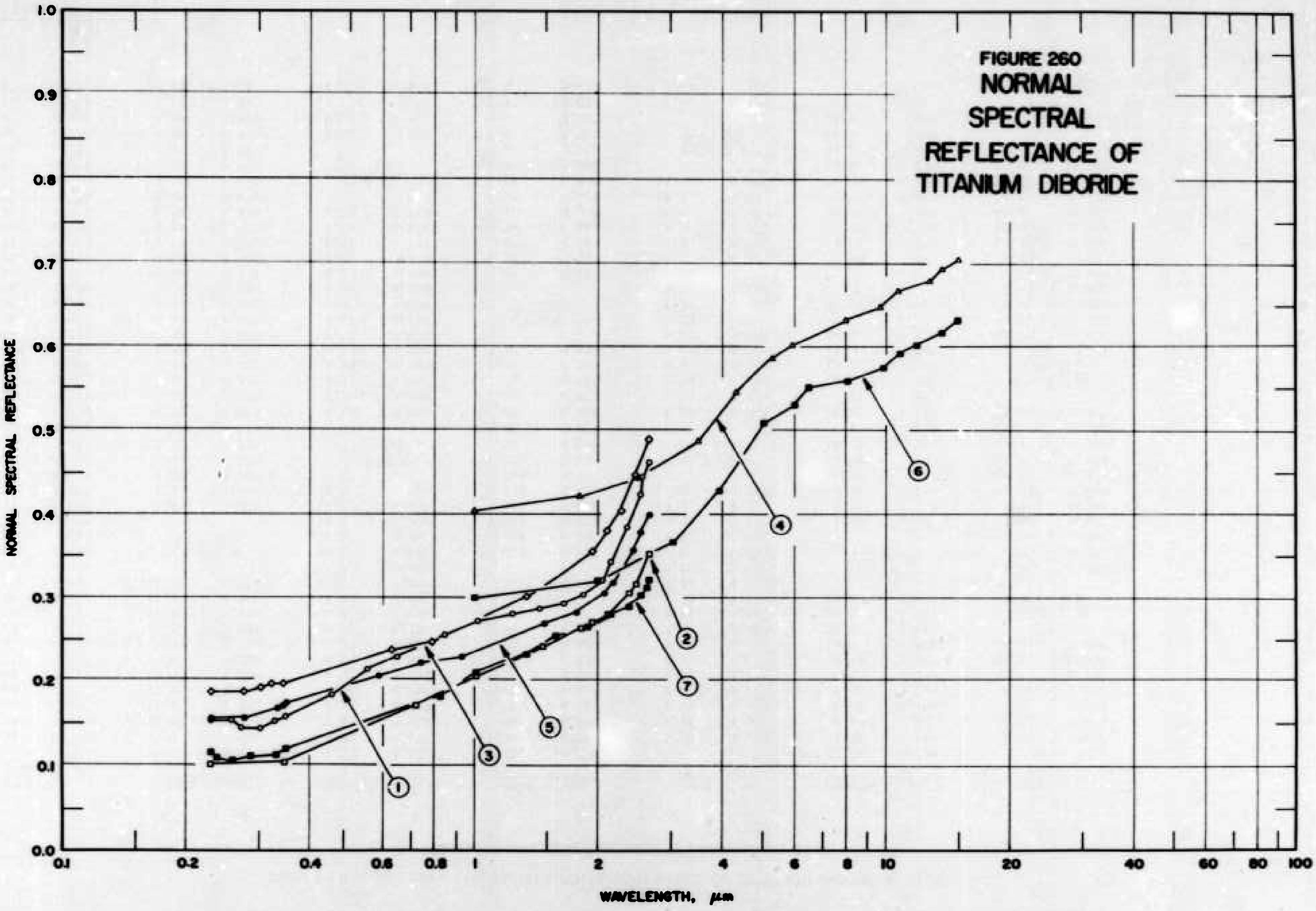


FIGURE 260
NORMAL
SPECTRAL
REFLECTANCE OF
TITANIUM DIBORIDE
NORMAL SPECTRAL REFLECTANCE
WAVELENGTH, μm
1.0
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0.0
0.1
0.2
0.4
0.6
0.8
1
2
4
6
8
10
20
40
60
80
100
1
2
3
4
5
6
7

SPECIFICATION TABLE NO. 260 NORMAL SPECTRAL REFLECTANCE OF TITANIUM DIBORIDE TiB_2

Curve No.	Ref. No.	Year	Temperature, K	Wavelength Range, μm	Geometry θ	Geometry θ'	Geometry ω'	Reported Error, %	Composition (weight percent), Specifications and Remarks
1	28	1963	298	0.230-2.65	~0°		2π		Sintered at 2073 K for 1 hr (setter material TiB_2); density 2.79 g cm^{-3}; theoretical density 4.52 g cm^{-3}; data extracted from smooth curve; [Authors' designation: Sample No. 1].
2	91	1967	298	0.230-2.65	0°		2π		Powder; commercially pure; -400+500 mesh; pressed at 16200 Newtons cm^{-2}; 1.6 mm thick on stainless steel; data extracted from smooth curve.
3	382	1965	~298	0.230-2.65	0°		2π		Underfired; sintered; surface roughness 100-150 μ inches; data extracted from smooth curve; MgO reference standard.
4	382	1965	~298	1.00-15.0	0°		2π		Above specimen and conditions; converted from reflectance factor.
5	382	1965	~298	0.230-2.65	0°		2π		Similar to curve 3 specimen and conditions except surface roughened by machine grooving a grid pattern ~0.004 in. deep with line spacing 0.001 in.
6	382	1965	~298	1.00-15.0	0°		2π		Above specimen and conditions; converted from reflectance factor.
7	393	1966	~298	0.230-2.65	~0°		2π		TiB_2; powder compacted at 35,300 psi; data extracted from smooth curve; MgO reference standard.
8*	393	1966	~298	0.230-2.65	~0°		2π		Similar to the above specimen and conditions except -170 mesh.
9*	393	1966	~298	0.230-2.65	~0°		2π		Similar to the above specimen and conditions except -400 mesh.

*Not shown on plot

DATA TABLE NO. 260 NORMAL SPECTRAL REFLECTANCE OF TITANIUM DIBORIDE TiB_2

[Wavelength, λ, μm; Reflectance, ρ; Temperature, T, K]

λ	ρ
CURVE 1 T = 298	
0.230	0.150
0.259	0.150
0.273	0.141
0.304	0.141
0.330	0.150
0.350	0.154
0.450	0.180
0.547	0.212
0.649	0.227
0.850	0.252
1.05	0.270
1.24	0.278
1.45	0.285
1.65	0.291
1.84	0.302
2.05	0.321
2.14	0.341
2.34	0.382
2.52	0.422
2.59	0.442
2.65	0.461
CURVE 2 T = 298	
0.230	0.100
0.348	0.103
0.723	0.167
1.01	0.204
1.47	0.240
1.81	0.261
1.94	0.269
2.12	0.279
2.38	0.303
2.47	0.316
2.65	0.315
CURVE 3 T ~ 298	
0.230	0.183
0.277	0.183
0.304	0.189
0.321	0.193
CURVE 3 (cont.)	
0.346	0.194
0.629	0.237
0.797	0.245
1.33	0.300
1.91	0.354
2.10	0.378
2.28	0.404
2.45	0.446
2.65	0.489
CURVE 4 T ~ 298	
1.00	0.403
1.80	0.420
2.52	0.441
3.53	0.486
4.34	0.542
5.22	0.585
5.99	0.601
8.00	0.631
9.78	0.648
10.6	0.666
12.8	0.679
13.6	0.694
15.0	0.704
CURVE 5 T ~ 298	
0.230	0.151
0.278	0.151
0.333	0.163
0.344	0.166
0.350	0.170
0.581	0.202
0.742	0.220
0.936	0.228
1.49	0.266
1.77	0.280
2.07	0.304
2.19	0.319
2.42	0.353
2.53	0.377
2.65	0.399
CURVE 6 T ~ 298	
1.00	0.298
2.00	0.320
3.03	0.365
3.95	0.427
5.01	0.508
6.00	0.529
6.52	0.549
8.01	0.556
9.90	0.572
10.7	0.591
11.9	0.601
13.6	0.618
15.0	0.631
CURVE 7 T ~ 298	
0.230	0.114
0.236	0.109
0.260	0.105
0.288	0.110
0.331	0.111
0.350	0.118
0.829	0.178
1.04	0.206
1.34	0.231
1.56	0.252
1.89	0.266
2.13	0.279
2.39	0.288
2.53	0.302
2.61	0.313
2.65	0.323
CURVE 8* T ~ 298	
0.230	0.117
0.253	0.112
0.292	0.117
0.309	0.122
0.322	0.126
0.341	0.125
0.403	0.131
CURVE 8 (cont.)*	
0.810	0.180
1.06	0.215
1.23	0.230
1.51	0.253
1.86	0.272
2.22	0.292
2.30	0.300
2.41	0.305
2.52	0.317
2.65	0.335
CURVE 9* T ~ 298	
0.230	0.114
0.251	0.108
0.294	0.115
0.323	0.123
0.337	0.126
0.360	0.135
0.596	0.166
0.933	0.204
1.31	0.254
1.50	0.275
1.70	0.280
2.14	0.300
2.32	0.310
2.53	0.333
2.65	0.344

*Not shown on plot.

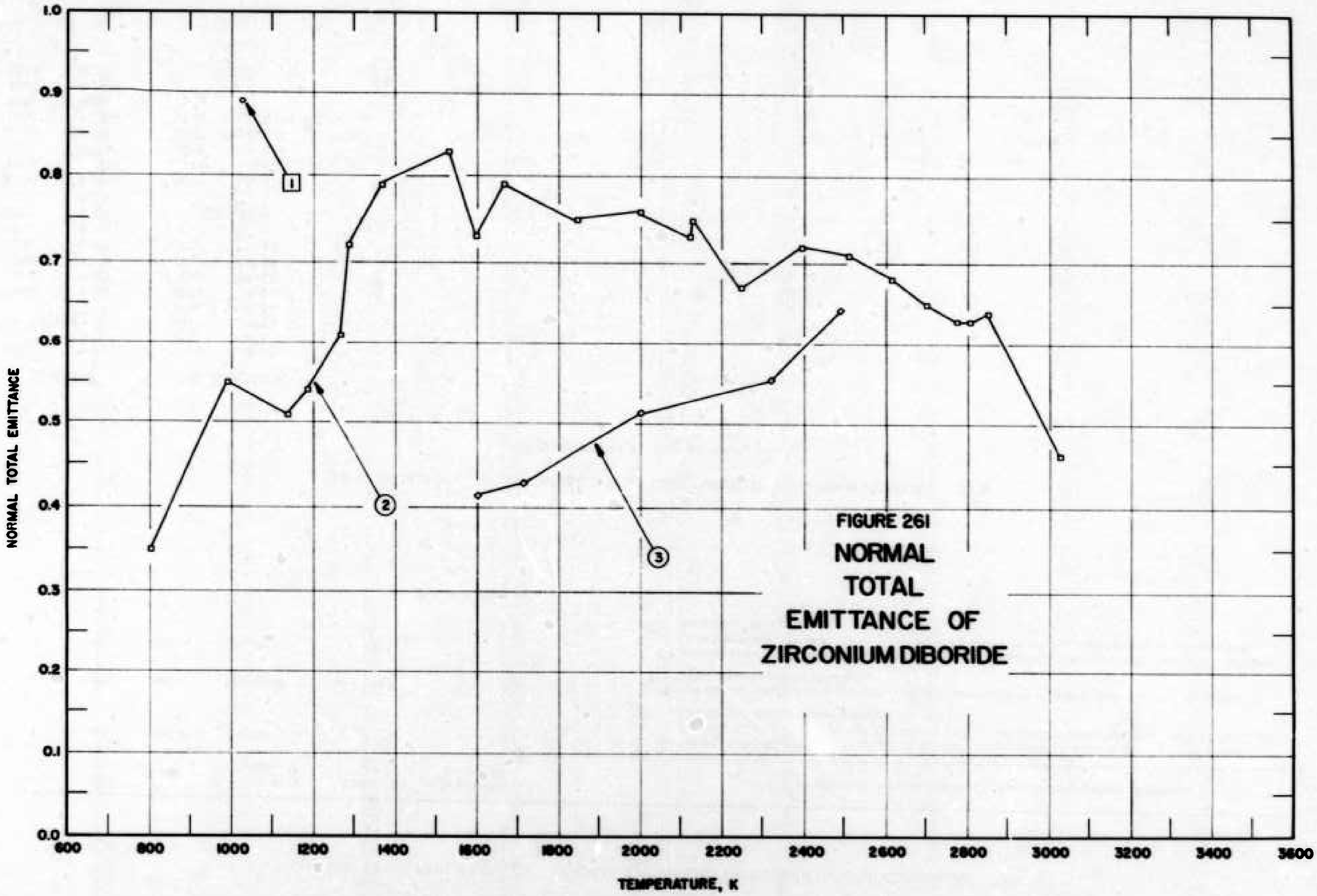


FIGURE 261
NORMAL
TOTAL
EMITTANCE OF
ZIRCONIUM DIBORIDE

SPECIFICATION TABLE NO. 261 NORMAL TOTAL EMITTANCE OF ZIRCONIUM DIBORIDE ZrB_2

Curve No.	Ref. No.	Year	Temperature Range, K	Geometry θ'	Reported Error, %	Composition (weight percent), Specifications and Remarks
1	28	1963	1023	~0°		Sintered at 2073 K for 1 hr (setter material ZrB_2); density 3.34 g cm^{-3}, theoretical density 6.15 g cm^{-3}; x-ray structure ZrB_2; integrated from spectral data (1 to 15 μm); [Authors' designation: Sample No. 99].
2	17	1962	805-3033	~0°		Hot pressed; dark areas appeared on surface at 2244 K; specimen started smoking at 2394 K; measured in argon.
3	38	1962	1600-2490	~0°		Prepared from micronized powder, hot pressed at >2273 K; sintered, polished, etched, then degassed by heating to ~973 K; measured in argon; calculated from spectral data (0.4 to 5 μm).

DATA TABLE NO. 261 NORMAL TOTAL EMITTANCE OF ZIRCONIUM DIBORIDE ZrB_2

[Temperature, T, K; Emittance, ϵ]

T	ϵ	T	ϵ
CURVE 1		**CURVE 2 (cont.)**	
1023	0.89	2394	0.72
		2505	0.71
CURVE 2		2611	0.68
		2700	0.65
805	0.35	2778	0.63
992	0.55	2805	0.63
1139	0.51	2850	0.64
1283	0.72	3033	0.46
1183	0.54		
1267	0.61	**CURVE 3**	
1361	0.79		
1528	0.83	1600	0.414
1599	0.73	1710	0.430
1667	0.79	2000	0.514
1844	0.75	2320	0.555
2000	0.76	2490	0.645
2128	0.75		
2122	0.73		
2244	0.67		

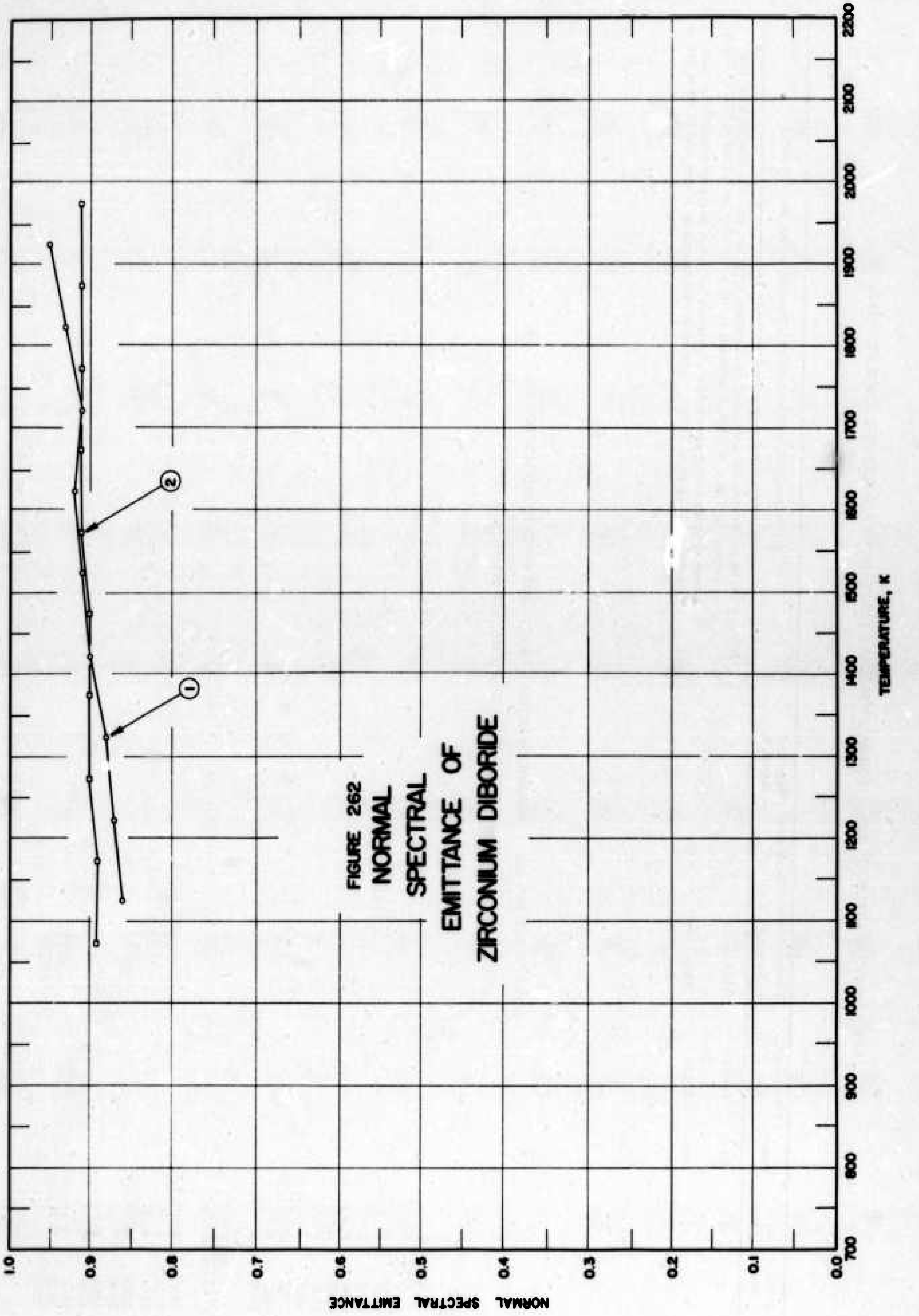


FIGURE 262 NORMAL SPECTRAL EMITTANCE OF ZIRCONIUM DIBORIDE

SPECIFICATION TABLE NO. 262 NORMAL SPECTRAL EMITTANCE OF ZIRCONIUM DIBORIDE ZrB_2

Curve No.	Ref. No.	Year	Wavelength, μm	Temperature Range, K	Geometry θ'	Reported Error, %	Composition (weight percent), Specifications and Remarks
1	16	1960	0.650	1123-1923	~0°		Layer of paste (~100 μm thick) on tantalum cylinder; paste prepared from fine powder (2-3 μm) of ZrB_2 suspended in nitrate binder and dried at 313 to 333 K.
2	13	1962	0.650	1073-1973	~0°		Layer of paste (~100 μm thick) on tantalum cylinder; paste prepared from fine powder (2-3 μm) of ZrB_2 suspended in nitrocellulose binder and dried at 313 to 333 K.

DATA TABLE NO. 262 NORMAL SPECTRAL EMITTANCE OF ZIRCONIUM DIBORIDE ZrB_2

[Temperature, T, K; Emittance, ϵ; Wavelength, λ, μm]

T	ϵ
CURVE 1	
λ = 0.650	
1123	0.86
1223	0.87
1323	0.88
1423	0.90
1523	0.91
1623	0.92
1723	0.91
1823	0.93
1923	0.95
CURVE 2	
λ = 0.650	
1073	0.89
1173	0.89
1273	0.90
1373	0.90
1473	0.90
1573	0.91
1673	0.91
1773	0.91
1873	0.91
1973	0.91

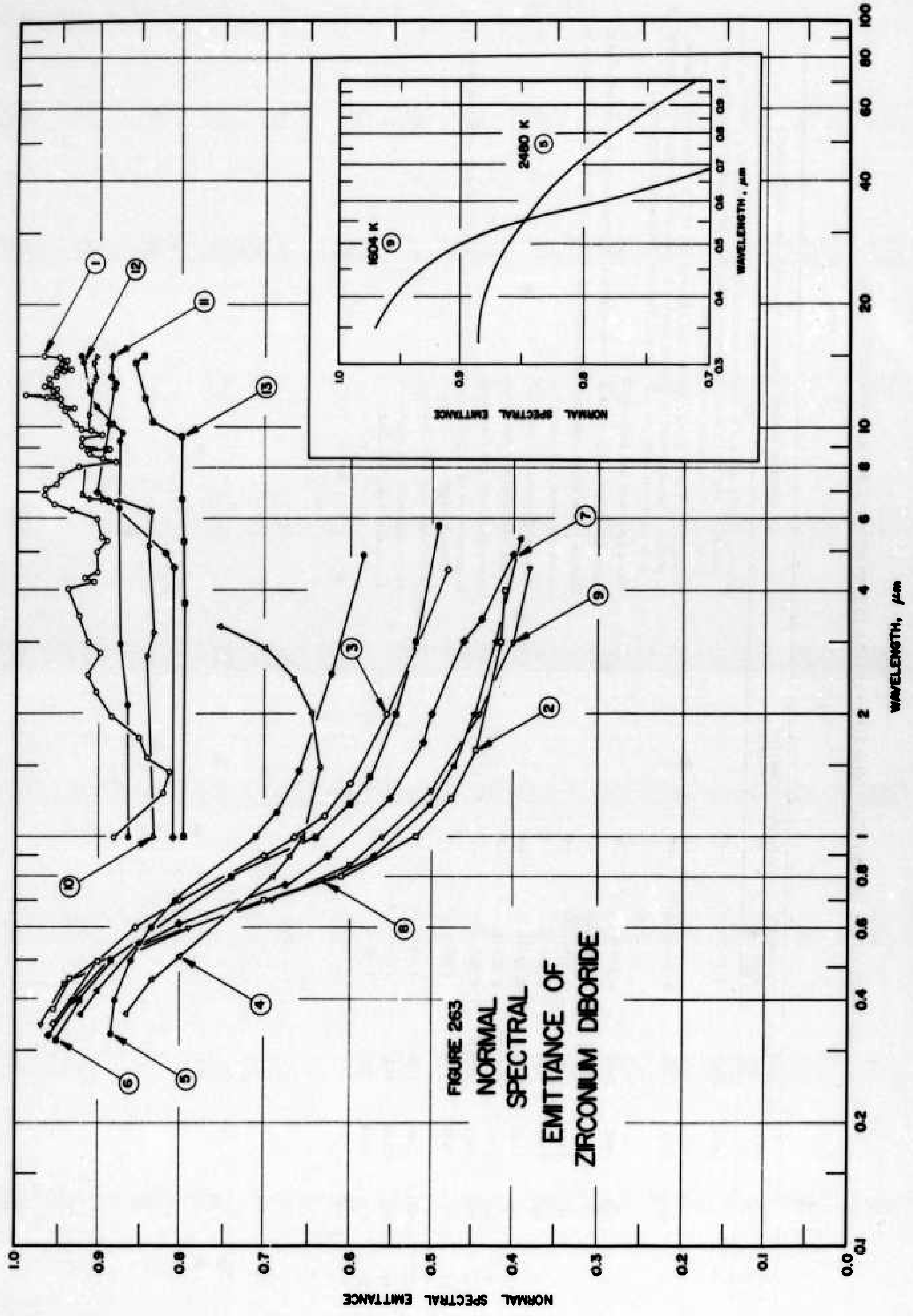


FIGURE 263 NORMAL SPECTRAL EMITTANCE OF ZIRCONIUM DIBORIDE

SPECIFICATION TABLE NO. 263 NORMAL SPECTRAL EMITTANCE OF ZIRCONIUM DIBORIDE ZrB_2

Curve No.	Ref. No.	Year	Temperature, K	Wavelength Range, μm	Geometry θ'	Reported Error, %	Composition (weight percent), Specifications and Remarks
1	28	1963	1023	1.00-15.0	~0°		Sintered at 2073 K for 1 hr (setter material ZrB_2); density 3.34 g cm^{-3}, theoretical density 6.15 g cm^{-3}; x-ray structure ZrB_2; data extracted from smooth curve; [Authors' designation: Sample No. 99].
2	38	1962	1704	0.380-4.00	~0°		Prepared from micronized powder; hot pressed at >2273 K; sintered, polished, etched, then degassed by heating to ~973 K; measured in argon (1140 mm Hg); data extracted from smooth curve; [Authors' designation: Specimen 1].
3	38	1962	2032	0.350-4.50	~0°		Above specimen and conditions.
4	38	1962	2389	0.370-3.28	~0°		Above specimen and conditions; x-ray analysis show structure converted to ZrN.
5	38	1962	2480	0.330-4.90	~0°		Similar to the above specimen and conditions except stabilized at 2000 K for a hr.
6	38	1962	2330	0.320-5.75	~0°		Above specimen and conditions.
7	38	1962	2000	0.330-4.90	~0°		Above specimen and conditions.
8	38	1962	1702	0.370-5.35	~0°		Above specimen and conditions.
9	38	1962	1604	0.350-4.50	~0°		Above specimen and conditions.
10	382	1965	1423	1.00-15.0	0°		Sintered 2 hrs at 1423 K; measured in argon atmosphere; data extracted from smooth curve.
11	382	1965	1273	1.00-15.0	0°		Above specimen and conditions.
12	382	1965	1073	1.00-15.0	0°		Above specimen and conditions.
13	382	1965	873	1.00-15.0	0°		Above specimen and conditions.

DATA TABLE NO. 263 NORMAL SPECTRAL EMITTANCE OF ZIRCONIUM DIBORIDE ZrB_2

[Wavelength, λ, μm; Emittance, ε; Temperature, T, K]

λ	ε
CURVE 1	
T = 1023	
1.00	0.881
1.28	0.821
1.45	0.814
1.56	0.841
1.75	0.850
1.99	0.885
2.28	0.902
2.49	0.913
2.82	0.899
3.00	0.913
3.49	0.925
4.02	0.939
4.20	0.906
4.31	0.919
4.43	0.901
5.00	0.902
5 31	0.891
5.40	0.899
6.00	0.902
6.30	0.933
6.54	0.957
6.89	0.969
7.08	0.969
7.28	0.953
7.69	0.948
8.01	0.927
8.29	0.881
8.41	0.896
8.63	0.914
8.83	0.916
8.89	0.889
9.02	0.921
9.45	0.921
9.61	0.898
9.84	0.910
9.96	0.922
10.1	0.930
11.0	0.942
11.1	0.932
11.3	0.948
11.8	0.948
11.9	0.966
12.0	0.952
12.0	0.990

λ	ε
CURVE 1 (cont.)	
12.1	0.952
12.2	0.959
12.4	0.952
12.6	0.970
12.7	0.961
13.2	0.964
13.4	0.954
13.6	0.954
13.7	0.944
13.8	0.953
13.8	0.935
13.9	0.952
14.1	0.942
14.2	0.948
14.5	0.948
14.5	0.940
14.7	0.949
14.8	0.949
15.0	0.970
CURVE 2	
T = 1704	
0.380	0.956
0.450	0.935
0.500	0.900
0.700	0.700
0.800	0.610
1.00	0.520
1.23	0.475
1.62	0.445
3.00	0.415
4.00	0.410
CURVE 3	
T = 2032	
0.350	0.955
0.500	0.900*
0.600	0.855
0.700	0.800
0.900	0.700
1.00	0.665
1.13	0.630
1.35	0.600

λ	ε
CURVE 3 (cont.)	
2.00	0.555
4.50	0.480
CURVE 4	
T = 2389	
0.370	0.865
0.450	0.835
0.510	0.800
0.700	0.720
0.800	0.690
0.900	0.670
1.00	0.655
1.48	0.635
2.00	0.645
2.42	0.665
2.90	0.700
3.28	0.755
CURVE 5	
T = 2480	
0.330	0.885
0.400	0.880
0.500	0.860
0.600	0.835
0.700	0.805
1.00	0.710
1.15	0.685
1.45	0.660
2.50	0.621
4.90	0.585
CURVE 6	
T = 2330	
0.320	0.950
0.400	0.922
0.500	0.885
0.600	0.835*
0.800	0.740
1.00	0.640
1.20	0.600
1.40	0.575
2.00	0.545

λ	ε
CURVE 6 (cont.)	
3.00	0.520
5.75	0.490
CURVE 7	
T = 2000	
0.330	0.960
0.400	0.930
0.500	0.885*
0.615	0.800
0.760	0.675
0.900	0.625
1.25	0.550
1.70	0.510
2.00	0.500
3.00	0.460
3.40	0.438
4.90	0.400
CURVE 8	
T = 1702	
0.370	0.920
0.420	0.900
0.550	0.850
0.610	0.800*
0.700	0.700*
0.780	0.630
0.900	0.570
1.20	0.500
1.50	0.470
2.00	0.445
3.00	0.420
5.35	0.390
CURVE 9	
T = 1604	
0.350	0.970
0.440	0.940
0.500	0.900*
0.600	0.790
0.700	0.690
0.860	0.600
1.00	0.560

λ	ε
CURVE 9 (cont.)	
1.30	0.500
2.00	0.440
3.00	0.400
4.50	0.380
CURVE 10	
T = 1473	
1.00	0.833
2.78	0.841
3.16	0.834
5.12	0.840
6.25	0.838
6.61	0.876
6.68	0.897
6.83	0.912
6.98	0.921
10.8	0.914
13.0	0.908
13.3	0.905
14.4	0.908
15.0	0.903
CURVE 11	
T = 1273	
1.00	0.810
4.59	0.810
5.99	0.820
6.65	0.891
7.00	0.903
8.92	0.892
10.5	0.889
12.5	0.884
12.8	0.881
13.3	0.888
15.0	0.886
CURVE 12	
T = 1073	
1.00	0.863
2.10	0.867
2.97	0.875
6.39	0.878

λ	ε
CURVE 12 (cont.)	
9.33	0.877
9.73	0.874
10.2	0.887
11.2	0.901
12.2	0.912
14.4	0.920
15.0	0.924
CURVE 13	
T = 873	
1.00	0.796
3.72	0.797
5.25	0.798
6.69	0.800
9.52	0.800
10.3	0.837
11.8	0.847
14.4	0.856
15.0	0.847

*Not shown on plot.

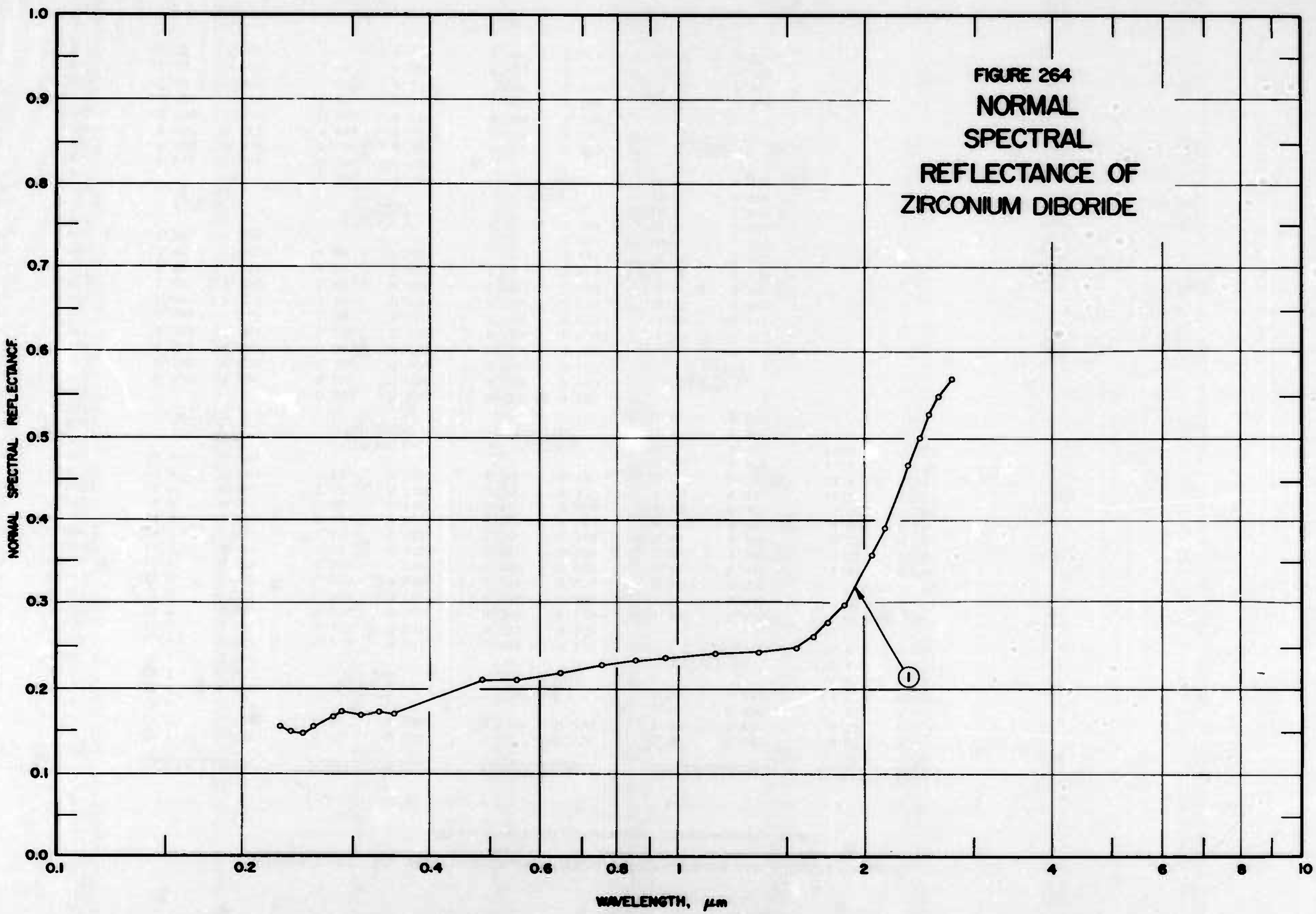


FIGURE 264
NORMAL
SPECTRAL
REFLECTANCE OF
ZIRCONIUM DIBORIDE
NORMAL SPECTRAL REFLECTANCE
WAVELENGTH, μm
1.0
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0.0
0.1
0.2
0.4
0.6
0.8
1
2
4
6
8
10
1

SPECIFICATION TABLE NO. 264 NORMAL SPECTRAL REFLECTANCE OF ZIRCONIUM DIBORIDE ZrB_2

Curve No.	Ref. No.	Year	Temperature, K	Wavelength Range, μm	Geometry θ	θ'	ω'	Reported Error, %	Composition (weight percent), Specifications and Remarks
1	28	1963	298	0.230-2.65	~0°		2π		Sintered at 2073 K for 1 hr (setter material ZrB_2); density 3.34 g cm^{-3}, theoretical density 6.15 g cm^{-3}; x-ray structure ZrB_2; data extracted from smooth curve; [Authors' designation: Sample No. 99].

DATA TABLE NO. 264 NORMAL SPECTRAL REFLECTANCE OF ZIRCONIUM DIBORIDE ZrB_2

[Wavelength, λ, μm; Reflectance, ρ; Temperature, T, K]

λ	ρ	λ	ρ
CURVE 1 T = 298		CURVE 1 (cont.)	
0.230	0.155	2.15	0.390
0.240	0.149	2.35	0.468
0.250	0.147	2.45	0.500
0.260	0.154	2.54	0.528
0.280	0.168	2.61	0.549
0.290	0.172	2.65	0.570
0.310	0.169		
0.331	0.172		
0.350	0.170		
0.486	0.210		
0.551	0.210		
0.649	0.219		
0.752	0.227		
0.851	0.233		
0.952	0.237		
1.15	0.241		
1.35	0.242		
1.55	0.249		
1.65	0.261		
1.74	0.277		
1.85	0.297		
2.05	0.358		

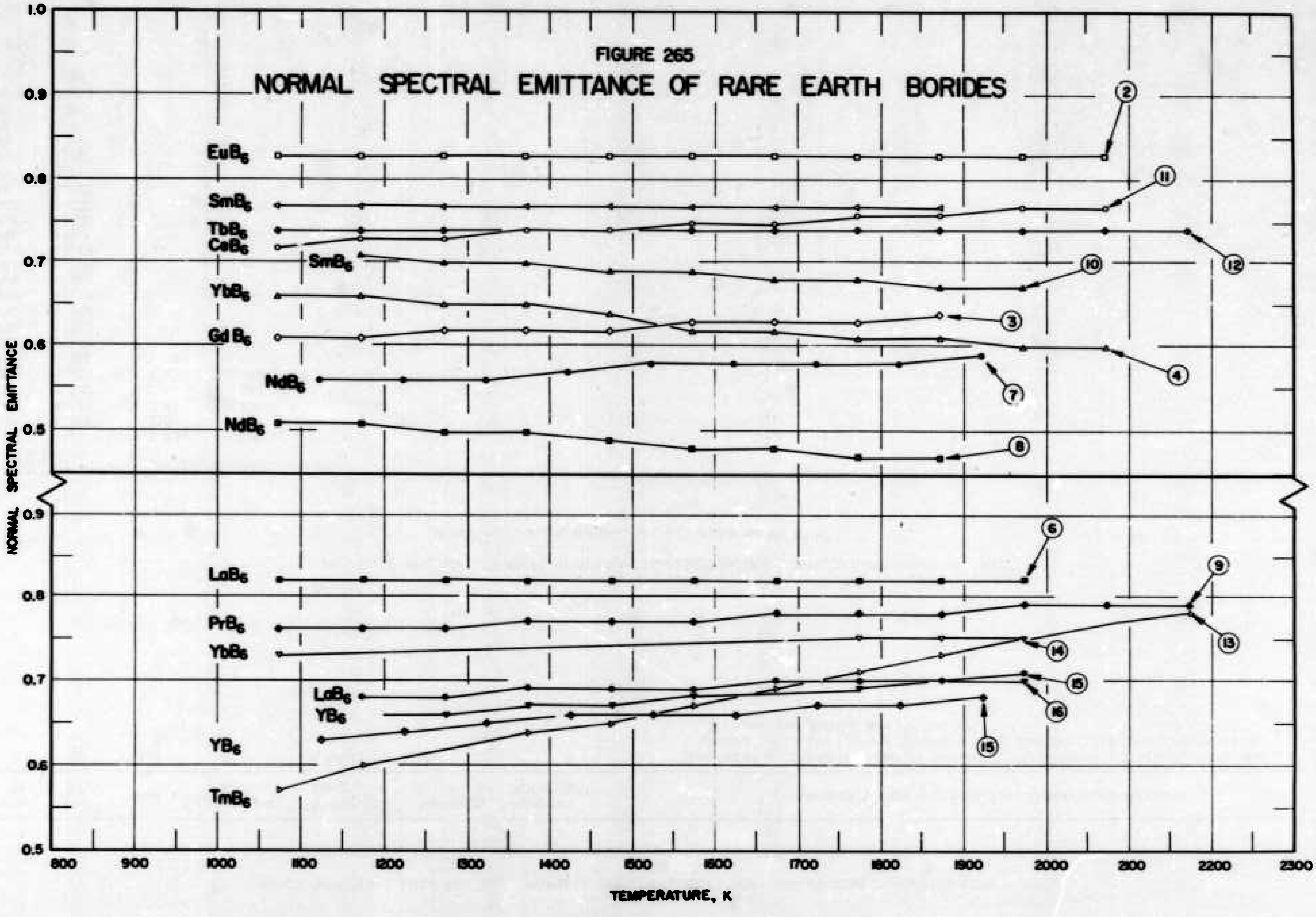


FIGURE 265
NORMAL SPECTRAL EMITTANCE OF RARE EARTH BORIDES
EuB6
SmB6
TbB6
CeB6
SmB6
YbB6
Gd B6
NdB6
NdB6
LaB6
PrB6
YbB6
LaB6
YB6
YB6
TmB6
2
11
12
10
3
4
7
8
6
9
13
14
15
16
15
NORMAL SPECTRAL EMITTANCE
TEMPERATURE, K
1.0
0.9
0.8
0.7
0.6
0.5
0.9
0.8
0.7
0.6
0.5
800
900
1000
1100
1200
1300
1400
1500
1600
1700
1800
1900
2000
2100
2200
2300

SPECIFICATION TABLE NO. 265 NORMAL SPECTRAL EMITTANCE OF RARE EARTH BORIDES

Curve No.	Ref. No.	Year	Wavelength, µm	Temperature Range, K	Geometry θ'	Reported Error, %	Composition (weight percent), Specifications and Remarks
1	13	1962	0.650	1073-2073	~0°		CERIUM HEXABORIDE, CeB_6; layer of paste (~100 µm thick) on tantalum cylinder; paste prepared from fine powder (2-3 µm) of CeB_6 suspended in nitrocellulose binder and dried at 313 to 333 K.
2	13	1962	0.650	1073-2073	~0°		EUROPIUM HEXABORIDE, EuB_6; layer of paste (~100 µm thick) on tantalum cylinder; paste prepared from fine powder (2-3 µm) of EuB_6 suspended in nitrocellulose binder and dried at 313 to 333 K.
3	16	1960	0.650	1123-1923	~0°		GADOLINIUM HEXABORIDE, GdB_6; layer of paste (~100 µm thick) on tantalum cylinder; paste prepared from fine powder (2-3 µm) of GdB_6 suspended in nitrate binder and dried at 313 to 333 K.
4	13	1962	0.650	1073-2073	~0°		GADOLINIUM HEXABORIDE, GdB_6; layer of paste (~100 µm thick) on tantalum cylinder; paste prepared from fine powder (2-3 µm) of GdB_6 suspended in nitrocellulose binder and dried at 313 to 333 K.
5	16	1960	0.650	1123-1923	~0°		LANTHANUM HEXABORIDE, LaB_6; layer of paste (~100 µm thick) on tantalum cylinder; paste prepared from fine powder (2-3 µm) of LaB_6 suspended in nitrate binder and dried at 313 to 333 K.
6	13	1962	0.650	1073-1973	~0°		LANTHANUM HEXABORIDE, LaB_6; layer of paste (~100 µm thick) on tantalum cylinder; paste prepared from fine powder (2-3µm) of LaB_6 suspended in nitrocellulose binder and dried at 313 to 333 K.
7	16	1960	0.650	1123-1923	~0°		NEODYMIUM HEXABORIDE, NdB_6; layer of paste (~100 µm thick) on tantalum cylinder; paste prepared from fine powder (2-3 µm) of NdB_6 suspended in nitrate binder and dried at 313 to 333 K.
8	13	1962	0.650	1073-1873	~0°		NEODYMIUM HEXABORIDE, NdB_6; layer of paste (~100 µm thick) on tantalum cylinder; paste prepared from fine powder (2-3 µm) of NdB_6 suspended in nitrocellulose binder and dried at 313 to 333 K.
9	13	1962	0.650	1073-2173	~0°		PRASEODYMIUM HEXABORIDE, PrB_6; layer of paste (~100 µm thick) on tantalum cylinder; paste prepared from fine powder (2-3 µm) of PrB_6 suspended in nitrocellulose binder and dried at 313 to 333 K.
10	16	1960	0.650	1123-1923	~0°		SAMARIUM HEXABORIDE, SmB_6; layer of paste (~100 µm thick) on tantalum cylinder; paste prepared from fine powder (2-3 µm) of SmB_6 suspended in nitrate binder and dried at 313 to 333 K.
11	13	1962	0.650	1073-1973	~0°		SAMARIUM HEXABORIDE, SmB_6; layer of paste (~100 µm thick) on tantalum cylinder; paste prepared from fine powder (2-3 µm) of SmB_6 suspended in nitrocellulose binder and dried at 313 to 333 K.
12	13	1962	0.650	1073-2173	~0°		TERBIUM HEXABORIDE, TbB_6; layer of paste (~100 µm thick) on tantalum cylinder; paste prepared from fine powder (2-3 µm) of TbB_6 suspended in nitrocellulose binder and dried at 313 to 333 K.

SPECIFICATION TABLE NO. 265 (continued)

Curve No.	Ref. No.	Year	Wavelength, μm	Temperature Range, K	Geometry θ'	Reported Error, %	Composition (weight percent), Specifications and Remarks
13	13	1962	0.650	1073-2173	$\sim 0°$		THULIUM HEXABORIDE, TmB_6; layer of paste ($\sim$100 μm thick) on tantalum cylinder; paste prepared from fine powder (2-3 μm) of TmB_6 suspended in nitrocellulose binder and dried at 313 to 333 K; sample contained some TmB_4.
14	13	1962	0.65	1073-1973	$\sim 0°$		YTTERBIUM HEXABORIDE, YbB_6; layer of paste ($\sim$100 μm thick) on tantalum cylinder; paste prepared from fine powder (2-3 μm) of YbB_6 suspended in nitrocellulose binder and dried at 313 to 333 K.
15	16	1960	0.650	1123-1923	$\sim 0°$		YTTRIUM HEXABORIDE, YB_6; layer of paste ($\sim$100 μm thick)on tantalum cylinder; paste prepared from fine powder (2-3 μm) of YB_6 suspended in nitrate binder and dried at 313 to 333 K.
16	13	1962	0.650	1073-1973	$\sim 0°$		YTTRIUM HEXABORIDE, YB_6; layer of paste ($\sim$100 μm thick) on tantalum cylinder; paste prepared from fine powder (2-3 μm) of YB_6 suspended in nitrocellulose binder and dried at 313 to 333 K.

DATA TABLE NO. 265 NORMAL SPECTRAL EMITTANCE OF RARE EARTH BORIDES

[Temperature, T, K; Emittance, ϵ; Wavelength, λ, μm]

T	ϵ
CURVE 1	
λ = 0.650	
1073	0.72
1173	0.73
1273	0.73
1373	0.74
1473	0.74
1573	0.75
1673	0.75
1773	0.76
1873	0.76
1973	0.77
2073	0.77
CURVE 2	
λ = 0.650	
1073	0.83
1173	0.83
1273	0.83
1373	0.83
1473	0.83
1573	0.83
1673	0.83
1773	0.83
1873	0.83
1973	0.83
2073	0.83
CURVE 3	
λ = 0.650	
1123	0.61
1223	0.61
1323	0.62
1423	0.62
1523	0.62
1623	0.63
1723	0.63
1823	0.63
1923	0.64
CURVE 4	
λ = 0.650	
1073	0.66
CURVE 4 (cont.)	
1173	0.66
1273	0.65
1373	0.65
1473	0.64
1573	0.62
1673	0.62
1773	0.61
1873	0.61
1973	0.60
2073	0.60
CURVE 5	
λ = 0.650	
1123	0.68
1223	0.68
1323	0.69
1423	0.69
1523	0.69
1623	0.70
1723	0.70
1823	0.70
1923	0.71
CURVE 6	
λ = 0.650	
1073	0.82
1173	0.82
1273	0.82
1373	0.82
1473	0.82
1573	0.82
1673	0.82
1873	0.82
1973	0.82
CURVE 7	
λ = 0.650	
1123	0.56
1223	0.56
1323	0.56
1423	0.57
1523	0.58
CURVE 7 (cont.)	
1623	0.58
1723	0.58
1823	0.58
1923	0.59
CURVE 8	
λ = 0.650	
1073	0.51
1173	0.51
1273	0.50
1373	0.50
1473	0.49
1573	0.48
1673	0.48
1773	0.47
1873	0.47
CURVE 9	
λ = 0.650	
1073	0.76
1173	0.76
1273	0.76
1373	0.77
1473	0.77
1573	0.77
1673	0.78
1773	0.78
1873	0.78
1973	0.79
2073	0.79
2173	0.79
CURVE 10	
λ = 0.650	
1123	0.71
1223	0.70
1323	0.70
1423	0.69
1523	0.69
1623	0.68
1723	0.68
1823	0.68
1923	0.67
CURVE 11	
λ = 0.650	
1073	0.77
1173	0.77
1273	0.77
1373	0.77
1473	0.77
1573	0.77
1673	0.77
1773	0.77
1873	0.77
1973	0.77
CURVE 12	
λ = 0.650	
1073	0.74
1173	0.74
1273	0.74
1373	0.74*
1473	0.74*
1573	0.74
1673	0.74
1773	0.74
1873	0.74
1973	0.74
2073	0.74
2173	0.74
CURVE 13	
λ = 0.650	
1073	0.57
1173	0.60
1273	0.62
1373	0.64
1473	0.65
1573	0.67
1673	0.69
1773	0.71
1873	0.73
1973	0.75
2073	0.77
2173	0.78
CURVE 14	
λ = 0.650	
1073	0.73
1173	0.73
1273	0.73
1373	0.74
1473	0.74
1573	0.74
1673	0.74
1773	0.75
1873	0.75
1973	0.75
CURVE 15	
λ = 0.650	
1123	0.63
1223	0.64
1323	0.65
1423	0.66
1523	0.66
1623	0.66
1723	0.67
1823	0.67
1923	0.68
CURVE 16	
λ = 0.650	
1073	0.66
1173	0.66
1273	0.66
1373	0.67
1473	0.67
1573	0.68
1673	0.68
1773	0.69
1873	0.70*
1973	0.70

*Not shown on plot.

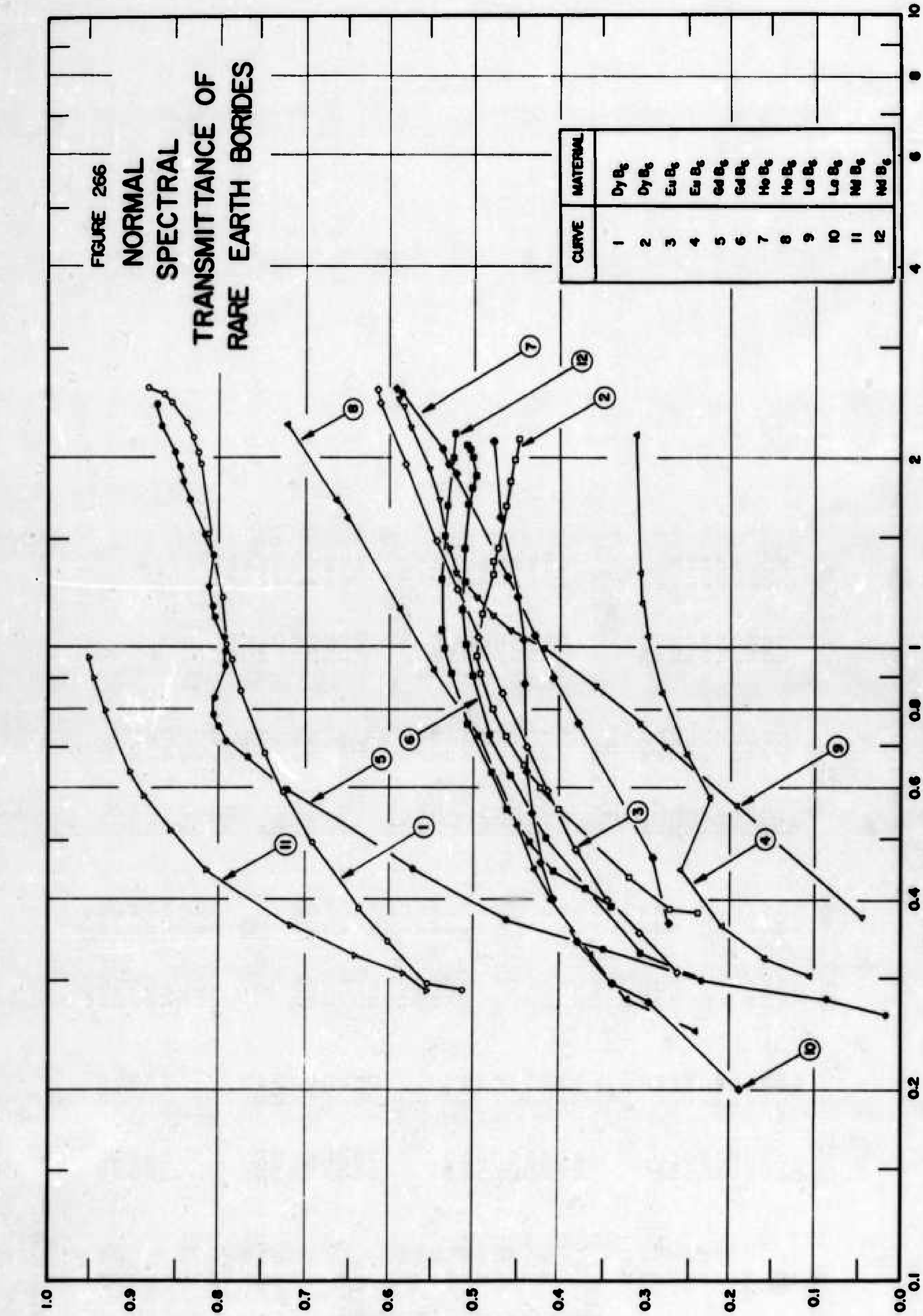


FIGURE 266 NORMAL SPECTRAL TRANSMITTANCE OF RARE EARTH BORIDES

SPECIFICATION TABLE NO. 266 NORMAL SPECTRAL TRANSMITTANCE OF RARE EARTH BORIDES

Curve No.	Ref. No.	Year	Temperature, K	Wavelength Range, μm	Geometry θ θ' ω'	Reported Error, %	Composition (weight percent), Specifications and Remarks
1	303	1961	~298	0.283-2.59	~0°~0°		DYSPROSIUM HEXABORIDE, DyB_6; thin film; thickness not controlled; deposited in vacuum by thermal evaporation; substrate, glass; data extracted from smooth curve; blank substrate reference standard.
2	303	1961	~298	0.380-2.14	~0°~0°		Similar to the above specimen and conditions except quartz substrate.
3	303	1961	~298	0.306-2.56	~0°~0°		ERBIUM HEXABORIDE, ErB_6; thin film; thickness not controlled; deposited in vacuum by thermal evaporation; substrate, glass; data extracted from smooth curve; blank substrate reference standard.
4	303	1961	~298	0.302-2.16	~0°~0°		Similar to the above specimen and conditions except quartz substrate.
5	303	1961	~298	0.262-2.42	~0°~0°		GADOLINIUM HEXABORIDE, GdB_6; thin film; thickness not controlled; deposited in vacuum by thermal evaporation; substrate, glass; data extracted from smooth curve; blank substrate reference standard.
6	303	1961	~298	0.262-2.09	~0°~0°		Similar to the above specimen and conditions except quartz substrate.
7	303	1961	~298	0.366-2.58	~0°~0°		HOLMIUM HEXABORIDE, HoB_6; thin film; thickness not controlled; deposited in vacuum by thermal evaporation; substrate, glass; data extracted from smooth curve; blank substrate reference standard.
8	303	1961	~298	0.248-2.25	~0°~0°		Similar to the above specimen and conditions except quartz substrate.
9	303	1961	~298	0.375-2.48	~0°~0°		LANTHANUM HEXABORIDE, LaB_6; thin film; thickness not controlled; deposited in vacuum by thermal evaporation; substrate, glass; data extracted from smooth curve; blank substrate reference standard.
10	303	1961	~298	0.200-2.11	~0°~0°		Similar to the above specimen and conditions except quartz substrate.
11	303	1961	~298	0.288-0.964	~0°~0°		NEODYMIUM HEXABORIDE, NdB_6; thin film; thickness not controlled; deposited in vacuum by thermal evaporation; substrate, glass; data extracted from smooth curve; blank substrate reference standard.
12	303	1961	~298	0.390-2.19	~0°~0°		Similar to the above specimen and conditions except quartz substrate.

DATA TABLE NO. 266 NORMAL SPECTRAL TRANSMITTANCE OF RARE EARTH BORIDES

[Wavelength, λ, μm; Transmittance, τ; Temperature, T, K]

CURVE 1
T ~ 298

λ	τ
0.288	0.511
0.295	0.553
0.342	0.600
0.388	0.637
0.493	0.692
0.591	0.724
0.681	0.745
0.854	0.773
0.957	0.785
1.07	0.791
1.20	0.796
1.51	0.813
1.95	0.821
2.03	0.825
2.15	0.831
2.27	0.839
2.45	0.856
2.51	0.864
2.59	0.882

CURVE 2
T ~ 298

λ	τ
0.380	0.238
0.385	0.272
0.431	0.320
0.555	0.400
0.600	0.422
0.651	0.441
0.721	0.463
0.800	0.478
0.902	0.492
0.965	0.496
1.13	0.490
1.30	0.478
1.36	0.478
1.43	0.471
1.67	0.462
1.83	0.458
1.98	0.453
2.14	0.448

CURVE 3
T ~ 298

λ	τ
0.306	0.264
0.353	0.309
0.400	0.344
0.480	0.380
0.595	0.415
0.696	0.439
0.842	0.467
1.04	0.495
1.23	0.519
1.47	0.542
1.95	0.580
2.43	0.611
2.56	0.615

CURVE 4
T ~ 298

λ	τ
0.302	0.105
0.322	0.156
0.361	0.209
0.443	0.260
0.579	0.323
0.676	0.351
0.841	0.381
1.04	0.398
1.17	0.404
[illegible]	0.407
2.16	0.411

CURVE 5
T ~ 298

λ	τ
0.262	0.016
0.278	0.085
0.298	0.234
0.334	0.350
0.371	0.461
0.448	0.571
0.599	0.720
0.673	0.765
0.714	0.790
0.750	0.800
0.786	0.806
0.835	0.805

CURVE 5 (cont.)

λ	τ
0.931	0.792
0.982	0.791
1.03	0.793
1.11	0.805
1.16	0.809
1.25	0.811
1.40	0.807
1.51	0.815
1.72	0.834
1.84	0.841
1.94	0.845
2.04	0.851
2.24	0.867
2.42	0.872

CURVE 6
T ~ 298

λ	τ
0.262	0.016*
0.278	0.085*
0.298	0.234*
0.329	0.306
0.500	0.416
0.626	0.458
0.729	0.481
0.900	0.500
1.01	0.509
1.15	0.512
1.27	0.510
1.43	0.510
1.68	0.505
1.78	0.500
1.86	0.498
2.00	0.500
2.05	0.503
2.09	0.506

CURVE 7
T ~ 298

λ	τ
0.366	0.273
0.465	0.291
0.759	0.378
0.891	0.408
1.04	0.430

CURVE 7 (cont.)

λ	τ
1.29	0.460
1.88	0.520
1.95	0.529
2.03	0.535
2.53	0.586
2.58	0.593

CURVE 8
T ~ 298

λ	τ
0.248	0.240
0.279	0.321
0.327	0.363
0.400	0.410
0.448	0.430
0.522	0.450
0.721	0.494
0.918	0.547
1.15	0.588
1.60	0.651
1.71	0.667
2.25	0.720

CURVE 9
T ~ 298

λ	τ
0.375	0.045
0.564	0.191
0.699	0.278
0.760	0.308
0.869	0.359
0.996	0.419
1.06	0.459
1.12	0.479
1.20	0.497
1.31	0.520
1.43	0.528
1.71	0.540
1.91	0.551
2.23	0.575
2.40	0.583
2.48	0.590

CURVE 10
T ~ 298

λ	τ
0.200	0.187
0.275	0.296
0.295	0.339
0.341	0.379
0.400	0.408
0.457	0.421
0.549	0.432
0.637	0.438
0.875	0.440
1.02	0.442
1.20	0.450
1.60	0.470
2.11	0.478

CURVE 11
T ~ 298

λ	τ
0.288	0.555
0.306	0.582
0.326	0.641
0.364	0.717
0.447	0.813
0.516	0.855
0.589	0.886
0.640	0.900
0.800	0.931
0.896	0.944
0.964	0.950

CURVE 12
T ~ 298

λ	τ
0.390	0.340
0.417	0.370
0.454	0.408
0.494	0.435
0.555	0.460
0.633	0.480
0.755	0.506
0.905	0.525
0.999	0.534
1.06	0.536
1.28	0.537
1.50	0.532

CURVE 12 (cont.)

λ	τ
1.67	0.530
2.00	0.522
2.19	0.520

*Not shown on plot.

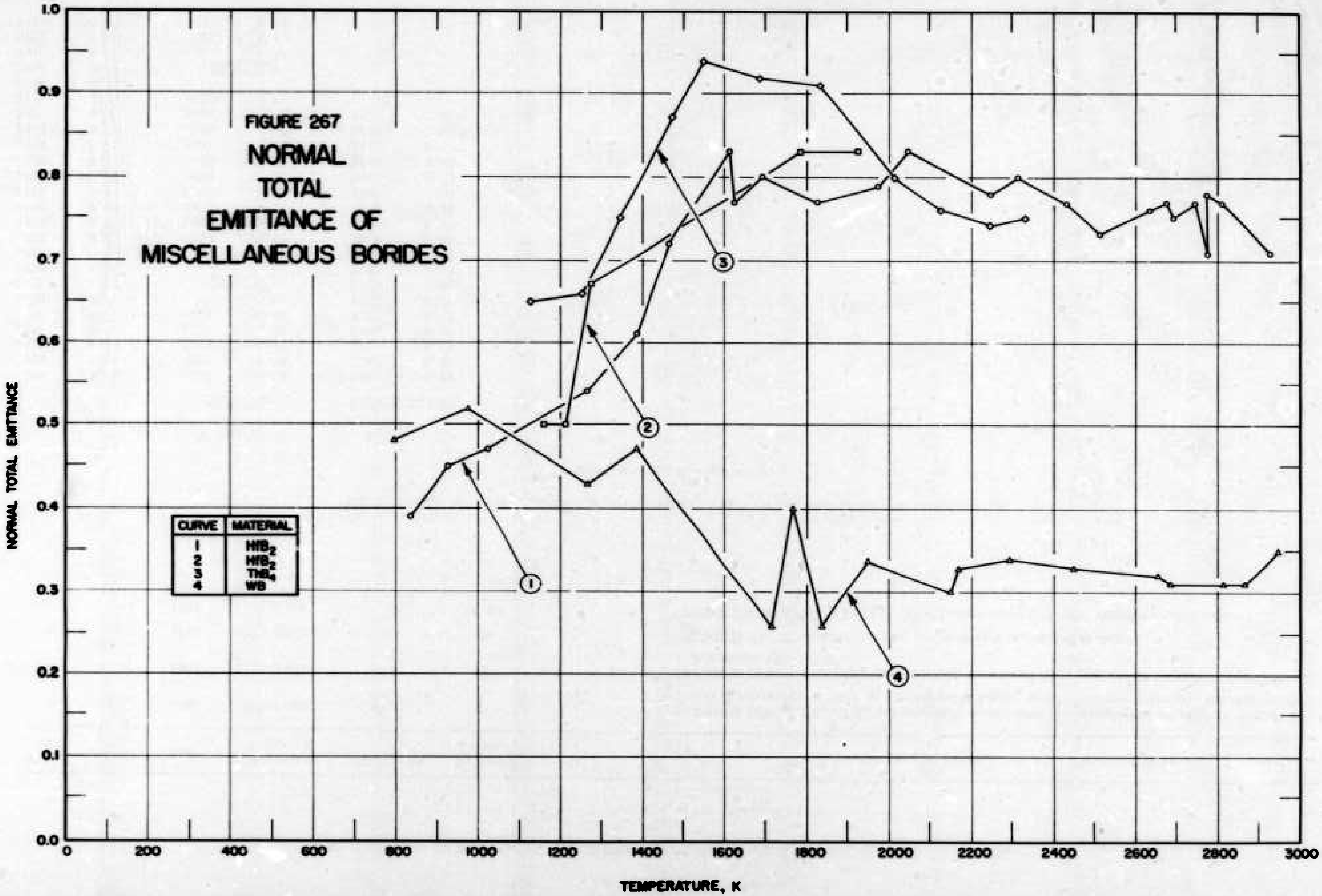


FIGURE 267
NORMAL
TOTAL
EMITTANCE OF
MISCELLANEOUS BORIDES
CURVE MATERIAL
1 HfB_2
2 HfB_2
3 ThB_4
4 WB
NORMAL TOTAL EMITTANCE
TEMPERATURE, K

SPECIFICATION TABLE NO. 267 NORMAL TOTAL EMITTANCE OF MISCELLANEOUS BORIDES

Curve No.	Ref. No.	Year	Temperature Range, K	Geometry θ'	Reported Error, %	Composition (weight percent), Specifications and Remarks
1	17	1962	836-2928	~0°	10	HAFNIUM DIBORIDE, HfB_2; hot pressed; small dark spots appeared on surface at 2244 K and disappeared at 2439 K; measured in argon; run 1; [Author's designation: Specimen 1].
2	17	1962	1160-1922	~0°	10	HAFNIUM DIBORIDE, HfB_2; hot pressed; measured in argon; run 1; [Author's designation: Specimen 2].
3	17	1962	1128-2333	~0°	10	THORIUM TETRABORIDE, ThB_4; hot pressed; measured in argon.
4	17	1962	797-2716	~0°	10-20	TUNGSTEN BORIDE, WB; hot pressed; measured in argon; edges melted at 2944 K.

DATA TABLE NO. 267 NORMAL TOTAL EMITTANCE OF MISCELLANEOUS BORIDES

[Temperature, T, K; Emittance, ϵ]

T	ϵ	T	ϵ	T	ϵ
CURVE 1		CURVE 2		CURVE 4 (cont.)	
836	0.39	1160	0.50	1361	0.43
925	0.45	1211	0.50	1383	0.47
1022	0.47	1277	0.67	1717	0.26
1261	0.54	1783	0.83	1839	0.26
1383	0.61	1922	0.83	1767	0.40
1461	0.72			1950	0.34
1622	0.77	CURVE 3		2150	0.30
1694	0.80			2167	0.33
1616	0.83	1128	0.65	2294	0.34
1822	0.77	1252	0.66	2450	0.33
1978	0.79	1343	0.75	2655	0.32
2044	0.83	1473	0.87	2683	0.31
2244	0.78	1550	0.94	2817	0.31
2311	0.80	1688	0.92	2867	0.31
2439	0.77	1831	0.91	2944	0.35
2511	0.73	2018	0.80	2722	0.57*
2633	0.76	2129	0.76	2605	0.66*
2678	0.77	2244	0.74	2716	0.66*
2772	0.71	2333	0.75		
2694	0.75				
2744	0.77	CURVE 4			
2810	0.77				
2772	0.78	797	0.48		
2928	0.71	972	0.52		

*Not shown on plot.

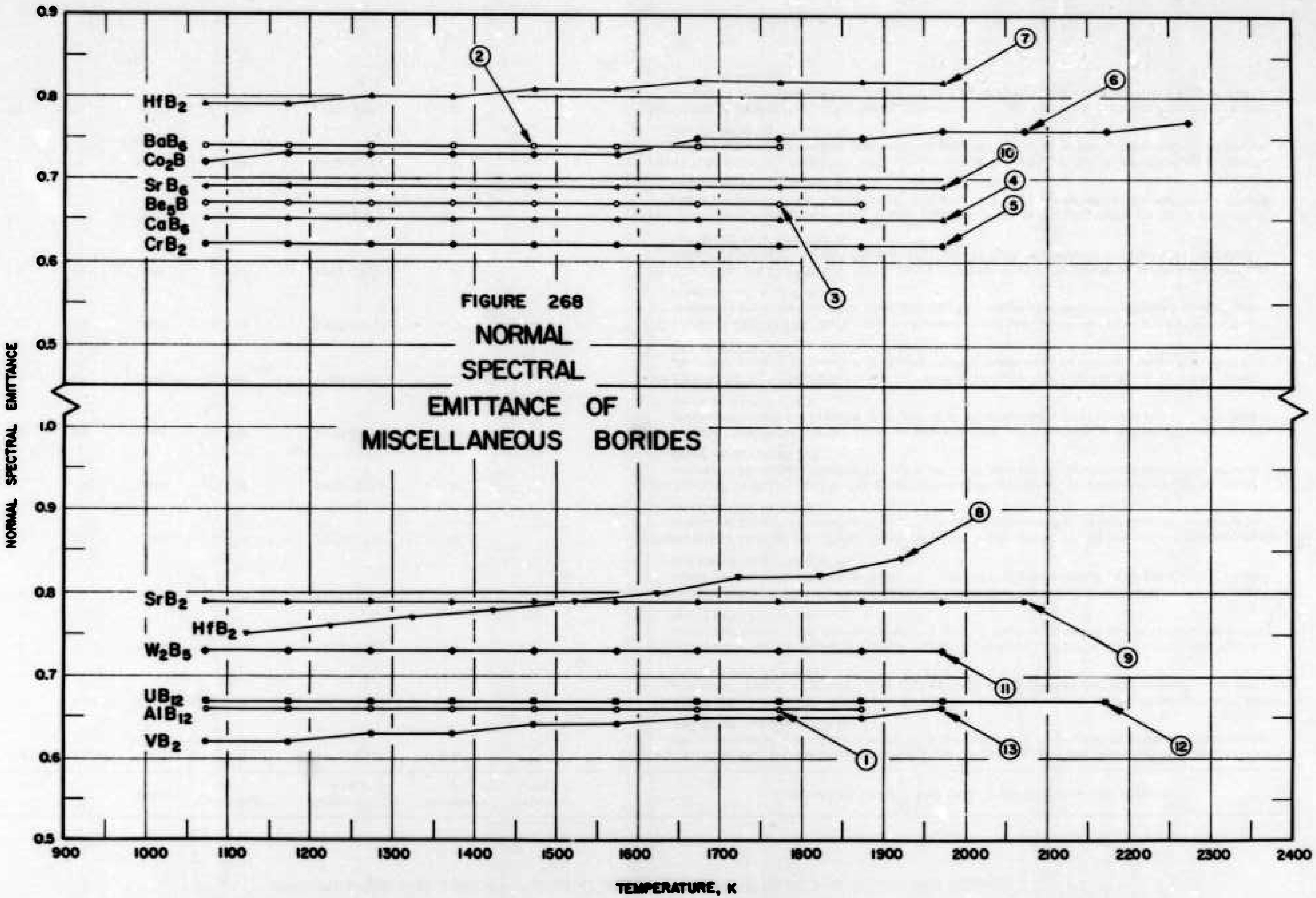


FIGURE 268 NORMAL SPECTRAL EMITTANCE OF MISCELLANEOUS BORIDES

SPECIFICATION TABLE NO. 268 NORMAL SPECTRAL EMITTANCE OF MISCELLANEOUS BORIDES

Curve No.	Ref. No.	Year	Wavelength, µm	Temperature Range, K	Geometry θ'	Reported Error, %	Composition (weight percent), Specifications and Remarks
1	13	1962	0.650	1073-1873	~0°		ALUMINUM DODECABORIDE, AlB_{12}; layer of paste (~100 µm thick) on tantalum cylinder; paste prepared from fine powder (2-3 µm) of AlB_{12} suspended in nitrocellulose binder and dried at 313 to 333 K.
2	13	1962	0.650	1073-1773	~0°		BARIUM HEXABORIDE, BaB_6; layer of paste (~100 µm thick) on tantalum cylinder; paste prepared from fine powder (2-3 µm) of BaB_6 suspended in nitrocellulose binder and dried at 313 to 333 K.
3	13	1962	0.650	1073-1873	~0°		PENTABERYLLIUM BORIDE, Be_5B; layer of paste (~100 µm thick) on tantalum cylinder; paste prepared from fine powder (2-3 µm) of Be_5B suspended in nitrocellulose binder dried at 313 to 333 K.
4	13	1962	0.650	1073-1973	~0°		CALCIUM HEXABORIDE, CaB_6; layer of paste (~100 µm thick) on tantalum cylinder; paste prepared from fine powder (2-3 µm) of CaB_6 suspended in nitrocellulose binder and dried at 313 to 333 K.
5	13	1962	0.650	1073-1973	~0°		CHROMIUM DIBORIDE, CrB_2; layer of paste (~100 µm thick) on tantalum cylinder; paste prepared from fine powder (2-3 µm) of CrB_2 suspended in nitrocellulose binder and dried at 313 to 333 K.
6	13	1962	0.650	1073-2273	~0°		DICOBALT BORIDE, Co_2B; layer of paste (~100 µm thick) on tantalum cylinder; paste prepared from fine powder (2-3 µm) of Co_2B suspended in nitrocellulose binder and dried at 313 to 333 K.
7	13	1962	0.650	1073-1973	~0°		HAFNIUM DIBORIDE, HfB_2; layer of paste (~100 µm thick) on tantalum cylinder; paste prepared from fine powder (2-3 µm) of HfB_2 suspended in nitrocellulose binder and dried at 313 to 333 K.
8	16	1960	0.650	1123-1923	~0°		HAFNIUM DIBORIDE, HfB_2; layer of paste (~100 µm thick) on tantalum cylinder; paste prepared from fine powder (2-3 µm) of HfB_2 suspended in nitrate binder and dried at 313 to 333 K.
9	13	1962	0.650	1073-2073	~0°		SCANDIUM DIBORIDE, ScB_2; layer of paste (~100 µm thick) on tantalum cylinder; paste prepared from fine powder (2-3 µm) of ScB_2 suspended in nitrocellulose binder and dried at 313 to 333 K.
10	13	1962	0.650	1073-1973	~0°		STRONTIUM HEXABORIDE, SrB_6; layer of paste (~100 µm thick) on tantalum cylinder; paste prepared from fine powder (2-3 µm) of SrB_6 suspended in nitrocellulose binder and dried at 313 to 333 K.
11	13	1962	0.650	1073-1973	~0°		DITUNGSTEN PENTABORIDE, W_2B_5; layer of paste (~100 µm thick) on tantalum cylinder; paste prepared from fine powder (2-3 µm) of W_2B_5 suspended in nitrocellulose binder and dried at 313 to 333 K.
12	13	1962	0.650	1073-2173	~0°		URANIUM DODECABORIDE, UB_{12}; layer of paste (~100 µm thick) on tantalum cylinder; paste prepared from fine powder (2-3 µm) of UB_{12} suspended in nitrocellulose binder and dried at 313 to 333 K.
13	13	1962	0.650	1073-1973	~0°		VANADIUM DIBORIDE, VB_2; layer of paste (~100 µm thick) on tantalum cylinder; paste prepared from fine powder (2-3 µm) of VB_2 suspended in nitrocellulose binder and dried at 313 to 333 K.

DATA TABLE NO. 268 NORMAL SPECTRAL EMITTANCE OF MISCELLANEOUS BORIDES

[Temperature, T, K; Emittance, ϵ; wavelength, λ, μm]

T	ϵ
CURVE 1 $\lambda = 0.650$	
1073	0.76
1173	0.76
1273	0.76
1373	0.76
1473	0.76
1573	0.76
1673	0.76
1773	0.76
1873	0.76
CURVE 2 $\lambda = 0.650$	
1073	0.84
1173	0.84
1273	0.84
1373	0.84
1473	0.84
1573	0.84
1673	0.84
1773	0.84
CURVE 3 $\lambda = 0.650$	
1073	0.77
1173	0.77
1273	0.77
1373	0.77
1473	0.77
1573	0.77
1673	0.77
1773	0.77
1873	0.77
CURVE 4 $\lambda = 0.650$	
1073	0.75
1173	0.75
1273	0.75
1373	0.75
1473	0.75
1573	0.75
CURVE 4 (cont.)	
1673	0.75
1773	0.75
1873	0.75
1973	0.75
CURVE 5 $\lambda = 0.650$	
1073	0.72
1173	0.72
1273	0.72
1373	0.72
1473	0.72
1573	0.72
1673	0.72
1773	0.72
1873	0.72
1973	0.72
CURVE 6 $\lambda = 0.650$	
1073	0.82
1173	0.83
1273	0.83
1373	0.84
1473	0.84
1573	0.84
1673	0.85
1773	0.85
1873	0.85
1973	0.86
2073	0.86
2173	0.86
2273	0.87
CURVE 7 $\lambda = 0.650$	
1073	0.89
1173	0.89
1273	0.90
1373	0.90
1473	0.91
1573	0.91
CURVE 7 (cont.)	
1673	0.92
1773	0.92
1873	0.92
1973	0.92
CURVE 8 $\lambda = 0.650$	
1123	0.85
1223	0.86
1323	0.87
1423	0.88
1523	0.89
1623	0.90
1723	0.92
1823	0.92
1923	0.94
CURVE 9 $\lambda = 0.650$	
1073	0.89
1173	0.89
1273	0.89
1373	0.89
1473	0.89
1573	0.89
1673	0.89
1773	0.89
1873	0.89
1973	0.89
2073	0.89
CURVE 10 $\lambda = 0.650$	
1073	0.79
1173	0.79
1273	0.79
1373	0.79
1473	0.79
1573	0.79
1673	0.79
1773	0.79
1873	0.79
1973	0.79
CURVE 11 $\lambda = 0.650$	
1073	0.83
1173	0.83
1273	0.83
1373	0.83
1473	0.83
1573	0.83
1673	0.83
1773	0.83
1873	0.83
1973	0.83
CURVE 12 $\lambda = 0.650$	
1073	0.77
1173	0.77
1273	0.77
1373	0.77
1473	0.77
1573	0.77
1673	0.77
1773	0.77
1873	0.77
1973	0.77
2073	0.77
2173	0.77
CURVE 13 $\lambda = 0.650$	
1073	0.72
1173	0.72
1273	0.73
1373	0.73
1473	0.74
1573	0.74
1673	0.75
1773	0.75
1873	0.76
1973	0.76

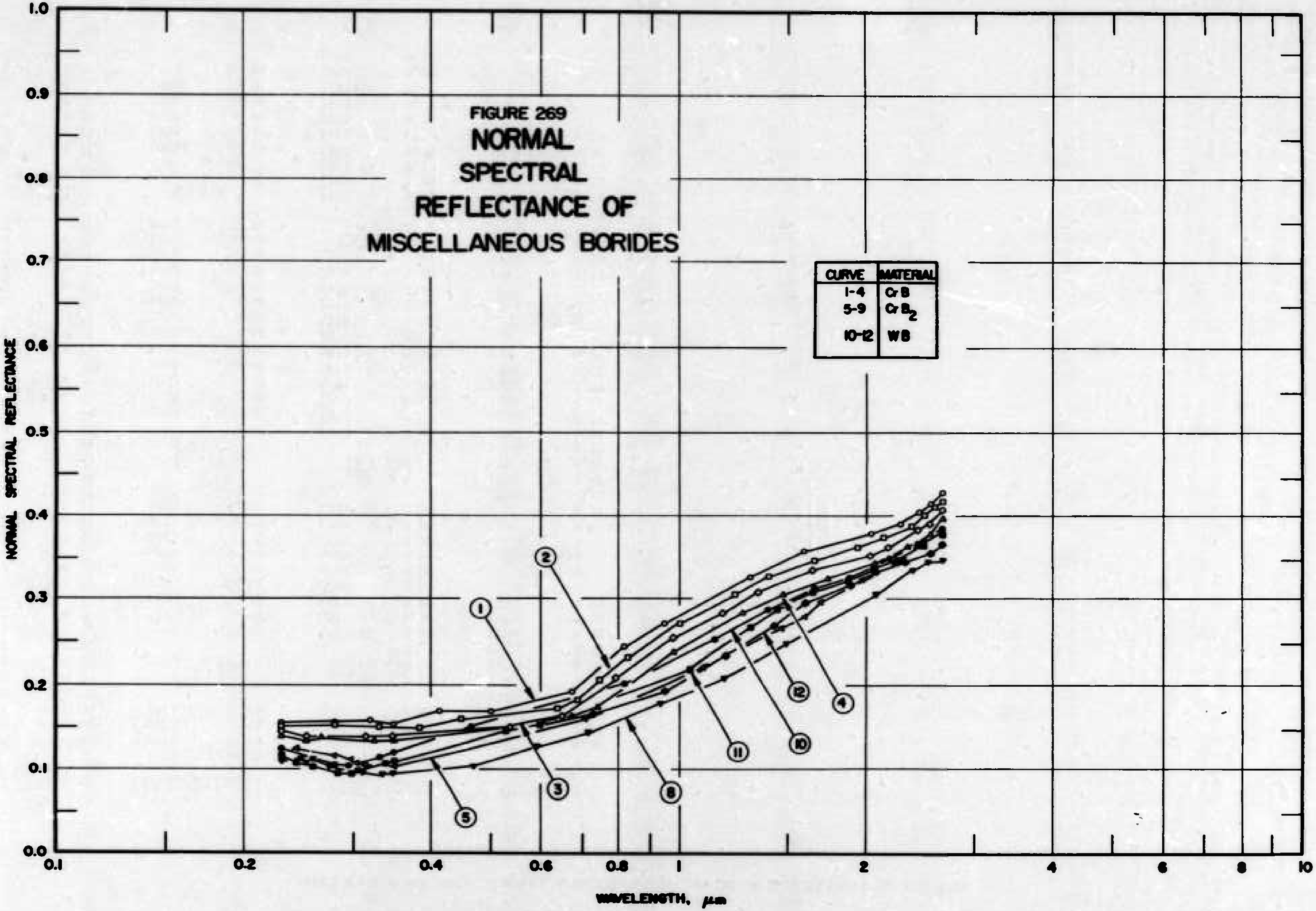


FIGURE 269
NORMAL SPECTRAL REFLECTANCE OF MISCELLANEOUS BORIDES

SPECIFICATION TABLE NO. 269 NORMAL SPECTRAL REFLECTANCE OF MISCELLANEOUS BORIDES

Curve No.	Ref. No.	Year	Temperature, K	Wavelength Range, μm	Geometry θ	θ'	ω'	Reported Error, %	Composition (weight percent), Specifications and Remarks
1	382	1965	~298	0.230-2.65	~0°		2π		CHROMIUM BORIDE, CrB; powder manufactured by U.S. Borax Research; 99.5% pure; compacted at 70,500 psi; data extracted from smooth curve; MgO reference standard.
2	382	1965	~298	0.230-2.65	~0°		2π		Similar to above specimen and conditions except compacted at 35,250 psi.
3	382	1965	~298	0.230-2.65	~0°		2π		Similar to above specimen and conditions except compacted at 11,750 psi.
4	382	1965	~298	0.230-2.65	~0°		2π		Similar to above specimen and conditions except compacted at 2,350 psi.
5	341	1966	~298	0.230-2.65	~0°		2π		DICHROMIUM BORIDE, Cr_2B; powder; compacted at 23,500 psi; data extracted from smooth curve; MgO reference standard.
6	341	1966	~298	0.230-2.65	~0°		2π		Above specimen and conditions except exposed to vacuum (10^{-3} mm Hg) for 30 min.
7	341	1966	~298	0.230-2.65	~0°		2π		Curve 5 specimen and conditions except exposed to vacuum (10^{-6} mm Hg) for 960 min.
8	341	1966	~298	0.230-2.65	~0°		2π		DICHROMIUM BORIDE, Cr_2B; powder; compacted at 23,500 psi; data extracted from smooth curve; MgO reference standard.
9	341	1966	~298	0.230-2.65	~0°		2π		Above specimen and conditions except surface contaminated by exposure to atomized oil.
10	382	1965	~298	0.230-2.65	~0°		2π		TUNGSTEN BORIDE, WB; powder; U.S. Borax Research; 99.5% pure; compacted at 70,500 psi; data extracted from smooth curve; MgO reference standard.
11	382	1965	~298	0.230-2.65	~0°		2π		Similar to above specimen and conditions except compacted at 11,750 psi.
12	382	1965	~298	0.230-2.65	~0°		2π		Similar to above specimen and conditions except compacted at 2,350 psi.

DATA TABLE NO. 269 NORMAL SPECTRAL REFLECTANCE OF MISCELLANEOUS BORIDES

[Wavelength, λ, μm; Reflectance, ρ; Temperature, T, K]

λ	ρ
CURVE 1	
T ~ 298	
0.230	0.153
0.280	0.153
0.312	0.156
0.347	0.152
0.411	0.169
0.500	0.169
0.671	0.192
0.815	0.243
0.943	0.270
1.30	0.327
1.58	0.358
2.04	0.379
2.27	0.390
2.43	0.403
2.53	0.415
2.65	0.430
CURVE 2	
T ~ 298	
0.230	0.150
0.280	0.151
0.330	0.150
0.383	0.149
0.448	0.160
0.638	0.172
0.685	0.182
0.746	0.206
0.826	0.231
1.00	0.270
1.23	0.305
1.39	0.328
1.65	0.348
1.94	0.363
2.14	0.374
2.37	0.387
2.49	0.400
2.57	0.411
2.65	0.419
CURVE 3	
T ~ 298	
0.230	0.145
0.252	0.139
CURVE 3 (cont.)	
0.313	0.138
0.346	0.139
0.534	0.150
0.647	0.163
0.794	0.209
0.974	0.254
1.17	0.282
1.34	0.309
1.64	0.335
2.02	0.352
2.16	0.361
2.41	0.383
2.53	0.391
2.65	0.408
CURVE 4	
T ~ 298	
0.230	0.140
0.252	0.135
0.267	0.138
0.324	0.134
0.349	0.134
0.534	0.150*
0.671	0.163
0.739	0.174
0.973	0.237
1.26	0.283
1.47	0.303
1.74	0.325
2.06	0.342
2.32	0.364
2.54	0.379
2.65	0.396
CURVE 5	
T ~ 298	
0.230	0.121
0.244	0.125
0.280	0.116
0.297	0.111
0.303	0.106
0.312	0.104
0.350	0.101
0.703	0.160
CURVE 5 (cont.)	
1.09	0.220
1.45	0.265
1.59	0.279
1.69	0.296
1.97	0.322
2.22	0.345
2.41	0.366
2.65	0.380
CURVE 6*	
T ~ 298	
0.230	0.121
0.244	0.125
0.280	0.116
0.297	0.111
0.303	0.106
0.312	0.104
0.350	0.101
0.420	0.102
0.705	0.143
1.05	0.192
1.39	0.239
1.48	0.245
1.55	0.257
2.41	0.335
2.65	0.339
CURVE 7*	
T ~ 298	
0.230	0.121
0.244	0.125
0.280	0.116
0.297	0.111
0.303	0.106
0.312	0.104
0.350	0.101
0.416	0.102
0.675	0.143
0.718	0.153
0.859	0.170
0.985	0.188
1.05	0.200
1.38	0.241
1.51	0.256
CURVE 7 (cont.)*	
1.89	0.293
2.37	0.339
2.65	0.352
CURVE 8	
T ~ 298	
0.230	0.110
0.247	0.112
0.251	0.109
0.258	0.111
0.275	0.101
0.310	0.097
0.334	0.092
0.346	0.093
0.468	0.102
0.590	0.128
0.713	0.144
0.927	0.178
1.17	0.209
1.49	0.247
2.08	0.304
2.36	0.335
2.50	0.345
2.65	0.347
CURVE 9*	
T ~ 298	
0.230	0.094
0.236	0.095
0.268	0.090
0.276	0.084
0.283	0.085
0.345	0.079
0.398	0.085
0.586	0.115
0.830	0.147
1.06	0.179
1.40	0.223
1.80	0.264
2.10	0.288
2.37	0.316
2.50	0.324
2.65	0.323
CURVE 10	
T ~ 298	
0.230	0.125
0.280	0.104
0.295	0.103
0.330	0.114
0.348	0.120
0.462	0.150
0.819	0.201
1.14	0.251
1.38	0.287
1.65	0.312
1.88	0.326
2.18	0.350
2.41	0.368
2.65	0.385
CURVE 11	
T ~ 298	
0.230	0.117
0.243	0.108
0.258	0.101
0.284	0.094
0.299	0.094
0.303	0.098
0.336	0.106
0.349	0.110
0.529	0.147
0.599	0.151
1.04	0.219
1.30	0.266
1.44	0.289
1.64	0.309
1.87	0.322
2.05	0.337
2.23	0.348
2.46	0.365
2.65	0.378
CURVE 12	
T ~ 298	
0.230	0.117*
0.243	0.108*
0.258	0.101*
0.284	0.094*
CURVE 12 (cont.)	
0.299	0.094*
0.303	0.098*
0.336	0.106*
0.349	0.110*
0.529	0.147*
0.599	0.151*
0.727	0.166
0.949	0.193
1.18	0.232
1.41	0.269
1.59	0.295
1.89	0.317
2.06	0.332
2.31	0.345
2.53	0.355
2.65	0.366

*Not shown on plot.

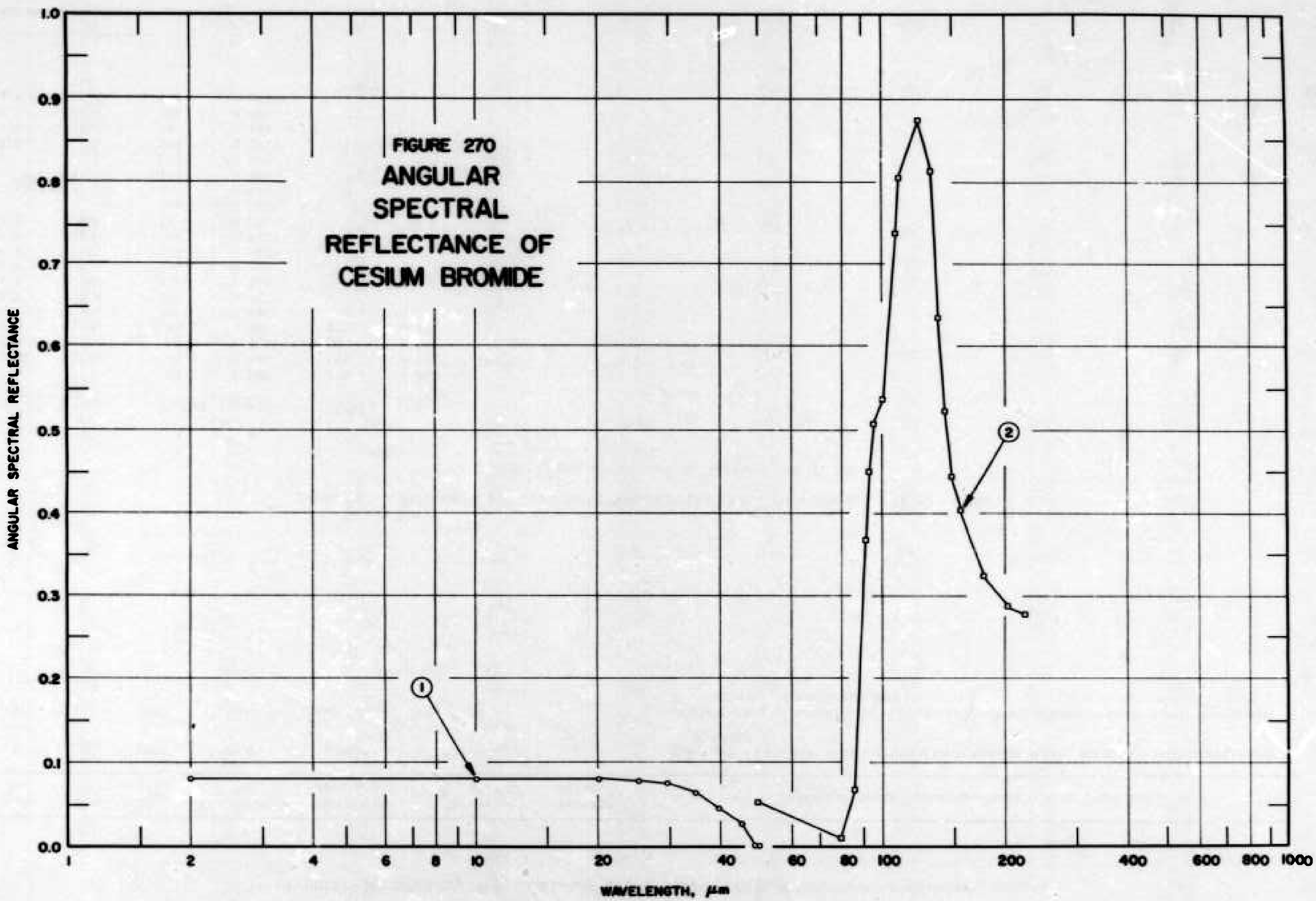


FIGURE 270
ANGULAR SPECTRAL REFLECTANCE OF CESIUM BROMIDE
ANGULAR SPECTRAL REFLECTANCE
WAVELENGTH, μm
1.0
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0.0
1
2
4
6
8
10
20
40
60
80
100
200
400
600
800
1000
1
2

SPECIFICATION TABLE NO. 270 ANGULAR SPECTRAL REFLECTANCE OF CESIUM BROMIDE CsBr

Curve No.	Ref. No.	Year	Temperature K	Wavelength Range, μm	Geometry θ	θ'	ω'	Reported Error, %	Composition (weight percent), Specifications, and Remarks
1	67	1963	~298	2.00-50.0	30°	30°			Specimen 1 cm thick; data extracted from smooth curve; aluminum mirror reference standard.
2	419	1962	300	49.7-223	15°	15°			Single crystals; measured in vacuum; data extracted from smooth curve; evaporated Al mirror reference standard.

DATA TABLE NO. 270 ANGULAR SPECTRAL REFLECTANCE OF CESIUM BROMIDE CsBr

[Wavelength, λ, μm; Reflectance, ρ; Temperature, T, K]

λ	ρ	λ	ρ	λ	ρ
CURVE 1 T ~ 298		CURVE 2 (cont.)		CURVE 2 (cont.)	
		90.5	0.368	179	0.323
2.00	0.080	92.2	0.450	191	0.302*
10.0	0.080	93.5	0.483*	203	0.287
20.0	0.080	95.9	0.509	223	0.278
25.0	0.079	100	0.537		
29.9	0.074	103	0.577*		
34.9	0.063	108	0.740		
39.9	0.044	110	0.805		
44.9	0.026	114	0.846*		
48.6	0.000	119	0.873*		
50.0	0.000	123	0.876		
		128	0.860*		
CURVE 2 T = 300		132	0.816		
		137	0.634		
		142	0.522		
49.7	0.051	144	0.481*		
79.0	0.010	149	0.444		
83.1	0.030	155	0.401		
84.9	0.068	164	0.361*		

*Not shown on plot

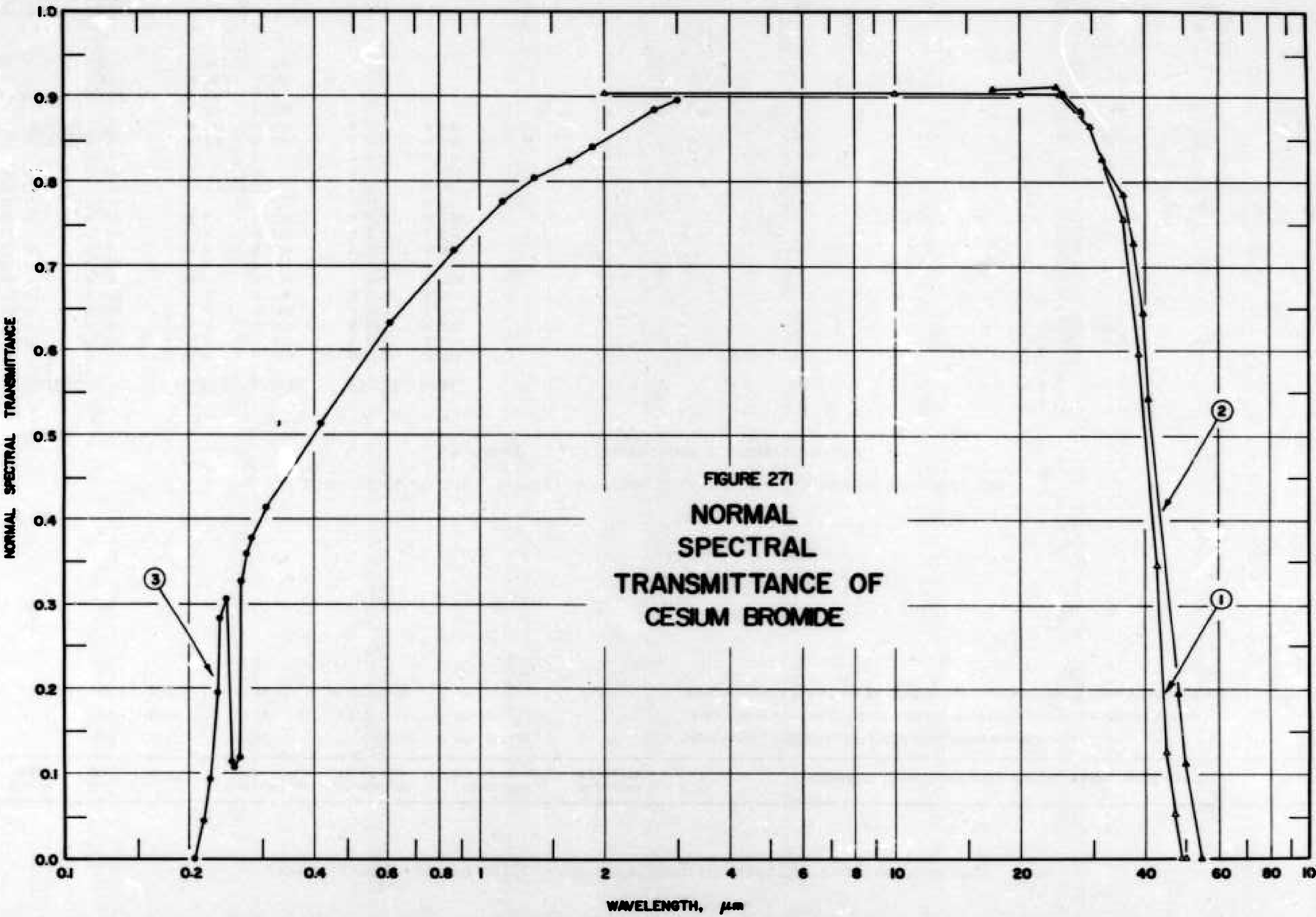


FIGURE 271
NORMAL SPECTRAL TRANSMITTANCE OF CESIUM BROMIDE

SPECIFICATION TABLE NO. 271 NORMAL SPECTRAL TRANSMITTANCE OF CESIUM BROMIDE CsBr

Curve No.	Ref. No.	Year	Temperature K	Wavelength Range, μm	Geometry θ	θ'	ω'	Reported Error, %	Composition (weight percent), Specifications, and Remarks
1	67	1963	~298	2.00-50.0	0°	0°			Specimen 1 cm thick; data extracted from smooth curve.
2	93	1960	298	17.2-54.3	~0°	~0°			High purity crystal (5.10 mm thick): data extracted from smooth curve.
3	94	1967	298	0.207-3.00	~0°	~0°		± 2	Single crystal (10.0 mm thick); polished; data extracted from smooth curve.

DATA TABLE NO. 271 NORMAL SPECTRAL TRANSMITTANCE OF CESIUM BROMIDE CsBr

[Wavelength, λ, μm; Transmittance, τ; Temperature, T, K]

λ	τ	λ	τ	λ	τ
CURVE 1		CURVE 2 (cont.)		CURVE 3 (cont.)	
T = 298					
		28.0	0.885	0.251	0.115
2.00	0.901	29.9	0.867*	0.257	0.109
10.0	0.901	33.3	0.829	0.264	0.120
20.0	0.901	35.2	0.788	0.269	0.329
25.0	0.901	37.4	0.730	0.274	0.359
29.9	0.868	39.3	0.644	0.283	0.378
35.4	0.754	41.4	0.541	0.309	0.414
38.8	0.598	48.0	0.194	0.417	0.511
42.6	0.346	50.2	0.112	0.601	0.631
45.7	0.129	54.3	0.000	0.873	0.720
47.1	0.051			1.13	0.777
49.0	0.000	CURVE 3		1.37	0.806
50.0	0.000	T = 298		1.65	0.824
				1.88	0.841
CURVE 2		0.207	0.000	2.63	0.886
T = 298		0.219	0.046	3.00	0.897
		0.224	0.091		
17.2	0.908	0.236	0.196		
24.5	0.911	0.239	0.282		
25.1	0.902	0.247	0.307		

*Not shown on plot

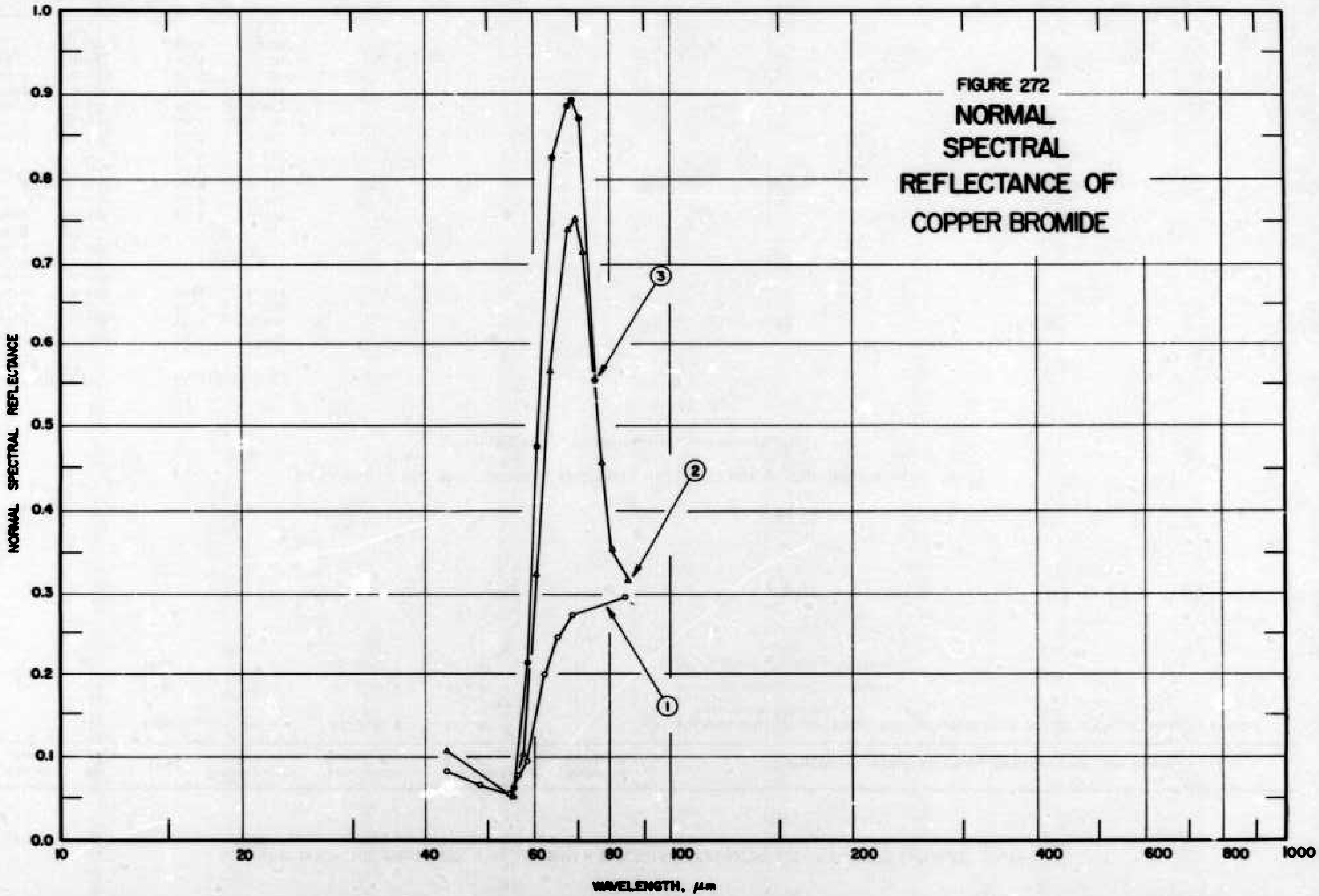


FIGURE 272
NORMAL
SPECTRAL
REFLECTANCE OF
COPPER BROMIDE

SPECIFICATION TABLE NO. 272 NORMAL SPECTRAL REFLECTANCE OF COPPER BROMIDE CuBr

Curve No.	Ref. No.	Year	Temperature K	Wavelength Range, μm	Geometry θ θ' ω'	Reported Error, %	Composition (weight percent), Specifications, and Remarks
1	424	1966	300	43.1-84.9	~0° ~0°		Pressed pellet (2 mm thick); data extracted from smooth curve; Al on CuBr crystal reference standard.
2	424	1966	77	43.2-85.4	~0° ~0°		Above specimen and conditions.
3	424	1966	~20	43.2-85.4	~0° ~0°		Above specimen and conditions.

DATA TABLE NO. 272 NORMAL SPECTRAL REFLECTANCE OF COPPER BROMIDE CuBr

[Wavelength, λ, μm; Reflectance, ρ; Temperature, T, K]

λ	ρ	λ	ρ
CURVE 1 T = 300		**CURVE 2 (cont.)**	
		70.1	0.754
43.1	0.082	72.7	0.714
49.0	0.068	77.5	0.457
54.8	0.057	80.9	0.354
56.8	0.079	85.4	0.318
58.5	0.094		
62.6	0.200	**CURVE 3** T ~ 20	
66.0	0.246		
69.9	0.272		
84.9	0.299	43.2	0.109*
		55.9	0.064
CURVE 2 T = 77		58.9	0.213
		60.6	0.476
		64.7	0.826
43.2	0.109	68.2	0.889
55.2	0.051	69.4	0.895
57.8	0.103	71.5	0.872
60.6	0.326	75.9	0.554
64.0	0.569	77.5	0.457*
68.2	0.742	80.9	0.354*
		85.4	0.318*

*Not shown on plot

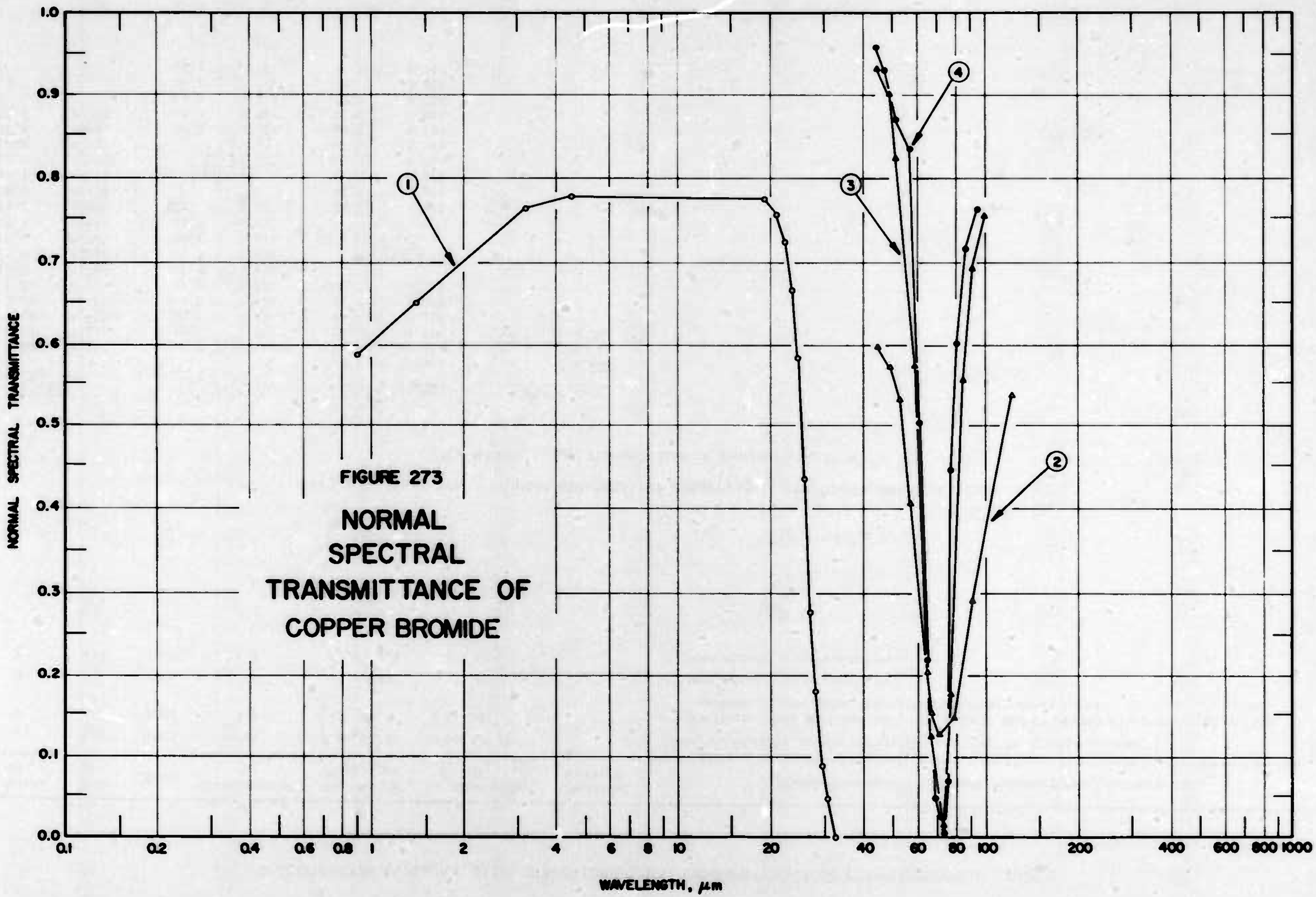


FIGURE 273

NORMAL SPECTRAL TRANSMITTANCE OF COPPER BROMIDE

SPECIFICATION TABLE NO. 273 NORMAL SPECTRAL TRANSMITTANCE OF COPPER BROMIDE CuBr

Curve No.	Ref. No.	Year	Temperature K	Wavelength Range, μm	Geometry θ θ' ω'	Reported Error, %	Composition (weight percent), Specifications, and Remarks
1	364	1965	~298	0.600-32.6	~0° ~0°		Single crystal (2.92 mm thick); data extracted from smooth curve.
2	424	1966	300	45.2-123	~0° ~0°		Film (9 μm thick) sublimed on quartz plate (2 mm thick); paraffin evaporated on film surface for protection; data extracted from smooth curve.
3	424	1966	77	45.2-100	~0° ~0°		Above specimen and conditions.
4	424	1966	4.2	44.2-95.2	~0° ~0°		Above specimen and conditions.

DATA TABLE NO. 273 NORMAL SPECTRAL TRANSMITTANCE OF COPPER BROMIDE CuBr

[Wavelength, λ, μm; Transmittance, τ; Temperature, T, K]

λ	τ	λ	τ	λ	τ	λ	τ
CURVE 1		CURVE 2		CURVE 3 (cont.)		CURVE 4 (cont.)	
T ~ 298		T = 300		70.4	0.022	80.6	0.604
0.600	0.000	45.2	0.600	72.5	0.013	87.0	0.718
0.900	0.585	49.5	0.573	76.9	0.177	95.2	0.764
1.40	0.652	52.6	0.531	84.7	0.558		
3.20	0.765	57.5	0.406	91.7	0.692		
4.50	0.780	64.5	0.203	100	0.757		
19.2	0.775	67.6	0.152				
21.0	0.758	71.9	0.126	CURVE 4			
22.4	0.726	78.1	0.148	T = 4.2			
23.5	0.668	91.7	0.290				
24.6	0.585	123	0.537	44.2	0.961		
26.0	0.436			47.4	0.934		
27.1	0.278	CURVE 3		51.5	0.870		
28.0	0.180	T = 77		56.5	0.734		
29.2	0.087			61.3	0.503		
30.4	0.046	45.2	0.938	64.5	0.220		
32.6	0.000	48.3	0.903	68.5	0.048		
		51.8	0.824	73.0	0.004		
		58.5	0.575	75.7	0.067		
		66.7	0.122	76.9	0.447		

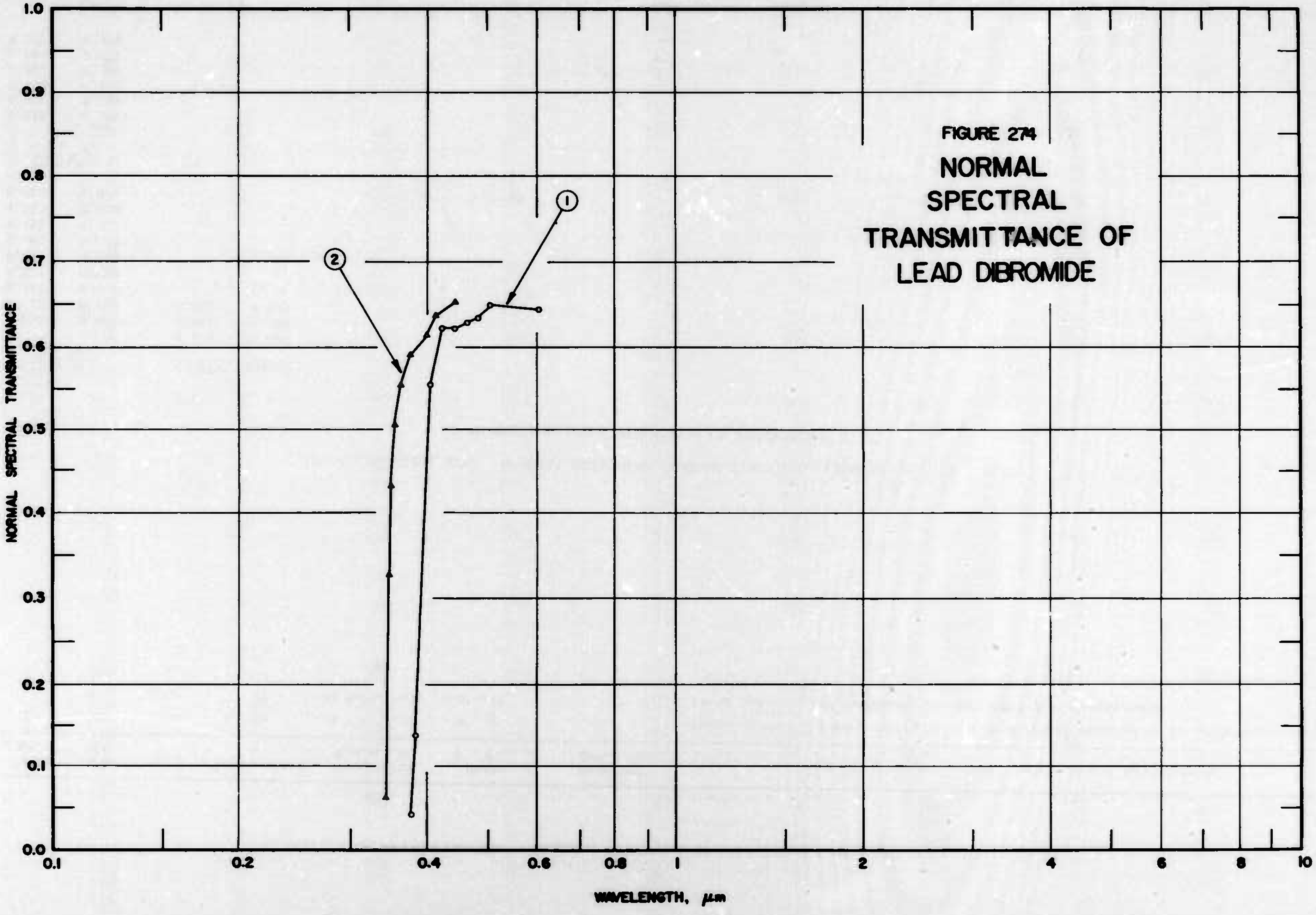


FIGURE 274
NORMAL
SPECTRAL
TRANSMITTANCE OF
LEAD DIBROMIDE
NORMAL SPECTRAL TRANSMITTANCE
WAVELENGTH, μm
1.0
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0.0
0.1
0.2
0.4
0.6
0.8
1
2
4
6
8
10
1
2

SPECIFICATION TABLE NO. 274 NORMAL SPECTRAL TRANSMITTANCE OF LEAD DIBROMIDE $PbBr_2$

Curve No.	Ref. No.	Year	Temperature K	Wavelength Range, μm	Geometry θ θ' ω'	Reported Error, %	Composition (weight percent), Specifications, and Remarks
1	400	1969	~298	0.378-0.602	~0° ~0°		Single crystals (~1 mm thick); grown by zone-refined material by the Bridgman method.
2	400	1969	77	0.342-0.641	~0° ~0°		Above specimen and conditions; data extracted from smooth curve.

DATA TABLE NO. 274 NORMAL SPECTRAL TRANSMITTANCE OF LEAD DIBROMIDE $PbBr_2$

[Wavelength, λ, μm; Transmittance, τ; Temperature, T, K]

λ	τ	λ	τ
CURVE 1		CURVE 2 (cont.)	
T ~ 298		0.400	0.615
0.378	0.0410	0.511	0.638
0.382	0.138	0.641	0.653
0.402	0.555		
0.421	0.622		
0.442	0.622		
0.461	0.630		
0.482	0.635		
0.501	0.650		
0.602	0.644		
CURVE 2			
T = 77			
0.342	0.0611		
0.347	0.329		
0.350	0.431		
0.354	0.506		
0.361	0.557		
0.377	0.592		

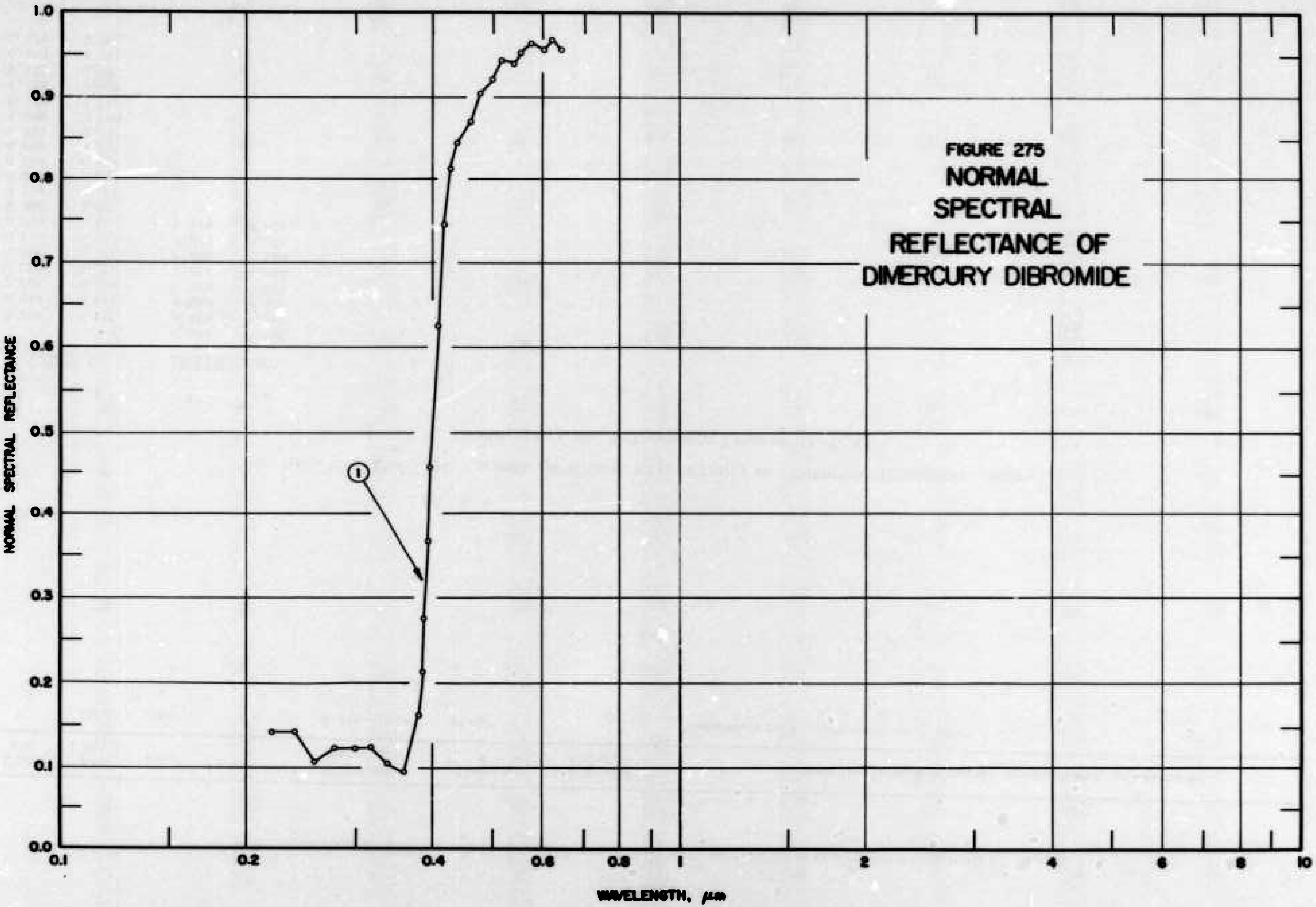


FIGURE 275
NORMAL
SPECTRAL
REFLECTANCE OF
DIMERCURY DIBROMIDE

SPECIFICATION TABLE NO. 275 NORMAL SPECTRAL REFLECTANCE OF DIMERCURY DIBROMIDE Hg_2Br_2

Curve No.	Ref. No.	Year	Temperature K	Wavelength Range, μm	Geometry θ θ' ω'	Reported Error, %	Composition (weight percent), Specifications, and Remarks
1	136	1967	~298	0.220-0.649	0° 45°		Magnesium carbonate reference standard.

DATA TABLE NO. 275 NORMAL SPECTRAL REFLECTANCE OF DIMERCURY DIBROMIDE Hg_2Br_2

[Wavelength, λ, μm; Reflectance, ρ; Temperature, T, K]

λ	ρ	λ	ρ
CURVE 1 T ~ 298		CURVE 1 (cont.)	
		0.500	0.922
0.220	0.141	0.519	0.946
0.240	0.141	0.540	0.942
0.259	0.106	0.559	0.953
0.279	0.121	0.579	0.963
0.300	0.121	0.601	0.959
0.319	0.123	0.620	0.970
0.339	0.103	0.649	0.957
0.360	0.095		
0.380	0.161		
0.385	0.211		
0.388	0.274		
0.393	0.367		
0.398	0.457		
0.409	0.626		
0.419	0.745		
0.428	0.812		
0.438	0.848		
0.460	0.871		
0.479	0.907		

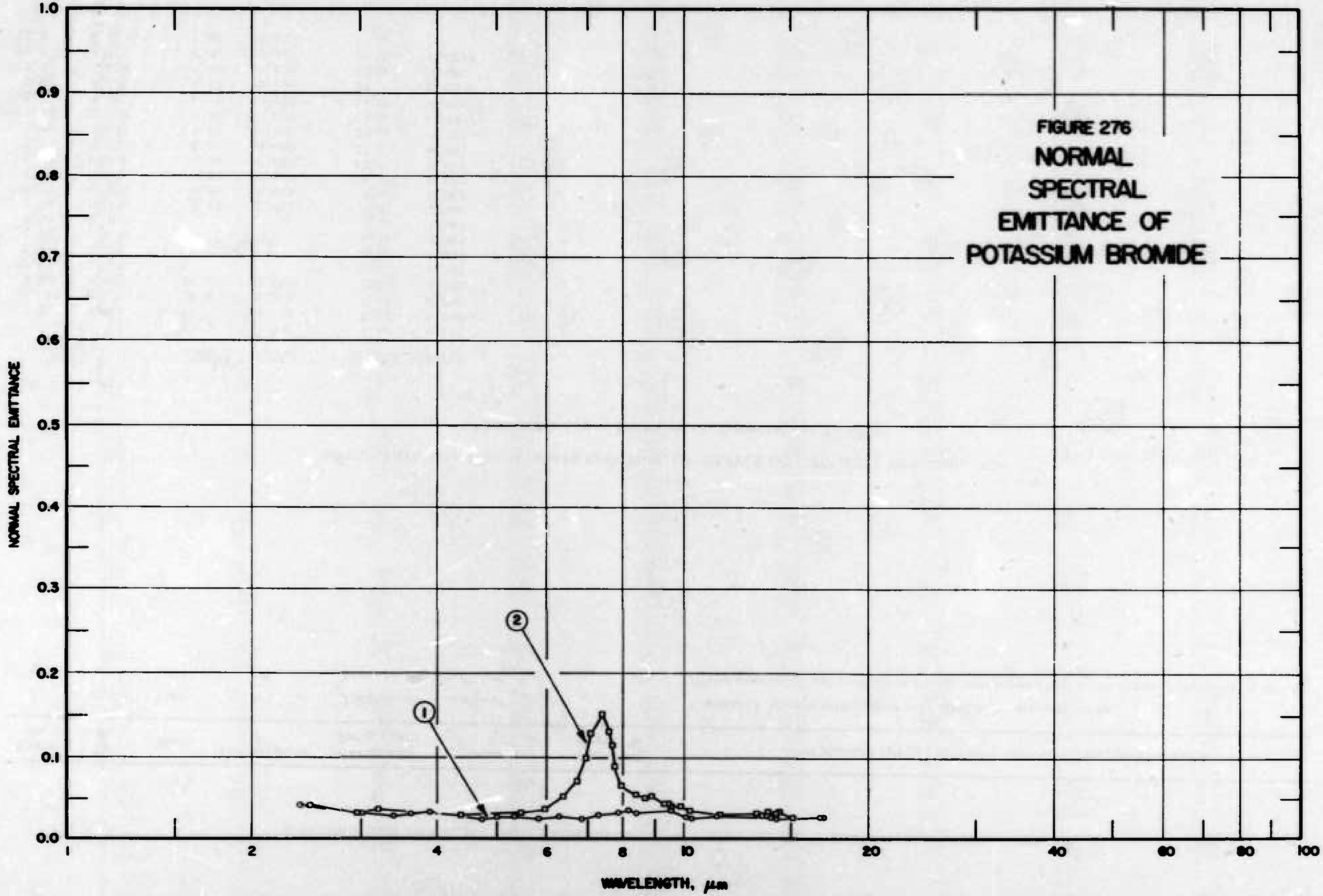


FIGURE 276
NORMAL
SPECTRAL
EMITTANCE OF
POTASSIUM BROMIDE
NORMAL SPECTRAL EMITTANCE
WAVELENGTH, μm
1
2
1.0
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0.0
1
2
4
6
8
10
20
40
60
80
100

SPECIFICATION TABLE NO. 276 NORMAL SPECTRAL EMITTANCE OF POTASSIUM BROMIDE KBr

Curve No.	Ref. No.	Year	Temperature K	Wavelength Range, μm	Geometry θ θ' ω'	Reported Error, %	Composition (weight percent), Specifications, and Remarks
1	309	1964	373	2.40-16.9	~0° ~0°		Crystal (4.65 mm thick); data extracted from smooth curve.
2	309	1964	373	2.49-16.9	~0° ~0°		Above specimen and conditions except measured after 6 hrs x-ray irradiation at 298 K.

DATA TABLE NO. 276 NORMAL SPECTRAL EMITTANCE OF POTASSIUM BROMIDE KBr

[Wavelength, λ, μm; Emittance, ϵ; Temperature, T, K]

λ	ϵ	λ	ϵ	λ	ϵ
CURVE 1 T = 373		CURVE 1 (cont.)		CURVE 2 (cont.)	
2.40	0.042	13.8	0.027	7.68	0.117
3.01	0.031	14.1	0.025	7.72	0.090
3.39	0.029	16.6	0.028	7.94	0.068
3.62	0.031	16.9	0.028	8.33	0.056
3.89	0.034			8.62	0.051
4.72	0.025	CURVE 2 T = 373		8.87	0.053
5.00	0.028			9.25	0.045
5.34	0.028	2.49	0.042	9.39	0.045
5.83	0.025	2.98	0.034	9.51	0.042
6.29	0.028	3.20	0.038	9.85	0.041
6.84	0.025	4.36	0.030	10.2	0.037
7.29	0.030	5.44	0.032	11.4	0.030
7.88	0.032	5.97	0.038	13.1	0.031
8.14	0.036	6.38	0.053	13.3	0.030
8.39	0.033	6.70	0.072	13.6	0.035
9.53	0.036	6.93	0.100	14.0	0.031
10.0	0.028	7.09	0.130	14.3	0.033
10.3	0.027	7.36	0.151	15.0	0.027
11.3	0.029	7.58	0.133	16.9	0.028*

*Not shown on plot

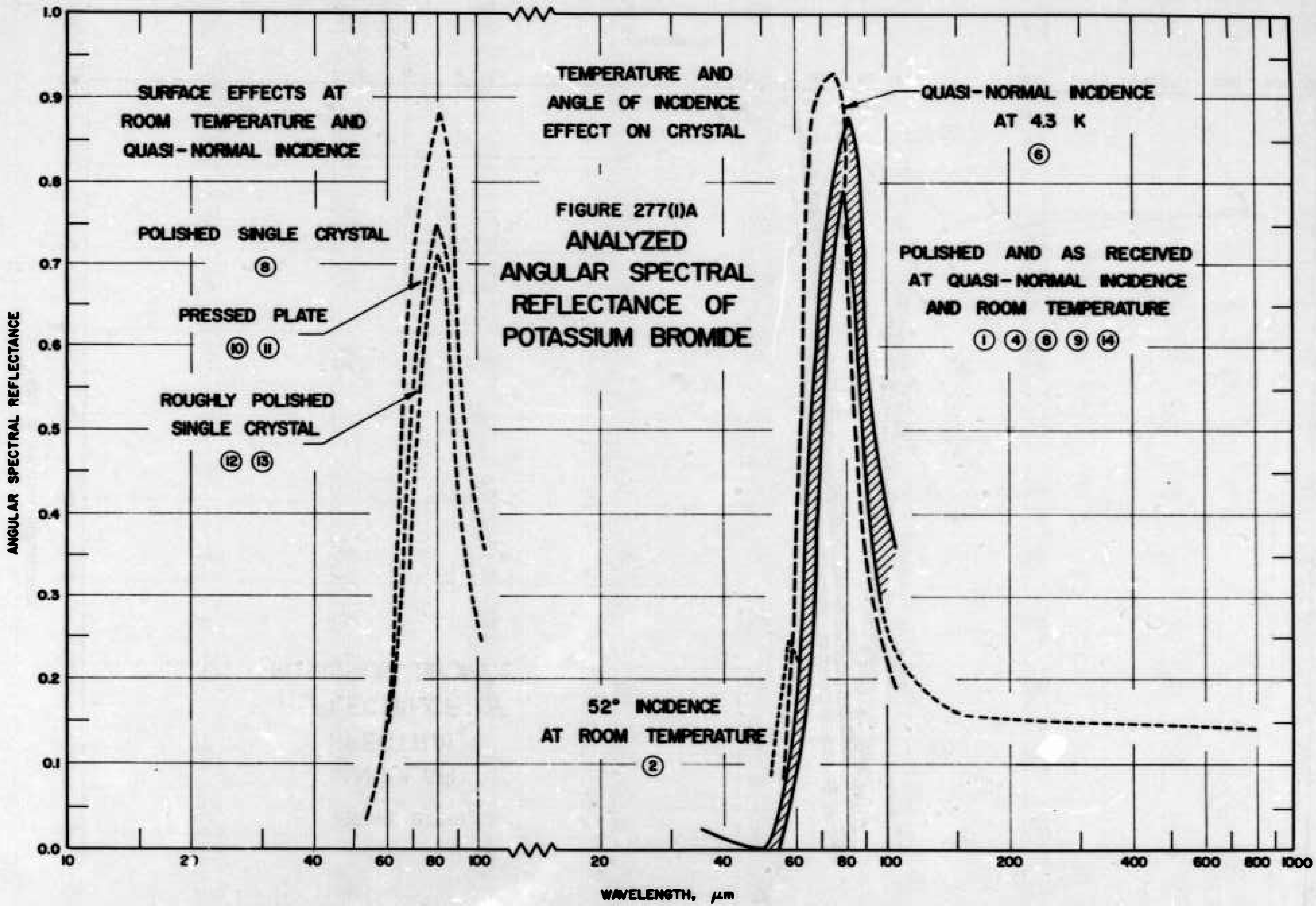


FIGURE 277(I)A
ANALYZED
ANGULAR SPECTRAL
REFLECTANCE OF
POTASSIUM BROMIDE

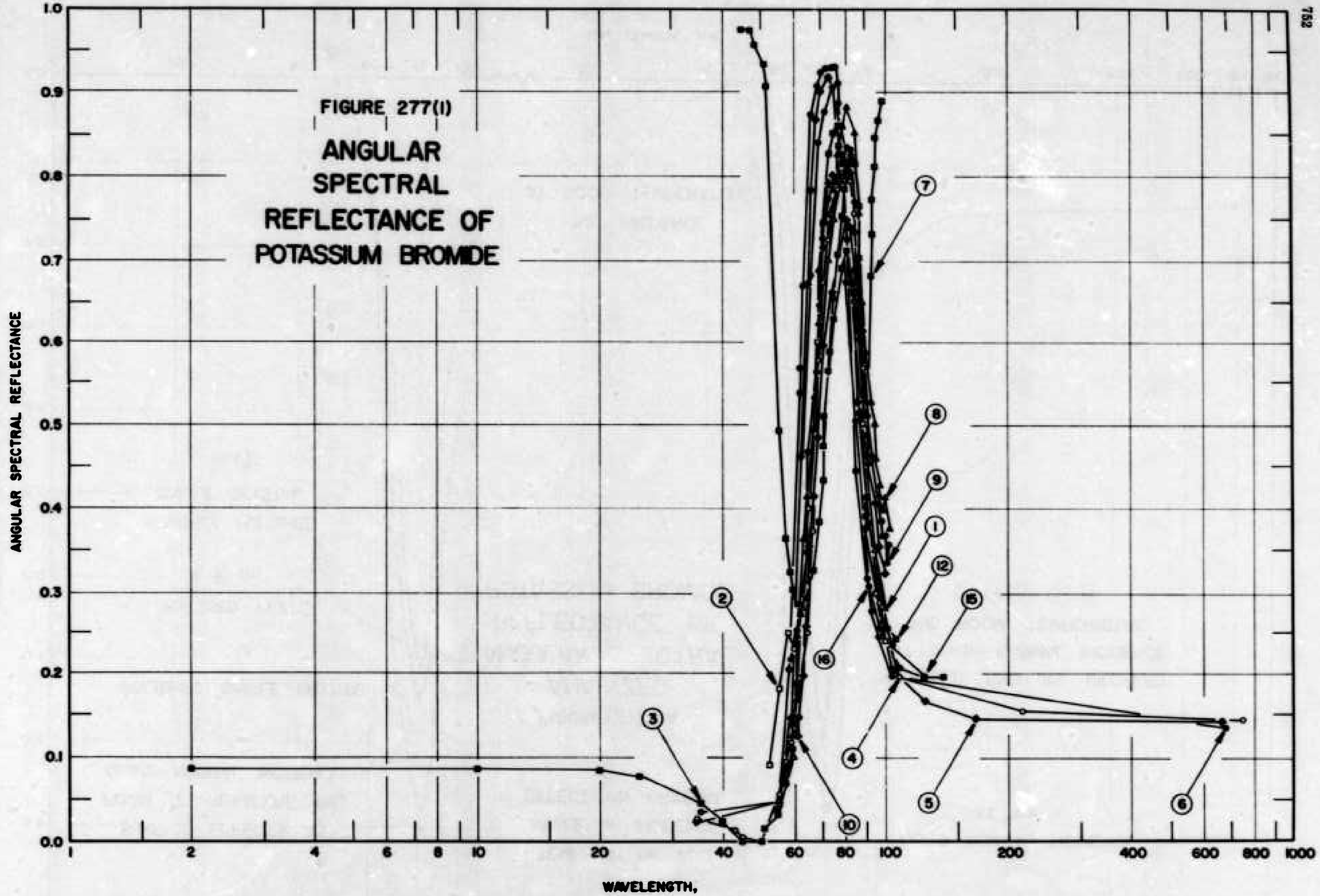


FIGURE 277(I)
ANGULAR SPECTRAL REFLECTANCE OF POTASSIUM BROMIDE
ANGULAR SPECTRAL REFLECTANCE
WAVELENGTH,
0.0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
1.0
1
2
4
6
8
10
20
40
60
80
100
200
400
600
800
1000
1
2
3
4
5
6
7
8
9
10
12
15
16

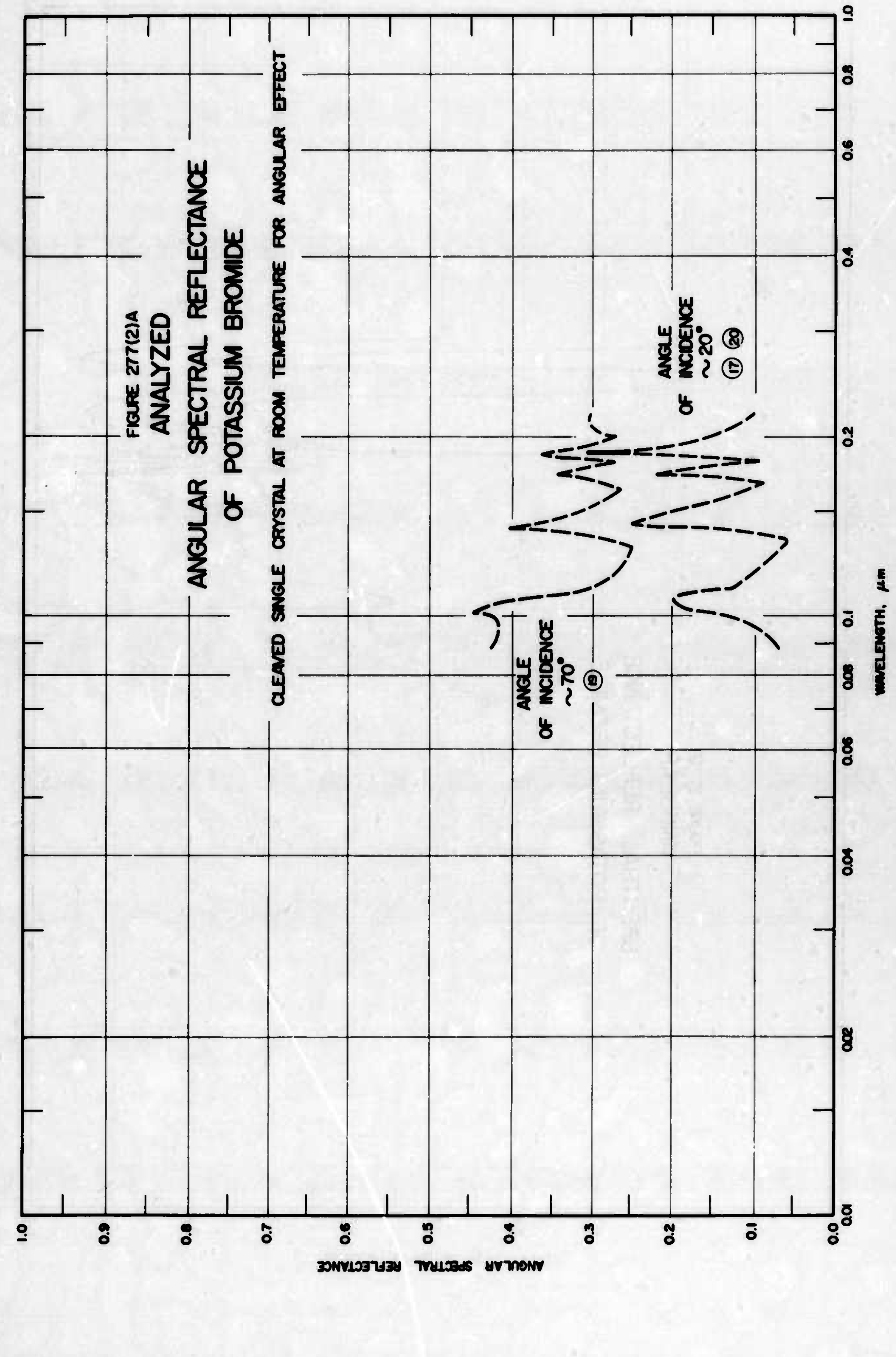


FIGURE 277(2)A
ANALYZED
ANGULAR SPECTRAL REFLECTANCE
OF POTASSIUM BROMIDE

CLEAVED SINGLE CRYSTAL AT ROOM TEMPERATURE FOR ANGULAR EFFECT

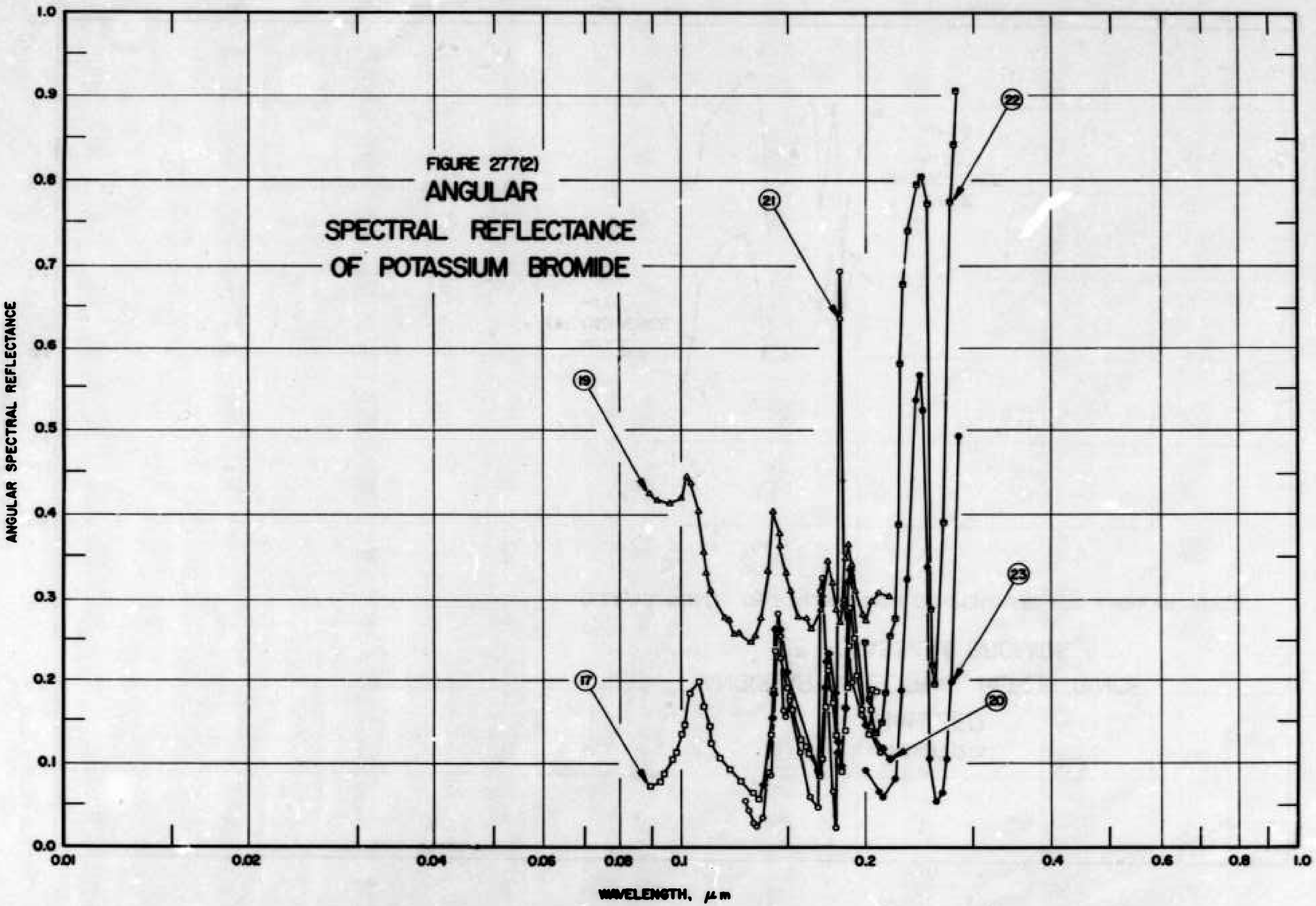


FIGURE 277(2)
ANGULAR
SPECTRAL REFLECTANCE
OF POTASSIUM BROMIDE
ANGULAR SPECTRAL REFLECTANCE
WAVELENGTH, μm
0.0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
1.0
0.01
0.02
0.04
0.06
0.08
0.1
0.2
0.4
0.6
0.8
1.0
17
19
20
21
22
23

SPECIFICATION TABLE NO. 277 ANGULAR SPECTRAL REFLECTANCE OF POTASSIUM BROMIDE KBr

Curve No.	Ref. No.	Year	Temperature K	Wavelength Range, μm	Geometry θ	θ'	ω'	Reported Error, %	Composition (weight percent), Specifications, and Remarks
1	95	1958	298	55.0-100	12°	12°			Single crystal; measured in vacuum; data extracted from smooth curve; Al coated mirror reference standard.
2	95	1958	298	52.0-100	52°	52°			Above specimen and conditions.
3	67	1963	~298	2.00-50.0	30°	30°			Specimen 5 mm thick; data extracted from smooth curve; aluminum mirror reference standard.
4	253	1967	300	34.7-757	15°	15°			Pure crystal; sample cut into a prism.
5	253	1963	77	34.7-662	15°	15°			Similar to the above specimen and conditions except measured in liquid nitrogen.
6	253	1963	4.3	35.1-680	15°	15°			Similar to the above specimen and conditions except measured in liquid helium.
7	253	1967	~298	44.7-98.6	60°	60°			Evaporated film; brass substrate; incident radiation polarized (p component); data extracted from smooth curve.
8	398	1961	~298	59.8-102	~0°	~0°			Polished single crystal.
9	398	1961	~298	59.9-102	~0°	~0°			Polished single crystal.
10	398	1961	~298	59.8-100	~0°	~0°			Pressed plate; polycrystalline.
11*	398	1961	~298	59.7-102	~0°	~0°			Pressed plate; polycrystalline.
12	398	1961	~298	70.2-106	~0°	~0°			Roughly polished single crystal.
13*	398	1961	~298	66.6-107	~0°	~0°			Roughly polished single crystal.
14*	419	1962	300	50.8-139	12°	12°			Single crystals; measured in vacuum; data extracted from smooth curve; evaporated Al mirror reference standard.
15	419	1962	200	50.5-139	12°	12°			Above specimen and conditions.
16	419	1962	100	50.5-139	12°	12°			Above specimen and conditions.
17	96	1963	298	0.0890-0.208	20°		2π		Harshaw crystal; cleaved; incident energy unpolarized; measured in air.
18*	96	1963	298	0.0890-0.208	50°		2π		Above specimen and conditions.
19	96	1963	298	0.0890-0.208	70°		2π		Above specimen and conditions.
20	377	1968	300	0.136-0.219	~20°	~20°			Cleaved single crystal; back surface treated with emery cloth; pressure $<10^{-6}$ mm Hg: data extracted from smooth curve.
21	377	1968	55	0.127-0.212	~20°	~20°			Above specimen and conditions.
22	366	1952	~298	0.200-0.280	0°	2π			120 ppm Tl; data extracted from smooth curve.
23	366	1952	~298	0.200-0.281	0°	2π			390 ppm Tl; data extracted from smooth curve.

* Not shown on plot

DATA TABLE NO. 277 ANGULAR SPECTRAL REFLECTANCE OF POTASSIUM BROMIDE KBr

[Wavelength, λ, μm; Reflectance, ρ; Temperature, T, K]

CURVE 1 T = 298

λ	ρ
55.0	0.045
60.0	0.100
63.[illegible]	0.280
7[illegible]	0.600
73.0	0.700
75.0	0.750
79.0	0.800
85.0	0.650
90.0	0.470
95.0	0.350
100	0.280

CURVE 2 T = 298

λ	ρ
52.0	0.090
55.0	0.180
58.0	0.250
60.0	0.230
65.0	0.400
69.0	0.600
73.0	0.750
79.0	0.800
85.0	0.650
88.0	0.500
95.0	0.300
100	0.240

CURVE 3 T = 298

λ	ρ
2.00	0.086
10.0	0.086
20.0	0.083
25.3	0.078
35.1	0.047
40.0	0.025
43.4	0.000
50.0	0.000

CURVE 4 T = 300

λ	ρ
34.7	0.029
43.0	0.012
45.8	0.003
50.4	0.000*
54.9	0.055
57.2	0.096
59.8	0.119
60.9	0.133
64.7	0.250
67.1	0.371
69.5	0.578
71.3	0.676
73.3	0.728
76.6	0.785
79.3	0.801
82.1	0.795
84.3	0.759
87.7	0.568
97.9	0.289
109	0.193
219	0.152
757	0.145

CURVE 5 T = 77

λ	ρ
34.7	0.025
55.0	0.046
59.2	0.147
62.5	0.461
64.8	0.672
66.0	0.784
68.2	0.869
70.8	0.900
73.2	0.918
82.7	0.802
86.2	0.527
90.0	0.374
105	0.206
125	0.168
167	0.147
662	0.143

CURVE 6 T = 4.3

λ	ρ
35.1	0.035
55.1	0.046*
58.8	0.205
62.1	0.539
62.1	0.566
63.6	0.670
66.8	0.873
68.6	0.908
70.3	0.921
72.2	0.927
74.2	0.929
76.5	0.929
77.6	0.910
79.4	0.889
80.2	0.810
81.9	0.729
85.8	0.443
90.8	0.317
93.0	0.277
96.8	0.244
105	0.198
680	0.134

CURVE 7 T ~ 298

λ	ρ
44.7	0.974
47.0	0.974
48.9	0.957
50.7	0.931
51.9	0.907
55.4	0.491
57.7	0.361
58.5	0.326
59.7	0.301
61.5	0.285
64.0	0.292
67.0	0.328
69.1	0.382
70.1	0.432
71.4	0.510
73.0	0.589
74.7	0.655
76.5	0.709

CURVE 7 (cont.)

λ	ρ
78.3	0.752
80.0	0.785
82.1	0.817
82.8	0.825
84.5	0.816
86.3	0.766
87.6	0.702
90.0	0.390
92.2	0.681
92.7	0.733
93.3	0.771
94.3	0.812
95.4	0.848
96.6	0.868
98.6	0.890

CURVE 8 T ~ 298

λ	ρ
59.8	0.124
60.7	0.169
61.5	0.244
62.4	0.273
63.3	0.362
64.2	0.412
64.8	0.431*
65.5	0.458*
66.5	0.495
67.4	0.531
68.4	0.592*
68.8	0.623
69.8	0.690
70.6	0.730
73.0	0.794
74.1	0.785
74.9	0.801
76.1	0.792
76.8	0.828
77.5	0.828*
78.3	0.860
79.2	0.889
79.8	0.879*
80.6	0.885
81.8	0.898*
82.3	0.876*

CURVE 8 (cont.)

λ	ρ
83.2	0.861*
84.1	0.853
84.9	0.849*
85.7	0.814*
86.7	0.759
88.4	0.650
89.1	0.625*
90.0	0.589
90.7	0.564*
91.6	0.536*
92.3	0.526
93.2	0.511*
94.2	0.500
95.0	0.460
96.1	0.443*
96.8	0.416
97.8	0.427
98.3	0.415*
99.5	0.399
100	0.412
101	0.393*
102	0.374

CURVE 9 T ~ 298

λ	ρ
59.9	0.217
60.7	0.251
64.1	0.349
64.9	0.390*
65.7	0.468
66.6	0.476*
68.4	0.561
69.8	0.646
70.7	0.689*
71.5	0.717
72.7	0.760*
73.4	0.774
74.5	0.780*
75.1	0.787*
76.0	0.779*
76.9	0.800
77.6	0.773*
78.5	0.829
79.4	0.795*

CURVE 9 (cont.)

λ	ρ
79.9	0.819
80.9	0.836
81.8	0.820*
82.4	0.835
83.4	0.815*
84.4	0.791*
85.0	0.736
85.1	0.770
86.1	0.726*
86.8	0.716*
87.6	0.667
88.6	0.615
89.3	0.585*
89.8	0.554
90.9	0.510
91.7	0.500*
92.7	0.501*
93.1	0.462
94.0	0.445*
98.0	0.383
98.7	0.367
99.5	0.376*
100	0.368
101	0.338
102	0.358

CURVE 10 T ~ 298

λ	ρ
59.8	0.140
60.8	0.124
61.7	0.148
62.3	0.199
64.0	0.259
64.9	0.355
66.6	0.415
67.5	0.434*
68.4	0.487
69.8	0.551*
70.6	0.599
71.5	0.628*
72.5	0.648*
73.2	0.645*
74.2	0.662
75.0	0.670*

CURVE 10 (cont.)

λ	ρ
76.0	0.678*
78.3	0.706
80.7	0.750
81.6	0.749*
82.3	0.743
83.5	0.736*
84.2	0.716*
85.1	0.690
85.8	0.680*
86.6	0.652*
87.5	0.603
88.3	0.552*
89.1	0.514
90.0	0.490*
90.8	0.464*
91.8	0.453
92.9	0.448*
94.2	0.425*
95.2	0.409
96.0	0.391*
96.9	0.381*
97.8	0.355
99.4	0.343*
100	0.325

CURVE 11* T ~ 298

λ	ρ
59.7	0.065
60.8	0.107
61.4	0.140
62.4	0.182
63.1	0.233
63.9	0.291
65.7	0.350
66.5	0.384
67.5	0.445
68.3	0.472
69.1	0.520
69.8	0.568
70.9	0.609
71.7	0.621
72.5	0.639
74.3	0.688
75.1	0.709

CURVE 11 (cont.)*

λ	ρ
75.9	0.699
77.0	0.689
77.5	0.722
78.6	0.742
79.4	0.768
80.1	0.767
80.9	0.786
81.7	0.798
82.4	0.793
83.3	0.779
84.0	0.767
85.7	0.711
86.5	0.690
87.3	0.638
88.3	0.592
89.3	0.541
90.0	0.518
90.7	0.500
92.6	0.431
93.5	0.417
94.3	0.402
95.1	0.383
95.9	0.370
97.3	0.344
97.8	0.324
99.3	0.313
101	0.303
102	0.282

CURVE 12 T ~ 298

λ	ρ
70.2	0.475
71.3	0.495*
72.6	0.565
75.6	0.630
76.8	0.644*
77.8	0.675*
79.6	0.692
81.2	0.712
82.5	0.719*
83.9	0.694*
84.7	0.661
86.3	0.582*
87.7	0.512

*Not shown on plot

DATA TABLE NO. 277 (continued)

CURVE 12 (cont.)

λ	ρ
89.2	0.456*
91.2	0.413
91.9	0.382*
92.8	0.364*
94.5	0.330
96.2	0.311*
97.4	0.283*
98.7	0.275*
99.7	0.264
103	0.251*
104	0.246*
105	0.250*
106	0.243*

CURVE 13*
T ~ 298

λ	ρ
66.6	0.356
71.7	0.551
74.3	0.619
78.2	0.695
79.8	0.719
85.3	0.590
91.7	0.363
92.3	0.352
99.3	0.285
100	0.281
100	0.295
101	0.268
106	0.251
107	0.249

CURVE 14*
T = 300

λ	ρ
50.8	0.005
54.8	0.031
57.8	0.061
59.2	0.097
60.9	0.117
64.5	0.226
73.6	0.720
75.6	0.774
78.8	0.788
82.0	0.766
84.9	0.691
90.5	0.457

CURVE 14 (cont.)

λ	ρ
98.6	0.294
107	0.224
121	0.189
139	0.182

CURVE 15
T = 200

λ	ρ
50.5	0.014
54.3	0.031
57.1	0.067
58.7	0.110
61.2	0.189
70.9	0.748
72.6	0.828
74.3	0.851
76.2	0.861
79.7	0.838
83.5	0.674
88.1	0.487
91.6	0.381
96.1	0.308
101	0.255
104	0.234
110	0.213*
124	0.196
139	0.196

CURVE 16
T = 100

λ	ρ
50.5	0.014*
54.0	0.035
55.0	0.065*
57.4	0.086
58.8	0.148*
66.3	0.682
69.8	0.841
71.7	0.877
74.4	0.905
77.6	0.899*
79.7	0.836*
81.8	0.673
85.1	0.504
88.3	0.380*
91.8	0.309
96.3	0.254

CURVE 16 (cont.)

λ	ρ
101	0.227*
109	0.208
124	0.196*
139	0.196*

CURVE 17
T = 298

λ	ρ
0.0890	0.073
0.0920	0.080
0.0935	0.088
0.0965	0.104
0.0970	0.108*
0.0980	0.112
0.0990	0.123*
0.100	0.135
0.101	0.146
0.1[illegible]3	0.183
0.104	0.196*
0.107	0.199
0.109	0.167
0.111	0.143
0.112	0.136*
0.113	0.121
0.114	0.114*
0.116	0.105
0.117	0.099*
0.119	0.095*
0.120	0.092
0.122	0.090*
0.123	0.087*
0.125	0.080
0.127	0.075*
0.128	0.072*
0.131	0.065
0.132	0.062*
0.134	0.059
0.136	0.065*
0.137	0.080
0.140	0.132
0.142	0.189
0.143	0.236
0.145	0.227
0.146	0.217*
0.149	0.190
0.150	0.180
0.151	0.170*

CURVE 17 (cont.)

λ	ρ
0.153	0.163
0.154	0.146*
0.156	0.129
0.158	0.125*
0.159	0.120
0.160	0.116*
0.161	0.110
0.164	0.099*
0.167	0.090*
0.168	0.086
0.169	0.093*
0.170	0.106
0.171	0.132*
0.172	0.167
0.173	0.196
0.174	0.210
0.175	0.205*
0.176	0.193*
0.177	0.172
0.178	0.152*
0.179	0.133
0.180	0.115
0.181	0.103*
0.182	0.094*
0.183	0.090
0.184	0.106*
0.185	0.139
0.186	0.190
0.187	0.243
0.188	0.284*
0.189	0.290
0.190	0.278*
0.191	0.251
0.192	0.225*
0.193	0.204
0.194	0.184*
0.196	0.162
0.198	0.145*
0.199	0.134*
0.201	0.132
0.202	0.140*
0.203	0.162
0.204	0.180*
0.206	0.188
0.208	0.185

CURVE 18*
T = 298

λ	ρ
0.0890	0.153
0.0920	0.174
0.0930	0.176
0.0940	0.178
0.0960	0.185
0.0980	0.200
0.0990	0.201
0.103	0.250
0.104	0.256
0.106	0.240
0.108	0.200
0.110	0.181
0.112	0.170
0.113	0.159
0.114	0.150
0.116	0.136
0.117	0.126
0.119	0.127
0.120	0.128
0.121	0.126
0.123	0.124
0.124	0.129
0.125	0.109
0.127	0.105
0.128	0.102
0.131	0.096
0.132	0.093
0.134	0.093
0.135	0.099
0.136	0.105
0.137	0.130
0.138	0.152
0.143	0.268
0.145	0.251
0.146	0.245
0.149	0.212
0.150	0.205
0.151	0.195
0.153	0.185
0.154	0.167
0.156	0.160
0.157	0.156
0.158	0.153
0.159	0.147
0.160	0.143
0.161	0.138

CURVE 18 (cont.)*

λ	ρ
0.162	0.134
0.163	0.127
0.166	0.120
0.168	0.121
0.169	0.127
0.170	0.146
0.171	0.174
0.172	0.203
0.173	0.224
0.174	0.232
0.175	0.229
0.176	0.211
0.177	0.195
0.178	0.174
0.179	0.154
0.180	0.139
0.181	0.126
0.182	0.119
0.183	0.122
0.184	0.142
0.185	0.176
0.186	0.218
0.187	0.268
0.188	0.294
0.189	0.296
0.190	0.283
0.191	0.256
0.192	0.234
0.193	0.212
0.194	0.198
0.196	0.175
0.198	0.162
0.199	0.153
0.201	0.151
0.202	0.156
0.203	0.172
0.204	0.183
0.206	0.186
0.208	0.183

CURVE 19
T = 298

λ	ρ
0.0890	0.426
0.0920	0.419
0.0935	0.418*
0.0960	0.416

CURVE 19 (cont.)

λ	ρ
0.0975	0.417*
0.100	0.420
0.101	0.435*
0.102	0.446
0.104	0.439
0.107	0.405
0.109	0.354
0.110	0.331
0.111	0.313*
0.113	0.310
0.114	0.297*
0.116	0.280*
0.117	0.281*
0.118	0.277
0.120	0.274
0.121	0.270*
0.122	0.260*
0.123	0.258
0.125	0.260
0.126	0.255*
0.127	0.250*
0.130	0.247
0.132	0.252*
0.133	0.256
0.134	0.264*
0.135	0.276
0.137	0.312*
0.138	0.332
0.142	0.405
0.143	0.399*
0.145	0.377
0.145	0.363
0.149	0.331
0.150	0.316*
0.151	0.310
0.153	0.299*
0.155	0.279
0.157	0.279*
0.160	0.277
0.161	0.274*
0.163	0.265
0.167	0.271*
0.168	0.275*
0.169	0.288
0.170	0.305
0.171	0.330*
0.173	0.348
0.174	0.346*
0.175	0.338*

CURVE 19 (cont.)

λ	ρ
0.176	0.320
0.177	0.303*
0.178	0.289
0.179	0.282*
0.180	0.274*
0.182	0.272
0.183	0.277*
0.184	0.294
0.184	0.319*
0.185	0.350
0.187	0.365
0.189	0.359*
0.190	0.340
0.191	0.323*
0.192	0.310
0.193	0.298*
0.196	0.283*
0.198	0.281
0.199	0.278*
0.200	0.274
0.202	0.285*
0.203	0.298
0.204	0.302*
0.205	0.308
0.208	0.301

CURVE 20
T = 300

λ	ρ
0.136	0.0742
0.141	0.153
0.143	0.265
0.145	0.265
0.146	0.255*
0.147	0.219*
0.148	0.214*
0.149	0.210
0.166	0.0938
0.167	0.0908
0.168	0.0960*
0.172	0.191
0.173	0.223
0.174	0.233
0.178	0.183
0.180	0.126
0.180	0.111
0.182	0.0991

*Not shown on plot

DATA TABLE NO. 277 (continued)

CURVE 20 (cont.)
T = 300

λ	ρ
0.185	0.165
0.187	0.320
0.188	0.334
0.193	0.202*
0.197	0.161*
0.200	0.144
0.213	0.117
0.219	0.106

CURVE 21
T = 55

λ	ρ
0.127	0.0552
0.128	0.0434
0.129	0.0411*
0.131	0.0397*
0.132	0.0291
0.133	0.0279
0.136	0.0358
0.138	0.0875*
0.138	0.0908
0.140	0.0881
0.143	0.262*
0.144	0.282
0.145	0.255
0.146	0.210*
0.147	0.162
0.148	0.156
0.150	0.174
0.156	0.111
0.158	0.114*
0.163	0.0606
0.166	0.0477
0.169	0.310
0.170	0.324
0.171	0.303*
0.177	0.0673
0.179	0.0214
0.182	0.637
0.182	0.694
0.184	0.298
0.186	0.243*
0.190	0.199
0.196	0.157
0.202	0.134
0.212	0.114

CURVE 22
T ~ 298

λ	ρ
0.200	0.247
0.202	0.176
0.205	0.145*
0.208	0.134
0.212	0.147
0.215	0.182
0.216	0.228*
0.219	0.255
0.222	0.276
0.224	0.397
0.227	0.580
0.230	0.677
0.234	0.740
0.237	0.779*
0.242	0.798
0.246	0.806
0.249	0.793*
0.251	0.772
0.254	0.287
0.255	0.217
0.258	0.193
0.262	0.206*
0.267	0.390
0.274	0.776
0.276	0.841
0.280	0.904

CURVE 23
T ~ 298

λ	ρ
0.200	0.091
0.210	0.067
0.214	0.060
0.218	0.078*
0.223	0.081
0.229	0.187
0.234	0.323
0.241	0.535
0.244	0.567
0.248	0.553*
0.249	0.521
0.251	0.339
0.252	0.101
0.254	0.067*
0.260	0.052
0.266	0.065

CURVE 23 (cont.)

λ	ρ
0.270	0.105
0.273	0.198
0.281	0.491

*Not shown on plot

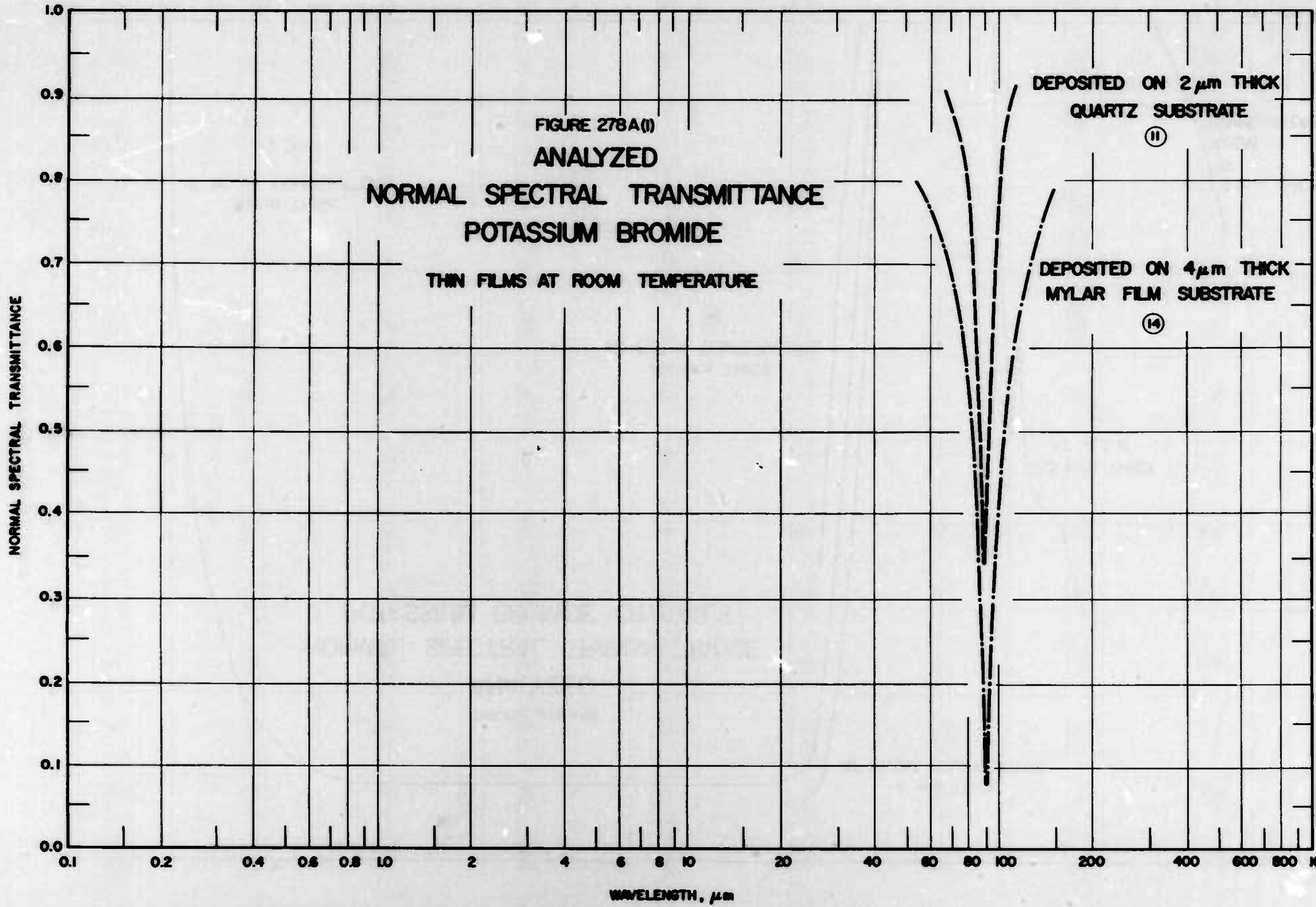
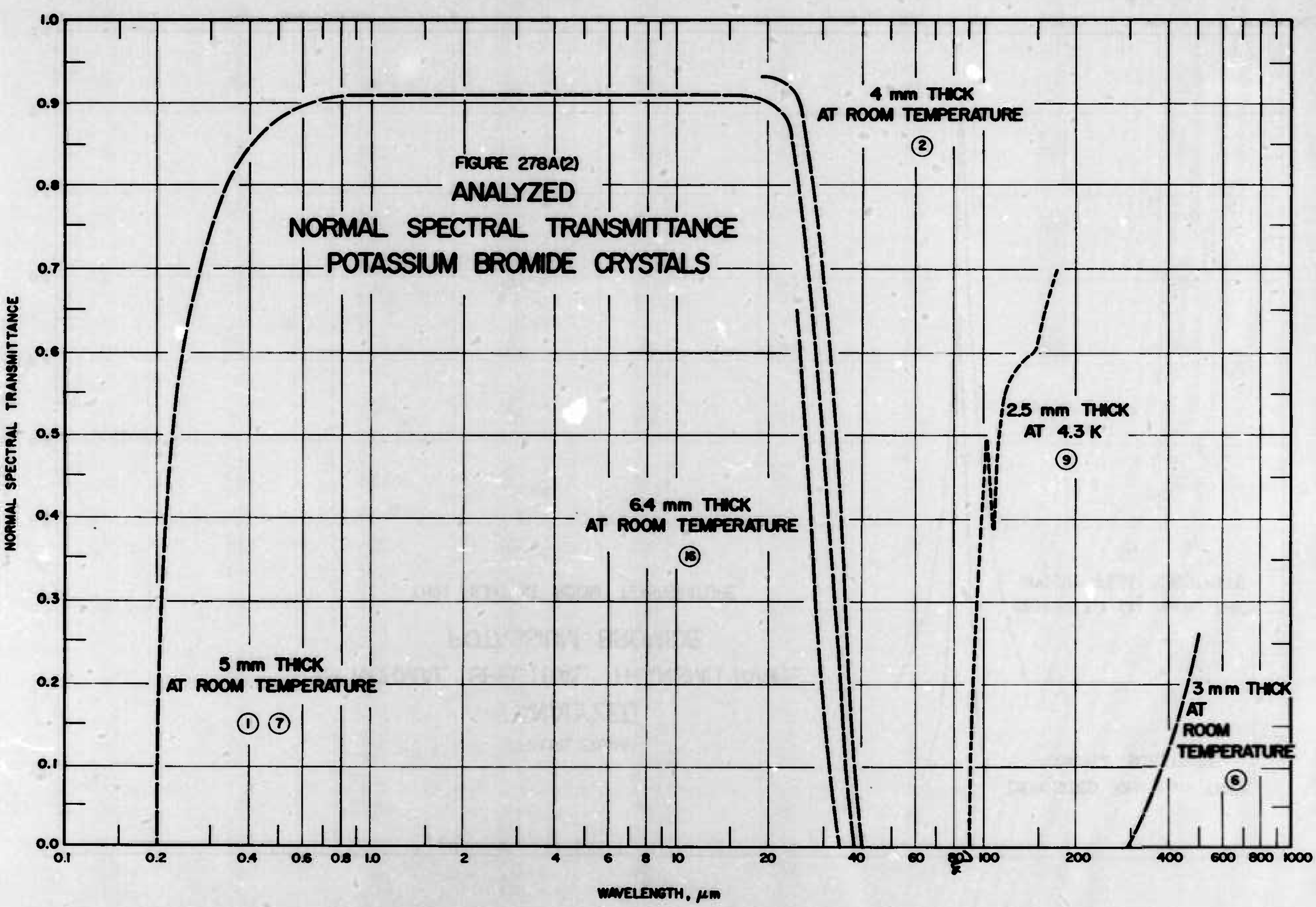


FIGURE 278A(I)
ANALYZED
NORMAL SPECTRAL TRANSMITTANCE
POTASSIUM BROMIDE
THIN FILMS AT ROOM TEMPERATURE
DEPOSITED ON 2 μm THICK
QUARTZ SUBSTRATE
11
DEPOSITED ON 4 μm THICK
MYLAR FILM SUBSTRATE
14
NORMAL SPECTRAL TRANSMITTANCE
0.0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
1.0
0.1
0.2
0.4
0.6
0.8
1.0
2
4
6
8
10
20
40
60
80
100
200
400
600
800
1000
WAVELENGTH, μm

FIGURE 278A(2)
ANALYZED
NORMAL SPECTRAL TRANSMITTANCE
POTASSIUM BROMIDE CRYSTALS



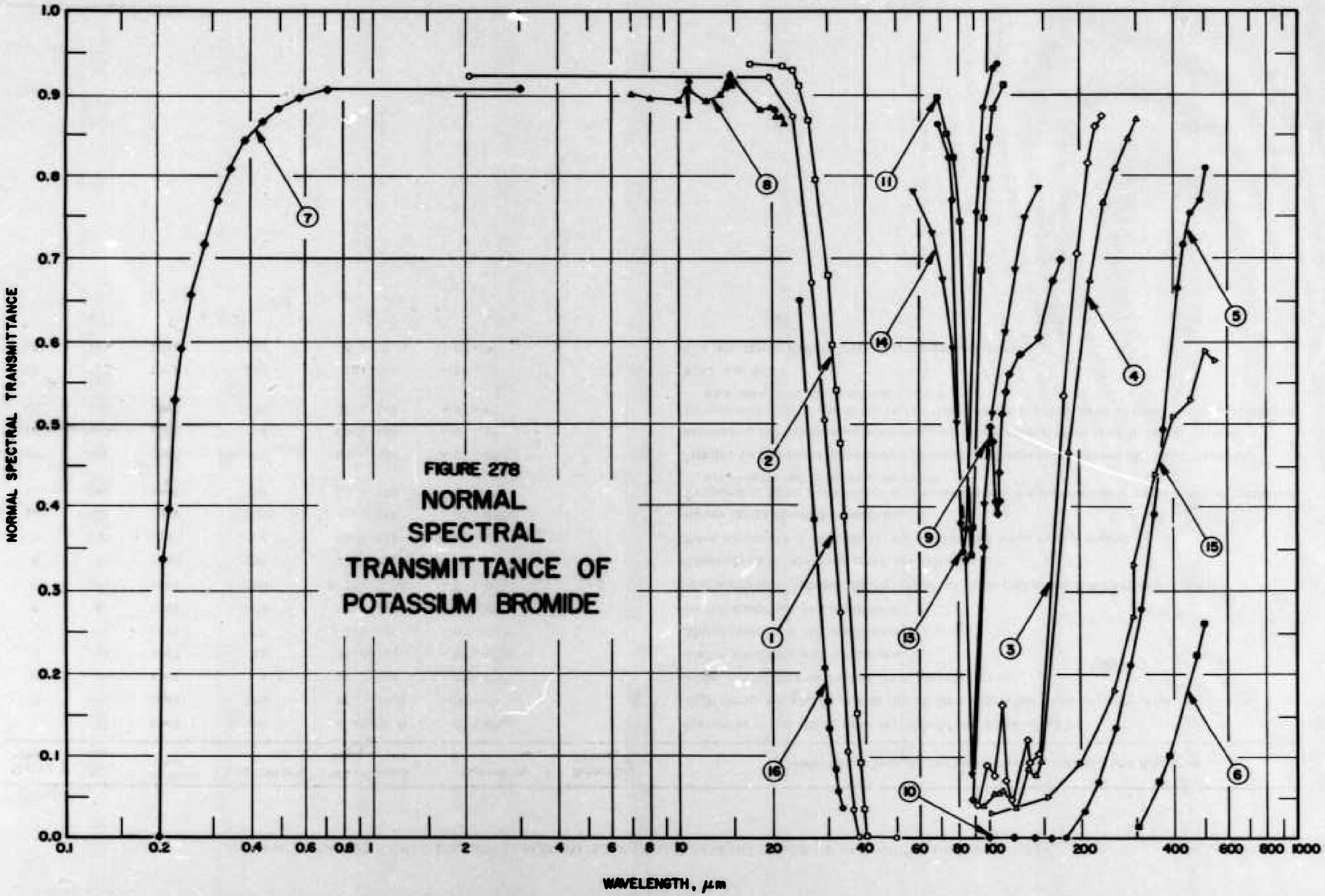


FIGURE 278
NORMAL
SPECTRAL
TRANSMITTANCE OF
POTASSIUM BROMIDE

SPECIFICATION TABLE NO. 278 NORMAL SPECTRAL TRANSMITTANCE OF POTASSIUM BROMIDE KBr

Curve No.	Ref. No.	Year	Temperature K	Wavelength Range, μm	Geometry θ	θ'	ω'	Reported Error, %	Composition (weight percent), Specifications, and Remarks
1	67	1963	~298	2.10-50.0	0°	0°			Specimen 5 mm thick; data extracted from smooth curve.
2	93	1960	298	17.2-40.3	~0°	~0°			High purity crystal (4.0 mm thick); data extracted from smooth curve.
3	98	1967	4.2	92.0-234	~0°	~0°			3 mm thick; data extracted from smooth curve.
4	98	1967	25	96.0-304	~0°	~0°			Above specimen and conditions.
5	98	1967	77	178-509	~0°	~0°			Above specimen and conditions.
6	98	1967	300	304-500	~0°	~0°			Above specimen and conditions.
7	94	1967	298	0.200-3.00	~0°	~0°		± 2	Single crystal (5.0 mm thick); polished; data extracted from smooth curve.
8	99	1968	~298	7.00-22.0	~0°	~0°			Cleaved; data extracted from smooth curve.
9	253	1967	4.3	89.5-173	~0°	~0°			Pure crystal (2.5 mm thick); data extracted from smooth curve.
10	253	1967	300	100-180	~0°	~0°			Above specimen and conditions.
11	253	1967	300	69.0-113	~0°	~0°			Evaporated film; 2 mm thick quartz substrate; measured under quasi-normal incidence data extracted from smooth curve.
12*	253	1963	~ 77	69.8-108	~0°	~0°			Similar to the above specimen and conditions except measured in liquid nitrogen.
13	253	1963	4.3	69.8-106	~0°	~0°			Similar to the above specimen and conditions except measured in liquid helium.
14	253	1967	300	57.4-146	~0°	~0°			Evaporated film; 4 μm thick Mylar film substrate; measured at quasi-normal incidence. data extracted from smooth curve.
15	292	1950	299	101-548	~0°	~0°			0.41 mm thick.
16	399	1948	~298	24.7-33.5	~0°	~0°			6.4 mm thick; data extracted from smooth curve.

* Not shown on plot

DATA TABLE NO. 278 NORMAL SPECTRAL TRANSMITTANCE OF POTASSIUM BROMIDE KBr

[Wavelength, λ, μm; Transmittance, τ; Temperature, T, K]

λ	τ
CURVE 1 T = 298	
2.10	0.924
19.8	0.924
23.3	0.872
27.0	0.673
29.8	0.508
33.1	0.275
35.0	0.105
36.5	0.035
37.9	0.000
50.0	0.000
CURVE 2 T = 298	
17.2	0.939
21.7	0.937
23.1	0.931
24.6	0.914
26.1	0.866
27.8	0.797
30.1	0.681
31.5	0.599
32.3	0.543
33.3	0.478
34.4	0.389
37.4	0.153
38.3	0.091
39.2	0.036
40.3	0.000
CURVE 3 T = 4.2	
92.0	0.040
99.0	0.089
103	0.077
110	0.164
113	0.070
119	0.048
131	0.120
135	0.092
144	0.103
176	0.535
196	0.706
211	0.817
CURVE 3 (cont.)	
223	0.860
234	0.874
CURVE 4 T = 25	
96.0	0.039
103	0.054
106	0.054
110	0.059
122	0.038
133	0.085
141	0.076
147	0.094
184	0.466
215	0.676
237	0.769
256	0.810
281	0.848
304	0.870
CURVE 5 T = 77	
178	0.000
201	0.032
225	0.068
259	0.136
289	0.212
311	0.279
343	0.390
370	0.494
414	0.666
431	0.715
454	0.751
490	0.792
509	0.810
CURVE 6 T = 300	
304	0.014
358	0.068
387	0.101
475	0.223
500	0.261
CURVE 7 T = 298	
0.200	0.000
0.205	0.337
0.217	0.396
0.228	0.530
0.238	0.593
0.257	0.659
0.281	0.718
0.314	0.770
0.346	0.809
0.385	0.841
0.439	0.866
0.497	0.883
0.576	0.896
0.711	0.908
3.00	0.909
CURVE 8 T ~ 298	
7.00	0.901
8.00	0.895
10.0	0.894
10.7	0.908
10.8	0.875
10.8	0.920
10.9	0.905
12.3	0.894
13.8	0.900
14.4	0.910
14.5	0.918
14.9	0.920
14.9	0.926
15.0	0.913
15.4	0.919
18.5	0.882
20.0	0.885
20.5	0.883
20.7	0.871
21.5	0.871
22.0	0.864
CURVE 9 T = 4.3	
89.5	0.046
97.6	0.352
100	0.478
102	0.499
104	0.479
105	0.406
107	0.391
108	0.407
109	0.442
112	0.513
115	0.540
118	0.560
129	0.586
146	0.606
162	0.677
173	0.700
CURVE 10 T = 300	
100	0.0
120	0.0
140	0.0
160	0.0
180	0.0*
CURVE 11 T = 300	
69.0	0.898
73.9	0.852
76.1	0.823
79.2	0.744
88.0	0.343
89.9	0.375
95.8	0.686
97.2	0.747
99.2	0.797
101	0.849
104	0.883
113	0.915
CURVE 12* T = 77	
69.8	0.837
75.7	0.773
78.1	0.688
83.5	0.344
84.5	0.344
91.9	0.691
94.5	0.797
96.3	0.834
98.5	0.872
100	0.898
103	0.915
108	0.942
CURVE 13 T = 4.3	
69.8	0.863
74.4	0.824
76.7	0.771
81.7	0.381
82.9	0.348
84.6	0.374
92.4	0.757
94.8	0.830
97.8	0.885
104	0.933
106	0.939
CURVE 14 T = 300	
57.4	0.781
66.0	0.729
71.5	0.676
76.3	0.592
79.6	0.502
84.2	0.336
87.6	0.076
97.8	0.401
103	0.513
112	0.613
122	0.688
132	0.749
146	0.785
CURVE 15 T = 299	
101	0.030
155	0.050
199	0.090
253	0.180
295	0.270
295	0.330
348	0.440
400	0.510
456	0.530
504	0.590
548	0.580
CURVE 16 T ~ 298	
24.7	0.653
27.3	0.389
29.4	0.210
30.0	0.167
30.4	0.136
32.0	0.083
32.7	0.058
33.5	0.038

*Not shown on plot

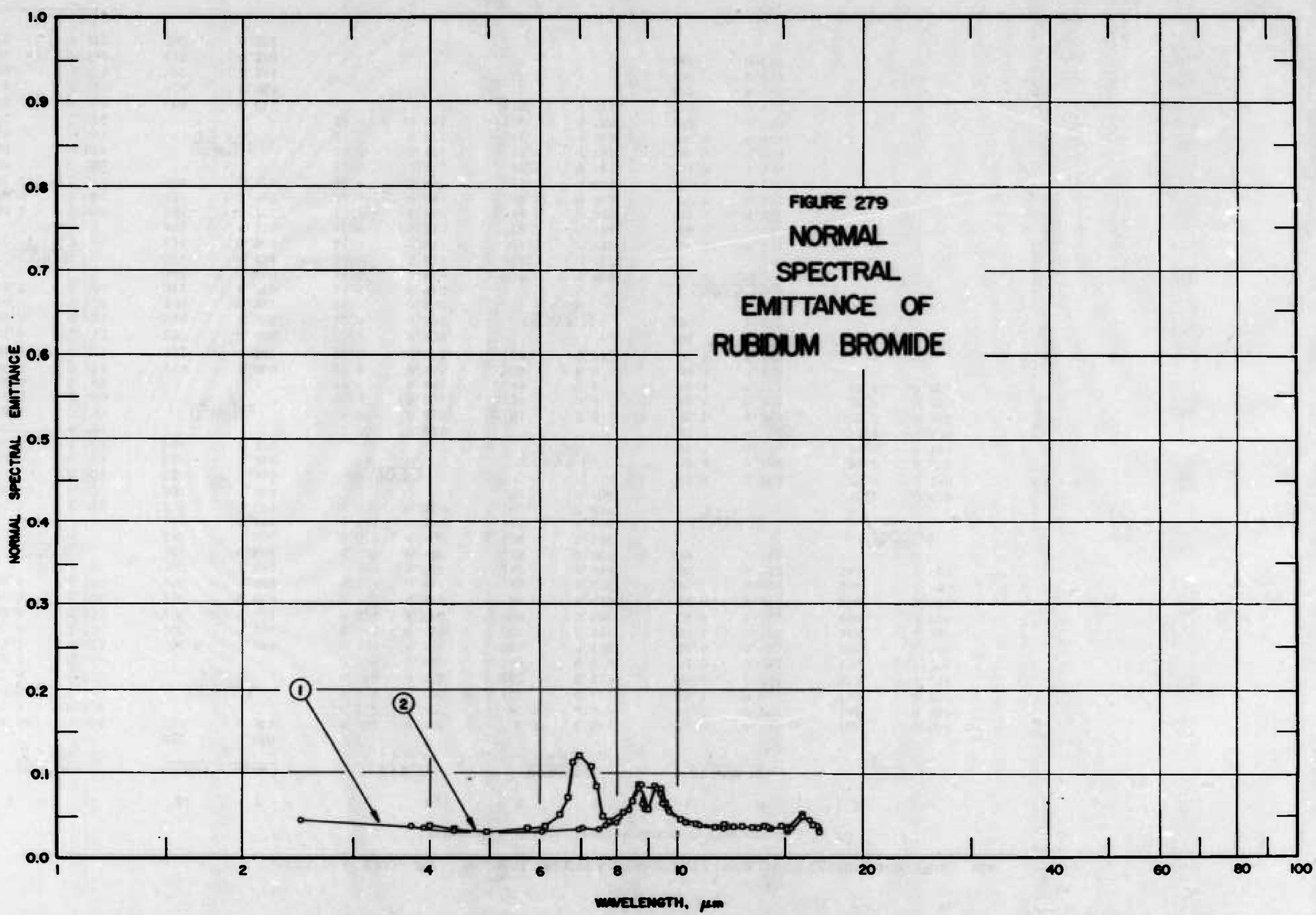


FIGURE 279 NORMAL SPECTRAL EMITTANCE OF RUBIDIUM BROMIDE

SPECIFICATION TABLE NO. 279 NORMAL SPECTRAL EMITTANCE OF RUBIDIUM BROMIDE RbBr

Curve No.	Ref. No.	Year	Temperature K	Wavelength Range, μm	Geometry θ θ' ω'	Reported Error, %	Composition (weight percent), Specifications, and Remarks
1	309	1964	373	2.48-16.9	$\sim 0° \sim 0°$		Crystal (5.31 mm thick); data extracted from smooth curve.
2	309	1964	373	4.00-16.9	$\sim 0° \sim 0°$		Above specimen and conditions except measured after 3 hrs x-ray irradiation at 298 K.

DATA TABLE NO. 279 NORMAL SPECTRAL EMITTANCE OF RUBIDIUM BROMIDE RbBr

[Wavelength, λ, μm; Emittance, ϵ; Temperature, T, K]

λ	ϵ	λ	ϵ	λ	ϵ	λ	ϵ
CURVE 1		CURVE 1 (cont.)		CURVE 2 (cont.)		CURVE 2 (cont.)	
T = 373		10.2	0.042	6.47	0.050	11.9	0.040
2.48	0.044	10.8	0.040	6.67	0.071	12.3	0.036
3.72	0.036	11.8	0.035	6.79	0.113	12.7	0.038
3.90	0.037	14.0	0.037	6.95	0.121	13.2	0.037
4.37	0.031	14.6	0.038	7.26	0.109	13.5	0.035
6.04	0.030	15.0	0.034	7.40	0.085	13.8	0.037
6.91	0.033	15.2	0.034	7.58	0.049	14.1	0.036
7.01	0.035	15.9	0.049	7.79	0.044	14.7	0.038
7.46	0.033	16.3	0.045	8.18	0.052	15.0	0.032
7.66	0.039	16.7	0.038	8.43	0.068	15.2	0.035
8.00	0.042	16.9	0.030	8.68	0.086	15.9	0.050
8.34	0.057			8.97	0.059	16.5	0.040
8.63	0.082	CURVE 2		9.18	0.085	16.9	0.031
8.70	0.077	T = 373		9.34	0.082		
8.77	0.063			9.55	0.065		
8.90	0.059	4.00	0.038	9.65	0.056		
9.23	0.081	4.38	0.032	10.1	0.045		
9.32	0.076	4.92	0.030	10.7	0.040		
9.41	0.065	5.71	0.035	11.0	0.042		
9.70	0.053	6.10	0.037	11.5	0.037		

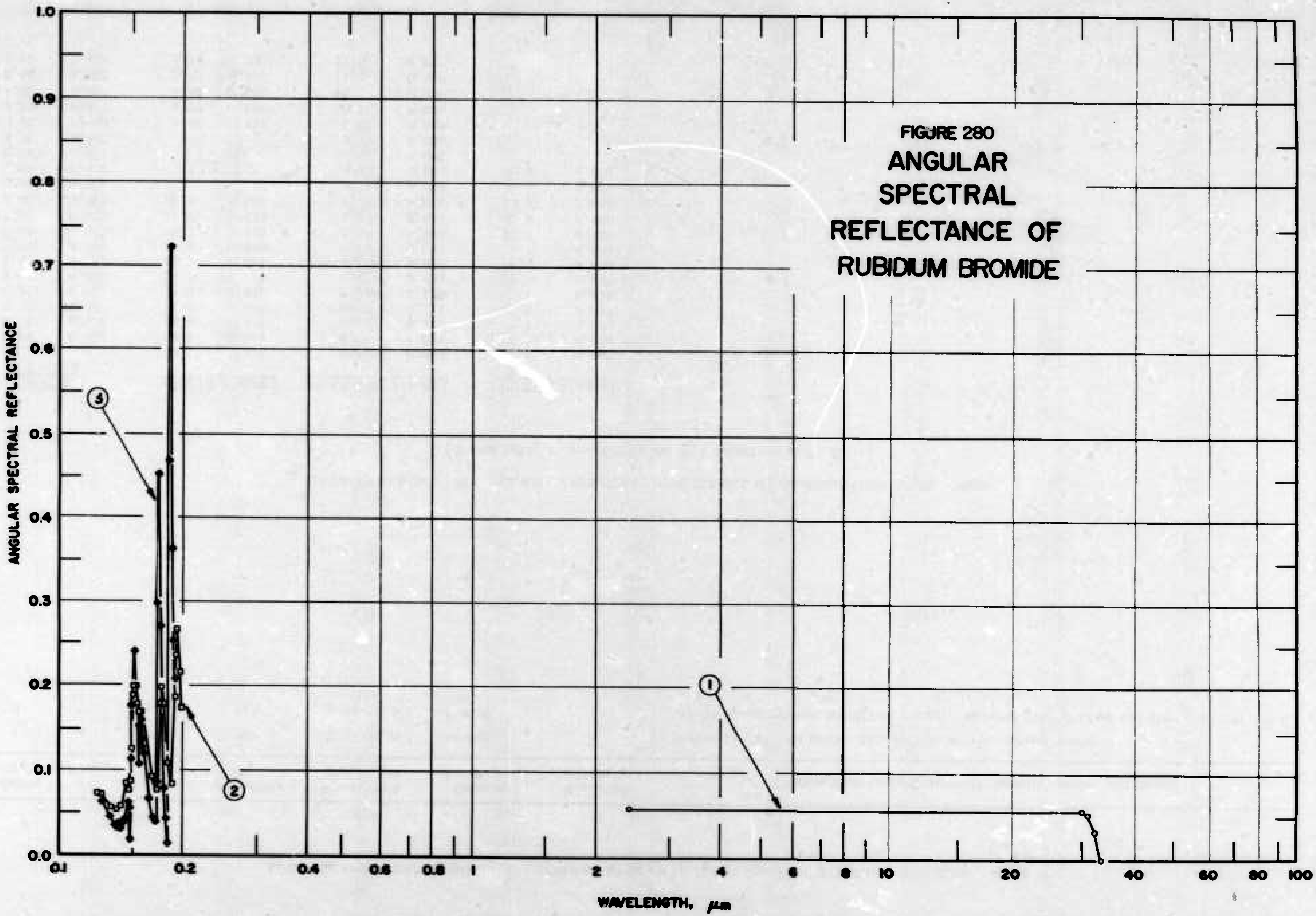


FIGURE 280
ANGULAR SPECTRAL REFLECTANCE OF RUBIDIUM BROMIDE

SPECIFICATION TABLE NO. 280 ANGULAR SPECTRAL REFLECTANCE OF RUBIDIUM BROMIDE RbBr

Curve No.	Ref. No.	Year	Temperature K	Wavelength Range, μm	Geometry θ θ' ω'	Reported Error, %	Composition (weight percent), Specifications, and Remarks
1	87	1968	313	2.40-33.3	30° 30°		Synthetic single crystal (5.3 mm thick); flat to ten fringes or better; data extracted from smooth curve; aluminum mirror reference standard.
2	377	1968	300	0.124-0.198	~20°~20°		Cleaved single crystal; back surface treated with emery cloth; pressure <10^{-6} mm Hg; data extracted from smooth curve.
3	377	1968	55	0.127-0.192	~20°~20°		Above specimen and conditions.

DATA TABLE NO. 280 ANGULAR SPECTRAL REFLECTANCE OF RUBIDIUM BROMIDE RbBr

[Wavelength, λ, μm; Reflectance, ρ; Temperature, T, K]

λ	ρ	λ	ρ	λ	ρ	λ	ρ
CURVE 1		CURVE 2 (cont.)		CURVE 3		CURVE 3 (cont.)	
T = 313				T = 55			
		0.151	0.186			0.159	0.128
2.4	0.057	0.152	0.199	0.127	0.0614	0.160	0.120
30.0	0.057	0.153	0.199	0.131	0.0457	0.161	0.120
31.0	0.051	0.155	0.177	0.136	0.0344	0.165	0.0670
32.1	0.031	0.156	0.168	0.137	0.0337	0.168	0.0448
33.3	0.000	0.157	0.169	0.140	0.0364	0.171	0.0386
		0.167	0.0914	0.142	0.0319	0.172	0.0851
CURVE 2		0.169	0.0826	0.142	0.0362	0.173	0.297
T = 300		0.172	0.0759	0.143	0.0380	0.174	0.451
		0.174	0.0819	0.144	0.0403	0.175	0.269
0.124	0.0720	0.177	0.177	0.146	0.0620	0.180	0.0780
0.126	0.0711	0.178	0.197	0.147	0.0546	0.182	0.0407
0.133	0.0552	0.180	0.177	0.149	0.0184	0.183	0.0143
0.135	0.0537	0.183	0.109	0.150	0.113	0.185	0.467
0.138	0.0537	0.186	0.0813	0.150	0.174	0.186	0.725
0.141	0.0588	0.191	0.184	0.152	0.238	0.188	0.362
0.146	0.0838	0.191	0.235	0.154	0.153	0.190	0.251
0.148	0.0769	0.193	0.265	0.156	0.106	0.192	0.206
0.149	0.0875	0.197	0.214	0.157	0.159		
0.150	0.126	0.198	0.172	0.158	0.137		

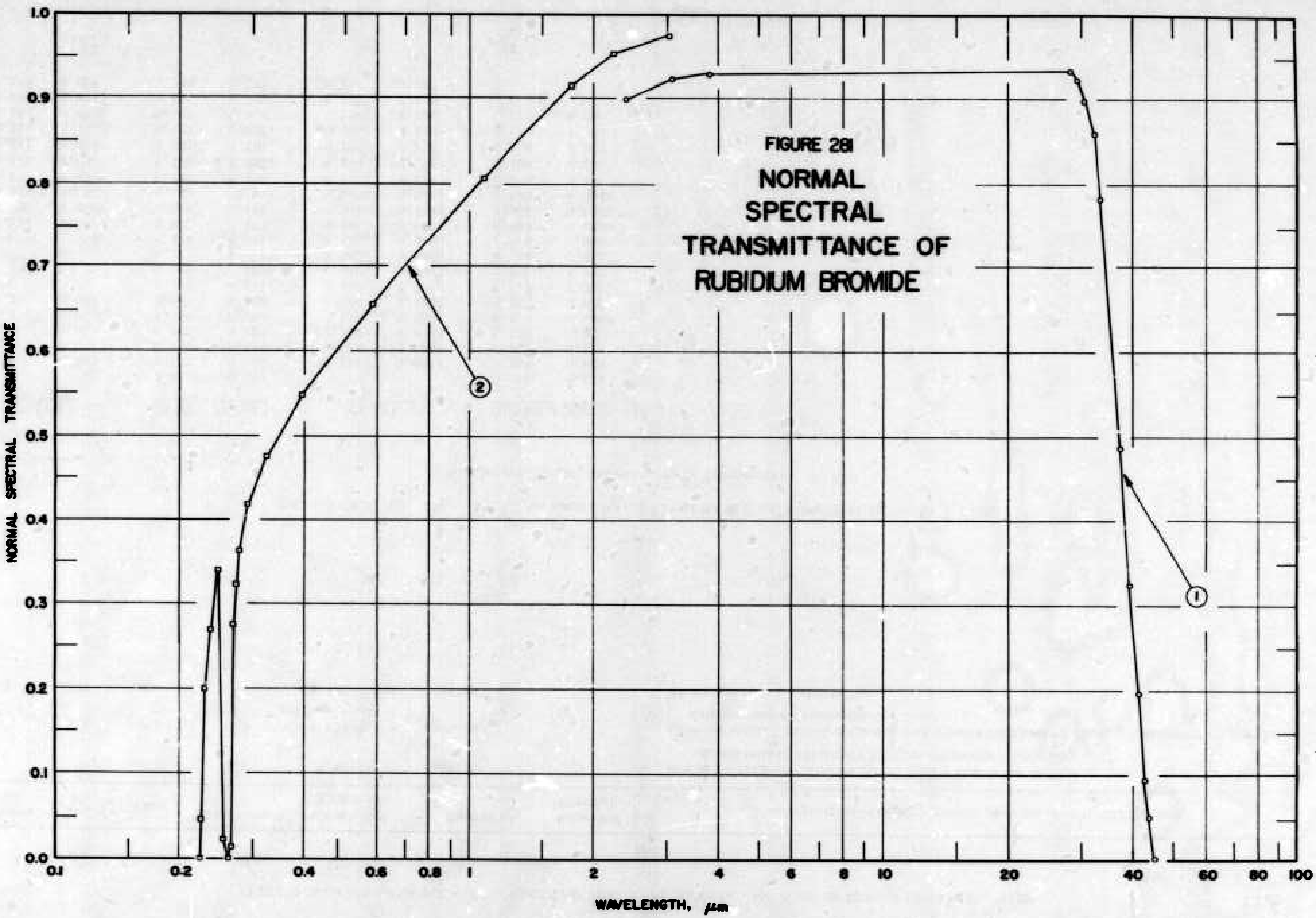


FIGURE 281
NORMAL SPECTRAL TRANSMITTANCE OF RUBIDIUM BROMIDE
NORMAL SPECTRAL TRANSMITTANCE
WAVELENGTH, μm
1.0
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0.0
0.1
0.2
0.4
0.6
0.8
1
2
4
6
8
10
20
40
60
80
100
1
2

SPECIFICATION TABLE NO. 281 NORMAL SPECTRAL TRANSMITTANCE OF RUBIDIUM BROMIDE RbBr

Curve No.	Ref. No.	Year	Temperature K	Wavelength Range, μm	Geometry θ θ' ω'	Reported Error, %	Composition (weight percent), Specifications, and Remarks
1	87	1968	313	2.40-45.0	~0° ~0°		Synthetic single crystal (5.3 mm thick); flat to ten fringes or better; data extracted from smooth curve.
2	373	1968	~298	0.223-3.03	~0° ~0°		Synthetic single crystal (5.3 mm thick); data extracted from smooth curve.

DATA TABLE NO. 281 NORMAL SPECTRAL TRANSMITTANCE OF R IDIUM BROMIDE RbBr

[Wavelength, λ, μm; Transmittance, τ; Temperature, T, K]

λ	τ	λ	τ
CURVE 1	T = 313	CURVE 2	T ~ 298
2.40	0.898	0.223	0.000
3.10	0.922	0.227	0.047
3.80	0.929	0.230	0.200
28.2	0.931	0.237	0.270
29.5	0.922	0.247	0.340
30.7	0.899	0.255	0.023
32.1	0.859	0.261	0.000
33.4	0.783	0.267	0.013
37.3	0.487	0.270	0.276
39.4	0.324	0.272	0.322
41.2	0.196	0.279	0.362
42.9	0.094	0.291	0.419
43.9	0.050	0.325	0.474
45.0	0.000	0.397	0.547
		0.584	0.657
		1.08	0.808
		1.76	0.914
		2.24	0.953
		3.03	0.975

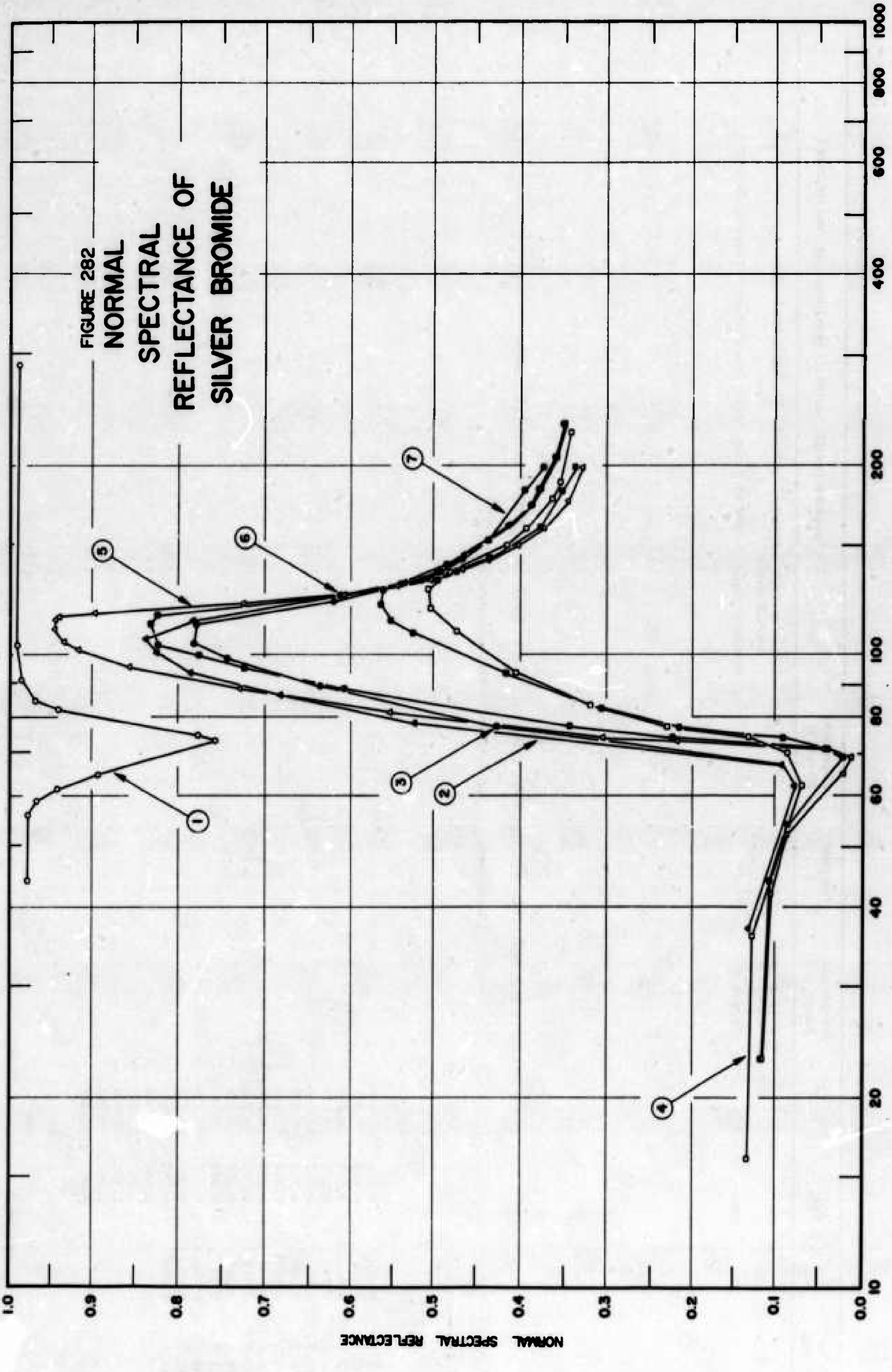


FIGURE 282 NORMAL SPECTRAL REFLECTANCE OF SILVER BROMIDE

SPECIFICATION TABLE NO. 282 NORMAL SPECTRAL REFLECTANCE OF SILVER BROMIDE AgBr

Curve No.	Ref. No.	Year	Temperature K	Wavelength Range, μm	Geometry θ	θ'	ω'	Reported Error, %	Composition (weight percent), Specifications, and Remarks
1	100	1967	300	43.9-285	0°	0°			Film 1 μm thick; vacuum evaporated onto substrate coated with 0.2 μm film of vacuum deposited silver; data extracted from smooth curve; silvered mirror reference standard.
2	98	1967	25	37.0-231	7.5°	7.5°			Single crystal; data extracted from smooth curve.
3	98	1967	77	37.0-231	7.5°	7.5°			Above specimen and conditions.
4	98	1967	300	16.0-226	7.5°	7.5°			Above specimen and conditions.
5	101	1968	25	23.0-198	15°	15°			Pellet; data extracted from smooth curve.
6	101	1968	77	23.0-199	15°	15°			Above specimen and conditions.
7	101	1968	290	23.0-199	15°	15°			Above specimen and conditions.

DATA TABLE NO. 282 NORMAL SPECTRAL REFLECTANCE OF SILVER BROMIDE AgBr

[Wavelength, λ, μm; Reflectance, ρ; Temperature, T, K]

CURVE 1
T = 300

λ	ρ
43.9	0.979
55.6	0.979
58.1	0.968
61.0	0.941
64.1	0.895
73.0	0.759
74.6	0.777
81.3	0.941
84.0	0.970
90.1	0.984
103	0.991
285	0.990

CURVE 2
T = 25

λ	ρ
37.0	0.131
62.0	0.079
67.0	0.093
78.0	0.523
86.0	0.683
93.0	0.788
100	0.826
106	0.839
113	0.783
130	0.538
135	0.499
143	0.466
160	0.416
173	0.389
184	0.378
206	0.360
231	0.350

CURVE 3
T = 77

λ	ρ
37.0	0.131*
62.0	0.079*
67.0	0.093*
77.0	0.429
89.0	0.638
98.0	0.745
104	0.782

CURVE 3 (cont.)

λ	ρ
112	0.780
122	0.621
131	0.516
135	0.494
142	0.468
160	0.416*
173	0.389
184	0.378
206	0.360
231	0.350

CURVE 4
T = 300

λ	ρ
16.0	0.132
36.0	0.127
62.0	0.070
70.0	0.087
74.0	0.131
77.0	0.231
83.0	0.320
93.0	0.406
108	0.476
117	0.503
126	0.509
135	0.481
149	0.419
157	0.393
176	0.366
187	0.355
226	0.342

CURVE 5
T = 25

λ	ρ
23.0	0.116
42.0	0.105
52.0	0.087
65.0	0.023
69.0	0.014
71.0	0.045
73.0	0.220
74.0	0.305
81.0	0.554
88.0	0.730

CURVE 5 (cont.)

λ	ρ
95.0	0.858
101	0.919
104	0.935
109	0.946
113	0.947
114	0.942
116	0.899
120	0.727
124	0.610
128	0.544
131	0.503
136	0.467
141	0.437
148	0.401
158	0.374
175	0.348
198	0.330

CURVE 6
T = 77

λ	ρ
23.0	0.116*
42.0	0.105*
52.0	0.087*
65.0	0.023*
69.0	0.014*
71.0	0.045*
74.0	0.226
77.0	0.344
88.0	0.610
95.0	0.725
99.0	0.777
103	0.823
111	0.831
115	0.824
124	0.614
129	0.541
132	0.499
135	0.476
141	0.438
149	0.402*
158	0.379
182	0.352
199	0.339

CURVE 7
T = 290

λ	ρ
23.0	0.119
44.0	0.109
54.0	0.086
65.0	0.023*
69.0	0.022
71.0	0.041
74.0	0.142
77.0	0.219
82.0	0.309
93.0	0.419
108	0.527
114	0.552
120	0.565
126	0.563
130	0.541*
138	0.489
151	0.439
181	0.397
199	0.375

*Not shown on plot

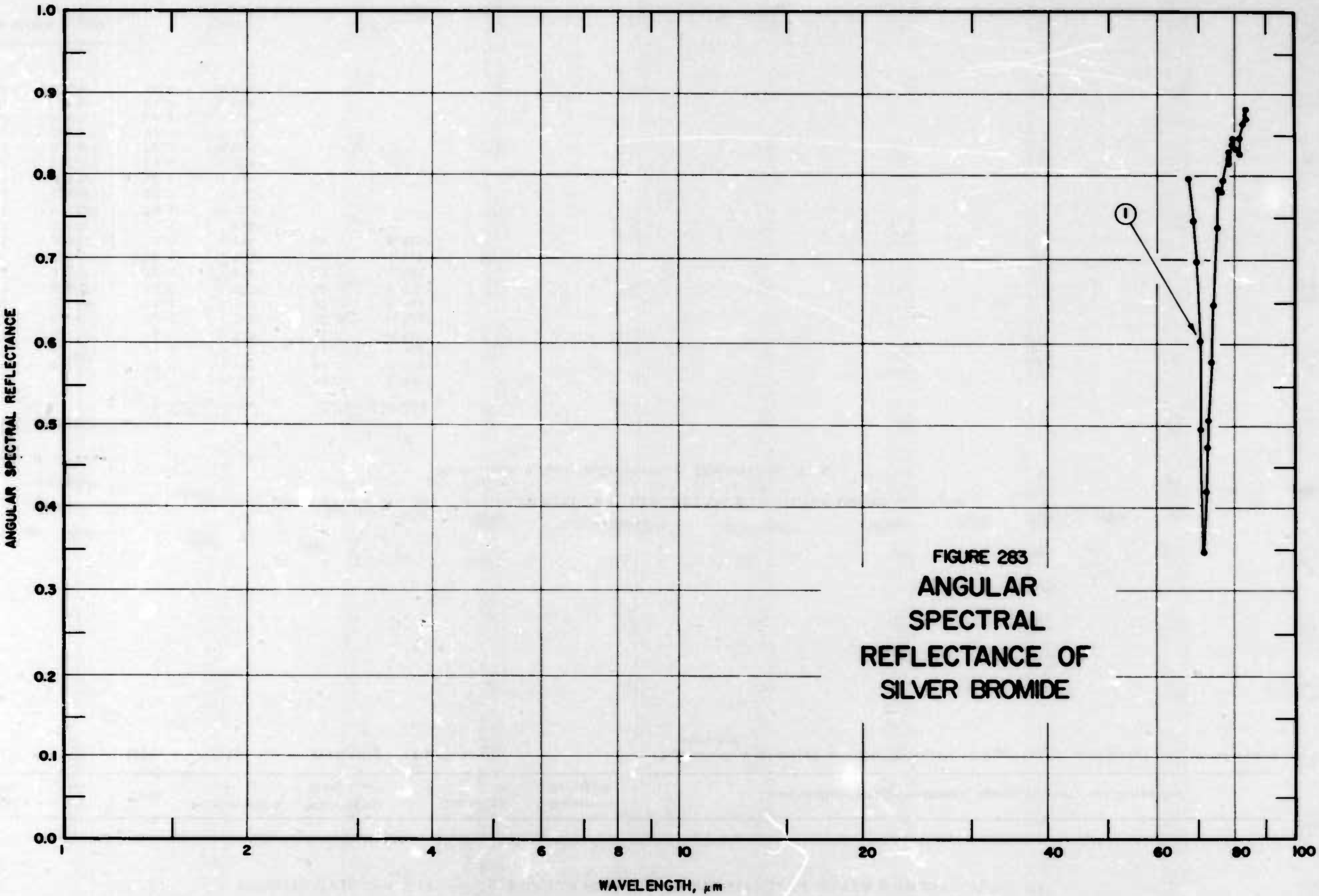


FIGURE 283
ANGULAR SPECTRAL REFLECTANCE OF SILVER BROMIDE

SPECIFICATION TABLE NO. 283 ANGULAR SPECTRAL REFLECTANCE OF SILVER BROMIDE AgBr

Curve No.	Ref. No.	Year	Temperature K	Wavelength Range, μm	Geometry θ θ' ω'	Reported Error, %	Composition (weight percent), Specifications, and Remarks
1	408	1969	7.5	67.1-83.8	~45°~45°		1 μm thick; evaporated on silver substrate (0.2 μm thick); aluminized mirror reference standard.

DATA TABLE NO. 283 ANGULAR SPECTRAL REFLECTANCE OF SILVER BROMIDE AgBr

[Wavelength, λ, μm; Reflectance, ρ; Temperature, T, K]

λ	ρ	λ	ρ	λ	ρ
CURVE 1		CURVE 1 (cont.)		CURVE 1 (cont.)	
T = 7.5		73.3	0.580	80.8	0.828*
67.1	0.798	74.0	0.648	81.1	0.828
67.7	0.773*	74.5	0.711*	81.3	0.841*
68.1	0.752*	75.0	0.739	81.6	0.847
68.2	0.748	75.4	0.755*	82.0	0.854*
68.6	0.748*	75.4	0.783	82.4	0.864
68.9	0.732*	75.6	0.780*	82.9	0.877*
69.2	0.699	76.0	0.780	83.1	0.883
69.6	0.640*	76.1	0.785*	83.5	0.871
70.1	0.603	76.5	0.794	83.8	0.881*
70.8	0.498	77.1	0.810*		
71.1	0.442*	78.1	0.830		
71.3	0.349	78.3	0.823*		
71.7	0.396*	78.7	0.815		
72.0	0.420	79.0	0.829*		
72.3	0.438*	79.2	0.838		
72.4	0.457*	79.6	0.847		
72.5	0.474	79.7	0.832*		
72.6	0.496*	80.2	0.832		
72.8	0.509	80.6	0.836*		

*Not shown on plot

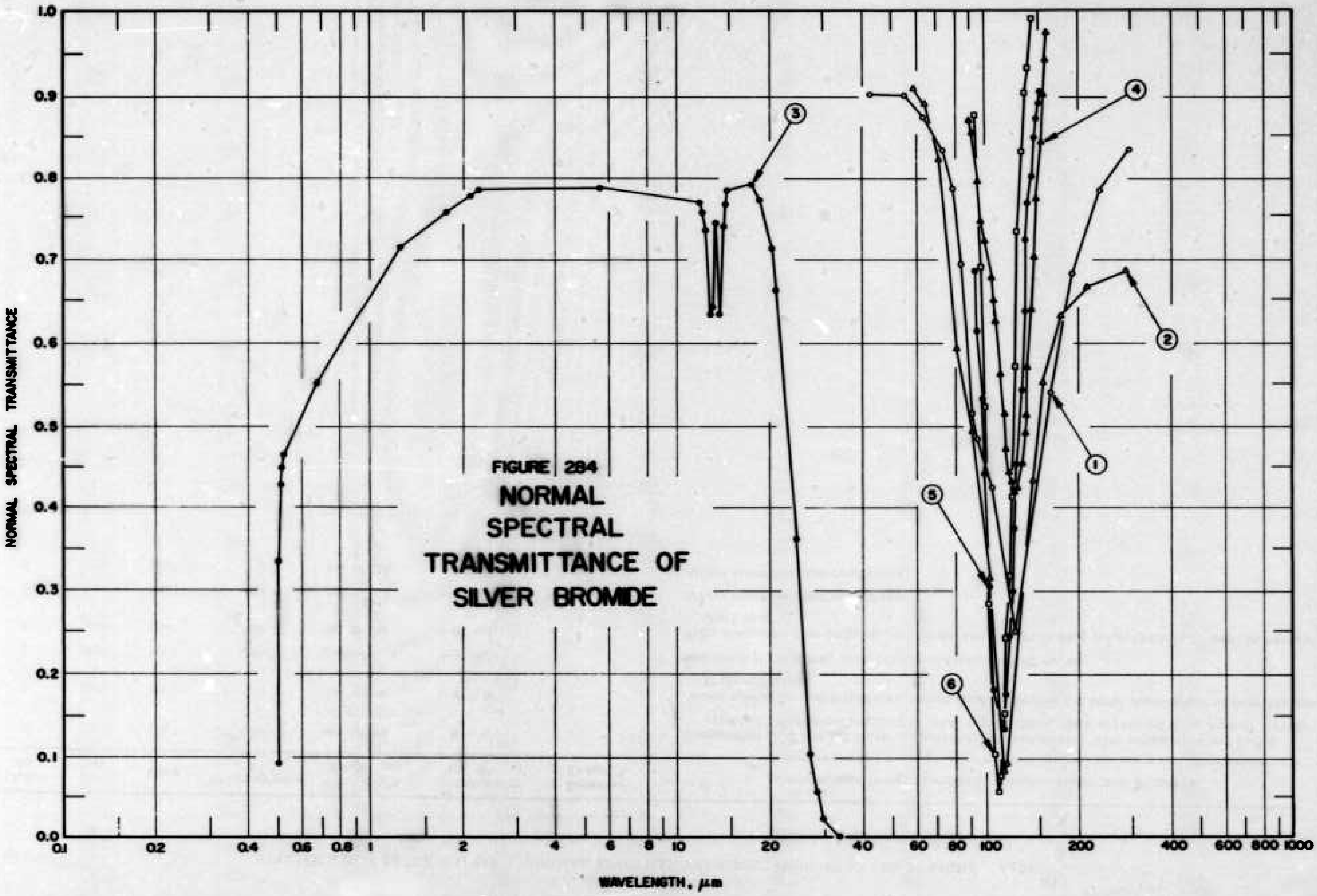


FIGURE 284 NORMAL SPECTRAL TRANSMITTANCE OF SILVER BROMIDE

SPECIFICATION TABLE NO. 284 NORMAL SPECTRAL TRANSMITTANCE OF SILVER BROMIDE AgBr

Curve No.	Ref. No.	Year	Temperature K	Wavelength Range, μm	Geometry θ θ' ω'	Reported Error, %	Composition (weight percent), Specifications, and Remarks
1	100	1967	300	43.7-294	0° 0°		Evaporated film (~1 μm thick) on polyethylene substrate; film crystalline and highly oriented (200) plane parallel to substrate surface; data extracted from smooth curve.
2	100	1967	143	58.5-286	0° 0°		Above specimen and conditions except data corrected for temp dependence of polyethylene transmittance.
3	289	1967	298	0.500-33.3	~0° ~0°		Sample 0.5 cm thick; data extracted from smooth curve.
4	398	1961	300	89.0-160	~0° ~0°		Film evaporated on polyethylene substrate (50 μm thick); polycrystalline; kept in vacuum until used.
5	398	1961	100	92.7-152	~0° ~0°		Above specimen and conditions.
6	398	1961	4.2	92.8-142	~0° ~0°		Above specimen and conditions.

DATA TABLE NO. 284 NORMAL SPECTRAL TRANSMITTANCE OF SILVER BROMIDE AgBr

[Wavelength, λ, μm; Transmittance, τ; Temperature, T, K]

CURVE 1
T = 300

λ	τ
43.7	0.[illegible]3
54.3	0.901
63.7	0.875
73.0	0.833
78.1	0.787
84.0	0.697
91.7	0.518
95.2	0.485
106	0.425
126	0.250
164	0.542
192	0.682
238	0.783
294	0.835

CURVE 2
T = 143

λ	τ
58.5	0.913
64.5	0.894
70.4	0.823
81.3	0.595
91.7	0.494
103	0.316
115	0.081
119	0.092
143	0.436
156	0.554
179	0.632
222	0.668
286	0.688

CURVE 3
T = 298

λ	τ
0.500	0.091
0.500	0.334
0.505	0.429
0.510	0.450
0.520	0.466
0.660	0.552
1.27	0.714
1.79	0.758
2.12	0.778

CURVE 3 (cont.)

λ	τ
2.28	0.784
5.60	0.789
12.0	0.770
12.2	0.757
12.5	0.734
13.0	0.635
13.1	0.643
13.4	0.744
13.8	0.636
14.2	0.742
14.4	0.769
14.8	0.785
17.8	0.791
18.9	0.772
20.6	0.713
21.6	0.663
24.6	0.361
27.0	0.102
28.2	0.054
29.9	0.021
33.3	0.000

CURVE 4
T = 300

λ	τ
89.0	0.871
91.8	0.859
94.9	0.799
97.8	0.747
100	0.723
103	0.680
106	0.652
109	0.628
111	0.565
114	0.518
117	0.472
120	0.446
122	0.432
125	0.420
129	0.425
131	0.455
133	0.493
136	0.514
139	0.572
142	0.641

CURVE 4 (cont.)

λ	τ
145	0.703
148	0.776
153	0.846
155	0.903
158	0.949
160	0.979

CURVE 5
T = 100

λ	τ
92.7	0.687
95.7	0.614
98.4	0.535
100	0.443
103	0.306
106	0.181
115	0.136
117	0.179
120	0.244
123	0.300
126	0.376
128	0.454
131	0.548
134	0.640
136	0.725
139	0.770
142	0.801
144	0.851
147	0.877
150	0.895
152	0.908

CURVE 6
T = 4.2

λ	τ
92.8	0.880
97.9	0.692
100	0.526
103	0.282
107	0.104
110	0.057
112	0.077
115	0.153
118	0.242
120	0.318

CURVE 6 (cont.)

λ	τ
122	0.414
125	0.573
128	0.736
131	0.832
134	0.907
139	0.939
142	0.994

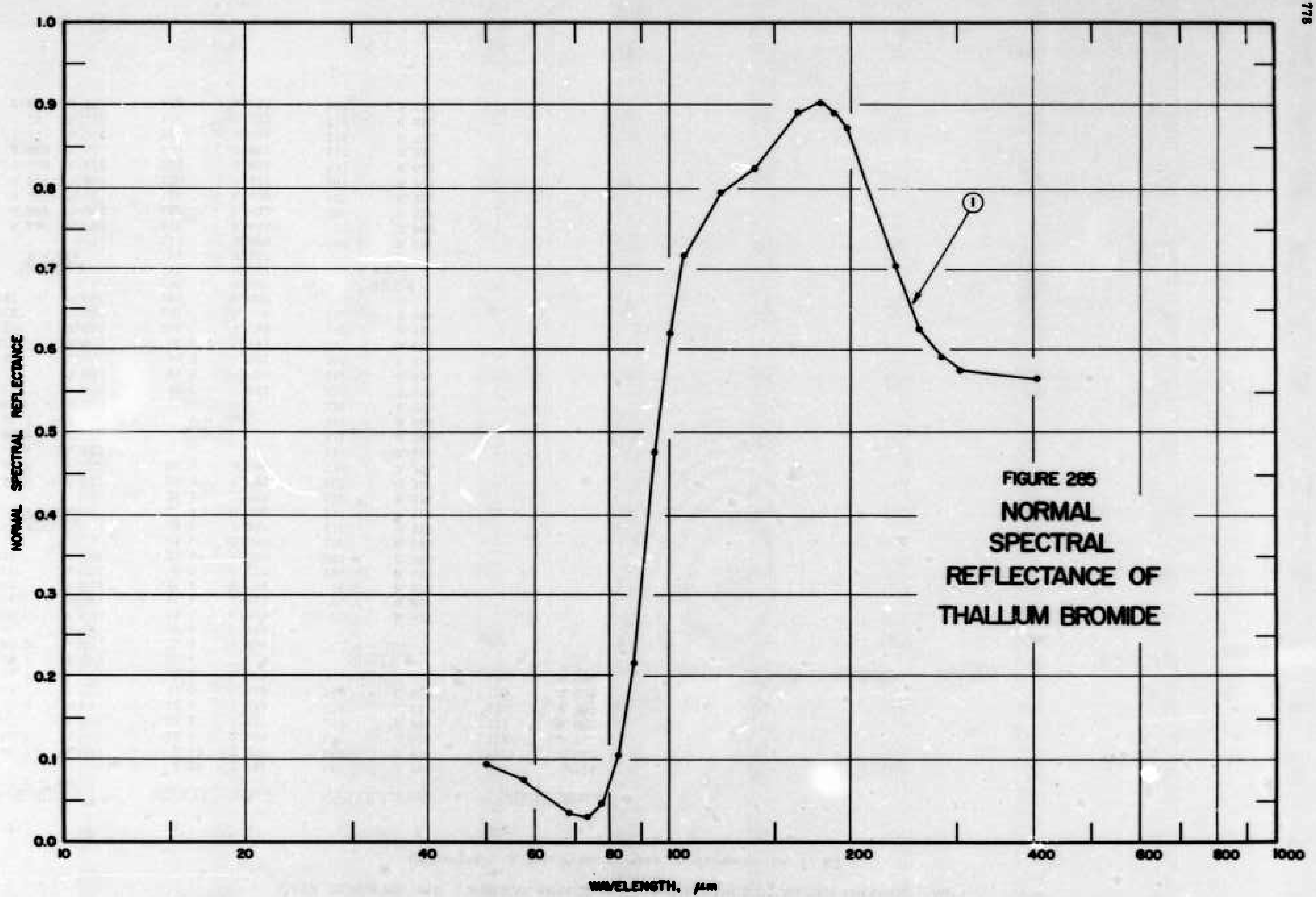


FIGURE 285
NORMAL
SPECTRAL
REFLECTANCE OF
THALLIUM BROMIDE

SPECIFICATION TABLE NO. 285 NORMAL SPECTRAL REFLECTANCE OF THALLIUM BROMIDE TlBr

Curve No.	Ref. No.	Year	Temperature K	Wavelength Range, μm	Geometry θ	θ'	ω'	Reported Error, %	Composition (weight percent), Specifications, and Remarks
1	419	1962	300	50.5-407	12°	12°			Single crystal; measured in vacuum; data extracted from smooth curve; evaporated Al mirror reference standard.

DATA TABLE NO. 285 NORMAL SPECTRAL REFLECTANCE OF THALLIUM BROMIDE TlBr

[Wavelength, λ, μm; Reflectance, ρ; Temperature, T, K]

λ	ρ	λ	ρ
CURVE 1 T = 300		CURVE 1 (cont.)	
50.5	0.094	281	0.591
57.6	0.075	303	0.578
68.5	0.035	407	0.567
73.2	0.030		
77.8	0.049		
82.7	0.105		
87.9	0.216		
94.1	0.476		
100	0.620		
106	0.718		
115	0.779*		
123	0.799		
138	0.823		
164	0.893		
178	0.901		
187	0.892		
197	0.873		
238	0.704		
260	0.626		

*Not shown on plot

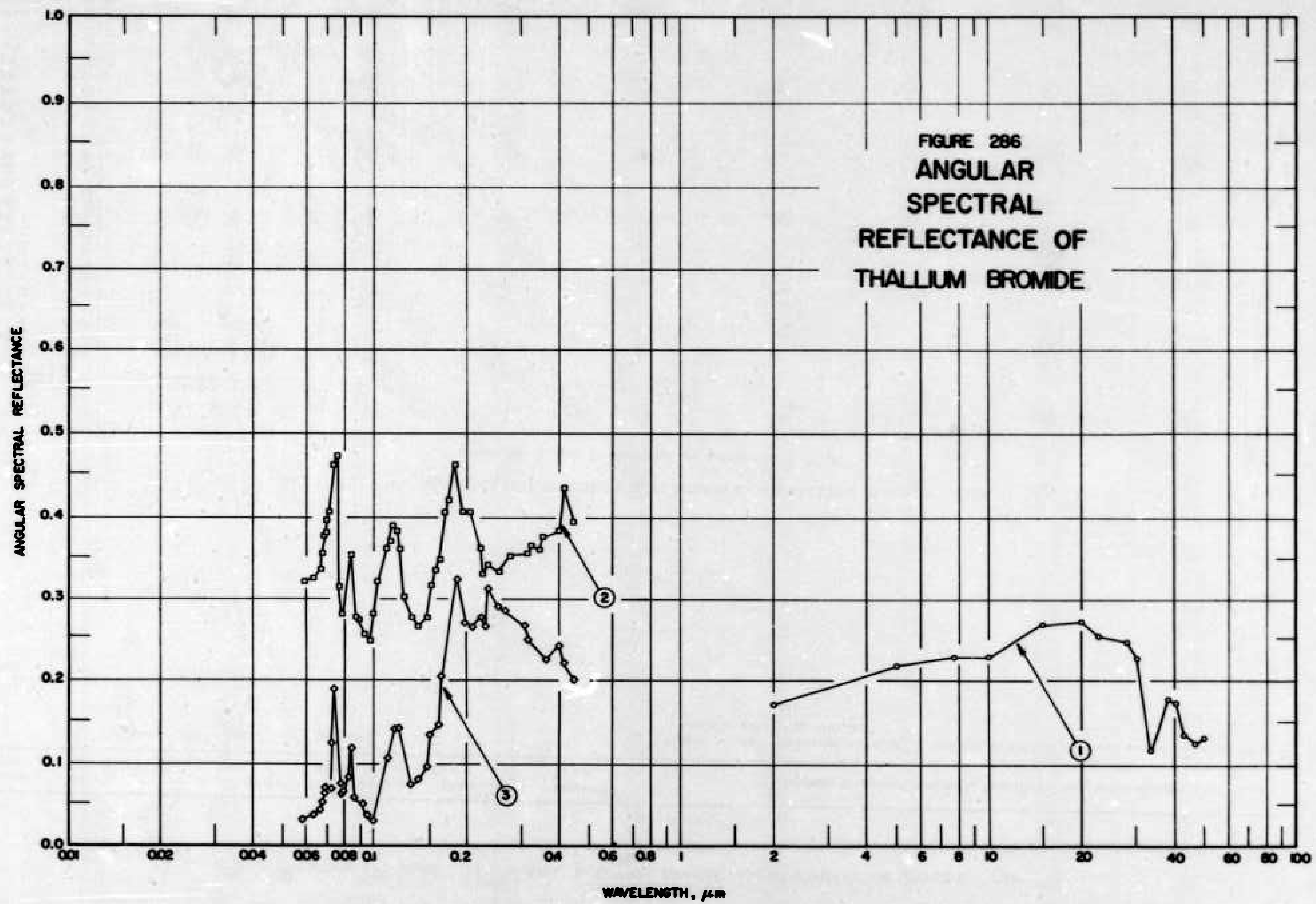


FIGURE 286
ANGULAR SPECTRAL REFLECTANCE OF THALLIUM BROMIDE

SPECIFICATION TABLE NO. 286 ANGULAR SPECTRAL REFLECTANCE OF THALLIUM BROMIDE TlBr

Curve No.	Ref. No.	Year	Temperature K	Wavelength Range, μm	Geometry θ	θ'	ω'	Reported Error, %	Composition (weight percent), Specifications, and Remarks
1	102	1965	298	2.00-50.0	30°	30°			Synthetic (1.65 mm thick); flat to ten fringes or better; data extracted from smooth curve; aluminum mirror reference standard.
2	103	1967	298	0.0590-0.443	70°	70°			Single crystal (Harshaw Chemical Co.); annealed at 473 K for 24 hrs; polished; measured in vacuum (10^{-2} mm Hg); data extracted from smooth curve.
3	103	1967	298	0.0580-0.443	20°	20°			Above specimen and conditions.

DATA TABLE NO. 286 ANGULAR SPECTRAL REFLECTANCE OF THALLIUM BROMIDE TlBr

[Wavelength, λ, μm; Reflectance, ρ; Temperature, T, K]

λ	ρ	λ	ρ	λ	ρ	λ	ρ	λ	ρ	λ	ρ
CURVE 1		CURVE 2		CURVE 2 (cont.)		CURVE 2 (cont.)		CURVE 3 (cont.)		CURVE 3 (cont.)	
T = 298		T = 298		0.108	0.362	0.253	0.333	0.0740	0.189	0.197	0.270
2.00	0.170	0.0590	0.321	0.111	0.370	0.276	0.354	0.0770	0.075	0.210	0.264
5.00	0.216	0.0630	0.326	0.113	0.390	0.318	0.357	0.0780	0.064	0.221	0.276
7.70	0.228	0.0660	0.338	0.116	0.385	0.326	0.367	0.0790	0.065	0.230	0.267
10.0	0.228	0.0670	0.357	0.120	0.361	0.344	0.361	0.0820	0.081	0.234	0.313
15.0	0.269	0.0680	0.379	0.124	0.302	0.354	0.378	0.0840	0.118	0.253	0.290
20.0	0.271	0.0690	0.381	0.131	0.276	0.400	0.384	0.0860	0.057	0.276	0.284
22.7	0.253	0.0700	0.396	0.138	0.265	0.413	0.437	0.0920	0.050	0.310	0.266
28.0	0.247	0.0710	0.407	0.148	0.277	0.443	0.395	0.0950	0.038	0.318	0.249
30.1	0.226	0.0730	0.461	0.151	0.317			0.0990	0.030	0.365	0.224
33.3	0.216	0.0750	0.372	0.159	0.336	CURVE 3		0.110	0.106	0.400	0.241
38.1	0.179	0.0760	0.315	0.163	0.350	T = 298		0.115	0.141	0.413	0.220
40.3	0.171	0.0780	0.280	0.170	0.406			0.118	0.142	0.443	0.200
43.2	0.134	0.0840	0.354	0.175	0.421	0.0580	0.031	0.131	0.073		
47.0	0.123	0.0870	0.276	0.182	0.461	0.0630	0.037	0.139	0.080		
50.0	0.130	0.0890	0.273	0.194	0.407	0.0660	0.043	0.148	0.097		
		0.0930	0.255	0.207	0.407	0.0670	0.051	0.151	0.134		
		0.0970	0.247	[illegible]	0.362	0.0690	0.062	0.161	0.147		
		0.0990	0.280	0.225	0.330	0.0690	0.070	0.165	0.203		
		0.102	0.321	0.234	0.343	0.0720	0.069	0.185	0.324		
						0.0720	0.123				

SPECIFICATION TABLE NO. 287 ANGULAR SPECTRAL REFLECTANCE OF THALLIUM BROMIDE TlBr

Curve No.	Ref. No.	Year	Temperature K	Wavelength, μ	Angular Range	Geometry θ θ'	Reported Error, %	Composition (weight percent), Specifications and Remarks
1*	103	1967	298	0.24	25.0-70.1	θ θ		Single crystal (Harshaw Chemical Co.); annealed at 473 K for 24 hrs; polished; measured in vacuum (10^{-2} mm Hg); data extracted from smooth curve.

DATA TABLE NO. 287 ANGULAR SPECTRAL REFLECTANCE OF THALLIUM BROMIDE TlBr

[Angle, θ', °; Reflectance, ρ; Temperature, T, K]

θ	ρ
CURVE 1* T = 298	
25.0	0.314
27.5	0.313
29.9	0.312
32.5	0.310
35.1	0.307
37.5	0.306
40.1	0.306
42.5	0.303
45.1	0.302
47.6	0.302
50.1	0.301
52.5	0.301
54.9	0.299
57.4	0.302
60.0	0.302
62.3	0.306
65.0	0.313
70.1	0.344

*No plot given

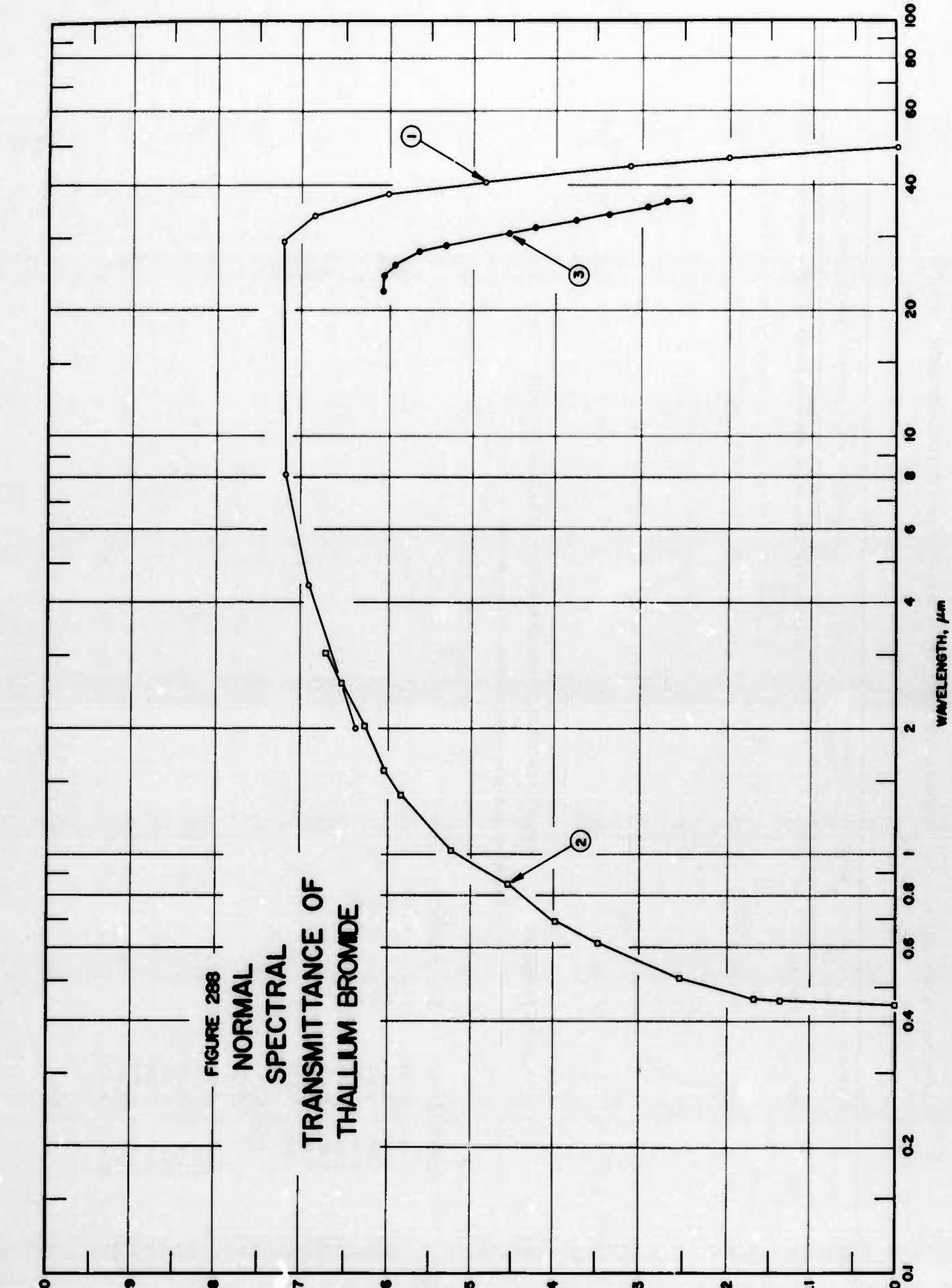


FIGURE 288 NORMAL SPECTRAL TRANSMITTANCE OF THALLIUM BROMIDE

SPECIFICATION TABLE NO. 288 NORMAL SPECTRAL TRANSMITTANCE OF THALLIUM BROMIDE TlBr

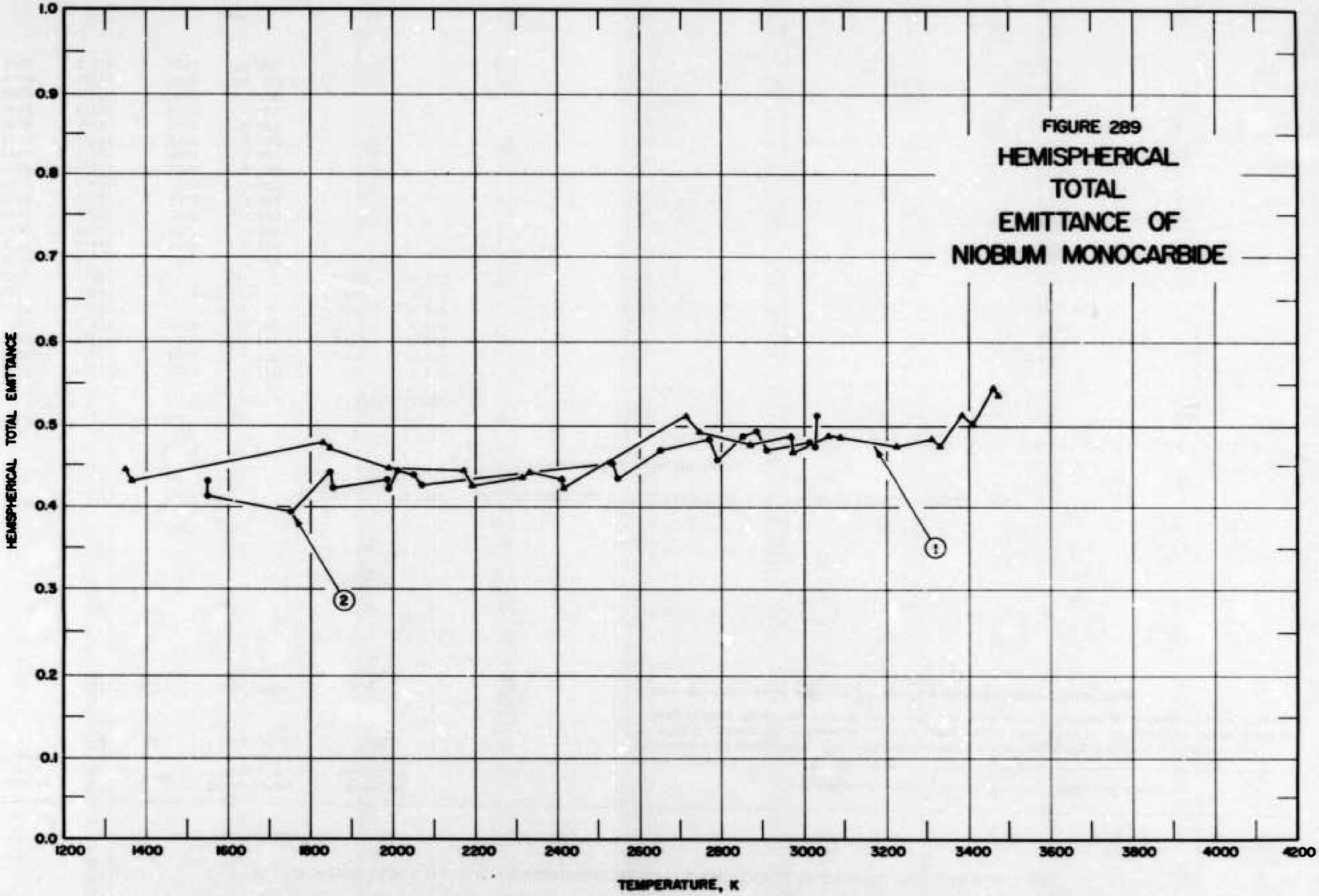
Curve No.	Ref. No.	Year	Temperature K	Wavelength Range, μm	Geometry θ θ' ω'	Reported Error, %	Composition (weight percent), Specifications, and Remarks
1	102	1965	~298	2.00-49.2	0° 0°		Synthetic (1.65 mm thick); flat to ten fringes or better; data extracted from smooth curve.
2	94	1967	298	0.437-3.00	~0° ~0°	± 2	Single crystal (1.65 mm thick); polished; data extracted from smooth curve.
3	399	1948	~298	22.1-36.8	~0° ~0°		~6 mm thick; data extracted from smooth curve.

DATA TABLE NO. 288 NORMAL SPECTRAL TRANSMITTANCE OF THALLIUM BROMIDE TlBr

[Wavelength, λ, μm; Transmittance, τ; Temperature, T, K]

λ	τ
CURVE 1	
T ~ 298	
2.00	0.636
4.40	0.691
8.10	0.719
29.2	0.722
33.6	0.687
38.0	0.601
40.7	0.484
44.1	0.313
46.6	0.200
49.2	0.000
CURVE 2	
T = 298	
0.437	0.000
0.443	0.137
0.448	0.167
0.501	0.253
0.608	0.[illegible]47
CURVE 2 (cont.)	
0.695	0.398
0.843	0.454
1.08	0.525
1.39	0.585
1.59	0.604
2.02	0.628
2.57	0.654
3.00	0.671
CURVE 3	
T ~ 298	
22.1	0.609
24.2	0.608
25.9	0.595
27.6	0.566
28.8	0.535
30.8	0.458
31.8	0.424
32.9	0.378
CURVE 3 (cont.)	
34.0	0.339
35.2	0.293
36.1	0.271
36.8	0.248

FIGURE 289
HEMISPHERICAL TOTAL EMITTANCE OF NIOBIUM MONOCARBIDE



SPECIFICATION TABLE NO. 289 HEMISPHERICAL TOTAL EMITTANCE OF NIOBIUM MONOCARBIDE NbC

Curve No.	Ref. No.	Year	Temperature Range, K	Reported Error, %	Composition (weight percent), Specifications and Remarks
1	363	1967	1353-3473		Powders cold compacted, followed by two-stage sintering in argon atm at a max temp of 2773 K; measured in vacuum over the temp range 1850-2200 K and back to 1330 K, then in argon from 2300 K to 3100 K and back, and from 3200 K to 3500 K; data from rise in temp.
2	363	1967	1547-3035		Above specimen and conditions except data obtained furing fall in temp.

DATA TABLE NO. 289 HEMISPHERICAL TOTAL EMITTANCE OF NIOBIUM MONOCARBIDE NbC

[Temperature, T, K; Emittance, ϵ]

T	ϵ	T	ϵ	T	ϵ
CURVE 1		CURVE 1 (cont.)		CURVE 2 (cont.)	
1353	0.447	3387	0.513	2790	0.457
1362	0.432	3403	0.503	2852	0.488
1836	0.480	3460	0.547	2881	0.491
1842	0.471	3473	0.539	2911	0.470
1993	0.449			3012	0.480
2177	0.447	CURVE 2		3026	0.475
2186	0.427			3035	0.512
2316	0.438	1547	0.431		
2337	0.441	1547	0.414		
2401	0.436	1750	0.395		
2418	0.421	1842	0.443		
2712	0.511	1851	0.423		
2741	0.493	1982	0.432		
2863	0.477	1988	0.421		
2962	0.487	2009	0.444		
2977	0.469	2051	0.440		
3060	0.489	2062	0.427		
3084	0.487	2539	0.451		
3232	0.475	2543	0.436		
3309	0.486	2653	0.470		
3335	0.474	2769	0.482		

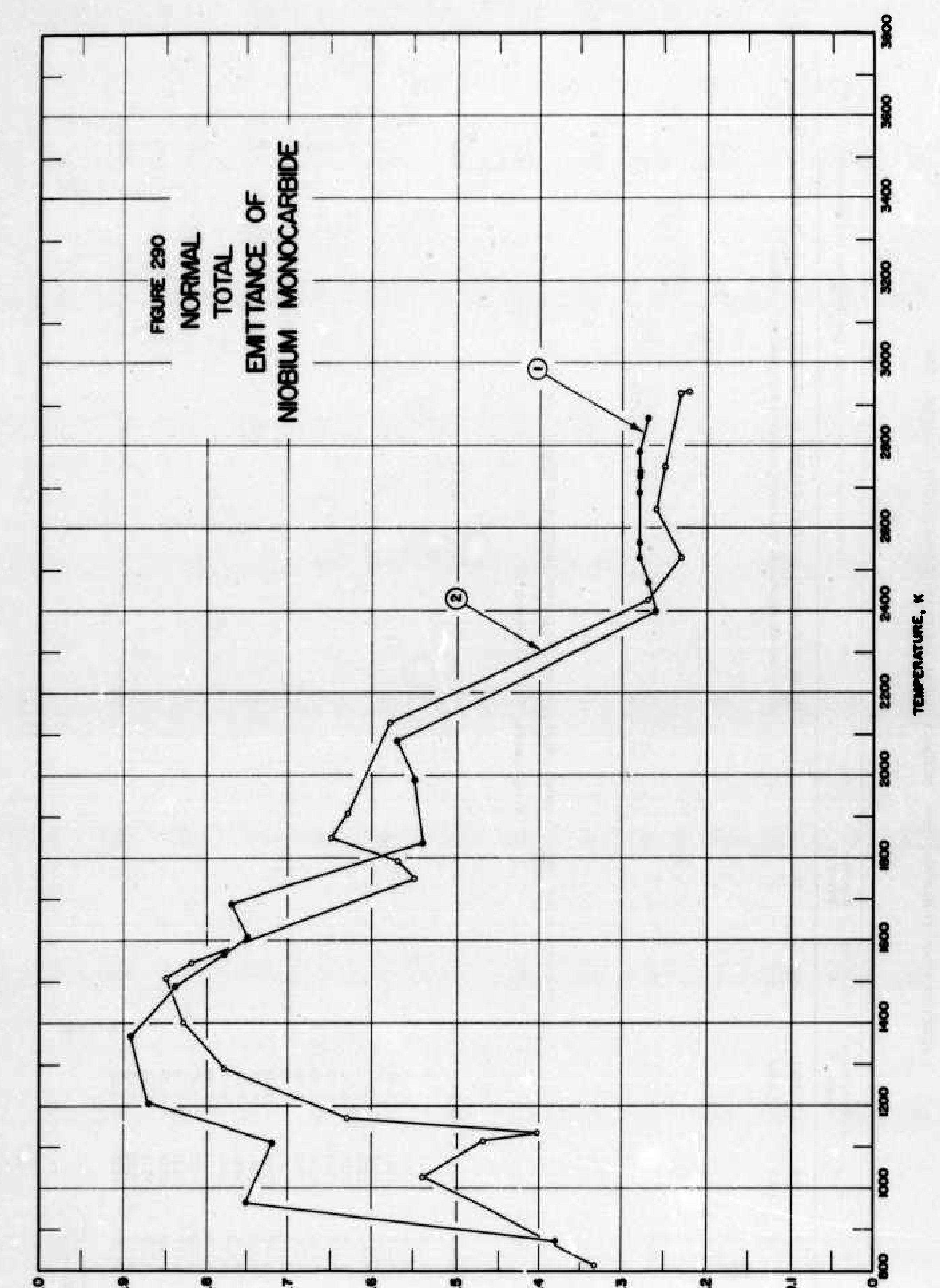


FIGURE 290
NORMAL
TOTAL
EMITTANCE OF
NIOBIUM MONOCARBIDE
1
2
NORMAL TOTAL EMITTANCE
TEMPERATURE, K
0.0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
1.0
800
1000
1200
1400
1600
1800
2000
2200
2400
2600
2800
3000
3200
3400
3600
3800

SPECIFICATION TABLE NO. 290 NORMAL TOTAL EMITTANCE OF NIOBIUM CARBIDE NbC

Curve No.	Ref. No.	Year	Temperature Range, K	Geometry θ'	Reported Error, %	Composition (weight percent), Specifications and Remarks
1	17	1962	875-2867	~0°	10	Hot pressed; specimen cracked at 2467 K; measured in argon; [Author's designation: Specimen 1].
2	17	1962	817-2933	~0°	10	Hot pressed; measured in argon; [Author's designation: Specimen 2].

DATA TABLE NO. 290 NORMAL TOTAL EMITTANCE OF NIOBIUM CARBIDE NbC

[Temperature, T, K; Emittance, ϵ]

T	ϵ	T	ϵ
CURVE 1		CURVE 2	
875	0.38	817	0.33
961	0.75	1022	[illegible]
1111	0.72	1117	0.47
1205	0.87	1117	0.47*
1367	0.89	1138	0.41
1489	0.84	1172	0.63
1561	0.78	1294	0.78
1611	0.75	1400	0.83
1689	0.77	1505	0.85
1839	0.54	1544	0.82
1994	0.55	1755	0.55
2083	0.57	1794	0.57
2400	0.26	1844	0.65
2467	0.27	1905	0.63
2522	0.28	2133	0.58
2561	0.28	2422	0.27
2689	0.28	2533	0.23
2722	0.28	2644	0.26
2739	0.28	2755	0.25
2783	0.28	2922	0.23
2867	0.27	2933	0.22

*Not shown on plot

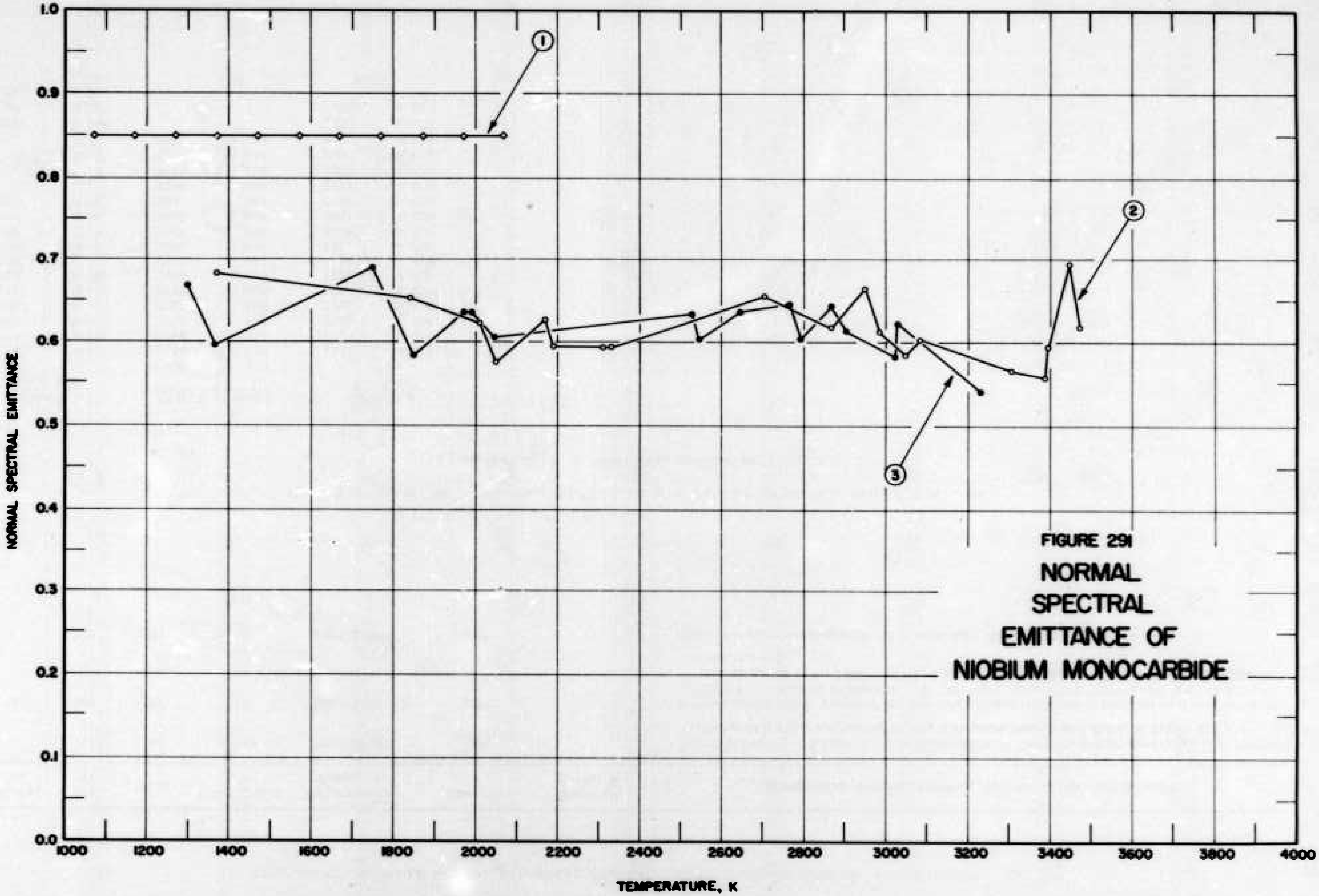


FIGURE 291
NORMAL
SPECTRAL
EMITTANCE OF
NIOBIUM MONOCARBIDE
NORMAL SPECTRAL EMITTANCE
TEMPERATURE, K
1.0
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0.0
1000
1200
1400
1600
1800
2000
2200
2400
2600
2800
3000
3200
3400
3600
3800
4000
1
2
3

SPECIFICATION TABLE NO. 291 NORMAL SPECTRAL EMITTANCE OF NIOBIUM MONOCARBIDE NbC

Curve No.	Ref. No.	Year	Wavelength, μm	Temperature Range, K	Geometry θ'	Reported Error, %	Composition (weight percent), Specifications, and Remarks
1	13	1962	0.650	1073-2073	~0°		Layer of paste (~100 μm thick) on tantalum cylinder; paste prepared from fine powder (2-3 μm) of NbC suspended in nitrocellulose binder and dried at 313 to 333 K.
2	363	1967	0.65	1368-3471	~0°		Powder compacted, followed by two-stage sintering in an argon atm at a max temp of 2773 K; measured in vacuum over the temp range 1850-2200 K and back to 1350 K, then in argon from 2300 K to 3100 K and back, and from 3200 K to 3500 K; data from rise in temp.
3	363	1967	0.65	1352-3230	~0°		Above specimen and conditions except data obtained during fall in temp.

DATA TABLE NO. 291 NORMAL SPECTRAL EMITTANCE OF NIOBIUM MONOCARBIDE NbC

[Temperature, T, K; Emittance, ϵ; Wavelength, λ, μm]

T	ϵ	T	ϵ	T	ϵ
CURVE 1		CURVE 2 (cont.)		CURVE 3	
λ = 0.650				λ = 0.65	
		2054	0.575		
1073	0.85	2174	0.629	1352	0.667
1173	0.85	2188	0.594	1362	0.596
1273	0.85	2312	0.594	1759	0.690
1373	0.85	2331	0.594	1856	0.583
1473	0.85	2707	0.656	1976	0.637
1573	0.85	2865	0.620	1992	0.637
1673	0.85	2951	0.664	2044	0.605
1773	0.85	2982	0.612	2534	0.633
1873	0.85	3057	0.583	2546	0.602
1973	0.85	3081	0.602	2641	0.638
2073	0.85	3307	0.565	2768	0.648
		3390	0.559	2793	0.602
CURVE 2		3399	0.594	2872	0.646
λ = 0.65		3457	0.694	2903	0.612
		3471	0.620	3027	0.581
1368	0.682			2036	0.623
1840	0.651			3230	0.540
2004	0.624				

SPECIFICATION TABLE NO. 292 HEMISPHERICAL TOTAL EMITTANCE OF SILICON MONOCARBIDE SiC

Curve No.	Ref. No.	Year	Temperature Range, K	Reported Error, %	Composition (weight percent), Specifications and Remarks
1*	105	1965	2000		No details given.

DATA TABLE NO. 292 HEMISPHERICAL TOTAL EMITTANCE OF SILICON MONOCARBIDE SiC

[Temperature, T, K; Emittance, ϵ]

T	ϵ
CURVE 1*	
2000	0.90

*No plot given.

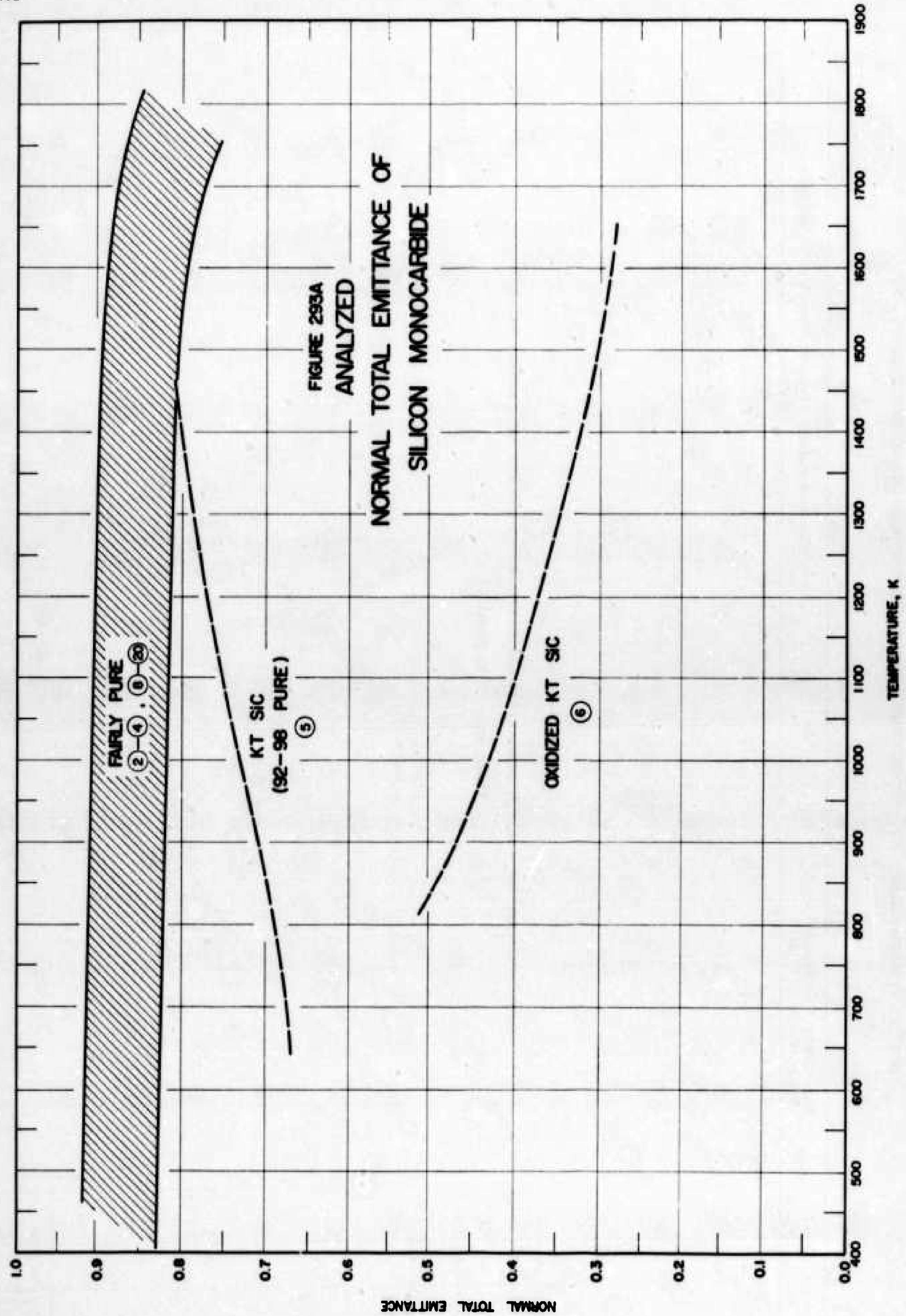


FIGURE 293A ANALYZED
NORMAL TOTAL EMITTANCE OF
SILICON MONOCARBIDE

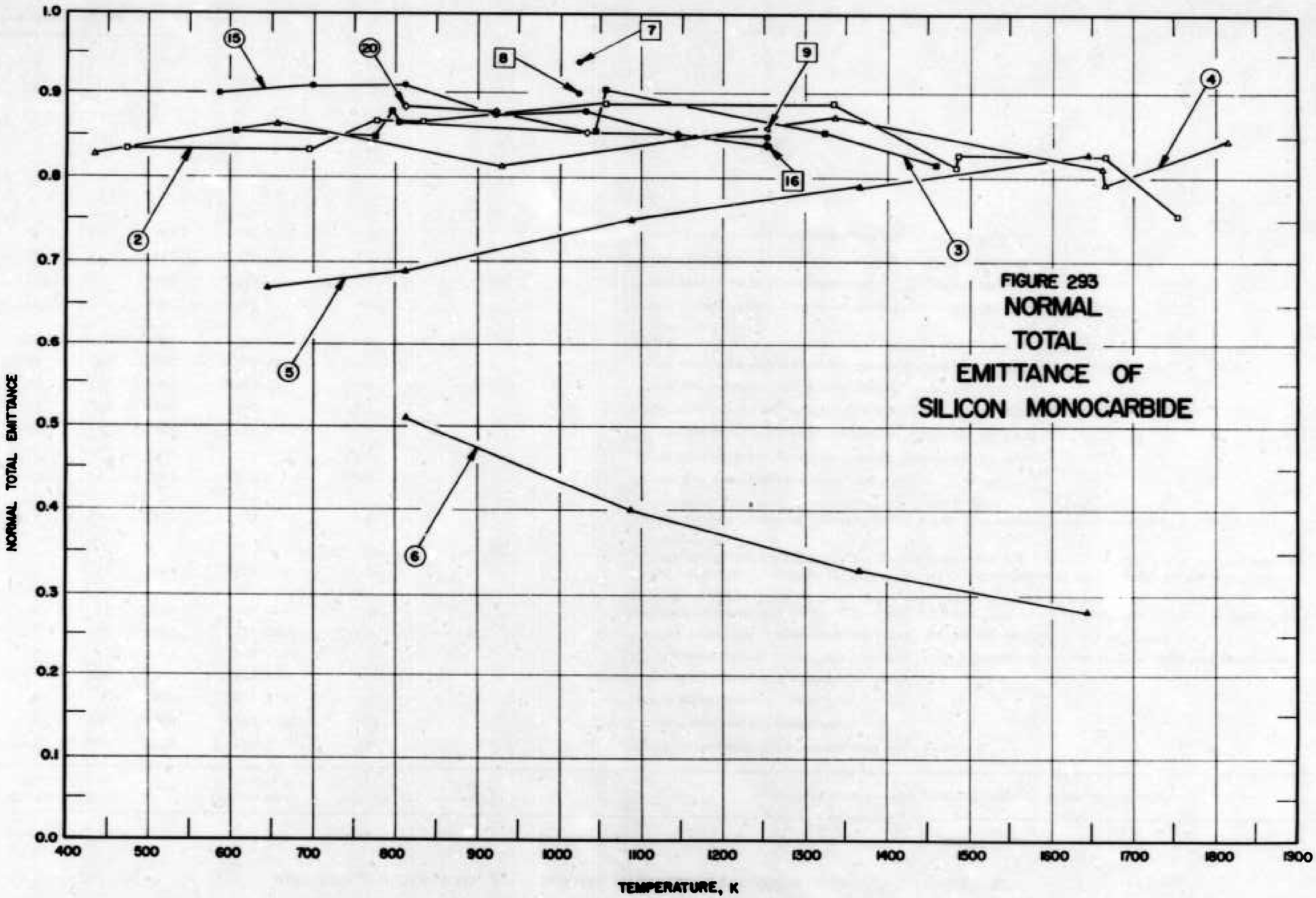


FIGURE 293
NORMAL
TOTAL
EMITTANCE OF
SILICON MONOCARBIDE

SPECIFICATION TABLE NO. 293 NORMAL TOTAL EMITTANCE OF SILICON MONOCARBIDE SiC

Curve No.	Ref. No.	Year	Temperature Range, K	Geometry θ'	Reported Error, %	Composition (weight percent), Specifications and Remarks
1*	106	1959	73.2	~0°		From Carborundum Co.; measured in air; cycle 1.
2	106	1959	474-1756	~0°		Above specimen and conditions.
3	106	1959	608-1460	~0°		Above specimen and conditions; cycle 2.
4	106	1959	434-1813	~0°		Curve 2 specimen and conditions; cycle 3.
5	25	1960	644-1644	~0°	±20	KT silicon carbide; 92-98 SiC, 2-8 free Si, 0-5 free C; measured in demoisturized helium gas.
6	25	1960	811-1644	~0°	± 20	Similar to the above specimen and conditions except oxidized in air at 1367 K for 1 hr.
7	28	1963	1023	~0°		Sintered by Carborundum Co.; density 2.32 g cm^{-3}; theoretical density 3.21 g cm^{-3}; integrated from spectral data (1-15 μm); [Authors' designation: Sample No. 102].
8	28	1963	1023	~0°		From Norton Co.; sintered at 2173 K for 1 hr; setter material SiC; density 1.49 g cm^{-3}; theoretical density 3.21 g cm^{-3}; integrated from spectral data (1-15 μm); [Authors' designation: Sample No. 103].
9	107	1962	1255	~0°		Norton SiC (Crystolon-R); ground and polished then cleaned with alcohol and distilled water; heated at 1255 K in quiescent air for 3 min; [Authors' designation: Specimen 1].
10*	107	1962	1255	~0°		Above specimen and conditions except heated 8 min.
11*	107	1962	1255	~0°		Above specimen and conditions except heated for 11 min.
12*	107	1962	1255	~0°		Above specimen and conditions except heated for 16.2 min.
13*	107	1962	1255	~0°		Above specimen and conditions except heated for 20 min.
14*	107	1962	1255	~0°		Above specimen and conditions except heated for 23.3 min.
15	107	1962	589-1255	~0°		Above specimen and conditions except heated for 25 min.
16	107	1962	1255	~0°		Similar to curve 9 specimen and conditions except heated for 10 min; [Authors' designation: Specimen 2].
17*	107	1962	1255	~0°		Above specimen and conditions except heated for 16.2 min.
18*	107	1962	1255	~0°		Above specimen and conditions except heated for 20 min.
19*	107	1962	1255	~0°		Above specimen and conditions except heated for 23.3 min.
20	107	1962	811-1255	~0°		Above specimen and conditions except heated for 25 min.

* Not shown on plot

DATA TABLE NO. 293 NORMAL TOTAL EMITTANCE OF SILICON MONOCARBIDE SiC

[Temperature, T, K; Emittance, ϵ]

T	ϵ
CURVE 1*	
73.2	0.794
CURVE 2	
474	0.836
693	0.834
779	0.867
833	0.867
1058	0.889
1335	0.889
1487	0.811
1488	0.827
1665	0.827
1756	0.755
CURVE 3	
608	0.856
778	0.850
794	0.880
803	0.868
1048	0.856
1059	0.905
1323	0.853
1460	0.817
CURVE 4	
434	0.830
658	0.865
930	0.816
1338	0.871
1662	0.811
1664	0.792
1813	0.847
CURVE 5	
644	0.67
811	0.69
1089	0.75
1367	0.79
1644	0.83
CURVE 6	
811	0.51
1089	0.40
1367	0.33
1644	0.28
CURVE 7	
1023	0.94
CURVE 8	
1023	0.90
CURVE 9	
1255	0.86
CURVE 10*	
1255	0.855
CURVE 11*	
1255	0.85
CURVE 12*	
1255	0.845
CURVE 13*	
1255	0.845
CURVE 14*	
1255	0.845
CURVE 15	
589	0.900
700	0.910
811	0.910
922	0.875
1033	0.880
1144	0.850
1255	0.850
CURVE 16	
1255	0.84
CURVE 17*	
1255	0.85
CURVE 18*	
1255	0.845
CURVE 19*	
1255	0.84
CURVE 20	
811	0.885
922	0.875
1033	0.855
1144	0.850
1255	0.840

*Not shown on plot

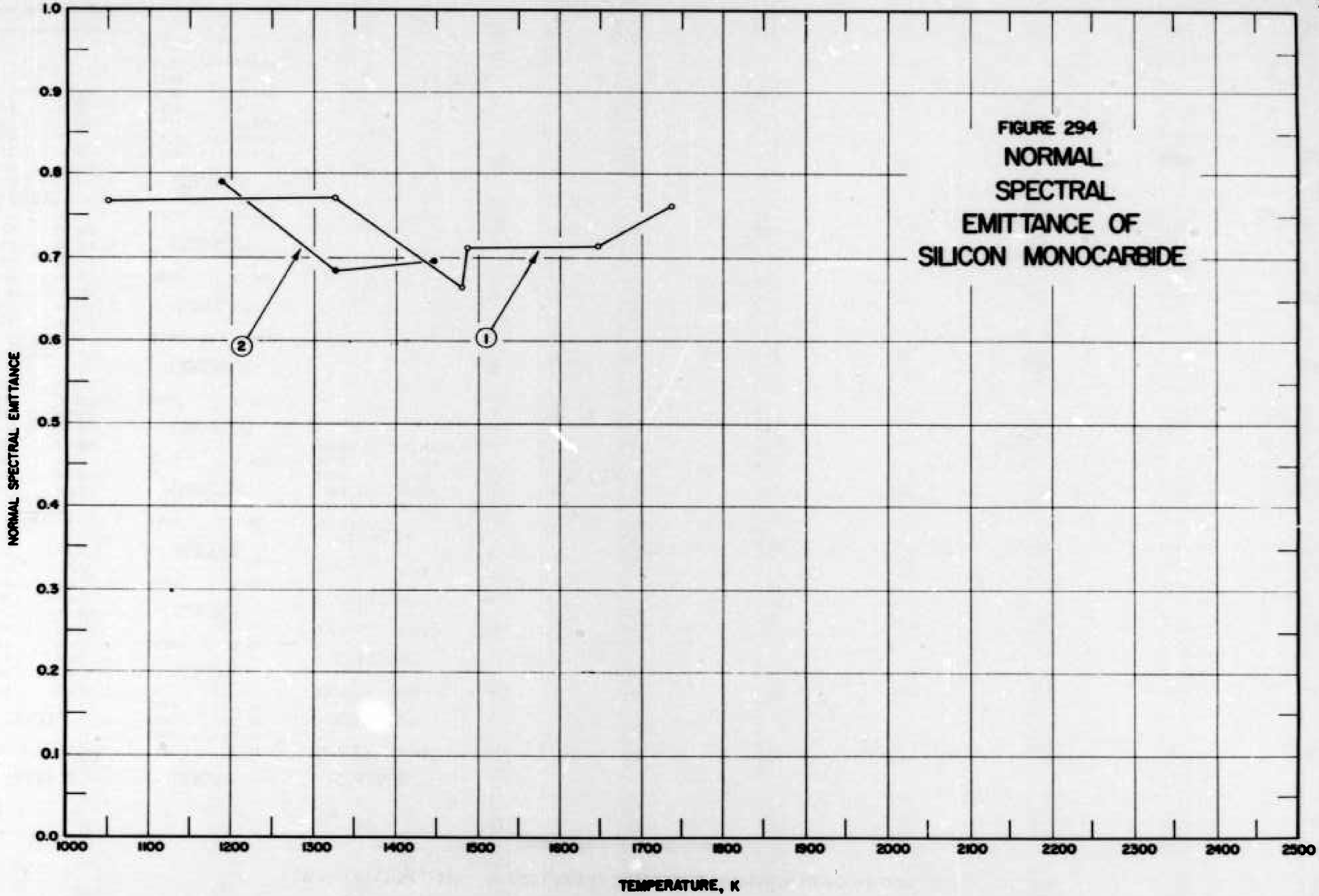


FIGURE 294
NORMAL
SPECTRAL
EMITTANCE OF
SILICON MONOCARBIDE

SPECIFICATION TABLE NO. 294 NORMAL SPECTRAL EMITTANCE OF SILICON MONOCARBIDE SiC

Curve No.	Ref. No.	Year	Wavelength, μm	Temperature Range, K	Geometry θ'	Reported Error, %	Composition (weight percent), Specifications, and Remarks
1	106	1959	0.665	1050-1736	~0°		Cycle 1.
2	106	1959	0.665	1189-1446	~0°		Above specimen and conditions; cycle 2.

DATA TABLE NO. 294 NORMAL SPECTRAL EMITTANCE OF SILICON MONOCARBIDE SiC

[Temperature, T, K; Emittance, ε; Wavelength, λ, μm]

T	ε
CURVE 1 $\lambda = 0.665$	
1050	0.769
1326	0.771
1480	0.664
1485	0.711
1648	0.714
1736	0.762
CURVE 2 $\lambda = 0.665$	
1189	0.790
1326	0.685
1446	0.699

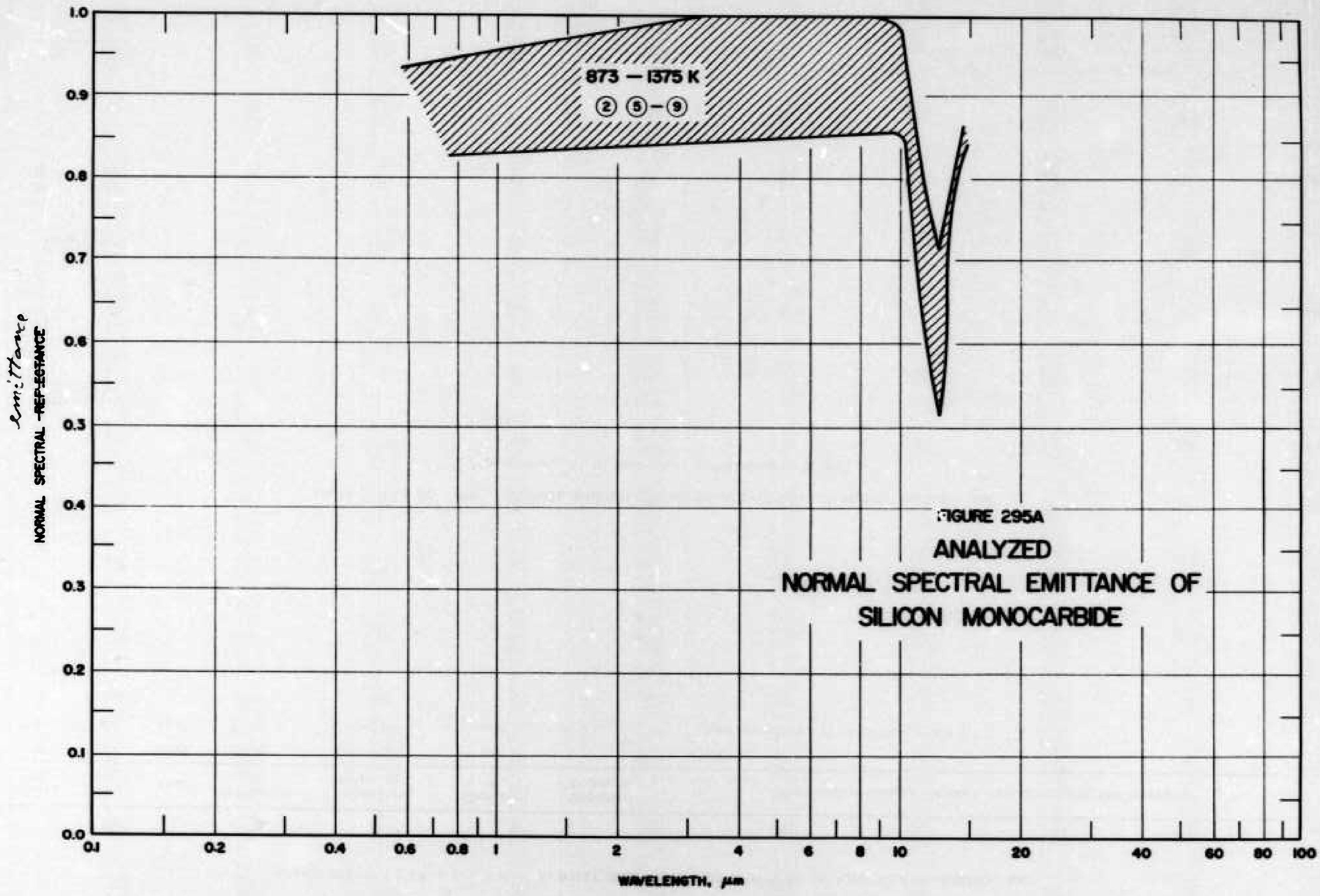


FIGURE 295A
ANALYZED
NORMAL SPECTRAL EMITTANCE OF
SILICON MONOCARBIDE

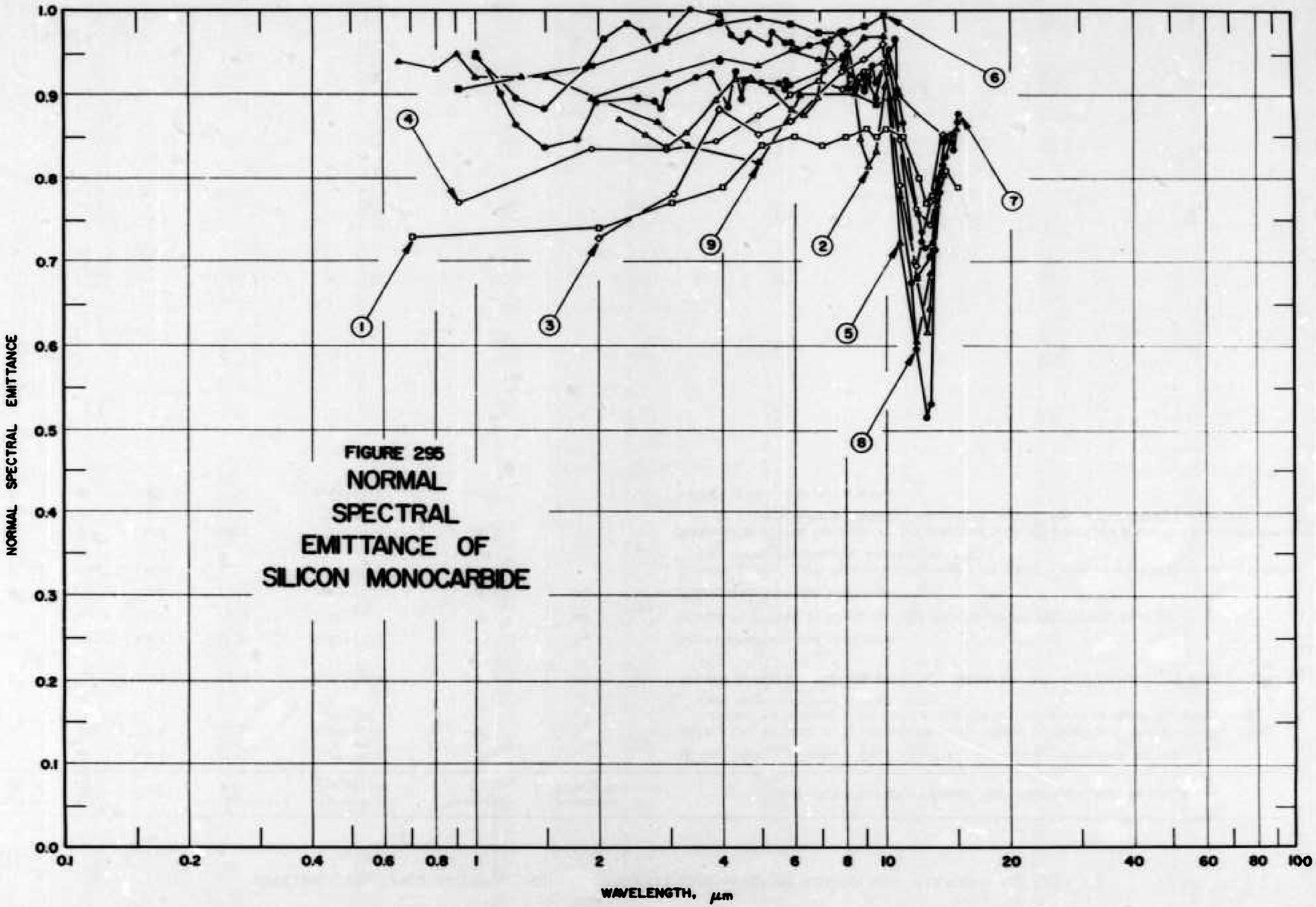


FIGURE 295
NORMAL
SPECTRAL
EMITTANCE OF
SILICON MONOCARBIDE

SPECIFICATION TABLE NO. 295 NORMAL SPECTRAL EMITTANCE OF SILICON MONOCARBIDE SiC

Curve No.	Ref. No.	Year	Temperature K	Wavelength Range, μm	Geometry θ'	Reported Error, %	Composition (weight percent), Specifications, and Remarks
1	108	1948	1375	1.7-15.0	~0°		Globar from the Carborundum Co.; data extracted from smooth curve.
2	22	1960	1296	2.24-13.9	~0°		Norton Co. Crystalon-R; flat and smooth surface obtained by diamond wheel cutting; oxidized by heating in air at 1400 K for 1 hr; measured in argon-hydrogen atm; data extracted from smooth curve.
3	111	1964	873	2.00-13.9	0°	≤4	Bonded Norton RC 4237; 80 pure SiC, nitride bonded; ultrasonically machined; measured in air.
4	111	1964	1293	0.91-13.9	0°	≤4	Above specimen and conditions.
5	111	1964	873	1.92-13.9	0°	≤4	Norton Crystolon R; 99 pure; ultrasonically machined; measured in air.
6	111	1964	1298	0.92-13.9	0°	≤4	Above specimen and conditions.
7	28	1963	1023	1.00-15.0	~0°		Density 2.32 g cm^{-3}; theoretical density 3.21 g cm^{-3}; data extracted from smooth curve; [Authors' designation: Sample No. 102].
8	28	1963	1023	1.00-15.0	~0°		Sintered at 2173 K for 1 hr (setter material SiC); density 1.49 g cm^{-3}; theoretical density 3.21 g cm^{-3}; data extracted from smooth curve; [Authors' designation: Sample No. 103].
9	110	1962	1358	0.65-14.9	~0°		Globar from Carborundum Co.

DATA TABLE NO. 295 NORMAL SPECTRAL EMITTANCE OF SILICON MONOCARBIDE SiC

[Wavelength, λ, μm; Emittance, ∈; Temperature, T, K]

λ	∈
CURVE 1	**T = 1375**
1.7	0.73
2.0	0.74
3.0	0.77
4.0	0.79
5.0	0.84
6.0	0.85
7.0	0.84
8.0	0.85
9.0	0.86
9.5	0.85
10.0	0.86
11.0	0.85
12.0	0.80
12.5	0.77
13.0	0.78
14.0	0.81
15.0	0.79
CURVE 2	**T = 1296**
2.24	0.872
2.60	0.851
2.91	0.839
3.27	0.854
3.86	0.896
4.37	0.916
4.70	0.919
5.34	0.903
5.97	0.883
6.35	0.879
6.82	0.899
7.13	0.938
7.39	0.964
7.71	0.974
8.09	0.961
8.44	0.910
8.75	0.848
9.12	0.815
9.47	0.832
10.0	0.910
10.3	0.931
10.6	0.899
11.8	0.700
CURVE 2 (cont.)	
12.5	0.617
12.8	0.644
13.0	0.711*
13.3	0.767
13.9	0.803
CURVE 3	**T = 873**
2.00	0.727
3.02	0.781
3.93	0.884
4.90	0.853
5.83	0.870
7.88	0.928
8.90	0.942
9.88	0.963
10.8	0.791
11.8	0.694
12.8	0.771
13.9	0.852
CURVE 4	**T = 1293**
0.910	0.770
1.93	0.834
2.93	0.836
3.89	0.846
4.92	0.878
5.86	0.900
6.88	0.915
7.88	0.906
8.90	0.927
9.88	0.939
10.9	0.848
11.9	0.761
12.9	0.744
13.9	0.806
CURVE 5	**T = 873**
1.92	0.897
2.93	0.923
CURVE 5 (cont.)	
3.95	0.943
4.94	0.934
5.95	0.954
6.95	0.942
7.91	0.944
8.93	0.960
9.88	0.971
10.9	0.723
11.9	0.604
12.8	0.685
13.9	0.807*
CURVE 6	**T = 1298**
0.92	0.903
1.94	0.932
2.93	0.965
3.91	0.986
4.96	0.990
5.95	0.984
6.96	0.974
7.95	0.976
8.94	0.981
9.89	0.994
10.9	0.849*
11.9	0.680
12.8	0.706
13.9	0.844
CURVE 7	**T = 1023**
1.00	0.945
1.26	0.898
1.49	0.885
1.88	0.930
2.06	0.969
2.34	0.984
2.59	0.974
2.73	0.954
3.32	1.000
3.99	0.995
4.20	0.972
4.44	0.964
CURVE 7 (cont.)	
4.66	0.973
5.20	0.963
5.29	0.974
5.42	0.962*
5.75	0.962
5.85	0.951*
5.97	0.965
6.07	0.956
6.50	0.960
7.01	0.963
7.50	0.956*
7.59	0.965*
8.03	0.958*
8.21	0.922
8.51	0.915
8.80	0.917*
8.89	0.902
9.16	0.913
9.51	0.896
10.2	0.956
10.5	0.958*
10.7	0.902
11.0	0.869
11.1	0.833*
11.5	0.787*
12.0	0.758
12.2	0.726
12.2	0.738
12.4	0.719
12.6	0.728*
13.0	0.722
13.3	0.800
13.5	0.817*
14.0	0.841*
14.5	0.852
15.0	0.880
CURVE 8	**T = 1023**
1.00	0.950
1.16	0.900
1.25	0.865
1.49	0.839
1.77	0.849
CURVE 8 (cont.)	
1.99	0.891
2.50	0.899
2.72	0.893
2.83	0.884
2.98	0.903
3.49	0.920
3.71	0.925
3.99	0.940
4.18	0.888
4.30	0.929
4.42	0.896
4.49	0.913
4.56	0.904*
5.00	0.912
5.51	0.912
5.73	0.905
5.77	0.916
5.87	0.910
6.25	0.926*
7.01	0.929
7.13	0.929*
7.29	0.936*
7.56	0.938*
7.87	0.945
7.94	0.932
8.03	0.951
8.11	0.926*
8.25	0.907
8.42	0.907
8.51	0.921*
8.83	0.921
8.91	0.906
9.03	0.920
9.16	0.920*
9.22	0.934
9.42	0.912
9.79	0.921*
10.0	0.939
10.1	0.957*
10.3	0.948*
10.4	0.967
10.6	0.903*
10.8	0.777
11.5	0.675
11.7	0.644*
CURVE 8 (cont.)	
11.9	0.598
12.5	0.514
12.9	0.530
13.1	0.714
13.5	0.786
13.8	0.819
13.9	0.811*
14.0	0.826
14.4	0.826*
14.5	0.843
14.6	0.834
15.0	0.870
CURVE 9	**T = 1358**
0.65	0.94*
0.80	0.93*
0.90	0.95*
1.00	0.92
1.30	0.92
1.50	0.92
2.80	0.87
3.3	0.84
4.9	0.82
5.8	0.90*
6.2	0.90
8.4	0.90
9.5	0.89
10.7	0.90
13.9	0.85
14.9	0.86

*Not shown on plot

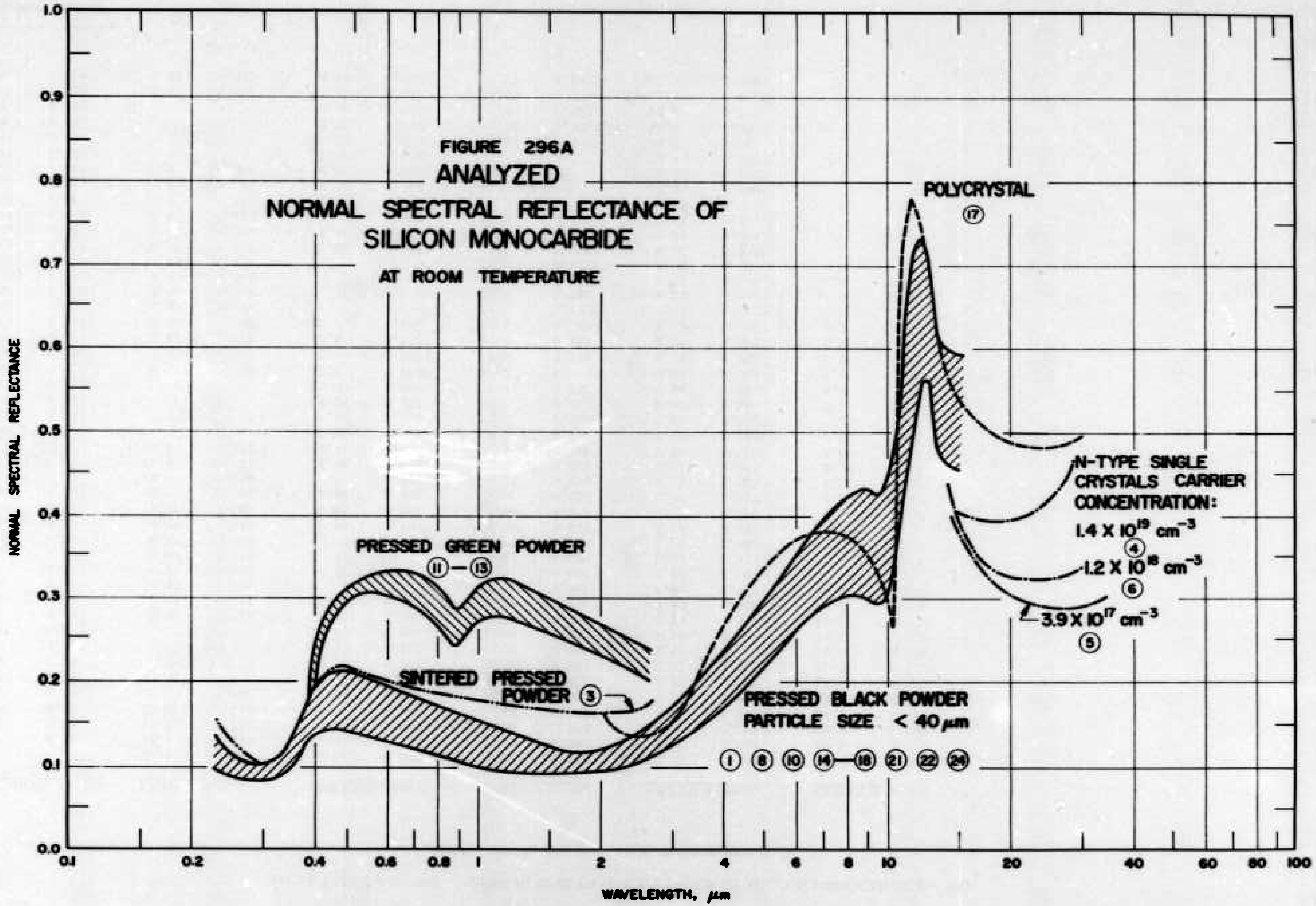


FIGURE 296A
ANALYZED
NORMAL SPECTRAL REFLECTANCE OF
SILICON MONOCARBIDE
AT ROOM TEMPERATURE
POLYCRYSTAL
17
N-TYPE SINGLE CRYSTALS CARRIER CONCENTRATION:
1.4×10^{19} cm^{-3}
4
1.2×10^{18} cm^{-3}
6
3.9×10^{17} cm^{-3}
5
PRESSED GREEN POWDER
11 — 13
SINTERED PRESSED POWDER 3
PRESSED BLACK POWDER
PARTICLE SIZE $< 40 \mu m$
1 8 10 14—18 21 22 24
NORMAL SPECTRAL REFLECTANCE
WAVELENGTH, μm
1.0
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0.0
0.1
0.2
0.4
0.6
0.8
1
2
4
6
8
10
20
40
60
80
100

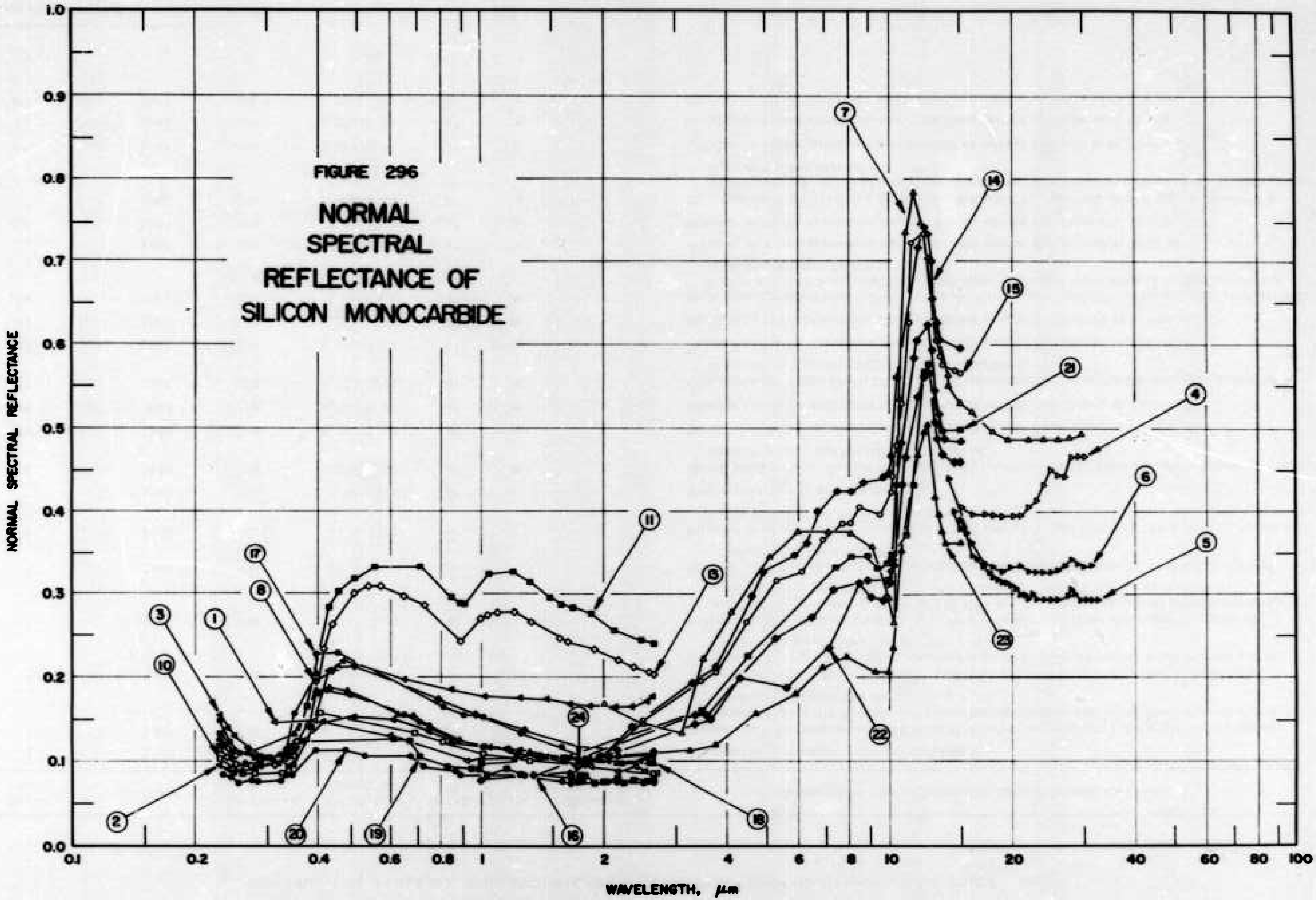


FIGURE 296

NORMAL SPECTRAL REFLECTANCE OF SILICON MONOCARBIDE

SPECIFICATION TABLE NO. 296 NORMAL SPECTRAL REFLECTANCE OF SILICON MONOCARBIDE SiC

Curve No.	Ref. No.	Year	Temperature K	Wavelength Range, μm	Geometry θ	θ'	ω'	Reported Error, %	Composition (weight percent), Specifications, and Remarks
1	106	1959	298	0.316-2.70	9°		2π	4	Magnesium carbonate reference standard.
2	28	1963	298	0.230-2.64	~0°		2π		Commercially sintered sample from Carborundum; density 2.32 g cm^{-3}; theoretical density 3.21 g cm^{-3}; MgO reference standard; data extracted from smooth curve; [Authors' designation: Sample No. 102].
3	28	1963	298	0.230-2.65	~0°		2π		Sintered at 2173 K for 1 hr (setter material SiC); density 1.49 g cm^{-3}; theoretical density 3.21 g cm^{-3}; MgO reference standard; data extracted from smooth curve; [Authors' designation: Sample No. 103].
4	112	1966	300	15.1-30.1	~0°	~0°			n-type; single crystal; grown in a Lely's type furnace from commercial grade or purified SiC; carrier density at 300 K 1.4 x 10^{13} cm^{-3}; measured in argon-nitrogen; incident beam perpendicular to the c-plane; [Author's designation: B-106].
5	112	1966	300	14.5-32.5	~0°	~0°			Similar to above specimen and conditions except carrier density at 300 K 3.9 x 10^{17} cm^{-3}; [Author's designation: B-93].
6	112	1966	300	14.0-31.1	~0°	~0°			Similar to above specimen and conditions except 15 μm thick; carrier density at 300 K 1.2 x 10^{18} cm^{-3}; [Author's designation: B-97].
7	86	1965	~298	2.00-29.9	~0°	~0°			Polycrystalline (Carborundum Co.).
8	382	1965	~298	0.230-2.65	0°		2π		Black powder from Norton Co.; 98% pure; compacted at 70 500 psi; data extracted from smooth curve; MgO reference standard.
9*	382	1965	~298	0.230-2.65	0°		2π		Similar to above specimen and conditions except compacted at 35 250 psi.
10	382	1965	~298	0.230-2.65	0°		2π		Similar to above specimen and conditions except compacted at 11 750 psi.
11	382	1965	~298	0.230-2.65	0°		2π		Green powder from Norton Co.; 99.4% pure; compacted at 70 500 psi; data extracted from smooth curve; MgO reference standard.
12*	382	1965	~298	0.230-2.65	0°		2π		Similar to above specimen and conditions except compacted at 35 250 psi.
13	382	1965	~298	0.230-2.65	0°		2π		Similar to above specimen and conditions except compacted at 11 750 psi.
14	362	1964	~298	1.00-15.0	0°		2π		98.1 pure powder from Fisher Scientific Co.; mesh size 320; compacted at 1400 psi with highly polished stainless steel ram; data extracted from smooth curve; converted from reflectance factor.
15	362	1964	~298	1.00-15.0	~0°		2π		Similar to above specimen and conditions except compacted at 7000 psi.
16	362	1964	~298	1.00-15.0	~0°		2π		Similar to above specimen and conditions except compacted at 28 000 psi.
17	362	1964	~298	0.230-2.65	0°		2π		98.1 pure powder (regular crystolon, Norton Co.); particle size 7 μm; compacted at 23 500 psi with highly polished stainless steel ram; data extracted from smooth curve; MgO reference standard.
18	362	1964	~298	0.230-2.65	~0°		2π		Similar to above specimen and conditions except particle size 30 μm.
19	362	1964	~298	0.230-2.65	~0°		2π		Similar to above specimen and conditions except particle size 70 μm.
20	362	1964	~298	0.230-2.65	~0°		2π		Similar to above specimen and conditions except particle size 160 μm.

* Not shown on plot

SPECIFICATION TABLE NO. 296 (continued)

Curve No.	Ref. No.	Year	Temperature K	Wavelength Range, μm	Geometry θ	θ'	ω'	Reported Error, %	Composition (weight percent), Specifications, and Remarks
21	362	1964	~298	1.00-15.0	0°		2π		98.1 pure powder (regular crystolon, Norton Co.); particle size 7 μm; compacted at 42 000 psi with highly polished stainless steel ram; data extracted from smooth curve; converted from reflectance factor.
22	362	1964	~298	1.00-15.0	~0°		2π		Similar to above specimen and conditions except particle size 30 μm.
23	362	1964	~298	1.00-15.0	~0°		2π		Similar to above specimen and conditions except particle size 70 μm.
24	362	1964	~298	0.230-2.65	~0°		2π		98.1 pure powder, Norton Co.; mesh size 400; compacted with highly polished stainless steel ram; data extracted from smooth curve; MgO reference standard.

DATA TABLE NO. 296 NORMAL SPECTRAL REFLECTANCE OF SILICON MONOCARBIDE SiC

[Wavelength, λ, μm; Reflectance, ρ; Temperature, T, K]

CURVE 1
T = 298

λ	ρ
0.316	0.147
0.397	0.149
0.600	0.130
0.921	0.100
1.00	0.102
1.21	0.102
1.35	0.108
1.70	0.097
1.89	0.093
2.19	0.089
2.40	0.093
2.51	0.089
2.70	0.088

CURVE 2
T = 298

λ	ρ
0.230	0.095
0.240	0.090
0.250	0.088
0.260	0.089
0.280	0.090
0.290	0.093
0.320	0.099
0.330	0.104*
0.340	0.105
0.350	0.111
0.410	0.148
0.493	0.152
0.613	0.150
0.751	0.134
0.850	0.121
1.05	0.119
1.15	0.115
1.25	0.114
1.44	0.108
1.65	0.104
1.85	0.102
2.14	0.100
2.44	0.100
2.54	0.103
2.64	0.103

CURVE 3
T = 298

λ	ρ
0.230	0.155
0.240	0.140
0.250	0.130
0.270	0.117
0.290	0.106
0.310	0.100
0.320	0.094
0.340	0.094
0.350	0.095
0.379	0.128
0.425	0.209
0.460	0.220
0.648	0.198
0.848	0.185
1.04	0.179
1.25	0.176
1.45	0.173
1.65	0.169
1.85	0.167
2.15	0.166
2.35	0.167
2.54	0.170
2.65	0.178

CURVE 4
T = 300

λ	ρ
15.1	0.404
16.0	0.397
17.1	0.397
18.0	0.398
19.0	0.396
20.1	0.396
21.0	0.397
22.0	0.405
23.0	0.412
24.0	0.431
25.0	0.450
26.0	0.445
27.0	0.443
28.0	0.466
29.1	0.466
30.1	0.466

CURVE 5
T = 300

λ	ρ
14.5	0.400
15.0	0.380
15.5	0.375
16.0	0.347
16.5	0.342
17.0	0.332
17.6	0.326
18.0	0.320
18.5	0.317
19.0	0.313
19.4	0.311
20.0	0.310
20.5	0.306
21.0	0.303*
21.5	0.300
22.0	0.295
22.5	0.300
23.0	0.294
23.5	0.292*
24.0	0.292
24.5	0.295*
25.0	0.293
25.5	0.294*
26.0	0.293
26.5	0.291*
27.0	0.293*
27.5	0.298
28.0	0.304
28.5	0.300
29.0	0.293*
29.5	0.291
30.0	0.292*
30.5	0.291
31.0	0.291*
31.5	0.291
32.0	0.291*
32.5	0.291

CURVE 6
T = 300

λ	ρ
14.0	0.440
14.5	0.400*
15.0	0.390

CURVE 6 (cont.)

λ	ρ
15.5	0.375*
16.0	0.361
17.0	0.338
18.0	0.333
19.0	0.327
20.0	0.332
21.0	0.332
22.0	0.327
23.0	0.327
24.0	0.327
25.0	0.327
26.0	0.329
27.0	0.333
28.0	0.342
29.0	0.336
30.0	0.332
31.1	0.334

CURVE 7
T ~ 298

λ	ρ
2.00	0.169
2.50	0.145
3.10	0.134
3.50	0.221
4.10	0.279
5.10	0.345
6.00	0.374
7.10	0.375
8.10	0.375
9.10	0.359
10.0	0.295
10.3	0.266
10.6	0.536
11.0	0.739
11.5	0.786
12.0	0.750
12.5	0.706
13.0	0.631
14.0	0.562
14.0	0.550
15.0	0.530
16.0	0.520
18.0	0.497

CURVE 7 (cont.)

λ	ρ
19.9	0.488
22.0	0.488
24.0	0.488
26.0	0.488
27.9	0.489
29.9	0.491

CURVE 8
T ~ 298

λ	ρ
0.230	0.107*
0.253	0.092*
0.288	0.089*
0.323	0.093*
0.350	0.115*
0.395	0.193
0.425	0.209
0.443	0.212
0.499	0.212
0.796	0.171
0.964	0.154
1.25	0.138
1.75	0.118*
2.13	0.111
2.65	0.110

CURVE 9*
T ~ 298

λ	ρ
0.230	0.104
0.252	0.090
0.284	0.086
0.330	0.091
0.347	0.096
0.350	0.108
0.394	0.168
0.427	0.181
0.466	0.181
0.701	0.147
0.840	0.131
1.04	0.117
1.28	0.110
1.46	0.102
2.00	0.092
2.65	0.090

CURVE 10
T ~ 298

λ	ρ
0.230	0.101
0.261	0.086
0.280	0.083
0.328	0.084
0.340	0.089
0.348	0.093*
0.350	0.105
0.401	0.157
0.688	0.133
0.805	0.121
1.02	0.108
1.31	0.100
1.73	0.093
2.65	0.086

CURVE 11
T ~ 298

λ	ρ
0.230	0.131
0.239	0.120
0.248	0.111
0.280	0.103
0.311	0.100*
0.331	0.106
0.346	0.118
0.349	0.123*
0.378	0.165
0.428	0.283
0.450	0.301
0.491	0.319
0.548	0.331
0.710	0.331
0.850	0.295
0.883	0.289
0.915	0.289
1.05	0.323
1.20	0.324
1.31	0.312
1.49	0.296
1.57	0.288
1.64	0.282
1.86	0.277
2.11	0.256

CURVE 11 (cont.)

λ	ρ
2.47	0.243
2.65	0.240

CURVE 12*
T ~ 298

λ	ρ
0.230	0.125
0.240	0.115
0.249	0.105
0.268	0.099
0.294	0.097
0.319	0.101
0.337	0.110
0.348	0.117
0.353	0.130
0.378	0.160
0.408	0.231
0.432	0.271
0.471	0.300
0.515	0.314
0.561	0.317
0.643	0.307
0.716	0.309
0.910	0.264
1.00	0.290
1.10	0.297
1.20	0.299
1.34	0.282
1.45	0.279
1.59	0.263
1.82	0.253
2.00	0.246
2.23	0.231
2.44	0.224
2.65	0.219

CURVE 13
T ~ 298

λ	ρ
0.230	0.114
0.240	0.103
0.251	0.095
0.274	0.094
0.288	0.092*

CURVE 13 (cont.)

λ	ρ
0.313	0.096
0.331	0.102
0.348	0.112*
0.356	0.122
0.380	0.141
0.416	0.232
0.438	0.263
0.495	0.300
0.532	0.309
0.565	0.309
0.649	0.299
0.733	0.285
0.899	0.241
1.00	0.270
1.04	0.274
1.07	0.274*
1.10	0.279
1.21	0.279
1.34	0.267
1.58	0.248
1.63	0.242
1.90	0.234
2.19	0.220
2.39	0.212
2.59	0.208
2.65	0.201

CURVE 14
T ~ 298

λ	ρ
1.00	0.107*
1.97	0.107
2.33	0.142
3.30	0.193
3.75	0.213
4.60	0.299
4.98	0.326
5.82	0.349
6.32	0.361
6.64	0.400
7.42	0.424
8.12	0.429
8.62	0.438
9.67	0.442
10.0	0.447

* Not shown on plot

DATA TABLE NO. 296 (continued)

CURVE 14 (cont.)
T ~ 298

λ	ρ
10.2	0.468
10.6	0.560
11.9	0.718
12.3	0.745
12.5	0.738
12.7	0.700
12.9	0.655
13.1	0.627
13.3	0.608
13.5	0.602*
15.0	0.597

CURVE 15
T ~ 298

λ	ρ
1.00	0.104*
1.97	0.104*
2.50	0.147
3.48	0.195
3.78	0.209
4.48	0.267
5.39	0.316
6.18	0.327
6.92	0.368
7.73	0.386
8.12	0.386
8.50	0.405
9.51	0.399
10.1	0.422
10.3	0.443
10.4	0.480
10.6	0.530
11.2	0.628
12.1	0.732*
12.4	0.735
11.6	0.714
13.0	0.635*
13.1	0.604
13.4	0.585
13.8	0.575
14.5	0.569
15.0	0.565

CURVE 16
T ~ 298

λ	ρ
1.00	0.079
1.36	0.083
3.36	0.154
3.57	0.154
5.28	0.247
6.49	0.272
7.33	0.305
8.97	0.317
9.88	0.317
10.1	0.328
10.2	0.342
10.5	0.431
10.8	0.482
11.5	0.582
11.8	0.605
12.5	0.623
12.7	0.593
13.0	0.545
13.2	0.519
13.6	0.488
15.0	0.484

CURVE 17
T ~ 298

λ	ρ
0.230	0.147
0.241	0.122
0.258	0.110
0.270	0.110
0.276	0.107*
0.298	0.103
0.319	0.103*
0.327	0.109
0.336	0.113
0.338	0.119
0.349	0.119*
0.350	0.154
0.391	0.202
0.399	0.228
0.444	0.228
0.806	0.164
0.912	0.154
1.01	0.151
1.26	0.132
1.58	0.119

CURVE 17 (cont.)

λ	ρ
1.80	0.111
2.18	0.107
2.65	0.109

CURVE 18
T ~ 298

λ	ρ
0.230	0.127
0.249	0.103
0.298	0.101*
0.330	0.103*
0.332	0.108*
0.349	0.112*
0.350	0.133
0.395	0.182
0.424	0.185
0.472	0.182
0.624	0.155
0.687	0.153
0.750	0.141
0.881	0.126
1.04	0.118
1.17	0.116
1.25	0.111*
1.32	0.111
1.39	0.107
1.64	0.102
2.15	0.099
2.65	0.099

CURVE 19
T ~ 298

λ	ρ
0.230	0.117
0.241	0.101*
0.246	0.101*
0.251	0.094
0.298	0.096*
0.305	0.102
0.343	0.102*
0.348	0.106
0.369	0.123
0.385	0.140
0.410	0.147
0.609	0.127
0.679	0.124

CURVE 19 (cont.)

λ	ρ
0.689	0.122*
0.702	0.104
0.834	0.092
0.950	0.090
0.997	0.090
1.04	0.083
1.16	0.090
1.25	0.082
1.69	0.080
1.71	0.076
1.74	0.081
1.78	0.076
1.80	0.081
1.87	0.079*
1.90	0.074
2.00	0.077
2.13	0.076*
2.17	0.080
2.22	0.074
2.35	0.074*
2.38	0.079
2.45	0.074*
2.57	0.077
2.65	0.080

CURVE 20
T ~ 298

λ	ρ
0.230	0.094*
0.236	0.082
0.246	0.080
0.258	0.072
0.275	0.078
0.287	0.076
0.324	0.077
0.330	0.083
0.348	0.083
0.350	0.097*
0.397	0.111
0.463	0.111
0.520	0.106
0.674	0.103
0.721	0.093
0.863	0.089
0.893	0.083
1.28	0.082

CURVE 20 (cont.)

λ	ρ
1.59	0.077
1.65	0.074
1.99	0.073*
2.04	0.075
2.15	0.075
2.17	0.073*
2.50	0.074
2.61	0.077*
2.65	0.076

CURVE 21
T ~ 298

λ	ρ
1.00	0.098
1.60	0.101
3.47	0.160
4.58	0.226
7.40	0.331
8.03	0.346
8.82	0.348
9.40	0.330
9.93	0.336
10.1	0.349
11.0	0.472
11.5	0.532
12.1	0.566
12.3	0.577*
12.5	0.577
13.2	0.503
13.5	0.497
15.0	0.499

CURVE 22
T ~ 298

λ	ρ
1.00	0.091*
1.80	0.100
3.37	0.145
3.64	0.150
4.38	0.199
5.60	0.237
7.19	0.285
8.41	0.312
8.71	0.312*
9.09	0.294
9.74	0.291

CURVE 22 (cont.)

λ	ρ
10.1	0.311
10.2	0.334
10.7	0.432
11.0	0.466
11.8	0.539
12.2	0.560
12.6	0.563
13.0	0.507
13.2	0.478
13.5	0.469
14.6	0.460
15.0	0.460

CURVE 23
T ~ 298

λ	ρ
1.00	0.078*
1.65	0.086
1.94	0.103
3.27	0.112
3.77	0.120
4.71	0.158
5.98	0.180
6.82	0.211
7.86	0.224
9.27	0.209
10.0	0.206
10.2	0.234
10.8	0.351
11.7	0.469
12.1	0.497
12.5	0.506
13.0	0.418
13.1	0.394
13.3	0.376
13.8	0.362
15.0	0.362

CURVE 24
T ~ 298

λ	ρ
0.230	0.132*
0.250	0.105*
0.265	0.098
0.290	0.095
0.330	0.100*

CURVE 24 (cont.)

λ	ρ
0.337	0.102*
0.339	0.105*
0.350	0.108*
0.400	0.180
0.424	0.182
0.480	0.179
0.650	0.154
0.703	0.148
0.707	0.141*
0.851	0.125
1.02	0.114
1.18	0.112
1.23	0.108
1.40	0.103*
1.75	0.100
2.22	0.098
2.59	0.099
2.65	0.102*

* Not shown on plot

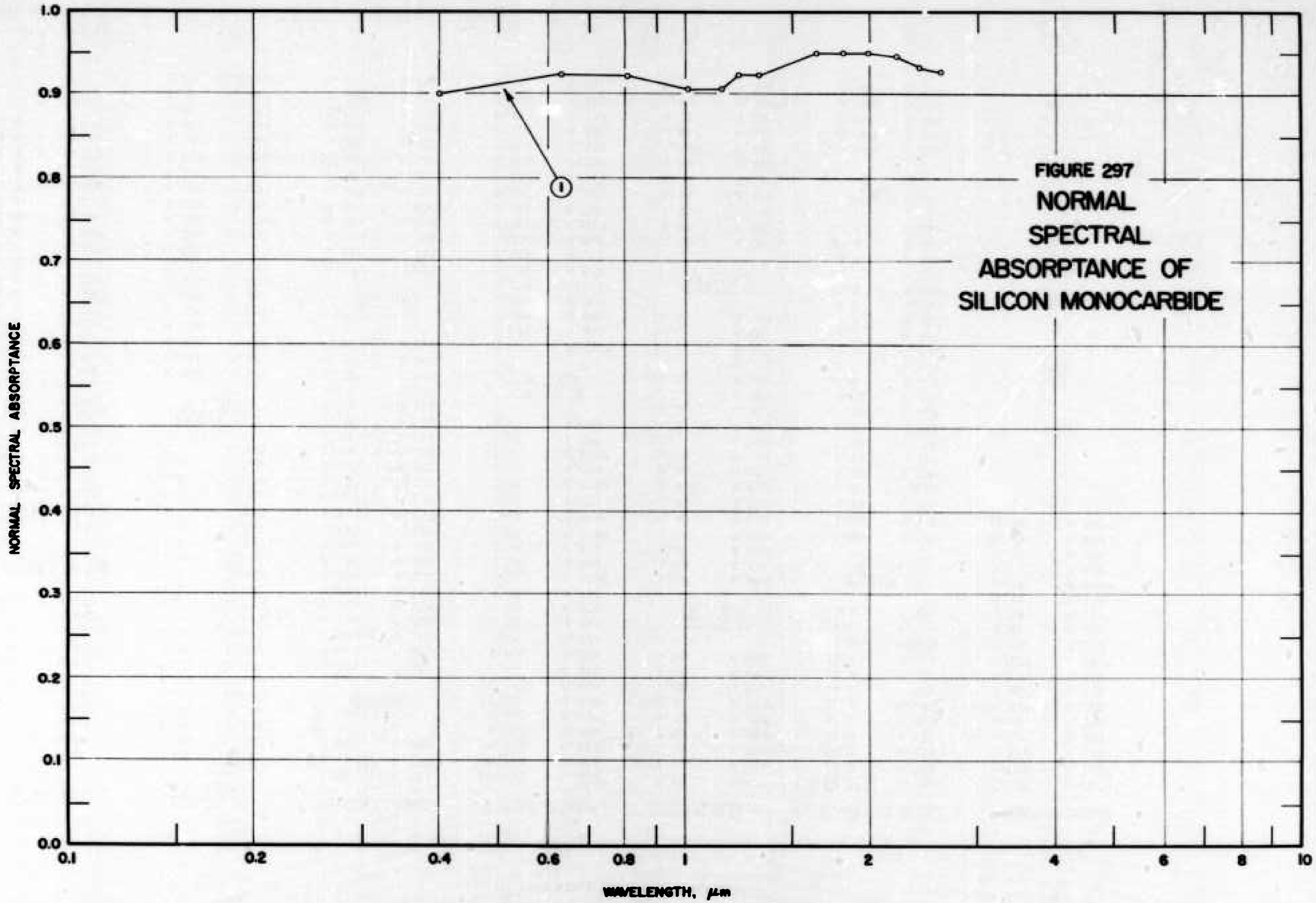


FIGURE 297 NORMAL SPECTRAL ABSORPTANCE OF SILICON MONOCARBIDE

SPECIFICATION TABLE NO. 297 NORMAL SPECTRAL ABSORPTANCE OF SILICON MONOCARBIDE SiC

Curve No.	Ref. No.	Year	Temperature K	Wavelength Range, μm	Geometry θ'	Reported Error, %	Composition (weight percent), Specifications, and Remarks
1	262	1954	~298	0.400-2.60	~0°		Globar; data extracted from smooth curve.

DATA TABLE NO. 297 NORMAL SPECTRAL ABSORPTANCE OF SILICON MONOCARBIDE SiC

[Wavelength, λ, μm; Absorptance, α; Temperature, T, K]

λ	α
CURVE 1 $T \sim 298$	
0.400	0.900
0.630	0.923
0.803	0.921
1.01	0.906
1.15	0.906
1.23	0.922
1.32	0.921
1.64	0.950
1.80	0.950
1.99	0.950
2.20	0.944
2.40	0.931
2.60	0.929

SPECIFICATION TABLE NO. 298 NORMAL SOLAR ABSORPTANCE OF SILICON MONOCARBIDE SiC

Curve No.	Ref. No.	Year	Temperature Range, K	Geometry θ	Reported Error, %	Composition (weight percent), Specifications and Remarks
1*	106	1959	298	9°		Computed from spectral reflectance (0.3 to 3 μm) for above atmosphere conditions.
2*	106	1959	298	9°		Above specimen and conditions except computed for sea level conditions.

DATA TABLE NO. 298 NORMAL SOLAR ABSORPTANCE OF SILICON MONOCARBIDE SiC

[Temperature, T, K; Absorptance, α]

T	α
CURVE 1*	
298	0.878
CURVE 2*	
298	0.879

*No plot given

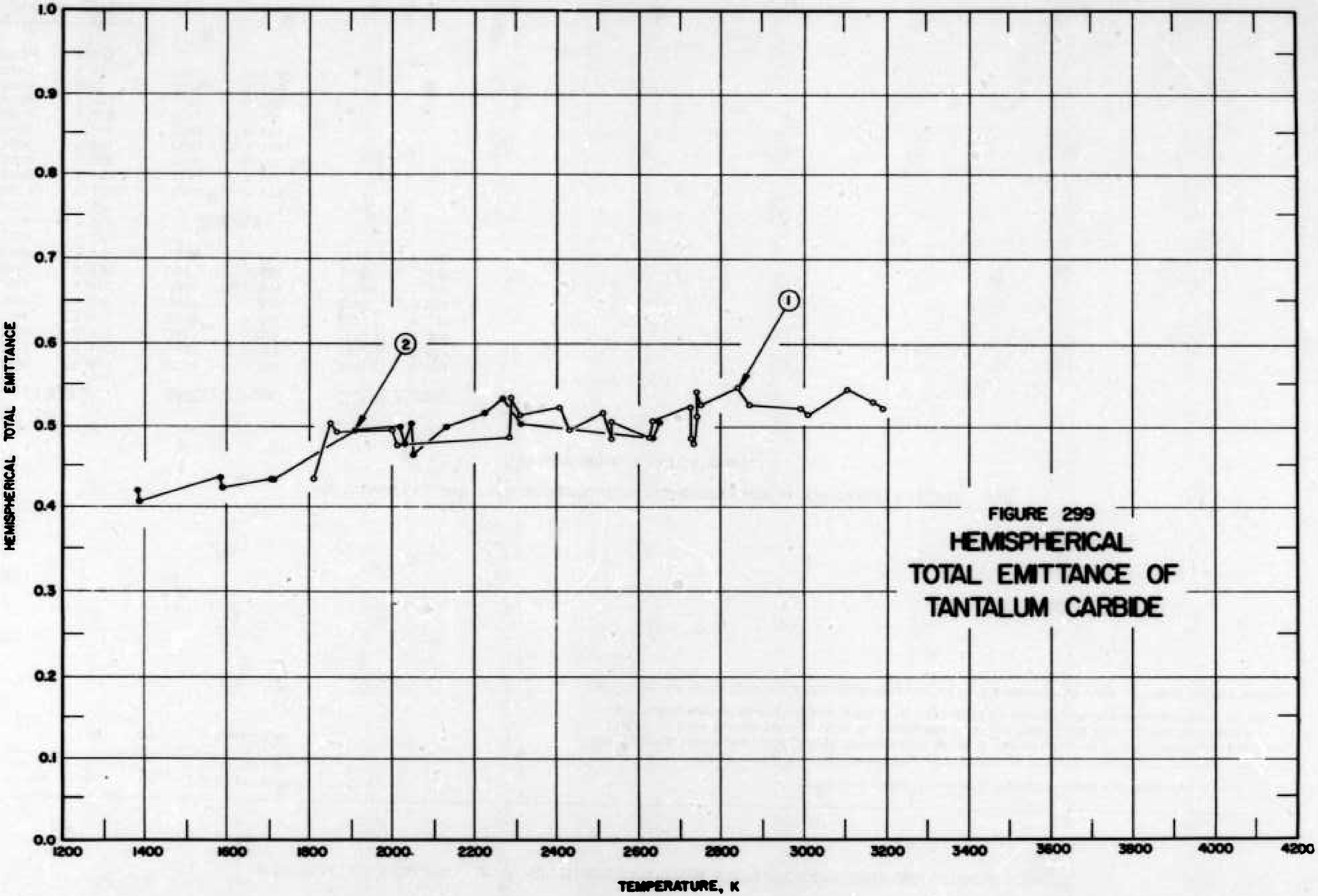


FIGURE 299
HEMISPHERICAL
TOTAL EMITTANCE OF
TANTALUM CARBIDE

SPECIFICATION TABLE NO. 299 HEMISPHERICAL TOTAL EMITTANCE OF TANTALUM CARBIDE TaC

Curve No.	Ref. No.	Year	Temperature Range, K	Reported Error, %	Composition (weight percent), Specifications and Remarks
1	290	1968	1808-3190		Cold pressed into tubes; sintered at 2900 K; measured in vacuum (7×10^{-5} to 4×10^{-4} mm Hg) from 1300 K to 2400 K then back to 1300 K, measured in argon from 2100 K to 3000 K and back to 2100 K, measured in argon from 2900 K to 3300-3500 K; porosity before measurement 26.8%.
2	290	1968	1382-2642		Similar to the above specimen and conditions except cold pressed into rods; porosity before measurement, 23.7%.

DATA TABLE NO. 299 HEMISPHERICAL TOTAL EMITTANCE OF TANTALUM CARBIDE TaC

[Temperature, T, K; Emittance, ϵ]

T	ϵ	T	ϵ	T	ϵ
CURVE 1		CURVE 1 (cont.)		CURVE 2 (cont.)	
1808	0.435	2754	0.528	2041	0.501
1817	0.432*	2840	0.548	2056	0.463
1854	0.501	2872	0.527	2134	0.500
1866	0.491	2999	0.523	2211	0.519
2000	0.494	3002	0.516	2276	0.534
2016	0.476	3102	0.545	2314	0.502
2284	0.484	3169	0.530	2630	0.483
2286	0.534	3190	0.521	2642	0.505
2315	0.516				
2404	0.522	CURVE 2			
2433	0.495				
2510	0.519	1382	0.420		
2530	0.483	1390	0.406		
2533	0.505	1586	0.437		
2626	0.484	1589	0.424		
2639	0.508	1702	0.434		
2726	0.522	1711	0.434		
2726	0.483	1910	0.495		
2733	0.479	2020	0.500		
2740	0.511	2036	0.479		
2740	0.541				

* Not shown on plot

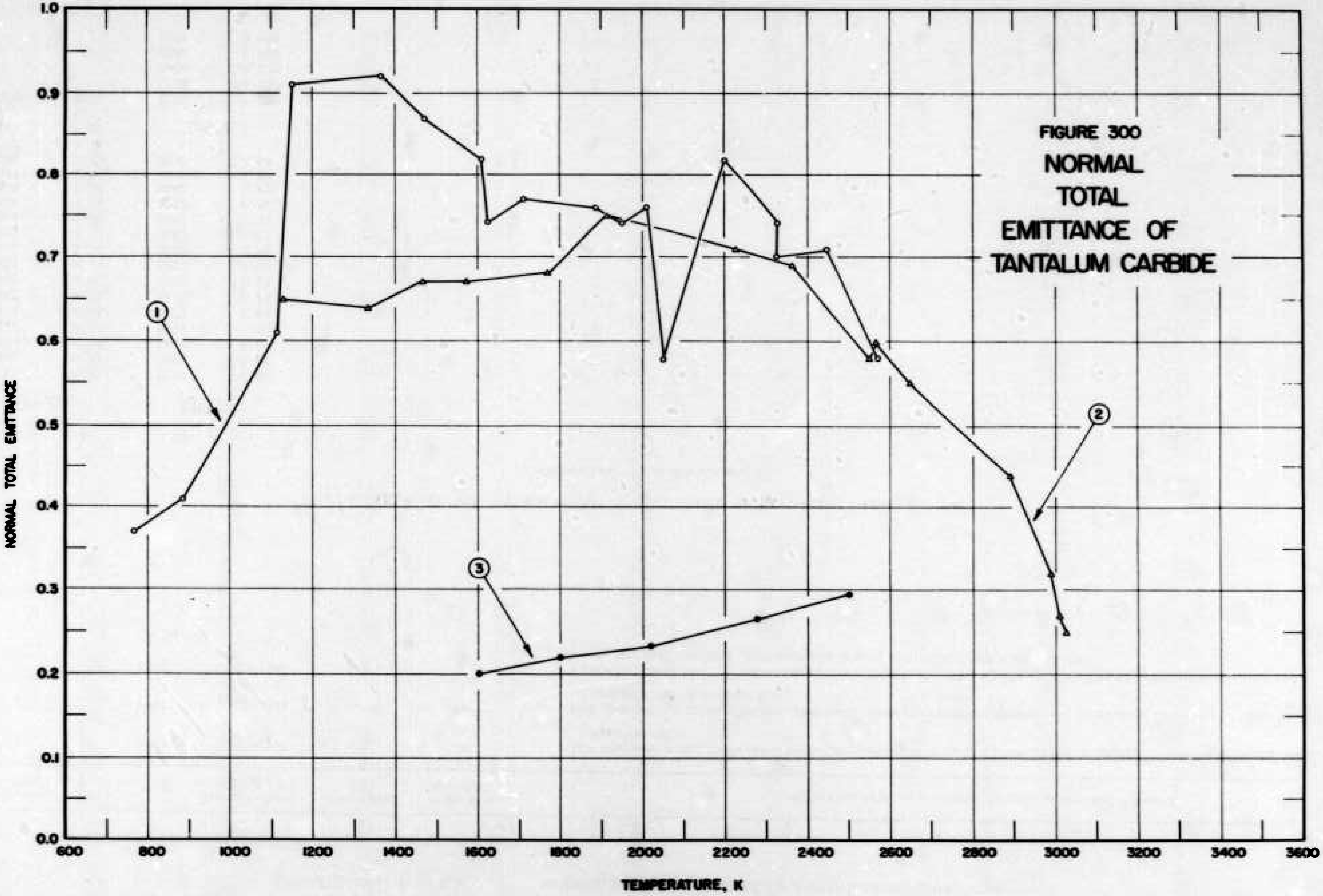


FIGURE 300
NORMAL
TOTAL
EMITTANCE OF
TANTALUM CARBIDE
NORMAL TOTAL EMITTANCE
TEMPERATURE, K
1.0
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0.0
600
800
1000
1200
1400
1600
1800
2000
2200
2400
2600
2800
3000
3200
3400
3600
1
2
3

SPECIFICATION TABLE NO. 300 NORMAL TOTAL EMITTANCE OF TANTALUM CARBIDE TaC

Curve No.	Ref. No.	Year	Temperature Range, K	Geometry θ'	Reported Error, %	Composition (weight percent), Specifications and Remarks
1	17	1962	767-2578	~0°	10	Hot pressed; small dark spot on surface appeared at 1611 K; measured in argon; [Author's designation: Specimen 1].
2	17	1962	1133-3022	~0°	10	Hot pressed; temp distribution uneven on specimen surface during test; measured in argon; [Author's designation: Specimen 2].
3	38	1962	1600-2500	~0°		Prepared from micronized powder, hot pressed at > 2273 K; sintered, polished, etched, then degassed by heating to ~ 973 K; measured in argon; computed from spectral data.

DATA TABLE NO. 300 NORMAL TOTAL EMITTANCE OF TANTALUM CARBIDE TaC

[Temperature, T, K; Emittance, ϵ]

T	ϵ	T	ϵ
CURVE 1		CURVE 2	
767	0.37	1133	0.65
889	0.41	1339	0.64
978	0.66	1461	0.67
1117	0.61	1578	0.67
1155	0.91	1772	0.68
1361	0.92	1917	0.75
1472	0.87	2227	0.71
1611	0.82	2361	0.69
1622	0.74	2555	0.58
1711	0.77	2561	0.60
1889	0.76	2655	0.55
1950	0.74	3022	0.25
2055	0.58	3005	0.27
2011	0.76	2989	0.32
2200	0.82	2883	0.44
2333	0.74		
2455	0.71	CURVE 3	
2328	0.70		
2578	0.58	1600	0.200
		1800	0.220
		2020	0.232
		2280	0.265
		2500	0.295

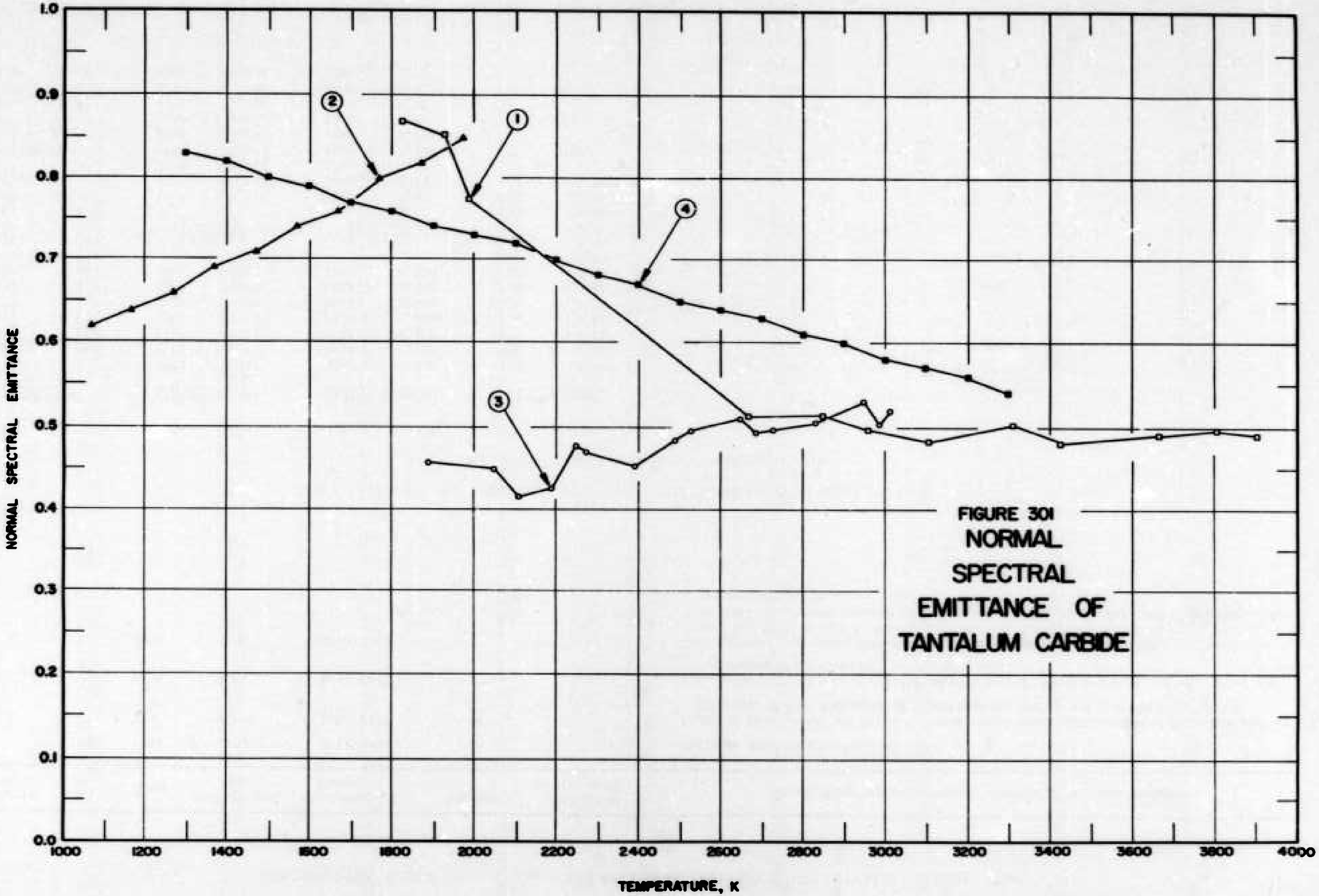


FIGURE 301
NORMAL
SPECTRAL
EMITTANCE OF
TANTALUM CARBIDE

SPECIFICATION TABLE NO. 301 NORMAL SPECTRAL EMITTANCE OF TANTALUM CARBIDE TaC

Curve No.	Ref. No.	Year	Wavelength, μm	Temperature Range,	Geometry θ'	Reported Error, %	Composition (weight percent), Specifications, and Remarks
1	113	1961	0.65	1824-3902	~0°		Polished with 400 grit diamond wheel.
2	13	1962	0.650	1073-1973	~0°		Layer of paste (~100 μm thick) on tantalum cylinder; paste prepared from fine powder (2-3 μm) of TaC suspended in nitrocellulose binder and dried at 313 to 333 K.
3	104	1964	0.65	1884-3012	~0°		$TaC_{0.93}$; impurities <1; final polished with No. 600 abrasive cloth and a diamond lap; measured in vacuum (10^{-5} to 10^{-6} mm Hg).
4	290	1968	0.65	1300-3300	~0°		Cold pressed into tubes; sintered at 2900 K; measured in vacuum (7×10^{-5} to 4×10^{-4} mm Hg) from 1300 K to 2400 K then back to 1300 K, measured in argon from 2100 K to 3000 K and back, measured in argon from 2900 K to 3300-3500 K; porosity before measurement, 26.8%.

DATA TABLE NO. 301 NORMAL SPECTRAL EMITTANCE OF TANTALUM CARBIDE TaC

[Temperature, T, K; Emittance, ϵ; Wavelength, λ, μm]

T	ϵ	T	ϵ	T	ϵ	T	ϵ
CURVE 1		CURVE 2 (cont.)		CURVE 3 (cont.)		CURVE 4 (cont.)	
λ = 0.65		1373	0.69	2648	0.510	2200	0.70
1824	0.869	1473	0.71	2682	0.491	2300	0.68
1930	0.851	1573	0.74	2733	0.497	2400	0.67
1986	0.774	1673	0.76	2836	0.506	2500	0.65
2677	0.513	1773	0.80	2944	0.530	2600	0.64
2852	0.514	1873	0.82	2984	0.501	2700	0.63
2960	0.499	1973	0.85	3013	0.520	2800	0.61
3101	0.481					2900	0.60
3316	0.501	CURVE 3		CURVE 4		3000	0.58
3427	0.480	λ = 0.65		λ = 0.65		3100	0.57
3667	0.490					3200	0.56
3805	0.498	1884	0.459	1300	0.83	3300	0.54
3902	0.490	2049	0.450	1400	0.82		
		2109	0.418	1500	0.80		
CURVE 2		2185	0.427	1600	0.79		
λ = 0.650		2249	0.479	1700	0.77		
		2272	0.470	1800	0.76		
1073	0.62	2397	0.452	1900	0.74		
1173	0.64	2486	0.484	2000	0.73		
1273	0.66	2524	0.499	2100	0.72		

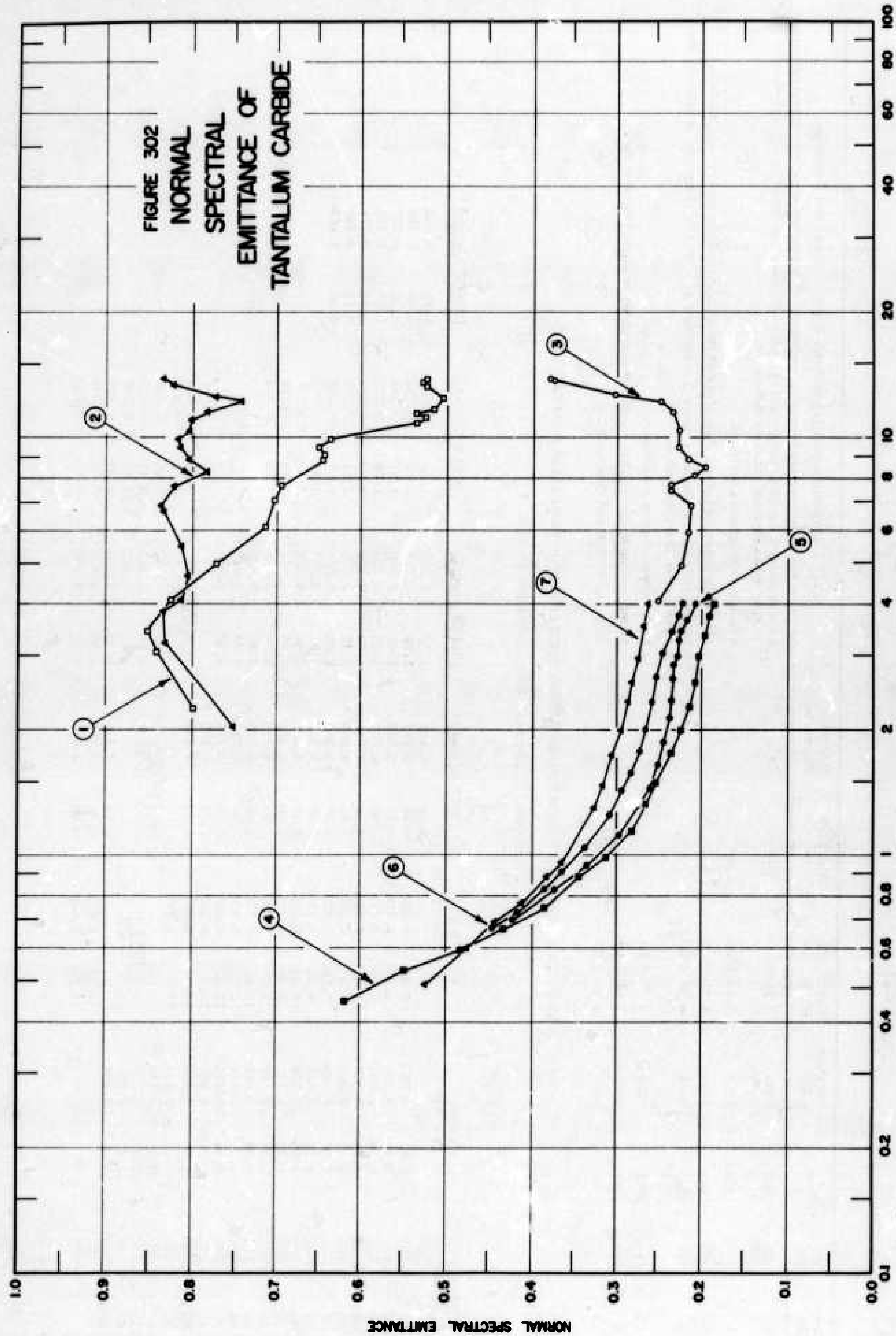


FIGURE 302 NORMAL SPECTRAL EMITTANCE OF TANTALUM CARBIDE

SPECIFICATION TABLE NO. 302 NORMAL SPECTRAL EMITTANCE OF TANTALUM CARBIDE TaC

Curve No.	Ref. No.	Year	Temperature K	Wavelength Range, μm	Geometry θ'	Reported Error, %	Composition (weight percent), Specifications, and Remarks
1	22	1960	1350	2.25-13.9	~0°		Smooth and flat surface, though not optically polished; measured in argon-hydrogen atm; data extracted from smooth curve.
2	22	1960	2250	2.04-13.9	~0°		Above specimen and conditions.
3	22	1960	3234	4.01-13.9	~0°		Above specimen and conditions; trace of tantalum pentoxide observed on surface.
4	38	1963	1830	0.46-4.00	~0°		Prepared from micronized powder; hot pressed at > 2273 K; measured in vacuum; data extracted from smooth curve.
5	114	1961	2250	0.70-4.00	~0°		Above specimen and conditions.
6	114	1961	2670	0.66-4.00	~0°		Above specimen and conditions except measured in argon (760 mm Hg).
7	114	1961	2880	0.49-4.00	~0°		Above specimen and conditions.

DATA TABLE NO. 302 NORMAL SPECTRAL EMITTANCE OF TANTALUM CARBIDE TaC

[Wavelength, λ, μm; Emittance, ϵ; Temperature, T, K]

CURVE 1, T = 1350

λ	ϵ
2.25	0.800
3.07	0.841
3.43	0.851
4.08	0.828
5.00	0.774
6.07	0.716
7.01	0.701
7.65	0.696
8.86	0.647
9.12	0.645
9.52	0.650
9.94	0.638
10.9	0.534
11.1	0.525
11.3	0.535
11.8	0.516
12.4	0.505
13.1	0.522
13.6	0.528
13.9	0.523

CURVE 2, T = 2250

λ	ϵ
2.04	0.753
3.22	0.831
3.38	0.834
4.05	0.816
4.67	0.808
5.57	0.815
6.63	0.837
6.93	0.839
7.62	0.821
8.37	0.786
8.86	0.805
9.44	0.816
9.94	0.819
10.3	0.805
11.0	0.803
11.5	0.784
12.1	0.745
12.6	0.775
13.4	0.825
13.9	0.836

CURVE 3, T = 3234

λ	ϵ
4.01	0.250
4.99	0.224
5.99	0.217
6.82	0.215
7.47	0.237
7.70	0.237
8.13	0.210
8.45	0.196
8.99	0.217
9.50	0.228
10.3	0.228
11.5	0.232
12.1	0.249
12.7	0.302
13.7	0.377
13.9	0.380

CURVE 4, T = 1830

λ	ϵ
0.46	0.619
0.53	0.549

CURVE 4 (cont.)

λ	ϵ
0.59	0.483
0.66	0.431
0.75	0.385
0.86	0.345
0.99	0.311
1.15	0.282
1.32	0.264
1.50	0.252
1.76	0.236
2.00	0.226
2.29	0.216
2.60	0.209
3.00	0.204
3.38	0.196
3.73	0.190
4.00	0.185

CURVE 5, T = 2250

λ	ϵ
0.70	0.422
0.83	0.372
0.95	0.335

CURVE 5 (cont.)

λ	ϵ
1.12	0.299
1.32	0.271
1.45	0.260
1.65	0.250
1.89	0.242
2.13	0.237
2.36	0.234
2.64	0.232
2.84	0.231
3.00	0.229
3.21	0.227
3.43	0.223
3.68	0.217
4.00	0.209

CURVE 6, T = 2670

λ	ϵ
0.66	0.448
0.73	0.417
0.83	0.385
0.91	0.364
1.05	0.339

CURVE 6 (cont.)

λ	ϵ
1.25	0.309
1.42	0.292
1.57	0.281
1.78	0.272
2.00	0.266
2.31	0.259
2.67	0.251
3.04	0.245
3.42	0.236
3.74	0.228
4.00	0.222

CURVE 7, T = 2880

λ	ϵ
0.49	0.523
0.60	0.476
0.69	0.442
0.77	0.412
0.88	0.382
0.96	0.366
1.30	0.329
1.49	0.318

CURVE 7 (cont.)

λ	ϵ
1.73	0.306
2.00	0.296
2.32	0.287
2.60	0.281
2.99	0.274
3.51	0.268
4.00	0.262

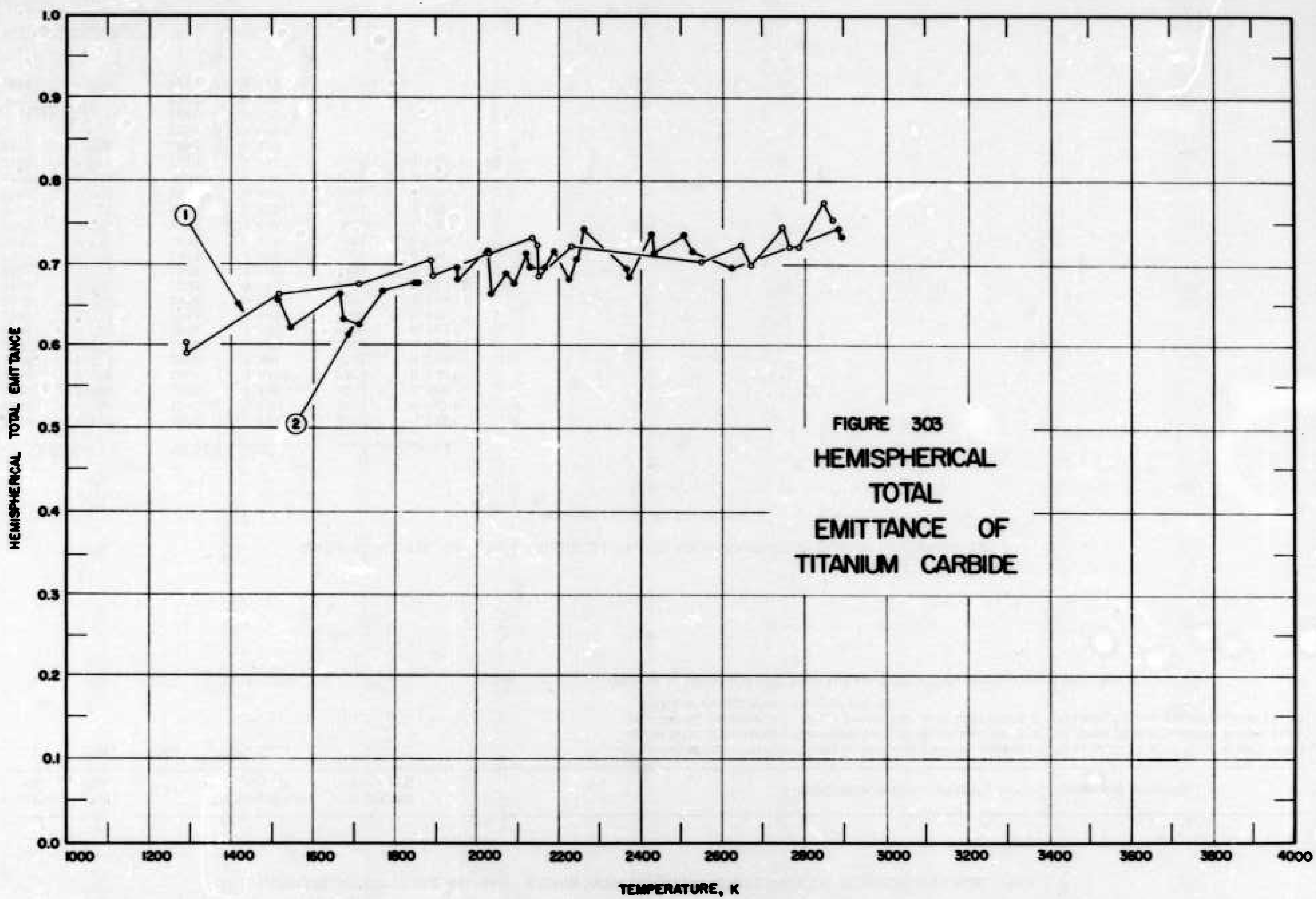


FIGURE 303
HEMISPHERICAL TOTAL EMITTANCE OF TITANIUM CARBIDE

SPECIFICATION TABLE NO. 303 HEMISPHERICAL TOTAL EMITTANCE OF TITANIUM CARBIDE TiC

Curve No.	Ref. No.	Year	Temperature Range, K	Reported Error, %	Composition (weight percent), Specifications and Remarks
1	290	1968	1290-2871		Cold pressed into rods or tubes; sintered at 2600 K; measured in vacuum (7×10^{-5} - 4×10^{-4} mm Hg) from 1300 K to 2400 K then back to 1300 K; measured in argon from 2100 K to 3000 K then back to 2100 K, measured in argon from 2900 K to 3300-3500 K; porosity before measurement 16.8%; [Authors' designation: Sample No. 1].
2	290	1968	1514-2894		Similar to the above specimen and conditions; [Authors' designation: Sample No. 2].

DATA TABLE NO. 303 HEMISPHERICAL TOTAL EMITTANCE OF TITANIUM CARBIDE TiC

[Temperature, T, K; Emittance, ε]

T	ε	T	ε	T	ε
CURVE 1		CURVE 2 (cont.)		CURVE 2 (cont.)	
1290	0.601	1515	0.644*	2197	0.712*
1295	0.590	1541	0.626	2219	0.687*
1518	0.664	1663	0.666	2228	0.681
1710	0.678	1666	0.648*	2230	0.708*
1884	0.704	1674	0.631	2241	0.708
1897	0.688	1714	0.627	2260	0.743
2036	0.716	1771	0.669	2271	0.721*
2139	0.733	1773	0.669*	2361	0.697
2149	0.724	1846	0.679	2371	0.685
2149	0.688	1859	0.679	2422	0.738
2238	0.723	1949	0.698	2434	0.714
2550	0.704	1955	0.682	2506	0.737
2642	0.726	2031	0.718	2528	0.719
2667	0.700	2038	0.665	2615	0.697*
2744	0.747	2048	0.683*	2621	0.697
2766	0.722	2076	0.690	2643	0.724*
2783	0.722	2093	0.678	2889	0.744
2850	0.774	2120	0.714	2894	0.735
2871	0.755	2130	0.699		
		2136	0.699*		
CURVE 2		2141	0.699*		
		2162	0.699		
1514	0.657	2190	0.718		

*Not shown on plot

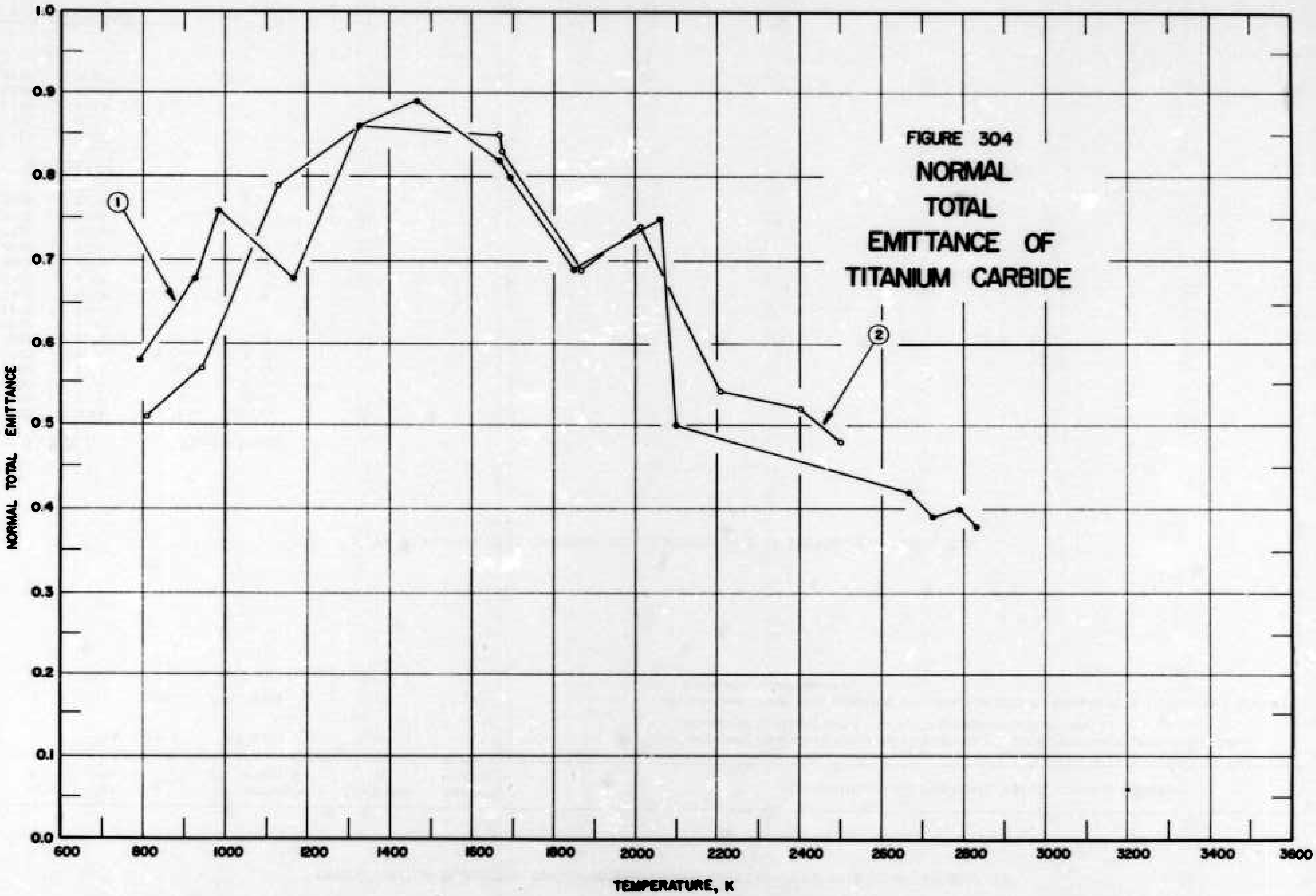


FIGURE 304 NORMAL TOTAL EMITTANCE OF TITANIUM CARBIDE

SPECIFICATION TABLE NO. 304 NORMAL TOTAL EMITTANCE OF TITANIUM CARBIDE TiC

Curve No.	Ref. No.	Year	Temperature Range, K	Geometry θ'	Reported Error, %	Composition (weight percent), Specifications and Remarks
1	17	1962	933-2839	~0°	10	Hot pressed; dark spots appeared on surface at 1850 K, surface blistered at 2100 K; measured in argon; run 1 [Author's designation: Specimen 1]
2	17	1962	814-2500	~0°	10	Hot pressed; black spot appeared on surfact at 1672 K; measured in argon; run 1 [Author's designation: Specimen 2].

DATA TABLE NO. 304 NORMAL TOTAL EMITTANCE OF TITANIUM CARBIDE TiC

[Temperature, T, K; Emittance, ε]

T	ε	T	ε
CURVE 1		**CURVE 2 (cont.)**	
933	0.68	1678	0.83
799	0.58	1867	0.69
986	0.76	2017	0.74
1161	0.68	2211	0.54
1333	0.86	2400	0.52
1461	0.89	2500	0.48
1689	0.80		
1672	0.82		
1850	0.69		
2100	0.50		
2060	0.75		
2649	0.42		
2722	0.39		
2789	0.40		
2839	0.38		
CURVE 2			
814	0.51		
944	0.57		
1139	0.79		
1333	0.86*		
1672	0.85		

*Not shown on plot

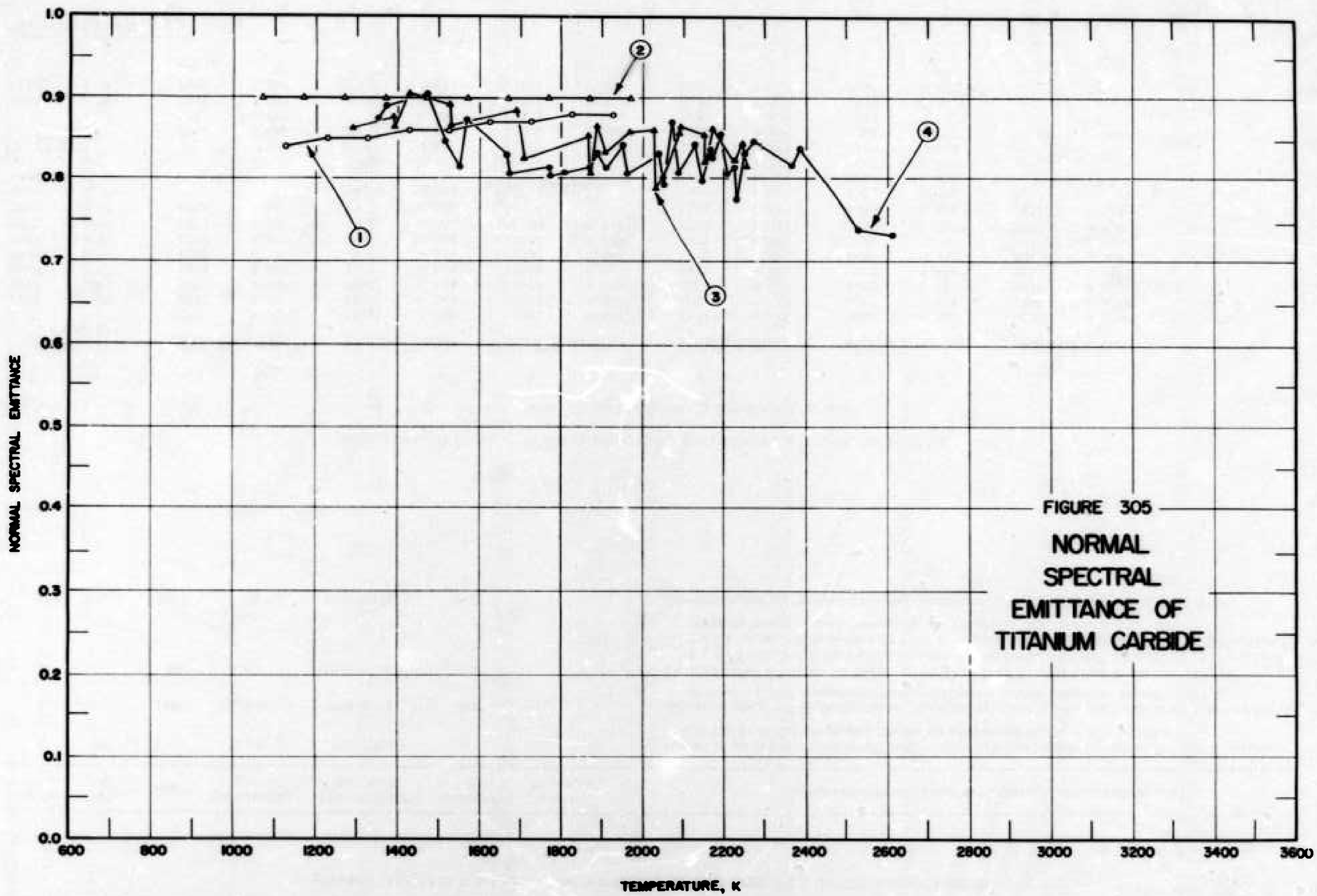


FIGURE 305
NORMAL SPECTRAL EMITTANCE OF TITANIUM CARBIDE

SPECIFICATION TABLE NO. 305 NORMAL SPECTRAL EMITTANCE OF TITANIUM CARBIDE TiC

Curve No.	Ref. No.	Year	Wavelength, μm	Temperature Range, K	Geometry θ'	Reported Error, %	Composition (weight percent), Specifications and Remarks
1	16	1960	0.650	1123-1923	~0°		Layer of paste (~100 μm thick) on tantalum cylinder; paste prepared from fine powder (2-3 μm) of TiC suspended in nitrate binder and dried at 313 to 333 K.
2	13	1962	0.650	1073-1973	~0°		Layer of paste (~100 μm thick) on tantalum cylinder; paste prepared from fine powder (2-3 μm) of TiC suspended in nitrocellulose binder and dried at 313 to 333 K.
3	290	1968	0.65	1294-2246	~0°		Cold pressed into rods or tubes; sintered at 2600 K; measured in vacuum (7×10^{-5} - 4×10^{-4} mm Hg) from 1300 K to 2400 K then back to 1300 K, measured in argon from 2100 K to 3000 K then back to 2100 K, measured in argon from 2900 K to 3300-3500 K; porosity before measurement 16.8%; [Authors' designation: Specimen No. 1].
4	290	1968	0.65	1357-2618	~0°		Similar to the above specimen and conditions; [Authors' designation: Sample No. 2].

DATA TABLE NO. 305 NORMAL SPECTRAL EMITTANCE OF TITANIUM CARBIDE TiC

[Temperature, T, K; Emittance, ε; Wavelength, λ, μm]

T	ε	T	ε	T	ε	T	ε	T	ε	T	ε	T	ε
CURVE 1		CURVE 2 (cont.)		CURVE 3 (cont.)		CURVE 3 (cont.)		CURVE 4 (cont.)		CURVE 4 (cont.)		CURVE 4 (cont.)	
λ = 0.650													
		1273	0.90	1522	0.892	2153	0.822	1544	0.817	2052	0.792	2253	0.839*
1123	0.84	1373	0.90	1526	0.869	2156	0.859*	1563	0.871	2077	0.870	2266	0.847*
1223	0.85	1473	0.90	1693	0.884	2163	0.846*	1666	0.830	2081	0.808	2278	0.847
1323	0.85	1573	0.90	1707	0.829	2166	0.861	1679	0.808	2125	0.814*	2365	0.817
1423	0.86	1673	0.90	1864	0.853	2236	0.824	1770	0.814	2130	0.841	2383	0.837
1523	0.86	1773	0.90	1867	0.808	2243	0.843	1772	0.803	2142	0.797	2513	0.773*
1623	0.87	1873	0.90	1889	0.866	2246	0.816	1774	0.814*	2166	0.819*	2531	0.740
1723	0.87	1973	0.90	1901	0.834			1854	0.801	2169	0.837	2618	0.735
1823	0.88			1963	0.858	CURVE 4		1877	0.814	2173	0.829		
1923	0.88	CURVE 3		2035	0.860	λ = 0.65		1891	0.831	2197	0.855		
		λ = 0.65		2038	0.787			1905	0.813	2205	0.808		
CURVE 2				2046	0.802	1357	0.875	1954	0.842	2228	0.814		
λ = 0.650		1294	0.863	2090	0.857	1375	0.890	1960	0.808	2231	0.775		
		1391	0.877	2099	0.864	1475	0.902	1983	0.824*	2233	0.785*		
1073	0.90	1391	0.866	2099	0.846*	1519	0.846	2040	0.831	2238	0.811*		
1173	0.90	1436	0.907	2148	0.855	1521	0.856*	2043	0.853*	2250	0.831		

*Not shown on plot

SPECIFICATION TABLE NO. 306 ANGULAR SPECTRAL EMITTANCE OF TITANIUM CARBIDE TiC

Curve No.	Ref. No.	Year	Wavelength μm	Temperature Range, K	Geometry θ'	Reported Error, %	Composition (weight percent), Specifications, and Remarks
1*	116	1960	0.6	1125-2425	45°		Slice cut from single crystal parallel to cleavage plane; highly polished; measured in argon (760 mm Hg).

DATA TABLE NO. 306 ANGULAR SPECTRAL EMITTANCE OF TITANIUM CARBIDE TiC

[Temperature, T, K; Emittance, ε; Wavelength, λ, μm]

T	ε
CURVE 1*	
$\lambda = 0.6$	
1125	0.40
1425	0.37
1750	0.35
2075	0.34
2425	0.32

* No plot given

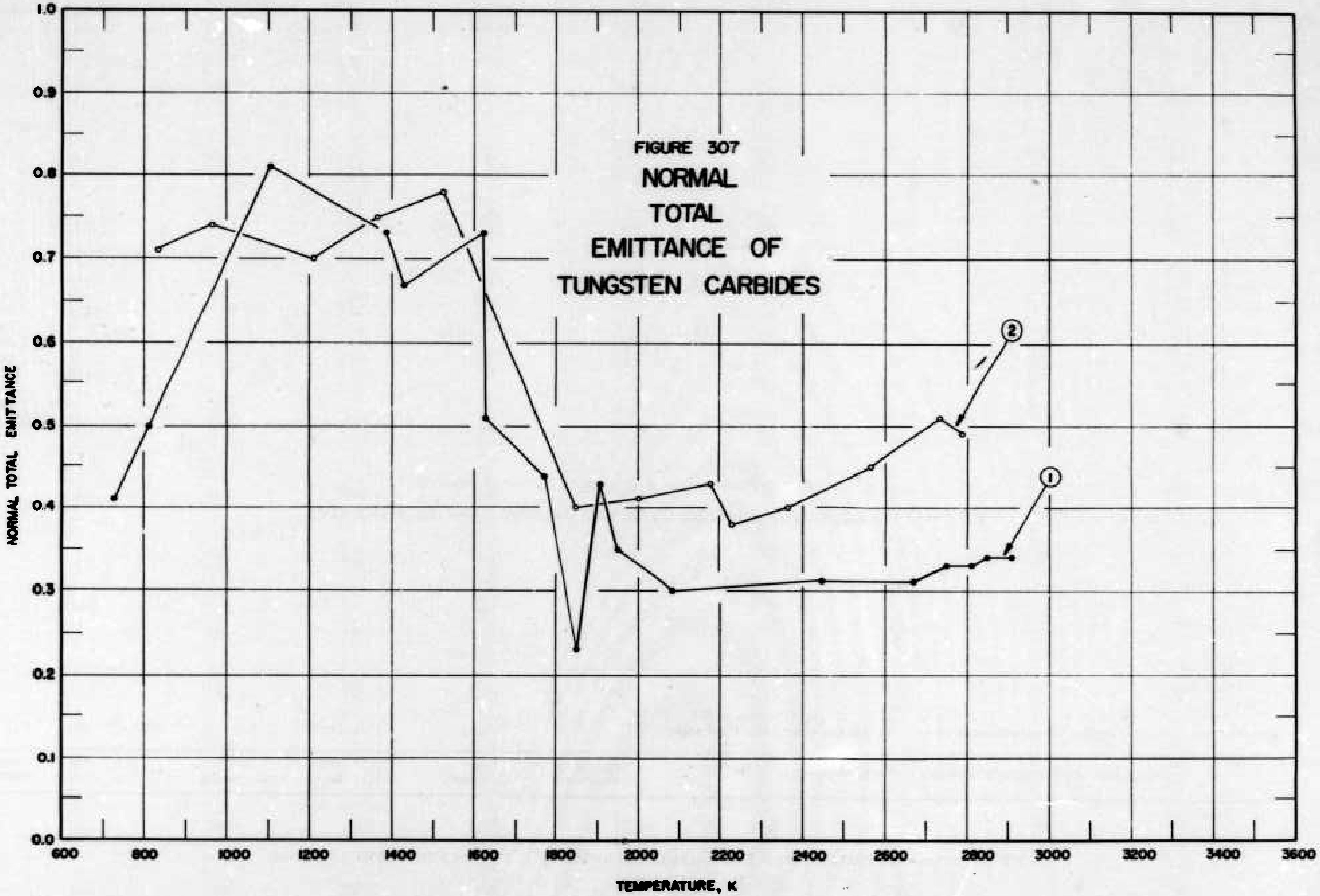


FIGURE 307
NORMAL
TOTAL
EMITTANCE OF
TUNGSTEN CARBIDES
1.0
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0.0
NORMAL TOTAL EMITTANCE
600
800
1000
1200
1400
1600
1800
2000
2200
2400
2600
2800
3000
3200
3400
3600
TEMPERATURE, K
1
2

SPECIFICATION TABLE NO. 307 NORMAL TOTAL EMITTANCE OF TUNGSTEN CARBIDES

Curve No.	Ref. No.	Year	Temperature Range, K	Geometry θ'	Reported Error, %	Composition (weight percent), Specifications and Remarks
1	17	1962	792-2911	~0°	10	WC; hot pressed; measured in argon; run 1; [Author's designation: Specimen 1].
2	17	1962	839-2794	~0°	10	WC; hot pressed; measured in argon; run 1; [Author's designation: Specimen 2].

DATA TABLE NO. 307 NORMAL TOTAL EMITTANCE OF TUNGSTEN CARBIDES

[Temperature, T, K; Emittance, ∈]

T	∈	T	∈
CURVE 1		CURVE 2 (cont.)	
792	0.41	1361	0.75
817	0.50	1217	0.70
1105	0.81	1522	0.78
1433	0.67	2178	0.43
1628	0.51	2000	0.41
1778	0.44	1844	0.40
1389	0.76	2233	0.38
1622	0.73	2361	0.40
1905	0.43	2567	0.45
2083	0.30	2739	0.51
1855	0.23	2794	0.49
2444	0.31		
2670	0.31		
2744	0.33		
2811	0.33		
1750	0.35		
2911	0.34		
2844	0.34		
CURVE 2			
839	0.71		
961	0.74		

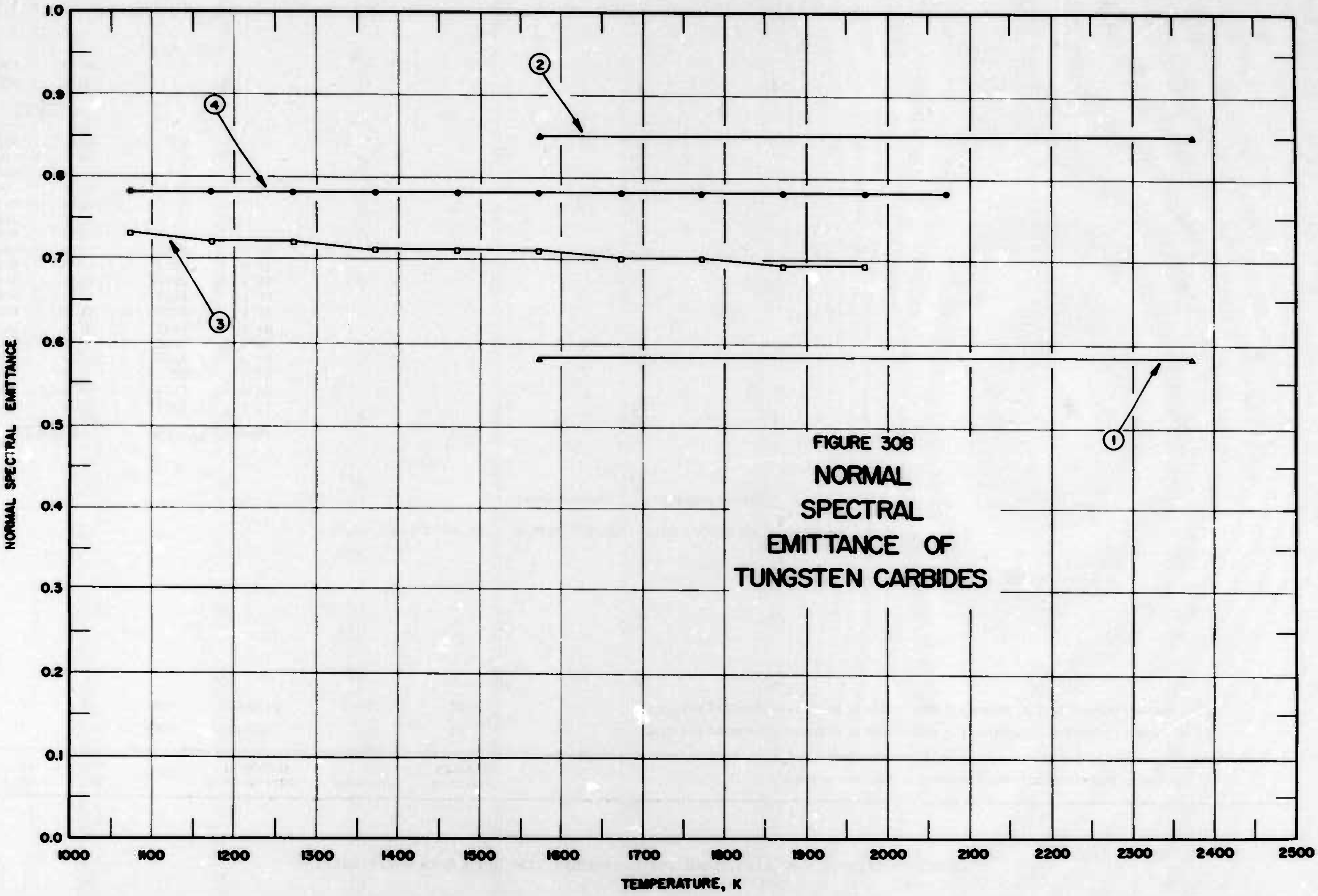


FIGURE 308
NORMAL
SPECTRAL
EMITTANCE OF
TUNGSTEN CARBIDES

SPECIFICATION TABLE NO. 308 NORMAL SPECTRAL EMITTANCE OF TUNGSTEN CARBIDES

Curve No.	Ref. No.	Year	Wavelength, μm	Temperature Range, K	Geometry θ'	Reported Error, %	Composition (weight percent), Specifications and Remarks
1	117	1961	0.65	1573-2373	~0°		WC; shining (ground) surface.
2	117	1961	0.65	1573-2373	~0°		WC; dull surface.
3	13	1962	0.650	1073-1973	~0°		WC; layer of paste (~100 μm thick) on tantalum cylinder; paste prepared from fine powder (2-3 μm) of WC suspended in nitrocellulose binder and dried at 313 to 333 K.
4	13	1962	0.650	1073-2073	~0°		W_2C; layer of paste (~100 μm thick) on tantalum cylinder; paste prepared from fine powder (2-3 μm) of W_2C suspended in nitrocellulose binder and dried at 313 to 333 K.

DATA TABLE NO. 308 NORMAL SPECTRAL EMITTANCE OF TUNGSTEN CARBIDES

[Temperature, T, K; Emittance, ϵ; Wavelength, λ, μm]

T	ϵ	T	ϵ
CURVE 1		**CURVE 3 (cont.)**	
λ = 0.65		1873	0.69
1573	0.58	1973	0.69
2373	0.58		
CURVE 2		**CURVE 4**	
λ = 0.65		λ = 0.650	
1573	0.85	1073	0.78
2373	0.85	1173	0.78
		1273	0.78
CURVE 3		1373	0.78
λ = 0.650		1473	0.78
		1573	0.78
		1673	0.78
1073	0.73	1773	0.78
1173	0.72	1873	0.78
1273	0.72	1973	0.78
1373	0.71	2073	0.78
1473	0.71		
1573	0.71		
1673	0.70		
1773	0.70		

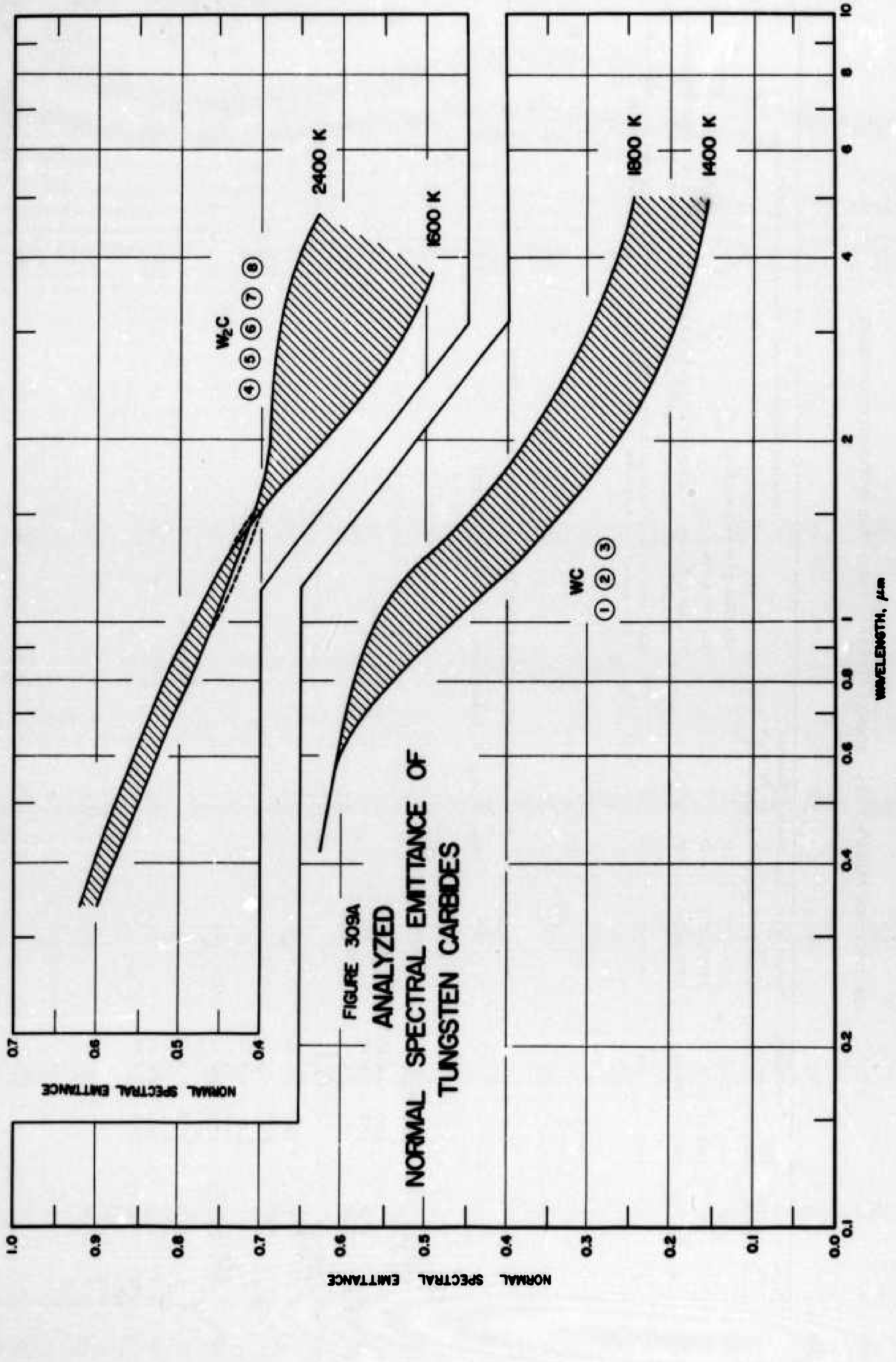


FIGURE 309A
ANALYZED
NORMAL SPECTRAL EMITTANCE OF
TUNGSTEN CARBIDES

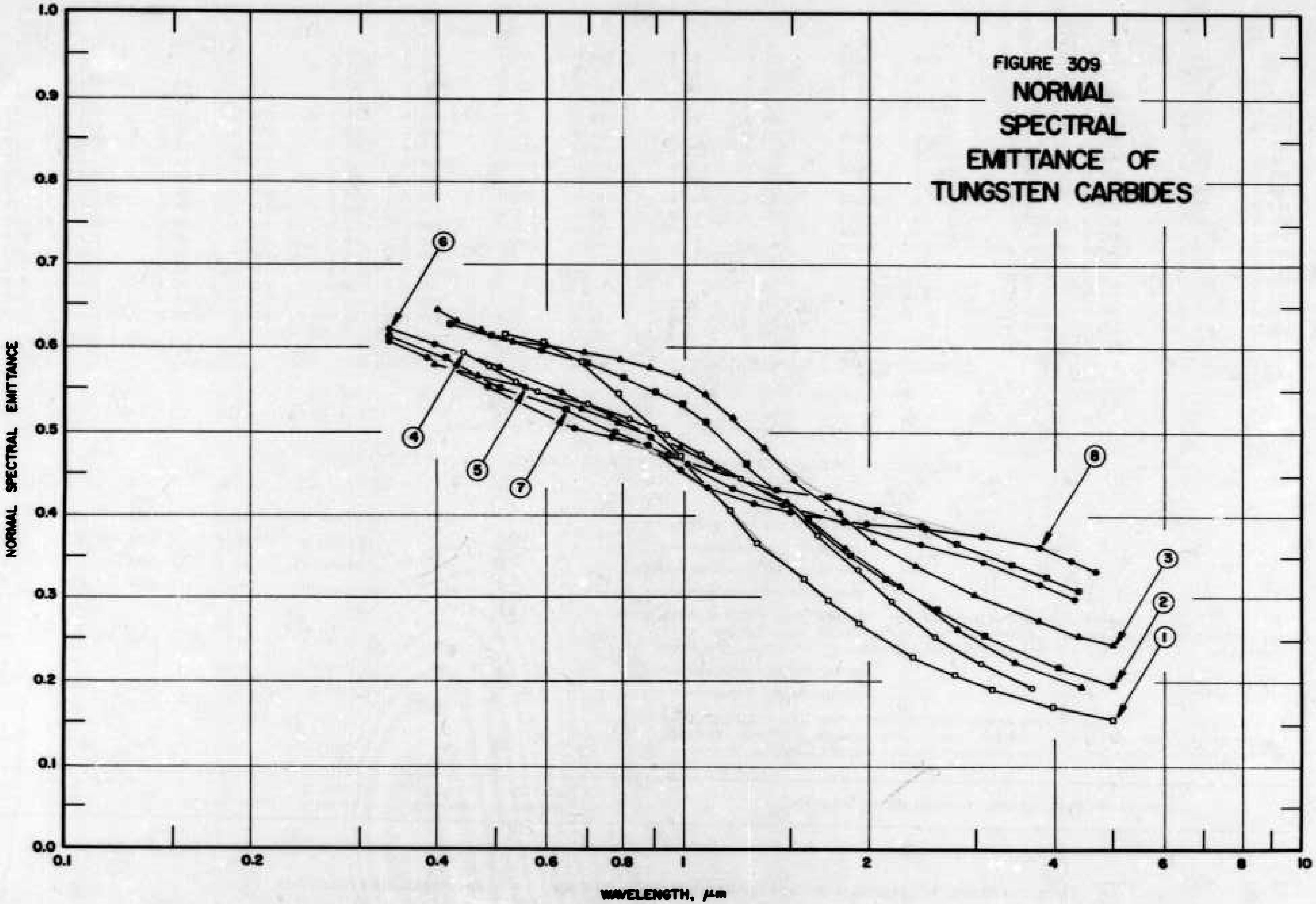


FIGURE 309
NORMAL
SPECTRAL
EMITTANCE OF
TUNGSTEN CARBIDES
NORMAL SPECTRAL EMITTANCE
WAVELENGTH, μm
0.0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
1.0
0.1
0.2
0.4
0.6
0.8
1
2
4
6
8
10
1
2
3
4
5
6
7
8

SPECIFICATION TABLE NO. 309 NORMAL SPECTRAL EMITTANCE OF TUNGSTEN CARBIDES

Curve No.	Ref. No.	Year	Temperature K	Wavelength Range, μm	Geometry θ'	Reported Error, %	Composition (weight percent), Specifications and Remarks
1	118	1963	1400	0.514-4.98	~0°		WC from A. D. Mackay; polished with 240, 400, and 600 grit carbide paper, silk cloth, and felt cloth; washed in acetone, then alcohol, and dried with dry nitrogen; measured in argon (77.6 mm Hg); data extracted from smooth curve.
2	118	1963	1600	0.42-4.98	~0°		Above specimen and conditions.
3	118	1963	1800	0.40-4.98	~0°		Above specimen and conditions.
4	118	1963	1600	0.440-3.66	~0°		α-phase W_2C from A. D. Mackay; polished with 240, 400, and 600 grit carbide paper, silk cloth, and felt cloth; washed in acetone, then alcohol, and dried with dry nitrogen; measured in argon (77.6 mm Hg); data extracted from smooth curve.
5	118	1963	1800	0.393-4.40	~0°		Above specimen and conditions.
6	118	1963	2000	0.334-4.30	~0°		Above specimen and conditions.
7	118	1963	2200	0.333-4.35	~0°		Above specimen and conditions.
8	118	1963	2400	0.334-4.61	~0°		Above specimen and conditions.

DATA TABLE NO. 309 NORMAL SPECTRAL EMITTANCE OF TUNGSTEN CARBIDES

[Wavelength, λ, μm; Emittance, ϵ; Temperature, T, K]

CURVE 1
T = 1400

λ	ϵ
0.514	0.619
0.593	0.607
0.689	0.582
0.784	0.547
0.894	0.506
0.984	0.472
1.18	0.408
1.33	0.369
1.57	0.322
1.72	0.298
1.93	0.270
2.36	0.230
2.73	0.206
3.17	0.190
3.99	0.170
4.98	0.156

CURVE 2
T = 1600

λ	ϵ
0.42	0.629
0.49	0.615
0.59	0.598
0.70	0.581
0.80	0.566
0.90	0.549
0.99	0.531
1.08	0.512
1.26	0.463
1.59	0.396
1.86	0.352
2.13	0.321
2.58	0.284
3.09	0.256
4.05	0.219
4.98	0.197

CURVE 3
T = 1800

λ	ϵ
0.40	0.646
0.43	0.632
0.47	0.621
0.53	0.609
0.60	0.601
0.69	0.594
0.79	0.588
0.88	0.578
0.98	0.566
1.08	0.546
1.20	0.519
1.35	0.482
1.52	0.446
1.79	0.401
2.04	0.370
2.37	0.340
2.97	0.301
3.76	0.271

CURVE 3 (cont.)

λ	ϵ
4.37	0.255
4.98	0.247

CURVE 4
T = 1600

λ	ϵ
0.440	0.593
0.485	0.579
0.537	0.560
0.580	0.549
0.700	0.533
0.813	0.517
0.931	0.499
1.07	0.475
1.24	0.448
1.46	0.413
1.65	0.378
1.91	0.336
2.17	0.294

CURVE 4 (cont.)

λ	ϵ
2.55	0.252
3.01	0.221
3.66	0.191

CURVE 5
T = 1800

λ	ϵ
0.393	0.580
0.464	0.567
0.552	0.553
0.681	0.529
0.782	0.511
0.982	0.481
1.13	0.460
1.47	0.416
1.83	0.362
2.24	0.313
2.79	0.262

CURVE 5 (cont.)

λ	ϵ
3.44	0.225
4.40	0.193

CURVE 6
T = 2000

λ	ϵ
0.334	0.621
0.397	0.602
0.502	0.578
0.635	0.548
0.760	0.520
0.883	0.494
1.02	0.462
1.20	0.433
1.45	0.411
1.83	0.392
2.43	0.368
3.07	0.343
3.79	0.316
4.30	0.299

CURVE 7
T = 2200

λ	ϵ
0.333	0.615
0.411	0.588
0.501	0.561
0.641	0.527
0.776	0.500
0.940	0.473
1.14	0.448
1.25	0.437
1.41	0.432
1.73	0.423
2.06	0.409
2.43	0.388
2.77	0.369
3.40	0.340
3.86	0.325
4.35	0.308

CURVE 8
T = 2400

λ	ϵ
0.334	0.608
0.387	0.587
0.482	0.554
0.668	0.503
0.764	0.496
0.871	0.483
0.984	0.457
1.09	0.436
1.30	0.414
1.49	0.403
1.98	0.390
2.47	0.385
3.05	0.379
3.79	0.362
4.23	0.348
4.61	0.331

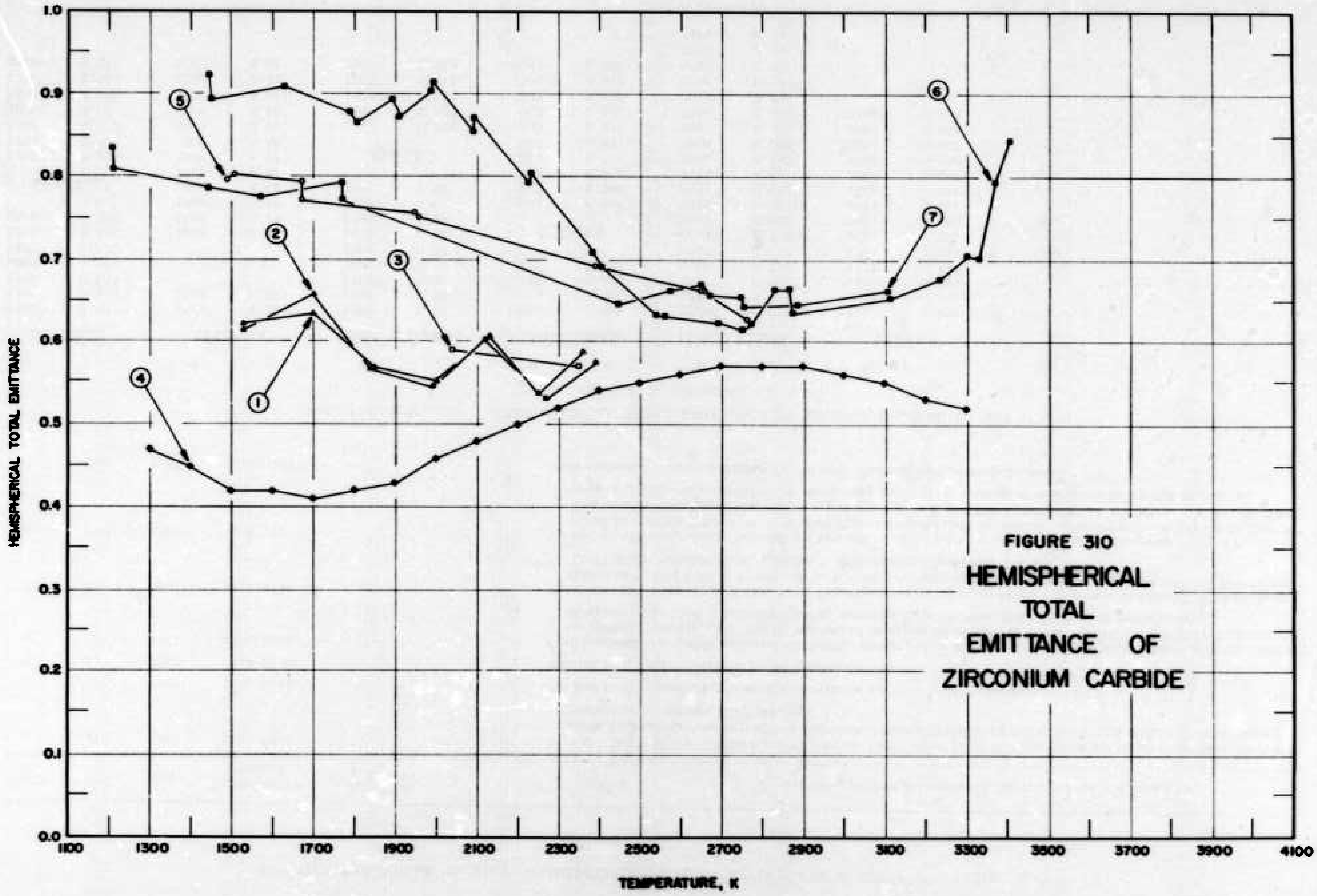


FIGURE 310
HEMISPHERICAL TOTAL EMITTANCE OF ZIRCONIUM CARBIDE

SPECIFICATION TABLE NO. 310 HEMISPHERICAL TOTAL EMITTANCE OF ZIRCONIUM CARBIDE ZrC

Curve No.	Ref. No.	Year	Temperature Range, K	Reported Error, %	Composition (weight percent), Specifications and Remarks
1	115	1962	1530-2360		11.8 C (theoretically 11.635 C), <20 ppm O; hot pressed at 2573 K and 6000 psi in graphite dies from 325 mesh high purity powder; 90% of theoretical density; polished through 600 grit silicon carbide paper; measured in vacuum (10^{-6} mm Hg).
2	115	1962	1530-2390		Similar to the above specimen and conditions except 11.7 C content.
3	115	1962	2040-2350		Similar to the above specimen and conditions.
4	290	1968	1300-3300		Cold pressed into rods; sintered at 2800 K; measured in vacuum (7×10^{-6} - 4×10^{-4} mm Hg) from 1300 K to 2400 K, then back to 1300 K, measured in argon from 2100 K to 3000 K and back to 2100 K; measured in argon from 2900 K to 3300-3500 K; porosity 12.6% before and 13.3% after measurement.
5	363	1967	1497-2760		Powders cold compacted, followed by two-stage sintering in an argon atm at a max temp of 2773 K; maintained one hr at 2500 K in vacuum before experiment; measured in vacuum; porosity 12.6% before and 13.3% after measurement; [Authors' designation: Specimen No. 1].
6	363	1967	1442-3401		Powders cold compacted, followed by two-stage sintering in an argon atm at a max temp of 2773 K; measured in vacuum from 1300 K to 2450 K then back to 1200 K, measured in argon from 2300 K to 2850 K then back to 2300 K, measured in argon from 2900 K to 3400 K; porosity 12.6% before and 13.3% after measurement; data reported for increasing temp only; [Authors' designation: Specimen No. 2].
7	363	1967	1211-3101		Above specimen and conditions except data obtained on lowering the temp.

DATA TABLE NO. 310 HEMISPHERICAL TOTAL EMITTANCE OF ZIRCONIUM CARBIDE ZrC

[Temperature, T, K; Emittance, ϵ]

T	ϵ	T	ϵ	T	ϵ	T	ϵ	T	ϵ	T	ϵ
CURVE 1		CURVE 3		CURVE 4 (cont.)		CURVE 5 (cont.)		CURVE 6 (cont.)		CURVE 7	
1530	0.621	2040	0.590	2500	0.55	1958	0.751	2093	0.871	1211	0.838
1700	0.636	2350	0.570	2600	0.56	2395	0.692	2229	0.795	1215	0.810
1850	0.569			2700	0.57	2647	0.662	2237	0.806	1441	0.788
2000	0.551	CURVE 4		2800	0.57	2760	0.629	2382	0.710	1571	0.777
2130	0.608			2900	0.57			2412	0.692	1771	0.795
2250	0.536	1300	0.47	3000	0.56	CURVE 6		2540	0.633	1771	0.775
2360	0.588	1400	0.45	3100	0.55			2560	0.631	2441	0.649
		1500	0.42	3200	0.53	1442	0.924	2698	0.624	2571	0.661
CURVE 2		1600	0.42	3300	0.52	1447	0.893	2751	0.616	2653	0.670
		1700	0.41			1630	0.910	2775	0.621	2666	0.657
1530	0.615	1800	0.42	CURVE 5		1795	0.880	2833	0.663	2743	0.655
1700	0.659	1900	0.43			1805	0.867	2864	0.663	2754	0.643
1840	0.567	2000	0.46	1497	0.798	1899	0.895	2867	0.638	2882	0.647
1990	0.544	2100	0.48	1509	0.802	1912	0.873	3108	0.653	3101	0.661
2120	0.602	2200	0.50	1677	0.796	1985	0.905	3239	0.678		
2270	0.530	2300	0.52	1677	0.773	1994	0.917	3300	0.707		
2390	0.574	2400	0.54	1945	0.759	2091	0.857	3333	0.704		
								3373	0.795		
								3401	0.847		

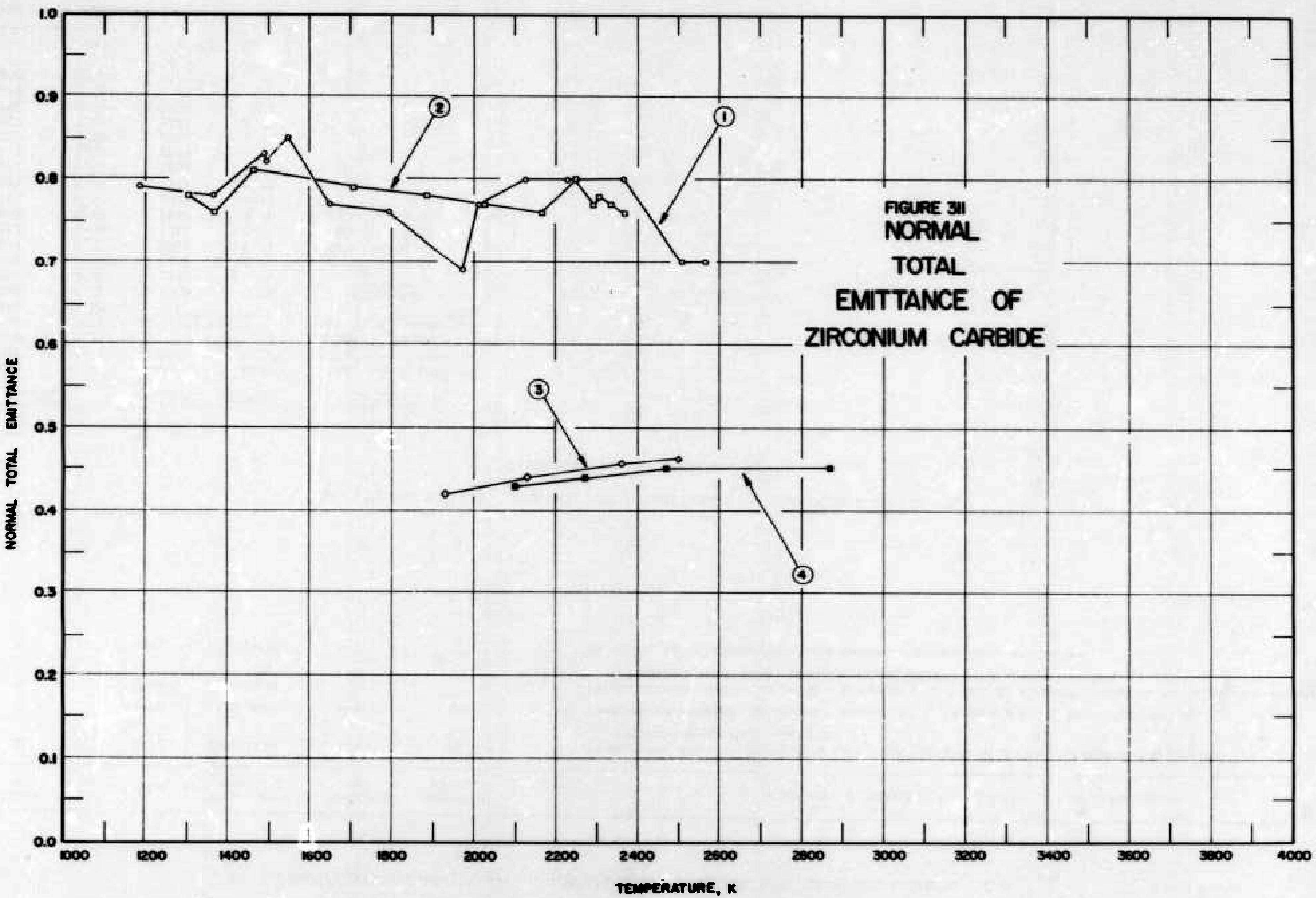


FIGURE 311
NORMAL
TOTAL
EMITTANCE OF
ZIRCONIUM CARBIDE
NORMAL TOTAL EMITTANCE
TEMPERATURE, K
1.0
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0.0
1000
1200
1400
1600
1800
2000
2200
2400
2600
2800
3000
3200
3400
3600
3800
4000
1
2
3
4

SPECIFICATION TABLE NO. 311 NORMAL TOTAL EMITTANCE OF ZIRCONIUM CARBIDE ZrC

Curve No.	Ref. No.	Year	Temperature Range, K	Geometry θ'	Reported Error, %	Composition (weight percent), Specifications and Remarks
1	17	1962	1189-2978	~0°	10	Pressed and sintered; black spots appeared on surface at 2517 K; measured in argon; run 1; [Author's designation: Specimen 1].
2	17	1962	1305-2367	~0°	10	Pressed and sintered; measured in argon; run 1; [Author's designation: Specimen 2].
3	38	1962	1930-2500	~0°		Prepared from micronized powder, hot pressed at >2273 K; sintered, polished, etched, then degassed by heating to ~973 K; measured in argon; integrated from spectral data.
4	37	1964	2100-2870	~0°		85.96 Zr, 14.1 C; integrated from spectral emittance (0.5 to 4.0 μm).

DATA TABLE NO. 311 NORMAL TOTAL EMITTANCE OF ZIRCONIUM CARBIDE ZrC

[Temperature, T, K; Emittance, ϵ]

T	ϵ	T	ϵ	T	ϵ
CURVE 1		CURVE 1 (cont.)		CURVE 3	
1189	0.79	2367	0.43*	1930	0.420
1366	0.78	2978	0.38*	2130	0.440
1489	0.83			2360	0.455
1494	0.82	CURVE 2		2500	0.460
1550	0.85				
1650	0.77	1305	0.78	CURVE 4	
1794	0.76	1372	0.76		
1972	0.69	1461	0.78	2100	0.43
2017	0.77	1555	0.81	2270	0.44
2122	0.80	1711	0.79	2470	0.45
2228	0.80	1883	0.78	2870	0.45
2361	0.80	2022	0.77		
2511	0.70	2167	0.76		
2561	0.70	2255	0.80		
2517	0.75*	2367	0.76		
2739	0.53*	2299	0.77		
2728	0.60*	2311	0.78		
2755	0.59*	2339	0.77		
2822	0.54*				
2867	0.48*				

*Not shown on plot

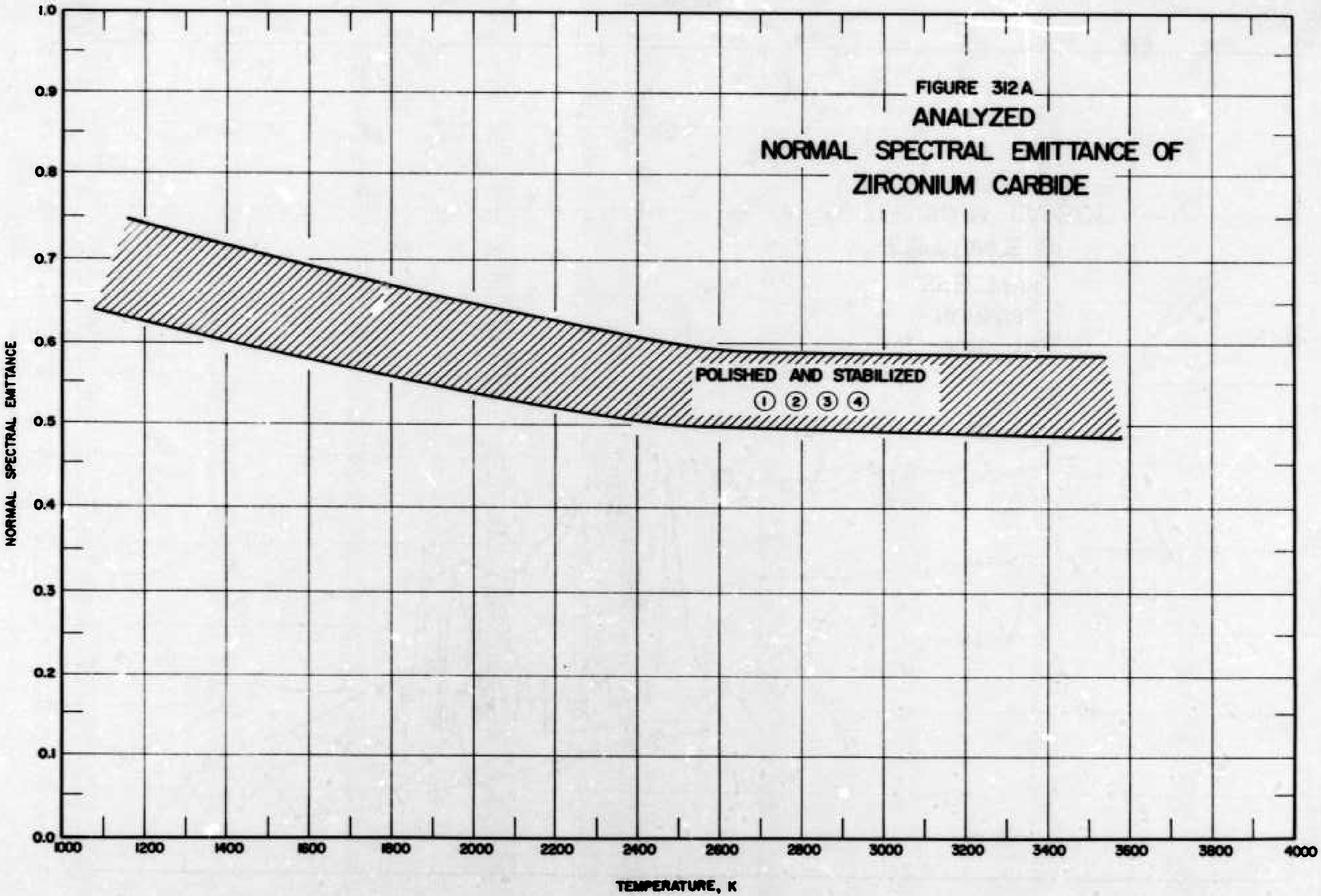


FIGURE 312A
ANALYZED
NORMAL SPECTRAL EMITTANCE OF
ZIRCONIUM CARBIDE
POLISHED AND STABILIZED
1 2 3 4
NORMAL SPECTRAL EMITTANCE
0.0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
1.0
1000
1200
1400
1600
1800
2000
2200
2400
2600
2800
3000
3200
3400
3600
3800
4000
TEMPERATURE, K

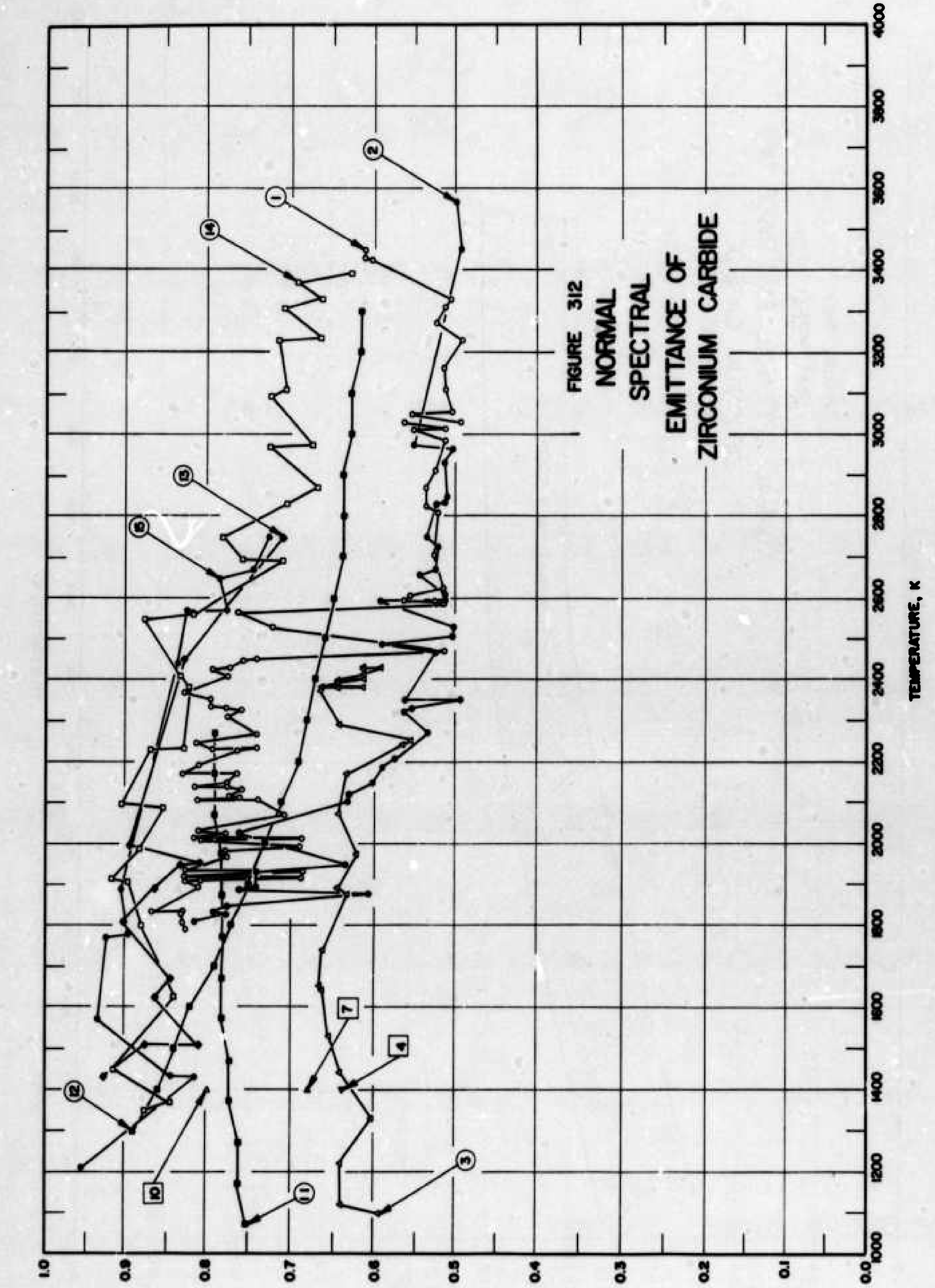


FIGURE 312 NORMAL SPECTRAL EMITTANCE OF ZIRCONIUM CARBIDE

SPECIFICATION TABLE NO. 312 NORMAL SPECTRAL EMITTANCE OF ZIRCONIUM CARBIDE ZrC

Curve No.	Ref. No.	Year	Wavelength, μm	Temperature Range, K	Geometry θ'	Reported Error, %	Composition (weight percent), Specifications and Remarks
1	113	1961	0.65	1795-3451	~0°		Polished with 400 grit diamond wheel; heating.
2	113	1961	0.65	3578-1812	~0°		Above specimen and conditions; cooling.
3	115	1962	0.65	1100-2430	~0°		11.8 C, <20 ppm O; hot pressed at 2573 K and 6000 psi in graphite dies from 325 mesh high purity powder; 90% of theoretical density; polished through 600 grit silicon carbide paper; measured in vacuum (10^{-6} mm Hg); heated to 1590 K for 1 hr; sample flashed to at least 1590 K immediately prior to measurement for temps below 1480 K.
4	119	1963	0.65	1400	~0°		Hot pressed in graphite dies from 325 mesh powder; preheated to 2400 K for 1 hr; measured in vacuum (5×10^{-6} mm Hg).
5*	119	1963	0.65	1400	~0°		Above specimen and conditions except measured 7 min after flashing.
6*	119	1963	0.65	1400	~0°		Above specimen and conditions except measured 14 min after flashing.
7	119	1963	0.65	1400	~0°		Above specimen and conditions except measured 21 min after flashing.
8*	119	1963	0.65	1400	~0°		Above specimen and conditions except measured 29 min after flashing.
9*	119	1963	0.65	1400	~0°		Above specimen and conditions except measured 45 min after flashing.
10	119	1963	0.65	1400	~0°		Above specimen and conditions except measured 60 min after flashing.
11	13	1962	0.650	1073-2273	~0°		Layer of paste (~100 μm thick) on tantalum cylinder; paste prepared from fine powder (2-3 μm) of ZrC suspended in nitrocellulose binder and dried at 313 to 333 K.
12	290	1968	0.65	1300-3300	~0°		Cold pressed into rods or tubes; sintered at 2800 K; measured in vacuum (7×10^{-6} - 4×10^{-6} mm Hg) from 1300 to 2400 K then back to 1300 K, in argon from 2100K to 3000 K and back to 2100 K, in argon from 2900 K to 3300-3500 K; porosity 12.6% before, 13.3% after measurement.
13	363	1967	0.65	1433-2749	~0°		Powders cold compacted followed by two-stage sintering in an argon atm at a max temp of 2773 K; maintained 1 hr at 2500 K in vacuum before experiment; measured in vacuum; [Authors' designation: Specimen No. 1].
14	363	1967	0.65	1358-3394	~0°		Powders cold compacted followed by two-stage sintering an an argon atm at a max temp of 2773 K; measured in vacuum from 1300 K to 2450 K then back to 1200 K; measured in argon from 2300 K to 2850 K then back to 2300 K, measured in argon from 2900 K to 3400 K; [Authors' designation: Specimen No. 2].
15	363	1967	0.65	1207-2755	~0°		Above specimen and conditions except data obtained on lowering the temp.

*Not shown on plot

DATA TABLE NO. 312 NORMAL SPECTRAL EMITTANCE OF ZIRCONIUM CARBIDE ZrC

[Temperature, T, K; Emittance, ϵ; Wavelength, λ, μm]

T	ϵ
CURVE 1 λ = 0.65	
1795	0.827
1811	0.830
1823	0.831
1834	0.830
1834	0.868
1893	0.810
1905	0.829
1907	0.808
1916	0.688
1920	0.829
1934	0.687
1936	0.829
1966	0.774
1986	0.774
1996	0.690
2006	0.808
2010	0.790
2012	0.689
2014	0.814
2023	0.774
2033	0.810
2071	0.707
2101	0.738
2102	0.811
2106	0.760
2114	0.773
2133	0.757
2140	0.776
2140	0.813
2155	0.774
2176	0.761
2176	0.830
2188	0.810
2227	0.761
2229	0.740
2235	0.794
2241	0.812
2264	0.740
2307	0.775
2326	0.759
2331	0.775
2334	0.794
2356	0.795
2368	0.829
2402	0.773

T	ϵ
CURVE 1 (cont.)	
2427	0.792
2429	0.772
2442	0.759
2450	0.740
2474	0.511
2536	0.721
2561	0.761
2583	0.525
2583	0.514
2597	0.526
2597	0.564
2606	0.559
2630	0.514
2708	0.527
2806	0.521
2823	0.537
2873	0.538
2914	0.524
2984	0.512
3010	0.552
3010	0.565
3011	0.512
3022	0.565
3030	0.492
3050	0.552
3058	0.504
3113	0.512
3160	0.514
3233	0.492
3272	0.525
3314	0.513
3338	0.503
3422	0.605
3434	0.616
3451	0.614
CURVE 2 λ = 0.65	
3578	0.500
3459	0.493
2969	0.551
2963	0.501
2943	0.503
2937	0.515
2842	0.511

T	ϵ
CURVE 2 (cont.)	
2829	0.513
2829	0.525
2749	0.536
2728	0.522
2670	0.525
2659	0.548
2611	0.513
2598	0.512
2593	0.594
2530	0.501
2505	0.503
2481	0.592
2469	0.526
2357	0.563
2356	0.492
2333	0.553
2320	0.565
2276	0.535
2202	0.577
2181	0.591
2152	0.602
2120	0.631
2100	0.631
2029	0.761
1946	0.634
1936	0.740
1891	0.740
1882	0.760
1874	0.609
1847	0.774
1835	0.791
1821	0.774
1812	0.815
CURVE 3 λ = 0.65	
1100	0.598
1120	0.641
1220	0.641
1330	0.601
1440	0.642
1530	0.654
1640	0.662
1650	0.665
1740	0.661

T	ϵ
CURVE 3 (cont.)	
1870	0.634
1890	0.644
1970	0.623
2070	0.643
2170	0.634
2240	0.566
2250	0.655
2290	0.643
2370	0.663
2380	0.644
2380	0.615
2380	0.664
2390	0.646
2390	0.616
2400	0.645
2400	0.615
2400	0.644*
2400	0.616*
2410	0.616
2420	0.615
2430	0.594
2430	0.614
CURVE 4 λ = 0.65	
1400	0.640
CURVE 5* λ = 0.65	
1400	0.660
CURVE 6* λ = 0.65	
1400	0.650
CURVE 7 λ = 0.65	
1400	0.680

T	ϵ
CURVE 8* λ = 0.65	
1400	0.719
CURVE 9* λ = 0.65	
1400	0.760
CURVE 10 λ = 0.65	
1400	0.800
CURVE 11 λ = 0.650	
1073	0.75
1173	0.76
1273	0.76
1373	0.77
1473	0.77
1573	0.78
1673	0.78
1773	0.78
1873	0.78
1973	0.78
2073	0.79
2173	0.79
2273	0.79
CURVE 12 λ = 0.650	
1300	0.89
1400	0.86
1500	0.84
1600	0.82
1700	0.79
1800	0.77
1900	0.75
2000	0.73
2100	0.71
2200	0.69
2300	0.68
2400	0.67
2500	0.66

T	ϵ
CURVE 12 (cont.)	
2600	0.65
2700	0.64
2800	0.64
2900	0.64
3000	0.63
3100	0.63
3200	0.62
3300	0.62
CURVE 13 λ = 0.65	
1433	0.929
1503	0.877
1503	0.807
1626	0.861
1673	0.844
1809	0.901
1890	0.863
1945	0.832
1956	0.809
1996	0.896
2453	0.829
2749	0.710
CURVE 14 λ = 0.65	
1358	0.875
1364	0.845
1446	0.916
1631	0.840
1800	0.880
1901	0.898
1909	0.918
1981	0.883
2086	0.853
2093	0.906
2235	0.870
2235	0.829
2380	0.821
2404	0.832
2542	0.877
2560	0.818
2694	0.710
2697	0.758

T	ϵ
CURVE 14 (cont.)	
2747	0.780
2832	0.706
2865	0.669
2967	0.725
2975	0.671
3099	0.723
3112	0.707
3236	0.713
3239	0.666
3302	0.710
3331	0.661
3376	0.692
3394	0.630
CURVE 15 λ = 0.65	
1207	0.953
1434	0.812
1438	0.842
1571	0.934
1770	0.924
1771	0.896
1884	0.904
2440	0.834
2574	0.826
2574	0.776
2652	0.783
2666	0.746
2755	0.729

* Not shown on plot

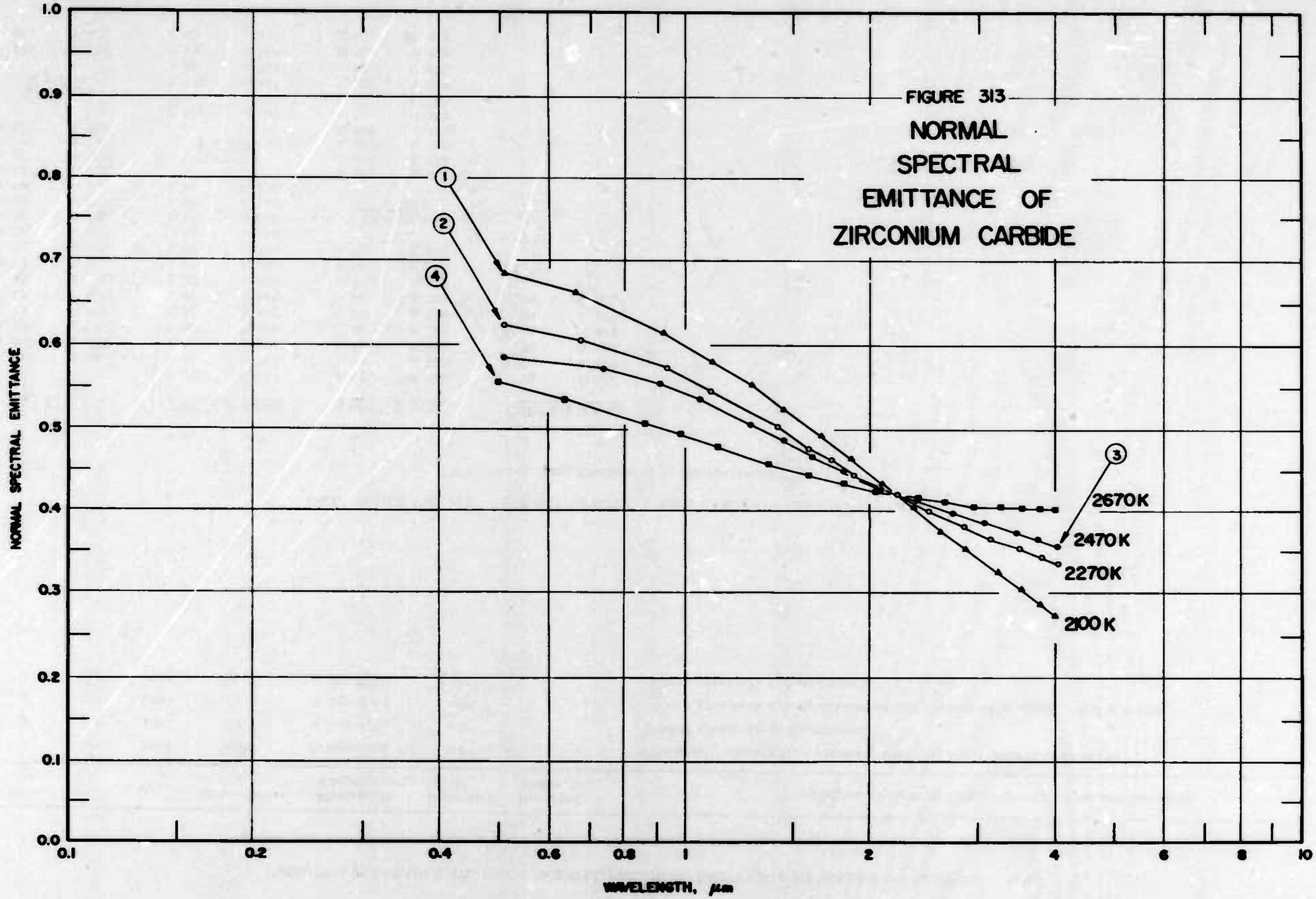


FIGURE 313
NORMAL
SPECTRAL
EMITTANCE OF
ZIRCONIUM CARBIDE
1
2
3
4
2670 K
2470 K
2270 K
2100 K
NORMAL SPECTRAL EMITTANCE
WAVELENGTH, μm
0.0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
1.0
0.1
0.2
0.4
0.6
0.8
1
2
4
6
8
10

SPECIFICATION TABLE NO. 313 NORMAL SPECTRAL EMITTANCE OF ZIRCONIUM CARBIDE ZrC

Curve No.	Ref. No.	Year	Temperature K	Wavelength Range, μm	Geometry θ'	Reported Error, %	Composition (weight percent), Specifications and Remarks
1	114	1961	2100	0.510-4.00	~0°		Polished; measured in vacuum; data extracted from smooth curve.
2	114	1961	2270	0.510-4.01	~0°		Above specimen and conditions.
3	114	1961	2470	0.510-4.01	~0°		Above specimen and conditions except measured in argon (~760 mm Hg).
4	114	1961	2670	0.500-4.00	~0°		Above specimen and conditions.

DATA TABLE NO. 313 NORMAL SPECTRAL EMITTANCE OF ZIRCONIUM CARBIDE ZrC

[Wavelength, μm; Emittance, ϵ; Temperature, T, K]

CURVE 1
T = 2100

λ	ϵ
0.510	0.685
0.660	0.663
0.920	0.618
1.12	0.581
1.29	0.552
1.45	0.525
1.66	0.493
1.87	0.464
2.10	0.433
2.36	0.401
2.60	0.375
2.86	0.351
3.22	0.324
3.52	0.303
3.79	0.287
4.00	0.276

CURVE 2
T = 2270

λ	ϵ
0.510	0.627
0.680	0.607

CURVE 2 (cont.)

λ	ϵ
0.930	0.573
1.10	0.547
1.41	0.501
1.59	0.479
1.73	0.462
1.89	0.446
2.21	0.420
2.50	0.400
2.85	0.380
3.15	0.366
3.50	0.352
3.80	0.342
4.01	0.336

CURVE 3
T = 2470

λ	ϵ
0.510	0.587
0.740	0.573
0.910	0.556
1.06	0.538
1.28	0.509
1.45	0.489

CURVE 3 (cont.)

λ	ϵ
1.62	0.468
1.81	0.450
2.09	0.428
2.38	0.412
2.72	0.398
3.08	0.385
3.47	0.372
3.74	0.364
4.01	0.357

CURVE 4
T = 2670

λ	ϵ
0.500	0.558
0.640	0.538
0.860	0.509
0.980	0.495
1.13	0.480
1.37	0.459
1.58	0.445
1.82	0.433
2.06	0.424
2.40	0.415

CURVE 4 (cont.)

λ	ϵ
2.65	0.411
2.95	0.405
3.27	0.405
3.51	0.403
3.79	0.402
4.00	0.401

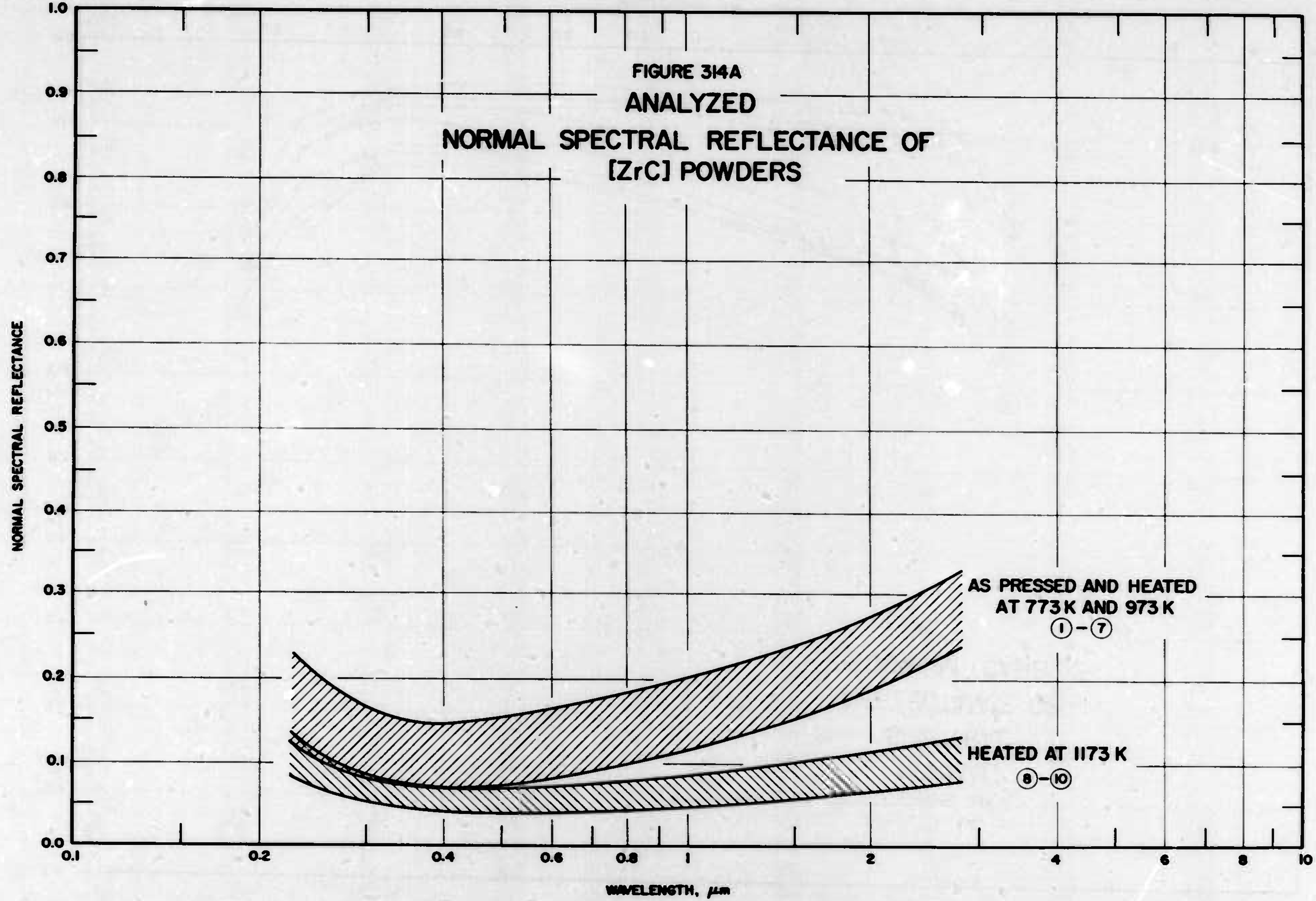


FIGURE 314A
ANALYZED
NORMAL SPECTRAL REFLECTANCE OF
[ZrC] POWDERS
AS PRESSED AND HEATED
AT 773 K AND 973 K
1 - 7
HEATED AT 1173 K
8 - 10
NORMAL SPECTRAL REFLECTANCE
WAVELENGTH, μm
0.0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
1.0
0.1
0.2
0.4
0.6
0.8
1
2
4
6
8
10

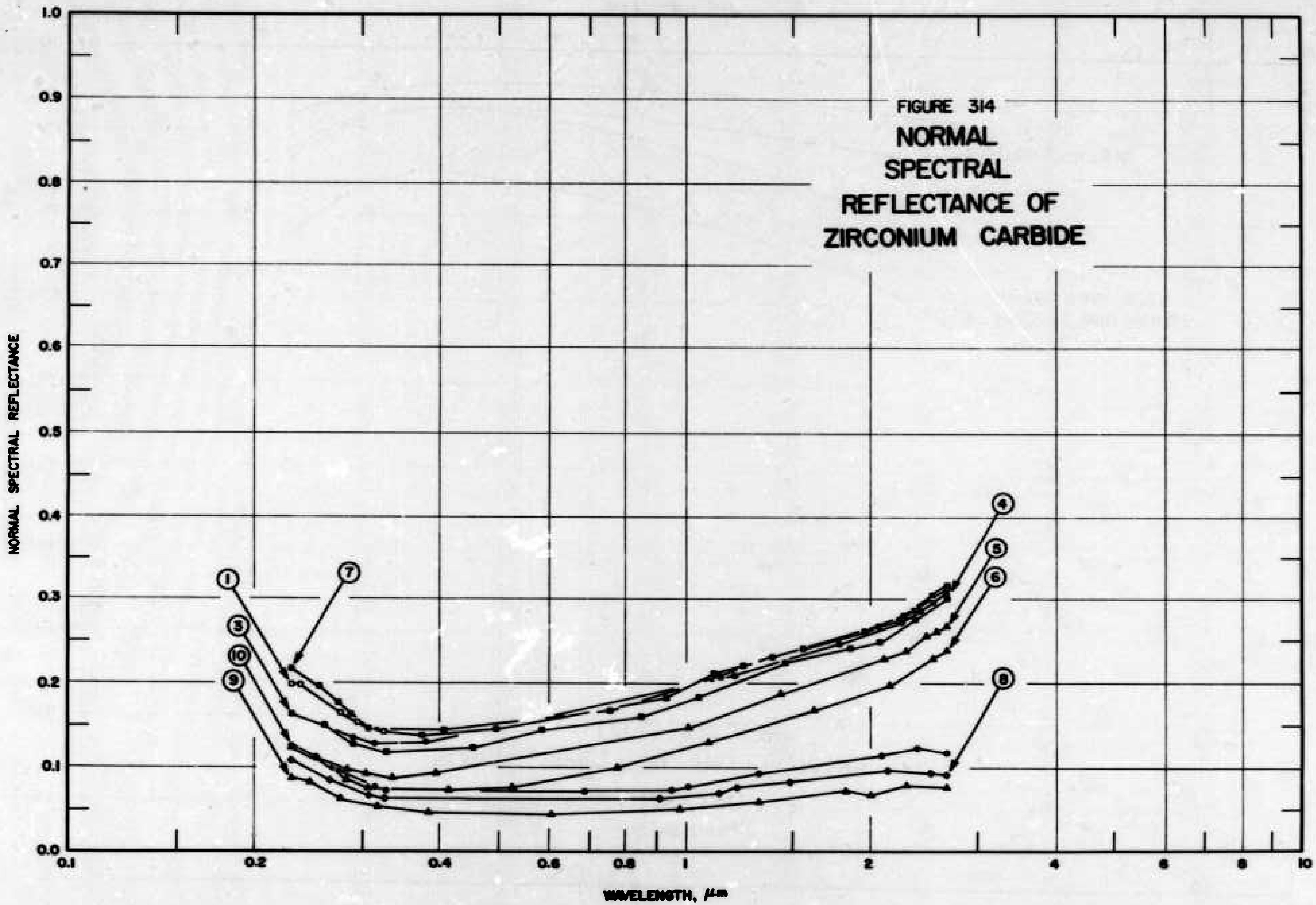


FIGURE 314
NORMAL SPECTRAL REFLECTANCE OF ZIRCONIUM CARBIDE
NORMAL SPECTRAL REFLECTANCE
WAVELENGTH, μm
1.0
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0.0
0.1
0.2
0.4
0.6
0.8
1
2
4
6
8
10
1
3
10
9
7
4
5
6
8

SPECIFICATION TABLE NO. 314 NORMAL SPECTRAL REFLECTANCE OF ZIRCONIUM CARBIDE ZrC

Curve No.	Ref. No.	Year	Temperature K	Wavelength Range, μm	Geometry θ	θ'	ω'	Reported Error, %	Composition (weight percent), Specifications and Remarks
1	382	1965	~298	0.230-2.65	0°		2π		Powder; compacted at 35 300 psi using polished stainless steel ram; data extracted from smooth curve; MgO reference standard.
2*	382	1965	~298	0.230-2.65	0°		2π		Above specimen and conditions except heated at 773 K for 30 min.
3	382	1965	~298	0.230-2.65	0°		2π		Above specimen and conditions except heated at 773 K for 120 min.
4	382	1965	~298	0.230-2.65	0°		2π		Similar to curve 1 specimen and conditions.
5	382	1965	~298	0.230-2.65	0°		2π		Above specimen and conditions except heated at 973 K for 15 min.
6	382	1965	~298	0.230-2.65	0°		2π		Above specimen and conditions except heated at 973 K for 30 min.
7	382	1965	~298	0.230-2.65	0°		2π		Similar to curve 1 specimen and conditions.
8	382	1965	~298	0.230-2.65	0°		2π		Above specimen and conditions except heated at 1173 K for 15 min.
9	382	1965	~298	0.230-2.65	0°		2π		Above specimen and conditions except heated at 1173 K for 30 min.
10	382	1965	~298	0.230-2.65	0°		2π		Above specimen and conditions except heated at 1173 K for 60 min.

* Not shown on plot

DATA TABLE NO. 314 NORMAL SPECTRAL REFLECTANCE OF ZIRCONIUM CARBIDE ZrC

[Wavelength, λ, μm; Reflectance, ρ; Temperature, T, K]

λ	ρ
CURVE 1	
T ~ 298	
0.230	0.199
0.239	0.199
0.276	0.163
0.294	0.151
0.325	0.141
0.375	0.139
0.496	0.146
0.929	0.181
1.11	0.210
1.24	0.220
1.55	0.240
1.95	0.260
2.22	0.272
2.35	0.284
2.65	0.312
CURVE 2*	
T ~ 298	
0.230	0.193
0.271	0.159
0.285	0.147
0.318	0.136
0.349	0.132
0.499	0.140
0.889	0.171
1.13	0.198
1.55	0.233
1.86	0.249
2.19	0.266
2.35	0.280
2.65	0.310
CURVE 3	
T ~ 298	
0.230	0.163
0.260	0.150
0.290	0.128
0.329	0.119
0.451	0.123
0.586	0.145
0.849	0.160
1.05	0.182
1.45	0.221
CURVE 3 (cont.)	
1.85	0.240
2.06	0.249
2.36	0.274
2.65	0.300
CURVE 4	
T ~ 298	
0.230	0.163*
0.290	0.134
0.313	0.129
0.380	0.130
1.20	0.208
1.78	0.247
2.22	0.271
2.40	0.285
2.51	0.295
2.65	0.304
CURVE 5	
T ~ 298	
0.230	0.122
0.253	0.110
0.283	0.097
0.303	0.091
0.337	0.088
0.394	0.092
1.01	0.149
1.43	0.187
2.10	0.228
2.28	0.237
2.46	0.254
2.56	0.260
2.65	0.268
CURVE 6	
T ~ 298	
0.230	0.122*
0.253	0.110*
0.283	0.087
0.308	0.076
0.417	0.072
0.527	0.077
0.777	0.100
CURVE 6 (cont.)	
1.09	0.130
1.61	0.169
2.14	0.198
2.51	0.229
2.65	0.238
CURVE 7	
T ~ 298	
0.230	0.216
0.256	0.195
0.272	0.177
0.288	0.162
0.307	0.148
0.406	0.144
0.751	0.168
1.14	0.208
1.38	0.230
2.06	0.267
2.26	0.279
2.51	0.302
2.65	0.315
CURVE 8	
T ~ 298	
0.230	0.109
0.266	0.086
0.307	0.068
0.325	0.063
0.903	0.063
1.13	0.070
1.22	0.079
1.48	0.083
2.13	0.098
2.50	0.096
2.65	0.092
CURVE 9	
T ~ 298	
0.230	0.089
0.248	0.082
0.277	0.063
0.319	0.051
0.381	0.048
CURVE 9 (cont.)	
0.604	0.045
0.973	0.050
1.32	0.060
1.83	0.072
2.00	0.069
2.29	0.080
2.65	0.077
CURVE 10	
T ~ 298	
0.230	0.123
0.251	0.111
0.273	0.095
0.313	0.078
0.329	0.071
0.682	0.071
0.950	0.073
1.01	0.079
1.32	0.092
2.09	0.115
2.37	0.121
2.65	0.119

* Not shown on plot

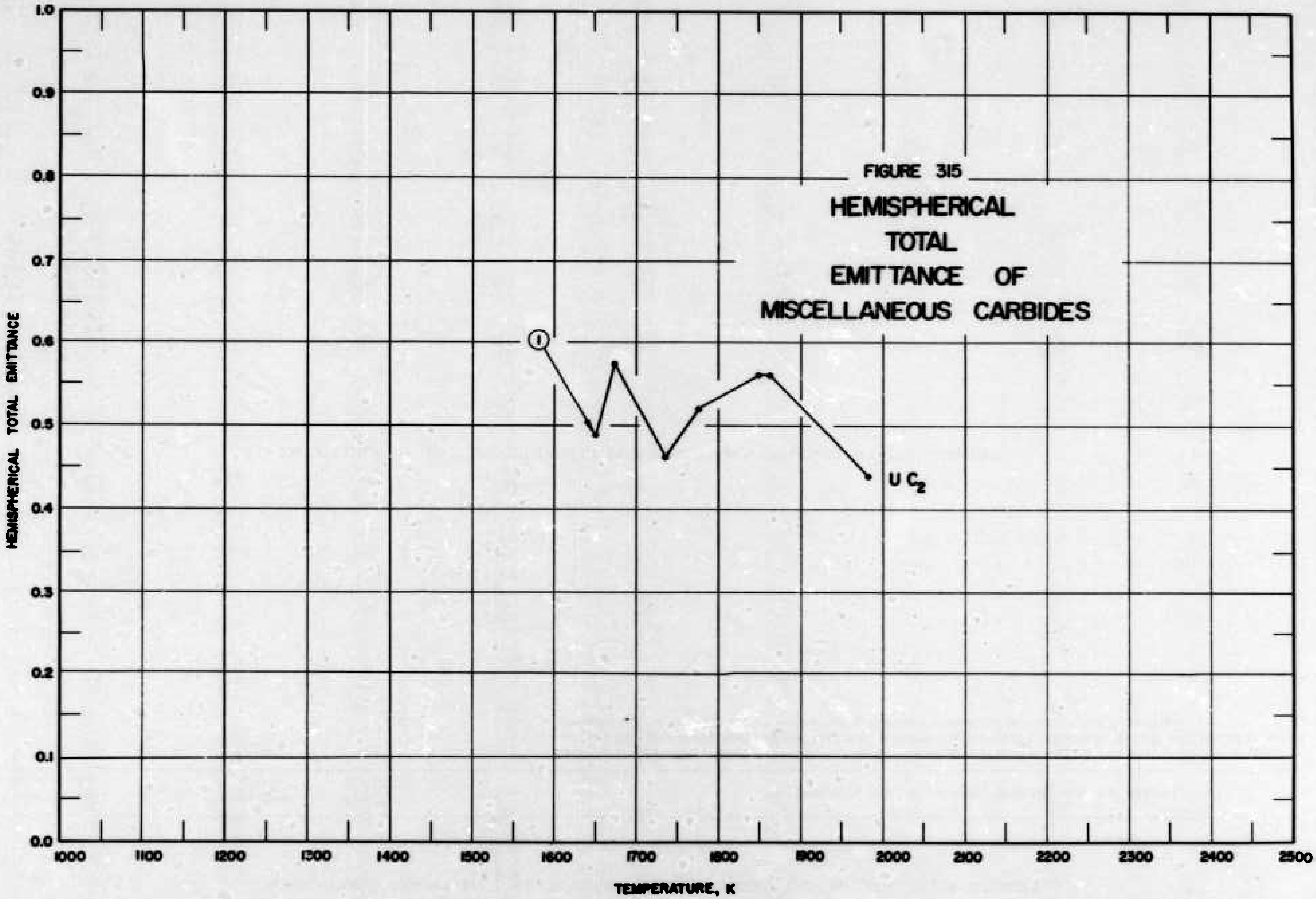


FIGURE 315
HEMISPHERICAL
TOTAL
EMITTANCE OF
MISCELLANEOUS CARBIDES
1
UC_2
HEMISPHERICAL TOTAL EMITTANCE
1.0
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0.0
1000
1100
1200
1300
1400
1500
1600
1700
1800
1900
2000
2100
2200
2300
2400
2500
TEMPERATURE, K

SPECIFICATION TABLE NO. 315 HEMISPHERICAL TOTAL EMITTANCE OF MISCELLANEOUS CARBIDES

Curve No.	Ref. No.	Year	Temperature Range, K	Reported Error, %	Composition (weight percent), Specifications and Remarks
1	115	1962	1650-1981		URANIUM DICARBIDE, UC_2; 8.7 C, 0.3 O; hot-pressed for 15 min at 1973 K and 6000 psi; 90% of theoretical density; fairly well crystallized with a trace of UC present; heated to 2423 K and cooled rapidly; cleaned and polished in a gettered-argon glove box; measured in vacuum (10^{-6} mm Hg).

DATA TABLE NO. 315 HEMISPHERICAL TOTAL EMITTANCE OF MISCELLANEOUS CARBIDES

[Temperature, T, K; Emittance, ϵ]

T	ϵ
CURVE 1	
1650	0.488
1671	0.571
1734	0.460
1777	0.520
1850	0.560
1861	0.560
1981	0.440

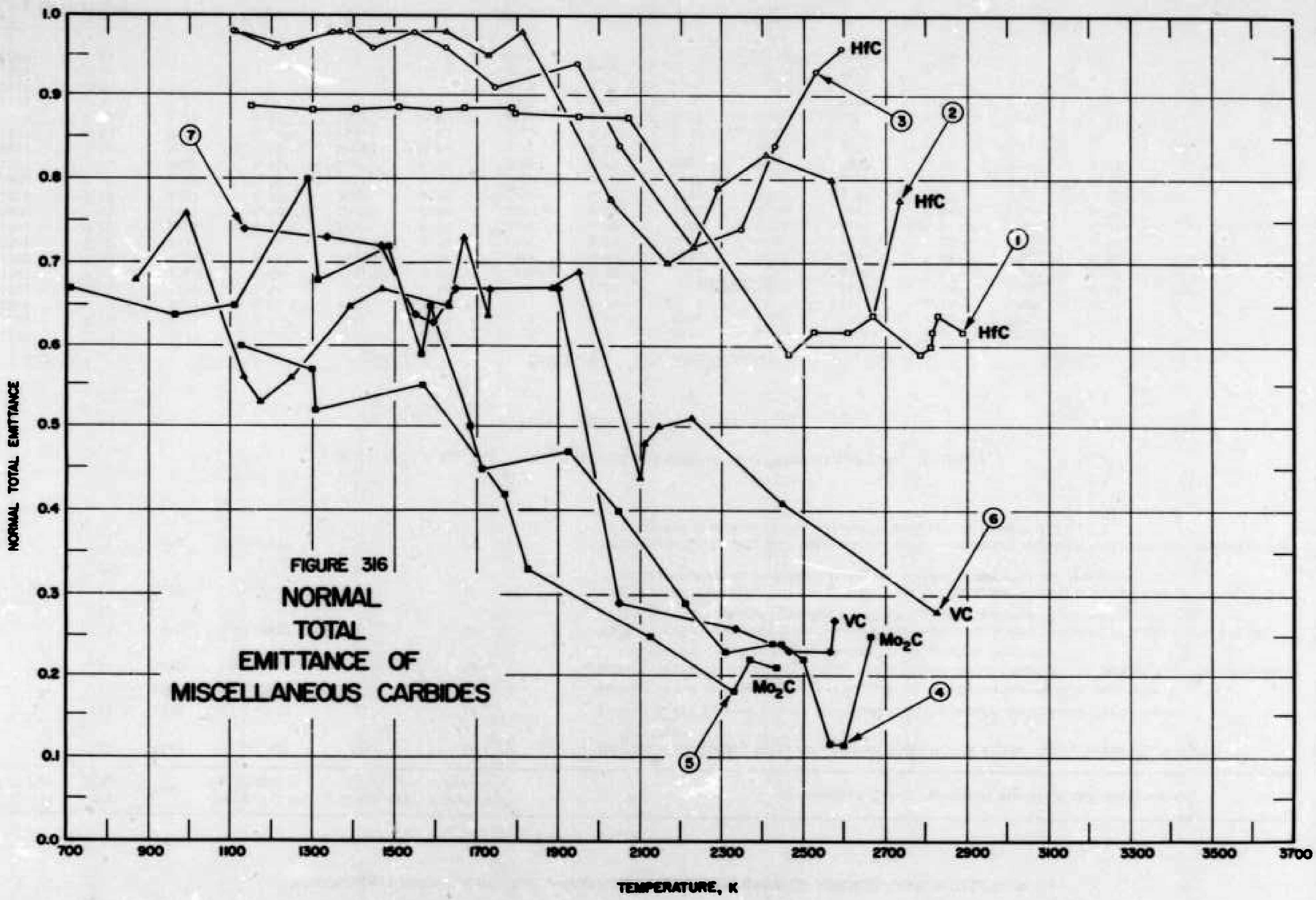


FIGURE 316
NORMAL
TOTAL
EMITTANCE OF
MISCELLANEOUS CARBIDES

SPECIFICATION TABLE NO. 316 NORMAL TOTAL EMITTANCE OF MISCELLANEOUS CARBIDES

Curve No.	Ref. No.	Year	Temperature Range, K	Geometry θ'	Reported Error, %	Composition (weight percent), Specifications and Remarks
1	17	1962	1155-2828	~0°	10	HAFNIUM CARBIDE, HfC; hot pressed; measured in argon; run 1; [Author's designation: Specimen 1].
2	17	1962	1117-2739	~0°	10	Similar to the above specimen and conditions; [Author's designation: Specimen 2].
3	17	1962	1114-2597	~0°	10	Similar to the above specimen and conditions; [Author's designation: Specimen 3].
4	17	1962	713-2661	~0°	10	DIMOLYBDENUM CARBIDE, Mo_2C; hot pressed; surface blistered at 2422 K; blisters collapsed at 2439 K; measured in argon; [Author's designation: Specimen 1].
5	17	1962	1305-2439	~0°	10	Similar to the above specimen and conditions except dark area in center of specimen at 1305 K, large surface blister appeared at 2372 K; [Author's designation: Specimen 2].
6	17	1962	867-2822	~0°	10	VANADIUM CARBIDE, VC; hot pressed; surface blistered at 2100 K and a crust appeared on the surface at 1955 K; measured in argon; [Author's designation: Specimen 1].
7	17	1962	1139-2572	~0°	10	VANADIUM CARBIDE, VC; hot pressed; surface blistered at 1900 K, blisters disappeared at 2055 K; measured in argon; run 1; [Author's designation: Specimen 2].

DATA TABLE NO. 316 NORMAL TOTAL EMITTANCE OF MISCELLANEOUS CARBIDES

[Temperature, T, K; Emittance, ε]

T	ε	T	ε	T	ε	T	ε	T	ε	T	ε	T	ε
CURVE 1		CURVE 2		CURVE 3		CURVE 4		CURVE 4 (cont.)		CURVE 6		CURVE 7	
1155	0.88	1117	0.98	1114	0.98	713	0.67	2439	0.29*	867	0.68	1139	0.74
1300	0.82	1211	0.96	1243	0.96	961	0.64	2661	0.25	997	0.76	1339	0.73
1405	0.83	1367	0.98	1353	0.98	1117	0.65			1139	0.56	1461	0.72
1511	0.86	1489	0.98	1394	0.98	1289	0.80	CURVE 5		1172	0.53	1644	0.67
1667	0.84	1628	0.98	1444	0.96	1489	0.72			1244	0.56	1544	0.64
1783	0.85	1733	0.95	1547	0.98	1583	0.65	1305	0.52	1394	0.65	1594	0.63
1605	0.82	1817	0.93	1622	0.96	1717	0.45	1128	0.60	1639	0.65	1900	0.67
1794	0.79	2033	0.77	1748	0.91	1317	0.68	1300	0.57	1733	0.64	2055	0.29
1950	0.75	2161	0.70	1949	0.94	1561	0.59	1567	0.55	1467	0.67	2339	0.26
2078	0.74	2238	0.72	2053	0.84	1683	0.50	1767	0.42	1739	0.67	2467	0.23
2461	0.59	2289	0.79	2237	0.72*	1922	0.47	1822	0.33	2100	0.44	2561	0.23
2522	0.62	2405	0.83	2347	0.74	2055	0.40	2128	0.25	1667	0.73	2572	0.27
2610	0.62	2567	0.80	2427	0.84	2216	0.29	2328	0.18	1883	0.67		
2667	0.64	2672	0.64*	2537	0.93	2422	0.24	2372	0.22	1955	0.69		
2789	0.59	2739	0.77	2597	0.96	2311	0.23	2439	0.21	2116	0.48		
2811	0.60					2500	0.22			2149	0.50		
2817	0.62					2478	0.24			2222	0.51		
2850	0.62					2600	0.13			2450	0.41		
2828	0.64					2561	0.15			2822	0.28		

*Not shown on plot

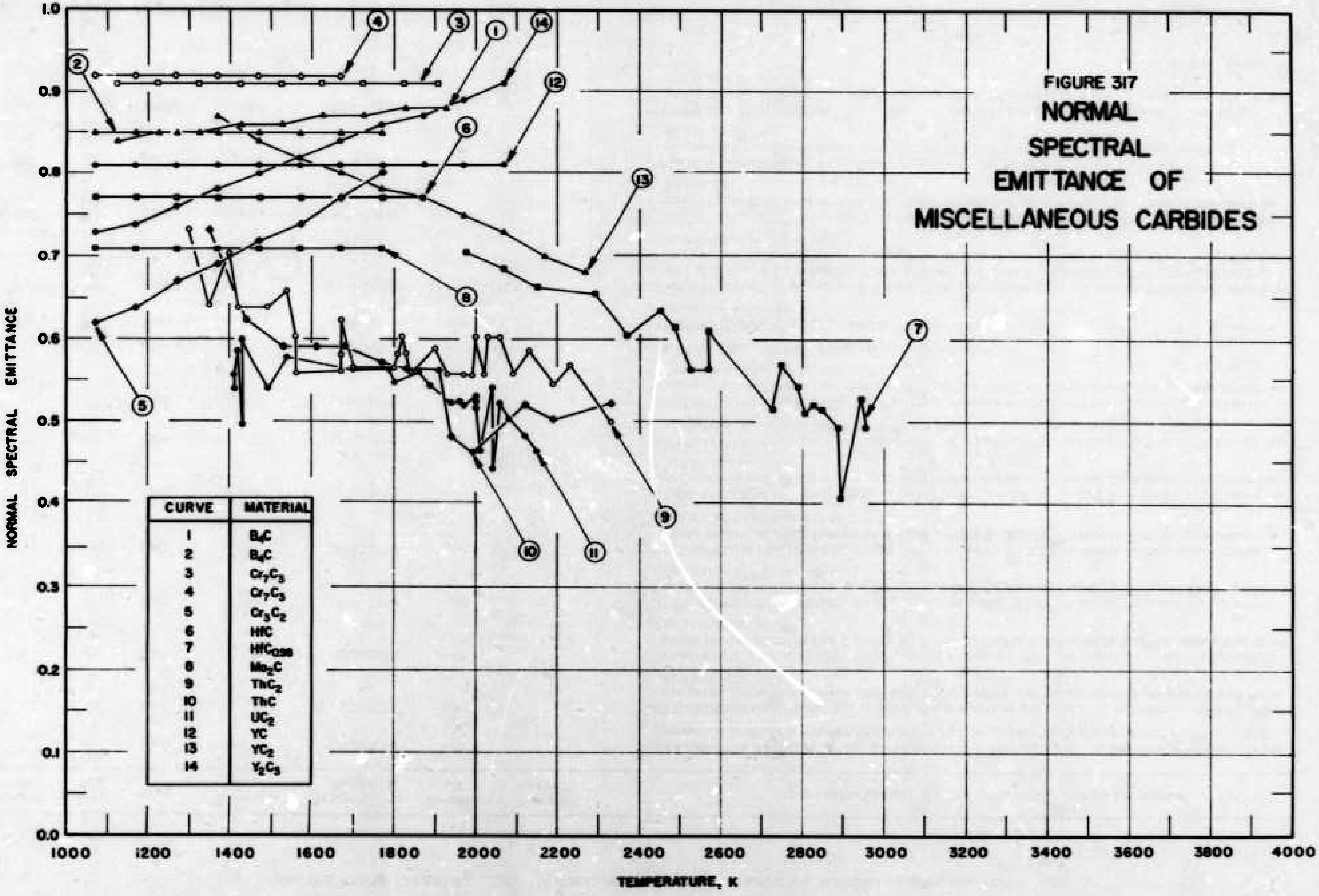


FIGURE 317
NORMAL
SPECTRAL
EMITTANCE OF
MISCELLANEOUS CARBIDES
NORMAL SPECTRAL EMITTANCE
TEMPERATURE, K
1.0
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0.0
1000
1200
1400
1600
1800
2000
2200
2400
2600
2800
3000
3200
3400
3600
3800
4000
CURVE
MATERIAL
1 B_4C
2 B_4C
3 Cr_7C_3
4 Cr_7C_3
5 Cr_3C_2
6 HfC
7 $HfC_{0.98}$
8 Mo_2C
9 ThC_2
10 ThC
11 UC_2
12 YC
13 YC_2
14 Y_2C_3

SPECIFICATION TABLE NO. 317 NORMAL SPECTRAL EMITTANCE OF MISCELLANEOUS CARBIDES

Curve No.	Ref. No.	Year	Wavelength μm	Temperature Range, K	Geometry θ'	Reported Error, %	Composition (weight percent), Specifications and Remarks
1	16	1960	0.650	1123-1923	~0°		TETRABORON CARBIDE, B_4C; layer of paste (~100 μm thick) on tantalum cylinder; paste prepared from fine powder (2-3 μm) of B_4C in nitrate binder and dried at 313 to 333 K.
2	13	1962	0.650	1073-1773	~0°		TETRABORON CARBIDE, B_4C; layer of paste (~100 μm thick) on tantalum cylinder; paste prepared from fine powder (203 μm) of B_4C suspended in nitrocellulose binder and dried at 313 to 333 K.
3	16	1960	0.650	1123-1923	~0°		7-CHROMIUM TRICARBIDE, Cr_7C_3; layer of paste (~100 μm thick) on tantalum cylinder; paste prepared from fine powder (2-3 μm) of Cr_7C_3 suspended in nitrate binder and dried at 313 to 333 K.
4	13	1962	0.650	1073-1673	~0°		7-CHROMIUM TRICARBIDE, Cr_7C_3; layer of paste (~100 μm thick) on tantalum cylinder; paste prepared from fine powder (2-3 μm) of Cr_7C_3 suspended in nitrocellulose binder and dried at 313 to 333 K.
5	13	1962	0.650	1073-1773	~0°		TRICHROMIUM DICARBIDE, Cr_3C_2; layer of paste (~100 μm thick) on tantalum cylinder; paste prepared from fine powder (2-3 μm thick) of Cr_3C_2 suspended in nitrocellulose binder and dried at 313 to 333 K.
6	13	1962	0.650	1073-1873	~0°		HAFNIUM CARBIDE, HfC; layer of paste (~100 μm thick) on tantalum cylinder; paste prepared from fine powder (2-3 μm) of HfC suspended in nitrocellulose binder and dried at 313 to 333 K.
7	104	1964	0.65	1978-2959	~0°		HAFNIUM CARBIDE, $HfC_{[illegible]}$; final polished with No. 600 abrasive cloth and a diamond lap; measured in vacuum ($10^{[illegible]}$ to 10^{-4} mm Hg).
8	13	1962	0.650	1073-1773	~0°		DIMOLYBDENUM CARBIDE, Mo_2C; layer of paste (~100 μm thick) on tantalum cylinder; paste prepared from fine powder (2-3 μm) of Mo_2C suspended in nitrocellulose binder and dried at 313 to 333 K.
9	115	1962	0.65	1300-2330	~0°		THORIUM DICARBIDE, ThC_2; thermally polished.
10	115	1962	0.65	1350-2330	~0°		THORIUM CARBIDE, ThC; obtained from Carborundum Co.; heated to 2335 K; specimen cracked on cooling.
11	115	1962	0.65	1410-2150	~0°		URANIUM DICARBIDE, UC_2; 8.7 C, 0.3 O; hot pressed for 15 min at 1973 K and 6000 psi; 90% of theoretical density; fairly well crystallized with a trace of UC present; heated to 2423 K and cooled rapidly; cleaned and polished in a gettered-argon glove box; measured in vacuum (10^{-6} mm Hg).
12	13	1962	0.650	1073-2073	~0°		YTTRIUM CARBIDE, YC; layer of paste (~100 μm thick) on tantalum cylinder; paste prepared from fine powder (2-3 μm) of YC suspended in nitrocellulose binder and dried at 313 to 333 K.
13	13	1962	0.650	1373-2273	~0°		YTTRIUM DICARBIDE, YC_2; layer of paste (~100 μm thick) on tantalum cylinder; paste prepared from fine powder (2-3 μm) of YC_2 suspended in nitrocellulose binder and dried at 313 to 333 K.
14	13	1962	0.650	1073-2073	~0°		DIYTTRIUM TRICARBIDE, Y_2C_3; layer of paste (~100 μm thick) on tantalum cylinder; paste prepared from fine powder (2-3 μm) of Y_2C_3 suspended in nitrocellulose binder and dried at 313 to 333 K.

DATA TABLE NO. 317 NORMAL SPECTRAL EMITTANCE OF MISCELLANEOUS CARBIDES

[Temperature, T, K; Emittance, ϵ; Wavelength, λ, μm]

CURVE 1
$\lambda = 0.650$

T	ϵ
1123	0.84
1223	0.85
1323	0.85
1423	0.86
1523	0.86
1623	0.87
1723	0.87
1823	0.88
1923	0.88

CURVE 2
$\lambda = 0.650$

T	ϵ
1073	0.85
1173	0.85
1273	0.85
1373	0.85
1473	0.85
1573	0.85
1673	0.85
1773	0.85

CURVE 3
$\lambda = 0.650$

T	ϵ
1123	0.91
1223	0.91
1323	0.91
1423	0.91
1523	0.91
1623	0.91
1723	0.91
1823	0.91
1923	0.91

CURVE 4
$\lambda = 0.650$

T	ϵ
1073	0.92
1173	0.92
1273	0.92
1373	0.92
1473	0.92
1573	0.92
1673	0.92

CURVE 5
$\lambda = 0.650$

T	ϵ
1073	0.62
1173	0.64
1273	0.67
1373	0.69
1473	0.72
1573	0.74
1673	0.77
1773	0.80

CURVE 6
$\lambda = 0.650$

T	ϵ
1073	0.77
1173	0.77
1273	0.77
1373	0.77
1473	0.77
1573	0.77
1673	0.77*
1773	0.77
1873	0.77

CURVE 7
$\lambda = 0.65$

T	ϵ
1978	0.703
2073	0.685
2159	0.664
2297	0.656
2370	0.604
2458	0.632
2488	0.613
2525	0.562
2578	0.562
2578	0.610
2733	0.517
2749	0.569
2789	0.540
2801	0.510
2826	0.520
2856	0.514
2886	0.491
2896	0.405
2943	0.527
2959	0.491

CURVE 8
$\lambda = 0.650$

T	ϵ
1073	0.71
1173	0.71
1273	0.71
1373	0.71
1473	0.71
1573	0.71
1673	0.71
1773	0.71

CURVE 9
$\lambda = 0.65$

T	ϵ
1300	0.733
1350	0.641
1400	0.702
1420	0.640
1490	0.640
1540	0.660
1560	0.602
1560	0.560
1670	0.561
1670	0.581
1670	0.622
1700	0.568
1800	0.567
1810	0.582
1820	0.602
1830	0.583
1840	0.560
1900	0.590
1930	0.559
1970	0.558
1990	0.557
2000	0.602
2020	0.559
2030	0.602
2060	0.601
2090	0.558
2130	0.588
2190	0.546
2230	0.570
2330	0.500

CURVE 10
$\lambda = 0.65$

T	ϵ
1350	0.734
1440	0.623
1530	0.592
1610	0.592
1680	0.592
1770	0.572
1830	0.564
1910	0.562
1940	0.481
1990	0.461
2120	0.520
2190	0.502
2330	0.522

CURVE 11
$\lambda = 0.65$

T	ϵ
1410	0.540
1410	0.558
1420	0.589
1430	0.499
1430	0.600
1490	0.540
1540	0.580
1700	0.561
1790	0.563
1800	0.549
1860	0.560
1890	0.542
1940	0.521
1960	0.524
1970	0.520
2000	0.530
2000	0.518
2000	0.524
2010	0.462
2040	0.540
2040	0.442
2060	0.521
2080	0.503
2120	0.481
2150	0.461

CURVE 12
$\lambda = 0.650$

T	ϵ
1073	0.81
1173	0.81
1273	0.81
1373	0.81
1473	0.81
1573	0.81
1673	0.81
1773	0.81
1873	0.81
1973	0.81
2073	0.81

CURVE 13
$\lambda = 0.650$

T	ϵ
1373	0.87
1473	0.84
1573	0.82
1673	0.80
1773	0.78
1873	0.77*
1973	0.75
2073	0.73
2173	0.70
2273	0.68

CURVE 14
$\lambda = 0.650$

T	ϵ
1073	0.73
1173	0.74
1273	0.76
1373	0.78
1473	0.80
1573	0.82
1673	0.84
1773	0.86
1873	0.87
1973	0.89
2073	0.91

* Not shown on plot

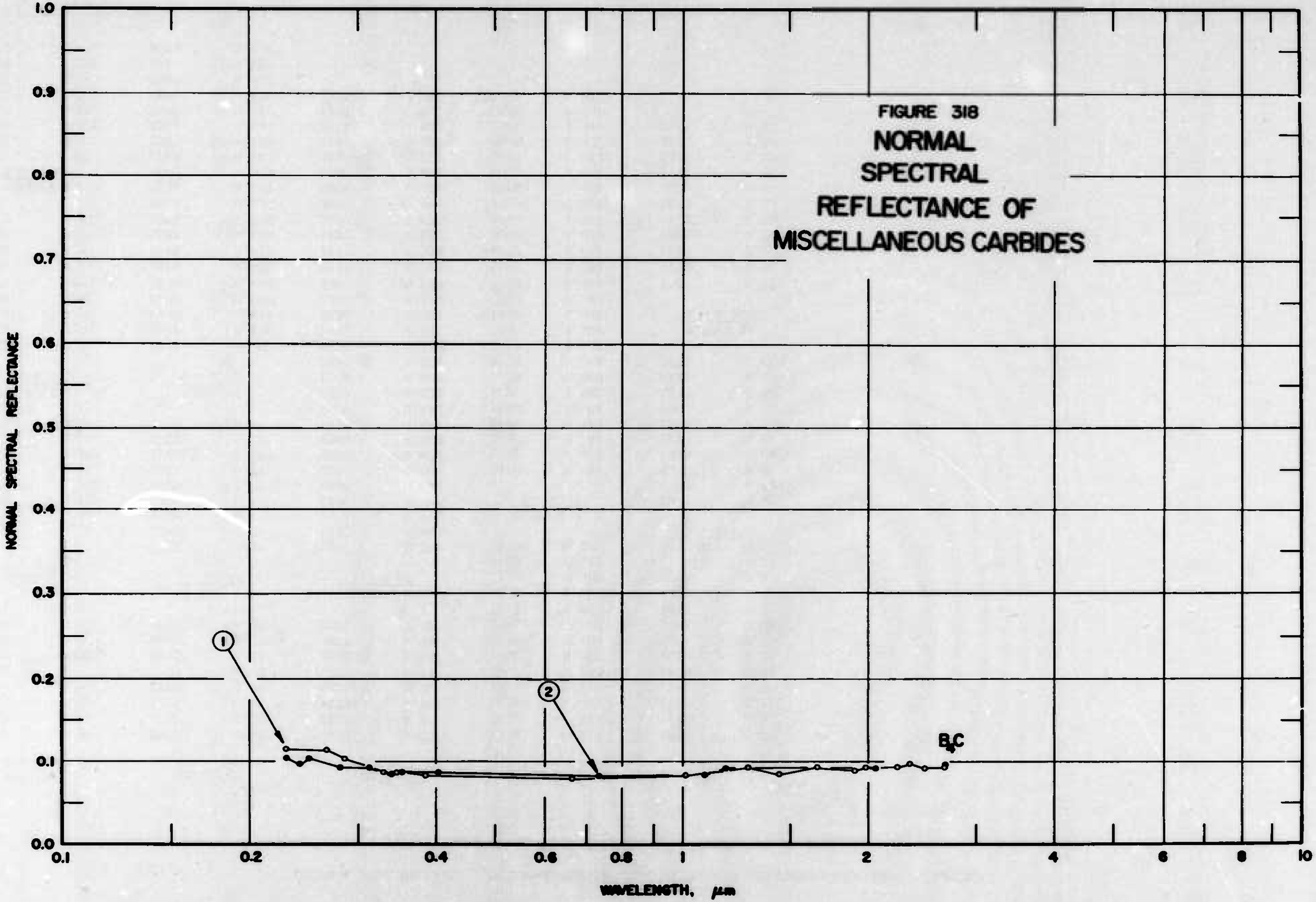


FIGURE 318
NORMAL
SPECTRAL
REFLECTANCE OF
MISCELLANEOUS CARBIDES

SPECIFICATION TABLE NO. 318 NORMAL SPECTRAL REFLECTANCE OF MISCELLANEOUS CARBIDES

Curve No.	Ref. No.	Year	Temperature K	Wavelength Range, μm	Geometry θ	θ'	ω'	Reported Error, %	Composition (weight percent), Specifications and Remarks
1	91	1967	298	0.230-2.65	0°		2π		TETRABORON CARBIDE, B_4C; powder; commercially pure; -230 +270 mesh; pressed at 16 200 newtons cm^{-2}; 1.6 mm thick on stainless steel; MgO reference standard; data extracted from smooth curve.
2	393	1966	~298	0.230-2.65	~0°		2π		TETRABORON CARBIDE, B_4C; powder compacted at 35 300 psi; data extracted from smooth curve; MgO reference standard.

DATA TABLE NO. 318 NORMAL SPECTRAL REFLECTANCE OF MISCELLANEOUS CARBIDES

[Wavelength, λ, μm; Reflectance, ρ; Temperature, T, K]

λ	ρ	λ	ρ
CURVE 1 T = 298		CURVE 2 T ~ 298	
0.230	0.117	0.230	0.103
0.268	0.114	0.242	0.099
0.285	0.101	0.250	0.103
0.330	0.089	0.280	0.093
0.346	0.087	0.312	0.093
0.385	0.082	0.340	0.085
0.665	0.080	0.352	0.089
1.02	0.082	0.403	0.087
1.27	0.092	0.733	0.082
1.43	0.086	1.08	0.085
1.65	0.093	1.15	0.092
1.90	0.090	2.04	0.092
1.99	0.092	2.65	0.094
2.22	0.093		
2.31	0.098		
2.48	0.091		
2.65	0.093		

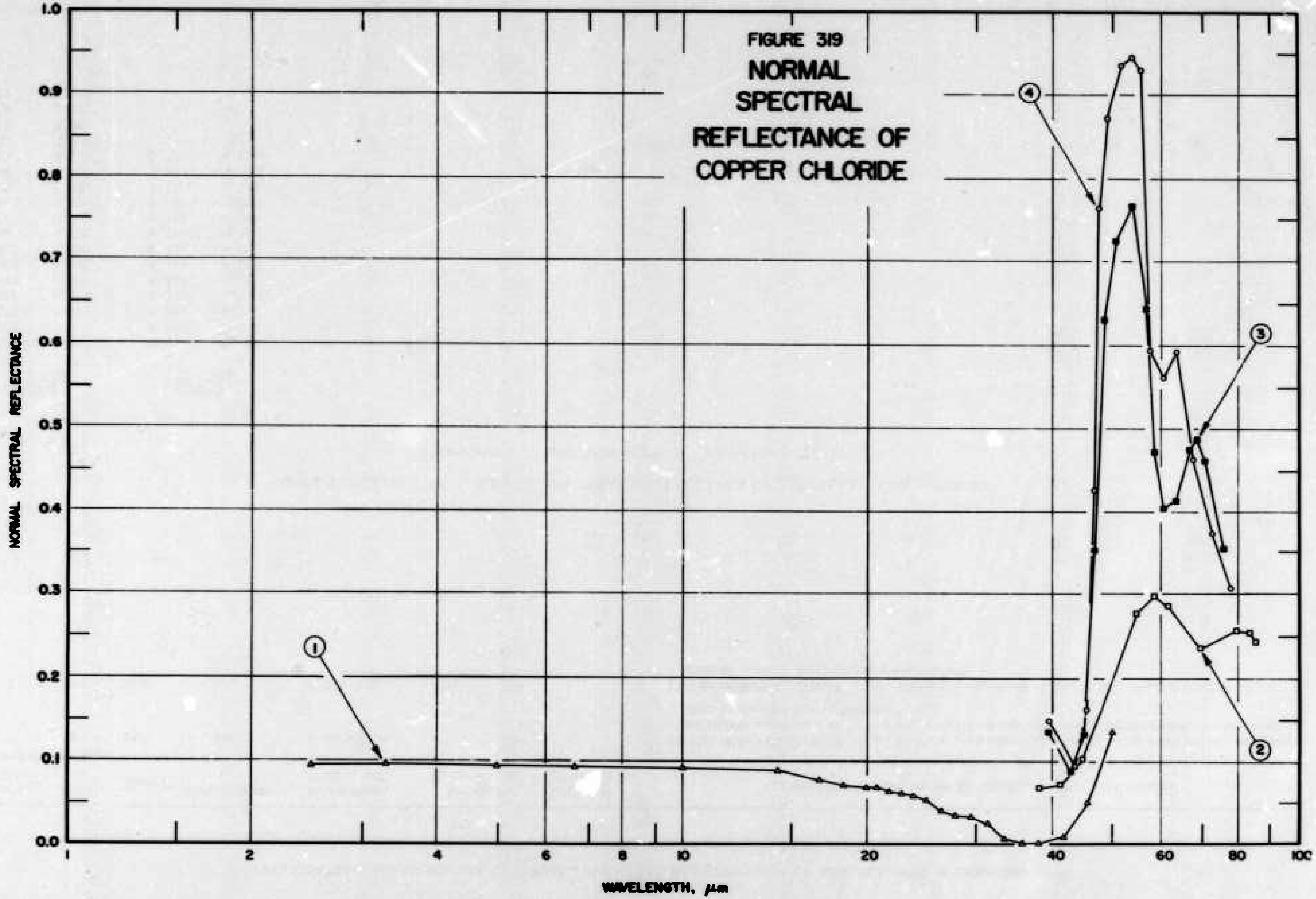


FIGURE 319
NORMAL SPECTRAL REFLECTANCE OF COPPER CHLORIDE

SPECIFICATION TABLE NO. 319 NORMAL SPECTRAL REFLECTANCE OF COPPER CHLORIDE CuCl

Curve No.	Ref. No.	Year	Temperature K	Wavelength Range, μm	Geometry θ θ' ω'	Reported Error, %	Composition (weight percent), Specifications, and Remarks
1	289	1967	~298	2.50-50.0	~0° ~0°		Reagent grade purified in current of HCl gas and zone-refined twice; crystals grown by double-gradient method.
2	424	1966	300	38.0-85.1	~0° ~0°		Pressed pellet (2 mm thick); data extracted from smooth curve; Al on CuCl crystal reference standard; comparison to single crystal showed no marked differences.
3	424	1966	77	39.4-85.1	~0° ~0°		Above specimen and conditions.
4	424	1966	~ 20	39.5-85.1	~0° ~0°		Above specimen and conditions.

DATA TABLE NO. 319 NORMAL SPECTRAL REFLECTANCE OF COPPER CHLORIDE CuCl

[Wavelength, λ, μm; Reflectance, ρ; Temperature, T, K]

λ	ρ	λ	ρ	λ	ρ	λ	ρ
CURVE 1 T ~ 298		CURVE 2 T = 300		CURVE 3 (cont.)		CURVE 4 (cont.)	
				63.3	0.413	77.6	0.308
2.50	0.096	38.0	0.070	66.7	0.478	85.1	0.244*
3.30	0.097	41.0	0.074	68.5	0.489		
5.00	0.096	44.9	0.101	70.5	0.461		
6.70	0.095	54.3	0.278	75.8	0.355		
10.0	0.093	58.1	0.299	85.1	0.244*		
14.3	0.090	61.9	0.287				
16.7	0.080	69.4	0.239	CURVE 4 T ~ 20			
18.2	0.071	79.9	0.259				
20.0	0.070	83.1	0.256				
20.8	0.070	85.1	0.244	39.5	0.150		
21.7	0.067			43.2	0.095		
22.7	0.063	CURVE 3 T = 77		45.3	0.161		
23.8	0.060			46.8	0.429		
25.0	0.051			47.4	0.764		
26.3	0.040	39.4	0.135	49.0	0.873		
27.8	0.035	42.9	0.090	51.6	0.938		
29.4	0.032	45.0	0.132	53.9	0.949		
31.3	0.026	46.8	0.352	55.5	0.932		
33.3	0.009	48.1	0.631	57.4	0.595		
35.7	0.001	50.5	0.723	58.9	0.586*		
38.0	0.000	53.7	0.768	60.4	0.562		
41.7	0.010	56.7	0.645	63.1	0.592		
45.5	0.050	58.5	0.473	67.9	0.465		
50.0	0.135	60.3	0.404	72.4	0.371		

*Not shown on plot

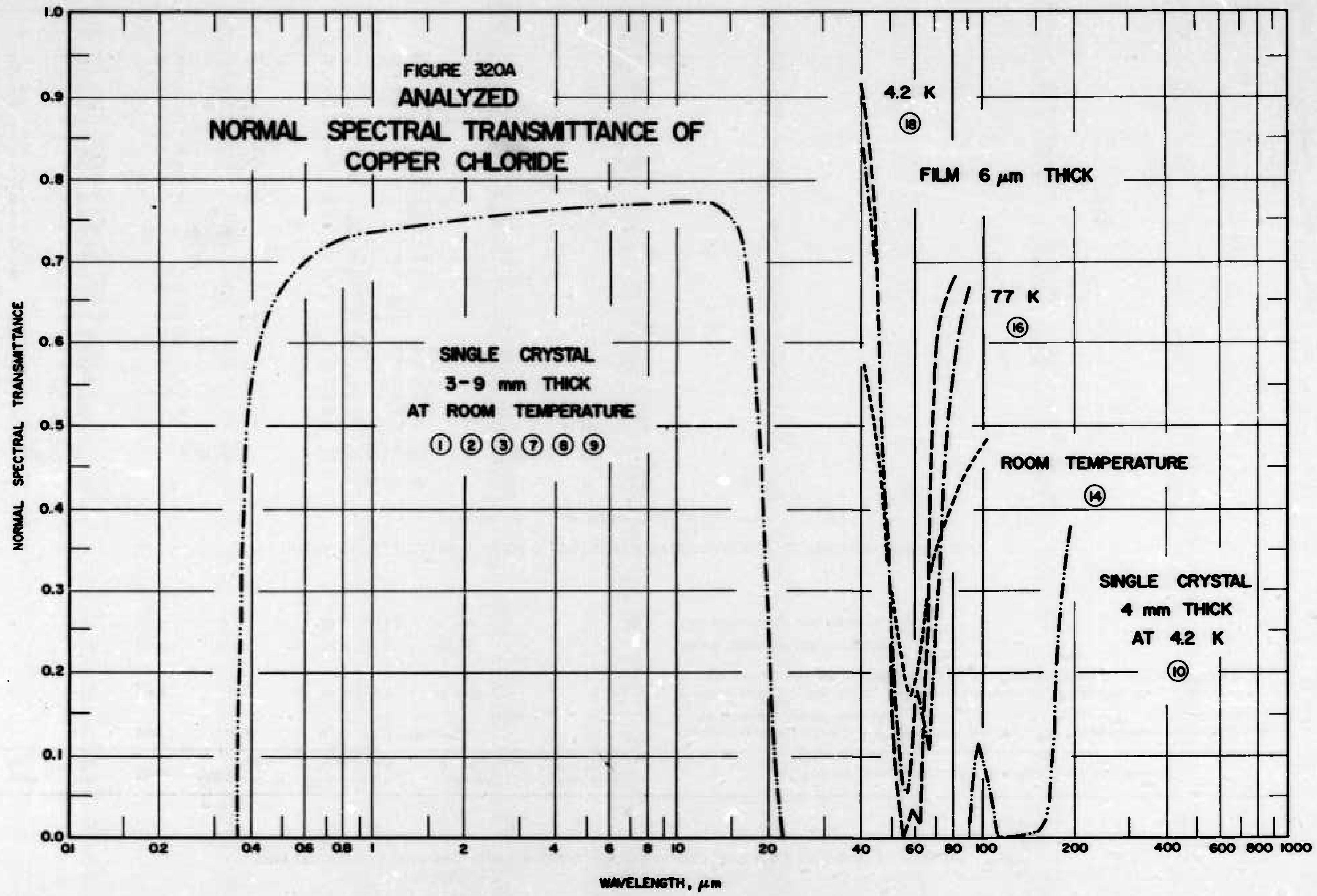


FIGURE 320A
ANALYZED
NORMAL SPECTRAL TRANSMITTANCE OF
COPPER CHLORIDE
SINGLE CRYSTAL
3-9 mm THICK
AT ROOM TEMPERATURE
1 2 3 7 8 9
4.2 K
18
FILM 6 μm THICK
77 K
16
ROOM TEMPERATURE
14
SINGLE CRYSTAL
4 mm THICK
AT 4.2 K
10
NORMAL SPECTRAL TRANSMITTANCE
0.0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
1.0
WAVELENGTH, μm
0.1
0.2
0.4
0.6
0.8
1
2
4
6
8
10
20
40
60
80
100
200
400
600
800
1000

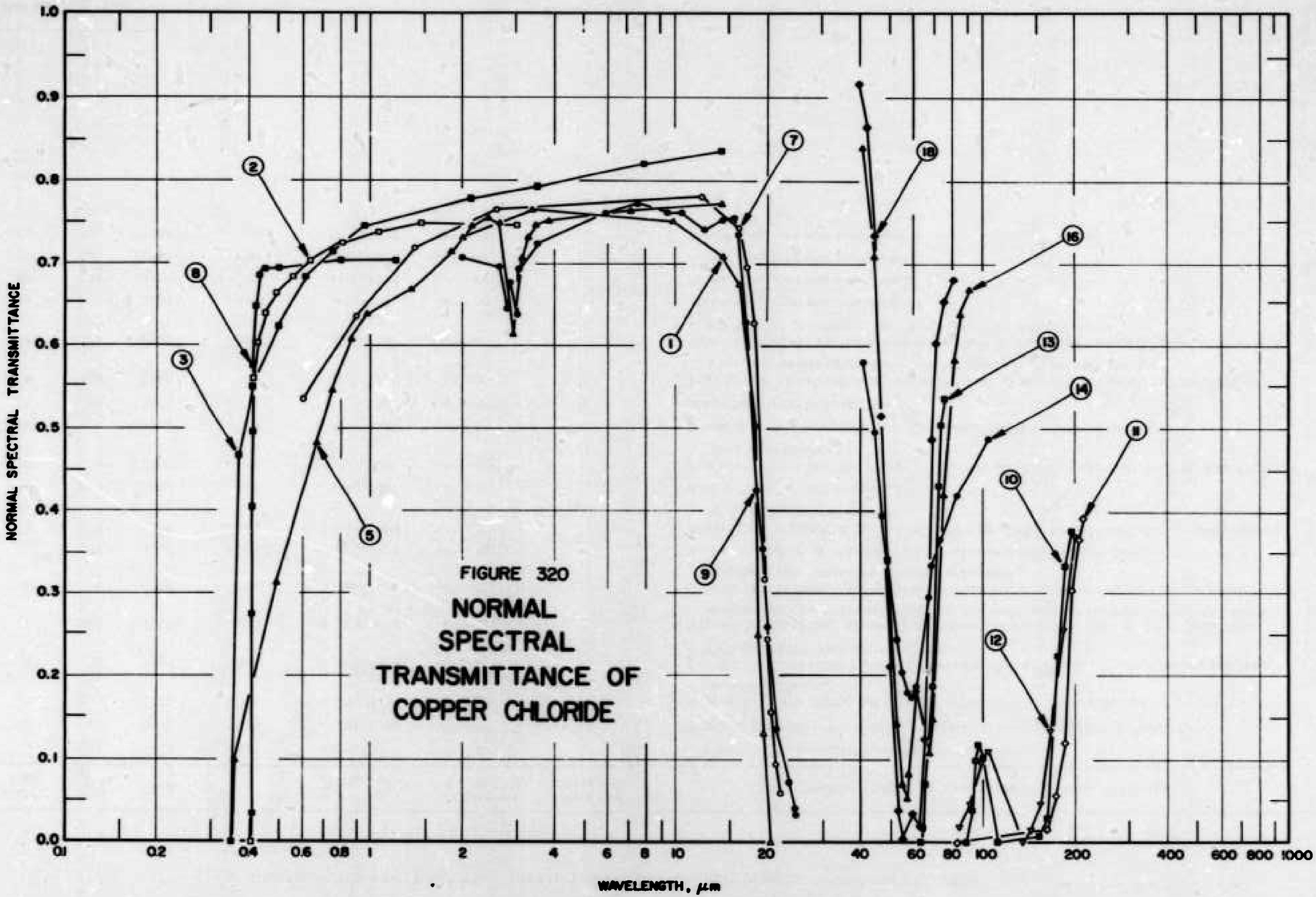


FIGURE 320
NORMAL SPECTRAL TRANSMITTANCE OF COPPER CHLORIDE

SPECIFICATION TABLE NO. 320 NORMAL SPECTRAL TRANSMITTANCE OF COPPER CHLORIDE CuCl

Curve No.	Ref. No.	Year	Temperature K	Wavelength Range, μm	Geometry θ	θ'	ω'	Reported Error, %	Composition (weight percent), Specifications, and Remarks
1	102	1965	~298	2.00-20.7	0°	0°			9.1 mm thick; data extracted from smooth curve.
2	94	1967	298	0.401-3.00	~0°	~0°		±2	Single crystal (9.1 mm thick); polished; data extracted from smooth curve.
3	126	1967	~298	0.350-14.4	~0°	~0°			Crystal (2.6 mm thick); grown from purified CuCl; polished; data extracted from smooth curve.
4*	126	1967	~298	0.350-14.4	~0°	~0°			Crystal (2.0 mm thick); grown from purified CuCl and 0.13% CsCl added; polished; data extracted from smooth curve.
5	126	1967	~298	0.350-14.4	~0°	~0°			Crystal (2 mm thick); grown from intermediate product after a single distillation without addition of metallic copper; polished; data extracted from smooth curve.
6*	126	1967	~298	0.350-14.4	~0°	~0°			Crystal (5 mm thick); grown from purified CuCl. after prolonged storage in air; polished; data extracted from smooth curve.
7	364	1965	~298	0.600-22.0	~0°	~0°			Single crystal (3.92 mm thick); data extracted from smooth curve.
8	289	1967	~298	0.401-1.20	~0°	~0°			Reagent grade purified in current of HCl gas and zone-refined twice; crystals grown by double-gradient method.
9	289	1967	~298	2.00-24.7	~0°	~0°			Above specimen and conditions.
10	424	1966	4.2	62.5-199	~0°	~0°			Single crystal (4 mm thick); clear blue but somewhat opalescent looking; data extracted from smooth curve.
11	424	1966	~ 20	83.8-212	~0°	~0°			Pressed pellet (2.3 mm thick); data extracted from smooth curve.
12	424	1966	4.2	84.0-200	~0°	~0°			Above specimen and conditions.
13	424	1966	4.2	62.5-75.7	~0°	~0°			Film (20 μm thick) sublimed on quartz plate (2 mm thick); paraffin evaporated on film surface for protection; data extracted from smooth curve.
14	424	1966	300	41.3-105	~0°	~0°			Film (6 μm thick) sublimed on quartz plate (2 mm thick); paraffin evaporated on film surface for protection; data extracted from smooth curve.
15*	424	1966	200	46.9-107	~0°	~0°			Above specimen and conditions.
16	424	1966	77	41.8-90.1	~0°	~0°			Above specimen and conditions.
17*	424	1966	~ 20	42.4-90.1	~0°	~0°			Above specimen and conditions.
18	424	1966	4.2	40.0-81.3	~0°	~0°			Above specimen and conditions.

*Not shown on plot

DATA TABLE NO. 320 NORMAL SPECTRAL TRANSMITTANCE OF COPPER CHLORIDE CuCl

[Wavelength, λ, μm; Transmittance, τ; Temperature, T, K]

λ	τ
CURVE 1 T ~ 298	
2.00	0.731
3.40	0.767
9.90	0.753
14.5	0.710
16.3	0.675
18.3	0.505
18.9	0.250
19.3	0.131
20.7	0.000
CURVE 2 T = 298	
0.401	0.000
0.407	0.560
0.422	0.603
0.455	0.638
0.490	0.662
0.549	0.683
0.633	0.703
0.816	0.726
1.06	0.740
1.48	0.750
3.00	0.748
CURVE 3 T ~ 298	
0.350	0.000
0.370	0.467
0.410	0.550
0.500	0.623
0.610	0.682
0.750	0.714
0.960	0.747
2.15	0.780
3.59	0.794
7.83	0.821
14.4	0.837
CURVE 4* T ~ 298	
0.350	0.000
0.370	0.467
0.410	0.550

λ	τ
CURVE 4 (cont.)*	
0.490	0.603
0.570	0.641
0.680	0.680
0.830	0.705
0.990	0.724
1.57	0.749
2.40	0.767
4.04	0.786
8.37	0.803
14.4	0.822
CURVE 5 T ~ 298	
0.350	0.000*
0.360	0.100
0.490	0.313
0.660	0.482
0.750	0.547
0.870	0.607
0.980	0.637
1.36	0.667
1.84	0.713
2.19	0.746
2.45	0.757
2.66	0.750
2.91	0.613
3.13	0.708
3.30	0.732
3.50	0.747
3.86	0.752
7.16	0.766
14.4	0.775
CURVE 6* T ~ 298	
0.350	0.000
0.370	0.195
0.420	0.341
0.460	0.450
0.500	0.484
0.580	0.501
0.630	0.494
0.690	0.471
0.770	0.391
0.910	0.242

λ	τ
CURVE 6 (cont.)*	
0.960	0.226
1.00	0.243
1.15	0.381
1.39	0.491
1.64	0.557
1.92	0.597
2.19	0.611
2.41	0.604
2.62	0.577
2.80	0.523
2.97	0.517
3.12	0.523
3.41	0.583
3.60	0.605
4.00	0.614
6.77	0.633
14.4	0.641
CURVE 7 T ~ 298	
0.600	0.535
9.900	0.634
1.40	0.720
2.60	0.767
12.4	0.782
16.2	0.745
17.4	0.699
18.2	0.628
19.6	0.319
20.0	0.245
20.5	0.159
21.1	0.094
22.0	0.060
CURVE 8 T ~ 298	
0.401	0.00104
0.403	0.0326
0.406	0.276
0.407	0.405
0.408	0.498
0.410	0.575
0.414	0.625*
0.420	0.649

λ	τ
CURVE 8 (cont.)	
0.433	0.685
0.450	0.694
0.500	0.694
0.800	0.704
1.20	0.704
CURVE 9 T ~ 298	
2.00	0.709
2.68	0.699
2.80	0.645
2.88	0.676
3.00	0.637
3.07	0.645*
3.09	0.694
3.13	0.704*
3.53	0.725
5.83	0.763
7.59	0.775
9.57	0.763
10.6	0.763
12.6	0.741
14.4	0.752
15.6	0.758
16.1	0.736
16.7	0.671*
17.1	0.629
18.5	0.427
19.1	0.357
20.0	0.260
21.6	0.137
23.1	0.0714
24.2	0.0403
24.7	0.0316
CURVE 10 T = 4.2	
62.5	0.000
88.6	0.000
92.1	0.038
95.1	0.100
97.5	0.119
100	0.103
111	0.000

λ	τ
CURVE 10 (cont.)	
153	0.007
161	0.027
177	0.225
187	0.332
199	0.380
CURVE 11 T ~ 20	
83.8	0.000
151	0.005*
161	0.015
174	0.057
186	0.120
199	0.306
206	0.367
212	0.395
CURVE 12 T = 4.2	
84.0	0.019
90.4	0.046
98.3	0.096
104	0.110
135	0.000
144	0.014
154	0.046
168	0.135
184	0.257
200	0.372
CURVE 13 T = 4.2	
62.5	0.000*
64.0	0.016
65.8	0.070
68.2	0.189
72.0	0.432
73.8	0.504
75.7	0.538

λ	τ
CURVE 14 T = 300	
41.3	0.580
44.4	0.497
47.8	0.397
49.5	0.340
52.9	0.244
54.9	0.204
57.1	0.180
58.5	0.175
61.3	0.188
67.6	0.298
69.0	0.335
73.0	0.368
83.3	0.420
105	0.488
CURVE 15* T = 200	
46.9	0.548
51.5	0.250
54.1	0.156
56.8	0.105
61.7	0.185
66.2	0.263
69.4	0.236
74.1	0.306
84.7	0.430
95.2	0.502
107	0.550
CURVE 16 T = 77	
41.8	0.842
44.8	0.710
49.3	0.346
52.4	0.143
54.6	0.070
56.5	0.052
57.8	0.081
61.3	0.184
67.6	0.107
69.9	0.150
75.2	0.420
80.6	0.582

λ	τ
CURVE 16 (cont.)	
85.5	0.638
90.1	0.666
CURVE 17* T ~ 20	
42.4	0.851
44.6	0.747
49.5	0.247
50.8	0.134
54.6	0.028
56.5	0.011
58.8	0.016
62.1	0.012
64.5	0.049
68.0	0.294
70.9	0.505
73.5	0.576
77.5	0.625
83.3	0.661
90.1	0.683
CURVE 18 T = 4.2	
40.0	0.920
42.7	0.865
45.0	0.734
46.9	0.517
50.2	0.211
53.7	0.039
55.6	0.002
59.2	0.034
63.3	0.018
65.4	0.125
69.0	0.487
71.9	0.603
75.8	0.651
81.3	0.680

*Not shown on plot

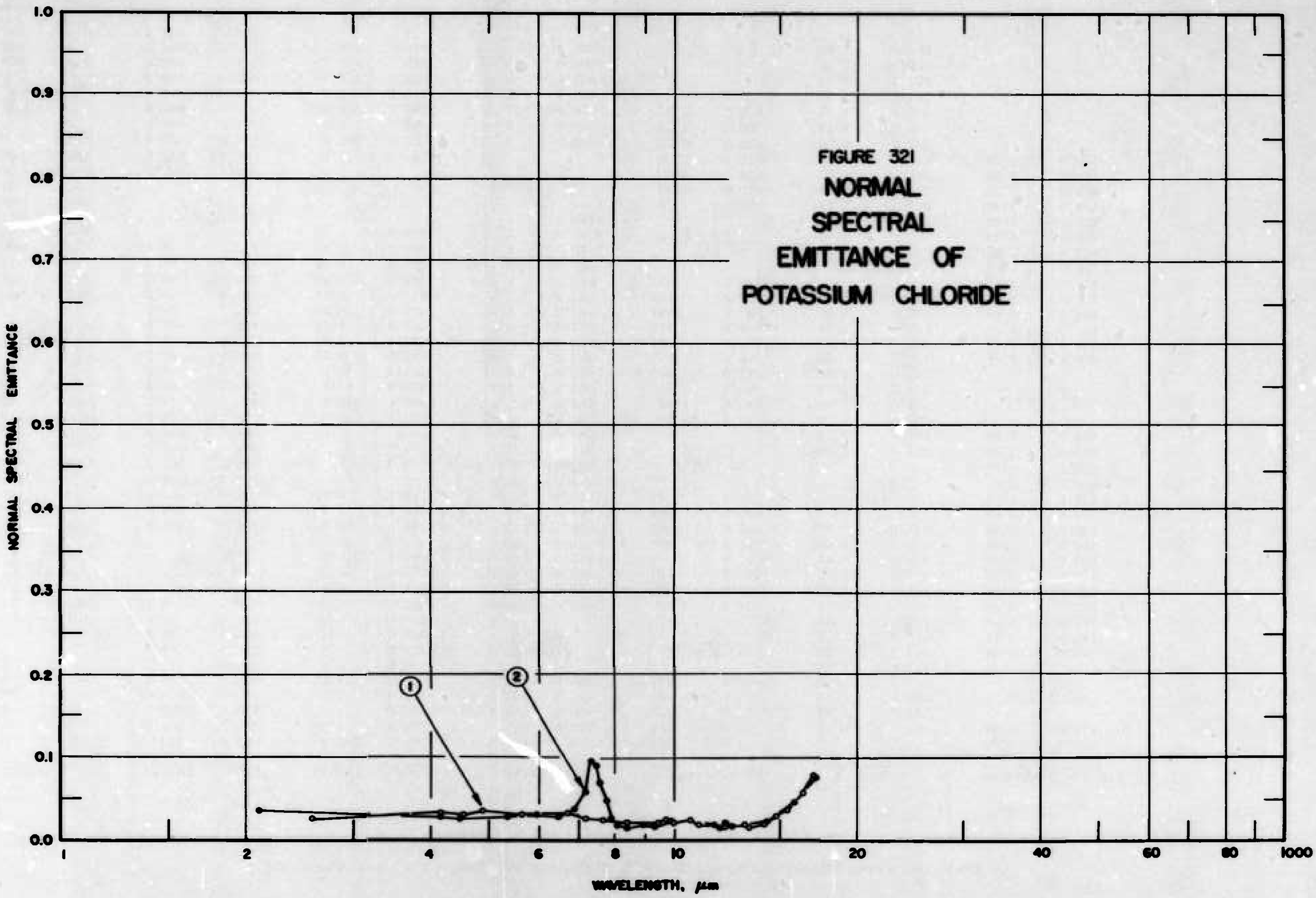


FIGURE 321
NORMAL
SPECTRAL
EMITTANCE OF
POTASSIUM CHLORIDE

SPECIFICATION TABLE NO. 321 NORMAL SPECTRAL EMITTANCE OF POTASSIUM CHLORIDE KCl

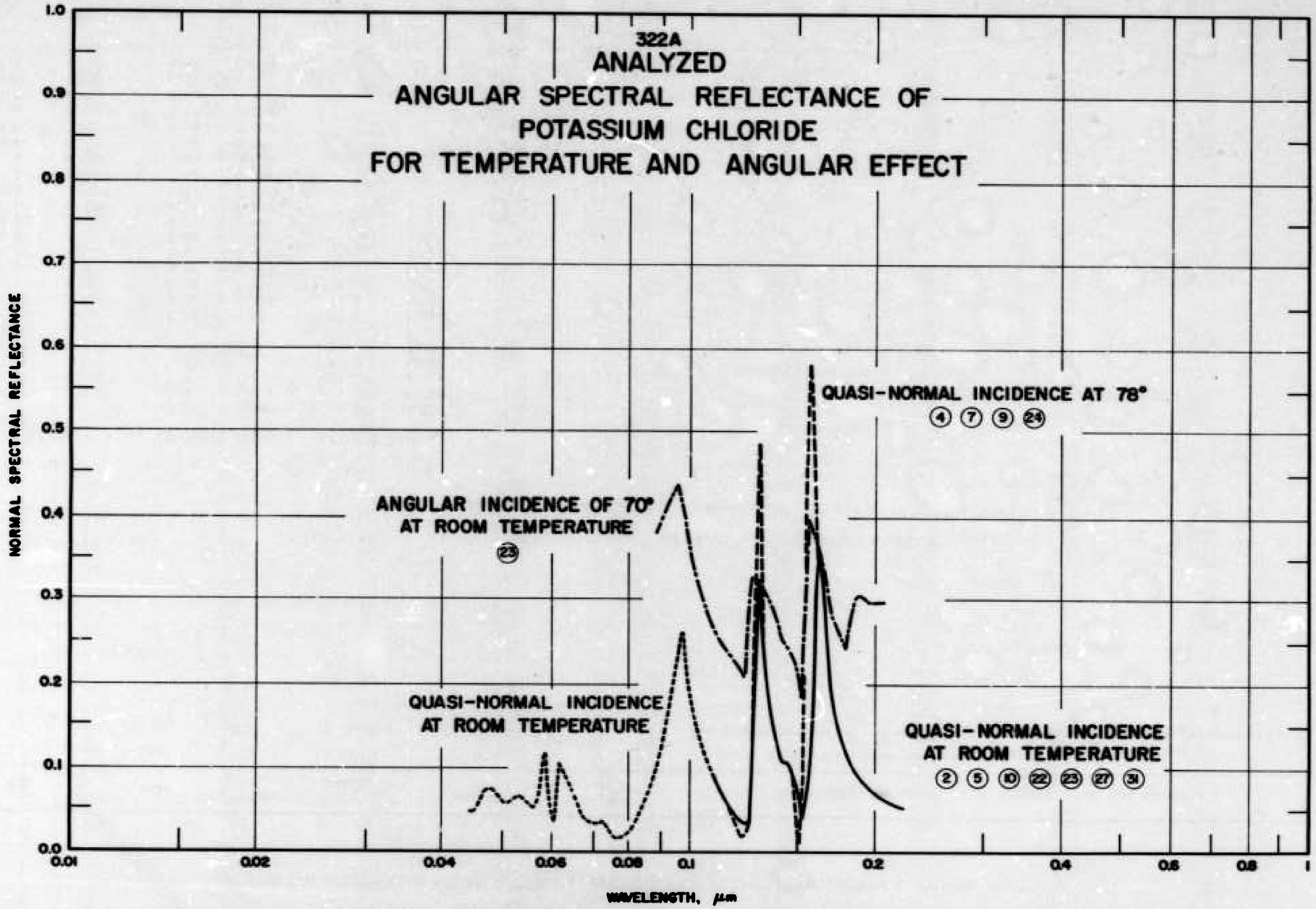
Curve No.	Ref. No.	Year	Temperature K	Wavelength Range, μm	Geometry θ'	Reported Error, %	Composition (weight percent), Specifications, and Remarks
1	309	1964	373	2.56-16.9	~0°		Crystal (2.10 mm thick); data extracted from smooth curve.
2	309	1964	373	2.10-17.0	~0°		Above specimen and conditions except measured after 2 hrs x-ray irradiation at 298 K.

DATA TABLE NO. 321 NORMAL SPECTRAL EMITTANCE OF POTASSIUM CHLORIDE KCl

[Wavelength, λ, μm; Emittance, ε; Temperature, T, K]

λ	ε	λ	ε	λ	ε
CURVE 1		CURVE 1 (cont.)		CURVE 2 (cont.)	
T = 373					
		16.2	0.055	9.26	0.018
2.56	0.026	16.9	0.076	9.82	0.021
4.17	0.032			11.6	0.019
4.51	0.030	CURVE 2		11.8	0.016
4.88	0.035	T = 373		12.1	0.020
5.61	0.030			12.4	0.017
6.70	0.032	2.10	0.035	13.4	0.015*
7.12	0.026	4.15	0.029	14.2	0.021
7.69	0.024	4.46	0.026	14.7	0.029*
8.37	0.020	5.31	0.028	15.7	0.044
9.36	0.020	5.47	0.027*	17.0	0.074
9.67	0.023	5.97	0.030		
9.95	0.020	6.47	0.029		
10.6	0.022	6.87	0.037		
10.9	0.017	7.11	0.058		
11.1	0.019*	7.30	0.094		
12.1	0.016	7.43	0.089		
13.0	0.018	7.56	0.067		
13.2	0.016	7.79	0.047		
13.5	0.018*	7.90	0.025		
14.0	0.019	8.03	0.017		
14.6	0.029	8.31	0.015		
15.3	0.035	8.87	0.019		

*Not shown on plot


322A
ANALYZED
ANGULAR SPECTRAL REFLECTANCE OF
POTASSIUM CHLORIDE
FOR TEMPERATURE AND ANGULAR EFFECT
QUASI-NORMAL INCIDENCE AT 78°
4 7 9 24
ANGULAR INCIDENCE OF 70°
AT ROOM TEMPERATURE
23
QUASI-NORMAL INCIDENCE
AT ROOM TEMPERATURE
QUASI-NORMAL INCIDENCE
AT ROOM TEMPERATURE
2 5 10 22 23 27 31
NORMAL SPECTRAL REFLECTANCE
1.0
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0.0
0.01
0.02
0.04
0.06
0.08
0.1
0.2
0.4
0.6
0.8
1
WAVELENGTH, μm

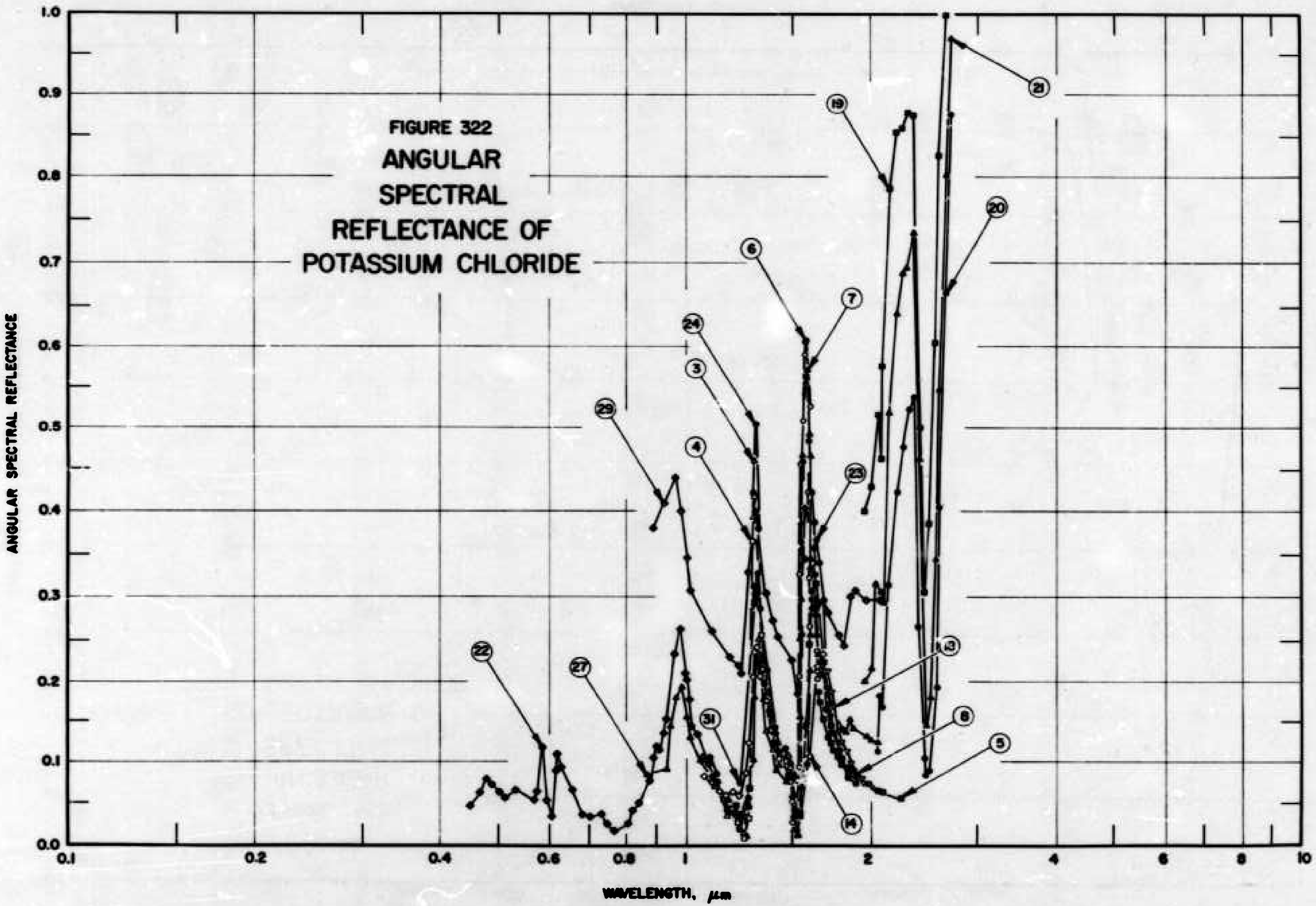


FIGURE 322
ANGULAR SPECTRAL REFLECTANCE OF POTASSIUM CHLORIDE

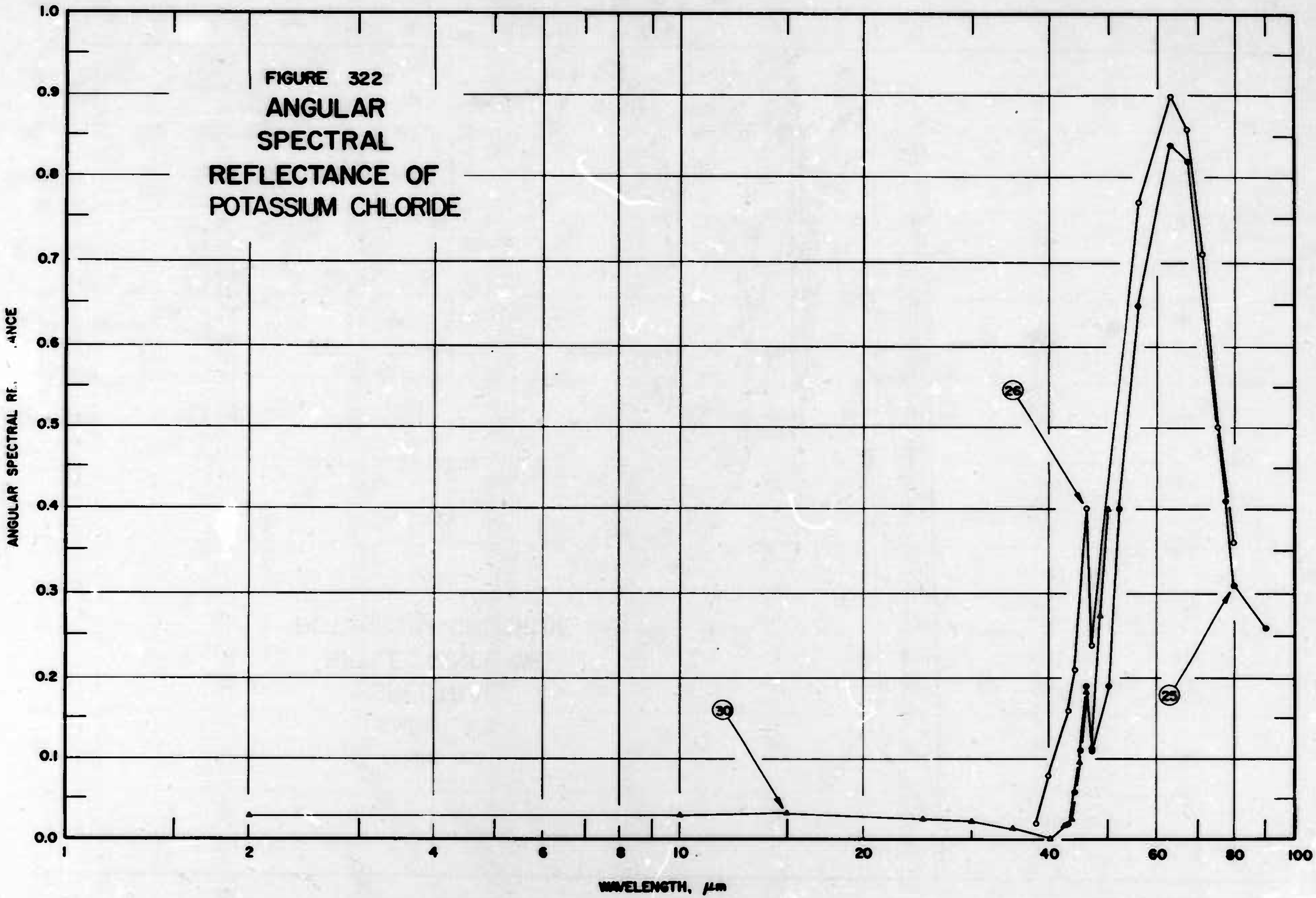


FIGURE 322
ANGULAR
SPECTRAL
REFLECTANCE OF
POTASSIUM CHLORIDE

SPECIFICATION TABLE NO. 322 ANGULAR SPECTRAL REFLECTANCE OF POTASSIUM CHLORIDE KCl

Curve No.	Ref. No.	Year	Temperature K	Wavelength Range, µm	Geometry θ	θ'	ω'	Reported Error, %	Composition (weight percent), Specifications, and Remarks
1*	127	1967	295	0.106-0.163	~10°	~10°			Single crystal; purified by vacuum distillation and chlorine treatment; zone-refined in the chlorine atm; cleaved; measured in vacuum (2-4 x 10^{-7} mm Hg); measured with constant slit width.
2*	127	1967	295	0.110-0.152	~10°	~10°			Above specimen and conditions except measured with variable slit width.
3	127	1967	10	0.106-0.221	~10°	~10°			Single crystal; purified by vacuum distillation and chlorine treatment; zone-refined in the chlorine atm; cleaved; measured in vacuum (2-4 x 10^{-7} mm Hg); data extracted from smooth curve.
4	127	1967	78	0.106-0.221	~10°	~10°			Above specimen and conditions.
5	127	1967	295	0.106-0.221	~10°	~10°			Above specimen and conditions.
6	127	1967	10	0.147-0.170	~10°	~10°			Cleaved single crystal purified by vacuum distillation and chlorine treatment; zone-refined in chlorine atm; measured in vacuum (2-4 x 10^{-7} mm Hg).
7	127	1967	78	0.147-0.172	~10°	~10°			Above specimen and conditions.
8	127	1967	10	0.163-0.209	~10°	~10°			Single crystal; purified by vacuum distillation and chlorine treatment; zone-refined in the chlorine atm; cleaved; measured in vacuum (2-4 x 10^{-7} mm Hg).
9*	127	1967	78	0.164-0.182	~10°	~10°			Above specimen and conditions except data extracted from smooth curve.
10*	127	1967	295	0.166-0.211	~10°	~10°			Above specimen and conditions.
11*	128	1967	183	0.111-0.196	~10°	~10°			Single crystal; purified by vacuum distillation and chlorine treatment; zone-refined in the chlorine atm; cleaved; measured in vacuum (2-4 x 10^{-7} mm Hg); data extracted from smooth curve.
12*	128	1967	387	0.109-0.196	~10°	~10°			Above specimen and conditions.
13*	128	1967	477	0.120-0.196	~10°	~10°			Above specimen and conditions.
14	128	1967	573	0.107-0.196	~10°	~10°			Above specimen and conditions.
15*	128	1967	183	0.165-0.180	~10°	~10°			Above specimen and conditions.
16*	128	1967	387	0.168-0.192	~10°	~10°			Above specimen and conditions.
17*	128	1967	477	0.169-0.198	~10°	~10°			Above specimen and conditions.
18	128	1967	573	0.170-0.194	~10°	~10°			Above specimen and conditions except data not extracted from smooth curve.
19	366	1952	~298	0.195-0.269	0°	2π			KCl:Tl; particles <40 µm.
20	366	1952	~298	0.205-0.270	0°	2π			KCl:Tl; particles <200 µm.
21	366	1952	~298	0.195-0.270	0°	2π			KCl:Tl; particles 100 µm.
22	389	1968	300	0.0447-0.112	~0°	~0°			Crystal; from the Harshaw Chemical Co.; freshly cleaved surface.
23	389	1968	300	0.109-0.194	~0°	~0°			Above specimen and conditions.
24	389	1968	77	0.109-0.194	~0°	~0°			Similar to the above specimen and conditions.

* Not shown on plot

SPECIFICATION TABLE NO. 322 (continued)

Curve No.	Ref. No.	Year	Temperature K	Wavelength Range, μm	Geometry θ	θ'	ω'	Reported Error, %	Composition (weight percent), Specifications, and Remarks
25	95	1958	298	43.0-90.0	12°	12°			Al mirror reference standard; data extracted from smooth curve.
26	95	1958	298	38.0-80.0	52°	52°			Above specimen and conditions.
27	96	1963	298	0.0860-0.208	20°		2π		Cleaved crystal; unpolarized incident energy; measured in air.
28*	96	1963	298	0.0930-0.208	50°		2π		Above specimen and conditions.
29	96	1963	298	0.0888-0.208	70°		2π		Above specimen and conditions.
30	102	1965	~298	2.00-50.0	30°	30°			Data extracted from smooth curve; aluminum mirror reference standard.
31	377	1968	300	0.122-0.178	~20°	~20°			Cleaved single crystal; back surface treated with emery cloth; pressure $<10^{-6}$ mm Hg; data extracted from smooth curve.
32*	377	1968	55	0.121-0.169	~20°	~20°			Above specimen and conditions.

* Not shown on plot

DATA TABLE NO. 322 ANGULAR SPECTRAL REFLECTANCE OF POTASSIUM CHLORIDE KCl

[Wavelength, λ, μm; Reflectance, ρ; Temperature, T, K]

λ	ρ
CURVE 1*	
T = 295	
0.106	0.103
0.106	0.101
0.109	0.084
0.110	0.079
0.111	0.073
0.112	0.068
0.114	0.054
0.115	0.050
0.116	0.049
0.116	0.050
0.117	0.046
0.117	0.048
0.119	0.047
0.120	0.045
0.121	0.041
0.121	0.040
0.123	0.037
0.124	0.037
0.124	0.038
0.125	0.043
0.125	0.055
0.126	0.077
0.126	0.126
0.127	0.227
0.128	0.261
0.128	0.302
0.129	0.309
0.129	0.315
0.129	0.305
0.131	0.279
0.132	0.251
0.133	0.222
0.134	0.207
0.134	0.195
0.135	0.178
0.136	0.158
0.137	0.145
0.137	0.135
0.139	0.120
0.140	0.111
0.141	0.105
0.142	0.101
0.143	0.097
0.144	0.095
0.145	0.090

λ	ρ
CURVE 1 (cont.)*	
0.146	0.087
0.146	0.085
0.147	0.085
0.148	0.081
0.149	0.074
0.150	0.060
0.151	0.049
0.151	0.046
0.152	0.042
0.152	0.037
0.153	0.032
0.153	0.031
0.154	0.037
0.154	0.043
0.154	0.048
0.155	0.073
0.155	0.081
0.156	0.114
0.156	0.142
0.157	0.168
0.157	0.208
0.158	0.217
0.158	0.236
0.158	0.259
0.160	0.304
0.160	0.314
0.161	0.322
0.161	0.319
0.162	0.312
0.162	0.309
0.163	0.300
CURVE 2*	
T = 295	
0.110	0.090
0.112	0.083
0.114	0.067
0.116	0.057
0.117	0.053
0.118	0.056
0.120	0.057
0.121	0.046
0.124	0.032
0.125	0.052
0.126	0.106

λ	ρ
CURVE 2 (cont.)*	
0.127	0.204
0.128	0.284
0.129	0.329
0.129	0.330
0.130	0.319
0.132	0.256
0.133	0.228
0.134	0.199
0.135	0.175
0.136	0.161
0.137	0.141
0.139	0.109
0.140	0.105
0.144	0.091
0.145	0.086
0.146	0.089
0.149	0.079
0.149	0.070
0.152	0.039
CURVE 3	
T = 10	
0.106	0.106
0.111	0.070
0.112	0.075*
0.115	0.053
0.116	0.034
0.119	0.040
0.120	0.037
0.124	0.013
0.125	0.010
0.125	0.031
0.128	0.394
0.129	0.460
0.132	0.251
0.134	0.176
0.135	0.137
0.137	0.125*
0.137	0.114
0.141	0.096
0.143	0.095*
0.144	0.104
0.145	0.097
0.146	0.109
0.149	0.019*

λ	ρ
CURVE 3 (cont.)	
0.150	0.014*
0.151	0.022*
0.153	0.263*
0.155	0.508*
0.156	0.609*
0.158	0.268*
0.159	0.528*
0.160	0.379*
0.161	0.295*
0.162	0.238*
0.164	0.183*
0.168	0.141*
0.170	0.125*
0.174	0.110*
0.179	0.098*
0.198	0.073*
0.221	0.056*
CURVE 4	
T = 78	
0.106	0.106*
0.111	0.070*
0.112	0.075*
0.115	0.053*
0.117	0.037*
0.118	0.043
0.119	0.043*
0.122	0.028
0.124	0.009
0.125	0.014*
0.126	0.031
0.128	0.364
0.129	0.404*
0.129	0.417
0.130	0.398*
0.132	0.256
0.133	0.214
0.134	0.173*
0.136	0.138
0.138	0.117*
0.141	0.101
0.143	0.099*
0.144	0.110
0.145	0.099
0.147	0.100*

λ	ρ
CURVE 4 (cont.)	
0.147	0.084*
0.150	0.018*
0.150	0.012*
0.151	0.016*
0.152	0.060*
0.153	0.220*
0.156	0.567*
0.157	0.570*
0.157	0.555*
0.158	0.337*
0.160	0.464*
0.161	0.314*
0.162	0.277*
0.165	0.196*
0.167	0.159*
0.168	0.143*
0.171	0.126*
0.173	0.114*
0.178	0.099*
0.194	0.076*
0.207	0.064*
0.221	0.056*
CURVE 5	
T = 295	
0.106	0.106*
0.114	0.052*
0.115	0.052*
0.117	0.041
0.118	0.047
0.120	0.046
0.122	0.032
0.125	0.038*
0.126	0.068
0.129	0.293
0.129	0.313
0.130	0.305
0.132	0.251*
0.136	0.156
0.138	0.124
0.141	0.105*
0.143	0.098*
0.144	0.096*
0.146	0.082
0.148	0.080*

λ	ρ
CURVE 5 (cont.)	
0.152	0.035*
0.153	0.031
0.155	0.085
0.158	0.248
0.160	0.308
0.161	0.316
0.162	0.297*
0.164	0.293
0.165	0.274*
0.166	0.223
0.167	0.192*
0.169	0.164
0.171	0.142
0.174	0.122*
0.179	0.104
0.184	0.089
0.205	0.066
0.221	0.056
CURVE 6	
T = 10	
0.147	0.093
0.147	0.077
0.148	0.051
0.149	0.027
0.150	0.017*
0.151	0.015*
0.151	0.053*
0.152	0.095
0.153	0.209
0.153	0.229*
0.153	0.328
0.154	0.399*
0.154	0.456
0.155	0.464*
0.155	0.510
0.156	0.591
0.156	0.610
0.156	0.610*
0.156	0.585*
0.157	0.557*
0.157	0.496*
0.157	0.423
0.157	0.373*
0.158	0.322

λ	ρ
CURVE 6 (cont.)	
0.158	0.268
0.158	0.272*
0.158	0.351*
0.159	0.460*
0.159	0.528
0.159	0.503*
0.159	0.416*
0.160	0.371*
0.160	0.341*
0.160	0.309*
0.161	0.294*
0.161	0.268*
0.162	0.237
0.163	0.211
0.163	0.201
0.164	0.190*
0.165	0.173*
0.166	0.153*
0.170	0.129*
0.170	0.122*
CURVE 7	
T = 78	
0.147	0.100
0.147	0.086*
0.148	0.060
0.149	0.036
0.150	0.017*
0.151	0.013
0.151	0.021*
0.152	0.055
0.153	0.155
0.153	0.252
0.154	0.298
0.154	0.386
0.155	0.466
0.156	0.559
0.156	0.573*
0.157	0.573
0.157	0.562*
0.157	0.492
0.158	0.442*
0.158	0.378*
0.158	0.355*
0.158	0.335

λ	ρ
CURVE 7 (cont.)	
0.159	0.344
0.159	0.368*
0.159	0.418*
0.159	0.466
0.160	0.435*
0.160	0.404*
0.160	0.360*
0.161	0.342*
0.161	0.315*
0.161	0.289
0.162	0.271*
0.162	0.259
0.162	0.246*
0.163	0.231
0.163	0.224*
0.164	0.208*
0.165	0.192*
0.165	0.187*
0.166	0.166*
0.170	0.131*
0.170	0.130*
0.172	0.123*
CURVE 8	
T = 10	
0.163	0.211*
0.163	0.201*
0.164	0.189
0.165	0.173
0.166	0.153
0.170	0.130
0.171	0.122
0.172	0.115
0.174	0.109*
0.177	0.105
0.179	0.099
0.181	0.096*
0.183	0.094
0.186	0.090
0.188	0.086*
0.189	0.085
0.199	0.073
0.206	0.066*
0.209	0.064

*Not shown on plot

DATA TABLE NO. 322 (continued)

λ	ρ
CURVE 9*	**T = 78**
0.164	0.215
0.165	0.191
0.166	0.177
0.166	0.165
0.167	0.154
0.168	0.143
0.169	0.136
0.171	0.127
0.172	0.121
0.173	0.115
0.176	0.108
0.178	0.103
0.182	0.094
CURVE 10*	**T = 295**
0.166	0.217
0.167	0.203
0.168	0.183
0.169	0.168
0.170	0.156
0.172	0.137
0.174	0.126
0.174	0.122
0.175	0.122
0.177	0.111
0.178	0.111
0.179	0.102
0.180	0.101
0.183	0.092
0.186	0.089
0.188	0.083
0.189	0.081
0.195	0.075
0.197	0.075
0.199	0.073
0.204	0.068
0.206	0.068
0.209	0.064
0.211	0.062
CURVE 11*	**T = 183**
0.111	0.073
CURVE 11 (cont.)*	
0.112	0.066
0.113	0.062
0.116	0.047
0.117	0.044
0.118	0.046
0.118	0.051
0.119	0.050
0.122	0.039
0.123	0.033
0.124	0.031
0.125	0.038
0.126	0.069
0.126	0.087
0.127	0.163
0.128	0.328
0.129	0.362
0.129	0.364
0.130	0.354
0.132	0.259
0.133	0.221
0.136	0.139
0.139	0.114
0.141	0.104
0.143	0.093
0.147	0.093
0.147	0.088
0.151	0.013
0.152	0.013
0.153	0.050
0.154	0.126
0.156	0.330
0.157	0.382
0.158	0.389
0.161	0.336
0.161	0.337
0.162	0.330
0.164	0.230
0.166	0.191
0.168	0.158
0.170	0.137
0.173	0.119
0.177	0.104
0.183	0.092
0.191	0.079
0.196	0.074
CURVE 12*	**T = 387**
0.109	0.088
0.112	0.066
0.113	0.063
0.114	0.054
0.115	0.056
0.116	0.053
0.117	0.053
0.119	0.058
0.120	0.056
0.122	0.049
0.124	0.051
0.125	0.062
0.126	0.103
0.126	0.138
0.128	0.263
0.129	0.283
0.129	0.286
0.132	0.237
0.136	0.163
0.136	0.150
0.138	0.132
0.142	0.099
0.146	0.083
0.148	0.083
0.153	0.050
0.155	0.058
0.156	0.090
0.158	0.154
0.161	0.264
0.162	0.285
0.163	0.285
0.165	0.270
0.169	0.188
0.172	0.152
0.176	0.121
0.181	0.104
0.187	0.087
0.192	0.080
0.196	0.074
CURVE 13*	**T = 477**
0.120	0.063
0.122	0.056
0.123	0.056
CURVE 13 (cont.)*	
0.124	0.064
0.125	0.072
0.126	0.099
0.127	0.171
0.129	0.252
0.129	0.259
0.130	0.262
0.131	0.252
0.133	0.216
0.136	0.138
0.139	0.113
0.141	0.107
0.143	0.093
0.147	0.093
0.148	0.085
0.149	0.082
0.153	0.063
0.155	0.065
0.156	0.080
0.158	0.133
0.162	0.230
0.164	0.258
0.165	0.262
0.166	0.254
0.171	0.180
0.173	0.152
0.177	0.124
0.182	0.102
0.189	0.085
0.196	0.074
CURVE 14	**T = 573**
0.107	0.083
0.110	0.074
0.113	0.065
0.116	0.060
0.117	0.060*
0.119	0.063
0.120	0.063*
0.122	0.060
0.123	0.064*
0.125	0.087
0.126	0.122
0.128	0.206
0.129	0.237
0.130	0.241
0.133	0.209
0.135	0.175
0.142	0.106*
CURVE 14 (cont.)	
0.145	0.094*
0.147	0.084*
0.149	0.084*
0.152	0.079
0.153	0.073*
0.156	0.083
0.158	0.108
0.164	0.219
0.166	0.234
0.167	0.235
0.171	0.207*
0.176	0.139*
0.180	0.120*
0.184	0.101*
0.190	0.086*
0.196	0.074*
CURVE 15*	**T = 183**
0.165	0.220
0.165	0.207
0.166	0.193
0.167	0.171
0.168	0.154
0.170	0.137
0.172	0.127
0.173	0.121
0.174	0.115
0.176	0.110
0.178	0.104
0.180	0.099
CURVE 16*	**T = 387**
0.168	0.220
0.168	0.202
0.169	0.188
0.170	0.174
0.171	0.162
0.173	0.147
0.174	0.133
0.177	0.120
0.179	0.110
0.182	0.100
0.185	0.092
CURVE 16 (cont.)*	
0.188	0.086
0.190	0.081
0.192	0.077
CURVE 17*	**T = 477**
0.169	0.220
0.171	0.186
0.172	0.170
0.173	0.160
0.174	0.148
0.175	0.135
0.177	0.123
0.180	0.111
0.181	0.106
0.184	0.098
0.186	0.092
0.189	0.086
0.192	0.079
0.195	0.076
0.198	0.072
CURVE 18	**T = 573**
0.170	0.215
0.171	0.207*
0.172	0.188
0.174	0.167
0.177	0.137
0.178	0.124
0.181	0.113
0.182	0.107*
0.185	0.097
0.187	0.094*
0.189	0.087*
0.191	0.083*
0.193	0.080
0.194	0.076
CURVE 19	**T ~ 298**
0.195	0.400
0.200	0.430
0.205	0.517
CURVE 19 (cont.)	
0.207	0.462
0.209	0.578
0.214	0.789
0.220	0.855
0.225	0.860
0.230	0.880
0.234	0.876
0.240	0.500
0.244	0.306
0.249	0.387
0.254	0.606
0.259	0.827
0.264	1.000
0.269	1.139*
CURVE 20	**T ~ 298**
0.205	0.111
0.207	0.181
0.209	0.169
0.214	0.313
0.220	0.422
0.225	0.479
0.230	0.523
0.235	0.537
0.239	0.268
0.242	0.104
0.244	0.084
0.249	0.090
0.255	0.192
0.259	0.405
0.264	0.667
0.270	0.878
CURVE 21	**T ~ 298**
0.195	0.200
0.200	0.216
0.204	0.315
0.207	0.305
0.210	0.294
0.214	0.520
0.220	0.641
0.225	0.690
0.229	0.694
CURVE 21 (cont.)	
0.234	0.736
0.240	0.461
0.244	0.146
0.250	0.180
0.254	0.346
0.259	0.549
0.264	0.804
0.270	0.971
CURVE 22	**T = 300**
0.0447	0.047
0.0452	0.047*
0.0461	0.063
0.0467	0.068*
0.0469	0.077*
0.0474	0.079
0.0486	0.071
0.0490	0.072*
0.0500	0.063
0.0510	0.056
0.0520	0.059*
0.0524	0.062*
0.0530	0.066
0.0537	0.069*
0.0545	0.061*
0.0556	0.052*
0.0568	0.051
0.0573	0.064
0.0583	0.117
0.0588	0.099*
0.0589	0.086*
0.0594	0.052
0.0603	0.033
0.0606	0.038*
0.0609	0.051*
0.0614	0.090
0.0615	0.102*
0.0617	0.110
0.0622	0.105*
0.0630	0.091
0.0631	0.087*
0.0636	0.081*
0.0639	0.084*
0.0642	0.080*
0.0653	0.065

*Not shown on plot

DATA TABLE NO. 322 (continued)

CURVE 22 (cont.)
T = 300

λ	ρ
0.0665	0.047*
0.0671	0.048*
0.0670	0.042*
0.0680	0.037
0.0687	0.034*
0.0694	0.034*
0.0700	0.033
0.0709	0.039*
0.0716	0.038*
0.0723	0.036*
0.0730	0.038
0.0737	0.030*
0.0747	0.026
0.0754	0.019*
0.0757	0.017*
0.0766	0.017
0.0776	0.019*
0.0804	0.028
0.0820	0.035*
0.0819	0.041
0.0829	0.041*
0.0835	0.046*
0.0834	0.050
0.0837	0.055*
0.0850	0.058*
0.0870	0.078
0.0874	0.093*
0.0885	0.104
0.0888	0.113*
0.0901	0.113
0.0897	0.119
0.0915	0.135
0.0924	0.145*
0.0923	0.151
0.0934	0.153*
0.0930	0.157*
0.0959	0.233
0.0979	0.263
0.0983	0.258*
0.0997	0.210
0.100	0.200
0.101	0.187*
0.101	0.178
0.102	0.144
0.104	0.134
0.108	0.097

CURVE 22 (cont.)

λ	ρ
0.108	0.095*
0.109	0.092*
0.112	0.076

CURVE 23
T = 300

λ	ρ
0.109	0.096*
0.110	0.082
0.112	0.075*
0.113	0.061*
0.114	0.054*
0.115	0.057*
0.117	0.045*
0.120	0.047*
0.121	0.039*
0.122	0.039
0.124	0.031*
0.126	0.045
0.126	0.065*
0.129	0.296
0.130	0.329
0.132	0.289
0.135	0.215
0.137	0.173*
0.139	0.135
0.143	0.108*
0.145	0.095*
0.147	0.097*
0.149	0.083
0.153	0.038
0.155	0.051*
0.156	0.099
0.160	0.331*
0.161	0.359
0.162	0.369
0.164	0.340
0.166	0.297
0.168	0.221*
0.169	0.191
0.171	0.156
0.174	0.133*
0.177	0.115
0.184	0.094*
0.194	0.076*

CURVE 24
T = 77

λ	ρ
0.109	0.105
0.110	0.088*
0.112	0.086
0.113	0.068*
0.115	0.057*
0.117	0.042*
0.119	0.042*
0.120	0.049*
0.123	0.019
0.125	0.013*
0.126	0.056
0.126	0.123*
0.127	0.203*
0.128	0.313*
0.128	0.421
0.130	0.504
0.131	0.380
0.133	0.253*
0.134	0.197
0.136	0.162
0.138	0.141
0.139	0.125*
0.141	0.112
0.144	0.105*
0.145	0.115
0.146	0.100*
0.147	0.111*
0.148	0.094*
0.150	0.025*
0.151	0.011*
0.151	0.016*
0.154	0.258
0.154	0.364
0.155	0.459
0.157	0.609
0.158	0.484
0.159	0.348*
0.160	0.472
0.161	0.387
0.163	0.280
0.166	0.208
0.169	0.157*
0.172	0.125*
0.178	0.097*
0.184	0.081
0.189	0.073
0.194	0.072*

CURVE 25
T = 298

λ	ρ
43.0	0.02
44.0	0.06
45.0	0.11
46.0	0.19
47.0	0.11
50.0	0.19
52.0	0.40
56.0	0.65
63.0	0.84
67.0	0.82
75.0	0.41
80.0	0.31
90.0	0.26

CURVE 26
T = 298

λ	ρ
38.0	0.02
40.0	0.08
43.0	0.16
44.0	0.21
46.0	0.40
47.0	0.24
56.0	0.77
63.0	0.90
67.0	0.86
71.0	0.71
75.0	0.50
80.0	0.36

CURVE 27
T = 298

λ	ρ
0.0860	0.075*
0.0860	0.085
0.0898	0.088*
0.0925	0.092
0.0930	0.098*
0.0937	0.104*
0.0940	0.144
0.0960	0.180
0.0965	0.184*
0.0970	0.190*
0.0980	0.195
0.0990	0.181*
0.0995	0.160*

CURVE 27 (cont.)

λ	ρ
0.100	0.155
0.100	0.147*
0.101	0.140*
0.102	0.130
0.103	0.122*
0.103	0.116*
0.104	0.110*
0.105	0.102
0.106	0.098*
0.107	0.093*
0.109	0.089*
0.110	0.084*
0.111	0.080
0.112	0.073*
0.113	0.068*
0.114	0.063*
0.115	0.058*
0.117	0.053
0.119	0.050*
0.120	0.046*
0.120	0.041*
0.123	0.036*
0.124	0.033*
0.125	0.027
0.126	0.038*
0.126	0.076*
0.127	0.101
0.127	0.145*
0.128	0.180
0.128	0.202*
0.129	0.235
0.131	0.219*
0.132	0.205*
0.133	0.180*
0.134	0.177*
0.134	0.169*
0.135	0.156*
0.136	0.147*
0.136	0.134*
0.137	0.128*
0.138	0.119*
0.139	0.114*
0.139	0.110*
0.139	0.104*
0.140	0.090
0.141	0.085*
0.143	0.083*
0.145	0.078

CURVE 27 (cont.)

λ	ρ
0.146	0.074*
0.148	0.070
0.150	0.064*
0.150	0.058*
0.151	0.049
0.151	0.043*
0.152	0.038*
0.152	0.031
0.153	0.054*
0.155	0.081
0.156	0.150
0.157	0.184*
0.158	0.214
0.159	0.232*
0.159	0.258
0.159	0.286*
0.160	0.290
0.161	0.277*
0.163	0.255*
0.165	0.228
0.166	0.217*
0.167	0.192*
0.168	0.174
0.169	0.165*
0.170	0.155*
0.171	0.144*
0.172	0.135
0.172	0.128*
0.174	0.121*
0.175	0.115*
0.177	0.112*
0.179	0.116
0.180	0.127*
0.181	0.138
0.182	0.145*
0.183	0.149*
0.184	0.151
0.186	0.142
0.190	0.139*
0.192	0.135*
0.194	0.133*
0.196	0.131*
0.198	0.130
0.200	0.128
0.202	0.125*
0.205	0.124

CURVE 28*
T = 298

λ	ρ
0.0930	0.185
0.0942	0.233
0.0960	0.248
0.0970	0.236
0.0984	0.190
0.100	0.173
0.101	0.155
0.103	0.139
0.105	0.130
0.107	0.120
0.109	0.110
0.110	0.103
0.112	0.095
0.113	0.085
0.114	0.079
0.116	0.073
0.118	0.072
0.120	0.069
0.121	0.060
0.123	0.055
0.124	0.060
0.125	0.100
0.126	0.135
0.126	0.148
0.127	0.190
0.130	0.270
0.131	0.265
0.133	0.220
0.134	0.198
0.135	0.180
0.136	0.156
0.137	0.143
0.139	0.127
0.141	0.113
0.142	0.107
0.143	0.103
0.145	0.100
0.147	0.095
0.148	0.090
0.149	0.084
0.150	0.065
0.152	0.050
0.154	0.068
0.155	0.118
0.156	0.180
0.157	0.220

CURVE 28 (cont.)*

λ	ρ
0.158	0.261
0.159	0.300
0.160	0.307
0.161	0.302
0.163	0.290
0.165	0.230
0.167	0.206
0.169	0.178
0.171	0.161
0.174	0.145
0.177	0.132
0.179	0.131
0.180	0.153
0.183	0.166
0.185	0.168
0.187	0.163
0.189	0.160
0.191	0.157
0.193	0.153
0.195	0.152
0.197	0.150
0.199	0.146
0.201	0.145
0.204	0.145
0.206	0.144
0.208	0.142

CURVE 29
T = 298

λ	ρ
0.0888	0.380
0.0916	0.410
0.0946	0.434*
0.0960	0.440
0.0970	0.420*
0.0980	0.400
0.0990	0.372*
0.100	0.346
0.101	0.328*
0.102	0.308
0.104	0.294*
0.106	0.280*
0.110	0.262
0.113	0.253*
0.114	0.240*
0.116	0.234*
0.117	0.230

*Not shown on plot

DATA TABLE NO. 322 (continued)

CURVE 29 (cont.)
T = 298

λ	ρ
0.119	0.228*
0.121	0.227*
0.121	0.220
0.122	0.215*
0.123	0.210
0.125	0.235*
0.126	0.294*
0.126	0.330
0.127	0.379*
0.130	0.400
0.131	0.390*
0.133	0.335*
0.135	0.303
0.138	0.275*
0.139	0.263*
0.141	0.255
0.143	0.244*
0.145	0.236*
0.148	0.228
0.149	0.220*
0.151	0.199*
0.153	0.185
0.155	0.280*
0.156	0.345
0.157	0.376*
0.158	0.397*
0.156	0.402
0.161	0.387*
0.163	0.358*
0.165	0.330*
0.166	0.313*
0.169	0.298
0.170	0.285*
0.172	0.270*
0.174	0.262*
0.176	0.259
0.177	0.255*
0.179	0.250*
0.180	0.245
0.181	0.260*
0.182	0.285*
0.183	0.293*
0.185	0.300
0.187	0.304*
0.189	0.309*
0.191	0.304*

CURVE 29 (cont.)

λ	ρ
0.192	0.300*
0.194	0.297*
0.196	0.297
0.200	0.298*
0.202	0.299*
0.206	0.299*
0.208	0.298

CURVE 30
T ~ 298

λ	ρ
2.00	0.030
10.0	0.030
15.0	0.031
25.0	0.026
30.0	0.022
35.0	0.014
40.1	0.002
42.5	0.018
43.7	0.026
45.0	0.096
46.0	0.183
47.0	0.113
48.7	0.275
50.0	0.400

CURVE 31
T = 300

λ	ρ
0.122	0.0731
0.126	0.0523*
0.128	0.211
0.129	0.303
0.130	0.303*
0.137	0.162*
0.139	0.146*
0.141	0.128*
0.143	0.117*
0.145	0.110*
0.147	0.105*
0.149	0.0869*
0.153	0.0410
0.156	0.145
0.158	0.243*
0.160	0.299
0.162	0.326
0.165	0.308*

CURVE 31 (cont.)

λ	ρ
0.168	0.226*
0.170	0.195*
0.172	0.171
0.178	0.140

CURVE 32*
T = 55

λ	ρ
0.121	0.0681
0.122	0.0515
0.124	0.0353
0.125	0.0164
0.127	0.121
0.128	0.224
0.130	0.338
0.130	0.327
0.132	0.217
0.135	0.157
0.138	0.124
0.140	0.110
0.143	0.104
0.145	0.111
0.145	0.110
0.147	0.115
0.149	0.0536
0.151	0.0104
0.153	0.156
0.154	0.295
0.155	0.381
0.156	0.524
0.158	0.320
0.159	0.407
0.161	0.277
0.164	0.201
0.167	0.165
0.169	0.147

*Not shown on plot

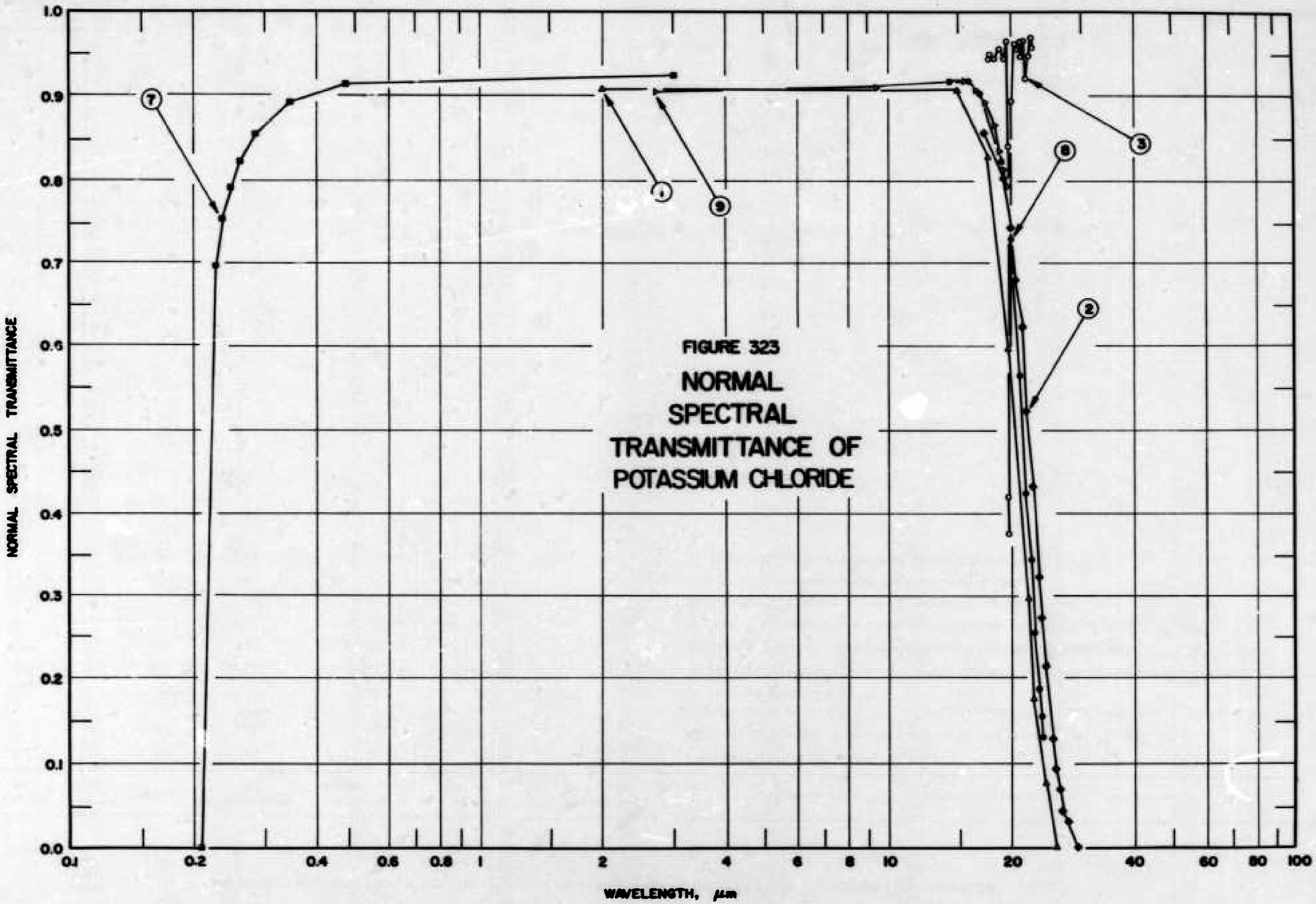


FIGURE 323
NORMAL
SPECTRAL
TRANSMITTANCE OF
POTASSIUM CHLORIDE
NORMAL SPECTRAL TRANSMITTANCE
WAVELENGTH, μm
1.0
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0.0
0.1
0.2
0.4
0.6
0.8
1
2
4
6
8
10
20
40
60
80
100
7
1
5
6
3
2

SPECIFICATION TABLE NO. 323 NORMAL SPECTRAL TRANSMITTANCE OF POTASSIUM CHLORIDE KCl

Curve No.	Ref. No.	Year	Temperature K	Wavelength Range, μm	Geometry θ	θ'	ω'	Reported Error, %	Composition (weight percent), Specifications, and Remarks
1	102	1965	~298	2.00-25.9	0°	0°			Data extracted from smooth curve.
2	93	1960	298	17.2-29.0	~0°	~0°			High purity crystal (5.30 mm thick); data extracted from smooth curve.
3	129	1967	21	17.63-22.28	0°	0°			Air-grown from the melt; U-centres (H^- ions) introduced into the crystal; data extracted from smooth curve.
4*	129	1967	21	19.03-21.29	0°	0°			Similar to the above specimen and conditions except doped with 2.06% Rb^+.
5*	129	1967	21	17.63-22.28	0°	0°			Similar to the above specimen and conditions except doped with 3.77% Rb^+.
6	129	1967	21	19.03-21.50	0°	0°			Similar to the above specimen and conditions except doped with 8.46% Rb^+.
7	94	1967	298	0.210-3.00	~0°	~0°		± 2	Single crystal (10.0 mm thick); polished; data extracted from smooth curve.
8	399	1948	~298	14.1-23.9	~0°	~0°			6 mm thick; data extracted from smooth curve.
9	399	1948	~298	2.70-19.5	~0°	~0°			12 mm thick; data extracted from smooth curve.

*Not shown on plot

DATA TABLE NO. 323 NORMAL SPECTRAL TRANSMITTANCE OF POTASSIUM CHLORIDE KCl

[Wavelength, λ, μm; Transmittance, τ; Temperature, T, K]

λ	τ
CURVE 1 T ~ 298	
2.00	0.907
14.9	0.907
17.4	0.830
19.8	0.598
22.0	0.299
22.8	0.175
24.2	0.077
25.9	0.000
CURVE 2 T = 298	
17.2	0.859
18.7	0.836*
19.3	0.802
20.0	0.746
20.6	0.680
21.1	0.622
21.9	0.521
22.6	0.431
23.3	0.325
23.7	0.271
24.1	0.213
24.6	0.175*
25.1	0.130
25.7	0.094
26.1	0.070
26.8	0.044
27.4	0.031
29.0	0.000
CURVE 3 T = 21	
17.63	0.943
17.85	0.947*
17.87	0.950
17.95	0.943*
18.09	0.950*
18.17	0.943
18.37	0.947*
18.42	0.956*
18.92	0.956
18.94	0.946*
19.11	0.956*
CURVE 3 (cont.)	
19.26	0.944
19.37	0.957*
19.48	0.966
19.54	0.959*
19.68	0.960*
19.73	0.933*
19.78	0.892*
19.81	0.842
19.87	0.420
19.91	0.375
19.96	0.493*
20.00	0.744*
20.05	0.895
20.10	0.929*
20.24	0.945*
20.46	0.961
20.52	0.949*
20.55	0.957*
20.67	0.952
20.70	0.963*
21.00	0.963
21.09	0.947
21.24	0.957*
21.43	0.964
21.72	0.959*
21.84	0.920
21.96	0.959*
22.05	0.949
22.12	0.960*
22.19	0.970
22.28	0.959
CURVE 4* T = 21	
19.03	0.935
19.07	0.931
19.11	0.939
19.26	0.919
19.30	0.908
19.39	0.922
19.50	0.908
19.68	0.895
19.73	0.870
19.78	0.807
19.80	0.724
CURVE 4 (cont.)*	
19.83	0.636
19.95	0.253
20.05	0.505
20.10	0.784
20.12	0.812
20.18	0.914
20.42	0.928
20.54	0.926
20.64	0.823
20.74	0.809
20.87	0.929
21.29	0.931
CURVE 5* T = 21	
17.63	0.897
17.75	0.886
17.93	0.886
18.02	0.877
18.10	0.807
18.23	0.654
18.39	0.866
18.46	0.915
18.63	0.925
18.76	0.875
18.90	0.878
19.00	0.928
19.11	0.941
19.24	0.929
19.33	0.922
19.41	0.930
19.61	0.704
19.70	0.772
19.75	0.740
19.79	0.676
19.92	0.000
20.11	0.000
20.11	0.172
20.24	0.682
20.29	0.790
20.39	0.895
20.47	0.923
20.54	0.895
20.64	0.666
20.79	0.411
CURVE 5 (cont.)*	
20.84	0.467
20.98	0.854
21.06	0.914
21.14	0.911
21.22	0.935
21.40	0.938
21.50	0.927
21.53	0.883
21.67	0.876
21.74	0.889
21.78	0.871
21.97	0.930
22.09	0.935
22.23	0.949
22.28	0.941
CURVE 6 T = 21	
19.03	0.873
19.09	0.889
19.25	0.888
19.33	0.893
19.40	0.901
19.49	0.886
19.69	0.725
19.74	0.718
19.80	0.715
19.90	0.623
20.11	0.352
20.19	0.303
20.25	0.343
20.32	0.482
20.38	0.696
20.49	0.800
20.59	0.805
20.68	0.766
20.90	0.546
20.96	0.532
21.01	0.548
21.08	0.623
21.14	0.742
21.24	0.845
21.40	0.900
21.50	0.906
CURVE 7 T = 298	
0.210	0.000
0.226	0.697
0.235	0.751
0.246	0.791
0.260	0.822
0.283	0.854
0.313	0.876*
0.349	0.892
0.412	0.904*
0.475	0.911
3.00	0.924
CURVE 8 T ~ 293	
14.1	0.916
15.7	0.916
16.9	0.902
19.0	0.824
19.3	0.808
20.0	0.731
21.0	0.564
21.7	0.423
22.2	0.345
22.7	0.255
23.3	0.186
23.7	0.155
23.9	0.131
CURVE 9 T ~ 298	
2.70	0.903
9.40	0.910
15.4	0.918
16.3	0.907
17.3	0.893
18.1	0.867
18.9	0.837
19.2	0.814
19.5	0.794

*Not shown on plot

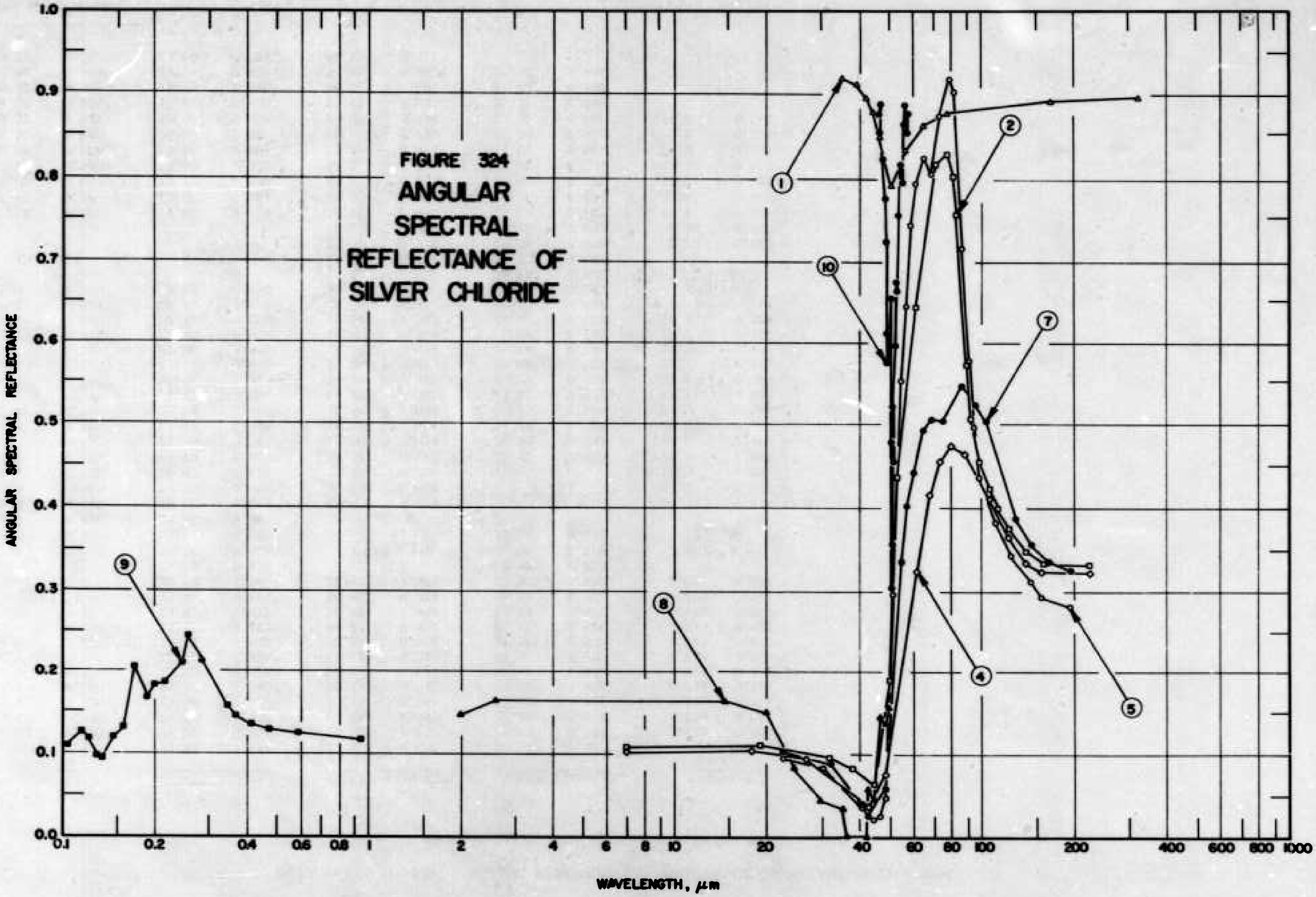


FIGURE 324 ANGULAR SPECTRAL REFLECTANCE OF SILVER CHLORIDE

SPECIFICATION TABLE NO. 324 ANGULAR SPECTRAL REFLECTANCE OF SILVER CHLORIDE AgCl

Curve No.	Ref. No.	Year	Temperature K	Wavelength Range, μm	Geometry θ	θ'	ω'	Reported Error, %	Composition (weight percent), Specifications, and Remarks
1	100	1967	300	35.7-322	0°	0°			Film (1 μm thick); vacuum evaporated onto substrate coated with 0.2 μm film of vacuum deposited silver; data extracted from smooth curve; silvered mirror reference standard.
2	98	1967	25	7.00-226	7.5°	7.5°			Single crystal; data extracted from smooth curve.
3*	98	1967	77	7.00-226	7.5°	7.5°			Above specimen and conditions.
4	98	1967	300	7.00-227	7.5°	7.5°			Above specimen and conditions.
5	101	1968	25	22.6-198	15°	15°			Single crystal cut into a prism to avoid interference; data extracted from smooth curve.
6*	101	1968	77	22.6-198	15°	15°			Above specimen and conditions.
7	101	1968	290	22.6-196	15°	15°			Above specimen and conditions.
8	67	1963	~298	2.00-50.0	30°	30°			Specimen 0.5 mm thick; data extracted from smooth curve; aluminum mirror reference standard.
9	392	1968	~298	0.0496-0.954	23°	23°			Pure sample from Harshaw Chemical and Eastman Kodak; freshly prepared surface polished, etched and rinsed in acid; data extracted from smooth curve.
10	408	1969	7.5	46.2-57.5	~45°	~45°			Film (1 μm thick); evaporated on silver substrate (0.2 μm thick); aluminized mirror reference standard.
11*	408	1969	7.5	49.4-53.1	~45°	~45°			Similar to the above specimen and conditions.

DATA TABLE NO. 324 ANGULAR SPECTRAL REFLECTANCE OF SILVER CHLORIDE AgCl

[Wavelength, λ, μm; Reflectance, ρ; Temperature, T, K]

CURVE 1
T ~ 300

λ	ρ
35.7	0.921
39.2	0.913
42.2	0.898
44.6	0.880
46.9	0.850
50.7	0.791
57.1	0.833
64.9	0.861
76.9	0.879
117	0.893
322	0.898

CURVE 2
T = 25

λ	ρ
7.00	0.109
19.0	0.110
32.0	0.098
38.0	0.083
45.0	0.061
50.0	0.190
53.0	0.437
61.0	0.647
71.0	0.819
77.0	0.837
81.0	0.802
83.0	0.754
90.0	0.573
93.0	0.506
99.0	0.455
106	0.425
114	0.400
124	0.377
140	0.350
160	0.335
226	0.333

CURVE 3*
T = 77

λ	ρ
7.00	0.109
19.0	0.110
32.0	0.098
38.0	0.083

CURVE 3 (cont.)*

λ	ρ
45.0	0.061
48.0	0.132
54.0	0.353
61.0	0.514
67.0	0.642
74.0	0.734
77.0	0.758
83.0	0.723
89.0	0.540
92.0	0.481
98.0	0.451
106	0.421
114	0.393
124	0.373
140	0.351
160	0.334
226	0.333

CURVE 4
T = 300

λ	ρ
7.00	0.101
18.0	0.102
27.0	0.094
43.0	0.038
49.0	0.075
62.0	0.325
68.0	0.418
73.0	0.455
80.0	0.475
89.0	0.464
106	0.411
123	0.365
140	0.339
159	0.326
227	0.322

CURVE 5
T = 25

λ	ρ
22.6	0.097
30.3	0.083
41.3	0.034
44.4	0.020
47.6	0.024

CURVE 5 (cont.)

λ	ρ
49.5	0.047
51.9	0.290
54.3	0.551
56.1	0.649
58.6	0.745
61.1	0.797
63.4	0.818*
65.7	0.824
69.9	0.808
73.3	0.875
76.1	0.914*
78.7	0.920
80.5	0.903
87.8	0.719
91.5	0.577
94.8	0.496
98.6	0.439
111	0.383
126	0.345
143	0.311
158	0.293
181	0.284*
198	0.281

CURVE 6*
T = 77

λ	ρ
22.6	0.097
30.3	0.083
41.3	0.034
44.4	0.020
47.6	0.024
49.5	0.047
51.9	0.290
53.2	0.443
54.4	0.507
58.2	0.641
61.0	0.696
64.1	0.731
66.2	0.736
69.8	0.713
71.6	0.727
76.4	0.818
79.7	0.835
81.7	0.821

CURVE 6 (cont.)*

λ	ρ
91.8	0.626
95.5	0.542
98.4	0.484
108	0.424
122	0.374
132	0.350
155	0.317
180	0.301
198	0.291

CURVE 7
T = 290

λ	ρ
22.6	0.102
32.5	0.089
41.3	0.039
43.6	0.025
46.6	0.027*
49.2	0.059
54.9	0.338
57.1	0.402
60.0	0.443
64.6	0.491
66.3	0.498*
69.9	0.505
74.7	0.503
81.7	0.541*
87.8	0.548
96.9	0.524
102	0.503
130	0.388
146	0.357
168	0.337
196	0.326

CURVE 8

λ	ρ
2.00	0.144
2.60	0.163
14.9	0.163
20.0	0.150
24.9	0.083
30.0	0.044
35.1	0.033
36.8	0.000
42.2	0.000
43.6	0.057
45.0	0.044
47.0	0.144
48.7	0.136
50.0	0.155

CURVE 9
T ~ 298

λ	ρ
0.0496	0.035*
0.0539	0.042*
0.0582	0.051*
0.0639	0.062*
0.0734	0.082*
0.0855	0.104*
0.0932	0.112*
0.102	0.109
0.114	0.122
0.120	0.116
0.127	0.097
0.132	0.091
0.146	0.119
0.149	0.122*
0.157	0.130
0.170	0.204
0.188	0.165
0.200	0.181
0.214	0.185
0.225	0.191*
0.243	0.210
0.253	0.245
0.282	0.211
0.344	0.156
0.365	0.143
0.413	0.132
0.477	0.127

CURVE 9 (cont.)

λ	ρ
0.590	0.121
0.954	0.116

CURVE 10
T = 7.5

λ	ρ
46.2	0.877
46.4	0.868*
46.4	0.876*
46.6	0.878*
46.7	0.880*
46.7	0.890*
47.0	0.890
47.1	0.881*
47.2	0.858*
47.3	0.852
47.6	0.858*
47.8	0.858*
48.0	0.822
48.1	0.816*
48.2	0.801*
48.3	0.791*
48.4	0.774*
48.5	0.779
48.7	0.781*
48.9	0.767*
49.0	0.748
49.1	0.724
49.2	0.686*
49.3	0.672*
49.4	0.654*
49.5	0.640*
49.6	0.611
49.7	0.594*
49.9	0.576
50.1	0.657
50.2	0.479
50.4	0.356*
50.5	0.303
50.8	0.359
50.8	0.397*
51.0	0.521
51.2	0.514*
51.3	0.504*
51.5	0.374*

CURVE 10 (cont.)

λ	ρ
52.0	0.455
52.2	0.494*
52.3	0.523*
52.4	0.597
52.5	0.597*
52.6	0.650*
52.7	0.657*
52.8	0.662*
52.9	0.675
53.1	0.665*
53.2	0.665*
53.4	0.665
53.5	0.680*
53.7	0.689*
53.9	0.719*
54.0	0.754
54.1	0.783*
54.2	0.801*
54.3	0.818
54.6	0.807*
54.7	0.798
54.8	0.807*
54.9	0.801*
55.1	0.797*
55.3	0.795*
55.5	0.809*
55.7	0.817*
56.0	0.865
56.1	0.889
56.2	0.874*
56.4	0.865*
56.8	0.854*
56.9	0.854
57.0	0.858*
57.2	0.866*
57.3	0.873*
57.5	0.879

CURVE 11*
T = 7.5

λ	ρ
49.4	0.711
49.5	0.717
49.7	0.717
49.8	0.718

CURVE 11 (cont.)*

λ	ρ
50.0	0.664
50.1	0.597
50.2	0.570
50.3	0.539
50.4	0.475
50.5	0.415
51.0	0.471
51.3	0.557
51.4	0.480
51.5	0.443
51.5	0.404
51.7	0.339
51.9	0.378
52.0	0.402
52.1	0.381
52.2	0.394
52.4	0.492
52.7	0.680
52.9	0.720
52.9	0.744
53.1	0.744

*Not shown on plot

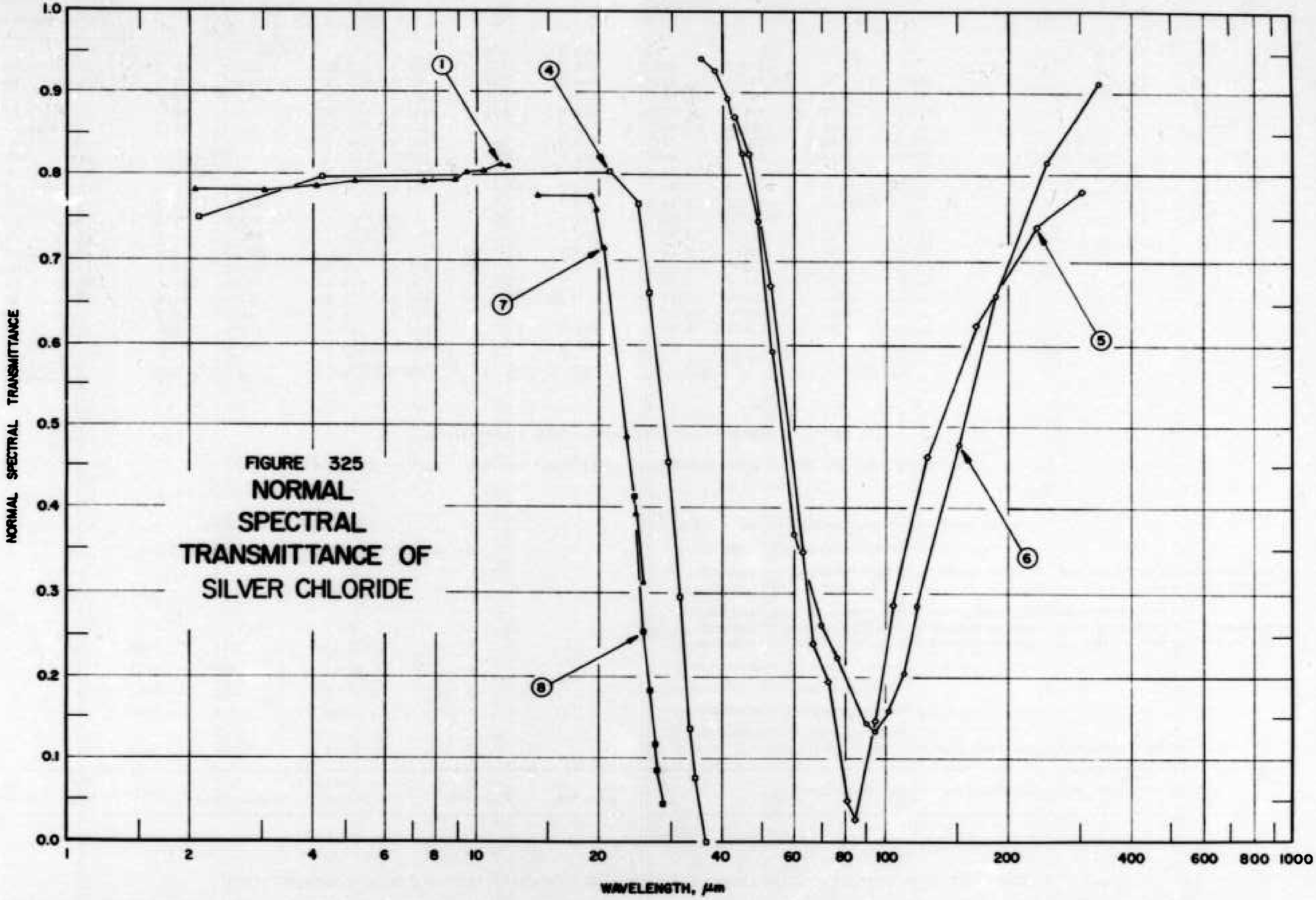


FIGURE 325
NORMAL
SPECTRAL
TRANSMITTANCE OF
SILVER CHLORIDE

SPECIFICATION TABLE NO. 325 NORMAL SPECTRAL TRANSMITTANCE OF SILVER CHLORIDE AgCl

Curve No.	Ref. No.	Year	Temperature K	Wavelength Range, μm	Geometry θ θ' ω'	Reported Error, %	Composition (weight percent), Specifications, and Remarks
1	12	1964	298	2.04-12.0	~0° ~0°		Crystal (2.79 mm thick) from Harshaw Chemical Co.; optically polished; data extracted from smooth curve.
2*	12	1964	373	2.03-12.0	~0° ~0°		Above specimen and conditions.
3*	12	1964	473	2.03-12.0	~0° ~0°		Above specimen and conditions.
4	67	1963	~298	2.10-50.0	0° 0°		Specimen 0.5 mm thick; data extracted from smooth curve.
5	100	1967	143	43.1-303	0° 0°		Evaporated film (~1 μm thick) on polyethylene substrate: film crystalline and highly oriented (200) plane parallel to substrate surface; data extracted from smooth curve; data corrected for temp dependence of polyethylene transmittance.
6	100	1967	300	35.6-333	0° 0°		Evaporated film (~1 μm thick) on polyethylene substrate; film crystalline and highly oriented (200) plane parallel to substrate surface; data extracted from smooth curve.
7	399	1948	~298	14.1-25.8	~0° ~0°		6 mm thick; data extracted from smooth curve.
8	399	1948	~298	24.4-28.7	~0° ~0°		2.1 mm thick; data extracted from smooth curve.

DATA TABLE NO. 325 NORMAL SPECTRAL TRANSMITTANCE OF SILVER CHLORIDE AgCl

[Wavelength, λ, μm; Transmittance, τ; Temperature, T, K]

CURVE 1
T = 298

λ	τ
2.04	0.781
3.02	0.781
4.02	0.789
5.02	0.791
7.49	0.791
7.98	0.795
8.98	0.795
9.47	0.801
10.5	0.805
11.0	0.808*
11.5	0.813
12.0	0.812

CURVE 2*
T = 373

λ	τ
2.03	0.780
3.03	0.779

CURVE 2 (cont.)*

λ	τ
3.52	0.786
4.01	0.791
6.98	0.791
7.98	0.794
8.97	0.794
9.47	0.799
9.97	0.804
11.0	0.806
11.5	0.812
12.0	0.813

CURVE 3*
T = 473

λ	τ
2.03	0.778
3.00	0.778
3.53	0.783
4.01	0.792
6.99	0.791

CURVE 3 (cont.)*

λ	τ
8.97	0.795
9.48	0.799
9.98	0.801
11.0	0.806
11.5	0.811
12.0	0.812

CURVE 4
T = 298

λ	τ
2.10	0.705
4.20	0.798
21.1	0.803
25.0	0.767
26.5	0.662
29.9	0.445
31.7	0.296
33.2	0.135
34.2	0.076

CURVE 4 (cont.)

λ	τ
36.6	0.000
50.0	0.000

CURVE 5
T = 143

λ	τ
43.1	0.872
46.7	0.828
52.4	0.671
63.3	0.349
67.6	0.241
72.5	0.195
81.3	0.050
84.7	0.028
94.3	0.144
105	0.288
126	0.463
169	0.628
238	0.742
303	0.783

CURVE 6
T ~ 300

λ	τ
35.6	0.942
38.3	0.928
41.5	0.896
45.6	0.828
49.0	0.747
53.4	0.591
60.9	0.368
70.4	0.261
77.5	0.224
90.9	0.141
94.3	0.133
103	0.159
111	0.205
122	0.286
151	0.476
188	0.660
250	0.817
333	0.911

CURVE 7
T ~ 298

λ	τ
14.1	0.777
19.1	0.777
19.9	0.760
20.6	0.716
23.5	0.488
24.8	0.392
25.8	0.312

CURVE 8
T ~ 298

λ	τ
24.4	0.414
25.9	0.256
26.7	0.181
27.4	0.119
27.9	0.085
28.7	0.046

*Not shown on plot

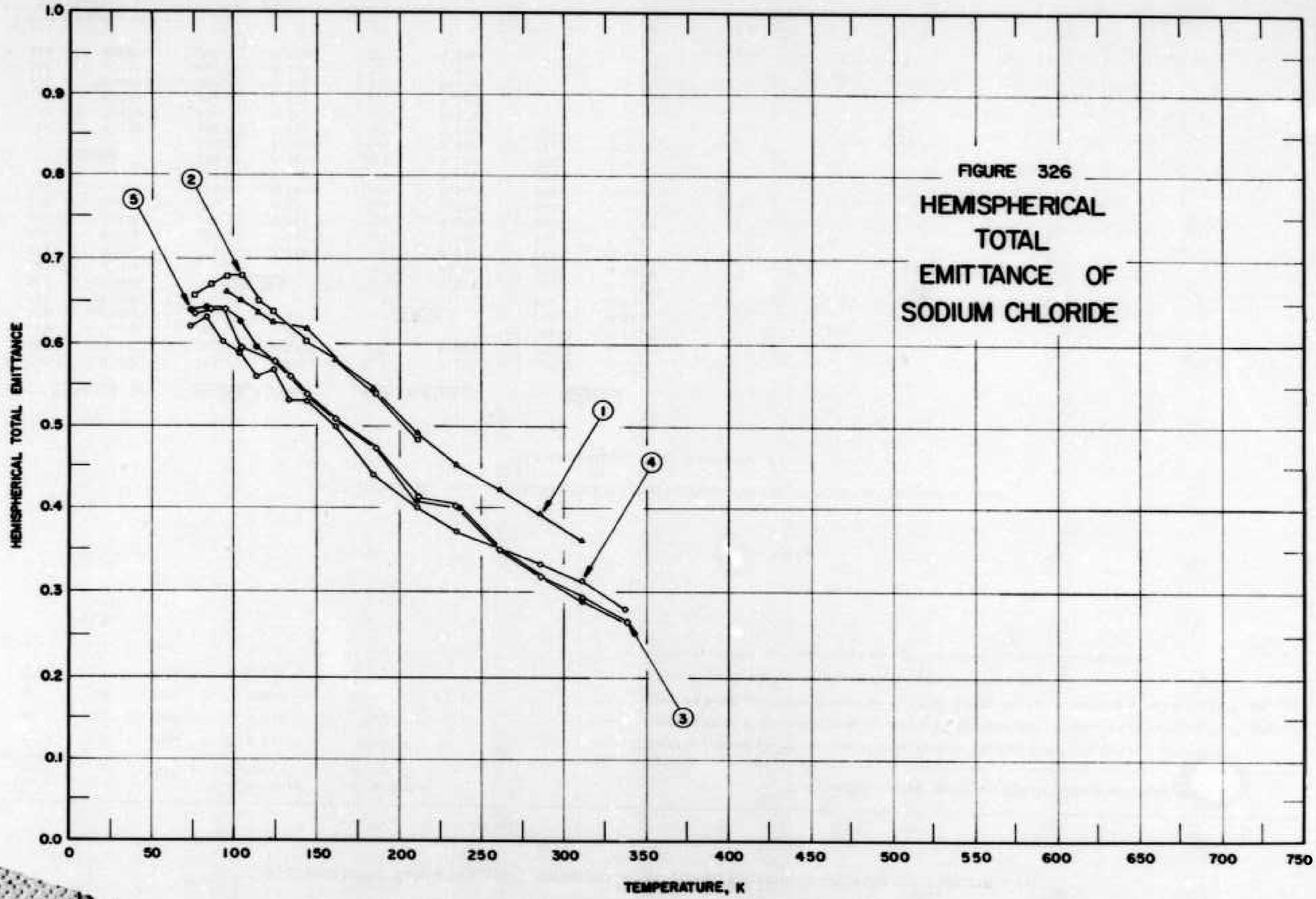


FIGURE 326
HEMISPHERICAL
TOTAL
EMITTANCE OF
SODIUM CHLORIDE
HEMISPHERICAL TOTAL EMITTANCE
TEMPERATURE, K
1.0
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0.0
0
50
100
150
200
250
300
350
400
450
500
550
600
650
700
750
1
2
3
4
5

SPECIFICATION TABLE NO. 326 HEMISPHERICAL TOTAL EMITTANCE OF SODIUM CHLORIDE NaCl

Curve No.	Ref. No.	Year	Temperature Range, K	Reported Error, %	Composition (weight percent), Specifications and Remarks
1	132	1966	95.2-311	± 5	Cleaved crystal (0.81 cm thick); measured in vacuum (10^{-9} mm Hg)
2	132	1966	75.4-212	± 5	Cleaved from the same crystal as above (0.56 cm thick); measured in vacuum (10^{-9} mm Hg).
3	132	1966	75.4-338	± 5	Cleaved from the same crystal as above (0.28 cm thick); measured in vacuum (10^{-9} mm Hg).
4	132	1966	74.6-337	± 5	Crystal; plain edges; measured in vacuum (10^{-9} mm Hg).
5	132	1967	74.8-337	± 5	Above specimen and conditions except vaporized aluminum on edges.

DATA TABLE NO. 326 HEMISPHERICAL TOTAL EMITTANCE OF SODIUM CHLORIDE NaCl

[Temperature, T, K; Emittance, ϵ]

T	ϵ	T	ϵ	T	ϵ	T	ϵ
CURVE 1		CURVE 2 (cont.)		CURVE 3 (cont.)		CURVE 5	
95.2	0.661	144	0.601	311	0.292	74.8	0.641
105.	0.651	161	0.583*	338	0.269	84.6	0.643
115	0.640	185	0.540			94.9	0.642*
124	0.629	212	0.481	CURVE 4		104	0.628
144	0.620			74.6	0.621	114	0.598
161	0.583	CURVE 3		84.3	0.631	124	0.580*
185	0.549			94.4	0.602	134	0.561*
211	0.492	75.4	0.639	104	0.590	144	0.540*
235	0.452	86.0	0.641	114	0.561	161	0.508*
261	0.423	95.0	0.641	124	0.570	185	0.471*
286	0.392	105	0.627	134	0.531	211	0.409
311	0.363	115	0.595	144	0.531	236	0.400
		125	0.580	161	0.500	261	0.349*
CURVE 2		135	0.561	185	0.442	286	0.318*
		144	0.540	211	0.400	311	0.290
75.4	0.659	162	0.510	235	0.372	337	0.265*
85.3	0.670	186	0.471	261	0.353*		
95.2	0.680	212	0.411	286	0.332		
105	0.680	235	0.401	311	0.312		
115	0.651	261	0.350	337	0.280		
124	0.640	286	0.319				

*Not shown on plot

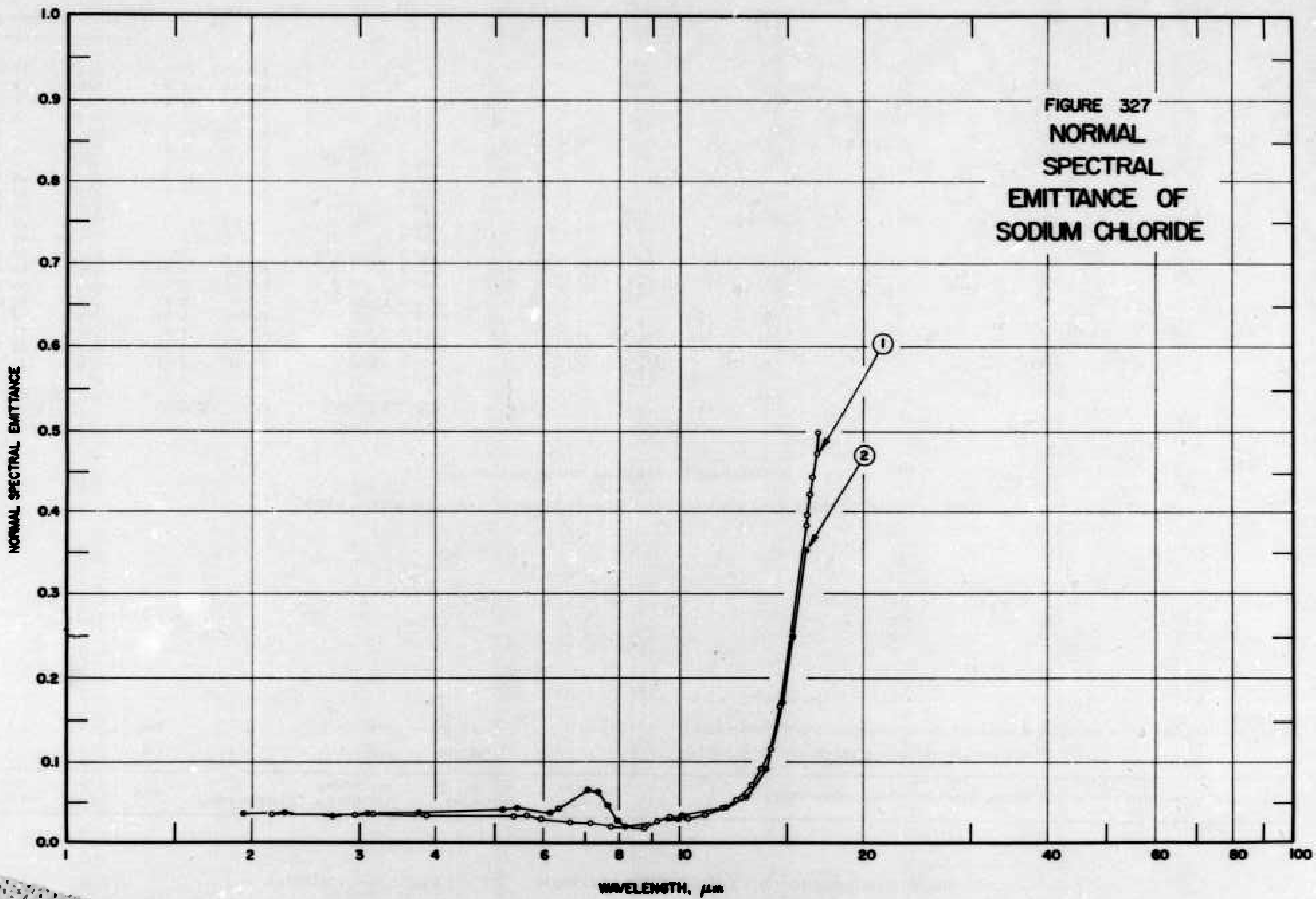


FIGURE 327
NORMAL SPECTRAL EMITTANCE OF SODIUM CHLORIDE

SPECIFICATION TABLE NO. 327 NORMAL SPECTRAL EMITTANCE OF SODIUM CHLORIDE NaCl

Curve No.	Ref. No.	Year	Temperature K	Wavelength Range, μm	Geometry θ θ' ω'	Reported Error, %	Composition (weight percent), Specifications, and Remarks
1	309	1964	373	2.17-16.8	~0° ~0°		Crystal (6.56 mm thick); data extracted from smooth curve.
2	309	1964	373	1.95-16.9	~0° ~0°		Above specimen and conditions except measured after 2 hrs x-ray irradiation at 298 K.

DATA TABLE NO. 327 NORMAL SPECTRAL EMITTANCE OF SODIUM CHLORIDE NaCl

[Wavelength, λ, μm; Emittance, ϵ; Temperature, T, K]

λ	ϵ	λ	ϵ	λ	ϵ
CURVE 1 T = 373		CURVE 1 (cont.)		CURVE 2 (cont.)	
		14.6	0.167	7.10	0.067
2.17	0.036	16.2	0.382	7.38	0.064
2.97	0.034	16.2	0.397	7.62	0.047
3.18	0.036	16.4	0.421	7.94	0.027
3.89	0.034	16.5	0.437*	8.17	0.020
5.38	0.033	16.5	0.445	9.63	0.031*
5.66	0.035	16.6	0.475	9.91	0.030
5.95	0.030	16.8	0.500	10.1	0.034
6.62	0.026			11.9	0.045
7.18	0.025	CURVE 2 T = 373		12.7	0.059
7.77	0.020			13.7	0.092
8.72	0.019			14.8	0.172
9.17	0.027	1.95	0.036	15.4	0.250
9.66	0.031	2.27	0.038	16.1	0.353
10.3	0.030	2.71	0.033	16.9	0.500*
11.0	0.035	3.10	0.037		
11.7	0.043	3.79	0.039		
12.4	0.053	5.17	0.041		
13.1	0.071	5.43	0.043		
13.6	0.091	6.17	0.039		
14.1	0.11[illegible]	6.39	0.042		

*Not shown on plot

SPECIFICATION TABLE NO. 328 HEMISPHERICAL SPECTRAL REFLECTANCE OF SODIUM CHLORIDE NaCl

Curve No.	Ref. No.	Year	Temperature K	Wavelength Range, μm	Geometry ω	θ'	ω'	Reported Error, %	Composition (weight percent), Specifications, and Remarks
1	133	1967	~77	1.00-10.0	2π	20°	0.02	6.0	Applied to metal surface by pressing two coats of powdered NaCl into place, after surface had been painted with saturated NaCl solution; thickness of coating ~3 mm; measured in vacuum (~ 10^{-6} mm Hg).

DATA TABLE NO. 328 HEMISPHERICAL SPECTRAL REFLECTANCE OF SODIUM CHLORIDE NaCl

[Wavelength, λ, μm; Reflectance, ρ; Temperature, T, K]

λ	ρ
CURVE 1	
T ~ 77	
1.00	0.931
2.01	0.922
2.52	0.859
2.80	0.777
3.04	0.794
3.32	0.864
3.49	0.891
4.01	0.891
5.00	0.884
5.55	0.864
6.00	0.801
6.50	0.788
7.04	0.760
7.48	0.801
8.04	0.794
8.50	0.717
8.75	0.694
8.99	0.730
9.50	0.764
10.0	0.780

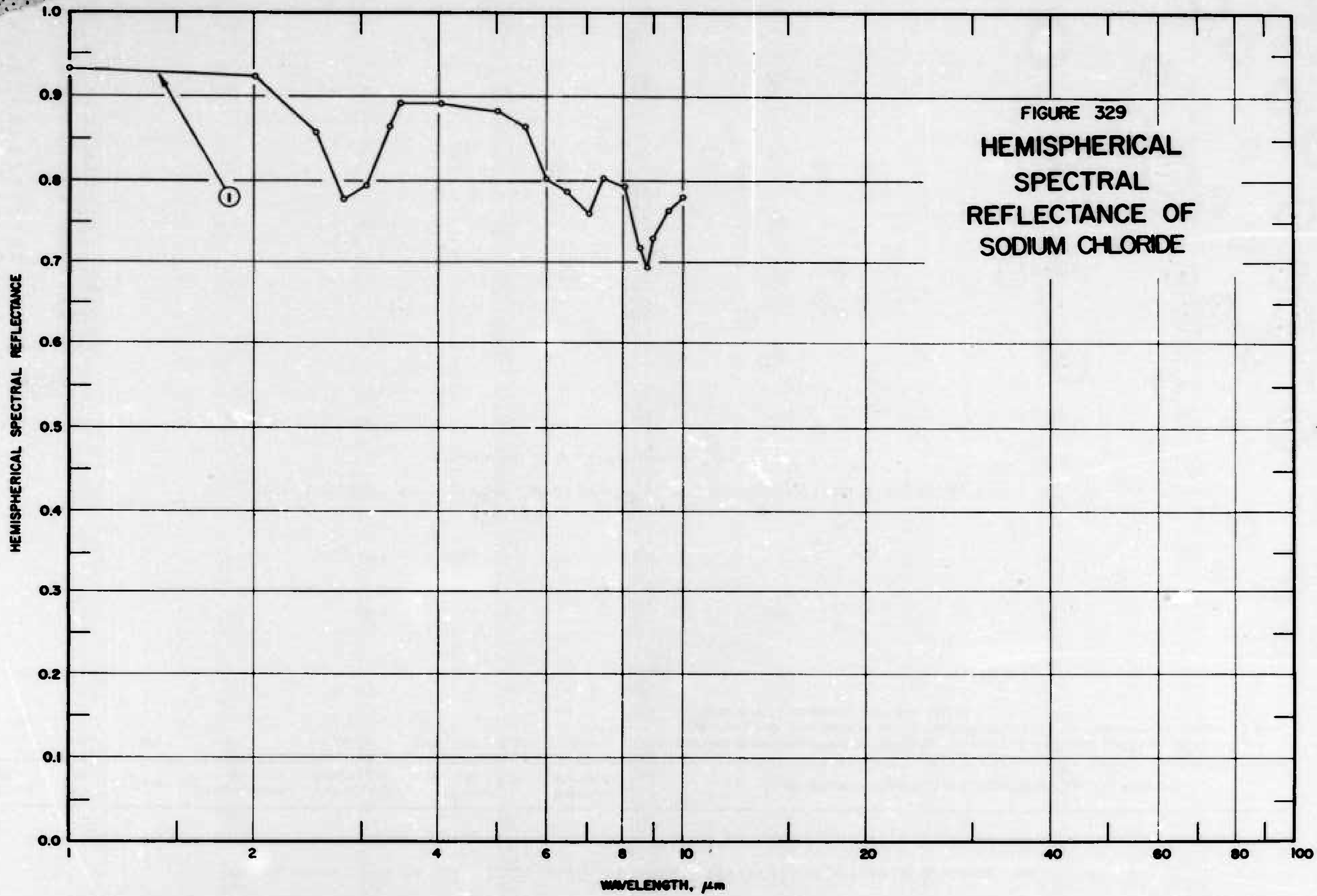


FIGURE 329
HEMISPHERICAL SPECTRAL REFLECTANCE OF SODIUM CHLORIDE

SPECIFICATION TABLE NO. 329 HEMISPHERICAL SPECTRAL REFLECTANCE OF SODIUM CHLORIDE NaCl

Curve No.	Ref. No.	Year	Temperature K	Wavelength, μm	Angular Range, θ'	Geometry ω	Geometry θ'	Geometry ω'	Reported Error, %	Composition (weight percent), Specifications and Remarks
1*	133	1967	~77	10	10°-70°	2π	θ'	0.02	6.0	Applied to metal surface by pressing two coats of powdered NaCl into place, after surface had been painted with saturated NaCl solution; thickness of coating ~3 mm; measured in vacuum (~10^{-6} mm Hg).

DATA TABLE NO. 329 HEMISPHERICAL SPECTRAL REFLECTANCE OF SODIUM CHLORIDE NaCl

[Angle, θ', °; Reflectance, ρ; Temperature, T, K; Wavelength, λ, μm]

θ'	ρ
CURVE 1*	
T ~ 77	
(λ = 10)	
10	0.777
15	0.765
20	0.768
30	0.774
40	0.796
50	0.802
60	0.804
70	0.822

…en

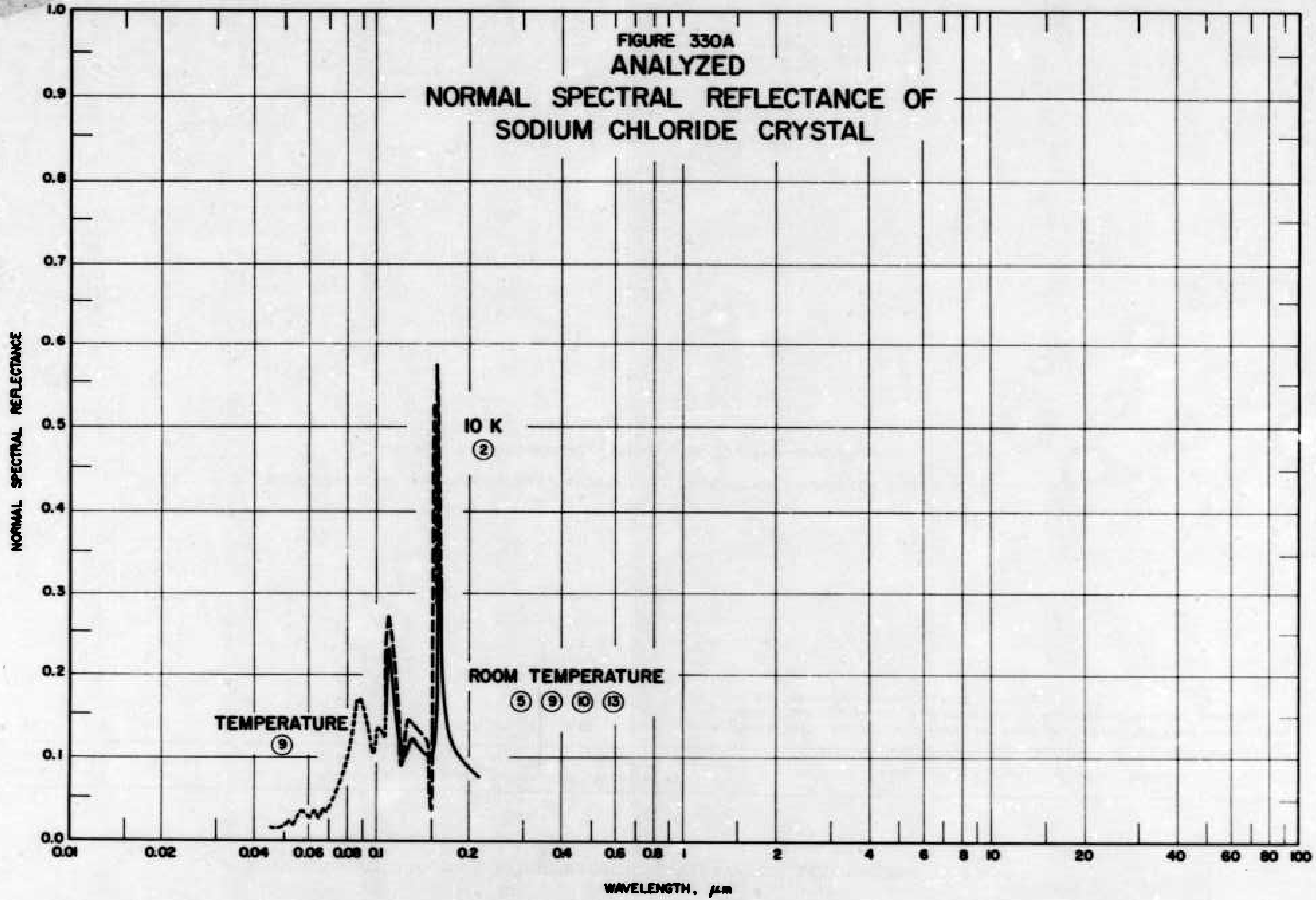


FIGURE 330A
ANALYZED
NORMAL SPECTRAL REFLECTANCE OF
SODIUM CHLORIDE CRYSTAL
10 K
2
ROOM TEMPERATURE
5 9 10 13
TEMPERATURE
9
NORMAL SPECTRAL REFLECTANCE
WAVELENGTH, μm
1.0
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0.0
0.01
0.02
0.04
0.06
0.08
0.1
0.2
0.4
0.6
0.8
1
2
4
6
8
10
20
40
60
80
100

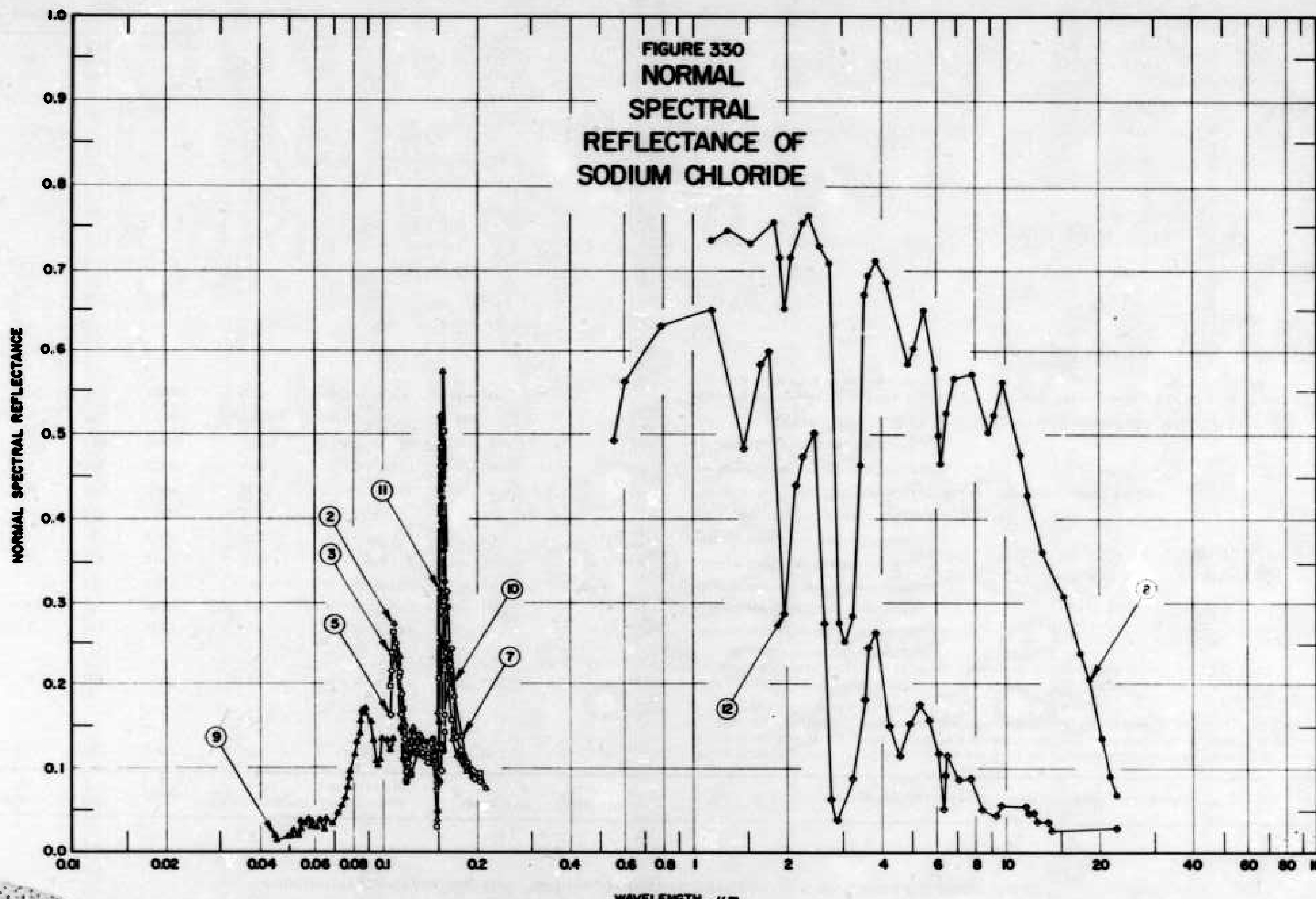


FIGURE 330
NORMAL
SPECTRAL
REFLECTANCE OF
SODIUM CHLORIDE
NORMAL SPECTRAL REFLECTANCE
WAVELENGTH, μm
1.0
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0.0
0.01
0.02
0.04
0.06
0.08
0.1
0.2
0.4
0.6
0.8
1
2
4
6
8
10
20
40
60
80
100
2
3
5
9
11
10
7
12

SPECIFICATION TABLE NO. 330 NORMAL SPECTRAL REFLECTANCE OF SODIUM CHLORIDE NaCl

Curve No.	Ref. No.	Year	Temperature K	Wavelength Range, μm	Geometry θ	θ'	ω'	Reported Error, %	Composition (weight percent), Specifications, and Remarks
1*	134	1967	77	0.1576-0.2120	10°	10°		± 3	Pure single crystal (0.63 mm thick); purified by vacuum distaillation followed by zone melting in clorine using a quartz ampoule; cleaved; measured in vacuum (3×10^{-7} mm Hg): reflectivity effected by absorption due to OH-impurity (~0.184 μm): data extracted from smooth curve.
2	134	1967	10	0.108-0.212	10°	10°		± 3	Pure single crystal; purified by vacuum distillation followed by zone melting in clorine using a quartz ampoule; cleaved; measured in vacuum (3×10^{-7} mm Hg): data extracted from smooth curve.
3	134	1967	78	0.105-0.212	10°	10°		± 3	Above specimen and conditions.
4*	134	1967	195	0.110-0.212	10°	10°		± 3	Above specimen and conditions.
5	134	1967	298	0.105-0.212	10°	10°		± 3	Above specimen and conditions.
6*	134	1967	473	0.110-0.212	10°	10°		± 3	Above specimen and conditions.
7	134	1967	573	0.109-0.212	10°	10°		± 3	Above specimen and conditions.
8	308	1966	~298	1.14-22.9	0°		2π		Granular; data extracted from smooth curve.
9	389	1968	300	0.0447-0.106	8°	8°			Crystal from the Harshaw Chemical Co.: freshly cleaved surface.
10	389	1968	300	0.113-0.191	8°	8°			Above specimen and conditions.
11	389	1968	77	0.1127-0.1908	8°	8°			Above specimen and conditions.
12	308	1966	~293	0.550-22.7	0°		2π		Salt Pool, Death Valley, Calif.; sample intact; data extracted from smooth curve.
13*	377	1968	300	0.124-0.187	~20°	~20°			Cleaved single crystal; back surface treated with emory cloth; pressure $<10^{-6}$ mm Hg: data extracted from smooth curve.

*Not shown on plot

DATA TABLE NO. 330 NORMAL SPECTRAL REFLECTANCE OF SODIUM CHLORIDE NaCl

[Wavelength, λ, μm; Reflectance, ρ; Temperature, T, K]

CURVE 1* T = 77

λ	ρ
0.1576	0.400
0.1581	0.344
0.1587	0.300
0.1604	0.256
0.1623	0.234
0.1634	0.238
0.1647	0.236
0.1670	0.217
0.1705	0.193
0.1733	0.175
0.1768	0.159
0.1803	0.144
0.1834	0.134
0.1868	0.129
0.1904	0.129
0.1944	0.132
0.2003	0.140
0.2048	0.141
0.2089	0.139
0.2120	0.134

CURVE 2 T = 10

λ	ρ
0.108	0.275
0.109	0.254*
0.111	0.232
0.113	0.151
0.116	0.086
0.117	0.088*
0.118	0.111*
0.119	0.127
0.121	0.132*
0.122	0.138*
0.123	0.149
0.125	0.146*
0.127	0.146*
0.129	0.132
0.131	0.136
0.133	0.127*
0.142	0.126*
0.143	0.122*
0.144	0.122
0.145	0.109

CURVE 2 (cont.)

λ	ρ
0.146	0.075
0.147	0.028
0.148	0.037
0.149	0.165
0.152	0.521
0.152	0.514*
0.153	0.443
0.154	0.285
0.155	0.575
0.156	0.348*
0.157	0.294*
0.159	0.237*
0.161	0.204
0.164	0.157*
0.168	0.134
0.173	0.115
0.185	0.098
0.201	0.082*
0.212	0.075

CURVE 3 T = 78

λ	ρ
0.105	0.198
0.106	0.238
0.107	0.259*
0.107	0.266
0.109	0.252*
0.111	0.213
0.116	0.095
0.116	0.092*
0.117	0.094*
0.118	0.105*
0.120	0.124*
0.123	0.137
0.125	0.137*
0.126	0.129
0.128	0.131*
0.129	0.137
0.130	0.132*
0.131	0.132*
0.133	0.126
0.137	0.118*
0.143	0.115*
0.144	0.118*

CURVE 3 (cont.)

λ	ρ
0.145	0.112
0.148	0.028
0.148	0.034*
0.150	0.256
0.152	0.462
0.152	0.485
0.153	0.477*
0.154	0.301
0.155	0.504
0.156	0.343*
0.157	0.294*
0.159	0.237
0.161	0.204*
0.164	0.157
0.168	0.134*
0.173	0.115*
0.185	0.098*
0.201	0.092
0.212	0.075*

CURVE 4* T = 195

λ	ρ
0.110	0.211
0.111	0.202
0.114	0.132
0.116	0.101
0.117	0.095
0.118	0.096
0.120	0.119
0.123	0.126
0.125	0.125
0.127	0.122
0.136	0.116
0.137	0.116
0.138	0.113
0.143	0.111
0.146	0.111
0.147	0.100
0.149	0.076
0.149	0.080
0.150	0.099
0.152	0.211
0.153	0.310
0.155	0.359

CURVE 4 (cont.)*

λ	ρ
0.156	0.345
0.157	0.350
0.158	0.367
0.159	0.327
0.160	0.254
0.161	0.213
0.164	0.177
0.167	0.144
0.171	0.127
0.175	0.112
0.185	0.097
0.200	0.083
0.212	0.075

CURVE 5 T = 298

λ	ρ
0.105	0.163
0.106	0.216
0.107	0.236*
0.108	0.239
0.110	0.233*
0.113	0.163
0.115	0.132
0.116	0.114*
0.117	0.106*
0.119	0.106
0.125	0.125
0.127	0.122*
0.129	0.124*
0.130	0.121*
0.131	0.117
0.135	0.113*
0.136	0.114*
0.139	0.106
0.143	0.104*
0.147	0.108*
0.150	0.102*
0.151	0.098
0.152	0.112*
0.156	0.297
0.157	0.306*
0.160	0.315
0.161	0.303*
0.163	0.225

CURVE 5 (cont.)

λ	ρ
0.166	0.181*
0.169	0.151*
0.171	0.137
0.176	0.120
0.185	0.100*
0.196	0.087
0.212	0.075*

CURVE 6* T = 473

λ	ρ
0.110	0.216
0.112	0.202
0.114	0.172
0.116	0.142
0.117	0.128
0.120	0.120
0.123	0.128
0.125	0.132
0.126	0.129
0.127	0.133
0.130	0.134
0.132	0.136
0.133	0.127
0.136	0.126
0.140	0.120
0.146	0.122
0.151	0.120
0.153	0.129
0.155	0.144
0.156	0.174
0.160	0.261
0.163	0.271
0.169	0.180
0.172	0.150
0.177	0.125
0.184	0.107
0.192	0.094
0.204	0.080
0.212	0.075

CURVE 7 T = 573

λ	ρ
0.109	0.250
0.110	0.233*
0.111	0.209
0.112	0.191*
0.112	0.189
0.115	0.150
0.117	0.136*
0.119	0.127*
0.120	0.123
0.121	0.123*
0.124	0.127*
0.125	0.125*
0.126	0.129*
0.128	0.129*
0.129	0.138*
0.130	0.132*
0.132	0.132*
0.133	0.124*
0.136	0.118*
0.139	0.117
0.143	0.117*
0.146	0.116*
0.151	0.121
0.154	0.127*
0.156	0.141
0.157	0.162
0.161	0.227*
0.162	0.235
0.165	0.243
0.166	0.242*
0.170	0.185
0.174	0.157*
0.177	0.138
0.181	0.123*
0.185	0.109
0.192	0.096*
0.202	0.082
0.212	0.075

CURVE 8 T ~ 298

λ	ρ
1.14	0.739
1.30	0.748

CURVE 8 (cont.)

λ	ρ
1.54	0.733
1.83	0.758
1.90	0.717
1.97	0.654
2.08	0.718
2.22	0.756
2.35	0.764
2.48	0.755*
2.54	0.730
2.72	0.710
2.91	0.276
3.07	0.252
3.25	0.284
3.45	0.466
3.55	0.672
3.66	0.699
3.83	0.711
4.20	0.688
4.84	0.585
5.10	0.603
5.28	0.649*
5.53	0.652
5.78	0.631*
5.92	0.580
6.01	0.558*
6.01	0.500
6.20	0.465
6.33	0.476*
6.48	0.524
6.56	0.558*
6.83	0.569
7.25	0.563*
7.83	0.571
8.19	0.558*
8.47	0.519*
8.81	0.503
9.25	0.523
9.83	0.561
11.0	0.505*
11.2	0.479
11.9	0.430
13.2	0.361
14.0	0.339*
15.4	0.310
16.2	0.272*

CURVE 8 (cont.)

λ	ρ
16.8	0.262*
17.3	0.239
17.8	0.227*
18.6	0.207
19.6	0.164*
20.3	0.135
21.1	0.103*
21.6	0.090
22.9	0.067

CURVE 9 T = 300

λ	ρ
0.0447	0.180
0.0454	0.135
0.0462	0.149*
0.0476	0.163*
0.0491	0.174
0.0497	0.169*
0.0503	0.195
0.0515	0.246
0.0527	0.234*
0.0532	0.221*
0.0533	0.183
0.0538	0.198*
0.0538	0.230*
0.0540	0.251
0.0546	0.323*
0.0547	0.351
0.0559	0.317
0.0570	0.330
0.0574	0.362*
0.0578	0.300*
0.0582	0.290
0.0586	0.335
0.0590	0.271*
0.0591	0.324*
0.0604	0.249
0.0606	0.278*
0.0613	0.344*
0.0613	0.368*
0.0617	0.360*
0.0620	0.370*
0.0622	0.324*
0.0631	0.355*

*Not shown on plot

DATA TABLE NO. 330 (continued)

λ	ρ
CURVE 9 (cont.) T = 300	
0.0630	0.274*
0.0636	0.252*
0.0640	0.225
0.0644	0.247*
0.0654	0.357*
0.0657	0.383
0.0664	0.364*
0.0666	0.394*
0.0672	0.375*
0.0672	0.315*
0.0678	0.336*
0.0686	0.311
0.0686	0.340*
0.0699	0.364*
0.0670	0.319*
0.0711	0.362*
0.0713	0.401*
0.0716	0.463
0.0720	0.378*
0.0725	0.454*
0.0729	0.414*
0.0734	0.536
0.0742	0.499*
0.0748	0.519*
0.0757	0.578*
0.0757	0.620
0.0765	0.627*
0.0763	0.682*
0.0764	0.768
0.0773	0.862*
0.0779	0.898
0.0779	0.962
0.0808	1.158
0.0811	1.217*
0.0824	1.304
0.0836	1.315*
0.0824	1.343*
0.0832	1.360*
0.0841	1.487
0.0840	1.558
0.0844	1.694
0.0846	1.658*
0.0860	1.656
0.0873	1.709
0.0884	1.698*
0.0898	1.644*

λ	ρ
CURVE 9 (cont.)	
0.0905	1.537
0.0912	1.504*
0.0932	1.310
0.0927	1.274*
0.0938	1.244*
0.0955	1.111*
0.0955	1.071
0.0958	1.038*
0.0968	1.021
0.0985	1.034*
0.0979	1.059*
0.0980	1.100
0.0984	1.166*
0.0984	1.204*
0.0993	1.258*
0.0993	1.298*
0.0998	1.321*
0.0999	1.353
0.102	1.339
0.103	1.258*
0.104	1.203
0.105	1.212*
0.105	1.248*
0.106	1.351
CURVE 10 T = 300	
0.113	0.170
0.118	0.093*
0.119	0.088*
0.120	0.092
0.121	0.106*
0.122	0.112*
0.123	0.115*
0.127	0.116
0.133	0.115*
0.137	0.111*
0.139	0.107*
0.145	0.106*
0.148	0.100
0.150	0.094*
0.151	0.094*
0.153	0.101*
0.153	0.120
0.156	0.248

λ	ρ
CURVE 10 (cont.)	
0.157	0.273*
0.158	0.292*
0.160	0.293*
0.160	0.295
0.161	0.284*
0.163	0.237*
0.164	0.200
0.168	0.165
0.172	0.138*
0.178	0.113
0.185	0.098*
0.191	0.090
CURVE 11 T = 77	
0.1127	0.164*
0.1130	0.147
0.1136	0.144*
0.1146	0.115*
0.1146	0.110
0.1149	0.106*
0.1151	0.101*
0.1164	0.082
0.1165	0.085*
0.1172	0.084*
0.1180	0.093*
0.1188	0.104*
0.1192	0.110*
0.1198	0.118
0.1198	0.122*
0.1205	0.122*
0.1214	0.133*
0.1227	0.141
0.1239	0.138*
0.1242	0.135*
0.1249	0.142
0.2154	0.138
0.1260	0.138
0.1263	0.141
0.1270	0.139
0.1280	0.138
0.1289	0.136
0.1294	0.136
0.1298	0.135
0.1307	0.138

λ	ρ
CURVE 11 (cont.)	
0.1312	0.137
0.1326	0.134
0.1333	0.132
0.1346	0.132
0.1351	0.130
0.1363	0.130
0.1363	0.125*
0.1373	0.128*
0.1381	0.124*
0.1390	0.128*
0.1400	0.129*
0.1404	0.127*
0.1404	0.123*
0.1416	0.125*
0.1417	0.127*
0.1422	0.129*
0.1422	0.133
0.1429	0.130*
0.1435	0.125*
0.1444	0.125*
0.1440	0.123*
0.1440	0.117
0.1450	0.120*
0.1450	0.112*
0.1459	0.112*
0.1466	0.101*
0.1469	0.096*
0.1471	0.089
0.1476	0.084*
0.1478	0.074*
0.1481	0.057*
0.1485	0.052*
0.1489	0.049
0.1499	0.064*
0.1501	0.084
0.1505	0.118*
0.1505	0.123*
0.1507	0.129
0.1507	0.153
0.1509	0.198*
0.1510	0.205*
0.1510	0.213
0.1514	0.253
0.1514	0.264*
0.1518	0.316
0.1523	0.383*

λ	ρ
CURVE 11 (cont.)	
0.1523	0.396
0.1525	0.416*
0.1525	0.421*
0.1525	0.426
0.1527	0.444*
0.1527	0.473*
0.1531	0.481
0.1535	0.477*
0.1537	0.471
0.1538	0.468*
0.1538	0.450
0.1542	0.441*
0.1544	0.430*
0.1546	0.421*
0.1544	0.402
0.1548	0.386*
0.1550	0.345*
0.1550	0.337*
0.1556	0.319*
0.1560	0.357*
0.1560	0.363
0.1564	0.464
0.1576	0.335*
0.1576	0.327
0.1580	0.314*
0.1586	0.278*
0.1592	0.268*
0.1598	0.250
0.1604	0.239*
0.1604	0.232*
0.1608	0.230
0.1608	0.226*
0.1610	0.216*
0.1621	0.212
0.1627	0.202*
0.1629	0.194*
0.1703	0.139*
0.1784	0.110*
0.1800	0.105
0.1908	0.090*
CURVE 12 T ~ 298	
0.550	0.495
0.600	0.563

λ	ρ
CURVE 12 (cont.)	
0.780	0.632
1.15	0.651
1.35	0.643*
1.47	0.486
1.67	0.584
1.77	0.600
1.95	0.287
2.13	0.441
2.22	0.475
2.44	0.301*
2.57	0.275
2.68	0.062
2.89	0.038
3.23	0.089
3.52	0.183
3.65	0.245
3.81	0.265
4.27	0.150
4.51	0.118*
4.60	0.115
4.96	0.152
5.35	0.178
5.71	0.158
6.08	0.117
6.25	0.050
6.40	0.093
6.53	0.115
6.79	0.098*
7.14	0.089
7.78	0.089
8.12	0.073*
8.40	0.050
8.59	0.045*
9.36	0.043
9.76	0.054
11.5	0.054
11.8	0.044
12.3	0.046
12.7	0.036
13.4	0.036
14.0	0.025
22.7	0.028

λ	ρ
CURVE 13* T = 300	
0.124	0.132
0.127	0.127
0.130	0.127
0.132	0.130
0.134	0.127
0.136	0.120
0.141	0.120
0.146	0.117
0.148	0.112
0.149	0.107
0.150	0.0980
0.151	0.104
0.154	0.175
0.156	0.277
0.157	0.309
0.159	0.338
0.162	0.313
0.165	0.224
0.168	0.186
0.173	0.162
0.178	0.144
0.187	0.127

*Not shown on plot

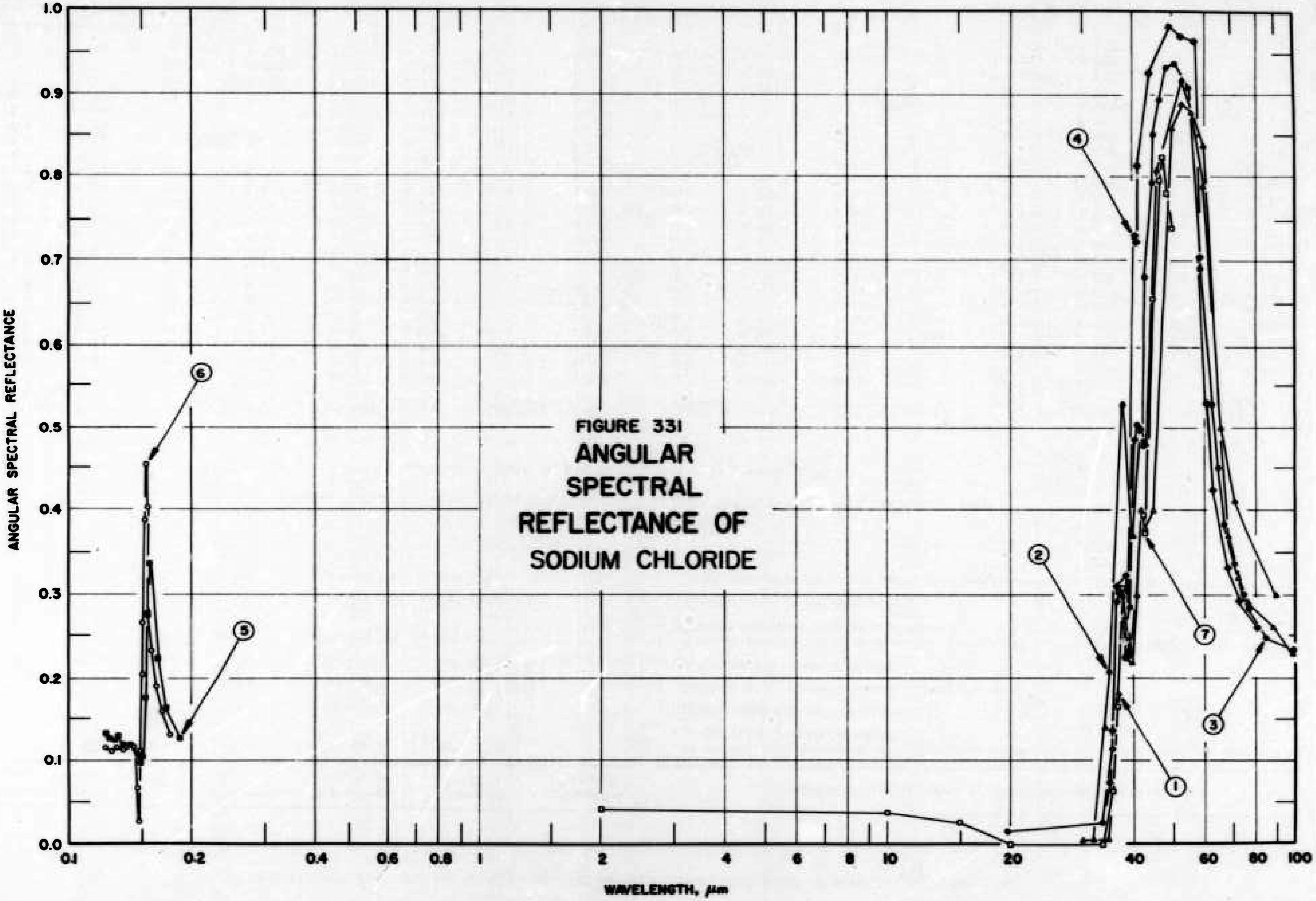


FIGURE 331
ANGULAR SPECTRAL REFLECTANCE OF SODIUM CHLORIDE

SPECIFICATION TABLE NO. 331 ANGULAR SPECTRAL REFLECTANCE OF SODIUM CHLORIDE NaCl

Curve No.	Ref. No.	Year	Temperature K	Wavelength Range, μm	Geometry θ θ' ω'	Reported Error, %	Composition (weight percent), Specifications, and Remarks
1	95	1958	298	30.0-100	12° 12°		Single crystals; measured in vacuum; data extracted from smooth curve; evaporated Al mirror reference standard.
2	95	1958	298	32.0-90.0	52° 52°		Above specimen and conditions.
3	419	1962	200	29.7-100	12° 12°		Similar to the above specimen and conditions.
4	419	1962	100	29.7-100	12° 12°		Above specimen and conditions.
5	377	1968	300	0.124-0.187	~20°~20°		Cleaved single crystal; back surface treated with emory cloth; pressure <10^{-6} mm Hg; data extracted from smooth curve.
6	377	1968	55	0.124-0.179	~20°~20°		Above specimen and conditions.
7	67	1963	~298	2.00-50.0	30° 30°		Specimen 5 mm thick; data extracted from smooth curve; aluminum mirror reference standard.

DATA TABLE NO. 331 ANGULAR SPECTRAL REFLECTANCE OF SODIUM CHLORIDE NaCl

[Wavelength, λ, μm; Reflectance, ρ; Temperature, T, K]

λ	ρ	λ	ρ	λ	ρ	λ	ρ	λ	ρ	λ	ρ	λ	ρ	λ	ρ
CURVE 1		CURVE 2		CURVE 3 (cont.)		CURVE 3 (cont.)		CURVE 4 (cont.)		CURVE 5 (cont.)		CURVE 6 (cont.)		CURVE 7	
T = 298		T = 298												T = 298	
				36.9	0.292	81.0	0.260*	53.7	0.971	0.136	0.120	0.126	0.112*		
30.0	0.02	32.0	0.03	37.4	0.302	85.7	0.247	56.3	0.918	0.141	0.120	0.128	0.112	2.00	0.041
35.0	0.03	34.0	0.14	38.7	0.248	89.7	0.238*	58.8	0.704	0.146	0.117*	0.131	0.117	10.0	0.039
37.0	0.18	35.0	0.21	39.5	0.285	100	0.233	61.2	0.530	0.148	0.112*	0.133	0.114*	15.0	0.026
38.0	0.30	38.0	0.53	40.8	0.485			62.2	0.477*	0.149	0.107	0.135	0.113*	20.0	0.000
40.0	0.22	40.0	0.37	41.4	0.503	CURVE 4		63.8	0.424	0.150	0.0980	0.137	0.115	33.8	0.000
41.0	0.30	42.0	0.50	42.1	0.477	T = 100		65.6	0.386*	0.151	0.104	0.141	0.115*	35.9	0.063
42.0	0.40	43.0	0.48	43.3	0.683			69.5	0.331	0.154	0.175	0.144	0.118	36.9	0.165
43.0	0.38	46.0	0.81	44.4	0.794	29.7	0.013*	73.9	0.292	0.156	0.277	0.146	0.107*	37.9	0.309
45.0	0.50	53.0	0.92	45.2	0.852	33.7	0.026*	81.0	0.261	0.157	0.309*	0.148	0.0695	39.9	0.223
50.0	0.86	60.0	0.84	46.4	0.895	35.0	0.072	85.7	0.247*	0.159	0.338	0.149	0.0286	42.5	0.395
53.0	0.89	66.0	0.50	48.4	0.931	35.6	0.137	89.7	0.238*	0.162	0.313*	0.150	0.111	43.1	0.375
56.0	0.88	71.0	0.41	51.0	0.938	36.6	0.310	100	0.233*	0.165	0.224	0.151	0.205	45.4	0.659
60.0	0.79	90.0	0.30	53.9	0.931*	38.1	0.226			0.168	0.186*	0.151	0.267	46.1	0.798
69.0	0.37			55.9	0.910	38.8	0.322	CURVE 5		0.173	0.162	0.153	0.389	46.7	0.826
73.0	0.32	CURVE 3		58.6	0.793	40.4	0.733	T = 300		0.178	0.144*	0.154	0.276	48.4	0.783
77.0	0.29	T = 200		62.9	0.527	41.2	0.726			0.187	0.127	0.155	0.453	50.0	0.742
89.0	0.26			65.0	0.450	41.8	0.814	0.124	0.132			0.156	0.401		
100	0.23	29.7	0.013	67.7	0.381	42.5	0.869*	0.127	0.127	CURVE 6		0.158	0.285*		
		33.7	0.025	70.4	0.337	44.0	0.929	0.130	0.127	T = 55		0.160	0.232		
		35.2	0.061*	74.6	0.300	46.4	0.969*	0.132	0.130			0.165	0.190		
		35.8	0.114	77.6	0.281	49.4	0.984	0.134	0.127*	0.124	0.116	0.170	0.159		
												0.179	0.132		

*Not shown on plot

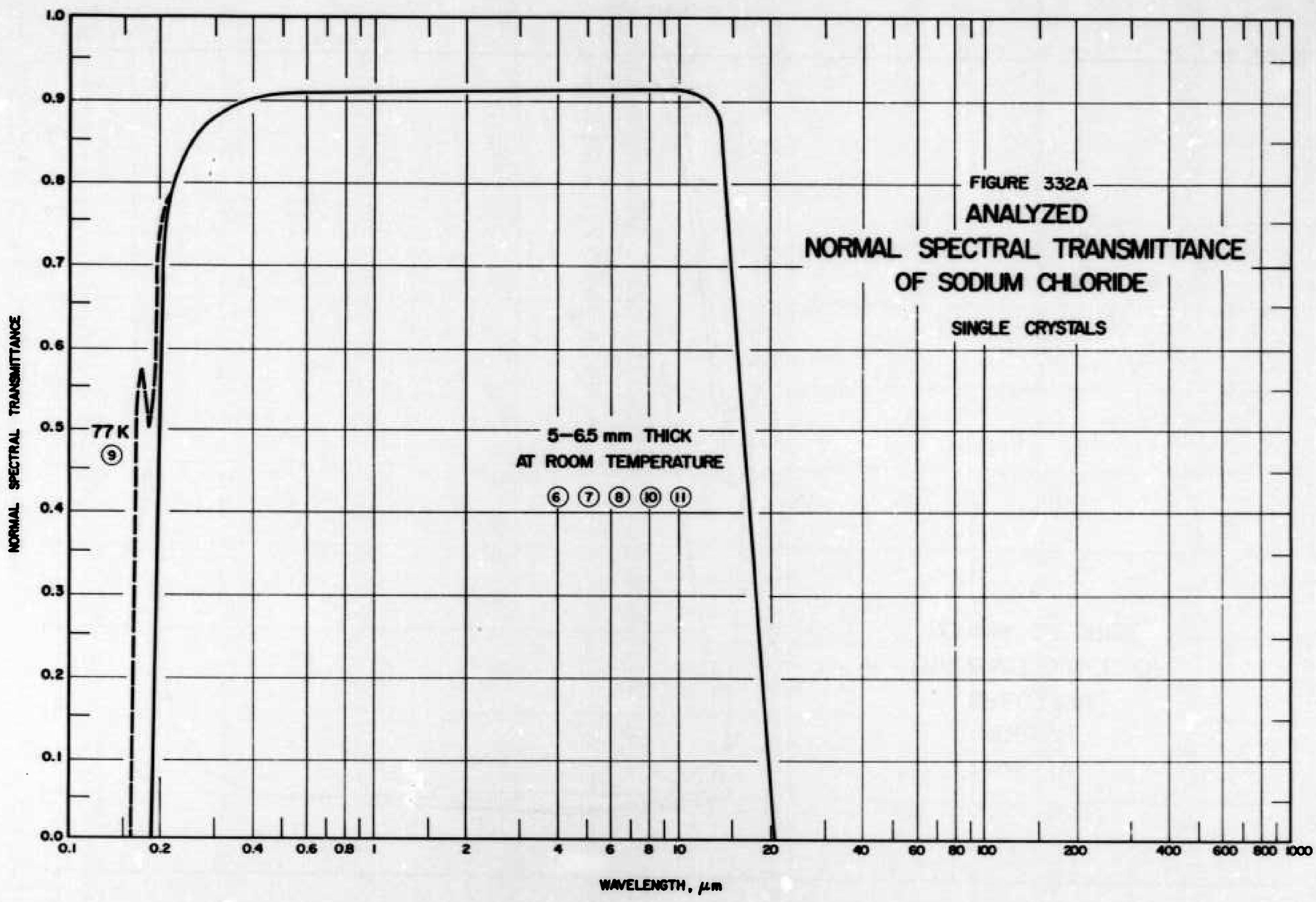


FIGURE 332A
ANALYZED
NORMAL SPECTRAL TRANSMITTANCE
OF SODIUM CHLORIDE
SINGLE CRYSTALS
5–6.5 mm THICK
AT ROOM TEMPERATURE
6 7 8 10 11
77 K
9
NORMAL SPECTRAL TRANSMITTANCE
WAVELENGTH, μm
1.0
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0.0
0.1
0.2
0.4
0.6
0.8
1
2
4
6
8
10
20
40
60
80
100
200
400
600
800
1000

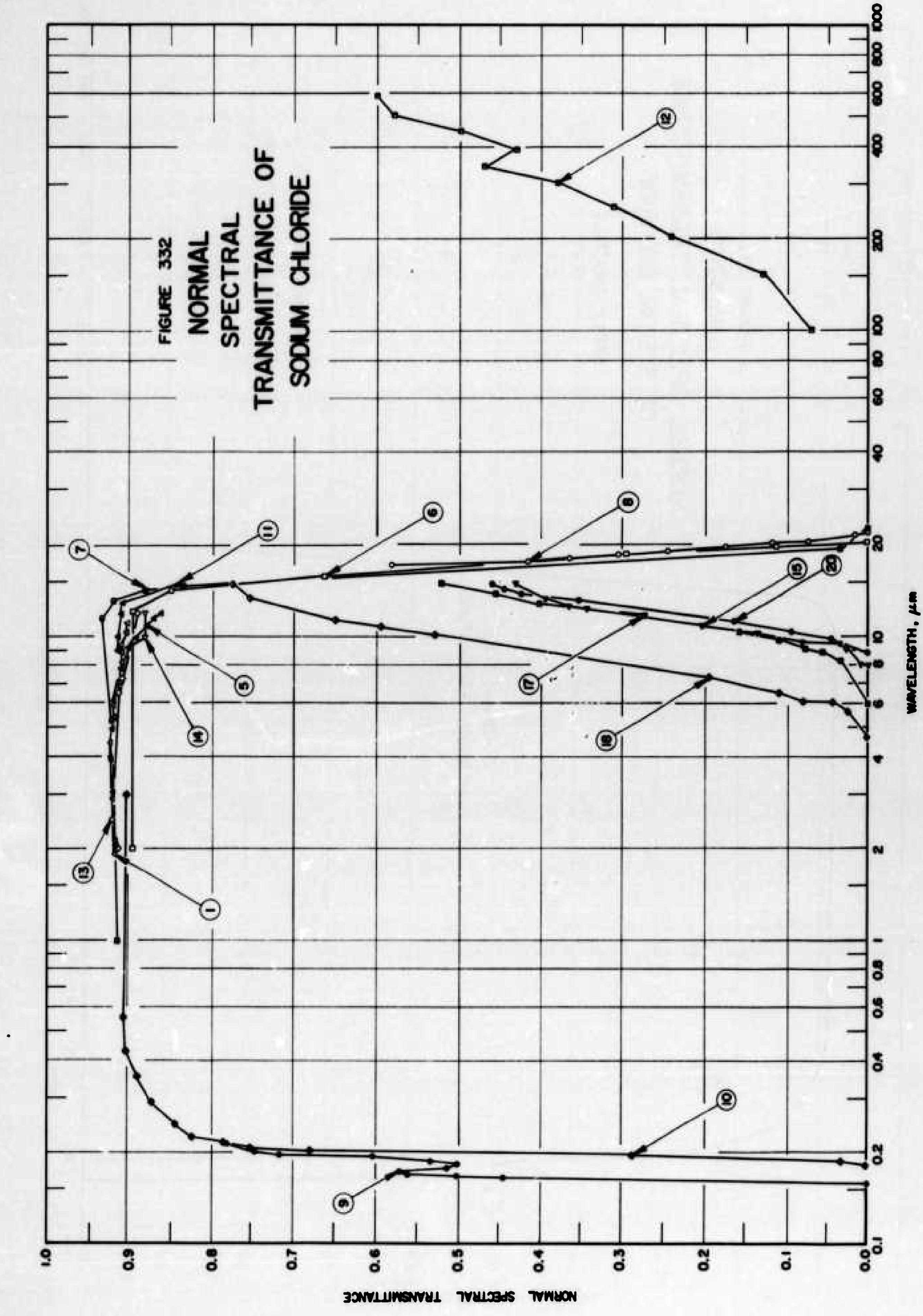


FIGURE 332
NORMAL SPECTRAL TRANSMITTANCE OF SODIUM CHLORIDE
NORMAL SPECTRAL TRANSMITTANCE
WAVELENGTH, μm
0.0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
1.0
0.1
0.2
0.4
0.6
0.8
1
2
4
6
8
10
20
40
60
80
100
200
400
600
800
1000
1
5
6
7
8
9
10
11
12
13
14
15
17
18
20

SPECIFICATION TABLE NO. 332 NORMAL SPECTRAL TRANSMITTANCE OF SODIUM CHLORIDE NaCl

Curve No.	Ref. No.	Year	Temperature K	Wavelength Range, μm	Geometry θ θ' ω'	Reported Error, %	Composition (weight percent), Specifications, and Remarks
1	12	1964	298	1.92-11.9	~0° ~0°		From Harshaw Chemical Co.; polished; data extracted from smooth curve.
2*	12	1964	373	2.04-12.0	~0° ~0°		Above specimen and conditions.
3*	12	1964	473	2.04-12.0	~0° ~0°		Above specimen and conditions.
4*	12	1964	573	2.04-12.0	~0° ~0°		Above specimen and conditions.
5	12	1964	673	2.04-12.0	~0° ~0°		Above specimen and conditions.
6	67	1963	~298	2.00-50.0	0° 0°		Specimen 5 mm thick; data extracted from smooth curve.
7	137	1965	298	1.00-22.0	0° 0°		Specimen 6.5 mm thick; data extracted from smooth curve.
8	93	1960	298	17.2-22.0	~0° ~0°		High purity crystal (6.0 mm thick); data extracted from smooth curve.
9	134	1967	77	0.1596-0.212	0° 0°	± 3	Pure single crystal (0.63 mm thick); purified by vacuum distillation followed by zone melting in chlorine using a quartz ampoule; cleaved; measured in vacuum (3×10^{-7} mm Hg); data extracted from smooth curve.
10	94	1967	298	0.182-3.00	~0° ~0°	± 2	Single crystal (5.0 mm thick); polished; data extracted from smooth curve.
11	298	1936	~298	9.00-15.0	~0° ~0°		Rock salt (5.45 mm thick); cubic.
12	292	1950	~298	100-594	~0° ~0°		0.32 mm thick.
13	288	1965	298	2.00-12.0	0° 0°		Single crystal NaCl manufactured by Harshaw Chemical Co. (2.80 mm thick); polished optically flat to within five green mercury fringes and a parallelism tolerance of ± 2.5 μm; data extracted from smooth curve.
14	288	1965	673	2.00-12.0	0° 0°		Above specimen and conditions.
15	368	1957	~298	8.00-15.0	~0° ~0°		Compacted powder (2.4 mm thick); particle size of 5 μm; sample compacted at 15 000 psi; sintered for 1 hr at 773 K; data extracted from smooth curve.
16*	368	1957	~298	6.00-15.0	~0° ~0°		Similar to the above specimen and conditions except sintered at 873 K for 1 hr and 2.0 mm thick.
17	368	1957	~298	6.00-15.0	~0° ~0°		Similar to the above specimen and conditions except sintered at 973 K for 1 hr.
18	368	1957	~298	4.66-15.0	~0° ~0°		Similar to the above specimen and conditions except sintered at 873 K for 1 hr and 1.0 mm thick.
19*	368	1957	~298	5.97-15.0	~0° ~0°		Similar to the above specimen and conditions except sintered at 873 K for 1 hr and 2.0 mm thick.
20	368	1957	~298	8.55-15.0	~0° ~0°		Similar to the above specimen and conditions except sintered at 873 K for 1 hr and 3.7 mm thick.

*Not shown on plot

DATA TABLE NO. 332 NORMAL SPECTRAL TRANSMITTANCE OF SODIUM CHLORIDE NaCl

[Wavelength, λ, μm; Transmittance, τ; Temperature, T, K]

CURVE 1
T = 298

λ	τ
1.92	0.921
2.91	0.925
3.90	0.926
4.42	0.929
5.40	0.925
5.91	0.925
6.89	0.916
8.38	0.915
8.88	0.914
9.40	0.912
10.4	0.907
11.9	0.907

CURVE 2*
T = 373

λ	τ
2.04	0.921
3.04	0.926
4.04	0.931
5.02	0.929
6.03	0.925
7.00	0.922
7.50	0.918
8.50	0.915
9.01	0.910
9.48	0.911
9.98	0.904
11.0	0.903
12.0	0.903

CURVE 3*
T = 473

λ	τ
2.04	0.922
3.03	0.928
4.01	0.930
5.01	0.930
6.02	0.925
7.00	0.919
8.00	0.915
8.99	0.914
10.0	0.900
11.0	0.899
12.0	0.900

CURVE 4*
T = 573

λ	τ
2.04	0.922
3.02	0.928
4.02	0.930
4.99	0.929
6.00	0.925
7.01	0.919
7.98	0.916
8.47	0.914
8.99	0.911
9.98	0.900
10.5	0.896
11.0	0.891
11.5	0.890
12.0	0.885

CURVE 5
T = 673

λ	τ
2.04	0.921
3.01	0.925
4.00	0.928
4.99	0.928
6.01	0.923
6.99	0.916*
7.97	0.913
8.98	0.910*
9.47	0.906
9.97	0.898
10.2	0.886*
10.5	0.887*
11.0	0.886
11.5	0.877
11.8	0.866*
12.0	0.865

CURVE 6
T = 298

λ	τ
2.00	0.900
12.1	0.900
14.1	0.852
15.9	0.665
18.7	0.299
19.9	0.113

CURVE 6 (cont.)

λ	τ
20.3	0.000
50.0	0.000

CURVE 7
T = 298

λ	τ
1.00	0.918
6.23	0.923
11.6	0.938
13.1	0.925
14.3	0.887
14.9	0.837
19.2	0.036
22.0	0.000

CURVE 8
T = 298

λ	τ
17.2	0.485
17.9	0.419
18.2	0.364
18.6	0.306
19.0	0.248
19.6	0.179
20.2	0.120
20.7	0.074
21.7	0.016
22.0	0.000

CURVE 9
T = 77

λ	τ
0.159	0.000
0.164	0.446
0.165	0.502
0.166	0.540*
0.168	0.561
0.170	0.570*
0.171	0.574
0.173	0.565*
0.179	0.515
0.181	0.503
0.183	0.505*
0.186	0.516*
0.188	0.535

CURVE 9 (cont.)

λ	τ
0.191	0.604
0.195	0.674*
0.198	0.718
0.201	0.747
0.205	0.766*
0.212	0.781

CURVE 10
T = 298

λ	τ
0.182	0.000
0.187	0.031
0.198	0.288
0.203	0.680
0.208	0.753
0.213	0.789
0.227	0.823
0.250	0.846
0.294	0.876
0.358	0.897
0.437	0.906
0.549	0.910
3.00	0.909

CURVE 11
T ~ 298

λ	τ
9.00	0.918
10.0	0.918
12.0	0.916
13.0	0.912
14.0	0.889
15.0	0.842

CURVE 12
T ~ 298

λ	τ
100	0.07
151	0.13
201	0.24
253	0.31
303	0.38
303	0.45*
345	0.47
397	0.43

CURVE 12 (cont.)

λ	τ
448	0.50
503	0.58
550	0.59*
594	0.60

CURVE 13
T = 298

λ	τ
2.00	0.919
2.50	0.924
4.50	0.928*
6.50	0.918
7.21	0.912
8.64	0.912*
9.50	0.903*
10.0	0.896*
12.0	0.896

CURVE 14
T = 673

λ	τ
2.00	0.919*
2.50	0.924*
4.50	0.928*
6.50	0.918*
7.21	0.912*
8.64	0.912*
9.50	0.903*
10.0	0.887
12.0	0.887

CURVE 15
T ~ 298

λ	τ
8.00	0.000
8.17	0.009
9.19	0.029
9.41	0.035
9.44	0.043*
9.46	0.068*
9.60	0.081
10.3	0.138
10.9	0.206
12.3	0.345
12.6	0.367

CURVE 15 (cont.)

λ	τ
12.9	0.385*
13.3	0.396
14.6	0.428*
15.0	0.432

CURVE 16*
T ~ 298

λ	τ
6.00	0.000
7.05	0.022
7.66	0.040
7.73	0.050
7.77	0.072
8.55	0.124
9.05	0.169
9.77	0.265
11.1	0.434
12.2	0.543
13.2	0.622
13.7	0.646
14.1	0.661
14.6	0.669
15.0	0.670

CURVE 17
T ~ 298

λ	τ
6.00	0.000
8.31	0.034
8.82	0.043*
8.97	0.056
9.04	0.079
9.69	0.111
10.3	0.160
11.6	0.274
12.9	0.402
13.6	0.456
14.6	0.507*
14.8	0.518*
15.0	0.523

CURVE 18
T ~ 298

λ	τ
4.66	0.000

CURVE 18 (cont.)

λ	τ
5.60	0.025
6.02	0.044
6.13	0.080
6.56	0.112
7.35	0.199
10.1	0.530
10.8	0.599
11.4	0.651
12.4	0.712*
13.3	0.752
14.1	0.776*
14.6	0.779*
15.0	0.779

CURVE 19*
T ~ 298

λ	τ
5.97	0.000
7.25	0.027
7.61	0.038
7.71	0.047
7.77	0.072
8.18	0.096
8.96	0.161
9.56	0.234
10.6	0.368
11.8	0.505
12.9	0.596
13.5	0.633
13.9	0.649
14.3	0.658
15.0	0.665

CURVE 20
T ~ 298

λ	τ
8.55	0.000
9.59	0.032*
9.88	0.047
9.97	0.074*
10.4	0.099
11.1	0.165
13.1	0.363
13.5	0.397*
13.9	0.426

CURVE 20 (cont.)

λ	τ
14.3	0.446
14.5	0.454*
15.0	0.460

* Not shown on plot

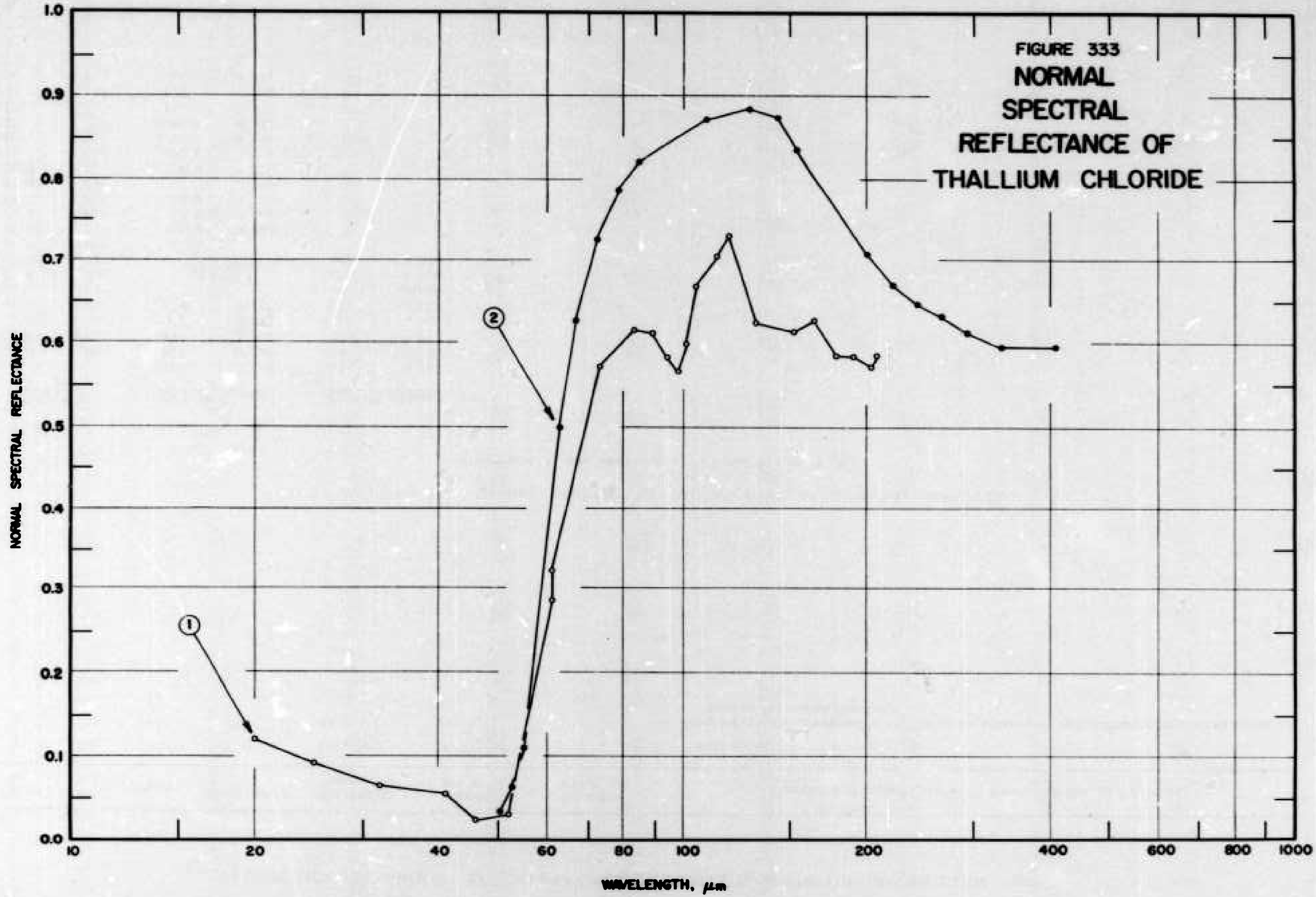


FIGURE 333
NORMAL
SPECTRAL
REFLECTANCE OF
THALLIUM CHLORIDE
NORMAL SPECTRAL REFLECTANCE
WAVELENGTH, μm
1.0
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0.0
10
20
40
60
80
100
200
400
600
800
1000
1
2

SPECIFICATION TABLE NO. 333 NORMAL SPECTRAL REFLECTANCE OF THALLIUM CHLORIDE TlCl

Curve No.	Ref. No.	Year	Temperature K	Wavelength Range, μm	Geometry θ θ′ ω′	Reported Error, %	Composition (weight percent), Specifications, and Remarks
1	342	1955	296	20.0-209	~0° ~0°		Single crystal.
2	419	1962	300	50.1-407	12° 12°		Single crystal; measured in vacuum; data extracted from smooth curve; evaporated Al mirror reference standard.

DATA TABLE NO. 333 NORMAL SPECTRAL REFLECTANCE OF THALLIUM CHLORIDE TlCl

[Wavelength, λ, μm; Reflectance, ρ; Temperature, T, K]

λ	ρ	λ	ρ	λ	ρ
CURVE 1 T = 296		CURVE 1 (cont.)		CURVE 2 (cont.)	
		164	0.628	154	0.835
20.0	0.120	178	0.587	200	0.709
25.0	0.091	190	0.586	220	0.670
32.0	0.064	203	0.572	242	0.647
41.0	0.054	209	0.587	265	0.631
46.0	0.023			292	0.613
52.0	0.030	CURVE 2 T = 300		332	0.598
61.0	0.289			407	0.598
61.0	0.322				
73.0	0.573	50.1	0.034		
83.0	0.616	52.7	0.061		
89.0	0.612	55.0	0.110		
94.0	0.584	62.9	0.500		
98.0	0.569	66.9	0.629		
101	0.600	72.1	0.724		
105	0.667	78.1	0.788		
114	0.704	84.7	0.821		
119	0.730	109	0.873		
132	0.626	128	0.889		
152	0.614	143	0.877		

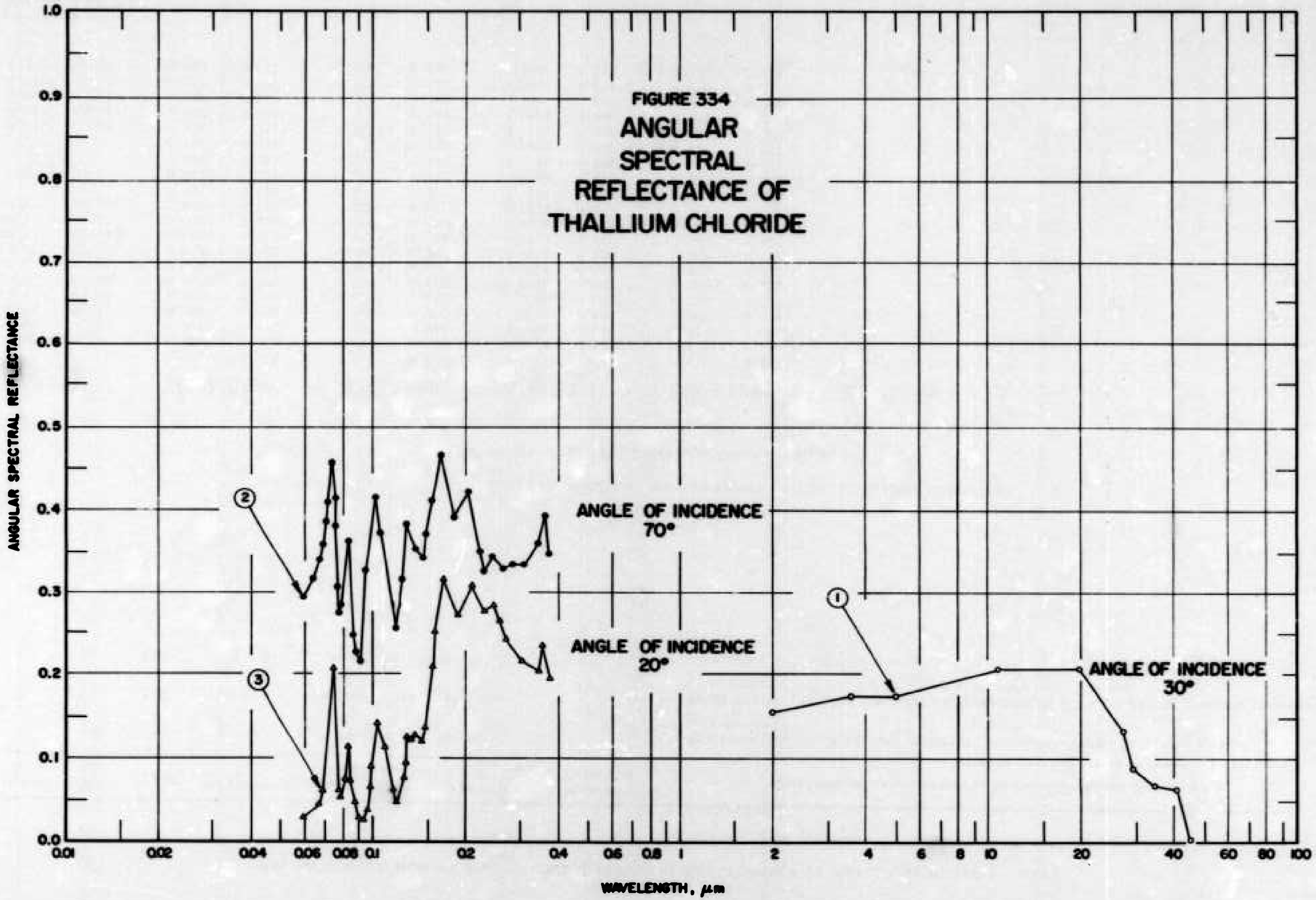


FIGURE 334
ANGULAR SPECTRAL REFLECTANCE OF THALLIUM CHLORIDE

SPECIFICATION TABLE NO. 334 ANGULAR SPECTRAL REFLECTANCE OF THALLIUM CHLORIDE TlCl

Curve No.	Ref. No.	Year	Temperature K	Wavelength Range, μm	Geometry θ θ' ω'	Reported Error, %	Composition (weight percent), Specifications, and Remarks
1	102	1965	~298	2.00-45.1	30° 30°		Specimen 1.65 mm thick; data extracted from smooth curve; aluminum mirror reference.
2	103	1967	298	0.0590-0.376	70° 70°		Single crystal (Harshaw Chemical Co.); annealed at 473 K for 24 hrs; polished; measured in vacuum (10^{-2} mm Hg); data extracted from smooth curve.
3	103	1967	298	0.0590-0.376	20° 20°		Above specimen and conditions.

DATA TABLE NO. 334 ANGULAR SPECTRAL REFLECTANCE OF THALLIUM CHLORIDE TlCl

[Wavelength, λ, μm; Reflectance, ρ; Temperature, T, K]

λ	ρ	λ	ρ	λ	ρ	λ	ρ	λ	ρ	λ	ρ
CURVE 1		CURVE 2 (cont.)		CURVE 2 (cont.)		CURVE 3		CURVE 3 (cont.)		CURVE 3 (cont.)	
T ~ 298						T = 298					
		0.0710	0.410	0.133	0.362*			0.114	0.063	0.344	0.204
2.00	0.157	0.0730	0.458	0.136	0.364	0.0590	0.029	0.118	0.049	0.354	0.236
3.60	0.175	0.0750	0.415	0.144	0.345	0.0660	0.046	0.124	0.077	0.376	0.198
5.00	0.175	0.0750	0.382	0.149	0.371	0.0680	0.062	0.127	0.094		
10.9	0.207	0.0760	0.308	0.155	0.412	0.0700	0.064*	0.129	0.125		
19.5	0.208	0.0770	0.274	0.159	0.449*	0.0740	0.207	0.131	0.121		
27.1	0.132	0.0780	0.284	0.168	0.467	0.0770	0.062	0.135	0.129		
29.9	0.088	0.0830	0.364	0.182	0.391	0.0780	0.052	0.143	0.120		
34.7	0.069	0.0850	0.272*	0.203	0.424	0.0810	0.075	0.146	0.138		
40.2	0.061	0.0860	0.248	0.214	0.356*	0.0830	0.111	0.155	0.210		
45.1	0.000	0.0880	0.226	0.221	0.351	0.0840	0.072	0.159	0.252		
		0.0910	0.216	0.230	0.327	0.0870	0.048	0.170	0.318		
CURVE 2		0.0930	0.231*	0.243	0.347	0.0900	0.029	0.188	0.272		
T = 298		0.0950	0.328	0.264	0.330	0.0930	0.026	0.197	0.273*		
		0.101	0.417	0.282	0.336	0.0960	0.037	0.210	0.310		
0.0590	0.296	0.102	0.391*	0.310	0.336	0.0980	0.066	0.230	0.277		
0.0630	0.318	0.105	0.374	0.318	0.350*	0.0980	0.090	0.248	0.283		
0.0660	0.341	0.117	0.257	0.344	0.362	0.102	0.142	0.258	0.266		
0.0680	0.360	0.123	0.317	0.365	0.395	0.106	0.134*	0.270	0.242		
0.0700	0.389	0.129	0.385	0.376	0.350	0.109	0.113	0.302	0.216		

*Not shown on plot

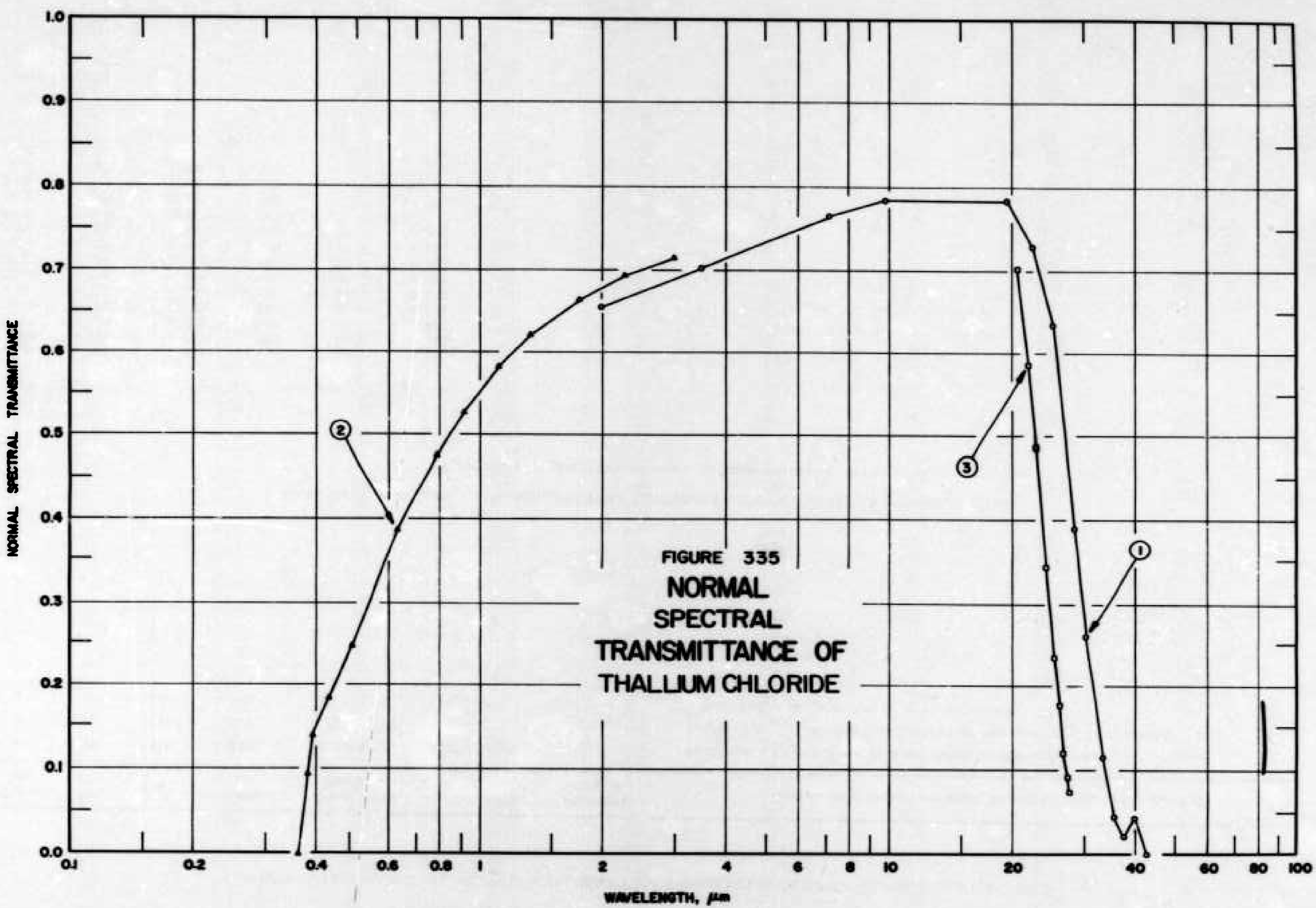


FIGURE 335
NORMAL
SPECTRAL
TRANSMITTANCE OF
THALLIUM CHLORIDE
NORMAL SPECTRAL TRANSMITTANCE
WAVELENGTH, μm
1.0
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0.0
0.1
0.2
0.4
0.6
0.8
1
2
4
6
8
10
20
40
60
80
100
1
2
3

SPECIFICATION TABLE NO. 335 NORMAL SPECTRAL TRANSMITTANCE OF THALLIUM CHLORIDE TlCl

Curve No.	Ref. No.	Year	Temperature K	Wavelength Range, μm	Geometry θ θ' ω'	Reported Error, %	Composition (weight percent), Specifications, and Remarks
1	102	1965	~298	2.00-42.3	0° 0°		Specimen 1.65 mm thick; data extracted from smooth curve.
2	94	1967	298	0.363-3.006	~0° ~0°		Single crystal (1.65 mm thick); polished; data extracted from smooth curve.
3	399	1948	~298	20.7-27.7	~0° ~0°		6 mm thick; data extracted from smooth curve.

DATA TABLE NO. 335 NORMAL SPECTRAL TRANSMITTANCE OF THALLIUM CHLORIDE TlCl

[Wavelength, λ, μm; Transmittance, τ; Temperature, T, K]

λ	τ	λ	τ	λ	τ
CURVE 1 T ~ 298		CURVE 2 T = 298		CURVE 3 T ~ 298	
2.00	0.655	0.363	0.000	20.7	0.702
3.50	0.702	0.381	0.095	22.0	0.589
7.20	0.769	0.397	0.139	23.0	0.487
9.90	0.786	0.430	0.183	24.3	0.341
19.8	0.786	0.489	0.247	25.4	0.236
22.9	0.730	0.638	0.388	26.1	0.177
25.2	0.638	0.792	0.478	26.8	0.120
28.8	0.390	0.920	0.529	27.3	0.091
30.3	0.260	1.11	0.583	27.7	0.074
33.5	0.113	1.34	0.621		
35.9	0.044	1.76	0.665		
37.9	0.022	2.29	0.695		
40.0	0.043	3.00	0.715		
42.3	0.000				

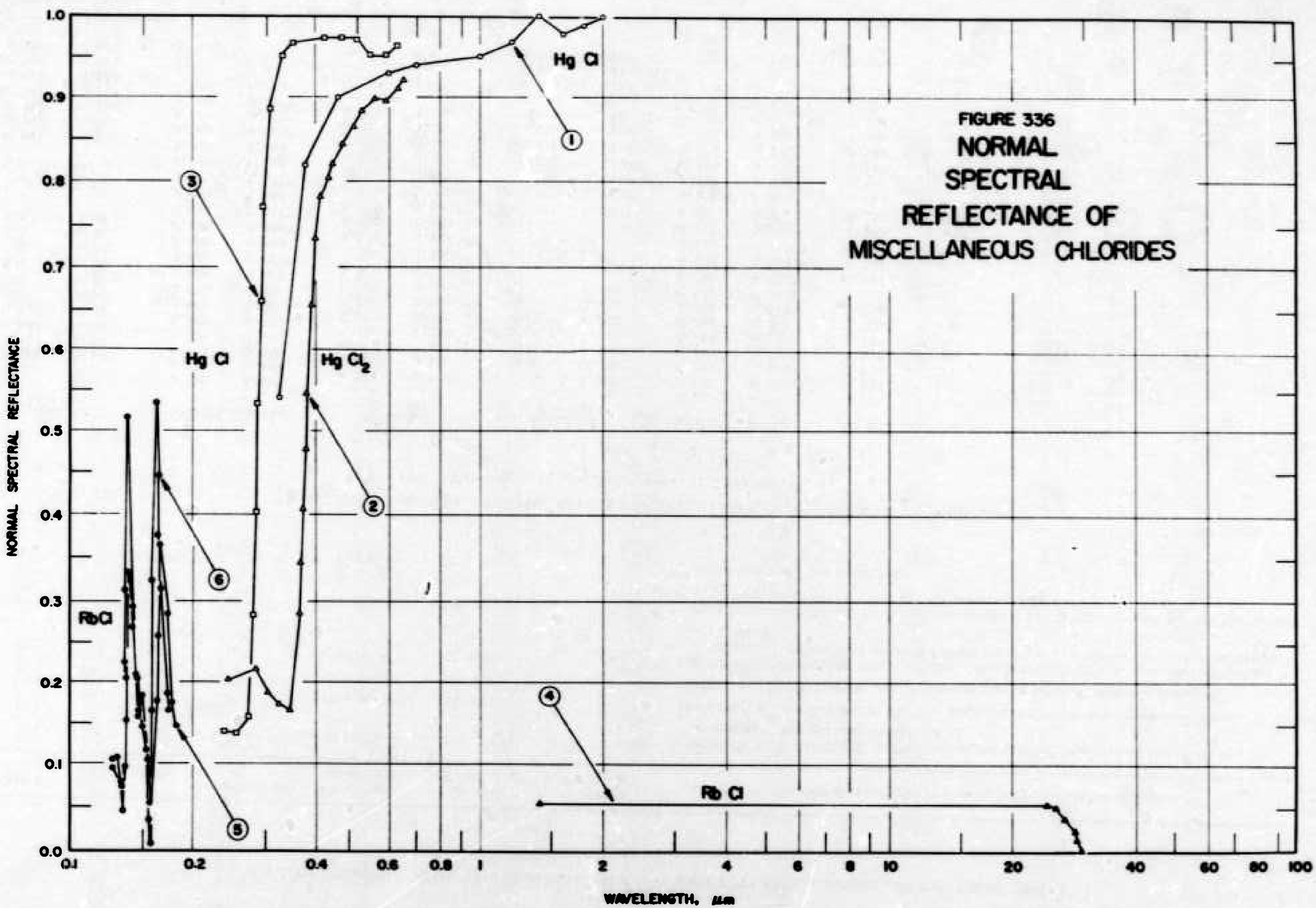


FIGURE 336
NORMAL
SPECTRAL
REFLECTANCE OF
MISCELLANEOUS CHLORIDES

SPECIFICATION TABLE NO. 336 NORMAL SPECTRAL REFLECTANCE OF MISCELLANEOUS CHLORIDES

Curve No.	Ref. No.	Year	Temperature K	Wavelength Range, μm	Geometry θ	θ'	ω'	Reported Error, %	Composition (weight percent), Specifications, and Remarks
1	92	1964	298	0.325-2.0	~0°		2π		MERCURY DICHLORIDE, $HgCl_2$; compacted powder; MgO reference standard; [Authors' designation: Sample 14].
2	136	1967	~298	0.241-0.651	0°	45°			DIMERCURY DICHLORIDE, Hg_2Cl_2; magnesium carbonate reference standard.
3	136	1967	~298	0.239-0.634	0°	45°			MERCURY DICHLORIDE, $HgCl_2$; magnesium carbonate reference standard.
4	87	1968	313	1.40-29.7	30°	30°			RUBIDIUM CHLORIDE, RbCl; synthetic single crystal (3.0 mm thick); flat to ten fringes or better; data extracted from smooth curve; aluminum mirror reference standard.
5	377	1968	300	0.127-0.182	~20°	~20°			RUBIDIUM CHLORIDE, RbCl; cleaved single crystal; back surface treated with emory cloth; pressure $< 10^{-6}$ mm Hg; data extracted from smooth curve.
6	377	1968	55	0.127-0.173	~20°	~20°			Above specimen and conditions.

DATA TABLE NO. 336 NORMAL SPECTRAL REFLECTANCE OF MISCELLANEOUS CHLORIDES

[Wavelength, λ, μm; Reflectance, ρ; Temperature, T, K]

λ	ρ
CURVE 1	**T = 298**
0.325	0.54
0.375	0.82
0.450	0.90
0.600	0.93
0.700	0.94
1.0	0.95
1.2	0.97
1.4	>1.00
1.6	0.98
1.8	0.99
2.0	1.00
CURVE 2	**T ~ 298**
0.241	0.202
0.281	0.218
0.301	0.187
0.321	0.171
0.344	0.165
0.361	0.284
0.365	0.344

λ	ρ
CURVE 2 (cont.)	
0.370	0.408
0.374	0.479
0.378	0.548
0.389	0.656
0.399	0.734
0.409	0.785
0.421	0.805
0.439	0.821
0.450	0.837*
0.460	0.846
0.469	0.850*
0.478	0.863*
0.489	0.866
0.500	0.878*
0.519	0.886
0.559	0.900
0.569	0.899*
0.590	0.897
0.609	0.904*
0.630	0.912
0.651	0.921

λ	ρ
CURVE 3	**T ~ 298**
0.239	0.140
0.252	0.139
0.271	0.158
0.280	0.282
0.284	0.403
0.289	0.531
0.294	0.660
0.298	0.771
0.309	0.888
0.330	0.951
0.350	0.964
0.379	0.964*
0.419	0.973
0.460	0.973
0.500	0.962
0.540	0.951
0.591	0.951
0.634	0.964

λ	ρ
CURVE 4	**T = 313**
1.40	0.053
24.1	0.053
25.5	0.050
26.8	0.037
28.2	0.022
28.9	0.013
29.7	0.000
CURVE 5	**T = 300**
0.127	0.0951
0.128	0.0923*
0.130	0.0942*
0.132	0.0908*
0.134	0.0710
0.135	0.0964
0.136	0.151
0.136	0.205
0.137	0.273*
0.138	0.324
0.139	0.332*

λ	ρ
CURVE 5 (cont.)	
0.139	0.332
0.141	0.269
0.144	0.210
0.145	0.183*
0.146	0.159
0.150	0.132
0.153	0.111*
0.154	0.105
0.158	0.0527
0.158	0.0543*
0.162	0.179
0.163	0.257
0.166	0.362
0.168	0.363*
0.171	0.282
0.176	0.199*
0.178	0.173
0.182	0.146
CURVE 6	**T = 55**
0.127	0.105

λ	ρ
CURVE 6 (cont.)	
0.128	0.105*
0.129	0.107*
0.130	0.107
0.131	0.103*
0.132	0.0936*
0.132	0.0793
0.134	0.0449
0.136	0.224
0.136	0.312
0.318	0.515
0.141	0.293
0.142	0.244*
0.144	0.206
0.145	0.177*
0.147	0.164
0.147	0.159*
0.149	0.156*
0.150	0.145
0.151	0.146*
0.153	0.116
0.155	0.0349
0.156	0.00971
0.158	0.165

λ	ρ
CURVE 6 (cont.)	
0.159	0.323
0.161	0.533
0.163	0.373
0.165	0.444
0.167	0.313
0.169	0.224*
0.172	0.185
0.173	0.165

*Not shown on plot

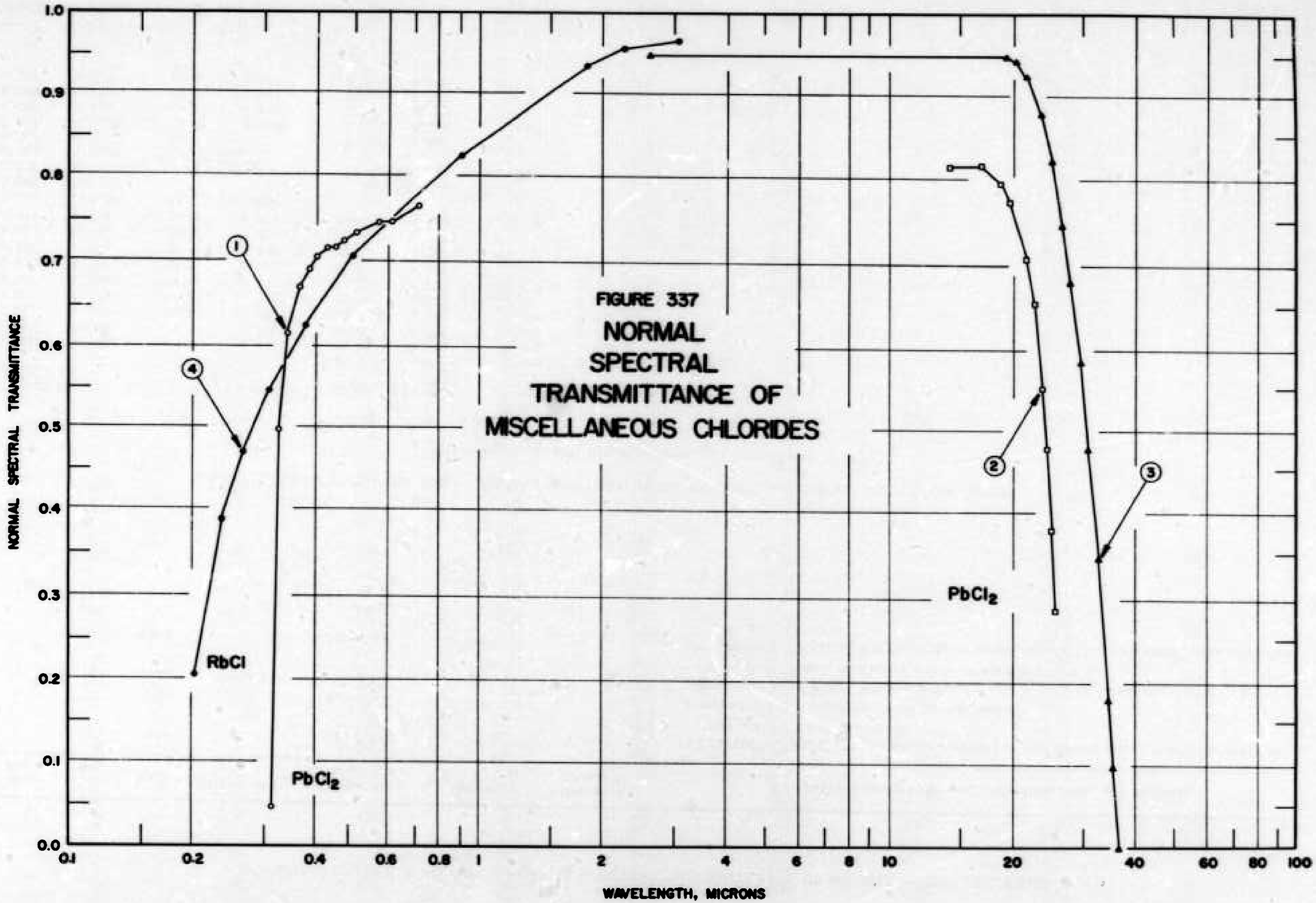


FIGURE 337
NORMAL SPECTRAL TRANSMITTANCE OF MISCELLANEOUS CHLORIDES

SPECIFICATION TABLE NO. 337 NORMAL SPECTRAL TRANSMITTANCE OF MISCELLANEOUS CHLORIDES

Curve No.	Ref. No.	Year	Temperature K	Wavelength Range, μm	Geometry θ θ' ω'	Reported Error, %	Composition (weight percent), Specifications, and Remarks
1	400	1969	~298	0.312-0.703	~0° ~0°		LEAD DICHLORIDE, $PbCl_2$; single crystal (~1 mm thick); grown from zone-refined material by the Bridgman method.
2	399	1948	~298	14.0-25.5	~0° ~0°		6 mm thick; data extracted from smooth curve.
3	87	1968	313	2.60-36.9	~0° ~0°		RUBIDIUM CHLORIDE, RbCl; synthetic single crystal (3.0 mm thick); flat to ten fringes or better; data extracted from smooth curve.
4	373	1968	~298	0.202-3.03	~0° ~0°		RUBIDIUM CHLORIDE, RbCl; synthetic single crystal (2.1 mm thick); data extracted from smooth curve.

DATA TABLE NO. 337 NORMAL SPECTRAL TRANSMITTANCE OF MISCELLANEOUS CHLORIDES

[Wavelength, λ, μm; Transmittance, τ; Temperature, T, K]

CURVE 1
T ~ 298

λ	τ
0.312	0.0468
0.321	0.498
0.340	0.614
0.361	0.670
0.381	0.690
0.400	0.705
0.421	0.714
0.441	0.714
0.461	0.723
0.481	0.723*
0.501	0.733
0.521	0.733
0.543	0.733*
0.562	0.746
0.591	0.748*
0.603	0.748
0.653	0.753*
0.703	0.762

CURVE 2
T ~ 298

λ	τ
14.0	0.814
16.9	0.816
18.7	0.794
19.9	0.771
21.6	0.707
22.6	0.653
23.7	0.550
24.3	0.479
25.0	0.379
25.5	0.284

CURVE 3
T = 313

λ	τ
2.60	0.950
19.3	0.950
20.3	0.944
21.6	0.925

CURVE 3 (cont.)

λ	τ
23.4	0.880
25.0	0.822
26.3	0.748
27.6	0.680
29.1	0.581
30.7	0.477
32.4	0.346
34.5	0.177
35.4	0.098
36.9	0.000

CURVE 4
T ~ 298

λ	τ
0.202	0.202
0.236	0.386
0.267	0.469
0.309	0.543
0.375	0.625

CURVE 4 (cont.)

λ	τ
0.489	0.705
0.900	0.824
1.82	0.934
2.25	0.958
3.03	0.968

* Not shown on plot

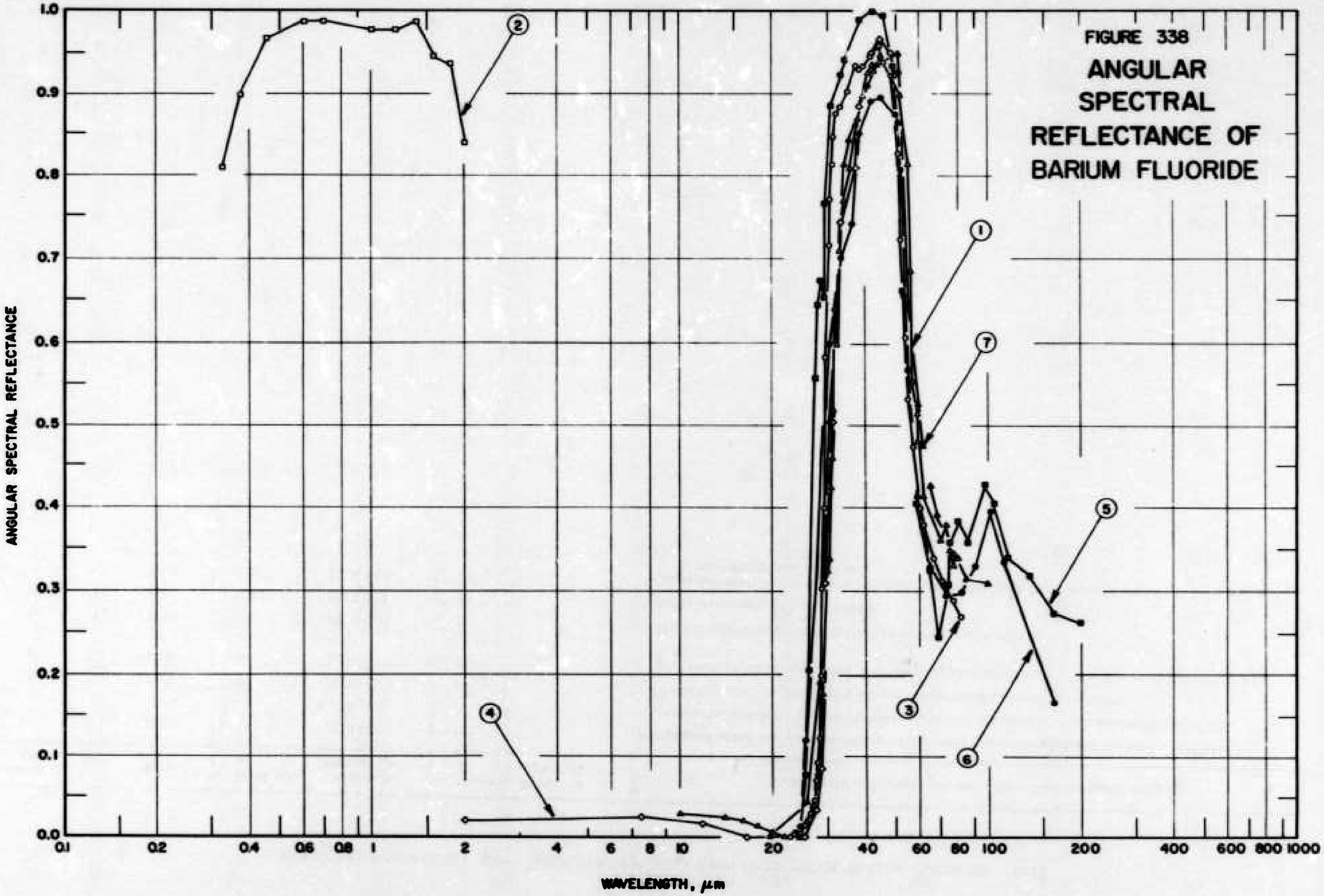


FIGURE 338
ANGULAR
SPECTRAL
REFLECTANCE OF
BARIUM FLUORIDE
ANGULAR SPECTRAL REFLECTANCE
WAVELENGTH, μm
1
2
3
4
5
6
7

SPECIFICATION TABLE NO. 338 ANGULAR SPECTRAL REFLECTANCE OF BARIUM FLUORIDE BaF_2

Curve No.	Ref. No.	Year	Temperature K	Wavelength Range, μm	Geometry θ	θ'	ω'	Reported Error, %	Composition (weight percent), Specifications and Remarks
1	139	1962	300	10.0-57.0	~0°	~0°			Polished using standard metallographic polishing method; back surface roughened.
2	92	1964	298	0.325-2.0	~0°		2π		Compacted powder; MgO reference standard; [Authors' designation: Sample 12].
3	140	1967	90	21.9-82.6	15°	15°			Crystal, pure; mechanically lapped and diamond abrasive polished.
4	102	1965	~298	2.00-50.0	30°	30°			Specimen 12 mm thick; data extracted from smooth curve; aluminum mirror reference standard.
5	141	1964	≤ 10	24.4-200	45°	45°			Al-2024 reference; data extracted from smooth curve.
6	141	1964	298	24.5-161	45°	45°			Above specimen and conditions.
7	419	1962	300	19.8-100	12°	12°			Single crystal; measured in vacuum; data extracted from smooth curve; evaporated Al mirror reference standard.

DATA TABLE NO. 338 ANGULAR SPECTRAL REFLECTANCE OF BARIUM FLUORIDE BaF_2

[Wavelength, λ, μm; Reflectance, ρ; Temperature, T, K]

CURVE 1
T = 300

λ	ρ
10.0	0.030
14.0	0.024
16.0	0.020
18.0	0.015
20.0	0.005
22.0	0.000
26.0	0.020
27.0	0.040
28.0	0.080
29.0	0.180
30.0	0.322
30.5	0.340
31.0	0.425
31.1	0.460
31.5	0.520
32.0	0.642
32.2	0.600
33.0	0.710
33.4	0.740*
34.4	0.770
35.2	0.780*
36.5	0.810
38.3	0.870
39.5	0.900
41.4	0.930
42.3	0.940
43.5	0.932
45.3	0.950
47.5	0.945*
52.0	0.900
53.5	0.894*
55.0	0.815
56.0	0.684
57.0	0.555
59.0	0.515
59.0	0.486*
59.0	0.480
62.0	0.415
67.6	0.375*
70.0	0.360
73.0	0.380
75.0	0.350
75.5	0.330
77.5	0.345
80.0	0.340

CURVE 2
T = 298

λ	ρ
0.325	0.81
0.375	0.90
0.450	0.97
0.600	0.99
0.700	0.99
1.0	0.98
1.2	0.98
1.4	0.99
1.6	0.95
1.8	0.94
2.0	0.84

CURVE 3
T = 90

λ	ρ
21.9	0.000*
22.9	0.000
23.4	0.002
23.9	0.005
24.5	0.004
25.5	0.014
25.9	0.022*
26.6	0.030
27.1	0.047
27.5	0.070
27.8	0.093
28.2	0.128
28.6	0.200
29.0	0.303
29.4	0.400
29.9	0.586
30.2	0.719
30.8	0.772
31.2	0.815
31.8	0.850
32.3	0.878
32.7	0.876*
33.3	0.881*
33.9	0.885
34.5	0.887*
35.1	0.896*
35.7	0.904
36.4	0.907*
37.0	0.923*
37.7	0.939
38.6	0.934

CURVE 3 (cont.)

λ	ρ
39.2	0.938
40.0	0.938*
40.8	0.941*
41.5	0.948*
42.6	0.950
43.5	0.953*
44.4	0.962
45.5	0.952*
46.5	0.942
47.6	0.942*
48.8	0.927
51.3	0.828
52.6	0.722
54.1	0.609
55.6	0.531
57.1	0.473
58.8	0.439*
60.6	0.400
62.5	0.380
66.2	0.340
70.9	0.311
76.9	0.287
82.6	0.270

CURVE 4
T ~ 298

λ	ρ
2.00	0.020
7.50	0.024
11.9	0.017
16.6	0.000
25.4	0.000
27.7	0.035
28.9	0.185
29.5	0.310
31.6	0.506
33.3	0.746
37.4	0.810
38.7	0.887
42.8	0.951
45.4	0.970
48.2	0.951
50.0	0.928

CURVE 5
T ≤ 10

λ	ρ
24.4	0.000
25.5	0.078
26.1	0.208
27.4	0.560
28.0	0.649
28.8	0.676
29.4	0.654
29.9	0.767
31.0	0.887
33.1	0.928
34.7	0.946
38.9	0.993
42.7	1.00*
46.0	0.996
49.7	0.939
51.8	0.866
52.9	0.661
58.1	0.403
64.5	0.323
68.4	0.248
74.0	0.307
75.7	0.358
80.0	0.383
86.2	0.359
98.0	0.427
105	0.403
117	0.340
136	0.317
161	0.273
200	0.261

CURVE 6
T = 298

λ	ρ
24.5	0.012
25.9	0.120
30.6	0.600
33.5	0.701
36.3	0.742
38.7	0.851
42.0	0.891
45.2	0.897
50.5	0.876
52.0	0.808
55.5	0.570

CURVE 6 (cont.)

λ	ρ
58.8	0.411
64.9	0.327
72.4	0.291
82.6	0.297
90.9	0.330
101	0.396
113	0.336
161	0.167

CURVE 7
T = 300

λ	ρ
19.8	0.000
23.5	0.005*
25.1	0.016*
26.2	0.045
27.4	0.094*
28.2	0.193
30.6	0.504
32.1	0.643*
33.3	0.745*
34.7	0.816
35.8	0.844
38.7	0.859*
40.5	0.913
44.0	0.940
50.2	0.952
51.4	0.931
52.4	0.856*
53.9	0.722*
55.4	0.649
56.8	0.582*
59.2	0.529
61.9	0.473
65.0	0.427
68.7	0.391
73.6	0.364*
78.7	0.333*
85.7	0.313
100	0.310

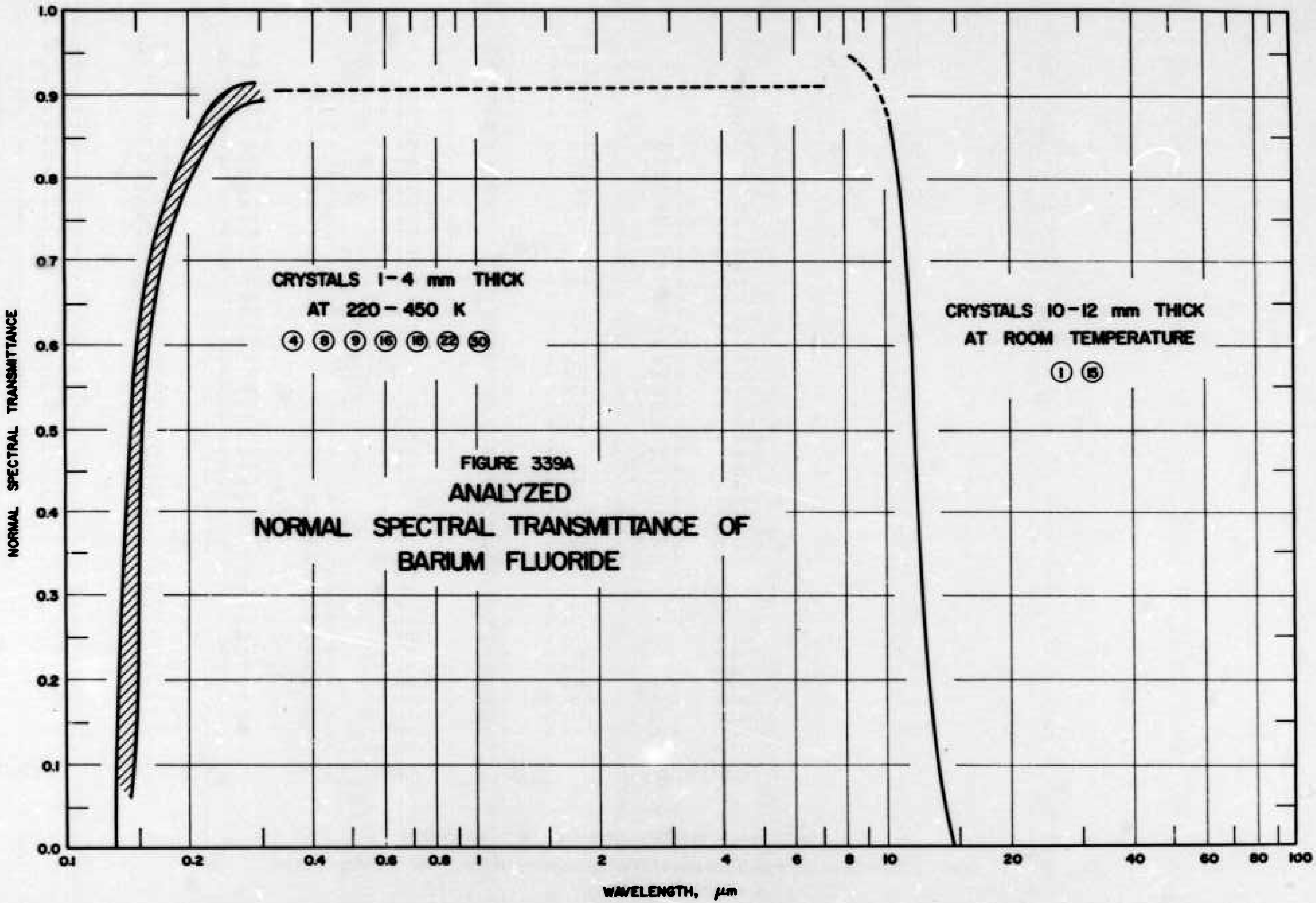


FIGURE 339A
ANALYZED
NORMAL SPECTRAL TRANSMITTANCE OF
BARIUM FLUORIDE

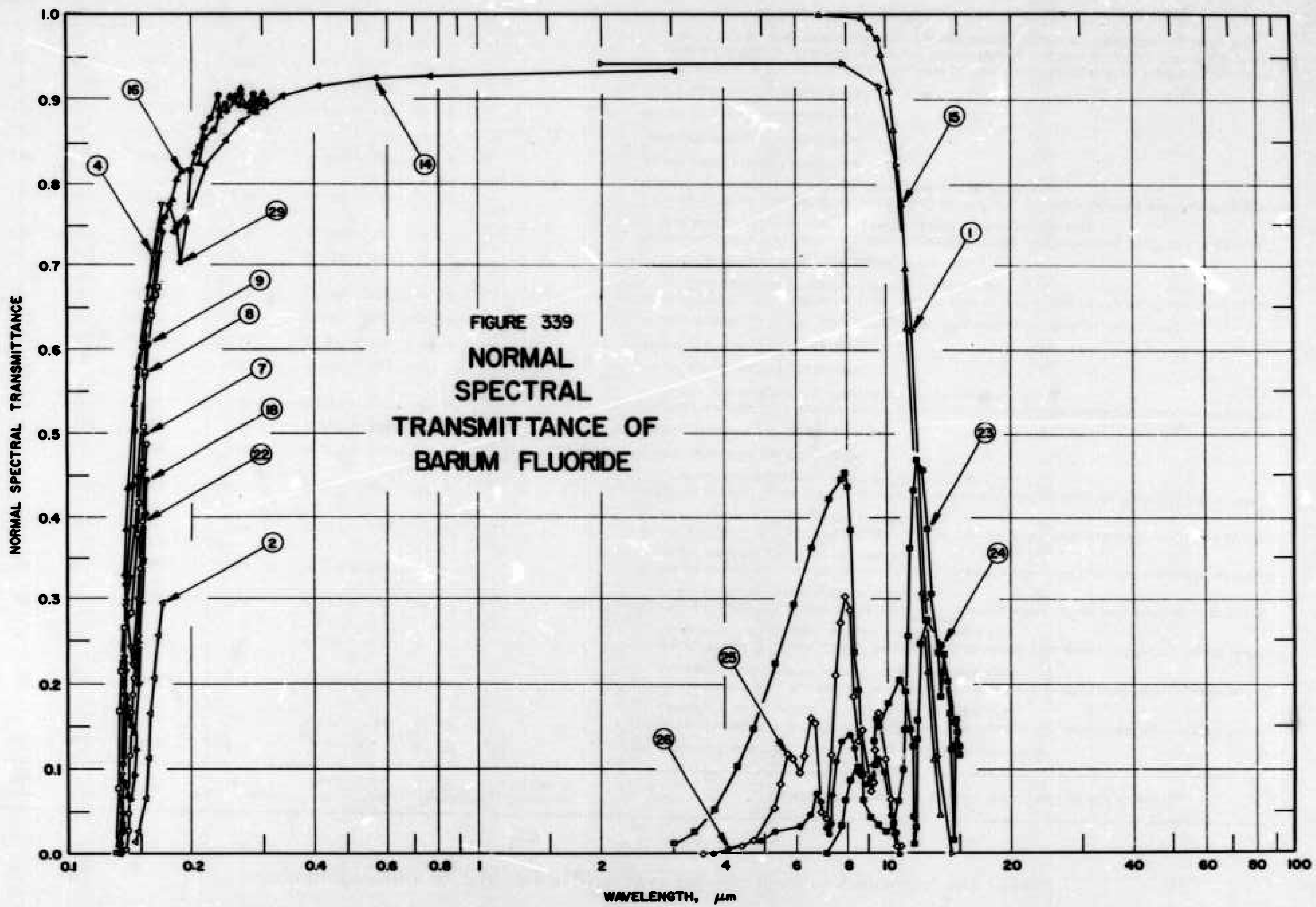


FIGURE 339
NORMAL SPECTRAL TRANSMITTANCE OF BARIUM FLUORIDE

SPECIFICATION TABLE NO. 339 NORMAL SPECTRAL TRANSMITTANCE OF BARIUM FLUORIDE BaF_2

Curve No.	Ref. No.	Year	Temperature K	Wavelength Range, μm	Geometry θ	θ'	ω'	Reported Error, %	Composition (weight percent), Specifications and Remarks
1	102	1965	~298	2.00-14.3	0°	0°			Specimen 12 mm thick; data extracted from smooth curve.
2	142	1966	298	0.145-0.170	0°	0°			Cleaved crystal (6.1 mm thick); measured in vacuum; data extracted from smooth curve; [Author's designation: Sample S1 (from ingot 1)].
3*	142	1966	298	0.134-0.170	0°	0°			Cleaved crystal (4.1 mm thick); measured in vacuum; data extracted from smooth curve; [Author's designation: Sample S3 (from ingot 3)].
4	142	1966	298	0.134-0.170	0°	0°			Cleaved crystal (4.2 mm thick); measured in vacuum; data extracted from smooth curve; [Author's designation: Sample S6 (from ingot 6)].
5*	142	1966	298	0.134-0.153	0°	0°			Above specimen and conditions measured in vacuum after 72 hrs heat treatment at 373 K under ambient atmospheric conditions.
6*	142	1966	298	0.134-0.153	0°	0°			Above specimen and conditions measured in vacuum after 267 hrs heat treatment at 373 K under ambient atmospheric conditions.
7	142	1966	298	0.134-0.153	0°	0°			Above specimen and conditions measured in vacuum after 1000 hrs heat treatment at 373 K under ambient atmospheric conditions.
8	142	1966	222.2	0.131-0.164	0°	0°			Polished crystal (2 mm thick); measured in vacuum; data extracted from smooth curve; [Author's designation: Sample W3 (from ingot 3)].
9	142	1966	298	0.134-0.170	0°	0°			Above specimen and conditions.
10*	142	1966	299.2	0.134-0.164	0°	0°			Above specimen and conditions.
11*	142	1966	206.2	0.131-0.165	0°	0°			Polished crystal (2.0 mm thick); measured in vacuum; data extracted from smooth curve; [Author's designation: Sample W8 (from ingot 8)].
12*	142	1966	296.2	0.134-0.165	0°	0°			Above specimen and conditions.
13*	142	1966	298	0.134-0.170	0°	0°			Above specimen and conditions.
14	94	1967	298	0.182-3.00	~0°	~0°			Single crystal (12.0 mm thick); polished; data extracted from smooth curve.
15	302	1952	~298	6.89-13.3	~0°	~0°			Single crystal; data extracted from smooth curve; reflection losses eliminated and transmission adjusted to standard thickness of 1 cm.
16	291	1966	~298	0.135-0.300	0°	0°			Crystal (1.10 mm thick); measured in vacuum.
17*	291	1966	~298	0.135-0.300	0°	0°			Above specimen and conditions except irradiated with 10^{14} electrons cm^{-2} at 1.0 Mev and 2.0 Mev for 30 min each; turned a blue tint after irradiation.
18	282	1965	299	0.134-0.155	0°	0°			Crystal (1.95 mm thick) from Harshaw Chemical Co.; freshly cleaved and stored in vacuum; data extracted from smooth curve; measured in vacuum.
19*	282	1965	329.5	0.135-0.155	0°	0°			Above specimen and conditions.
20*	282	1965	365	0.136-0.155	0°	0°			Above specimen and conditions.
21*	282	1965	409	0.137-0.155	0°	0°			Above specimen and conditions.
22	282	1965	449	0.139-0.155	0°	0°			Above specimen and conditions.
23	368	1957	~298	3.00-15.0	~0°	~0°			>1 Sr, 0.01-0.1 Fe, Na, and Cu; compact (2 mm thick); prepared by aqueous precipitation of $Ba(NO_3)_2$ solution plus excess NaF solution; particle size less than 1 μm; sintered 1 hr at 973 K; data extracted from smooth curve; [Authors' designation: BaF_2 B].

*Not shown on plot

SPECIFICATION TABLE NO. 339 (continued)

Curve No.	Ref. No.	Year	Temperature K	Wavelength Range, μm	Geometry θ	θ'	ω'	Reported Error, %	Composition (weight percent), Specifications and Remarks
24	368	1957	~298	7.09-15.0	~0°	~0°			≫1 Sr, 0.01-0.1 Fe and Na, <0.1 Cu; compact (2 mm thick); prepared by aqueous precipitation of $Ba(CH_3COO)_2$ plus excess NaF solution; particle size greater than 1 μm; sintered 1 hr at 773 K; data extracted from smooth curve; [Authors' designation: BaF_2 F].
25	368	1957	~298	3.52-10.9	~0°	~0°			≫1 Sr, >0.1 Fe, <0.01 Cr; compact (2 mm thick); prepared by grounding in Attritor water slurry and steel balls; particle size about 1 μm; sintered 1 hr at 773 K; data extracted from smooth curve; [Authors' designation: BaF_2 G].
26	368	1957	~298	3.74-10.7	~0°	~0°			Compact (2 mm thick); prepared by passing through Micronizer six times; particle size is 1.2 μm; sintered 1 hr at 973 K; data extracted from smooth curve; [Authors' designation: BaF_2 H].
27*	368	1957	~298	3.38-14.9	~0°	~0°			Similar to the above specimen and conditions except sintered at 1073 K.
28*	368	1957	~298	~3-~14	~0°	~0°			Similar to the above specimen and conditions except sintered at 1173 K; no transmission throughout wavelength range.
29	97	1967	~298	0.134-0.301	~0°	~0°			Crystal (3.18 mm thick) from Optivac, Inc.; optically polished.
30*	97	1967	~298	0.134-0.301	~0°	~0°			Above specimen and conditions except measured after irradiated by a total flux of 8.25 x 10^{18} protons cm^{-2} evenly distributed over 3, 3.8, and 4.6 MeV.

*Not shown on plot

DATA TABLE NO. 339 NORMAL SPECTRAL TRANSMITTANCE OF BARIUM FLUORIDE BaF_2

[Wavelength, λ, μm; Transmittance, τ; Temperature, T, K]

CURVE 1
T ~ 298

λ	τ
2.00	0.941
7.80	0.941
9.60	0.915
10.5	0.826
11.5	0.622
12.4	0.300
13.1	0.114
14.3	0.000

CURVE 2
T = 298

λ	τ
0.145	0.016
0.149	0.027
0.154	0.065
0.157	0.112
0.159	0.165
0.162	0.209
0.166	0.257
0.170	0.296

CURVE 3*
T = 298

λ	τ
0.134	0.044
0.135	0.189
0.136	0.285
0.139	0.399
0.140	0.433
0.144	0.511
0.150	0.627
0.155	0.710
0.159	0.770
0.164	0.812
0.170	0.838

CURVE 4
T = 298

λ	τ
0.134	0.000
0.135	0.092
0.137	0.230
0.139	0.290
0.141	0.241
0.144	0.222

CURVE 4 (cont.)

λ	τ
0.146	0.231*
0.149	0.300
0.150	0.372
0.151	0.476*
0.153	0.568
0.156	0.654
0.161	0.713
0.165	0.756*
0.170	0.778

CURVE 5*
T = 298

λ	τ
0.134	0.000
0.135	0.042
0.136	0.111
0.136	0.171
0.138	0.192
0.141	0.175
0.143	0.149
0.146	0.167
0.147	0.206
0.149	0.252
0.149	0.300
0.150	0.329
0.151	0.386
0.152	0.428
0.153	0.500

CURVE 6*
T = 298

λ	τ
0.134	0.000
0.135	0.042
0.135	0.096
0.137	0.118
0.140	0.100
0.143	0.092
0.145	0.106
0.147	0.144
0.149	0.246
0.150	0.291
0.151	0.340
0.151	0.396
0.152	0.428
0.153	0.500

CURVE 7
T = 298

λ	τ
0.134	0.000*
0.135	0.039
0.135	0.067
0.137	0.083
0.138	0.081*
0.140	0.069
0.142	0.066
0.143	0.071*
0.145	0.392
0.146	0.122
0.147	0.154*
0.149	0.249
0.150	0.295
0.151	0.343
0.152	0.420*
0.152	0.459
0.153	0.500

CURVE 8
T = 22.2

λ	τ
0.131	0.001
0.132	0.079
0.133	0.167
0.134	0.214
0.135	0.258*
0.138	0.264
0.141	0.281
0.143	0.317*
0.147	0.379
0.149	0.418
0.151	0.464
0.153	0.509
0.155	0.571
0.157	0.609*
0.160	0.640
0.163	0.663
0.164	0.671

CURVE 9
T = 298

λ	τ
0.134	0.000
0.136	0.092*
0.138	0.215

CURVE 9 (cont.)

λ	τ
0.139	0.297
0.141	0.328
0.146	0.388
0.149	0.448
0.151	0.503*
0.156	0.604
0.161	0.672*
0.166	0.716
0.170	0.740

CURVE 10*
T = 299.2

λ	τ
0.134	0.000
0.135	0.034
0.137	0.145
0.138	0.246
0.139	0.275
0.139	0.301
0.142	0.338
0.148	0.422
0.151	0.505
0.155	0.578
0.158	0.630
0.161	0.673
0.164	0.700

CURVE 11*
T = 206.2

λ	τ
0.131	0.000
0.133	0.063
0.134	0.125
0.135	0.174
0.137	0.188
0.140	0.193
0.144	0.230
0.146	0.280
0.149	0.364
0.152	0.442
0.155	0.503
0.158	0.534
0.161	0.558
0.165	0.575

CURVE 12*
T = 296.2

λ	τ
0.134	0.000
0.136	0.109
0.137	0.200
0.138	0.236
0.141	0.254
0.145	0.295
0.148	0.362
0.151	0.458
0.155	0.544
0.158	0.592
0.161	0.615
0.165	0.634

CURVE 13*
T = 298

λ	τ
0.134	0.000
0.135	0.091
0.136	0.179
0.137	0.228
0.139	0.249
0.143	0.270
0.146	0.311
0.149	0.369
0.151	0.448
0.154	0.530
0.157	0.580
0.160	0.612
0.164	0.632
0.170	0.655

CURVE 14
T = 298

λ	τ
0.182	0.742
0.189	0.751
0.200	0.772
0.219	0.824
0.241	0.853
0.269	0.877
0.303	0.891
0.338	0.904
0.411	0.915
0.562	0.925
0.762	0.928
3.00	0.936

CURVE 15
T ~ 298

λ	τ
6.89	1.000
8.74	0.997
9.09	0.986
9.44	0.973
9.70	0.952
10.1	0.910
10.4	0.865
10.8	0.775
11.1	0.696
11.3	0.625
11.8	0.463*
12.2	0.308
12.6	0.214
13.0	0.111
13.3	0.049

CURVE 16
T ~ 298

λ	τ
0.135	0.031
0.135	0.081*
0.136	0.173
0.137	0.276*
0.137	0.330
0.139	0.383
0.139	0.419*
0.140	0.433
0.141	0.452*
0.144	0.502*
0.145	0.532
0.146	0.535*
0.147	0.563*
0.149	0.580
0.150	0.600*
0.152	0.600*
0.154	0.618*
0.155	0.626*
0.156	0.650*
0.158	0.663*
0.159	0.676
0.162	0.711*
0.164	0.716
0.165	0.724
0.165	0.737
0.167	0.751

CURVE 16 (cont.)

λ	τ
0.170	0.755
0.175	0.774
0.180	0.781
0.185	0.807
0.190	0.813
0.195	0.814*
0.200	0.822*
0.204	0.809*
0.210	0.826
0.215	0.854
0.220	0.857*
0.225	0.862*
0.229	0.865
0.235	0.880
0.240	0.885*
0.244	0.891*
0.250	0.903
0.255	0.903*
0.259	0.903
0.265	0.912
0.270	0.915*
0.274	0.921
0.280	0.885
0.285	0.896
0.290	0.885
0.295	0.892*
0.300	0.908

CURVE 17*
T ~ 298

λ	τ
0.135	0.031
0.135	0.081
0.136	0.173
0.137	0.296
0.138	0.351
0.139	0.410
0.139	0.454
0.140	0.462
0.141	0.485
0.143	0.502
0.144	0.523
0.145	0.550
0.146	0.558
0.149	0.595
0.151	0.584

CURVE 17 (cont.)

λ	τ
0.152	0.605
0.154	0.609
0.155	0.620
0.157	0.646
0.160	0.675
0.163	0.702
0.163	0.718
0.164	0.729
0.165	0.721
0.167	0.738
0.170	0.764
0.175	0.766
0.180	0.776
0.185	0.790
0.190	0.807
0.195	0.814
0.200	0.824
0.205	0.822
0.210	0.828
0.214	0.831
0.220	0.853
0.225	0.857
0.230	0.864
0.235	0.861
0.240	0.866
0.245	0.861
0.250	0.866
0.255	0.874
0.259	0.867
0.265	0.874
0.270	0.870
0.275	0.873
0.280	0.868
0.285	0.871
0.290	0.859
0.295	0.857
0.300	0.874

CURVE 18
T = 299

λ	τ
0.1340	0.014*
0.1346	0.032*
0.1350	0.049
0.1354	0.081*
0.1357	0.104

*Not shown on plot

DATA TABLE NO. 339 (continued)

CURVE 18 (cont.)
T = 299

λ	τ
0.136	0.127*
0.136	0.151*
0.137	0.166*
0.137	0.177*
0.138	0.181
0.139	0.172*
0.140	0.159
0.142	0.150
0.143	0.143
0.145	0.143*
0.146	0.151*
0.147	0.172*
0.148	0.200
0.148	0.226*
0.150	0.297*
0.151	0.347
0.153	0.402
0.155	0.445

CURVE 19*
T = 329.5

λ	τ
0.135	0.000
0.135	0.022
0.136	0.046
0.136	0.080
0.137	0.137
0.137	0.167
0.138	0.183
0.138	0.192
0.139	0.192
0.141	0.178
0.142	0.167
0.143	0.161
0.145	0.161
0.146	0.172
0.147	0.210
0.148	0.233
0.149	0.258
0.150	0.330
0.152	0.375
0.153	0.430
0.155	0.475

CURVE 20*
T = 365

λ	τ
0.136	0.000
0.136	0.025
0.137	0.043
0.137	0.071
0.138	0.106
0.138	0.126
0.138	0.151
0.139	0.177
0.139	0.194
0.140	0.203
0.141	0.203
0.142	0.191
0.143	0.185
0.145	0.189
0.146	0.198
0.147	0.211
0.148	0.227
0.148	0.246
0.149	0.288
0.150	0.339
0 152	0.394
0.153	0.438
0.155	0.489

CURVE 21*
T = 409

λ	τ
0.137	0.000
0.137	0.011
0.138	0.023
0.138	0.037
0.139	0.066
0.140	0.162
0.140	0.180
0.141	0.199
0.142	0.206
0.144	0.211
0.145	0.206
0.146	0.214
0.147	0.230
0.148	0.253
0.149	0.294
0.150	0.339
0.152	0.394
0.153	0.438
0.155	0.489

CURVE 22
T = 449

λ	τ
0.139	0.004
0.139	0.014
0.140	0.028
0.140	0.048
0.141	0.115
0.142	0.148*
0.142	0.165
0.143	0.187
0.143	0.198*
0.144	0.207
0.145	0.207*
0.146	0.222*
0.147	0.233
0.148	0.253
0.149	0.294*
0.150	0.339
0.152	0.394
0.153	0.438*
0.155	0.489

CURVE 23
T ~ 298

λ	τ
3.00	0.013
3.37	0.027
3.78	0.051
4.32	0.101
4.70	0.148
5.29	0.224
5.87	0.292
6.57	0.361
7.20	0.421
7.62	0.448
7.83	0.452
8.00	0.436
8.15	0.386
8.33	0.238
8.41	0.191
8.63	0.095
8.79	0.065
9.03	0.046
9.47	0.035
9.99	0.028
10.4	0.039
10.7	0.062
10.9	0.100

CURVE 23 (cont.)

λ	τ
11.1	0.147
11.2	0.259
11.4	0.361
11.6	0.431
11.8	0.461*
12.0	0.470
12.2	0.457
12.5	0.387
13.0	0.308
13.2	0.237
13.4	0.186
13.4	0.217
13.5	0.232*
13.6	0.234
14.0	0.201
14.5	0.155
15.0	0.127

CURVE 24
T ~ 298

λ	τ
7.09	0.000
7.63	0.035
7.85	0.063
8.14	0.089
8.44	0.102
8.89	0.115*
9.24	0.133
9.40	0.159
9.35	0.105
9.38	0.083*
9.50	0.150
9.59	0.163*
10.0	0.179
10.4	0.201*
10.7	0.207
10.9	0.204*
11.0	0.191
11.1	0.173*
11.3	0.149
11.4	0.129
11.4	0.045
11.5	0.012
11.6	0.031
11.6	0.117*
11.7	0.157
11.8	0.136

CURVE 24 (cont.)

λ	τ
11.9	0.220*
12.0	0.248
12.2	0.265*
12.5	0.274
13.1	0.260*
13.6	0.246
13.9	0.211*
14.1	0.165
14.2	0.124
14.3	0.019
14.4	0.129
14.5	0.157*
14.7	0.158
14.9	0.143
15.0	0.118

CURVE 25
T ~ 298

λ	τ
3.52	0.000
4.40	0.010
4.72	0.018
5.24	0.054
5.45	0.082
5.66	0.114*
5.75	0.119
5.89	0.112
6.05	0.098
6.25	0.117
6.42	0.156*
6.51	0.160
6.61	0.154
6.89	0.050
7.02	0.042
7.18	0.052*
7.29	0.118
7.46	0.211
7.63	0.271
7.84	0.296*
7.95	0.302
8.06	0.289
8.14	0.266*
8.26	0.185
8.37	0.135
8.48	0.133
8.58	0.144*
8.67	0.147

CURVE 25 (cont.)

λ	τ
8.79	0.095*
8.88	0.080*
9.02	0.075
9.22	0.084
9.33	0.121
9.40	0.159*
9.48	0.164
9.62	0.158*
9.92	0.111
10.2	0.066
10.4	0.024
10.5	0.010
10.8	0.010
10.9	0.000*

CURVE 26
T ~ 298

λ	τ
3.74	0.000
4.09	0.008
4.98	0.018
5.37	0.028
6.07	0.032
6.45	0.049
6.76	0.071
6.91	0.062
7.04	0.031
7.20	0.026
7.29	0.037
7.33	0.070
7.52	0.110
7.79	0.132
8.08	0.14[illegible]
8.30	0.124
8.55	0.097
8.92	0.082
9.13	0.090
9.33	0.110*
9.51	0.112
9.80	0.097
10.2	0.049
10.5	0.024
10.7	0.000

CURVE 27*
T ~ 298

λ	τ
3.38	0.000
3.67	0.014
4.63	0.035
5.21	0.068
6.40	0.211
6.66	0.232
6.84	0.235
6.98	0.230
7.10	0.219
7.15	0.245
7.22	0.269
7.22	0.284
7.38	0.306
7.72	0.330
7.97	0.348
8.32	0.295
8.53	0.211
8.60	0.207
8.74	0.215
8.97	0.157
9.23	0.125
9.29	0.141
9.29	0.191
9.44	0.228
9.55	0.231
9.65	0.221
9.90	0.156
10.0	0.108
10.5	0.043
10.6	0.025
10.8	0.000
12.2	0.000
12.5	0.025
12.8	0.033
13.2	0.034
13.5	0.043
13.7	0.055
14.4	0.039
14.6	0.034
14.9	0.030

CURVE 28*
T ~ 298

λ	τ
~3	0
~14	0

CURVE 29
T ~ 298

λ	τ
0.134	0.012
0.136	0.029
0.137	0.189
0.139	0.318
0.143	0.438
0.146	0.502
0.149	0.553
0.151	0.602
0.154	0.633
0.157	0.646
0.160	0.660
0.164	0.702
0.169	0.744
0.174	0.760
0.179	0.776
0.184	0.747
0.189	0.701
0.194	0.756
0.200	0.817
0.205	0.839
0.210	0.844
0.215	0.869
0.220	0.879
0.225	0.889*
0.230	0.906
0.235	0.889
0.240	0.895
0.245	0.888
0.250	0.898*
0.255	0.899
0.261	0.894
0.266	0.903
0.271	0.892
0.276	0.901*
0.281	0.905
0.286	0.897*
0.291	0.896
0.296	0.900
0.301	0.899

CURVE 30*
T ~ 298

λ	τ
0.134	0.027
0.136	0.043
0.140	0.279

*Not shown on plot

DATA TABLE NO. 339 (continued)

λ	τ
CURVE 30 (cont.)*	
T ~ 298	
0.143	0.404
0.146	0.474
0.149	0.511
0.151	0.558
0.154	0.616
0.157	0.646
0.160	0.665
0.164	0.699
0.169	0.738
0.174	0.760
0.179	0.788
0.184	0.747
0.189	0.701
0.194	0.724
0.200	0.778
0.205	0.817
0.210	0.835
0.215	0.849
0.220	0.860
0.225	0.880
0.230	0.883
0.235	0.877
0.240	0.878
0.245	0.871
0.250	0.889
0.256	0.890
0.260	0.890
0.266	0.894
0.271	0.907
0.276	0.910
0.281	0.886
0.286	0.909
0.291	0.892
0.296	0.909
0.301	0.906

*Not shown on plot

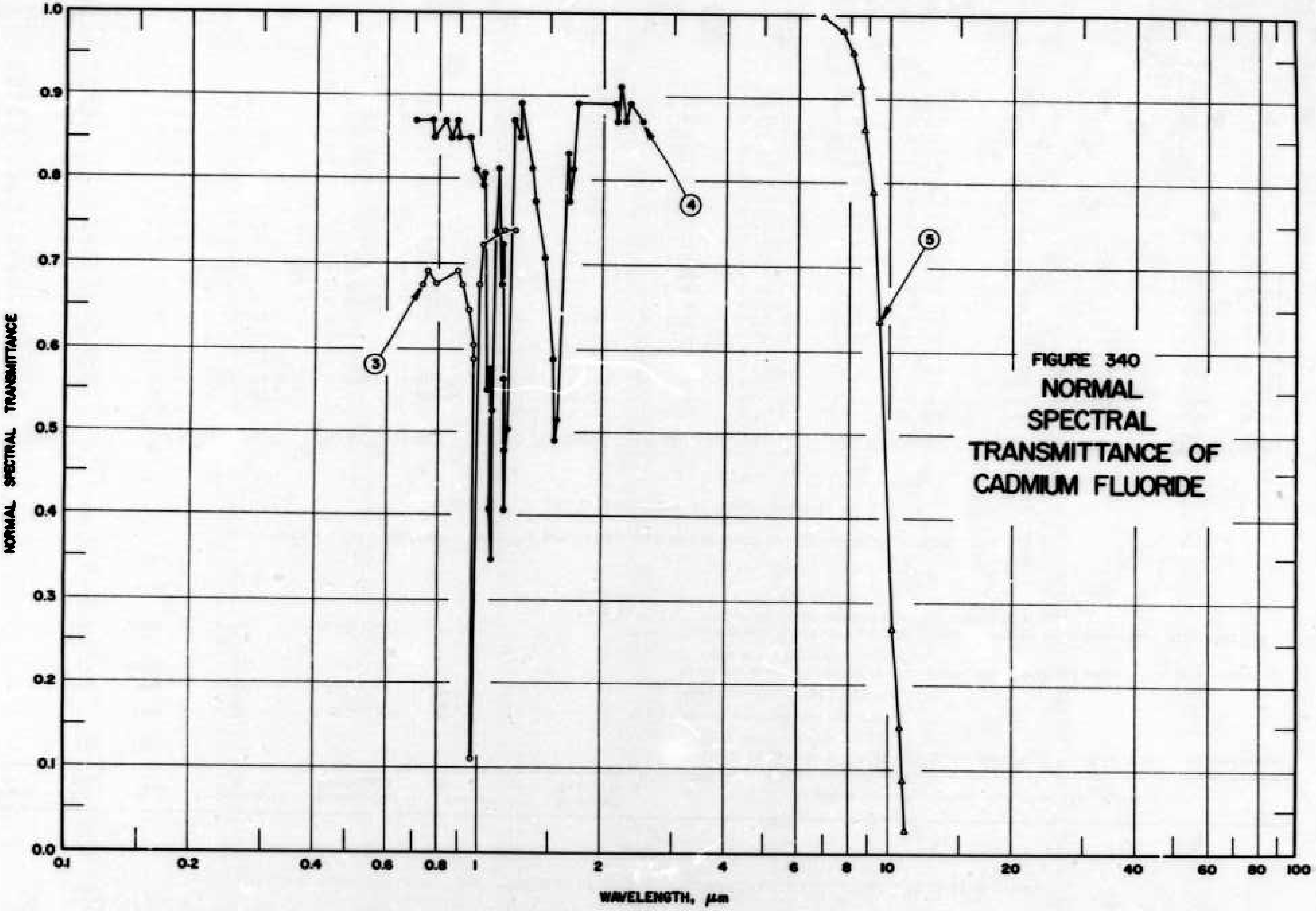


FIGURE 340
NORMAL
SPECTRAL
TRANSMITTANCE OF
CADMIUM FLUORIDE

SPECIFICATION TABLE NO. 340 NORMAL SPECTRAL TRANSMITTANCE OF CADMIUM FLUORIDE CdF_2

Curve No.	Ref. No.	Year	Temperature K	Wavelength Range, μm	Geometry θ	θ'	ω'	Reported Error, %	Composition (weight percent), Specifications, and Remarks
1*	143	1965	6	0.950-0.989	0°	0°			Synthetic single crystal (4.81 mm thick); doped with 0.1 mole % YbF_3; data extracted from smooth curve.
2*	143	1965	77	0.961-0.983	0°	0°			Above specimen and conditions.
3	143	1965	300	0.735-1.22	0°	0°			Above specimen and conditions.
4	143	1965	77	0.70-2.50	0°	0°			Synthetic single crystal (1.90 mm thick); doped with 0.1 mole % U^{+4}; data extracted from smooth curve.
5	302	1952	~293	6.86-11.0	~0°	~0°			Single crystal; data extracted from smooth curve; reflection losses eliminated and transmission adjusted to standard thickness of 1 cm.

DATA TABLE NO. 340 NORMAL SPECTRAL TRANSMITTANCE OF CADMIUM FLUORIDE CdF_2

[Wavelength, λ, μm; Transmittance, τ; Temperature, T, K]

λ	τ
CURVE 1*	**T = 6**
0.950	0.708
0.957	0.692
0.960	0.692
0.961	0.708
0.962	0.661
0.962	0.676
0.962	0.692
0.963	0.708
0.965	0.708
0.967	0.741
0.970	0.741
0.971	0.741
0.973	0.692
0.973	0.676
0.974	0.589
0.974	0.603
0.975	0.240
0.976	0.331
0.976	0.083
0.976	0.204
0.977	0.204
0.977	0.603

λ	τ
CURVE 1 (cont.)*	
0.978	0.692
0.978	0.646
0.979	0.759
0.979	0.776
0.980	0.759
0.981	0.794
0.989	0.813
CURVE 2*	**T = 77**
0.961	0.724
0.962	0.724
0.962	0.661
0.962	0.724
0.963	0.708
0.965	0.741
0.969	0.741
0.971	0.724
0.972	0.708
0.973	0.631

λ	τ
CURVE 2 (cont.)*	
0.974	0.631
0.974	0.550
0.975	0.316
0.976	0.316
0.976	0.095
0.977	0.501
0.978	0.676
0.979	0.692
0.979	0.776
0.981	0.794
0.983	0.794
CURVE 3	**T = 300**
0.735	0.676
0.755	0.692
0.788	0.676
0.892	0.692
0.911	0.676
0.926	0.646*
0.946	0.646

λ	τ
CURVE 3 (cont.)	
0.976	0.603
0.976	0.110
0.976	0.589
1.00	0.676
1.02	0.724
1.15	0.741
1.22	0.741
CURVE 4	**T = 77**
0.70	0.871
0.77	0.871
0.78	0.851
0.83	0.871
0.86	0.851
0.88	0.871
0.89	0.851*
0.90	0.871*
0.95	0.851
0.98	0.813
1.02	0.794

λ	τ
CURVE 4 (cont.)	
1.02	0.759*
1.03	0.741*
1.05	0.550
1.06	0.575
1.07	0.407
1.07	0.550*
1.08	0.347
1.08	0.525
1.09	0.407*
1.10	0.741
1.10	0.759*
1.11	0.813
1.14	0.676
1.14	0.724
1.15	0.676*
1.15	0.407
1.15	0.562
1.16	0.479
1.16	0.575*
1.17	0.525*
1.17	0.661*
1.18	0.501

λ	τ
CURVE 4 (cont.)	
1.18	0.832*
1.19	0.871*
1.21	0.871
1.25	0.871*
1.26	0.851
1.26	0.891
1.28	0.851*
1.33	0.813
1.36	0.741*
1.38	0.776
1.42	0.741*
1.45	0.708
1.51	0.589
1.53	0.490
1.54	0.525*
1.55	0.513
1.59	0.692*
1.61	0.794*
1.64	0.832
1.65	0.776
1.65	0.813*
1.66	0.794*

λ	τ
CURVE 4 (cont.)	
1.66	0.813*
1.68	0.794*
1.68	0.813*
1.69	0.813
1.70	0.871*
1.72	0.891
2.15	0.891
2.16	0.891
2.18	0.871
2.20	0.912
2.21	0.871*
2.25	0.891*
2.29	0.871
2.32	0.891
2.35	0.871*
2.50	0.871
CURVE 5	**T ~ 298**
6.86	1.00
7.71	0.983

λ	τ
CURVE 5 (cont.)	
8.07	0.959
8.44	0.916
8.71	0.864
9.01	0.790
9.42	0.638
10.2	0.268
10.6	0.150
10.8	0.087
11.0	0.051*
11.0	0.028

*Not shown on plot

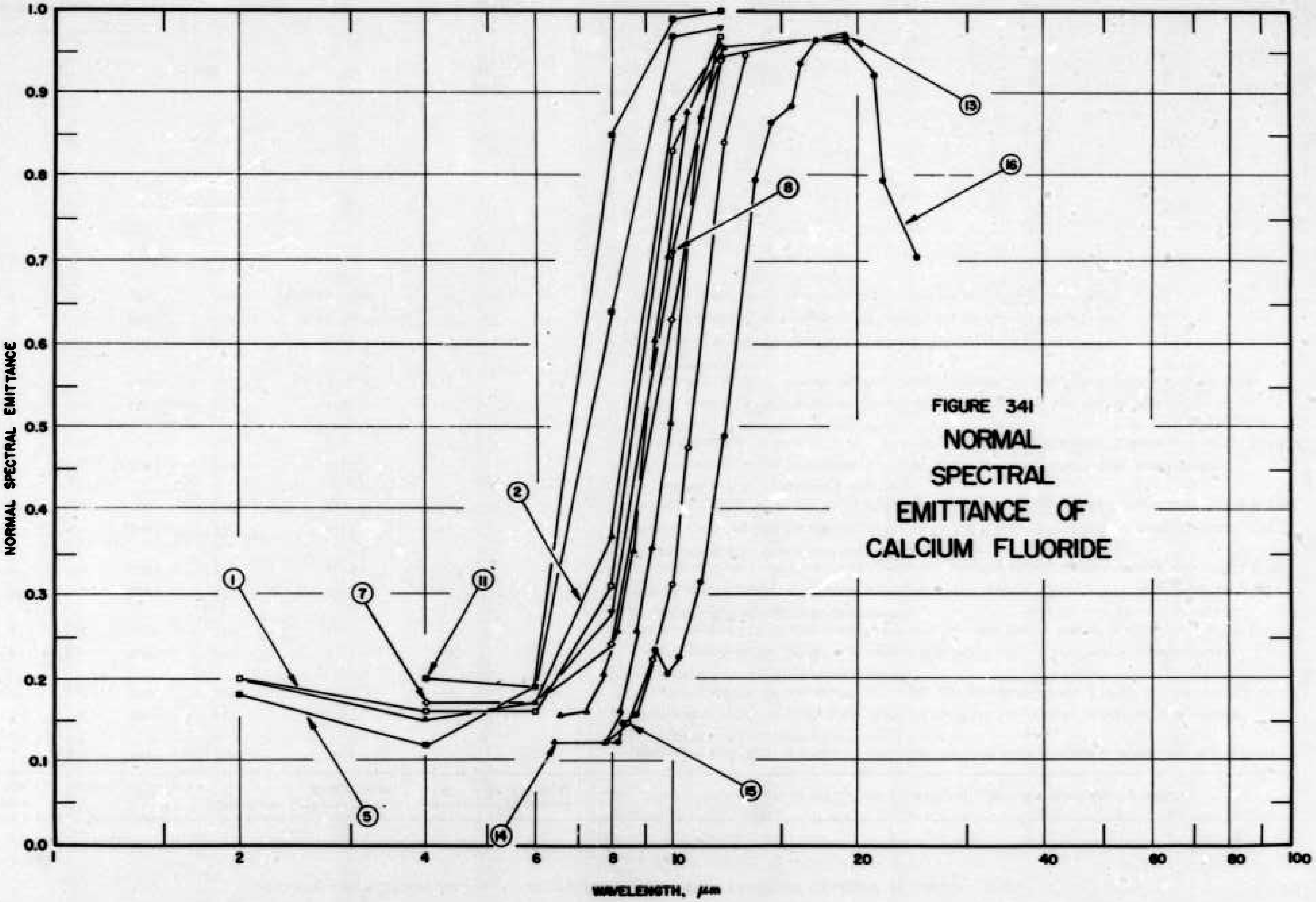


FIGURE 341
NORMAL
SPECTRAL
EMITTANCE OF
CALCIUM FLUORIDE

SPECIFICATION TABLE NO. 341 NORMAL SPECTRAL EMITTANCE OF CALCIUM FLUORIDE CaF_2

Curve No.	Ref. No.	Year	Temperature K	Wavelength Range, μm	Geometry θ'	Reported Error, %	Composition (weight percent), Specifications and Remarks
1	144	1967	773	2-12	~0°	<2	Single crystal (2.08 mm thick); polished, parallel faces; heated in apparatus at 773 K for approx 0.5 hr before measurement.
2	144	1967	873	2-12	~0°		Above specimen and conditions; reheated to 873 K for ~0.5 hr before measurement.
3*	144	1967	773	2-12	~0°		Single crystal (8.09 mm thick); polished, parallel faces; heated in apparatus at 773 K for approx 0.5 hr before measurement.
4*	144	1967	873	2-12	~0°		Above specimen and conditions; reheated to 873 K for ~0.5 hr before measurement.
5	144	1967	773	2-12	~0°		Single crystal (16.11 mm thick); polished, parallel faces; heated in apparatus at 773 K for approx 0.5 hr before measurement.
6*	144	1967	873	2-12	~0°		Above specimen and conditions; reheated to 873 K for ~0.5 hr before measurement.
7	144	1967	773	4-12	~0°		Polycrystalline (1.07 mm thick); polished, parallel faces; heated in apparatus at 773 K for approx 0.5 hr before measurement.
8	144	1967	873	4-12	~0°		Above specimen and conditions; reheated to 873 K for ~0.5 hr before measurement.
9*	144	1967	773	4-12	~0°		Polycrystalline (3.18 mm thick); polished, parallel faces; heated in apparatus at 773 K for approx 0.5 hr before measurement.
10	144	1967	873	4-12	~0°		Above specimen and conditions; reheated to 873 K for ~0.5 hr before measurement.
11	144	1967	773	4-12	~0°		Polycrystalline (6.54 mm thick); polished, parallel faces; heated in apparatus at 773 K for approx 0.5 hr before measurement.
12*	144	1967	873	4-12	~0°		Above specimen and conditions; reheated to 873 K for ~0.5 hr before measurement.
13	145	1967	562	6.60-19.3	0°		Single crystal (3.00 mm thick) from Semi-Element Inc.; polished; data extracted from smooth curve.
14	145	1967	562	6.42-19.3	0°		Similar to the above specimen and conditions except 1.50 mm thick.
15	145	1967	562	6.42-19.3	0°		Similar to the above specimen and conditions except 0.55 mm thick.
16	145	1967	562	6.42-25.0	0°		Similar to the above specimen and conditions except 0.20 mm thick.

*Not shown on plot

DATA TABLE NO. 341 NORMAL SPECTRAL EMITTANCE OF CALCIUM FLUORIDE CaF_2

[Wavelength, λ, μm; Emittance, ϵ; Temperature, T, K]

λ	ϵ
CURVE 1	
T = 773	
2	0.20
4	0.16
6	0.16
8	0.31
10	0.83
12	0.97
CURVE 2	
T = 873	
2	0.20*
4	0.15
6	0.17
8	0.37
10	0.87
12	0.96
CURVE 3*	
T = 773	
2	0.18
4	0.16
6	0.17
8	0.67
10	0.99
12	0.97
CURVE 4*	
T = 873	
2	0.18
4	0.15
6	0.20
8	0.74
10	0.99
12	1.00
CURVE 5	
T = 773	
2	0.18
4	0.12
6	0.19
8	0.85
10	0.99
12	1.00

λ	ϵ
CURVE 6*	
T = 873	
2	0.19
4	0.14
6	0.25
8	0.92
10	0.99
12	0.98
CURVE 7	
T = 773	
4	0.17
6	0.17*
8	0.24
10	0.63
12	0.94
CURVE 8	
T = 873	
4	0.17*
6	0.17*
8	0.28
10	0.71
12	0.98
CURVE 9*	
T = 773	
4	0.18
6	0.17
8	0.41
10	0.94
12	0.98
CURVE 10*	
T = 873	
4	0.19
6	0.19
8	0.49
10	0.95
12	0.98

λ	ϵ
CURVE 11	
T = 773	
4	0.20
6	0.19*
8	0.64
10	0.97
12	0.98*
CURVE 12*	
T = 873	
4	0.20
6	0.23
8	0.70
10	0.96
12	0.98
CURVE 13	
T = 562	
6.60	0.156
7.28	0.160
7.75	0.204
8.18	0.258
8.66	0.352
9.35	0.604
9.84	0.703
10.6	0.879
12.3	0.957
19.3	0.970
CURVE 14	
T = 562	
6.42	0.122
7.80	0.122
8.21	0.160
8.75	0.257
9.29	0.354
9.93	0.504
11.3	0.874
12.3	0.944
19.3	0.972

λ	ϵ
CURVE 15	
T = 562	
6.42	0.122*
7.84	0.122
8.47	0.147
9.24	0.222
10.0	0.311
10.6	0.474
12.3	0.840
13.2	0.948
19.3	0.970*
CURVE 16	
T = 562	
6.42	0.122*
8.12	0.122
8.30	0.146
8.73	0.156
9.32	0.232
9.80	0.206
10.3	0.225
11.2	0.316
12.2	0.490
13.7	0.794
14.5	0.863
15.6	0.886
16.1	0.938
17.2	0.964
19.3	0.970
21.4	0.922
22.0	0.793
25.0	0.701

*Not shown on plot

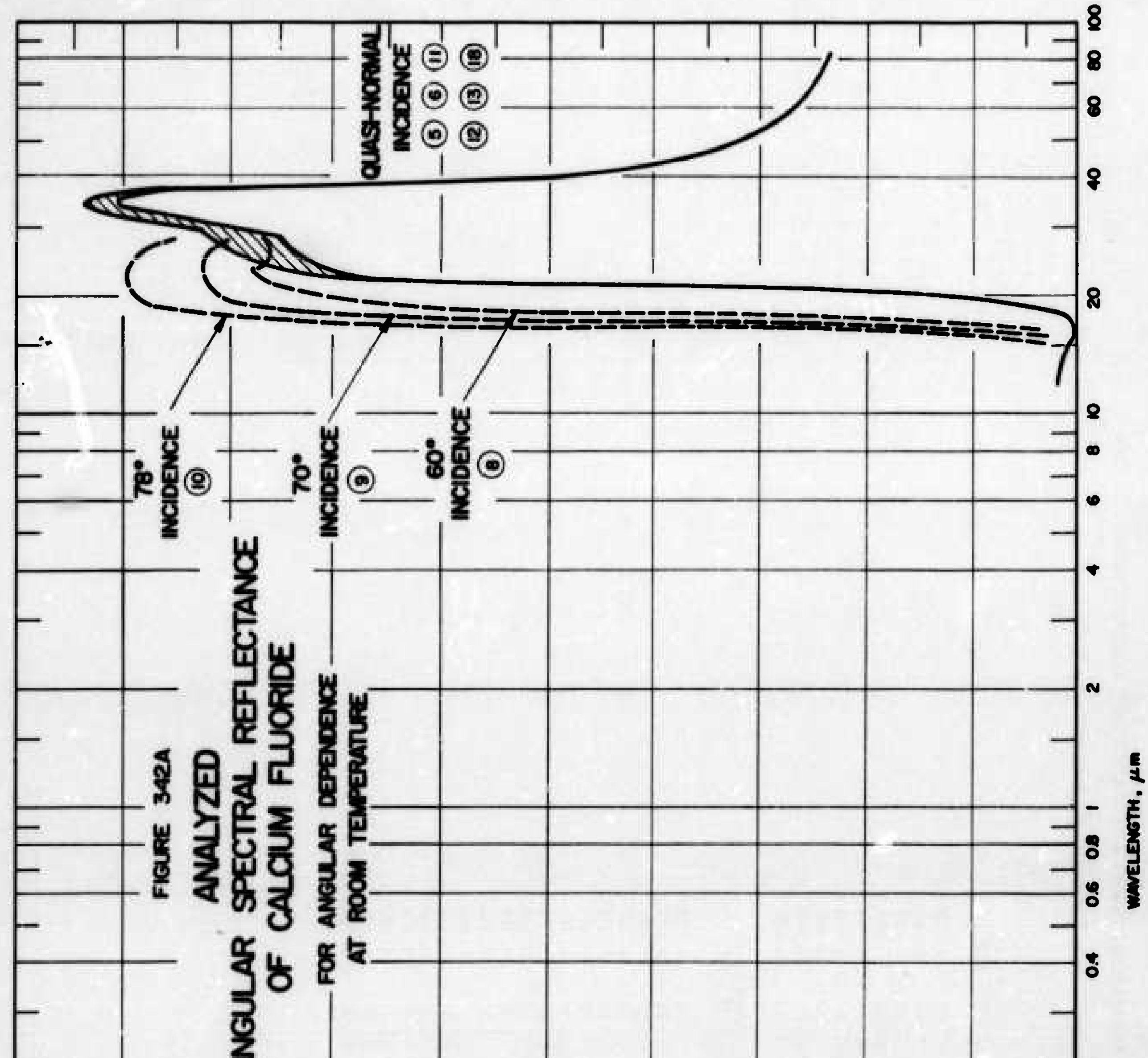


FIGURE 342A
ANALYZED
ANGULAR SPECTRAL REFLECTANCE
OF CALCIUM FLUORIDE
FOR ANGULAR DEPENDENCE
AT ROOM TEMPERATURE

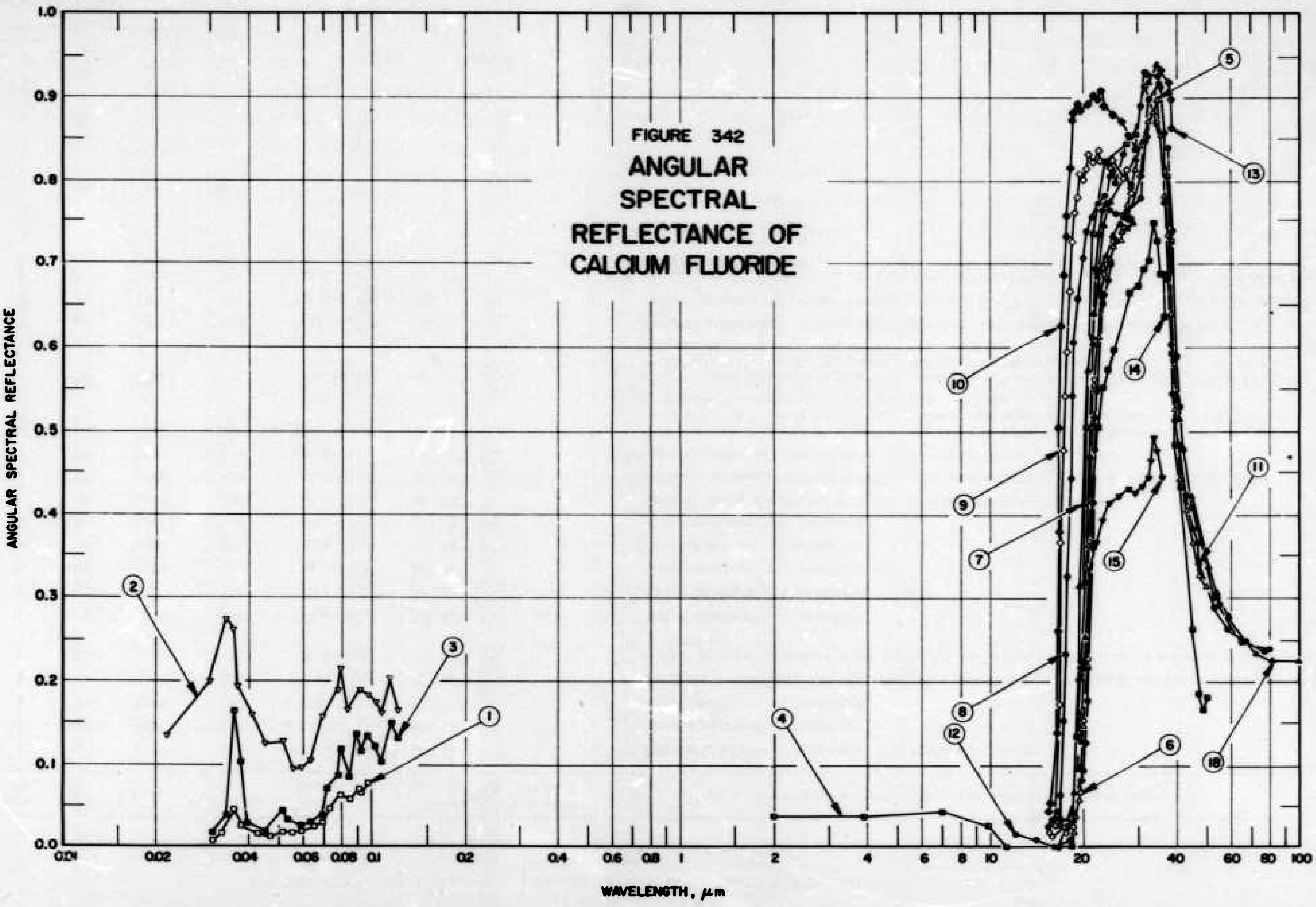


FIGURE 342
ANGULAR
SPECTRAL
REFLECTANCE OF
CALCIUM FLUORIDE
ANGULAR SPECTRAL REFLECTANCE
WAVELENGTH, μm
1.0
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0.0
0.01
0.02
0.04
0.06
0.08
0.1
0.2
0.4
0.6
0.8
1
2
4
6
8
10
20
40
60
80
100
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
18

SPECIFICATION TABLE NO. 342 ANGULAR SPECTRAL REFLECTANCE OF CALCIUM FLUORIDE CaF_2

Curve No.	Ref. No.	Year	Temperature K	Wavelength Range, μm	Geometry θ	θ'	ω'	Reported Error, %	Composition (weight percent), Specifications and Remarks
1	147	1967	298	0.0301-0.0972	20°	20°			Polished; measured in vacuum; data extracted from smooth curve.
2	147	1967	298	0.0215-0.120	60°	60°			Cleaved; measured in vacuum.
3	147	1967	298	0.0305-0.120	20°	20°			Above specimen and conditions.
4	67	1963	~298	2.00-50.0	30°	30°			Specimen 5 mm thick; data extracted from smooth curve; aluminum mirror reference standard.
5	380	1966	~298	17.9-50.0	15°	15°			Crystal polished to a plate-glass finish and flat to five fringes; aluminum mirror reference standard.
6	380	1966	~298	15.4-28.6	15°	15°			Above specimen and conditions.
7	380	1966	~298	15.4-28.6	40°	40°			Above specimen and conditions.
8	380	1966	~298	15.4-28.4	60°	60°			Above specimen and conditions.
9	380	1966	~298	15.4-28.6	70°	70°			Above specimen and conditions.
10	380	1966	~298	15.4-28.6	78°	78°			Above specimen and conditions.
11	140	1967	90	10.9-76.3	15°	15°			Crystal, pure; mechanically lapped and diamond abrasive polished.
12	139	1962	300	12.0-80.0	~0°	~0°			Polished by using standard metallographic polishing methods; back surface roughened.
13	146	1966	~298	16.5-38.5	~0°	~0°			Crystal; polished; data extracted from smooth curve.
14	146	1966	~298	19.0-36.7	~0°	~0°			Film; optical thickness 10 quarterwaves at λ = 2.8 μm; electron beam deposited in vacuum (2 to 8 x 10^{-6} mm Hg) at normal incidence onto glass substrate heated to 588 K; rate of depositing 1 quarterwave per min at λ = 0.5 μm.
15	146	1966	~298	19.1-36.0	~0°	~0°			Film; optical thickness 10 quarterwaves at λ = 2.7 μm; electron beam deposited in vacuum (2 to 8 x 10^{-6} mm Hg) at normal incidence onto glass substrate heated to 423 K; rate of depositing 1 quarterwave per min at λ = 0.5 μm.
16*	82	1963	298	0.440-0.600	~0°		2π		Reagent grade supplied by Allied Chemical Co.; compacted powder at 10,000 psi.
17*	82	1963	298	0.440-0.600	~0°		2π		Above specimen and conditions except exposed to UV irradiation; 200 ESH with solar factor 3.
18	419	1962	300	18.8-100	12°	12°			Single crystal; measured in vacuum; data extracted from smooth curve; evaporated Al mirror reference standard.

* Not shown on plot

DATA TABLE NO. 342 ANGULAR SPECTRAL REFLECTANCE OF CALCIUM FLUORIDE CaF_2

[Wavelength, λ, μm; Reflectance, ρ; Temperature, T, K]

λ	ρ
CURVE 1	**T = 298**
0.0301	0.006
0.0324	0.016
0.0353	0.043
0.0379	0.025
0.0428	0.014
0.0462	0.012
0.0503	0.018
0.0545	0.017
0.0593	0.019
0.0647	0.023
0.0682	0.029
0.0739	0.044
0.0778	0.061*
0.0783	0.063
0.0847	0.058
0.0867	0.060*
0.0906	0.069
0.0921	0.067
0.0972	0.077
CURVE 2	**T = 298**
0.0215	0.131
0.0300	0.200
0.0337	0.274
0.0353	0.263
0.0366	0.196
0.0402	0.160
0.0454	0.124
0.0508	0.126
0.0553	0.096
0.0598	0.098
0.0629	0.105
0.0698	0.159
0.0762	0.190
0.0784	0.216
0.0836	0.165
0.0903	0.190
0.0922	0.186*
0.0974	0.186
0.102	0.175
0.109	0.161
0.114	0.201
0.120	0.165

λ	ρ
CURVE 3	**T = 298**
0.0305	0.017
0.0334	0.047
0.0357	0.164
0.0372	0.101
0.0392	0.029
0.0426	0.019*
0.0459	0.017
0.0510	0.042
0.0535	0.031
0.0555	0.028*
0.0598	0.025
0.0630	0.029
0.0698	0.037
0.0719	0.070
0.0763	0.087
0.0789	0.117
0.0840	0.085
0.0898	0.135
0.0924	0.116
0.0975	0.132
0.101	0.120
0.108	0.101
0.114	0.150
0.120	0.130
CURVE 4	**T ~ 298**
2.00	0.038
4.90	0.038
7.00	0.041
9.90	0.027
11.2	0.000
18.3	0.000
19.8	0.210
20.4	0.503
21.6	0.736
23.9	0.823
27.3	0.847
29.5	0.858
31.8	0.917
34.4	0.872
37.6	0.805
38.5	0.728
38.5	0.594

λ	ρ
CURVE 4 (cont.)	
39.5	0.483
41.8	0.431
44.9	0.263
46.4	0.189
48.3	0.168
50.0	0.181
CURVE 5	**T ~ 298**
17.9	0.024
18.1	0.033
18.5	0.019
18.8	0.039
19.2	0.058
20.0	0.149
20.4	0.220
20.7	0.361
21.2	0.506
21.7	0.558
22.2	0.615
22.7	0.667
23.1	0.690
23.8	0.695*
24.3	0.706
25.0	0.720
25.6	0.729
26.2	0.729
26.9	0.740
27.7	0.771
28.4	0.795
29.2	0.815
30.1	0.841
32.1	0.873
33.3	0.886
34.4	0.900
35.6	0.858
36.9	0.782
37.5	0.732
38.3	0.643
39.2	0.581
39.8	0.526
41.7	0.442
43.3	0.406
45.2	0.363
47.4	0.323
50.0	0.311

λ	ρ
CURVE 6	**T ~ 298**
15.4	0.019
15.7	0.016*
15.9	0.012
17.2	0.022
17.5	0.017
17.9	0.029*
18.2	0.035
18.5	0.024
18.9	0.041*
19.2	0.057*
19.6	0.067
20.0	0.153
20.4	0.227
20.8	0.364
21.3	0.507*
21.7	0.561
22.2	0.619*
22.7	0.667*
23.3	0.689
23.8	0.700
24.4	0.710*
25.0	0.726
25.6	0.733*
26.2	0.740*
27.0	0.742
27.8	0.772*
28.6	0.752
CURVE 7	**T ~ 298**
15.4	0.017*
15.6	0.013*
16.7	0.024*
16.9	0.026
17.3	0.017*
17.5	0.028*
17.9	0.036*
18.2	0.032*
18.5	0.043
18.9	0.069
19.2	0.202
19.6	0.312
20.0	0.413
20.4	0.508*

λ	ρ
CURVE 7 (cont.)	
20.8	0.574
21.3	0.615
21.7	0.646
22.2	0.675
22.7	0.695
23.3	0.710
23.8	0.710
24.4	0.720*
25.0	0.735
25.6	0.737*
26.3	0.748
27.0	0.741
27.8	0.741
28.6	0.750
CURVE 8	**T ~ 298**
15.4	0.025
15.6	0.032
15.9	0.031*
16.1	0.036*
16.4	0.043
16.7	0.036
16.9	0.063
17.2	0.152
17.5	0.234
17.9	0.324
18.2	0.444
18.5	0.546
18.9	0.609
19.2	0.660
20.0	0.709
20.4	0.740
20.8	0.749*
21.2	0.754
21.7	0.768*
22.2	0.773
22.7	0.775*
23.2	0.782
24.4	0.764
25.0	0.763*
25.6	0.761
26.2	0.758*
27.0	0.744*
27.8	0.766
28.4	0.798

λ	ρ
CURVE 9	**T ~ 298**
15.4	0.026*
15.6	0.023*
15.9	0.027*
16.2	0.029
16.4	0.036*
16.7	0.175
16.9	0.367
17.3	0.479
17.5	0.544
17.9	0.597
18.2	0.669
18.5	0.727
18.9	0.760
19.2	0.780
19.6	0.810
20.0	0.802
20.4	0.816
20.8	0.832
21.7	0.822
22.2	0.837
22.7	0.824
23.3	0.826*
23.8	0.821*
24.4	0.818
24.9	0.824
25.6	0.807*
26.2	0.903*
27.0	0.802
27.7	0.812
28.6	0.786
CURVE 10	**T ~ 298**
15.4	0.046
15.6	0.053
16.1	0.047*
16.3	0.139
16.4	0.262
16.6	0.380
16.7	0.504
17.0	0.628
17.3	0.687
17.6	0.731
17.9	0.757

λ	ρ
CURVE 10 (cont.)	
18.2	0.818
18.5	0.874
18.9	0.884
19.2	0.894
19.6	0.888
20.0	0.887*
20.8	0.894
21.3	0.892*
21.7	0.903
22.2	0.900
22.7	0.910
23.3	0.893
23.8	0.899*
25.0	0.884
25.6	0.880*
26.2	0.874
27.0	0.870*
27.7	0.863*
28.6	0.854
CURVE 11	**T = 90**
18.9	0.025*
19.9	0.100
20.4	0.219
21.0	0.470
21.5	0.604
22.0	0.697
22.5	0.734
23.0	0.764
23.5	0.772
23.8	0.765*
24.0	0.774*
24.2	0.797*
24.5	0.807
24.7	0.807*
25.0	0.811
25.3	0.806*
25.6	0.800
25.9	0.805*
26.5	0.818*
27.0	0.833
27.4	0.845*
28.0	0.856
28.5	0.845*

λ	ρ
CURVE 11 (cont.)	
28.9	0.842*
29.4	0.838
29.9	0.856*
30.2	0.891
30.6	0.917*
31.2	0.934*
31.6	0.934
32.2	0.931
32.7	0.933*
33.3	0.932*
33.7	0.932*
34.4	0.932*
34.7	0.930
35.1	0.930*
35.3	0.917
35.6	0.903*
36.3	0.860
36.9	0.776
37.7	0.680
38.3	0.603
39.0	0.547
39.8	0.511
40.6	0.485
41.5	0.447*
42.3	0.426
43.1	0.408*
44.0	0.394*
45.2	0.382
46.3	0.364
47.6	0.340
49.7	0.315*
52.3	0.288
55.5	0.274*
58.4	0.265
62.1	0.255*
66.6	0.250
70.9	0.247*
76.3	0.239
CURVE 12	**T = 300**
12.0	0.015
14.0	0.009
16.0	0.000
18.0	0.009

* Not shown on plot

DATA TABLE NO. 342 (continued)

CURVE 12 (cont.)
T = 300

λ	ρ
18.6	0.020*
19.0	0.040*
20.0	0.095
20.6	0.180
21.2	0.360
21.7	0.480
22.0	0.550
22.2	0.610*
23.0	0.655
23.4	0.670*
24.0	0.680
24.2	0.700
26.0	0.720*
25.5	0.730*
27.0	0.740
27.0	0.755
27.5	0.765
28.0	0.770*
30.5	0.780
30.6	0.805*
31.5	0.850
31.7	0.860*
32.5	0.900
34.0	0.918*
35.0	0.920
36.0	0.897*
37.5	0.840
38.4	0.740
40.0	0.590
41.0	0.530
42.0	0.480
45.0	0.410
47.0	0.360*
52.7	0.300
55.0	0.290
58.0	0.260*
60.0	0.260*
65.0	0.250
70.0	0.245
80.0	0.240

CURVE 13
T ~ 298

λ	ρ
16.5	0.000
18.2	0.017*

CURVE 13 (cont.)

λ	ρ
19.3	0.045*
19.9	0.082
20.3	0.127
20.7	0.215*
21.2	0.417
21.6	0.518
22.3	0.596*
23.1	0.665
23.9	0.702*
24.8	0.723*
26.1	0.741*
27.9	0.752
28.9	0.767*
30.5	0.808
32.0	0.855
33.2	0.897
34.3	0.921*
35.9	0.938
36.9	0.935*
37.6	0.921
38.1	0.900
38.5	0.865

CURVE 14
T ~ 298

λ	ρ
19.0	0.132
19.6	0.226
20.1	0.317
22.1	0.505
23.0	0.556
24.0	0.576
25.0	0.599
25.8	0.635*
28.0	0.666
30.0	0.672
30.8	0.686*
31.6	0.695
32.9	0.702
33.9	0.749
34.9	0.726
35.5	0.689
36.7	0.689
36.7	0.640

CURVE 15
T ~ 298

λ	ρ
19.1	0.030*
19.6	0.127
20.0	0.221
21.0	0.332
22.0	0.364
23.0	0.393
24.1	0.415
24.5	0.418*
26.0	0.423
27.0	0.426*
28.0	0.431
29.9	0.429
31.0	0.434
32.1	0.444
33.0	0.465
33.9	0.491
34.9	0.478
36.0	0.443

CURVE 16*
T = 298

λ	ρ
0.440	0.945
0.600	0.970

CURVE 17*
T = 298

λ	ρ
0.440	0.610
0.600	0.875

CURVE 18
T = 300

λ	ρ
18.8	0.064*
19.1	0.096
19.6	0.162
20.1	0.256
20.8	0.450*
21.5	0.606*
22.3	0.684
23.2	0.747
24.1	0.777
25.9	0.803*
29.4	0.827
32.7	0.923*

CURVE 18 (cont.)

λ	ρ
34.1	0.942
35.3	0.942*
36.6	0.921*
37.3	0.879*
37.9	0.818*
38.5	0.716*
39.4	0.614*
40.0	0.549
41.2	0.515
42.2	0.467*
44.1	0.421
46.8	0.379*
50.3	0.339
54.2	0.308
59.7	0.279
67.1	0.252*
73.9	0.232
81.0	0.225
100	0.225

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* Not shown on plot

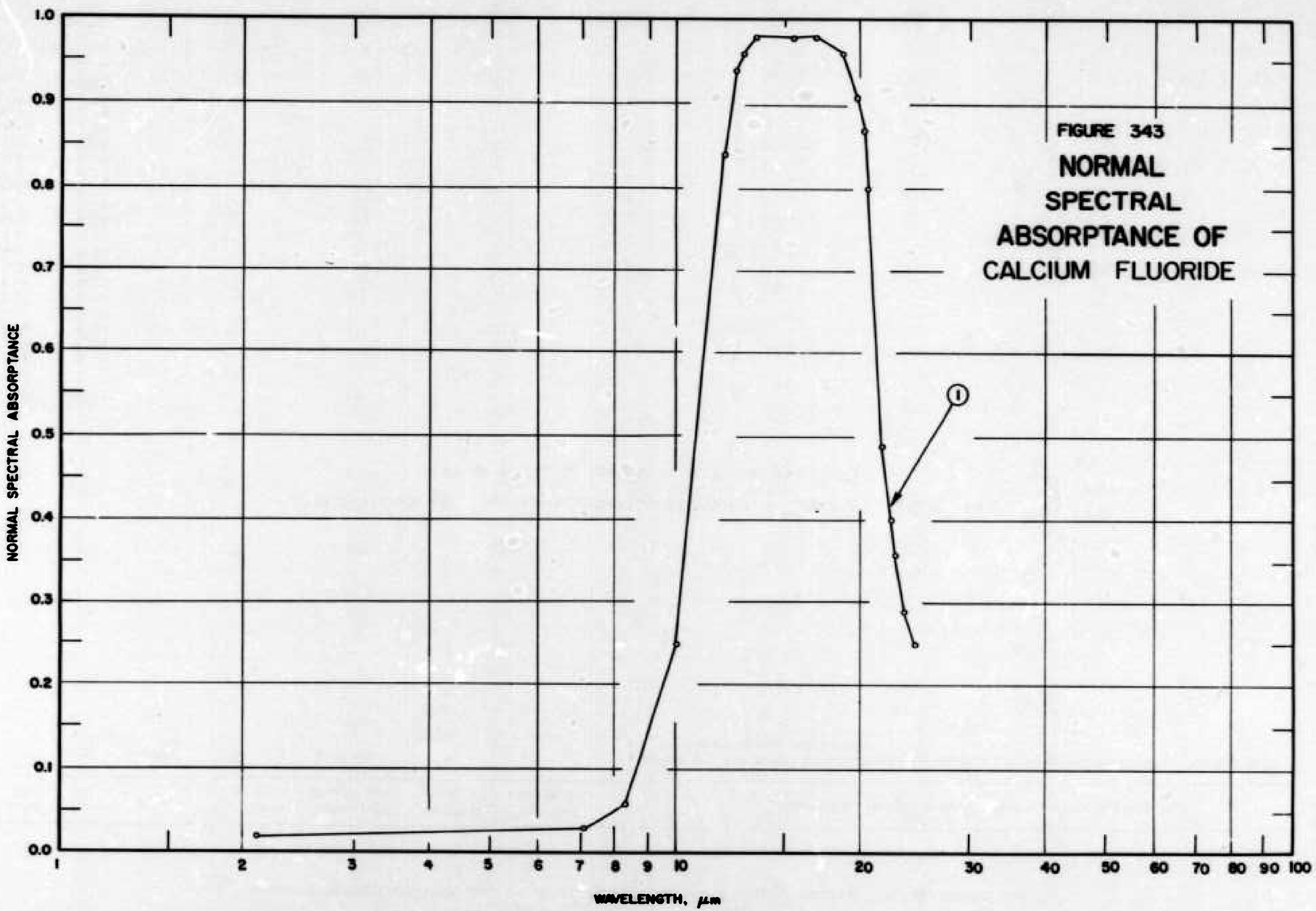
FIGURE 343
NORMAL SPECTRAL ABSORPTANCE OF CALCIUM FLUORIDE
1
NORMAL SPECTRAL ABSORPTANCE
1.0
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0.0
1
2
3
4
5
6
7
8
9
10
20
30
40
50
60
70
80
90
100
WAVELENGTH, μm

SPECIFICATION TABLE NO. 343 NORMAL SPECTRAL ABSORPTANCE OF CALCIUM FLUORIDE CaF_2

Curve No.	Ref. No.	Year	Temperature K	Wavelength Range, μm	Geometry θ	Reported Error, %	Composition (weight percent), Specifications and Remarks
1	68	1963	373	2.10-24.5	0°		Irtran 3 (1 mm thick) from Eastman Kodak Co.; hot pressed; measured in vacuum; data extracted from smooth curve.

DATA TABLE NO. 343 NORMAL SPECTRAL ABSORPTANCE OF CALCIUM FLUORIDE CaF_2

[Wavelength, λ, μm; Absorptance, α; Temperature, T, K]

λ	α
CURVE 1 T = 373	
2.10	0.02
7.10	0.03
8.30	0.06
10.0	0.25
12.1	0.84
12.5	0.94
12.9	0.96
13.5	0.98
15.5	0.98
16.9	0.98
18.6	0.96
19.6	0.91
20.1	0.87
20.4	0.80
21.7	0.49
22.4	0.40
22.8	0.36
23.7	0.29
24.5	0.25

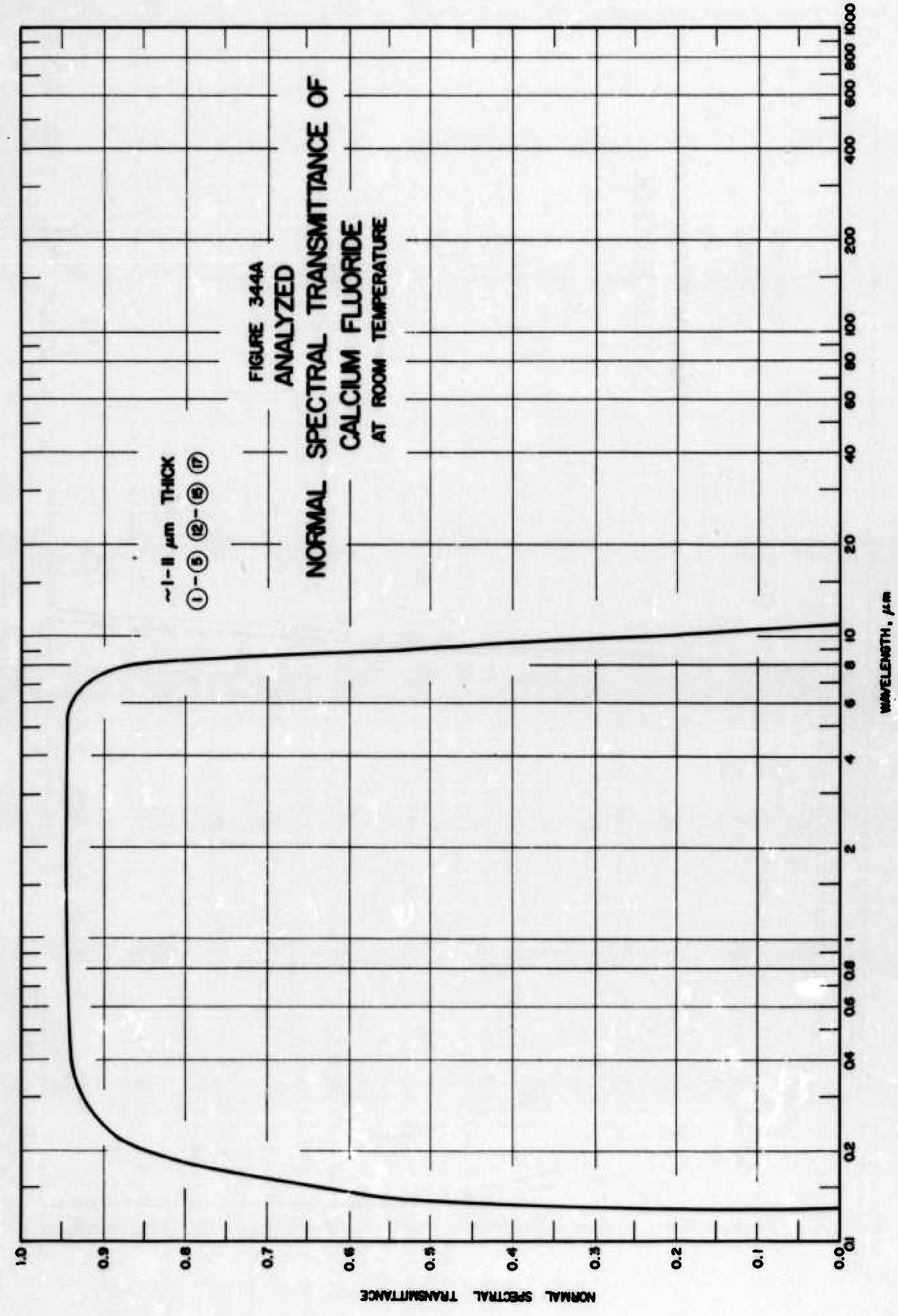
FIGURE 344A
ANALYZED
NORMAL SPECTRAL TRANSMITTANCE OF
CALCIUM FLUORIDE
AT ROOM TEMPERATURE
~1-11 μm THICK
1 - 5 12 - 15 17
NORMAL SPECTRAL TRANSMITTANCE
WAVELENGTH, μm
0.0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
1.0
0.1
0.2
0.4
0.6
0.8
1
2
4
6
8
10
20
40
60
80
100
200
400
600
800
1000

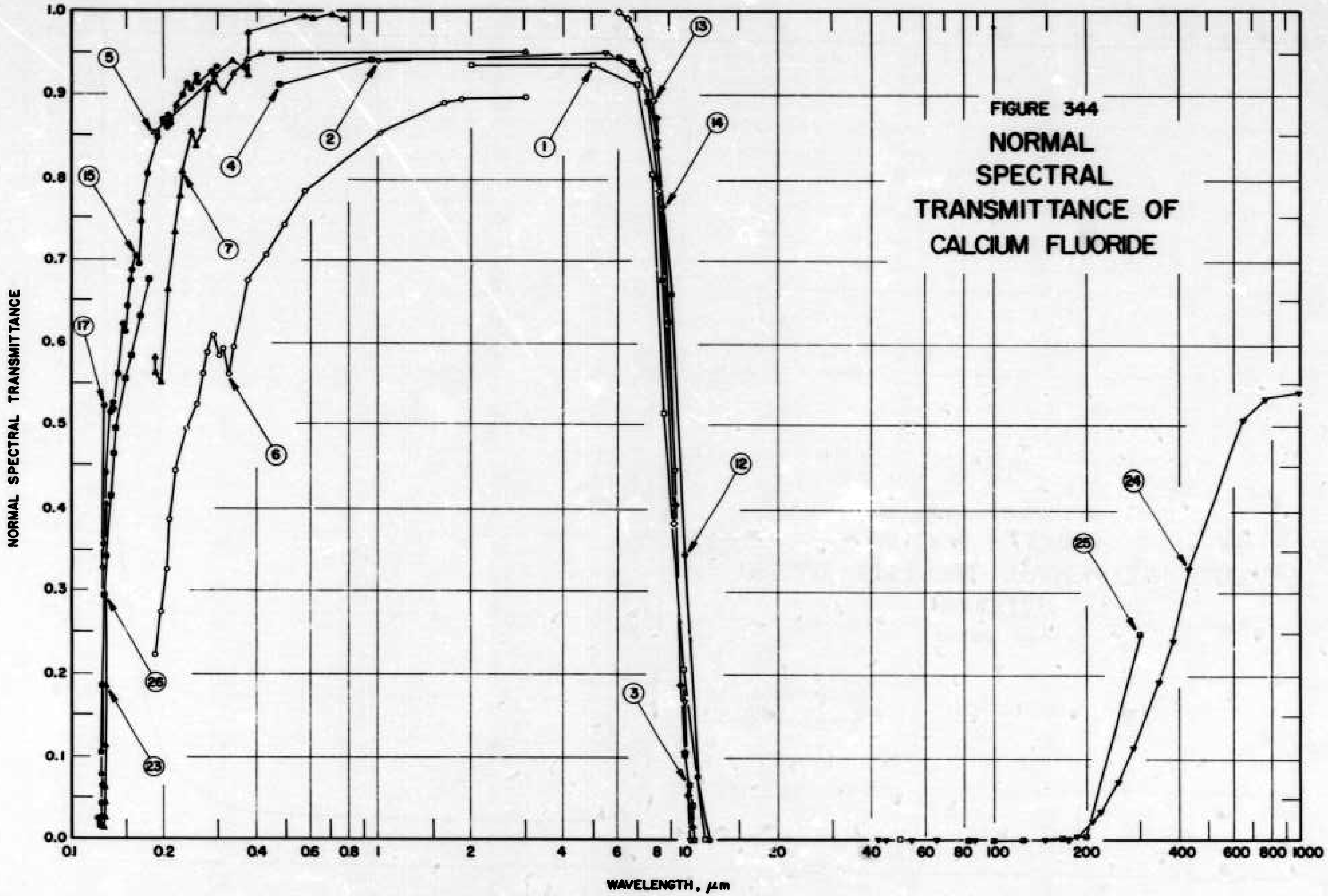

FIGURE 344 NORMAL SPECTRAL TRANSMITTANCE OF CALCIUM FLUORIDE

SPECIFICATION TABLE NO. 344 NORMAL SPECTRAL TRANSMITTANCE OF CALCIUM FLUORIDE CaF_2

Curve No.	Ref. No.	Year	Temperature K	Wavelength Range, μm	Geometry θ	θ'	ω'	Reported Error, %	Composition (weight percent) Specifications and Remarks
1	67	1963	~298	2.00-50.0	0°	0°			Specimen 5 mm thick; data extracted from smooth curve.
2	137	1965	298	1.00-10.3	0°	0°			6.5 mm thick; data extracted from smooth curve.
3	148	1966	~298	0.470-10.6	<15°	<15°			Commercially available single crystal (11.2 mm thick); data extracted from smooth curve.
4	148	1966	~298	0.470-10.6	<15°	<15°			Hot-pressed polycrystal (11.2 mm thick); prepared from pulverized single crystal of approx 180 μm average particle size; hot-pressed in vacuum at 1173 K at a pressure of 40,000 psi for approx 30 min; data extracted from smooth curve.
5	94	1967	298	0.185-3.00	~0°	~0°		±2	Single crystal (5.0 mm thick); polished; data extracted from smooth curve.
6	94	1967	298	0.187-3.00	~0°	~0°		±2	Irtran 3 (2.0 mm thick); polished; data extracted from smooth curve.
7	149	1967	4.2	0.185-0.771	0°	0°			Ultra pure crystal (1 mm thick) from Vinor Lab.; data extracted from smooth curve.
8*	149	1967	4.2	0.199-0.780	0°	0°			The above specimen and conditions except after 27 hrs total irradiation time with 50 KeV energy limit x-rays.
9*	149	1967	4.2	0.213-0.782	0°	0°			The above specimen and conditions except after 44 hrs total irradiation time with 50 KeV energy limit x-rays.
10*	150	1967	77	0.240-0.329	~0°	~0°			$Ca_{0.99}Tb_{0.01}F_2$; crystal (6 mm thick) grown from melts of optical-grade commercial CaF_2 powder and 99.9 pure TbF_3 in an atmosphere of dry argon; optically ground and polished; data extracted from smooth curve.
11*	150	1967	77	0.240-0.329	~0°	~0°			$Ca_{0.98}Tb_{0.01}Na_{0.01}F_2$; crystal (6 mm thick) grown from melts of optical-grade commercial CaF_2 powder, 99.9 pure TbF_3, and reagent-grade NaF in an atmosphere of dry argon; optically ground and polished; data extracted from smooth curve.
12	298	1936	~298	8.01-12.0	~0°	~0°			Fluorite cubic crystal (5.45 mm thick).
13	302	1952	~298	6.02-9.29	~0°	~0°			Synthetic single crystal; data extracted from smooth curve; reflection losses eliminated and transmission adjusted to standard thickness of 1 cm.
14	302	1952	~298	8.07-10.5	~0°	~0°			Similar to above specimen and conditions except natural crystal.
15	291	1966	~298	0.120 -0.300	0°	0°			Synthetic crystal (3.60 mm thick) from Harshaw Chemical Co.; polished; measured in vacuum.
16*	291	1966	~298	0.123 -0.300	0°	0°			Above specimen and conditions except irradiated with 10^{14} electrons cm^{-2} at 1.0 MeV and 2.0 MeV for 30 min each; turned a violet color after irradiation.
17	282	1965	300	0.121 -0.123	0°	0°			Freshly cleaved crystal (1.22 mm thick) from Harshaw Chemical Co.; stored and measured in vacuum; data extracted from smooth curve.
18*	282	1965	310	0.121 -0.123	0°	0°			Above specimen and conditions.
19*	282	1965	325	0.122 -0.124	0°	0°			Above specimen and conditions.
20*	282	1965	344	0.122 -0.124	0°	0°			Above specimen and conditions.
21*	282	1965	355	0.123 -0.125	0°	0°			Above specimen and conditions.

* Not shown on plot

SPECIFICATION TABLE NO. 344 (continued)

Curve No.	Ref. No.	Year	Temperature K	Wavelength Range, μm	Geometry θ θ' ω'	Reported Error, %	Composition (weight percent), Specifications and Remarks
22*	282	1965	377	0.123 -0.125	0° 0°		Above specimen and conditions.
23	282	1965	401	0.124 -0.126	0° 0°		Above specimen and conditions.
24	313	1966	~298	42.3-1000	~0° ~0°		Polycrystalline Irtran 3 (fluorite, cubic; 1.88 mm thick); fabricated by the Eastman Kodak Co.
25	314	1966	300	83.3-300	~0° ~0°		Irtran 3 (2 mm thick) from Eastman Kodak Co.
26	404	1965	~298	0.122 -0.179	~0° ~0°		2 mm thick; data extracted from smooth curve.

*Not shown on plot

DATA TABLE NO. 344 NORMAL SPECTRAL TRANSMITTANCE OF CALCIUM FLUORIDE CaF_2

[Wavelength, λ, μm; Transmittance, τ; Temperature, T, K]

CURVE 1
T = 298

λ	τ
2.00	0.933
5.00	0.938
7.00	0.915
7.80	0.805
8.60	0.516
9.90	0.207
11.5	0.000
50.0	0.000

CURVE 2
T = 298

λ	τ
1.00	0.941
5.48	0.951
6.69	0.935
7.44	0.902
8.03	0.845
9.33	0.448
10.0	0.167
10.3	0.000

CURVE 3
T ~ 298

λ	τ
0.470	0.945
6.18	0.949
6.65	0.941
7.03	0.927
7.47	0.891
7.81	0.849*
8.08	0.802
8.50	0.678
10.1	0.101
10.2	0.066
10.5	0.034
10.6	0.000

CURVE 4
T ~ 298

λ	τ
0.470	0.911
0.950	0.945
6.18	0.949*
6.65	0.941*

CURVE 4 (cont.)

λ	τ
7.03	0.927*
7.47	0.891*
7.81	0.849*
8.08	0.802*
8.50	0.678*
10.1	0.101*
10.2	0.066*
10.5	0.034*
10.7	0.000*

CURVE 5
T = 298

λ	τ
0.185	0.853
0.278	0.911
0.294	0.913
0.311	0.901
0.337	0.929
0.374	0.944
0.418	0.950
3.[illegible]	0.951

CURVE 6
T = 298

λ	τ
0.187	0.221
0.196	0.273
0.202	0.325
0.206	0.389
0.219	0.445
0.238	0.496
0.254	0.523
0.268	0.562
0.274	0.589
0.290	0.610
0.302	0.586
0.310	0.592
0.322	0.561
0.339	0.595
0.346	0.632*
0.376	0.675
0.426	0.708
0.490	0.742
0.578	0.784
1.03	0.855

CURVE 6 (cont.)

λ	τ
1.67	0.890
1.89	0.895
3.01	0.897

CURVE 7
T = 4.2

λ	τ
0.185	0.582
0.188	0.564
0.195	0.551
0.206	0.664
0.216	0.736
0.224	0.780
0.227	0.809
0.245	0.857
0.252	0.838
0.269	0.859
0.277	0.906
0.293	0.925
0.331	0.942
0.362	0.933
0.365	0.948*
0.373	0.925
0.373	0.977
0.532	0.991*
0.565	0.998
0.606	0.995
0.712	0.998
0.771	0.993

CURVE 8*
T = 4.2

λ	τ
0.199	0.125
0.211	0.371
0.217	0.459
0.234	0.489
0.241	0.469
0.263	0.349
0.272	0.312
0.284	0.245
0.295	0.195
0.307	0.179
0.326	0.174
0.330	0.165

CURVE 8 (cont.)*

λ	τ
0.348	0.0261
0.351	0.0136
0.370	0.00330
0.378	0.00375
0.391	0.00771
0.400	0.0254
0.405	0.0611
0.406	0.126
0.423	0.637
0.431	0.865
0.440	0.968
0.459	0.953
0.476	0.957
0.499	0.940
0.531	0.979
0.568	1.000
0.676	1.000
0.713	0.993
0.780	0.973

CURVE 9*
T = 4.2

λ	τ
0.213	0.270
0.221	0.385
0.228	0.399
0.245	0.357
0.258	0.256
0.305	0.0843
0.312	0.0815
0.324	0.0813
0.331	0.0752
0.350	0.00822
0.372	0.000540
0.378	0.000450
0.397	0.00160
0.410	0.0486
0.419	0.228
0.435	0.811
0.451	0.908
0.482	0.873
0.514	0.900
0.544	0.955
0.578	0.991
0.707	0.991
0.782	0.971

CURVE 10*
T = 77

λ	τ
0.240	0.828
0.241	0.813
0.243	0.796
0.245	0.824
0.248	0.849
0.251	0.855
0.253	0.841
0.255	0.793
0.256	0.782
0.257	0.787
0.258	0.776
0.259	0.776
0.263	0.869
0.270	0.925
0.271	0.918
0.272	0.906
0.273	0.925
0.275	0.942
0.278	0.955
0.281	0.951
0.282	0.931
0.284	0.916
0.285	0.931
0.286	0.931
0.288	0.968
0.289	0.962
0.292	0.975
0.293	0.959
0.294	0.968
0.300	0.964
0.301	0.944
0.304	0.971
0.309	0.977
0.311	0.989
0.316	0.991
0.319	0.946
0.322	0.968
0.328	0.984
0.329	0.977

CURVE 11*
T = 77

λ	τ
0.240	0.493
0.245	0.536

CURVE 11 (cont.)*

λ	τ
0.246	0.538
0.248	0.522
0.249	0.489
0.250	0.447
0.251	0.406
0.253	0.314
0.253	0.279
0.254	0.264
0.255	0.256
0.256	0.242
0.256	0.217
0.257	0.233
0.257	0.237
0.258	0.228
0.259	0.180
0.259	0.190
0.259	0.247
0.259	0.260
0.260	0.323
0.260	0.369
0.261	0.423
0.262	0.476
0.263	0.525
0.265	0.573
0.269	0.625
0.272	0.670
0.281	0.755
0.290	0.836
0.300	0.885
0.303	0.900
0.310	0.908
0.312	0.908
0.314	0.923
0.319	0.929
0.327	0.955
0.329	0.959

CURVE 12
T ~ 298

λ	τ
8.01	0.839
9.00	0.660
10.0	0.347
11.0	0.078
12.0	0.000

CURVE 13
T ~ 298

λ	τ
6.02	1.000
6.58	0.993
7.08	0.970
7.54	0.932
7.83	0.894
8.06	0.846*
8.26	0.787
8.58	0.675*
9.29	0.386

CURVE 14
T ~ 298

λ	τ
8.07	0.871
8.44	0.768
8.81	0.629
9.31	0.409
9.77	0.187
10.0	0.107
10.2	0.053
10.4	0.017
10.5	0.000*

CURVE 15
T ~ 298

λ	τ
0.120	0.025
0.121	0.016
0.122	0.061
0.123	0.267*
0.124	0.357
0.126	0.384*
0.126	0.414*
0.127	0.441
0.128	0.453*
0.129	0.502*
0.131	0.515
0.133	0.528
0.133	0.525*
0.134	0.520
0.136	0.542*
0.137	0.544*
0.140	0.561
0.141	0.575*
0.142	0.589*

CURVE 15 (cont.)

λ	τ
0.144	0.600*
0.145	0.605*
0.146	0.622
0.148	0.614
0.150	0.646
0.152	0.640*
0.154	0.672
0.155	0.688
0.157	0.678*
0.158	0.683*
0.160	0.703
0.162	0.695
0.166	0.748
0.167	0.770
0.170	0.786*
0.175	0.807
0.180	0.812*
0.185	0.838*
0.190	0.850
0.195	0.863*
0.200	0.870
0.205	0.860
0.205	0.877
0.210	0.866
0.215	0.876*
0.220	0.888
0.224	0.900*
0.230	0.900
0.234	0.905*
0.239	0.914
0.245	0.909
0.249	0.918*
0.255	0.922
0.259	0.915
0.265	0.919*
0.269	0.922*
0.274	0.926*
0.280	0.929*
0.284	0.929
0.289	0.935*
0.295	0.935*
0.300	0.936*

* Not shown on plot

DATA TABLE NO. 344 (continued)

CURVE 16* T ~ 298

λ	τ
0.123	0.094
0.124	0.242
0.124	0.325
0.126	0.395
0.127	0.405
0.128	0.411
0.128	0.428
0.129	0.445
0.130	0.456
0.133	0.487
0.134	0.475
0.136	0.508
0.138	0.493
0.140	0.499
0.141	0.505
0.143	0.511
0.144	0.526
0.145	0.529
0.147	0.532
0.149	0.551
0.149	0.557
0.152	0.563
0.153	0.575
0.155	0.579
0.156	0.587
0.159	0.590
0.160	0.592
0.161	0.580
0.162	0.597
0.162	0.608
0.165	0.585
0.166	0.623
0.170	0.576
0.175	0.545
0.179	0.481
0.184	0.452
0.189	0.450
0.195	0.466
0.200	0.490
0.204	0.549
0.210	0.582
0.215	0.584
0.219	0.565
0.224	0.554
0.229	0.561

CURVE 16 (cont.)*

λ	τ
0.234	0.590
0.239	0.619
0.245	0.644
0.249	0.652
0.255	0.655
0.259	0 685
0.264	0.663
0.269	0.664
0.274	0.660
0.279	0.649
0.285	0.651
0.289	0.633
0.294	0.621
0.300	0.611

CURVE 17 T = 300

λ	τ
0.121	0.019
0.121	0.027
0.121	0.041
0.121	0.089
0.122	0.329
0.123	0.525

CURVE 18* T = 310

λ	τ
0.121	0.01
0.121	0.014
0.122	0.021
0.122	0.034
0.122	0.052
0.123	0.239
0.123	0.407

CURVE 19* T = 325

λ	τ
0.122	0.031
0.123	0.093
0.123	0.134
0.123	0.266
0.124	0.406

CURVE 20* T = 344

λ	τ
0.122	0.009
0.122	0.026
0.123	0.044
0.123	0.084
0.123	0.131
0.124	0.302

CURVE 21* T = 355

λ	τ
0.123	0.012
0.123	0.019
0.123	0.029
0.123	0.040
0.123	0.058
0.124	0.086
0.124	0.127
0.124	0.357
0.125	0.559

CURVE 22* T = 377

λ	τ
0.123	0.008
0.124	0.022
0.124	0.041
0.124	0.064
0.124	0.139
0.125	0.341
0.125	0.503

CURVE 23 T = 401

λ	τ
0.124	0.011
0.124	0.018*
0.125	0.026
0.125	0.041
0.125	0.060
0.125	0.111
0.126	0.185
0.126	0.408

CURVE 24 T ~ 298

λ	τ
42.3	0.000
45.9	0.000
51.1	0.000*
54.4	0.000
60.3	0.000*
66.7	0.000
76.9	0.000*
88.0	0.000
105	0.000*
119	0.000*
129	0.000*
149	0.000
163	0.000*
178	0.000
187	0.005
210	0.025
221	0.037
254	0.070
284	0.113
309	0.145*
347	0.192
383	0.241
427	0.329
641	0.509
775	0.532
1000	0.542

CURVE 25 T = 300

λ	τ
83.3	<0.01
100	<0.01
125	<0.01
166.7	0.02
200	0.04
300	0.25

CURVE 26 T ~ 298

λ	τ
0.122	0.104
0.123	0.188
0.124	0.246*
0.125	0.296
0.127	0.341
0.129	0.383*
0.131	0.418
0.135	0.461
0.138	0.495
0.143	0.531*
0.147	0.558
0.153	0.585
0.165	0.631
0.179	0.676

*Not shown on plot

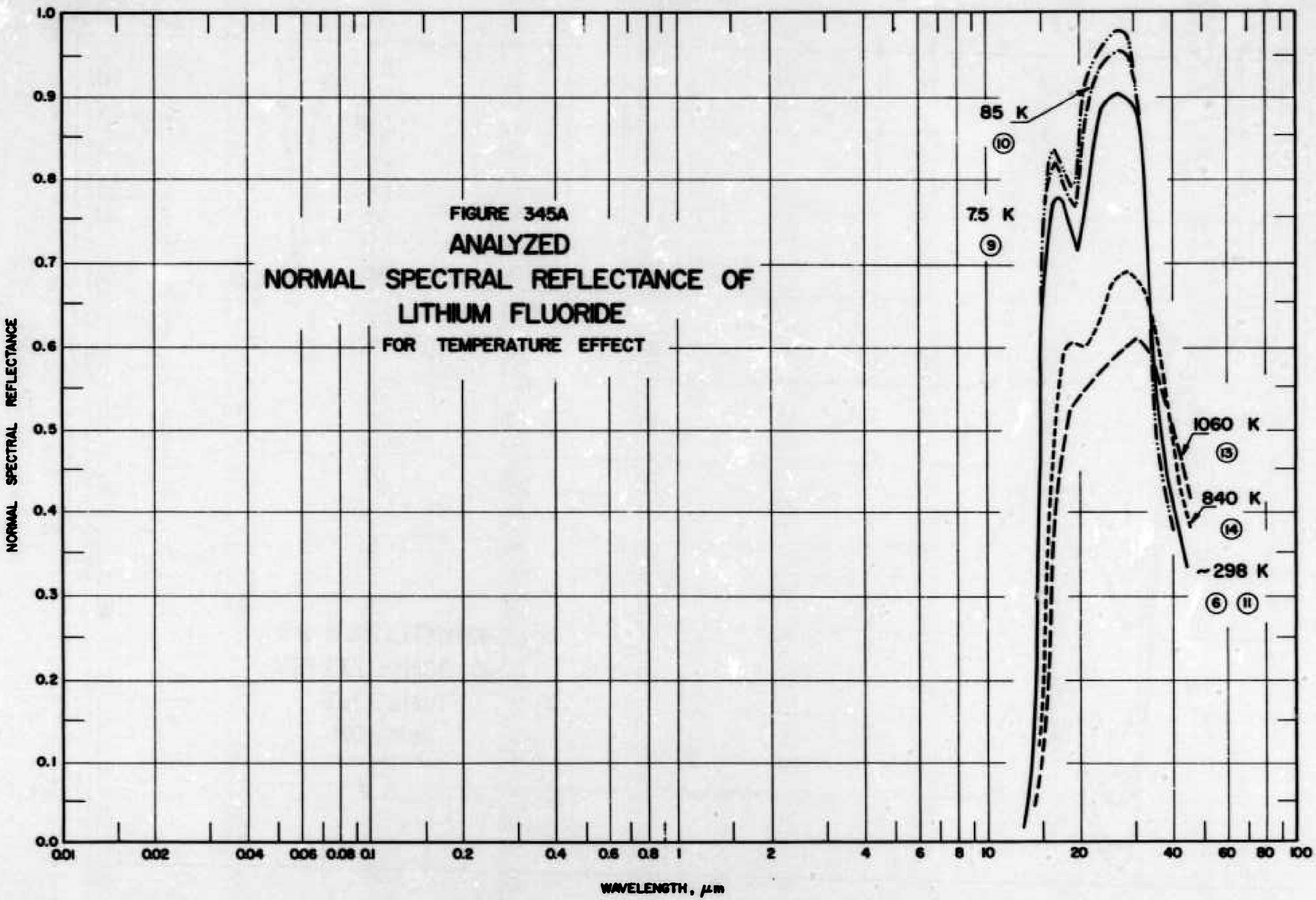

FIGURE 345A
ANALYZED
NORMAL SPECTRAL REFLECTANCE OF
LITHIUM FLUORIDE
FOR TEMPERATURE EFFECT

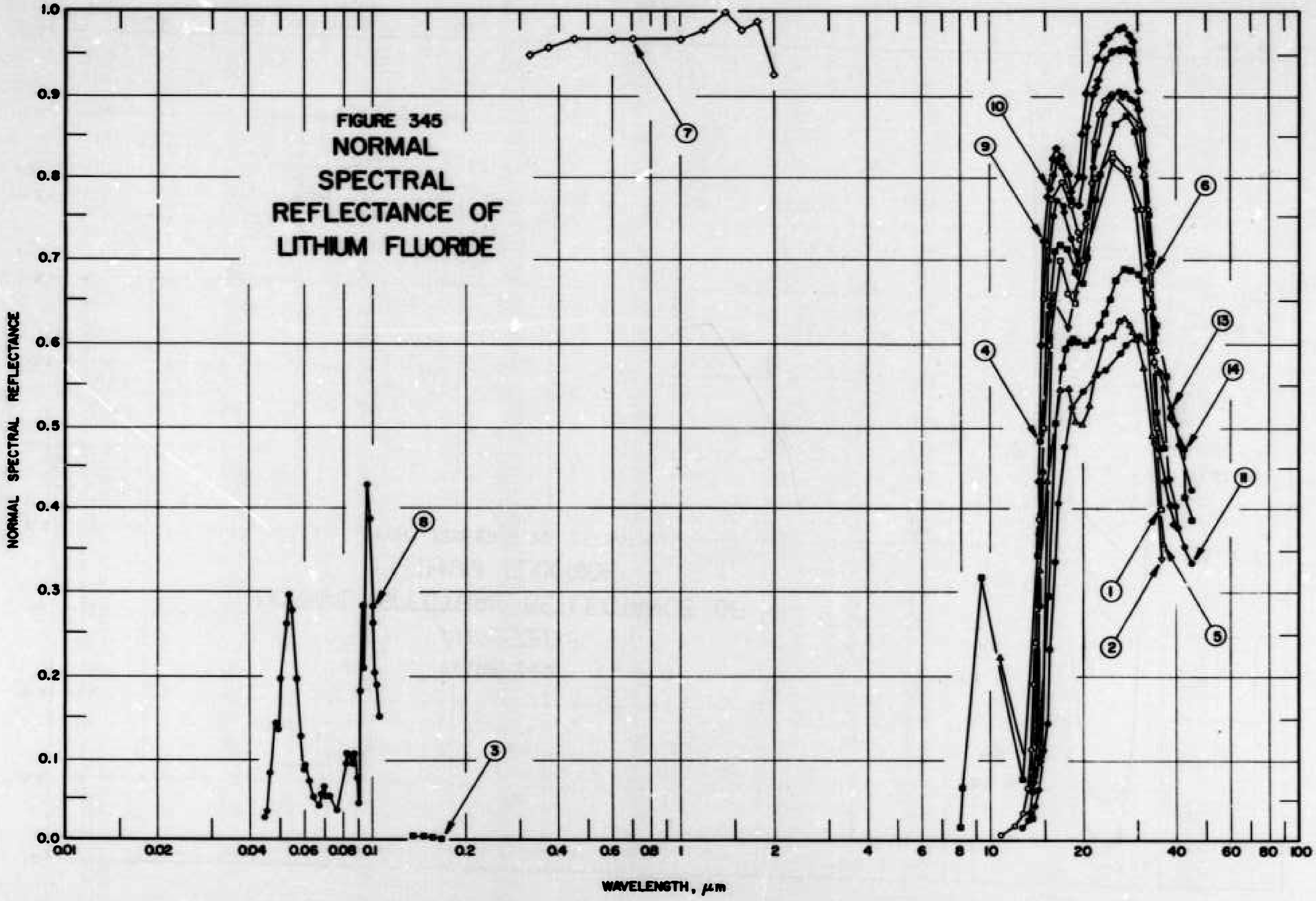

FIGURE 345
NORMAL SPECTRAL REFLECTANCE OF LITHIUM FLUORIDE

SPECIFICATION TABLE NO. 345 NORMAL SPECTRAL REFLECTANCE OF LITHIUM FLUORIDE LiF

Curve No.	Ref. No.	Year	Temperature K	Wavelength Range, μm	Geometry θ	θ'	ω'	Reported	Composition (weight percent), Specifications and Remarks
1	152	1960	300	14.5-36.0	~0°	~0°			Li^7F film (10 μm thick); vacuum deposited onto substrate of natural LiF crystal; data extracted from smooth curve.
2	152	1960	300	14.5-36.0	~0°	~0°			Li^6F film; similar to above specimen and conditions.
3	14	1941	298	0.1347-0.1640	~0°	~0°			Reflecting surface polished; back surface ground; measured in vacuum (0.001 mm Hg).
4	146	1966	~298	8.0-36.9	~0°	~0°			Film; optical thickness 10 quarterwaves at λ = 1.1 μm; electron beam deposited in vacuum (2 to 8 x 10^{-6} mm Hg) at normal incidence onto glass substrate heated to 588 K; rate of depositing 1 quarterwave per min at λ = 0.5 μm.
5	146	1966	~298	10.9-36.9	~0°	~0°			Film; optical thickness 10 quarterwaves at λ = 1.15 μm; electron beam deposited in vacuum (2 to 8 x 10^{-6} mm Hg) at normal incidence onto glass substrate heated to 423 K; rate of depositing 1 quarterwave per min at λ = 0.5 μm.
6	146	1966	~298	10.6-34.5	~0°	~0°			Crystal; polished; data extracted from smooth curve.
7	92	1964	298	0.325-2.0	~0°		2π		Compacted powder; MgO reference standard. [Authors' designation: Sample 15].
8	154	1967	300	0.044-0.104	8°	8°			Single crystal (2 mm thick); freshly cleaved in air; exposed to a low humidity for about 2 min before transferred to the vacuum; measured in vacuum.
9	297	1966	7.5	13.4-39.8	11°	11°			Single crystal; high purity; polished to half a wavelength at sodium d line; annealed in vacuum for 2 days at a temp of ~75% of the crystal melting temp; measured in inert atm; aluminized mirror reference standard.
10	297	1966	85	13.3-43.7	11°	11°			Above specimen and conditions.
11	297	1966	295	12.8-45.2	11°	11°			Above specimen and conditions.
12*	297	1966	605	13.9-45.2	11°	11°			Above specimen and conditions.
13	297	1966	1060	13.9-45.2	11°	11°			Above specimen and conditions.
14	297	1966	840	13.5-45.7	11°	11°			Above specimen and conditions.
15*	297	1966	420	14.3-45.2	11°	11°			Above specimen and conditions.

*Not shown on plot

DATA TABLE NO. 345 NORMAL SPECTRAL REFLECTANCE OF LITHIUM FLUORIDE LiF

[Wavelength, λ, μm; Reflectance, ρ; Temperature, T, K]

CURVE 1
T = 300

λ	ρ
14.5	0.24
15.0	0.50
15.5	0.60
17.0	0.70
18.0	0.66
19.0	0.65
20.0	0.70
22.0	0.80
25.0	0.83
28.0	0.81
31.0	0.76
33.0	0.66
34.0	0.58
35.0	0.50
36.0	0.40

CURVE 2
T = 300

λ	ρ
14.5	0.10
15.0	0.50*
16.0	0.66
18.0	0.62
19.0	0.66
20.0	0.70*
25.0	0.82
28.0	0.80
30.0	0.76
32.0	0.64
34.0	0.48
36.0	0.34

CURVE 3
T = 298

λ	ρ
0.1347	0.05
0.1438	0.05
0.1570	0.04
0.1640	0.02

CURVE 4
T ~ 298

λ	ρ
8.1	0.016
8.1	0.065

CURVE 4 (cont.)

λ	ρ
9.4	0.319
12.7	0.074
14.1	0.344
14.5	0.484
14.9	0.499
15.7	0.648
16.1	0.710
17.0	0.718
18.0	0.711
19.0	0.686
20.0	0.671
20.6	0.701
22.0	0.771
22.9	0.802
24.5	0.827*
25.8	0.866
26.8	0.871*
27.7	0.874
29.4	0.858
31.0	0.815
32.9	0.751
33.5	0.707
33.9	0.644
34.9	0.520
36.9	0.474

CURVE 5
T ~ 298

λ	ρ
10.9	0.224
13.5	0.068
14.5	0.327
15.4	0.436
16.0	0.477
17.1	0.549
18.1	0.549
19.0	0.508
20.0	0.506
21.0	0.528
22.0	0.562
23.9	0.608
25.0	0.610
26.1	0.629
27.1	0.630
28.1	0.621
29.0	0.616

CURVE 5 (cont.)

λ	ρ
30.0	0.607
30.9	0.596*
31.9	0.572
32.9	0.536*
33.9	0.490
36.0	0.398*
36.9	0.359

CURVE 6
T ~ 298

λ	ρ
10.6	0.008
12.0	0.019
12.7	0.033
13.1	0.064
13.6	0.113
13.9	0.191
14.4	0.389
15.0	0.663
15.4	0.719
16.0	0.773
16.6	0.792*
17.1	0.795
17.9	0.787*
18.6	0.766
19.3	0.733
19.9	0.726
20.5	0.743
21.3	0.794
22.0	0.847
22.9	0.880
23.8	0.898
25.0	0.903
27.4	0.901*
29.5	0.884*
30.7	0.864
31.8	0.804
32.4	0.760
33.1	0.687
34.5	0.591

CURVE 7
T = 298

λ	ρ
0.325	0.95
0.375	0.96

CURVE 7 (cont.)

λ	ρ
0.450	0.97
0.600	0.97
0.700	0.97
1.0	0.97
1.2	0.98
1.4	>1.00
1.6	0.98
1.8	0.99
2.0	0.93

CURVE 8
T = 300

λ	ρ
0.044	0.027
0.045	0.034
0.046	0.057*
0.046	0.066*
0.046	0.082
0.047	0.089*
0.047	0.099*
0.048	0.133*
0.048	0.144
0.049	0.148*
0.049	0.138
0.050	0.199
0.051	0.195*
0.051	0.210*
0.052	0.247*
0.052	0.263
0.053	0.294*
0.053	0.299
0.054	0.278
0.055	0.258*
0.056	0.199
0.057	0.136*
0.057	0.124*
0.058	0.128
0.058	0.111*
0.060	0.087
0.060	0.092
0.061	0.075*
0.062	0.071
0.063	0.065*
0.063	0.055*
0.064	0.058*
0.064	0.052

CURVE 8 (cont.)

λ	ρ
0.065	0.051*
0.066	0.047*
0.067	0.043
0.067	0.047*
0.068	0.052*
0.068	0.051*
0.068	0.054*
0.068	0.056
0.069	0.055*
0.070	0.060*
0.070	0.064
0.070	0.055
0.071	0.060*
0.071	0.056*
0.072	0.053
0.075	0.038*
0.076	0.036
0.076	0.035*
0.077	0.038*
0.077	0.037*
0.077	0.040*
0.081	0.088*
0.081	0.092*
0.082	0.095
0.082	0.105*
0.082	0.109
0.084	0.104
0.084	0.108*
0.084	0.110*
0.086	0.096
0.086	0.107*
0.087	0.109
0.087	0.095*
0.087	0.090*
0.088	0.094*
0.088	0.078
0.088	0.081*
0.089	0.049*
0.090	0.044
0.090	0.051*
0.091	0.080*
0.091	0.185
0.093	0.281
0.093	0.210
0.093	0.276*
0.095	0.338*
0.095	0.407*

CURVE 8 (cont.)

λ	ρ
0.096	0.430
0.096	0.423*
0.098	0.387
0.100	0.281
0.100	0.288*
0.100	0.270*
0.100	0.264
0.101	0.205
0.102	0.190
0.103	0.181*
0.104	0.151

CURVE 9
T = 7.5

λ	ρ
39.8	0.381
38.3	0.405
37.0	0.436
35.6	0.475
34.5	0.522*
33.3	0.602
32.3	0.696
31.2	0.801
30.3	0.884
29.4	0.968
28.6	0.974
27.9	0.979*
27.1	0.981
26.4	0.980
25.7	0.979*
25.0	0.977*
24.4	0.972
23.8	0.963
23.2	0.958*
22.7	0.956*
22.2	0.948
21.7	0.933*
21.3	0.926*
20.8	0.903
20.4	0.882*
20.0	0.856
19.6	0.801
18.6	0.783
18.5	0.796*
18.2	0.805
17.8	0.816*

CURVE 9 (cont.)

λ	ρ
17.5	0.821*
17.2	0.825
16.9	0.831*
16.7	0.833
16.4	0.828*
16.1	0.821
15.9	0.814*
15.6	0.802*
15.4	0.777
15.0	0.722
14.8	0.600
14.6	0.437
14.5	0.283
14.3	0.196*
14.1	0.140
13.9	0.090
13.7	0.060
13.5	0.040*
13.4	0.035

CURVE 10
T = 85

λ	ρ
43.7	0.347*
41.8	0.362*
40.2	0.388*
38.3	0.416*
37.2	0.444*
35.8	0.477*
34.5	0.536*
33.3	0.615*
32.4	0.722*
31.3	0.828*
30.4	0.909
29.5	0.941
28.7	0.954
27.9	0.958
27.1	0.958*
26.4	0.958
25.7	0.957*
25.0	0.956
24.4	0.953*
23.9	0.944
23.3	0.932*
22.8	0.922
22.2	0.912

CURVE 10 (cont.)

λ	ρ
21.8	0.903
21.3	0.887*
20.9	0.863
20.4	0.833*
20.0	0.800
19.7	0.768
19.3	0.761*
18.9	0.775
18.5	0.793*
18.2	0.802*
17.9	0.806*
17.5	0.812
17.2	0.816*
16.9	0.820
16.7	0.822*
16.4	0.819*
16.2	0.803
15.9	0.788
15.6	0.767*
15.4	0.732*
15.1	0.674*
14.8	0.517*
14.5	0.237*
14.3	0.179*
14.1	0.119*
13.9	0.083*
13.7	0.048*
13.3	0.035*

CURVE 11
T = 295

λ	ρ
45.2	0.336
43.7	0.355
41.7	0.377
40.0	0.403
38.5	0.438
37.0	0.478*
35.7	0.519*
34.5	0.576*
33.3	0.711*
32.3	0.820
31.2	0.860
30.3	0.891*
29.3	0.895
28.5	0.899

*Not shown on plot

DATA TABLE NO. 345 (continued)

CURVE 11 (cont.) T = 295

λ	ρ
27.7	0.902
27.0	0.900
26.3	0.906
25.6	0.904*
25.0	0.900
24.4	0.892*
23.8	0.880
23.2	0.880*
22.7	0.861*
22.2	0.840
21.7	0.811
21.2	0.793*
20.8	0.755
20.4	0.714*
20.0	0.697*
19.6	0.695
19.2	0.710
18.8	0.724
18.5	0.730*
18.2	0.744
17.9	0.757
17.5	0.763
17.2	0.761*
16.9	0.768*
16.7	0.772
16.4	0.763*
16.1	0.751
15.8	0.730*
15.6	0.700
15.4	0.655*
15.2	0.554*
14.9	0.447
14.7	0.318*
14.5	0.228*
14.3	0.171
14.1	0.121*
13.9	0.071
13.7	0.046*
13.5	0.031*
13.3	0.026
12.8	0.015

CURVE 12* T = 605

λ	ρ
45.2	0.362
43.3	0.381
41.7	0.410
39.8	0.440
38.5	0.482
37.0	0.532
35.7	0.596
34.5	0.656
33.4	0.706
32.3	0.740
31.2	0.757
30.3	0.766
29.4	0.773
28.6	0.778
27.8	0.776
27.0	0.780
26.2	0.777
25.6	0.777
24.9	0.766
24.4	0.754
23.8	0.739
23.3	0.720
22.7	0.696
22.2	0.675
21.7	0.652
21.2	0.643
20.8	0.632
20.4	0.633
20.0	0.635
19.6	0.636
19.2	0.650
18.8	0.656
18.5	0.660
18.2	0.664
17.8	0.666
17.5	0.667
17.2	0.662
16.9	0.655
16.7	0.647
16.4	0.634
16.1	0.611
15.9	0.572
15.6	0.526
15.4	0.464
15.2	0.365

CURVE 12 (cont.)*

λ	ρ
14.9	0.273
14.7	0.198
14.5	0.149
14.3	0.120
14.1	0.088
13.9	0.056

CURVE 13 T = 1060

λ	ρ
45.2	0.424
43.5	0.453*
41.5	0.480
40.0	0.504
38.5	0.526
37.0	0.545*
35.7	0.567
34.5	0.582*
33.3	0.591
32.4	0.602*
31.2	0.606*
30.3	0.610
29.4	0.610*
28.6	0.606*
27.7	0.600
27.0	0.594*
26.3	0.590
25.6	0.583*
25.0	0.579*
24.4	0.578*
23.8	0.570
23.3	0.569*
22.7	0.567*
22.2	0.565
21.7	0.558*
21.3	0.556*
20.8	0.554*
20.4	0.549*
20.0	0.544
19.6	0.538*
19.2	0.533*
18.9	0.531*
18.5	0.524
18.1	0.513*
17.8	0.495*
17.5	0.478

CURVE 13 (cont.)

λ	ρ
17.2	0.461*
16.9	0.441*
16.7	0.409
16.4	0.371*
16.1	0.339
15.9	0.281*
15.6	0.231
15.4	0.190*
15.2	0.146
14.9	0.112
14.7	0.090*
14.3	0.063
13.9	0.041

CURVE 14 T = 840

λ	ρ
45.7	0.386
43.7	0.414
41.8	0.439
40.2	0.474
38.5	0.513
37.3	0.561
35.8	0.589*
34.7	0.623
33.4	0.649*
32.4	0.660
31.4	0.675
30.5	0.681
29.5	0.686*
28.7	0.687
27.9	0.687*
27.1	0.689
26.4	0.684*
25.7	0.676
25.1	0.667*
24.4	0.652
23.8	0.638
23.3	0.627*
22.8	0.622
22.2	0.614*
21.8	0.611*
21.3	0.605
20.9	0.603*
20.4	0.600
20.0	0.602*

CURVE 14 (cont.)

λ	ρ
19.6	0.603*
19.3	0.602
18.9	0.604
18.6	0.602
18.2	0.603*
17.9	0.595
17.6	0.585*
17.3	0.573
17.0	0.555*
16.7	0.539*
16.4	0.506
16.2	0.473*
15.9	0.414
15.6	0.367*
15.4	0.294
15.2	0.231
14.9	0.168
14.7	0.123
14.5	0.102
14.3	0.086*
14.1	0.063*
13.9	0.047*
13.5	0.028

CURVE 15* T = 420

λ	ρ
45.2	0.346
43.5	0.361
41.8	0.381
40.0	0.410
38.5	0.444
37.2	0.484
36.0	0.530
34.6	0.602
33.4	0.701
32.4	0.781
31.3	0.815
30.5	0.832
29.5	0.844
28.7	0.843
27.9	0.852
27.2	0.853
26.4	0.855
25.7	0.854
25.1	0.848

CURVE 15 (cont.)*

λ	ρ
24.4	0.844
23.9	0.828
23.3	0.812
22.8	0.798
22.3	0.767
21.8	0.744
21.3	0.713
20.9	0.682
20.4	0.668
20.0	0.666
19.6	0.661
19.3	0.680
18.9	0.691
18.5	0.699
18.2	0.703
17.9	0.715
17.6	0.718
17.3	0.726
17.0	0.726
16.7	0.725
16.4	0.717
16.2	0.707
15.9	0.683
15.6	0.647
15.4	0.599
15.2	0.517
14.9	0.418
14.7	0.302
14.5	0.217
14.3	0.160

plot

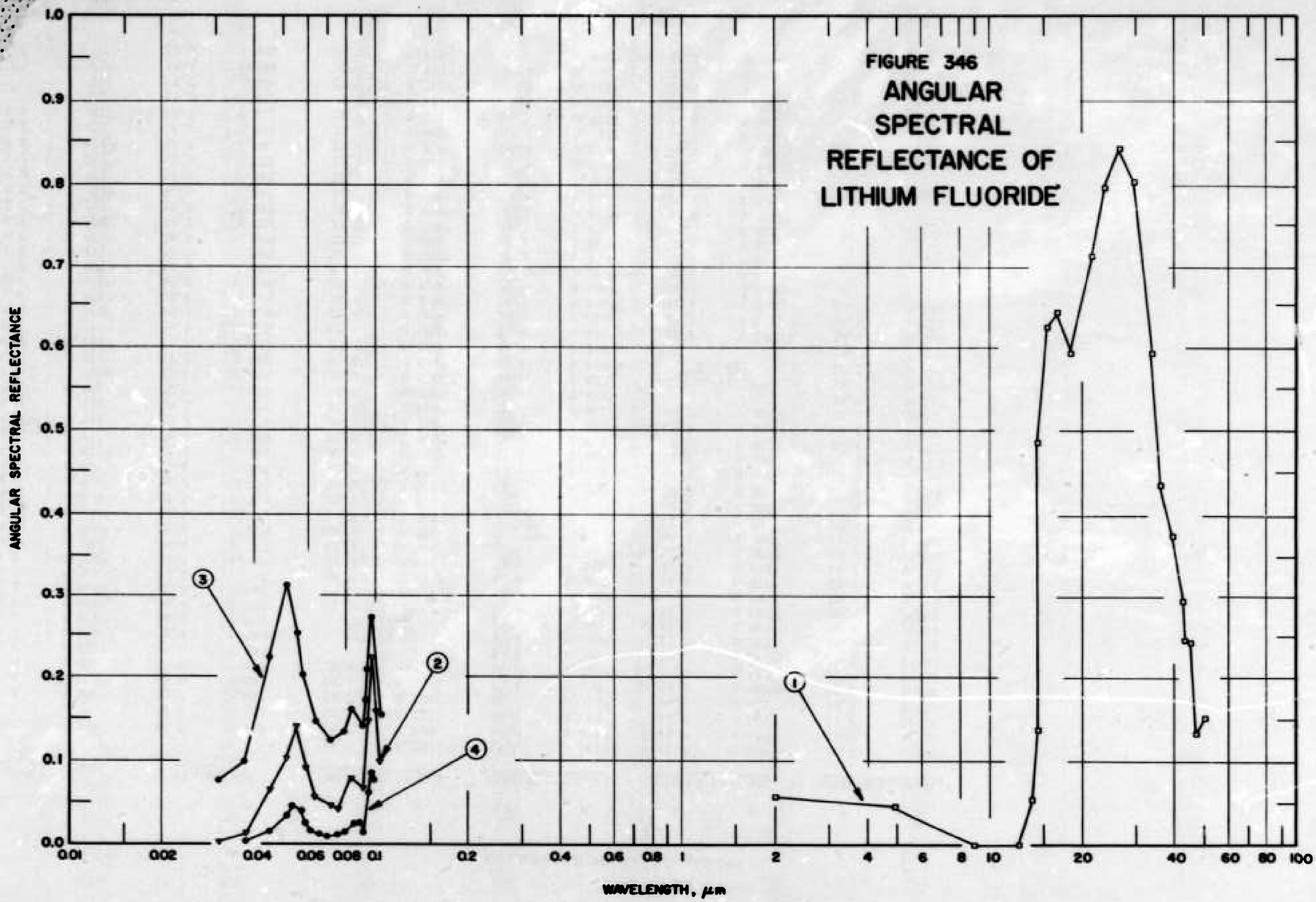

FIGURE 346
ANGULAR SPECTRAL REFLECTANCE OF LITHIUM FLUORIDE

SPECIFICATION TABLE NO. 346 ANGULAR SPECTRAL REFLECTANCE OF LITHIUM FLUORIDE LiF

Curve No.	Ref. No.	Year	Temperature K	Wavelength Range, μm	Geometry θ	θ'	ω'	Reported Error, %	Composition (weight percent), Specifications and Remarks
1	67	1963	~298	2.00-50.0	30°	30°			Specimen 5 mm thick; data extracted from smooth curve; aluminum mirror reference standard.
2	147	1967	298	0.0306-0.103	20°	20°			Cleaved; measured in vacuum.
3	147	1967	298	0.0306-0.103	60°	60°			Above specimen and conditions.
4	147	1967	298	0.0372-0.0985	20°	20°			Polished; measured in vacuum; data extracted from smooth curve.

DATA TABLE NO. 346 ANGULAR SPECTRAL REFLECTANCE OF LITHIUM FLUORIDE LiF

[Wavelength, λ, μm; Reflectance, ρ; Temperature, T, K]

λ	ρ	λ	ρ	λ	ρ	λ	ρ
CURVE 1 T = 298		CURVE 2 T = 298		CURVE 3 (cont.)		CURVE 4 (cont.)	
2.00	0.058	0.0306	0.002	0.0505	0.312	0.0650	0.012
4.90	0.048	0.0372	0.013	0.0549	0.252	0.0690	0.010
8.90	0.000	0.0458	0.066	0.0579	0.201	0.0748	0.011
12.3	0.000	0.0501	0.101	0.0626	0.149	0.0799	0.016
13.7	0.054	0.0544	0.140	0.0711	0.124	0.0854	0.024
14.1	0.139	0.0592	0.091	0.0782	0.136	0.0881	0.024
14.1	0.487	0.0626	0.057	0.0839	0.162	0.0894	0.022*
15.4	0.625	0.0711	0.048	0.0909	0.141	0.0914	0.015
16.8	0.642	0.0747	0.043	0.0936	0.171	0.0926	0.023*
18.4	0.598	0.0776	0.055*	0.0946	0.210	0.0950	0.062
21.3	0.712	0.0832	0.080	0.0968	0.274	0.0962	0.080*
23.8	0.799	0.0914	0.069	0.103	0.155	0.0971	0.084
26.8	0.841	0.0943	0.149			0.0985	0.079
29.9	0.802	0.0973	0.224	CURVE 4 T = 298			
33.3	0.594	0.100	0.160				
36.1	0.436	0.103	0.100	0.0372	0.003		
39.5	0.378			0.0447	0.018		
42.6	0.292	CURVE 3 T = 298		0.0501	0.036		
43.8	0.249			0.0537	0.048		
45.6	0.242			0.0554	0.047*		
46.3	0.181*	0.0306	0.078	0.0569	0.040		
47.7	0.133	0.0370	0.100	0.0584	0.027		
50.0	0.152	0.0447	0.224	0.0611	0.017		

* Not shown on plot

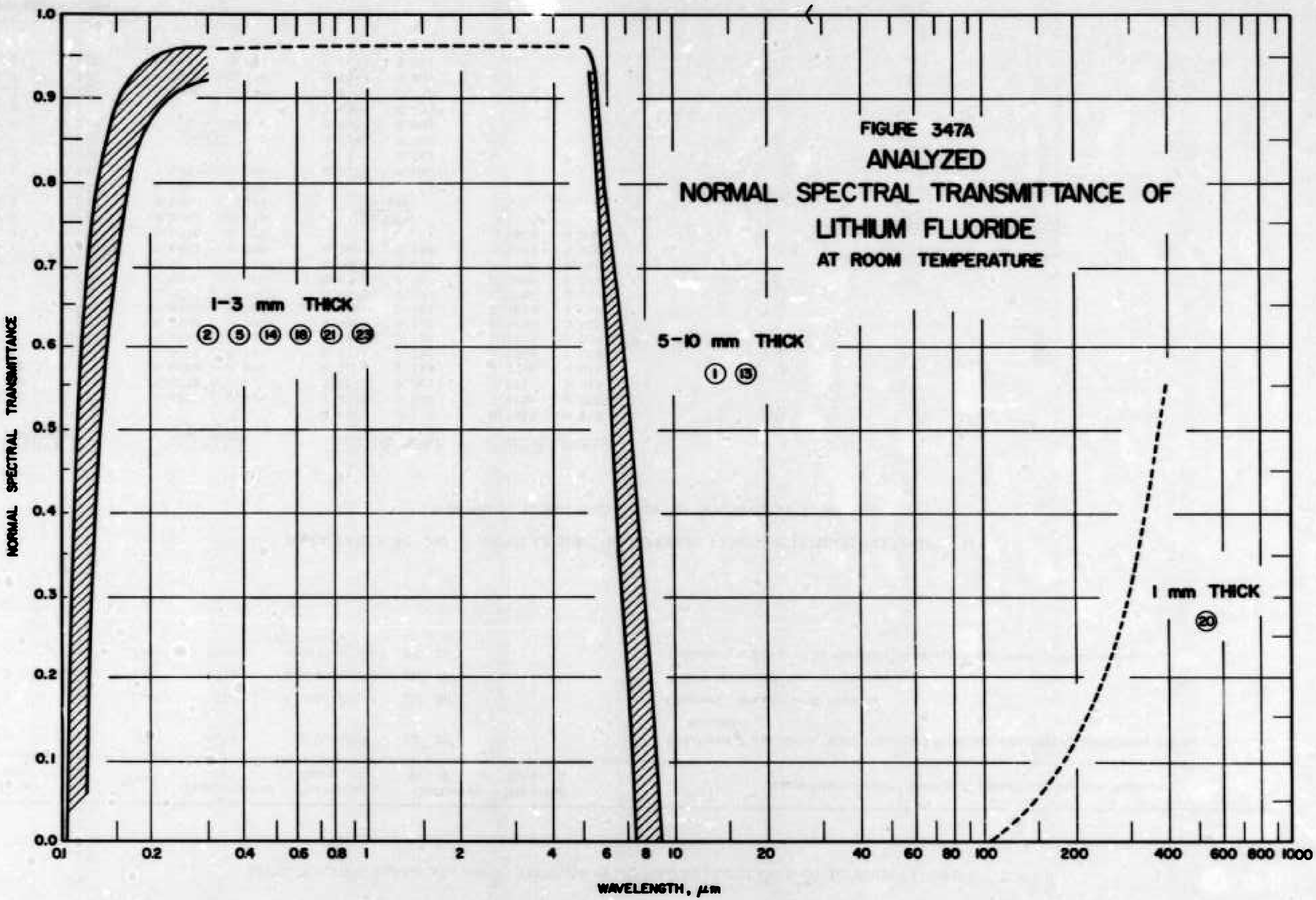

FIGURE 347A
ANALYZED
NORMAL SPECTRAL TRANSMITTANCE OF
LITHIUM FLUORIDE
AT ROOM TEMPERATURE

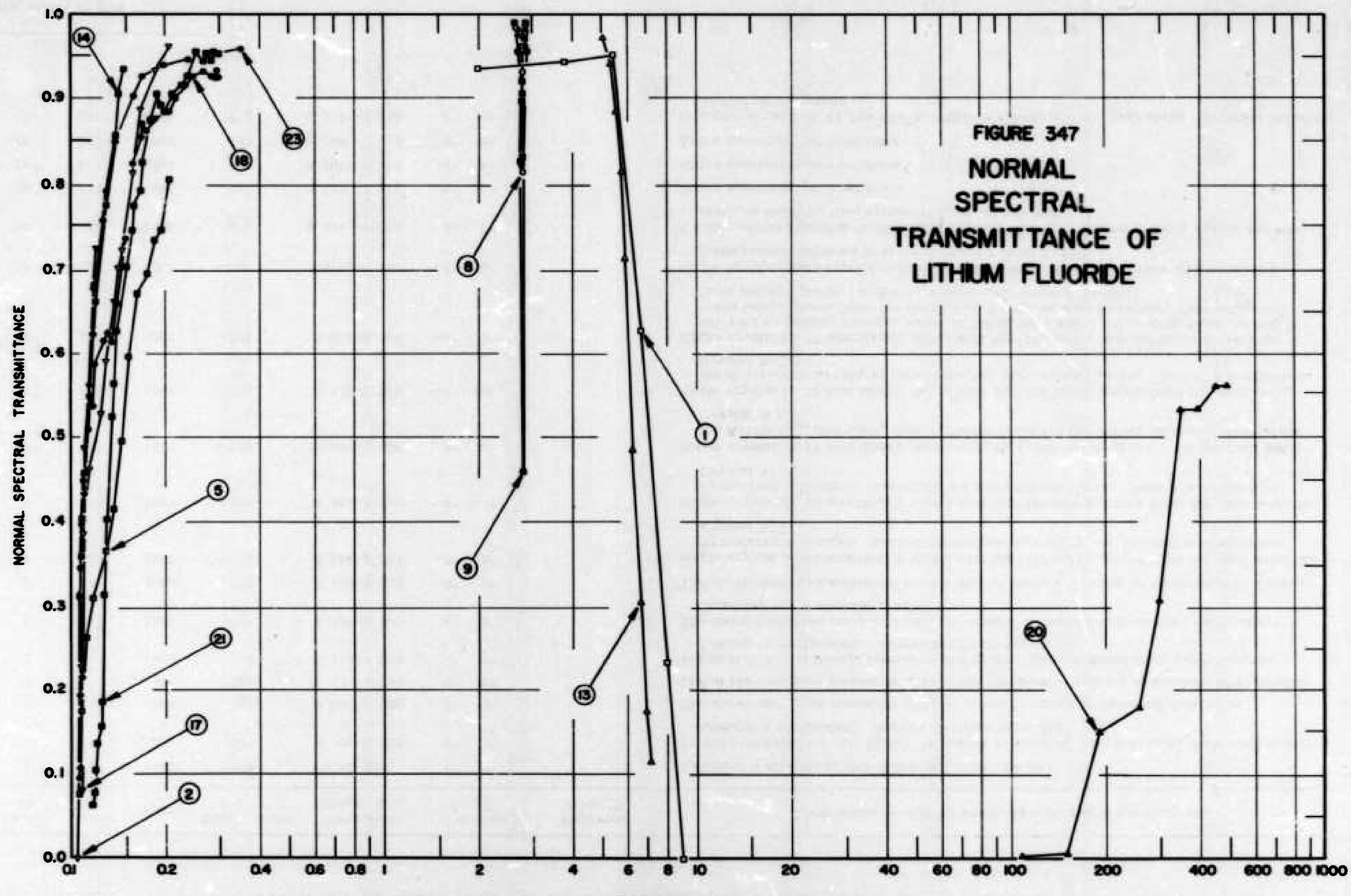
FIGURE 347
NORMAL
SPECTRAL
TRANSMITTANCE OF
LITHIUM FLUORIDE
NORMAL SPECTRAL TRANSMITTANCE
WAVELENGTH, μm
1.0
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0.0
0.1
0.2
0.4
0.6
0.8
1
2
4
6
8
10
20
40
60
80
100
200
400
600
800
1000
14
23
16
5
21
17
2
8
9
1
13
20

SPECIFICATION TABLE NO. 347 NORMAL SPECTRAL TRANSMITTANCE OF LITHIUM FLUORIDE LiF

Curve No.	Ref. No.	Year	Temperature K	Wavelength Range, μm	Geometry θ	Geometry θ'	Reported Error, %	Composition (weight percent), Specifications and Remarks
1	67	1963	~298	2.00-50.0	0°	0°		Specimen 5 mm thick; data extracted from smooth curve.
2	142	1966	298	0.104-0.205	0°	0°		Freshly cleaved (1.3 mm thick); measured in vacuum; data extracted from smooth curve; [Author's designation: Sample S2 (from ingot 2)].
3	142	1966	298	0.104-0.205	0°	0°		The above specimen measured after 20 months storage in chemical desiccator.
4	142	1966	298	0.104-0.205	0°	0°		The above specimen measured after 2 min ultrasonic cleaning in absolute ethyl alcohol.
5	142	1966	298	0.104-0.205	0°	0°		Polished (2.0 mm thick); measured in vacuum; data extracted from smooth curve; [Author's designation: Sample W2 (from ingot 2)].
6	142	1966	298	0.104-0.205	0°	0°		The above specimen measured after 11 months storage in uncontrolled environment (humidity never exceeding 95%).
7	142	1966	298	0.104-0.205	0°	0°		The above specimen measured after 2 min ultrasonic cleaning in absolute ethyl alcohol.
8	155	1967	~298	2.660-2.859	~0°	~0°		Single crystal (3.81 mm thick); doped with Mg (120 ppm); grown from the melt using the Kyropolous technique; data extracted from smooth curve; [Author's designation: Crystal R5].
9	155	1967	~298	2.660-2.860	~0°	~0°		Single crystal (3.89 mm thick); doped with Mg (100 ppm); grown from the melt using the Kyropolous technique; data extracted from smooth curve; [Author's designation: Crystal A3].
10*	155	1967	~298	2.660-2.860	~0°	~0°		Single crystal (3.07 mm thick); doped with Mg (~100 ppm); grown from the melt using the Kyropolous technique; data extracted from smooth curve; [Author's designation: Crystal W].
11*	155	1967	~298	2.600-2.860	~0°	~0°		Single crystal (2.95 mm thick); doped with Mg (105 ppm); grown from the melt using the Kyropolous technique; data extracted from smooth curve; [Author's designation: Crystal R4].
12*	155	1967	~298	2.600-2.860	~0°	~0°		Single crystal (2.77 mm thick); doped with Mg (105 ppm), also diffusion doped with OH^- ions by heating in water vapor at 750 K for 4 days, followed by rapid cooling to room temp; grown from the melt using the Kyropolous technique; data extracted from smooth curve; [Author's designation: Crystal R4(OH)].
13	302	1952	~298	5.00-7.19	~0°	~0°		Single crystal; data extracted from smooth curve; reflection losses eliminated and transmission adjusted to standard thickness of 1 cm.
14	282	1965	299	0.104 -0.145	0°	0°		Freshly cleaved crystal (1.55 mm thick) from Harshaw Chemical Co.; stored and measured in vacuum; data extracted from smooth curve.
15*	282	1965	336	0.105 -0.145	0°	0°		Above specimen and conditions.
16*	282	1965	374	0.106 -0.119	0°	0°		Above specimen and conditions.
17	282	1965	407	0.107 -0.119	0°	0°		Above specimen and conditions.
18	291	1966	~298	0.105 -0.300	0°	0°		Synthetic crystal (2.09 mm thick); Harshaw Chemical Co.; high purity; optically polished; measured in vacuum.

*Not shown on plot

SPECIFICATION TABLE NO. 347 (continued)

Curve No.	Ref. No.	Year	Temperature K	Wavelength Range, μm	Geometry θ	θ'	ω'	Reported Error, %	Composition (weight percent), Specifications and Remarks
19*	291	1966	~298	0.121 -0.300	0°	0°			Above specimen and conditions except irradiated with 10^{14} electrons cm^{-2} at 1.0 MeV and 2.0 MeV for 30 min each; turned a yellow color after irradiation.
20	292	1950	~298	109-486	~0°	~0°			1.00 mm thick.
21	97	1967	~298	0.114 -0.300	~0°	~0°			High purity synthetic crystal (3.18 mm thick) from Optivac, Inc.; optically polished.
22*	97	1967	~298	0.114 -0.300	~0°	~0°			Above specimen and conditions measured after irradiation by a total flux of 8.25 x 10^{10} protons cm^{-2} evenly distributed over 3, 3.8, and 4.6 MeV.
23	404	1965	~298	0.105 -0.350	~0°	~0°			Pure LiF (2 mm thick); data extracted from smooth curve.

* Not shown on plot

DATA TABLE NO. 347 NORMAL SPECTRAL TRANSMITTANCE OF LITHIUM FLUORIDE LiF

[Wavelength, λ, μm; Transmittance, τ; Temperature, T, K]

λ	τ
CURVE 1 T ~ 298	
2.00	0.938
3.80	0.944
5.40	0.903
6.60	0.629
8.00	0.232
9.00	0.000
50.0	0.000
CURVE 2 T = 298	
0.104	0.000
0.106	0.229
0.109	0.388
0.113	0.461
0.122	0.526
0.128	0.590
0.137	0.662
0.140	0.701
0.145	0.723
0.148	0.753*
0.154	0.813
0.166	0.889
0.186	0.934
0.205	0.962
CURVE 3 T = 298	
0.104	0.000
0.106	0.107
0.110	0.277
0.112	0.297
0.115	0.314
0.119	0.354
0.122	0.372
0.128	0.392
0.138	0.450
0.143	0.489
0.145	0.521
0.151	0.624
0.157	0.744
0.162	0.774
0.166	0.834
CURVE 3 (cont.)	
0.172	0.804
0.178	0.827
0.186	0.853
0.205	0.865
CURVE 4 T = 298	
0.104	0.000
0.105	0.148
0.107	0.240
0.109	0.296
0.112	0.413
0.115	0.501
0.120	0.572
0.125	0.637
0.129	0.658
0.133	0.664
0.143	0.772
0.153	0.837
0.162	0.873
0.182	0.887
0.205	0.884
CURVE 5 T = 298	
0.104	0.000*
0.107	0.172
0.110	0.266
0.116	0.311
0.126	0.368
0.133	0.419
0.142	0.494
0.151	0.597
0.160	0.673
0.166	0.696*
0.173	0.699
0.183	0.735
0.192	0.747
0.205	0.807
CURVE 6 T = 298	
0.104	0.000
0.107	0.066
0.117	0.136
0.131	0.178
0.140	0.208
0.144	0.251
0.149	0.327
0.153	0.437
0.156	0.503
0.160	0.545
0.168	0.585
0.185	0.718
0.192	0.731
0.200	0.777
0.205	0.805
CURVE 7 T = 298	
0.104	0.000
0.107	0.141
0.118	0.269
0.130	0.366
0.141	0.417
0.151	0.544
0.159	0.637
0.165	0.682
0.173	0.701
0.183	0.733
0.194	0.759
0.205	0.805
CURVE 8 T ~ 298	
2.660	0.987
2.714	0.984
2.782	0.982
2.787	0.977
2.789	0.958
2.791	0.959
2.793	0.966*
2.796	0.932
2.798	0.816
CURVE 8 (cont.)	
2.802	0.966
2.808	0.980
2.817	0.985*
2.820	0.983
2.828	0.988*
2.859	0.990
CURVE 9 T ~ 298	
2.660	0.992
2.676	0.986*
2.706	0.989*
2.710	0.984*
2.713	0.963*
2.716	0.981*
2.724	0.982*
2.728	0.958
2.732	0.983*
2.737	0.986
2.746	0.977*
2.750	0.951*
2.753	0.952*
2.757	0.827
2.760	0.897*
2.763	0.907
2.767	0.832
2.771	0.863*
2.774	0.977*
2.778	0.975*
2.781	0.958
2.786	0.974*
2.792	0.959*
2.794	0.921
2.798	0.460*
2.801	0.904*
2.803	0.952*
2.807	0.973*
2.812	0.983*
2.819	0.984
2.824	0.963*
2.829	0.985*
2.839	0.992*
2.860	0.992
CURVE 10* T ~ 298	
2.660	0.994
2.678	0.990
2.710	0.993
2.714	0.963
2.717	0.986
2.719	0.984
2.720	0.989
2.726	0.981
2.729	0.958
2.733	0.985
2.735	0.990
2.745	0.989
2.751	0.968
2.755	0.964
2.758	0.916
2.760	0.908
2.762	0.891
2.764	0.892
2.767	0.787
2.772	0.961
2.774	0.981
2.778	0.985
2.783	0.965
2.787	0.984
2.793	0.979
2.796	0.924
2.799	0.636
2.803	0.955
2.805	0.979
2.810	0.991
2.822	0.995
2.825	0.992
2.828	0.995
2.848	0.998
2.848	0.993
2.860	0.990
CURVE 11* T ~ 298	
2.600	0.988
2.693	0.994
2.697	0.991
2.788	0.991
CURVE 11 (cont.)*	
2.790	0.989
2.795	0.988
2.798	0.963
2.800	0.972
2.802	0.991
2.860	0.997
CURVE 12* T ~ 298	
2.600	0.972
2.637	0.971
2.651	0.960
2.658	0.948
2.668	0.920
2.680	0.860
2.685	0.862
2.695	0.920
2.708	0.939
2.722	0.956
2.726	0.957
2.728	0.947
2.731	0.961
2.740	0.969
2.741	0.966
2.745	0.968
2.750	0.963
2.756	0.964
2.758	0.950
2.761	0.959
2.765	0.963
2.768	0.958
2.771	0.975
2.775	0.982
2.794	0.983
2.796	0.976
2.799	0.933
2.803	0.984
2.808	0.988
2.860	0.995
CURVE 13 T ~ 298	
5.00	0.975
CURVE 13 (cont.)	
5.29	0.943
5.53	0.886
5.73	0.818
5.92	0.713
6.26	0.486
6.60	0.308
6.95	0.174
7.19	0.114
CURVE 14 T = 299	
0.104	0.076
0.105	0.306
0.106	0.360
0.107	0.404
0.109	0.459
0.119	0.663
0.127	0.778
0.134	0.859
0.140	0.906
0.145	0.937
CURVE 15* T = 336	
0.105	0.103
0.106	0.319
0.107	0.369
0.108	0.428
0.109	0.482
0.116	0.627
0.121	0.730
0.129	0.840
0.136	0.915
0.142	0.962
0.145	0.974
CURVE 16* T = 374	
0.106	0.035
0.108	0.365
0.108	0.442
0.109	0.487
CURVE 16 (cont.)*	
0.111	0.560
0.117	0.678
0.119	0.725
CURVE 17 T = 407	
0.107	0.080
0.109	0.432
0.109	0.487
0.111	0.560
0.117	0.678
0.119	0.725
CURVE 18 T ~ 298	
0.105	0.095
0.105	0.191
0.105	0.227*
0.106	0.349
0.106	0.398
0.107	0.415*
0.108	0.450
0.109	0.475*
0.111	0.509
0.112	0.529*
0.113	0.537*
0.113	0.542
0.114	0.534
0.114	0.552*
0.115	0.550*
0.116	0.582*
0.117	0.589*
0.118	0.589
0.119	0.594*
0.120	0.597*
0.122	0.595*
0.123	0.595*
0.125	0.618
0.126	0.600*
0.127	0.612*
0.128	0.620*
0.129	0.624
0.132	0.616

*Not shown on plot

DATA TABLE NO. 347 (continued)

λ	τ
CURVE 18 (cont.) T ~ 298	
0.134	0.638*
0.136	0.646*
0.139	0.661
0.139	0.657*
0.140	0.662*
0.140	0.658*
0.143	0.700*
0.146	0.727*
0.148	0.737
0.149	0.765*
0.152	0.810*
0.155	0.826
0.157	0.831*
0.160	0.857
0.162	0.853*
0.164	0.864*
0.166	0.870
0.167	0.865*
0.168	0.865*
0.170	0.861*
0.172	0.861
0.175	0.872*
0.180	0.873*
0.185	0.877
0.190	0.873*
0.194	0.876*
0.200	0.879*
0.205	0.885
0.210	0.898*
0.215	0.900
0.219	0.907*
0.225	0.905*
0.230	0.918
0.235	0.916*
0.240	0.918*
0.245	0.927
0.250	0.924*
0.255	0.929*
0.260	0.927*
0.265	0.931
0.270	0.928*
0.275	0.928*
0.280	0.928
0.285	0.930*
0.290	0.927

λ	τ
CURVE 18 (cont.)	
0.295	0.932
0.300	0.926
CURVE 19* T ~ 298	
0.121	0.025
0.123	0.051
0.125	0.061
0.126	0.065
0.127	0.065
0.128	0.062
0.129	0.062
0.131	0.060
0.134	0.064
0.136	0.056
0.139	0.056
0.139	0.048
0.143	0.041
0.146	0.036
0.148	0.031
0.149	0.028
0.152	0.021
0.154	0.018
0.156	0.015
0.158	0.011
0.160	0.008
0.161	0.006
0.162	0.005
0.284	0.053
0.289	0.160
0.295	0.291
0.300	0.384
CURVE 20 T ~ 298	
109	0.04
150	0.08
190	0.15
256	0.18
294	0.31
345	0.53
394	0.53
445	0.56
486	0.56

λ	τ
CURVE 21 T ~ 298	
0.114	0.062
0.116	0.077
0.117	0.103
0.118	0.119*
0.119	0.133
0.121	0.154
0.122	0.186
0.125	0.315
0.128	0.403
0.131	0.521
0.133	0.562
0.136	0.593*
0.139	0.629
0.143	0.644*
0.145	0.669*
0.148	0.704
0.151	0.726*
0.154	0.749
0.157	0.774
0.160	0.783*
0.163	0.795
0.166	0.817*
0.168	0.828
0.174	0.849*
0.179	0.877
0.184	0.892*
0.189	0.903
0.194	0.892
0.200	0.885
0.204	0.899*
0.210	0.904
0.215	0.911*
0.219	0.918*
0.225	0.918
0.229	0.920*
0.235	0.929
0.240	0.946*
0.245	0.950*
0.250	0.958
0.255	0.948*
0.260	0.945*
0.265	0.944
0.270	0.954
0.275	0.946
0.280	0.946

λ	τ
CURVE 21 (cont.)	
0.285	0.955
0.290	0.949
0.295	0.953
0.300	0.953
CURVE 22* T ~ 298	
0.114	0.076
0.116	0.077
0.117	0.097
0.118	0.115
0.119	0.128
0.121	0.166
0.122	0.204
0.126	0.316
0.128	0.395
0.131	0.484
0.133	0.520
0.136	0.564
0.139	0.573
0.143	0.582
0.145	0.601
0.149	0.633
0.151	0.663
0.154	0.686
0.157	0.739
0.160	0.748
0.163	0.795
0.166	0.809
0.168	0.807
0.174	0.817
0.179	0.827
0.184	0.860
0.190	0.856
0.194	0.856
0.200	0.878
0.205	0.873
0.209	0.875
0.215	0.876
0.220	0.874
0.225	0.855
0.229	0.825
0.234	0.798
0.239	0.782
0.244	0.771

λ	τ
CURVE 22 (cont.)*	
0.250	0.777
0.255	0.777
0.260	0.800
0.265	0.828
0.270	0.868
0.275	0.885
0.280	0.913
0.285	0.902
0.290	0.925
0.294	0.923
0.300	0.930
CURVE 23 T ~ 298	
0.105	0.107
0.106	0.214
0.109	0.389*
0.112	0.547
0.115	0.624
0.117	0.681
0.120	0.726*
0.123	0.758
0.127	0.791
0.131	0.822*
0.137	0.850
0.145	0.878*
0.156	0.902
0.179	0.929
0.204	0.940
0.237	0.949
0.268	0.954*
0.350	0.960

*Not shown on plot

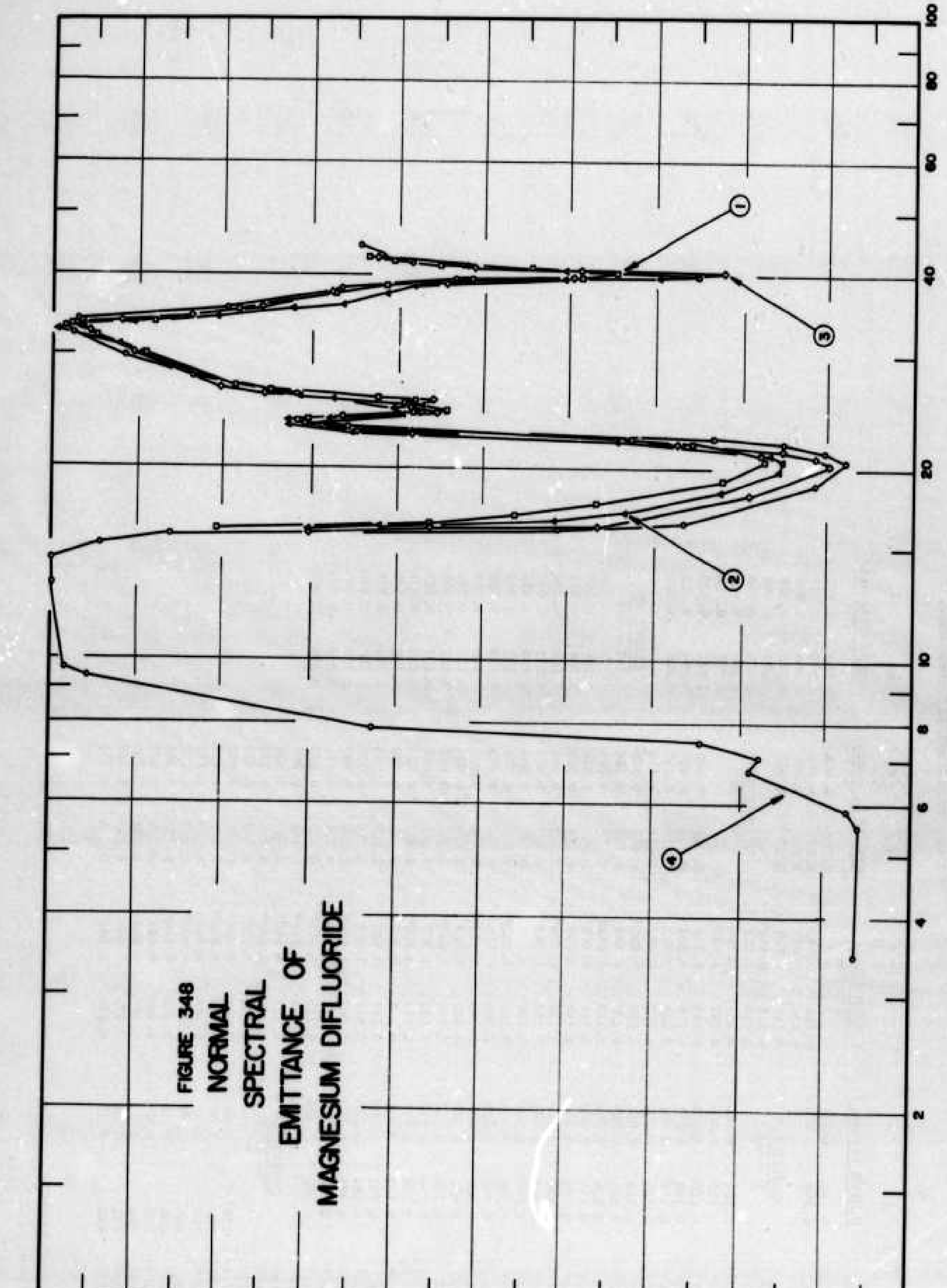

FIGURE 348 NORMAL SPECTRAL EMITTANCE OF MAGNESIUM DIFLUORIDE

SPECIFICATION TABLE NO. 348 NORMAL SPECTRAL EMITTANCE OF MAGNESIUM DIFLUORIDE MgF_2

Curve No.	Ref. No.	Year	Temperature K	Wavelength Range, μm	Geometry θ'	Reported Error, %	Composition (weight percent), Specifications, and Remarks
1	156	1966	373	16.0-42.6	0°		Irtran 1 (2 mm thick) from Eastman Kodak; data extracted from smooth curve.
2	156	1966	203	16.0-42.6	0°		Above specimen and conditions.
3	156	1966	77	15.9-42.6	0°		Above specimen and conditions.
✓4	274	1966	77	3.49-44.5	0°		Irtran 1 (2.0 mm thick) from Eastman Kodak Co.; microcrystalline, hot pressed compact; density 3.18 g cm^{-3}; data extracted from smooth curve.

DATA TABLE NO. 348 NORMAL SPECTRAL EMITTANCE OF MAGNESIUM DIFLUORIDE MgF_2

[Wavelength, λ, μm; Emittance, ϵ; Temperature, T, K]

λ	ϵ	λ	ϵ	λ	ϵ	λ	ϵ	λ	ϵ	λ	ϵ	λ	ϵ	λ	ϵ
CURVE 1	T = 373	CURVE 1 (cont.)		CURVE 2	T = 203	CURVE 2 (cont.)		CURVE 3	T = 77	CURVE 3 (cont.)		CURVE 4	T = 77	CURVE 4 (cont.)	
16.0	0.809	30.0	0.893	16.0	0.702	30.0	0.899	15.9	0.701	30.0	0.905	44.5	0.645	21.2	0.101
16.4	0.565	32.0	0.950	16.2	0.621	31.0	0.924	16.2	0.562	31.7	0.948*	42.7	0.627	20.5	0.080
16.8	0.463	32.9	0.978*	16.5	0.417	32.6	0.998	16.3	0.366	32.5	0.958	41.6	0.588	18.8	0.114
17.6	0.366	33.2	0.980	17.0	0.334	33.1	0.964	16.5	0.307*	33.1	0.974	39.8	0.252	16.4	0.267
19.2	0.222	33.9	0.883	18.4	0.228	33.5	0.909	18.1	0.193	33.6	0.921	39.4	0.536	16.0	0.411
20.5	0.173	35.1	0.781	19.9	0.159	34.1	0.809	19.7	0.121*	34.3	0.840	38.0	0.667	15.6	0.862
21.0	0.177	37.1	0.672	20.6	0.154	35.1	0.720	20.4	0.099	35.5	0.757	35.3	0.797	15.1	0.943
21.8	0.257	38.4	0.614	21.0	0.169	35.9	0.664	20.9	0.112	37.3	0.676	33.8	0.971	14.3	1.00
22.1	0.327	39.2	0.513	21.8	0.259*	37.3	0.615	21.3	0.151	38.1	0.621*	33.0	0.987	13.1	1.00*
23.1	0.659	39.7	0.384	22.0	0.342	38.1	0.583	21.8	0.274	38.8	0.548	32.1	0.979	9.68	0.985
23.6	0.715	40.1	0.344	22.6	0.653	39.3	0.406	22.5	0.586	39.4	0.395	29.8	0.917	9.27	0.957
23.9	0.703	40.4	0.348*	23.3	0.726	39.7	0.297	22.7	0.648	40.1	0.223	27.6	0.838	7.87	0.628
24.0	0.665	41.0	0.445	23.7	0.725	40.0	0.254	23.5	0.708	40.5	0.317*	26.6	0.784*	7.43	0.245
24.3	0.581	41.4	0.552	23.9	0.680	40.7	0.406	23.9	0.617*	40.6	0.389	26.0	0.716	7.05	0.179
24.5	0.544	42.0	0.606	24.1	0.596	41.1	0.522	24.2	0.553	41.0	0.512	25.2	0.588*	6.71	0.190
25.2	0.595	42.2	0.619*	24.3	0.581*	41.8	0.599*	24.3	0.545*	41.4	0.555*	24.4	0.572	5.86	0.076
25.5	0.580	42.6	0.633	24.7	0.607	42.1	0.619	24.7	0.584	41.9	0.602*	23.6	0.713*	5.52	0.062
25.7	0.624			25.0	0.571	42.6	0.633*	25.0	0.572*	42.3	0.625	23.1	0.690	3.49	0.065
26.3	0.748			25.5	0.675			25.6	0.660	42.6	0.633*	22.7	0.585		
26.8	0.789			25.7	0.712			26.0	0.752			22.2	0.233		
				27.7	0.831			26.4	0.802			21.7	0.152		

*Not shown on plot

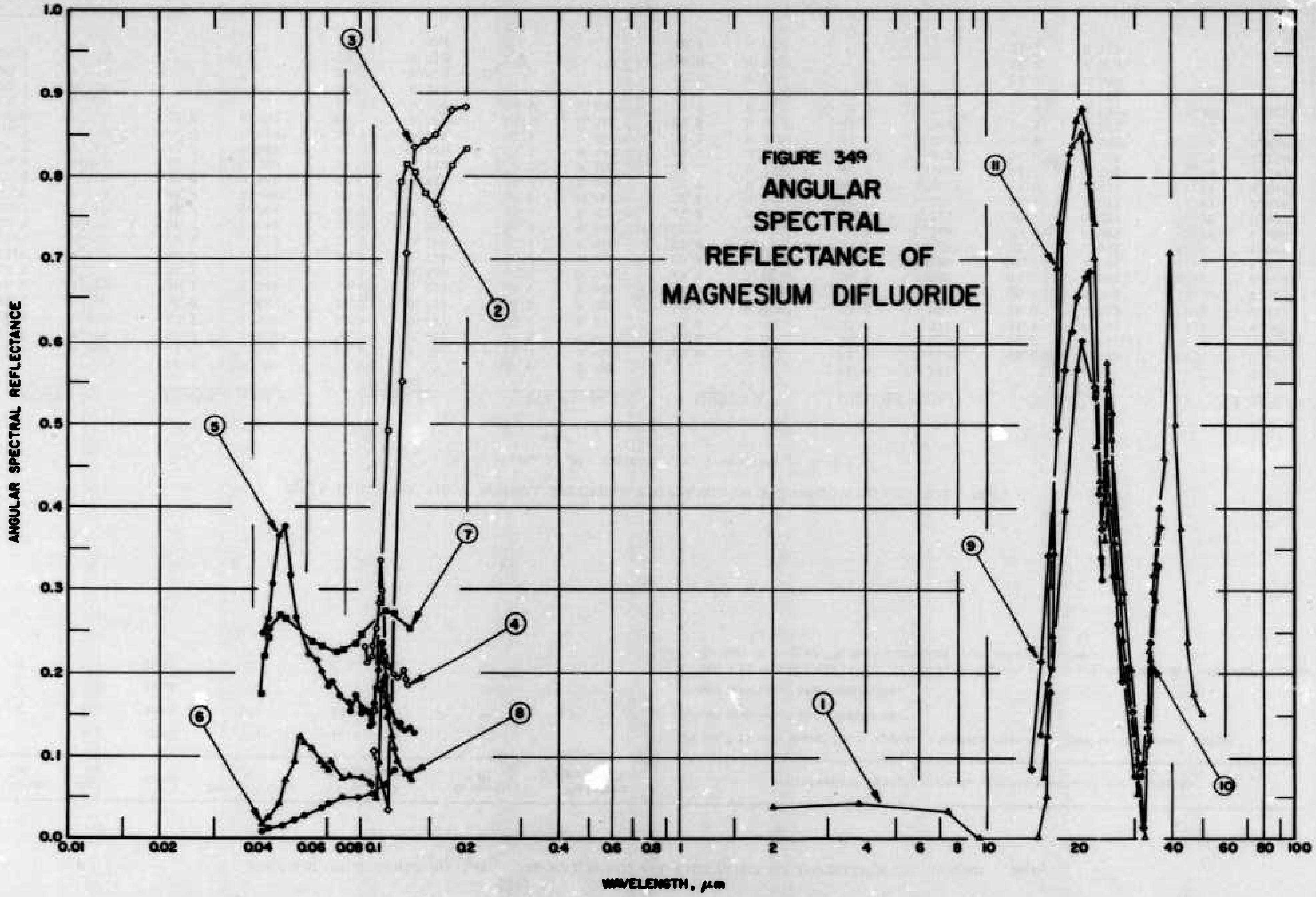

FIGURE 349
ANGULAR SPECTRAL REFLECTANCE OF MAGNESIUM DIFLUORIDE

SPECIFICATION TABLE NO. 349 ANGULAR SPECTRAL REFLECTANCE OF MAGNESIUM DIFLUORIDE MgF_2

Curve No.	Ref. No.	Year	Temperature K	Wavelength Range, μm	Geometry θ	θ'	ω'	Reported Error, %	Composition (weight percent), Specifications, and Remarks
1	67	1963	~298	2.00-50.0	30°	30°			Irtran I (2 mm thick); data extracted from smooth curve; aluminum mirror reference standard.
2	151	1959	~298	0.100-0.200	~18°	~18°			Evaporated Al coated immediately with MgF_2 (250 Å thick) before removal from the evaporator; film was 24 hrs old; glass substrate.
3	151	1959	~298	0.100-0.200	~18°	~18°			Similar to the above specimen and conditions except 380 Å thick.
4	162	1967	298	0.0933-0.128	75°	75°			Single crystal.
5	162	1967	298	0.0438-0.133	70°	70°			Above specimen and conditions.
6	162	1967	298	0.0437-0.131	20°	20°			Above specimen and conditions.
7	162	1967	298	0.0425-0.130	70°	70°			Evaporated film (10^{-6} mm Hg and 20 sec deposition time); substrate clean glass slide; exposed to air; data extracted from smooth curve.
8	162	1967	298	0.0426-0.130	20°	20°			Above specimen and conditions.
9	146	1966	~298	13.9-36.9	~0°	~0°			Film; optical thickness 10 quarterwaves at λ = 2.4 μm; electron beam deposited in vacuum (2 to 8 x 10^{-6} mm Hg) at normal incidence onto glass substrate heated to 588 K; rate of depositing 1 quarterwave per min at λ = 0.5 μm.
10	146	1966	~298	14.9-36.0	~0°	~0°			Film; optical thickness 10 quarterwaves at λ = 1.4 μm; electron beam deposited in vacuum (2 to 8 x 10^{-6} mm Hg) at normal incidence onto glass substrate heated to 423 K; rate of depositing 1 quarterwave per min at λ = 0.5 μm; slight scattering seen in optical region and slight cracking.
11	146	1966	~298	15.1-36.2	~0°	~0°			Hot pressed; data extracted from smooth curve.

DATA TABLE NO. 349 ANGULAR SPECTRAL REFLECTANCE OF MAGNESIUM DIFLUORIDE MgF_2

[Wavelength, λ, μm; Reflectance, ρ; Temperature, T, K]

CURVE 1
T ~ 298

λ	ρ
2.00	0.039
3.80	0.042
7.40	0.033
9.40	0.000
14.4	0.000
15.4	0.050
16.0	0.302
17.7	0.720
19.0	0.838
20.3	0.855
21.7	0.796
22.1	0.700
23.4	0.383
24.7	0.577
25.1	0.483
25.6	0.495*
27.2	0.298
29.0	0.204
30.8	0.108
32.1	0.000
32.9	0.000*
33.6	0.227
34.1	0.298
35.9	0.359
37.6	0.460
39.4	0.709
40.9	0.500
42.6	0.375
44.3	0.239
46.7	0.171
50.0	0.151

CURVE 2
T ~ 298

λ	ρ
0.100	0.157
0.110	0.494
0.121	0.796
0.126	0.817
0.136	0.809
0.148	0.781
0.160	0.767
0.180	0.814
0.200	0.836

CURVE 3
T ~ 298

λ	ρ
0.100	0.108
0.110	0.034
0.121	0.552
0.126	0.707
0.135	0.836
0.148	0.848
0.160	0.852
0.180	0.881
0.200	0.886

CURVE 4
T = 298

λ	ρ
0.0933	0.233
0.0955	0.215
0.0971	0.215*
0.0983	0.222
0.0990	0.235
0.101	0.254
0.102	0.283
0.104	0.337
0.105	0.300
0.106	0.241*
0.107	0.221
0.109	0.215*
0.110	0.210
0.111	0.207*
0.112	0.204*
0.114	0.200
0.117	0.200*
0.117	0.196
0.120	0.199*
0.121	0.195
0.121	0.197*
0.123	0.201
0.124	0.194*
0.126	0.192
0.127	0.189*
0.128	0.188

CURVE 5
T = 298

λ	ρ
0.0438	0.250
0.0453	0.266
0.0464	0.307
0.0476	0.359*
0.0489	0.368
0.0513	0.380
0.0531	0.319
0.0542	0.288*
0.0557	0.268
0.0579	0.243*
0.0585	0.234*
0.0602	0.224
0.0612	0.228
0.0632	0.223*
0.0649	0.219
0.0663	0.205*
0.0676	0.201
0.0687	0.189*
0.0708	0.184*
0.0718	0.185
0.0729	0.190
0.0750	0.187*
0.0764	0.172
0.0776	0.167*
0.0791	0.165*
0.0804	0.167*
0.0833	0.165
0.0838	0.156
0.0853	0.164*
0.0874	0.173
0.0883	0.164*
0.0904	0.160
0.0918	0.152
0.0920	0.160*
0.0927	0.152*
0.0951	0.158*
0.0953	0.155
0.0958	0.141*
0.0967	0.138
0.0969	0.150*
0.0977	0.153*
0.0982	0.141
0.0991	0.158*
0.100	0.166

CURVE 5 (cont.)

λ	ρ
0.101	0.181
0.102	0.204
0.103	0.236*
0.104	0.234*
0.105	0.238
0.106	0.213
0.107	0.197
0.108	0.179*
0.109	0.171
0.110	0.173*
0.112	0.155
0.113	0.149*
0.115	0.148*
0.116	0.142
0.117	0.139*
0.119	0.140*
0.120	0.141
0.120	0.138
0.122	0.139*
0.123	0.136*
0.124	0.131
0.124	0.134*
0.126	0.132*
0.128	0.132*
0.130	0.136
0.131	0.132*
0.133	0.129

CURVE 6
T = 298

λ	ρ
0.0437	0.019
0.0453	0.025
0.0464	0.026*
0.0476	0.030*
0.0488	0.043
0.0496	0.051*
0.0513	0.071
0.0542	0.099
0.0558	0.111*
0.0577	0.124
0.0585	0.117
0.0603	0.118*
0.0611	0.113*
0.0629	0.110

CURVE 6 (cont.)

λ	ρ
0.0648	0.107*
0.0663	0.097
0.0674	0.097*
0.0687	0.090
0.0707	0.086
0.0717	0.088*
0.0727	0.098
0.0748	0.082*
0.0764	0.078*
0.0776	0.075*
0.0791	0.075
0.0802	0.077*
0.0830	0.079
0.0840	0.073*
0.0848	0.076*
0.0881	0.075
0.0901	0.077*
0.0916	0.076
0.0919	0.082*
0.0950	0.075*
0.0971	0.074*
0.0980	0.068
0.0987	0.061*
0.101	0.050
0.102	0.057*
0.103	0.096
0.105	0.180
0.106	0.191
0.107	0.184*
0.108	0.162
0.109	0.154*
0.110	0.150
0.112	0.125
0.113	0.113*
0.115	0.110
0.116	0.102*
0.117	0.097
0.119	0.095*
0.120	0.092*
0.121	0.089*
0.123	0.086*
0.124	0.084*
0.126	0.080
0.128	0.079*
0.131	0.073

CURVE 7
T = 298

λ	ρ
0.0425	0.178
0.0438	0.223
0.0448	0.244
0.0456	0.255
0.0466	0.263*
0.0480	0.269*
0.0495	0.270
0.0513	0.268
0.0629	0.240
0.0673	0.234
0.0710	0.231*
0.0755	0.229
0.0792	0.230
0.0832	0.232*
0.0871	0.237
0.0914	0.248
0.0977	0.266*
0.102	0.273*
0.108	0.275
0.115	0.272
0.123	0.265*
0.130	0.256

CURVE 8
T = 298

λ	ρ
0.0426	0.009
0.0451	0.011
0.0500	0.016
0.0543	0.021
0.0590	0.027
0.0648	0.035*
0.0667	0.037
0.0706	0.041
0.0807	0.045*
0.0891	0.050
0.0998	0.053
0.104	0.057*
0.107	0.067
0.115	0.085
0.119	0.081*
0.130	0.080

CURVE 9
T ~ 298

λ	ρ
13.9	0.086
14.9	0.215
15.9	0.342
17.0	0.494
18.0	0.567
19.0	0.615
19.9	0.652
21.0	0.676
21.5	0.681
22.0	0.675*
22.5	0.548
23.0	0.419
23.5	0.374
23.9	0.385*
25.5	0.456
25.9	0.357
26.4	0.260
26.9	0.194*
27.3	0.190
28.9	0.208
29.9	0.155
30.9	0.090
32.0	0.011
33.0	0.133
33.9	0.239
34.9	0.316
36.0	0.360*
36.9	0.377

CURVE 10
T ~ 298

λ	ρ
14.9	0.125
15.5	0.189
16.1	0.206
18.0	0.399
19.9	0.569
21.1	0.602
22.4	0.533
23.1	0.340
23.4	0.312
24.6	0.404
25.9	0.316
26.9	0.260*

CURVE 10 (cont.)

λ	ρ
27.9	0.199
30.0	0.075
31.2	0.075
32.0	0.091
33.9	0.216
35.0	0.285
36.0	0.329

CURVE 11
T ~ 298

λ	ρ
15.1	0.073
15.6	0.125
16.0	0.180
16.3	0.249
16.5	0.346
17.0	0.689
17.4	0.743
18.8	0.828
19.8	0.867
20.5	0.882
21.0	0.881*
21.5	0.871*
21.8	0.845
22.3	0.742
22.9	0.477
23.2	0.432
24.0	0.360
24.2	0.422
24.5	0.543
24.9	0.555
25.2	0.548*
25.5	0.515
25.9	0.404
26.6	0.313
27.0	0.281
27.5	0.240
28.2	0.195
29.1	0.157*
30.0	0.126
30.8	0.103*
31.7	0.088
32.7	0.084*
33.4	0.118
34.2	0.216*
35.2	0.332
36.2	0.400

*Not shown on plot

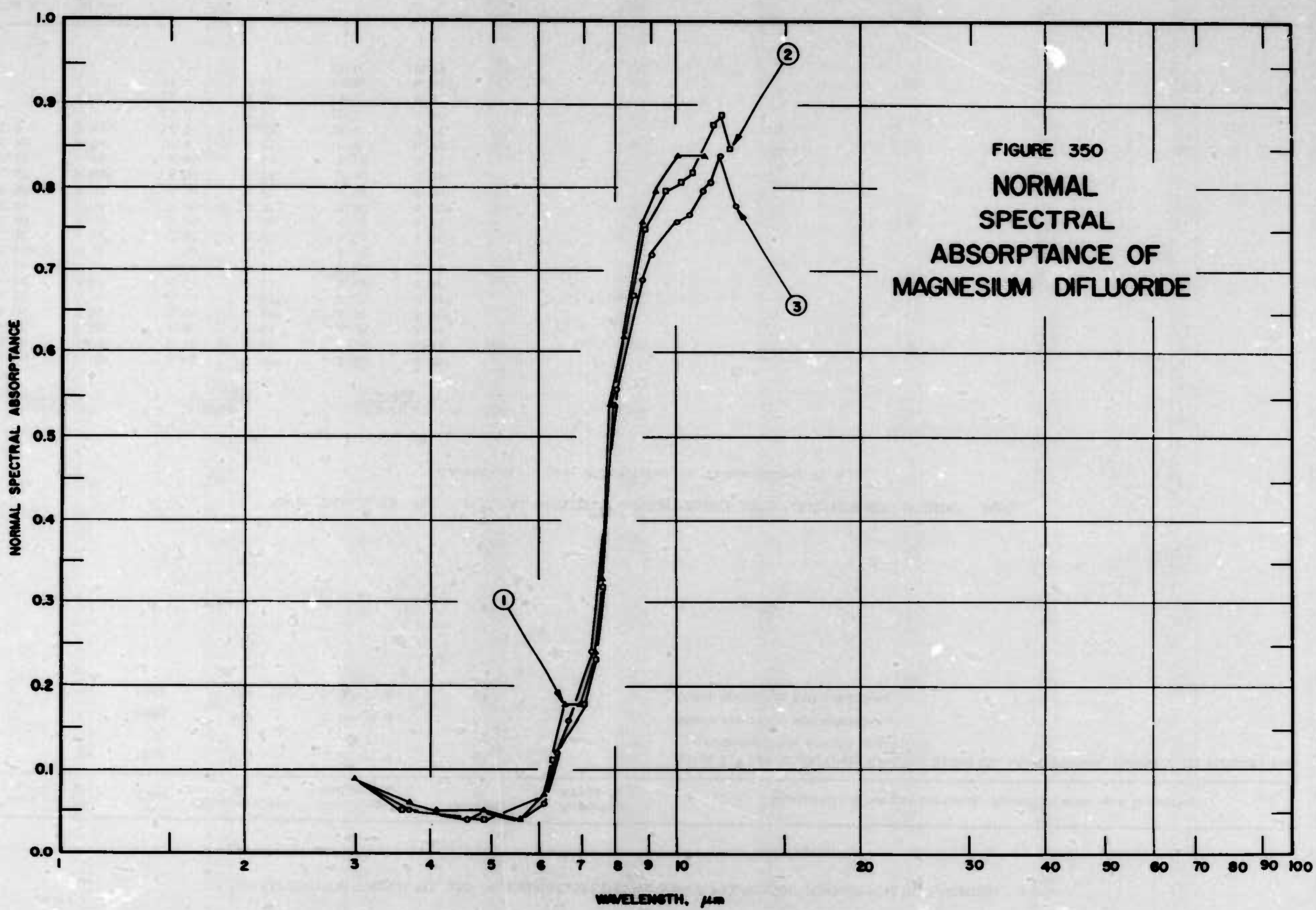
FIGURE 350
NORMAL
SPECTRAL
ABSORPTANCE OF
MAGNESIUM DIFLUORIDE
NORMAL SPECTRAL ABSORPTANCE
WAVELENGTH, μm
1.0
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0.0
1
2
3
4
5
6
7
8
9
10
20
30
40
50
60
70
80
90
100
1
2
3

SPECIFICATION TABLE NO. 350 NORMAL SPECTRAL ABSORPTANCE OF MAGNESIUM DIFLUORIDE MgF_2

Curve No.	Ref. No.	Year	Temperature K	Wavelength Range, µm	Geometry θ	Reported Error, %	Composition (weight percent), Specifications, and Remarks
1	68	1963	333	3.00-11.2	0°		Irtran I (2 mm thick) from Eastman Kodak Co.; hot pressed; measured in vacuum; data extracted from smooth curve.
2	68	1963	393	3.00-14.8	0°		Above specimen and conditions.
3	68	1963	453	3.00-15.0	0°		Above specimen and conditions.

DATA TABLE NO. 350 NORMAL SPECTRAL ABSORPTANCE OF MAGNESIUM DIFLUORIDE MgF_2

[Wavelength, λ, µm; Absorptance, α; Temperature, T, K]

λ	α	λ	α	λ	α
CURVE 1 T = 333		CURVE 2 T = 393		CURVE 3 T = 453	
3.00	0.09	3.00	0.09*	3.00	0.09*
3.70	0.06	3.60	0.05	3.70	0.05
4.10	0.05	4.90	0.04	4.60	0.04
4.90	0.05	5.60	0.04*	4.90	0.05*
5.60	0.04	6.10	0.07*	5.60	0.04*
6.10	0.07	6.30	0.11	6.10	0.06
6.60	0.18	6.60	0.17	6.40	0.12
7.00	0.18	7.10	0.18	6.70	0.16
7.40	0.24	7.40	0.23	7.00	0.16
7.60	0.33	7.60	0.32	7.30	0.24
7.80	0.54	7.90	0.54	7.60	0.32*
8.10	0.62	8.50	0.67	8.00	0.56
8.40	0.68*	8.90	0.75	8.80	0.69
8.80	0.76	9.60	0.80	9.10	0.72
9.20	0.84	10.4	0.81	10.0	0.76
11.2	0.84	11.2	0.82	11.0	0.77
		13.0	0.88	12.1	0.80
		13.6	0.89	12.8	0.81
		14.8	0.85	13.5	0.84
				15.0	0.78

*Not shown on plot

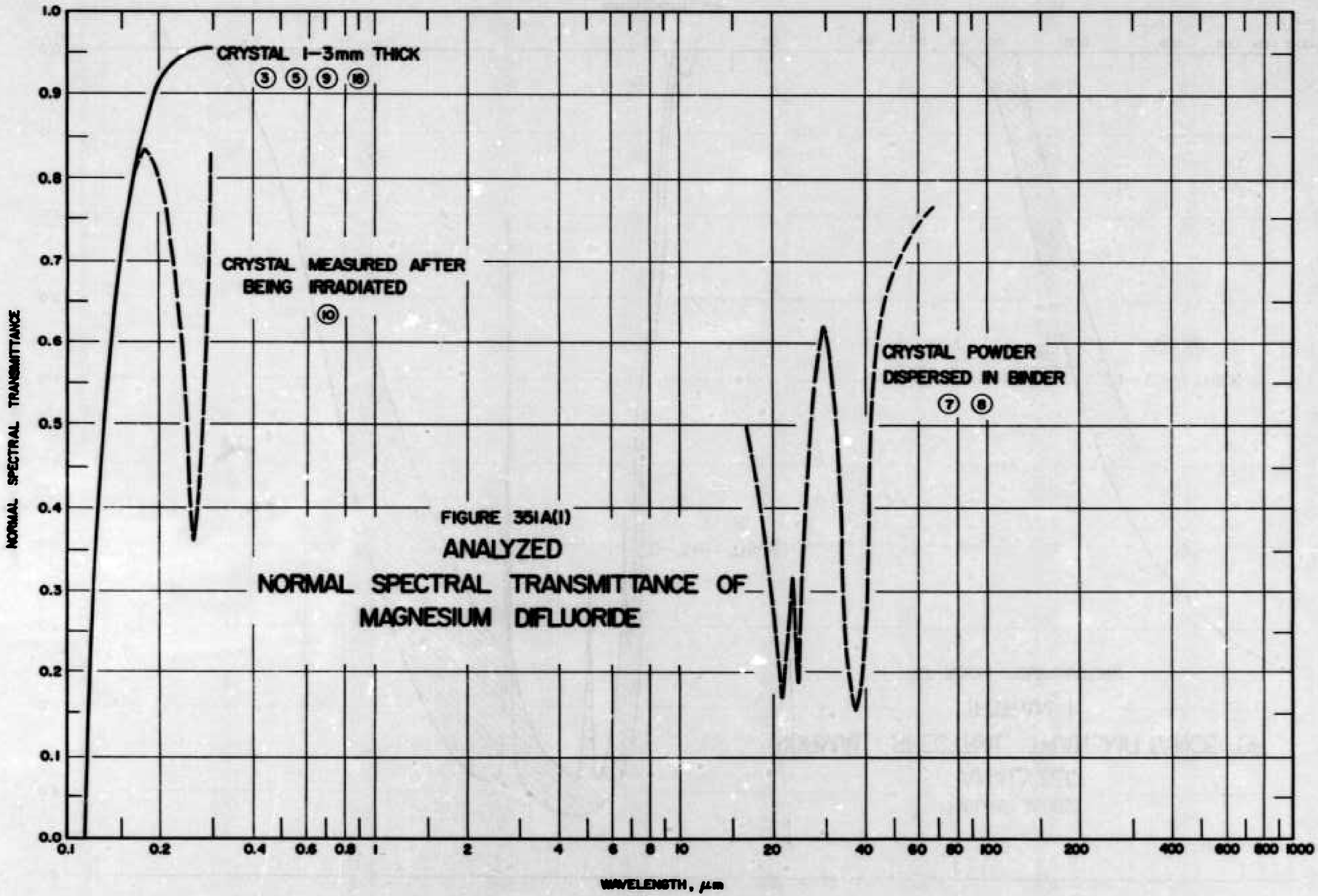

FIGURE 351A(1)
ANALYZED
NORMAL SPECTRAL TRANSMITTANCE OF
MAGNESIUM DIFLUORIDE

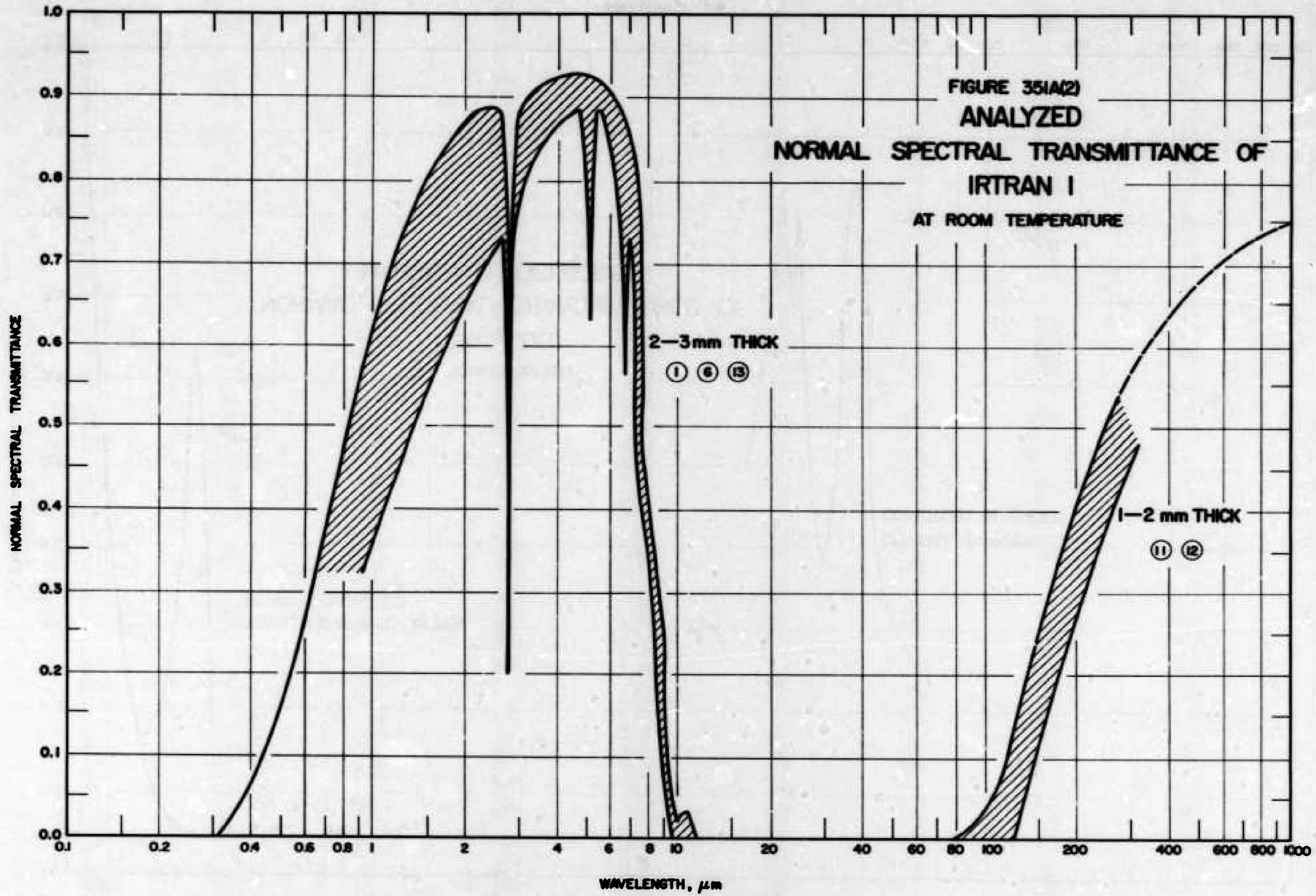

FIGURE 351A(2)
ANALYZED
NORMAL SPECTRAL TRANSMITTANCE OF
IRTRAN I
AT ROOM TEMPERATURE

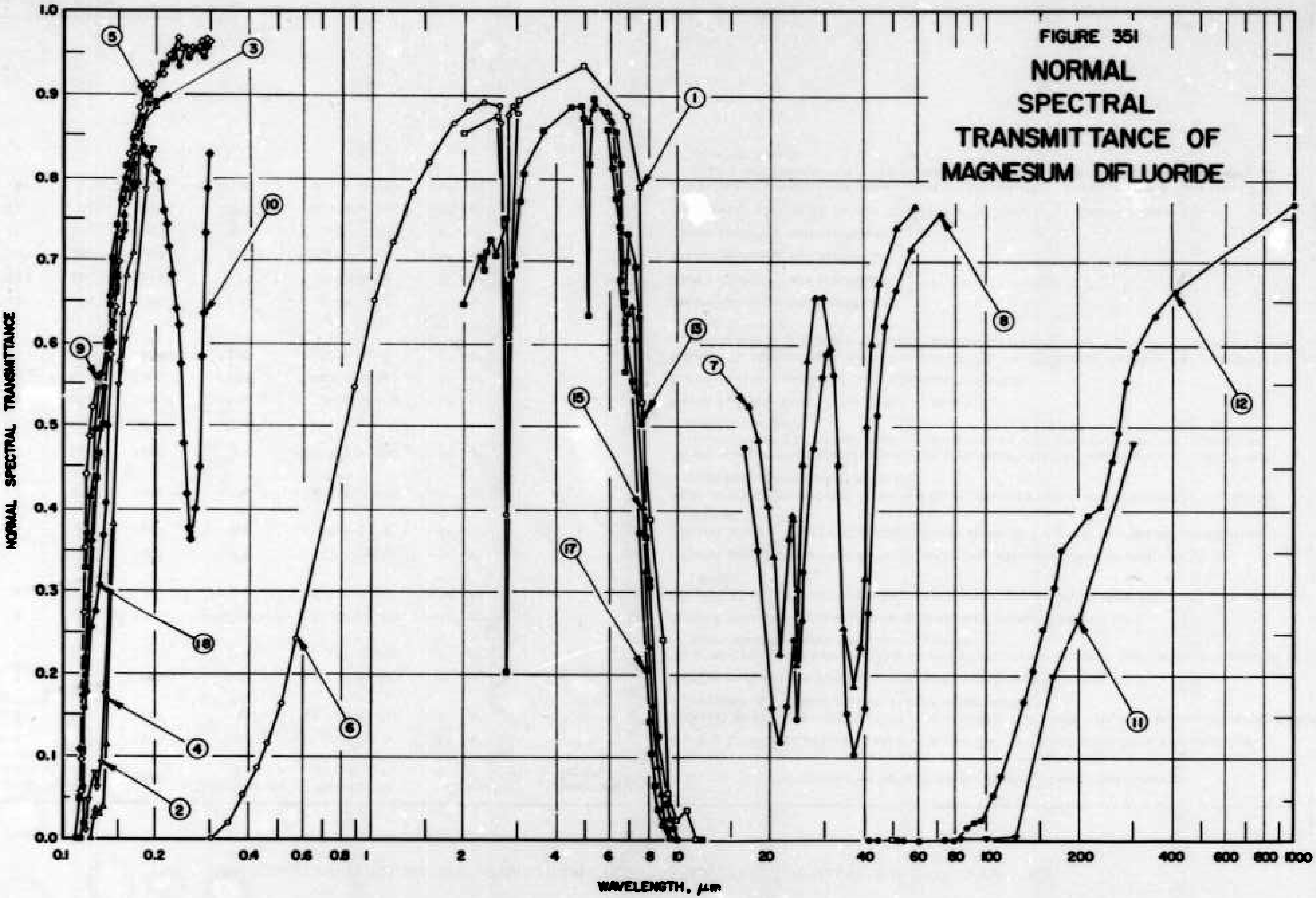
FIGURE 351
NORMAL
SPECTRAL
TRANSMITTANCE OF
MAGNESIUM DIFLUORIDE
NORMAL SPECTRAL TRANSMITTANCE
WAVELENGTH, μm
1.0
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0.0
0.1
0.2
0.4
0.6
0.8
1
2
4
6
8
10
20
40
60
80
100
200
400
600
800
1000
1
2
3
4
5
6
7
8
9
10
11
12
13
15
17
18

SPECIFICATION TABLE NO. 351 NORMAL SPECTRAL TRANSMITTANCE OF MAGNESIUM DIFLUORIDE MgF_2

Curve No.	Ref. No.	Year	Temperature K	Wavelength Range, μm	Geometry θ	Geometry θ'	Geometry ω'	Reported Error, %	Composition (weight percent), Specifications, and Remarks
1	67	1963	~298	2.00-50.0	0°	0°			Irtran I (2 mm thick) from Eastman Kodak Co.; data extracted from smooth curve.
2	163	1967	298	0.116-0.199	0°	0°			Uniaxial birefringent crystal (13.24 mm thick); measured with light polarized perpendicular to optical axis; data extracted from smooth curve.
3	163	1967	298	0.110-0.200	0°	0°			Similar to the above specimen and conditions except 1.32 mm thick.
4	163	1967	298	0.121-0.200	0°	0°			Uniaxial birefringent crystal (14.82 mm thick); measured with light polarized parallel to optical axis; data extracted from smooth curve.
5	163	1967	298	0.113-0.200	0°	0°			Similar to the above specimen and conditions except 1.40 mm thick.
6	94	1967	298	0.302-3.00	~0°	~0°			Irtran 1 (2.0 mm thick) from Eastman Kodak Co.; polished; data extracted from smooth curve.
7	164	1967	78	17.3-58.1	~0°	~0°			Crystal powder dispersed in Nujol mull; data extracted from smooth curve.
8	164	1967	298	16.8-71.9	~0°	~0°			Crystal powder dispersed in polyethylene sheet (1-2 mg cm^{-2}); data extracted from smooth curve.
9	291	1966	~298	0.113-0.300	0°	0°			High purity single crystal (1.51 mm thick) made by Harshaw Chemical Co.; optically polished; measured in vacuum.
10	291	1966	~298	0.113-0.300	0°	0°			Above specimen and conditions except irradiated with 10^{14} electrons cm^{-2} at 1.0 MeV and 2.0 MeV for 30 min each; angle of c-axis with electron beam 90°; colorless after irradiation.
11	314	1966	300	83.3-300.0	~0°	~0°			Irtran 1 (2 mm thick) from Eastman Kodak Co.
12	313	1966	~298	42.0-1000	~0°	~0°			Irtran 1 (1.07 mm thick) from Eastman Kodak Co.
13	288	1965	298	2.00-12.0	0°	0°			Irtran 1 (2.80 mm thick) from Eastman Kodak Co.; polished optically flat to within five green mercury fringes and a parallelism tolerance of ±2.5 μm; data extracted from smooth curve.
14*	288	1965	373	2.00-12.0	0°	0°			Above specimen and conditions.
15	288	1965	473	2.00-12.0	0°	0°			Above specimen and conditions.
16*	288	1965	573	2.00-12.0	0°	0°			Above specimen and conditions.
17	288	1965	673	2.00-12.0	0°	0°			Above specimen and conditions.
18	97	1967	~298	0.114-0.299	~0°	~0°			High purity crystal (3.18 mm thick) from Optivac, Inc.; optically polished.
19*	97	1967	~298	0.114-0.279	~0°	~0°			Above specimen and conditions except measured after irradiation by a total flux of 8.25×10^{10} protons cm^{-2} evenly distributed over 3, 3.8, and 4.6 MeV; crystal phosphoresced.

* Not shown on plot

DATA TABLE NO. 351 NORMAL SPECTRAL TRANSMITTANCE OF MAGNESIUM DIFLUORIDE MgF_2

[Wavelength, λ, μm; Transmittance, τ; Temperature, T, K]

CURVE 1
T = 298

λ	τ
2.00	0.852
2.60	0.875
2.80	0.607
3.00	0.895
4.90	0.937
6.80	0.875
7.50	0.790
7.60	0.529
8.20	0.388
9.00	0.241
9.40	0.056
10.0	0.025
10.9	0.037
11.5	0.000
50.0	0.000

CURVE 2
T = 298

λ	τ
0.116	0.010
0.120	0.045
0.123	0.073*
0.125	0.078
0.126	0.074*
0.128	0.060
0.131	0.067*
0.133	0.050
0.135	0.176
0.150	0.548
0.151	0.572*
0.154	0.587*
0.157	0.601
0.164	0.617*
0.166	0.648
0.173	0.698*
0.183	0.784
0.186	0.802*
0.189	0.812
0.193	0.818*
0.196	0.825*
0.199	0.831

CURVE 3
T = 298

λ	τ
0.110	0.000
0.113	0.049
0.117	0.329
0.118	0.370
0.121	0.414
0.125	0.452*
0.130	0.496
0.134	0.543
0.137	0.597
0.140	0.656
0.142	0.702
0.146	0.732*
0.152	0.771
0.158	0.814
0.162	0.827*
0.167	0.835
0.172	0.846*
0.177	0.872
0.180	0.880*
0.183	0.887*
0.187	0.890
0.192	0.893*
0.200	0.893

CURVE 4
T = 298

λ	τ
0.121	0.000
0.123	0.027
0.126	0.036
0.130	0.030
0.132	0.032*
0.133	0.040
0.137	0.113
0.139	0.168
0.144	0.381
0.150	0.580
0.151	0.607*
0.153	0.634
0.156	0.658*
0.159	0.681
0.166	0.709
0.171	0.796
0.174	0.830

CURVE 4 (cont.)

λ	τ
0.179	0.854*
0.181	0.871
0.184	0.885*
0.188	0.894
0.192	0.894*
0.200	0.887

CURVE 5
T = 298

λ	τ
0.113	0.000
0.115	0.018
0.116	0.199
0.127	0.439
0.130	0.466
0.133	0.501
0.136	0.555*
0.140	0.645
0.144	0.697
0.148	0.742
0.152	0.777*
0.156	0.800
0.161	0.822*
0.167	0.847
0.175	0.870*
0.188	0.899
0.192	0.895*
0.196	0.885*
0.200	0.900*

CURVE 6
T = 298

λ	τ
0.302	0.000
0.343	0.020
0.388	0.051
0.427	0.084
0.460	0.114
0.510	0.165
0.572	0.241
0.881	0.547
1.04	0.657
1.18	0.721
1.37	0.783
1.54	0.820

CURVE 6 (cont.)

λ	τ
1.87	0.865
2.10	0.882
2.36	0.892
2.61	0.889
2.66	0.866
2.76	0.391
2.80	0.877
2.90	0.888
3.00	0.877

CURVE 7
T = 78

λ	τ
17.2	0.524
18.4	0.481
19.8	0.404
20.7	0.344
21.6	0.224
23.0	0.366
23.4	0.395
23.8	0.387
24.1	0.211
24.6	0.304
25.1	0.453
26.3	0.582
28.0	0.658
29.8	0.658
31.6	0.599
35.0	0.257
36.1	0.197*
37.3	0.189
39.3	0.233
40.3	0.315
41.3	0.500
42.3	0.602
44.8	0.675
51.2	0.741
58.1	0.768

CURVE 8
T = 298

λ	τ
16.8	0.474
18.2	0.351
20.4	0.160

CURVE 8 (cont.)

λ	τ
21.3	0.124*
21.9	0.119
22.7	0.161
23.9	0.241
24.4	0.147
25.1	0.267
25.7	0.326
27.7	0.472
29.6	0.560
30.6	0.590
31.4	0.59[illegible]
32.3	0.56[illegible]
33.5	0.453
34.8	0.255
35.7	0.152
36.6	0.121*
37.7	0.104
39.0	0.112*
40.4	0.160
42.0	0.277
44.6	0.514
46.0	0.572*
47.3	0.621
51.0	0.666
56.5	0.712
71.9	0.755

CURVE 9
T ~ 298

λ	τ
0.113	0.057
0.113	0.098
0.114	0.275
0.114	0.306*
0.115	0.352
0.116	0.404*
0.117	0.442
0.118	0.473*
0.120	0.486
0.121	0.523
0.123	0.526*
0.125	0.543*
0.128	0.553
0.129	0.561*
0.133	0.590*

CURVE 9 (cont.)

λ	τ
0.136	0.595*
0.139	0.599
0.140	0.589
0.141	0.615
0.142	0.639*
0.146	0.641
0.146	0.653*
0.148	0.699
0.149	0.713*
0.155	0.768
0.156	0.807*
0.159	0.824*
0.162	0.829
0.165	0.820
0.167	0.856*
0.169	0.851
0.175	0.884
0.180	0.885*
0.185	0.911
0.190	0.908
0.195	0.912
0.200	0.916*
0.205	0.920*
0.210	0.925
0.215	0.945*
0.220	0.949
0.225	0.952*
0.230	0.965*
0.235	0.970
0.240	0.956
0.245	0.958*
0.250	0.955*
0.255	0.951
0.260	0.958
0.265	0.954*
0.270	0.959*
0.275	0.959
0.280	0.965
0.285	0.950
0.290	0.968*
0.295	0.968
0.300	0.964

CURVE 10
T ~ 298

λ	τ
0.113	0.107
0.115	0.171
0.115	0.191*
0.116	0.219
0.117	0.243*
0.118	0.270*
0.119	0.293
0.121	0.360
0.123	0.415*
0.125	0.494
0.130	0.561
0.134	0.583*
0.136	0.603
0.139	0.614*
0.141	0.624
0.143	0.637*
0.146	0.648*
0.149	0.677
0.155	0.736
0.157	0.749*
0.159	0.787*
0.162	0.793
0.164	0.789
0.167	0.817
0.170	0.820*
0.175	0.830*
0.180	0.834
0.185	0.829
0.190	0.828*
0.195	0.817*
0.200	0.808
0.205	0.796
0.210	0.760
0.215	0.745
0.219	0.719
0.225	0.681
0.230	0.641
0.234	0.621
0.240	0.578
0.245	0.479
0.250	0.420
0.254	0.379
0.259	0.363
0.264	0.365*

CURVE 10 (cont.)

λ	τ
0.269	0.400
0.275	0.450
0.280	0.585
0.285	0.634
0.290	0.733
0.295	0.788
0.300	0.829

CURVE 11
T = 300

λ	τ
83.3	<0.01
100.0	0.03
125.0	0.05
166.7	0.20
200.0	0.27
300.0	0.48

CURVE 12
T ~ 298

λ	τ
42.0	0.000
45.7	0.000
52.4	0.000
54.1	0.000
60.6	0.000
65.8	0.000*
69.9	0.000*
74.1	0.000
79.4	0.000
87.7	0.014
90.9	0.020
97.1	0.026
105	0.055
111	0.078
132	0.169
141	0.207
154	0.258
167	0.308
179	0.352
213	0.394
233	0.405
256	0.457
270	0.491
286	0.554

*Not shown on plot

DATA TABLE NO. 351 (continued)

CURVE 12 (cont.)
T ~ 298

λ	τ
303	0.596
357	0.634
417	0.665
1000	0.770

CURVE 13
T = 298

λ	τ
2.00	0.649
2.28	0.704
2.33	0.689
2.36	0.710
2.43	0.725
2.51	0.725*
2.58	0.705
2.74	0.750
2.78	0.201
2.81	0.610
2.83	0.684
2.94	0.696
3.04	0.771
3.15	0.807
3.31	0.829*
3.63	0.858
4.46	0.887
4.80	0.889
4.90	0.871
5.01	0.632
5.05	0.819
5.08	0.853*
5.14	0.883*
5.24	0.899
5.98	0.898*
6.28	0.855
6.49	0.819
6.53	0.783
6.68	0.567
6.76	0.663
6.80	0.700
6.93	0.733
7.07	0.732*
7.25	0.692
7.34	0.641*
7.46	0.631
7.55	0.579*

CURVE 13 (cont.)

λ	τ
7.59	0.505
7.69	0.516
7.99	0.367
8.06	0.307
8.15	0.315
8.78	0.123
8.99	0.074
9.21	0.046
9.49	0.025
9.73	0.014
10.0	0.000
12.0	0.000

CURVE 14*
T = 273

λ	τ
2.00	0.649
2.28	0.704
2.33	0.689
2.36	0.710
2.43	0.725
2.51	0.725
2.58	0.705
2.74	0.750
2.78	0.201
2.81	0.610
2.83	0.684
2.94	0.696
3.04	0.771
3.15	0.807
3.31	0.829
3.63	0.858
4.46	0.887
4.80	0.889
4.90	0.871
5.01	0.632
5.08	0.847
5.14	0.878
5.29	0.896
5.92	0.896
6.12	0.877
6.44	0.811
6.57	0.762
6.69	0.574
6.76	0.657
6.93	0.698
7.07	0.698

CURVE 14 (cont.)*

λ	τ
7.21	0.667
7.37	0.608
7.42	0.605
7.57	0.534
7.65	0.466
7.73	0.466
7.96	0.329
8.06	0.273
8.18	0.270
8.52	0.165
8.83	0.089
8.99	0.058
9.26	0.028
9.49	0.017
10.0	0.000
12.0	0.000

CURVE 15
T = 473

λ	τ
2.00	0.649*
2.28	0.704
2.33	0.689*
2.36	0.710*
2.43	0.725*
2.51	0.725*
2.58	0.705*
2.74	0.750*
2.78	0.201*
2.81	0.610*
2.83	0.684*
2.94	0.696*
3.04	0.771*
3.15	0.807*
3.31	0.829*
3.63	0.858*
4.46	0.887*
4.80	0.889*
4.90	0.871*
5.01	0.632*
5.09	0.819*
5.15	0.867
5.23	0.884
5.37	0.891
5.94	0.882
6.10	0.868

CURVE 15 (cont.)

λ	τ
6.29	0.828
6.46	0.783*
6.58	0.738
6.69	0.575*
6.75	0.624
6.85	0.637
6.94	0.645*
7.06	0.645
7.20	0.607
7.36	0.542
7.49	0.504*
7.64	0.403
7.69	0.394*
7.88	0.324
8.02	0.231
8.33	0.162
8.65	0.087
8.85	0.054
9.09	0.026
9.42	0.013
10.0	0.000*
12.0	0.000*

CURVE 16*
T = 573

λ	τ
2.00	0.649
2.29	0.697
2.31	0.689
2.38	0.714
2.43	0.725
2.52	0.725
2.56	0.702
2.64	0.702
2.75	0.749
2.78	0.201
2.84	0.666
2.96	0.682
3.02	0.731
3.17	0.803
3.53	0.831
4.41	0.879
4.85	0.883
4.96	0.804
5.01	0.632
5.10	0.813

CURVE 16 (cont.)*

λ	τ
5.17	0.869
5.29	0.880
5.66	0.877
6.01	0.861
6.17	0.834
6.42	0.766
6.59	0.688
6.70	0.575
6.83	0.594
7.02	0.597
7.15	0.569
7.38	0.466
7.60	0.374
7.63	0.341
7.74	0.320
8.06	0.174
8.49	0.087
8.77	0.046
9.03	0.021
9.50	0.000
12.0	0.000

CURVE 17
T = 673

λ	τ
2.00	0.649*
2.29	0.697*
2.31	0.689*
2.38	0.714*
2.43	0.725*
2.52	0.725*
2.56	0.702*
2.64	0.702*
2.75	0.749*
2.78	0.201*
2.84	0.666*
2.96	0.682*
3.02	0.731*
3.17	0.803*
3.53	0.831*
4.41	0.879*
4.85	0.383*
4.96	0.804*
5.01	0.632*
5.10	0.813*
5.17	0.869*

CURVE 17 (cont.)

λ	τ
5.29	0.880*
5.68	0.872*
5.89	0.859
6.18	0.814
6.33	0.776
6.45	0.742
6.56	0.679
6.64	0.609
6.70	0.567*
7.01	0.553
7.24	0.491*
7.50	0.371
7.87	0.209
8.04	0.141
8.24	0.103
8.50	0.064
8.77	0.038
9.00	0.018
9.50	0.000
12.0	0.000*

CURVE 18
T ~ 298

λ	τ
0.114	0.060
0.114	0.107*
0.115	0.158
0.117	0.200*
0.118	0.227
0.121	0.259
0.122	0.265*
0.124	0.272*
0.127	0.278
0.130	0.307
0.133	0.368
0.135	0.408
0.138	0.500
0.139	0.514*
0.143	0.601
0.145	0.660
0.149	0.681
0.151	0.729
0.154	0.753
0.157	0.786
0.160	0.799*
0.164	0.810

CURVE 18 (cont.)

λ	τ
0.169	0.825*
0.174	0.851
0.179	0.871*
0.184	0.900*
0.189	0.903*
0.194	0.910*
0.199	0.913*
0.204	0.926
0.209	0.938
0.214	0.938
0.219	0.937*
0.224	0.942
0.229	0.951
0.234	0.954*
0.239	0.934
0.244	0.948*
0.249	0.956
0.254	0.944
0.259	0.949*
0.264	0.956
0.269	0.946*
0.274	0.954*
0.279	0.956*
0.284	0.947
0.289	0.955*
0.294	0.958
0.299	0.956*

CURVE 19*
T ~ 298

λ	τ
0.114	0.070
0.115	0.122
0.115	0.168
0.117	0.210
0.118	0.235
0.121	0.259
0.122	0.277
0.124	0.281
0.127	0.287
0.130	0.313
0.133	0.392
0.135	0.465
0.138	0.520
0.139	0.533
0.143	0.611

CURVE 19 (cont.)*

λ	τ
0.145	0.682
0.149	0.715
0.151	0.729
0.154	0.761
0.157	0.792
0.160	0.801
0.164	0.802
0.169	0.826
0.174	0.873
0.179	0.881
0.184	0.901
0.189	0.915
0.195	0.906
0.199	0.928
0.204	0.939
0.209	0.938
0.214	0.938
0.219	0.952
0.224	0.952
0.229	0.951
0.234	0.952
0.239	0.950
0.244	0.941
0.249	0.950
0.254	0.935
0.260	0.936
0.264	0.943
0.269	0.956
0.274	0.943
0.279	0.930
0.284	0.938
0.289	0.939
0.294	0.942
0.299	0.945

*Not shown on plot

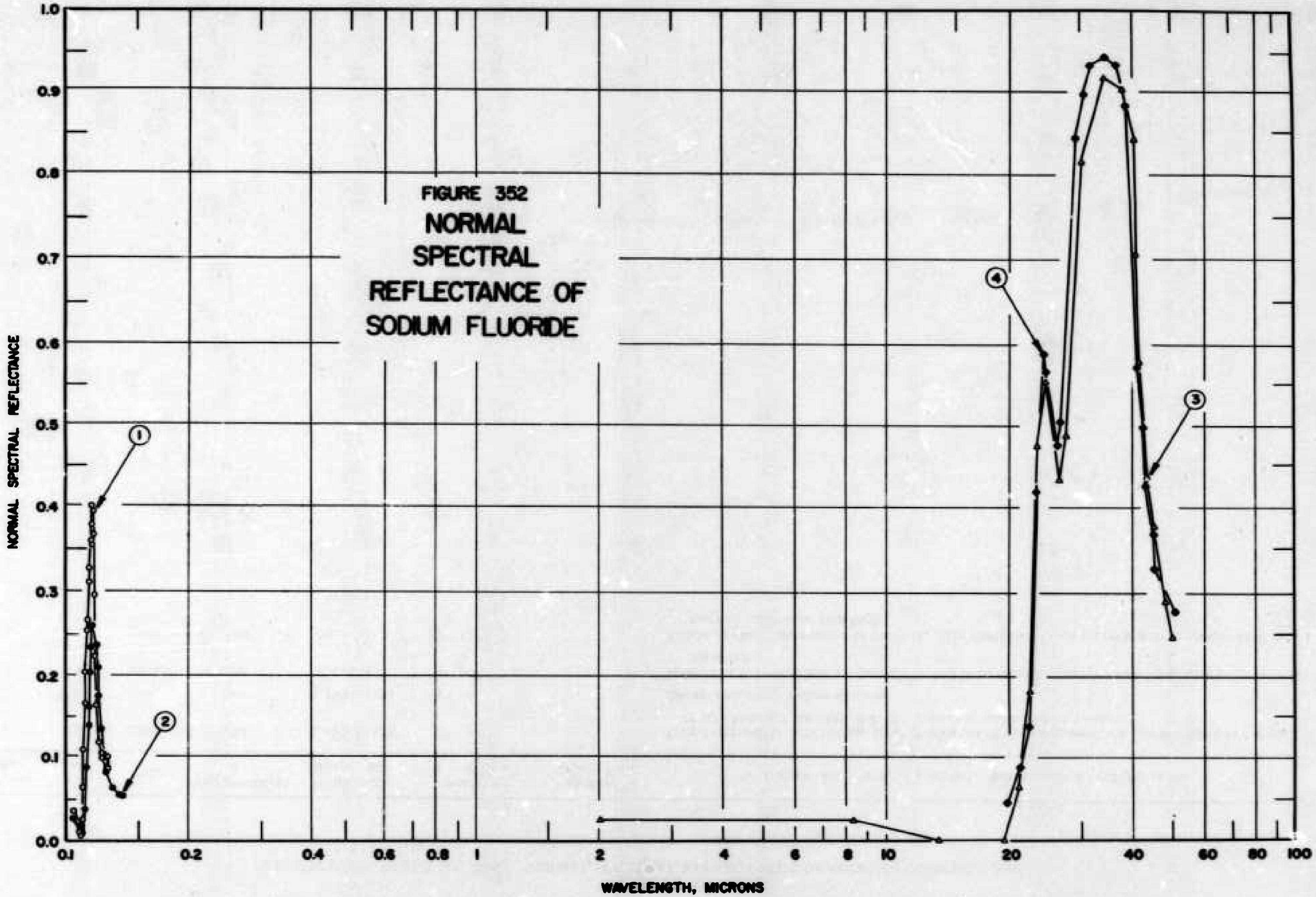

FIGURE 352
NORMAL SPECTRAL REFLECTANCE OF SODIUM FLUORIDE

SPECIFICATION TABLE NO. 352 NORMAL SPECTRAL REFLECTANCE OF SODIUM FLUORIDE NaF

Curve No.	Ref. No.	Year	Temperature K	Wavelength Range, μm	Geometry θ	θ'	ω'	Reported Error, %	Composition (weight percent), Specifications, and Remarks
1	154	1967	77	0.105-0.126	8°	8°			Single crystal (2 mm thick); freshly cleaved in air; exposed to a low humidity for about 2 min before transferred to the vacuum; measured in vacuum.
2	154	1967	300	0.105-0.137	8°	8°			Above specimen and conditions.
3	102	1965	~298	2.00-50.0	30°	30°			Specimen 2.16 mm thick; data extracted from smooth curve; aluminum mirror reference standard.
4	419	1962	300	19.9-51.6	12°	12°			Single crystal; measured in vacuum; data extracted from smooth curve; evaporated Al mirror reference standard.

DATA TABLE NO. 352 NORMAL SPECTRAL REFLECTANCE OF SODIUM FLUORIDE NaF

[Wavelength, λ, μm; Reflectance, ρ; Temperature, T, K]

λ	ρ	λ	ρ	λ	ρ	λ	ρ	λ	ρ
CURVE 1	T = 77	CURVE 1 (cont.)		CURVE 1 (cont.)		CURVE 2 (cont.)		CURVE 3 (cont.)	
		0.113	0.325*	0.124	0.092	0.119	0.237	41.3	0.707
0.105	0.035	0.113	0.347*	0.124	0.094*	0.119	0.221*	41.9	0.572
0.105	0.032*	0.114	0.359	0.124	0.090	0.119	0.217*	43.3	0.437
0.105	0.032*	0.114	0.353	0.126	0.086	0.120	0.215*	45.0	0.376
0.105	0.031*	0.114	0.365*			0.120	0.210	48.0	0.286
0.105	0.026*	0.114	0.367*	CURVE 2	T = 300	0.120	0.188*	50.0	0.249
0.106	0.021	0.114	0.378*			0.120	0.176*		
0.106	0.017*	0.115	0.378			0.120	0.173	CURVE 4	T = 300
0.107	0.013*	0.115	0.384*	0.105	0.026	0.121	0.132*		
0.107	0.010	0.115	0.386*	0.105	0.026*	0.122	0.132		
0.107	0.008*	0.115	0.391*	0.106	0.028*	0.122	0.108*	19.9	0.047
0.107	0.005*	0.115	0.397*	0.106	0.027*	0.122	0.106*	21.4	0.088
0.108	0.005*	0.115	0.400	0.106	0.026*	0.123	0.090*	22.1	0.138
0.108	0.004	0.116	0.401*	0.107	0.026*	0.124	0.084*	23.3	0.417
0.108	0.004*	0.116	0.400*	0.107	0.022*	0.124	0.080	23.8	0.550*
0.109	0.004	0.116	0.392	0.108	0.019*	0.126	0.071*	24.2	0.588
0.109	0.006*	0.116	0.396*	0.108	0.014	0.126	0.068*	24.6	0.567
0.109	0.011*	0.116	0.383*	0.109	0.010*	0.127	0.068*	25.3	0.499*
0.110	0.024	0.116	0.365	0.109	0.007*	0.129	0.064*	26.1	0.472
0.110	0.036*	0.116	0.384*	0.109	0.005*	0.130	0.061	26.7	0.501
0.110	0.063	0.117	0.358*	0.110	0.009	0.132	0.056*	29.0	0.844
0.110	0.085*	0.117	0.348*	0.111	0.020*	0.133	0.057*	30.1	0.899
0.110	0.109	0.117	0.313*	0.111	0.031*	0.134	0.053*	31.8	0.932
0.111	0.133*	0.117	0.295	0.111	0.036	0.135	0.053	34.1	0.943
0.111	0.165	0.117	0.269*	0.111	0.047*	0.136	0.052*	36.8	0.934
0.111	0.175*	0.117	0.257*	0.112	0.060*	0.137	0.054*	38.3	0.882
0.111	0.191*	0.117	0.246*	0.112	0.084	0.137	0.051	41.4	0.570
0.111	0.206	0.117	0.238*	0.113	0.125*			42.1	0.497
0.111	0.214*	0.118	0.223	0.113	0.138	CURVE 3	T ~ 298	43.4	0.424
0.111	0.223*	0.118	0.179*	0.113	0.153*			45.0	0.368
0.112	0.226*	0.119	0.167*	0.113	0.160			47.3	0.329
0.112	0.245*	0.119	0.161	0.114	0.186*	2.00	0.023	51.6	0.279
0.112	0.252	0.119	0.138*	0.114	0.192*	8.30	0.023		
0.112	0.265*	0.120	0.132*	0.114	0.202	13.4	0.000		
0.112	0.265	0.120	0.121*	0.115	0.208*	19.3	0.000		
0.112	0.271*	0.120	0.117	0.115	0.212*	21.0	0.064		
0.112	0.291*	0.120	0.115*	0.115	0.220*	22.1	0.180		
0.113	0.296*	0.121	0.106*	0.115	0.232	23.4	0.472		
0.113	0.310	0.122	0.105*	0.116	0.242*	24.5	0.551		
0.113	0.310*	0.122	0.101	0.116	0.248*	26.3	0.430		
0.113	0.313*	0.122	0.098	0.116	0.259	27.4	0.486		
0.113	0.313*	0.123	0.102	0.117	0.258*	30.0	0.816		
0.113	0.322*	0.123	0.098*	0.118	0.248*	34.0	0.916		
0.113	0.327*	0.123	0.094*	0.118	0.245*	37.8	0.901		
0.113	0.328	0.123	0.095*	0.119	0.241*	40.1	0.842		

*Not shown on plot

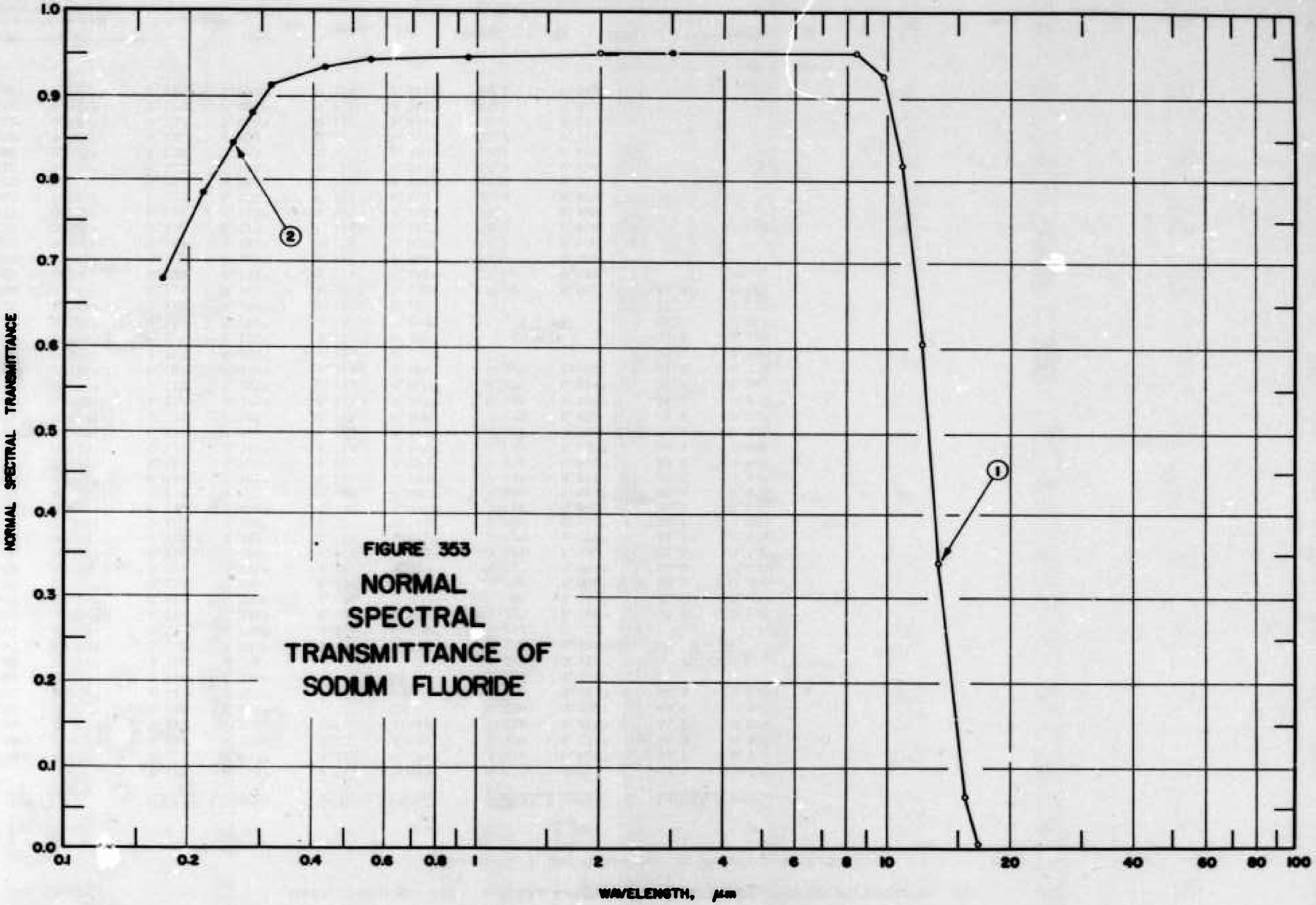

FIGURE 353
NORMAL SPECTRAL TRANSMITTANCE OF SODIUM FLUORIDE

SPECIFICATION TABLE NO. 353 NORMAL SPECTRAL TRANSMITTANCE OF SODIUM FLUORIDE NaF

Curve No.	Ref. No.	Year	Temperature K	Wavelength Range, μm	Geometry θ	θ'	ω'	Reported Error, %	Composition (weight percent), Specifications, and Remarks
1	102	1965	~298	2.20-16.8	0°	0°			Specimen 2.16 mm thick; data extracted from smooth curve.
2	94	1967	298	0.171-3.00	~0°	~0°			Single crystal (2.16 mm thick); polished; data extracted from smooth curve.

DATA TABLE NO. 353 NORMAL SPECTRAL TRANSMITTANCE OF SODIUM FLUORIDE NaF

[Wavelength, λ, μm; Transmittance, τ; Temperature, T, K]

λ	τ	λ	τ
CURVE 1 T ~ 298		CURVE 2 (cont.)	
2.20	0.952	0.421	0.936
8.40	0.952	0.550	0.943
9.80	0.926	0.955	0.947
10.9	0.820	3.00	0.951
12.1	0.603		
13.3	0.340		
14.6	0.143		
15.5	0.064		
16.8	0.009		
CURVE 2 T = 298			
0.171	0.680		
0.217	0.785		
0.252	0.847		
0.281	0.881		
0.314	0.991		
0.347	0.923*		

*Not shown on plot

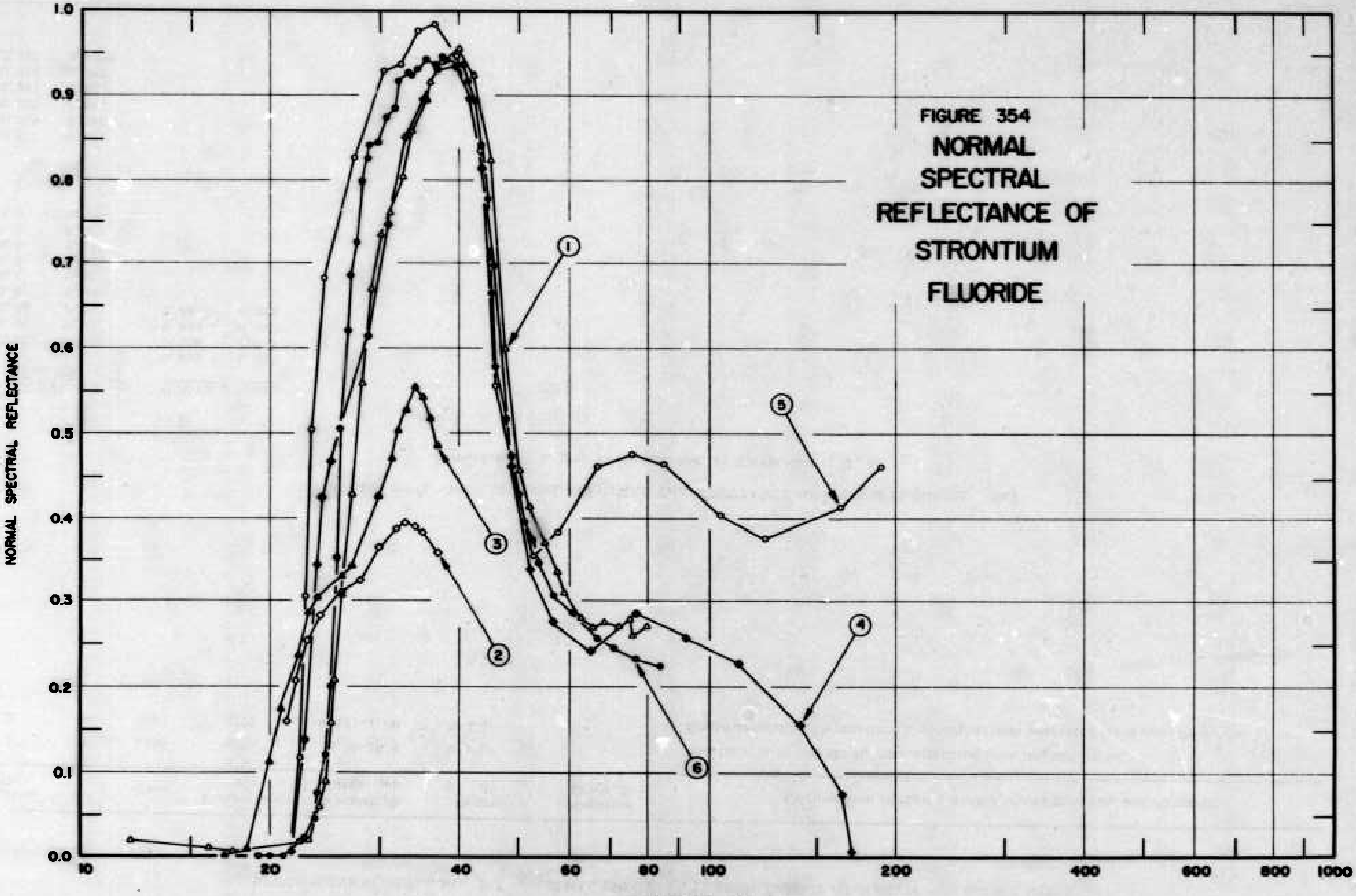
FIGURE 354
NORMAL
SPECTRAL
REFLECTANCE OF
STRONTIUM
FLUORIDE
NORMAL SPECTRAL REFLECTANCE
WAVELENGTH, μm
1.0
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0.0
10
20
40
60
80
100
200
400
600
800
1000
1
2
3
4
5
6

SPECIFICATION TABLE NO. 354 ANGULAR SPECTRAL REFLECTANCE OF STRONTIUM FLUORIDE SrF_2

Curve No.	Ref. No.	Year	Temperature K	Wavelength Range, μm	Geometry θ	θ'	ω'	Reported Error, %	Composition (weight percent), Specifications, and Remarks
1	139	1962	300	12.0-80.0	~0°	~0°			Polished by using standard metallographic polishing method; back surface roughened.
2	146	1966	~298	21.2-37.0	~0°	~0°			Film; optical thickness 10 quarterwaves at $\lambda = 2.4$ μm; electron beam deposited in vacuum (2 to 8 x 10^{-6} mm Hg) at normal incidence onto glass substrate heated to 423 K; rate of depositing 1 quarterwave per min at $\lambda = 0.5$ μm; strong scattering seen in optical region.
3	146	1966	~298	17.0-37.0	~0°	~0°			Film; optical thickness 10 quarterwaves at $\lambda = 2.4$ μm; electron beam deposited in vacuum (2 to 8 x 10^{-6} mm Hg) at normal incidence ont glass substrate heated to 588 K; rate of depositing 1 quarterwave per min at $\lambda = 0.5$ μm; strong scattering seen in optical region.
4	141	1964	298	21.6-169	45°	45°			Al 2024 reference standard; data extracted from smooth curve.
5	141	1964	7±0.5	21.5-188	45°	45°			Above specimen and conditions.
6	140	1967	90	19.2-83.3	15°	15°			Crystal; pure; mechanically lapped and diamond abrasive polished.

DATA TABLE NO. 354 ANGULAR SPECTRAL REFLECTANCE OF STRONTIUM FLUORIDE SrF_2

[Wavelength, λ, μm; Reflectance, ρ; Temperature, T, K]

CURVE 1
T = 300

λ	ρ
12.0	0.020
16.0	0.010
17.5	0.005
22.2	0.017
23.0	0.020
24.0	0.060
24.5	0.090
25.0	0.158
25.2	0.208
25.5	0.220*
26.0	0.305
27.0	0.430
28.0	0.560
29.0	0.670
30.0	0.735
31.0	0.760
32.0	0.775*
32.5	0.805
33.5	0.860
33.6	0.860*
35.2	0.895
35.5	0.900*
36.0	0.915
37.5	0.940
40.0	0.955
42.1	0.925
43.5	0.904*
45.0	0.824
47.4	0.600
50.0	0.458
52.0	0.415
55.0	0.370
57.2	0.335
59.0	0.310
62.5	0.280
65.4	0.270
68.0	0.275
72.5	0.270
75.0	0.280
75.3	0.260
80.0	0.270

CURVE 2
T ~ 298

λ	ρ
21.2	0.160
22.0	0.207
22.9	0.253
24.0	0.282
26.0	0.309
27.9	0.325
29.9	0.365
31.9	0.388
32.9	0.395
34.0	0.390
35.0	0.382
37.0	0.359

CURVE 3
T ~ 298

λ	ρ
17.0	0.000
18.4	0.009
20.0	0.111
20.9	0.174
22.1	0.237
23.0	0.286
23.9	0.304
26.0	0.330
27.0	0.342
29.8	0.429
31.1	0.471
32.0	0.501
33.0	0.529
34.0	0.554
35.0	0.542
36.0	0.519
37.0	0.489

CURVE 4
T = 298

λ	ρ
21.6	0.006
22.6	0.139
23.7	0.343
24.2	0.424
25.0	0.470
28.5	0.616

CURVE 4 (cont.)

λ	ρ
30.9	0.747
32.7	0.853
35.0	0.896
37.0	0.931
39.2	0.935
41.8	0.899
43.4	0.819
45.2	0.699
48.7	0.461
52.0	0.339
56.4	0.275
64.9	0.242
76.9	0.285
91.7	0.259
112	0.229
140	0.155
163	0.074
169	0.005

CURVE 5
T = 7±0.5

λ	ρ
21.5	0.006*
22.3	0.119
22.7	0.304
23.2	0.503
24.4	0.681
27.1	0.829
30.3	0.930
32.2	0.939
34.4	0.975
36.3	0.983
39.8	0.947
43.1	0.836
45.8	0.558
52.6	0.353
57.4	0.381
66.2	0.461
75.1	0.479
84.7	0.466
104	0.405
123	0.375
163	0.414
188	0.461

CURVE 6
T = 90

λ	ρ
19.1	0.000
20.0	0.000
21.0	0.000
21.9	0.009*
22.7	0.022
22.9	0.027*
23.5	0.046
23.9	0.076
24.5	0.120
25.0	0.200
25.5	0.351
25.9	0.507
26.4	0.621
26.9	0.686
27.3	0.726
28.0	0.800
28.4	0.828
28.8	0.841
29.2	0.841*
29.6	0.848
30.1	0.857*
30.6	0.877
31.0	0.888
31.5	0.909*
32.0	0.918
32.5	0.929*
33.1	0.929
33.7	0.926
34.2	0.931
34.8	0.933*
35.4	0.941
36.1	0.938*
36.7	0.938
37.4	0.948
38.1	0.942
38.9	0.942*
39.6	0.337*
40.6	0.939
41.3	0.918
42.1	0.895
43.1	0.842
44.2	0.779
45.0	0.665

CURVE 6 (cont.)

λ	ρ
45.8	0.580
47.3	0.519
48.5	0.476
50.0	0.430
51.0	0.398
52.3	0.373
53.7	0.346
54.9	0.326*
56.8	0.307
58.1	0.296*
60.2	0.288
62.1	0.279*
66.2	0.258
70.9	0.244
76.3	0.232
83.3	0.224

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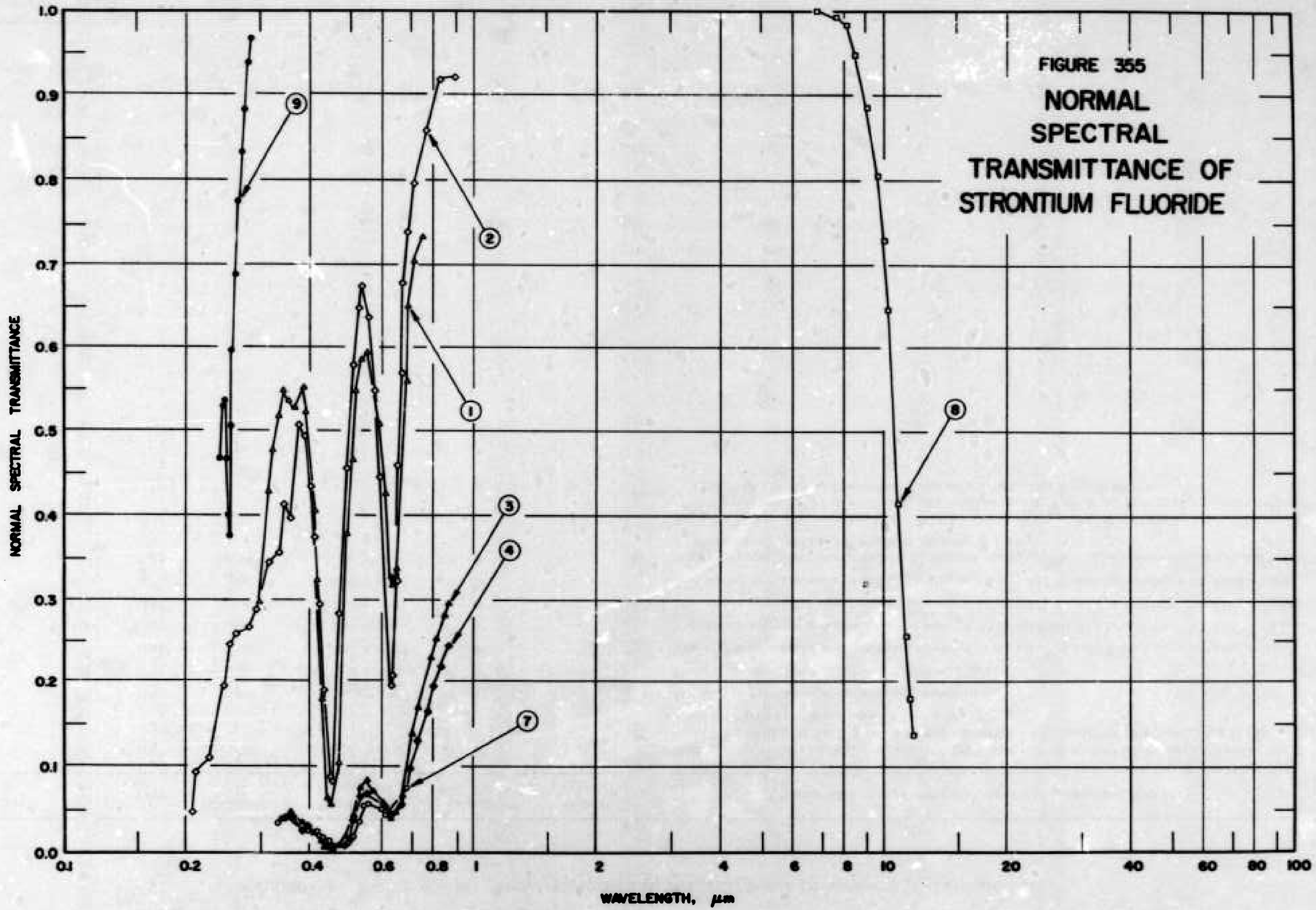
* Not shown on plot

FIGURE 355
NORMAL SPECTRAL TRANSMITTANCE OF STRONTIUM FLUORIDE



SPECIFICATION TABLE NO. 355 NORMAL SPECTRAL TRANSMITTANCE OF STRONTIUM FLUORIDE SrF_2

Curve No.	Ref. No.	Year	Temperature K	Wavelength Range, μm	Geometry θ	θ'	ω'	Reported Error, %	Composition (weight percent), Specifications, and Remarks
1	166	1967	300	0.300-0.749	0°	0°			High purity single crystal (~0.4 mm thick); colored additively in strontium vapor (10^{-2} mm Hg) at 1173 K for 45 min; quenched to room temp; cleaved along (111) plane; data extracted from smooth curve.
2	166	1967	80	0.206-0.900	0°	0°			Similar to the above specimen and conditions.
3	166	1967	300	0.340-0.868	0°	0°			Similar to the above specimen and conditions.
4	166	1967	300	0.336-0.867	0°	0°			The above specimen and conditions except after total 15 min bleaching with 4490 Å light.
5*	166	1967	300	0.336-0.867	0°	0°			The above specimen and conditions except after total 30 min bleaching with 4490 Å light.
6*	166	1967	300	0.336-0.617	0°	0°			The above specimen and conditions except after total 45 min bleaching with 4490 Å light.
7	166	1967	300	0.336-0.867	0°	0°			The above specimen and conditions except after total 60 min bleaching with 4490 Å light.
8	302	1952	~298	6.86-11.7	~0°	~0°			Single crystal; data extracted from smooth curve; reflection losses eliminated and transmission adjusted to standard thickness of 1 cm.
9	150	1967	77	0.240-0.289	~0°	~0°			$Sr_{0.98}Tb_{0.01}Na_{0.01}F_2$; crystal (6 mm thick) grown from melts of optical-grade commercial SrF_2 powder, 99.9 pure TbF_3, and reagent-grade NaF in an atmosphere of dry argon; optically ground and polished; data extracted from smooth curve.

*Not shown on plot

DATA TABLE NO. 355 NORMAL SPECTRAL TRANSMITTANCE OF STRONTIUM FLUORIDE SrF_2

[Wavelength, λ, μm; Transmittance, τ; Temperature, T, K]

CURVE 1
T = 300

λ	τ
0.300	0.296
0.315	0.428
0.322	0.474
0.332	0.515
0.343	0.547
0.355	0.533
0.367	0.525
0.383	0.550
0.390	0.520
0.411	0.404
0.418	0.322
0.428	0.177
0.440	0.0615
0.449	0.0558
0.455	0.0579*
0.466	0.102
0.492	0.379
0.503	0.463
0.517	0.547
0.532	0.583
0.552	0.593
0.566	0.570*
0.585	0.508
0.604	0.424
0.627	0.327
0.636	0.318
0.647	0.337
0.681	0.557
0.698	0.650
0.720	0.705
0.749	0.735

CURVE 2
T = 80

λ	τ
0.206	0.0495
0.210	0.0931
0.227	0.110
0.248	0.192
0.253	0.244
0.261	0.259
0.282	0.266
0.298	0.289
0.318	0.344

CURVE 2 (cont.)

λ	τ
0.337	0.356
0.347	0.411
0.360	0.397
0.376	0.507
0.384	0.492
0.400	0.421
0.410	0.373
0.420	0.294
0.429	0.188
0.443	0.0891
0.448	0.0838
0.453	0.0879*
0.476	0.282
0.490	0.454
0.506	0.578
0.521	0.647
0.537	0.673
0.559	0.635
0.578	0.547
0.591	0.443
0.621	0.200*
0.627	0.193
0.635	0.207
0.646	0.322
0.652	0.458
0.662	0.568
0.677	0.678
0.696	0.740
0.720	0.796
0.765	0.859
0.827	0.918
0.900	0.920

CURVE 3
T = 300

λ	τ
0.340	0.0395
0.342	0.0416*
0.349	0.0461*
0.352	0.0478*
0.360	0.0486
0.365	0.0471*
0.380	0.0354*
0.385	0.0349
0.391	0.0356*

CURVE 3 (cont.)

λ	τ
0.399	0.0347*
0.407	0.0276*
0.411	0.0221
0.422	0.0115
0.423	0.00897*
0.427	0.00647*
0.434	0.00435
0.438	0.00368*
0.442	0.00329*
0.447	0.00310
0.451	0.00308*
0.454	0.00318*
0.476	0.00813
0.495	0.0176
0.512	0.0415
0.528	0.0630*
0.534	0.0741
0.538	0.0776*
0.544	0.0804*
0.554	0.0815
0.562	0.0804*
0.571	0.0757*
0.579	0.0703
0.583	0.0670*
0.600	0.0589
0.609	0.0516*
0.616	0.0441*
0.620	0.0416*
0.627	0.0397
0.635	0.0403*
0.643	0.0440
0.661	0.0575*
0.670	0.0653
0.712	0.137
0.737	0.169
0.765	0.201*
0.788	0.227
0.809	0.250
0.829	0.265*
0.847	0.280
0.868	0.294

CURVE 4
T = 300

λ	τ
0.336	0.0361*
0.346	0.0404
0.353	0.0408*
0.361	0.0404
0.364	0.0386*
0.372	0.0330*
0.382	0.0269
0.393	0.0296*
0.399	0.0304
0.407	0.0274*
0.412	0.0221*
0.427	0.0118*
0.439	0.00794*
0.446	0.00631
0.454	0.00615*
0.459	0.00618*
0.463	0.00637*
0.469	0.00713*
0.482	0.00883
0.489	0.00957*
0.494	0.0110*
0.500	0.0147
0.514	0.0388
0.525	0.0561*
0.533	0.0630
0.540	0.0668*
0.550	0.0684
0.568	0.0673*
0.582	0.0653*
0.593	0.0607*
0.602	0.0537
0.606	0.0509*
0.616	0.0442*
0.620	0.0413*
0.628	0.0395*
0.638	0.0402
0.645	0.0435*
0.661	0.0543
0.682	0.0741*
0.700	0.0984
0.737	0.130
0.772	0.163
0.800	0.191
0.830	0.218

CURVE 4 (cont.)

λ	τ
0.850	0.232*
0.867	0.242

CURVE 5*
T = 300

λ	τ
0.336	0.0347
0.357	0.0384
0.364	0.0376
0.374	0.0296
0.388	0.0195
0.398	0.0215
0.405	0.0195
0.413	0.0164
0.423	0.0115
0.438	0.00859
0.455	0.00653
0.468	0.00713
0.477	0.00813
0.481	0.00881
0.490	0.00953
0.495	0.0106
0.499	0.0114
0.506	0.0177
0.515	0.0304
0.521	0.0383
0.530	0.0470
0.537	0.0543
0.543	0.0561
0.554	0.0543
0.568	0.0532
0.589	0.0521
0.602	0.0504
0.613	0.0433
0.619	0.0413
0.628	0.0395
0.638	0.0402
0.645	0.0435
0.661	0.0543
0.682	0.0741
0.700	0.0984
0.737	0.130
0.772	0.163
0.800	0.191
0.830	0.218

CURVE 5 (cont.)*

λ	τ
0.850	0.232
0.867	0.242

CURVE 6*
T = 300

λ	τ
0.336	0.0361
0.347	0.0405
0.352	0.0409
0.360	0.0404
0.365	0.0385
0.372	0.0329
0.386	0.0219
0.389	0.0219
0.397	0.0241
0.401	0.0239
0.407	0.0217
0.412	0.0189
0.422	0.0130
0.428	0.0112
0.435	0.0106
0.438	0.0120
0.452	0.00764
0.458	0.00740
0.466	0.00757
0.478	0.00877
0.491	0.0101
0.498	0.0110
0.505	0.0154
0.518	0.0305
0.527	0.0401
0.531	0.0480
0.535	0.0508
0.541	0.0531
0.550	0.0546
0.561	0.0551
0.578	0.0547
0.590	0.0535
0.601	0.0499
0.608	0.0469
0.619	0.0410
0.628	0.0395
0.638	0.0402
0.645	0.0435
0.661	0.0543

CURVE 6 (cont.)*

λ	τ
0.682	0.0741
0.700	0.0984
0.737	0.130
0.772	0.163
0.800	0.191
0.830	0.218
0.850	0.232
0.867	0.242

CURVE 7
T = 300

λ	τ
0.336	0.0359
0.348	0.0400*
0.353	0.0409
0.360	0.0403*
0.366	0.0386*
0.372	0.0328*
0.382	0.0241*
0.389	0.0222*
0.398	0.0242
0.401	0.0245*
0.406	0.0240*
0.413	0.0220
0.421	0.0167*
0.426	0.0141
0.431	0.0128*
0.436	0.0119*
0.442	0.0110
0.449	0.00940*
0.457	0.00834*
0.465	0.00789*
0.469	0.00794*
0.479	0.00861*
0.482	0.00879*
0.492	0.00927*
0.498	0.0103
0.507	0.0142*
0.510	0.0193
0.527	0.0366
0.540	0.0513
0.550	0.0568
0.558	0.0550*
0.566	0.0537*
0.583	0.0533*
0.594	0.0594*

CURVE 7 (cont.)

λ	τ
0.600	0.0504
0.606	0.0486*
0.615	0.0426
0.620	0.0409*
0.628	0.0395*
0.638	0.0402*
0.645	0.0435*
0.661	0.0543*
0.682	0.0741
0.700	0.0984*
0.737	0.130*
0.772	0.163*
0.800	0.191*
0.830	0.218*
0.850	0.232*
0.867	0.243*

CURVE 8
T ~ 298

λ	τ
6.86	1.000
7.76	0.994
8.03	0.983
8.58	0.949
9.09	0.889
9.63	0.805
10.0	0.730
10.2	0.646
10.8	0.411
11.3	0.255
11.5	0.178
11.7	0.136

CURVE 9
T = 77

λ	τ
0.240	0.468
0.245	0.527
0.246	0.536
0.248	0.525*
0.249	0.504*
0.250	0.466
0.251	0.400
0.253	0.375
0.254	0.378*

* Not shown on plot

DATA TABLE NO. 355 (continued)

λ	τ
CURVE 9 (cont.)	
T = 77	
0.256	0.506
0.257	0.533*
0.258	0.596
0.259	0.650*
0.261	0.689
0.263	0.731*
0.266	0.776
0.271	0.832
0.277	0.883
0.284	0.938
0.289	0.968

*Not shown on plot

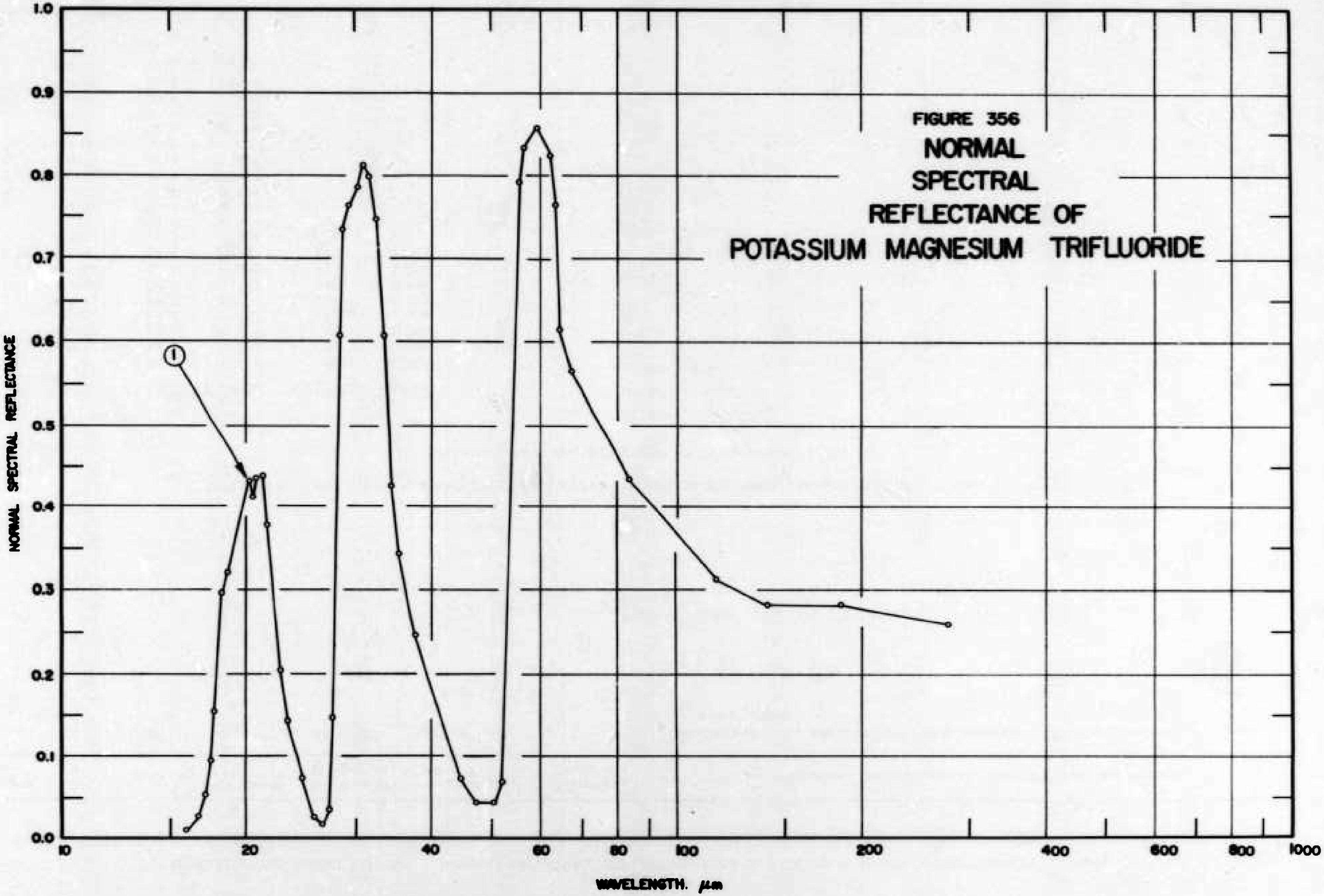


FIGURE 356
NORMAL
SPECTRAL
REFLECTANCE OF
POTASSIUM MAGNESIUM TRIFLUORIDE
1
NORMAL SPECTRAL REFLECTANCE
0.0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
1.0
WAVELENGTH, μm
10
20
40
60
80
100
200
400
600
800
1000

SPECIFICATION TABLE NO. 356 NORMAL SPECTRAL REFLECTANCE OF POTASSIUM MAGNESIUM TRIFLUORIDE $KMgF_3$

Curve No.	Ref. No.	Year	Temperature K	Wavelength Range, μm	Geometry θ	θ'	ω'	Reported Error, %	Composition (weight percent), Specifications, and Remarks
1	167	1965	~298	16.0-277	~0°	~0°			Single crystal (>2 mm thick) with cubic perovskite structure; data extracted from smooth curve.

DATA TABLE NO. 356 NORMAL SPECTRAL REFLECTANCE OF POTASSIUM MAGNESIUM TRIFLUORIDE $KMgF_3$

[Wavelength, λ, μm; Reflectance, ρ; Temperature, T, K]

λ	ρ	λ	ρ	λ	ρ
CURVE 1		CURVE 1 (cont.)		CURVE 1 (cont.)	
T ~ 298		27.7	0.149	63.6	0.763
16.0	0.010	28.3	0.608	64.9	0.614
16.7	0.027	28.9	0.734	67.1	0.566
17.1	0.053	29.4	0.762	83.3	0.434
17.5	0.095	30.3	0.787	116	0.311
17.7	0.154	31.0	0.813	140	0.284
18.3	0.299	31.9	0.800	185	0.284
18.6	0.320	32.6	0.747	277	0.260
18.9	0.322*	33.5	0.607		
20.1	0.432	34.3	0.429		
20.5	0.413	35.4	0.341		
20.8	0.436	37.7	0.247		
21.1	0.439	44.6	0.072		
21.6	0.378	47.1	0.045		
22.7	0.203	50.5	0.045		
23.4	0.141	52.0	0.070		
24.6	0.073	55.5	0.793		
25.9	0.024	56.8	0.833		
26.5	0.019	59.1	0.859		
27.2	0.035	62.1	0.825		

* Not shown on plot

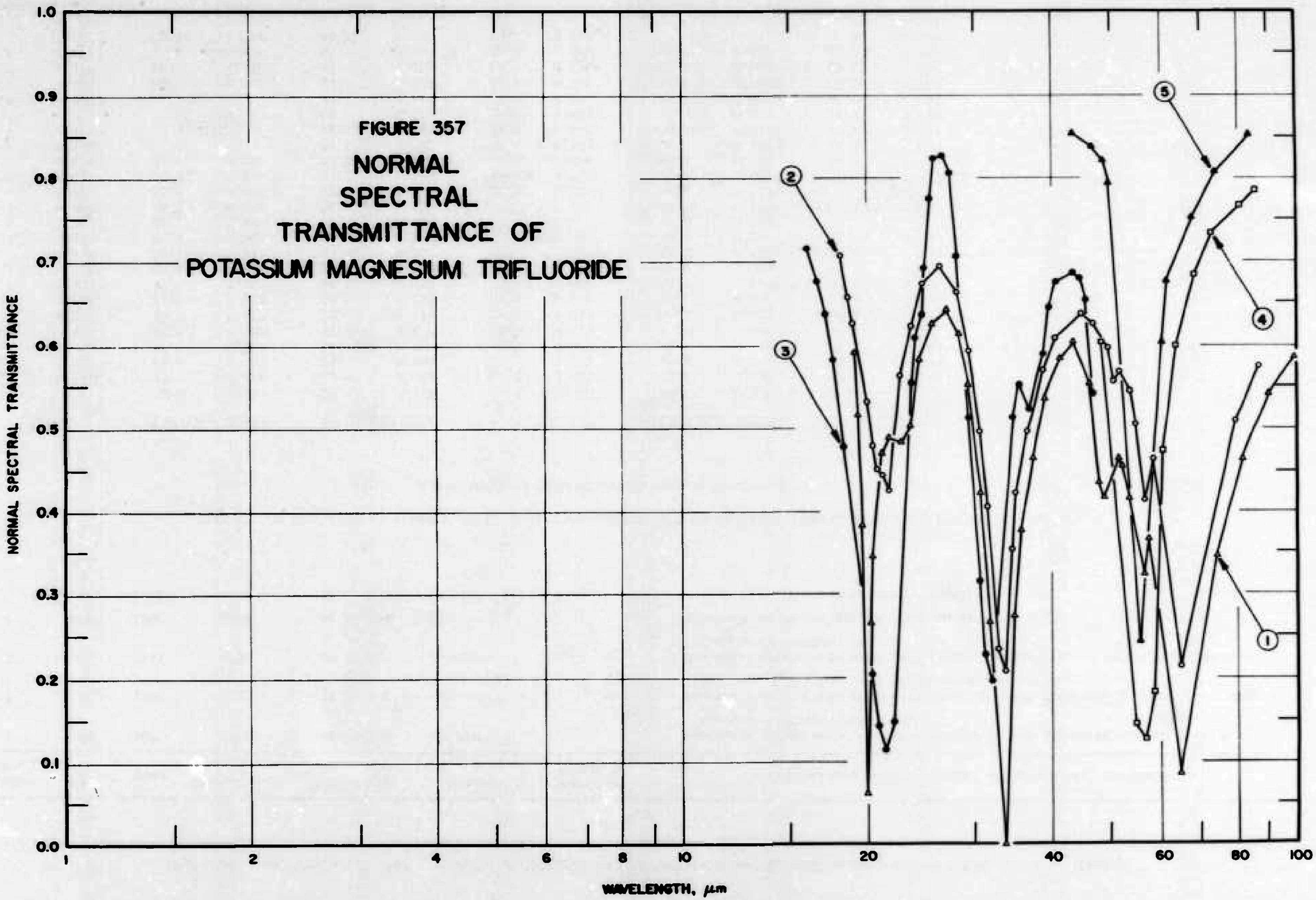


FIGURE 357
NORMAL
SPECTRAL
TRANSMITTANCE OF
POTASSIUM MAGNESIUM TRIFLUORIDE

SPECIFICATION TABLE NO. 357 NORMAL SPECTRAL TRANSMITTANCE OF POTASSIUM MAGNESIUM TRIFLUORIDE $KMgF_3$

Curve No.	Ref. No.	Year	Temperature K	Wavelength Range, μm	Geometry θ θ' ω'	Reported Error, %	Composition (weight percent), Specifications, and Remarks
1	164	1967	78	19.1-99.0	~0° ~0°		Powder of crystal with cubic perovskite structure dispersed in Nujol mull; data extracted from smooth curve.
2	164	1967	298	18.2-86.2	~0° ~0°		Powder of crystal with cubic perovskite structure dispersed in polyethylene sheet (1-2 mg cm^{-2}); data extracted from smooth curve.
3	167	1965	~298	16.0-46.7	<15°<15°		Powder of crystal with cubic perovskite structure in polyethylene (~150 μm thick); data extracted from smooth curve.
4	167	1965	~298	48.3-85.4	<15°<15°		Similar to the above specimen and conditions.
5	167	1965	~298	43.2-83.3	<15°<15°		Similar to the above specimen and conditions.

DATA TABLE NO. 357 NORMAL SPECTRAL TRANSMITTANCE OF POTASSIUM MAGNESIUM TRIFLUORIDE $KMgF_3$

[Wavelength, λ, μm; Transmittance, τ; Temperature, T, K]

λ	τ	λ	τ	λ	τ	λ	τ	λ	τ	λ	τ
CURVE 1 T = 78		CURVE 1 (cont.)		CURVE 2 (cont.)		CURVE 2 (cont.)		CURVE 3 (cont.)		CURVE 4 T ~ 298	
		39.0	0.539	20.4	0.480	50.2	0.557	24.0	0.610		
19.1	0.593	41.1	0.584	20.9	0.451	51.2	0.569	24.5	0.637	48.3	0.604
19.3	0.519	43.6	0.606	21.1	0.448	53.4	0.547	24.8	0.692	54.3	0.149
19.6	0.385	46.0	0.554	21.7	0.477	54.9	0.503	25.3	0.775	56.4	0.129
20.0	0.064	47.6	0.436	22.6	0.563	56.5	0.413	25.9	0.824	58.1	0.181
20.2	0.268	48.7	0.417	23.5	0.625	58.1	0.436	26.5	0.829	60.6	0.474
20.3	0.346	51.2	0.465	24.7	0.671	64.1	0.212	27.2	0.806	63.6	0.600
20.5	0.417*	52.0	0.459	26.2	0.695	79.3	0.510	28.0	0.707	68.0	0.683
21.1	0.471	53.4	0.415	27.1	0.690*	86.2	0.574	29.2	0.513	72.9	0.731
21.7	0.490	56.1	0.321	23.0	0.662			30.3	0.315	80.6	0.768
22.9	0.486	57.4	0.367	29.3	0.593	CURVE 3 T ~ 298		31.0	0.229	85.4	0.785
23.5	0.504	64.1	0.087	30.4	0.498			31.9	0.198		
24.3	0.581	74.0	0.348	31.2	0.406			32.7	0.233*	CURVE 5 T ~ 298	
25.5	0.627	81.9	0.466	32.8	0.234	16.0	0.714	34.4	0.513		
27.0	0.642	90.0	0.541	33.3	0.209	16.6	0.676	35.2	0.551		
28.2	0.616	99.0	0.584	34.2	0.352	17.1	0.638	36.9	0.525	43.2	0.856
29.3	0.552			34.9	0.422	17.6	0.581	38.6	0.590	46.5	0.840
30.6	0.421	CURVE 2 T = 298		36.3	0.498	18.4	0.480	39.6	0.644	48.5	0.822
31.6	0.269			38.6	0.570	20.3	0.203	40.9	0.675	49.7	0.796
33.3	0.000			40.4	0.610	20.9	0.145	43.1	0.689	55.2	0.246
34.8	0.274	18.1	0.708	43.4	0.634*	21.3	0.114	44.6	0.680	60.2	0.603
35.7	0.377	18.7	0.657	44.8	0.638	21.8	0.118*	45.4	0.651	62.5	0.677
37.1	0.467	19.0	0.628	46.9	0.628	22.0	0.150	46.7	0.541	67.1	0.752
		20.0	0.534	49.2	0.597	23.6	0.556			73.5	0.809
										83.3	0.852

*Not shown on plot

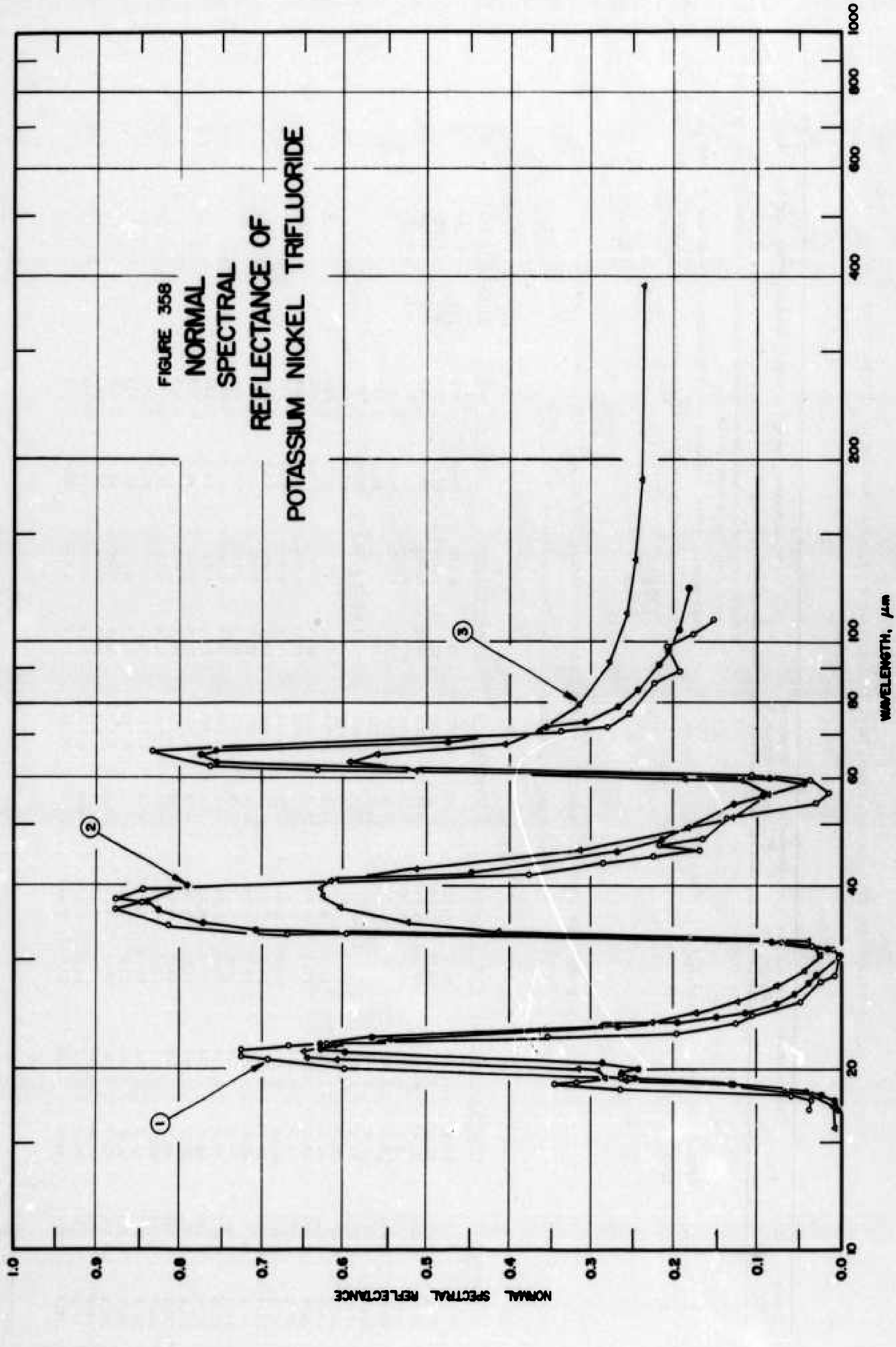


FIGURE 358 NORMAL SPECTRAL REFLECTANCE OF POTASSIUM NICKEL TRIFLUORIDE

SPECIFICATION TABLE NO. 358 NORMAL SPECTRAL REFLECTANCE OF POTASSIUM NICKEL TRIFLUORIDE $KNiF_3$

Curve No.	Ref. No.	Year	Temperature K	Wavelength Range, μm	Geometry θ θ' ω'	Reported Error, %	Composition (weight percent), Specifications, and Remarks
1	305	1967	90	17.1-109	8° 8°		Crystal with cubic perovskite structure; measured in vacuum (10^{-6} mm Hg); data extracted from smooth curve.
2	305	1967	300	17.1-123	15° 15°		Above specimen and conditions except measured in vacuum of 10^{-3} mm Hg.
3	167	1965	~298	16.0-384	~0° ~0°		Single crystal with cubic perovskite structure (>2 mm thick); data extracted from smooth curve.

DATA TABLE NO. 358 NORMAL SPECTRAL REFLECTANCE OF POTASSIUM NICKEL TRIFLUORIDE $KNiF_3$

[Wavelength, λ, μm; Reflectance, ρ; Temperature, T, K]

λ	ρ	λ	ρ	λ	ρ	λ	ρ	λ	ρ	λ	ρ	λ	ρ
CURVE 1 T = 90		CURVE 1 (cont.)		CURVE 1 (cont.)		CURVE 2 (cont.)		CURVE 2 (cont.)		CURVE 3 (cont.)		CURVE 3 (cont.)	
		33.2	0.596	89.2	0.191	26.5	0.055	83.3	0.242	25.8	0.121	111	0.257
17.1	0.036	33.2	0.670	98.0	0.208	27.6	0.038	91.7	0.216	27.2	0.079	136	0.246
17.7	0.033	33.6	0.747*	103	0.177	28.5	0.029	96.1	0.204	29.0	0.042	185	0.239
18.0	0.060	34.3	0.813	109	0.151	29.3	0.027*	105	0.192	30.8	0.022	384	0.235
18.5	0.264	36.5	0.878			30.6	0.000	123	0.182	32.1	0.037		
18.8	0.345	37.4	0.847	CURVE 2		31.5	0.015			33.5	0.412		
19.0	0.319	38.0	0.877	T = 300		32.1	0.083	CURVE 3		34.8	0.522		
19.3	0.252	39.3	0.846			33.9	0.706	T ~ 298		36.7	0.601		
19.3	0.252*	41.6	0.377	17.1	0.001	34.6	0.772			38.1	0.624		
20.2	0.599	43.1	0.284	17.7	0.008	36.1	0.828	16.0	0.008	39.6	0.627		
20.6	0.693	44.8	0.223	18.1	0.021	37.5	0.842	17.8	0.008	40.8	0.614		
21.0	0.725	45.6	0.170	18.4	0.040	40.0	0.791	18.2	0.033	42.3	0.512		
21.4	0.725	46.5	0.217	18.9	0.127	42.0	0.448	18.4	0.069	45.6	0.315		
21.8	0.668	47.8	0.168	19.3	0.246	45.2	0.269	18.7	0.131	49.7	0.182		
22.0	0.620	51.5	0.138	19.6	0.253	47.6	0.212	19.1	0.259	51.8	0.130		
22.5	0.352	54.3	0.029	20.0	0.241	54.3	0.128	19.4	0.282	56.1	0.087		
22.9	0.196	56.8	0.014	20.4	0.284	56.8	0.094	19.9	0.291	59.1	0.116		
23.6	0.126	59.1	0.034	21.3	0.599	58.8	0.042	20.0	0.316	59.8	0.189		
24.4	0.104	60.2	0.106	21.5	0.629	60.2	0.085	20.7	0.609	61.3	0.512		
25.7	0.048	61.7	0.631	22.0	0.629	63.6	0.759	20.9	0.645	63.6	0.592		
27.8	0.022	62.8	0.764	22.5	0.566	65.3	0.774	21.3	0.650	65.3	0.561		
28.2	0.008	66.2	0.835	23.3	0.266	66.2	0.757	21.8	0.610	65.7	0.471*		
30.4	0.001	71.4	0.337	23.8	0.195	68.9	0.474	22.2	0.549	68.0	0.406		
31.3	0.010	72.9	0.280	24.2	0.150	72.4	0.355	23.5	0.287	71.9	0.361		
31.8	0.032	76.9	0.252	24.7	0.113	74.0	0.308	23.9	0.224	79.3	0.314		
32.1	0.072	85.4	0.222	25.5	0.079	78.7	0.266	24.7	0.174	92.5	0.278		

* Not shown on plot

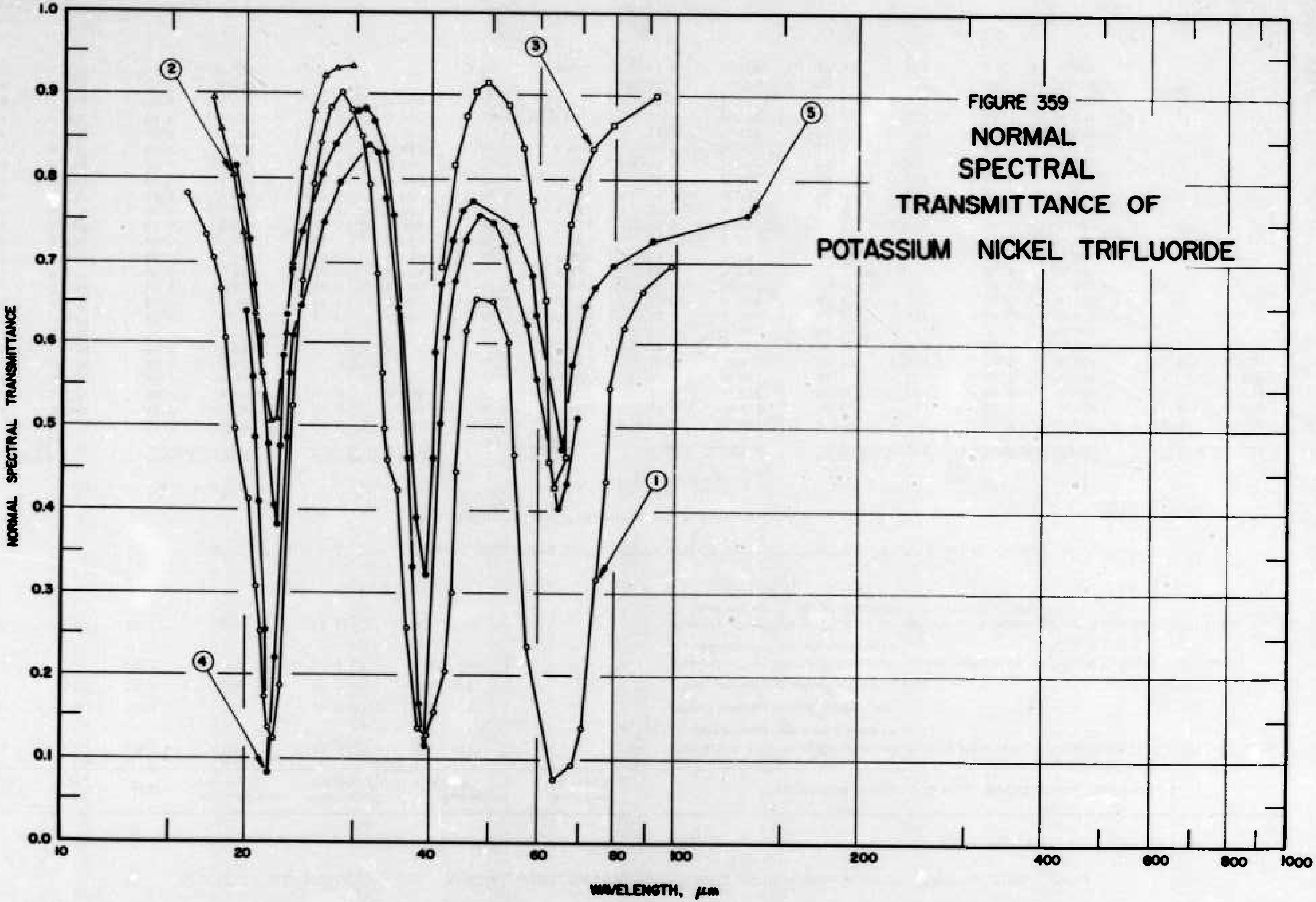


FIGURE 359
NORMAL
SPECTRAL
TRANSMITTANCE OF
POTASSIUM NICKEL TRIFLUORIDE

SPECIFICATION TABLE NO. 359 NORMAL SPECTRAL TRANSMITTANCE OF POTASSIUM NICKEL TRIFLUORIDE $KNiF_3$

Curve No.	Ref. No.	Year	Temperature K	Wavelength Range, μm	Geometry θ	θ'	ω'	Reported Error, %	Composition (weight percent), Specifications, and Remarks
1	167	1965	~298	16.0-98.0	<15°	<15°			Powder of crystal with cubic perovskite structure in polyethylene (~6 mil thick); data extracted from smooth curve.
2	167	1965	~298	17.6-29.9	<15°	<15°			Above specimen and conditions.
3	167	1965	~298	41.6-92.5	<15°	<15°			Above specimen and conditions.
4	164	1967	78	20.1-69.4	~0°	~0°			Powder of crystal with cubic perovskite structure dispersed in Nujol mull; data extracted from smooth curve.
5	164	1967	298	19.1-131	~0°	~0°			Powder of crystal with cubic perovskite structure dispersed in plyethylene sheet (1-2 mg cm^{-2}); data extracted from smooth curve.

DATA TABLE NO. 359 NORMAL SPECTRAL TRANSMITTANCE OF POTASSIUM NICKEL TRIFLUORIDE $KNiF_3$

[Wavelength, λ, μm; Transmittance, τ; Temperature, T, K]

CURVE 1
T ~ 298

λ	τ
16.0	0.781
17.2	0.731
17.6	0.704
18.1	0.668
18.5	0.603
19.1	0.497
20.2	0.411
20.8	0.309
21.1	0.251
21.5	0.171
21.7	0.135
22.1	0.121
22.4	0.136*
22.8	0.189
23.9	0.523
24.6	0.679
25.6	0.794
26.3	0.846
27.2	0.886
28.5	0.901
29.9	0.884
30.9	0.853
31.8	0.793

CURVE 1 (cont.)

λ	τ
32.6	0.687
33.3	0.565
33.5	0.498
34.0	0.460
35.3	0.423
36.6	0.256
38.1	0.133
39.6	0.127
40.9	0.153
42.5	0.203
43.4	0.300
44.0	0.449
45.8	0.618
47.3	0.654
50.2	0.651
53.4	0.600
54.9	0.469
57.8	0.233
63.6	0.074
68.0	0.092
70.4	0.134
74.6	0.317
77.5	0.435
78.1	0.547

CURVE 1 (cont.)

λ	τ
82.6	0.620
88.4	0.664
93.0	0.698

CURVE 2
T ~ 298

λ	τ
17.6	0.897
18.2	0.862
19.0	0.803
19.8	0.734
20.6	0.639
21.1	0.563
22.0	0.506
22.4	0.510
23.1	0.612
23.7	0.700
24.8	0.813
25.9	0.884
26.9	0.921
28.0	0.932
29.9	0.934

CURVE 3
T ~ 298

λ	τ
41.6	0.695
43.6	0.817
45.6	0.877
47.1	0.903
49.7	0.914
53.4	0.890
56.4	0.839
58.1	0.775
61.3	0.653
62.1	0.459
63.6	0.427
66.2	0.465
66.1	0.698
67.5	0.746
69.4	0.791
73.5	0.836
79.3	0.869
92.5	0.900

CURVE 4
T = 78

λ	τ
20.1	0.640

CURVE 4 (cont.)

λ	τ
20.4	0.560
20.6	0.488
21.0	0.410
21.4	0.253
21.8	0.081
22.2	0.220
23.1	0.487
23.5	0.564
23.9	0.610
24.5	0.647
26.6	0.747
28.4	0.798
31.6	0.841
32.7	0.831
33.9	0.777
35.3	0.645
36.7	0.462
37.3	0.332
38.4	0.164
39.2	0.114
41.4	0.501
42.7	0.607
43.8	0.679
45.4	0.728

CURVE 4 (cont.)

λ	τ
48.0	0.756
50.2	0.748
52.9	0.720
54.3	0.679
57.1	0.623
59.5	0.558
64.9	0.401
66.6	0.431
69.4	0.510

CURVE 5
T = 298

λ	τ
19.1	0.815
19.6	0.780
20.2	0.728
20.6	0.672
21.1	0.609
21.3	0.563*
21.7	0.480
22.1	0.403
22.4	0.382
22.7	0.476
23.0	0.585

CURVE 5 (cont.)

λ	τ
23.3	0.636
23.8	0.692
24.6	0.736
26.5	0.807
28.0	0.843
30.1	0.881
31.1	0.885
32.3	0.872
33.5	0.833
34.8	0.759
35.9	0.648*
38.0	0.391
39.2	0.322
40.1	0.462
40.9	0.590
41.8	0.673
43.2	0.728
45.0	0.761
46.7	0.775
50.7	0.774*
54.6	0.741
58.1	0.685
59.1	0.636
65.3	0.473

CURVE 5 (cont.)

λ	τ
68.0	0.574
71.4	0.646
74.0	0.670
79.3	0.698
91.7	0.728
131	0.758

*Not shown on plot

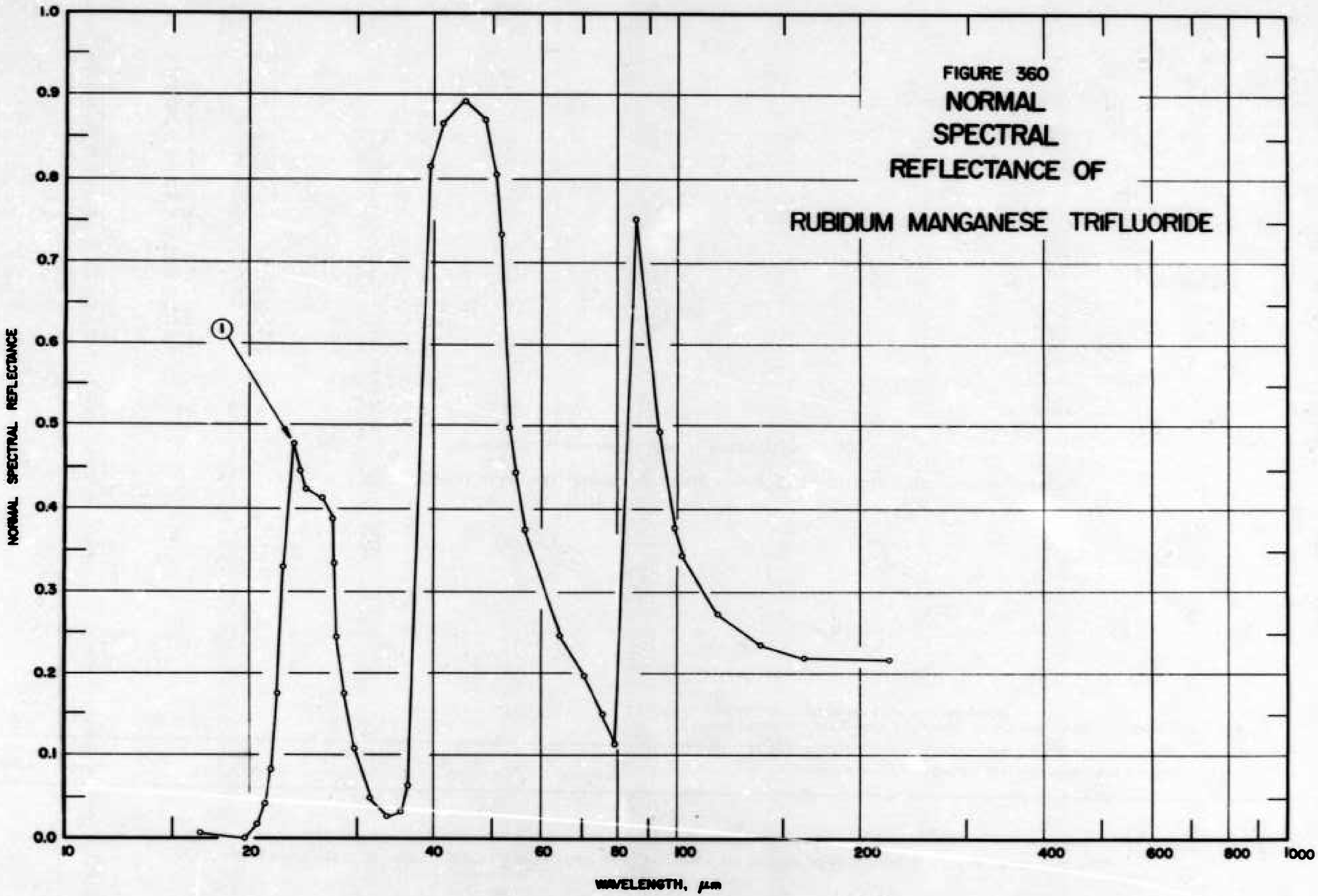


FIGURE 360
NORMAL
SPECTRAL
REFLECTANCE OF
RUBIDIUM MANGANESE TRIFLUORIDE
NORMAL SPECTRAL REFLECTANCE
WAVELENGTH, μm
1.0
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0.0
10
20
40
60
80
100
200
400
600
800
1000
1

SPECIFICATION TABLE NO. 360 NORMAL SPECTRAL REFLECTANCE OF RUBIDIUM MANGANESE TRIFLUORIDE $RbMnF_3$

Curve No.	Ref. No.	Year	Temperature K	Wavelength Range, μm	Geometry θ θ' ω'	Reported Error, %	Composition (weight percent), Specifications, and Remarks
1	304	1967	~298	16.7-222	~0° ~0°		Crystal with cubic perovskite structure; metallographically polished with 0.05 μm alumina; data extracted from smooth curve.

DATA TABLE NO. 360 NORMAL SPECTRAL REFLECTANCE OF RUBIDIUM MANGANESE TRIFLUORIDE $RbMnF_3$

[Wavelength, λ, μm; Reflectance, ρ; Temperature, T, K]

λ	ρ	λ	ρ	λ	ρ
CURVE 1		CURVE 1 (cont.)		CURVE 1 (cont.)	
T ~ 298		36.1	0.064	137	0.234
16.7	0.008	30.0	0.651	161	0.220
19.8	0.000	39.2	0.816	222	0.218
20.6	0.017	41.2	0.868		
21.2	0.043	45.0	0.893		
21.7	0.081	48.5	0.872		
22.2	0.173	50.3	0.806		
22.8	0.330	51.5	0.735		
23.7	0.477	53.2	0.497		
24.1	0.447	54.1	0.444		
24.8	0.424	56.5	0.375		
26.2	0.412	64.1	0.247		
27.4	0.387	70.9	0.198		
27.5	0.333	75.8	0.150		
27.9	0.244	79.4	0.062		
28.6	0.174	85.5	0.753		
29.8	0.109	93.5	0.493		
31.5	0.050	99.0	0.379		
33.6	0.027	102	0.342		
35.2	0.031	116	0.272		

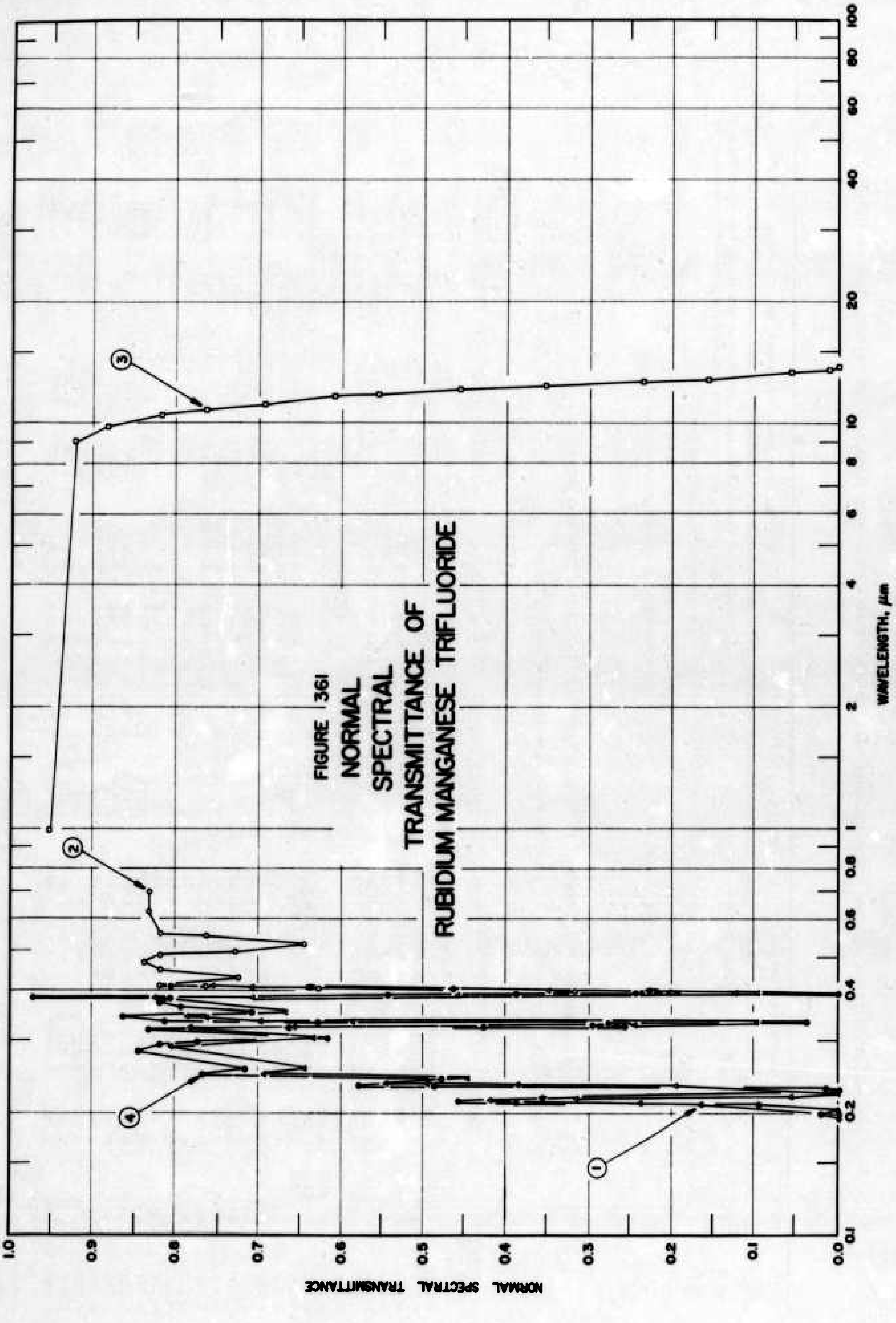


FIGURE 361 NORMAL SPECTRAL TRANSMITTANCE OF RUBIDIUM MANGANESE TRIFLUORIDE

SPECIFICATION TABLE NO. 361 NORMAL SPECTRAL TRANSMITTANCE OF RUBIDIUM MANGANESE TRIFLUORIDE $RbMnF_3$

Curve No.	Ref. No.	Year	Temperature K	Wavelength Range, μm	Geometry θ θ' ω'	Reported Error, %	Composition (weight percent), Specifications, and Remarks
1	289	1967	298	0.200-0.410	~0° ~0°		Crystals with cubic perovskite structure grown from stoichiometric melt (Czochralski) method under a purified argon atm; data extracted from smooth curve.
2	289	1967	298	0.400-0.700	~0° ~0°		Above specimen and conditions.
3	289	1967	298	1.0-13.8	~0° ~0°		Above specimen and conditions.
4	289	1967	83	0.196-0.410	~0° ~0°		Above specimen and conditions.

DATA TABLE NO. 361 NORMAL SPECTRAL TRANSMITTANCE OF RUBIDIUM MANGANESE TRIFLUORIDE $RbMnF_3$

[Wavelength, λ, μm; Transmittance, τ; Temperature, T, K]

CURVE 1
T = 298

λ	τ
0.200	0.000159
0.210	0.163
0.212	0.239
0.215	0.418
0.217	0.314
0.220	0.0535
0.223	0.00730
0.224	0.000847*
0.226	0.000714*
0.226	0.000794*
0.232	0.192
0.234	0.386
0.235	0.495
0.237	0.546
0.239	0.538*
0.241	0.495*
0.243	0.444
0.245	0.476*
0.248	0.662*
0.250	0.694
0.253	0.685*
0.259	0.645
0.262	0.649*
0.267	0.719*
0.272	0.758*
0.293	0.806

CURVE 1 (cont.)

λ	τ
0.298	0.781*
0.309	0.633
0.312	0.649*
0.320	0.775*
0.323	0.781
0.325	0.725*
0.326	0.658
0.329	0.262*
0.330	0.245
0.333	0.0820*
0.333	0.0952
0.337	0.585
0.339	0.699
0.341	0.763
0.344	0.787
0.348	0.741*
0.354	0.667
0.362	0.794*
0.370	0.826*
0.383	0.826
0.386	0.813*
0.388	0.709
0.390	0.457
0.393	0.202
0.394	0.122
0.396	0.00943

CURVE 1 (cont.)

λ	τ
0.337	0.00671*
0.398	0.0195*
0.400	0.347
0.402	0.538*
0.403	0.641
0.404	0.709
0.406	0.735*
0.410	0.758

CURVE 2
T = 298

λ	τ
0.400	0.316
0.401	0.629
0.403	0.621*
0.405	0.763
0.407	0.800*
0.411	0.820
0.419	0.752*
0.423	0.730*
0.431	0.725
0.435	0.735*
0.452	0.820
0.458	0.833*
0.465	0.840*
0.474	0.840
0.483	0.820

CURVE 2 (cont.)

λ	τ
0.490	0.794*
0.500	0.730
0.508	0.667*
0.514	0.649*
0.520	0.645
0.525	0.654*
0.529	0.671*
0.542	0.763
0.548	0.775*
0.556	0.820
0.565	0.826*
0.627	0.833
0.700	0.833

CURVE 3
T = 298

λ	τ
1.00	0.952
9.12	0.926
9.85	0.885
10.5	0.820
10.9	0.769
11.3	0.694
11.7	0.610
11.9	0.556
12.2	0.459
12.4	0.351

CURVE 3
T = 298

λ	τ
12.7	0.238
12.9	0.156
13.2	0.0546
13.5	0.0120
13.8	0.00100

CURVE 4
T = 83

λ	τ
0.196	0.000100
0.198	0.00292*
0.201	0.0217*
0.201	0.0206
0.204	0.00488
0.204	0.00450*
0.205	0.00508*
0.210	0.0926
0.213	0.388
0.214	0.452
0.216	0.459
0.218	0.424*
0.219	0.353
0.224	0.00231*
0.227	0.000161*
0.228	0.000175
0.230	0.0142

CURVE 4 (cont.)

λ	τ
0.232	0.485
0.233	0.562*
0.234	0.578
0.237	0.543*
0.240	0.549*
0.242	0.478
0.246	0.680*
0.250	0.752*
0.253	0.769
0.258	0.714
0.276	0.820*
0.285	0.847
0.294	0.820
0.300	0.775
0.304	0.671*
0.307	0.658*
0.309	0.617
0.317	0.806*
0.320	0.833
0.324	0.763*
0.325	0.662
0.327	0.424
0.328	0.255
0.330	0.294
0.331	0.275
0.332	0.0362
0.335	0.629

CURVE 4 (cont.)

λ	τ
0.337	0.735*
0.338	0.813
0.343	0.855*
0.346	0.862
0.350	0.775*
0.353	0.709
0.355	0.735*
0.357	0.699*
0.357	0.735*
0.358	0.680*
0.359	0.730*
0.361	0.781*
0.363	0.794
0.372	0.820
0.383	0.806
0.386	0.971
0.388	0.680*
0.390	0.541
0.391	0.388
0.392	0.273*
0.394	0.242
0.395	0.00307
0.397	0.0118*
0.397	0.0100*
0.400	0.228
0.401	0.463
0.402	0.568*
0.403	0.637

CURVE 4 (cont.)

λ	τ
0.405	0.709*
0.407	0.769*
0.410	0.806

* Not shown on plot

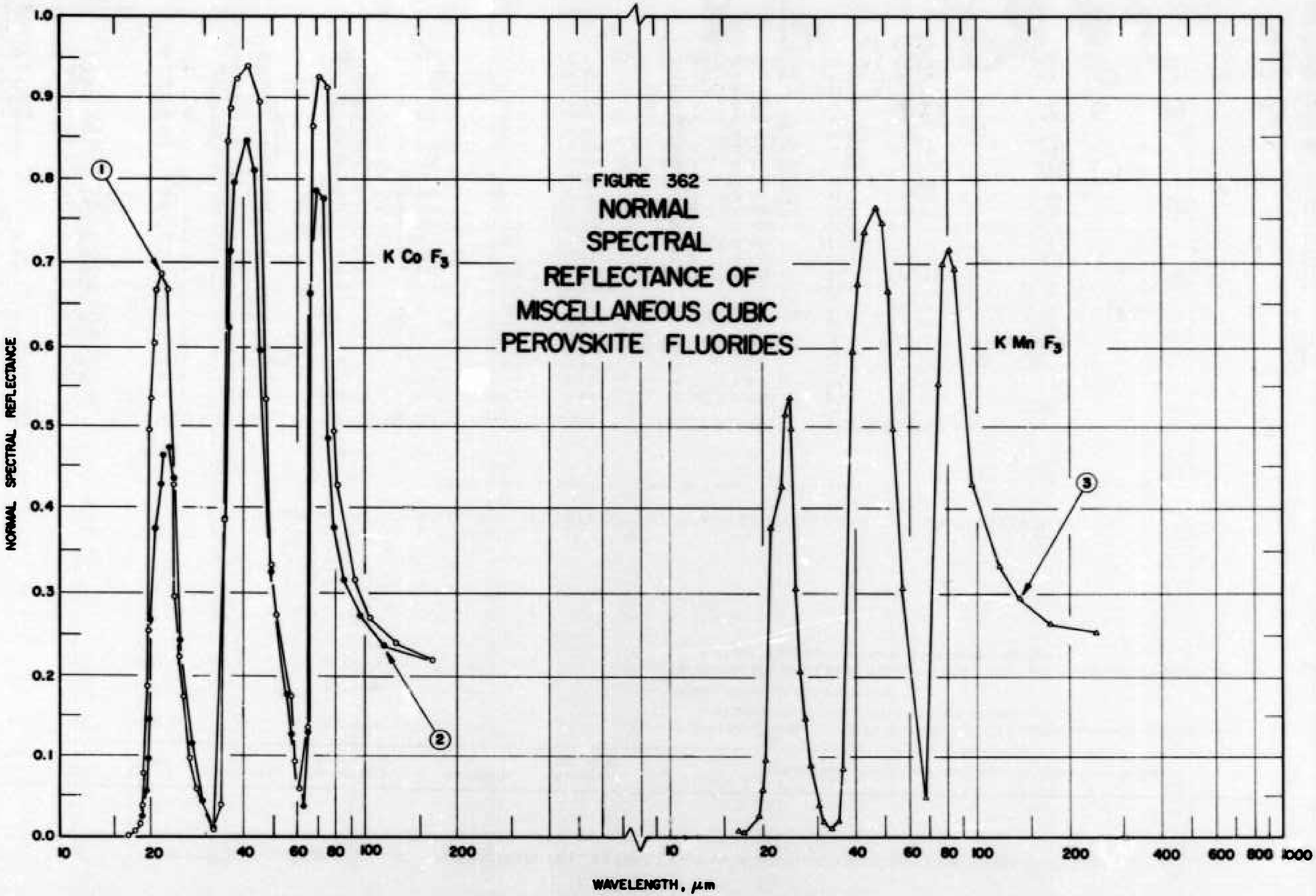


FIGURE 362
NORMAL
SPECTRAL
REFLECTANCE OF
MISCELLANEOUS CUBIC
PEROVSKITE FLUORIDES
K Co F3
K Mn F3
NORMAL SPECTRAL REFLECTANCE
WAVELENGTH, μm
1
2
3

SPECIFICATION TABLE NO. 362 NORMAL SPECTRAL REFLECTANCE OF MISCELLANEOUS CUBIC PEROVSKITE FLUORIDES

Curve No.	Ref. No.	Year	Temperature K	Wavelength Range, μm	Geometry θ θ' ω'	Reported Error, %	Composition (weight percent), Specifications, and Remarks
1	304	1967	80	16.7-166	~0° ~0°		POTASSIUM COBALT TRIFLUORIDE, $KCoF_3$; metallographically polished with 0.05 μm alumina; data extracted from smooth curve.
2	304	1967	300	16.7-166	~0° ~0°		Above specimen and conditions.
3	304	1967	~298	16.7-243	~0° ~0°		POTASSIUM MANGANESE TRIFLUORIDE, $KMnF_3$; metallographically polished with 0.05 μm alumina; data extracted from smooth curve.

DATA TABLE NO. 362 NORMAL SPECTRAL REFLECTANCE OF MISCELLANEOUS CUBIC PEROVSKITE FLUORIDES

[Wavelength, λ, μm; Reflectance, ρ; Temperature, T, K]

CURVE 1
T = 80

λ	ρ
16.7	0.000
17.5	0.006
18.1	0.013
18.6	0.037
18.8	0.078
19.5	0.189
19.6	0.253
19.8	0.495
20.0	0.534
20.3	0.604
20.7	0.666
21.4	0.688
21.9	0.685*
22.4	0.666
22.8	0.629*
23.4	0.429
23.9	0.295
24.4	0.222
25.1	0.171
26.5	0.098
28.0	0.057
31.9	0.009

CURVE 1 (cont.)

λ	ρ
33.7	0.036
34.6	0.386
35.7	0.846
36.6	0.889
38.6	0.924
41.7	0.940
44.1	0.926*
45.0	0.896
46.7	0.531
49.3	0.331
50.5	0.273
56.5	0.174
58.1	0.123*
58.8	0.091
60.2	0.058
64.1	0.133
66.2	0.861
67.6	0.910*
70.9	0.926
75.2	0.911
78.7	0.491
81.3	0.426
93.5	0.314
103	0.270
125	0.240
166	0.222

CURVE 2
T = 300

λ	ρ
16.7	0.000*
17.6	0.006*
18.1	0.013*
18.6	0.022
19.2	0.054
19.6	0.098
19.8	0.143
20.0	0.269
20.5	0.374
21.1	0.429
21.9	0.461
22.7	0.471
23.5	0.435
24.9	0.242
25.8	0.174*
27.0	0.113

CURVE 2 (cont.)

λ	ρ
29.2	0.041
31.9	0.010
33.6	0.037*
34.8	0.388
35.2	0.624
36.0	0.711
37.5	0.797
38.8	0.831*
40.3	0.848
41.7	0.844*
43.9	0.810
45.5	0.596
49.3	0.325
55.9	0.178
57.8	0.124
62.1	0.036
64.1	0.128
65.8	0.661
67.6	0.772*
69.4	0.786
72.5	0.776
75.2	0.482
79.4	0.378
85.5	0.314
96.2	0.273
114	0.237
166	0.220*

CURVE 3
T ~ 298

λ	ρ
16.7	0.008
17.3	0.006
19.4	0.023
20.0	0.056
20.3	0.094
21.3	0.379
21.6	0.407*
22.3	0.418*
23.0	0.425
23.8	0.515
24.5	0.536
24.9	0.499
25.8	0.304
26.7	0.206
27.3	0.149

CURVE 3 (cont.)

λ	ρ
28.7	0.088
30.4	0.039
31.9	0.017
33.3	0.010
35.3	0.019
36.5	0.084
39.4	0.596
41.3	0.673
43.9	0.738
47.4	0.766
49.5	0.746
51.8	0.666
53.2	0.499
57.1	0.306
68.0	0.047
74.1	0.553
77.5	0.700
80.6	0.715
84.7	0.691
96.2	0.429
119	0.331
137	0.291
172	0.266
243	0.253

*Not shown on plot

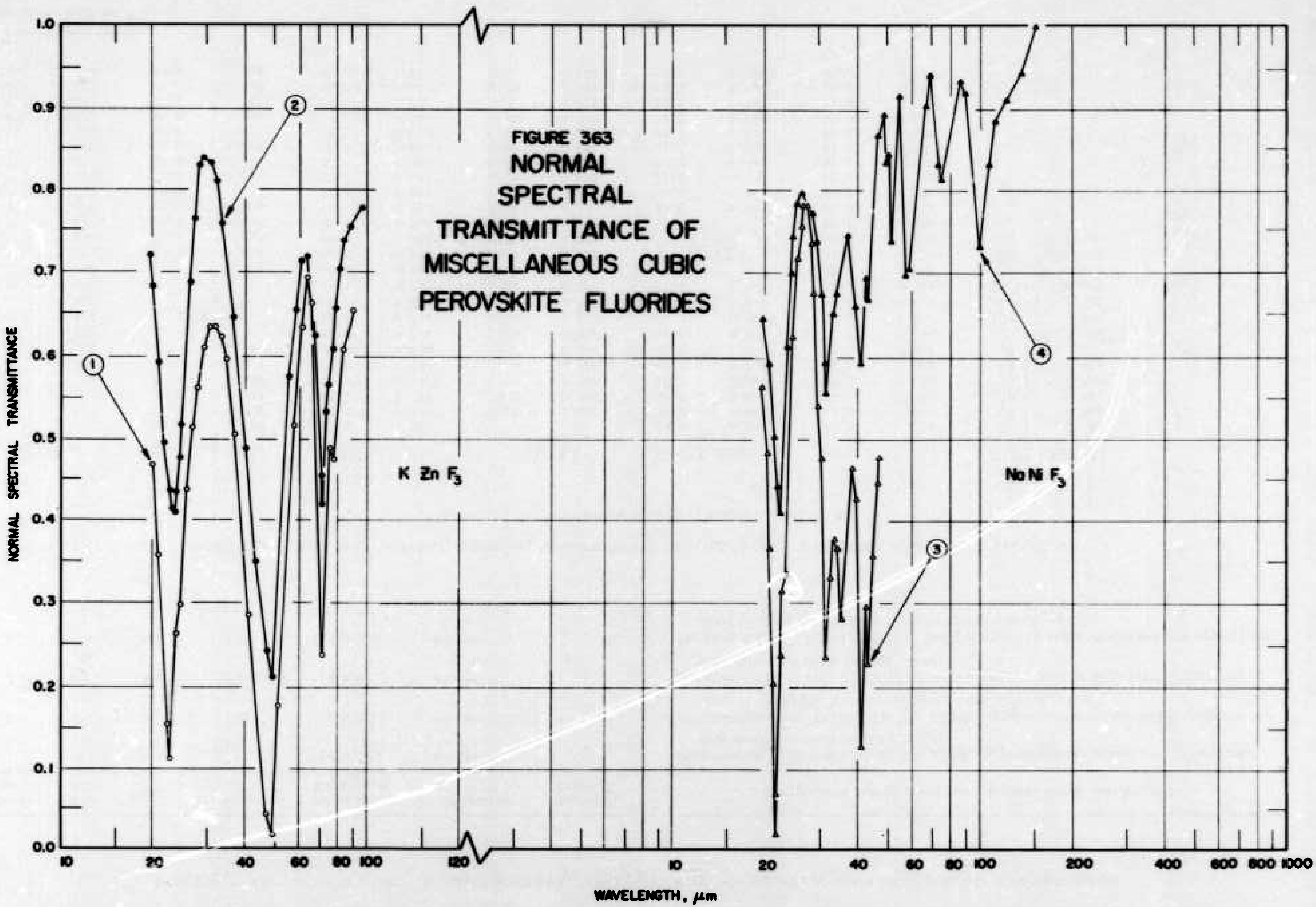


FIGURE 363
NORMAL SPECTRAL TRANSMITTANCE OF MISCELLANEOUS CUBIC PEROVSKITE FLUORIDES

SPECIFICATION TABLE NO. 363 NORMAL SPECTRAL TRANSMITTANCE OF MISCELLANEOUS CUBIC PEROVSKITE FLUORIDES

Curve No.	Ref. No.	Year	Temperature K	Wavelength Range, μm	Geometry θ θ' ω'	Reported Error, %	Composition (weight percent), Specifications, and Remarks
1	164	1967	78	20.0-103	~0° ~0°		POTASSIUM ZINC TRIFLUORIDE, $KZnF_3$; crystal powder dispersed in Nujol mull; data extracted from smooth curve.
2	164	1967	298	19.6-96.2	~0° ~0°		POTASSIUM ZINC TRIFLUORIDE, $KZnF_3$; crystal powder dispersed in polyethylene sheet (1-2 mg cm^{-2}); data extracted from smooth curve.
3	164	1967	78	19.6-47.0	~0° ~0°		SODIUM NICKEL TRIFLUORIDE, $NaNiF_3$; crystal powder dispersed in Nujol mull; data extracted from smooth curve.
4	164	1967	298	19.9-151	~0° ~0°		SODIUM NICKEL TRIFLUORIDE, $NaNiF_3$; crystal powder dispersed in polyethylene sheet (1-2 mg cm^{-2}); data extracted from smooth curve.

DATA TABLE NO. 363 NORMAL SPECTRAL TRANSMITTANCE OF MISCELLANEOUS CUBIC PEROVSKITE FLUORIDES

[Wavelength, λ, μm; Transmittance, τ; Temperature, T, K]

λ	τ	λ	τ	λ	τ	λ	τ	λ	τ	λ	τ	λ	τ
CURVE 1		CURVE 1 (cont.)		CURVE 2 (cont.)		CURVE 3		CURVE 3 (cont.)		CURVE 4 (cont.)		CURVE 4 (cont.)	
T = 78		70.4	0.236	31.0	0.832	T = 78		35.4	0.280	27.2	0.799*	58.4	0.702
20.0	0.467	75.1	0.487	32.1	0.810	19.6	0.565	38.4	0.462	28.4	0.771	66.6	0.904
20.8	0.356	76.9	0.474	33.7	0.759	20.2	0.482	39.3	0.427	29.3	0.738	69.9	0.943
22.1	0.155	84.0	0.607	36.5	0.648	20.8	0.365	40.3	0.126	30.3	0.673	73.5	0.830
22.7	0.111	90.0	0.655	40.0	0.488	21.4	0.202	42.3	0.293	31.1	0.593	74.6	0.811
23.9	0.262	103	0.703*	43.2	0.350	21.7	0.067	43.1	0.226	31.8	0.559	86.9	0.937
24.4	0.298			46.7	0.241	21.9	0.019	44.4	0.356	32.7	0.595*	90.0	0.922
25.9	0.437	CURVE 2		48.5	0.211	22.5	0.238	45.4	0.395*	33.4	0.651	100	0.739
26.8	0.513	T = 298		55.8	0.578	22.8	0.312	46.5	0.446	34.3	0.675	107	0.831
27.9	0.563			58.1	0.655	23.4	0.334	47.0	0.477	35.9	0.664*	112	0.887
29.7	0.610	19.6	0.720	60.9	0.711	24.9	0.623			37.8	0.744	121	0.913
30.9	0.633	20.0	0.681	63.6	0.719	25.7	0.716	CURVE 4		38.6	0.729*	136	0.946
31.8	0.636	20.8	0.593	65.7	0.692*	26.2	0.753	T = 298		39.8	0.660	151	1.000
33.0	0.623	21.7	0.497	67.1	0.624	26.7	0.770			40.8	0.591		
34.2	0.599	22.5	0.436	70.4	0.452	27.4	0.770	19.9	0.648	42.9	0.693		
36.7	0.503	23.0	0.413	71.4	0.420	28.2	0.733	20.6	0.591	43.8	0.669		
41.3	0.283	23.2	0.410	73.5	0.531	28.9	0.675	21.5	0.501	46.5	0.869		
47.1	0.042	23.9	0.435	74.0	0.568	29.8	0.540	22.0	0.441	47.3	0.869*		
48.7	0.018	24.5	0.476	76.9	0.609	30.2	0.477	22.3	0.410	48.3	0.894		
51.2	0.179	24.8	0.517	78.7	0.659	31.4	0.235	23.6	0.611	49.2	0.832		
56.5	0.518	26.2	0.688	80.6	0.703	32.3	0.330	24.2	0.700	50.0	0.842		
60.2	0.634	27.1	0.762	84.0	0.738	33.2	0.370*	24.7	0.743	51.0	0.738		
62.8	0.692	28.6	0.830	88.5	0.753	33.9	0.378	25.4	0.782	54.6	0.917		
64.9	0.662	29.8	0.839	96.2	0.777	34.4	0.364	26.2	0.799	57.4	0.698		

*Not shown on plot

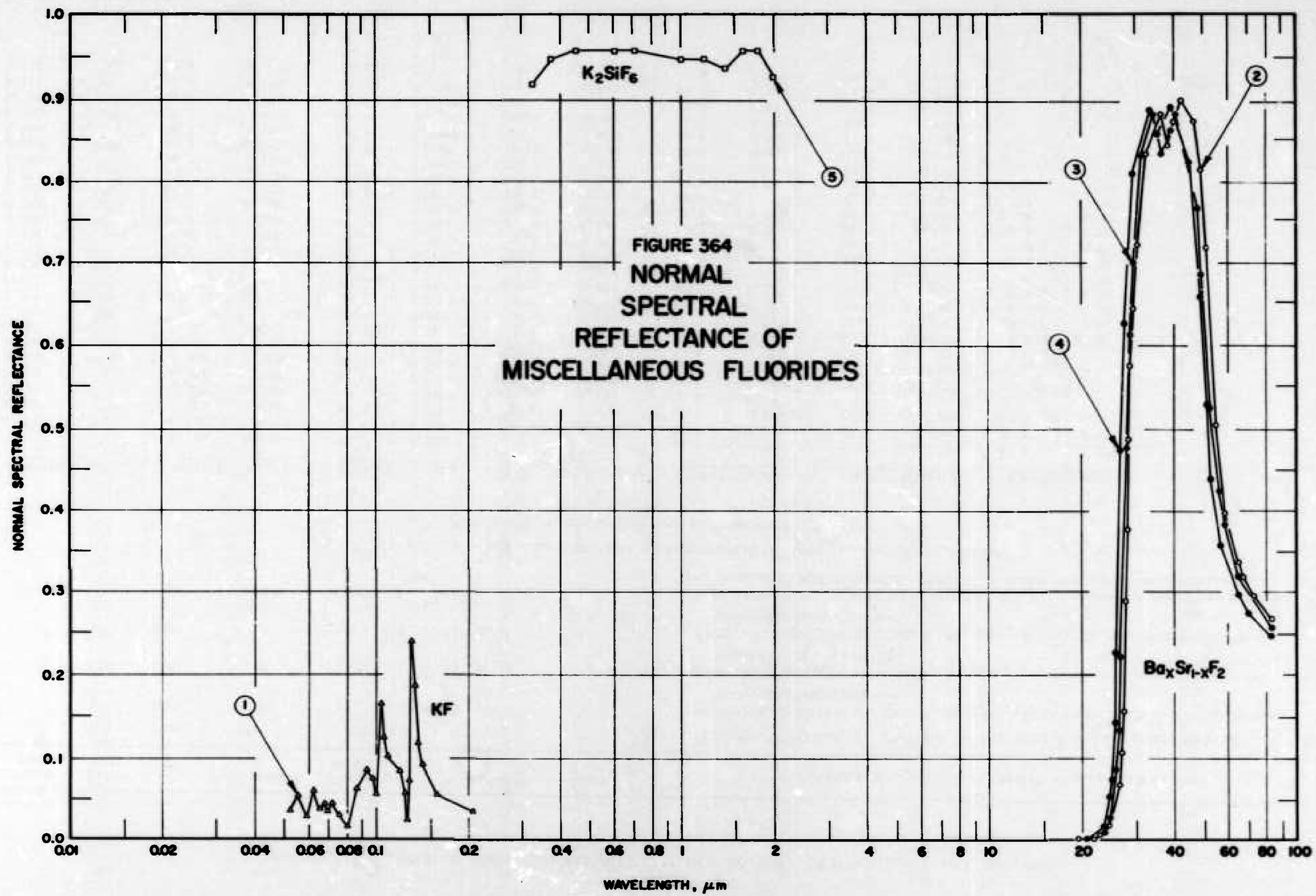


FIGURE 364
NORMAL
SPECTRAL
REFLECTANCE OF
MISCELLANEOUS FLUORIDES
K_2SiF_6
KF
$Ba_xSr_{1-x}F_2$
1
2
3
4
5
NORMAL SPECTRAL REFLECTANCE
WAVELENGTH, μm
0.0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
1.0
0.01
0.02
0.04
0.06
0.08
0.1
0.2
0.4
0.6
0.8
1
2
4
6
8
10
20
40
60
80
100

SPECIFICATION TABLE NO. 364 NORMAL SPECTRAL REFLECTANCE OF MISCELLANEOUS FLUORIDES

Curve No.	Ref. No.	Year	Temperature K	Wavelength Range, μm	Geometry θ	θ'	ω'	Reported Error, %	Composition (weight percent), Specifications, and Remarks
1	165	1966	298	0.052-0.207	0°	0°			POTASSIUM FLUORIDE, KF; single crystal; freshly cleaved; measured in air.
2	140	1967	90	19.1-83.3	15°	15°			BARIUM STRONTIUM FLUORIDE, $Ba_{0.71}Sr_{0.29}F_2$; crystal; mechanically lapped and diamond abrasive polished.
3	140	1967	90	19.1-83.3	15°	15°			BARIUM STRONTIUM FLUORIDE, $Ba_{0.5}Sr_{0.5}F_2$; crystal; mechanically lapped and diamond abrasive polished.
4	140	1967	90	19.1-83.3	15°	15°			BARIUM STRONTIUM FLUORIDE, $Ba_{0.25}Sr_{0.75}F_2$; crystal; mechanically lapped and diamond abrasive polished.
5	92	1964	298	0.325-1.2	~0°		2π		DIPOTASSIUM SILICON HEXAFLUORIDE, K_2SiF_6; compacted powder; data extracted from table; MgO reference standard; [Authors' designation: Sample 25].

DATA TABLE NO. 364 NORMAL SPECTRAL REFLECTANCE OF MISCELLANEOUS FLUORIDES

[Wavelength, λ, μm; Reflectance, ρ; Temperature, T, K]

CURVE 1 T = 298

λ	ρ
0.052	0.035
0.053	0.046*
0.055	0.053
0.059	0.029
0.062	0.060
0.065	0.038
0.067	0.042
0.069	0.036
0.071	0.045
0.073	0.043*
0.074	0.044*
0.075	0.030
0.080	0.014
0.086	0.062
0.089	0.069*
0.093	0.085
0.095	0.077*
0.097	0.075
0.100	0.056
0.104	0.166
0.105	0.125
0.108	0.102
0.117	0.083
0.121	0.058
0.124	0.023
0.127	0.071
0.130	0.240
0.132	0.189
0.135	0.118
0.140	0.092
0.159	0.055
0.207	0.035

CURVE 2 T = 90

λ	ρ
19.1	0.000
21.9	0.000
22.8	0.004
23.7	0.008*
24.3	0.016
25.1	0.030*
25.7	0.040*
26.2	0.068
26.7	0.108
27.1	0.158
27.7	0.288
28.0	0.377
28.4	0.489
28.9	0.576
29.4	0.644
30.2	0.720
31.3	0.787*
32.4	0.832
33.8	0.860*
35.3	0.879*
36.2	0.882
38.3	0.844
38.9	0.847*
40.0	0.871
41.8	0.895*
42.9	0.900
44.4	0.895*
46.9	0.873
48.5	0.849*
49.2	0.815
51.0	0.717
52.9	0.599*
54.9	0.502
56.5	0.448*
58.8	0.396
61.7	0.363*
64.9	0.336
67.5	0.317
73.5	0.292
83.3	0.267

CURVE 3 T = 90

λ	ρ
19.1	0.000*
22.4	0.000*
23.3	0.008
23.9	0.019*
24.5	0.028
25.3	0.056*
25.8	0.086
26.3	0.133
26.8	0.221
28.0	0.478
28.8	0.611
29.6	0.700
30.4	0.772*
31.6	0.831
32.7	0.870*
34.2	0.882
35.3	0.867*
36.9	0.833
38.0	0.836*
39.3	0.863
40.8	0.882
42.3	0.885*
44.0	0.870*
46.3	0.828*
48.0	0.768
49.7	0.685
51.0	0.599*
52.6	0.522
54.3	0.468*
56.1	0.425
58.4	0.383
61.3	0.351*
65.3	0.317
71.4	0.291*
83.3	0.258

CURVE 4 T = 90

λ	ρ
19.1	0.000*
20.7	0.000
22.1	0.005*
23.2	0.014
23.9	0.029*
24.6	0.052
25.0	0.073
25.3	0.099*
25.6	0.142
25.9	0.229
26.8	0.475
27.3	0.556*
27.7	0.626
28.7	0.724*
29.8	0.810
31.0	0.856*
32.3	0.886*
33.4	0.889
34.3	0.881*
35.3	0.859
36.3	0.864*
38.0	0.884
39.6	0.892
42.0	0.885*
44.0	0.867*
45.4	0.824
46.9	0.768*
48.5	0.659
49.5	0.580*
50.5	0.527
51.2	0.484*
52.9	0.440
55.5	0.394*
57.8	0.358
61.3	0.324*
65.3	0.295
70.4	0.273
75.1	0.255*
83.3	0.247

CURVE 5 T = 298

λ	ρ
0.325	0.92
0.375	0.95
0.450	0.96
0.600	0.96
0.700	0.96
1.0	0.95
1.2	0.95
1.4	0.94
1.6	0.96
1.8	0.96
2.0	0.93

* Not shown on plot

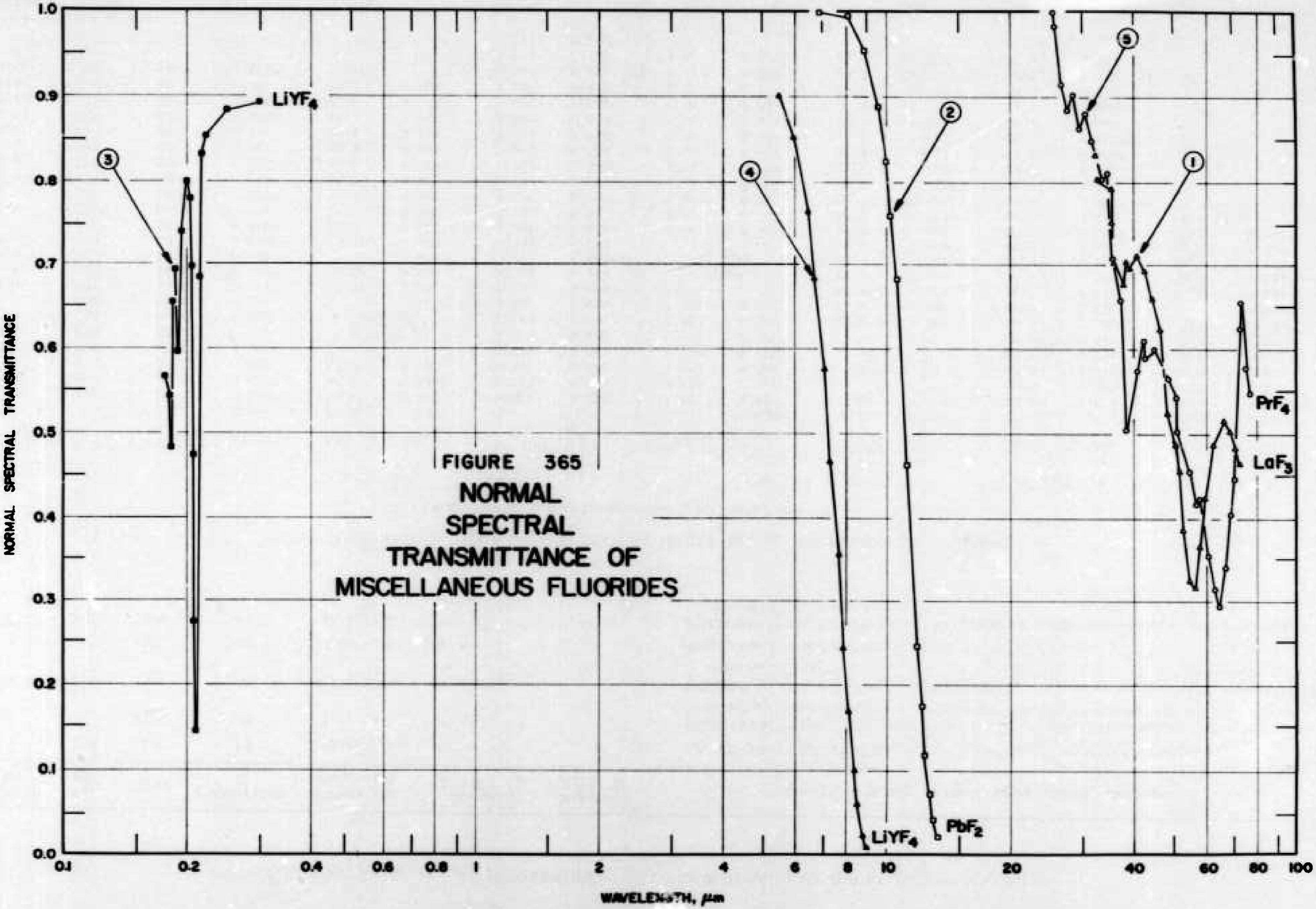


FIGURE 365
NORMAL
SPECTRAL
TRANSMITTANCE OF
MISCELLANEOUS FLUORIDES

SPECIFICATION TABLE NO. 365 NORMAL SPECTRAL TRANSMITTANCE OF MISCELLANEOUS FLUORIDES

Curve No.	Ref. No.	Year	Temperature K	Wavelength Range, μm	Geometry θ θ' ω'	Reported Error, %	Composition (weight percent), Specifications, and Remarks
1	306	1966	1.5	32.4-73.8	0° 0°		LANTHANUM TRIFLUORIDE, LaF_3; 1% Pr^{3+}; single crystal (4.6 mm thick).
2	302	1952	~298	6.87-13.2	~0° ~0°		LEAD DIFLUORIDE, PbF_2; single crystal; data extracted from smooth curve; reflection losses eliminated and transmission adjusted to standard thickness of 1 cm.
3	289	1967	298	0.179-0.300	~0° ~0°		LITHIUM YTTRIUM TETRAFLUORIDE, $LiYF_4$; crystals grown from melt; data extracted from smooth curve.
4	289	1967	298	1.01-9.00	~0° ~0°		Above specimen and conditions.
5	306	1966	1.5	25.5-77.8	0° 0°		PRASEODYMIUM TRIFLUORIDE, PrF_3; 200 mg powder pressed in 1 gram polyethylene; effective PrF_3 thickness 65 μm.

DATA TABLE NO. 365 NORMAL SPECTRAL TRANSMITTANCE OF MISCELLANEOUS FLUORIDES

[Wavelength, λ, μm; Transmittance, τ; Temperature, T, K]

λ	τ
CURVE 1 T = 1.5	
32.4	0.834
32.9	0.804
33.8	0.791*
35.1	0.793
35.5	0.753
36.0	0.701
36.9	0.695*
38.0	0.677
38.8	0.703
39.9	0.698
40.8	0.711
41.8	0.696*
42.6	0.700*
42.6	0.691
42.8	0.675*
43.9	0.666*
44.4	0.660
45.6	0.641*
46.5	0.622
47.4	0.596*
47.9	0.556*
48.8	0.523
49.9	0.507*
CURVE 1 (cont.)	
51.2	0.487
52.0	0.458
53.0	0.412*
53.3	0.386
53.4	0.352*
53.9	0.339
54.4	0.329*
55.0	0.324
55.5	0.334*
55.9	0.315*
56.4	0.317
57.0	0.336*
57.4	0.353*
58.0	0.366
58.8	0.372*
59.4	0.395*
60.0	0.425
60.5	0.447*
62.5	0.489
64.6	0.503*
66.8	0.515
69.0	0.503
69.7	0.515*
CURVE 1 (cont.)	
70.4	0.503*
71.8	0.483
72.9	0.483*
73.8	0.465
CURVE 2 T ~ 298	
6.87	1.000
8.10	0.996
8.95	0.955
9.60	0.890
10.0	0.826
10.3	0.762
10.6	0.683
11.2	0.462
11.9	0.246
12.1	0.174
12.4	0.118
12.7	0.072
13.0	0.043
13.2	0.021
CURVE 3 T = 298	
0.179	0.568
0.180	0.568*
0.181	0.543
0.182	0.481
0.183	0.474*
0.184	0.481*
0.185	0.654
0.185	0.685*
0.186	0.694
0.188	0.662*
0.190	0.599
0.192	0.658*
0.195	0.741
0.197	0.787*
0.200	0.800
0.201	0.800*
0.203	0.781
0.204	0.746*
0.205	0.699
0.206	0.602*
0.207	0.472
0.208	0.272
0.210	0.143
0.215	0.685
CURVE 3 (cont.)	
0.217	0.813*
0.217	0.833
0.219	0.847*
0.221	0.855
0.246	0.870*
0.248	0.877*
0.250	0.885
0.300	0.893
CURVE 4 T = 298	
1.04	0.962
5.52	0.901
6.00	0.855
6.46	0.769
6.78	0.685
7.11	0.578
7.39	0.467
7.66	0.356
7.96	0.243
8.17	0.168
8.40	0.100
8.56	0.0610
CURVE 4 (cont.)	
8.80	0.0251
9.00	0.0100
CURVE 5 T = 1.5	
25.5	1.000
25.9	0.984
26.9	0.919
27.8	0.886
28.8	0.901
29.8	0.863
30.8	0.881
30.8	0.855*
31.9	0.850
32.9	0.815*
33.8	0.803
34.8	0.811
35.8	0.709
37.2	0.658
37.9	0.599*
38.9	0.505
40.0	0.514*
40.9	0.573
CURVE 5 (cont.)	
41.4	0.610*
42.9	0.610
42.9	0.590
43.9	0.612*
44.7	0.594*
45.9	0.600
46.8	0.583*
47.9	0.592*
48.7	0.562
50.0	0.562*
50.9	0.542
51.9	0.501
53.9	0.481*
54.8	0.455
55.9	0.441*
57.0	0.417
58.0	0.422
58.9	0.389*
59.7	0.363*
60.9	0.353
61.7	0.362*
63.0	0.330*
63.9	0.313
65.0	0.291
CURVE 5 (cont.)	
66.0	0.300*
66.9	0.340
68.0	0.399*
68.9	0.404
69.9	0.432*
70.7	0.448
71.9	0.591*
72.8	0.623
73.7	0.654
74.7	0.591*
75.9	0.578
76.8	0.549
77.8	0.551*

*Not shown on plot

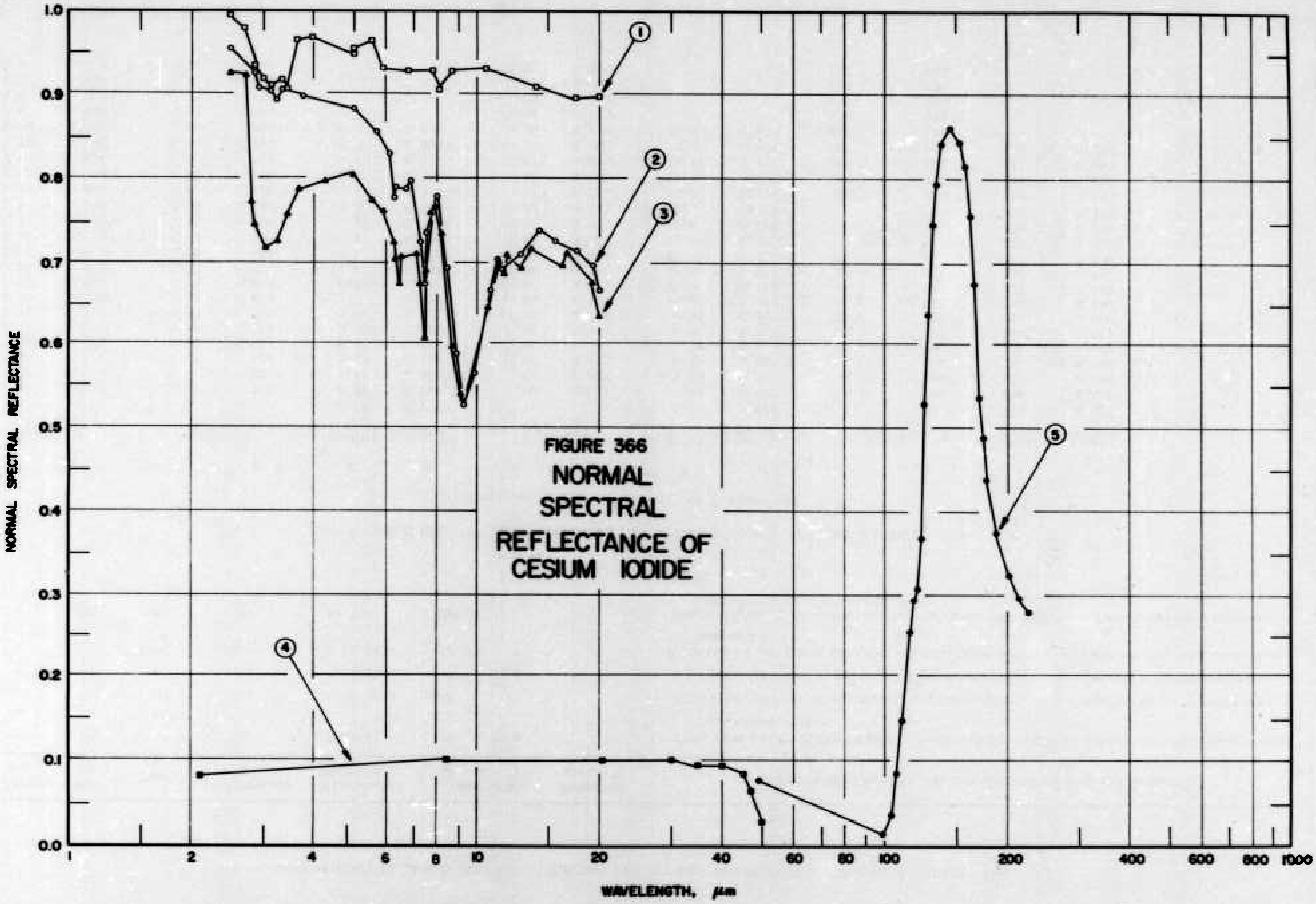


FIGURE 366
NORMAL
SPECTRAL
REFLECTANCE OF
CESIUM IODIDE

SPECIFICATION TABLE NO. 366 NORMAL SPECTRAL REFLECTANCE OF CESIUM IODIDE CsI

Curve No.	Ref. No.	Year	Temperature K	Wavelength Range, μm	Geometry θ	θ'	ω'	Reported Error, %	Composition (weight percent), Specifications, and Remarks
1	76	1967	298	2.50-20.0	~0°		2π		Ultra pure (impurities <80 ppm) powder (4 mm thick) on aluminum flat; data extracted from smooth curve.
2	76	1967	573	2.50-20.0	~0°		2π		99.5 pure powder (4 mm thick) on aluminum flat; data extracted from smooth curve.
3	76	1967	298	2.50-20.0	~0°		2π		99.5 pure powder (4 mm thick) on aluminum flat; data extracted from smooth curve.
4	67	1963	~298	2.10-50.0	30°	30°			Specimen 1 cm thick; data extracted from smooth curve; aluminum mirror reference standard.
5	419	1962	300	49.7-223	15°	15°			Single crystals; measured in vacuum; data extracted from smooth curve; evaporated Al mirror reference standard.

DATA TABLE NO. 366 NORMAL SPECTRAL REFLECTANCE OF CESIUM IODIDE CsI

[Wavelength, λ, μm; Reflectance, ρ; Temperature, T, K]

CURVE 1
T = 298

λ	ρ
2.50	0.994
2.70	0.978
2.86	0.932
3.00	0.918
3.15	0.910
3.31	0.916
3.45	0.906
3.62	0.961
3.98	0.966
5.00	0.949
5.00	0.953
5.43	0.957*
5.59	0.962
5.88	0.930
6.80	0.926
7.09	0.904
7.75	0.926
9.09	0.927*
10.6	0.930
14.0	0.909
17.5	0.895
20.0	0.898

CURVE 2
T = 573

λ	ρ
2.50	0.951
2.81	0.933*
2.86	0.923
2.92	0.906
3.11	0.901
3.22	0.893
3.34	0.901
3.44	0.904*
3.76	0.897
5.00	0.883
5.00	0.887*
5.65	0.856
5.95	0.846*
6.10	0.830
6.25	0.778
6.37	0.790
6.71	0.789
6.94	0.796
7.19	0.767*
7.35	0.725
7.41	0.673
7.52	0.736

CURVE 2 (cont.)

λ	ρ
7.69	0.771*
8.00	0.780
8.47	0.694
8.85	0.586
9.26	0.525
9.35	0.522*
9.90	0.561
10.7	0.666
11.3	0.701
11.6	0.693
11.9	0.719*
12.8	0.710
13.5	0.731*
14.2	0.740
15.6	0.727
16.6	0.715*
17.5	0.715
19.2	0.697
20.0	0.667

CURVE 3
T = 298

λ	ρ
2.50	0.924
2.72	0.922
2.80	0.772
2.87	0.747
3.03	0.719
3.23	0.726
3.44	0.759
3.69	0.787
4.24	0.799
5.00	0.804
5.00	0.809*
5.59	0.775
5.88	0.761
6.21	0.725
6.33	0.704
6.41	0.675
6.58	0.707
6.80	0.707*
7.04	0.710
7.25	0.673
7.41	0.604
7.52	0.690

CURVE 3 (cont.)

λ	ρ
7.75	0.760
7.94	0.769
8.20	0.736
8.70	0.596
9.09	0.539
9.35	0.521
9.90	0.561*
10.6	0.646
11.3	0.702
11.6	0.689
11.9	0.710
12.5	0.698*
12.8	0.694
13.5	0.719
15.8	0.710*
16.3	0.699
16.6	0.711
19.2	0.677
20.0	0.634

CURVE 4
T ~ 298

λ	ρ
2.10	0.080
8.40	0.100
20.1	0.100
30.0	0.100
34.8	0.092
40.0	0.092
45.2	0.082
47.9	0.061
50.0	0.027

CURVE 5
T = 300

λ	ρ
49.7	0.076
98.4	0.012
103	0.035
107	0.083
110	0.146
115	0.252
118	0.293
120	0.309
122	0.368

CURVE 5 (cont.)

λ	ρ
125	0.526
128	0.637
131	0.749
134	0.793
138	0.842
145	0.860
148	0.860*
152	0.844
157	0.816
162	0.757
165	0.676
170	0.533
173	0.488
178	0.438
188	0.373
201	0.325
211	0.297
223	0.278

*Not shown on plot

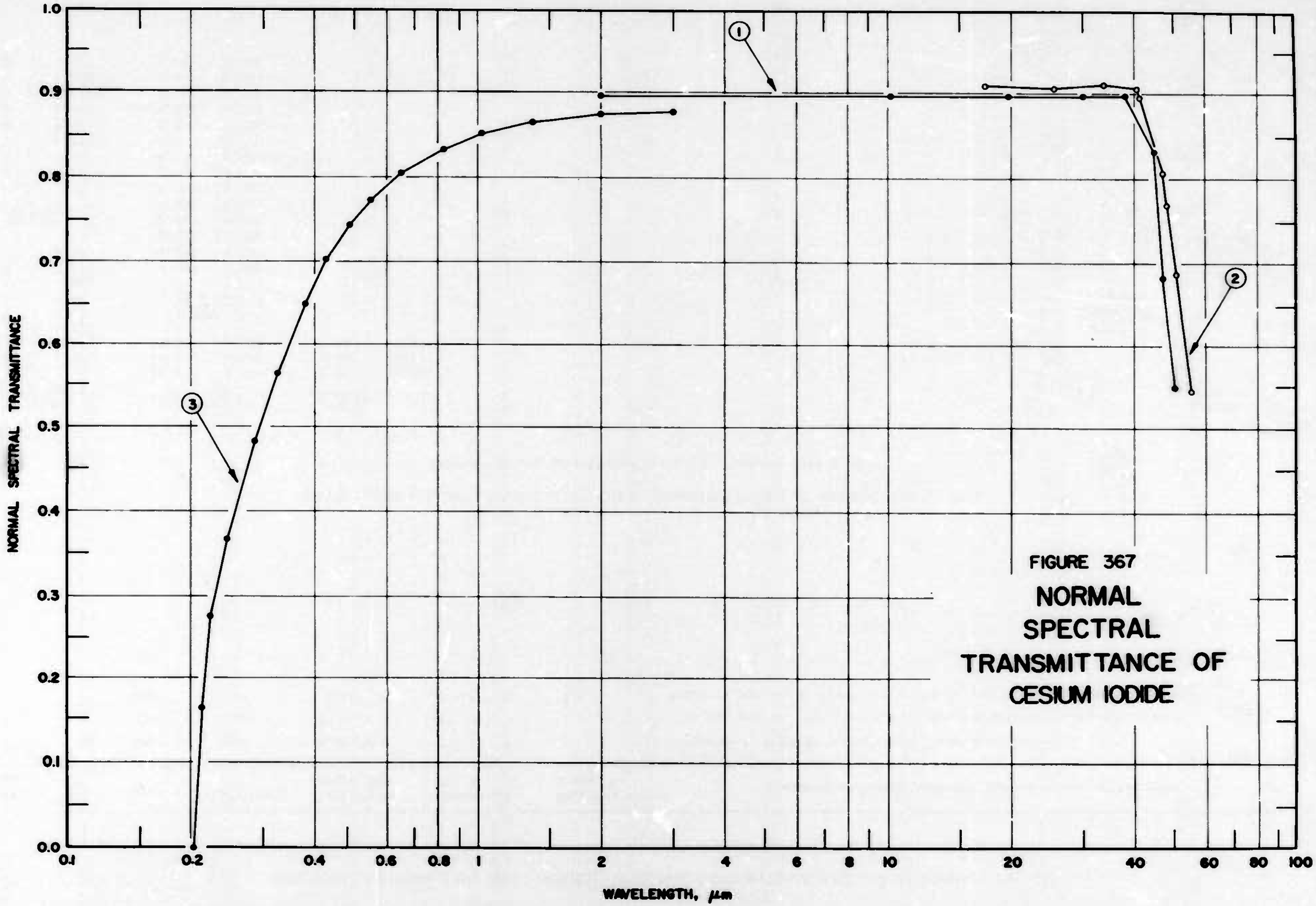


FIGURE 367
NORMAL SPECTRAL TRANSMITTANCE OF CESIUM IODIDE

SPECIFICATION TABLE NO. 367 NORMAL SPECTRAL TRANSMITTANCE OF CESIUM IODIDE CsI

Curve No.	Ref. No.	Year	Temperature K	Wavelength Range, μm	Geometry θ θ' ω'	Reported Error, %	Composition (weight percent), Specifications, and Remarks
1	67	1963	~298	2.00-50.0	0° 0°		Specimen 1 cm thick; data extracted from smooth curve.
2	93	1960	298	17.2-55.5	~0° ~0°		High purity crystal (5.0 mm thick); data extracted from smooth curve.
3	94	1967	298	0.203-3.00	~0° ~0°	±2	Single crystal (10.0 mm thick); polished; data extracted from smooth curve.

DATA TABLE NO. 367 NORMAL SPECTRAL TRANSMITTANCE OF CESIUM IODIDE CsI

[Wavelength, λ, μm; Transmittance, τ; Temperature, T, K]

λ	τ	λ	τ	λ	τ
CURVE 1 T ~ 298		**CURVE 2 (cont.)**		**CURVE 3 (cont.)**	
		48.0	0.770	1.38	0.866
2.00	0.897	50.7	0.688	2.00	0.876
10.1	0.897	55.5	0.542	3.00	0.879
19.9	0.897				
30.0	0.897	**CURVE 3** T = 298			
38.8	0.897				
42.8	0.832				
47.1	0.682	0.203	0.000		
50.0	0.549	0.212	0.161		
		0.222	0.276		
CURVE 2 T = 298		0.245	0.367		
		0.287	0.481		
		0.325	0.562		
17.2	0.908	0.368	0.624		
25.7	0.905	0.380	0.650		
33.9	0.910	0.425	0.702		
40.4	0.905	0.485	0.746		
41.8	0.894	0.554	0.773		
43.2	0.874*	0.657	0.805		
44.4	0.852*	0.824	0.833		
46.5	0.808	1.03	0.851		

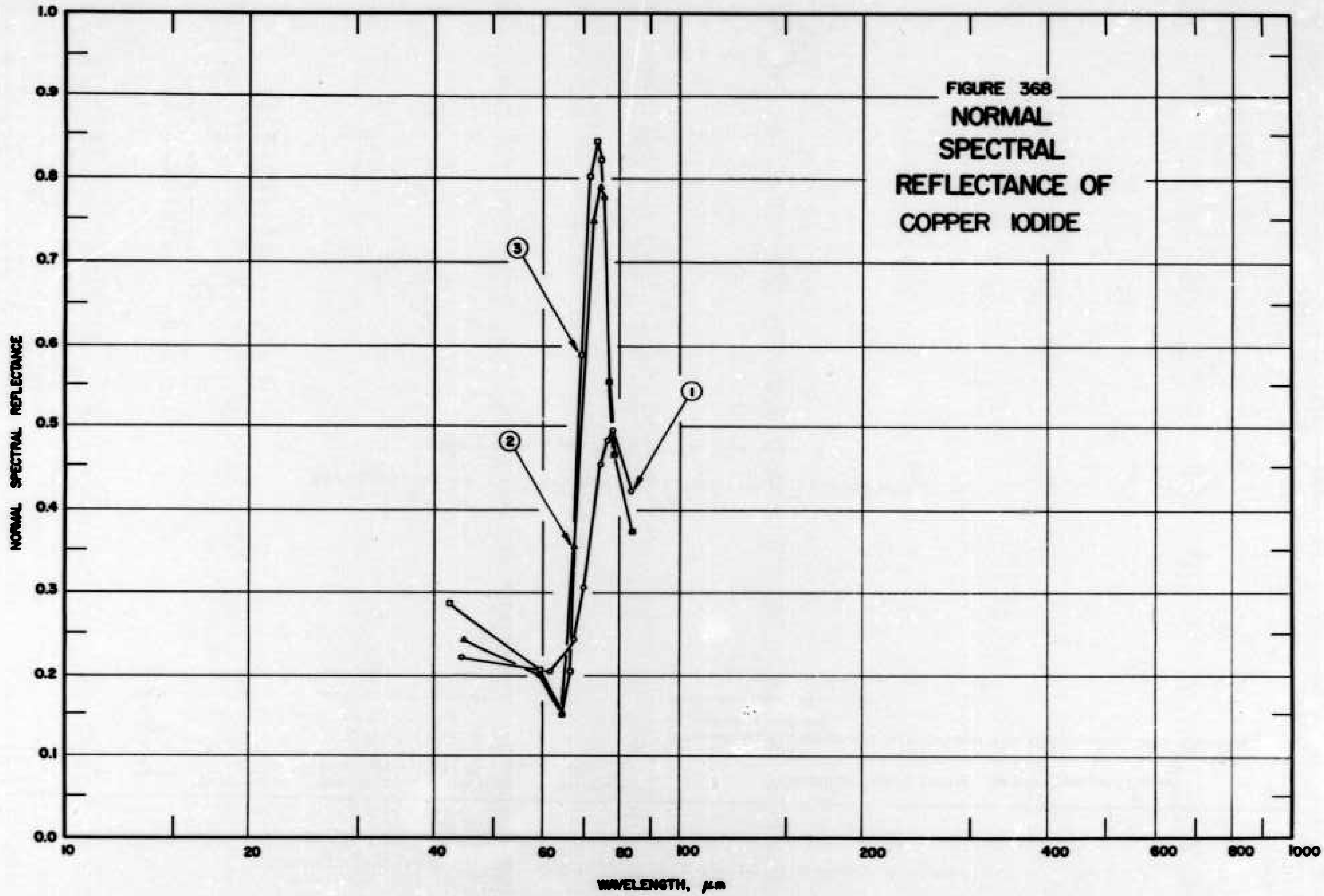


FIGURE 368
NORMAL SPECTRAL REFLECTANCE OF COPPER IODIDE

SPECIFICATION TABLE NO. 368 NORMAL SPECTRAL REFLECTANCE OF COPPER IODIDE CuI

Curve No.	Ref. No.	Year	Temperature K	Wavelength Range, μm	Geometry θ θ' ω'	Reported Error, %	Composition (weight percent), Specifications, and Remarks
1	424	1966	300	44.1-83.2	~0° ~0°		Pressed pellet (2 mm thick); data extracted from smooth curve; Al on CuI crystal reference standard.
2	424	1966	77	44.6-83.6	~0° ~0°		Above specimen and conditions.
3	424	1966	~20	42.3-83.6	~0° ~0°		Above specimen and conditions.

DATA TABLE NO. 368 NORMAL SPECTRAL REFLECTANCE OF COPPER IODIDE CuI

[Wavelength, λ, μm; Reflectance, ρ; Temperature, T, K]

λ	ρ	λ	ρ
CURVE 1 T = 300		CURVE 2 (cont.)	
44.1	0.221	77.0	0.556
61.6	0.204	78.9	0.464
67.1	0.244	83.6	0.373
70.0	0.306	CURVE 3 T ~ 20	
74.7	0.453	42.3	0.289
76.2	0.482	59.4	0.205
78.0	0.494	64.6	0.150
83.2	0.422	66.3	0.205
CURVE 2 T = 77		69.1	0.590
44.6	0.245	71.8	0.802
59.2	0.200	73.9	0.845
64.6	0.150	74.6	0.822
67.2	0.356	77.0	0.556
72.5	0.750	78.9	0.464
74.1	0.792	83.6	0.373
75.1	0.780		

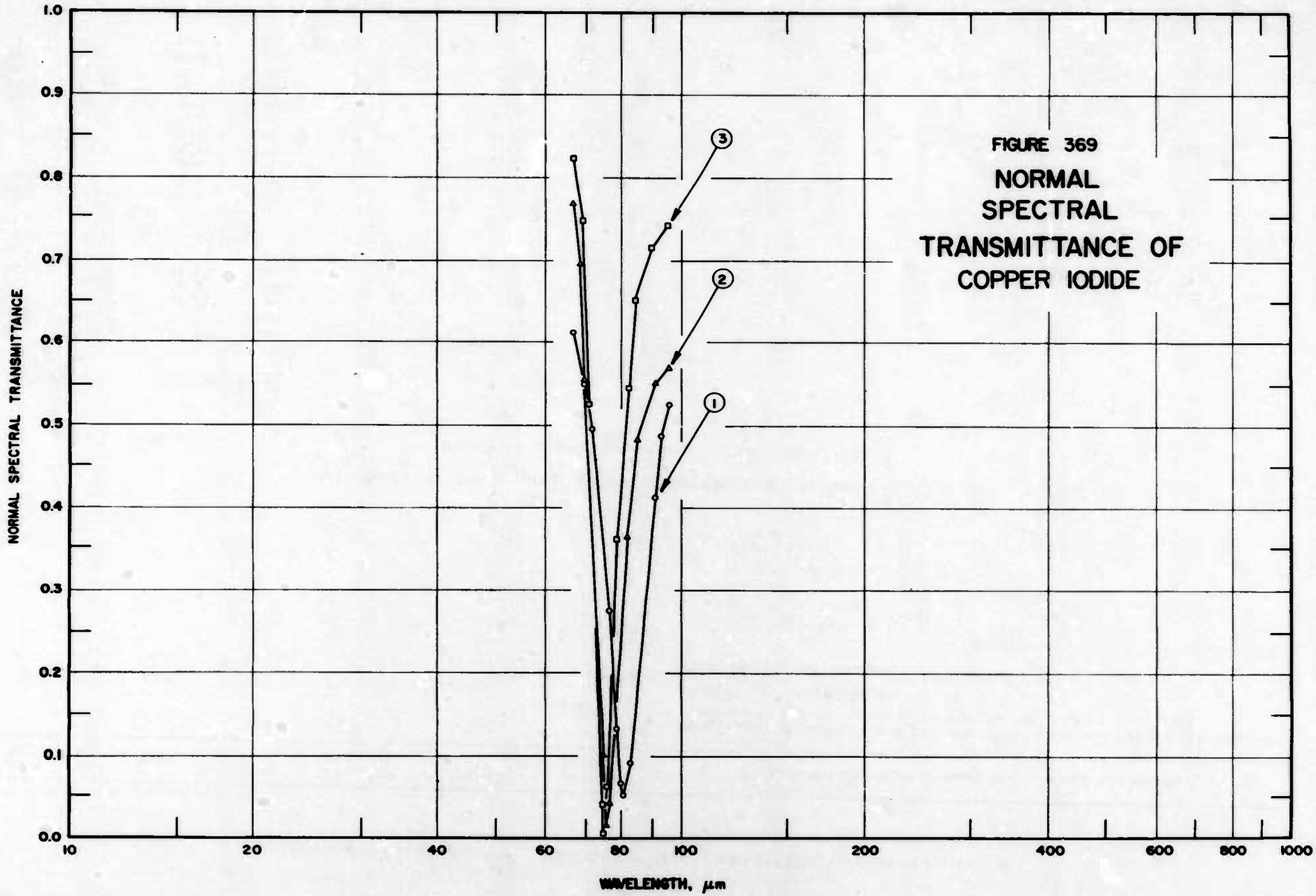


FIGURE 369
NORMAL
SPECTRAL
TRANSMITTANCE OF
COPPER IODIDE
NORMAL SPECTRAL TRANSMITTANCE
WAVELENGTH, μm
1.0
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0.0
10
20
40
60
80
100
200
400
600
800
1000
1
2
3

SPECIFICATION TABLE NO. 369 NORMAL SPECTRAL TRANSMITTANCE OF COPPER IODIDE CuI

Curve No.	Ref. No.	Year	Temperature K	Wavelength Range, μm	Geometry θ θ' ω'	Reported Error, %	Composition (weight percent), Specifications, and Remarks
1	424	1966	300	66.7-95.2	~0° ~0°		Film (4 μm thick) sublimed on quartz plate (2 mm thick); paraffin evaporated on film surface for protection; data extracted from smooth curve.
2	424	1966	77	66.7-95.2	~0° ~0°		Above specimen and conditions.
3	424	1966	20	66.7-95.2	~0° ~0°		Above specimen and conditions.

DATA TABLE NO. 369 NORMAL SPECTRAL TRANSMITTANCE OF COPPER IODIDE CuI

[Wavelength, λ, μm; Transmittance, τ; Temperature, T, K]

λ	τ	λ	τ
CURVE 1 T = 300		CURVE 2 (cont.)	
		75.8	0.019
66.7	0.611	76.9	0.044
69.9	0.551	81.3	0.362
71.4	0.497	84.7	0.483
76.3	0.274	90.9	0.553
78.7	0.131	95.2	0.571
80.0	0.069		
80.6	0.051	CURVE 3 T = 20	
82.6	0.093		
90.1	0.415		
92.6	0.489	66.7	0.824
95.2	0.525	69.0	0.747
		70.9	0.528
CURVE 2 T = 77		74.1	0.041
		74.6	0.008
		75.8	0.063
66.7	0.769	78.7	0.355
68.5	0.696	82.0	0.549
69.9	0.556	84.7	0.651
74.1	0.101	89.3	0.716
		95.2	0.740

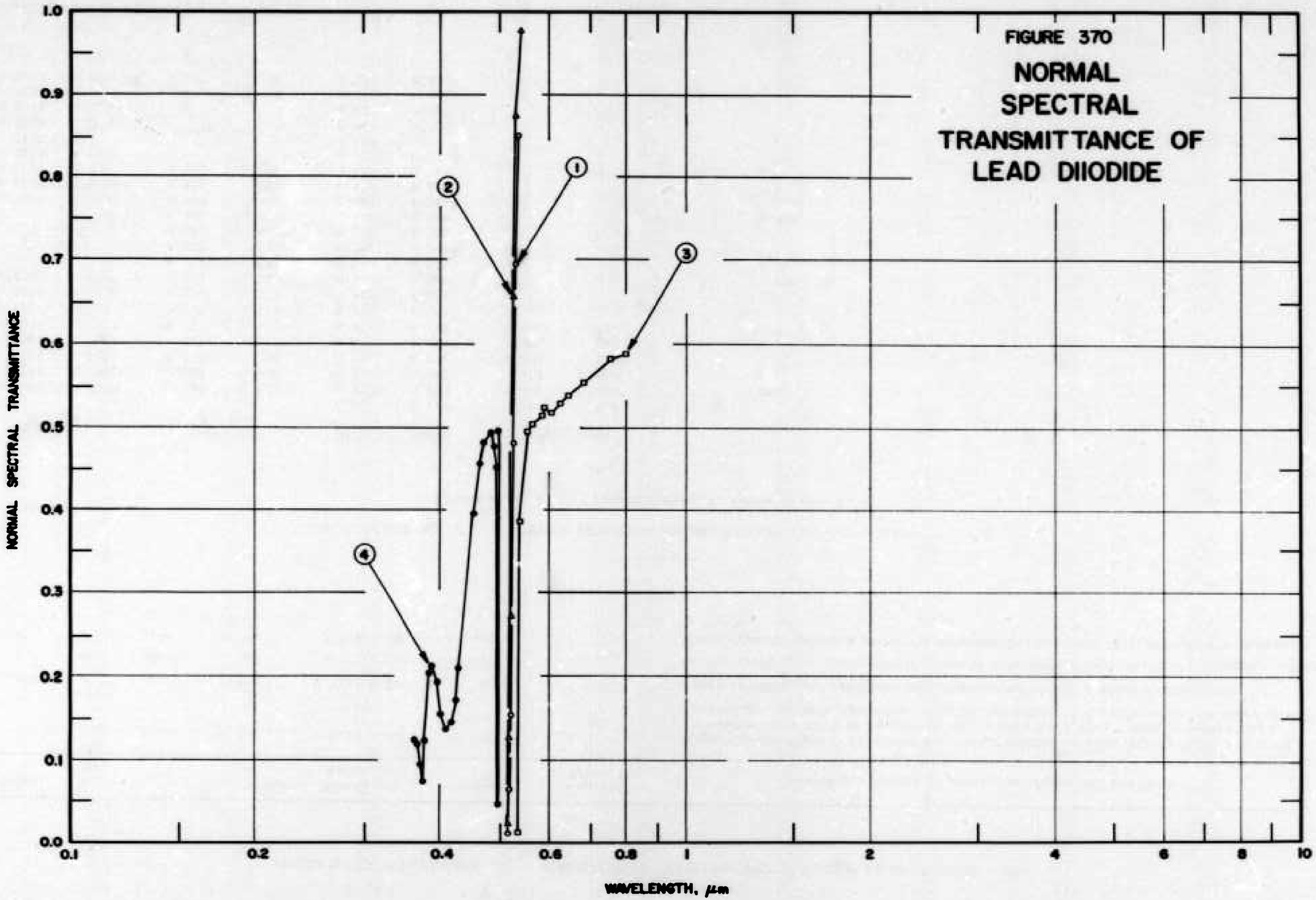


FIGURE 370
NORMAL
SPECTRAL
TRANSMITTANCE OF
LEAD DIIODIDE
NORMAL SPECTRAL TRANSMITTANCE
WAVELENGTH, μm
1.0
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0.0
0.1
0.2
0.4
0.6
0.8
1
2
4
6
8
10
1
2
3
4

SPECIFICATION TABLE NO. 370 NORMAL SPECTRAL TRANSMITTANCE OF LEAD DIIODIDE PbI_2

Curve No.	Ref. No.	Year	Temperature K	Wavelength Range, μm	Geometry θ	θ'	ω'	Reported Error, %	Composition (weight percent), Specifications, and Remarks
1	169	1962	298	0.5155-0.5352	0°	0°			Single crystal (6 μm thick) grown from water solution by slow cooling of the saturated solution from 373 K to room temp over a period of 8 hrs; c-axis perpendicular to specimen surface; applied ac electricl field (8×10^5 V cm^{-1}) coincident with c-axis.
2	169	1962	298	0.5149-0.5402	0°	0°			Above specimen and conditions except measured without applied electric field.
3	400	1969	~298	0.532-0.800	~0°	~0°			Single crystals (~0.5 mm thick); grown by zone-refined material by the Bridgman method.
4	401	1966	~ 77	0.362-0.498	~0°	~0°			Single crystal; radiation polarized perpendicular to c-axis; data extracted from smooth curve.

DATA TABLE NO. 370 NORMAL SPECTRAL TRANSMITTANCE OF LEAD DIIODIDE PbI_2

[Wavelength, λ, μm; Transmittance, τ; Temperature, T, K]

CURVE 1
T = 298

λ	τ
0.5155	0.0120
0.5165	0.0244*
0.5185	0.0650
0.5206	0.154
0.5224	0.299*
0.5254	0.484
0.5304	0.696
0.5352	0.853

CURVE 2
T = 298

λ	τ
0.5149	0.0243
0.5159	0.0448*
0.5180	0.128
0.5202	0.273
0.5223	0.469*
0.5250	0.659
0.5301	0.877
0.5349	0.957*
0.5402	0.979

CURVE 3
T ~ 298

λ	τ
0.532	0.0158
0.538	0.388
0.552	0.498
0.562	0.505
0.572	0.511*
0.582	0.516
0.589	0.525
0.601	0.519
0.621	0.530
0.642	0.540
0.662	0.545*
0.681	0.558
0.702	0.557*
0.751	0.583
0.800	0.590

CURVE 4
T ~ 77

λ	τ
0.362	0.124
0.366	0.120

CURVE 4 (cont.)

λ	τ
0.368	0.113*
0.370	0.096
0.370	0.080*
0.372	0.074
0.373	0.084*
0.377	0.123
0.379	0.168*
0.383	0.203
0.384	0.209*
0.386	0.212
0.390	0.208*
0.394	0.195
0.400	0.156
0.404	0.144*
0.409	0.138
0.416	0.147
0.422	0.172
0.428	0.210
0.451	0.399
0.461	0.457
0.470	0.484
0.475	0.492*

CURVE 4 (cont.)

λ	τ
0.481	0.494
0.486	0.489*
0.490	0.480
0.492	0.452
0.496	0.047
0.498	0.499

*Not shown on plot

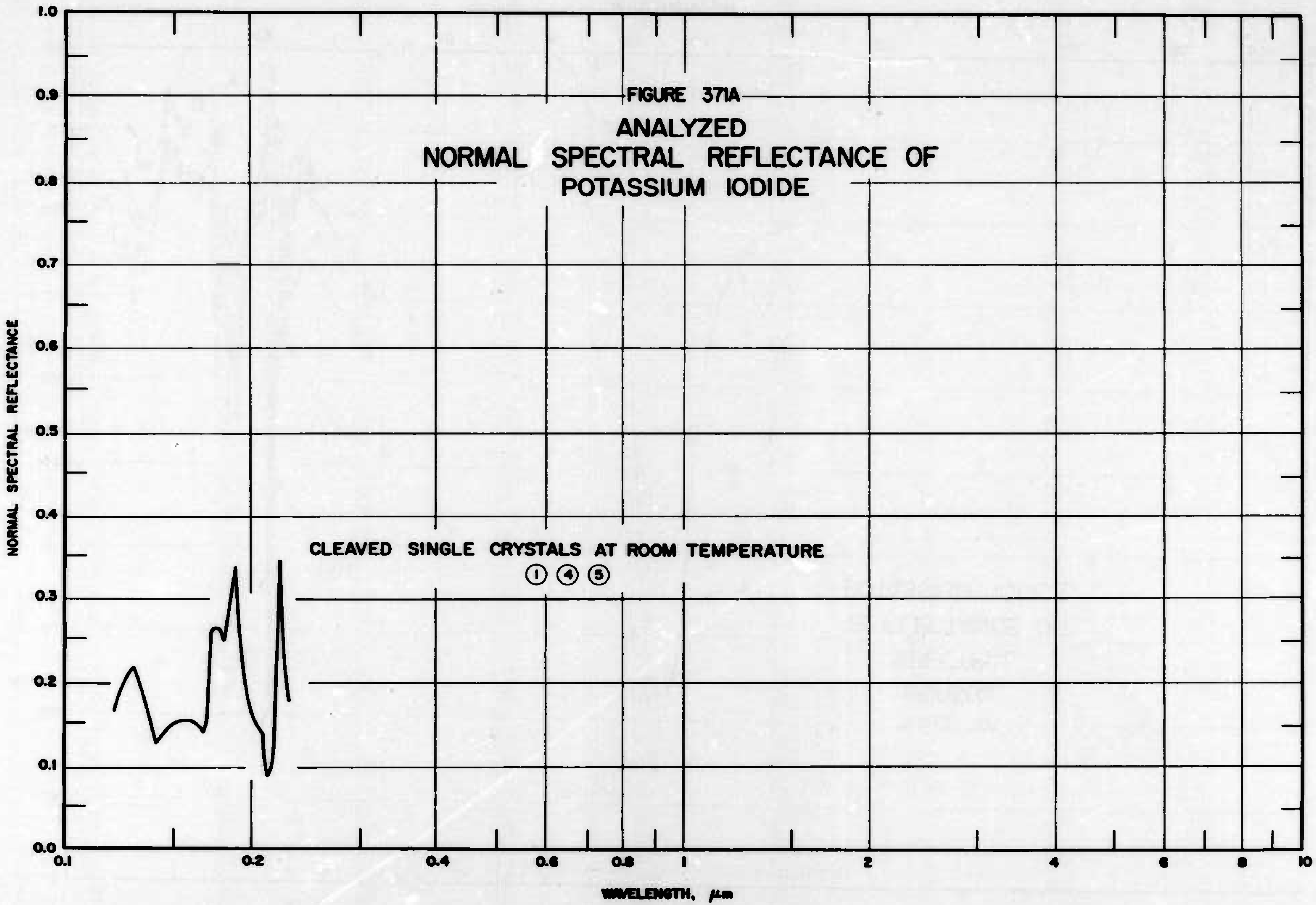


FIGURE 371A
ANALYZED
NORMAL SPECTRAL REFLECTANCE OF
POTASSIUM IODIDE
CLEAVED SINGLE CRYSTALS AT ROOM TEMPERATURE
1 4 5
NORMAL SPECTRAL REFLECTANCE
1.0
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0.0
0.1
0.2
0.4
0.6
0.8
1
2
4
6
8
10
WAVELENGTH, μm

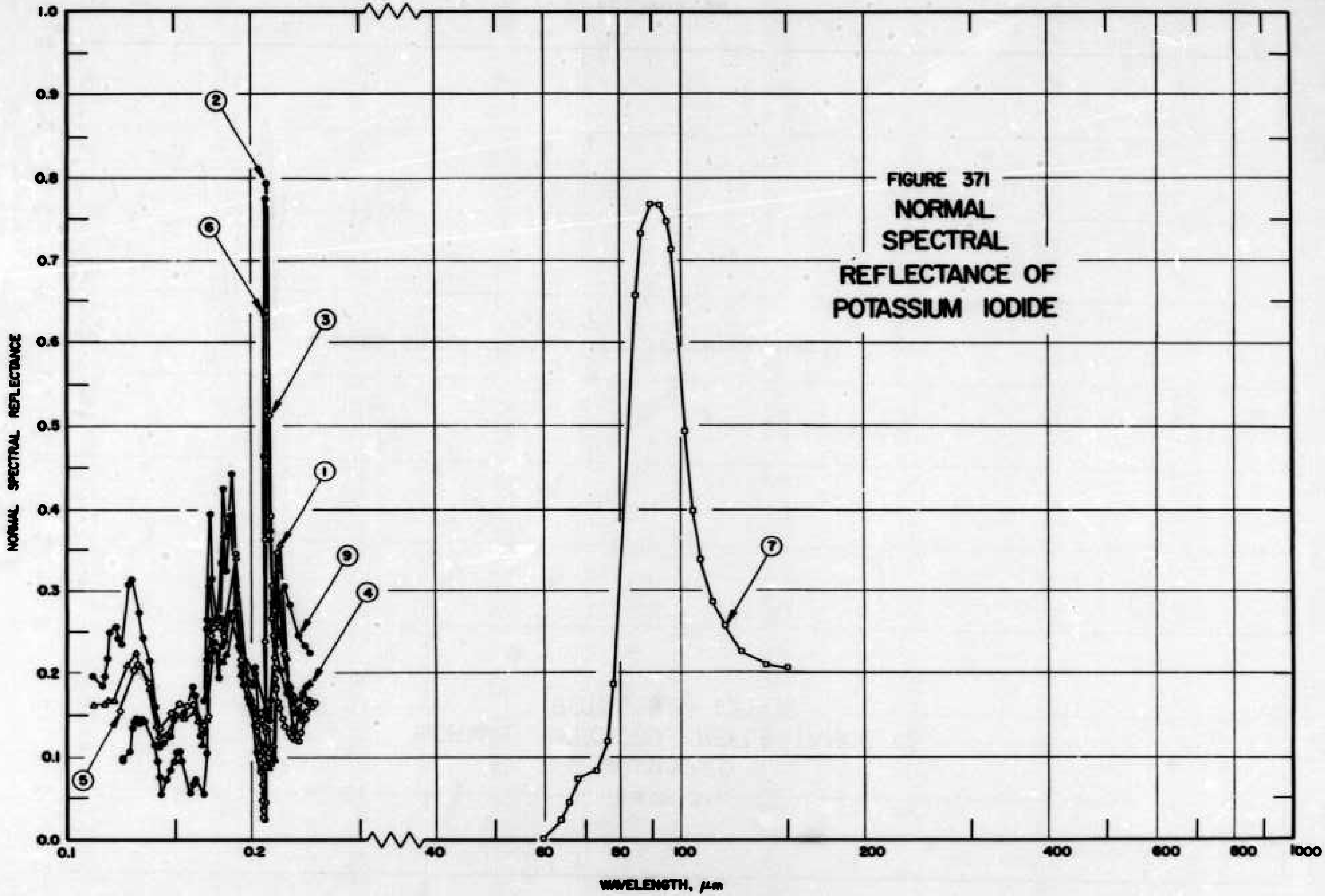


FIGURE 371 NORMAL SPECTRAL REFLECTANCE OF POTASSIUM IODIDE

SPECIFICATION TABLE NO. 371 NORMAL SPECTRAL REFLECTANCE OF POTASSIUM IODIDE KI

Curve No.	Ref. No.	Year	Temperature K	Wavelength Range, μm	Geometry θ θ' ω'	Reported Error, %	Composition (weight percent), Specifications, and Remarks
1	170	1967	300	0.110-0.248	~8° ~8°		Crystal cleaved in air (exposed to the atmosphere for about 2 min); measured in vacuum (10^{-7} mm Hg); data extracted from smooth curve.
2	170	1967	77	0.110-0.248	~8° ~8°		Above specimen and conditions.
3	171	1958	93	0.201-0.253	6° 6°		Single crystal; cleaved; measured in vacuum.
4	275	1968	~298	0.165-0.248	14° 14°		Single crystal (~2 mm thick); cleaved from a larger crystal in air; measured in vacuum (<5 x 10^{-8} mm Hg); data extracted from smooth curve.
5	377	1968	300	0.124-0.242	~20° ~20°		Cleaved single crystal; back surface treated with emery cloth; measured in vacuum (10^{-6} mm Hg); data extracted from smooth curve.
6	377	1968	55	0.124-0.242	~20° ~20°		Above specimen and conditions.
7	419	1962	300	59.9-149	12° 12°		Single crystal; measured in vacuum; data extracted from smooth curve; evaporated Al mirror reference standard.
8*	275	1968	~298	0.165-0.248	14° 14°		Film deposited on LiF substrate; thickness such that optical density = 0.102 at 6.1 eV; measured in vacuum (<5 x 10^{-8} mm Hg); data extracted from smooth curve.
9	275	1968	~298	0.166-0.248	14° 14°		Similar to the above specimen and conditions except optical density = 0.300 at 6.1 eV.
10*	275	1968	~298	0.166-0.246	14° 14°		Similar to the above specimen and conditions except optical density = 0.700 at 6.1 eV.
11*	273	1968	~298	0.166-0.248	14° 14°		Similar to the above specimen and conditions except optical density >2 at 6.1 eV.

* Not shown on plot

DATA TABLE NO. 371 NORMAL SPECTRAL REFLECTANCE OF POTASSIUM IODIDE KI

[Wavelength, λ, μm; Reflectance, ρ; Temperature, T, K]

CURVE 1
T = 300

λ	ρ
0.110	0.162
0.112	0.162*
0.115	0.162
0.117	0.168
0.119	0.186
0.125	0.208
0.129	0.224
0.132	0.206
0.136	0.181
0.139	0.138
0.141	0.126
0.145	0.127
0.150	0.150
0.155	0.147
0.161	0.153
0.164	0.142
0.167	0.142
0.168	0.158*
0.169	0.192
0.173	0.261
0.176	0.262
0.178	0.263
0.180	0.253
0.189	0.340
0.195	0.201
0.197	0.174
0.202	0.151
0.211	0.133
0.213	0.091
0.216	0.112
0.222	0.354
0.227	0.217
0.230	0.182
0.234	0.170
0.242	0.173
0.248	0.167

CURVE 2
T = 77

λ	ρ
0.110	0.197
0.114	0.186
0.115	0.196
0.117	0.217

CURVE 2 (cont.)

λ	ρ
0.118	0.250
0.120	0.256
0.122	0.241
0.124	0.236
0.127	0.309
0.128	0.316
0.131	0.272
0.134	0.243
0.136	0.214
0.136	0.181*
0.139	0.160
0.142	0.111
0.144	0.118
0.146	0.173
0.149	0.193
0.155	0.151
0.160	0.181
0.161	0.173
0.164	0.125
0.166	0.130
0.168	0.252
0.171	0.395
0.173	0.316
0.177	0.264
0.179	0.334
0.180	0.424
0.183	0.370
0.186	0.441
0.188	0.299
0.191	0.229
0.195	0.200
0.200	0.185
0.203	0.205
0.209	0.052
0.210	0.158
0.213	0.798
0.216	0.362
0.219	0.232
0.222	0.201
0.227	0.176
0.232	0.168
0.242	0.174
0.248	0.167

CURVE 3
T = 93

λ	ρ
0.201	0.144
0.202	0.138
0.202	0.130
0.203	0.110
0.204	0.100
0.205	0.0912
0.205	0.0817
0.206	0.0676
0.207	0.0571*
0.207	0.0466
0.208	0.0366
0.208	0.0264
0.209	0.0232
0.209	0.0465
0.210	0.130
0.210	0.238
0.210	0.362
0.211	0.453
0.212	0.518
0.213	0.554
0.213	0.511
0.214	0.391
0.215	0.306
0.215	0.266
0.216	0.244
0.217	0.219
0.217	0.203
0.218	0.192
0.219	0.180
0.220	0.165
0.221	0.159
0.221	0.154*
0.223	0.151*
0.223	0.146
0.225	0.142*
0.226	0.138
0.227	0.136*
0.228	0.134*
0.229	0.132*
0.230	0.131*
0.230	0.129
0.232	0.127*
0.233	0.125
0.234	0.123*
0.238	0.119

CURVE 3 (cont.)

λ	ρ
0.240	0.129
0.245	0.146
0.246	0.153
0.250	0.160
0.253	0.161

CURVE 4
T ~ 298

λ	ρ
0.165	0.116
0.171	0.216
0.172	0.227
0.173	0.227
0.179	0.212
0.181	0.221
0.188	0.286
0.189	0.279*
0.193	0.196
0.197	0.164
0.203	0.131*
0.208	0.114
0.212	0.092
0.213	0.088
0.215	0.096
0.219	0.282
0.220	0.324
0.228	0.185
0.231	0.135
0.233	0.131
0.238	0.157
0.243	0.182
0.245	0.186*
0.248	0.186

CURVE 5
T = 300

λ	ρ
0.124	0.156
0.128	0.201
0.130	0.209
0.131	0.209*
0.136	0.187
0.143	0.133
0.147	0.152
0.153	0.163

CURVE 5 (cont.)

λ	ρ
0.156	0.161
0.160	0.163
0.162	0.156*
0.166	0.139
0.168	0.149
0.171	0.229
0.172	0.246
0.173	0.254
0.176	0.254
0.180	0.245
0.188	0.342
0.193	0.214
0.199	0.168
0.205	0.151
0.208	0.143
0.213	0.104
0.218	0.276
0.220	0.347
0.225	0.221
0.230	0.175
0.234	0.159
0.242	0.142

CURVE 6
T = 55

λ	ρ
0.124	0.0980
0.124	0.0982*
0.126	0.108
0.127	0.134
0.128	0.141
0.129	0.144
0.131	0.140
0.132	0.140*
0.134	0.147
0.134	0.142
0.137	0.114
0.138	0.115*
0.140	0.0957
0.142	0.0787
0.143	0.0531
0.145	0.0716
0.146	0.0834
0.148	0.0871
0.149	0.0947

CURVE 6 (cont.)

λ	ρ
0.150	0.105
0.153	0.105
0.154	0.0955
0.158	0.0568
0.160	0.0678
0.162	0.0716
0.166	0.0547
0.167	0.102
0.168	0.216
0.169	0.264
0.170	0.306
0.177	0.193
0.180	0.367
0.182	0.326
0.185	0.395
0.188	0.274
0.191	0.208
0.194	0.183
0.196	0.171
0.199	0.167*
0.201	0.189
0.203	0.154
0.206	0.0875
0.208	0.0391
0.210	0.464
0.211	0.637
0.212	0.775
0.215	0.371
0.216	0.287
0.218	0.244
0.222	0.201*
0.227	0.175*
0.235	0.152
0.242	0.138

CURVE 7
T = 300

λ	ρ
59.9	0.000
63.3	0.024
65.3	0.044
67.4	0.072
72.6	0.081
75.3	0.119
77.2	0.185

CURVE 7 (cont.)

λ	ρ
84.1	0.656
86.2	0.732
89.7	0.768
92.2	0.768
95.0	0.746
96.8	0.711
102	0.491
104	0.399
107	0.337
112	0.285
117	0.256
125	0.225
136	0.209
149	0.203

CURVE 8*
T ~ 298

λ	ρ
0.165	0.129
0.167	0.133
0.168	0.143
0.171	0.159
0.172	0.166
0.174	0.166
0.176	0.161
0.178	0.161
0.180	0.166
0.182	0.174
0.184	0.185
0.186	0.210
0.188	0.214
0.190	0.209
0.191	0.188
0.194	0.159
0.195	0.150
0.197	0.141
0.201	0.125
0.209	0.104
0.211	0.101
0.214	0.110
0.216	0.121
0.219	0.154
0.221	0.157
0.230	0.127
0.233	0.112

CURVE 8 (cont.)*

λ	ρ
0.240	0.100
0.244	0.095
0.248	0.091

CURVE 9
T ~ 298

λ	ρ
0.166	0.168
0.171	0.227*
0.172	0.238*
0.174	0.239
0.177	0.231*
0.178	0.232
0.180	0.237
0.184	0.272
0.185	0.274*
0.186	0.274*
0.187	0.262*
0.188	0.243*
0.189	0.231
0.191	0.224*
0.202	0.199
0.207	0.181*
0.213	0.143
0.215	0.167
0.217	0.261*
0.218	0.278*
0.222	0.299
0.223	0.304*
0.225	0.304
0.230	0.281
0.234	0.263
0.238	0.246
0.244	0.231
0.248	0.223

CURVE 10*
T ~ 298

λ	ρ
0.166	0.118
0.168	0.152
0.169	0.168
0.171	0.177
0.173	0.178
0.176	0.171

*Not shown on plot

DATA TABLE NO. 371 (continued)

λ	ρ	λ	ρ
CURVE 10 (cont.)*		CURVE 11 (cont.)*	
0.178	0.172	0.222	0.071
0.179	0.179	0.223	0.056
0.185	0.215	0.225	0.050
0.186	0.215	0.229	0.047
0.188	0.203	0.231	0.050
0.190	0.158	0.234	0.050
0.192	0.139	0.236	0.048
0.194	0.128	0.242	0.050
0.196	0.122	0.248	0.055
0.204	0.113		
0.206	0.103		
0.211	0.064		
0.212	0.066		
0.213	0.074		
0.216	0.173		
0.217	0.204		
0.219	0.221		
0.221	0.178		
0.223	0.161		
0.224	0.161		
0.226	0.193		
0.228	0.207		
0.230	0.207		
0.236	0.189		
0.246	0.148		
CURVE 11* $T \sim 298$			
0.166	0.026		
0.168	0.039		
0.171	0.050		
0.172	0.053		
0.173	0.053		
0.178	0.042		
0.180	0.042		
0.184	0.055		
0.187	0.067		
0.188	0.067		
0.193	0.041		
0.197	0.030		
0.209	0.026		
0.212	0.024		
0.214	0.035		
0.217	0.060		
0.220	0.075		

*Not shown on plot

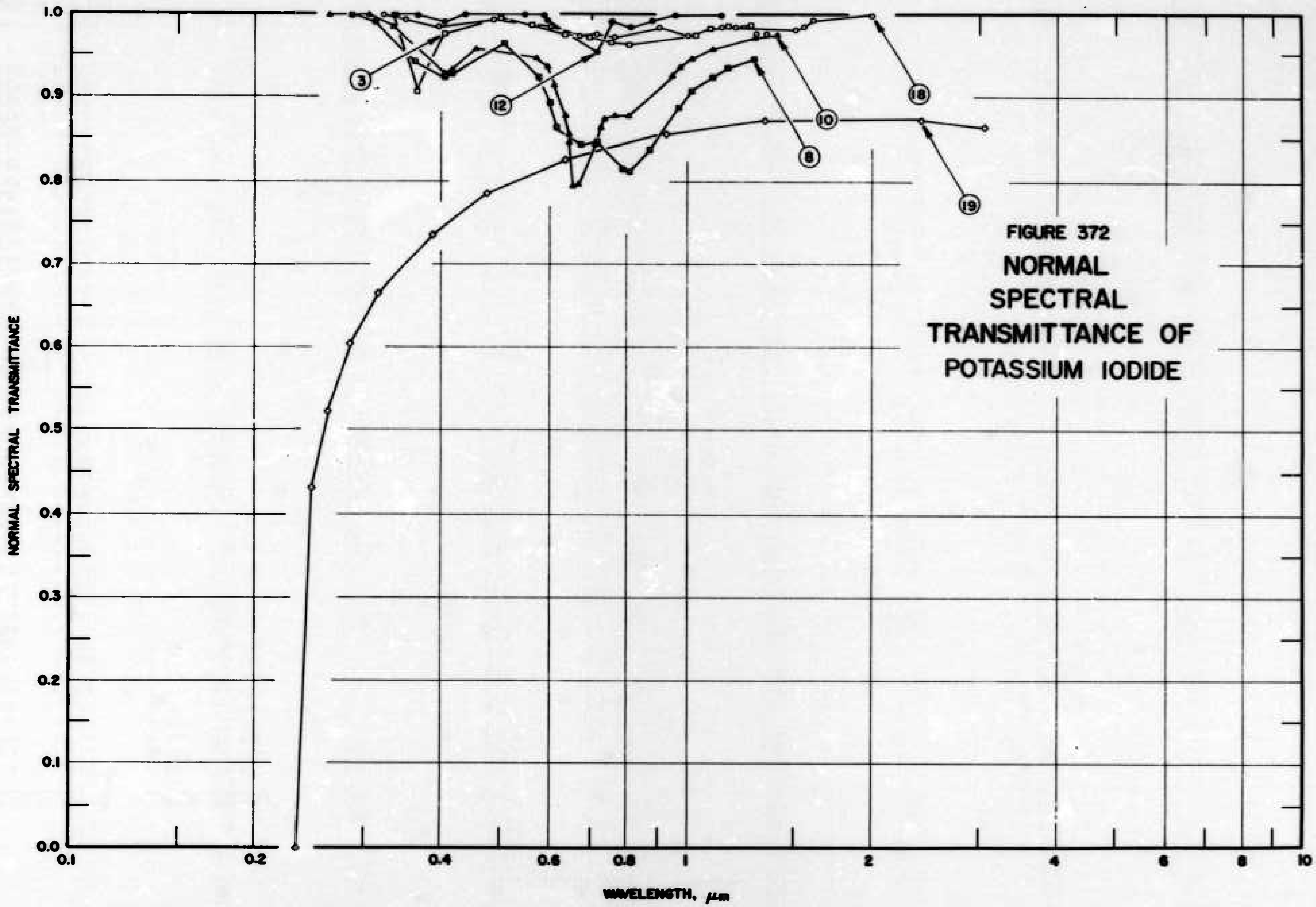


FIGURE 372
NORMAL
SPECTRAL
TRANSMITTANCE OF
POTASSIUM IODIDE

SPECIFICATION TABLE NO. 372 NORMAL SPECTRAL TRANSMITTANCE OF POTASSIUM IODIDE KI

Curve No.	Ref. No.	Year	Temperature K	Wavelength Range, μm	Geometry θ	θ'	ω'	Reported Error, %	Composition (weight percent), Specifications, and Remarks
1*	172	1967	78	0.300-0.771	0°	0°			Pure crystal from Harshaw Chemical Co. (2 mm thick); annealed; x-rayed at 78 K for 2 hrs; data extracted from smooth curve.
2*	172	1967	78	0.300-1.60	0°	0°			Pure crystal from Harshaw Chemical Co. (2 mm thick); plastically deformed (8000 kg cm^{-2}) and cooled to 78 K within 30 min of pressing; x-rayed at 78 K for 10 min; data extracted from smooth curve.
3	172	1967	78	0.337-1.27	0°	0°			Pure crystal from Harshaw Chemical Co. (2 mm thick); plastically deformed (8000 kg cm^{-2}) and cooled to 78 K within 30 min of pressing; x-rayed at 78 K for 15 sec; data extracted from smooth curve.
4*	172	1967	78	0.336-1.27	0°	0°			Similar to the above specimen and conditions except x-rayed at 78 K for 30 sec.
5*	172	1967	78	0.313-1.27	0°	0°			Similar to the above specimen and conditions except x-rayed at 78 K for 1 min.
6*	172	1967	78	0.299-1.27	0°	0°			Similar to the above specimen and conditions except x-rayed at 78 K for 3 min.
7*	172	1967	78	0.288-1.27	0°	0°			Similar to the above specimen and conditions except x-rayed at 78 K for 5 min.
8	172	1967	78	0.288-1.27	0°	0°			Similar to the above specimen and conditions except x-rayed at 78 K for 10 min.
9*	172	1967	78	0.288-1.27	0°	0°			Similar to the above specimen and conditions except x-rayed at 78 K for 15 min.
10	172	1967	78	0.263-1.40	0°	0°			Similar to the above specimen and conditions except x-rayed at 78 K for 2 hrs.
11*	172	1967	78	0.263-1.40	0°	0°			Above specimen and conditions except further irradiated using 1.01 μm light for 5.5 min.
12	172	1967	78	0.328-1.14	0°	0°			Above specimen and conditions except further irradiated using 1.01 μm light for total 70.5 min.
13*	172	1967	78	0.270-2.00	0°	0°			Pure crystal from Harshaw Chemical Co. (2 mm thick); plastically deformed (8000 kg cm^{-2}) and cooled to 78 K within 30 min of pressing; x-rayed at 78 K for 10 min; data extracted from smooth curve.
14*	172	1967	78	0.270-2.00	0°	0°			Above specimen and conditions except warmed up to 130 K (after first glow) and cooled back to 78 K.
15*	172	1967	78	0.292-2.00	0°	0°			Above specimen and conditions except warmed up to 143 K (second glow) and cooled back to 78 K.
16*	172	1967	78	0.292-2.00	0°	0°			Above specimen and conditions except warmed up to 175 K (third glow) and cooled back to 78 K.
17*	172	1967	78	0.308-2.00	0°	0°			Above specimen and conditions except warmed up to 205 K (fourth glow) and cooled back to 78 K.
18	172	1967	78	0.321-2.00	0°	0°			Above specimen and conditions except warmed up to 225 K (fifth glow) and cooled back to 78 K.
19	373	1968	~298	0.233-3.03	~0°	~0°			Synthetic single crystal (4.3 mm thick); data extracted from smooth curve.

* Not shown on plot

DATA TABLE NO. 372 NORMAL SPECTRAL TRANSMITTANCE OF POTASSIUM IODIDE KI

[Wavelength, λ, μm; Transmittance, τ; Temperature, T, K]

λ	τ
CURVE 1*	**T = 78**
0.300	1.000
0.368	0.995
0.402	0.995
0.428	1.000
0.526	1.000
0.587	0.993
0.624	0.984
0.661	0.946
0.672	0.946
0.682	0.946
0.707	0.975
0.726	0.984
0.771	0.993
CURVE 2*	**T = 78**
0.300	1.000
0.334	0.984
0.368	0.935
0.411	0.908
0.485	0.955
0.509	0.962
0.543	0.959
0.646	0.841
0.671	0.832
0.714	0.834
0.801	0.813
0.844	0.822
0.952	0.885
1.03	0.910
1.14	0.935
1.27	0.953
1.38	0.964
1.49	0.973
1.60	0.979
CURVE 3	**T = 78**
0.337	1.000
0.366	0.908
0.495	0.979
0.500	0.998
0.560	0.989
CURVE 3 (cont.)	
0.637	0.977
0.691	0.973
0.756	0.968
0.805	0.964
1.02	0.977
1.09	0.982
1.16	0.986
1.27	0.989
CURVE 4*	**T = 78**
0.336	1.000
0.366	0.991
0.410	0.971
0.503	0.993
0.597	0.975
0.676	0.957
0.716	0.955
0.808	0.942
0.824	0.942
0.951	0.959
0.988	0.964
1.04	0.968
1.11	0.973
1.17	0.977
1.27	0.982
CURVE 5*	**T = 78**
0.313	1.000
0.332	0.995
0.383	0.966
0.410	0.957
0.487	0.986
0.502	0.989
0.622	0.957
0.672	0.940
0.690	0.938
0.779	0.923
0.810	0.920
0.964	0.946
1.02	0.955
1.11	0.966
1.19	0.971
CURVE 5 (cont.)*	
1.21	0.973
1.27	0.977
CURVE 6*	**T = 78**
0.299	1.000
0.324	0.993
0.360	0.975
0.410	0.948
0.420	0.951
0.502	0.982
0.600	0.944
0.675	0.902
0.727	0.914
0.803	0.893
0.937	0.929
1.05	0.948
1.12	0.957
1.19	0.962
1.27	0.968
CURVE 7*	**T = 78**
0.288	1.000
0.313	0.993
0.360	0.962
0.411	0.933
0.457	0.951
0.506	0.973
0.583	0.944
0.607	0.923
0.629	0.893
0.675	0.871
0.727	0.879
0.804	0.849
0.859	0.865
0.946	0.904
1.04	0.929
1.13	0.946
1.20	0.953
1.27	0.959
CURVE 8	**T = 78**
0.288	1.000
0.316	0.991
0.361	0.942
0.405	0.923
0.419	0.927
0.508	0.966
0.574	0.925
0.600	0.895
0.617	0.867
0.674	0.843
0.717	0.849
0.790	0.818
0.807	0.815
0.870	0.838
0.970	0.889
1.02	0.908
1.10	0.923
1.17	0.935
1.27	0.946
CURVE 9*	**T = 78**
0.288	1.000
0.319	0.991
0.364	0.938
0.403	0.923
0.419	0.927
0.506	0.966
0.577	0.918
0.598	0.897
0.613	0.865
0.666	0.832
0.720	0.843
0.800	0.815
0.894	0.849
0.983	0.893
1.04	0.912
1.12	0.927
1.19	0.938
1.27	0.946
CURVE 10	
0.263	1.000
0.307	1.000
0.337	0.986
0.403	0.927
0.419	0.931
0.455	0.957
0.504	0.966*
0.570	0.948
0.592	0.938
0.610	0.916
0.635	0.879
0.643	0.855
0.645	0.847
0.655	0.798
0.669	0.794
0.710	0.845
0.726	0.863
0.739	0.873
0.762	0.879
0.804	0.879
0.943	0.927
0.975	0.938
1.03	0.948
1.10	0.957
1.29	0.971
1.40	0.977
CURVE 11*	**T = 78**
0.263	1.000
0.343	0.995
0.358	0.991
0.377	0.977
0.381	0.971
0.405	0.964
0.446	0.979
0.478	0.986
0.507	0.986
0.539	0.982
0.577	0.971
0.595	0.957
0.659	0.849
0.673	0.845
0.726	0.938
0.765	0.944
CURVE 11 (cont.)*	
0.813	0.940
0.851	0.948
0.903	0.962
0.948	0.968
1.01	0.975
1.08	0.979
1.15	0.984
1.27	0.989
1.40	0.993
CURVE 12	**T = 78**
0.328	1.000
0.365	1.000
0.408	0.991
0.437	1.000
0.544	1.000
0.583	1.000
0.592	0.993
0.674	0.867
0.717	0.953
0.758	0.991
0.810	0.986
0.877	0.993
0.957	1.000
1.14	1.000
CURVE 13*	**T = 78**
0.270	1.000
0.328	0.993
0.357	0.973
0.368	0.953
0.400	0.940
0.446	0.966
0.504	0.975
0.516	0.975
0.600	0.933
0.670	0.883
0.708	0.889
0.753	0.881
0.801	0.869
0.935	0.914
0.998	0.933
CURVE 13 (cont.)*	
1.07	0.944
1.12	0.951
1.20	0.955
1.40	0.971
1.60	0.982
1.80	0.991
2.00	1.000
CURVE 14*	**T = 78**
0.270	1.000
0.331	0.993
0.359	0.973
0.371	0.953
0.400	0.940
0.446	0.962
0.497	0.966
0.556	0.962
0.598	0.948
0.671	0.891
0.707	0.893
0.800	0.883
0.902	0.918
1.00	0.942
1.12	0.959
1.19	0.966
1.40	0.977
1.60	0.989
1.80	0.995
2.00	1.000
CURVE 15*	**T = 78**
0.292	1.000
0.337	0.993
0.361	0.982
0.404	0.966
0.456	0.977
0.501	0.986
0.576	0.979
0.609	0.973
0.628	0.953
0.649	0.929
0.677	0.920
CURVE 15 (cont.)*	
0.800	0.938
0.998	0.962
1.20	0.975
1.40	0.986
1.60	0.993
2.00	1.000
CURVE 16*	**T = 78**
0.292	1.000
0.337	0.993
0.361	0.982
0.404	0.966
0.430	0.968
0.468	0.977
0.524	0.982
0.597	0.975
0.619	0.964
0.647	0.931
0.683	0.916
0.801	0.946
0.855	0.955
0.914	0.959
0.998	0.957
1.03	0.959
1.10	0.973
1.20	0.982
1.40	0.991
1.60	0.995
2.00	1.000
CURVE 17*	**T = 78**
0.308	1.000
0.351	0.991
0.404	0.973
0.421	0.973
0.458	0.989
0.502	0.986
0.553	0.989
0.611	0.979
0.669	0.964
0.697	0.966
0.749	0.959

*Not shown on plot

DATA TABLE NO. 372 (continued)

λ	τ
CURVE 17 (cont.)*	
T = 78	
0.870	0.971
0.900	0.973
1.00	0.968
1.09	0.977
1.20	0.982
1.30	0.977
1.35	0.977
1.40	0.977
1.50	0.986
1.70	0.993
2.00	1.000
CURVE 18	
T = 78	
0.321	1.000
0.350	0.993
0.398	0.984
0.487	0.995
0 600	0.986
0.670	0.975
0.716	0.977
0.766	0.973
0.900	0.984
1.00	0.977
1.14	0.986
1.20	0.986
1.30	0.977
1.35	0.977
1.50	0.982
1.55	0.986
1.60	0.993
2.00	1.000
CURVE 19	
T ~ 298	
0.233	0.000
0.249	0.434
0.262	0.521
0.285	0.604
0.319	0.668
0.389	0.738
0.474	0.786
0.633	0.827
CURVE 19 (cont.)	
0.925	0.858
1.34	0.871
2.40	0.871
3.03	0.866

*Not shown on plot

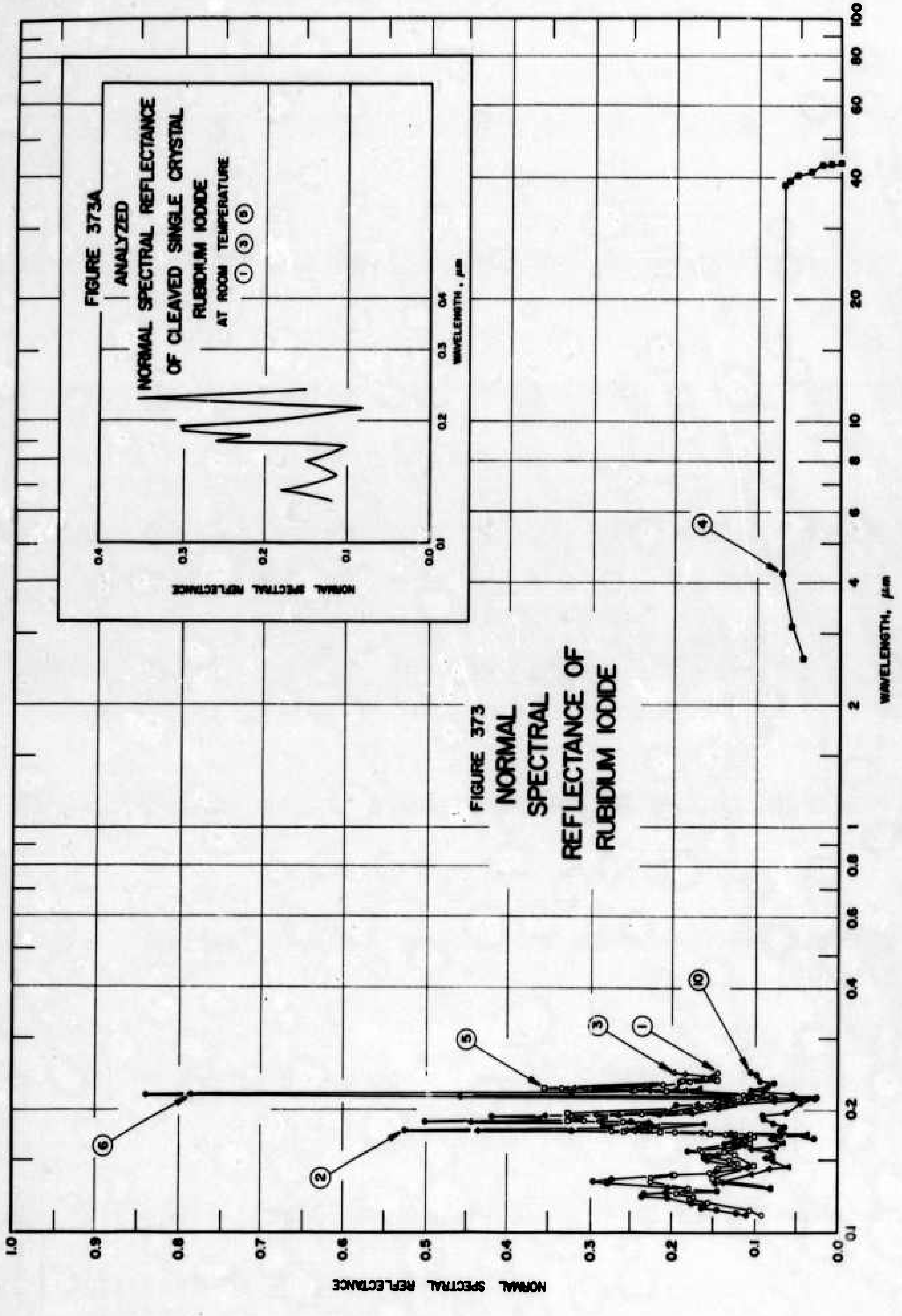


FIGURE 373 NORMAL SPECTRAL REFLECTANCE OF RUBIDIUM IODIDE

SPECIFICATION TABLE NO. 373 NORMAL SPECTRAL REFLECTANCE OF RUBIDIUM IODIDE RbI

Curve No.	Ref. No.	Year	Temperature K	Wavelength Range, μm	Geometry θ	Geometry θ'	Geometry ω'	Reported Error, %	Composition (weight percent), Specifications, and Remarks
1	170	1967	300	0.110-0.248	~8°	~8°			Single crystal cleaved in air (exposed to the atmosphere for about 2 min); measured in vacuum (10^{-7} mm Hg); data extracted from smooth curve.
2	170	1967	77	0.110-0.284	~8°	~8°			Above specimen and conditions.
3	275	1968	~298	0.174-0.248	14°	14°			Single crystal (~2 mm thick); cleaved from a larger crystal in air; measured in vacuum ($<5 \times 10^{-6}$ mm Hg); data extracted from smooth curve.
4	87	1968	313	2.60-43.8	30°	30°			Synthetic single crystal (3.9 mm thick); flat to ten fringes or better; data extracted from smooth curve; aluminum mirror reference standard.
5	377	1968	300	0.129-0.238	~20°	~20°			Cleaved single crystal; back surface treated with emery cloth; measured in vacuum ($<10^{-6}$ mm Hg); data extracted from smooth curve.
6	377	1968	55	0.129-0.225	~20°	~20°			Above specimen and conditions.
7*	275	1968	~298	0.169-0.247	14°	14°			Film deposited on LiF substrate; thickness such that optical density = 0.065 at 6.0 eV; measured in vacuum ($<5 \times 10^{-6}$ mm Hg); data extracted from smooth curve.
8*	273	1968	~298	0.169-0.247	14°	14°			Similar to the above specimen and conditions except optical density = 0.162 at 6.0 eV.
9*	273	1968	~298	0.169-0.248	14°	14°			Similar to the above specimen and conditions except optical density = 0.728 at 6.0 eV.
10	273	1968	~298	0.170-0.248	14°	14°			Similar to the above specimen and conditions except optical density >2 at 6.0 eV.

* Not shown on plot

DATA TABLE NO. 373 NORMAL SPECTRAL REFLECTANCE OF RUBIDIUM IODIDE RbI

[Wavelength, λ, μm; Reflectance, ρ; Temperature, T, K]

CURVE 1
T = 300

λ	ρ
0.110	0.090
0.114	0.114
0.118	0.154
0.120	0.177
0.121	0.172
0.123	0.191
0.129	0.179
0.133	0.224
0.135	0.224
0.138	0.193
0.140	0.152
0.144	0.143
0.146	0.126
0.148	0.120
0.150	0.130
0.153	0.153
0.158	0.163
0.160	0.165
0.164	0.135
0.169	0.111
0.174	0.135
0.175	0.197
0.178	0.271
0.181	0.235
0.184	0.233
0.188	0.307
0.193	0.322
0.195	0.236
0.199	0.187
0.204	0.155
0.210	0.144
0.216	0.099
0.219	0.114
0.222	0.241
0.224	0.336
0.230	0.210
0.233	0.178
0.234	0.184
0.240	0.159
0.248	0.143

CURVE 2
T = 77

λ	ρ
0.110	0.110
0.112	0.121
0.114	0.144
0.116	0.161
0.118	0.159
0.119	0.176
0.121	0.201
0.123	0.234
0.124	0.232
0.125	0.205
0.127	0.144
0.129	0.203
0.131	0.278
0.132	0.294
0.134	0.271
0.138	0.196
0.141	0.146
0.145	0.109
0.147	0.109
0.150	0.155
0.152	0.160
0.156	0.143
0.158	0.130
0.162	0.124
0.165	0.111
0.167	0.115
0.170	0.124*
0.171	0.110
0.173	0.067
0.174	0.128
0.175	0.194*
0.177	0.525
0.179	0.322
0.180	0.272
0.182	0.283
0.183	0.224
0.184	0.249
0.186	0.500
0.189	0.310
0.191	0.418
0.192	0.322*
0.194	0.261
0.196	0.211
0.203	0.169*

CURVE 2 (cont.)

λ	ρ
0.205	0.192
0.207	0.134
0.211	0.074
0.212	0.025
0.216	0.839
0.220	0.322
0.222	0.244
0.226	0.191
0.232	0.179*
0.235	0.186
0.240	0.159
0.248	0.143*

CURVE 3
T ~ 298

λ	ρ
0.174	0.122
0.176	0.164
0.178	0.244
0.179	0.252
0.183	0.218
0.184	0.215*
0.185	0.227
0.189	0.289
0.191	0.280
0.193	0.292
0.195	0.286*
0.198	0.205
0.201	0.165
0.205	0.142
0.211	0.126
0.214	0.107
0.216	0.090
0.219	0.104
0.221	0.182
0.224	0.306
0.225	0.320
0.229	0.232
0.234	0.176*
0.238	0.155*
0.240	0.150
0.244	0.184
0.248	0.197

CURVE 4
T = 313

λ	ρ
2.60	0.045
3.10	0.057
4.20	0.069
38.1	0.069
39.4	0.062
40.7	0.053
41.8	0.039
42.8	0.024
43.4	0.014
43.8	0.000

CURVE 5
T = 300

λ	ρ
0.129	0.0800
0.134	0.144
0.135	0.148
0.146	0.100
0.148	0.100*
0.154	0.124
0.158	0.137
0.160	0.127*
0.165	0.110*
0.166	0.104
0.168	0.100*
0.171	0.100
0.172	0.105
0.175	0.151
0.176	0.211
0.178	0.255
0.179	0.255*
0.180	0.224
0.182	0.220
0.184	0.228*
0.185	0.257
0.188	0.327
0.189	0.258*
0.190	0.324*
0.194	0.325
0.202	0.164
0.204	0.141*
0.208	0.130
0.212	0.111
0.216	0.0789

CURVE 5 (cont.)

λ	ρ
0.218	0.0806
0.221	0.206
0.225	0.352
0.231	0.188*
0.238	0.143

CURVE 6
T = 55

λ	ρ
0.129	0.0800
0.133	0.139
0.133	0.146
0.135	0.148*
0.139	0.101
0.143	0.0800
0.147	0.0576
0.150	0.0775
0.151	0.0840
0.156	0.0780
0.158	0.0807
0.160	0.102
0.163	0.0713
0.165	0.0676*
0.167	0.0636
0.170	0.0795
0.171	0.0733
0.172	0.0736*
0.174	0.0388
0.177	0.434
0.180	0.227
0.182	0.218*
0.182	0.225*
0.184	0.160
0.186	0.443
0.189	0.255*
0.192	0.362
0.194	0.216
0.197	0.175
0.202	0.142
0.205	0.168
0.207	0.123
0.210	0.0743
0.213	0.0294
0.214	0.458
0.216	0.745

CURVE 6 (cont.)

λ	ρ
0.221	0.227
0.223	0.194*
0.225	0.167

CURVE 7*
T ~ 298

λ	ρ
0.169	0.114
0.171	0.112
0.174	0.114
0.176	0.119
0.177	0.126
0.178	0.133
0.179	0.136
0.180	0.136
0.183	0.131
0.185	0.131
0.188	0.147
0.190	0.148
0.193	0.156
0.194	0.156
0.197	0.129
0.199	0.117
0.203	0.103
0.205	0.094
0.211	0.085
0.213	0.082
0.217	0.082
0.220	0.092
0.224	0.133
0.225	0.139
0.227	0.139
0.230	0.118
0.233	0.104
0.236	0.099
0.240	0.092
0.244	0.086
0.247	0.083

CURVE 8*
T ~ 298

λ	ρ
0.169	0.153
0.170	0.150
0.172	0.150

CURVE 8 (cont.)*

λ	ρ
0.173	0.154
0.175	0.161
0.176	0.169
0.177	0.185
0.178	0.209
0.179	0.220
0.180	0.223
0.181	0.223
0.182	0.218
0.184	0.216
0.185	0.222
0.188	0.247
0.190	0.270
0.192	0.275
0.194	0.294
0.194	0.297
0.195	0.297
0.197	0.278
0.200	0.227
0.201	0.209
0.204	0.185
0.208	0.159
0.216	0.120
0.218	0.120
0.220	0.147
0.225	0.246
0.227	0.262
0.228	0.259
0.232	0.218
0.235	0.191
0.239	0.170
0.242	0.156
0.247	0.140

CURVE 9*
T ~ 298

λ	ρ
0.169	0.075
0.171	0.075
0.173	0.085
0.174	0.093
0.176	0.115
0.177	0.143
0.178	0.158
0.179	0.158

CURVE 9 (cont.)*

λ	ρ
0.182	0.146
0.182	0.144
0.183	0.145
0.184	0.151
0.186	0.174
0.187	0.185
0.188	0.190
0.189	0.194
0.190	0.194
0.191	0.191
0.192	0.191
0.193	0.201
0.195	0.191
0.198	0.142
0.200	0.121
0.201	0.112
0.203	0.107
0.206	0.102
0.211	0.101
0.213	0.096
0.216	0.081
0.218	0.085
0.219	0.099
0.221	0.124
0.221	0.148
0.222	0.174
0.223	0.184
0.223	0.193
0.225	0.198
0.226	0.195
0.228	0.149
0.230	0.129
0.230	0.125
0.232	0.132
0.234	0.159
0.236	0.180
0.237	0.191
0.239	0.199
0.241	0.204
0.244	0.206
0.246	0.202
0.248	0.197

*Not shown on plot

DATA TABLE NO. 373 (continued)

λ	ρ
CURVE 10	
T ~ 298	
0.170	0.029
0.171	0.031*
0.172	0.033*
0.174	0.040*
0.175	0.050*
0.177	0.065*
0.178	0.068
0.182	0.061
0.183	0.064*
0.186	0.076
0.188	0.084*
0.189	0.087*
0.190	0.087
0.192	0.086*
0.193	0.090*
0.194	0.090
0.196	0.071*
0.198	0.060
0.200	0.053*
0.203	0.048*
0.209	0.044
0.214	0.037*
0.216	0.037*
0.218	0.046*
0.219	0.052
0.220	0.063*
0.221	0.076*
0.221	0.088
0.223	0.101*
0.224	0.104
0.225	0.104*
0.227	0.096*
0.228	0.081
0.229	0.076*
0.231	0.076
0.235	0.091
0.241	0.093*
0.244	0.098
0.248	0.104

*Not shown on plot

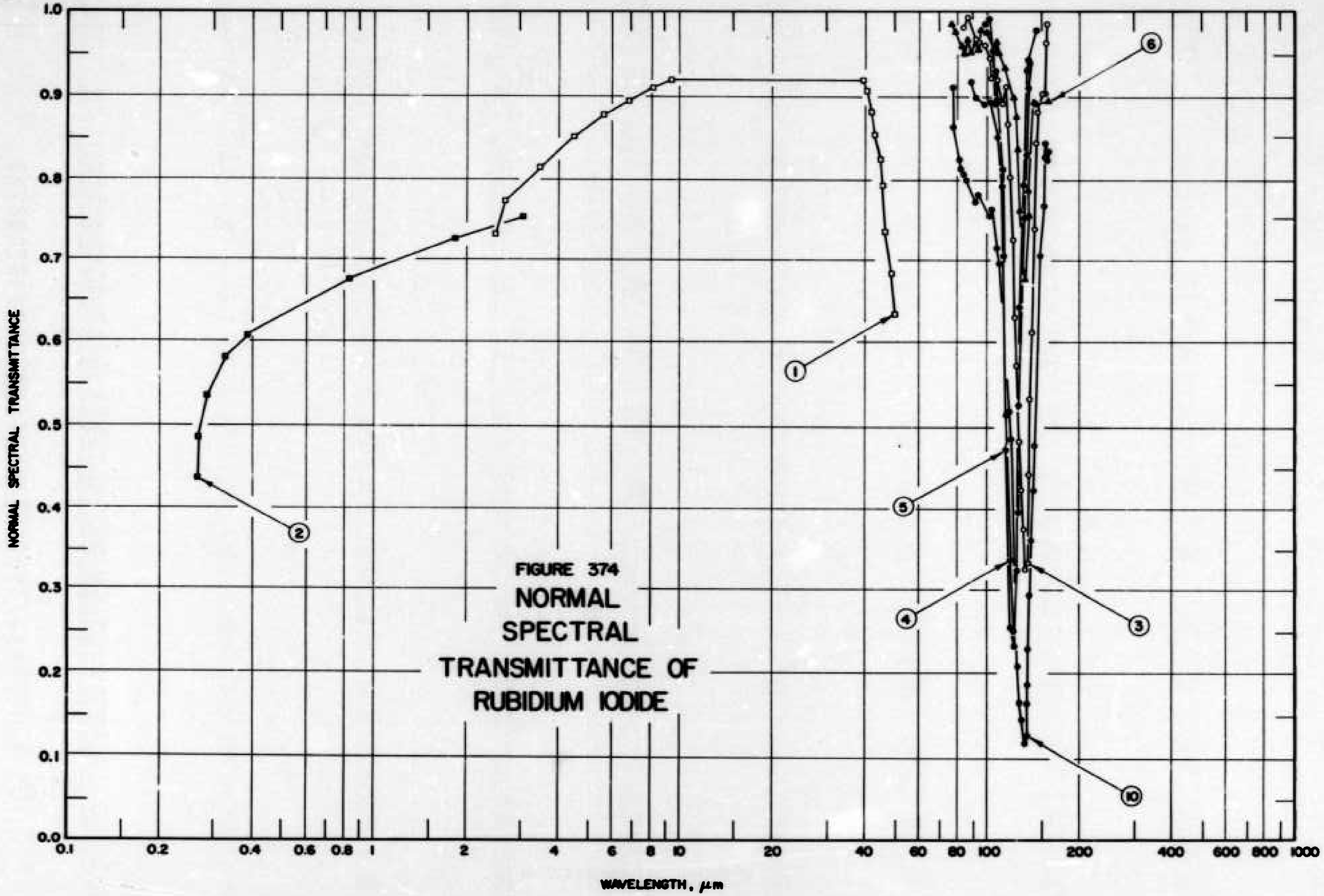


FIGURE 374
NORMAL
SPECTRAL
TRANSMITTANCE OF
RUBIDIUM IODIDE

SPECIFICATION TABLE NO. 374 NORMAL SPECTRAL TRANSMITTANCE OF RUBIDIUM IODIDE RbI

Curve No.	Ref. No.	Year	Temperature K	Wavelength Range, μm	Geometry θ θ' ω'	Reported Error, %	Composition (weight percent), Specifications, and Remarks
1	87	1968	313	2.50-50.0	~0° ~0°		Synthetic single crystal (3.91 mm thick); flat to ten fringes or better; data extracted from smooth curve.
2	373	1968	~298	0.241-3.03	~0° ~0°		Synthetic single crystal (1.36 mm thick); data extracted from smooth curve.
3	398	1961	300	84.3-159	~0° ~0°		Film evaporated on polyethylene substrate (50 μm thick); polycrystalline; kept in vacuum until used.
4	398	1961	100	89.8-139	~0° ~0°		Above specimen and conditions.
5	398	1961	4.2	98.2-145	~0° ~0°		Above specimen and conditions.
6	398	1961	~298	76.9-160	~0° ~0°		Film (0.25 μm thick) evaporated on polyethylene substrate (50 μm thick); polycrystalline; kept in vacuum until used.
7*	398	1961	~298	76.5-161	~0° ~0°		Similar to the above specimen and conditions except 0.77 μm thick.
8*	398	1961	~298	76.5-159	~0° ~0°		Similar to the above specimen and conditions except 0.87 μm thick.
9*	398	1961	~298	76.4-161	~0° ~0°		Similar to the above specimen and conditions except 2.36 μm thick.
10	398	1961	~298	76.6-160	~0° ~0°		Similar to the above specimen and conditions except 3.54 μm thick.

* Not shown on plot

DATA TABLE NO. 374 NORMAL SPECTRAL TRANSMITTANCE OF RUBIDIUM IODIDE RbI

[Wavelength, λ, μm; Transmittance, τ; Temperature, T, K]

CURVE 1
T = 313

λ	τ
2.50	0.731
2.70	0.776
3.50	0.815
4.50	0.851
5.60	0.880
6.80	0.897
8.10	0.912
9.40	0.922
39.7	0.922
41.2	0.908
42.7	0.882
43.9	0.856
45.0	0.824
46.0	0.793
47.6	0.736
49.0	0.682
50.0	0.633

CURVE 2
T ~ 298

λ	τ
0.241	0.000
0.261	0.439
0.264	0.487
0.283	0.536
0.326	0.581
0.388	0.607
0.836	0.676
1.82	0.728
3.03	0.753

CURVE 3
T = 300

λ	τ
84.3	0.983
87.4	0.995
92.7	0.970
95.4	0.968
98.2	0.964
101	0.949
104	0.925
106	0.926*
109	0.924
112	0.892

CURVE 3 (cont.)

λ	τ
114	0.916
117	0.869
120	0.803
123	0.724
126	0.630
127	0.575
129	0.482
130	0.425
131	0.376
132	0.326
133	0.332
135	0.371
137	0.447
138	0.532
140	0.612
142	0.740
145	0.845
148	0.883
151	0.905
154	0.905
156	0.968
159	0.987

CURVE 4
T = 100

λ	τ
89.8	0.920
92.7	0.900
98.3	0.892
103	0.894
109	0.851
112	0.792
117	0.516
120	0.339
123	0.250
125	0.322
128	0.526
131	0.751
134	0.830
137	0.911
139	0.943

CURVE 5
T = 4.2

λ	τ
98.2	0.989
101	0.993
103	0.957
106	0.891
106	0.933
109	0.896
112	0.811
114	0.706
117	0.473
120	0.256
122	0.232
126	0.399
129	0.642
131	0.795
134	0.936
137	0.947
145	0.980

CURVE 6
T ~ 298

λ	τ
76.9	0.988
77.8	0.982*
79.3	0.979
80.6	0.976*
82.1	0.973*
83.5	0.962
85.0	0.952
86.1	0.958*
87.5	0.970
89.0	0.953
90.3	0.958*
91.7	0.966
93.3	0.956*
94.9	0.959
96.2	0.980
97.5	0.976*
98.6	0.980*
100	0.979
101	0.976*
103	0.967*
104	0.960
105	0.963*
107	0.967

CURVE 6 (cont.)

λ	τ
109	0.963*
110	0.951
111	0.949*
113	0.942*
114	0.941*
116	0.938
117	0.918*
119	0.911*
120	0.908*
122	0.907*
123	0.890
125	0.879
126	0.838
127	0.826*
129	0.790*
130	0.762*
131	0.678*
133	0.678
134	0.753
135	0.789
136	0.837*
139	0.859*
140	0.885*
141	0.895
142	0.882*
143	0.898*
145	0.893*
148	0.886*
153	0.889*
155	0.901*
157	0.903*
160	0.899

CURVE 7*
T ~ 298

λ	τ
76.5	0.938
77.5	0.939
79.1	0.926
80.3	0.922
81.7	0.929
83.1	0.920
84.8	0.917
85.8	0.930
87.3	0.930

CURVE 7 (cont.)*

λ	τ
88.6	0.922
89.9	0.922
91.2	0.920
93.0	0.922
94.3	0.919
95.4	0.929
97.3	0.919
98.3	0.929
99.6	0.919
101	0.918
102	0.913
104	0.916
105	0.902
106	0.906
108	0.900
109	0.881
111	0.869
112	0.864
114	0.861
115	0.842
116	0.822
118	0.812
120	0.807
121	0.777
123	0.767
125	0.704
127	0.655
128	0.603
129	0.524
130	0.495
134	0.518
135	0.579
136	0.648
138	0.732
140	0.783
141	0.817
143	0.820
144	0.851
145	0.861
147	0.864
148	0.846
149	0.840
153	0.869
156	0.889
158	0.895
159	0.869
161	0.878

CURVE 8*
T ~ 298

λ	τ
76.5	0.923
77.6	0.926
79.2	0.917
80.3	0.930
81.7	0.917
83.3	0.906
84.8	0.899
86.1	0.905
87.5	0.896
88.7	0.907
90.2	0.890
91.2	0.906
93.0	0.914
94.3	0.905
95.8	0.910
97.6	0.906
98.5	0.910
99.5	0.901
101	0.899
102	0.895
104	0.886
105	0.875
106	0.875
108	0.871
109	0.869
111	0.860
112	0.846
113	0.847
114	0.827
116	0.814
118	0.789
120	0.776
121	0.765
123	0.726
124	0.688
126	0.635
127	0.580
130	0.458
131	0.422
135	0.476
136	0.556
137	0.633
138	0.695
140	0.757
141	0.784
142	0.800

CURVE 8 (cont.)*

λ	τ
144	0.804
144	0.886
145	0.828
145	0.844
147	0.830
147	0.852
147	0.870
149	0.799
149	0.809
149	0.850
149	0.897
151	0.843
152	0.809
152	0.836
153	0.816
154	0.852
159	0.855

CURVE 9*
T ~ 298

λ	τ
76.4	0.897
77.8	0.883
79.1	0.869
80.7	0.884
81.9	0.872
83.0	0.855
84.7	0.859
85.9	0.857
87.4	0.853
89.0	0.829
90.3	0.836
90.7	0.822
91.8	0.822
93.5	0.819
94.7	0.823
95.8	0.827
97.1	0.828
98.3	0.826
99.6	0.817
101	0.807
103	0.906
104	0.806
106	0.792
107	0.796
108	0.805
109	0.764

CURVE 9 (cont.)*

λ	τ
111	0.733
112	0.748
113	0.706
116	0.649
118	0.651
119	0.617
120	0.598
121	0.579
123	0.540
125	0.492
126	0.427
127	0.388
129	0.314
130	0.260
131	0.237
133	0.237
134	0.282
136	0.336
137	0.417
139	0.522
140	0.613
141	0.682
142	0.717
143	0.761
161	0.868

CURVE 10
T ~ 298

λ	τ
76.6	0.913
77.6	0.865
79.2	0.826*
80.8	0.824
82.0	0.813
83.3	0.812*
84.9	0.809
86.0	0.800
87.5	0.794*
89.0	0.782*
91.0	0.773*
92.4	0.772
94.8	0.782
95.9	0.780*
97.3	0.779*
98.4	0.774*
99.4	0.762*
101	0.753

*Not shown on plot

DATA TABLE NO. 374 (continued)

λ	τ
CURVE 10 (cont.)	
T ~ 298	
102	0.762
104	0.756*
106	0.747*
107	0.749*
108	0.736*
109	0.725*
109	0.714
110	0.697
112	0.682*
113	0.669*
116	0.586*
118	0.564*
119	0.518
120	0.487
122	0.437*
125	0.306*
126	0.242*
127	0.210
129	0.163
130	0.144
132	0.117
133	0.124
135	0.163
135	0.188
137	0.230
138	0.291
140	0.361
141	0.426
141	0.480
144	0.599*
146	0.624*
147	0.644*
148	0.692*
150	0.704
152	0.736*
153	0.769
155	0.827
156	0.847
157	0.831*
159	0.824
160	0.832

*Not shown on plot

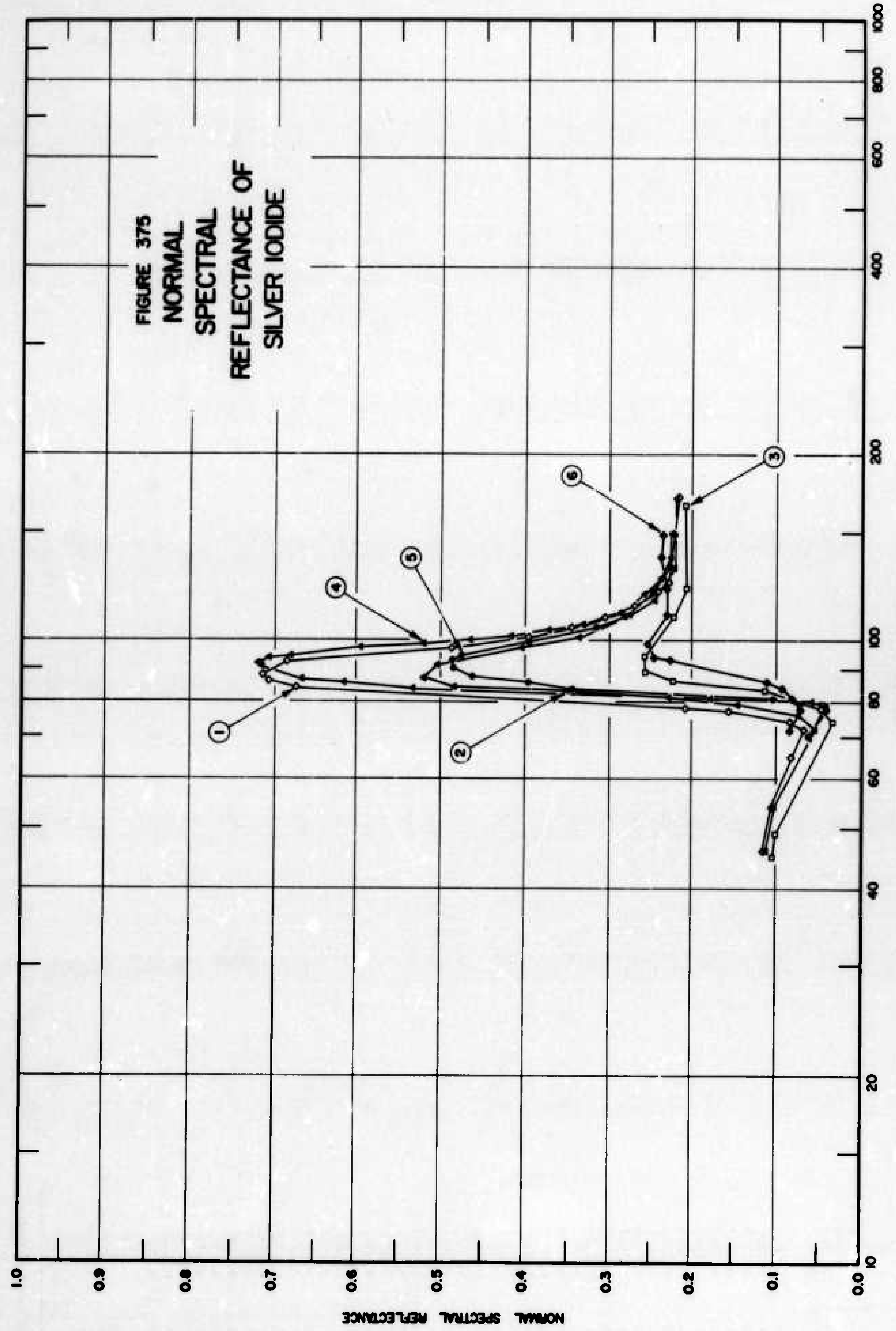


FIGURE 375 NORMAL SPECTRAL REFLECTANCE OF SILVER IODIDE

SPECIFICATION TABLE NO. 375 NORMAL SPECTRAL REFLECTANCE OF SILVER IODIDE AgI

Curve No.	Ref. No.	Year	Temperature K	Wavelength Range, μm	Geometry θ	θ'	ω'	Reported Error, %	Composition (weight percent), Specifications, and Remarks
1	98	1967	25	46.0-170	7.5°	7.5°			Data extracted from smooth curve.
2	98	1967	77	46.0-170	7.5°	7.5°			Above specimen and conditions.
3	98	1967	300	45.0-165	7.5°	7.5°			Above specimen and conditions.
4	101	1968	25	70.0-149	15°	15°			Pellet; data extracted from smooth curve.
5	101	1968	77	70.0-149	15°	15°			Above specimen and conditions.
6	101	1968	290	71.5-147	15°	15°			Above specimen and conditions.

DATA TABLE NO. 375 NORMAL SPECTRAL REFLECTANCE OF SILVER IODIDE AgI

[Wavelength, λ, μm; Reflectance, ρ; Temperature, T, K]

CURVE 1
T = 25

λ	ρ
46.0	0.115
54.0	0.106
65.0	0.082
72.0	0.069
74.0	0.084
77.0	0.155
78.0	0.207
84.0	0.673
86.0	0.707
88.0	0.713
92.0	0.668
97.0	0.489
101	0.398
105	0.349
109	0.305
114	0.270
120	0.240
124	0.229
132	0.220*
170	0.218

CURVE 2
T = 77

λ	ρ
46.0	0.111
54.0	0.104
72.0	0.054
76.0	0.076
79.0	0.147
81.0	0.229
83.0	0.351
84.0	0.484
87.0	0.520
91.0	0.503
97.0	0.401
102	0.338
110	0.274
116	0.244
124	0.229*
133	0.220
170	0.218

CURVE 3
T = 300

λ	ρ
45.0	0.102
49.0	0.100
74.0	0.034
78.0	0.049
83.0	0.133
86.0	0.221
89.0	0.258
94.0	0.258
108	0.221
123	0.204
165	0.207

CURVE 4
T = 25

λ	ρ
70.0	0.061
78.7	0.041
80.0	0.060
80.9	0.178
83.5	0.531

CURVE 4 (cont.)

λ	ρ
85.3	0.617
86.9	0.668
90.8	0.715
91.9	0.720
93.6	0.707
94.9	0.680
97.1	0.594
98.7	0.520
100	0.465
102	0.419
104	0.372
107	0.332
112	0.288
119	0.259
126	0.239
136	0.226
149	0.226

CURVE 5
T = 77

λ	ρ
70.0	0.061
78.7	0.041
80.0	0.060*
80.9	0.102
83.7	0.346
85.3	0.399
87.4	0.462
90.0	0.486
92.3	0.488
94.2	0.476
99.4	0.396
105	0.317
109	0.280
120	0.247
132	0.226
149	0.221

CURVE 6
T = 290

λ	ρ
71.5	0.086
77.8	0.071
81.9	0.081
83.9	0.093
85.4	0.111
92.4	0.227
94.3	0.247
98.7	0.253
110	0.230
122	0.230
137	0.237
147	0.234

*Not shown on plot

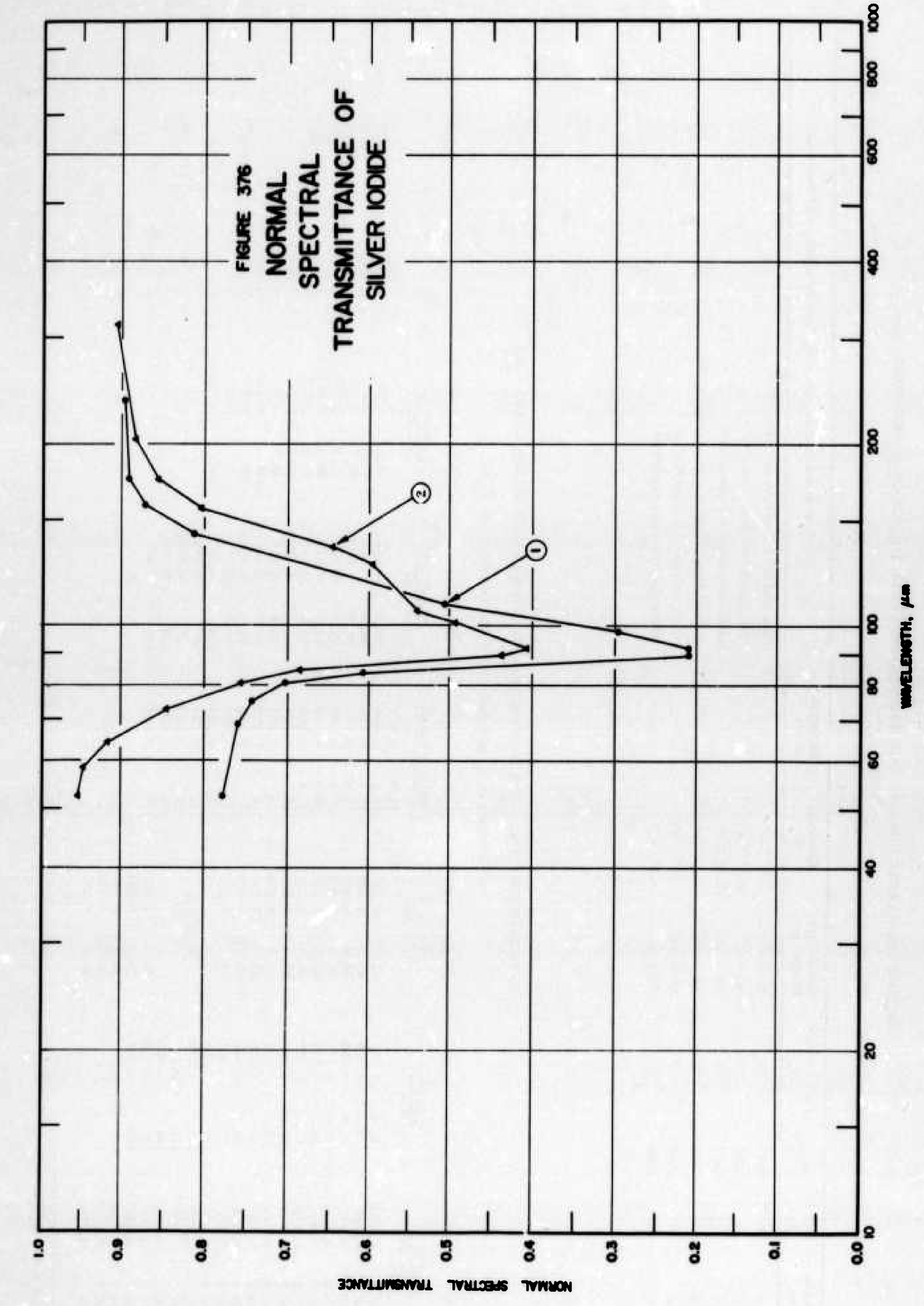


FIGURE 376
NORMAL
SPECTRAL
TRANSMITTANCE OF
SILVER IODIDE
1
2
NORMAL SPECTRAL TRANSMITTANCE
WAVELENGTH, μm
0.0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
1.0
10
20
40
60
80
100
200
400
600
800
1000

SPECIFICATION TABLE NO. 376 NORMAL SPECTRAL TRANSMITTANCE OF SILVER IODIDE AgI

Curve No.	Ref. No.	Year	Temperature K	Wavelength Range, μm	Geometry θ θ' ω'	Reported Error, %	Composition (weight percent), Specifications, and Remarks
1	100	1967	143	52.6-238	0° 0°		Evaporated film (~1 μm thick) on polyethylene substrate; film crystalline and highly oriented (002) plane parallel to substrate surface; data extracted from smooth curve; data corrected for temp dependence of polyethylene transmittance.
2	100	1967	300	52.1-312	0° 0°		Above specimen and conditions.

DATA TABLE NO. 376 NORMAL SPECTRAL TRANSMITTANCE OF SILVER IODIDE AgI

[Wavelength, λ, μm; Transmittance, τ; Temperature, T, K]

λ	τ	λ	τ
CURVE 1	T = 143	CURVE 2	T = 300
52.6	0.778	52.1	0.955
69.0	0.760	58.1	0.949
75.8	0.741	64.5	0.917
80.6	0.701	73.0	0.848
83.3	0.609	80.6	0.758
89.3	0.210	84.7	0.688
91.7	0.210	89.3	0.437
97.1	0.299	91.7	0.407
107	0.506	101	0.493
142	0.812	106	0.540
158	0.872	126	0.596
175	0.892	135	0.647
238	0.898	156	0.805
		175	0.857
		204	0.883
		312	0.907

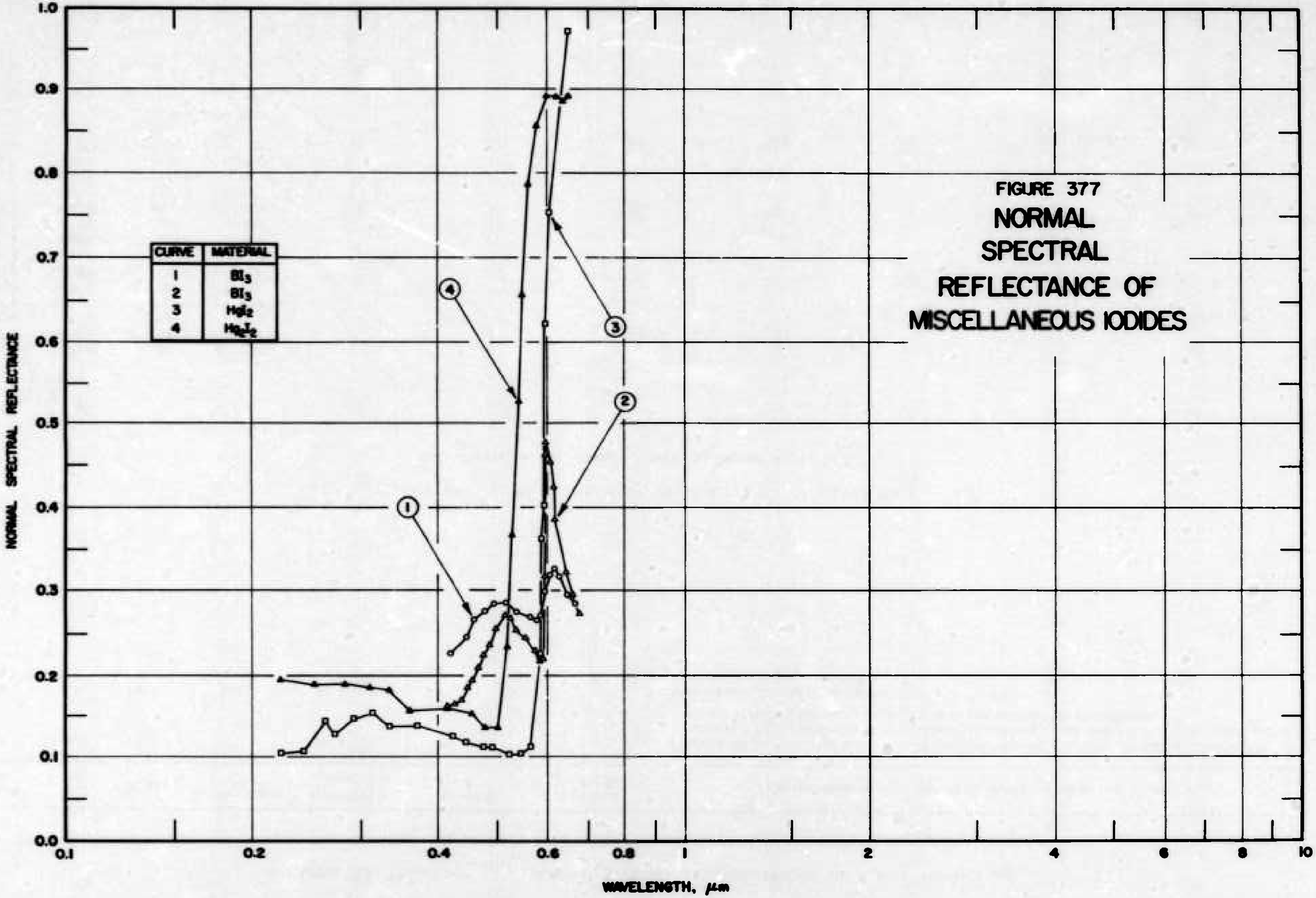


FIGURE 377
NORMAL
SPECTRAL
REFLECTANCE OF
MISCELLANEOUS IODIDES
CURVE MATERIAL
1 BI3
2 BI3
3 HgI2
4 Hg2I2
NORMAL SPECTRAL REFLECTANCE
WAVELENGTH, μm
1.0
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0.0
0.1
0.2
0.4
0.6
0.8
1
2
4
6
8
10

SPECIFICATION TABLE NO. 377 NORMAL SPECTRAL REFLECTANCE OF MISCELLANEOUS IODIDES

Curve No.	Ref. No.	Year	Temperature K	Wavelength Range, μm	Geometry θ θ' ω'	Reported Error, %	Composition (weight percent), Specifications, and Remarks
1	168	1967	298	0.420-0.667	~0° ~0°		BISMUTH TRIIODIDE, BiI_3; single crystal; measured at cleavage plane (the plane perpendicular to the symmetrical crystallographic direction C_3).
2	168	1967	98	0.413-0.678	~0° ~0°		The above specimen and conditions.
3	136	1967	~298	0.220-0.650	0° 45°		MERCURY DIIODIDE, HgI_2; magnesium carbonate reference standard.
4	136	1967	~298	0.223-0.650	0° 45°		DIMERCURY DIIODIDE, Hg_2I_2; magnesium carbonate reference standard.

DATA TABLE NO. 377 NORMAL SPECTRAL REFLECTANCE OF MISCELLANEOUS IODIDES

[Wavelength, λ, μm; Reflectance, ρ; Temperature, T, K]

λ	ρ	λ	ρ	λ	ρ	λ	ρ	λ	ρ	λ	ρ
CURVE 1	T = 293	CURVE 1 (cont.)		CURVE 2 (cont.)		CURVE 2 (cont.)		CURVE 3 (cont.)		CURVE 4 (cont.)	
		0.646	0.296	0.481	0.232*	0.608	0.453	0.471	0.112	0.411	0.160
0.420	0.228	0.667	0.289	0.484	0.239	0.611	0.426	0.490	0.111	0.441	0.158*
0.441	0.248			0.490	0.247*	0.617	0.386	0.522	0.102	0.451	0.151
0.458	0.267	CURVE 2	T = 98	0.498	0.257	0.642	0.321	0.541	0.103	0.479	0.136
0.477	0.278			0.504	0.266*	0.646	0.316*	0.561	0.111	0.500	0.136
0.484	0.283*			0.512	0.272	0.660	0.298	0.585	0.228	0.519	0.235
0.492	0.286	0.413	0.162	0.521	0.270	0.678	0.273	0.589	0.361	0.529	0.369
0.500	0.286*	0.420	0.164*	0.528	0.263*			0.591	0.403	0.540	0.527
0.515	0.286	0.425	0.165	0.534	0.256	CURVE 3	T ~ 298	0.597	0.622	0.549	0.657
0.537	0.278	0.429	0.170*	0.544	0.252*			0.601	0.755	0.560	0.788
0.561	0.270	0.434	0.170	0.554	0.248			0.650	0.972	0.579	0.858
0.574	0.268	0.435	0.173*	0.564	0.248*	0.222	0.104			0.600	0.893
0.582	0.271	0.440	0.178*	0.571	0.230	0.242	0.108	CURVE 4	T ~ 298	0.620	0.893
0.588	0.287*	0.446	0.186	0.582	0.219	0.262	0.143			0.638	0.889
0.593	0.300	0.448	0.191*	0.585	0.217*	0.272	0.129			0.650	0.893
0.599	0.309*	0.451	0.195	0.590	0.220	0.292	0.147	0.223	0.196		
0.602	0.320	0.456	0.204*	0.593	0.319	0.311	0.152	0.251	0.190		
0.608	0.328*	0.463	0.210	0.596	0.427*	0.331	0.139	0.282	0.190		
0.617	0.328	0.470	0.219*	0.596	0.461	0.370	0.139	0.310	0.187		
0.629	0.317	0.473	0.226	0.596	0.473*	0.421	0.124	0.331	0.183		
				0.599	0.478	0.441	0.119	0.360	0.158		

*Not shown on plot

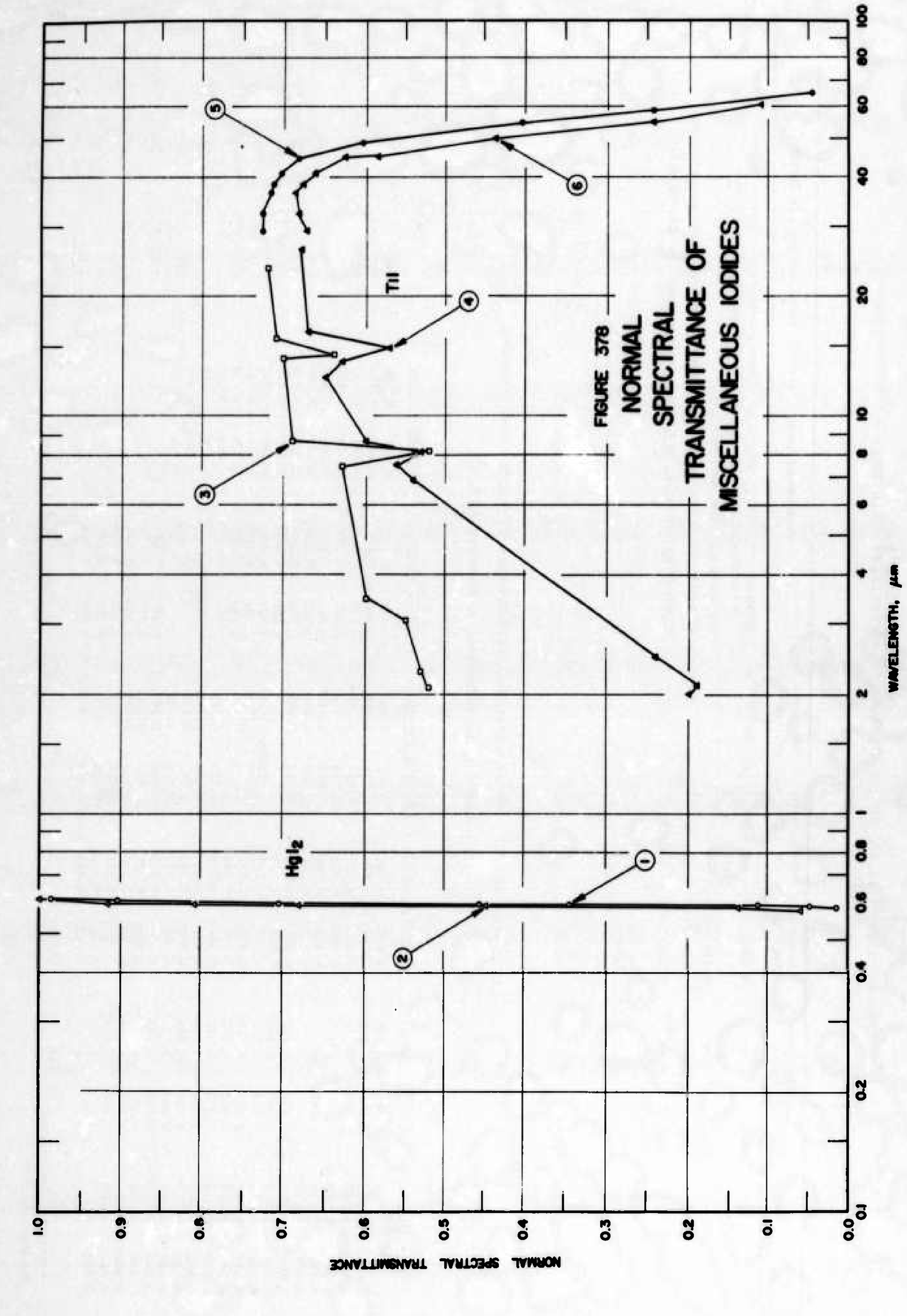


FIGURE 378 NORMAL SPECTRAL TRANSMITTANCE OF MISCELLANEOUS IODIDES

SPECIFICATION TABLE NO. 378 NORMAL SPECTRAL TRANSMITTANCE OF MISCELLANEOUS IODIDES

Curve No.	Ref. No.	Year	Temperature K	Wavelength Range, μm	Geometry θ	θ'	ω	Reported Error, %	Composition (weight percent), Specifications, and Remarks
1	169	1962	298	0.580-0.606	0°	0°			MERCURY DIIODIDE, HgI_2; single crystal (0.1 mm thick); grown by slow cooling from 353 K of a water solution having a concentration of 0.88 M HgI_2 and 1.2 M KI; cleaved; c-axis perpendicular to the specimen surface; applied ac electric field (8000 v rms) coincident with c-axis; data extracted from smooth curve.
2	169	1962	298	0.580-0.606	0°	0°			Above specimen and conditions except measured without applied electric field.
3	339	1965	298	2.08-23.8	0°	0°			THALLIUM IODIDE, TlI with 2±0.5% CsI; single crystal; measured right after mechanical finishing; same results obtained after storing for a month in air and repolishing; data taken from smooth curve.
4	339	1965	298	2.00-26.3	0°	0°			The above specimen measured after storing for a month in air.
5	339	1965	298	29.1-65.1	0°	0°			THALLIUM IODIDE, TlI with 2±0.5% CsI; single crystal (1.5 mm thick); ground with emery paper and polished with chromium oxide in ethyl alcohol.
6	339	1965	298	29.3-60.2	0°	0°			Similar to the above specimen and conditions except 2.7 mm thick.

DATA TABLE NO. 378 NORMAL SPECTRAL TRANSMITTANCE OF MISCELLANEOUS IODIDES

[Wavelength, λ, μm; Transmittance, τ; Temperature, T, K]

λ	τ
CURVE 1	**T = 298**
0.580	0.0139
0.582	0.0495
0.584	0.111
0.587	0.224*
0.589	0.344
0.591	0.455
0.593	0.584*
0.596	0.703
0.599	0.835*
0.602	0.905
0.606	0.988
CURVE 2	**T = 298**
0.580	0.0586
0.581	0.136
CURVE 2 (cont.)	
0.584	0.291*
0.587	0.448
0.589	0.595*
0.591	0.680
0.595	0.807
0.599	0.918
0.606	1.000
CURVE 3	**T = 298**
2.08	0.52
2.27	0.53
3.04	0.55
3.48	0.60
7.41	0.63
8.20	0.52
8.70	0.69
CURVE 3 (cont.)	
14.0	0.70
14.4	0.64
15.6	0.71
23.8	0.72
CURVE 4	**T = 298**
2.00	0.20
2.10	0.19
2.48	0.24
6.99	0.54
7.58	0.56
8.13	0.53
8.62	0.60
12.5	0.65
13.8	0.63
14.9	0.57
CURVE 4 (cont.)	
16.1	0.67
26.3	0.68
CURVE 5	**T = 298**
29.1	0.728
32.2	0.728
36.7	0.717
38.3	0.713
40.7	0.702
44.6	0.681
49.6	0.606
54.7	0.401
59.4	0.241
65.1	0.046
CURVE 6	**T = 298**
29.3	0.673
32.1	0.681
36.9	0.687
38.2	0.679
40.6	0.662
45.4	0.627
45.4	0.586
50.0	0.436
55.0	0.243
60.2	0.110

* Not shown on plot

SPECIFICATION TABLE NO. 379 NORMAL TOTAL EMITTANCE OF ALUMINUM NITRIDE AlN

Curve No.	Ref. No.	Year	Temperature Range, K	Geometry θ'	Reported Error, %	Composition (weight percent), Specifications and Remarks
1*	28	1963	1023	$\sim 0°$		Density 2.04 g cm^{-3}, theoretical density 3.05 g cm^{-3}; integrated from spectral data (1-15 μm); [Authors' designation: Sample No. 87].

DATA TABLE NO. 379 NORMAL TOTAL EMITTANCE OF ALUMINUM NITRIDE AlN

[Temperature, T, K; Emittance, ϵ]

T	ϵ
CURVE 1 *	
1023	0.81

* No plot given

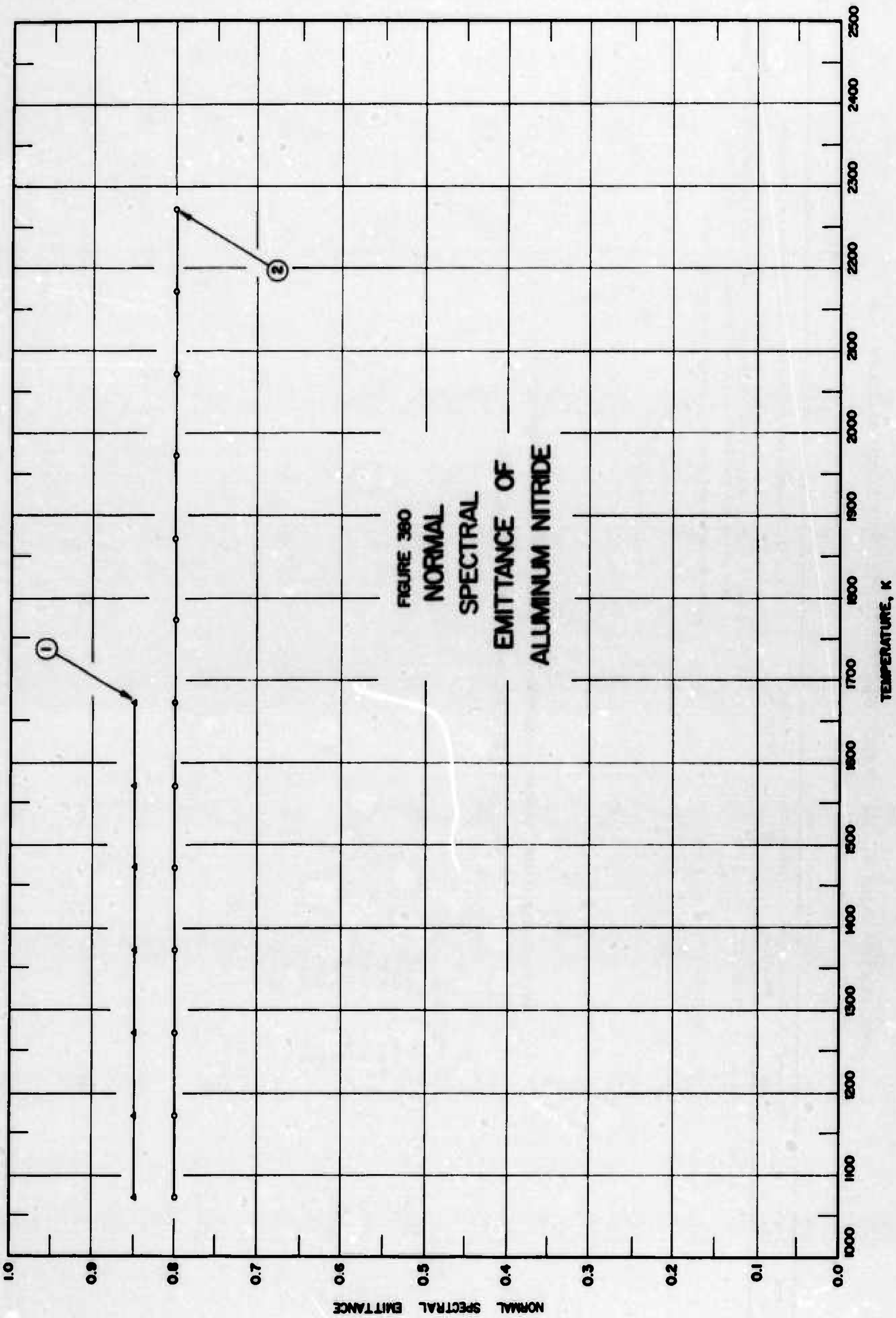


FIGURE 390 NORMAL SPECTRAL EMITTANCE OF ALUMINUM NITRIDE

SPECIFICATION TABLE NO. 380 NORMAL SPECTRAL EMITTANCE OF ALUMINUM NITRIDE AlN

Curve No.	Ref. No.	Year	Wavelength, μm	Temperature Range, K	Geometry θ'	Reported Error, %	Composition (weight percent), Specifications, and Remarks
1	13	1962	0.650	1073-1673	~0°		Layer of paste (~100 μm thick) on tantalum cylinder; paste prepared from fine powder (2-3 μm) of AlN suspended in nitrocellulose binder and dried at 313 to 333 K.
2	13	1962	0.650	1073-2273	~0°		Above specimen and conditions except measured in argon.

DATA TABLE NO. 380 NORMAL SPECTRAL EMITTANCE OF ALUMINUM NITRIDE AlN

[Temperature, T, K; Emittance, ϵ, Wavelength, λ, μm]

T	ϵ	T	ϵ
CURVE 1		CURVE 2	
1073	0.85	1073	0.80
1173	0.85	1173	0.80
1273	0.85	1273	0.80
1373	0.85	1373	0.80
1473	0.85	1473	0.80
1573	0.85	1573	0.80
1673	0.85	1673	0.80
		1773	0.80
		1873	0.80
		1973	0.80
		2073	0.80
		2173	0.80
		2273	0.80

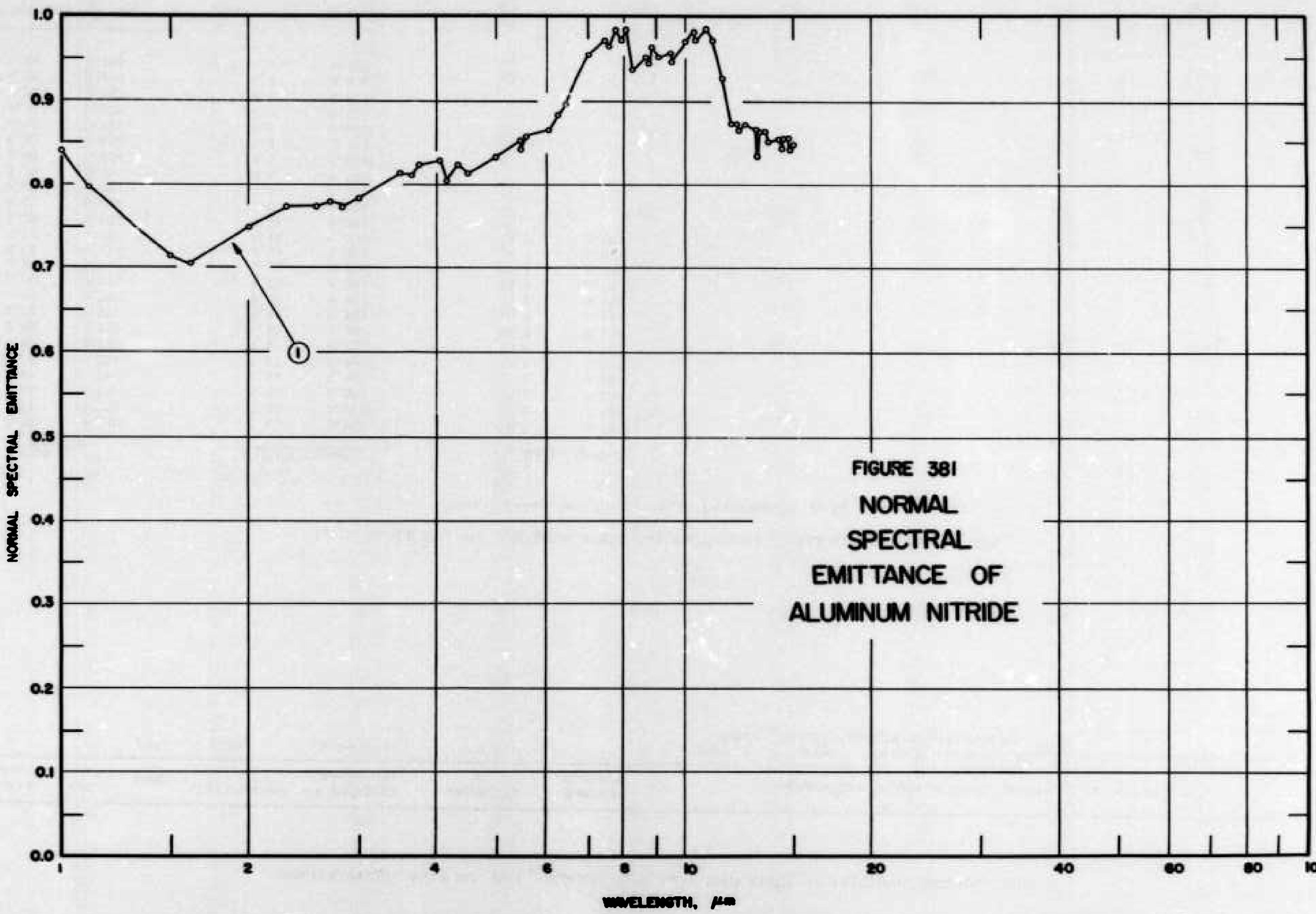


FIGURE 381 NORMAL SPECTRAL EMITTANCE OF ALUMINUM NITRIDE

SPECIFICATION TABLE NO. 381 NORMAL SPECTRAL EMITTANCE OF ALUMINUM NITRIDE AlN

Curve No.	Ref. No.	Year	Temperature K	Wavelength Range, μm	Geometry θ'	Reported Error, %	Composition (weight percent), Specifications, and Remarks
1	28	1963	1023	1.00-15.0	~0°		Density 2.04 g cm^{-3}, theoretical density 3.05 g cm^{-3}; data extracted from smooth curve; [Authors' designation: Sample No. 87].

DATA TABLE NO. 381 NORMAL SPECTRAL EMITTANCE OF ALUMINUM NITRIDE AlN

[Wavelength, λ, μm; Emittance, ϵ; Temperature, T, K]

λ	ϵ	λ	ϵ	λ	ϵ
CURVE 1		CURVE 1 (cont.)		CURVE 1 (cont.)	
1.00	0.840	7.00	0.956	12.5	0.869*
1.11	0.799	7.49	0.973	13.0	0.868
1.50	0.713	7.58	0.969	13.1	0.836
1.61	0.703	7.74	0.985	13.2	0.864
2.00	0.750	7.87	0.985*	13.5	0.864
2.30	0.772	7.97	0.974	13.6	0.852
2.58	0.772	8.03	0.987	14.2	0.854
2.70	0.779	8.22	0.937	14.4	0.844
2.82	0.772	8.68	0.953	14.4	0.856
3.00	0.782	8.76	0.945	14.5	0.843*
3.50	0.816	8.83	0.964	14.6	0.856
3.65	0.813	9.04	0.952	14.7	0.842
3.77	0.826	9.42	0.957	15.0	0.850
4.05	0.830	9.51	0.948		
4.17	0.806	10.0	0.972		
4.33	0.824	10.3	0.982		
4.50	0.816	10.4	0.975		
5.00	0.834	10.8	0.989		
5.43	0.852	11.1	0.974		
5.48	0.841	11.5	0.926		
5.57	0.858	11.8	0.871		
6.05	0.865	12.0	0.871		
6.27	0.884	12.2	0.865		
6.48	0.898	12.5	0.926		

* Not shown on plot

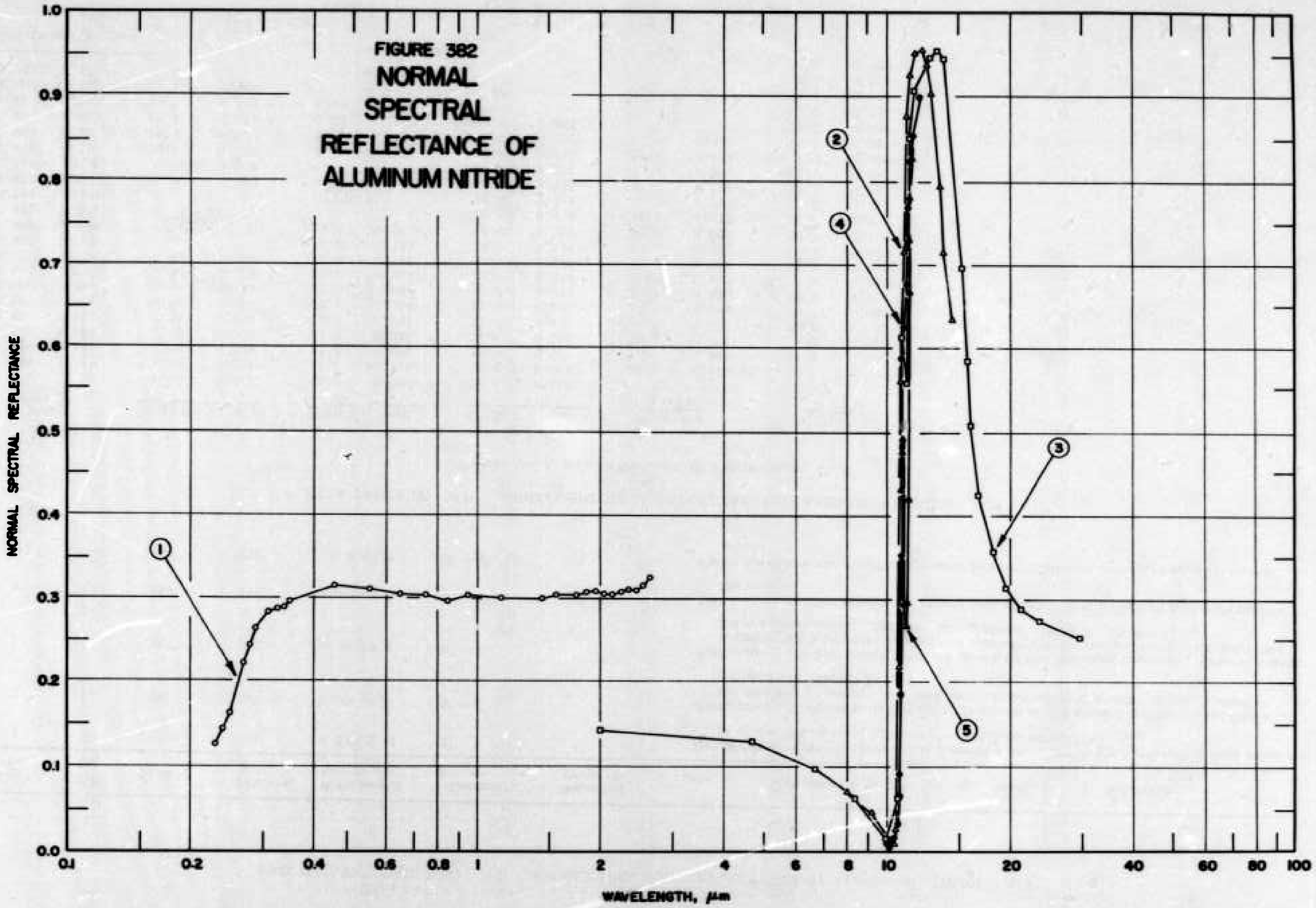


FIGURE 382 NORMAL SPECTRAL REFLECTANCE OF ALUMINUM NITRIDE

SPECIFICATION TABLE NO. 382 NORMAL SPECTRAL REFLECTANCE OF ALUMINUM NITRIDE AlN

Curve No.	Ref. No.	Year	Temperature, K	Wavelength Range, μm	Geometry θ	θ'	ω'	Reported Error, %	Composition (weight percent), Specifications, and Remarks
1	28	1963	298	0.230-2.65	~0°		2π		Density 2.04 g cm^{-3}, theoretical density 3.05 g cm^{-3}; MgO reference; data extracted from smooth curve; [Authors' designation: Sample No. 87].
2	174	1967	298	8.00-14.3	~0°	~0°			Flat platelet (0.025 mm thick); crystals grown at the Allen Clark Research Center of the Plessey Company; polished; data extracted from smooth curve; [Authors' designation: Series E].
3	174	1967	298	2.00-29.8	~0°	~0°			Flat plate (~0.5 mm thick); crystals grown by the Pechiney Company, France; c-axis approximately parallel to the front surface; ground and polished; data extracted from smooth curve; [Authors' designation: series F, AN965F2].
4	174	1967	298	10.0-12.0	~0°	~0°			Above specimen and conditions except incident radiation polarized perpendicular to the c-axis.
5	174	1967	298	10.0-12.0	~0°	~0°			Above specimen and conditions except incident radiation polarized parallel to the c-axis.

DATA TABLE NO. 382 NORMAL SPECTRAL REFLECTANCE OF ALUMINUM NITRIDE AlN

[Wavelength, λ, μm; Reflectance, ρ; Temperature, T, K]

λ	ρ	λ	ρ	λ	ρ	λ	ρ	λ	ρ	λ	ρ
CURVE 1 T = 298		CURVE 1 (cont.)		CURVE 2 (cont.)		CURVE 3 (cont.)		CURVE 4 T = 298		CURVE 5 T = 298	
0.230	0.126	1.85	0.308	10.9	0.559*	10.0	0.013	10.0	0.010	10.0	0.010*
0.240	0.141	1.95	0.308	11.0	0.719	10.6	0.061	10.1	0.005	10.1	0.005*
0.250	0.160	2.05	0.304	11.2	0.880	10.9	0.612	10.5	0.019	10.5	0.019*
0.270	0.220	2.15	0.304	11.3	0.925	11.1	0.556	10.6	0.033	10.6	0.033*
0.280	0.241	2.25	0.308	11.7	0.951	11.3	0.851	10.7	0.064	10.7	0.064*
0.290	0.261	2.35	0.310	12.1	0.956	11.6	0.906	10.7	0.092	10.7	0.092*
0.310	0.281	2.45	0.310	12.5	0.938	12.6	0.949	10.8	0.183	10.8	0.183*
0.327	0.286	2.54	0.314	12.9	0.901	13.3	0.955	10.9	0.351	10.9	0.351*
0.340	0.289	2.65	0.325	13.4	0.795	13.8	0.946	10.9	0.587	10.9	0.430
0.350	0.296	CURVE 2 T = 298		13.8	0.717	15.2	0.698	11.0	0.625	10.9	0.476
0.445	0.314	8.00	0.070	14.3	0.634	15.6	0.582	11.1	0.677	10.9	0.492
0.544	0.310	9.10	0.048	CURVE 3 T = 298		16.0	0.509	11.2	0.727	11.0	0.292
0.650	0.305	10.1	0.013	2.00	0.141	16.8	0.424	11.2	0.770	11.1	0.268
0.749	0.303	10.4	0.010	4.70	0.130	18.1	0.358	11.4	0.826	11.1	0.296
0.851	0.299	10.5	0.029	6.70	0.099	19.6	0.311	11.5	0.854	11.2	0.420
0.950	0.301	10.7	0.218	8.40	0.062	21.1	0.287	12.0	0.900	11.3	0.667
1.15	0.300	10.8	0.559			23.7	0.272			11.3	0.726*
1.45	0.300					29.8	0.251			11.3	0.781
1.55	0.303									11.4	0.829
1.75	0.303									11.5	0.854*
										12.0	0.900*

* Not shown on plot

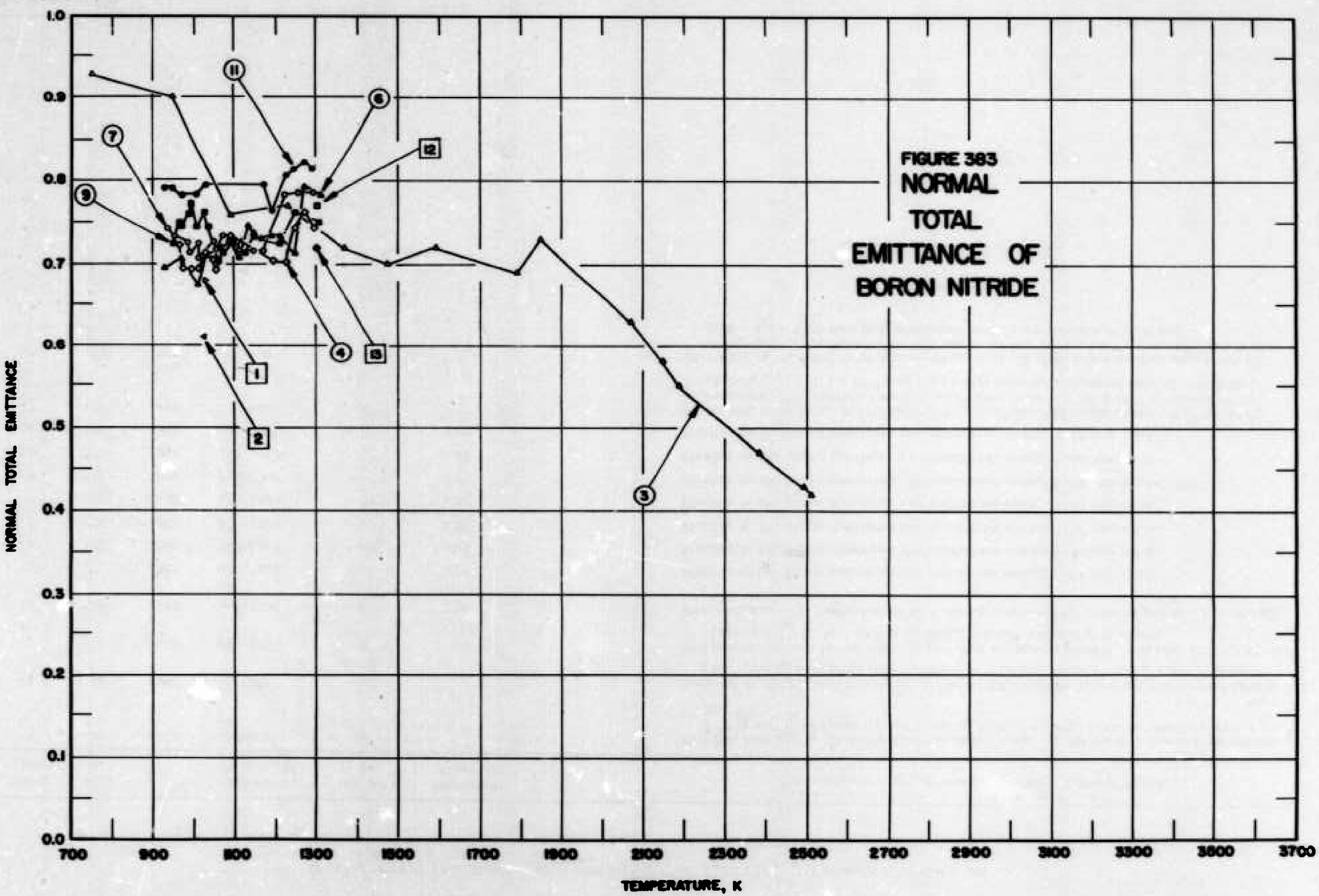


FIGURE 383 NORMAL TOTAL EMITTANCE OF BORON NITRIDE

SPECIFICATION TABLE NO. 383 NORMAL TOTAL EMITTANCE OF BORON NITRIDE BN

Curve No.	Ref. No.	Year	Temperature Range, K	Geometry θ'	Reported Error, %	Composition (weight percent), Specifications and Remarks
1	28	1963	1023	~0°		97% BN; sintered by Carborundum Company; density 2.09 g cm^{-3}, theoretical density 2.27 g cm^{-3}; integrated from spectral data (1-15 μm); [Authors' designation: Sample No. 97].
2	28	1963	1023	~0°		Sintered at 2123 K for 2 hrs (setter material BN); density 2.00 cm^{-3}, theoretical density 2.27 g cm^{-3}; integrated from spectral data (1-15 μm); [Authors' designation: Sample No. 98].
3	17	1962	753-2516	~0°	10	Hot pressed; small bright spot appeared on surface at 1789 K, smoking at 2183 K, dark spots at 2516 K, and violent smoking at 2499; measured in argon.
4	175	1962	961-1297	~9°	±20	Pressed; machined; polished on decreasing grits of emery paper and dried at 373 K; 0.71 mm thick.
5*	175	1962	935-1298	~0°	±20	Similar to the above specimen and conditions except 0.74 mm thick.
6	175	1962	934-1309	~0°	±20	Similar to the above specimen and conditions except 1.12 mm thick.
7	175	1962	939-1288	~0°	±20	Similar to the above specimen and conditions except 1.57 mm thick.
8*	175	1962	928-1298	~0°	±20	Similar to the above specimen and conditions except 1.83 mm thick.
9	175	1962	954-1302	~0°	±20	Similar to the above specimen and conditions except 3.28 mm thick.
10*	175	1962	929-1305	~0°	±20	Similar to the above specimen and conditions except 5.00 mm thick.
11	175	1962	929-1290	~0°	±20	Similar to the above specimen and conditions except 6.43 mm thick.
12	179	1965	1300	~0°		97.00 BN, 2.40 B_2O_3, 0.20 Al_2O_3 + SiO_2, 0.10 alkaline earth oxides, and 0.008 C; hexagonal BN; surface roughness 110 μin; density 2.15 g cm^{-3}; measured in vacuum (3.5 - 5.0 x 10^{-7} mm Hg); integrated from spectral data (0 - 10 μm).
13	179	1965	1300	~0°		97.00 BN, 2.40 B_2O_3, 0.20 Al_2O_3 + SiO_2, 0.10 alkaline earth oxides, and 0.008 C; hexagonal BN; polished with silk cloth; density 2.15 g cm^{-3}; measured in vacuum (3.5 - 5.0 x 10^{-7} mm Hg); integrated from spectral data (0 - 10 μm).

* Not shown on plot

DATA TABLE NO. 383 NORMAL TOTAL EMITTANCE OF BORON NITRIDE BN

[Temperature, T, K; Emittance, ϵ]

CURVE 1

T	ϵ
1023	0.68

CURVE 2

T	ϵ
1023	0.61

CURVE 3

T	ϵ
753	0.93
950	0.90
1094	0.76
1233	0.77
1367	0.72
1478	0.70
1594	0.72
1789	0.69
1855	0.73
2078	0.63
2155	0.58
2183	0.55
2383	0.47
2516	0.42
2499	0.43

CURVE 4

T	ϵ
961	0.721
978	0.693
996	0.693
1010	0.693
1024	0.711
1050	0.701
1058	0.692
1088	0.732
1093	0.732*
1199	0.702
1221	0.702
1242	0.742
1274	0.761
1297	0.742

CURVE 5*

T	ϵ
935	0.675
952	0.681
995	0.692*
1004	0.692*
1009	0.692*
1015	0.692*
1020	0.692
1027	0.712*
1036	0.694
1044	0.702*
1052	0.702*
1060	0.702
1070	0.702*
1072	0.702*
1104	0.694
1121	0.732
1138	0.722
1157	0.722
1173	0.732
1192	0.713
1207	0.713
1226	0.734
1245	0.734
1268	0.762*
1274	0.772
1298	0.772

CURVE 6

T	ϵ
934	0.695
968	0.708
1010	0.675
1025	0.713
1062	0.720
1097	0.727
1117	0.709
1136	0.748
1148	0.739
1162	0.730
1188	0.733

CURVE 6 (cont.)

T	ϵ
1210	0.731
1249	0.712
1267	0.791
1309	0.781

CURVE 7

T	ϵ
939	0.742
957	0.732
983	0.724
994	0.712
1004	0.725
1012	0.706
1023	0.706*
1038	0.714*
1050	0.726
1057	0.718
1059	0.725*
1071	0.732
1104	0.726
1113	0.715
1143	0.714
1167	0.715
1194	0.734*
1220	0.782
1258	0.785
1288	0.785

CURVE 8*

T	ϵ
928	0.730
940	0.711
970	0.718
992	0.720
1006	0.720
1014	0.710
1025	0.710
1034	0.720
1053	0.730
1064	0.730

CURVE 8* (cont.)

T	ϵ
1072	0.730
1079	0.731
1085	0.720
1210	0.791
1230	0.791
1246	0.782
1262	0.782
1278	0.782
1298	0.762

CURVE 9

T	ϵ
954	0.723
962	0.750
969	0.745
983	0.760
994	0.771
1005	0.744
1013	0.752*
1021	0.762
1033	0.754*
1038	0.743
1060	0.702
1075	0.712
1096	0.722
1124	0.712
1144	0.731
1172	0.713*
1212	0.721
1243	0.761
1302	0.750

CURVE 10*

T	ϵ
929	0.761
943	0.740
964	0.731
981	0.740
995	0.740
1014	0.722

CURVE 10* (cont.)

T	ϵ
1030	0.750
1045	0.732
1063	0.742
1085	0.732
1104	0.760
1128	0.741
1164	0.751
1193	0.761
1206	0.752
1261	0.792
1276	0.772
1293	0.781
1305	0.774

CURVE 11

T	ϵ
929	0.790
940	0.790*
952	0.790
973	0.782
985	0.782*
1003	0.782
1030	0.793
1172	0.793
1191	0.764
1227	0.804
1244	0.812
1270	0.822
1290	0.813

CURVE 12

T	ϵ
1300	0.770

CURVE 13

T	ϵ
1300	0.720

* Not shown on plot

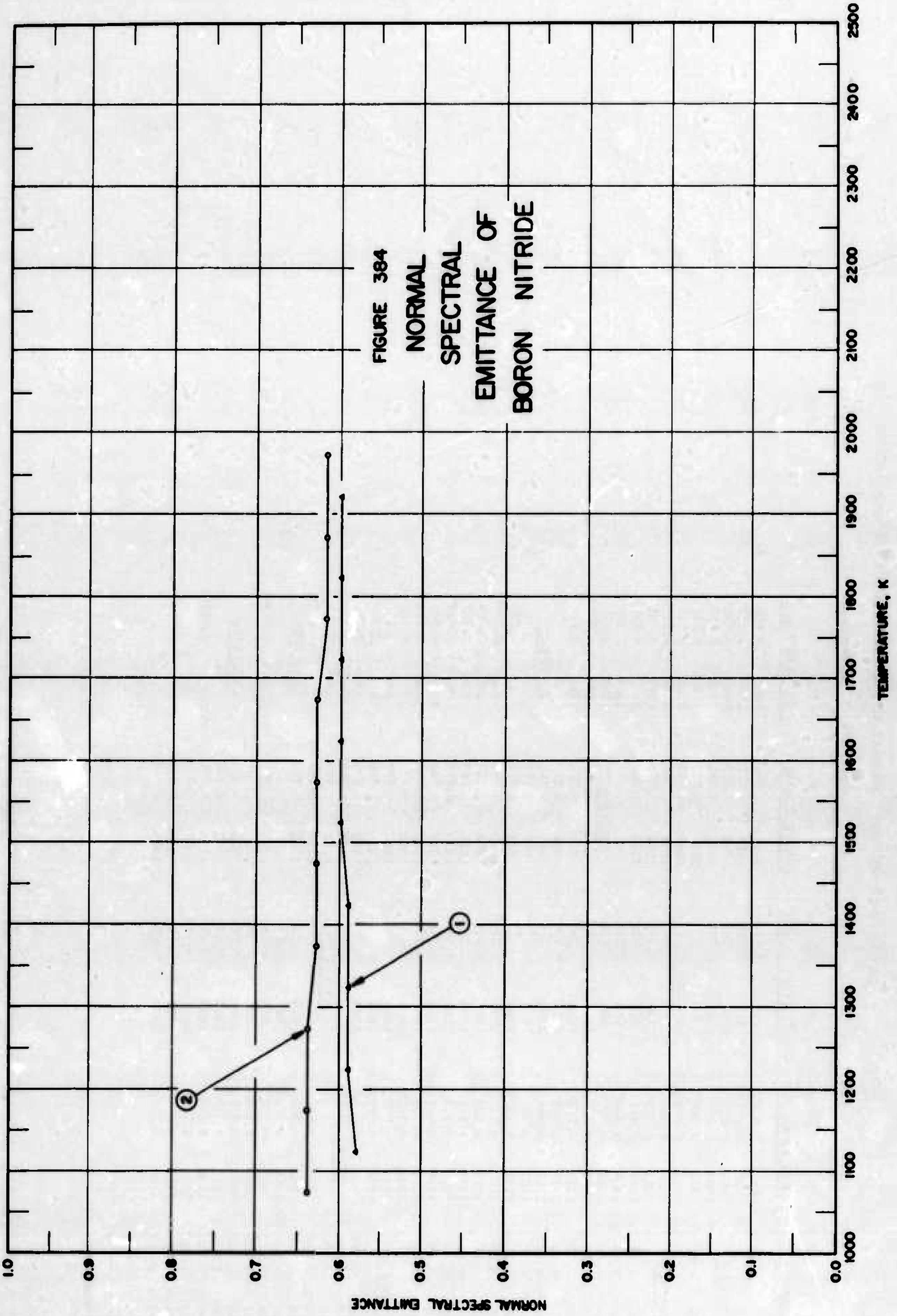


FIGURE 384 NORMAL SPECTRAL EMITTANCE OF BORON NITRIDE

SPECIFICATION TABLE NO. 384 NORMAL SPECTRAL EMITTANCE OF BORON NITRIDE BN

Curve No.	Ref. No.	Year	Wavelength, μm	Temperature Range, K	Geometry θ'	Reported Error, %	Composition (weight percent), Specifications, and Remarks
1	16	1960	0.650	1123-1923	$\sim 0°$		Layer of paste ($\sim$100 μm thick) on tantalum cylinder; paste prepared from fine powder (2-3 μm) of BN suspended in nitrate binder and dried at 313 to 333 K.
2	13	1962	0.650	1073-1973	$\sim 0°$		Layer of paste ($\sim$100 μm thick) on tantalum cylinder; paste prepared from fine powder (2-3 μm) of BN suspended in nitrocellulose binder and dried at 313 to 333 K.

DATA TABLE NO. 384 NORMAL SPECTRAL EMITTANCE OF BORON NITRIDE BN

[Temperature, T, K; Emittance, ϵ; Wavelength, λ, μm]

T	ϵ
CURVE 1	
$\lambda = 0.650$	
1123	0.58
1223	0.59
1323	0.59
1423	0.59
1523	0.60
1623	0.60
1723	0.60
1823	0.60
1923	0.60
CURVE 2	
$\lambda = 0.650$	
1073	0.64
1173	0.64
1273	0.64
1373	0.63
1473	0.63
1573	0.63
1673	0.63
1773	0.62
1873	0.62
1973	0.62

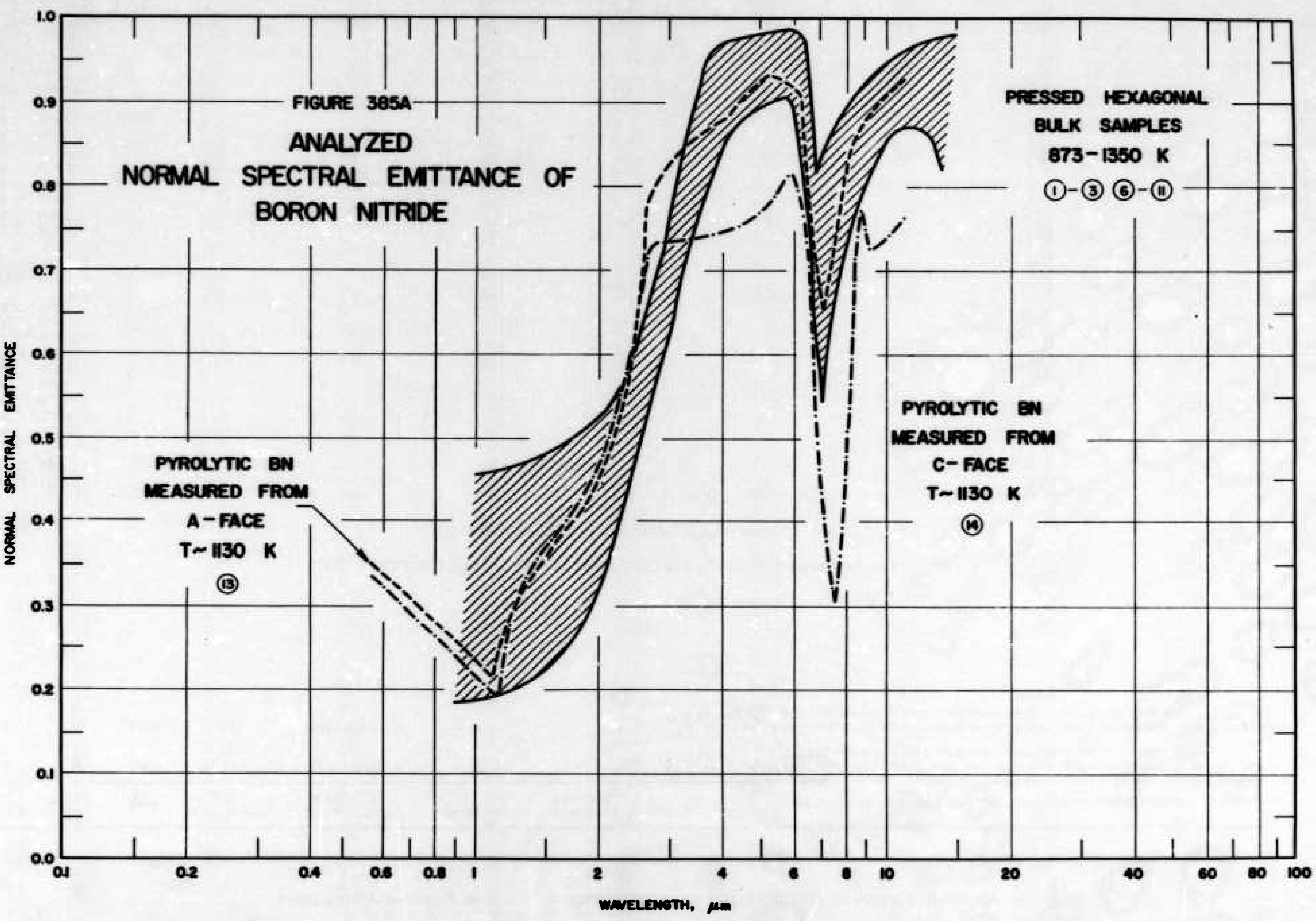


FIGURE 385A
ANALYZED
NORMAL SPECTRAL EMITTANCE OF
BORON NITRIDE
PRESSED HEXAGONAL
BULK SAMPLES
873-1350 K
(1)-(3) (6)-(11)
PYROLYTIC BN
MEASURED FROM
A-FACE
T~1130 K
(13)
PYROLYTIC BN
MEASURED FROM
C-FACE
T~1130 K
(14)
NORMAL SPECTRAL EMITTANCE
WAVELENGTH, μm
0.0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
1.0
0.1
0.2
0.4
0.6
0.8
1
2
4
6
8
10
20
40
60
80
100

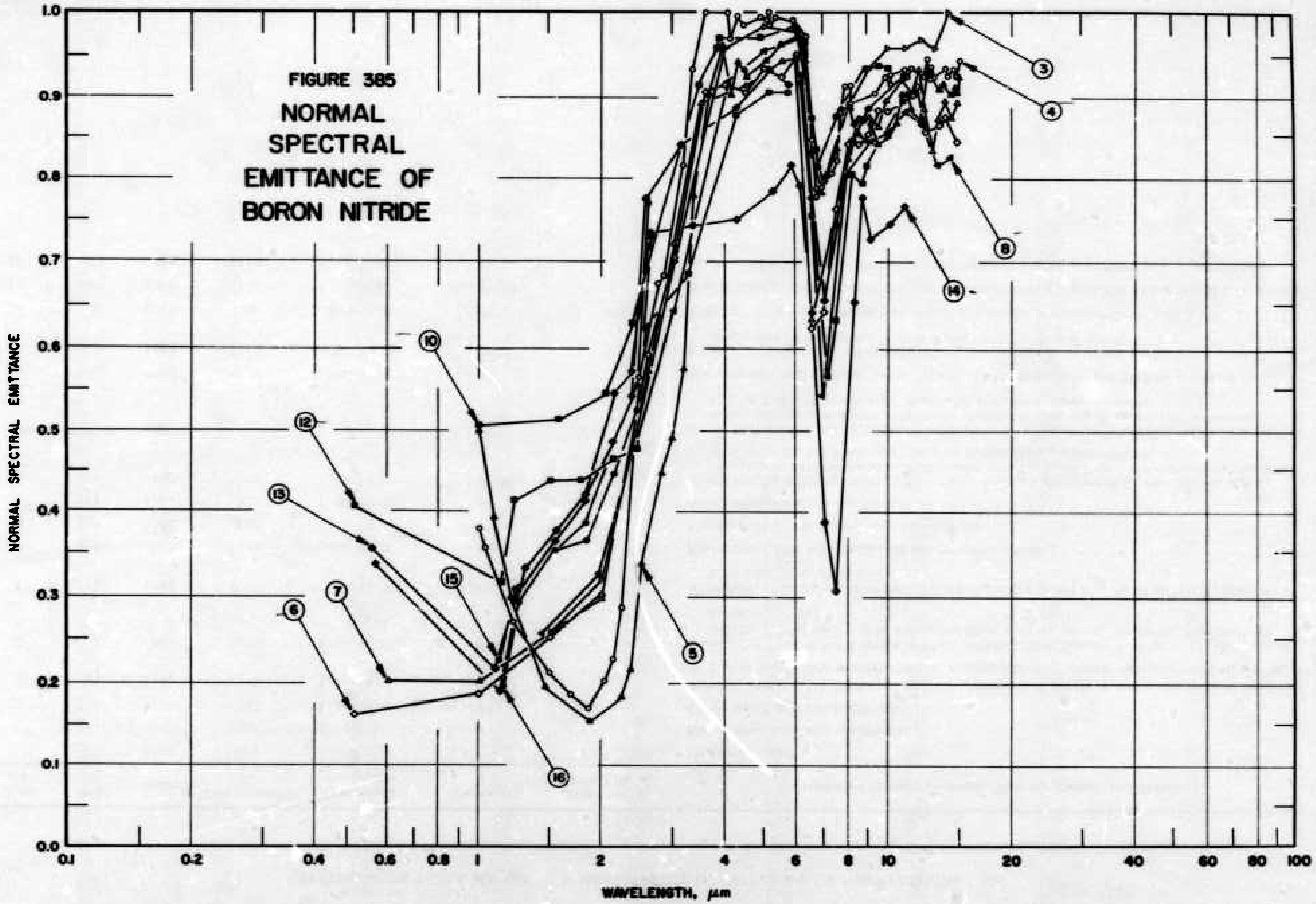


FIGURE 385
NORMAL SPECTRAL EMITTANCE OF BORON NITRIDE

SPECIFICATION TABLE NO. 385 NORMAL SPECTRAL EMITTANCE OF BORON NITRIDE BN

Curve No.	Ref. No.	Year	Temperature, K	Wavelength Range, μm	Geometry θ'	Reported Error, %	Composition (weight percent), Specifications, and Remarks
1*	109	1960	873	2.00-14.0	~0°	± 4	Measured in air.
2*	109	1960	1083	2.00-14.0	~0°	± 4	Above specimen and conditions.
3	109	1960	1353	1.50-14.0	~0°	± 4	Above specimen and conditions.
4	28	1963	1023	1.00-15.0	~0°		97% BN; sintered by Carborundum Company; density 2.09 g cm^{-3}, theoretical density 2.27 g cm^{-3}; data extracted from smooth curve; [Authors' designation: Sample No. 97].
5	28	1963	1023	1.00-15.0	~0°		Sintered at 2123 K for 2 hours (setter material BN); density 2.00 g cm^{-3}, theoretical density 2.27 g cm^{-3}; data extracted from smooth curve; [Authors' designation: Sample No. 98].
6	175	1962	1083	0.500-14.9	~0°		Machined; polished on decreasing grits of emery paper and dried at 373 K; specimen 6.43 mm thick; first test.
7	175	1962	1083	0.600-14.9	~0°		Above specimen and conditions except second test.
8	111	1964	873	1.42-14.1	0°	≤ 4	Ultrasonically machined; measured in air.
9*	111	1964	1353	1.43-15.0	0°	≤± 4	Above specimen and conditions.
10	179	1965	1300	1.00-10.0	~0°		97.00 BN, 2.40 B_2O_3, 0.20 $Al_2O_3 + SiO_2$, 0.10 alkaline earth oxides, and 0.008 C; hexagonal; surface roughness 110 μin; density 2.15 g cm^{-3}; measured in vacuum (3.5 to 5.0 x 10^{-2} mm Hg); data extracted from smooth curve.
11*	179	1965	1300	1.00-10.0	~0°		97.00 BN, 2.40 B_2O_3, 0.20 $Al_2O_3 + SiO_2$, 0.10 alkaline earth oxides, and 0.008 C; hexagonal; polished with silk cloth; density 2.15 g cm^{-3}; measured in vacuum (3.5 to 5.0 x 10^{-2} mm Hg); data extracted from smooth curve.
12	333	1968	~1128	0.530-10.9	~0°		Hot-pressed polycrystal; mechanically polished surface; purified H_2 atmosphere.
13	333	1968	~1128	0.550-11.0	~0°		Pyrolytic; formed by vapor deposition; mechanically polished surface; purified H_2 atmosphere; measured from A-face; density ~2.2 g cm^{-3}.
14	333	1968	~1128	0.560-11.0	~0°		Similar to above specimen and conditions except measured from c-face.
15	333	1968	1133	1.13-2.60	~0°		Above specimen and conditions except measured with polarizer axis parallel to c-axis.
16	333	1968	1133	1.14-2.61	~0°		Above specimen and conditions except measured with polarizer axis perpendicular to c-axis.

* Not shown on plot

DATA TABLE NO. 385 NORMAL SPECTRAL EMITTANCE OF BORON NITRIDE BN

[Wavelength, λ, μm; Emittance, ∈; Temperature, T, K]

λ	∈
CURVE 1*	**T = 873**
2.00	0.330
3.00	0.648
4.00	0.924
5.00	0.970
6.00	0.940
7.00	0.540
8.00	0.812
9.00	0.855
10.0	0.870
11.0	0.894
12.0	0.870
13.0	0.822
14.0	0.844
CURVE 2*	**T = 1083**
2.00	0.32
3.00	0.69
4.00	0.93
5.00	0.97
6.00	0.96
7.00	0.60
8.00	0.88
9.00	0.91
10.0	0.88
11.0	0.92
12.0	0.91
13.0	0.88
14.0	0.91
CURVE 3	**T = 1353**
1.50	0.257
2.00	0.320
3.00	0.700
4.00	0.960
5.00	0.986
6.00	0.980
7.00	0.798
8.00	0.890
9.00	0.935

λ	∈
CURVE 3 (cont.)	
10.0	0.960
11.0	0.960
12.0	0.970
13.0	0.960
14.0	1.000
CURVE 4	**T = 1273**
1.00	0.380
1.04	0.356
1.21	0.270
1.50	0.212
1.68	0.186
1.86	0.170
2.02	0.201
2.13	0.227
2.24	0.288
2.49	0.565
2.71	0.673
2.82	0.683
3.17	0.818
3.31	0.931
3.60	1.000
4.03	1.000
4.21	0.970
4.30	0.997
4.41	0.989
4.84	0.996
5.07	0.993
5.12	1.000
5.18	0.988
5.38	0.996
5.84	0.993
5.93	0.985*
6.08	0.993*
6.32	0.975
6.51	0.849
6.64	0.789
6.78	0.779
6.96	0.790
7.28	0.806
7.51	0.821
7.65	0.880

λ	∈
CURVE 4 (cont.)	
7.84	0.912
7.92	0.994*
8.03	0.915
8.14	0.891
9.14	0.919*
9.37	0.904
9.83	0.901*
9.97	0.924
10.1	0.914
10.1	0.927
11.0	0.933
11.1	0.926
11.4	0.935
11.6	0.926*
12.2	0.926
12.3	0.949
12.8	0.922
12.9	0.937
13.0	0.925
13.9	0.935
14.0	0.926
14.5	0.934
14.7	0.927*
14.8	0.927
15.0	0.945
CURVE 5	**T = 1023**
1.00	0.500
1.09	0.394
1.20	0.300
1.46	0.197
1.89	0.155
2.21	0.183
2.36	0.217
2.50	0.339
2.80	0.449
2.99	0.490
3.17	0.574
3.35	0.780
3.68	0.903
3.99	0.961
4.17	0.901
4.35	0.943

λ	∈
CURVE 5 (cont.)	
4.47	0.933
4.55	0.925
5.01	0.944
5.50	0.965
6.01	0.976
6.30	0.945
6.52	0.832
6.70	0.785*
6.88	0.785
7.01	0.804
7.50	0.839
7.68	0.884
8.03	0.889
8.24	0.867
8.52	0.855
8.82	0.858*
8.94	0.849
9.12	0.869
9.53	0.843
10.0	0.852
10.5	0.867
10.8	0.903
11.1	0.903
11.3	0.888
11.7	0.888*
12.0	0.872
12.1	0.872*
12.5	0.933
13.0	0.921*
13.4	0.910
13.6	0.917
14.1	0.914*
14.4	0.902
14.6	0.912
14.8	0.903
14.9	0.925
CURVE 6	**T = 1083**
0.500	0.162
1.00	0.189
1.50	0.251
2.00	0.301

λ	∈
CURVE 6 (cont.)	
2.60	0.592
3.00	0.702
3.60	0.904
4.00	0.915
4.50	0.906
5.00	0.933
5.50	0.925
6.00	0.952
6.50	0.623
7.00	0.642
7.50	0.762
8.00	0.843
8.50	0.843
9.00	0.852
9.50	0.885
10.0	0.884
10.9	0.896*
11.5	0.902
11.9	0.913
12.4	0.857
12.9	0.856*
13.4	0.865
13.9	0.876
14.4	0.875*
14.9	0.846
CURVE 7	**T = 1083**
0.600	0.201
1.00	0.201
1.60	0.267
2.00	0.300
2.60	0.571
3.00	0.722
3.50	0.894
4.10	0.904*
4.50	0.913
5.00	0.933*
5.50	0.943
6.00	0.950
6.50	0.635
7.00	0.642*
7.50	0.761*

λ	∈
CURVE 7 (cont.)	
8.00	0.824
8.50	0.874
9.00	0.874
9.50	0.864
9.90	0.896
10.4	0.895*
10.9	0.921
11.5	0.904
11.9	0.934
12.4	0.885
12.9	0.834
13.4	0.872
13.9	0.895
14.4	0.875
14.9	0.894
CURVE 8	**T = 873**
1.42	0.258
1.99	0.327
3.00	0.644
4.03	0.919
5.00	0.957
6.03	0.931
6.99	0.543
7.98	0.803
9.02	0.846
10.0	0.856
11.0	0.881
12.1	0.866
13.1	0.818
14.1	0.828
CURVE 9*	**T = 1353**
1.43	0.257
1.99	0.326
2.90	0.696
3.96	0.948
4.98	0.976
5.97	0.975
6.93	0.796
8.01	0.879

λ	∈
CURVE 9 (cont.)	
8.98	0.927
9.99	0.947
11.0	0.943
12.0	0.952
12.9	0.944
14.0	0.957
15.0	0.976
CURVE 10	**T = 1300**
1.00	0.507
1.57	0.513
2.03	0.548
2.39	0.630
3.45	0.914
3.82	0.960*
4.89	0.971
5.94	0.988
6.26	0.969
6.53	0.874
6.61	0.834
6.77	0.813
7.47	0.876
8.06	0.914*
8.86	0.935*
9.47	0.939
10.0	0.937
CURVE 11*	**T = 1300**
1.00	0.458
1.67	0.488
2.21	0.552
2.89	0.716
3.42	0.894
3.64	0.923
4.24	0.940
5.45	0.955
6.08	0.975
6.25	0.956
6.28	0.802
6.37	0.664

λ	∈
CURVE 11 (cont.)	
6.49	0.593
6.82	0.579
7.21	0.598
7.63	0.707
7.82	0.782
8.29	0.831
8.86	0.845
10.0	0.854
CURVE 12	**T ~ 1128**
0.530	0.407
1.13	0.317
1.21	0.413
1.50	0.437
1.77	0.439
2.13	0.463
2.43	0.477
2.58	0.623
3.28	0.687
4.22	0.878
5.15	0.905
5.75	0.905
6.12	0.918
6.51	0.753
7.05	0.566
7.42	0.632
8.20	0.804
8.71	0.793
8.99	0.815
10.0	0.852*
10.9	0.895

* Not shown on plot

DATA TABLE NO. 385 (continued)

λ	ε	λ	ε
CURVE 13 T ~ 1138		**CURVE 15** T = 1133	
0.550	0.354	1.13	0.228
1.10	0.218	1.23	0.309
1.23	0.300	1.53	0.378*
1.53	0.363	1.82	0.386
1.81	0.411	2.13	0.484*
2.11	0.486	2.44	0.554
2.37	0.541	2.60	0.770
2.56	0.777		
3.28	0.842	**CURVE 16** T = 1133	
4.23	0.889		
5.15	0.934		
5.72	0.915	1.14	0.196
6.10	0.928	1.24	0.292
6.51	0.778	1.53	0.352
7.00	0.656	1.81	0.365
7.42	0.745	2.13	0.448
8.20	0.847	2.44	0.525
8.73	0.871	2.61	0.732
9.00	0.887		
10.0	0.897*		
11.0	0.926		
CURVE 14 T ~ 1128			
0.560	0.338		
1.12	0.190		
1.30	0.332		
1.55	0.378		
1.83	0.420		
2.14	0.547		
2.36	0.571		
2.61	0.735		
3.31	0.743		
4.25	0.750		
5.22	0.786		
5.80	0.817		
6.11	0.791		
6.58	0.642		
7.00	0.386		
7.42	0.309		
8.23	0.654		
8.69	0.779		
9.04	0.727		
10.1	0.746		
11.0	0.768		

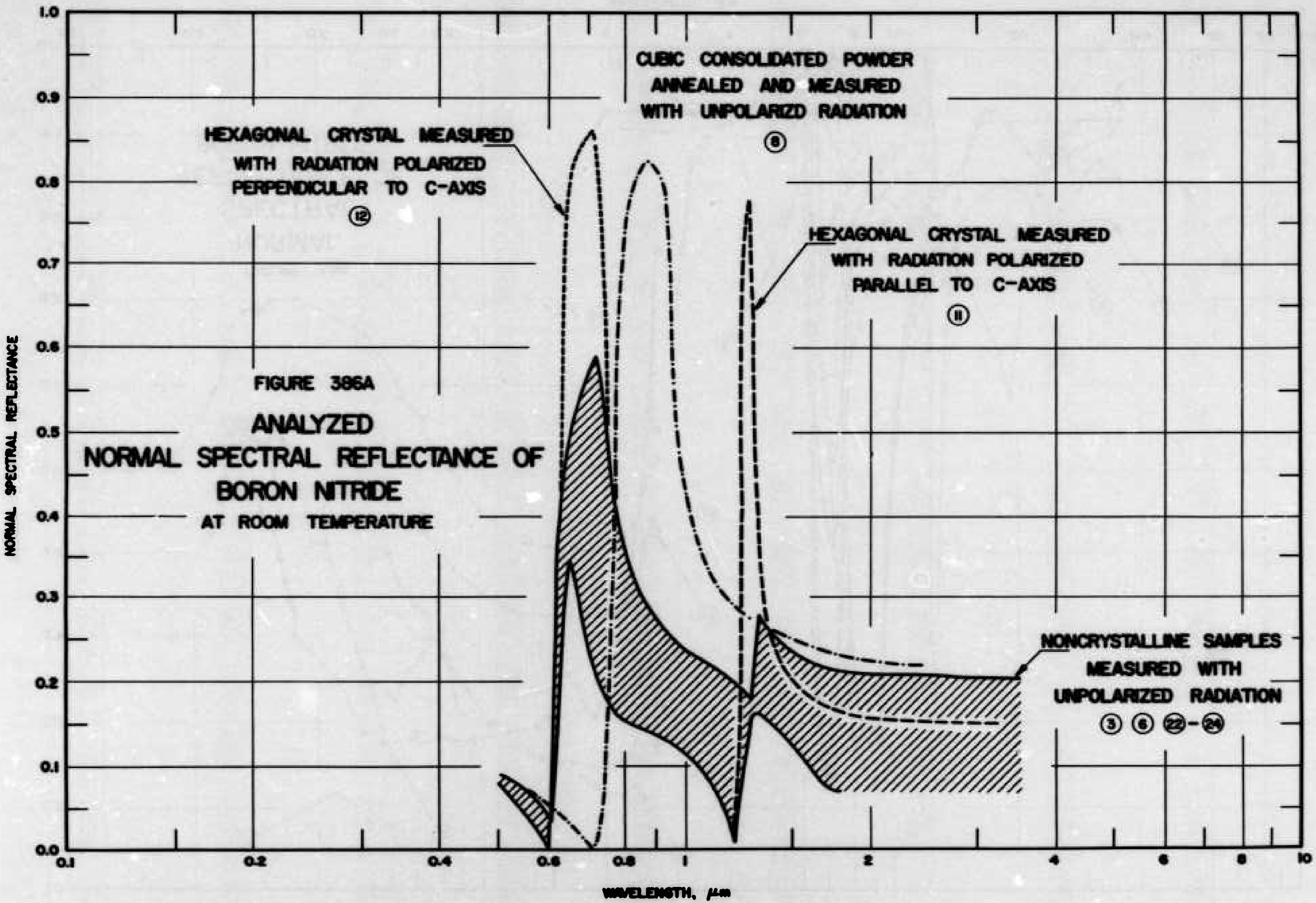


FIGURE 386A
ANALYZED
NORMAL SPECTRAL REFLECTANCE OF
BORON NITRIDE
AT ROOM TEMPERATURE
HEXAGONAL CRYSTAL MEASURED
WITH RADIATION POLARIZED
PERPENDICULAR TO C-AXIS
12
CUBIC CONSOLIDATED POWDER
ANNEALED AND MEASURED
WITH UNPOLARIZD RADIATION
8
HEXAGONAL CRYSTAL MEASURED
WITH RADIATION POLARIZED
PARALLEL TO C-AXIS
11
NONCRYSTALLINE SAMPLES
MEASURED WITH
UNPOLARIZED RADIATION
3 6 22-24
NORMAL SPECTRAL REFLECTANCE
WAVELENGTH, μm
1.0
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0.0
0.1
0.2
0.4
0.6
0.8
1
2
4
6
8
10

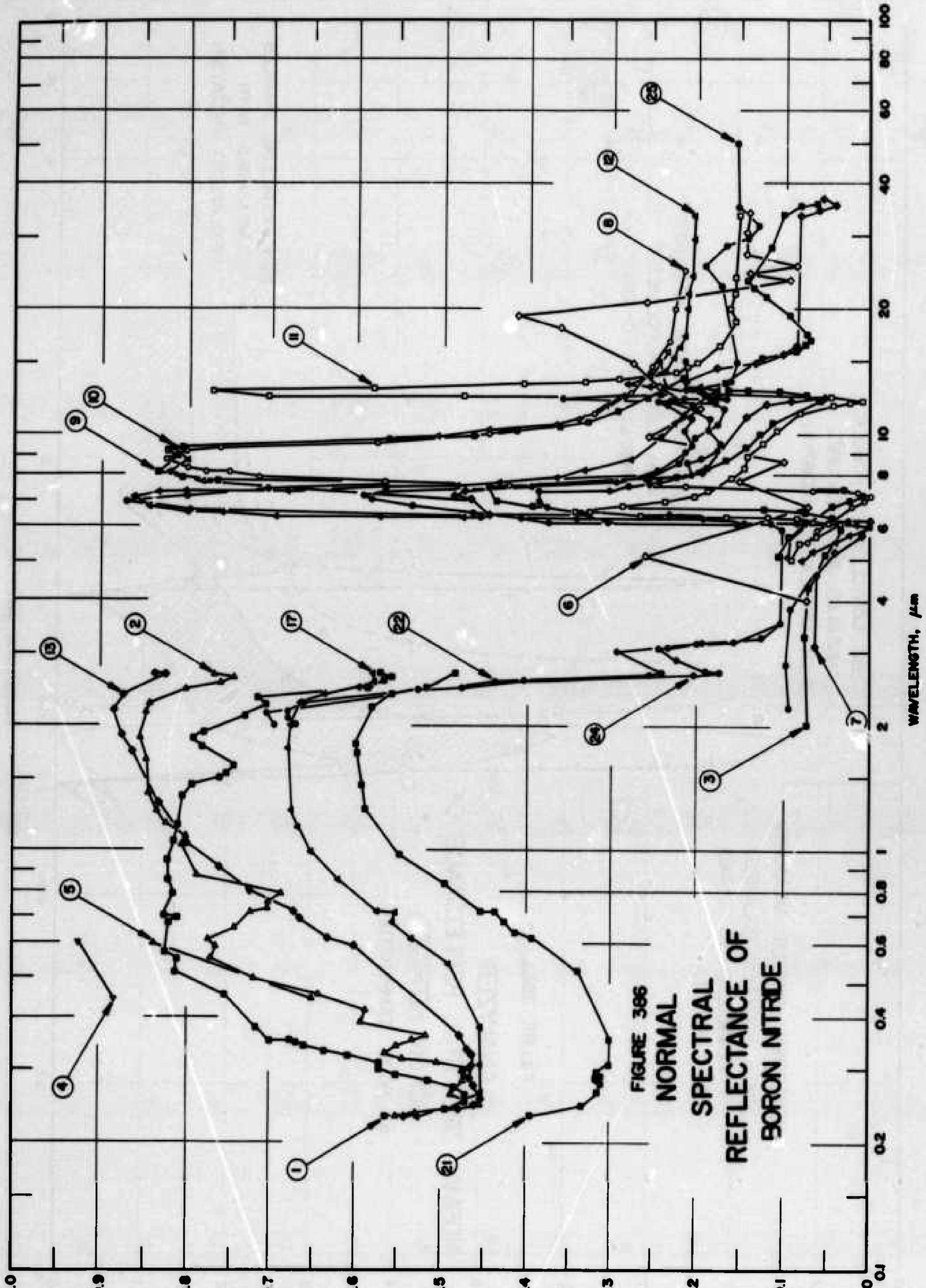


FIGURE 386 NORMAL SPECTRAL REFLECTANCE OF BORON NITRIDE

SPECIFICATION TABLE NO. 386 NORMAL SPECTRAL REFLECTANCE OF BORON NITRIDE BN

Curve No.	Ref. No.	Year	Temperature, K	Wavelength Range, μm	Geometry θ	Geometry θ'	Geometry ω'	Reported Error, %	Composition (weight percent), Specifications, and Remarks
1	28	1963	298	0.230-2.65	~0°		2π		97 pure; sintered by Carborundum Co., density 2.09 g cm^{-3}, theoretical density 2.27 g cm^{-3}; MgO reference standard; data extracted from smooth curve; [Authors' designation: Sample No. 97].
2	28	1963	298	0.230-2.65	~0°		2π		100 pure; sintered at 2123 K for 2 hrs (setter material BN); density 2.00 g cm^{-3}, theoretical density 2.27 g cm^{-3}; MgO reference standard; data extracted from smooth curve; [Authors' designation: Sample No. 98].
3	176	1963	298	2.00-35.9	0°		2π		Pressed powder; data extracted from smooth curve.
4	82	1963	298	0.440-0.600	~0°		2π		HC 0021 manufactured by Carborundum Company; compacted powder at 10 000 psi.
5	82	1963	298	0.440-0.600	~0°		2π		Above specimen and conditions except exposed to uv irradiation; 75 ESH with solar factor 1.5.
6	146	1966	~298	4.00-34.0	~0°	~0°			Film; optical thickness 10 quarterwaves at λ = 1.7 μm; electron beam deposited in vacuum (2 to 8 x 10^{-5} mmHg) at normal incidence onto glass substrate heated to 588 K; rate of depositing 1 quarterwave per min at λ = 0.5 μm; clear dark brown in appearance.
7	146	1966	~298	3.10-37.0	~0°	~0°			Polished; data extracted from smooth curve.
8	177	1967	298	5.56-24.8	~0°	~0°			Powder of cubic BN subjected to high temperature and pressure for consolidation; ground and polished to perfectly flat, homogeneous mirror-like finish; opaque; annealed in air at 623 K for 15 min; density approaches theoretical value of 3.50 gm cm^{-3}.
9	177	1967	78	5.04-13.5	~0°	~0°			Similar to the above specimen and conditions except specimen not annealed; data extracted from smooth curve.
10	177	1967	298	5.04-15.9	~0°	~0°			Above specimen and conditions.
11	384	1966	~298	5.00-33.3	~0°	~0°			Hexagonal crystal; parallel to the c-axis of the crystal.
12	384	1966	~298	5.00-33.3	~0°	~0°			Similar to the above specimen and conditions except light polarized perpendicular to the c-axis of the crystal.
13	362	1964	~298	0.230-2.65	0°		2π		99.5 pure powder, Carborundum Corporation; mesh size 325; compacted at 290 psi with highly polished stainless steel ram; data extracted from smooth curve; MgO reference standard.
14*	362	1964	~298	0.230-2.65	~0°		2π		Similar to above specimen and conditions except compacted at 1150 psi.
15*	362	1964	~298	0.230-2.65	~0°		2π		Similar to above specimen and conditions except compacted at 2880 psi.
16*	362	1964	~298	0.230-2.65	~0°		2π		Similar to above specimen and conditions except compacted at 5760 psi.
17	362	1964	~298	0.230-2.65	~0°		2π		Similar to above specimen and conditions except compacted at 11 500 psi.
18*	362	1964	~298	0.230-2.65	~0°		2π		Similar to above specimen and conditions except compacted at 20 200 psi.
19*	362	1964	~298	0.230-2.65	~0°		2π		Similar to above specimen and conditions except compacted at 28 800 psi.

* Not shown on plot

SPECIFICATION TABLE NO. 386 (continued)

Curve No.	Ref. No.	Year	Temperature, K	Wavelength Range, μm	Geometry θ	θ'	ω'	Reported Error, %	Composition (weight percent), Specifications, and Remarks
20*	362	1964	~298	0.230-2.65	~0°		2π		Similar to above specimen and conditions except compacted at 31 700 psi.
21	362	1964	~298	0.230-2.65	~0°		2π		Similar to above specimen and conditions except compacted at 34 600 psi.
22	362	1964	~298	2.00-15.0	0°		2π		Commercial sintered sample; surface machine groove to roughness 35-40 μin ; data extracted from smooth curve; converted from reflectance factor.
23*	362	1964	~298	2.00-15.0	0°		2π		Similar to above specimen and conditions except surface roughness 300-400 μin.
24	362	1964	~298	2.00-15.0	0°		2π		Similar to above specimen and conditions except surface roughness 1800-2200 μin.
25	87	1968	313	2.20-50.0	30°	30°			Synthetic polycrystal (6.0 mm thick); flat to ten fringes or better; data extracted from smooth curve; aluminum mirror reference standard.

* Not shown on plot

DATA TABLE NO. 386 NORMAL SPECTRAL REFLECTANCE OF BORON NITRIDE BN

[Wavelength, λ, μm; Reflectance, ρ; Temperature, T, K]

CURVE 1
T = 298

λ	ρ
0.230	0.562
0.240	0.494
0.250	0.470
0.260	0.470
0.270	0.483
0.280	0.514
0.290	0.550
0.300	0.570
0.310	0.570
0.320	0.607
0.330	0.635
0.340	0.660
0.345	0.669
0.350	0.675
0.350	0.700
0.379	0.719
0.447	0.757
0.513	0.813
0.548	0.813
0.569	0.827
0.673	0.823
0.683	0.811
0.700	0.828
0.789	0.818
0.854	0.823
0.950	0.823
1.05	0.819
1.15	0.812
1.35	0.807
1.44	0.799
1.50	0.762
1.53	0.754
1.60	0.749
1.79	0.786
1.83	0.785*
1.86	0.794
1.91	0.781
1.99	0.773*
2.10	0.731
2.26	0.707
2.32	0.718
2.36	0.699*
2.45	0.586
2.47	0.573*
2.55	0.566
2.60	0.559
2.65	0.570

CURVE 2
T = 298

λ	ρ
0.230	0.550
0.233	0.529
0.236	0.499*
0.245	0.452
0.260	0.486
0.280	0.472
0.290	0.470
0.294	0.473
0.300	0.467
0.310	0.504
0.319	0.543
0.327	0.562
0.340	0.550
0.350	0.531
0.360	0.518
0.387	0.592
0.413	0.587
0.448	0.641
0.497	0.720
0.551	0.772
0.582	0.769
0.603	0.777
0.652	0.744
0.702	0.724
0.721	0.701
0.757	0.701
0.789	0.687
0.875	0.790
1.04	0.809
1.08	0.801
1.15	0.826
1.24	0.836
1.38	0.844
1.65	0.849
1.89	0.856
2.15	0.850
2.25	0.847
2.35	0.838
2.43	0.801
2.51	0.761
2.60	0.748
2.65	0.770

CURVE 3
T = 298

λ	ρ
2.00	0.074
3.29	0.077
4.28	0.071
5.18	0.052
5.85	0.035
6.28	0.046
6.47	0.076
6.60	0.124
6.72	0.395
6.94	0.437
7.17	0.446*
7.44	0.448
7.81	0.260
7.99	0.223
8.31	0.189
8.70	0.167
9.33	0.146
10.0	0.130
10.6	0.114
12.0	0.060
12.4	0.075
12.6	0.108
12.6	0.143
12.7	0.165
13.3	0.169
15.2	0.128
15.7	0.088
16.2	0.077
16.9	0.071
17.3	0.073
19.3	0.093
21.4	0.122
22.4	0.139
23.5	0.143
24.5	0.142*
28.0	0.118
33.7	0.101
34.6	0.093*
35.2	0.082
35.9	0.064

CURVE 4
T = 298

λ	ρ
0.440	0.885
0.600	0.925

CURVE 5
T = 298

λ	ρ
0.440	0.650
0.600	0.840

CURVE 6
T ~ 298

λ	ρ
4.00	0.075
5.10	0.260
6.70	0.073
7.70	0.151
8.60	0.100
9.90	0.257
11.5	0.196
13.0	0.244
14.8	0.273
18.0	0.361
19.3	0.415
20.9	0.260
23.4	0.094
24.4	0.141
25.4	0.088
27.0	0.145
30.1	0.145
34.0	0.142

CURVE 7
T ~ 298

λ	ρ
3.10	0.066
4.60	0.063
5.20	0.041
5.70	0.010
6.10	0.000
6.40	0.233
6.40	0.448
7.00	0.469
7.10	0.489
7.30	0.474
7.60	0.255
7.80	0.225*
8.10	0.193
8.80	0.166*
11.0	0.146
11.7	0.122
12.0	0.092
12.1	0.056
12.5	0.193
12.9	0.213
13.4	0.213
14.3	0.179
14.9	0.135
15.4	0.101
16.1	0.087
33.4	0.082
34.8	0.062
35.5	0.043
36.4	0.045*
37.0	0.057

CURVE 8
T = 298

λ	ρ
5.56	0.073
5.90	0.062
6.24	0.045*
6.67	0.021
6.94	0.008
7.02	0.004*
7.15	0.000
7.23	0.015
7.36	0.068
7.45	0.213
7.53	0.425
7.66	0.567
7.93	0.716
8.02	0.752
8.18	0.781
8.31	0.801
8.48	0.816*
8.65	0.828
8.79	0.828*
8.96	0.826*
9.10	0.804
9.25	0.763
9.58	0.576
10.0	0.449
11.1	0.322
12.5	0.277
14.3	0.251
16.7	0.231
20.0	0.227
24.8	0.218

CURVE 9
T = 78

λ	ρ
5.04	0.109
5.62	0.095
6.12	0.078
6.66	0.046
6.99	0.024
7.14	0.010
7.27	0.017*
7.39	0.032
7.72	0.769
7.75	0.789*
7.82	0.810
7.98	0.828*
8.17	0.839
8.33	0.838*
8.64	0.819*
8.88	0.816
9.12	0.828
9.29	0.825*
9.38	0.810
9.73	0.562
9.94	0.465
10.1	0.413
10.4	0.363
10.7	0.330
11.3	0.293
12.1	0.258
13.5	0.217

CURVE 10
T = 298

λ	ρ
5.04	0.097
5.63	0.093*
6.11	0.076*
6.66	0.046*
6.99	0.024*
7.14	0.010*
7.27	0.017*
7.39	0.032*
7.72	0.769*
7.77	0.786
8.17	0.825
8.33	0.822*
8.54	0.807*
8.71	0.802
8.92	0.800*
9.14	0.813*
9.28	0.821
9.38	0.813*
9.76	0.561*
9.88	0.508
10.1	0.448
10.2	0.411*
10.5	0.369
10.9	0.341
11.6	0.308
12.6	0.280*
13.9	0.255
15.9	0.234

CURVE 11
T ~ 298

λ	ρ
5.00	0.092
5.10	0.089*
5.21	0.087*
5.33	0.084*
5.44	0.081
5.56	0.071*
5.68	0.064
5.80	0.056*
5.95	0.042*
6.09	0.036
6.17	0.050
6.24	0.085
6.29	0.120
6.33	0.168
6.37	0.219*
6.39	0.268
6.44	0.305*
6.47	0.329
6.58	0.345
6.66	0.328*
6.76	0.289
6.84	0.260*
6.93	0.238
7.05	0.221*
7.12	0.202
7.26	0.189
7.47	0.177*
7.69	0.163*
7.94	0.160
8.22	0.148
8.50	0.144*
8.84	0.143
9.10	0.133*
9.46	0.126
9.83	0.116*
10.2	0.110
10.6	0.098*
11.0	0.088*
11.2	0.082
11.4	0.065*
11.7	0.044
11.9	0.025
12.0	0.010
12.1	0.049
12.3	0.478
12.3	0.702
12.7	0.774

* Not shown on plot

DATA TABLE NO. 386 (cont.)

CURVE 11 (cont.)

λ	ρ
12.9	0.580
13.1	0.408
13.2	0.333
13.5	0.291
13.6	0.262*
14.0	0.224
14.3	0.212
14.8	0.200
15.3	0.194*
16.2	0.175
17.3	0.172*
18.6	0.157
20.1	0.162
21.7	0.159
23.9	0.159
26.4	0.157*
29.9	0.153*
33.3	0.152

CURVE 12
T ~ 298

λ	ρ
5.00	0.080
5.11	0.077*
5.21	0.069
5.32	0.067*
5.43	0.051*
5.55	0.042
5.68	0.033*
5.78	0.025
5.87	0.009*
5.93	0.004*
6.00	0.000
6.10	0.018
6.09	0.026*
6.13	0.043*
6.18	0.087
6.22	0.194
6.23	0.344
6.28	0.476
6.30	0.572
6.34	0.642*
6.39	0.697
6.46	0.762
6.55	0.803
6.63	0.829*

CURVE 12 (cont.)

λ	ρ
6.72	0.849
6.84	0.857*
6.93	0.862*
7.05	0.863
7.13	0.850*
7.21	0.836
7.24	0.805
7.28	0.758*
7.32	0.686
7.39	0.615*
7.45	0.565
7.52	0.520*
7.56	0.484
7.67	0.435
7.80	0.402*
7.93	0.369
8.08	0.347*
8.20	0.333
8.50	0.308*
8.77	0.279
9.12	0.271*
9.41	0.252*
9.84	0.243
10.2	0.235*
10.6	0.228
11.2	0.217
11.7	0.208
12.0	0.196*
12.4	0.184*
12.8	0.177
13.0	0.199
13.0	0.256
13.2	0.282
13.5	0.265*
14.3	0.239
15.3	0.228
16.2	0.221
17.3	0.215
18.6	0.215*
20.0	0.211
21.9	0.211
24.0	0.208
26.4	0.205*
29.4	0.205
33.3	0.203

CURVE 13
T ~ 298

λ	ρ
0.230	0.540
0.240	0.479
0.243	0.475*
0.245	0.460
0.249	0.462*
0.253	0.453
0.259	0.457*
0.264	0.454*
0.272	0.460
0.276	0.459*
0.285	0.466
0.291	0.463*
0.298	0.466*
0.302	0.461
0.322	0.461
0.332	0.469
0.350	0.467*
0.360	0.477
0.589	0.600
0.618	0.632
0.681	0.664
0.703	0.662*
0.717	0.671
0.717	0.679*
0.800	0.724
0.901	0.761
1.05	0.801
1.30	0.835
1.72	0.864
1.90	0.878
2.08	0.883*
2.19	0.887
2.33	0.885*
2.37	0.876
2.48	0.833*
2.63	0.829
2.65	0.840

CURVE 14*
T ~ 298

λ	ρ
0.230	0.526
0.236	0.492
0.252	0.450
0.261	0.452

CURVE 14 (cont.)

λ	ρ
0.288	0.462
0.308	0.453
0.330	0.459
0.350	0.461
0.441	0.493
0.549	0.550
0.624	0.614
0.679	0.639
0.698	0.635
0.712	0.659
0.801	0.699
0.976	0.760
1.11	0.786
1.32	0.808
1.84	0.839
1.97	0.844
2.29	0.844
2.36	0.837
2.45	0.791
2.52	0.777
2.62	0.778
2.65	0.785

CURVE 15*
T ~ 298

λ	ρ
0.230	0.526
0.236	0.492
0.252	0.450
0.261	0.452
0.288	0.462
0.308	0.453
0.330	0.459
0.341	0.457
0.360	0.456
0.452	0.486
0.558	0.529
0.671	0.596
0.695	0.593
0.699	0.599
0.706	0.609
0.850	0.670
1.01	0.710
1.21	0.734
1.46	0.747
1.68	0.755
1.71	0.754
1.74	0.760

CURVE 15 (cont.)

λ	ρ
1.99	0.761
2.13	0.753
2.32	0.752
2.36	0.740
2.44	0.695
2.52	0.674
2.59	0.672
2.65	0.677

CURVE 16*
T ~ 298

λ	ρ
0.230	0.526
0.236	0.492
0.252	0.450
0.261	0.452
0.288	0.462
0.308	0.453
0.324	0.455
0.330	0.458
0.360	0.456
0.527	0.511
0.627	0.566
0.679	0.585
0.700	0.581
0.712	0.599
0.847	0.654
1.03	0.700
1.28	0.724
1.45	0.726
1.83	0.736
1.92	0.733
2.03	0.734
2.17	0.727
2.33	0.723
2.38	0.707
2.48	0.650
2.60	0.641
2.65	0.650

CURVE 17
T ~ 298

λ	ρ
0.230	0.526
0.236	0.492*
0.252	0.450*

CURVE 17 (cont.)

λ	ρ
0.261	0.452
0.288	0.462*
0.308	0.453
0.325	0.453*
0.374	0.452
0.530	0.492
0.612	0.532
0.679	0.556
0.704	0.552
0.713	0.572
0.853	0.620
0.992	0.651
1.13	0.669
1.24	0.675
1.75	0.680
2.01	0.677
2.07	0.668*
2.25	0.665
2.34	0.656*
2.39	0.637
2.46	0.599
2.53	0.579
2.59	0.574*
2.65	0.580

CURVE 18*
T ~ 298

λ	ρ
0.230	0.526
0.243	0.462
0.255	0.442
0.264	0.439
0.284	0.443
0.297	0.434
0.302	0.435
0.305	0.429
0.318	0.423
0.350	0.423
0.553	0.463
0.614	0.500
0.676	0.519
0.700	0.514
0.713	0.539
0.846	0.588
0.998	0.621
1.15	0.641

CURVE 18 (cont.)

λ	ρ
1.31	0.648
1.86	0.649
2.15	0.632
2.30	0.630
2.36	0.616
2.48	0.548
2.52	0.547
2.55	0.538
2.65	0.539

CURVE 19*
T ~ 298

λ	ρ
0.230	0.520
0.233	0.489
0.248	0.440
0.256	0.432
0.293	0.430
0.310	0.420
0.350	0.420
0.371	0.417
0.539	0.451
0.625	0.492
0.684	0.510
0.698	0.507
0.717	0.530
0.839	0.570
0.952	0.601
1.15	0.622
1.78	0.629
1.93	0.620
2.02	0.620
2.15	0.609
2.27	0.604
2.36	0.591
2.47	0.534
2.55	0.519
2.65	0.521

CURVE 20*
T ~ 298

λ	ρ
0.230	0.488
0.232	0.442
0.241	0.400
0.259	0.371

CURVE 20 (cont.)

λ	ρ
0.270	0.367
0.297	0.362
0.310	0.359
0.340	0.356
0.345	0.359
0.350	0.356
0.364	0.346
0.534	0.391
0.617	0.441
0.681	0.469
0.696	0.468
0.704	0.481
0.820	0.537
0.967	0.584
1.11	0.608
1.29	0.619
1.55	0.621
1.79	0.619
2.02	0.613
2.15	0.601
2.29	0.600
2.37	0.578
2.41	0.550
2.51	0.518
2.60	0.509
2.65	0.512

CURVE 21
T ~ 298

λ	ρ
0.230	0.394
0.244	0.331
0.262	0.314
0.263	0.316*
0.276	0.310
0.281	0.316
0.283	0.312*
0.287	0.310
0.291	0.314
0.302	0.310*
0.304	0.300
0.350	0.300
0.515	0.339
0.614	0.393
0.638	0.413
0.677	0.426

* Not shown on plot

DATA TABLE NO. 386 (continued)

CURVE 21 (cont.)

λ	ρ
0.694	0.425*
0.701	0.437
0.826	0.499
0.971	0.549
1.06	0.569*
1.25	0.588
1.42	0.591
1.61	0.591*
1.70	0.597
1.80	0.600
2.06	0.588*
2.20	0.580
2.27	0.580*
2.32	0.577*
2.38	0.557
2.45	0.519
2.54	0.493*
2.57	0.492*
2.60	0.488*
2.63	0.489*
2.65	0.486

CURVE 22
T ~ 298

λ	ρ
2.00	0.698
2.12	0.706
2.18	0.698*
2.54	0.439
2.62	0.254
2.68	0.240
2.75	0.240*
3.00	0.294
3.04	0.290*
3.11	0.200
3.18	0.158
3.24	0.139*
3.50	0.103
5.93	0.103
6.04	0.118
6.10	0.155
6.19	0.376
6.26	0.410
6.48	0.465
6.74	0.537

CURVE 22 (cont.)

λ	ρ
7.00	0.582
7.19	0.591
7.26	0.567
7.42	0.397
7.64	0.298
7.76	0.280*
7.99	0.258*
8.20	0.248
8.60	0.242*
9.01	0.214
9.40	0.206
10.2	0.216
10.9	0.207
11.3	0.215*
11.7	0.236
11.9	0.249*
12.0	0.249
12.1	0.228
12.1	0.184
12.2	0.178
12.5	0.215*
13.0	0.239
15.0	0.245

CURVE 23*
T ~ 298

λ	ρ
2.00	0.681
2.09	0.691
2.20	0.691
2.54	0.420
2.60	0.356
2.63	0.261
2.65	0.206
2.73	0.197
2.87	0.230
3.01	0.252
3.09	0.242
3.14	0.181
3.22	0.143
3.35	0.123
3.50	0.103
5.93	0.103
6.06	0.123
6.14	0.234

CURVE 23 (cont.)

λ	ρ
6.21	0.361
6.28	0.410
6.62	0.492
6.80	0.511
7.03	0.511
7.23	0.480
7.29	0.446
7.36	0.383
7.44	0.336
7.68	0.271
7.82	0.243
8.00	0.225
8.64	0.220
8.92	0.199
9.62	0.191
9.80	0.196
11.2	0.203
11.5	0.210
11.9	0.250
12.0	0.250
12.1	0.226
12.1	0.191
12.1	0.169
12.2	0.166
12.6	0.207
13.0	0.228
15.0	0.234

CURVE 24
T ~ 298

λ	ρ
2.00	0.670
2.08	0.680
2.15	0.680
2.25	0.661
2.41	0.527
2.45	0.477
2.56	0.405
2.62	0.202
2.66	0.173
2.70	0.188
2.89	0.222
3.03	0.243
3.08	0.232
3.13	0.193

CURVE 24 (cont.)

λ	ρ
3.16	0.149*
3.21	0.126
3.50	0.103*
5.93	0.103
6.08	0.118*
6.13	0.147
6.18	0.306
6.28	0.333*
6.46	0.337
6.72	0.377
6.98	0.389
7.22	0.389
7.29	0.379*
7.39	0.303
7.45	0.280
7.62	0.244
7.79	0.221*
8.00	0.208
8.59	0.211
8.79	0.195
9.06	0.179
9.50	0.175
10.3	0.188
10.8	0.186
11.5	0.201
11.8	0.231*
12.0	0.231
12.1	0.217
12.1	0.166
12.2	0.166*
12.6	0.199

CURVE 25
T = 313

λ	ρ
2.20	0.094
2.80	0.098
3.80	0.092
6.00	0.000
6.20	0.027
6.10	0.379
6.30	0.459
6.60	0.800
6.90	0.872
7.10	0.803

CURVE 25 (cont.)

λ	ρ
7.40	0.705
7.50	0.395*
7.70	0.298*
8.00	0.253
8.50	0.221
9.00	0.211*
9.80	0.201
10.5	0.177
11.5	0.170
11.8	0.180
11.8	0.203*
12.1	0.360
12.2	0.285
12.5	0.143
12.7	0.143*
12.9	0.200*
13.4	0.161
14.9	0.154
22.7	0.172
25.3	0.190
26.5	0.190*
28.2	0.168
29.7	0.143
31.7	0.132
35.0	0.154*
50.0	0.156

* Not shown on plot

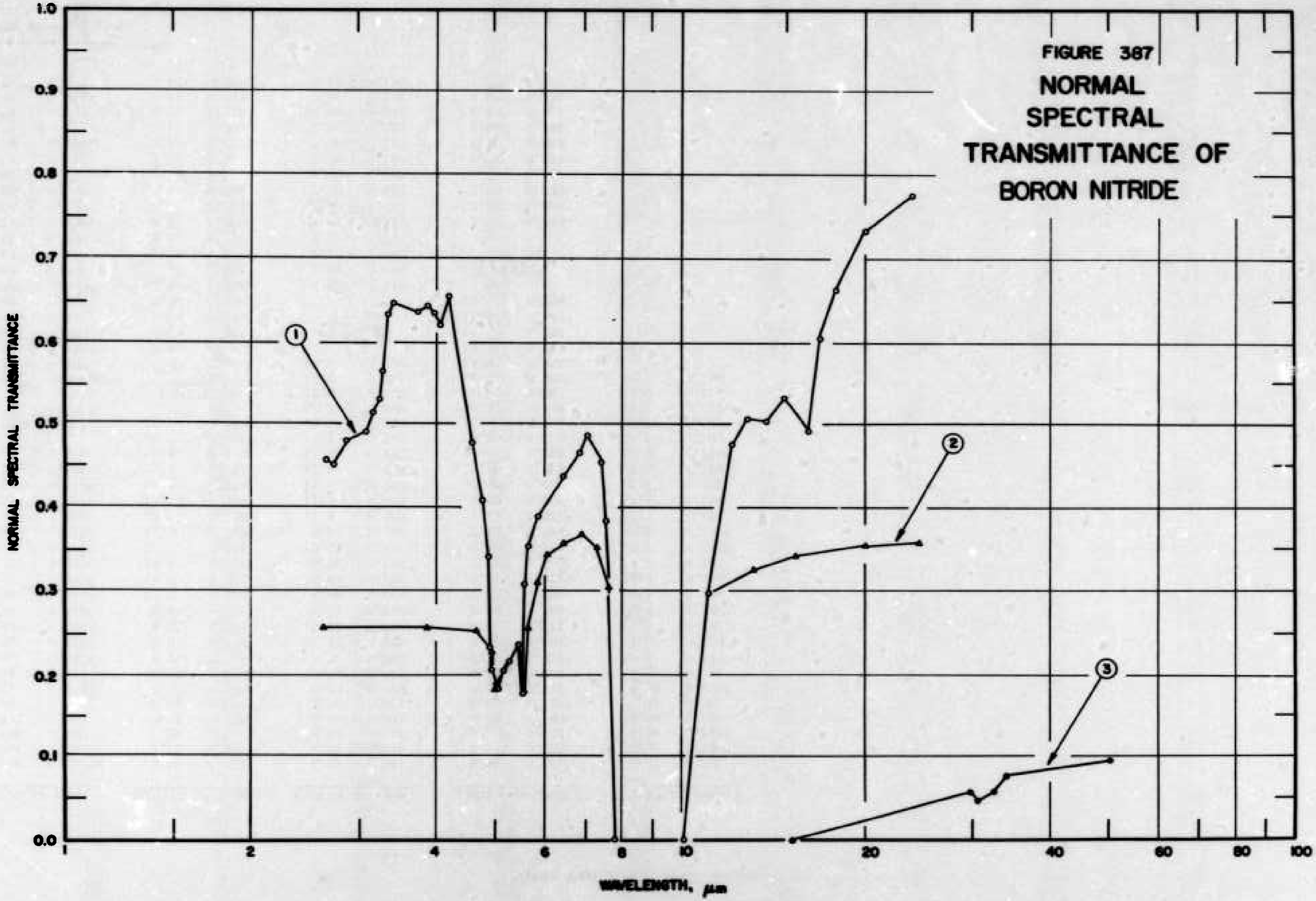


FIGURE 387
NORMAL
SPECTRAL
TRANSMITTANCE OF
BORON NITRIDE
NORMAL SPECTRAL TRANSMITTANCE
WAVELENGTH, μm
1.0
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0.0
1
2
4
6
8
10
20
40
60
80
100
1
2
3

SPECIFICATION TABLE NO. 387 NORMAL SPECTRAL TRANSMITTANCE OF BORON NITRIDE BN

Curve No.	Ref. No.	Year	Temperature, K	Wavelength Range, μm	Geometry θ	θ'	ω'	Reported Error, %	Composition (weight percent), Specifications, and Remarks
1	177	1967	~298	2.65-23.8	~0°	~0°			Single crystal platlets with cubic structure (30 μm thick); grown at very high pressure and temperature; 10^{10} ohm-cm electrical resistivity; data extracted from smooth curve.
2	177	1967	~298	2.62-24.3	~0°	~0°			Single crystal platlets with cubic structure (30 μm thick); beryllium-doped; grown at very high pressure and temperature; 10^4 ohm-cm electrical resistivity; data extracted from smooth curve.
3	87	1968	313	15.2-50.0	~0°	~0°			Synthetic polycrystal (6.0 mm thick); flat to ten fringes or better; data extracted from smooth curve.

DATA TABLE NO. 387 NORMAL SPECTRAL TRANSMITTANCE OF BORON NITRIDE BN

[Wavelength, λ, μm; Transmittance, τ; Temperature, T, K]

λ	τ	λ	τ	λ	τ	λ	τ
CURVE 1 T ~ 298		CURVE 1 (cont.)		CURVE 2 T ~ 298		CURVE 3 T = 313	
		5.41	0.237				
2.65	0.455	5.52	0.176	2.62	0.259	15.2	0.000
2.72	0.450	5.59	0.307	3.86	0.258	29.7	0.057
2.77	0.449*	5.65	0.353	4.69	0.253	30.5	0.047
2.89	0.480	5.88	0.390	4.93	0.228	32.1	0.057
3.09	0.490	6.41	0.436	5.00	0.181	34.0	0.077
3.16	0.511	6.85	0.462	5.13	0.206*	50.0	0.094
3.23	0.530	7.09	0.487	5.29	0.217*		
3.27	0.565	7.41	0.452	5.41	0.237*		
3.32	0.635	7.52	0.382	5.52	0.177*		
3.34	0.646*	7.81	0.000	5.56	0.180		
3.40	0.649	10.1	0.000	5.62	0.258		
3.72	0.639	11.1	0.299	5.81	0.310		
3.89	0.645	12.2	0.477	6.06	0.343		
3.98	0.637	12.8	0.508	6.41	0.358		
4.08	0.621	13.7	0.503	6.90	0.367		
4.20	0.656	14.7	0.532	7.30	0.351		
4.59	0.478	16.1	0.492	7.63	0.301		
4.78	0.409	16.9	0.606	7.81	0.000		
4.88	0.340	17.9	0.665	10.1	0.000*		
4.90	0.232	20.0	0.733	11.1	0.299*		
4.93	0.206	23.8	0.776	13.2	0.326		
5.03	0.183			15.4	0.343		
5.13	0.206			20.0	0.355		
5.29	0.218			24.4	0.359		

* Not shown on plot

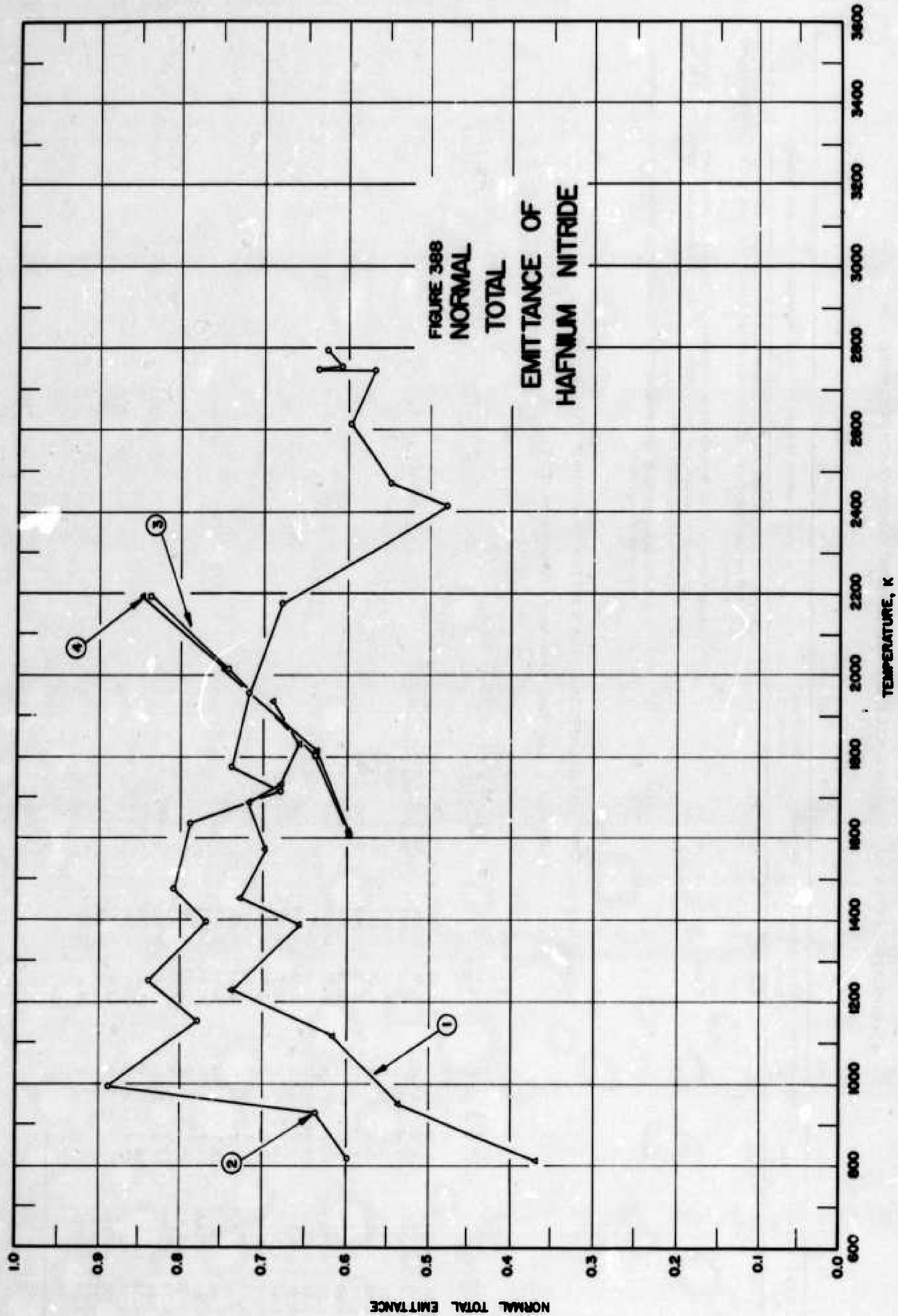


FIGURE 388 NORMAL TOTAL EMITTANCE OF HAFNIUM NITRIDE

SPECIFICATION TABLE NO. 388 NORMAL TOTAL EMITTANCE OF HAFNIUM NITRIDE HfN

Curve No.	Ref. No.	Year	Temperature Range, K	Geometry θ'	Reported Error, %	Composition (weight percent), Specifications and Remarks
1	17	1962	808-1933	~0°	10	Hot pressed; measured in argon; run 1; [Author's designation: Specimen 1].
2	17	1962	819-2744	~0°	10	Hot pressed; specimen cracked at 2744 K; measured in argon; run 1; [Author's designation: Specimen 2].
3	38	1962	1605-2195	~0°		Prepared from micronized powder, hot pressed at >2273 K; sintered, polished, etched, then degassed by heating to ~973 K; measured in argon; integrated from spectral data.
4	37	1964	1617-2192	~0°		Measured in argon; integrated from spectral emittance over the range 0.4 to 5.0 μm.

DATA TABLE NO. 388 NORMAL TOTAL EMITTANCE, OF HAFNIUM NITRIDE HfN

[Temperature, T, K; Emittance, ε]

T	ε	T	ε	T	ε
CURVE 1		CURVE 2 (cont.)		CURVE 4	
808	0.37	1478	0.81	1617	0.60
950	0.54	1633	0.79	1809	0.64
1117	0.62	1778	0.74	2006	0.75
1222	0.74	1717	0.68	2192	0.85
1383	0.66	1955	0.72		
1455	0.73	2172	0.68		
1572	0.70	2405	0.48		
1688	0.72	2467	0.55		
1822	0.66	2611	0.60		
1733	0.68	2744	0.57		
1933	0.69	2744	0.62*		
		2749	0.61*		
CURVE 2		2794	0.63		
		2744	0.64		
819	0.60				
925	0.64	CURVE 3			
992	0.89				
1155	0.77	1605	0.600		
1250	0.84	1800	0.642		
1394	0.77	2005	0.748		
		2195	0.840		

*Not shown on plot

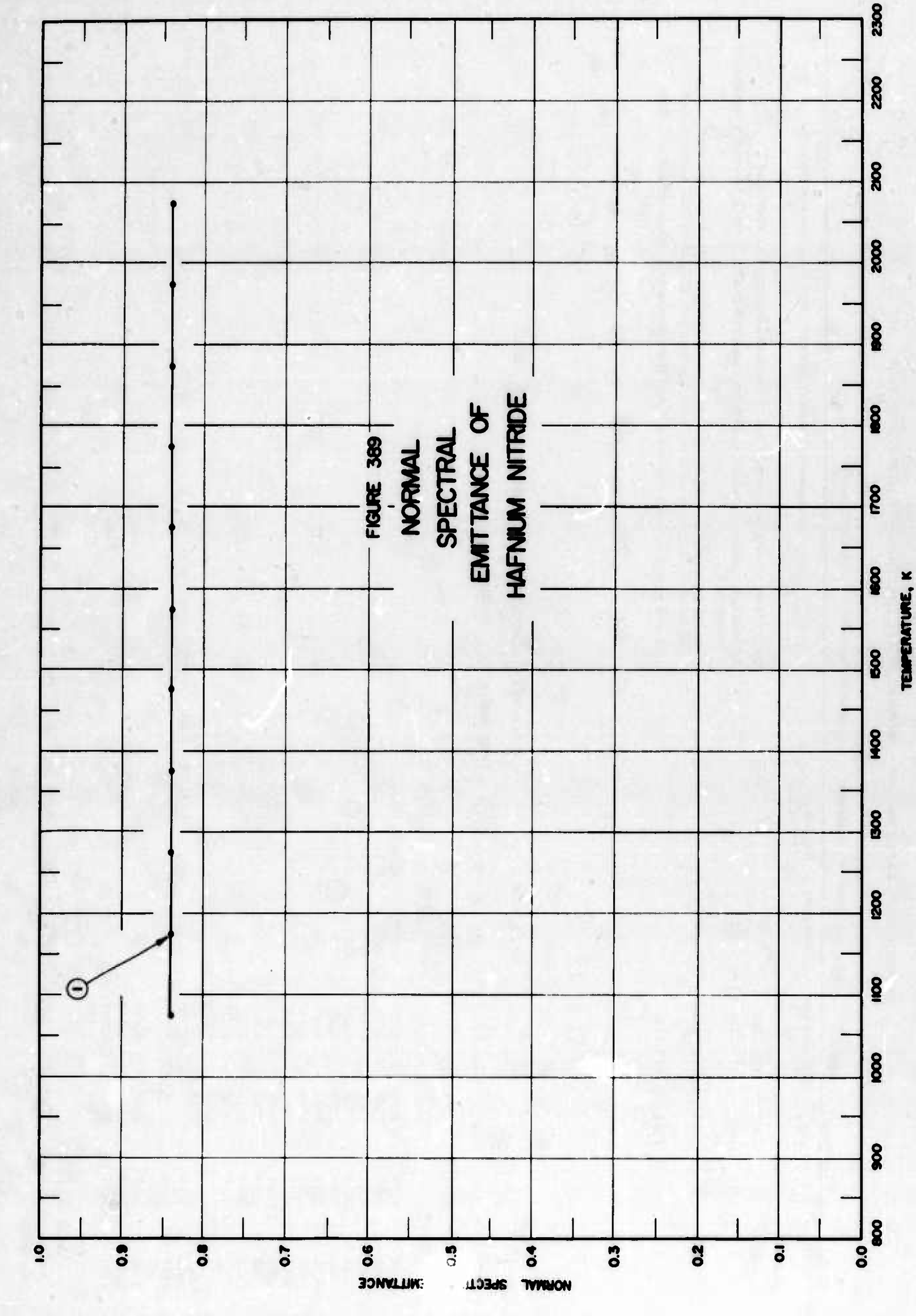


FIGURE 389 NORMAL SPECTRAL EMITTANCE OF HAFNIUM NITRIDE

SPECIFICATION TABLE NO. 389 NORMAL SPECTRAL EMITTANCE OF HAFNIUM NITRIDE HfN

Curve No.	Ref. No.	Year	Wavelength, μm	Temperature Range, K	Geometry θ'	Reported Error, %	Composition (weight percent), Specifications, and Remarks
1	13	1962	0.650	1073-2073	~0°		Layer of paste (~100 μm thick) on tantalum cylinder; paste prepared from fine powder (2-3 μm) of HfN suspended in nitrocellulose binder and dried at 313 to 333 K.

DATA TABLE NO. 389 NORMAL SPECTRAL EMITTANCE OF HAFNIUM NITRIDE HfN

[Temperature, T, K; Emittance, ϵ; Wavelength, λ, μm]

T	ϵ
CURVE 1 $\lambda = 0.650$	
1073	0.84
1173	0.84
1273	0.84
1373	0.84
1473	0.84
1573	0.84
1673	0.84
1773	0.84
1873	0.84
1973	0.84
2073	0.84

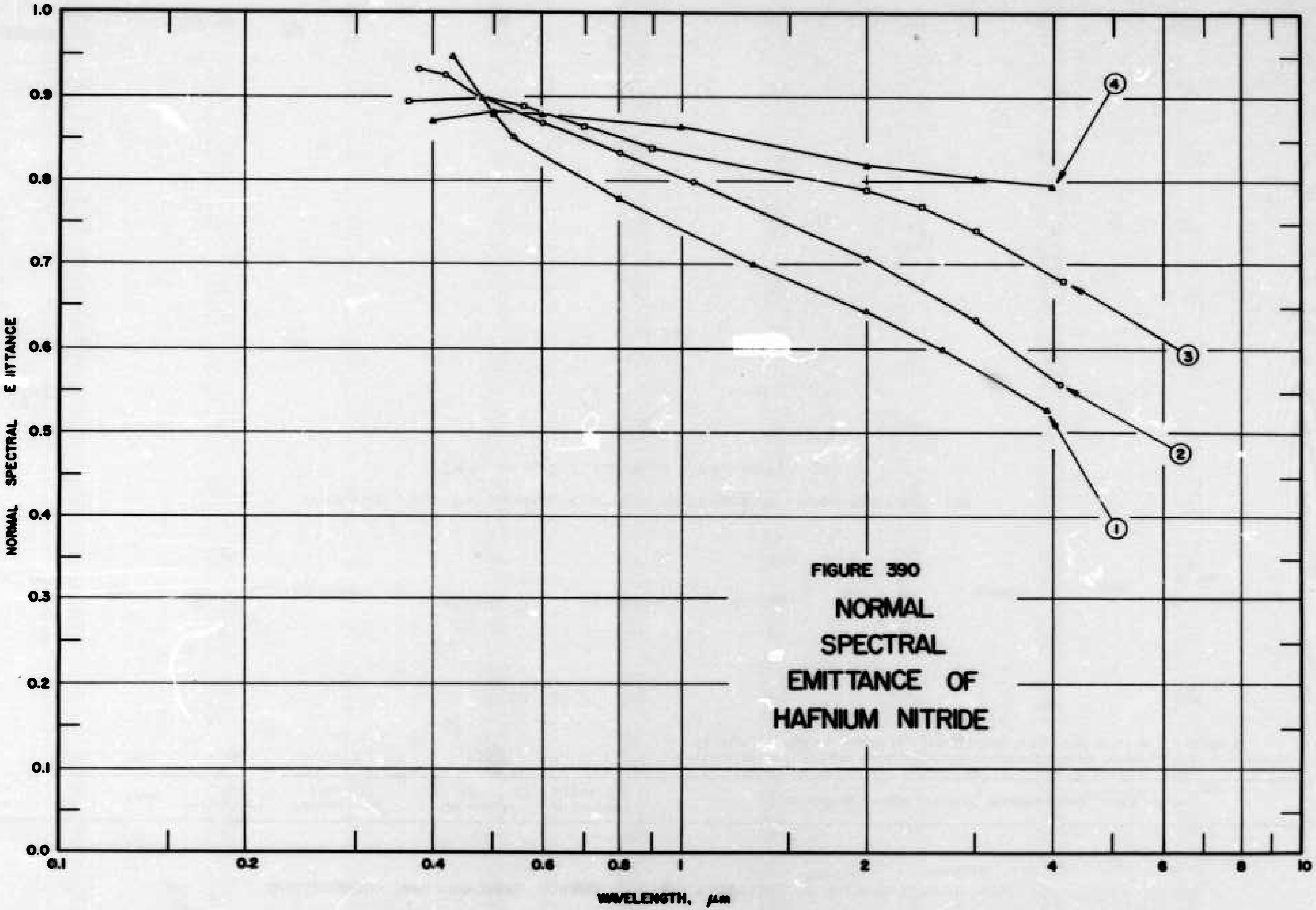


FIGURE 390
NORMAL SPECTRAL EMITTANCE OF HAFNIUM NITRIDE

SPECIFICATION TABLE NO. 390 NORMAL SPECTRAL EMITTANCE OF HAFNIUM NITRIDE HfN

Curve No.	Ref. No.	Year	Temperature K	Wavelength Range, μm	Geometry θ'	Reported Error, %	Composition (weight percent), Specifications, and Remarks
1	38	1962	1617	0.430-3.90	~0°		Prepared from micronized powder, hot pressed at > 2273 K; sintered, polished, etched, then degassed by heating to ~ 973 K; measured in argon (1570 mm Hg); data extracted from smooth curve.
2	38	1962	1809	0.380-4.10	~0°		Above specimen and conditions.
3	38	1962	2006	0.365-4.15	~0°		Above specimen and conditions.
4	38	1962	2192	0.400-4.00	~0°		Above specimen and conditions.

DATA TABLE NO. 390 NORMAL SPECTRAL EMITTANCE OF HAFNIUM NITRIDE HfN

[Wavelength, λ, μm; Emittance, ϵ; Temperature, T, K]

λ	ϵ	λ	ϵ	λ	ϵ
CURVE 1 T = 1617		CURVE 2 (cont.)		CURVE 4 T = 2192	
0.430	0.950	2.00	0.706	0.400	0.872
0.480	0.900	3.00	0.635	0.500	0.882
0.500	0.880	4.10	0.560	0.600	0.880
0.540	0.854	CURVE 3 T = 2006		1.00	0.865
0.600	0.780	0.365	0.895	2.00	0.820
1.31	0.700	0.480	0.900*	3.00	0.802
2.00	0.645	0.560	0.890	4.00	0.795
2.65	0.600	0.700	0.865		
3.90	0.529	0.900	0.840		
CURVE 2 T = 1809		2.00	0.790		
0.380	0.935	2.45	0.770		
0.420	0.929	3.00	0.740		
0.480	0.900*	4.15	0.680		
0.600	0.870				
0.800	0.835				
1.05	0.800				

* Not shown on plot

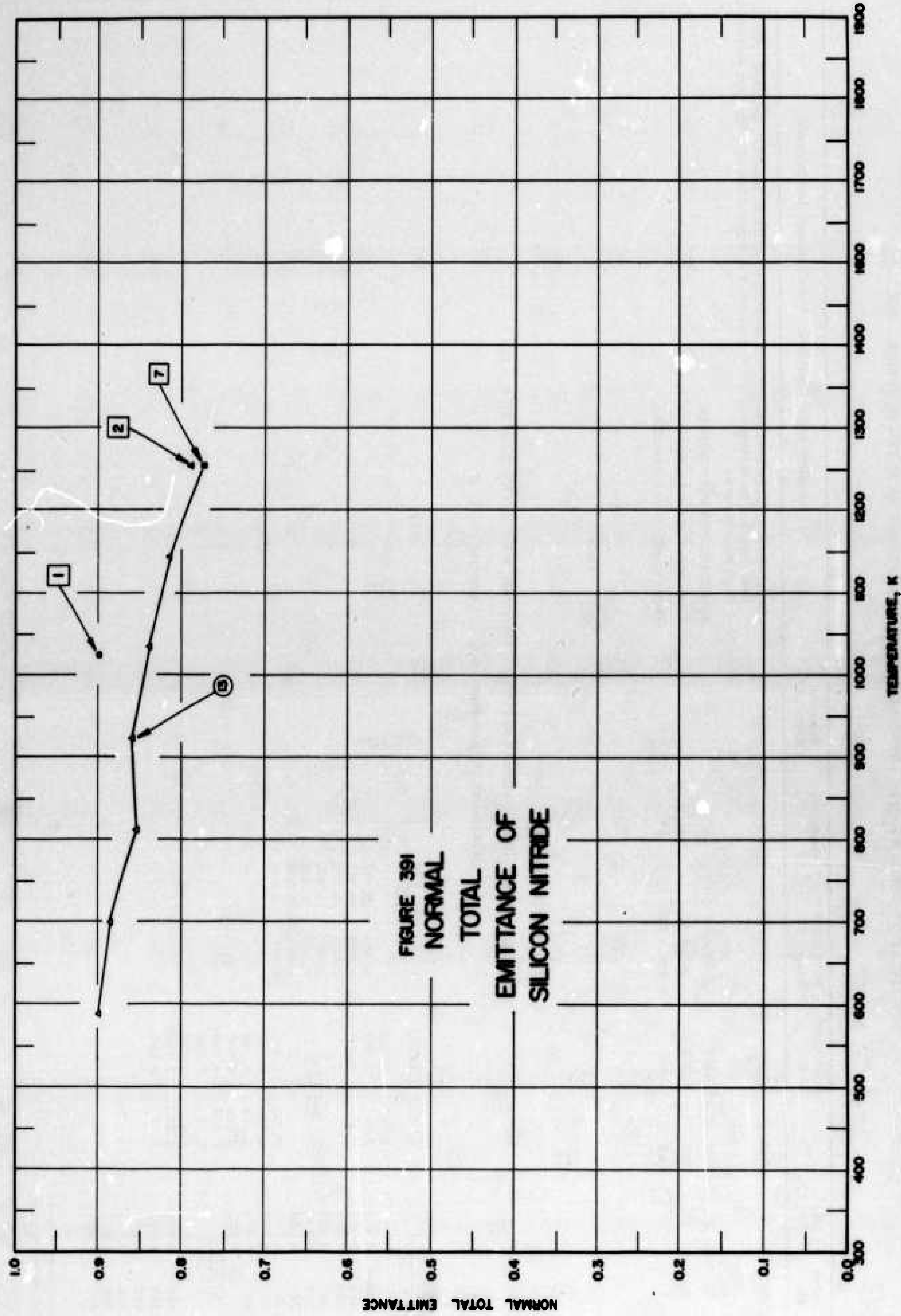


FIGURE 391 NORMAL TOTAL EMITTANCE OF SILICON NITRIDE

SPECIFICATION TABLE NO. 391 NORMAL TOTAL EMITTANCE OF SILICON NITRIDE Si_3N_4

Curve No.	Ref. No.	Year	Temperature Range, K	Geometry θ'	Reported Error, %	Composition (weight percent), Specifications and Remarks
1	28	1963	1023	~0°		Sintered at 1673 K for 2 hrs (setter material Si_3N_4); density 1.82 g cm^{-3}, theoretical density 3.44 g cm^{-3}; x-ray structure $\alpha Si_3N_4 + \beta Si_3N_4$; integrated from spectral data (1-15 μm); [Authors' designation: Sample No. 106].
2	107	1962	1255	~0°		Pure Si_3N_4 mixture (No. 2817-C) from Carborundum Company; ground and polished then cleaned with alcohol and distilled water; [Authors' designation: Specimen 1].
3*	107	1962	1255	~0°		Above specimen and conditions except heated in quiescent air at 1255 K for 3 min.
4*	107	1962	1255	~0°		Above specimen and conditions except heated for 6.2 min.
5*	107	1962	1255	~0°		Above specimen and conditions except heated for 10 min.
6*	107	1962	1255	~0°		Above specimen and conditions except heated for 15 min.
7	107	1962	1255	~0°		Above specimen and conditions except heated for 20 min.
8*	107	1962	1255	~0°		Pure Si_3N_4 mixture (No. 2817-C) from Carborundum Company; ground and polished with alcohol and distilled water; heated in quiescent air at 1255 K for 5 min.
9*	107	1962	1255	~0°		Above specimen and conditions except heated for 10 min.
10*	107	1962	1255	~0°		Above specimen and conditions except heated for 15 min.
11*	107	1962	1255	~0°		Above specimen and conditions except heated for 20 min.
12*	107	1962	589-1255	~0°		Pure Si_3N_4 mixture (No. 2817-C) from Carborundum Company; ground and polished, then cleaned with alcohol and distilled water; heated in quiescent air at 1255 K for 20 min; [Authors' designation: Specimen 1].
13	107	1962	589-1255	~0°		Similar to the above specimen and conditions; [Authors' designation: Specimen 2].

* Not shown on plot

DATA TABLE NO. 391 NORMAL TOTAL EMITTANCE OF SILICON NITRIDE Si_3N_4

[Temperature, T, K; Emittance, ϵ]

T	ϵ
CURVE 1	
1023	0.90
CURVE 2	
1255	0.79
CURVE 3*	
1255	0.78
CURVE 4*	
1255	0.775
CURVE 5*	
1255	0.775
CURVE 6*	
1255	0.77
CURVE 7	
1255	0.775
CURVE 8*	
1255	0.775
CURVE 9*	
1255	0.775
CURVE 10*	
1255	0.785
CURVE 11*	
1255	0.775

T	ϵ
CURVE 12*	
589	0.885
700	0.885
811	0.850
922	0.852
1033	0.845
1144	0.815
1255	0.775
CURVE 13	
589	0.90
700	0.885
811	0.855
922	0.86
1033	0.84
1144	0.815
1255	0.775*

* Not shown on plot

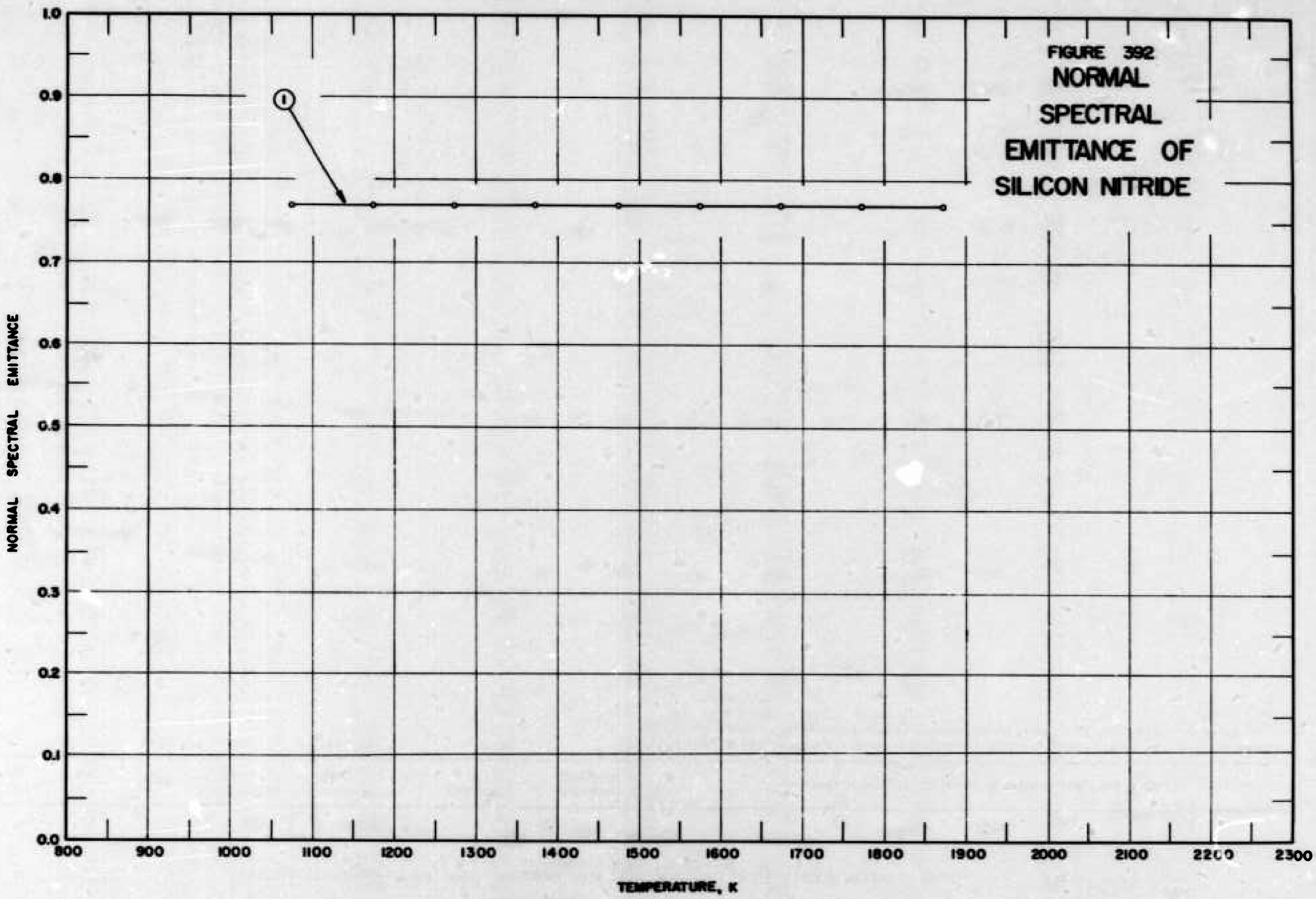


FIGURE 392
NORMAL SPECTRAL EMITTANCE OF SILICON NITRIDE
NORMAL SPECTRAL EMITTANCE
TEMPERATURE, K
1
0.0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
1.0
800
900
1000
1100
1200
1300
1400
1500
1600
1700
1800
1900
2000
2100
2200
2300

SPECIFICATION TABLE NO. 392 NORMAL SPECTRAL EMITTANCE OF SILICON NITRIDE Si_3N_4

Curve No.	Ref. No.	Year	Wavelength, µm	Temperature Range, K	Geometry θ'	Reported Error, %	Composition (weight percent), Specifications, and Remarks
1	13	1962	0.650	1073-1873	~0°		Layer of paste (~100 µm thick) on tantalum cylinder; paste prepared from find powder (2-3 µm) of Si_3N_4 suspended in nitrocellulose binder and dried at 313 to 333 K.

DATA TABLE NO. 392 NORMAL SPECTRAL EMITTANCE OF SILICON NITRIDE Si_3N_4

T	ε
CURVE 1 $\lambda = 0.650$	
1073	0.77
1173	0.77
1273	0.77
1373	0.77
1473	0.77
1573	0.77
1673	0.77
1773	0.77
1873	0.77

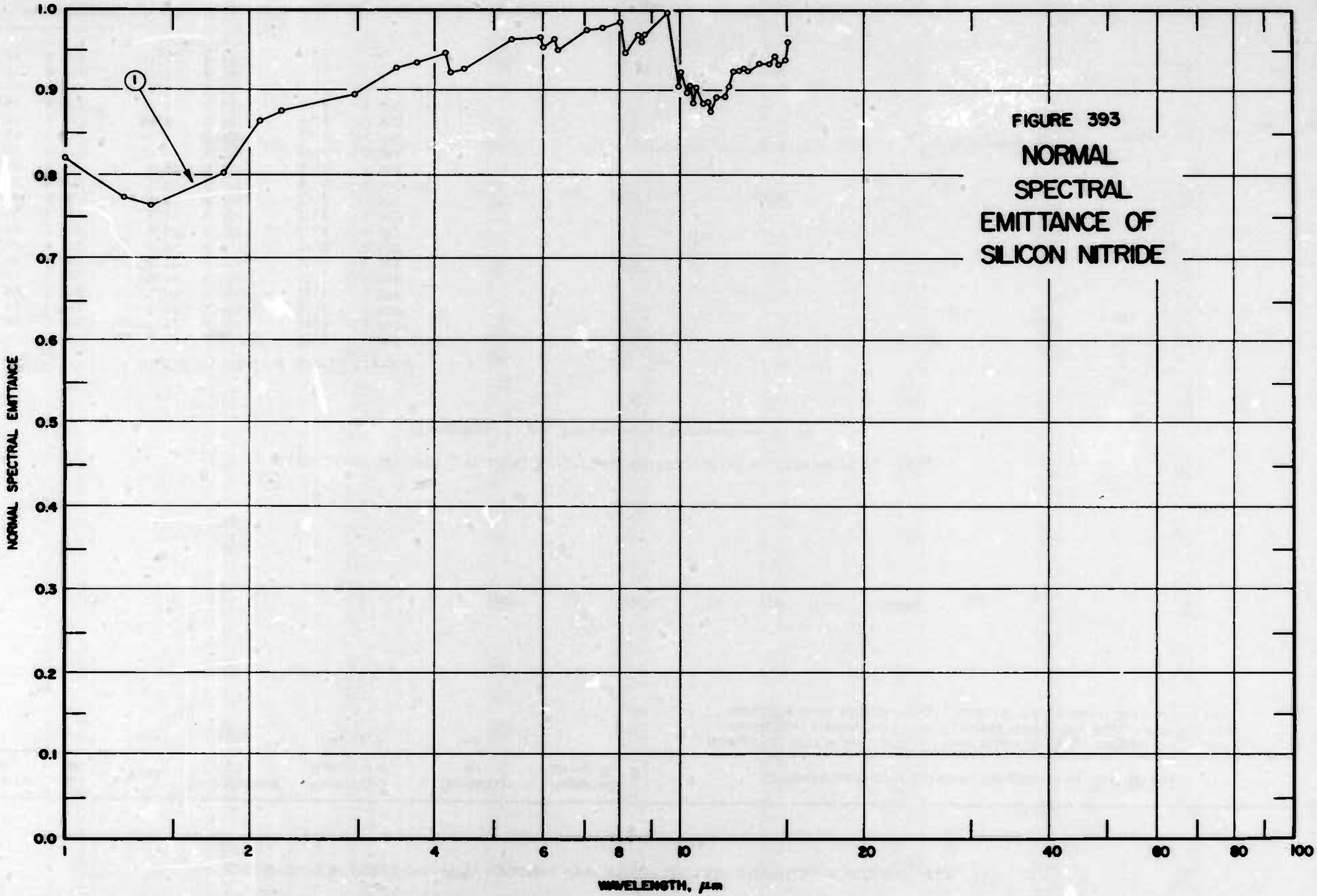


FIGURE 393
NORMAL
SPECTRAL
EMITTANCE OF
SILICON NITRIDE

SPECIFICATION TABLE NO. 393 NORMAL SPECTRAL EMITTANCE OF SILICON NITRIDE Si_3N_4

Curve No.	Ref. No.	Year	Temperature, K	Wavelength Range, μm	Geometry θ'	Reported Error, %	Composition (weight percent), Specifications, and Remarks
1	28	1963	1023	1.00-15.0	~0°		Sintered at 1673 K for 2 hours (setter material Si_3N_4); density 1.82 g cm^{-3}, theoretical density 3.44 g cm^{-3}; x-ray structure α Si_3N_4 + β Si_3N_4; data extracted from smooth curve; [Authors' designation: Sample No. 106].

DATA TABLE NO. 393 NORMAL SPECTRAL EMITTANCE OF SILICON NITRIDE Si_3N_4

[Wavelength, λ, μm; Emittance, ϵ; Temperature, T, K]

λ	ϵ	λ	ϵ	λ	ϵ
CURVE 1 T = 1023		CURVE 1 (cont.)		CURVE 1 (cont.)	
		6.50	0.969*	11.2	0.878
1.00	0.820	7.01	0.975	11.3	0.886*
1.25	0.772	7.50	0.978	11.4	0.877*
1.39	0.763	7.68	0.984*	11.5	0.894
1.81	0.801	8.00	0.984	11.8	0.894
2.08	0.864	8.17	0.949	12.0	0.905
2.25	0.876	8.55	0.970	12.2	0.923
2.98	0.899	8.64	0.960	12.5	0.923
3.46	0.929	8.71	0.970	12.6	0.929
3.60	0.925*	9.51	0.898	12.9	0.925
3.73	0.935	9.72	0.895*	13.5	0.934
4 16	0.946	9.96	0.904	14.0	0.934
4.25	0.921	10.0	0.923	14.3	0.941
4.49	0.928	10.3	0.899	14.5	0.934
5 32	0.962	10.4	0.905	14.8	0.938
5.91	0.964	10.5	0.889	15.0	0.960
6.00	0.953	10.6	0.901		
6.21	0.962	10.9	0.885		
6.34	0.950	11.1	0.887		

*Not shown on plot

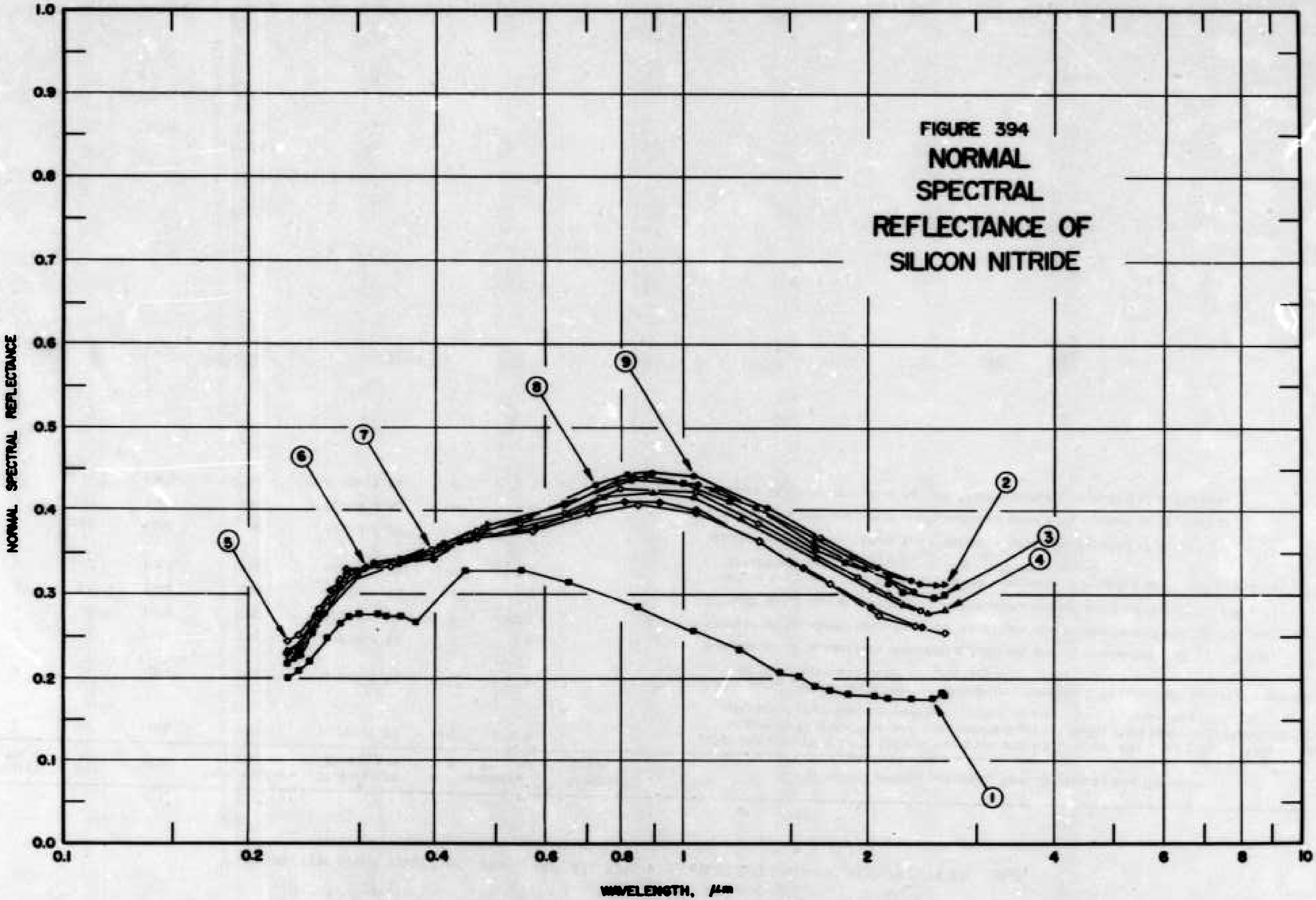


FIGURE 394
NORMAL
SPECTRAL
REFLECTANCE OF
SILICON NITRIDE
NORMAL SPECTRAL REFLECTANCE
WAVELENGTH, μm
1.0
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0.0
0.1
0.2
0.4
0.6
0.8
1
2
4
6
8
10
1
2
3
4
5
6
7
8
9

SPECIFICATION TABLE NO. 394 NORMAL SPECTRAL REFLECTANCE OF SILICON NITRIDE Si_3N_4

Curve No.	Ref. No.	Year	Temperature K	Wavelength Range, μm	Geometry θ	θ'	ω'	Reported Error, %	Composition (weight percent), Specifications, and Remarks
1	28	1963	298	0.230-2.65	~0°		2π		Sintered at 1673 K for 2 hours (setter material Si_3N_4); density 1.82 g cm^{-3}, theoretical density 3.44 g cm^{-3}; x-ray structure $\alpha Si_3N_4 + \beta Si_3N_4$; MgO reference standard; data extracted from smooth curve; [Authors' designation: Sample No. 106].
2	34	1966	298	0.230-2.65	0°		2π		>99 pure; compacted powder; compaction pressure 2350 psi; MgO reference standard; data extracted from smooth curve.
3	34	1966	298	0.230-2.65	0°		2π		Similar to the above specimen and conditions except compacted with 11 800 psi.
4	34	1966	298	0.230-2.65	0°		2π		Similar to the above specimen and conditions except compacted with 35 300 psi.
5	34	1966	298	0.230-2.65	0°		2π		Similar to the above specimen and conditions except compacted with 70 500 psi.
6	382	1965	~298	0.230-2.65	0°		2π		Powder; source, Union Carbide Metals Company; compacted at 70 500 psi; data extracted from smooth curve; MgO reference standard.
7	382	1965	~298	0.230-2.65	0°		2π		Similar to above specimen and conditions except compacted at 35 250 psi.
8	382	1965	~298	0.230-2.65	0°		2π		Similar to above specimen and conditions except compacted at 11 750 psi.
9	382	1965	~298	0.230-2.65	0°		2π		Similar to above specimen and conditions except compacted at 2 350 psi.

DATA TABLE NO. 394 NORMAL SPECTRAL REFLECTANCE OF SILICON NITRIDE Si_3N_4

[Wavelength, λ, μm; Reflectance, ρ; Temperature, T, K]

CURVE 1
T = 298

λ	ρ
0.230	0.200
0.240	0.209
0.250	0.[illegible]
0.266	0.249
0.280	0.265
0.290	0.274
0.300	0.276
0.321	0.276
0.331	0.275
0.350	0.275
0.370	0.268
0.449	0.330
0.550	0.330
0.651	0.315
0.849	0.288
1.04	0.259
1.24	0.234
1.44	0.209
1.54	0.201
1.64	0.192
1.74	0.189
1.85	0.182
2.04	0.180
2.14	0.177
2.35	0.177
2.54	0.177
2.61	0.181
2.65	0.180

CURVE 2
T = 298

λ	ρ
0.230	0.220
0.242	0.226
0.255	0.261
0.280	0.307
0.298	0.324
0.315	0.335
0.349	0.340
0.404	0.357
0.486	0.381
0.646	0.407
0.783	0.437

CURVE 2 (cont.)

λ	ρ
0.874	0.442
1.14	0.429
1.64	0.367
1.87	0.347
2.15	0.324
2.41	0.311
2.59	0.311
2.65	0.312

CURVE 3
T = 298

λ	ρ
0.230	0.219
0.243	0.231
0.260	0.275
0.279	0.312
0.313	0.335*
0.349	0.337
0.439	0.362
0.647	0.410
0.821	0.438
1.00	0.434
1.19	0.412
1.64	0.355
1.84	0.340
2.15	0.312
2.28	0.301
2.54	0.298
2.65	0.300

CURVE 4
T = 298

λ	ρ
0.230	0.231
0.243	0.241
0.255	0.275
0.275	0.313*
0.287	0.327
0.302	0.330
0.349	0.334*
0.450	0.365
0.651	0.396
0.748	0.419
0.891	0.422

CURVE 4 (cont.)

λ	ρ
1.04	0.419
1.24	0.390
1.64	0.345
2.03	0.308
2.26	0.290
2.50	0.280
2.65	0.281

CURVE 5
T = 298

λ	ρ
0.230	0.243
0.242	0.251
0.258	0.281
0.280	0.318
0.288	0.330
0.349	0.333
0.468	0.367
0.571	0.375
0.704	0.399
0.842	0.409
1.05	0.399
1.33	0.363
1.74	0.312
2.08	0.279
2.38	0.263
2.65	0.254

CURVE 6
T ~ 298

λ	ρ
0.230	0.229
0.242	0.239
0.250	0.257
0.260	0.284*
0.270	0.302
0.280	0.316*
0.290	0.326*
0.309	0.332
0.330	0.336
0.350	0.337*
0.399	0.344
0.464	0.370
0.580	0.378

CURVE 6 (cont.)

λ	ρ
0.714	0.403
0.803	0.411
0.912	0.411
1.05	0.400
1.57	0.334
2.01	0.287
2.43	0.262
2.65	0.254*

CURVE 7
T ~ 298

λ	ρ
0.230	0.230*
0.235	0.231
0.245	0.243*
0.256	0.272
0.264	0.291
0.273	0.307
0.283	0.319
0.292	0.326
0.309	0.331*
0.349	0.338*
0.391	0.353
0.464	0.375
0.547	0.383
0.649	0.399
0.734	0.417
0.799	0.426
1.05	0.423
1.33	0.384
1.62	0.351*
1.91	0.322
2.15	0.300
2.42	0.283
2.65	0.282*

CURVE 8
T ~ 298

λ	ρ
0.230	0.218*
0.236	0.221
0.251	0.252
0.262	0.279
0.278	0.310*

CURVE 8 (cont.)

λ	ρ
0.293	0.324*
0.308	0.331*
0.318	0.338
0.350	0.341
0.411	0.360
0.483	0.381*
0.568	0.392
0.721	0.431
0.815	0.442
0.960	0.442
1.06	0.432
1.31	0.403
1.64	0.360
1.97	0.332
2.15	0.313
2.36	0.302
2.65	0.300*

CURVE 9
T ~ 298

λ	ρ
0.230	0.218*
0.236	0.221*
0.251	0.252*
0.262	0.279*
0.278	0.310*
0.293	0.324*
0.308	0.331*
0.318	0.338*
0.350	0.341*
0.411	0.360*
0.483	0.381*
0.568	0.392*
0.721	0.431*
0.815	0.442*
0.899	0.448
1.04	0.442
1.37	0.403
1.66	0.369
2.06	0.334
2.34	0.319
2.56	0.312*
2.65	0.314*

* Not shown on plot

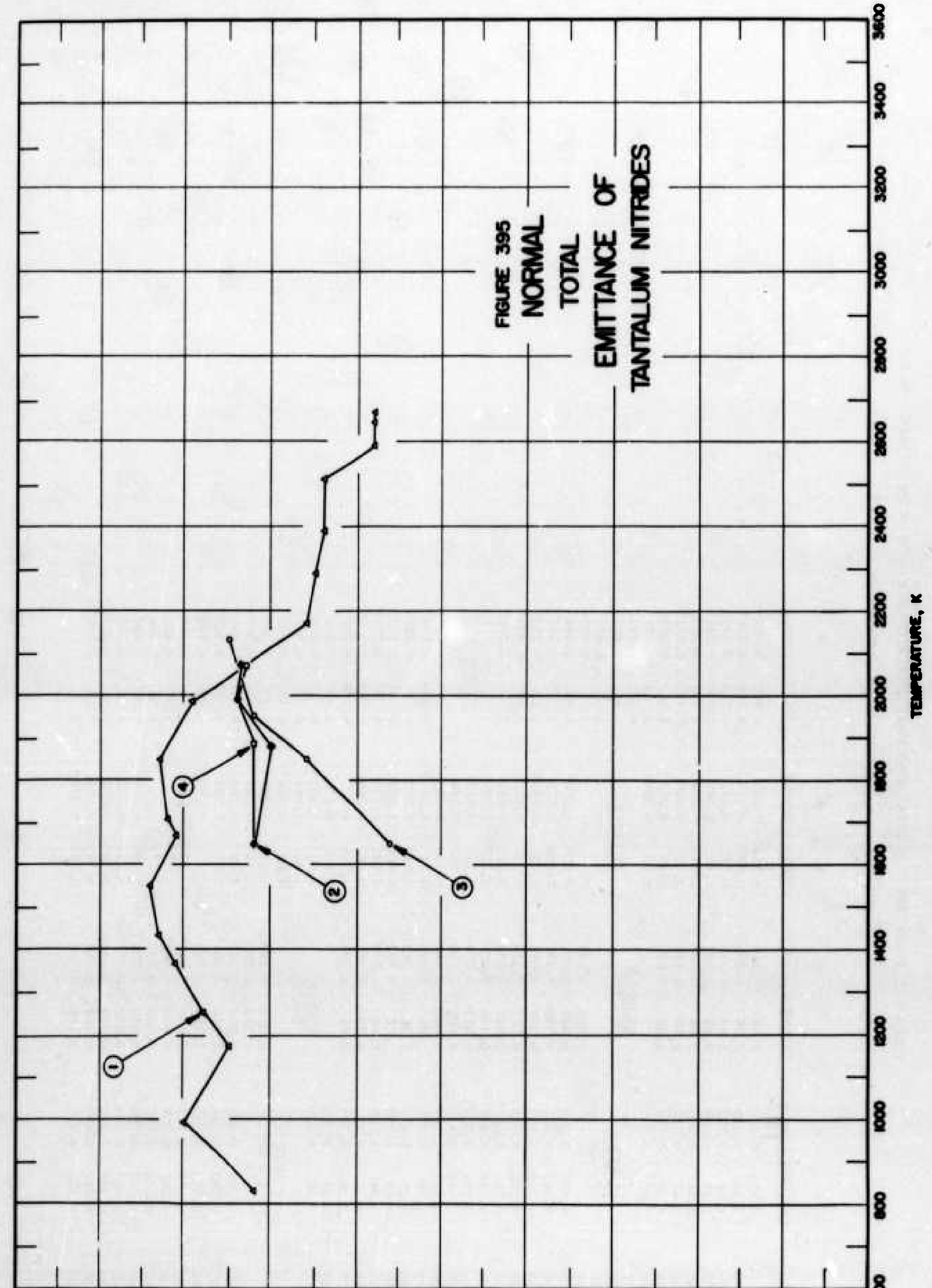


FIGURE 395 NORMAL TOTAL EMITTANCE OF TANTALUM NITRIDES
NORMAL TOTAL EMITTANCE
TEMPERATURE, K
0.0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
1.0
600
800
1000
1200
1400
1600
1800
2000
2200
2400
2600
2800
3000
3200
3400
3600
1
2
3
4

SPECIFICATION TABLE NO. 395 NORMAL TOTAL EMITTANCE OF TANTALUM NITRIDES

Curve No.	Ref. No.	Year	Temperature Range, K	Geometry θ'	Reported Error, %	Composition (weight percent), Specifications and Remarks
1	17	1962	830-2672	~0°	10	TaN; hot pressed; measured in argon.
2	38	1962	1650-2070	~0°		TaN; prepared from micronized powder, hot pressed at > 2273 K; sintered, polished, etched, then degassed by heating to ~ 973 K; measured in argon; integrated from spectral data.
3	37	1964	1648-2132	~0°		TaN; density 14.36 g cm^{-3}; measured in argon; computed from spectral emittance over the range 0.4 to 5.0 μm.
4	37	1964	1648-2070	~0°		TaN; 95.84 Ta, 3.53 N; density 14.36 g cm^{-3}; measured in nitrogen; computed from spectral emittance over the range 0.4 to 5.0 μm.

DATA TABLE NO. 395 NORMAL TOTAL EMITTANCE OF TANTALUM NITRIDES

[Temperature, T, K; Emittance, ∈]

T	∈	T	∈
CURVE 1		CURVE 2	
830	0.72	1650	0.720
997	0.80	1880	0.700
1172	0.75	1990	0.740
1250	0.78	2070	0.736
1361	0.81		
1439	0.83	CURVE 3	
1555	0.84		
1672	0.81	1648	0.56
1705	0.82	1851	0.66
1850	0.83	1956	0.72
1994	0.79	2132	0.75
2178	0.66		
2294	0.65	CURVE 4	
2394	0.64		
2517	0.64	1648	0.72*
2644	0.58	1982	0.72
2672	0.58	1990	0.74*
2589	0.58	2070	0.73

*Not shown on plot

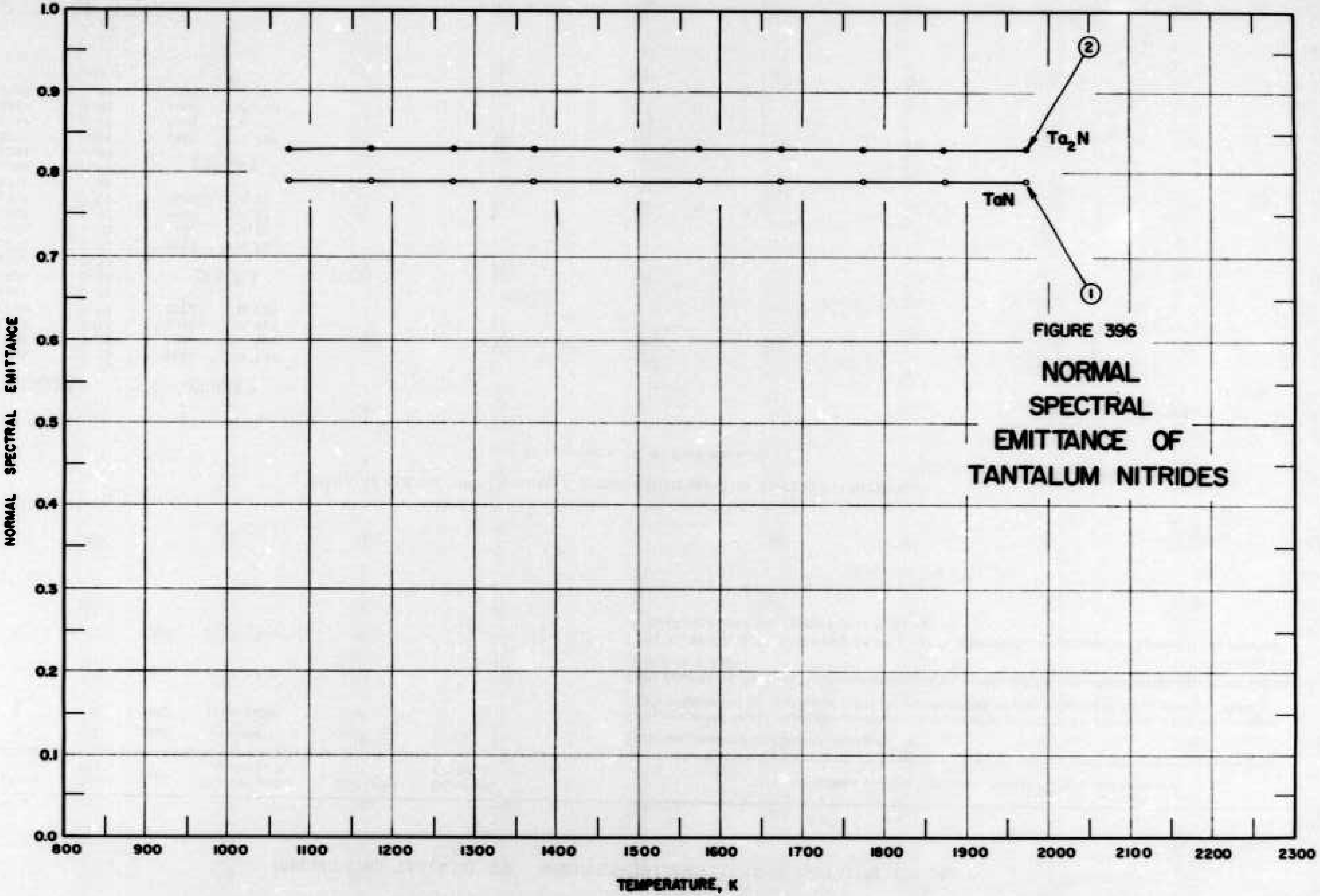


FIGURE 396
NORMAL SPECTRAL EMITTANCE OF TANTALUM NITRIDES

SPECIFICATION TABLE NO. 396 NORMAL SPECTRAL EMITTANCE OF TANTALUM NITRIDES

Curve No.	Ref. No.	Year	Wavelength μm	Temperature Range, K	Geometry θ'	Reported Error, %	Composition (weight percent), Specifications, and Remarks
1	13	1962	0.650	1073-1973	~0°		TaN; layer of paste (~100 μm thick) on tantalum cylinder; paste prepared from fine powder (2-3 μm) of TaN suspended in nitrocellulose binder and dried at 313 to 333 K.
2	13	1962	0.650	1073-1973	~0°		Ta_2N; layer of paste (~100 μm thick) on tantalum cylinder; paste prepared from fine powder (2-3 μm) of Ta_2N suspended in nitrocellulose binder and dried at 313 to 333 K.

DATA TABLE NO. 396 NORMAL SPECTRAL EMITTANCE OF TANTALUM NITRIDES

[Temperature, T, K; Emittance, ϵ; Wavelength, λ, μm]

T	ϵ	T	ϵ
CURVE 1 λ = 0.650		CURVE 2 (cont.)	
1073	0.79	1873	0.83
1173	0.79	1973	0.83
1273	0.79		
1373	0.79		
1473	0.79		
1573	0.79		
1673	0.79		
1773	0.79		
1873	0.79		
1973	0.79		
CURVE 2 λ = 0.650			
1073	0.83		
1173	0.83		
1273	0.83		
1373	0.83		
1473	0.83		
1573	0.83		
1673	0.83		
1773	0.83		

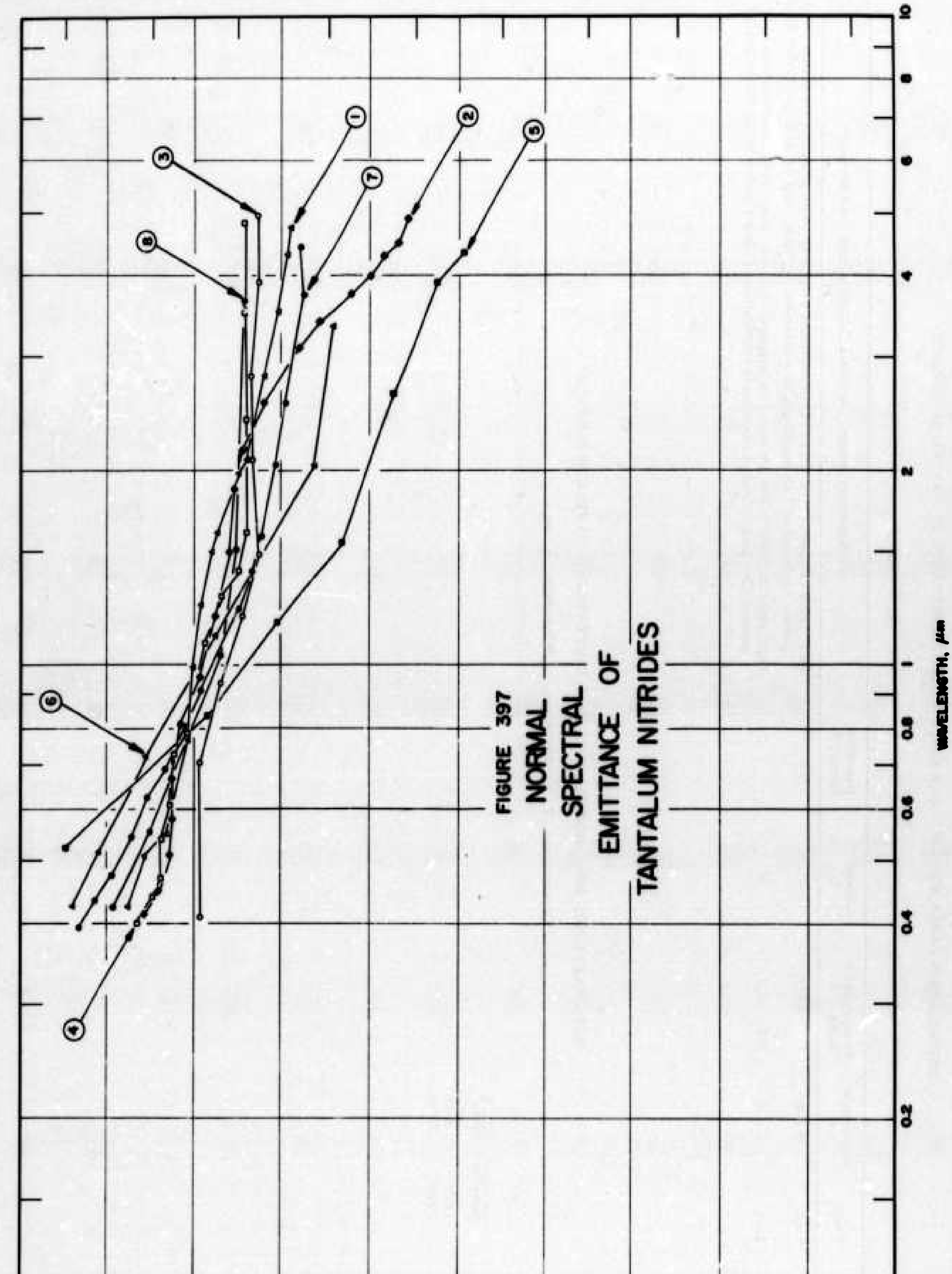


FIGURE 397 NORMAL SPECTRAL EMITTANCE OF TANTALUM NITRIDES

SPECIFICATION TABLE NO. 397 NORMAL SPECTRAL EMITTANCE OF TANTALUM NITRIDES

Curve No.	Ref. No.	Year	Temperature K	Wavelength Range, μm	Geometry θ'	Reported Error, %	Composition (weight percent), Specifications, and Remarks
1	38	1962	1648	0.425-4.75	~0°		TaN; prepared from micronized powder, hot pressed at > 2273 K; sintered, polished, etched, then degassed by heating to ~973 K; measured in nitrogen (1520 mm Hg).
2	38	1962	1882	0.415-4.90	~0°		Above specimen and conditions.
3	38	1962	1990	0.410-4.95	~0°		Above specimen and conditions.
4	38	1962	2070	0.400-4.80	~0°		Above specimen and conditions.
5	37	1964	1648	0.521-4.33	~0°		TaN; density 14.36 g cm^{-3}; measured in argon (1.14 x 10^3 mm Hg).
6	37	1964	1851	0.425-3.35	~0°		Above specimen and conditions.
7	37	1964	1956	0.418-4.44	~0°		Above specimen and conditions.
8	37	1964	2132	0.425-3.64	~0°		Above specimen and conditions.

DATA TABLE NO. 397 NORMAL SPECTRAL EMITTANCE OF TANTALUM NITRIDES

[Wavelength, λ, μm; Emittance, ϵ; Temperature, T, K]

CURVE 1
T = 1648

λ	ϵ
0.425	0.880
0.510	0.860
0.650	0.835
0.770	0.810
0.990	0.802
1.24	0.795
1.50	0.780
1.60	0.775
1.99	0.750
2.08	0.740
2.80	0.720
3.51	0.704
4.30	0.692
4.75	0.690

CURVE 2
T = 1882

λ	ϵ
0.415	0.860
0.450	0.841
0.510	0.830
0.580	0.828
0.670	0.828
0.810	0.819
0.960	0.795
1.19	0.779
1.50	0.760
1.88	0.755
2.15	0.745
2.55	0.720
3.10	0.680
3.40	0.660
3.75	0.624
4.00	0.600
4.30	0.586
4.50	0.570
4.90	0.560

CURVE 3
T = 1990

λ	ϵ
0.410	0.795
0.710	0.795
0.935	0.770
1.19	0.745
1.49	0.726
2.08	0.735
2.80	0.735
3.90	0.728
4.95	0.728

CURVE 4
T = 2070

λ	ϵ
0.400	0.869
0.440	0.850
0.470	0.840
0.540	0.840
0.610	0.830
0.730	0.825

CURVE 4 (cont.)

λ	ϵ
0.890	0.810
1.07	0.790
1.28	0.770
1.40	0.750
1.60	0.740
2.40	0.740
3.50	0.741
4.80	0.741

CURVE 5
T = 1648

λ	ϵ
0.521	0.950
0.839	0.786
1.16	0.705
1.55	0.634
2.61	0.575
3.90	0.525
4.33	0.496

CURVE 6
T = 1851

λ	ϵ
0.425	0.941
0.511	0.912
0.721	0.859
1.11	0.777
2.04	0.663
3.35	0.644

CURVE 7
T = 1956

λ	ϵ
0.395	0.935
0.433	0.918
0.477	0.897
0.543	0.878
0.623	0.857
0.693	0.834
0.916	0.795
1.23	0.750
1.40	0.735

CURVE 7 (cont.)

λ	ϵ
1.58	0.722
2.03	0.708
2.54	0.699
3.03	0.679*
3.72	0.675
4.44	0.678

CURVE 8
T = 2132

λ	ϵ
0.425	0.895
0.555	0.852
1.04	0.770
1.51	0.751
3.64	0.742

*Not shown on plot

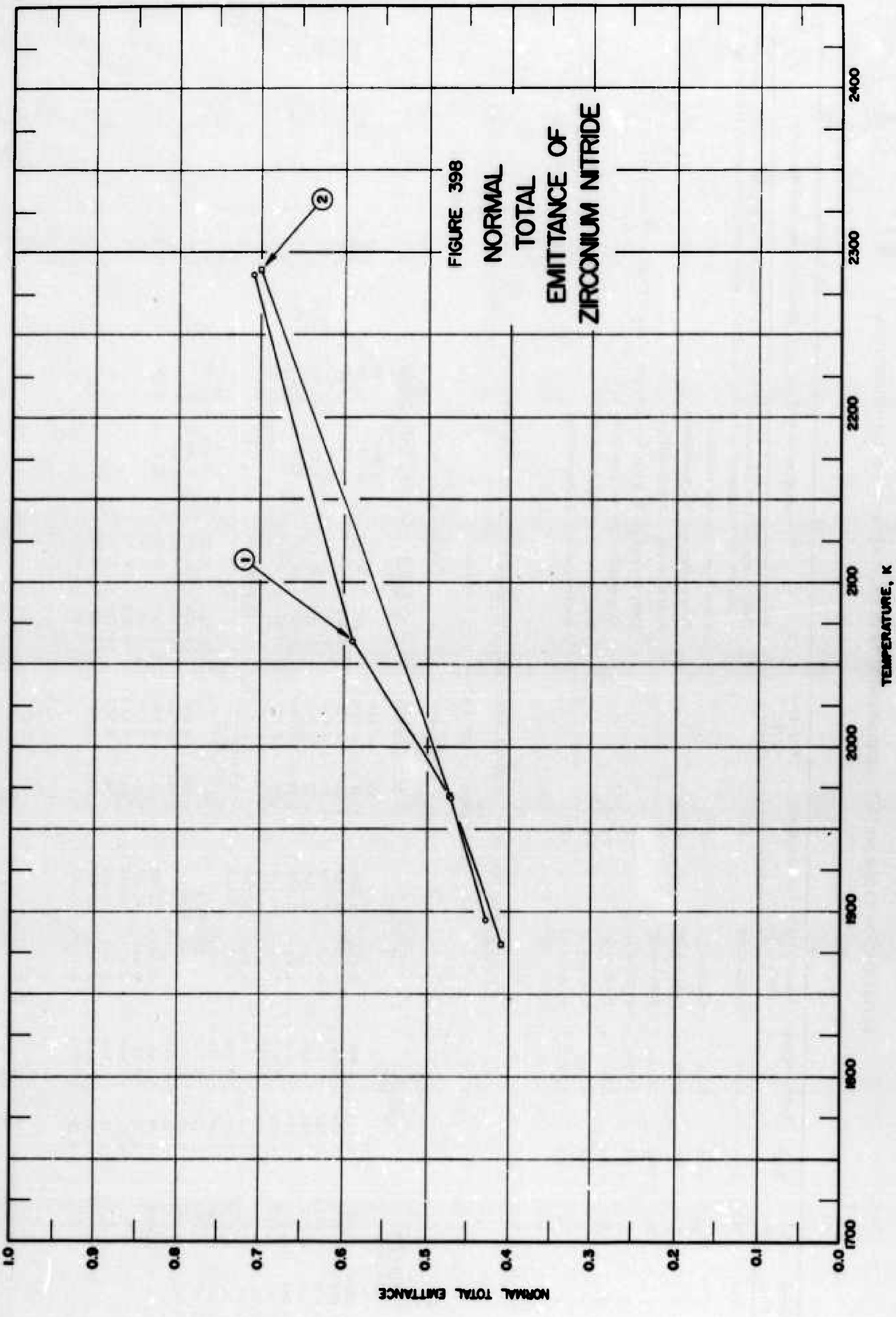


FIGURE 398 NORMAL TOTAL EMITTANCE OF ZIRCONIUM NITRIDE

SPECIFICATION TABLE NO. 398 NORMAL TOTAL EMITTANCE OF ZIRCONIUM NITRIDE

Curve No.	Ref. No.	Year	Temperature Range, K	Geometry θ'	Reported Error, %	Composition (weight percent), Specifications and Remarks
1	37	1964	1895-2287	~0°		Integrated from spectral emittance over the range 0.4 to 5.0 μm.
2	38	1962	1880-2290	~0°		Prepared from micronized powder, hot pressed at > 2273 K; sintered, polished, etched, then degassed by heating to ~973 K; measured in argon; integrated from spectral data.

DATA TABLE NO. 398 NORMAL TOTAL EMITTANCE OF ZIRCONIUM NITRIDE

[Temperature, T, K; Emittance, ϵ]

T	ϵ
CURVE 1	
1895	0.43
1968	0.47
2064	0.59
2287	0.71
CURVE 2	
1880	0.410
1970	0.471
2290	0.700

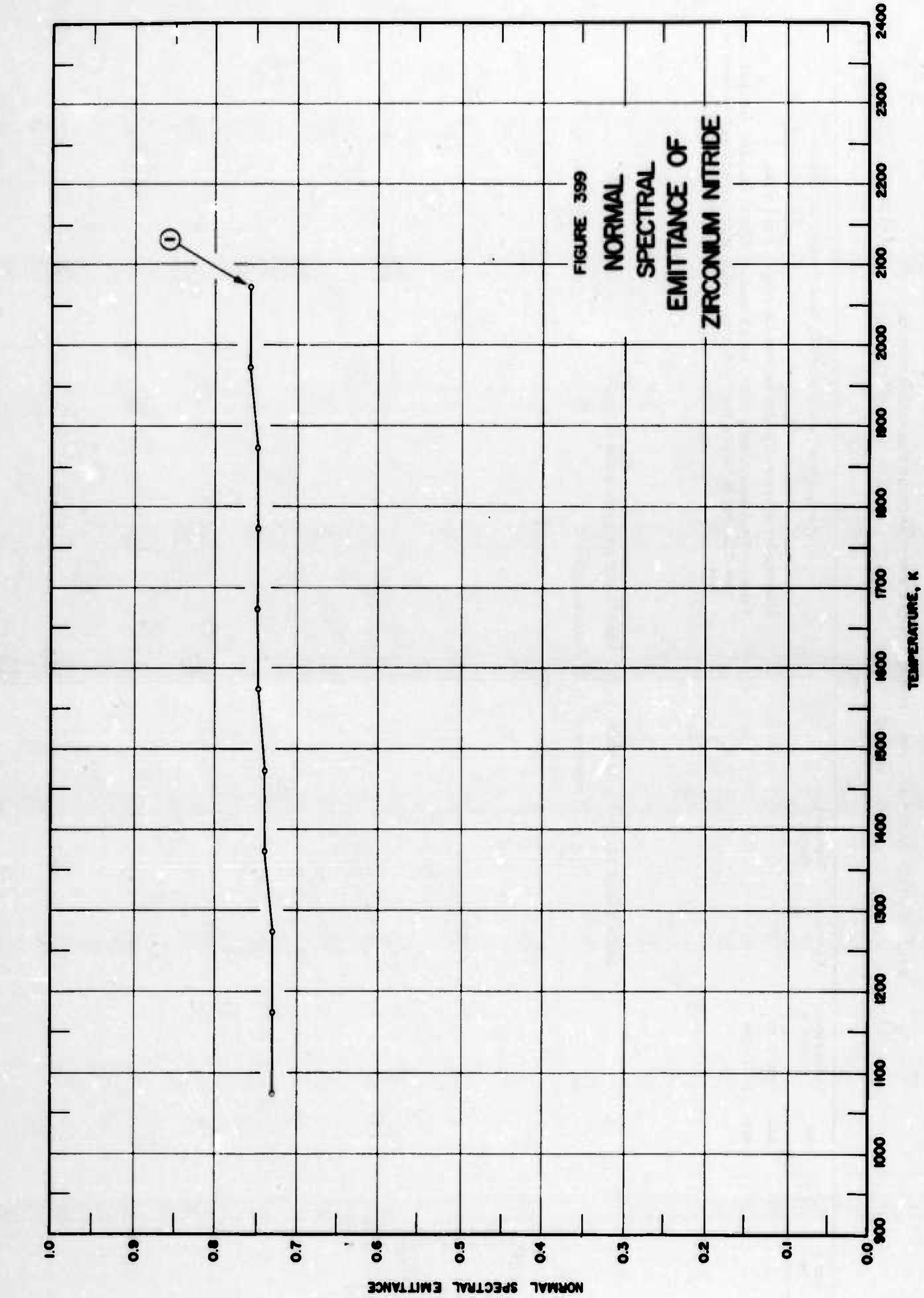


FIGURE 399 NORMAL SPECTRAL EMITTANCE OF ZIRCONIUM NITRIDE

SPECIFICATION TABLE NO. 399 NORMAL SPECTRAL EMITTANCE OF ZIRCONIUM NITRIDE ZrN

Curve No.	Ref. No.	Year	Wavelength, μm	Temperature Range, K	Geometry θ'	Reported Error, %	Composition (weight percent), Specifications, and Remarks
1	13	1962	0.650	1073-2073	$\sim 0°$		Layer of paste ($\sim$100 μm thick) on tantalum cylinder; paste prepared from fine powder (2-3 μ) of ZrN suspended in nitrocellulose binder and dried at 313 to 333 K.

DATA TABLE NO. 399 NORMAL SPECTRAL EMITTANCE OF ZIRCONIUM NITRIDE ZrN

[Temperature, T, K; Emittance, ϵ; Wavelength, λ, μm]

T	ϵ
CURVE 1 $\lambda = 0.650$	
1073	0.73
1173	0.73
1273	0.73
1373	0.74
1473	0.74
1573	0.75
1673	0.75
1773	0.75
1873	0.75
1973	0.76
2073	0.76

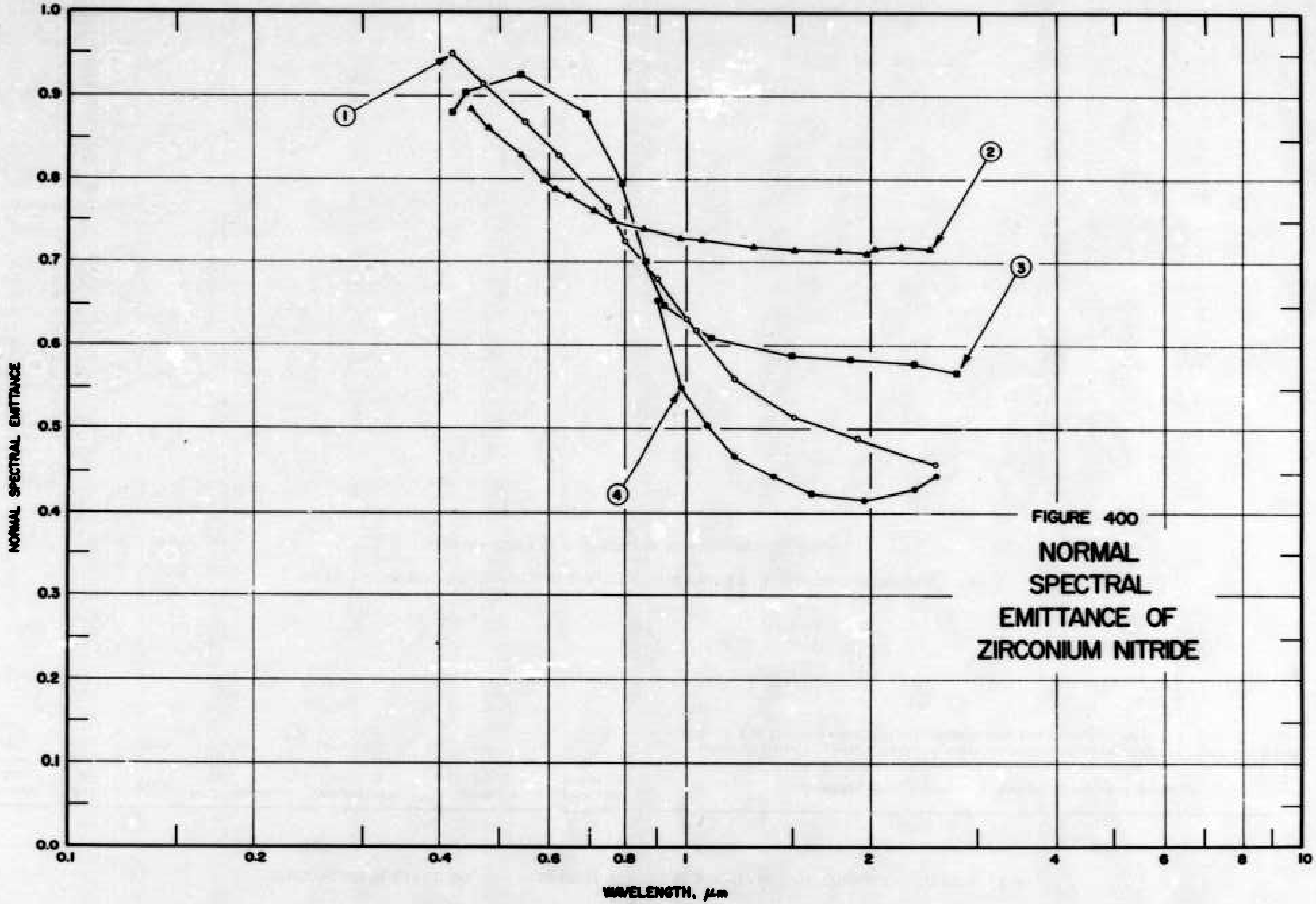


FIGURE 400 NORMAL SPECTRAL EMITTANCE OF ZIRCONIUM NITRIDE

SPECIFICATION TABLE NO. 400 NORMAL SPECTRAL EMITTANCE OF ZIRCONIUM NITRIDE ZrN

Curve No.	Ref. No.	Year	Temperature K	Wavelength Range, μm	Geometry θ'	Reported Error, %	Composition (weight percent), Specifications, and Remarks
1	38	1962	1968	0.420-2.55	~0°		Prepared from micronized powder, hot pressed at > 2273 K; sintered, polished, etched, then degassed by heating to ~ 973 K; measured in argon.
2	38	1962	2287	0.450-2.50	~0°		Above specimen and conditions.
3	38	1962	2064	0.420-2.75	~0°		Above specimen and conditions.
4	38	1962	1895	0.900-2.55	~0°		Above specimen and conditions.

DATA TABLE NO. 400 NORMAL SPECTRAL EMITTANCE OF ZIRCONIUM NITRIDE ZrN

[Wavelength, λ, μm; Emittance, ϵ; Temperature, T, K]

λ	ϵ	λ	ϵ	λ	ϵ	λ	ϵ
CURVE 1		**CURVE 2 (cont.)**		**CURVE 3**		**CURVE 4 (cont.)**	
T = 1968		0.590	0.800	T = 2064		1.20	0.470
0.420	0.950	0.615	0.790	0.420	0.881	1.38	0.445
0.470	0.915	0.650	0.780	0.440	0.905	1.60	0.425
0.550	0.870	0.710	0.762	0.540	0.926	1.95	0.417
0.620	0.830	0.765	0.750	0.690	0.880	2.35	0.430
0.750	0.765	0.855	0.740	0.790	0.795	2.55	0.445
0.800	0.725	0.980	0.730	0.860	0.700		
0.900	0.680	1.06	0.728	0.920	0.650		
1.00	0.632	1.29	0.719	1.10	0.610		
1.04	0.620	1.50	0.715	1.49	0.590		
1.20	0.560	1.77	0.711	1.85	0.586		
1.50	0.515	1.98	0.710	2.35	0.580		
1.90	0.490	2.03	0.715	2.75	0.570		
2.55	0.460	2.10	0.715*				
		2.25	0.717	**CURVE 4**			
CURVE 2		2.38	0.715*	T = 1895			
λ = 2287		2.50	0.715				
0.450	0.888			0.900	0.655		
0.480	0.865			0.930	0.603*		
0.540	0.830			0.980	0.550		
				1.07	0.502		

*Not shown on plot

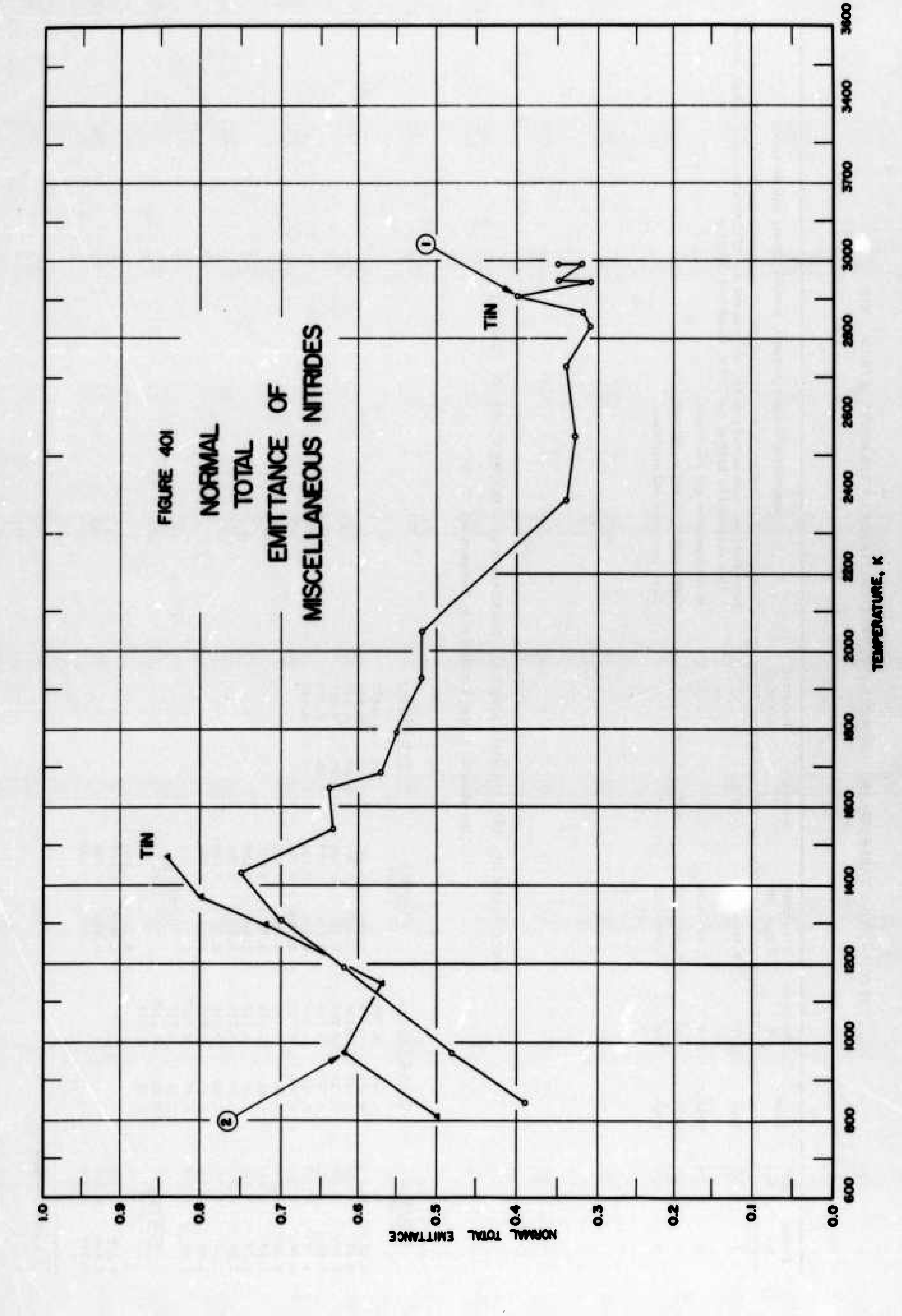


FIGURE 401 NORMAL TOTAL EMITTANCE OF MISCELLANEOUS NITRIDES

SPECIFICATION TABLE NO. 401 NORMAL TOTAL EMITTANCE OF MISCELLANEOUS NITRIDES

Curve No.	Ref. No.	Year	Temperature Range, K	Geometry θ'	Reported Error, %	Composition (weight percent), Specifications and Remarks
1	17	1962	842-2994	~0°	10	TITANIUM NITRIDE, TiN; hot pressed; specimen started smoking at 2911 K; measured in argon; run 1; [Author's designation: Specimen 1].
2	17	1962	811-1478	~0°	10	TITANIUM NITRIDE, TiN; hot pressed; measured in argon; run 1; [Author's designation: Specimen 2].

DATA TABLE NO. 401 NORMAL TOTAL EMITTANCE OF MISCELLANEOUS NITRIDES

[Temperature, T, K; Emittance, ϵ]

T	ϵ	T	ϵ
CURVE 1		**CURVE 2**	
842	0.39	811	0.50
978	0.48	978	0.62
1189	0.62	1150	0.57
1311	0.70	1300	0.72
1438	0.75	1372	0.80
1544	0.63	1478	0.84
1683	0.57		
1794	0.55		
1650	0.64		
1933	0.52		
2055	0.52		
2383	0.34		
2555	0.33		
2733	0.34		
2828	0.31		
2861	0.32		
2944	0.31		
2994	0.32		
2955	0.35		
2911	0.40		
2994	0.35		

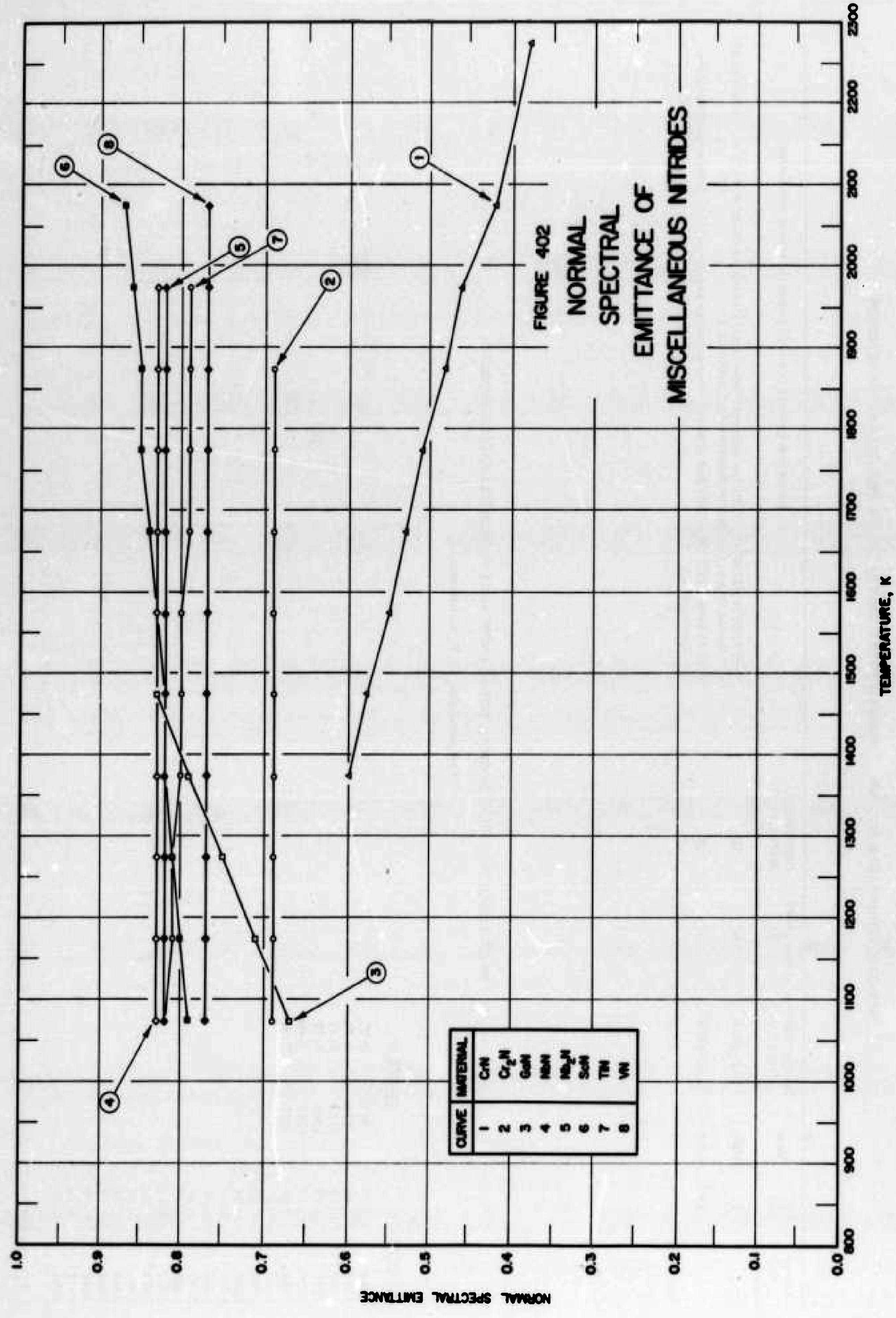


FIGURE 402
NORMAL SPECTRAL EMITTANCE OF MISCELLANEOUS NITRIDES

SPECIFICATION TABLE NO. 402 NORMAL SPECTRAL EMITTANCE OF MISCELLANEOUS NITRIDES

Curve No.	Ref. No.	Year	Wavelength, µm	Temperature Range, K	Geometry θ'	Reported Error, %	Composition (weight percent), Specifications, and Remarks
1	13	1962	0.650	1373-2273	~0°		CHROMIUM NITRIDE, CrN; layer of paste (~100 µm thick) on tantalum cylinder; paste prepared from fine powder (2-3 µm) of CrN suspended in nitrocellulose binder and dried at 313 to 333 K; changed to Cr_2N above 1573 K.
2	13	1962	0.650	1073-1873	~0°		DICHROMIUM NITRIDE, Cr_2N; layer of paste (~100 µm thick) on tantalum cylinder; paste prepared from fine powder (2-3 µm) of Cr_2N suspended in nitrocellulose binder and dried at 313 to 333 K.
3	13	1962	0.650	1073-1473	~0°		GALLIUM NITRIDE, GaN; layer of paste (~100 µm thick) on tantalum cylinder; paste prepared from fine powder (2-3 µm) of GaN suspended in nitrocellulose binder and dried at 313 to 333 K.
4	13	1962	0.650	1073-1973	~0°		NIOBIUM NITRIDE, NbN; layer of paste (~100 µm thick) on tantalum cylinder; paste prepared from fine powder (2-3 µm) of NbN suspended in nitrocellulose binder and dried at 313 to 333 K.
5	13	1962	0.650	1073-1973	~0°		DINIOBIUM NITRIDE, Nb_2N; layer of paste (~100 µm thick) on tantalum cylinder; paste prepared from fine powder (2-3 µm) of Nb_2N suspended in nitrocellulose binder and dried at 313 to 333 K.
6	13	1962	0.650	1073-2073	~0°		SCANDIUM NITRIDE, ScN; layer of paste (~100 µm thick) on tantalum cylinder; paste prepared from fine powder (2-3 µm) of ScN suspended in nitrocellulose binder and dried at 313 to 333 K.
7	13	1962	0.650	1073-1973	~0°		TITANIUM NITRIDE, TiN; layer of paste (~100 µm thick) on tantalum cylinder; paste prepared from fine powder (2-3 µm) of TiN suspended in nitrocellulose binder and dried at 313 to 333 K.
8	13	1962	0.650	1073-2073	~0°		VANADIUM NITRIDE, VN; layer of paste (~100 µm thick) on tantalum cylinder; paste prepared from fine powder (2-3 µm) of VN suspended in nitrocellulose binder and dried at 313 to 333 K.
9*	13	1962	0.650	1073-1873	~0°		TRIVANADIUM NITRIDE, V_3N; layer of paste (~100 µm thick) on tantalum cylinder; paste prepared from fine powder (2-3 µm) of V_3N suspended in nitrocellulose binder and dried at 313 to 333 K.

* Not shown on plot

DATA TABLE NO. 402 NORMAL SPECTRAL EMITTANCE OF MISCELLANEOUS NITRIDES

[Temperature, T, K; Emittance, ϵ; Wavelength, λ, μm]

T	ϵ
CURVE 1 $\lambda = 0.650$	
1373	0.60
1473	0.58
1573	0.55
1673	0.53
1773	0.51
1873	0.48
1973	0.46
2073	0.44
2173	0.42
2273	0.38
CURVE 2 $\lambda = 0.650$	
1073	0.69
1173	0.69
1273	0.69
1373	0.69
1473	0.69
1573	0.69
1673	0.69
1773	0.69
1873	0.69
CURVE 3 $\lambda = 0.650$	
1073	0.67
1173	0.71
1273	0.75
1373	0.79
1473	0.83
CURVE 4 $\lambda = 0.650$	
1073	0.83
1173	0.83
1273	0.83
1373	0.83
1473	0.83*
1573	0.83
1673	0.83
1773	0.83
1873	0.83
1973	0.83
CURVE 5 $\lambda = 0.650$	
1073	0.82
1173	0.82
1273	0.82
1373	0.82
1473	0.82
1573	0.82
1673	0.82
1773	0.82
1873	0.82
1973	0.82
CURVE 6 $\lambda = 0.650$	
1073	0.79
1173	0.80
1273	0.81
1373	0.82*
1473	0.82*
1573	0.83*
1373	0.84
1773	0.85
1873	0.85
1973	0.86
2073	0.87
CURVE 7 $\lambda = 0.650$	
1073	0.82*
1173	0.81
1273	0.81*
1373	0.80
1473	0.80
1573	0.80
1673	0.79
1773	0.79
1873	0.79
1973	0.79
CURVE 8 $\lambda = 0.650$	
1073	0.77
1173	0.77
1273	0.77
CURVE 8 (cont.)	
1373	0.77
1473	0.77
1573	0.77
1673	0.77
1773	0.77
1873	0.77
1973	0.77
2073	0.77
CURVE 9* $\lambda = 0.650$	
1073	0.82
1173	0.82
1273	0.82
1373	0.82
1473	0.82
1573	0.82
1673	0.82
1773	0.82
1873	0.82

*Not shown on plot

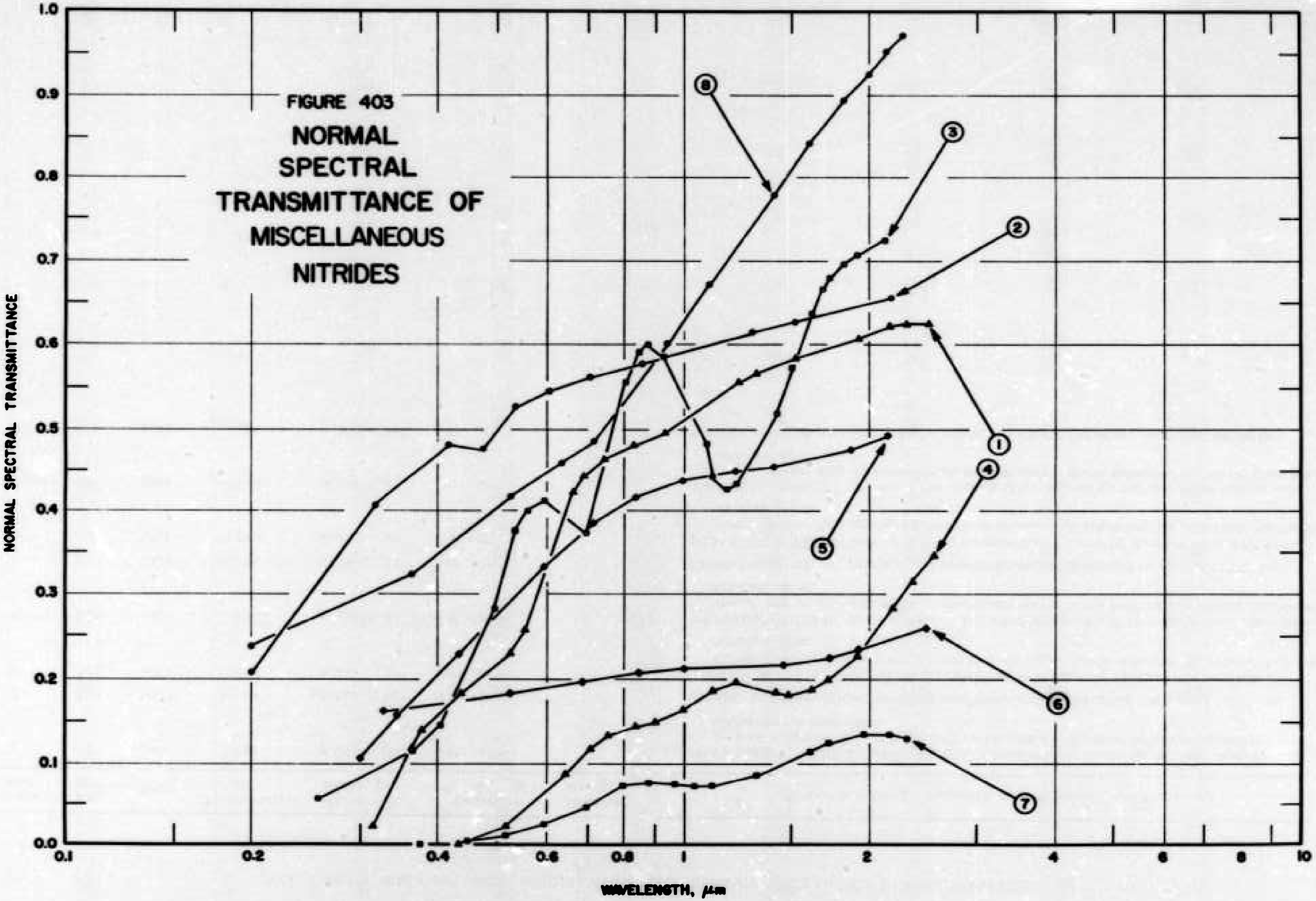


FIGURE 403
NORMAL SPECTRAL TRANSMITTANCE OF MISCELLANEOUS NITRIDES

SPECIFICATION TABLE NO. 403 NORMAL SPECTRAL TRANSMITTANCE OF MISCELLANEOUS NITRIDES

Curve No.	Ref. No.	Year	Temperature K	Wavelength Range, μm	Geometry θ θ' ω'	Reported Error, %	Composition (weight percent), Specifications, and Remarks
1	303	1961	~298	0.315-2.50	~0° ~0°		DYSPROSIUM NITRIDE, DyN; thin film; deposited in vacuum by thermal evaporation; substrate, glass; data extracted from smooth curve; blank substrate standard; thickness not controlled.
2	303	1961	~298	0.200-2.16	~0° ~0°		Similar to the above specimen and conditions except deposited on quartz substrate.
3	303	1961	~298	0.256-2.12	~0° ~0°		ERBIUM NITRIDE, ErN; thin film; deposited in vacuum by thermal evaporation; substrate, quartz; data extracted from smooth curve; blank substrate standard; thickness not controlled.
4	303	1961	~298	0.432-2.53	~0° ~0°		HOLMIUM NITRIDE, HoN; thin film; deposited in vacuum by thermal evaporation; substrate, glass; data extracted from smooth curve; blank substrate standard; thickness not controlled.
5	303	1961	~298	0.300-2.14	~0° ~0°		Similar to the above specimen and conditions except deposited on quartz substrate.
6	303	1961	~298	0.327-2.49	~0° ~0°		SCANDIUM NITRIDE, ScN; thin film; deposited in vacuum by thermal evaporation; substrate, glass; data extracted from smooth curve; blank substrate standard; thickness not controlled.
7	303	1961	~298	0.374-2.30	~0° ~0°		YTTRIUM NITRIDE, YN; thin film; deposited in vacuum by thermal evaporation; substrate, glass; data extracted from smooth curve; blank substrate standard; thickness not controlled.
8	303	1961	~298	0.200-2.26	~0° ~0°		Similar to the above specimen and conditions except deposited on quartz substrate.

DATA TABLE NO. 403 NORMAL SPECTRAL TRANSMITTANCE OF MISCELLANEOUS NITRIDES

[Wavelength, λ, μm; Transmittance, τ; Temperature, T, K]

CURVE 1
T ~ 298

λ	τ
0.315	0.021
0.361	0.119
0.379	0.140
0.439	0.182
0.521	0.230
0.553	0.257
0.661	0.421
0.690	0.443
0.747	0.463
0.830	0.481
0.930	0.497
1.23	0.559
1.31	0.569
1.52	0.585
1.93	0.609
2.18	0.621
2.30	0.625
2.41	0.626*
2.50	0.625

CURVE 2
T ~ 298

λ	τ
0.200	0.209
0.318	0.407
0.415	0.481
0.475	0.478
0.532	0.529
0.606	0.546
0.709	0.562
0.852	0.579
1.29	0.615
1.51	0.627
2.16	0.656

CURVE 3
T ~ 298

λ	τ
0.256	0.058
0.363	0.116
0.404	0.146
0.498	0.281
0.534	0.375
0.570	0.400

CURVE 3 (cont.)

λ	τ
0.595	0.412
0.693	0.371
0.705	0.373*
0.808	0.557
0.848	0.591
0.877	0.600
0.922	0.588
1.08	0.483
1.12	0.442
1.14	0.432*
1.18	0.427
1.22	0.432
1.41	0.520
1.50	0.573
1.61	0.637
1.68	0.666
1.73	0.680
1.81	0.696
1.91	0.707
2.12	0.722

CURVE 4
T ~ 298

λ	τ
0.432	0.000
0.516	0.023
0.641	0.089
0.708	0.119
0.757	0.132
0.838	0.144
0.900	0.150
0.997	0.164
1.12	0.189
1.17	0.195*
1.23	0.198
1.32	0.192*
1.41	0.184
1.48	0.182
1.53	0.183*
1.62	0.188
1.72	0.200
1.91	0.229
2.19	0.282
2.35	0.314
2.53	0.346

CURVE 5
T ~ 298

λ	τ
0.300	0.109
0.344	0.159
0.431	0.230
0.598	0.333
0.715	0.385
0.838	0.417
0.992	0.439
1.21	0.450
1.40	0.455
1.87	0.479
2.14	0.494

CURVE 6
T ~ 298

λ	τ
0.327	0.162
0.522	0.183
0.685	0.197
0.841	0.206
1.00	0.211
1.45	0.218
1.72	0.225
1.93	0.234
2.49	0.260

CURVE 7
T ~ 298

λ	τ
0.374	0.000
0.449	0.005
0.516	0.012
0.596	0.026
0.696	0.048
0.800	0.073
0.878	0.078
0.968	0.077
1.04	0.073
1.11	0.073
1.32	0.087
1.60	0.113
1.73	0.124
1.95	0.135
2.15	0.134
2.30	0.130

CURVE 8
T ~ 298

λ	τ
0.200	0.239
0.361	0.323
0.526	0.419
0.632	0.460
0.718	0.488
0.937	0.600
1.10	0.671
1.40	0.779
1.60	0.842
1.82	0.895
2.00	0.928
2.12	0.951
2.26	0.971

*Not shown on plot

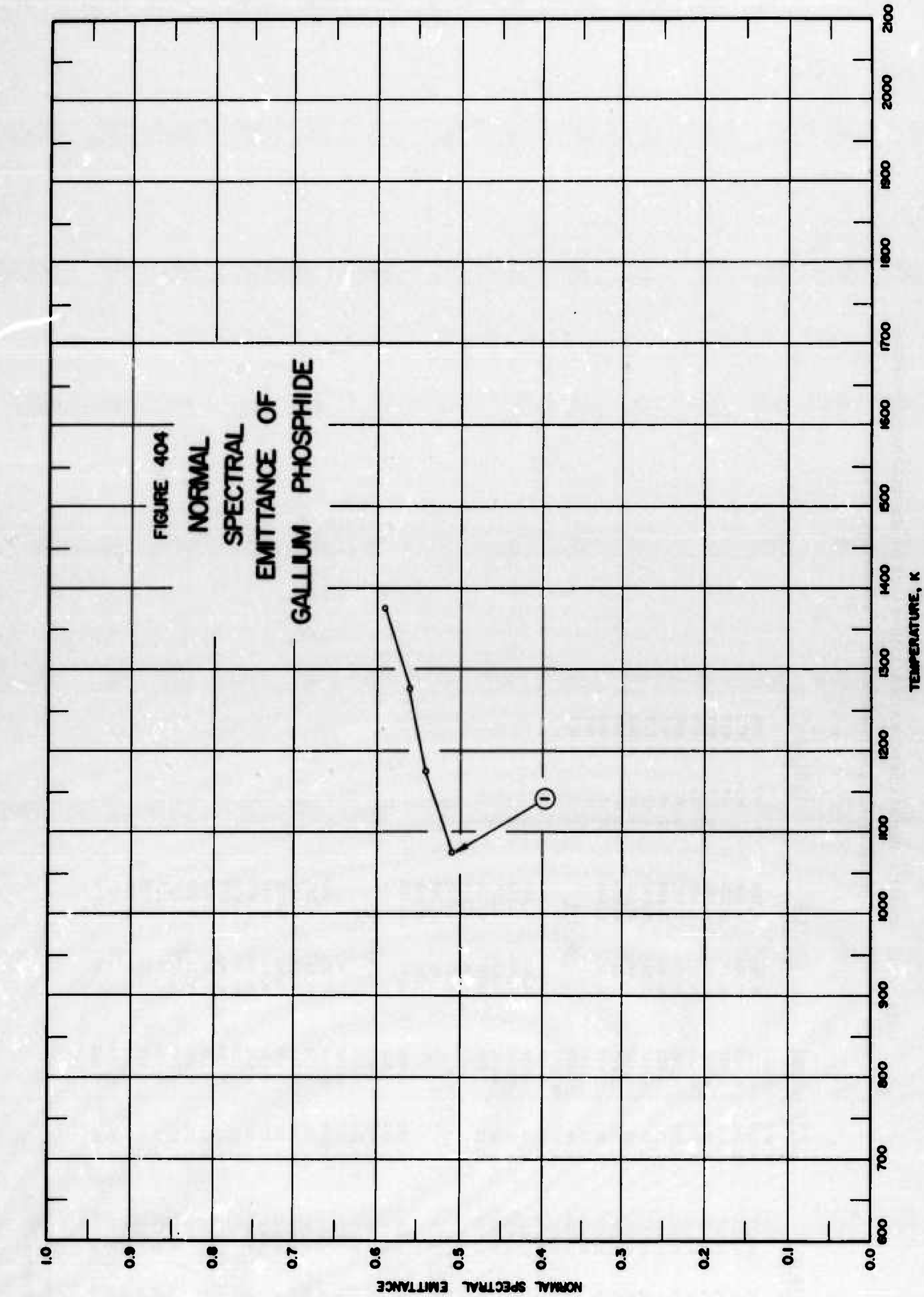


FIGURE 404 NORMAL SPECTRAL EMITTANCE OF GALLIUM PHOSPHIDE

SPECIFICATION TABLE NO. 404 NORMAL SPECTRAL EMITTANCE OF GALLIUM PHOSPHIDE GaP

Curve No.	Ref. No.	Year	Wavelength μm	Temperature Range, K	Geometry θ'	Reported Error, %	Composition (weight percent), Specifications, and Remarks
1	13	1962	0.650	1073-1373	~0°		Layer of paste (~100 μm thick) on tantalum cylinder; paste prepared from fine powder (2-3 μm) of GaP suspended in nitrocellulose binder and dried at 313 to 333 K.

DATA TABLE NO. 404 NORMAL SPECTRAL EMITTANCE OF GALLIUM PHOSPHIDE GaP

[Temperature, T, K; Emittance, ϵ; Wavelength, λ, μm]

T	ϵ
CURVE 1	
λ = 0.650	
1073	0.51
1173	0.54
1273	0.56
1373	0.59

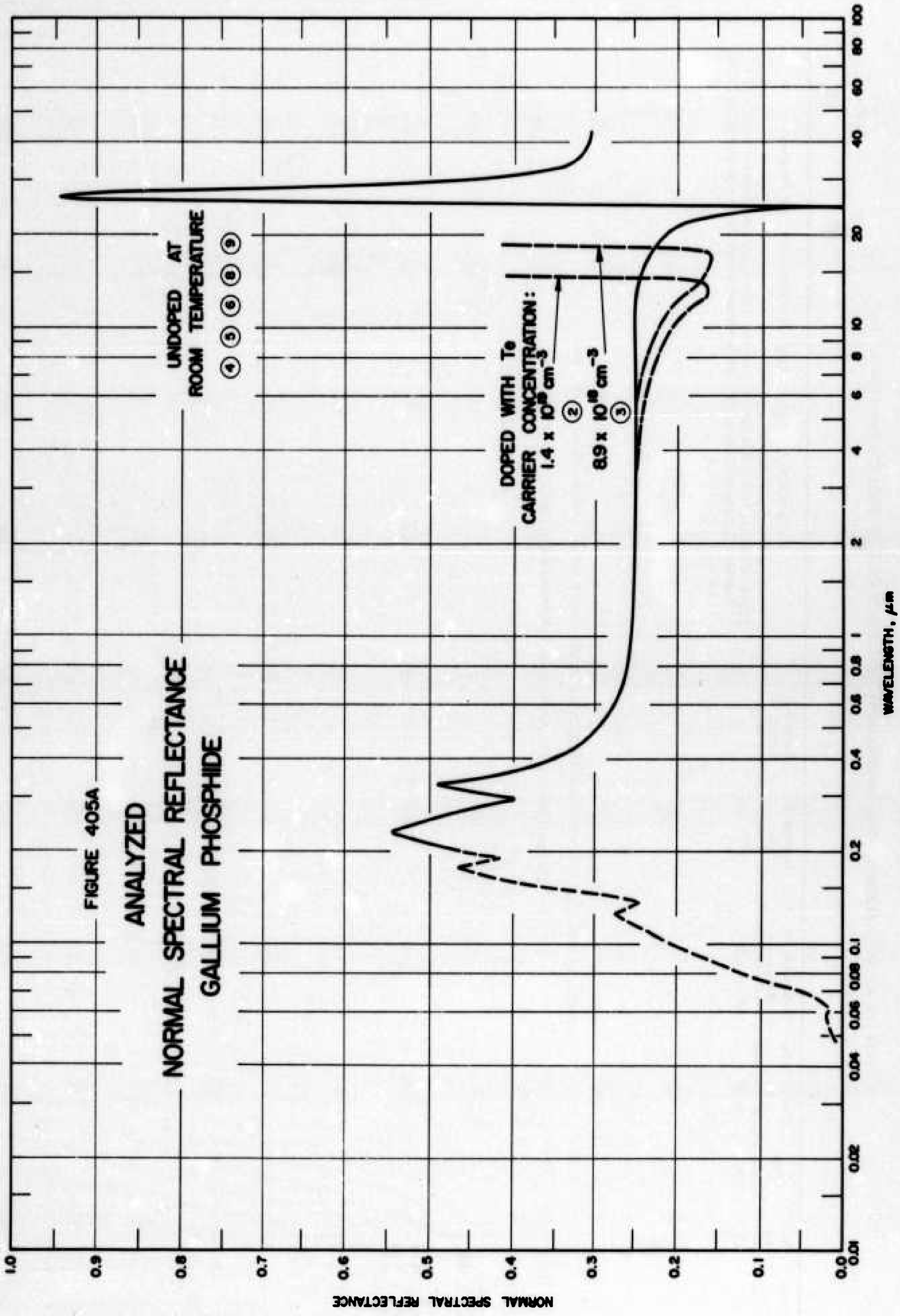


FIGURE 405A
ANALYZED
NORMAL SPECTRAL REFLECTANCE
GALLIUM PHOSPHIDE

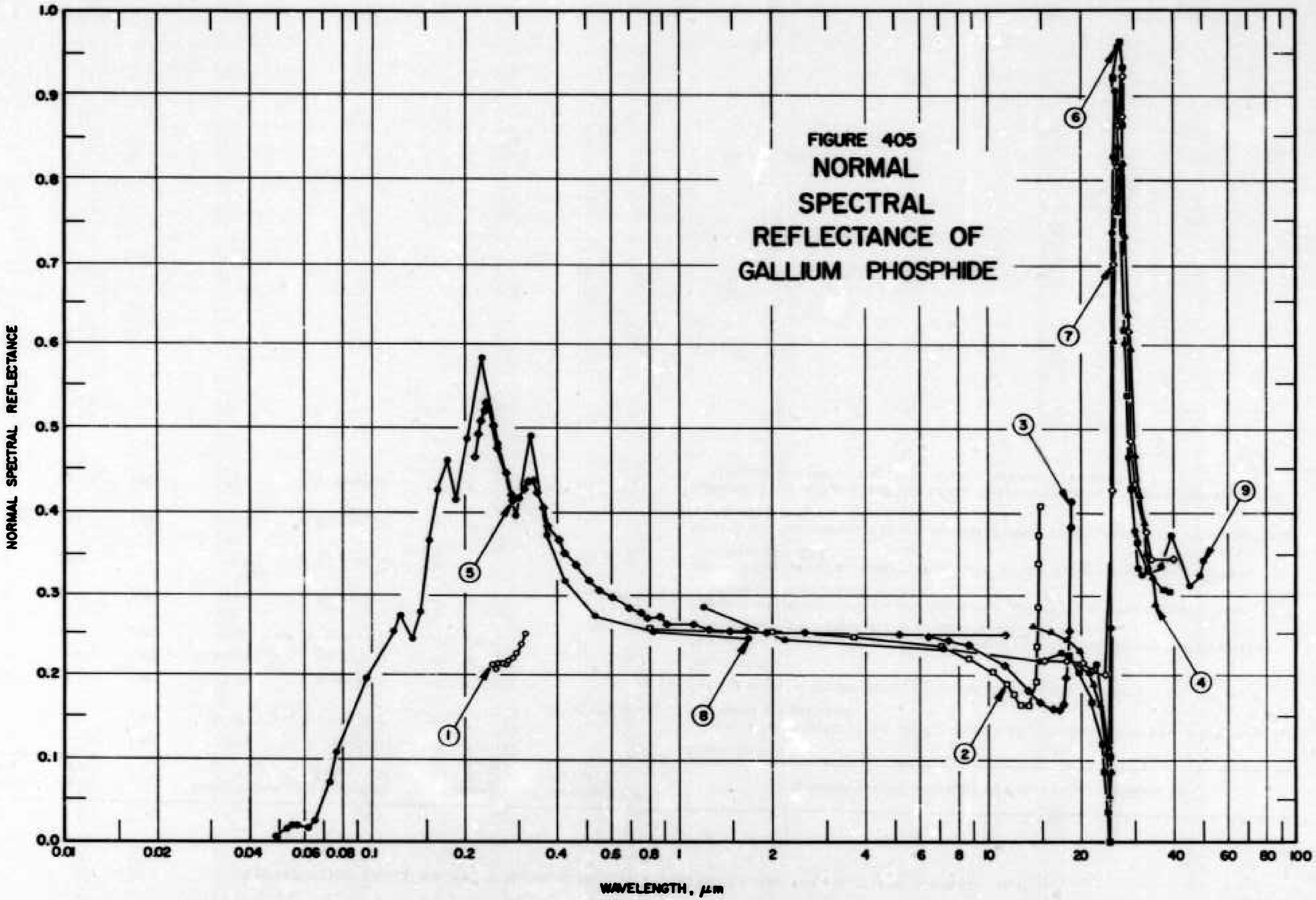


FIGURE 405
NORMAL
SPECTRAL
REFLECTANCE OF
GALLIUM PHOSPHIDE

SPECIFICATION TABLE NO. 405 NORMAL SPECTRAL REFLECTANCE OF GALLIUM PHOSPHIDE GaP

Curve No.	Ref. No.	Year	Temperature, K	Wavelength Range, μm	Geometry θ	θ'	ω'	Reported Error, %	Composition (weight percent), Specifications, and Remarks
1	84	1967	290	0.248-0.311	~0°	~0°			Single crystal.
2	85	1967	~298	0.800-14.9	~0°	~0°			n-type, single crystal (2 mm thick); doped with Te; carrier density 1.4 x 10^{19} cm^{-3}; ground and polished.
3	85	1967	~298	6.40-18.8	~0°	~0°			Similar to above specimen and conditions except carrier density 8.9 x 10^{18} cm^{-3}.
4	86	1965	~298	14.0-35.0	~0°	~0°			Single crystal.
5	251	1967	~298	0.219-11.3	~0°	~0°			Mechanically polished on one face and lapped on the second face; polished surface subjected to a light etch in a mixture of HCl and HNO_3.
6	250	1967	298	18.3-39.0	~0°	~0°			Undoped n-type (electron concentration ~1 x 10^{17} cm^{-3}); mirror polished; data extracted from smooth curve.
7	250	1967	298	15.1-40.0	~0°	~0°			Sulfur-doped (electron concentration 8.5 x 10^{18} cm^{-3}) grown on GaAs substrate; mirror polished.
8	299	1963	~299	0.0487-1.70	~0°	~0°			Etched; minimal exposure to air; measured under poor vacuum; data extracted from smooth curve.
9	87	1968	313	1.20-50.0	30°	30°			Synthetic single crystal (1.0 mm thick); flat to ten fringes or better; data extracted from smooth curve; aluminum mirror reference standard.

DATA TABLE NO. 405 NORMAL SPECTRAL REFLECTANCE OF GALLIUM PHOSPHIDE GaP

[Wavelength, λ, μm; Reflectance, ρ; Temperature, T, K]

CURVE 1
T = 290

λ	ρ
0.248	0.211
0.249	0.212*
0.250	0.210*
0.251	0.208*
0.252	0.208
0.254	0.210*
0.256	0.212*
0.258	0.213
0.260	0.212*
0.263	0.214*
0.264	0.214*
0.266	0.214
0.268	0.213*
0.271	0.212
0.274	0.214*
0.278	0.216
0.278	0.214*
0.282	0.217*
0.287	0.220
0.292	0.225
0.303	0.237
0.311	0.250

CURVE 2
T ~298

λ	ρ
0.800	0.258
2.00	0.253
3.70	0.249
4.90	0.246
7.10	0.233
8.70	0.220
10.3	0.202
11.5	0.190
12.1	0.179
12.9	0.164
13.5	0.164
14.1	0.192
14.2	0.235
14.3	0.282
14.6	0.340
14.8	0.374
14.9	0.409

CURVE 3
T ~298

λ	ρ
6.4	0.246
7.4	0.241
8.7	0.237
11.2	0.211
13.3	0.181
14.7	0.169
16.2	0.160
17.0	0.159
17.8	0.166
18.0	0.198
18.2	0.255
18.7	0.383
18.8	0.412

CURVE 4
T ~298

λ	ρ
14.0	0.260
16.0	0.253
18.0	0.242
20.0	0.230
22.0	0.190
23.0	0.163
24.0	0.106
24.5	0.055
25.0	0.081
25.5	0.603
26.0	0.770
26.3	0.781
26.5	0.761
27.0	0.811
27.5	0.820
28.0	0.732
28.6	0.634
29.0	0.541
30.0	0.466
31.0	0.420
32.0	0.388
32.9	0.352
34.0	0.321
35.0	0.286

CURVE 5
T ~298

λ	ρ
0.219	0.464
0.223	0.491
0.228	0.509
0.232	0.520
0.234	0.527
0.238	0.523*
0.244	0.512*
0.250	0.501
0.254	0.491*
0.258	0.473
0.262	0.466*
0.268	0.453*
0.274	0.446
0.281	0.435*
0.282	0.420
0.289	0.413
0.294	0.416*
0.300	0.416
0.301	0.423*
0.309	0.423*
0.312	0.428
0.317	0.433*
0.322	0.436
0.330	0.438*
0.337	0.439
0.339	0.428*
0.348	0.422
0.353	0.416*
0.356	0.408*
0.363	0.404
0.370	0.399*
0.373	0.392*
0.376	0.384
0.386	0.382*
0.393	0.377*
0.402	0.368
0.416	0.362*
0.421	0.351
0.435	0.343*
0.460	0.338*
0.476	0.328*
0.502	0.318
0.521	0.307*

CURVE 5 (cont.)

λ	ρ
0.553	0.305
0.571	0.298*
0.609	0.298
0.623	0.288*
0.659	0.287*
0.688	0.282
0.751	0.277
0.789	0.270
0.879	0.271
0.918	0.262
1.11	0.262
1.25	0.256
1.47	0.253
1.69	0.255
1.93	0.252
2.58	0.252
3.75	0.250*
5.16	0.250
11.3	0.250

CURVE 6
T = 298

λ	ρ
18.3	0.221
19.9	0.203
21.6	0.167
23.2	0.117
23.7	0.084
24.2	0.037
24.6	0.000
24.9	0.112
25.6	0.922
26.3	0.959
27.0	0.961
27.3	0.933
27.5	0.864
27.8	0.616
28.1	0.536
28.4	0.477*
29.1	0.429
30.0	0.388*
30.8	0.364
31.7	0.349*
33.0	0.332

CURVE 6 (cont.)

λ	ρ
34.7	0.319*
37.3	0.307
39.0	0.304

CURVE 7
T = 298

λ	ρ
15.1	0.219
18.0	0.219
20.1	0.215
21.9	0.206
23.1	0.201*
24.0	0.200
24.7	0.200
25.2	0.429
25.7	0.700
26.2	0.813
26.7	0.863
27.2	0.924
27.4	0.877
27.6	0.726*
28.1	0.614
29.0	0.483
30.0	0.431
32.5	0.376
34.9	0.348
40.0	0.348

CURVE 8
T ~298

λ	ρ
0.0487	0.008
0.0498	0.010*
0.0510	0.012*
0.0524	0.016
0.0535	0.019*
0.0543	0.020
0.0557	0.021*
0.0574	0.020
0.0592	0.018*
0.0609	0.016*
0.0620	0.016
0.0629	0.016*
0.0640	0.019*

CURVE 8 (cont.)

λ	ρ
0.0648	0.024
0.0648	0.027*
0.0724	0.070
0.0766	0.108
0.0963	0.196
0.116	0.253
0.112	0.273
0.127	0.265*
0.132	0.244*
0.135	0.242
0.144	0.279
0.152	0.369
0.163	0.426
0.179	0.460
0.188	0.415
0.206	0.488
0.230	0.584
0.257	0.480
0.291	0.399
0.330	0.490
0.372	0.373
0.426	0.318
0.539	0.272
0.838	0.253
1.70	0.245

CURVE 9
T = 313

λ	ρ
	0.283
2.20	0.242
7.20	0.231
14.6	0.217
17.2	0.229
20.0	0.214
21.4	0.202
22.2	0.213
24.3	0.113
25.0	0.257
25.1	0.739
25.5	0.826
26.0	0.907
26.6	0.838
27.7	0.600

CURVE 9 (cont.)

λ	ρ
28.8	0.464
30.0	0.380
30.8	0.333
31.7	0.326
36.2	0.334
39.7	0.372
45.0	0.312
48.1	0.322
50.0	0.345

* Not shown on plot

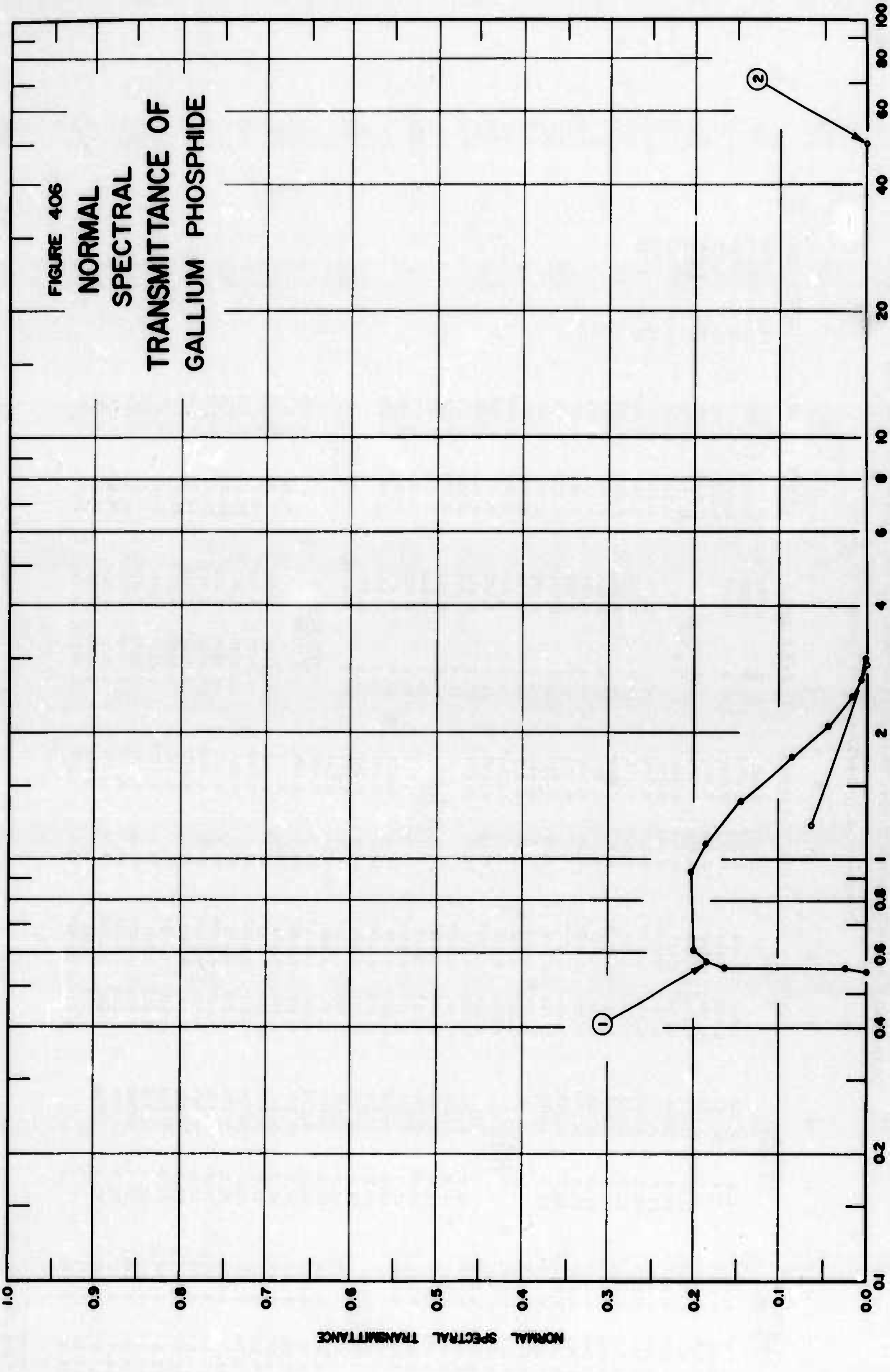


FIGURE 406
NORMAL
SPECTRAL
TRANSMITTANCE OF
GALLIUM PHOSPHIDE

SPECIFICATION TABLE NO. 406 NORMAL SPECTRAL TRANSMITTANCE OF GALLIUM PHOSPHIDE GaP

Curve No.	Ref. No.	Year	Temperature K	Wavelength Range, μm	Geometry θ	θ'	ω'	Reported Error, %	Composition (weight percent), Specifications, and Remarks
1	94	1967	298	0.540-3.00	~0°	~0°		±2	Synthetic crystal (1.0 mm thick); polished; data extracted from smooth curve.
2	87	1968	313	1.20-50.0	~0°	~0°			Synthetic single crystal (1.0 mm thick); flat to ten fringes or better; data extracted from smooth curve.

DATA TABLE NO. 406 NORMAL SPECTRAL TRANSMITTANCE OF GALLIUM PHOSPHIDE GaP

[Wavelength, λ, μm; Transmittance, τ; Temperature, T, K]

λ	τ
CURVE 1	
T = 298	
0.540	0.000
0.554	0.024
0.554	0.161
0.566	0.184
0.601	0.200
0.939	0.202
1.09	0.185
1.36	0.145
1.74	0.083
2.07	0.043
2.41	0.018
2.68	0.006
3.00	0.000
CURVE 2	
T = 313	
1.20	0.061
2.90	0.000
50.0	0.000

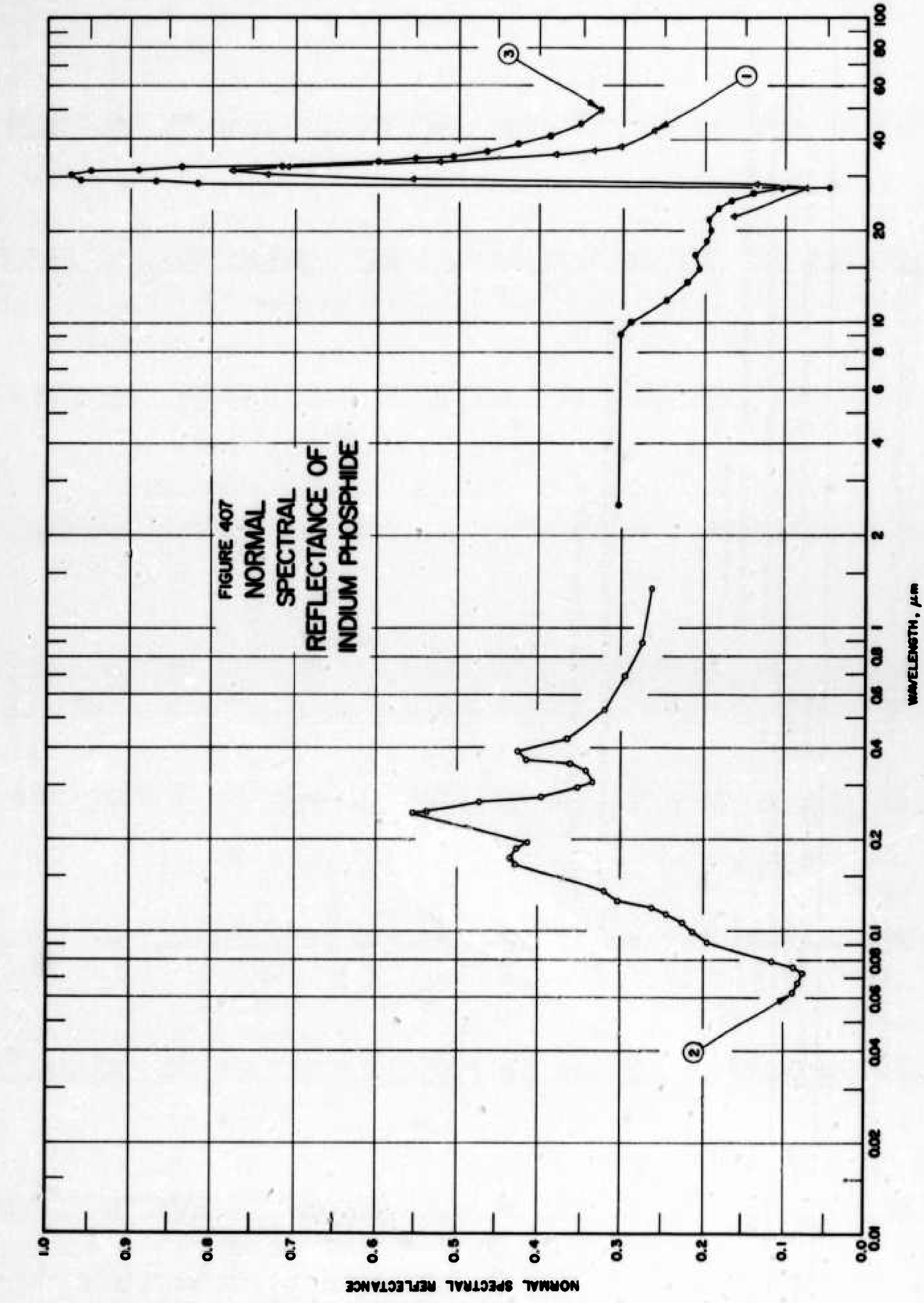


FIGURE 407 NORMAL SPECTRAL REFLECTANCE OF INDIUM PHOSPHIDE

SPECIFICATION TABLE NO. 407 NORMAL SPECTRAL REFLECTANCE OF INDIUM PHOSPHIDE InP

Curve No.	Ref. No.	Year	Temperature K	Wavelength Range, μm	Geometry θ θ' ω'	Reported Error, %	Composition (weight percent), Specifications, and Remarks
1	418	1962	~298	22.2-42.9	10° 10°		Crystal; polished to mirror finish; data extracted from smooth curve.
2	388	1965	297	0.0620-1.33	~0° ~0°		Polished with Linde B; etched with a mixture of equal parts of HNO_3 and HCl; data extracted from smooth curve.
3	87	1968	313	2.50-50.0	30° 30°		Synthetic crystal (1.0 mm thick); flat to ten fringes or better; data extracted from smooth curve.

DATA TABLE NO. 407 NORMAL SPECTRAL REFLECTANCE OF INDIUM PHOSPHIDE InP

[Wavelength, λ, μm; Reflectance, ρ; Temperature, T, K]

λ	ρ	λ	ρ	λ	ρ	λ	ρ
CURVE 1		CURVE 2 (cont.)		CURVE 2 (cont.)		CURVE 3 (cont.)	
T ~ 298							
		0.0997	0.212	0.886	0.278	30.3	0.976
22.2	0.164	0.105	0.226	1.33	0.267	31.2	0.950
27.7	0.074	0.111	0.244			31.9	0.890
28.4	0.139	0.116	0.264	CURVE 3		32.3	0.836
29.5	0.558	0.123	0.301	T = 313		32.8	0.716
30.3	0.738	0.129	0.306*			33.6	0.600
31.1	0.776	0.134	0.320	2.50	0.303	34.3	0.551
32.3	0.710	0.164	0.428	9.10	0.303	35.0	0.506
33.8	0.521	0.172	0.435	10.0	0.290	36.4	0.462
35.3	0.382	0.185	0.429	11.5	0.247	38.4	0.427
36.4	0.338	0.195	0.411	13.5	0.221	41.3	0.388
37.9	0.302	0.241	0.554	15.0	0.210	45.0	0.353
42.9	0.261	0.249	0.536	15.6	0.210*	47.5	0.337*
		0.264	0.471	16.8	0.215	50.0	0.327
CURVE 2		0.273	0.397	18.5	0.200		
T = 297		0.291	0.355	20.0	0.193		
		0.308	0.339	21.7	0.199		
0.0620	0.089	0.335	0.348	23.5	0.184		
0.0665	0.082	0.353	0.364	25.0	0.167		
0.0692	0.076*	0.368	0.414	26.6	0.140		
0.0724	0.076	0.388	0.426	27.2	0.105		
0.0758	0.088	0.422	0.368	27.9	0.047		
0.0791	0.115	0.468	0.339*	28.6	0.819		
0.0911	0.198	0.537	0.320	29.0	0.868		
0.0927	0.207*	0.681	0.297	29.7	0.963		

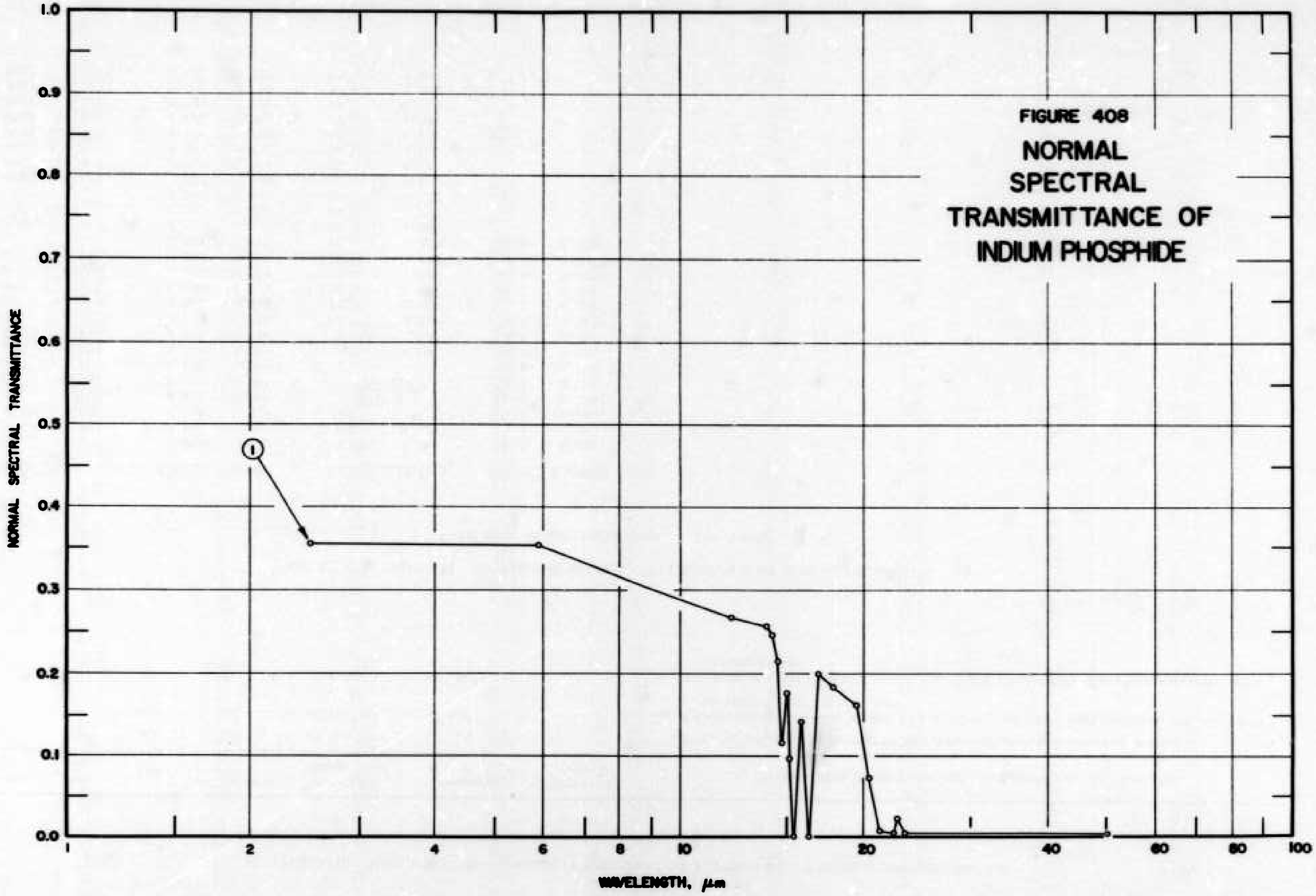


FIGURE 408
NORMAL
SPECTRAL
TRANSMITTANCE OF
INDIUM PHOSPHIDE
1
NORMAL SPECTRAL TRANSMITTANCE
1.0
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0.0
1
2
4
6
8
10
20
40
60
80
100
WAVELENGTH, μm

SPECIFICATION TABLE NO. 408 NORMAL SPECTRAL TRANSMITTANCE OF INDIUM PHOSPHIDE InP

Curve No.	Ref. No.	Year	Temperature, K	Wavelength Range, μm	Geometry θ	Geometry θ'	Geometry ω'	Reported Error, %	Composition (weight percent), Specifications, and Remarks
1	87	1968	313	2.50-50.0	~0°	~0°			Synthetic single crystal (1.0 mm thick); flat to ten fringes or better; data extracted from smooth curve.

DATA TABLE NO. 408 NORMAL SPECTRAL TRANSMITTANCE OF INDIUM PHOSPHIDE InP

[Wavelength, λ, μm; Transmittance, τ; Temperature, T, K]

λ	τ
CURVE 1	
T = 313	
2.50	0.352
[illegible].90	0.352
12.2	0.269
13.9	0.256
14.2	0.247
14.5	0.214
14.7	0.114
15.0	0.174
15.1	0.099
15.4	0.000
15.8	0.142
16.3	0.000
16.9	0.200
17.9	0.183
19.5	0.161
20.3	0.073
21.2	0.007
22.1	0.003
22.6	0.022
23.3	0.003
50.0	0.003

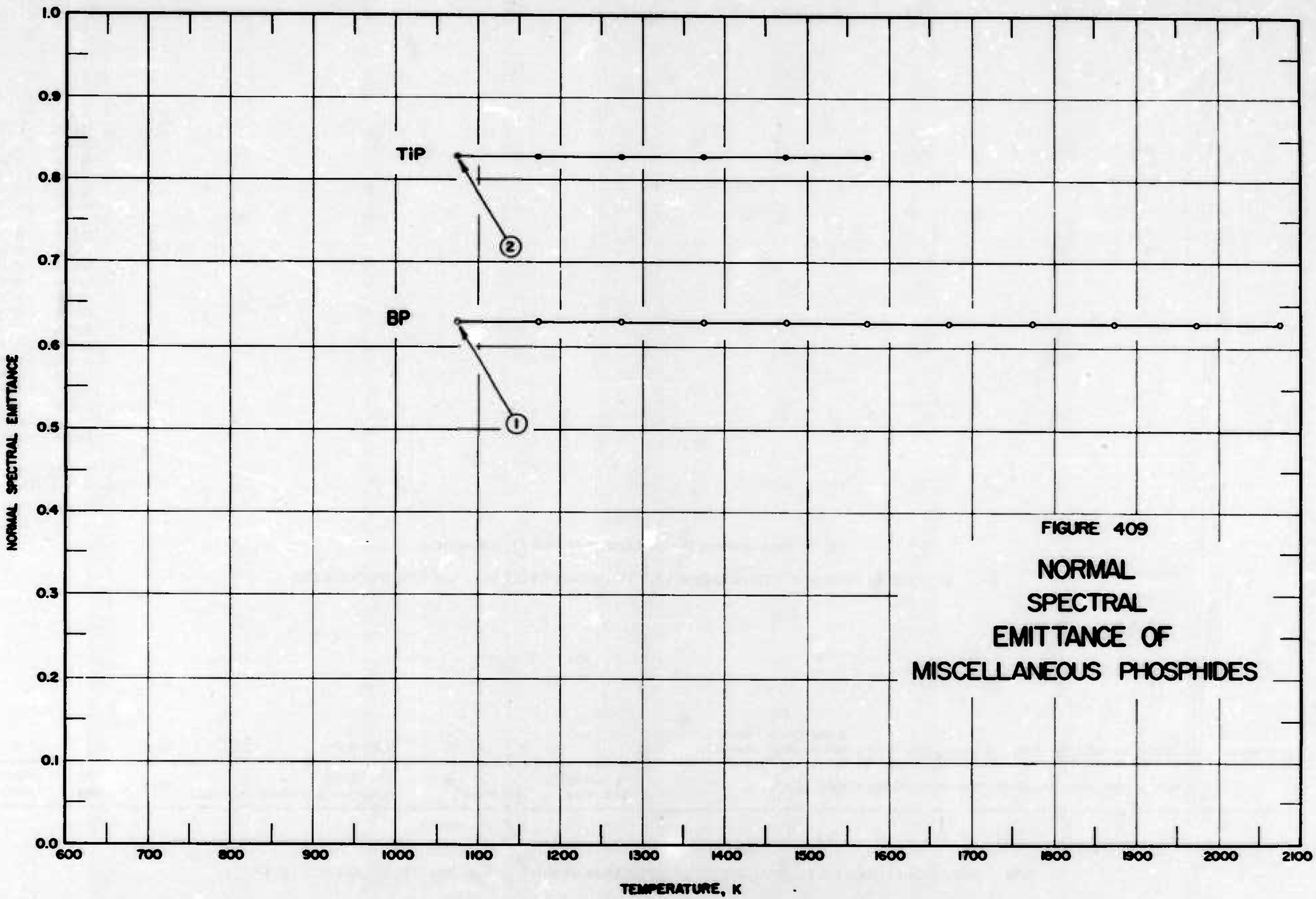


FIGURE 409

NORMAL SPECTRAL EMITTANCE OF MISCELLANEOUS PHOSPHIDES

SPECIFICATION TABLE NO. 409 NORMAL SPECTRAL EMITTANCE OF MISCELLANEOUS PHOSPHIDES

Curve No.	Ref. No.	Year	Wavelength, μm	Temperature Range, K	Geometry θ'	Reported Error, %	Composition (weight percent), Specifications, and Remarks
1	13	1962	0.650	1073-2073	~0°		BORON PHOSPHIDE, BP; layer of paste (~100 μm thick) on tantalum cylinder; paste prepared from fine powder (2-3 μm) of BP suspended in nitrocellulose binder and dried at 313 to 333 K.
2	13	1962	0.650	1073-1573	~0°		TITANIUM PHOSPHIDE, TiP; layer of paste (~100 μm thick) on tantalum cylinder; paste prepared from fine powder (2-3 μm) of TiP suspended in nitrocellulose binder and dried at 313 to 333 K.

DATA TABLE NO. 409 NORMAL SPECTRAL EMITTANCE OF MISCELLANEOUS PHOSPHIDES

[Temperature, T, K; Emittance, ϵ; Wavelength, λ, μm]

T	ϵ
CURVE 1	
$\lambda = 0.650$	
1073	0.63
1173	0.63
1273	0.63
1373	0.63
1473	0.63
1573	0.63
1673	0.63
1773	0.63
1873	0.63
1973	0.63
2073	0.63
CURVE 2	
$\lambda = 0.650$	
1073	0.83
1173	0.83
1273	0.83
1373	0.83
1473	0.83
1573	0.83

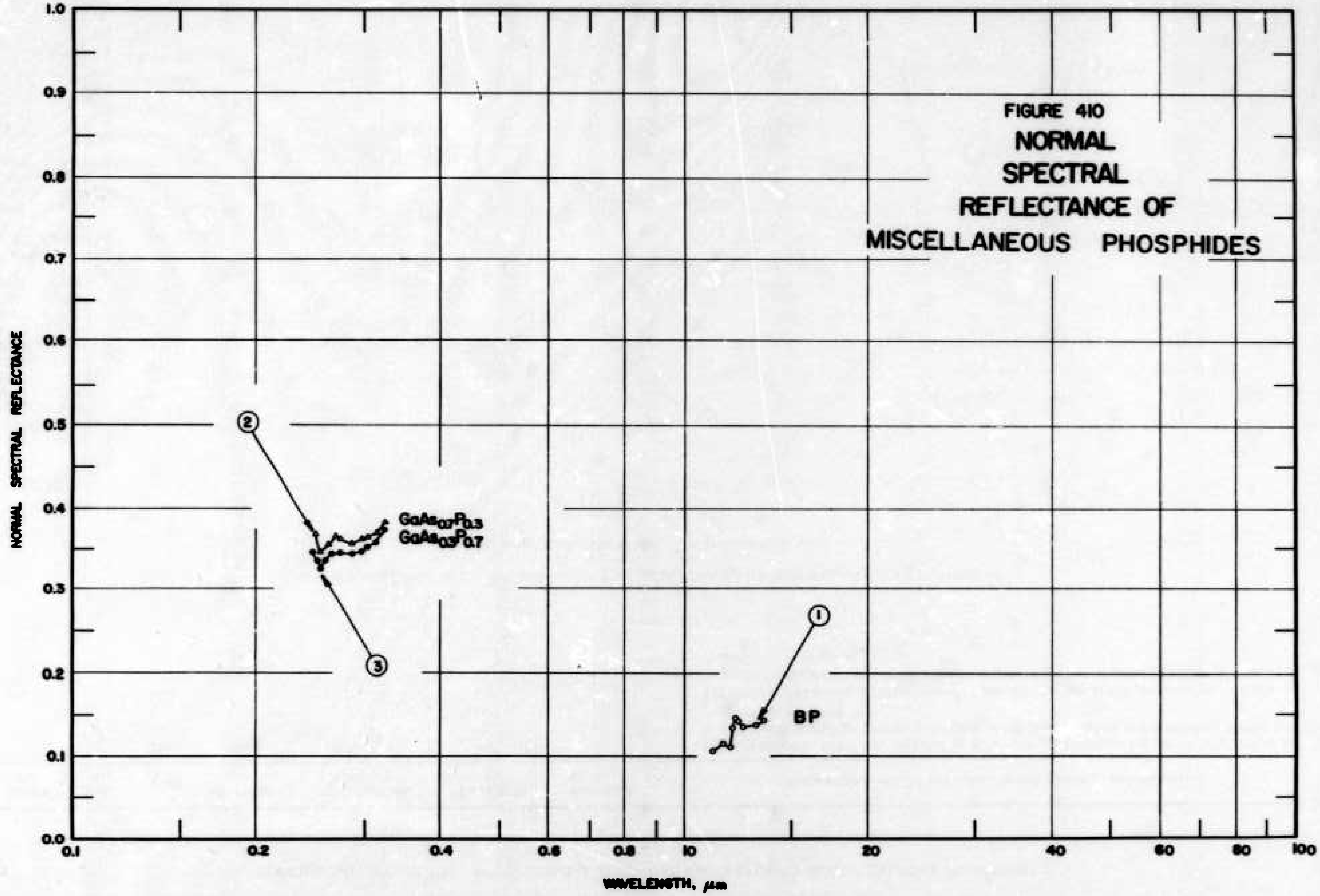


FIGURE 410
NORMAL
SPECTRAL
REFLECTANCE OF
MISCELLANEOUS PHOSPHIDES
NORMAL SPECTRAL REFLECTANCE
WAVELENGTH, μm
1.0
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0.0
0.1
0.2
0.4
0.6
0.8
10
20
40
60
80
100
1
2
3
BP
GaAs0.7P0.3
GaAs0.3P0.7

SPECIFICATION TABLE NO. 410 NORMAL SPECTRAL REFLECTANCE OF MISCELLANEOUS PHOSPHIDES

Curve No.	Ref. No.	Year	Temperature K	Wavelength Range, μm	Geometry θ θ' ω'	Reported Error, %	Composition (weight percent), Specifications, and Remarks
1	177	1967	298	11.1-13.5	~0° ~0°		BORON PHOSPHIDE, BP; Very fine single-crystal particles hot-pressed; cubic structure; ground and polished; data extracted from smooth curve.
2	84	1967	290	0.250-0.325	~0° ~0°		GALLIUM ARSENIC PHOSPHIDE, Ga $As_{0.7}$ $P_{0.3}$; single crystal.
3	84	1967	290	0.249-0.324	~0° ~0°		GALLIUM ARSENIC PHOSPHIDE, Ga $As_{0.3}$ $P_{0.7}$; single crystal.

DATA TABLE NO. 410 NORMAL SPECTRAL REFLECTANCE OF MISCELLANEOUS PHOSPHIDES

[Wavelength, λ, μm; Reflectance, ρ; Temperature, T, K]

λ	ρ	λ	ρ	λ	ρ
CURVE 1		CURVE 2 (cont.)		CURVE 3 (cont.)	
T = 298					
		0.257	0.353*	0.251	0.335*
11.1	0.109	0.258	0.353*	0.252	0.332*
11.6	0.116	0.259	0.353*	0.253	0.327*
11.7	0.116*	0.261	0.354	0.254	0.327
11.8	0.116*	0.263	0.357*	0.255	0.333*
11.9	0.111	0.264	0.359*	0.257	0.334*
12.0	0.113*	0.266	0.363*	0.257	0.337*
12.0	0.134	0.268	0.364*	0.258	0.337*
12.1	0.149	0.270	0.365	0.260	0.337
12.2	0.141	0.272	0.363	0.262	0.336*
12.2	0.138*	0.276	0.364*	0.263	0.338*
12.3	0.137*	0.279	0.362*	0.264	0.341*
12.5	0.136	0.282	0.361*	0.266	0.343
12.7	0.137*	0.285	0.359*	0.268	0.345*
12.9	0.137*	0.289	0.358	0.271	0.345*
13.1	0.139	0.293	0.359*	0.273	0.345
13.5	0.142	0.299	0.361	0.274	0.344*
		0.303	0.363	0.279	0.344*
CURVE 2		0.315	0.370	0.285	0.344*
T = 290		0.325	0.381	0.288	0.344
				0.293	0.346*
0.250	0.368	CURVE 3		0.298	0.348
0.253	0.358*	T = 290		0.303	0.351
0.254	0.350*			0.313	0.359
0.255	0.348	0.249	0.346	0.324	0.373
0.256	0.350*	0.251	0.337		

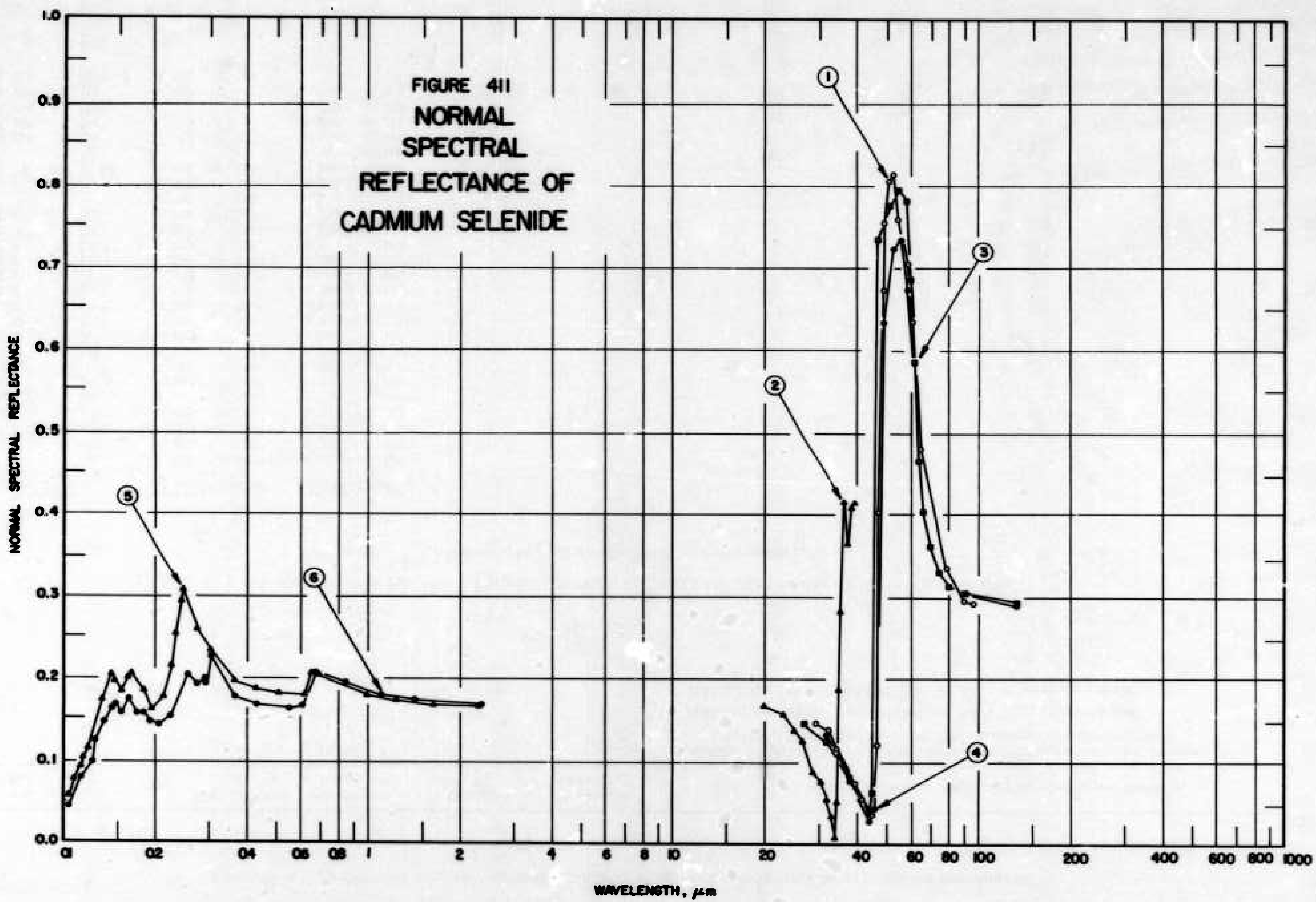


FIGURE 411
NORMAL
SPECTRAL
REFLECTANCE OF
CADMIUM SELENIDE
NORMAL SPECTRAL REFLECTANCE
WAVELENGTH, µm
1.0
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0.0
0.1
0.2
0.4
0.6
0.8
1
2
4
6
8
10
20
40
60
80
100
200
400
600
800
1000
1
2
3
4
5
6

SPECIFICATION TABLE NO. 411 NORMAL SPECTRAL REFLECTANCE OF CADMIUM SELENIDE CdSe

Curve No.	Ref. No.	Year	Temperature, K	Wavelength Range, μm	Geometry θ θ' ω'	Reported Error, %	Composition (weight percent), Specifications, and Remarks
1	73	1965	300	29.7-97.9	12° 12°	±1	No details given.
2	86	1965	~298	20.0-39.9	$\sim0^\circ$ $\sim0^\circ$		Single crystal.
3	98	1967	77	27.0-133	7.5° 7.5°		Polycrystal; data extracted from smooth curve.
4	98	1967	300	27.0-133	7.5° 7.5°		Above specimen and conditions.
5	390	1965	298	0.103-2.30	$\sim0^\circ$ $\sim0^\circ$		Hexagonal crystal; polished and unetched; measured with light polarized parallel to the c-axis; data extracted from smooth curve.
6	390	1965	298	0.103-2.38	$\sim0^\circ$ $\sim0^\circ$		Similar to the above specimen and conditions except measured with light polarized perpendicular to the c-axis.

DATA TABLE NO. 411 NORMAL SPECTRAL REFLECTANCE OF CADMIUM SELENIDE CdSe

[Wavelength, λ, μm; Reflectance, ρ; Temperature, T, K]

λ	ρ
CURVE 1 T = 300	
29.7	0.147
32.3	0.139
34.5	0.116
39.5	0.072
42.0	0.055
44.7	0.036
45.4	0.047*
46.4	0.120
47.7	0.403
48.7	0.673
49.5	0.757
50.5	0.808
51.1	0.815*
52.2	0.815
52.8	0.815*
53.4	0.794*
53.9	0.773*
54.3	0.760
55.5	0.747*
57.1	0.741*
58.3	0.735*
58.8	0.706
59.5	0.673*
60.6	0.638
62.2	0.569*

λ	ρ
CURVE 1 (cont.)	
64.5	0.482
69.6	0.397*
79.4	0.338
90.1	0.298
97.9	0.291
CURVE 2 T ~ 298	
20.0	0.168
21.0	0.166*
23.0	0.157
25.0	0.137
26.9	0.124
28.9	0.089
30.1	0.077
31.0	0.072*
32.0	0.052
33.0	0.035
33.7	0.024*
34.0	0.006
34.5	0.051
35.0	0.188
35.4	0.282
35.9	0.405*
36.9	0.418

λ	ρ
CURVE 2 (cont.)	
37.9	0.367
38.8	0.410
39.9	0.415
CURVE 3 T = 77	
27.0	0.147
32.0	0.125
38.0	0.078
44.0	0.038
45.0	0.061
47.0	0.736
51.0	0.777
55.0	0.798
58.0	0.783
60.0	0.687
62.0	0.587
64.0	0.468
66.0	0.404
70.0	0.364
74.0	0.331
80.0	0.314
91.0	0.306
133.0	0.294

λ	ρ
CURVE 4 T = 300	
27.0	0.147*
32.0	0.131
38.0	0.081
44.0	0.028
46.0	0.042
49.0	0.631
53.0	0.725
56.0	0.737
59.0	0.673
61.0	0.586*
64.0	0.468*
66.0	0.405*
70.0	0.364*
74.0	0.331*
80.0	0.313*
91.0	0.305*
133.0	0.290
CURVE 5 T = 298	
0.103	0.059
0.109	0.078
0.112	0.093
0.115	0.103

λ	ρ
CURVE 5 (cont.)	
0.120	0.115
0.133	0.172
0.142	0.202
0.148	0.197
0.154	0.183
0.161	0.200
0.167	0.204
0.176	0.192*
0.183	0.185
0.194	0.166*
0.199	0.162
0.203	0.167*
0.207	0.177*
0.211	0.177
0.228	0.215
0.234	0.253
0.242	0.294
0.249	0.309
0.277	0.260
0.306	0.231
0.368	0.198
0.435	0.188
0.515	0.181
0.620	0.180
0.656	0.205
0.685	0.205

λ	ρ
CURVE 5 (cont.)	
1.00	0.180
1.22	0.173
1.63	0.169
2.30	0.168
CURVE 6 T = 298	
0.103	0.046
0.108	0.054*
0.113	0.080
0.116	0.087*
0.122	0.100
0.128	0.123
0.135	0.146
0.142	0.162
0.147	0.167
0.154	0.158
0.162	0.171
0.164	0.171*
0.175	0.159
0.181	0.159
0.193	0.146
0.206	0.143
0.221	0.152
0.256	0.201

λ	ρ
CURVE 6 (cont.)	
0.274	0.192
0.291	0.200
0.298	0.195
0.304	0.210*
0.307	0.226
0.329	0.194*
0.364	0.179
0.437	0.169
0.551	0.164
0.602	0.165
0.623	0.175*
0.667	0.206
0.844	0.194
1.10	0.180
1.41	0.172
2.38	0.169

* Not shown on plot

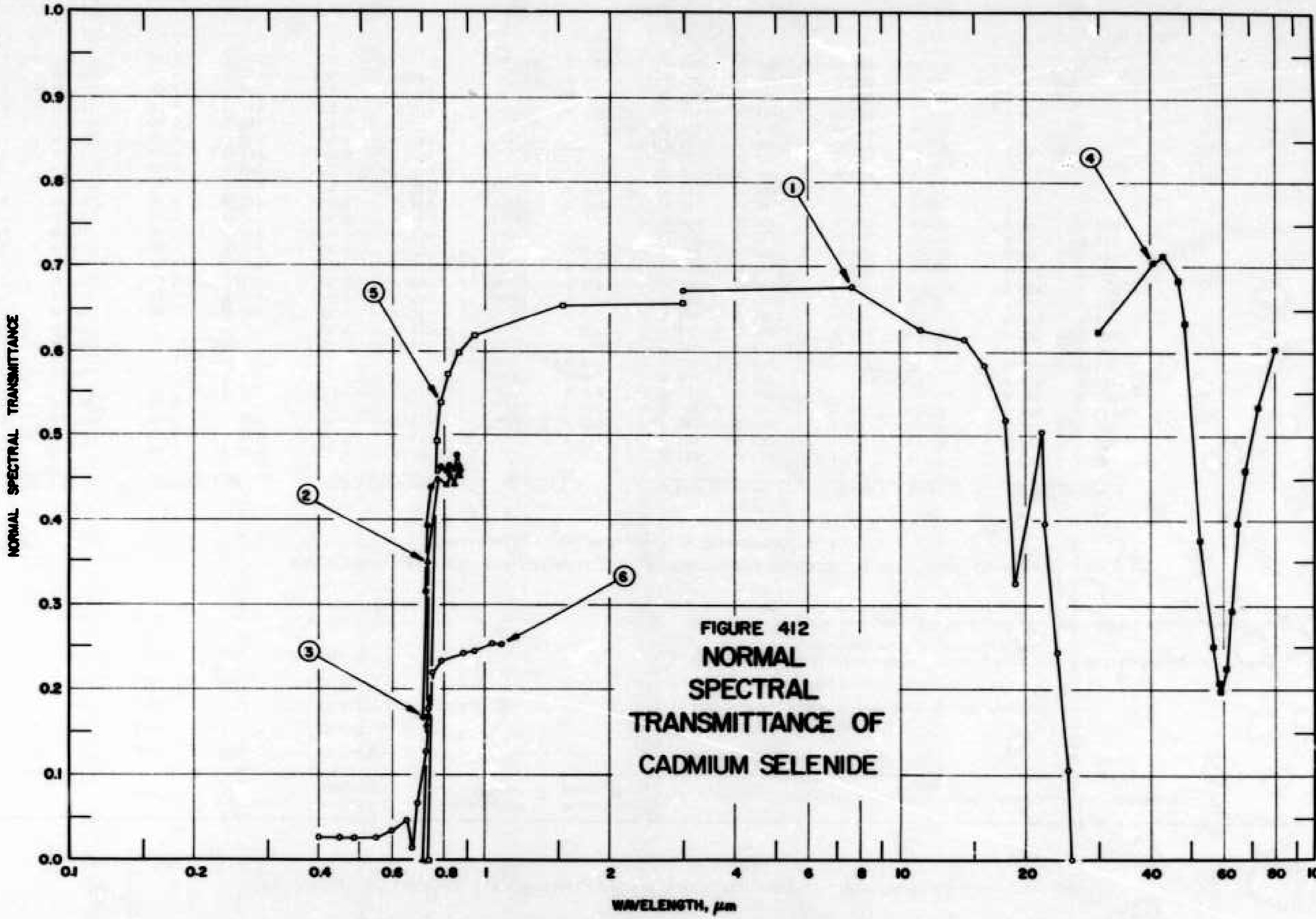


FIGURE 412
NORMAL
SPECTRAL
TRANSMITTANCE OF
CADMIUM SELENIDE

SPECIFICATION TABLE NO. 412 NORMAL SPECTRAL TRANSMITTANCE OF CADMIUM SELENIDE CdSe

Curve No.	Ref. No.	Year	Temperature, K	Wavelength Range, μm	Geometry θ θ' ω'	Reported Error, %	Composition (weight percent), Specifications, and Remarks
1	102	1965	~298	2.00-26.0	0° 0°		Specimen 1.67 mm thick; data extracted from smooth curve.
2	255	1960	298	0.718-0.879	~0° ~0°		Single crystal (crystal class C_{6v})starting material being G.E. CdSe with impurities of Al, Cu, Fe, Mn, Pb, and Si between 1 and 10 ppm, and Zn at ~20 ppm; grown from powder in quartz tube at 1223 K; light polarized perpendicular to the c-axis; data extracted from smooth curve.
3	255	1960	298	0.709-0.879	~0° ~0°		Above specimen and conditions except light polarized parallel to the c-axis.
4	256	1967	300	30.0-80.0	~0° ~0°	±1	Thin film evaporated on collodion film; data extracted from smooth curve.
5	94	1967	298	0.739-3.00	~0° ~0°	±2	Single crystal (1.67 mm thick); polished; data extracted from smooth curve.
6	257	1967	~298	0.400-1.10	~0° ~0°		No details given.

DATA TABLE NO. 412 NORMAL SPECTRAL TRANSMITTANCE OF CADMIUM SELENIDE CdSe

[Wavelength, λ, μm; Transmittance, τ; Temperature, T, K]

CURVE 1
T ~ 298

λ	τ
2.00	0.671
7.70	0.677
11.2	0.627
14.2	0.616
16.1	0.583
18.0	0.516
19.0	0.325
20.0	0.503
22.3	0.397
24.0	0.241
25.4	0.104
26.0	0.000

CURVE 2
T = 298

λ	τ
0.718	0.000
0.724	0.159
0.730	0.350
0.737	0.410*
0.754	0.443*

CURVE 2 (cont.)

λ	τ
0.778	0.451
0.783	0.446
0.787	0.450
0.792	0.446*
0.796	0.448*
0.801	0.442
0.805	0.444*
0.808	0.442*
0.812	0.448*
0.827	0.450*
0.833	0.453
0.838	0.447*
0.841	0.451*
0.847	0.444
0.855	0.457*
0.861	0.444*
0.867	0.464
0.875	0.454
0.879	0.459*

CURVE 3
T = 298

λ	τ
0.709	0.000
0.716	0.169
0.722	0.315
0.731	0.392
0.746	0.440
0.763	0.455*
0.777	0.456*
0.781	0.463
0.786	0.455*
0.790	0.460*
0.794	0.454*
0.798	0.460*
0.807	0.460
0.812	0.457
0.816	0.464*
0.822	0.459*
0.827	0.463
0.832	0.460*
0.838	0.468*
0.842	0.461
0.848	0.468*

CURVE 3 (cont.)

λ	τ
0.854	0.462*
0.860	0.477
0.867	0.467
0.872	0.477
0.879	0.460

CURVE 4
T = 300

λ	τ
30.0	0.623
40.8	0.702
43.4	0.711
45.5	0.704*
47.2	0.684
48.4	0.632
53.5	0.375
56.5	0.250
58.2	0.208
59.6	0.199
60.6	0.224
62.7	0.291
65.8	0.397

CURVE 4 (cont.)

λ	τ
68.0	0.460
69.9	0.492*
73.0	0.531
80.0	0.603

CURVE 5
T = 298

λ	τ
0.739	0.000
0.762	0.493
0.783	0.537
0.820	0.571
0.869	0.600
0.948	0.620
1.55	0.654
3.00	0.658

CURVE 6
T ~ 298

λ	τ
0.400	0.003
0.449	0.003

CURVE 6 (cont.)

λ	τ
0.498	0.003
0.523	0.003*
0.548	0.003
0.573	0.003*
0.600	0.003
0.624	0.004*
0.650	0.005
0.673	0.015
0.699	0.069
0.724	0.129
0.751	0.171
0.776	0.182*
0.796	0.184
0.848	0.188*
0.899	0.192
0.950	0.196
0.996	0.196*
1.04	0.202
1.10	0.202

* Not shown on plot

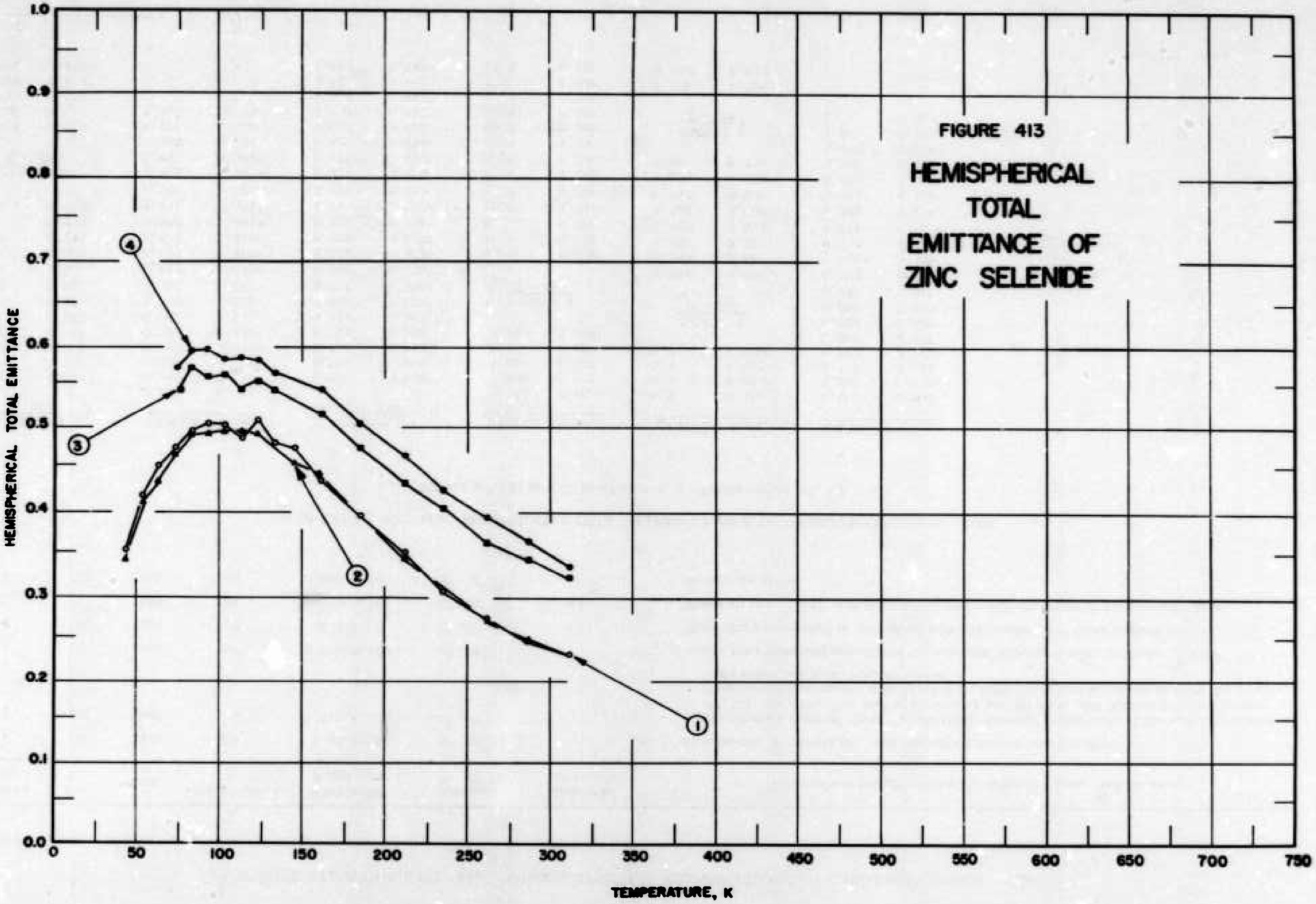


FIGURE 413

HEMISPHERICAL TOTAL EMITTANCE OF ZINC SELENIDE

SPECIFICATION TABLE NO. 413 HEMISPHERICAL TOTAL EMITTANCE OF ZINC SELENIDE ZnSe

Curve No.	Ref. No.	Year	Temperature Range, K	Reported Error, %	Composition (weight percent), Specifications and Remarks
1	301	1968	44.4-311		Irtran 4 (1 mm thick); polycrystal; [Authors' designation: Specimen 1].
2	301	1968	44.4-312		Similar to above specimen and conditions except [Authors' designation: Specimen 2].
3	301	1968	75.1-311		Irtran 4 (2 mm thick); polycrystal.
4	301	1968	75.0-311		Irtran 4 (3 mm thick); polycrystal.

DATA TABLE NO. 413 HEMISPHERICAL TOTAL EMITTANCE OF ZINC SELENIDE ZnSe

[Temperature, T, K; Emittance, ∈]

T	∈	T	∈	T	∈	T	∈
CURVE 1		CURVE 2 (cont.)		CURVE 3 (cont.)		CURVE 4 (cont.)	
44.4	0.357	63.8	0.437	114	0.549	235	0.428
54.0	0.420	74.2	0.469	124	0.557	261	0.393
64.2	0.452	84.2	0.491	134	0.546	287	0.367
74.2	0.476	94.3	0.491	161	0.518	311	0.338
84.1	0.497	104	0.495	185	0.478		
94.3	0.504	114	0.497	212	0.433		
103	0.502	123	0.492	235	0.406		
114	0.489	133	0.482*	262	0.364		
124	0.510	145	0.459	286	0.349		
134	0.482	160	0.445	311	0.325		
145	0.477	185	0.394*				
161	0.438	211	0.347	CURVE 4			
185	0.398	235	0.309*				
211	0.354	261	0.275	75.0	0.572		
235	0.309	286	0.251	84.6	0.597		
261	0.277	312	0.232*	93.9	0.598		
286	0.250			104	0.585		
311	0.233	CURVE 3		114	0.588		
				124	0.585		
CURVE 2		75.1	0.549	134	0.567		
		84.7	0.574	161	0.547		
44.4	0.346	94.7	0.561	185	0.505		
54.3	0.411	104	0.565	211	0.467		

*Not shown on plot

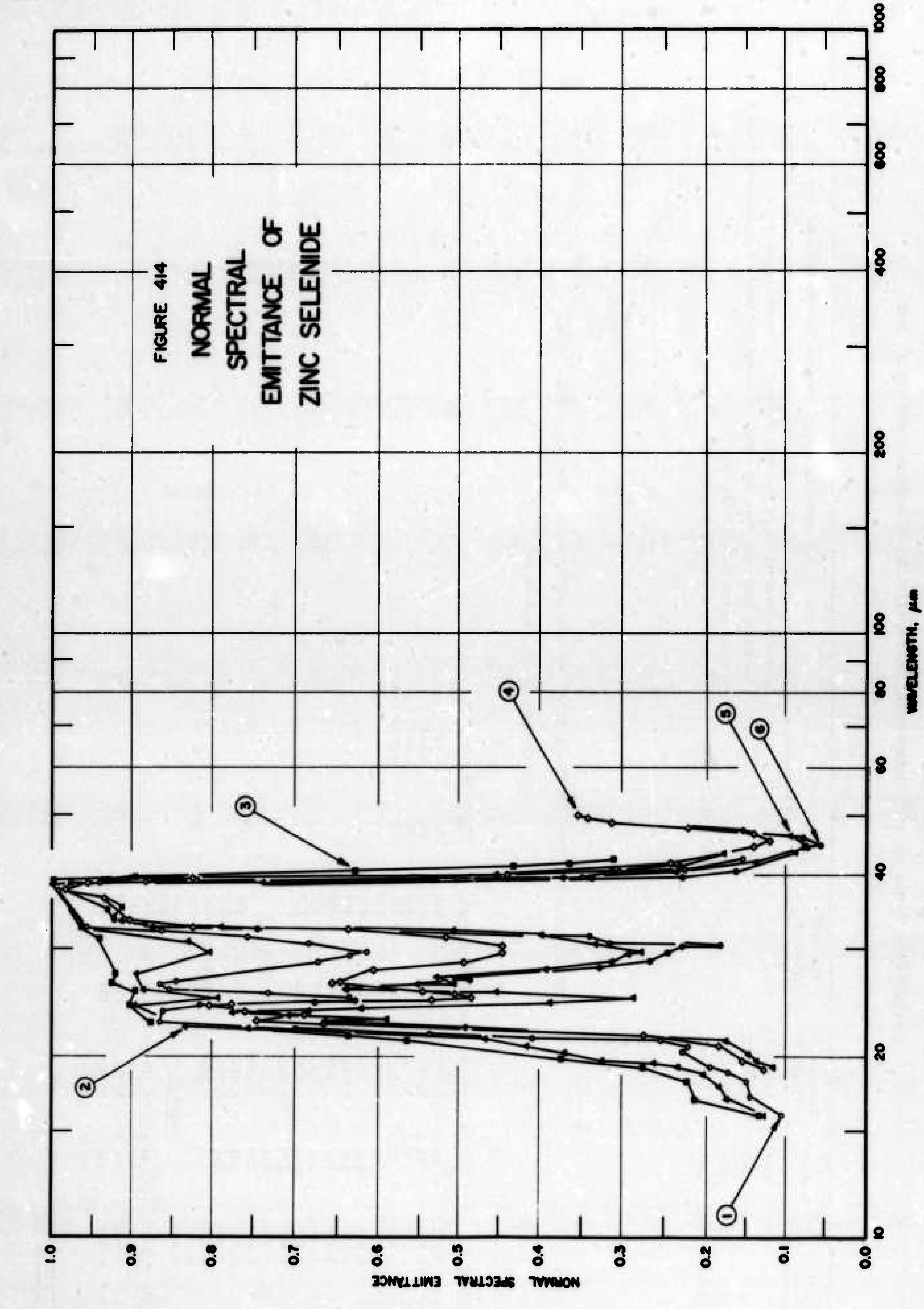


FIGURE 414
NORMAL SPECTRAL EMITTANCE OF ZINC SELENIDE

SPECIFICATION TABLE NO. 414 NORMAL SPECTRAL EMITTANCE OF ZINC SELENIDE ZnSe

Curve No.	Ref. No.	Year	Temperature K	Wavelength Range, μm	Geometry θ'	Reported Error, %	Composition (weight percent), Specifications, and Remarks
1	156	1966	77	16.0-42.2	0°		Irtran 4 (2 mm thick) from Eastman Kodak Co.; data extracted from smooth curve.
2	156	1966	203	16.0-43.1	0°		Above specimen and conditions.
3	156	1966	373	16.0-42.3	0°		Above specimen and conditions.
4	274	1966	19[illegible]	19.0-50.0	0°		Irtran 4 (0.37 mm thick) from Eastman Kodak Co.; microcrystalline, hot pressed compact; density 5.27 g cm^{-3}; data extracted from smooth curve.
5	274	1966	77	19.2-50.0	0°		Above specimen and conditions.
6	274	1966	4.2	19.2-50.0	0°		Above specimen and conditions.

DATA TABLE NO. 414 NORMAL SPECTRAL EMITTANCE OF ZINC SELENIDE ZnSe

[Wavelength, λ, μm; Emittance, ϵ; Temperature, T, K]

CURVE 1
T = 77

λ	ϵ
16.0	0.104
17.1	0.145
18.1	0.150
18.8	0.172
19.1	0.195
20.3	0.330
20.9	0.323
21.2	0.352
21.4	0.410
21.8	0.539
22.1	0.700
22.8	0.869
23.9	0.861
24.1	0.818
24.4	0.677
24.7	0.630
25.0	0.636
25.4	0.731
25.8	0.853
26.2	0.866
26.6	0.847
27.1	0.848*
28.6	0.673
29.2	0.636
29.9	0.614
30.4	0.618*
30.9	0.683
31.4	0.759
31.9	0.786*
32.2	0.864
32.5	0.923*
32.8	0.958
37.8	0.995
38.3	0.971*
38.7	0.941
38.9	0.885
39.4	0.501
39.9	0.350
40.1	0.305
40.3	0.263*
40.8	0.226
41.7	0.168*
42.2	0.153

CURVE 2
T = 203

λ	ϵ
16.0	0.127
17.0	0.174
17.9	0.183
18.6	0.201
19.2	0.235
19.5	0.263
19.8	0.324
20.2	0.370
20.8	0.416
21.4	0.467
21.6	0.538*
22.1	0.755
22.4	0.834
22.8	0.881*
23.2	0.895*
24.2	0.899
24.5	0.882*
25.0	0.793
25.8	0.889
27.2	0.898
29.1	0.826*
29.8	0.803
30.4	0.806*
31.0	0.830
32.7	0.958*
38.4	1.000
38.8	0.972*
39.1	0.902
40.0	0.451
40.5	0.313
40.8	0.267*
41.1	0.231
42.1	0.195*
43.1	0.179

CURVE 3
T = 373

λ	ϵ
16.0	0.132
17.0	0.211
18.2	0.221
18.7	0.236*
19.2	0.275

CURVE 3 (cont.)

λ	ϵ
19.8	0.374
21.1	0.569
21.6	0.637
22.4	0.835*
22.7	0.878
23.2	0.893*
24.4	0.901
25.6	0.898
26.4	0.928
27.3	0.921
28.7	0.925*
31.2	0.942
32.7	0.961
39.0	1.000
39.6	0.975*
39.9	0.898
40.5	0.630
41.2	0.431
41.7	0.364
42.3	0.310

CURVE 4
T = 195

λ	ϵ
19.0	0.127
19.7	0.155
20.9	0.173
21.6	0.275
22.5	0.667
22.9	0.747
23.4	0.690
23.6	0.760
24.1	0.805
24.3	0.777*
24.6	0.678*
24.7	0.533
25.0	0.483
25.2	0.505
25.5	0.546
25.8	0.643*
26.1	0.659
26.5	0.649
26.9	0.657*
27.7	0.608

CURVE 4 (cont.)

λ	ϵ
28.6	0.494
29.6	0.445
30.2	0.445
31.2	0.516
32.2	0.637
32.4	0.726*
32.7	0.824
32.9	0.882*
33.7	0.901
35.0	0.911*
36.5	0.939
37.8	0.986
38.4	0.978*
38.7	0.956
39.2	0.825
40.0	0.440
40.6	0.313*
41.8	0.241
44.3	0.140
45.5	0.120
46.9	0.140
47.9	0.221
48.7	0.312
49.5	0.342
50.0	0.353

CURVE 5
T = 77

λ	ϵ
19.2	0.116
19.6	0.136
20.1	0.147
20.8	0.147*
21.2	0.174
22.1	0.492
22.6	0.666
23.0	0.591
23.3	0.708
23.7	0.774
23.8	0.684
24.0	0.621
24.2	0.509*
24.3	0.388
24.5	0.328*
25.0	0.287

CURVE 5 (cont.)

λ	ϵ
25.5	0.452
25.9	0.640
26.1	0.551
26.4	0.506
27.0	0.529
27.9	0.392
28.3	0.376*
28.7	0.311
29.1	0.286*
29.5	0.291
29.9	0.279
30.7	0.331
31.6	0.397
32.1	0.507
32.6	0.790
33.0	0.886
33.4	0.917
34.0	0.925
35.1	0.914
36.4	0.935*
37.8	0.985
38.4	0.979
38.8	0.740
39.4	0.371
40.1	0.238
42.0	0.139
43.7	0.087
44.8	0.074
46.1	0.093
47.9	0.221*
48.7	0.312*
49.5	0.342*
50.0	0.353*

CURVE 6
T = 4.2

λ	ϵ
19.2	0.116*
19.6	0.136*
20.1	0.147*
20.8	0.147*
21.2	0.174*
22.1	0.492*
22.6	0.666*

CURVE 6 (cont.)

λ	ϵ
23.0	0.591*
23.3	0.708*
23.7	0.774*
23.8	0.684*
24.0	0.621*
24.2	0.509*
24.3	0.388*
24.5	0.328*
25.0	0.287*
25.5	0.452*
25.9	0.640*
26.1	0.551*
26.6	0.486
26.9	0.504
28.0	0.327
28.8	0.266
29.6	0.249
30.1	0.230
30.4	0.282
30.9	0.316
31.6	0.340
32.5	0.747
32.9	0.876
33.2	0.909*
33.8	0.923
35.0	0.915
36.5	0.933
37.8	0.985*
38.4	0.979*
38.8	0.740*
39.1	0.337
39.5	0.230
40.5	0.163
44.2	0.071
44.9	0.058
46.0	0.076
47.1	0.155
47.9	0.221
48.7	0.312*
49.5	0.342*
50.0	0.353*

*Not shown on plot

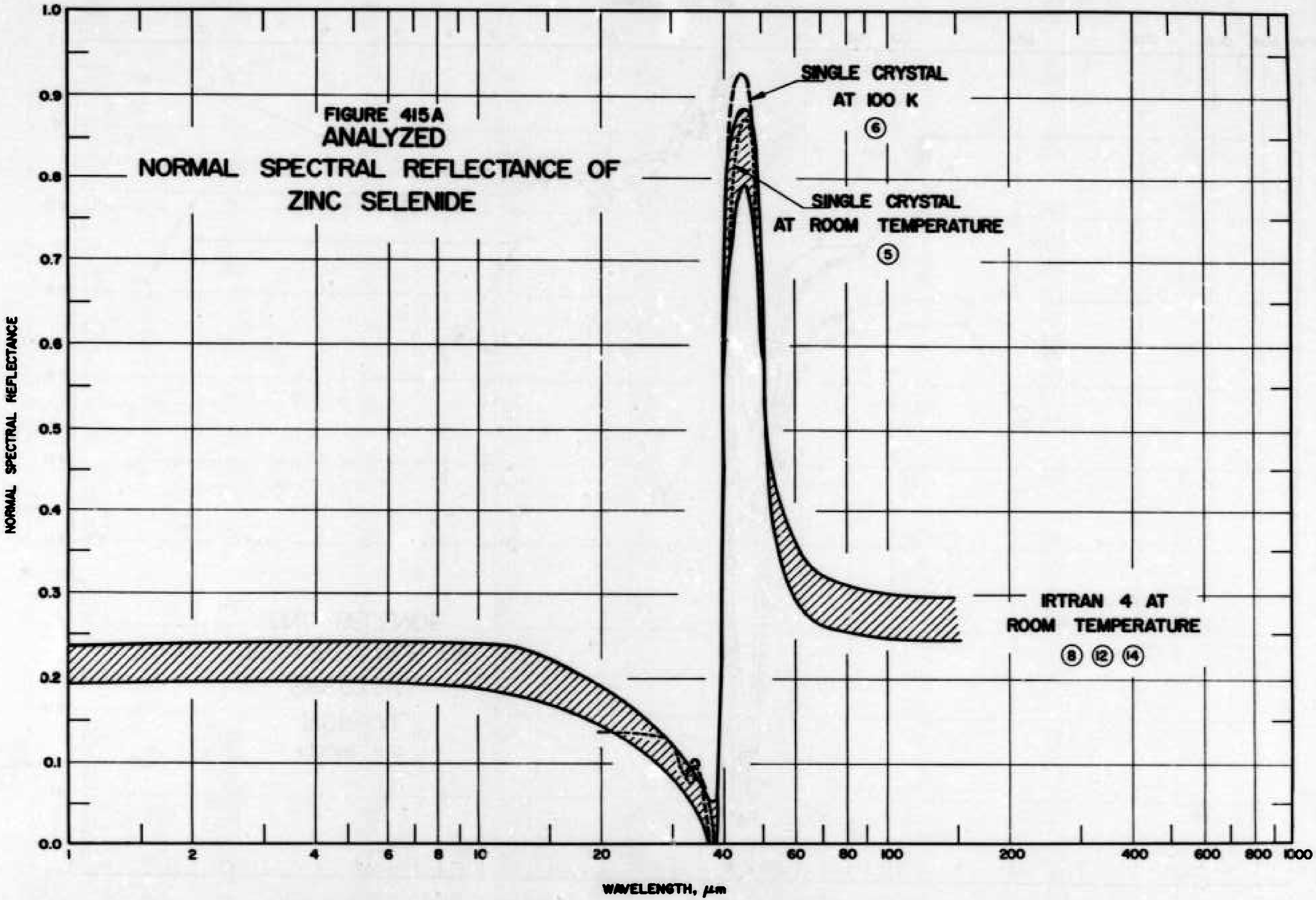


FIGURE 415A
ANALYZED
NORMAL SPECTRAL REFLECTANCE OF
ZINC SELENIDE
SINGLE CRYSTAL
AT 100 K
6
SINGLE CRYSTAL
AT ROOM TEMPERATURE
5
IRTRAN 4 AT
ROOM TEMPERATURE
8 12 14
NORMAL SPECTRAL REFLECTANCE
1.0
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0.0
1
2
4
6
8
10
20
40
60
80
100
200
400
600
800
1000
WAVELENGTH, μm

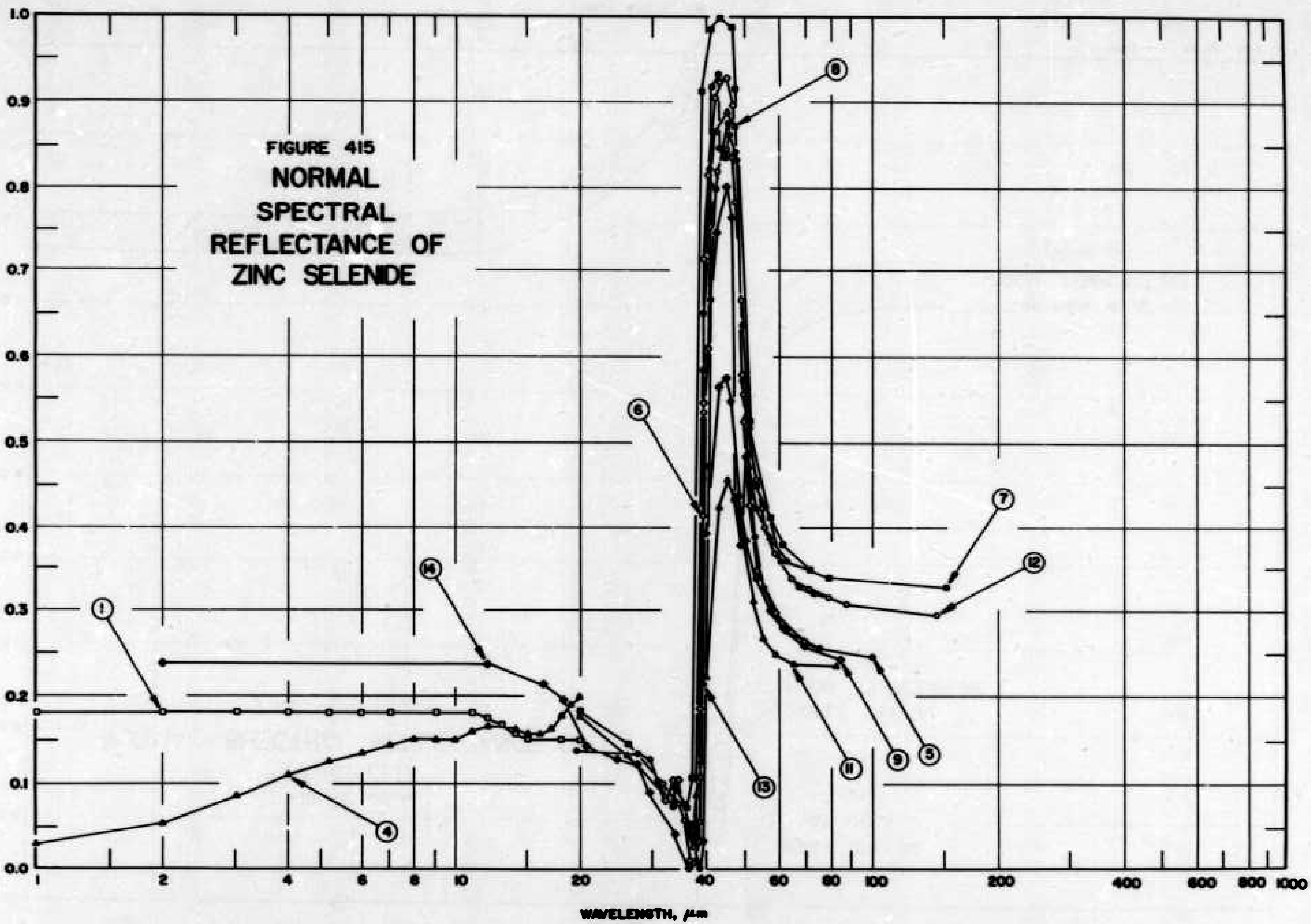


FIGURE 415
NORMAL
SPECTRAL
REFLECTANCE OF
ZINC SELENIDE
WAVELENGTH, μm
1.0
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0.0
1
2
4
6
8
10
20
40
60
80
100
200
400
600
800
1000

SPECIFICATION TABLE NO. 415 NORMAL SPECTRAL REFLECTANCE OF ZINC SELENIDE ZnSe

Curve No.	Ref. No.	Year	Temperature K	Wavelength Range, μm	Geometry θ	θ'	ω'	Reported Error, %	Composition (weight percent), Specifications, and Remarks
1	258	1964	~298	1.00-20.0	~0°	~0°			Trace of ZnS; produced by Merck and Co.; powder baked at elevated temp for 1/2 hr and kept in argon atmosphere for 2 weeks; hot pressed at 1438 K; data extracted from smooth curve; [Authors' designation: Sample No. 6522-7].
2*	258	1964	523	1.00-20.0	~0°	~0°			Above specimen and conditions.
3*	258	1964	623	1.00-20.0	~0°	~0°			Above specimen and conditions.
4	258	1964	673	1.00-20.0	~0°	~0°			Above specimen and conditions except film formed on surface.
5	256	1967	300	19.7-100	12°	12°		±1	Polished to a mirror-like finish; aluminized mirror reference standard; data extracted from smooth curve.
6	256	1967	100	19.7-100	12°	12°		±1	Above specimen and conditions.
7	98	1967	77	20.0-150	7.5°	7.5°			Irtran 4; data extracted from smooth curve.
8	98	1967	300	20.0-150	7.5°	7.5°			Above specimen and conditions.
9	98	1967	77	40.0-84.0	7.5°	7.5°			Pellet; data extracted from smooth curve.
10*	98	1967	25	40.0-84.0	7.5°	7.5°			Above specimen and conditions.
11	98	1967	300	40.0-82.0	7.5°	7.5°			Above specimen and conditions.
12	259	1966	300	31.4-143	< 15°	< 15°			Hot pressed pellet (Eastman Kodak Lab); polished; data extracted from smooth curve.
13	259	1966	300	39.1-87.0	< 15°	< 15°			The above specimen polished and annealed; data extracted from smooth curve.
14	102	1965	~298	2.00-50.0	30°	30°			Irtran 4; pressed-sintered; specimen 2.0 mm thick; data extracted from smooth curve; aluminum mirror reference standard.

* Not shown on plot

DATA TABLE NO. 415 NORMAL SPECTRAL REFLECTANCE OF ZINC SELENIDE ZnSe

[Wavelength, λ, μm; Reflectance, ρ; Temperature, T, K]

CURVE 1
T ~ 298

λ	ρ
1.00	0.180
2.00	0.180
3.00	0.180
4.00	0.180
5.00	0.180
6.00	0.180
7.00	0.180
8.00	0.180*
9.00	0.180
10.0	0.180*
11.0	0.180
12.0	0.175
13.0	0.168
14.0	0.157
15.0	0.150
16.0	0.150*
17.0	0.150*
18.0	0.150
19.0	0.150*
20.0	0.150

CURVE 2*
T ~ 523

λ	ρ
1.00	0.180
2.00	0.180
3.00	0.180
4.00	0.180
5.00	0.180
6.00	0.180
7.00	0.180
8.00	0.180
9.00	0.180
10.0	0.180
11.0	0.180
12.0	0.175
13.0	0.168
14.0	0.157
15.0	0.150
16.0	0.150
17.0	0.150
18.0	0.150
19.0	0.150
20.0	0.150

CURVE 3*
T = 623

λ	ρ
1.00	0.180
2.00	0.180
3.00	0.180
4.00	0.180
5.00	0.180
6.00	0.180
7.00	0.180
8.00	0.180
9.00	0.180
10.0	0.180
11.0	0.180
12.0	0.175
13.0	0.168
14.0	0.157
15.0	0.150
16.0	0.150
17.0	0.150
18.0	0.150
19.0	0.150
20.0	0.150

CURVE 4
T = 673

λ	ρ
1.00	0.030
2.00	0.053
3.00	0.085
4.00	0.110
5.00	0.125
6.00	0.133
7.00	0.142
8.00	0.150
9.00	0.150
10.0	0.150
11.0	0.160
12.0	0.165
13.0	0.168*
14.0	0.163
15.0	0.158
16.0	0.158
17.0	0.162
18.0	0.178
19.0	0.190
20.0	0.200

CURVE 5
T = 300

λ	ρ
19.7	0.138
27.2	0.136
29.1	0.128
30.9	0.102
33.1	0.072
33.5	0.080
33.9	0.097
34.6	0.094*
35.7	0.077
36.8	0.050
38.1	0.008
38.6	0.000
39.3	0.033
40.1	0.471
41.0	0.666
41.4	0.750*
42.1	0.800
42.9	0.846*
43.7	0.868*
45.6	0.876
47.0	0.865*
47.7	0.832
49.3	0.570
50.2	0.489
51.1	0.427*
52.1	0.387
53.7	0.348*
55.4	0.326
58.3	0.298*
61.9	0.280
69.5	0.261*
75.1	0.254
100	0.246

CURVE 6
T = 100

λ	ρ
19.7	0.138*
27.2	0.136*
29.1	0.128*
30.9	0.102*
32.6	0.080
33.4	0.102
34.3	0.105

CURVE 6 (cont.)

λ	ρ
36.8	0.010
37.9	0.009
38.3	0.034
38.5	0.067*
38.9	0.185
39.1	0.416
39.4	0.546
39.7	0.715
40.3	0.816
40.8	0.868*
42.0	0.905
43.2	0.922
44.6	0.929
46.2	0.896
46.9	0.846*
48.8	0.578
49.4	0.525
50.2	0.472*
51.1	0.427
52.1	0.387*
53.7	0.348
55.4	0.326*
58.4	0.298
61.9	0.280*
69.5	0.261
75.1	0.254*
100	0.246*

CURVE 7
T = 77

λ	ρ
20.0	0.181
26.0	0.146
36.0	0.072
37.0	0.108
39.0	0.911
41.0	0.985
43.0	0.998
46.0	0.988
47.0	0.915
51.0	0.523
53.0	0.450
57.0	0.412
61.0	0.379
71.0	0.349

CURVE 7 (cont.)

λ	ρ
79.0	0.339
150	0.326

CURVE 8
T = 300

λ	ρ
20.0	0.178
26.0	0.132
37.0	0.050
38.0	0.086
39.0	0.125
41.0	0.809
42.0	0.869
45.0	0.890
47.0	0.873
50.0	0.530
51.0	0.471
53.0	0.424
57.0	0.387
63.0	0.358
70.0	0.347*
79.0	0.338*
150	0.324*

CURVE 9
T = 77

λ	ρ
40.0	0.392
43.0	0.562
45.0	0.572
46.0	0.548
48.0	0.439
50.0	0.382
53.0	0.338
57.0	0.300
62.0	0.278
69.0	0.259
84.0	0.241

CURVE 10*
T = 25

λ	ρ
40.0	0.392
43.0	0.562
45.0	0.572

CURVE 10 (cont.)

λ	ρ
46.0	0.548
48.0	0.439
50.0	0.382
53.0	0.338
57.0	0.300
62.0	0.278
69.0	0.259
84.0	0.241

CURVE 11
T = 300

λ	ρ
40.0	0.221
43.0	0.424
45.0	0.456
47.0	0.436
52.0	0.310
55.0	0.267
59.0	0.249
65.0	0.239
82.0	0.236

CURVE 12
T = 300

λ	ρ
31.3	0.100
32.1	0.099*
33.1	0.092*
34.3	0.078
35.6	0.058
37.5	0.026
37.9	0.028*
38.2	0.037*
38.6	0.056
38.9	0.109
39.7	0.535
40.1	0.610
40.6	0.685*
41.3	0.751
42.0	0.792*
42.8	0.820
43.8	0.841*
44.3	0.846*
44.8	0.849
45.3	0.848*

CURVE 12 (cont.)

λ	ρ
46.0	0.838
46.5	0.821*
47.3	0.783
48.1	0.733*
48.9	0.666
49.5	0.586*
49.9	0.553
50.7	0.516*
51.6	0.487*
52.7	0.456
54.5	0.422
55.9	0.400
57.4	0.383*
58.9	0.369
60.3	0.358*
62.1	0.349*
64.0	0.339
67.9	0.329*
70.3	0.324
73.1	0.320*
78.1	0.313
86.9	0.308
143.1	0.295

CURVE 13
T = 300

λ	ρ
39.1	0.213
39.8	0.535*
39.9	0.650
40.1	0.729
40.7	0.823
41.1	0.879*
41.7	0.919
42.4	0.931
42.9	0.923*
43.0	0.912*
43.4	0.865*
43.6	0.849
43.9	0.841*
44.2	0.836
44.8	0.837*
45.3	0.842*
45.9	0.861
46.6	0.859*

CURVE 13 (cont.)

λ	ρ
47.0	0.842
47.6	0.793*
49.1	0.664*
49.1	0.637
49.6	0.587*
49.9	0.553*
50.7	0.516
51.6	0.487*
52.7	0.456*
54.5	0.422*
55.9	0.400*
57.4	0.383*
58.9	0.369*
60.3	0.358
62.1	0.349*
64.0	0.339
67.9	0.329
70.3	0.324*
73.1	0.320
78.1	0.313*
87.0	0.308*

CURVE 14
T ~ 298

λ	ρ
2.00	0.238
12.0	0.238
16.2	0.214
18.1	0.194
20.6	0.142
24.4	0.129
27.3	0.121
29.4	0.090
33.8	0.041
36.4	0.000
37.9	0.054
39.8	0.583
42.1	0.749
45.3	0.801
46.0	0.764
46.6	0.431
48.1	0.378
50.0	0.485

* Not shown on plot

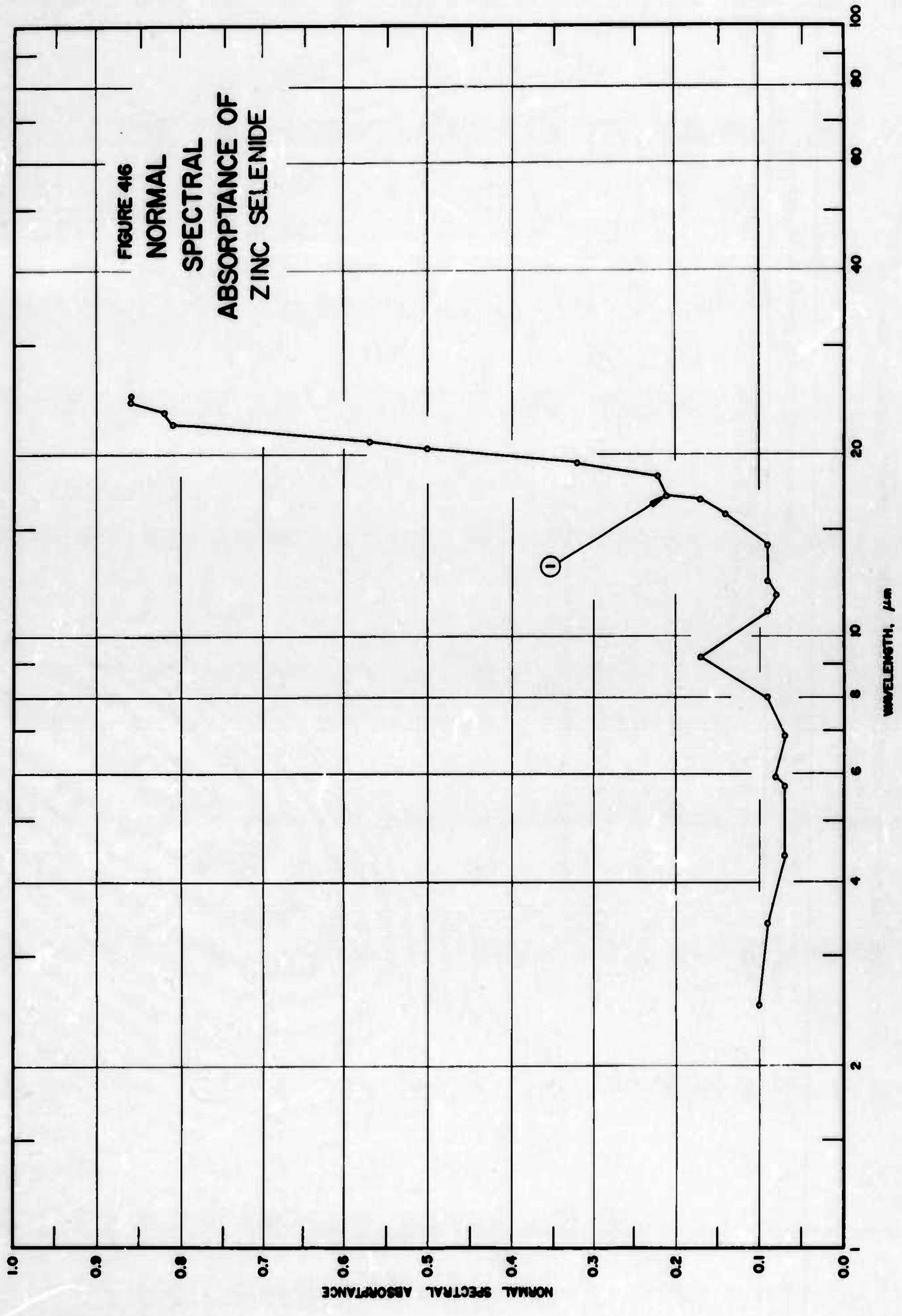


FIGURE 416 NORMAL SPECTRAL ABSORPTANCE OF ZINC SELENIDE

SPECIFICATION TABLE NO. 416 NORMAL SPECTRAL ABSORPTANCE OF ZINC SELENIDE ZnSe

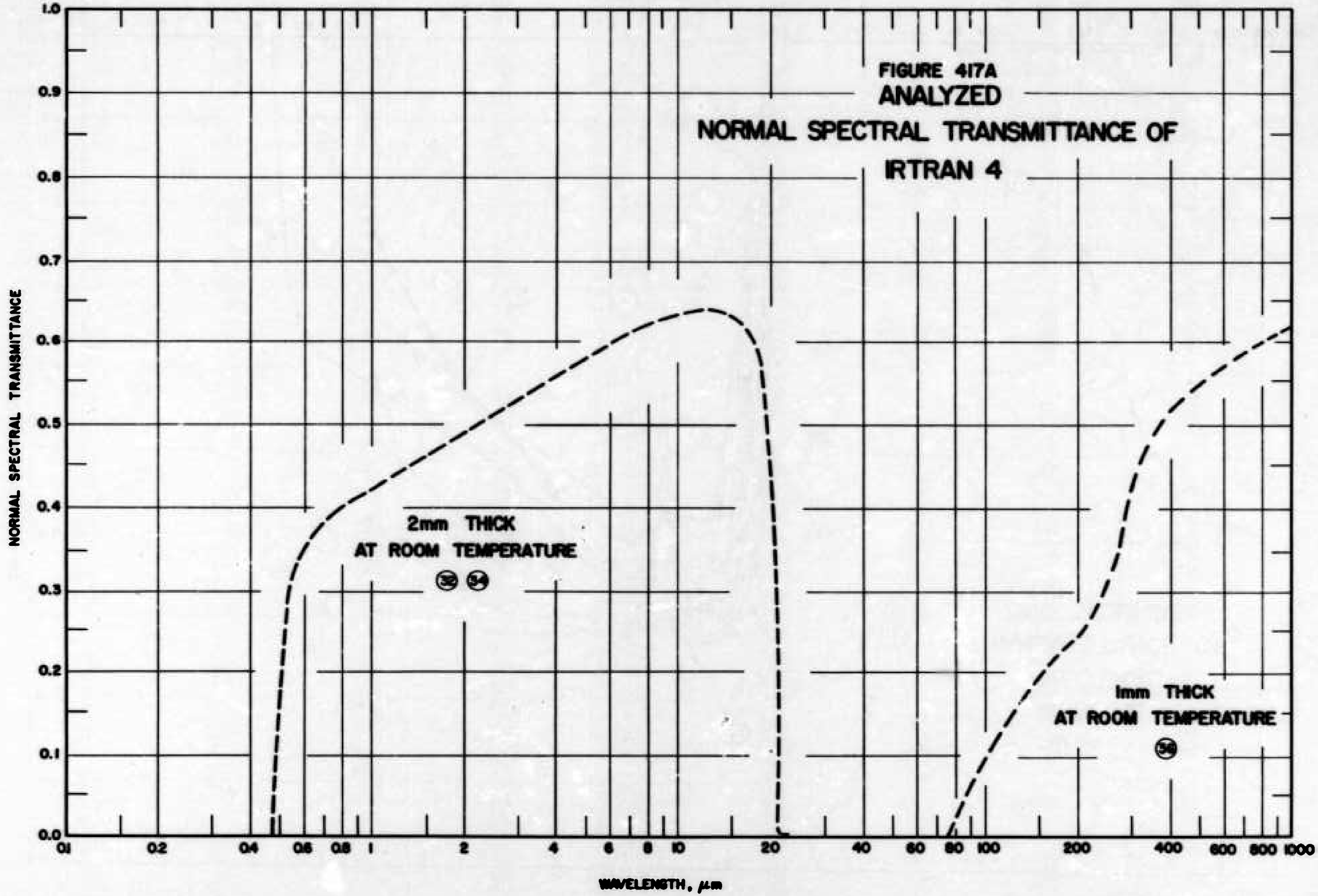
Curve No.	Ref. No.	Year	Temperature K	Wavelength Range, μm	Geometry θ	Reported Error, %	Composition (weight percent), Specifications, and Remarks
1	68	1963	373	2.50-25.0	0°		Irtran 4 (1 mm thick) from Eastman Kodak Co.; hot pressed; measured in vacuum; data extracted from smooth curve.

DATA TABLE NO. 416 NORMAL SPECTRAL ABSORPTANCE OF ZINC SELENIDE ZnSe

[Wavelength, λ, μm; Absorptance, α; Temperature, T, K]

λ	α
CURVE 1	
T = 373	
2.50	0.10
3.40	0.09
4.40	0.07
5.70	0.07
5.90	0.08
6.90	0.07
8.00	0.09
9.20	0.17
11.0	0.09
11.7	0.08
12.3	0.09
14.1	0.09
15.8	0.14
16.7	0.17
17.0	0.21
18.3	0.22
19.4	0.32
20.4	0.50
21.0	0.57
22.3	0.81
23.4	0.82
24.1	0.86
25.0	0.86

FIGURE 417A
ANALYZED
NORMAL SPECTRAL TRANSMITTANCE OF
IRTRAN 4



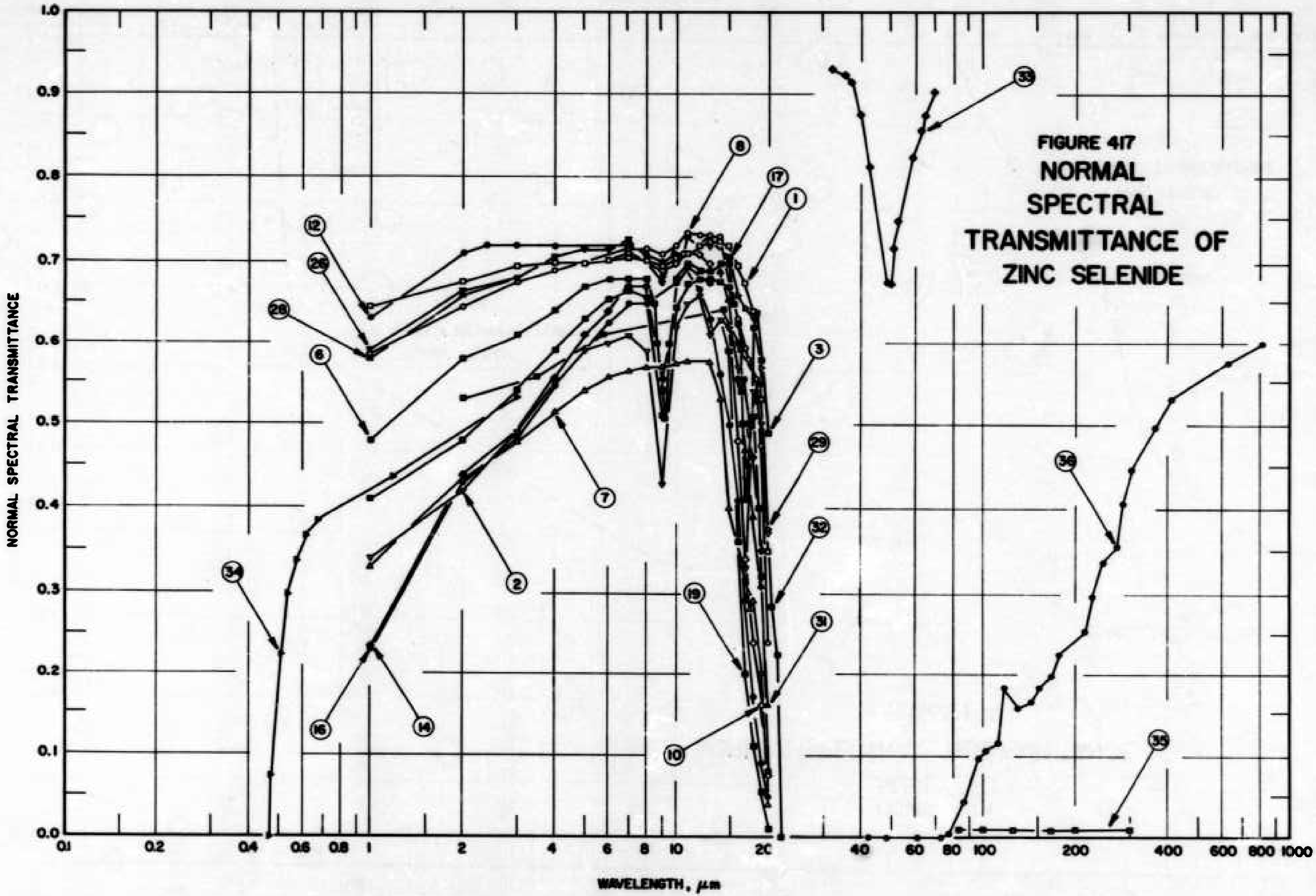


FIGURE 417
NORMAL SPECTRAL TRANSMITTANCE OF ZINC SELENIDE

SPECIFICATION TABLE NO. 417 NORMAL SPECTRAL TRANSMITTANCE OF ZINC SELENIDE ZnSE

Curve No.	Ref. No.	Year	Temperature K	Wavelength Range, µm	Geometry θ	θ'	ω'	Reported Error, %	Composition (weight percent), Specifications, and Remarks
1	258	1964	~298	1.00-20.0	~0°	~0°			With trace of ZnS; produced by Merck and Co; 1.02 mm thick; powder baked at elevated temp for 1/2 hr and kept in argon atmosphere for 2 weeks; hot-pressed at 1438 K.
2	258	1964	~298	1.00-20.0	~0°	~0°			Similar to the above specimen and conditions except produced by G. E. Corp.
3	258	1964	~298	1.00-20.0	~0°	~0°			Similar to the above specimen and conditions except produced by RCA Co.
4*	258	1964	~298	1.00-20.0	~0°	~0°			Similar to curve 1 specimen and conditions except hot-pressed in dome shape 2.69 mm thick; [Author's designation: Dome No. 6009].
5*	258	1964	~298	1.00-20.0	~0°	~0°			Similar to the above specimen and conditions except 4.62 mm thick; [Author's designation: Sample No. 6001].
6	258	1964	~298	1.00-20.0	~0°	~0°			Similar to curve 1 specimen and conditions except 10.0 mm thick; [Author's designation: Sample No. 6519].
7	258	1964	~298	1.00-20.0	~0°	~0°			Similar to the above specimen and conditions except 13.0 mm thick; [Author's designation: Sample No. 6527].
8	258	1964	~298	1.00-20.0	~0°	~0°			Similar to the above specimen and conditions except 5.03 mm thick; [Author's designation: Sample No. 6521-2].
9*	258	1964	523	1.00-20.0	~0°	~0°			Above specimen and conditions.
10	258	1964	623	1.00-20.0	~0°	~0°			Above specimen and conditions.
11*	258	1964	~298	13.0-20.0	~0°	~0°			Above specimen and conditions except cooled back to room temp.
12	258	1964	673	1.00-20.0	~0°	~0°			Above specimen and conditions.
13*	258	1964	~298	13.0-20.0	~0°	~0°			Above specimen and conditions except cooled back to room temp.
14	258	1964	~298	1.00-13.0	~0°	~0°			Similar to curve 1 specimen and conditions except 1.903 cm thick; [Author's designation: Sample No. 6522-1].
15*	258	1964	523	1.00-13.0	~0°	~0°			Above specimen and conditions.
16	258	1964	623	1.00-13.0	~0°	~0°			Above specimen and conditions.
17	258	1964	~298	14.0-20.0	~0°	~0°			Above specimen and conditions except ground and polished; 0.829 cm thick.
18*	258	1964	523	14.0-20.0	~0°	~0°			Above specimen and conditions.
19	258	1964	623	14.0-20.0	~0°	~0°			Above specimen and conditions.
20*	258	1964	~298	1.00-13.0	~0°	~0°			Similar to curve 14 specimen and conditions except 0.498 cm thick; [Author's designation: Sample No. 6522-2].
21*	258	1964	523	1.00-13.0	~0°	~0°			Above specimen and conditions.
22*	258	1964	623	1.00-13.0	~0°	~0°			Above specimen and conditions.
23*	258	1964	~298	14.0-20.0	~0°	~0°			Above specimen and conditions except ground and polished; 0.478 cm thick.
24*	258	1964	523	14.0-20.0	~0°	~0°			Above specimen and conditions.

* Not shown on plot

SPECIFICATION TABLE NO. 417 (continued)

Curve No.	Ref. No.	Year	Temperature K	Wavelength Range, μm	Geometry θ	θ'	ω'	Reported Error, %	Composition (weight percent), Specifications, and Remarks
25*	258	1964	623	14.0-20.0	~0°	~0°			Above specimen and conditions.
26	258	1964	~298	1.00-13.0	~0°	~0°			Similar to curve 16 specimen and conditions except 0.305 cm thick; [Author's designation: Sample No. 6522-3].
27*	258	1964	523	1.00-13.0	~0°	~0°			Above specimen and conditions.
28	258	1964	623	1.00-13.0	~0°	~0°			Above specimen and conditions.
29	258	1964	~298	14.0-20.0	~0°	~0°			Above specimen and conditions except ground and polished; 0.269 cm thick
30*	258	1964	523	14.0-20.0	~0°	~0°			Above specimen and conditions.
31	258	1964	623	14.0-20.0	~0°	~0°			Above specimen and conditions.
32	102	1965	~298	2.00-22.0	0°	0°			Irtran 4; pressed-sintered (2.0 mm thick); data extracted from smooth curve.
33	256	1967	300	32.5-70.0	~0°	~0°		±1	Thin film evaporated on collodion film; data extracted from smooth curve.
34	94	1967	298	0.461-3.00	~0°	~0°		±2	Irtran 4 (2.0 mm thick); polished; data extracted from smooth curve.
35	314	1966	300	83.3-300.0	~0°	~0°			Irtran 4 (2 mm thick) from Eastman Kodak Co.
36	313	1966	~298	42.2-813	~0°	~0°			Irtran 4 (1.00 mm thick); from Eastman Kodak Co.; polycrystalline.

* Not shown on plot

DATA TABLE NO. 417 NORMAL SPECTRAL TRANSMITTANCE OF ZINC SELENIDE ZnSe

[Wavelength, λ, μm; Transmittance, τ; Temperature, T, K]

CURVE 1
T ~ 298

λ	τ
1.00	0.645
2.00	0.675
3.00	0.695
4.00	0.700
5.00	0.700
6.00	0.702
7.00	0.706
8.00	0.702
9.00	0.698
10.0	0.705
11.0	0.710
12.0	0.720
13.0	0.722
14.0	0.725
15.0	0.720
16.0	0.698
17.0	0.675
18.0	0.640
19.0	0.530
20.0	0.350

CURVE 2
T ~ 298

λ	τ
1.00	0.340
2.00	0.420
3.00	0.490
4.00	0.550
5.00	0.590
6.00	0.600
7.00	0.610
8.00	0.590
9.00	0.430
10.0	0.620
11.0	0.650
12.0	0.660
13.0	0.610
14.0	0.630
15.0	0.620
16.0	0.570
17.0	0.330
18.0	0.540
19.0	0.500
20.0	0.370

CURVE 3
T ~ 298

λ	τ
1.00	0.410
2.00	0.480
3.00	0.540
4.00	0.590
5.00	0.630
6.00	0.655
7.00	0.665
8.00	0.657
9.00	0.510
10.0	0.645
11.0	0.672
12.0	0.680
13.0	0.680
14.0	0.678
15.0	0.670
16.0	0.625
16.2	0.600
16.5	0.500
17.0	0.410
17.6	0.500
18.0	0.620
18.2	0.640
19.0	0.580
20.0	0.490

CURVE 4*
T ~ 298

λ	τ
1.00	0.610
2.00	0.650
3.00	0.670
4.00	0.690
5.00	0.700
6.00	0.700
7.00	0.700
8.00	0.705
9.00	0.710
10.0	0.710
11.0	0.715
12.0	0.717
13.0	0.715
14.0	0.695
15.0	0.560
16.0	0.590

CURVE 4 (cont.)*

λ	τ
16.5	0.565
16.9	0.575
17.0	0.577
17.4	0.570
17.7	0.558
18.0	0.558
18.1	0.558
19.0	0.498
20.0	0.300

CURVE 5*
T ~ 298

λ	τ
1.00	0.390
2.00	0.450
3.00	0.460
4.00	0.480
5.00	0.510
6.00	0.540
7.00	0.550
8.00	0.560
9.00	0.555
9.20	0.550
10.0	0.570
11.0	0.580
11.7	0.590
12.0	0.585
13.0	0.590
14.0	0.590
15.0	0.580
15.9	0.505
16.0	0.502
16.1	0.500
17.0	0.490
17.6	0.460
18.0	0.460
18.1	0.460
19.0	0.400
20.0	0.171

CURVE 6
T ~ 298

λ	τ
1.00	0.480
2.00	0.580

CURVE 6 (cont.)

λ	τ
3.00	0.610
4.00	0.640
5.00	0.670
6.00	0.680
7.00	0.680
8.00	0.680
8.50	0.650
8.70	0.600
9.00	0.540
9.10	0.508
9.50	0.600
10.0	0.680
11.0	0.700
12.0	0.690
13.0	0.690
14.0	0.700
15.0	0.700
15.5	0.650
16.0	0.600
16.5	0.540
16.8	0.555
17.0	0.540*
17.4	0.500
17.5	0.498*
18.0	0.510
18.3	0.500*
18.8	0.400
19.0	0.320
20.0	0.080

CURVE 7
T ~ 298

λ	τ
1.00	0.330
2.00	0.435
3.00	0.478
4.00	0.515
5.00	0.540
6.00	0.557
7.00	0.565
8.00	0.570
9.00	0.570
10.0	0.575
11.0	0.578
12.0	0.578*

CURVE 7 (cont.)

λ	τ
13.0	0.578
14.0	0.530
15.0	0.400
16.6	0.335
16.8	0.338*
17.0	0.330*
17.3	0.300
17.6	0.280
18.0	0.290
19.0	0.200
20.0	0.040

CURVE 8
T ~ 298

λ	τ
1.00	0.585
2.00	0.645
3.00	0.675
4.00	0.690
5.00	0.700*
6.00	0.705*
7.00	0.715
8.00	0.715
9.00	0.710
9.60	0.710
10.0	0.720
11.0	0.735
12.0	0.732
13.0	0.732
14.0	0.730
15.0	0.700*
16.0	0.630
16.6	0.600*
16.8	0.600*
17.0	0.595
17.4	0.580
18.0	0.562*
18.3	0.555
19.0	0.475
20.0	0.240

CURVE 9*
T = 523

λ	τ
1.00	0.585
2.00	0.645
3.00	0.675
4.00	0.690
5.00	0.700
6.00	0.705
7.00	0.715
8.00	0.715
9.00	0.710
9.60	0.710
10.0	0.720
11.0	0.735
12.0	0.732
14.0	0.720
15.0	0.705
16.0	0.670
17.0	0.550
18.0	0.340
19.0	0.260
20.0	0.110

CURVE 10
T = 623

λ	τ
1.00	0.585*
2.00	0.645*
3.00	0.675*
4.00	0.690*
5.00	0.700*
6.00	0.705*
7.00	0.710
8.00	0.700*
9.00	0.690
10.0	0.700
10.7	0.710
11.0	0.710*
12.0	0.710
13.0	0.700
14.0	0.675*
15.0	0.620*
16.0	0.480
17.0	0.340
18.0	0.240
19.0	0.160
20.0	0.075

CURVE 11*
T ~ 298

λ	τ
13.0	0.721
13.5	0.721
14.0	0.717
14.5	0.708
14.9	0.699
15.3	0.683
15.5	0.661
15.8	0.631
16.0	0.612
16.4	0.589
16.6	0.579
16.9	0.569
17.1	0.558
17.5	0.533
17.7	0.527
18.0	0.522
18.3	0.511
18.7	0.479
19.0	0.435
19.4	0.368
19.8	0.285
20.0	0.222

CURVE 12
T = 673

λ	τ
1.00	0.630
2.00	0.710
2.40	0.720
3.00	0.720
4.00	0.720
5.00	0.720*
6.00	0.720*
7.00	0.720
8.00	0.710
9.00	0.700
10.0	0.710
11.0	0.710*
12.0	0.665
13.0	0.630
14.0	0.560
15.0	0.500
16.0	0.410
17.0	0.290

CURVE 12 (cont.)

λ	τ
18.0	0.170
19.0	0.090
20.0	0.050

CURVE 13*
T ~ 298

λ	τ
13.0	0.570
13.5	0.515
14.0	0.450
14.4	0.440
14.5	0.444
15.0	0.570
15.5	0.600
16.0	0.593
17.0	0.503
18.0	0.380
19.0	0.260
20.0	0.120

CURVE 14
T = 298

λ	τ
1.00	0.235
2.00	0.440
3.00	0.490*
4.00	0.555
5.00	0.610
6.00	0.640
7.00	0.670
8.00	0.670
9.00	0.555
10.0	0.720*
11.0	0.730
12.0	0.720*
13.0	0.730*

CURVE 15*
T = 523

λ	τ
1.00	0.235
2.00	0.440
3.00	0.490
4.00	0.555
5.00	0.610
6.00	0.640

*Not shown on plot

DATA TABLE NO. 417 (continued)

λ	τ
CURVE 15 (cont.)*	
T = 523	
7.00	0.670
8.00	0.670
9.00	0.555
10.0	0.720
11.0	0.730
12.0	0.720
13.0	0.710
CURVE 16	
T = 623	
1.00	0.230
2.00	0.430
3.00	0.480
4.00	0.545
5.00	0.590*
6.00	0.625
7.00	0.650
8.00	0.650
9.00	0.555*
10.0	0.675
11.0	0.695
12.0	0.690*
13.0	0.675
CURVE 17	
T ~ 298	
14.0	0.730*
15.0	0.705
16.0	0.555
17.0	0.500*
18.0	0.460
19.0	0.350
20.0	0.080*
CURVE 18*	
T = 523	
14.0	0.700
15.0	0.640
16.0	0.425
17.0	0.275
18.0	0.185
19.0	0.110
20.0	0.010

λ	τ
CURVE 19	
T = 623	
14.0	0.630*
15.0	0.590
16.0	0.360
17.0	0.200
18.0	0.110
19.0	0.055
20.0	0.010
CURVE 20*	
T = 298	
1.00	0.495
2.00	0.610
3.00	0.640
4.00	0.665
5.00	0.680
6.00	0.710
7.00	0.625
8.00	0.715
9.00	0.625
10.0	0.715
11.0	0.720
12.0	0.720
13.0	0.715
CURVE 21*	
T = 523	
1.00	0.495
2.00	0.610
3.00	0.640
4.00	0.665
5.00	0.680
6.00	0.700
7.00	0.710
8.00	0.705
9.00	0.625
10.0	0.715
11.0	0.715
12.0	0.715
13.0	0.705

λ	τ
CURVE 22*	
T = 623	
1.00	0.490
2.00	0.605
3.00	0.640
4.00	0.660
5.00	0.675
6.00	0.695
7.00	0.705
8.00	0.695
9.00	0.625
10.0	0.700
11.0	0.695
12.0	0.680
13.0	0.680
CURVE 23*	
T = 298	
14.0	0.720
15.0	0.710
16.0	0.625
17.0	0.605
18.0	0.565
19.0	0.405
20.0	0.240
CURVE 24*	
T = 523	
14.0	0.700
15.0	0.675
16.0	0.540
17.0	0.425
18.0	0.330
19.0	0.260
20.0	0.110
CURVE 25*	
T = 623	
14.0	0.660
15.0	0.640
16.0	0.490
17.0	0.355
18.0	0.250
19.0	0.180
20.0	0.090

λ	τ
CURVE 26	
T ~ 298	
1.00	0.590
2.00	0.665
3.00	0.680
4.00	0.705
5.00	0.715
6.00	0.715
7.00	0.725
8.00	0.715*
9.00	0.675
10.0	0.720*
11.0	0.730*
12.0	0.730*
13.0	0.720
CURVE 27*	
T = 523	
1.00	0.590
2.00	0.665
3.00	0.680
4.00	0.705
5.00	0.715
6.00	0.715
7.00	0.725
8.00	0.715
9.00	0.685
10.0	0.720
11.0	0.730
12.0	0.730
13.0	0.720
CURVE 28	
T = 623	
1.00	0.580
2.00	0.660
3.00	0.680*
4.00	0.705*
5.00	0.715*
6.00	0.715*
7.00	0.725*
8.00	0.710*
9.00	0.685
10.0	0.710*
11.0	0.720*
12.0	0.715*
13.0	0.695*

λ	τ
CURVE 29	
T ~ 298	
14.0	0.730*
15.0	0.705*
16.0	0.660
17.0	0.645
18.0	0.635
19.0	0.570
20.0	0.375
CURVE 30*	
T = 523	
14.0	0.725
15.0	0.685
16.0	0.600
17.0	0.525
18.0	0.455
19.0	0.385
20.0	0.210
CURVE 31	
T = 623	
14.0	0.690
15.0	0.655
16.0	0.565*
17.0	0.470
18.0	0.390
19.0	0.310
20.0	0.160
CURVE 32	
T ~ 298	
2.00	0.531
3.50	0.558
5.70	0.610
14.2	0.643
16.3	0.591
17.1	0.598*
18.9	0.550
20.5	0.281
21.4	0.223
22.0	0.000

λ	τ
CURVE 33	
T = 300	
32.5	0.933
36.0	0.928
37.7	0.919
40.0	0.878
43.1	0.815
48.4	0.678
50.0	0.675
51.4	0.718
53.2	0.750
59.9	0.824
62.7	0.857
65.3	0.877
70.0	0.904
CURVE 34	
T = 298	
0.461	0.000
0.479	0.071
0.504	0.223
0.537	0.299
0.568	0.339
0.616	0.366
0.669	0.383
1.17	0.438
3.00	0.532
CURVE 35	
T = 300	
83.3	<0.01
100.0	<0.01
125.0	<0.01
166.7	<0.01
200.0	<0.01
300.0	<0.01
CURVE 36	
T ~ 298	
42.2	0.000
46.1	0.000
52.6	0.000*
54.5	0.000*
61.1	0.000
70.1	0.000*

λ	τ
CURVE 36 (cont.)	
73.9	0.000
77.5	0.005
87.6	0.043
97.7	0.098
102	0.104
111	0.111
118	0.182
130	0.158
141	0.164
151	0.182
169	0.199
178	0.224
214	0.255
227	0.298
246	0.339
272	0.356
281	0.406
307	0.448
362	0.499
410	0.530
625	0.578
818	0.600

*Not shown on plot

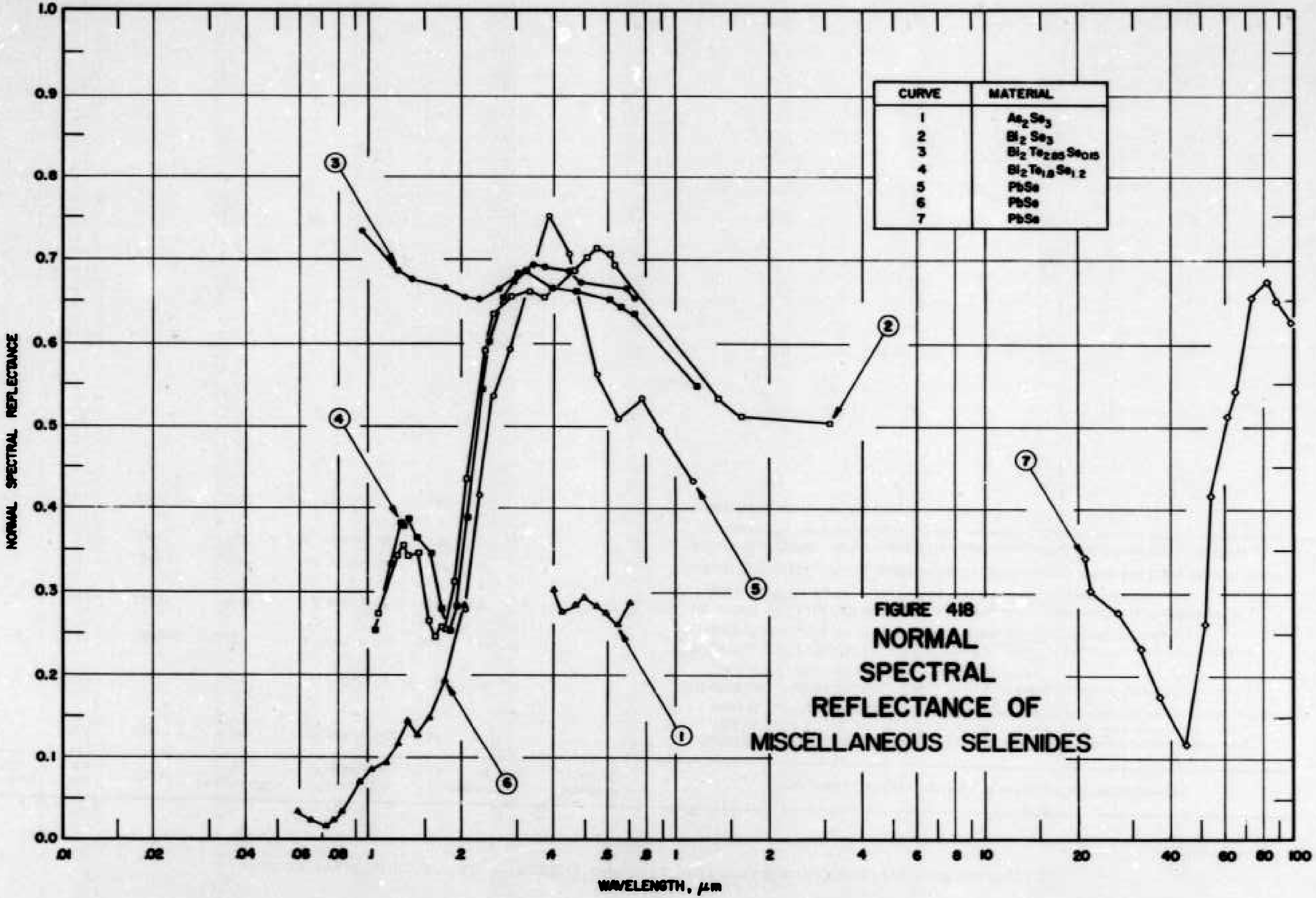


FIGURE 418
NORMAL SPECTRAL REFLECTANCE OF MISCELLANEOUS SELENIDES

SPECIFICATION TABLE NO. 418 NORMAL SPECTRAL REFLECTANCE OF MISCELLANEOUS SELENIDES

Curve No.	Ref. No.	Year	Temperature K	Wavelength Range, μm	Geometry θ	θ'	ω'	Reported Error, %	Composition (weight percent), Specifications, and Remarks
1	254	1968	298	0.400-0.702	20°	20°			DIARSENIC TRISELENIDE, As_2Se_3; vacuum deposited film on mylar substrate; film thickness 1.75 μm; specimen in amorphous state; data extracted from smooth curve; aluminum mirror reference standard; average of three samples.
2	391	1965	300	0.107-3.18	~0°	~0°			DIBISMUTH TRISELENIDE, Bi_2Se_3; polished; cleavage plane is perpendicular to the c-axis; data extracted from smooth curve.
3	391	1965	300	0.0954-0.738	~0°	~0°			BISMUTH TELLURIUM SELENIDE, $Bi_2Te_{2.85}Se_{0.15}$; polished; cleavage plane is perpendicular to the c-axis; data extracted from smooth curve.
4	391	1965	300	0.105-1.17	~0°	~0°			BISMUTH TELLURIUM SELENDIE, $Bi_2Te_{1.8}Se_{1.2}$; polished; cleavage plane is perpendicular to the c-axis; data extracted from smooth curve.
5	74	1964	297	0.207-1.18	~0°	~0°			LEAD SELENIDE, PbSe; single crystal; cleaved; data extracted from smooth curve.
6	74	1964	297	0.0590-0.207	~0°	~0°			LEAD SELENIDE, PbSe; epitaxially-deposited layer, single crystal with (100) orientation on NaCl single crystal substrate; data extracted from smooth curve.
7	336	1955	296	21.0-208	~0°	~0°			LEAD SELENIDE, PbSe; single crystal.

DATA TABLE NO. 418 NORMAL SPECTRAL REFLECTANCE OF MISCELLANEOUS SELENIDES

[Wavelength, λ, μm; Reflectance, ρ; Temperature, T, K]

λ	ρ
CURVE 1 T = 298	
0.400	0.303
0.423	0.279
0.473	0.284
0.500	0.294
0.550	0.284
0.599	0.276
0.650	0.262
0.676	0.265*
0.702	0.287
CURVE 2 T = 300	
0.107	0.275
0.121	0.344
0.124	0.343*
0.130	0.356
0.134	0.344
0.140	0.349*
0.143	0.346*
0.145	0.349
0.149	0.340*
0.158	0.268
0.161	0.254*
0.165	0.248
0.172	0.260
0.178	0.258
0.190	0.312
0.210	0.439
0.240	0.593
0.255	0.636
0.276	0.649*
0.290	0.659
0.314	0.657*
0.332	0.663
0.348	0.657*
0.372	0.657
0.411	0.683*
0.461	0.689
0.484	0.701*
0.512	0.701
0.546	0.712
0.605	0.709
0.633	0.696

λ	ρ
CURVE 2 (cont.)	
1.22	0.535*
1.38	0.533
1.63	0.513
3.18	0.506
CURVE 3 T = 300	
0.0954	0.733
0.123	0.688
0.129	0.683*
0.139	0.678
0.152	0.675*
0.166	0.673*
0.178	0.669
0.196	0.663*
0.207	0.658
0.216	0.654*
0.230	0.654
0.241	0.655*
0.267	0.666
0.304	0.684
0.345	0.695
0.375	0.691
0.399	0.692*
0.423	0.687*
0.451	0.687
0.534	0.674*
0.596	0.674
0.646	0.673*
0.681	0.667
0.738	0.656
CURVE 4 T = 300	
0.105	0.252
0.119	0.332
0.120	0.335*
0.124	0.352*
0.128	0.382
0.130	0.380
0.132	0.384*
0.133	0.388
0.135	0.387*

λ	ρ
CURVE 4 (cont.)	
0.139	0.376*
0.142	0.364
0.145	0.358*
0.149	0.357*
0.155	0.360*
0.160	0.349
0.163	0.337*
0.171	0.280
0.173	0.276*
0.175	0.278*
0.177	0.274*
0.181	0.253
0.184	0.268*
0.188	0.265*
0.193	0.282
0.210	0.390
0.234	0.547
0.248	0.604
0.271	0.659
0.292	0.675*
0.299	0.676
0.308	0.682*
0.320	0.681*
0.328	0.688
0.379	0.669*
0.397	0.666
0.443	0.664*
0.477	0.663
0.515	0.667*
0.605	0.654
0.660	0.644
0.725	0.639
1.17	0.550
CURVE 5 T = 297	
0.207	0.280
0.230	0.417
0.253	0.539
0.288	0.598
0.388	0.751
0.443	0.708
0.564	0.563
0.653	0.510

λ	ρ
CURVE 5 (cont.)	
0.775	0.535
0.886	0.496
1.13	0.433
CURVE 6 T = 297	
0.0590	0.034
0.0646	0.024
0.0729	0.017
0.0775	0.023
0.0827	0.034
0.0947	0.070
0.102	0.085
0.113	0.096
0.123	0.118
0.132	0.146
0.135	0.145*
0.143	0.129
0.149	0.131*
0.159	0.150
0.177	0.195
0.207	0.283
CURVE 7 T = 296	
21.0	0.341
22.0	0.302
27.0	0.278
32.0	0.232
37.0	0.178
45.0	0.118
52.0	0.264
54.0	0.419
61.0	0.513
65.0	0.542
73.0	0.657
82.0	0.674
88.0	0.651
99.0	0.628
107	0.654*
122	0.663*
133	0.651*
143	0.644*

λ	ρ
CURVE 7 (cont.)	
152	0.616*
158	0.635*
171	0.630*
183	0.636*
195	0.633*
202	0.633*
208	0.612*

*Not shown on plot

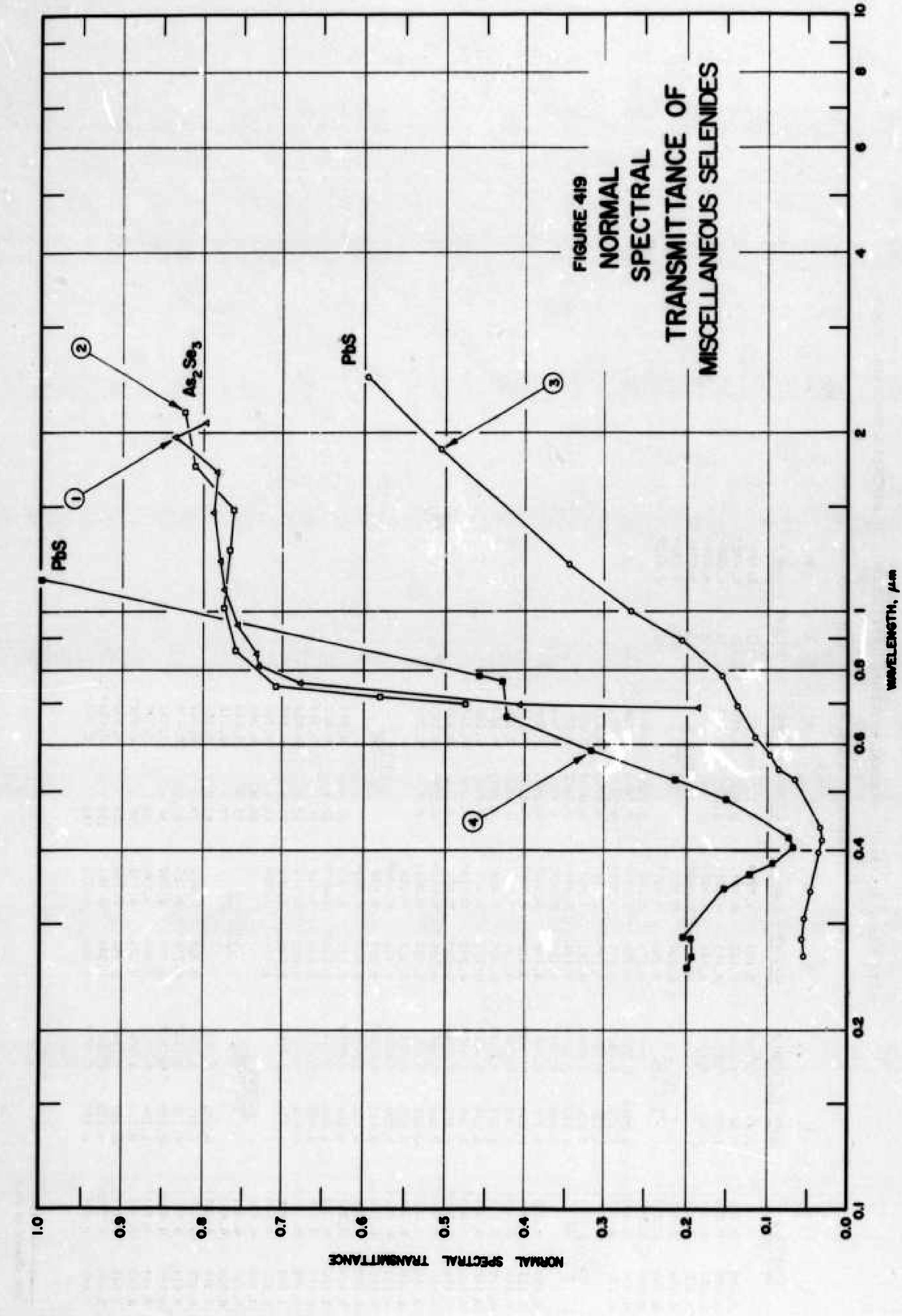


FIGURE 419 NORMAL SPECTRAL TRANSMITTANCE OF MISCELLANEOUS SELENIDES

SPECIFICATION TABLE NO. 419 NORMAL SPECTRAL TRANSMITTANCE OF MISCELLANEOUS SELENIDES

Curve No.	Ref. No.	Year	Temperature K	Wavelength Range, μm	Geometry θ	θ'	ω'	Reported Error, %	Composition (weight percent), Specifications, and Remarks
1	254	1968	298	0.690-2.07	~0°	~0°			DIARSENIC TRISELENIDE, As_2Se_3; vacuum deposited film (1.40 μm thick) on mylar substrate; specimen in amorphous state.
2	254	1968	298	0.650-2.15	~0°	~0°			Similar to the above specimen and conditions except film thickness 3.26 μm.
3	74	1964	297	0.264-2.48	0°	0°			LEAD SELENIDE, PbSe; epitaxially-deposited thin film (250 Å thick); single crystal with orientation (100); data extracted from smooth curve.
4	74	1964	77	0.253-1.13	0°	0°			Above specimen and conditions.

DATA TABLE NO. 419 NORMAL SPECTRAL TRANSMITTANCE OF MISCELLANEOUS SELENIDES

[Wavelength, λ, μm; Transmittance, τ; Temperature, T, K]

λ	τ	λ	τ	λ	τ	λ	τ
CURVE 1 T = 298		CURVE 2 (cont.)		CURVE 3 (cont.)		CURVE 4 (cont.)	
		0.860	0.760	0.697	0.136	0.428	0.0710
0.690	0.186	1.02	0.772	0.780	0.154	0.488	0.150
0.700	0.409	1.27	0.766	0.899	0.202	0.523	0.212
0.760	0.677	1.48	0.761	1.00	0.269	0.588	0.318
0.810	0.730	1.75	0.811	1.20	0.346	0.670	0.424
0.850	0.731	2.15	0.825	1.87	0.507	0.761	0.430
0.950	0.758			2.48	0.598	0.785	0.458
1.08	0.772	CURVE 3 T = 297				1.13	1.000
1.21	0.779			CURVE 4 T = 77			
1.46	0.788						
1.71	0.781	0.264	0.0548				
1.96	0.836	0.284	0.0571	0.253	0.200		
2.07	0.798	0.306	0.0546	0.264	0.193		
		0.340	0.0466	0.281	0.194		
CURVE 2 T = 298		0.396	0.0339	0.288	0.204		
		0.413	0.0317	0.309	0.191		
		0.438	0.0356	0.343	0.151		
0.650	0.185*	0.521	0.0676	0.364	0.121		
0.700	0.475	0.546	0.0849	0.380	0.0910		
0.720	0.581	0.574	0.0989	0.403	0.0685		
0.750	0.709	0.614	0.116	0.412	0.0668*		

* Not shown on plot

SPECIFICATION TABLE NO. 420 NORMAL TOTAL EMITTANCE OF BORON SILICIDES

Curve No.	Ref. No.	Year	Temperature Range, K	Geometry θ'	Reported Error, %	Composition (weight percent), Specifications and Remarks
1*	28	1963	1023	~0°		B_4Si; sintered at 1423 K for 2 hrs (setter material B_4Si); density 1.32 g cm^{-3}; x-ray structure B_4Si; integrated from spectral data (1-15 μm); [Authors' designation: Sample No. 100].
2*	28	1963	1023	~0°		B_6Si; sintered at 1623 K for 2 hrs (setter material B_6Si); density 1.32 g cm^{-3}, theoretical density 2.43 g cm^{-3}; x-ray structure B_6Si; integrated from spectral data (1-15 μm); [Authors designation: Sample No. 101].

DATA TABLE NO. 420 NORMAL TOTAL EMITTANCE OF BORON SILICIDES

[Temperature, T, K; Emittance, ϵ]

T	ϵ
CURVE 1*	
1023	0.91
CURVE 2*	
1023	0.97

* No plot given

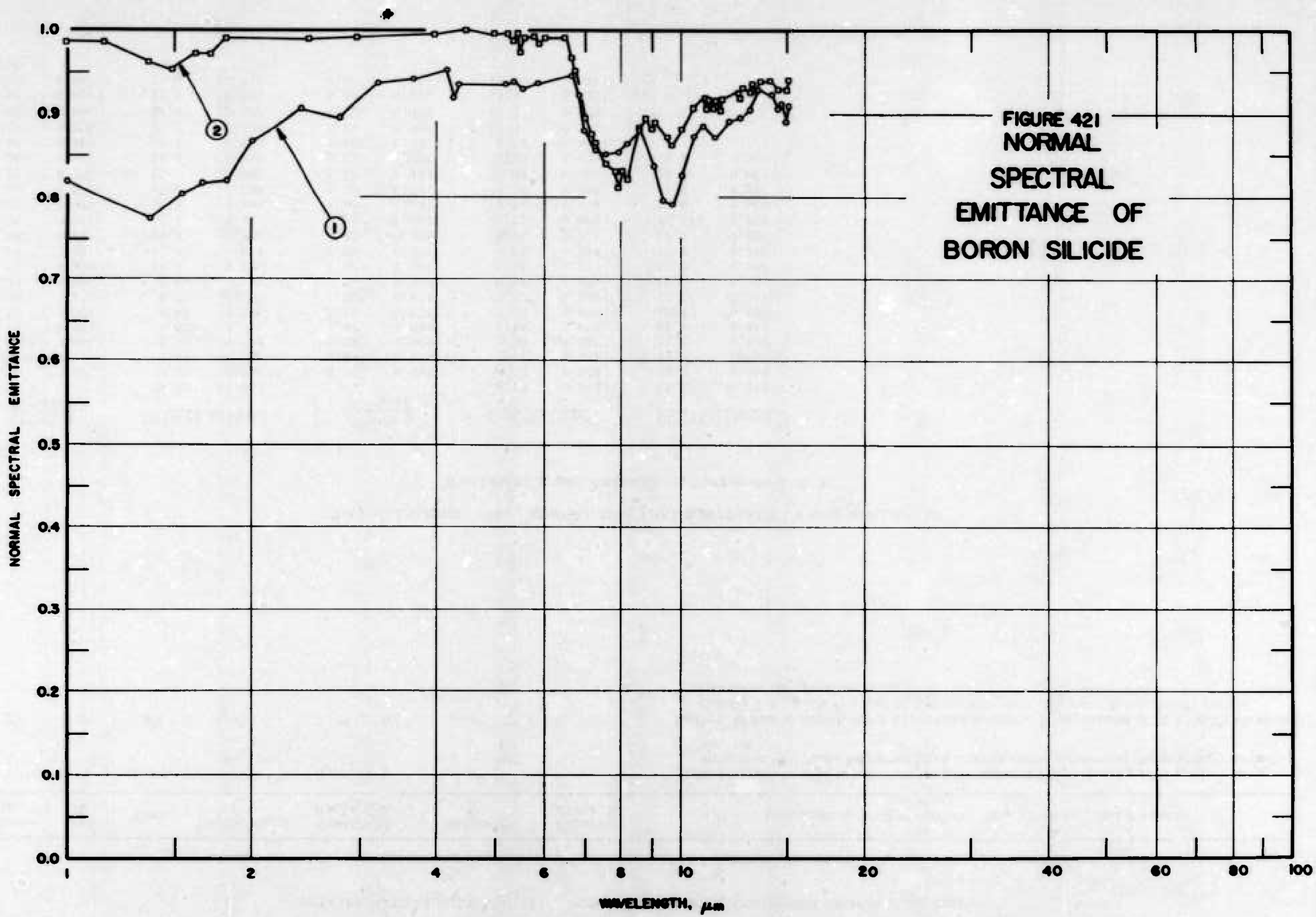


FIGURE 421 NORMAL SPECTRAL EMITTANCE OF BORON SILICIDE
NORMAL SPECTRAL EMITTANCE
WAVELENGTH, μm
1.0
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0.0
1
2
4
6
8
10
20
40
60
80
100
1
2

SPECIFICATION TABLE NO. 421 NORMAL SPECTRAL EMITTANCE OF BORON SILICIDES

Curve No.	Ref. No.	Year	Temperature K	Wavelength Range, µm	Geometry θ'	Reported Error, %	Composition (weight percent), Specifications, and Remarks
1	28	1963	1023	1.00-15.0	~0°		B_4Si; sintered at 1423 K for 2 hrs (setter material B_4Si); density 1.32 g cm^{-3}; x-ray structure B_4Si; data extracted from smooth curve; [Authors' designation: Sample No. 100].
2	28	1963	1023	1.00-15.0	~0°		B_6Si; sintered at 1623 K for 2 hrs (setter material B_6Si); density 1.32 g cm^{-3}, theoretical density 2.43 g cm^{-3}; x-ray structure B_6Si; data extracted from smooth curve; [Authors' designation: Sample No. 101].

DATA TABLE NO. 421 NORMAL SPECTRAL EMITTANCE OF BORON SILICIDES

[Wavelength, λ, µm; Emittance, ϵ; Temperature, T, K]

λ	ϵ	λ	ϵ	λ	ϵ	λ	ϵ	λ	ϵ
CURVE 1		**CURVE 1 (cont.)**		**CURVE 2**		**CURVE 2 (cont.)**		**CURVE 2 (cont.)**	
T = 1023				T = 1023					
		7.26	0.857			6.50	0.991	11.1	0.917
1.00	0.820	7.52	0.851	1.00	0.985	6.63	0.969	11.3	0.908
1.37	0.773	7.91	0.854	1.15	0.985	6.74	0.951	11.4	0.916
1.54	0.804	8.16	0.865	1.36	0.962	6.99	0.897	11.6	0.904
1.66	0.819	8.52	0.881	1.48	0.953	7.16	0.878	11.7	0.918
1.82	0.821	9.03	0.836	1.62	0.972	7.28	0.866	12.4	0.927
2.00	0.868	9.33	0.797	1.72	0.972	7.52	0.840	12.5	0.919
2.41	0.905	9.69	0.791	1.81	0.990	7.82	0.831	12.6	0.930
2.79	0.896	10.0	0.828	2.48	0.990	7.91	0.812	13.0	0.926
3.21	0.937	10.5	0.874	2.99	0.992	8.01	0.831	13.1	0.935
3.68	0.941	10.8	0.889	3.97	0.997	8.16	0.822	13.2	0.927
4.17	0.952	11.4	0.873	4.49	1.000	8.51	0.884	13.5	0.939
4.27	0.919	12.0	0.894	4.99	0.997	8.74	0.898	14.0	0.939
4.33	0.935	12.5	0.898	5.24	0.997	8.95	0.884	14.4	0.930
5.19	0.935	13.0	0.905	5.33	0.989	9.02	0.892	14.8	0.928
5.34	0.939	13.4	0.929	5.42	0.998	9.49	0.873	15.0	0.940
5.53	0.930	14.1	0.921	5.48	0.975	9.65	0.863		
5.87	0.936	14.4	0.908	5.58	0.991	10.0	0.883		
6.63	0.946	14.6	0.912	5.78	0.993	10.5	0.909		
6.81	0.921	14.8	0.892	5.89	0.985	10.9	0.919		
6.97	0.882	15.0	0.910	6.00	0.991	11.0	0.907		
7.26									

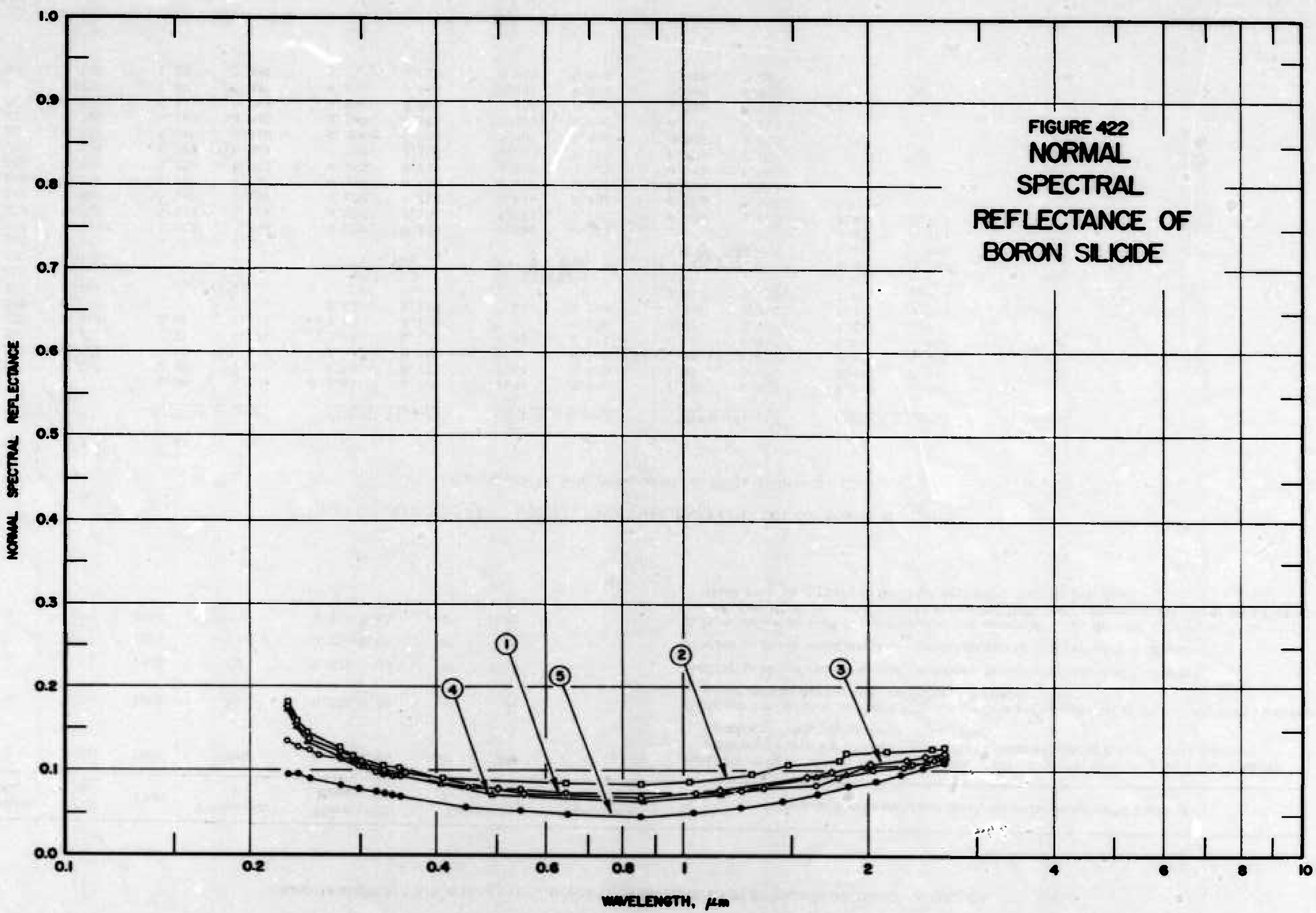


FIGURE 422
NORMAL
SPECTRAL
REFLECTANCE OF
BORON SILICIDE
NORMAL SPECTRAL REFLECTANCE
1.0
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0.0
0.1
0.2
0.4
0.6
0.8
1
2
4
6
8
10
WAVELENGTH, μm
1
2
3
4
5

SPECIFICATION TABLE NO. 422 NORMAL SPECTRAL REFLECTANCE OF BORON SILICIDES

Curve No.	Ref. No.	Year	Temperature K	Wavelength Range, μm	Geometry θ	Geometry θ'	Geometry ω'	Reported Error, %	Composition (weight percent), Specifications, and Remarks
1	28	1963	298	0.230-2.65	~0°		2π		B_4Si; sintered at 1423 K for 2 hrs (setter material B_4Si); density 1.32 g cm^{-3}; x-ray structure B_4Si; MgO reference standard; data extracted from smooth curve; [Authors' designation: Sample No. 100].
2	382	1965	~298	0.230-2.65	0°		2π		B_4Si; powder, Allis-Chalmers Mfg. Co.; 95% pure; compacted at 70 500 psi; data extracted from smooth curve; MgO reference standard.
3	382	1965	~298	0.230-2.65	0°		2π		Similar to above specimen and conditions except compacted at 11 750 psi.
4	382	1965	~298	0.230-2.65	0°		2π		Similar to above specimen and conditions except compacted at 2350 psi.
5	28	1963	298	0.230-2.65	~0°		2π		B_6Si; sintered at 1623 K for 2 hrs (setter material B_6Si); density 1.32 g cm^{-3}, theoretical density 2.43 g cm^{-3}; x-ray structure B_6Si; MgO reference standard; data extracted from smooth curve; [Authors' designation: Sample No. 101].

DATA TABLE NO. 422 NORMAL SPECTRAL REFLECTANCE OF BORON SILICIDES

[Wavelength, λ, μm; Reflectance, ρ; Temperature, T, K]

λ	ρ	λ	ρ	λ	ρ	λ	ρ	λ	ρ	λ	ρ
CURVE 1	T = 298	CURVE 1 (cont.)		CURVE 2 (cont.)		CURVE 3 (cont.)		CURVE 4 (cont.)		CURVE 5 (cont.)	
		2.28	0.104	1.48	0.106	1.58	0.092	1.15	0.073	0.549	0.052
0.230	0.135	2.35	0.108	1.79	0.111	1.74	0.099	1.64	0.093	0.651	0.049
0.240	0.128	2.55	0.112	1.84	0.120	2.01	0.109	1.84	0.095	0.851	0.047
0.250	0.124	2.57	0.115	2.14	0.122	2.30	0.112	1.98	0.102	1.04	0.050
0.259	0.118	2.65	0.115	2.53	0.126	2.46	0.116	2.32	0.106	1.24	0.057
0.280	0.112			2.65	0.128	2.65	0.120	2.48	0.110	1.45	0.065
0.300	0.104	CURVE 2	T ~ 298					2.65	0.113	1.65	0.072
0.310	0.101			CURVE 3	T ~ 298	CURVE 4	T ~ 298			1.85	0.081
0.320	0.098							CURVE 5	T = 298	2.05	0.089
0.330	0.096	0.230	0.180							2.25	0.095
0.340	0.092	0.239	0.159	0.230	0.175	0.230	0.173			2.45	0.101
0.350	0.092	0.249	0.144	0.239	0.154	0.237	0.151	0.230	0.095	2.65	0.110
0.450	0.080	0.260	0.127	0.250	0.138	0.248	0.135	0.240	0.095		
0.549	0.078	0.293	0.117	0.280	0.122	0.279	0.117	0.250	0.090		
0.649	0.074	0.329	0.105	0.303	0.110	0.293	0.112	0.280	0.081		
1.05	0.074	0.349	0.101	0.329	0.100	0.305	0.103	0.300	0.078		
1.24	0.076	0.410	0.090	0.356	0.096	0.330	0.099	0.320	0.075		
1.35	0.080	0.649	0.085	0.503	0.079	0.343	0.093	0.330	0.073		
1.64	0.084	0.854	0.084	0.655	0.072	0.406	0.084	0.340	0.071		
1.68	0.091	1.02	0.087	0.854	0.069	0.491	0.071	0.350	0.070		
2.03	0.100	1.29	0.096	1.15	0.078	0.860	0.066	0.449	0.057		

SPECIFICATION TABLE NO. 423 NORMAL TOTAL EMITTANCE OF CHROMIUM SILICIDES

Curve No.	Ref. No.	Year	Temperature Range, K	Geometry θ'	Reported Error, %	Composition (weight percent), Specifications and Remarks
1*	28	1963	1023	~0°		Cr_3Si; sintered at 1473 K for 2 hrs (setter material Cr_3Si); density 3.22 g cm^{-3}, theoretical density 6.45 g cm^{-3}; integrated from spectral data (1-15 μm); [Authors' designation: Sample No. 104].
2*	28	1963	1023	~0°		Cr_3Si; sintered at 1373 K for 2 hrs (setter material Cr_3Si); density 3.18 g cm^{-3}, theoretical density 6.45 g cm^{-3}; integrated from spectral data (1-15 μm); [Authors' designation: Sample No. 105].

DATA TABLE NO. 423 NORMAL TOTAL EMITTANCE OF CHROMIUM SILICIDES

[Temperature, T, K; Emittance, ϵ]

T	ϵ
CURVE 1*	
1023	0.80
CURVE 2*	
1023	0.75

* No plot given

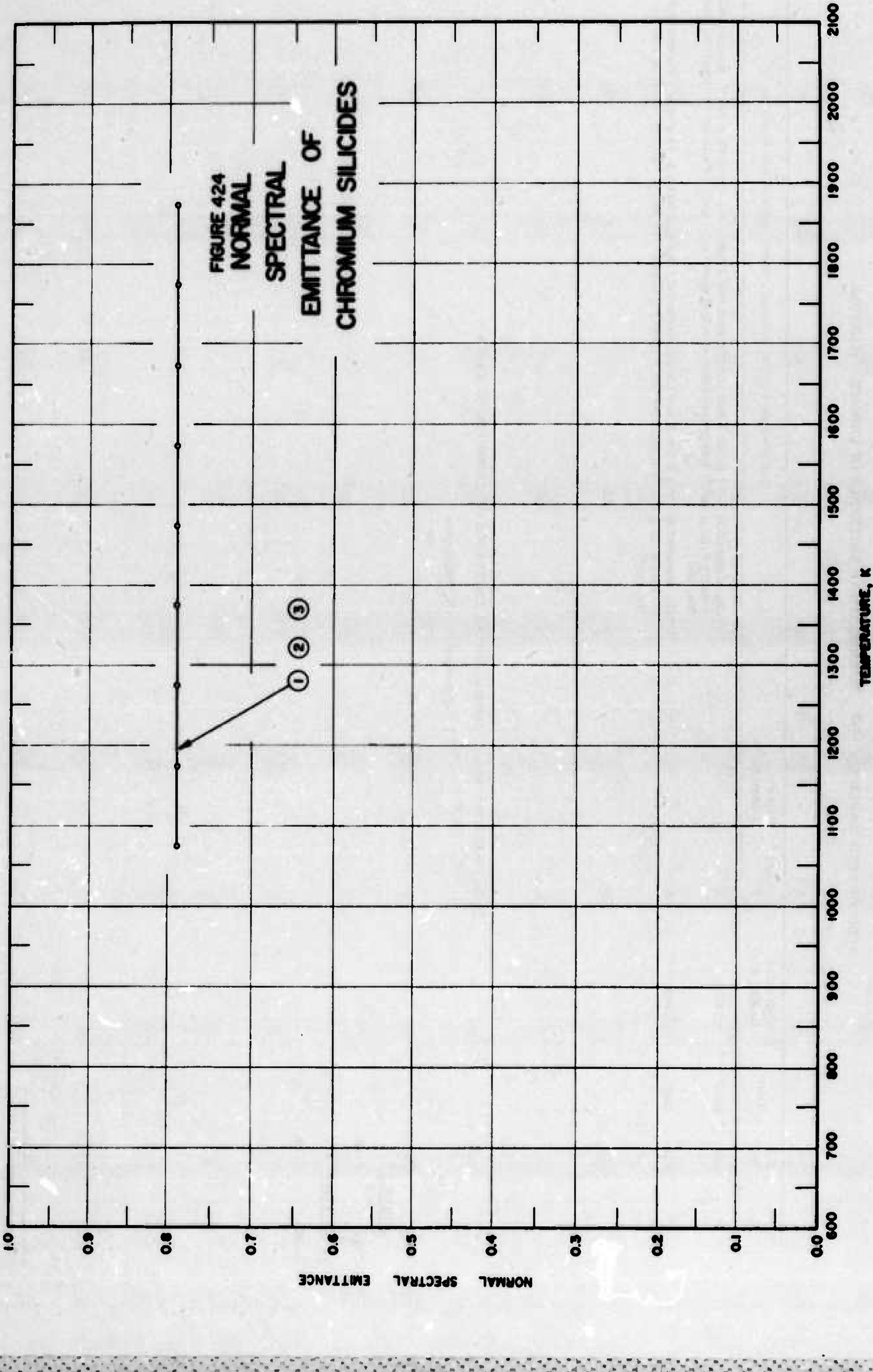


FIGURE 424 NORMAL SPECTRAL EMITTANCE OF CHROMIUM SILICIDES

SPECIFICATION TABLE NO. 424 NORMAL SPECTRAL EMITTANCE OF CHROMIUM SILICIDES

Curve No.	Ref. No.	Year	Wavelength, μm	Temperature Range, K	Geometry θ'	Reported Error, %	Composition (weight percent), Specifications, and Remarks
1	13	1962	0.650	1073-1873	~0°		CrSi; layer of paste (~100 μm thick) on tantalum cylinder; paste prepared from fine powder (2-3 μm) of CrSi suspended in nitrocellulose binder and dried at 313 to 333 K.
2*	13	1962	0.650	1073-1873	~0°		$CrSi_2$; layer of paste (~100 μm thick) on tantalum cylinder; paste prepared from fine powder (2-3 μm) of $CrSi_2$ suspended in nitrocellulose binder and dried at 313 to 333 K.
3*	13	1962	0.650	1073-1873	~0°		Cr_3Si_2; layer of paste (~100 μm thick) on tantalum cylinder; paste prepared from fine powder (2-3 μm) of Cr_3Si_2 suspended in nitrocellulose binder and dried at 313 to 333 K.

DATA TABLE NO. 424 NORMAL SPECTRAL EMITTANCE OF CHROMIUM SILICIDES

[Temperature, T, K; Emittance, ε; Wavelength, λ, μm]

T	ε	T	ε
CURVE 1 λ = 0.650		CURVE 2 (cont.)*	
1073	0.79	1673	0.79
1173	0.79	1773	0.79
1273	0.79	1873	0.79
1373	0.79	CURVE 3* λ = 0.650	
1473	0.79	1073	0.79
1573	0.79	1173	0.79
1673	0.79	1273	0.79
1773	0.79	1373	0.79
1873	0.79	1473	0.79
CURVE 2* λ = 0.650		1573	0.79
1073	0.79	1673	0.79
1173	0.79	1773	0.79
1273	0.79	1873	0.79
1373	0.79		
1473	0.79		
1573	0.79		

*Not shown on plot

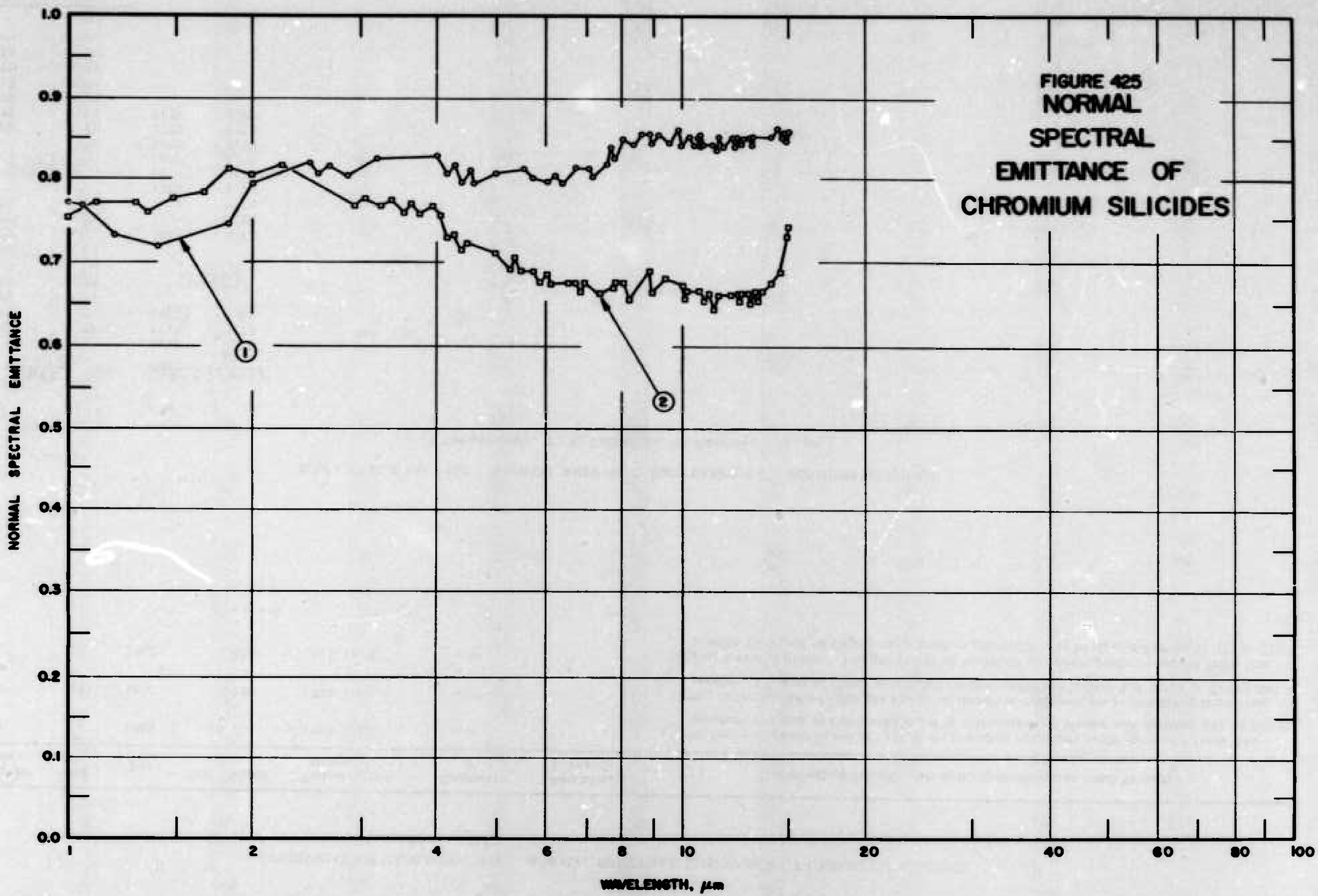


FIGURE 425
NORMAL
SPECTRAL
EMITTANCE OF
CHROMIUM SILICIDES

SPECIFICATION TABLE NO. 425 NORMAL SPECTRAL EMITTANCE OF CHROMIUM SILICIDES

Curve No.	Ref. No.	Year	Temperature K	Wavelength Range, μm	Geometry θ'	Reported Error, %	Composition (weight percent), Specifications, and Remarks
1	28	1963	1023	1.00-15.0	~0°		Cr_3Si; sintered at 1473 K for 2 hrs (setter material Cr_3Si); density 3.22 g cm^{-3}, theoretical density 6.45 g cm^{-3}; data extracted from smooth curve; [Authors' designation: Sample No. 104].
2	28	1963	1023	1.00-15.0	~0°		Cr_3Si; sintered at 1273 K for 2 hrs (setter material Cr_3Si); density 3.18 g cm^{-3}, theoretical density 6.45 g cm^{-3}; data extracted from smooth curve; total values integrated from spectral data (1-15 μm); [Authors' designation: Sample No. 105].

DATA TABLE NO. 425 NORMAL SPECTRAL EMITTANCE OF CHROMIUM SILICIDES

[Wavelength, λ, μm; Emittance, ∈; Temperature, T, K]

λ	∈	λ	∈	λ	∈	λ	∈	λ	∈	λ	∈
CURVE 1		CURVE 1 (cont.)		CURVE 1 (cont.)		CURVE 2		CURVE 2 (cont.)		CURVE 2 (cont.)	
T = 1023		6.02	0.798	10.7	0.841	T = 1023		4.39	0.715	9.36	0.681
1.00	0.770	6.20	0.804	10.7	0.856	1.00	0.752	4.49	0.722	10.0	0.673
1.06	0.768	6.39	0.797	10.8	0.843	1.11	0.770	4.99	0.711	10.1	0.658
1.18	0.731	6.71	0.812	11.2	0.843	1.29	0.770	5.25	0.691	10.2	0.668
1.40	0.718	7.05	0.812	11.4	0.837	1.35	0.759	5.34	0.705	10.7	0.668
1.82	0.747	7.15	0.803	11.5	0.853	1.48	0.776	5.47	0.690	10.8	0.655
2.00	0.792	7.52	0.820	11.7	0.841	1.67	0.782	5.74	0.690	11.1	0.663
2.48	0.820	7.68	0.840	12.1	0.852	1.83	0.812	5.87	0.677	11.3	0.645
2.55	0.807	7.76	0.826	12.2	0.841	1.99	0.805	6.01	0.685	11.5	0.661
2.66	0.817	8.01	0.851	12.3	0.853	2.23	0.818	6.14	0.675	12.0	0.663
2.85	0.804	8.35	0.843	12.5	0.846	2.92	0.766	6.52	0.676	12.3	0.664
3.19	0.826	8.60	0.858	12.6	0.851	3.05	0.776	6.72	0.677	12.4	0.653
4.00	0.830	8.88	0.858	12.9	0.851	3.21	0.768	6.82	0.666	12.5	0.664
4.15	0.808	8.98	0.847	13.0	0.842	3.37	0.775	6.94	0.677	12.8	0.664
4.27	0.818	9.11	0.857	13.1	0.854	3.51	0.759	7.34	0.664	12.9	0.652
4.38	0.796	9.57	0.847	14.0	0.854	3.61	0.770	7.71	0.670	13.2	0.667
4.51	0.810	9.84	0.862	14.4	0.862	3.73	0.757	7.81	0.676	13.3	0.653
4.59	0.795	10.0	0.843	14.6	0.851	3.92	0.768	8.04	0.676	13.5	0.666
5.00	0.808	10.2	0.853	14.7	0.859	4.02	0.755	8.20	0.656	14.0	0.675
5.51	0.812	10.5	0.844	14.8	0.849	4.15	0.730	8.87	0.690	14.5	0.690
5.71	0.800	10.6	0.853	15.0	0.860	4.26	0.732	8.95	0.665	14.8	0.731
										14.9	0.741

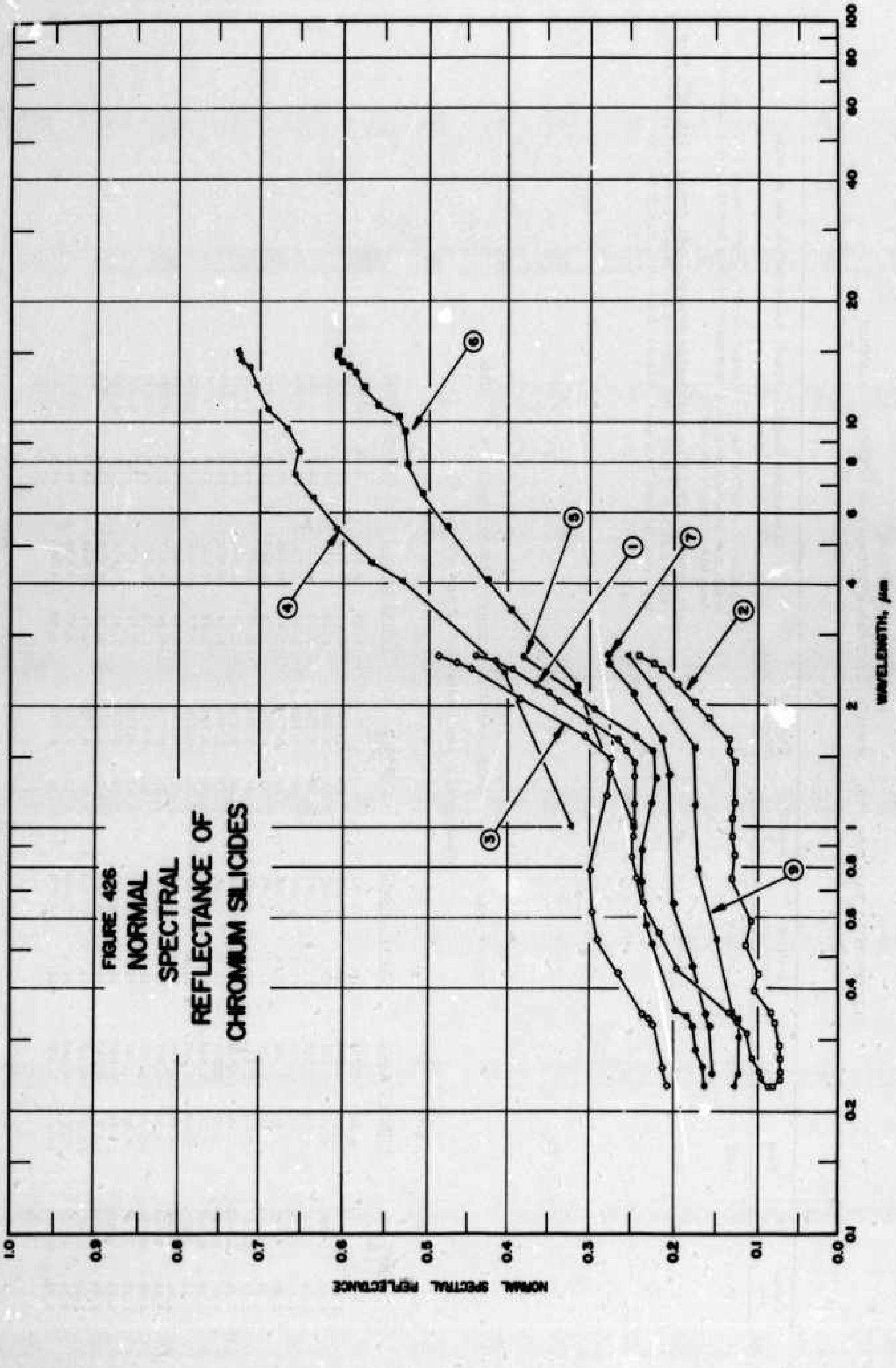


FIGURE 426 NORMAL SPECTRAL REFLECTANCE OF CHROMIUM SILICIDES

SPECIFICATION TABLE NO. 426 NORMAL SPECTRAL REFLECTANCE OF CHROMIUM SILICIDES

Curve No.	Ref. No.	Year	Temperature K	Wavelength Range, µm	Geometry θ	θ'	ω'	Reported Error, %	Composition (weight percent), Specifications, and Remarks
1	28	1963	298	0.230-2.65	~0°		2π		Cr_3Si; sintered at 1373 K for 2 hrs (setter material Cr_3Si); density 3.18 g cm^{-3}, theoretical density 6.45 g cm^{-3}; MgO reference standard; data extracted from smooth curve; [Authors' designation: Sample No. 105].
2	28	1963	298	0.230-2.65	~0°		2π		Cr_3Si; sintered at 1473 K for 2 hrs (setter material Cr_3Si); density 3.22 g cm^{-3}, theoretical density 6.45 g cm^{-3}; MgO reference standard; data extracted from smooth curve; [Authors' designation: Sample No. 104].
3	382	1965	~298	0.230-2.65	0°		2π		Cr_3Si; underfired, sintered; surface roughness 90-110 µinches; data extracted from smooth curve; MgO reference standard.
4	382	1965	~298	1.00-15.0	0°		2π		Above specimen and conditions; converted from R(2π, 0°).
5	382	1965	~298	0.230-2.65	0°		2π		Similar to curve 3 specimen and conditions except surface roughened by machine grooving a grid pattern ~0.004 in. deep with line spacing 0.001 in.
6	382	1965	~298	1.00-15.0	0°		2π		Above specimen and conditions; converted from R(2π, 0°).
7	382	1965	~298	0.230-2.65	C°		2π		Cr_3Si; powder; source Borolite Corp.; 99% pure; compacted at 70500 psi; data extracted from smooth curve; MgO reference standard.
8*	382	1965	~298	0.230-2.65	0°		2π		Similar to above specimen and conditions except compacted at 35250 psi.
9	382	1965	~298	0.230-2.65	0°		2π		Similar to above specimen and conditions except compacted at 11750 psi.

* Not shown on plot

DATA TABLE NO. 426 NORMAL SPECTRAL REFLECTANCE OF CHROMIUM SILICIDES

[Wavelength, λ, μm; Reflectance, ρ; Temperature, T, K]

CURVE 1
T = 298

λ	ρ
0.230	0.085
0.240	0.095
0.250	0.099
0.270	0.105
0.310	0.112
0.330	0.123
0.350	0.135
0.447	0.196
0.548	0.217
0.650	0.233
0.749	0.242
0.847	0.249
0.951	0.247
1.04	0.247
1.14	0.245
1.34	0.246
1.44	0.246
1.55	0.254
1.65	0.267
1.84	0.300
2.05	0.336
2.15	0.349
2.25	0.365
2.45	0.393
2.58	0.415
2.65	0.440

CURVE 2
T = 298

λ	ρ
0.230	0.080
0.240	0.072
0.250	0.071
0.270	0.071
0.290	0.072
0.330	0.078
0.350	0.081
0.395	0.104
0.436	0.098
0.510	0.114
0.583	0.109
0.750	0.130
0.852	0.128
0.953	0.130
1.05	0.130
1.15	0.128
1.45	0.128
1.54	0.132
1.65	0.137
1.85	0.156
2.05	0.175
2.25	0.195
2.45	0.211
2.54	0.221
2.65	0.240

CURVE 3
T ~ 298

λ	ρ
0.230	0.208
0.255	0.212
0.327	0.223
0.339	0.229
0.346	0.235
0.437	0.263
0.527	0.289
0.615	0.295
0.786	0.297
1.20	0.278
1.35	0.273
1.49	0.273
1.69	0.302
2.07	0.382
2.44	0.445
2.53	0.463
2.65	0.487

CURVE 4
T ~ 298

λ	ρ
1.00	0.321
2.40	0.402
4.04	0.530
4.50	0.566
5.43	0.609
6.51	0.637
7.40	0.658
8.50	0.653
9.65	0.666
10.7	0.690
12.3	0.702
13.7	0.713
14.1	0.722
14.8	0.725
15.0	0.728

CURVE 5
T ~ 298

λ	ρ
0.230	0.162
0.257	0.165
0.281	0.173
0.325	0.177
0.341	0.183
0.351	0.198
0.514	0.225
0.572	0.231
0.733	0.237
0.874	0.237
1.15	0.225
1.31	0.220
1.54	0.224
1.69	0.244
1.97	0.294
2.15	0.319
2.65	0.380

CURVE 6
T ~ 298

λ	ρ
1.00	0.247
2.23	0.314
3.44	0.395
4.02	0.425
5.59	0.477
6.66	0.507
7.89	0.525
9.42	0.527
10.2	0.536
11.0	0.560
12.2	0.575
13.3	0.585
13.8	0.593
14.0	0.602
14.6	0.606
15.0	0.606

CURVE 7
T ~ 298

λ	ρ
0.230	0.162*
0.246	0.153
0.323	0.158
0.348	0.161
0.454	0.178
0.643	0.200
1.33	0.205
1.64	0.212
2.11	0.247
2.51	0.276
2.65	0.278

CURVE 8
T ~ 298

λ	ρ
0.230	0.140
0.254	0.138
0.286	0.141
0.342	0.141
0.380	0.151
0.640	0.178
0.828	0.190
1.35	0.192
1.63	0.199
2.11	0.234
2.39	0.257
2.65	0.268

CURVE 9
T ~ 298

λ	ρ
0.230	0.126
0.244	0.121
0.302	0.122
0.333	0.122
0.349	0.130
0.524	0.148
0.783	0.170
1.14	0.175
1.56	0.175
1.95	0.203
2.24	0.224
2.65	0.253

*Not shown on plot

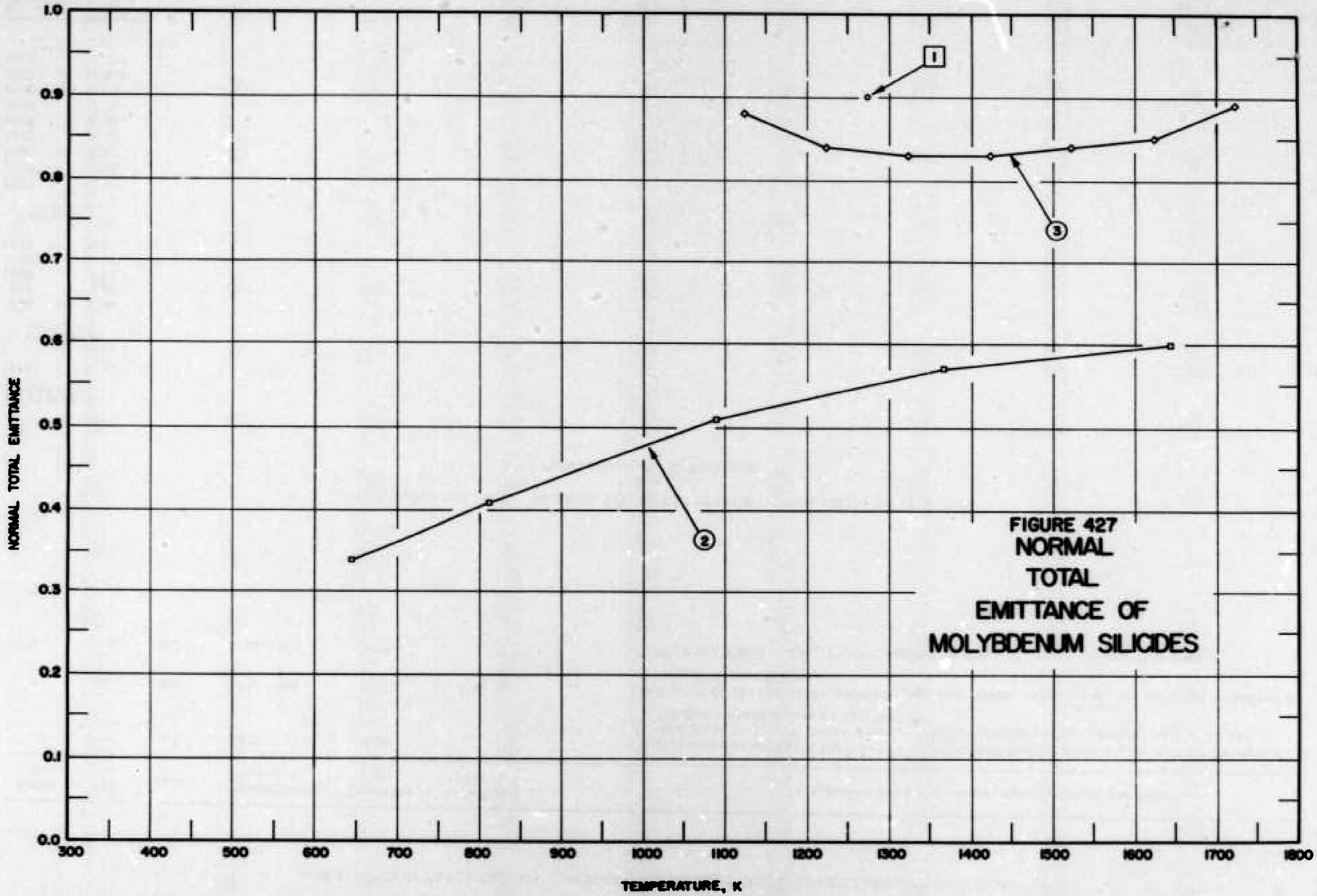


FIGURE 427 NORMAL TOTAL EMITTANCE OF MOLYBDENUM SILICIDES

SPECIFICATION TABLE NO. 427 NORMAL TOTAL EMITTANCE OF MOLYBDENUM SILICIDES

Curve No.	Ref. No.	Year	Temperature Range, K	Geometry θ'	Reported Error, %	Composition (weight percent), Specifications and Remarks
1	28	1963	1273	~0°		$MoSi_2$; sintered at 1623 K for 2 hrs (setter material $MoSi_2$); density 4.84 g cm^{-3}; theoretical density 6.24 g cm^{-3}; x-ray structure $MoSi_2$; integrated from spectral data (1-15 μm); [Authors' designation: Sample No. 13].
2	25	1960	644-1644	~0°	± 20	$MoSi_2$; 62-63 Mo and 36-37 Si; wet ball milled, dried, cast, dried, and sintered; measured in demoisturized helium.
3	279	1962	1123-1923	~0°		$MoSi_2$ from Pfandler Co., PFR-6; applied on Mo-0.5Ti alloy; measured in vacuum.

DATA TABLE NO. 427 NORMAL TOTAL EMITTANCE OF MOLYBDENUM SILICIDES

[Temperature, T, K; Emittance, ϵ]

T	ϵ
CURVE 1	
1273	0.90
CURVE 2	
644	0.34
811	0.41
1089	0.51
1367	0.57
1644	0.60
CURVE 3	
1123	0.88
1223	0.84
1323	0.83
1423	0.83
1523	0.84
1623	0.85
1723	0.89
1823	0.93*
1923	0.96*

*Not shown on plot

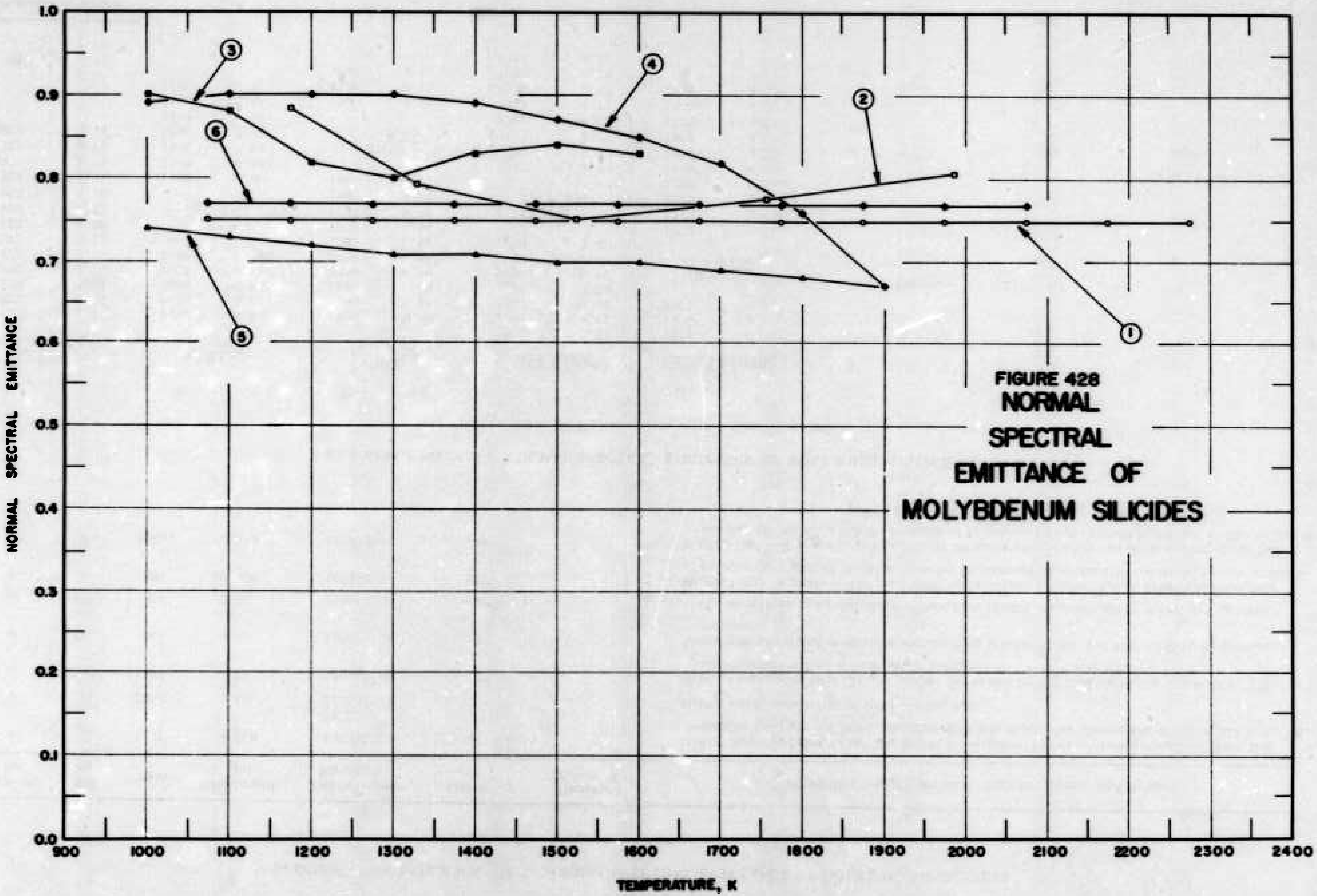


FIGURE 428 NORMAL SPECTRAL EMITTANCE OF MOLYBDENUM SILICIDES

SPECIFICATION TABLE NO. 428 NORMAL SPECTRAL EMITTANCE OF MOLYBDENUM SILICIDES

Curve No.	Ref. No.	Year	Wavelength, μm	Temperature Range, K	Geometry θ'	Reported Error, %	Composition (weight percent), Specifications, and Remarks
1	13	1962	0.650	1073-2273	~0°		$MoSi_2$; layer of paste (~100 μm thick) on tantalum cylinder; paste prepared from fine powder (2-3 μm) of $MoSi_2$ suspended in nitrocellulose binder and dried at 313 to 333 K.
2	22	1960	0.65	1175-1986	~0°		$MoSi_2$; pure; measured in 90Ar + $10H_2$ atm.
3	262	1966	0.65	1000-1600	~0°		$MoSi_2$; evaporated film (75 μm thick); deposited by thermal diffusion; substrate, VM-1 molybdenum alloy; measured in vacuum (10^{-4} - 10^{-5} mm Hg).
4	262	1966	0.65	1000-1900	~0°		Above specimen and conditions except heat treated in air for 1 hr at 1473 K; thickness 80 μm.
5	262	1966	0.65	1000-1900	~0°		Above specimen and conditions except heat treated in vacuum (10^{-5} mm Hg) at 1900 K.
6	13	1962	0.650	1073-2073	~0°		Mo_3Si; layer of paste (~100 μm thick) on tantalum cylinder; paste prepared from fine powder (2-3 μm) of Mo_3Si suspended in nitrocellulose binder and dried at 313 to 333 K.
7*	13	1962	0.650	1073-1973	~0°		Mo_5Si_3; layer of paste (~100 μm thick) on tantalum cylinder; paste prepared from fine powder (2-3 μm) of Mo_5Si_3 suspended in nitrocellulose binder and dried at 313 to 333 K.

DATA TABLE NO. 428 NORMAL SPECTRAL EMITTANCE OF MOLYBDENUM SILICIDES

[Temperature, T, K; Emittance, ε; Wavelength, λ, μm]

T	ε	T	ε	T	ε	T	ε	T	ε
CURVE 1		CURVE 2		CURVE 4		CURVE 5 (cont.)		CURVE 6 (cont.)	
λ = 0.650		λ = 0.65		λ = 0.65					
						1300	0.71	1873	0.77
1073	0.75	1175	0.882	1000	0.89	1400	0.71	1973	0.77
1173	0.75	1329	0.794	1100	0.90	1500	0.70	2073	0.77
1273	0.75	1522	0.751	1200	0.90	1600	0.70		
1373	0.75	1756	0.777	1300	0.90	1700	0.69	CURVE 7*	
1473	0.75	1986	0.806	1400	0.89	1800	0.68	λ = 0.650	
1573	0.75			1500	0.87	1900	0.67*		
1673	0.75	CURVE 3		1600	0.85			1073	0.75
1773	0.75	λ = 0.65		1700	0.82	CURVE 6		1173	0.75
1873	0.75			1800	0.76	λ = 0.650		1273	0.75
1973	0.75	1000	0.90	1900	0.67			1373	0.75
2073	0.75	1100	0.88			1073	0.77	1473	0.75
2173	0.75	1200	0.82	CURVE 5		1173	0.77	1573	0.75
2273	0.75	1300	0.80	λ = 0.65		1273	0.77	1673	0.75
		1400	0.83			1373	0.77	1773	0.75
		1500	0.84	1000	0.74	1473	0.77	1873	0.75
		1600	0.80	1100	0.73	1573	0.77	1973	0.75
				1200	0.72	1673	0.77		
						1773	0.77		

* Not shown on plot

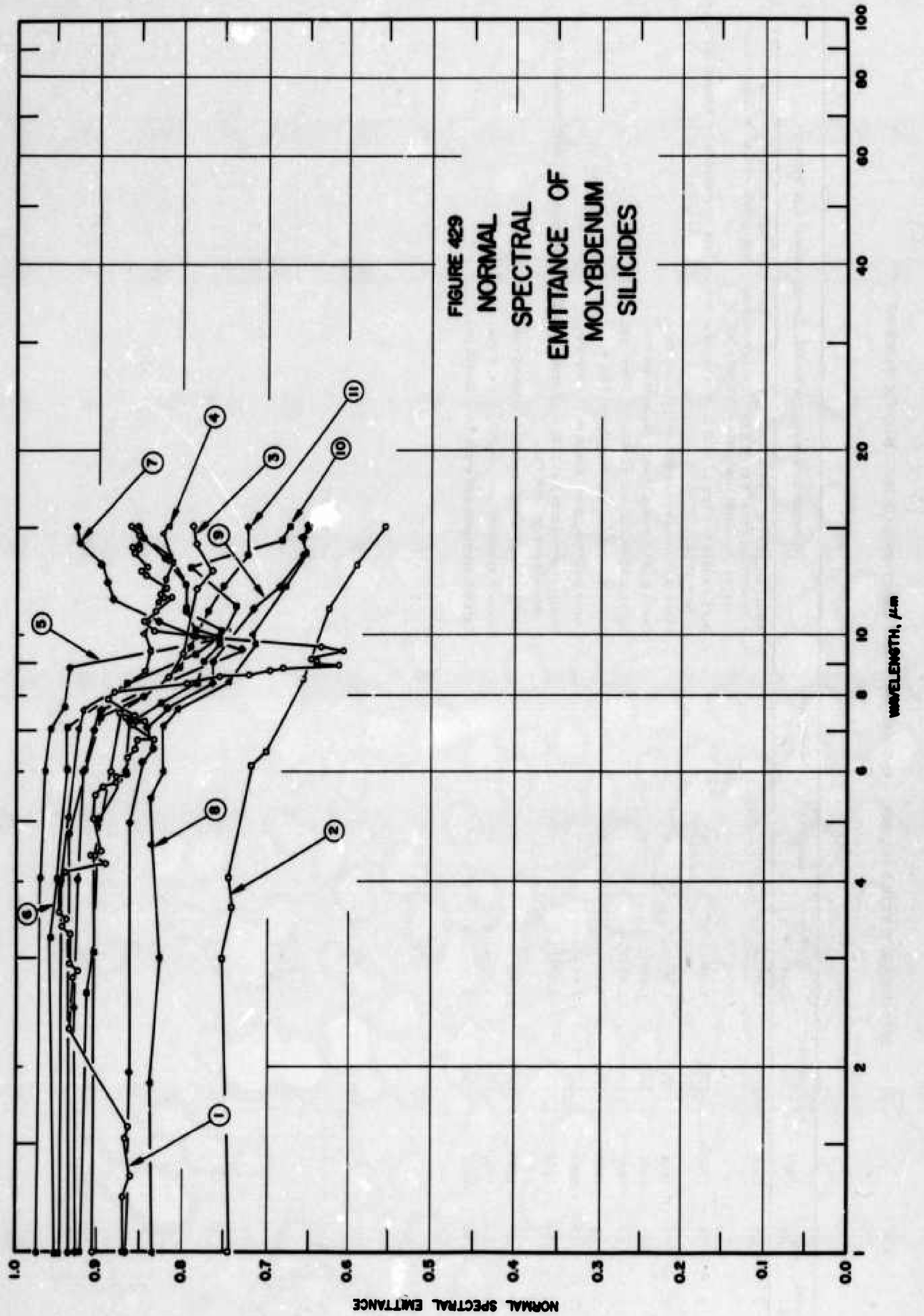


FIGURE 429 NORMAL SPECTRAL EMITTANCE OF MOLYBDENUM SILICIDES

SPECIFICATION TABLE NO. 429 NORMAL SPECTRAL EMITTANCE OF MOLYBDENUM SILICIDES

Curve No.	Ref. No.	Year	Temperature K	Wavelength Range, μm	Geometry θ'	Reported Error, %	Composition (weight percent), Specifications, and Remarks
1	28	1963	1273	1.00-15.0	~0°		$MoSi_2$; sintered at 1623 K for 2 hrs (setter material $MoSi_2$); density 4.84 g cm^{-3}; theoretical density 6.24 g cm^{-3}; x-ray structure $MoSi_2$; data extracted from smooth curve; [Authors' designation: Sample No. 13].
2	29	1966	1273	1.00-15.0	0°		$MoSi_2$; sintered 2 hrs at 1423 K; measured in argon; data extracted from smooth curve; first run.
3	29	1966	1273	1.00-15.0	0°		Above specimen and conditions; second run.
4	29	1966	1273	1.00-15.0	0°		Curve 2 specimen and conditions; third run.
5	29	1966	1273	1.00-15.0	0°		Curve 2 specimen and conditions; fourth run.
6	29	1966	1273	1.00-15.0	0°		Curve 2 specimen and conditions; fifth run.
7	29	1966	1273	1.00-15.0	0°		Curve 2 specimen and conditions; sixth run.
8	29	1966	1273	1.00-15.0	0°		$MoSi_2$; sintered 2 hrs at 1423 K; measured in argon-hydrogen atm; data extracted from smooth curve; first run.
9	29	1966	1273	1.00-15.0	0°		Above specimen and conditions; second run.
10	29	1966	1273	1.00-15.0	0°		Curve 8 specimen and conditions; third run.
11	29	1966	1273	1.00-15.0	0°		Curve 8 specimen and conditions; fourth run.

DATA TABLE NO. 429 NORMAL SPECTRAL EMITTANCE OF MOLYBDENUM SILICIDES

[Wavelength, λ, μm; Emittance, ε; Temperature, T, K]

CURVE 1
T = 1273

λ	ε
1.00	0.870
1.23	0.870
1.33	0.860
1.53	0.867
1.60	0.863
2.30	0.933
2.79	0.930
2.86	0.923
2.93	0.934
3.29	0.934
3.38	0.943
3.47	0.938
3.55	0.947
3.97	0.946
4.00	0.943
4.11	0.940
4.27	0.891
4.40	0.908
4.46	0.896
5.01	0.904
5.56	0.902
5.67	0.894
5.77	0.879
5.89	0.879
5.95	0.867
6.32	0.865
6.51	0.857
6.74	0.855
6.78	0.835
7.18	0.860
7.23	0.846
7.32	0.869
7.40	0.857
7.85	0.889
8.06	0.881
8.33	0.795
8.52	0.756
8.60	0.721
8.73	0.699
8.83	0.681
8.91	0.614
8.98	0.641
9.05	0.641
9.10	0.648
9.38	0.606

CURVE 1 (cont.)

λ	ε
9.54	0.636
9.93	0.784
10.1	0.835
10.5	0.847
10.9	0.832
11.5	0.823
11.5	0.815
11.6	0.828
11.8	0.820
12.5	0.845
12.7	0.850
12.8	0.841
13.6	0.859
13.7	0.854
13.8	0.860
13.9	0.852
14.5	0.851
15.0	0.861

CURVE 2
T = 1273

λ	ε
1.00	0.744
2.99	0.752
3.61	0.740
4.04	0.745
6.11	0.717
7.48	0.701
8.42	0.658
11.0	0.627
13.0	0.591
15.0	0.556

CURVE 3
T = 1273

λ	ε
1.00	0.904
4.39	0.904
6.00	0.885
7.49	0.876
8.50	0.818
9.30	0.800
11.8	0.782
12.7	0.766
14.0	0.784
15.0	0.786

CURVE 4
T = 1273

λ	ε
1.00	0.947
3.97	0.948
5.05	0.936
7.01	0.922
7.52	0.917
8.71	0.846
9.35	0.839
10.0	0.848
11.3	0.830
12.3	0.821
13.1	0.812
14.6	0.825
15.0	0.819

CURVE 5
T = 1273

λ	ε
1.00	0.973
4.02	0.970
6.00	0.963
7.02	0.956
7.64	0.940
8.82	0.835
9.82	0.756
10.1	0.754
10.9	0.796
12.1	0.796
13.3	0.821
14.4	0.849
15.0	0.853

CURVE 6
T = 1273

λ	ε
1.00	0.950
3.24	0.957
4.01	0.948
6.03	0.936
7.09	0.936
8.34	0.865
9.30	0.784
10.2	0.784
11.0	0.796
12.1	0.796*
13.4	0.819

CURVE 6 (cont.)

λ	ε
14.4	0.849*
15.0	0.853*

CURVE 7
T = 1273

λ	ε
1.00	0.927
2.49	0.929
4.01	0.924
6.00	0.918
7.00	0.904
7.53	0.897
9.46	0.731
9.92	0.786
10.5	0.830
11.4	0.883
12.1	0.890
13.0	0.897
14.1	0.922
15.0	0.927

CURVE 8
T = 1273

λ	ε
1.00	0.834
1.88	0.839
3.00	0.828
4.59	0.838
5.41	0.838
6.00	0.823
7.10	0.823
7.58	0.809
8.36	0.745
9.61	0.713
10.0	0.717
12.0	0.679
13.6	0.654
14.4	0.660
15.0	0.650

CURVE 9
T = 1273

λ	ε
1.00	0.865
1.96	0.862
4.98	0.862

CURVE 9 (cont.)

λ	ε
6.20	0.849
6.56	0.835
7.06	0.842
7.60	0.819
8.32	0.763
9.01	0.763
11.0	0.716
12.0	0.684
13.4	0.659
14.4	0.659
15.0	0.652

CURVE 10
T = 1273

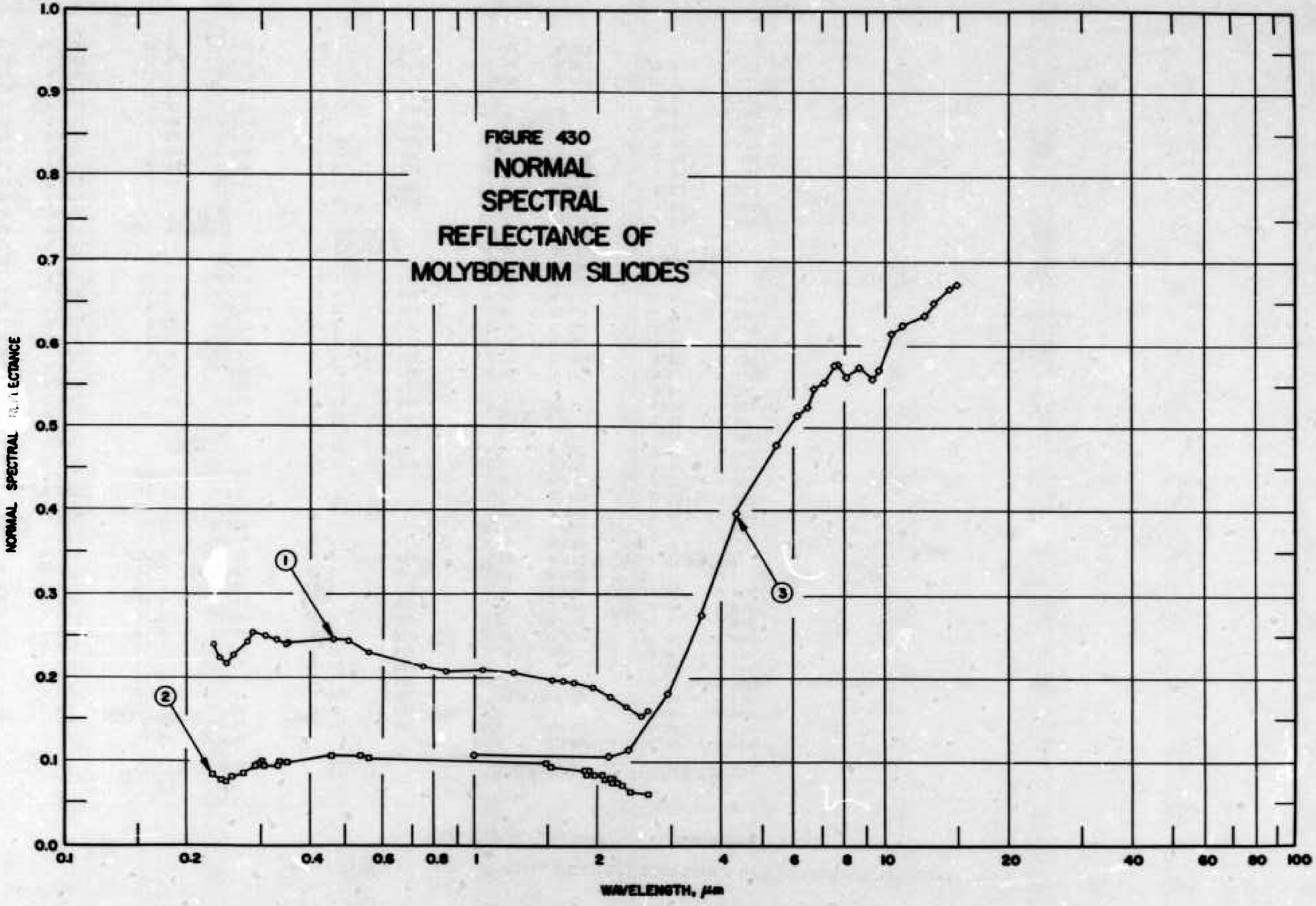
λ	ε
1.00	0.920
2.62	0.912
3.05	0.903
5.02	0.898
6.00	0.868
7.21	0.862
7.75	0.827
8.35	0.781
9.02	0.775
9.63	0.757
9.97	0.756
11.1	0.736
12.8	0.690
14.3	0.683
15.0	0.674

CURVE 11
T = 1273

λ	ε
1.00	0.934
4.76	0.934
6.02	0.916
7.31	0.898
7.98	0.848
8.82	0.802
9.59	0.790
10.9	0.770
12.0	0.751
13.5	0.723
15.0	0.723

*Not shown on plot

FIGURE 430
NORMAL
SPECTRAL
REFLECTANCE OF
MOLYBDENUM SILICIDES



SPECIFICATION TABLE NO. 430 NORMAL SPECTRAL REFLECTANCE OF MOLYBDENUM SILICIDES

Curve No.	Ref. No.	Year	Temperature K	Wavelength Range, μm	Geometry θ	θ'	ω'	Reported Error, %	Composition (weight percent), Specifications, and Remarks
1	28	1963	298	0.231-2.65	~0°		2π		$MoSi_2$; sintered at 1623 K for 2 hrs (setter material $MoSi_2$); density 4.84 g cm^{-3}; theoretical density 6.24 g cm^{-3}; x-ray structure $MoSi_2$; MgO reference standard; data extracted from smooth curve; [Authors' designation: Sample No. 13].
2	362	1964	~298	0.230-2.65	0°		2π		$MoSi_2$; 98.6% pure powder, Fansteel Metallurgical Co.; mesh size 325; compacted with highly polished stainless steel ram; data extracted from smooth curve; MgO reference standard.
3	362	1964	~298	1.00-15.0	0°		2π		$MoSi_2$; 98.6% pure powder, Fansteel Metallurgical Co.; mesh size 325; compacted with highly polished stainless steel ram; data extracted from smooth curve; converted from reflectance factor.

DATA TABLE NO. 430 NORMAL SPECTRAL REFLECTANCE OF MOLYBDENUM SILICIDES

[Wavelength, λ, μm; Reflectance, ρ; Temperature, T, K]

λ	ρ	λ	ρ	λ	ρ	λ	ρ	λ	ρ
CURVE 1		CURVE 1 (cont.)		CURVE 2 (cont.)		CURVE 3		CURVE 3 (cont.)	
T = 298						T ~ 298			
		1.75	0.192	0.335	0.097			12.5	0.637
0.231	0.240	1.95	0.188	0.350	0.097	1.00	0.107	13.1	0.650
0.240	0.223	2.15	0.177	0.447	0.107	2.11	0.107	14.4	0.669
0.250	0.218	2.35	0.164	0.527	0.107	2.38	0.113	15.0	0.672
0.260	0.228	2.55	0.151	0.554	0.102	2.96	0.180		
0.280	0.242	2.65	0.160	1.50	0.098	3.59	0.275		
0.290	0.253			1.54	0.092	4.34	0.397		
0.310	0.250	CURVE 2		1.85	0.089	5.42	0.479		
0.330	0.245	T ~ 298		1.89	0.083	6.11	0.514		
0.351	0.241			1.90	0.087	6.49	0.524		
0.350	0.240	0.230	0.093	1.96	0.082	6.73	0.548		
0.452	0.245	0.241	0.076	2.04	0.082	7.15	0.555		
0.495	0.244	0.249	0.075	2.07	0.078	7.59	0.573		
0.552	0.230	0.259	0.080	2.14	0.079	7.78	0.573		
0.749	0.214	0.274	0.084	2.16	0.073	8.09	0.560		
0.851	0.208	0.292	0.093	2.17	0.078	8.69	0.571		
1.05	0.210	0.300	0.094	2.21	0.073	9.31	0.559		
1.25	0.206	0.303	0.098	2.29	0.070	9.68	0.569		
1.55	0.197	0.306	0.093	2.39	0.062	10.4	0.615		
1.65	0.195	0.332	0.094	2.65	0.060	11.0	0.623		

SPECIFICATION TABLE NO. 431 NORMAL TOTAL EMITTANCE OF TANTALUM DISILICIDE $TaSi_2$

Curve No.	Ref. No.	Year	Temperature Range, K	Geometry θ'	Reported Error, %	Composition (weight percent), Specifications and Remarks
1*	28	1963	1023	~0°		Sintered at 1723 K for 2 hrs (setter material $TaSi_2$); density 4.78 g cm^{-3}, theoretical density 9.10 g cm^{-3}; x-ray structure $TaSi_2$; integrated over the range 1-15 μm; [Authors' designation: Sample No. 108].

DATA TABLE NO. 431 NORMAL TOTAL EMITTANCE OF TANTALUM DISILICIDE $TaSi_2$

[Temperature, T, K; Emittance, ϵ]

T	ϵ
CURVE 1*	
1023	0.83

*No plot given

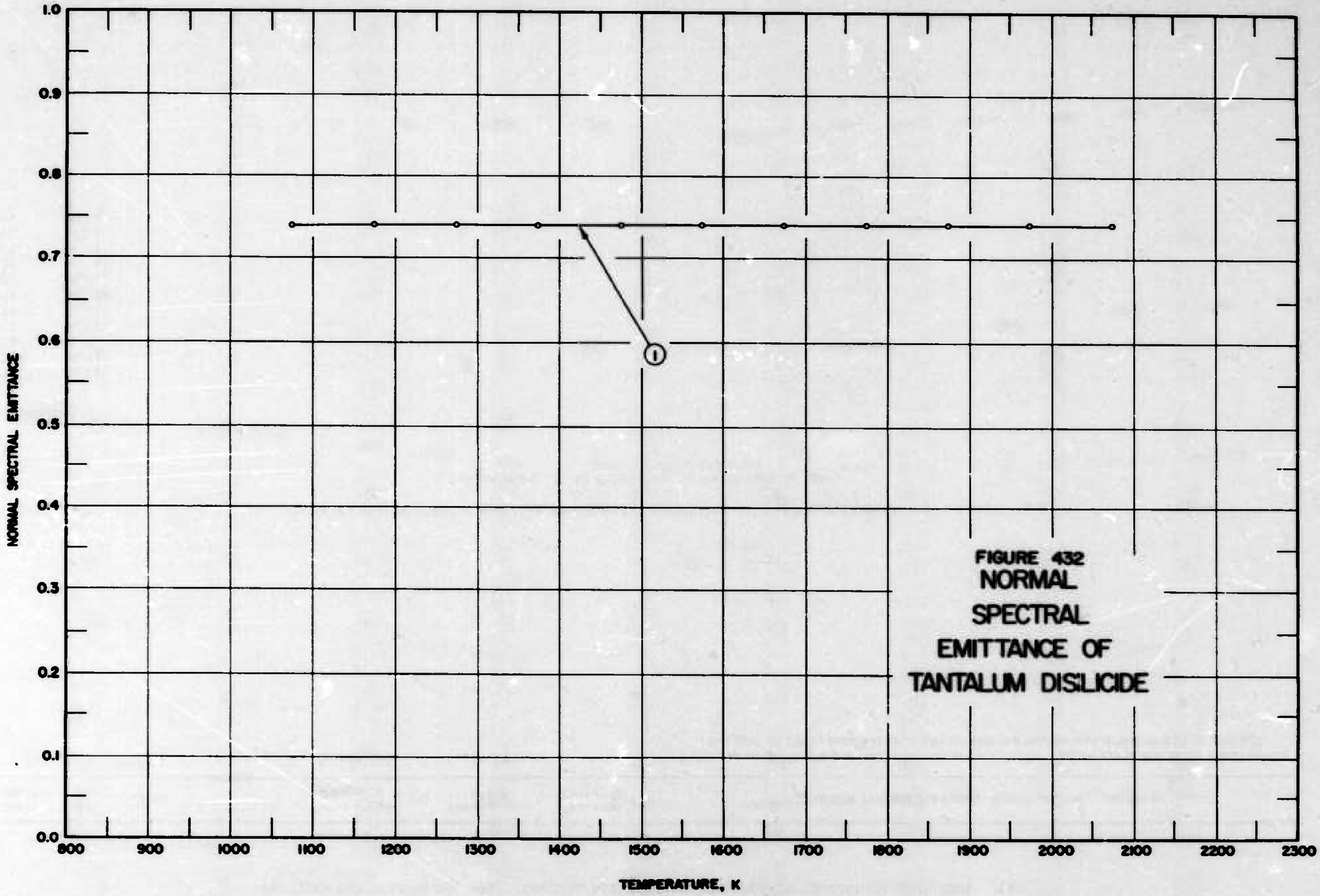


FIGURE 432 NORMAL SPECTRAL EMITTANCE OF TANTALUM DISILICIDE

SPECIFICATION TABLE NO. 432 NORMAL SPECTRAL EMITTANCE OF TANTALUM DISILICIDE $TaSi_2$

Curve No.	Ref. No.	Year	Wavelength, μm	Temperature Range, K	Geometry θ'	Reported Error, %	Composition (weight percent), Specifications, and Remarks
1	13	1962	0.650	1073-2073	~0°		Layer of paste (~100 μm thick) on tantalum cylinder; paste prepared from fine powder (2-3 μm) of $TaSi_2$ suspended in nitrocellulose binder and dried at 313 to 333 K.

DATA TABLE NO. 432 NORMAL SPECTRAL EMITTANCE OF TANTALUM DISILICIDE $TaSi_2$

[Temperature, T, K; Emittance, ϵ; Wavelength, λ, μm]

T	ϵ
CURVE 1	
$\lambda = 0.650$	
1073	0.74
1173	0.74
1273	0.74
1373	0.74
1473	0.74
1573	0.74
1673	0.74
1773	0.74
1873	0.74
1973	0.74
2073	0.74

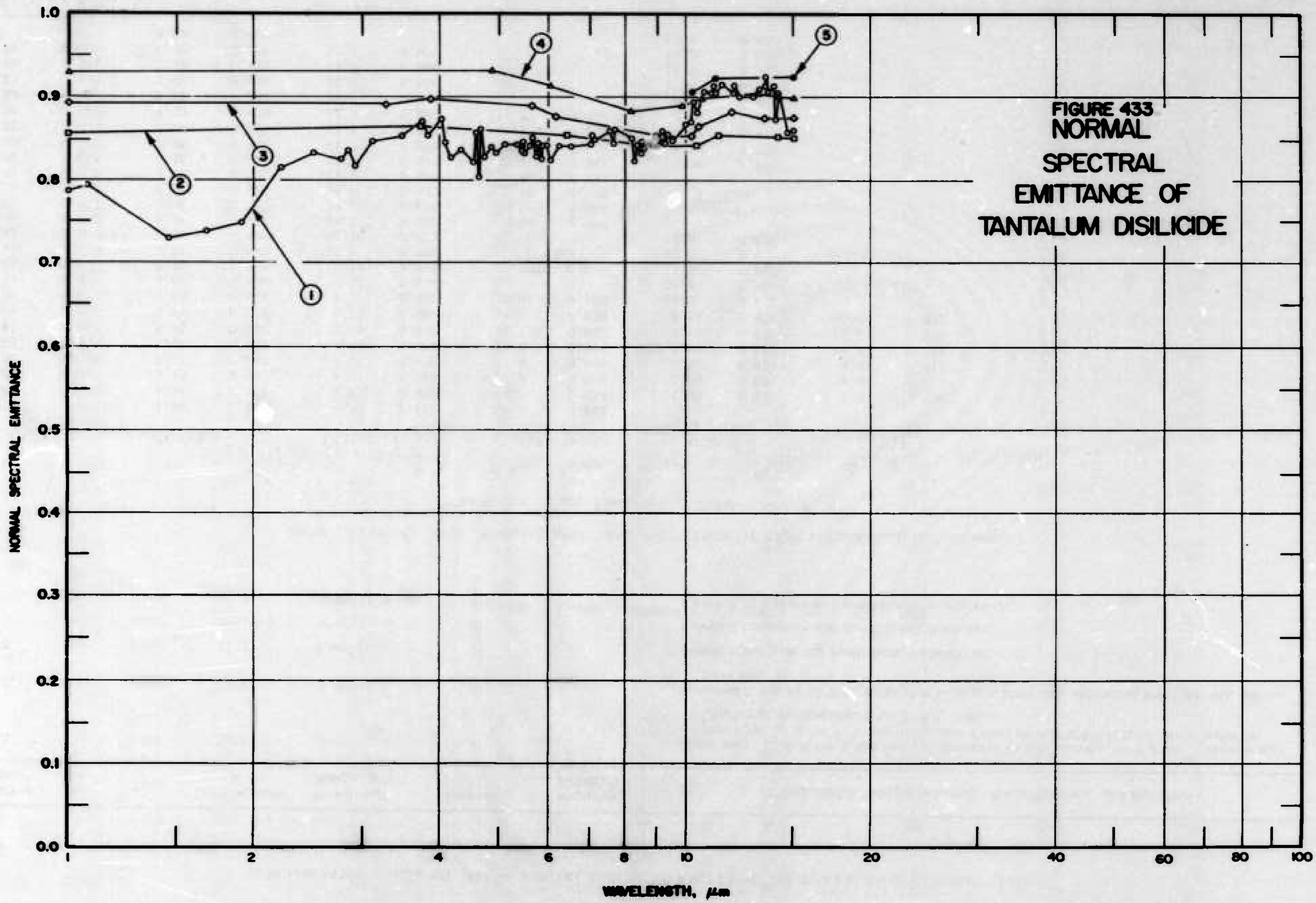


FIGURE 433
NORMAL
SPECTRAL
EMITTANCE OF
TANTALUM DISILICIDE
NORMAL SPECTRAL EMITTANCE
WAVELENGTH, μm
1.0
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0.0
1
2
4
6
8
10
20
40
60
80
100
1
2
3
4
5

SPECIFICATION TABLE NO. 433 NORMAL SPECTRAL EMITTANCE OF TANTALUM DISILICIDE $TaSi_2$

Curve No.	Ref. No.	Year	Temperature K	Wavelength Range, µm	Geometry θ'	Reported Error, %	Composition (weight percent), Specifications, and Remarks
1	28	1963	1023	1.00-15.0	~0°		Sintered at 1723 K for 2 hrs (setter material $TaSi_2$), density 4.78 g cm^{-3}; theoretical density 9.10 g cm^{-3}; x-ray structure $TaSi_2$; data extracted from smooth curve; [Authors' designation: Sample No. 108].
2	382	1965	1273	[illegible]	0°		Sintered 2 hrs at 1523 K; measured in argon atm; data extracted from smooth curve; first run.
3	382	1965	1273	[illegible]	0°		Above specimen and conditions; second run.
4	382	1965	1273	1.00-15.0	0°		Curve 2 specimen and conditions; third run.
5	382	1965	1273	1.00-15.0	0°		Curve 2 specimen and conditions; fourth run.

DATA TABLE NO. 433 NORMAL SPECTRAL EMITTANCE OF TANTALUM DISILICIDE $TaSi_2$

[Wavelength, λ, µm; Emittance, ∈; Temperature, T, K]

λ	∈
CURVE 1	**T = 1023**
1.00	0.785
1.07	0.794
1.46	0.729
1.68	0.737
1.91	0.748
2.22	0.816
2.50	0.833
2.78	0.828
2.85	0.836
2.91	0.819
3.11	0.848
3.49	0.853
3.75	0.871
3.82	0.856
4.01	0.874
4.09	0.848
4.19	0.829
4.32	0.838
4.54	0.822
4.59	0.859
4.62	0.802
4.66	0.861
4.72	0.829

λ	∈
CURVE 1 (cont.)	
4.86	0.841
4.94	0.834
5.10	0.843
5.34	0.843
5.41	0.836
5.45	0.848
5.49	0.832
5.60	0.841
5.67	0.853
5.72	0.830
5.77	0.847
5.82	0.826
5.87	0.842
5.96	0.842
6.04	0.825
6.22	0.841
6.52	0.841
7.01	0.844
7.07	0.857
7.16	0.850
7.57	0.861
7.66	0.846
7.69	0.862
8.20	0.852
8.29	0.824

λ	∈
CURVE 1 (cont.)	
8.36	0.843
8.43	0.833
8.48	0.849
8.55	0.839
8.96	0.854
9.04	0.842
9.15	0.860
9.23	0.847
9.32	0.856
9.51	0.849
10.0	0.868
10.2	0.871
10.3	0.895
10.4	0.882
10.7	0.907
11.0	0.903
11.1	0.913
11.3	0.903
11.5	0.914
11.9	0.904
12.0	0.913
12.2	0.900
12.9	0.900
13.2	0.910

λ	∈
CURVE 1 (cont.)	
13.5	0.913
13.5	0.923
13.6	0.906
13.9	0.913
14.0	0.874
14.1	0.905
14.7	0.859
15.0	0.860
CURVE 2	**T = 1273**
1.00	0.858
3.74	0.866
6.42	0.855
8.84	0.842
10.4	0.842
11.3	0.855
14.1	0.854
15.0	0.852

λ	∈
CURVE 3	**T = 1273**
1.00	0.892
3.29	0.891
3.86	0.898
5.65	0.890
6.19	0.878
9.16	0.855
10.2	0.855
10.5	0.866
11.9	0.882
13.5	0.875
15.0	0.876
CURVE 4	**T = 1273**
1.00	0.930
4.88	0.931
6.07	0.913
8.13	0.883
9.87	0.890
10.6	0.899
13.2	0.903
14.2	0.900
15.0	0.899

λ	∈
CURVE 5	**T = 1273**
1.00	0.930*
4.88	0.931*
6.07	0.913*
10.0	0.907
11.1	0.921
15.0	0.922

*Not shown on plot

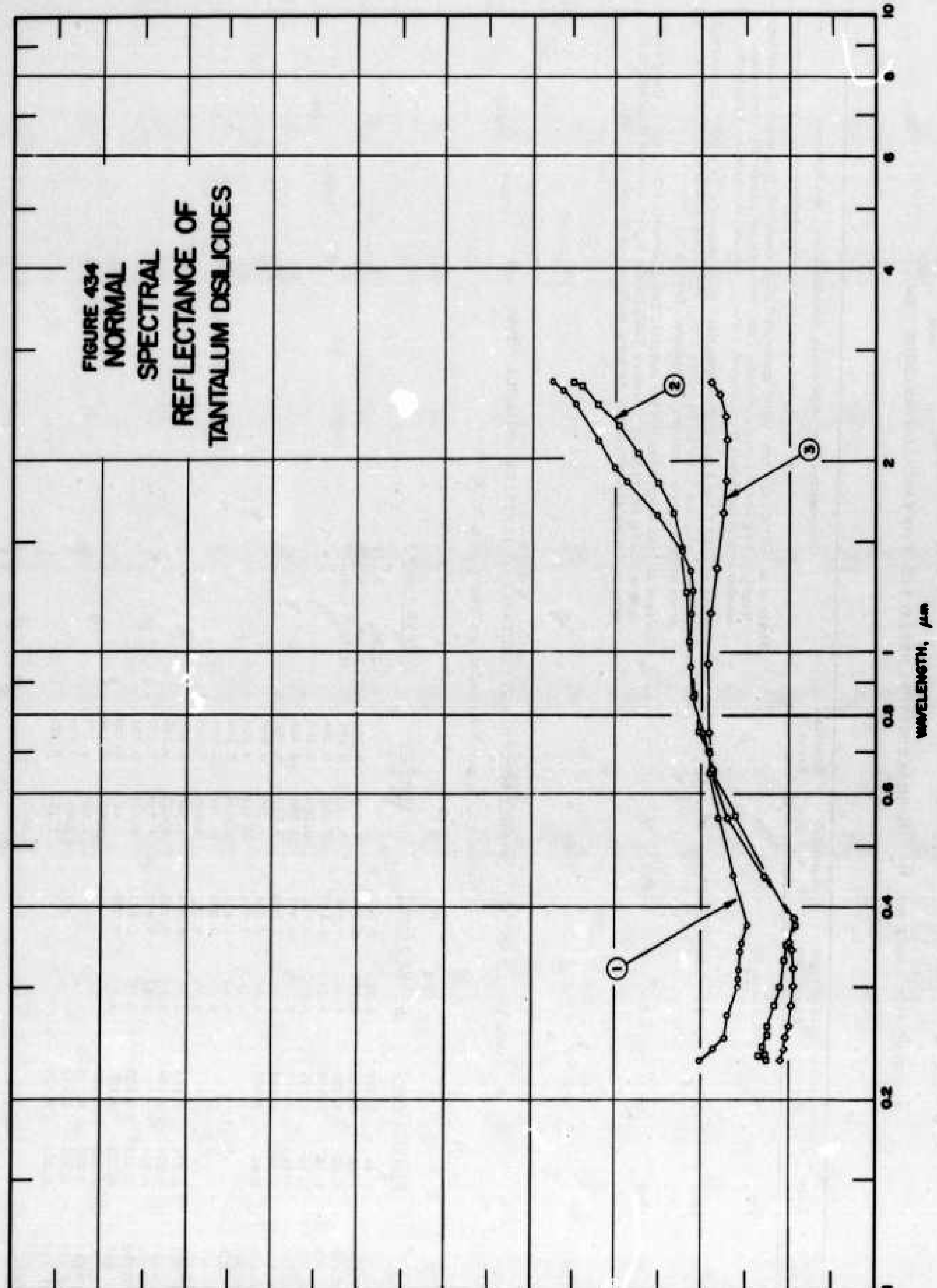


FIGURE 434 NORMAL SPECTRAL REFLECTANCE OF TANTALUM DISILICIDES

SPECIFICATION TABLE NO. 434 NORMAL SPECTRAL REFLECTANCE OF TANTALUM DISILICIDE $TaSi_2$

Curve No.	Ref. No.	Year	Temperature K	Wavelength Range, μm	Geometry, θ θ'	ω	Reported Error, %	Composition (weight percent), Specifications, and Remarks
1	28	1963	298	0.230-2.65	~0°	2π		Sintered at 1623 K for 2 hrs (setter material $TaSi_2$); density 5.96 g cm^{-3}, theoretical density 9.10 g cm^{-3}; x-ray structure $TaSi_2$ (unexplained lines); MgO reference standard; data extracted from smooth curve; [Authors' designation: Sample No. 107].
2	28	1963	298	0.230-2.65	~0°	2π		Sintered at 1723 K for 2 hrs (setter material $TaSi_2$); density 4.78 g cm^{-3}, theoretical density 9.10 g cm^{-3}; x-ray structure $TaSi_2$; MgO reference standard; data extracted from smooth curve; [Authors' designation: Sample No. 108].
3	28	1963	298	0.230-2.65	~0°	2π		Sintered at 1823 K for 2 hrs (setter material $TaSi_2$); density 4.38 g cm^{-3}, theoretical density 9.10 g cm^{-3}; x-ray structure $TaSi_2$ (best); MgO reference standard; data extracted from smooth curve; [Authors' designation: Sample No. 109].

DATA TABLE NO. 434 NORMAL SPECTRAL REFLECTANCE OF TANTALUM DISILICIDE $TaSi_2$

[Wavelength, λ, μm; Reflectance, ρ; Temperature, T, K]

λ	ρ	λ	ρ	λ	ρ	λ	ρ	λ	ρ
CURVE 1 T = 298		CURVE 1 (cont.)		CURVE 2 (cont.)		CURVE 3 T = 298		CURVE 3 (cont.)	
		1.44	0.223	0.349	0.101			2.34	0.174
0.230	0.200	1.64	0.252	0.375	0.093	0.230	0.111	2.54	0.181
0.240	0.187	1.85	0.286	0.552	0.163	0.240	0.106	2.65	0.190
0.250	0.174	1.95	0.300	0.649	0.189	0.250	0.104		
0.270	0.171	2.14	0.321	0.695	0.191	0.260	0.100		
0.300	0.160	2.45	0.348	0.750	0.201	0.280	0.098		
0.309	0.159	2.59	0.362	0.852	0.209	0.300	0.096		
0.319	0.159	2.65	0.375	1.04	0.214	0.320	0.096		
0.340	0.157			1.24	0.219	0.341	0.098		
0.350	0.155	CURVE 2 T = 298		1.45	0.222	0.350	0.100		
0.374	0.148			1.65	0.233	0.382	0.095		
0.448	0.166			1.84	0.251	0.446	0.129		
0.550	0.181	0.230	0.125	2.05	0.274	0.550	0.171		
0.647	0.191	0.234	0.134	2.25	0.295	0.652	0.189		
0.692	0.191	0.235	0.126	2.45	0.321	0.748	0.193		
0.748	0.199	0.242	0.130	2.60	0.341	0.952	0.194		
0.849	0.210	0.251	0.125	2.65	0.350	1.15	0.190		
0.950	0.212	0.260	0.125			1.35	0.184		
1.15	0.211	0.280	0.116			1.65	0.178		
1.25	0.210	0.300	0.110			1.85	0.174		
1.34	0.212	0.330	0.104			2.15	0.174		

SPECIFICATION TABLE NO. 435 NORMAL TOTAL EMITTANCE OF TITANIUM SILICIDES

Curve No.	Ref. No.	Year	Temperature Range, K	Geometry θ'	Reported Error, %	Composition (weight percent), Specifications and Remarks
1*	28	1963	1023	~0°		$TiSi_2$; Sintered at 1573 K for 2 hrs (setter material $TiSi_2$); density 2.82 g cm^{-3}, theoretical density 4.12 g cm^{-3}; integrated from spectral data (1-15 μm); [Authors' designation: Sample No. 86].

DATA TABLE NO. 435 NORMAL TOTAL EMITTANCE OF TITANIUM SILICIDES

[Temperature, T, K; Emittance, ϵ]

T	ϵ
CURVE 1*	
1023	0.77

*No plot given

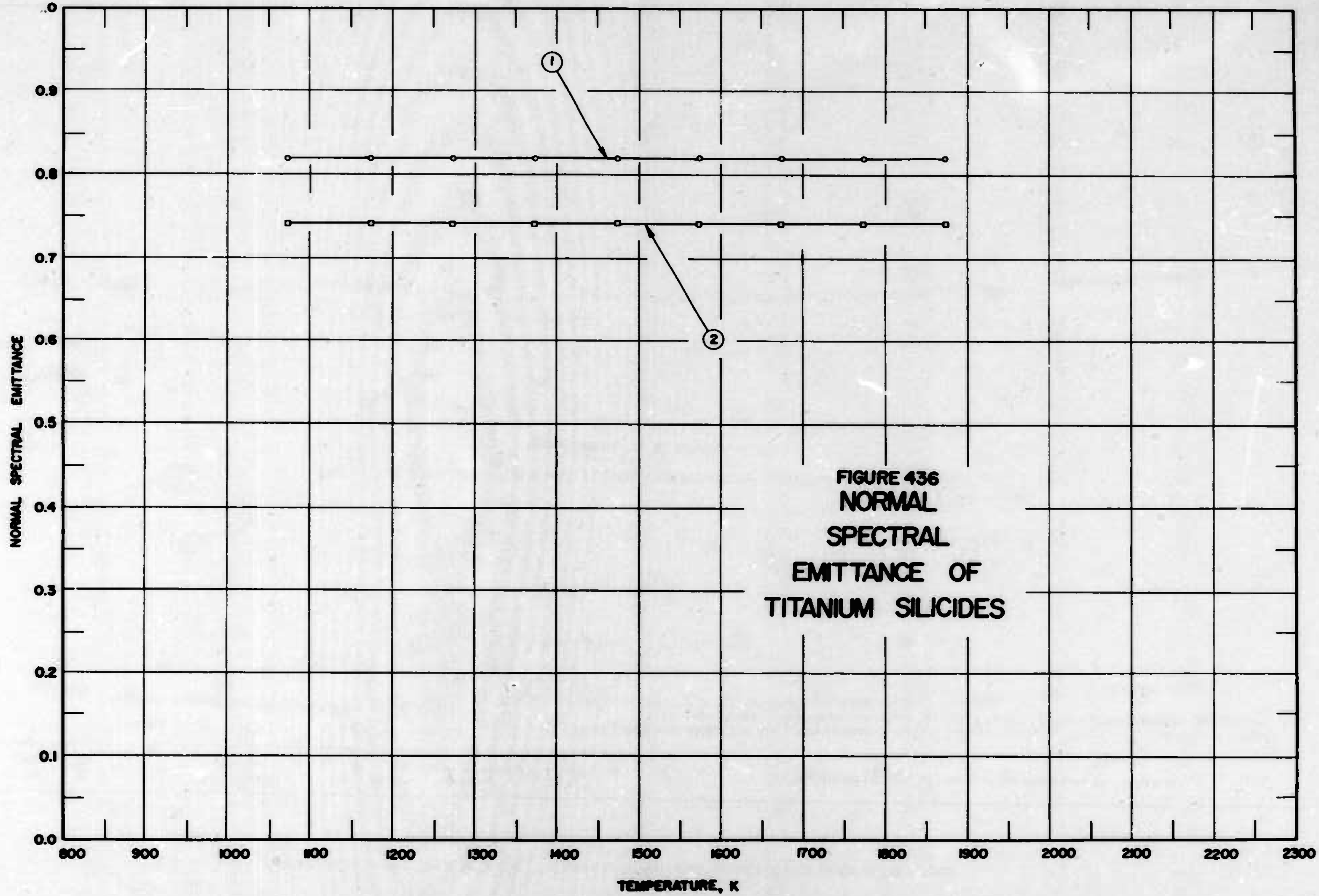


FIGURE 436 NORMAL SPECTRAL EMITTANCE OF TITANIUM SILICIDES

SPECIFICATION TABLE NO. 436 NORMAL SPECTRAL EMITTANCE OF TITANIUM SILICIDES

Curve No.	Ref. No.	Year	Wavelength, µm	Temperature Range, K	Geometry θ'	Reported Error, %	Composition (weight percent), Specifications, and Remarks
1	13	1962	0.650	1073-1873	~0°		$TiSi_2$; layer of paste (~100 µm thick) on tantalum cylinder; paste prepared from fine powder (2-3 µm) of $TiSi_2$ suspended in nitrocellulose binder and dried at 313 to 333 K.
2	13	1962	0.65	1073-1873	~0°		Ti_5Si_3; layer of paste (~100 µm thick) on tantalum cylinder; paste prepared from fine powder (2-3 µm) of Ti_5Si_3 suspended in nitrocellulose binder and dried at 313 to 333 K.

DATA TABLE NO. 436 NORMAL SPECTRAL EMITTANCE OF TITANIUM SILICIDES

[Temperature, T, K; Emittance, ϵ; Wavelength, λ, µm]

T	ϵ	T	ϵ
CURVE 1 λ = 0.650		**CURVE 2 (cont.)**	
1073	0.82	1673	0.74
1173	0.82	1773	0.74
1273	0.82	1873	0.74
1373	0.82		
1473	0.82		
1573	0.82		
1673	0.82		
1773	0.82		
1873	0.82		
CURVE 2 λ = 0.65			
1073	0.74		
1173	0.74		
1273	0.74		
1373	0.74		
1473	0.74		
1573	0.74		

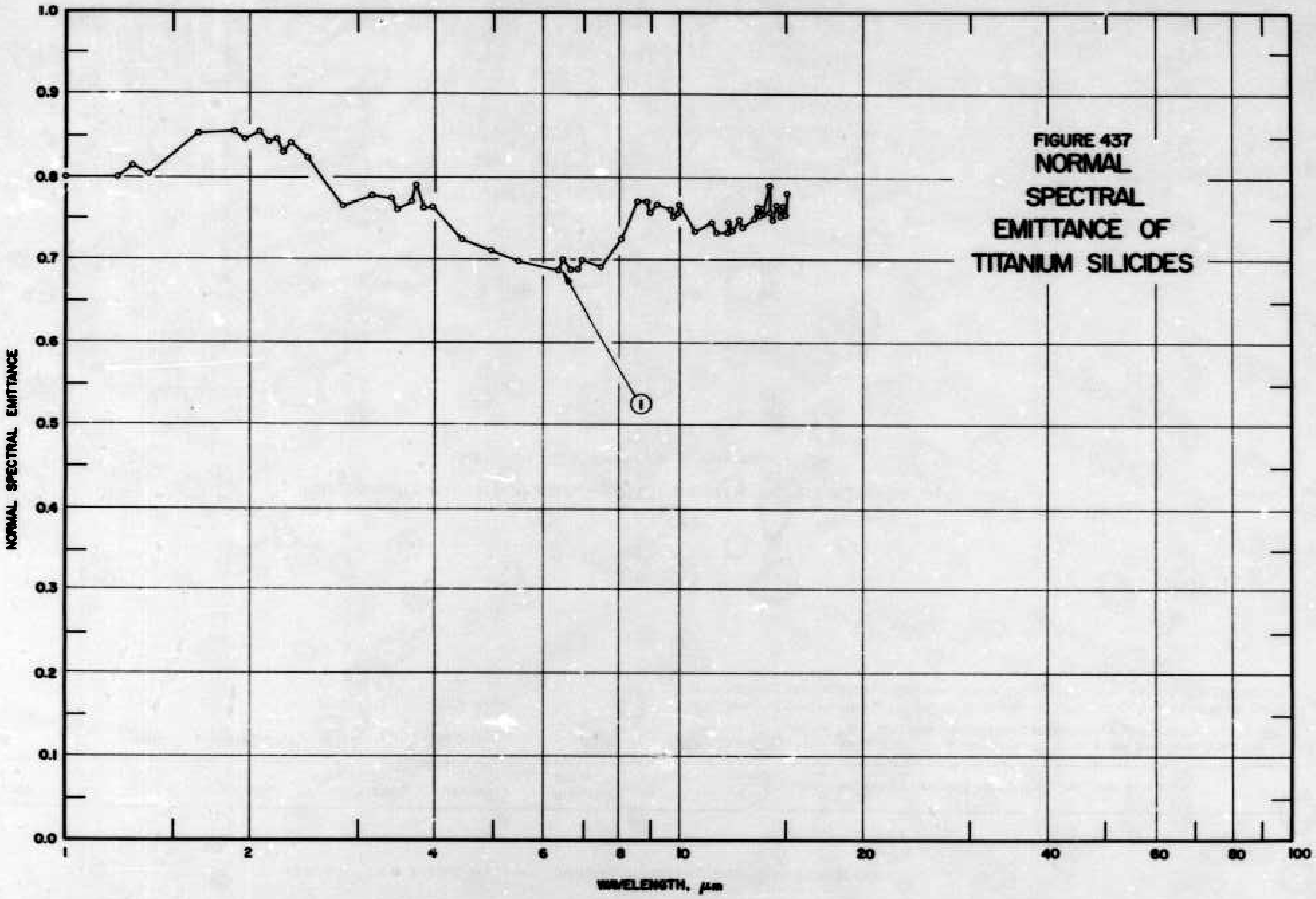


FIGURE 437 NORMAL SPECTRAL EMITTANCE OF TITANIUM SILICIDES

SPECIFICATION TABLE NO. 437 NORMAL SPECTRAL EMITTANCE OF TITANIUM SILICIDES

Curve No.	Ref. No.	Year	Temperature K	Wavelength Range, μm	Geometry θ'	Reported Error, %	Composition (weight percent), Specifications, and Remarks
1	28	1963	1023	1.00-15.0	$\sim 0°$		$TiSi_2$; sintered at 1573 K for 2 hrs (setter material $TiSi_2$); density 2.82 g cm^{-3}, theoretical density 4.12 g cm^{-3}; data extracted from smooth curve; [Authors' designation: Sample No. 86].

DATA TABLE NO. 437 NORMAL SPECTRAL EMITTANCE OF TITANIUM SILICIDES

[Wavelength, λ, μm; Emittance, ϵ; Temperature, T, K]

λ	ϵ	λ	ϵ	λ	ϵ
CURVE 1 T = 1023		CURVE 1 (cont.)		CURVE 1 (cont.)	
		3.99	0.763	11.5	0.732
1.00	0.800	4.41	0.722	12.0	0.732
1.22	0.800	4.93	0.710	12.0	0.745
1.29	0.814	5.48	0.699	12.2	0.735
1.37	0.803	6.36	0.687	12.5	0.749
1.65	0.853	6.49	0.700	12.6	0.739
1.89	0.855	6.63	0.688	13.3	0.750
1.97	0.846	6.85	0.688	13.4	0.763
2.07	0.855	6.93	0.700	13.5	0.754
2.15	0.842	7.49	0.690	13.6	0.762
2.21	0.847	8.02	0.725	13.6	0.753
2.27	0.830	8.51	0.770	13.9	0.764
2.33	0.840	8.84	0.770	14.0	0.790
2.48	0.825	8.94	0.757	14.0	0.758
2.82	0.764	9.20	0.767	14.2	0.748
3.16	0.778	9.67	0.760	14.4	0.767
3.40	0.774	9.78	0.751	14.6	0.754
3.48	0.760	9.90	0.755	14.7	0.766
3.66	0.770	10.0	0.766	14.8	0.754
3.73	0.791	10.6	0.735	15.0	0.780
3.82	0.763	11.3	0.745		

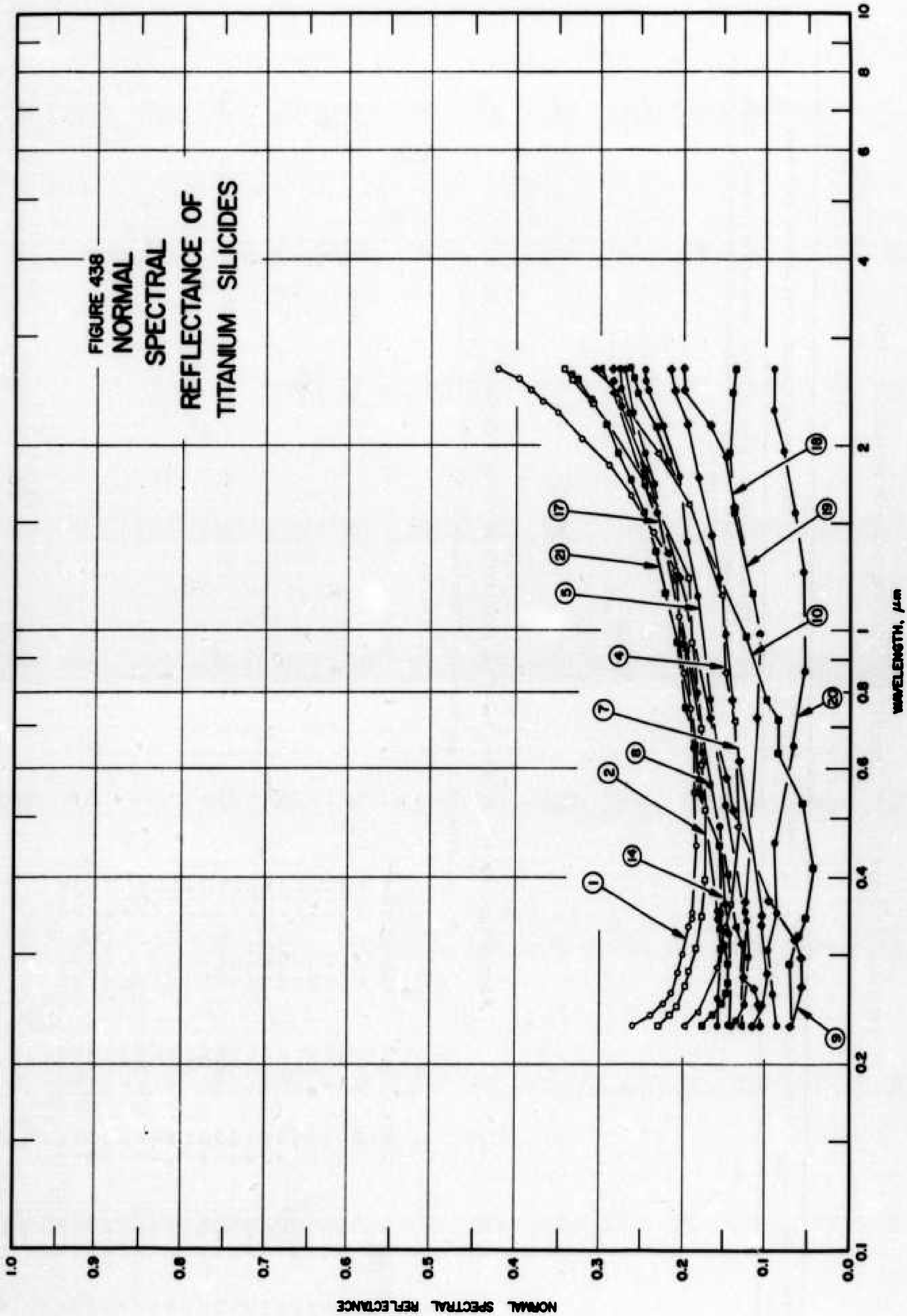


FIGURE 438 NORMAL SPECTRAL REFLECTANCE OF TITANIUM SILICIDES

SPECIFICATION TABLE NO. 438 NORMAL SPECTRAL REFLECTANCE OF TITANIUM SILICIDES

Curve No.	Ref. No.	Year	Temperature K	Wavelength Range, μm	Geometry θ	θ'	ω'	Reported Error, %	Composition (weight percent), Specifications, and Remarks
1	28	1963	298	0.230-2.65	~0°		2π		$TiSi_2$; sintered at 1573 K for 2 hrs (setter material $TiSi_2$); density 2.82 g cm^{-3}, theoretical density 4.12 g cm^{-3}; MgO reference standard; data extracted from smooth curve; [Authors' designation: Sample No. 86].
2	382	1965	~298	0.230-2.65	0°		2π		$TiSi_2$ powder, Allis Chalmers Manufacturing Co.; 98% pure; compated at 70 500 psi; data extracted from smooth curve; MgO reference standard.
3*	382	1965	~298	0.230-2.65	0°		2π		Similar to above specimen and conditions except compacted at 11 750 psi.
4	382	1965	~298	0.230-2.65	0°		2π		Similar to above specimen and conditions except compacted at 2350 psi.
5	382	1965	~298	0.230-2.65	0°		2π		Ti_5Si_3 powder, Allis Chalmers Manufacturing Co.; 98% pure; compacted at 70 500 psi; data extracted from smooth curve; MgO reference standard.
6*	382	1965	~298	0.230-2.65	0°		2π		Similar to above specimen and conditions except compacted at 11 750 psi.
7	382	1965	~298	0.230-2.65	0°		2π		Similar to above specimen and conditions except compacted at 2350 psi.
8	382	1965	~298	0.230-2.65	0°		2π		Ti_5Si_3 powder; compacted at 35 300 psi using polished stainless steel ram; data extracted from smooth curve; MgO reference standard.
9	382	1965	~298	0.230-2.65	0°		2π		Above specimen and conditions except heated at 773 K for 30 min.
10	382	1965	~298	0.230-2.65	0°		2π		Curve 8 specimen and conditions except heated at 773 K for 180 min.
11*	382	1965	~298	0.230-2.65	0°		2π		Similar to curve 8 specimen and conditions.
12*	382	1965	~298	0.230-2.65	0°		2π		Above specimen and conditions except heated at 973 K for 15 min.
13*	382	1965	~298	0.230-2.65	0°		2π		Curve 11 specimen and conditions except heated at 973 K for 60 min.
14	382	1965	~298	0.230-2.65	0°		2π		Similar to curve 8 specimen and conditions.
15*	382	1965	~298	0.230-2.65	0°		2π		Above specimen and conditions except heated at 1173 K for 30 min.
16*	382	1965	~298	0.230-2.65	0°		2π		Curve 14 specimen and conditions except heated at 1173 K for 120 min.
17	382	1965	~298	0.230-2.65	0°		2π		Similar to curve 8 specimen and conditions.
18	382	1965	~298	0.230-2.65	0°		2π		Above specimen and conditions except heated at 1373 K for 15 min.
19	382	1965	~298	0.230-2.65	0°		2π		Curve 17 specimen and conditions except heated at 1373 K for 60 min.
20	382	1965	~298	0.230-2.65	0°		2π		Curve 17 specimen and conditions except heated at 1373 K for 240 min.
21	28	1963	298	0.230-2.65	~0°		2π		Ti_5Si_3; sintered at 1573 K for 2 hrs (setter material Ti_5Si_3); density 1.93 g cm^{-3}, theoretical density 4.32 g cm^{-3}; MgO reference standard; data extracted from smooth curve; [Authors' designation: Sample No. 77].

* Not shown on plot

DATA TABLE NO. 438 NORMAL SPECTRAL REFLECTANCE OF TITANIUM SILICIDES

[Wavelength, λ, μm; Reflectance, ρ; Temperature, T, K]

CURVE 1 T = 298

λ	ρ
0.230	0.260
0.240	0.236
0.250	0.222
0.260	0.214
0.280	0.206
0.300	0.200
0.331	0.192
0.341	0.189
0.350	0.189
0.450	0.184
0.549	0.186
0.648	0.188
0.748	0.191
0.851	0.200
0.949	0.205
1.05	0.205
1.25	0.210
1.44	0.236
1.65	0.263
1.85	0.291
2.05	0.323
2.25	0.354
2.35	0.371
2.45	0.383
2.55	0.399
2.65	0.425

CURVE 2 T ~ 298

λ	ρ
0.230	0.229
0.240	0.216
0.248	0.207
0.266	0.198
0.281	0.193
0.306	0.183
0.345	0.178
0.399	0.172
0.512	0.172
0.608	0.179
0.698	0.179
0.952	0.190
1.22	0.194
1.74	0.247
2.32	0.310
2.55	0.335
2.65	0.345

CURVE 3* T ~ 298

λ	ρ
0.230	0.217
0.241	0.201
0.274	0.184
0.313	0.169
0.344	0.162
0.406	0.151
0.484	0.151
0.797	0.163
0.965	0.169
1.19	0.173
1.64	0.220
1.98	0.262
2.25	0.298
2.46	0.318
2.57	0.328
2.65	0.329

CURVE 4 T ~ 298

λ	ρ
0.230	0.197
0.243	0.180
0.287	0.158
0.310	0.152
0.332	0.148
0.361	0.140
0.481	0.13[illegible]
0.717	0.137
0.854	0.149
1.14	0.151
1.60	0.192
1.93	0.230
2.41	0.284
2.65	0.309

CURVE 5 T ~ 298

λ	ρ
0.230	0.140
0.235	0.133
0.250	0.123
0.299	0.120
0.340	0.121
0.350	0.124
0.523	0.148
0.776	0.168
1.14	0.182
1.38	0.196
1.77	0.207
2.14	0.226
2.45	0.242
2.53	0.247
2.65	0.247

CURVE 6* T ~ 298

λ	ρ
0.230	0.120
0.242	0.115
0.254	0.104
0.278	0.100
0.323	0.103
0.345	0.105
0.608	0.134
0.741	0.152
0.967	0.161
1.25	0.171
1.60	0.186
1.87	0.199
2.23	0.214
2.37	0.219
2.58	0.231
2.65	0.236

CURVE 7 T ~ 298

λ	ρ
0.230	0.115
0.250	0.100
0.280	0.096
0.335	0.102
0.346	0.102
0.613	0.131
0.773	0.140
0.981	0.149
1.21	0.156
1.42	0.168
1.76	0.181
2.16	0.196
2.45	0.211
2.65	0.217

CURVE 8 T ~ 298

λ	ρ
0.230	0.128
0.312	0.129
0.331	0.133
0.404	0.144
0.562	0.168
0.925	0.198
1.33	0.220
1.71	0.247
2.43	0.288
2.65	0.300

CURVE 9 T ~ 298

λ	ρ
0.230	0.070
0.267	0.058
0.298	0.058
0.318	0.065
0.368	0.094
0.514	0.139
0.580	0.148
0.724	0.167
1.22	0.205
1.81	0.247
2.30	0.278
2.53	0.288
2.65	0.288

CURVE 10 T ~ 298

λ	ρ
0.230	0.070*
0.290	0.070
0.321	0.060
0.342	0.051
0.413	0.044
0.526	0.058
0.634	0.084
0.718	0.085
0.771	0.099
0.977	0.125
1.89	0.220
2.13	0.233
2.41	0.255
2.56	0.260
2.65	0.263

CURVE 11* T ~ 298

λ	ρ
0.230	0.120
0.302	0.123
0.340	0.133
0.427	0.146
0.706	0.177
1.34	0.218
1.97	0.258
2.65	0.285

CURVE 12* T ~ 298

λ	ρ
0.230	0.063
0.256	0.065
0.269	0.063
0.325	0.063
0.333	0.056
0.427	0.056
0.590	0.095
0.972	0.140
1.33	0.173
1.73	0.208
2.17	0.235
2.48	0.256
2.65	0.259

CURVE 13* T ~ 298

λ	ρ
0.230	0.081
0.249	0.083
0.261	0.091
0.290	0.102
0.320	0.106
0.349	0.121
0.508	0.080
0.575	0.068
0.655	0.060
0.760	0.060
1.28	0.119
1.86	0.177
2.42	0.213
2.55	0.220
2.65	0.221

CURVE 14 T ~ 298

λ	ρ
0.230	0.142
0.323	0.142
0.364	0.146
0.482	0.154
0.637	0.178
0.792	0.182
1.73	0.235
1.94	0.247
2.25	0.261
2.65	0.271

CURVE 15* T ~ 298

λ	ρ
0.230	0.091
0.267	0.099
0.339	0.124
0.348	0.122
0.401	0.091
0.431	0.081
0.501	0.078
0.623	0.086
1.08	0.150
1.59	0.195
1.93	0.221
2.32	0.249
2.65	0.258

CURVE 16* T ~ 298

λ	ρ
0.230	0.082
0.235	0.087
0.255	0.087
0.284	0.100
0.325	0.111
0.345	0.113
0.349	0.110
0.424	0.076
0.588	0.070
0.708	0.075
0.957	0.109
1.45	0.158
1.80	0.199
2.24	0.227
2.50	0.245
2.65	0.251

CURVE 17 T ~ 298

λ	ρ
0.230	0.156
0.255	0.156
0.305	0.152
0.341	0.156
0.351	0.156
0.545	0.179
0.947	0.200
1.55	0.231
1.79	0.247
2.25	0.268
2.46	0.278
2.65	0.279

CURVE 18 T ~ 298

λ	ρ
0.230	0.103
0.250	0.106
0.264	0.113
0.276	0.126
0.368	0.123
0.725	0.110
0.989	0.107
1.58	0.139
1.91	0.149
2.15	0.168
2.46	0.200
2.65	0.200

CURVE 19 T ~ 298

λ	ρ
0.230	0.103*
0.250	0.106*
0.264	0.113*
0.276	0.126*
0.368	0.123*
0.725	0.110*
0.989	0.107*
1.15	0.116
1.55	0.139
1.94	0.145
2.42	0.140
2.65	0.136

CURVE 20 T ~ 298

λ	ρ
0.230	0.085
0.259	0.090
0.305	0.097
0.350	0.085
0.455	0.089
0.650	0.068
0.858	0.054
1.24	0.057
1.55	0.066
1.95	0.080
2.26	0.090
2.65	0.090

CURVE 21 T = 298

λ	ρ
0.230	0.175
0.240	0.162
0.250	0.150
0.260	0.147
0.270	0.143
0.290	0.143
0.310	0.149

*Not shown on plot

DATA TABLE NO. 438 (continued)

λ	ρ
CURVE 21 (cont.) T = 298	
0.330	0.152
0.350	0.154
0.450	0.154
0.549	0.181
0.650	0.187
0.750	0.198
0.952	0.209
1.15	0.222
1.34	0.233
1.55	0.247
1.75	0.262
1.94	0.280
2.15	0.294
2.35	0.311
2.55	0.329
2.60	0.336
2.65	0.345*

*Not shown on plot

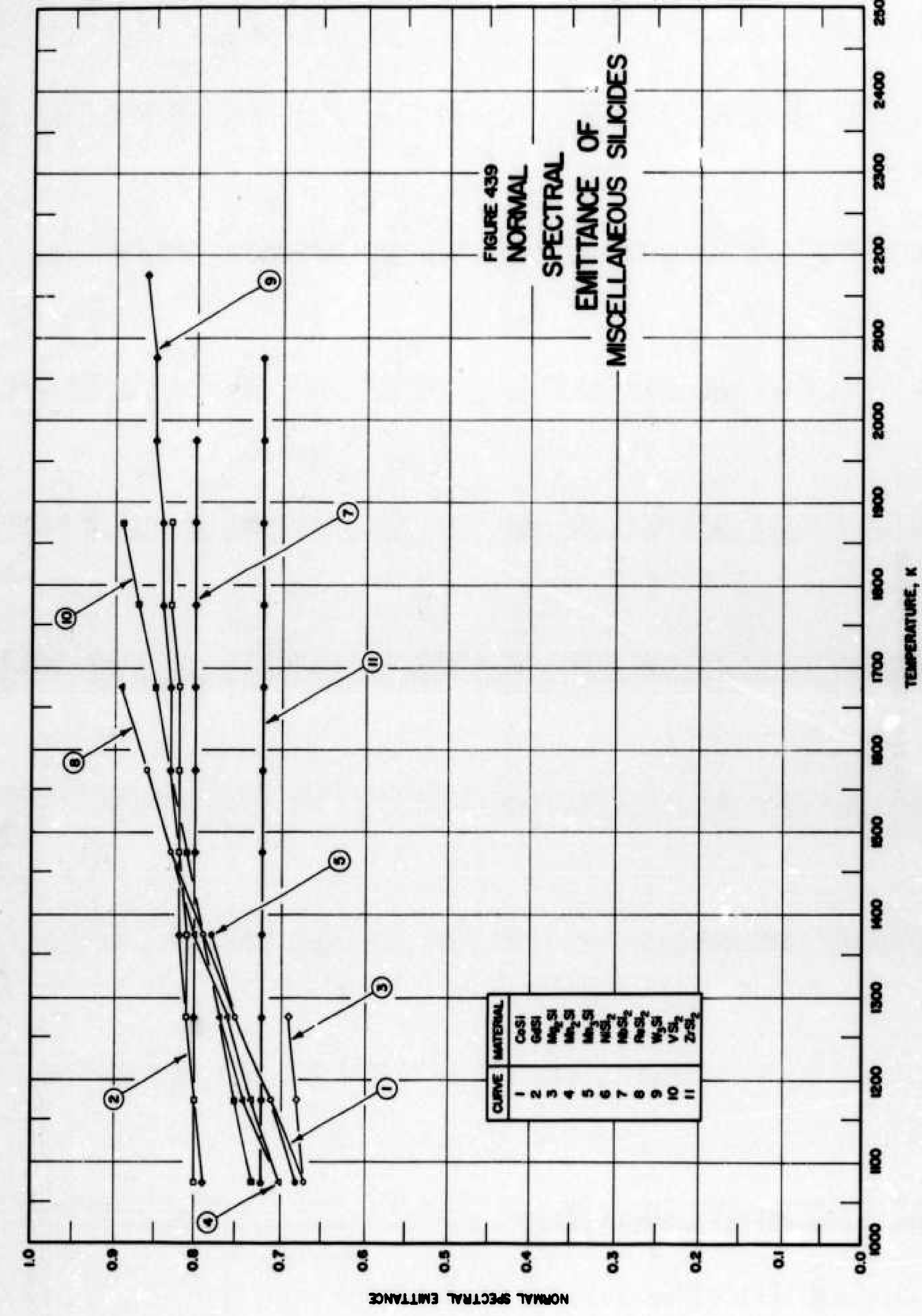


FIGURE 439 NORMAL SPECTRAL EMITTANCE OF MISCELLANEOUS SILICIDES

SPECIFICATION TABLE NO. 439 NORMAL SPECTRAL EMITTANCE OF MISCELLANEOUS SILICIDES

Curve No.	Ref. No.	Year	Wavelength μm	Temperature Range, K	Geometry θ'	Reported Error, %	Composition (weight percent), Specifications, and Remarks
1	13	1962	0.650	1073-1573	~0°		COBALT SILICIDE, CoSi; layer of paste (~100 μm thick) on tantalum cylinder: paste prepared from fine powder (2-3μm) of CoSi suspended in nitrocellulose binder and dried at 313 to 333 K; measured in argon.
2	13	1962	0.650	1073-1873	~0°		GADOLINIUM DISILICIDE, $GdSi_2$; layer of paste (~100 μm thick) on tantalum cylinder; paste prepared from fine powder (2-3 μm) of $GdSi_2$ suspended in nitrocellulose binder and dried at 313 to 333 K.
3	13	1962	0.650	1073-1273	~0°		DIMAGNESIUM SILICIDE, Mg_2Si; layer of paste (~100 μm thick) on tantalum cylinder; paste prepared from fine powder (2-3 μm) of Mg_2Si suspended in nitrocellulose binder and dried at 313 to 333 K; measured in argon.
4	13	1962	0.650	1073-1473	~0°		MANGANESE DISILICIDE, $MnSi_2$; layer of paste (~100 μm thick) on tantalum cylinder; paste prepared from fine powder (2-3 μm) of $MnSi_2$ suspended in nitrocellulose binder and dried at 313 to 333 K; measured in air.
5	13	1962	0.650	1073-1373	~0°		TRIMANGANESE SILICIDE, Mn_3Si; layer of paste (~100 μm thick) on tantalum cylinder; paste prepared from fine powder (2-3 μm) of Mn_3Si suspended in nitrocellulose binder and dried at 313 to 333 K; measured in argon.
6*	13	1962	0.650	1073-1473	~0°		NICKEL DISILICIDE, $NiSi_2$; layer of paste (~100 μm thick) on tantalum cylinder; paste prepared from fine powder (2-3 μm) of $NiSi_2$ suspended in nitrocellulose binder and dried at 313 to 333 K; measured in argon.
7	13	1962	0.650	1073-1973	~0°		NIOBIUM DISILICIDE, $NbSi_2$; layer of paste (~100 μm thick) on tantalum cylinder; paste prepared from fine powder (2-3 μm) of $NbSi_2$ suspended in nitrocellulose binder and dried at 313 to 333 K.
8	13	1962	0.650	1073-1673	~0°		RHENIUM DISILICIDE, $ReSi_2$; layer of paste (~100 μm thick) on tantalum cylinder; paste prepared from fine powder (2-3 μm) of $ReSi_2$ suspended in nitrocellulose binder and dried at 313 to 333 K.
9	13	1962	0.650	1073-2173	~0°		TRITUNGSTEN SILICIDE, W_3Si; layer of paste (~100 μm thick) on tantalum cylinder; paste prepared from fine powder (2-3 μm) of W_3Si suspended in nitrocellulose binder and dried at 313 to 333 K.
10	13	1962	0.650	1073-1873	~0°		VANADIUM DISILICIDE, VSi_2; layer of paste (~100 μm thick) on tantalum cylinder; paste prepared from fine powder (2-3 μm) of VSi_2 suspended in nitrocellulose binder and dried at 313 to 333 K.
11	13	1962	0.650	1073-2073	~0°		ZIRCONIUM SILICIDE, $ZrSi_2$; layer of paste (~100 μm thick) on tantalum cylinder; paste prepared from fine powder (2-3 μm) of $ZrSi_2$ suspended in nitrocellulose binder and dried at 313 to 333 K.

* Not shown on plot

DATA TABLE NO. 439 NORMAL SPECTRAL EMITTANCE OF MISCELLANEOUS SILICIDES

[Temperature, T, K; Emittance, ϵ; Wavelength, μm]

T	ϵ
CURVE 1	
$\lambda = 0.650$	
1073	0.67
1173	0.71
1273	0.75
1373	0.79
1473	0.83
1573	0.86
CURVE 2	
$\lambda = 0.650$	
1073	0.80
1173	0.80
1273	0.81
1373	0.81
1473	0.82
1573	0.82
1673	0.82
1773	0.83
1873	0.83
CURVE 3	
$\lambda = 0.650$	
1073	0.67*
1173	0.68
1273	0.69
CURVE 4	
$\lambda = 0.650$	
1073	0.70
1173	0.73
1273	0.76
1373	0.80
1473	0.83*
CURVE 5	
$\lambda = 0.650$	
1073	0.68
1173	0.71*
1273	0.75*
1373	0.78

T	ϵ
CURVE 6*	
$\lambda = 0.650$	
1073	0.67
1173	0.71
1273	0.75
1373	0.78
1473	0.82
CURVE 7	
$\lambda = 0.650$	
1073	0.80*
1173	0.80*
1273	0.80
1373	0.80*
1473	0.80
1573	0.80
1673	0.80
1773	0.80
1873	0.80
1973	0.80
CURVE 8	
$\lambda = 0.650$	
1073	0.70*
1173	0.74
1273	0.77
1373	0.80*
1473	0.83*
1573	0.86*
1673	0.89
CURVE 9	
$\lambda = 0.650$	
1073	0.79
1173	0.80*
1273	0.81*
1373	0.82
1473	0.82*
1573	0.83
1673	0.83
1773	0.84
1873	0.84

T	ϵ
CURVE 9 (cont.)	
1973	0.85
2073	0.85
2173	0.86
CURVE 10	
$\lambda = 0.650$	
1073	0.73
1173	0.75
1273	0.77*
1373	0.79*
1473	0.81
1573	0.83*
1673	0.85
1773	0.87
1873	0.89
CURVE 11	
$\lambda = 0.650$	
1073	0.72
1173	0.72
1273	0.72
1373	0.72
1473	0.72
1573	0.72
1673	0.72
1773	0.72
1873	0.72
1973	0.72
2073	0.72

*Not shown on plot

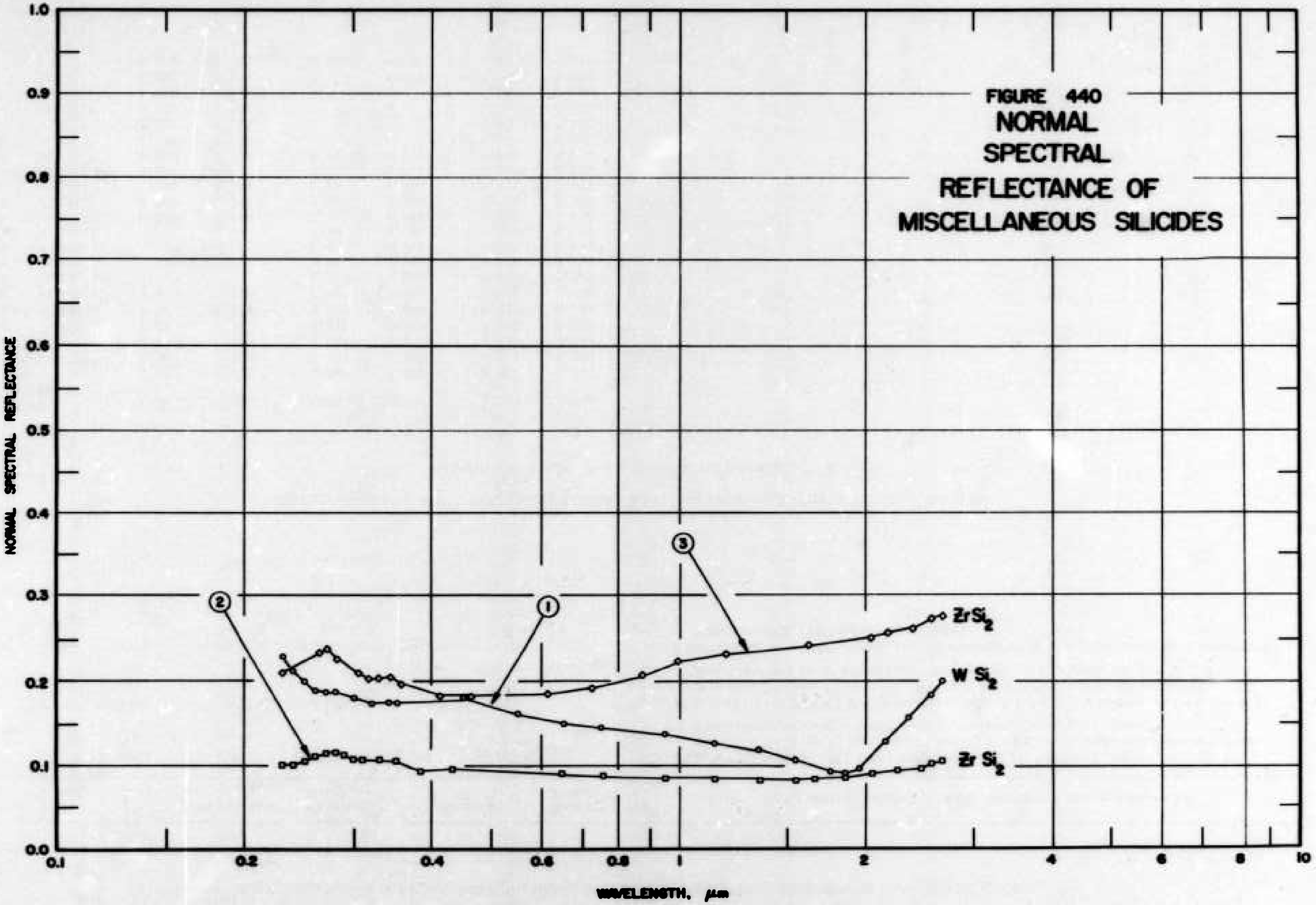


FIGURE 440
NORMAL
SPECTRAL
REFLECTANCE OF
MISCELLANEOUS SILICIDES

SPECIFICATION TABLE NO. 440 NORMAL SPECTRAL REFLECTANCE OF MISCELLANEOUS SILICIDES

Curve No.	Ref. No.	Year	Temperature K	Wavelength Range, μm	Geometry θ θ'	ω'	Reported Error, %	Composition (weight percent), Specifications, and Remarks
1	28	1963	298	0.030-2.65	~0°	2π		TUNGSTEN DISILICIDE, WSi_2; sintered at 1773 K for 2 hrs (setter material WSi_2); density 5.16 g cm^{-3}, theoretical density 9.87 g cm^{-3}; MgO reference standard; data extracted from smooth curve; [Authors' designation: Sample No. 110].
2	28	1963	298	0.23-2.65	~0°	2π		ZIRCONIUM SILICIDE, $ZrSi_2$; sintered at 1573 K for 2 hrs (setter material $ZrSi_2$); density 2.18 g cm^{-3}; x-ray structure $ZrSi_2$ + $ZrSiO_4$; MgO reference standard; data extracted from smooth curve; [Authors' designation: Sample No. 111].
3	393	1966	~298	0.230-2.65	~0°	2π		ZIRCONIUM SILICIDE, $ZrSi_2$; powder compacted at 35300 psi; data extracted from smooth curve; MgO reference standard.

DATA TABLE NO. 440 NORMAL SPECTRAL REFLECTANCE OF MISCELLANEOUS SILICIDES

[Wavelength, λ, μm; Reflectance, ρ; Temperature, T, K]

λ	ρ	λ	ρ	λ	ρ	λ	ρ
CURVE 1 T = 298		CURVE 1 (cont.)		CURVE 2 (cont.)		CURVE 3 (cont.)	
		1.85	0.091	0.384	0.093	0.262	0.234
0.230	0.230	1.95	0.098	0.434	0.097	0.271	0.239
0.240	0.212	2.14	0.128	0.648	0.091	0.281	0.229
0.250	0.200	2.34	0.159	0.751	0.089	0.305	0.210
0.260	0.189	2.55	0.184	0.949	0.085	0.316	0.202
0.270	0.188	2.65	0.200	1.14	0.083	0.329	0.202
0.280	0.188			1.35	0.082	0.342	0.205
0.300	0.181	CURVE 2		1.54	0.084	0.359	0.198
0.320	0.174	T = 298		1.65	0.085	0.413	0.182
0.341	0.175			1.85	0.088	0.461	0.181
0.351	0.175	0.230	0.100	2.05	0.091	0.613	0.186
0.450	0.180	0.240	0.100	2.25	0.095	0.724	0.192
0.550	0.161	0.250	0.104	2.45	0.098	0.870	0.207
0.650	0.150	0.260	0.110	2.55	0.101	0.991	0.224
0.747	0.146	0.270	0.114	2.65	0.105	1.19	0.234
0.947	0.136	0.280	0.115			1.61	0.242
1.14	0.126	0.290	0.112	CURVE 3		2.02	0.251
1.34	0.119	0.300	0.108	T ~ 298		2.15	0.259
1.54	0.106	0.310	0.106			2.38	0.262
1.75	0.093	0.330	0.106	0.230	0.210	2.55	0.274
		0.350	0.105	0.234	0.207	2.65	0.277

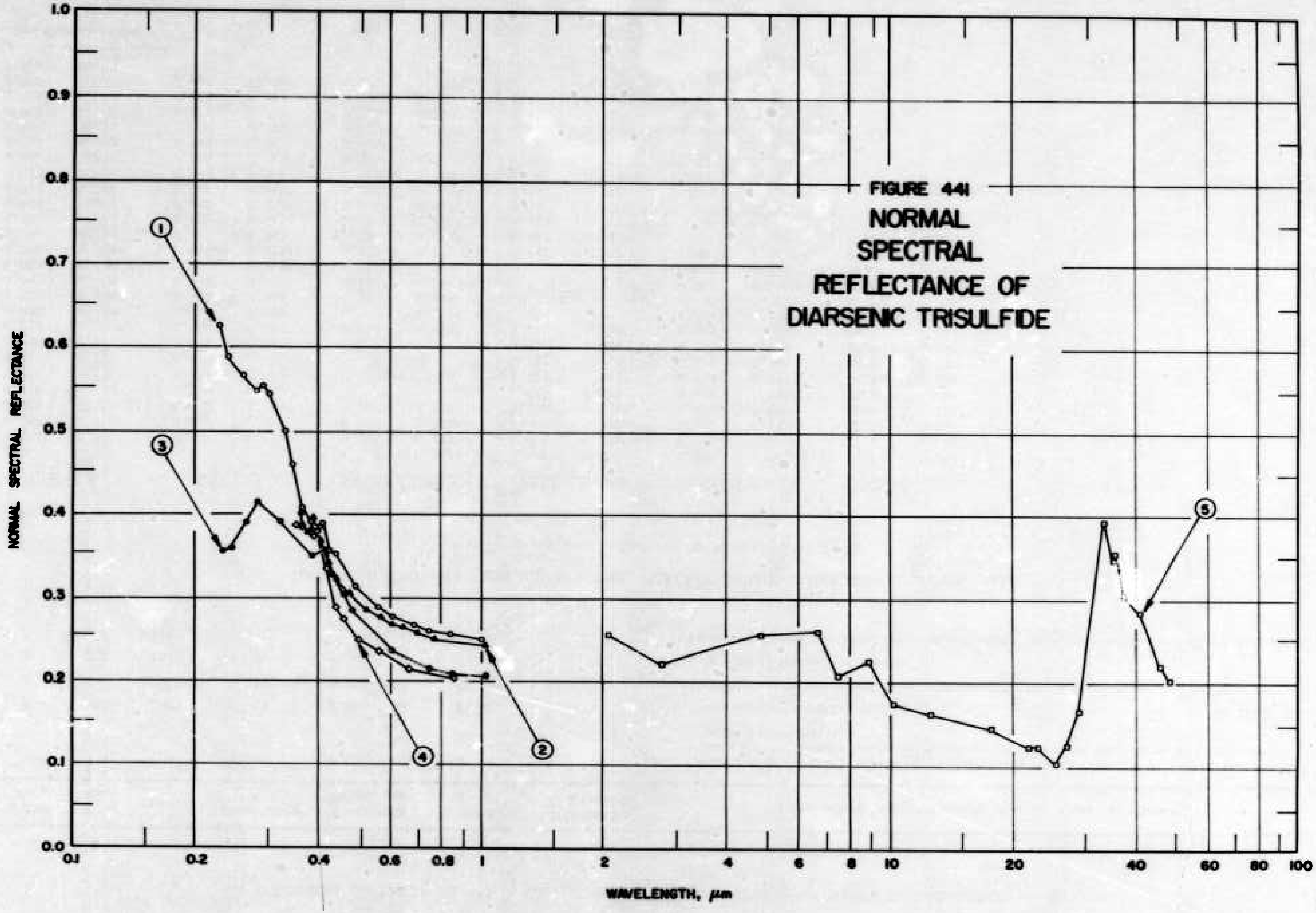


FIGURE 441
NORMAL
SPECTRAL
REFLECTANCE OF
DIARSENIC TRISULFIDE
NORMAL SPECTRAL REFLECTANCE
WAVELENGTH, μm
1.0
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0.0
0.1
0.2
0.4
0.6
0.8
1
2
4
6
8
10
20
40
60
80
100
1
2
3
4
5

SPECIFICATION TABLE NO. 441 NORMAL SPECTRAL REFLECTANCE OF DIARSENIC TRISULFIDE As_2S_3

Curve No.	Ref. No.	Year	Temperature K	Wavelength Range, μm	Geometry θ	θ'	ω'	Reported Error, %	Composition (weight percent), Specifications, and Remarks
1	263	1967	290	0.221-0.980	5°	5°			Cleaved single crystal; biaxial; specimen surface perpendicular to b-axis; measured with the incident radiation polarized perpendicular to the c-axis; data extracted from smooth curve.
2	263	1967	77	0.351-1.00	5°	5°			Above specimen and conditions.
3	263	1967	290	0.227-1.00	5°	5°			Above specimen and conditions except incident radiation polarized parallel to c-axis.
4	263	1967	77	0.346-1.00	5°	5°			Above specimen and conditions.
5	67	1963	~298	2.00-50.0	30°	30°			5 mm thick; data extracted from smooth curve; aluminum mirror reference standard.

DATA TABLE NO. 441 NORMAL SPECTRAL REFLECTANCE OF DIARSENIC TRISULFIDE As_2S_3

[Wavelength, λ, μm; Reflectance, ρ; Temperature, T, K]

CURVE 1
T = 290

λ	ρ
0.221	0.624
0.235	0.588
0.253	0.566
0.275	0.549
0.279	0.549*
0.287	0.551
0.296	0.543
0.312	0.521*
0.321	0.500
0.339	0.460
0.357	0.409
0.372	0.390
0.380	0.384*
0.391	0.383
0.400	0.389
0.417	0.352
0.431	0.350
0.435	0.338*
0.483	0.311
0.543	0.288
0.599	0.275
0.662	0.265
0.725	0.250
0.820	0.253
0.980	0.248

CURVE 2
T = 77

λ	ρ
0.351	0.401
0.358	0.388
0.362	0.384*
0.369	0.378
0.372	0.380
0.373	0.383*
0.376	0.388*
0.380	0.396
0.395	0.370*
0.398	0.368
0.405	0.367*
0.407	0.365*
0.410	0.354*
0.417	0.340
0.426	0.329*
0.433	0.322
0.446	0.313*
0.461	0.305
0.490	0.292*
0.518	0.283
0.556	0.274
0.599	0.265
0.625	0.261
0.680	0.255

CURVE 2 (cont.)

λ	ρ
0.746	0.249
0.806	0.245*
0.893	0.242*
1.00	0.240

CURVE 3
T = 290

λ	ρ
0.227	0.353
0.235	0.353*
0.240	0.358
0.246	0.366*
0.260	0.389
0.279	0.413
0.283	0.414*
0.290	0.411*
0.315	0.390
0.365	0.355*
0.379	0.349
0.389	0.347*
0.408	0.355
0.412	0.348*
0.420	0.328
0.427	0.323*
0.441	0.321*

CURVE 3 (cont.)

λ	ρ
0.452	0.302
0.474	0.283
0.498	0.266*
0.526	0.249*
0.585	0.232
0.654	0.219*
0.730	0.213
0.826	0.209
1.00	0.208

CURVE 4
T = 77

λ	ρ
0.346	0.387
0.366	0.375*
0.373	0.372*
0.377	0.372*
0.380	0.372
0.383	0.374*
0.389	0.377
0.407	0.331
0.410	0.334*
0.413	0.336*
0.420	0.334*
0.424	0.328*

CURVE 4 (cont.)

λ	ρ
0.437	0.289
0.444	0.280*
0.450	0.272
0.465	0.262*
0.476	0.255*
0.498	0.247
0.518	0.240*
0.552	0.231
0.581	0.224*
0.621	0.216*
0.645	0.213
0.671	0.211*
0.847	0.204
1.00	0.201*

CURVE 5
T = 298

λ	ρ
2.00	0.251
2.70	0.220
4.70	0.251
6.50	0.259
7.30	0.208
8.70	0.223
10.0	0.174

CURVE 5 (cont.)

λ	ρ
12.3	0.161
17.4	0.147
21.3	0.125
22.4	0.125*
25.0	0.104
26.5	0.128
28.2	0.216
32.9	0.395
34.3	0.347
34.9	0.353
36.1	0.309
40.0	0.284
44.8	0.220
47.7	0.105
50.0	0.000

* Not shown on plot

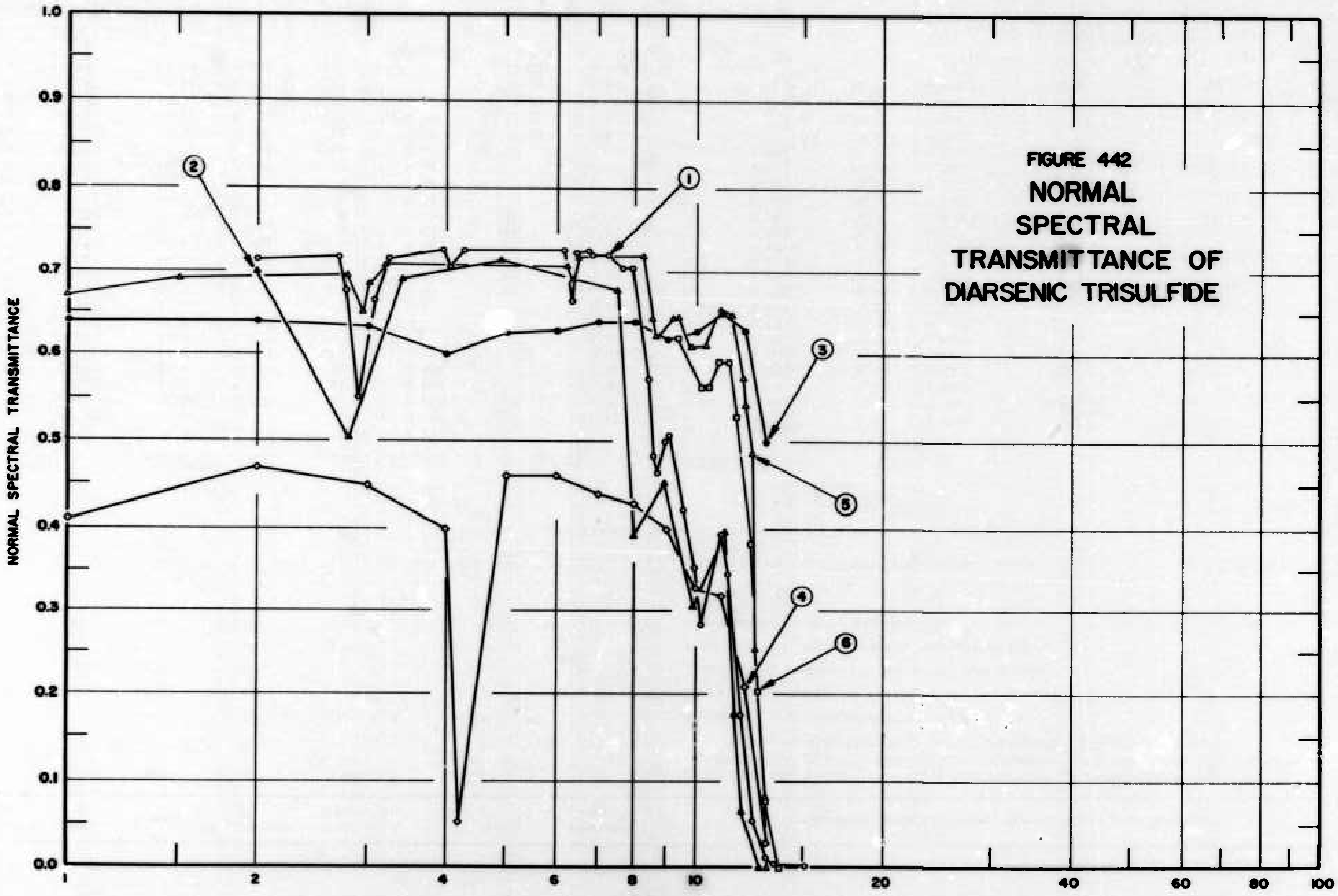


FIGURE 442
NORMAL
SPECTRAL
TRANSMITTANCE OF
DIARSENIC TRISULFIDE

SPECIFICATION TABLE NO. 442 NORMAL SPECTRAL TRANSMITTANCE OF DIARSENIC TRISULFIDE As_2S_3

Curve No.	Ref. No.	Year	Temperature K	Wavelength Range, μm	Geometry θ θ' ω'	Reported Error, %	Composition (weight percent), Specifications, and Remarks
1	69	1963	298	2.00-15.0	~0° ~0°		From Barr and Stroud (~0.25 in. thick); fabricated to plane parallel with 0.00001 radiation wedge angle; both surfaces polished optically flat to within 5 green mercury fringes; refractive index 2.418; data extracted from smooth curve.
2	67	1963	~298	2.00-12.7	0° 0°		5 mm thick; data extracted from smooth curve.
3	264	1950	298	1-13	0° 0°		Glassy state; molded (0.15 mm thick); red in color.
4	264	1950	298	1-13	0° 0°		Glassy state; molded (2.6 mm thick); red in color.
5	430	1964	50	1.00-13.1	0° 0°		1.02 mm thick; data extracted from smooth curve.
6	430	1964	300	1.00-13.7	0° 0°		Above specimen and conditions.

DATA TABLE NO. 442 NORMAL SPECTRAL TRANSMITTANCE OF DIARSENIC TRISULFIDE As_2S_3

[Wavelength, λ, μm; Transmittance, τ; Temperature, T, K]

λ	τ
CURVE 1 T = 298	
2.00	0.715
2.70	0.719
2.76	0.679
2.80	0.676*
2.90	0.551
3.07	0.665
3.22	0.715
3.97	0.727
4.06	0.706
4.27	0.727
6.19	0.727
6.32	0.661
6.42	0.723
6.71	0.726
6.87	0.720
7.26	0.720
7.63	0.703
7.95	0.703
8.24	0.674*
8.40	0.574
8.57	0.483
8.70	0.463
8.92	0.500

λ	τ
CURVE 1 (cont.)	
9.09	0.508
9.53	0.421
9.90	0.353
10.2	0.284
10.4	0.346*
10.7	0.391*
11.0	0.395
11.3	0.347
11.8	0.179
12.4	0.056
13.0	0.013
13.4	0.002
15.0	0.001
CURVE 2 T = 298	
2.00	0.700
2.80	0.504
3.40	0.692
4.90	0.713
7.50	0.677
8.00	0.391
8.90	0.452

λ	τ
CURVE 2 (cont.)	
9.90	0.306
11.1	0.397
11.6	0.179
11.9	0.068
12.7	0.000
CURVE 3 T = 298	
1	0.64
2	0.64
3	0.633
4	0.60
5	0.627
6	0.63
7	0.64
8	0.64
9	0.62
10	0.63
11	0.65
12	0.63
13	0.50

λ	τ
CURVE 4 T = 298	
1	0.41
2	0.47
3	0.45
4	0.40
4.2	0.051
5	0.46
6	0.46
7	0.44
8	0.43
9	0.40
10	0.33
11	0.32
12	0.21
13	0.03
CURVE 5 T = 50	
1.00	0.670
1.51	0.691
2.79	0.696
2.94	0.651
3.03	0.686

λ	τ
CURVE 5 (cont.)	
3.21	0.708
6.25	0.708
6.38	0.691
6.51	0.719
8.29	0.719
8.53	0.644
8.65	0.624
9.17	0.647
9.41	0.648
9.85	0.613
10.4	0.613
10.9	0.650*
11.3	0.649
11.9	0.575
12.1	0.543
12.3	0.489
12.6	0.254
12.9	0.075
13.1	0.000

λ	τ
CURVE 6 T = 300	
1.00	0.670*
1.51	0.691*
2.79	0.696*
2.94	0.651*
3.03	0.686*
3.21	0.708*
6.25	0.708*
6.38	0.691*
6.51	0.719*
8.29	0.719*
8.53	0.644*
8.72	0.620*
9.43	0.620
10.2	0.565
10.5	0.565
10.9	0.593
11.3	0.592
11.7	0.529
12.3	0.382
12.7	0.206
13.0	0.069
13.7	0.000

*Not shown on plot

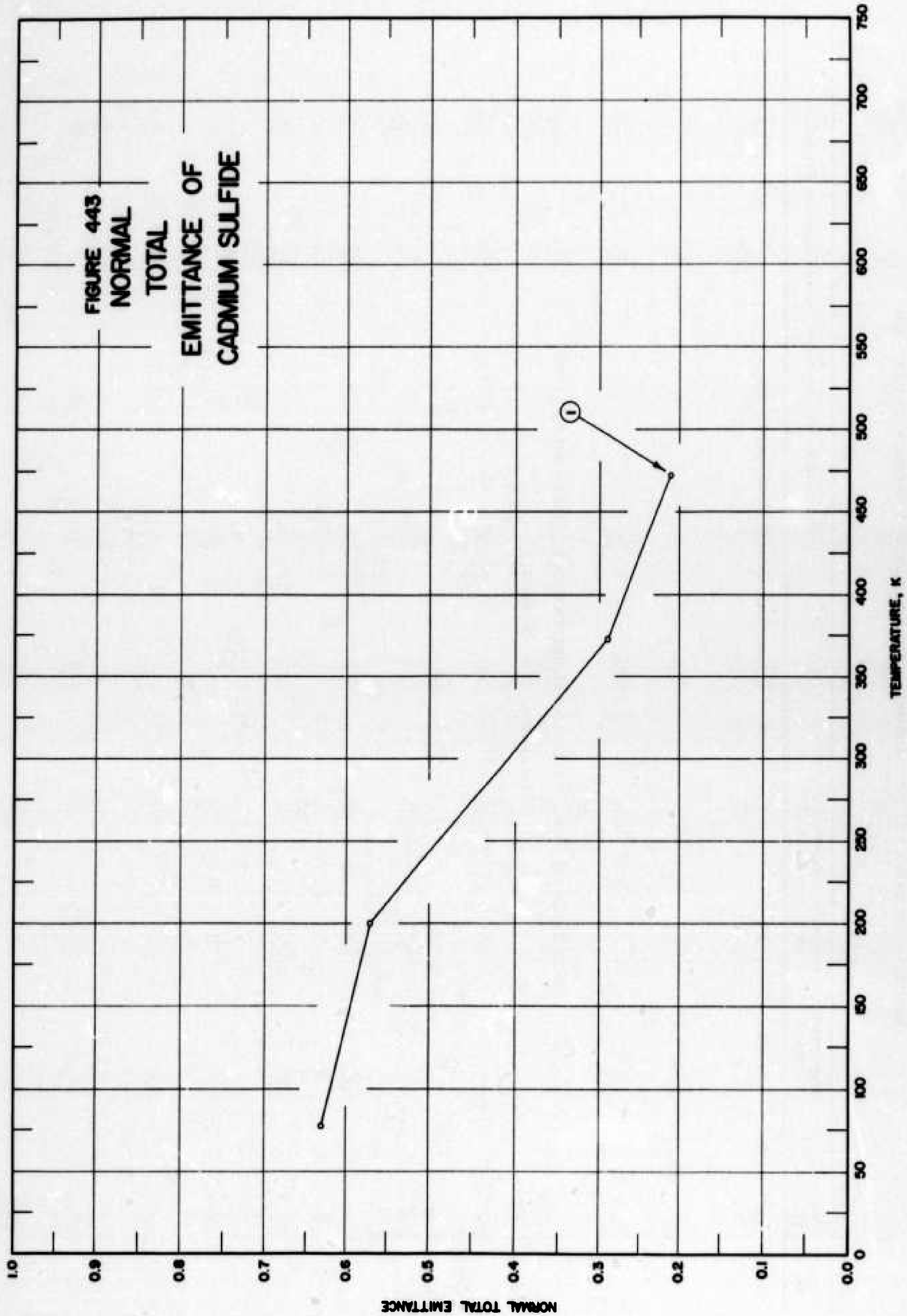


FIGURE 443 NORMAL TOTAL EMITTANCE OF CADMIUM SULFIDE

SPECIFICATION TABLE NO. 443 NORMAL TOTAL EMITTANCE OF CADMIUM SULFIDE CdS

Curve No.	Ref. No.	Year	Temperature Range, K	Geometry θ'	Reported Error, %	Composition (weight percent), Specifications and Remarks
1	156	1966	77-473	0°		5.1 mm thick; computed from spectral data.

DATA TABLE NO. 443 NORMAL TOTAL EMITTANCE OF CADMIUM SULFIDE CdS

[Temperature, T, K; Emittance, ϵ]

T	ϵ
CURVE 1	
77	0.63
200	0.57
373	0.29
473	0.21

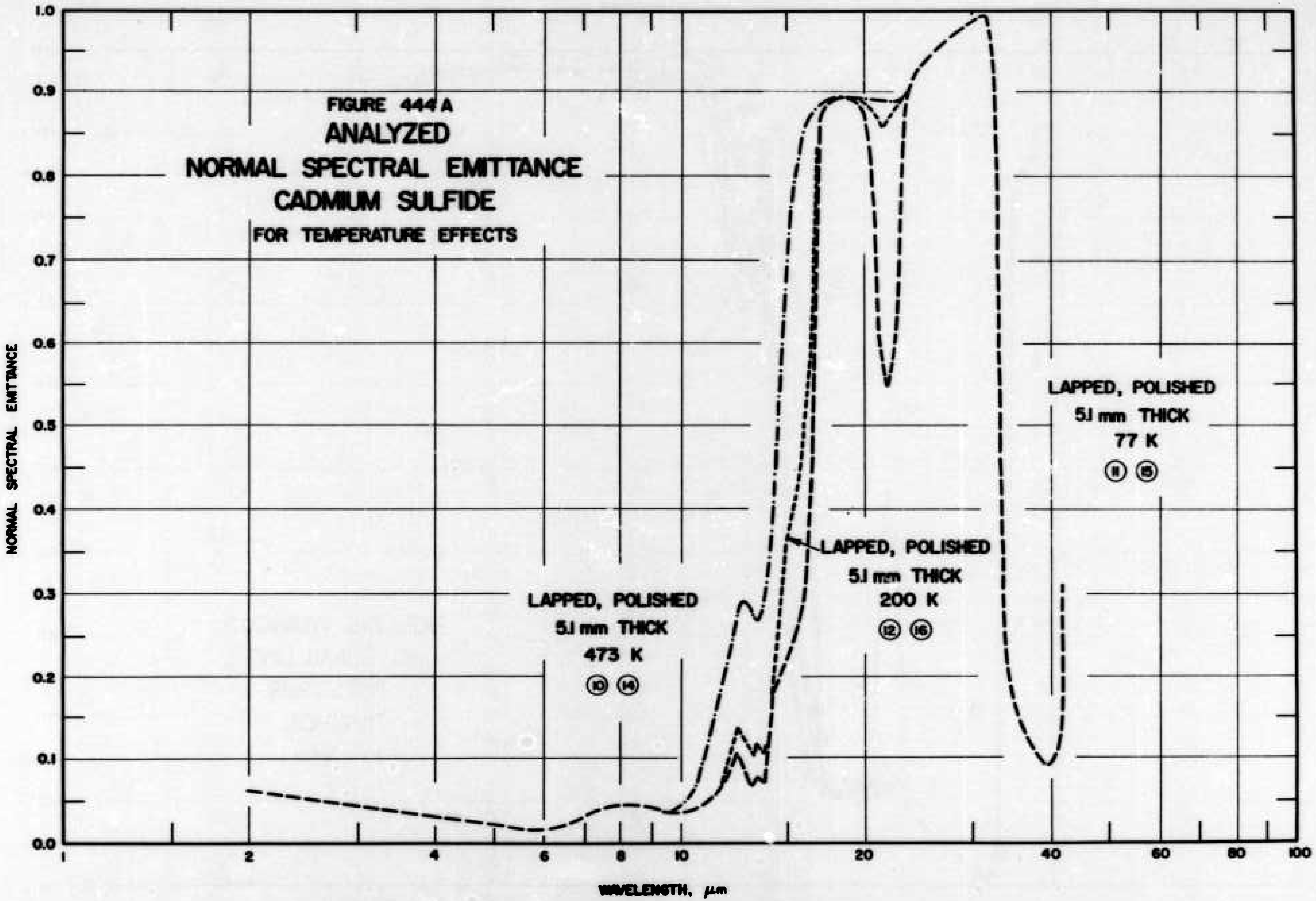


FIGURE 444A
ANALYZED
NORMAL SPECTRAL EMITTANCE
CADMIUM SULFIDE
FOR TEMPERATURE EFFECTS

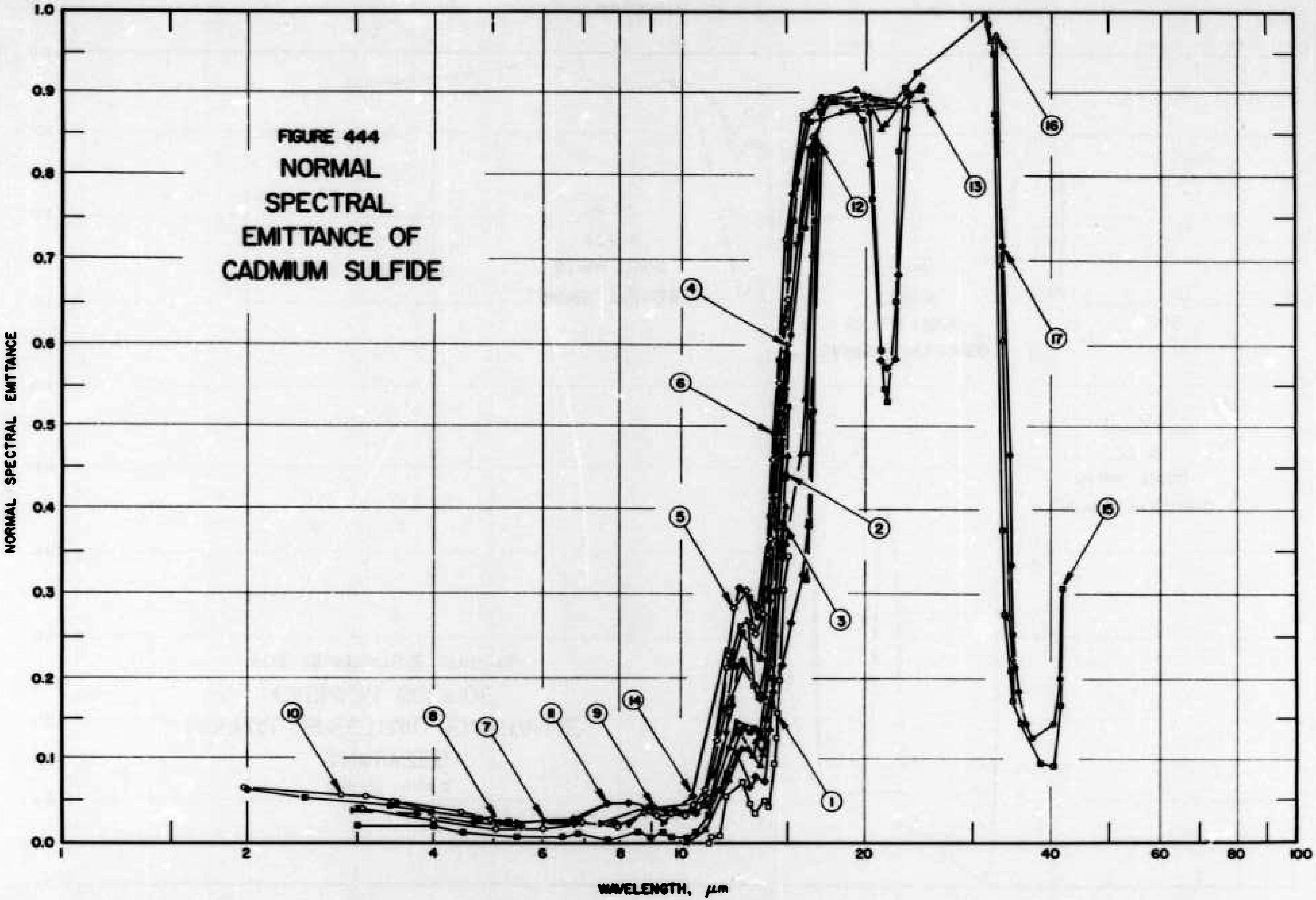


FIGURE 444
NORMAL
SPECTRAL
EMITTANCE OF
CADMIUM SULFIDE

SPECIFICATION TABLE NO. 444 NORMAL SPECTRAL EMITTANCE OF CADMIUM SULFIDE CdS

Curve No.	Ref. No.	Year	Temperature K	Wavelength Range, μm	Geometry θ'	Reported Error, %	Composition (weight percent), Specifications, and Remarks
1	52	1961	333	11.1-15.0	~0°		2.15 mm thick; ground and polished; measured in vacuum; data extracted from smooth curve.
2	52	1961	393	10.3-15.0	~0°		Above specimen and conditions.
3	52	1961	453	3.00-15.0	~0°		Above specimen and conditions.
4	52	1961	333	11.0-15.0	~0°		Similar to the above specimen and conditions except 7.49 mm thick.
5	52	1961	393	3.06-15.0	~0°		Above specimen and conditions.
6	52	1961	453	12.83-15.0	~0°		Above specimen and conditions.
7	53	1962	323	2.97-23.3	~0°		Lapped and polished (5.1 mm thick); data extracted from smooth curve.
8	53	1962	373	3.03-23.3	~0°		Above specimen and conditions.
9	53	1962	423	2.48-23.4	~0°		Above specimen and conditions.
10	53	1962	473	1.97-23.4	~0°		Above specimen and conditions.
11	156	1966	77	2.00-24.8	0°		5.1 mm thick; data extracted from smooth curve.
12	156	1966	200	2.00-24.7	0°		Above specimen and conditions.
13	156	1966	373	2.00-25.0	0°		Above specimen and conditions.
14	156	1966	473	2.00-25.0	0°		Above specimen and conditions.
15	156	1966	77	16.0-41.8	0°		Above specimen and conditions.
16	156	1966	203	16.0-41.8	0°		Above specimen and conditions.
17	156	1966	373	16.0-41.8	0°		Above specimen and conditions.

DATA TABLE NO. 444 NORMAL SPECTRAL EMITTANCE OF CADMIUM SULFIDE CdS

[Wavelength, λ, μm; Emittance, ϵ; Temperature, T, K]

λ	ϵ
CURVE 1	**T = 333**
11.1	0.000
11.3	0.009
11.6	0.010
11.9	0.052
12.6	0.071
13.0	0.046
13.3	0.034
13.7	0.050
13.9	0.041
14.2	0.094
14.3	0.126
14.4	0.159
14.5	0.199
14.8	0.301
15.0	0.344
CURVE 2	**T = 393**
10.3	0.000
11.0	0.016
11.1	0.020*
12.0	0.075
12.6	0.112
12.9	0.112
13.5	0.092
13.7	0.113
14.0	0.137
14.1	0.168
14.3	0.253
14.7	0.341
14.9	0.402
14.9	0.443
15.0	0.465
CURVE 3	**T = 453**
3.00	0.020
4.00	0.020
4.49	0.011
4.97	0.011
5.42	0.007
6.46	0.008
6.82	0.011
7.67	0.004
8.51	0.012
8.97	0.009
9.33	0.011
9.65	0.009
10.3	0.009
10.6	0.013
11.2	0.031
11.9	0.083
12.5	0.131
12.7	0.137
13.0	0.135
13.1	0.139
13.5	0.128
13.8	0.150
14.1	0.200
14.4	0.301
14.7	0.383
14.8	0.439
15.0	0.525
CURVE 4	**T = 333**
11.0	0.058
11.3	0.087
11.8	0.156
12.2	0.231
12.5	0.262
12.8	0.270
13.0	0.240
13.2	0.191
13.4	0.179
13.8	0.222
14.1	0.303*
14.3	0.400
14.6	0.501
15.0	0.600
CURVE 5	**T = 393**
3.06	0.040
4.00	0.024
5.01	0.018
6.00	0.019
6.99	0.022
7.99	0.020
8.79	0.036
9.18	0.031
9.68	0.034
10.2	0.032
10.5	0.045
11.0	0.063
11.5	0.124
12.0	0.229
12.3	0.282
12.8	0.304
13.2	0.262
13.3	0.253
13.6	0.277
14.0	0.366
14.2	0.460
14.5	0.554
14.8	0.627
15.0	0.654
CURVE 6	**T = 453**
12.8	0.309*
13.0	0.298
13.4	0.272
13.6	0.292
14.0	0.392
14.2	0.491
14.5	0.583
14.8	0.633
14.8	0.653*
15.0	0.678
CURVE 7	**T = 323**
2.97	0.038
3.76	0.032
5.13	0.024
5.47	0.023
6.02	0.026
6.81	0.023
6.95	0.024*
7.47	0.022
7.83	0.024*
8.23	0.022*
8.79	0.039*
8.99	0.041
9.40	0.023
9.73	0.040
10.0	0.037
10.2	0.034*
11.3	0.042
12.0	0.112
12.4	0.148
13.1	0.146*
13.5	0.135
14.0	0.214
14.4	0.345
14.9	0.549
15.6	0.728
16.5	0.834
17.0	0.869
18.4	0.878
23.3	0.883
CURVE 8	**T = 373**
3.03	0.040
3.73	0.035*
5.09	0.025
5.48	0.024*
6.00	0.026*
6.79	0.023
6.92	0.024*
7.46	0.022*
7.86	0.024
8.24	0.023
8.80	0.040
9.00	0.041*
9.42	0.039
9.70	0.040*
10.0	0.037*
10.2	0.034*
11.2	0.048*
11.9	0.132
12.2	0.177
12.7	0.218
13.5	0.175
14.0	0.291
14.4	0.377
14.6	0.482
14.9	0.592
15.5	0.718
16.3	0.832
17.1	0.870*
20.1	0.884
23.3	0.884*
CURVE 9	**T = 423**
2.48	0.051
3.40	0.042
3.98	0.036
4.74	0.028
5.30	0.025
6.01	0.026*
6.79	0.023*
6.93	0.024*
7.47	0.022*
7.87	0.024*
8.25	0.022*
8.80	0.039*
9.01	0.041
9.43	0.039*
9.67	0.040*
10.0	0.037*
10.2	0.034*
11.0	0.049
11.9	0.161
12.2	0.214
12.6	0.254
13.5	0.226
13.9	0.308
14.7	0.574
14.8	0.622*
15.3	0.749
15.5	0.792
16.3	0.863
19.4	0.882
23.4	0.882*
CURVE 10	**T = 473**
1.97	0.065
2.83	0.056
3.10	0.053
3.41	0.047
4.41	0.034
4.95	0.028
5.46	0.026*
6.01	0.026*
6.81	0.023*
6.92	0.024*
7.47	0.022*
7.86	0.024*
8.20	0.023*
8.77	0.039*
9.00	0.041*
9.42	0.039*
9.67	0.040*
10.0	0.037*
10.2	0.034*
10.9	0.046
11.9	0.213
12.7	0.307*
13.4	0.280
13.8	0.349
14.7	0.636*
14.9	0.721
15.8	0.871
16.8	0.881
19.4	0.883*
23.4	0.883*
CURVE 11	**T = 77**
2.00	0.062
3.48	0.048*
4.65	0.025
5.06	0.028*
5.58	0.020
6.00	0.028*
6.71	0.027*
7.64	0.047
8.23	0.047
9.75	0.037*
10.6	0.034
11.6	0.062
12.0	0.079*
12.4	0.109
13.0	0.067
13.3	0.080
13.7	0.072
14.1	0.124*
14.1	0.182
14.4	0.208*
14.7	0.218
15.1	0.269
15.5	0.263*
15.9	0.322
16.1	0.380
16.3	0.512
16.6	0.881*
16.9	0.885*
17.0	0.895
19.3	0.904
20.0	0.897
20.3	0.879
21.1	0.581
21.7	0.573
22.2	0.585
22.6	0.685
23.3	0.859
23.6	0.899
24.0	0.905*
24.8	0.910
CURVE 12	**T = 200**
2.00	0.062*
3.48	0.048*
4.65	0.025*
5.06	0.028*
5.58	0.020*
6.00	0.028*
6.71	0.027*
7.64	0.047*
8.23	0.047*
9.75	0.037*
10.5	0.037*
11.2	0.057*
12.1	0.110*
12.4	0.138
12.7	0.131*
13.1	0.104
13.3	0.121
13.5	0.118
13.6	0.105
14.0	0.170
14.9	0.360
15.1	0.402
15.8	0.468
16.0	0.534
16.6	0.843
17.2	0.883
17.5	0.891
20.0	0.896*
20.5	0.886*
21.2	0.859
21.7	0.862
22.1	0.859*
22.3	0.863*
22.7	0.886
23.6	0.900
24.7	0.904
CURVE 13	**T = 373**
2.00	0.062*
3.48	0.048*
4.65	0.025*
5.06	0.028*
5.58	0.020*
6.00	0.028*
6.71	0.027*
7.64	0.047*
8.23	0.047*
9.75	0.037*
10.5	0.036

*Not shown on plot

DATA TABLE NO. 444 (continued)

λ	∈
CURVE 13 (cont.)	
T = 373	
11.0	0.055*
11.3	0.081
12.2	0.168
12.4	0.216
12.6	0.222
12.9	0.220
13.6	0.177
14.4	0.360
15.1	0.612
15.6	0.725*
16.4	0.827
17.3	0.886*
25.0	0.892
CURVE 14	
T = 473	
2.00	0.062*
3.48	0.048
4.65	0.025*
5.06	0.028*
5.58	0.020*
6.00	0.028*
6.71	0.027
7.64	0.047*
8.23	0.047*
9.75	0.037*
10.5	0.056
12.5	0.308
12.9	0.306
13.4	0.285
14.1	0.414
14.5	0.517
15.0	0.713
15.3	0.779
16.0	0.868
16.4	0.881
16.8	0.884
25.0	0.892*
CURVE 15	
T = 55	
16.0	0.319
16.2	0.385
CURVE 15 (cont.)	
16.4	0.518
16.5	0.748
16.7	0.846*
16.9	0.877
17.9	0.890
18.9	0.888
19.9	0.868
20.3	0.811
20.5	0.771
21.1	0.595
21.3	0.548
21.7	0.530
22.1	0.583*
22.4	0.651
22.8	0.830
23.2	0.907
24.4	0.929
31.2	0.995
31.6	0.986
32.1	0.950
32.4	0.874
33.4	0.375
33.8	0.276
34.2	0.210
34.8	0.172
35.7	0.145
38.2	0.095
40.4	0.092
41.3	0.167
41.8	0.308
CURVE 16	
T = 203	
16.0	0.468
16.4	0.708
16.5	0.846
16.9	0.880*
17.9	0.893
20.2	0.896
20.6	0.892*
22.1	0.892
24.4	0.928*
31.5	0.996*
32.0	0.968
32.7	0.873
CURVE 16 (cont.)	
33.1	0.696
33.2	0.607
34.1	0.272
34.4	0.225
34.8	0.175*
35.7	0.145*
38.2	0.095*
40.4	0.092*
41.3	0.167*
41.8	0.308*
CURVE 17	
T = 373	
16.0	0.739
16.9	0.880*
17.9	0.891*
20.2	0.896*
20.7	0.891
22.2	0.893*
24.4	0.928*
31.8	0.997*
32.2	0.951*
32.8	0.866
33.4	0.717
34.1	0.465
34.5	0.333
34.8	0.251
35.0	0.212
35.4	0.185
36.4	0.144
37.1	0.128
40.3	0.142
40.8	0.160
41.4	0.200
41.8	0.308*

*Not shown on plot

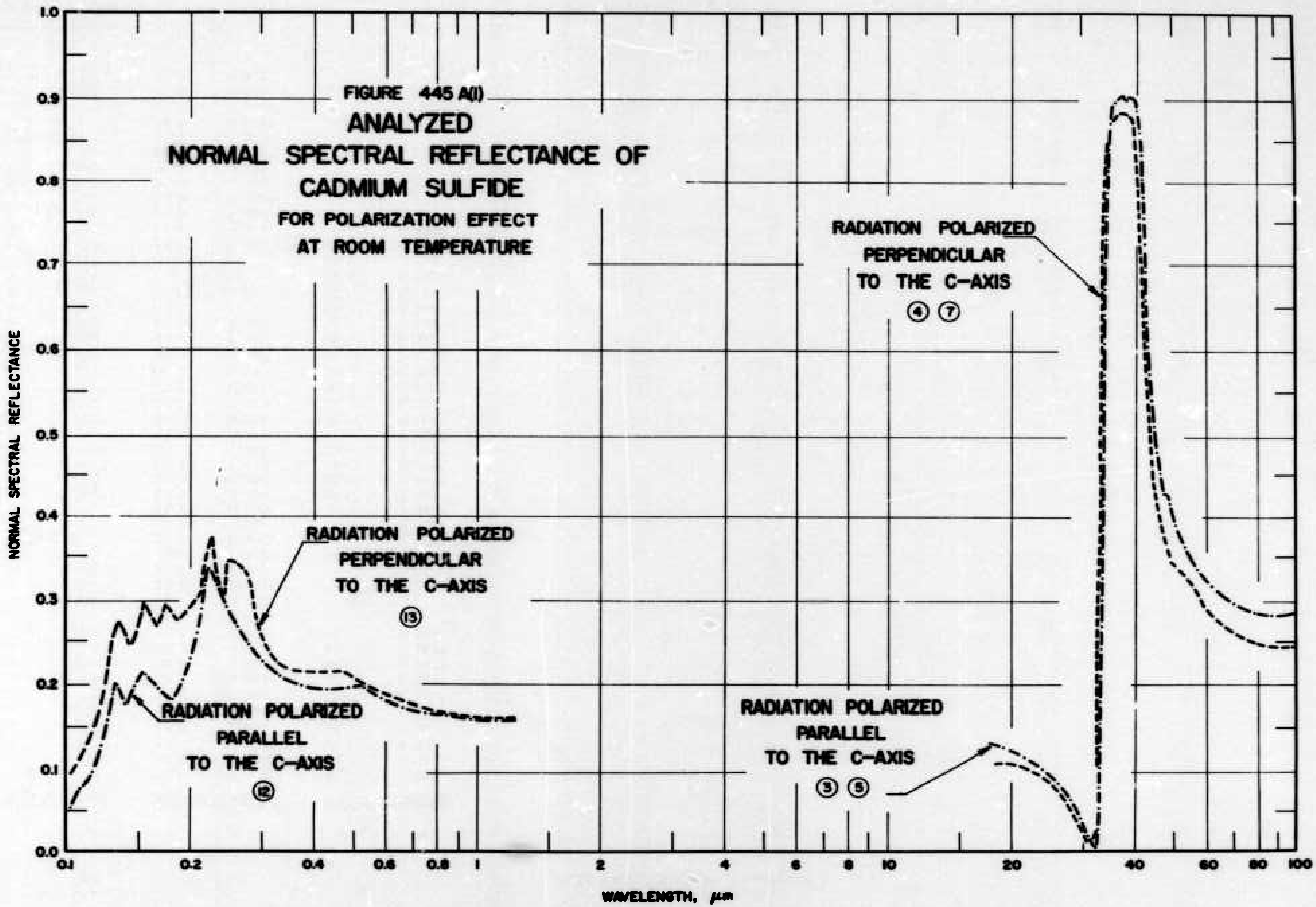


FIGURE 445 A(I)
ANALYZED
NORMAL SPECTRAL REFLECTANCE OF
CADMIUM SULFIDE
FOR POLARIZATION EFFECT
AT ROOM TEMPERATURE
RADIATION POLARIZED PERPENDICULAR TO THE C-AXIS 13
RADIATION POLARIZED PARALLEL TO THE C-AXIS 12
RADIATION POLARIZED PERPENDICULAR TO THE C-AXIS 4 7
RADIATION POLARIZED PARALLEL TO THE C-AXIS 3 5
NORMAL SPECTRAL REFLECTANCE
WAVELENGTH, μm
1.0
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0.0
0.1
0.2
0.4
0.6
0.8
1
2
4
6
8
10
20
40
60
80
100

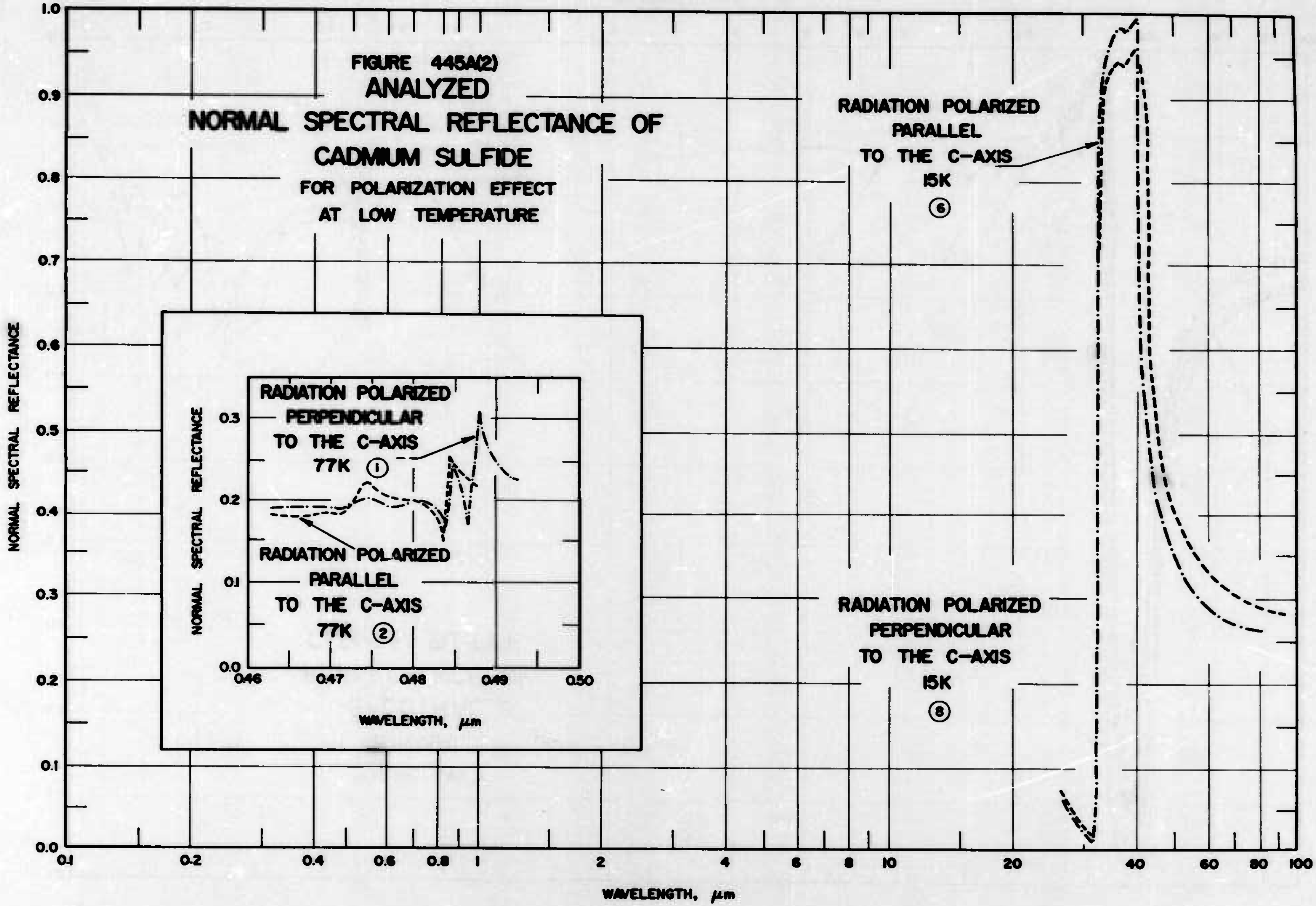


FIGURE 445A(2)
ANALYZED
NORMAL SPECTRAL REFLECTANCE OF
CADMIUM SULFIDE
FOR POLARIZATION EFFECT
AT LOW TEMPERATURE
RADIATION POLARIZED
PARALLEL
TO THE C-AXIS
15K
6
RADIATION POLARIZED
PERPENDICULAR
TO THE C-AXIS
15K
8
RADIATION POLARIZED
PERPENDICULAR
TO THE C-AXIS
77K
1
RADIATION POLARIZED
PARALLEL
TO THE C-AXIS
77K
2
NORMAL SPECTRAL REFLECTANCE
WAVELENGTH, μm
0.0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
1.0
0.1
0.2
0.4
0.6
0.8
1
2
4
6
8
10
20
40
60
80
100
0.46
0.47
0.48
0.49
0.50

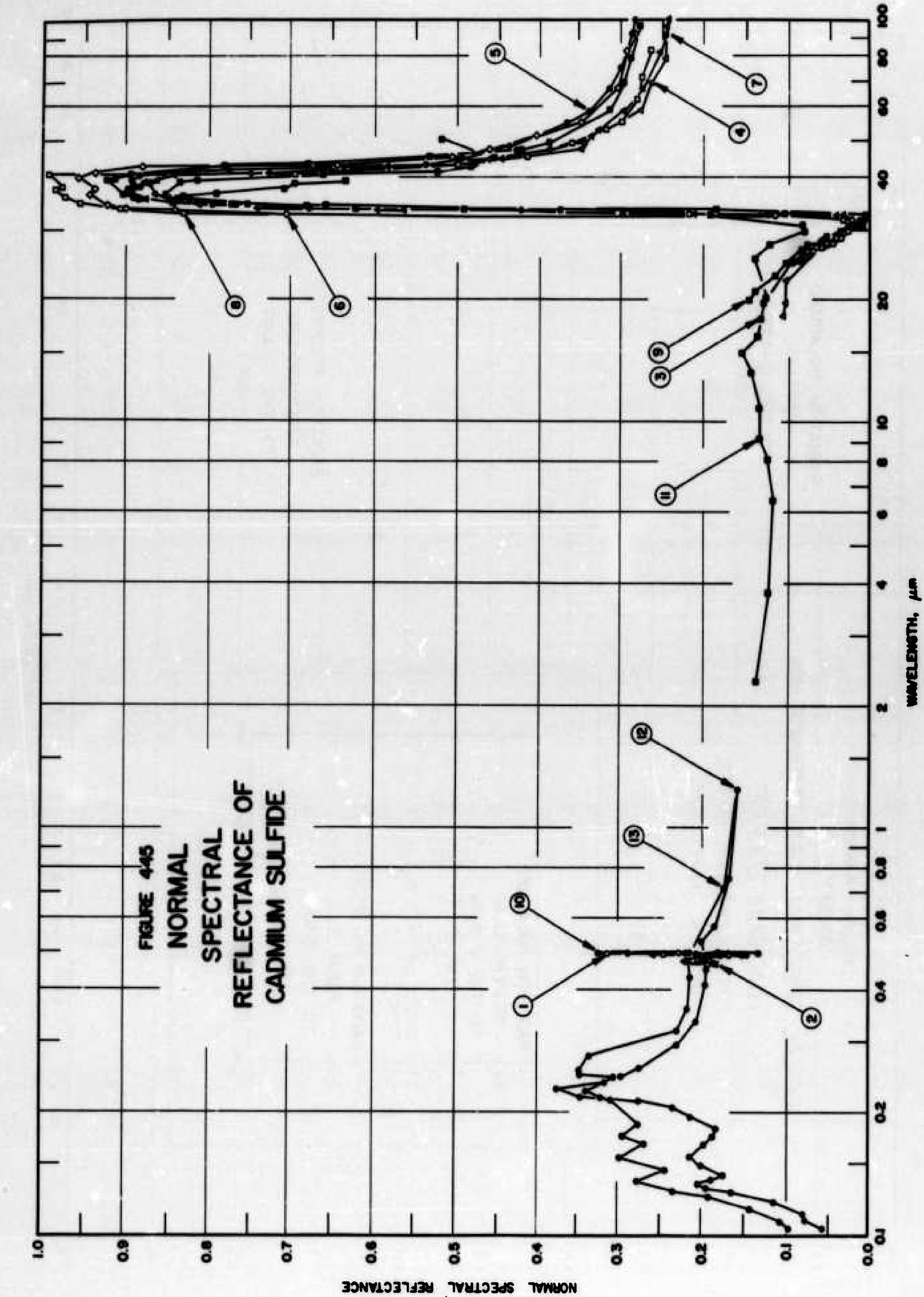


FIGURE 445 NORMAL SPECTRAL REFLECTANCE OF CADMIUM SULFIDE

SPECIFICATION TABLE NO. 445 NORMAL SPECTRAL REFLECTANCE OF CADMIUM SULFIDE CdS

Curve No.	Ref. No.	Year	Temperature K	Wavelength Range, μm	Geometry θ	θ'	ω'	Reported Error, %	Composition (weight percent), Specifications, and Remarks
1	266	1959	77	0.4627-0.4921	<10°	<10°			Single crystal (1.5 mm thick); cleaved from a large crystal grown at the Wright Air Development Center; c-axis parallel to specimen surface; incident light polarized perpendicular to c-axis; measured in vacuum; data extracted from smooth curve.
2	266	1959	77	0.4627-0.4874	<10°	<10°			Above specimen and conditions except incident light polarized parallel to c-axis.
3	73	1965	300	18.0-94.8	12°	12°		± 1	Hexagonal; polished to a mirror-like finish; aluminized mirror reference standard; radiation polarized parallel to the c-axis.
4	73	1965	300	18.1-95.0	12°	12°		± 1	Above specimen and conditions except radiation polarized perpendicular to the c-axis.
5	267	1967	300	25.0-100	~0°	~0°			Single crystal; wurtzite-type structure; optically uniaxial; 10^4 cm^{-3} carrier concentration; specimen surface containing c-axis; mechanically and chemically polished; measured with E vector parallel to c-axis.
6	267	1967	15	25.0-90.1	~0°	~0°			Above specimen and conditions.
7	267	1967	300	25.0-100	~0°	~0°			Above specimen and conditions except measured with E vector perpendicular to c-axis.
8	267	1967	15	25.0-83.3	~0°	~0°			Above specimen and conditions.
9	86	1965	~298	20.0-39.0	~0°	~0°			Single crystal.
10	268	1958	81	0.4779-0.4892	0°	0°		± 10	Single crystal; surface untreated; specimen surface parallel to c-axis; E vector of incident light perpendicular to c-axis; data extracted from smooth curve.
11	87	1968	313	2.30-50.0	30°	30°			Synthetic single crystal (5.1 mm thick); flat to ten fringes or better; data extracted from smooth curve; aluminum mirror reference standard.
12	390	1965	298	0.103-1.24	~0°	~0°			Hexagonal crystal; natural surface of platelet grown from the vapor phase; measured with light polarized parallel to the c-axis; data extracted from smooth curve.
13	390	1965	298	0.103-1.24	~0°	~0°			Similar to the above specimen and conditions except measured with light polarized perpendicular to the c-axis.

DATA TABLE NO. 445 NORMAL SPECTRAL REFLECTANCE OF CADMIUM SULIFDE CdS

[Wavelength, λ, μm; Reflectance, ρ; Temperature, T, K]

CURVE 1
T = 77

λ	ρ
0.4627	0.193
0.4672	0.194
0.4715	0.190*
0.4733	0.200*
0.4744	0.203
0.4769	0.195*
0.4782	0.195*
0.4802	0.200
0.4814	0.200*
0.4831	0.191*
0.4838	0.167
0.4848	0.247
0.4867	0.169
0.4874	0.305*
0.4878	0.311
0.4888	0.266*
0.4897	0.247*
0.4905	0.238*
0.4921	0.230

CURVE 2
T = 77

λ	ρ
0.4627	0.181
0.4660	0.180*
0.4683	0.185*
0.4699	0.185
0.4708	0.183*
0.4718	0.190*
0.4736	0.219*
0.4744	0.222
0.4760	0.209*
0.4780	0.202*
0.4801	0.200*
0.4821	0.191
0.4836	0.151
0.4844	0.254*
0.4849	0.243*
0.4863	0.230
0.4874	0.221

CURVE 3
T = 300

λ	ρ
18.0	0.132
19.9	0.130
24.8	0.098
27.4	0.079
29.7	0.039
30.8	0.015
31.7	0.007
32.8	0.103
33.1	0.371
33.7	0.622
34.2	0.773
34.7	0.846
36.8	0.901
37.6	0.911*
39.3	0.921
39.8	0.912
40.8	0.895
41.6	0.876
42.0	0.782
43.1	0.678
44.5	0.532
47.2	0.427
49.7	0.387
59.5	0.311
69.5	0.298
79.7	0.289
94.8	0.277

CURVE 4
T = 300

λ	ρ
13.1	0.108
19.9	0.104
22.4	0.104
27.4	0.058*
30.1	0.009
32.2	0.034
32.8	0.299
33.2	0.599
34.2	0.812
35.6	0.850
36.4	0.867
37.4	0.874*
38.9	0.874
39.8	0.864

CURVE 4 (cont.)

λ	ρ
40.5	0.846
41.1	0.750
42.2	0.613
44.8	0.462
47.2	0.389
49.6	0.343
59.7	0.276
69.9	0.261
79.7	0.249
95.0	0.245

CURVE 5
T = 300

λ	ρ
25.0	0.093
25.6	0.087
26.3	0.079*
26.9	0.079*
27.7	0.062
28.5	0.062*
30.3	0.029
30.6	0.017*
31.1	0.012
31.6	0.018*
32.2	0.033*
32.6	0.125
33.1	0.423
33.6	0.679
34.1	0.796
34.7	0.846*
35.3	0.886
35.8	0.892
36.5	0.899*
37.3	0.899
37.6	0.896*
38.0	0.886
38.7	0.892
39.5	0.894
40.1	0.885
41.1	0.856
42.0	0.778
42.9	0.637
43.8	0.537
44.8	0.493
45.8	0.447*

CURVE 5 (cont.)

λ	ρ
46.3	0.427
46.9	0.430
47.6	0.435*
48.0	0.437
48.7	0.432*
49.2	0.426*
54.9	0.365
58.1	0.339
61.7	0.321*
66.2	0.311
70.4	0.300*
75.7	0.300
82.6	0.293*
90.1	0.286
100	0.282

CURVE 6
T = 15

λ	ρ
25.0	0.093*
25.6	0.085*
26.3	0.079
27.0	0.068
27.7	0.053
28.5	0.041
29.4	0.034*
30.3	0.015
30.7	0.015*
31.2	0.011*
31.7	0.021
32.2	0.117
32.7	0.704
33.3	0.844
33.9	0.900
34.3	0.921
35.1	0.933*
35.8	0.943*
36.3	0.943
37.0	0.938*
37.6	0.939
38.4	0.949*
39.2	0.955*
40.0	0.958
40.8	0.950*
41.4	0.937

CURVE 6 (cont.)

λ	ρ
42.5	0.881
43.4	0.644
44.4	0.553*
45.2	0.507
46.5	0.486*
47.6	0.461
48.7	0.441*
50.0	0.423*
51.2	0.403
52.6	0.381*
55.5	0.349
58.4	0.326*
62.5	0.309*
66.6	0.302
70.9	0.298*
76.3	0.291*
82.6	0.291
90.1	0.282

CURVE 7
T = 300

λ	ρ
25.0	0.089
25.6	0.076*
26.3	0.075*
27.0	0.065*
27.7	0.055*
28.6	0.045*
30.4	0.021
31.2	0.015*
31.8	0.018*
32.2	0.042
32.7	0.211
33.3	0.562
33.9	0.742
35.1	0.877
35.7	0.887*
36.2	0.893*
36.9	0.896
37.6	0.896*
38.3	0.889*
39.0	0.880
39.8	0.868*
40.6	0.845*
41.5	0.729

CURVE 7 (cont.)

λ	ρ
42.5	0.584
43.4	0.499*
44.4	0.448
45.2	0.414
46.3	0.389
47.6	0.365
48.7	0.346
49.7	0.335*
50.5	0.335
51.2	0.335*
51.8	0.335*
52.6	0.329
54.0	0.322
55.5	0.308*
58.4	0.297
66.2	0.271
70.9	0.264*
82.6	0.252
90.9	0.246
100	0.244

CURVE 8
T = 15

λ	ρ
25.0	0.086*
25.6	0.076*
26.3	0.071*
27.0	0.060
27.7	0.049
28.6	0.039
29.4	0.029
30.3	0.012*
31.3	0.012*
31.7	0.033
32.3	0.219
32.8	0.831
33.4	0.906
34.0	0.937*
34.6	0.954
35.2	0.962*
35.8	0.971
36.5	0.978*
37.1	0.985
38.0	0.977
38.7	0.981*

CURVE 8 (cont.)

λ	ρ
39.3	0.985*
40.1	0.992
40.9	0.982*
41.6	0.694
42.7	0.581*
43.6	0.500
44.4	0.449*
45.4	0.415
46.5	0.385*
47.6	0.371
48.7	0.358
50.0	0.350*
51.5	0.335*
52.6	0.319
55.5	0.298
58.8	0.286*
62.5	0.280
66.6	0.276*
70.9	0.275
83.3	0.263

CURVE 9
T ~ 298

λ	ρ
20.0	0.148
21.0	0.140
23.0	0.117
24.9	0.101
26.9	0.083
28.9	0.053
30.0	0.026*
31.0	0.009*
32.1	0.005
33.1	0.185
33.6	0.492
34.0	0.680
34.5	0.752
35.0	0.819
35.5	0.826
36.0	0.834
36.9	0.791
37.9	0.707
39.0	0.694
39.9	0.633

CURVE 10
T = 81

λ	ρ
0.4779	0.200
0.4800	0.202*
0.4811	0.198*
0.4822	0.192*
0.4829	0.178
0.4834	0.162*
0.4838	0.147
0.4839	0.206
0.4842	0.247*
0.4845	0.258*
0.4846	0.242*
0.4851	0.232*
0.4857	0.210*
0.4861	0.194*
0.4863	0.180
0.4868	0.132
0.4872	0.323*
0.4874	0.323
0.4881	0.289
0.4885	0.276*
0.4892	0.264

CURVE 11
T = 313

λ	ρ
2.30	0.137
3.80	0.123
6.40	0.119
8.10	0.125
9.10	0.133
10.8	0.133
13.2	0.142
14.8	0.155
16.2	0.139
20.1	0.128
25.1	0.140
27.5	0.123
29.8	0.081
30.9	0.081
32.5	0.191
34.1	0.658
34.1	0.728*
34.3	0.767
34.7	0.819*
35.5	0.840
63.4	0.851

* Not shown on plot

DATA TABLE NO. 445 (continued)

λ	ρ
CURVE 11 (cont.) T = 313	
37.8	0.848*
39.0	0.839
39.9	0.817
40.3	0.797*
41.1	0.660
41.4	0.567*
41.9	0.522
42.7	0.484
43.7	0.465*
44.4	0.456*
45.6	0.456
47.4	0.479*
50.0	0.520
CURVE 12 T = 298	
0.103	0.057
0.106	0.079
0.113	0.080
0.120	0.114
0.126	0.164
0.127	0.179*
0.130	0.193
0.132	0.202
0.136	0.188
0.140	0.172
0.145	0.178*
0.149	0.200
0.155	0.214
0.166	0.197
0.174	0.185
0.181	0.181
0.189	0.193*
0.195	0.212
0.205	0.233
0.213	0.271
0.216	0.298*
0.217	0.320
0.225	0.338
0.243	0.294
0.259	0.271
0.291	0.230
0.331	0.206*
0.411	0.194
CURVE 12 (cont.)	
0.449	0.194
0.471	0.206*
0.492	0.219*
0.525	0.200
0.574	0.184
0.752	0.169
1.24	0.159
CURVE 13 T = 298	
0.103	0.099
0.106	0.109
0.107	0.109*
0.115	0.141
0.123	0.190
0.128	0.233
0.135	0.276
0.139	0.256*
0.143	0.242
0.146	0.265*
0.149	0.282*
0.155	0.299
0.168	0.268
0.175	0.291
0.181	0.276*
0.188	0.273
0.196	0.279*
0.200	0.292*
0.213	0.309
0.219	0.344
0.228	0.372
0.230	0.360*
0.236	0.315
0.243	0.302
0.247	0.305*
0.249	0.345
0.251	0.348
0.255	0.345*
0.273	0.285
0.292	0.251*
0.319	0.230
0.360	0.219
0.423	0.214
0.470	0.218
0.488	0.229*
CURVE 13 (cont.)	
0.577	0.189*
0.713	0.172
1.24	0.159*

*Not shown on plot

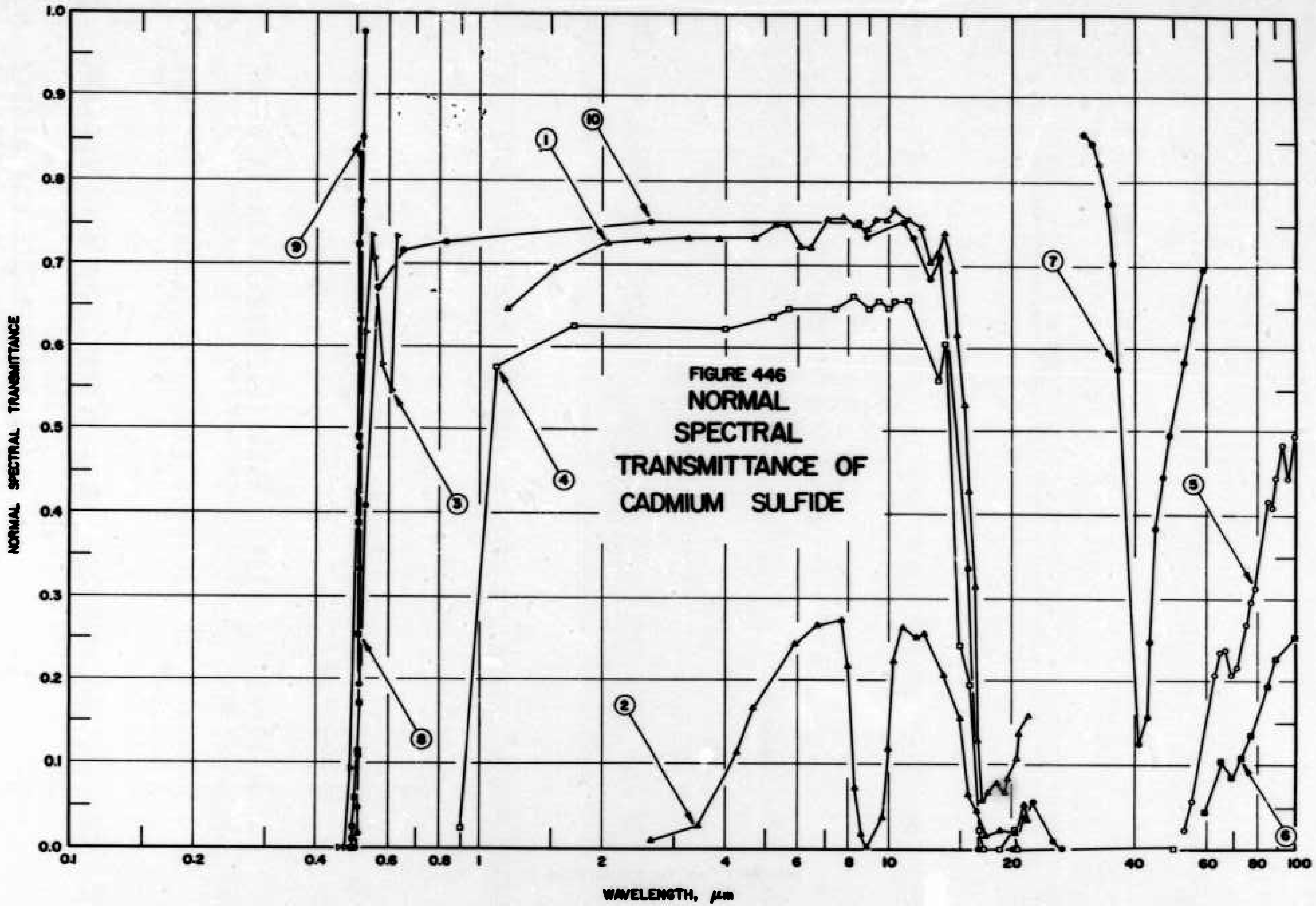


FIGURE 446
NORMAL
SPECTRAL
TRANSMITTANCE OF
CADMIUM SULFIDE
NORMAL SPECTRAL TRANSMITTANCE
WAVELENGTH, μm
1.0
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0.0
0.1
0.2
0.4
0.6
0.8
1
2
4
6
8
10
20
40
60
80
100
1
2
3
4
5
6
7
8
9
10

SPECIFICATION TABLE NO. 446 NORMAL SPECTRAL TRANSMITTANCE OF CADMIUM SULFIDE CdS

Curve No.	Ref. No.	Year	Temperature K	Wavelength Range, μm	Geometry θ	θ'	ω'	Reported Error, %	Composition (weight percent), Specifications, and Remarks
1	269	1960	298	1.18-22.0	0°	0°			Pure single crystal (3.02 mm thick); grown by sublimation recrystallization method; measured in air.
2	269	1960	298	2.62-22.0	0°	0°			Sintered (2.42 mm thick); using a pressing die under 20 000 psi pressure and heated to 873 K; measured in air; data extracted from smooth curve.
3	270	1966	298	0.458-0.630	0°	0°			Film (6800 Å thick).
4	87	1968	313	0.900-50.0	~0°	~0°			Synthetic single crystal (5.1 mm thick); flat to ten fringes or better; data extracted from smooth curve.
5	73	1965	300	53.7-99.3	~0°	~0°			Thin; hexagonal; as grown; radiation polarized parallel to the c-axis; data extracted from smooth curve; [Authors' designation: Sample A].
6	73	1965	300	54.0-98.8	~0°	~0°			Thin; hexagonal; as grown; radiation polarized perpendicular to the c-axis; data extracted from smooth curve; [Authors' designation: Sample B].
7	256	1967	300	30.0-59.7	~0°	~0°		±1	Thin film evaporated on collodion film; data extracted from smooth curve.
8	268	1958	301	0.4848-0.5158	0°	0°			Single crystal (0.89 μm thick); specimen surface parallel to c-axis; E vector of incident light parallel to c-axis.
9	268	1958	301	0.4651-0.5252	0°	0°			Above specimen and conditions except E vector of incident light perpendicular to c-axis.
10	271	1967	298	0.500-26.6	0°	0°			Grown by Electronics Research Div., Clevite Corp. from the vapor phase and sulfur-compensated with high resistivity (0.338 cm thick); optic axis parallel to the surface; data extracted from smooth curve.

DATA TABLE NO. 446 NORMAL SPECTRAL TRANSMITTANCE OF CADMIUM SULFIDE CdS

[Wavelength, λ, μm; Transmittance, τ; Temperature, T, K]

CURVE 1
T = 298

λ	τ
1.18	0.646
1.53	0.698
2.08	0.727
2.58	0.730
3.22	0.732
3.84	0.732
4.73	0.732
5.25	0.750
5.67	0.750
6.13	0.722
6.42	0.722
7.13	0.758
7.80	0.760
8.37	0.750
8.92	0.745
9.26	0.757
9.93	0.757
10.4	0.770
11.2	0.758
12.0	0.747
12.7	0.705
13.2	0.714
13.6	0.740
14.4	0.696
14.8	0.619
15.2	0.530
15.8	0.429
16.2	0.316
16.5	0.129
17.0	0.057
17.5	0.067
17.9	0.067*
18.4	0.080
19.1	0.069
19.4	0.083
19.9	0.091*
20.5	0.109
20.9	0.136
21.5	0.147*
22.0	0.158

CURVE 2
T = 298

λ	τ
2.62	0.010
3.41	0.026
4.23	0.111
4.69	0.165
5.95	0.244
6.73	0.266
7.71	0.271
8.00	0.218
8.21	0.072
8.60	0.019
8.96	0.001
9.67	0.038
10.0	0.118
10.4	0.225
10.9	0.263
11.7	0.251
12.1	0.256
13.6	0.207
15.0	0.152
15.6	0.065
16.4	0.046
17.2	0.016
18.9	0.021
20.3	0.020
21.5	0.052
22.0	0.034

CURVE 3
T = 298

λ	τ
0.458	0.000
0.470	0.000
0.482	0.091
0.506	0.421
0.522	0.618
0.544	0.735
0.559	0.708
0.580	0.577
0.604	0.545
0.630	0.733

CURVE 4
T = 313

λ	τ
0.900	0.023
1.10	0.575
1.70	0.626
4.00	0.623
5.20	0.639
5.70	0.647
7.40	0.647
8.20	0.661
9.00	0.646
9.50	0.654
10.0	0.649
10.3	0.658
11.2	0.658
13.1	0.560
13.6	0.607
13.9	0.607*
15.0	0.242
15.9	0.193
16.7	0.021
17.1	0.000
18.8	0.000
20.1	0.023
20.6	0.000
50.0	0.000

CURVE 5
T = 300

λ	τ
53.7	0.021
55.8	0.056
62.6	0.208
64.8	0.234
66.6	0.239
69.1	0.208
71.7	0.217
75.1	0.269
77.0	0.298
79.4	0.313
85.1	0.416
87.9	0.410
89.9	0.444
92.0	0.483
93.3	0.455*
94.6	0.442

CURVE 5 (cont.)

λ	τ
96.6	0.472*
99.3	0.495

CURVE 6
T = 300

λ	τ
54.0	0.002
59.5	0.044
65.6	0.102
69.6	0.085
72.2	0.107
77.8	0.134
84.5	0.194
89.3	0.229
98.8	0.251

CURVE 7
T = 300

λ	τ
30.0	0.858
31.4	0.848
32.7	0.823
34.3	0.778
35.3	0.702
36.7	0.572
41.4	0.123
42.5	0.154
43.8	0.249
45.6	0.383
46.7	0.443
48.3	0.493
52.3	0.582
55.6	0.638
59.7	0.699

CURVE 8
T = 301

λ	τ
0.4848	0.000420
0.4864	0.000550*
0.4876	0.000730*
0.4876	0.000800*
0.4890	0.00127*
0.4890	0.00140*
0.4899	0.00215*

CURVE 8 (cont.)

λ	τ
0.4908	0.00380*
0.4918	0.00562*
0.4927	0.00794*
0.4941	0.0100
0.4950	0.0129*
0.4959	0.0145*
0.4966	0.0162*
0.4979	0.0186*
0.4987	0.0229
0.4999	0.0331*
0.5010	0.0589
0.5021	0.112
0.5032	0.170
0.5043	0.251
0.5047	0.347*
0.5059	0.389
0.5071	0.447*
0.5080	0.490
0.5114	0.589
0.5140	0.724
0.5158	0.832

CURVE 9
T = 301

λ	τ
0.4651	0.000276*
0.4680	0.000300*
0.4724	0.000310*
0.4779	0.000310*
0.4826	0.000320*
0.4859	0.000370*
0.4876	0.000460*
0.4891	0.000600*
0.4904	0.000750*
0.4917	0.000870*
0.4930	0.00100*
0.4964	0.00110*
0.4983	0.00123*
0.4992	0.00141*
0.5001	0.00183*
0.5010	0.00324*
0.5019	0.00490*
0.5031	0.00912*
0.5045	0.00182
0.5050	0.0490

CURVE 9 (cont.)

λ	τ
0.5061	0.107
0.5067	0.191
0.5077	0.275*
0.5089	0.331
0.5100	0.389*
0.5110	0.427*
0.5117	0.479
0.5132	0.525*
0.5145	0.631
0.5162	0.724*
0.5175	0.776
0.5200	0.851
0.5252	0.977

CURVE 10
T = 298

λ	τ
0.500	0.000
0.516	0.019*
0.528	0.409
0.565	0.671
0.655	0.714
0.832	0.727
2.62	0.752
8.48	0.752
8.91	0.735
9.52	0.752*
10.8	0.752
11.5	0.733
12.6	0.683
13.4	0.710
15.6	0.336
16.6	0.000
20.1	0.000
21.7	0.038
22.6	0.056
25.1	0.010
26.6	0.000

* Not shown on plot

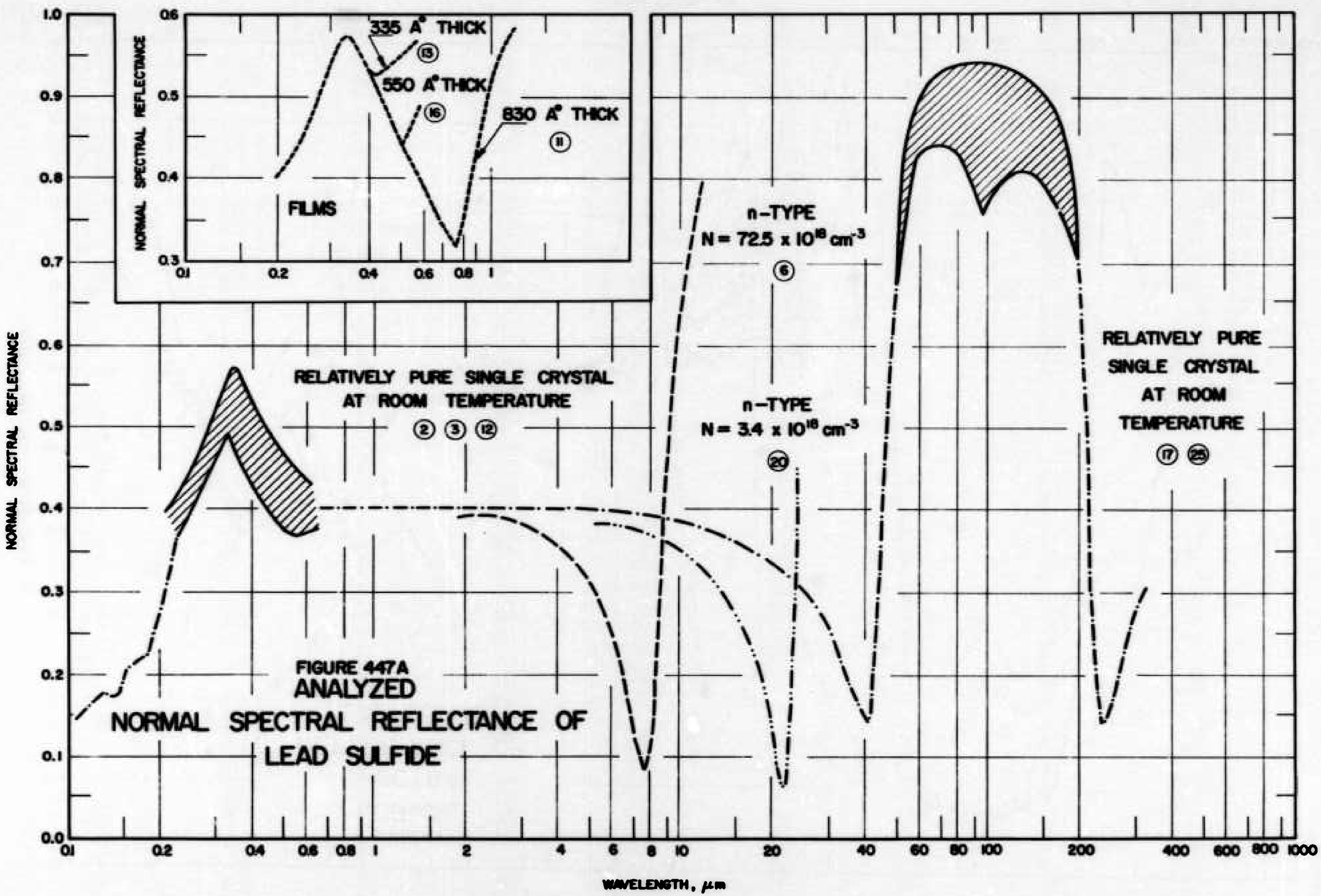


FIGURE 447A
ANALYZED
NORMAL SPECTRAL REFLECTANCE OF LEAD SULFIDE

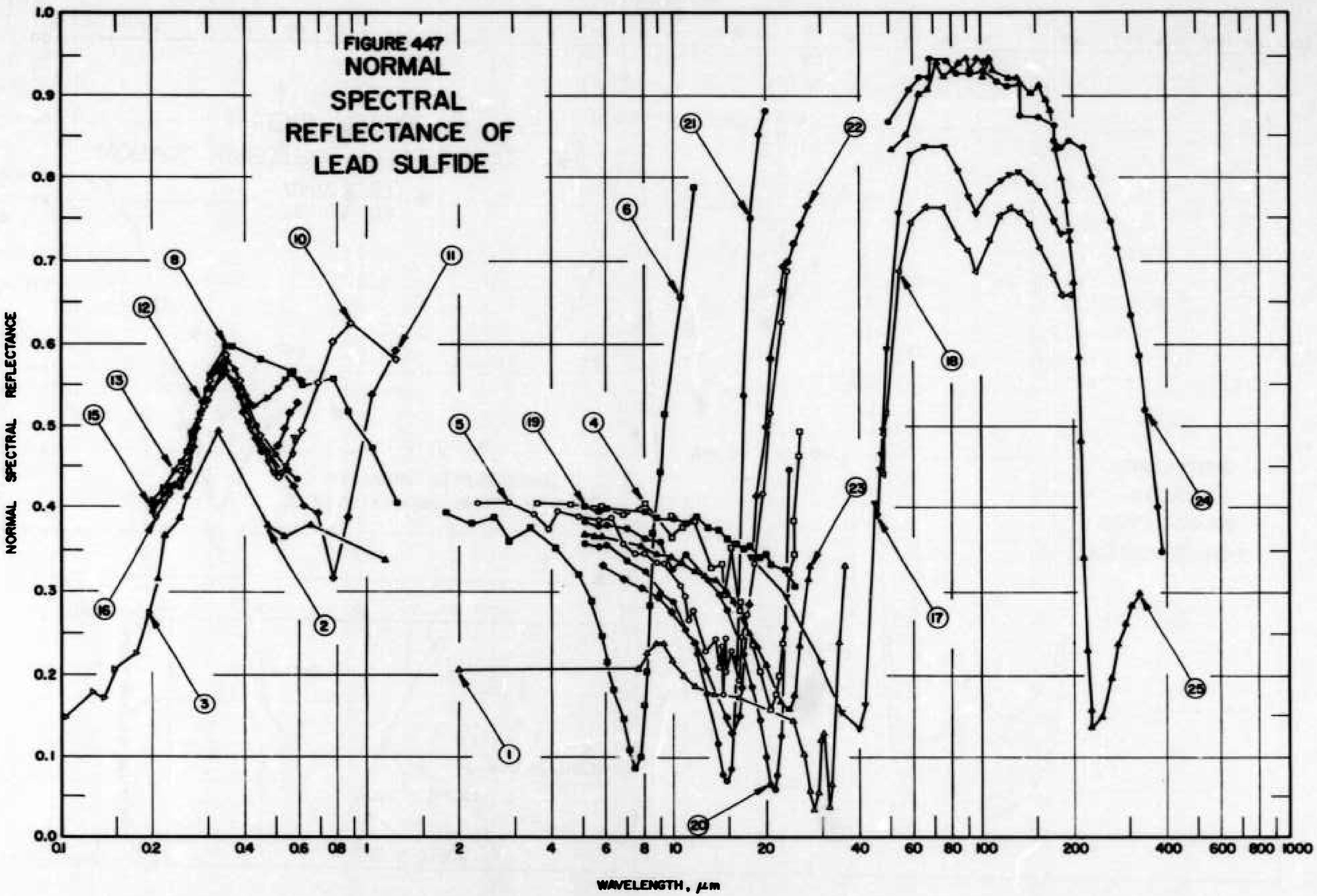


FIGURE 447
NORMAL
SPECTRAL
REFLECTANCE OF
LEAD SULFIDE
NORMAL SPECTRAL REFLECTANCE
WAVELENGTH, μm
0.0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
1.0
0.1
0.2
0.4
0.6
0.8
1
2
4
6
8
10
20
40
60
80
100
200
400
600
800
1000
1
2
3
4
5
6
8
10
11
12
13
15
16
17
18
19
20
21
22
23
24
25

SPECIFICATION TABLE NO. 447 NORMAL SPECTRAL REFLECTANCE OF LEAD SULFIDE PbS

Curve No.	Ref. No.	Year	Temperature K	Wavelength Range, μm	Geometry θ	θ'	ω'	Reported Error, %	Composition (weight percent), Specifications, and Remarks
1	176	1963	298	2.00-36.0	0°		2π		Galena; polished; porous surface; data taken from smooth curve.
2	74	1964	297	0.207-1.13	~0°	~0°			Single crystal; cleaved; data extracted from smooth curve.
3	74	1964	297	0.0590-0.207	~0°	~0°			Epitaxially-deposited layer, single crystal with (100) orientation, on NaCl single-crystal substrate; data extracted from smooth curve.
4	316	1967	293	3.60-25.8	~0°	~0°			Crystal; grown by slow cooling of the melt; electron density 3.9×10^{18} cm^{-3}; measured in argon; [Authors' designation: Sample No. 4].
5	316	1967	293	2.30-23.2	~0°	~0°			Similar to the above sample and conditions except electron density 11.0×10^{18} cm^{-3}; [Authors' designation: Sample No. 8].
6	316	1967	293	1.80-11.8	~0°	~0°			Similar to the above specimen and conditions except electron density 72.5×10^{18} cm^{-3}; [Authors' designation: Sample No. 22].
7*	316	1967	293	5.30-22.6	~0°	~0°			Similar to the above specimen and conditions except electron density 10.2×10^{18} cm^{-3}; [Authors' designation: Sample No. 42].
8	344	1967	~298	0.248-1.24	9°	9°		± 2	Epitaxial thin film (260 Å thick); grown in vacuum; measured immediately after formation.
9*	344	1967	~298	0.248-1.24	9°	9°		-2, +4	Similar to above specimen and conditions except film thickness 430 Å.
10	344	1967	~298	0.248-1.24	9°	9°		± 2	Similar to curve 8 specimen and conditions except film thickness 490 Å.
11	344	1967	~298	0.248-1.24	9°	9°		-2, +4	Similar to curve 8 specimen and conditions except film thickness 830 Å.
12	345	1967	298	0.200-0.596	~0°	~0°		± 5	Crystalline; cleaved.
13	345	1967	298	0.200-0.602	~0°	~0°		± 5	Epitaxial PbS film (335 Å thick); NaCl substrate (~3 mm thick) cleaved in air; powdered natural PbS evaporated in vacuum (5×10^{-6} mm Hg) at 40 to 80 Å min^{-1} and with a substrate temp of 573 K.
14*	345	1967	298	0.200-0.605	~0°	~0°		± 5	Similar to the above specimen and conditions except film 410 Å thick.
15	345	1967	298	0.200-0.599	~0°	~0°		± 5	Similar to the above specimen and conditions except film 475 Å thick.
16	345	1967	298	0.200-0.602	~0°	~0°		± 5	Epitaxial PbS film (550 Å thick); KCl substrate (~3 mm thick) cleaved in air; powdered natural PbS evaporated in vacuum (5×10^{-6} mm Hg) at 200 Å min^{-1} and at a substrate of 573 K.
17	336	1955	296	18.0-196	~0°	~0°			Single crystal.
18	336	1955	403	48.0-196	~0°	~0°			Single crystal.
19	387	1965	85	5.14-24.7	~10°	~10°			Natural n-type crystal; optical surface prepared by cleaving along a crystal face; carrier density 4.0×10^{17} cm^{-3} at 77 K; aluminized mirror reference standard; [Authors' designation: Sample A].
20	387	1965	85	5.14-23.9	~10°	~10°			Similar to the above specimen and conditions except synthetic crystal; carrier density 3.4×10^{18} cm^{-3}; [Authors' designation: Sample C].
21	387	1965	85	5.14-20.0	~10°	~10°			Similar to the above specimen and conditions except carrier density 9.2×10^{18} cm^{-3}; [Authors' designation: Sample E].

* Not shown on plot

SPECIFICATION TABLE NO. 447 (continued)

Curve No.	Ref. No.	Year	Temperature K	Wavelength Range, μm	Geometry θ	θ'	ω'	Reported Error, %	Composition (weight percent), Specifications, and Remarks
22	387	1965	300	5.94-27.1	8°	8°			Synthetic n-type crystal; polished and ground; carrier density 8.8 x 10^{18} cm^{-3}; aluminized mirror reference standard; [Authors' designation: Sample D].
23	387	1965	300	5.04-27.5	8°	8°			Similar to the above specimen and conditions except carrier density 3.1 x 10^{18} cm^{-3}; [Authors' designation: Sample B].
24	387	1965	300	50.0-388	8°	8°			Synthetic n-type crystal; polished and ground; similar to sample C in electrical characteristics; aluminized mirror reference standard.
25	387	1965	300	51.0-324	8°	8°			Natural n-type crystal; polished and ground; low carrier density; aluminized mirror reference standard.

DATA TABLE NO. 447 NORMAL SPECTRAL REFLECTANCE OF LEAD SULFIDE PbS

[Wavelength, λ, μm; Reflectance, ρ; Temperature, T, K]

CURVE 1
T = 298

λ	ρ
2.00	0.205
7.76	0.207
8.31	0.225
8.80	0.239
9.23	0.239
9.96	0.217
10.8	0.200
11.8	0.188
13.5	0.178
16.1	0.173
20.8	0.165*
22.4	0.159*
24.1	0.142
25.4	0.123*
26.3	0.103
27.8	0.058
28.5	0.034
28.9	0.032*
29.3	0.054
30.0	0.120
30.2	0.127*
30.5	0.127
32.0	0.038
32.3	0.041*
32.8	0.064
33.3	0.100*
34.8	0.240
36.0	0.332

CURVE 2
T = 297

λ	ρ
0.207	0.315
0.218	0.364
0.243	0.386
0.258	0.411
0.326	0.494
0.477	0.379
0.539	0.365
0.653	0.379
1.13	0.340

CURVE 3
T = 297

λ	ρ
0.0590	0.047*
0.0678	0.038*
0.0734	0.038*
0.0770	0.070*
0.0810	0.105*
0.0849	0.129*
0.0839	0.143*
0.102	0.146
0.107	0.153*
0.119	0.175*
0.125	0.179
0.138	0.170
0.143	0.174*
0.149	0.205
0.161	0.210*
0.175	0.225
0.191	0.274
0.207	0.314*

CURVE 4
T = 293

λ	ρ
3.60	0.402
4.60	0.402
5.80	0.400
6.90	0.390
8.10	0.402
9.80	0.365
10.6	0.378
11.8	0.383
13.0	0.353*
13.2	0.330
14.3	0.334
14.6	0.297
15.2	0.351
15.6	0.315*
16.1	0.279
16.5	0.286
17.4	0.244*
18.0	0.236
18.6	0.206*
19.0	0.201
19.5	0.182*
19.9	0.178*

CURVE 4 (cont.)

λ	ρ
20.2	0.164*
20.5	0.169*
20.6	0.158
20.9	0.167*
21.3	0.179
21.6	0.186*
22.0	0.200
22.2	0.219*
22.3	0.237
22.7	0.256*
23.2	0.287*
23.5	0.322
23.8	0.358*
24.4	0.385
24.4	0.347
24.9	0.424*
25.2	0.463
25.8	0.494

CURVE 5
T = 293

λ	ρ
2.30	0.402
2.90	0.403
3.50	0.390
3.90	0.371
4.20	0.394
4.90	0.388
5.70	0.383
6.30	0.386
6.90	0.357
7.50	0.347
8.10	0.347
8.90	0.335
9.40	0.335
9.90	0.327*
10.6	0.306
11.0	0.293
11.2	0.266
11.8	0.276
12.5	0.244*
12.9	0.228
13.2	0.241*
13.7	0.241
14.0	0.210

CURVE 5 (cont.)

λ	ρ
14.2	0.234
14.5	0.195*
14.7	0.176
14.7	0.245
14.9	0.203
15.2	0.218*
15.4	0.229
15.7	0.210*
16.1	0.195
16.2	0.236*
16.8	0.248
16.9	0.277*
17.3	0.272
17.9	0.301*
18.4	0.335
18.9	0.372*
19.6	0.419
20.1	0.471*
20.7	0.516
21.6	0.569*
22.4	0.628
22.7	0.679*
23.2	0.689

CURVE 6
T = 293

λ	ρ
1.80	0.392
2.20	0.380
2.60	0.387
2.90	0.360
3.40	0.373
4.10	0.351
4.90	0.320
5.40	0.287
5.80	0.248
6.10	0.215
6.40	0.181
6.50	0.166*
6.90	0.144
7.00	0.127*
7.20	0.108
7.30	0.098*
7.50	0.083
7.70	0.089*

CURVE 6 (cont.)

λ	ρ
7.80	0.100
8.00	0.116*
8.00	0.162
8.20	0.202
8.30	0.249*
8.40	0.281
8.50	0.301*
8.50	0.333*
8.60	0.368
8.80	0.403*
9.00	0.445
9.10	0.472*
9.30	0.515
9.70	0.569*
10.5	0.659
11.1	0.746*
11.8	0.788

CURVE 7*
T = 293

λ	ρ
5.30	0.375
6.60	0.367
8.20	0.365
9.10	0.321
9.50	0.316
10.4	0.289
11.2	0.246
11.7	0.256
12.5	0.212
13.1	0.211
13.6	0.183
14.1	0.186
14.6	0.157
14.8	0.187
15.2	0.197
15.5	0.240
16.0	0.258
16.5	0.319
17.3	0.399
18.5	0.545
19.5	0.626
20.6	0.733
21.7	0.792
22.6	0.860

CURVE 8
T ~ 298

λ	ρ
0.248	0.452
0.258	0.469
0.269	0.490
0.281	0.512
0.294	0.533*
0.309	0.561
0.325	0.584*
0.343	0.599
0.365	0.599
0.387	0.591*
0.412	0.587*
0.443	0.582
0.475	0.586*
0.516	0.579*
0.563	0.566
0.617	0.550
0.689	0.558*
0.770	0.559
0.879	0.519
1.03	0.471
1.24	0.404

CURVE 9*
T ~ 298

λ	ρ
0.248	0.450
0.256	0.464
0.270	0.482
0.282	0.501
0.295	0.523
0.309	0.541
0.325	0.561
0.343	0.566
0.364	0.554
0.387	0.530
0.412	0.498
0.443	0.470
0.475	0.444
0.517	0.457
0.563	0.486
0.620	0.513
0.685	0.555
0.770	0.588
0.886	0.594

CURVE 9 (cont.)*

λ	ρ
1.03	0.579
1.24	0.533

CURVE 10
T ~ 298

λ	ρ
0.248	0.445
0.258	0.452
0.269	0.469*
0.282	0.494*
0.294	0.522
0.309	0.554
0.325	0.580*
0.343	0.588
0.363	0.575*
0.387	0.554
0.413	0.517*
0.441	0.487
0.477	0.449*
0.517	0.439
0.564	0.462*
0.617	0.494
0.685	0.552
0.775	0.601
0.886	0.626
1.03	0.620*
1.24	0.582

CURVE 11
T ~ 298

λ	ρ
0.248	0.434
0.259	0.451*
0.270	0.472
0.282	0.495*
0.295	0.517*
0.310	0.542
0.325	0.562*
0.344	0.568
0.365	0.552*
0.387	0.533
0.413	0.511*
0.444	0.488*
0.475	0.469
0.514	0.452*

CURVE 11 (cont.)

λ	ρ
0.564	0.425
0.620	0.400
0.685	0.391
0.775	0.316
0.879	0.388
1.03	0.537
1.24	0.594

CURVE 12
T = 298

λ	ρ
0.200	0.394
0.204	0.403*
0.210	0.406*
0.215	0.416
0.220	0.419*
0.225	0.426*
0.229	0.426
0.235	0.425*
0.240	0.424*
0.245	0.424
0.250	0.426*
0.260	0.442
0.270	0.468*
0.280	0.511*
0.290	0.529
0.301	0.543*
0.310	0.552*
0.319	0.560*
0.329	0.575
0.341	0.573*
0.350	0.569*
0.359	0.562*
0.369	0.555
0.380	0.544*
0.388	0.540*
0.400	0.535*
0.409	0.525*
0.419	0.517*
0.429	0.509*
0.439	0.500
0.449	0.490*
0.457	0.484*
0.469	0.477*
0.479	0.471*

*Not shown on plot

DATA TABLE NO. 447 (continued)

λ	ρ
CURVE 12 (cont.)	
0.490	0.468*
0.500	0.463
0.510	0.456*
0.521	0.451*
0.541	0.444
0.561	0.442*
0.579	0.438*
0.596	0.436
CURVE 13 T = 298	
0.200	0.409
0.204	0.410*
0.210	0.413*
0.215	0.422
0.219	0.425*
0.225	0.433*
0.229	0.436*
0.235	0.443
0.240	0.446*
0.244	0.449*
0.250	0.451*
0.260	0.465*
0.269	0.484
0.280	0.511*
0.290	0.530*
0.301	0.543
0.310	0.554*
0.320	0.570
0.330	0.580*
0.340	0.580*
0.350	0.580
0.360	0.571*
0.370	0.570
0.380	0.563*
0.390	0.554*
0.400	0.536
0.409	0.524*
0.420	0.525*
0.429	0.525
0.439	0.523*
0.449	0.528*
0.461	0.528*
0.471	0.532
0.482	0.537*
0.494	0.541*

λ	ρ
CURVE 13 (cont.)	
0.508	0.545
0.521	0.550*
0.539	0.557
0.558	0.563
0.582	0.562*
0.602	0.557
CURVE 14* T = 298	
0.200	0.414
0.205	0.416
0.210	0.426
0.215	0.428
0.220	0.433
0.225	0.440
0.229	0.442
0.235	0.447
0.239	0.447
0.245	0.449
0.250	0.454
0.260	0.472
0.270	0.502
0.280	0.529
0.290	0.550
0.301	0.568
0.310	0.581
0.320	0.591
0.330	0.598
0.340	0.605
0.350	0.605
0.360	0.596
0.369	0.595
0.381	0.585
0.390	0.575
0.398	0.563
0.410	0.550
0.420	0.543
0.430	0.539
0.439	0.534
0.451	0.530
0.461	0.529
0.471	0.531
0.482	0.538
0.490	0.545
0.504	0.553
0.512	0.561
0.523	0.539

λ	ρ
CURVE 14 (cont.)*	
0.541	0.576
0.563	0.587
0.582	0.590
0.605	0.594
CURVE 15 T = 298	
0.200	0.400
0.204	0.403*
0.209	0.407*
0.214	0.416*
0.219	0.419*
0.225	0.426*
0.229	0.426*
0.235	0.427
0.239	0.428*
0.244	0.427*
0.250	0.427*
0.260	0.447*
0.270	0.475*
0.279	0.498
0.289	0.520*
0.301	0.530
0.310	0.544*
0.319	0.552*
0.330	0.565
0.340	0.572
0.350	0.569*
0.359	0.562*
0.369	0.555*
0.380	0.545*
0.388	0.532*
0.398	0.516
0.410	0.505
0.420	0.496*
0.430	0.488*
0.438	0.482
0.449	0.475*
0.459	0.469
0.467	0.468*
0.478	0.466*
0.490	0.465*
0.502	0.467*
0.510	0.475
0.521	0.481*
0.539	0.496

λ	ρ
CURVE 15 (cont.)	
0.558	0.517
0.582	0.518*
0.599	0.528
CURVE 16 T = 298	
0.200	0.395*
0.204	0.388
0.209	0.393*
0.215	0.403
0.219	0.406*
0.225	0.414
0.229	0.418*
0.235	0.422*
0.240	0.428*
0.245	0.428*
0.250	0.428*
0.260	0.452*
0.270	0.481*
0.280	0.505
0.290	0.529*
0.300	0.544*
0.310	0.551*
0.319	0.561*
0.330	0.565*
0.340	0.572*
0.351	0.569*
0.359	0.562*
0.369	0.554*
0.380	0.544*
0.388	0.532*
0.398	0.517*
0.410	0.505*
0.419	0.496
0.432	0.488*
0.439	0.481*
0.449	0.475
0.459	0.462*
0.469	0.454
0.480	0.445*
0.490	0.441
0.502	0.438*
0.510	0.438*
0.521	0.442
0.539	0.450
0.561	0.464

λ	ρ
CURVE 16 (cont.)	
0.579	0.425
0.602	0.495*
CURVE 17 T = 296	
18.0	0.345
23.0	0.293
30.0	0.214
35.0	0.155
40.0	0.134
42.0	0.162
45.0	0.406
46.0	0.390
47.0	0.446
47.0	0.464
48.0	0.495
49.0	0.596
54.0	0.756
59.0	0.828
66.0	0.837
76.0	0.837
85.0	0.809
91.0	0.776
97.0	0.756
107	0.782
116	0.797
124	0.802
134	0.808
145	0.793
157	0.782
172	0.748
183	0.735
196	0.739
CURVE 18 T = 403	
48.0	0.441
48.0	0.466*
48.0	0.490
49.0	0.518
54.0	0.686
59.0	0.748
66.0	0.765
75.0	0.763
85.0	0.729

λ	ρ
CURVE 18 (cont.)	
91.0	0.713
97.0	0.688
107	0.727
117	0.752
125	0.762
134	0.757
145	0.744
158	0.718
172	0.681
184	0.660
196	0.660
CURVE 19 T = 85	
5.14	0.400
5.67	0.395
6.01	0.399
6.96	0.392*
8.02	0.394
8.98	0.387
10.0	0.388
11.0	0.381
12.0	0.386
13.0	0.377
14.0	0.373
15.0	0.363
16.0	0.359
17.0	0.352
18.0	0.354
19.0	0.343
20.0	0.347
20.9	0.336
22.2	0.330*
23.0	0.327
24.3	0.313*
24.7	0.309
CURVE 20 T = 85	
5.14	0.381
5.69	0.377
6.05	0.378
7.03	0.373
8.03	0.361
9.02	0.359

λ	ρ
CURVE 20 (cont.)	
10.0	0.328
11.0	0.348
12.0	0.323*
13.0	0.314
14.0	0.296
15.0	0.279
16.0	0.251
17.0	0.223
18.0	0.188
19.0	0.145
20.0	0.100
20.8	0.062
21.4	0.059
21.7	0.076
22.2	0.125
22.9	0.259
23.9	0.448
CURVE 21 T = 85	
5.14	0.356
5.67	0.353
6.01	0.355
7.05	0.337
8.02	0.323
9.05	0.298
10.0	0.287
11.0	0.254
12.0	0.223
13.0	0.178
14.0	0.113
14.6	0.074
15.0	0.066
15.3	0.081
16.0	0.220
17.0	0.537
18.0	0.750
19.0	0.851
20.0	0.883
CURVE 22 T = 300	
5.94	0.331
6.91	0.315
7.91	0.305

λ	ρ
CURVE 22 (cont.)	
8.89	0.292
9.87	0.276
10.8	0.259*
11.8	0.239
12.8	0.208
13.9	0.179*
15.0	0.149
15.5	0.129
15.9	0.133*
16.2	0.150
16.4	0.160*
16.8	0.186
17.8	0.285
18.9	0.415
20.0	0.500
20.7	0.585
22.1	0.664
22.9	0.692
23.8	0.700
24.7	0.721
26.0	0.745
27.1	0.765
CURVE 23 T = 300	
5.04	0.368
5.59	0.365
5.89	0.365
6.96	0.359*
7.88	0.354
8.97	0.348
9.95	0.344
10.8	0.333
11.8	0.326
12.9	0.320
13.9	0.313
15.0	0.300
15.8	0.289
16.8	0.269*
17.9	0.251
18.9	0.234
20.0	0.214
20.8	0.194*
22.3	0.166
23.0	0.163*
23.8	0.160

* Not shown on plot

DATA TABLE NO. 447 (continued)

CURVE 23 (cont.)
T = 300

λ	ρ
24.8	0.176
26.0	0.233
27.2	0.317
27.5	0.331

CURVE 24
T = 300

λ	ρ
50.0	0.868
58.0	0.908
63.0	0.923
68.0	0.925
68.0	0.948
77.0	0.945
84.0	0.930
93.0	0.930
101	0.932
105	0.927*
113	0.920
123	0.911
132	0.915
132	0.876
138	0.882*
148	0.877*
155	0.871
134	0.868*
173	0.843
174	0.863
184	0.836
195	0.844
206	0.836*
215	0.836
221	0.823*
225	0.814*
230	0.800
245	0.779*
262	0.748
277	0.719
293	0.678*
308	0.638
323	0.589
340	0.520
356	0.459*
372	0.400
388	0.350

CURVE 25
T = 300

λ	ρ
51.0	0.833
57.0	0.852
63.0	0.901
67.0	0.910
72.0	0.943
76.0	0.927
81.0	0.935
85.0	0.942
90.0	0.949
93.0	0.933
97.0	0.949
101	0.945
101	0.928
106	0.949
110	0.935
114	0.933*
119	0.928*
123	0.924
128	0.924*
131	0.924
138	0.910*
148	0.903
156	0.912
164	0.898
170	0.885
174	0.860*
179	0.833
185	0.800
190	0.771
195	0.727
200	0.674
206	0.588
210	0.483
215	0.343
220	0.230
226	0.158
229	0.138
246	0.150
261	0.198
278	0.237
294	0.262
308	0.282
324	0.300

*Not shown on plot

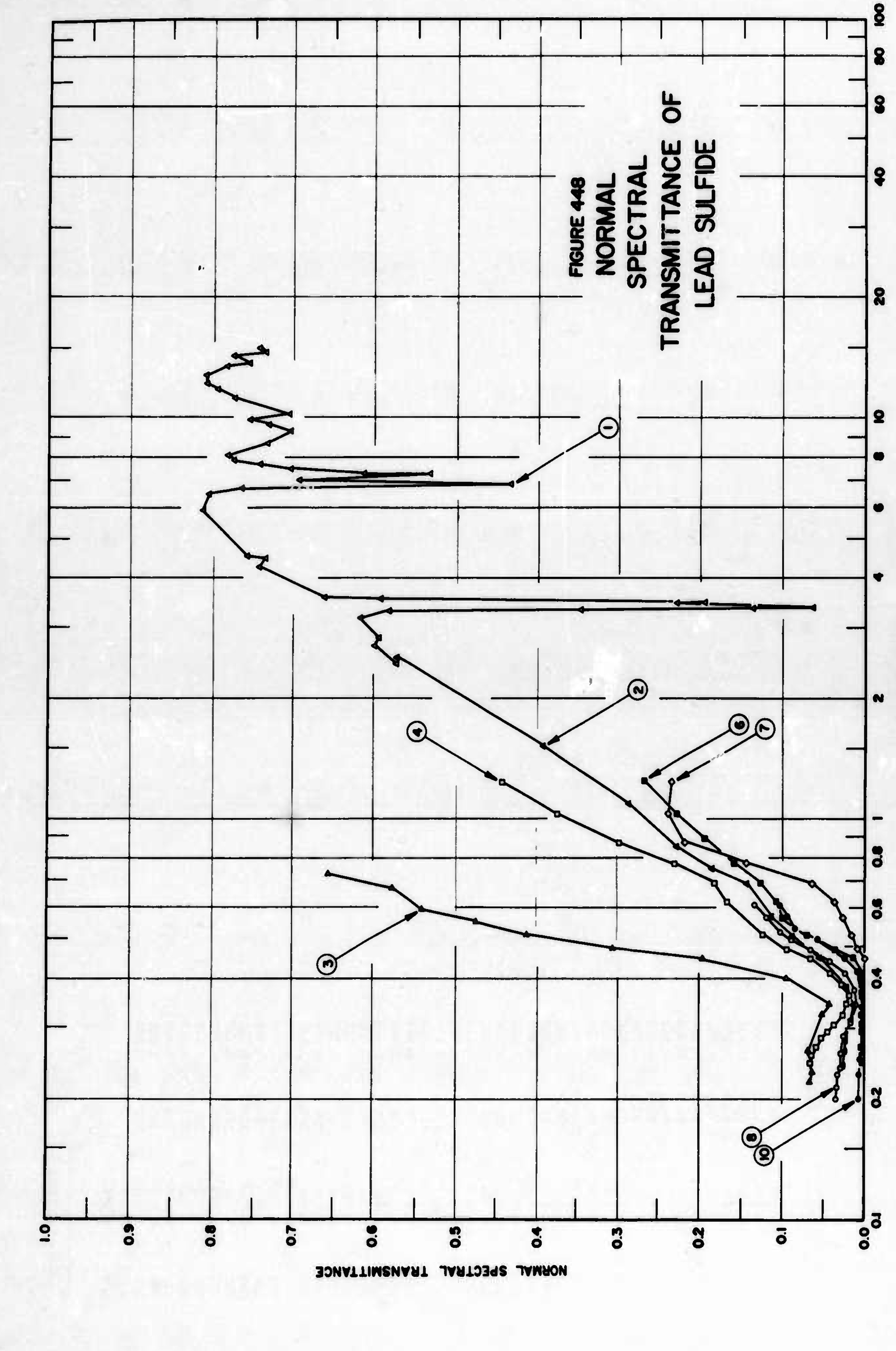


FIGURE 448 NORMAL SPECTRAL TRANSMITTANCE OF LEAD SULFIDE

SPECIFICATION TABLE NO. 448 NORMAL SPECTRAL TRANSMITTANCE OF LEAD SULFIDE PbS

Curve No.	Ref. No.	Year	Temperature K	Wavelength Range, μm	Geometry θ	θ'	ω'	Reported Error, %	Composition (weight percent), Specifications, and Remarks
1	26	1962	298	2.44-15.0	~0°	~0°			Ground in Nujol mull; data extracted from smooth curve.
2	74	1964	297	0.241-2.53	0°	0°			Epitaxially-deposited thin film (340 Å thick); single crystal with orientation (100); data extracted from smooth curve.
3	74	1964	77	0.220-0.849	~0°	~0°			Above specimen and conditions.
4	344	1967	~298	0.248-1.24	0°	0°		3-10	Epitaxial thin film (260 Å thick); deposited on crystal substrate in vacuum; measured immediately after formation.
5*	344	1967	~298	0.248-1.24	0°	0°		3-10	Similar to the above specimen and conditions except film thickness 430 Å.
6	344	1967	~298	0.248-1.24	0°	0°		3-10	Similar to the above specimen and conditions except film thickness 490 Å.
7	344	1967	~298	0.248-1.24	0°	0°		3-10	Similar to the above specimen and conditions except film thickness 830 Å.
8	345	1967	298	0.200-0.605	~0°	~0°		± 10-25	Epitaxial film (~335 Å thick); NaCl substrate (~3 mm thick) cleaved in air; powdered natural PbS evaporated in vacuum (5×10^{-4} mm Hg) at 40 to 80 Å min^{-1} and at a substrate temp of 573 K.
9*	345	1967	298	0.200-0.608	~0°	~0°		± 10-25	Similar to the above specimen and conditions except with 410 Å film thickness.
10	345	1967	298	0.200-0.605	~0°	~0°		± 10-25	Similar to the above specimen and conditions except with 475 Å film thickness.
11*	345	1967	298	0.200-0.605	~0°	~0°		± 10-25	Epitaxial film (550 Å thick); KCl substrate (~3 mm thick) cleaved in air; powdered natural PbS evaporated in vacuum (5×10^{-4} mm Hg, rate 200 Å min^{-1}) and grown at a substrate temperature of 573 K.

* Not shown on plot

DATA TABLE NO. 448 NORMAL SPECTRAL TRANSMITTANCE OF LEAD SULFIDE PbS

[Wavelength, λ, μm; Transmittance, τ; Temperature, T, K]

CURVE 1, T = 298

λ	τ
2.44	0.573
2.54	0.573*
2.64	0.593*
2.70	0.600
2.82	0.595
2.87	0.593*
3.19	0.619
3.25	0.613*
3.30	0.582
3.32	0.347
3.33	0.138
3.37	0.062
3.44	0.228
3.47	0.196
3.47	0.268*
3.51	0.592
3.59	0.662
3.71	0.667*
4.18	0.730*
4.21	0.745
4.41	0.746*
4.46	0.738
4.57	0.760
4.96	0.779*
5.89	0.813
6.04	0.808*
6.42	0.808
6.63	0.795*
6.69	0.766
6.74	0.693*
6.81	0.431
7.00	0.694
7.15	0.681*
7.24	0.532
7.27	0.595*
7.30	0.611
7.32	0.671*
7.43	0.701
7.53	0.744*
7.71	0.744
7.78	0.768*
7.93	0.776
8.05	0.776*
8.13	0.784
8.37	0.783*

CURVE 1 (cont.)

λ	τ
8.61	0.734
8.88	0.720*
9.32	0.702
9.48	0.704*
9.62	0.732
9.98	0.755
10.2	0.704*
10.3	0.703
10.4	0.733*
11.1	0.776
11.2	0.776*
11.2	0.789*
11.6	0.796*
11.9	0.796
12.2	0.810*
12.3	0.810
12.8	0.810
13.3	0.799*
13.4	0.796*
13.5	0.786
13.8	0.765
14.0	0.776
14.3	0.776
14.5	0.767*
14.6	0.739
14.7	0.743*
15.0	0.743

CURVE 2, T = 297

λ	τ
0.241	0.0275
0.264	0.0268
0.280	0.0252
0.318	0.0195
0.345	0.0160
0.365	0.0171*
0.380	0.0212
0.449	0.0551
0.506	0.0885
0.566	0.113
0.689	0.144
0.756	0.185
0.855	0.229
1.09	0.286
1.51	0.394
2.53	0.571

CURVE 3, T = 77

λ	τ
0.220	0.0662
0.234	0.0622
0.241	0.0655*
0.248	0.0684*
0.261	0.0697
0.284	0.0659*
0.313	0.0568*
0.326	0.0516
0.348	0.0417
0.365	0.0443*
0.382	0.0562*
0.408	0.0951
0.444	0.196
0.479	0.307
0.512	0.415
0.551	0.475
0.599	0.541
0.667	0.579
0.721	0.658
0.849	1.000

CURVE 4, T ~ 298

λ	τ
0.248	0.0662
0.258	0.0638
0.270	0.0594
0.282	0.0526
0.295	0.0464
0.309	0.0382
0.325	0.0298
0.343	0.0220
0.364	0.0208
0.386	0.0290
0.412	0.0418
0.441	0.0640
0.475	0.094
0.516	0.125
0.563	0.153*
0.620	0.167
0.685	0.181
0.770	0.230
0.879	0.300
1.03	0.375
1.24	0.442

CURVE 5*, T ~ 298

λ	τ
0.248	0.0094
0.258	0.0086
0.269	0.0078
0.281	0.0070
0.294	0.0056
0.309	0.0045
0.324	0.0033
0.343	0.0025
0.362	0.0025
0.386	0.0040
0.412	0.0090
0.441	0.0213
0.475	0.044
0.516	0.080
0.561	0.105
0.620	0.121
0.685	0.134
0.775	0.163
0.886	0.200
1.03	0.239
1.24	0.271

CURVE 6, T ~ 298

λ	τ
0.248	0.0057
0.258	0.0055*
0.270	0.0054
0.281	0.0046*
0.295	0.0038
0.308	0.0029
0.325	0.0020
0.343	0.0016*
0.364	0.0016
0.387	0.0022
0.412	0.0058
0.443	0.0146
0.477	0.036
0.515	0.070
0.561	0.100
0.620	0.107
0.685	0.126
0.770	0.160
0.886	0.192
1.03	0.229
1.24	0.267

CURVE 7, T ~ 298

λ	τ
0.443	0.000
0.477	0.010
0.515	0.017
0.561	0.026
0.620	0.038
0.685	0.063
0.775	0.143
0.879	0.218
1.03	0.2[illegible]9
1.24	0.234

CURVE 8, T = 298

λ	τ
0.200	0.0363
0.205	0.0358*
0.211	0.0358
0.215	0.0368*
0.220	0.0356*
0.225	0.0347*
0.230	0.0330
0.235	0.0319*
0.240	0.0303
0.245	0.0310*
0.209	0.0315*
0.261	0.0306
0.270	0.0298*
0.281	0.0263
0.290	0.0239*
0.301	0.0211*
0.310	0.0185
0.320	0.0158
0.332	0.0136*
0.342	0.0119
0.352	0.0112*
0.360	0.0111*
0.371	0.0117
0.380	0.0135*
0.391	0.0159*
0.400	0.0196*
0.411	0.0245
0.422	0.0299*
0.431	0.0365*
0.440	0.0419
0.451	0.0492*
0.459	0.0575*

CURVE 8 (cont.)

λ	τ
0.470	0.0643
0.481	0.0728*
0.500	0.0879
0.523	0.101
0.541	0.114*
0.564	0.120
0.582	0.126*
0.605	0.133

CURVE 9*, T = 298

λ	τ
0.200	0.0195
0.204	0.0189
0.210	0.0186
0.215	0.0175
0.220	0.0172
0.225	0.0166
0.230	0.0163
0.235	0.0155
0.241	0.0151
0.245	0.0153
0.251	0.0151
0.261	0.0145
0.270	0.0136
0.280	0.0124
0.290	0.0106
0.301	0.0094
0.311	0.0081
0.320	0.0066
0.331	0.0054
0.341	0.0046
0.351	0.0043
0.360	0.0044
0.369	0.0049
0.379	0.0057
0.391	0.0076
0.400	0.0099
0.411	0.0129
0.420	0.0171
0.431	0.0214
0.440	0.0279
0.449	0.0345
0.459	0.0407
0.470	0.0481
0.479	0.0560

CURVE 9 (cont.)*

λ	τ
0.500	0.0711
0.519	0.0863
0.539	0.0959
0.564	0.103
0.588	0.109
0.608	0.114

CURVE 10, T = 298

λ	τ
0.200	0.0093
0.205	0.0090*
0.210	0.0098*
0.214	0.0091*
0.220	0.0091*
0.225	0.0083*
0.230	0.0081
0.235	0.0077*
0.240	0.0076*
0.245	0.0077*
0.250	0.0078
0.260	0.0078*
0.270	0.0071*
0.280	0.0064*
0.290	0.0058*
0.300	0.0050
0.310	0.0041*
0.320	0.0035*
0.330	0.0030*
0.340	0.0025
0.349	0.0024*
0.359	0.0025*
0.370	0.0028
0.379	0.0033*
0.390	0.0042*
0.400	0.0057
0.409	0.0081*
0.419	0.0107
0.429	0.0143*
0.438	0.0185*
0.449	0.0230
0.458	0.0291*
0.470	0.0360*
0.479	0.0435*
0.500	0.0578
0.521	0.0724*

CURVE 10 (cont.)

λ	τ
0.539	0.0836
0.564	0.0925
0.579	0.0964*
0.605	0.102

CURVE 11*, T = 298

λ	τ
0.200	0.0053
0.205	0.0045
0.211	0.0042
0.214	0.0037
0.220	0.0036
0.225	0.0032
0.230	0.0031
0.234	0.0030
0.240	0.0030
0.246	0.0031
0.251	0.0032
0.259	0.0032
0.269	0.0028
0.279	0.0025
0.290	0.0020
0.300	0.0017
0.310	0.0015
0.320	0.0012
0.330	0.0009
0.340	0.0009
0.350	0.0008
0.360	0.0008
0.372	0.0009
0.382	0.0011
0.391	0.0015
0.401	0.0023
0.409	0.0033
0.420	0.0048
0.431	0.0067
0.438	0.0090
0.451	0.0126
0.459	0.0162
0.471	0.0211
0.481	0.0272
0.502	0.0407
0.521	0.0565
0.539	0.0682
0.561	0.0776
0.582	0.0871
0.605	0.0908

*Not shown on plot

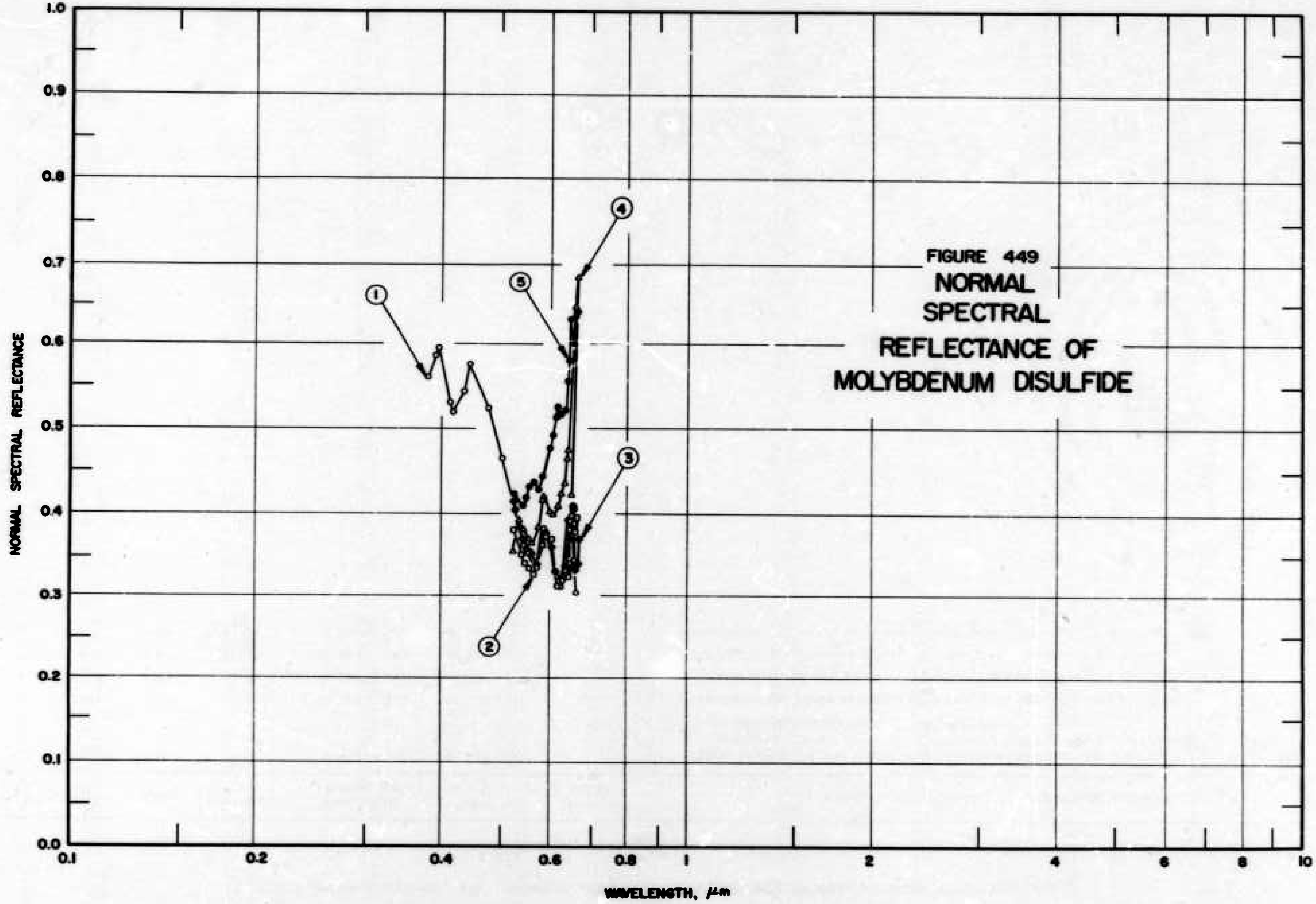


FIGURE 449 NORMAL SPECTRAL REFLECTANCE OF MOLYBDENUM DISULFIDE

SPECIFICATION TABLE NO. 449 NORMAL SPECTRAL REFLECTANCE OF MOLYBDENUM DISULFIDE MoS_2

Curve No.	Ref. No.	Year	Temperature K	Wavelength Range, μm	Geometry θ	Geometry θ'	Geometry ω'	Reported Error, %	Composition (weight percent), Specifications, and Remarks
1	349	1967	77	0.381-0.666	~6°	~6°			Single crystal (~1 mm thick); anisotropic and uniaxial negative cleaved on (0001) plane; specimen surface perpendicular to optic c-axis; E vector perpendicular to optic c-axis; data extracted from smooth curve.
2	349	1967	77	0.526-0.652	~6°	~6°			Similar to the above specimen and conditions except 0.4165 μm thick.
3	349	1967	77	0.526-0.667	~6°	~6°			Similar to the above specimen and conditions except 0.4105 μm thick.
4	349	1967	77	0.526-0.663	~6°	~6°			Similar to the above specimen and conditions except 0.158 μm thick.
5	349	1967	77	0.526-0.661	~6°	~6°			Similar to the above specimen and conditions except 0.055 μm thick.

DATA TABLE NO. 449 NORMAL SPECTRAL REFLECTANCE OF MOLYBDENUM DISULFIDE MoS_2

[Wavelength, λ, μm; Reflectance, ρ; Temperature, T, K]

λ	ρ	λ	ρ	λ	ρ	λ	ρ	λ	ρ	λ	ρ
CURVE 1 T = 77		CURVE 2 T = 77		CURVE 2 (cont.)		CURVE 3 (cont.)		CURVE 4 (cont.)		CURVE 5 (cont.)	
0.381	0.562	0.526	0.384	0.650	0.392	0.646	0.389*	0.633	0.436*	0.624	0.518
0.385	0.568*	0.534	0.366*	0.652	0.380	0.648	0.394	0.636	0.436*	0.626	0.521*
0.388	0.576*	0.539	0.354	0.652	0.381	0.649	0.397*	0.638	0.440*	0.627	0.519*
0.390	0.588	0.543	0.347*	0.654	0.399	0.652	0.394*	0.640	0.466	0.629	0.529*
0.394	0.597	0.546	0.343*			0.654	0.400*	0.643	0.475	0.631	0.524*
0.397	0.590*	0.548	0.342	CURVE 3		0.655	0.410	0.649	0.424	0.635	0.523
0.399	0.593*	0.551	0.339*	T = 77		0.656	0.407	0.660	0.648	0.637	0.525*
0.411	0.532	0.553	0.340*	0.526	0.417	0.659	0.341	0.661	0.669*	0.641	0.558
0.414	0.534*	0.555	0.339	0.529	0.406	0.661	0.336	0.663	0.686	0.642	0.583
0.418	0.521	0.558	0.341*	0.535	0.390	0.662	0.343			0.645	0.631*
0.420	0.522*	0.560	0.338*	0.539	0.381*	0.667	0.374	CURVE 5		0.646	0.637
0.424	0.538*	0.563	0.334*	0.543	0.372			T = 77		0.648	0.642*
0.429	0.531*	0.566	0.330	0.546	0.366*	CURVE 4		0.526	0.426	0.651	0.641*
0.434	0.543	0.569	0.329*	0.551	0.357	T = 77		0.533	0.415*	0.653	0.643*
0.439	0.561*	0.572	0.332*	0.553	0.359	0.526	0.367	0.536	0.412*	0.654	0.651
0.445	0.579	0.574	0.334*	0.555	0.355	0.527	0.370*	0.539	0.410*	0.657	0.687
0.448	0.577*	0.576	0.339*	0.557	0.354	0.529	0.376*	0.542	0.410	0.658	0.693*
0.451	0.582	0.582	0.364	0.559	0.355	0.535	0.395	0.545	0.412*	0.660	0.695
0.468	0.549*	0.585	0.371*	0.561	0.353	0.540	0.388*	0.546	0.414*	0.661	0.690*
0.473	0.542*	0.586	0.373*	0.565	0.345*	0.543	0.382	0.548	0.420*		
0.479	0.530	0.588	0.375*	0.569	0.341*	0.546	0.376*	0.550	0.420		
0.503	0.465	0.590	0.375	0.572	0.341	0.550	0.372*	0.552	0.423*		
0.536	0.386*	0.594	0.374*	0.575	0.343*	0.511	0.373*	0.554	0.430*		
0.546	0.364	0.599	0.371*	0.577	0.347*	0.554	0.371*	0.555	0.434		
0.551	0.358*	0.602	0.371	0.583	0.369*	0.556	0.371	0.559	0.431*		
0.554	0.359*	0.605	0.358*	0.587	0.376*	0.557	0.372*	0.561	0.432*		
0.554	0.354	0.615	0.328*	0.590	0.379	0.560	0.368	0.565	0.437*		
0.560	0.356*	0.618	0.315	0.593	0.376*	0.569	0.372*	0.568	0.439		
0.568	0.339*	0.620	0.312*	0.596	0.372*	0.571	0.377*	0.570	0.438*		
0.572	0.338	0.622	0.311	0.601	0.362	0.574	0.386	0.572	0.434*		
0.578	0.351*	0.625	0.316*	0.606	0.345*	0.580	0.409*	0.575	0.430		
0.583	0.365*	0.627	0.316*	0.609	0.336*	0.584	0.418	0.578	0.432*		
0.586	0.379*	0.628	0.320*	0.611	0.332	0.587	0.422	0.580	0.437*		
0.589	0.382	0.631	0.320*	0.617	0.337*	0.591	0.418*	0.585	0.445		
0.621	0.327*	0.632	0.326*	0.621	0.338*	0.599	0.404	0.591	0.441*		
0.629	0.321	0.633	0.327	0.625	0.327*	0.604	0.399*	0.593	0.443*		
0.634	0.334*	0.636	0.325*	0.627	0.325	0.608	0.398	0.595	0.448*		
0.637	0.333	0.638	0.328*	0.629	0.327*	0.611	0.399*	0.600	0.479		
0.643	0.366*	0.639	0.331*	0.631	0.325*	0.615	0.404*	0.604	0.493		
0.647	0.392*	0.641	0.343	0.632	0.336*	0.619	0.410	0.608	0.506*		
0.650	0.398	0.644	0.383	0.654	0.338*	0.622	0.417*	0.611	0.515		
0.652	0.395*	0.645	0.391*	0.636	0.337*	0.625	0.424	0.615	0.523*		
0.658	0.347	0.647	0.396	0.639	0.340	0.628	0.433*	0.619	0.528		
0.662	0.329*	0.648	0.397	0.640	0.348*	0.629	0.433*	0.621	0.527*		
0.666	0.308	0.649	0.396	0.644	0.371	0.631	0.438	0.622	0.520*		

*Not shown on plot

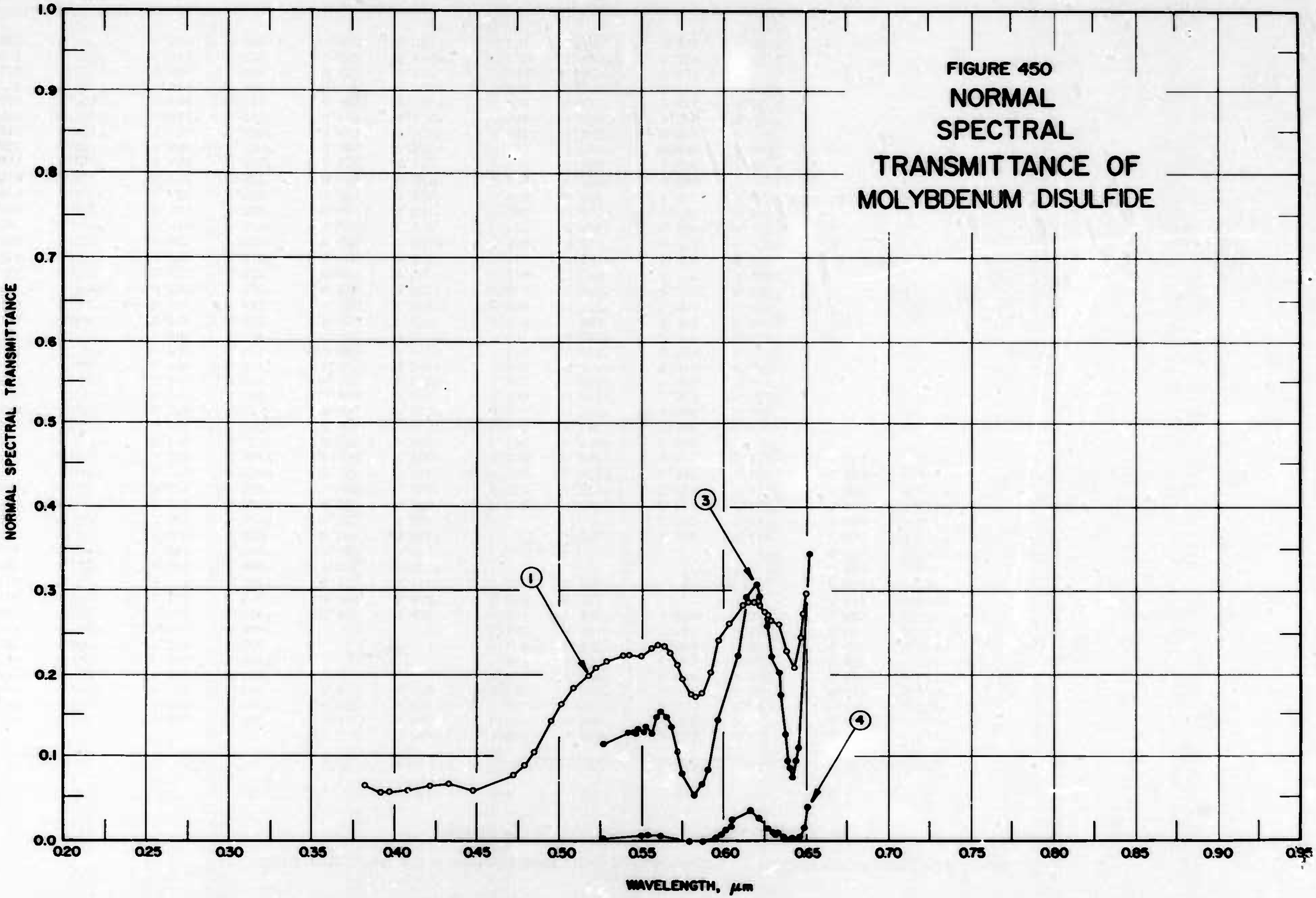


FIGURE 450
NORMAL
SPECTRAL
TRANSMITTANCE OF
MOLYBDENUM DISULFIDE
NORMAL SPECTRAL TRANSMITTANCE
WAVELENGTH, μm
1
3
4
0.0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
1.0
0.20
0.25
0.30
0.35
0.40
0.45
0.50
0.55
0.60
0.65
0.70
0.75
0.80
0.85
0.90
0.95

SPECIFICATION TABLE NO. 450 NORMAL SPECTRAL TRANSMITTANCE OF MOLYBDENUM DISULFIDE MoS_2

Curve No.	Ref. No.	Year	Temperature K	Wavelength Range, μm	Geometry θ	θ'	ω'	Reported Error, %	Composition (weight percent), Specifications, and Remarks
1	349	1967	77	0.382-0.650	~0°	~0°			Single crystal (0.062 μm thick); anisotropic and uniaxial negative; cleaved on (0001) plane; specimen surface perpendicular to optic c-axis; E vector perpendicular to optic c-axis; data extracted from smooth curve.
2*	349	1967	77	0.526-0.653	~0°	~0°			Similar to the above specimen and conditions except 0.076 μm thick.
3	349	1967	77	0.526-0.652	~0°	~0°			Similar to the above specimen and conditions except 0.1256 μm thick.
4	349	1967	77	0.526-0.650	~0°	~0°			Similar to the above specimen and conditions except 0.4165 μm thick.
5*	349	1967	77	0.526-0.650	~0°	~0°			Similar to the above specimen and conditions except 0.505 μm thick.

* Not shown on plot

DATA TABLE NO. 450 NORMAL SPECTRAL TRANSMITTANCE OF MOLYBDENUM DISULFIDE MoS_2

[Wavelength, λ, μm; Transmittance, τ; Temperature, T, K]

λ	τ	λ	τ	λ	τ	λ	τ	λ	τ	λ	τ
CURVE 1 T = 77		**CURVE 1 (cont.)**		**CURVE 2 (cont.)***		**CURVE 3 (cont.)**		**CURVE 4 (cont.)**		**CURVE 5 (cont.)***	
		0.622	0.285	0.618	0.379	0.585	0.055*	0.579	0.0008	0.564	0.0033
0.382	0.063	0.624	0.283*	0.619	0.373	0.587	0.065	0.583	0.0006*	0.571	0.0014
0.391	0.056	0.625	0.279	0.620	0.370	0.590	0.083	0.587	0.0009	0.575	0.0004
0.397	0.057	0.628	0.275	0.621	0.360	0.597	0.145	0.590	0.0013*	0.579	0.0001
0.401	0.056*	0.629	0.267	0.622	0.360	0.609	0.255	0.592	0.0021*	0.583	0.0001
0.403	0.059	0.634	0.261	0.622	0.352	0.614	0.291	0.595	0.0032	0.587	0.0003
0.413	0.059*	0.638	0.230	0.624	0.352	0.617	0.302*	0.597	0.0052*	0.590	0.0008
0.421	0.063	0.643	0.210	0.625	0.345	0.620	0.307	0.599	0.0078	0.594	0.0015
0.426	0.062*	0.647	0.249	0.625	0.331	0.622	0.303*	0.602	0.0124	0.597	0.0025
0.433	0.064	0.648	0.275	0.627	0.328	0.622	0.298	0.605	0.0179	0.598	0.0036
0.438	0.062*	0.650	0.299	0.629	0.294	0.623	0.293	0.605	0.0215	0.601	0.0065
0.443	0.443			0.632	0.286	0.623	0.285*	0.609	0.0287*	0.610	0.0192
0.448	0.059	**CURVE 2*** T = 77		0.634	0.274	0.625	0.277*	0.613	0.0348*	0.613	0.0220
0.451	0.058*			0.636	0.245	0.626	0.260	0.614	0.0360*	0.615	0.0229
0.473	0.076			0.639	0.201	0.627	0.256*	0.616	0.0368	0.617	0.0230
0.479	0.089	0.526	0.193	0.641	0.183	0.629	0.224	0.618	0.0359*	0.619	0.0224
0.485	0.104	0.531	0.225	0.643	0.192	0.632	0.215*	0.620	0.0333	0.621	0.0198
0.495	0.144	0.535	0.246	0.645	0.221	0.634	0.201	0.622	0.0297	0.625	0.0127
0.501	0.164	0.537	0.257	0.647	0.255	0.635	0.175	0.627	0.0133	0.628	0.0062
0.509	0.185	0.539	0.259	0.652	0.383	0.638	0.124	0.628	0.0115*	0.629	0.0062
0.517	0.200	0.540	0.258	0.653	0.393	0.639	0.093	0.629	0.0116*	0.630	0.0050
0.523	0.210	0.542	0.261			0.640	0.085	0.630	0.0104	0.632	0.0051
0.529	0.218	0.543	0.260	**CURVE 3** T = 77		0.641	0.072	0.631	0.0098	0.634	0.0042
0.539	0.225	0.546	0.269			0.642	0.078*	0.632	0.0102	0.636	0.0023
0.540	0.224*	0.589	0.268			0.644	0.094	0.636	0.0041	0.638	0.0014
0.542	0.225	0.550	0.273	0.526	0.112	0.645	0.110	0.637	0.0025*	0.641	0.0007
0.543	0.224*	0.552	0.276	0.542	0.129	0.652	0.346	0.639	0.0016*	0.643	0.0012
0.546	0.225*	0.555	0.270	0.544	0.127*			0.641	0.0013	0.645	0.0025
0.550	0.225	0.560	0.279	0.545	0.129	**CURVE 4** T = 77		0.643	0.0013*	0.647	0.0037
0.551	0.230*	0.562	0.281	0.546	0.127			0.645	0.0022*	0.648	0.0059
0.556	0.231	0.564	0.277	0.548	0.131			0.646	0.0033	0.650	0.0205
0.560	0.237	0.568	0.249	0.551	0.129	0.526	0.0037	0.648	0.0144		
0.564	0.236	0.571	0.214	0.552	0.133	0.534	0.0046*	0.650	0.0397		
0.567	0.229	0.576	0.155	0.554	0.131*	0.548	0.0053*				
0.572	0.212	0.578	0.141	0.556	0.127	0.550	0.0057	**CURVE 5*** T = 77			
0.575	0.196	0.582	0.133	0.557	0.139*	0.552	0.0053*				
0.580	0.178	0.582	0.131	0.559	0.149	0.554	0.0057*				
0.583	0.173	0.584	0.134	0.562	0.152	0.557	0.0053*	0.526	0.0014		
0.586	0.179	0.588	0.169	0.565	0.148	0.559	0.0065	0.540	0.0026		
0.591	0.202	0.596	0.252	0.567	0.143*	0.562	0.0068*	0.550	0.0032		
0.598	0.241	0.600	0.296	0.568	0.134	0.564	0.0067*	0.552	0.0030		
0.604	0.264	0.603	0.321	0.572	0.104	0.565	0.0062*	0.554	0.0034		
0.611	0.283	0.608	0.360	0.575	0.078	0.566	0.0054	0.557	0.0030		
0.615	0.289	0.611	0.371	0.578	0.065*	0.571	0.0028*	0.559	0.0037		
0.619	0.290	0.613	0.380	0.580	0.054*	0.574	0.0016*	0.560	0.0039		
0.621	0.290	0.616	0.384	0.582	0.052	0.578	0.0010*	0.562	0.0037		

*Not shown on plot

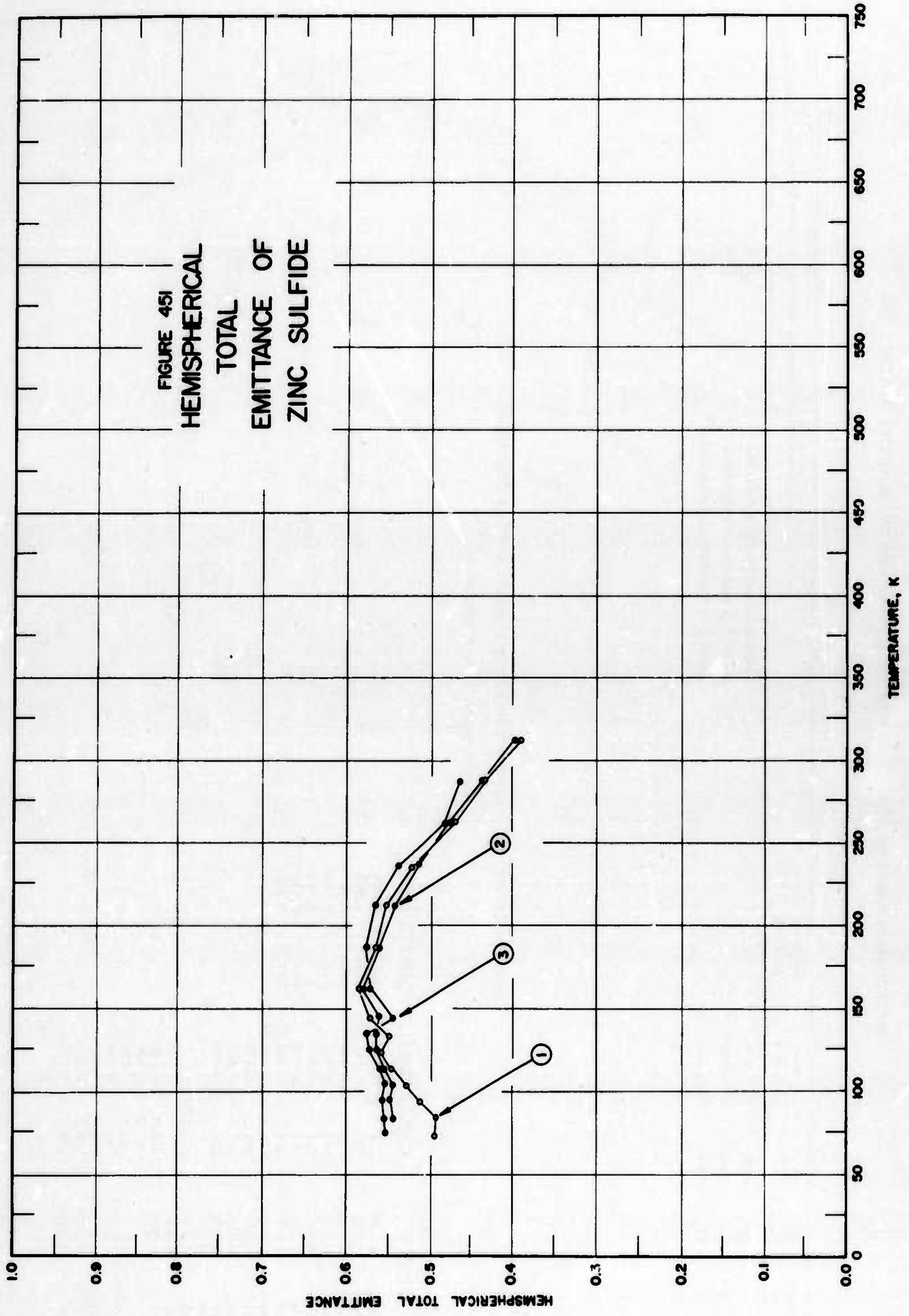


FIGURE 451 HEMISPHERICAL TOTAL EMITTANCE OF ZINC SULFIDE

SPECIFICATION TABLE NO. 451 HEMISPHERICAL TOTAL EMITTANCE OF ZINC SULFIDE ZnS

Curve No.	Ref. No.	Year	Temperature Range, K	Reported Error, %	Composition (weight percent), Specifications and Remarks
1	301	1968	74.9-312		Irtran 2 (1 mm thick); polycrystal.
2	301	1968	84.9-312		Irtran 2 (2 mm thick); polycrystal.
3	301	1968	75.3-287		Irtran 2 (3 mm thick); polycrystal.

DATA TABLE NO. 451 HEMISPHERICAL TOTAL EMITTANCE OF ZINC SULFIDE ZnS

[Temperature, T, K; Emittance, ϵ]

T	ϵ	T	ϵ	T	ϵ
CURVE 1		CURVE 2 (cont.)		CURVE 3 (cont.)	
74.9	0.496	114	0.558	144	0.546
85.0	0.493	125	0.565	161	0.573
94.7	0.514	135	0.566	186	0.577
104	0.530	145	0.561	212	0.569
114	0.549	161	0.581	236	0.540
124	0.560	186	0.563	262	0.483
134	0.550	212	0.543	287	0.463
144	0.572	236	0.518		
161	0.586	262	0.477		
186	0.568	287	0.437		
212	0.552	312	0.398		
235	0.525				
262	0.470	CURVE 3			
287	0.432				
312	0.390	75.3	0.555		
		84.9	0.557		
CURVE 2		95.2	0.560		
		105	0.556		
84.9	0.546	114	0.562		
95.0	0.550	125	0.574		
104	0.546	135	0.577		

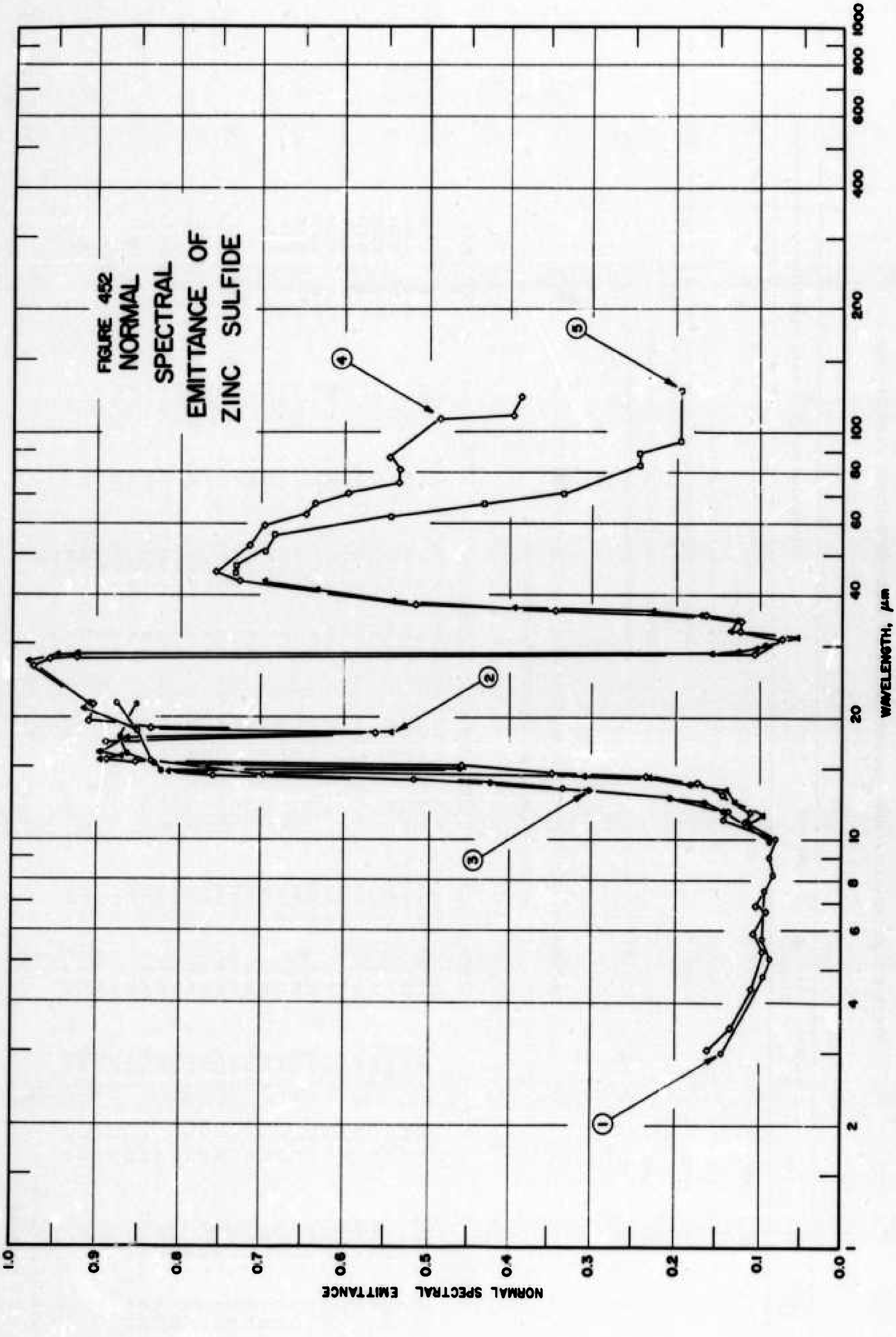


FIGURE 452 NORMAL SPECTRAL EMITTANCE OF ZINC SULFIDE

SPECIFICATION TABLE NO. 452 NORMAL SPECTRAL EMITTANCE OF ZINC SULFIDE ZnS

Curve No.	Ref. No.	Year	Temperature K	Wavelength Range, µm	Geometry θ'	Reported Error, %	Composition (weight percent), Specifications, and Remarks
1	156	1966	373	3.00-21.7	0°		Irtran 2 manufactured by Eastman Kodak Co. (2 mm thick); data extracted from smooth curve.
2	156	1966	77	3.00-43.6	0°		Above specimen and conditions.
3	274	1966	373	9.86-21.4	0°		Irtran 2 from Eastman Kodak Co. (2.0 mm thick); microcrystalline, hot-pressed compact; density 4.09 g cm^{-3}; data extracted from smooth curve.
4	274	1966	77	3.01-122	0°		Similar to the above specimen and conditions.
5	274	1966	4.2	45.4-126	0°		Similar to the above specimen and conditions.

DATA TABLE NO. 452 NORMAL SPECTRAL EMITTANCE OF ZINC SULFIDE ZnS

[Wavelength, λ, µm; Emittance, ϵ; Temperature, T, K]

CURVE 1
T = 373

λ	ϵ
3.00	0.145
4.60	0.095
5.02	0.088
5.69	0.097
7.42	0.093
8.20	0.082
9.06	0.089
10.0	0.080
11.1	0.142
11.8	0.139
12.6	0.209
13.3	0.333
14.0	0.517
14.4	0.698
14.7	0.834*
15.6	0.838
16.1	0.846*
18.5	0.851
20.3	0.872*
21.7	0.877

CURVE 2
T = 77

λ	ϵ
3.00	0.145*
4.60	0.095*
5.02	0.089*
5.69	0.097*
7.42	0.093*
8.20	0.082*
9.06	0.089*
10.0	0.081*
11.0	0.115
11.5	0.097
12.4	0.130
13.1	0.140
13.8	0.181
14.1	0.230
14.4	0.309
14.8	0.815
15.0	0.461
15.2	0.766
15.4	0.878*
15.7	0.896
16.0	0.871
16.3	0.899
17.5	0.898*
17.9	0.865

CURVE 2 (cont.)

λ	ϵ
18.3	0.545
18.8	0.857
19.1	0.861*
19.6	0.912*
21.0	0.916
21.5	0.910
22.3	0.929*
27.2	0.981
27.8	0.968*
28.1	0.949
28.2	0.922
28.9	0.156
29.0	0.126
29.5	0.105
20.0	0.094
30.6	0.058*
31.2	0.056
32.1	0.129*
32.9	0.133
34.4	0.127
35.1	0.142*
35.6	0.170
36.1	0.227
37.0	0.395
37.6	0.469*

CURVE 2 (cont.)

λ	ϵ
38.5	0.541
39.7	0.593*
41.0	0.633
43.6	0.698

CURVE 3
T = 373

λ	ϵ
9.86	0.087
11.1	0.141*
11.7	0.141
12.2	0.166
13.1	0.302
13.8	0.425
14.3	0.760
14.7	0.825
15.4	0.831
16.1	0.867
17.9	0.871
21.4	0.855

CURVE 4
T = 77

λ	ϵ
3.01	0.160

CURVE 4 (cont.)

λ	ϵ
3.48	0.134
4.29	0.110
5.26	0.099
5.98	0.109
6.61	0.091
6.85	0.104
7.40	0.091*
9.86	0.087*
11.0	0.119
11.6	0.111
12.9	0.144
13.8	0.173
14.2	0.233
14.5	0.374
14.8	0.824*
15.1	0.461
15.5	0.856
15.7	0.890
17.3	0.890
17.8	0.871*
18.2	0.561
18.9	0.839
19.5	0.910
21.3	0.906
26.5	0.978

CURVE 4 (cont.)

λ	ϵ
27.8	0.957
28.0	0.922
28.4	0.109
31.0	0.072
32.6	0.124
34.1	0.124
35.9	0.163
36.5	0.343
37.8	0.516
43.5	0.728
45.8	0.759
52.7	0.713
59.6	0.699
62.9	0.649
67.6	0.637
70.1	0.597
74.8	0.537
81.8	0.537
86.7	0.548
107	0.488
110	0.398
122	0.386

CURVE 5
T = 4.2

λ	ϵ
45.4	0.731
47.4	0.731
50.9	0.696
56.0	0.683
62.4	0.545
66.2	0.431
70.3	0.334
83.0	0.245
89.9	0.245
95.1	0.195
126	0.195

*Not shown on plot

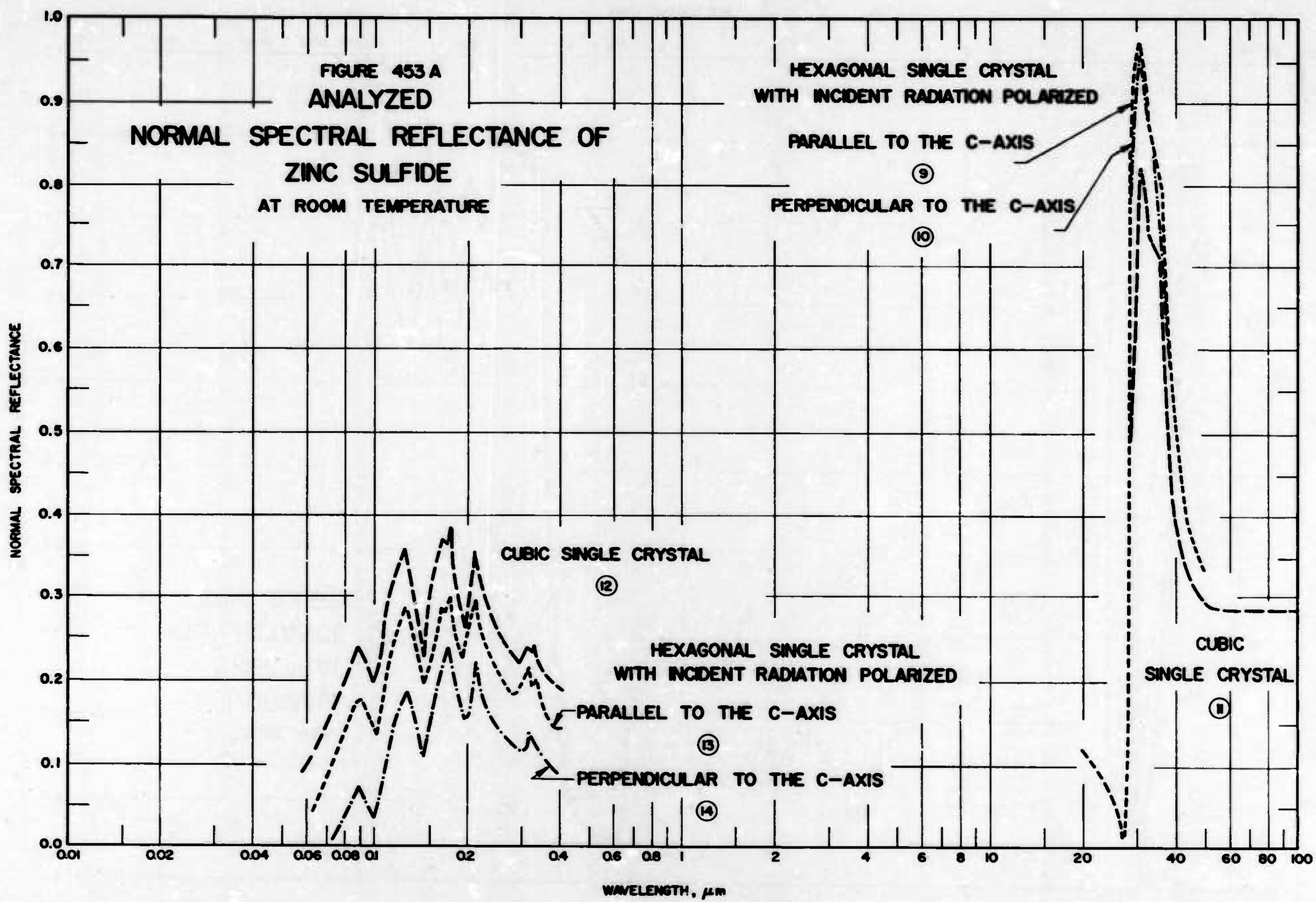


FIGURE 453 A
ANALYZED
NORMAL SPECTRAL REFLECTANCE OF
ZINC SULFIDE
AT ROOM TEMPERATURE
HEXAGONAL SINGLE CRYSTAL
WITH INCIDENT RADIATION POLARIZED
PARALLEL TO THE C-AXIS
9
PERPENDICULAR TO THE C-AXIS
10
CUBIC SINGLE CRYSTAL
12
HEXAGONAL SINGLE CRYSTAL
WITH INCIDENT RADIATION POLARIZED
PARALLEL TO THE C-AXIS
13
PERPENDICULAR TO THE C-AXIS
14
CUBIC
SINGLE CRYSTAL
11
NORMAL SPECTRAL REFLECTANCE
WAVELENGTH, μm
0.0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
1.0
0.01
0.02
0.04
0.06
0.08
0.1
0.2
0.4
0.6
0.8
1
2
4
6
8
10
20
40
60
80
100

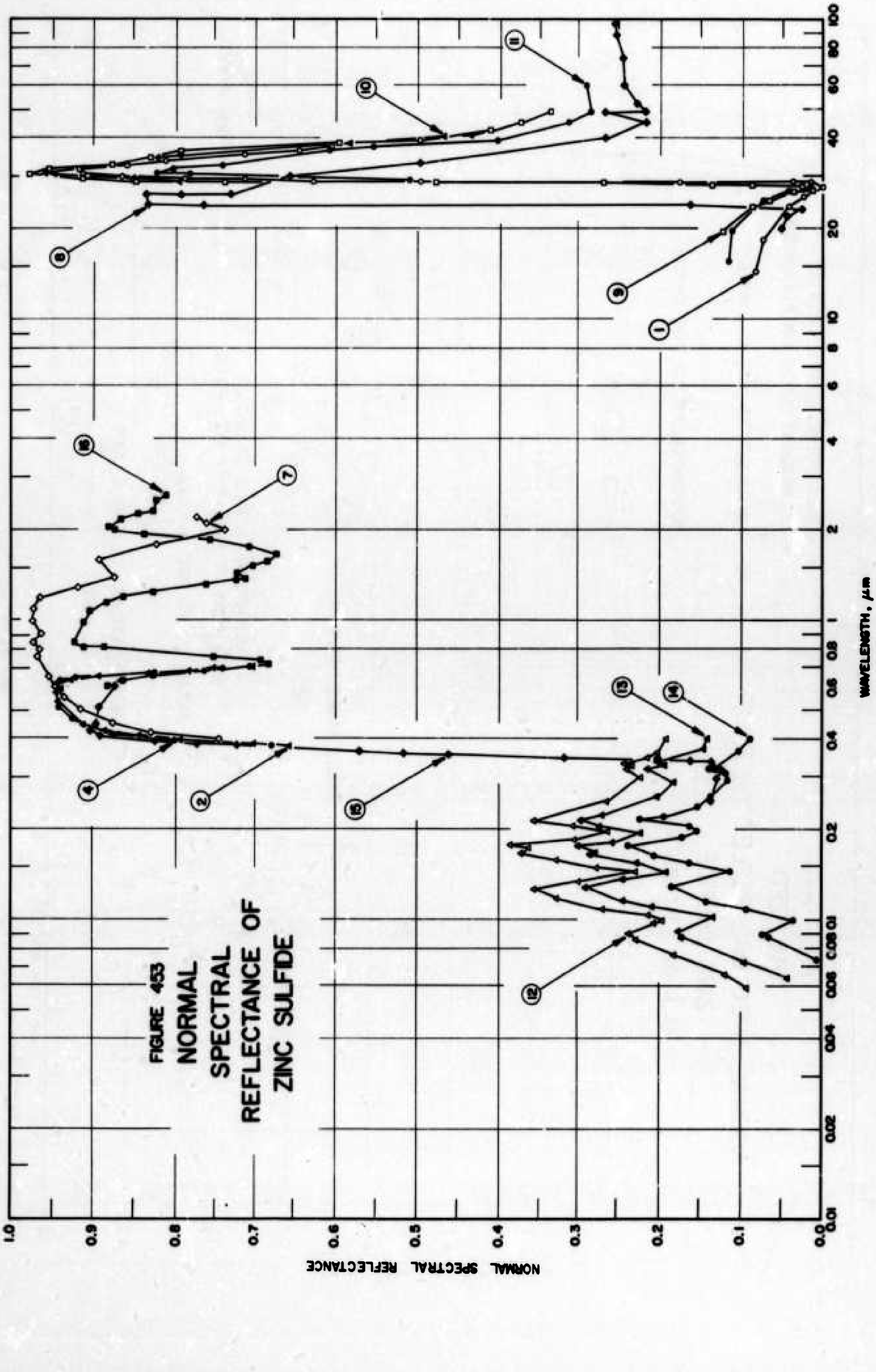


FIGURE 453 NORMAL SPECTRAL REFLECTANCE OF ZINC SULFIDE

SPECIFICATION TABLE NO. 453 NORMAL SPECTRAL REFLECTANCE OF ZINC SULFIDE ZnS

Curve No.	Ref. No.	Year	Temperature K	Wavelength Range, μm	Geometry θ	θ'	ω'	Reported Error, %	Composition (weight percent), Specifications, and Remarks
1	83	1962	298	14.1-37.7	0°		2π		Crystal; data extracted from smooth curve.
2	82	1963	~298	0.380-0.700	~0°		2π		Reagent grade supplied by Matheson,Coleman, and Bell; compacted powder at 10 000 psi; data extracted from smooth curve.
3*	82	1963	~298	0.380-0.700	~0°		2π		Above specimen and conditions except exposed in vacuum (10^{-5} mm Hg) to 75 ESH at solar factor 1.5 suns.
4	246	1962	298	0.380-0.700	0°		2π		Reagent grade; powder pressed at 10^4 psi; data extracted from smooth curve; [Author's designation: Sample K].
5*	246	1962	298	0.380-0.700	0°		2π		Above specimen and conditions except measured after being exposed to simulated solar radiation at 1.5 suns for 50 hrs.
6*	246	1962	298	0.380-0.700	0°		2π		Above specimen and conditions except measured after subsequently being exposed to 4 suns for 67 hrs.
7	120	1962	298	0.40-2.2	~0°		2π		Converted from R (2π,~0°); [Authors' designation: Specimen X76].
8	336	1955	298	20.0-203	~0°	~0°			Single crystal.
9	256	1967	300	19.7-49.7	12°	12°		± 1	Hexagonal; polished to a mirror-like finish; aluminized mirror reference; radiation polarized parallel to the c-axis; data extracted from smooth curve.
10	256	1967	300	19.7-49.7	12°	12°		± 1	Above specimen and conditions except radiation polarized perpendicular to the c-axis.
11	256	1967	300	15.5-60.0	12°	12°		± 1	Cubic; polished to a mirror-like finish; aluminized mirror reference.
12	390	1965	298	0.0587-0.400	~0°	~0°			Cubic single crystal from Semi-Elements, Inc; freshly cleaved; data extracted from smooth curve.
13	390	1965	298	0.0625-0.400	~0°	~0°			Hexagonal single crystal from Semi-Elements, Inc; freshly cleaved; light polarized parallel to the c-axis.
14	390	1965	298	0.0724-0.400	~0°	~0°			Similar to the above specimen and conditions except measured with light polarized perpendicular to the c-axis.
15	121	1964	~298	0.250-0.600	~0°		2π		Superlith XXXN (C.J. Osborn Co.); compacted powder; 98% pure; $BaSO_4$ reference; data extracted from smooth curve.
16	121	1964	~298	0.600-2.60	~0°		2π		Similar to the above specimen and conditions.

* Not shown on plot

DATA TABLE NO. 453 NORMAL SPECTRAL REFLECTANCE OF ZINC SULFIDE ZnS

[Wavelength, λ, μm; Reflectance, ρ; Temperature, T, K]

CURVE 1 T = 298

λ	ρ
14.1	0.084
18.1	0.074
23.3	0.042
25.4	0.023
27.2	0.000
28.0	0.000*
28.3	0.016
28.4	0.038
28.5	0.179
28.6	0.202*
28.7	0.496
28.9	0.628
29.1	0.711
29.6	0.790
30.0	0.863
30.6	0.911
31.0	0.919*
31.3	0.919
32.4	0.857
33.1	0.832*
33.8	0.811
34.2	0.790*
35.3	0.711
35.9	0.675*
36.5	0.644
37.2	0.614*
37.7	0.603

CURVE 2 T ~ 298

λ	ρ
0.380	0.658
0.386	0.701
0.391	0.755*
0.397	0.797
0.407	0.846
0.421	0.886
0.444	0.912
0.456	0.922*
0.523	0.944
0.566	0.948
0.596	0.941
0.607	0.945*
0.618	0.946
0.630	0.941*
0.636	0.930
0.643	0.913*
0.649	0.894
0.660	0.833
0.667	0.785
0.670	0.769*
0.675	0.759*
0.685	0.752
0.700	0.704

CURVE 3* T ~ 298

λ	ρ
0.380	0.658
0.389	0.714
0.400	0.784
0.413	0.839
0.420	0.861
0.430	0.880
0.463	0.907
0.488	0.919
0.520	0.932
0.541	0.937
0.584	0.938
0.597	0.935
0.606	0.939
0.620	0.943
0.630	0.936
0.637	0.922
0.645	0.898
0.660	0.833
0.667	0.779
0.670	0.764
0.675	0.754
0.685	0.748
0.700	0.704

CURVE 4 T = 298

λ	ρ
0.380	0.678
0.385	0.705*
0.398	0.801
0.407	0.840*
0.417	0.875
0.422	0.887*
0.448	0.916*
0.469	0.927
0.515	0.943
0.540	0.948*
0.579	0.946*
0.591	0.943*
0.605	0.946*
0.614	0.947*
0.630	0.942
0.640	0.924
0.648	0.897*
0.660	0.826
0.667	0.779*
0.671	0.765
0.675	0.759*
0.682	0.757*
0.689	0.741
0.700	0.706

CURVE 5* T = 298

λ	ρ
0.380	0.651
0.385	0.677
0.390	0.720
0.402	0.790
0.420	0.857
0.429	0.874
0.458	0.903
0.497	0.922
0.531	0.935
0.584	0.938
0.596	0.937
0.615	0.943
0.625	0.941
0.633	0.931
0.641	0.913
0.654	0.861
0.666	0.780
0.670	0.763
0.674	0.757
0.680	0.753
0.685	0.744
0.700	0.703

CURVE 6* T = 298

λ	ρ
0.380	0.622
0.389	0.644
0.409	0.742
0.428	0.799
0.432	0.804
0.440	0.808
0.465	0.841
0.523	0.890
0.548	0.905
0.564	0.906
0.577	0.913
0.591	0.912
0.595	0.909
0.608	0.916
0.613	0.919
0.617	0.923
0.626	0.920
0.632	0.914
0.638	0.911
0.648	0.883
0.653	0.860
0.660	0.807
0.665	0.777
0.673	0.745
0.679	0.739
0.687	0.733
0.700	0.697

CURVE 7 T = 298

λ	ρ
0.4	0.746
0.42	0.830
0.45	0.879
0.5	0.916
0.55	0.937
0.55	0.934*
0.6	0.946
0.65	0.955
0.7	0.962*
0.75	0.97
0.8	0.969
0.85	0.975
0.9	0.965
0.95	0.966*
1.0	0.975
1.1	0.974
1.2	0.968
1.3	0.92
1.4	0.875
1.6	0.894
1.8	0.824
2.0	0.740
2.1	0.761
2.2	0.775

CURVE 8 T = 298

λ	ρ
20.0	0.052
22.0	0.047
23.0	0.029
24.0	0.164
24.0	0.756
24.0	0.832
26.0	0.835
26.0	0.795
26.0	0.730
30.0	0.656
33.0	0.499
40.0	0.266
45.0	0.219
49.0	0.268
49.0	0.219
52.0	0.228
60.0	0.243
74.0	0.244
88.0	0.251
96.0	0.252
118	0.252*
152	0.252*
171	0.252*
203	0.249*

CURVE 9 T = 300

λ	ρ
19.7	0.121
23.4	0.087
24.8	0.066
26.1	0.038
26.9	0.013
27.4	0.029
27.7	0.088
27.9	0.136
28.1	0.267
28.3	0.476
28.5	0.740
28.8	0.850
29.2	0.912
29.7	0.960*
30.1	0.978
31.1	0.972*
31.6	0.954
32.8	0.879
33.8	0.847*
34.8	0.830
35.4	0.823*
36.1	0.793
36.8	0.748*
38.1	0.597
38.9	0.534*
39.5	0.497
41.0	0.444*
42.4	0.411
45.2	0.373
49.7	0.336

CURVE 10 T = 300

λ	ρ
19.7	0.121*
23.4	0.087*
24.8	0.066*
26.1	0.038*
26.9	0.013*
27.4	0.029*
27.7	0.088*
27.9	0.136*
28.1	0.267*
28.3	0.476*
38.5	0.740*
28.7	0.798
29.1	0.852
29.6	0.912*
30.1	0.949
30.6	0.960
31.2	0.952*
32.6	0.871*
34.3	0.821
35.3	0.795
36.6	0.732*
38.1	0.585
38.7	0.534*
40.3	0.468
41.2	0.439
42.4	0.412*
45.2	0.373*
49.7	0.336*

CURVE 11 T = 300

λ	ρ
15.5	0.116
19.9	0.112
24.9	0.073
26.6	0.043
27.1	0.016
27.6	0.031*
29.0	0.510
30.1	0.784
30.9	0.828
31.6	0.803
32.4	0.742
33.6	0.735*
35.0	0.712*
36.8	0.608
37.4	0.553
39.8	0.401
44.9	0.311
49.9	0.282
60.0	0.288

CURVE 12 T = 298

λ	ρ
0.0587	0.094
0.0641	0.118
0.0759	0.182
0.0845	0.227
0.0892	0.236
0.0934	0.224*
0.0966	0.206
0.0995	0.198
0.104	0.213
0.107	0.270
0.112	0.314*
0.115	0.328
0.120	0.345*
0.124	0.359*
0.125	0.359
0.134	0.300
0.138	0.266*
0.142	0.229
0.148	0.276
0.156	0.329
0.158	0.340*
0.166	0.373
0.172	0.363
0.175	0.389
0.177	0.346*
0.182	0.304
0.188	0.274*
0.196	0.262
0.205	0.306
0.208	0.355*
0.211	0.359
0.221	0.325*
0.247	0.265
0.273	0.235*
0.299	0.221
0.315	0.240
0.325	0.234
0.330	0.241
0.344	0.215
0.360	0.201
0.400	0.191

CURVE 13 T = 298

λ	ρ
0.0625	0.044
0.0717	0.098
0.0864	0.171
0.0902	0.178
0.101	0.133
0.109	0.210
0.113	0.244
0.119	0.268*

* Not shown on plot

DATA TABLE NO. 453 (continued)

λ	ρ	λ	ρ	λ	ρ
CURVE 13 (cont.) T = 298		CURVE 14 (cont.)		CURVE 16 T ~ 298	
0.126	0.290	0.195	0.155	0.600	0.882
0.129	0.286*	0.202	0.162	0.628	0.863
0.135	0.243	0.216	0.223	0.650	0.829
0.141	0.191	0.220	0.196	0.696	0.701*
0.144	0.193*	0.225	0.192*	0.715	0.681
0.153	0.277	0.239	0.155	0.728	0.693
0.165	0.283	0.259	0.138	0.753	0.751
0.167	0.279	0.290	0.117	0.802	0.887
0.175	0.300	0.302	0.118	0.818	0.912
0.180	0.258	0.319	0.140	0.847	0.925
0.193	0.223	0.320	0.134	0.994	0.912
0.199	0.231*	0.327	0.137*	1.09	0.905
0.205	0.271	0.362	0.103	1.16	0.885
0.214	0.297	0.400	0.090	1.20	0.863
0.217	0.276*			1.24	0.829
0.221	0.270	CURVE 15 T ~ 298		1.31	0.761
0.237	0.227*	0.250	0.138	1.36	0.724
0.256	0.202	0.292	0.130	1.39	0.711
0.289	0.183	0.315	0.122	1.41	0.716*
0.303	0.187*	0.326	0.122	1.44	0.723
0.317	0.215	0.330	0.126*	1.47	0.717*
0.325	0.196	0.334	0.136	1.51	0.701
0.332	0.202	0.338	0.163	1.59	0.684
0.349	0.163*	0.341	0.201	1.68	0.672
0.370	0.147	0.346	0.318	1.71	0.679*
0.400	0.141	0.355	0.461	1.79	0.709
		0.360	0.518	1.83	0.729*
CURVE 14 T = 298		0.365	0.573	1.86	0.757
0.0724	0.007	0.382	0.723	1.93	0.837
0.0871	0.067	0.388	0.775	1.96	0.863*
0.0890	0.072	0.396	0.826	2.00	0.874
0.0998	0.039	0.402	0.865*	2.06	0.881
0.107	0.092	0.408	0.891	2.15	0.877*
0.113	0.143	0.415	0.900*	2.18	0.865
0.119	0.151*	0.422	0.903	2.23	0.846
0.125	0.168*	0.440	0.903*	2.33	0.829
0.129	0.186	0.450	0.899	2.41	0.823*
0.136	0.151*	0.507	0.895	2.51	0.825
0.142	0.112	0.533	0.892*	2.56	0.821
0.153	0.163	0.600	0.873	2.60	0.811
0.163	0.207				
0.168	0.213*				
0.175	0.238				
0.186	0.172				

* Not shown on plot

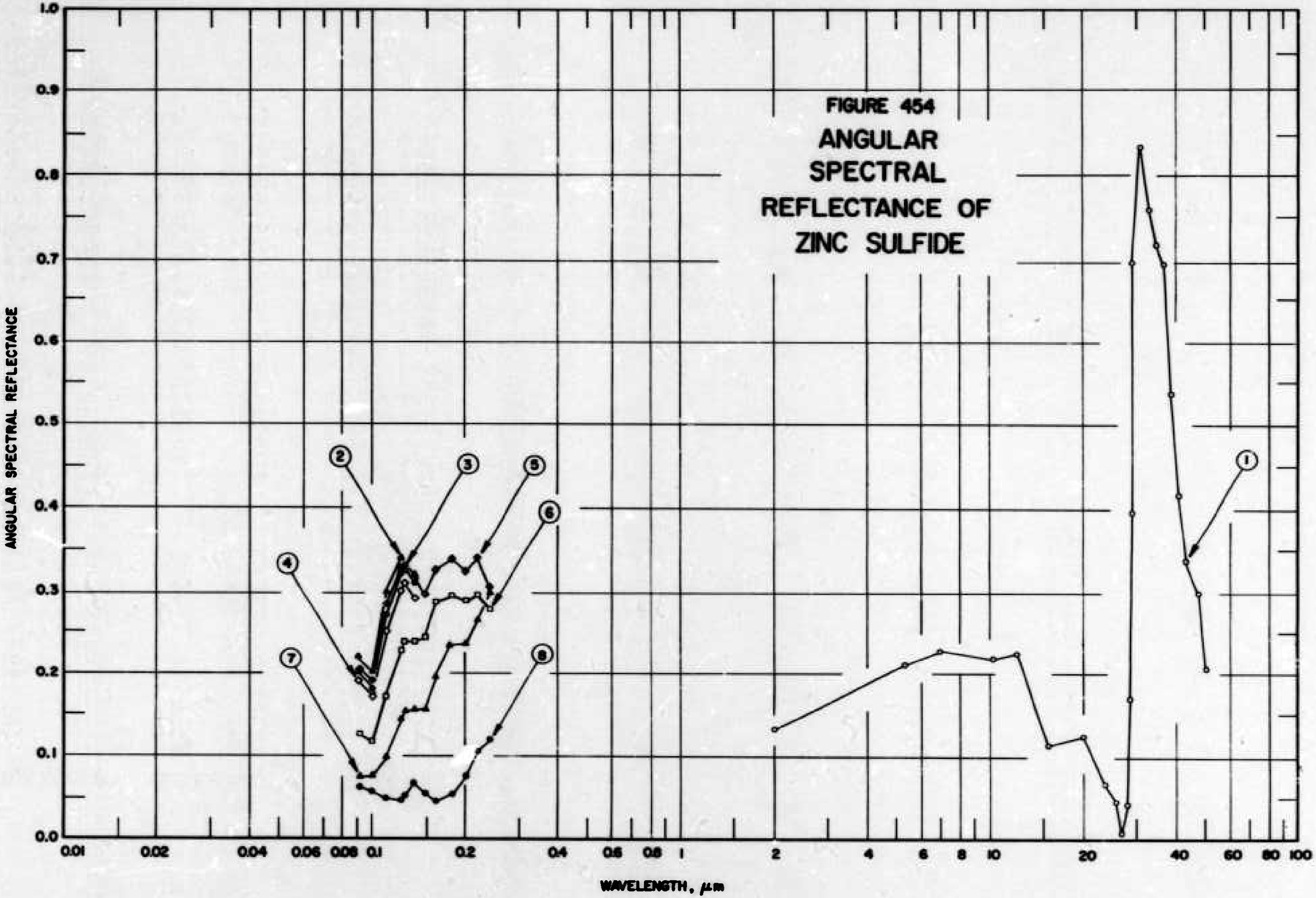


FIGURE 454
ANGULAR SPECTRAL REFLECTANCE OF ZINC SULFIDE

SPECIFICATION TABLE NO. 454 ANGULAR SPECTRAL REFLECTANCE OF ZINC SULFIDE ZnS

Curve No.	Ref. No.	Year	Temperature K	Wavelength Range, μm	Geometry θ	θ'	ω'	Reported Error, %	Composition (weight percent), Specifications, and Remarks
1	67	1963	~298	2.00-50.0	30°	30°			Irtran 2 (1 mm thick); data extracted from smooth curve; aluminum mirror standard.
2	151	1959	~298	0.0900-0.1360	~18°	~18°			Film (1200 Å thick); surface to be coated was cleaned by a high-voltage dc glow discharge; 2 hrs old.
3	151	1959	~298	0.0900-0.1360	~18°	~18°			Above specimen and conditions except measured when two months old.
4	151	1959	~298	0.0900-0.1360	~18°	~18°			Above specimen and conditions except measured when two yrs old.
5	151	1959	~298	0.0908-0.240	~18°	~18°			Freshly evaporated film; surfaces to be coated was cleaned by a high voltage dc glow discharge; not exposed to ultraviolet irradiation.
6	151	1959	~298	0.0901-0.240	~18°	~18°			Above specimen and conditions except measured after exposed to 2 hrs ultraviolet radiation from a quartz mercury burner at a distance of about 7 in.
7	151	1959	~298	0.0904-0.240	~18°	~18°			Curve 5 specimen and conditions except measured after exposed to 4 hrs ultraviolet radiation from a quartz mercury burner at a distance of about 7 in.
8	151	1959	~298	0.0904-0.240	~18°	~18°			Curve 5 specimen and conditions except measured after exposed to 24 hrs ultraviolet radiation from a quartz mercury burner at a distance of about 7 in.

DATA TABLE NO. 454 ANGULAR SPECTRAL REFLECTANCE OF ZINC SULFIDE ZnS

[Wavelength, λ, μm; Reflectance, ρ; Temperature, T, K]

CURVE 1 T ~ 298

λ	ρ
2.00	0.130
5.30	0.210
6.90	0.226
10.1	0.217
12.1	0.221
15.4	0.110
20.0	0.120
23.3	0.065
25.3	0.045
26.7	0.004
27.9	0.040
28.0	0.169
28.6	0.396
38.9	0.698
30.7	0.835
32.8	0.760
34.6	0.719
36.6	0.695

CURVE 1 (cont.)

λ	ρ
38.2	0.535
40.1	0.412
43.5	0.336
47.4	0.298
50.0	0.201

CURVE 2 T ~ 298

λ	ρ
0.0900	0.22
0.1000	0.20
0.1105	0.30
0.1216	0.34
0.1264	0.34*
0.1360	0.32

CURVE 3 T ~ 298

λ	ρ
0.0900	0.20
0.1000	0.18
0.1105	0.27
0.1216	0.32
0.1264	0.33
0.1360	0.31

CURVE 4 T ~ 298

λ	ρ
0.0900	0.19
0.1000	0.17
0.1105	0.25
0.1216	0.30
0.1264	0.31
0.1360	0.29

CURVE 5 T ~ 298

λ	ρ
0.0908	0.202
0.100	0.190
0.110	0.283
0.121	0.325
0.126	0.328*
0.136	0.314
0.148	0.297
0.160	0.324
0.180	0.339
0.200	0.321
0.220	0.340
0.240	0.304

CURVE 6 T ~ 298

λ	ρ
0.0901	0.121
0.100	0.115

CURVE 6 (cont.)

λ	ρ
0.110	0.170
0.121	0.227
0.126	0.239
0.136	0.239
0.148	0.241
0.160	0.285
0.180	0.292
0.200	0.287
0.220	0.295
0.240	0.277

CURVE 7 T ~ 298

λ	ρ
0.0904	0.072
0.1003	0.075
0.110	0.097
0.121	0.142
0.126	0.153

CURVE 7 (cont.)

λ	ρ
0.136	0.155
0.148	0.155
0.160	0.194
0.179	0.232
0.200	0.235
0.220	0.263
0.240	0.249

CURVE 8 T ~ 298

λ	ρ
0.0904	0.061
0.100	0.059
0.110	0.050
0.121	0.047
0.126	0.052
0.135	0.066
0.148	0.055
0.160	0.046

CURVE 8 (cont.)

λ	ρ
0.180	0.053
0.200	0.074
0.220	0.101
0.240	0.116

* Not shown on plot

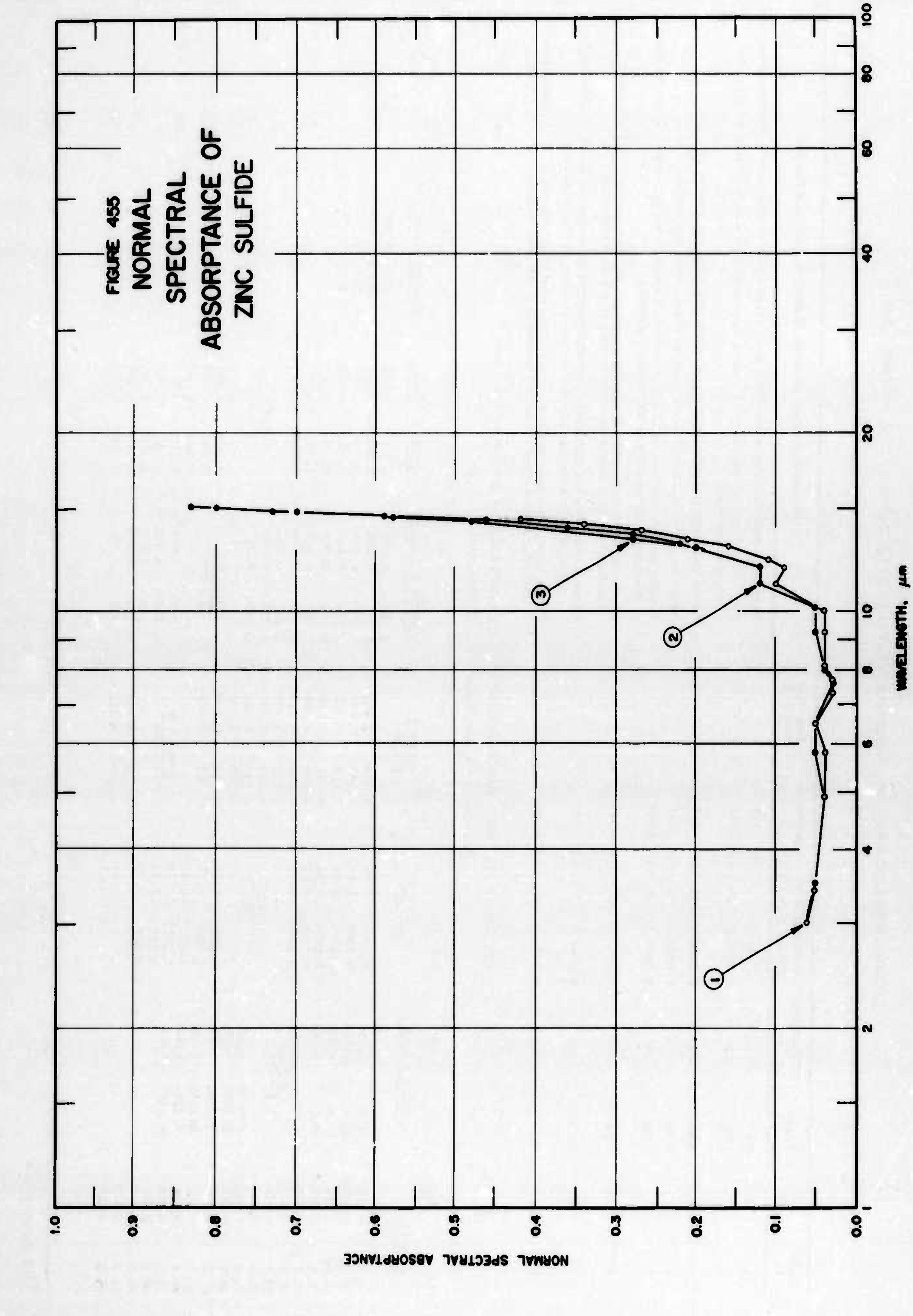


FIGURE 455
NORMAL
SPECTRAL
ABSORPTANCE OF
ZINC SULFIDE
NORMAL SPECTRAL ABSORPTANCE
WAVELENGTH, μm
0.0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
1.0
1
2
4
6
8
10
20
40
60
80
100
1
2
3

SPECIFICATION TABLE NO. 455 NORMAL SPECTRAL ABSORPTANCE OF ZINC SULFIDE ZnS

Curve No.	Ref. No.	Year	Temperature K	Wavelength Range, μm	Geometry θ	Reported Error, %	Composition (weight percent), Specifications, and Remarks
1	68	1963	333	3.00-14.3	0°		Irtran 2 from Eastman Kodak Co. (2 mm thick); hot pressed; measured in vacuum; data extracted from smooth curve.
2	68	1963	393	3.00-15.0	0°		Similar to above specimen and conditions.
3	68	1963	453	3.00-15.0	0°		Similar to above specimen and conditions.

DATA TABLE NO. 455 NORMAL SPECTRAL ABSORPTANCE OF ZINC SULFIDE ZnS

[Wavelength, λ, μm; Absorptance, α; Temperature, T, K]

λ	α	λ	α	λ	α
CURVE 1		CURVE 2 (cont.)		CURVE 3 (cont.)	
T = 333		7.60	0.03	12.7	0.20
3.00	0.06	8.00	0.04	13.3	0.28
3.40	0.05	9.20	0.04*	13.7	0.36*
4.90	0.04	10.1	0.05	14.2	0.48
5.80	0.04	11.1	0.12	14.4	0.58
6.50	0.05	11.9	0.12	14.7	0.70
7.30	0.03	13.0	0.22	15.0	0.83
7.70	0.03	13.5	0.28		
8.10	0.04	13.8	0.36		
9.20	0.04	14.3	0.46		
10.0	0.04	14.5	0.59		
11.1	0.10	14.8	0.73		
11.8	0.09	15.0	0.80		
12.3	0.11				
12.8	0.16	CURVE 3			
13.3	0.21	T = 453			
13.6	0.27				
14.0	0.34	3.00	0.06*		
14.3	0.42	3.40	0.05*		
		4.90	0.04*		
CURVE 2		5.80	0.05		
T = 393		6.50	0.05*		
		7.70	0.03*		
3.00	0.06*	8.00	0.04*		
3.50	0.05	9.20	0.05		
4.90	0.04*	10.1	0.05*		
5.80	0.04*	11.1	0.12*		
6.50	0.05*	11.8	0.12*		

* Not shown on plot

SPECIFICATION TABLE NO. 456 NORMAL SOLAR ABSORPTANCE OF ZINC SULFIDE ZnS

Curve No.	Ref. No.	Year	Temperature Range, K	Geometry θ	Reported Error, %	Composition (weight percent), Specifications and Remarks
1*	121	1964	~298	~0°		Superlith XXXN (C.J. Osborn Co.); compacted powder; purity > 99%; computed from spectral reflectance data.
2*	121	1964	~298	~0°		Similar to curve 1 specimen and conditions except exposed to 100 ESH.

DATA TABLE NO. 456 NORMAL SOLAR ABSORPTANCE OF ZINC SULFIDE ZnS

[Temperature, T, K; Absorptance, α]

T	α
CURVE 1*	
298	0.184
CURVE 2*	
298	0.226

*No plot given

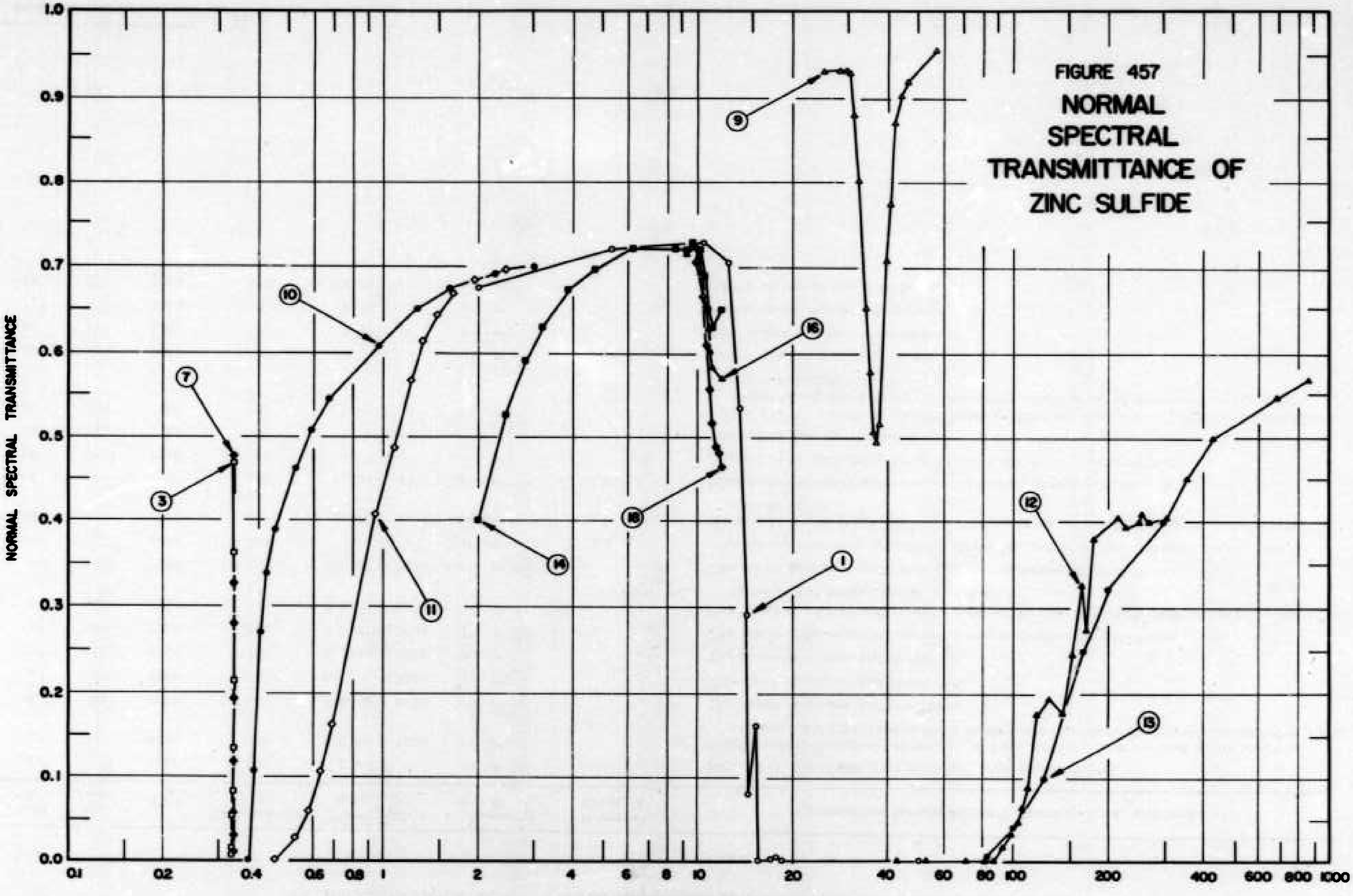


FIGURE 457
NORMAL SPECTRAL TRANSMITTANCE OF ZINC SULFIDE

SPECIFICATION TABLE NO. 457 NORMAL SPECTRAL TRANSMITTANCE OF ZINC SULFIDE ZnS

Curve No.	Ref. No.	Year	Temperature K	Wavelength Range, μm	Geometry θ	θ'	ω'	Reported Error, %	Composition (weight percent), Specifications, and Remarks
1	67	1963	~298	2.00-50.0	0°	0°			Irtran 2 (1 mm thick); data extracted from smooth curve.
2*	346	1958	298	0.3288-0.3330	0°	0°			Single crystal (hexagonal structure, 4.6 μm thick); c-axis parallel to the specimen surface; light polarized parallel to the c-axis (extraordinary ray); measured at 1 atm.
3	346	1958	293	0.3289-0.3420	0°	0°			The above specimen and conditions.
4*	346	1958	343	0.3321-0.3343	0°	0°			The above specimen and conditions.
5*	346	1958	393	0.3340-0.3376	0°	0°			The above specimen and conditions.
6*	346	1958	298	0.3281-0.3334	0°	0°			The above specimen and conditions except measured at 1700 atm.
7	346	1958	298	0.3314-0.3358	0°	0°			The above specimen and conditions except measured with the light polarized perpendicular to the c-axis (ordinary ray) at 1 atm.
8*	346	1958	298	0.3290-0.3358	0°	0°			The above specimen and conditions except measured at 1700 atm.
9	256	1967	300	25.1-56.4	~0°	~0°		± 1	Thin film evaporated on collodion film; data extracted from smooth curve.
10	94	1967	298	0.374-3.00	~0°	~0°		± 2	Irtran 2 (1.0 mm thick); polished; sample of recent production; data extracted from smooth curve.
11	94	1967	298	0.456-3.00	~0°	~0°		± 2	Similar to the above specimen and condition except sample of early production.
12	313	1966	~298	42.4-862	~0°	~0°			Irtran 2 (0.98 mm thick) from Eastman Kodak Co.; polycrystalline.
13	314	1966	300	83.3-300	~0°	~0°			Irtran 2 (2 mm thick) from Eastman Kodak Co.; pressed and sintered.
14	288	1965	298	2.00-12.0	0°	0°			Irtran 2 (2.80 mm thick) manufactured by Eastman Kodak Co.; polished optically flat to within five green mercury fringes and a parallelism tolerance of ± 2.5 μm; data extracted from smooth curve.
15*	288	1965	373	2.00-12.0	0°	0°			Above specimen and conditions.
16	288	1965	473	2.00-12.0	0°	0°			Above specimen and conditions.
17*	288	1965	573	2.00-12.0	0°	0°			Above specimen and conditions.
18	288	1965	673	2.00-12.0	0°	0°			Above specimen and conditions.

* Not shown on plot

DATA TABLE NO. 457 NORMAL SPECTRAL TRANSMITTANCE OF ZINC SULFIDE ZnS

[Wavelength, λ, μm; Transmittance, τ; Temperature, T, K]

λ	τ
CURVE 1	
T ~ 298	
2.00	0.676
5.30	0.720
10.5	0.727
12.6	0.705
13.7	0.535
14.4	0.291
14.5	0.080
15.4	0.161
15.6	0.000
17.1	0.002
17.9	0.036
18.6	0.000
50.0	0.000
CURVE 2*	
T = 298	
0.3288	0.000
0.3290	0.018
0.3294	0.049
0.3297	0.100
0.3300	0.155
0.3303	0.243
0.3308	0.332
0.3311	0.366
0.3313	0.426
0.3317	0.597
0.3320	0.591
0.3324	0.526
0.3327	0.623
0.3330	0.755
CURVE 3	
T = 293	
0.3289	0.005
0.3291	0.013
0.3293	0.022*
0.3297	0.053
0.3300	0.082
0.3303	0.134
0.3307	0.214
0.3310	0.245*
0.3313	0.254
0.3317	0.361

λ	τ
CURVE 3 (cont.)	
0.3320	0.469
0.3323	0.369*
0.3327	0.365*
0.3330	0.551*
0.3333	0.636*
0.3337	0.462*
0.3340	0.406*
0.3343	0.507*
0.3347	0.727*
0.3350	0.708*
0.3352	0.608*
0.3353	0.507*
0.3356	0.407*
0.3359	0.464*
0.3362	0.653*
0.3366	0.799*
0.3369	0.652*
0.3372	0.472*
0.3376	0.427*
0.3379	0.523*
0.3383	0.751*
0.3386	0.813*
0.3389	0.606*
0.3391	0.440*
0.3396	0.443*
0.3399	0.576*
0.3403	0.799*
0.3406	0.839*
0.3410	0.659*
0.3413	0.512*
0.3418	0.440*
0.3420	0.454*
CURVE 4*	
T = 343	
0.3321	0.027
0.3324	0.047
0.3327	0.091
0.3330	0.127
0.3333	0.209
0.3337	0.243
0.3340	0.260
0.3343	0.352

λ	τ
CURVE 5*	
T = 393	
0.3340	0.008
0.3343	0.009
0.3347	0.019
0.3350	0.031
0.3353	0.039
0.3357	0.069
0.3360	0.091
0.3363	0.148
0.3367	0.159
0.3370	0.168
0.3373	0.231
0.3376	0.321
CURVE 6*	
T = 298	
0.3281	0.031
0.3284	0.066
0.3287	0.137
0.3290	0.220
0.3293	0.292
0.3297	0.426
0.3300	0.512
0.3303	0.519
0.3307	0.634
0.3311	0.817
0.3313	0.768
0.3318	0.721
0.3321	0.833
0.3323	0.987
0.3328	0.916
0.3331	0.785
0.3334	0.766
CURVE 7	
T = 298	
0.3314	0.007
0.3320	0.013*
0.3323	0.029
0.3327	0.055
0.3330	0.117
0.3333	0.193
0.3338	0.280
0.3340	0.325

λ	τ
CURVE 7 (cont.)	
0.3343	0.419*
0.3347	0.478
0.3350	0.435*
0.3353	0.515*
0.3358	0.635*
CURVE 8*	
T = 298	
0.3290	0.013
0.3294	0.026
0.3298	0.043
0.3300	0.051
0.3303	0.059
0.3308	0.076
0.3310	0.088
0.3313	0.101
0.3317	0.134
0.3320	0.219
0.3323	0.310
0.3327	0.410
0.3330	0.429
0.3333	0.474
0.3338	0.590
0.3340	0.585
0.3343	0.563
0.3347	0.631
0.3350	0.662
0.3353	0.578
0.3358	0.603
CURVE 9	
T = 300	
25.1	0.933
28.2	0.941
29.9	0.935
30.5	0.921
31.4	0.881
32.6	0.802
34.3	0.653
35.1	0.579
36.1	0.506
37.0	0.494
37.7	0.517
39.7	0.708

λ	τ
CURVE 9 (cont.)	
40.4	0.775
41.4	0.827*
42.6	0.870
44.1	0.904
46.5	0.923
56.4	0.959
CURVE 10	
T = 298	
0.374	0.000
0.389	0.107
0.408	0.271
0.424	0.339
0.455	0.390
0.522	0.461
0.586	0.508
0.666	0.545
0.972	0.607
1.28	0.651
1.64	0.676
2.28	0.692
3.00	0.700
CURVE 11	
T = 298	
0.456	0.000
0.524	0.027
0.579	0.059
0.632	0.105
0.690	0.162
0.952	0.407
1.07	0.487
1.22	0.568
1.34	0.613
1.48	0.645
1.69	0.670
1.95	0.685
2.45	0.697
3.00	0.700*
CURVE 12	
T ~ 298	
42.4	0.000

λ	τ
CURVE 12 (cont.)	
46.6	0.000*
53.0	0.000
54.6	0.000*
61.4	0.000*
70.2	0.000
72.1	0.000*
78.5	0.000*
81.0	0.000
87.3	0.000
93.1	0.016
98.0	0.032
103	0.047
106	0.065
111	0.088
118	0.175
130	0.195
143	0.177
154	0.246
166	0.325
171	0.276
181	0.381
215	0.405
227	0.394
250	0.400
256	0.409
270	0.400
307	0.404
356	0.461
427	0.500
685	0.548
862	0.569
CURVE 13	
T = 300	
83.3	<0.01
100	0.04
125	0.10
166.7	0.25
200	0.32
300	0.40
CURVE 14	
T = 298	
2.00	0.400

λ	τ
CURVE 14 (cont.)	
2.46	0.526
2.81	0.591
3.21	0.628
3.88	0.674
4.70	0.698
6.16	0.721
8.60	0.721
9.31	0.720
9.69	0.728
9.99	0.728*
10.2	0.720
10.6	0.691
10.7	0.667*
10.9	0.651
11.2	0.630
11.5	0.630*
11.8	0.651*
12.0	0.651
CURVE 15*	
T = 373	
2.00	0.400
2.46	0.526
2.81	0.591
3.21	0.628
3.88	0.674
4.70	0.698
6.16	0.721
8.60	0.721
9.31	0.716
9.73	0.724
10.2	0.724
10.5	0.688
10.7	0.663
10.9	0.633
11.3	0.600
11.5	0.600
11.7	0.615
12.0	0.615
CURVE 16	
T = 473	
2.00	0.400*
2.46	0.526*
2.81	0.591*

λ	τ
CURVE 16 (cont.)	
3.21	0.628*
3.88	0.674*
4.70	0.698*
6.16	0.721*
8.60	0.721*
9.31	0.716
9.62	0.723
9.91	0.723*
10.1	0.713
10.4	0.693
10.7	0.655
10.8	0.628
11.0	0.602
11.2	0.584
11.5	0.577*
12.0	0.570
CURVE 17*	
T = 573	
2.00	0.400
2.46	0.526
2.81	0.591
3.21	0.628
3.88	0.674
4.70	0.698
6.16	0.721
8.60	0.721
9.31	0.712
9.75	0.708
10.0	0.697
10.3	0.675
10.5	0.650
10.9	0.582
11.1	0.562
11.2	0.543
11.5	0.522
12.9	0.517
CURVE 18	
T = 673	
2.00	0.400*
2.46	0.526*
2.81	0.591*
3.21	0.628*

* Not shown on plot

DATA TABLE NO. 457 (continued)

λ	τ
CURVE 18 (cont.)	
T = 673	
3.88	0.674
4.70	0.698*
6.16	0.721*
8.60	0.721*
9.31	0.713*
9.85	0.705
10.4	0.667
10.7	0.609
11.0	0.557
11.2	0.517
11.5	0.489
11.6	0.484*
11.8	0.481
12.0	0.464

*Not shown on plot

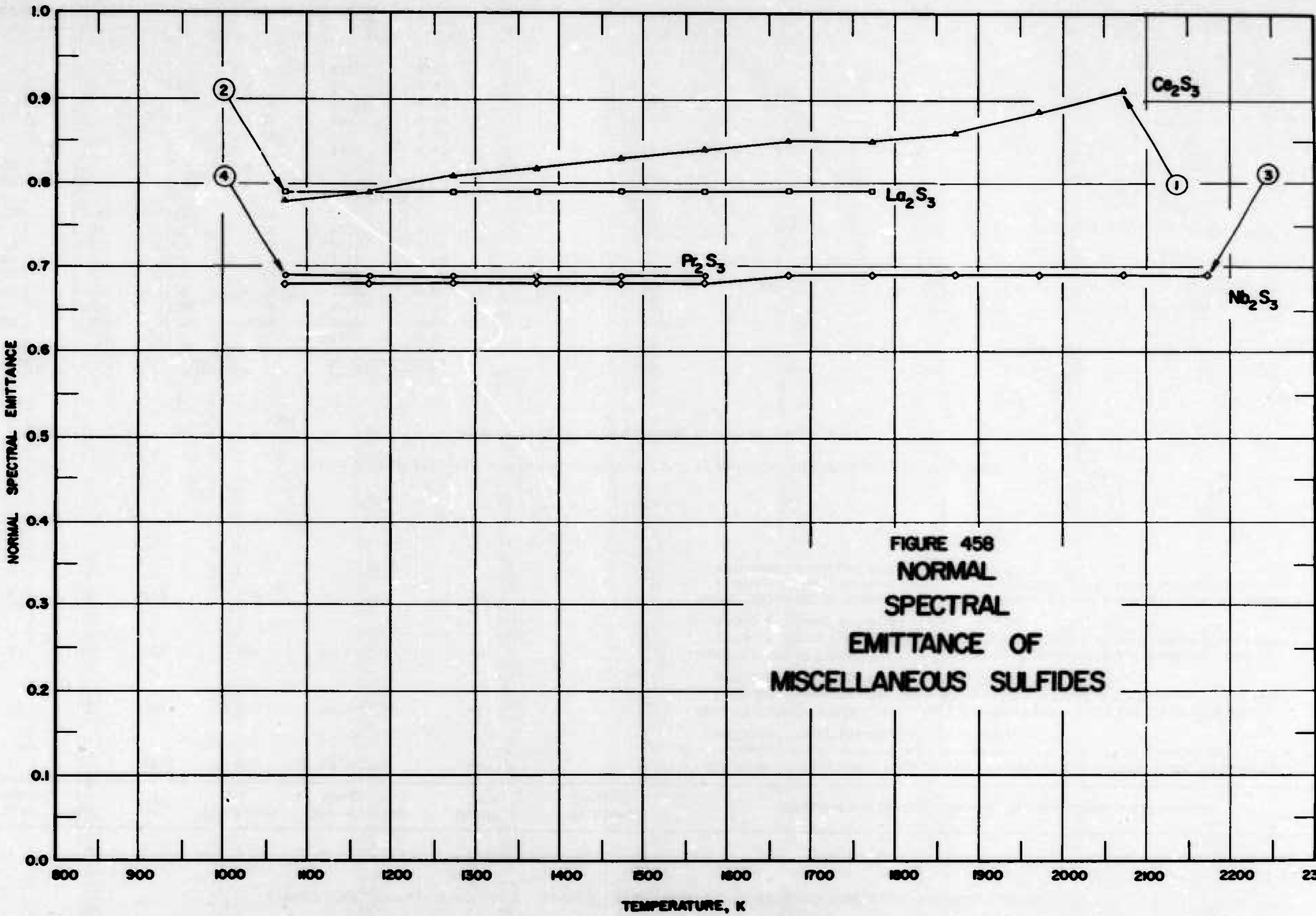


FIGURE 458
NORMAL
SPECTRAL
EMITTANCE OF
MISCELLANEOUS SULFIDES

SPECIFICATION TABLE NO. 458 NORMAL SPECTRAL EMITTANCE OF MISCELLANEOUS SULFIDES

Curve No.	Ref. No.	Year	Wavelength µm	Temperature Range, K	Geometry θ'	Reported Error, %	Composition (weight percent), Specifications, and Remarks
1	13	1962	0.650	1073-2073	~0°		DICERIUM TRISULFIDE, Ce_2S_3; layer of paste (approx 100 µm thick) on tantalum cylinder; paste prepared from fine powder (2-3 µm) of Ce_2S_3 suspended in nitrocellulose binder and dried at 313 to 333 K.
2	13	1962	0.650	1073-1773	~0°		DILANTHANUM TRISULFIDE, La_2S_3; layer of paste (~100 µm thick) on tantalum cylinder; paste prepared from fine powder (2-3 µm) of La_2S_3 suspended in nitrocellulose binder and dried at 313 to 333 K.
3	13	1962	0.650	1073-2173	~0°		DINEODYMIUM TRISULFIDE, Nd_2S_3; layer of paste (~100 µm thick) on tantalum cylinder; paste prepared from fine powder (2-3 µm) of Nd_2S_3 suspended in nitrocellulose binder and dried at 313 to 333 K.
4	13	1962	0.650	1073-1573	~0°		DIPRASEODYMIUM TRISULFIDE, Pr_2S_3; layer of paste (~100 µm thick) on tantalum cylinder; paste prepared from fine powder (2-3 µm) of Pr_2S_3 suspended in nitrocellulose binder and dried at 313 to 333 K.

DATA TABLE NO. 458 NORMAL SPECTRAL EMITTANCE OF MISCELLANEOUS SULFIDES

[Temperature, T, K; Emittance, ϵ; Wavelength, λ, µm]

T	ϵ	T	ϵ	T	ϵ
CURVE 1 λ = 0.650		CURVE 2 λ = 0.650		CURVE 3 (cont.)	
				1473	0.68
1073	0.78	1073	0.79	1573	0.68
1173	0.79	1173	0.79*	1673	0.68
1273	0.81	1273	0.79	1773	0.68
1373	0.82	1373	0.79	1873	0.68
1473	0.83	1473	0.79	1973	0.68
1573	0.84	1573	0.79	2073	0.68
1673	0.85	1673	0.79	2173	0.68
1773	0.85	1773	0.79		
1873	0.86			CURVE 4 λ = 0.650	
1973	0.89	CURVE 3 λ = 0.650			
2073	0.91			1073	0.69
		1073	0.68	1173	0.69
		1173	0.68	1273	0.69
		1273	0.68	1373	0.69
		1373	0.68	1473	0.69
				1573	0.69

*Not shown on plot

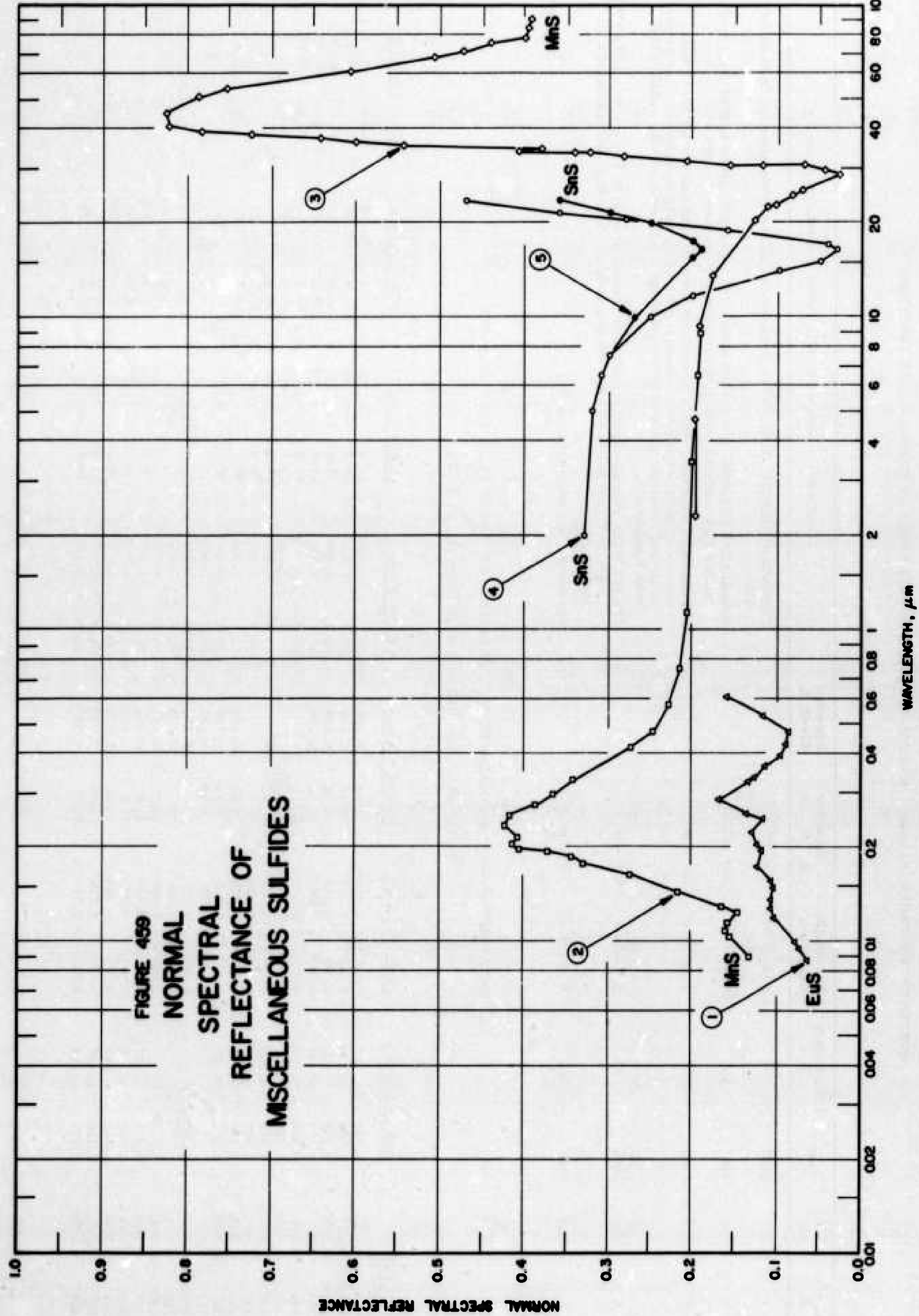


FIGURE 459
NORMAL
SPECTRAL
REFLECTANCE OF
MISCELLANEOUS SULFIDES

SPECIFICATION TABLE NO. 459 NORMAL SPECTRAL REFLECTANCE OF MISCELLANEOUS SULFIDES

Curve No.	Ref. No.	Year	Temperature K	Wavelength Range, μm	Geometry θ θ' ω'	Reported Error, %	Composition (weight percent), Specifications, and Remarks
1	347	1967	298	0.0886-0.611	10° 10°		EUROPIUM SULFIDE, EuS; powder; pressed and polished; data extracted from smooth curve.
2	348	1967	~298	0.088-8.86	~6° ~6°		MANGANESE SULFIDE, MnS; single crystal (<1 mm thick); grown by chemical transport method with iodine as carrier; data extracted from smooth curve.
3	348	1967	~298	2.30-90.0	~0° ~0°		MANGANESE SULFIDE, MnS; pressed from finely ground MnS powder at ~17 tons; density ~0.92 of single crystal density; polished by using succeedingly finer grades of lapping compound followed by dry polishing on a paper covered polishing wheel with 3 μm powder.
4	350	1961	80	2.00-23.8	~0° ~0°		TIN SULFIDE, SnS; Ag-doped crystal (hole concentration at 80 K: p = 1.06 x 10^{18} cm^{-3}); unpolarized light falling on a surface perpendicular to c-axis; data extracted from smooth curve.
5	350	1961	300	2.00-23.6	~0° ~0°		Above specimen and conditions.

DATA TABLE NO. 459 NORMAL SPECTRAL REFLECTANCE OF MISCELLANEOUS SULFIDES

[Wavelength, λ, μm; Reflectance, ρ; Temperature, T, K]

λ	ρ	λ	ρ	λ	ρ	λ	ρ	λ	ρ	λ	ρ	λ		λ	ρ
CURVE 1		CURVE 1 (cont.)		CURVE 2 (cont.)		CURVE 2 (cont.)		CURVE 3 (cont.)		CURVE 3 (cont.)		CURVE 4 (cont.)		CURVE 5 (cont.)	
T = 298															
		0.325	0.133	0.125	0.150*	1.14	0.206	28.7	0.027	50.4	0.789	11.7	0.20	16.4	0.19
0.0886	0.062	0.332	0.129	0.129	0.164	3.44	0.200	29.4	0.044	52.5	0.786*	14.0	0.10	17.5	0.20
0.0952	0.071	0.349	0.123*	0.141	0.216	6.52	0.194	30.4	0.069	54.0	0.751	15.0	0.05	20.0	0.25
0.100	0.078	0.364	0.114	0.161	0.274	8.86	0.190	30.4	0.118	60.3	0.605	16.3	0.03	21.8	0.30
0.117	0.101	0.394	0.098	0.179	0.330			30.4	0.157	68.0	0.508	17.0	0.04	23.6	0.36
0.120	0.103*	0.434	0.090	0.185	0.344	CURVE 3		31.1	0.209	71.1	0.471	19.0	0.16		
0.127	0.107	0.463	0.089	0.192	0.371	T ~ 298		31.3	0.261*	76.0	0.441	20.3	0.28		
0.134	0.107	0.477	0.092*	0.199	0.405			32.3	0.281	78.5	0.400	21.5	0.36		
0.148	0.105	0.534	0.119	0.206	0.414	2.30	0.199	33.1	0.321	85.2	0.398	23.8	0.47		
0.155	0.107	0.611	0.160	0.217	0.409	4.70	0.199	33.1	0.343	90.0	0.391				
0.172	0.121			0.235	0.421	9.40	0.191	33.9	0.407			CURVE 5			
0.178	0.121*	CURVE 2		0.251	0.417	13.7	0.178	34.4	0.381	CURVE 4		T = 300			
0.196	0.119	T ~ 298		0.271	0.388	20.4	0.129	35.8	0.543	T = 80					
0.205	0.121			0.297	0.366	22.3	0.111	36.3	0.600			2.00	0.33*		
0.221	0.130	0.088	0.133	0.330	0.341	22.6	0.102	37.3	0.641	2.00	0.33	5.00	0.32*		
0.249	0.116	0.104	0.155	0.420	0.273	24.1	0.082	38.2	0.723	5.00	0.32	6.50	0.31*		
0.259	0.136	0.108	0.160	0.473	0.248	25.3	0.070	39.7	0.782	6.50	0.31	7.50	0.30*		
0.283	0.167	0.114	0.157	0.571	0.226	27.3	0.046*	41.5	0.821	7.50	0.30	10.0	0.27		
0.294	0.169*	0.121	0.148	0.751	0.215	27.9	0.037*	45.5	0.825	10.0	0.25	15.5	0.20		

*Not shown on plot

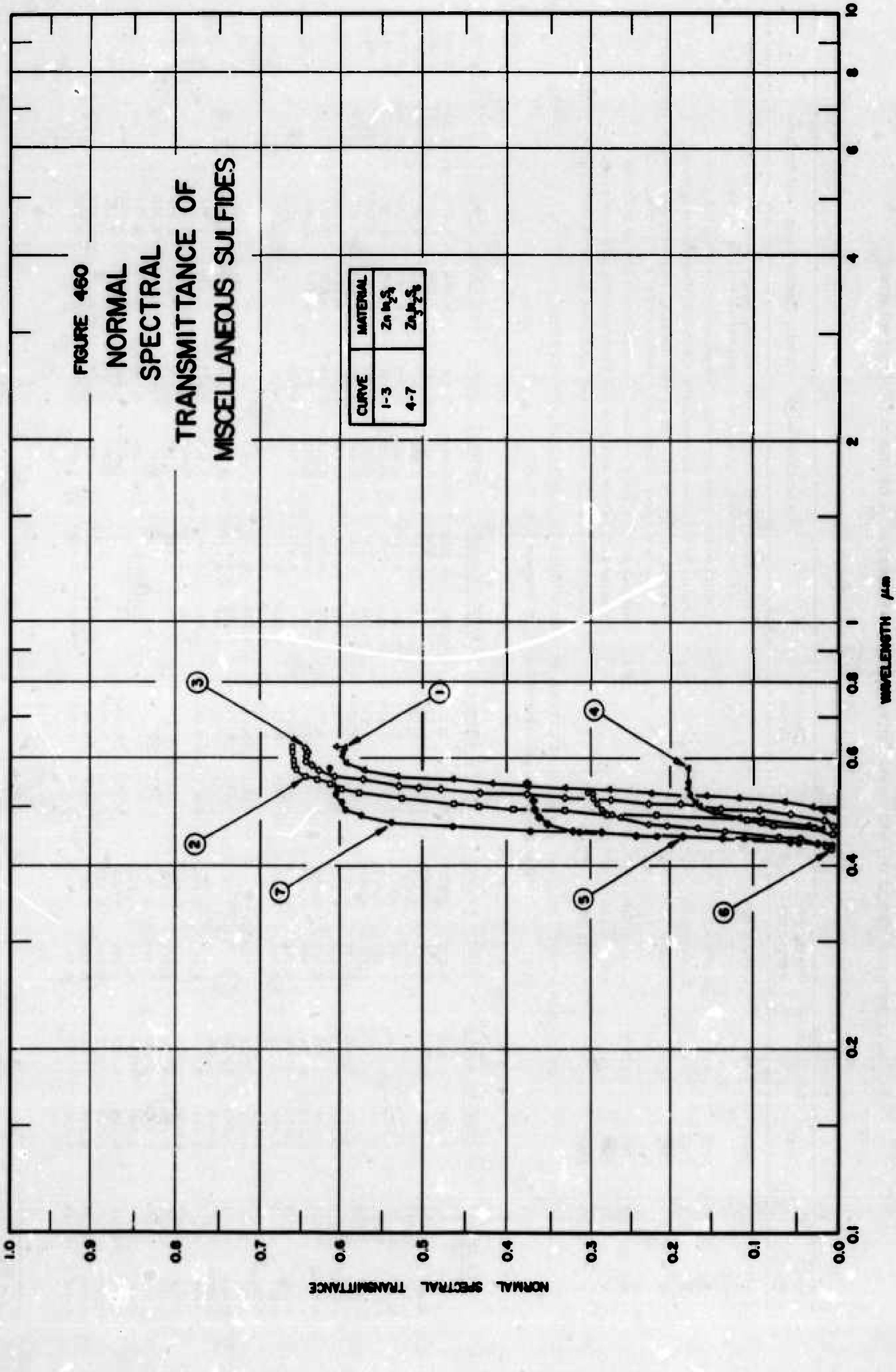


FIGURE 460
NORMAL
SPECTRAL
TRANSMITTANCE OF
MISCELLANEOUS SULFIDES
CURVE | MATERIAL
1-3 | $ZnIn_2S_4$
4-7 | $Zn_3In_2S_6$
NORMAL SPECTRAL TRANSMITTANCE
WAVELENGTH μm

SPECIFICATION TABLE NO. 460 NORMAL SPECTRAL TRANSMITTANCE OF MISCELLANEOUS SULFIDES

Curve No.	Ref. No.	Year	Temperature K	Wavelength Range, μm	Geometry θ θ' ω'	Reported Error, %	Composition (weight percent), Specifications, and Remarks
1	351	1967	~298	0.491-0.621	~0° ~0°		ZINC DIINDIUM TETRASULFIDE, $ZnIn_2S_4$; single crystal (~100 μm thick); mirror-smooth surface; optical c-axes perpendicular to the surface.
2	351	1967	~298	0.450-0.621	~0° ~0°		Similar to the above specimen and conditions; thickness not given.
3	351	1967	~298	0.466-0.620	~0° ~0°		Similar to the above specimen and conditions; thickness not given.
4	351	1967	~298	0.450-0.579	~0° ~0°		TRIZINC DIINDIUM HEXASULFIDE, $Zn_3In_2S_6$; single crystal (~150 μm thick); mirror-smooth surface; optical c-axes perpendicular to the surface.
5	351	1967	~298	0.435-0.544	~0° ~0°		Similar to the above specimen and conditions; thickness not given.
6	351	1967	~298	0.425-0.529	~0° ~0°		Similar to the above specimen and conditions; thickness not given.
7	351	1967	~298	0.431-0.579	~0° ~0°		Similar to the above specimen and conditions; thickness of the sample 20 μm.

DATA TABLE NO. 460 NORMAL SPECTRAL TRANSMITTANCE OF MISCELLANEOUS SULFIDES

[Wavelength, λ, μm; Transmittance, τ, Temperature, T, K]

λ	τ
CURVE 1	
T ~ 298	
0.491	0.006
0.495	0.016
0.500	0.030
0.506	0.042*
0.510	0.064
0.510	0.074*
0.516	0.116
0.520	0.155
0.520	0.165*
0.526	0.224
0.526	0.234*
0.531	0.277
0.531	0.285*
0.536	0.331
0.540	0.375
0.545	0.419
0.551	0.463
0.560	0.530
0.571	0.560*
0.571	0.571
0.581	0.586*
0.590	0.594
0.601	0.597
0.612	0.597

λ	τ
CURVE 1 (cont.)	
0.621	0.596
0.621	0.605
CURVE 2	
T ~ 298	
0.450	0.006
0.456	0.016*
0.460	0.029
0.465	0.076
0.470	0.090
0.476	0.107
0.481	0.212*
0.481	0.218
0.486	0.272*
0.486	0.280
0.491	0.324*
0.491	0.331
0.495	0.376*
0.496	0.393
0.500	0.434
0.505	0.463
0.515	0.526
0.521	0.551*
0.526	0.577

λ	τ
CURVE 2 (cont.)	
0.526	0.583*
0.531	0.589*
0.531	0.598
0.541	0.612
0.551	0.630
0.560	0.644
0.571	0.655
0.581	0.658
0.591	0.658
0.600	0.659*
0.611	0.660
0.621	0.660
CURVE 3	
T ~ 298	
0.466	0.006
0.470	0.011*
0.475	0.018
0.481	0.032*
0.486	0.057
0.491	0.093
0.496	0.139
0.501	0.187
0.501	0.196*

λ	τ
CURVE 3 (cont.)	
0.506	0.227
0.506	0.235*
0.511	0.275
0.516	0.331
0.521	0.376
0.526	0.432
0.531	0.480
0.536	0.502
0.540	0.529
0.551	0.572
0.560	0.608
0.571	0.628
0.581	0.635
0.591	0.642
0.601	0.642
0.611	0.640
0.620	0.642
CURVE 4	
T ~ 298	
0.450	0.005*
0.455	0.009*
0.460	0.019
0.466	0.035

λ	τ
CURVE 4 (cont.)	
0.469	0.059*
0.475	0.090
0.480	0.116
0.484	0.131*
0.490	0.146
0.495	0.155*
0.500	0.161
0.504	0.165*
0.509	0.169
0.514	0.172*
0.520	0.175
0.524	0.176*
0.529	0.176*
0.534	0.178
0.539	0.178*
0.549	0.178*
0.559	0.178*
0.569	0.178*
0.579	0.178
CURVE 5	
T ~ 298	
0.435	0.023
0.438	0.058

λ	τ
CURVE 5 (cont.)	
0.442	0.135
0.446	0.184
0.449	0.243
0.453	0.289
0.455	0.321
0.469	0.351
0.480	0.362
0.495	0.369
0.510	0.369
0.529	0.375
0.544	0.375
CURVE 6	
T ~ 298	
0.425	0.007
0.430	0.012
0.441	0.045
0.445	0.070
0.455	0.132
0.460	0.166
0.465	0.203
0.469	0.226
0.474	0.248*
0.480	0.261

λ	τ
CURVE 6 (cont.)	
0.485	0.275
0.490	0.281*
0.495	0.286
0.499	0.290*
0.504	0.292
0.509	0.295*
0.514	0.297
0.519	0.298*
0.523	0.298
0.529	0.301
CURVE 7	
T ~ 298	
0.431	0.006
0.436	0.022*
0.439	0.048
0.442	0.110
0.446	0.218
0.451	0.315
0.452	0.371
0.454	0.404*
0.461	0.464
0.470	0.536
0.481	0.574

λ	τ
CURVE 7 (cont.)	
0.494	0.593
0.508	0.599
0.524	0.605
0.534	0.602
0.558	0.611
0.579	0.613

* Not shown on plot

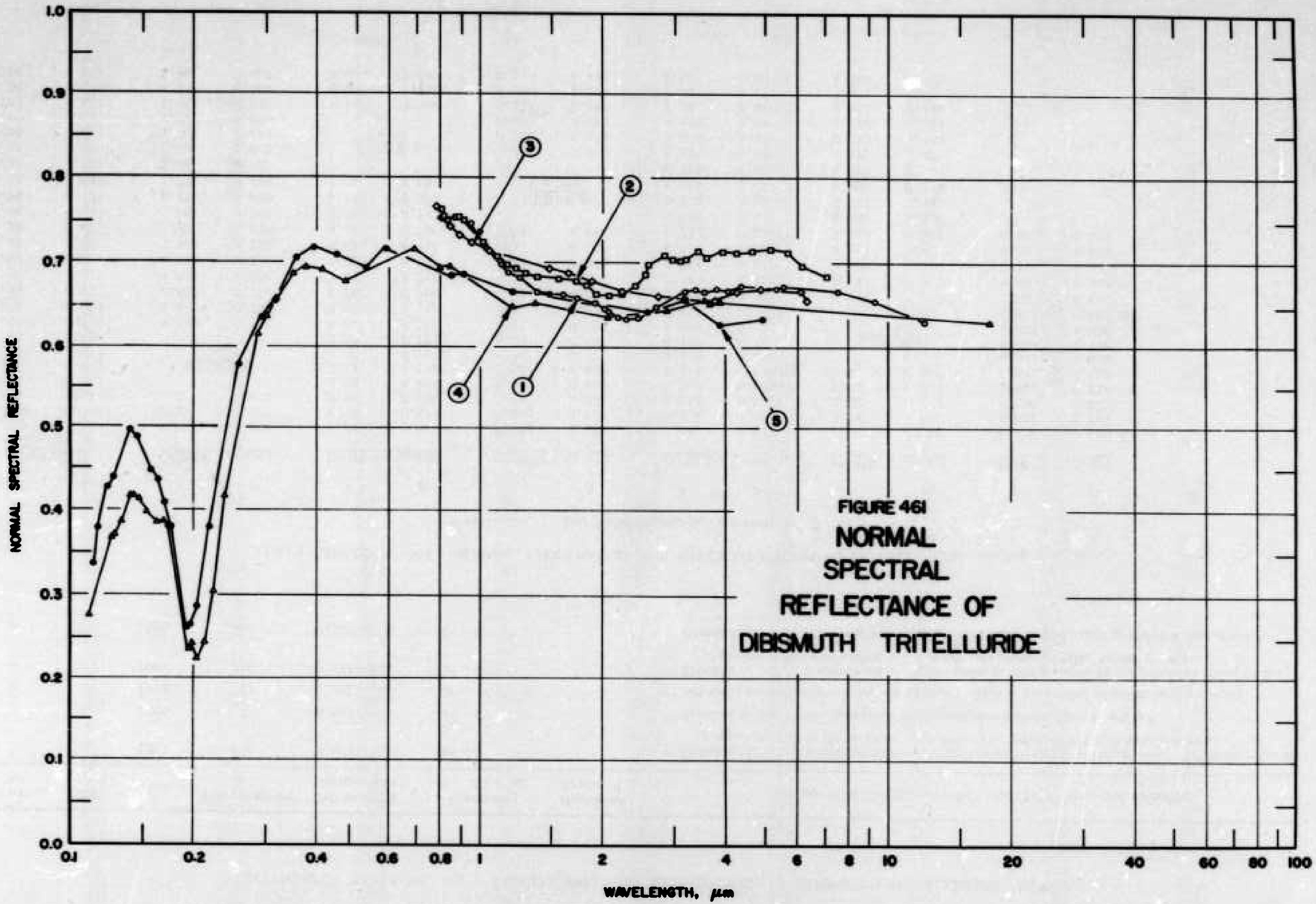


FIGURE 461
NORMAL
SPECTRAL
REFLECTANCE OF
DIBISMUTH TRITELLURIDE

SPECIFICATION TABLE NO. 461 NORMAL SPECTRAL REFLECTANCE OF DIBISMUTH TRITELLURIDE Bi_2Te_3

Curve No.	Ref. No.	Year	Temperature K	Wavelength Range, µm	Geometry θ θ' ω'	Reported Error, %	Composition (weight percent), Specifications, and Remarks
1	391	1965	300	0.954-12.3	~0° ~0°		Uniaxial crystal; cleavage plane perpendicular to the c-axis; incident radiation polarized perpendicular to the c-axis; polished; data extracted from smooth curve.
2	391	1965	77	0.802-7.05	~0° ~0°		Similar to the above specimen and conditions except sample etched.
3	391	1965	77	0.787-7.34	~0° ~0°		Above specimen and conditions except radiation polarized parallel to the c-axis.
4	391	1965	300	0.111-17.7	~0° ~0°		Similar to curve 1 specimen and conditions except sample is cut perpendicular to the cleavage plane and radiation is polarized perpendicular to the c-axis.
5	391	1965	300	0.112-4.96	~0° ~0°		Above specimen and conditions except radiation is polarized parallel to the c-axis.

DATA TABLE NO. 461 NORMAL SPECTRAL REFLECTANCE OF DIBISMUTH TRITELLURIDE Bi_2Te_3

[Wavelength, λ, µm; Reflectance, ρ; Temperature, T, K]

λ	ρ
CURVE 1 T = 300	
0.954	0.746
1.04	0.717
1.12	0.698
1.17	0.689
1.25	0.681
1.39	0.666
1.60	0.663
1.73	0.659
1.91	0.652
2.01	0.647
2.07	0.644
2.18	0.636
2.29	0.635
2.44	0.637
2.70	0.649
3.18	0.667
3.39	0.669
3.55	0.666
3.80	0.669
4.04	0.668
4.35	0.673
5.34	0.670
6.56	0.672
CURVE 1 (cont.)	
7.52	0.668
9.25	0.655
12.3	0.631
CURVE 2 T = 77	
0.802	0.762
0.819	0.755
0.838	0.750
0.867	0.754
0.888	0.754
0.916	0.750
1.02	0.725
1.10	0.707
1.17	0.698
1.22	0.693
1.29	0.687
1.39	0.683
1.56	0.681
1.71	0.679
1.81	0.673
1.91	0.664
2.06	0.661
CURVE 2 (cont.)	
2.23	0.664
2.40	0.672
2.53	0.686
2.59	0.699
2.84	0.709
2.97	0.703
3.10	0.701
3.20	0.702
3.42	0.713
3.60	0.706
3.91	0.713
4.22	0.711
4.61	0.714
5.19	0.716
5.69	0.712
6.14	0.697
7.05	0.683
CURVE 3 T = 77	
0.787	0.766
0.806	0.754
0.844	0.743
CURVE 3 (cont.)	
0.891	0.733
0.959	0.724
1.05	0.715
1.49	0.693
1.65	0.689
1.89	0.679
2.23	0.667
2.71	0.660
3.17	0.659
3.76	0.657
4.25	0.666
4.84	0.670
6.11	0.668
7.34	0.656
CURVE 4 T = 300	
0.111	0.276
0.126	0.366
0.128	0.370
0.133	0.385
0.140	0.416
0.143	0.416
CURVE 4 (cont.)	
0.147	0.412
0.154	0.398
0.162	0.384
0.169	0.385
0.174	0.379
0.195	0.237
0.198	0.241
0.203	0.225
0.211	0.244
0.223	0.304
0.239	0.417
0.288	0.617
0.301	0.638
0.316	0.658
0.350	0.687
0.376	0.694
0.411	0.691
0.470	0.679
0.697	0.717
0.800	0.693
0.849	0.695
1.20	0.649
1.36	0.651
2.07	0.363
CURVE 4 (cont.)	
2.88	0.643
3.54	0.657
3.64	0.652
6.89	0.654
17.7	0.630
CURVE 5 T = 300	
0.112	0.336
0.117	0.377
0.123	0.427
0.127	0.437
0.146	0.495
0.145	0.486
0.157	0.445
0.163	0.434
0.170	0.409
0.175	0.379
0.191	0.260
0.196	0.264
0.203	0.287
0.219	0.379
0.259	0.577
CURVE 5 (cont.)	
0.295	0.636
0.317	0.657
0.356	0.705
0.391	0.718
0.444	0.709
0.525	0.693
0.689	0.716
0.855	0.685
0.912	0.687
1.20	0.666
1.49	0.664
2.58	0.642
3.88	0.629
4.96	0.634

SPECIFICATION TABLE NO. 462 HEMISPHERICAL TOTAL EMITTANCE OF CADMIUM TELLURIDE CdTe

Curve No.	Ref. No.	Year	Temperature Range, K	Reported Error, %	Composition (weight percent), Specifications, and Remarks
1	301	1968	44.5-311		Irtran 6; polycrystal (1 mm thick).
2	301	1968	75.2-311		Above specimen and conditions.
3	301	1968	75.1-312		Irtran 6; polycrystal (2 mm thick).
4	301	1968	75.2-311		Irtran 6; polycrystal (3 mm thick).

DATA TABLE NO. 462 HEMISPHERICAL TOTAL EMITTANCE OF CADMIUM TELLURIDE CdTe

[Temperature, T, K; Emittance, ϵ]

T	ϵ	T	ϵ	T	ϵ
CURVE 1		CURVE 2 (cont.)		CURVE 3 (cont.)	
44.5	0.428	104	0.384	212	0.263
54.8	0.451	114	0.364	236	0.236
64.5	0.451	124	0.343	261	0.217
74.8	0.444	134	0.325	286	0.205
84.3	0.433	144	0.310	312	0.195
94.5	0.410	162	0.273		
104	0.392	18[illegible]	0.237	CURVE 4	
114	0.370	211	0.214*		
124	0.351	236	0.187*	75.2	0.555
134	0.321	262	0.169	84.7	0.526
144	0.307	286	0.157	95.0	0.506
161	0.280	311	0.144	105	0.490
185	0.243			114	0.462
211	0.214	CURVE 3		125	0.446
236	0.187			135	0.415
262	0.168	75.1	0.519	162	0.366
287	0.155	84.8	0.496	186	0.323
311	0.151	94.8	0.473	213	0.286
		104	0.452	237	0.260
CURVE 2		115	0.428	262	0.245
		125	0.406	287	0.234
75.2	0.437	135	0.392	311	0.221
84.8	0.424	162	0.337		
94.7	0.402	186	0.286		

*Not shown on plot

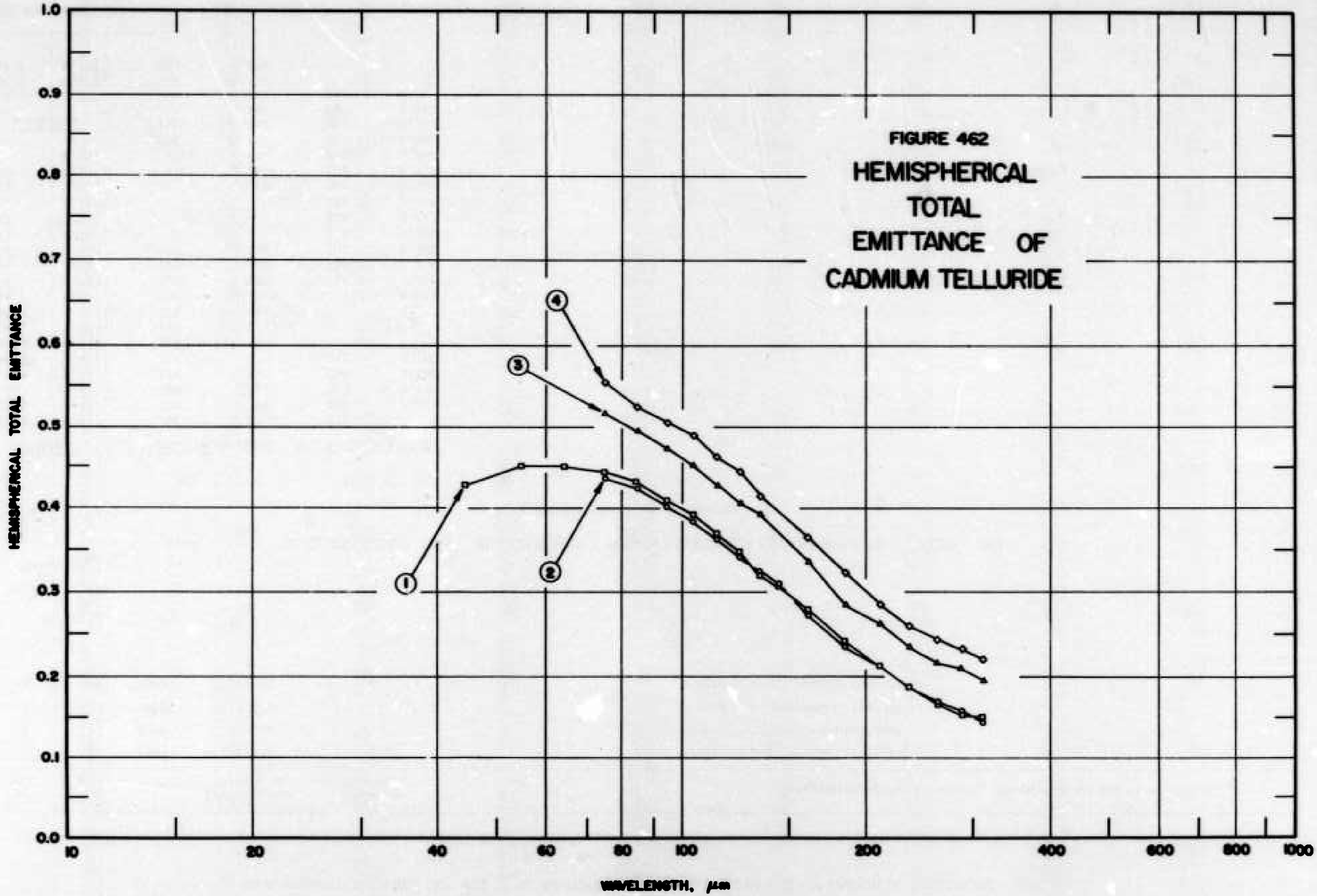


FIGURE 462
HEMISPHERICAL
TOTAL
EMITTANCE OF
CADMIUM TELLURIDE
HEMISPHERICAL TOTAL EMITTANCE
WAVELENGTH, μm
1.0
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0.0
10
20
40
60
80
100
200
400
600
800
1000
1
2
3
4

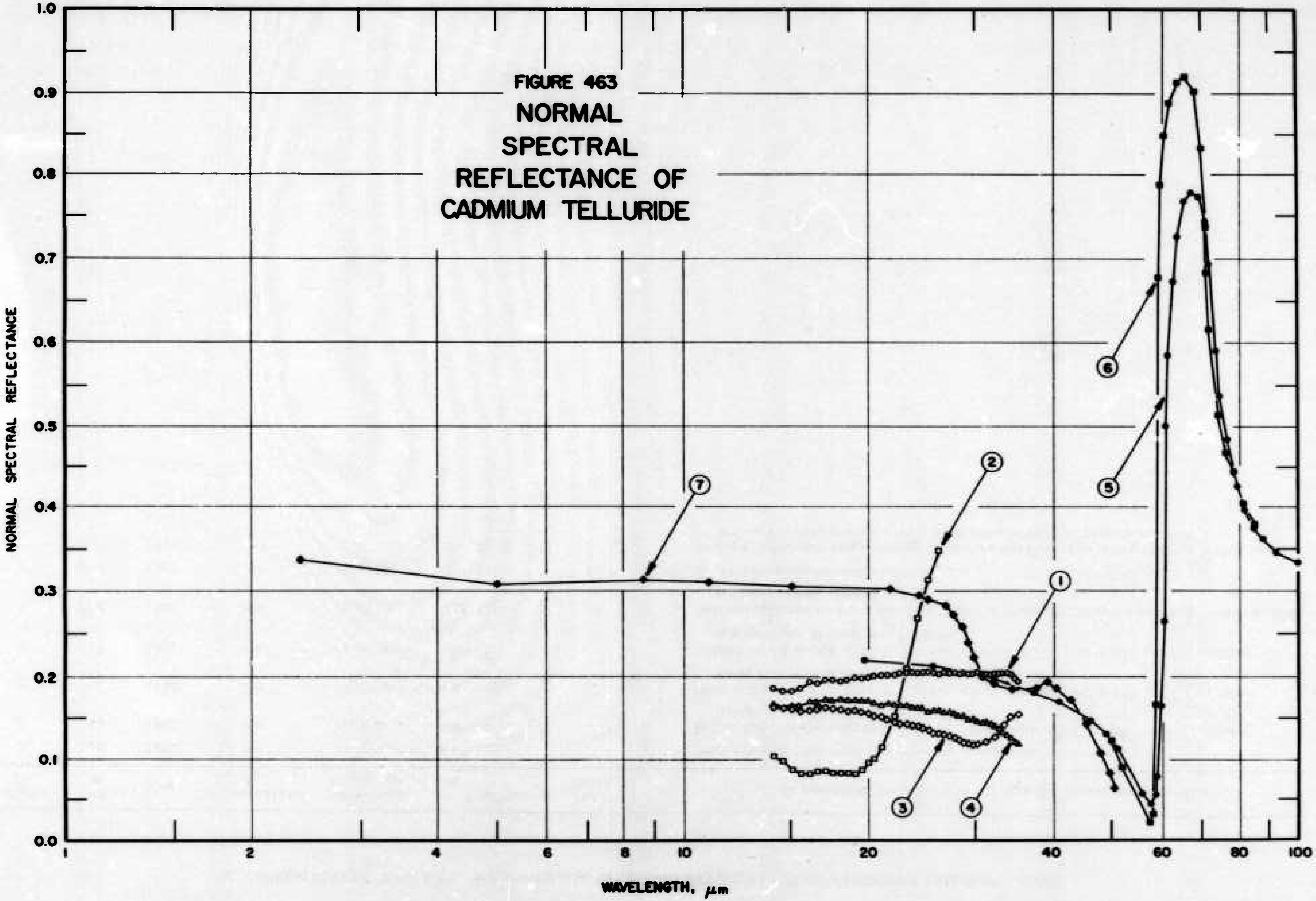


FIGURE 463
NORMAL SPECTRAL REFLECTANCE OF CADMIUM TELLURIDE

SPECIFICATION TABLE NO. 463 NORMAL SPECTRAL REFLECTANCE OF CADMIUM TELLURIDE CdTe

Curve No.	Ref. No.	Year	Temperature K	Wavelength Range, μm	Geometry θ	θ'	ω'	Reported Error, %	Composition (weight percent), Specifications, and Remarks
1	352	1962	298	14.0-35.0	$\sim 0°$	$\sim 0°$			Pure crystal; [Authors' designation: Sample No. 7187-310].
2	352	1962	298	14.0-26.0	$\sim 0°$	$\sim 0°$			Iodine doped n-type crystal; carrier concentration 1.81×10^{17} cm^{-3}; [Authors' designation: Sample No. 7234-117].
3	352	1962	298	14.0-35.0	$\sim 0°$	$\sim 0°$			Indium doped n-type crystal; carrier concentration 4.97×10^{17} cm^{-3}; [Authors' designation: Sample No. 7234-67].
4	352	1962	298	14.0-35.0	$\sim 0°$	$\sim 0°$			Indium doped n-type crystal; carrier concentration 3.22×10^{17} cm^{-3}; [Authors' designation: Sample No. 7234-99].
5	256	1967	300	19.7-100	12°	12°		±1	Surface polished to a mirror-like finish; aluminized mirror reference standard; data extracted from smooth curve.
6	256	1967	100	19.7-100	12°	12°		±1	Above specimen and conditions.
7	87	1968	313	2.4-50.0	30°	30°			Irtran 6; synthetic single crystal (2.0 mm thick); flat to ten fringes or better; data extracted from smooth curve; aluminum mirror reference standard.

DATA TABLE NO. 463 NORMAL SPECTRAL REFLECTANCE OF CADMIUM TELLURIDE CdTe

[Wavelength, λ, μm; Reflectance, ρ; Temperature, T, K]

λ	ρ
CURVE 1	**T = 298**
14.0	0.1873
14.5	0.1840
15.0	0.1830
15.5	0.1876
16.0	0.1939
16.5	0.1923
17.0	0.1968
17.5	0.1965
18.0	0.1957
18.4	0.1977
19.0	0.1993
19.5	0.1996
20.0	0.1998
20.4	0.2001
21.0	0.2005
21.4	0.2006
22.0	0.2017
22.4	0.2031
23.0	0.2037
23.5	0.2037
24.0	0.2034
24.5	0.2034
25.0	0.2041
25.5	0.2031
26.0	0.2023
26.5	0.2030
27.0	0.2035
27.5	0.2032
28.0	0.2028
28.4	0.2048
29.0	0.2022
29.5	0.2028
30.0	0.2038
30.5	0.2028
31.0	0.2021
31.5	0.2016
32.0	0.2023
32.5	0.2028
33.0	0.2028
33.5	0.2030
34.0	0.2024
34.5	0.1998
35.0	0.1949

λ	ρ
CURVE 2	**T = 298**
14.0	0.1037
14.5	0.0999
15.0	0.0889
15.5	0.0803
16.0	0.0836
16.5	0.0850
17.0	0.0866
17.5	0.0848
18.0	0.0843
18.5	0.0844
19.0	0.0832
19.5	0.0886
20.0	0.0951
20.4	0.1009
21.0	0.1159
22.0	0.1514
23.0	0.2088
24.0	0.2689
25.0	0.3143
26.0	0.3493
CURVE 3	**T = 298**
14.0	0.1644
14.5	0.1616
15.0	0.1616
15.5	0.1588
16.0	0.1592
16.4	0.1605
17.0	0.1639
17.5	0.1612
18.0	0.1604
18.5	0.1599
19.0	0.1592
19.4	0.1571
20.0	0.1560
20.4	0.1520
21.0	0.1517
21.4	0.1499
22.0	0.1462
22.4	0.1434
23.0	0.1427

λ	ρ
CURVE 3 (cont.)	
23.5	0.1418
24.0	0.1405
24.4	0.1385
25.0	0.1351
25.4	0.1331
26.0	0.1318
26.5	0.1307
27.0	0.1290
27.5	0.1279
28.0	0.1243
28.5	0.1214
29.0	0.1203
29.5	0.1188
30.0	0.1196
31.0	0.1214
32.0	0.1285
33.1	0.1413
34.0	0.1504
35.0	0.1542
CURVE 4	**T = 298**
14.0	0.1665
14.5	0.1618*
15.0	0.1651
15.4	0.1656
16.0	0.1708
16.4	0.1706
17.0	0.1720
17.4	0.1711
18.0	0.1735
18.5	0.1729
19.0	0.1715
19.5	0.1715
20.0	0.1711
20.4	0.1697
21.0	0.1678
21.5	0.1683
22.0	0.1669
22.5	0.1662
23.0	0.1662
23.5	0.1635
24.0	0.1631

λ	ρ
CURVE 4 (cont.)	
24.4	0.1612
25.0	0.1588
25.5	0.1595
26.0	0.1595
26.5	0.1573
27.0	0.1573
27.5	0.1553
28.0	0.1522
28.5	0.1518
29.0	0.1492
29.5	0.1495
30.0	0.1478
30.5	0.1466
31.0	0.1453
31.5	0.1437
32.0	0.1406
32.5	0.1388
33.1	0.1322
33.5	0.1301
34.0	0.1270
34.5	0.1210
35.0	0.1198
CURVE 5	**T = 300**
19.7	0.219
25.4	0.211
31.8	0.199
37.0	0.180
40.8	0.170
45.9	0.146
48.4	0.131
50.5	0.114
55.4	0.058
57.1	0.045
58.3	0.057
58.8	0.080
59.7	0.165
60.3	0.263
60.9	0.500
61.3	0.586
62.5	0.672
63.5	0.726

λ	ρ
CURVE 5 (cont.)	
65.1	0.767
66.8	0.776
68.8	0.772
70.4	0.742
71.2	0.693
73.1	0.591
74.3	0.537
76.3	0.483
79.2	0.427
81.6	0.396
84.5	0.373
87.2	0.361
91.8	0.346
100	0.334
CURVE 6	**T = 100**
19.7	0.219*
25.4	0.211*
31.8	0.199*
37.0	0.180*
40.8	0.170*
45.9	0.146*
49.5	0.123
51.2	0.090
57.0	0.022
57.6	0.032
58.2	0.167
59.1	0.676
59.8	0.787
60.3	0.848
61.6	0.889
63.3	0.913
65.4	0.920
67.6	0.902
69.1	0.831
70.1	0.736
70.7	0.681
71.4	0.618
73.7	0.515
76.0	0.468
78.1	0.444
80.9	0.402

λ	ρ
CURVE 6 (cont.)	
84.1	0.378
87.2	0.361*
91.8	0.346*
100	0.334*
CURVE 7	**T = 313**
2.4	0.338
5.0	0.309
8.6	0.313
11.0	0.311
15.0	0.305
21.6	0.301
24.1	0.295
25.0	0.290
26.6	0.282
27.4	0.272
28.3	0.258
29.0	0.239
29.7	0.221
30.5	0.200
31.9	0.191
34.1	0.185
37.3	0.186
39.0	0.194
40.4	0.188
42.5	0.172
45.0	0.143
47.6	0.109
49.1	0.084
50.0	0.065

*Not shown on plot

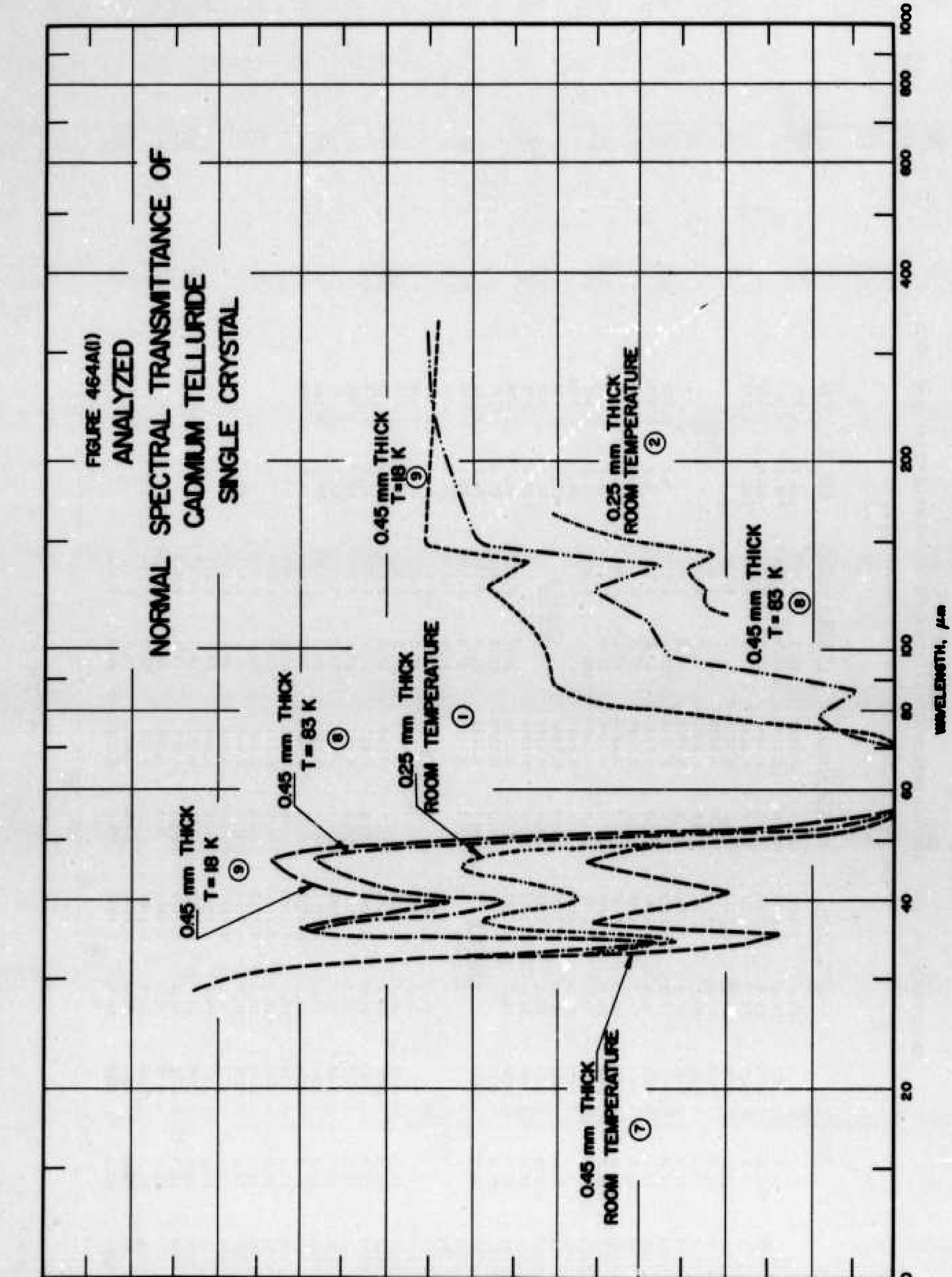


FIGURE 464A(I)
ANALYZED
NORMAL SPECTRAL TRANSMITTANCE OF
CADMIUM TELLURIDE
SINGLE CRYSTAL
0.45 mm THICK
T = 18 K
9
0.45 mm THICK
T = 83 K
8
0.25 mm THICK
ROOM TEMPERATURE
1
0.45 mm THICK
ROOM TEMPERATURE
7
0.25 mm THICK
ROOM TEMPERATURE
2
NORMAL SPECTRAL TRANSMITTANCE
WAVELENGTH, μm
1.0
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0.0
10
20
40
60
80
100
200
400
600
800
1000

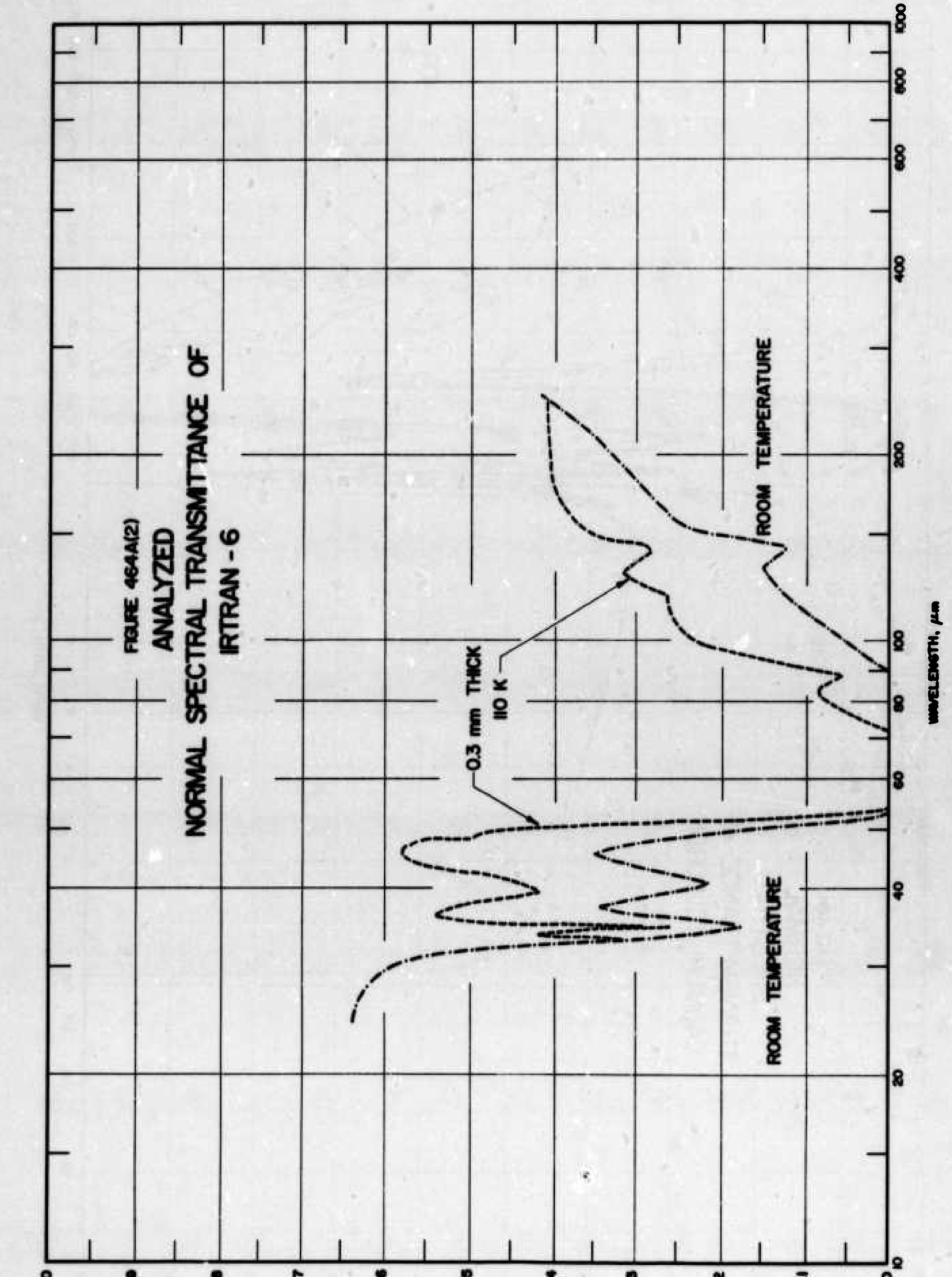


FIGURE 464A(2)
ANALYZED
NORMAL SPECTRAL TRANSMITTANCE OF
IRTRAN - 6

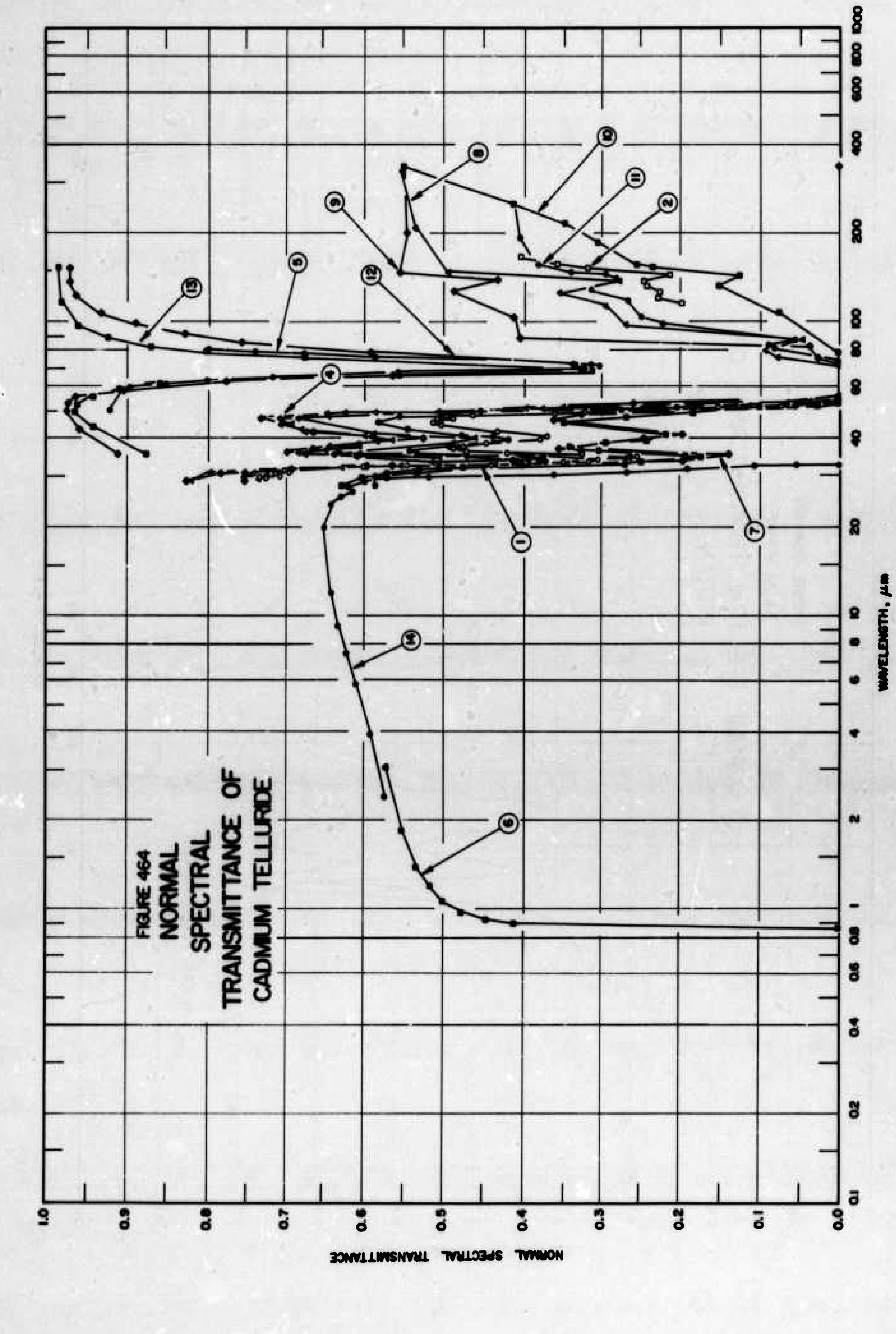


FIGURE 464 NORMAL SPECTRAL TRANSMITTANCE OF CADMIUM TELLURIDE

SPECIFICATION TABLE NO. 464 NORMAL SPECTRAL TRANSMITTANCE OF CADMIUM TELLURIDE CdTe

Curve No.	Ref. No.	Year	Temperature K	Wavelength Range, μm	Geometry θ	θ'	ω'	Reported Error, %	Composition (weight percent), Specifications, and Remarks
1	73	1965	300	29.1-52.0	~0°	~0°			0.25 mm thick; data extracted from smooth curve.
2	73	1965	300	115-166	~0°	~0°			Above specimen and conditions.
3*	73	1965	200	29.1-51.9	~0°	~0°			Above specimen and conditions.
4	73	1965	100	29.1-51.9	~0°	~0°			Above specimen and conditions.
5	256	1967	300	50.0-80.1	~0°	~0°		±1	Thin film evaporated on collodion film; data extracted from smooth curve.
6	94	1967	298	0.853-3.00	>15°	>15°		±2	Irtran 6 (2.0 mm thick); polished; data extracted from smooth curve.
7	353	1967	290	28.6-333	~0°	~0°			Bridgman-grown single crystal (0.45 mm thick); resistivity 7 x 10^5 ohm cm; data extracted from smooth curve; transmittance measured along [111] axis.
8	353	1967	83	28.6-323	~0°	~0°			Similar to the above specimen and conditions.
9	353	1967	18	28.6-333	~0°	~0°			Similar to the above specimen and conditions.
10	218	1967	300	27.8-250	~0°	~0°			Irtran 6 (0.3 mm thick); data extracted from smooth curve.
11	218	1967	110	27.8-250	~0°	~0°			Above specimen and conditions.
12	218	1967	300	35.8-153	~0°	~0°			Film (~1 μm thick); evaporated in vacuum; medium-density polyethylene substrate; data extracted from smooth curve.
13	218	1967	140	35.8-153	~0°	~0°			Above specimen and conditions.
14	87	1968	313	2.40-32.4	~0°	~0°			Irtran 6; synthetic single crystal (2.0 mm thick); flat to ten fringes or better; data extracted from smooth curve.

*Not shown on plot

DATA TABLE NO. 464 NORMAL SPECTRAL TRANSMITTANCE OF CADMIUM TELLURIDE CdTe

[Wavelength, λ, μm; Transmittance, τ; Temperature, T, K]

CURVE 1
T = 300

λ	τ
29.1	0.727
29.5	0.735
29.9	0.708
30.2	0.713
30.6	0.696
31.1	0.702
32.1	0.601
32.5	0.547
32.8	0.442
33.2	0.351
33.4	0.317
34.0	0.304
34.3	0.264
34.8	0.254
35.6	0.327
35.9	0.421
36.4	0.471
37.1	0.487
37.8	0.475
38.6	0.446
39.8	0.381
40.3	0.371
42.5	0.433
44.3	0.502
45.4	0.512
45.8	0.503
46.3	0.508
46.9	0.488
47.6	0.496
47.9	0.462
48.5	0.361
49.1	0.321
50.4	0.152
51.2	0.071
52.0	0.028

CURVE 2
T = 300

λ	τ
115	0.199
120	0.228
127	0.225
131	0.240
136	0.244
143	0.214
151	0.319
158	0.359
166	0.405

CURVE 3*
T = 200

λ	τ
29.1	0.727
29.8	0.734
30.1	0.713
31.0	0.716
32.0	0.624
32.5	0.543
32.6	0.459
34.1	0.319
34.5	0.293
35.0	0.350
35.5	0.464
35.8	0.550
36.1	0.578
36.6	0.578
37.0	0.558
37.7	0.552
40.0	0.465
41.2	0.485
42.6	0.557
43.2	0.566
43.7	0.593
44.5	0.597
45.1	0.604
45.6	0.584
46.4	0.606
47.4	0.586
47.9	0.520
48.3	0.461
49.1	0.433
50.5	0.199
51.5	0.090
51.9	0.052

CURVE 4
T = 100

λ	τ
29.1	0.738
29.4	0.756
29.9	0.725
30.4	0.742
30.9	0.717
31.3	0.698
32.0	0.627
32.5	0.555
32.7	0.437
33.2	0.513
34.0	0.395
34.8	0.503
34.9	0.610
35.5	0.673
36.0	0.683
36.9	0.649
37.5	0.644
37.9	0.605
38.2	0.608
39.1	0.584
39.4	0.566
40.1	0.590
40.6	0.600
42.2	0.675
43.1	0.679
44.8	0.708
45.4	0.691
45.8	0.706
47.0	0.709
47.5	0.644
48.3	0.647
48.8	0.624
49.2	0.587
49.7	0.507
50.3	0.377
50.9	0.352
51.9	0.113

CURVE 5
T = 300

λ	τ
50.0	0.925
58.8	0.909
59.9	0.899
61.9	0.852
63.3	0.802
64.8	0.719
67.1	0.559
69.8	0.329
70.7	0.303
71.8	0.314
75.6	0.587
77.2	0.677
78.5	0.741
80.1	0.800

CURVE 6
T = 298

λ	τ
0.853	0.000
0.895	0.411
0.918	0.446
0.970	0.476
1.05	0.500
1.18	0.516
1.38	0.534
1.83	0.552
3.00	0.572

CURVE 7
T = 290

λ	τ
28.6	0.826
30.2	0.784
31.3	0.692
32.2	0.599
32.9	0.403
33.6	0.196
35.3	0.139
36.5	0.327
37.0	0.357
40.0	0.244
41.3	0.198
46.1	0.362
48.1	0.327
51.8	0.054
54.6	0.000
333	0.000

CURVE 8
T = 83

λ	τ
28.6	0.822
30.7	0.797
31.8	0.692*
32.5	0.507
33.0	0.346
33.6	0.411
34.4	0.269
35.3	0.638
35.8	0.685
36.5	0.667
38.9	0.487
40.0	0.460
41.7	0.589
46.7	0.684
50.3	0.399
52.9	0.063
55.9	0.000
70.4	0.000
75.8	0.077
79.4	0.092
86.2	0.046
98.0	0.268
112	0.294
125	0.357
137	0.276
149	0.493
208	0.536
323	0.553

CURVE 9
T = 18

λ	τ
28.6	0.753
30.3	0.753
31.6	0.698*
32.4	0.566
33.1	0.347*
33.4	0.414
34.4	0.264
34.8	0.378
35.3	0.605
36.2	0.700
37.0	0.665
40.0	0.524
42.2	0.665
46.7	0.733
52.6	0.259
53.2	0.036
54.3	0.000*
71.4	0.000
74.1	0.026
82.6	0.357
88.5	0.405
102	0.413
127	0.488
139	0.434
149	0.457
200	0.547
333	0.541

CURVE 10
T = 300

λ	τ
27.8	0.628
29.4	0.603
30.4	0.572
31.3	0.530
32.0	0.475
32.9	0.370
33.2	0.249
34.7	0.174
35.0	0.193
36.2	0.302
37.3	0.344
38.7	0.293
39.6	0.241
40.6	0.218
45.4	0.351
47.8	0.269
49.7	0.185
51.0	0.100
51.8	0.029
52.6	0.000
89.2	0.000
106	0.075
131	0.151
142	0.123
151	0.234
156	0.254
188	0.304
212	0.350
250	0.414

CURVE 11
T = 110

λ	τ
27.8	0.588
29.9	0.588
30.6	0.575
31.4	0.532
32.1	0.475
33.0	0.312
33.3	0.373
34.2	0.265*
35.0	0.470
35.5	0.533
36.4	0.544
37.8	0.492
39.6	0.420
40.8	0.440
41.1	0.477
43.2	0.548
45.8	0.583
47.6	0.556
47.8	0.502
49.5	0.453
50.0	0.274
50.7	0.204
51.8	0.129
52.6	0.049
53.1	0.000*
72.9	0.000
80.6	0.081
83.3	0.089
87.7	0.055
98.0	0.221
103	0.249
119	0.266
129	0.315
140	0.280
144	0.293
147	0.342
158	0.383
192	0.406
250	0.414*

CURVE 12
T = 300

λ	τ
35.8	0.914
43.2	0.961
49.5	0.977
52.6	0.977
55.5	0.967
58.4	0.906
62.1	0.779
65.7	0.567
69.9	0.322
71.4	0.339
78.1	0.592
85.4	0.759
90.9	0.829
99.0	0.890
108	0.936
123	0.967
138	0.973
153	0.973

CURVE 13
T = 140

λ	τ
35.8	0.877
44.0	0.945
49.5	0.969
52.6	0.965
55.8	0.946
58.8	0.911
60.6	0.859
65.3	0.557
68.0	0.314
70.9	0.338
75.7	0.675
78.7	0.802
82.6	0.870
88.4	0.928
97.0	0.963
117	0.982
153	0.987

CURVE 14
T = 313

λ	τ
2.40	0.575
3.90	0.593
5.80	0.610
7.40	0.622
9.20	0.631

*Not shown on plot

DATA TABLE NO. 464 (continued)

λ	τ
CURVE 14 (cont.)	
T = 313	
12.3	0.641
20.0	0.650
23.8	0.642
25.4	0.629
26.5	0.615
27.4	0.620
28.5	0.600
29.2	0.573
29.5	0.519
30.0	0.362
30.7	0.269
31.5	0.191
32.1	0.106
32.3	0.053
32.4	0.000

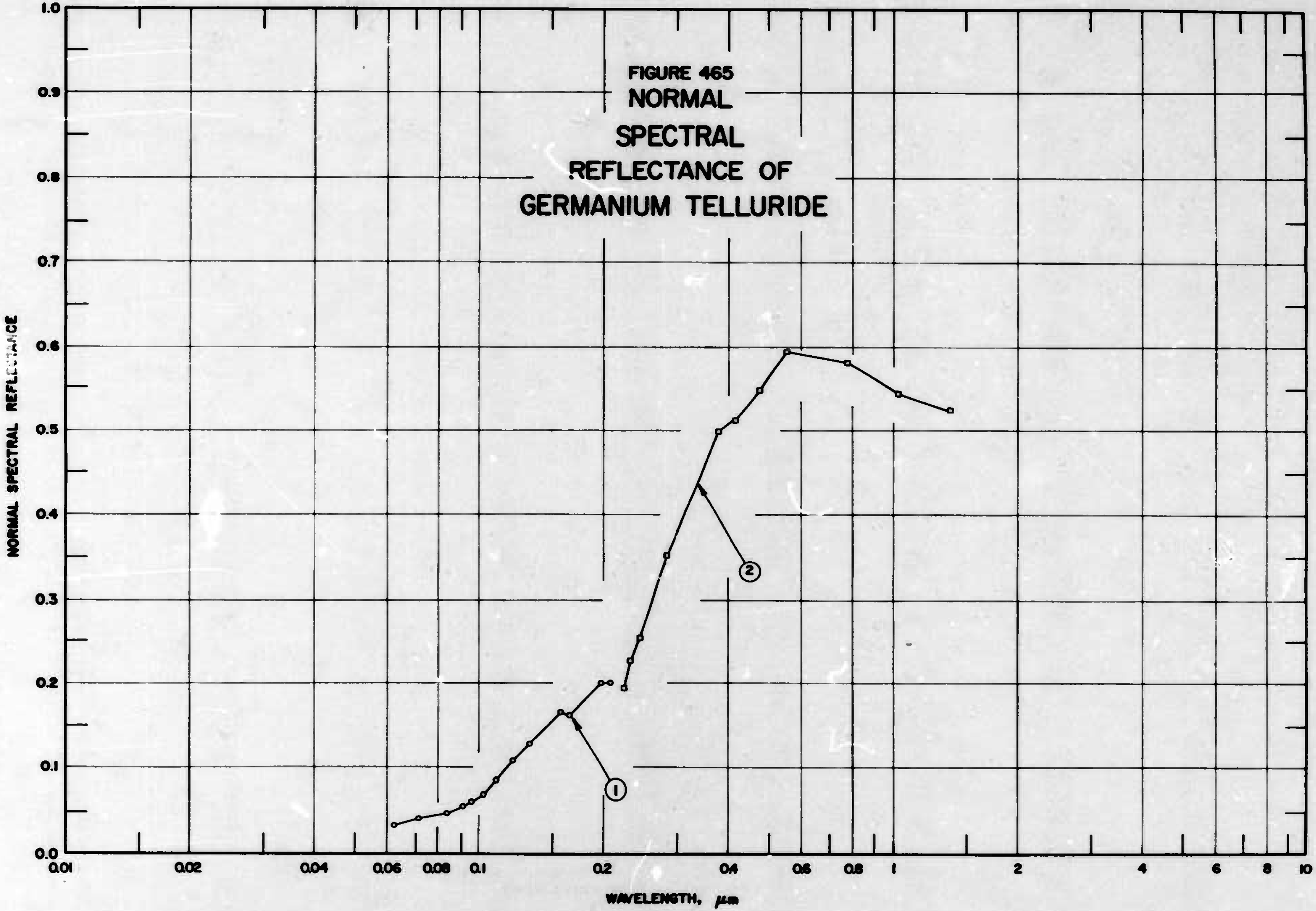


FIGURE 465 NORMAL SPECTRAL REFLECTANCE OF GERMANIUM TELLURIDE

SPECIFICATION TABLE NO. 465 NORMAL SPECTRAL REFLECTANCE OF GERMANIUM TELLURIDE GeTe

Curve No.	Ref. No.	Year	Temperature K	Wavelength Range, μm	Geometry θ θ' ω'	Reported Error, %	Composition (weight percent), Specifications, and Remarks
1	74	1964	297	0.0620-0.207	~0° ~0°		Evaporated layer (polycrystal).
2	74	1964	297	0.207-1.38	~0° ~0°		Single crystal; cleaved; data extracted from smooth curve.

DATA TABLE NO. 465 NORMAL SPECTRAL REFLECTANCE OF GERMANIUM TELLURIDE GeTe

[Wavelength, λ, μm; Reflectance, ρ; Temperature, T, K]

λ	ρ	λ	ρ
CURVE 1 T = 297		CURVE 2 T = 297	
0.0620	0.032	0.207	0.200*
0.0713	0.041	0.221	0.193
0.0838	0.049	0.230	0.227
0.0905	0.057	0.243	0.254
0.0954	0.061	0.282	0.351
0.102	0.070	0.376	0.499
0.109	0.084	0.413	0.511
0.120	0.109	0.477	0.547
0.131	0.129	0.653	0.595
0.157	0.165	0.775	0.580
0.165	0.162	1.03	0.544
0.197	0.200	1.38	0.524
0.207	0.200		

* Not shown on plot

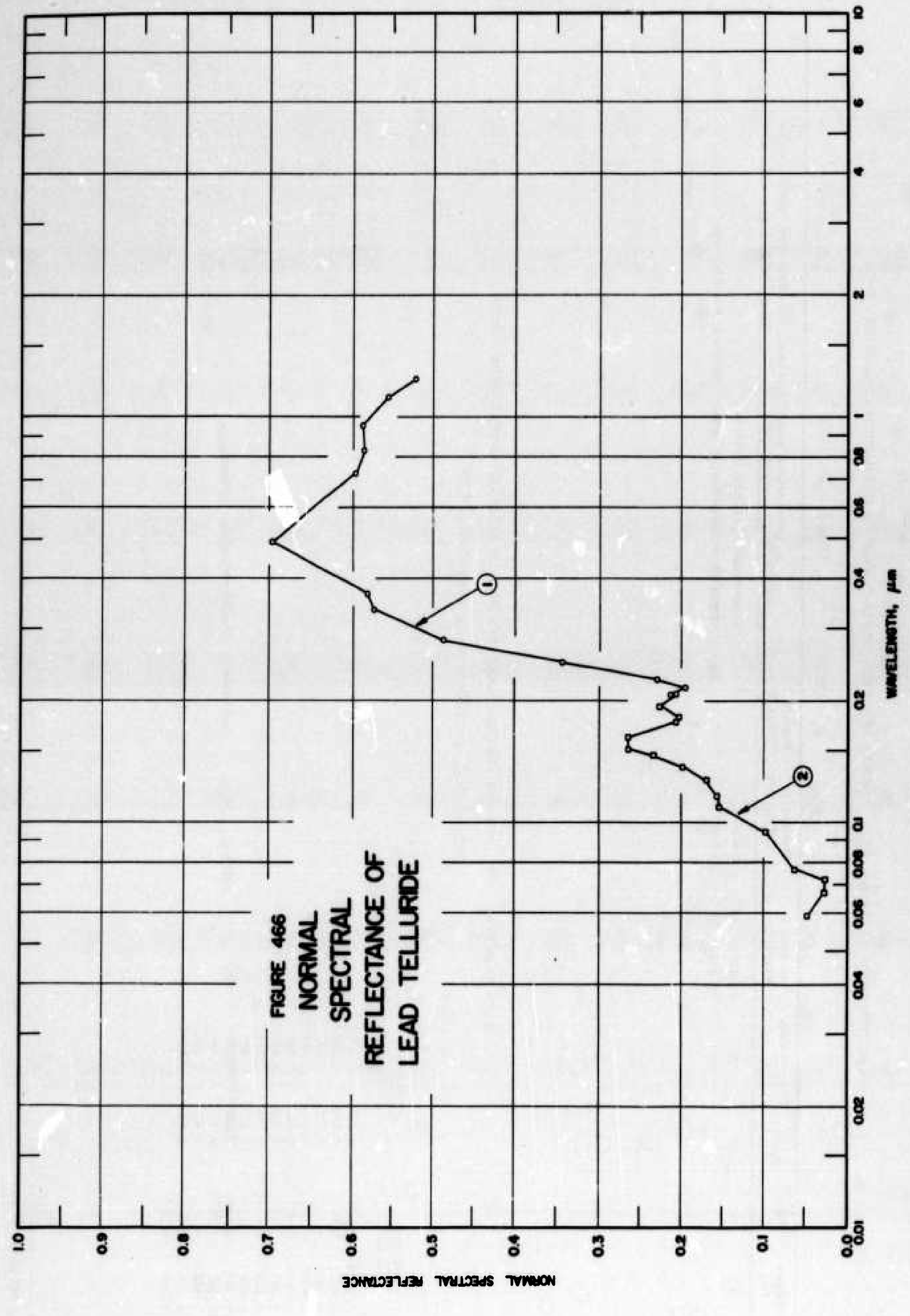


FIGURE 466 NORMAL SPECTRAL REFLECTANCE OF LEAD TELLURIDE

SPECIFICATION TABLE NO. 466 NORMAL SPECTRAL REFLECTANCE OF LEAD TELLURIDE PbTe

Curve No.	Ref. No.	Year	Temperature K	Wavelength Range, μm	Geometry θ θ' ω'	Reported Error, %	Composition (weight percent), Specifications, and Remarks
1	74	1964	297	0.207-1.24	~0° ~0°		Single crystal; cleaved; data extracted from smooth curve.
2	74	1964	297	0.0590-0.207	~0° ~0°		Epitaxially-deposited layer; single crystal with (100) orientation on KBr single crystal substrate; data extracted from smooth curve.

DATA TABLE NO. 466 NORMAL SPECTRAL REFLECTANCE OF LEAD TELLURIDE PbTe

[Wavelength, λ, μm; Reflectance, ρ; Temperature, T, K]

λ	ρ	λ	ρ
CURVE 1	T = 297	CURVE 2	T = 297
0.207	0.215	0.0590	0.048
0.214	0.193	0.0670	0.027
0.225	0.230	0.0721	0.026
0.248	0.343	0.0765	0.028
0.282	0.486	0.0861	0.062
0.335	0.571	0.0954	0.098
0.365	0.580	0.109	0.153
0.496	0.698	0.116	0.157
0.729	0.598	0.127	0.169
0.827	0.586	0.136	0.199
0.954	0.588	0.146	0.234
1.12	0.554	0.151	0.264
1.24	0.522	0.161	0.264
		0.177	0.208
		0.182	0.203
		0.194	0.229
		0.207	0.209

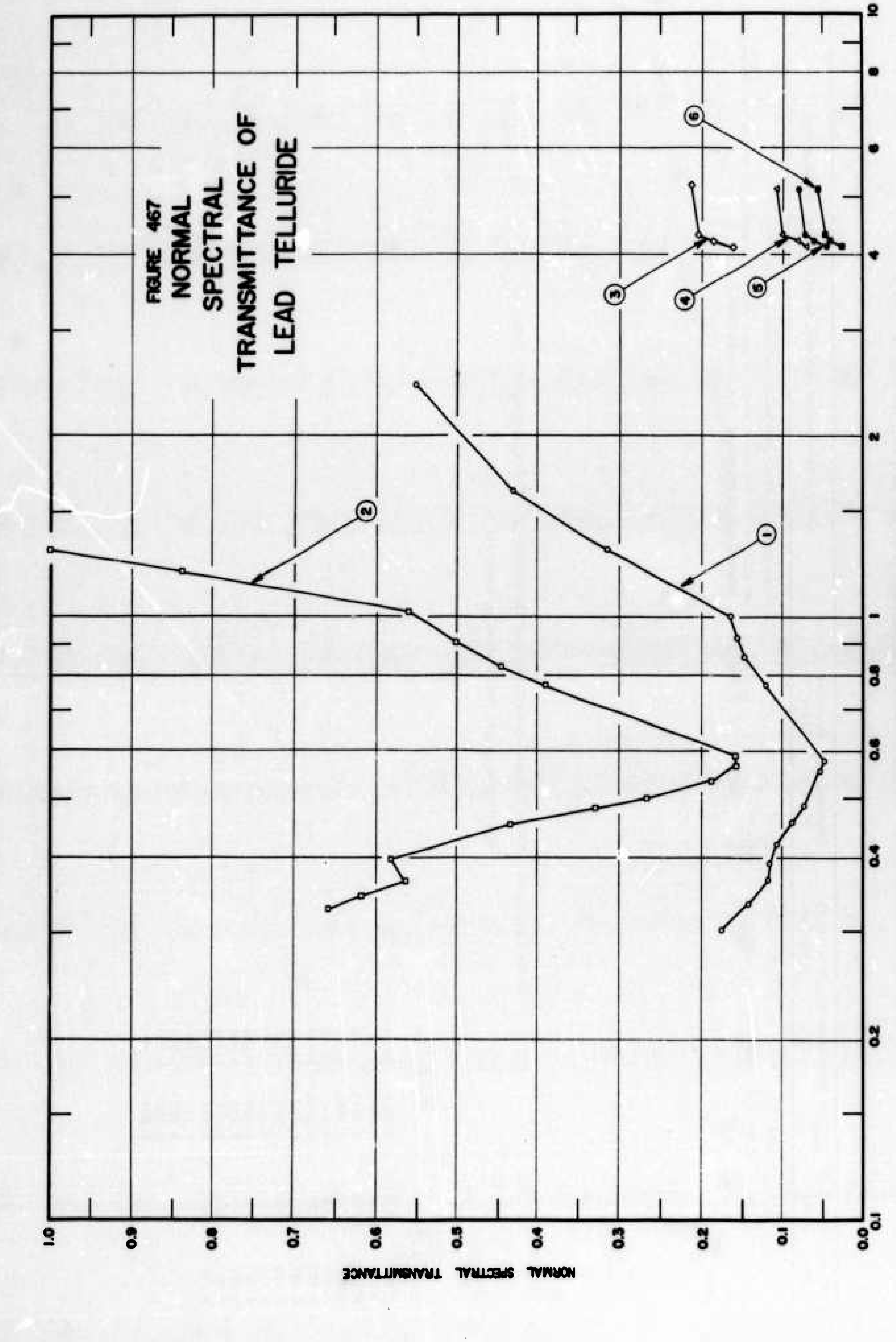


FIGURE 467
NORMAL
SPECTRAL
TRANSMITTANCE OF
LEAD TELLURIDE
NORMAL SPECTRAL TRANSMITTANCE
WAVELENGTH, μm
0.0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
1.0
0.1
0.2
0.4
0.6
0.8
1
2
4
6
8
10
1
2
3
4
5
6

SPECIFICATION TABLE NO. 467 NORMAL SPECTRAL TRANSMITTANCE OF LEAD TELLURIDE PbTe

Curve No.	Ref. No.	Year	Temperature K	Wavelength Range, μm	Geometry θ θ' ω'	Reported Error, %	Composition (weight percent), Specifications, and Remarks
1	74	1964	297	0.302-2.43	0° 0°		Epitaxially-deposited thin film (280 Å thick); single crystal with orientation (100); data extracted from smooth curve.
2	74	1964	77	0.328-1.28	0° 0°		Above specimen and conditions.
3	358	1966	298	4.1-5.2	~0° ~0°		Single crystal; equilibrated with 5% Pb-rich PbTe at 1133 K and brine quenched; both surfaces ground on 600 paper and polished on a micro-cloth using 0.5 μm Linde Gamma AB; one surface mounted on an optically flat T-12 crystal (τ = 0.93) by placing epoxy cement around the edges; thickness of PbTe 145 μm; surfaces showed no scratches under x10 magnification.
4	358	1966	298	4.1-5.2	~0° ~0°		Similar to the above specimen and conditions except 346 μm thick.
5	358	1966	298	4.1-5.2	~0° ~0°		Similar to the above specimen and conditions except 474 μm thick.
6	358	1966	298	4.1-5.2	~0° ~0°		Similar to the above specimen and conditions except 593 μm thick.

DATA TABLE NO. 467 NORMAL SPECTRAL TRANSMITTANCE OF LEAD TELLURIDE PbTe

[Wavelength, λ, μm; Transmittance, τ; Temperature, T, K]

λ	τ	λ	τ	λ	τ	λ	τ
CURVE 1 T = 297		CURVE 2 T = 77		CURVE 3 T = 298		CURVE 5 (cont.)	
0.302	0.174	0.328	0.659	4.1	0.163	4.3	0.0741
0.334	0.143	0.344	0.619	4.2	0.186	5.2	0.0807
0.366	0.118	0.363	0.564	4.3	0.203	CURVE 6 T = 298	
0.390	0.117	0.399	0.582	5.2	0.214		
0.420	0.107	0.451	0.434	CURVE 4 T = 298		4.1	0.0278
0.456	0.0895	0.482	0.329			4.2	0.0408
0.488	0.0736	0.500	0.267			4.3	0.0481
0.554	0.0514	0.532	0.188			5.2	0.0554
0.577	0.0493	0.564	0.159	4.1	0.070		
0.770	0.121	0.588	0.159	4.2	0.089		
0.855	0.148	0.770	0.391	4.3	0.100		
0.919	0.157	0.821	0.447	5.2	0.108		
1.00	0.165	0.905	0.501	CURVE 5 T = 298			
1.29	0.316	1.03	0.562				
1.61	0.431	1.18	0.839				
2.43	0.553	1.28	1.00	4.1	0.0473		
				4.2	0.0616		

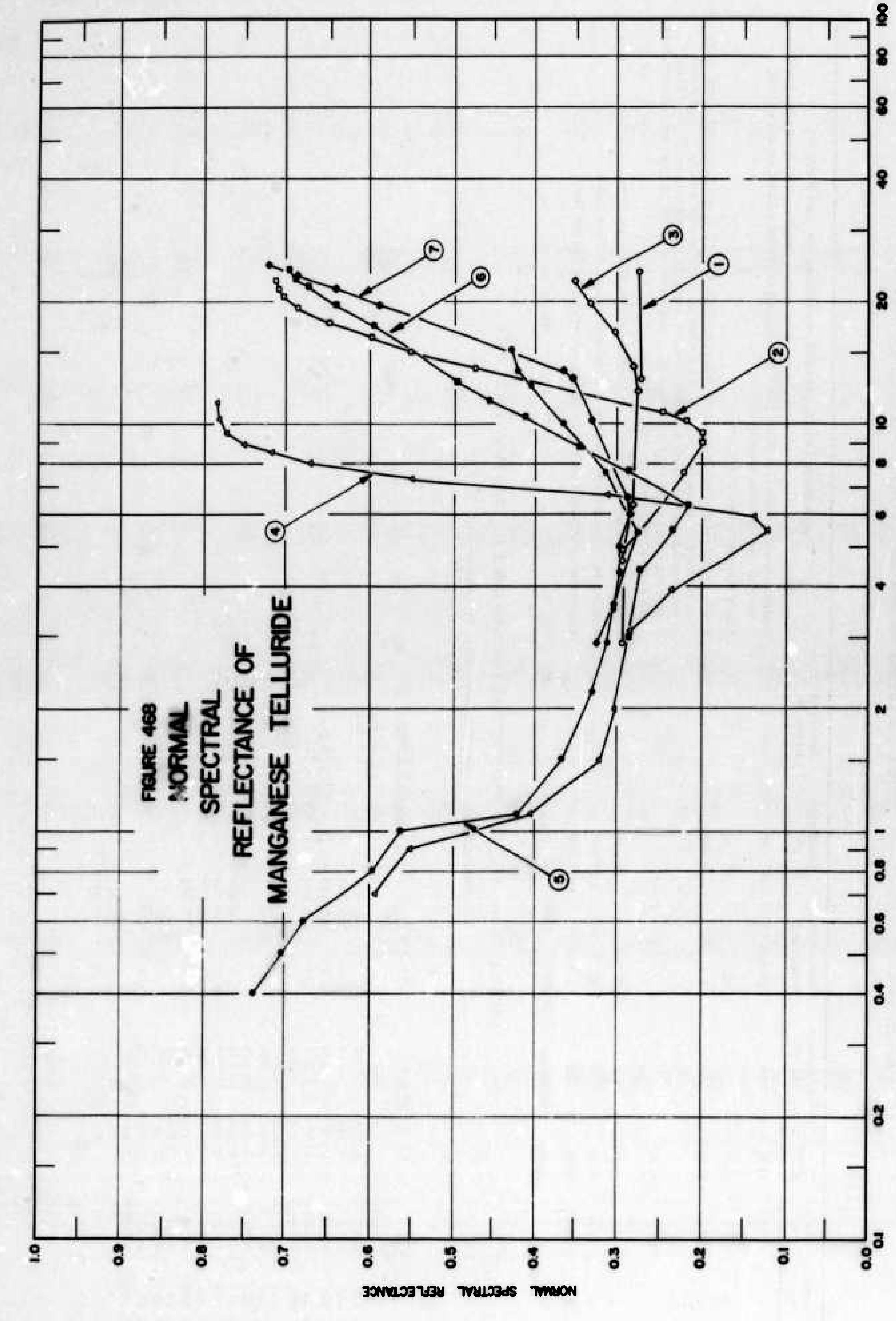


FIGURE 468 NORMAL SPECTRAL REFLECTANCE OF MANGANESE TELLURIDE

SPECIFICATION TABLE NO. 468 NORMAL SPECTRAL REFLECTANCE OF MANGANESE TELLURIDE MnTe

Curve No.	Ref. No.	Year	Temperature K	Wavelength Range, μm	Geometry θ θ' ω'	Reported Error, %	Composition (weight percent), Specifications, and Remarks
1	357	1967	300	12.9-23.7	$\sim 0° \sim 0°$		p-type single crystal (0.5 cm thick); doped with Cr ($\sim 10^{16}$ cm^{-3} free holes concentration at 77 K); electrical resistivity: ~300 ohm cm at 77 K and ~20 ohm cm at Néel temp (307 K); mobility: ~2 cm^2 V^{-1} sec^{-1} at 77 K; polished; c-axis perpendicular to the specimen surface; data extracted from smooth curve; [Author's designation: Sample 2].
2	357	1967	80	2.90-22.3	$\sim 0° \sim 0°$		p-type single crystal (0.5 cm thick), doped with Na (3.6×10^{19} cm^{-3} free holes concentration at 77 K); 6.9×10^{-4} ohm cm electrical resistivity at 77 K; 2.3×10^{-4} ohm cm electrical resistivity at Néel temp (307 K); mobility 250 cm^2 V^{-1} sec^{-1} at 77 K and 7 cm^2 V^{-1} sec^{-1} at Néel temp (307 K); polished; c-axis perpendicular to the specimen surface; data extraged from smooth curve; [Author's designation: Sample 4].
3	357	1967	300	4.60-22.4	$\sim 0° \sim 0°$		Above specimen and conditions.
4	357	1967	80	0.7-11.3	$\sim 0° \sim 0°$		p-type single crystal (0.5 cm t[illegible]d); doped with Na (8×10^{19} cm^{-3} free holes concentration at 77 K); 4×10^{-4} ohm cm electrical resistivity at 77 K; 1.5×10^{-2} ohm cm electrical resistivity at Néel temp (307 K); mobility 190 cm^2 V^{-1} sec^{-1} at 77 K; mobility 5 cm^2 V^{-1} sec^{-1} at Néel temp (307 K); polished; c-axis perpendicular to the specimen surface; data extracted from smooth curve; [Author's designation: Sample 5].
5	357	1967	300	0.400-15.1	$\sim 0° \sim 0°$		Above specimen and conditions.
6	357	1967	80	3.00-24.0	$\sim 0° \sim 0°$		p-type single crystal; doped with Na (8×10^{19} cm^{-3} free holes concentration at 77 K); electrical resistivity: 4×10^{-4} ohm cm at 77 K and 1.5×10^{-2} ohm cm at Néel temp (307 K); mobility: 190 cm^2 V^{-1} sec^{-1} at 77 K and 5 cm^2 V^{-1} sec^{-1} at Néel temp (307 K); polished; c-axis parallel to the specimen surface; measured with light polarized perpendicular to the c-axis; data taken from smooth curve.
7	357	1967	80	2.90-24.6	$\sim 0° \sim 0°$		Above specimen and conditions except measured with light polarized parallel to the c-axis.

DATA TABLE NO. 468 NORMAL SPECTRAL REFLECTANCE OF MANGANESE TELLURIDE MnTe

[Wavelength, λ, μm; Reflectance, ρ; Temperature, T, K]

λ	ρ	λ	ρ	λ	ρ
CURVE 1 T = 300		CURVE 4 (cont.)		CURVE 6 (cont.)	
		5.9	0.139	22.7	0.689
12.9	0.275	6.7	0.312	24.0	0.698
23.7	0.277	7.3	0.552		
		8.0	0.672	CURVE 7 T = 80	
CURVE 2 T = 80		8.5	0.719		
		8.9	0.754		
		9.5	0.776	2.90	0.325
2.90	0.294	10.2	0.785	3.60	0.304
4.90	0.293	11.3	0.788	4.30	0.298
7.60	0.222			5.00	0.298
9.00	0.200	CURVE 5 T = 300		6.00	0.285
9.50	0.200			6.60	0.287
10.1	0.220			10.1	0.332
10.6	0.249	0.400	0.740	12.9	0.353
13.6	0.476	0.500	0.703	13.5	0.366
15.0	0.554	0.600	0.679	19.5	0.590
16.2	0.600	0.800	0.598	21.3	0.643
17.7	0.651	1.00	0.563	23.0	0.688
19.3	0.687	1.10	0.422	24.6	0.722
20.4	0.704	1.50	0.367		
21.4	0.710	2.20	0.331		
22.3	0.714	2.90	0.312		
		3.50	0.304		
CURVE 3 T = 300		5.40	0.276		
		7.60	0.315		
		10.0	0.366		
4.60	0.293	12.3	0.408		
6.30	0.281	13.5	0.423		
12.0	0.276	15.1	0.430		
13.8	0.281				
16.8	0.303	CURVE 6 T = 80			
19.8	0.335				
22.4	0.354				
		3.00	0.286		
CURVE 4 T = 80		4.40	0.273		
		5.50	0.237		
		6.30	0.218		
0.7	0.592	7.70	0.286		
0.9	0.553	8.80	0.346		
1.1	0.406	10.3	0.414		
1.5	0.322	11.4	0.457		
2.0	0.303	12.8	0.496		
3.1	0.285	17.3	0.598		
3.9	0.239	19.5	0.643		
5.5	0.121	21.6	0.673		

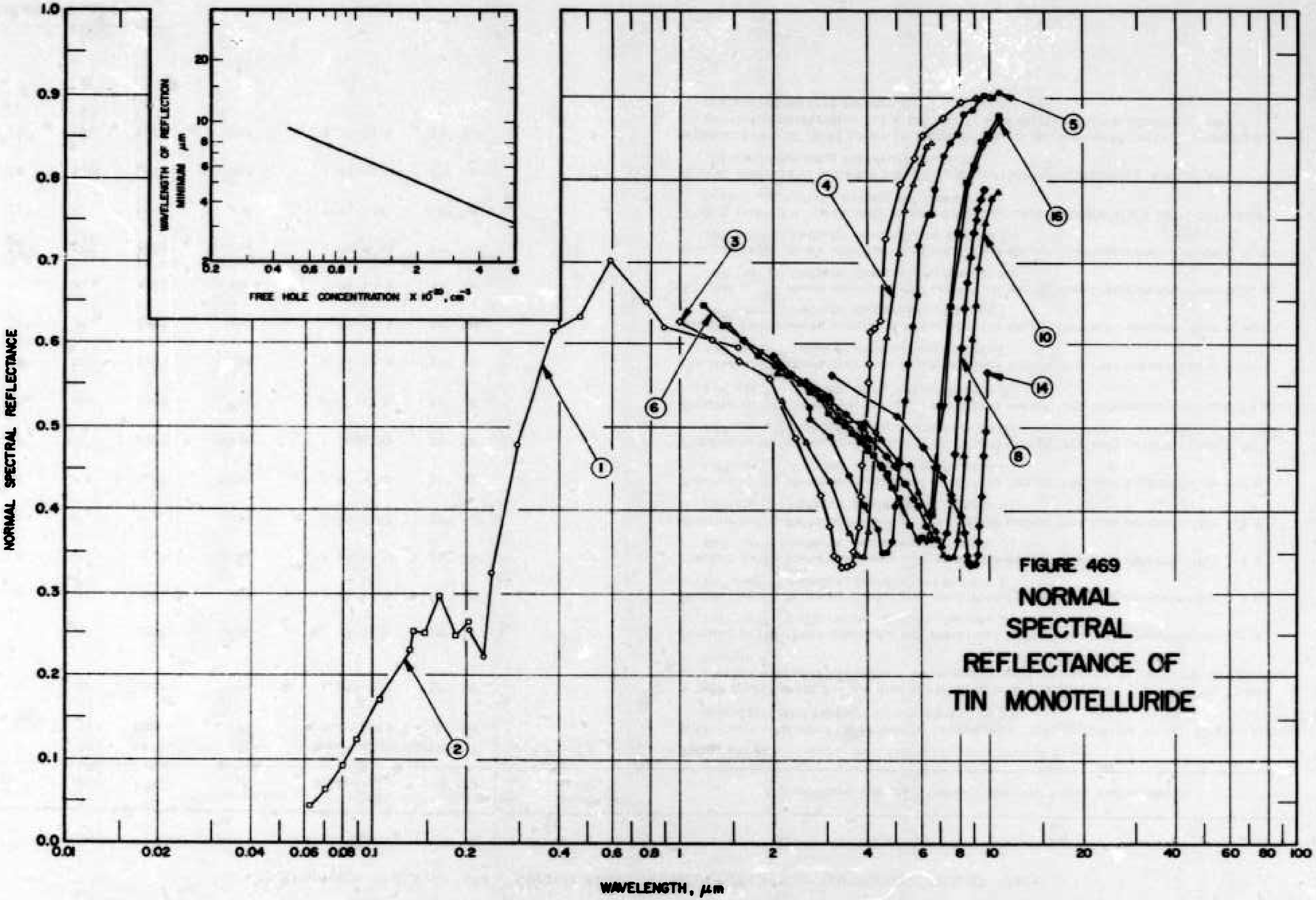


FIGURE 469 NORMAL SPECTRAL REFLECTANCE OF TIN MONOTELLURIDE

SPECIFICATION TABLE NO. 469 NORMAL SPECTRAL REFLECTANCE OF TIN MONOTELLURIDE SnTe

Curve No.	Ref. No.	Year	Temperature K	Wavelength Range, μm	Geometry θ	θ'	ω'	Reported Error, %	Composition (weight percent), Specifications, and Remarks
1	74	1964	297	0.207-1.55	~0°	~0°			Single crystal; cleaved; data extracted from smooth curve.
2	74	1964	297	0.0620-0.207	~0°	~0°			Epitaxially-deposited layer; single crystal with (100) orientation on KCl single crystal substrate; data extracted from smooth curve.
3	355	1967	~298	1.00-10.0	10°	10°			p-type single crystal (~0.8 mm thick); free hole concentration 4.8 x 10^{20} cm^{-3}; heat treated; polished and etched to flat and mirror-like surface; [Authors' designation: Sample A].
4	355	1967	~298	2.13-6.54	10°	10°			Similar to the above specimen and conditions except free hole concentration 3.8 x 10^{20} cm^{-3}; [Authors' designation: Sample B].
5	355	1967	~298	2.11-10.9	10°	10°			Similar to the above specimen and conditions except free hole concentration 2.5 x 10^{20} cm^{-3}; [Authors' designation: Sample C].
6	355	1967	~298	1.20-10.9	10°	10°			Similar to the above specimen and conditions except free hole concentration 1.4 x 10^{20} cm^{-3}; [Authors' designation: Sample D].
7*	355	1967	~298	1.93-9.22	10°	10°			Similar to the above specimen and conditions except free hole concentration 1.3 x 10^{20} cm^{-3}; [Authors' designation: Sample E].
8	355	1967	~298	2.00-9.63	10°	10°			Similar to the above specimen and conditions except free hole concentration 1.0 x 10^{20} cm^{-3}; [Authors' designation: Sample F].
9*	355	1967	~298	2.00-9.03	10°	10°			Similar to the above specimen and conditions except free hole concentration 0.90 x 10^{20} cm^{-3}; [Authors' designation: Sample G].
10	355	1967	~298	2.07-10.6	10°	10°			Similar to the above specimen and conditions except free hole concentration 0.74 x 10^{20} cm^{-3}; [Authors' designation: Sample H].
11*	355	1967	~298	3.94-10.8	10°	10°			Similar to the above specimen and conditions except free hole concentration 0.56 x 10^{20} cm^{-3}; [Authors' designation: Sample I].
12*	355	1967	~298	2.05-10.9	10°	10°			Similar to the above specimen and conditions except free hole concentration 0.55 x 10^{20} cm^{-3}; [Authors' designation: Sample J].
13*	355	1967	~298	3.95-10.8	10°	10°			Similar to the above specimen and conditions except free hole concentration 0.51 x 10^{20} cm^{-3}; [Authors' designation: Sample K].
14	355	1967	~298	3.05-9.95	10°	10°			Similar to the above specimen and conditions except free hole concentration 0.48 x 10^{20} cm^{-3}; [Authors' designation: Sample L].
15*	355	1967	300	2.51-188	~0°	~0°			Thin p-type film, epitaxially grown; free hole concentration 1.4 x 10^{20} cm^{-3}; thickness 1.4 μm; NaCl crystal substrate.
16	356	1968	298	1.43-10.9	15°	15°		±3	Thick, chemically polished bulk sample; carrier concentration 1.4 x 10^{20} cm^{-3}; polished aluminum reference standard.
17*	356	1968	298	2.08-11.0	15°	15°		3	Epitaxial crystal film; grown by vacuum deposition on cleaved rocksalt substrate; carrier concentration 1.4 x 10^{20} cm^{-3}; data extracted from smooth curve; aluminized mirror reference.

* Not shown on plot

SPECIFICATION TABLE NO. 469 (continued)

Curve No.	Ref. No.	Year	Temperature K	Wavelength Range, μm	Geometry θ	θ'	ω'	Reported Error, %	Composition (weight percent), Specifications, and Remarks
18*	356	1968	298	1.39-5.51	15°	15°		3	Similar to above specimen and conditions except carrier concentration 6.8×10^{20} cm^{-3}; film thickness 0.77 μm.
19*	356	1968	298	2.01-14.5	15°	15°		3	Similar to above specimen and conditions except carrier concentration 3.6×10^{19} cm^{-3}; film thickness 1.9 μm.

* Not shown on plot

DATA TABLE NO. 469 NORMAL SPECTRAL REFLECTANCE OF TIN MONOTELLURIDE SnTe

[Wavelength, λ, μm; Reflectance, ρ; Temperature, T, K]

CURVE 1
T = 297

λ	ρ
0.207	0.254
0.230	0.221
0.243	0.325
0.295	0.478
0.388	0.615
0.477	0.631
0.590	0.701
0.775	0.650
0.886	0.620
1.55	0.597

CURVE 2
T = 297

λ	ρ
0.0620	0.044
0.0701	0.064
0.0800	0.091
0.0892	0.121
0.105	0.170
0.131	0.230
0.135	0.252
0.146	0.250
0.165	0.297
0.185	0.247
0.207	0.264

CURVE 3
T ~ 298

λ	ρ
1.00	0.627
1.29	0.605
1.57	0.579
1.95	0.559
2.37	0.487
2.85	0.419
3.02	0.382
3.11	0.349
3.23	0.341
3.31	0.332
3.48	0.332
3.60	0.337
3.67	0.352
3.75	0.381
3.82	0.416

CURVE 3 (cont.)

λ	ρ
3.86	0.455
3.92	0.493
4.02	0.554
4.07	0.578
4.19	0.613
4.28	0.669
4.41	0.678
4.61	0.727
4.91	0.776
5.12	0.795
5.68	0.824
6.06	0.854
7.04	0.873
8.02	0.892
9.04	0.899
10.0	0.899

CURVE 4
T ~ 298

λ	ρ
2.13	0.531
2.59	0.481
3.09	0.436
3.51	0.373
3.72	0.348
3.92	0.348
4.09	0.375
4.31	0.495
4.69	0.608
5.08	0.710
5.37	0.761
5.72	0.795
6.00	0.819
6.24	0.839
6.54	0.842

CURVE 5
T ~ 298

λ	ρ
2.11	0.570
2.61	0.525
2.61	0.510
3.07	0.487
3.52	0.442
3.95	0.406

CURVE 5 (cont.)

λ	ρ
4.38	0.379
4.51	0.350
4.64	0.351
4.81	0.363
4.97	0.406
5.14	0.458
5.33	0.531
5.48	0.576
5.63	0.620
5.81	0.659
5.99	0.720
6.36	0.758
6.47	0.758
6.74	0.787
7.14	0.828
7.47	0.844
7.81	0.855
8.35	0.876
8.86	0.884
9.33	0.896
9.77	0.900
10.2	0.898
10.9	0.904

CURVE 6
T ~ 298

λ	ρ
1.20	0.646
1.38	0.622
1.60	0.603
1.80	0.585
2.02	0.573
2.21	0.563
2.43	0.552
2.61	0.542
2.81	0.533
3.00	0.518
3.21	0.509
3.41	0.500
3.63	0.492
3.82	0.481
4.04	0.473
4.23	0.468
4.43	0.455
4.54	0.451

CURVE 6 (cont.)

λ	ρ
4.65	0.445
4.81	0.426
5.04	0.415
5.53	0.382
5.84	0.366
6.00	0.367
6.27	0.366
6.54	0.399
6.77	0.452
7.00	0.526
7.49	0.644
7.99	0.732
8.51	0.796
8.99	0.813
9.43	0.842
9.95	0.853
10.9	0.873

CURVE 7*
T ~ 298

λ	ρ
1.93	0.574
2.43	0.554
2.93	0.525
3.40	0.497
3.79	0.490
4.00	0.466
4.55	0.447
4.92	0.425
5.23	0.409
5.56	0.389
5.80	0.389
6.12	0.372
6.36	0.390
6.60	0.437
6.87	0.503
7.12	0.576
7.36	0.631
7.59	0.661
7.79	0.685
8.03	0.729
8.22	0.756
8.41	0.770
8.61	0.785
8.80	0.791
9.22	0.826

CURVE 8
T ~ 298

λ	ρ
2.00	0.586
2.25	0.564
3.00	0.536
3.47	0.517
3.87	0.500
4.07	0.485
4.64	0.466
4.97	0.454
5.33	0.432
5.65	0.415
5.95	0.405
6.21	0.384
6.49	0.366
6.77	0.366
7.00	0.358
7.26	0.375
7.48	0.419
7.69	0.469
7.90	0.533
8.09	0.594
8.31	0.641
8.50	0.674
8.73	0.705
8.91	0.731
9.09	0.750
9.29	0.764
9.45	0.778
9.63	0.789

CURVE 9*
T ~ 298

λ	ρ
2.00	0.577
2.53	0.553
3.05	0.540
3.48	0.526
3.90	0.507
4.11	0.507
4.67	0.478
5.01	0.466
5.34	0.451
5.66	0.442
5.95	0.426
6.23	0.414

CURVE 9 (cont.)*

λ	ρ
6.47	0.397
6.78	0.376
7.01	0.364
7.25	0.369
7.51	0.382
7.71	0.410
7.95	0.455
8.11	0.523
8.29	0.574
8.50	0.600
8.64	0.654
8.88	0.684
9.03	0.702

CURVE 10
T ~ 298

λ	ρ
2.07	0.564
2.58	0.554
3.05	0.536
3.47	0.507
3.92	0.506
4.51	0.484
5.02	0.460
5.56	0.455
5.97	0.421
6.38	0.398
6.77	0.378
7.12	0.348
7.38	0.343
7.61	0.343
7.83	0.364
8.11	0.399
8.35	0.466
8.57	0.535
8.84	0.604
9.08	0.648
9.32	0.694
9.80	0.747
10.1	0.776
10.8	0.784

CURVE 11*
T ~ 298

λ	ρ
3.94	0.538
4.68	0.517
5.37	0.501
5.97	0.482
6.50	0.458
7.04	0.435
7.46	0.403
7.94	0.374
8.32	0.361
8.75	0.358
8.93	0.377
9.08	0.406
9.27	0.449
9.44	0.508
9.70	0.553
9.83	0.603
9.99	0.638
10.1	0.675
10.3	0.702
10.4	0.728
10.8	0.766

CURVE 12*
T ~ 298

λ	ρ
2.05	0.574
2.55	0.564
3.06	0.559
3.50	0.539
3.92	0.538
4.13	0.529
4.67	0.516
5.04	0.513
5.33	0.494
5.62	0.497
5.91	0.482
6.21	0.468
6.48	0.458
6.75	0.455
6.97	0.440
7.18	0.426
7.47	0.425
7.66	0.402
7.90	0.392

CURVE 12 (cont.)*

λ	ρ
8.08	0.379
8.31	0.369
8.50	0.350
8.69	0.348
8.92	0.355
9.08	0.355
9.26	0.379
9.45	0.411
9.59	0.452
9.77	0.513
9.92	0.552
10.0	0.592
10.3	0.627
10.4	0.663
10.6	0.694
10.7	0.705
10.9	0.724

CURVE 13*
T ~ 298

λ	ρ
3.95	0.546
4.69	0.529
5.34	0.509
5.92	0.488
6.49	0.480
7.02	0.452
7.49	0.429
7.92	0.413
8.33	0.388
8.72	0.368
9.13	0.361
9.29	0.365
9.48	0.379
9.62	0.400
9.83	0.448
9.99	0.496
10.1	0.540
10.2	0.580
10.4	0.626
10.6	0.668
10.7	0.693
10.8	0.718

*Not shown on plot

DATA TABLE NO. 469 (continued)

CURVE 14
T ~ 298

λ	ρ
3.05	0.561
5.00	0.513
6.03	0.477
7.03	0.440
7.50	0.413
8.05	0.396
8.25	0.375
8.48	0.347
8.57	0.341
8.70	0.336
8.85	0.336
9.01	0.336
9.11	0.339
9.24	0.348
9.28	0.364
9.38	0.384
9.52	0.417
9.68	0.468
9.78	0.495
9.95	0.567

CURVE 15*
T = 300

λ	ρ
2.51	0.558
2.52	0.532
2.54	0.503
2.55	0.484
2.58	0.485
2.59	0.506
2.61	0.544
2.63	0.578
2.65	0.608
2.66	0.628
2.68	0.633
2.70	0.633
2.73	0.620
2.75	0.600
2.76	0.570
2.79	0.539
2.81	0.503
2.83	0.477
2.85	0.457
2.88	0.463
2.89	0.493

CURVE 15 (cont.)*

λ	ρ
2.92	0.530
2.95	0.577
2.96	0.601
2.99	0.624
3.02	0.624
3.04	0.619
3.06	0.613
3.09	0.579
3.11	0.556
3.14	0.528
3.17	0.494
3.19	0.463
3.22	0.446
3.25	0.446
3.28	0.477
3.31	0.505
3.34	0.528
3.37	0.564
3.40	0.587
3.43	0.590
3.45	0.594
3.49	0.576
3.53	0.562
3.57	0.540
3.60	0.507
3.64	0.480
3.68	0.453
3.71	0.433
3.74	0.424
3.79	0.436
3.81	0.466
3.86	0.480
3.91	0.516
3.94	0.536
3.98	0.536
4.02	0.539
4.03	0.533
4.06	0.541
4.08	0.533
4.11	0.517
4.11	0.498
4.16	0.498
4.21	0.465
4.25	0.444
4.31	0.421
4.38	0.414

CURVE 15 (cont.)*

λ	ρ
4.46	0.419
4.52	0.433
4.56	0.446
4.62	0.455
4.68	0.472
4.71	0.467
4.80	0.468
4.88	0.450
4.91	0.434
4.98	0.423
5.07	0.403
5.14	0.385
5.21	0.376
5.27	0.363
5.36	0.363
5.40	0.368
5.52	0.368
5.59	0.374
5.67	0.370
5.77	0.363
5.86	0.363
5.92	0.351
6.03	0.346
6.17	0.352
6.24	0.377
6.35	0.391
6.44	0.409
6.57	0.438
6.71	0.485
6.80	0.512
6.97	0.556
7.08	0.585
7.22	0.616
7.38	0.641
7.51	0.665
7.67	0.691
7.84	0.707
8.01	0.732
8.19	0.751
8.42	0.767
8.57	0.778
8.76	0.787
9.00	0.801
9.29	0.816
9.49	0.823
9.76	0.823

CURVE 15 (cont.)*

λ	ρ
9.76	0.843
10.0	0.848
10.3	0.845
10.7	0.841
11.0	0.867
11.4	0.871
11.8	0.877
12.1	0.895
12.6	0.872
13.1	0.890
13.6	0.886
14.2	0.930
14.7	0.905
14.8	0.891
15.4	0.891
15.4	0.905
15.9	0.889
16.5	0.897
17.1	0.897
17.8	0.897
18.5	0.906
19.4	0.897
20.2	0.913
21.1	0.905
22.3	0.912
23.5	0.916
24.8	0.903
24.8	0.920
25.7	0.911
25.7	0.921
27.3	0.919
28.6	0.919
29.7	0.936
29.7	0.907
31.2	0.907
31.2	0.932
33.3	0.932
33.3	0.915
34.9	0.935
37.4	0.932
40.3	0.932
42.9	0.915
44.8	0.941
45.8	0.915
47.3	0.938
49.7	0.943

CURVE 15 (cont.)*

λ	ρ
52.3	0.934
55.8	0.941
55.8	0.970
59.5	0.975
59.5	0.945
64.1	0.976
70.4	0.958
73.5	0.950
73.5	0.960
78.7	0.982
87.7	0.959
92.5	0.929
105	0.940
105	0.947
114	0.958
135	0.947
144	0.961
144	0.943
163	0.943
188	0.954
188	0.913

CURVE 16
T = 298

λ	ρ
1.43	0.623
1.64	0.601
1.84	0.589
2.05	0.575
2.22	0.564
2.42	0.554
2.63	0.543
2.83	0.539
3.04	0.525
3.22	0.515
3.40	0.503
3.63	0.493
3.82	0.487
4.03	0.475
4.22	0.469
4.41	0.455
4.62	0.443
4.82	0.428
5.01	0.416
5.52	0.383
5.83	0.368

CURVE 16 (cont.)

λ	ρ
5.94	0.363
6.26	0.365
6.52	0.400
6.76	0.451
7.03	0.526
7.50	0.646
8.05	0.730
8.53	0.795
8.99	0.813
9.47	0.838
10.0	0.850
10.9	0.869

CURVE 17*
T = 298

λ	ρ
2.08	0.572
2.21	0.574
2.34	0.542
2.42	0.592
2.51	0.561
2.57	0.509
2.63	0.591
2.71	0.629
2.79	0.593
2.86	0.467
2.91	0.561
3.05	0.616
3.15	0.578
3.25	0.434
3.32	0.538
3.42	0.582
3.55	0.547
3.61	0.468
3.72	0.416
3.88	0.490
4.02	0.524
4.20	0.483
4.41	0.404
4.64	0.445
4.76	0.453
4.90	0.434
5.19	0.379
5.38	0.366
5.65	0.366
6.08	0.347

CURVE 17 (cont.)*

λ	ρ
6.32	0.364
6.55	0.406
7.00	0.540
7.48	0.652
7.75	0.703
8.26	0.755
8.62	0.782
9.27	0.812
9.88	0.827
10.4	0.839
11.0	0.844

CURVE 18*
T = 298

λ	ρ
1.39	0.592
1.49	0.574
1.59	0.561
1.70	0.547
1.78	0.524
1.85	0.512
1.94	0.539
2.03	0.415
2.14	0.483
2.19	0.495
2.26	0.413
2.32	0.380
2.42	0.404
2.49	0.415
2.54	0.387
2.68	0.341
2.76	0.334
2.88	0.334
3.00	0.343
3.11	0.384
3.23	0.472
3.49	0.617
3.76	0.716
3.99	0.781
4.28	0.825
4.51	0.843
5.01	0.869
5.51	0.885

CURVE 19*
T = 298

λ	ρ
2.01	0.561
2.29	0.560
2.50	0.558
2.77	0.546
3.23	0.555
3.37	0.465
3.50	0.670
3.69	0.337
3.91	0.731
4.10	0.432
4.16	0.290
4.50	0.738
4.76	0.325
4.82	0.307
5.03	0.637
5.18	0.724
5.42	0.582
5.64	0.290
5.96	0.610
6.17	0.681
6.51	0.541
6.78	0.315
7.15	0.497
7.49	0.612
7.92	0.482
8.34	0.322
8.73	0.420
9.13	0.464
9.50	0.410
9.75	0.339
9.99	0.321
10.2	0.318
10.4	0.336
10.7	0.371
10.9	0.436
11.2	0.527
11.5	0.602
11.7	0.652
12.0	0.705
12.5	0.762
13.0	0.791
13.5	0.827
14.0	0.839
14.5	0.860

* Not shown on plot

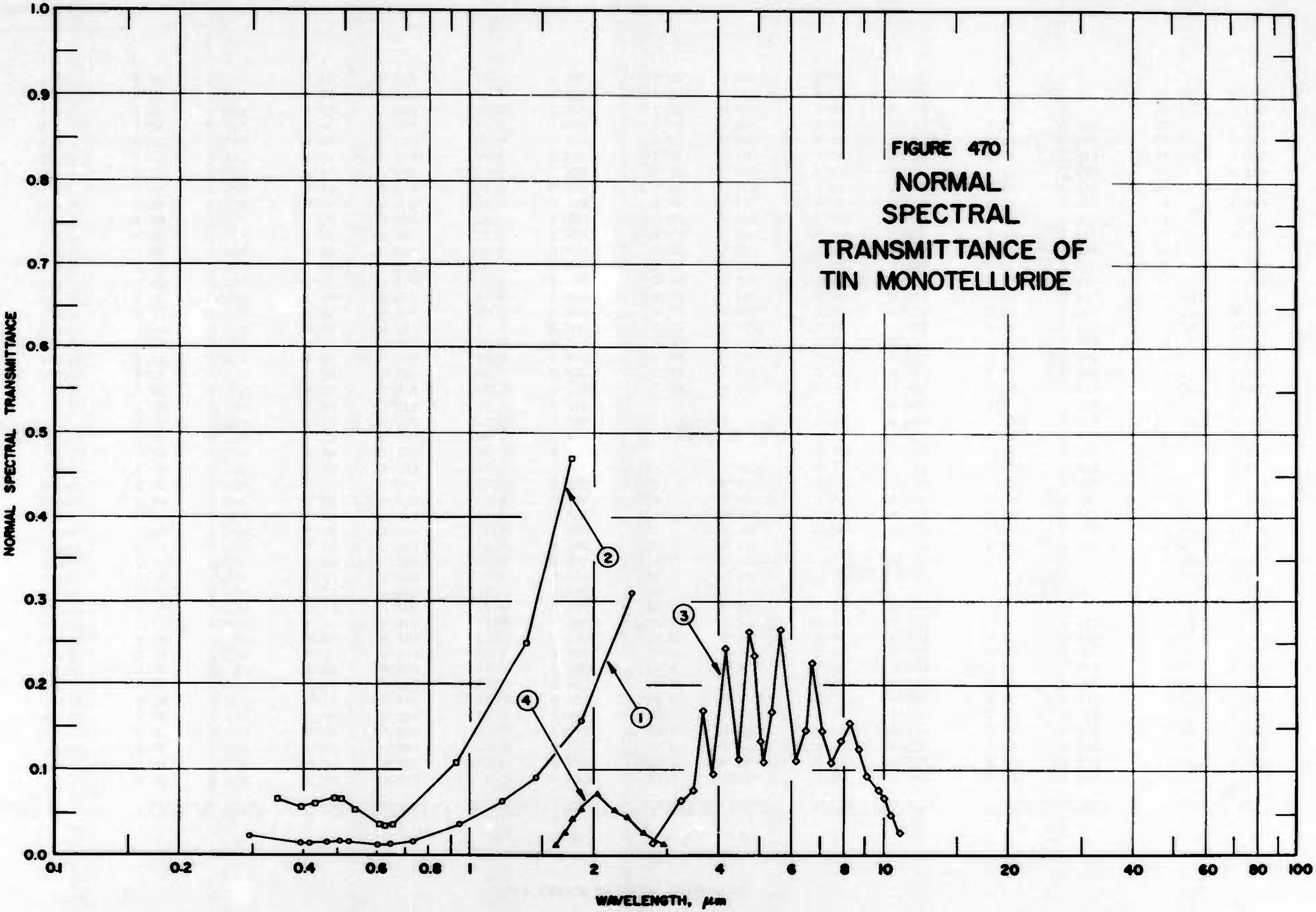


FIGURE 470
NORMAL
SPECTRAL
TRANSMITTANCE OF
TIN MONOTELLURIDE
NORMAL SPECTRAL TRANSMITTANCE
WAVELENGTH, μm
1.0
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0.0
0.1
0.2
0.4
0.6
0.8
1
2
4
6
8
10
20
40
60
80
100
1
2
3
4

SPECIFICATION TABLE NO. 470 NORMAL SPECTRAL TRANSMITTANCE OF TIN MONOTELLURIDE SnTe

Curve No.	Ref. No.	Year	Temperature K	Wavelength Range, μm	Geometry θ	θ'	ω'	Reported Error, %	Composition (weight percent), Specifications, and Remarks
1	74	1964	297	0.298-2.48	0°	0°			Epitaxially-deposited thin film (300 Å thick); single crystal with orientation (100); data extracted from smooth curve.
2	74	1964	77	0.347-1.77	0°	0°			Above specimen and conditions.
3	356	1968	298	2.77-10.9	~0°	~0°		3	Epitaxial crystal film (1.9 μm thick); grown by vacuum deposition on cleaved rocksalt substrate; carrier concentration 3.6 x 10^{19} cm^{-3}; data extracted from smooth curve.
4	356	1968	298	1.61-2.93	~0°	~0°		3	Similar to above specimen and conditions except carrier concentration 6.8 x 10^{20} cm^{-3}; film thickness 0.77 μm.

DATA TABLE NO. 470 NORMAL SPECTRAL TRANSMITTANCE OF TIN MONOTELLURIDE SnTe

[Wavelength, λ, μm; Transmittance, τ; Temperature, T, K]

λ	τ	λ	τ	λ	τ	λ	τ
CURVE 1		**CURVE 2 (cont.)**		**CURVE 3 (cont.)**		**CURVE 4 (cont.)**	
T = 297		0.530	0.0536	6.17	0.111	2.61	0.028
0.298	0.0220	0.605	0.0361	6.46	0.147	2.93	0.012
0.392	0.0142	0.623	0.0354	6.73	0.225		
0.413	0.0142	0.656	0.0373	7.10	0.145		
0.458	0.0157	0.925	0.109	7.48	0.110		
0.488	0.0161	1.37	0.249	7.92	0.133		
0.512	0.0155	1.77	0.468	8.31	0.153		
0.602	0.0121			8.72	0.124		
0.646	0.0124	**CURVE 3**		9.12	0.092		
0.734	0.0163	T = 298		9.73	0.077		
0.947	0.0374			10.0	0.068		
1.20	0.0621	2.77	0.014	10.4	0.049		
1.45	0.0902	3.23	0.065	10.9	0.028		
1.87	0.157	3.46	0.076				
2.48	0.309	3.67	0.169	**CURVE 4**			
		3.88	0.095	T = 298			
CURVE 2		4.17	0.241				
T = 77		4.45	0.112	1.61	0.011		
		4.74	0.262	1.70	0.028		
0.347	0.0662	4.87	0.233	1.76	0.042		
0.397	0.0578	5.01	0.133	1.86	0.055		
0.428	0.0600	5.16	0.110	2.02	0.071		
0.473	0.0671	5.39	0.167	2.24	0.054		
0.496	0.0650	5.65	0.265	2.40	0.046		

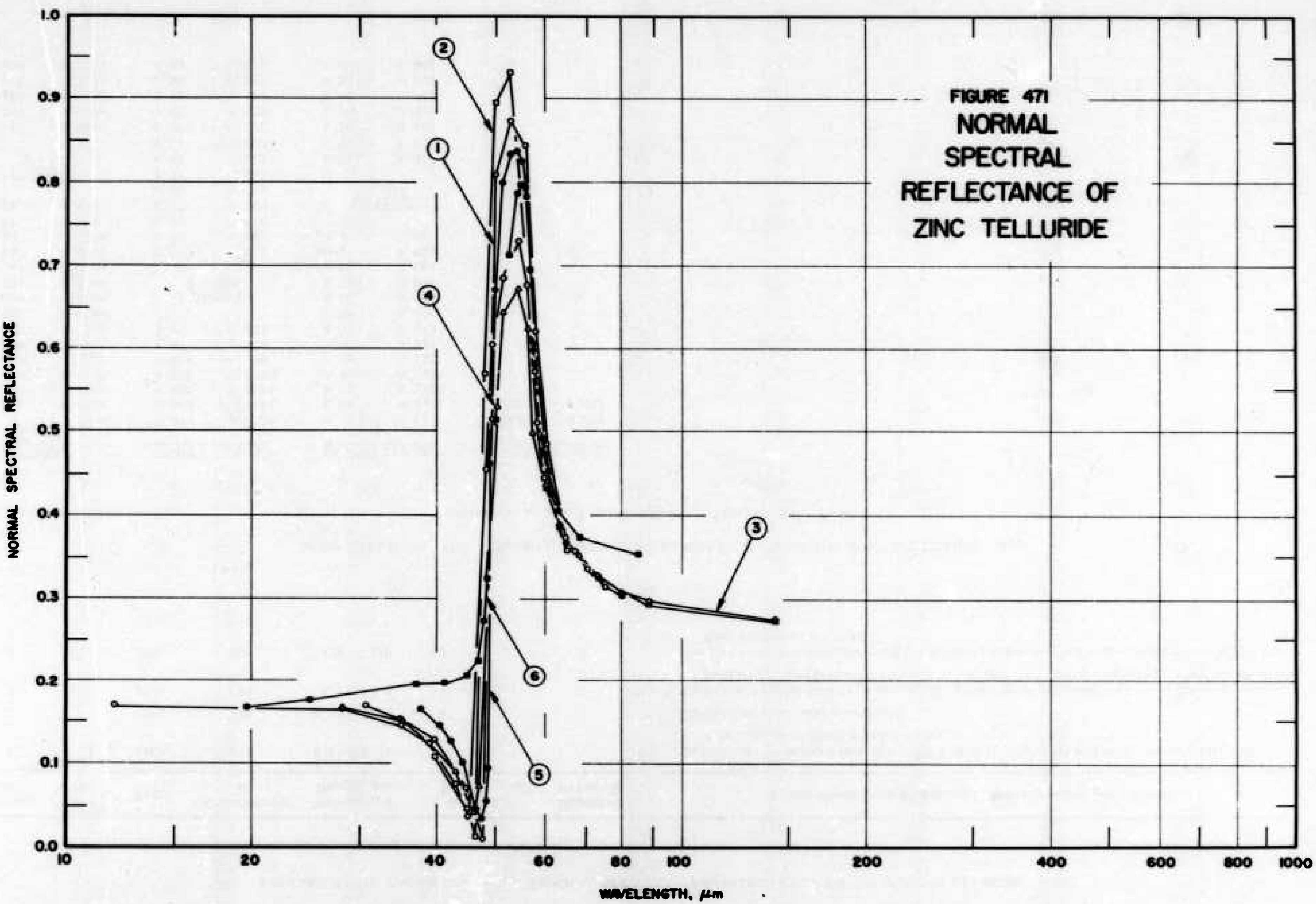


FIGURE 471 NORMAL SPECTRAL REFLECTANCE OF ZINC TELLURIDE

SPECIFICATION TABLE NO. 471 NORMAL SPECTRAL REFLECTANCE OF ZINC TELLURIDE ZnTe

Curve No.	Ref. No.	Year	Temperature K	Wavelength Range, μm	Geometry θ	θ'	ω'	Reported Error, %	Composition (weight percent), Specifications, and Remarks
1	256	1967	300	30.6-80.0	12°	12°		± 1	Polished to a mirror-like finish; aluminized mirror reference standard.
2	256	1967	100	39.9-65.0	12°	12°		± 1	Above specimen and conditions.
3	98	1967	77	12.0-141	7.5°	7.5°			Pellet; data extracted from smooth curve.
4	98	1967	300	12.0-141	7.5°	7.5°			Above specimen and conditions.
5	396	1967	300	37.9-64.9	~15°	~15°			Single crystal; grown by Bridgman-Stockharger method at up to 1573 K and at 50 to 60 atm of argon; carrier concentration <10^{16} cm^{-3}; data extracted from smooth curve.
6	396	1967	300	19.7-84.7	~15°	~15°			p-type single crystal; highly doped with P; carrier concentration 2 to 8 x 10^{18} cm^{-3}; grown by Bridgman-Stockharger method at <1573 K and 50 to 60 atm of argon; data extracted from smooth curve.

DATA TABLE NO. 471 NORMAL SPECTRAL REFLECTANCE OF ZINC TELLURIDE ZnTe

[Wavelength, λ, μm; Reflectance, ρ; Temperature, T, K]

CURVE 1, T = 300

λ	ρ
30.6	0.169
34.9	0.152
39.9	0.129
44.9	0.071
47.5	0.010
49.0	0.513
49.8	0.810
52.5	0.872
55.0	0.845
57.3	0.621
60.0	0.485
64.9	0.372
70.0	0.335
75.0	0.314
80.0	0.303

CURVE 2, T = 100

λ	ρ
39.9	0.107
44.9	0.046
46.2	0.012
47.9	0.570
49.8	0.897
52.4	0.931
57.3	0.574
59.9	0.446
65.0	0.359

CURVE 3, T = 77

λ	ρ
12.0	0.170
28.0	0.164
35.0	0.145
39.0	0.123
43.0	0.077
45.0	0.039
48.0	0.456
49.0	0.607
51.0	0.688
54.0	0.730
56.0	0.678
58.0	0.510
60.0	0.437
63.0	0.388
67.0	0.358
73.0	0.327
80.0	0.304
88.0	0.295
141	0.275

CURVE 4, T = 300

λ	ρ
12.0	0.170*
28.0	0.165
35.0	0.150
39.0	0.123*
43.0	0.090
46.0	0.041
47.0	0.073
50.0	0.528
52.0	0.644
54.0	0.673
56.0	0.624
57.0	0.497
60.0	0.432
63.0	0.367
68.0	0.352
73.0	0.326
80.0	0.307
88.0	0.293
141	0.273

CURVE 5, T = 300

λ	ρ
37.9	0.164
40.3	0.145
42.2	0.126
44.1	0.100
46.3	0.046
47.4	0.034
48.1	0.056
48.5	0.194
48.8	0.462
49.8	0.672
51.0	0.800
52.4	0.835
53.8	0.839
54.9	0.826
55.6	0.782
57.1	0.599
59.2	0.491
61.0	0.427
64.9	0.366

CURVE 6, T = 300

λ	ρ
19.7	0.167
24.9	0.173
37.0	0.196
41.2	0.197
44.8	0.206
46.7	0.225
47.6	0.273
48.1	0.323
49.8	0.514
52.1	0.711
53.8	0.788
54.3	0.799
55.2	0.794
56.5	0.696
58.1	0.547
60.2	0.453
62.9	0.402
68.0	0.372
84.7	0.353

* Not shown on plot

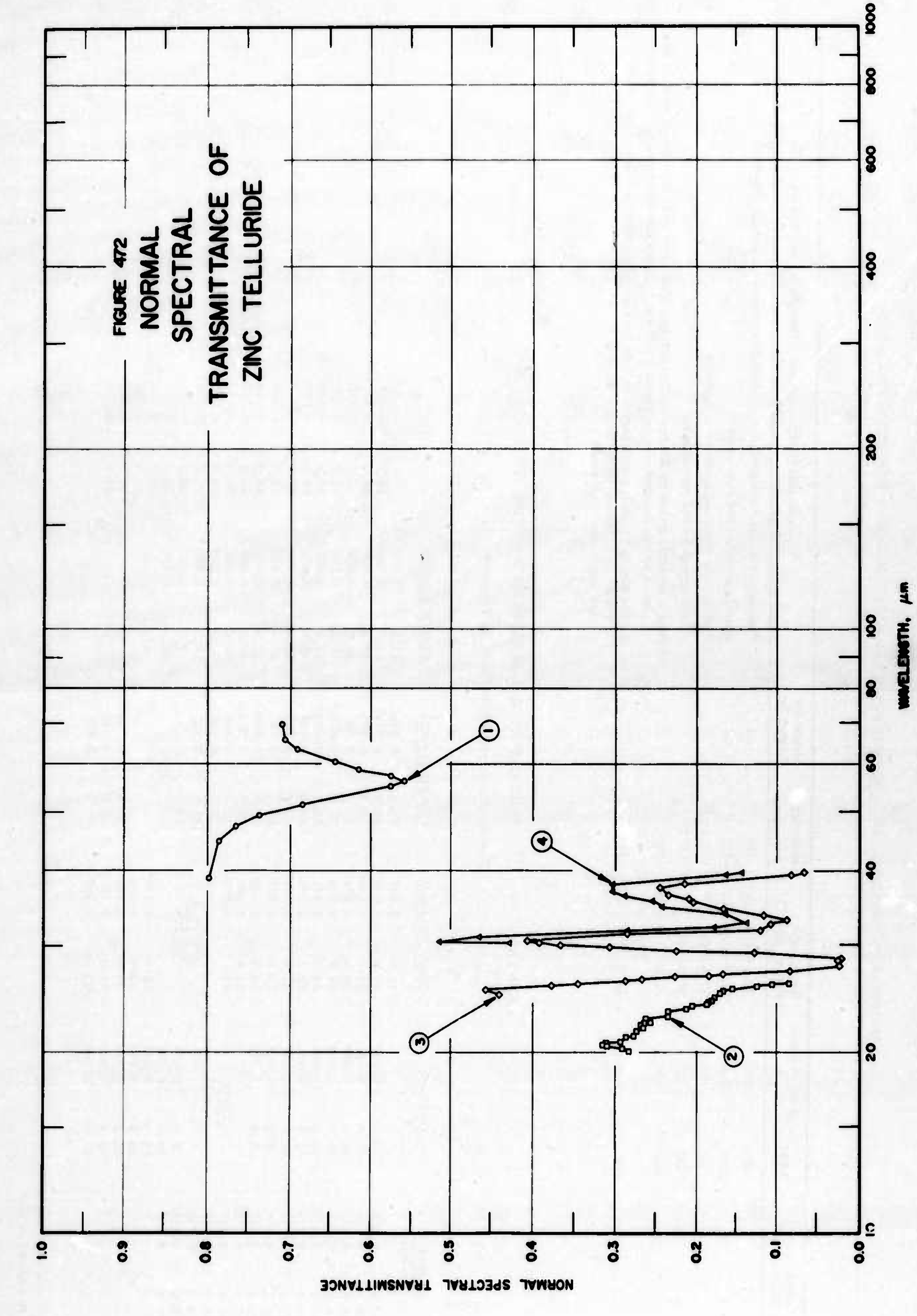


FIGURE 472 NORMAL SPECTRAL TRANSMITTANCE OF ZINC TELLURIDE

SPECIFICATION TABLE NO. 472 NORMAL SPECTRAL TRANSMITTANCE OF ZINC TELLURIDE ZnTe

Curve No.	Ref. No.	Year	Temperature K	Wavelength Range, μm	Geometry θ θ' ω'	Reported Error, %	Composition (weight percent), Specifications, and Remarks
1	256	1967	300	38.7-69.7	~0° ~0°	± 1	Thin film evaporated on collodion film; data extracted from smooth curve.
2	396	1967	300	20.0-26.0	~0° ~0°		Single crystal (1.185 mm thick); grown by Bridgman-Stockharger method at up to 1573 K and at 50 to 60 atm of argon; data extracted from smooth curve.
3	396	1967	300	24.9-39.7	~0° ~0°		Similar to the above specimen and conditions except 340 μm thick.
4	396	1967	300	30.2-39.8	~0° ~0°		Similar to the above specimen and conditions except 200 μm thick.

DATA TABLE NO. 472 NORMAL SPECTRAL TRANSMITTANCE OF ZINC TELLURIDE ZnTe

[Wavelength, λ, μm; Transmittance, τ; Temperature, T, K]

CURVE 1
T = 300

λ	τ
38.7	0.798
44.6	0.786
47.3	0.765
49.5	0.735
51.3	0.684
55.0	0.575
56.1	0.559
57.2	0.575
58.8	0.616
60.2	0.642
63.4	0.690
65.9	0.705
69.7	0.709

CURVE 2
T = 300

λ	τ
20.0	0.282
20.2	0.291
20.4	0.309
20.5	0.313
20.7	0.310
20.8	0.293
21.1	0.287
21.3	0.277
21.6	0.273

CURVE 2 (cont.)

λ	τ
21.9	0.265
22.1	0.268
22.3	0.264
22.3	0.257
22.6	0.261
22.9	0.234
23.2	0.234
23.5	0.211
23.8	0.204
24.0	0.187
24.2	0.185
24.3	0.180
24.6	0.177
25.0	0.170
25.1	0.167
25.4	0.154
25.6	0.124
25.9	0.105
26.0	0.084

CURVE 3
T = 300

λ	τ
24.9	0.439
25.3	0.456
25.7	0.378
35.9	0.344

CURVE 3 (cont.)

λ	τ
26.1	0.287
26.4	0.266
26.6	0.227
26.7	0.183
26.9	0.166
27.2	0.082
27.8	0.025
28.1	0.023
28.5	0.023
29.2	0.129
29.4	0.225
29.8	0.305
30.0	0.367
30.3	0.391
30.5	0.407
31.2	0.283
31.9	0.120
32.5	0.107
33.0	0.086
33.7	0.117
34.4	0.167
35.2	0.201
35.8	0.209
36.2	0.234
37.2	0.245
38.0	0.213
39.2	0.080
39.7	0.065

CURVE 4
T = 300

λ	τ
30.2	0.429
30.4	0.514
31.0	0.465
31.6	0.285
32.1	0.179
32.9	0.137
33.9	0.164
34.8	0.241
35.6	0.253
36.1	0.289
36.9	0.301
37.9	0.301
39.4	0.163
39.8	0.142

6. INTERMETALLIC COMPOUNDS

SPECIFICATION TABLE NO. 473 NORMAL TOTAL EMITTANCE OF BERYLLIUM INTERMETALLIC COMPOUNDS

Curve No.	Ref. No.	Year	Temperature Range, K	Geometry θ'	Reported Error, %	Composition (weight percent), Specifications and Remarks
1*	28	1963	1023	~0°		$Be_{12}Nb$; sintered at 1723 K for 2 hrs (setter material $Be_{12}Nb$); density 2.17 g cm^{-3}, theoretical density 2.91 g cm^{-3}; x-ray structure $Be_{12}Nb$ (unexplained lines); integrated from spectral data (1-15 μm); [Authors' designation: Sample No. 92].
2*	28	1963	1023	~0°		$Be_{17}Nb_2$; sintered at 1723 K for 2 hrs (setter material $Be_{17}Nb_2$); density 1.94 g cm^{-3}, theoretical density 3.28 g cm^{-3}; x-ray structure $Be_{17}Nb_2$; integrated from spectral data (1-15 μm); [Authors' designation: Sample No. 93].
3*	28	1963	1023	~0°		$Be_{12}Ta$; sintered at 1673 K for 2 hrs (setter material $Be_{12}Ta$); density 2.42 g cm^{-3}, theoretical density 4.18 g cm^{-3}; x-ray structure $Be_{12}Ta$ (unexplained lines); integrated from spectral data (1-15 μm); [Authors' designation: Sample No. 37].
4*	28	1963	1023	~0°		99.9 $Be_{12}Ta$, 0.1 BeO; sintered at 1673 K for 2 hrs (setter material $Be_{12}Ta$); density 2.32 g cm^{-3}; integrated from spectral data (1-15 μm); [Authors' designation: Sample No. 43].
5*	28	1963	1023	~0°		$Be_{17}Ta_2$; sintered at 1673 K for 2 hrs (setter material $Be_{17}Ta_2$); density 3.60 g cm^{-3}, theoretical density 5.05 g cm^{-3}; x-ray structure $Be_{17}Ta_2$; integrated from spectral data (1-15 μm); [Authors' designation: Sample No. 94].

DATA TABLE NO. 473 NORMAL TOTAL EMITTANCE OF BERYLLIUM INTERMETALLIC COMPOUNDS

[Temperature, T, K; Emittance, ϵ]

T	ϵ
CURVE 1*	
1023	0.57
CURVE 2*	
1023	0.45
CURVE 3*	
1023	0.92
CURVE 4*	
1023	0.88
CURVE 5*	
1023	0.91

* No plot given

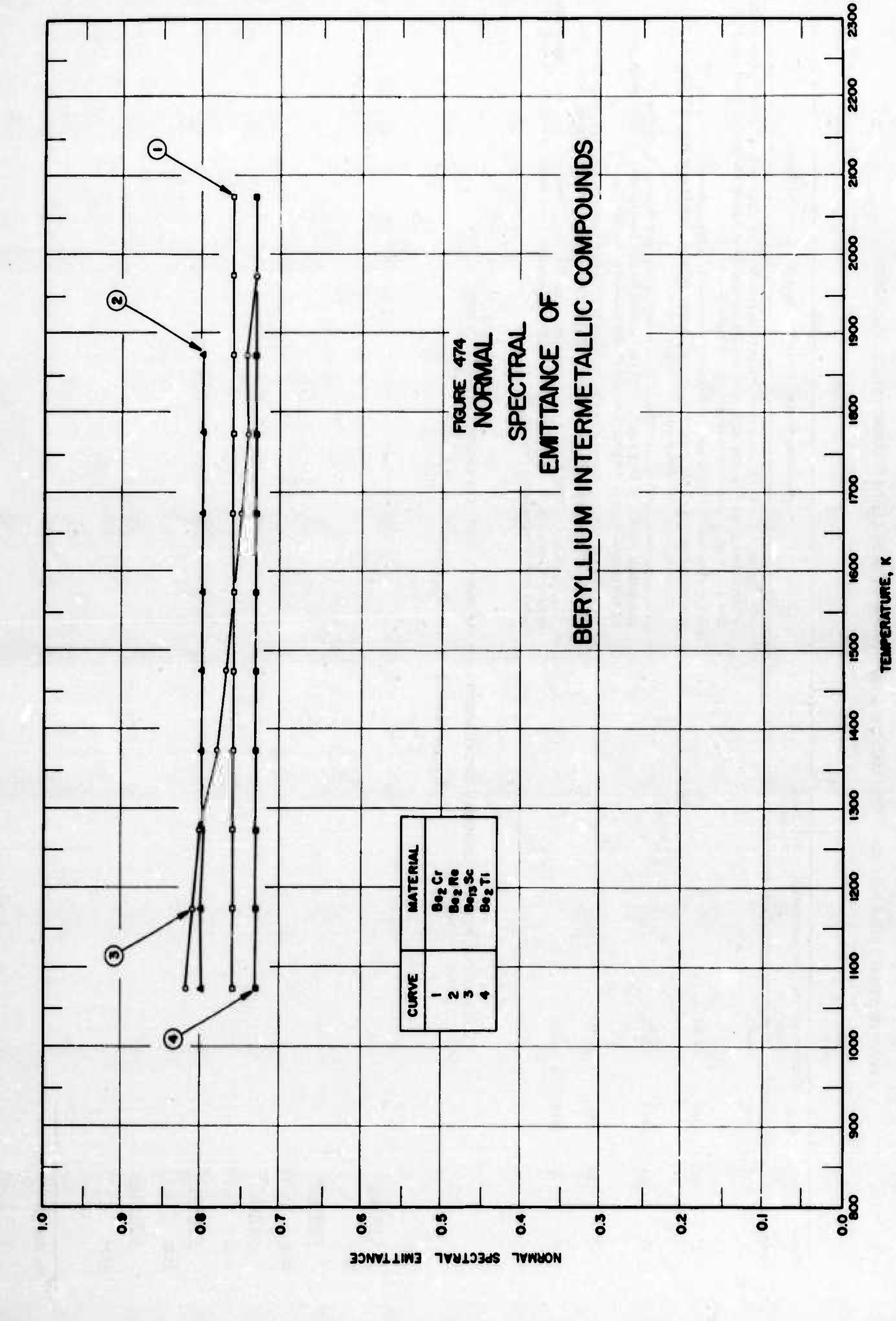


FIGURE 474 NORMAL SPECTRAL EMITTANCE OF BERYLLIUM INTERMETALLIC COMPOUNDS

SPECIFICATION TABLE NO. 474 NORMAL SPECTRAL EMITTANCE OF BERYLLIUM INTERMETALLIC COMPOUNDS

Curve No.	Ref. No.	Year	Wavelength	Temperature Range, K	Geometry θ'	Reported Error, %	Composition (weight percent), Specifications and Remarks
1	13	1962	0.650	1073-2073	~0°		Be_2Cr; layer of paste (~100 μm thick) on tantalum cylinder; paste prepared from fine powder (2-3 μm) of Be_2Cr suspended in nitrocellulose binder and dried at 313 to 333 K.
2	13	1962	0.650	1073-1873	~0°		Be_2Re; layer of paste (~100 μm thick) on tantalum cylinder; paste prepared from fine powder (2-3 μm) of Be_2Re suspended in nitrocellulose binder and dried at 313 to 333 K.
3	13	1962	0.650	1073-1973	~0°		$Be_{13}Sc$; layer of paste (~100 μm thick) on tantalum cylinder; paste prepared from fine powder (2-3 μm) of $Be_{13}Sc$ suspended in nitrocellulose binder and dried at 313 to 333 K.
4	13	1962	0.650	1073-2073	~0°		Be_2Ti; layer of paste (~100 μm thick) on tantalum cylinder; paste prepared from fine powder (2-3 μm) of Be_2Ti suspended in nitrocellulose binder and dried at 313 to 333 K.

DATA TABLE NO. 474 NORMAL SPECTRAL EMITTANCE OF BERYLLIUM INTERMETALLIC COMPOUNDS

[Temperature, T, K; Emittance, ϵ; Wavelength, λ, μm]

T	ϵ	T	ϵ
CURVE 1 λ = 0.650		**CURVE 3** λ = 0.650	
1073	0.76	1073	0.82
1173	0.76	1173	0.81
1273	0.76	1273	0.80
1373	0.76	1373	0.78
1473	0.76	1473	0.77
1573	0.76	1573	0.76*
1673	0.76	1673	0.75
1773	0.76	1773	0.74
1873	0.76	1873	0.74
1973	0.76	1973	0.73
2073	0.76		
		CURVE 4 λ = 0.650	
CURVE 2 λ = 0.650		1073	0.73
1073	0.80	1173	0.73
1173	0.80	1273	0.73
1273	0.80	1373	0.73
1373	0.80	1473	0.73
1473	0.80	1573	0.73
1573	0.80	1673	0.73
1673	0.80	1773	0.73
1773	0.80	1873	0.73
1873	0.80	1973	0.73*
		2073	0.73

* Not shown on plot

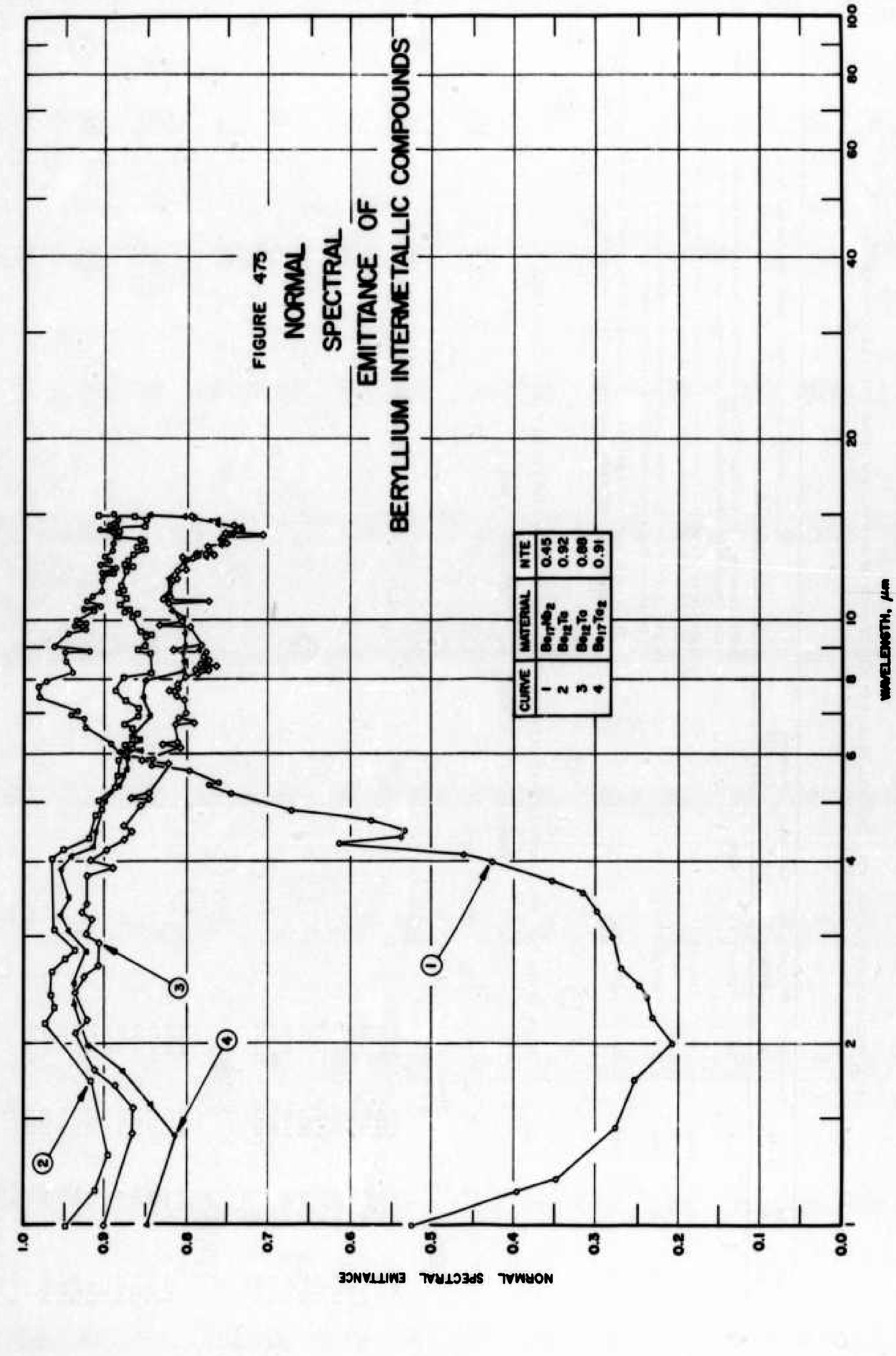


FIGURE 475
NORMAL
SPECTRAL
EMITTANCE OF
BERYLLIUM INTERMETALLIC COMPOUNDS
NORMAL SPECTRAL EMITTANCE
WAVELENGTH, μm
1.0
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0.0
1
2
4
6
8
10
20
40
60
80
100
1
2
3
4
CURVE | MATERIAL | NTE
1 | $Be_{17}Nb_2$ | 0.45
2 | $Be_{12}Ti$ | 0.92
3 | $Be_{12}Ta$ | 0.89
4 | $Be_{17}Ta_2$ | 0.91

SPECIFICATION TABLE NO. 475 NORMAL SPECTRAL EMITTANCE OF BERYLLIUM INTERMETALLIC COMPOUNDS

Curve No.	Ref. No.	Year	Temperature K	Wavelength Range, μm	Geometry θ'	Reported Error, %	Composition (weight percent), Specifications and Remarks
1	28	1963	1023	1.00-15.0	~0°		$Be_{17}Nb_2$; sintered at 1723 K for 2 hrs (setter material $Be_{17}Nb_2$); density 1.94 g cm^{-3}, theoretical density 3.28 g cm^{-3}; x-ray structure $Be_{17}Nb_2$; data extracted from smooth curve; [Authors' designation: Sample No. 93].
2	28	1963	1223	1.00-15.0	~0°		$Be_{12}Ta$; sintered at 1673 K for 2 hrs (setter material $Be_{12}Ta$); density 2.42 g cm^{-3}, theoretical density 4.18 g cm^{-3}; x-ray structure $Be_{12}Ta$ (unexplained lines); data extracted from smooth curve; [Authors' designation: Sample No. 37].
3	28	1963	1023	1.00-15.0	~0°		99.9 $Be_{12}Ta$, 0.1 BeO; sintered at 1673 K for 2 hrs (setter material $Be_{12}Ta$); density 2.32 g cm^{-3}; data extracted from smooth curve; [Authors' designation: Sample No. 43].
4	28	1963	1023	1.00-15.0	~0°		$Be_{17}Ta_2$; sintered at 1673 K for 2 hrs (setter material $Be_{17}Ta_2$); density 3.60 g cm^{-3}, theoretical density 5.05 g cm^{-3}; x-ray structure $Be_{17}Ta_2$; data extracted from smooth curve; [Authors' designation: Sample No. 94].

DATA TABLE NO. 475 NORMAL SPECTRAL EMITTANCE OF BERYLLIUM INTERMETALLIC COMPOUNDS

[Wavelength, λ, μm; Emittance, ∈; Temperature, T, K]

CURVE 1
T = 1023

λ	∈
1.00	0.524
1.13	0.397
1.19	0.349
1.45	0.275
1.74	0.253
2.00	0.206
2.21	0.232
2.38	0.239
2.49	0.248
2.65	0.270
3.00	0.279
3.30	0.299
3.54	0.316
3.70	0.352
3.99	0.427
4.10	0.462
4.25	0.617
4.37	0.538
4.49	0.534
4.66	0.576
4.83	0.670
5.15	0.746
5.32	0.773
5.37	0.760
5.64	0.799
5.73	0.844
5.88	0.843
5.98	0.877
6.23	0.892
6.64	0.924
6.89	0.926
6.95	0.943
7.04	0.933
7.46	0.981
7.77	0.981
7.92	0.974
8.18	0.941
8.51	0.950
8.82	0.950
8.89	0.919
9.04	0.964
9.49	0.947
9.61	0.923

CURVE 1 (cont.)

λ	∈
9.71	0.939
9.86	0.924
9.99	0.936
10.3	0.914
10.4	0.928
10.5	0.907
10.7	0.923
10.9	0.915
11.1	0.903
11.5	0.903
11.8	0.901
11.9	0.890
11.9	0.902
12.2	0.888
12.3	0.906
12.5	0.894
12.6	0.900
13.0	0.891
13.4	0.890
14.0	0.890
14.0	0.908
14.2	0.888
14.3	0.895
14.4	0.890
14.6	0.883
15.0	0.890

CURVE 2
T = 1223

λ	∈
1.00	0.950
1.14	0.912
1.31	0.895
1.74	0.918
2.15	0.974
2.29	0.964
2.40	0.969
2.62	0.966
2.75	0.950
2.85	0.938
3.07	0.962
4.01	0.968
4.19	0.953
4.35	0.920

CURVE 2 (cont.)

λ	∈
4.75	0.912
4.88	0.904
5.02	0.909
5.30	0.889
5.51	0.886
5.88	0.884
6.12	0.868
6.20	0.878
6.33	0.868
6.61	0.868
6.75	0.877
6.92	0.860
7.19	0.860
7.36	0.876
7.67	0.889
8.01	0.879
8.18	0.845
8.80	0.846
8.91	0.862
9.01	0.852
9.36	0.852
9.48	0.845
9.59	0.858
10.0	0.869
10.1	0.862
10.2	0.877
10.4	0.871
10.5	0.882
10.9	0.876
11.0	0.885
11.0	0.878
11.4	0.880
12.0	0.877
12.2	0.868
12.3	0.878
12.5	0.873
12.8	0.868
13.1	0.852
13.1	0.862
13.5	0.853
13.5	0.859
13.7	0.850
14.0	0.850
14.1	0.840
14.4	0.853
14.5	0.851
14.8	0.866
15.0	0.910

CURVE 3
T = 1023

λ	∈
1.00	0.900
1.42	0.867
1.56	0.867
1.70	0.886
1.81	0.913
2.08	0.937
2.18	0.921
2.41	0.938
2.56	0.927
2.68	0.909
2.91	0.909
3.01	0.923
3.20	0.916
3.29	0.930
3.38	0.921
3.79	0.921
3.89	0.890
4.00	0.918
4.19	0.898
4.33	0.876
4.49	0.868
4.57	0.877
4.93	0.858
5.05	0.847
5.09	0.869
5.17	0.849
5.77	0.825
5.85	0.856
6.15	0.810
6.20	0.831
6.28	0.814
6.71	0.817
6.78	0.791
6.89	0.814
7.00	0.801
7.39	0.805

CURVE 3 (cont.)

λ	∈
7.49	0.814
7.64	0.825
7.74	0.812
7.84	0.814
8.02	0.803
8.12	0.788
8.22	0.773
3.28	0.791
8.35	0.763
8.44	0.782
8.55	0.772
8.67	0.780
8.81	0.777
8.90	0.820
9.01	0.781
9.74	0.797
9.80	0.836
9.88	0.808
10.5	0.828
10.6	0.773
10.7	0.831
10.8	0.823
11.5	0.820
11.7	0.813
12.0	0.815
12.1	0.802
12.6	0.795
12.6	0.808
12.8	0.769
12.8	0.780
13.0	0.774
13.2	0.774
13.4	0.751
13.6	0.756
13.7	0.708
13.9	0.754
14.0	0.739
14.4	0.744
14.7	0.793
14.8	0.795
15.0	0.850*

CURVE 4
T = 1023

λ	∈
1.00	0.850
1.41	0.817
1.58	0.845
1.80	0.878
1.99	0.920
2.31	0.939
2.51	0.939
2.82	0.922
3.06	0.948
3.26	0.957
3.49	0.946
3.88	0.957
4.09	0.944
4.21	0.916
4.49	0.913
5.02	0.900
5.32	0.883
5.53	0.879
5.65	0.874
5.90	0.874
6.01	0.882
6.07	0.857
6.14	0.873
6.23	0.859
6.42	0.869
6.98	0.848
7.49	0.855
7.95	0.851
8.22	0.802
8.51	0.804
8.84	0.806
8.91	0.784
9.02	0.805
9.51	0.805
10.0	0.806
10.3	0.821
10.8	0.821
10.9	0.828
11.0	0.824
11.6	0.824
11.9	0.817
12.5	0.805
12.7	0.778

CURVE 4 (cont.)

λ	∈
12.9	0.790
13.3	0.758
13.5	0.758
13.6	0.743
14.0	0.733
14.3	0.734
14.4	0.761
14.5	0.761
14.7	0.803
15.0	0.849

* Not shown on plot

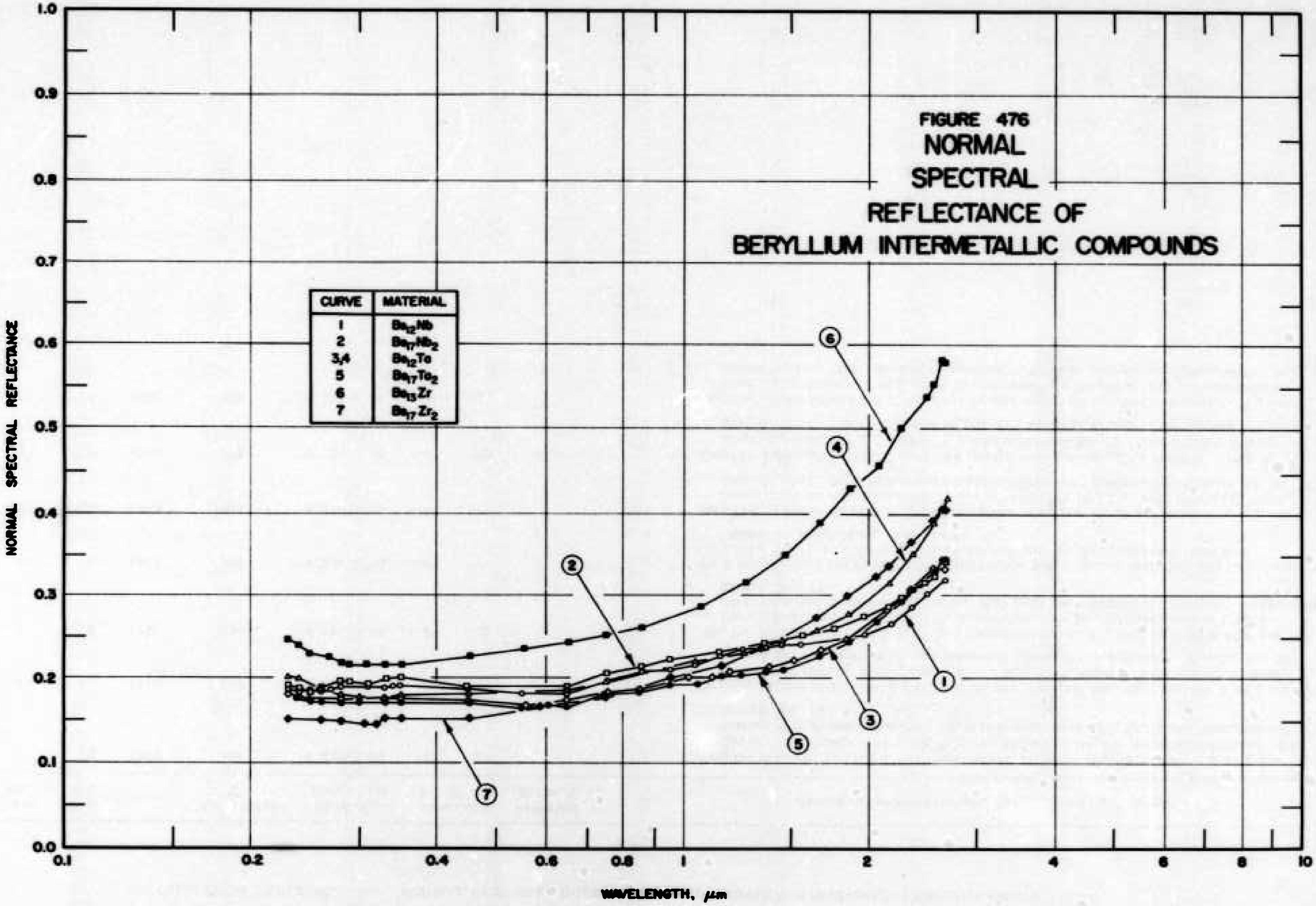


FIGURE 476
NORMAL
SPECTRAL
REFLECTANCE OF
BERYLLIUM INTERMETALLIC COMPOUNDS
CURVE | MATERIAL
1 | $Be_{12}Nb$
2 | $Be_{17}Nb_2$
3,4 | $Be_{12}Ta$
5 | $Be_{17}Ta_2$
6 | $Be_{13}Zr$
7 | $Be_{17}Zr_2$
NORMAL SPECTRAL REFLECTANCE
WAVELENGTH, μm
0.0 0.1 0.2 0.3 0.4 0.5 0.6 0.7 0.8 0.9 1.0
0.1 0.2 0.4 0.6 0.8 1 2 4 6 8 10
1 2 3 4 5 6 7

SPECIFICATION TABLE NO. 476 NORMAL SPECTRAL REFLECTANCE OF BERYLLIUM INTERMETALLIC COMPOUNDS

Curve No.	Ref. No.	Year	Temperature K	Wavelength Range, μm	Geometry θ	θ'	ω'	Reported Error, %	Composition (weight percent), Specifications and Remarks
1	28	1963	298	0.230-2.65	~0°		2π		$Be_{12}Nb$; sintered at 1723 K for 2 hrs (setter material $Be_{12}Nb$); density 2.17 g cm^{-3}, theoretical density 2.91 g cm^{-3}; x-ray structure $Be_{12}Nb$ (unexplained lines); data extracted from smooth curve; MgO reference standard; [Authors' designation: Sample No. 92].
2	28	1963	298	0.230-2.65	~0°		2π		$Be_{17}Nb_2$; sintered at 1723 K for 2 hrs (setter material $Be_{17}Nb_2$); density 1.94 g cm^{-3}, theoretical density 3.28 g cm^{-3}; x-ray structure $Be_{17}Nb_2$; data extracted from smooth curve; MgO reference standard; [Authors' designation: Sample No. 93].
3	28	1963	298	0.230-2.65	~0°		2π		$Be_{12}Ta$; sintered at 1673 K for 2 hrs (setter material $Be_{12}Ta$); density 2.42 g cm^{-3}, theoretical density 4.18 g cm^{-3}; x-ray structure $Be_{12}Ta$ (unexplained lines); data extracted from smooth curve; MgO reference standard; [Authors' designation: Sample No. 37].
4	28	1963	298	0.230-2.65	~0°		2π		99.9 $Be_{12}Ta$, 0.1 BeO; sintered at 1673 K for 2 hrs (setter material $Be_{12}Ta$); density 2.32 g cm^{-3}; data extracted from smooth curve; MgO reference standard; [Authors' designation: Sample No. 43].
5	28	1963	298	0.230-2.65	~0°		2π		$Be_{17}Ta_2$; sintered at 1673 K for 2 hrs (setter material $Be_{17}Ta_2$); density 3.60 g cm^{-3}, theoretical density 5.05 g cm^{-3}; x-ray structure $Be_{17}Ta_2$; data extracted from smooth curve; MgO reference standard; [Authors' designation: Sample No. 94].
6	28	1963	298	0.230-2.65	~0°		2π		$Be_{13}Zr$; sintered at 1773 K for 2 hrs (setter material $Be_{13}Zr$); density 2.16 g cm^{-3}, theoretical density 2.72 g cm^{-3}; x-ray structure $Be_{13}Zr$; data extracted from smooth curve; MgO reference standard; [Authors' designation: Sample No. 95].
7	28	1963	298	0.230-2.65	~0°		2π		$Be_{17}Zr_2$; sintered at 1723 K for 2 hrs (setter material $Be_{17}Zr_2$); density 2.07 g cm^{-3}, theoretical density 3.08 g cm^{-3}; x-ray structure $Be_{17}Zr_2$; data extracted from smooth curve; MgO reference standard; [Authors' designation: Sample No. 96].

DATA TABLE NO. 476 NORMAL SPECTRAL REFLECTANCE OF BERYLLIUM INTERMETALLIC COMPOUNDS

[Wavelength, λ, μm; Reflectance, ρ; Temperature, T, K]

CURVE 1
T = 298

λ	ρ
0.230	0.185
0.240	0.182
0.250	0.183
0.260	0.183
0.270	0.185
0.280	0.189
0.310	0.189
0.329	0.188
0.340	0.190
0.349	0.190
0.448	0.186
0.547	0.181
0.648	0.180
0.750	0.197
0.853	0.207
0.950	0.210
1.05	0.217
1.15	0.226
1.25	0.234
1.35	0.237
1.45	0.240
1.55	0.240
1.78	0.250
1.95	0.253
2.15	0.267
2.35	0.286
2.48	0.301
2.65	0.320

CURVE 2
T = 298

λ	ρ
0.230	0.190
0.240	0.186
0.250	0.183
0.260	0.188
0.279	0.195
0.290	0.195
0.310	0.191
0.331	0.198
0.350	0.200
0.446	0.190
0.648	0.190
0.750	0.205

CURVE 2 (cont.)

λ	ρ
0.851	0.214
0.948	0.222
1.15	0.231
1.35	0.242
1.55	0.251
1.75	0.260
1.95	0.274
2.15	0.287
2.25	0.299
2.45	0.316
2.55	0.324
2.65	0.340

CURVE 3
T = 298

λ	ρ
0.230	0.180
0.240	0.176
0.250	0.174
0.280	0.174
0.330	0.174
0.350	0.174
0.450	0.171
0.552	0.168
0.649	0.173
0.751	0.183
0.848	0.188
1.01	0.200
1.11	0.200
1.18	0.208
1.37	0.212
1.50	0.221
1.67	0.234
1.84	0.248
2.15	0.281
2.35	0.309
2.55	0.335
2.65	0.350*

CURVE 4
T = 298

λ	ρ
0.230	0.200
0.240	0.199
0.260	0.184

CURVE 4 (cont.)

λ	ρ
0.280	0.179
0.300	0.176
0.329	0.175
0.350	0.179
0.450	0.181
0.648	0.185
0.749	0.196
1.05	0.220
1.25	0.230
1.45	0.245
1.65	0.258
1.85	0.278
2.15	0.315
2.35	0.351
2.55	0.390
2.65	0.420

CURVE 5
T = 298

λ	ρ
0.230	0.180*
0.239	0.177
0.250	0.172
0.260	0.170
0.280	0.170
0.300	0.170
0.330	0.170
0.350	0.170
0.451	0.170
0.547	0.163
0.603	0.168
0.649	0.166
0.748	0.180
0.848	0.184
0.950	0.191
1.05	0.194
1.15	0.201
1.24	0.203
1.35	0.208
1.45	0.210
1.65	0.226
1.85	0.244
2.05	0.269
2.25	0.294
2.35	0.309

CURVE 5 (cont.)

λ	ρ
2.55	0.333
2.61	0.347
2.65	0.347

CURVE 6
T = 298

λ	ρ
0.230	0.245
0.240	0.239
0.250	0.229
0.269	0.225
0.280	0.218
0.289	0.216
0.309	0.216
0.330	0.216
0.350	0.216
0.452	0.226
0.551	0.235
0.651	0.242
0.750	0.251
0.854	0.261
1.05	0.288
1.25	0.318
1.45	0.350
1.65	0.390
1.86	0.431
2.06	0.468
2.25	0.500
2.45	0.539
2.55	0.554
2.63	0.582
2.65	0.580

CURVE 7
T = 298

λ	ρ
0.230	0.150
0.260	0.150
0.280	0.148
0.305	0.146
0.320	0.145
0.330	0.151
0.350	0.151
0.451	0.151
0.585	0.166

CURVE 7 (cont.)

λ	ρ
0.650	0.166
0.749	0.179
0.952	0.200
1.15	0.217
1.35	0.237
1.65	0.272
1.85	0.300
2.05	0.325
2.15	0.338
2.35	0.367
2.54	0.391
2.62	0.407
2.64	0.407

* Not shown on plot

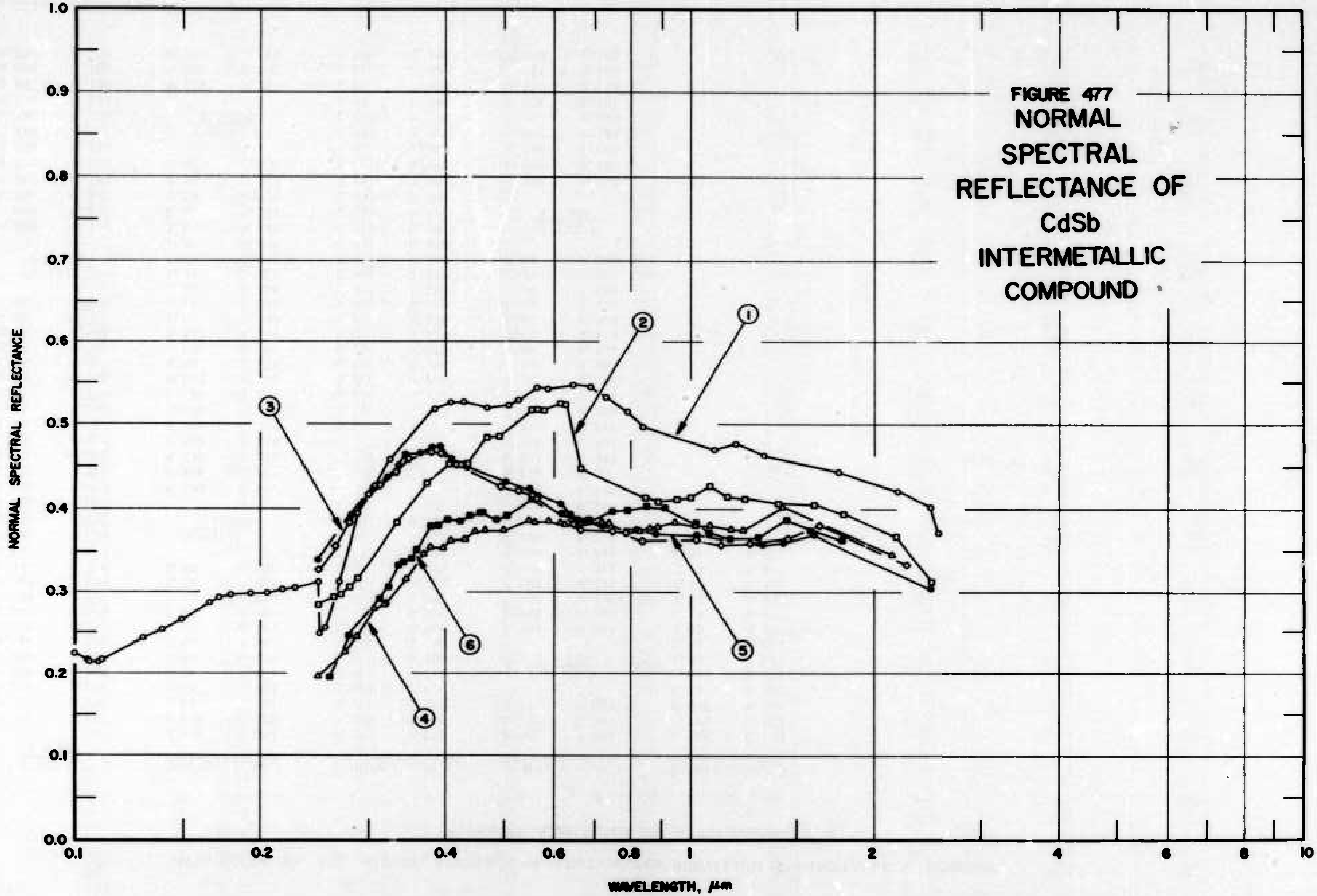


FIGURE 477 NORMAL SPECTRAL REFLECTANCE OF CdSb INTERMETALLIC COMPOUND

SPECIFICATION TABLE NO. 477 NORMAL SPECTRAL REFLECTANCE OF CdSb INTERMETALLIC COMPOUND

Curve No.	Ref. No.	Year	Temperature K	Wavelength Range, μm	Geometry θ θ' ω'	Reported Error, %	Composition (weight percent), Specifications and Remarks
1	354	1968	300	0.100-2.53	~0° ~0°		Single crystal; surface as cleaved; incident beam polorized with E parallel to a-axis; data extracted from smooth curve.
2	354	1968	77	0.249-2.48	~0° ~0°		Similar to above specimen and conditions.
3	354	1968	300	0.249-2.25	~0° ~0°		Similar to curve 1 specimen and conditions except incident beam polarized with E parallel to b-axis.
4	354	1968	77	0.248-2.14	~0° ~0°		Similar to above specimen and conditions.
5	354	1968	300	0.247-2.48	~0° ~0°		Similar to curve 1 specimen and conditions except incident beam polarized with E parallel to c-axis.
6	354	1968	77	0.257-1.77	~0° ~0°		Similar to above specimen and conditions.

DATA TABLE NO. 477 NORMAL SPECTRAL REFLECTANCE OF CdSb INTERMETALLIC COMPOUND

[Wavelength, λ, μm; Reflectance, ρ; Temperature, T, K]

CURVE 1
T = 300

λ	ρ
0.100	0.224
0.105	0.217
0.106	0.215
0.109	0.215
0.111	0.216
0.129	0.242
0.138	0.253
0.148	0.267
0.165	0.288
0.171	0.293
0.179	0.296
0.193	0.298
0.205	0.299
0.216	0.302
0.228	0.305
0.248	0.312
0.249	0.240
0.254	0.257
0.269	0.311
0.288	0.395
0.306	0.428
0.325	0.459
0.382	0.519
0.408	0.526
0.428	0.527
0.468	0.520
0.504	0.522
0.525	0.528
0.561	0.543
0.588	0.542
0.642	0.548
0.689	0.543
0.729	0.531
0.790	0.514
0.832	0.498
1.09	0.470
1.18	0.478
1.32	0.463
1.75	0.444
2.18	0.421
2.48	0.401
2.53	0.371

CURVE 2
T = 77

λ	ρ
0.249	0.283
0.262	0.293
0.270	0.299
0.278	0.307
0.288	0.318
0.331	0.383
0.373	0.431
0.404	0.451
0.421	0.451
0.432	0.453
0.466	0.485
0.490	0.487
0.551	0.517
0.561	0.518
0.578	0.517
0.614	0.524
0.629	0.523
0.761	0.449
0.844	0.413
0.886	0.410
0.947	0.412
1.00	0.415
1.07	0.429
1.15	0.415
1.23	0.412
1.38	0.408
1.59	0.405
1.77	0.394
2.18	0.369
2.48	0.312

CURVE 3
T = 300

λ	ρ
0.249	0.329
0.264	0.357
0.279	0.383
0.300	0.419
0.311	0.429
0.332	0.444
0.349	0.459
0.379	0.468
0.391	0.466
0.418	0.451

CURVE 3 (cont.)

λ	ρ
0.492	0.429
0.525	0.422
0.553	0.418
0.561	0.413
0.649	0.381
0.663	0.377
0.747	0.375
0.785	0.372
0.832	0.363
[illegible]	0.363
1.12	0.359
1.25	0.360
1.44	0.367
1.63	0.380
2.25	0.334

CURVE 4
T = 77

λ	ρ
0.248	0.197
0.274	0.227
0.286	0.245
0.305	0.280
0.309	0.284
0.320	0.286
0.343	0.316
0.367	0.349
0.378	0.355
0.395	0.354
0.409	0.364
0.429	0.364
0.446	0.372
0.464	0.376
0.496	0.375
0.546	0.388
0.556	0.387
0.588	0.387
0.614	0.383
0.623	0.381
0.653	0.380
0.717	0.385
0.738	0.383
0.790	0.374
0.827	0.374
0.855	0.378

CURVE 4 (cont.)

λ	ρ
0.886	0.379
0.939	0.384
1.02	0.380
1.07	0.380
1.16	0.376
1.23	0.377
1.41	0.401
2.14	0.347

CURVE 5
T = 300

λ	ρ
0.247	0.340
0.280	0.393
0.302	0.426
0.321	0.439
0.335	0.451
0.343	0.464
0.362	0.467
0.380	0.473
0.390	0.474
0.409	0.459
0.431	0.450
0.500	0.432
0.546	0.426
0.569	0.417
0.614	0.406
0.636	0.393
0.670	0.386
0.717	0.380
0.816	0.374
0.879	0.370
1.03	0.369
1.31	0.358
1.43	0.360
1.59	0.370
2.48	0.303

CURVE 6
T = 77

λ	ρ
0.257	0.195
0.279	0.247
0.311	0.291
0.322	0.307

CURVE 6 (cont.)

λ	ρ
0.335	0.333
0.340	0.336
0.351	0.341
0.358	0.352
0.378	0.379
0.388	0.380
0.401	0.387
0.423	0.384
0.437	0.391
0.453	0.396
0.459	0.395
0.484	0.388
0.504	0.391
0.551	0.412
0.617	0.395
0.656	0.388
0.685	0.388
0.743	0.398
0.790	0.399
0.849	0.403
0.905	0.401
1.02	0.382
1.07	0.371
1.16	0.365
1.29	0.368
1.44	0.387
1.57	0.373
1.77	0.362

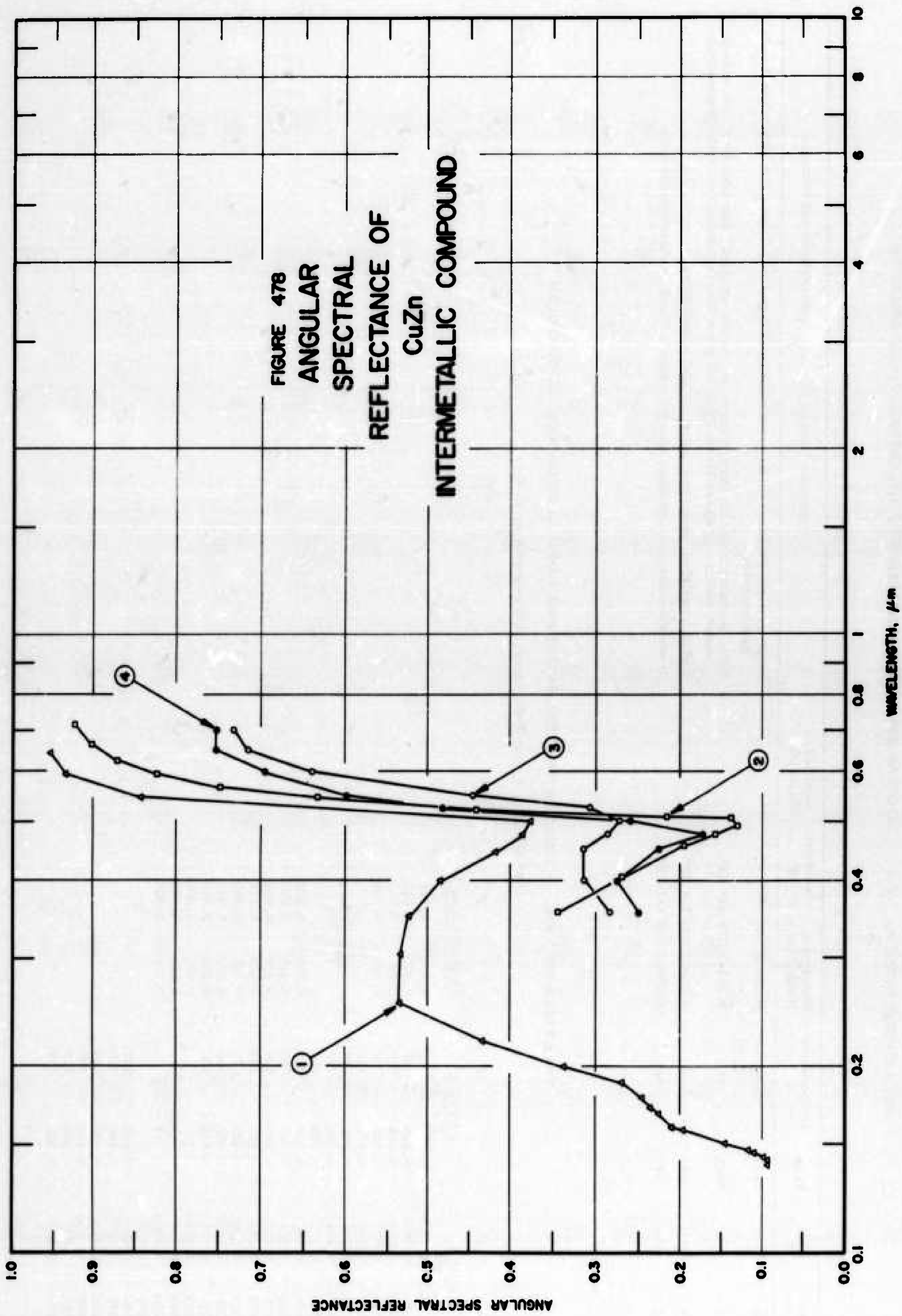


FIGURE 478 ANGULAR SPECTRAL REFLECTANCE OF CuZn INTERMETALLIC COMPOUND

SPECIFICATION TABLE NO. 478 ANGULAR SPECTRAL REFLECTANCE OF CuZn INTERMETALLIC COMPOUND

Curve No.	Ref. No.	Year	Temperature K	Wavelength Range, μm	Geometry θ	θ'	ω'	Reported Error, %	Composition (weight percent), Specifications and Remarks
1	331	1967	~298	0.139-0.646	7°	7°			Single crystal, β-phase; surface mechanically polished and cleaned with ethyl alcohol and distilled water.
2	8	1961	298	0.354-0.711	45°	45°			Film, β-phase; 2.000 μm thick; vacuum evaporated on glass; data extracted from smooth curve; radiation reflected from CuZn and glass interface using total reflection method.
3	359	1962	548	0.356-0.700	18°	18°			β-phase; polished; measured in dry nitrogen atmosphere.
4	359	1962	300	0.356-0.700	18°	18°			Above specimen and conditions after exposure to 548 K in above measurement.

DATA TABLE NO. 478 ANGULAR SPECTRAL REFLECTANCE OF CuZn INTERMETALLIC COMPOUND

[Wavelength, λ, μm; Reflectance, ρ; Temperature, T, K]

CURVE 1
T ~ 298

λ	ρ
0.139	0.092
0.141	0.091
0.142	0.097
0.145	0.110
0.147	0.128
0.150	0.145
0.157	0.195
0.160	0.210
0.166	0.224
0.171	0.236
0.178	0.249
0.189	0.270
0.200	0.338
0.220	0.434
0.253	0.536
0.302	0.533
0.350	0.524
0.400	0.486
0.448	0.420
0.479	0.386
0.500	0.379
0.546	0.845
0.593	0.939
0.646	0.955

CURVE 2
T = 298

λ	ρ
0.354	0.346
0.405	0.270
0.452	0.194
0.474	0.158
0.490	0.130
0.503	0.139
0.509	0.216
0.520	0.441
0.543	0.636
0.567	0.750
0.595	0.824
0.623	0.871
0.662	0.904
0.711	0.926

CURVE 3
T = 548

λ	ρ
0.356	0.283
0.400	0.316
0.450	0.315
0.476	0.288
0.500	0.272
0.525	0.309

CURVE 3 (cont.)

λ	ρ
0.550	0.448
0.600	0.642
0.650	0.717
0.700	0.733

CURVE 4
T = 300

λ	ρ
0.356	0.250
0.400	0.273
0.450	0.224
0.476	0.171
0.500	0.260
0.525	0.481
0.550	0.600
0.600	0.699
0.650	0.753
0.700	0.754

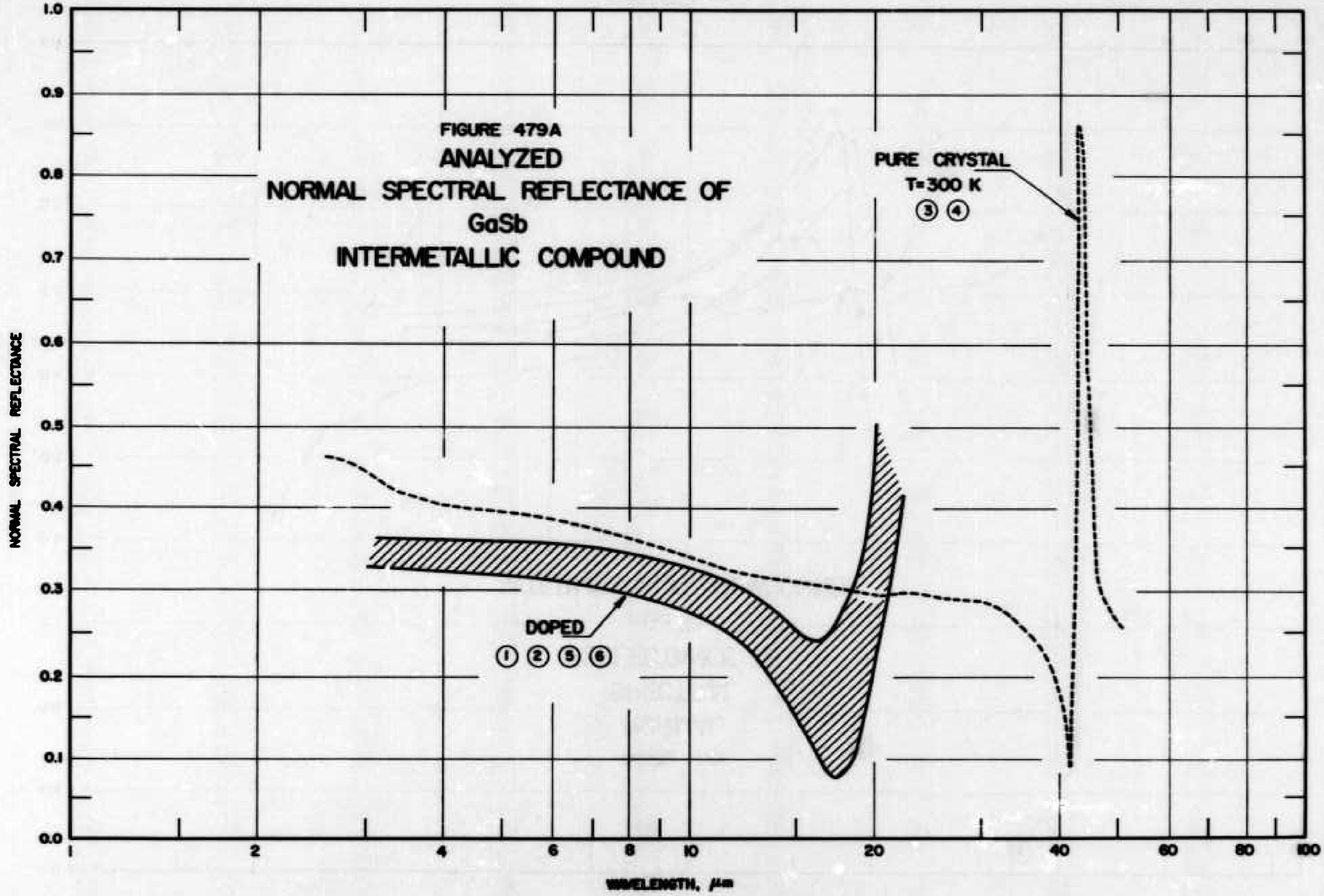


FIGURE 479A
ANALYZED
NORMAL SPECTRAL REFLECTANCE OF
GaSb
INTERMETALLIC COMPOUND
PURE CRYSTAL
T=300 K
3 4
DOPED
1 2 5 6
NORMAL SPECTRAL REFLECTANCE
1.0
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0.0
1
2
4
6
8
10
20
40
60
80
100
WAVELENGTH, μm

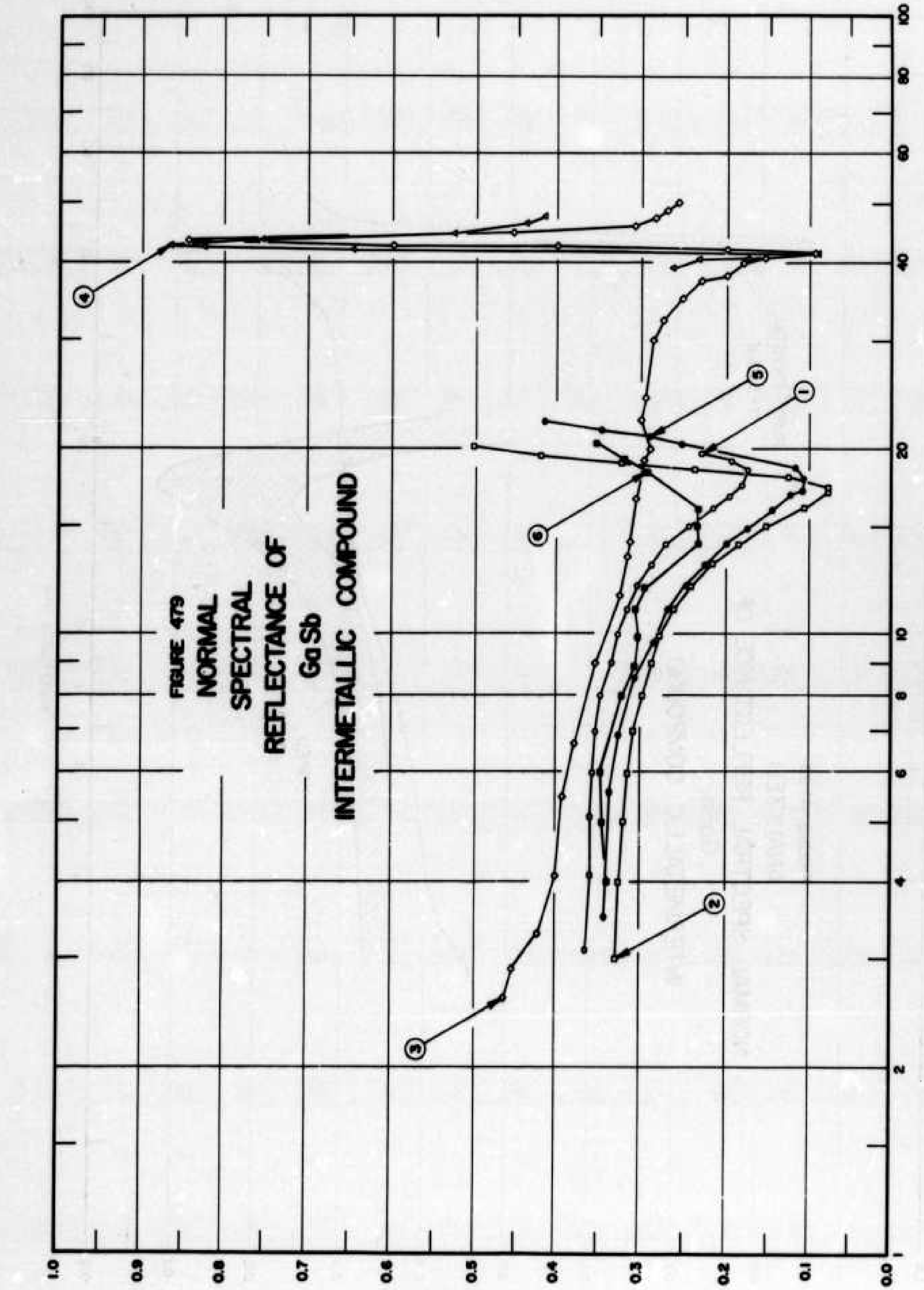


FIGURE 479
NORMAL
SPECTRAL
REFLECTANCE OF
GaSb
INTERMETALLIC COMPOUND
NORMAL SPECTRAL REFLECTANCE
WAVELENGTH, μm
1.0
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0.0
1
2
4
6
8
10
20
40
60
80
100
1
2
3
4
5
6

SPECIFICATION TABLE NO. 479 NORMAL SPECTRAL REFLECTANCE OF GaSb INTERMETALLIC COMPOUND

Curve No.	Ref. No.	Year	Temperature, K	Wavelength Range, μm	Geometry θ θ' ω	Reported Error, %	Composition (weight percent), Specifications and Remarks
1	317	1968	273	3.1-19.6	~0° ~0°		Single crystal, n-type, Te doped; polished to mirror finish; calculated from spectral emittance data.
2	317	1968	77	3.0-20.1	~0° ~0°		Above specimen and conditions.
3	87	1968	313	2.6-50.0	30° 30°		Synthetic single crystal, thickness 0.5 mm; flat to ten fringes or better; data extracted from smooth curve; aluminum mirror reference standard.
4	418	1962	~4.2	39.2-47.6	10° 10°		Crystal, polished to mirror finish; data extracted from smooth curve.
5	421	1961	300	3.5-22.2	~0° ~0°		Crystal; n-type; Hall coefficient at 300 K, -3.4 cm^3 $coul^{-1}$.
6	421	1961	300	4.0-22.1	~0° ~0°		Crystal; p-type; Hall coefficient at 300 K, 0.5 cm^3 $coul^{-1}$.

DATA TABLE NO. 479 NORMAL SPECTRAL REFLECTANCE OF GaSb INTERMETALLIC COMPOUND

[Wavelength, λ, μm; Reflectance, ρ; Temperature, T, K]

λ	ρ	λ	ρ	λ	ρ	λ	ρ	λ	ρ	λ	ρ	λ	ρ	λ	ρ
CURVE 1 T = 273		CURVE 2 T = 77		CURVE 2 (cont.)		CURVE 3 (cont.)		CURVE 3 (cont.)		CURVE 4 (cont.)		CURVE 5 (cont.)		CURVE 6 (cont.)	
				19.5	0.420	22.1	0.300	48.5	0.270	45.2	0.466*	17.9	0.107	11.0	0.305
3.1	0.363	3.0	0.329	20.1	0.501	24.1	0.295	50.0	0.258	46.1	0.439	18.6	0.118	11.9	0.296
4.1	0.359	4.0	0.326			30.0	0.288			47.6	0.416	19.2	0.145	12.9	0.284*
5.1	0.359	5.0	0.320	CURVE 3 T = 313		32.2	0.276	CURVE 4 T = ~4.2				19.9	0.198*	14.0	0.283
6.0	0.357	6.0	0.313			35.0	0.251			CURVE 5 T = 300		20.4	0.251	15.0	0.285
7.0	0.353	7.0	0.307			37.1	0.230					21.0	0.292	16.0	0.283
8.0	0.349	8.0	0.299	2.6	0.464	39.0	0.200	39.2	0.264			21.6	0.347	17.0	0.286*
9.0	0.335	9.0	0.288	2.9	0.453	40.0	0.180	39.8	0.259*	3.5	0.342	22.0	0.399*	18.4	0.292
10.0	0.328	9.9	0.278	3.3	0.422	40.7	0.155	40.3	0.232	5.6	0.336	22.2	0.415	19.4	0.320
11.0	0.318	11.0	0.262	4.1	0.400	41.6	0.094	40.6	0.175	6.9	0.325			20.4	0.351
12.0	0.303	12.0	0.242	5.5	0.391	42.2	0.200	41.5	0.090	8.5	0.307	CURVE 6 T = 300		22.1	0.416
13.0	0.289	13.0	0.217	6.7	0.378	42.5	0.400	41.6	0.157*	9.7	0.284				
14.0	0.272	14.0	0.186	8.0	0.351	42.7	0.600	42.0	0.649	11.0	0.268				
15.0	0.244	15.0	0.152	9.2	0.353	42.9	0.800*	42.2	0.824	12.0	0.249	4.0	0.337		
16.0	0.217	16.0	0.106	11.6	0.324	43.2	0.844	42.4	0.862*	13.0	0.226	5.0	0.344		
16.7	0.197	17.0	0.076	13.4	0.316	43.8	0.744*	42.7	0.869	14.0	0.200	6 0	0.347		
17.5	0.181	17.3	0.076	14.2	0.311	44.7	0.453	42.9	0.852*	14.9	0.174	6.9	0.323*		
18.5	0.176	18.0	0.125	16.6	0.305	45.3	0.350*	43.5	0.751	15.7	0.145	8.0	0.321		
19.1	0.194	18.5	0.239	19.3	0.298	45.8	0.307	44.1	0.568*	16.7	0.123	8.9	0.309		
19.6	0.230	19.0	0.323	20.0	0.290	47.3	0.283	44.6	0.529	17.2	0.109	9.9	0.302		

*Not shown on plot.

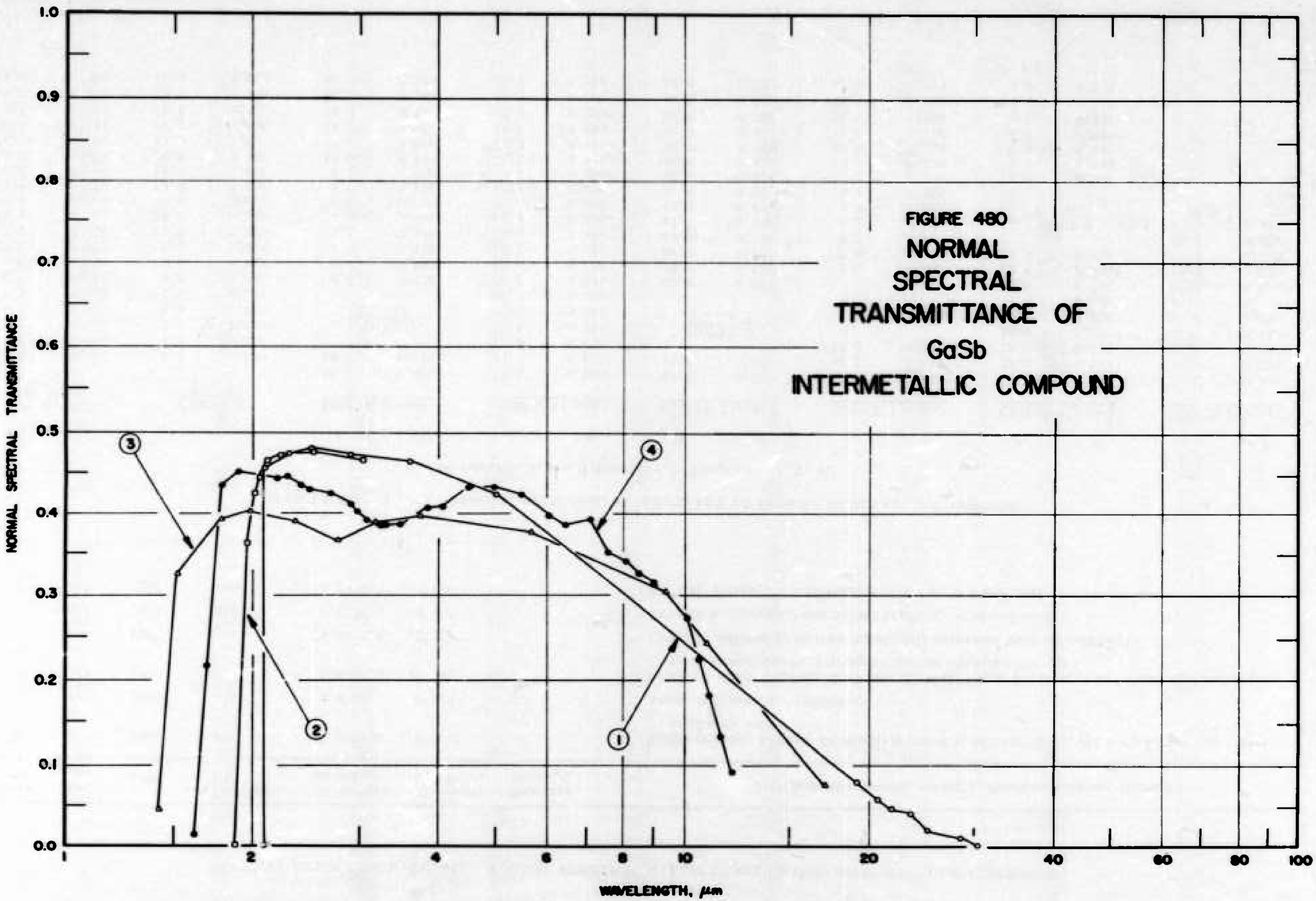


FIGURE 480
NORMAL
SPECTRAL
TRANSMITTANCE OF
GaSb
INTERMETALLIC COMPOUND
NORMAL SPECTRAL TRANSMITTANCE
WAVELENGTH, μm
1.0
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0.0
1
2
4
6
8
10
20
40
60
80
100
1
2
3
4

SPECIFICATION TABLE NO. 480 NORMAL SPECTRAL TRANSMITTANCE OF GaSb INTERMETALLIC COMPOUND

Curve No.	Ref. No.	Year	Temperature, K	Wavelength Range, μm	Geometry θ θ' ω	Reported Error, %	Composition (weight percent), Specifications and Remarks
1	87	1968	313	2.1-50.0	~0° ~0°		Synthetic single crystal; thickness 0.5 mm; flat to ten fringes or better; data extracted from smooth curve.
2	373	1968	~298	1.87-3.03	~0° ~0°		Synthetic single crystal; thickness 0.5 mm; data extracted from smooth curve.
3	420	1968	~298	1.43-17.0	0° 0°		Crystal; n-type, doped with Te; carrier concentration 1.5 x 10^{17} cm^{-3}; ground and polished on both sides; data extracted from smooth curve.
4	421	1961	~ 80	1.62-14.1	~0° ~0°		Crystal; n-type; thickness 1.2 mm; Hall coefficient at 77 K, -129 cm^3 $coul^{-1}$.

DATA TABLE NO. 480 NORMAL SPECTRAL TRANSMITTANCE OF GaSb INTERMETALLIC COMPOUND

[Wavelength, λ, μm; Transmittance, τ; Temperature, T, K]

λ	τ	λ	τ	λ	τ	λ	τ	λ	τ	λ	τ
CURVE 1 T = 313		CURVE 2 T = ~298		CURVE 3 (cont.)		CURVE 4 (cont.)		CURVE 4 (cont.)		CURVE 4 (cont.)	
				1.99	0.403	1.90	0.451	4.19	0.420*	14.1	0.091
2.1	0.000	1.87	0.000	2.35	0.391	2.07	0.451*	4.50	0.435		
2.1	0.457	1.97	0.362	2.74	0.369	2.20	0.445	4.99	0.435		
2.3	0.475	2.02	0.426	3.19	0.390	2.29	0.447	5.49	0.425		
2.5	0.480	2.05	0.446	3.73	0.399	2.40	0.436	6.04	0.399		
2.9	0.473	2.11	0.465	5.57	0.379	2.48	0.431	6.43	0.386		
3.6	0.466	2.22	0.474	9.37	0.305	2.68	0.428	7.08	0.393		
5.0	0.424	2.51	9.479	11.9	0.244	2.90	0.412	7.52	0.351		
19.2	0.080	3.03	0.466	17.0	0.079	2.96	0.401	8.07	0.343		
20.7	0.060					3.07	0.392	8.41	0.329		
21.8	0.048	CURVE 3 T = ~298		CURVE 4 T = ~80		3.22	0.384	8.93	0.314		
23.4	0.041					3.30	0.385	9.53	0.291*		
25.0	0.020					3.48	0.388	10.1	0.276		
28.1	0.011	1.43	0.047	1.62	0.016	3.77	0.399*	11.1	0.225		
30.0	0.000	1.53	0.328	1.69	0.219	3.85	0.408	12.0	0.183		
50.0	0.000	1.78	0.395	1.78	0.436	4.06	0.410	13.0	0.132		

*Not shown on plot

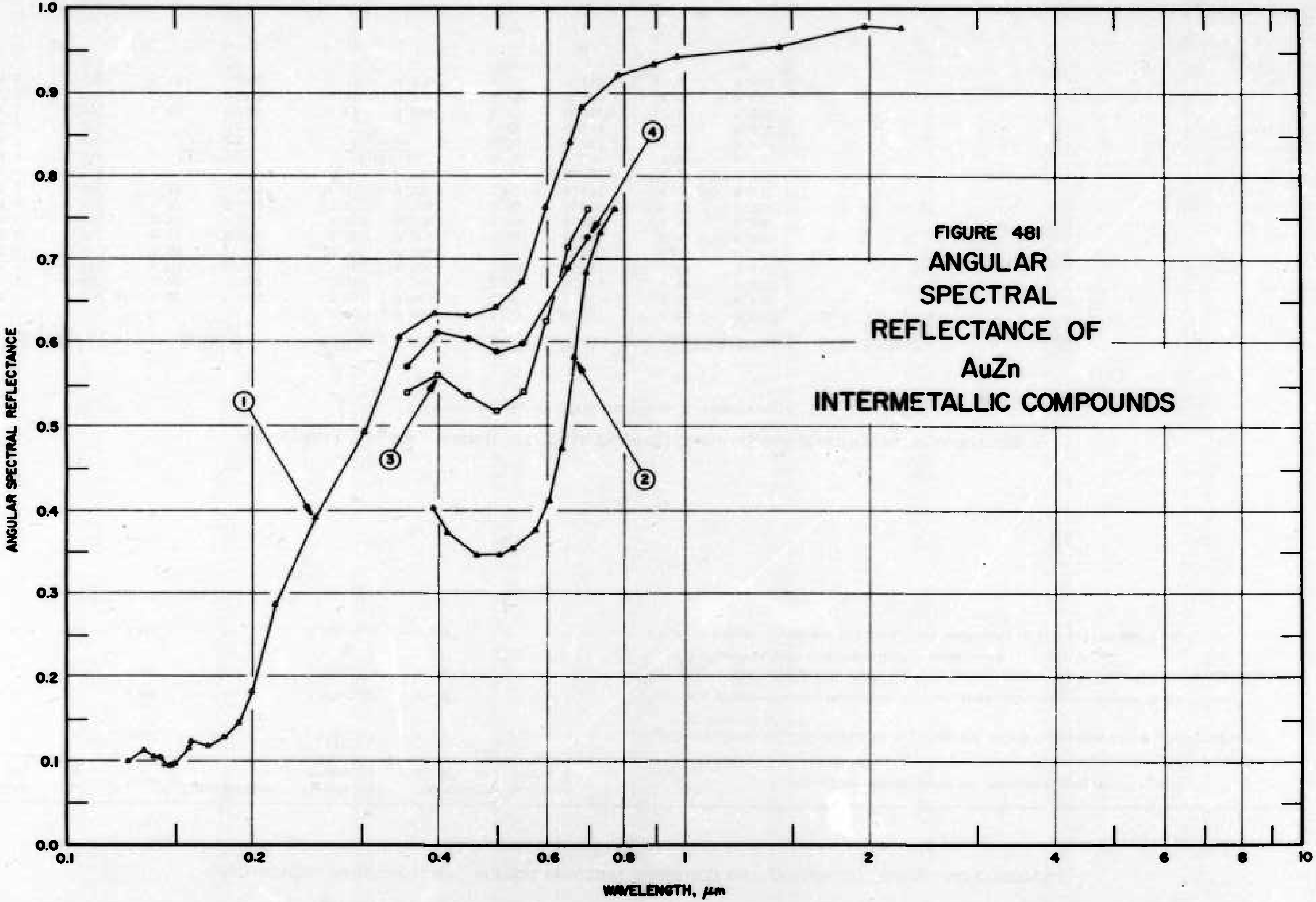


FIGURE 481 ANGULAR SPECTRAL REFLECTANCE OF AuZn INTERMETALLIC COMPOUNDS

SPECIFICATION TABLE NO. 481 ANGULAR SPECTRAL REFLECTANCE OF AuZn INTERMETALLIC COMPOUND

Curve No.	Ref. No.	Year	Temperature K	Wavelength Range, μm	Geometry θ	θ'	ω'	Reported Error, %	Composition (weight percent), Specifications and Remarks
1	331	1967	~298	0.126-2.25	7°	7°			Single crystal, β-phase; surface mechanically polished and cleaned with ethyl alcohol and distilled water.
2	8	1961	298	0.391-0.776	45°	45°			Film, β-phase; thickness 2000Å; vacuum evaporated on glass; data extracted from smooth curve; radiation reflected from AuZn and glass interface using total reflection method.
3	7	1957	301	0.358-0.700	18°		2π		Polished.
4	7	1957	534	0.358-0.700	18°		2π		Polished; measured in dry hydrogen.

DATA TABLE NO. 481 ANGULAR SPECTRAL REFLECTANCE OF AuZn INTERMETALLIC COMPOUND

[Wavelength, λ, μm; Reflectance, ρ; Temperature, T, K]

λ	ρ
CURVE 1	**T ~ 298**
0.126	0.100
0.134	0.113
0.139	0.106
0.142	0.104
0.145	0.097
0.147	0.095
0.150	0.098
0.157	0.115
0.160	0.122
0.170	0.119
0.180	0.128
0.190	0.144
0.200	0.183
0.219	0.286
0.253	0.393
0.301	0.497
0.347	0.608
0.399	0.636
0.449	0.635
0.498	0.642
0.549	0.674
0.596	0.765
0.642	0.843
0.689	0.885
0.785	0.925
CURVE 1 (cont.)	
0.892	0.939
0.976	0.947
1.44	0.957
1.97	0.980
2.25	0.979
CURVE 2	**T = 298**
0.391	0.405
0.418	0.373
0.462	0.349
0.505	0.349
0.530	0.354
0.576	0.377
0.606	0.413
0.636	0.478
0.663	0.586
0.699	0.688
0.734	0.735
0.776	0.761
CURVE 3	**T = 301**
0.358	0.542
0.400	0.563
0.450	0.539
0.500	0.520
0.550	0.543
0.600	0.627
0.650	0.715
0.700	0.761
CURVE 4	**T = 534**
0.358	0.573
0.400	0.613
0.450	0.605
0.500	0.590
0.550	0.600
0.600	0.627*
0.650	0.691
0.700	0.728

*Not shown on plot

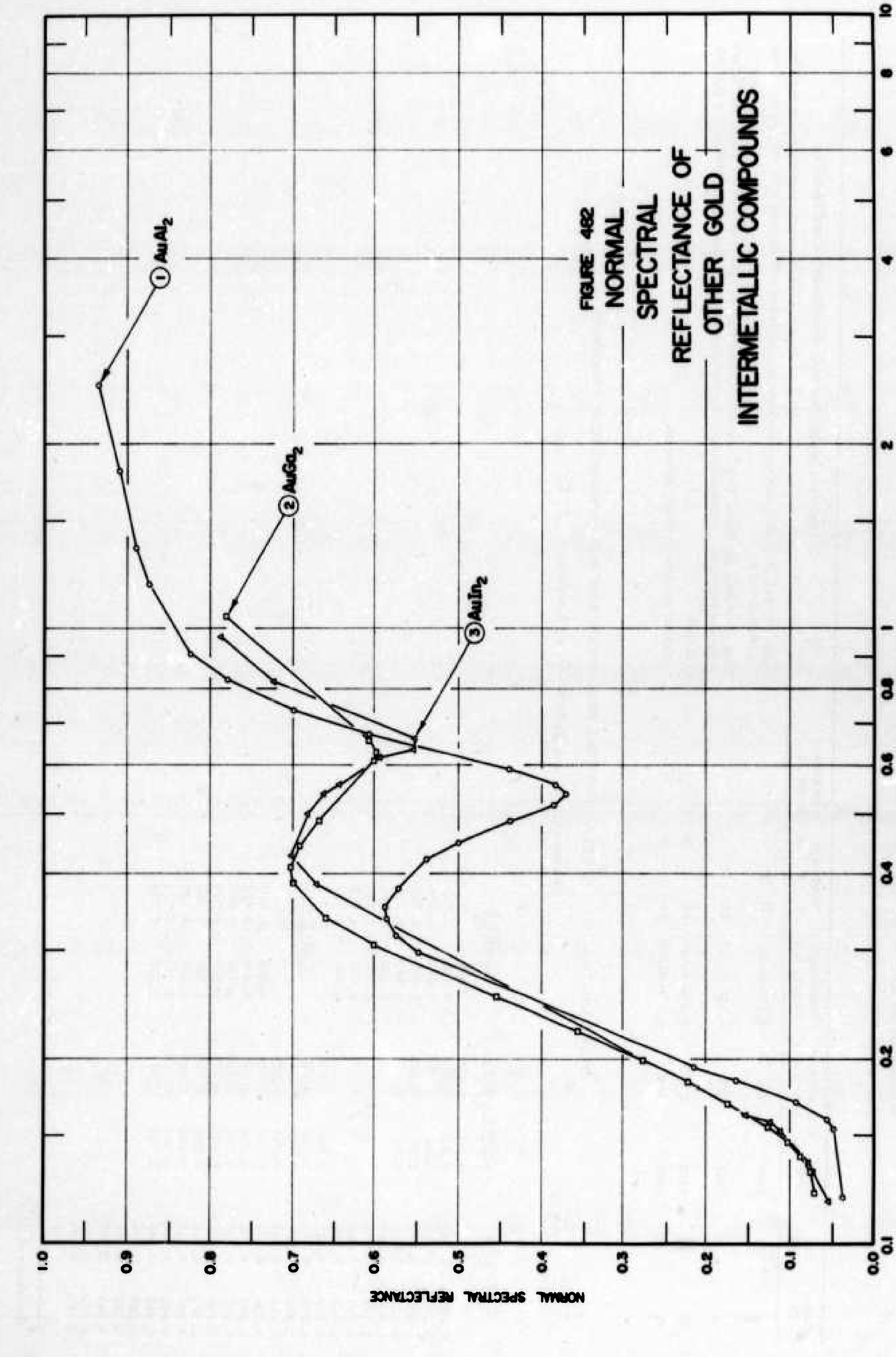


FIGURE 482 NORMAL SPECTRAL REFLECTANCE OF OTHER GOLD INTERMETALLIC COMPOUNDS

SPECIFICATION TABLE NO. 482 NORMAL SPECTRAL REFLECTANCE OF OTHER GOLD INTERMETALLIC COMPOUNDS

Curve No.	Ref. No.	Year	Temperature K	Wavelength Range, μm	Geometry θ	θ'	ω'	Reported Error, %	Composition (weight percent), Specifications and Remarks
1	332	1967	~298	0.119-2.48	7°	7°			$AuAl_2$; single crystal; surface lapped and mechanically polished down to 0.25 micron diamond paste on a sylvet polishing cloth and cleaned with ethyl alcohol and distilled water.
2	332	1967	~298	0.121-2.48	7°	7°			$AuGa_2$; single crystal; surface lapped and mechanically polished down to 0.25 micron diamond paste on a sylvet polishing cloth and cleaned with ethyl alcohol and distilled water.
3	332	1967	~298	0.117-2.48	7°	7°			$AuIn_2$; single crystal; surface lapped and mechanically polished down to 0.25 micron diamond paste on a sylvet polishing cloth and cleaned with ethyl alcohol and distilled water.

DATA TABLE NO. 482 NORMAL SPECTRAL REFLECTANCE OF OTHER GOLD INTERMETALLIC COMPOUNDS

[Wavelength, λ, μm; Reflectance, ρ; Temperature, T, K]

λ	ρ	λ	ρ	λ	ρ	λ	ρ
CURVE 1 T ~ 298		CURVE 1 (cont.)		CURVE 2 (cont.)		CURVE 3 (cont.)	
0.119	0.038	1.35	0.891	0.626	0.599	0.969	0.789
0.154	0.048	1.80	0.910	0.656	0.607	2.48	0.935*
0.159	0.055	2.48	0.935	1.04	0.781		
0.170	0.093	CURVE 2 T ~ 298		2.48	0.935*		
0.184	0.164	0.121	0.070				
0.194	0.214	0.131	0.075	CURVE 3 T ~ 298			
0.297	0.548	0.139	0.086				
0.316	0.573	0.146	0.102	0.117	0.054		
0.336	0.584	0.155	0.126	0.131	0.074		
0.352	0.586	0.169	0.174	0.136	0.078		
0.379	0.571	0.183	0.221	0.148	0.098		
0.422	0.537	0.199	0.276	0.153	0.111		
0.449	0.500	0.221	0.357	0.157	0.124		
0.488	0.433	0.251	0.452	0.163	0.151		
0.517	0.383	0.305	0.600	0.384	0.671		
0.537	0.370	0.338	0.660	0.428	0.702		
0.559	0.382	0.385	0.700	0.500	0.681		
0.590	0.439	0.408	0.704	0.537	0.662		
0.674	0.607	0.441	0.693	0.559	0.645		
0.734	0.700	0.488	0.669	0.614	0.594		
0.821	0.780	0.608	0.600	0.639	0.553		
0.905	0.823			0.663	0.551		
1.17	0.876			0.816	0.723		

* Not shown on plot

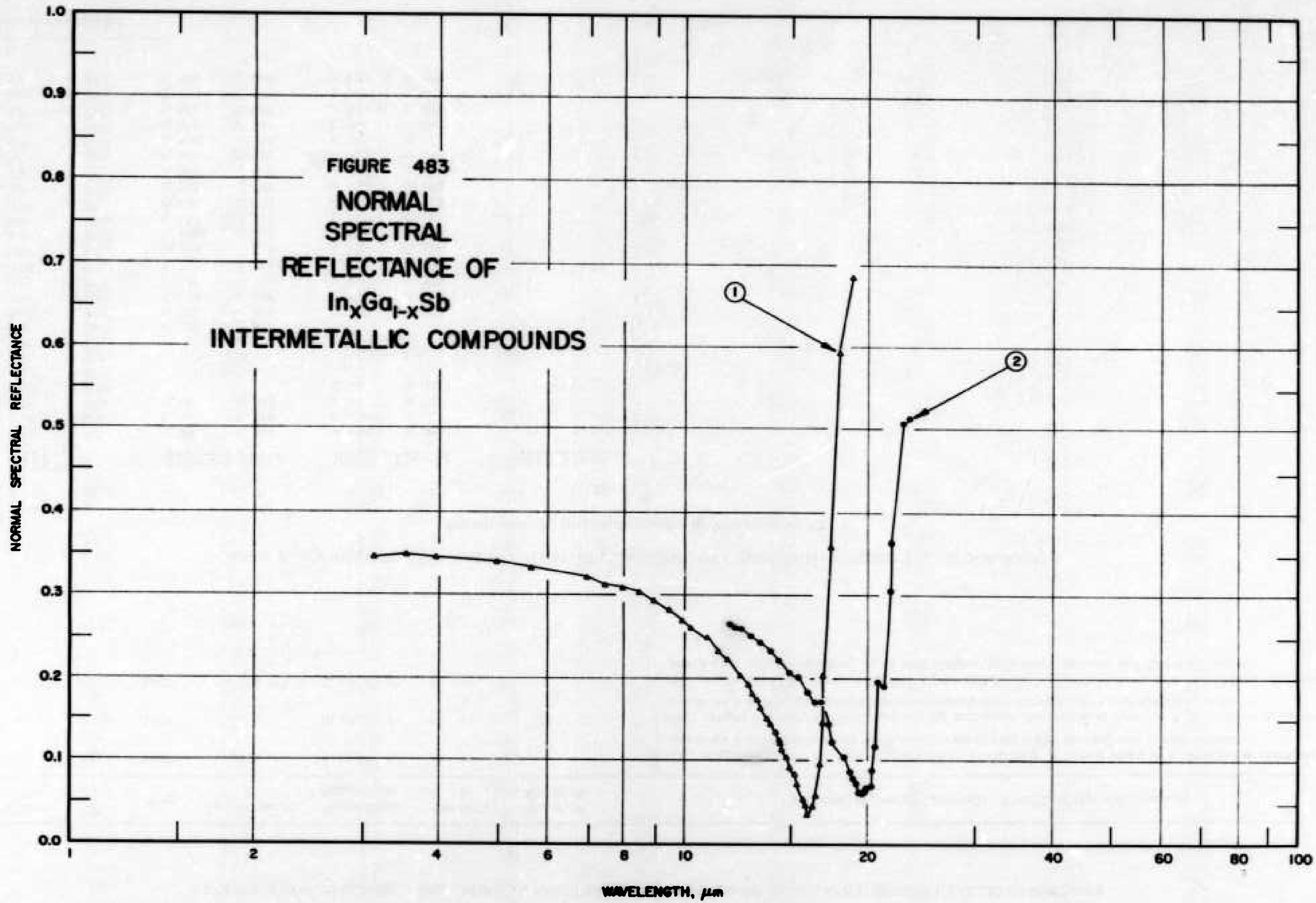


FIGURE 483
NORMAL
SPECTRAL
REFLECTANCE OF
$In_xGa_{1-x}Sb$
INTERMETALLIC COMPOUNDS

SPECIFICATION TABLE NO. 483 NORMAL SPECTRAL REFLECTANCE OF $In_xGa_{1-x}Sb$ INTERMETALLIC COMPOUNDS

Curve No.	Ref. No.	Year	Temperature K	Wavelength Range, μm	Geometry θ	θ'	ω'	Reported Error, %	Composition (weight percent), Specifications and Remarks
1	317	1969	~298	3.12-18.28	10°	10°			$In_{0.56}Ga_{0.44}Sb$; bulk slice cut from polycrystalline ingot; thickness 0.5 mm; mechanically polished down to 0.05 μ alumina powder, etched in solution of 1 part HNO_3 + 2 parts HCl, and washed in alcohol.
2	317	1969	~298	11.91-23.2	10°	10°			$In_{0.225}Ga_{0.775}Sb$; bulk slice cut from polycrystalline ingot; thickness 0.5 mm; mechanically polished down to 0.05 μ alumina powder, etched in solution of 1 part HNO_3 + 2 parts HCl, and washed in alcohol.

DATA TABLE NO. 483 NORMAL SPECTRAL REFLECTANCE OF $In_xGa_{1-x}Sb$ INTERMETALLIC COMPOUNDS

[Wavelength, λ, μm; Reflectance, ρ; Temperature, T, K]

λ	ρ	λ	ρ	λ	ρ	λ	ρ
CURVE 1	T ~ 298	CURVE 1 (cont.)		CURVE 2	T ~ 298	CURVE 2 (cont.)	
3.12	0.347	13.5	0.150	11.9	0.269	19.9	0.066
3.51	0.350	13.8	0.145	12.1	0.263	20.2	0.070
3.95	0.345	14.0	0.134	12.5	0.261	20.4	0.089
4.97	0.340	14.2	0.125	12.9	0.251	20.6	0.118
5.61	0.333	14.4	0.120	13.4	0.243	20.9	0.198
6.92	0.321	14.5	0.114	14.0	0.232	21.3	0.290
7.42	0.312	14.7	0.103	14.5	0.222	21.7	0.364
7.95	0.310	15.0	0.093	15.0	0.207	21.9	0.407
8.41	0.302	15.2	0.084	15.5	0.202	22.4	0.452
8.93	0.293	15.3	0.073	16.0	0.182	22.9	0.508
9.45	0.284	15.5	0.053	16.5	0.171	23.2	0.513
9.93	0.272	15.8	0.048	16.8	0.161		
10.4	0.262	16.0	0.038	17.4	0.143		
10.9	0.250	16.1	0.046	17.8	0.133		
11.4	0.232	16.3	0.060	17.9	0.123		
11.8	0.223	16.5	0.096	18.4	0.101		
12.0	0.214	16.7	0.145	18.7	0.089		
12.4	0.202	16.9	0.203	18.9	0.080		
12.7	0.192	17.3	0.360	19.1	0.074		
13.0	0.181	17.9	0.594	19.4	0.065		
13.1	0.175	18.3	0.687	19.5	0.061		
13.3	0.164			19.7	0.065		

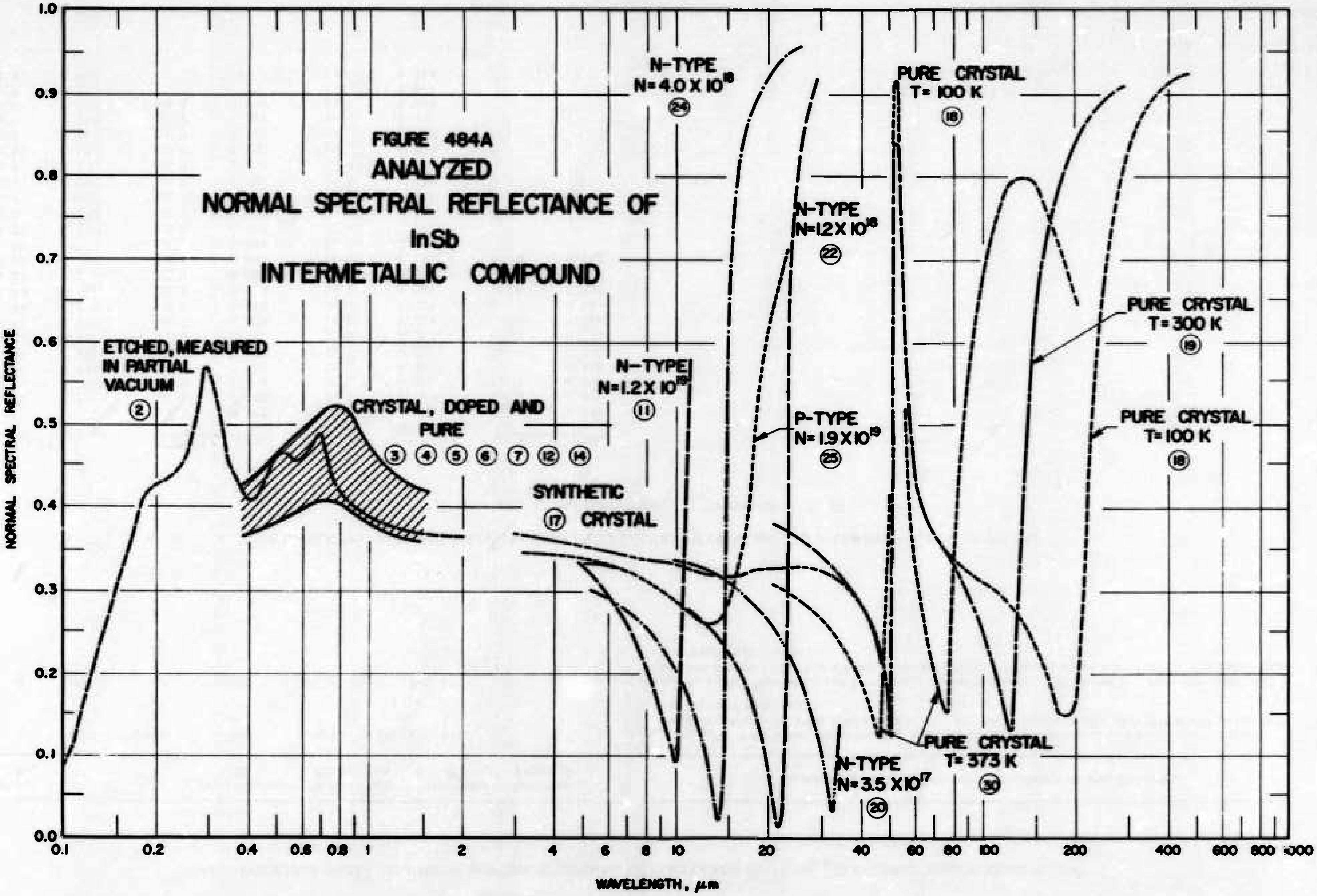


FIGURE 484A
ANALYZED
NORMAL SPECTRAL REFLECTANCE OF
InSb
INTERMETALLIC COMPOUND

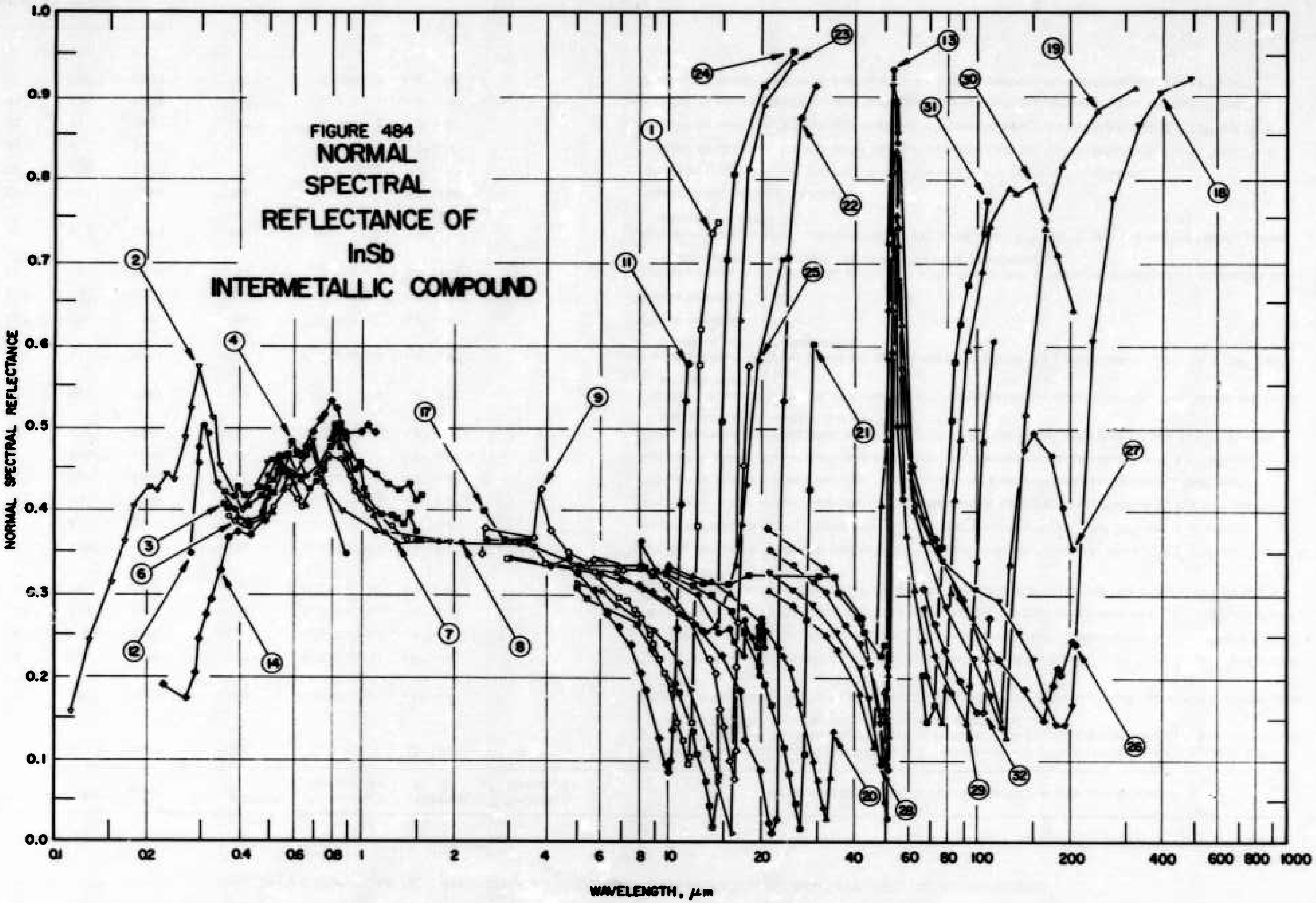


FIGURE 484
NORMAL
SPECTRAL
REFLECTANCE OF
InSb
INTERMETALLIC COMPOUND
NORMAL SPECTRAL REFLECTANCE
WAVELENGTH, μm
1.0
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0.0
0.1
0.2
0.4
0.6
0.8
1
2
4
6
8
10
20
40
60
80
100
200
400
600
800
1000
1
2
3
4
6
7
8
9
11
12
13
14
17
18
19
20
21
22
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SPECIFICATION TABLE NO. 484 NORMAL SPECTRAL REFLECTANCE OF InSb INTERMETALLIC COMPOUND

Curve No.	Ref. No.	Year	Temperature K	Wavelength Range, μm	Geometry θ	θ'	ω'	Reported Error, %	Composition (weight percent), Specifications and Remarks
1	318	1969	~298	2.96-14.5	10°	10°			Bulk slice cut from polycrystalline ingot; thickness 0.5 mm; carrier concentration > 10^{18} cm^{-3} front side mechanically polished down to 0.05 μm alumina powder, etched in solution of 1 part HNO_3 + 7 parts HCl, and washed in alcohol.
2	299	1963	~298	0.0487-1.91	~0°	~0°			Etched; minimal exposure to air; measured under poor vacuum; data extracted from smooth curve.
3	319	1964	~298	0.352-1.55	~0°	~0°			Single crystal; doped p-type; carrier concentration at 77 K, 3.7 x 10^{18} cm^{-3}; polished surface.
4	319	1964	~298	0.357-1.50	~0°	~0°			Similar to curve 3 specimen and conditons except carrier concentration 5.2 x 10^{18} cm^{-3} at 77 K.
5*	319	1964	~298	0.357-1.50	~0°	~0°			Similar to curve 3 specimen and conditions except carrier concentration 2.4 x 10^{17} cm^{-3} at 77 K.
6	319	1964	~298	0.361-1.50	~0°	~0°			Similar to curve 3 specimen and conditions except n-type with carrier concentration 4.5 x 10^{13} cm^{-3} at 77 K.
7	319	1964	~298	0.362-1.56	~0°	~0°			Similar to above specimen and conditions except carrier concentration 1.6 x 10^{17} cm^{-3} at 77 K.
8	320	1966	300	1.77-20.7	~0°	~0°			Single crystal; n-type, doped with Se; carrier concentration 7.5 x 10^{17} cm^{-3} at 300 K.
9	320	1966	300	2.48-18.2	~0°	~0°			Similar to curve 8 specimen and conditions except carrier concentration 2.6 x 10^{18} cm^{-3}.
10*	320	1966	300	2.59-13.5	~0°	~0°			Similar to curve 8 specimen and conditions except carrier concentration 6 x 10^{18} cm^{-3}.
11	320	1966	300	2.54-11.5	~0°	~0°			Similar to curve 8 specimen and conditions except carrier concentration 1.2 x 10^{19} cm^{-3}.
12	330	1966	~298	0.271-0.892	~0°	~0°			Pure; carrier concentration at ~298 K 0.8 x 10^{15} cm^{-3}; polished and etched in CP-4; data extracted from smooth curve.
13	418	1962	~ 4.2	48.3-57.4	10°	10°			Crystal; obtained from Ohio Semiconductors; polished to mirror finish, data extracted from smooth curve.
14	337	1964	298	0.224-1.10	~0°	~0°			Single crystal; n-type; provided by Giredmet; carrier concentration at ~298, 2 x 10^{16} cm^{-3}; polished with chromic oxide.
15*	336	1955	298	19.0-199	~0°	~0°			Single crystal.
16*	336	1955	373	19.0-192	~0°	~0°			Single crystal.
17	87	1968	313	2.5-50.0	30°	30°			Synthetic single crystal; thickness 1.0 mm; flat to ten fringes or better; data extracted from smooth curve; aluminum mirror reference standard.
18	417	1965	100	50.0-490	10°	10°			Single crystal, n-type; impurity concentration, 6 x 10^{15} cm^{-3}; ground and polished. (Same sample as curve 26.)
19	417	1965	300	50.0-483	10°	10°			Above specimen and conditions.
20	416	1957	297	10.0-34.3	~0°	~0°			Single crystal, n-type; carrier concentration 3.5 x 10^{17} cm^{-3}; polished.
21	416	1957	297	9.9-29.6	~0°	~0°			Similar to above specimen and conditions except carrier concentration 6.2 x 10^{17} cm^{-3}.
22	416	1957	297	5.0-30.0	~0°	~0°			Similar to above specimen and conditions except carrier concentration 1.2 x 10^{18} cm^{-3}.
23	416	1957	297	5.0-25.1	~0°	~0°			Similar to above specimen and conditions except carrier concentration 2.8 x 10^{18} cm^{-3}.
24	416	1957	297	5.0-25.2	~0°	~0°			Similar to above specimen and conditions except carrier concentration 4.0 x 10^{18} cm^{-3}.

*Not shown on plot

SPECIFICATION TABLE NO. 484 (continued)

Curve No.	Ref. No.	Year	Temperature K	Wavelength Range, μm	Geometry θ	θ'	ω'	Reported Error, %	Composition (weight percent), Specifications and Remarks
25	416	1957	297	3.09-23.3	~0°	~0°			Single crystal, p-type; Zn doped; carrier concentration 1.9×10^{19} cm^{-3}; polished.
26	414	1956	238	21.0-208	45°	45°			Single crystal, n-type; thickness 3mm; free electron carrier concentration at 83 K, 6×10^{15} cm^{-3}, at 300 K, 2×10^{16} cm^{-3}; ground and polished.
27	414	1956	298	21.2-202	45°	45°			Above specimen and conditions.
28	414	1956	338	21.1-48.7	45°	45°			Above specimen and conditions.
29	414	1956	338	66.9-113	45°	45°			Above specimen and conditions.
30	414	1956	373	21.1-202	45°	45°			Above specimen and conditions.
31	414	1956	403	66.9-109	45°	45°			Above specimen and conditions.
32	414	1956	316	67.1-110	45°	45°			Above specimen and conditions.
33*	414	1956	313	119-202	45°	45°			Above specimen and conditions.

*Not shown on plot

DATA TABLE NO. 484 NORMAL SPECTRAL REFLECTANCE OF InSb INTERMETALLIC COMPOUND

[Wavelength, λ, μm; Reflectance, ρ; Temperature, T, K]

CURVE 1
T ~ 298

λ	ρ
2.96	0.343
3.96	0.339
4.95	0.331
5.65	0.328
5.94	0.322
6.88	0.299
7.38	0.294
7.74	0.282
7.86	0.278
8.13	0.273
8.34	0.269*
8.51	0.260*
8.79	0.251
8.95	0.243
9.15	0.236*
9.39	0.222
9.55	0.218*
9.74	0.207
9.98	0.196*
10.2	0.187
10.4	0.173*
10.5	0.165*
10.7	0.147
10.9	0.133*
11.1	0.122
11.4	0.109*
11.6	0.094
11.8	0.103
12.0	0.147
12.3	0.383
12.6	0.493*
12.7	0.580
12.9	0.608*
13.0	0.622
13.4	0.695*
13.9	0.738
14.5	0.749

CURVE 2
T ~ 298

λ	ρ
0.0487	0.010*
0.0546	0.013*
0.0588	0.015*

CURVE 2 (cont.)

λ	ρ
0.0620	0.016*
0.0650	0.015*
0.0692	0.011*
0.0749	0.007*
0.0783	0.007*
0.0820	0.008*
0.0846	0.012*
0.0886	0.022*
0.0890	0.023*
0.102	0.089*
0.112	0.159
0.129	0.246
0.151	0.318
0.169	0.361
0.190	0.403
0.203	0.429
0.213	0.425
0.230	0.443
0.242	0.439
0.263	0.484
0.279	0.525
0.294	0.577
0.322	0.511
0.342	0.455
0.404	0.400
0.458	0.430
0.490	0.459
0.502	0.462
0.569	0.450
0.696	0.486
0.743	0.430
0.867	0.400
1.10	0.377
1.91	0.363

CURVE 3
T ~ 298

λ	ρ
0.352	0.409
0.363	0.401
0.383	0.401*
0.404	0.402*
0.424	0.403*
0.442	0.406
0.465	0.412*

CURVE 3 (cont.)

λ	ρ
0.469	0.418
0.484	0.416*
0.498	0.426
0.513	0.420
0.522	0.431*
0.543	0.439*
0.551	0.449
0.562	0.457*
0.563	0.465*
0.572	0.470
0.583	0.459*
0.596	0.453*
0.626	0.437
0.652	0.431*
0.665	0.424
0.684	0.427*
0.708	0.433
0.726	0.438*
0.742	0.450
0.784	0.479*
0.802	0.493
0.817	0.504
0.835	0.496*
0.858	0.477
0.909	0.468
0.950	0.450
0.968	0.456*
0.983	0.458
0.992	0.449*
1.05	0.448*
1.08	0.444*
1.11	0.444
1.16	0.437*
1.21	0.432
1.26	0.437*
1.31	0.424
1.36	0.424*
1.42	0.432
1.51	0.413
1.56	0.417

CURVE 4
T ~ 298

λ	ρ
0.357	0.421

CURVE 4 (cont.)

λ	ρ
0.388	0.418
0.393	0.427
0.419	0.418
0.448	0.423*
0.464	0.428
0.488	0.426*
0.509	0.436
0.529	0.434*
0.555	0.453
0.575	0.471*
0.585	0.483
0.605	0.481*
0.615	0.471
0.622	0.457*
0.649	0.448*
0.669	0.441
0.696	0.446*
0.712	0.449*
0.728	0.456
0.749	0.465*
0.767	0.471*
0.786	0.478
0.812	0.484*
0.810	0.490*
0.828	0.500
0.852	0.506
0.874	0.500*
0.894	0.487
0.937	0.462*
0.961	0.460*
0.980	0.453
0.998	0.441*
1.01	0.426
1.04	0.419
1.06	0.417*
1.09	0.410*
1.16	0.396
1.21	0.391*
1.26	0.394
1.31	0.390
1.36	0.385
1.41	0.397
1.51	0.375

CURVE 5*
T ~ 298

λ	ρ
0.357	0.408
0.377	0.407
0.401	0.408
0.401	0.414
0.424	0.410
0.462	0.414
0.478	0.426
0.496	0.436
0.517	0.445
0.545	0.456
0.552	0.466
0.567	0.474
0.579	0.488
0.592	0.477
0.605	0.468
0.651	0.448
0.667	0.442
0.685	0.442
0.705	0.444
0.729	0.452
0.745	0.459
0.761	0.471
0.789	0.486
0.812	0.509
0.818	0.515
0.825	0.526
0.852	0.518
0.874	0.505
0.902	0.466
0.921	0.477
0.934	0.476
0.948	0.467
0.959	0.458
0.986	0.450
1.01	0.446
1.03	0.448
1.05	0.441
1.08	0.444
1.10	0.435
1.20	0.420
1.25	0.403
1.30	0.414
1.36	0.406
1.41	0.404
1.51	0.414

CURVE 6
T ~ 298

λ	ρ
0.361	0.391
0.387	0.387
0.408	0.381
0.437	0.382*
0.463	0.381*
0.482	0.386*
0.482	0.393
0.503	0.392*
0.515	0.401
0.522	0.407*
0.538	0.411*
0.545	0.421*
0.563	0.429
0.578	0.421*
0.591	0.413*
0.617	0.411
0.624	0.403*
0.639	0.403
0.656	0.407*
0.676	0.411*
0.695	0.425*
0.717	0.434*
0.736	0.444
0.754	0.457*
0.775	0.462*
0.789	0.466*
0.803	0.469
0.823	0.466*
0.844	0.461
0.861	0.456*
0.880	0.444*
0.903	0.441
0.924	0.434*
0.943	0.421
0.964	0.424*
0.982	0.417
1.00	0.412
1.05	0.400
1.10	0.400
1.15	0.387*
1.21	0.383*
1.25	0.381
1.30	0.379*
1.35	0.377*
1.40	0.366
1.50	0.371

CURVE 7
T ~ 298

λ	ρ
0.362	0.392*
0.396	0.391
0.424	0.389
0.451	0.391*
0.482	0.395*
0.503	0.399
0.523	0.401*
0.542	0.424
0.551	0.433*
0.569	0.442
0.574	0.450*
0.584	0.439*
0.600	0.432
0.615	0.421*
0.633	0.410*
0.643	0.405
0.674	0.415*
0.689	0.425*
0.712	0.444
0.731	0.456*
0.748	0.463*
0.765	0.463
0.768	0.476*
0.783	0.486
0.802	0.494*
0.825	0.500*
0.845	0.492
0.863	0.481*
0.889	0.462
0.907	0.453*
0.926	0.441*
0.950	0.434
0.963	0.427*
0.985	0.422*
1.00	0.414*
1.06	0.401*
1.10	0.394
1.15	0.392*
1.20	0.375
1.25	0.370*
1.30	0.361
1.35	0.365*
1.40	0.365
1.50	0.363*
1.56	0.363

CURVE 8
T = 300

λ	ρ
1.77	0.362
2.11	0.362
3.24	0.361
3.66	0.358
5.11	0.338
8.11	0.337
8.12	0.366
9.04	0.330
9.87	0.327*
12.5	0.300
14.6	0.254
15.8	0.260
16.1	0.243
17.4	0.227
17.7	0.270
18.3	0.262*
18.8	0.250
19.0	0.246*
19.2	0.237
19.5	0.261
19.6	0.201
19.8	0.269*
19.8	0.240*
20.0	0.273
20.3	0.237
20.8	0.258

CURVE 9
T = 300

λ	ρ
2.48	0.350
2.51	0.380
3.67	0.368
3.81	0.428
4.18	0.379
4.74	0.351
5.44	0.339
5.74	0.343
7.03	0.330
8.08	0.333
8.99	0.329
9.83	0.311
11.9	0.270
13.6	0.222
14.1	0.207

* Not shown on plot

DATA TABLE NO. 484 (continued)

CURVE 9 (cont.)
T = 300

λ	ρ
14.3	0.200*
14.9	0.168*
14.9	0.161
15.2	0.140
15.5	0.129*
15.9	0.100
16.1	0.084*
16.3	0.077
16.5	0.085*
16.6	0.111
16.8	0.154*
17.0	0.214
17.1	0.269
17.4	0.392*
17.7	0.456
18.0	0.522*
18.2	0.579

CURVE 10*
T = 300

λ	ρ
2.59	0.369
4.16	0.346
5.69	0.330
6.94	0.307
8.03	0.280
9.02	0.239
9.79	0.220
10.5	0.176
10.5	0.089
11.2	0.127
11.5	0.107
11.9	0.079
12.1	0.067
12.3	0.056
12.5	0.047
12.6	0.056
12.7	0.108
12.8	0.167
12.9	0.230
13.0	0.302
13.0	0.333
13.1	0.390
13.2	0.445
13.4	0.514
13.5	0.568

CURVE 11
T = 300

λ	ρ
2.54	0.365
3.45	0.365
4.15	0.334
4.74	0.345
5.00	0.328
5.67	0.306
6.38	0.279
6.98	0.261
7.49	0.240
8.08	0.206
8.55	0.185
8.99	0.159*
9.34	0.127
9.81	0.095
10.0	0.085
10.2	0.100
10.4	0.136
10.5	0.193
10.7	0.260
10.9	0.321*
11.1	0.409
11.2	0.481*
11.4	0.532
11.5	0.580

CURVE 12
T ~ 298

λ	ρ
0.271	0.350
0.293	0.457
0.299	0.476
0.306	0.501
0.315	0.493
0.333	0.455*
0.349	0.432
0.365	0.417*
0.382	0.400
0.394	0.386*
0.413	0.382*
0.423	0.381
0.451	0.386*
0.470	0.397
0.525	0.469
0.566	0.446*
0.599	0.443
0.620	0.446*

CURVE 12 (cont.)

λ	ρ
0.649	0.467*
0.670	0.477
0.892	0.350

CURVE 13
T ~ 4.2

λ	ρ
48.3	0.149
49.3	0.101
50.0	0.049
50.5	0.028
51.0	0.214
51.3	0.615*
51.5	0.725
52.0	0.801*
52.6	0.915*
52.9	0.938
53.5	0.915*
54.1	0.858
54.3	0.741
54.6	0.572*
54.9	0.501
55.6	0.460*
56.2	0.429*
57.4	0.415

CURVE 14
T = 298

λ	ρ
0.224	0.191
0.268	0.175
0.288	0.204
0.299	0.248
0.310	0.274
0.320	0.293
0.346	0.329
0.366	0.367
0.399	0.374
0.437	0.370
0.480	0.389
0.498	0.413
0.519	0.429*
0.539	0.450
0.559	0.468
0.575	0.452*
0.595	0.442*
0.638	0.467
0.658	0.477

CURVE 14 (cont.)

λ	ρ
0.681	0.487*
0.698	0.497
0.734	0.510
0.755	0.517
0.775	0.524*
0.795	0.533
0.825	0.524
0.848	0.508*
0.865	0.500*
0.896	0.494
0.949	0.496*
1.00	0.499
1.04	0.502
1.10	0.496

CURVE 15*
T = 298

λ	ρ
19	0.380
25	0.355
29	0.329
35	0.301
39	0.277
44	0.207
49	0.103
50	0.276
51	0.511
52	0.809
53	0.856
54	0.757
57	0.610
59	0.449
70	0.341
81	0.277
99	0.221
112	0.178
120	0.519
124	0.232
130	0.358
135	0.496
140	0.570
150	0.610
159	0.616
170	0.604
182	0.566
191	0.510
199	0.459

CURVE 16*
T = 373

λ	ρ
19	0.317
25	0.287
30	0.273
35	0.228
42	0.160
45	0.101
48	0.310
49	0.510
50	0.724
53	0.750
56	0.534
59	0.376
64	0.286
70	0.205
76	0.159
81	0.275
89	0.518
100	0.663
109	0.747
120	0.797
132	0.803
141	0.804
151	0.803
162	0.782
181	0.722
192	0.686

CURVE 17
T = 313

λ	ρ
2.5	0.400
2.9	0.365
8.4	0.332
8.9	0.326
10.0	0.332
12.0	0.326*
13.0	0.313
15.7	0.313
18.1	0.325
29.4	0.329*
30.5	0.321
34.9	0.321
35.7	0.303
41.1	0.273
42.6	0.256
47.1	0.234*
48.2	0.227
50.0	0.240

CURVE 18
T = 100

λ	ρ
50.0	0.161
51.0	0.123
51.3	0.189
51.7	0.585
52.1	0.804
52.7	0.894*
53.4	0.919
54.1	0.899
54.6	0.843
55.6	0.680
57.0	0.570*
58.8	0.501
61.6	0.448
67.1	0.390
76.4	0.342
91.1	0.320*
99.5	0.307
119	0.291
138	0.256
154	0.221
169	0.175
182	0.145
192	0.145
201	0.166
237	0.609
273	0.778
331	0.866
396	0.906
490	0.927

CURVE 19
T = 300

λ	ρ
50.0	0.186
50.9	0.155
51.3	0.128
51.9	0.205
52.5	0.647
53.4	0.811
54.1	0.834
55.4	0.786*
56.5	0.628
57.9	0.525*
60.3	0.459
63.6	0.409
71.3	0.363
90.9	0.295
106	0.222

CURVE 19 (cont.)

λ	ρ
124	0.128
128	0.130*
143	0.519
167	0.742
190	0.818
248	0.883
326	0.911
483	0.926*

CURVE 20
T = 297

λ	ρ
10.0	0.335
12.0	0.324
13.8	0.319
15.9	0.301
17.9	0.286
20.0	0.269
20.8	0.253*
22.0	0.249*
23.6	0.229
23.9	0.221*
25.0	0.212
26.0	0.189
26.9	0.170
27.8	0.160*
28.9	0.129*
29.9	0.100
30.5	0.091*
30.9	0.075
31.4	0.054*
31.9	0.041
32.5	0.028
33.8	0.079
34.3	0.136

CURVE 21
T = 297

λ	ρ
9.9	0.324
12.0	0.311
13.9	0.300
16.0	0.280
17.9	0.254
19.0	0.236*
19.9	0.215
20.9	0.193
21.9	0.168
22.9	0.140*
23.8	0.116

CURVE 21 (cont.)

λ	ρ
24.9	0.082
26.0	0.048
26.4	0.028*
26.8	0.015
27.4	0.108
28.0	0.270
28.5	0.426
29.6	0.601

CURVE 22
T = 297

λ	ρ
5.0	0.328*
6.0	0.324
7.0	0.319
8.0	0.312
8.9	0.303
9.9	0.295
11.0	0.284*
11.9	0.273*
13.0	0.258
14.0	0.243*
15.0	0.229
15.9	0.209*
17.1	0.185
18.1	0.155*
18.9	0.123
19.5	0.105*
20.0	0.088
20.5	0.068*
20.9	0.044*
21.4	0.021
21.9	0.010
22.4	0.029
22.9	0.238
23.5	0.533
24.1	0.707
25.1	0.803*
27.0	0.872
30.0	0.916

CURVE 23
T = 297

λ	ρ
5.0	0.314
6.1	0.305
6.8	0.289
8.0	0.275*
9.0	0.257
9.9	0.241
10.9	0.219

* Not shown on plot

DATA TABLE NO. 484 (continued)

CURVE 23 (cont.)
T = 297

λ	ρ
11.9	0.189
12.5	0.173*
13.0	0.146*
13.4	0.118
14.0	0.101
14.3	0.071
15.1	0.045*
15.5	0.018
16.0	0.010
16.5	0.187
17.2	0.631
18.1	0.813
20.1	0.890
25.1	0.946

CURVE 24
T = 297

λ	ρ
5.0	0.309
5.4	0.296
6.0	0.298*
6.9	0.279*
7.9	0.264
8.8	0.237
9.9	0.214
10.9	0.182
12.0	0.133
12.3	0.107
13.1	0.071
13.4	0.043
13.9	0.018
14.5	0.080
15.0	0.508
15.6	0.705
16.1	0.806
17.2	0.861*
20.2	0.914
25.2	0.959

CURVE 25
T = 297

λ	ρ
3.09	0.345
5.06	0.338*
6.66	0.328
8.36	0.309

CURVE 25 (cont.)

λ	ρ
9.61	0.292*
10.9	0.277
12.1	0.266
13.3	0.257
14.2	0.261
15.0	0.277*
15.9	0.310*
16.6	0.338
17.4	0.384
18.1	0.431
18.7	0.480*
19.9	0.584
23.3	0.706

CURVE 26
T = 238

λ	ρ
21.0	0.380
32.2	0.332
42.1	0.273
51.7	0.089
54.4	0.895
61.1	0.455
73.0	0.368
89.1	0.298
119	0.223
141	0.189
152	0.157*
164	0.150
177	0.192
183	0.212
190	0.206
196	0.232*
202	0.246
208	0.241

CURVE 27
T = 298

λ	ρ
21.2	0.355
25.4	0.338
29.6	0.317
32.3	0.304
35.2	0.292*
37.9	0.264
42.0	0.243
45.2	0.217

CURVE 27 (cont.)

λ	ρ
46.4	0.196*
48.8	0.154
50.5	0.093
52.2	0.593
54.3	0.844
56.5	0.574
58.6	0.477*
63.1	0.400
66.8	0.363
69.6	0.341*
73.0	0.318*
79.1	0.286
89.2	0.246*
98.0	0.224*
105	0.201*
110	0.180
120	0.140
130	0.339
135	0.426*
141	0.475*
153	0.496
165	0.495*
177	0.469
190	0.404
202	0.356

CURVE 28
T = 338

λ	ρ
21.1	0.327
25.3	0.309
29.6	0.289
32.5	0.275*
35.1	0.256
38.0	0.237*
42.0	0.212
45.3	0.176
46.4	0.152*
48.7	0.093

CURVE 29
T = 338

λ	ρ
66.9	0.284
69.9	0.253*
73.3	0.226
82.4	0.183

CURVE 29 (cont.)

λ	ρ
89.3	0.150*
91.8	0.144
95.1	0.191
97.8	0.272
100	0.343
104	0.484
109	0.591*
113	0.609

CURVE 30
T = 373

λ	ρ
21.1	0.306
25.3	0.289
29.8	0.256*
32.4	0.251
35.1	0.234
37.8	0.209*
42.1	0.181
45.1	0.136*
46.3	0.115
46.9	0.096
48.9	0.296
49.8	0.409
50.5	0.489
51.3	0.577*
51.9	0.644
52.5	0.707
54.2	0.756
55.3	0.722
56.4	0.526*
59.8	0.370
63.2	0.306
66.8	0.249
69.7	0.202
72.9	0.175*
76.5	0.144
78.9	0.187
82.4	0.302
85.7	0.413
88.6	0.489
91.7	0.545*
94.8	0.596
104	0.690
107	0.727*
110	0.744
120	0.784*

CURVE 30 (cont.)

λ	ρ
129	0.790
135	0.781
141	0.787*
149	0.792*
151	0.793
158	0.776*
164	0.751
171	0.734*
177	0.721*
183	0.710
190	0.685*
196	0.660*
202	0.648

CURVE 31
T = 403

λ	ρ
66.9	0.203
69.6	0.147
72.8	0.167
76.5	0.357
79.1	0.446*
82.3	0.510
85.2	0.582
88.6	0.629
91.4	0.646*
94.5	0.675
104	0.739
110	0.774

CURVE 32
T = 316

λ	ρ
67.1	0.309
73.0	0.266
79.3	0.235
89.3	0.199
101	0.160
105	0.169
110	0.271

CURVE 33*
T = 313

λ	ρ
119	0.392
130	0.554
135	0.600

CURVE 33 (cont.)*

λ	ρ
141	0.648
151	0.684
158	0.671
164	0.649
171	0.639
177	0.611
190	0.558
202	0.493

* Not shown on plot

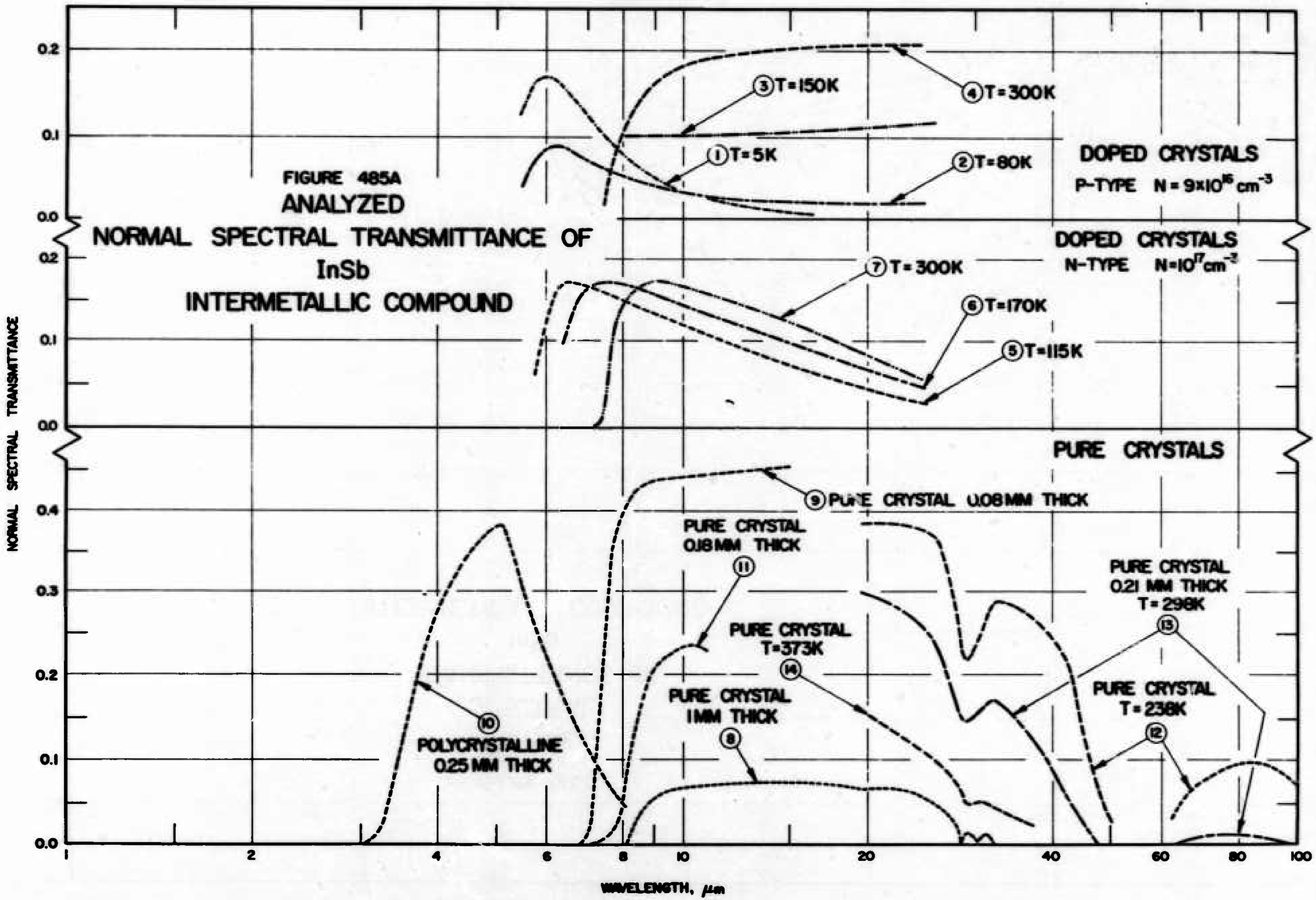


FIGURE 485A
ANALYZED
NORMAL SPECTRAL TRANSMITTANCE OF
InSb
INTERMETALLIC COMPOUND
DOPED CRYSTALS
P-TYPE N = 9×10^16 cm^-3
DOPED CRYSTALS
N-TYPE N=10^17 cm^-3
PURE CRYSTALS
1 T=5K
2 T=80K
3 T=150K
4 T=300K
5 T=115K
6 T=170K
7 T=300K
8 PURE CRYSTAL 1MM THICK
9 PURE CRYSTAL 0.08MM THICK
10 POLYCRYSTALLINE 0.25 MM THICK
11 PURE CRYSTAL 0.18MM THICK
12 PURE CRYSTAL T=238K
13 PURE CRYSTAL 0.21 MM THICK T=298K
14 PURE CRYSTAL T=373K
NORMAL SPECTRAL TRANSMITTANCE
WAVELENGTH, μm
0.0
0.1
0.2
0.3
0.4
1
2
4
6
8
10
20
40
60
80
100

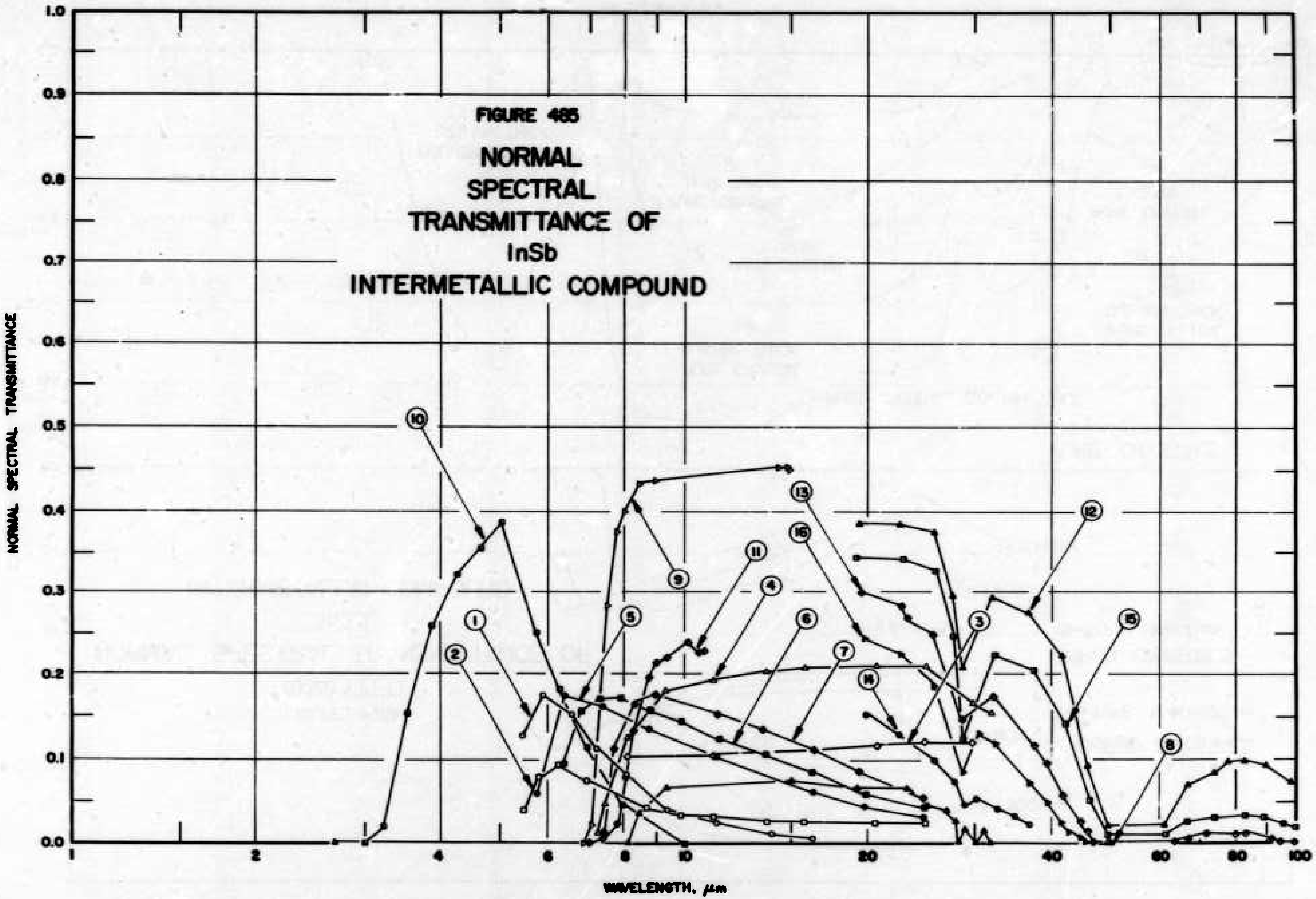


FIGURE 485
NORMAL
SPECTRAL
TRANSMITTANCE OF
InSb
INTERMETALLIC COMPOUND

SPECIFICATION TABLE NO. 485 NORMAL SPECTRAL TRANSMITTANCE OF InSb INTERMETALLIC COMPOUND

Curve No.	Ref. No.	Year	Temperature K	Wavelength Range, μm	Geometry θ	θ'	ω'	Reported Error, %	Composition (weight percent), Specifications and Remarks
1	18	1955	~ 5	5.44-16.1	~0°	~0°			p-type crystallite; hole concentration 9×10^{16} cm^{-3}.
2	18	1955	80	5.48-24.9	~0°	~0°			Above specimen and conditions.
3	18	1955	150	8.07-29.6	~0°	~0°			Above specimen and conditions.
4	18	1955	300	7.21-31.9	~0°	~0°			Above specimen and conditions.
5	18	1955	115	5.75-24.6	~0°	~0°			n-type; large crystallite; carrier concentration 10^{17} cm^{-3}.
6	18	1955	170	6.37-24.7	~0°	~0°			Above specimen and conditions.
7	18	1955	300	7.40-24.5	~0°	~0°			Above specimen and conditions.
8	87	1968	313	2.7-50.0	~0°	~0°			Synthetic single crystal; thickness 1.0 mm; flat to ten fringes or better; data extracted from smooth curve.
9	310	1961	~298	6.83-14.8	0°	0°			High purity; cut from commercial material from Ohio Semiconductors (InSb-8-n); thickness 0.08 mm; data extracted from smooth curve.
10	415	1953	~298	3.00-10.0	0°	0°			Polycrystalline; prepared from commercial grade 99.8 Sb and 99.95 Zn; stoichiometric to within 12%; thickness 0.254 mm; resistivity ~10^{-4} ohm cm.
11	415	1953	~298	7.00-11.5	0°	0°			Crystalline, zone refined; thickness 0.18 mm; resistivity 7×10^{-3} ohm cm.
12	414	1956	238	19.4-119	0°	0°			Single crystal, n-type; thickness 0.21 mm; free electron carrier concentration at 83 K, 6×10^{15} cm^{-3}, at 300 K, 2×10^{16} cm^{-3}; ground and polished.
13	414	1956	298	19.5-99.9	0°	0°			Above specimen and conditions.
14	414	1956	373	19.7-36.9	0°	0°			Above specimen and conditions.
15	414	1956	238	19.3-100	0°	0°			Similar to curve 12 specimen and conditions except thickness 0.35 mm.
16	414	1956	298	19.7-45.6	0°	0°			Above specimen and conditions.

DATA TABLE NO. 485 NORMAL SPECTRAL TRANSMITTANCE OF InSb INTERMETALLIC COMPOUND

[Wavelength, λ, μ; Transmittance, τ; Temperature, T, K]

λ	τ
CURVE 1	**T ~ 5**
5.44	0.128
5.89	0.175
6.51	0.152
7.19	0.113
8.05	0.083
9.33	0.041
11.3	0.025
13.9	0.011
16.2	0.006
CURVE 2	**T = 80**
5.48	0.041
5.78	0.079
6.23	0.095
6.98	0.076
8.67	0.044
9.83	0.035
11.3	0.032
13.6	0.027
15.7	0.025
20.6	0.025
24.9	0.025
CURVE 3	**T = 150**
8.07	0.103
11.2	0.105
15.5	0.109
20.8	0.118
24.7	0.121
29.6	0.121
CURVE 4	**T = 300**
7.21	0.014
7.40	0.048
8.09	0.127
9.23	0.180
11.2	0.192
13.6	0.204
CURVE 4 (cont.)	
15.7	0.209
20.6	0.210
25.0	0.210
29.5	0.167
31.9	0.154
CURVE 5	**T = 115**
5.75	0.060
6.38	0.174
7.33	0.162
8.75	0.135
11.5	0.103
16.2	0.061
19.8	0.045
24.6	0.031
CURVE 6	**T = 170**
6.37	0.096
6.76	0.156
7.29	0.171
7.89	0.171
8.76	0.158
9.81	0.144
11.5	0.123
13.6	0.107
16.2	0.087
20.0	0.060
24.7	0.044
CURVE 7	**T = 300**
7.40	0.013
7.69	0.112
8.26	0.165
8.97	0.177
11.4	0.154
13.5	0.135
16.3	0.111
20.0	0.087
24.5	0.057
CURVE 8	**T = 313**
2.7	0.000
8.1	0.000
8.4	0.036
9.3	0.067
15.0	0.077
19.3	0.068
23.0	0.068
25.0	0.045
26.8	0.040
27.6	0.027
28.0	0.003
28.8	0.019
30.0	0.000
31.0	0.017
31.7	0.000
50.0	0.000
CURVE 9	**T ~ 298**
6.83	0.000
7.03	0.023
7.47	0.285
7.76	0.377
8.00	0.400
8.40	0.435
8.95	0.437
14.2	0.455
14.7	0.455
14.9	0.451
CURVE 10	**T ~ 298**
3.00	0.00
3.23	0.20
3.53	1.53
3.89	2.60
4.26	3.24
4.63	3.55
5.02	3.39
5.72	2.51
6.25	1.83
6.96	1.15
CURVE 10 (cont.)	
7.98	0.49
10.0	0.00
CURVE 11	**T ~ 298**
7.00	0.000
7.35	0.004
7.66	0.012*
7.80	0.025*
8.01	0.081
8.28	0.135
8.77	0.199
9.06	0.215
9.34	0.222
9.53	0.224*
10.1	0.237*
10.4	0.240
10.6	0.238*
11.0	0.231*
11.2	0.229
11.5	0.230
CURVE 12	**T = 238**
19.4	0.388
22.6	0.387
25.6	0.377*
27.5	0.297
28.7	0.210
32.0	0.295
36.9	0.277
41.9	0.224
45.9	0.095
49.3	0.021
61.0	0.022
66.4	0.072
73.1	0.086
77.6	0.101
82.5	0.103
89.1	0.096
98.2	0.077
111	0.049*
119	0.032*
CURVE 13	**T = 298**
19.5	0.300
22.6	0.284
23.1	0.270
25.5	0.250
28.5	0.149
32.0	0.175
37.2	0.119
39.1	0.097
41.8	0.060
42.9	0.037
44.6	0.029
45.7	0.014
46.9	0.001
63.3	0.002
66.6	0.008
71.1	0.013
79.5	0.011
82.7	0.013
85.5	0.012
88.6	0.010
91.6	0.007
94.3	0.004
99.9	0.002
CURVE 14	**T = 373**
19.7	0.151
22.5	0.130
25.6	0.100
27.6	0.075
28.6	0.049
30.4	0.053
32.5	0.041
34.6	0.034
36.9	0.023
CURVE 15	**T = 238**
19.3	0.345
22.7	0.342
25.8	0.328
27.5	0.249
CURVE 15 (cont.)	
28.6	0.123
32.2	0.225
37.1	0.204
42.0	0.143
46.0	0.052
49.1	0.013
61.3	0.011
66.7	0.028
73.1	0.032
82.7	0.035
88.8	0.031
95.1	0.025
100.	0.020
CURVE 16	**T = 298**
19.7	0.246
22.6	0.228
25.6	0.189
28.4	0.088
30.3	0.131
32.2	0.120
36.9	0.076
39.2	0.050
41.4	0.028
42.8	0.016
44.4	0.009
45.6	0.002

* Not shown on plot

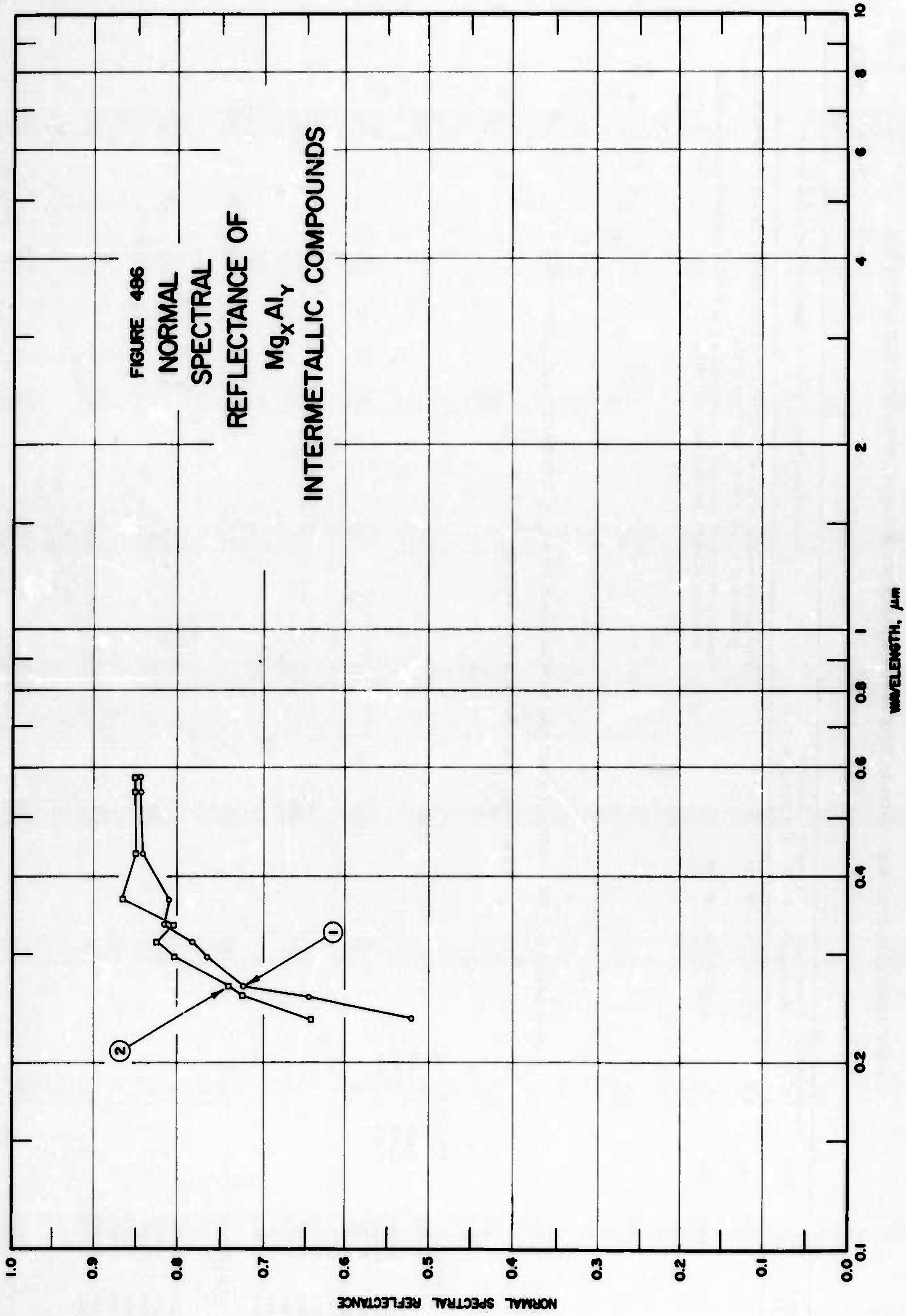


FIGURE 486 NORMAL SPECTRAL REFLECTANCE OF Mg_XAl_Y INTERMETALLIC COMPOUNDS

SPECIFICATION TABLE NO. 486 NORMAL SPECTRAL REFLECTANCE OF Mg_xAl_y INTERMETALLIC COMPOUNDS

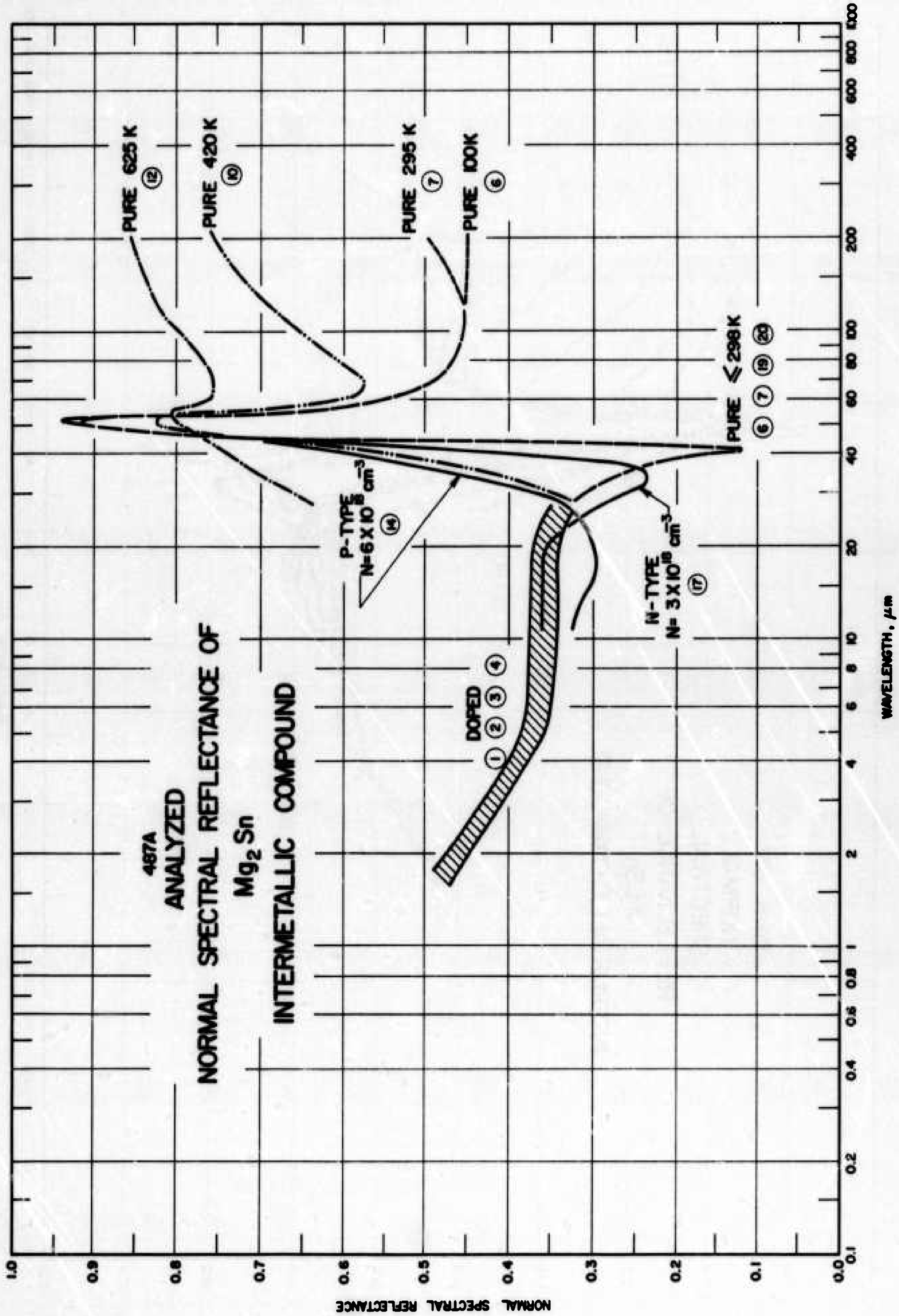
Curve No.	Ref. No.	Year	Temperature, K	Wavelength Range, μm	Geometry θ θ' ω	Reported Error, %	Composition (weight percent), Specifications and Remarks
1	11	1934	298	0.235-0.578	~0° ~0°		Mg_2Al_3; cold worked; annealed in inert gas for 6 to 24 hrs; polished; stored in dilute solutions of NaOH, NaOH + NaF, and HNO_3.
2	11	1934	298	0.235-0.578	~0° ~0°		Mg_3Al_2; cold worked; annealed in inert gas for 6 to 24 hrs; polished; stored in dilute solutions of NaOH, NaOH + NaF, and HNO_3.

DATA TABLE NO. 486 NORMAL SPECTRAL REFLECTANCE OF Mg_xAl_y INTERMETALLIC COMPOUNDS

[Wavelength, λ, μm; Reflectance, ρ; Temperature, T, K]

λ	ρ
CURVE 1	
T = 298	
0.235	0.520
0.254	0.646
0.265	0.724
0.297	0.767
0.312	0.781
0.334	0.818
0.366	0.810
0.435	0.843
0.546	0.844
0.578	0.845
CURVE 2	
T = 298	
0.235	0.642
0.254	0.723
0.265	0.740
0.297	0.804
0.312	0.826
0.334	0.805
0.366	0.866

λ	ρ
CURVE 2 (cont.)	
0.435	0.850
0.546	0.851
0.578	0.851


487A
ANALYZED
NORMAL SPECTRAL REFLECTANCE OF
Mg_2Sn
INTERMETALLIC COMPOUND
PURE 625 K (12)
PURE 420 K (10)
PURE 295 K (7)
PURE 100K (6)
PURE ≤298 K (6) (7) (19) (20)
P-TYPE N=6 X 10^18 cm^-3 (14)
N-TYPE N= 3 X 10^18 cm^-3 (17)
DOPED (1) (2) (3) (4)
NORMAL SPECTRAL REFLECTANCE
WAVELENGTH, μm
0.0 0.1 0.2 0.3 0.4 0.5 0.6 0.7 0.8 0.9 1.0
0.1 0.2 0.4 0.6 0.8 1 2 4 6 8 10 20 40 60 80 100 200 400 600 800 1000

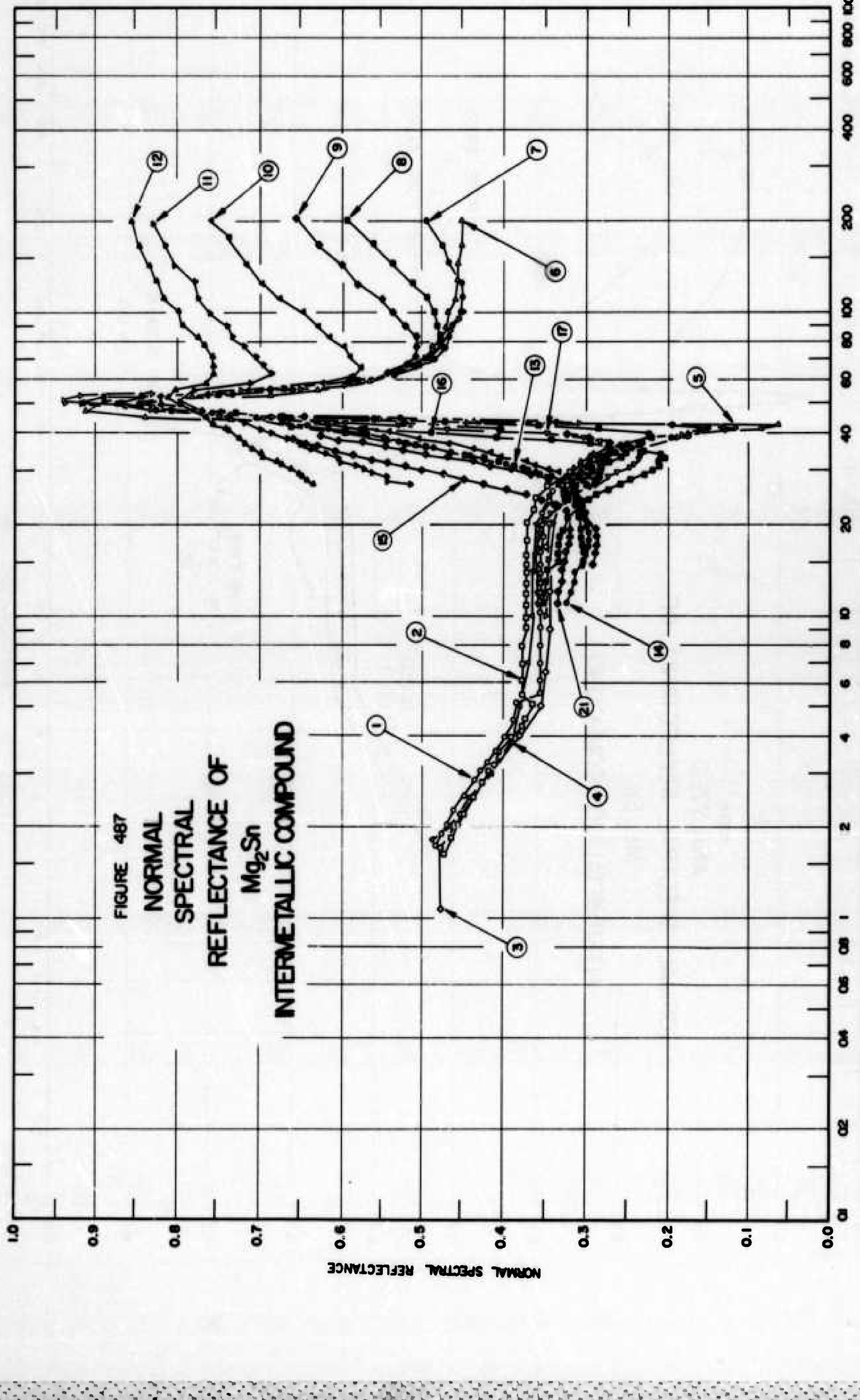


FIGURE 487 NORMAL SPECTRAL REFLECTANCE OF Mg_2Sn INTERMETALLIC COMPOUND

SPECIFICATION TABLE NO. 487 NORMAL SPECTRAL REFLECTANCE OF Mg_2Sn INTERMETALLIC COMPOUND

Curve No.	Ref. No.	Year	Temperature, K	Wavelength Range, μm	Geometry θ	Geometry θ'	Geometry ω	Reported Error, %	Composition (weight percent), Specifications and Remarks
1	383	1964	~298	1.73-32.9	8°	8°			Single crystal, p-type, doped with excess Mg; polished on a pitch lap.
2	383	1964	~298	1.61-32.9	8°	8°			Single crystal, n-type, doped with excess Sn; polished on a pitch lap.
3	20	1963	296	1.7-33.0	~8°	~8°			Single crystal, n-type, doped with excess Sn; impurity concentration 8.3 x 10^{18} cm^{-3}; electron concentration in conduction band 2.7 x 10^{17} electrons cm^{-3}; hole concentration in valence band 1.8 x 10^{17} holes cm^{-3}; polished surface; measured in air; aluminum reference standard; [Author's designation: Sample No. 28].
4	20	1963	296	1.8-29.0	~8°	~8°			Single crystal, p-type, doped with excess Mg; impurity concentration 3.4 x 10^{18} cm^{-3}; electron concentration in conduction band 1.8 x 10^{17} electrons cm^{-3}; hole concentration in valence band 2.1 x 10^{17} holes cm^{-3}; polished surface; measured in air; aluminum reference standard; [Author's designation: Sample No. 15].
5	322	1964	~298	10-100	8°	8°			Crystal, nearly intrinsic; carrier concentration ~3 x 10^{17} cm^{-3}.
6	323	1966	100	27.0-200	15°	15°			Pure; data extracted from smooth curve.
7	323	1966	295	27.0-200	15°	15°			Above specimen and conditions.
8	323	1966	330	27.0-200	15°	15°			Above specimen and conditions.
9	323	1966	360	27.0-204	15°	15°			Above specimen and conditions.
10	323	1966	420	27.0-200	15°	15°			Above specimen and conditions.
11	323	1966	520	27.1-196	15°	15°			Above specimen and conditions.
12	323	1966	625	27.0-200	15°	15°			Above specimen and conditions.
13	324	1967	80	15.1-42.0	8°	8°			Doped p-type, carrier concentration ~6 x 10^{18} cm^{-3}; [Authors' designation: Sample 291].
14	324	1967	296	11.0-45.0	8°	8°			Above specimen and conditions.
15	324	1967	473	14.9-38.2	8°	8°			Above specimen and conditions.
16	324	1967	80	11.0-41.0	8°	8°			Doped n-type, carrier concentration ~3 x 10^{18} cm^{-3}; [Authors' designation: Sample B-2].
17	324	1967	296	11.0-47.6	8°	8°			Above specimen and conditions.
18*	324	1967	473	11.1-42.7	8°	8°			Above specimen and conditions.
19*	324	1967	80	21.1-43.7	8°	8°			Doped n-type, carrier concentration 10^{18} - 10^{17} cm^{-3}; [Authors' designation: Sample MZ 36].
20*	324	1967	296	11.0-48.8	8°	8°			Above specimen and conditions.
21	324	1967	473	11.0-39.1	8°	8°			Above specimen and conditions.

*Not shown on plot

DATA TABLE NO. 487 NORMAL SPECTRAL REFLECTANCE OF Mg_2Sn INTERMETALLIC COMPOUND

[Wavelength, λ, μm; Reflectance, ρ; Temperature, T, K]

CURVE 1
T ~ 298

λ	ρ
1.73	0.482
1.90	0.475
2.04	0.469
2.28	0.459
2.53	0.447
2.84	0.434
3.03	0.428
3.26	0.419
3.55	0.408
3.97	0.399
4.50	0.388
5.11	0.385
5.51	0.356
6.07	0.356
6.98	0.356
7.96	0.356
9.02	0.356
10.0	0.356
11.0	0.356
12.0	0.356
13.0	0.356
13.9	0.356
14.8	0.356
16.1	0.356
18.0	0.352
20.0	0.353
22.0	0.353
23.7	0.347
25.8	0.341
27.9	0.323
30.0	0.307
32.9	0.282

CURVE 2
T ~ 298

λ	ρ
1.61	0.471
1.81	0.462
2.01	0.454
2.20	0.448
2.50	0.437
2.80	0.425
3.03	0.418
3.52	0.406

CURVE 2 (cont.)

λ	ρ
3.96	0.390
4.30	0.378
4.52	0.372
5.01	0.365
5.45	0.378
6.04	0.378
6.93	0.378
7.96	0.378
9.02	0.373
9.89	0.373
11.0	0.373
12.0	0.373
12.9	0.373
14.0	0.373
15.0	0.373
16.0	0.373
18.0	0.372
20.0	0.372
22.2	0.364
24.0	0.361
26.7	0.349
30.0	0.320
32.9	0.288

CURVE 3
T = 296

λ	ρ
1.7	0.465
2.2	0.450
3.2	0.410
4.0	0.380
5.0	0.355
6.5	0.350
9.0	0.345
12.0	0.345
17.0	0.350
20.0	0.345
23.0	0.340
27.0	0.330
31.0	0.300
33.0	0.285

CURVE 4
T = 296

λ	ρ
1.8	0.485
2.0	0.465
2.5	0.440
3.0	0.415
3.8	0.390
5.0	0.380
7.0	0.370
10.0	0.365
14.0	0.365
20.0	0.360
25.0	0.345
29.0	0.310

CURVE 5
T ~ 298

λ	ρ
10.0	0.350
15.4	0.346
20.1	0.341
25.3	0.329
29.5	0.307
33.9	0.271
36.9	0.231
38.5	0.189
38.9	0.174
39.2	0.185
40.8	0.128
41.4	0.115
41.8	0.130
42.6	0.196
43.0	0.309
43.7	0.443
44.3	0.551
45.1	0.685
45.9	0.748
48.0	0.830
50.0	0.919
50.7	0.940
51.9	0.942
53.1	0.920
54.0	0.828
55.1	0.721
55.9	0.651
57.2	0.598

CURVE 5 (cont.)

λ	ρ
59.8	0.561
63.0	0.534
66.7	0.510
70.9	0.497
78.1	0.476
86.3	0.465
94.7	0.454
100.0	0.449

CURVE 6
T = 100

λ	ρ
27.0	0.334
27.8	0.325
28.5	0.325
29.2	0.316
30.2	0.316
31.2	0.306
32.3	0.307
33.3	0.294
34.2	0.288
35.6	0.275
36.9	0.250
38.5	0.222
39.8	0.176
41.3	0.082
42.2	0.061
43.3	0.437
44.2	0.732
45.2	0.838
47.4	0.913
50.0	0.918
51.0	0.889
52.1	0.782
53.5	0.686
55.2	0.630
58.5	0.567
62.1	0.537
66.7	0.515
70.4	0.496
76.3	0.487
82.6	0.476
89.6	0.470
100	0.467
110	0.458

CURVE 6 (cont.)

λ	ρ
127	0.455
143	0.455
167	0.450
200	0.450

CURVE 7
T = 295

λ	ρ
27.0	0.318
27.7	0.318
28.5	0.310
29.3	0.310*
30.2	0.304*
31.2	0.299
32.3	0.292
33.3	0.281
34.5	0.265
35.7	0.256
37.0	0.231
38.5	0.197
40.2	0.162
41.5	0.150
42.6	0.196
43.3	0.337
44.4	0.526
45.5	0.672
46.3	0.756
47.6	0.827
50.0	0.871
52.4	0.840
53.8	0.731
55.2	0.663
59.2	0.588
62.1	0.535
66.7	0.508
70.9	0.484
76.3	0.470
83.3	0.466
90.1	0.460
100	0.450
112	0.450
125	0.450
145	0.466
167	0.474
200	0.493

CURVE 8
T = 330

λ	ρ
27.0	0.300
27.8	0.304
28.6	0.296
29.3	0.290
30.2	0.291
31.2	0.281
32.2	0.272
33.3	0.258
34.4	0.253
35.7	0.246
37.0	0.233
38.5	0.221
39.8	0.220
41.5	0.283
42.6	0.358
43.5	0.470
44.2	0.561
45.5	0.673
46.5	0.729
47.6	0.807
50.0	0.869
52.6	0.841
53.8	0.748
55.2	0.670
59.2	0.582
62.1	0.539*
66.2	0.505
70.9	0.490
76.3	0.477
83.3	0.477
90.1	0.480
100	0.484
111	0.494
125	0.511
143	0.536
169	0.560
200	0.595

CURVE 9
T = 360

λ	ρ
27.0	0.288
27.8	0.288
28.5	0.284

CURVE 9 (cont.)

λ	ρ
29.4	0.282
30.3	0.281
31.3	0.278*
32.3	0.275
33.4	0.275
34.4	0.271
35.7	0.271
37.0	0.271
38.5	0.296
39.8	0.324
41.7	0.403
43.5	0.522
45.5	0.646
47.6	0.770
50.0	0.848
52.1	0.841*
53.8	0.762
55.6	0.687
58.8	0.591
62.5	0.542
66.7	0.518
71.4	0.508
76.9	0.508
83.3	0.508
90.1	0.520
100	0.535
110	0.550
123	0.581
143	0.600
167	0.628
204	0.656

CURVE 10
T = 420

λ	ρ
27.0	0.312
27.8	0.319
28.6	0.323
29.4	0.334
30.3	0.347
31.2	0.362
32.2	0.371
33.4	0.401
34.5	0.416
35.7	0.437

CURVE 10 (cont.)

λ	ρ
37.0	0.465
38.6	0.502
40.2	0.540
41.8	0.580
43.3	0.620
45.5	0.689
47.6	0.748
49.8	0.820
52.4	0.820
55.6	0.713
58.5	0.625
61.7	0.589
66.7	0.579
71.4	0.591
76.3	0.599
83.3	0.616
90.1	0.630
100	0.649
111	0.677
125	0.699
143	0.716
167	0.739
200	0.758

CURVE 11

λ	ρ
27.1	0.517
27.8	0.543
28.6	0.543
29.4	0.563
30.3	0.574
31.2	0.583
32.4	0.604
33.2	0.605
34.4	0.620
35.7	0.638
37.0	0.651
38.3	0.666
40.0	0.685
41.5	0.698
43.7	0.718
45.2	0.734
47.6	0.768
50.3	0.798
52.6	0.820*

*Not shown on plot

DATA TABLE NO. 487 (continued)

CURVE 11 (cont.)

λ	ρ
55.2	0.779
58.5	0.710
62.9	0.685
67.1	0.695
71.4	0.704
77.5	0.718
83.3	0.732
90.1	0.739
99.0	0.759
111	0.773
127	0.776
143	0.801
166	0.814
196	0.829

CURVE 12
T = 625

λ	ρ
27.0	0.637
27.8	0.643
28.7	0.650
29.3	0.653
30.3	0.663
31.2	0.672
32.3	0.678
33.3	0.696
34.5	0.699
35.7	0.709
37.0	0.718
38.5	0.724
40.2	0.737
41.5	0.740
43.3	0.755
45.7	0.780
47.4	0.780
49.8	0.796
52.6	0.811
55.6	0.802
58.8	0.765
62.1	0.755
66.2	0.755
71.9	0.755
77.5	0.765
83.3	0.774
90.1	0.793
101	0.799

CURVE 12 (cont.)

λ	ρ
111	0.817
128	0.824
143	0.831
167	0.845
200	0.855

CURVE 13
T = 80

λ	ρ
15.1	0.303
16.1	0.303
17.0	0.302
18.2	0.304
19.2	0.306
21.1	0.309
22.0	0.310
23.0	0.314
24.0	0.321
25.0	0.321
26.0	0.328
27.0	0.334
28.0	0.346
29.0	0.356
30.0	0.370
31.1	0.387
32.1	0.406
33.1	0.424
34.0	0.448
35.1	0.473
36.1	0.495
36.5	0.508
37.0	0.520
38.0	0.544
39.1	0.570
40.0	0.596
42.0	0.661

CURVE 14
T = 296

λ	ρ
11.0	0.323
11.9	0.318
12.9	0.314
13.9	0.313
14.8	0.304
15.8	0.300

CURVE 14 (cont.)

λ	ρ
17.0	0.297
17.9	0.297
18.8	0.297
19.7	0.300
20.9	0.300
21.9	0.300
22.8	0.304
23.8	0.304
25.8	0.312
26.9	0.318
27.9	0.330
28.8	0.343
29.8	0.361
30.9	0.376
31.8	0.396
32.9	0.422
33.8	0.440
34.7	0.463
36.0	0.484
36.9	0.508
37.9	0.528
38.9	0.548
39.8	0.572
40.8	0.593
41.7	0.617
42.7	0.644
43.7	0.671
45.0	0.704

CURVE 15
T = 473

λ	ρ
14.9	0.291
16.0	0.288
17.2	0.286
18.3	0.286
19.2	0.288
20.0	0.298
22.1	0.324
23.0	0.338
24.1	0.356
25.0	0.372
26.0	0.397
27.1	0.424
28.0	0.448
29.1	0.472

CURVE 15 (cont.)

λ	ρ
30.1	0.500
31.1	0.520
32.1	0.542
32.9	0.564
34.0	0.587
35.0	0.609
36.2	0.630
37.0	0.646
38.2	0.661

CURVE 16
T = 80

λ	ρ
11.0	0.353
11.9	0.354
13.0	0.350
14.1	0.349
15.1	0.335
16.0	0.335
17.2	0.335
18.2	0.333
19.1	0.329
21.0	0.322
23.0	0.306
24.0	0.296
25.0	0.287
26.0	0.272
27.1	0.258
28.0	0.248
29.0	0.229
30.0	0.219
31.1	0.211
32.1	0.212
33.1	0.204
34.0	0.210
35.1	0.230
36.2	0.259
37.0	0.294
38.0	0.342
38.9	0.408
40.0	0.487
41.0	0.574

CURVE 17
T = 296

λ	ρ
11.0	0.358
11.9	0.358
13.0	0.357
13.9	0.358
14.8	0.356*
15.9	0.361
16.8	0.359
17.8	0.359
18.8	0.356
19.6	0.354
20.9	0.350
21.8	0.344
22.9	0.332
23.9	0.324
25.9	0.315
25.9	0.304
26.9	0.296
27.7	0.283
28.7	0.273
29.8	0.261
30.8	0.249
31.8	0.241
32.9	0.237
33.9	0.233
34.8	0.232
36.0	0.247*
36.8	0.255
37.9	0.281
38.6	0.302
40.0	0.349
40.7	0.405*
41.8	0.469
42.7	0.529
43.7	0.598
44.8	0.665
45.2	0.694
45.9	0.733
47.6	0.847

CURVE 18*
T = 473

λ	ρ
11.1	0.346
12.0	0.340
13.1	0.337

CURVE 18 (cont.)*

λ	ρ
14.1	0.332
15.2	0.330
16.2	0.327
17.2	0.324
18.2	0.309
19.2	0.309
21.1	0.295
22.1	0.294
23.1	0.294
24.1	0.295
25.0	0.294
26.2	0.298
27.1	0.306
28.0	0.321
29.1	0.342
30.1	0.370
31.2	0.396
32.1	0.426
33.0	0.461
34.2	0.488
35.1	0.517
36.1	0.554
36.9	0.585
38.0	0.616
39.2	0.649
40.0	0.677
40.8	0.705
41.8	0.733
42.7	0.748

CURVE 19*
T = 80

λ	ρ
21.1	0.350
22.0	0.344
23.0	0.340
25.0	0.323
26.0	0.320
27.0	0.315
28.0	0.301
29.0	0.291
30.0	0.282
31.1	0.277
32.1	0.274
33.1	0.266
34.0	0.260

CURVE 19 (cont.)*

λ	ρ
35.1	0.250
36.1	0.235
37.0	0.219
38.0	0.195
39.1	0.167
40.0	0.128
41.0	0.074
41.7	0.036
42.0	0.042
43.1	0.373
43.7	0.602

CURVE 20*
T = 296

λ	ρ
11.0	0.357
11.9	0.355
13.0	0.356
14.0	0.356
15.0	0.355
15.9	0.358
16.9	0.355
17.8	0.355
18.8	0.353
19.7	0.353
20.9	0.341
21.9	0.343
22.9	0.338
23.9	0.333
24.9	0.334
25.8	0.328
26.8	0.326
27.9	0.315
28.8	0.309
29.9	0.303
30.9	0.292
31.8	0.281
32.9	0.268
33.9	0.258
34.8	0.247
36.9	0.219
37.9	0.203
38.9	0.184
40.0	0.161
40.8	0.131
41.8	0.123

CURVE 20 (cont.)*

λ	ρ
42.9	0.218
43.9	0.418
44.8	0.633
45.9	0.766
46.7	0.794
47.6	0.804
48.8	0.871

CURVE 21
T = 473

λ	ρ
11.0	0.335
12.0	0.335
13.0	0.330
14.1	0.330
15.1	0.328
16.1	0.326
17.2	0.321
18.1	0.320
19.1	0.320
21.1	0.307
22.1	0.308
23.1	0.308*
24.1	0.312
25.0	0.317*
26.0	0.322
27.1	0.331*
28.1	0.348*
29.1	0.366
30.1	0.390
31.1	0.416
32.2	0.438
33.1	0.468
34.1	0.495
35.1	0.523
36.1	0.547
37.0	0.577
38.0	0.605
39.1	0.628

* Not shown on plot

SPECIFICATION TABLE NO. 488 NORMAL TOTAL EMITTANCE OF Ni_xAl INTERMETALLIC COMPOUNDS

Curve No.	Ref. No.	Year	Temperature Range, K	Geometry θ'	Reported Error, %	Composition (weight percent), Specifications and Remarks
1*	28	1963	1273	~0°		NiAl; sintered at 1673 K for 2 hrs (setter meterial NiAl); density 3.80 gr cm^{-3}, theoretical density 6.0 gr cm^{-3}; x-ray structure NiAl; calculated from spectral data (1 - 15μm); [Authors' designation: Sample No. 52].
2*	28	1963	1023	~0°		Ni_3Al; sintered at 1473 K for 2 hrs (setter material Ni_3Al); density 3.32 gr cm^{-3}, theoretical density 7.4 gr cm^{-3}; x-ray structure Ni_3Al; calculated from spectral data (1 - 15μm); [Authors' designation: Sample No. 89].

DATA TABLE NO. 488 NORMAL TOTAL EMITTANCE OF Ni_xAl INTERMETALLIC COMPOUNDS

[Temperature, T, K; Emittance, ϵ]

T	ϵ
CURVE 1*	
1273	0.72
CURVE 2*	
1023	0.69

* No plot given

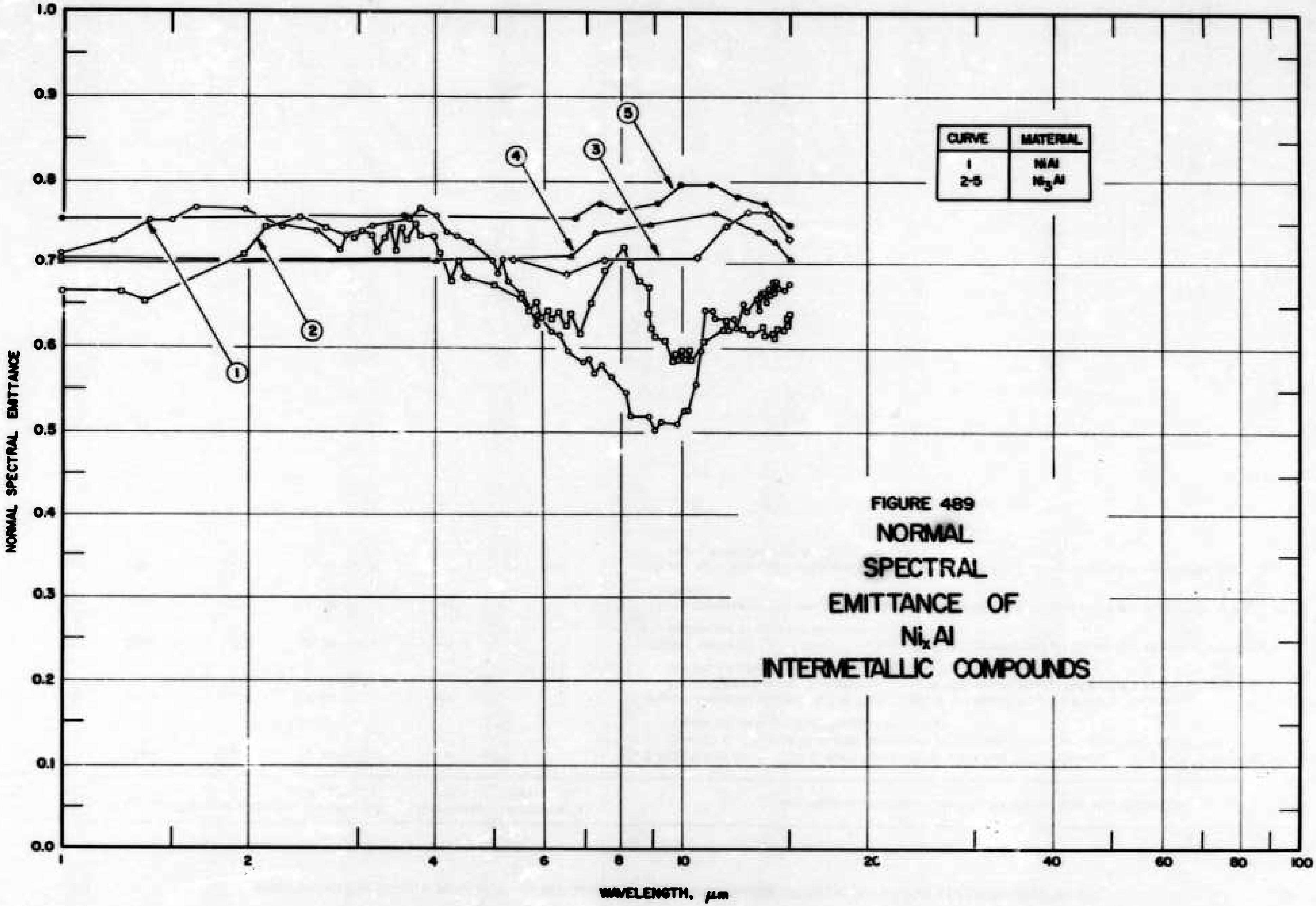


FIGURE 489 NORMAL SPECTRAL EMITTANCE OF Ni_xAl INTERMETALLIC COMPOUNDS

SPECIFICATION TABLE NO. 489 NORMAL SPECTRAL EMITTANCE OF Ni_xAl INTERMETALLIC COMPOUNDS

Curve No.	Ref. No.	Year	Temperature, K	Wavelength Range, μm	Geometry θ'	Reported Error, %	Composition (weight percent), Specifications and Remarks
1	28	1963	1273	1.00-15.0	~0°		NiAl; sintered at 1673 K for 2 hrs (setter material NiAl); density 3.80 gr cm^{-3}, theoretical density 6.0 gr cm^{-3}; x-ray structure NiAl; data extracted from smooth curve; [Authors' designation: Sample No. 52].
2	28	1963	1023	1.00-15.0	~0°		Ni_3Al; sintered at 1473 K for 2 hrs (setter material Ni_3Al); density 3.32 gr cm^{-3}, theoretical density 7.4 gr cm^{-3}; x-ray structure Ni_3Al; data extracted from smooth curve; [Authors' designation: Sample No. 89].
3	382	1965	1273	1.00-15.0	0°		Ni_3Al; sintered 2 hrs at 1473 K; density 4.35; measured in argon-H_2 atmosphere; data extracted from smooth curve.
4	382	1965	1273	1.00-15.0	0°		Above specimen and conditions except heated at 1273 K in measuring apparatus for 1/2 hr total.
5	382	1965	1273	1.00-15.0	0°		Above specimen and conditions except heated at 1273 K in measuring apparatus for 4 hrs total; final density 4.56.

DATA TABLE NO. 489 NORMAL SPECTRAL EMITTANCE OF Ni_xAl INTERMETALLIC COMPOUNDS

[Wavelength, λ, μm; Emittance, ∈; Temperature, T, K]

CURVE 1
T = 1273

λ	∈
1.00	0.710
1.21	0.726
1.39	0.751
1.51	0.751
1.65	0.769
1.99	0.767
2.26	0.744
2.59	0.738
2.81	0.715
2.89	0.734
3.18	0.745
3.63	0.754
3.80	0.768
4.03	0.758
4.20	0.736
4.34	0.732
4.46	0.683
4.58	0.727
4.98	0.701
5.08	0.687
5.15	0.704
5.26	0.678
5.51	0.663
5.82	0.628
5.89	0.637
6.16	0.620
6.39	0.617
6.57	0.597
6.96	0.583
7.10	0.589
7.23	0.570
7.45	0.580
7.73	0.567
8.14	0.548
8.30	0.519
8.84	0.519
9.02	0.501
9.25	0.512
9.82	0.510
10.1	0.525
10.2	0.525
10.5	0.558
10.8	0.597
11.0	0.643

CURVE 1 (cont.)

λ	∈
11.2	0.643
11.3	C.635
12.1	0.635
12.2	0.624
12.6	0.651
12.7	0.642
13.3	0.659
13.4	0.645
13.4	0.660
13.5	0.650
13.6	0.666
13.7	0.653
13.9	0 670
13.9	0.662
14.0	0.678
14.1	0.665
14.4	0.679
14.5	0.671
14.7	0.668
15.0	0.675

CURVE 2
T = 1023

λ	∈
1.00	0.665
1.25	0.665
1.36	0.653
1.97	0.710
2.13	0.742
2.42	0.756
2.67	0.741
2.97	0.730
3.05	0.738
3.18	0.734
3.24	0.712
3.32	0.730
3.40	0.743
3.46	0.714
3.53	0.742
3.60	0.726
3.71	0.748
3.80	0.731
4.00	0.731
4.09	0.711

CURVE 2 (cont.)

λ	∈
4.26	0.678
4.38	0.701
4.50	0.681
5.00	0.673
5.50	0.659
5.69	0.642
5.83	0.653
5.95	0.637
6.10	0.644
6.19	0.634
6.33	0.641
6.51	0.627
6.62	0.640
6.87	0.618
7.13	0.651
7.51	0.691
8.06	0.719
8.25	0.699
8.51	0.678
8.83	0.640
8.88	0.672
8.96	0.624
9.08	0.614
9.39	0.609
9.67	0.585
9.76	0.595
9.88	0.587
10.0	0.598
10.2	0.588
10.3	0.599
10.4	0.586
10.9	0.609
11.7	0.622
11.9	0.635
12.0	0.622
12.5	0.624
13.0	0.618
13.5	0.626
13.6	0.616
14.0	0.618
14.1	0.612
14.4	0.624
14.7	0.623
14.8	0.636
14.9	0.628
15.0	0.640

CURVE 3
T = 1273

λ	∈
1.00	0.703
5.35	0.703
6.51	0.686
7.51	0.703
10.6	0.706
11.8	0.746
13.0	0.765
14.0	0.762
15.0	0.730

CURVE 4
T = 1273

λ	∈
1.00	0.702
4.01	0.702
6.61	0.708
7.28	0.737
8.90	0.749
11.4	0.762
13.4	0.739
14.1	0.727
15.0	0.705

CURVE 5
T = 1273

λ	∈
1.00	0.752
3.57	0.758
6.77	0.756
7.40	0.773
7.99	0.765
9.11	0.775
9.99	0.798
11.3	0.798
12.4	0.781
13.5	0.773
15.0	0.748

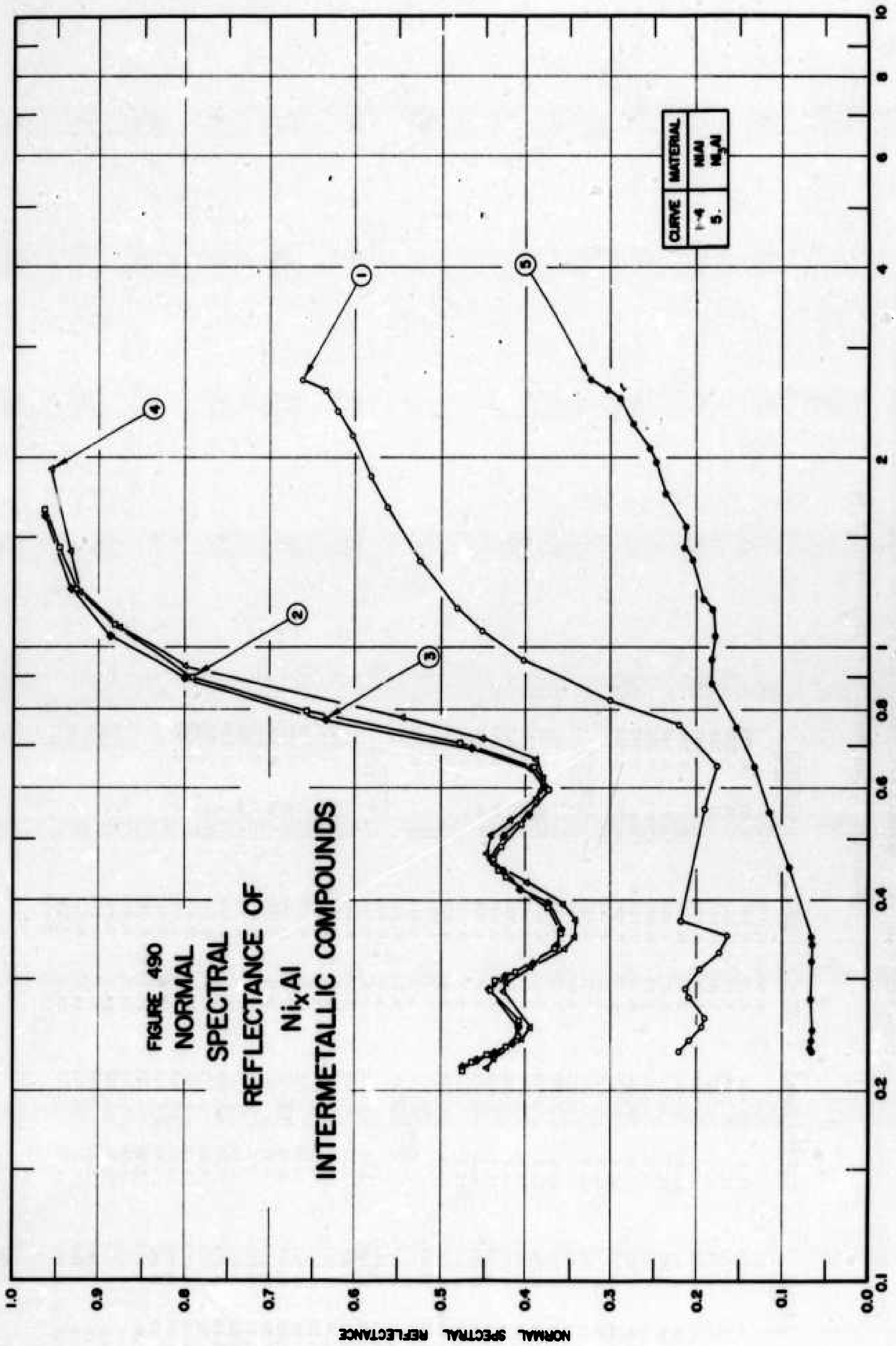


FIGURE 490 NORMAL SPECTRAL REFLECTANCE OF Ni_xAl INTERMETALLIC COMPOUNDS

SPECIFICATION TABLE NO. 490 NORMAL SPECTRAL REFLECTANCE OF Ni_xAl INTERMETALLIC COMPOUNDS

Curve No.	Ref. No.	Year	Temperature K	Wavelength Range, μm	Geometry θ	θ'	ω'	Reported Error, %	Composition (weight percent), Specifications and Remarks
1	28	1963	~298	0.230-2.65	0°		2π		NiAl; sintered at 1673 K for 2 hrs (setter material NiAl); density 3.89 $g\,m^{-3}$, theoretical density 6.0 $g\,cm^{-3}$; x-ray structure NiAl; data extracted from smooth curve; MgO reference standard; [Authors' designation: Sample No. 52].
2	329	1966	~298	0.215-1.65	~0°	~0°			NiAl; 49.1 at. % Ni; mechanically polished to 0.05 μm alumina; calculated from angular reflectance data.
3	329	1966	~298	0.217-1.61	~0°	~0°			Similar to above specimen and conditions.
4	329	1966	~298	0.218-1.91	~0°	~0°			Above specimen and conditions except annealed 20 hrs at 673 K in vacuum (<10^{-6} mm Hg).
5	28	1963	298	0.230-2.65	0°		2π		Ni_3Al; sintered at 1473 K for 2 hrs (setter material Ni_3Al); density 3.32 $g\,cm^{-3}$, theoretical density 7.4 $g\,cm^{-3}$; x-ray structure Ni_3Al; data extracted from smooth curve; MgO reference standard; [Authors' designation: Sample No. 89].

DATA TABLE NO. 490 NORMAL SPECTRAL REFLECTANCE OF Ni_xAl INTERMETALLIC COMPOUNDS

[Wavelength, λ, μm; Reflectance, ρ; Temperature, T, K]

CURVE 1
T ~ 298

λ	ρ
0.230	0.220
0.240	0.209
0.251	0.194
0.260	0.190
0.280	0.209
0.290	0.212
0.310	0.197
0.330	0.173
0.350	0.162
0.470	0.219
0.553	0.190
0.649	0.175
0.751	0.220
0.824	0.300
0.952	0.401
1.05	0.452
1.15	0.481
1.35	0.525
1.65	0.561
1.85	0.581
2.15	0.602
2.35	0.621
2.55	0.637
2.65	0.662

CURVE 2
T ~ 298

λ	ρ
0.215	0.475
0.221	0.464
0.228	0.446
0.234	0.423
0.244	0.409
0.256	0.409
0.288	0.441
0.299	0.436
0.309	0.412
0.335	0.367
0.355	0.360
0.389	0.373
0.432	0.424
0.446	0.434
0.463	0.439
0.488	0.430
0.528	0.405
0.599	0.373
0.649	0.390
0.705	0.478
0.795	0.656
0.899	0.791
1.08	0.894
1.24	0.928
1.44	0.949
1.65	0.964

CURVE 3
T ~ 298

λ	ρ
0.217	0.473
0.224	0.458
0.230	0.438
0.238	0.416
0.252	0.408
0.289	0.442
0.302	0.425
0.319	0.390
0.337	0.366
0.358	0.360
0.395	0.375
0.418	0.408
0.443	0.428
0.464	0.441
0.502	0.426
0.546	0.396
0.602	0.379
0.649	0.392
0.693	0.464
0.770	0.635
0.892	0.800
1.04	0.889
1.24	0.934
1.61	0.963

CURVE 4
T ~ 298

λ	ρ
0.218	0.448
0.225	0.439
0.241	0.404
0.252	0.393
0.286	0.428
0.297	0.422
0.314	0.393
0.333	0.354
0.350	0.342
0.371	0.342
0.392	0.358
0.426	0.399
0.456	0.439
0.473	0.448
0.506	0.441
0.534	0.419
0.579	0.386
0.620	0.379
0.667	0.388
0.717	0.451
0.775	0.545
0.939	0.800
1.07	0.877
1.23	0.912
1.41	0.935
1.91	0.957

CURVE 5
T = 298

λ	ρ
0.230	0.065
0.234	0.066
0.240	0.065
0.249	0.065
0.279	0.067
0.320	0.066
0.340	0.066
0.350	0.065
0.450	0.091
0.549	0.115
0.649	0.131
0.747	0.152
0.872	0.181
0.951	0.182
1.05	0.179
1.15	0.180
1.25	0.192
1.35	0.204
1.45	0.215
1.55	0.222
1.75	0.236
1.95	0.249
2.05	0.255
2.25	0.273
2.45	0.290
2.55	0.303
2.65	0.325

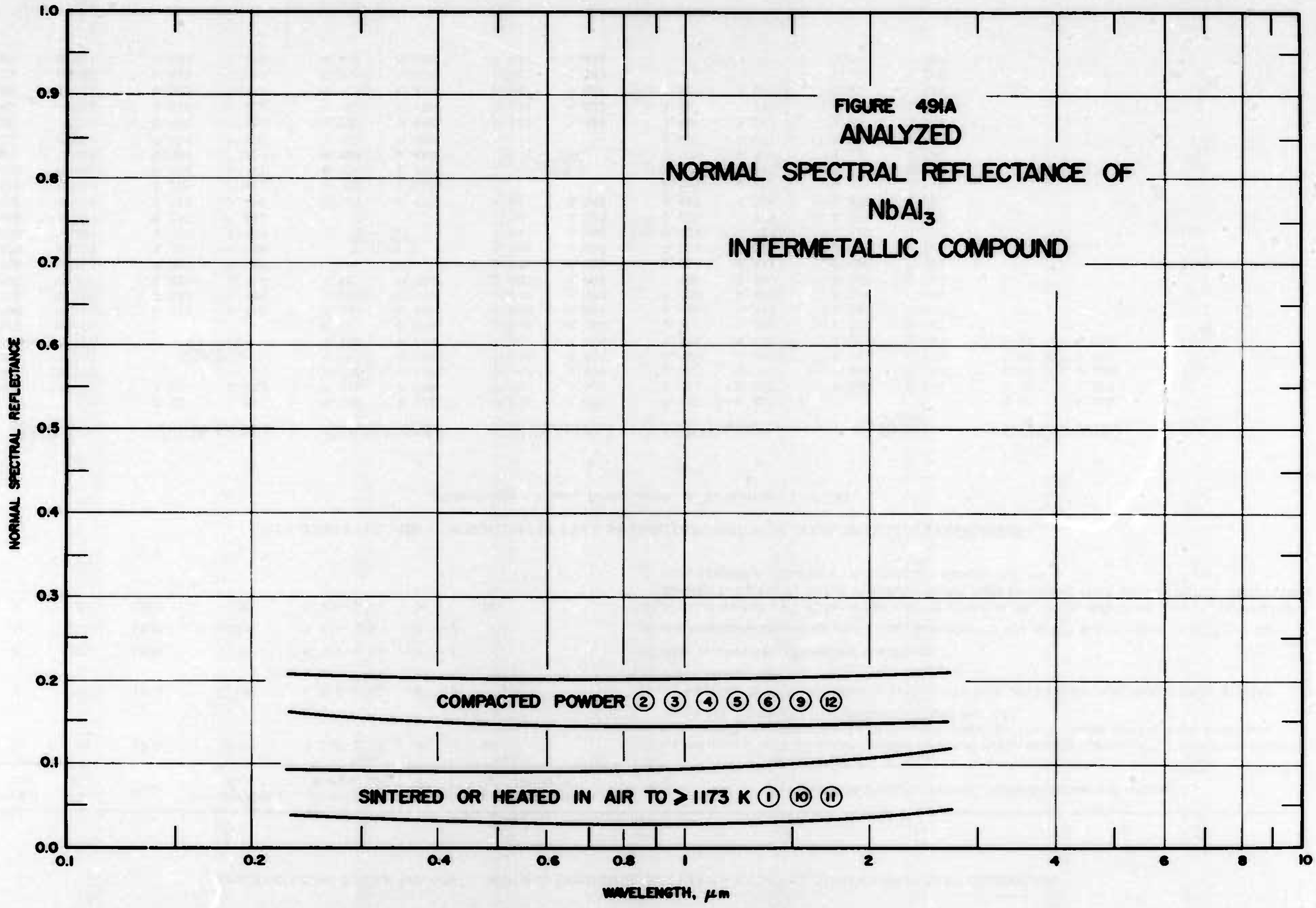


FIGURE 491A
ANALYZED
NORMAL SPECTRAL REFLECTANCE OF
NbAl3
INTERMETALLIC COMPOUND
COMPACTED POWDER 2 3 4 5 6 9 12
SINTERED OR HEATED IN AIR TO > 1173 K 1 10 11
NORMAL SPECTRAL REFLECTANCE
0.0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
1.0
WAVELENGTH, μm
0.1
0.2
0.4
0.6
0.8
1
2
4
6
8
10

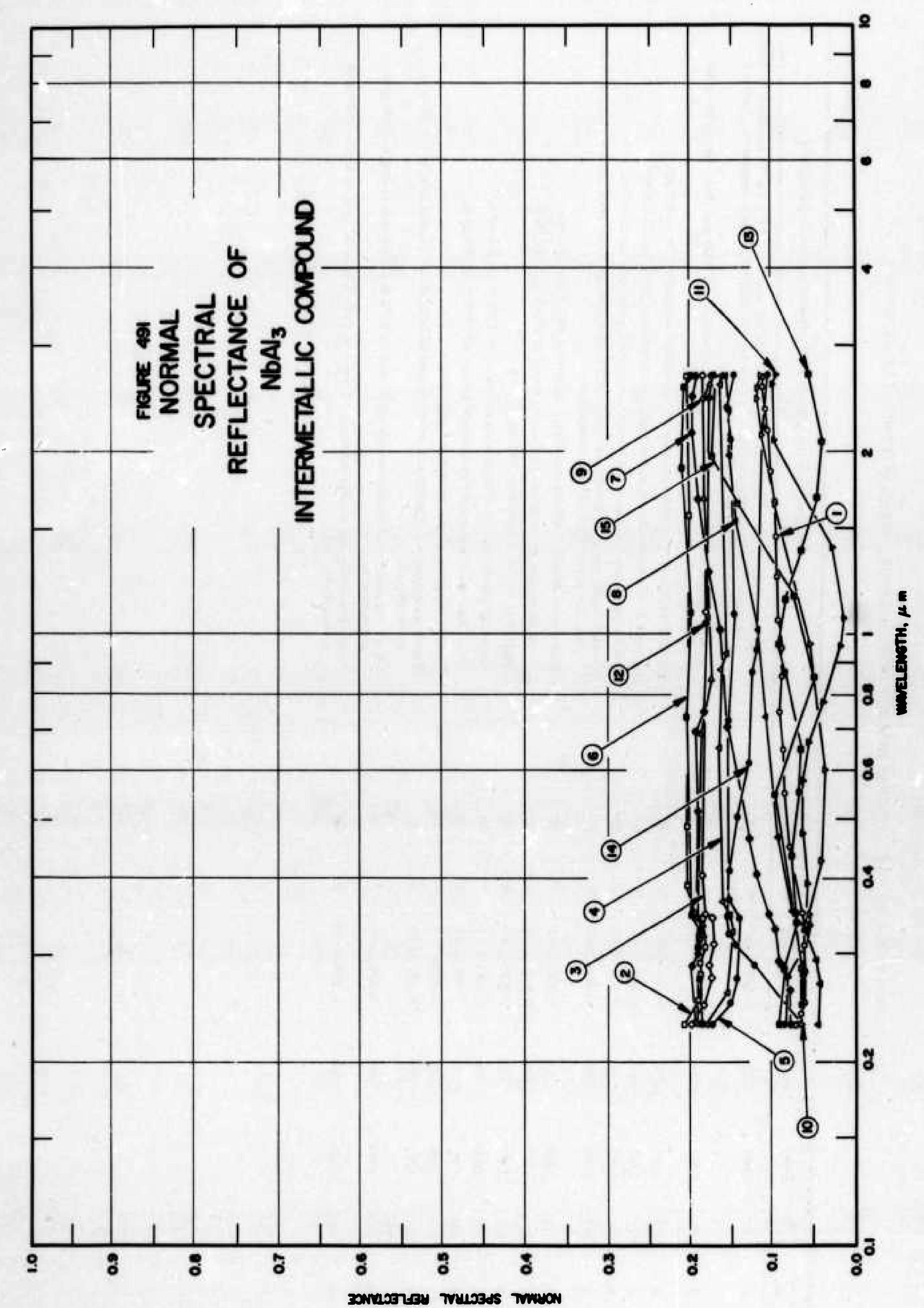


FIGURE 491 NORMAL SPECTRAL REFLECTANCE OF $NbAl_3$ INTERMETALLIC COMPOUND

SPECIFICATION TABLE NO. 491 NORMAL SPECTRAL REFLECTANCE OF $NbAl_3$ INTERMETALLIC COMPOUND

Curve No.	Ref. No.	Year	Temperature K	Wavelength Range, μm	Geometry θ	θ'	ω'	Reported Error, %	Composition (weight percent), Specifications and Remarks
1	28	1963	298	0.230-2.657	~0°		2π		Sintered at 1573 K for 2 hrs (setter material Al_2O_3); density 2.74 g cm^{-3}; theoretical density 4.57 g cm^{-3}; data extracted from smooth curve; MgO reference standard; [Authors' designation: Sample No. 88].
2	382	1965	~298	0.230-2.65	0°		2π		Powder; mfgr. Borolite Corp; 99% pure; compacted at 70 500 psi; data extracted from smooth curve; reference standard MgO.
3	382	1965	~298	0.230-2.65	0°		2π		Similar to above specimen and conditions except compacted at 35 250 psi.
4	382	1965	~298	0.230-2.65	0°		2π		Similar to above specimen and conditions except compacted at 11 750 psi.
5	382	1965	~298	0.230-2.65	0°		2π		Similar to above specimen and conditions except compacted at 2350 psi.
6	382	1965	~298	0.230-2.65	0°		2π		Powder; compacted at 35 300 psi with a polished stainless steel ram; data extracted from smooth curve; MgO reference standard.
7	382	1965	~298	0.230-2.65	0°		2π		Above specimen and conditions except heated at 973 K for 30 min.
8	382	1965	~298	0.230-2.65	0°		2π		Above specimen and conditions except heated at 973 K for 120 min.
9	382	1965	~298	0.230-2.65	0°		2π		Similar to curve 1 specimen and conditions.
10	382	1965	~298	0.230-2.65	0°		2π		Above specimen and conditions except heated at 1173 K for 15 min.
11	382	1965	~298	0.230-2.65	0°		2π		Above specimen and conditions except heated at 1173 K for 60 min.
12	382	1965	~298	0.230-2.65	0°		2π		Similar to curve 1 specimen and conditions.
13	382	1965	~298	0.230-2.65	0°		2π		Above specimen and conditions except heated at 1373 K for 15 min in argon-hydrogen atmosphere.
14	382	1965	~298	0.230-2.65	0°		2π		Above specimen and conditions except heated at 1373 K for 60 min in argon-hydrogen atmosphere.
15	382	1965	~298	0.230-2.65	0°		2π		Above specimen and conditions except heated at 1373 K for 240 min in argon-hydrogen atmosphere.

DATA TABLE NO. 491 NORMAL SPECTRAL REFLECTANCE OF $NbAl_3$ INTERMETALLIC COMPOUND

[Wavelength, λ, μm; Reflectance, ρ; Temperature, T, K]

λ	ρ
CURVE 1	**T ~ 298**
0.230	0.070
0.240	0.064
0.250	0.060
0.280	0.060
0.310	0.060
0.330	0.060
0.350	0.063
0.450	0.078
0.550	0.082
0.649	0.083
0.749	0.090
0.852	0.087
0.950	0.087
1.05	0.091
1.25	0.092
1.45	0.093
1.65	0.096
1.85	0.100
2.15	0.104
2.35	0.107
2.55	0.110
2.65	0.110
CURVE 2	**T ~ 298**
0.230	0.208
0.252	0.190
0.278	0.186
0.291	0.187
0.308	0.181
0.344	0.183
0.350	0.195
0.388	0.201
0.484	0.202
1.55	0.200
2.65	0.203
CURVE 3	**T ~ 298**
0.230	0.199
0.247	0.182
0.274	0.173
0.289	0.176
CURVE 3 (cont.)	
0.311	0.170
0.344	0.172
0.348	0.181
0.403	0.185
1.08	0.180
2.65	0.183
CURVE 4	**T ~ 298**
0.230	0.179
0.258	0.154
0.326	0.149
0.347	0.151
0.365	0.160
0.651	0.165
0.875	0.162
0.926	0.156
2.56	0.164
2.65	0.161
CURVE 5	**T ~ 298**
0.230	0.172
0.250	0.150
0.273	0.143
0.342	0.140
0.368	0.152
0.724	0.154
1.08	0.147
2.10	0.150
2.36	0.154
2.65	0.147
CURVE 6	**T ~ 298**
0.230	0.182
0.273	0.188
0.307	0.190
0.329	0.188
0.348	0.198
0.730	0.203
1.08	0.199
1.87	0.210
CURVE 6 (cont.)	
2.53	0.208
2.65	0.199
CURVE 7	**T ~ 298**
0.230	0.075
0.262	0.077
0.288	0.086
0.293	0.090
0.330	0.095
0.348	0.102
0.405	0.119
0.462	0.129
0.706	0.154
1.01	0.164
1.27	0.178
1.65	0.190
2.14	0.198
2.45	0.197
2.65	0.191
CURVE 8	**T ~ 298**
0.230	0.043
0.266	0.041
0.294	0.046
0.327	0.060
0.351	0.074
0.465	0.091
0.731	0.108
1.01	0.118
1.54	0.144
1.96	0.151
2.32	0.153
2.65	0.158
CURVE 9	**T ~ 298**
0.230	0.190
0.307	0.190*
0.321	0.181
0.335	0.184
0.343	0.191
CURVE 9 (cont.)	
0.687	0.187
0.844	0.174
1.67	0.182
2.43	0.182
2.59	0.176
2.65	0.171
CURVE 10	**T ~ 298**
0.230	0.063
0.285	0.063
0.333	0.053
0.349	0.053
0.426	0.040
0.600	0.036
0.961	0.054
1.65	0.095
2.14	0.111
2.42	0.118
2.54	0.118
2.65	0.112
CURVE 11	**T ~ 298**
0.230	0.080
0.275	0.078
0.310	0.060*
0.391	0.055
0.473	0.062
0.574	0.062
0.667	0.054
0.775	0.038
0.953	0.018
1.06	0.014
1.39	0.029
2.09	0.082
2.36	0.096
2.58	0.097
2.65	0.092
CURVE 12	**T ~ 298**
0.230	0.193*
0.286	0.199
0.300	0.190
0.512	0.190
0.690	0.193
0.747	0.182
1.04	0.180
2.45	0.177
2.65	0.172
CURVE 13	**T ~ 298**
0.230	0.090
0.284	0.085
0.337	0.070
0.350	0.070
0.433	0.075
0.551	0.067
0.649	0.064
0.866	0.084
0.960	0.090
1.15	0.083
1.36	0.065
1.66	0.045
2.06	0.040
2.65	0.054
CURVE 14	**T ~ 298**
0.230	0.062*
0.248	0.062
0.288	0.121
0.310	0.144
0.323	0.151
0.345	0.154
0.410	0.151
0.501	0.141
0.612	0.129
0.865	0.123
1.94	0.119
2.19	0.110
2.65	0.104
CURVE 15	**T ~ 298**
0.230	0.062*
0.279	0.062
0.548	0.045
0.851	0.049
1.15	0.071
1.65	0.142
1.96	0.174
2.65	0.172*

*Not shown on plot

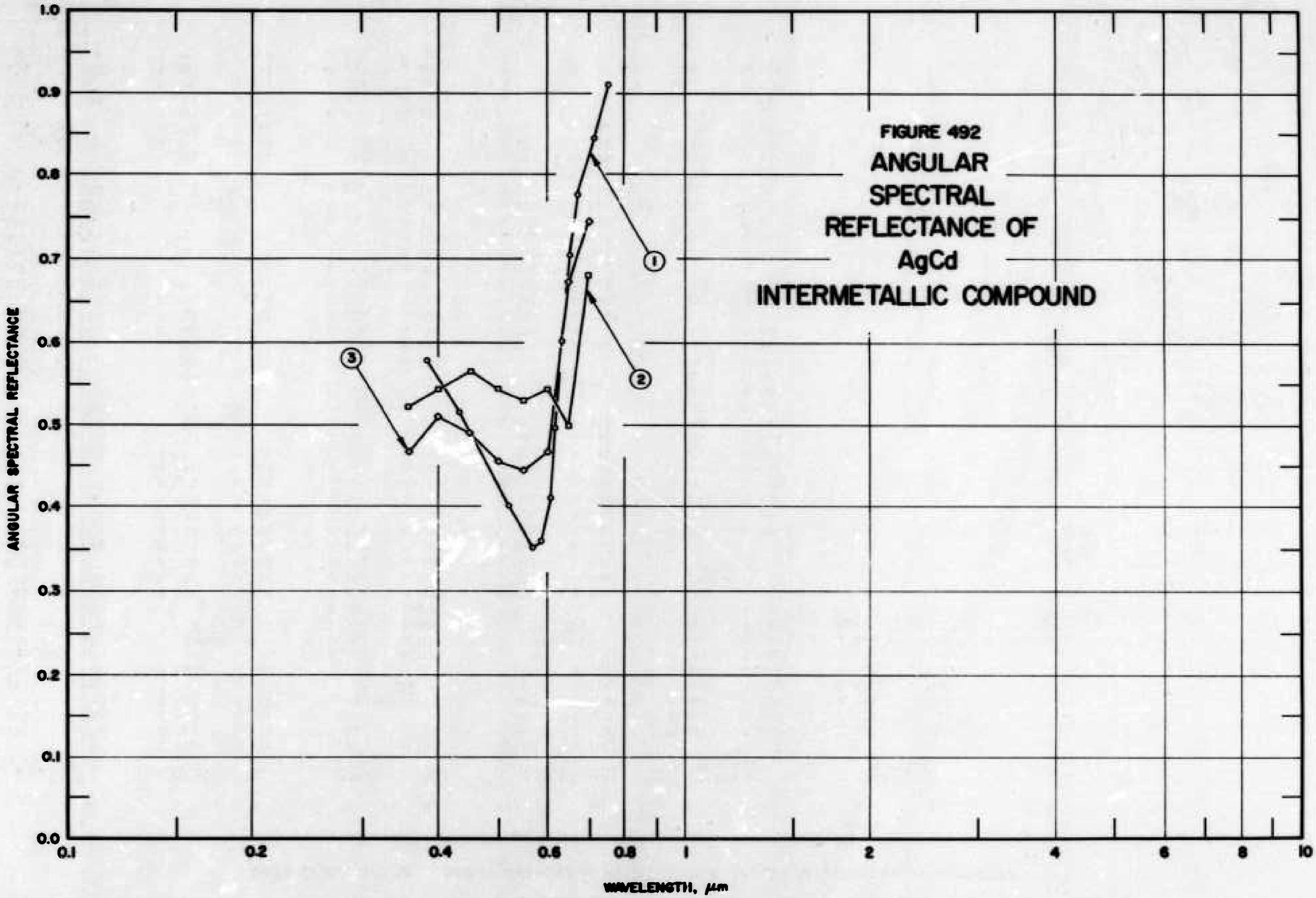


FIGURE 492
ANGULAR
SPECTRAL
REFLECTANCE OF
AgCd
INTERMETALLIC COMPOUND
1
2
3
1.0
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0.0
0.1
0.2
0.4
0.6
0.8
1
2
4
6
8
10
ANGULAR SPECTRAL REFLECTANCE
WAVELENGTH, μm

SPECIFICATION TABLE NO. 492 ANGULAR SPECTRAL REFLECTANCE OF AgCd INTERMETALLIC COMPOUNDS

Curve No.	Ref. No.	Year	Temperature K	Wavelength Range, μm	Geometry θ	θ'	ω'	Reported Error, %	Composition (weight percent), Specifications and Remarks
1	8	1961	298	0.384-0.758	45°	45°			β-phase film; 2000 Å thick; vacuum evaporated on glass; data extracted from smooth curve; radiation reflected from AgCd and glass interface using total reflection method.
2	7	1957	485	0.359-0.700	18°		2π		Polished; measured in dry hydrogen.
3	7	1957	301	0.359-0.700	18°		2π		Polished.

DATA TABLE NO. 492 ANGULAR SPECTRAL REFLECTANCE OF AgCd INTERMETALLIC COMPOUNDS

[Wavelength, λ, μm; Reflectance, ρ; Temperature, T, K]

λ	ρ	λ	ρ
CURVE 1 T = 298		CURVE 3 T = 301	
0.384	0.580	0.359	0.469
0.432	0.517	0.400	0.511
0.520	0.401	0.450	0.486
0.566	0.352	0.500	0.457
0.588	0.360	0.550	0.445
0.606	0.411	0.600	0.468
0.619	0.498	0.650	0.673
0.632	0.601	0.700	0.747
0.654	0.705		
0.671	0.777		
0.709	0.845		
0.758	0.911		
CURVE 2 T = 485			
0.359	0.522		
0.490	0.545		
0.450	0.567		
0.500	0.543		
0.550	0.530		
0.600	0.544		
0.650	0.600		
0.700	0.681		

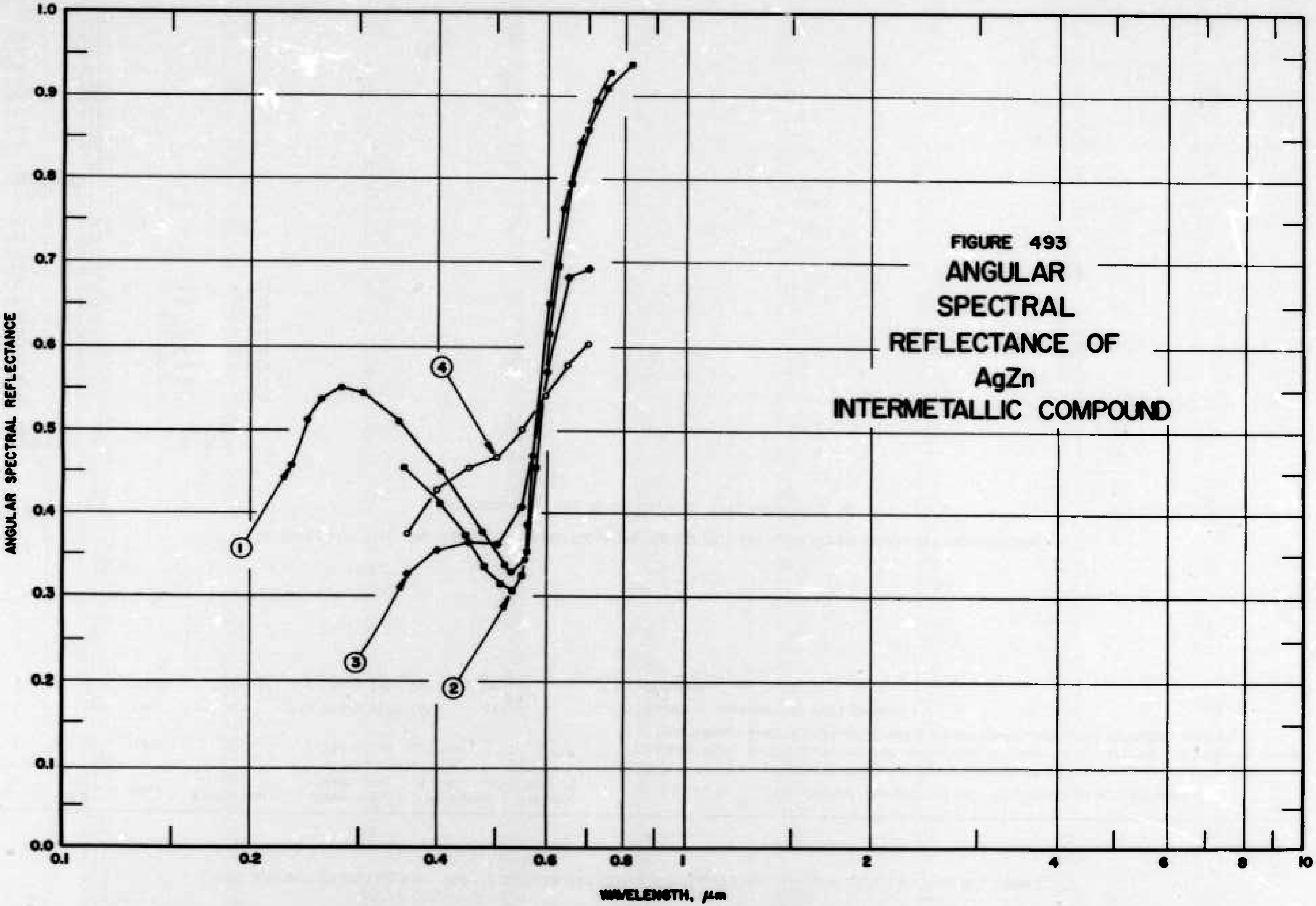


FIGURE 493
ANGULAR
SPECTRAL
REFLECTANCE OF
AgZn
INTERMETALLIC COMPOUND
ANGULAR SPECTRAL REFLECTANCE
WAVELENGTH, μm
1.0
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0.0
0.1
0.2
0.4
0.6
0.8
1
2
4
6
8
10
1
2
3
4

SPECIFICATION TABLE NO. 493 ANGULAR SPECTRAL REFLECTANCE OF AgZn INTERMETALLIC COMPOUND

Curve No.	Ref. No.	Year	Temperature K	Wavelength Range, μm	Geometry θ	θ'	ω'	Reported Error, %	Composition (weight percent), Specifications and Remarks
1	8	1961	298	0.233-0.756	45°	45°			Film, β-phase; 2.000 μm thick; vacuum evaporated on quartz; data extracted from smooth curve; radiation reflected from AgZn- quartz interface using total reflection method.
2	8	1961	298	0.354-0.818	45°	45°			Similar to above specimen and conditions except evaporated on glass.
3	7	1957	301	0.359-0.700	18°		2π		96.5 AgZn, 3.5 Au; polished.
4	7	1957	559	0.358-0.700	18°		2π		96.5 AgZn, 3.5 Au; polished; measured in dry nitrogen.

DATA TABLE NO. 493 ANGULAR SPECTRAL REFLECTANCE OF AgZn INTERFACE COMPOUND

[Wavelength, λ, μm; Reflectance, ρ; Temperature, T, K]

λ	ρ	λ	ρ	λ	ρ
CURVE 1		**CURVE 2**		**CURVE 3 (cont.)**	
T = 298		T = 298			
0.233	0.459	0.354	0.457	0.500	0.362
0.247	0.513	0.403	0.413	0.548	0.410
0.260	0.539	0.442	0.375	0.600	0.574
0.280	0.554	0.477	0.337	0.649	0.683
0.302	0.547	0.504	0.317	0.700	0.694
0.347	0.513	0.529	0.308		
0.405	0.452	0.547	0.326	**CURVE 4**	
0.474	0.379	0.557	0.356	T = 559	
0.514	0.339	0.572	0.457	0.358	0.376
0.527	0.330	0.602	0.619	0.400	0.430
0.552	0.345	0.622	0.696	0.450	0.457
0.559	0.387	0.657	0.796	0.500	0.470
0.568	0.471	0.698	0.861	0.549	0.504
0.603	0.654	0.748	0.911	0.598	0.544
0.639	0.767	0.818	0.940	0.648	0.580
0.679	0.846			0.700	0.607
0.717	0.895	**CURVE 3**			
0.756	0.931	T = 301			
		0.359	0.328		
		0.400	0.357		
		0.450	0.366		

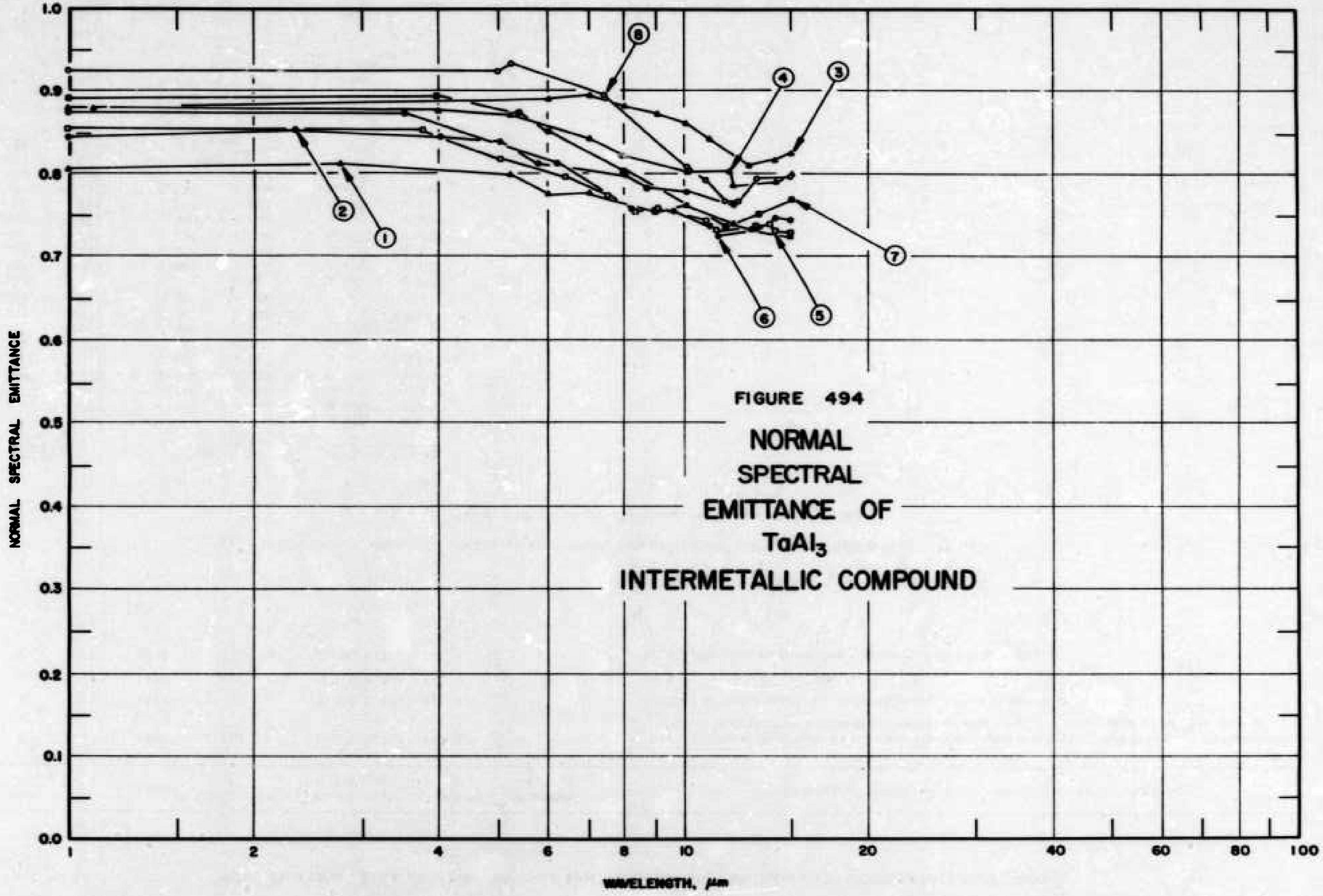


FIGURE 494

NORMAL SPECTRAL EMITTANCE OF $TaAl_3$ INTERMETALLIC COMPOUND

SPECIFICATION TABLE NO. 494 NORMAL SPECTRAL EMITTANCE OF $TaAl_3$ INTERMETALLIC COMPOUND

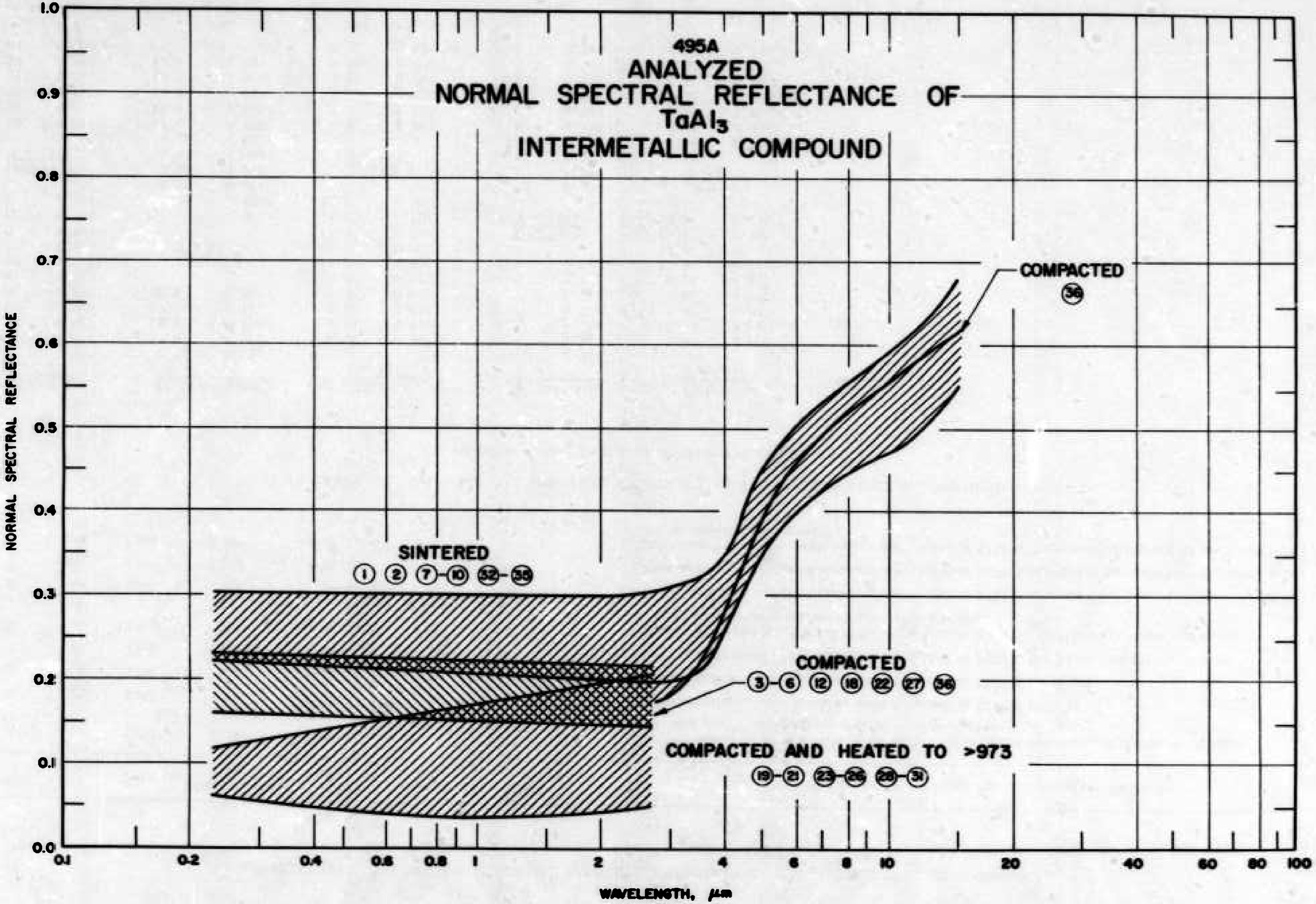
Curve No.	Ref. No.	Year	Temperature K	Wavelength Range, μm	Geometry θ'	Reported Error, %	Composition (weight percent), Specifications and Remarks
1	29	1966	1273	1.00-15.0	0°		Powder; sintered 18 hrs at 1473 K; measured in argon-hydrogen atmosphere; density 4.76 g cm^{-3}; data extracted from smooth curve.
2	29	1966	1273	1.00-15.0	0°		Above specimen and conditions except heated at 1273 K for 1 hr.
3	29	1966	1273	1.00-15.0	0°		Above specimen and conditions except heated at 1273 K for 2 hrs.
4	29	1966	1273	1.00-15.0	0°		Above specimen and conditions except heated at 1273 K for 3 hrs; density 4.80 g cm^{-3}.
5	382	1965	1273	1.00-15.0	0°		Powder; sintered 3 hrs at 1273 K; density 3.98 g cm^{-3}; measured in argon-hydrogen atmosphere; data extracted from smooth curve.
6	382	1965	1273	1.00-15.0	0°		Above specimen and conditions except heated at 1273 K in measuring apparatus for 1 hr total.
7	382	1965	1273	1.00-15.0	0°		Above specimen and conditions except heated at 1273 K in measuring apparatus for 2 hrs total.
8	382	1965	1273	1.00-15.0	0°		Above specimen and conditions except heated at 1273 K in measuring apparatus for 3 hrs total; final density 4.14 g cm^{-3}.

DATA TABLE NO. 494 NORMAL SPECTRAL EMITTANCE OF $TaAl_3$ INTERMETALLIC COMPOUND

[Wavelength, λ, μm; Emittance, ∈; Temperature, T, K]

λ	∈
CURVE 1 T = 1273	
1.00	0.807
2.79	0.812
5.26	0.800
6.01	0.779
7.03	0.779
9.00	0.754
10.1	0.763
12.0	0.740
12.8	0.733
15.0	0.726
CURVE 2 T = 1273	
1.00	0.845
2.36	0.852
4.01	0.849
5.01	0.840
5.80	0.812
8.01	0.800
CURVE 2 (cont.)	
8.70	0.782
10.0	0.779
12.0	0.763
12.9	0.747
15.0	0.747
CURVE 3 T = 1273	
1.01	0.880
4.00	0.879*
6.02	0.891
7.04	0.898
8.02	0.884
9.01	0.873
10.0	0.863
11.0	0.845
12.3	0.812
14.0	0.819
15.0	0.828
CURVE 4 T = 1273	
1.00	0.880
4.00	0.879
5.26	0.872
7.01	0.843
8.00	0.824
10.0	0.803
11.1	0.803
12.0	0.788
14.0	0.791
15.0	0.800
CURVE 5 T = 1273	
1.00	0.855
3.78	0.855
5.02	0.820
6.94	0.797
7.54	0.776
8.33	0.754
CURVE 5 (cont.)	
9.04	0.759
10.8	0.743
11.3	0.731
13.1	0.738
13.7	0.740
14.0	0.732
15.0	0.727
CURVE 6 T = 1273	
1.00	0.874
3.52	0.874
6.25	0.813
8.25	0.759
9.67	0.757
11.0	0.738
11.4	0.729
13.1	0.736
14.0	0.749
15.0	0.746
CURVE 7 T = 1273	
1.00	0.891
3.99	0.896
5.40	0.875
6.03	0.851
8.00	0.801
10.9	0.749*
11.6	0.739
13.4	0.752
15.0	0.770
CURVE 8 T = 1273	
1.00	0.925
5.00	0.925
5.23	0.935
7.48	0.896
10.1	0.810
10.9	0.793
11.6	0.769
CURVE 8 (cont.)	
12.3	0.769
13.2	0.794
15.0	0.798*

*Not shown on plot


495A
ANALYZED
NORMAL SPECTRAL REFLECTANCE OF
TaAl3
INTERMETALLIC COMPOUND
NORMAL SPECTRAL REFLECTANCE
1.0
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0.0
0.1
0.2
0.4
0.6
0.8
1
2
4
6
8
10
20
40
60
80
100
WAVELENGTH, μm
SINTERED
1 2 7-10 32-35
COMPACTED
3-6 12 18 22 27 36
COMPACTED AND HEATED TO >973
19-21 23-26 28-31
COMPACTED
36

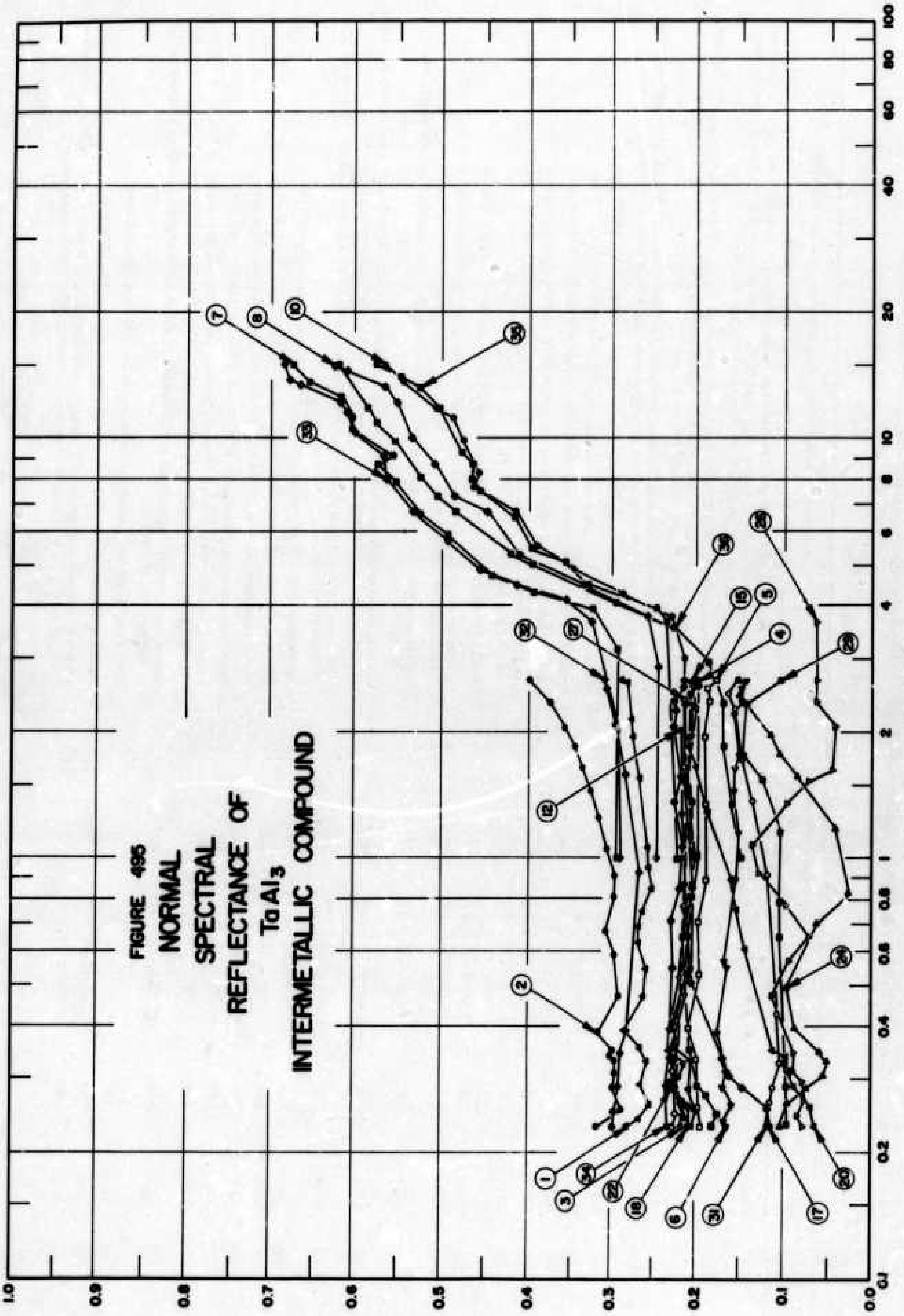


FIGURE 495
NORMAL
SPECTRAL
REFLECTANCE OF
$TaAl_3$
INTERMETALLIC COMPOUND
NORMAL SPECTRAL REFLECTANCE
WAVELENGTH, μm
0.0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
1.0
0.1
0.2
0.4
0.6
0.8
1
2
4
6
8
10
20
40
60
80
100

SPECIFICATION TABLE NO. 495 NORMAL SPECTRAL REFLECTANCE OF $TaAl_3$ INTERMETALLIC COMPOUND

Curve No.	Ref. No.	Year	Temperature K	Wavelength Range, μm	Geometry θ	θ'	ω'	Reported Error, %	Composition (weight percent), Specifications and Remarks
1	28	1963	298	0.230-2.65	~0°		2π		Powder; sintered at 1373 K for 2 hrs (setter material $TaAl_3$); density 4.53 g cm^{-3}, theoretical density 6.92 g cm^{-3}; x-ray structure $TaAl_3$; data extracted from smooth curve; MgO reference standard; [Authors' designation: Sample No. 90].
2	28	1963	298	0.230-2.65	~0°		2π		Powder; sintered at 1573 K for 2 hrs (setter material $TaAl_3$); density 4.88 g cm^{-3}, theoretical density 6.92 g cm^{-3}; data extracted from smooth curve; MgO reference standard; [Authors' designation: Sample No. 91].
3	29	1966	298	0.230-2.65	~0°		2π		Powder, commercial grade, 99% pure; compacted at 70 500 psi with highly-polished, stainless steel ram; data extracted from smooth curve; MgO reference standard.
4	29	1966	298	0.230-2.65	~0°		2π		Similar to above specimen and conditions except compacted at 35 300 psi.
5	29	1966	298	0.230-2.65	~0°		2π		Similar to above specimen and conditions except compacted at 11 800 psi.
6	29	1966	298	0.230-2.65	~0°		2π		Similar to above specimen and conditions except compacted at 2350 psi.
7	29	1966	298	1.00-15.0	~0°		2π		Sintered for 2 hrs at 1100 C; data extracted from smooth curve; converted from R(2π, 0°).
8	29	1966	298	1.00-15.0	~0°		2π		Similar to above specimen and conditions except horizontally grooved (0.047 in. wide and 0.004 in. deep) every 0.200 in.
9	29	1966	298	1.00-15.0	~0°		2π		Similar to above specimen and conditions except grooved every 0.100 in.
10	29	1966	298	1.00-15.0	~0°		2π		Similar to above specimen and conditions except grooved horizontally every 0.100 in. and vertically every 0.200 in.
11*	29	1966	298	1.00-15.0	~0°		2π		Similar to above specimen and conditions except grooved horizontally and vertically every 0.100 in.
12	29	1966	298	0.230-2.65	~0°		2π		Powder, commerical grade, 99% pure; compacted at 35 300 psi with highly-polished, stainless steel ram ; data extracted from smooth curve; MgO reference standard.
13*	29	1966	298	0.230-2.65	~0°		2π		Above specimen and conditions except heated at 773 K in an argon atmosphere (about 10 ppm oxygen) for 5 min.
14*	29	1966	298	0.230-2.65	~0°		2π		Above specimen and conditions except with 15 min total heating time.
15	29	1966	298	0.230-2.65	~0°		2π		Above specimen and conditions except with 30 min total heating time.
16*	29	1966	298	0.230-2.65	~0°		2π		Above specimen and conditions except with 60 min total heating time.
17	29	1966	298	0.230-2.65	~0°		2π		Above specimen and conditions except with 120 min total heating time.
18	29	1966	298	0.230-2.65	~0°		2π		Powder, commercial grade, 99% pure; pressed at 35 300 psi with highly-polished, stainless steel ram ; data extracted from smooth curve; MgO reference standard.
19*	29	1966	298	0.230-2.65	~0°		2π		Above specimen and conditions except heated at 973 K in an argon atmosphere (about 10 ppm oxygen) for 15 min.
20	29	1966	298	0.230-2.65	~0°		2π		Above specimen and conditions except with 30 min total heating time.
21*	29	1966	298	0.230-2.65	~0°		2π		Above specimen and conditions except with 60 min total heating time.
22	29	1966	298	0.230-2.65	~0°		2π		Powder, commercial grade, 99% pure; pressed at 35 300 psi with highly-polished, stainless steel ram ; data extracted from smooth curve; MgO reference standard.

*Not shown on plot

SPECIFICATION TABLE NO. 495 (continued)

Curve No.	Ref. No.	Year	Temperature K	Wavelength Range, μm	Geometry θ θ'	ω'	Reported Error, %	Composition (weight percent), Specifications and Remarks
23*	29	1966	298	0.230-2.65	~0°	2π		Above specimen and conditions except heated at 1173 K in an argon atmosphere (about 10 ppm oxygen) for 15 min.
24	29	1966	298	0.230-2.65	~0°	2π		Above specimen and conditions except with 30 min total heating time.
25*	29	1966	298	0.230-2.65	~0°	2π		Above specimen and conditions except with 60 min total heating time.
26	29	1966	298	0.230-2.65	~0°	2π		Above specimen and conditions except with 120 min total heating time.
27	29	1966	298	0.230-2.65	~0°	2π		Powder, commercial grade, 99% pure; pressed at 35300 psi with highly-polished, stainless steel ram ; data extracted from smooth curve; MgO reference standard.
28*	29	1966	298	0.230-2.65	~0°	2π		Above specimen and conditions except heated at 1373 K in an argon atmosphere (about 10 ppm oxygen) for 15 min.
29	29	1966	298	0.230-2.65	~0°	2π		Above specimen and conditions except with 30 min total heating time.
30*	29	1966	298	0.230-2.65	~0°	2π		Above specimen and conditions except with 60 min total heating time.
31	29	1966	298	0.230-2.65	~0°	2π		Above specimen and conditions except with 120 min total heating time.
32	382	1965	~298	0.230-2.65	~0°	2π		Powder; underfired, sintered; surface roughness 65-95 μin. ; data extracted from smooth curve; MgO reference standard.
33	382	1965	~298	1.00-15.0	~0°	2π		Above specimen and conditions; converted from R (2π, 0°).
34	382	1965	~298	0.230-2.65	~0°	2π		Similar to curve 1 specimen and conditions except surface roughened by machine grooving a grid pattern ~0.004 in. deep with line spacing 0.001 in.
35	382	1965	~298	1.00-15.0	~0°	2π		Above specimen and conditions; converted from R(2π, 0°).
36	393	1966	~298	1.00-15.0	~0°	2π		Powder, compacted at 21 000 psi; data extracted from smooth curve; converted from R (2π, 0°).

*Not shown on plot

DATA TABLE NO. 495 NORMAL SPECTRAL REFLECTANCE OF $TaAl_3$ INTERMETALLIC COMPOUND

[Wavelength, λ, μm; Reflectance, ρ; Temperature, T, K]

λ	ρ
CURVE 1 T = 298	
0.230	0.280
0.240	0.264
0.250	0.255*
0.260	0.251
0.270	0.255*
0.280	0.257*
0.290	0.261
0.300	0.260*
0.310	0.257*
0.330	0.257
0.340	0.261*
0.351	0.263
0.390	0.281
0.470	0.260
0.551	0.257
0.626	0.266
0.688	0.266
0.748	0.261
0.847	0.250
0.949	0.253
1.04	0.255
1.15	0.258*
1.34	0.261*
1.54	0.265
1.75	0.266*
1.94	0.271
2.15	0.273
2.35	0.278*
2.54	0.279*
2.61	0.280
2.65	0.285
CURVE 2 T = 298	
0.230	0.318
0.241	0.295*
0.251	0.286
0.270	0.288*
0.287	0.297
0.310	0.294
0.320	0.294*
0.330	0.294
0.340	0.300
CURVE 2 (cont.)	
0.350	0.299
0.387	0.313
0.471	0.290
0.589	0.296
0.675	0.305
0.803	0.296
0.908	0.296
1.05	0.305
1.24	0.313
1.45	0.324
1.65	0.335
1.85	0.345
2.05	0.358
2.15	0.362*
2.25	0.367*
2.35	0.375
2.45	0.381*
2.61	0.389*
2.65	0.400
CURVE 3 T = 298	
0.230	0.218
0.237	0.218*
0.246	0.214
0.262	0.214
0.274	0.220
0.293	0.222
0.306	0.218
0.325	0.213
0.350	0.230
0.391	0.229
0.520	0.219
1.13	0.205
1.64	0.210
2.34	0.210
2.65	0.207
CURVE 4 T = 298	
0.231	0.204
0.251	0.200
0.281	0.207
CURVE 4 (cont.)	
0.330	0.205
0.351	0.221
0.423	0.221
0.549	0.206
0.648	0.209
1.01	0.198
1.65	0.200
2.28	0.200
2.65	0.196
CURVE 5 T = 298	
0.230	0.192
0.255	0.194
0.261	0.193*
0.280	0.201
0.331	0.197
0.351	0.204*
0.390	0.208
0.524	0.193
0.710	0.196
0.882	0.186
1.34	0.189
1.56	0.187*
1.96	0.189
2.39	0.183
2.52	0.184
2.65	0.176
CURVE 6 T = 298	
0.230	0.164
0.235	0.167
0.259	0.158
0.282	0.168
0.310	0.163
0.341	0.166*
0.351	0.168*
0.383	0.173
0.552	0.162
0.645	0.164
0.882	0.153
1.15	0.150
CURVE 6 (cont.)	
1.42	0.154
1.61	0.154
1.75	0.150
2.02	0.155
2.38	0.148
2.51	0.148
2.65	0.143
CURVE 7 T = 298	
1.00	0.291
3.16	0.291
3.96	0.321
4.33	0.395
4.75	0.441
5.81	0.492
6.60	0.524
7.89	0.552
8.73	0.571
9.03	0.557
10.4	0.602
11.0	0.602
11.7	0.615*
12.7	0.619
13.6	0.665
15.0	0.675
CURVE 8 T = 298	
1.00	0.274
2.87	0.243
3.79	0.258
4.42	0.335
5.24	0.411
6.41	0.448
7.33	0.485
8.65	0.508
10.0	0.534
12.0	0.550
13.0	0.564
13.4	0.591*
14.3	0.610
15.0	0.626
CURVE 9	
1.00	0.247
2.87	0.243
3.79	0.258
4.42	0.335
5.24	0.411
6.41	0.448
7.33	0.485
8.65	0.508
10.0	0.534
12.0	0.550
13.0	0.564
13.4	0.591
14.3	0.610
15.0	0.626
CURVE 10 T = 298	
1.00	0.216
3.00	0.215
3.74	0.228
4.26	0.284
4.86	0.349
5.59	0.390
6.65	0.416
7.64	0.462
8.30	0.457
9.98	0.474
11.1	0.487
11.9	0.508
13.8	0.543
15.0	0.566
CURVE 11* T = 298	
1.00	0.216
3.00	0.215
3.74	0.228
4.26	0.284
4.86	0.349
5.59	0.390
6.65	0.416
7.64	0.462
8.30	0.457
CURVE 11 (cont.)*	
9.98	0.474
11.1	0.487
11.9	0.508
13.8	0.543
15.0	0.566
CURVE 12	
0.230	0.200*
0.261	0.205*
0.288	0.222
0.311	0.220*
0.329	0.220*
0.350	0.227*
0.356	0.227*
0.544	0.224*
0.658	0.226*
0.877	0.212
0.998	0.216*
1.28	0.218
2.14	0.218
2.38	0.213*
2.65	0.211*
CURVE 13*	
0.230	0.200
0.261	0.205
0.288	0.222
0.311	0.220
0.329	0.200
0.350	0.227
0.356	0.227
0.544	0.224
0.658	0.226
0.877	0.212
0.998	0.216
1.28	0.218
2.14	0.218
2.38	0.213
2.65	0.211
CURVE 14* T = 298	
0.230	0.185
0.236	0.185
0.252	0.178
0.275	0.196
0.288	0.201
0.324	0.202
0.350	0.209
0.649	0.214
0.851	0.205
1.38	0.204
1.49	0.209
2.33	0.209
2.41	0.205
2.53	0.205
2.65	0.200
CURVE 15 T = 298	
0.230	0.180
0.239	0.180*
0.247	0.173
0.258	0.176*
0.271	0.186
0.289	0.197
0.330	0.201*
0.350	0.204
0.646	0.213
0.815	0.204
1.36	0.204
1.48	0.209
2.32	0.209*
2.43	0.205
2.52	0.205*
2.58	0.200
2.65	0.200
CURVE 16* T = 298	
0.230	0.148
0.250	0.151
0.296	0.181
0.330	0.187
CURVE 16 (cont.)*	
0.350	0.203
0.646	0.212
0.845	0.205
1.36	0.205
1.50	0.210
2.33	0.210
2.41	0.204
2.51	0.204
2.59	0.199
2.65	0.199
CURVE 17 T = 298	
0.230	0.115
0.254	0.119
0.284	0.146
0.318	0.160
0.334	0.168
0.350	0.178*
0.514	0.204
0.651	0.213
0.853	0.202
1.35	0.202
1.50	0.211
2.30	0.211
2.40	0.203*
2.50	0.203*
2.57	0.199
2.65	0.199*
CURVE 18 T = 298	
0.230	0.207
0.258	0.207
0.295	0.227
0.314	0.221
0.337	0.228
0.350	0.229*
0.547	0.226
0.704	0.228
0.856	0.219
1.06	0.214
1.37	0.223

* Not shown on plot

DATA TABLE NO. 495 (continued)

λ	ρ
CURVE 18 (cont.)	
T = 298	
1.59	0.219
2.04	0.226
2.22	0.222
2.37	0.225
2.56	0.215
2.65	0.215
CURVE 19*	
T = 298	
0.230	0.075
0.241	0.078
0.264	0.082
0.287	0.098
0.331	0.101
0.350	0.118
0.654	0.153
1.04	0.175
1.39	0.192
1.64	0.199
2.03	0.204
2.37	0.207
2.65	0.203
CURVE 20	
T = 298	
0.230	0.066
0.254	0.069
0.288	0.088
0.318	0.091
0.339	0.096
0.350	0.111
0.603	0.141
0.758	0.152
0.890	0.156
1.29	0.185
1.65	0.199*
1.88	0.210
2.35	0.210*
2.65	0.202*
CURVE 21*	
T = 298	
0.230	0.057
CURVE 21 (cont.)*	
0.253	0.057
0.277	0.069
0.296	0.079
0.330	0.084
0.344	0.088
0.350	0.100
0.710	0.139
0.819	0.138
1.16	0.166
1.64	0.188
1.82	0.202
2.04	0.202
2.16	0.207
2.36	0.207
2.65	0.201
CURVE 22	
T = 298	
0.230	0.209*
0.242	0.212
0.263	0.215
0.289	0.228
0.304	0.219*
0.339	0.221
0.350	0.225*
0.402	0.225
0.525	0.210
0.755	0.211
1.00	0.200
1.43	0.209
1.97	0.209
2.65	0.199*
CURVE 23*	
0.230	0.069
0.247	0.068
0.282	0.099
0.304	0.127
0.334	0.146
0.347	0.151
0.433	0.123
0.573	0.068
0.695	0.044
0.948	0.063
1.38	0.119
CURVE 23 (cont.)*	
1.71	0.145
2.14	0.172
2.65	0.188
CURVE 24	
T = 298	
0.230	0.102
0.261	0.095
0.283	0.073
0.302	0.056
0.330	0.050
0.348	[illegible]
0.398	0.087
0.496	0.099
0.700	0.061
0.891	0.028
1.17	0.041
1.58	0.084
1.79	0.104
1.99	0.118
2.40	0.150
2.65	0.150
CURVE 25*	
T = 298	
0.230	0.092
0.241	0.089
0.261	0.070
0.287	0.075
0.310	0.095
0.343	0.107
0.350	0.101
0.463	0.078
0.572	0.099
0.695	0.132
0.806	0.119
1.05	0.066
1.30	0.037
1.70	0.042
1.97	0.064
2.21	0.093
2.44	0.106
2.65	0.106
CURVE 26	
T = 298	
0.230	0.077
0.246	0.081
0.267	0.075
0.292	0.077
0.311	0.089
0.346	0.088
0.350	0.091*
0.469	0.111
0.561	0.093
0.650	0.070
0.775	0.098
0.910	0.129
1.08	0.134
1.34	0.098
1.51	0.070
1.80	0.047
2.04	0.042
2.38	0.061
2.65	0.062
CURVE 27	
T = 298	
0.230	0.226
0.249	0.221
0.291	0.229*
0.313	0.226
0.344	0.226
0.350	0.226*
0.778	0.212
1.65	0.212
2.39	0.212
2.65	0.204*
CURVE 28*	
T = 298	
0.230	0.102
0.245	0.086
0.280	0.087
0.330	0.088
0.350	0.088
0.512	0.085
0.680	0.092
0.866	0.081
1.14	0.114
CURVE 28 (cont.)*	
1.39	0.133
1.65	0.129
2.21	0.095
2.48	0.081
2.55	0.080
2.65	0.071
CURVE 29	
T = 298	
0.231	0.096
0.279	0.096
0.329	0.098
0.650	0.101
0.796	0.102
1.15	0.101
1.51	0.125
1.76	0.144
2.31	0.141
2.65	0.111
CURVE 30*	
T = 298	
0.230	0.097
0.280	0.097
0.330	0.097
0.908	0.104
1.23	0.120
1.74	0.132
1.86	0.130
2.02	0.138
2.29	0.141
2.44	0.151
2.65	0.143
CURVE 31	
T = 298	
0.231	0.117
0.261	0.115
0.285	0.112
0.329	0.104
0.422	0.106
0.917	0.119
1.37	0.134
1.72	0.147
2.39	0.154
CURVE 31 (cont.)	
2.47	0.161
2.65	0.150
CURVE 32	
T ~ 298	
0.230	0.297
0.252	0.294
0.289	0.290
0.329	0.294*
0.344	0.288
0.389	0.281
0.936	0.267
1.60	0.281
2.10	0.296
2.51	0.305
2.65	0.309
CURVE 33	
T ~ 298	
1.00	0.289
2.12	0.292
3.65	0.300
3.94	0.326
4.14	0.356
4.44	0.416
4.85	0.452
5.73	0.491
6.69	0.531
8.00	0.561
9.12	0.567
10.2	0.600
11.5	0.610
12.1	0.619
12.5	0.621*
13.4	0.664
14.0	0.679
15.0	0.683
CURVE 34	
T ~ 298	
0.230	0.230
0.288	0.232
0.331	0.226*
0.351	0.224
CURVE 34 (cont.)	
0.472	0.211
0.841	0.208
1.10	0.204
1.97	0.207
2.31	0.203
2.65	0.202*
CURVE 35	
T ~ 298	
1.00	0.221
2.07	0.225*
3.69	0.233
3.91	0.248
4.56	0.328
5.03	0.367
5.52	0.394
6.53	0.419
7.56	0.455
8.00	0.465
8.72	0.466
9.34	0.476
11.7	0.502
13.1	0.524
14.0	0.549
14.8	0.565*
15.0	0.575
CURVE 36	
T ~ 298	
1.00	0.149
1.36	0.159
1.86	0.167
2.34	0.168
2.93	0.185
3.58	0.224
4.13	0.293
5.00	0.393
5.36	0.421
6.64	0.483
7.28	0.506
8.17	0.523
9.91	0.553
10.9	0.575
11.9	0.585
14.6	0.621*
15.0	0.620

* Not shown on plot

SPECIFICATION TABLE NO. 496 NORMAL TOTAL EMITTANCE OF TiAl INTERMETALLIC COMPOUND

Curve No.	Ref. No.	Year	Temperature Range, K	Geometry θ'	Reported Error, %	Composition (weight percent), Specifications and Remarks
1*	28	1963	1023	~0°		Sintered at 1473 K for 2 hrs (setter material TiAl); density 2.57 g cm^{-3}, theoretical density 4.0 g cm^{-3}; x-ray structure TiAl; intetrated from spectral data (1-15 μm); [Authors' designation: Sample No. 67].

DATA TABLE NO. 496 NORMAL TOTAL EMITTANCE OF TiAl INTERMETALLIC COMPOUND

[Temperature, T, K; Emittance, ϵ]

T	ϵ
CURVE 1*	
1023	0.96

* No plot given

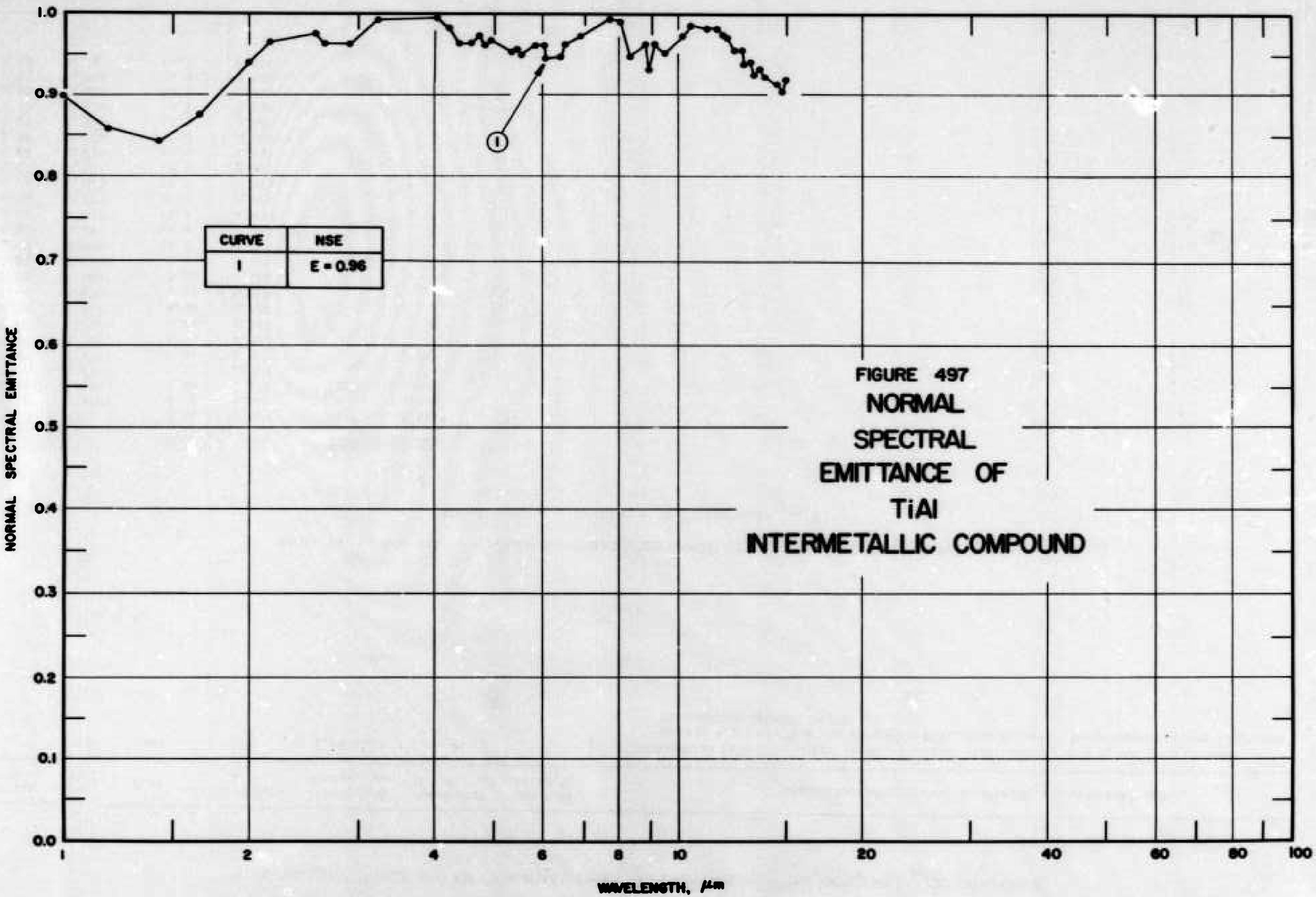


FIGURE 497
NORMAL
SPECTRAL
EMITTANCE OF
TiAl
INTERMETALLIC COMPOUND

SPECIFICATION TABLE NO. 497 NORMAL SPECTRAL EMITTANCE OF TiAl INTERMETALLIC COMPOUND

Curve No.	Ref. No.	Year	Temperature K	Wavelength Range, μm	Geometry θ θ' ω'	Reported Error, %	Composition (weight percent), Specifications and Remarks
1	28	1963	1023	1.00-15.0	~0°		Sintered at 1473 K for 2 hrs (setter material TiAl); density 2.57 g cm^{-3}, theoretical density 4.0 g cm^{-3}; x-ray structure TiAl; data extracted from smooth curve; [Authors' designation: Sample No. 67].

DATA TABLE NO. 497 NORMAL SPECTRAL EMITTANCE OF TiAl INTERMETALLIC COMPOUND

[Wavelength, λ, μ; Emittance, ε; Temperature, T, K]

λ	ε	λ	ε	λ	ε
CURVE 1 T = 1023		CURVE 1 (cont.)		CURVE 1 (cont.)	
		6.41	0.950	14.7	0.916*
1.00	0.900	6.52	0.962	14.8	0.905
1.18	0.860	6.99	0.973	15.0	0.920
1.47	0.847	7.77	0.997		
1.66	0.877	8.02	0.991		
2.00	0.942	8.31	0.950		
2.18	0.969	8.82	0.963		
2.59	0.978	8.91	0.933		
2.65	0.968	9.18	0.967		
2.92	0.968	9.52	0.953		
3.26	0.994	10.0	0.971		
4.08	0.999	10.5	0.988		
4.23	0.985	11.0	0.983		
4.40	0.969	11.5	0.983		
4.60	0.967	11.6	0.974		
4.74	0.975	12.0	0.972		
4.87	0.961	12.4	0.957		
4.96	0.970	12.6	0.957		
5.39	0.953	12.6	0.940		
5.47	0.959	13.0	0.942		
5.59	0.951	13.1	0.929		
5.82	0.961	13.5	0.932		
6.02	0.961	13.9	0.923		
6.09	0.947	14.5	0.916		

*Not shown on plot

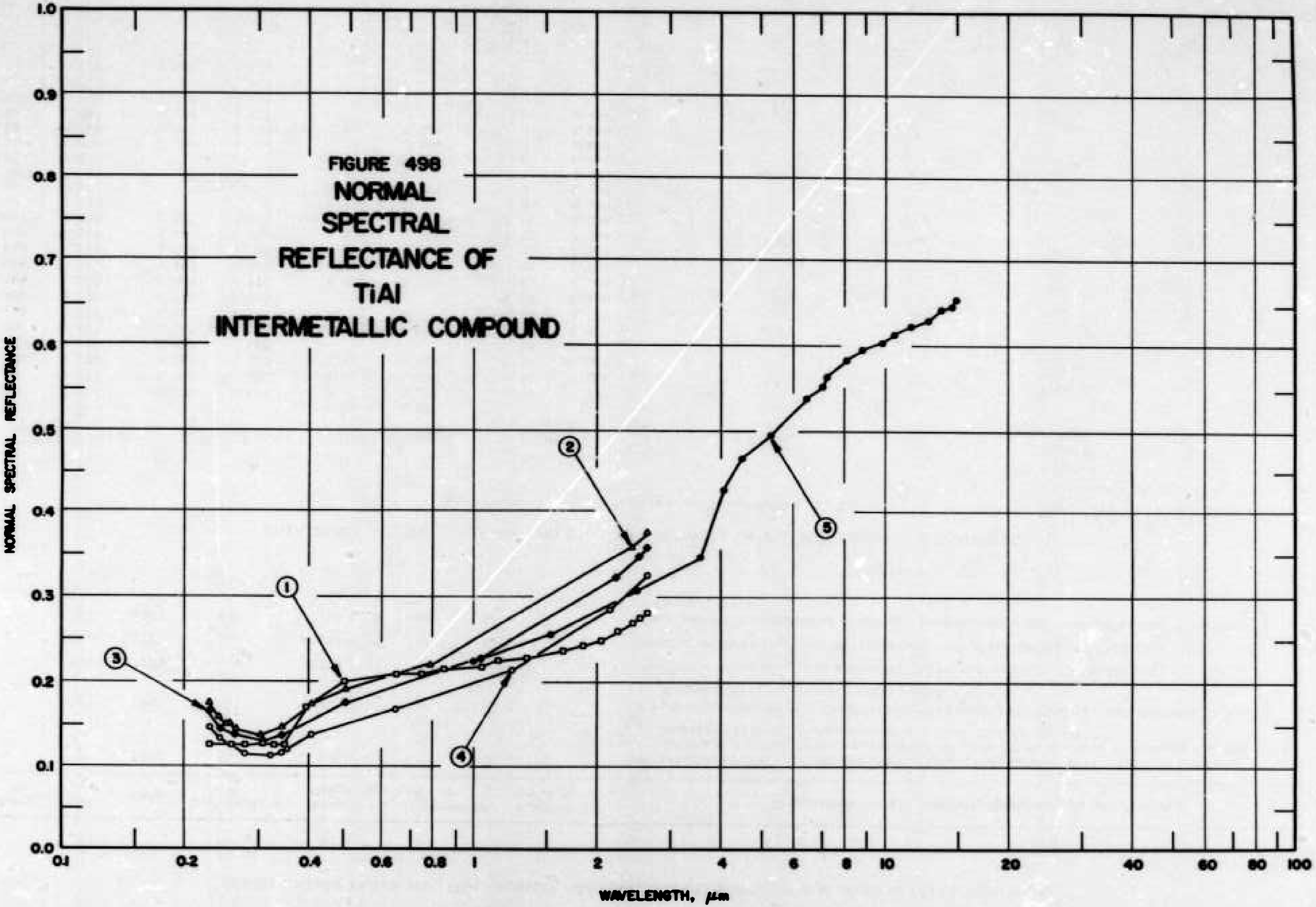


FIGURE 498
NORMAL SPECTRAL REFLECTANCE OF TiAl INTERMETALLIC COMPOUND

SPECIFICATION TABLE NO. 498 NORMAL SPECTRAL REFLECTANCE OF TiAl INTERMETALLIC COMPOUND

Curve No.	Ref. No.	Year	Temperature K	Wavelength Range, μm	Geometry θ	θ'	ω'	Reported Error, %	Composition (weight percent), Specifications and Remarks
1	28	1963	298	0.230-2.65	~0°		2π		Sintered at 1473 K for 2 hrs (setter material TiAl); density 2.57 g cm^{-3}, theoretical density 4.0 g cm^{-3}; x-ray structure TiAl; data extracted from smooth curve; MgO reference standard; [Authors' designation: Sample No. 67].
2	382	1965	~298	0.230-2.65	0°		2π		99 pure; powder; mfgr., Borolite Corp; compacted at 70 500 psi; data extracted from smooth curve; reference standard MgO.
3	382	1965	~298	0.230-2.65	0°		2π		Similar to above specimen and conditions except compacted at 35 250 psi.
4	382	1965	~298	0.230-2.65	0°		2π		Similar to above specimen and conditions except compacted at 11 750 psi.
5	395	1964	~423	1.00-15.0	~0°		2π		Pure powder; compacted at 21 000 psi; data extracted from smooth curve; converted from R (2π, 0°).

DATA TABLE NO. 498 NORMAL SPECTRAL REFLECTANCE OF TiAl INTERMETALLIC COMPOUND

[Wavelength, λ, μm; Reflectance, ρ; Temperature, T, K]

CURVE 1
T = 298

λ	ρ
0.230	0.126
0.260	0.125
0.280	0.125
0.310	0.126
0.330	0.124
0.350	0.125
0.396	0.170
0.485	0.200
0.648	0.209
0.749	0.210
0.849	0.215
1.05	0.219
1.15	0.224
1.35	0.227
1.65	0.234
1.85	0.241
2.05	0.249
2.25	0.258
2.45	0.268
2.55	0.273
2.61	0.277*
2.65	0.280

CURVE 2
T ~ 298

λ	ρ
0.230	0.174
0.242	0.159
0.252	0.150
0.259	0.150
0.267	0.143
0.305	0.137
0.344	0.145
0.407	0.171
0.497	0.190
0.786	0.220
2.44	0.359
2.65	0.376

CURVE 3
T ~ 298

λ	ρ
0.230	0.164
0.247	0.144
0.263	0.137
0.310	0.128
0.346	0.136
0.498	0.175

CURVE 3 (cont.)

λ	ρ
1.06	0.227
2.22	0.322
2.51	0.348
2.65	0.358

CURVE 4
T ~ 298

λ	ρ
0.230	0.144
0.242	0.132
0.280	0.114
0.321	0.112
0.343	0.116
0.351	0.120
0.407	0.137
0.649	0.167
1.25	0.215
2.15	0.284
2.65	0.324

CURVE 5
T ~ 423

λ	ρ
1.00	0.223
1.56	0.254
2.50	0.307
3.58	0.397
4.04	0.427
4.58	0.467
5.27	0.499
6.43	0.540
7.03	0.553
7.22	0.566
8.02	0.584
8.98	0.599
9.95	0.605
10.5	0.616
11.7	0.626
13.0	0.631
13.9	0.644
14.6	0.649
15.0	0.657

SPECIFICATION TABLE NO. 499 NORMAL TOTAL EMITTANCE OF $TiCr_2$ INTERMETALLIC COMPOUND

Curve No.	Ref. No.	Year	Temperature Range, K	Geometry θ'	Reported Error, %	Composition (weight percent), Specifications and Remarks
1*	28	1963	1023	~0°		Sintered at 1373 K for 1 hr (setter material $TiCr_2$); density 3.36 g cm^{-3}, theoretical density 6.03 g cm^{-3}; integrated from spectral data (1-15 μm); [Authors' designation: Sample No. 25].
2*	28	1963	1023	~0°		Similar to above specimen and conditions except sintered at 1423 K for 2 hrs; [Authors' designation: Sample No. 26].

DATA TABLE NO. 499 NORMAL TOTAL EMITTANCE OF $TiCr_2$ INTERMETALLIC COMPOUND

[Temperature, T, K; Emittance, ϵ]

T	ϵ
CURVE 1*	
1023	0.96
CURVE 2*	
1023	0.93

* No plot given

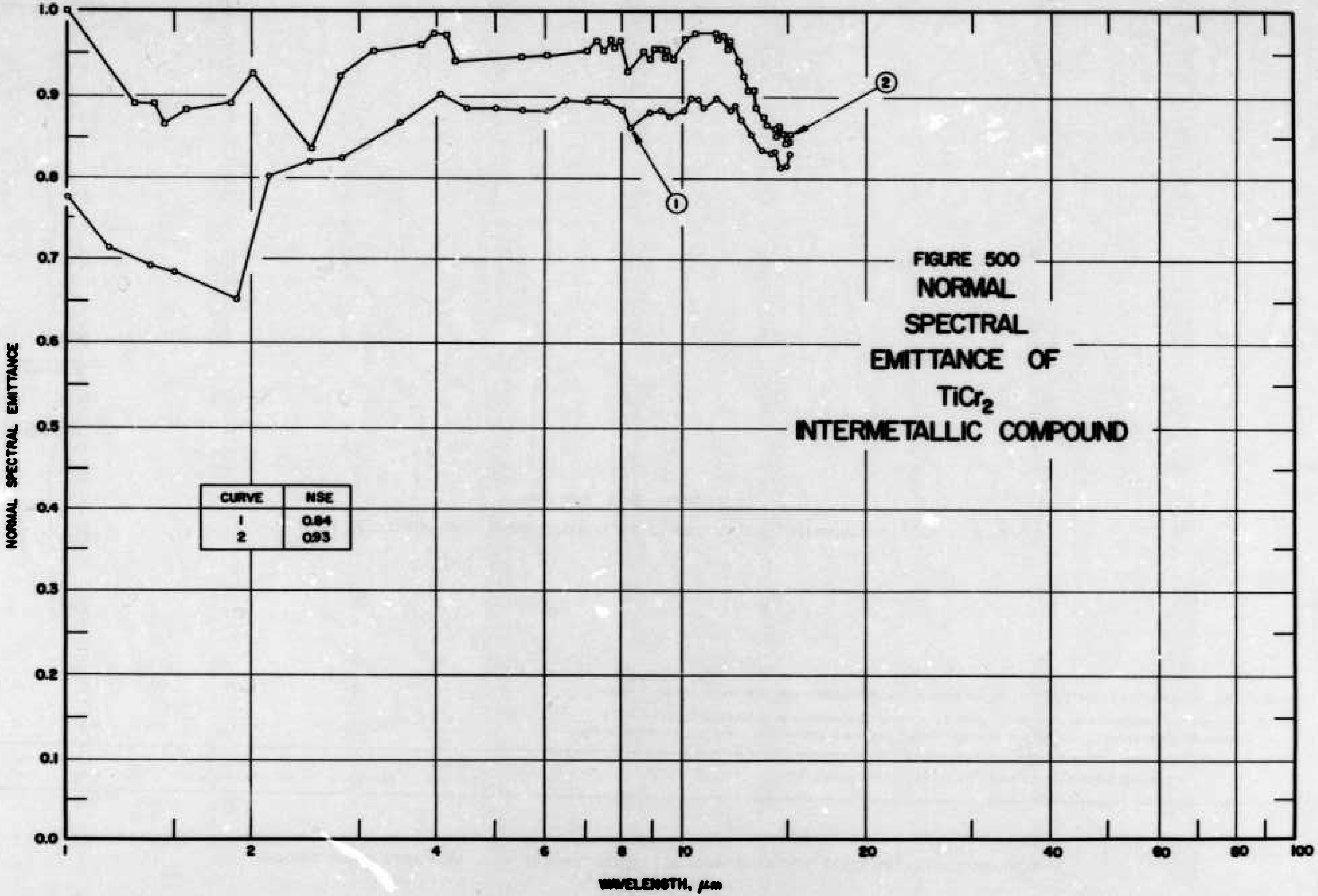


FIGURE 500 NORMAL SPECTRAL EMITTANCE OF $TiCr_2$ INTERMETALLIC COMPOUND

SPECIFICATION TABLE NO. 500 NORMAL SPECTRAL EMITTANCE OF $TiCr_2$ INTERMETALLIC COMPOUNDS

Curve No.	Ref. No.	Year	Temperature K	Wavelength Range, μm	Geometry θ θ' ω'	Reported Error, %	Composition (weight percent), Specifications and Remarks
1	28	1963	1023	1.00-15.0	~0°		Sintered at 1373 K for 1 hr (setter material $TiCr_2$); density 3.36 g cm^{-3}, theoretical density 6.03 g cm^{-3}; data extracted from smooth curve; [Authors' designation: Sample No. 25].
2	28	1963	1223	1.00-15.0	~0°		Similar to above specimen and conditions except sintered at 1423 K for 2 hrs; [Authors' designation: Sample No. 26].

DATA TABLE NO. 500 NORMAL SPECTRAL EMITTANCE OF $TiCr_2$ INTERMETALLIC COMPOUNDS

[Wavelength, λ, μm; Emittance, ϵ; Temperature, T, K]

λ	ϵ	λ	ϵ	λ	ϵ	λ	ϵ	λ	ϵ	λ	ϵ
CURVE 1 T = 1023		CURVE 1 (cont.)		CURVE 1 (cont.)		CURVE 2 (cont.)		CURVE 2 (cont.)		CURVE 2 (cont.)	
		6.00	0.957	11.5	0.969	2.27	0.937	7.51	0.940	13.8	0.895
1.00	1.00	6.14	0.971	11.6	0.972	2.38	0.941	7.70	0.949	14.0	0.882
1.09	0.969	6.27	0.954	11.7	0.959	2.47	0.930	7.84	0.940	14.5	0.878
1.40	0.911	6.44	0.974	11.8	0.967	2.57	0.939	7.99	0.950	14.6	0.867
1.46	0.920	7.01	0.978	12.1	0.964	2.75	0.922	8.28	0.917	14.8	0.871
1.63	0.902	7.12	0.970	12.5	0.953	3.11	0.953	8.49	0.924	15.0	0.865
1.76	0.916	7.42	0.982	13.0	0.938	3.55	0.958	8.82	0.931		
1.99	0.953	7.65	0.985	13.3	0.935	3.83	0.973	8.90	0.893		
2.18	0.949	7.80	0.973	13.4	0.917	3.99	0.973	9.00	0.929		
2.29	0.970	8.01	0.981	13.9	0.924	4.07	0.959	9.25	0.934		
2.59	0.960	8.18	0.937	14.1	0.912	4.21	0.959	9.44	0.924		
2.77	0.941	8.26	0.949	14.2	0.916	4.30	0.929	9.54	0.930		
2.91	0.957	8.46	0.953	14.5	0.903	4.37	0.941	9.75	0.925		
2.99	0.957	8.55	0.959	14.7	0.910	4.51	0.934	10.3	0.949		
3.01	0.968	8.64	0.950	14.8	0.897	4.62	0.945	10.4	0.945		
3.31	0.982	8.76	0.961	15.0	0.930	4.71	0.938	10.6	0.946		
3.49	0.973	8.89	0.948			5.18	0.938	10.8	0.957		
3.89	1.00	9.03	0.963	CURVE 2 T = 1223		5.30	0.931	11.5	0.949		
4.07	0.980	9.14	0.957			5.49	0.940	12.0	0.949		
4.22	0.980	9.36	0.961			5.65	0.930	12.0	0.936		
4.39	0.958	9.45	0.945	1.00	0.920	6.01	0.929	12.5	0.936		
4.48	0.970	10.0	0.963	1.33	0.878	6.19	0.925	12.9	0.922		
5.00	0.970	10.2	0.978	1.50	0.860	6.34	0.935	13.0	0.912		
5.52	0.965	11.0	0.978	1.80	0.870	6.58	0.940	13.2	0.916		
5.64	0.954	11.1	0.972	1.99	0.925	6.84	0.928	13.4	0.903		
5.72	0.969	11.1	0.991	2.17	0.925	6.95	0.943	13.5	0.903		
5.91	0.969	11.2	0.977	2.22	0.908	7.04	0.938	13.6	0.890		

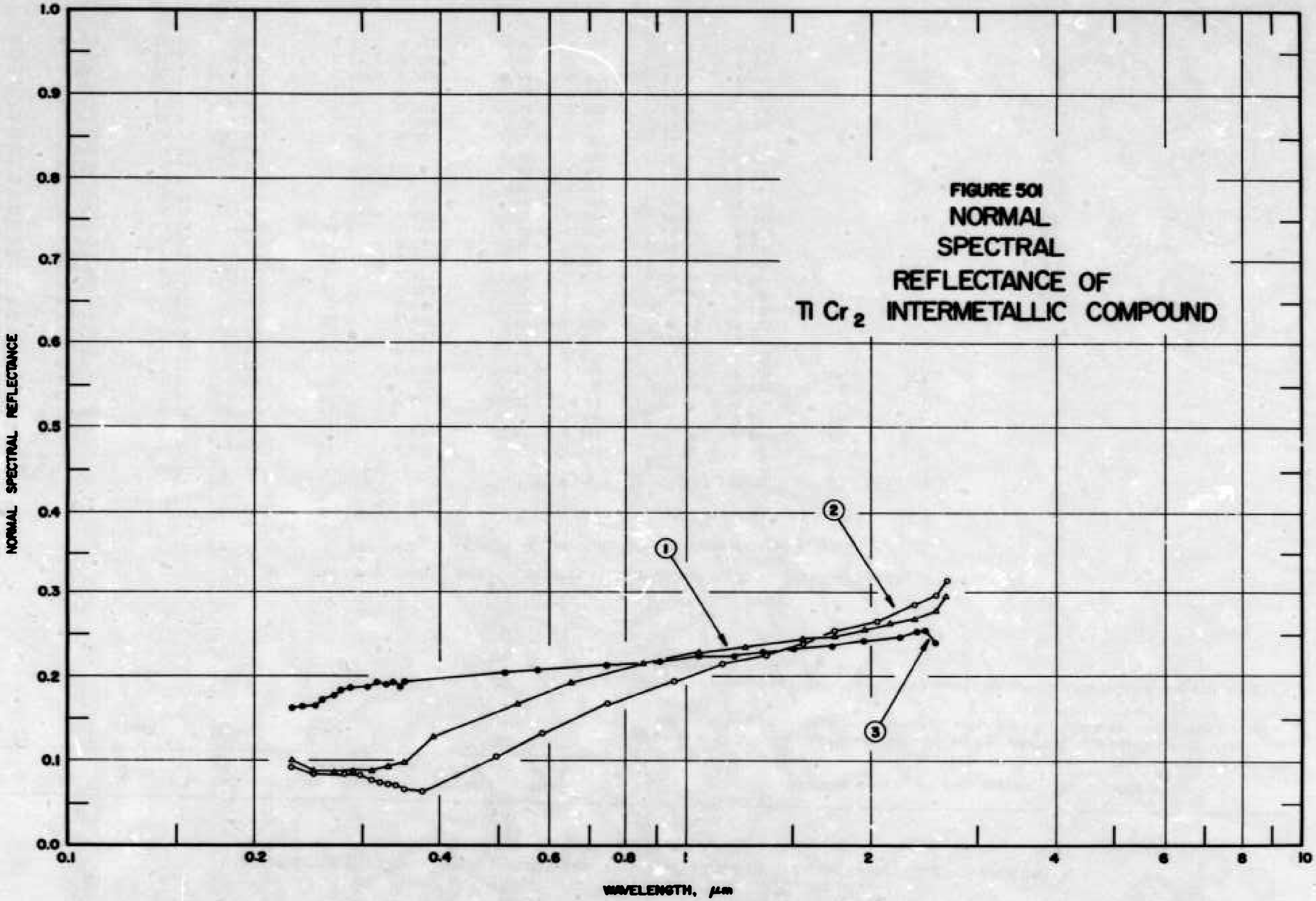


FIGURE 501
NORMAL
SPECTRAL
REFLECTANCE OF
Ti Cr_2 INTERMETALLIC COMPOUND

SPECIFICATION TABLE NO. 501 NORMAL SPECTRAL REFLECTANCE OF $TiCr_2$ INTERMETALLIC COMPOUNDS

Curve No.	Ref. No.	Year	Temperature K	Wavelength Range, μm	Geometry θ θ'	ω'	Reported Error, %	Composition (weight percent), Specifications and Remarks
1	28	1963	298	0.230-2.65	~0°	2π		Sintered at 1373 K for 1 hr (setter material $TiCr_2$); density 3.36 g cm^{-3}, theoretical density 6.03 g cm^{-3}; data extracted from smooth curve; MgO reference standard; [Authors' designation: Sample No. 25].
2	28	1963	298	0.230-2.65	~0°	2π		Similar to above specimen and conditions except sintered at 1423 K for 2 hrs; [Authors' designation: Sample No. 26].
3	342	1968	~298	0.230-2.65	0°	2π		Powder; compacted at 11 800 psi; data extracted from smooth curve; reference standard MgO.

DATA TABLE NO. 501 NORMAL SPECTRAL REFLECTANCE OF $TiCr_2$ INTERMETALLIC COMPOUNDS

[Wavelength, λ, μm; Reflectance, ρ; Temperature, T, K]

λ	ρ	λ	ρ	λ	ρ	λ	ρ
CURVE 1 T = 298		CURVE 2 T = 298		CURVE 3 T ~ 298		CURVE 3 (cont.)	
0.230	0.100	0.230	0.091	0.230	0.161	2.38	0.252
0.250	0.089	0.250	0.085	0.240	0.162	2.45	0.255
0.270	0.087	0.280	0.094	0.251	0.166	2.65	0.240
0.290	0.088	0.299	0.081	0.258	0.171		
0.310	0.089	0.310	0.079	0.270	0.178		
0.330	0.092	0.320	0.076	0.277	0.183		
0.350	0.098	0.330	0.072	0.288	0.186		
0.390	0.129	0.340	0.071	0.304	0.188		
0.533	0.169	0.350	0.069	0.319	0.191		
0.650	0.192	0.372	0.065	0.329	0.190		
0.850	0.216	0.494	0.102	0.335	0.191		
1.05	0.229	0.582	0.131	0.343	0.189		
1.25	0.235	0.746	0.169	0.350	0.192		
1.55	0.243	0.951	0.194	0.510	0.204		
1.75	0.249	1.15	0.213	0.577	0.207		
1.95	0.255	1.35	0.226	0.741	0.212		
2.15	0.261	1.55	0.239	0.908	0.219		
2.35	0.268	1.75	0.251	1.06	0.223		
2.55	0.278	2.05	0.266	1.20	0.223		
2.65	0.295	2.35	0.286	1.34	0.228		
		2.56	0.298	1.51	0.231		
		2.60	0.303*	1.73	0.237		
		2.65	0.314	1.96	0.241		
				2.23	0.248		

*Not shown on plot

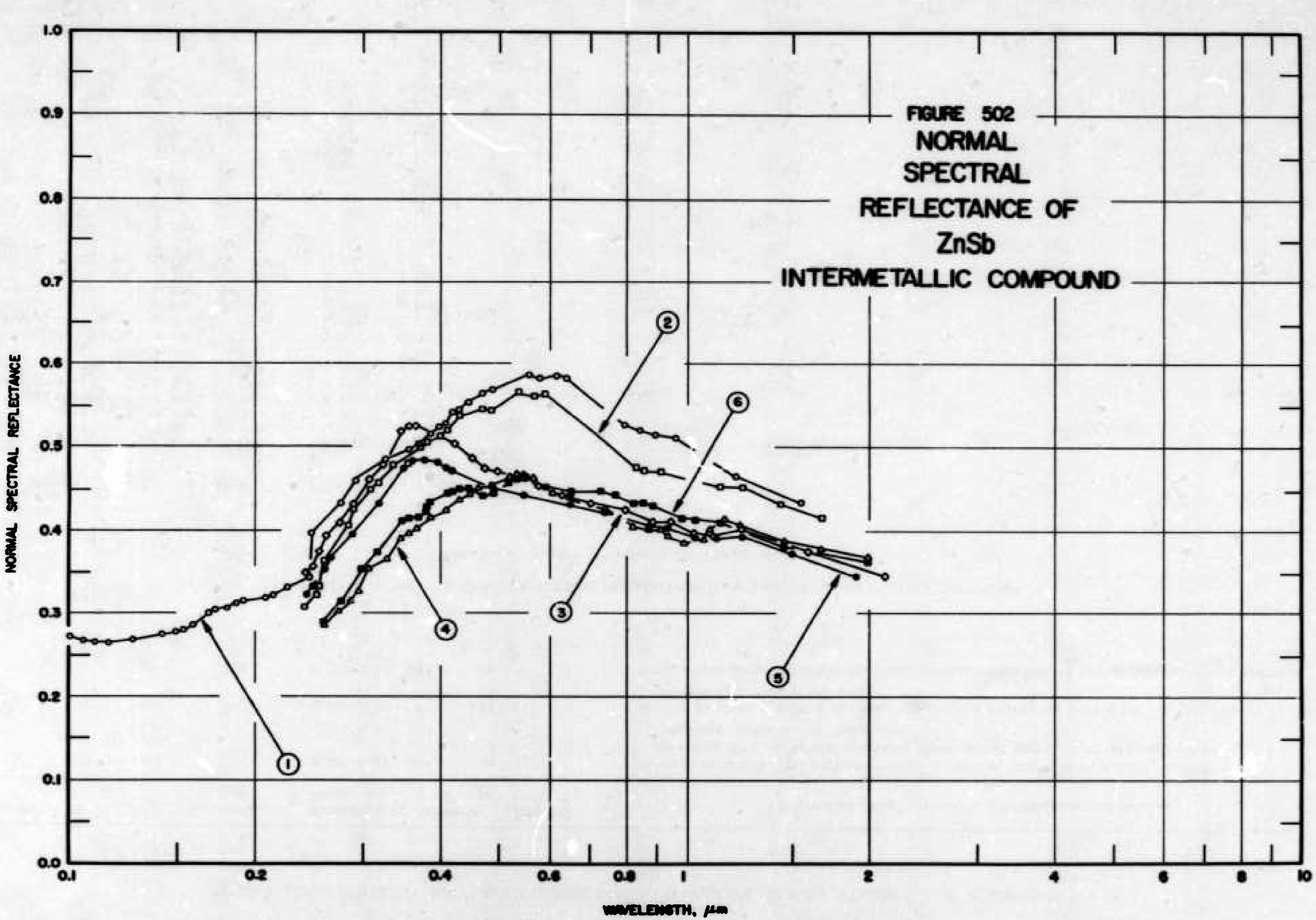


FIGURE 502 NORMAL SPECTRAL REFLECTANCE OF ZnSb INTERMETALLIC COMPOUND

SPECIFICATION TABLE NO. 502 NORMAL SPECTRAL REFLECTANCE OF ZnSb INTERMETALLIC COMPOUND

Curve No.	Ref. No.	Year	Temperature K	Wavelength Range, μm	Geometry θ	θ'	ω'	Reported Error, %	Composition (weight percent), Specifications and Remarks
1	354	1968	300	0.100-1.50	~0°	~0°			Single crystal; cleaved surface; incident beam polarized with E parallel to a-axis; data extracted from smooth curve.
2	354	1968	77	0.240-1.65	~0°	~0°			Similar to above specimen and conditions.
3	354	1968	300	0.241-2.10	~0°	~0°			Similar to curve 1 specimen and conditions except incident beam polarized with E parallel to b-axis.
4	354	1968	77	0.259-1.97	~0°	~0°			Similar to above specimen and conditions.
5	354	1968	300	0.241-1.88	~0°	~0°			Similar to curve 1 specimen and conditions except incident beam polarized with E parallel to c-axis.
6	354	1368	77	0.257-1.97	~0°	~0°			Similar to above specimen and conditions.

DATA TABLE NO. 502 NORMAL SPECTRAL REFLECTANCE OF ZnSb INTERMETALLIC COMPOUND

[Wavelength, λ, μm; Reflectance, ρ; Temperature, T, K]

λ	ρ	λ	ρ	λ	ρ	λ	ρ	λ	ρ
CURVE 1 T = 300		CURVE 2 T = 77		CURVE 3 (cont.)		CURVE 4 (cont.)		CURVE 6 (cont.)	
0.100	0.271	0.240	0.308	0.449	0.488	0.984	0.386	0.368	0.417
0.105	0.268	0.251	0.323	0.470	0.477	1.06	0.390	0.376	0.422
0.110	0.266	0.253	0.333	0.492	0.472	1.08	0.401	0.378	0.430
0.116	0.266	0.258	0.362	0.546	0.466	1.15	0.417	0.38[illegible]	0.435
0.127	0.269	0.281	0.407	0.574	0.455	1.22	0.409	0.40[illegible]	0.446
0.142	0.274	0.288	0.427	0.623	0.444	1.43	0.389	0.416	0.449
0.148	0.277	0.307	0.450	0.697	0.435	1.65	0.378	0.428	0.451
0.153	0.280	0.315	0.458	0.795	0.428	1.97	0.369	0.441	0.451
0.158	0.286	0.332	0.480	0.879	0.412	CURVE 5 T = 300		0.466	0.444
0.167	0.300	0.350	0.481	0.939	0.412	0.241	0.323	0.486	0.447
0.172	0.303	0.367	0.500	1.02	0.399	0.248	0.333	0.512	0.459
0.180	0.307	0.379	0.505	1.10	0.395	0.259	0.352	0.530	0.462
0.186	0.314	0.399	0.513	1.23	0.402	0.264	0.368	0.590	0.452
0.191	0.316	0.408	0.520	1.57	0.374	0.288	0.397	0.649	0.449
0.207	0.320	0.426	0.538	2.10	0.347	0.316	0.434	0.725	0.449
0.213	0.323	0.443	0.538	CURVE 4 T = 77		0.348	0.478	0.765	0.445
0.225	0.332	0.466	0.546	0.259	0.286	0.359	0.485	0.816	0.433
0.243	0.344	0.482	0.545	0.272	0.301	0.375	0.485	0.844	0.433
0.244	0.398	0.534	0.568	0.285	0.317	0.395	0.482	0.879	0.431
0.273	0.433	0.564	0.563	0.293	0.329	0.407	0.477	0.976	0.416
0.291	0.460	0.588	0.566	0.304	0.354	0.418	0.471	1.02	0.413
0.325	0.487	0.821	0.479	0.325	0.366	0.486	0.451	1.13	0.411
0.353	0.498	0.849	0.474	0.341	0.390	0.541	0.444	1.44	0.380
0.367	0.502	0.905	0.473	0.351	0.397	0.649	0.434	1.97	0.361
0.383	0.517	1.13	0.454	0.362	0.402	0.734	0.425		
0.397	0.522	1.23	0.454	0.382	0.418	0.861	0.407		
0.405	0.528	1.41	0.434	0.407	0.426	0.925	0.404		
0.416	0.542	1.65	0.417	0.428	0.438	1.02	0.392		
0.426	0.545	CURVE 3 T = 300		0.443	0.440	1.11	0.391		
0.441	0.550	0.241	0.350	0.459	0.451	1.23	0.394		
0.466	0.567	0.247	0.357	0.482	0.433	1.48	0.372		
0.482	0.570	0.253	0.374	0.515	0.466	1.88	0.347		
0.554	0.589	0.260	0.394	0.530	0.469	CURVE 6 T = 77			
0.579	0.584	0.273	0.410	0.544	0.469	0.257	0.290		
0.611	0.588	0.289	0.432	0.561	0.465	0.274	0.316		
0.636	0.584	0.305	0.464	0.605	0.447	0.296	0.354		
0.795	0.526	0.322	0.480	0.649	0.447	0.315	0.373		
0.838	0.520	0.343	0.519	0.738	0.428	0.345	0.412		
0.886	0.515	0.353	0.525	0.816	0.406	0.352	0.416		
0.954	0.511	0.362	0.525	0.867	0.404				
1.20	0.468	0.420	0.502	0.905	0.401				
1.53	0.434			0.925	0.394				

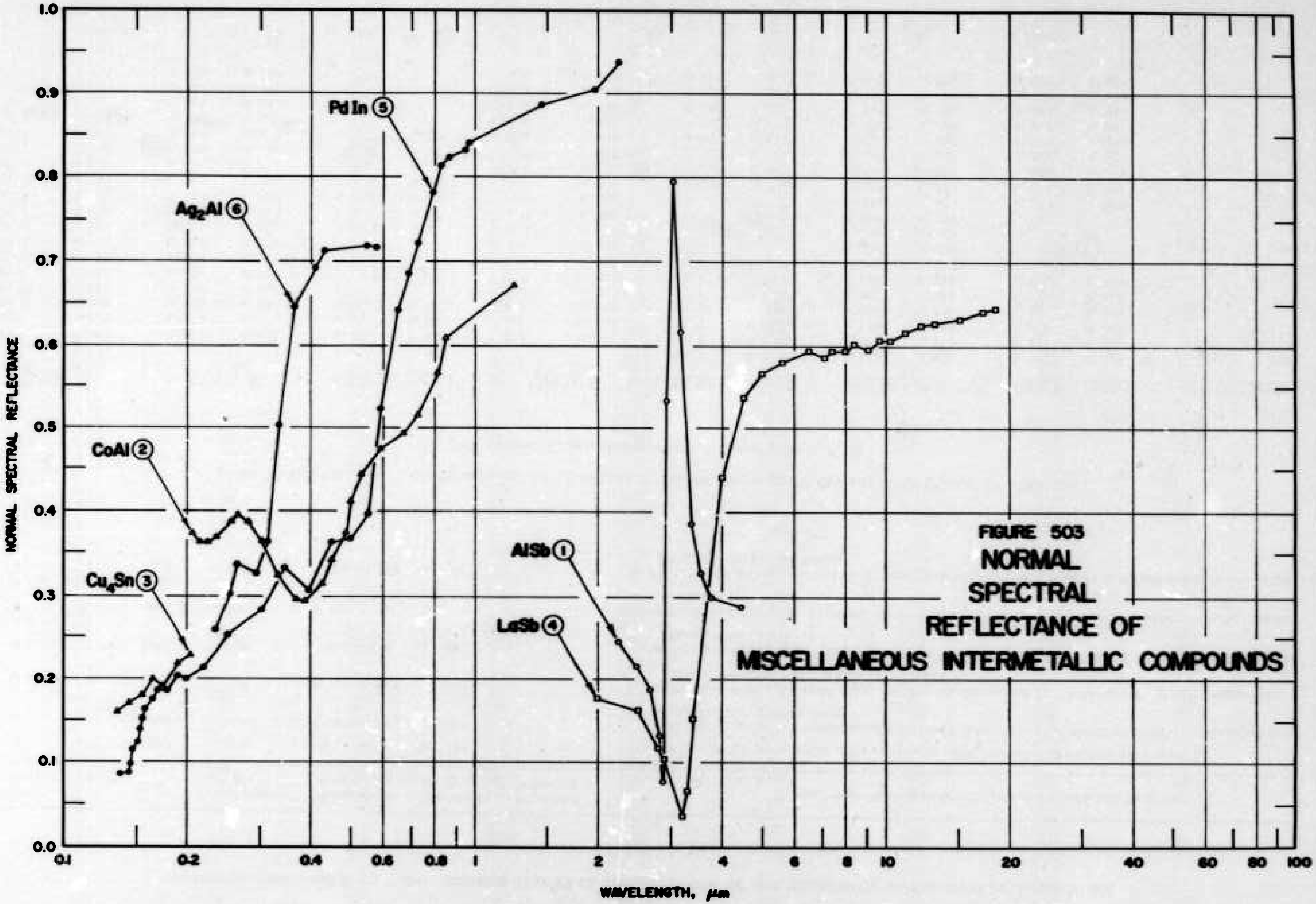


FIGURE 503 NORMAL SPECTRAL REFLECTANCE OF MISCELLANEOUS INTERMETALLIC COMPOUNDS

SPECIFICATION TABLE NO. 503 NORMAL SPECTRAL REFLECTANCE OF MISCELLANEOUS INTERMETALLIC COMPOUNDS

Curve No.	Ref. No.	Year	Temperature K	Wavelength Range, μm	Geometry θ	θ'	ω'	Reported Error, %	Composition (weight percent), Specifications and Remarks
1	418	1962	~298	22.2-44.1	10°	10°			AlSb; crystal; polished to mirror finish; data extracted from smooth curve.
2	329	1966	~298	0.207-1.24	~0°	~0°			CoAl; 50.3 at. % Co; mechanically polished down to 0.05 μ alumina powder; calculated from angular reflectance data.
3	14	1941	298	0.134-0.202	~0°	~0°			Cu_4Sn; speculum; nominal composition: 68.25 Cu and 31.75 Sn; polished with magnesium oxide; measured in vacuum (10^{-3} mm Hg).
4	321	1967	~298	2.0-18.6	~0°	~0°			LaSb; monocrystalline chip; carrier concentration 2.7 x 10^{21} cm^{-3}; [Authors' designation: Sample No. 2].
5	331	1967	~298	0.139-2.21	7°	7°			PdIn; β-phase; single crystal; surface mechanically polished and cleaned with ethyl alcohol and distilled water.
6	11	1934	298	0.235-0.578	~0°	~0°			Ag_3Al; cold worked; annealed in inert gas for 6-24 hrs; stored in dilute solutions of NaOH, NaOH + NaF, and HNO_3.

DATA TABLE NO. 503 NORMAL SPECTRAL REFLECTANCE OF MISCELLANEOUS INTERMETALLIC COMPOUNDS

[Wavelength, λ, μm; Reflectance, ρ; Temperature, T, K]

λ	ρ
CURVE 1 T ~ 298	
22.2	0.244
24.9	0.218
26.7	0.188
28.1	0.131
28.8	0.078
29.3	0.532
29.4	0.768
29.6	0.786
30.1	0.797
30.7	0.777
31.7	0.617
33.9	0.386
35.1	0.328
37.4	0.300
44.1	0.287
CURVE 2 T ~ 298	
0.207	0.372
0.215	0.361
0.225	0.361
0.236	0.369
0.258	0.388
0.268	0.396
0.282	0.388
0.305	0.362
0.332	0.325
0.370	0.297
0.389	0.283
0.426	0.315
0.456	0.343
0.484	0.378
0.500	0.411
0.532	0.442
0.590	0.472
0.670	0.492
CURVE 2 (cont.)	
0.725	0.516
0.816	0.566
0.954	0.610
1.24	0.672
CURVE 3 T = 298	
0.135	0.16
0.144	0.17
0.157	0.18
0.164	0.20
0.176	0.19
0.190	0.22
0.203	0.23
CURVE 4 T ~ 298	
2.0	0.177
2.5	0.162
2.8	0.119
2.9	0.103
3.2	0.037
3.3	0.065
3.4	0.151
4.0	0.440
4.5	0.538
5.0	0.566
5.6	0.580
6.5	0.595
7.1	0.587
7.4	0.594
8.0	0.595
8.4	0.602
9.1	0.598
9.7	0.608
CURVE 4 (cont.)	
10.1	0.608
11.1	0.619
12.2	0.624
13.2	0.628
15.1	0.632
17.1	0.641
18.6	0.645
CURVE 5 T ~ 298	
0.139	0.084
0.143	0.088
0.145	0.099
0.147	0.117
0.151	0.125
0.153	0.140
0.157	0.151
0.159	0.162
CURVE 5 (cont.)	
0.165	0.174
0.170	0.185
0.180	0.185
0.190	0.203
0.200	0.200
0.220	0.214
0.251	0.252
0.301	0.282
0.349	0.333
0.399	0.357
0.449	0.361
0.500	0.367
0.551	0.397
0.590	0.521
0.646	0.642
0.697	0.688
0.734	0.723
0.790	0.781
0.827	0.814
CURVE 5 (cont.)	
0.867	0.824
0.947	0.833
0.976	0.841
1.46	0.889
1.97	0.904
2.21	0.939
CURVE 6 T = 298	
0.235	0.259
0.254	0.301
0.265	0.338
0.297	0.327
0.312	0.362
0.334	0.501
0.366	0.648
0.406	0.692
0.435	0.711
CURVE 6 (cont.)	
0.546	0.720
0.578	0.719

7. NONMETAL-METAL MIXTURES

A. Sintered Pressed Powders

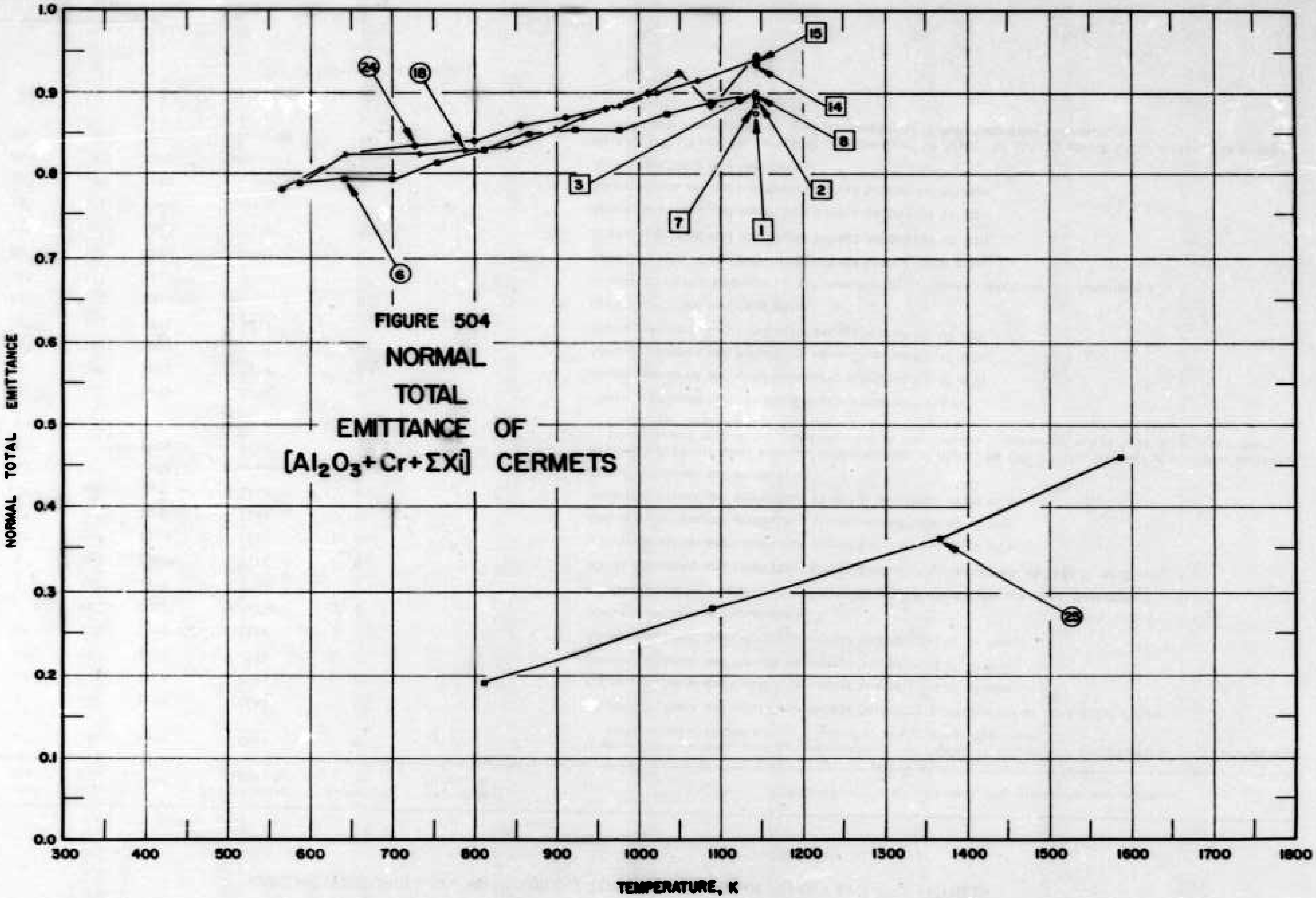


FIGURE 504
NORMAL
TOTAL
EMITTANCE OF
$[Al_2O_3+Cr+\Sigma X_i]$ CERMETS

SPECIFICATION TABLE NO. 504 NORMAL TOTAL EMITTANCE OF [Al_2O_3 + Cr + ΣX_i] CERMETS

Curve No.	Ref. No.	Year	Temperature Range, K	Geometry θ'	Reported Error, %	Composition (weight percent), Specifications and Remarks
1	107	1962	1144	0°		Haynes LT-1 cermet; nominal composition: 23 Al_2O_3, 77 Cr; ground and polished, then cleaned with alcohol and distilled water; [Authors' designation: Specimen 1].
2	107	1962	1144	0°		Above specimen and conditions except heated in quiescent air at 1144 K for 5 min.
3*	107	1962	1144	0°		Above specimen and conditions except heated total of 10 min.
4*	107	1962	1144	0°		Above specimen and conditions except heated total of 15 min.
5*	107	1962	1144	0°		Above specimen and conditions except heated total of 20 min.
6	107	1962	589-1144	0°		Above specimen and conditions.
7	107	1962	1144	0°		Similar to curve 1 specimen and conditions; [Authors' designation: Specimen 2].
8	107	1962	1144	0°		Above specimen and conditions except heated in quiescent air at 1144 K for 5 min.
9*	107	1962	1144	0°		Above specimen and conditions except heated total of 10 min.
10*	107	1962	1144	0°		Above specimen and conditions except heated total of 15 min.
11*	107	1962	1144	0°		Above specimen and conditions except heated total of 20 min.
12*	107	1962	589-1144	0°		Above specimen and conditions.
13*	107	1962	1144	0°		Haynes LT-1B cermet; nominal composition: 19 Al_2O_3, 60 Cr; 19 Mo, 2 TiO_2; ground and polished, then cleaned with alcohol and distilled water; heated in quiescent air at 1144 K for ~2.0 min; [Authors' designation: Specimen 1].
14	107	1962	1144	0°		Above specimen and conditions except heated for 5 min.
15	107	1962	1144	0°		Above specimen and conditions except heated for 10 min.
16*	107	1962	1144	0°		Above specimen and conditions except heated for 15 min.
17*	107	1962	1144	0°		Above specimen and conditions except heated for 20 min.
18	107	1962	589-1144	0°		Above specimen and conditions.
19*	107	1962	1144	0°		Similar to curve 1 specimen and conditions; [Authors' designation: Specimen 2].
20	107	1962	1144	0°		Above specimen and conditions except heated for 5 min.
21*	107	1962	1144	0°		Above specimen and conditions except heated for 10 min.
22*	107	1962	1144	0°		Above specimen and conditions except heated for 15 min.
23*	107	1962	1144	0°		Above specimen and conditions except heated for 20 min.
24	107	1962	566-1144	0°		Above specimen and conditions.
25	25	1960	811-1589	~0°	± 20	Haynes LT-1B cermet; nominal composition: 19 Al_2O_3, 59 Cr, 20 Mo, 2 TiO_2; sintered in argon-hydrogen atmosphere at 1867 K; measured in demoisturized helium.

* Not shown on plot

DATA TABLE NO. 504 NORMAL TOTAL EMITTANCE OF $[Al_2O_3 + Cr + \Sigma X_i]$ CERMETS

[Temperature, T, K; Emittance, ε]

T	ε
CURVE 1	
1144	0.875
CURVE 2	
1144	0.89
CURVE 3*	
1144	0.90
CURVE 4*	
1144	0.90
CURVE 5*	
1144	0.90
CURVE 6	
589	0.79
644	0.795
700	0.795
755	0.815
811	0.83
866	0.85
922	0.855
977	0.855
1033	0.875
1089	0.89
1144	0.90*
CURVE 7	
1144	0.885
CURVE 8	
1144	0.895
CURVE 9*	
1144	0.90
CURVE 10*	
1144	0.90
CURVE 11*	
1144	0.90
CURVE 12*	
589	0.79
644	0.795
700	0.795
755	0.815
811	0.83
866	0.84
922	0.855
977	0.86
1033	0.88
1089	0.89
1144	0.90
CURVE 13*	
1144	0.885
CURVE 14	
1144	0.935
CURVE 15	
1144	0.94
CURVE 16*	
1144	0.94
CURVE 17*	
1144	0.94
CURVE 18	
589	0.79*
644	0.825
733	0.825
789	0.83
CURVE 18 (cont.)	
844	0.835
900	0.855
933	0.87
977	0.885
1022	0.90
1072	0.915
1144	0.94*
CURVE 19*	
1144	0.885
CURVE 20	
1144	0.935
CURVE 21*	
1144	0.94
CURVE 22*	
1144	0.94
CURVE 23*	
1144	0.94
CURVE 24	
566	0.78
655	0.825*
727	0.835
800	0.84
855	0.86
911	0.87
961	0.88
1011	0.90
1050	0.925
1089	0.935
1144	0.945
CURVE 25	
811	0.19
1089	0.28
1367	0.36
1589	0.46

* Not shown on plot

SPECIFICATION TABLE NO. 505 NORMAL TOTAL EMITTANCE OF [Al_2O_3 + NiAl] CERMETS

Curve No.	Ref. No.	Year	Temperature Range, K	Geometry θ'	Reported Error, %	Composition (weight percent), Specifications and Remarks
1*	28	1963	1023	~0°		1 Al_2O_3, 99 NiAl; sintered at 1573 K for 2 hrs (setter material NiAl); density 3.92 g cm^{-3}; integrated from spectral data (1-15 μm); [Authors' designation: Sample No. 53].
2*	28	1963	1023	~0°		12 Al_2O_3, 99 NiAl; sintered at 1623 K for 2 hrs (setter material NiAl); density 3.32 g cm^{-3}; x-ray structure NiAl + Al_2O_3; integrated from spectral data (1-15 μm); [Authors' designation: Sample No. 54].
3*	28	1963	1023	~0°		28 Al_2O_3, 72 NiAl; sintered at 1673 K for 2 hrs (setter material NiAl); density 2.88 g cm^{-3}; integrated from spectral data (1-15 μm); [Authors' designation: Sample No. 55].
4*	28	1963	1023	~0°		28 Al_2O_3, 72 NiAl; sintered at 1673 K for 2 hrs (setter material NiAl); density 3.34 g cm^{-3}; integrated from spectral data (1-15 μm); [Authors' designation: Sample No. 56].
5*	28	1963	1023	~0°		46 Al_2O_3, 54 NiAl; sintered at 1773 K for 2 hrs (setter material NiAl + Al_2O_3); density 3.05 g cm^{-3}; integrated from spectral data (1-15 μm); [Authors' designation: Sample No. 57].
6*	28	1963	1023	~0°		78 Al_2O_3, 22 NiAl; sintered at 1773 K for 2 hrs (setter material NiAl + Al_2O_3); density 3.05 g cm^{-3}; x-ray structure NiAl + Al_2O_3; integrated from spectral data (1-15 μm); [Authors' designation: Sample No. 58].

DATA TABLE NO. 505 NORMAL TOTAL EMITTANCE OF [Al_2O_3 + NiAl] CERMETS

[Temperature, T, K; Emittance, ϵ]

T	ϵ	T	ϵ
CURVE 1*		CURVE 6*	
1023	0.54	1023	0.89
CURVE 2*			
1023	0.88		
CURVE 3*			
1023	0.82		
CURVE 4*			
1023	0.74		
CURVE 5*			
1023	0.68		

*No plot given

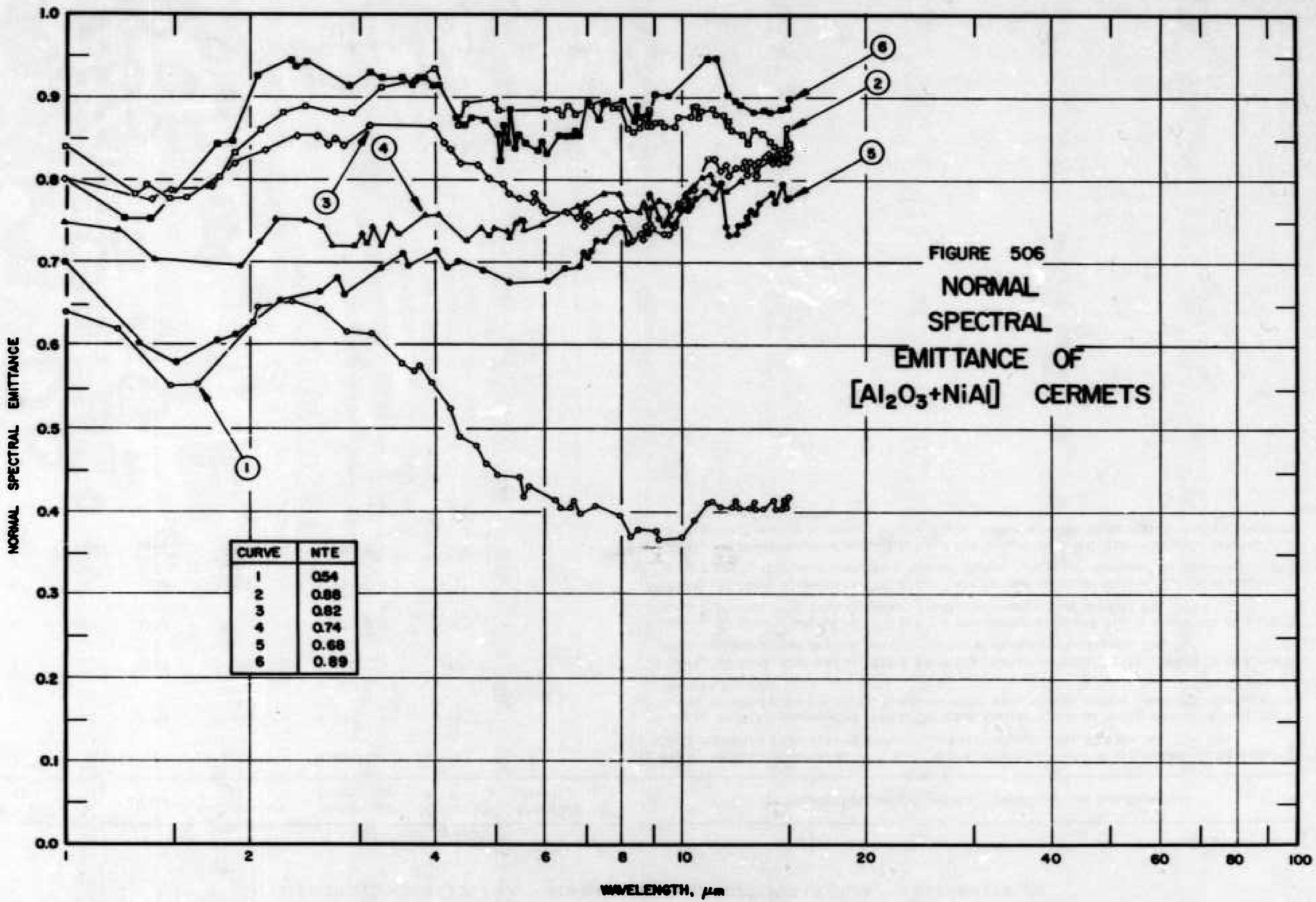


FIGURE 506
NORMAL
SPECTRAL
EMITTANCE OF
$[Al_2O_3+NiAl]$ CERMETS

SPECIFICATION TABLE NO. 506 NORMAL SPECTRAL EMITTANCE OF [Al_2O_3 + NiAl] CERMETS

Curve No.	Ref. No.	Year	Temperature K	Wavelength Range, μm	Geometry θ θ' ω'	Reported Error, %	Composition (weight percent), Specifications and Remarks
1	28	1963	1023	1.00-15.0	~0°		1 Al_2O_3, 99 NiAl; sintered at 1573 K for 2 hrs (setter material NiAl); density 3.92 g cm^{-3}; data extracted from smooth curve; [Authors' designation: Sample No. 53].
2	28	1963	1023	1.00-15.0	~0°		12 Al_2O_3, 88 NiAl; sintered at 1623 K for 2 hrs (setter material NiAl); density 3.32 g cm^{-3}; x-ray structure NiAl + Al_2O_3; data extracted from smooth curve; [Authors' designation: Sample No. 54].
3	28	1963	1023	1.00-15.0	~0°		28 Al_2O_3, 72 NiAl; sintered at 1673 K for 2 hrs (setter material NiAl); density 2.88 g cm^{-3}; data extracted from smooth curve; [Authors' designation: Sample No. 55].
4	28	1963	1023	1.00-15.0	~0°		28 Al_2O_3, 72 NiAl; sintered at 1673 K for 2 hrs (setter material NiAl); density 3.34 g cm^{-3}; data extracted from smooth curve; [Authors' designation: Sample No. 56].
5	28	1963	1023	1.00-15.0	~0°		46 Al_2O_3, 54 NiAl; sintered at 1773 K for 2 hrs (setter material NiAl + Al_2O_3); density 3.05 g cm^{-3}; data extracted from smooth curve; [Authors' designation: Sample No. 57].
6	28	1963	1023	1.00-15.0	~0°		78 Al_2O_3, 22 NiAl; sintered at 1773 K for 2 hrs (setter material NiAl + Al_2O_3); density 3.05 g cm^{-3}; x-ray structure NiAl + Al_2O_3; data extracted from smooth curve; [Authors' designation: Sample No. 58].

DATA TABLE NO. 506 NORMAL SPECTRAL EMITTANCE OF $[Al_2O_3 + NiAl]$ CERMETS

[Wavelength, λ, μm; Emittance, ϵ; Temperature, T, K]

CURVE 1
T = 1023

λ	ϵ
1.00	0.640
1.22	0.620
1.49	0.553
1.64	0.556
2.01	0.629
2.34	0.654
2.60	0.644
2.87	0.617
3.15	0.616
3.51	0.580
3.69	0.571
3.77	0.578
3.92	0.559
4.22	0.525
4.38	0.491
4.63	0.481
4.83	0.459
5.01	0.447
5.49	0.441
5.56	0.420
5.65	0.431
6.23	0.416
6.35	0.405
6.60	0.407
6.70	0.416
6.85	0.399
7.22	0.409
7.96	0.396
8.28	0.370
8.46	0.379
9.06	0.375
9.17	0.367
10.0	0.370
10.5	0.390
11.0	0.412
11.3	0.413
11.5	0.408
12.1	0.408
12.3	0.415
12.4	0.407
13.0	0.405
13.1	0.413
13.2	0.404
13.5	0.405

CURVE 1 (cont.)

λ	ϵ
14.1	0.416
14.2	0.403
14.5	0.403
14.6	0.417
14.8	0.407
15.0	0.420

CURVE 2
T = 1023

λ	ϵ
1.00	0.840
1.30	0.783
1.36	0.795
1.47	0.776
1.57	0.790
1.78	0.804
1.88	0.833
2.07	0.861
2.25	0.881
2.45	0.890
2.73	0.881
2.91	0.881
3.25	0.913
3.70	0.921
3.99	0.936
4.33	0.866
4.45	0.894
4.98	0.899
5.05	0.888
6.00	0.887
6.29	0.887
6.40	0.879
6.53	0.891
6.74	0.880
7.11	0.891
7.59	0.899
7.75	0.889
7.99	0.890
8.20	0.861
8.36	0.859
8.42	0.880
8.52	0.864
8.73	0.877
8.84	0.867
8.89	0.888

CURVE 2 (cont.)

λ	ϵ
8.93	0.866
9.03	0.871
9.27	0.871
9.39	0.866
9.75	0.866
9.85	0.878
10.4	0.878
10.5	0.891
10.6	0.891
10.7	0.877
10.7	0.887
11.3	0.889
11.4	0.880
11.7	0.880
11.8	0.868
11.9	0.871
12.0	0.861
12.5	0.857
12.8	0.845
13.1	0.861
13.5	0.856
14.0	0.849
14.3	0.841
14.5	0.838
14.8	0.826
14.9	0.863
15.0	0.845

CURVE 3
T = 1023

λ	ϵ
1.00	0.800
1.38	0.777
1.48	0.788
1.73	0.791
1.89	0.821
2.12	0.837
2.39	0.854
2.57	0.854
2.66	0.842
2.74	0.850
2.84	0.841
3.11	0.866
3.99	0.866
4.12	0.846

CURVE 3 (cont.)

λ	ϵ
4.23	0.839
4.39	0.821
4.68	0.820
4.89	0.801
5.13	0.797
5.24	0.784
5.49	0.779
5.72	0.774
5.79	0.783
5.99	0.769
6.04	0.761
6.52	0.761
6.80	0.755
6.87	0.768
6.94	0.744
7.01	0.759
7.12	0.751
7.51	0.761
7.92	0.761
8.31	0.727
8.56	0.737
8.65	0.729
8.77	0.743
8.89	0.749
8.99	0.741
9.37	0.736
9.51	0.733
9.78	0.743
9.99	0.765
10.5	0.790
11.0	0.827
11.3	0.827
11.5	0.812
11.8	0.820
11.9	0.805
12.3	0.816
12.5	0.816
12.6	0.824
12.8	0.824
13.2	0.820
13.3	0.824
13.7	0.830
13.9	0.834
14.1	0.822
14.3	0.831

CURVE 3 (cont.)

λ	ϵ
14.4	0.822
14.5	0.835
14.6	0.823
14.9	0.828
15.0	0.840

CURVE 4
T = 1023

λ	ϵ
1.00	0.749
1.23	0.729
1.40	0.702
1.93	0.698
2.05	0.724
2.20	0.751
2.45	0.751
2.61	0.743
2.71	0.720
2.95	0.720
3.04	0.736
3.09	0.722
3.15	0.743
3.25	0.720
3.38	0.748
3.48	0.735
3.81	0.759
4.07	0.759
4.49	0.728
4.71	0.741
4.89	0.735
4.99	0.741
5.21	0.739
5.27	0.730
5.39	0.749
5.45	0.737
5.50	0.752
5.57	0.740
5.99	0.748
6.50	0.762
6.81	0.769
7.00	0.771
7.50	0.784
7.93	0.784
7.99	0.797
8.17	0.761

CURVE 4 (cont.)

λ	ϵ
8.51	0.761
8.66	0.773
8.79	0.768
8.90	0.747*
8.99	0.767
9.18	0.776
9.49	0.770
9.54	0.759
9.84	0.772
10.2	0.782
10.7	0.802
11.2	0.809
11.4	0.799
11.8	0.789
12.5	0.800
13.4	0.825*
14.0	0.828
14.5	0.830*
15.0	0.830

CURVE 5
T = 1023

λ	ϵ
1.00	0.700
1.32	0.601
1.52	0.581
1.76	0.605
1.89	0.613
2.05	0.647
2.23	0.656
2.59	0.666
2.77	0.681
2.84	0.662
3.27	0.695
3.53	0.711
3.60	0.698
4.00	0.713
4.19	0.695
4.31	0.701
4.42	0.681
4.78	0.691
5.26	0.677
6.01	0.679
6.49	0.694
6.83	0.698

CURVE 5 (cont.)

λ	ϵ
6.93	0.712
7.05	0.707
7.14	0.715
7.29	0.728
7.50	0.728
7.87	0.742
8.07	0.742
8.19	0.724
8.84	0.738
8.90	0.784
8.99	0.742*
9.17	0.755
9.32	0.747
9.45	0.751
9.65	0.746
10.0	0.765
10.2	0.765
10.3	0.777
10.4	0.770
10.5	0.778
11.0	0.788
11.3	0.779
11.6	0.747
11.9	0.743
12.0	0.734
12.3	0.736
12.4	0.746
12.6	0.746
12.7	0.756
12.9	0.750
13.0	0.764
13.1	0.760
13.4	0.771
14.0	0.784
14.1	0.774
14.5	0.797
14.7	0.769
15.0	0.780

CURVE 6
T = 1023

λ	ϵ
1.00	0.800
1.25	0.753
1.37	0.752

CURVE 6 (cont.)

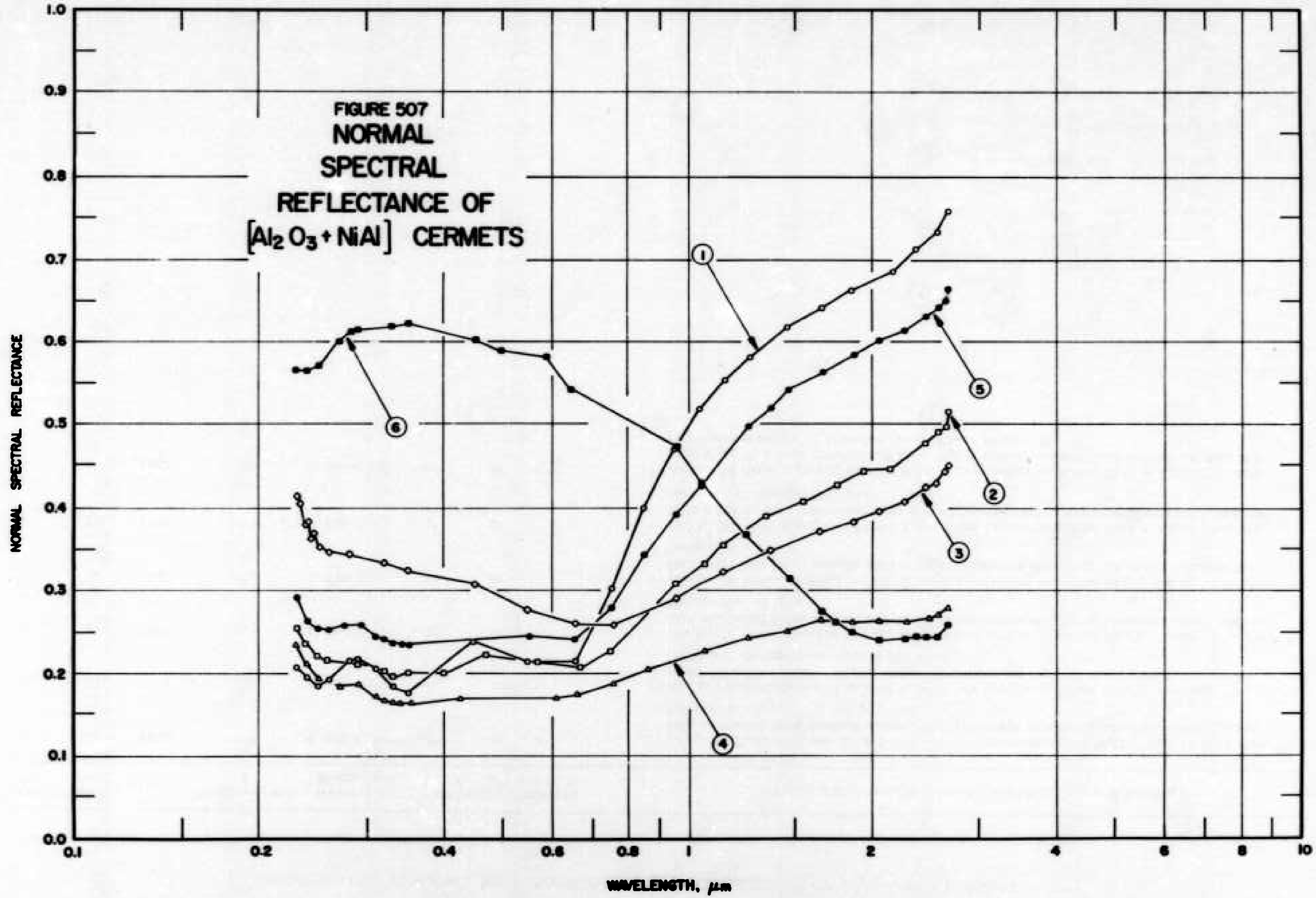
λ	ϵ
1.76	0.841
1.87	0.846
2.05	0.926
2.33	0.944
2.38	0.937
2.46	0.944
2.90	0.914
3.11	0.931
3.27	0.925
3.51	0.925
3.64	0.915
3.73	0.923
3.82	0.923
3.94	0.915
4.03	0.915
4.30	0.876
4.43	0.869
4.56	0.876
4.60	0.843
4.68	0.872
5.01	0.857
5.08	0.825
5.14	0.867
5.21	0.845
5.29	0.887
5.35	0.839
5.43	0.854
5.50	0.862
5.56	0.844
5.86	0.836
5.94	0.849
6.07	0.832
6.31	0.853
6.50	0.853
6.62	0.853
6.72	0.860
6.82	0.854
8.02	0.896
8.36	0.873
8.42	0.892
8.50	0.878
8.82	0.902
8.88	0.884
9.02	0.903
9.51	0.903

*Not shown on plot

DATA TABLE NO. 506 (continued)

λ	ϵ
CURVE 6 (cont.) T = 1023	
10.0	0.921
10.5	0.938
11.0	0.948
11.4	0.948
12.0	0.905
12.2	0.897
12.5	0.892
13.0	0.883
13.5	0.885
14.0	0.883
14.5	0.886
14.9	0.888
15.0	0.900

FIGURE 507
NORMAL
SPECTRAL
REFLECTANCE OF
[Al_2O_3 + NiAl] CERMETS



SPECIFICATION TABLE NO. 507 NORMAL SPECTRAL REFLECTANCE OF [Al_2O_3 + NiAl] CERMETS

Curve No.	Ref. No.	Year	Temperature K	Wavelength Range, μm	Geometry θ	θ'	ω'	Reported Error, %	Composition (weight percent), Specifications and Remarks
1	28	1963	298	0.230-2.65	~0°		2π		1 Al_2O_3, 99 NiAl; sintered at 1573 K for 2 hrs (setter material NiAl); density 3.92 g cm^{-3}; data extracted from smooth curve; MgO reference standard; [Authors' designation: Sample No. 53].
2	28	1963	298	0.230-2.65	~0°		2π		12 Al_2O_3, 88 NiAl; sintered at 1623 K for 2 hrs (setter material NiAl); density 3.32 g cm^{-3}; x-ray structure NiAl + Al_2O_3; data extracted from smooth curve; MgO reference standard; [Authors' designation: Sample No. 54].
3	28	1963	298	0.230-2.65	~0°		2π		28 Al_2O_3, 72 NiAl; sintered at 1673 K for 2 hrs (setter material NiAl); density 2.88 g cm^{-3}; data extracted from smooth curve; MgO reference standard; [Authors' designation: Sample No. 55].
4	28	1963	298	0.230-2.65	~0°		2π		28 Al_2O_3, 72 NiAl; sintered at 1673 K for 2 hrs (setter material NiAl); density 3.34 g cm^{-3}; data extracted from smooth curve; MgO reference standard; [Authors' designation: Sample No. 56].
5	28	1963	298	0.230-2.65	~0°		2π		46 Al_2O_3, 54 NiAl; sintered at 1773 K for 2 hrs (setter material NiAl + Al_2O_3); density 3.05 g cm^{-3}; data extracted from smooth curve; MgO reference standard; [Authors' designation: Sample No. 57].
6	28	1963	298	0.230-2.65	~0°		2π		78 Al_2O_3, 22 NiAl; sintered at 1773 K for 2 hrs (setter material NiAl + Al_2O_3); density 3.05 g cm^{-3}; x-ray structure NiAl + Al_2O_3; data extracted from smooth curve; MgO reference standard; [Authors' designation: Sample No. 58].

DATA TABLE NO. 507 NORMAL SPECTRAL REFLECTANCE OF [Al_2O_3 + NiAl] CERMETS

[Wavelength, λ, μm; Reflectance, ρ; Temperature, T, K]

λ	ρ
CURVE 1	**T = 298**
0.230	0.207
0.240	0.195
0.250	0.187
0.260	0.191
0.280	0.216
0.290	0.218
0.310	0.205
0.330	0.184
0.350	0.176
0.449	0.239
0.549	0.213
0.651	0.213
0.750	0.301
0.848	0.400
0.950	0.470
1.05	0.519
1.15	0.555
1.25	0.584
1.45	0.620
1.65	0.642
1.85	0.664
2.15	0.688
2.35	0.712
2.55	0.734
2.65	0.759
CURVE 2	**T = 298**
0.230	0.257
0.239	0.236
0.249	0.221
0.259	0.216
0.280	0.217
0.299	0.211
0.320	0.203
0.330	0.197
0.350	0.200
0.400	0.200
0.467	0.222
0.568	0.213
0.668	0.209
0.747	0.227
0.848	0.270
CURVE 2 (cont.)	
0.950	0.308
1.05	0.334
1.15	0.356
1.35	0.390
1.55	0.410
1.75	0.429
1.95	0.444
2.15	0.455
2.45	0.478
2.55	0.491
2.62	0.497
2.65	0.515
CURVE 3	**T = 298**
0.230	0.415
0.233	0.406
0.237	0.380
0.240	0.384
0.242	0.363
0.245	0.370
0.250	0.353
0.260	0.348
0.280	0.346
0.320	0.334
0.350	0.325
0.450	0.309
0.549	0.279
0.552	0.262
0.751	0.261
0.952	0.291
1.15	0.323
1.35	0.350
1.65	0.371
1.85	0.383
2.05	0.397
2.25	0.410
2.45	0.424
2.55	0.430
2.62	0.441
2.65	0.450
CURVE 4	**T = 298**
0.230	0.235
0.240	0.211
0.250	0.195
0.270	0.183
0.290	0.178
0.310	0.171
0.320	0.167
0.330	0.165
0.340	0.163
0.351	0.163
0.425	0.170
0.607	0.170
0.657	0.175
0.751	0.189
0.853	0.204
1.05	0.227
1.25	0.243
1.45	0.251
1.65	0.256
1.85	0.262
2.05	0.263
2.25	0.265
2.45	0.269
2.55	0.271
2.65	0.280
CURVE 5	**T = 298**
0.230	0.292
0.240	0.265
0.250	0.255
0.260	0.253
0.275	0.260
0.293	0.260
0.310	0.245
0.320	0.241
0.330	0.236
0.340	0.236
0.350	0.235
0.450	0.263
0.551	0.246
0.651	0.241
0.750	0.280
CURVE 5 (cont.)	
0.849	0.345
0.951	0.393
1.05	0.428
1.25	0.499
1.35	0.520
1.45	0.541
1.65	0.565
1.85	0.587
2.05	0.601
2.25	0.615
2.45	0.632
2.55	0.642
2.61	0.651
2.65	0.665
CURVE 6	**T = 298**
0.230	0.569
0.240	0.569
0.250	0.572
0.272	0.600
0.282	0.614
0.290	0.616
0.330	0.620
0.350	0.624
0.450	0.601
0.496	0.590
0.586	0.583
0.748	0.543
0.951	0.472
1.05	0.429
1.25	0.369
1.45	0.315
1.65	0.276
1.75	0.262
1.85	0.250
2.05	0.240
2.25	0.241
2.35	0.244
2.45	0.244
2.55	0.246
2.65	0.260

SPECIFICATION TABLE NO. 508 NORMAL TOTAL EMITTANCE OF [Al_2O_3 + TiAl] CERMETS

Curve No.	Ref. No.	Year	Temperature Range, K	Geometry θ'	Reported Error, %	Composition (weight percent), Specifications and Remarks
1*	28	1963	1273	~0°		1 Al_2O_3, 99 TiAl; sintered at 1573 K for 2 hrs (setter material graphite); density 2.46 g cm^{-3}; integrated from spectral data (1-15 μm); [Authors' designation: Sample No. 68].
2*	28	1963	1023	~0°		12 Al_2O_3, 88 TiAl; sintered at 1573 K for 2 hrs (setter material graphite); density 2.60 g cm^{-3}; x-ray structure TiAl + Al_2O_3; integrated from spectral data (1-15 μm); [Authors' designation: Sample No. 70].
3*	28	1963	1023	~0°		12 Al_2O_3, 88 TiAl; sintered at 1573 K for 2 hrs (setter material TiAl + Al_2O_3); density 2.76 g cm^{-3}; integrated from spectral data (1-15 μm); [Authors' designation: Sample No. 71].
4*	28	1963	1273	~0°		28 Al_2O_3, 72 TiAl; sintered at 1573 K for 2 hrs (setter material graphite); density 2.36 g cm^{-3}; integrated from spectral data (1-15 μm); [Authors' designation: Sample No. 72].
5*	28	1963	1023	~0°		22 Al_2O_3, 78 TiAl; sintered at 1573 K for 2 hrs (setter material graphite); density 2.14 g cm^{-3}; integrated from spectral data (1-15 μm); [Authors' designation: Sample No. 76].
6*	28	1963	1273	~0°		54 Al_2O_3, 46 TiAl; sintered at 1573 K for 2 hrs (setter material graphite); density 2.29 g cm^{-3}; integrated from spectral data (1-15 μm); [Authors' designation: Sample No. 74].
7*	28	1963	1023	~0°		54 Al_2O_3, 46 TiAl; sintered at 1573 K for 2 hrs (setter material Al_2O_3); density 2.24 g cm^{-3}; integrated from spectral data (1-15 μm); [Authors' designation: Sample No. 75].

DATA TABLE NO. 508 NORMAL TOTAL EMITTANCE OF [Al_2O_3 + TiAl] CERMETS

[Temperature, T, K; Emittance, ϵ]

T	ϵ	T	ϵ
CURVE 1*		CURVE 5*	
1273	0.76	1023	0.41
CURVE 2*		CURVE 6*	
1023	0.85	1273	0.46
CURVE 3*		CURVE 7*	
1023	0.89	1023	0.85
CURVE 4*			
1273	0.72		

* No plot given

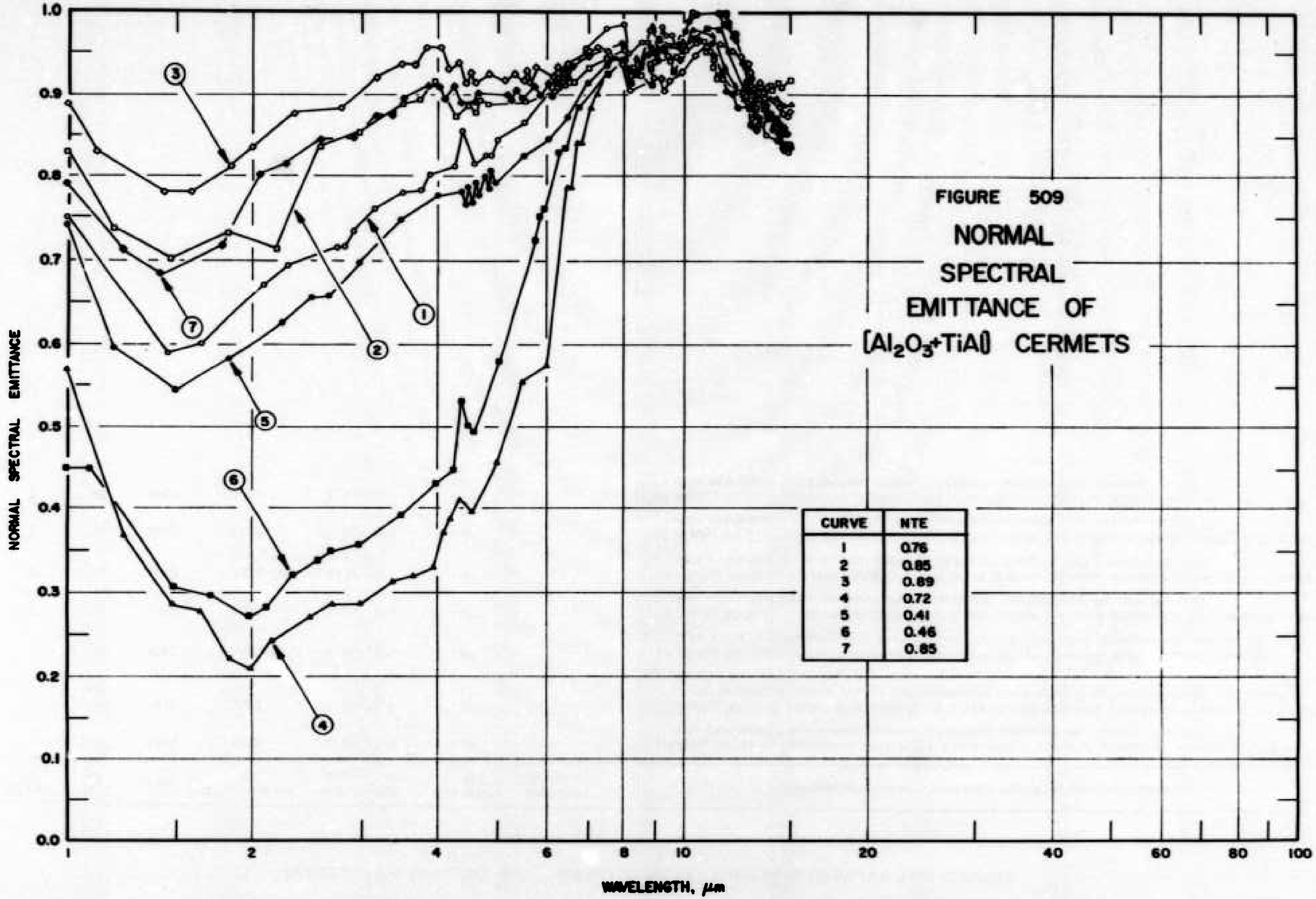


FIGURE 509
NORMAL SPECTRAL EMITTANCE OF [Al_2O_3+TiAl] CERMETS

SPECIFICATION TABLE NO. 509 NORMAL SPECTRAL EMITTANCE OF [Al_2O_3 + TiAl] CERMETS

Curve No.	Ref. No.	Year	Temperature K	Wavelength Range, μm	Geometry θ'	Reported Error, %	Composition (weight percent), Specifications and Remarks
1	28	1963	1273	1.00-15.0	~0°		1 Al_2O_3, 99 TiAl; sintered at 1573 K for 2 hrs (setter material graphite); density 2.46 g cm^{-3}; data extracted from smooth curve; [Authors' designation: Sample No. 68].
2	28	1963	1023	1.00-15.0	~0°		12 Al_2O_3, 88 TiAl; sintered at 1573 K for 2 hrs (setter material graphite); density 2.60 g cm^{-3}; x-ray structure TiAl + Al_2O_3; data extracted from smooth curve; [Authors' designation: Sample No. 70].
3	28	1963	1023	1.00-15.0	~0°		12 Al_2O_3, 88 TiAl; sintered at 1573 K for 2 hrs (setter material TiAl + Al_2O_3); density 2.76 g cm^{-3}; data extracted from smooth curve; [Authors' designation: Sample No. 71].
4	28	1963	1023	1.00-15.0	~0°		78 Al_2O_3, 22 TiAl; sintered at 1573 K for 2 hrs (setter material graphite); density 2.14 g cm^{-3}; data extracted from smooth curve; [Authors' designation: Sample No. 76].
5	28	1963	1273	1.00-15.0	~0°		28 Al_2O_3, 72 TiAl; sintered at 1573 K for 2 hrs (setter material graphite); density 2.36 g cm^{-3}; data extracted from smooth curve; [Authors' designation: Sample No. 72].
6	28	1963	1273	1.00-15.0	~0°		54 Al_2O_3, 46 TiAl; sintered at 1573 K for 2 hrs (setter material graphite); density 2.29 g cm^{-3}; data extracted from smooth curve; [Authors' designation: Sample No. 74].
7	28	1963	1023	1.00-15.0	~0°		54 Al_2O_3, 46 TiAl; sintered at 1573 K for 2 hrs (setter material Al_2O_3); density 2.24 g cm^{-3}; data extracted from smooth curve; [Authors' designation: Sample No. 75].

DATA TABLE NO. 509 NORMAL SPECTRAL EMITTANCE OF $[Al_2O_3 + TiAl]$ CERMETS

[Wavelength, λ, μm; Emittance, ϵ; Temperature, T, K]

CURVE 1 T = 1273

λ	ϵ
1.00	0.750
1.46	0.591
1.65	0.601
2.09	0.672
2.28	0.696
2.74	0.717
2.81	0.717
2.91	0.734
3.15	0.760
3.50	0.780
3.74	0.783
3.87	0.803
4.25	0.813
4.38	0.856
4.59	0.516
4.78	0.828
4.87	0.828
5.00	0.846
5.51	0.867
6.28	0.922
6.41	0.913
6.50	0.932
6.99	0.957
7.50	0.981
8.00	0.987
8.13	0.950
8.51	0.964
8.71	0.964
8.86	0.980
9.11	0.967
9.24	0.984
9.38	0.974
9.59	0.974
9.68	0.959
10.3	1.000
11.6	1.000
11.7	0.986
12.0	0.977
12.2	0.977
12.5	0.940
12.8	0.916
12.9	0.914
13.2	0.883
13.4	0.865

CURVE 1 (cont.)

λ	ϵ
13.5	0.865
13.7	0.851
14.3	0.847
14.5	0.833
14.8	0.836
14.9	0.831
15.0	0.840

CURVE 2 T = 1023

λ	ϵ
1.00	0.830
1.19	0.737
1.47	0.701
1.82	0.731
2.19	0.813
2.57	0.839
2.99	0.853
3.50	0.890
3.74	0.895
3.93	0.919
4.29	0.874
4.47	0.889
4.60	0.877
4.68	0.895
4.81	0.890
5.51	0.894
6.19	0.906
6.29	0.921
6.36	0.912
6.59	0.932
6.67	0.918
7.01	0.933
7.51	0.945
8.01	0.953
8.23	0.925
8.51	0.925
8.81	0.938
8.89	0.980
8.97	0.940
9.03	0.948
9.44	0.948
9.54	0.941
9.72	0.945
10.1	0.953
10.5	0.962
10.8	0.965

CURVE 2 (cont.)

λ	ϵ
10.9	0.951
11.0	0.951
11.2	0.932
11.2	0.941
11.5	0.921
11.6	0.921
11.8	0.907
12.5	0.900
13.0	0.896
13.2	0.903
13.3	0.897
13.4	0.912
13.5	0.904
13.9	0.912
14.0	0.908
14.3	0.916
14.5	0.911
15.0	0.920

CURVE 3 T = 1023

λ	ϵ
1.00	0.890
1.12	0.831
1.44	0.780
1.59	0.780
1.85	0.814
2.00	0.836
2.33	0.878
2.79	0.884
3.16	0.921
3.50	0.938
3.68	0.937
3.83	0.957
4.03	0.957
4.17	0.931
4.31	0.939
4.43	0.915
4.51	0.928
4.60	0.916
4.85	0.927
5.12	0.919
5.32	0.926
5.52	0.919
5.56	0.930
5.64	0.918

CURVE 3 (cont.)

λ	ϵ
5.76	0.934
6.17	0.921
6.25	0.934
6.39	0.921
6.50	0.937
7.01	0.951
7.26	0.956
7.51	0.952
8.00	0.938
8.20	0.909
8.99	0.921
9.02	0.921
9.30	0.908
9.50	0.919
9.99	0.929
10.5	0.949
11.0	0.957
11.5	0.963
12.0	0.952
12.5	0.947
12.7	0.939
13.0	0.928
13.3	0.911
13.5	0.916
13.6	0.899
13.6	0.911
14.0	0.894
14.2	0.891
14.4	0.886
14.6	0.878
14.8	0.873
15.0	0.880

CURVE 4 T = 1023

λ	ϵ
1.00	0.570
1.24	0.368
1.49	0.286
1.65	0.278
1.83	0.221
1.99	0.210
2.15	0.242
2.49	0.270
2.70	0.286

CURVE 4 (cont.)

λ	ϵ
3.00	0.288
3.36	0.316
3.63	0.322
3.93	0.331
4.10	0.371
4.20	0.387
4.33	0.414
4.54	0.397
5.00	0.459
5.49	0.555
6.00	0.675
6.49	0.787
6.60	0.787
6.72	0.841
6.83	0.841
7.06	0.885
7.21	0.903
7.67	0.945
8.05	0.945
8.17	0.927
8.32	0.927
8.39	0.945
8.50	0.935
8.82	0.952
8.87	0.985
9.04	0.957
9.30	0.958
9.49	0.946
9.85	0.958
9.96	0.966
10.1	0.959
10.3	0.980
11.1	0.974
11.3	0.960
11.6	0.935
12.0	0.913
12.5	0.896
12.7	0.890
12.8	0.883
13.0	0.890
13.1	0.882
13.5	0.888
13.6	0.882
13.9	0.898
14.1	0.896
14.5	0.889
15.0	0.890

CURVE 5 T = 1273

λ	ϵ
1.00	0.740
1.19	0.597
1.50	0.544
1.83	0.583
2.23	0.628
2.50	0.655
2.65	0.659
2.99	0.699
3.48	0.749
4.00	0.777
4.36	0.781
4.45	0.765
4.49	0.786
4.55	0.768
4.60	0.793
4.65	0.778
4.75	0.800
4.83	0.785
4.88	0.808
4.99	0.792
5.50	0.826
6.02	0.846
6.50	0.873
7.00	0.917
7.51	0.936
8.03	0.957
8.26	0.930
8.51	0.939
8.83	0.957
9.01	0.949
9.12	0.969
9.50	0.959
9.81	0.961
10.0	0.979
10.2	0.990
10.5	0.999
11.5	1.000
11.6	0.989
11.6	1.000
11.8	0.990
12.0	0.970
12.1	0.968
12.5	0.940
12.7	0.935

CURVE 5 (cont.)

λ	ϵ
12.8	0.920
12.9	0.922
13.0	0.904
13.6	0.891
13.7	0.876
13.8	0.878
14.0	0.859
14.2	0.867
14.5	0.847
14.6	0.835
15.0	0.835

CURVE 6 T = 1273

λ	ϵ
1.00	0.450
1.08	0.450
1.25	0.366
1.48	0.309
1.71	0.297
1.97	0.271
2.11	0.282
2.31	0.322
2.55	0.339
2.68	0.350
2.99	0.356
3.48	0.392
3.98	0.432
4.25	0.450
4.37	0.534
4.49	0.502
4.59	0.496
5.01	0.580
5.73	0.725
5.81	0.751
5.94	0.760
6.26	0.831
6.44	0.836
6.79	0.886
7.52	0.929
7.97	0.940
8.23	0.917
8.49	0.930
8.84	0.933
8.90	0.915
9.08	0.942

CURVE 6 (cont.)

λ	ϵ
9.56	0.940*
9.64	0.930
10.0	0.953
10.5	0.970
11.0	0.981
11.5	0.980
12.0	0.953
12.6	0.910
12.7	0.916
12.7	0.902
12.9	0.904
13.1	0.897
13.1	0.898
13.6	0.884
14.0	0.872
14.2	0.872
14.4	0.856
14.5	0.857
14.7	0.840
15.0	0.840*

CURVE 7 T = 1023

λ	ϵ
1.00	0.790
1.23	0.710
1.41	0.684
1.78	0.718
2.05	0.802
2.25	0.816
2.58	0.847
2.91	0.849
3.16	0.874
3.36	0.874
3.50	0.895
3.85	0.911
4.01	0.911
4.10	0.896
4.24	0.911
4.35	0.891
4.59	0.891
4.74	0.901
5.17	0.900
5.24	0.894
5.35	0.906

* Not shown on plot

DATA TABLE NO. 509 (continued)

λ	ϵ
CURVE 7 (cont.)	
5.46	0.896
5.74	0.913
5.84	0.900
6.01	0.914
6.10	0.899
6.20	0.919
6.30	0.914
6.42	0.931
6.50	0.921
6.61	0.934
7.00	0.946
7.51	0.953*
7.99	0.961
8.17	0.930
8.78	0.949
9.30	0.953
9.55	0.935*
9.86	0.943
9.96	0.957*
10.6	0.967
11.1	0.963
11.2	0.947
11.5	0.928
11.8	0.906
12.0	0.901
12.3	0.885
12.8	0.876
12.9	0.861
13.1	0.875
13.2	0.859
13.3	0.872
13.8	0.871
14.3	0.865
14.4	0.853
14.4	0.863
14.5	0.852
14.6	0.860
14.8	0.853
15.0	0.880*

*Not shown on plot

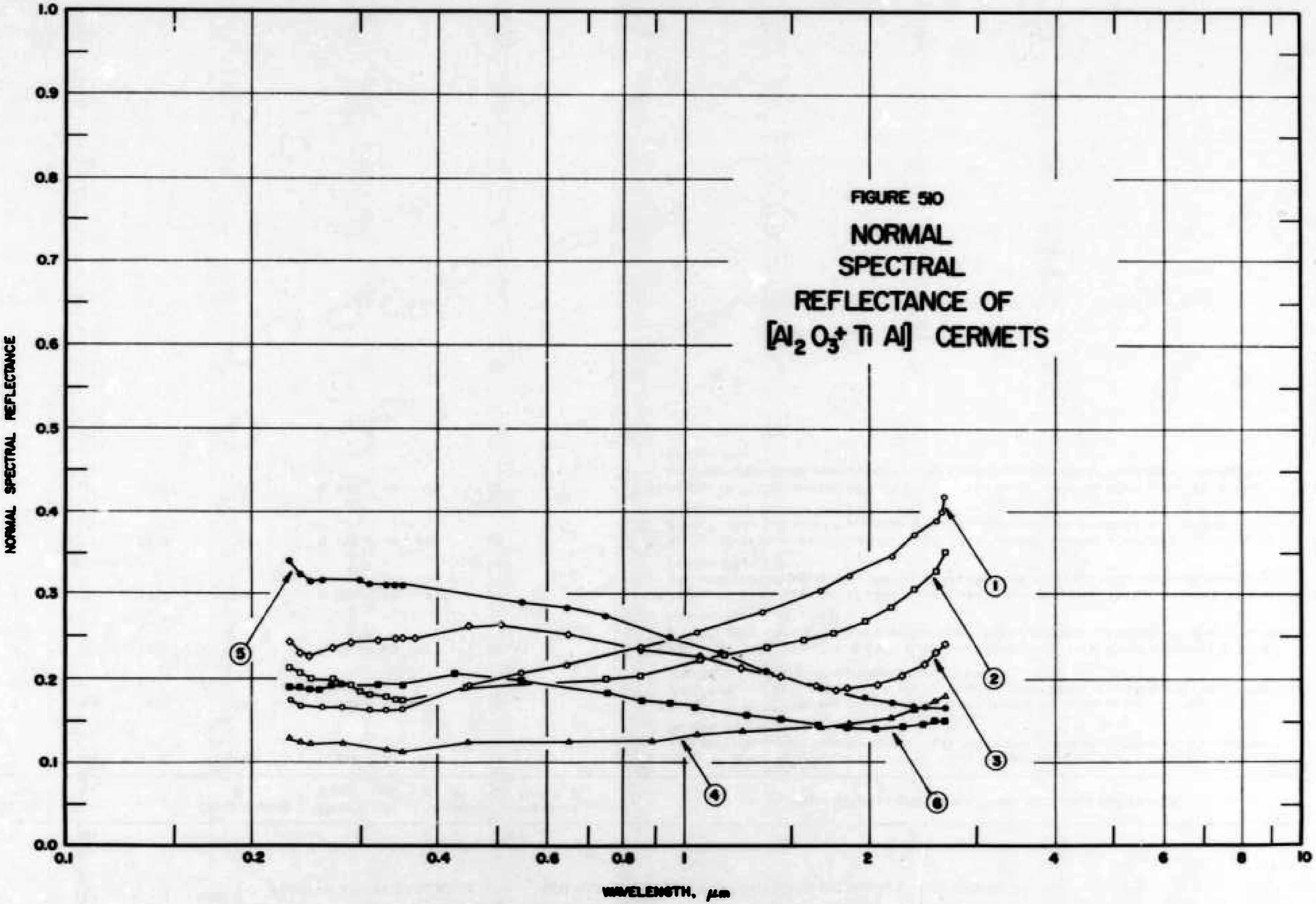


FIGURE 510
NORMAL SPECTRAL REFLECTANCE OF $[Al_2O_3 + Ti\ Al]$ CERMETS

SPECIFICATION TABLE NO. 510 NORMAL SPECTRAL REFLECTANCE OF [Al_2O_3 + TiAl] CERMETS

Curve No.	Ref. No.	Year	Temperature K	Wavelength Range, μm	Geometry θ	θ'	ω'	Reported Error, %	Composition (weight percent), Specifications and Remarks
1	28	1963	298	0.231-2.65	~0°		2π		1 Al_2O_3, 99 TiAl; sintered at 1573 K for 2 hrs (setter material TiAl); density 2.50 g cm^{-3}; data extracted from smooth curve; MgO reference standard; [Authors' designation: Sample No. 69].
2	28	1963	298	0.230-2.65	~0°		2π		12 Al_2O_3, 88 TiAl; sintered at 1573 K for 2 hrs (setter material graphite); density 2.60 g cm^{-3}; x-ray structure TiAl + Al_2O_3; data extracted from smooth curve; Mgo reference standard; [Authors' designation: Sample No. 70].
3	28	1963	298	0.230-2.65	~0°		2π		28 Al_2O_3, 72 TiAl; sintered at 1573 K for 2 hrs (setter material graphite); density 2.36 g cm^{-3}; data extracted from smooth curve; MgO reference standard; [Authors' designation: Sample No. 72].
4	28	1963	298	0.230-2.65	~0°		2π		28 Al_2O_3, 72 TiAl; sintered at 1573 K for 2 hrs (setter material TiAl); density 2.20 g cm^{-3}; data extracted from smooth curve; MgO reference standard; [Authors' designation: Sample No. 73].
5	28	1963	298	0.230-2.65	~0°		2π		78 Al_2O_3, 22 Ti Al; sintered at 1573 K for 2 hrs (setter material graphite); density 2.14 g cm^{-3}; data extracted from smooth curve; MgO reference standard; [Authors' designation: Sample No. 76].
6	28	1963	298	0.230-2.65	~0°		2π		54 Al_2O_3, 46 TiAl; sintered at 1573 K for 2 hrs (setter material Al_2O_3); density 2.24 g cm^{-3}; data extracted from smooth curve; MgO reference standard; [Authors' designation: Sample No. 75].

DATA TABLE NO. 510 NORMAL SPECTRAL REFLECTANCE OF $[Al_2O_3 + TiAl]$ CERMETS

[Wavelength, λ, μm; Reflectance, ρ; Temperature, T, K]

CURVE 1
T = 298

λ	ρ
0.231	0.175
0.240	0.169
0.260	0.166
0.280	0.166
0.310	0.164
0.330	0.164
0.350	0.164
0.450	0.192
0.545	0.208
0.645	0.216
0.850	0.236
1.05	0.253
1.35	0.279
1.65	0.302
1.85	0.322
2.15	0.346
2.35	0.371
2.55	0.389
2.60	0.400
2.65	0.420

CURVE 2
T = 298

λ	ρ
0.230	0.212
0.240	0.206
0.250	0.200
0.270	0.200
0.290	0.192
0.300	0.186
0.310	0.181
0.330	0.179
0.341	0.176
0.350	0.175
0.446	0.191
0.549	0.197
0.748	0.200
0.849	0.204
1.05	0.222
1.15	0.228
1.35	0.236
1.55	0.245
1.75	0.252
1.95	0.268

CURVE 2 (cont.)

λ	ρ
2.15	0.284
2.35	0.306
2.55	0.329
2.65	0.350

CURVE 3
T = 298

λ	ρ
0.230	0.242
0.240	0.230
0.249	0.227
0.270	0.235
0.290	0.241
0.320	0.243
0.341	0.247
0.350	0.247
0.368	0.246
0.448	0.261
0.506	0.262
0.650	0.251
0.846	0.235
1.05	0.226
1.24	0.212
1.44	0.202
1.64	0.191
1.75	0.188
1.85	0.190
2.05	0.194
2.25	0.204
2.45	0.218
2.55	0.230
2.65	0.240

CURVE 4
T = 298

λ	ρ
0.230	0.130
0.240	0.124
0.249	0.122
0.280	0.122
0.330	0.116
0.350	0.120
0.447	0.125
0.650	0.127
0.889	0.127

CURVE 4 (cont.)

λ	ρ
1.05	0.135
1.24	0.139
1.65	0.143
1.85	0.147
2.15	0.154
2.35	0.162
2.55	0.173
2.65	0.180

CURVE 5
T = 298

λ	ρ
0.230	0.340
0.240	0.322
0.250	0.314
0.290	0.316
0.299	0.316
0.309	0.311
0.330	0.310
0.340	0.310
0.350	0.310
0.547	0.290
0.645	0.283
0.747	0.273
0.947	0.249
1.15	0.230
1.35	0.210
1.65	0.190
1.95	0.179
2.15	0.172
2.35	0.168
2.45	0.168
2.65	0.166

CURVE 6
T = 298

λ	ρ
0.230	0.190
0.240	0.190
0.249	0.186
0.259	0.186
0.270	0.191
0.279	0.193
0.320	0.193
0.350	0.193

CURVE 6 (cont.)

λ	ρ
0.425	0.207
0.544	0.199
0.750	0.182
0.854	0.174
0.949	0.171
1.05	0.167
1.25	0.157
1.45	0.151
1.65	0.143
1.85	0.142
2.05	0.140
2.25	0.142
2.45	0.147
2.55	0.150
2.65	0.150

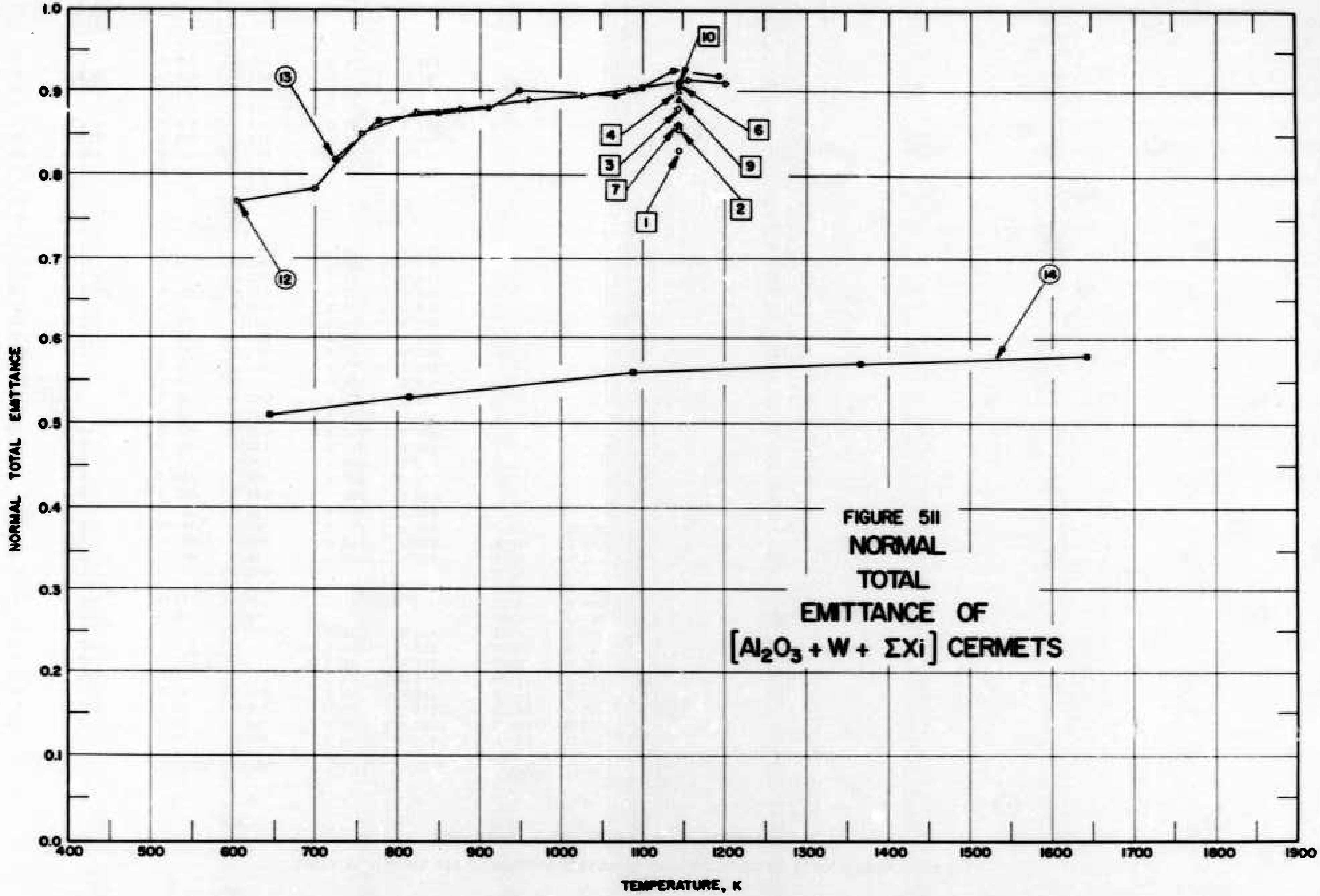


FIGURE 511
NORMAL
TOTAL
EMITTANCE OF
$[Al_2O_3 + W + \Sigma Xi]$ CERMETS

SPECIFICATION TABLE NO. 511 NORMAL TOTAL EMITTANCE OF $[Al_2O_3 + W + \Sigma X_i]$ CERMETS

Curve No.	Ref. No.	Year	Temperature Range, K	Geometry θ'	Reported Error, %	Composition (weight percent), Specifications and Remarks
1	107	1962	1144	0°		Haynes LT-2 cermet; nominal composition: 15 Al_2O_3, 60 W, 25 Cr; ground and polished, then cleaned with alcohol and distilled water; heated in quiescent air at 1144 K for 0.9 min; [Authors' designation: Specimen 1].
2	107	1962	1144	0°		Above specimen and conditions except heated for 3 min.
3	107	1962	1144	0°		Above specimen and conditions except heated for 6.25 min.
4	107	1962	1144	0°		Above specimen and conditions except heated for 10 min.
5*	107	1962	1144	0°		Above specimen and conditions except heated for 15 min.
6	107	1962	1144	0°		Above specimen and conditions except heated for 20 min.
7	107	1962	1144	~0°		Similar to curve 1 specimen and conditions except heated in quiescent air at 1144 K for 2.05 min; [Authors' designation: Sample 2].
8*	107	1962	1144	0°		Above specimen and conditions except heated for 5 min.
9	107	1962	1144	0°		Above specimen and conditions except heated for 10.8 min.
10	107	1962	1144	0°		Above specimen and conditions except heated for 15 min.
11*	107	1962	1144	0°		Above specimen and conditions except heated for 20 min.
12	107	1962	605-1202	~0°		Haynes LT-2 cermet; nominal composition: 15 Al_2O_3, 60 W, 25 Cr; ground and polished, then cleaned with alcohol and distilled water; oxidized at 1144 K for 20 min; [Authors' designation: Specimen 1].
13	107	1962	722-1194	0°		Similar to above specimen and conditions; [Authors' designation: Specimen 2].
14	25	1962	644-1644	0°		Haynes LT-2 cermet; nominal composition: 15 Al_2O_3, 60 W, 25 Cr; sintered in hydrogen-argon atmosphere; measured in demoisturized helium.

*Not shown on plot

DATA TABLE NO. 511 NORMAL TOTAL EMITTANCE OF [Al_2O_3 + W + ΣX_i] CERMETS

[Temperature, T, K; Emittance, ϵ]

T	ϵ	T	ϵ
CURVE 1		**CURVE 12**	
1144	0.830	605	0.770
		700	0.785
CURVE 2		758	0.850
		822	0.875
1144	0.855	878	0.880
		961	0.890
CURVE 3		1028	0.895
		1084	0.904
1144	0.880	1155	0.915
		1202	0.910
CURVE 4			
		CURVE 13	
1144	0.900		
		722	0.820
CURVE 5*		778	0.865
		850	0.875
1144	0.900	911	0.880
		950	0.900
CURVE 6		1066	0.896
		1100	0.905
1144	0.905	1139	0.927
		1194	0.920
CURVE 7			
		CURVE 14	
1144	0.86		
		644	0.51
CURVE 8*		811	0.53
		1089	0.56
1144	0.86	1366	0.57
		1644	0.58
CURVE 9			
1144	0.89		
CURVE 10			
1144	0.91		
CURVE 11*			
1144	0.91		

*Not shown on plot

SPECIFICATION TABLE NO. 512 NORMAL TOTAL EMITTANCE OF [$BeO + Be_{12}Ta$] CERMETS

Curve No.	Ref. No.	Year	Temperature Range, K	Geometry θ'	Reported Error, %	Composition (weight percent), Specifications and Remarks
1*	28	1963	1023	~0°		1 BeO, 99 $Be_{12}Ta$; sintered at 1673 K for 2 hrs (setter material $Be_{12}Ta$); density 2.39 g cm^{-3}; integrated from spectral data (1-15 μm); [Authors' designation: Sample No. 44].
2*	28	1963	1023	~0°		3 BeO, 97 $Be_{12}Ta$; sintered at 1673 K for 2 hrs (setter material $Be_{12}Ta$); density 2.60 g cm^{-3}; integrated from spectral data (1-15 μm); [Authors' designation: Sample No. 45].
3*	28	1963	1023	~0°		8 BeO, 92 $Be_{12}Ta$; sintered at 1723 K for 2 hrs (setter material Ta_2O_5); density 2.46 g cm^{-3}; integrated from spectral data (1-15 μm); [Authors' designation: Sample No. 46].
4*	28	1963	1023	~0°		8 BeO, 92 $Be_{12}Ta$; sintered at 1623 K for 2 hrs (setter material Ta_2O_5); density 2.38 g cm^{-3}; integrated from spectral data (1-15 μm); [Authors' designation: Sample No. 47].
5*	28	1963	1023	~0°		21 BeO, 79 $Be_{12}Ta$; sintered at 1673 K for 2 hrs (setter material $Be_{12}Ta$); density 2.21 g cm^{-3}; x-ray structure $Be_{12}Ta$ + Ta + Be; integrated from spectral data (1-15 μm); [Authors' designation: Sample No. 48].
6*	28	1963	1023	~0°		1 BeO, 98 $Be_{12}Ta$, 1 Ta_2O_5; sintered at 1673 K for 2 hrs (setter material $Be_{12}Ta$); density 2.43 g cm^{-3}; integrated from spectral data (1-15 μm); [Authors' designation: Sample No. 49].
7*	28	1963	1023	~0°		3 BeO, 95 $Be_{12}Ta$, 2 Ta_2O_5; sintered at 1723 K for 2 hrs (setter material Ta_2O_5); density 2.56 g cm^{-3}; integrated from spectral data (1-15 μm); [Authors' designation: Sample No. 50].
8*	28	1963	1023	~0°		5 BeO + 92 $Be_{12}Ta$, 3 Ta_2O_5; sintered at 1673 K for 2 hrs (setter material $Be_{12}Ta$); density 2.32 g cm^{-3}; x-ray structure $Be_{12}Ta$ (unexplained lines); integrated from spectral data (1-15 μm); [Authors' designation: Sample No. 51].

DATA TABLE NO. 512 NORMAL TOTAL EMITTANCE OF [$BeO + Be_{12}Ta$] CERMETS

[Temperature, T, K; Emittance, ε]

T	ε	T	ε	T	ε
CURVE 1*		CURVE 4*		CURVE 7*	
1023	0.90	1023	0.79	1023	0.88
CURVE 2*		CURVE 5*		CURVE 8*	
1023	0.87	1023	0.79	1023	0.89
CURVE 3*		CURVE 6*			
1023	0.80	1023	0.83		

*No plot given

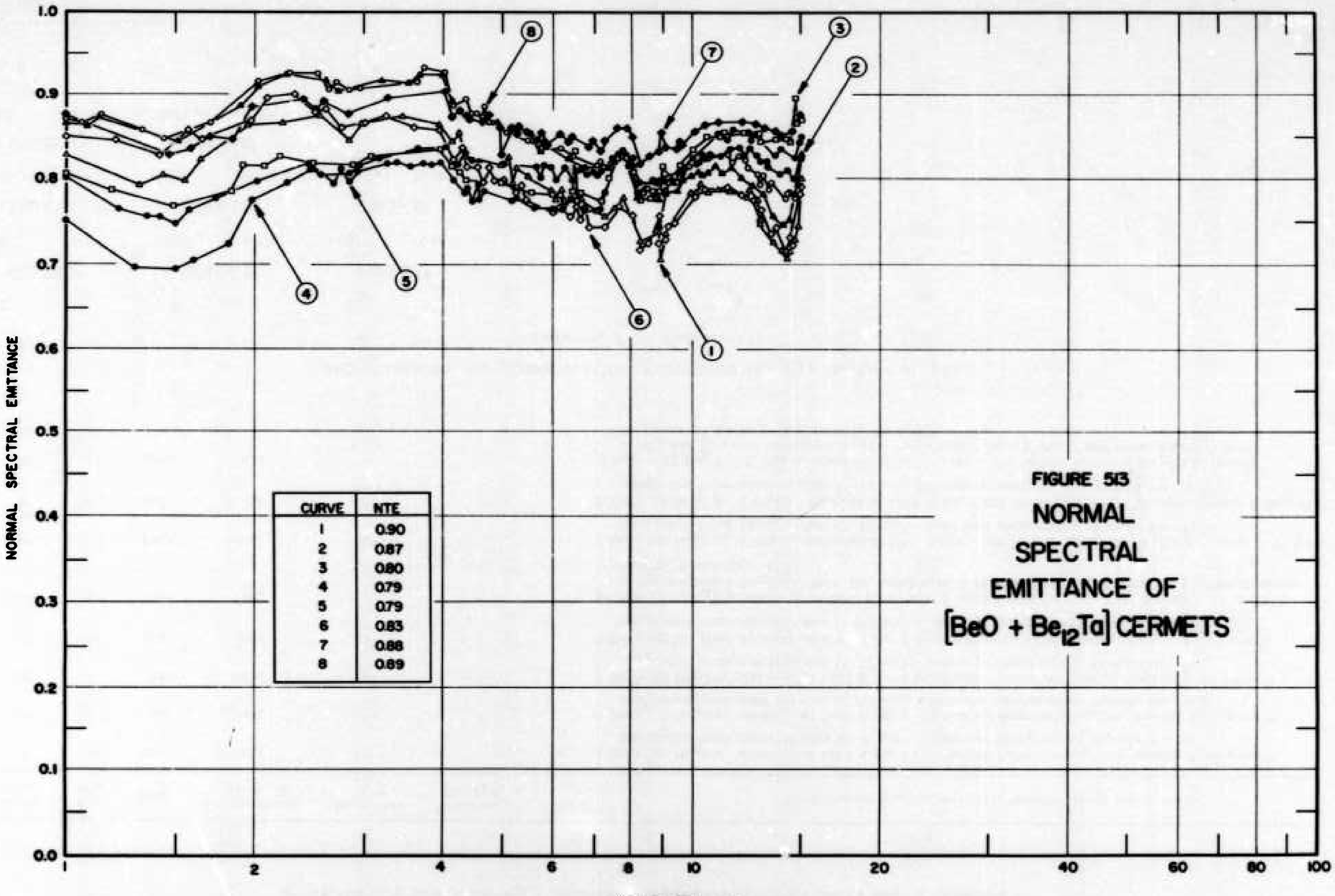


FIGURE 513
NORMAL
SPECTRAL
EMITTANCE OF
[BeO + $Be_{12}Ta$] CERMETS

SPECIFICATION TABLE NO. 513 NORMAL SPECTRAL EMITTANCE OF [$BeO + Be_{12}Ta$] CERMETS

Curve No.	Ref. No.	Year	Temperature K	Wavelength Range, μm	Geometry θ θ' ω'	Reported Error, %	Composition (weight percent), Specifications and Remarks
1	28	1963	1023	1.00-15.0	~0°		1 BeO, 99 $Be_{12}Ta$; sintered at 1673 K for 2 hrs (setter material $Be_{12}Ta$); density 2.39 g cm^{-3}; x-ray structure $Be_{12}Ta$ + BeO; data extracted from smooth curve; [Authors' designation: Sample No. 44].
2	28	1963	1023	1.00-15.0	~0°		3 BeO, 97 $Be_{12}Ta$; sintered at 1673 K for 2 hrs (setter material $Be_{12}Ta$); density 2.60 g cm^{-3}; data extracted from smooth curve; [Authors' designation: Sample No. 45].
3	28	1963	1023	1.00-15.0	~0°		8 BeO, 92 $Be_{12}Ta$; sintered at 1723 K for 2 hrs (setter material Ta_2O_5); density 2.46 g cm^{-3}; data extracted from smooth curve; [Authors' designation: Sample No. 46].
4	28	1963	1023	1.00-15.0	~0°		8 BeO, 92 $Be_{12}Ta$; sintered at 1623 K for 2 hrs (setter material Ta_2O_5); density 2.38 g cm^{-3}; data extracted from smooth curve; [Authors' designation: Sample No. 47].
5	28	1963	1023	1.00-15.0	~0°		21 BeO, 79 $Be_{12}Ta$; sintered at 1673 K for 2 hrs (setter material $Be_{12}Ta$); density 2.21 g cm^{-3}; x-ray structure $Be_{12}Ta$ + Ta + Be; data extracted from smooth curve; [Authors' designation: Sample No. 48].
6	28	1963	1023	1.00-15.0	~0°		1 BeO, 98 $Be_{12}Ta$, 1 Ta_2O_5; sintered at 1673 K for 2 hrs (setter material $Be_{12}Ta$); density 2.43 g cm^{-3}; data extracted from smooth curve; [Authors' designation: Sample No. 49].
7	28	1963	1023	1.00-15.0	~0°		3 BeO, 95 $Be_{12}Ta$, 2 Ta_2O_5; sintered at 1723 K for 2 hrs (setter material Ta_2O_5); density 2.56 g cm^{-3}; data extracted from smooth curve; [Authors' designation: Sample No. 50].
8	28	1963	1023	1.00-15.0	~0°		5 BeO, 92 $Be_{12}Ta$, 3 Ta_2O_5; sintered at 1673 K for 2 hrs (setter material $Be_{12}Ta$); density 2.32 g cm^{-3}; x-ray structure $Be_{12}Ta$ (unexplained lines); data extracted from smooth curve; [Authors' designation: Sample No. 51].

DATA TABLE NO. 513 NORMAL SPECTRAL EMITTANCE OF [BeO + $Be_{12}Ta$] CERMETS

[Wavelength, λ, μm; Emittance, ∈; Temperature, T, K]

CURVE 1
T = 1023

λ	∈
1.00	0.829
1.32	0.791
1.43	0.801
1.55	0.798
1.64	0.821
1.95	0.861
2.22	0.866
2.55	0.874
2.81	0.848
2.98	0.864
3.45	0.871
3.98	0.863
4.13	0.845
4.24	0.856
4.32	0.828
4.98	0.816
5.10	0.824
5.17	0.796
5.23	0.811
5.49	0.801
5.97	0.788
6.08	0.776
6.19	0.788
6.27	0.775
6.64	0.778
7.02	0.762
7.25	0.756
7.50	0.765
7.80	0.779
8.24	0.728
8.83	0.739
8.90	0.704
9.04	0.738
9.91	0.783
10.3	0.786
10.5	0.794
10.6	0.784
11.0	0.789
11.5	0.785
12.1	0.779
12.2	0.788
12.4	0.768*
12.5	0.775
12.7	0.765*
12.8	0.749
12.9	0.757*
13.5	0.727
14.0	0.717
14.3	0.708
14.4	0.716
14.5	0.730
14.6	0.748
15.0	0.800

CURVE 2
T = 1023

λ	∈
1.00	0.865
1.07	0.861
1.13	0.871
1.51	0.843
1.90	0.888
2.02	0.910
2.25	0.924
2.60	0.917
2.72	0.902
3.20	0.918
3.53	0.914
3.69	0.924
4.00	0.924
4.14	0.891
4.37	0.874
4.90	0.868
5.51	0.853
5.59	0.846
5.72	0.832
5.80	0.842
6.36	0.823
6.50	0.832
6.77	0.811
7.34	0.811
7.50	0.820
8.01	0.818
8.14	0.777
8.81	0.775
8.89	0.746
9.02	0.782
9.49	0.786
9.66	0.799
9.99	0.802
10.2	0.809
10.5	0.805
10.9	0.816
11.1	0.807
11.5	0.811
12.0	0.800
12.5	0.791
13.0	0.781
13.5	0.758
14.0	0.747
14.4	0.751
14.6	0.783
14.8	0.793
15.0	0.830

CURVE 3
T = 1023

λ	∈
1.00	0.801
1.17	0.787
1.49	0.764
1.84	0.783
1.93	0.814
2.07	0.812
2.20	0.825
2.48	0.818
2.88	0.815
3.08	0.826
3.98	0.831
4.14	0.812
4.27	0.809
4.35	0.799
4.92	0.793
5.52	0.781
6.00	0.780
6.09	0.774*
6.17	0.780
6.26	0.771
6.42	0.784
6.53	0.771
6.61	0.783
7.18	0.773
7.35	0.800
7.60	0.822
7.84	0.822
8.04	0.809
8.22	0.774
8.51	0.777
8.61	0.784
8.73	0.774
8.83	0.784
8.92	0.815
9.02	0.784*
9.17	0.797
9.45	0.797
9.52	0.814
10.0	0.834
10.5	0.850
11.0	0.850
11.3	0.855
11.4	0.852
12.0	0.855
12.8	0.853
13.0	0.845
13.5	0.848
14.0	0.848
14.4	0.843
14.6	0.899
14.7	0.865
14.9	0.867*
15.0	0.870

CURVE 4
T = 1023

λ	∈
1.00	0.750
1.29	0.698
1.50	0.694
1.60	0.703
1.81	0.722
1.99	0.772
2.25	0.794
2.46	0.810
2.55	0.801
2.82	0.803
2.95	0.813
3.18	0.821
3.66	0.834
4.04	0.837
4.21	0.818
4.31	0.830
4.49	0.820
5.00	0.817
5.61	0.811
5.71	0.800
5.80	0.815
5.99	0.811
6.06	0.799
6.25	0.811
6.41	0.799
6.68	0.810
6.80	0.802
6.91	0.808
7.01	0.801
7.11	0.807
7.29	0.803*
7.46	0.822
7.61	0.829
7.86	0.829*
7.96	0.816
8.05	0.825
8.23	0.794
8.77	0.794
8.82	0.786*
8.93	0.813
9.00	0.797
9.53	0.797*
9.61	0.805
9.68	0.797*
9.77	0.812
10.0	0.819
10.3	0.820
10.4	0.829
10.5	0.822
10.6	0.829
11.0	0.827
11.1	0.820*
11.3	0.833*
11.5	0.833
11.9	0.836
12.1	0.829
12.4	0.834
12.7	0.829
12.8	0.820
13.1	0.820
13.3	0.812
13.6	0.805
14.1	0.810
14.5	0.800
15.0	0.825

CURVE 5
T = 1023

λ	∈
1.00	0.800
1.22	0.762
1.35	0.755
1.41	0.755
1.50	0.748
1.57	0.761
1.74	0.776
2.01	0.796
2.45	0.816
2.69	0.792
2.73	0.810
2.83	0.794
2.91	0.808
3.28	0.817
3.38	0.819
3.54	0.812
3.71	0.818
3.84	0.814
3.99	0.819
4.17	0.798
4.32	0.781
4.39	0.789
4.46	0.771
4.52	0.792
4.58	0.775
4.65	0.783
5.16	0.771
5.22	0.777
5.60	0.766
6.00	0.766
6.21	0.763
6.46	0.777
6.53	0.766*
6.60	0.778*
6.71	0.762
7.14	0.763
7.26	0.782
7.51	0.823*
7.76	0.831
8.01	0.819*
8.13	0.781
8.67	0.779
8.99	0.793*
9.33	0.795
9.50	0.808
10.0	0.824
10.5	0.824*
11.0	0.851
11.3	0.853*
11.4	0.848
11.5	0.859
11.6	0.852*
12.0	0.856*
12.3	0.855
12.5	0.847
12.6	0.852
13.0	0.840*
13.6	0.829
13.7	0.835
13.8	0.825*
14.7	0.825
14.8	0.830*
14.8	0.842
14.9	0.831*
15.0	0.850

CURVE 6
T = 1023

λ	∈
1.00	0.850
1.20	0.844
1.42	0.826
1.57	0.859
1.65	0.846
1.98	0.869
2.10	0.897
2.32	0.900
2.50	0.879
2.60	0.881
2.76	0.860
3.00	0.865
3.24	0.872
3.60	0.860
3.96	0.857
4.18	0.821
4.30	0.834
4.39	0.814
4.53	0.812
4.61	0.794
4.72	0.811
4.85	0.799
5.00	0.799
5.26	0.782
5.33	0.792
5.47	0.775
5.75	0.768*
6.00	0.760
6.14	0.765
6.40	0.754
6.52	0.767
6.63	0.751
6.72	0.763
6.83	0.743
7.29	0.743
7.63	0.768
8.02	0.757
8.21	0.717
8.50	0.724
8.81	0.724
8.89	0.758
9.01	0.730
9.15	0.743
9.36	0.749
10.0	0.779
10.5	0.787
11.5	0.790
12.0	0.780
12.6	0.775
12.9	0.750
13.0	0.764
13.4	0.738
13.6	0.741
14.1	0.715
14.4	0.732
14.5	0.723
14.6	0.740*

*Not shown on plot

DATA TABLE NO. 513 (continued)

λ	ε	λ	ε	λ	ε
CURVE 6 (cont.)		CURVE 7 (cont.)		CURVE 8 (cont.)	
T = 1023					
		8.90	0.856	5.14	0.860*
14.8	0.782	8.99	0.829*	5.26	0.852*
15.0	0.790	9.07	0.837	5.49	0.844
		9.48	0.835	5.63	0.847*
CURVE 7		9.53	0.844	5.71	0.833
T = 1023		9.62	0.840	5.82	0.843*
		10.0	0.857	6.18	0.836
1.00	0.875	10.5	0.863	6.49	0.827
1.47	0.828	11.0	0.867	7.01	0.814
1.59	0.835	12.0	0.869	7.11	0.820
1.70	0.850	12.6	0.866	7.29	0.812
1.85	0.847	13.0	0.860	7.53	0.824*
1.97	0.884	13.5	0.857	7.69	0.833*
2.40	0.894	14.0	0.852	7.82	0.825*
2.50	0.880	14.4	0.847*	7.93	0.814*
2.58	0.891	14.5	0.857	8.02	0.823*
2.82	0.874	14.7	0.867*	8.33	0.781
3.27	0.897	15.0	0.875	8.48	0.789
4.03	0.902			8.57	0.785*
4.17	0.871	CURVE 8		9.02	0.785
4.28	0.880	T = 1023		9.18	0.794
4.41	0.870			9.59	0.801
4.64	0.869	1.00	0.870	9.89	0.815
4.75	0.874	1.06	0.866	10.5	0.824
4.95	0.860	1.14	0.873*	11.4	0.829
5.13	0.860	1.33	0.857	11.5	0.819
5.23	0.853	1.44	0.849	11.8	0.828
5.30	0.861	1.70	0.866	11.9	0.820*
5.44	0.855	2.02	0.916	12.2	0.822
5.52	0.856*	2.27	0.925	12.3	0.812
5.62	0.843	2.51	0.925	12.5	0.814*
5.75	0.855	2.61	0.907	12.6	0.804
5.88	0.840	2.70	0.913	12.8	0.804*
5.98	0.849*	2.83	0.905	12.9	0.791
6.18	0.852	2.96	0.908	13.0	0.803
6.32	0.842	3.62	0.916	13.2	0.789
6.43	0.850	3.72	0.931	13.4	0.795
6.84	0.839	4.01	0.929	14.0	0.776
6.99	0.844	4.16	0.888	14.1	0.781
7.13	0.831	4.33	0.893	14.2	0.774*
7.27	0.846	4.42	0.874	14.4	0.782
7.60	0.860	4.53	0.877	14.5	0.779
7.90	0.860	4.61	0.871	15.0	0.825*
8.05	0.850	4.66	0.885		
8.24	0.818	4.73	0.868		
8.52	0.827	5.04	0.853		
8.85	0.831				

* Not shown on plot

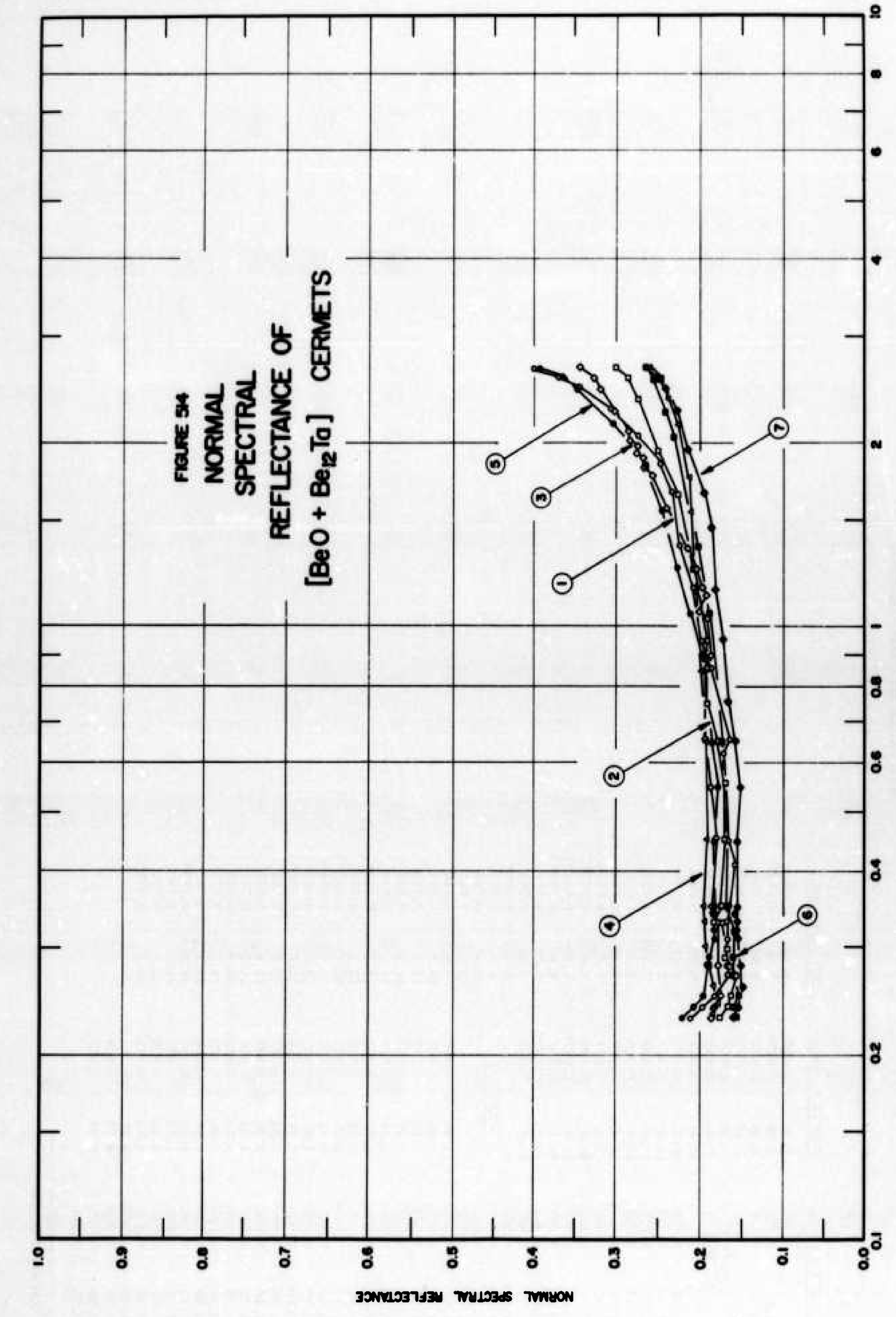


FIGURE 514
NORMAL
SPECTRAL
REFLECTANCE OF
[BeO + $Be_{12}Ta$] CERMETS
NORMAL SPECTRAL REFLECTANCE
WAVELENGTH, μm
0.0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
1.0
0.1
0.2
0.4
0.6
0.8
1
2
4
6
8
10
1
2
3
4
5
6
7

SPECIFICATION TABLE NO. 514 NORMAL SPECTRAL REFLECTANCE OF [$BeO + Be_{12}Ta$] CERMETS

Curve No.	Ref. No.	Year	Temperature K	Wavelength Range, μm	Geometry θ	θ'	ω'	Reported Error, %	Composition (weight percent), Specifications and Remarks
1	28	1963	298	0.230-2.65	~0°		2π		1 BeO, 99 $Be_{12}Ta$; sintered at 1673 K for 2 hrs (setter material $Be_{12}Ta$); density 2.39 g cm^{-3}; data extracted from smooth curve; MgO reference standard; [Authors' designation: Sample No. 44].
2	28	1963	298	0.230-2.65	~0°		2π		3 BeO, 97 $Be_{12}Ta$; sintered at 1673 K for 2 hrs (setter material $Be_{12}Ta$); density 2.60 g cm^{-3}; data extracted from smooth curve; MgO reference standard; [Authors' designation: Sample No. 45].
3	28	1963	298	0.230-2.65	~0°		2π		8 BeO, 92 $Be_{12}Ta$; sintered at 1723 K for 2 hrs (setter material Ta_2O_5); density 2.46 g cm^{-3}; data extracted from smooth curve; MgO reference standard; [Authors' designation: Sample No. 46].
4	28	1963	298	0.230-2.65	~0°		2π		1 BeO, 98 $Be_{12}Ta$; sintered at 1673 K for 2 hrs (setter material Ta_2O_5); density 2.21 g cm^{-3}; data extracted from smooth curve; MgO reference standard; [Authors' designation: Sample No. 48].
5	28	1963	298	0.230-2.65	~0°		2π		1 BeO, 98 $Be_{12}Ta$, 1 Ta_2O_5; sintered at 1673 K for 2 hrs (setter material $Be_{12}Ta$); density 2.43 g cm^{-3}; data extracted from smooth curve; MgO referene standard; [Authors' designation: Sample No. 49].
6	28	1963	298	0.230-2.65	~0°		2π		3 BeO, 95 $Be_{12}Ta$, 2 Ta_2O_5; sintered at 1723 K for 2 hrs (setter material Ta_2O_5); density 2.56 g cm^{-3}; data extracted from smooth curve; MgO reference standard; [Authors' designation: Sample No. 50].
7	28	1963	298	0.230-2.65	~0°		2π		5 BeO, 92 $Be_{12}Ta$, 3 Ta_2O_5; sintered at 1673 K for 2 hrs (setter material $Be_{12}Ta$); density 2.32 g cm^{-3}; x-ray structure $Be_{12}Ta$ (unexplained lines); data extracted from smooth curve; MgO reference standard; [Authors' designation: Sample No. 51].

DATA TABLE NO. 514 NORMAL SPECTRAL REFLECTANCE OF [$BeO + Be_{12}Ta$] CERMETS

[Wavelength, λ, μm; Reflectance, ρ; Temperature, T, K]

CURVE 1
T = 298

λ	ρ
0.230	0.210
0.240	0.197
0.250	0.181
0.270	0.167
0.280	0.168
0.309	0.168
0.330	0.168
0.350	0.165
0.408	0.159
0.448	0.167
0.620	0.171
0.653	0.165
0.854	0.188
0.949	0.199
1.15	0.209
1.35	0.225
1.65	0.234
1.85	0.249
2.05	0.273
2.25	0.307
2.45	0.345
2.55	0.369
2.65	0.400

CURVE 2
T = 298

λ	ρ
0.230	0.175
0.240	0.167
0.250	0.162
0.260	0.161
0.279	0.166*
0.289	0.170
0.299	0.168
0.329	0.172
0.350	0.174
0.450	0.170
0.550	0.170
0.648	0.179
0.747	0.191
0.852	0.191
0.949	0.194
1.25	0.208
1.65	0.227
1.95	0.250

CURVE 2 (cont.)

λ	ρ
2.35	0.273
2.55	0.286
2.65	0.300

CURVE 3
T = 298

λ	ρ
0.230	0.185
0.240	0.181
0.250	0.175
0.280	0.178
0.330	0.178
0.341	0.181
0.350	0.185
0.451	0.180
0.547	0.188
0.651	0.193
0.848	0.193
0.896	0.188
0.950	0.197*
1.03	0.191
1.06	0.200
1.13	0.191
1.15	0.198
1.25	0.206*
1.35	0.215
1.55	0.240
1.75	0.258
1.82	0.269
1.89	0.269
1.93	0.276
1.97	0.275
2.01	0.284
2.09	0.286
2.25	0.302
2.45	0.320
2.55	0.328
2.65	0.345

CURVE 4
T = 298

λ	ρ
0.230	0.175*
0.233	0.183
0.239	0.183*

CURVE 4 (cont.)

λ	ρ
0.243	0.178
0.260	0.182
0.280	0.189
0.300	0.192
0.330	0.193
0.350	0.195
0.450	0.191
0.650	0.193
0.847	0.198
1.15	0.203
1.55	0.211
1.75	0.213
2.15	0.227
2.35	0.238
2.55	0.248
2.65	0.260

CURVE 5
T = 298

λ	ρ
0.230	0.220
0.240	0.207
0.250	0.196
0.280	0.190
0.290	0.189
0.310	0.183
0.320	0.183*
0.330	0.183*
0.350	0.183
0.448	0.182
0.549	0.179
0.647	0.186
0.846	0.198*
1.05	0.211
1.25	0.226
1.55	0.245
1.85	0.267
2.15	0.304
2.45	0.349
2.55	0.365
2.65	0.393

CURVE 6
T = 298

λ	ρ
0.230	0.155
0.240	0.160
0.250	0.153
0.270	0.156
0.290	0.160
0.319	0.160
0.350	0.168
0.450	0.168*
0.648	0.175
1.05	0.190
1.35	0.201
2.05	0.231
2.25	0.241
2.55	0.255
2.65	0.265

CURVE 7
T = 298

λ	ρ
0.230	0.160
0.240	0.153
0.259	0.148
0.280	0.150
0.310	0.154
0.320	0.156
0.330	0.155
0.340	0.158
0.350	0.155
0.447	0.155
0.547	0.151
0.650	0.158
0.753	0.168
0.952	0.173
1.15	0.181
1.45	0.187
1.65	0.195
1.95	0.214
2.25	0.228
2.45	0.241
2.56	0.250
2.65	0.265*

*Not shown on plot

SPECIFICATION TABLE NO. 515 NORMAL TOTAL EMITTANCE OF [Cr_2O_3 + $TiCr_2$ + ΣX_i] CERMETS

Curve No.	Ref. No.	Year	Temperature Range, K	Geometry θ'	Reported Error, %	Composition (weight percent), Specifications and Remarks
1*	28	1963	1273	~0°		1 Cr_2O_3, 99 $TiCr_2$; sintered at 1423 K for 2 hrs (setter material $TiCr_2$); density 3.36 g cm^{-3}; x-ray structure $TiCr_2$ + Cr_2O_3; integrated from spectral data (1-15 μm); [Authors' designation: Sample No. 27].
2*	28	1963	1023	~0°		10 Cr_2O_3, 90 $TiCr_2$; sintered at 1423 K for 2 hrs (setter material $TiCr_2$); density 3.36 g cm^{-3}; integrated from spectral data (1-15 μm); [Authors' designation: Sample No. 28].
3*	28	1963	1023	~0°		50 Cr_2O_3, 50 $TiCr_2$; sintered at 1423 K for 2 hrs (setter material $TiCr_2$ + Cr_2O_3); density 3.40 g cm^{-3}; integrated from spectral data (1-15 μm); [Authors' designation: Sample No. 30].
4*	28	1963	1023	~0°		5 Cr_2O_3, 92 $TiCr_2$, 3 TiO_2; sintered at 1423 K for 2 hrs (setter material $TiCr_2$); density 3.73 g cm^{-3}; integrated from spectral data (1-15 μm); [Authors' designation: Sample No. 34].
5*	28	1963	1023	~0°		10 Cr_2O_3, 85.1 $TiCr_2$, 5 TiO_2; sintered at 1498 K for 2 hrs (setter material $TiCr_2$); density 3.59 g cm^{-3}; x-ray structure $TiCr_2$ + TiO_2 (rutile) + Cr_2O_3; integrated from spectral data (1-15 μm); [Authors' designation: Sample No. 35].
6*	28	1963	1023	~0°		14 Cr_2O_3, 84 $TiCr_2$, 2 TiO_2; sintered at 1573 K for 2 hrs (setter material $TiCr_2$); density 4.08 g cm^{-3}; integrated from spectral data (1-15 μm); [Authors' designation: Sample No. 36].

DATA TABLE NO. 515 NORMAL TOTAL EMITTANCE OF [Cr_2O_3 + $TiCr_2$ + ΣX_i] CERMETS

[Temperature, T, K; Emittance, ϵ]

T	ϵ	T	ϵ
CURVE 1*		CURVE 4*	
1023	0.93	1023	0.77
CURVE 2*		CURVE 5*	
1023	0.88	1023	0.89
CURVE 3*		CURVE 6*	
1023	0.86	1023	0.81

*No plot given

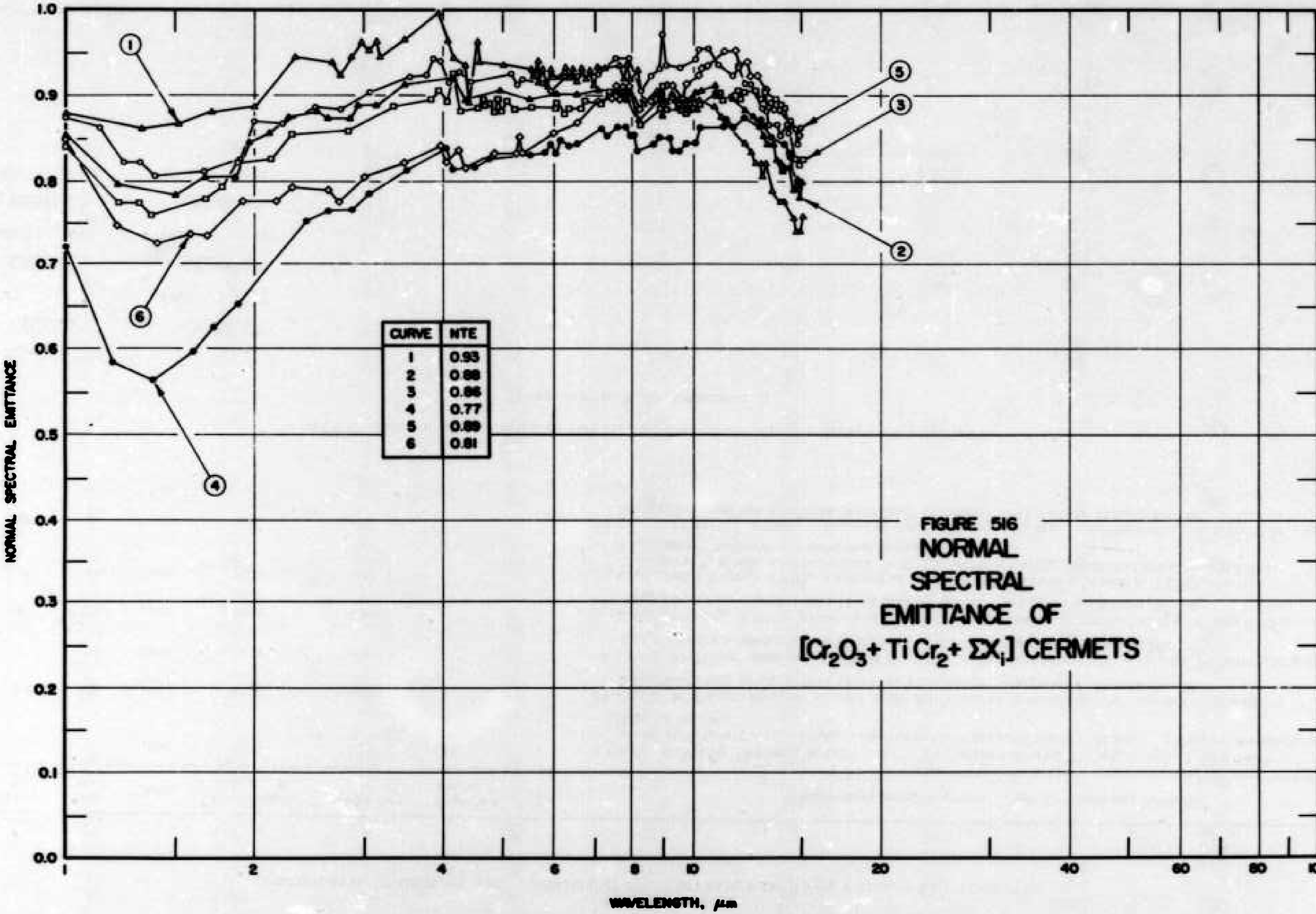


FIGURE 516
NORMAL SPECTRAL EMITTANCE OF
$[Cr_2O_3 + TiCr_2 + \Sigma X_i]$ CERMETS

SPECIFICATION TABLE NO. 516 NORMAL SPECTRAL EMITTANCE OF $[Cr_2O_3 + TiCr_2 + \Sigma X_i]$ CERMETS

Curve No.	Ref. No.	Year	Temperature K	Wavelength Range, μm	Geometry θ θ' ω'	Reported Error, %	Composition (weight percent), Specifications and Remarks
1	28	1963	1273	1.00-15.0	~0°		1 Cr_2O_3, 99 $TiCr_2$; sintered at 1423 K for 2 hrs (setter material $TiCr_2$); density 3.36 g cm^{-3}; x-ray structure $TiCr_2$ + Cr_2O_3; data extracted from smooth curve; [Authors' designation: Sample No. 27].
2	28	1963	1023	1.00-15.0	~0°		10 Cr_2O_3, 90 $TiCr_2$; sintered at 1423 K for 2 hrs (setter material $TiCr_2$); density 3.36 g cm^{-3}; data extracted from smooth curve; [Authors' designation: Sample No. 28].
3	28	1963	1023	1.00-15.0	~0°		50 Cr_2O_3, 50 $TiCr_2$; sintered at 1423 K for 2 hrs (setter material $TiCr_2$ + Cr_2O_3); density 3.40 g cm^{-3}; data extracted from smooth curve; [Authors' designation: Sample No. 30].
4	28	1963	1023	1.00-15.0	~0°		5 Cr_2O_3, 92 $TiCr_2$, 3 TiO_2; sintered at 1423 K for 2 hrs (setter material $TiCr_2$); density 3.73 g cm^{-3}; data extracted from smooth curve; [Authors' designation: Sample No. 34].
5	28	1963	1023	1.00-15.0	~0°		10 Cr_2O_3, 85.1 $TiCr_2$, 5 TiO_2; sintered at 1498 K for 2 hrs (setter material $TiCr_2$); density 3.59 g cm^{-3}; x-ray structure $TiCr_2$ + TiO_2 (rutile) + Cr_2O_3; data extracted from smooth curve; [Authors' designation: Sample No. 35].
6	28	1963	1023	1.00-15.0	~0°		14 Cr_2O_3, 84 $TiCr_2$, 2 TiO_2; sintered at 1573 K for 2 hrs (setter material $TiCr_2$); density 4.08 g cm^{-3}; data extracted from smooth curve; [Authors' designation: Sample No. 36].

DATA TABLE NO. 516 NORMAL SPECTRAL EMITTANCE OF $[Cr_2O_3 + TiCr_2 + \Sigma X_i]$ CERMETS

[Wavelength, λ, μm; Emittance, ε; Temperature, T, K]

λ	ε
CURVE 1	
T = 1273	
1.00	0.880
1.33	0.862
1.51	0.868
1.72	0.881
2.00	0.888
2.31	0.948
2.67	0.940
2.75	0.927
2.85	0.948
2.99	0.961
3.05	0.953
3.13	0.966
3.19	0.949
3.49	0.968
3.91	0.997
4.07	0.965
4.19	0.945
4.31	0.938
4.40	0.893
4.51	0.964
4.59	0.940
5.00	0.939
5.51	0.933
5.58	0.923
5.65	0.943
5.69	0.917
5.78	0.932
5.87	0.911
5.94	0.932
6.00	0.923
6.19	0.923
6.28	0.935
6.34	0.921
6.43	0.934
6.51	0.919
6.68	0.935
6.78	0.920
6.87	0.931
6.93	0.913
7.01	0.935
7.26	0.935
7.67	0.938
7.78	0.920
7.88	0.938

λ	ε
CURVE 1 (cont.)	
7.95	0.920
8.13	0.932
8.34	0.892
8.79	0.908
9.01	0.895
9.29	0.903
9.49	0.897
9.85	0.883
10.0	0.899
10.1	0.887
10.2	0.898
10.9	0.890
11.0	0.878
12.0	0.845
12.5	0.836
12.5	0.822
12.8	0.822
12.8	0.808
13.0	0.822
13.5	0.790
13.6	0.778
14.0	0.778
14.5	0.756
14.7	0.740
14.9	0.740
15.0	0.760
CURVE 2	
T = 1023	
1.00	0.855
1.23	0.799
1.50	0.785
1.66	0.806
1.87	0.806
1.96	0.849
2.11	0.857
2.28	0.875
2.52	0.881
2.61	0.874
2.85	0.874
2.92	0.890
3.11	0.890
3.49	0.915
4.15	0.921

λ	ε
CURVE 2 (cont.)	
4.35	0.896
4.91	0.907
5.50	0.898
6.01	0.901
6.51	0.901
7.01	0.907
7.80	0.909
7.87	0.897
7.97	0.905
8.20	0.872
8.87	0.897
8.92	0.879
8.98	0.896
9.38	0.896
9.48	0.888
9.73	0.895
10.0	0.902
10.4	0.908
10.8	0.911
10.9	0.900
11.5	0.899
12.0	0.883
12.5	0.878
13.0	0.853
13.2	0.843
13.5	0.843
13.6	0.829
13.8	0.823
13.9	0.811
14.0	0.818
14.3	0.818
14.5	0.791
14.6	0.803
14.7	0.777*
14.9	0.781
15.0	0.800
CURVE 3	
T = 1023	
1.00	0.840
1.23	0.775
1.32	0.774
1.37	0.760
1.67	0.780

λ	ε
CURVE 3 (cont.)	
1.77	0.796
1.89	0.822
2.13	0.829
2.30	0.856
2.82	0.860
3.34	0.890
3.82	0.897
3.94	0.908
4.08	0.895
4.18	0.927
4.26	0.882
4.52	0.887
4.61	0.898
4.66	0.890
4.74	0.891
4.83	0.882
4.90	0.898
4.99	0.882
5.09	0.896
5.20	0.886
5.51	0.889
6.01	0.888
6.08	0.892
6.25	0.880
6.33	0.888
6.63	0.888
6.75	0.894
7.17	0.891
7.32	0.906
7.82	0.899
7.93	0.908*
8.22	0.868
8.84	0.885
8.92	0.913
9.05	0.884
9.51	0.883
9.79	0.880
9.87	0.891
10.0	0.887
10.1	0.901*
10.3	0.893
10.4	0.901
10.9	0.901
11.0	0.907
11.1	0.898

λ	ε
CURVE 3 (cont.)	
11.5	0.898*
11.8	0.908
12.0	0.898
12.0	0.905
12.5	0.908
12.9	0.899
13.1	0.906
13.5	0.897
13.7	0.890
14.0	0.887
14.6	0.829
14.8	0.829*
14.9	0.820
15.0	0.829
CURVE 4	
T = 1023	
1.00	0.720
1.19	0.586
1.37	0.564
1.60	0.599
1.73	0.627
1.89	0.652
2.41	0.751
2.61	0.765
2.89	0.767
3.06	0.787
3.50	0.814
4.02	0.840
4.13	0.816
4.50	0.819
4.72	0.829
5.50	0.831
5.80	0.835
5.96	0.846
6.03	0.836
6.15	0.850
6.36	0.842
6.51	0.847
7.19	0.862
7.30	0.855
7.60	0.865
7.84	0.865
7.92	0.858

λ	ε
CURVE 4 (cont.)	
8.02	0.858
8.15	0.839
8.63	0.848
8.77	0.845*
8.89	0.852
9.16	0.852
9.29	0.838
9.50	0.838
9.78	0.848
10.0	0.848
10.3	0.863
11.2	0.865
11.3	0.872
11.5	0.865
12.0	0.875
12.5	0.875*
12.8	0.864
12.9	0.873
13.0	0.867
13.2	0.865*
13.4	0.851
14.0	0.846
14.2	0.834
14.3	0.820*
14.5	0.820
14.8	0.796
15.0	0.800*
CURVE 5	
T = 1023	
1.00	0.876
1.14	0.863
1.24	0.823
1.31	0.823
1.39	0.807
1.66	0.811
1.90	0.826
2.00	0.870
2.23	0.869
2.50	0.887
2.75	0.884
3.07	0.904
3.51	0.922
3.78	0.925

λ	ε
CURVE 5 (cont.)	
3.86	0.943
3.99	0.941
4.10	0.918
4.25	0.930
4.41	0.918
5.13	0.927
5.28	0.915
5.34	0.920
5.75	0.915
5.92	0.907
6.11	0.921*
6.27	0.923
6.59	0.923
7.02	0.928
7.51	0.944
7.91	0.944
8.21	0.907
8.53	0.923
8.84	0.933
8.92	0.971
9.02	0.939
9.52	0.936
10.0	0.945
10.2	0.955
10.5	0.956
11.0	0.939
11.7	0.925
11.8	0.936
12.1	0.917
12.4	0.917
12.5	0.906*
12.7	0.906*
12.9	0.887
13.1	0.884
13.2	0.869
13.5	0.869
13.6	0.856
14.0	0.868
14.2	0.859
14.3	0.872
14.5	0.862
14.7	0.846
14.8	0.863*
14.9	0.863
15.0	0.879*

λ	ε
CURVE 6	
T = 1023	
1.00	0.850
1.22	0.749
1.40	0.724
1.58	0.738
1.69	0.735
1.92	0.778
2.18	0.779
2.30	0.793
2.62	0.790
2.71	0.776
3.00	0.804
3.48	0.822
3.98	0.841
4.08	0.823
4.21	0.838
4.34	0.818
4.84	0.832
5.22	0.834
5.30	0.851
5.36	0.834
6.00	0.859
6.51	0.870
7.01	0.893
7.43	0.898
7.54	0.911
7.69	0.898
7.78	0.911
7.88	0.895*
7.95	0.913
8.23	0.884
8.33	0.893
8.55	0.893
8.72	0.903
8.96	0.895*
9.09	0.913
9.27	0.913
9.44	0.899*
9.64	0.899
9.78	0.916
10.2	0.923
10.5	0.931
10.6	0.938
11.1	0.938*
11.3	0.951

* Not shown on plot

DATA TABLE NO. 516 (continued)

λ	ϵ
CURVE 6 (cont.)	
T = 1023	
11.7	0.951
11.8	0.936
12.3	0.940
12.4	0.925
12.6	0.925
13.0	0.904
13.1	0.887
13.4	0.892
13.5	0.885
13.9	0.884
14.0	0.875*
14.6	0.872*
14.8	0.865
14.9	0.856
15.0	0.875*

*Not shown on plot

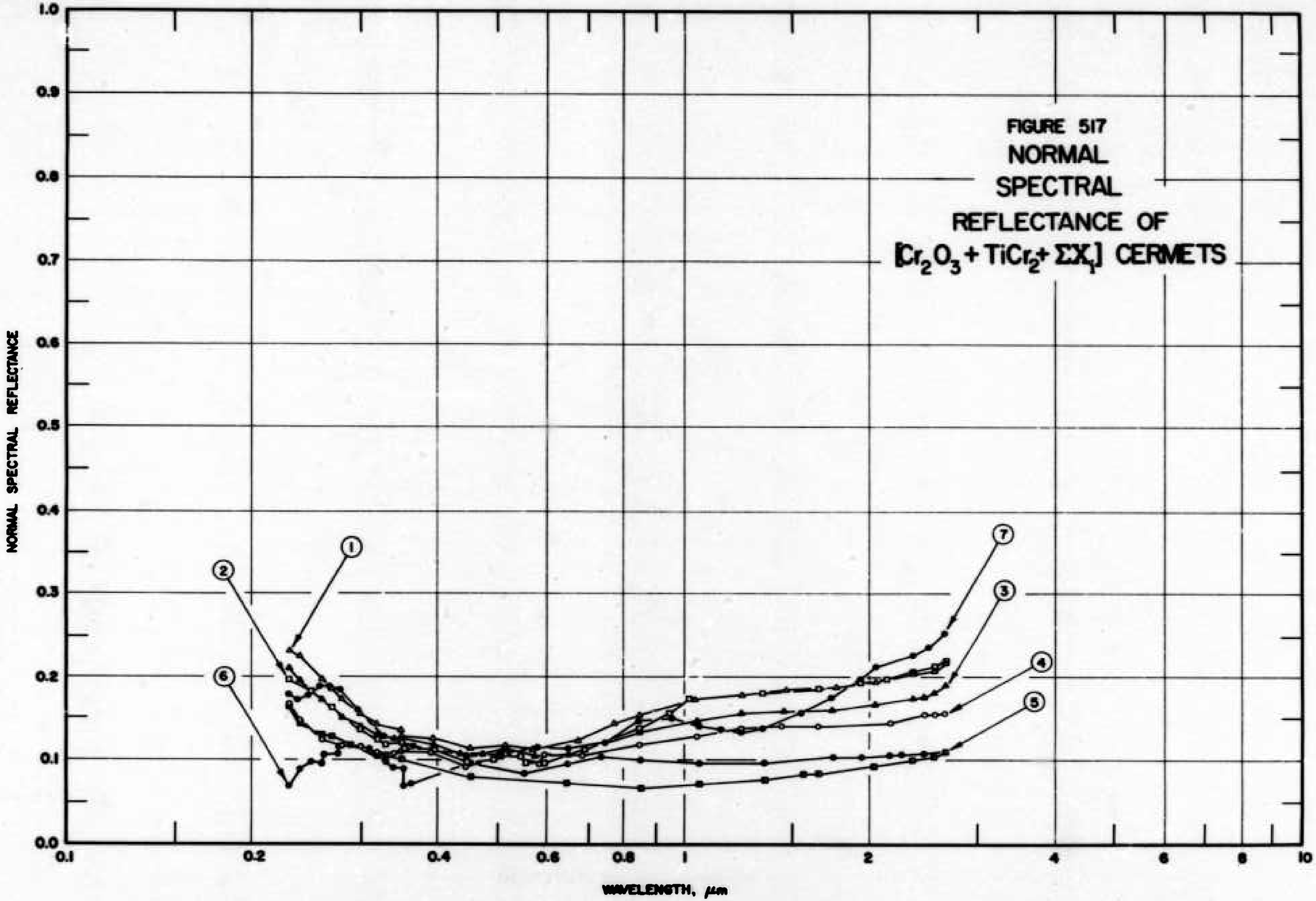


FIGURE 517
NORMAL
SPECTRAL
REFLECTANCE OF
$[Cr_2O_3 + TiCr_2 + \Sigma X_i]$ CERMETS
NORMAL SPECTRAL REFLECTANCE
WAVELENGTH, μm
1.0
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0.0
0.1
0.2
0.4
0.6
0.8
1
2
4
6
8
10
1
2
3
4
5
6
7

SPECIFICATION TABLE NO. 517 NORMAL SPECTRAL REFLECTANCE OF [Cr_2O_3 + $TiCr_2$ + ΣX_i] CERMETS

Curve No.	Ref. No.	Year	Temperature K	Wavelength Range, μm	Geometry θ	θ'	ω'	Reported Error, %	Composition (weight percent), Specifications, and Remarks
1	28	1963	298	0.230-2.65	~0°		2π		1 Cr_2O_3, 99 $TiCr_2$; sintered at 1423 K for 2 hrs (setter material $TiCr_2$); density 3.36 g cm^{-3}; x-ray structure $TiCr_2$ + Cr_2O_3; data extracted from smooth curve; MgO reference standard; [Authors' designation: Sample No. 27].
2	28	1963	298	0.230-2.65	~0°		2π		10 Cr_2O_3, 90 $TiCr_2$; sintered at 1423 K for 2 hrs (setter material $TiCr_2$); density 3.36 g cm^{-3}; data extracted from smooth curve; MgO reference standard; [Authors' designation: Sample No. 28].
3	28	1963	298	0.230-2.65	~0°		2π		25 Cr_2O_3, 75 $TiCr_2$; sintered at 1423 K for 2 hrs (setter material $TiCr_2$ + Cr_2O_3); density 3.51 g cm^{-3}; x-ray structure $TiCr_2$ + Cr_2O_3; data extracted from smooth curve; MgO reference standard; [Authors' designation: Sample No. 29].
4	28	1963	298	0.230-2.65	~0°		2π		50 Cr_2O_3, 50 $TiCr_2$; sintered at 1423 K for 2 hrs (setter material $TiCr_2$ + Cr_2O_3); density 3.40 g cm^{-3}; data extracted from smooth curve; MgO reference standard; [Authors' designation: Sample No. 30].
5	28	1963	298	0.230-2.65	~0°		2π		5 Cr_2O_3, 92 $TiCr_2$, 3 TiO_2; sintered at 1423 K for 2 hrs (setter material $TiCr_2$); density 3.73 g cm^{-3}; data extracted from smooth curve; MgO reference standard; [Authors' designation: Sample No. 34].
6	28	1963	298	0.230-2.65	~0°		2π		10 Cr_2O_3, 8.51 $TiCr_2$, 5 TiO_2; sintered at 1498 K for 2 hrs (setter material $TiCr_2$); density 3.59 g cm^{-3}; x-ray structure $TiCr_2$ + TiO_2 (rutile) + Cr_2O_3; data extracted from smooth curve; MgO reference standard; [Authors' designation: Sample No. 35].
7	28	1963	298	0.230-2.65	~0°		2π		14 Cr_2O_3, 84 $TiCr_2$, 2 TiO_2; sintered at 1573 K for 2 hrs (setter material $TiCr_2$); density 4.08 g cm^{-3}; data extracted from smooth curve; MgO reference standard; [Authors' designation: Sample No. 36].

DATA TABLE NO. 517 NORMAL SPECTRAL REFLECTANCE OF $[Cr_2O_3 + TiCr_2 + \Sigma X_i]$ CERMETS

[Wavelength, λ, μm; Reflectance, ρ; Temperature, T, K]

λ	ρ
CURVE 1	
T = 298	
0.230	0.231
0.240	0.226
0.260	0.199
0.270	0.185
0.280	0.172
0.300	0.155
0.320	0.141
0.350	0.135
0.350	0.128
0.393	0.125
0.452	0.112
0.516	0.117
0.570	0.111
0.673	0.121
0.775	0.141
0.849	0.152
1.05	0.171
1.25	0.179
1.45	0.185
1.75	0.188
2.05	0.193
2.35	0.202
2.55	0.208
2.65	0.218
CURVE 2	
T = 298	
0.230	0.198
0.250	0.181
0.270	0.161
0.300	0.136
0.320	0.123
0.330	0.119
0.350	0.120
0.353	0.111
0.397	0.111
0.448	0.099
0.492	0.100
0.508	0.103
0.546	0.103
0.557	0.098
0.598	0.098
0.690	0.112
0.849	0.139
CURVE 2 (cont.)	
0.949	0.154
1.15	0.172
1.35	0.180
1.65	0.184
1.95	0.192
2.15	0.198
2.35	0.205
2.55	0.211
2.65	0.220
CURVE 3	
T = 298	
0.230	0.210
0.240	0.194
0.260	0.171
0.280	0.150
0.300	0.138
0.320	0.129
0.340	0.124
0.350	0.124
0.350	0.119*
0.397	0.119
0.437	0.109
0.474	0.109
0.517	0.115
0.571	0.105
0.650	0.108
0.848	0.134
1.05	0.147
1.25	0.154
1.45	0.158
1.75	0.160
2.15	0.167
2.35	0.173
2.44	0.175
2.55	0.180
2.65	0.190
CURVE 4	
T = 298	
0.230	0.166
0.240	0.147
0.260	0.122
0.280	0.116
0.300	0.115
CURVE 4 (cont.)	
0.320	0.109
0.330	0.109*
0.340	0.109
0.350	0.110
0.350	0.103*
0.390	0.109
0.446	0.092
0.515	0.106
0.584	0.096
0.683	0.105
0.849	0.119
1.05	0.128
1.25	0.136
1.45	0.140
1.65	0.140
2.15	0.143
2.45	0.151
2.55	0.152
2.65	0.155
CURVE 5	
T = 298	
0.230	0.163
0.240	0.142
0.260	0.130
0.270	0.129
0.290	0.118
0.320	0.104
0.330	0.103
0.350	0.100
0.451	0.080
0.648	0.073
0.850	0.069
1.06	0.072
1.36	0.079
1.56	0.084
1.65	0.084
2.04	0.093
2.35	0.100
2.55	0.104
2.65	0.110
CURVE 6	
T = 298	
0.230	0.070
0.240	0.090
0.250	0.099
0.260	0.097
0.261	0.106
0.276	0.107
0.278	0.115
0.300	0.115*
0.310	0.111
0.320	0.105*
0.330	0.099
0.340	0.090
0.351	0.090
0.351	0.070
0.450	0.071
0.551	0.098
0.584	0.084
0.599	0.106
0.652	0.096
0.731	0.101
0.850	0.100
1.05	0.098
1.35	0.098
1.75	0.101
1.95	0.101
2.15	0.104
2.25	0.106
2.45	0.109
2.65	0.110*
CURVE 7	
T = 298	
0.230	0.178
0.239	0.171
0.249	0.178
0.259	0.188
0.269	0.188
0.279	0.183
0.299	0.160
0.329	0.129
0.350	0.125*
0.364	0.115
0.448	0.103
0.505	0.105
CURVE 7 (cont.)	
0.580	0.114
0.650	0.111
0.749	0.120
0.849	0.147
0.954	0.150
1.05	0.140
1.15	0.137
1.25	0.134
1.35	0.137
1.55	0.154
1.75	0.175
1.95	0.197
2.16	0.212
2.35	0.228
2.55	0.239
2.65	0.255

* Not shown on plot

SPECIFICATION TABLE NO. 518 NORMAL TOTAL EMITTANCE OF [NiO + NiAl + ΣX_i] CERMETS

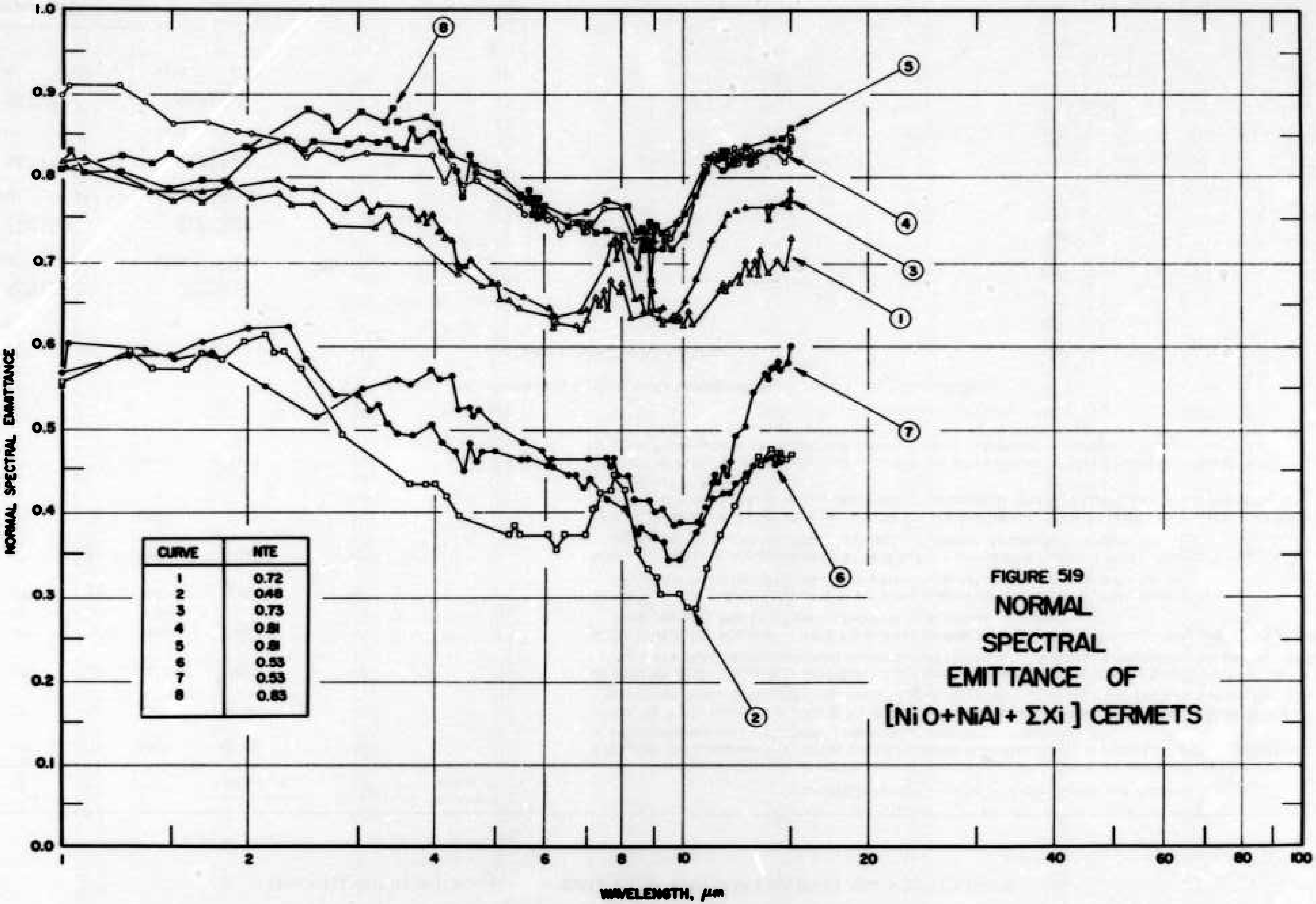
Curve No.	Ref. No.	Year	Temperature Range, K	Geometry θ'	Reported Error, %	Composition (weight percent), Specifications and Remarks
1*	28	1963	1023	~0°		1 NiO, 99 NiAl; sintered at 1623 K for 2 hrs (setter material NiAl); density 4.91 g cm^{-3}; integrated from spectral data (1-15 μm); [Authors' designation: Sample No. 59].
2*	28	1963	1023	~0°		9 NiO, 91 NiAl; sintered at 1723 K for 2 hrs (setter material graphite); density 4.58 g cm^{-3}; x-ray structure NiAl; integrated from spectral data (1-15 μm); [Authors' designation: Sample No. 60].
3*	28	1963	1023	~0°		23 NiO, 77 NiAl; sintered at 1623 K for 2 hrs (setter material NiAl); density 5.19 g cm^{-3}; x-ray structure NiAl; integrated from spectral data (1-15 μm); [Authors' designation: Sample No. 61].
4*	28	1963	1023	~0°		46 NiO, 54 NiAl; sintered at 1573 K for 2 hrs (setter material NiAl); density 3.44 g cm^{-3}; integrated from spectral data (1-15 μm); [Authors' designation: Sample No. 62].
5*	28	1963	1273	~0°		72 NiO, 28 NiAl; sintered at 1573 K for 2 hrs (setter material NiAl + NiO); density 4.40 g cm^{-3}; integrated from spectral data (1-15 μm); [Authors' designation: Sample No. 63].
6*	28	1963	1023	~0°		5 NiO, 91 NiAl, 4 Al_2O_3; sintered at 1623 K for 2 hrs (setter material NiAl); density 4.58 g cm^{-3}; integrated from spectral data (1-15 μm); [Authors' designation: Sample No. 64].
7*	28	1963	1273	~0°		12 NiO, 79 NiAl, 9 Al_2O_3; sintered at 1573 K for 2 hrs (setter material mixture); density 4.33 g cm^{-3}; x-ray structure NiAl + Al_2O_3; integrated from spectral data (1-15 μm); [Authors' designation: Sample No. 65].
8*	28	1963	1273	~0°		23 NiO, 62 NiAl, 15 Al_2O_3; sintered at 1523 K for 2 hrs (setter material mixture); density 4.31 g cm^{-3}; integrated from spectral data (1-15 μm); [Authors' designation: Sample No. 66].

DATA TABLE NO. 518 NORMAL TOTAL EMITTANCE OF [NiO + NiAl + ΣX_i] CERMETS

[Temperature, T, K; Emittance, ϵ]

T	ϵ	T	ϵ
CURVE 1*		CURVE 5*	
1023	0.72	1273	0.81
CURVE 2*		CURVE 6*	
1023	0.48	1023	0.53
CURVE 3*		CURVE 7*	
1023	0.73	1273	0.53
CURVE 4*		CURVE 8*	
1023	0.81	1273	0.83

*No plot given



CURVE	NTE
1	0.72
2	0.48
3	0.73
4	0.81
5	0.81
6	0.53
7	0.53
8	0.83

FIGURE 519 NORMAL SPECTRAL EMITTANCE OF [NiO+NiAl+ΣXi] CERMETS

SPECIFICATION TABLE NO. 519 NORMAL SPECTRAL EMITTANCE OF [NiO + NiAl + ΣX_i] CERMETS

Curve No.	Ref. No.	Year	Temperature K	Wavelength Range, μm	Geometry θ'	Reported Error, %	Composition (weight percent), Specifications and Remarks
1	28	1963	1023	1.00-15.0	~0°		1 NiO, 99 NiAl; sintered at 1623 K for 2 hrs (setter material NiAl); density 4.91 g cm^{-3}; data extracted from smooth curve; [Authors' designation: Sample No. 59].
2	28	1963	1023	1.00-15.0	~0°		9 NiO, 91 NiAl; sintered at 1723 K for 2 hrs (setter material graphite); density 4.58 g cm^{-3}; x-ray structure NiAl; data extracted from smooth curve; [Authors' designation: Sample No. 60].
3	28	1963	1023	1.00-15.0	~0°		23 NiO, 77 NiAl; sintered at 1623 K for 2 hrs (setter material NiAl); density 5.19 g cm^{-3}; x-ray structure NiAl; data extracted from smooth curve; [Authors' designation: Sample No. 61].
4	28	1963	1023	1.00-15.0	~0°		46 NiO, 54 NiAl; sintered at 1573 K for 2 hrs (setter material NiAl); density 3.44 g cm^{-3}; data extracted from smooth curve; [Authors' designation: Sample No. 62].
5	28	1963	1273	1.00-15.0	~0°		72 NiO, 28 NiAl; sintered at 1573 K for 2 hrs (setter material NiAl + NiO); density 4.40 g cm^{-3}; data extracted from smooth curve; [Authors' designation: Sample No. 63].
6	28	1963	1023	1.00-15.0	~0°		5 NiO, 91 NiAl, 4 Al_2O_3; sintered at 1623 K for 2 hrs (setter material NiAl); density 4.58 g cm^{-3}; data extracted from smooth curve; [Authors' designation: Sample No. 64].
7	28	1963	1273	1.00-15.0	~0°		12 NiO, 79 NiAl, 9 Al_2O_3; sintered at 1573 K for 2 hrs (setter material mixture); density 4.33 g cm^{-3}; x-ray structure NiAl + Al_2O_3; data extracted from smooth curve; [Authors' designation: Sample No. 65].
8	28	1963	1273	1.00-15.0	~0°		23 NiO, 62 NiAl, 15 Al_2O_3; sintered at 1523 K for 2 hrs (setter material mixture); density 4.31 g cm^{-3}; data extracted from smooth curve; [Authors' designation: Sample No. 66].

DATA TABLE NO. 519 NORMAL SPECTRAL EMITTANCE OF $[NiO + NiAl + \Sigma X_i]$ CERMETS

[Wavelength, λ, μm; Emittance, ϵ; Temperature, T, K]

λ	ϵ
CURVE 1	
T = 1023	
1.00	0.820
1.09	0.823
1.51	0.771
1.61	0.780
1.69	0.770
1.86	0.793
2.01	0.774
2.24	0.780
2.33	0.769
2.55	0.769
2.74	0.741
3.20	0.741
3.35	0.754
3.44	0.738
3.76	0.728
4.01	0.737
4.16	0.730
4.31	0.687
4.36	0.696
4.73	0.672
5.01	0.676
5.09	0.657
5.29	0.657
5.49	0.649
6.12	0.639
6.19	0.623
6.26	0.630
6.75	0.627
6.89	0.620
7.00	0.631
7.29	0.660
7.38	0.650
7.47	0.669
7.56	0.644
7.61	0.680
7.93	0.665
8.00	0.675
8.25	0.635
8.82	0.642
8.88	0.674
8.95	0.643
9.13	0.643
9.29	0.629

λ	ϵ
CURVE 1 (cont.)	
9.64	0.639
9.76	0.631
9.87	0.637
10.0	0.625
10.1	0.641
10.3	0.641*
10.4	0.627
11.5	0.669
11.7	0.675
11.8	0.667
12.0	0.676
12.1	0.654
12.3	0.688
12.4	0.678
12.6	0.689*
13.0	0.689
13.1	0.702
13.2	0.686
13.5	0.715
13.7	0.689
14.2	0.706
14.8	0.693
15.0	0.730
CURVE 2	
T = 1023	
1.00	0.560
1.29	0.596
1.40	0.574
1.59	0.574
1.68	0.593
1.81	0.587
1.97	0.606
2.13	0.614
2.20	0.593
2.27	0.595
2.43	0.575
2.81	0.497
3.49	0.446
3.62	0.434
3.86	0.434
4.00	0.434
4.17	0.420

λ	ϵ
CURVE 2 (cont.)	
4.36	0.396
5.24	0.373
5.35	0.381
5.49	0.371
6.07	0.371
6.22	0.357
6.45	0.372
6.94	0.372
7.14	0.401
7.26	0.404
7.38	0.423
7.65	0.427
7.78	0.446
8.06	0.429
8.41	0.355
8.78	0.336
9.02	0.326
9.15	0.301
9.83	0.301
10.1	0.288
10.5	0.288
11.0	0.336
11.5	0.371
12.0	0.408
12.5	0.438
13.2	0.468
13.3	0.455
13.7	0.466*
13.8	0.478
14.2	0.471
14.5	0.471
14.7	0.463
15.0	0.470
CURVE 3	
T = 1023	
1.00	0.820*
1.12	0.812
1.39	0.783
1.69	0.782
2.21	0.797
2.38	0.787
2.58	0.785

λ	ϵ
CURVE 3 (cont.)	
2.87	0.762
3.09	0.774
3.17	0.760
3.25	0.767
3.65	0.766
3.73	0.750
3.81	0.758
3.87	0.749
3.96	0.758
4.10	0.738
4.23	0.728
4.31	0.700
4.48	0.697
4.56	0.705
4.99	0.678
5.50	0.660
6.10	0.648
6.24	0.636
6.81	0.641
7.00	0.645
7.54	0.700
7.67	0.723
7.80	0.730
7.87	0.704
7.96	0.724
8.37	0.657
8.54	0.660
8.66	0.642
8.85	0.642*
8.92	0.668
9.16	0.636
9.23	0.648
9.51	0.632
10.0	0.655
10.5	0.680
11.0	0.728
11.5	0.743
11.6	0.757
12.5	0.761
13.7	0.763
13.8	0.750
14.0	0.766
14.5	0.769
14.7	0.759*

λ	ϵ
CURVE 3 (cont.)	
14.8	0.772*
14.9	0.772
15.0	0.766
15.0	0.785
CURVE 4	
T = 1023	
1.00	0.900
1.08	0.911
1.24	0.911
1.36	0.891
1.51	0.864
1.73	0.868
1.93	0.858
2.01	0.854
2.36	0.846
2.49	0.824
2.60	0.835
2.82	0.821
3.10	0.830
3.99	0.828
4.14	0.791
4.28	0.813
4.42	0.790
4.64	0.796
5.48	0.766
5.56	0.756
5.95	0.765
6.06	0.750
6.26	0.750
6.39	0.733
6.63	0.747
6.90	0.747
7.00	0.739
7.49	0.763
8.00	0.762
8.39	0.728
8.82	0.737
9.40	0.736
9.59	0.730
9.85	0.750
10.9	0.814
11.3	0.829

λ	ϵ
CURVE 4 (cont.)	
11.9	0.827
12.0	0.835
12.1	0.825
12.2	0.834*
12.3	0.819
12.5	0.831
13.0	0.832
13.1	0.821
13.2	0.831
14.0	0.831
14.5	0.819
14.9	0.830
15.0	0.850
CURVE 5	
T = 1273	
1.00	0.820*
1.04	0.833
1.09	0.806
1.25	0.809
1.48	0.787
1.69	0.798
1.84	0.797
2.06	0.831
2.31	0.847
2.47	0.833
2.54	0.845
2.90	0.840
3.07	0.849
3.23	0.841
3.38	0.849
3.47	0.839
3.58	0.837
3.65	0.860
3.76	0.847
3.96	0.856
4.10	0.832
4.32	0.807
4.46	0.774
4.55	0.829
4.62	0.797*
4.65	0.804
5.01	0.798

λ	ϵ
CURVE 5 (cont.)	
5.50	0.776
5.64	0.770
5.68	0.786
5.73	0.756
5.78	0.776
5.83	0.752
5.86	0.774
5.92	0.758
6.00	0.764
6.51	0.753
7.00	0.759
7.52	0.771
8.14	0.766
8.45	0.735
8.78	0.735
8.88	0.748
8.96	0.726
9.06	0.743
9.23	0.733
9.80	0.748
10.0	0.759
10.5	0.777
11.0	0.808
11.2	0.823
11.4	0.822
11.6	0.833
11.7	0.823
11.9	0.833
12.0	0.815
12.1	0.823
12.7	0.833*
12.8	0.827*
13.0	0.827
13.1	0.839
14.0	0.846
14.5	0.848
14.8	0.847*
15.0	0.860
CURVE 6	
T = 1023	
1.00	0.551
1.15	0.603

λ	ϵ
CURVE 6 (cont.)	
1.37	0.596
1.52	0.586
1.75	0.593
2.14	0.553
2.59	0.516
3.06	0.550
3.49	0.562
3.64	0.555
3.96	0.573
4.09	0.561
4.26	0.568
4.35	0.524
4.51	0.527
4.60	0.519
4.70	0.523
5.00	0.505
5.51	0.484
5.93	0.475
6.16	0.452
6.52	0.445
6.78	0.445
6.95	0.430
7.10	0.440
7.32	0.425*
7.52	0.416
8.01	0.401
8.42	0.373
8.54	0.380
9.00	0.370
9.30	0.364
9.46	0.345
9.88	0.344
10.5	0.376
10.6	0.383
10.9	0.408
11.1	0.419
11.5	0.422
11.8	0.422
12.0	0.434
12.5	0.447
13.0	0.455
13.5	0.461
13.9	0.466
14.0	0.457

*Not shown on plot

DATA TABLE NO. 519 (continued)

λ	∈	λ	∈	λ	∈
CURVE 6 (cont.) T = 1023		**CURVE 7 (cont.)**		**CURVE 8 (cont.)**	
		9.81	0.387	6.52	0.742
14.3	0.469	10.5	0.387	6.72	0.737
14.4	0.460	10.9	0.402*	6.79	0.748
14.6	0.468*	11.2	0.434	6.97	0.736
15.0	0.470*	11.4	0.448	7.10	0.747
		11.5	0.438	7.28	0.735
CURVE 7 T = 1273		11.6	0.453	7.53	0.738
		11.7	0.443	8.01	0.732
		11.9	0.460	8.16	0.731*
1.00	0.570	12.3	0.493	8.26	0.714
1.28	0.590	12.5	0.501	8.48	0.697
1.50	0.590	13.0	0.545	8.60	0.740
1.68	0.605	13.5	0.570	8.66	0.716
2.00	0.621	13.7	0.563	8.71	0.727
2.31	0.626	13.9	0.575	8.83	0.719
2.49	0.587	14.1	0.577	8.89	0.679
2.75	0.542	14.3	0.582	8.98	0.717
3.00	0.543	14.4	0.573	9.09	0.725*
3.13	0.523	14.9	0.581	9.21	0.719
3.22	0.530	15.0	0.600	9.34	0.727
3.35	0.508			9.60	0.719
3.49	0.497	**CURVE 8** T = 1273		10.0	0.734
3.69	0.493			10.5	0.778*
3.96	0.506			11.0	0.822
4.10	0.486	1.00	0.810	11.5	0.822*
4.30	0.472	1.25	0.828	11.6	0.809
4.43	0.450	1.40	0.819	12.0	0.818
4.54	0.483	1.50	0.830	12.5	0.818
4.67	0.460	1.62	0.817	12.8	0.824
4.79	0.472	1.99	0.839	13.0	0.818
5.00	0.474	2.50	0.882	13.1	0.829
5.50	0.463	2.68	0.872	14.0	0.831
5.62	0.463	2.77	0.858	14.4	0.837
6.01	0.454	3.04	0.880	14.7	0.834
6.15	0.463	3.32	0.868	14.8	0.845*
7.02	0.462	3.43	0.883	15.0	0.845
7.55	0.465	3.49	0.869		
7.65	0.452	3.88	0.876		
7.75	0.464	4.01	0.866		
7.89	0.443	4.11	0.946		
8.12	0.442	4.26	0.829		
8.31	0.415	4.52	0.828*		
8.82	0.414	4.61	0.816		
9.00	0.400	5.01	0.803		
9.26	0.402	5.50	0.778		
9.66	0.382	6.00	0.753*		

*Not shown on plot

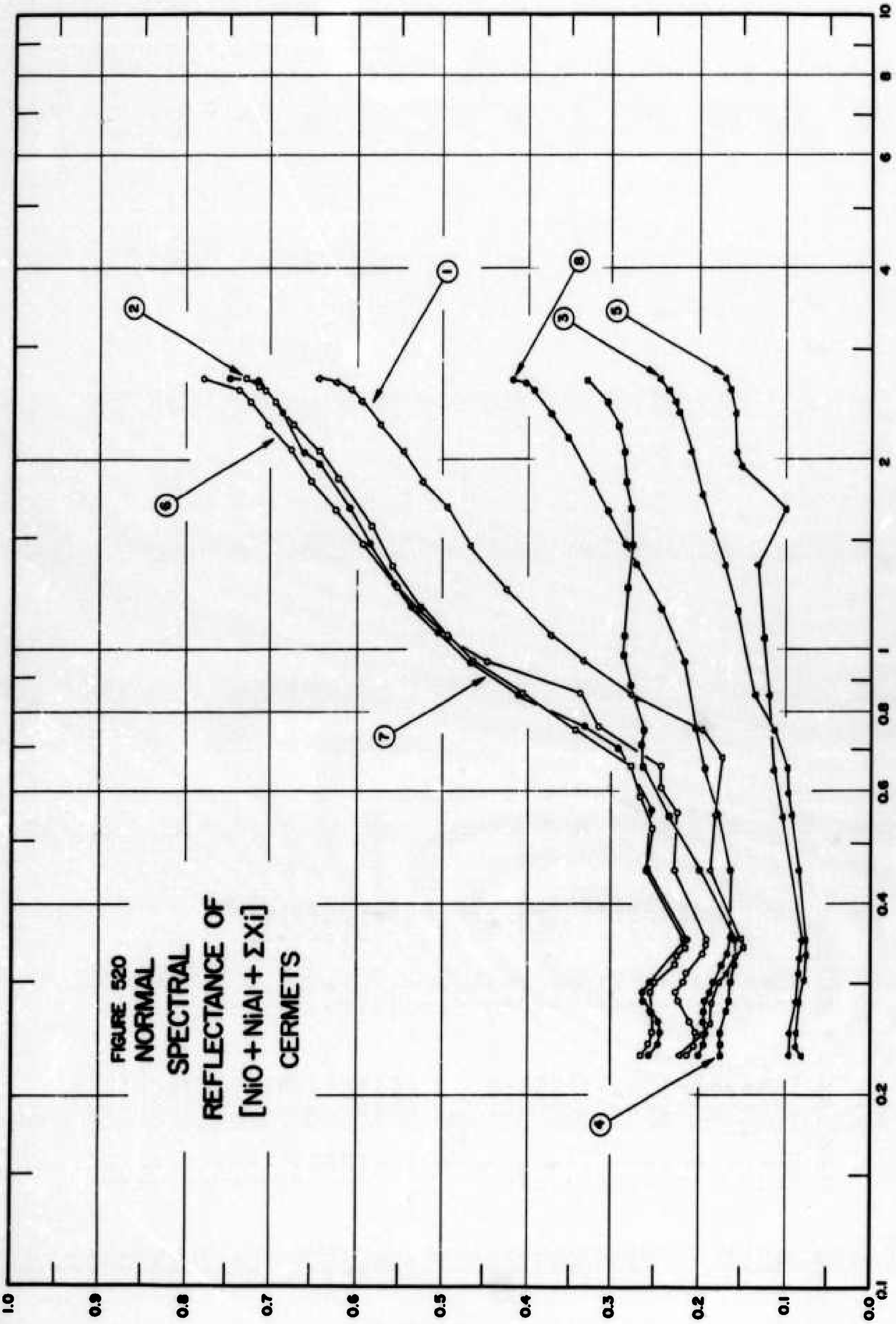


FIGURE 520 NORMAL SPECTRAL REFLECTANCE OF [NiO + NiAl + ΣXi] CERMETS

SPECIFICATION TABLE NO. 520 NORMAL SPECTRAL REFLECTANCE OF [$NiO + NiAl + \Sigma X_i$] CERMETS

Curve No.	Ref. No.	Year	Temperature K	Wavelength Range, μm	Geometry θ	θ'	ω'	Reported Error, %	Composition (weight percent), Specifications and Remarks
1	28	1963	298	0.230-2.65	~0°		2π		1 NiO, 99 NiAl; sintered at 1623 K for 2 hrs (setter material NiAl); density 4.91 g cm^{-3}; data extracted from smooth curve; MgO reference standard; [Authors' designation: Sample No. 59].
2	28	1963	298	0.230-2.65	~0°		2π		9 NiO, 91 NiAl; sintered at 1723 K for 2 hrs (setter material graphite); density 4.58 g cm^{-3}; x-ray structure NiAl; data extracted from smooth curve; MgO reference standard; [Authors' designation: Sample No. 60].
3	28	1963	298	0.230-2.65	~0°		2π		23 NiO, 77 NiAl; sintered at 1623 K for 2 hrs (setter material NiAl); density 5.19 g cm^{-3}; x-ray structure NiAl; data extracted from smooth curve; MgO reference standard; [Authors' designation: Sample No. 61].
4	28	1963	298	0.230-2.65	~0°		2π		46 NiO, 54 NiAl; sintered at 1573 K for 2 hrs (setter material NiAl); density 3.44 g cm^{-3}; data extracted from smooth curve; MgO reference standard; [Authors' designation: Sample No. 62].
5	28	1963	298	0.230-2.65	~0°		2π		72 NiO, 28 NiAl; sintered at 1573 K for 2 hrs (setter material NiAl + NiO); density 4.40 g cm^{-3}; data extracted from smooth curve; MgO reference standard; [Authors' designation: Sample No. 63].
6	28	1963	298	0.230-2.65	~0°		2π		12 NiO, 79 NiAl, 4 Al_2O_3; sintered at 1623 K for 2 hrs (setter material NiAl); density 4.58 g cm^{-3}; data extracted from smooth curve; MgO reference standard; [Authors' designation: Sample No. 64].
7	28	1963	298	0.230-2.65	~0°		2π		12 NiO, 79 NiAl, 9 Al_2O_3; sintered at 1573 K for 2 hrs (setter material mixture); density 4.33 g cm^{-3}; x-ray structure NiAl + Al_2O_3; data extracted from smooth curve; MgO reference standard; [Authors' designation: Sample No. 65].
8	28	1963	298	0.230-2.65	~0°		2π		23 NiO, 62 NiAl, 15 Al_2O_3; sintered at 1523 K for 2 hrs (setter material mixture); density 4.31 g cm^{-3}; data extracted from smooth curve; MgO reference standard; [Authors' designation: Sample No. 66].

DATA TABLE NO. 520 NORMAL SPECTRAL REFLECTANCE OF [NiO + NiAl + ΣX_i] CERMETS

[Wavelength, λ, μm; Reflectance, ρ; Temperature, T, K]

CURVE 1
T = 298

λ	ρ
0.230	0.221
0.249	0.199
0.259	0.188
0.279	0.186
0.300	0.178
0.310	0.169
0.330	0.154
0.340	0.149
0.350	0.150
0.450	0.188
0.550	0.181
0.676	0.172
0.749	0.199
0.848	0.278
0.951	0.333
1.05	0.372
1.25	0.428
1.45	0.468
1.65	0.496
1.85	0.523
2.05	0.549
2.25	0.571
2.45	0.598
2.55	0.609
2.62	0.624
2.65	0.645

CURVE 2
T = 298

λ	ρ
0.230	0.265
0.240	0.258
0.250	0.252
0.269	0.253
0.290	0.256
0.300	0.250
0.320	0.228
0.330	0.225
0.340	0.216
0.350	0.217
0.450	0.260
0.521	0.251
0.588	0.269
0.652	0.277

CURVE 2 (cont.)

λ	ρ
0.749	0.344
0.850	0.408
0.952	0.463
1.05	0.496
1.15	0.524
1.35	0.560
1.55	0.585
1.85	0.621
2.05	0.642
2.25	0.671
2.45	0.694
2.56	0.709
2.60	0.715
2.65	0.730

CURVE 3
T = 298

λ	ρ
0.230	0.080
0.238	0.088
0.250	0.088
0.280	0.082
0.301	0.077
0.331	0.073
0.350	0.075
0.450	0.082
0.550	0.091
0.596	0.098
0.650	0.097
0.748	0.112
0.949	0.136
1.15	0.153
1.35	0.170
1.55	0.184
1.75	0.198
2.05	0.210
2.35	0.223
2.45	0.228
2.55	0.235
2.65	0.245

CURVE 4
T = 298

λ	ρ
0.230	0.175

CURVE 4 (cont.)

λ	ρ
0.240	0.175
0.250	0.175
0.270	0.167
0.280	0.164
0.300	0.161
0.320	0.157
0.330	0.157*
0.350	0.157
0.450	0.200
0.548	0.233
0.651	0.263
0.706	0.266
0.745	0.261
0.874	0.279
0.975	0.285
1.05	0.286
1.25	0.282
1.45	0.279
1.65	0.279
1.85	0.283
2.05	0.284
2.25	0.291
2.45	0.305
2.65	0.330

CURVE 5
T = 298

λ	ρ
0.230	0.096
0.250	0.094
0.280	0.088
0.310	0.083
0.329	0.081
0.350	0.080
0.549	0.102
0.644	0.114
0.848	0.120
1.05	0.126
1.35	0.132
1.65	0.100
1.95	0.150
2.15	0.154
2.35	0.158
2.56	0.162
2.65	0.170

CURVE 6
T = 298

λ	ρ
0.230	0.212
0.239	0.205
0.250	0.202
0.260	0.210
0.280	0.223
0.290	0.226
0.300	0.219
0.310	0.214
0.331	0.197
0.341	0.191
0.350	0.191
0.450	0.228
0.552	0.226
0.605	0.243
0.654	0.243
0.754	0.318
0.850	0.388
0.951	0.449
1.05	0.494
1.15	0.527
1.25	0.554
1.45	0.593
1.65	0.625
1.85	0.651
2.05	0.674
2.25	0.701
2.45	0.725
2.55	0.739
2.65	0.780

CURVE 7
T = 298

λ	ρ
0.230	0.257
0.240	0.248
0.250	0.244
0.260	0.247
0.270	0.253
0.280	0.263
0.290	0.263
0.300	0.255
0.320	0.228*
0.340	0.215*
0.350	0.215

CURVE 7 (cont.)

λ	ρ
0.453	0.260
0.560	0.253
0.700	0.292
0.751	0.332
0.848	0.411
0.950	0.469
1.05	0.509
1.15	0.537
1.25	0.557
1.45	0.587
1.65	0.610
1.95	0.641
2.15	0.660
2.35	0.686
2.55	0.707*
2.61	0.718
2.65	0.750

CURVE 8
T = 298

λ	ρ
0.230	0.200
0.240	0.195
0.250	0.193
0.260	0.196
0.270	0.196
0.280	0.192
0.290	0.189
0.300	0.182
0.320	0.171
0.331	0.167
0.350	0.161
0.450	0.161
0.550	0.180
0.651	0.194
0.750	0.201
0.951	0.219
1.15	0.241
1.35	0.271
1.45	0.284
1.65	0.303
1.85	0.323
2.15	0.351
2.35	0.371
2.55	0.393

CURVE 8 (cont.)

λ	ρ
2.60	0.401
2.65	0.420

*Not shown on plot

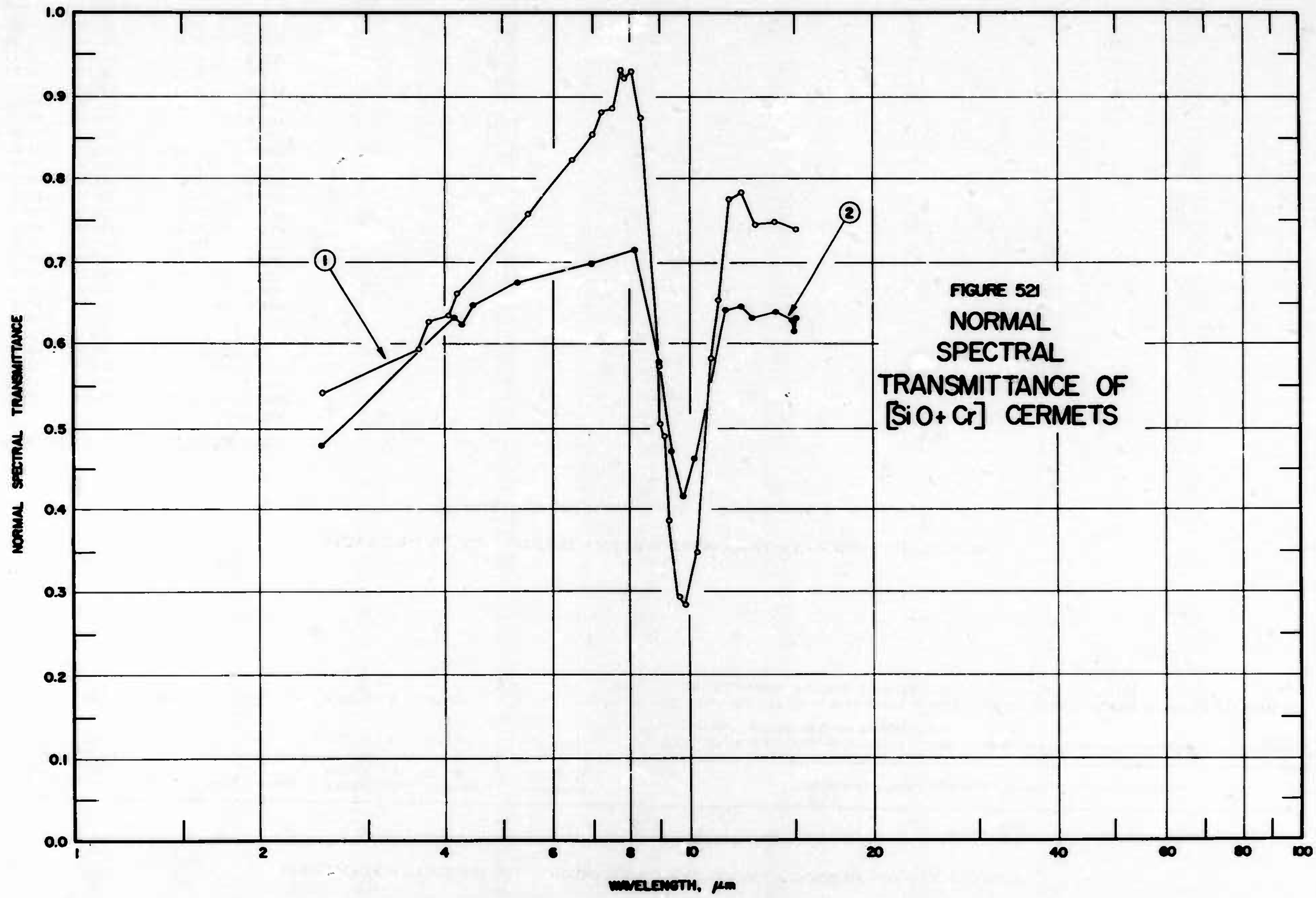


FIGURE 521 NORMAL SPECTRAL TRANSMITTANCE OF [SiO + Cr] CERMETS

SPECIFICATION TABLE NO. 521 NORMAL SPECTRAL TRANSMITTANCE OF [SiO + Cr] CERMETS

Curve No.	Ref. No.	Year	Temperature K	Wavelength Range, μm	Geometry θ θ' ω'	Reported Error, %	Composition (weight percent), Specifications and Remarks
1	326	1968	~298	2.52-15.0	~0°~0°		90.7 SiO, 9.3 Cr film; evaporated in high vacuum; sodium chloride substrate, cleaned in air; data extracted from smooth curve.
2	326	1968	~298	2.52-15.0	~0°~0°		50.9 SiO, 49.1 Cr film; evaporated in high vacuum; sodium chloride substrate, cleaned in air; data extracted from smooth curve.

DATA TABLE NO. 521 NORMAL SPECTRAL TRANSMITTANCE OF [SiO + Cr] CERMETS

[Wavelength, λ, μm; Transmittance, τ; Temperature, T, K]

λ	τ	λ	τ
CURVE 1 T ~ 298		**CURVE 1 (cont.)**	
		12.9	0.748
2.52	0.541	13.7	0.750
3.61	0.596	15.0	0.740
3.77	0.629		
4.08	0.635	**CURVE 2** T ~ 298	
4.20	0.662		
5.47	0.759		
6.46	0.825	2.52	0.480
6.97	0.856	4.17	0.632
7.20	0.882	4.29	0.625
7.50	0.889	4.43	0.650
7.74	0.933	5.27	0.679
7.89	0.924	6.93	0.700
8.06	0.931	8.11	0.717
8.34	0.877	8.93	0.579
8.92	0.573	9.35	0.472
8.97	0.507	9.74	0.418
9.10	0.492	10.1	0.462
9.26	0.389	10.8	0.581*
9.63	0.294	11.5	0.641
9.86	0.285	12.1	0.647
10.3	0.350	12.7	0.631
10.9	0.583	13.9	0.640
11.0	0.665	14.8	0.630
11.5	0.774	14.9	0.616
12.2	0.783	15.0	0.632

* Not shown on plot

SPECIFICATION TABLE NO. 522 NORMAL TOTAL EMITTANCE OF [Ta_2O_5 + $Be_{12}Ta$] CERMETS

Curve No.	Ref. No.	Year	Temperature Range, K	Geometry θ'	Reported Error, %	Composition (weight percent), Specifications and Remarks
1*	28	1963	1023	~0°		2 Ta_2O_5, 98 $Be_{12}Ta$; sintered at 1623 K for 2 hours (setter material $Be_{12}Ta$); density 2.65 g cm^{-3}; integrated from spectral data (1-15 μm); [Authors' designation: Sample no. 38].
2*	28	1963	1023	~0°		15 Ta_2O_5, 85 $Be_{12}Ta$; sintered at 1623 K for 2 hours (setter material $Be_{12}Ta$); density 4.02 g cm^{-3}; integrated from spectral data (1-15 μm); [Authors' designation: Sample no. 39].

DATA TABLE NO. 522 NORMAL TOTAL EMITTANCE OF [Ta_2O_5 + $Be_{12}Ta$] CERMETS

[Temperature, T, K; Emittance, ϵ]

T	ϵ
Curve 1*	
1023	0.83
Curve 2*	
1023	0.79

* No plot given

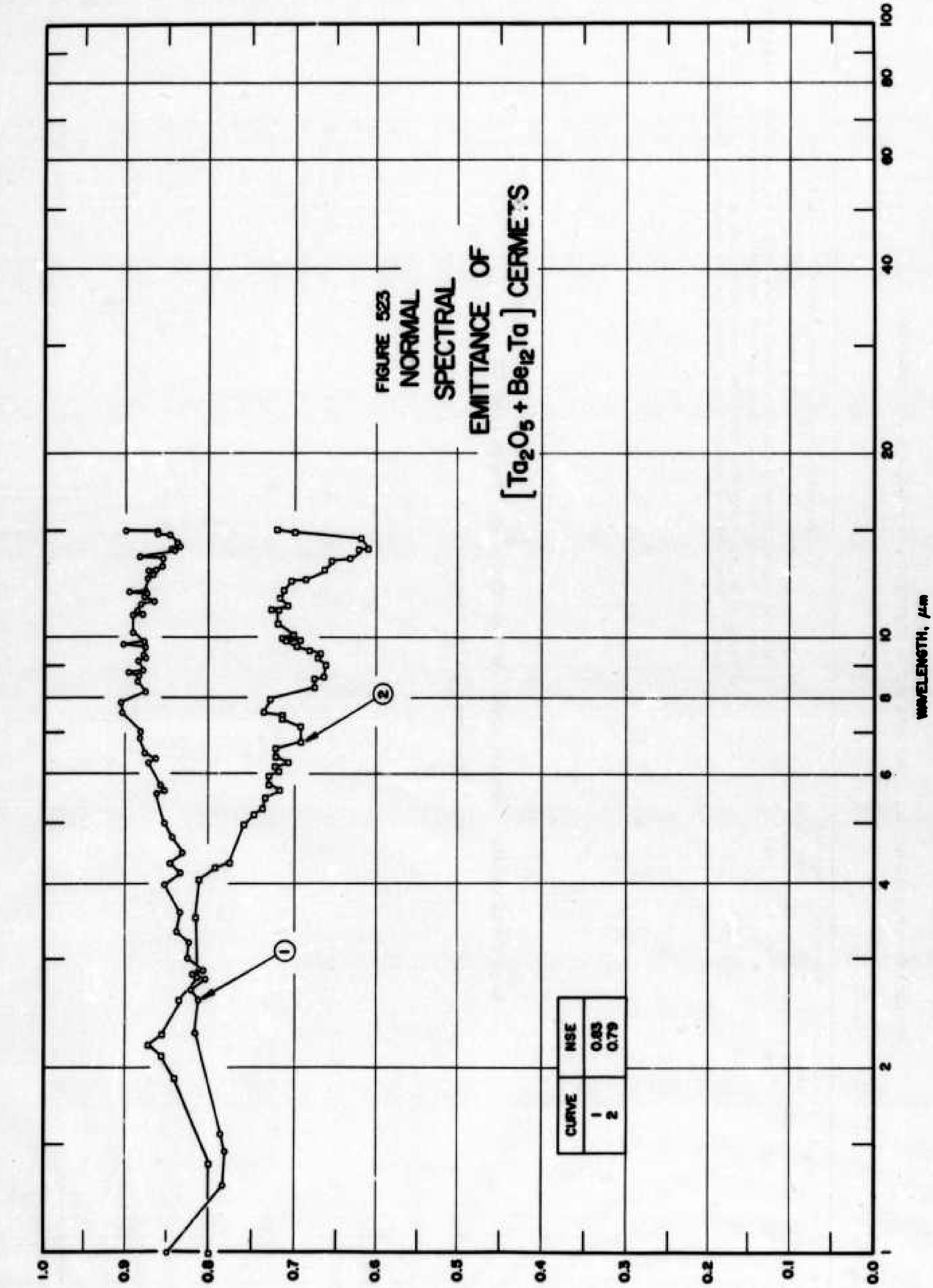


FIGURE 523 NORMAL SPECTRAL EMITTANCE OF $[Ta_2O_5 + Be_{12}Ta]$ CERMETS

SPECIFICATION TABLE NO. 523 NORMAL SPECTRAL EMITTANCE OF [Ta_2O_5 + $Be_{12}Ta$] CERMETS

Curve No.	Ref. No.	Year	Temperature, K	Wavelength Range, μm	Geometry θ'	Reported Error, %	Composition (weight percent), Specifications and Remarks
1	28	1963	1023	1.00-15.0	~0°		2 Ta_2O_5, 98 $Be_{12}Ta$; sintered at 1623 K for 2 hours (setter material $Be_{12}Ta$); density 2.65 g cm^{-3}; data extracted from smooth curve; [Author's designation: Sample No. 38].
2	28	1963	1023	1.00-15.0	~0°		15 Ta_2O_5, 85 $Be_{12}Ta$; sintered at 1623 K for 2 hours (setter material $Be_{12}Ta$); density 4.02 g cm^{-3}; data extracted from smooth curve; [Author's designation: Sample No. 39].

DATA TABLE NO. 523 NORMAL SPECTRAL EMITTANCE OF [Ta_2O_5 + $Be_{12}Ta$] CERMETS

[Wavelength, λ, μm; Emittance, ε; Temperature, T, K]

λ	ε	λ	ε	λ	ε	λ	ε	λ	ε
CURVE 1 T = 1023		CURVE 1 (cont.)		CURVE 1 (cont.)		CURVE 2 (cont.)		CURVE 2 (cont.)	
		6.89	0.884	12.7	0.872	4.01	0.812	9.50	0.683
1.00	0.850	7.01	0.881	12.8	0.863	4.21	0.794	9.69	0.699
1.28	0.784	7.51	0.905	12.9	0.869	4.29	0.766	9.82	0.710
1.46	0.781	7.89	0.907	13.0	0.858	4.98	0.760	9.88	0.694
1.56	0.787	8.17	0.877	13.5	0.858	5.15	0.748	9.97	0.714
2.26	0.817	8.50	0.886	13.6	0.850	5.29	0.736	10.0	0.702
2.57	0.812	8.68	0.883	13.8	0.841	5.48	0.734	10.5	0.719
2.66	0.821	8.76	0.896	13.9	0.845	5.65	0.717	11.0	0.719
2.77	0.804	8.82	0.878	14.1	0.835	5.76	0.730	11.0	0.729
2.82	0.820	9.16	0.887	14.4	0.838	5.95	0.730	11.2	0.708
2.88	0.807	9.27	0.875	14.7	0.848	6.06	0.717	11.5	0.717
3.01	0.825	9.34	0.879	14.7	0.861	6.15	0.721	11.9	0.706
3.20	0.825	9.65	0.877	14.9	0.861	6.28	0.706	12.3	0.703
3.31	0.839	9.72	0.903	15.0	0.900	6.40	0.721	12.4	0.689
3.58	0.835	9.88	0.878			6.60	0.721	12.9	0.665
3.99	0.854	10.1	0.892	CURVE 2 T = 1023		6.79	0.693	13.2	0.657
4.15	0.833	10.8	0.892			7.16	0.693	13.4	0.634
4.30	0.847	10.9	0.880			7.36	0.714	13.9	0.622
4.49	0.831	11.0	0.888	1.00	0.800	7.48	0.714	13.9	0.610
4.73	0.844	11.4	0.883	1.39	0.800	7.56	0.737	14.5	0.620
5.00	0.852	11.5	0.869	1.93	0.841	7.92	0.729	14.7	0.700
5.56	0.862	11.6	0.879	2.09	0.857	8.27	0.677	15.0	0.720
5.64	0.853	11.7	0.874	2.17	0.874	8.52	0.677		
5.75	0.858	11.8	0.896	2.26	0.856	8.60	0.666		
6.26	0.872	11.9	0.876	2.57	0.836	9.00	0.663		
6.32	0.864	12.5	0.875	2.80	0.816	9.21	0.673		
6.50	0.877	12.6	0.868	3.50	0.817	9.38	0.670		

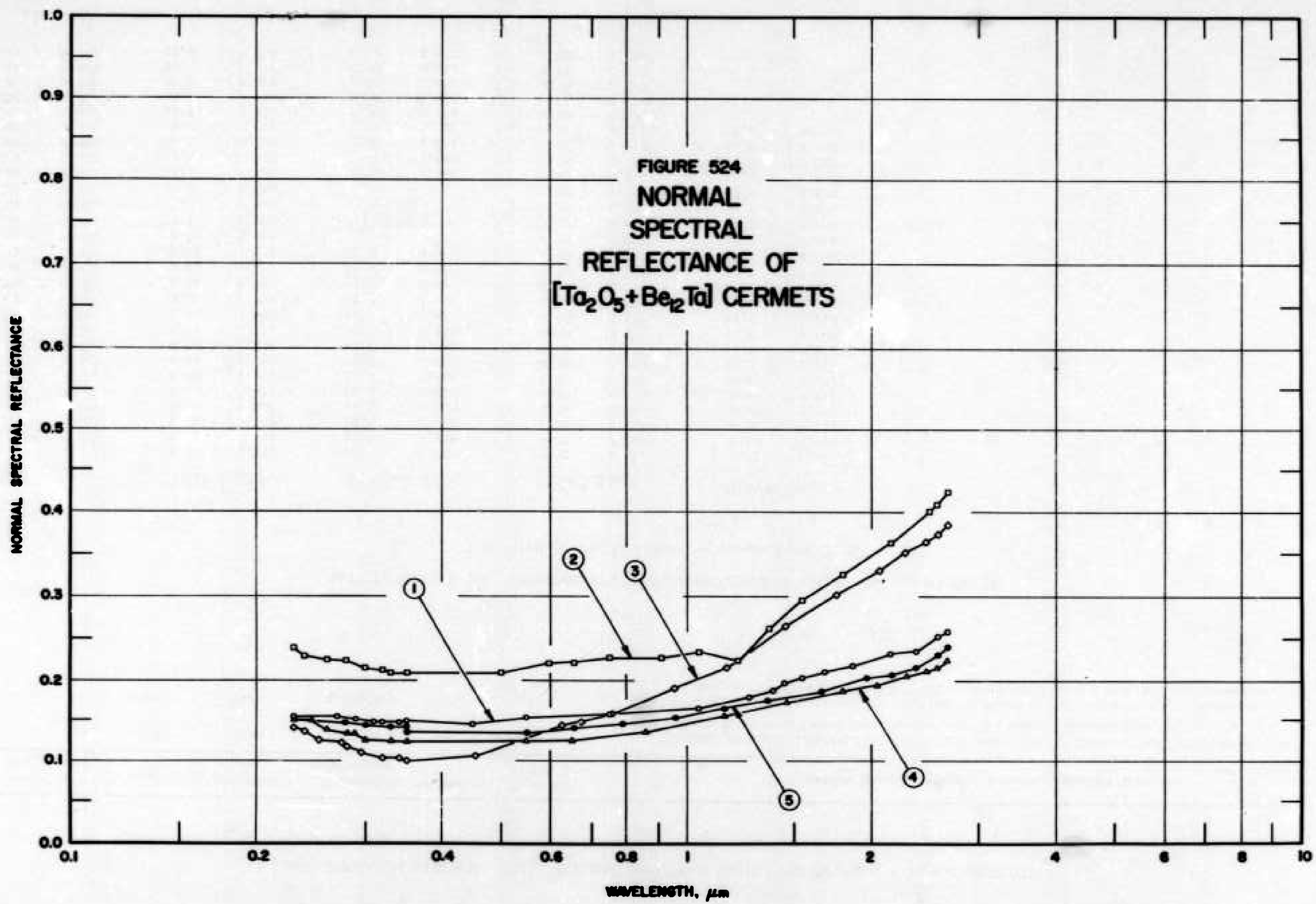


FIGURE 524
NORMAL
SPECTRAL
REFLECTANCE OF
$[Ta_2O_5+Be_{12}Ta]$ CERMETS
NORMAL SPECTRAL REFLECTANCE
WAVELENGTH, μm
0.0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
1.0
0.1
0.2
0.4
0.6
0.8
1
2
4
6
8
10
1
2
3
4
5

SPECIFICATION TABLE NO. 524 NORMAL SPECTRAL REFLECTANCE OF [Ta_2O_5 + $Be_{12}Ta$] CERMETS

Curve No.	Ref. No.	Year	Temperature K	Wavelength Range, μm	Geometry θ θ' ω'		Reported Error, %	Composition (weight percent), Specifications and Remarks
1	28	1963	298	0.230-2.65	~0°	2π		2 Ta_2O_5, 98 $Be_{12}Ta$; sintered at 1623 K for 2 hrs (setter material $Be_{12}Ta$); density 2.65 g cm^{-3}; data extracted from smooth curve; MgO reference standard; [Authors' designation: Sample No. 38].
2	28	1963	298	0.230-2.65	~0°	2π		15 Ta_2O_5, 85 $Be_{12}Ta$; sintered at 1623 K for 2 hrs (setter material $Be_{12}Ta$); density 4.02 g cm^{-3}; data extracted from smooth curve; MgO reference standard; [Authors' designation: Sample No. 39].
3	28	1963	298	0.230-2.65	~0°	2π		34 Ta_2O_5, 66 $Be_{12}Ta$; sintered at 1723 K for 2 hrs (setter material Ta_2O_5); density 3.23 g cm^{-3}; data extracted from smooth curve; MgO reference standard; [Authors' designation: Sample No. 40].
4	28	1963	298	0.230-2.65	~0°	2π		82 Ta_2O_5, 18 $Be_{12}Ta$; sintered at 1623 K for 2 hrs (setter material $Be_{12}Ta$); density 5.19 g cm^{-3}; data extracted from smooth curve; MgO reference standard; [Authors' designation: Sample No. 42].
5	28	1963	298	0.230-2.65	~0°	2π		60 Ta_2O_5, 40 $Be_{12}Ta$; sintered at 1673 K for 2 hrs (setter material $Be_{12}Ta$); density 1.81 g cm^{-3}; data extracted from smooth curve; MgO reference standard; [Authors' designation: Sample No. 41].

DATA TABLE NO. 524 NORMAL SPECTRAL REFLECTANCE OF [Ta_2O_5 + $Be_{12}Ta$] CERMETS

[Wavelength, λ, μm; Reflectance, ρ; Temperature, T, K]

CURVE 1
T = 298

λ	ρ
0.230	0.155
0.270	0.155
0.290	0.152
0.310	0.149
0.320	0.149
0.340	0.149
0.350	0.150
0.449	0.145
0.548	0.154
0.748	0.159
1.05	0.167
1.25	0.180
1.37	0.189
1.44	0.198
1.54	0.203
1.66	0.211
1.85	0.219

CURVE 1 (cont.)

λ	ρ
2.14	0.233
2.35	0.237
2.55	0.253
2.65	0.260

CURVE 2
T = 298

λ	ρ
0.230	0.240
0.240	0.230
0.260	0.226
0.280	0.226
0.300	0.217
0.320	0.212
0.330	0.210
0.350	0.210
0.500	0.210
0.595	0.222

CURVE 2 (cont.)

λ	ρ
0.651	0.222
0.749	0.229
0.901	0.229
1.05	0.235
1.21	0.250
1.35	0.263
1.55	0.295
1.80	0.328
2.15	0.363
2.45	0.400
2.55	0.410
2.65	0.425

CURVE 3
T = 298

λ	ρ
0.230	0.140
0.240	0.136

CURVE 3 (cont.)

λ	ρ
0.253	0.126
0.275	0.122
0.280	0.119
0.297	0.110
0.320	0.104
0.340	0.104
0.350	0.100
0.452	0.107
0.621	0.145
0.672	0.149
0.751	0.159
0.950	0.191
1.15	0.217
1.45	0.266
1.75	0.301
2.05	0.331
2.25	0.352
2.45	0.365

CURVE 3 (cont.)

λ	ρ
2.55	0.373
2.65	0.385

CURVE 4
T = 298

λ	ρ
0.230	0.150
0.245	0.150
0.260	0.139
0.280	0.133
0.289	0.133
0.300	0.126
0.330	0.125
0.350	0.125
0.547	0.125
0.650	0.125
0.852	0.137
1.15	0.157

CURVE 4 (cont.)

λ	ρ
1.45	0.173
1.78	0.188
2.03	0.195
2.27	0.206
2.45	0.211
2.55	0.217
2.65	0.225

CURVE 5
T = 298

λ	ρ
0.230	0.150*
0.279	0.148
0.300	0.144
0.330	0.142
0.350	0.142
0.350	0.135
0.550	0.135

CURVE 5 (cont.)

λ	ρ
0.656	0.140
0.786	0.146
0.957	0.153
1.15	0.166
1.35	0.177
1.65	0.187
1.95	0.201
2.15	0.206
2.35	0.216
2.55	0.231
2.65	0.240

*Not shown on plot

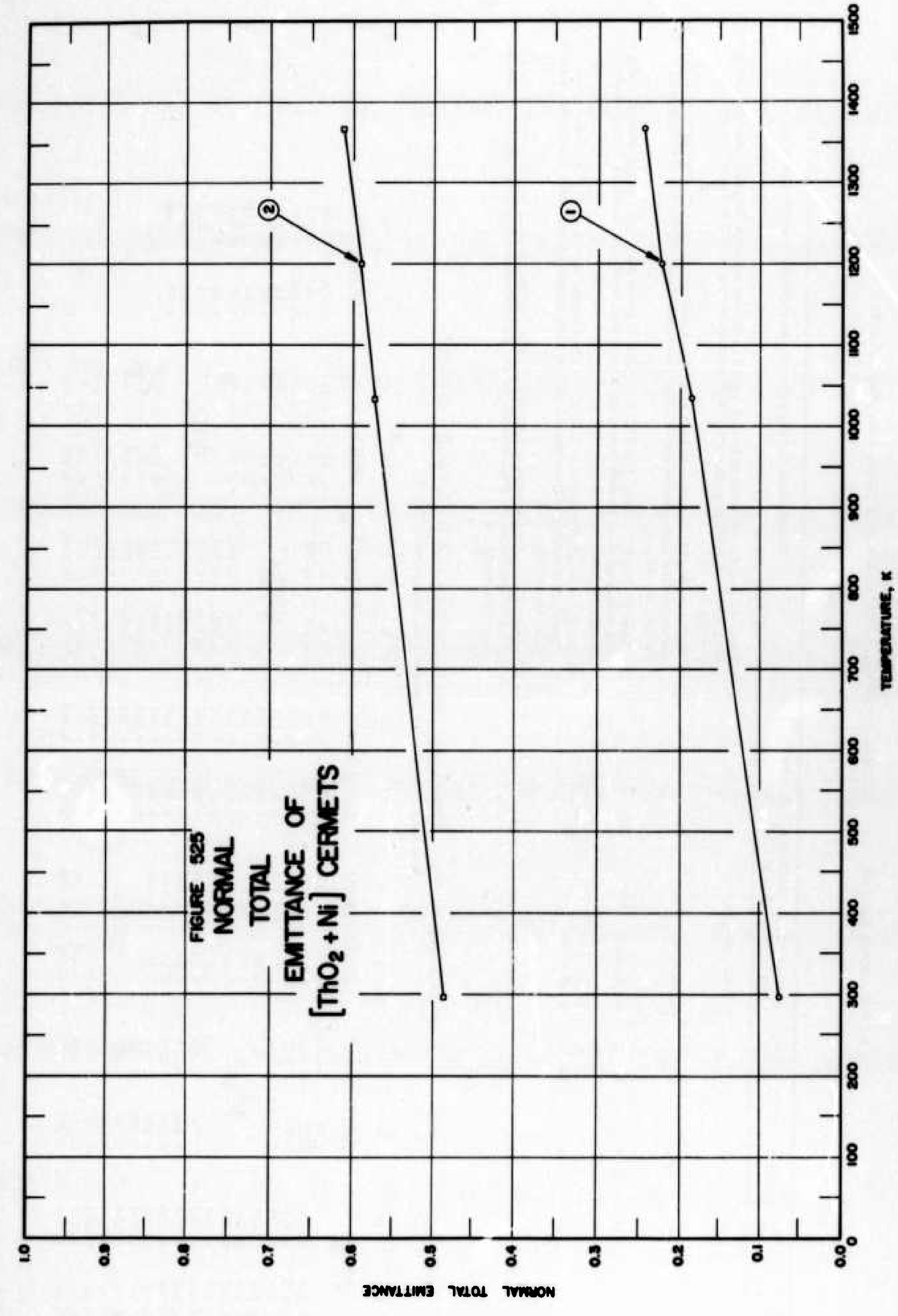


FIGURE 525 NORMAL TOTAL EMITTANCE OF $[ThO_2 + Ni]$ CERMETS

SPECIFICATION TABLE NO. 525 NORMAL TOTAL EMITTANCE OF [ThO_2 + Ni] CERMETS

Curve No.	Ref. No.	Year	Temperature Range, K	Geometry ϑ'	Reported Error, %	Composition (weight percent), Specifications and Remarks
1	327	1965	298-1366	0°		TD-Nickel; 2.20 ThO_2; annealed, structure similar to that of a cold-rolled material; as received; calculated from spectral reflectance data.
2	327	1965	298-1366	0°		Similar to the above specimen and conditions except measured after 6 cycles (1 hr with max. temp at 1455 K for 1 cycle); environmental exposure at low pressure (2 mm Hg).

DATA TABLE NO. 525 NORMAL TOTAL EMITTANCE OF [ThO_2 + Ni] CERMETS

[Temperature, T, K; Emittance, ϵ]

T	ϵ
CURVE 1	
298	0.076
1033	0.187
1200	0.224
1366	0.245
CURVE 2	
298	0.485
1033	0.573
1200	0.592
1366	0.612

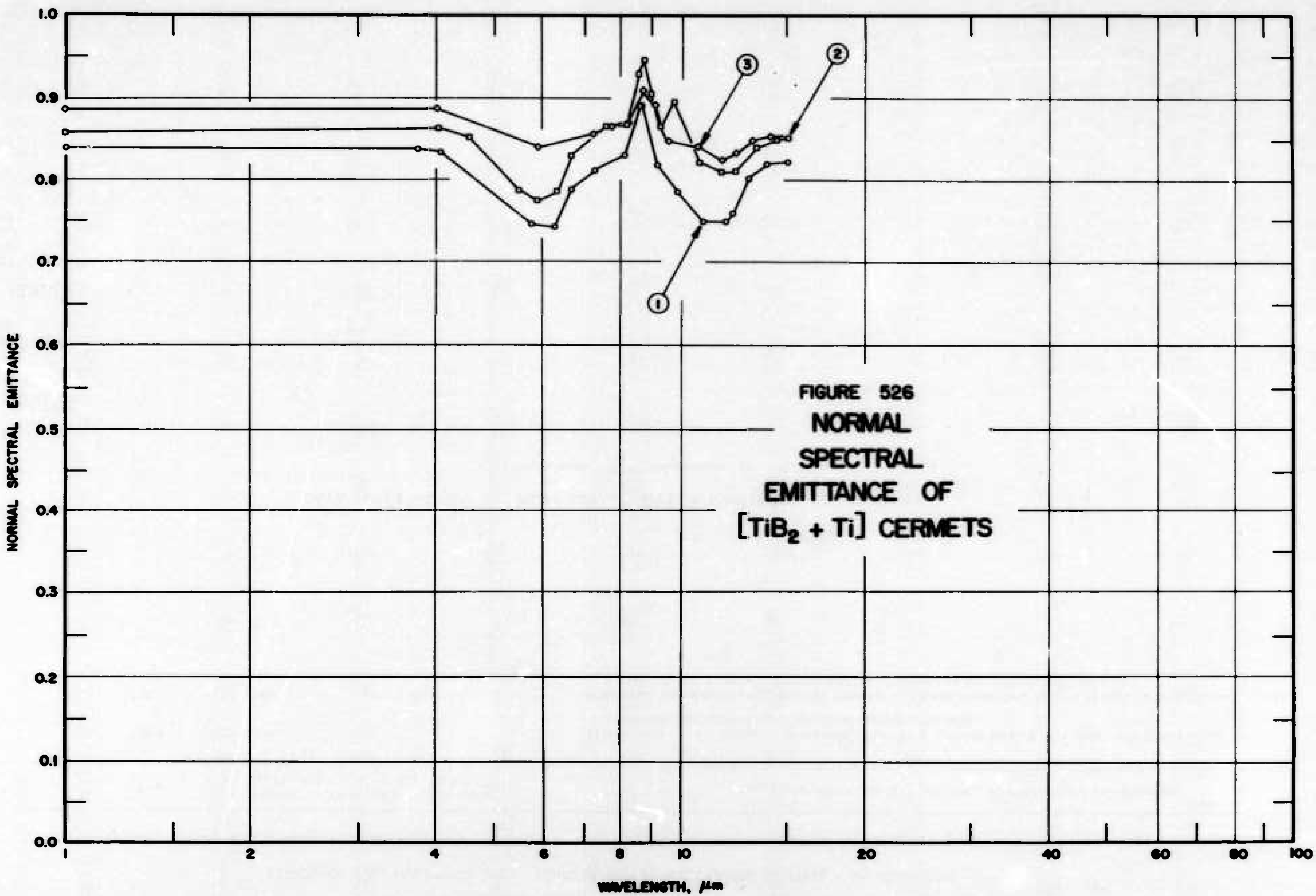


FIGURE 526 NORMAL SPECTRAL EMITTANCE OF [TiB_2 + Ti] CERMETS

SPECIFICATION TABLE NO. 526 NORMAL SPECTRAL EMITTANCE OF [TiB_2 + Ti] CERMETS

Curve No.	Ref. No.	Year	Temperature K	Wavelength Range, μm	Geometry θ'	Reported Error, %	Composition (weight percent), Specifications and Remarks
1	382	1965	1273	1.00-15.0	0°		59 TiB_2, 41 Ti; sintered 2 hrs at 1973 K; measured in argon-hydrogen atmosphere; data extracted from smooth curve.
2	382	1965	1273	1.00-15.0	0°		Above specimen and conditions except heated at 1273 K in measuring apparatus for 1 hr total.
3	382	1965	1273	1.00-15.0	0°		Above specimen and conditions except heated at 1273 K in measuring apparatus for 2 hrs total.

DATA TABLE NO. 526 NORMAL SPECTRAL EMITTANCE OF [TiB_2 + Ti] CERMETS

[Wavelength, λ, μm; Emittance, ϵ; Temperature, T, K]

λ	ϵ	λ	ϵ	λ	ϵ
CURVE 1 T = 1273K		CURVE 2 T = 1273K		CURVE 3 T = 1273K	
1.00	0.840	1.00	0.860	1.00	0.889
3.75	0.840	4.02	0.865	4.01	0.890
4.09	0.836	4.52	0.855	5.85	0.842
5.71	0.746	5.45	0.789	7.21	0.860
6.22	0.742	5.83	0.776	7.72	0.869
6.62	0.790	6.28	0.789	8.17	0.870
7.25	0.812	6.61	0.832	8.70	0.911
8.10	0.832	7.52	0.869	9.05	0.894
8.56	0.893	8.18	0.869	9.26	0.868
8.64	0.893	8.51	0.931	9.57	0.850
9.16	0.820	8.70	0.947	10.5	0.843
9.87	0.786	8.99	0.908	11.6	0.826
10.9	0.750	9.29	0.868	12.3	0.835
11.8	0.750	9.71	0.848	13.0	0.851
12.2	0.760	10.7	0.823	14.0	0.856
12.9	0.802	11.5	0.811	15.0	0.854*
13.8	0.821	12.3	0.811		
15.0	0.823	13.2	0.841		
		14.4	0.851		
		15.0	0.854		

*Not shown on plot

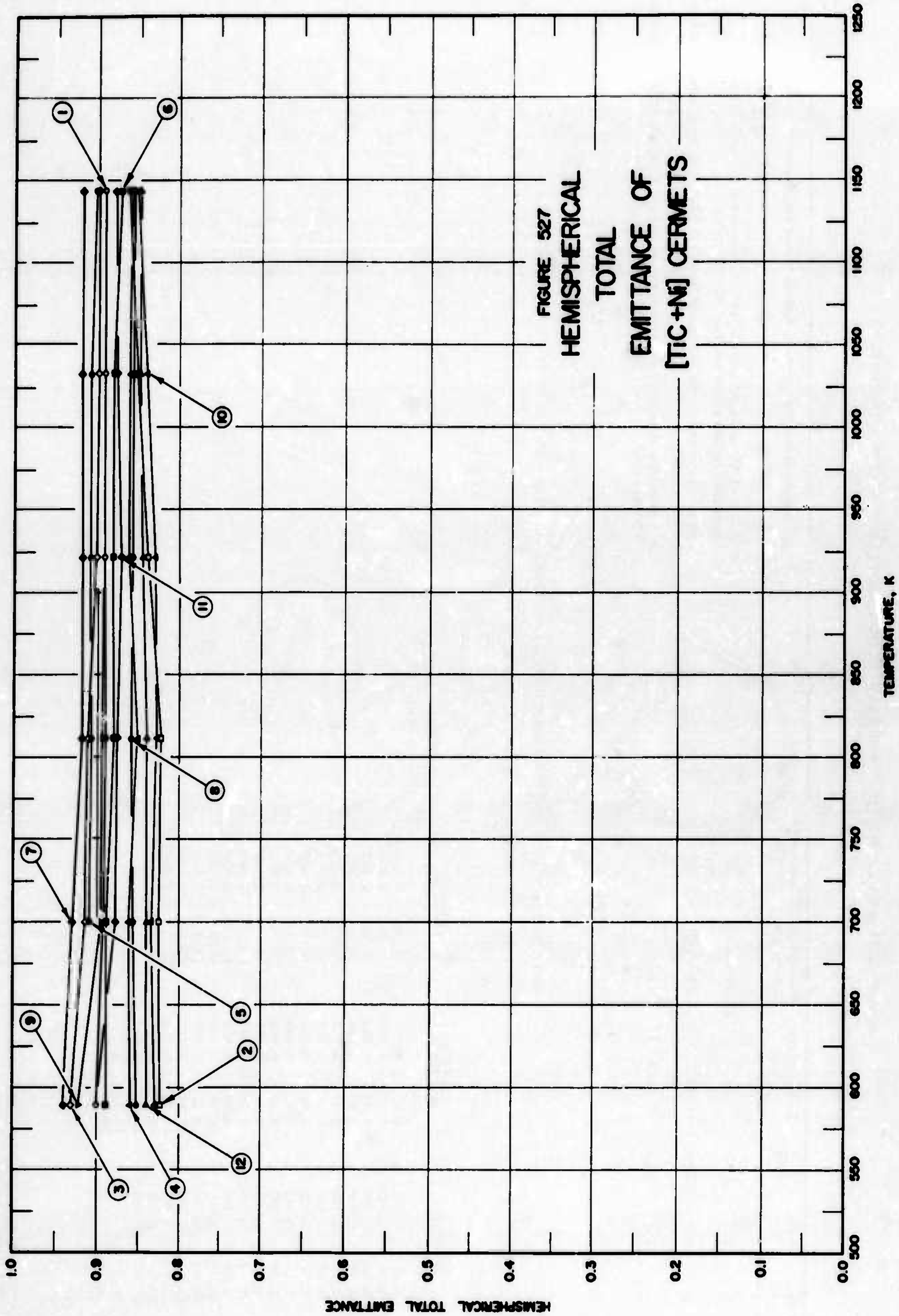


FIGURE 527 HEMISPHERICAL TOTAL EMITTANCE OF [TiC+Ni] CERMETS

SPECIFICATION TABLE NO. 527 HEMISPHERICAL TOTAL EMITTANCE OF [TiC + Ni] CERMETS

Curve No.	Ref. No.	Year	Temperature Range, K	Reported Error, %	Composition (weight percent), Specifications and Remarks
1	325	1959	589-1144		Kennametal K150A; nominal composition: 80 TiC, 10 Ni, and 10 NbC; as received; oxidized 20 min at 1144 K.
2	325	1959	589-1144		Similar to above specimen and conditions except polished.
3	325	1959	589-1144		Kennametal K151A; nominal composition: 70 TiC, 20 Ni, and 10 NbC; as received; oxidized 20 min at 1144 K.
4	325	1959	589-1144		Similar to above specimen and conditions except polished.
5	325	1959	589-1144		Kennametal K152B; nominal composition: 65 TiC, 30 Ni, and 5 NbC; as received; oxidized 20 min at 1144 K.
6	325	1959	589-1144		Similar to above specimen and conditions except polished.
7	325	1959	589-1144		Kennametal K153B; nominal composition: 54 TiC, 40 Ni, and 6 NbC; as received; oxidized 20 min at 1144 K.
8	325	1959	589-1144		Similar to above specimen and conditions except polished.
9	325	1959	589-1144		Kennametal K163B1; nominal composition: 54 TiC, 33.3 Ni, 6.7 Mo, and 6 NbC; as received; oxidized 20 min at 1144 K.
10	325	1959	589-1144		Similar to above specimen and conditions except polished.
11	325	1959	589-1144		Kennametal K184B; nominal composition: 40 TiC, 40 Ni, 10 NbC, 4 Mo, 3 Al, and 3 Cr; as received; oxidized 20 min at 1144 K.
12	325	1959	589-1144		Similar to above specimen and conditions except polished.

DATA TABLE NO. 527 HEMISPHERICAL TOTAL EMITTANCE OF [TiC + Ni] CERMETS

[Temperature, T, K; Emittance, ϵ]

T	ϵ	T	ϵ	T	ϵ
CURVE 1		CURVE 6		CURVE 11	
589	0.900	589	0.889	589	0.900*
700	0.892	700	0.890	700	0.878
811	0.890	811	0.880	811	0.878
922	0.892	922	0.881	922	0.872
1033	0.892	1033	0.880	1033	0.879
1144	0.892	1144	0.873	1144	0.879
CURVE 2		CURVE 7		CURVE 12	
589	0.825	589	0.940	589	0.840
700	0.826	700	0.930	700	0.840
811	0.825	811	0.920	811	0.840
922	0.840	922	0.920	922	0.846
1033	0.852	1033	0.920	1033	0.850
1144	0.862	1144	0.920	1144	0.850
CURVE 3		CURVE 8			
589	0.931	589	0.851		
700	0.915	700	0.859		
811	0.911	811	0.860		
922	0.901	922	0.860		
1033	0.900	1033	0.860		
1144	0.900	1144	0.860		
CURVE 4		CURVE 9			
589	0.860	589	0.921		
700	0.682	700	0.893		
811	0.851	811	0.892		
922	0.862	866	0.892		
1033	0.861	922	0.892*		
1144	0.861	1033	0.892*		
		1144	0.892*		
CURVE 5		CURVE 10			
589	0.900*	589	0.830		
700	0.910	700	0.835		
811	0.909	811	0.830		
922	0.910	922	0.831		
1033	0.910	1033	0.841		
1144	0.902	1144	0.851		

*Not shown on plot

SPECIFICATION TABLE NO. 528 NORMAL TOTAL EMITTANCE OF [TiC + Ni] CERMETS

Curve No.	Ref. No.	Year	Temperature Range, K	Geometry θ'	Reported Error, %	Composition (weight percent), Specifications and Remarks
1*	325	1959	1144	~0°		Kennametal K150A; nominal composition: 80 TiC, 10 Ni, 10 NbC; as received.
2*	325	1959	1144	~0°		Above specimen and conditions except measured after 5 min at 1144 K.
3*	325	1959	1144	~0°		Above specimen and conditions except measured after 10 min at 1144 K.
4*	325	1959	1144	~0°		Above specimen and conditions except measured after 15 min at 1144 K.
5*	325	1959	1144	~0°		Above specimen and conditions except measured after 20 min at 1144 K.
6*	325	1959	1144	~0°		Similar to curve 1 specimen and conditions except polished.
7*	325	1959	1144	~0°		Above specimen and conditions except measured after 5 min at 1144 K.
8*	325	1959	1144	~0°		Above specimen and conditions except measured after 10 min at 1144 K.
9*	325	1959	1144	~0°		Above specimen and conditions except measured after 15 min at 1144 K.
10*	325	1959	1144	~0°		Above specimen and conditions except measured after 20 min at 1144 K.
11*	325	1959	1144	~0°		Kennametal K151A; nominal composition: 70 TiC, 20 Ni, and 10 NbC; as received.
12*	325	1959	1144	~0°		Above specimen and conditions except measured after 5 min at 1144 K.
13*	325	1959	1144	~0°		Above specimen and conditions except measured after 10 min at 1144 K.
14*	325	1959	1144	~0°		Above specimen and conditions except measured after 15 min at 1144 K.
15*	325	1959	1144	~0°		Above specimen and conditions except measured after 20 min at 1144 K.
16*	325	1959	1144	~0°		Similar to curve 1 specimen and conditions except polished.
17*	325	1959	1144	~0°		Above specimen and conditions except measured after 5 min at 1144 K.
18*	325	1959	1144	~0°		Above specimen and conditions except measured after 10 min at 1144 K.
19*	325	1959	1144	~0°		Above specimen and conditions except measured after 15 min at 1144 K.
20*	325	1959	1144	~0°		Above specimen and conditions except measured after 20 min at 1144 K.
21*	325	1959	1144	~0°		Kennametal K152B; nominal composition: 65 TiC, 30 Ni, and 5 NbC; as received.
22*	325	1959	1144	~0°		Above specimen and conditions except measured after 5 min at 1144 K.
23*	325	1959	1144	~0°		Above specimen and conditions except measured after 10 min at 1144 K.
24*	325	1959	1144	~0°		Above specimen and conditions except measured after 15 min at 1144 K.
25*	325	1959	1144	~0°		Above specimen and conditions except measured after 20 min at 1144 K.
26*	325	1959	1144	~0°		Similar to curve 1 specimen and conditions except polished.
27*	325	1959	1144	~0°		Above specimen and conditions except measured after 5 min at 1144 K.
28*	325	1959	1144	~0°		Above specimen and conditions except measured after 10 min at 1144 K.
29*	325	1959	1144	~0°		Above specimen and conditions except measured after 15 min at 1144 K.
30*	325	1959	1144	~0°		Above specimen and conditions except measured after 20 min at 1144 K.

*No plot given

SPECIFICATION TABLE NO. 528 (continued)

Curve No.	Ref. No.	Year	Temperature Range, K	Geometry θ'	Reported Error, %	Composition (weight percent), Specifications and Remarks
31*	325	1959	1144	~0°		Kennametal K153B; nominal composition: 54 TiC, 40 Ni, and 6 NbC; as received.
32*	325	1959	1144	~0°		Above specimen and conditions except measured after 5 min at 1144 K.
33*	325	1959	1144	~0°		Above specimen and conditions except measured after 10 min at 1144 K.
34*	325	1959	1144	~0°		Above specimen and conditions except measured after 15 min at 1144 K.
35*	325	1959	1144	~0°		Above specimen and conditions except measured after 20 min at 1144 K.
36*	325	1959	1144	~0°		Similar to curve 1 specimen and conditions except polished.
37*	325	1959	1144	~0°		Above specimen and conditions except measured after 5 min at 1144 K.
38*	325	1959	1144	~0°		Above specimen and conditions except measured after 10 min at 1144 K.
39*	325	1959	1144	~0°		Above specimen and conditions except measured after 15 min at 1144 K.
40*	325	1959	1144	~0°		Above specimen and conditions except measured after 20 min at 1144 K.
41*	325	1959	1144	~0°		Kennametal K163B1; nominal composition: 54 TiC, 33.3 Ni, 6.7 Mo, and 6 NbC; as received
42*	325	1959	1144	~0°		Above specimen and conditions except measured after 5 min at 1144 K.
43*	325	1959	1144	~0°		Above specimen and conditions except measured after 10 min at 1144 K.
44*	325	1959	1144	~0°		Above specimen and conditions except measured after 15 min at 1144 K.
45*	325	1959	1144	~0°		Above specimen and conditions except measured after 20 min at 1144 K.
46*	325	1959	1144	~0°		Similar to curve 1 specimen and conditions except polished.
47*	325	1959	1144	~0°		Above specimen and conditions except measured after 5 min at 1144 K.
48*	325	1959	1144	~0°		Above specimen and conditions except measured after 10 min at 1144 K.
49*	325	1959	1144	~0°		Above specimen and conditions except measured after 15 min at 1144 K.
50*	325	1959	1144	~0°		Above specimen and conditions except measured after 20 min at 1144 K.
51*	325	1959	1144	~0°		Kennametal K184B; nominal composition 40 TiC, 40 Ni, 10 NbC, 4 Mo, 3 Al, 3 Cr; as received.
52*	325	1959	1144	~0°		Above specimen and conditions except measured after 5 min at 1144 K.
53*	325	1959	1144	~0°		Above specimen and conditions except measured after 10 min at 1144 K.
54*	325	1959	1144	~0°		Above specimen and conditions except measured after 15 min at 1144 K.
55*	325	1959	1144	~0°		Above specimen and conditions except measured after 20 min at 1144 K.
56*	325	1959	1144	~0°		Similar to curve 1 specimen and conditions except polished.
57*	325	1959	1144	~0°		Above specimen and conditions except measured after 5 min at 1144 K.
58*	325	1959	1144	~0°		Above specimen and conditions except measured after 10 min at 1144 K.

* No plot given

SPECIFICATION TABLE NO. 528 (continued)

Curve No.	Ref. No.	Year	Temperature Range, K	Geometry θ'	Reported Error, %	Composition (weight percent), Specifications and Remarks
59*	325	1959	1144	~0°		Above specimen and conditions except measured after 15 min at 1144 K.
60*	325	1959	1144	~0°		Above specimen and conditions except measured after 20 min at 1144 K.

*No plot given

DATA TABLE NO. 528 NORMAL TOTAL EMITTANCE OF [TiC + Ni] CERMETS

[Temperature, T, K; Emittance, ε]

T	ε	T	ε	T	ε	T	ε	T	ε
CURVE 1*		CURVE 13*		CURVE 25*		CURVE 37*		CURVE 49*	
1144	0.865	1144	0.900	1144	0.898	1144	0.841	1144	0.851
CURVE 2*		CURVE 14*		CURVE 26*		CURVE 38*		CURVE 50*	
1144	0.877	1144	0.900	1144	0.818	1144	0.850	1144	0.850
CURVE 3*		CURVE 15*		CURVE 27*		CURVE 39*		CURVE 51*	
1144	0.887	1144	0.902	1144	0.849	1144	0.861	1144	0.830
CURVE 4*		CURVE 16*		CURVE 28*		CURVE 40*		CURVE 52*	
1144	0.886	1144	0.816	1144	0.858	1144	0.862	1144	0.851
CURVE 5*		CURVE 17*		CURVE 29*		CURVE 41*		CURVE 53*	
1144	0.887	1144	0.833	1144	0.868	1144	0.882	1144	0.871
CURVE 6*		CURVE 18*		CURVE 30*		CURVE 42*		CURVE 54*	
1144	0.825	1144	0.845	1144	0.869	1144	0.891	1144	0.871
CURVE 7*		CURVE 19*		CURVE 31*		CURVE 43*		CURVE 55*	
1144	0.836	1144	0.861	1144	0.880	1144	0.891	1144	0.871
CURVE 8*		CURVE 20*		CURVE 32*		CURVE 44*		CURVE 56*	
1144	0.850	1144	0.861	1144	0.900	1144	0.891	1144	0.820
CURVE 9*		CURVE 21*		CURVE 33*		CURVE 45*		CURVE 57*	
1144	0.860	1144	0.878	1144	0.915	1144	0.891	1144	0.831
CURVE 10*		CURVE 22*		CURVE 34*		CURVE 46*		CURVE 58*	
1144	0.864	1144	0.889	1144	0.921	1144	0.800	1144	0.840
CURVE 11*		CURVE 23*		CURVE 35*		CURVE 47*		CURVE 59*	
1144	0.861	1144	0.896	1144	0.922	1144	0.825	1144	0.850
CURVE 12*		CURVE 24*		CURVE 36*		CURVE 48*		CURVE 60*	
1144	0.886	1144	0.899	1144	0.820	1144	0.846	1144	0.850

*No plot given

SPECIFICATION TABLE NO. 529 NORMAL TOTAL EMITTANCE OF [TiO_2 + $TiCr_2$] CERMETS

Curve No.	Ref. No.	Year	Temperature Range, K	Geometry θ'	Reported Error, %	Composition (weight percent), Specifications and Remarks
1*	28	1963	1023	~0°		6 TiO_2, 94 $TiCr_2$; sintered at 1423 K for 2 hrs (setter material $TiCr_2$); density 3.20 g cm^{-3}; x-ray structure $TiCr_2$ + TiO_2 (rutile); integrated from spectral data (1-15 μm); [Authors' designation: Sample No. 31].
2*	28	1963	1023	~0°		15 TiO_2, 85 $TiCr_2$; sintered at 1423 K for 2 hrs (setter material $TiCr_2$); density 3.25 g cm^{-3}; integrated from spectral data (1-15 μm); [Authors' designation: Sample No. 32].

DATA TABLE NO. 529 NORMAL TOTAL EMITTANCE OF [TiO_2 + $TiCr_2$] CERMETS

[Temperature, T, K; Emittance, ε]

T	ε
CURVE 1*	
1023	0.84
CURVE 2*	
1023	0.93

* No plot given

SPECIFICATION TABLE NO. 530 NORMAL SPECTRAL EMITTANCE OF [TiO_2 + $TiCr_2$] CERMETS

Curve No.	Ref. No.	Year	Temperature K	Wavelength Range, μm	Geometry θ θ' ω	Reported Error, %	Composition (weight percent), Specifications and Remarks
1	28	1963	1023	1.00-15.0	~0°		6 TiO_2, 94 $TiCr_2$; sintered at 1423 K for 2 hrs (setter material $TiCr_2$); density 3.20 g cm^{-3}; x-ray structure $TiCr_2$ + TiO_2 (rutile); data extracted from smooth curve; [Authors' designation: Sample No. 31].
2	28	1963	1023	1.00-15.0	~0°		15 TiO_2, 85 $TiCr_2$; sintered at 1423 K for 2 hrs (setter material $TiCr_2$); density 3.25 g cm^{-3}; data extracted from smooth curve; [Authors' designation: Sample No. 32].

DATA TABLE NO. 530 NORMAL SPECTRAL EMITTANCE OF [TiO_2 + $TiCr_2$] CERMETS

[Wavelength, λ, μm; Emittance, ε; Temperature, T, K]

λ	ε	λ	ε	λ	ε	λ	ε
CURVE 1		CURVE 1 (cont.)		CURVE 2 (cont.)		CURVE 2 (cont.)	
T = 1023		10.3	0.898	2.00	0.929	10.0	0.969
1.00	0.775	10.6	0.898	2.50	0.936	10.5	0.975
1.17	0.712	10.8	0.889	2.78	0.924	11.3	0.975
1.37	0.691	11.4	0.898	3.15	0.953	11.4	0.968
1.50	0.684	12.0	0.885	3.78	0.960	11.7	0.971
1.89	0.751	12.1	0.890	3.94	0.975	11.8	0.957
2.13	0.801	12.5	0.871	4.15	0.971	11.9	0.966
2.49	0.820	13.0	0.855	4.29	0.943	12.4	0.942
2.80	0.825	13.5	0.835	5.50	0.947	12.5	0.925
3.49	0.869	14.0	0.830	6.01	0.949	12.8	0.908
4.04	0.901	14.1	0.834	7.00	0.954	13.0	0.908
4.49	0.886	14.5	0.811	7.28	0.965	13.1	0.888
5.00	0.886	14.7	0.815	7.42	0.954	13.5	0.877
5.51	0.884	15.0	0.830	7.66	0.968	13.8	0.868
6.02	0.883			7.77	0.957	14.0	0.853
6.50	0.896	CURVE 2		7.97	0.966	14.0	0.862
7.01	0.895	T = 1023		8.12	0.930	14.2	0.851
7.51	0.895			8.63	0.952	14.3	0.865
8.01	0.884	1.00	1.00	8.86	0.943	14.5	0.856
8.27	0.863	1.28	0.892	9.00	0.955	14.7	0.842
8.81	0.881	1.37	0.892	9.26	0.957	14.8	0.850
9.22	0.883	1.44	0.866	9.36	0.946	14.9	0.844
9.51	0.876	1.56	0.884	9.44	0.955	15.0	0.855
10.0	0.884	1.85	0.891	9.64	0.945		

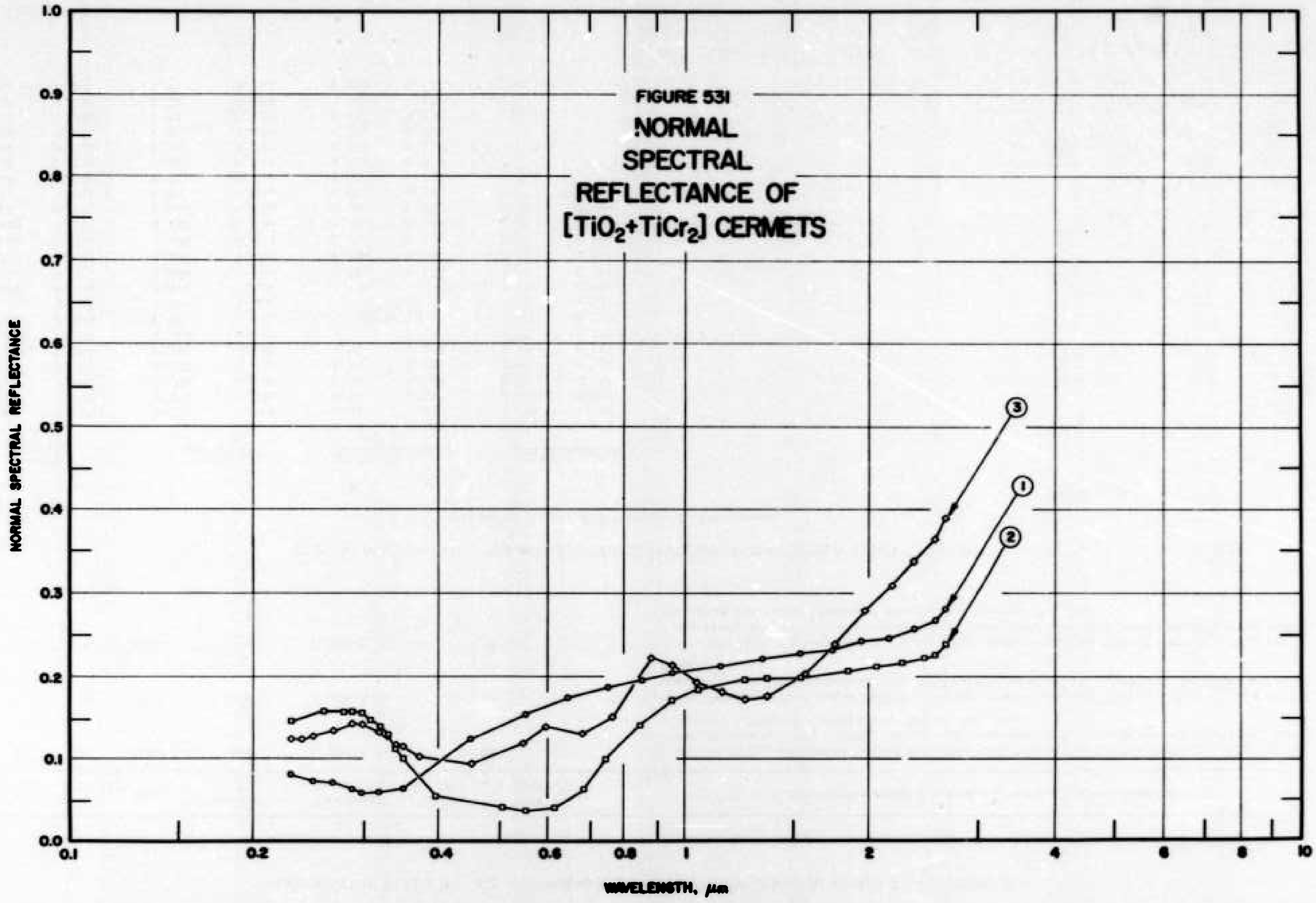


FIGURE 531
NORMAL
SPECTRAL
REFLECTANCE OF
[TiO_2+$TiCr_2$] CERMETS

SPECIFICATION TABLE NO. 531 NORMAL SPECTRAL REFLECTANCE OF [TiO_2 + $TiCr_2$] CERMETS

Curve No.	Ref. No.	Year	Temperature K	Wavelength Range, μm	Geometry θ	θ'	ω'	Reported Error, %	Composition (weight percent), Specifications and Remarks
1	28	1963	298	0.230-2.65	~0°		2π		6 TiO_2, 94 $TiCr_2$; sintered at 1423 K for 2 hrs (setter material $TiCr_2$); density 3.20 g cm^{-3}; x-ray structure $TiCr_2$ + TiO_2 (rutile); data extracted from smooth curve; MgO reference standard; [Authors' designation: Sample No. 31].
2	28	1963	298	0.230-2.65	~0°		2π		15 TiO_2, 85 $TiCr_2$; sintered at 1423 K for 2 hrs (setter material $TiCr_2$); density 3.25 g cm^{-3}; data extracted from smooth curve; MgO reference standard; [Authors' designation: Sample No. 32].
3	28	1963	298	0.230-2.65	~0°		2π		34 TiO_2, 66 $TiCr_2$; sintered at 1573 K for 2 hrs (setter material $TiCr_2$); density 3.06 g cm^{-3}; x-ray structure $TiCr_2$ (rutile) unexplained lines; data extracted from smooth curve; MgO reference standard; [Authors' designation: Sample No. 33].

DATA TABLE NO. 531 NORMAL SPECTRAL REFLECTANCE OF [TiO_2 + $TiCr_2$] CERMETS

[Wavelength, λ, μm; Reflectance, ρ; Temperature, T, K]

λ	ρ	λ	ρ	λ	ρ	λ	ρ
CURVE 1 T = 298		**CURVE 2** T = 298		**CURVE 2 (cont.)**		**CURVE 3 (cont.)**	
0.230	0.080	0.230	0.148	1.84	0.206	0.681	0.131
0.250	0.073	0.260	0.159	2.04	0.212	0.761	0.151
0.270	0.071	0.280	0.159	2.25	0.218	0.880	0.223
0.290	0.063	0.290	0.159	2.45	0.224	0.953	0.214
0.300	0.060	0.300	0.158	2.55	0.228	1.05	0.193
0.320	0.060	0.310	0.149	2.65	0.240	1.15	0.181
0.350	0.065	0.321	0.140			1.25	0.175
0.450	0.125	0.330	0.130	**CURVE 3** T = 298		1.35	0.179
0.551	0.155	0.340	0.111			1.55	0.201
0.649	0.175	0.350	0.100	0.230	0.125	1.75	0.240
0.750	0.187	0.397	0.056	0.240	0.125	1.95	0.280
0.851	0.196	0.508	0.042	0.250	0.128	2.15	0.310
0.952	0.204	0.551	0.038	0.270	0.135	2.35	0.340
1.15	0.212	0.615	0.041	0.290	0.143	2.55	0.365
1.34	0.221	0.687	0.065	0.300	0.142	2.65	0.390
1.54	0.229	0.747	0.100	0.320	0.132		
1.75	0.234	0.845	0.142	0.340	0.119		
1.94	0.243	0.951	0.172	0.350	0.116		
2.15	0.246	1.05	0.184	0.371	0.102		
2.35	0.258	1.24	0.197	0.451	0.095		
2.55	0.269	1.35	0.199	0.546	0.120		
2.65	0.280	1.54	0.199	0.596	0.141		

B. Pressed Powders

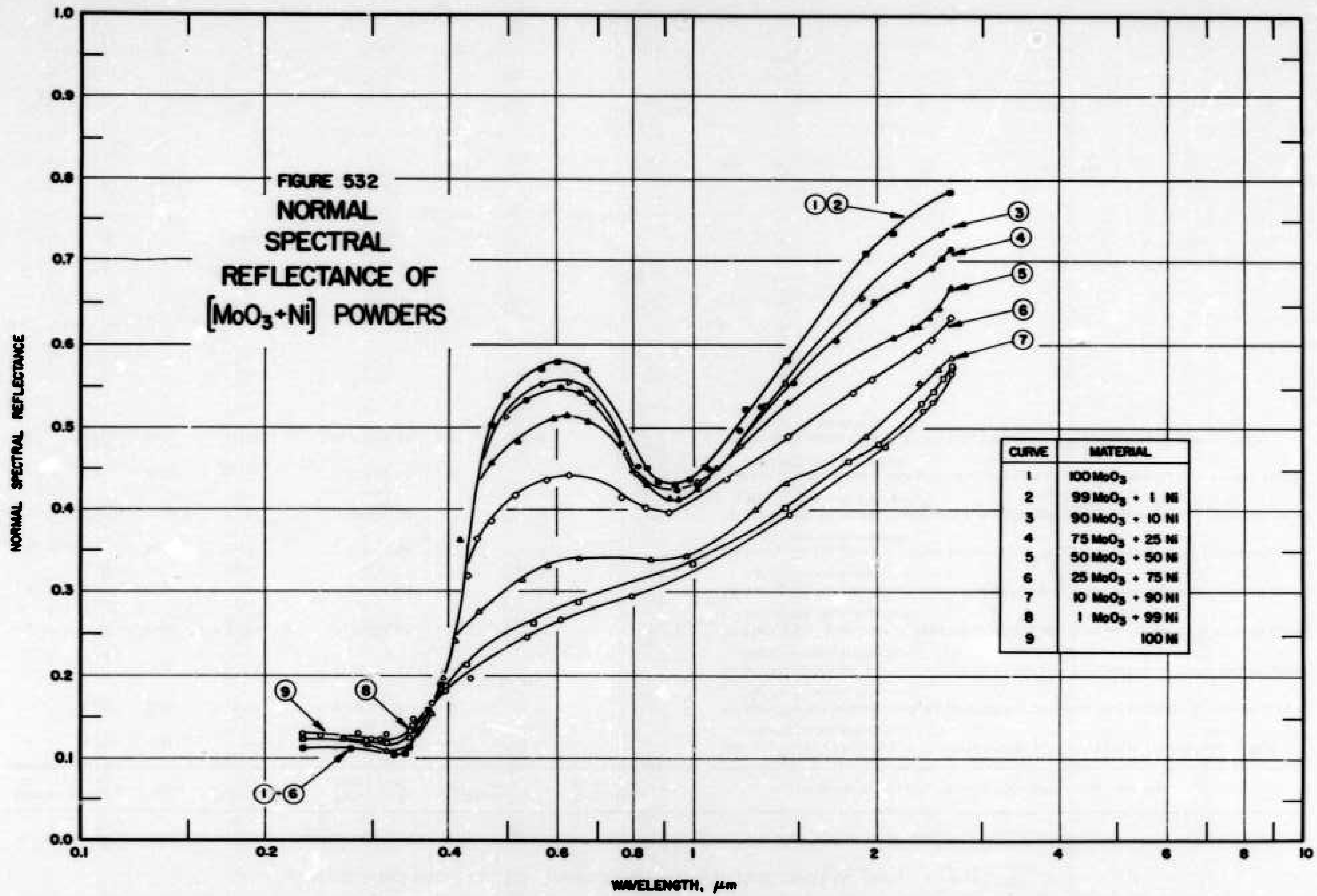


FIGURE 532
NORMAL SPECTRAL REFLECTANCE OF $[MoO_3+Ni]$ POWDERS

SPECIFICATION TABLE NO. 532 NORMAL SPECTRAL REFLECTANCE OF [MoO_3 + Ni] POWDERS

Curve No.	Ref. No.	Year	Temperature K	Wavelength Range, μm	Geometry θ	θ'	ω'	Reported Error, %	Composition (weight percent), Specifications, and Remarks
1	393	1966	~298	0.230-2.65	~0°		2π		MoO_3; powder compacted at 23 500 psi; data extracted from smooth curve; MgO reference standard.
2	393	1966	~298	0.230-2.65	~0°		2π		99 MoO_3, 1 Ni; powder compacted at 23 500 psi; data extracted from smooth curve; MgO reference standard.
3	393	1966	~298	0.230-2.65	~0°		2π		90 MoO_3, 10 Ni; powder compacted at 23 500 psi; data extracted from smooth curve; MgO reference standard.
4	393	1966	~298	0.230-2.65	~0°		2π		75 MoO_3, 25 Ni; powder compacted at 23 500 psi; data extracted from smooth curve; MgO reference standard.
5	393	1966	~298	0.230-2.65	~0°		2π		50 MoO_3, 50 Ni; powder compacted at 23 500 psi; data extracted from smooth curve; MgO reference standard.
6	393	1966	~298	0.230-2.65	~0°		2π		25 MoO_3, 75 Ni; powder compacted at 23 500 psi; data extracted from smooth curve; MgO reference standard.
7	393	1966	~298	0.230-2.65	~0°		2π		10 MoO_3, 90 Ni; powder compacted at 23 500 psi; data extracted from smooth curve; MgO reference standard.
8	393	1966	~298	0.230-2.65	~0°		2π		1 MoO_3, 90 Ni; powder compacted at 23 500 psi; data extracted from smooth curve; MgO reference standard.
9	393	1966	~298	0.230-2.65	~0°		2π		Ni; powder compacted at 23 500 psi; data extracted from smooth curve; MgO reference standard.

DATA TABLE NO. 532 NORMAL SPECTRAL REFLECTANCE OF [MoO_3 + Ni] POWDERS

[Wavelength, λ, μm; Reflectance, ρ; Temperature, T, K]

CURVE 1
T ~ 298

λ	ρ
0.230	0.112
0.276	0.112
0.326	0.104
0.337	0.106
0.344	0.115
0.351	0.132
0.370	0.139
0.388	0.190
0.417	0.364
0.469	0.503
0.495	0.540
0.566	0.572
0.600	0.580
0.664	0.572
0.838	0.451
0.873	0.434
0.922	0.431
0.984	0.436
1.04	0.454
1.22	0.523
1.42	0.585
1.59	0.628
1.99	0.710
2.14	0.735
2.29	0.758
2.40	0.769
2.65	0.787

CURVE 2
T ~ 298

λ	ρ
0.230	0.112
0.276	0.112
0.326	0.104
0.337	0.106
0.344	0.115
0.351	0.132
0.370	0.159
0.388	0.190
0.417	0.364
0.469	0.503
0.495	0.540
0.566	0.572
0.600	0.580

CURVE 2 (cont.)

λ	ρ
0.664	0.572
0.838	0.451
0.873	0.434
0.922	0.431
0.984	0.436
1.04	0.454
1.22	0.523
1.42	0.585
1.59	0.628
1.99	0.710
2.14	0.735
2.29	0.758
2.40	0.769
2.65	0.787

CURVE 3
T ~ 298

λ	ρ
0.230	0.112
0.276	0.112
0.326	0.104
0.337	0.107
0.344	0.115
0.351	0.132
0.370	0.159
0.388	0.190
0.417	0.364
0.458	0.477
0.495	0.515
0.566	0.555
0.627	0.557
0.669	0.550
0.777	0.473
0.805	0.445
0.836	0.434
0.886	0.423
0.940	0.423
1.02	0.434
1.19	0.480
1.31	0.529
1.41	0.556
1.65	0.610
1.89	0.659
2.22	0.710
2.53	0.735
2.65	0.747

CURVE 4
T ~ 298

λ	ρ
0.230	0.112
0.276	0.112
0.326	0.104
0.337	0.107
0.344	0.115
0.351	0.132
0.370	0.159
0.388	0.190
0.417	0.364
0.495	0.515
0.532	0.534
0.607	0.550
0.652	0.544
0.686	0.532
0.763	0.484
0.813	0.453
0.862	0.437
0.939	0.424
1.01	0.431
1.06	0.450
1.18	0.499
1.29	0.527
1.46	0.556
1.70	0.609
1.99	0.653
2.24	0.675
2.48	0.691
2.57	0.702
2.65	0.715

CURVE 5
T ~ 298

λ	ρ
0.230	0.112
0.276	0.112
0.326	0.104
0.337	0.107
0.344	0.115
0.351	0.132
0.370	0.159
0.388	0.190
0.417	0.364
0.469	0.459
0.519	0.486

CURVE 5 (cont.)

λ	ρ
0.591	0.511
0.620	0.515
0.673	0.509
0.798	0.449
0.837	0.430
0.886	0.417
0.910	0.413
0.942	0.413
1.01	0.426
1.08	0.451
1.43	0.531
1.65	0.563
2.14	0.611
2.27	0.623
2.36	0.627
2.44	0.636
2.53	0.648
2.65	0.669

CURVE 6
T ~ 298

λ	ρ
0.230	0.112
0.276	0.112
0.326	0.104
0.337	0.107
0.344	0.115
0.351	0.132
0.370	0.159
0.388	0.190
0.428	0.320
0.441	0.365
0.469	0.387
0.512	0.416
0.574	0.435
0.628	0.442
0.766	0.416
0.832	0.402
0.909	0.397
1.14	0.438
1.43	0.491
1.82	0.546
1.95	0.561
2.35	0.597
2.46	0.609
2.65	0.636

CURVE 7
T ~ 298

λ	ρ
0.230	0.124
0.269	0.124
0.294	0.117
0.315	0.108
0.346	0.118
0.349	0.130
0.373	0.155
0.390	0.199
0.409	0.243
0.445	0.276
0.523	0.315
0.579	0.331
0.650	0.340
0.847	0.339
0.907	0.343
1.25	0.400
1.42	0.432
1.91	0.493
2.36	0.553
2.53	0.572
2.65	0.587

CURVE 8
T ~ 298

λ	ρ
0.230	0.124
0.269	0.124
0.294	0.121
0.315	0.118
0.342	0.125
0.344	0.132
0.348	0.139
0.373	0.157
0.392	0.186
0.426	0.214
0.549	0.264
0.648	0.287
0.993	0.331
1.40	0.403
1.79	0.460
2.01	0.482
2.37	0.531
2.49	0.548
2.57	0.563
2.65	0.576

CURVE 9
T ~ 298

λ	ρ
0.230	0.130
0.246	0.128
0.282	0.130
0.299	0.123
0.308	0.123
0.315	0.128
0.343	0.133
0.349	0.148
0.375	0.167
0.392	0.181
0.431	0.197
0.535	0.247
0.603	0.267
0.794	0.293
1.44	0.395
2.07	0.480
2.38	0.521
2.46	0.532
2.65	0.569

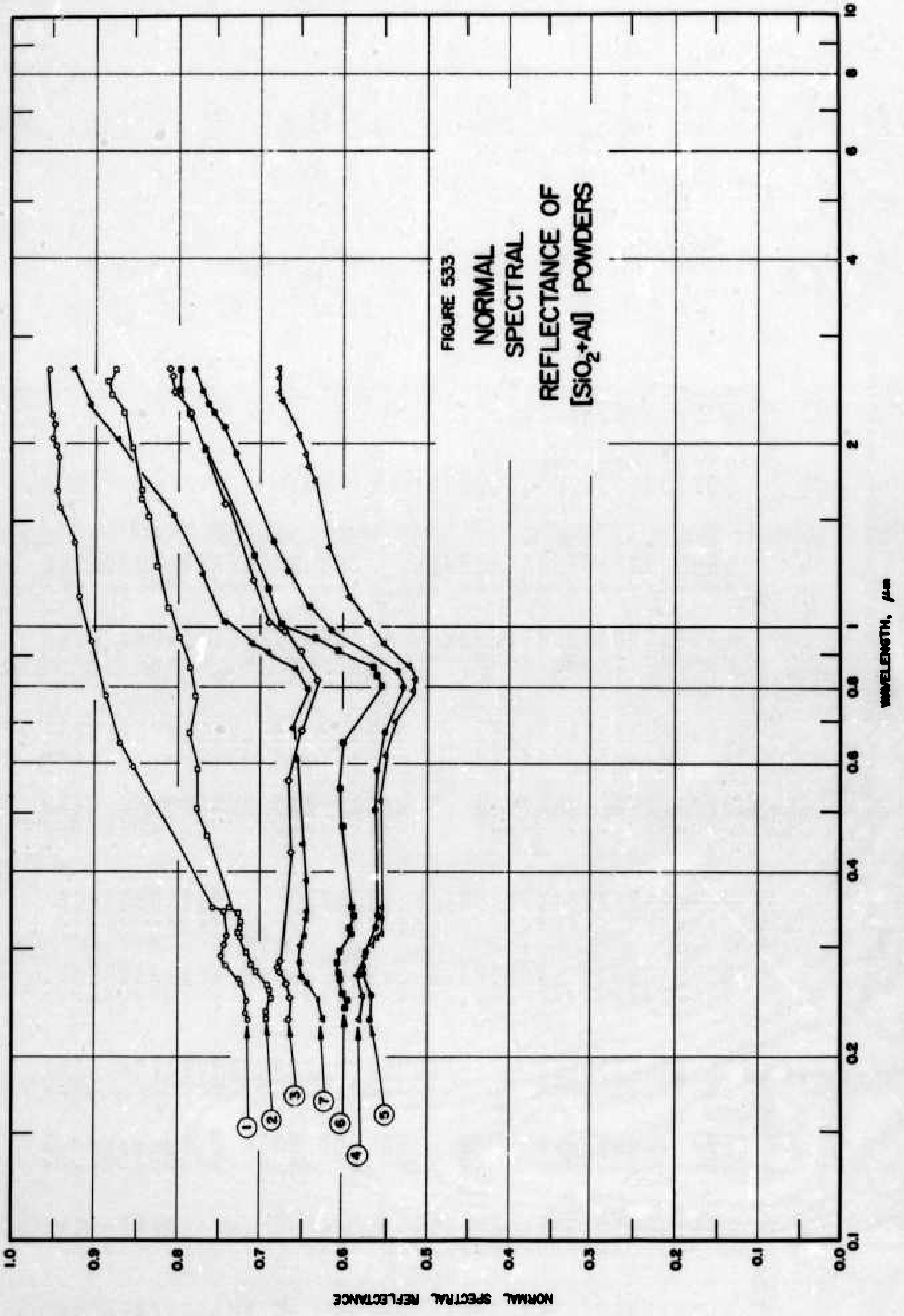


FIGURE 533
NORMAL SPECTRAL REFLECTANCE OF $[SiO_2+Al]$ POWDERS

SPECIFICATION TABLE NO. 533 NORMAL SPECTRAL REFLECTANCE OF [SiO_2 + Al] POWDERS

Curve No.	Ref. No.	Year	Temperature K	Wavelength Range, μm	Geometry θ	Geometry θ'	Geometry ω'	Reported Error, %	Composition (weight percent), Specifications, and Remarks
1	342	1968	~298	0.230-2.65	0°		2π		SiO_2; -230 +270 mesh powder; compacted at 23 500 psi; data extracted from smooth curve; MgO reference standard.
2	342	1968	~298	0.230-2.65	0°		2π		90 SiO_2, 10 Al; -230 +270 mesh powder compacted at 23 500 psi; data extracted from smooth curve; MgO reference standard.
3	342	1968	~298	0.230-2.65	0°		2π		75 SiO_2, 25 Al; -230 +270 mesh powder compacted at 23 500 psi; data extracted from smooth curve; MgO reference standard.
4	342	1968	~298	0.230-2.65	0°		2π		50 SiO_2, 50 Al; -230 +270 mesh powder compacted at 23 500 psi; data extracted from smooth curve; MgO reference standard.
5	342	1968	~298	0.230-2.65	0°		2π		25 SiO_2, 75 Al; -230 +270 mesh powder compacted at 23 500 psi; data extracted from smooth curve; MgO reference standard.
6	342	1968	~298	0.230-2.65	0°		2π		10 SiO_2, 90 Al; -230 +270 mesh powder compacted at 23 500 psi; data extracted from smooth curve; MgO reference standard.
7	342	1968	~298	0.230-2.65	0°		2π		Al, -230 +270 mesh powder; compacted at 23 500 psi; data extracted from smooth curve; MgO reference standard.

DATA TAELE NO. 533 NORMAL SPECTRAL REFLECTANCE of [SiO_2 + Al] POWDERS

[Wavelength, λ, μm; Reflectance, ρ; Temperature, T, K]

CURVE 1 (T ~ 298)

λ	ρ
0.230	0.716
0.236	0.718
0.247	0.717
0.262	0.724
0.267	0.727
0.280	0.742
0.293	0.749
0.306	0.746
0.316	0.740
0.343	0.744
0.350	0.758
0.595	0.856
0.650	0.871
0.777	0.889
0.951	0.906
1.13	0.920
1.37	0.924
1.56	0.943
1.06	0.947
1.90	0.945
1.99	0.949
2.05	0.953
2.15	0.950
2.20	0.952
2.65	0.955

CURVE 2 (T ~ 298)

λ	ρ
0.230	0.693
0.237	0.695
0.249	0.687
0.256	0.689
0.261	0.691
0.276	0.705
0.283	0.711
0.297	0.717
0.312	0.724
0.318	0.727
0.323	0.725
0.333	0.723
0.342	0.726
0.350	0.738
0.459	0.763

CURVE 2 (cont.)

λ	ρ
0.509	0.778
0.589	0.788
0.675	0.787
0.776	0.779
0.860	0.785
0.962	0.800
1.07	0.813
1.25	0.829
1.50	0.836
1.62	0.845
1.68	0.847
1.98	0.856
2.25	0.867
2.40	0.877
2.53	0.877
2.65	0.879

CURVE 3 (T ~ 298)

λ	ρ
0.230	0.666
0.249	0.665
0.262	0.669
0.274	0.677
0.280	0.678
0.286	0.677
0.430	0.661
0.561	0.664
0.686	0.650
0.820	0.631
0.902	0.650
0.981	0.670
1.07	0.690
1.19	0.709
1.59	0.743
2.24	0.786
2.47	0.805
2.59	0.808
2.65	0.811

CURVE 4 (T ~ 298)

λ	ρ
0.230	0.581
0.251	0.579

CURVE 4 (cont.)

λ	ρ
0.271	0.583
0.291	0.576
0.301	0.567
0.312	0.562
0.319	0.558
0.336	0.557
0.350	0.557
0.521	0.559
0.619	0.550
0.702	0.539
0.790	0.517
0.823	0.515
0.862	0.521
0.938	0.552
1.01	0.574
1.12	0.594
1.35	0.619
1.74	0.637
1.84	0.642
1.92	0.647
2.06	0.655
2.36	0.672
2.42	0.677
2.56	0.679
2.65	0.679

CURVE 5 (T ~ 298)

λ	ρ
0.230	0.570
0.251	0.569
0.271	0.578
0.280	3.579
0.296	0.575
0.324	0.562
0.340	0.560
0.350	0.560
0.504	0.563
0.585	0.561
0.674	0.551
0.800	0.529
0.844	0.536
0.988	0.614
1.08	0.641
1.24	0.669
1.38	0.684

CURVE 5 (cont.)

λ	ρ
1.93	0.730
2.11	0.744
2.24	0.756
2.31	0.763
2.43	0.770
2.65	0.780

CURVE 6 (T ~ 298)

λ	ρ
0.230	0.598
0.237	0.597
0.243	0.600
0.267	0.603
0.272	0.604
0.286	0.607
0.298	0.603
0.319	0.592
0.324	0.593
0.340	0.589
0.350	0.591
0.475	0.600
0.547	0.603
0.650	0.600
0.804	0.556
0.837	0.562
0.860	0.568
0.912	0.606
0.966	0.633
1.06	0.673
1.15	0.690
1.31	0.709
1.96	0.766
2.24	0.784
2.47	0.799
2.65	0.799

CURVE 7 (T ~ 298)

λ	ρ
0.230	0.627
0.249	0.631
0.263	0.643
0.270	0.650
0.284	0.652

CURVE 7 (cont.)

λ	ρ
0.303	0.652
0.315	0.648
0.336	0.647
0.344	0.645
0.387	0.646
0.442	0.649
0.609	0.667
0.688	0.661
0.797	0.643
0.854	0.658
0.910	0.690
0.940	0.710
1.06	0.743
1.22	0.772
1.53	0.807
2.06	0.875
2.34	0.908
2.49	0.922
2.65	0.927

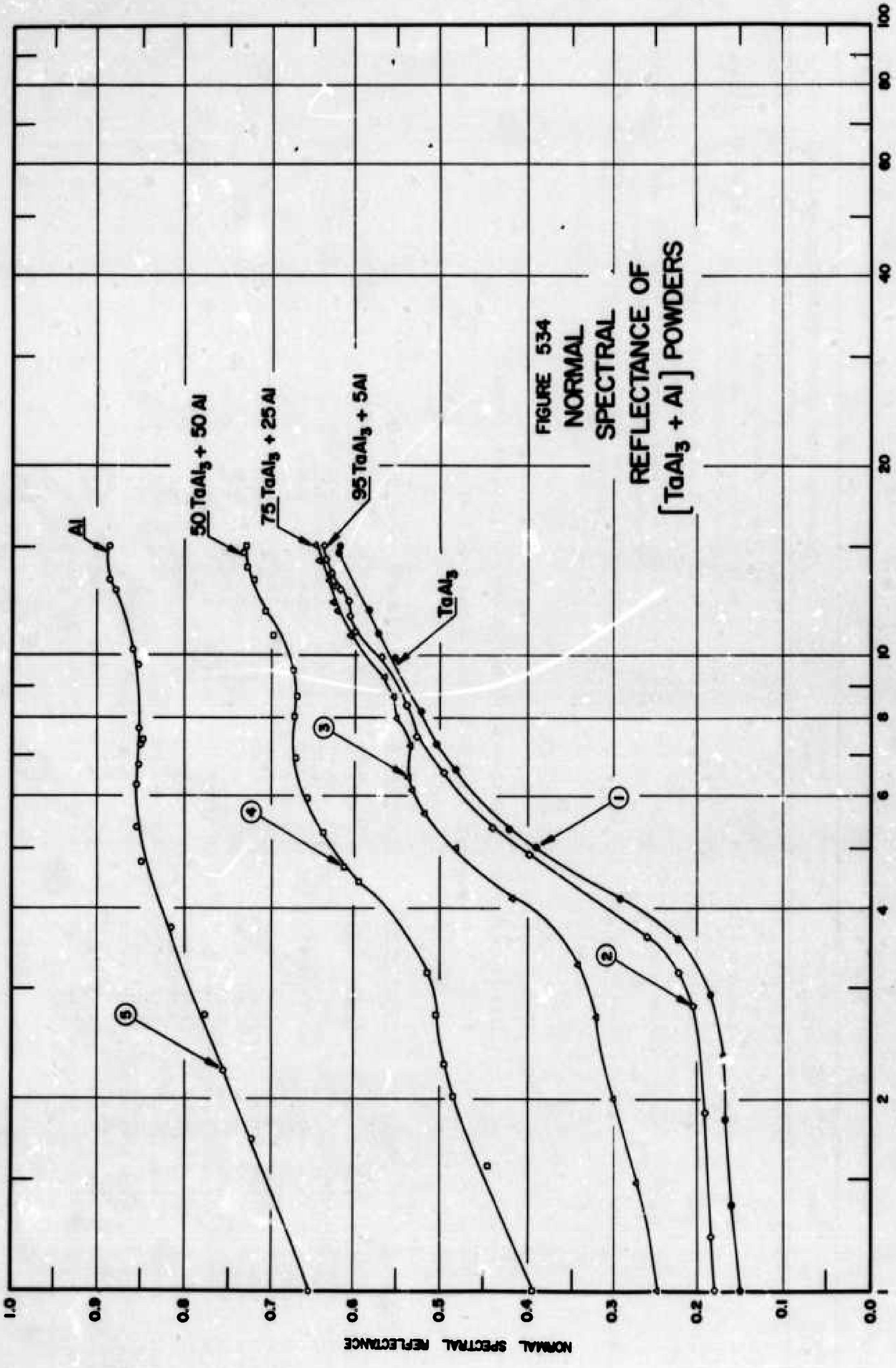


FIGURE 534 NORMAL SPECTRAL REFLECTANCE OF [$TaAl_3$ + Al] POWDERS

SPECIFICATION TABLE NO. 534 NORMAL SPECTRAL REFLECTANCE OF [$TaAl_3$ + Al] POWDERS

Curve No.	Ref. No.	Year	Temperature K	Wavelength Range, µm	Geometry θ	θ'	ω'	Reported Error, %	Composition (weight percent), Specifications, and Remarks
1	393	1966	~298	1.00-15.0	~0°		2π		$TaAl_3$; powder compacted at 21 000 psi; data extracted from smooth curve; converted from reflectance factor.
2	393	1966	~298	1.00-15.0	~0°		2π		95 $TaAl_3$, 5 Al; powder compacted at 21 000 psi; data extracted from smooth curve; converted from reflectance factor.
3	393	1966	~298	1.00-15.0	~0°		2π		75 $TaAl_3$, 25 Al; powder compacted at 21 000 psi; data extracted from smooth curve; converted from reflectance factor.
4	393	1966	~298	1.00-15.0	~0°		2π		50 $TaAl_3$, 50 Al; powder compacted at 21 000 psi; data extracted from smooth curve; converted from reflectance factor.
5	393	1966	~298	1.00-15.0	~0°		2π		Al; powder compacted at 21 000 psi; data extracted from smooth curve; converted from reflectance factor.

DATA TABLE NO. 534 NORMAL SPECTRAL REFLECTANCE OF [$TaAl_3$ + Al] POWDERS

[Wavelength, λ, µm; Reflectance, ρ; Temperature, T, K]

λ	ρ	λ	ρ	λ	ρ	λ	ρ	λ	ρ	λ	ρ
CURVE 1		CURVE 2		CURVE 2 (cont.)		CURVE 3 (cont.)		CURVE 4 (cont.)		CURVE 5 (cont.)	
T ~ 298		T ~ 298									
1.00	0.149	1.00	0.179	14.3	0.636	9.21	0.566	4.64	0.614	2.21	0.759
1.36	0.159	1.23	0.184	15.0	0.639	10.8	0.606	5.28	0.639	2.71	0.779
1.86	0.167	1.91	0.190	CURVE 3		11.7	0.624	5.96	0.658	3.71	0.818
2.34	0.168	2.80	0.204	T ~ 298		12.2	0.627	6.90	0.672	4.73	0.851
2.93	0.185	3.17	0.223	1.00	0.246	12.8	0.627	8.01	0.674	5.38	0.858
3.58	0.224	3.60	0.260	1.48	0.274	13.2	0.632	8.63	0.671	6.28	0.854
4.13	0.293	4.86	0.400	2.00	0.300	14.0	0.645	9.53	0.676	6.74	0.856
5.00	0.393	5.37	0.442	2.70	0.322	15.0	0.649	10.7	0.700	7.29	0.854
5.36	0.421	6.51	0.498	3.26	0.345	CURVE 4		11.8	0.709	7.40	0.850
6.64	0.483	6.88	0.517	4.15	0.419	T ~ 298		13.2	0.724	7.70	0.855
7.28	0.506	7.49	0.529	4.99	0.484	1.00	0.396	13.8	0.732	9.70	0.855
8.17	0.523	8.37	0.540	5.63	0.519	1.57	0.446	14.5	0.736	10.3	0.864
9.91	0.553	9.96	0.570	6.14	0.534	2.04	0.487	15.0	0.733	12.2	0.882
10.9	0.575	10.9	0.602	6.47	0.538	2.27	0.497	CURVE 5		13.2	0.889
11.8	0.585	11.6	0.607	7.20	0.536	2.71	0.505	T ~ 298		15.0	0.898
14.5	0.621	12.3	0.607	8.00	0.551	3.17	0.516	1.00	0.655		
15.0	0.620	12.8	0.620	8.62	0.558	4.40	0.597	1.74	0.725		
		13.5	0.630								

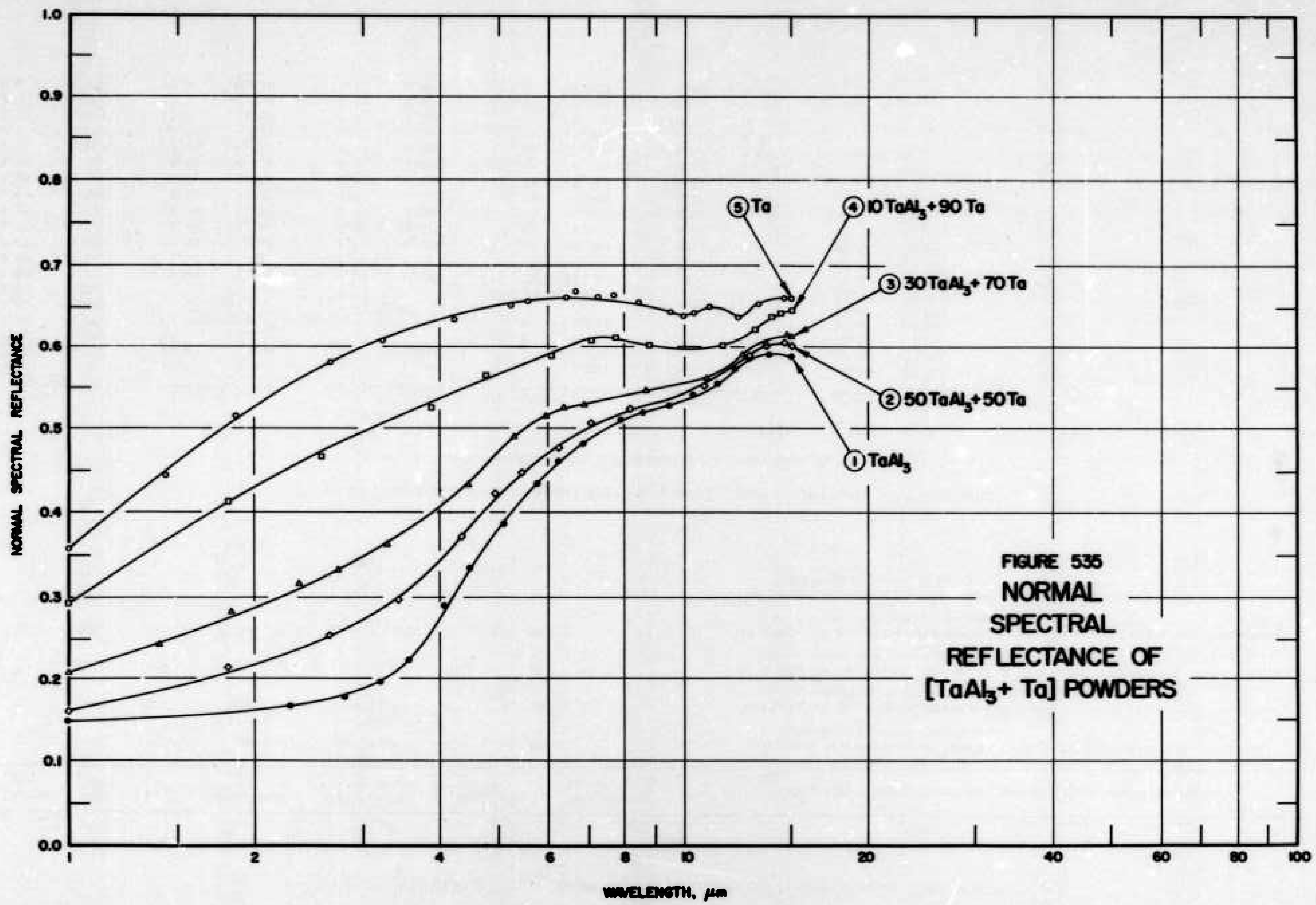


FIGURE 535 NORMAL SPECTRAL REFLECTANCE OF $[TaAl_3 + Ta]$ POWDERS

SPECIFICATION TABLE NO. 535 NORMAL SPECTRAL REFLECTANCE OF [$TaAl_3$ + Ta] POWDERS

Curve No.	Ref. No.	Year	Temperature K	Wavelength Range, μm	Geometry θ	θ'	ω'	Reported Error, %	Composition (weight percent), Specifications, and Remarks
1	393	1966	~298	1.00-15.0	~0°		2π		$TaAl_3$; powder compacted at 21 000 psi; data extracted from smooth curve; converted from reflectance factor.
2	393	1966	~298	1.00-15.0	~0°		2π		50 $TaAl_3$, 50 Al; powder compacted at 21 000 psi; data extracted from smooth curve; converted from reflectance factor.
3	393	1966	~298	1.00-15.0	~0°		2π		30 $TaAl_3$, 70 Ta; powder compacted at 21 000 psi; data extracted from smooth curve; converted from reflectance factor.
4	393	1966	~298	1.00-15.0	~0°		2π		10 $TaAl_3$, 90 Ta; powder compacted at 21 000 psi; data extracted from smooth curve; converted from reflectance factor.
5	393	1966	~298	1.00-15.0	~0°		2π		Ta; powder compacted at 21 000 psi; data extracted from smooth curve; converted from reflectance factor.

DATA TABLE NO. 535 NORMAL SPECTRAL REFLECTANCE OF [$TaAl_3$ + Ta] POWDERS

[Wavelength, λ, μm; Reflectance, ρ; Temperature, T, K]

λ	ρ	λ	ρ	λ	ρ	λ	ρ	λ	ρ	λ	ρ
CURVE 1		CURVE 1 (cont.)		CURVE 2 (cont.)		CURVE 3 (cont.)		CURVE 4 (cont.)		CURVE 5 (cont.)	
T ~ 298											
		13.7	0.593	14.5	0.603	12.4	0.591	13.8	0.639	8.40	0.657
1.00	0.147	15.0	0.590	15.0	0.601	13.6	0.606	14.4	0.644	9.49	0.645
2.29	0.166					14.7	0.618	15.0	0.646	9.93	0.640
2.80	0.178	CURVE 2		CURVE 3		15.0	0.614			10.4	0.644
3,20	0.196	T ~ 298		T ~ 298				CURVE 5		11.0	0.651
3.57	0.225					CURVE 4		T ~ 298		12.3	0.639
4.09	0.291	1.00	0.169	1.00	0.208	T ~ 298				13.3	0.655
4.49	0.337	1.82	0.213	1.41	0.243			1.00	0.358	14.5	0.663
5.07	0.388	2.65	0.255	1.84	0.284	1.00	0.294	1.44	0.443	15.0	0.663
5.77	0.436	3.41	0.298	2.36	0.317	1.82	0.412	1.87	0.516		
6.21	0.461	4.34	0.372	2.74	0.334	2.57	0.467	2.64	0.581		
6.85	0.484	4.93	0.423	3.29	0.362	3.89	0.526	3.23	0.609		
7.90	0.511	5.41	0.449	4.44	0.435	4.75	0.561	4.21	0.635		
8.58	0.520	6.21	0.476	5.29	0.492	6.08	0.590	5.22	0.652		
9.41	0.529	7.05	0.506	5.92	0.518	7.03	0.609	5.58	0.657		
10.3	0.542	8.17	0.525	6.36	0.527	7.72	0.613	6.45	0.662		
11.3	0.556	10.7	0.553	6.84	0.529	8.76	0.603	6.67	0.760		
12.1	0.575	12.7	0.592	8.62	0.548	11.5	0.603	7.21	0.664		
12.8	0.589	13.5	0.602	10.8	0.563	13:0	0.622	7.67	0.666		

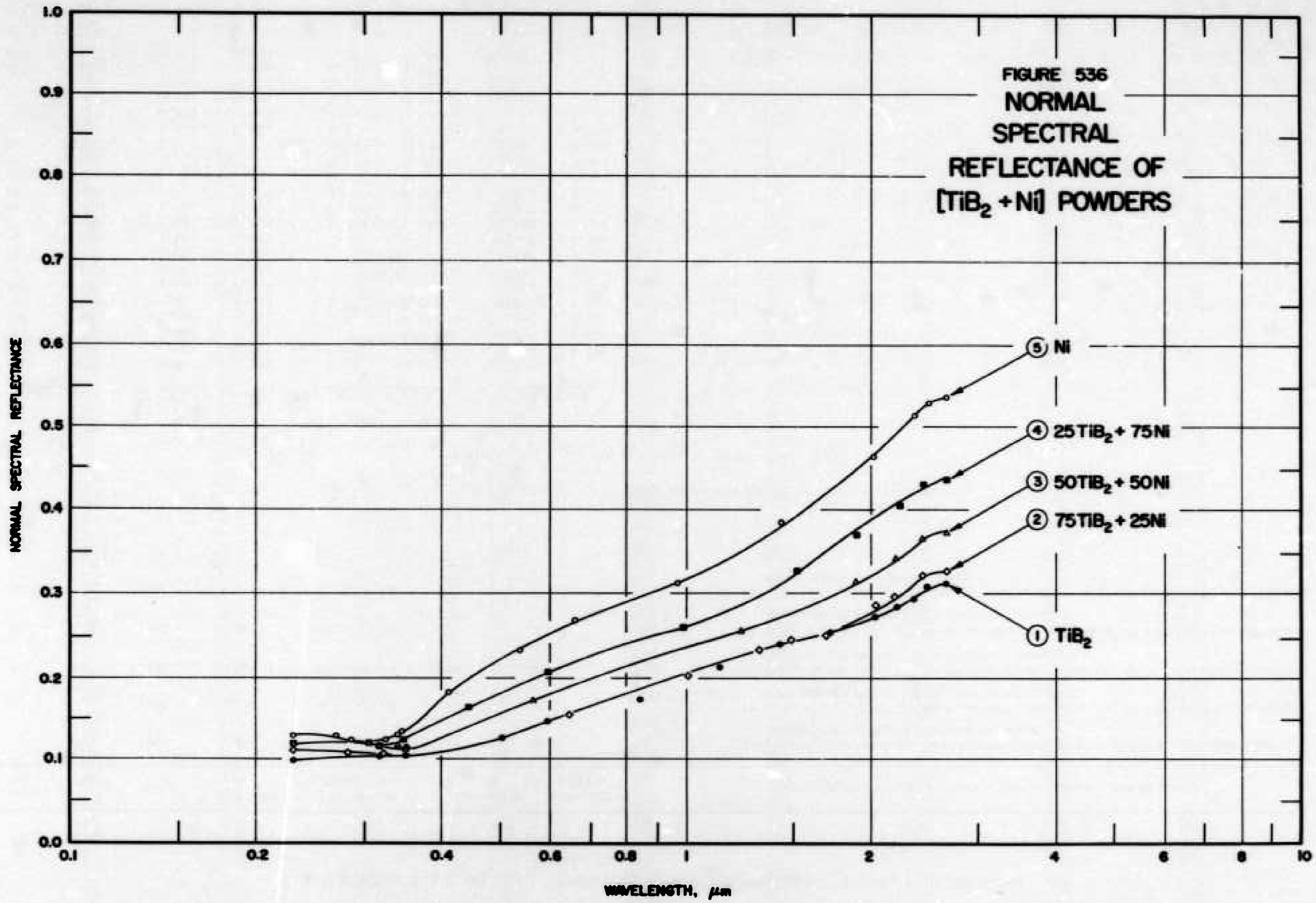


FIGURE 536 NORMAL SPECTRAL REFLECTANCE OF $[TiB_2 + Ni]$ POWDERS

SPECIFICATION TABLE NO. 536 NORMAL SPECTRAL REFLECTANCE OF [TiB_2 + Ni] POWDERS

Curve No.	Ref. No.	Year	Temperature K	Wavelength Range, μm	Geometry θ	Geometry θ'	Geometry ω'	Reported Error, %	Composition (weight percent), Specifications, and Remarks
1	341	1966	~298	0.230-2.65	~0°		2π		TiB_2; -230 +270 mesh powder; compacted at 23 500 psi; data extracted from smooth curve; MgO reference standard.
2	341	1966	~298	0.230-2.65	~0°		2π		75 TiB_2, 25 Ni; -230+ 270 mesh powder; compacted at 23 500 psi; data extracted from smooth curve; MgO reference standard.
3	341	1966	~298	0.230-2.65	~0°		2π		50 TiB_2, 50 Ni; -230+270 mesh powder; compacted at 23 500 psi; data extracted from smooth curve; MgO reference standard.
4	341	1966	~298	0.230-2.65	~0°		2π		25 TiB_2, 75 Ni; -230+270 mesh powder; compacted at 23 500 psi; data extracted from smooth curve; MgO reference standard.
5	341	1966	~298	0.230-2.65	~0°		2π		Ni; -230+270 mesh powder; compacted at 23 500 psi; data extracted from smooth curve; MgO reference standard.

DATA TABLE NO. 536 NORMAL SPECTRAL REFLECTANCE OF [TiB_2 + Ni] POWDERS

[Wavelength, λ, μm; Reflectance, ρ; Temperature, T, K]

λ	ρ
CURVE 1	
T ~ 298	
0.230	0.098
0.318	0.101
0.350	0.102
0.501	0.126
0.595	0.147
0.840	0.174
1.14	0.214
1.45	0.241
1.70	0.255
2.03	0.273
2.20	0.284
2.35	0.294
2.47	0.309
2.65	0.312
CURVE 2	
T ~ 298	
0.230	0.110
0.283	0.107
CURVE 2 (cont.)	
0.322	0.107
0.350	0.114
0.645	0.154
1.00	0.201
1.31	0.235
1.[illegible]8	0.248
1.69	0.256
2.03	0.288
2.18	0.297
2.43	0.320
2.65	0.329
CURVE 3	
T ~ 298	
0.230	0.118
0.305	0.118
0.317	0.116
0.340	0.117
0.350	0.121
0.562	0.174
CURVE 3 (cont.)	
1.22	0.257
1.88	0.316
2.19	0.342
2.41	0.366
2.65	0.371
CURVE 4	
T ~ 298	
0.230	0.118
0.305	0.118
0.317	0.116
0.347	0.122
0.442	0.163
0.597	0.208
0.988	0.261
1.50	0.328
1.88	0.370
2.22	0.402
2.43	0.430
2.65	0.434
CURVE 5	
T ~ 298	
0.230	0.128
0.270	0.128
0.286	0.121
0.324	0.121
0.340	0.129
0.347	0.133
0.416	0.183
0.535	0.234
0.660	0.268
0.967	0.313
1.42	0.385
2.00	0.464
2.35	0.515
2.48	0.530
2.65	0.536

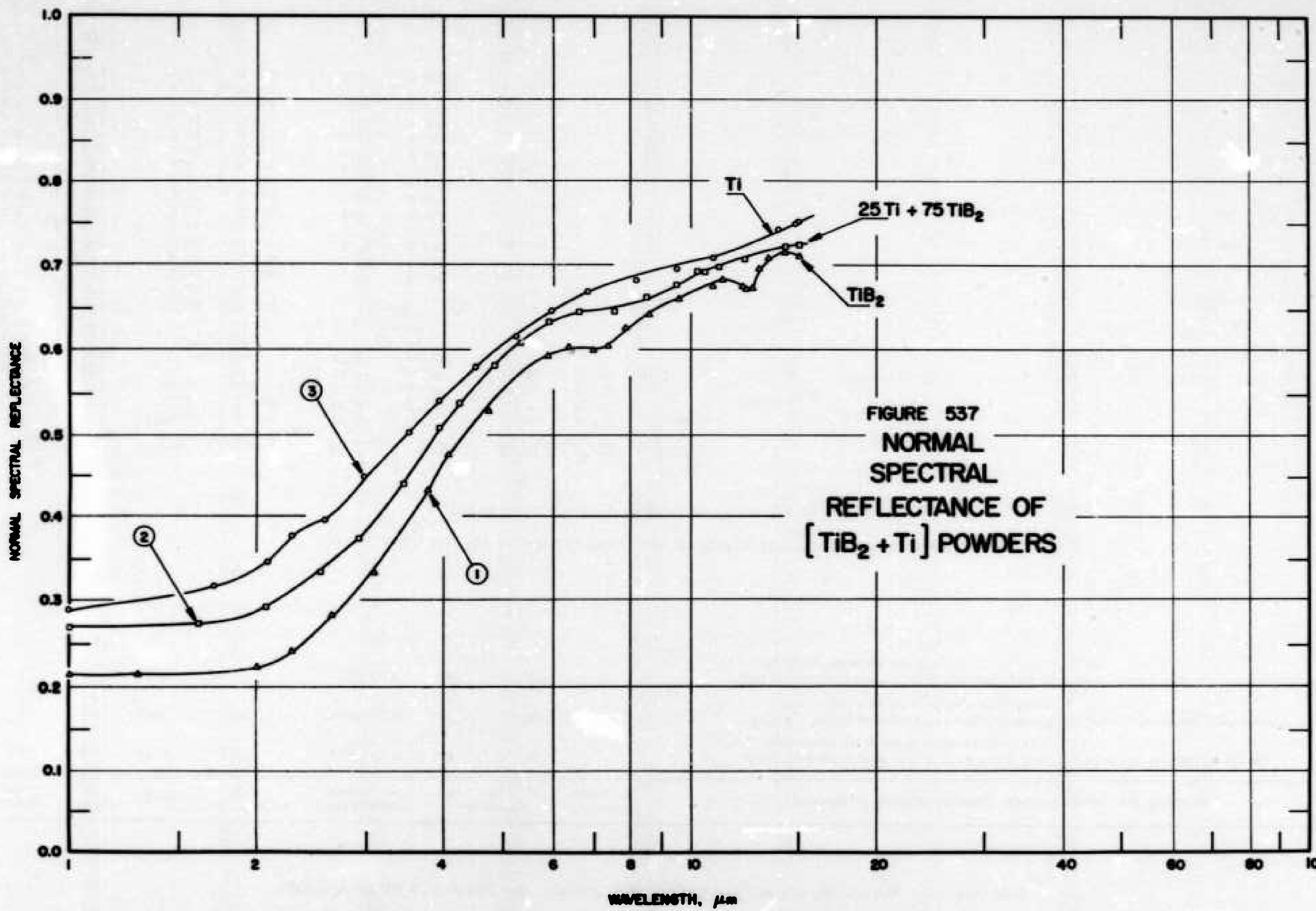


FIGURE 537 NORMAL SPECTRAL REFLECTANCE OF $[TiB_2 + Ti]$ POWDERS

SPECIFICATION TABLE NO. 537 NORMAL SPECTRAL REFLECTANCE OF [TiB_2 + Ti] POWDERS

Curve No.	Ref. No.	Year	Temperature K	Wavelength Range, μm	Geometry θ	Geometry θ'	Geometry ω'	Reported Error, %	Composition (weight percent), Specifications, and Remarks
1	393	1966	~298	1.00-15.0	~0°		2π		TiB_2; powder compacted at 21 000 psi; data extracted from smooth curve; converted from reflectance factor.
2	393	1966	~298	1.00-15.0	~0°		2π		75 TiB_2, 25 Ti; powder compacted at 21 000 psi; data extracted from smooth curve; converted from reflectance factor.
3	393	1966	~298	1.00-15.0	~0°		2π		Ti; powder compacted at 21 000 psi; data extracted from smooth curve; converted from reflectance factor.

DATA TABLE NO. 537 NORMAL SPECTRAL REFLECTANCE OF [TiB_2 + Ti] POWDERS

[Wavelength, λ, μm; Reflectance, ρ; Temperature, T, K]

CURVE 1
T ~ 298

λ	ρ
1.00	0.213
1.28	0.213
2.00	0.223
2.26	0.242
2.64	0.283
3.08	0.335
3.76	0.433
4.08	0.478
4.72	0.530
5.87	0.594
6.35	0.604
6.96	0.600
7.35	0.606
7.85	0.629
8.55	0.644
9.58	0.662
10.7	0.676
11.3	0.684
12.2	0.678
12.3	0.674
12.6	0.674
12.9	0.696

CURVE 1 (cont.)

λ	ρ
13.4	0.710
14.2	0.718
15.0	0.711

CURVE 2
T ~ 298

λ	ρ
1.00	0.269
1.62	0.273
2.06	0.292
2.53	0.335
2.91	0.375
3.44	0.440
3.92	0.510
4.23	0.542
4.84	0.582
5.34	0.610
5.89	0.635
6.60	0.647
7.51	0.658
8.44	0.664
9.48	0.678
10.3	0.695

CURVE 2 (cont.)

λ	ρ
10.5	0.693
11.0	0.700
12.3	0.708
14.2	0.724
15.0	0.725

CURVE 3
T ~ 298

λ	ρ
1.00	0.290
1.71	0.319
2.09	0.348
2.28	0.378
2.57	0.397
2.97	0.450
3.51	0.506
3.92	0.542
4.50	0.581
5.21	0.618
5.96	0.648
6.83	0.670
8.17	0.683
9.50	0.697

CURVE 3 (cont.)

λ	ρ
10.9	0.710
13.8	0.742
14.8	0.750
15.0	0.753

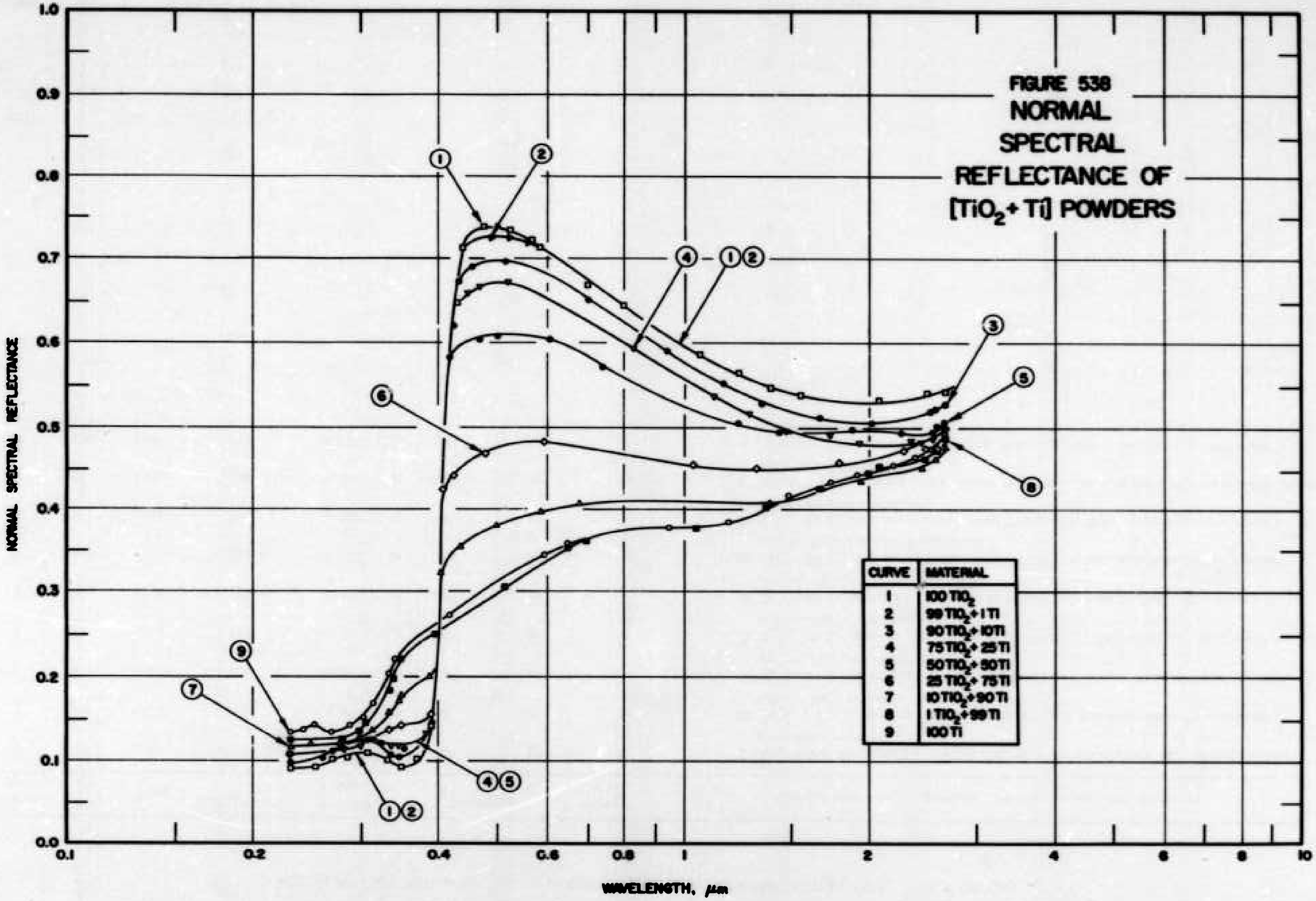


FIGURE 538 NORMAL SPECTRAL REFLECTANCE OF $[TiO_2 + Ti]$ POWDERS

SPECIFICATION TABLE NO. 538 NORMAL SPECTRAL REFLECTANCE OF [TiO_2 + Ti] POWDERS

Curve No.	Ref. No.	Year	Temperature K	Wavelength Range, μm	Geometry θ	θ'	ω'	Reported Error, %	Composition (weight percent), Specifications, and Remarks
1	393	1966	~298	0.230-2.65	~0°		2π		TiO_2; powder compacted at 35 300 psi; data extracted from smooth curve; MgO reference standard.
2	393	1966	~298	0.230-2.65	~0°		2π		99 TiO_2, 1 Ti; powder compacted at 35 300 psi; data extracted from smooth curve; MgO reference standard.
3	393	1966	~298	0.230-2.65	~0°		2π		90 TiO_2, 10 Ti; powder compacted at 35 300 psi; data extracted from smooth curve; MgO reference standard.
4	393	1966	~298	0.230-2.65	~0°		2π		75 TiO_2, 25 Ti; powder compacted at 35 300 psi; data extracted from smooth curve; MgO reference standard.
5	393	1966	~298	0.230-2.65	~0°		2π		50 TiO_2, 50 Ti; powder compacted at 35 300 psi; data extracted from smooth curve; MgO reference standard.
6	393	1966	~298	0.230-2.65	~0°		2π		25 TiO_2, 75 Ti; powder compacted at 35 300 psi; data extracted from smooth curve; MgO reference standard.
7	393	1966	~298	0.230-2.65	~0°		2π		10 TiO_2, 90 Ti; powder compacted at 35 300 psi; data extracted from smooth curve; MgO reference standard.
8	393	1966	~298	0.230-2.65	~0°		2π		1 TiO_2, 99 Ti; powder compacted at 35 300 psi; data extracted from smooth curve; MgO reference standard.
9	393	1966	~298	0.230-2.65	~0°		2π		Ti; powder compacted at 35 300 psi; data extracted from smooth curve; MgO reference standard.

DATA TABLE NO. 538 NORMAL SPECTRAL REFLECTANCE OF [TiO_2 + Ti] POWDERS

[Wavelength, λ, μm; Reflectance, ρ; Temperature, T, K]

CURVE 1
T ~ 298

λ	ρ
0.230	0.091
0.253	0.092
0.269	0.101
0.285	0.104
0.308	0.110
0.330	0.101
0.349	0.092
0.368	0.102
0.389	0.141
0.428	0.648
0.438	0.712
0.452	0.738
0.524	0.734
0.569	0.721
0.582	0.712
0.697	0.670
0.793	0.646
1.05	0.588
1.22	0.566
1.38	0.549
1.54	0.539
2.07	0.534
2.49	0.541
2.65	0.543

CURVE 2
T ~ 298

λ	ρ
0.230	0.091
0.253	0.092
0.269	0.101
0.285	0.104
0.308	0.110
0.330	0.101
0.349	0.092
0.368	0.102
0.389	0.141
0.428	0.648
0.438	0.712
0.483	0.724
0.520	0.724
0.559	0.719
0.582	0.712
0.697	0.670
0.793	0.646
1.05	0.588
1.22	0.566
1.38	0.549
1.54	0.539
2.07	0.534
2.49	0.541
2.65	0.543

CURVE 3
T ~ 298

λ	ρ
0.230	0.099
0.260	0.102
0.270	0.111
0.297	0.117
0.307	0.124
0.324	0.120
0.336	0.107
0.345	0.105
0.351	0.113
0.379	0.120
0.390	0.145
0.423	0.621
0.430	0.674
0.452	0.690
0.511	0.697
0.697	0.651
0.932	0.591
1.15	0.553
1.34	0.530
1.65	0.513
2.01	0.508
2.50	0.520
2.57	0.523
2.65	0.529

CURVE 4
T ~ 298

λ	ρ
0.230	0.107
0.281	0.113
0.300	0.118
0.312	0.125
0.335	0.117
0.345	0.117
0.349	0.121
0.383	0.133
0.426	0.649*
0.445	0.660
0.464	0.669
0.515	0.673
0.827	0.595
1.12	0.538
1.27	0.517
1.46	0.497
1.72	0.492
1.93	0.484
2.33	0.487
2.44	0.484
2.53	0.488
2.65	0.499

CURVE 5
T ~ 298

λ	ρ
0.230	0.107
0.281	0.113
0.300	0.118
0.312	0.125
0.335	0.117
0.345	0.117
0.349	0.121
0.383	0.133
0.419	0.582
0.466	0.603
0.500	0.609
0.608	0.602
0.739	0.572
1.23	0.506
1.42	0.496
1.84	0.499
2.25	0.496
2.52	0.496
2.58	0.502
2.65	0.509

CURVE 6
T ~ 298

λ	ρ
0.230	0.106
0.280	0.115
0.299	0.116
0.331	0.137
0.349	0.141
0.389	0.155
0.408	0.425
0.423	0.441
0.479	0.469
0.592	0.484
1.03	0.456
1.31	0.451
1.78	0.458
2.28	0.474
2.48	0.474
2.56	0.483
2.65	0.500

CURVE 7
T ~ 298

λ	ρ
0.230	0.116
0.249	0.120
0.277	0.120
0.297	0.128
0.311	0.137
0.331	0.159
0.345	0.171
0.348	0.179
0.387	0.200
0.402	0.326
0.432	0.354
0.498	0.380
0.584	0.398
0.676	0.407
1.37	0.408
1.65	0.427
1.94	0.437
2.42	0.451
2.55	0.463
2.65	0.477

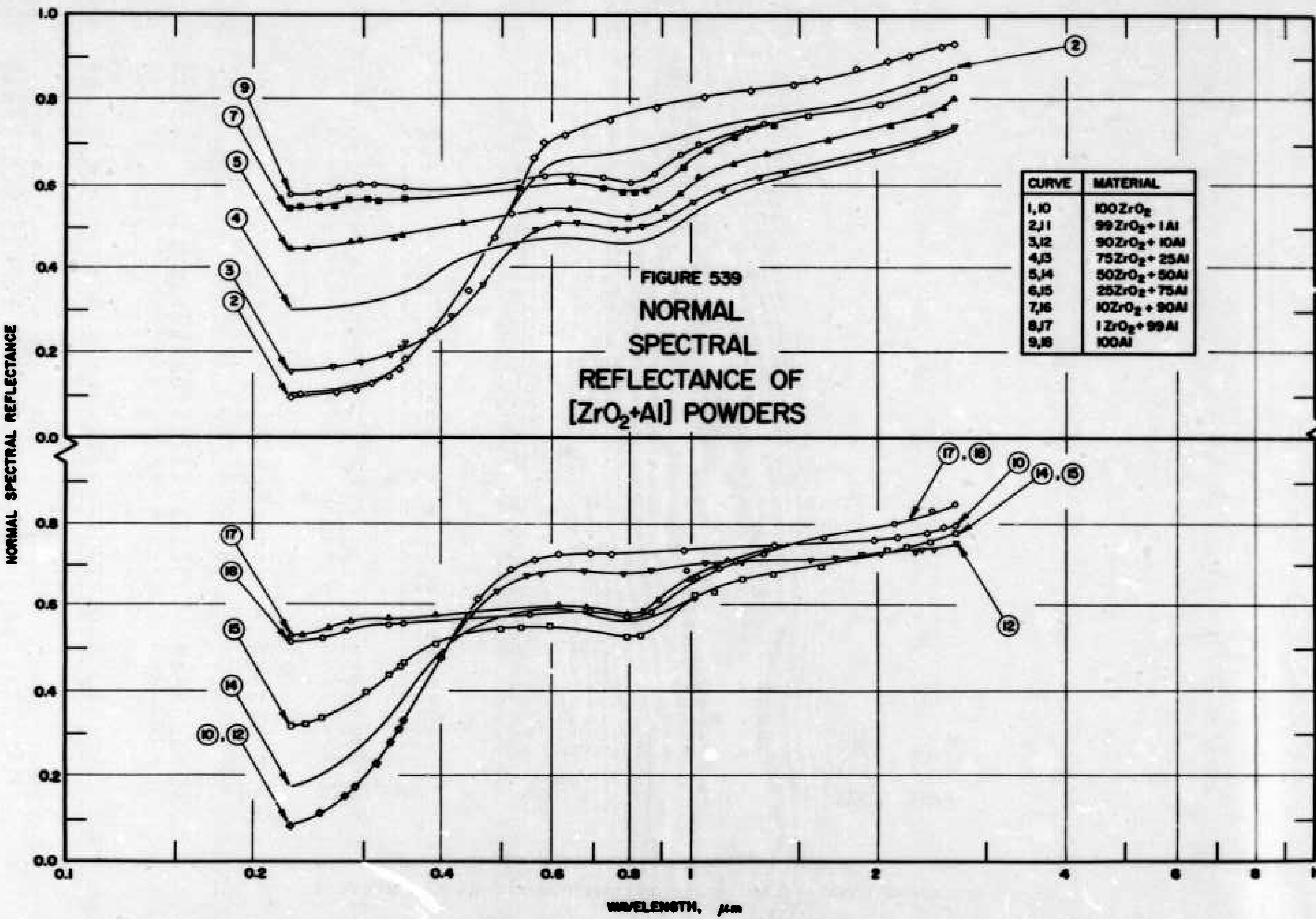
CURVE 8
T ~ 298

λ	ρ
0.230	0.126
0.279	0.127
0.296	0.136
0.304	0.146
0.331	0.184
0.339	0.199
0.347	0.221
0.395	0.250
0.511	0.305
0.646	0.353
0.695	0.360
1.04	0.377
1.36	0.401
1.65	0.426
1.97	0.446
2.20	0.455
2.46	0.463
2.56	0.472
2.65	0.488

CURVE 9
T ~ 298

λ	ρ
0.230	0.133
0.243	0.136
0.253	0.141
0.267	0.133
0.288	0.142
0.301	0.151
0.314	0.169
0.332	0.202
0.340	0.220
0.347	0.242
0.417	0.274
0.592	0.343
0.648	0.358
0.942	0.377
1.11	0.385
1.47	0.417
1.72	0.435
1.90	0.444
1.99	0.444
2.19	0.455
2.38	0.466
2.52	0.478
2.59	0.486
2.65	0.495

* Not shown on plot



CURVE	MATERIAL
1,10	$100ZrO_2$
2,11	$99ZrO_2 + 1Al$
3,12	$90ZrO_2 + 10Al$
4,13	$75ZrO_2 + 25Al$
5,14	$50ZrO_2 + 50Al$
6,15	$25ZrO_2 + 75Al$
7,16	$10ZrO_2 + 90Al$
8,17	$1ZrO_2 + 99Al$
9,18	$100Al$

FIGURE 539
NORMAL SPECTRAL REFLECTANCE OF $[ZrO_2+Al]$ POWDERS

SPECIFICATION TABLE NO. 539 NORMAL SPECTRAL REFLECTANCE OF [ZrO_2 + Al] POWDERS

Curve No.	Ref. No.	Year	Temperature K	Wavelength Range, μm	Geometry θ	Geometry θ'	Geometry ω'	Reported Error, %	Composition (weight percent), Specifications, and Remarks
1	393	1966	~298	0.230-2.65	~0°		2π		ZrO_2; -170 mesh; powder compacted at 23 500 psi; data extracted from smooth curve; MgO reference standard.
2	393	1966	~298	0.230-2.65	~0°		2π		99 ZrO_2, 1 Al; -170 and -400 mesh, respectively; powder compacted at 23 500 psi; data extracted from smooth curve; MgO reference standard.
3	393	1966	~298	0.230-2.65	~0°		2π		90 ZrO_2, 10 Al; -170 and -400 mesh, respectively; powder compacted at 23 500 psi; data extracted from smooth curve; MgO reference standard.
4	393	1966	~298	0.230-2.65	~0°		2π		75 ArO_2, 25 Al; -170 and -400 mesh, repsectively; powder compacted at 23 500 psi; data extracted from smooth curve; MgO reference standard.
5	393	1966	~298	0.230-2.65	~0°		2π		50 ArO_2, 50 Al; -170 and -400 mesh, respectively; powder compacted at 23 500 psi; data extracted from smooth curve; MgO reference standard.
6*	393	1966	~298	0.230-2.65	~0°		2π		25 ZrO_2, 75 Al; -170 and -400 mesh, respectively; powder compacted at 23 500 psi; data extracted from smooth curve; MgO reference standard.
7	393	1966	~298	0.230-2.65	~0°		2π		10 ZrO_2, 90 Al; -170 and -400 mesh, respectively; powder compacted at 23 500 psi; data extracted from smooth curve; MgO reference standard.
8*	393	1966	~298	0.230-2.65	~0°		2π		1 ZrO_2, 99 Al; -170 and -400 mesh, respectively; powder compacted at 23 500 psi; data extracted from smooth curve; MgO reference standard.
9	393	1966	~298	0.230-2.65	~0°		2π		Al; -400 mesh; powder compacted at 23 500 psi; data extracted from smooth curve; MgO reference standard.
10	393	1966	~298	0.230-2.65	~0°		2π		ZrO_2; -400 mesh; powder compacted at 23 500 psi; data extracted from smooth curve; MgO reference standard.
11*	393	1966	~298	0.230-2.65	~0°		2π		99 ZrO_2, 1 Al; -400 and -170 mesh, respectively; powder compacted at 23 500 psi; data extracted from smooth curve; MgO reference standard.
12	393	1966	~298	0.230-2.65	~0°		2π		90 ZrO_2, 10 Al; -400 and -170 mesh, respectively; powder compacted at 23 500 psi; data extracted from smooth curve; MgO reference standard.
13*	393	1966	~298	0.230-2.65	~0°		2π		75 ZrO_2, 25 Al; -400 and -170 mesh, respectively; powder compacted at 23 500 psi; data extracted from smooth curve; MgO reference standard.
14	393	1966	~298	0.230-2.65	~0°		2π		50 ZrO_2, 50 Al; -400 and -170 mesh, respectively; powder compacted at 23 500 psi; data extracted from smooth curve; MgO reference standard.
15	393	1966	~298	0.230-2.65	~0°		2π		25 ZrO_2, 75 Al; -400 and -170 mesh, respectively; powder compacted at 23 500 psi; data extracted from smooth curve; MgO reference standard.
16*	393	1966	~298	0.230-2.65	~0°		2π		10 ZrO_2, 90 Al; -400 and -170 mesh, respectively; powder compacted at 23 500 psi; data extracted from smooth curve; MgO reference standard.
17	393	1966	~298	0.230-2.65	~0°		2π		1 ZrO_2, 99 Al; -400 and -170 mesh, respectively; powder compacted at 23 500 psi; data extracted from smooth curve; MgO reference standard.
18	393	1966	~298	0.230-2.65	~0°		2π		Al; -170 mesh; powder compacted at 23 500 psi; data extracted from smooth curve; MgO reference standard.

*Not shown on plot

SPECIFICATION TABLE NO. 539 (continued)

Curve No.	Ref. No.	Year	Temperature K	Wavelength Range, μm	Geometry θ	θ'	ω'	Reported Error, %	Composition (weight percent), Specifications, and Remarks
19*	393	1966	~298	0.230-2.65	~0°		2π		ZrO_2; powder compacted at 23 500 psi; data extracted from smooth curve; MgO reference standard.
20*	393	1966	~298	0.230-2.65	~0°		2π		99 ZrO_2, 1 Al; powder compacted at 23 500 psi; data extracted from smooth curve; MgO reference standard.
21*	393	1966	~298	0.230-2.65	~0°		2π		90 ZrO_2, 10 Al; powder compacted at 23 500 psi; data extracted from smooth curve; MgO reference standard.
22*	393	1966	~298	0.230-2.65	~0°		2π		75 ZrO_2, 25 Al; powder compacted at 23 500 psi; data extracted from smooth curve; MgO reference standard.
23*	393	1966	~298	0.230-2.65	~0°		2π		50 ZrO_2, 50 Al; powder compacted at 23 500 psi; data extracted from smooth curve; MgO reference standard.
24*	393	1966	~298	0.230-2.65	~0°		2π		25 ZrO_2, 75 Al; powder compacted at 23 500 psi; data extracted from smooth curve; MgO reference standard.
25*	393	1966	~298	0.230-2.65	~0°		2π		10 ZrO_2, 90 Al; powder compacted at 23 500 psi; data extracted from smooth curve; MgO reference standard.
26*	393	1966	~298	0.230-2.65	~0°		2π		1 ZrO_2, 99 Al; powder compacted at 23 500 psi; data extracted from smooth curve; MgO reference standard.
27*	393	1966	~298	0.230-2.65	~0°		2π		Al; powder compacted at 23 500 psi; data extracted from smooth curve; MgO reference standard.

*Not shown on plot

DATA TABLE NO. 539 NORMAL SPECTRAL REFLECTANCE OF [ZrO_2 + Al] POWDERS

[Wavelength, λ, μm; Reflectance, ρ; Temperature, T, K]

CURVE 1
T ~ 298

λ	ρ
0.230	0.097
0.239	0.101
0.272	0.108
0.292	0.116
0.310	0.131
0.330	0.146
0.342	0.162
0.350	0.186
0.385	0.251
0.442	0.347
0.488	0.477
0.518	0.532
0.561	0.668
0.581	0.701
0.630	0.722
0.742	0.754
0.881	0.782
1.06	0.805
1.25	0.823
1.47	0.836
1.60	0.848
1.85	0.876
2.08	0.893
2.25	0.904
2.53	0.924
2.65	0.935

CURVE 2
T ~ 298

λ	ρ
0.230	0.100
0.247	0.111
0.274	0.117
0.295	0.125
0.310	0.131
0.330	0.146
0.342	0.162
0.350	0.186
0.385	0.251
0.442	0.347
0.448	0.477
0.518	0.532
0.564	0.616
0.598	0.648

CURVE 2 (cont.)

λ	ρ
0.667	0.672
0.858	0.696
0.982	0.723
1.09	0.741
1.28	0.758
1.59	0.784
1.93	0.811
2.37	0.848
2.65	0.879

CURVE 3
T ~ 298

λ	ρ
0.230	0.157
0.267	0.168
0.297	0.175
0.331	0.193
0.346	0.208
0.350	0.222
0.413	0.284
0.469	0.360
0.523	0.452
0.565	0.493
0.613	0.508
0.660	0.510
0.754	0.499
0.797	0.495
0.838	0.502
0.911	0.528
1.01	0.563
1.13	0.591
1.29	0.621
1.42	0.636
1.97	0.682
2.30	0.706
2.49	0.728
2.65	0.742

CURVE 4
T ~ 298

λ	ρ
0.230	0.299
0.321	0.323
0.343	0.331
0.350	0.347

CURVE 4 (cont.)

λ	ρ
0.490	0.438
0.572	0.469
0.641	0.475
0.776	0.460
0.906	0.490
1.01	0.538
1.13	0.579
1.3[illegible]	0.611
1.52	0.632
1.93	0.668
2.21	0.686
2.39	0.700
2.65	0.729

CURVE 5
T ~ 298

λ	ρ
0.230	0.447
0.245	0.448
0.287	0.465
0.297	0.470
0.336	0.474
0.346	0.480
0.433	0.505
0.576	0.541
0.641	0.545
0.798	0.525
0.885	0.547
0.958	0.585
1.02	0.621
1.17	0.657
1.33	0.679
1.66	0.709
2.10	0.742
2.41	0.767
2.55	0.784
2.65	0.803

CURVE 6*
T ~ 298

λ	ρ
0.230	0.522
0.242	0.522
0.266	0.533
0.290	0.544

CURVE 6 (cont.)

λ	ρ
0.311	0.547
0.330	0.544
0.350	0.552
0.501	0.572
0.647	0.590
0.802	0.576
0.890	0.596
0.992	0.649
1.06	0.679
1.19	0.709
1.38	0.734
1.61	0.757
1.85	0.772
2.06	0.794
2.09	0.790
2.30	0.807
2.65	0.845

CURVE 7
T ~ 298

λ	ρ
0.230	0.544
0.247	0.548
0.256	0.548
0.270	0.559
0.284	0.565
0.304	0.565
0.309	0.563*
0.319	0.563
0.334	0.560
0.350	0.570
0.532	0.597
0.647	0.607
0.727	0.599
0.782	0.587
0.812	0.586
0.849	0.591
0.971	0.646
1.07	0.687
1.18	0.716
1.36	0.742
1.55	0.764*
2.02	0.793*
2.37	0.829*
2.65	0.857*

CURVE 8*
T ~ 298

λ	ρ
0.230	0.552
0.258	0.558
0.274	0.570
0.297	0.573
0.326	0.570
0.345	0.575
0.504	0.600
0.641	0.613
0.772	0.597
0.810	0.594
0.853	0.600
0.964	0.655
1.06	0.698
1.25	0.732
1.55	0.764
2.02	0.793
2.37	0.829
2.65	0.857

CURVE 9
T ~ 298

λ	ρ
0.230	0.580
0.255	0.584
0.275	0.597
0.298	0.601
0.314	0.601
0.350	0.598
0.587	0.624
0.645	0.626
0.729	0.620
0.802	0.608
0.877	0.630
0.963	0.676
1.03	0.700
1.23	0.737
1.32	0.749
1.55	0.764
2.02	0.793
2.37	0.829
2.65	0.857

CURVE 10
T ~ 298

λ	ρ
0.230	0.085
0.255	0.112
0.280	0.152
0.292	0.175
0.315	0.227
0.332	0.276
0.343	0.305
0.349	0.328
0.400	0.479
0.457	0.615
0.518	0.686
0.564	0.711
0.614	0.723
0.691	0.728
0.748	0.725
0.976	0.737
1.36	0.747
1.76	0.748
1.97	0.759
2.15	0.764
2.40	0.779
2.55	0.791
2.65	0.792

CURVE 11*
T ~ 298

λ	ρ
0.230	0.085
0.255	0.112
0.280	0.152
0.292	0.175
0.315	0.227
0.332	0.276
0.343	0.305
0.349	0.328
0.400	0.479
0.459	0.610
0.492	0.643
0.545	0.678
0.603	0.705
0.703	0.710
0.844	0.707
0.956	0.718
1.45	0.724

CURVE 11 (cont.)*

λ	ρ
1.60	0.722
1.99	0.736
2.24	0.743
2.40	0.751
2.65	0.777

CURVE 12
T ~ 298

λ	ρ
0.230	0.085
0.255	0.112
0.280	0.152
0.292	0.175
0.315	0.227
0.332	0.276
0.343	0.305
0.349	0.328
0.400	0.479
0.449	0.580
0.492	0.631
0.549	0.671
0.577	0.677
0.678	0.682
0.783	0.676
0.868	0.683
1.06	0.701
1.22	0.703
1.56	0.710
1.71	0.715
1.89	0.722*
2.04	0.726
2.30	0.730
2.35	0.739
2.46	0.739
2.65	0.752

CURVE 13*
T ~ 298

λ	ρ
0.230	0.108
0.254	0.132
0.280	0.173
0.291	0.194
0.313	0.244
0.333	0.299

CURVE 13 (cont.)

λ	ρ
0.346	0.344
0.350	0.364
0.439	0.556
0.480	0.594
0.546	0.630
0.582	0.645
0.644	0.649
0.686	0.642
0.776	0.635
0.866	0.637
0.993	0.662
1.13	0.678
1.46	0.696
1.69	0.700
1.95	0.708
2.14	0.716
2.30	0.723
2.46	0.734
2.65	0.738

CURVE 14
T ~ 298

λ	ρ
0.230	0.177
0.258	0.205
0.287	0.248
0.310	0.291
0.328	0.329
0.346	0.378
0.348	0.385
0.391	0.484
0.440	0.539
0.524	0.570
0.603	0.590
0.674	0.580
0.725	0.567
0.763	0.563
0.806	0.561
0.851	0.568
1.01	0.619
1.13	0.654
1.26	0.667
1.50	0.689
1.69	0.700
1.95	0.726

* Not shown on plot

DATA TABLE NO. 539 (continued)

CURVE 14 (cont.)
T ~ 298

λ	ρ
2.15	0.725
2.30	0.730
2.46	0.751
2.65	0.770

CURVE 15
T ~ 298

λ	ρ
[illegible]	0.317
[illegible]	0.320
[illegible]	0.337
[illegible]	0.399
0.330	0.437
0.343	0.457
0.347	0.467
0.393	0.508
0.500	0.541
0.537	0.546
0.597	0.550
0.793	0.526
0.833	0.528
1.02	0.612
1.09	0.632
1.22	0.661
1.36	0.677
1.63	0.697
1.89	0.722
2.07	0.734
2.22	0.742
2.42	0.754

CURVE 16*
T ~ 298

λ	ρ
0.230	0.417
0.243	0.417
0.287	0.468
0.331	0.505
0.342	0.516
0.487	0.563
0.566	0.575
0.616	0.575
0.697	0.565
0.785	0.548
0.842	0.552
0.894	0.573

CURVE 16 (cont.)*

λ	ρ
0.973	0.619
1.10	0.667
1.22	0.692
1.34	0.710
1.58	0.736
1.81	0.760
1.95	0.769
2.20	0.779
2.35	0.793
2.65	0.822

CURVE 17
T ~ 298

λ	ρ
0.230	0.528
0.240	0.529
0.264	0.548
0.286	0.560
0.330	0.567
0.391	0.579
0.614	0.597
0.682	0.593
0.791	0.579
0.839	0.583
0.888	0.610
0.995	0.663
1.09	0.695
1.15	0.711
1.32	0.730
1.64	0.764*
2.13	0.800*
2.45	0.833*
2.65	0.847*

CURVE 18
T ~ 298

λ	ρ
0.230	0.512
0.259	0.522
0.283	0.540
0.330	0.553
0.347	0.556
0.553	0.578
0.693	0.582
0.794	0.570
0.864	0.581
0.986	0.648

CURVE 18 (cont.)

λ	ρ
1.03	0.670
1.11	0.690
1.18	0.707
1.32	0.728
1.64	0.764
2.13	0.800
2.45	0.833
2.65	0.847

CURVE 19*
T ~ 298

λ	ρ
0.230	0.101
0.262	0.108
0.278	0.115
0.288	0.124
0.330	0.150
0.342	0.161
0.347	0.172
0.350	0.179
0.414	0.357
0.529	0.609
0.577	0.728
0.615	0.757
0.685	0.769
0.970	0.798
1.34	0.827
1.46	0.826
1.71	0.858
2.06	0.881
2.25	0.895
2.40	0.904
2.65	0.934

CURVE 20*
T ~ 298

λ	ρ
0.230	0.118
0.276	0.130
0.321	0.157
0.339	0.174
0.347	0.186
0.360	0.216
0.480	0.520
0.527	0.593
0.536	0.637
0.564	0.680

CURVE 20 (cont.)*

λ	ρ
0.615	0.703
0.773	0.714
1.02	0.747
1.24	0.776
1.46	0.784
1.65	0.809
2.14	0.846
2.57	0.884
2.65	0.893

CURVE 21*
T ~ 298

λ	ρ
0.230	0.177
0.244	0.178
0.286	0.199
0.311	0.208
0.331	0.223
0.342	0.234
0.350	0.271
0.425	0.378
0.515	0.513
0.556	0.533
0.641	0.550
0.744	0.546
0.851	0.550
0.940	0.577
1.02	0.603
1.23	0.632
1.64	0.667
1.74	0.680
2.21	0.706
2.49	0.731
2.65	0.745

CURVE 22*
T ~ 298

λ	ρ
0.230	0.264
0.246	0.262
0.290	0.287
0.310	0.288
0.330	0.301
0.341	0.307
0.346	0.318
0.350	0.335
0.422	0.422

CURVE 22 (cont.)*

λ	ρ
0.482	0.467
0.551	0.504
0.604	0.514
0.658	0.514
0.754	0.496
0.822	0.496
0.921	0.532
0.966	0.553
1.07	0.582
1.18	0.601
1.29	0.615
1.70	0.655
2.21	0.686
2.54	0.712
2.65	0.726

CURVE 23*
T ~ 298

λ	ρ
0.230	0.439
0.256	0.452
0.281	0.470
0.297	0.475
0.331	0.480
0.340	0.485
0.346	0.495
0.351	0.508
0.477	0.553
0.533	0.563
0.589	0.569
0.664	0.569
0.760	0.539
0.786	0.534
0.831	0.543
0.982	0.620
1.05	0.638
1.14	0.663
1.29	0.682
1.67	0.705
2.14	0.744
2.37	0.756
2.56	0.777
2.65	0.786

CURVE 24*
T ~ 298

λ	ρ
0.230	0.536
0.256	0.547
0.277	0.570
0.321	0.571
0.344	0.585
0.624	0.629
0.683	0.620
0.762	0.599
0.805	0.595
0.872	0.614
0.951	0.658
1.01	0.682
1.08	0.703
1.15	0.718
1.29	0.732
1.74	0.767
2.21	0.792
2.50	0.821
2.65	0.836

CURVE 25*
T ~ 298

λ	ρ
0.230	0.574
0.257	0.592
0.281	0.611
0.310	0.619
0.335	0.621
0.347	0.623
0.384	0.636
0.540	0.658
0.596	0.661
0.761	0.638
0.803	0.638
0.857	0.650
0.915	0.684
1.07	0.736
1.15	0.752
1.41	0.775
1.72	0.791
2.25	0.829
2.56	0.855
2.65	0.864

CURVE 26*
T ~ 298

λ	ρ
0.230	0.593
0.254	0.608
0.270	0.620
0.309	0.628
0.384	0.636
0.540	0.658
0.596	0.661
0.761	0.638
0.803	0.638
0.857	0.650
0.915	0.684
1.07	0.736
1.15	0.752
1.41	0.775
1.72	0.791
2.25	0.829
2.56	0.855
2.65	0.864

CURVE 27*
T ~ 298

λ	ρ
0.230	0.626
0.249	0.632
0.282	0.650
0.305	0.650
0.324	0.660
0.347	0.661
0.434	0.668
0.542	0.682
0.647	0.682
0.791	0.661
0.833	0.667
1.02	0.748
1.08	0.765
1.26	0.782
1.57	0.798
1.73	0.807
1.80	0.816
2.15	0.840
2.53	0.870
2.65	0.877

* Not shown on plot

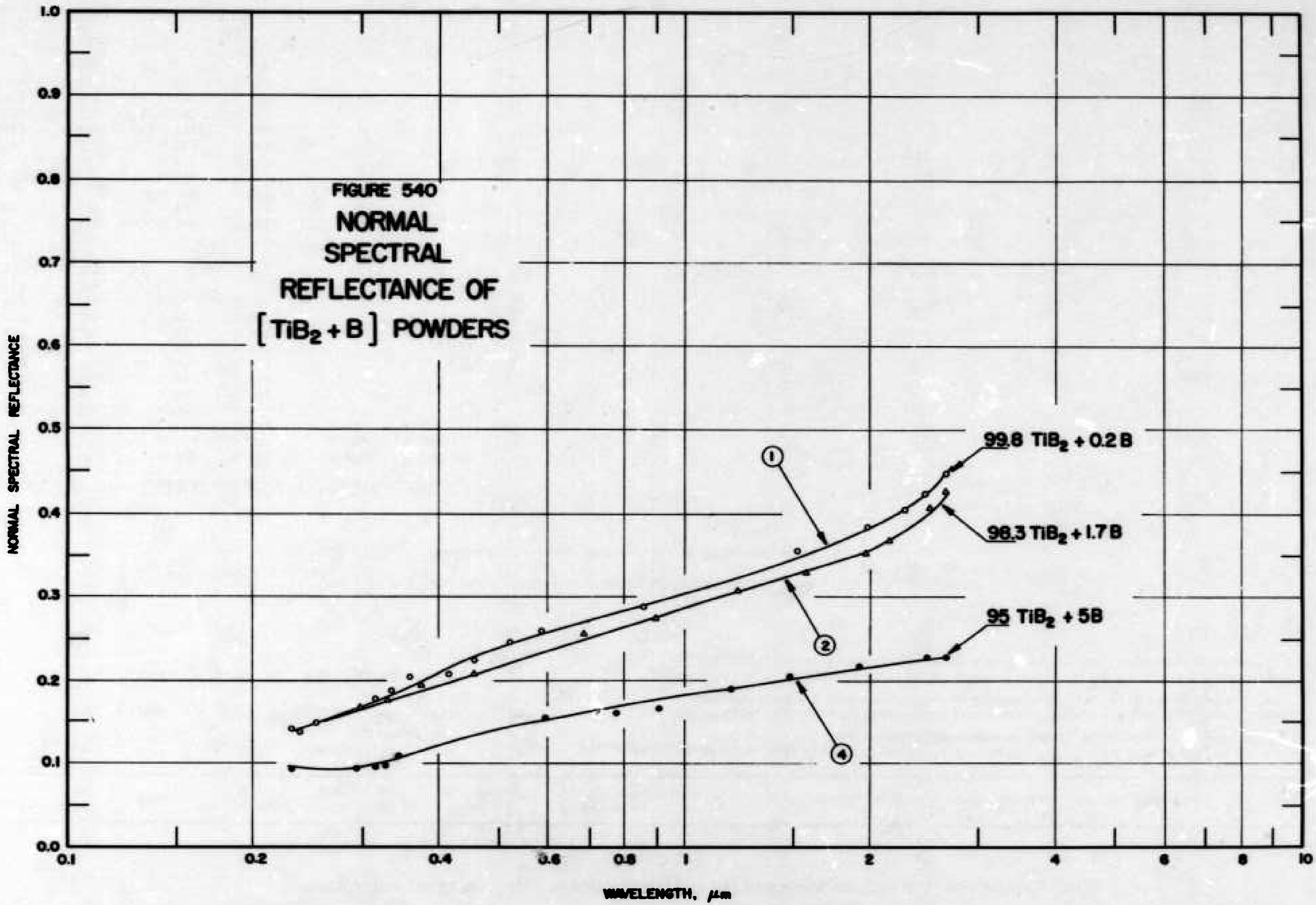


FIGURE 540
NORMAL
SPECTRAL
REFLECTANCE OF
[TiB_2 + B] POWDERS

SPECIFICATION TABLE NO. 540 NORMAL SPECTRAL REFLECTANCE OF [TiB_2 + B] POWDERS

Curve No.	Ref. No.	Year	Temperature K	Wavelength Range, μm	Geometry θ	θ'	ω'	Reported Error, %	Composition (weight percent), Specifications, and Remarks
1	393	1966	~298	0.230-2.65	~0°		2π		99.84 TiB_2, 0.16 B; cold pressed and sintered at 2173 K for 2 hrs; 2 or 3 wt. percent polyvinyl binder; data extracted from smooth curve; MgO reference standard.
2	393	1966	~298	0.230-2.65	~0°		2π		98.30 TiB_2, 1.70 B; cold pressed and sintered at 2173 K for 2 hrs; 2 or 3 wt. percent polyvinyl binder; data extracted from smooth curve; MgO reference standard.
3	393	1966	~298	0.230-2.65	~0°		2π		95.07 TiB_2, 4.93 B; cold pressed and sintered at 2173 K for 2 hrs; 2 or 3 wt. percent polyvinyl binder; data extracted from smooth curve; MgO reference standard.

DATA TABLE NO. 540 NORMAL SPECTRAL REFLECTANCE OF [TiB_2 + B] POWDERS

[Wavelength, λ, μm; Reflectance, ρ; Temperature, T, K]

λ	ρ
CURVE 1 $T \sim 298$	
0.230	0.140
0.239	0.138
0.252	0.148
0.315	0.177
0.333	0.187
0.359	0.201
0.411	0.208
0.459	0.223
0.520	0.247
0.585	0.260
0.858	0.288
1.52	0.355
1.99	0.381
2.27	0.404
2.45	0.421
2.65	0.449
CURVE 2 $T \sim 298$	
0.230	0.140
0.239	0.138
0.252	0.148
0.296	0.167
CURVE 2 (cont.)	
0.330	0.175
0.374	0.193
0.457	0.209
0.681	0.258
0.891	0.273
1.22	0.306
1.57	0.330
1.96	0.352
2.14	0.367
2.50	0.407
2.65	0.426
CURVE 3 $T \sim 298$	
0.230	0.091
0.292	0.091
0.315	0.094
0.328	0.096
0.341	0.108
0.592	0.153
0.771	0.160
0.905	0.165
1.19	0.190
1.48	0.204
CURVE 3 (cont.)	
1.91	0.216
2.48	0.226
2.65	0.229

8. MISCELLANEOUS MIXTURES

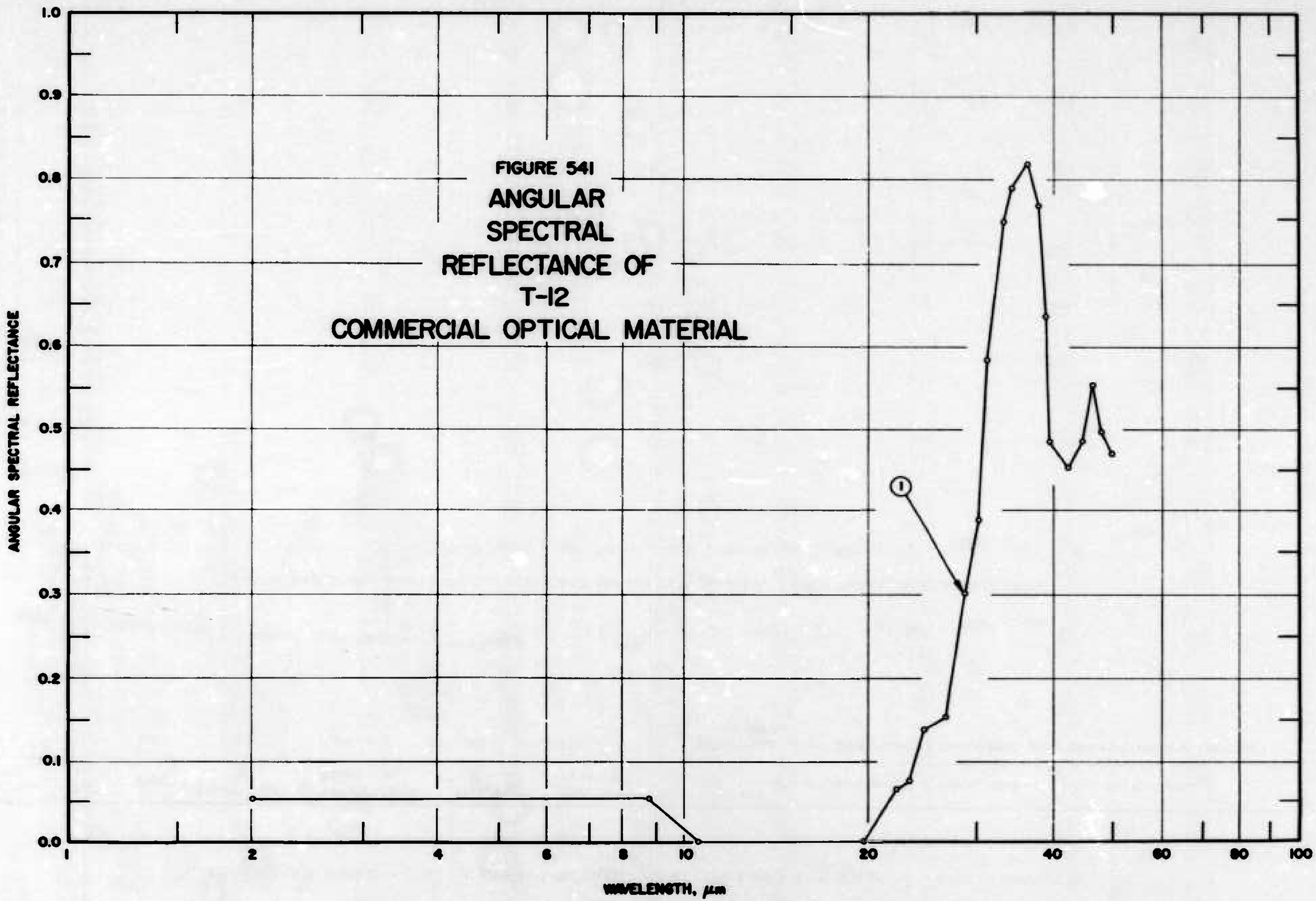


FIGURE 541
ANGULAR
SPECTRAL
REFLECTANCE OF
T-12
COMMERCIAL OPTICAL MATERIAL
ANGULAR SPECTRAL REFLECTANCE
WAVELENGTH, μm
1.0
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0.0
1
2
4
6
8
10
20
40
60
80
100
1

SPECIFICATION TABLE NO. 541 ANGULAR SPECTRAL REFLECTANCE OF T-12 COMMERCIAL OPTICAL MATERIAL

Curve No.	Ref. No.	Year	Temperature, K	Wavelength Range, µm	Geometry θ	θ'	ω'	Reported Error, %	Composition (weight percent), Specifications, and Remarks
1	102	1965	~298	2.00-50.0	30°	30°			Polycrystal (4 mm thick); data extracted from smooth curve; aluminum mirror standard.

DATA TABLE NO. 541 ANGULAR SPECTRAL REFLECTANCE OF T-12 COMMERCIAL OPTICAL MATERIAL

[Wavelength, λ, µm; Reflectance, ρ; Temperature, T, K]

λ	ρ
CURVE 1	
T ~ 298	
2.00	0.051
8.80	0.051
10.6	0.000
19.7	0.000
22.1	0.064
23.3	0.076
24.6	0.137
26.8	0.152
28.9	0.300
30.1	0.389
31.3	0.582
33.1	0.748
34.3	0.789
36.1	0.817
38.0	0.765
39.0	0.634
39.9	0.483
42.1	0.451
44.9	0.484
46.5	0.553
48.0	0.496
50.0	0.470

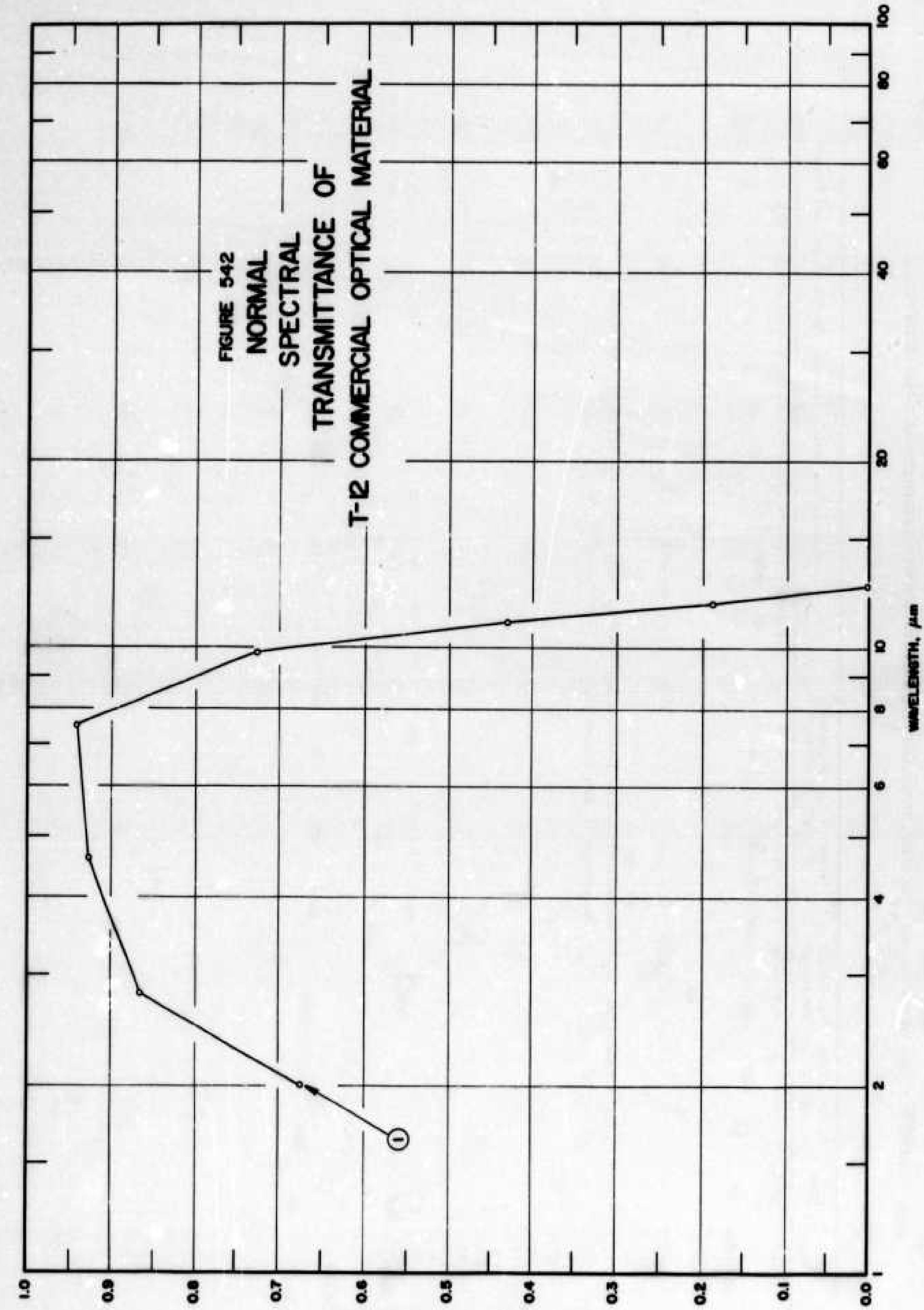


FIGURE 542 NORMAL SPECTRAL TRANSMITTANCE OF T-12 COMMERCIAL OPTICAL MATERIAL

SPECIFICATION TABLE NO. 542 NORMAL SPECTRAL TRANSMITTANCE OF T-12 COMMERCIAL OPTICAL MATERIAL

Curve No.	Ref. No.	Year	Temperature, K	Wavelength Range, μm	Geometry θ	θ'	ω'	Reported Error, %	Composition (weight percent), Specifications, and Remarks
1	102	1965	~298	2.00-12.5	0°	0°			Polycrystal (4 mm thick); data extracted from smooth curve.

DATA TABLE NO. 542 NORMAL SPECTRAL TRANSMITTANCE OF T-12 COMMERCIAL OP AL MATERIAL
[Wavelength, λ, μm; Transmittance, τ; Temperature, T, K]

λ	τ
CURVE 1	
T ~ 298	
2.00	0.674
2.80	0.867
4.60	0.928
7.50	0.942
9.80	0.728
10.9	0.430
11.7	0.188
12.5	0.000

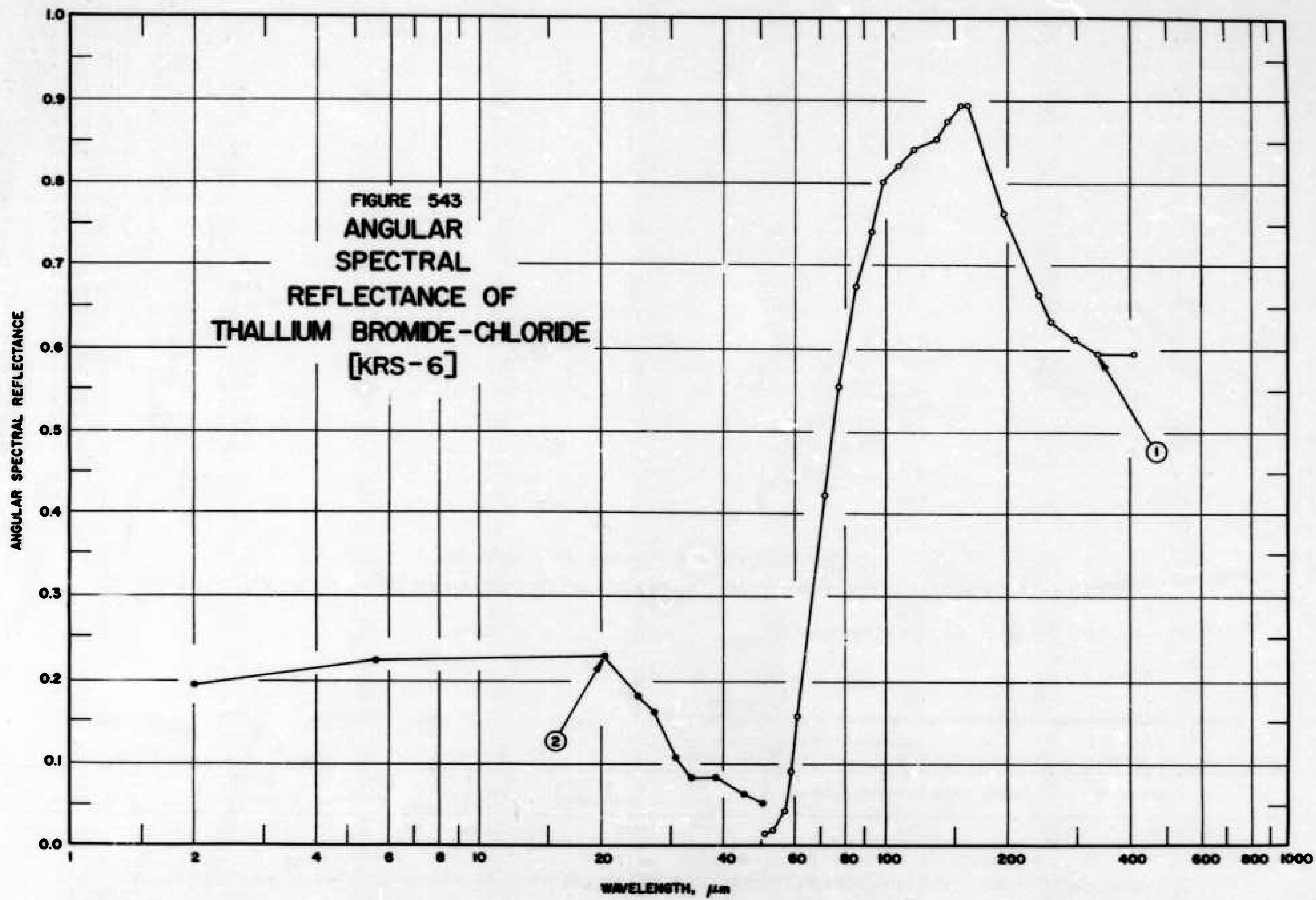


FIGURE 543
ANGULAR
SPECTRAL
REFLECTANCE OF
THALLIUM BROMIDE-CHLORIDE
[KRS-6]
ANGULAR SPECTRAL REFLECTANCE
WAVELENGTH, μm
1.0
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0.0
1
2
4
6
8
10
20
40
60
80
100
200
400
600
800
1000
1
2

SPECIFICATION TABLE NO. 543 ANGULAR SPECTRAL REFLECTANCE OF THALLIUM BROMIDE-CHLORIDE [KRS-6] 2Tl Br + 3TlCl

Curve No.	Ref. No.	Year	Temperature, K	Wavelength Range, μm	Geometry θ	θ′	ω′	Reported Error, %	Composition (weight percent), Specifications, and Remarks
1	419	1962	300	50.1-407	12°	12°			Single crystals; measured in vacuum; data extracted from smooth curve; evaporated Al mirror reference standard.
2	102	1965	~298	2.00-50.0	30°	30°			1.65 mm thick; data extracted from smooth curve; aluminum mirror reference standard.

DATA TABLE NO. 543 ANGULAR SPECTRAL REFLECTANCE OF THALLIUM BROMIDE-CHLORIDE [KRS-6] 2Tl Br + 3TlCl

[Wavelength, λ, μm; Reflectance, ρ; Temperature, T, K]

λ	ρ	λ	ρ
CURVE 1	T = 300	CURVE 2	T ~ 298
50.1	0.015	2.00	0.194
53.4	0.020	5.60	0.225
56.2	0.043	20.4	0.230
58.6	0.090	24.9	0.180
61.5	0.156	27.0	0.161
71.7	0.422	30.6	0.109
77.6	0.554	33.3	0.084
85.3	0.676	38.4	0.084
92.2	0.743	45.1	0.064
99.7	0.801	50.0	0.051
107	0.824		
117	0.845		
133	0.855		
142	0.877		
154	0.898		
160	0.898		
199	0.764		
240	0.665		
257	0.635		
292	0.613		
332	0.598		
407	0.598		

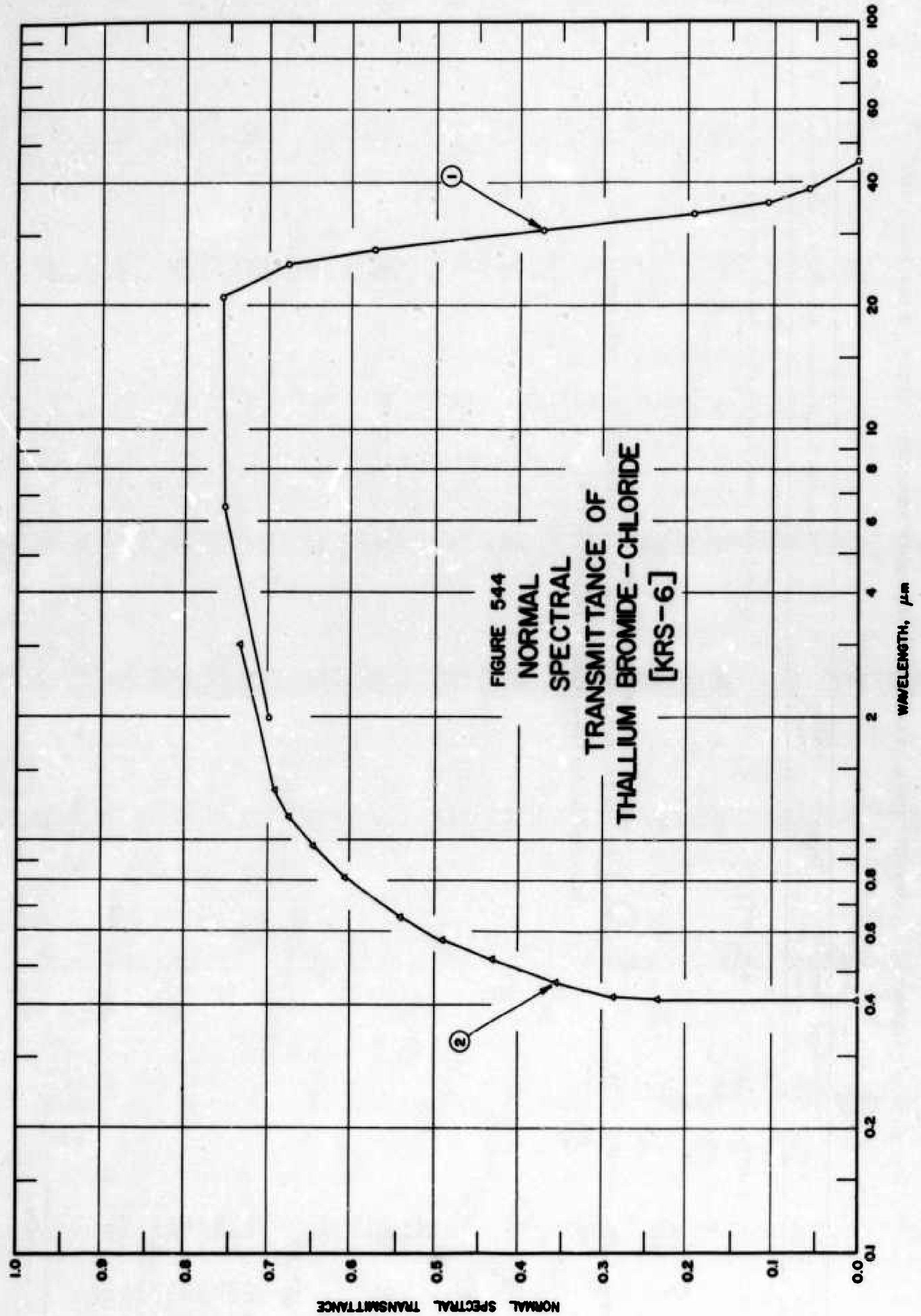


FIGURE 544
NORMAL
SPECTRAL
TRANSMITTANCE OF
THALLIUM BROMIDE - CHLORIDE
[KRS-6]
1
2
NORMAL SPECTRAL TRANSMITTANCE
0.0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
1.0
WAVELENGTH, μm
0.1
0.2
0.4
0.6
0.8
1
2
4
6
8
10
20
40
60
80
100

SPECIFICATION TABLE NO. 544 NORMAL SPECTRAL TRANSMITTANCE OF THALLIUM BROMIDE-CHLORIDE [KRS-6] $2TlBr + 3TlCl$

Curve No.	Ref. No.	Year	Temperature, K	Wavelength Range, μm	Geometry θ	θ'	ω'	Reported Error, %	Composition (weight percent), Specifications, and Remarks
1	102	1965	~298	2.00-45.0	0°	0°			1.65 mm thick; data extracted from smooth curve.
2	94	1967	298	0.409-3.00	~0°	~0°		±2	Polished single crystal (1.65 mm thick); data extracted from smooth curve.

DATA TABLE NO. 544 NORMAL SPECTRAL TRANSMITTANCE OF THALLIUM BROMIDE-CHLORIDE [KRS-6] $2TlBr + 3TlCl$

[Wavelength, λ, μm; Transmittance, τ; Temperature, T, K]

λ	τ
CURVE 1	
T ~298	
2.00	0.700
6.50	0.755
21.0	0.759
25.1	0.676
27.3	0.574
30.5	0.372
33.5	0.193
35.6	0.109
38.6	0.057
45.0	0.000
CURVE 2	
T = 298	
0.409	0.000
0.410	0.234
0.418	0.286*
0.451	0.354
0.514	0.430
0.575	0.491
0.656	0.543
0.818	0.606
0.970	0.646
1.14	0.675
1.32	0.691
3.00	0.739

* Not shown on plot

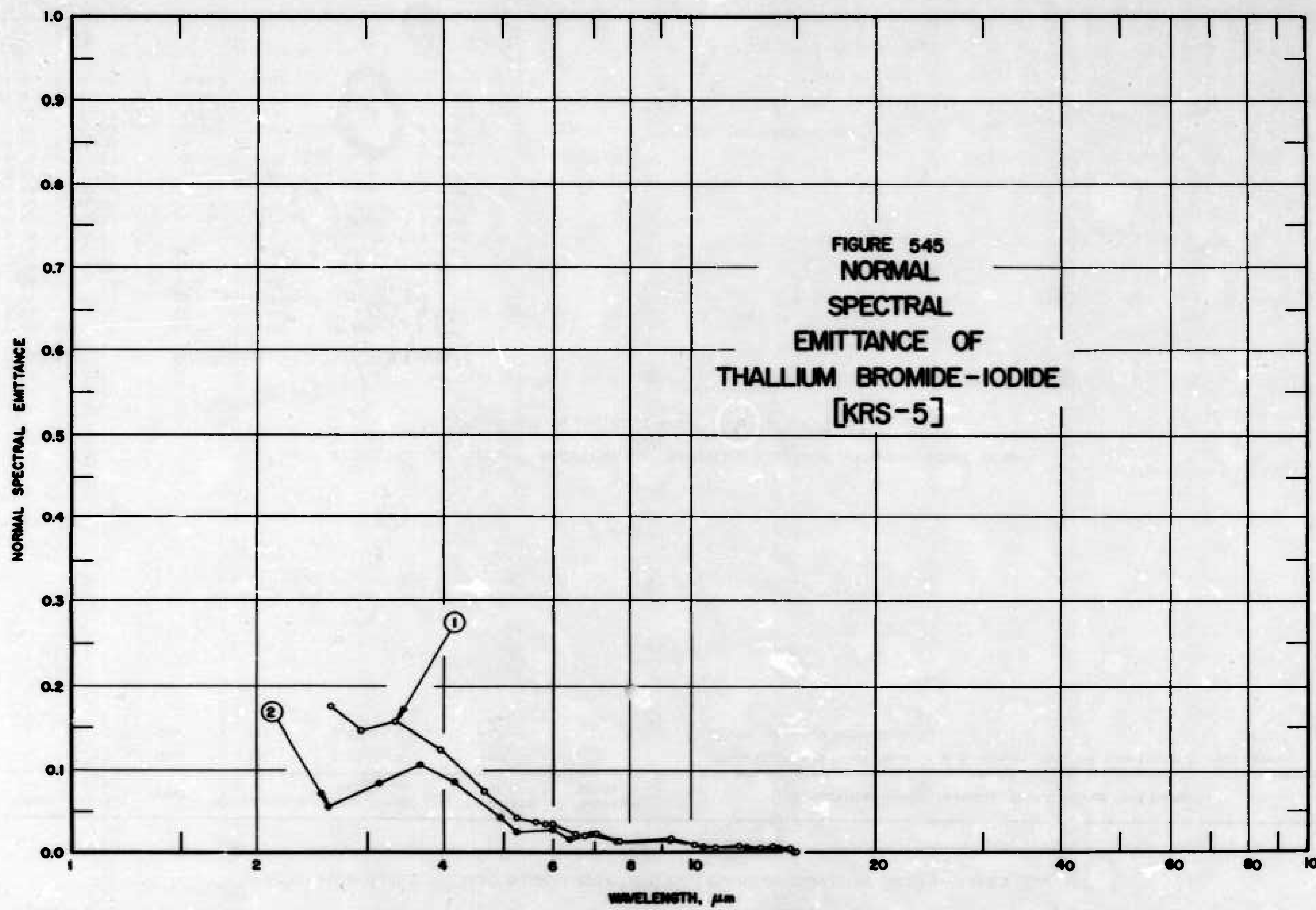


FIGURE 545
NORMAL
SPECTRAL
EMITTANCE OF
THALLIUM BROMIDE-IODIDE
[KRS-5]

SPECIFICATION TABLE NO. 545 NORMAL SPECTRAL EMITTANCE OF THALLIUM BROMIDE-IODIDE (KRS-5)

Curve No.	Ref. No.	Year	Temperature, K	Wavelength Range, μm	Geometry θ'	Reported Error, %	Composition (weight percent), Specifications, and Remarks
1	52	1961	353	2.61-14.9	~0°		Plate (2.05 mm thick); measured in vacuum; data extracted from smooth curve.
2	52	1961	413	2.60-14.8	~0°		Above specimen and conditions.

DATA TABLE NO. 545 NORMAL SPECTRAL EMITTANCE OF THALLIUM BROMIDE-IODIDE (KRS-5)

[Wavelength, λ, μm; Emittance, ϵ; Temperature, T, K]

λ	ϵ	λ	ϵ	λ	ϵ
CURVE 1	T = 353	CURVE 1 (cont.)		CURVE 2 (cont.)	
		12.0	0.008	6.40	0.017
2.61	0.175	13.0	0.006	6.99	0.022
2.94	0.149	13.6	0.008	7.66	0.013
3.34	0.154	13.8	0.004*	9.25	0.017
3.98	0.123	14.5	0.004	10.1	0.010
4.66	0.073	14.[illegible]	0.000	10.5	0.009
5.28	0.041			11.0	0.004*
5.63	0.037	CURVE 2	T = 413	12.0	0.009*
5.83	0.034			12.8	0.007
6.00	0.036			13.0	0.005*
6.52	0.021	2.60	0.055	13.5	0.007*
6.79	0.020	3.15	0.083	13.8	0.005
7.08	0.022	3.68	0.106	14.6	0.004*
7.70	0.014	4.19	0.085	14.8	0.000
9.29	0.019	4.97	0.041		
10.2	0.010	5.56	0.025		
11.0	0.006	6.00	0.028		

* Not shown on plot

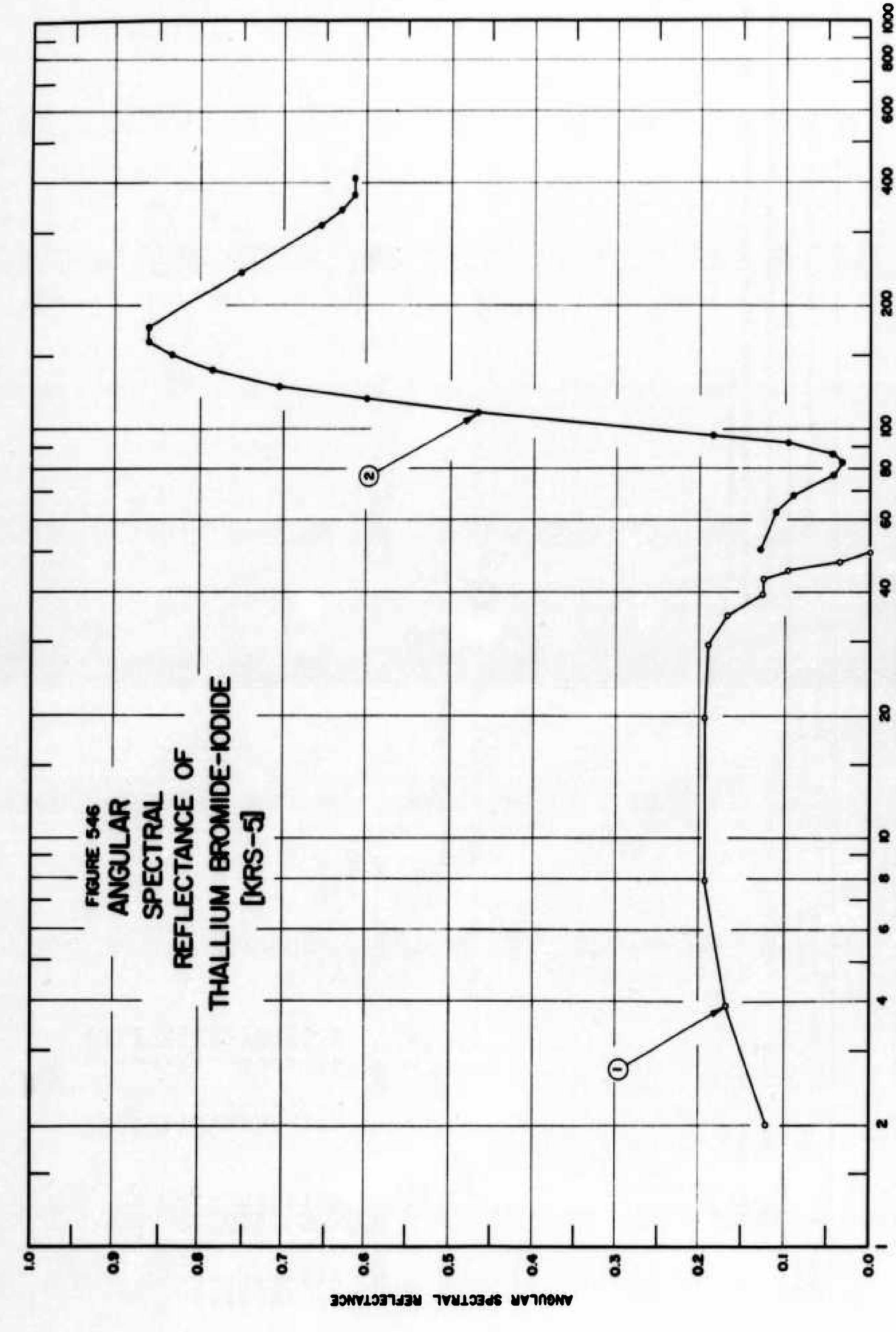


FIGURE 546 ANGULAR SPECTRAL REFLECTANCE OF THALLIUM BROMIDE-IODIDE [KRS-5]

SPECIFICATION TABLE NO. 546 ANGULAR SPECTRAL REFLECTANCE OF THALLIUM BROMIDE-IODIDE (KRS-5)

Curve No.	Ref. No.	Year	Temperature, K	Wavelength Range, μm	Geometry θ θ' ω'	Reported Error, %	Composition (weight percent), Specifications, and Remarks
1	67	1963	~298	2.00-50.0	30° 30°		2 mm thick; data extracted from smooth curve; aluminum mirror reference standard.
2	419	1962	300	50.1-407	12° 12°		Single crystals; measured in vacuum; data extracted from smooth curve; evaporated Al mirror reference standard.

DATA TABLE NO. 546 ANGULAR SPECTRAL REFLECTANCE OF THALLIUM BROMIDE-IODIDE (KRS-5)

[Wavelength, λ, μm; Reflectance, ρ; Temperature, T, K]

λ	ρ	λ	ρ	λ	ρ
CURVE 1 T ~ 298		CURVE 2 T = 300		CURVE 2 (cont.)	
				345	0.631
2.00	0.122	50.1	0.130	374	0.618
3.90	0.169	62.9	0.112	407	0.618
7.90	0.194	69.3	0.090		
19.9	0.194	77.6	0.044		
29.9	0.190	83.3	0.035		
35.0	0.169	87.9	0.046		
39.9	0.127	92.4	0.097		
43.8	0.127	97.4	0.185		
45.8	0.098	110	0.469		
47.2	0.039	119	0.600		
50.0	0.000	128	0.709		
		140	0.790		
		152	0.839		
		164	0.864		
		179	0.864		
		241	0.753		
		314	0.658		

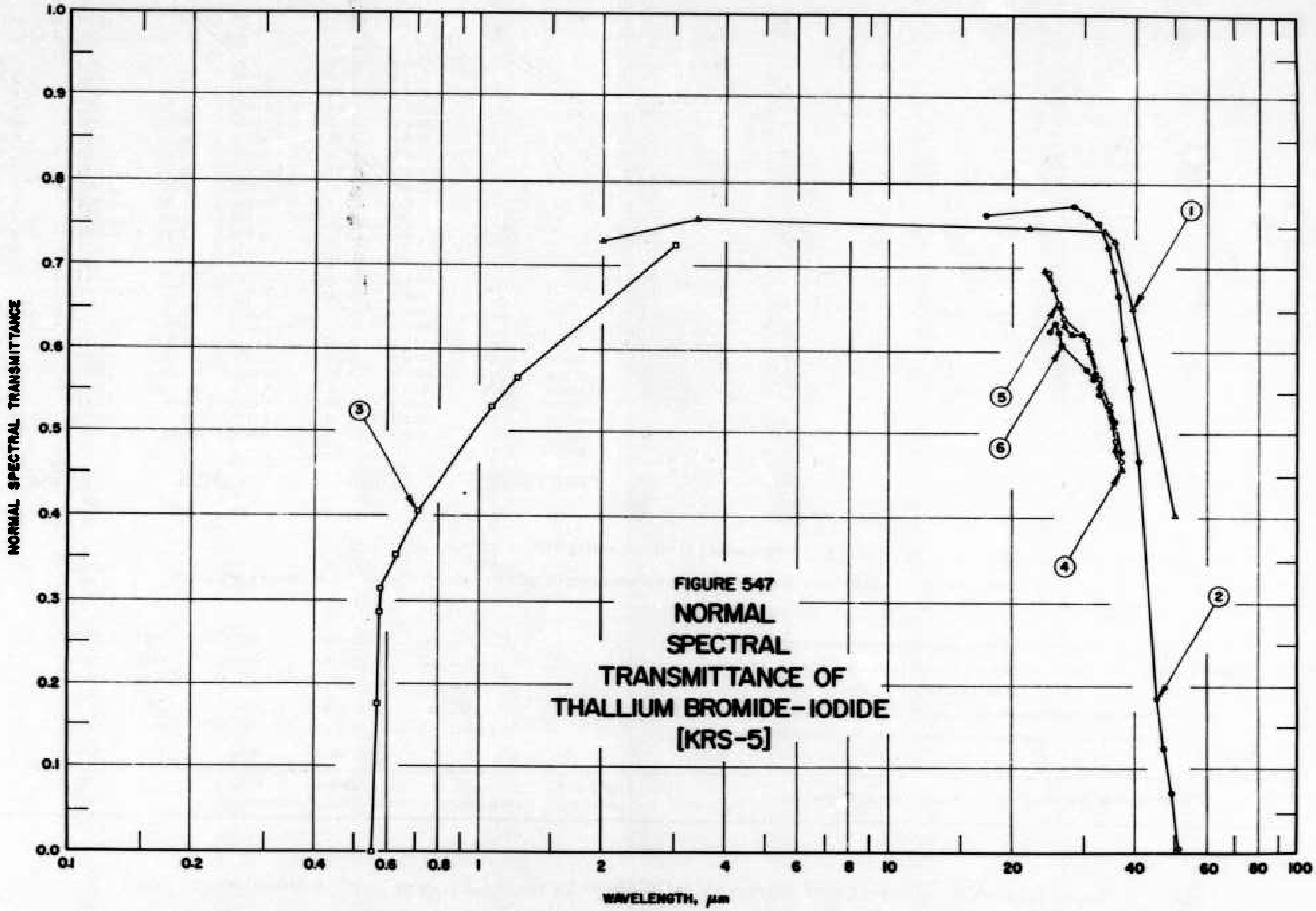


FIGURE 547
NORMAL
SPECTRAL
TRANSMITTANCE OF
THALLIUM BROMIDE-IODIDE
[KRS-5]

SPECIFICATION TABLE NO. 547 NORMAL SPECTRAL TRANSMITTANCE OF THALLIUM BROMIDE-IODIDE [KRS-5] 2TlBr + 3TlI

Curve No.	Ref. No.	Year	Temperature K	Wavelength Range, μm	Geometry θ	θ'	ω'	Reported Error, %	Composition (weight percent), Specifications, and Remarks
1	67	1963	~ 298	2.00-50.0	0°	0°			2 mm thick; data extracted from smooth curve.
2	93	1960	298	17.2-51.5	~0	~0			High purity crystal (5.15 mm thick); data extracted from smooth curve.
3	94	1967	298	0.550-3.00	< 15°	< 15°		± 2	Polished single crystal (2.0 mm thick); data extracted from smooth curve.
4	399	1948	~298	24.6-37.0	~0°	~0°			4 mm thick; data extracted from smooth curve.
5	399	1948	~298	24.6-37.0	~0°	~0°			8 mm thick from Harshaw Chemical Co.; data extracted from smooth curve.
6	399	1948	~298	24.8-37.0	~0°	~0°			8 mm thick from Jena; data extracted from smooth curve.

DATA TABLE NO. 547 NORMAL SPECTRAL TRANSMITTANCE OF THALLIUM BROMIDE-IODIDE [KRS-5] 2TlBr + 3TlI

[Wavelength, λ, μm; Transmittance, τ; Temperature, T, K]

λ	τ
CURVE 1 T = 298	
2.00	0.731
4.40	0.758
22.0	0.749
33.6	0.745
35.8	0.734
39.8	0.653
50.0	0.401
CURVE 2 T = 298	
17.2	0.762
28.2	0.774
30.6	0.765
32.6	0.752
34.2	0.725
35.4	0.696
36.3	0.666
37.7	0.615
39.0	0.556
40.6	0.466
45.8	0.182
47.1	0.123
49.0	0.071
51.5	0.003

λ	τ
CURVE 3 T = 298	
0.550	0.000
0.561	0.176
0.570	0.286
0.578	0.316
0.622	0.352
0.717	0.408
1.06	0.530
1.23	0.565
3.00	0.728
CURVE 4 T ~298	
24.6	0.697
25.1	0.676
26.1	0.653
26.9	0.631
28.0	0.620
29.9	0.620
31.0	0.600
32.9	0.554
35.1	0.506
35.9	0.480
37.0	0.459

λ	τ
CURVE 5 T ~298	
24.6	0.695
26.0	0.657
26.7	0.640
27.2	0.631*
27.6	0.623*
30.3	0.613
31.1	0.600*
32.6	0.566
34.3	0.534
35.8	0.490
36.4	0.475*
37.0	0.465
CURVE 6 T ~298	
24.8	0.623
25.4	0.633
26.0	0.622
26.3	0.609
27.0	0.606*
29.3	0.607*
30.1	0.578
30.9	0.565*
31.8	0.565
32.0	0.571

λ	τ
CURVE 6 (cont.)	
32.8	0.549
33.5	0.537*
34.2	0.538*
34.8	0.527
35.6	0.512
36.2	0.515*
37.0	0.477

* Not shown on plot

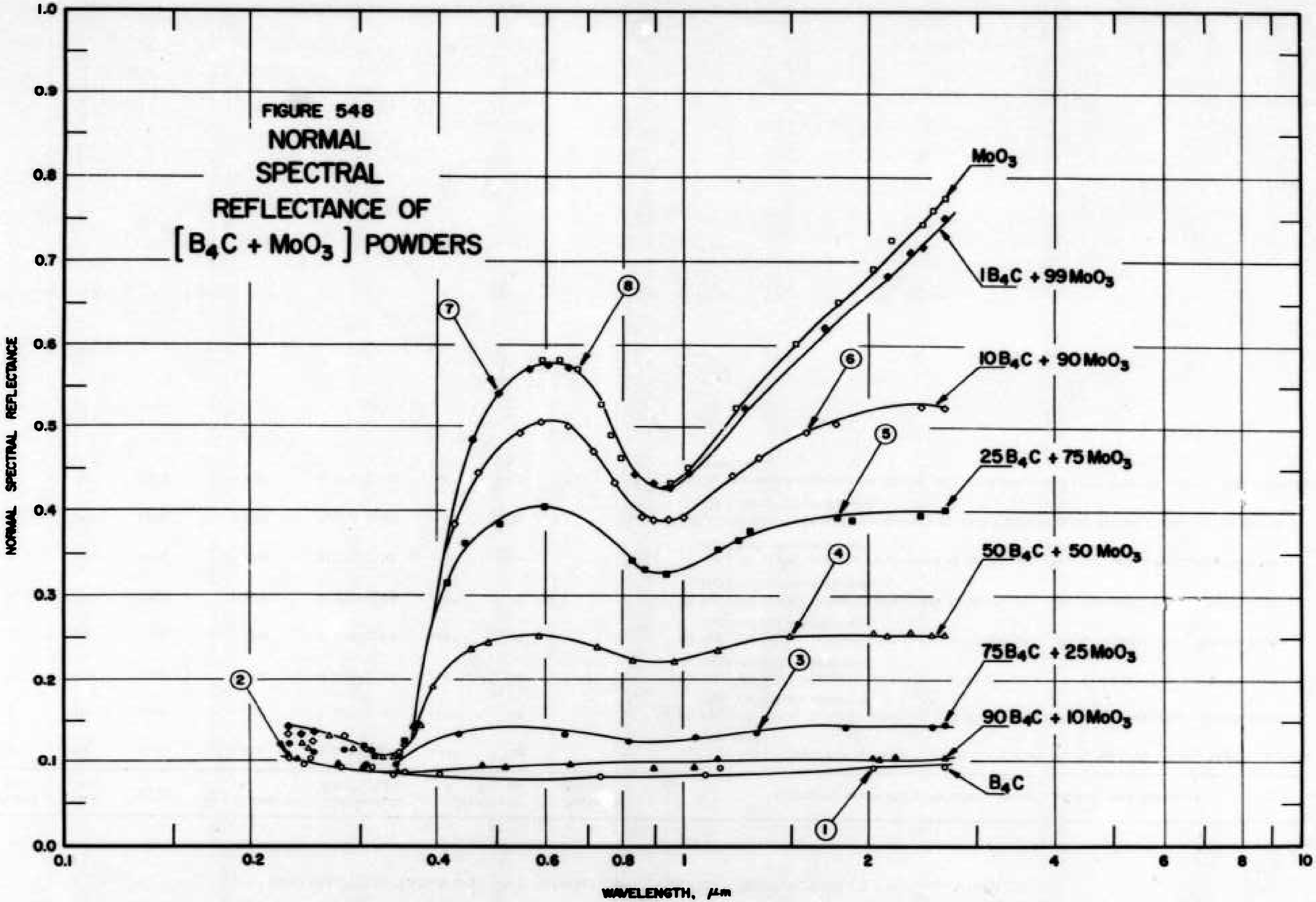


FIGURE 548
NORMAL
SPECTRAL
REFLECTANCE OF
[$B_4C + MoO_3$] POWDERS
MoO_3
$1 B_4C + 99 MoO_3$
$10 B_4C + 90 MoO_3$
$25 B_4C + 75 MoO_3$
$50 B_4C + 50 MoO_3$
$75 B_4C + 25 MoO_3$
$90 B_4C + 10 MoO_3$
B_4C
1
2
3
4
5
6
7
8
NORMAL SPECTRAL REFLECTANCE
WAVELENGTH, μm
0.0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
1.0
0.1
0.2
0.4
0.6
0.8
1
2
4
6
8
10

SPECIFICATION TABLE NO. 548 NORMAL SPECTRAL REFLECTANCE OF [B_4C + MoO_3] POWDERS

Curve No.	Ref. No.	Year	Temperature K	Wavelength Range, μm	Geometry θ	Geometry θ'	Geometry ω'	Reported Error, %	Composition (weight percent), Specifications, and Remarks
1	393	1966	~298	0.230-2.65	~0°		2π		B_4C; powder compacted at 35300 psi; data extracted from smooth curve; MgO reference standard.
2	393	1966	~298	0.230-2.65	~0°		2π		90 B_4C, 10 MoO_3; powder compacted at 35300 psi; data extracted from smooth curve; MgO reference standard.
3	393	1966	~298	0.230-2.65	~0°		2π		75 B_4C, 25 MoO_3; powder compacted at 35300 psi; data extracted from smooth curve; MgO reference standard.
4	393	1966	~298	0.230-2.65	~0°		2π		50 B_4C, 50 MoO_3; powder compacted at 35300 psi; data extracted from smooth curve; MgO reference standard.
5	393	1966	~298	0.230-2.65	~0°		2π		25 B_4C, 75 MoO_3; powder compacted at 35300 psi; data extracted from smooth curve; MgO reference standard.
6	393	1966	~298	0.230-2.65	~0°		2π		10 B_4C, 90 MoO_3; powder compacted at 35300 psi; data extracted from smooth curve; MgO reference standard.
7	393	1966	~298	0.230-2.65	~0°		2π		1 B_4C, 99 MoO_3; powder compacted at 35300 psi; data extracted from smooth curve; MgO reference standard.
8	393	1966	~298	0.230-2.65	~0°		2π		MoO_3; powder compacted at 35300 psi; data extracted from smooth curve; MgO reference standard.

DATA TABLE NO. 548 NORMAL SPECTRAL REFLECTANCE OF [B_4C + MoO_3] POWDERS

[Wavelength, λ, μm; Reflectance, ρ; Temperature, T, K]

λ	ρ
CURVE 1	
T ~ 298	
0.230	0.103
0.242	0.099
0.250	0.103
0.280	0.093
0.312	0.093
0.340	0.085
0.352	0.089
0.403	0.087
0.733	0.082
1.08	0.085
1.15	0.092
2.04	0.092
2.65	0.094
CURVE 2	
T ~ 298	
0.230	0.109
0.239	0.101
0.277	0.099
0.303	0.093
0.342	0.088
0.473	0.097
0.514	0.093
0.658	0.097
0.899	0.091
1.04	0.093
1.14	0.104
2.01	0.104
2.06	0.101
2.20	0.106
2.65	0.106
CURVE 3	
T ~ 298	
0.230	0.121
0.253	0.111
0.281	0.114
0.308	0.098
0.342	0.098
0.349	0.106
0.433	0.135
0.642	0.135
CURVE 3 (cont.)	
0.814	0.127
1.05	0.131
1.32	0.139
1.84	0.143
2.54	0.143
2.65	0.147
CURVE 4	
T ~ 298	
0.230	0.126
0.241	0.124
0.248	0.119
0.268	0.132
0.293	0.117
0.326	0.106
0.340	0.106
0.347	0.111
0.351	0.121
0.378	0.146
0.393	0.192
0.454	0.237
0.484	0.244
0.584	0.251
0.729	0.240
0.823	0.224
0.965	0.223
1.14	0.239
1.49	0.251
2.04	0.258
2.14	0.253
2.32	0.258
2.51	0.255
2.65	0.255
CURVE 5	
T ~ 298	
0.230	0.126
0.241	0.124
0.248	0.119
0.268	0.132
0.296	0.116
0.304	0.120
0.317	0.107
CURVE 5 (cont.)	
0.342	0.107
0.347	0.113
0.352	0.126
0.373	0.148
0.416	0.317
0.442	0.364
0.501	0.389
0.599	0.409
0.825	0.343
0.869	0.331
0.937	0.329
1.14	0.357
1.23	0.369
1.28	0.379
1.77	0.395
1.89	0.391
2.41	0.397
2.65	0.401
CURVE 6	
T ~ 298	
0.230	0.133
0.252	0.129
0.283	0.132
0.307	0.117
0.320	0.108
0.340	0.108
0.346	0.111
0.351	0.125
0.371	0.146
0.427	0.386
0.467	0.448
0.541	0.495
0.590	0.507
0.652	0.501
0.711	0.472
0.773	0.434
0.858	0.396
0.893	0.391
0.943	0.391
1.00	0.395
1.20	0.443
1.32	0.465
1.58	0.496
CURVE 6 (cont.)	
1.76	0.507
2.42	0.526
2.65	0.526
CURVE 7	
T ~ 298	
0.230	0.144
0.241	0.135
0.254	0.138
0.286	0.131
0.311	0.115
0.337	0.108
0.344	0.111
0.350	0.122
0.365	0.141
0.456	0.487
0.507	0.545
0.561	0.572
0.601	0.579
0.652	0.575
0.839	0.446
0.894	0.433
0.951	0.430
1.02	0.446
1.26	0.526
1.70	0.624
2.14	0.689
2.34	0.711
2.44	0.718
2.65	0.754
CURVE 8	
T ~ 298	
0.230	0.144
0.241	0.135
0.254	0.138
0.286	0.131
0.311	0.115
0.337	0.108
0.344	0.111
0.350	0.122
0.365	0.144
0.456	0.487
CURVE 8 (cont.)	
0.507	0.545
0.563	0.577
0.590	0.584
0.630	0.585
0.674	0.574
0.735	0.530
0.761	0.491
0.795	0.465
0.846	0.442
0.897	0.434
0.950	0.432
1.03	0.451
1.22	0.524
1.52	0.601
1.78	0.653
2.01	0.694
2.18	0.726
2.44	0.748
2.53	0.762
2.65	0.779

SPECIFICATION TABLE NO. 549 NORMAL TOTAL EMITTANCE OF [TiB_2 + H_3BO_3] POWDERS

Curve No.	Ref. No.	Year	Temperature Range, K	Geometry θ'	Reported Error, %	Composition (weight percent), Specifications and Remarks
1*	28	1963	1273	~0°		99 TiB_2, 1 H_3BO_3; sintered at 1573 K for 2 hrs (setter material TiB_2); density 2.66 g cm^{-3}; x-ray structure TiB_2; integrated over the range 1-15 μm; [Authors' designation: Sample No. 8].
2*	28	1963	1023	~0°		99 TiB_2, 1 H_3BO_3; sintered at 1623 K for 2 hrs (setter material TiB_2); density 2.40 g cm^{-3}; integrated over the range 1-15 μm; [Authors' designation: Sample No. 9].
3*	28	1963	1273	~0°		81 TiB_2, 19 H_3BO_3; sintered at 1573 K for 2 hrs (setter material TiB_2); density 2.25 g cm^{-3}; x-ray structure TiB_2; integrated over the range 1-15 μm; [Authors' designation: Sample No. 11].

DATA TABLE NO. 549 NORMAL TOTAL EMITTANCE OF [TiB_2 + H_3BO_3] POWDERS

[Temperature, T, K; Emittance, ϵ]

T	ϵ
CURVE 1*	
1273	0.83
CURVE 2*	
1023	0.84
CURVE 3*	
1273	0.89

*No plot given

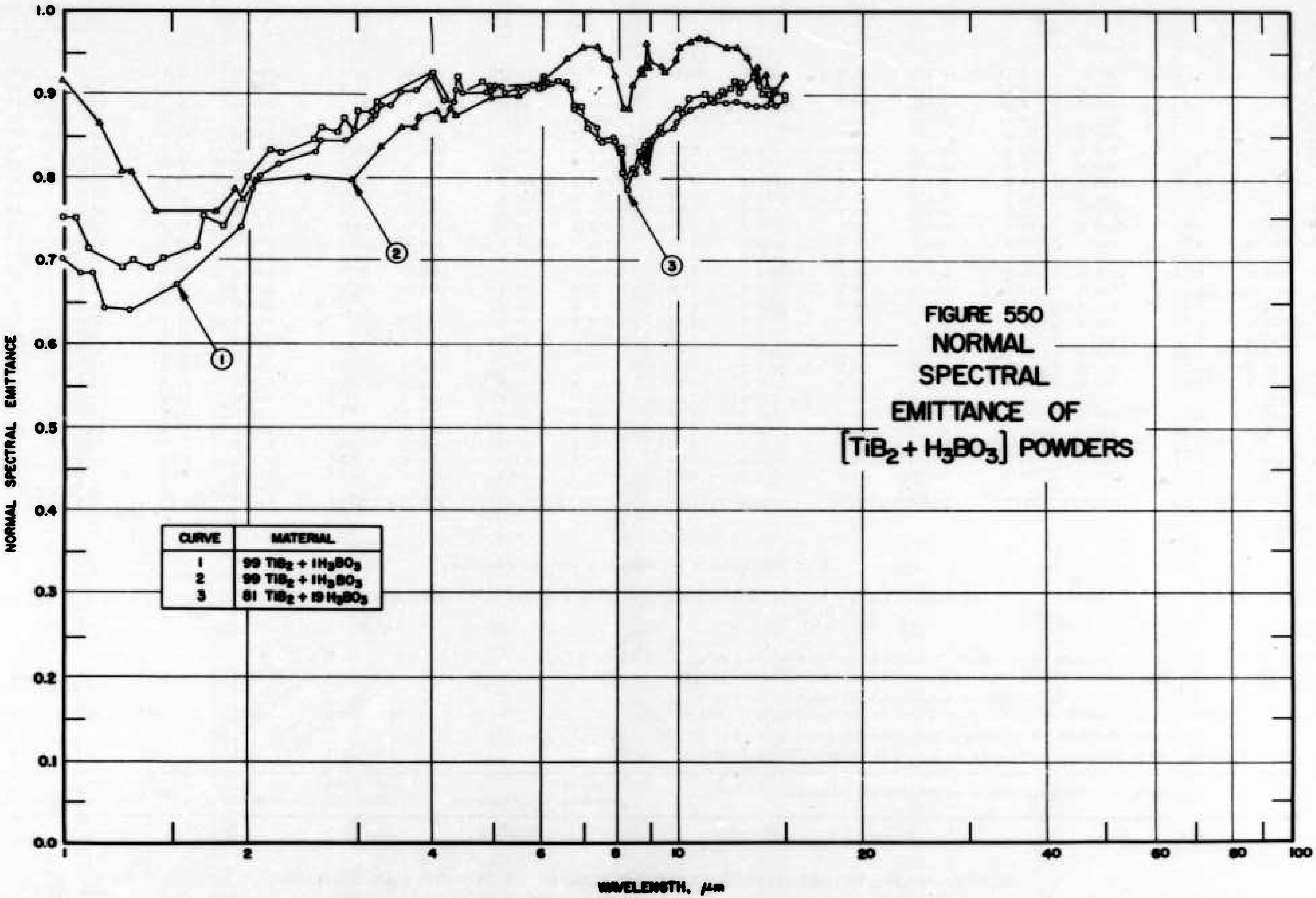


FIGURE 550
NORMAL
SPECTRAL
EMITTANCE OF
[$TiB_2 + H_3BO_3$] POWDERS

SPECIFICATION TABLE NO. 550 NORMAL SPECTRAL EMITTANCE OF [$TiB_2 + H_3BO_3$] POWDERS

Curve No.	Ref. No.	Year	Temperature K	Wavelength Range, μm	Geometry θ'	Reported Error, %	Composition (weight percent), Specifications, and Remarks
1	28	1963	1273	1.00-15.0	~0°		99 TiB_2, 1 H_3BO_3; sintered at 1573 K for 2 hrs (setter material TiB_2); density 2.66 g cm^{-3}; x-ray structure TiB_2; [Authors' designation: Sample No. 8].
2	28	1963	1023	1.00-15.0	~0°		99 TiB_2, 1 H_3BO_3; sintered at 1623 K for 2 hrs (setter material TiB_2); density 2.40 g cm^{-3}; [Authors' designation: Sample No. 9].
3	28	1963	1273	1.00-15.0	~0°		81 TiB_2, 19 H_3BO_3; sintered at 1573 K for 2 hrs (setter material TiB_2); density 2.25 g cm^{-3}; x-ray structure TiB_2; [Authors' designation: Sample No. 11].

DATA TABLE NO. 550 NORMAL SPECTRAL EMITTANCE OF [$TiB_2 + H_3BO_3$] POWDERS

[Wavelength, λ, μm; Emittance, ε; Temperature, T, K]

λ	ε	λ	ε	λ	ε	λ	ε	λ	ε	λ	ε	λ	ε	λ	ε
CURVE 1		CURVE 1 (cont.)		CURVE 1 (cont.)		CURVE 2 (cont.)		CURVE 2 (cont.)		CURVE 3 (cont.)		CURVE 3 (cont.)		CURVE 3 (cont.)	
T = 1273		4.99	0.903	12.0	0.893	4.05	0.880	10.0	0.956	1.11	0.712	5.94	0.908	11.2	0.896
1.00	0.700	5.06	0.910	12.5	0.893	4.15	0.871	10.3	0.956	1.24	0.690	6.05	0.920	11.6	0.898
1.07	0.683	5.17	0.910	12.9	0.901	4.27	0.885	10.5	0.963	1.31	0.699	6.12	0.913	11.7	0.906
1.12	0.683	5.24	0.902	13.5	0.902	4.36	0.875	10.5	0.956*	1.38	0.688	6.40	0.916	11.8	0.901
1.17	0.643	5.50	0.907	13.6	0.889	4.99	0.898	10.6	0.967*	1.46	0.701	6.69	0.906	12.2	0.908
1.28	0.640	6.06	0.909	14.0	0.889	5.50	0.899	11.2	0.967	1.65	0.714	6.77	0.885	12.4	0.917
1.53	0.670	6.12	0.917	14.4	0.888	6.01	0.918	12.0	0.958	1.79	0.751	6.97	0.885	12.5	0.917*
1.96	0.739	6.60	0.917	15.0	0.896	6.50	0.947	12.5	0.958	1.82	0.739	7.14	0.861	12.6	0.903
2.03	0.784	6.82	0.882			7.01	0.958	13.0	0.948	1.99	0.800	7.54	0.844	12.7	0.916
2.10	0.801	7.40	0.861	CURVE 2		7.40	0.959	13.3	0.942*	2.17	0.833	7.91	0.844	12.8	0.910
2.25	0.816	7.46	0.849	T = 1023		7.62	0.945	13.3	0.928	2.26	0.829	8.03	0.830	13.3	0.920
2.58	0.830	7.90	0.850			7.74	0.945	13.4	0.928*	2.56	0.847	8.08	0.835	13.6	0.911
2.63	0.844	8.15	0.829	1.00	0.916	7.90	0.923	13.5	0.935	2.63	0.861	8.14	0.804	13.7	0.901
2.88	0.846	8.23	0.801	1.14	0.867	8.01	0.923*	13.6	0.919	2.80	0.854	8.20	0.802*	14.1	0.901
3.17	0.871	8.38	0.799*	1.25	0.805	8.16	0.884	13.6	0.926*	2.88	0.871	8.29	0.785	14.2	0.890
3.22	0.875	8.44	0.812	1.29	0.805	8.31	0.884	13.9	0.926	2.96	0.858	8.71	0.830	14.4	0.902
3.29	0.887	8.51	0.804	1.42	0.758	8.44	0.913	14.0	0.910	3.02	0.880	8.78	0.826	15.0	0.900
3.42	0.888	8.83	0.837	1.77	0.758	8.70	0.932	14.4	0.906	3.19	0.880	8.87	0.839		
3.56	0.902	8.91	0.809	1.91	0.787	8.77	0.925	14.7	0.907*	3.24	0.892	8.91	0.816		
3.74	0.905	9.05	0.846	1.97	0.771	8.85	0.934	14.8	0.917*	3.99	0.924	8.99	0.845		
3.98	0.921	9.42	0.854	2.06	0.795	8.89	0.961	14.9	0.910*	4.27	0.882*	9.33	0.855		
4.18	0.893	9.85	0.861	2.50	0.799	8.98	0.932	15.0	0.925	4.39	0.921	9.36	0.862		
4.32	0.891	9.92	0.869	2.94	0.798	9.01	0.941			4.47	0.901*	9.78	0.859*		
4.37	0.907	10.5	0.883	3.28	0.839	9.41	0.936	CURVE 3		4.81	0.916	10.0	0.882		
4.45	0.900	11.0	0.890	3.54	0.861	9.56	0.928	T = 1273		5.00	0.908	10.2	0.880		
4.89	0.903	11.4	0.892	3.71	0.861	9.90	0.945			5.80	0.911	10.4	0.897		
4.96	0.911	11.5	0.888*	3.79	0.873	10.0	0.945*	1.00	0.750	5.85	0.913*	11.1	0.900		
								1.05	0.749						

*Not shown on plot

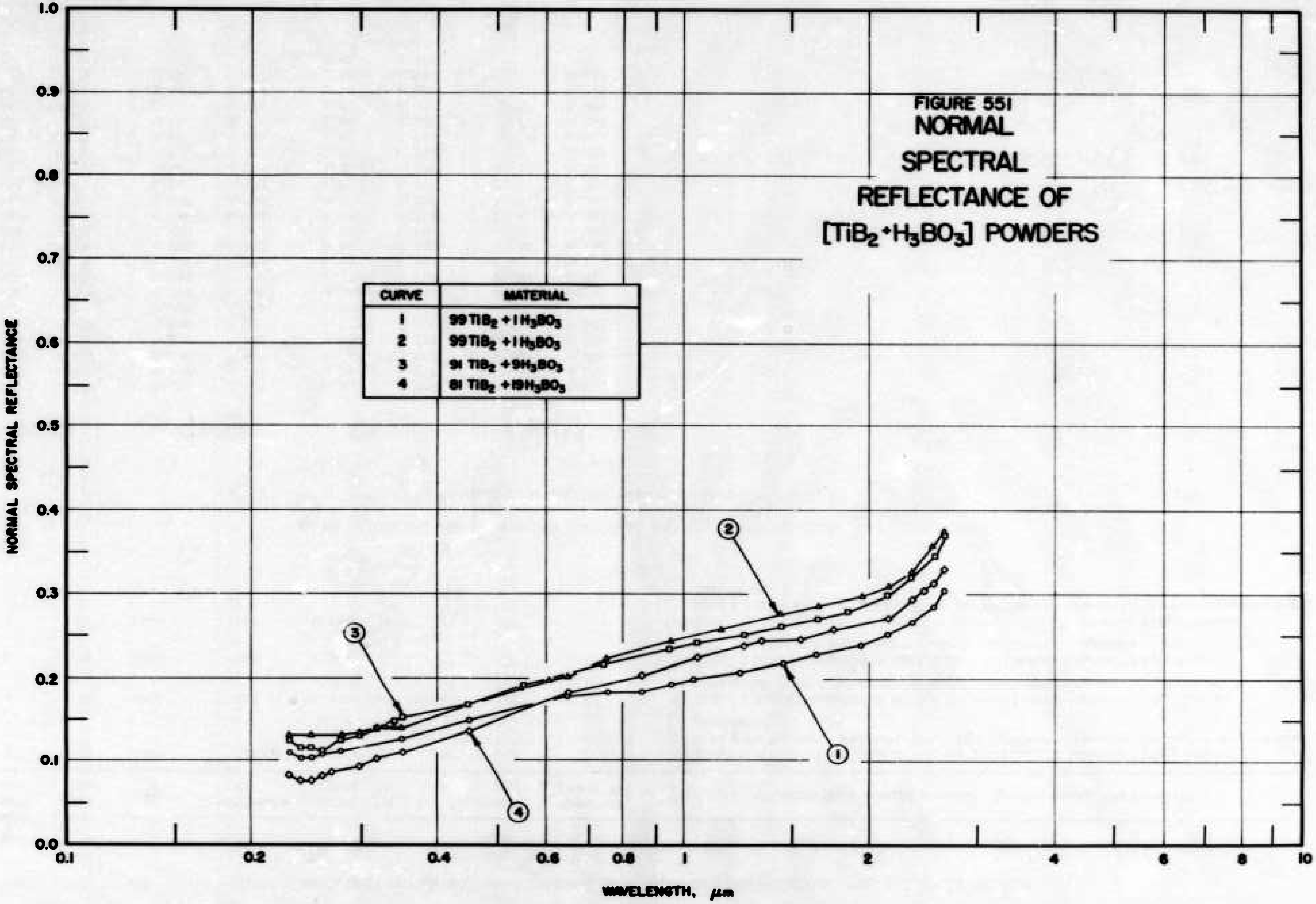


FIGURE 551
NORMAL
SPECTRAL
REFLECTANCE OF
[TiB_2+H_3BO_3] POWDERS
CURVE
MATERIAL
1
99 TiB_2 + 1 H_3BO_3
2
99 TiB_2 + 1 H_3BO_3
3
91 TiB_2 + 9 H_3BO_3
4
81 TiB_2 + 19 H_3BO_3
NORMAL SPECTRAL REFLECTANCE
WAVELENGTH, μm
1.0
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0.0
0.1
0.2
0.4
0.6
0.8
1
2
4
6
8
10

SPECIFICATION TABLE NO. 551 NORMAL SPECTRAL REFLECTANCE OF [$TiB_2 + H_3BO_3$] POWDERS

Curve No.	Ref. No.	Year	Temperature K	Wavelength Range, μm	Geometry θ	θ'	ω'	Reported Error, %	Composition (weight percent), Specifications, and Remarks
1	28	1963	298	0.230-2.65	~0°		2π		99 TiB_2, 1 H_3BO_3; sintered at 1573 K for 2 hrs (setter material TiB_2); density 2.66 g cm^{-3}; x-ray structure TiB_2; MgO reference standard; [Authors' designation: Sample No. 8].
2	28	1963	298	0.230-2.65	~0°		2π		99 TiB_2, 1 H_3BO_3; sintered at 1623 K for 2 hrs (setter material TiB_2); density 2.40 g cm^{-3}; MgO reference standard; [Authors' designation: Sample No. 9].
3	28	1963	298	0.230-2.65	~0°		2π		91 TiB_2, 9 H_3BO_3; sintered at 1973 K for 1 hr (setter material TiB_2); density 2.20 g cm^{-3}; MgO reference standard; [Authors' designation: Sample No. 10].
4	28	1963	298	0.230-2.65	~0°		2π		81 TiB_2, 19 H_3BO_3; sintered at 1573 K for 2 hrs (setter material TiB_2); density 2.25 g cm^{-3}; x-ray structure TiB_2; MgO reference standard; [Authors' designation: Sample No. 11].

DATA TABLE NO. 551 NORMAL SPECTRAL REFLECTANCE OF [$TiB_2 + H_3BO_3$] POWDERS

[Wavelength, λ, μm; Reflectance, ρ; Temperature, T, K]

λ	ρ	λ	ρ	λ	ρ	λ	ρ
CURVE 1 T = 298		CURVE 2 T = 298		CURVE 3 T = 298		CURVE 4 T = 298	
0.230	0.110	0.230	0.131	0.230	0.126	0.230	0.084
0.240	0.102	0.250	0.131	0.240	0.117	0.240	0.076
0.250	0.102	0.280	0.131	0.250	0.117	0.250	0.076
0.260	0.109	0.299	0.133	0.260	0.123	0.260	0.080
0.279	0.111	0.320	0.140	0.279	0.126	0.270	0.065
0.350	0.128	0.330	0.140	0.299	0.132	0.299	0.092
0.451	0.150	0.340	0.140	0.320	0.140	0.319	0.102
0.649	0.179	0.350	0.140	0.340	0.148	0.350	0.110
0.751	0.183	0.547	0.189	0.350	0.152	0.450	0.136
0.852	0.184	0.602	0.199	0.448	0.169	0.650	0.184
0.952	0.195	0.650	0.201	0.550	0.192	0.851	0.205
1.05	0.200	0.749	0.223	0.749	0.217	1.05	0.224
1.25	0.209	0.950	0.245	0.947	0.235	1.25	0.237
1.45	0.219	1.15	0.259	1.05	0.241	1.35	0.243
1.64	0.228	1.44	0.278	1.25	0.252	1.55	0.245
1.94	0.239	1.65	0.287	1.44	0.262	1.75	0.259
2.14	0.251	1.95	0.298	1.65	0.272	2.15	0.271
2.34	0.267	2.15	0.310	1.85	0.280	2.35	0.295
2.54	0.286	2.35	0.329	2.14	0.300	2.45	0.305
2.65	0.305	2.54	0.359	2.35	0.320	2.55	0.315
		2.65	0.377	2.55	0.346	2.65	0.330
				2.65	0.371		

SPECIFICATION TABLE NO. 552 NORMAL TOTAL EMITTANCE OF [$MoSi_2$ + MoO_3] POWDERS

Curve No.	Ref. No.	Year	Temperature Range, K	Geometry θ'	Reported Error, %	Composition (weight percent), Specifications and Remarks
1*	28	1963	1273	~0°		99 $MoSi_2$, 1 MoO_3; sintered at 1723 K for 2 hrs (setter material $MoSi_2$); density 4.90 g cm^{-3}; integrated over the range 1-15 μm; [Authors' designation: Sample No. 19].
2*	28	1963	1273	~0°		90 $MoSi_2$, 10 MoO_3; sintered at 1723 K for 2 hrs (setter material $MoSi_2$); density 3.03 g cm^{-3}; x-ray structure $MoSi_2$ + MoO_3; integrated over the range 1-15 μm; [Authors' designation: Sample No. 20].
3*	28	1963	1273	~0°		76 $MoSi_2$, 24 MoO_3; sintered at 1723 K for 2 hrs (setter material $MoSi_2$); density 4.78 g cm^{-3}; x-ray structure $MoSi_2$ + MoO_3; integrated over the range 1-15 μm; [Authors' designation: Sample No. 21].

DATA TABLE NO. 552 NORMAL TOTAL EMITTANCE OF [$MoSi_2$ + MoO_3] POWDERS

[Temperature, T, K; Emittance, ϵ]

T	ϵ
CURVE 1*	
1273	0.81
CURVE 2*	
1273	0.91
CURVE 3*	
1273	0.82

*No plot given

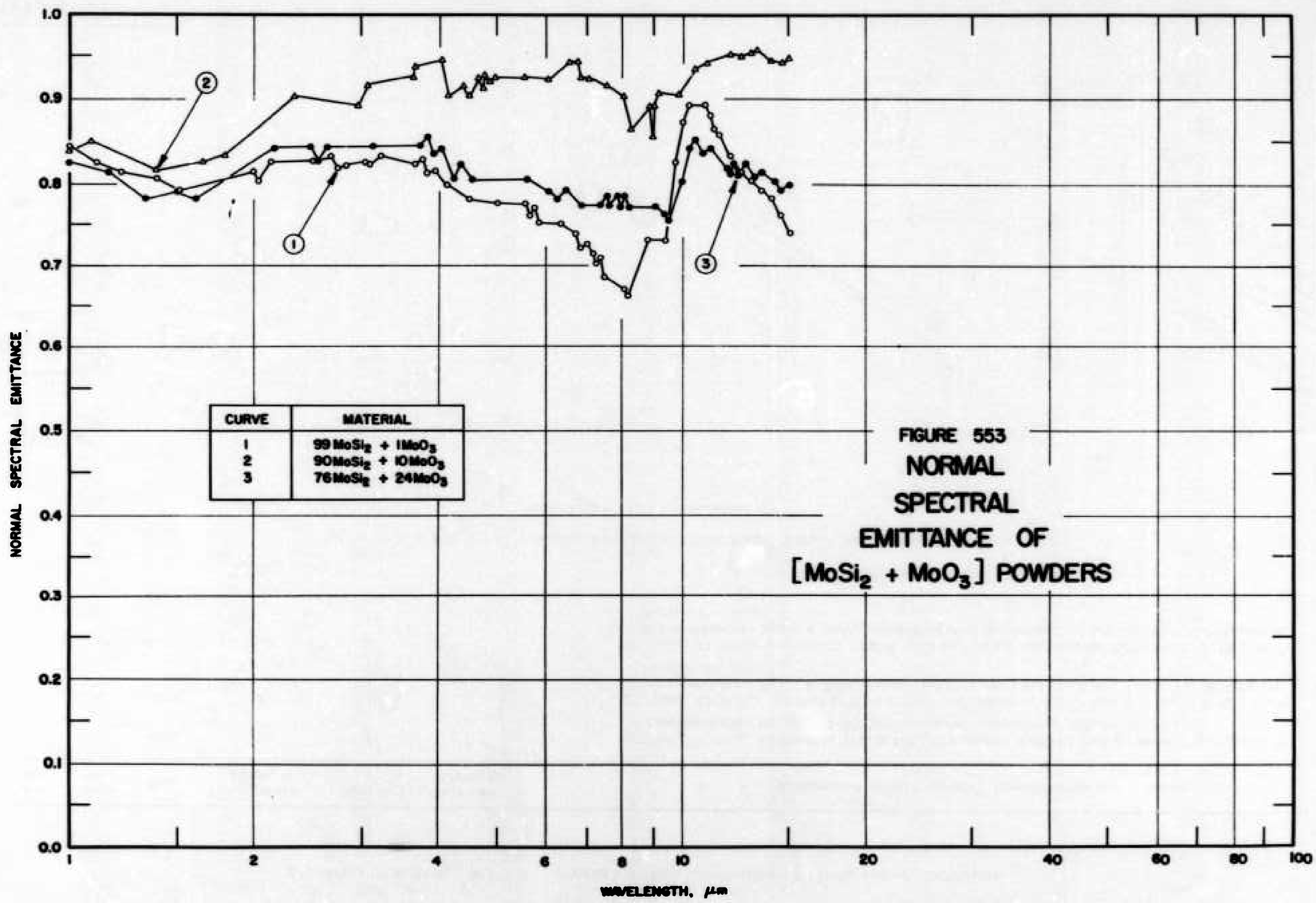


FIGURE 553 NORMAL SPECTRAL EMITTANCE OF [$MoSi_2$ + MoO_3] POWDERS

SPECIFICATION TABLE NO. 553 NORMAL SPECTRAL EMITTANCE OF [$MoSi_2$ + MoO_3] POWDERS

Curve No.	Ref. No.	Year	Temperature K	Wavelength Range, μm	Geometry θ'	Reported Error, %	Composition (weight percent), Specifications, and Remarks
1	28	1963	1273	1.00-15.0	~0°		99 $MoSi_2$, 1 MoO_3; sintered at 1723 K for 2 hrs (setter material $MoSi_2$); density 4.90 g cm^{-3}; [Authors' designation: Sample No. 19].
2	28	1963	1273	1.00-15.0	~0°		90 $MoSi_2$, 10 MoO_3; sintered at 1723 K for 2 hrs (setter material $MoSi_2$); density 3.03 g cm^{-3}; x-ray structure $MoSi_2$ + MoO_3; [Authors' designation: Sample No. 20].
3	28	1963	1273	1.00-15.0	~0°		76 $MoSi_2$, 24 MoO_3; sintered at 1723 K for 2 hrs (setter material $MoSi_2$); density 4.78 g cm^{-3}; x-ray structure $MoSi_2$ + MoO_3; [Authors' designation: Sample No. 21].

DATA TABLE NO. 553 NORMAL SPECTRAL EMITTANCE OF [$MoSi_2$ + MoO_3] POWDERS

[Wavelength, λ, μm; Emittance, ∈; Temperature, T, K]

λ	∈
CURVE 1	**T = 1273**
1.00	0.845
1.11	0.826
1.23	0.814
1.39	0.809
1.52	0.794
2.00	0.815
2.04	0.805
2.13	0.827
2.50	0.829
2.68	0.834
2.72	0.820
2.76	0.823*
2.83	0.823
3.02	0.829
3.10	0.826
3.21	0.834
3.69	0.824
3.79	0.830
3.84	0.813
3.99	0.819
4.13	0.800
4.50	0.781
5.00	0.777
5.55	0.777
5.66	0.763
5.76	0.771
CURVE 1 (cont.)	
5.85	0.755
6.37	0.752
6.70	0.740
6.84	0.721
7.00	0.728
7.15	0.716
7.27	0.702
7.38	0.710
7.49	0.687
7.69	0.687
7.77	0.672*
8.09	0.672
8.19	0.664
8.80	0.732
9.39	0.731
9.79	0.827
10.0	0.875
10.1	0.875*
10.2	0.896
10.8	0.896
10.9	0.882*
11.1	0.882
11.2	0.867
11.5	0.860
12.0	0.834
12.5	0.815
13.0	0.806
CURVE 1 (cont.)	
13.5	0.793
14.0	0.782
14.5	0.752
15.0	0.740
CURVE 2	**T = 1273**
1.00	0.840
1.08	0.851
1.38	0.818
1.65	0.827
1.80	0.834
2.32	0.903
2.98	0.895
3.09	0.919
3.64	0.927
3.68	0.940
4.07	0.949
4.17	0.909
4.40	0.919
4.50	0.907
4.66	0.928
4.72	0.914
4.78	0.930
4.89	0.921
4.99	0.927
CURVE 2 (cont.)	
5.51	0.927
6.01	0.926
6.51	0.943
6.76	0.943
6.85	0.928
7.08	0.928
7.52	0.919
8.01	0.903
8.25	0.867
8.88	0.892
8.92	0.858
9.00	0.894
9.11	0.910
9.23	0.903*
9.86	0.909
9.99	0.924*
10.5	0.937
11.0	0.944
12.0	0.952
12.5	0.951
13.0	0.955
13.3	0.958
13.4	0.945*
14.0	0.946*
14.2	0.944*
14.6	0.944
14.7	0.947*
15.0	0.950
CURVE 3	**T = 1273**
1.00	0.825
1.16	0.814
1.33	0.782
1.50	0.791
1.61	0.782
2.17	0.842
2.49	0.844
2.54	0.827
2.62	0.843
2.83	0.829
3.12	0.849
3.75	0.849
3.84	0.857
3.93	0.839
4.06	0.841
4.25	0.807
4.35	0.822
4.53	0.807
5.60	0.808
6.01	0.791
6.26	0.783
6.49	0.795
6.84	0.776
7.38	0.776
7.53	0.787
7.60	0.775
CURVE 3 (cont.)	
7.67	0.789*
7.88	0.789
7.94	0.773
8.05	0.789
8.20	0.772
9.01	0.772
9.32	0.763
9.45	0.757
10.0	0.804
10.0	0.823*
10.3	0.845
10.5	0.852
10.8	0.836
11.1	0.841
11.2	0.830*
11.5	0.824*
11.8	0.820
12.0	0.815
12.1	0.823
12.4	0.811
12.7	0.824
12.8	0.814*
13.1	0.810
13.2	0.815*
13.5	0.815
13.7	0.806*
14.3	0.803
CURVE 3 (cont.)	
14.5	0.793
14.8	0.793*
15.0	0.800

*Not shown on plot

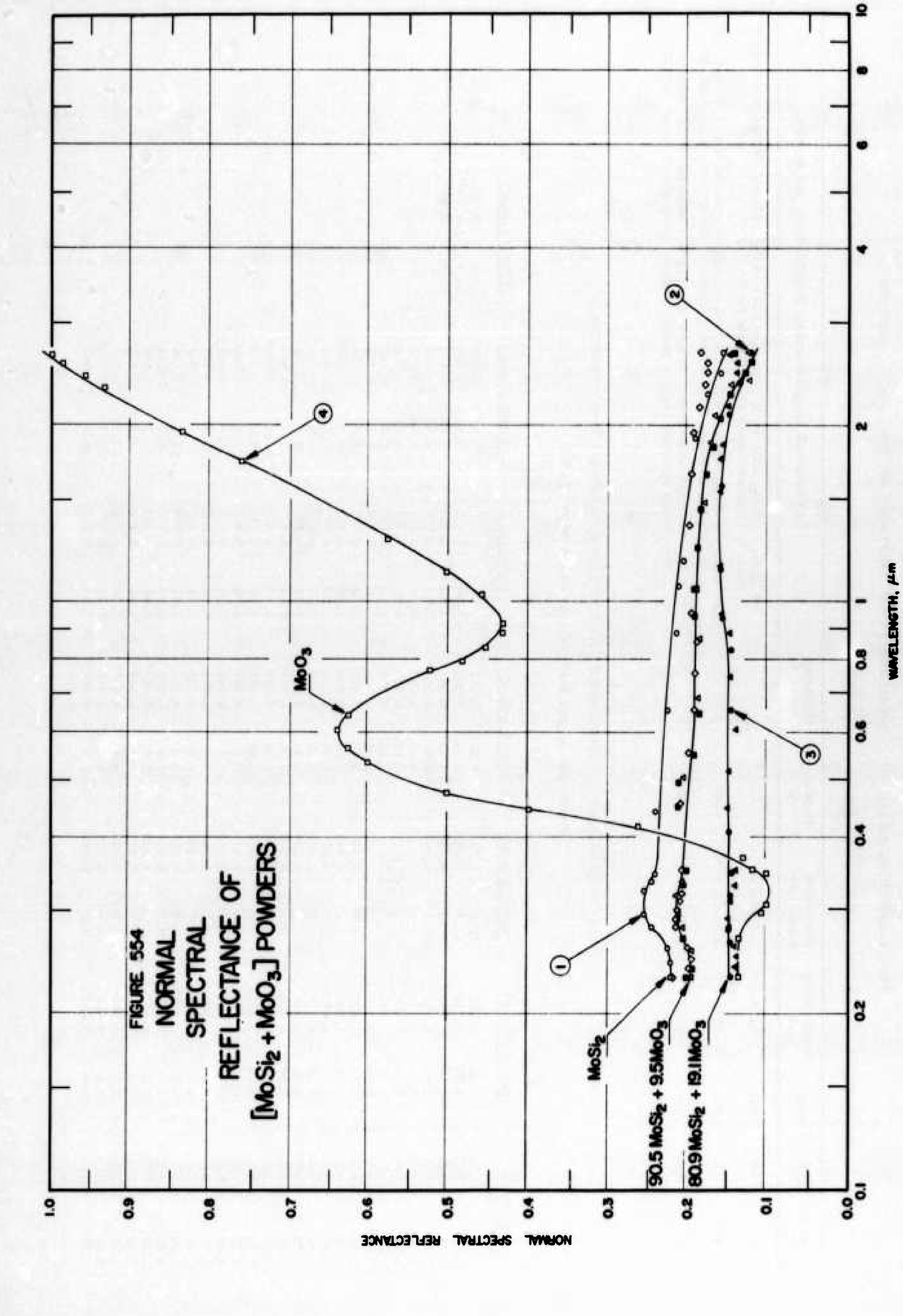


FIGURE 554 NORMAL SPECTRAL REFLECTANCE OF [$MoSi_2 + MoO_3$] POWDERS

SPECIFICATION TABLE NO. 554 NORMAL SPECTRAL REFLECTANCE OF [$MoSi_2$ + MoO_3] POWDERS

Curve No.	Ref. No.	Year	Temperature K	Wavelength Range, μm	Geometry θ θ'	ω'	Reported Error, %	Composition (weight percent), Specifications, and Remarks
1	393	1966	~298	0.230-2.65	~0°	2π		$MoSi_2$; cold pressed and sintered at 1623 K for 2 hrs; 2 or 3 wt. percent polyvinyl binder; data extracted from smooth curve; MgO reference standard.
2	393	1966	~298	0.230-2.65	~0°	2π		90.49 $MoSi_2$, 9.51 MoO_3; cold pressed and sintered at 1723 K for 2 hrs; 2 or 3 wt. percent polyvinyl binder; data extracted from smooth curve; MgO reference standard.
3	393	1966	~298	0.230-2.65	~0°	2π		80.87 MoSi, 19.13 MoO_3; cold pressed and sintered at 1723 K for 2 hrs; 2 or 3 wt. percent polyvinyl binder; data extracted from smooth curve; MgO reference standard.
4	393	1966	~298	0.230-2.65	~0°	2π		MoO_3; cold pressed and sintered at 1723 K for 2 hrs; 2 or 3 wt. percent polyvinyl binder; data extracted from smooth curve; MgO reference standard.

DATA TABLE NO. 554 NORMAL SPECTRAL REFLECTANCE OF [$MoSi_2$ + MoO_3] POWDERS

[Wavelength, λ, μm; Reflectance, ρ; Temperature, T, K]

λ	ρ	λ	ρ	λ	ρ	λ	ρ	λ	ρ
CURVE 1 T ~ 298		CURVE 2 T ~ 298		CURVE 3 T ~ 298		CURVE 4 T ~ 298		CURVE 4 (cont.)	
								1.13	0.501
0.230	0.220	0.230	0.193	0.230	0.142	0.230	0.133	1.28	0.577
0.243	0.220	0.254	0.193	0.262	0.142	0.269	0.133	1.74	0.761
0.257	0.223	0.280	0.202	0.277	0.146	0.296	0.108	1.95	0.836
0.280	0.244	0.298	0.210	0.319	0.144	0.303	0.100	2.31	0.931
0.294	0.252	0.319	0.213	0.346	0.141	0.345	0.100	2.42	0.958
0.321	0.252	0.333	0.205	0.408	0.146	0.350	0.117	2.54	0.989
0.335	0.243	0.501	0.201	0.653	0.141	0.368	0.128	2.65	1.02
0.341	0.244	0.682	0.186	0.825	0.141	0.414	0.261		
0.344	0.240	0.865	0.182	0.935	0.152	0.444	0.400		
0.651	0.225	1.05	0.189	1.14	0.156	0.472	0.501		
0.886	0.212	1.47	0.178	1.57	0.156	0.532	0.600		
1.06	0.210	1.86	0.170	2.09	0.146	0.561	0.627		
1.17	0.203	2.08	0.162	2.35	0.131	0.604	0.640		
1.47	0.203	2.32	0.141	2.65	0.121	0.641	0.627		
1.90	0.190	2.39	0.128			0.762	0.521		
2.26	0.172	2.65	0.121			0.798	0.484		
2.44	0.158					0.834	0.454		
2.65	0.153					0.888	0.435		
						0.919	0.435		
						1.03	0.460		

SPECIFICATION TABLE NO. 555 NORMAL TOTAL EMITTANCE OF [$MoSi_2$ + SiO_2] POWDERS

Curve No.	Ref. No.	Year	Temperature Range, K	Geometry θ'	Reported Error, %	Composition (weight percent), Specifications and Remarks
1*	28	1963	1273	~0°		99.6 $MoSi_2$, 0.4 SiO_2; sintered at 1623 K for 2 hrs (setter material $MoSi_2$); density 4.64 g cm^{-3}; x-ray structure $MoSi_2$ + SiO_2; integrated over the range 1-15 μm; [Authors' designation: Sample No. 14].
2*	28	1963	1273	~0°		96 $MoSi_2$, 4 SiO_2; sintered at 1623 K for 2 hrs (setter material $MoSi_2$); density 4.34 g cm^{-3}; x-ray structure $MoSi_2$ + SiO_2; integrated over the range 1-15 μm; [Authors' designation: Sample No. 15].
3*	28	1963	1273	~0°		88 $MoSi_2$, 12 SiO_2; sintered at 1623 K for 2 hrs (setter material $MoSi_2$); density 4.25 g cm^{-3}; integrated over the range 1-15 μm; [Authors' designation: Sample No. 16].
4*	28	1963	1273	~0°		72 $MoSi_2$, 28 SiO_2; sintered at 1623 K for 2 hrs (setter material $MoSi_2$); density 2.83 g cm^{-3}; x-ray structure $MoSi_2$ + SiO_2; integrated over the range 1-15 μm; [Authors' designation: Sample No. 17].
5*	28	1963	1273	~0°		54 SiO_2, 46 $MoSi_2$; sintered at 1623 K for 2 hrs (setter material $MoSi_2$); density 2.03 g cm^{-3}; integrated over the range 1-15 μm; [Authors' designation: Sample No. 18].

DATA TABLE NO. 555 NORMAL TOTAL EMITTANCE OF [$MoSi_2$ + SiO_2] POWDERS

[Temperature, T, K; Emittance, ϵ]

T	ϵ
CURVE 1*	
1273	0.76
CURVE 2*	
1273	0.88
CURVE 3*	
1273	0.76
CURVE 4*	
1273	0.91
CURVE 5*	
1273	0.88

*No plot given

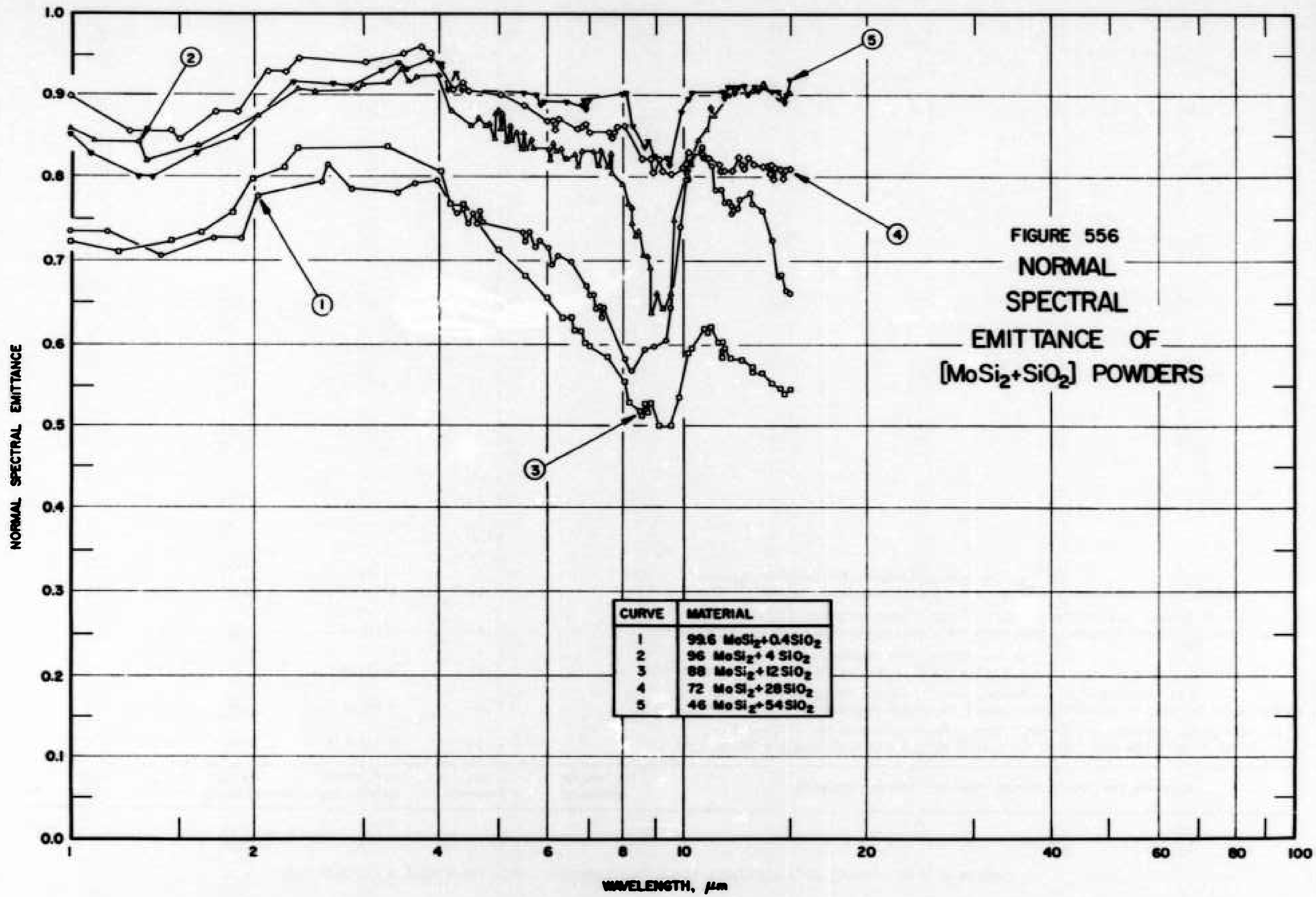


FIGURE 556 NORMAL SPECTRAL EMITTANCE OF $[MoSi_2+SiO_2]$ POWDERS

SPECIFICATION TABLE NO. 556 NORMAL SPECTRAL EMITTANCE OF [$MoSi_2$ + SiO_2] POWDERS

Curve No.	Ref. No.	Year	Temperature K	Wavelength Range, μm	Geometry θ'	Reported Error, %	Composition (weight percent), Specifications, and Remarks
1	28	1963	1273	1.00-15.0	~0°		99.6 $MoSi_2$, 0.4 SiO_2; sintered at 1623 K for 2 hrs (setter material $MoSi_2$); density 4.64 g cm^{-3}; x-ray structure $MoSi_2$ + SiO_2; [Authors' designation: Sample No. 14].
2	28	1963	1273	1.00-15.0	~0°		96 $MoSi_2$, 4 SiO_2; sintered at 1623 K for 2 hrs (setter material $MoSi_2$); density 4.34 g cm^{-3}; x-ray structure $MoSi_2$ + SiO_2; [Authors' designation: Sample No. 15].
3	28	1963	1273	1.00-15.0	~0°		88 $MoSi_2$, 12 SiO_2; sintered at 1623 K for 2 hrs (setter material $MoSi_2$); density 4.25 g cm^{-3}; [Authors' designation: Sample No. 16].
4	28	1963	1273	1.00-15.0	~0°		72 $MoSi_2$, 28 SiO_2; sintered at 1623 K for 2 hrs (setter material $MoSi_2$); density 2.83 g cm^{-3}; x-ray structure $MoSi_2$ + SiO_2; [Authors' designation: Sample No. 17].
5	28	1963	1273	1.00-15.0	~0°		54 SiO_2, 46 $MoSi_2$; sintered at 1623 K for 2 hrs (setter material $MoSi_2$); density 2.03 g cm^{-3}; [Authors' designation: Sample No. 18].

DATA TABLE NO. 556 NORMAL SPECTRAL EMITTANCE OF [$MoSi_2$ + SiO_2] POWDERS

[Wavelength, λ, μm; Emittance, ε; Temperature, T, K]

CURVE 1
T = 1273

λ	ε
1.00	0.735
1.15	0.735
1.42	0.704
1.73	0.726
1.90	0.726
2.02	0.777
2.58	0.793
2.64	0.814
2.89	0.786
3.42	0.780
3.65	0.792
3.97	0.795
4.28	0.757
4.39	0.762
4.47	0.745
4.53	0.756
4.60	0.745
4.65	0.759
4.71	0.746
5.48	0.733
5.53	0.722
5.62	0.733
5.75	0.715
5.84	0.724
6.01	0.716
6.10	0.696
6.21	0.707
6.59	0.698
6.97	0.669
7.04	0.658
7.15	0.658
7.21	0.644
7.32	0.646
7.37	0.633
7.41	0.644
8.01	0.584
8.24	0.569
8.69	0.596
8.95	0.599
9.33	0.606
9.52	0.644
9.88	0.740
10.1	0.798
10.2	0.799

CURVE 1 (cont.)

λ	ε
10.3	0.819
10.7	0.836
10.8	0.823
11.2	0.813
11.3	0.785
11.6	0.785
11.8	0.770
11.9	0.770
12.0	0.757
12.1	0.768
12.2	0.761
12.3	0.763
12.4	0.776
12.9	0.781
13.0	0.769
13.5	0.760
14.0	0.725
14.4	0.683
14.6	0.683
14.7	0.665
15.0	0.660

CURVE 2
T = 1273

λ	ε
1.00	0.860
1.09	0.845
1.29	0.841
1.37	0.820
1.62	0.838
2.02	0.876
2.36	0.908
2.51	0.904
2.94	0.908
3.00	0.914
3.30	0.916
3.46	0.934
3.57	0.918
3.66	0.923
4.00	0.924
4.20	0.881
5.00	0.881
4.50	0.863
4.64	0.873
4.77	0.863

CURVE 2 (cont.)

λ	ε
4.83	0.868
4.91	0.849
4.98	0.871
5.02	0.859
5.07	0.878
5.14	0.843
5.22	0.863
5.27	0.847
5.35	0.855
5.45	0.833
5.50	0.855
5.56	0.833
5.63	0.847
5.70	0.833
6.01	0.832
6.07	0.821
6.12	0.841
6.20	0.831
6.49	0.835
6.54	0.824
6.68	0.828
6.76	0.814
7.17	0.831
7.29	0.815
7.37	0.832
7.54	0.813
7.61	0.829
7.66	0.804
8.00	0.791
8.12	0.768
8.21	0.746
8.24	0.767
8.37	0.730
8.45	0.737
8.60	0.707
8.75	0.707
8.77	0.691
8.86	0.691
8.90	0.637
9.06	0.660
9.28	0.647
9.52	0.660
9.75	0.749
10.1	0.806
10.3	0.818
13.4	0.829

CURVE 2 (cont.)

λ	ε
10.6	0.845
11.0	0.859
11.1	0.886
11.2	0.876
11.8	0.900
13.0	0.906
13.5	0.911
14.0	0.905
14.5	0.898
14.8	0.882
15.0	0.901

CURVE 3
T = 1273

λ	ε
1.00	0.721
1.20	0.710
1.46	0.722
1.47	0.708
1.64	0.734
1.84	0.759
1.98	0.798
2.24	0.811
2.36	0.833
3.30	0.833
4.01	0.807
4.17	0.768
4.38	0.768
5.00	0.712
5.51	0.681
6.00	0.655
6.39	0.632
6.56	0.632
6.67	0.618
6.81	0.618
6.91	0.601
7.05	0.597
7.51	0.586
8.01	0.556
8.17	0.529
8.50	0.518
8.59	0.511
8.68	0.526
8.75	0.515
8.85	0.527

CURVE 3 (cont.)

λ	ε
9.10	0.500
9.53	0.500
9.85	0.535
10.2	0.591
10.3	0.598
10.9	0.620
11.0	0.616
11.1	0.623
11.5	0.603
11.6	0.603
11.6	0.586
11.7	0.596
12.0	0.585
12.5	0.583
13.0	0.574
13.0	0.569
13.5	0.569
14.0	0.553
14.5	0.547
14.7	0.540
15.0	0.546

CURVE 4
T = 1273

λ	ε
1.00	0.900
1.25	0.856
1.46	0.856
1.51	0.847
1.74	0.880
1.87	0.880
2.10	0.930
2.25	0.930
2.36	0.947
3.01	0.941
3.50	0.954
3.74	0.960
3.89	0.952
6.02	0.962
4.22	0.906
4.37	0.916
4.48	0.905
5.01	0.900
5.50	0.889
6.00	0.869
6.12	0.869

CURVE 4 (cont.)

λ	ε
6.19	0.856
6.27	0.871
6.77	0.860
6.85	0.861
6.94	0.866
7.01	0.852
7.59	0.855
7.66	0.849
7.73	0.857
8.07	0.862
8.59	0.822
8.88	0.822
8.93	0.808
9.11	0.822
9.22	0.806
9.57	0.802
10.0	0.861
10.1	0.868
10.2	0.880
10.7	0.878
10.8	0.873
11.0	0.873
11.5	0.865
11.6	0.856
11.7	0.858
12.2	0.859
12.4	0.865
12.5	0.865
12.7	0.861
12.7	0.873
13.1	0.867
13.1	0.862
13.8	0.861
13.9	0.854
14.0	0.865
14.1	0.849
14.3	0.861
14.5	0.860
14.6	0.849
14.7	0.859
15.0	0.860

CURVE 5
T = 1273

λ	ε
1.00	0.851
1.18	0.828
1.29	0.800
1.36	0.800
1.61	0.829
1.87	0.847
2.31	0.916
2.69	0.913
2.89	0.911
3.24	0.931
3.43	0.941
3.53	0.934
3.89	0.948
4.04	0.940
4.16	0.907
4.28	0.929
4.37	0.905
5.50	0.904
5.78	0.900
5.85	0.889
5.96	0.893
6.48	0.893
6.84	0.889
6.91	0.897
6.98	0.883
7.04	0.897
8.00	0.902
8.09	0.902
8.29	0.864
8.67	0.836
8.78	0.843
9.00	0.823
9.42	0.823
9.50	0.815
9.97	0.880
10.2	0.898
10.7	0.904
11.6	0.904
11.7	0.897
11.8	0.911
12.1	0.911
12.2	0.902
12.4	0.911
12.7	0.913

CURVE 5 (cont.)

λ	ε
12.8	0.900
13.2	0.912
13.4	0.905
13.5	0.912
14.0	0.905
14.5	0.905
14.7	0.894
14.9	0.902
15.0	0.920

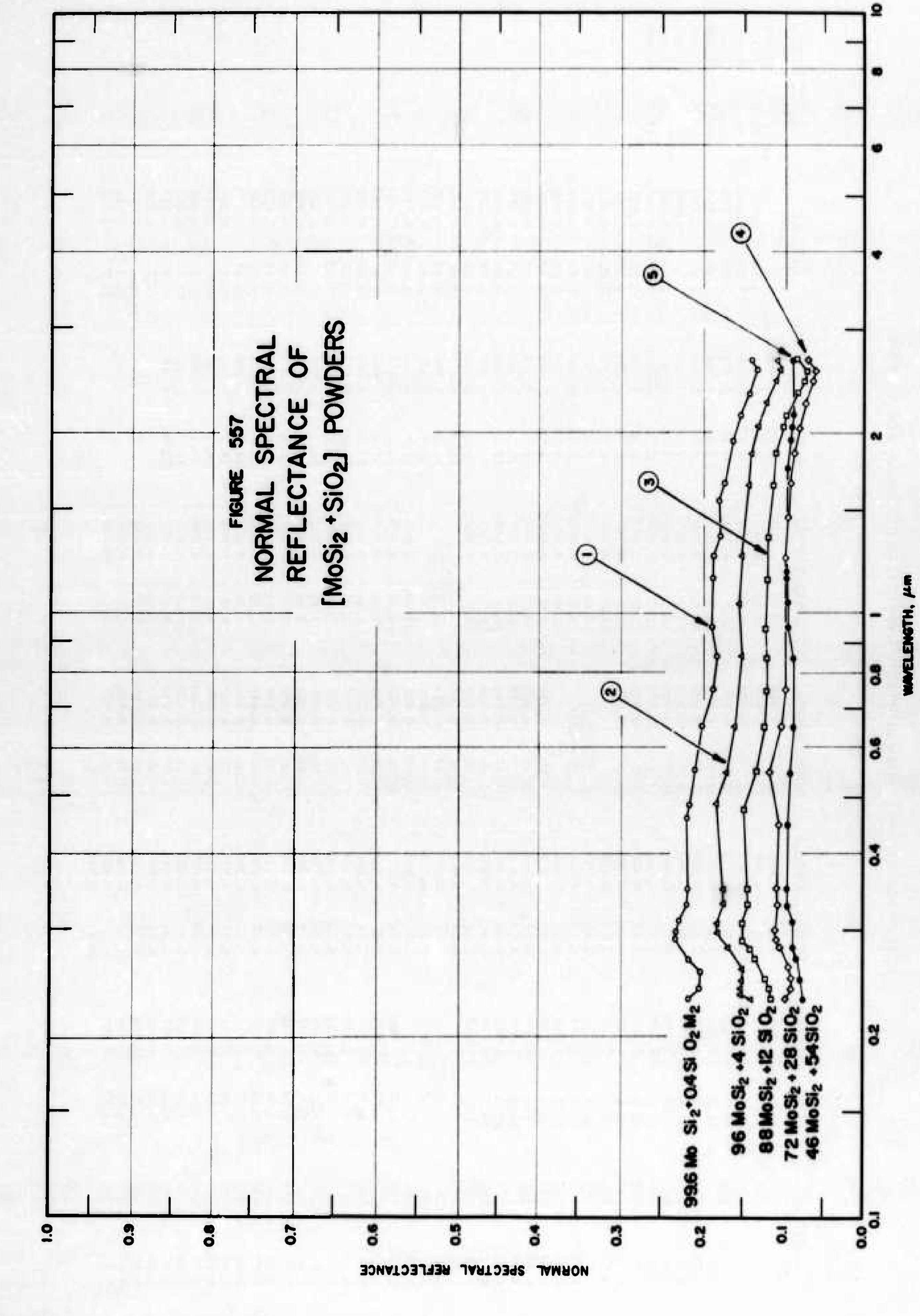


FIGURE 557
NORMAL SPECTRAL REFLECTANCE OF $[MoSi_2 + SiO_2]$ POWDERS

SPECIFICATION TABLE NO. 557 NORMAL SPECTRAL REFLECTANCE OF [$MoSi_2$ + SiO_2] POWDERS

Curve No.	Ref. No.	Year	Temperature K	Wavelength Range, μm	Geometry θ	θ'	ω'	Reported Error, %	Composition (weight percent), Specifications, and Remarks
1	28	1963	298	0.230-2.65	~0°		2π		99.6 $MoSi_2$, 0.4 SiO_2; sintered at 1623 K for 2 hrs (setter material $MoSi_2$); density 4.64 g cm^{-3}; x-ray structure $MoSi_2$ + SiO_2; MgO reference standard; [Authors' designation: Sample No. 14].
2	28	1963	298	0.230-2.65	~0°		2π		96 $MoSi_2$, 4 SiO_2; sintered at 1623 K for 2 hrs (setter material $MoSi_2$); density 4.34 g cm^{-3}; x-ray structure $MoSi_2$ + SiO_2; MgO reference standard; [Authors' designation: Sample No. 15].
3	28	1963	298	0.230-2.65	~0°		2π		88 $MoSi_2$, 12 SiO_2; sintered at 1623 K for 2 hrs (setter material $MoSi_2$); density 4.25 g cm^{-3}; MgO reference standard; [Authors' designation: Sample No. 16].
4	28	1963	298	0.230-2.65	~0°		2π		72 $MoSi_2$, 28 SiO_2; sintered at 1623 K for 2 hrs (setter material $MoSi_2$); density 2.83 g cm^{-3}; x-ray structure $MoSi_2$ + SiO_2; MgO reference standard; [Authors' designation: Sample No. 17].
5	28	1963	298	0.230-2.65	~0°		2π		46 $MoSi_2$, 54 SiO_2; sintered at 1623 K for 2 hrs (setter material $MoSi_2$); density 2.03 g cm^{-3}; MgO reference standard; [Authors' designation: Sample No. 18].

DATA TABLE NO. 557 NORMAL SPECTRAL REFLECTANCE OF [$MoSi_2$ + SiO_2] POWDERS

[Wavelength, λ, μm; Reflectance, ρ; Temperature, T, K]

CURVE 1
T = 298

λ	ρ
0.230	0.215
0.240	0.200
0.255	0.200
0.269	0.215
0.290	0.231
0.299	0.230
0.310	0.226
0.330	0.218
0.350	0.217
0.485	0.224
0.553	0.209
0.652	0.199
0.750	0.187
0.853	0.182
0.950	0.168
1.15	0.187
1.25	0.187
1.35	0.179

CURVE 1 (cont.)

λ	ρ
1.54	0.180
1.65	0.174
1.94	0.164
2.15	0.155
2.35	0.143
2.55	0.134
2.65	0.140

CURVE 2
T = 298

λ	ρ
0.230	0.139
0.234	0.151
0.240	0.151
0.257	0.150
0.280	0.168
0.297	0.180
0.309	0.180
0.330	0.173

CURVE 2 (cont.)

λ	ρ
0.350	0.173
0.486	0.181
0.549	0.171
0.650	0.160
0.850	0.151
1.04	0.156
1.25	0.151
1.65	0.145
1.85	0.140
2.05	0.132
2.25	0.123
2.45	0.111
2.55	0.106
2.65	0.110

CURVE 3
T = 298

λ	ρ
0.230	0.115
0.240	0.118

CURVE 3 (cont.)

λ	ρ
0.249	0.121
0.269	0.135
0.279	0.140
0.289	0.150
0.309	0.150
0.330	0.143
0.350	0.143
0.475	0.149
0.550	0.134
0.650	0.125
0.748	0.122
0.848	0.122
0.949	0.124
1.15	0.122
1.35	0.121
1.65	0.115
1.85	0.111
2.05	0.101
2.15	0.097

CURVE 3 (cont.)

λ	ρ
2.35	0.085
2.45	0.076
2.54	0.073
2.65	0.085

CURVE 4
T = 298

λ	ρ
0.230	0.097
0.240	0.090
0.250	0.090
0.260	0.093
0.280	0.102
0.290	0.109
0.300	0.110
0.330	0.107
0.351	0.108
0.449	0.105
0.549	0.117

CURVE 4 (cont.)

λ	ρ
0.549	0.110
0.651	0.101
0.750	0.099
1.25	0.099
1.45	0.096
1.65	0.093
1.85	0.089
2.04	0.082
2.25	0.075
2.45	0.065
2.55	0.062
2.65	0.070

CURVE 5
T = 298

λ	ρ
0.230	0.075
0.249	0.079
0.270	0.082

CURVE 5 (cont.)

λ	ρ
0.280	0.088
0.310	0.089
0.330	0.095
0.351	0.095
0.350	0.095
0.450	0.095
0.548	0.091
0.650	0.089
0.849	0.089
0.952	0.092
1.05	0.096
1.15	0.097
1.75	0.097
1.95	0.093
2.05	0.091
2.15	0.089
2.65	0.090

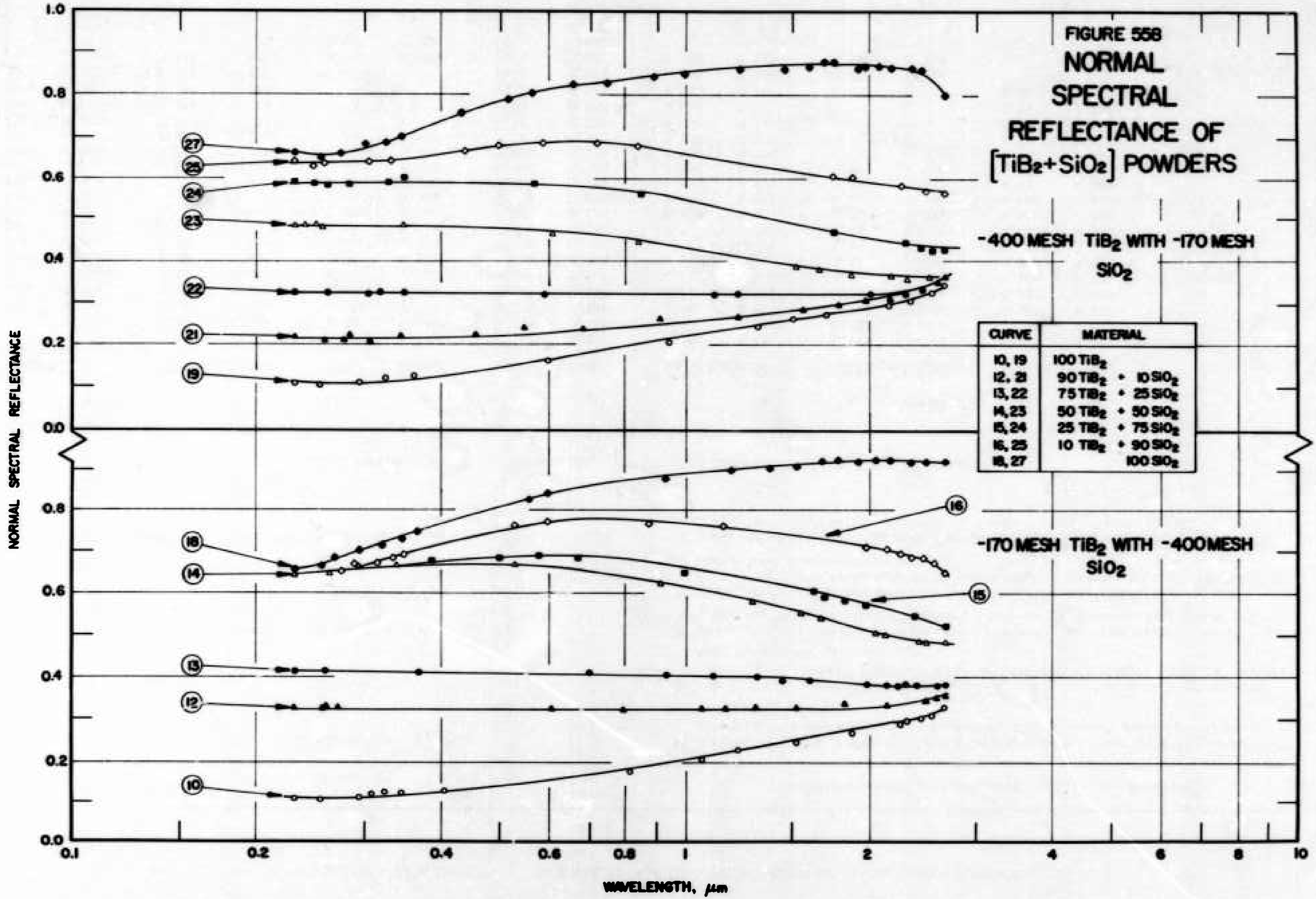


FIGURE 558
NORMAL
SPECTRAL
REFLECTANCE OF
[TiB_2+SiO_2] POWDERS
-400 MESH TiB_2 WITH -170 MESH SiO_2
-170 MESH TiB_2 WITH -400 MESH SiO_2
CURVE MATERIAL
10, 19 100 TiB_2
12, 21 90 TiB_2 + 10 SiO_2
13, 22 75 TiB_2 + 25 SiO_2
14, 23 50 TiB_2 + 50 SiO_2
15, 24 25 TiB_2 + 75 SiO_2
16, 25 10 TiB_2 + 90 SiO_2
18, 27 100 SiO_2
NORMAL SPECTRAL REFLECTANCE
WAVELENGTH, μm
27
25
24
23
22
21
19
18
14
13
12
10
16
15
1.0
0.8
0.6
0.4
0.2
0.0
0.1
0.2
0.4
0.6
0.8
1
2
4
6
8
10

SPECIFICATION TABLE NO. 558 NORMAL SPECTRAL REFLECTANCE OF [TiB_2 + SiO_2] POWDERS

Curve No.	Ref. No.	Year	Temperature K	Wavelength Range, μm	Geometry θ	θ'	ω'	Reported Error, %	Composition (weight percent), Specifications, and Remarks
1*	393	1966	~298	0.230-2.65	~0°		2π		TiB_2; powder compacted at 35300 psi; data extracted from smooth curve; MgO reference standard.
2*	393	1966	~298	0.230-2.65	~0°		2π		99 TiB_2, 1 SiO_2; powder compacted at 35300 psi; data extracted from smooth curve; MgO reference standard.
3*	393	1966	~298	0.230-2.65	~0°		2π		90 TiB_2, 10 SiO_2; powder compacted at 35300 psi; data extracted from smooth curve; MgO reference standard.
4*	393	1966	~298	0.230-2.65	~0°		2π		75 TiB_2, 25 SiO_2; powder compacted at 35300 psi; data extracted from smooth curve; MgO reference standard.
5*	393	1966	~298	0.230-2.65	~0°		2π		50 TiB_2, 50 SiO_2; powder compacted at 35300 psi; data extracted from smooth curve; MgO reference standard.
6*	393	1966	~298	0.230-2.65	~0°		2π		25 TiB_2, 75 SiO_2; powder compacted at 35300 psi; data extracted from smooth curve; MgO reference standard.
7*	393	1966	~298	0.230-2.65	~0°		2π		10 TiB_2, 90 SiO_2; powder compacted at 35300 psi; data extracted from smooth curve; MgO reference standard.
8*	393	1966	~298	0.230-2.65	~0°		2π		1 TiB_2, 99 SiO_2; powder compacted at 35300 psi; data extracted from smooth curve; MgO reference standard.
9*	393	1966	~298	0.230-2.65	~0°		2π		SiO_2; powder compacted at 35300 psi; data extracted from smooth curve; MgO reference standard.
10	393	1966	~298	0.230-2.65	~0°		2π		TiB_2; -400 mesh; powder compacted at 35300 psi; data extracted from smooth curve; MgO reference standard.
11*	393	1966	~298	0.230-2.65	~0°		2π		99 TiB_2, 1 SiO_2; -400 and -170 mesh, respectively; powder compacted at 35300 psi; data extracted from smooth curve; MgO reference standard.
12	393	1966	~298	0.230-2.65	~0°		2π		90 TiB_2, 10 SiO_2; -400 and -170 mesh, respectively; powder compacted at 35300 psi; data extracted from smooth curve; MgO reference standard.
13	393	1966	~298	0.230-2.65	~0°		2π		75 TiB_2, 25 SiO_2; -400 and -170 mesh, respectively; powder compacted at 35300 psi; data extracted from smooth curve; MgO reference standard.
14	393	1966	~298	0.230-2.65	~0°		2π		50 TiB_2, 50 SiO_2; -400 and -170 mesh, respectively; powder compacted at 35300 psi; data extracted from smooth curve; MgO reference standard.
15	393	1966	~298	0.230-2.65	~0°		2π		25 TiB_2, 75 SiO_2; -400 and -170 mesh, respectively; powder compacted at 35300 psi; data extracted from smooth curve; MgO reference standard.
16	393	1966	~298	0.230-2.65	~0°		2π		10 TiB_2, 90 SiO_2; -400 and -170 mesh, respectively, powder compacted at 35300 psi; data extracted from smooth curve; MgO reference standard.
17*	393	1966	~298	0.230-2.65	~0°		2π		1 TiB_2, 99 SiO_2; -400 and -170 mesh, respectively; powder compacted at 35300 psi; data extracted from smooth curve; MgO reference standard.
18	393	1966	~298	0.230-2.65	~0°		2π		SiO_2; -170 mesh; powder compacted at 35300 psi; data extracted from smooth curve; MgO reference standard.

*Not shown on plot

SPECIFICATION TABLE NO. 558 (continued)

Curve No.	Ref. No.	Year	Temperature K	Wavelength Range, μm	Geometry θ	θ'	ω'	Reported Error, %	Composition (weight percent), Specifications, and Remarks
19	393	1966	~298	0.230-2.65	~0°		2π		TiB_2; -170 mesh; powder compacted at 35300 psi; data extracted from smooth curve; MgO reference standard.
20*	393	1966	~298	0.230-2.65	~0°		2π		99 TiB_2, 1 SiO_2; -170 and -400 mesh, respectively; powder compacted at 35300 psi; data extracted from smooth curve; MgO reference standard.
21	393	1966	~298	0.230-2.65	~0°		2π		90 TiB_2, 10 SiO_2; -170 and -400 mesh, respectively; powder compacted at 35300 psi; data extracted from smooth curve; MgO reference standard.
22	393	1966	~298	0.230-2.65	~0°		2π		75 TiB_2, 25 SiO_2; -170 and -400 mesh, respectively; powder compacted at 35300 psi; data extracted from smooth curve; MgO reference standard.
23	393	1966	~298	0.230-2.65	~0°		2π		50 TiB_2, 50 SiO_2; -170 and -400 mesh, respectively; powder compacted at 35300 psi; data extracted from smooth curve; MgO reference standard.
24	393	1966	~298	0.230-2.65	~0°		2π		25 TiB_2, 75 SiO_2; -170 and -400 mesh, respectively; powder compacted at 35300 psi; data extracted from smooth curve; MgO reference standard.
25	393	1966	~298	0.230-2.65	~0°		2π		10 TiB_2, 90 SiO_2; -170 and -400 mesh, respectively; powder compacted at 35300 psi; data extracted from smooth curve; MgO reference standard.
26*	393	1966	~298	0.230-2.65	~0°		2π		1 TiB_2, 99 SiO_2; -170 and -400 mesh, respectively; powder compacted at 35300 psi; data extracted from smooth curve; MgO reference standard.
27	393	1966	~298	0.230-2.65	~0°		2π		SiO_2; -400 mesh; powder compacted at 35300 psi; data extracted from smooth curve; MgO reference standard.

* Not shown on plot

SPECIFICATION TABLE NO. 558 NORMAL SPECTRAL REFLECTANCE OF [TiB_2 + SiO_2] POWDERS

[Wavelength, λ, μm; Reflectance, ρ; Temperature, T, K]

CURVE 1* T ~ 298

λ	ρ
0.230	0.114
0.236	0.109
0.260	0.105
0.288	0.110
0.331	0.111
0.350	0.118
0.366	0.140
0.829	0.178
1.04	0.206
1.34	0.231
1.56	0.252
1.89	0.266
2.13	0.279
2.39	0.288
2.53	0.302
2.61	0.31[illegible]
2.65	0.323

CURVE 2* T ~ 298

λ	ρ
0.230	0.123
0.240	0.117
0.288	0.1[illegible]7
0.302	0.122
0.336	0.124
0.345	0.127
0.584	0.156
0.823	0.179
0.963	0.199
1.04	0.206
1.34	0.231
1.56	0.252
1.89	0.266
2.13	0.279
2.39	0.288
2.53	0.302
2.61	0.313
2.65	0.323

CURVE 3* T ~ 298

λ	ρ
0.230	0.229
0.240	0.224
0.259	0.220
0.280	0.222
0.291	0.227
0.301	0.224
0.350	0.233
0.592	0.241
0.933	0.257
1.15	0.274
1.50	0.280
1.73	0.297
2.01	0.305
2.14	0.314
2.36	0.322
2.49	0.328
2.57	0.336
2.65	0.348

CURVE 4* T ~ 298

λ	ρ
0.230	0.417
0.236	0.420
0.245	0.417
0.260	0.422
0.276	0.425
0.288	0.422
0.301	0.424
0.321	0.422
0.346	0.424
0.550	0.419
0.753	0.402
1.19	0.394
1.49	0.387
2.14	0.382
2.33	0.379
2.47	0.384
2.65	0.384

CURVE 5* T ~ 298

λ	ρ
0.230	0.575
0.257	0.578
0.276	0.588
0.287	0.602
0.308	0.607
0.324	0.607
0.340	0.605
0.424	0.612
0.569	0.620
0.721	0.606
0.914	0.585
1.89	0.522
2.14	0.509
2.36	0.495
2.47	0.490
2.53	0.489
2.65	0.496

CURVE 6* T ~ 298

λ	ρ
0.230	0.639
0.264	0.648
0.277	0.658
0.285	0.673
0.306	0.681
0.327	0.683
0.338	0.685
0.528	0.728
0.618	0.734
0.716	0.728
0.899	0.708
1.90	0.634
2.15	0.618
2.22	0.619
2.47	0.603
2.60	0.598
2.65	0.600

CURVE 7* T ~ 298

λ	ρ
0.230	0.660
0.252	0.665
0.270	0.678
0.284	0.698
0.300	0.707
0.322	0.716
0.339	0.726
0.350	0.738
0.584	0.807
0.634	0.817
0.692	0.818
0.814	0.809
0.905	0.801
1.88	0.750
2.06	0.745
2.20	0.734
2.28	0.736
2.35	0.733
2.47	0.726
2.58	0.715
2.65	0.705

CURVE 8* T ~ 298

λ	ρ
0.230	0.666
0.247	0.670
0.262	0.679
0.276	0.697
0.288	0.709
0.299	0.715
0.328	0.726
0.343	0.737
0.349	0.747
0.427	0.771
0.541	0.825
0.607	0.850
0.761	0.868
0.886	0.880
0.967	0.884
1.09	0.893
1.29	0.889
1.45	0.892
1.58	0.886
1.82	0.891
1.91	0.884
1.96	0.883
2.02	0.890
2.06	0.893
2.17	0.883
2.36	0.885
2.54	0.855
2.65	0.833

CURVE 9* T ~ 298

λ	ρ
0.230	0.666
0.247	0.670
0.262	0.679
0.276	0.697
0.288	0.709
0.299	0.715
0.328	0.726
0.343	0.737
0.349	0.747
0.418	0.783
0.563	0.849
0.626	0.868
0.724	0.875
0.948	0.902
1.20	0.918
1.33	0.914
1.44	0.916
1.57	0.928
1.62	0.933
1.75	0.937
1.86	0.927
1.95	0.920
2.04	0.933
2.09	0.939
2.22	0.923
2.33	0.930
2.38	0.926
2.49	0.904
2.58	0.876
2.65	0.850

CURVE 10 T ~ 298

λ	ρ
0.230	0.114
0.251	0.108
0.294	0.115
0.323	0.123
0.337	0.126
0.360	0.135
0.596	0.166
0.933	0.204
1.31	0.254
1.50	0.275
1.70	0.280
2.14	0.300
2.32	0.310
2.53	0.333
2.65	0.344

CURVE 11* T ~ 298

λ	ρ
0.230	0.131
0.246	0.127
0.273	0.128
0.284	0.136
0.302	0.131
0.321	0.134
0.350	0.141
0.796	0.200
1.05	0.235
1.32	0.256
1.64	0.271
1.72	0.282
2.13	0.304
2.40	0.327
2.51	0.334
2.65	0.354

CURVE 12 T ~ 298

λ	ρ
0.230	0.220
0.259	0.216
0.276	0.218
0.281	0.223
0.305	0.218
0.341	0.221
0.454	0.228
0.543	0.241
0.680	0.241
0.909	0.265
1.23	0.276
1.55	0.295
1.77	0.301
1.96	0.311
2.15	0.319
2.44	0.340
2.58	0.3[illegible]
2.65	[illegible]

CURVE 13 T ~ 298

λ	ρ
0.230	0.332
0.260	0.331
0.303	0.329
0.319	0.334
0.349	0.331
0.586	0.324
1.11	0.321
1.21	0.327
2.00	0.324
2.28	0.328
2.44	0.339
2.65	0.362*

CURVE 14 T ~ 298

λ	ρ
0.230	0.482
0.240	0.482
0.244	0.486
0.250	0.486
0.255	0.480
0.347	0.486
0.604	0.468
0.832	0.443
1.51	0.390
1.65	0.382
1.86	0.376
2.16	0.363
2.30	0.360
2.50	0.362
2.65	0.366

CURVE 15 T ~ 298

λ	ρ
0.230	0.596
0.248	0.596
0.260	0.589
0.281	0.591
0.329	0.597
0.346	0.602
0.567	0.594
0.843	0.566
1.75	0.476
2.29	0.441
2.41	0.435
2.54	0.432
2.65	0.432

CURVE 16 T ~ 298

λ	ρ
0.230	0.643
0.247	0.638
0.256	0.641
0.304	0.642
0.330	0.647
0.435	0.675
0.496	0.686
0.584	0.692
0.718	0.692
0.832	0.682
1.74	0.612
1.86	0.602
2.25	0.584
2.48	0.571
2.65	0.563

CURVE 17* T ~ 298

λ	ρ
0.230	0.662
0.254	0.658
0.274	0.666
0.300	0.687
0.325	0.699
0.341	0.709
0.350	0.721
0.433	0.749
0.545	0.798
0.619	0.814
0.694	0.819
0.749	0.826
0.901	0.833
1.15	0.836
1.27	0.830
1.59	0.833
1.76	0.838
1.97	0.824
2.03	0.830
2.08	0.835

* Not shown on plot

DATA TABLE NO. 558 (continued)

λ	ρ
CURVE 17 (cont.)*	
T ~ 298	
2.12	0.826
2.16	0.823
2.25	0.826
2.33	0.832
2.45	0.813
2.53	0.802
2.60	0.791
2.65	0.778
CURVE 18	
T ~ 298	
0.230	0.662
0.254	0.658
0.274	0.666
0.300	0.687
0.325	0.699
0.342	0.714
0.348	0.729
0.430	0.762
0.511	0.799
0.560	0.817
0.654	0.831
0.741	0.835
0.882	0.847
0.996	0.859
1.23	0.869
1.45	0.869
1.59	0.875
1.69	0.882
1.75	0.882
1.91	0.867
1.96	0.870
2.06	0.879
2.16	0.868
2.33	0.870
2.42	0.861
2.65	0.801
CURVE 19	
T ~ 298	
0.230	0.117
0.253	0.112
0.292	0.117
0.309	0.122
CURVE 19 (cont.)	
0.322	0.126
0.341	0.125
0.403	0.131
0.810	0.180
1.06	0.215
1.23	0.230
1.51	0.253
1.86	0.272
2.22	0.292
2.30	0.300
2.41	0.305
2.52	0.317
2.65	0.335
CURVE 20*	
T ~ 298	
0.230	0.142
0.249	0.137
0.270	0.137
0.329	0.147
0.347	0.147
0.441	0.152
0.738	0.184
1.05	0.226
1.39	0.257
1.83	0.282
2.06	0.292
2.34	0.310
2.52	0.328
2.65	0.341
CURVE 21	
T ~ 298	
0.230	0.327
0.255	0.329
0.260	0.331
0.372	0.327
0.602	0.329
0.796	0.321
1.06	0.326
1.17	0.331
1.30	0.336
1.52	0.331
1.82	0.340
2.13	0.338
CURVE 21 (cont.)	
2.48	0.345
2.57	0.351
2.65	0.360
CURVE 22	
T ~ 298	
0.230	0.419
0.259	0.419
0.369	0.417
0.699	0.417
0.928	0.408
1.12	0.406
1.31	0.401
1.44	0.393
1.59	0.393
1.97	0.384
2.14	0.384
2.22	0.381
2.29	0.385
2.39	0.381
2.57	0.381
2.65	0.383
CURVE 23	
T ~ 298	
0.230	0.644
0.261	0.653
0.292	0.668
0.339	0.674
0.529	0.674
0.903	0.624
1.28	0.581
1.54	0.559
1.65	0.544
2.03	0.512
2.11	0.504
2.40	0.488
2.47	0.483
2.65	0.483
CURVE 24	
T ~ 298	
0.230	0.644
0.261	0.653
0.292	0.668
0.339	0.674
0.383	0.680
0.499	0.686
0.574	0.693
0.662	0.690
0.999	0.657
1.61	0.603
1.68	0.598
1.81	0.586
1.96	0.579
2.36	0.548
2.65	0.525
CURVE 25	
T ~ 298	
0.230	0.644*
0.261	0.653*
0.274	0.658
0.289	0.671
0.313	0.678
0.332	0.685
0.346	0.697
0.525	0.762
0.598	0.778
0.866	0.770
1.15	0.762
1.98	0.718
2.13	0.711
2.24	0.700
2.33	0.693
2.44	0.688
2.55	0.671
2.65	0.657
CURVE 26*	
T ~ 298	
0.230	0.671
0.242	0.673
0.254	0.679
0.288	0.716
0.303	0.717
CURVE 26 (cont.)*	
0.336	0.733
0.348	0.742
0.399	0.767
0.536	0.827
0.602	0.842
0.953	0.877
1.12	0.889
1.46	0.892
1.49	0.900
1.74	0.905
2.10	0.905
2.16	0.897
2.33	0.899
2.55	0.889
2.65	0.886
CURVE 27	
T ~ 298	
0.230	0.659
0.254	0.667
0.268	0.686
0.293	0.708
0.299	0.712
0.320	0.719
0.337	0.722
0.343	0.730
0.361	0.749
0.553	0.835
0.594	0.845
0.926	0.881
1.18	0.902
1.37	0.908
1.52	0.919
1.66	0.924
1.78	0.933
1.91	0.926
2.05	0.936
2.15	0.930
2.33	0.928
2.48	0.923
2.65	0.924

* Not shown on plot

SPECIFICATION TABLE NO. 559 NORMAL TOTAL EMITTANCE OF [TiB_2 + TiO_2] POWDER

Curve No.	Ref. No.	Year	Temperature Range, K	Geometry θ'	Reported Error, %	Composition (weight percent), Specifications and Remarks
1*	28	1963	1273	~0°		99 TiB_2, 1 TiO_2; sintered at 1623 K for 2 hrs (setter material TiB_2); density 2.1 g cm^{-3}; x-ray structure TiB_2 + TiO_2 (brookite); integrated over the range 1-15 μm; [Authors' designation: Sample No. 2].
2*	28	1963	1273	~0°		94 TiB_2, 6 TiO_2; sintered at 1573 K for 2 hrs (setter material TiB_2); density 2.41 g cm^{-3}; x-ray structure TiB_2 + TiO_2 (rutile); integrated over the range 1-15 μm; [Authors' designation: Sample No. 3].
3*	28	1963	1273	~0°		89 TiB_2, 11 TiO_2; sintered at 1723 K for 2 hrs (setter material graphite); density 2.65 g cm^{-3}; integrated over the range 1-15 μm; [Authors' designation: Sample No. 4].
4*	28	1963	1273	~0°		72 TiB_2, 28 TiO_2; sintered at 1673 K for 2 hrs (setter material TiB_2); density 2.81 g cm^{-3}; x-ray structure TiB_2 + TiO_2 (brookite); integrated over the range 1-15 μm; [Authors' designation: Sample No. 5].
5*	28	1963	1273	~0°		47 TiB_2, 53 TiO_2; sintered at 1573 K for 2 hrs (setter material TiB_2); density 2.87 g cm^{-3}; integrated over the range 1-15 μm; [Authors' designation: Sample No. 6].
6*	28	1963	1273	~0°		22 TiB_2, 78 TiO_2; sintered at 1623 K for 2 hrs (setter material TiO_2); density 2.47 g cm^{-3}; x-ray structure TiB_2 + TiO_2 (anatase); integrated over the range 1-15 μm; [Authors' designation: Sample No. 7].

DATA TABLE NO. 559 NORMAL TOTAL EMITTANCE OF [TiB_2 + TiO_2] POWDER

[Temperature, T, K; Emittance, ϵ]

T	ϵ	T	ϵ
CURVE 1*		CURVE 5*	
1273	0.90	1273	0.87
CURVE 2*		CURVE 6*	
1273	0.90	1273	0.48
CURVE 3*			
1273	0.90		
CURVE 4*			
1273	0.89		

* No plot given

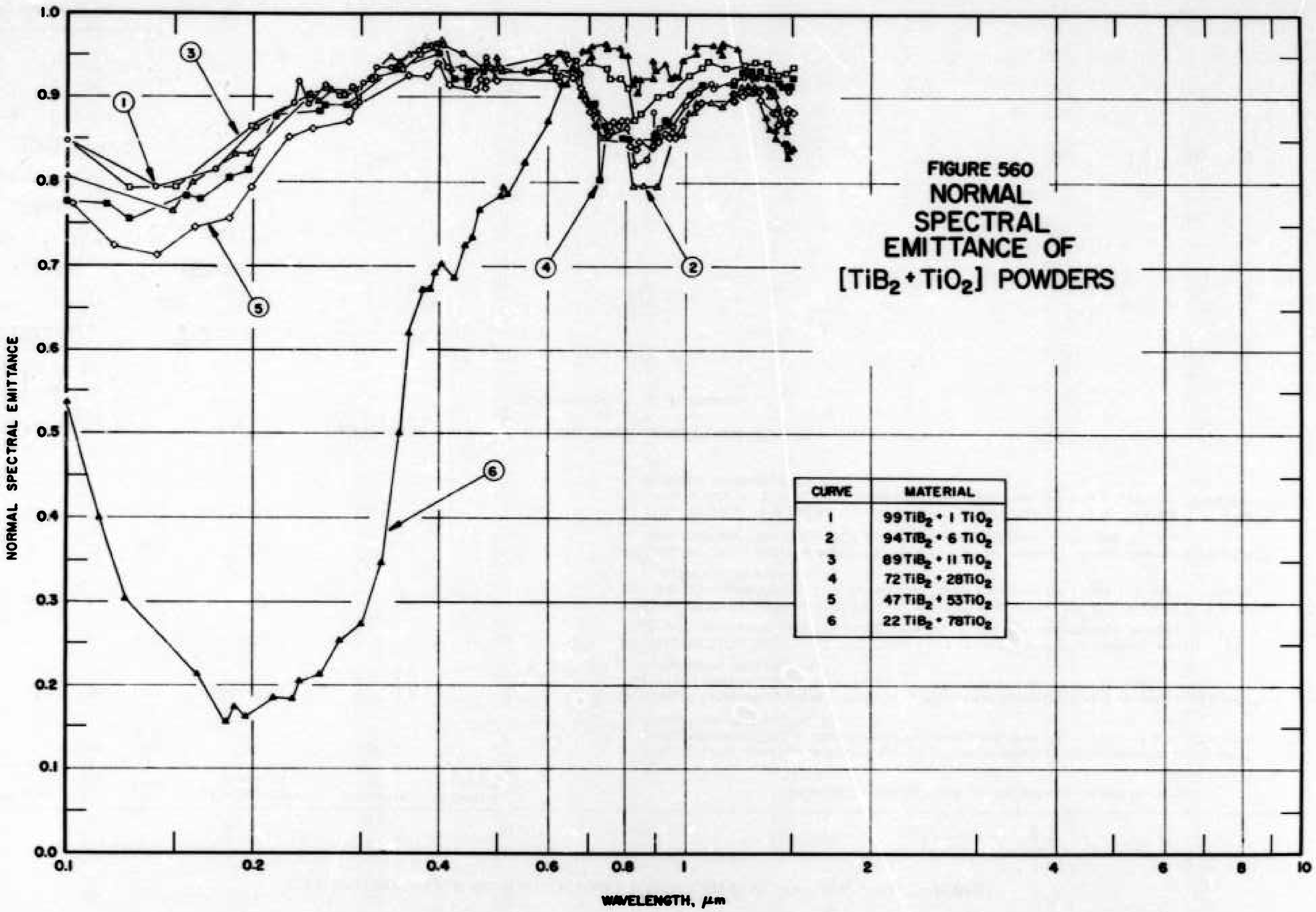


FIGURE 560 NORMAL SPECTRAL EMITTANCE OF [TiB_2 + TiO_2] POWDERS

SPECIFICATION TABLE NO. 560 NORMAL SPECTRAL EMITTANCE OF [TiB_2 + TiO_2] POWDERS

Curve No.	Ref. No.	Year	Temperature K	Wavelength Range, μm	Geometry θ'	Reported Error, %	Composition (weight percent), Specifications, and Remarks
1	28	1963	2073	1.00-15.0	~0°		99 TiB_2, 1 TiO_2; sintered at 1623 K for 2 hrs (setter material TiB_2); density 2.1 g cm^{-3}; x-ray structure TiB_2 + TiO_2 (brookite); [Authors' designation: Sample No. 2].
2	28	1963	1273	1.00-15.0	~0°		94 TiB_2, 6 TiO_2; sintered at 1573 K for 2 hrs (setter material TiB_2); density 2.41 g cm^{-3}; x-ray structure TiB_2 + TiO_2 (rutile); [Authors' designation: Sample No. 3].
3	28	1963	1273	1.00-15.0	~0°		89 TiB_2, 11 TiO_2; sintered at 1723 K for 2 hrs (setter material graphite); density 2.65 g cm^{-3}; x-ray structure TiB_2 + TiO_2 (rutile); [Authors' designation: Sample No. 4].
4	28	1963	1273	1.00-15.0	~0°		72 TiB_2, 28 TiO_2; sintered at 1673 K for 2 hrs (setter material TiB_2); density 2.81 g cm^{-3}; x-ray structure TiB_2 + TiO_2 (brookite); [Authors' designation: Sample No. 5].
5	28	1963	1273	1.02-15.0	~0°		47 TiB_2, 53 TiO_2; sintered at 1573 K for 2 hrs (setter material TiB_2); density 2.78 g cm^{-3}; [Authors' designation: Sample No. 6].
6	28	1963	1273	1.00-15.0	~0°		22 TiB_2, 78 TiO_2; sintered at 1623 K for 2 hrs (setter material TiO_2); density 2.47 g cm^{-3}; x-ray structure TiB_2 + TiO_2 (anatase); [Authors' designation: Sample No. 7].

DATA TABLE NO. 560 NORMAL SPECTRAL EMITTANCE OF [TiB_2 + TiO_2] POWDERS

[Wavelength, λ, μm; Emittance, ϵ; Temperature, T, K]

CURVE 1
T = 2073

λ	ϵ
1.00	0.850
1.39	0.795
1.74	0.815
2.01	0.865
2.32	0.893
2.37	0.920
2.46	0.893
2.61	0.915
2.76	0.902
2.90	0.913
2.97	0.897
3.01	0.919
3.11	0.921
3.17	0.938
3.44	0.938
3.70	0.957
3.89	0.965
4.07	0.965
4.23	0.923
4.36	0.954
4.45	0.934
4.70	0.937
4.76	0.950
4.83	0.937
5.99	0.951
6.41	0.954
6.48	0.948
6.66	0.948
6.78	0.930
6.81	0.905
7.13	0.887
7.50	0.857
8.06	0.865
8.28	0.822
8.68	0.829
8.84	0.844
8.89	0.885
8.98	0.852
9.06	0.866
9.59	0.869
10.0	0.893
10.5	0.909
11.0	0.919
11.2	0.914

CURVE 1 (cont.)

λ	ϵ
12.0	0.921
12.5	0.926
13.0	0.927
13.5	0.926
13.8	0.925
13.9	0.910
14.4	0.913
14.7	0.910
14.8	0.917
15.0	0.920

CURVE 2
T = 1273

λ	ϵ
1.00	0.810
1.44	0.768
1.60	0.800
1.87	0.834
1.98	0.834
2.48	0.905
2.55	0.898
2.69	0.910
2.92	0.910
3.34	0.950
3.45	0.944
3.59	0.953
3.71	0.953
3.79	0.966
4.03	0.971
4.19	0.936
4.86	0.936
4.92	0.925
4.98	0.950
5.04	0.935
5.51	0.935
6.01	0.935
6.66	0.935
6.80	0.902
7.28	0.865
7.36	0.852
8.06	0.850
8.23	0.797
8.52	0.797
9.00	0.797
9.51	0.858

CURVE 2 (cont.)

λ	ϵ
9.84	0.858
10.1	0.883
10.3	0.883
10.4	0.896
11.0	0.896
11.5	0.901
12.0	0.906
12.4	0.916
12.7	0.916
12.8	0.908
12.9	0.915
13.5	0.915
13.6	0.915
13.7	0.901
14.0	0.903
14.3	0.893
14.5	0.871
14.6	0.862
14.7	0.876
15.0	0.885

CURVE 3
T = 1273

λ	ϵ
1.00	0.850*
1.26	0.795
1.50	0.795
1.99	0.867
2.48	0.903
2.62	0.911
2.82	0.904
3.14	0.925
3.49	0.936
3.71	0.952
3.94	0.961
4.05	0.961
4.11	0.939
4.37	0.939
4.47	0.929
4.54	0.934
4.73	0.939
5.03	0.937
5.49	0.932
6.05	0.934
6.11	0.939

CURVE 3 (cont.)

λ	ϵ
6.18	0.929
6.66	0.949
6.91	0.948
6.99	0.942
7.47	0.937
7.53	0.925
7.82	0.925
8.04	0.914
8.26	0.873
8.49	0.882
8.98	0.902
9.47	0.904
10.1	0.929
10.6	0.939
10.9	0.939
10.9	0.944
11.6	0.937
11.7	0.947
12.5	0.941
13.0	0.944
13.6	0.941
13.7	0.934
14.1	0.930
14.6	0.931
15.0	0.939

CURVE 4
T = 1273

λ	ϵ
1.00	0.779
1.16	0.773
1.26	0.757
1.56	0.785
1.64	0.780
1.84	0.807
1.97	0.815
2.19	0.878
2.54	0.886
2.61	0.893
2.85	0.893
3.40	0.938
4.00	0.954
4.21	0.924
4.43	0.924
4.49	0.933

CURVE 4 (cont.)

λ	ϵ
4.70	0.933
5.65	0.933
6.00	0.943
6.22	0.955
6.51	0.955
6.99	0.895
7.16	0.895
7.38	0.869
7.96	0.855
8.08	0.851
8.26	0.804
8.86	0.853
8.91	0.883
8.97	0.856
9.22	0.875
9.36	0.871
10.2	0.904
10.7	0.918
12.0	0.918
12.4	0.932
12.7	0.932
13.0	0.926
13.3	0.935
13.2	0.928
13.7	0.928
13.7	0.912
14.3	0.920
14.4	0.914
14.6	0.914
14.7	0.911
14.8	0.911
14.9	0.926
15.0	0.926

CURVE 5
T = 1273

λ	ϵ
1.02	0.775
1.19	0.725
1.40	0.713
1.62	0.749
1.84	0.758
1.99	0.795
2.29	0.854
2.50	0.865

CURVE 5 (cont.)

λ	ϵ
2.85	0.873
2.94	0.892
3.59	0.929
3.83	0.928
3.99	0.943
4.21	0.915
4.50	0.915
4.56	0.910
4.67	0.922
4.73	0.912
4.77	0.921
4.99	0.921
6.21	0.921
6.26	0.926
6.59	0.925
6.80	0.914
7.00	0.885
7.15	0.885
7.19	0.869
7.51	0.869
7.57	0.864
7.67	0.873
7.81	0.868
7.88	0.882
7.93	0.873
8.04	0.873
8.18	0.842
8.32	0.840
8.40	0.832
8.50	0.842
8.80	0.842
8.91	0.859
9.02	0.850
9.21	0.860
9.39	0.855
9.52	0.860
9.60	0.853
9.91	0.875
10.4	0.890
10.6	0.896
12.0	0.897
12.0	0.903
12.4	0.904
12.5	0.907
13.1	0.908

CURVE 5 (cont.)

λ	ϵ
13.2	0.900
13.9	0.884
14.1	0.884
14.2	0.870
14.7	0.890
14.7	0.885
15.0	0.885

CURVE 6
T = 1273

λ	ϵ
1.00	0.535
1.13	0.399
1.30	0.301
1.63	0.212
1.82	0.156
1.87	0.172
1.95	0.161
2.16	0.184
2.32	0.184
2.38	0.204
2.58	0.213
2.76	0.253
3.00	0.273
3.23	0.349
3.43	0.500
3.57	0.621
3.77	0.672
3.88	0.675
3.92	0.692
4.05	0.701
4.26	0.687
4.40	0.729
4.51	0.734
4.68	0.768
5.03	0.785
5.08	0.795
5.16	0.786
5.50	0.823
6.00	0.873
6.31	0.917
6.43	0.917
6.56	0.939
6.81	0.959
6.96	0.959

CURVE 6 (cont.)

λ	ϵ
7.01	0.950
7.06	0.964
7.41	0.967
7.48	0.960
7.86	0.960
7.93	0.952
8.04	0.952
8.22	0.916
8.29	0.925
8.34	0.908
8.42	0.923
8.83	0.924
8.88	0.948
8.95	0.933
9.25	0.942
9.46	0.925
9.54	0.929
9.76	0.926
9.89	0.947
10.4	0.952
10.4	0.963
11.2	0.965
11.3	0.959
11.4	0.963
11.5	0.952
11.5	0.967
12.2	0.960
12.3	0.931
12.6	0.930
12.7	0.918
13.0	0.909
13.5	0.878
13.7	0.865
14.0	0.853
14.5	0.849
14.7	0.849
14.8	0.831
14.9	0.839
15.0	0.840

* Not shown on plot

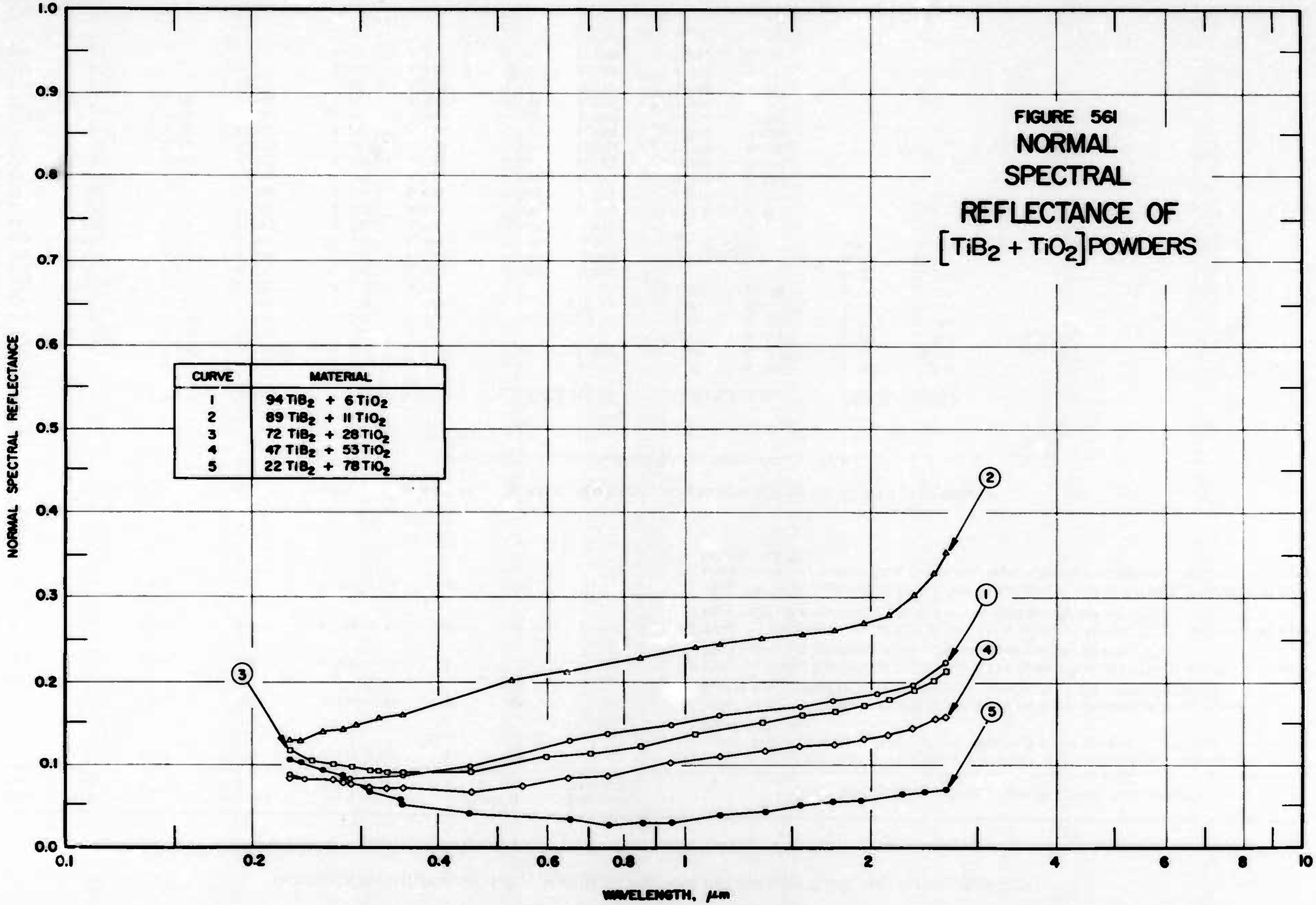


FIGURE 561
NORMAL SPECTRAL REFLECTANCE OF $[TiB_2 + TiO_2]$ POWDERS

SPECIFICATION TABLE NO. 561 NORMAL SPECTRAL REFLECTANCE OF [TiB_2 + TiO_2] POWDERS

Curve No.	Ref. No.	Year	Temperature K	Wavelength Range, μm	Geometry θ	θ'	ω'	Reported Error, %	Composition (weight percent), Specifications, and Remarks
1	28	1963	298	0.230-2.65	~0°		2π		94 TiB_2, 6 TiO_2; sintered at 1573 K for 2 hrs (setter material TiB_2); density 2.41 g cm^{-3}; x-ray structure TiB_2 + TiO_2 (rutile); MgO reference standard; [Authors' designation: Sample No. 3].
2	28	1963	298	0.230-2.65	~0°		2π		89 TiB_2, 11 TiO_2; sintered at 1723 K for 2 hrs (setter material graphite); density 2.65 g cm^{-3}; MgO reference standard; [Authors' designation: Sample No. 4].
3	28	1963	298	0.230-2.65	~0°		2π		72 TiB_2, 28 TiO_2; sintered at 1673 K for 2 hrs (setter material TiB_2); density 2.81 g cm^{-3}; MgO reference standard; [Authors' designation: Sample No. 5].
4	28	1963	298	0.230-2.65	~0°		2π		47 TiB_2, 53 TiO_2; sintered at 1573 K for 2 hrs (setter material TiB_2); density 2.87 g cm^{-3}; MgO reference standard; [Authors' designation: Sample No. 6].
5	28	1963	298	0.230-2.65	~0°		2π		22 TiB_2, 78 TiO_2; sintered at 1623 K for 2 hrs (setter material TiO_2); density 2.47 g cm^{-3}; x-ray structure TiB_2 + TiO_2 (anatase); MgO reference standard; [Authors' designation: Sample No. 7].

DATA TABLE NO. 561 NORMAL SPECTRAL REFLECTANCE OF [TiB_2 + TiO_2] POWDERS

[Wavelength, λ, μm; Reflectance, ρ; Temperature, T, K]

λ	ρ
CURVE 1 T = 298	
0.230	0.088
0.244	0.082
0.289	0.082
0.350	0.087
0.450	0.099
0.651	0.130
0.750	0.138
0.950	0.149
1.14	0.160
1.54	0.171
1.74	0.178
2.05	0.187
2.34	0.199
2.65	0.223
CURVE 2 T = 298	
0.230	0.130
0.240	0.130
CURVE 2 (cont.)	
0.260	0.140
0.280	0.143
0.294	0.149
0.320	0.155
0.350	0.160
0.525	0.202
0.645	0.213
0.848	0.229
1.05	0.242
1.14	0.244
1.34	0.254
1.55	0.259
1.75	0.264
1.95	0.273
2.15	0.283
2.35	0.302
2.55	0.330
2.65	0.356
CURVE 3 T = 298	
0.230	0.119
0.250	0.105
0.270	0.101
0.290	0.098
0.310	0.094
0.320	0.094
0.330	0.092
0.340	0.091
0.350	0.090
0.449	0.093
0.598	0.111
0.703	0.115
0.849	0.124
1.04	0.139
1.34	0.151
1.55	0.160
1.75	0.165
1.95	0.173
2.15	0.180
2.35	0.191
CURVE 3 (cont.)	
2.54	0.201
2.65	0.215
CURVE 4 T = 298	
0.230	0.083
0.270	0.081
0.280	0.079
0.289	0.077
0.309	0.071
0.330	0.071
0.350	0.071
0.451	0.067
0.548	0.075
0.649	0.083
0.750	0.087
0.946	0.102
1.14	0.111
1.35	0.118
1.54	0.122
CURVE 4 (cont.)	
1.75	0.126
1.95	0.132
2.14	0.138
2.34	0.145
2.55	0.156
2.65	0.158
CURVE 5 T = 298	
0.230	0.107
0.240	0.102
0.260	0.094
0.280	0.088
0.310	0.069
0.349	0.057
0.350	0.050
0.450	0.041
0.652	0.035
0.753	0.027
0.852	0.030
CURVE 5 (cont.)	
0.951	0.030
1.14	0.040
1.35	0.043
1.54	0.050
1.74	0.054
1.94	0.058
2.25	0.065
2.45	0.067
2.65	0.070

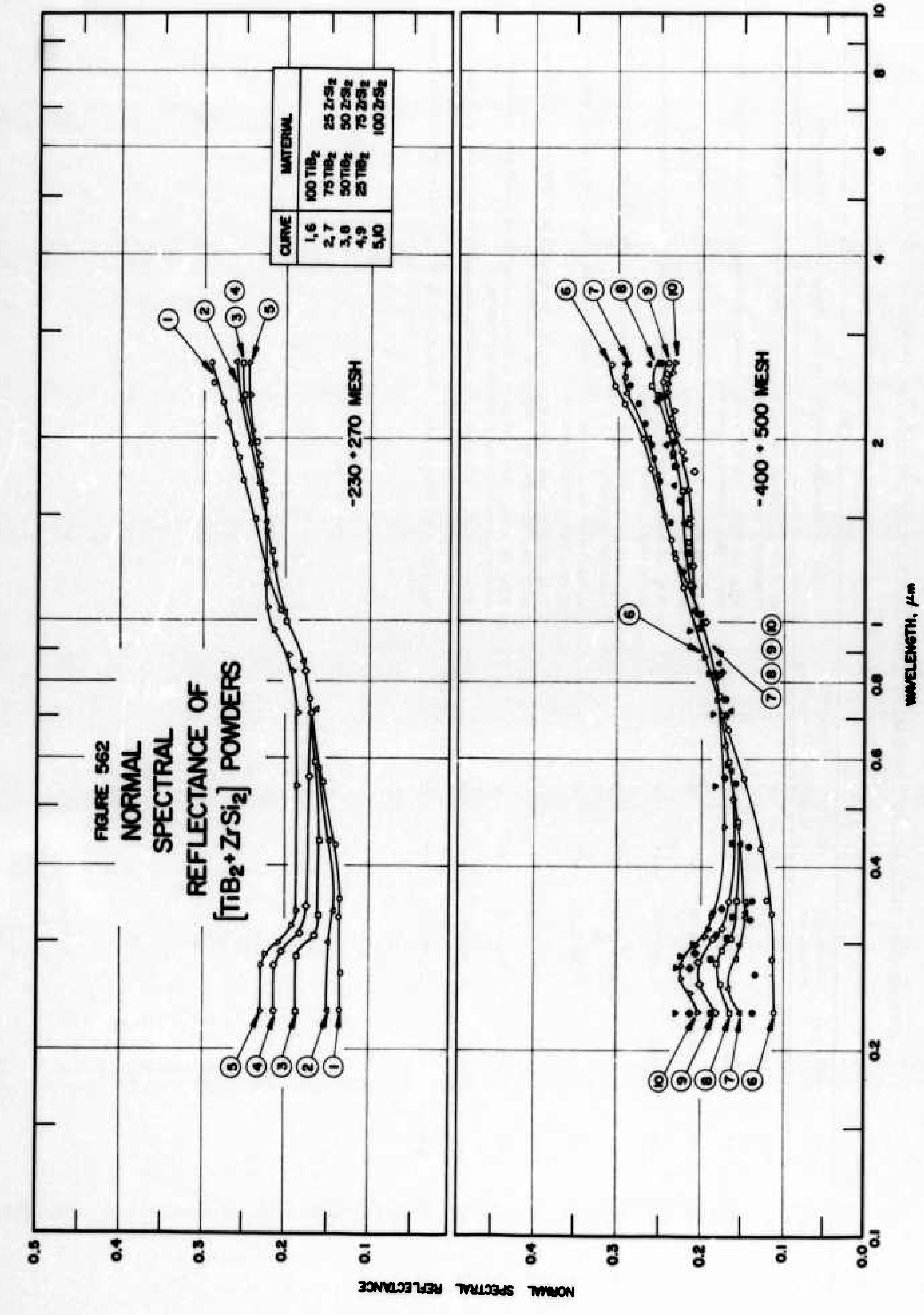


FIGURE 562
NORMAL SPECTRAL REFLECTANCE OF $[TiB_2 + ZrSi_2]$ POWDERS
CURVE | MATERIAL
1,6 | 100 TiB_2
2,7 | 75 TiB_2 25 $ZrSi_2$
3,8 | 50 TiB_2 50 $ZrSi_2$
4,9 | 25 TiB_2 75 $ZrSi_2$
5,10 | 100 $ZrSi_2$
-230 +270 MESH
-400 +500 MESH
NORMAL SPECTRAL REFLECTANCE
WAVELENGTH, μm
0.0
0.1
0.2
0.3
0.4
0.5
0.1
0.2
0.4
0.6
0.8
1
2
4
6
8
10
1
2
3
4
5
6
7
8
9
10

SPECIFICATION TABLE NO. 562 NORMAL SPECTRAL REFLECTANCE OF [TiB_2 + $ZrSi_2$] POWDERS

Curve No.	Ref. No.	Year	Temperature K	Wavelength Range, μm	Geometry θ	θ'	ω'	Reported Error, %	Composition (weight percent), Specifications, and Remarks
1	341	1966	~298	0.230-2.65	~0°		2π		TiB_2; -230 +270 mesh powder; compacted; data extracted from smooth curve; MgO reference standard.
2	341	1966	~298	0.230-2.65	~0°		2π		75 TiB_2, 25 $ZrSi_2$; -230 +270 mesh powder; compacted; data extracted from smooth curve; MgO reference standard.
3	341	1966	~298	0.230-2.65	~0°		2π		50 TiB_2, 50 $ZrSi_2$; -230 +270 mesh powder; compacted; data extracted from smooth curve; MgO reference standard.
4	341	1966	~298	0.230-2.65	~0°		2π		25 TiB_2, 75 $ZrSi_2$; -230 +270 mesh powder; compacted; data extracted from smooth curve; MgO reference standard.
5	341	1966	~298	0.230-2.65	~0°		2π		$ZrSi_2$; -230 +270 mesh powder; compacted; data extracted from smooth curve MgO reference standard.
6	341	1966	~298	0.230-2.65	~0°		2π		TiB_2; -400 +500 mesh powder; compacted at 35300 psi; data extracted from smooth curve; MgO reference standard.
7	341	1966	~298	0.230-2.65	~0°		2π		75 TiB_2, 25 $ZrSi_2$; -400 +500 mesh powder; compacted at 35300 psi; data extracted from smooth curve; MgO reference standard.
8	341	1966	~298	0.230-2.65	~0°		2π		50 TiB_2, 50 $ZrSi_2$; -400 +500 mesh powder; compacted at 35300 psi; data extracted from smooth curve; MgO reference standard.
9	341	1966	~298	0.230-2.65	~0°		2π		25 TiB_2, 75 $ZrSi_2$; -400 +500 mesh powder; compacted at 35300 psi; data extracted from smooth curve; MgO reference standard.
10	341	1966	~298	0.230-2.65	~0°		2π		$ZrSi_2$; -400 +500 mesh powder; compacted at 35300 psi; data extracted from smooth curve.

DATA TABLE NO. 562 NORMAL SPECTRAL REFLECTANCE OF [TiB_2 + $ZrSi_2$] POWDERS

[Wavelength, λ, μm; Reflectance, ρ; Temperature, T, K]

CURVE 1
T ~ 298

λ	ρ
0.230	0.138
0.265	0.136
0.328	0.139
0.350	0.138
0.430	0.141
0.544	0.158
0.748	0.172
1.04	0.208
1.21	0.223
1.46	0.239
1.70	0.253
1.85	0.260
1.95	0.263
2.11	0.271
2.29	0.279
2.45	0.290
2.65	0.292

CURVE 2
T ~ 298

λ	ρ
0.230	0.151
0.299	0.151
0.335	0.146
0.437	0.151
0.571	0.163
0.718	0.168
0.851	0.180
1.03	0.202
1.24	0.215
1.45	0.223
1.68	0.233
1.95	0.244
2.30	0.258
2.65	0.262

CURVE 3
T ~ 298

λ	ρ
0.230	0.189
0.281	0.189
0.305	0.169
0.330	0.162
0.437	0.162
0.587	0.169
0.747	0.172*
0.997	0.200
1.30	0.218
1.57	0.227
1.80	0.233
1.96	0.237
2.33	0.252
2.65	0.254

CURVE 4
T ~ 298

λ	ρ
0.230	0.213
0.271	0.213
0.287	0.206
0.309	0.182
0.340	0.176
0.556	0.173
0.701	0.171
0.823	0.179
0.997	0.200*
1.30	0.218*
1.57	0.227*
1.80	0.233*
1.96	0.237*
2.33	0.252*
2.65	0.254*

CURVE 5
T ~ 298

λ	ρ
0.230	0.230
0.273	0.230
0.285	0.225
0.297	0.209
0.316	0.193
0.335	0.189
0.539	0.187
0.704	0.188
0.822	0.193
0.875	0.199
0.966	0.215
1.05	0.221
1.15	0.225
1.40	0.222
1.64	0.227
1.87	0.236
2.05	0.241
2.35	0.245
2.65	0.249

CURVE 6
T ~ 298

λ	ρ
0.230	0.112
0.280	0.113
0.332	0.114
0.350	0.121
0.428	0.128
0.556	0.149
0.701	0.177
0.817	0.187
1.14	0.222
1.27	0.231
1.37	0.238
1.59	0.253
1.78	0.264
2.00	0.273
2.29	0.297
2.43	0.305
2.65	0.310

CURVE 7
T ~ 298

λ	ρ
0.230	0.150
0.252	0.158
0.281	0.159
0.295	0.149
0.330	0.147
0.350	0.147
0.476	0.155
0.629	0.171
0.816	0.186
1.03	0.207
1.29	0.231
1.48	0.245
1.74	0.256
2.00	0.266
2.38	0.293
2.52	0.295
2.65	0.293

CURVE 8
T ~ 298

λ	ρ
0.230	0.165
0.257	0.177
0.276	0.182
0.291	0.176
0.303	0.163
0.350	0.156
0.472	0.153
0.590	0.167
0.756	0.179
0.973	0.203
1.15	0.214
1.35	0.216
1.64	0.223
1.89	0.237
2.07	0.240
2.30	0.255
2.44	0.262
2.65	0.253

CURVE 9
T ~ 298

λ	ρ
0.230	0.183
0.256	0.202
0.279	0.202
0.303	0.186
0.316	0.175
0.350	0.166
0.513	0.162
0.667	0.169
0.822	0.178
1.00	0.198
1.24	0.211
1.45	0.216
1.77	0.221
1.90	0.224
2.15	0.237
2.34	0.249
2.49	0.249
2.55	0.243
2.65	0.240

CURVE 10
T ~ 298

λ	ρ
0.230	0.203
0.249	0.211
0.261	0.222
0.275	0.222
0.297	0.206
0.306	0.196
0.330	0.190
0.350	0.183
0.461	0.174
0.747	0.182
0.972	0.205
1.15	0.215
1.47	0.215
1.65	0.218
1.85	0.221
2.04	0.230
2.21	0.233
2.37	0.242
2.47	0.242
2.56	0.236
2.65	0.233

* Not shown on plot

SPECIFICATION TABLE NO. 563 NORMAL TOTAL EMITTANCE OF [$TiSi_2$ + Ti_5Si_3] POWDERS

Curve No.	Ref. No.	Year	Temperature Range, K	Geometry θ'	Reported Error, %	Composition (weight percent), Specifications and Remarks
1*	28	1963	1023	~0°		95 $TiSi_2$, 5 Ti_5Si_3; sintered at 1573 K for 2 hrs (setter material graphite); density 2.98 g cm^{-3}; integrated over the range 1-15 μm; [Authors' designation: Sample No. 85].
2*	28	1963	1023	~0°		95 $TiSi_2$, 5 Ti_5Si_3; sintered at 1573 K for 2 hrs (setter material Ti_5Si_3 + $TiSi_2$); density 3.09 g cm^{-3}; integrated over the range 1-15 μm; [Authors' designation: Sample No. 84].
3*	28	1963	1023	~0°		90 $TiSi_2$, 10 Ti_5Si_3; sintered at 1623 K for 2 hrs (setter material $TiSi_2$); density 3.49 g cm^{-3}; integrated over the range 1-15 μm; [Authors' designation: Sample No. 83].
4*	28	1963	1023	~0°		75 $TiSi_2$, 25 Ti_5Si_3; sintered at 1623 K for 2 hrs (setter material $TiSi_2$); density 3.44 g cm^{-3}; x-ray structure Ti_5Si_3 + $TiSi_2$; integrated over the range 1-15 μm; [Authors' designation: Sample No. 82].
5*	28	1963	1023	~0°		50 $TiSi_2$, 50 Ti_5Si_3; sintered at 1573 K for 2 hrs (setter material Ti_5Si_3); density 3.22 g cm^{-3}; integrated over the range 1-15 μm; [Authors' designation: Sample No. 81].
6*	28	1963	1023	~0°		25 $TiSi_2$, 75 Ti_5Si_3; sintered at 1573 K for 2 hrs (setter material Ti_5Si_3); density 3.02 g cm^{-3}; integrated over the range 1-15 μm; [Authors' designation: Sample No. 80].
7*	28	1963	1023	~0°		10 $TiSi_2$, 90 Ti_5Si_3; sintered at 1573 K for 2 hrs (setter material Ti_5Si_3); density 3.02 g cm^{-3}; x-ray structure Ti_5Si_3 + $TiSi_2$; integrated over the range 1-15 μm; [Authors' designation: Sample No. 79].
8*	28	1963	1023	~0°		5 $TiSi_2$, 95 Ti_5Si_3; sintered at 1573 K for 2 hrs (setter material Ti_5Si_3); density 2.77 g cm^{-3}; integrated over the range 1-15 μm; [Authors' designation: Sample No. 78].

*No plot given

DATA TABLE NO. 563 NORMAL TOTAL EMITTANCE OF [$TiSi_2$ + Ti_5Si_3] POWDERS

[Temperature, T, K; Emittance, ϵ]

T	ϵ
CURVE 1*	
1023	0.82
CURVE 2*	
1023	0.85
CURVE 3*	
1023	0.75
CURVE 4*	
1023	0.83
CURVE 5*	
1023	0.74
CURVE 6*	
1023	0.86
CURVE 7*	
1023	0.92
CURVE 8*	
1023	0.90

* No plot given

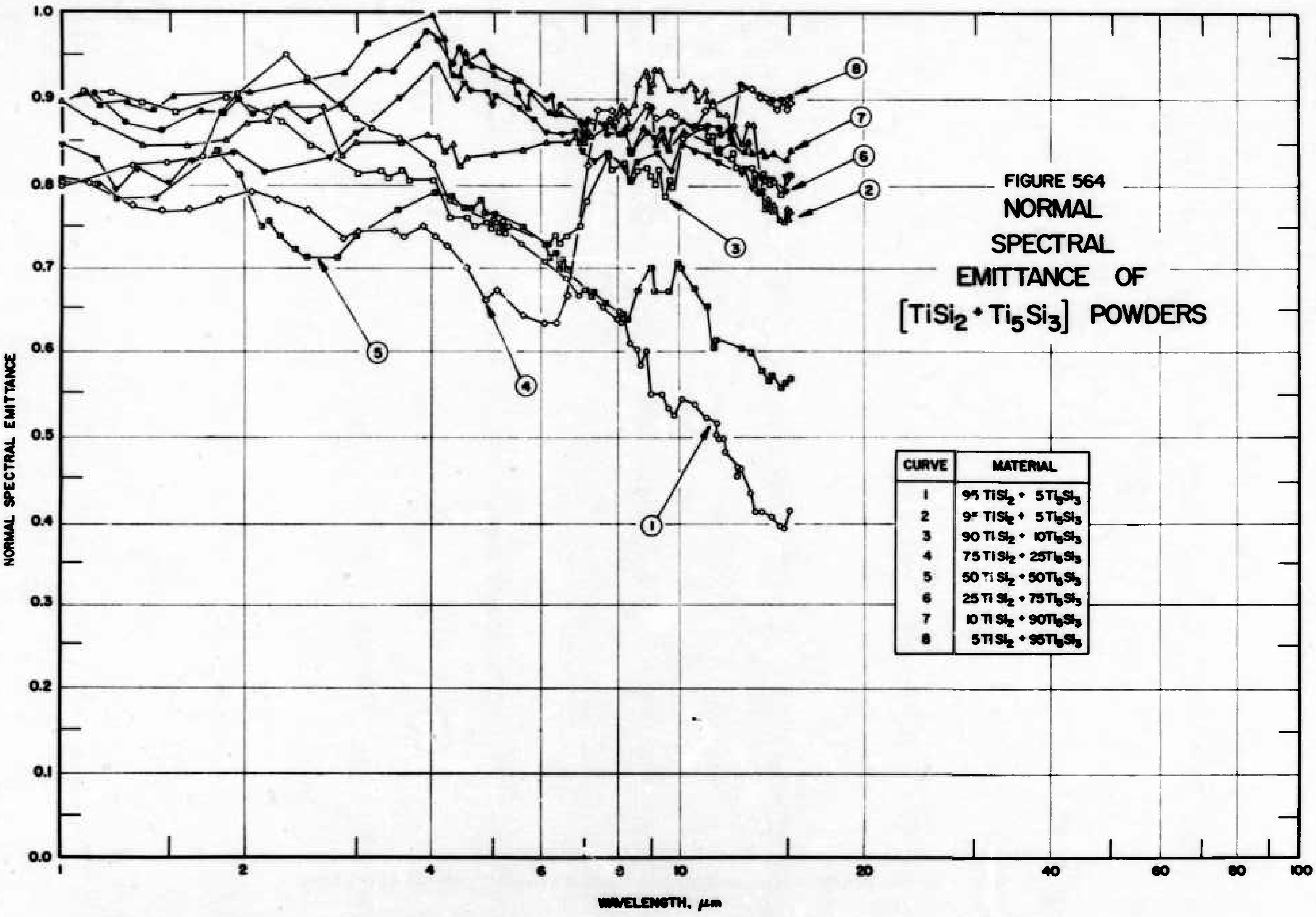


FIGURE 564 NORMAL SPECTRAL EMITTANCE OF $[TiSi_2 + Ti_5Si_3]$ POWDERS

SPECIFICATION TABLE NO. 564 NORMAL SPECTRAL EMITTANCE OF [$TiSi_2$ + Ti_5Si_3] POWDERS

Curve No.	Ref. No.	Year	Temperature K	Wavelength Range, μm	Geometry θ'	Reported Error, %	Composition (weight percent), Specifications, and Remarks
1	28	1963	1023	1.00-15.0	~0°		95 $TiSi_2$, 5 Ti_5Si_3; sintered at 1573 K for 2 hrs (setter material graphite); density 2.98 g cm^{-3}; [Authors' designation: Sample No. 85].
2	28	1963	1023	1.00-15.0	~0°		95 $TiSi_2$, 5 Ti_5Si_3; sintered at 1573 K for 2 hrs (setter material Ti_5Si_3 + $TiSi_2$); density 3.09 g cm^{-3}; [Authors' designation: Sample No. 84].
3	28	1963	1023	1.00-15.0	~0°		90 $TiSi_2$, 10 Ti_5Si_3; sintered at 1623 K for 2 hrs (setter material $TiSi_2$); density 3.49 g cm^{-3}; [Authors' designation: Sample No. 83].
4	28	1963	1023	1.00-15.0	~0°		75 $TiSi_2$, 25 Ti_5Si_3; sintered at 1623 K for 2 hrs (setter material $TiSi_2$); density 3.44 g cm^{-3}; x-ray structure Ti_5Si_3 + $TiSi_2$; [Authors' designation: Sample No. 82].
5	28	1963	1023	1.00-15.0	~0°		50 $TiSi_2$, 50 Ti_5Si_3; sintered at 1573 K for 2 hrs (setter material Ti_5Si_3); density 3.22 g cm^{-3}; [Authors' designation: Sample No. 81].
6	28	1963	1023	1.00-15.0	~0°		25 $TiSi_2$; 75 Ti_5Si_3; sintered at 1573 K for 2 hrs (setter material Ti_5Si_3); density 3.02 g cm^{-3}; [Authors' designation: Sample No. 80].
7	28	1963	1023	1.00-15.0	~0°		10 $TiSi_2$, 90 Ti_5Si_3; sintered at 1573 K for 2 hrs (setter material Ti_5Si_3); density 3.02 g cm^{-3}; x-ray structure Ti_5Si_3 + $TiSi_2$; [Authors' designation: Sample No. 79].
8	28	1963	1023	1.00-15.0	~0°		5 $TiSi_2$, 95 Ti_5Si_3; sintered at 1573 K for 2 hrs (setter material Ti_5Si_3); density 2.77 g cm^{-3}; [Authors' designation: Sample No. 78].

DATA TABLE NO. 564 NORMAL SPECTRAL EMITTANCE OF [$TiSi_2 + Ti_5Si_3$] POWDERS

[Wavelength, λ, μm; Emittance, ϵ; Temperature, T, K]

λ	ϵ
CURVE 1	
T = 1023	
1.00	0.800
1.30	0.824
1.47	0.829
1.68	0.883
1.81	0.889
1.92	0.910
2.30	0.952
2.49	0.926
2.85	0.892
2.99	0.881
3.17	0.869
3.50	0.858
3.98	0.829
4.22	0.786
4.50	0.777
5.01	0.759
5.51	0.731
6.01	0.710
6.51	0.691
6.84	0.670
6.99	0.677
7.49	0.655
7.87	0.641
7.93	0.651
8.00	0.638
8.09	0.643
8.27	0.612
8.49	0.603
8.58	0.589
8.78	0.601
8.94	0.553
9.25	0.553
9.50	0.537
9.72	0.529
10.0	0.549
10.5	0.541
11.0	0.526
11.4	0.509
11.5	0.520
11.6	0.501
11.7	0.501
11.9	0.487
12.3	0.470
12.3	0.459

λ	ϵ
CURVE 1 (cont.)	
12.5	0.469
13.0	0.444
13.3	0.419
13.5	0.419
14.0	0.412
14.5	0.400
14.7	0.399
15.0	0.420
CURVE 2	
T = 1023	
1.00	0.900
1.13	0.876
1.35	0.849
1.59	0.850
1.84	0.855
1.99	0.878
2.15	0.878
2.20	0.894
2.64	0.859
2.82	0.839
2.99	0.853
3.51	0.853
3.89	0.863
4.04	0.860
4.15	0.842
4.27	0.851
4.36	0.827
4.49	0.836
4.99	0.840
5.51	0.847
6.01	0.853
6.51	0.856
6.74	0.862
6.81	0.854
6.90	0.868
6.97	0.856
7.07	0.868
7.14	0.861
7.51	0.873
7.67	0.883
7.84	0.883
8.00	0.897
8.17	0.890

λ	ϵ
CURVE 2 (cont.)	
8.38	0.899
8.45	0.922
8.73	0.939
8.78	0.932
8.86	0.941
8.92	0.921
9.00	0.940
9.19	0.940
9.51	0.918
10.0	0.918
10.3	0.923
10.5	0.917
10.7	0.904
10.9	0.916
11.0	0.904
11.2	0.903
11.5	0.889
11.8	0.889
12.0	0.873
12.2	0.875
12.5	0.854
12.8	0.826
13.0	0.826
13.5	0.798
13.6	0.778
13.7	0.790
13.8	0.777
13.9	0.782
14.1	0.774
14.2	0.781
14.4	0.763
14.7	0.760
14.8	0.777
14.9	0.765
15.0	0.775
CURVE 3	
T = 1023	
1.00	0.900*
1.08	0.911
1.20	0.911
1.35	0.899
1.52	0.889
1.84	0.905

λ	ϵ
CURVE 3 (cont.)	
2.26	0.878
2.51	0.850
3.00	0.819
3.28	0.821
3.38	0.812
3.51	0.822
3.63	0.810
3.99	0.810
4.22	0.766
4.50	0.766
4.62	0.756
4.83	0.760
4.92	0.751
4.98	0.763
5.05	0.747
5.12	0.761
5.20	0.748
5.27	0.755
6.09	0.731
6.23	0.744
6.38	0.732
6.51	0.743
6.85	0.757
7.00	0.786
7.28	0.823
7.60	0.840
7.70	0.823
7.76	0.835*
8.08	0.831
8.27	0.810
8.44	0.824
8.74	0.828
8.90	0.819
9.06	0.809
9.15	0.824
9.35	0.793
9.55	0.814
9.61	0.803
10.0	0.860
10.5	0.877
10.9	0.874
11.0	0.862
11.2	0.862
11.3	0.848
11.4	0.858*

λ	ϵ
CURVE 3 (cont.)	
12.0	0.837
12.1	0.843
12.2	0.828
13.0	0.828
13.1	0.820
13.5	0.820
13.6	0.811
13.7	0.817*
13.9	0.808
14.2	0.810
14.5	0.795
15.0	0.820
CURVE 4	
T = 1023	
1.00	0.805
1.11	0.805
1.30	0.779
1.45	0.772
1.61	0.773
1.80	0.785
2.01	0.796
2.22	0.786
2.49	0.773
2.82	0.739
3.00	0.748
3.43	0.749
3.55	0.740
3.83	0.755
4.00	0.740
4.18	0.730
4.50	0.702
4.82	0.675
5.01	0.676
5.51	0.645
6.00	0.636
6.27	0.636
6.51	0.670
7.01	0.828
7.30	0.892
7.70	0.892
7.81	0.879
8.03	0.892
8.21	0.871

λ	ϵ
CURVE 4 (cont.)	
8.74	0.897
9.02	0.885
9.51	0.840
9.71	0.838
10.5	0.871
10.6	0.882*
11.0	0.893
11.2	0.891*
11.3	0.899
12.0	0.910*
12.5	0.917
13.0	0.917
13.4	0.909
14.0	0.903
14.2	0.903*
14.3	0.894
14.4	0.902*
14.6	0.902
14.8	0.893
15.0	0.900
CURVE 5	
T = 1023	
1.00	0.810
1.14	0.805
1.23	0.789
1.42	0.789
1.77	0.843
1.94	0.818
2.10	0.754
2.16	0.761
2.25	0.743
2.39	0.727
2.49	0.718
2.79	0.716
2.99	0.742
3.49	0.774
4.00	0.797
4.27	0.792
4.43	0.779
4.50	0.784*
4.58	0.778
4.76	0.789
4.81	0.772

λ	ϵ
CURVE 5 (cont.)	
4.87	0.783*
5.00	0.772
5.51	0.754
6.00	0.732
6.13	0.717
6.28	0.722
6.36	0.701
6.45	0.713
6.52	0.701
7.01	0.678
7.16	0.670
7.23	0.676
7.53	0.661
8.02	0.649
8.15	0.641
8.50	0.677
8.71	0.687*
8.85	0.684*
8.91	0.703
9.02	0.676
9.58	0.676
9.87	0.710
10.0	0.703
10.2	0.693*
10.5	0.678
11.0	0.657
11.6	0.628*
11.8	0.608
11.8	0.617
12.5	0.606
13.0	0.601
13.5	0.581
13.6	0.577
13.9	0.571
14.0	0.579
14.2	0.569*
14.4	0.574*
14.5	0.565
14.7	0.569
14.9	0.561*
15.0	0.575

λ	ϵ
CURVE 6	
T = 1023	
1.00	0.850
1.14	0.832
1.23	0.798
1.32	0.824
1.49	0.808
1.62	0.832
1.89	0.841
2.13	0.820
2.70	0.836
3.00	0.864
3.50	0.905
4.00	0.947
4.33	0.903
4.45	0.925
4.55	0.915
4.88	0.915
4.95	0.897
5.00	0.909
5.48	0.895
5.61	0.888*
5.75	0.883
5.82	0.872*
5.95	0.883*
6.08	0.866
6.44	0.866
6.50	0.855*
6.61	0.868
6.72	0.848*
6.81	0.862*
6.90	0.847
7.12	0.840*
7.19	0.850*
7.24	0.834
7.35	0.844*
7.60	0.844
7.74	0.831*
8.08	0.830
8.27	0.811
8.45	0.834
9.13	0.842
9.28	0.834*
9.49	0.834*
9.62	0.824
9.99	0.853

* Not shown on plot

DATA TABLE NO. 564 (continued)

CURVE 6 (cont.)
T = 1023

λ	ε
10.5	0.846
11.0	0.840
11.5	0.832
12.0	0.822
12.5	0.822
12.6	0.829
12.9	0.823*
13.0	0.804
13.2	0.813
13.3	0.798
13.5	0.818
13.5	0.804
13.7	0.813*
13.8	0.801*
14.0	0.813
14.1	0.808*
14.7	0.808*
14.8	0.800
14.8	0.818
15.0	0.820

CURVE 7
T = 1023

λ	ε
1.00	0.900*
1.09	0.908
1.15	0.895
1.27	0.899
1.40	0.890
1.51	0.904
2.00	0.910
2.49	0.926
2.84	0.933
3.10	0.969
3.93	1.000
4.12	0.974
4.28	0.931
4.37	0.931
4.46	0.957
4.54	0.943
4.99	0.931
5.33	0.923
5.40	0.910
5.48	0.916*
5.56	0.910*

CURVE 7 (cont.)

λ	ε
5.63	0.896
5.69	0.911
6.10	0.887
6.36	0.887
6.82	0.877
6.94	0.867
7.00	0.881
7.05	0.869*
7.18	0.879*
7.74	0.873
7.90	0.863
8.10	0.872
8.26	0.845
8.50	0.865*
8.57	0.849*
8.66	0.870
8.77	0.857*
8.89	0.897
9.01	0.853
9.25	0.860
9.48	0.849
10.0	0.867
10.4	0.867*
11.0	0.854
11.5	0.842
11.6	0.849
12.1	0.843*
12.2	0.853
12.6	0.845
12.7	0.854
13.0	0.842
13.2	0.847*
13.3	0.838*
13.5	0.845
13.6	0.838
14.1	0.842
14.7	0.835
15.0	0.845

CURVE 8
T = 1023

λ	ε
1.00	0.900*
1.13	0.907
1.26	0.873
1.45	0.864

CURVE 8 (cont.)

λ	ε
1.68	0.887
1.82	0.887
1.93	0.900
2.02	0.887
2.30	0.897
2.50	0.878
2.83	0.890
3.25	0.937
3.41	0.937
3.74	0.968
3.87	0.982
4.06	0.974
4.28	0.945
4.39	0.963
4.48	0.947
4.79	0.958
4.98	0.941
5.48	0.926
6.02	0.904
6.17	0.909
6.24	0.887
6.38	0.897
6.58	0.895*
6.68	0.887*
6.78	0.883*
6.96	0.876
7.50	0.875
7.58	0.865
7.64	0.879*
8.10	0.865
8.29	0.846
8.79	0.867
9.02	0.860
9.26	0.870
9.49	0.850
9.65	0.870
9.91	0.870
10.0	0.879
10.5	0.877
10.9	0.873*
11.0	0.864*
11.1	0.874
11.2	0.866*
11.5	0.871
11.6	0.864
11.9	0.869

CURVE 8 (cont.)

λ	ε
12.0	0.860
12.1	0.870*
12.4	0.860*
12.5	0.873
12.7	0.861
12.8	0.871
12.9	0.863*
13.3	0.863
14.0	0.855
14.5	0.855
15.0	0.859

*Not shown on plot

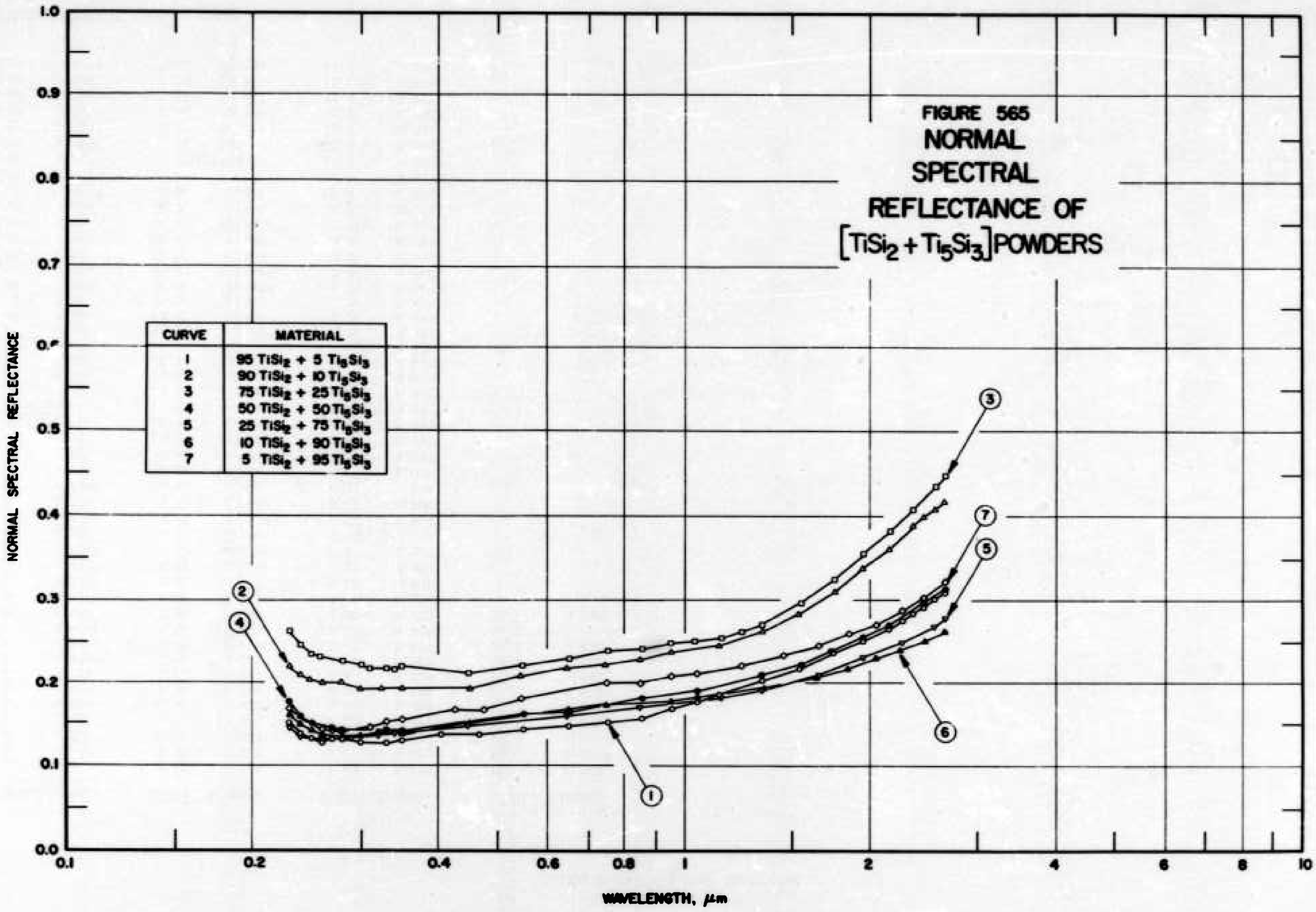


FIGURE 565 NORMAL SPECTRAL REFLECTANCE OF $[TiSi_2 + Ti_5Si_3]$ POWDERS

SPECIFICATION TABLE NO. 565 NORMAL SPECTRAL REFLECTANCE OF [$TiSi_2$ + Ti_5Si_3] POWDERS

Curve No.	Ref. No.	Year	Temperature K	Wavelength Range, μm	Geometry θ	Geometry θ'	Geometry ω'	Reported Error, %	Composition (weight percent), Specifications, and Remarks
1	28	1963	298	0.230-2.65	~0°		2π		95 $TiSi_2$, 5 Ti_5Si_3; sintered at 1573 K for 2 hrs (setter material graphite); density 2.98 g cm^{-3}; MgO reference standard; [Authors' designation: Sample No. 85].
2	28	1963	298	0.230-2.65	~0°		2π		90 $TiSi_2$, 10 Ti_5Si_3; sintered at 1623 K for 2 hrs (setter material $TiSi_2$); density 3.49 g cm^{-3}; MgO reference standard; [Authors' designation: Sample No. 83].
3	28	1963	298	0.230-2.65	~0°		2π		75 $TiSi_2$, 25 Ti_5Si_3; sintered at 1623 K for 2 hrs (setter material $TiSi_2$); density 3.44 g cm^{-3}; x-ray structure Ti_5Si_3 + $TiSi_2$; MgO reference standard; [Authors' designation: Sample No. 82].
4	28	1963	298	0.230-2.65	~0°		2π		50 $SiSi_2$, 50 Ti_5Si_3; sintered at 1573 K for 2 hrs (setter material Ti_5Si_3); density 3.22 g cm^{-3}; MgO reference standard; [Authors' designation: Sample No. 81].
5	28	1963	298	0.230-2.65	~0°		2π		25 $TiSi_2$, 75 Ti_5Si_3; sintered at 1573 K for 2 hrs (setter material Ti_5Si_3); density 3.02 g cm^{-3}; MgO reference standard; [Authors' designation: Sample No. 80].
6	28	1963	298	0.230-2.65	~0°		2π		10 $TiSi_2$, 90 Ti_5Si_3; sintered at 1573 K for 2 hrs (setter material Ti_5Si_3); density 3.02 g cm^{-3}; x-ray structure Ti_5Si_3 + $TiSi_2$; MgO reference standard; [Authors' designation: Sample No. 79].
7	28	1963	298	0.230-2.65	~0°		2π		5 $TiSi_2$, 95 Ti_5Si_3; sintered at 1573 K for 2 hrs (setter material Ti_5Si_3); density 2.77 g cm^{-3}; MgO reference standard; [Authors' designation: Sample No. 78].

DATA TABLE NO. 565 NORMAL SPECTRAL REFLECTANCE OF [$TiSi_2$ + Ti_5Si_3] POWDERS

[Wavelength, λ, μm; Reflectance, ρ; Temperature, T, K]

CURVE 1
T = 298

λ	ρ
0.230	0.150
0.240	0.138
0.250	0.131
0.260	0.129
0.270	0.131
0.280	0.131
0.300	0.128
0.330	0.128
0.350	0.130
0.405	0.137
0.466	0.139
0.550	0.143
0.650	0.148
0.751	0.151
0.854	0.157
0.955	0.169
1.05	0.177
1.14	0.187
1.34	0.201
1.54	0.219
1.75	0.236
1.95	0.252
2.15	0.268
2.25	0.277
2.35	0.286
2.45	0.293
2.55	0.303
2.65	0.311

CURVE 2
T = 298

λ	ρ
0.230	0.220
0.240	0.210
0.249	0.204
0.260	0.200
0.279	0.200
0.300	0.194
0.324	0.193
0.350	0.193
0.450	0.193
0.543	0.209
0.647	0.219
0.744	0.222
0.848	0.229

CURVE 2 (cont.)

λ	ρ
0.950	0.235
1.15	0.246
1.34	0.264
1.55	0.286
1.75	0.312
1.95	0.340
2.15	0.361
2.35	0.390
2.45	0.401
2.55	0.410
2.65	0.420

CURVE 3
T = 298

λ	ρ
0.230	0.264
0.240	0.248
0.250	0.235
0.256	0.232
0.280	0.227
0.300	0.222
0.310	0.219
0.330	0.219
0.340	0.219
0.350	0.220
0.449	0.213
0.549	0.222
0.651	0.230
0.751	0.240
0.852	0.243
0.950	0.250
1.05	0.251
1.15	0.256
1.25	0.265
1.35	0.274
1.55	0.299
1.75	0.328
1.95	0.357
2.15	0.384
2.35	0.410
2.55	0.437
2.65	0.450

CURVE 4
T = 298

λ	ρ
0.230	0.175
0.240	0.158
0.250	0.150
0.270	0.145
0.280	0.143
0.330	0.143
0.350	0.143
0.449	0.150*
0.552	0.161
0.653	0.165
0.852	0.181
1.05	0.191
1.34	0.210
1.55	0.223
1.75	0.240
1.95	0.256
2.15	0.271
2.35	0.289*
2.45	0.297
2.55	0.301*
2.65	0.315

CURVE 5
T = 298

λ	ρ
0.230	0.145
0.240	0.134
0.250	0.130
0.260	0.130
0.290	0.131
0.320	0.136
0.340	0.139
0.350	0.140
0.449	0.149
0.648	0.160
0.848	0.170
1.15	0.182
1.35	0.191
1.65	0.210
1.95	0.232
2.25	0.250
2.55	0.270
2.65	0.280

CURVE 6
T = 298

λ	ρ
0.230	0.160
0.240	0.149
0.250	0.142
0.260	0.138
0.280	0.134
0.300	0.135
0.320	0.139
0.330	0.139
0.350	0.139
0.450	0.150
0.650	0.168
0.749	0.173
0.950	0.177
1.05	0.182
1.35	0.195
1.65	0.209
1.84	0.218
2.05	0.231
2.25	0.240
2.45	0.252
2.65	0.265

CURVE 7
T = 298

λ	ρ
0.230	0.169
0.240	0.156
0.250	0.149
0.260	0.143
0.270	0.141
0.280	0.140
0.310	0.145
0.330	0.151
0.350	0.154
0.426	0.167
0.475	0.167
0.546	0.181
0.747	0.200
0.849	0.200
0.951	0.209
1.05	0.212
1.24	0.222
1.45	0.235
1.65	0.247

CURVE 7 (cont.)

λ	ρ
1.85	0.261
2.05	0.274
2.25	0.290
2.45	0.303
2.65	0.325

* Not shown on plot

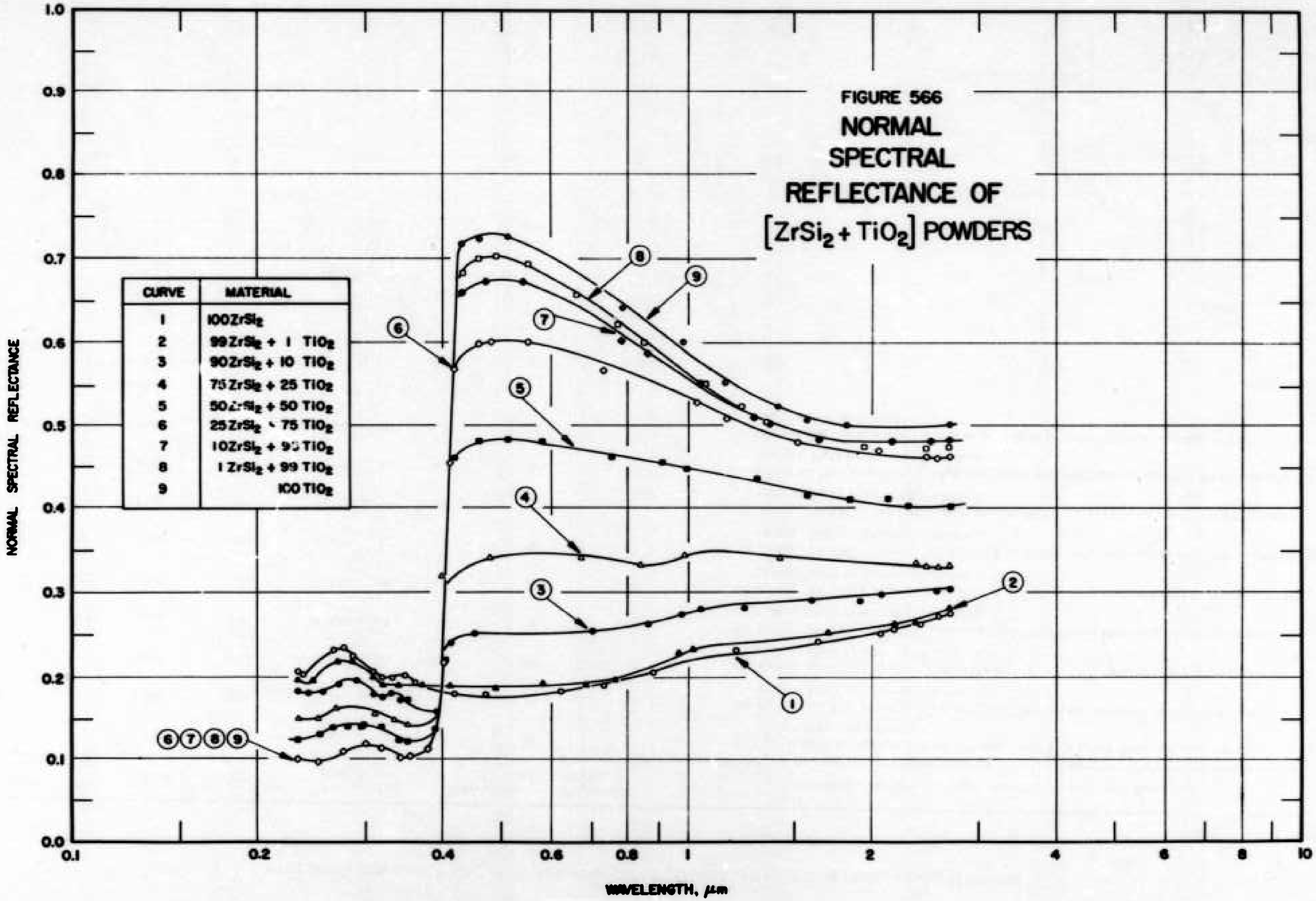


FIGURE 566
NORMAL
SPECTRAL
REFLECTANCE OF
[ZrSi2 + TiO2] POWDERS
CURVE
MATERIAL
1 100ZrSi2
2 99ZrSi2 + 1 TiO2
3 90ZrSi2 + 10 TiO2
4 75ZrSi2 + 25 TiO2
5 50ZrSi2 + 50 TiO2
6 25ZrSi2 + 75 TiO2
7 10ZrSi2 + 90 TiO2
8 1 ZrSi2 + 99 TiO2
9 100 TiO2
NORMAL SPECTRAL REFLECTANCE
WAVELENGTH, μm
1.0
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0.0
0.1
0.2
0.4
0.6
0.8
1
2
4
6
8
10

SPECIFICATION TABLE NO. 566 NORMAL SPECTRAL REFLECTANCE OF [$ZrSi_2$ + TiO_2] POWDERS

Curve No.	Ref. No.	Year	Temperature, K	Wavelength Range, μm	Geometry θ	θ'	ω'	Reported Error, %	Composition (weight percent), Specifications, and Remarks
1	393	1966	~298	0.230-2.65	~0°		2π		$ZrSi_2$; powder compacted at 35 300 psi; data extracted from smooth curve; MgO reference standard
2	393	1966	~298	0.230-2.65	~0°		2π		99 $ZrSi_2$, 1 TiO_2; powder compacted at 35 300 psi; data extracted from smooth curve; MgO reference standard.
3	393	1966	~298	0.230-2.65	~0°		2π		90 $ZrSi_2$, 10 TiO_2; powder compacted at 35 300 psi; data extracted from smooth curve; MgO reference standard.
4	393	1966	~298	0.230-2.65	~0°		2π		75 $ZrSi_2$, 25 TiO_2; powder compacted at 35 300 psi; data extracted from smooth curve; MgO reference standard.
5	393	1966	~298	0.230-2.65	~0°		2π		50 $ZrSi_2$, 50 TiO_2; powder compacted at 35 300 psi; data extracted from smooth curve; MgO reference standard.
6	393	1966	~298	0.230-2.65	~0°		2π		25 $ZrSi_2$, 75 TiO_2; powder compacted at 35 300 psi; data extracted from smooth curve; MgO reference standard.
7	393	1966	~298	0.230-2.65	~0°		2π		10 $ZrSi_2$, 90 TiO_2; powder compacted at 35 300 psi; data extracted from smooth curve; MgO reference standard.
8	393	1966	~298	0.230-2.65	~0°		2π		1 $ZrSi_2$; 99 TiO_2; powder compacted at 35 300 psi; data extracted from smooth curve; MgO reference standard.
9	393	1966	~298	0.230-2.65	~0°		2π		TiO_2; powder compacted at 35 300 psi; data extracted from smooth curve; MgO reference standard.

DATA TABLE NO. 566 NORMAL SPECTRAL REFLECTANCE OF [$ZrSi_2$ + TiO_2] POWDERS

[Wavelength, λ, μm; Reflectance, ρ; Temperature, T, K]

λ	ρ
CURVE 1	
T ~ 298	
0.230	0.210
0.234	0.207
0.262	0.234
0.271	0.239
0.281	0.229
0.305	0.210
0.316	0.202
0.329	0.202
0.342	0.205
0.359	0.198
0.413	0.182
0.461	0.18[illegible]
0.613	0.186
0.724	0.192
0.870	0.207
0.991	0.224
1.19	0.234
1.61	0.242
2.02	0.251
2.15	0.259
2.38	0.262
2.55	0.274
2.65	0.277
CURVE 2	
T ~ 298	
0.230	0.200
0.244	0.200
0.266	0.222
0.281	0.222
0.304	0.204
0.317	0.194
0.332	0.194
0.335	0.197
0.366	0.196
0.407	0.193
0.482	0.190
0.577	0.196
0.678	0.195
0.755	0.200
0.953	0.230
1.01	0.236
1.77	0.253
CURVE 2 (cont.)	
2.14	0.264
2.32	0.267
2.65	0.283
CURVE 3	
T ~ 298	
0.230	0.189
0.240	0.184
0.251	0.185
0.268	0.197
0.287	0.200
0.306	0.183
0.316	0.180
0.327	0.184
0.339	0.176
0.349	0.177
0.388	0.161
0.409	0.245
0.448	0.255
0.693	0.257
0.851	0.265
0.966	0.279
1.04	0.285
1.23	0.285
1.57	0.292
1.90	0.293
2.05	0.300
2.51	0.304
2.65	0.306
CURVE 4	
T ~ 298	
0.230	0.154
0.249	0.154
0.265	0.167
0.306	0.160
0.330	0.151
0.347	0.148
0.386	0.160
0.394	0.325
0.471	0.343
0.666	0.344
0.830	0.337
CURVE 4 (cont.)	
0.972	0.349
1.40	0.344
2.32	0.339
2.42	0.335
2.53	0.332
2.65	0.333
CURVE 5	
T ~ 298	
0.230	0.129
0.250	0.132
0.261	0.141
0.279	0.144
0.291	0.141
0.295	0.143
0.313	0.141
0.336	0.128
0.346	0.125
0.384	0.140
0.400	0.222
0.413	0.451
0.452	0.484
0.509	0.489
0.573	0.486
0.746	0.464
0.900	0.457
0.982	0.450
1.28	0.436
1.55	0.419
1.81	0.412
2.10	0.412
2.26	0.405
2.65	0.405
CURVE 6	
T ~ 298	
0.230	0.102
0.249	0.100
0.271	0.113
0.298	0.121
0.315	0.118
0.339	0.105
0.350	0.107
CURVE 6 (cont.)	
0.373	0.117
0.397	0.220
0.409	0.459
0.414	0.574
0.451	0.601
0.476	0.606
0.547	0.606
0.723	0.571
1.03	0.531
1.15	0.512
1.50	0.483
2.02	0.471
2.43	0.465
2.53	0.461
2.65	0.464
CURVE 7	
T ~ 298	
0.230	0.102
0.249	0.100
0.271	0.113
0.298	0.121
0.315	0.118
0.339	0.105
0.350	0.107
0.373	0.117
0.397	0.220
0.409	0.459
0.427	0.664
0.469	0.679
0.531	0.677
0.776	0.609
0.853	0.592
1.04	0.556
1.27	0.513
1.35	0.505
1.62	0.487
2.14	0.484
2.48	0.484
2.65	0.487
CURVE 8	
T ~ 298	
0.230	0.102
0.249	0.100
0.271	0.113
0.298	0.121
0.315	0.118
0.339	0.105
0.350	0.107
0.373	0.117
0.397	0.220
0.409	0.459
0.428	0.689
0.454	0.702
0.484	0.706
0.548	0.699
0.651	0.660
0.761	0.626
0.840	0.603
1.06	0.554
1.22	0.526
1.34	0.507
1.62	0.488
1.93	0.479
2.42	0.476
2.65	0.477
CURVE 9	
T ~ 298	
0.230	0.102
0.249	0.100
0.271	0.113
0.298	0.121
0.315	0.118
0.339	0.105
0.350	0.107
0.373	0.117
0.397	0.220
0.409	0.459
0.429	0.720
0.456	0.728
0.509	0.730
0.780	0.645
0.977	0.603
1.14	0.559
CURVE 9 (cont.)	
1.39	0.528
1.55	0.510
1.80	0.503
2.65	0.503

SPECIFICATION TABLE NO. 567 NORMAL TOTAL EMITTANCE OF [$MoSi_2 + MoO_3 + SiO_2$] POWDERS

Curve No.	Ref. No.	Year	Temperature Range, K	Geometry θ'	Reported Error, %	Composition (weight percent), Specifications and Remarks
1*	28	1963	1273	~0°		95 $MoSi_2$, 3 MoO_3, 2 SiO_2; sintered at 1723 K for 2 hrs (setter material $MoSi_2$); density 4.68 g cm^{-3}; integrated over the range 1-15 μm; [Authors' designation: Sample No. 22].
2*	28	1963	1273	~0°		87 $MoSi_2$, 7 MoO_3, 6 SiO_2; sintered at 1723 K for 2 hrs (setter material $MoSi_2$); density 4.72 g cm^{-3}; x-ray structure $MoSi_2$ + MoO_3; integrated over the range 1-15 μm; [Authors' designation: Sample No. 23].
3*	28	1963	1273	~0°		73 $MoSi_2$, 15 MoO_3, 12 SiO_2; sintered at 1723 K for 2 hrs (setter material $MoSi_2$); density 3.79 g cm^{-3}; integrated over the range 1-15 μm; [Authors' designation: Sample No. 24].

DATA TABLE NO. 567 NORMAL TOTAL EMITTANCE OF [$MoSi_2 + MoO_3 + SiO_2$] POWDERS

[Temperature, T, K; Emittance, ϵ]

T	ϵ
CURVE 1*	
1273	0.77
CURVE 2*	
1273	0.82
CURVE 3*	
1273	0.85

*No plot given

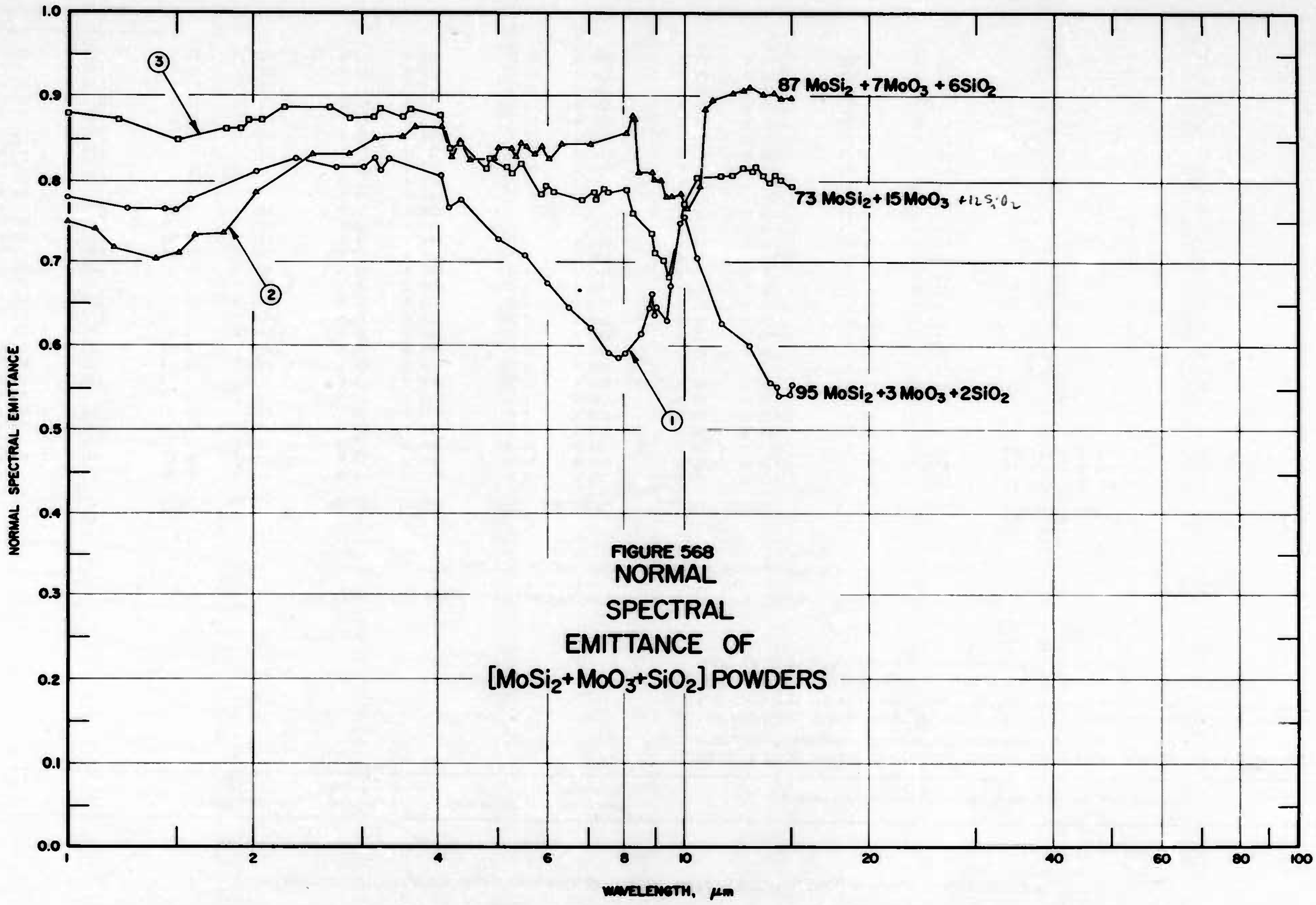


FIGURE 568
NORMAL SPECTRAL EMITTANCE OF [$MoSi_2$+MoO_3+SiO_2] POWDERS

SPECIFICATION TABLE NO. 568 NORMAL SPECTRAL EMITTANCE OF [$MoSi_2$ + MoO_3 + SiO_2] POWDERS

Curve No.	Ref. No.	Year	Temperature K	Wavelength Range, μm	Geometry θ'	Reported Error, %	Composition (weight percent), Specifications, and Remarks
1	28	1963	1273	1.00-15.0	~0°		95 $MoSi_2$, 3 MoO_3, 2 SiO_2; sintered at 1723 K for _ hrs (setter material $MoSi_2$); density 4.68 g cm^{-3}; [Authors' designation: Sample No. 22].
2	28	1963	1273	1.00-15.0	~0°		87 $MoSi_2$, 7 MoO_3, 6 SiO_2; sintered at 1723 K for 2 hrs (setter material $MoSi_2$); density 4.72 g cm^{-3}; x-ray structure $MoSi_2$ + MoO_3; [Authors' designation: Sample No. 23].
3	28	1963	1273	1.00-15.0	~0°		73 $MoSi_2$, 15 MoO_3, 12 SiO_2; sintered at 1723 K for 2 hrs (setter material $MoSi_2$); density 3.79 g cm^{-3}; [Authors' designation: Sample No. 24].

DATA TABLE NO. 568 NORMAL SPECTRAL EMITTANCE OF [$MoSi_2$ + MoO_3 + SiO_2] POWDERS

[Wavelength, λ, μm; Emittance, ϵ; Temperature, T, K]

λ	ϵ	λ	ϵ	λ	ϵ	λ	ϵ	λ	ϵ	λ	ϵ	λ	ϵ
CURVE 1 T = 1273		CURVE 1 (cont.)		CURVE 2 (cont.)		CURVE 2 (cont.)		CURVE 3 (cont.)		CURVE 3 (cont.)		CURVE 3 (cont.)	
		9.00	0.647	1.79	0.735	9.19	0.801	2.68	0.889	7.20	0.777	14.1	0.809
1.00	0.780	9.34	0.630	2.01	0.786	9.31	0.781	2.87	0.875	7.44	0.791	14.5	0.801
1.25	0.765	9.50	0.671	2.50	0.832	9.52	0.781	3.14	0.876	7.54	0.787	15.0	0.795
1.43	0.765	9.83	0.749	2.87	0.832	9.81	0.835	3.22	0.886	8.09	0.790		
1.50	0.763	10.0	0.755	3.16	0.853	10.1	0.867	3.28	0.878*	8.29	0.760		
1.58	0.777	10.5	0.705	3.50	0.855	10.3	0.867*	3.50	0.878	8.42	0.760*		
2.03	0.811	11.5	0.626	3.68	0.866	10.6	0.895	3.60	0.886	8.65	0.738*		
2.36	0.829	11.6	0.626	4.05	0.866	10.7	0.887	4.01	0.879	8.86	0.735		
2.72	0.819	11.7	0.610*	4.20	0.830	11.1	0.898	4.19	0.840	8.91	0.776		
3.01	0.819	12.7	0.600	4.31	0.849	12.0	0.902	4.32	0.848	8.99	0.710		
3.17	0.829	12.8	0.588*	4.50	0.827	12.5	0.907	4.44	0.825*	9.21	0.701		
3.23	0.813	13.6	0.569*	4.93	0.828	12.9	0.912	4.70	0.825*	9.46	0.681		
3.31	0.829	13.8	0.558	5.00	0.840	13.5	0.903	4.78	0.816	9.76	0.739		
4.02	0.809	13.8	0.558	5.25	0.840	14.0	0.904	4.83	0.829	10.0	0.773		
4.18	0.768	14.1	0.553	5.34	0.831	14.4	0.899	4.91	0.819*	10.2	0.791		
4.33	0.777	14.3	0.541	5.41	0.846	15.0	0.899	5.18	0.819	10.5	0.804		
5.00	0.728	14.9	0.543	5.59	0.843			5.28	0.810	11.0	0.807*		
5.51	0.708	15.0	0.555	5.71	0.833	CURVE 3 T = 1273		5.43	0.822	11.5	0.807		
6.00	0.673			5.88	0.842			5.65	0.798*	12.0	0.807*		
6.50	0.645	CURVE 2 T = 1273		6.02	0.828			5.79	0.798*	12.2	0.811		
7.01	0.621			6.31	0.847	1.00	0.880	5.86	0.784	12.3	0.808*		
7.51	0.592			7.01	0.847	1.21	0.871	5.98	0.795	12.5	0.816		
7.81	0.586	1.00	0.750	8.04	0.858	1.51	0.850	6.08	0.778*	13.0	0.812		
8.01	0.592	1.11	0.740	8.24	0.829	1.82	0.862	6.14	0.787	13.2	0.816		
8.50	0.515	1.18	0.717	8.34	0.827	1.91	0.862	6.69	0.787*	13.5	0.808		
8.78	0.645	1.39	0.702	8.43	0.811	1.96	0.872	6.82	0.776	13.7	0.807*		
8.87	0.661	1.51	0.710	8.88	0.811	2.07	0.872	6.92	0.783*	13.7	0.797		
8.92	0.637	1.61	0.732	8.95	0.801	2.25	0.889	7.12	0.786	13.8	0.797		

*Not shown on plot

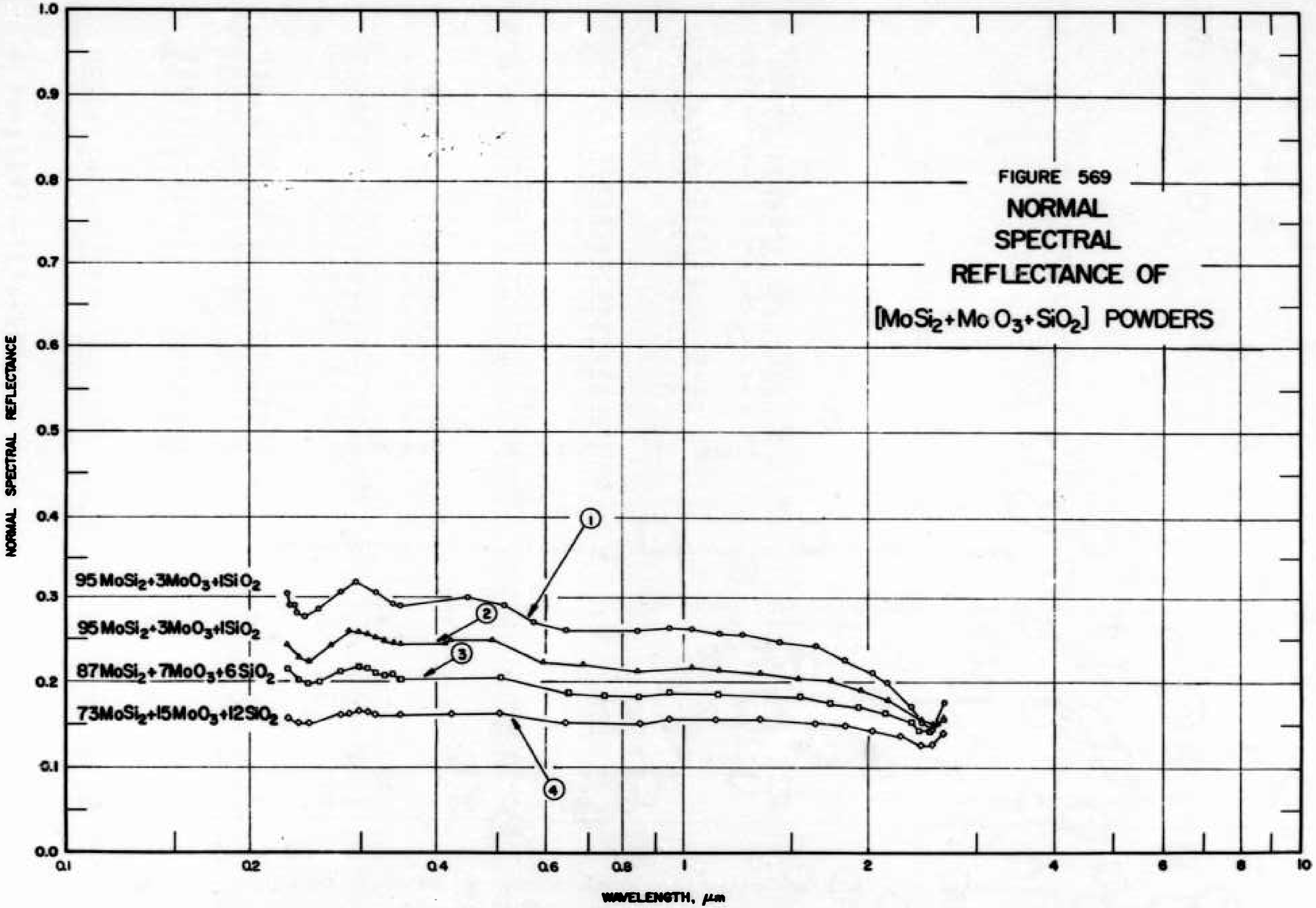


FIGURE 569
NORMAL
SPECTRAL
REFLECTANCE OF
[MoSi2+MoO3+SiO2] POWDERS
NORMAL SPECTRAL REFLECTANCE
WAVELENGTH, μm
0.0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
1.0
0.1
0.2
0.4
0.6
0.8
1
2
4
6
8
10
95 MoSi2+3MoO3+1SiO2
95 MoSi2+3MoO3+1SiO2
87MoSi2+7MoO3+6SiO2
73MoSi2+15MoO3+12SiO2
1
2
3
4

SPECIFICATION TABLE NO. 569 NORMAL SPECTRAL REFLECTANCE OF [$MoSi_2 + MoO_3 + SiO_2$] POWDERS

Curve No.	Ref. No.	Year	Temperature K	Wavelength Range, μm	Geometry θ	Geometry θ'	Geometry ω'	Reported Error, %	Composition (weight percent), Specifications, and Remarks
1	28	1963	298	0.230-2.65	~0°		2π		95 $MoSi_2$, 3 MoO_3, 2 SiO_2; sintered at 1723 K for 2 hrs (setter material $MoSi_2$); density 4.68 g cm^{-3}; smooth side measured; MgO reference standard; [Authors' designation: Sample No. 22].
2	28	1963	298	0.230-2.65	~0°		2π		Above specimen and conditions except rough side measured.
3	28	1963	298	0.230-2.65	~0°		2π		87 $MoSi_2$, 7 MoO_3, 6 SiO_2; sintered at 1723 K for 2 hrs (setter material $MoSi_2$); density 4.72 g cm^{-3}; x-ray structure $MoSi_2$ + MoO_3; MgO reference standard; [Authors' designation: Sample No. 23].
4	28	1963	298	0.230-2.65	~0°		2π		73 $MoSi_2$, 15 MoO_3, 12 SiO_2; sintered at 1723 K for 2 hrs (setter material $MoSi_2$); density 3.79 g cm^{-3}; MgO reference standard; [Authors' designation: Sample No. 24].

DATA TABLE NO. 569 NORMAL SPECTRAL REFLECTANCE OF [$MoSi_2 + MoO_3 + SiO_2$] POWDERS

[Wavelength, λ, μm; Reflectance, ρ; Temperature, T, K]

λ	ρ	λ	ρ	λ	ρ	λ	ρ	λ	ρ
CURVE 1		CURVE 1 (cont.)		CURVE 2 (cont.)		CURVE 3 (cont.)		CURVE 4	
T = 298		2.04	0.211	0.595	0.224	0.310	0.217	T = 298	
0.230	0.305	2.15	0.200	0.690	0.221	0.320	0.211	0.230	0.158
0.232	0.292	2.35	0.172	0.845	0.214	0.330	0.208	0.240	0.151
0.236	0.292	2.45	0.153	1.04	0.218	0.340	0.210	0.250	0.151
0.239	0.283	2.54	0.146	1.15	0.215	0.350	0.203	0.280	0.162
0.246	0.278	2.65	0.176	1.34	0.211	0.510	0.206	0.290	0.163
0.259	0.287			1.54	0.205	0.652	0.189	0.300	0.167
0.280	0.308	CURVE 2		1.75	0.201	0.748	0.186	0.310	0.166
0.297	0.320	T = 298		1.95	0.192	0.850	0.185	0.320	0.163
0.320	0.308			2.15	0.180	0.952	0.188	0.350	0.163
0.340	0.294	0.230	0.245	2.45	0.156	1.15	0.188	0.425	0.165
0.350	0.292	0.240	0.229	2.55	0.152	1.55	0.184	0.506	0.165
0.451	0.301	0.249	0.226	2.61	0.152	1.74	0.178	0.648	0.153
0.515	0.293	0.270	0.244	2.65	0.160	1.94	0.173	0.852	0.153
0.573	0.271	0.290	0.260			2.15	0.166	0.950	0.159
0.649	0.262	0.300	0.260	CURVE 3		2.35	0.154	1.14	0.158
0.844	0.262	0.310	0.257	T = 298		2.45	0.144	1.35	0.158
0.951	0.264	0.320	0.254			2.55	0.144	1.65	0.153
1.05	0.264	0.330	0.249	0.230	0.215	2.65	0.158	1.84	0.150
1.15	0.259	0.341	0.247	0.240	0.201			2.05	0.144
1.25	0.256	0.350	0.246	0.248	0.197			2.25	0.138
1.44	0.249	0.414	0.246	0.259	0.200			2.44	0.129
1.65	0.243	0.423	0.250	0.280	0.211			2.55	0.129
1.85	0.227	0.493	0.250	0.300	0.218			2.65	0.140

SPECIFICATION TABLE NO. 570 NORMAL TOTAL EMITTANCE OF [TiB_2 + TiO_2 + H_3BO_3] POWDERS

Curve No.	Ref. No.	Year	Temperature Range, K	Geometry θ'	Reported Error, %	Composition (weight percent), Specifications and Remarks
1*	28	1963	1273	~0°		76 TiB_2, 13 TiO_2, 11 H_3BO_3; sintered at 1973 K for 1 hr (setter material TiB_2); density 2.96 g cm^{-3}; x-ray structure TiB_2 + TiO_2 (rutile); integrated over the range 1-15 μm; [Authors' designation: Sample No. 12].

DATA TABLE NO. 570 NORMAL TOTAL EMITTANCE OF [TiB_2 + TiO_2 + H_3BO_3] POWDERS

[Temperature, T, K; Emittance, ϵ]

T	ϵ
CURVE 1*	
1273	0.75

*No plot given

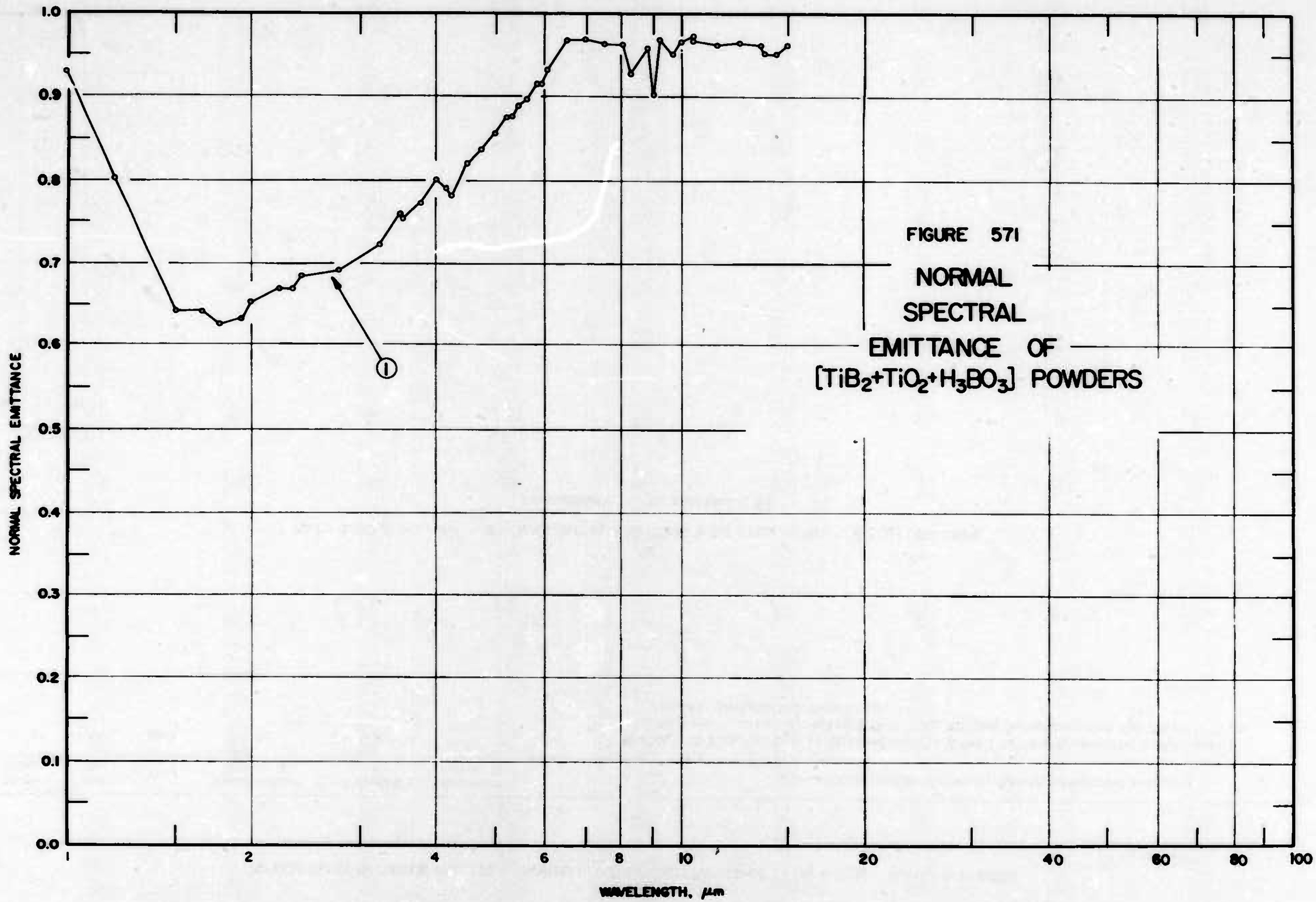


FIGURE 571 NORMAL SPECTRAL EMITTANCE OF $[TiB_2+TiO_2+H_3BO_3]$ POWDERS

SPECIFICATION TABLE NO. 571 NORMAL SPECTRAL EMITTANCE OF [TiB_2 + TiO_2 + H_3BO_3] POWDERS

Curve No.	Ref. No.	Year	Temperature K	Wavelength Range, μm	Geometry θ'	Reported Error, %	Composition (weight percent), Specifications, and Remarks
1	28	1963	1273	1.00-15.0	~0°		76 TiB_2, 13 TiO_2, 11 H_3BO_3; sintered at 1973 K for 1 hr (setter material TiB_2); density 2.06 g cm^{-3}; x-ray structure TiB_2 + TiO_2 (rutile); [Authors' designation: Sample No. 12].

DATA TABLE NO. 571 NORMAL SPECTRAL EMITTANCE OF [TiB_2 + TiO_2 + H_3BO_3] POWDERS

[Wavelength, λ, μm; Emittance, ϵ; Temperature, T, K]

λ	ϵ	λ	ϵ	λ	ϵ
CURVE 1 T = 1273		CURVE 1 (cont.)		CURVE 1 (cont.)	
		5.32	0.879	10.6	0.974*
1.00	0.930	5.43	0.893	11.2	0.973*
1.20	0.802	5.61	0.898	11.5	0.963
1.51	0.641	5.82	0.916	12.5	0.966
1.67	0.641	5.92	0.916	13.6	0.963
1.77	0.627	6.01	0.933*	13.7	0.953
1.93	0.632	6.09	0.933	14.5	0.953
2.00	0.652	6.16	0.949*	15.0	0.961
2.21	0.670	6.51	0.960*		
2.34	0.670	6.54	0.968		
2.43	0.685	7.01	0.970		
2.78	0.693	7.51	0.963		
3.23	0.722	8.07	0.963		
3.50	0.760	8.30	0.929		
3.52	0.755	8.85	0.959		
3.64	0.774*	8.91	0.903		
3.79	0.772	8.97	0.953*		
4.00	0.801	9.13	0.959*		
4.16	0.794	9.23	0.970		
4.24	0.781	9.32	0.960*		
4.50	0.822	9.61	0.960*		
4.73	0.839	9.72	0.951		
5.00	0.858	10.0	0.967		
5.20	0.878	10.5	0.975		
		10.5	0.969		

* Not shown on plot

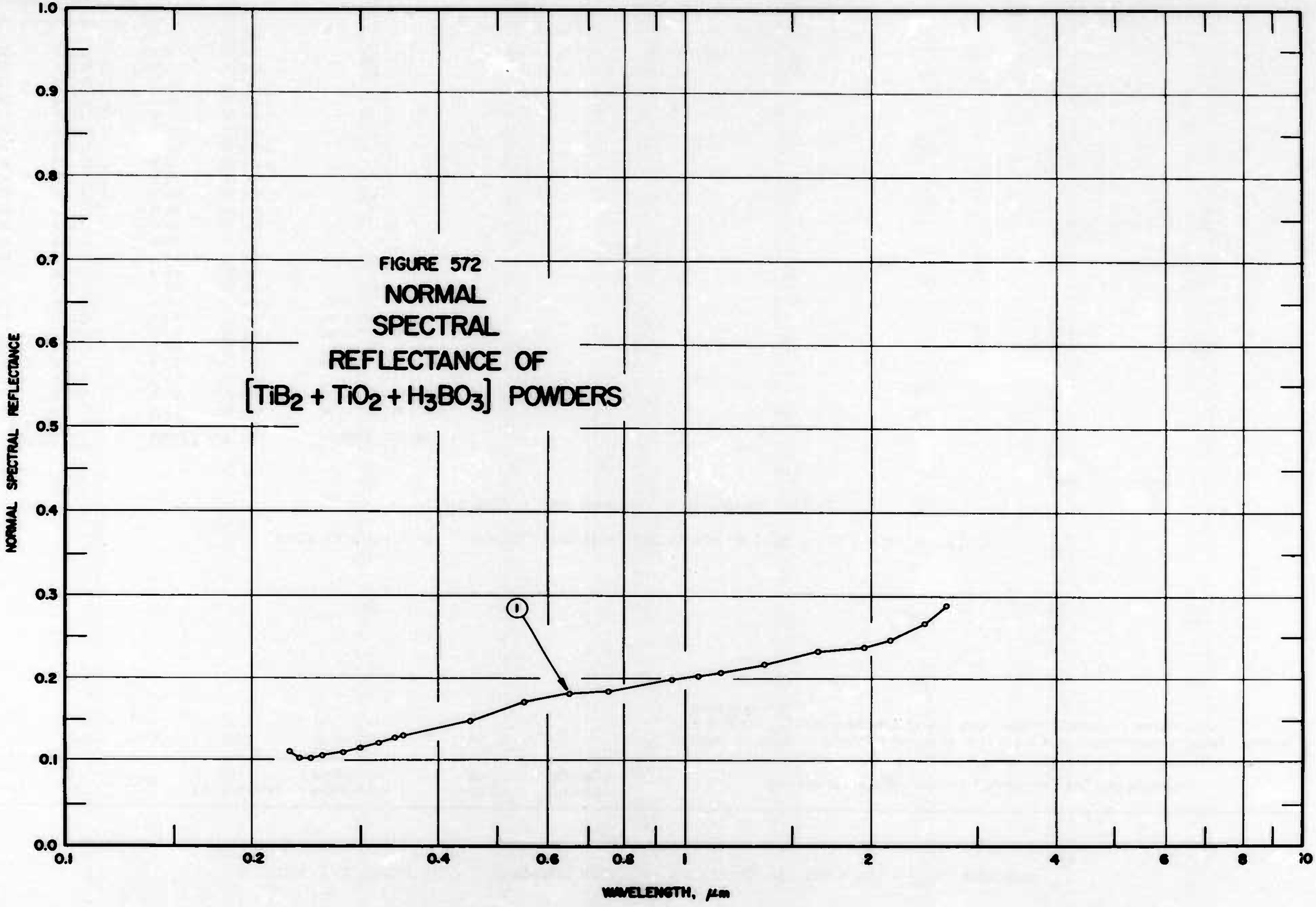


FIGURE 572
NORMAL
SPECTRAL
REFLECTANCE OF
[$TiB_2 + TiO_2 + H_3BO_3$] POWDERS
1
NORMAL SPECTRAL REFLECTANCE
1.0
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0.0
0.1
0.2
0.4
0.6
0.8
1
2
4
6
8
10
WAVELENGTH, μm

SPECIFICATION TABLE NO. 572 NORMAL SPECTRAL REFLECTANCE OF [TiB_2 + TiO_2 + H_3BO_3] POWDERS

Curve No.	Ref. No.	Year	Temperature K	Wavelength Range, μm	Geometry θ	Geometry θ'	Geometry ω'	Reported Error, %	Composition (weight percent), Specifications, and Remarks
1	28	1963	298	0.230-2.65	~0°		2π		76 TiB_2, 13 TiO_2, 11 H_3BO_3; sintered at 1973 K for 1 hr (setter material TiB_2); density 2.06 g cm^{-3}; x-ray structure TiB_2 + TiO_2 (rutile); MgO reference standard; [Authors' designation: Sample No. 12].

DATA TABLE NO. 572 NORMAL SPECTRAL REFLECTANCE OF [TiB_2 + TiO_2 + H_3BO_3] POWDERS

[Wavelength, λ, μm; Reflectance, ρ; Temperature, T, K]

λ	ρ
CURVE 1 T = 298	
0.230	0.110
0.239	0.101
0.249	0.101
0.259	0.105
0.280	0.110
0.299	0.115
0.320	0.121
0.340	0.128
0.350	0.130
0.450	0.149
0.550	0.171
0.650	0.181
0.750	0.183
0.952	0.199
1.05	0.201
1.15	0.208
1.34	0.218
1.65	0.232
1.95	0.238
2.15	0.247
2.45	0.268
2.65	0.290

9. GLASSES

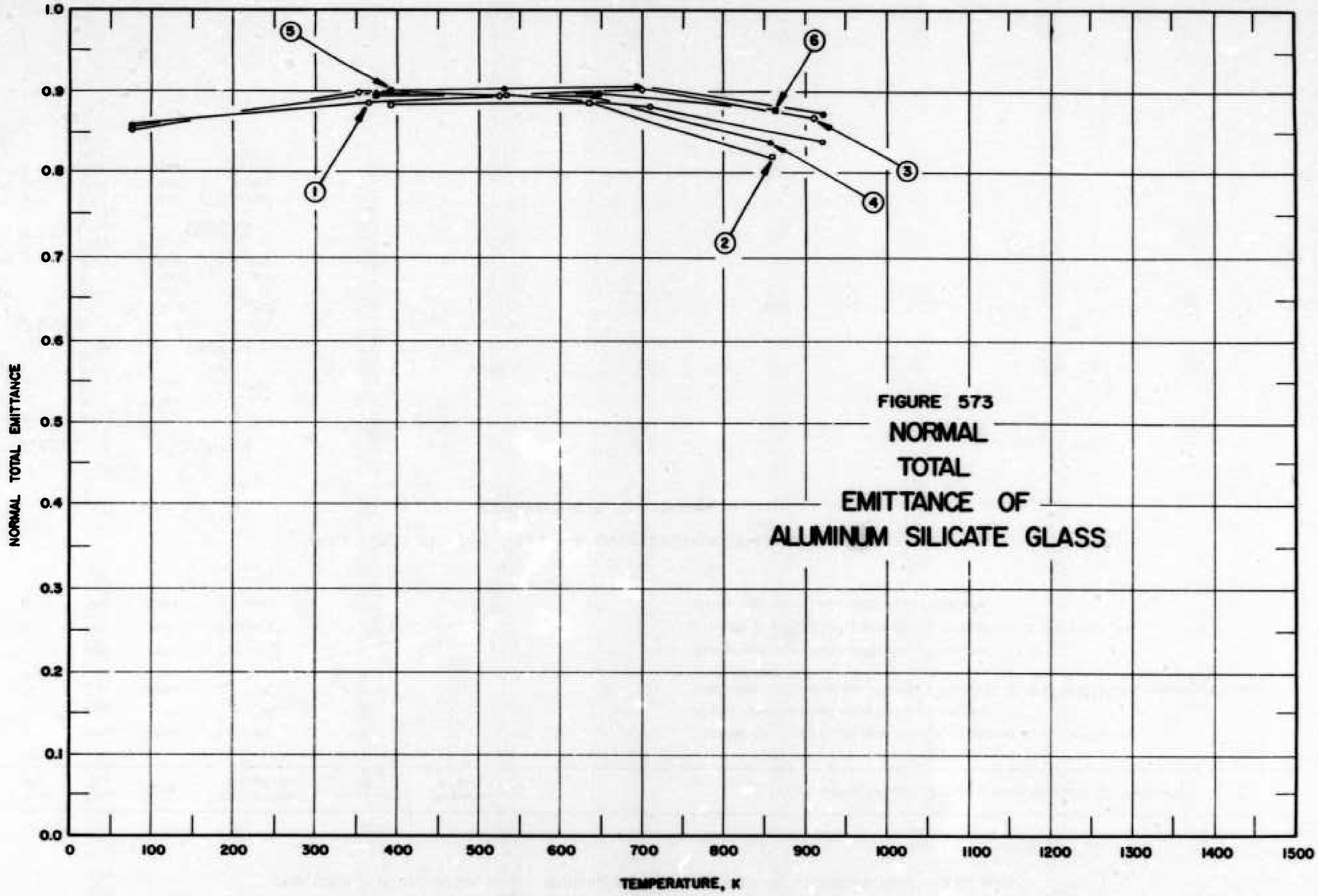


FIGURE 573
NORMAL
TOTAL
EMITTANCE OF
ALUMINUM SILICATE GLASS

SPECIFICATION TABLE NO. 573 NORMAL TOTAL EMITTANCE OF ALUMINUM SILICATE GLASS

Curve No.	Ref. No.	Year	Temperature Range, K	Geometry θ'	Reported Error, %	Composition (weight percent), Specifications and Remarks
1	106	1959	76.5-922	~0°		Corning No. 1723 (4.76 mm thick); measured in air; cycle one.
2	106	1959	391-860	~0°		Above specimen and conditions; cycle two.
3	106	1959	75.9-911	~0°		Aluminum silicate glass, Corning No. 1723 (7.9375 mm thick); measured in air; cycle one.
4	106	1959	373-859	~0°		Above specimen and conditions; cycle two.
5	106	1959	76.5-923	~0°		Corning No. 1723 (12.7 mm thick); measured in air; cycle one.
6	106	1959	373-862	~0°		Above specimen and conditions; cycle two.

DATA TABLE NO. 573 NORMAL TOTAL EMITTANCE OF ALUMINUM SILICATE GLASS

[Temperature, T, K; Emittance, ϵ]

T	ϵ	T	ϵ
CURVE 1		CURVE 4	
76.5	0.860	373	0.899
366	0.887	641	0.895
534	0.896	859	0.838
710	0.881		
822	0.839	CURVE 5	
		76.5	0.857
CURVE 2		392	0.902
391	0.883	531	0.901
637	0.887	693	0.906
860	0.819	923	0.872
CURVE 3		CURVE 6	
75.9	0.853	373	0.898
351	0.899	647	0.898
527	0.893	862	0.878
700	0.901		
911	0.869		

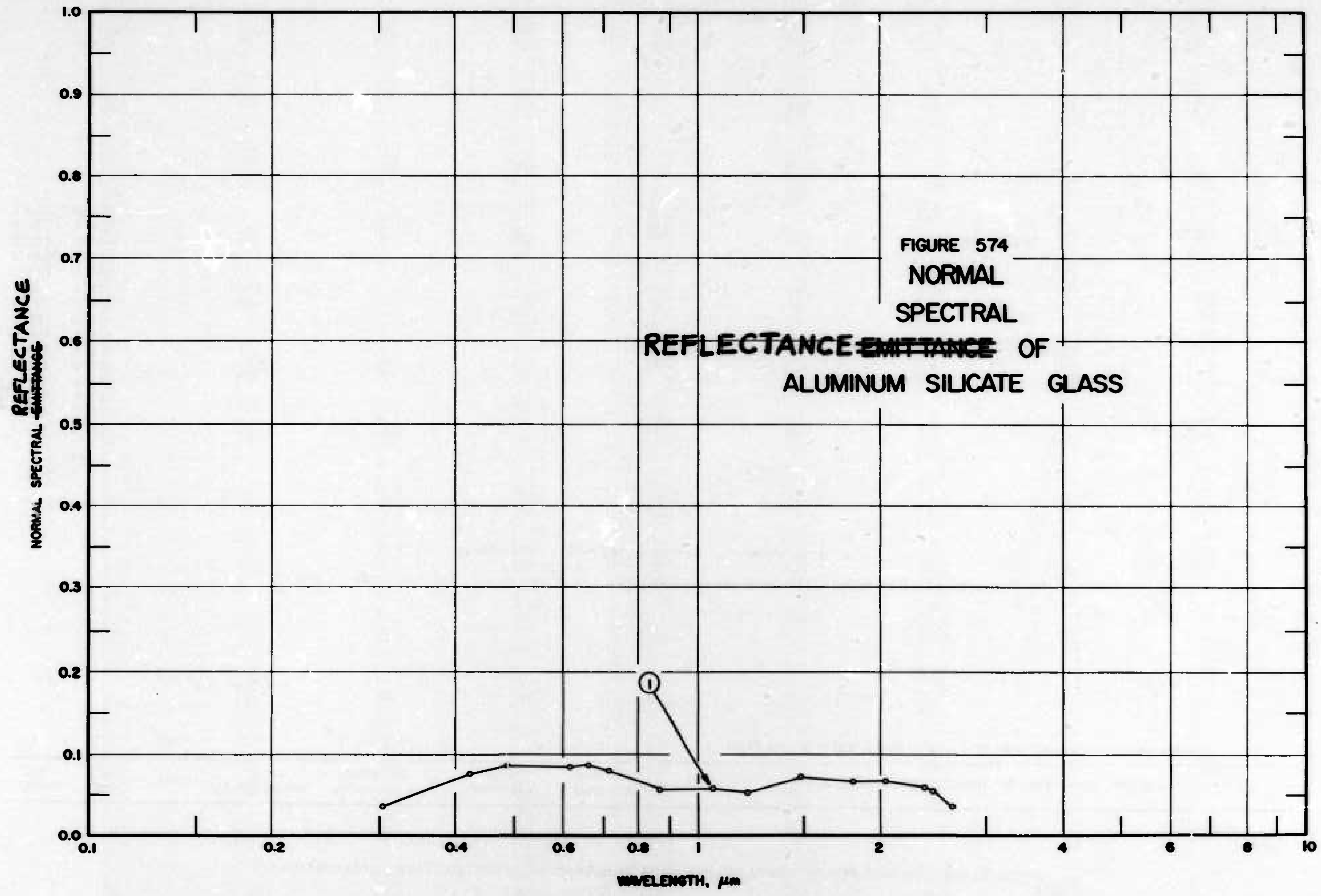


FIGURE 574
NORMAL
SPECTRAL
REFLECTANCE ~~EMITTANCE~~ OF
ALUMINUM SILICATE GLASS
REFLECTANCE
NORMAL SPECTRAL ~~EMITTANCE~~
1.0
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0.0
0.1
0.2
0.4
0.6
0.8
1
2
4
6
8
10
WAVELENGTH, μm
1

SPECIFICATION TABLE NO. 574 NORMAL SPECTRAL REFLECTANCE OF ALUMINUM SILICATE GLASS

Curve No.	Ref. No.	Year	Temperature, K	Wavelength Range, μm	Geometry θ	Geometry θ'	Geometry ω'	Reported Error, %	Composition (weight percent), Specifications, and Remarks
1	106	1959	298	0.303-2.61	9°		2π	4	Corning No. 1723 (12.7 mm thick); data extracted from smooth curve.

T 10062
See p. 82, Fig 57

DATA TABLE NO. 574 NORMAL SPECTRAL REFLECTANCE OF ALUMINUM SILICATE GLASS

[Wavelength, λ, μm; Reflectance, ρ; Temperature, T, K]

λ	ρ
CURVE 1	T = 298
0.303	0.036
0.423	0.077
0.489	0.087
0.616	0.085
0.664	0.087
0.711	0.080
0.869	0.056
1.06	0.058
12.0	0.051
1.47	0.072
1.80	0.067
2.04	0.067
2.35	0.060
2.44	0.055
2.61	0.035

SPECIFICATION TABLE NO. 575 NORMAL SOLAR ABSORPTANCE OF ALUMINUM SILICATE GLASS

Curve No.	Ref. No.	Year	Temperature Range, K	Geometry θ	Reported Error, %	Composition (weight percent), Specifications and Remarks
1*	106	1959	298	9°		Corning No. 1723 (12.7 mm thick); computed from spectral reflectance and spectral transmittance data (0.3 to 3 μm) for above atmosphere conditions.
2*	106	1959	298	9°		Above specimen and conditions except computed for sea level conditions.

DATA TABLE NO. 575 NORMAL SOLAR ABSORPTANCE OF ALUMINUM SILICATE GLASS

[Temperature, T, K; Absorptance, α]

T	α
CURVE 1*	
298	0.133
CURVE 2*	
298	0.087

* Not shown on plot

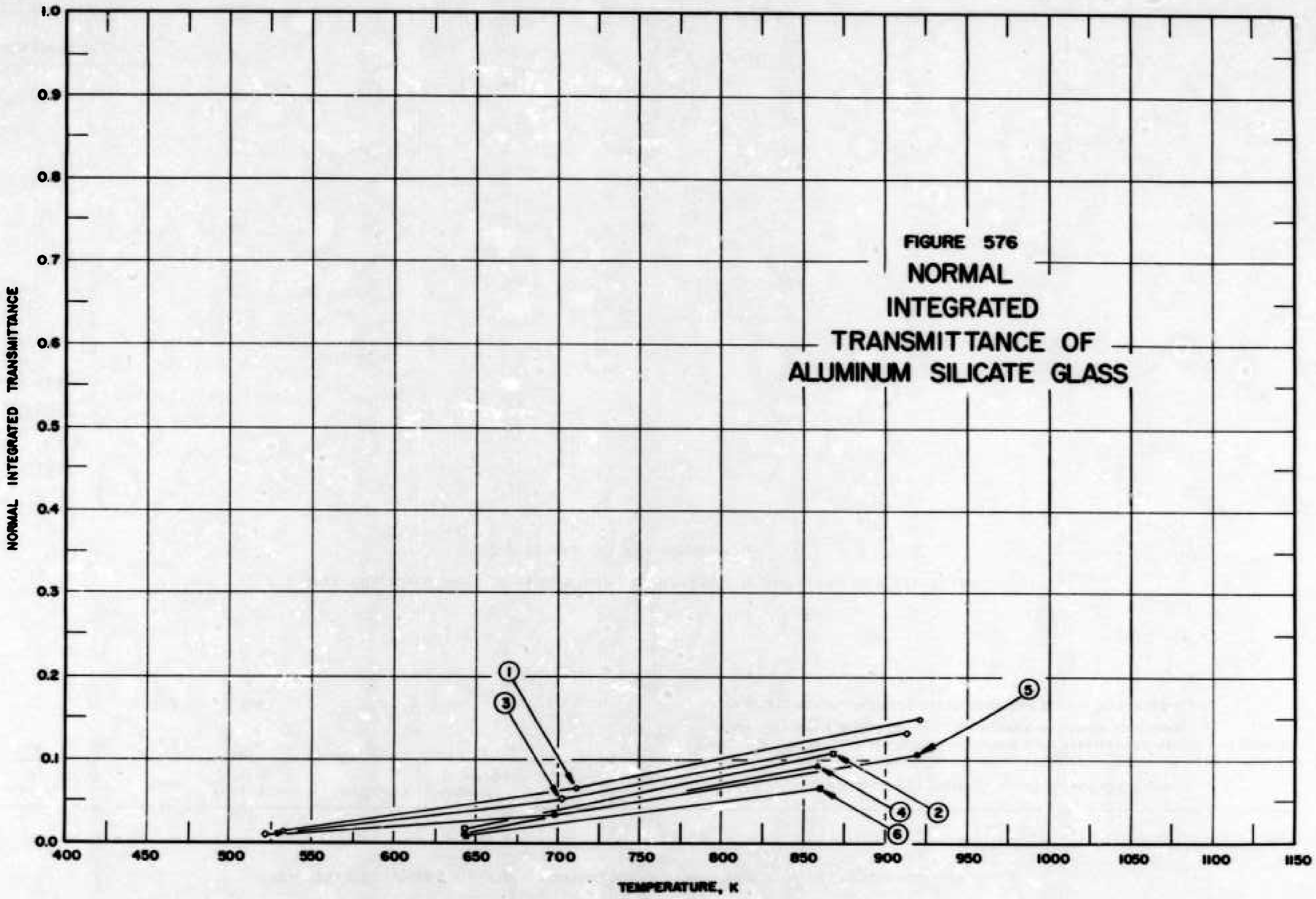


FIGURE 576
NORMAL
INTEGRATED
TRANSMITTANCE OF
ALUMINUM SILICATE GLASS

SPECIFICATION TABLE NO. 576 NORMAL INTEGRATED TRANSMITTANCE OF ALUMINUM SILICATE GLASS

Curve No.	Ref. No.	Year	Temperature Range, K	Geometry θ	θ'	ω'	Reported Error, %	Composition (weight percent), Specifications and Remarks
1	106	1959	533-922	~0°	~0°			Corning No. 1723 (4.76 mm thick); measured in air; black body incident radiation at temperature of measurement; cycle one.
2	106	1959	643-868	~0°	~0°			Above specimen and conditions; cycle two.
3	106	1959	522-914	~0°	~0°			Corning No. 1723 (7.94 mm thick); measured in air; black body incident radiation at temperature of measurement; cycle one.
4	106	1959	643-859	~0°	~0°			Above specimen and conditions; cycle two.
5	106	1959	530-920	~0°	~0°			Corning No. 1723 (12.7 mm thick); measured in air; black body incident radiation at temperature of measurement; cycle one.
6	106	1959	642-860	~0°	~0°			Above specimen and conditions; cycle two.

DATA TABLE NO. 576 NORMAL INTEGRATED TRANSMITTANCE OF ALUMINUM SILICATE GLASS

[Temperature, T, K; Transmittance, τ]

T	τ	T	τ
CURVE 1		**CURVE 5**	
533	0.013	530	0.010
706	0.065	699	0.034
922	0.150	920	0.106
CURVE 2		**CURVE 6**	
643	0.018	642	0.011*
868	0.109	860	0.065
CURVE 3			
522	0.010		
702	0.052		
914	0.132		
CURVE 4			
643	0.011		
859	0.092		

*Not shown on plot

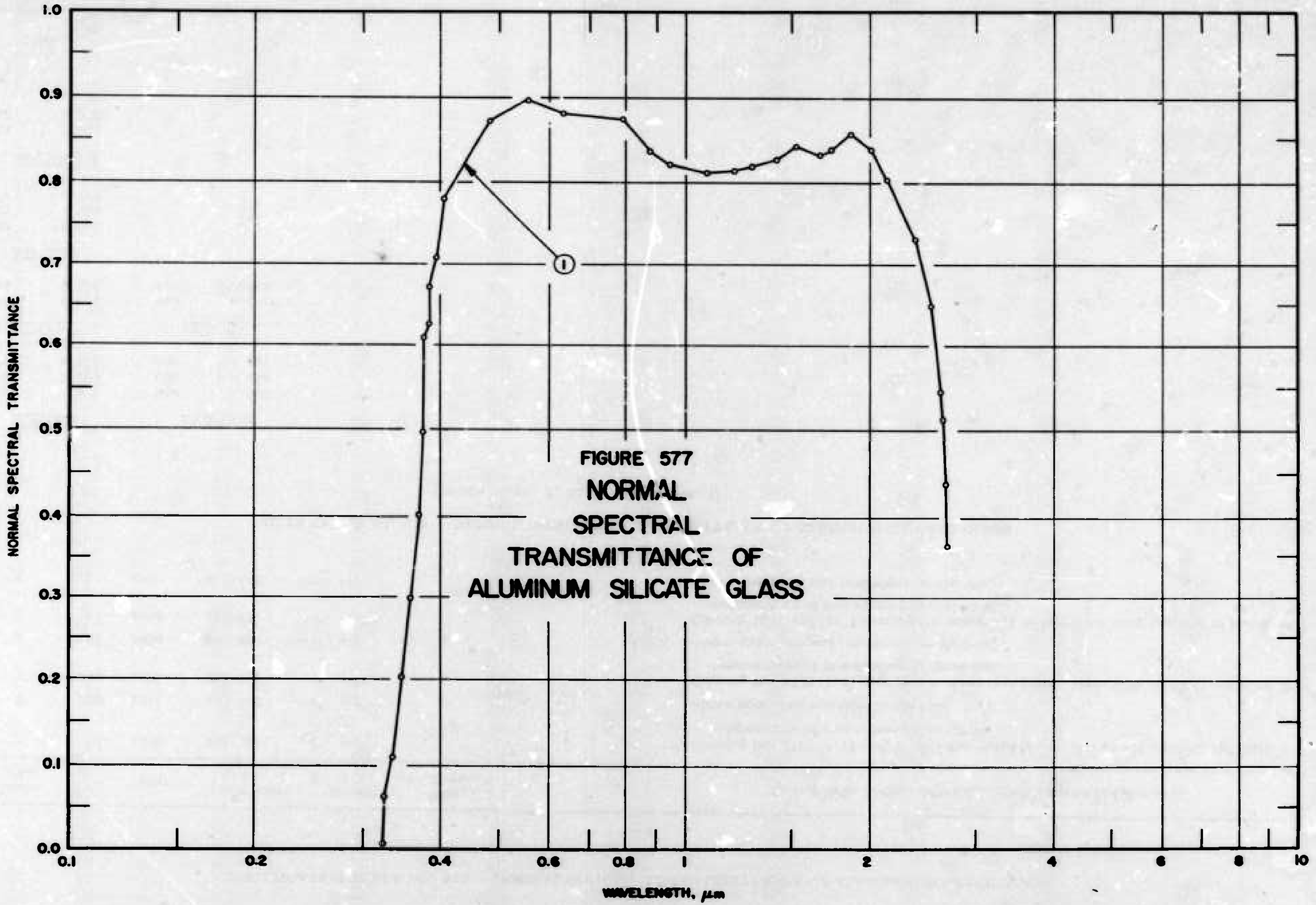


FIGURE 577
NORMAL
SPECTRAL
TRANSMITTANCE OF
ALUMINUM SILICATE GLASS

SPECIFICATION TABLE NO. 577 NORMAL SPECTRAL TRANSMITTANCE OF ALUMINUM SILICATE GLASS

Curve No.	Ref. No.	Year	Temperature, K	Wavelength Range, μm	Geometry θ	θ'	ω'	Reported Error, %	Composition (weight percent), Specifications, and Remarks
1	106	1959	298	0.324-2.69	~0°		2π		Corning No. 1723 (12.7 mm thick).

DATA TABLE NO. 577 NORMAL SPECTRAL TRANSMITTANCE OF ALUMINUM SILICATE GLASS

[Wavelength, λ, μm; Transmittance, τ; Temperature, T, K]

λ	τ	λ	τ
CURVE 1 T = 298		CURVE 1 (cont.)	
		1.73	0.839
0.324	0.008	1.86	0.858
0.324	0.064	2.01	0.838
0.335	0.110	2.14	0.804
0.333	0.138*	2.38	0.731
0.345	0.201	2.51	0.650
0.358	0.299	2.60	0.547
0.370	0.401	2.63	0.514
0.375	0.499	2.66	0.439
0.377	0.610	2.69	0.364
0.383	0.627		
0.383	0.673		
0.394	0.709		
0.405	0.780		
0.481	0.871		
0.557	0.897		
0.731	0.881		
0.791	0.875		
0.876	0.837		
0.942	0.822		
1.08	0.813		
1.20	0.815		
1.28	0.820		
1.41	0.829		
1.52	0.841		
1.65	0.831		

* Not shown on plot

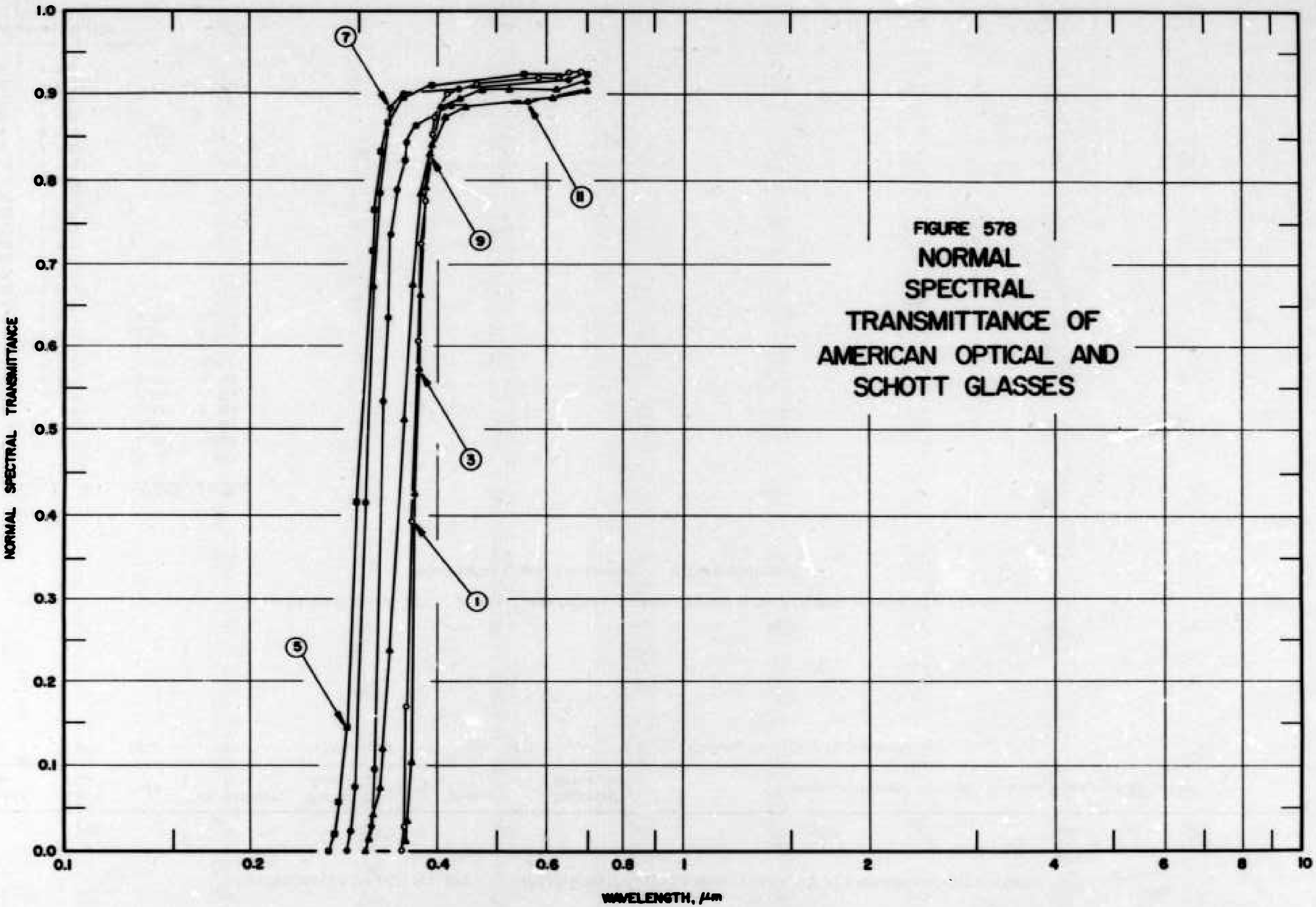


FIGURE 578
NORMAL SPECTRAL TRANSMITTANCE OF AMERICAN OPTICAL AND SCHOTT GLASSES

SPECIFICATION TABLE NO. 578 NORMAL SPECTRAL TRANSMITTANCE OF AMERICAN OPTICAL AND SCHOTT GLASSES

Curve No.	Ref. No.	Year	Temperature K	Wavelength Range, μm	Geometry θ	θ'	ω'	Reported Error, %	Composition (weight percent), Specifications, and Remarks
1	406	1968	~298	0.350-0.689	~0°	~0°			American Optical Co. AO-1053 glass (5 mm thick); data extracted from smooth curve.
2*	406	1968	~298	0.350-0.689	~0°	~0°			Above specimen and conditions except exposed to an irradiance of ~1.9 solar constants for 24 hrs.
3	406	1968	~298	0.355-0.700	~0°	~0°			Schott Glassworks B & L 529516 glass (5 mm thick); data extracted from smooth curve.
4*	406	1968	~298	0.355-0.700	~0°	~0°			Above specimen and conditions except exposed to an irradiance of ~1.9 solar constants for 24 hrs.
5	406	1968	~298	0.268-0.700	~0°	~0°			Schott Glassworks BK-8 glass (5 mm thick); data extracted from smooth curve.
6*	406	1968	~298	0.268-0.700	~0°	~0°			Above specimen and conditions except exposed to an irradiance of ~1.9 solar constants for 24 hrs.
7	406	1968	~298	0.287-0.700	~0°	~0°			Schott Glassworks K-5 glass (5 mm thick); data extracted from smooth curve.
8*	406	1968	~298	0.287-0.700	~0°	~0°			Above specimen and conditions except exposed to an irradiance of ~1.9 solar constants for 24 hrs.
9	406	1968	~298	0.306-0.700	~0°	~0°			Schott Glassworks KzSF-4 glass (5 mm thick); data extracted from smooth curve.
10*	406	1968	~298	0.300-0.700	~0°	~0°			Above specimen and conditions except exposed to an irradiance of ~1.9 solar constants for 24 hrs.
11	406	1968	~298	0.306-0.700	~0°	~0°			Schott Glassworks SF-2 glass (5 mm thick); data extracted from smooth curve.
12*	406	1968	~298	0.306-0.700	~0°	~0°			Above specimen and conditions except exposed to an irradiance of ~1.9 solar constants for 24 hrs.

*Not shown on plot

DATA TABLE NO. 578 NORMAL SPECTRAL TRANSMITTANCE OF AMERICAN OPTICAL AND SCHOTT GLASSES

[Wavelength, λ, μm; Transmittance, τ; Temperature, T, K]

λ	τ
CURVE 1	
T ~ 298	
0.350	0.000
0.352	0.028
0.358	0.170
0.364	0.395
0.471	0.607
0.377	0.726
0.381	0.778
0.386	0.821*
0.393	0.852
0.398	0.872
0.409	0.887*
0.419	0.900
0.436	0.906*
0.462	0.911
0.588	0.920
0.630	0.920
0.651	0.927
0.689	0.927
CURVE 2*	
T ~ 298	
0.350	0.000
0.352	0.028
0.358	0.170
0.364	0.395
0.371	0.607
0.377	0.726
0.381	0.778
0.386	0.810
0.400	0.857
0.410	0.878
0.421	0.893
0.444	0.904
0.462	0.911
0.588	0.920
0.651	0.927
0.689	0.927
CURVE 3	
T ~ 298	
0.355	0.011
0.357	0.034
0.361	0.102
CURVE 3 (cont.)	
0.369	0.427
0.374	0.572
0.376	0.663
0.384	0.791
0.391	0.841
0.395	0.861*
0.400	0.874*
0.409	0.887
0.437	0.896
0.474	0.906
0.521	0.908
0.628	0.908
0.700	0.917
CURVE 4*	
T ~ 298	
0.355	0.011
0.357	0.034
0.361	0.102
0.369	0.427
0.374	0.572
0.376	0.663
0.384	0.763
0.388	0.808
0.394	0.840
0.400	0.861
0.412	0.879
0.423	0.886
0.464	0.899
0.521	0.908
0.628	0.908
0.700	0.917
CURVE 5	
T ~ 298	
0.268	0.000
0.272	0.020
0.278	0.057
0.285	0.144
0.297	0.417
0.315	0.718
0.318	0.769
0.325	0.833
0.332	0.868
CURVE 5 (cont.)	
0.352	0.899
0.393	0.911
0.554	0.921
0.685	0.929*
0.700	0.924
CURVE 6*	
T ~ 298	
0.268	0.000
0.274	0.025
0.281	0.057
0.287	0.118
0.306	0.389
0.315	0.497
0.326	0.582
0.347	0.656
0.387	0.771
0.409	0.818
0.437	0.826
0.473	0.855
0.565	0.875
0.585	0.887
0.645	0.896
0.700	0.907
CURVE 7	
T ~ 298	
0.287	0.000
0.290	0.021
0.295	0.074
0.307	0.416
0.316	0.672
0.324	0.788
0.332	0.867*
0.338	0.883
0.354	0.900
0.435	0.909
0.588	0.919*
0.652	0.919
0.700	0.926*
CURVE 8*	
T ~ 298	
0.287	0.000
0.290	0.021
0.295	0.074
0.301	0.205
0.316	0.603
0.323	0.720
0.331	0.788
0.342	0.831
0.355	0.859
0.379	0.876
0.403	0.884
0.464	0.890
0.489	0.898
0.543	0.898
0.646	0.908
0.700	0.915
CURVE 9	
T ~ 298	
0.306	0.000
0.310	0.015
0.315	0.041
0.321	0.072
0.327	0.120
0.335	0.239
0.353	0.512
0.366	0.676
0.379	0.787
0.390	0.834
0.398	0.857*
0.412	0.874
0.448	0.886
0.616	0.898
0.700	0.904
CURVE 10*	
T ~ 298	
0.300	0.143
0.307	0.230
0.319	0.438
0.333	0.620
0.344	0.728
0.351	0.784
CURVE 10 (cont.)*	
0.363	0.836
0.372	0.850
0.397	0.863
0.449	0.874
0.476	0.882
0.627	0.882
0.700	0.887
CURVE 11	
T ~ 298	
0.306	0.000*
0.311	0.028
0.316	0.096
0.329	0.531
0.333	0.635
0.339	0.739
0.345	0.790
0.354	0.824
0.358	0.845
0.370	0.861
0.421	0.889
0.561	0.891
0.700	0.906*
CURVE 12*	
T ~ 298	
0.306	0.000
0.311	0.028
0.316	0.096
0.329	0.531
0.333	0.635
0.339	0.731
0.347	0.804
0.354	0.845
0.360	0.858
0.372	0.873
0.390	0.883
0.421	0.889
0.561	0.891
0.700	0.906

*Not shown on plot

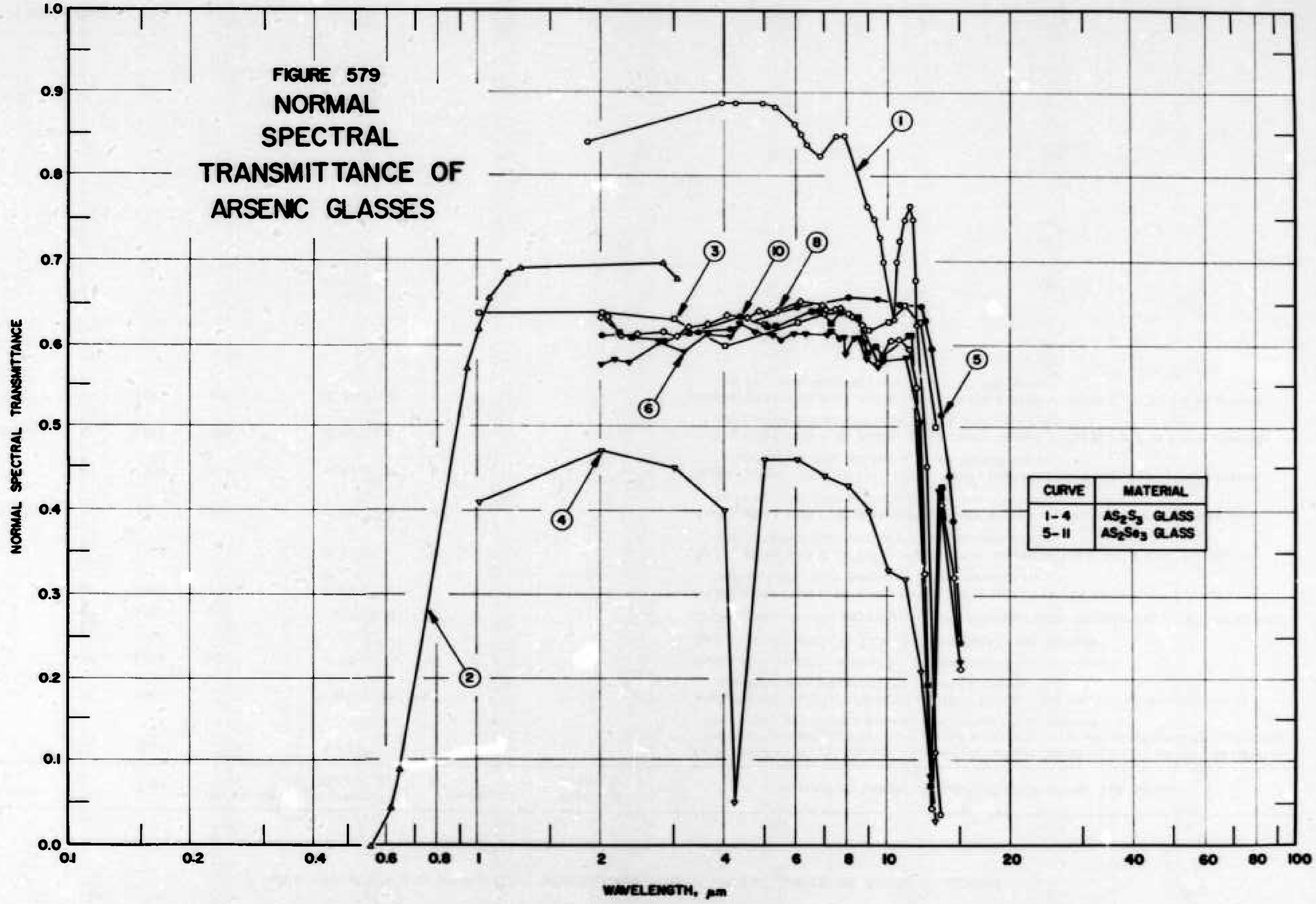


FIGURE 579 NORMAL SPECTRAL TRANSMITTANCE OF ARSENIC GLASSES

SPECIFICATION TABLE NO. 579 NORMAL SPECTRAL TRANSMITTANCE OF ARSENIC GLASSES

Curve No.	Ref. No.	Year	Temperature, K	Wavelength Range, μm	Geometry θ	θ'	ω'	Reported Error, %	Composition (weight percent), Specifications, and Remarks
1	441	1952	179.2	1.85-13.3	0°	0°			As_2S_3 glass (2.09 mm thick); with striations and streaks running roughly parallel to a diameter and perpendicular to the entrance slit of the spectrometer; measured in helium gas (with a pressure of several millimeters).
2	94	1967	298	0.547-3.00	>15°	>15°		±2	As_2S_3 Stoichiometric Arsenic Trisulfide Glass, (5.0 mm thick); single crystal; polished; data extracted from smooth curve.
3	264	1950	298	1-13	0°	0°			As_2S_3; glassy state; molded (0.15 mm thick); red in color.
4	264	1950	298	1-13	0°	0°			As_2S_3; glassy state; molded (2.6 mm thick); red in color.
5	49	1963	298	2.0-15.0	0°	0°			As_2Se_3 glass; 99.99+ pure; ground and polished; data extracted from smooth curve.
6	49	1963	298	2.00-15.0	0°	0°			As_2Se_3 glass with 0.05 TeO_2 added; melts heated at 823 K for 3 to 4 hrs; ground and polished; data extracted from smooth curve.
7*	49	1963	298	2.00-15.0	0°	0°			As_2Se_3 glass with 0.10 TeO_2 added; melts heated at 823 K for 3 to 4 hrs; ground and polished; data extracted from smooth curve.
8	49	1963	298	2.00-15.0	0°	0°			As_2Se_3 glass with 0.05 SeO_2 added; melts heated at 823 K for 3 to 4 hrs; ground and polished; data extracted from smooth curve.
9*	49	1963	298	2.00-15.0	0°	0°			As_2Se_3 glass with 0.10 SeO_2 added; melts heated at 823 K for 3 to 4 hrs; ground and polished; data extracted from smooth curve.
10	49	1963	298	2.00-15.0	0°	0°			As_2Se_3 glass with 0.05 As_2O_3 added; melts heated at 823 K for 3 to 4 hrs; ground and polished; data extracted from smooth curve.
11*	49	1963	298	2.00-15.0	0°	0°			As_2Se_3 glass with 0.10 As_2O_3 added; melts heated at 823 K for 3 to 4 hrs; ground and polished; data extracted from smooth curve.

* Not shown on plot

DATA TABLE NO. 579 NORMAL SPECTRAL TRANSMITTANCE OF ARSENIC GLASSES

[Wavelength, λ, μm; Transmittance, τ; Temperature, T, K]

λ	τ
CURVE 1 T = 179.2	
1.85	0.841
3.92	0.888
4.28	0.888
4.98	0.888
5.31	0.883
5.91	0.863
6.14	0.850
6.34	0.839
6.64	0.829*
6.89	0.826
7.12	0.832*
7.51	0.849
7.82	0.849
8.01	0.841*
8.19	0.829*
8.48	0.798*
8.78	0.784*
8.97	0.765
9.31	0.750
9.61	0.731
9.84	0.699
10.1	0.639*
10.3	0.632
10.3	0.640*
10.4	0.664*
10.5	0.699
10.6	0.727
10.9	0.751
11.0	0.762*
11.3	0.766
11.5	0.750
11.7	0.680
11.9	0.626
12.0	0.551*
12.2	0.522*
12.3	0.507*
12.4	0.489*
12.5	0.451
12.6	0.359*
12.8	0.261*
12.9	0.163*
13.0	0.110
13.1	0.081*
13.1	0.058*
13.3	0.037

λ	τ
CURVE 2 T = 298	
0.547	0.000
0.608	0.044
0.641	0.089
0.939	0.571
1.00	0.622
1.07	0.658
1.19	0.686
1.27	0.693
2.81	0.698
3.00	0.681
CURVE 3 T = 298	
1	0.64
2	0.64
3	0.633
4	0.60
5	0.627
6	0.63
7	0.64
8	0.64
9	0.62
10	0.63
11	0.65
12	0.63
13	0.50
CURVE 4 T = 298	
1	0.41
2	0.47
3	0.45
4	0.40
4.2	0.051
5	0.46
6	0.46
7	0.44
8	0.43
9	0.40
10	0.33
11	0.32
12	0.21
13	0.03

λ	τ
CURVE 5 T = 298	
2.00	0.613
3.43	0.617
4.12	0.621
6.00	0.648
8.00	0.659
9.45	0.656
10.8	0.650
12.0	0.649
12.4	0.631
12.8	0.597
13.5	0.514
14.0	0.440
14.3	0.387
15.0	0.245
CURVE 6 T = 298	
2.00	0.576
2.15	0.582
2.32	0.579
2.78	0.604
3.17	0.591
3.64	0.615
4.12	0.611
4.37	0.628
4.71	0.618
5.26	0.613
5.49	0.607
5.89	0.616
6.31	0.615
7.14	0.614
7.29	0.619
7.60	0.610
7.85	0.611
7.97	0.590
8.35	0.610
8.49	0.611
8.87	0.585
9.17	0.583*
9.50	0.573
9.76	0.581*
11.1	0.585
11.4	0.572*
11.7	0.541*

λ	τ
CURVE 6 (cont.)	
12.0	0.506
12.1	0.466*
12.4	0.340*
12.6	0.081
12.7	0.085*
12.7	0.195*
12.9	0.366*
13.1	0.403*
13.2	0.423*
13.4	0.424
13.6	0.411*
14.7	0.269*
15.0	0.221
CURVE 7* T = 298	
2.00	0.571
2.41	0.573
2.84	0.589
3.00	0.589
3.30	0.583
3.54	0.597
3.69	0.595
4.13	0.600
4.44	0.618
5.03	0.600
7.73	0.600
7.86	0.586
8.00	0.582
8.38	0.602
8.77	0.579
9.24	0.569
9.55	0.569
9.76	0.573
11.2	0.573
11.5	0.560
11.8	0.517
12.0	0.469
12.2	0.390
12.4	0.253
12.4	0.097
12.5	0.049
12.7	0.035
12.9	0.219
13.1	0.376
13.3	0.403

λ	τ
CURVE 7 (cont.)	
13.6	0.390
13.9	0.362
15.0	0.202
CURVE 8 T = 298	
2.00	0.636
2.07	0.636
2.23	0.613
2.45	0.615
2.84	0.619
3.05	0.612
3.26	0.624
3.63	0.628
4.01	0.639
4.54	0.635
4.83	0.643
5.06	0.640
5.40	0.644
5.57	0.643*
5.84	0.654*
6.05	0.654
6.12	0.650
6.98	0.649
7.08	0.645*
7.42	0.645
7.66	0.646
8.19	0.639
8.70	0.627
8.89	0.601*
9.24	0.594*
9.50	0.579*
9.71	0.579
10.2	0.606
10.4	0.601*
10.6	0.608*
10.9	0.604*
11.2	0.608*
11.4	0.596
11.8	0.549
11.9	0.511*
12.1	0.465*
12.3	0.328
12.5	0.174*
12.6	0.045*

λ	τ
CURVE 8 (cont.)	
12.7	0.045
12.8	0.161*
12.9	0.263*
13.0	0.354*
13.3	0.402*
13.5	0.408
13.9	0.387*
14.2	0.350*
14.5	0.322
15.0	0.211
CURVE 9* T = 298	
2.00	0.600
2.36	0.591
2.77	0.593
3.50	0.591
3.69	0.601
3.84	0.612
4.28	0.615
4.66	0.606
5.07	0.618
5.42	0.620
6.15	0.626
6.81	0.625
8.59	0.596
9.03	0.568
9.62	0.554
10.0	0.561
10.4	0.582
10.9	0.582
11.2	0.570
11.7	0.524
11.9	0.471
11.9	0.451
12.1	0.396
12.4	0.160
12.6	0.019
12.7	0.019
12.8	0.056
12.9	0.220
13.0	0.315
13.1	0.346
13.3	0.372
13.5	0.380

λ	τ
CURVE 9 (cont.)	
14.1	0.339
14.5	0.271
14.8	0.209
15.0	0.172
CURVE 10 T = 298	
2.00	0.633*
2.20	0.617
2.36	0.610
2.84	0.607
3.27	0.616
3.58	0.625*
4.04	0.631*
4.39	0.638
5.03	0.626
5.32	0.626
6.52	0.642
6.70	0.641*
6.85	0.643
7.23	0.629
7.71	0.640
8.04	0.628*
8.34	0.636*
8.55	0.635*
8.77	0.603
8.97	0.591
9.24	0.601*
9.39	0.600
9.69	0.589
10.2	0.606*
10.8	0.597*
11.0	0.599*
11.3	0.614*
11.4	0.614
11.5	0.604*
11.8	0.563*
12.0	0.501*
12.3	0.367*
12.4	0.251*
12.5	0.192*
12.6	0.116*
12.6	0.083*
12.6	0.070
12.7	0.076*

λ	τ
CURVE 10 (cont.)	
12.7	0.156*
12.8	0.287*
12.9	0.343*
13.0	0.377*
13.2	0.416*
13.3	0.426*
13.5	0.428
13.8	0.401*
14.0	0.394*
14.8	0.257*
15.0	0.213*
CURVE 11* T = 298	
2.00	0.609
2.39	0.593
3.06	0.592
3.78	0.598
4.41	0.624
4.61	0.617
4.70	0.620
4.84	0.614
5.22	0.607
6.11	0.619
6.24	0.622
6.74	0.621
7.20	0.620
7.52	0.606
7.72	0.622
8.10	0.611
8.40	0.613
8.66	0.588
8.93	0.577
9.61	0.576
10.2	0.586
11.4	0.577
11.6	0.564
11.8	0.536
12.0	0.471
12.3	0.311
12.4	0.254
12.5	0.115
12.6	0.026
12.7	0.024
12.8	0.025

* Not shown on plot

DATA TABLE NO. 579 (continued)

λ	τ
CURVE 11 (cont.)*	
T = 298	
12.8	0.080
12.8	0.255
12.9	0.323
13.2	0.393
13.4	0.416
13.6	0.410
14.0	0.355
14.1	0.338
14.7	0.228
15.0	0.171

*Not shown on plot

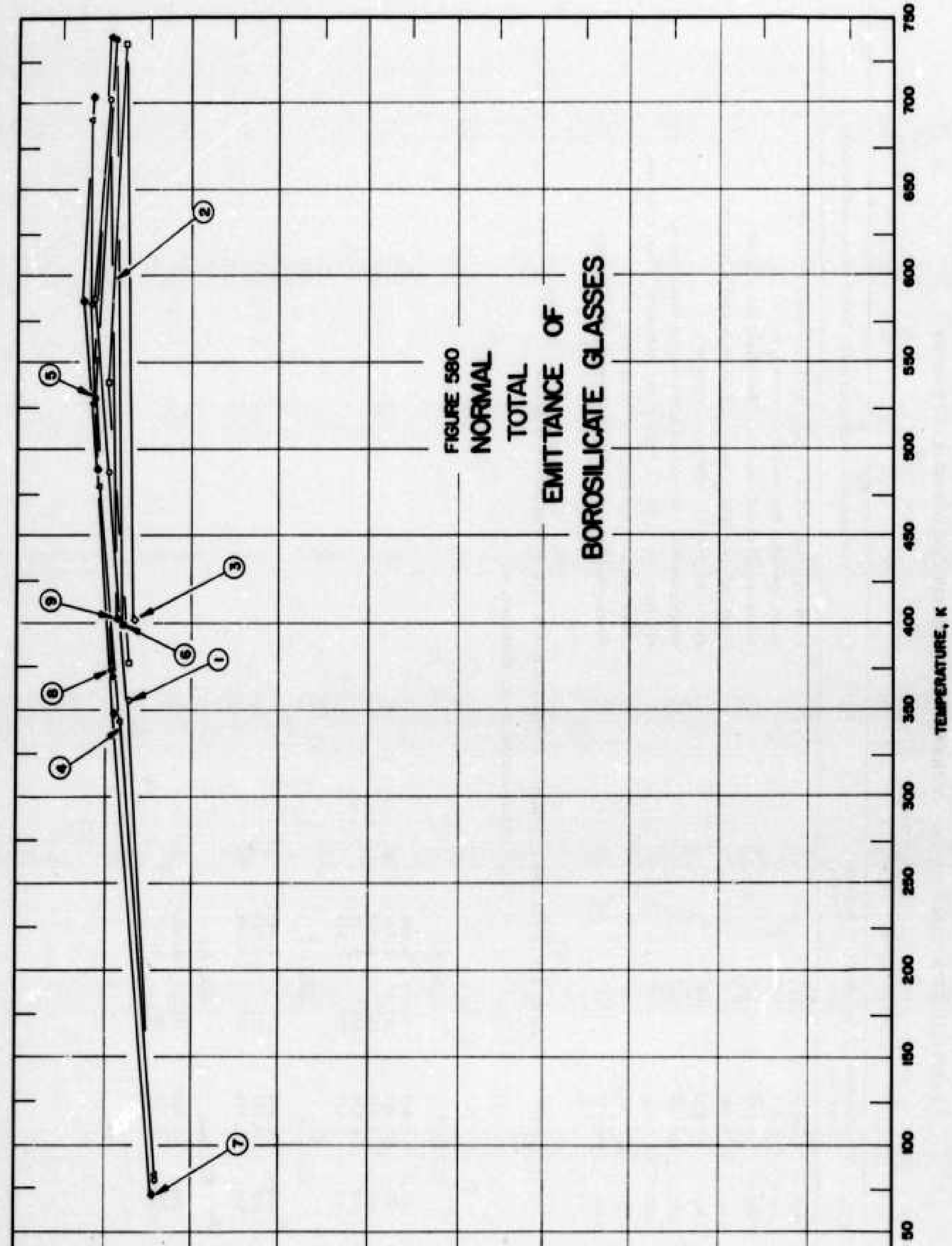


FIGURE 580 NORMAL TOTAL EMITTANCE OF BOROSILICATE GLASSES

SPECIFICATION TABLE NO. 580 NORMAL TOTAL EMITTANCE OF BOROSILICATE GLASSES

Curve No.	Ref. No.	Year	Temperature Range, K	Geometry θ'	Reported Error, %	Composition (weight percent), Specifications and Remarks
1	106	1959	79.3-702	~0°		Pittsburgh No. 3235 (4.76 mm thick); measured in air; cycle one.
2	106	1959	376-738	~0°		Above specimen and conditions; cycle two.
3	106	1959	402-738	~0°		Above specimen and conditions; decreasing temperature.
4	106	1959	82.1-690	~0°		Pittsburgh No. 3235 (6.35 mm thick); measured in air; cycle one.
5	106	1959	368-736	~0°		Above specimen and conditions; cycle two.
6	106	1959	399-736	~0°		Above specimen and conditions; decreasing temperature.
7	106	1959	70.4-703	~0°		Pittsburgh No. 3235 (12.7 mm thick); measured in air; cycle one.
8	106	1959	372-737	~0°		Above specimen and conditions; cycle two.
9	106	1959	402-737	~0°		Above specimen and conditions; decreasing temperature.

DATA TABLE NO. 580 NORMAL TOTAL EMITTANCE OF BOROSILICATE GLASSES

[Temperature, T, K; Emittance, ϵ]

T	ϵ	T	ϵ	T	ϵ
CURVE 1		CURVE 4		CURVE 7	
79.3	0.842	82.1	0.843	70.4	0.846
355	0.874	343	0.882	347	0.890
487	0.898	478	0.908	488	0.910
586	0.911	584	0.918	585	0.924
702	0.896	690	0.916	703	0.915
CURVE 2		CURVE 5		CURVE 8	
376	0.873	368	0.891	372	0.895
538	0.898	529	0.912	527	0.915
738	0.876	736	0.889	737	0.894
CURVE 3		CURVE 6		CURVE 9	
738	0.876*	736	0.889*	737	0.895*
402	0.868	399	0.880	402	0.887

* Not shown on plot

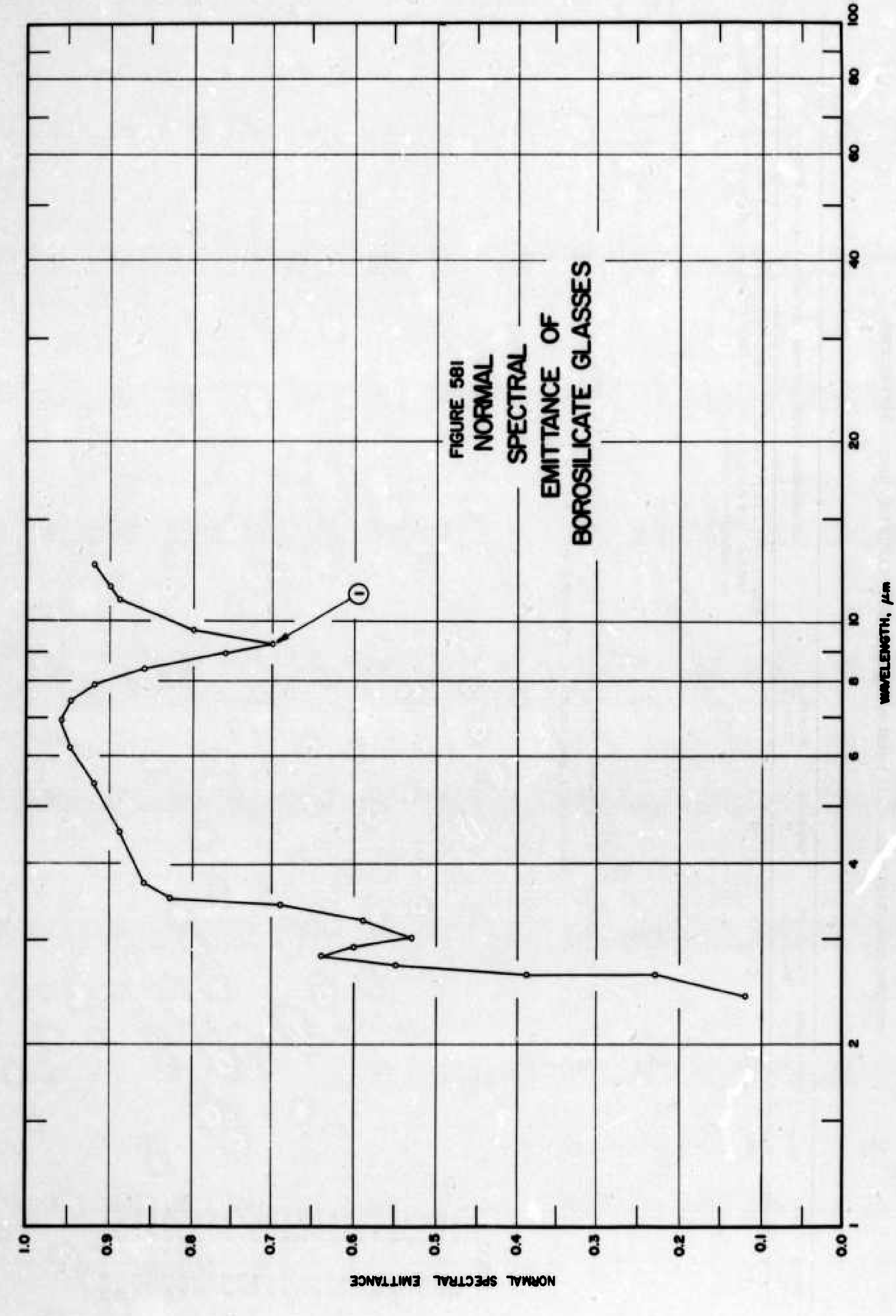


FIGURE 581 NORMAL SPECTRAL EMITTANCE OF BOROSILICATE GLASSES

SPECIFICATION TABLE NO. 581 NORMAL SPECTRAL EMITTANCE OF BOROSILICATE GLASSES

Curve No.	Ref. No.	Year	Temperature, K	Wavelength Range, μm	Geometry θ'	Reported Error, %	Composition (weight percent), Specifications, and Remarks
1	407	1951	811	2.4-12.5	~0°		Kimble N-51 A (3.17 mm thick); nominal composition: 74.7 SiO_2, 9.6 B_2O_2, 6.9 Na_2O and K_2O, 5.6 R_2O_2, 2.2 BaO, 0.9 CaO; ground and polished on both sides; data extracted from smooth curve.

DATA TABLE NO. 581 NORMAL SPECTRAL EMITTANCE OF BOROSILICATE GLASSES

[Wavelength, λ, μm; Emittance, ϵ; Temperature, T, K]

λ	ϵ
CURVE 1	
2.4	0.12
2.6	0.23
2.6	0.39
2.7	0.55
2.8	0.64
2.9	0.60
3.0	0.53
3.2	0.59
3.4	0.69
3.5	0.83
3.7	0.86
4.5	0.89
5.4	0.92
6.4	0.95
6.9	0.96
7.4	0.95
7.9	0.92
8.4	0.86
8.9	0.76
9.2	0.70
9.7	0.80
10.9	0.89
11.5	0.90
12.5	0.92

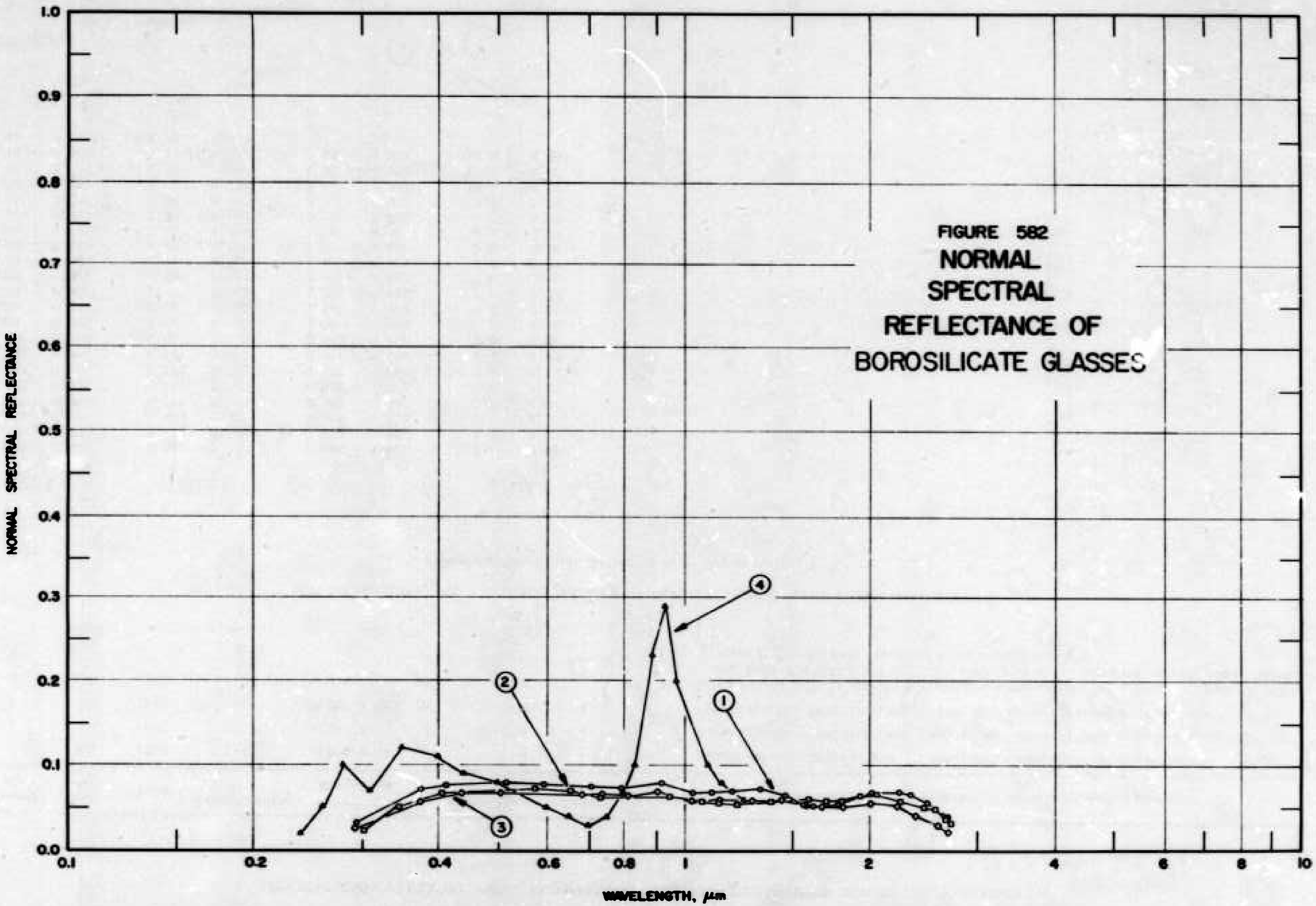


FIGURE 582 NORMAL SPECTRAL REFLECTANCE OF BOROSILICATE GLASSES

SPECIFICATION TABLE NO. 582 NORMAL SPECTRAL REFLECTANCE OF BOROSILICATE GLASSES

Curve No.	Ref. No.	Year	Temperature, K	Wavelength Range, μm	θ	Geometry θ'	ω'	Reported Error, %	Composition (weight percent), Specifications, and Remarks
1	106	1959	298	0.296-2.69	9°		2π	4	Pittsburgh No. 3235 (4.76 mm thick); data extracted from smooth curve.
2	106	1959	298	0.302-2.70	9°		2π	4	Pittsburgh No. 3235 (6.35 mm thick); data extracted from smooth curve.
3	106	1959	298	0.293-2.69	9°		2π	4	Pittsburgh No. 3235 (12.7 mm thick); data extracted from smooth curve.
4	407	1951	811	2.4-12.5	~0°		2π		Kimble N-51 A (3.17 mm thick); nominal composition: 74.7 SiO_2, 9.6 B_2O_2, 6.9 Na_2O and K_2O, 5.6 R_2O_2, 2.2 BaO, 0.9 CaO; ground and polished on both sides; calculated from 1- ($\epsilon + \tau$); data extracted from smooth curve.

DATA TABLE NO. 582 NORMAL SPECTRAL REFLECTANCE OF BOROSILICATE GLASSES

[Wavelength, λ, μm; Reflectance, ρ; Temperature, T, K]

λ	ρ	λ	ρ	λ	ρ	λ	ρ
CURVE 1 T = 298		CURVE 2 T = 298		CURVE 3 T = 298		CURVE 4 T = 811	
0.296	0.032	0.302	0.023	0.293	0.026	2.4	0.02
0.376	0.071	0.345	0.050	0.372	0.057	2.6	0.05
0.412	0.076	0.408	0.068	0.438	0.069	2.8	0.10
0.517	0.080	0.572	0.073	0.507	0.069	3.1	0.07
0.593	0.079	0.651	0.070	0.682	0.067	3.5	0.12
0.708	0.075	0.732	0.063	0.737	0.067	4.0	0.11
0.798	0.074	0.947	0.064	0.810	0.066	4.4	0.09
0.916	0.080	1.06	0.059	0.902	0.070	5.0	0.08
1.03	0.069	1.14	0.056	1.03	0.060	6.0	0.05
1.10	0.069	1.22	0.052	1.14	0.058	6.5	0.04
1.20	0.070	1.38	0.058	1.29	0.058	7.0	0.03
1.33	0.071	1.58	0.061	1.44	0.060	7.5	0.04
1.45	0.065	1.70	0.059	1.57	0.054	8.0	0.07
1.56	0.054	1.80	0.059	1.67	0.050	8.3	0.10
1.63	0.051	1.93	0.065	1.80	0.050	8.9	0.23
1.78	0.055	2.05	0.068	2.00	0.056	9.3	0.29
2.01	0.069	2.24	0.059	2.20	0.051	9.7	0.20
2.23	0.069	2.45	0.050	2.38	0.041	10.9	0.10
2.33	0.066	2.55	0.049	2.59	0.030	11.5	0.08
2.49	0.056	2.65	0.039	2.69	0.021	12.5	0.06
2.69	0.040	2.70	0.032				

SPECIFICATION TABLE NO. 583 NORMAL SOLAR ABSORPTANCE OF BOROSILICATE GLASSES

Curve No.	Ref. No.	Year	Temperature Range, K	Geometry θ	Reported Error, %	Composition (weight percent), Specifications and Remarks
1*	106	1959	298	9°		Pittsburgh No. 3235 (4.76 mm thick); computed from spectral reflectance and spectral transmittance data (0.3 to 3 μm) for above atmosphere conditions.
2*	106	1959	298	9°		Above specimen and conditions except computed for sea level conditions.
3*	106	1959	298	9°		Pittsburgh No. 3235 (6.35 mm thick); computed from spectral reflectance and spectral transmittance data (0.3 to 3 μm) for above atmosphere conditions.
4*	106	1959	298	9°		Above specimen and conditions except computed for sea level conditions.
5*	106	1959	298	9°		Pittsburgh No. 3235 (12.7 mm thick); computed from spectral reflectance and spectral transmittance data (0.3 to 3 μm) for above atmosphere conditions.
6*	106	1959	298	9°		Above specimen and conditions except computed for sea level conditions.

DATA TABLE NO. 583 NORMAL SOLAR ABSORPTANCE OF BOROSILICATE GLASSES

[Temperature, T, K; Absorptance, α]

T	α
CURVE 1*	
298	0.052
CURVE 2*	
298	0.023
CURVE 3*	
298	0.062
CURVE 4*	
298	0.026
CURVE 5*	
298	0.098
CURVE 6*	
298	0.038

*No plot given

SPECIFICATION TABLE NO. 584 NORMAL INTEGRATED TRANSMITTANCE OF BOROSILICATE GLASS

Curve No.	Ref. No.	Year	Temperature Range, K	Geometry θ	Geometry θ'	Geometry ω'	Reported Error, %	Composition (weight percent), Specifications and Remarks
1*	106	1959	587-698	~0°	~0°			Pittsburgh No. 3235 (4.76 mm thick); measured in air; black body incident radiation at temperature of measurement; cycle one.
2*	106	1959	734	~0°	~0°			Above specimen and conditions; cycle two.
3*	106	1959	589-699	~0°	~0°			Pittsburgh No. 3235 (6.35 mm thick); measured in air; black body incident radiation at temperature of measurement; cycle one.
4*	106	1959	731	~0°	~0°			Above specimen and conditions; cycle two.
5*	106	1959	583-699	~0°	~0°			Pittsburgh No. 3235 (12.7 mm thick); measured in air; black body incident radiation at temperature of measurement; cycle one.
6*	106	1959	734	~0°	~0°			Above specimen and conditions; cycle two.

DATA TABLE NO. 584 NORMAL INTEGRATED TRANSMITTANCE OF BOROSILICATE GLASS

[Temperature, T, K; Transmittance, τ]

T	τ
CURVE 1*	
587	0.012
698	0.032
CURVE 2*	
734	0.044
CURVE 3*	
589	0.013
699	0.034
CURVE 4*	
731	0.044
CURVE 5*	
583	0.012
699	0.032
CURVE 6*	
734	0.042

*No plot given

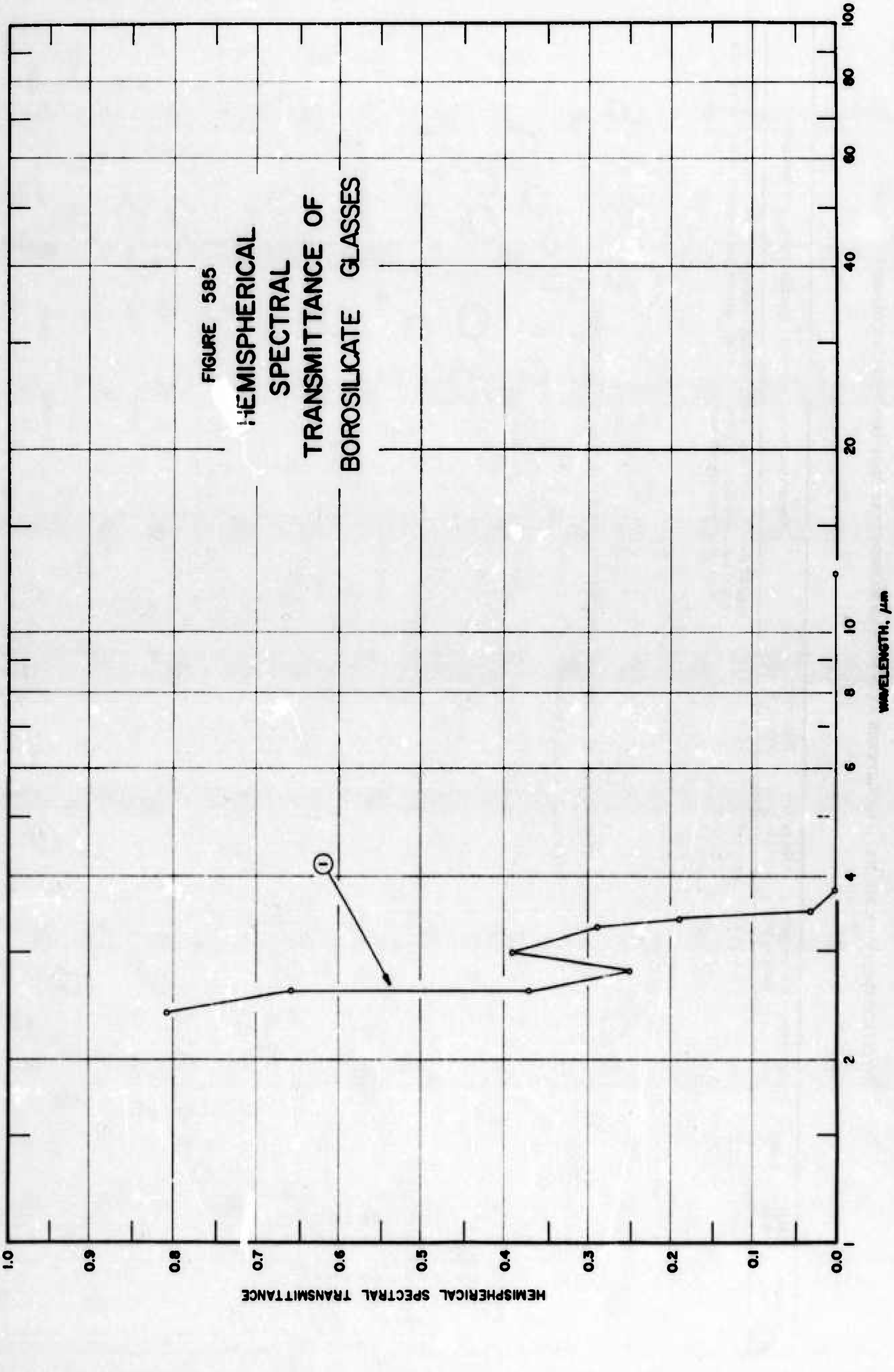


FIGURE 585 HEMISPHERICAL SPECTRAL TRANSMITTANCE OF BOROSILICATE GLASSES

SPECIFICATION TABLE NO. 585 HEMISPHERICAL SPECTRAL TRANSMITTANCE OF BOROSILICATE GLASSES

Curve No.	Ref. No.	Year	Temperature, K	Wavelength Range, μm	Geometry ω	θ'	ω'	Reported Error, %	Composition (weight percent), Specifications, and Remarks
1	407	1951	811	2.4-12.5	2π	$\sim 0°$			Kimble N-51 A (3.17 mm thick); nominal composition: 74.7 SiO_2, 9.6 B_2O_2, 6.9 Na_2O and K_2O, 5.6 R_2O_2, 2.2 BaO, 0.9 CaO; ground and polished on both sides; data extracted from smooth curve.

DATA TABLE NO. 585 HEMISPHERICAL SPECTRAL TRANSMITTANCE OF BOROSILICATE GLASSES

[Wavelength, λ, μm; Transmittance, τ; Temperature, T, K]

λ	τ
CURVE 1	
T = 811	
2.4	0.81
2.6	0.66
2.6	0.37
2.8	0.25
3.0	0.39
3.3	0.29
3.4	0.19
3.5	0.03
3.8	0.00
12.5	0.00

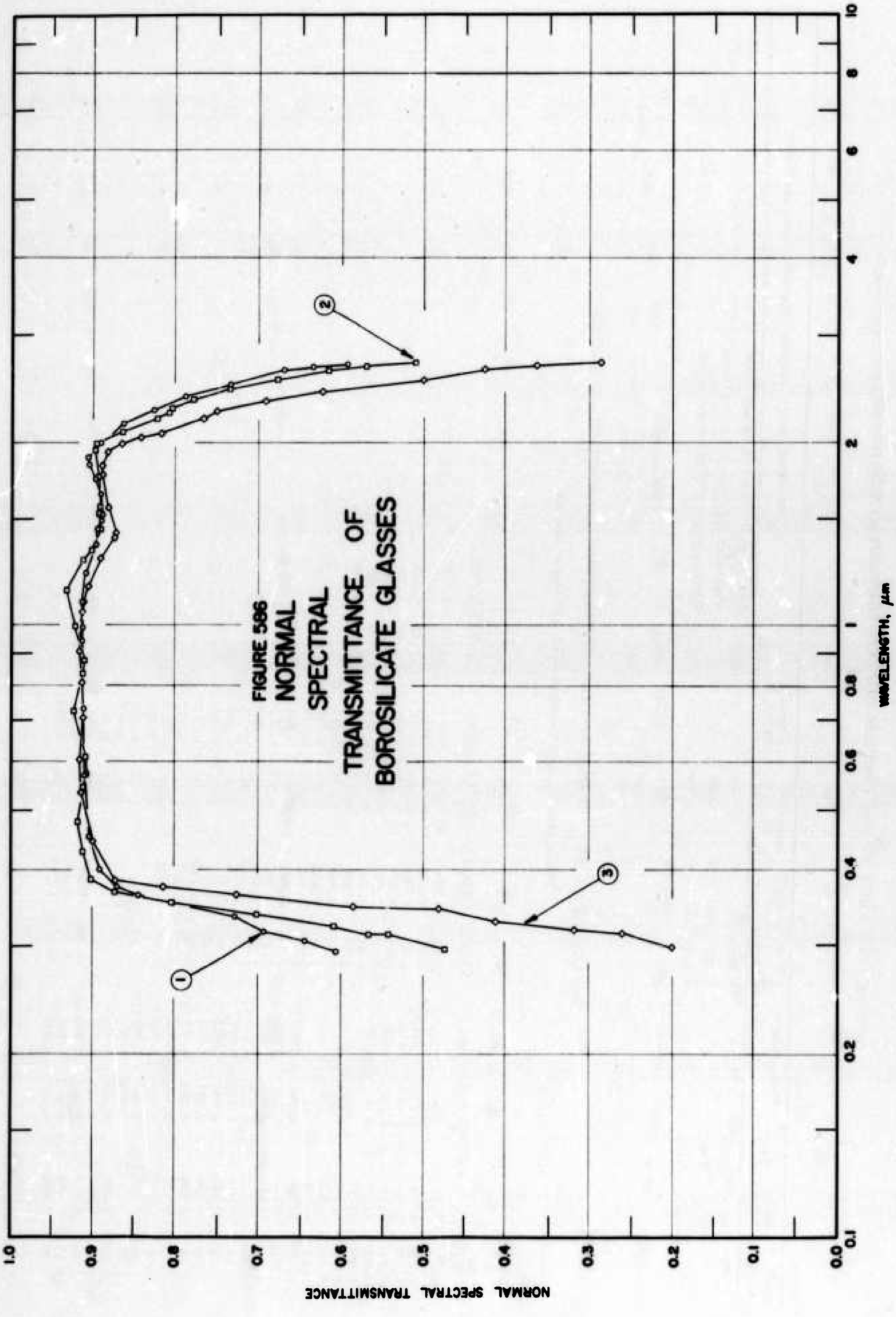


FIGURE 586 NORMAL SPECTRAL TRANSMITTANCE OF BOROSILICATE GLASSES

SPECIFICATION TABLE NO. 586 NORMAL SPECTRAL TRANSMITTANCE OF BOROSILICATE GLASSES

Curve No.	Ref. No.	Year	Temperature, K	Wavelength Range, μm	Geometry θ	θ'	ω'	Reported Error, %	Composition (weight percent), Specifications, and Remarks
1	106	1959	298	0.293-2.68	$\sim 0^\circ$		2π		Pittsburgh No. 3235 (4.76 mm thick).
2	106	1959	298	0.295-2.69	$\sim 0^\circ$		2π		Pittsburgh No. 3235 (6.35 mm thick).
3	106	1959	298	0.298-2.69	$\sim 0^\circ$		2π		Pittsburgh No. 3235 (12.7 mm thick).

DATA TABLE NO. 586 NORMAL SPECTRAL TRANSMITTANCE OF BOROSILICATE GLASSES

[Wavelength, λ, μm; Transmittance, τ; Temperature, T, K]

λ	τ	λ	τ	λ	τ	λ	τ	λ	τ
CURVE 1 T = 298		CURVE 1 (cont.)		CURVE 2 (cont.)		CURVE 3 (cont.)		CURVE 3 (cont.)	
		2.37	0.789	1.14	0.932	0.328	0.411	2.23	0.752
0.293	0.606	2.49	0.734	1.27	0.913	0.344	0.482	2.32	0.692
0.305	0.644	2.60	0.670	1.33	0.901	0.348	0.587	2.40	0.623
0.317	0.692	2.65	0.633	1.44	0.893	0.364	0.727	2.52	0.501
0.333	0.729	2.68	0.596	1.52	0.893	0.373	0.813	2.60	0.427
0.361	0.843			1.56	0.892	0.382	0.872	2.66	0.365
0.373	0.870	CURVE 2 T = 298		1.75	0.895	0.442	0.900	2.69	0.289
0.400	0.891			1.94	0.898	0.534	0.915		
0.453	0.904			1.99	0.895	0.601	0.917		
0.569	0.910	0.295	0.474	2.07	0.863	0.708	0.912		
0.730	0.912	0.311	0.541	2.18	0.821	0.807	0.914		
0.942	0.914	0.311	0.569	2.21	0.809	0.905	0.918		
0.994	0.913	0.322	0.610	2.26	0.804	1.05	0.914		
1.09	0.914	0.336	0.701	2.34	0.779	1.09	0.911		
1.22	0.910	0.351	0.802	2.43	0.735	1.16	0.908		
1.36	0.898	0.367	0.872	2.52	0.678	1.29	0.892		
1.44	0.896	0.384	0.901	2.60	0.616	1.39	0.874		
1.48	0.892	0.428	0.913	2.65	0.571	1.42	0.873		
1.52	0.890	0.478	0.919	2.69	0.511	1.56	0.882		
1.64	0.891	0.545	0.912			1.76	0.890		
1.74	0.898	0.570	0.910	CURVE 3 T = 298		1.83	0.891		
1.83	0.904	0.610	0.910			1.92	0.884		
1.88	0.906	0.725	0.923			1.99	0.866		
1.99	0.892	0.832	0.913	0.298	0.200	2.04	0.841		
2.13	0.864	0.873	0.911	0.314	0.260	2.07	0.818		
2.26	0.826	0.997	0.922	0.318	0.318	2.19	0.768		

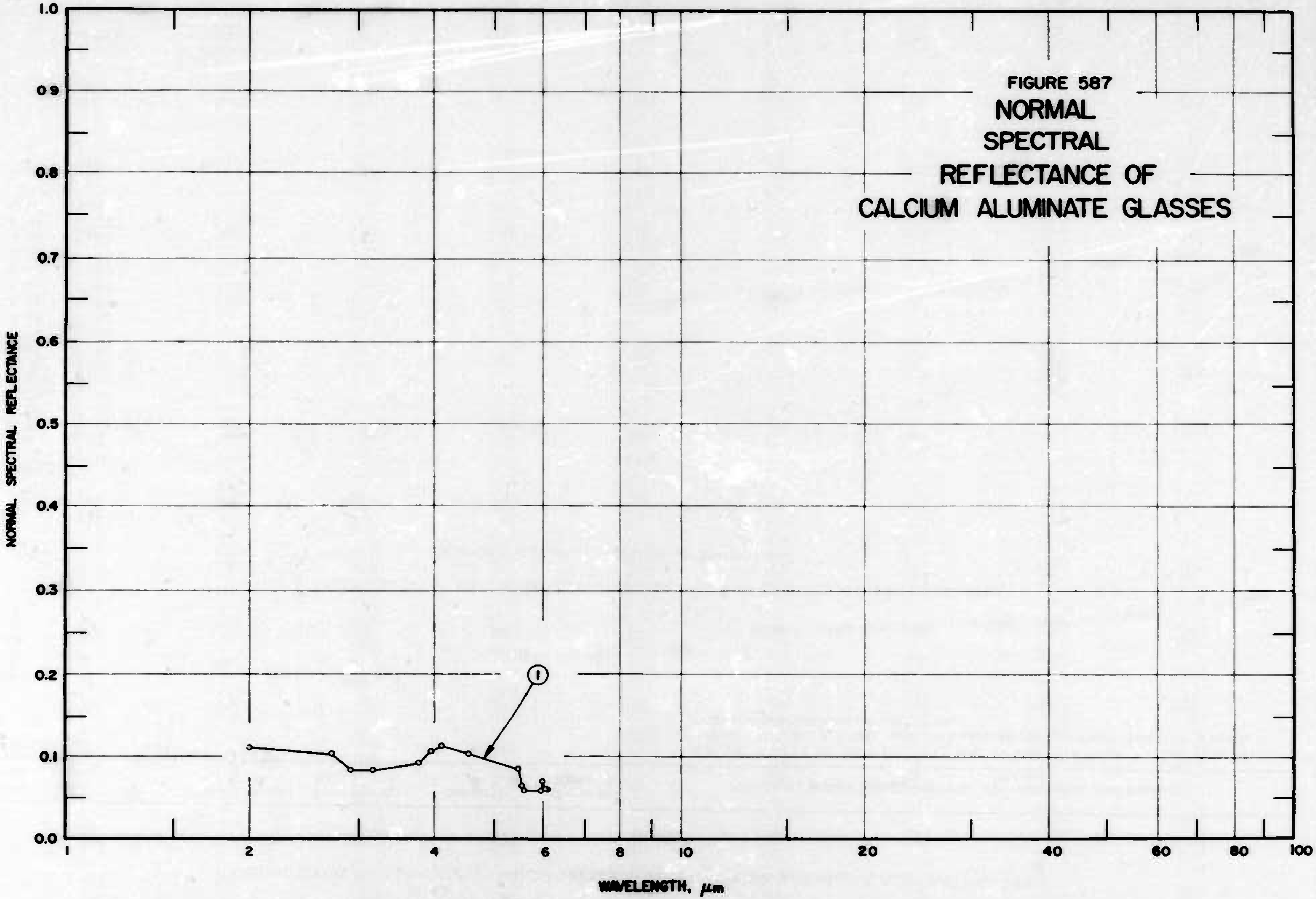


FIGURE 587
NORMAL
SPECTRAL
REFLECTANCE OF
CALCIUM ALUMINATE GLASSES

SPECIFICATION TABLE NO. 587 NORMAL SPECTRAL REFLECTANCE OF CALCIUM ALUMINATE GLASSES

Curve No.	Ref. No.	Year	Temperature, K	Wavelength Range, μm	Geometry θ	θ'	ω'	Reported Error, %	Composition (weight percent), Specifications, and Remarks
1	368	1957	~298	2.00-6.08	~0°	~0°			Melt No. 5561 (2.05 mm thick); 55 Al_2O_3, 30 CaO, 7.5 Na_2O, 5.0 Fe_2O_3, 2.5 K_2O plus 2.0 MgO, 2.0 BaO, and 2.0 La_2O_3; sample produced from 5500 g batch; data extracted from smooth curve.

DATA TABLE NO. 587 NORMAL SPECTRAL REFLECTANCE OF CALCIUM ALUMINATE GLASSES

[Wavelength, λ, μm; Reflectance, ρ; Temperature, T, K]

λ	ρ
CURVE 1	
T ~298	
2.00	0.110
2.72	0.102
2.91	0.085
3.17	0.085
3.76	0.092
3.94	0.106
4.10	0.111
4.54	0.102
5.46	0.087
5.53	0.066
5.59	0.060
5.93	0.060
5.99	0.071
6.04	0.061
6.08	0.061

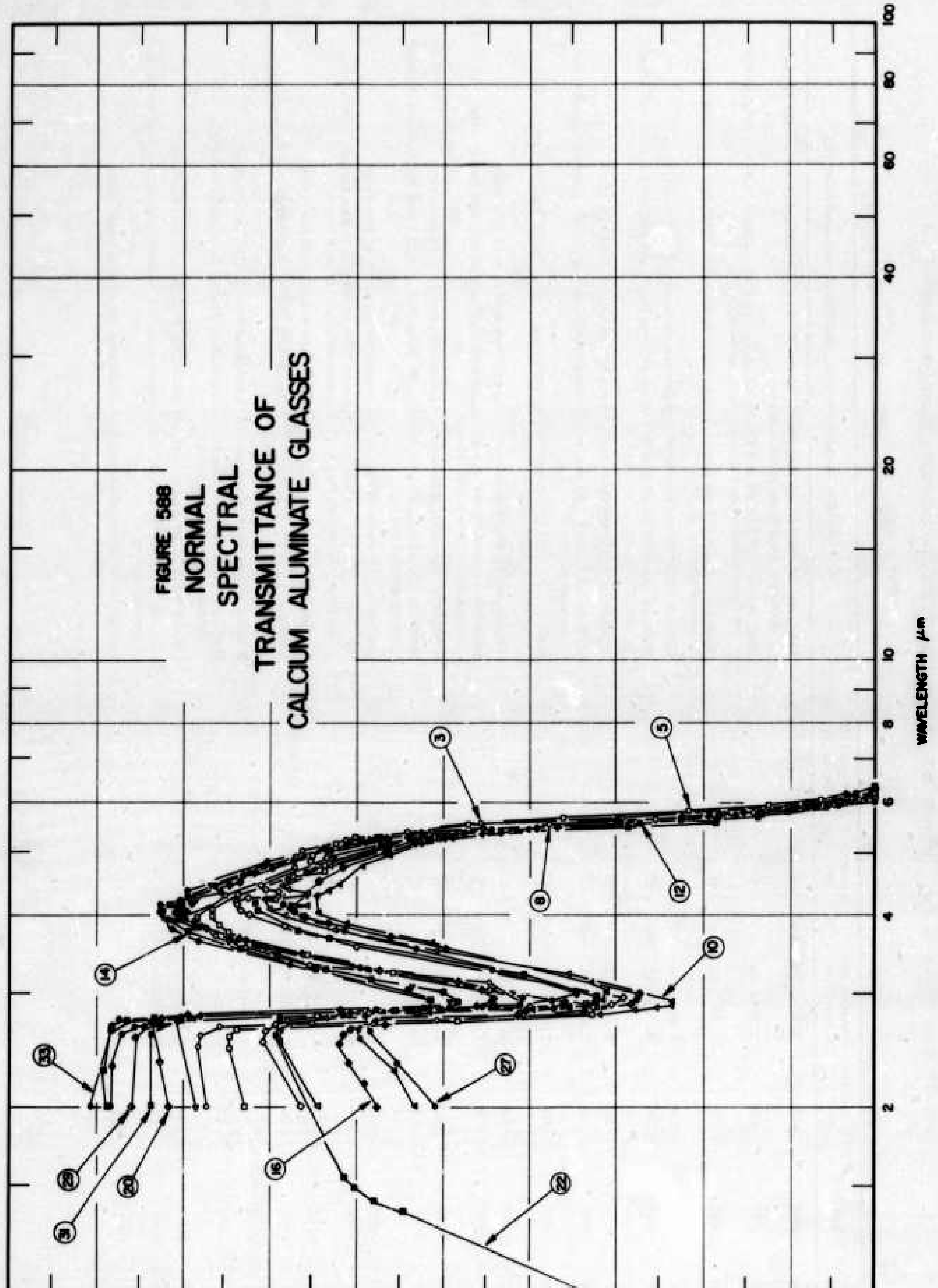


FIGURE 568 NORMAL SPECTRAL TRANSMITTANCE OF CALCIUM ALUMINATE GLASSES

SPECIFICATION TABLE NO. 588 NORMAL SPECTRAL TRANSMITTANCE OF CALCIUM ALUMINATE GLASSES

Curve No.	Ref. No.	Year	Temperature, K	Wavelength Range, μm	Geometry θ	θ'	ω'	Reported Error, %	Composition (weight percent), Specifications, and Remarks
1*	368	1957	~298	2.00-5.78	~0°	~0°			Melt No. 1A 5516 (3.95 mm thick); 55 Al_2O_3, 30 CaO, and 5 BaO base with 32 GeO_2; data extracted from smooth curve.
2*	368	1957	~298	2.00-5.74	~0°	~0°			Melt No. 1A 5515 (4.00 mm thick); 50 Al_2O_3, 40 CaO, 5 Na_2O, and 5 BaO base with 32 GeO_2 added; data extracted from smooth curve.
3	368	1957	~298	2.00-6.15	~0°	~0°			Melt No. 1A 5344 (1.88 mm thick); containing SnO_2 and BaO; data extracted from smooth curve.
4*	368	1957	~298	2.00-5.80	~0°	~0°			Similar to the above specimen and conditions except 5.11 mm thick.
5	368	1957	~298	2.00-6.17	~0°	~0°			Melt No. 1A 5357 (2.03 mm thick); containing Fe_2O_3 and BaO; data extracted from smooth curve.
6*	368	1957	~298	2.00-5.91	~0°	~0°			Similar to the above specimen and conditions except 4.98 mm thick.
7*	368	1957	~298	2.00-5.87	~0°	~0°			Melt No. 1A 5507 (4.03 mm thick); containing Fe_2O_3 and BaO; data extracted from smooth curve.
8	368	1957	~298	2.00-6.10	~0°	~0°			Melt No. 1A 5637 (2.19 mm thick); containing Fe_2O_3, BaO, MgO and La_2O_3; data extracted from smooth curve.
9*	368	1957	~298	2.00-5.84	~0°	~0°			Similar to the above specimen and conditions except 4.18 mm thick.
10	368	1957	~298	2.00-6.08	~0°	~0°			Melt No. 1A 5657 (2.09 mm thick); containing Fe_2O_3, BaO, and La_2O_3; data extracted from smooth curve.
11*	368	1957	~298	2.00-5.82	~0°	~0°			Similar to the above specimen and conditions except 4.05 mm thick.
12*	368	1957	~298	2.00-6.02	~0°	~0°			Melt No. 1A 5658 (2.15 mm thick); containing BaO, La_2O_3, and MgO; data extracted from smooth curve.
13*	368	1957	~298	2.00-5.83	~0°	~0°			Similar to the above specimen and conditions except 4.16 mm thick.
14	368	1957	~298	2.00-6.33	~0°	~0°			Melt Nos. 1A 5659-1A 5721-1A 5728-1A 5788 (2.00 mm thick); typical values for glass containing no Fe_2O_3; data extracted from smooth curve.
15*	368	1957	~298	2.00-6.00	~0°	~0°			Similar to the above specimen and conditions except 4.00 mm thick.
16	368	1957	~298	2.00-6.31	~0°	~0°			Melt No. 1A 5733 (2.17 mm thick); containing Fe_2O_3, BaO, MgO and ZrO_2; data extracted from smooth curve.
17*	368	1957	~298	2.00-6.00	~0°	~0°			Similar to the above specimen and conditions except 4.13 mm thick.
18	368	1957	~298	2.00-6.16	~0°	~0°			Melt No. 1A 5734 (2.06 mm thick); containing Fe_2O_3, BaO, TiO_2 and ZrO_2; data extracted from smooth curve.
19*	368	1957	~298	2.00-5.92	~0°	~0°			Similar to the above specimen and conditions except 4.13 mm thick.
20	368	1957	~298	2.00-6.25	~0°	~0°			Melt No. 1A 5781 (2.18 mm thick); containing 2.0 mole Fe_2O_3; data extracted from smooth curve.
21*	368	1957	~298	2.00-6.14	~0°	~0°			Similar to the above specimen and conditions except 3.98 mm thick.

*Not shown on plot

SPECIFICATION TABLE NO. 588 (Continued)

Curve No.	Ref. No.	Year	Temperature, K	Wavelength Range, μm	Geometry θ	θ'	ω'	Reported Error, %	Composition (weight percent), Specifications, and Remarks
22	368	1957	~298	1.00-6.10	~0°	~0°			Melt No. 5561 (2.05 mm thick); 55 Al_2O_3, 30 CaO, 7.5 N_2O, 5 Fe_2O_3, 2.5 K_2O base with 2.0 MgO, 2.9 BaO, and 2.0 La_2O_3; sample produced from 5500 g batch; data extracted from smooth curve.
23*	368	1957	~298	2.00-5.72	~0°	~0°			Similar to the above specimen and conditions except 4.0 mm thick.
24*	368	1957	~298	2.00-5.53	~0°	~0°			Similar to the above specimen and conditions except 10.12 mm thick.
25*	368	1957	~298	2.00-5.83	~0°	~0°			Similar to the above specimen and conditions except 4.11 mm thick.
26*	368	1957	~298	2.00-5.92	~0°	~0°			Similar to the above specimen and conditions except exposure for one month.
27	368	1957	~298	2.00-6.10	~0°	~0°			Melt No. 1A 5629 (2.01 mm thick); 55 Al_2O_3, 30 CaO, 7.5 Na_2O, 5 Fe_2O_3, 2.5 K_2O base with 2.0 BaO, 2.0 La_2O_3 and 2.0 MgO; treated with dry air; data extracted from smooth curve.
28*	368	1957	~298	2.00-5.83	~0°	~0°			Similar to the above specimen and conditions except 4.05 mm thick.
29	368	1957	~298	2.00-6.18	~0°	~0°			Melt No. 1A 5744 (2.17 mm thick); 7.5 Na_2O, 2.5 K_2O, 35 CaO, 55 Al_2O_3, 1.0 Fe_2O_3 plus 2.0 BaO, 2.0 MgO, and 2.0 La_2O_3; water added to the batch, data extracted from smooth curve.
30*	368	1957	~298	2.00-6.00	~0°	~0°			Similar to the above specimen and conditions except 4.08 mm thick.
31	368	1957	~298	2.00-6.18	~0°	~0°			Melt No. 1A 5745 (2.11 mm thick); 55 Al_2O_3, 35 CaO; 7.5 Na_2O, 2.5 K_2O base, with 2.0 BaO, 2.0 MgO, and 2.0 La_2O_3; bubbled with dry air; data extracted from smooth curve.
32*	368	1957	~298	2.00-6.00	~0°	~0°			Similar to the above specimen and conditions except 4.17 mm thick.
33	368	1957	~298	2.00-6.20	~0°	~0°			Melt No. 1A 5861 (2.11 mm thick); 60 Al_2O_3, 32.5 CaO, 5 Na_2O, 2.5 K_2O base with 2.0 BaO, 2.0 MgO and 2.0 La_2O_3; sample produced from a 5500 g batch; data extracted from smooth curve.
34*	368	1957	~298	2.00-6.20	~0°	~0°			Similar to the above specimen and conditions except 4.08 mm thick.
35	368	1957	~298	2.00-6.26	~0°	~0°			Melt No. 1A 5846 (2.15 mm thick); 57.5 Al_2O_3, 32.5 CaO, 7.5 Na_2O, 2.5 K_2O base and 2.0 Fe_2O_3, 2.0 BaO, 2.0 MgO and 2.0 La_2O_3; sample produced from a 5500 g batch; data extracted from a smooth curve.
36*	368	1957	~298	2.00-6.00	~0°	~0°			Similar to the above specimen and conditions except 4.19 mm thick.

*Not shown on plot

DATA TABLE NO. 588 NORMAL SPECTRAL TRANSMITTANCE OF CALCIUM ALUMINATE GLASSES

[Wavelength, λ, μm; Transmittance, τ; Temperature, T, K]

λ	τ
CURVE 1*	
T ~ 298	
2.00	0.893
2.19	0.888
2.52	0.859
2.64	0.818
2.70	0.759
2.79	0.159
2.83	0.120
2.88	0.104
2.95	0.104
3.07	0.130
3.18	0.164
3.29	0.213
3.47	0.320
3.79	0.535
3.91	0.584
3.97	0.607
4.07	0.609
4.26	0.552
4.79	0.449
4.98	0.408
5.11	0.354
5.37	0.194
5.52	0.110
5.65	0.053
5.78	0.000
CURVE 2*	
T ~ 298	
2.00	0.878
2.22	0.884
2.70	0.845
2.75	0.834
2.78	0.813
2.88	0.218
2.92	0.181
2.96	0.154
3.03	0.153
3.14	0.188
3.33	0.279
3.79	0.567
3.88	0.612
3.91	0.624
3.98	0.640

λ	τ
CURVE 2 (cont.)*	
4.12	0.648
4.33	0.583
4.60	0.516
4.84	0.424
5.02	0.363
5.28	0.211
5.42	0.132
5.56	0.068
5.74	0.000
CURVE 3	
T ~ 298	
2.00	0.773
2.49	0.783
2.59	0.780
2.66	0.758
2.70	0.651
2.72	0.508
2.79	0.409
2.88	0.400
3.12	0.548
3.34	0.654
3.55	0.728
3.70	0.762
3.82	0.781
3.98	0.785
4.29	0.750
4.74	0.671
4.91	0.670
5.02	0.663
5.22	0.615
5.38	0.544
5.52	0.458
5.67	0.293
5.89	0.131
5.98	0.055
6.06	0.027
6.15	0.000
CURVE 4*	
T ~ 298	
2.00	0.763
2.57	0.769

λ	τ
CURVE 4 (cont.)*	
2.61	0.756
2.64	0.726
2.75	0.160
2.79	0.135
2.83	0.125
2.87	0.125
2.92	0.134
3.03	0.197
3.53	0.537
3.76	0.644
3.84	0.665
3.98	0.672
4.07	0.672
4.19	0.656
4.51	0.530
4.70	0.448
4.89	0.448
4.99	0.433
5.29	0.297
5.43	0.200
5.68	0.062
5.80	0.000
CURVE 5	
T ~ 298	
2.00	0.728
2.47	0.747
2.57	0.747
2.64	0.737
2.71	0.485
2.79	0.326
2.86	0.322
2.90	0.330
3.04	0.448
3.24	0.560
3.45	0.657
3.75	0.746
3.84	0.758
3.98	0.766
4.08	0.766
4.30	0.735
4.58	0.672
4.66	0.639
4.78	0.639

λ	τ
CURVE 5 (cont.)	
4.84	0.652
4.95	0.651
5.14	0.628
5.26	0.601
5.51	0.474
5.65	0.360
5.80	0.218
5.92	0.125
6.02	0.065
6.09	0.029
6.17	0.000
CURVE 6*	
T ~ 298	
2.00	0.587
2.23	0.613
2.50	0.633
2.57	0.631
2.60	0.618
2.75	0.113
2.78	0.086
2.81	0.076
2.88	0.074
3.06	0.161
3.19	0.252
3.41	0.438
3.64	0.557
3.72	0.588
3.80	0.609
3.95	0.624
4.05	0.623
4.16	0.604
4.26	0.569
4.32	0.536
4.42	0.522
4.58	0.432
4.63	0.410
4.70	0.401
4.87	0.437
4.94	0.437
5.10	0.388
5.35	0.272
5.63	0.100
5.77	0.047
5.91	0.000

λ	τ
CURVE 7*	
T ~ 298	
2.00	0.416
2.58	0.481
2.77	0.490
2.83	0.473
2.91	0.203
2.93	0.174
2.96	0.153
3.02	0.141
3.08	0.145
3.29	0.217
3.92	0.507
4.06	0.539
4.15	0.551
4.25	0.553
4.47	0.512
5.00	0.386
5.17	0.335
5.46	0.194
5.71	0.038
5.77	0.012
5.87	0.000
CURVE 8	
T ~ 298	
2.00	0.662
2.53	0.708
2.62	0.705
2.68	0.694
2.72	0.679
2.76	0.647
2.80	0.587
2.86	0.325
2.89	0.304
2.96	0.291
3.57	0.600
3.81	0.681
4.00	0.724
4.08	0.733
4.14	0.737
4.20	0.737
4.24	0.724
4.29	0.690
4.32	0.690

λ	τ
CURVE 8 (cont.)	
4.37	0.703
4.45	0.710
4.91	0.636
5.19	0.570
5.32	0.518
5.52	0.376
5.64	0.257
5.79	0.141
5.95	0.049
6.01	0.029
6.10	0.000
CURVE 9*	
T ~ 298	
2.00	0.517
2.44	0.568
2.54	0.575
2.67	0.554
2.71	0.540
2.74	0.522
2.76	0.489
2.79	0.221
2.81	0.173
2.83	0.141
2.88	0.116
2.96	0.116
3.04	0.139
3.76	0.512
3.97	0.591
4.04	0.603
4.11	0.610
4.18	0.610
4.24	0.598
4.32	0.567
4.44	0.567
4.74	0.506
5.12	0.405
5.25	0.339
5.42	0.211
5.53	0.139
5.63	0.090
5.76	0.036
5.84	0.000

λ	τ
CURVE 10	
T ~ 298	
2.00	0.645
2.53	0.688
2.64	0.688
2.70	0.677
2.75	0.636
2.79	0.319
2.82	0.279
2.85	0.254
2.89	0.237
2.94	0.237
3.21	0.354
3.50	0.508
3.79	0.626
3.98	0.681
4.08	0.700
4.21	0.707
4.29	0.659
4.32	0.657
4.37	0.679
4.41	0.685
4.76	0.632
5.21	0.535
5.33	0.487
5.59	0.298
5.71	0.179
5.76	0.137
5.85	0.086
5.92	0.055
6.00	0.026
6.08	0.000
CURVE 11*	
T ~ 298	
2.00	0.487
2.42	0.530
2.65	0.541
2.70	0.531
2.73	0.508
2.82	0.119
2.85	0.090
2.90	0.070
2.98	0.068
3.32	0.205

λ	τ
CURVE 11 (cont.)*	
4.05	0.538
4.08	0.546
4.14	0.556
4.18	0.556
4.24	0.535
4.30	0.508
4.35	0.508
4.44	0.524
5.19	0.349
5.33	0.295
5.41	0.233
5.48	0.167
5.56	0.110
5.61	0.079
5.71	0.042
5.82	0.000
CURVE 12*	
T ~ 298	
2.00	0.884
2.31	0.882
2.60	0.871
2.66	0.858
2.71	0.837
2.76	0.802
2.82	0.518
2.86	0.455
2.90	0.411
2.96	0.409
3.30	0.597
3.54	0.702
3.83	0.780

*Not shown on plot

DATA TABLE NO. 588 (Continued)

CURVE 12 (cont.)* T ~ 298

λ	τ
3.94	0.800
4.03	0.810
4.14	0.810
4.21	0.803
4.31	0.756
4.43	0.762
4.67	0.722
5.23	0.568
5.31	0.529
5.58	0.273
5.72	0.164
5.83	0.095
5.93	0.045
6.02	0.000

CURVE 13* T ~ 298

λ	τ
2.00	0.899
2.49	0.864
2.65	0.844
2.69	0.822
2.73	0.785
2.75	0.448
2.79	0.304
2.82	0.245
2.88	0.211
2.93	0.211
3.13	0.325
3.60	0.632
3.70	0.677
3.82	0.719
3.90	0.735
4.03	0.742
4.23	0.690
4.29	0.690
4.86	0.513
5.19	0.388
5.33	0.304
5.53	0.154
5.68	0.076
5.78	0.025
5.83	0.000

CURVE 14 T ~ 298

λ	τ
2.00	0.889
2.28	0.892
2.64	0.882
2.71	0.866
2.75	0.834
2.82	0.556
2.85	0.524
2.94	0.515
3.05	0.541
3.29	0.648
3.52	0.734
3.76	0.795
3.92	0.819
4.06	0.823
4.16	0.817
4.74	0.706
5.06	0.633
5.23	0.572
5.33	0.521
5.38	0.478
5.47	0.387
5.56	0.286
5.63	0.226
5.75	0.136
5.86	0.082
6.00	0.048
6.18	0.022
6.33	0.000

CURVE 15* T ~ 298

λ	τ
2.00	0.899
2.28	0.892
2.46	0.881
2.59	0.870
2.67	0.855
2.71	0.836
2.75	0.777
2.82	0.541
2.83	0.395
2.86	0.347
2.89	0.324

CURVE 15 (cont.)*

λ	τ
2.93	0.319
3.00	0.328
3.33	0.509
3.48	0.586
3.81	0.720
3.89	0.745
3.98	0.757
4.09	0.758
4.48	0.650
4.80	0.560
5.07	0.464
5.22	0.393
5.31	0.328
5.41	0.246
5.50	0.171
5.62	0.103
5.75	0.050
5.86	0.026
6.00	0.000

CURVE 16 T ~ 298

λ	τ
2.00	0.576
2.16	0.591
2.33	0.610
2.50	0.621
2.59	0.618
2.64	0.607
2.69	0.568
2.76	0.414
2.81	0.333
2.90	0.282
2.95	0.276
3.00	0.283
3.52	0.499
3.69	0.562
3.87	0.635
3.95	0.659
4.02	0.671
4.09	0.676
4.50	0.643
4.72	0.618
5.00	0.569

CURVE 16 (cont.)

λ	τ
5.17	0.533
5.26	0.499
5.38	0.433
5.49	0.368
5.66	0.227
5.76	0.154
5.85	0.097
5.92	0.072
6.13	0.034
6.31	0.000

CURVE 17* T ~ 298

λ	τ
2.00	0.400
2.22	0.431
2.48	0.460
2.59	0.466
2.66	0.452
2.71	0.409
2.75	0.339
2.82	0.163
2.88	0.114
2.96	0.110
3.08	0.127
3.22	0.168
3.45	0.274
3.74	0.406
3.90	0.473
4.01	0.498
4.10	0.508
4.25	0.499
4.57	0.465
4.72	0.436
5.04	0.380
5.17	0.330
5.35	0.248
5.52	0.154
5.65	0.081
5.77	0.049
5.90	0.021
6.00	0.000

CURVE 18 T ~ 298

λ	τ
2.00	0.534
2.26	0.558
2.55	0.596
2.64	0.599
2.72	0.579
2.80	0.516
2.82	0.501
2.83	0.397
2.88	0.333
2.94	0.313
3.01	0.310
3.12	0.328
3.60	0.514
3.88	0.613
4.01	0.644
4.11	0.656
4.29	0.647
4.35	0.634
4.46	0.621
4.76	0.593
4.98	0.563
5.16	0.528
5.27	0.492
5.33	0.457
5.42	0.401
5.56	0.296
5.69	0.195
6.00	0.031
6.07	0.012
6.16	0.000

CURVE 19* T ~ 298

λ	τ
2.00	0.329
2.20	0.357
2.46	0.387
2.66	0.400
2.72	0.381
2.75	0.330
2.75	0.276
2.81	0.188
2.88	0.132

CURVE 19 (cont.)*

λ	τ
2.94	0.121
3.04	0.128
3.23	0.177
3.50	0.281
3.73	0.382
3.87	0.431
4.05	0.471
4.17	0.481
4.29	0.455
4.39	0.460
4.52	0.444
4.87	0.364
5.08	0.319
5.24	0.261
5.41	0.182
5.62	0.071
5.75	0.031
5.92	0.000

CURVE 20 T ~ 298

λ	τ
2.00	0.817
2.35	0.827
2.70	0.835
2.75	0.825
2.79	0.796
2.84	0.620
2.88	0.462
2.91	0.444
2.95	0.441
3.03	0.457
3.27	0.575
3.47	0.661
3.67	0.735
3.85	0.780*
4.03	0.803
4.13	0.809
4.25	0.795
4.44	0.745
4.50	0.734
4.60	0.730
4.73	0.698
4.87	0.671

CURVE 20 (cont.)

λ	τ
5.07	0.639
5.21	0.598
5.35	0.525
5.45	0.455
5.63	0.296
5.92	0.083
6.00	0.054*
6.25	0.000*

CURVE 21* T ~ 298

λ	τ
2.00	0.760
2.33	0.765
2.43	0.769
2.64	0.763
2.73	0.749
2.76	0.726
2.79	0.560
2.83	0.394
2.88	0.273
2.92	0.251
2.95	0.246
3.00	0.254
3.12	0.330
3.32	0.443
3.53	0.551
3.77	0.645
3.97	0.698
4.11	0.711
4.19	0.709
4.25	0.699
4.32	0.680
4.36	0.673
4.43	0.669
4.52	0.645
4.94	0.493
5.24	0.385
5.36	0.314
5.61	0.147
5.70	0.088
5.80	0.053
5.92	0.026
6.14	0.000

CURVE 22 T ~ 298

λ	τ
1.00	0.316
1.37	0.549
1.42	0.580
1.49	0.601
1.55	0.616
2.58	0.694
2.74	0.689
2.81	0.541
2.87	0.352
2.94	0.321
2.98	0.321
3.21	0.408
3.67	0.634
3.78	0.668
4.03	0.714
4.18	0.716
4.63	0.658
5.06	0.566
5.25	0.503
5.69	0.138
5.76	0.102
5.88	0.058
5.96	0.033
6.10	0.000*

CURVE 23* T ~ 298

λ	τ
2.00	0.480
2.15	0.503
2.58	0.541
2.69	0.545
2.74	0.529
2.83	0.154
2.85	0.131
2.89	0.110
2.96	0.110
3.07	0.136
3.66	0.434
3.90	0.525
4.02	0.557
4.11	0.568
4.17	0.568

* Not shown on plot

DATA TABLE NO. 588 (Continued)

λ	τ
CURVE 23 (cont.)*	
T ~ 298	
4.75	0.448
5.04	0.360
5.23	0.294
5.45	0.145
5.53	0.080
5.64	0.039
5.72	0.000
CURVE 24*	
T ~ 298	
2.00	0.200
2.12	0.213
2.76	0.263
2.79	0.263
2.83	0.217
2.86	0.097
2.90	0.037
2.95	0.000
3.16	0.000
3.41	0.031
3.49	0.052
3.75	0.163
3.95	0.253
4.04	0.284
4.14	0.294
4.25	0.288
5.07	0.104
5.38	0.032
5.53	0.000
CURVE 25*	
T ~ 298	
2.00	0.476
2.41	0.525
2.62	0.544
2.77	0.546
2.81	0.502
2.88	0.203
2.89	0.170
2.94	0.121
3.00	0.113
3.14	0.140
3.41	0.256

λ	τ
CURVE 25 (cont.)*	
3.98	0.544
4.13	0.579
4.19	0.582
4.27	0.575
5.12	0.356
5.24	0.311
5.33	0.262
5.47	0.163
5.62	0.071
5.71	0.036
5.83	0.000
CURVE 26*	
T ~ 298	
2.00	0.508
2.28	0.536
2.54	0.559
2.59	0.562
2.65	0.557
2.71	0.529
2.74	0.484
2.77	0.439
2.78	0.189
2.80	0.151
2.85	0.120
2.91	0.102
2.98	0.102
3.19	0.180
3.43	0.305
3.71	0.457
3.85	0.523
3.98	0.562
4.10	0.576
4.19	0.575
4.49	0.522
5.04	0.387
5.16	0.344
5.31	0.273
5.47	0.162
5.60	0.092
5.70	0.053
5.80	0.022
5.92	0.000

λ	τ
CURVE 27	
T ~ 298	
2.00	0.510
2.33	0.555
2.62	0.583
2.77	0.590
2.82	0.578
2.87	0.439
2.93	0.374
3.00	0.344
3.28	0.443
3.51	0.532
3.76	0.616
3.96	0.661
4.12	0.683
4.31	0.690*
4.52	0.679
4.87	0.629
5.11	0.571
5.28	0.516
5.43	0.444
5.60	0.298*
5.78	0.156
5.91	0.068
6.00	0.029*
6.10	0.000*
CURVE 28*	
T ~ 298	
2.00	0.300
2.67	0.383
2.78	0.389
2.83	0.376
2.86	0.341
2.92	0.179
2.99	0.141
3.07	0.135
3.30	0.223
3.83	0.447
3.96	0.489
4.09	0.518
4.24	0.531
4.42	0.525
4.65	0.486
5.02	0.389
5.26	0.306

λ	τ
CURVE 28 (cont.)*	
5.51	0.193
5.66	0.096
5.76	0.031
5.83	0.000
CURVE 29	
T ~ 298	
2.00	0.861
2.56	0.858
2.66	0.848
2.73	0.827
2.77	0.780
2.82	0.405
2.85	0.371
2.91	0.358
3.13	0.485
3.45	0.658*
3.64	0.728
3.80	0.775
3.90	0.789
4.03	0.798
4.19	0.791
4.64	0.719
5.02	0.632
5.23	0.568
5.29	0.542
5.48	0.393
5.73	0.182
5.91	0.070*
6.00	0.037*
6.18	0.000*
CURVE 30*	
T ~ 298	
2.00	0.826
2.33	0.829
2.60	0.819
2.68	0.802
2.76	0.757
2.80	0.392
2.80	0.265
2.83	0.206
2.86	0.172
2.89	0.169

λ	τ
CURVE 30 (cont.)*	
2.99	0.194
3.14	0.292
3.46	0.502
3.71	0.623
3.90	0.691
3.99	0.712
4.07	0.717
4.15	0.706
4.68	0.570
4.98	0.489
5.05	0.451
5.17	0.410
5.26	0.360
5.37	0.286
5.50	0.187
5.57	0.125
5.75	0.045
6.00	0.000
CURVE 31	
T ~ 298	
2.00	0.838
2.60	0.838
2.68	0.829
2.74	0.802
2.78	0.618
2.81	0.538
2.85	0.494
2.92	0.485
3.01	0.500
3.16	0.583
3.29	0.638
3.45	0.690
3.65	0.745
3.81	0.788
3.94	0.804
4.05	0.810*
4.15	0.802
4.64	0.719*
5.05	0.633*
5.14	0.612
5.19	0.591
5.23	0.568*
5.29	0.542*
5.48	0.393*

λ	τ
CURVE 31 (cont.)	
5.73	0.182*
5.91	0.070*
6.00	0.037*
6.18	0.000*
CURVE 32*	
T ~ 298	
2.00	0.808
2.37	0.813
2.59	0.806
2.69	0.785
2.73	0.750
2.77	0.682
2.80	0.462
2.82	0.311
2.86	0.278
2.90	0.275
2.98	0.290
3.07	0.342
3.26	0.466
3.44	0.563
3.62	0.647
3.76	0.690
3.89	0.720
4.01	0.733
4.06	0.736
4.14	0.729
4.86	0.530
4.98	0.489
5.05	0.451
5.17	0.410
5.26	0.360
5.37	0.286
5.50	0.187
5.57	0.125
5.75	0.045
6.00	0.000
CURVE 33	
T ~ 298	
2.00	0.908
2.68	0.883
2.72	0.877
2.80	0.608

λ	τ
CURVE 33 (cont.)	
2.82	0.560
2.88	0.518
2.95	0.518
3.33	0.677
3.64	0.781
3.80	0.813
4.03	0.827
4.15	0.827
4.35	0.798
4.81	0.703
5.22	0.588
5.69	0.182
5.82	0.099*
5.91	0.052*
6.00	0.024*
6.20	0.000*
CURVE 34*	
T ~ 298	
2.00	0.887
2.54	0.866
2.65	0.854
2.71	0.827
2.73	0.792
2.84	0.376
2.86	0.346
2.91	0.327
2.95	0.327
3.56	0.641
3.71	0.698
3.86	0.739
4.00	0.751
4.09	0.751
4.32	0.707
4.79	0.577
5.13	0.445
5.32	0.346
5.37	0.266
5.49	0.169
5.60	0.104
5.67	0.074
5.81	0.038
6.00	0.024
6.20	0.000

λ	τ
CURVE 35	
T ~ 298	
2.00	0.785
2.72	0.806
2.75	0.787
2.89	0.508
2.93	0.493
3.09	0.538
3.46	0.692
3.64	0.748
3.95	0.812
4.11	0.814*
4.22	0.787
4.45	0.768
5.22	0.604
5.73	0.194
5.81	0.134
5.90	0.097
6.01	0.050*
6.14	0.028*
6.26	0.000*
CURVE 36*	
T ~ 298	
2.00	0.699
2.31	0.709
2.62	0.723
2.68	0.715
2.72	0.689
2.75	0.657
2.87	0.310
2.89	0.293
2.96	0.283
3.30	0.461
3.66	0.628
3.92	0.706
4.02	0.718
4.06	0.723
4.11	0.723
4.66	0.597
4.94	0.514
5.19	0.420
5.35	0.325
5.54	0.166
5.60	0.126
5.68	0.082
5.77	0.052
5.87	0.028
6.00	0.000

* Not shown on plot

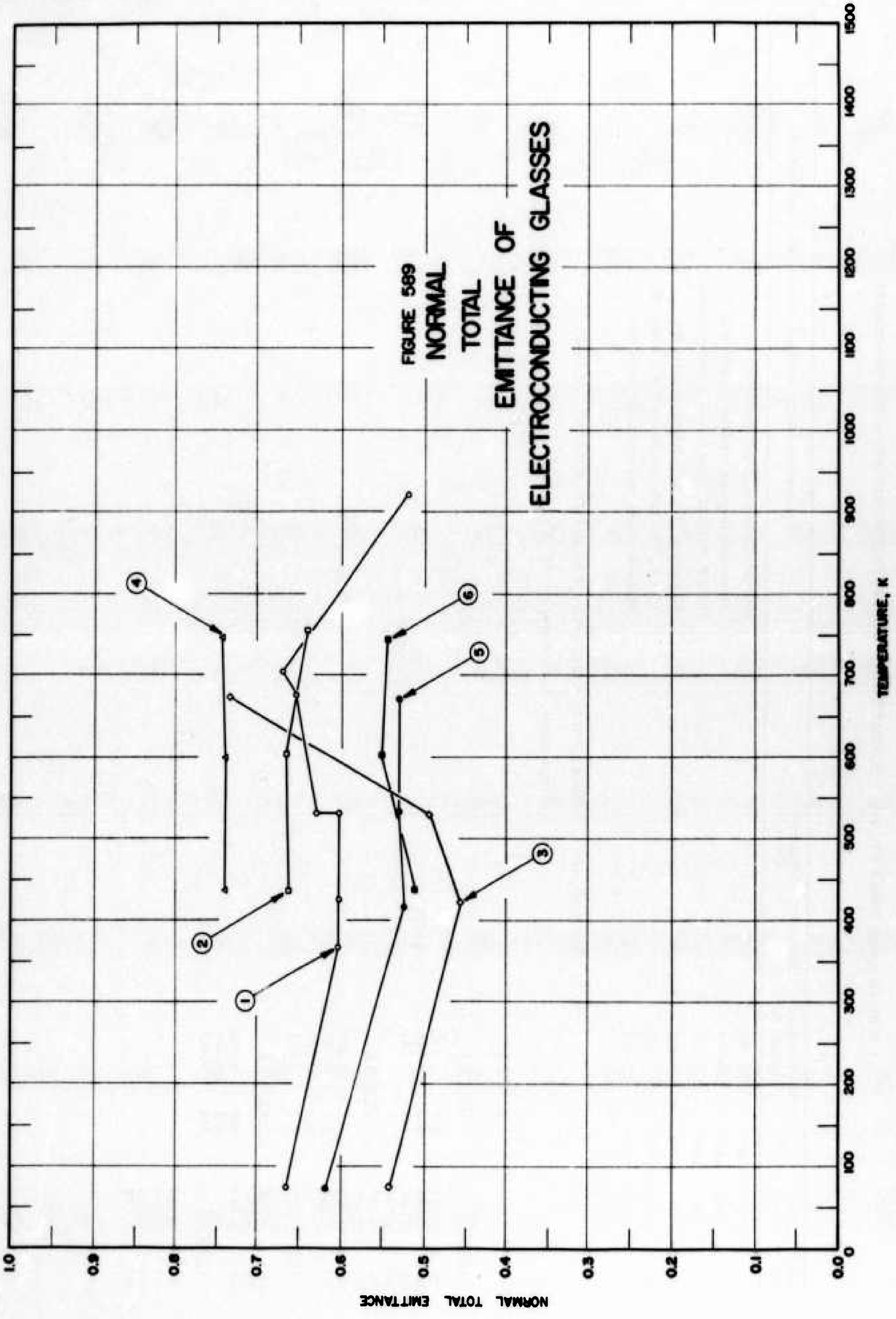


FIGURE 589 NORMAL TOTAL EMITTANCE OF ELECTROCONDUCTING GLASSES

SPECIFICATION TABLE NO. 589 NORMAL TOTAL EMITTANCE OF ELECTROCONDUCTING GLASSES

Curve No.	Ref. No.	Year	Temperature Range, K	Geometry θ'	Reported Error, %	Composition (weight percent), Specifications and Remarks
1	106	1959	75.4-921	~0°		547-26; measured in air; cycle one.
2	106	1959	435-755	~0°		Above specimen and conditions; cycle two.
3	106	1959	75.4-673	~0°		L.O.F. 81E 19778; measured in air; cycle one.
4	106	1959	435-748	~0°		Above specimen and conditions; cycle two.
5	106	1959	73.7-672	~0°		L.O.F. PB 19195; measured in air; cycle one.
6	106	1959	436-745	~0°		Above specimen and conditions; cycle two.

DATA TABLE NO. 589 NORMAL TOTAL EMITTANCE OF ELECTROCONDUCTING GLASSES

[Temperature, T, K; Emittance, ϵ]

T	ϵ	T	ϵ
CURVE 1		CURVE 4	
75.4	0.665	435	0.740
368	0.607	600	0.740
426	0.604	748	0.744
532	0.604		
532	0.630	CURVE 5	
677	0.655		
703	0.670	73.7	0.619
921	0.522	417	0.527
		534	0.531
CURVE 2		672	0.531
435	0.664		
604	0.667	CURVE 6	
755	0.642	436	0.513
		601	0.551
CURVE 3		745	0.545
75.4	0.542		
421	0.458		
530	0.496		
673	0.736		

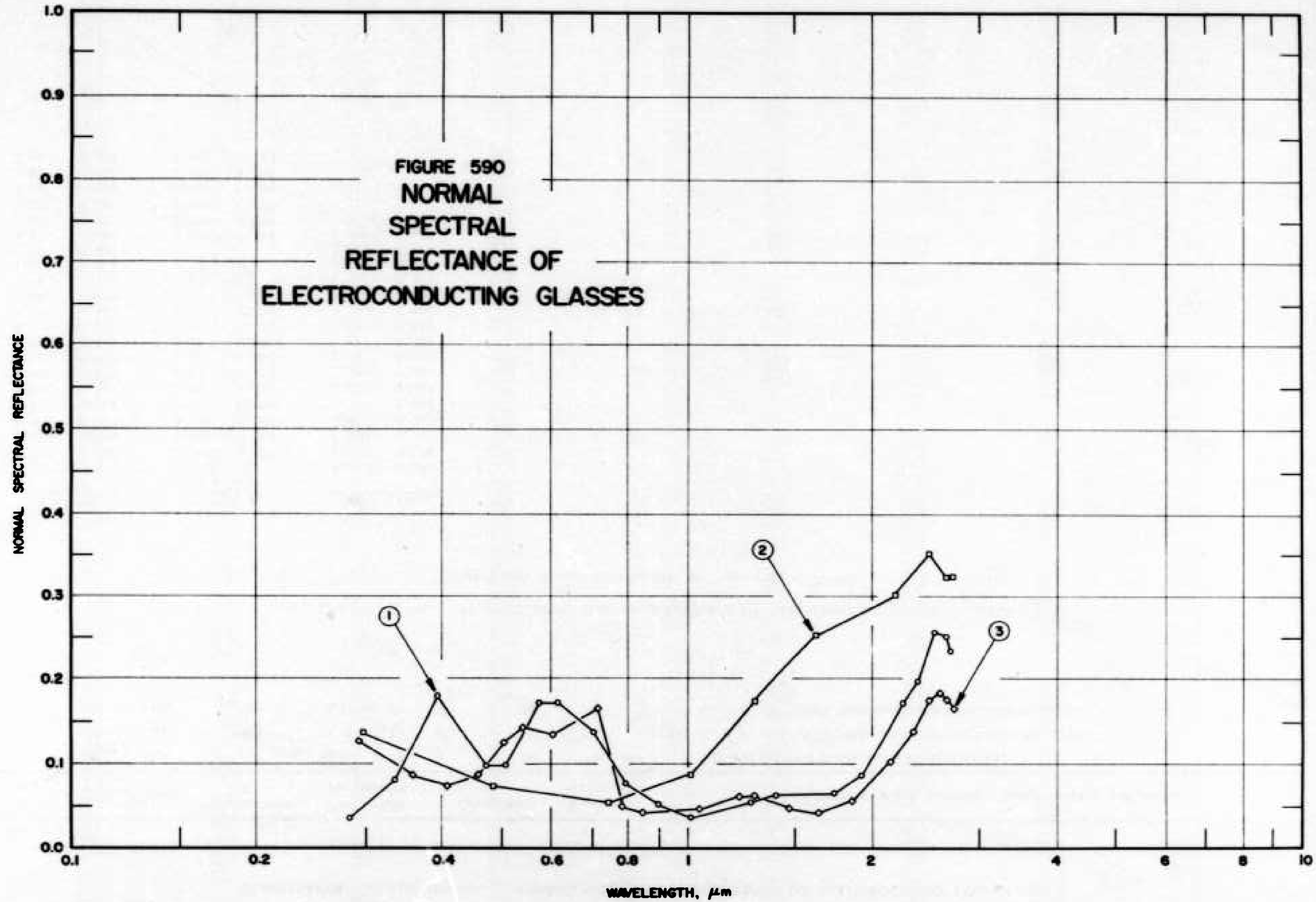


FIGURE 590
NORMAL
SPECTRAL
REFLECTANCE OF
ELECTROCONDUCTING GLASSES
NORMAL SPECTRAL REFLECTANCE
WAVELENGTH, μm
1.0
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0.0
0.1
0.2
0.4
0.6
0.8
1
2
4
6
8
10
1
2
3

SPECIFICATION TABLE NO. 590 NORMAL SPECTRAL REFLECTANCE OF ELECTROCONDUCTING GLASSES

Curve No.	Ref. No.	Year	Temperature, K	Wavelength Range, μm	Geometry θ	θ'	ω'	Reported Error, %	Composition (weight percent), Specifications, and Remarks
1	106	1959	298	0.282-2.68	9°		2π	4	547-26; data extracted from smooth curve.
2	106	1959	298	0.299-2.70	9°		2π	4	L.O.F. 81E 19778; data extracted from smooth curve.
3	106	1959	298	0.293-2.70	9°		2π	4	L.O.F. PB 19195; data extracted from smooth curve.

DATA TABLE NO. 590 NORMAL SPECTRAL REFLECTANCE OF ELECTROCONDUCTING GLASSES

[Wavelength, λ, μm; Reflectance, ρ; Temperature, T, K]

λ	ρ
CURVE 1 T = 298	
0.282	0.036
0.333	0.080
0.391	0.180
0.470	0.099
0.506	0.099
0.573	0.172
0.613	0.172
0.701	0.139
0.795	0.078
0.895	0.052
1.00	0.039
1.26	0.055
1.39	0.063
1.73	0.066
1.92	0.088
2.23	0.171
2.37	0.198
2.51	0.258
2.63	0.251
2.68	0.234

λ	ρ
CURVE 2 T = 298	
0.299	0.137
0.483	0.073
0.743	0.055
1.00	0.089
1.29	0.175
1.61	0.252
2.09	0.301
2.48	0.352
2.64	0.323
2.70	0.324
CURVE 3 T = 298	
0.293	0.128
0.359	0.088
0.406	0.073
0.459	0.089
0.501	0.126
0.540	0.144

λ	ρ
CURVE 3 (cont.)	
0.602	0.135
0.712	0.076
0.783	0.050
0.843	0.043
1.00	0.049
1.20	0.062
1.28	0.063
1.46	0.049
1.63	0.042
1.85	0.058
2.13	0.101
2.32	0.139
2.48	0.175
2.58	0.182
2.64	0.177
2.70	0.166

SPECIFICATION TABLE NO. 591 NORMAL SOLAR ABSORPTANCE OF ELECTROCONDUCTING GLASSES

Curve No.	Ref. No.	Year	Temperature Range, K	Geometry θ	Reported Error	Composition (weight percent), Specifications, and Remarks
1*	106	1959	298	9°		L.O.F. PB 19195; computed from spectral reflectance and spectral transmittance data (0.3 to 3 μm) for above atmosphere conditions.
2*	106	1959	298	9°		Above specimen and conditions except computed for sea level conditions.
3*	106	1959	298	9°		L.O.F. 81E 19778; computed from spectral reflectance and spectral transmittance data (0.3 to 3 μm) for above atmosphere conditions.
4*	106	1959	298	9°		Above specimen and conditions except computed for sea level conditions.
5*	106	1959	298	9°		547-26; computed from spectral reflectance and spectral transmittance data (0.3 to 3 μm) for above atmosphere conditions.
6*	106	1959	298	9°		Above specimen and conditions except computed for sea level conditions.

DATA TABLE NO. 591 NORMAL SOLAR ABSORPTANCE OF ELECTROCONDUCTING GLASSES

[Temperature, T, K; Absorptance, α]

T	α
CURVE 1*	
298	0.223
CURVE 2*	
298	0.185
CURVE 3*	
298	0.357
CURVE 4*	
298	0.344
CURVE 5*	
298	0.177
CURVE 6*	
298	0.126

*No plot given

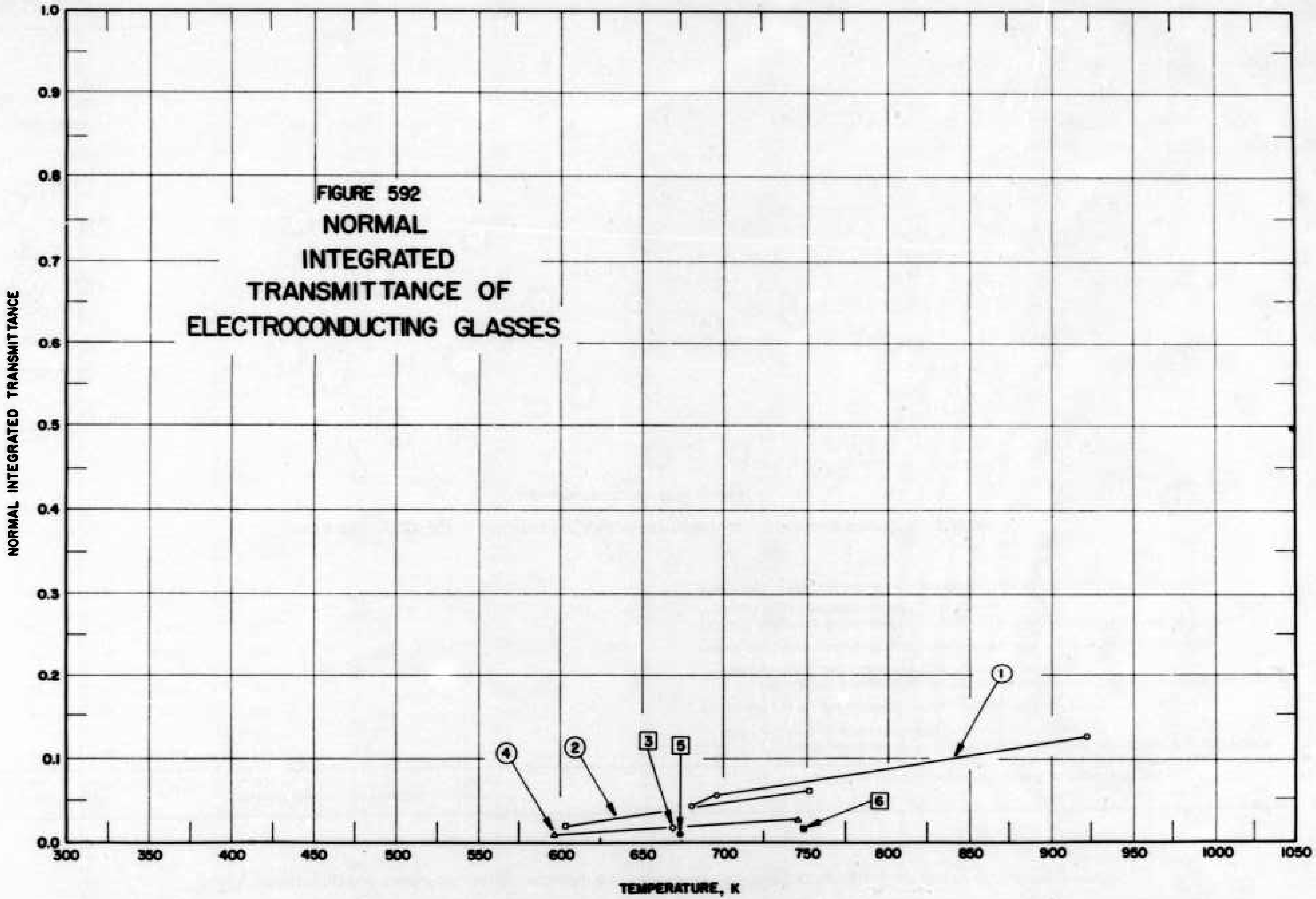


FIGURE 592
NORMAL
INTEGRATED
TRANSMITTANCE OF
ELECTROCONDUCTING GLASSES
NORMAL INTEGRATED TRANSMITTANCE
TEMPERATURE, K
0.0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
1.0
300
350
400
450
500
550
600
650
700
750
800
850
900
950
1000
1050
1
2
3
4
5
6

SPECIFICATION TABLE NO. 592 NORMAL INTEGRATED TRANSMITTANCE OF ELECTROCONDUCTING GLASSES

Curve No.	Ref. No.	Year	Temperature Range, K	Geometry θ	θ'	ω'	Reported Error, %	Composition (weight percent), Specifications and Remarks
1	106	1959	680-923	~0°	~0°			547-26; measured in air; black body incident radiation at temperature of measurement; cycle one.
2	106	1959	603-751	~0°	~0°			Above specimen and conditions; cycle two.
3	106	1959	688	~0°	~0°			L.O.F. 81E 19778; measured in air; black body incident radiation at temperature of measurement; cycle one.
4	106	1959	596-745	~0°	~0°			Above specimen and conditions; cycle two.
5	106	1959	674	~0°	~0°			L.O.F. PB 19195; measured in air; black body incident radiation at temp of measurement; cycle one.
6	106	1959	748	~0°	~0°			Above specimen and conditions; cycle two.

DATA TABLE NO. 592 NORMAL INTEGRATED TRANSMITTANCE OF ELECTROCONDUCTING GLASSES

[Temperature, T, K; Transmittance, τ]

T	τ
CURVE 1	
680	0.041
695	0.055
923	0.125
CURVE 2	
603	0.019
751	0.060
CURVE 3	
668	0.017
CURVE 4	
596	0.008
745	0.025
CURVE 5	
674	0.009
CURVE 6	
748	0.015

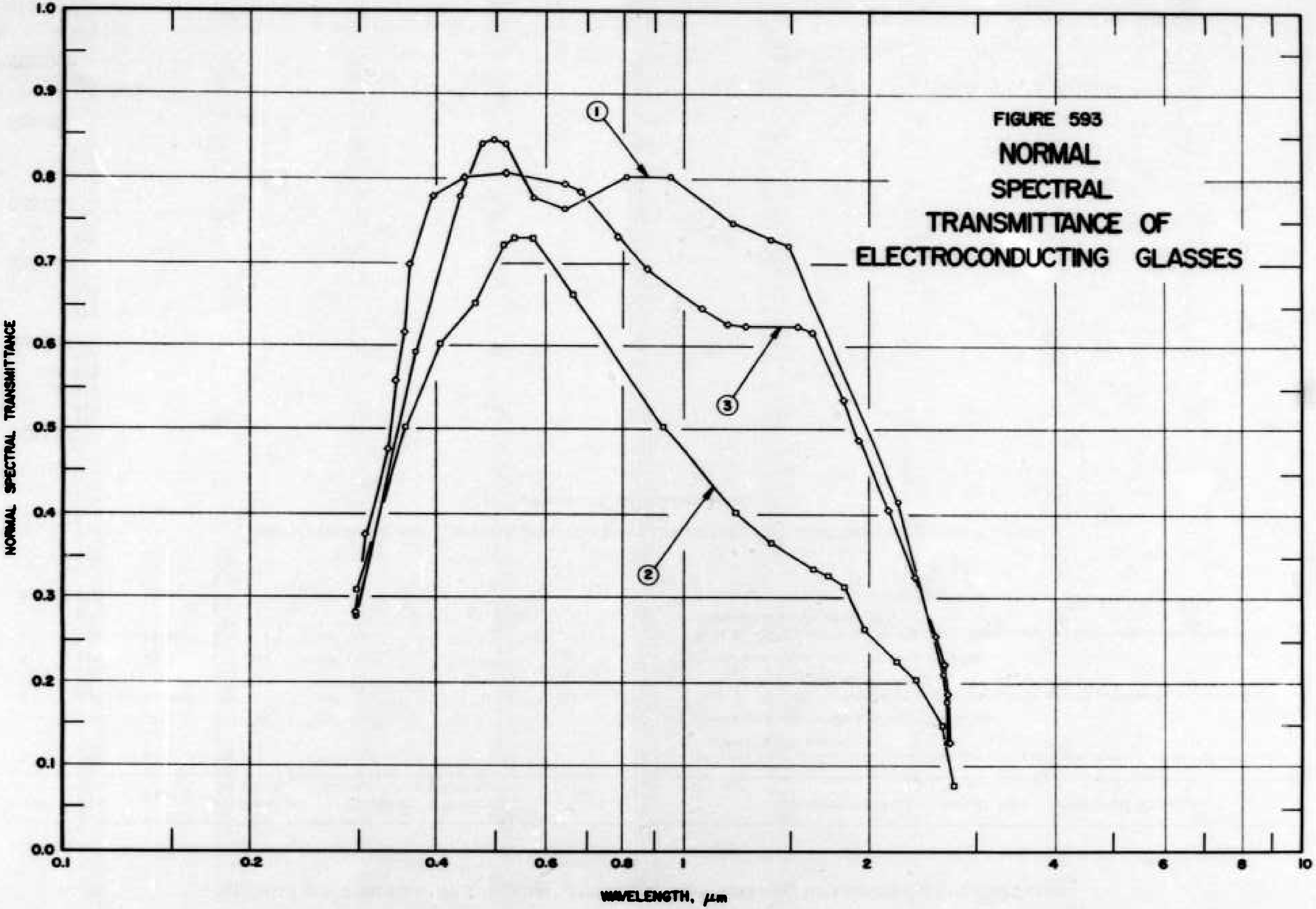


FIGURE 593
NORMAL SPECTRAL TRANSMITTANCE OF ELECTROCONDUCTING GLASSES

SPECIFICATION TABLE NO. 593 NORMAL SPECTRAL TRANSMITTANCE OF ELECTROCONDUCTING GLASSES

Curve No.	Ref. No.	Year	Temperature, K	Wavelength Range, μm	θ	Geometry θ'	ω'	Reported Error, %	Composition (weight percent), Specifications, and Remarks
1	106	1959	298	0.298-2.69	~0°		2π		547-26.
2	106	1959	298	0.298-2.70	~0°		2π		L. O. F. 81E 19778.
3	106	1959	298	0.296-2.69	~0°		2π		L. O. F. PB 19195.

DATA TABLE NO. 593 NORMAL SPECTRAL TRANSMITTANCE OF ELECTROCONDUCTING GLASSES

[Wavelength, λ, μm; Transmittance, τ; Temperature, T, K]

λ	τ
CURVE 1	**T = 298**
0.298	0.280
0.370	0.594
0.438	0.780
0.472	0.840
0.498	0.845
0.519	0.840
0.575	0.778
0.649	0.765
0.810	0.803
0.951	0.803
1.20	0.748
1.39	0.730
1.48	0.721
2.20	0.417
2.62	0.210
2.66	0.176
2.69	0.128
CURVE 2	**T = 298**
0.298	0.310
0.359	0.502
0.408	0.601
0.461	0.654
CURVE 2 (cont.)	
0.511	0.722
0.533	0.730
0.571	0.730
0.663	0.663
0.927	0.501
1.22	0.401
1.39	0.368
1.62	0.334
1.72	0.328
1.81	0.315
1.96	0.263
2.20	0.225
2.38	0.202
2.60	0.149
2.70	0.076
CURVE 3	**T = 298**
0.296	0.284
0.309	0.377
0.335	0.476
0.344	0.561
0.355	0.619
0.361	0.699
0.395	0.780
CURVE 3 (cont.)	
0.443	0.803
0.520	0.809
0.647	0.797
0.686	0.788
0.788	0.732
0.862	0.692
1.07	0.649
1.18	0.629
1.25	0.626
1.54	0.626
1.61	0.619
1.81	0.536
1.92	0.486
2.15	0.406
2.37	0.326
2.56	0.257
2.63	0.221
2.66	0.186
2.69	0.128

SPECIFICATION TABLE NO. 594 HEMISPHERICAL TOTAL EMITTANCE OF FUSED SILICA GLASS

Curve No.	Ref. No.	Year	Temperature Range, K	Reported Error, %	Composition (weight percent), Specifications and Remarks
1*	223	1963	221-229	2.5	Corning Glass Co. 7940 fused silica.

DATA TABLE NO. 594 HEMISPHERICAL TOTAL EMITTANCE OF FUSED SILICA GLASS

[Temperature, T, K; Emittance, ϵ]

T	ϵ
CURVE 1*	
221	0.74
229	0.72

* Not shown on plot

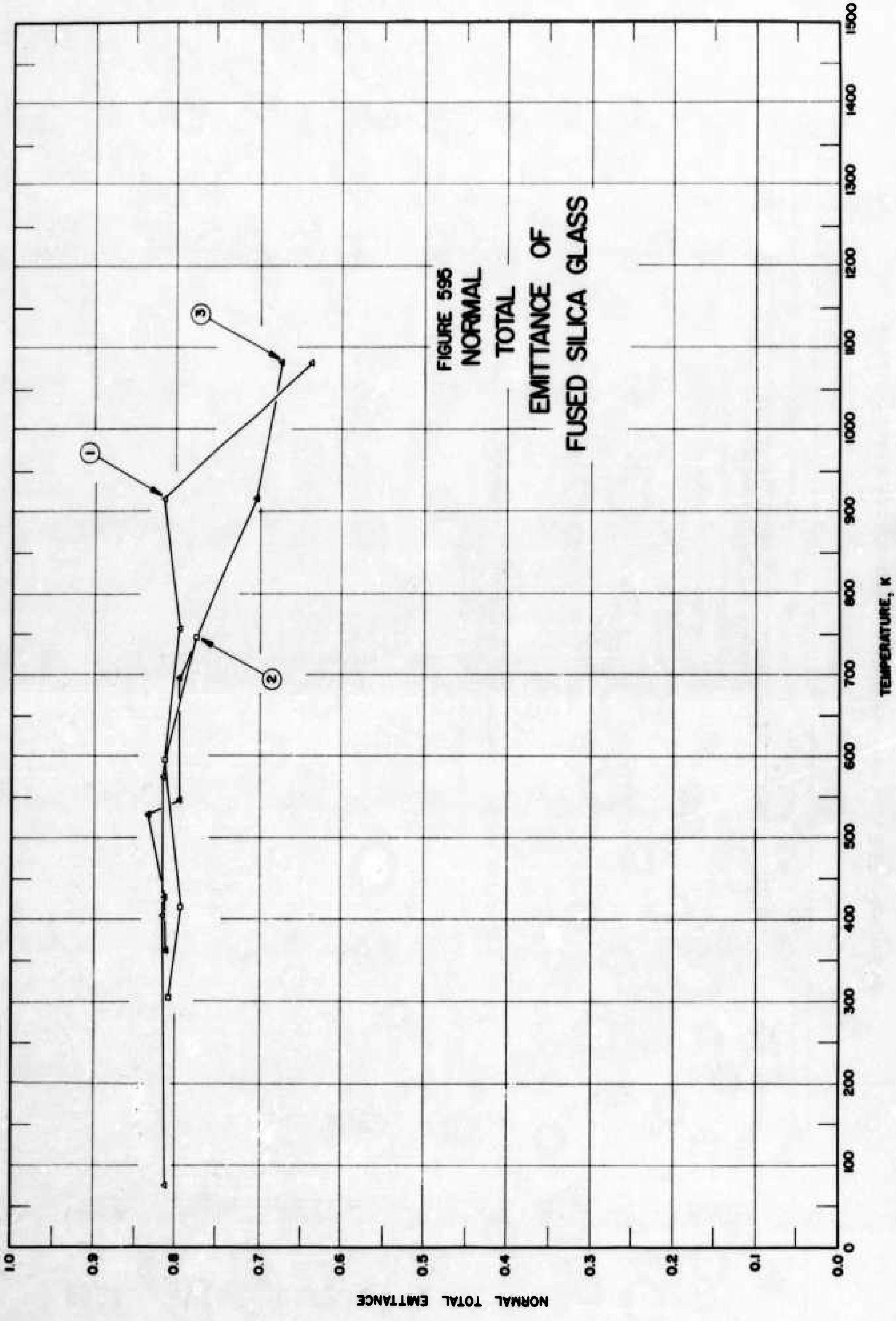


FIGURE 595 NORMAL TOTAL EMITTANCE OF FUSED SILICA GLASS

SPECIFICATION TABLE NO. 595 NORMAL TOTAL EMITTANCE OF FUSED SILICA GLASS

Curve No.	Ref. No.	Year	Temperature Range, K	Geometry θ'	Reported Error, %	Composition (weight percent), Specifications and Remarks
1	106	1959	78.7-1081	~0°		Corning No. 7940 (12.7 mm thick); measured in air; cycle one.
2	106	1959	305-749	~0°		Above specimen and conditions; cycle two.
3	106	1959	361-1083	~0°		Above specimen and conditions; cycle three.

DATA TABLE NO. 595 NORMAL TOTAL EMITTANCE OF FUSED SILICA GLASS

[Temperature, T, K; Emittance, ϵ]

T	ϵ	T	ϵ
CURVE 1		**CURVE 3 (cont.)**	
78.7	0.813	697	0.799
405	0.818	917	0.708
570	0.818	1083	0.674
759	0.796		
916	0.816		
1081	0.640		
CURVE 2			
305	0.810		
417	0.795		
598	0.815		
749	0.776		
CURVE 3			
361	0.811		
428	0.816		
530	0.835		
549	0.798		

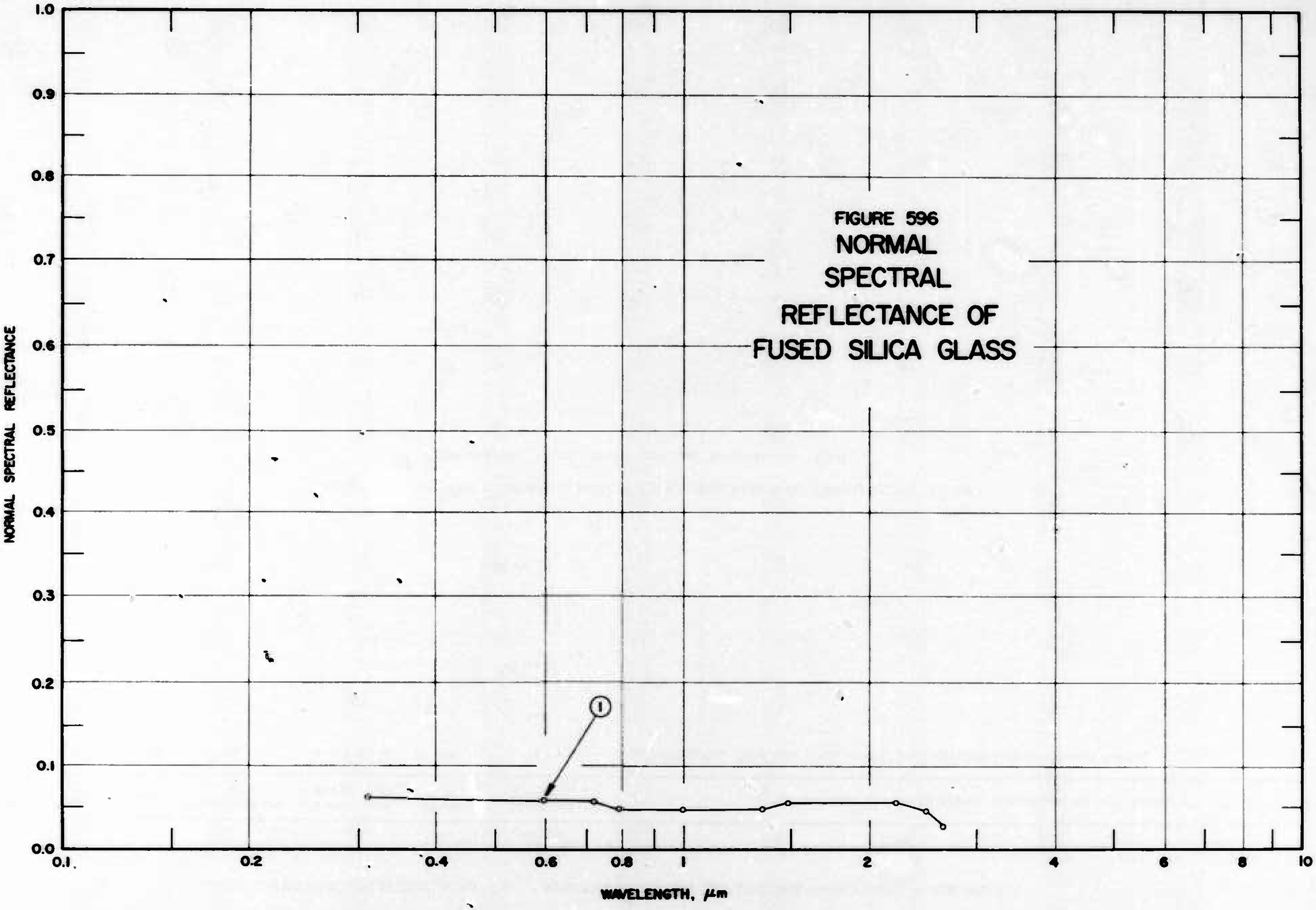


FIGURE 596
NORMAL
SPECTRAL
REFLECTANCE OF
FUSED SILICA GLASS

SPECIFICATION TABLE NO. 596 NORMAL SPECTRAL REFLECTANCE OF FUSED SILICA GLASS

Curve No.	Ref. No.	Year	Temperature K	Wavelength Range, μm	Geometry θ	θ'	ω'	Reported Error, %	Composition (weight percent), Specifications and Remarks
1	106	1959	298	0.310-2.61	9°	2π		4	Corning No. 7940 (12.7 mm thick); data extracted from smooth curve.

DATA TABLE NO. 596 NORMAL SPECTRAL REFLECTANCE OF FUSED SILICA GLASS

[Wavelength, λ, μm; Reflectance, ρ; Temperature, T, K]

λ	ρ
CURVE 1	
T = 298	
0.310	0.060
0.599	0.059
0.712	0.055
0.783	0.048
0.997	0.048
1.34	0.048
1.47	0.054
2.20	0.054
2.46	0.045
2.61	0.028

SPECIFICATION TABLE NO. 597 NORMAL SOLAR ABSORPTANCE OF FUSED SILICA GLASS

Curve No.	Ref. No.	Year	Temperature Range, K	Geometry θ	Reported Error, %	Composition (weight percent), Specifications and Remarks
1*	106	1959	298	9°		Corning No. 7940 (12.7 mm thick); computed from spectral reflectance and spectral transmittance data (0.3 to 3 μm) for above atm conditions.
2*	106	1959	298	9°		Above specimen and conditions except computed for sea level conditions.

DATA TABLE NO. 597 NORMAL SOLAR ABSORPTANCE OF FUSED SILICA GLASS

[Temperature, T, K; Absorptance, α]

T	α
CURVE 1*	
298	0.025
CURVE 2*	
298	0.018

* No plot given

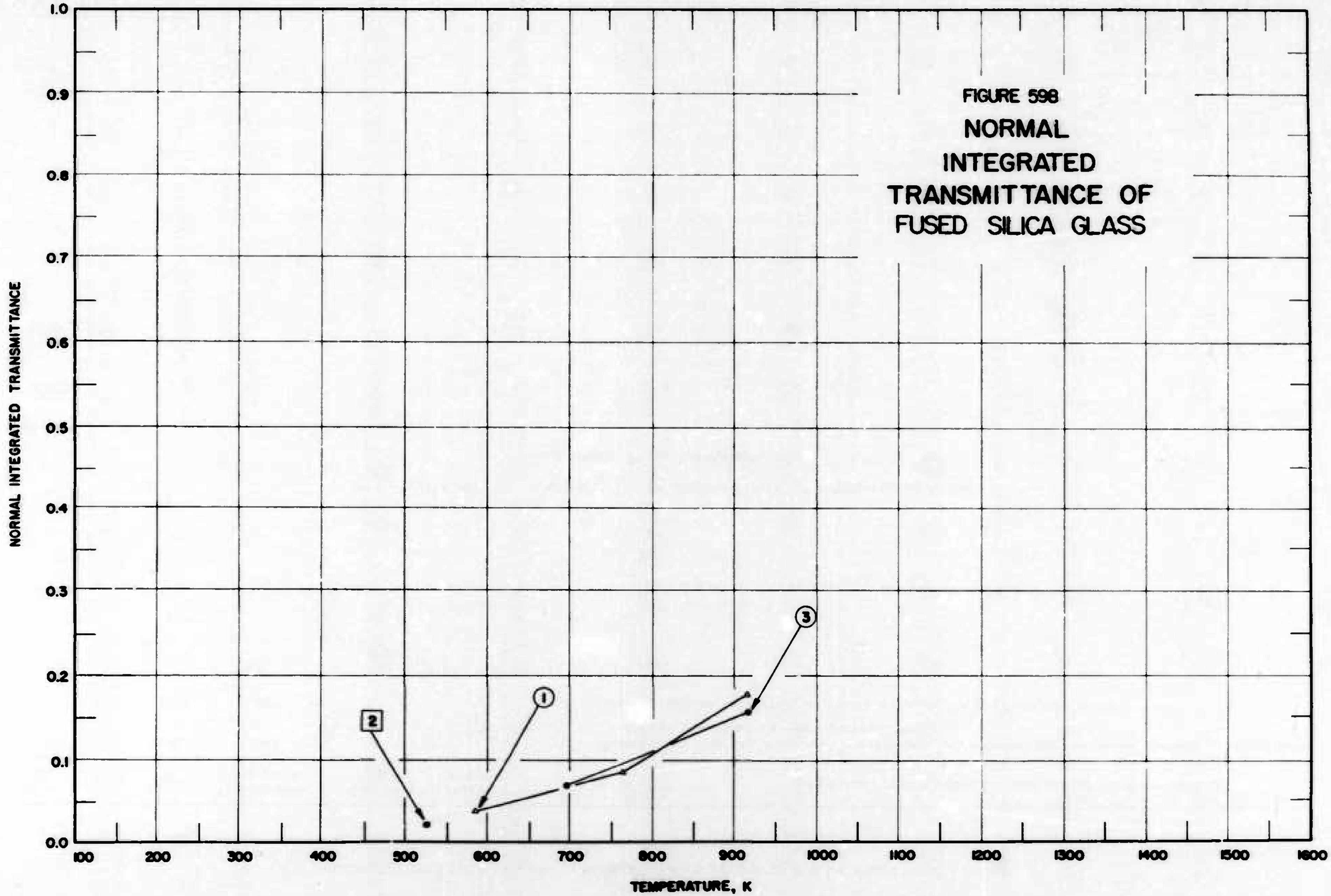


FIGURE 598
NORMAL
INTEGRATED
TRANSMITTANCE OF
FUSED SILICA GLASS

SPECIFICATION TABLE NO. 598 NORMAL INTEGRATED TRANSMITTANCE OF FUSED SILICA GLASS

Curve No.	Ref. No.	Year	Temperature Range, K	Geometry θ	θ'	ω'	Reported Error, %	Composition (weight percent), Specifications and Remarks
1	106	1959	585-916	~0°	~0°			Corning No. 7940 (12.7 mm thick); measured in air; black body incident radiation at temp of measurement; cycle one.
2	106	1959	526	~0°	~0°			Above specimen and conditions; cycle two.
3	106	1959	698-918	~0°	~0°			Above specimen and conditions; cycle three.

DATA TABLE NO. 598 NORMAL INTEGRATED TRANSMITTANCE OF FUSED SILICA GLASS

[Temperature, T, K; Transmittance, τ]

T	τ
CURVE 1	
585	0.038
763	0.085
916	0.177
CURVE 2	
526	0.020
CURVE 3	
698	0.069
918	0.155

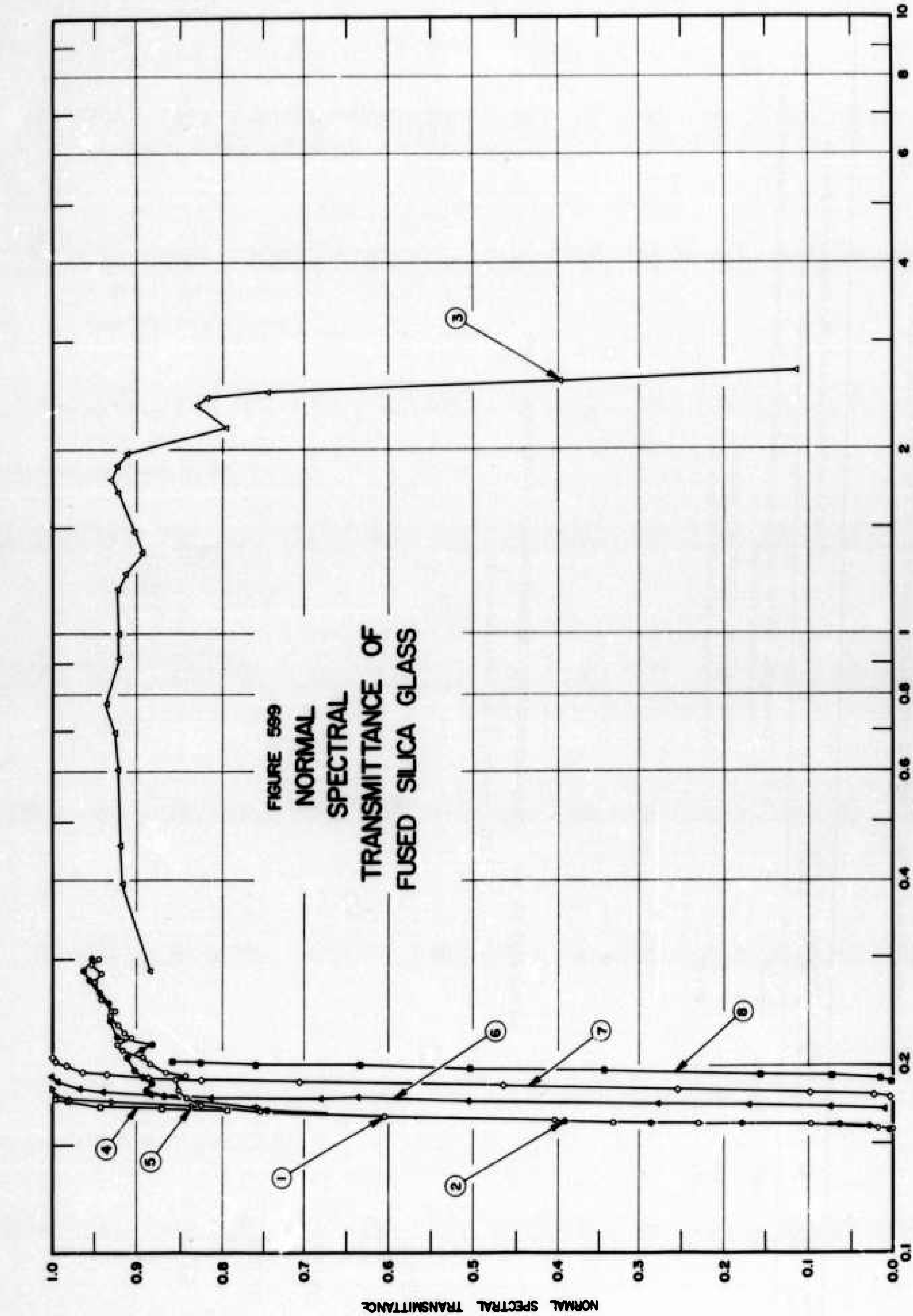


FIGURE 599
NORMAL SPECTRAL TRANSMITTANCE OF FUSED SILICA GLASS
NORMAL SPECTRAL TRANSMITTANCE
WAVELENGTH, μm
0.0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
1.0
0.1
0.2
0.4
0.6
0.8
1
2
4
6
8
10
1
2
3
4
5
6
7
8

SPECIFICATION TABLE NO. 599 NORMAL SPECTRAL TRANSMITTANCE OF FUSED SILICA GLASS

Curve No.	Ref. No.	Year	Temperature K	Wavelength Range, μm	Geometry θ	θ'	ω'	Reported Error, %	Composition (weight percent), Specifications, and Remarks
1	291	1966	~298	0.158-0.300	0°	0°			Corning No. 7940 (3.29 mm thick); measured in vacuum.
2	291	1966	~298	0.158-0.300	0°	0°			Above specimen and conditions except irradiated with 10^{14} electrons cm^{-2} at 2.0 MeV incident through a sapphire shield (6.4 mm thick).
3	106	1959	298	0.287 2.69	~0°	2π			Corning No. 7940 (12.7 mm thick).
4	436	1966	295	0.171-0.177	~0°	~0°			Corning No. 7940, UV grade (0.9 cm thick); washed in detergent and distilled water, washed in acetone, rinsed in distilled water and dried; data extracted from smooth curve.
5	436	1966	533	0.171-0.185	~0°	~0°			Above specimen and conditions.
6	436	1966	811	0.171-0.194	~0°	~0°			Above specimen and conditions.
7	436	1966	1033	0.178-0.207	~0°	~0°			Above specimen and conditions.
8	436	1966	1255	0.189-0.208	~0°	~0°			Above specimen and conditions.

DATA TABLE NO. 599 NORMAL SPECTRAL TRANSMITTANCE OF FUSED SILICA GLASS

[Wavelength, λ, μm; Transmittance, τ; Temperature, T, K]

λ	τ
CURVE 1	**T ~ 298**
0.158	0.000
0.159	0.019
0.161	0.097
0.162	0.230
0.163	0.331
0.164	0.402
0.166	0.605
0.170	0.755
0.175	0.827
0.179	0.843
0.184	0.852
0.189	0.853*
0.192	0.857
0.194	0.846
0.197	0.868
0.199	0.875*
0.204	0.889
0.209	0.896
0.214	0.916
0.219	0.923
0.224	0.908
CURVE 1 (cont.)	
0.229	0.914
0.234	0.921
0.239	0.928*
0.244	0.931
0.249	0.928
0.254	0.939*
0.259	0.942
0.264	0.945*
0.269	0.945
0.274	0.950
0.279	0.945*
0.284	0.941
0.289	0.949
0.294	0.954
0.300	0.947
CURVE 2	**T ~ 298**
0.158	0.003
0.160	0.028
0.161	0.063
CURVE 2 (cont.)	
0.162	0.179
0.163	0.286
0.164	0.391
0.166	0.606*
0.170	0.746
0.174	0.824*
0.180	0.870
0.184	0.890
0.189	0.884
0.192	0.894*
0.194	0.894
0.197	0.893*
0.199	0.901
0.205	0.903*
0.209	0.911
0.214	0.895
0.219	0.883
0.224	0.923
0.229	0.929*
0.234	0.929
0.239	0.932
0.244	0.933*
CURVE 2 (cont.)	
0.249	0.929*
0.254	0.935
0.259	0.940*
0.264	0.946
0.269	0.950*
0.274	0.950*
0.279	0.955
0.284	0.957*
0.289	0.961
0.294	0.961*
0.300	0.953
CURVE 3	**T = 298**
0.287	0.888
0.397	0.918
0.456	0.920
0.601	0.921
0.695	0.926
0.775	0.939
0.917	0.922
CURVE 3 (cont.)	
1.00	0.922
1.19	0.922
1.26	0.915
1.36	0.894
1.48	0.904
1.70	0.922
1.79	0.931
1.88	0.926
1.99	0.912
2.17	0.798
2.22	0.796*
2.35	0.831
2.41	0.820
2.47	0.745
2.59	0.398
2.69	0.112
CURVE 4	**T = 295**
0.171	0.795
0.172	0.871
CURVE 4 (cont.)	
0.174	0.944
0.176	0.983
0.177	0.999
CURVE 5	**T = 533**
0.171	0.650
0.172	0.758
0.173	0.836
0.176	0.930
0.178	0.979
0.181	0.997
0.185	1.003
CURVE 6	**T = 811**
0.171	0.010
0.172	0.074
0.173	0.168
0.174	0.278
CURVE 6 (cont.)	
0.176	0.506
0.177	0.680
0.179	0.815
0.181	0.885
0.183	0.940
0.185	0.968
0.190	0.994
0.194	1.005
CURVE 7	**T = 1033**
0.178	0.002
0.180	0.022
0.182	0.098
0.184	0.259
0.186	0.464
0.189	0.705
0.191	0.826
0.193	0.888
0.195	0.935
0.198	0.965
CURVE 7 (cont.)	
0.201	0.983
0.205	0.998
0.207	1.005
CURVE 8	**T = 1255**
0.189	0.000
0.191	0.013
0.193	0.071
0.194	0.155
0.197	0.344
0.199	0.502
0.201	0.634
0.204	0.760
0.206	0.828
0.208	0.860

*Not shown on plot

SPECIFICATION TABLE NO. 600 NORMAL SOLAR TRANSMITTANCE OF FUSED SILICA GLASS

Curve No.	Ref. No.	Year	Temperature Range, K	Geometry θ	θ'	ω'	Reported Error, %	Composition (weight percent), Specifications and Remarks
1*	276	1968	~298	~0°	~0°			Corning 7940 Industrial fused silica; thickness 0.794 mm; pitch-polished 80-50 on both sides.
2*	276	1968	~298	~0°	~0°			Above specimen and conditions except exposed to 500 ESH uv radiation at solar factor 10 suns at 700 K.
3*	276	1968	~298	~0°	~0°			Similar to curve 1 specimen and conditions except 0.2 mm thick.
4*	276	1968	~298	~0°	~0°			Above specimen and conditions except exposed to 500 ESH uv radiation at solar factor 10 suns at 700 K.
5*	276	1968	~298	~0°	~0°			Corning 7940 UV grade fused silica; thickness 0.2 mm; pitch-polished 80-50 on both sides.
6*	276	1968	~298	~0°	~0°			Above specimen and conditions except exposed to 500 ESH uv radiation at solar factor 10 suns at 700 K.

DATA TABLE NO. 600 NORMAL SOLAR TRANSMITTANCE OF FUSED SILICA GLASS

[Temperature, T, K; Transmittance, τ]

T	τ
CURVE 1*	
298	0.938
CURVE 2*	
298	0.932
CURVE 3*	
298	0.938
CURVE 4*	
298	0.928
CURVE 5*	
298	0.934
CURVE 6*	
298	0.925

*No plot given

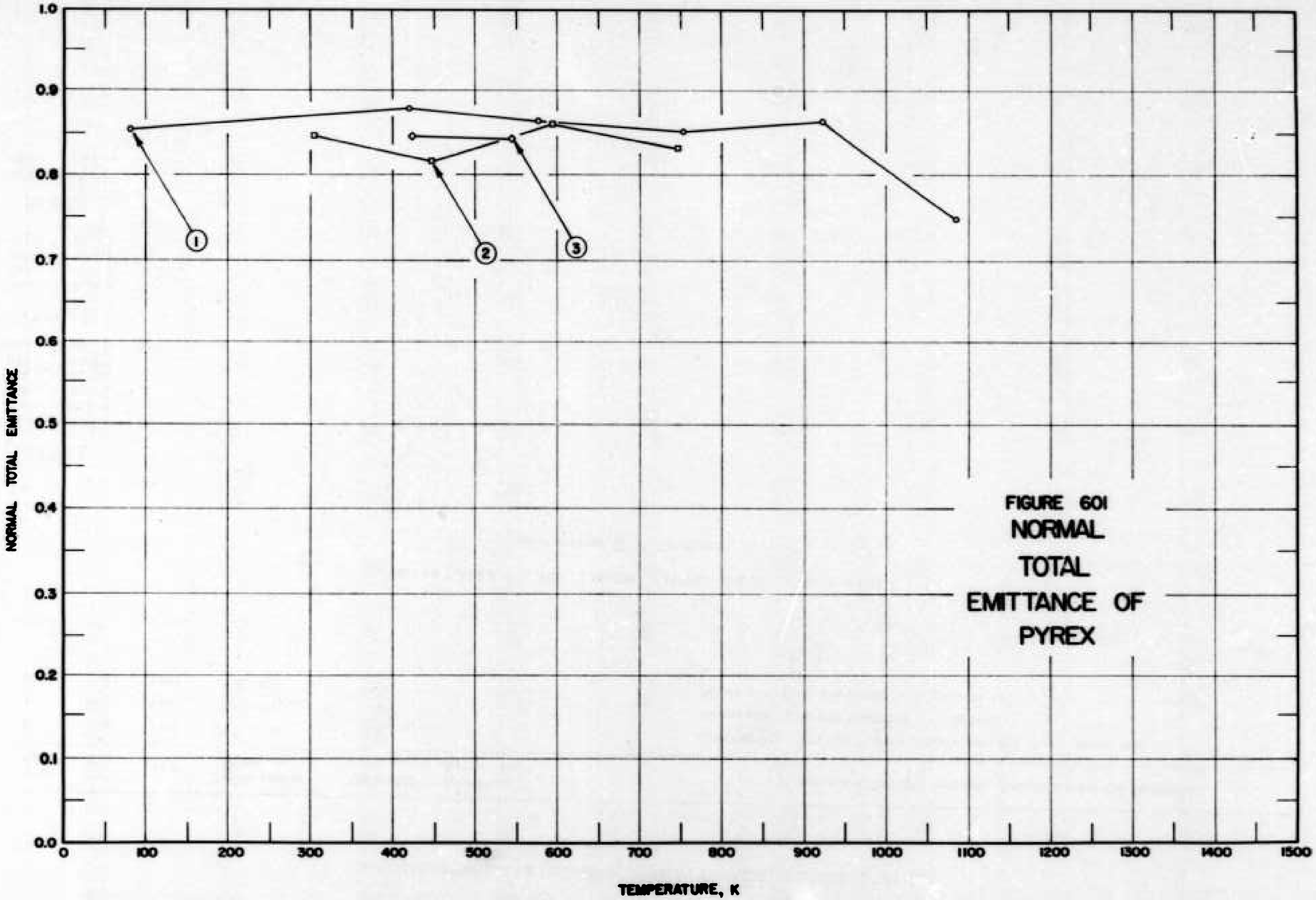


FIGURE 601 NORMAL TOTAL EMITTANCE OF PYREX

SPECIFICATION TABLE NO. 601 NORMAL TOTAL EMITTANCE OF PYREX

Curve No.	Ref. No.	Year	Temperature Range, K	Geometry θ	Reported Error, %	Composition (weight percent), Specifications and Remarks
1	106	1959	81.5-1086	$\sim 0°$		Corning No. 7740 (12.7 mm thick); measured in air; cycle one.
2	106	1959	305-747	$\sim 0°$		Above specimen and conditions; cycle two.
3	106	1959	422-545	$\sim 0°$		Above specimen and conditions; cycle three.

DATA TABLE NO. 601 NORMAL TOTAL EMITTANCE OF PYREX

[Temperature, T, K; Emittance, ϵ]

T	ϵ
CURVE 1	
81.5	0.854
420	0.879
578	0.864
754	0.851
923	0.863
1086	0.748
CURVE 2	
305	0.848
449	0.818
595	0.860
747	0.832
CURVE 3	
422	0.847
545	0.844

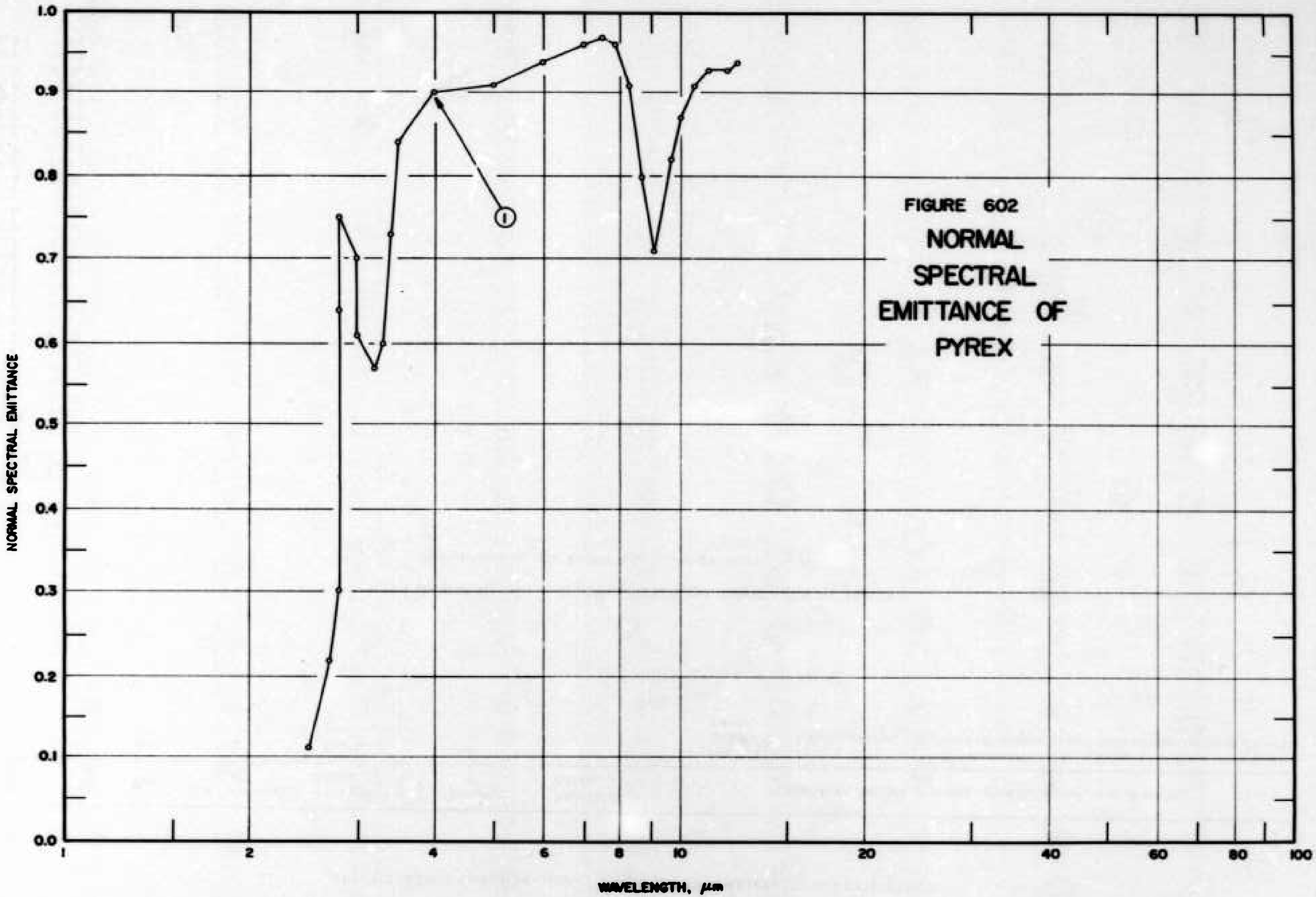


FIGURE 602 NORMAL SPECTRAL EMITTANCE OF PYREX

SPECIFICATION TABLE NO. 602 NORMAL SPECTRAL EMITTANCE OF PYREX

Curve No.	Ref. No.	Year	Temperature, K	Wavelength Range, μm	Geometry θ'	Reported Error, %	Composition (weight percent), Specifications, and Remarks
1	407	1951	811	2.5-12.5	~0°		Pyrex 774 (3.175 mm thick); nominal composition: 81.0 SiO_2, 13.0 B_2O_2, 3.8 Na_2O and K_2O, 2.2 R_2O_2; ground and polished on both sides; data extracted from smooth curve.

DATA TABLE NO. 602 NORMAL SPECTRAL EMITTANCE OF PYREX

[Wavelength, λ, μm; Emittance, ϵ; Temperature, T, K]

λ	τ
CURVE 1	
T = 811	
2.5	0.11
2.7	0.22
2.8	0.40
2.8	0.64
2.8	0.75
3.0	0.70
3.0	0.61
3.2	0.57
3.3	0.60
3.4	0.73
3.5	0.84
4.0	0.90
5.0	0.91
6.0	0.94
7.0	0.96
7.5	0.97
7.9	0.96
8.3	0.91
8.7	0.80
9.1	0.71
9.7	0.82
10.1	0.87
10.6	0.91
11.2	0.93
12.0	0.93
12.5	0.94

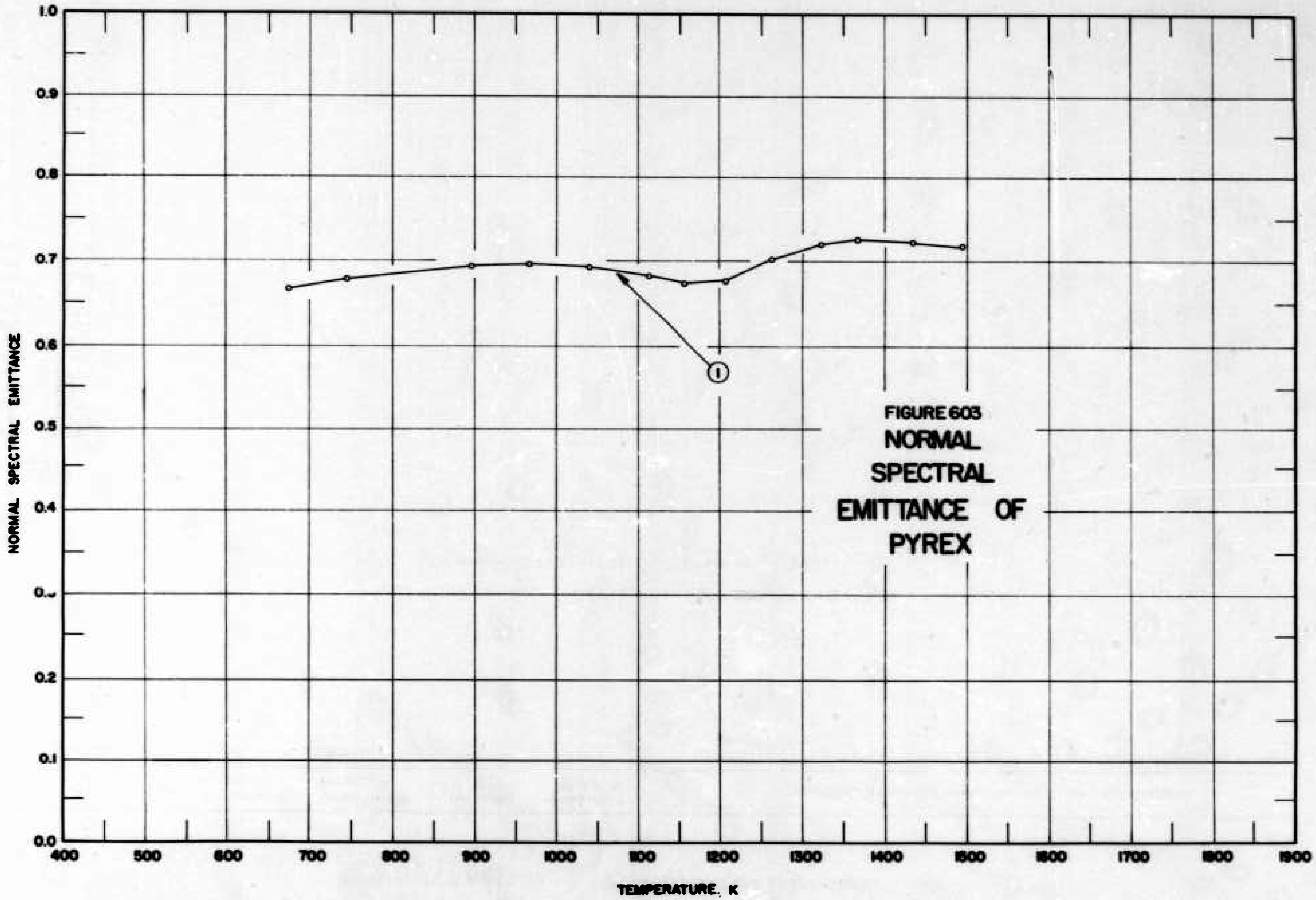


FIGURE 603
NORMAL SPECTRAL EMITTANCE OF PYREX

SPECIFICATION TABLE NO. 603 NORMAL SPECTRAL EMITTANCE OF PYREX

Curve No.	Ref. No.	Year	Wavelength, μm	Temperature Range, K	Geometry θ'	Reported Error, %	Composition (weight percent), Specifications, and Remarks
1	407	1951	9.1	674-1495	$\sim 0°$		Pyrex 774 (1.588 mm thick); ground and polished on both sides; data extracted from smooth curve.

DATA TABLE NO. 603 NORMAL SPECTRAL EMITTANCE OF PYREX

[Temperature, T, K; Emittance, ϵ; Wavelength, λ, μm]

T	ϵ
CURVE 1	
$\lambda = 9.1$	
674	0.666
745	0.679
897	0.695
966	0.698
1040	0.694
1112	0.681
1156	0.672
1206	0.677
1261	0.701
1321	0.721
1367	0.728
1434	0.724
1495	0.720

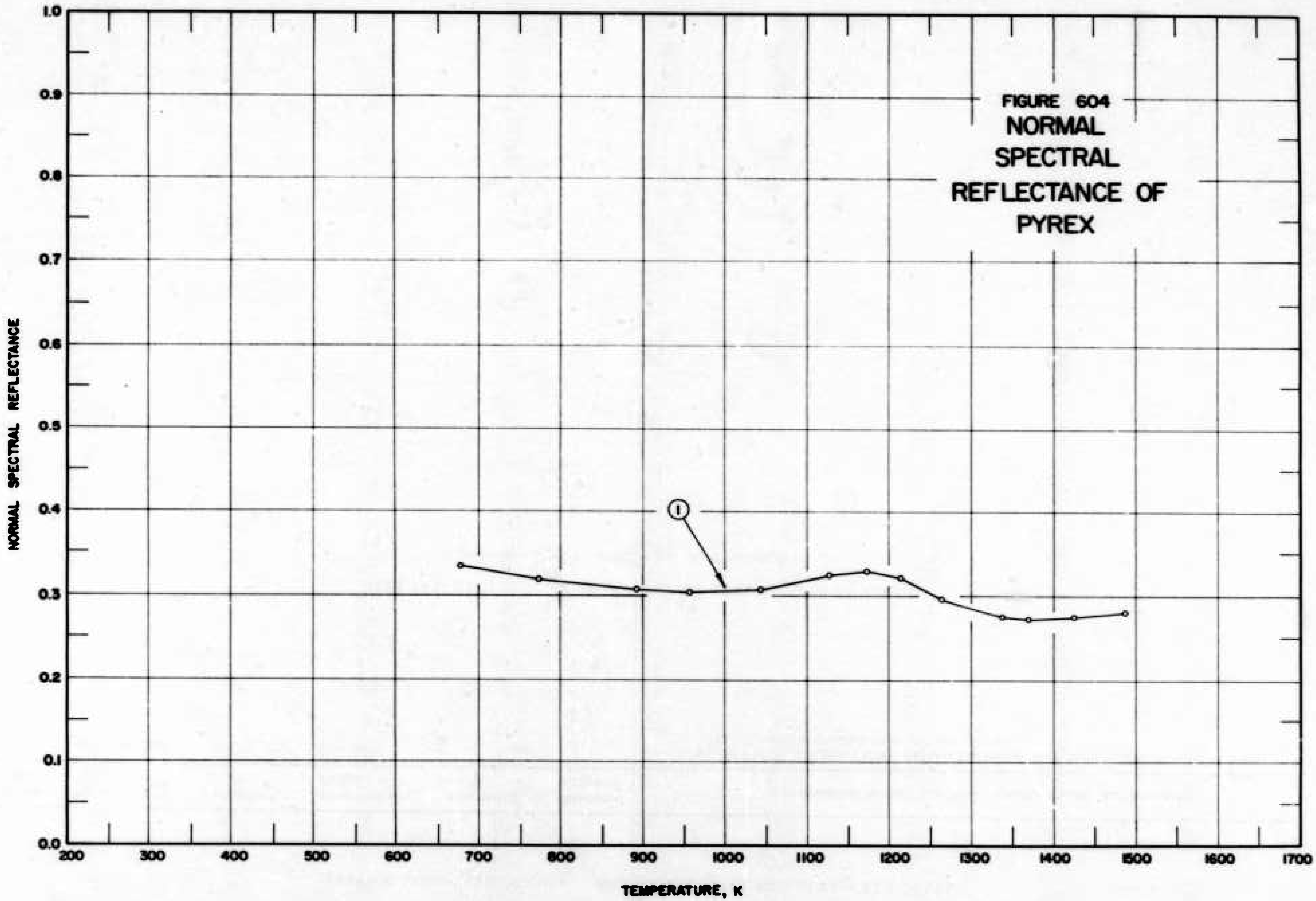


FIGURE 604
NORMAL
SPECTRAL
REFLECTANCE OF
PYREX
NORMAL SPECTRAL REFLECTANCE
TEMPERATURE, K
1.0
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0.0
200
300
400
500
600
700
800
900
1000
1100
1200
1300
1400
1500
1600
1700
1

SPECIFICATION TABLE NO. 604 NORMAL SPECTRAL REFLECTANCE OF PYREX

Curve No.	Ref. No.	Year	Wavelength, μm	Temperature Range, K	Geometry θ	Geometry θ'	Geometry ω'	Reported Error, %	Composition (weight percent), Specifications, and Remarks
1	407	1951	9.1	678-1489	~0°		2π		Pyrex 774 (1.588 mm thick); ground and polished on both sides; calculated from $(1-\epsilon)$; data extracted from smooth curve.

DATA TABLE NO. 604 NORMAL SPECTRAL REFLECTANCE OF PYREX

[Temperature, T, K; Reflectance, ρ; Wavelength, λ, μm]

T	ρ
CURVE 1 $\lambda = 9.1$	
678	0.332
772	0.318
891	0.307
957	0.303
1043	0.306
1129	0.323
1172	0.328
1213	0.320
1265	0.297
1338	0.277
1370	0.274
1427	0.276
1489	0.281

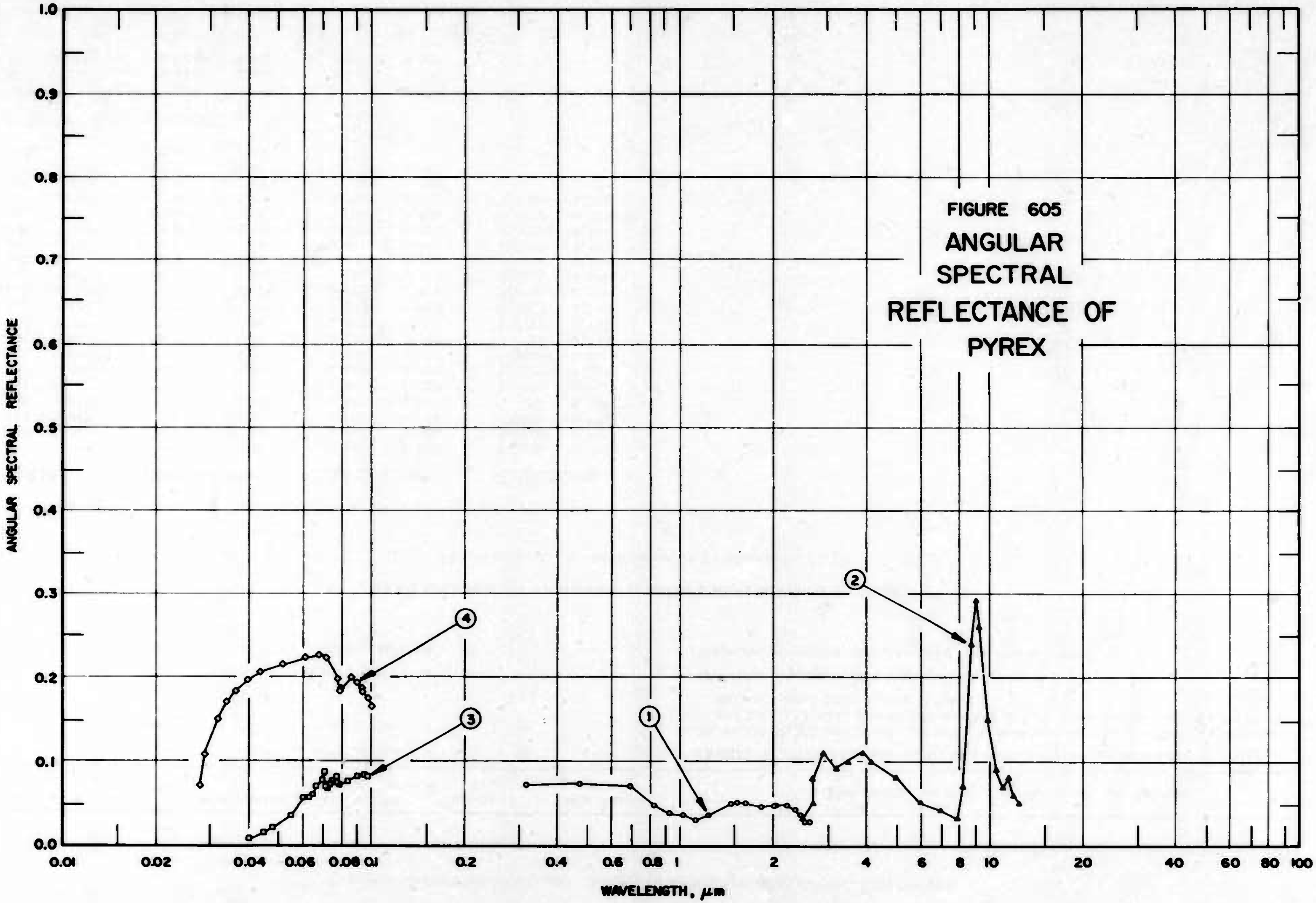


FIGURE 605
ANGULAR SPECTRAL REFLECTANCE OF PYREX

SPECIFICATION TABLE NO. 605 ANGULAR SPECTRAL REFLECTANCE OF PYREX

Curve No.	Ref. No.	Year	Temperature, K	Wavelength Range, μm	θ	Geometry θ'	ω'	Reported Error, %	Composition (weight percent), Specifications, and Remarks
1	106	1959	298	0.317-2.618	9°		2π	4	Corning No. 7740 (12.7 mm thick); data extracted from smooth curve.
2	407	1951	811	2.5-12.5	~0°		2π		Pyrex 774 (3.175 mm thick); nominal composition: 81.0 SiO_2, 13.0 B_2O_2, 3.8 Na_2O and K_2O, 2.2 R_2O_2; ground and polished on both sides; calculated from $1 - (\epsilon + \tau)$; data extracted from smooth curve.
3	147	1967	298	0.0400-0.0972	20	20			Measured in vacuum; data extracted from smooth curve.
4	147	1967	298	0.0275-0.1000	60	60			Measured in vacuum; data extracted from smooth curve.

DATA TABLE NO. 605 ANGULAR SPECTRAL REFLECTANCE OF PYREX

[Wavelength, λ, μm; Reflectance, ρ; Temperature, T, K]

CURVE 1
T = 298

λ	ρ
0.317	0.071
0.478	0.072
0.695	0.070
0.824	0.047
0.923	0.036
1.032	0.033
1.120	0.029
1.215	0.032
1.485	0.049
1.543	0.050
1.643	0.050
1.823	0.045
2.044	0.047
2.098	0.048
2.215	0.048
2.359	0.042
2.470	0.033
2.571	0.027
2.618	0.027

CURVE 2
T = 811

λ	ρ
2.5	0.03
2.7	0.05

CURVE 2 (cont.)

λ	ρ
2.7	0.08
2.9	0.11
3.2	0.09
3.5	0.10
3.9	0.11
4.2	0.10
5.0	0.08
6.0	0.05
7.0	0.04
7.9	0.03
8.2	0.07
8.8	0.24
9.1	0.29
9.3	0.26
9.9	0.15
10.5	0.09
11.0	0.07
11.5	0.08
12.0	0.06
12.5	0.05

CURVE 3
T = 298

λ	ρ
0.0400	0.005
0.0443	0.011

CURVE 3 (cont.)

λ	ρ
0.0476	0.019
0.0541	0.034
0.0600	0.056
0.0624	0.057
0.0640	0.060
0.0658	0.067
0.0686	0.078
0.0701	0.086
0.0709	0.070
0.0714	0.069
0.0734	0.072
0.0743	0.076
0.0763	0.081
0.0778	0.074
0.0784	0.073
0.0834	0.076
0.0908	0.081
0.0945	0.082
0.0972	0.081

CURVE 4
T = 298

λ	ρ
0.0275	0.070
0.0286	0.108
0.0313	0.150

CURVE 4 (cont.)

λ	ρ
0.0336	0.170
0.0358	0.184
0.0393	0.198
0.0430	0.207
0.0509	0.217
0.0607	0.224
0.0666	0.226
0.0703	0.223
0.0773	0.199
0.0785	0.185
0.0793	0.186
0.0853	0.200
0.0898	0.194
0.0928	0.188
0.0938	0.184
0.0973	0.175
0.1000	0.165

SPECIFICATION TABLE NO. 606 NORMAL SOLAR ABSORPTANCE OF PYREX

Curve No.	Ref. No.	Year	Temperature Range, K	Geometry θ	Reported Error, %	Composition (weight percent), Specifications and Remarks
1*	106	1959	298	9°		Corning No. 7740 (12.7 mm thick); computed from spectral reflectance and spectral transmittance data (0.3 to 3 μm) for above atmosphere conditions.
2*	106	1959	298	9°		Above specimen and conditions except computed for sea level conditions.

DATA TABLE NO. 606 NORMAL SOLAR ABSORPTANCE OF PYREX

[Temperature, T, K; Absorptance, α]

T	α
CURVE 1*	
298	0.190
CURVE 2*	
298	0.219

*No plot given

SPECIFICATION TABLE NO. 607 NORMAL INTEGRATED TRANSMITTANCE OF PYREX

Curve No.	Ref. No.	Year	Temperature Range, K	Geometry θ	θ'	ω'	Reported Error, %	Composition (weight percent), Specifications and Remarks
1*	106	1959	535-923	~0°	~0°			Corning No. 7740 (12.7 mm thick); measured in air; black body incident radiation at temperature of measurement.

DATA TABLE NO. 607 NORMAL INTEGRATED TRANSMITTANCE OF PYREX

[Temperature, T, K; Transmittance, τ]

T	τ
CURVE 1*	
535	0.006
587	0.004
764	0.024
923	0.065

*No plot given

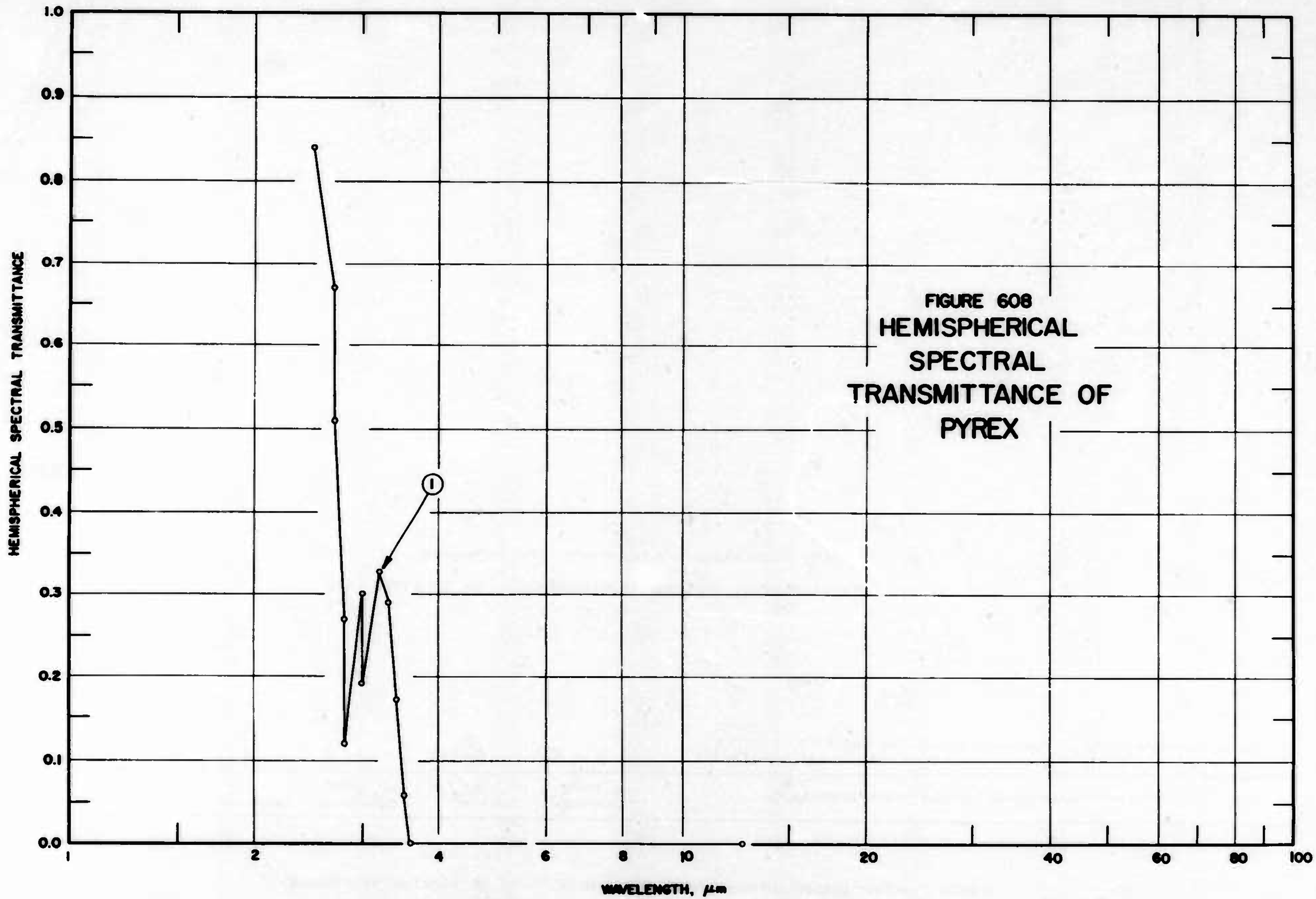


FIGURE 608
HEMISPHERICAL SPECTRAL TRANSMITTANCE OF PYREX
HEMISPHERICAL SPECTRAL TRANSMITTANCE
WAVELENGTH, μm
1.0
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0.0
1
2
4
6
8
10
20
40
60
80
100
1

SPECIFICATION TABLE NO. 608 HEMISPHERICAL SPECTRAL TRANSMITTANCE OF PYREX

Curve No.	Ref. No.	Year	Temperature, K	Wavelength Range, μm	Geometry ω	θ'	ω'	Reported Error, %	Composition (weight percent), Specifications, and Remarks
1	407	1951	811	2.5-12.5	2π	$\sim 0°$			Pyrex 774 (3.175 mm thick); composition: 81.0 SiO_2, 13.0 B_2O_2, 3.8 Na_2O and K_2O, 2.2 R_2O_2; ground and polished on both sides; data extracted from smooth curve.

DATA TABLE NO. 608 HEMISPHERICAL SPECTRAL TRANSMITTANCE OF PYREX

[Wavelength, λ, μm; Transmittance, τ; Temperature, T, K]

λ	τ
CURVE 1	
T = 811	
2.5	0.84
2.7	0.67
2.7	0.51
2.8	0.27
2.8	0.12
3.0	0.19
3.0	0.30
3.2	0.33
3.3	0.29
3.4	0.17
3.5	0.06
3.7	0.00
12.5	0.00

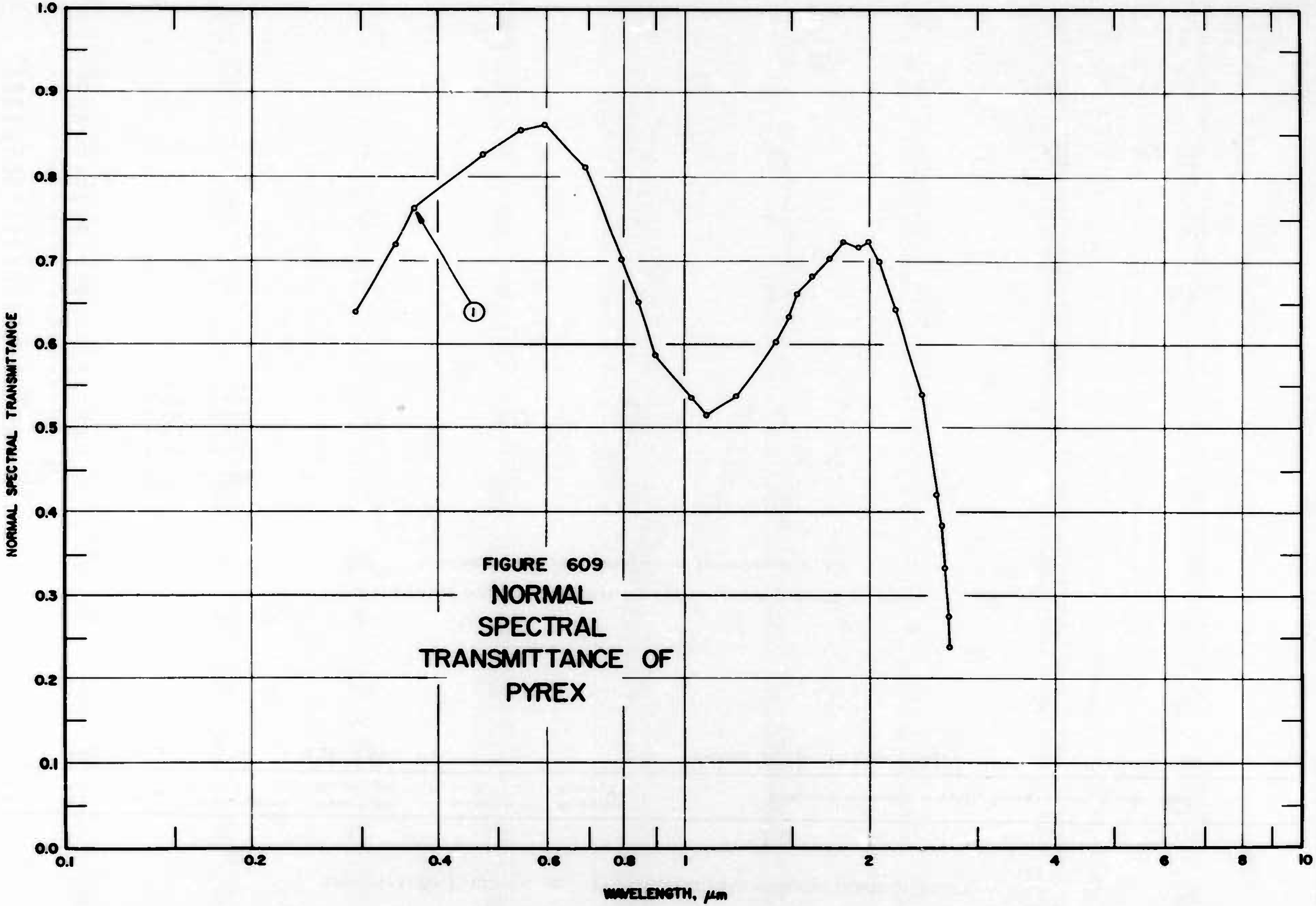


FIGURE 609
NORMAL
SPECTRAL
TRANSMITTANCE OF
PYREX

SPECIFICATION TABLE NO. 609 NORMAL SPECTRAL TRANSMITTANCE OF PYREX

Curve No.	Ref. No.	Year	Temperature, K	Wavelength Range, μm	Geometry θ	θ'	ω'	Reported Error, %	Composition (weight percent), Specifications, and Remarks
1	106	1959	298	0.295-2.698	$\sim 0°$		2π		Corning No. 7740 (12.7 mm thick).

DATA TABLE NO. 609 NORMAL SPECTRAL TRANSMITTANCE OF PYREX

[Wavelength, λ, μm; Transmittance, τ; Temperature, T, K]

λ	τ
CURVE 1 T = 298	
0.295	0.640
0.341	0.720
0.369	0.764
0.473	0.829
0.545	0.855
0.596	0.861
0.697	0.813
0.796	0.701
0.846	0.651
0.900	0.589
1.030	0.533
1.096	0.514
1.220	0.537
1.418	0.604
1.480	0.635
1.537	0.662
1.613	0.681
1.727	0.704
1.811	0.726
1.933	0.719
2.000	0.725
2.094	0.700
2.204	0.643
2.434	0.539
CURVE 1 (cont.)	
2.582	0.421
2.620	0.385
2.656	0.335
2.690	0.276
2.698	0.239

SPECIFICATION TABLE NO. 610 HEMISPHERICAL TOTAL EMITTANCE OF PYROCERAMS

Curve No.	Ref. No.	Year	Temperature Range, K	Reported Error, %	Composition (weight percent), Specifications and Remarks
1*	223	1963	165-273	2.5	Pyroceram 9606; Corning Glass Co.; measured in vacuum (0.2×10^{-4} mm Hg).
2*	223	1963	182-223	2.5	Pyroceram 9608; Corning Glass Co.; measured in vacuum (0.2×10^{-4} mm Hg).

DATA TABLE NO. 610 HEMISPHERICAL TOTAL EMITTANCE OF PYROCERAMS

[Temperature, T, K; Emittance, ϵ]

T	ϵ
CURVE 1*	
165	0.82
221	0.81
273	0.89
CURVE 2*	
182	0.80
215	0.80
223	0.79

*No plot given

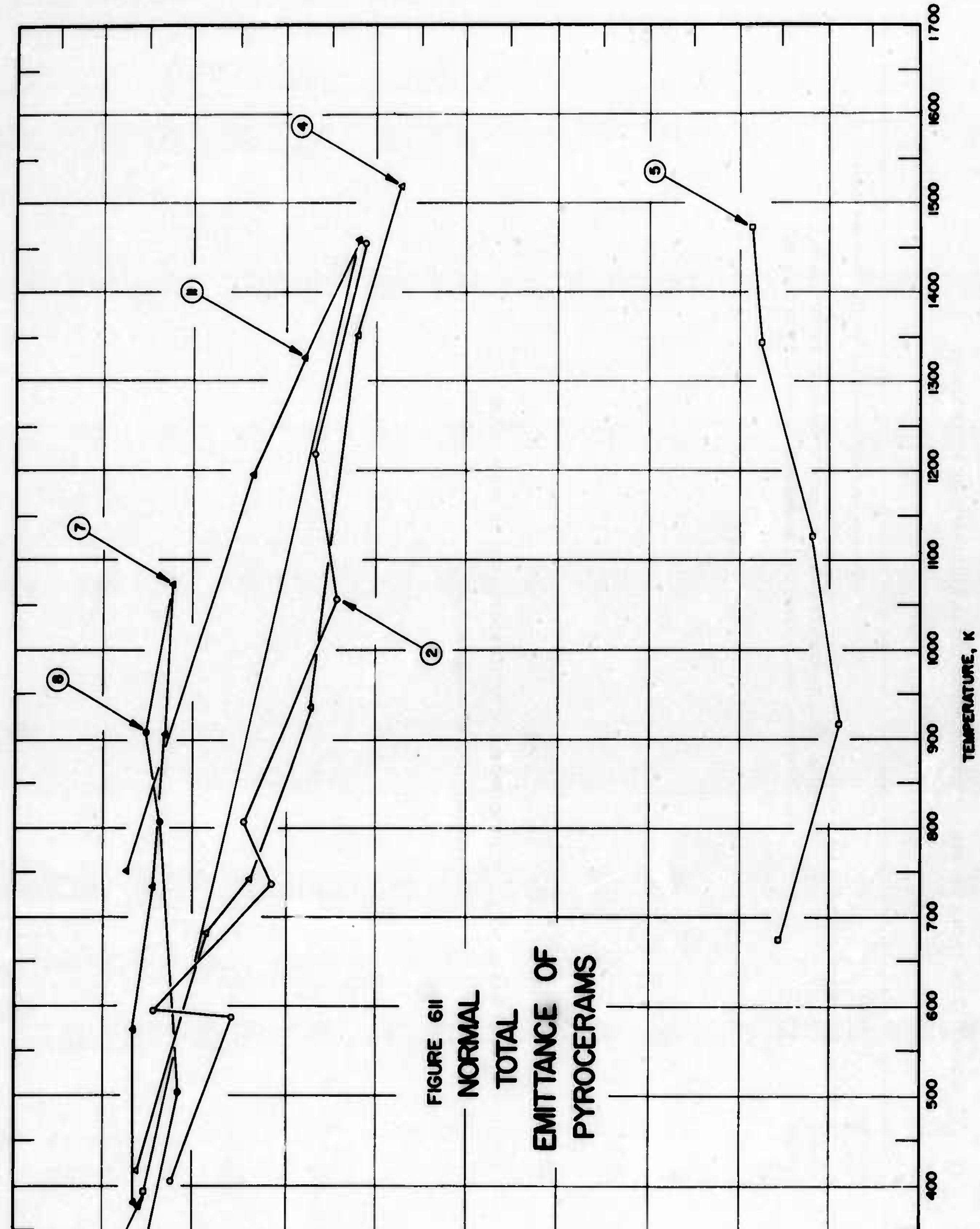


FIGURE 611 NORMAL TOTAL EMITTANCE OF PYROCERAMS

SPECIFICATION TABLE NO. 611 NORMAL TOTAL EMITTANCE OF PYROCERAMS

Curve No.	Ref. No.	Year	Temperature Range, K	Geometry θ'	Reported Error, %	Composition (weight percent), Specifications and Remarks
1*	106	1959	82.1	~0°		Pyroceram 9606; Corning Glass Co.; measured in air; cycle one.
2	106	1959	403-1458	~0°		Above specimen and conditions.
3*	106	1959	512-1332	~0°		Above specimen and conditions; cycle two.
4	106	1959	419-1520	~0°		Above specimen and conditions; cycle three.
5	184	1960	673-1473	0°	~10	Pyroceram 9608; Corning Glass Co.; polished; measured in vacuum.
6*	106	1959	78.7	~0°		Pyroceram 9608; Corning Glass Co.; measured in air; cycle one.
7	106	1959	381-1073	~0°		Above specimen and conditions; increasing temp.
8	106	1959	343-1072	~0°		Above specimen and conditions; decreasing temp.
9*	106	1959	590-1022	~0°		Curve 6 specimen and conditions; cycle two.
10*	106	1959	371-1022	~0°		Above specimen and conditions; decreasing temp.
11	106	1959	751-1460	~0°		Curve 6 specimen and conditions; cycle three.
12	106	1959	394-1460	~0°		Above specimen and conditions; decreasing temp.

DATA TABLE NO. 611 NORMAL TOTAL EMITTANCE OF PYROCERAMS

[Temperature, T, K; Emittance, ϵ]

T	ϵ
CURVE 1*	
82.1	0.861
CURVE 2	
403	0.825
588	0.760
595	0.844
739	0.717
804	0.746
1058	0.644
1220	0.667
1458	0.614
CURVE 3*	
512	0.810
814	0.696
CURVE 3 (cont.)*	
1027	0.693
1332	0.598
CURVE 4	
419	0.863
683	0.786
742	0.740
936	0.671
1352	0.624
1520	0.571
CURVE 5	
673	0.155
916	0.088
1127	0.118
CURVE 5 (cont.)	
1342	0.173
1473	0.189
CURVE 6*	
78.7	0.827
CURVE 7	
381	0.866
575	0.866
735	0.844
905	0.831
1073	0.824
CURVE 8	
1072	0.824*
909	0.853
808	0.839
503	0.818
343	0.850
CURVE 9*	
590	0.861
848	0.818
1022	0.818
CURVE 10*	
1022	0.819
638	0.842
371	0.854
CURVE 11	
751	0.874
1198	0.736
1329	0.680
1460	0.621
CURVE 12	
1460	0.621
394	0.855

*Not shown on plot

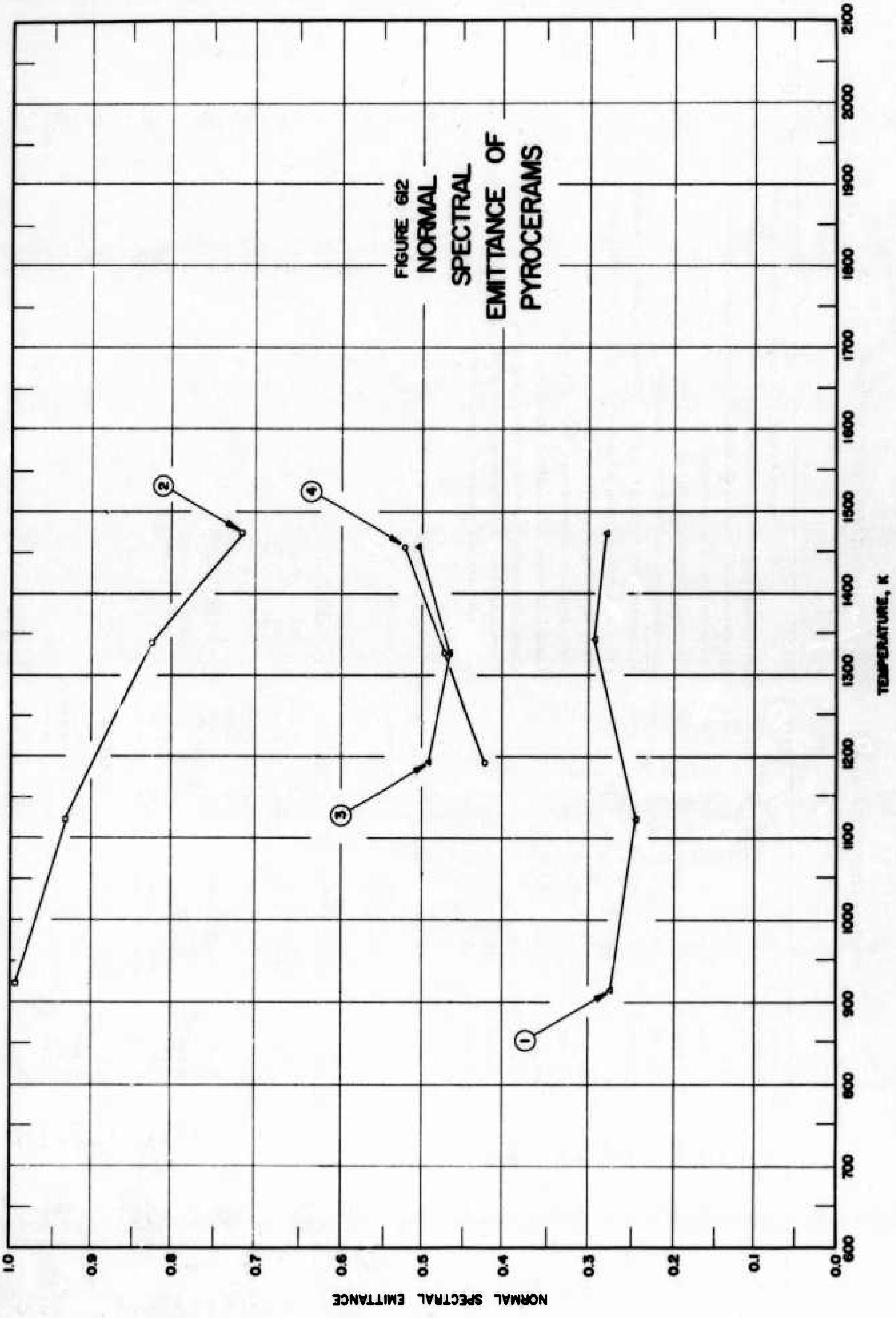


FIGURE 612 NORMAL SPECTRAL EMITTANCE OF PYROCERAMS

SPECIFICATION TABLE NO. 613 NORMAL SPECTRAL EMITTANCE OF PYROCERAMS

Curve No.	Ref. No.	Year	Temperature K	Wavelength Range, μm	Geometry θ'	Reported Error, %	Composition (weight percent), Specifications and Remarks
1	188	1964	813	1-14	~0°	0.5	Pyroceram 9606; Corning Glass Co.
2	188	1964	1021	1-14	~0°	0.5	Above specimen and conditions.
3	188	1964	1205	1-14	~0°	0.5	Above specimen and conditions.
4	188	1964	1403	1-14	~0°	0.5	Above specimen and conditions.
5	188	1964	813	1-14	~0°	0.5	Pyroceram 9608; Corning Glass Co.
6	188	1964	1018	1-14	~0°	0.5	Above specimen and conditions.
7	188	1964	1205	1-14	~0°	0.5	Above specimen and conditions.
8	188	1964	1405	1-14	~0°	0.5	Above specimen and conditions.

DATA TABLE NO. 613 NORMAL SPECTRAL EMITTANCE OF PYROCERAMS

[Wavelength, λ, μm; Emittance, ϵ; Temperature, T, K]

λ	ϵ	λ	ϵ	λ	ϵ	λ	ϵ
CURVE 1 T = 813		**CURVE 3** T = 1205		**CURVE 5** T = 813		**CURVE 7** T = 1205	
1	0.67	1	0.56	1	0.73	1	0.58
2	0.19	2	0.29	2	0.23	2	0.45
3	0.32	3	0.34	3	0.81	3	0.77
4	0.45	4	0.49	4	0.85	4	0.87
5	0.83	5	0.85	5	0.99	5	0.95
8	0.99	8	0.99*	8	0.99*	8	0.99*
11	0.84	11	0.79	11	0.90	11	0.92
14	0.84	14	0.84*	14	0.94	14	0.96
CURVE 2 T = 1021		**CURVE 4** T = 1403		**CURVE 6** T = 1018		**CURVE 8** T = 1405	
1	0.83	1	0.29	1	0.74	1	0.46
2	0.20	2	0.27	2	0.22	2	0.55
3	0.33	3	0.30	3	0.79	3	0.76
4	0.46	4	0.58	4	0.86	4	0.88
5	0.83*	5	0.84	5	0.93	5	0.96
8	0.98	8	0.97	8	0.96	8	0.99*
11	0.80	11	0.79*	11	0.90*	11	0.91
14	0.82	14	0.83	14	0.92	14	0.93

*Not shown on plot

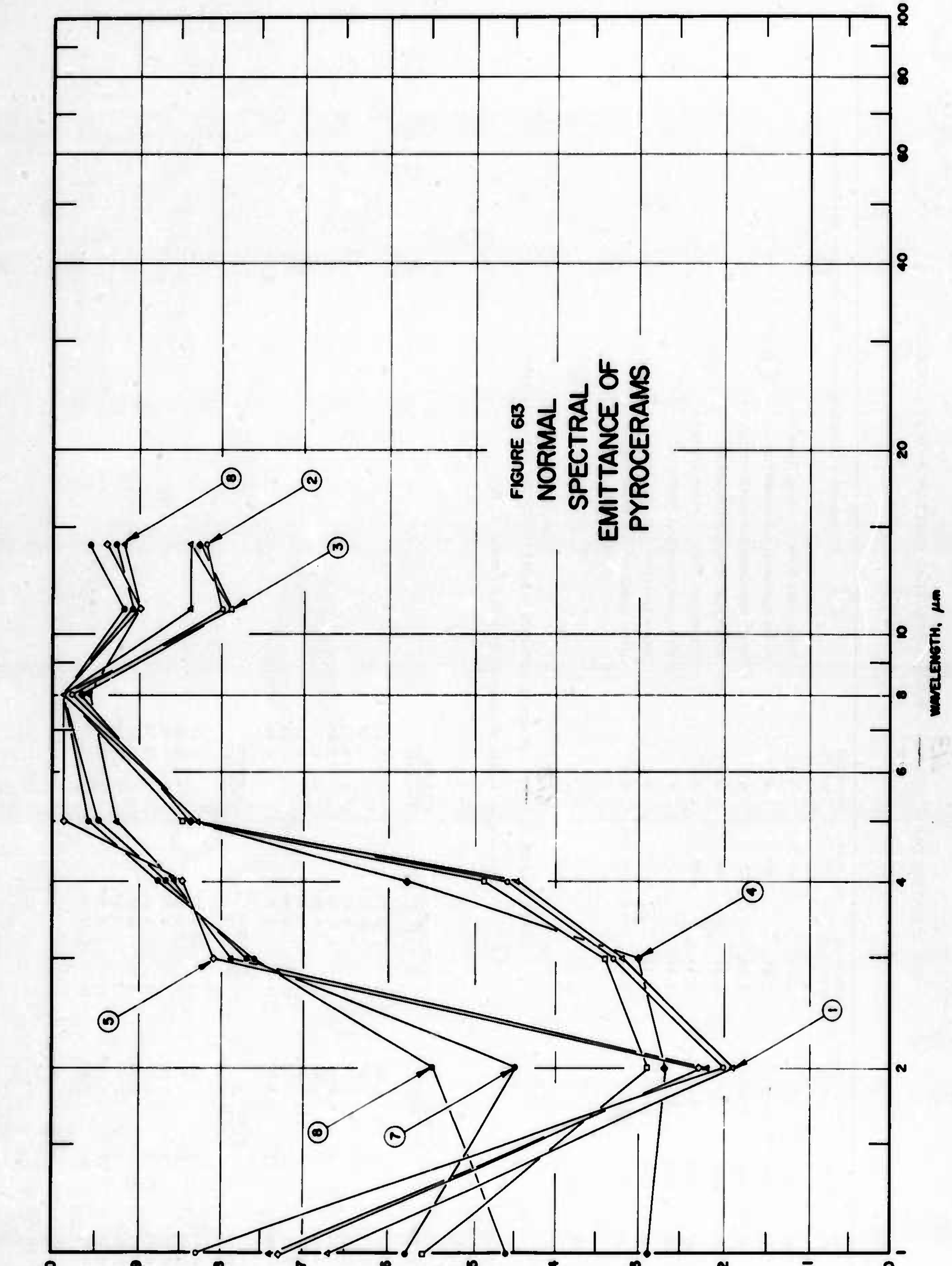


FIGURE 613
NORMAL
SPECTRAL
EMITTANCE OF
PYROCERAMS

SPECIFICATION TABLE NO. ~~613~~ 612 NORMAL SPECTRAL EMITTANCE OF PYROCERAMS

Curve No.	Ref. No.	Year	Wavelength, μm	Temperature Range, K	Geometry θ'	Reported Error, %	Composition (weight percent), Specifications and Remarks
1	184	1960	0.640	915-1473	0°	~10	Pyroceram 9608; Corning Glass Co.; polished; measured in vacuum.
2	184	1960	1	924-1473	0°	~10	Pyroceram 9608; Corning Glass Co.; polished; measured in vacuum.
3	106	1959	0.665	1193-1459	~0°		Pyroceram 9608; Corning Glass Co.
4	106	1959	0.665	1191-1456	~0°		Pyroceram 9606; Corning Glass Co.

DATA TABLE NO. ~~610~~ 612 NORMAL SPECTRAL EMITTANCE OF PYROCERAMS

[Temperature, T, K; Emittance, ϵ; Wavelength, λ, μm]

T	ϵ	T	ϵ
CURVE 1	λ = 0.640	CURVE 4	λ = 0.665
915	0.275	1191	0.423
1121	0.243	1327	0.472
1343	0.292	1456	0.525
1473	0.280		
CURVE 2	λ = 1		
924	0.994		
1124	0.935		
1340	0.826		
1473	0.719		
CURVE 3	λ = 0.665		
1193	0.494		
1326	0.467		
1459	0.508		

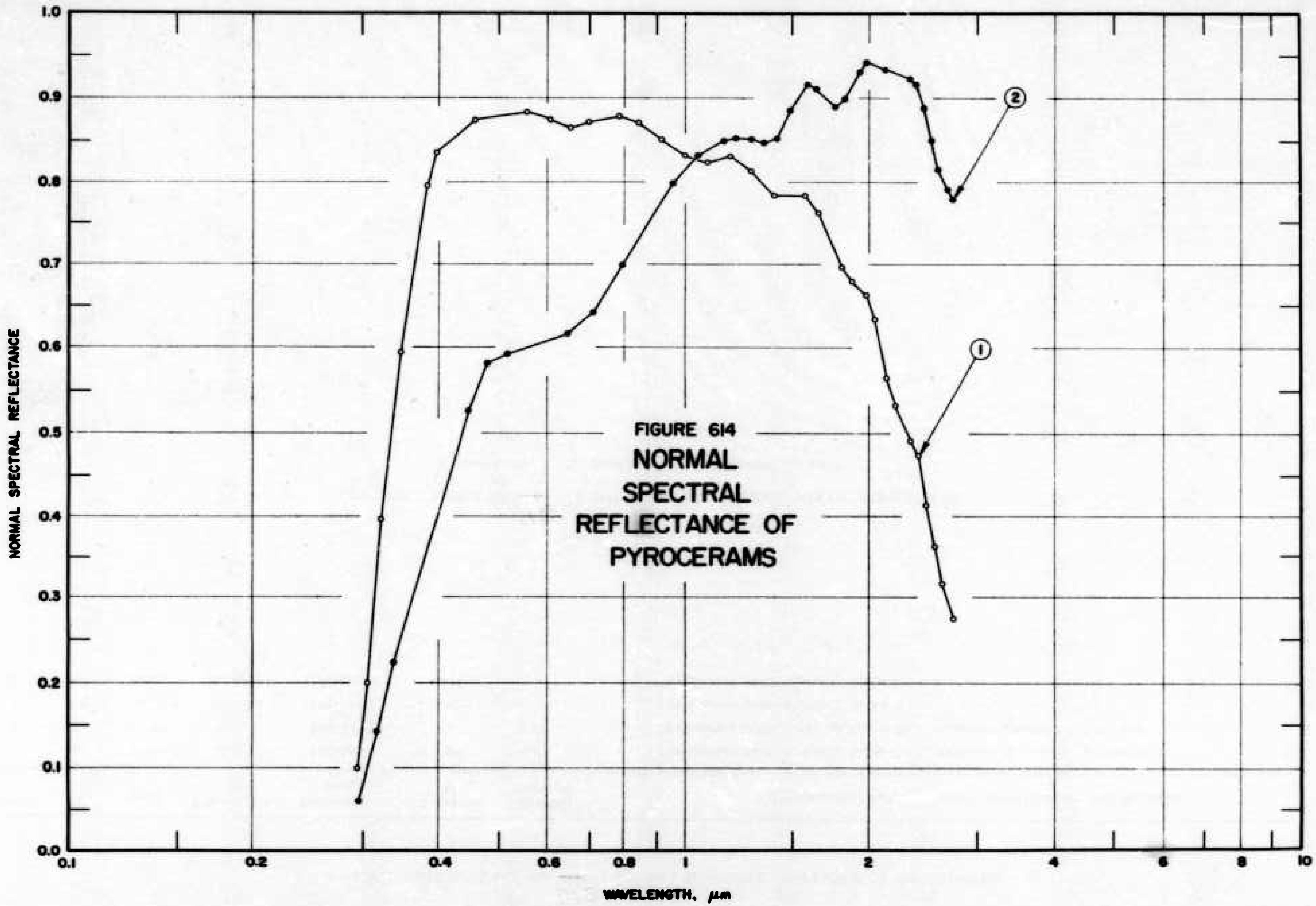


FIGURE 614
NORMAL
SPECTRAL
REFLECTANCE OF
PYROCERAMS

SPECIFICATION TABLE NO. 614 NORMAL SPECTRAL REFLECTANCE OF PYROCERAMS

Curve No.	Ref. No.	Year	Temperature K	Wavelength Range, μm	Geometry θ	θ'	ω'	Reported Error, %	Composition (weight percent), Specifications and Remarks
1	106	1959	298	0.297-2.73	9°	2π		4	Pyroceram 9608; Corning Glass Co.; data extracted from smooth curve.
2	106	1959	298	0.297-2.72	9°	2π		4	Pyroceram 9606; Corning Glass Co.; data extracted from smooth curve.

DATA TABLE NO. 614 NORMAL SPECTRAL REFLECTANCE OF PYROCERAMS

[Wavelength, λ, μm; Reflectance, ρ; Temperature, T, K]

λ	ρ
CURVE 1 T = 298	
0.297	0.100
0.307	0.200
0.322	0.399
0.347	0.596
0.382	0.798
0.399	0.839
0.458	0.874
0.503	0.882*
0.555	0.884
0.603	0.878
0.652	0.868
0.700	0.872
0.786	0.880
0.844	0.872
0.918	0.853
1.00	0.834
1.08	0.827
1.19	0.832
1.28	0.814
1.40	0.785

λ	ρ
CURVE 1 (cont.)	
1.56	0.784
1.65	0.762
1.80	0.698
1.87	0.680
1.98	0.663
2.04	0.635
2.14	0.568
2.20	0.534
2.33	0.492
2.40	0.476
2.48	0.417
2.55	0.362
2.62	0.319
2.73	0.275
CURVE 2 T = 298	
0.297	0.062
0.318	0.142
0.339	0.224

λ	ρ
CURVE 2 (cont.)	
0.446	0.529
0.480	0.582
0.516	0.593
0.639	0.619
0.710	0.642
0.795	0.700
0.952	0.800
1.05	0.835
1.16	0.852
1.21	0.854
1.28	0.854
1.35	0.850
1.41	0.855
1.49	0.889
1.58	0.918
1.64	0.912
1.77	0.891
1.83	0.900
1.94	0.934
1.99	0.944
2.12	0.938

λ	ρ
CURVE 2 (cont.)	
2.32	0.925
2.39	0.919
2.45	0.890
2.51	0.852
2.59	0.819
2.68	0.791
2.72	0.780

* Not shown on plot

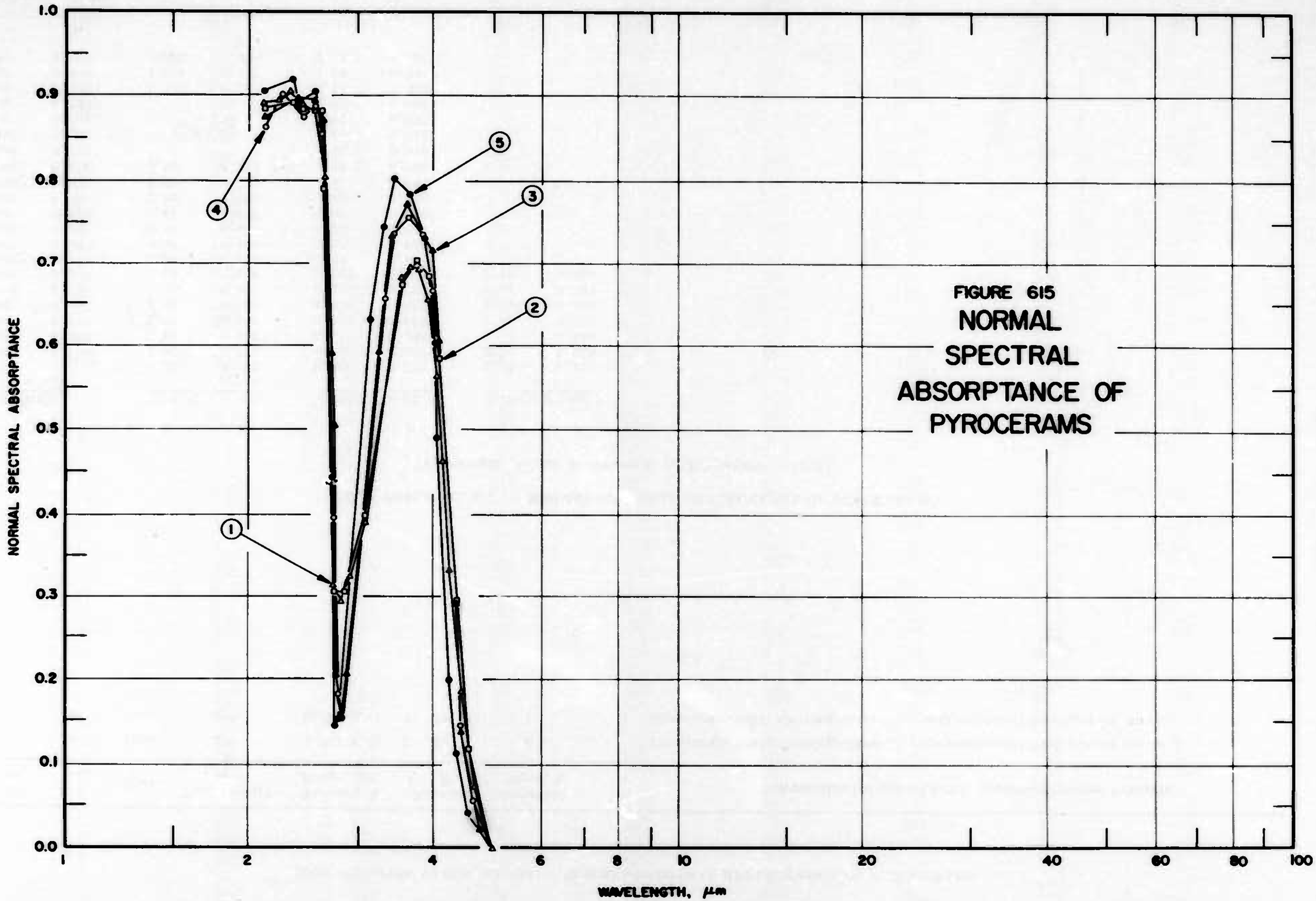


FIGURE 615
NORMAL
SPECTRAL
ABSORPTANCE OF
PYROCERAMS

SPECIFICATION TABLE NO. 615 NORMAL SPECTRAL ABSORPTANCE OF PYROCERAMS

Curve No.	Ref. No.	Year	Temperature K	Wavelength Range, μm	Geometry θ	Reported Error, %	Composition (weight percent), Specifications and Remarks
1	402	1966	298	2.14-5.00	0°		Pyroceram (1.5 mm thick); 62 SiO_2, 29 Al_2O_3, 6.5 Li_2O, additives TiO_2; Corning Glass Co.; vitreous structure; ground and polished to plane-parallel; data extracted from smooth curve.
2	402	1966	298	2.14-5.00	0°		Similar to the above specimen and conditions except being heated at 923 K for 10 hrs.
3	402	1966	298	2.14-5.00	0°		Similar to the above specimen and conditions except being heated at 923 K for 10 hrs and then heated at 1053 K for 0.5 hr; crystalline structure.
4	402	1966	298	2.14-5.00	0°		Similar to the above specimen and conditions except being heated at 923 K for 10 hrs and then heated at 1053 K for 1 hr; crystalline structure.
5	402	1966	298	2.14-5.00	0°		Similar to the above specimen and conditions except being heated at 923 K for 10 hrs and then heated at 1053 K for 7 hrs; crystalline structure.

DATA TABLE NO. 615 NORMAL SPECTRAL ABSORPTANCE OF PYROCERAMS

[Wavelength, λ, μm; Absorptance, α; Temperature, T, K]

CURVE 1
T = 298

λ	α
2.14	0.892
2.24	0.897
2.33	0.907
2.46	0.892
2.59	0.884
2.66	0.808
2.75	0.316
2.82	0.295
2.93	0.325
3.10	0.391
3.56	0.683
3.68	0.699
3.80	0.694
3.94	0.657
4.08	0.566
4.13	0.463
4.29	0.333
4.44	0.188
4.69	0.071
5.00	0.000

CURVE 2
T = 298

λ	α
2.14	0.888
2.39	0.894
2.47	0.885
2.62	0.885
2.65	0.792
2.76	0.308
2.89	0.308
3.10	0.400
3.58	0.675
3.79	0.704
3.92	0.684
4.10	0.586
4.39	0.298
4.57	0.119
5.00	0.000*

CURVE 3
T = 298

λ	α
2.14	0.877

CURVE 3 (cont.)

λ	α
2.27	0.893*
2.42	0.900
2.49	0.882*
2.59	0.898
2.65	0.872
2.73	0.591
2.76	0.507
2.79	0.205
2.84	0.157
2.90	0.206
3.28	0.594
3.42	0.735
3.62	0.774
4.00	0.716
4.10	0.608
4.37	0.292
4.44	0.139
4.78	0.021
5.00	0.000*

CURVE 4
T = 298

λ	α
2.14	0.864
2.29	0.901
2.38	0.894*
2.47	0.877
2.58	0.890
2.63	0.857
2.75	0.399
2.80	0.162
2.82	0.154
3.34	0.659
3.46	0.738
3.64	0.759
3.85	0.738
4.00	0.668
4.44	0.144
4.65	0.056
5.00	0.000*

CURVE 5
T = 298

λ	α
2.14	0.907
2.38	0.920
2.43	0.895
2.58	0.908
2.62	0.869
2.73	0.445
2.76	0.146
2.80	0.152
3.18	0.632
3.32	0.748
3.46	0.803
3.69	0.785
3.89	0.733
4.02	0.604
4.08	0.491
4.24	0.200
4.39	0.113
4.59	0.041
5.00	0.000*

*Not shown on plot

SPECIFICATION TABLE NO. 616 NORMAL SOLAR ABSORPTANCE OF PYROCERAMS

Curve No.	Ref. No.	Year	Temperature Range, K	Geometry θ	Reported Error, %	Composition (weight percent), Specifications and Remarks
1*	106	1959	298	9°		Pyroceram 9608; Corning Glass Co.; integrated from spectral reflectance data (0.3 to 3 μm) for above atm conditions.
2*	106	1959	298	9°		Above specimen and conditions except computed for sea level conditions.
3*	106	1959	298	9°		Pyroceram 9606; Corning Glass Co.; integrated from spectral reflectance data (0.3 to 3 μm) for above atm conditions.
4*	106	1959	298	9°		Above specimen and conditions except computed for sea level conditions.

DATA TABLE NO. 616 NORMAL SOLAR ABSORPTANCE OF PYROCERAMS

[Temperature, T, K; Absorptance, α]

T	α
CURVE 1*	
298	0.159
CURVE 2*	
298	0.135
CURVE 3*	
298	0.330
CURVE 4*	
293	0.316

* No plot given

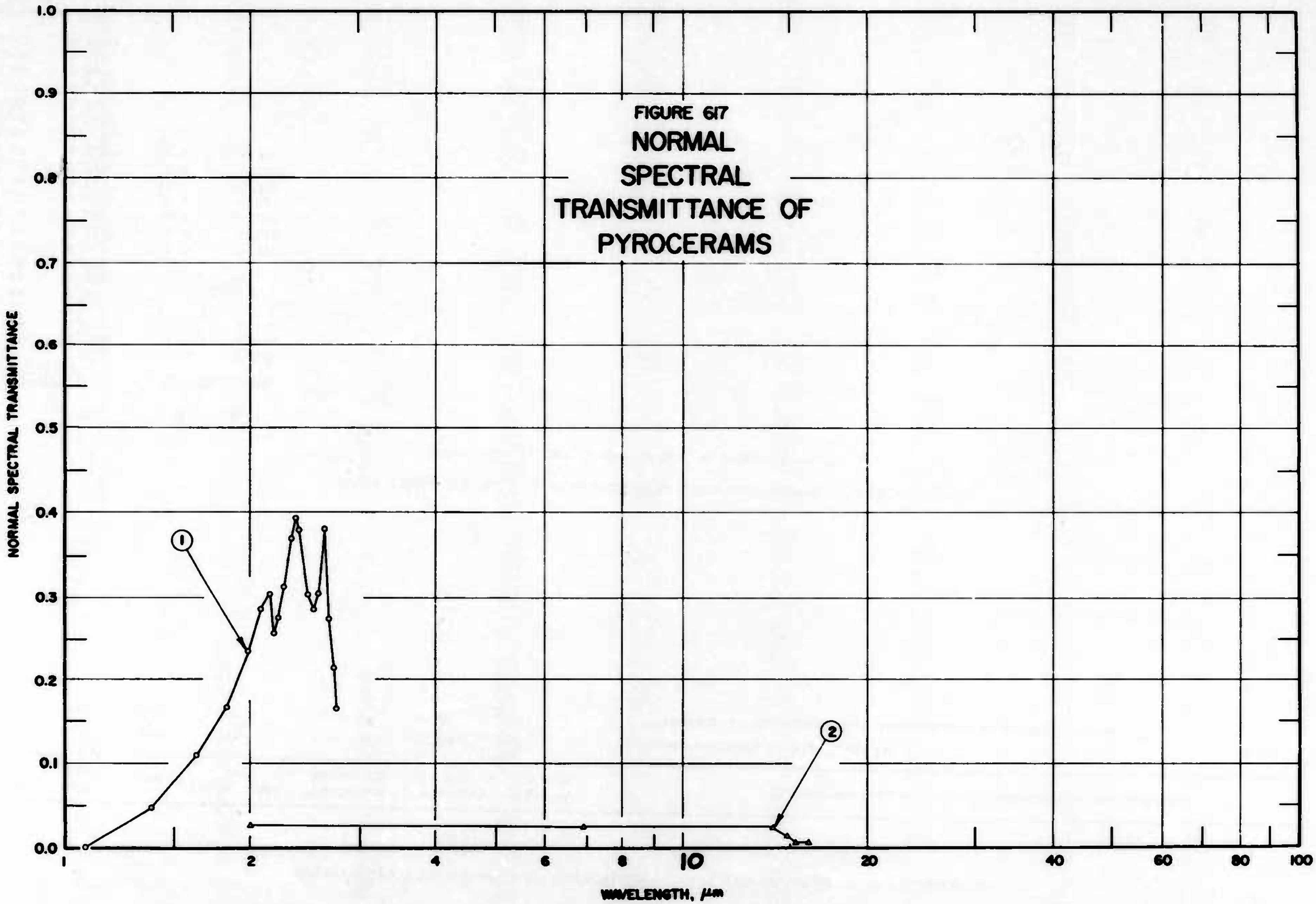


FIGURE 617
NORMAL SPECTRAL TRANSMITTANCE OF PYROCERAMS
NORMAL SPECTRAL TRANSMITTANCE
WAVELENGTH, μm
1.0
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0.0
1
2
4
6
8
10
20
40
60
80
100
1
2

SPECIFICATION TABLE NO. 617 NORMAL SPECTRAL TRANSMITTANCE OF PYROCERAMS

Curve No.	Ref. No.	Year	Temperature K	Wavelength Range, μm	Geometry θ θ' ω'	Reported Error, %	Composition (weight percent), Specifications and Remarks
1	106	1959	298	1.08 -2.75	~0° 2π		Pyroceram 9608; Corning Glass Co.
2	403	1958	295	2.00-16.0	0° 0°		Pyroceram; Corning Glass Co.; data extracted from smooth curve.

DATA TABLE NO. 617 NORMAL SPECTRAL TRANSMITTANCE OF PYROCERAMS

[Wavelength, λ, μm; Transmittance, τ; Temperature, T, K]

λ	τ	λ	τ
CURVE 1 T = 298		CURVE 1 (cont.)	
1.08	0.000	2.67	0.273
1.39	0.049	2.71	0.215
1.64	0.110	2.75	0.164
1.83	0.166		
1.99	0.235	CURVE 2 T = 295	
2.09	0.288		
2.15	0.302	2.00	0.027
2.17	0.290*	6.99	0.025
2.19	0.257	14.0	0.024
2.21	0.266	14.1	0.021*
2.26	0.312	14.7	0.014
2.32	0.370	15.3	0.008
2.36	0.392	16.0	0.008
2.40	0.380		
2.49	0.302		
2.53	0.286		
2.57	0.290*		
2.59	0.304		
2.63	0.380		
2.65	0.363*		

* Not shown on plot

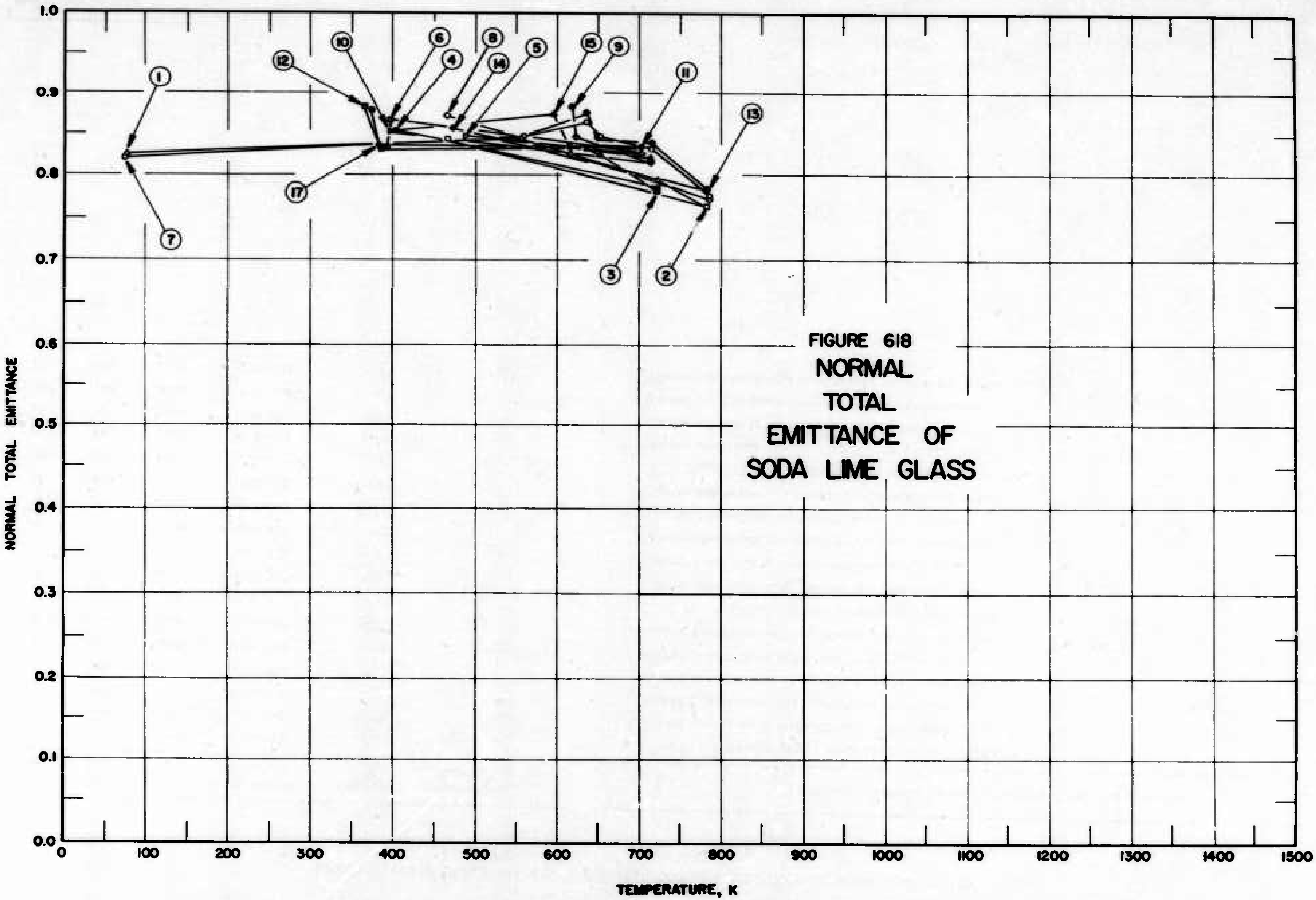


FIGURE 618
NORMAL
TOTAL
EMITTANCE OF
SODA LIME GLASS
NORMAL TOTAL EMITTANCE
TEMPERATURE, K
0.0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
1.0
0
100
200
300
400
500
600
700
800
900
1000
1100
1200
1300
1400
1500
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
17

SPECIFICATION TABLE NO. 618 NORMAL TOTAL EMITTANCE OF SODA LIME GLASS

Curve No.	Ref. No.	Year	Temperature Range, K	Geometry ζ'	Reported Error, %	Composition (weight percent), Specifications and Remarks
1	106	1959	77.1-782	~0°		L. O. F.; 6.35 mm thick; measured in air; cycle one.
2	106	1959	469-782	~0°		Above specimen and conditions; decreasing temp.
3	106	1959	639-722	~0°		Curve 1 specimen and conditions; cycle two.
4	106	1959	403-722	~0°		Above specimen and conditions; decreasing temp.
5	106	1959	489-703	~0°		Curve 1 specimen and conditions; cycle three.
6	106	1959	391-703	~0°		Above specimen and conditions; decreasing temp.
7	106	1959	76.5	~0°		L. O. F.; 9.525 mm thick; measured in air; cycle one.
8	106	1959	468-787	~0°		Above specimen and conditions; decreasing temp.
9	106	1959	620-715	~0°		Curve 7 specimen and conditions; cycle two.
10	106	1959	399-715	~0°		Above specimen and conditions; decreasing temp.
11	106	1959	486-702	~0°		Curve 7 specimen and conditions; cycle three.
12	106	1959	369-702	~0°		Above specimen and conditions; decreasing temp.
13	106	1959	74.8	~0°		L. O. F.; 12.7 mm thick; measured in air; cycle one.
14	106	1959	472-783	~0°		Above specimen and conditions; decreasing temp.
15	106	1959	396-713	~0°		Curve 13 specimen and conditions; cycle two.
16*	106	1959	483-704	~0°		Curve 13 specimen and conditions; cycle three.
17	106	1959	375-704	~0°		Above specimen and conditions; decreasing temp.

*Not shown on plot

DATA TABLE NO. 618 NORMAL TOTAL EMITTANCE OF SODA LIME GLASS

[Temperature, T, K; Emittance, ϵ]

T	ϵ	T	ϵ	T	ϵ
CURVE 1		CURVE 9		CURVE 17	
77.1	0.827	620	0.884	704	0.834
559	0.845	624	0.847	383	0.834
619	0.829	715	0.816	375	0.880
724	0.796	CURVE 10			
782	0.765	715	0.816		
CURVE 2		399	0.854		
782	0.765	CURVE 11			
469	0.843	486	0.846*		
CURVE 3		702	0.833		
639	0.833	CURVE 12			
651	0.827	702	0.833*		
722	0.783	386	0.832		
CURVE 4		369	0.884		
722	0.783*	CURVE 13			
403	0.854	74.8	0.827*		
CURVE 5		556	0.849*		
489	0.847	636	0.878		
703	0.826	650	0.844		
CURVE 6		716	0.839		
703	0.826*	783	0.784		
399	0.869	CURVE 14			
391	0.834	783	0.784*		
CURVE 7		472	0.859		
76.5	0.823	CURVE 15			
560	0.848	396	0.851*		
639	0.864	599	6.875		
653	0.848	618	0.835		
716	0.831	713	0.820		
787	0.777	CURVE 16*			
CURVE 8		483	0.850		
787	0.775	704	0.833		
468	0.871				

*Not shown on plot

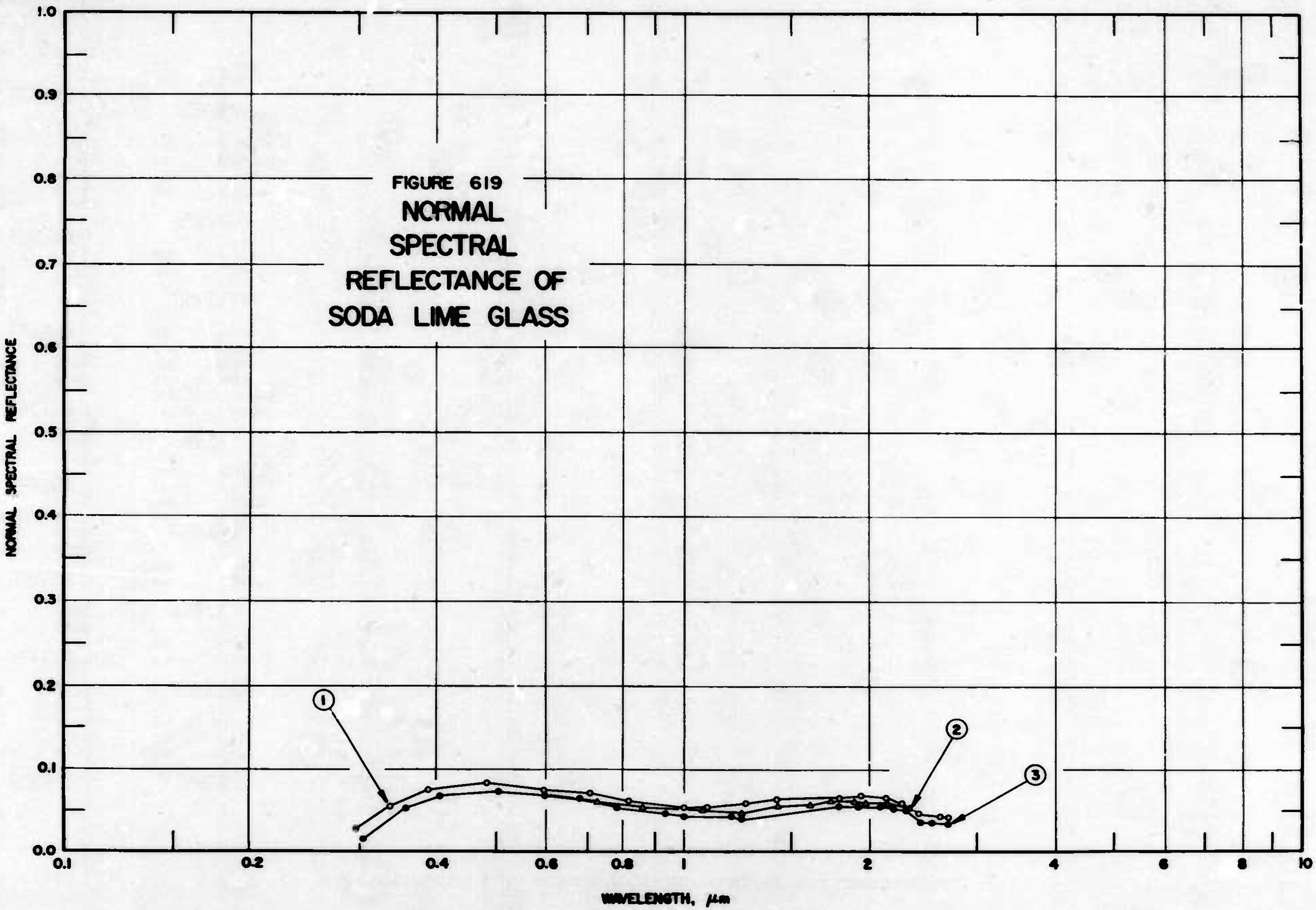


FIGURE 619
NORMAL
SPECTRAL
REFLECTANCE OF
SODA LIME GLASS

SPECIFICATION TABLE NO. 619 NORMAL SPECTRAL REFLECTANCE OF SODA LIME GLASS

Curve No.	Ref. No.	Year	Temperature K	Wavelength Range, μm	Geometry θ θ' ω'	Reported Error, %	Composition (weight percent), Specifications and Remarks
1	106	1959	298	0.296-2.69	9° 2π	4	L. O. F.; 6.35 mm thick; data extracted from smooth curve.
2	106	1959	298	0.598-2.31	9° 2π	4	L. O. F.; 9.525 mm thick; data extracted from smooth curve.
3	106	1959	298	0.303-2.69	9° 2π	4	L. O. F.; 12.7 mm thick; data extracted from smooth curve.

DATA TABLE NO. 619 NORMAL SPECTRAL REFLECTANCE OF SODA LIME GLASS

[Wavelength, λ, μm; Reflectance, ρ; Temperature, T, K]

λ	ρ	λ	ρ	λ	ρ
CURVE 1 T = 298		CURVE 2 T = 298		CURVE 3 T = 298	
0.296	0.029	0.598	0.071	0.303	0.016
0.335	0.056	0.729	0.062	0.359	0.052
0.389	0.075	0.857	0.053	0.404	0.068
0.481	0.082	1.07	0.050	0.502	0.073
0.599	0.074	1.24	0.049	0.600	0.069
0.701	0.071	1.42	0.056	0.680	0.065
0.819	0.062	1.60	0.059	0.783	0.052
1.00	0.055	1.73	0.062	0.938	0.048
1.09	0.054	1.89	0.061	1.00	0.044
1.26	0.060	1.97	0.060	1.19	0.043
1.42	0.063	2.13	0.060	1.24	0.040
1.79	0.066	2.31	0.051	1.41	0.051*
1.94	0.069			1.79	0.055
2.12	0.067			1.92	0.055
2.25	0.060			1.99	0.052*
2.40	0.049			2.08	0.054
2.60	0.044			2.19	0.052
2.69	0.043			2.29	0.050
				2.41	0.038
				2.52	0.037
				2.69	0.035

*Not shown on plot

SPECIFICATION TABLE NO. 620 NORMAL SOLAR ABSORPTANCE OF SODA LIME GLASS

Curve No.	Ref. No.	Year	Temperature Range, K	Geometry θ	Reported Error, %	Composition (weight percent), Specifications and Remarks
1*	106	1959	298	9°		L. O. F.; 6.35 mm thick; computed from spectral reflectance and spectral transmittance data (0.3 to 3 μm) for above atm conditions.
2*	106	1959	298	9°		Above specimen and conditions except computed for sea level conditions.
3*	106	1959	298	9°		L. O. F.; 9.525 mm thick; computed from spectral reflectance and spectral transmittance data (0.3 to 3 μm) for above atm conditions.
4*	106	1959	298	9°		Above specimen and conditions except computed for sea level conditions.
5*	106	1959	298	9°		L. O. F.; 12.7 mm thick; computed from spectral reflectance and spectral transmittance data (0.3 to 3 μm) for above atm conditions.
6*	106	1959	298	9°		Above specimen and conditions except computed for sea level conditions.

DATA TABLE NO. 620 NORMAL SOLAR ABSORPTANCE OF SODA LIME GLASS

[Temperature, T, K; Absorptance, α]

T	α
CURVE 1*	
298	0.144
CURVE 2*	
298	0.130
CURVE 3*	
298	0.195
CURVE 4*	
298	0.186
CURVE 5*	
298	0.250
CURVE 6*	
298	0.237

*No plot given

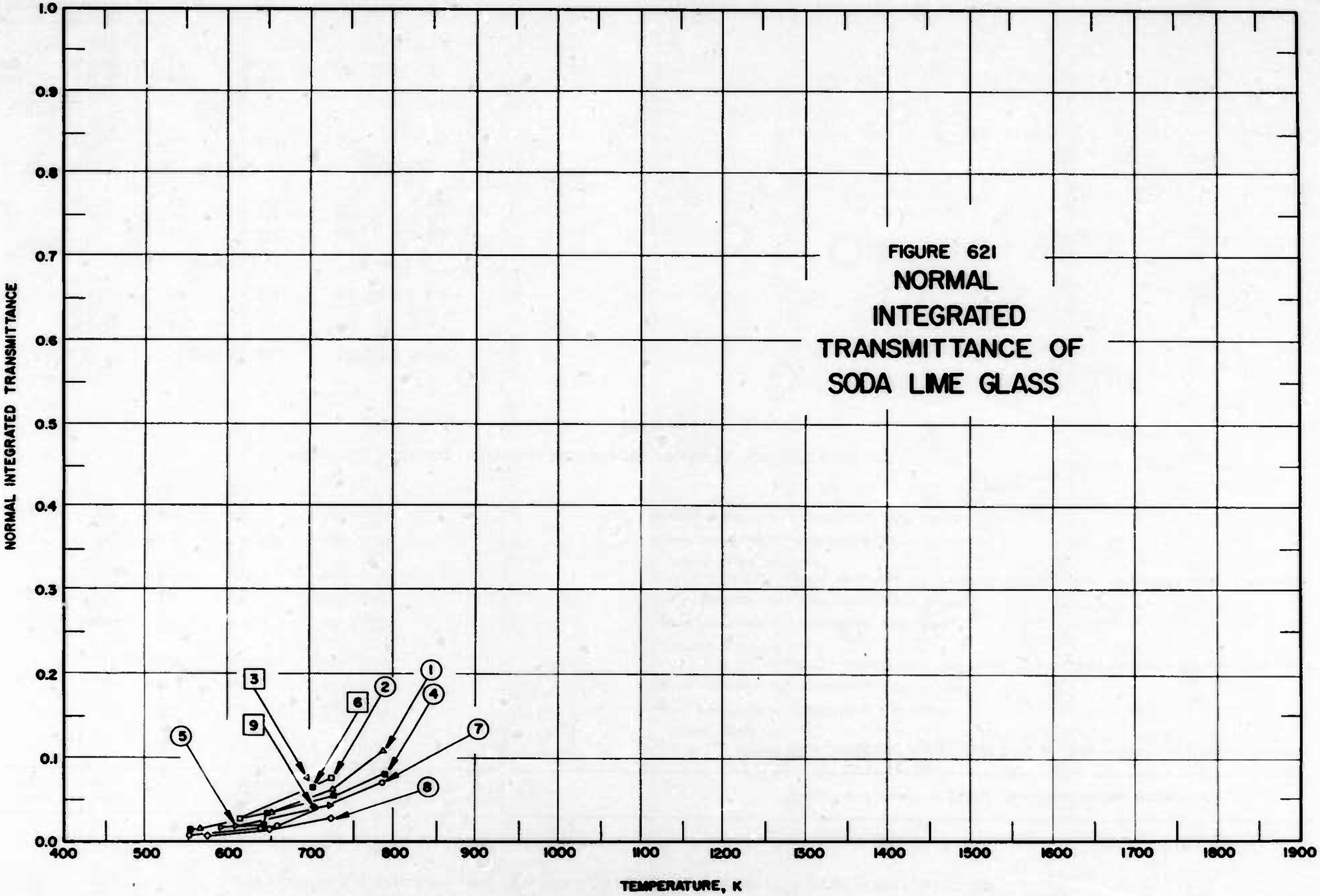


FIGURE 621
NORMAL
INTEGRATED
TRANSMITTANCE OF
SODA LIME GLASS
NORMAL INTEGRATED TRANSMITTANCE
TEMPERATURE, K
0.0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
1.0
400
500
600
700
800
900
1000
1100
1200
1300
1400
1500
1600
1700
1800
1900
1
2
3
4
5
6
7
8
9

SPECIFICATION TABLE NO. 621 NORMAL INTEGRATED TRANSMITTANCE OF SODA LIME GLASS

Curve No.	Ref. No.	Year	Temperature Range, K	Geometry θ	θ'	ω'	Reported Error, %	Composition (weight percent), Specifications and Remarks
1	106	1959	567-786	~0°	~0°			L. O. F.; 6.35 mm thick; measured in air; black body incident radiation at temp of measurement; cycle one.
2	106	1959	615-724	~0°	~0°			Above specimen and conditions; cycle two.
3	106	1959	696	~0°	~0°			Above specimen and conditions; cycle three.
4	106	1959	555-790	~0°	~0°			L. O. F.; 9.525 mm thick; measured in air; black body incident radiation at temp of measurement; cycle one.
5	106	1959	593-722	~0°	~0°			Above specimen and conditions; cycle two.
6	106	1959	702	~0°	~0°			Above specimen and conditions; cycle three.
7	106	1959	553-786	~0°	~0°			L. O. F.; 12.7 mm thick; measured in air; black body incident radiation at temp of measurement; cycle one.
8	106	1959	576-723	~0°	~0°			Above specimen and conditions; cycle two.
9	106	1959	704	~0°	~0°			Above specimen and conditions; cycle three.

DATA TABLE NO. 621 NORMAL INTEGRATED TRANSMITTANCE OF SODA LIME GLASS

[Temperature, T, K; Transmittance, τ]

T	τ	T	τ	T	τ
CURVE 1		CURVE 4 (cont.)		CURVE 7 (cont.)	
567	0.013	649	0.031	660	0.016
652	0.032	728	0.053	722	0.042*
726	0.061	790	0.080	786	0.070
786	0.109				
CURVE 2		CURVE 5		CURVE 8	
		593	0.014	576	0.006
615	0.025	610	0.016	600	0.012
724	0.075	722	0.041	723	0.026
CURVE 3		CURVE 6		CURVE 9	
696	0.075	702	0.064	704	0.040
CURVE 4		CURVE 7			
555	0.011	553	0.006		
643	0.019	640	0.015		

* Not shown on plot

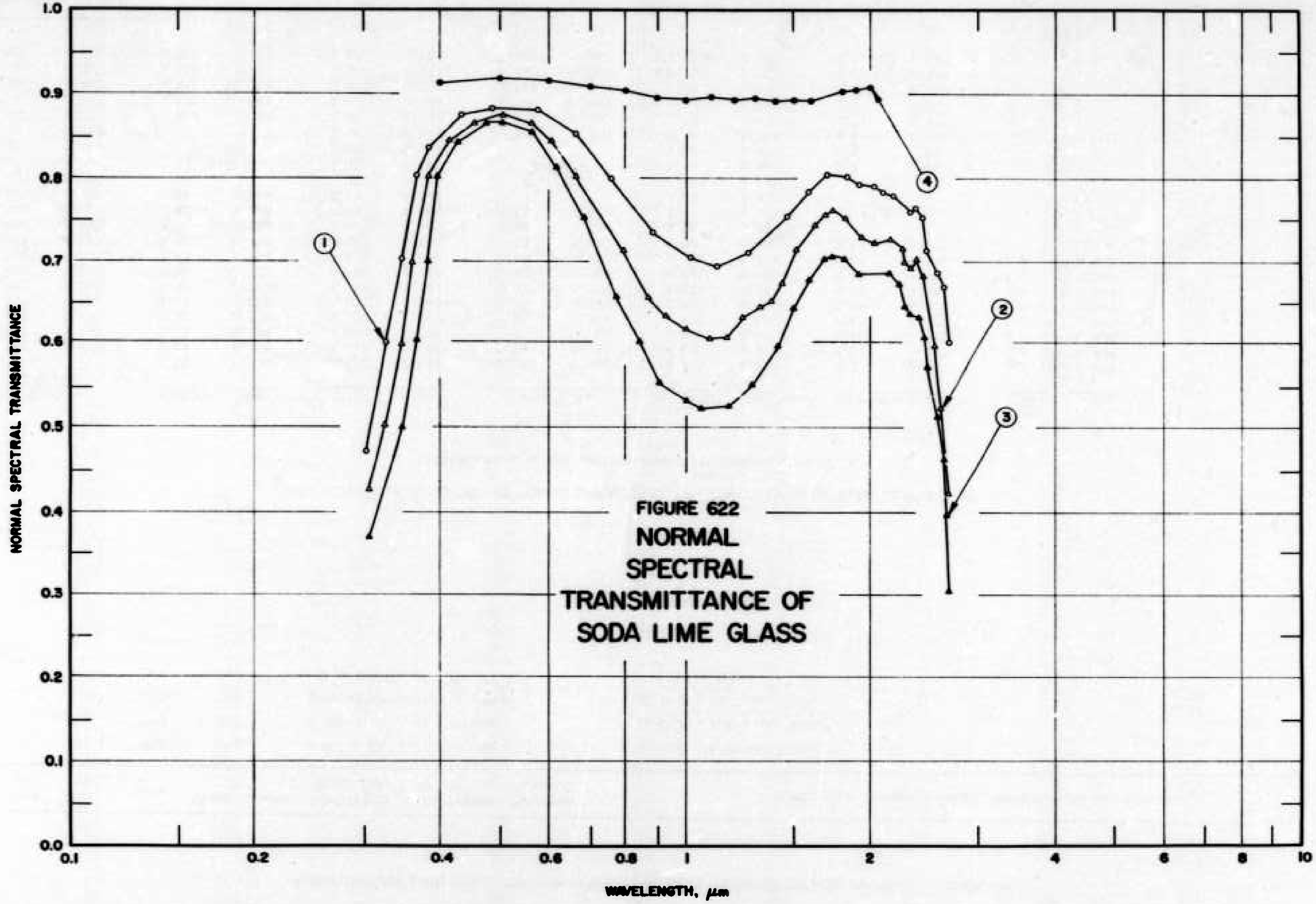


FIGURE 622
NORMAL
SPECTRAL
TRANSMITTANCE OF
SODA LIME GLASS

SPECIFICATION TABLE NO. 622 NORMAL SPECTRAL TRANSMITTANCE OF SODA LIME GLASS

Curve No.	Ref. No.	Year	Temperature K	Wavelength Range, μm	Geometry θ	θ'	ω'	Reported Error, %	Composition (weight percent), Specifications and Remarks
1	106	1959	298	0.303-2.68	~0°		2π		L. O. F.; 6.35 mm thick.
2	106	1959	298	0.306-2.69	0°		2π		L. O. F.; 9.525 mm thick.
3	106	1959	298	0.307-2.69	~0°		2π		L. O. F.; 12.7 mm thick.
4	405	1962	~298	0.4-2.0	~0°	~0°			1.588 mm thick.

DATA TABLE NO. 622 NORMAL SPECTRAL TRANSMITTANCE OF SODA LIME GLASS

[Wavelength, λ, μm; Transmittance, τ; Temperature, T, K]

CURVE 1
T = 298

λ	τ
0.303	0.472
0.327	0.600
0.346	0.701
0.367	0.801
0.382	0.838
0.431	0.876
0.489	0.883
0.579	0.881
0.663	0.853
0.760	0.800
0.885	0.735
1.02	0.704
1.13	0.696
1.26	0.710
1.46	0.753
1.59	0.786
1.70	0.804
1.74	0.805*
1.84	0.801
1.93	0.794

CURVE 1 (cont.)

λ	τ
2.02	0.791
2.10	0.784
2.18	0.780
2.23	0.774*
2.31	0.760
2.35	0.762*
2.38	0.765
2.43	0.751
2.48	0.713
2.58	0.689
2.62	0.670
2.68	0.600

CURVE 2
T = 298

λ	τ
0.306	0.428
0.325	0.501
0.345	0.599
0.360	0.700
0.381	0.802

CURVE 2 (cont.)

λ	τ
0.411	0.849
0.453	0.868
0.506	0.878
0.561	0.867
0.603	0.848
0.662	0.801
0.793	0.713
0.870	0.658
0.929	0.633
1.00	0.617
1.09	0.604
1.16	0.607
1.24	0.631
1.32	0.646
1.37	0.651
1.44	0.674
1.52	0.714
1.62	0.744
1.69	0.756
1.74	0.761
1.82	0.752

CURVE 2 (cont.)

λ	τ
1.94	0.730
2.04	0.723
2.15	0.726
2.23	0.716
2.28	0.700
2.31	0.693
2.38	0.701
2.43	0.682
2.53	0.597
2.60	0.523
2.69	0.421

CURVE 3
T = 298

λ	τ
0.307	0.370
0.348	0.500
0.367	0.601
0.381	0.700
0.399	0.802
0.429	0.845

CURVE 3 (cont.)

λ	τ
0.475	0.867
0.503	0.868
0.561	0.857
0.619	0.814
0.683	0.752
0.771	0.659
0.841	0.600
0.905	0.556
1.00	0.533
1.06	0.524
1.17	0.527
1.28	0.553
1.41	0.599
1.50	0.644
1.58	0.678
1.68	0.704
1.74	0.707
1.81	0.702
1.93	0.685
2.15	0.686
2.21	0.672

CURVE 3 (cont.)

λ	τ
2.27	0.647
2.31	0.637
2.40	0.632
2.45	0.607
2.48	0.572
2.58	0.514
2.62	0.462
2.65	0.399
2.69	0.301

CURVE 4
T ~ 298

λ	τ
0.4	0.913
0.5	0.920
0.6	0.916
0.7	0.910
0.8	0.904
0.9	0.897
1.0	0.895
1.1	0.898

CURVE 4 (cont.)

λ	τ
1.2	0.894
1.3	0.896
1.4	0.893
1.5	0.895
1.6	0.895
1.8	0.904
1.9	0.907
2.0	0.910

*Not shown on plot

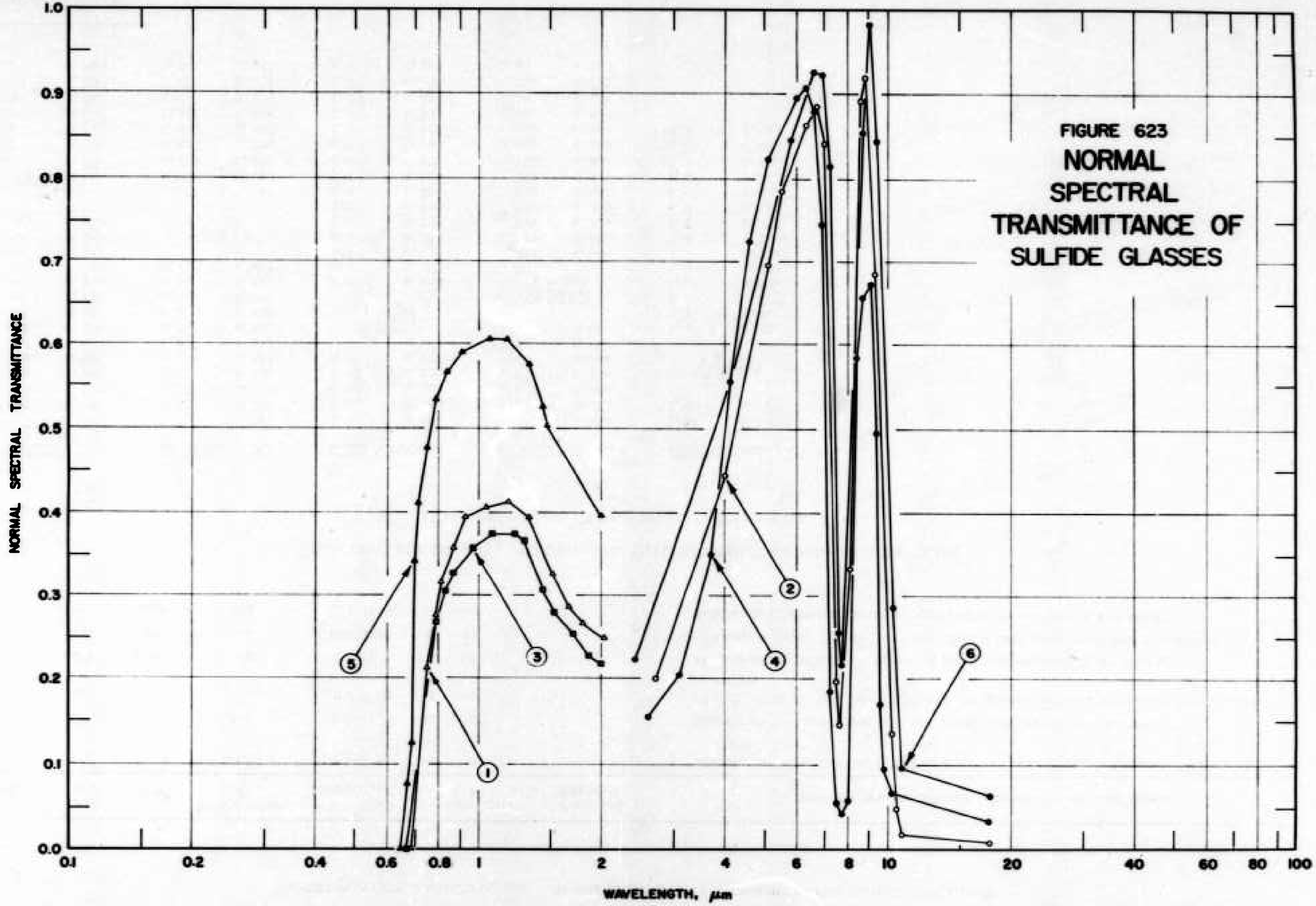


FIGURE 623
NORMAL
SPECTRAL
TRANSMITTANCE OF
SULFIDE GLASSES
NORMAL SPECTRAL TRANSMITTANCE
WAVELENGTH, μm
1.0
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0.0
0.1
0.2
0.4
0.6
0.8
1
2
4
6
8
10
20
40
60
80
100
1
2
3
4
5
6

SPECIFICATION TABLE NO. 623 NORMAL SPECTRAL TRANSMITTANCE OF SULFIDE GLASS

Curve No.	Ref. No.	Year	Temperature, K	Wavelength Range, μm	Geometry θ	θ'	ω'	Reported Error, %	Composition (weight percent), Specifications, and Remarks
1	451	1968	298	0.687-2.01	~0°	~0°			80 GeS_2, 5 Na_2S, 15 CdS, 0.1 CoS (0.71 mm thick); data extracted from smooth curve.
2	451	1968	298	2.7-17.7	~0°	~0°			Similar to the above specimen and conditions except 0.6 mm thick.
3	451	1968	298	0.674-2.00	~0°	~0°			80 GeS_2, 5 Na_2S, 15 CdS, 0.1 FeS (0.96 mm thick); data extracted from smooth curve.
4	451	1968	298	2.6-17.7	~0°	~0°			Similar to the above specimen and conditions except 1.0 mm thick.
5	451	1968	298	0.642-2.00	~0°	~0°			80 GeS_2, 5 Na_2S, 15 CdS (1.68 mm thick); data extracted from smooth curve.
6	451	1968	298	2.4-17.8	~0°	~0°			Similar to the above specimen and conditions except 1.1 mm thick.

DATA TABLE NO. 623 NORMAL SPECTRAL TRANSMITTANCE OF SULFIDE GLASS

[Wavelength, λ, μm; Transmittance, τ; Temperature, T, K]

λ	τ	λ	τ	λ	τ	λ	τ	λ	τ
CURVE 1		CURVE 2 (cont.)		CURVE 3 (cont.)		CURVE 4 (cont.)		CURVE 5 (cont.)	
T = 298		7.0	0.841	1.4[illegible]	0.306	8.7	0.658	1.48	0.505
0.687	0.000	7.5	0.196	1.52	0.280	9.1	0.672	2.00	0.397
0.755	0.212	7.6	0.145	1.70	0.253	9.4	0.496		
0.783	0.276	8.1	0.333	1.88	0.229	9.6	0.168	CURVE 6	
0.819	0.317	8.6	0.892	2.00	0.217	9.8	0.094	T = 298	
0.864	0.357	8.8	0.919			10.2	0.066	2.4	0.222
0.939	0.393	9.3	0.685	CURVE 4		17.7	0.034	4.1	0.555*
1.03	0.408	10.2	0.133	T = 298				5.8	0.848
1.19	0.411	10.5	0.049	2.6	0.151	CURVE 5		6.6	0.924
1.31	0.395	10.8	0.027	3.1	0.202	T = 298		6.9	0.922
1.51	0.329	17.7	0.008	3.7	0.350	0.642	0.000	7.2	0.817
1.66	0.288			4.1	0.552	0.678	0.077	7.6	0.256
1.80	0.269	CURVE 3		4.6	0.727	0.687	0.124	7.7	0.219
2.01	0.250	T = 298		5.1	0.823	0.700	0.342	8.7	0.855
		0.674	0.000	6.0	0.896	0.715	0.411	9.0	0.982
CURVE 2		0.755	0.213*	6.3	0.908	0.747	0.477	9.4	0.845
T = 298		0.793	0.268	6.6	0.880	0.796	0.531	10.3	0.285
2.7	0.200	0.835	0.305	6.9	0.747	0.840	0.565	10.9	0.096
4.0	0.445	0.873	0.329	7.2	0.183	0.903	0.590	17.8	0.061
5.1	0.697	0.979	0.356	7.5	0.053	1.06	0.609		
5.5	0.786	1.08	0.371	7.7	0.041	1.18	0.607		
6.3	0.862	1.22	0.371	8.0	0.059	1.31	0.573		
6.7	0.885	1.30	0.365	8.4	0.582	1.42	0.525		

*Not shown on plot

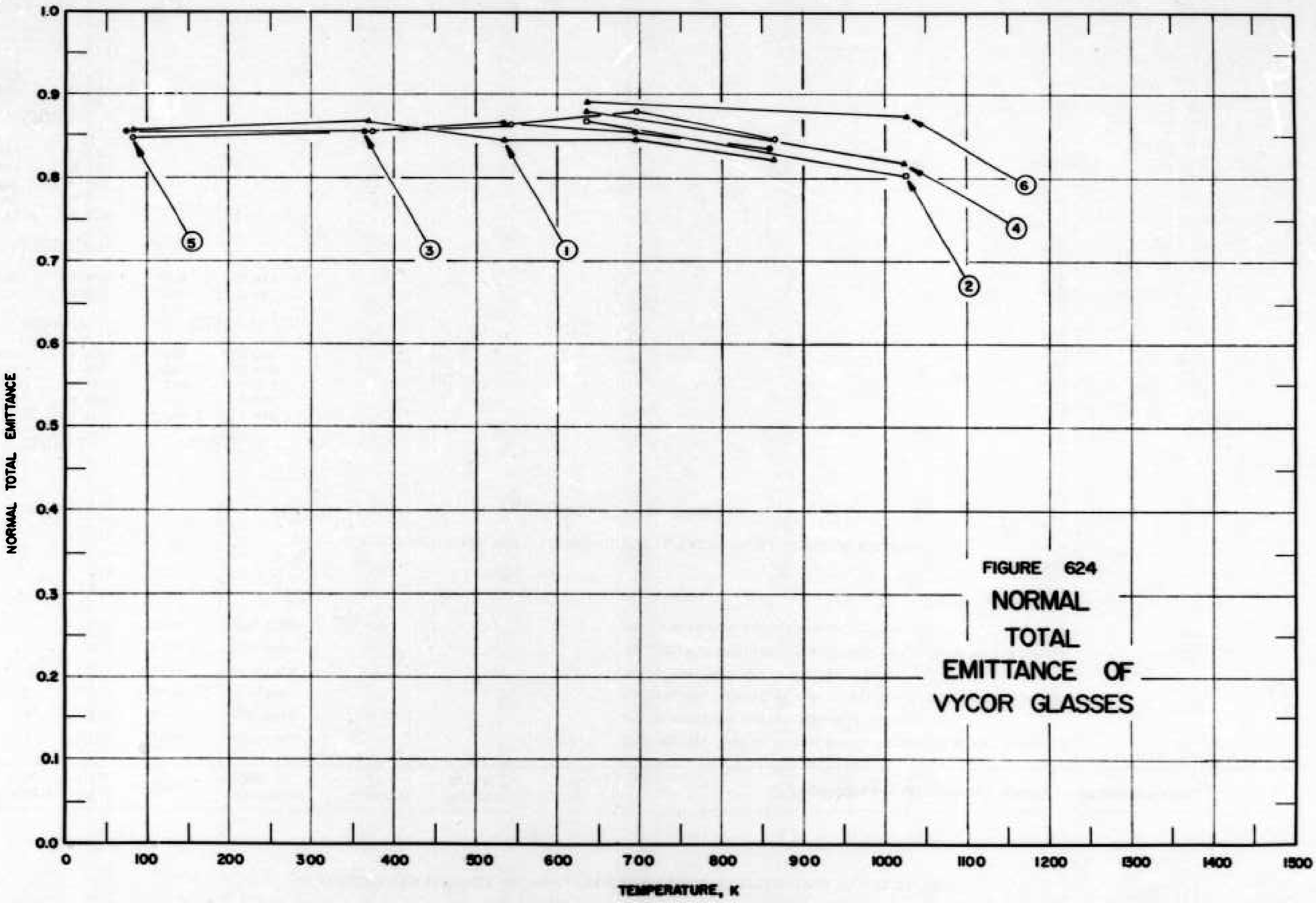


FIGURE 624
NORMAL
TOTAL
EMITTANCE OF
VYCOR GLASSES
NORMAL TOTAL EMITTANCE
TEMPERATURE, K
1.0
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0.0
0
100
200
300
400
500
600
700
800
900
1000
1100
1200
1300
1400
1500
1
2
3
4
5
6

SPECIFICATION TABLE NO. 624 NORMAL TOTAL EMITTANCE OF VYCOR GLASSES

Curve No.	Ref. No.	Year	Temperature Range, K	Geometry θ'	Reported Error, %	Composition (weight percent), Specifications and Remarks
1	106	1959	78.2-864	~0°		Corning No. 7900 (4.76 mm thick); measured in air; cycle one.
2	106	1959	639-1026	~0°		Above specimen and conditions; cycle two.
3	106	1959	75.9-860	~0°		Corning No. 7900 (7.94 mm thick); measured in air; cycle one.
4	106	1959	638-1025	~0°		Above specimen and conditions; cycle two.
5	106	1959	78.2-866	~0°		Corning No. 7900 (12.7 mm thick); measured in air; cycle one.
6	106	1959	638-1029	~0°		Above specimen and conditions; cycle two.

DATA TABLE NO. 624 NORMAL TOTAL EMITTANCE OF VYCOR GLASSES

[Temperature, T, K; Emittance, ε]

T	ε	T	ε
CURVE 1		**CURVE 5**	
78.2	0.857	78.2	0.849
370	0.868	375	0.856
538	0.846	543	0.864
698	0.846	699	0.880
864	0.824	866	0.849
CURVE 2		**CURVE 6**	
639	0.868	638	0.891
1026	0.804	1029	0.872
CURVE 3			
75.9	0.855		
368	0.855		
535	0.865		
695	0.855		
860	0.836		
CURVE 4			
638	0.880		
1025	0.820		

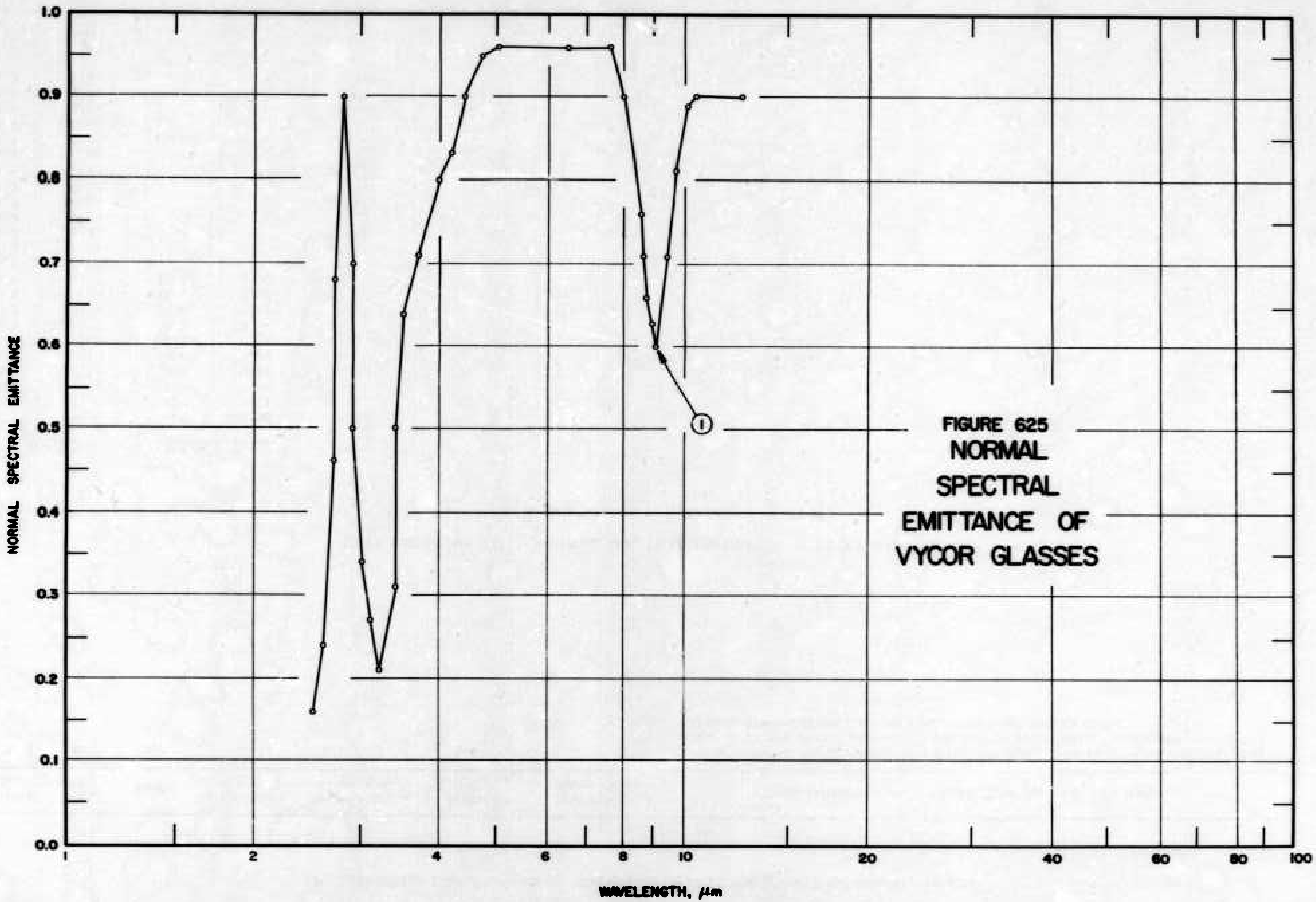


FIGURE 625
NORMAL
SPECTRAL
EMITTANCE OF
VYCOR GLASSES

SPECIFICATION TABLE NO. 625 NORMAL SPECTRAL EMITTANCE OF VYCOR GLASSES

Curve No.	Ref. No.	Year	Temperature K	Wavelength Range, μm	Geometry θ'	Reported Error, %	Composition (weight percent), Specifications, and Remarks
1	407	1951	811	2.5-12.5	~0°		Corning; nominal composition: 96.3 SiO_2, 2.9 B_2O_3, 0.04 R_2O_3, 0.04 max Na_2O and K_2O (1.59 mm thick); ground and polished on both sides; sample prepared by the Owens-Illinois Glass Co.; data extracted from smooth curve.

DATA TABLE NO. 625 NORMAL SPECTRAL EMITTANCE OF VYCOR GLASSES

[Wavelength, λ, μm; Emittance, ∈; Temperature, T, K]

λ	∈	λ	∈
CURVE 1 T = 811		CURVE 1 (cont.)	
		8.5	0.76
2.5	0.16	8.6	0.71
2.6	0.24	8.7	0.66
2.7	0.46	8.9	0.63
2.7	0.68	9.0	0.60
2.8	0.90	9.4	0.71
2.9	0.70	9.7	0.81
2.9	0.50	10.2	0.89
3.0	0.34	10.5	0.90
3.1	0.27	12.5	0.90
3.2	0.21		
3.4	0.31		
3.4	0.50		
3.5	0.64		
3.7	0.71		
4.0	0.80		
4.2	0.83		
4.4	0.90		
4.7	0.95		
5.0	0.96		
6.5	0.96		
7.6	0.96		
8.0	0.90		

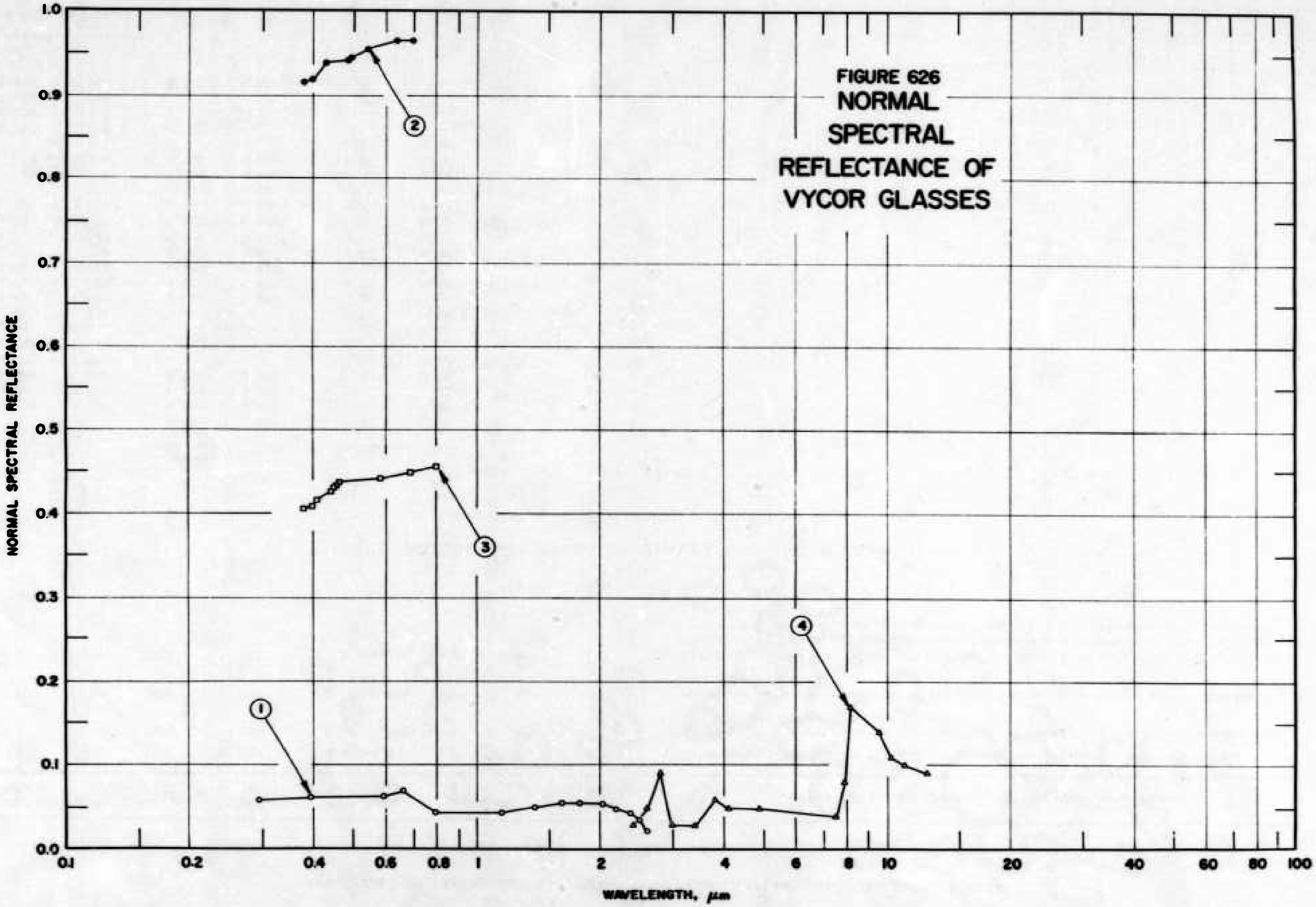


FIGURE 626
NORMAL
SPECTRAL
REFLECTANCE OF
VYCOR GLASSES

SPECIFICATION TABLE NO. 626 NORMAL SPECTRAL REFLECTANCE OF VYCOR GLASSES

Curve No.	Ref. No.	Year	Temperature K	Wavelength Range, μm	Geometry θ	Geometry θ'	Geometry ω'	Reported Error, %	Composition (weight percent), Specifications, and Remarks
1	106	1959	298	0.296-2.60	9°		2π	4	Corning No. 7900 (12.7 mm thick); magnesium carbonate reference standard.
2	246	1962	298	0.380-0.700	0°		2π		Corning 7900; powder (compact pressure 10^4 psi); data extracted from smooth curve; [Authors' designation: Sample 10].
3	246	1962	298	0.380-0.700	0°		2π		Above specimen and conditions except being exposed to simulated solar radiation at 4 suns for 67 hrs.
4	407	1951	811	2.4-12.5	~0°		2π		Corning; nominal composition: 96.3 SiO_2, 2.9 B_2O_3, 0.04 R_2O_3, 0.04 max Na_2O and K_2O (1.59 mm thick); ground and polished on both sides; sample prepared by the Owens-Illinois Glass Co.; calculated from $1-(\epsilon+\tau)$; data extracted from smooth curve.

DATA TABLE NO. 626 NORMAL SPECTRAL REFLECTANCE OF VYCOR GLASSES

[Wavelength, λ, μm; Reflectance, ρ; Temperature, T, K]

λ	ρ	λ	ρ	λ	ρ
CURVE 1		CURVE 2 (cont.)		CURVE 4 (cont.)	
T = 298		0.499	0.946	2.6	0.05
0.296	0.058	0.545	0.955	2.8	0.09
0.393	0.061	0.641	0.967	3.0	0.03
0.596	0.063	0.700	0.968	3.4	0.03
0.662	0.062			3.8	0.06
0.798	0.046	CURVE 3		4.1	0.05
1.15	0.045	T = 298		4.9	0.05
1.39	0.051			7.5	0.04
1.61	0.057	0.380	0.407	7.9	0.08
1.79	0.056	0.396	0.409	8.2	0.17
2.03	0.056	0.407	0.415	8.5	0.25
2.19	0.050	0.422	0.428	8.8	0.36
2.37	0.045	0.446	0.431*	9.0	0.38
2.49	0.037	0.455	0.434	9.2	0.34
2.60	0.022	0.461	0.437*	9.6	0.20
		0.579	0.441	10.0	0.14
CURVE 2		0.688	0.449	10.3	0.11
T = 298		0.700	0.454	11.0	0.10
				12.5	0.09
0.380	0.917	CURVE 4			
0.399	0.920	T = 811			
0.428	0.938				
0.484	0.941	2.4	0.03		

* Not shown on plot

SPECIFICATION TABLE NO. 627 NORMAL SOLAR ABSORPTANCE OF VYCOR GLASSES

Curve No.	Ref. No.	Year	Temperature Range, K	Geometry θ	Reported Error, %	Composition (weight percent), Specifications and Remarks
1*	106	1959	298	9°		Corning No. 7900 (12.7 mm thick); computed from spectral reflectance and spectral transmittance data (0.3 to 3 μm) for above atmosphere conditions.
2*	106	1959	298	9°		Above specimen and conditions except computed for sea level conditions.

DATA TABLE NO. 627 NORMAL SOLAR ABSORPTANCE OF VYCOR GLASSES

[Temperature, T, K; Absorptance, α]

T	α
CURVE 1*	
298	0.062
CURVE 2*	
298	0.033

*No plot given

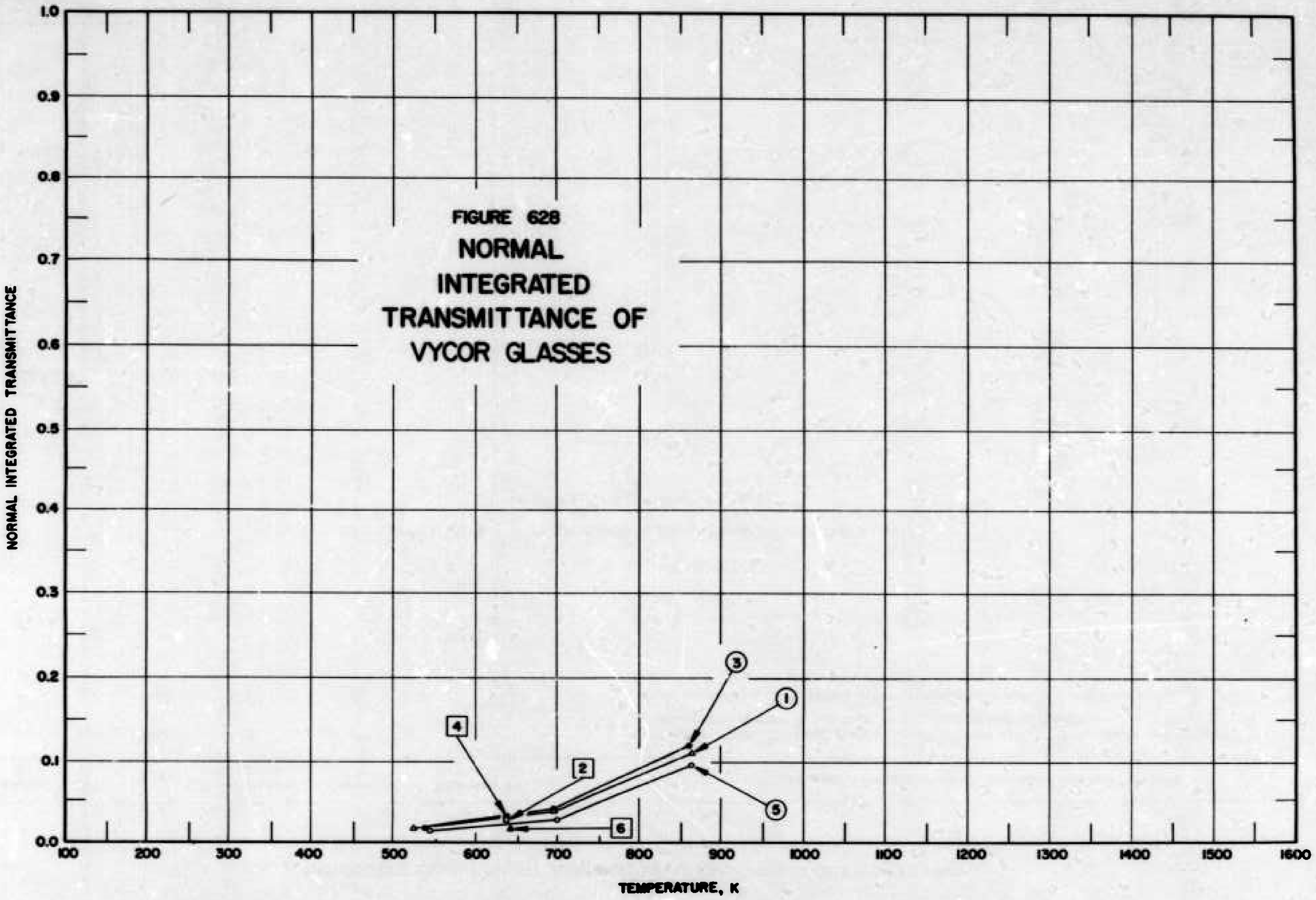


FIGURE 628
NORMAL INTEGRATED TRANSMITTANCE OF VYCOR GLASSES
NORMAL INTEGRATED TRANSMITTANCE
TEMPERATURE, K
0.0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
1.0
100
200
300
400
500
600
700
800
900
1000
1100
1200
1300
1400
1500
1600
1
2
3
4
5
6

SPECIFICATION TABLE NO. 628 NORMAL INTEGRATED TRANSMITTANCE OF VYCOR GLASSES

Curve No	Ref. No.	Year	Temperature Range, K	Geometry θ θ' ω'	Reported Error, %	Composition (weight percent), Specifications and Remarks
1	106	1959	523-863	~0° ~0°		Corning No. 7900 (4.76 mm thick); measured in air; black body incident radiation at temp of measurement; cycle one.
2	106	1959	639	~0° ~0°		Above specimen and conditions; cycle two.
3	106	1959	539-860	~0° ~0°		Corning No. 7900 (7.94 mm thick); measured in air; black body incident radiation at temp of measurement; cycle one.
4	106	1959	638	~0° ~0°		Above specimen and conditions; cycle two.
5	106	1959	543-863	~0° ~0°		Corning No. 7900 (12.7 mm thick); measured in air; black body incident radiation at temp of measurement; cycle one.
6	106	1959	641	~0° ~0°		Above specimen and conditions; cycle two.

DATA TABLE NO. 628 NORMAL INTEGRATED TRANSMITTANCE OF VYCOR GLASSES

[Temperature, T, K; Transmittance, τ]

T	τ	T	τ
CURVE 1		CURVE 5	
523	0.014	543	0.013
696	0.039	700	0.029
863	0.110	863	0.096
CURVE 2		CURVE 6	
639	0.029	641	0.019
CURVE 3			
539	0.016		
698	0.040		
860	0.120		
CURVE 4			
638	0.030		

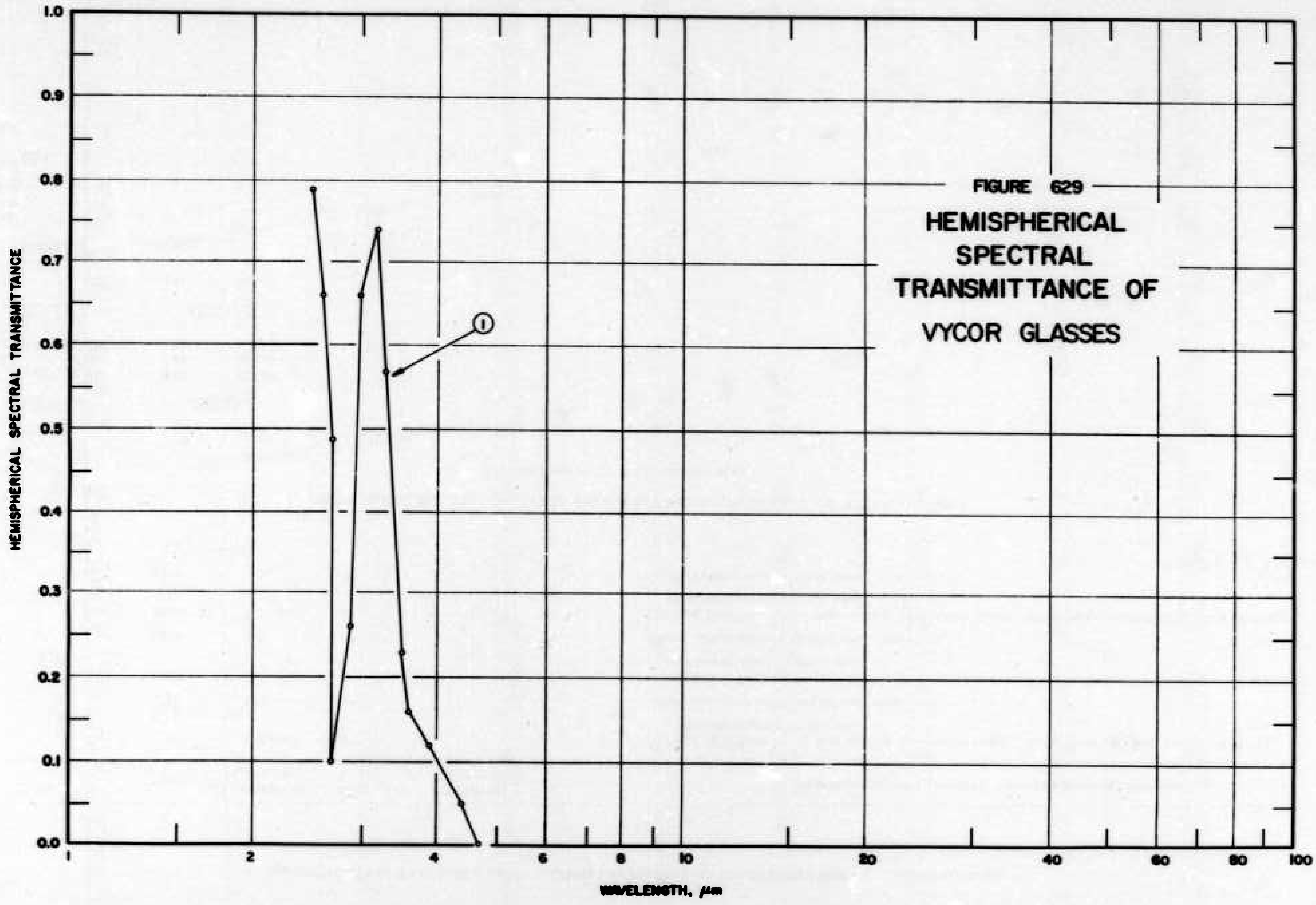


FIGURE 629
HEMISPHERICAL SPECTRAL TRANSMITTANCE OF VYCOR GLASSES
1
HEMISPHERICAL SPECTRAL TRANSMITTANCE
WAVELENGTH, μm
1.0
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0.0
1
2
4
6
8
10
20
40
60
80
100

SPECIFICATION TABLE NO. 629 HEMISPHERICAL SPECTRAL TRANSMITTANCE OF VYCOR GLASSES

Curve No.	Ref. No.	Year	Temperature K	Wavelength Range, μm	Geometry ω θ' ω'	Reported Error, %	Composition (weight percent), Specifications, and Remarks
1	407	1951	811	2.5-12.5	2π ~0°		Corning; nominal composition: 96.3 SiO_2, 2.9 B_2O_3, 0.04 R_2O_3, 0.04 max Na_2O and K_2O (1.59 mm thick); ground and polished on both sides; sample prepared by the Owens-Illinois Glass Co.; data extracted from smooth curve.

DATA TABLE NO. 629 HEMISPHERICAL SPECTRAL TRANSMITTANCE OF VYCOR GLASSES

[Wavelength, λ, μm; Transmittance, τ; Temperature, T, K]

λ	τ
CURVE 1	**T = 811**
2.5	0.79
2.6	0.66
2.7	0.49
2.7	0.10
2.9	0.26
3.0	0.66
3.2	0.74
3.3	0.57
3.5	0.23
3.6	0.16
3.9	0.12
4.4	0.05
4.7	0.00
12.5	0.00

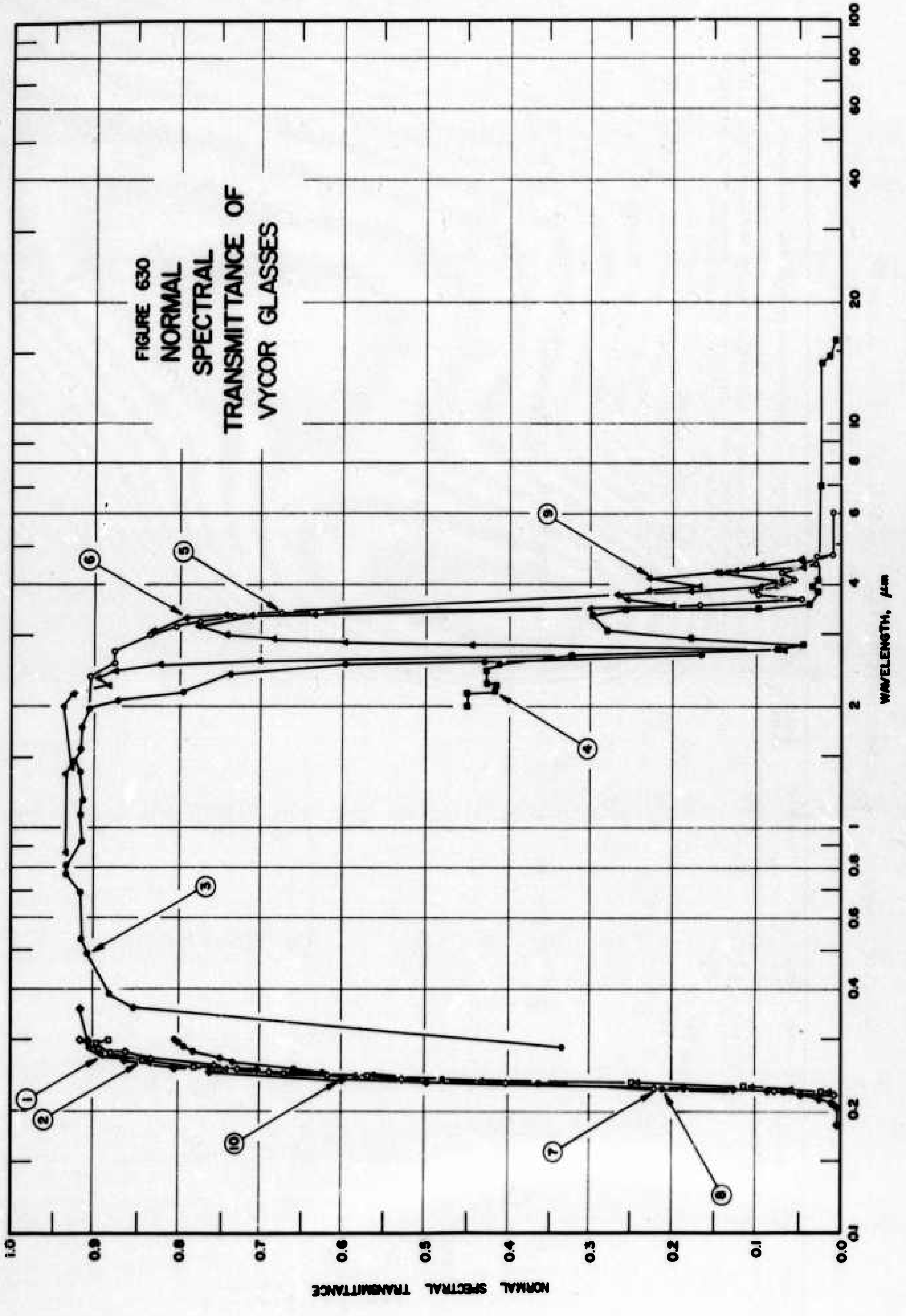


FIGURE 630 NORMAL SPECTRAL TRANSMITTANCE OF VYCOR GLASSES

SPECIFICATION TABLE NO. 630 NORMAL SPECTRAL TRANSMITTANCE OF VYCOR GLASSES

Curve No.	Ref. No.	Year	Temperature K	Wavelength Range, μm	Geometry θ	Geometry θ'	Geometry ω'	Reported Error, %	Composition (weight percent), Specifications, and Remarks
1	97	1967	~298	0.222-0.299	~0°	~0°			Corning No. 7910 (3.18 mm thick).
2	97	1967	~298	0.222-0.300	~0°	~0°			Above specimen and conditions except measured after irradiation by a total flux of 8.[illegible]5 x 10^{18} protons cm^{-2} evenly distributed over 3, 3.8, and 4.6 MeV.
3	106	1959	298	0.289-2.69	~0°		2π		Corning No. 7900 (12.7 mm thick).
4	403	1958	295	2.00-16.0	0°	0°			Corning Glass Co.; data extracted from smooth curve.
5	288	1965	673	2.00-6.00	0°	0°			Corning No. 7905 (2.80 mm thick); polished optically flat to within five green mercury fringes and a parallelism tolerance of ± 2.5 μm; data extracted from smooth curve.
6	288	1965	298	2.00-6.00	0°	0°			Above specimen and conditions.
7	291	1966	~298	0.220-0.300	0°	0°			Corning No. 7910 (2.22 mm thick); measured in vacuum.
8	291	1966	~298	0.220-0.300	0°	0°			Above specimen and conditions except irradiated with 10^{14} electrons cm^{-2} at 2.0 MeV incident through a sapphire shield (6.4 mm thick); turned a grey color after irradiation.
9	409	1968	~298	0.857-4.60	~0°	~0°			Vycor No. 790 (2.0 mm thick); data extracted from smooth curve.
10	409	1968	~298	0.184-0.360	~0°	~0°			Vycor No. 791 (2 mm thick); data extracted from smooth curve.

DATA TABLE NO. 630 NORMAL SPECTRAL TRANSMITTANCE OF VYCOR GLASSES

[Wavelength, λ, μm; Transmittance, τ; Temperature, T, K]

CURVE 1
T ~ 298

λ	τ
0.222	0.011
0.225	0.027*
0.227	0.059
0.230	0.102
0.235	0.240
0.239	0.431
0.244	0.585
0.249	0.695*
0.254	0.742
0.259	0.796*
0.264	0.835
0.269	0.876*
0.274	0.891
0.279	0.889*
0.284	0.904
0.289	0.908*
0.294	0.908*
0.299	0.909

CURVE 2
T ~ 298

λ	τ
0.222	0.022
0.225	0.030*
0.227	0.059*
0.230	0.112
0.234	0.248
0.239	0.437*
0.244	0.568
0.249	0.670
0.254	0.736*
0.259	0.783
0.264	0.811
0.269	0.842
0.274	0.859*
0.279	0.881
0.284	0.881
0.290	0.891*
0.294	0.899
0.300	0.882

CURVE 3
T = 298

λ	τ
0.289	0.334
0.360	0.853
0.390	0.881
0.498	0.909
0.535	0.915
0.597	0.916*
0.692	0.916
0.776	0.916
0.810	0.932
0.929	0.915
1.08	0.917
1.16	0.914
1.39	0.917
1.48	0.923
1.57	0.917
1.79	0.915
1.91	0.914*
1.99	0.906
2.08	0.873
2.17	0.797
2.40	0.739
2.52	0.597
2.59	0.430
2.69	0.164

CURVE 4
T = 295

λ	τ
2.00	0.450
2.14	0.450
2.19	0.419
2.25	0.417
2.29	0.429
2.44	0.429
2.52	0.411
2.68	0.322
2.76	0.072
2.78	0.056*
2.81	0.043
2.86	0.044*
2.92	0.179
2.97	0.232*
3.08	0.279
3.18	0.293*
3.34	0.297

CURVE 4 (cont.)

λ	τ
3.39	0.281*
3.42	0.255
3.49	0.097
3.52	0.054*
3.57	0.037
3.68	0.029*
3.81	0.028
3.85	0.033*
3.98	0.033
4.04	0.029
7.00	0.025
14.0	0.024
14.0	0.021*
14.7	0.014
15.3	0.008*
16.0	0.008

CURVE 5
T = 673

λ	τ
2.00	0.905
2.36	0.905
2.54	0.879
2.71	0.879
3.00	0.836
3.11	0.805
3.21	0.776
3.31	0.735
3.40	0.674
3.52	0.168
3.66	0.046
3.75	0.099
3.89	0.106
3.97	0.073
4.09	0.054
4.21	0.070
4.29	0.070*
4.43	0.030
4.63	0.030
4.73	0.010
6.00	0.010

CURVE 6
T = 298

λ	τ
2.00	0.905*
2.36	0.905*
2.54	0.879*
2.71	0.879*
3.09	0.831
3.30	0.795
3.37	0.744
3.52	0.168*
3.66	0.046*
3.82	0.178
3.91	0.094
4.03	0.070
4.12	0.127*
4.23	0.144
4.31	0.124
4.40	0.045
4.59	0.045
4.73	0.010*
6.00	0.010*

CURVE 7
T ~ 298

λ	τ
0.220	0.008
0.224	0.076
0.229	0.220
0.235	0.401
0.240	0.525
0.245	0.617
0.250	0.688
0.255	0.729
0.260	0.757
0.265	0.802*
0.270	0.832
0.275	0.843*
0.280	0.861
0.285	0.893
0.290	0.891*
0.295	0.897*
0.300	0.914

CURVE 8
T ~ 298

λ	τ
0.220	0.006*
0.224	0.065
0.229	0.210
0.234	0.361
0.240	0.479
0.244	0.560
0.250	0.621
0.255	0.658
0.259	0.701*
0.265	0.735
0.270	0.750
0.275	0.779*
0.280	0.782
0.285	0.787*
0.290	0.794
0.295	0.800
0.300	0.806

CURVE 9
T ~ 298

λ	τ
0.857	0.935
1.36	0.935
1.41	0.928
1.48	0.935*
2.00	0.938
2.16	0.916
2.26	0.884
2.37	0.899
2.45	0.879
2.52	0.825
2.60	0.700
2.73	0.066
2.82	0.444
2.88	0.599
2.93	0.683
3.00	0.744
3.08	0.773*
3.19	0.780
3.27	0.758*
3.34	0.711
3.38	0.634
3.47	0.300
3.51	0.200

CURVE 9 (cont.)

λ	τ
3.57	0.166
3.62	0.175*
3.68	0.251
3.73	0.265
3.82	0.227
3.90	0.179*
3.97	0.167
4.03	0.178*
4.12	0.221*
4.16	0.228
4.22	0.211*
4.27	0.149
4.32	0.119*
4.42	0.093
4.51	0.067
4.60	0.045

CURVE 10
T ~ 298

λ	τ
0.184	0.004
0.205	0.004
0.210	0.010
0.215	0.024
0.220	0.048
0.224	0.084
0.227	0.126
0.229	0.185
0.236	0.499
0.240	0.600
0.254	0.702
0.250	0.762
0.255	0.806
0.261	0.838*
0.269	0.865
0.280	0.885*
0.299	0.907
0.360	0.916

*Not shown on plot

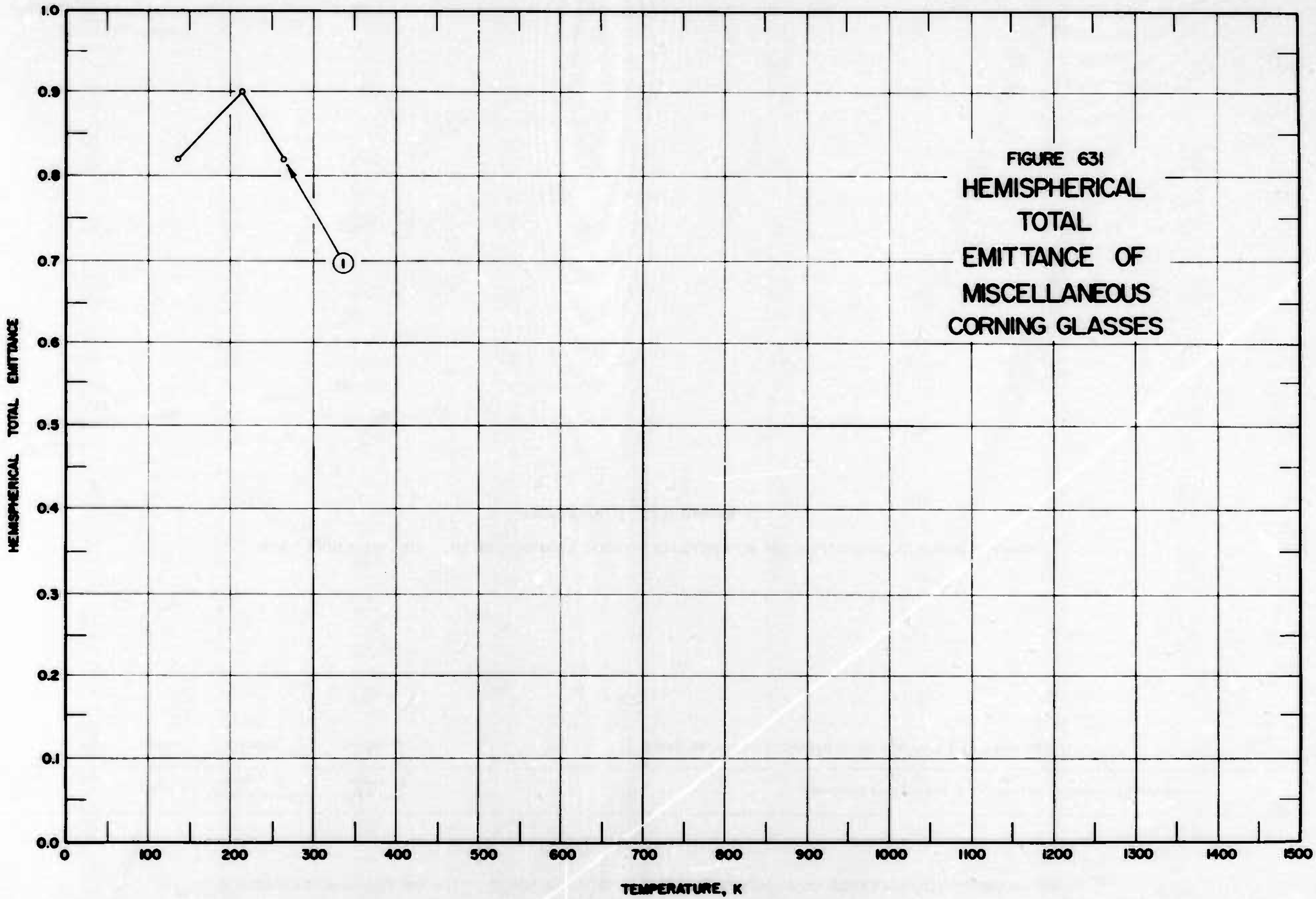


FIGURE 631
HEMISPHERICAL TOTAL EMITTANCE OF MISCELLANEOUS CORNING GLASSES
HEMISPHERICAL TOTAL EMITTANCE
TEMPERATURE, K
1
0.0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
1.0
0
100
200
300
400
500
600
700
800
900
1000
1100
1200
1300
1400
1500

SPECIFICATION TABLE NO. 631 HEMISPHERICAL TOTAL EMITTANCE OF MISCELLANEOUS CORNING GLASSES

Curve No.	Ref. No.	Year	Temperature Range, K	Reported Error, %	Composition (weight percent), Specifications and Remarks
1	223	1963	139-263	2.5	Corning No. 9690; measured in vacuum (0.2×10^{-4} mm Hg).

DATA TABLE NO. 631 HEMISPHERICAL TOTAL EMITTANCE OF MISCELLANEOUS CORNING GLASSES

[Temperature, T, K; Emittance, ϵ]

T	ϵ
CURVE 1	
263	0.82
139	0.68
211	0.90

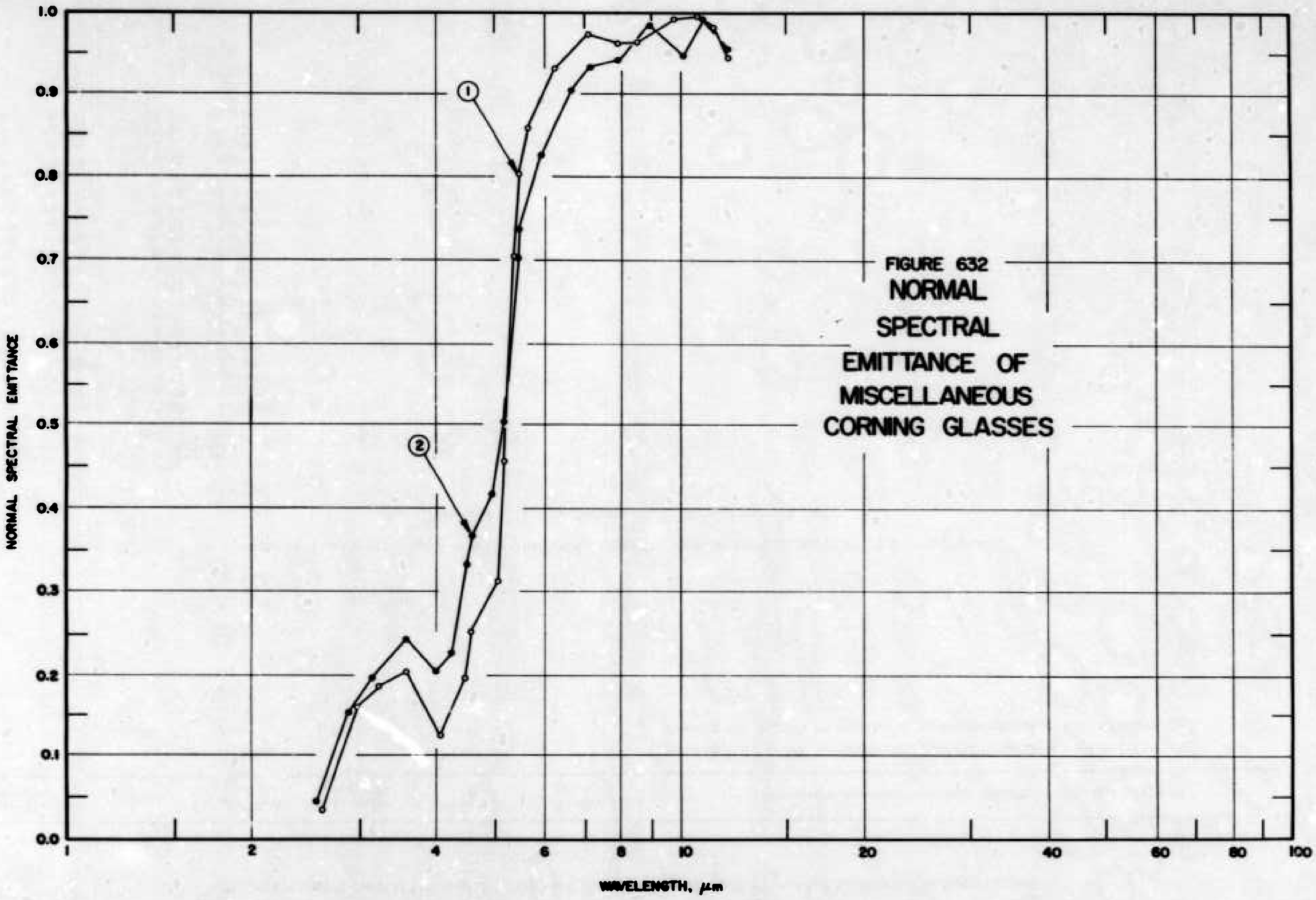


FIGURE 632 NORMAL SPECTRAL EMITTANCE OF MISCELLANEOUS CORNING GLASSES

SPECIFICATION TABLE NO. 632 NORMAL SPECTRAL EMITTANCE OF MISCELLANEOUS CORNING GLASSES

Curve No.	Ref. No.	Year	Temperature K	Wavelength Range, μm	Geometry θ'	Reported Error, %	Composition (weight percent), Specifications, and Remarks
1	235	1960	533	2.60-12.0	0°		Corning No. 9752 (3.05 mm thick); data extracted from smooth curve.
2	235	1960	643	2.55-12.0	~0°		Corning No. 9752 (3.05 mm thick); data extracted from smooth curve.

DATA TABLE NO. 632 NORMAL SPECTRAL EMITTANCE OF MISCELLANEOUS CORNING GLASSES

[Wavelength, λ, μm; Emittance, ϵ; Temperature, T, K]

λ	ϵ	λ	ϵ
CURVE 1	T = 533	CURVE 2	T = 643
2.60	0.034	2.55	0.045
2.99	0.160	2.89	0.152
3.21	0.187	3.14	0.199
3.58	0.203	3.56	0.245
4.08	0.125	4.00	0.205
4.43	0.199	4.22	0.229
4.56	0.253	4.50	0.333
5.02	0.312	4.59	0.369
5.18	0.456	4.91	0.419
5.38	0.705	5.15	0.502
5.47	0.801	5.41	0.702
5.63	0.858	5.48	0.736
6.27	0.932	5.97	0.826
7.10	0.975	6.68	0.902
7.98	0.962	7.18	0.935
8.50	0.963	7.98	0.941
9.98	0.994	8.99	0.986
10.5	0.999	10.1	0.950
11.4	0.983	10.9	0.994
12.0	0.947	12.0	0.957

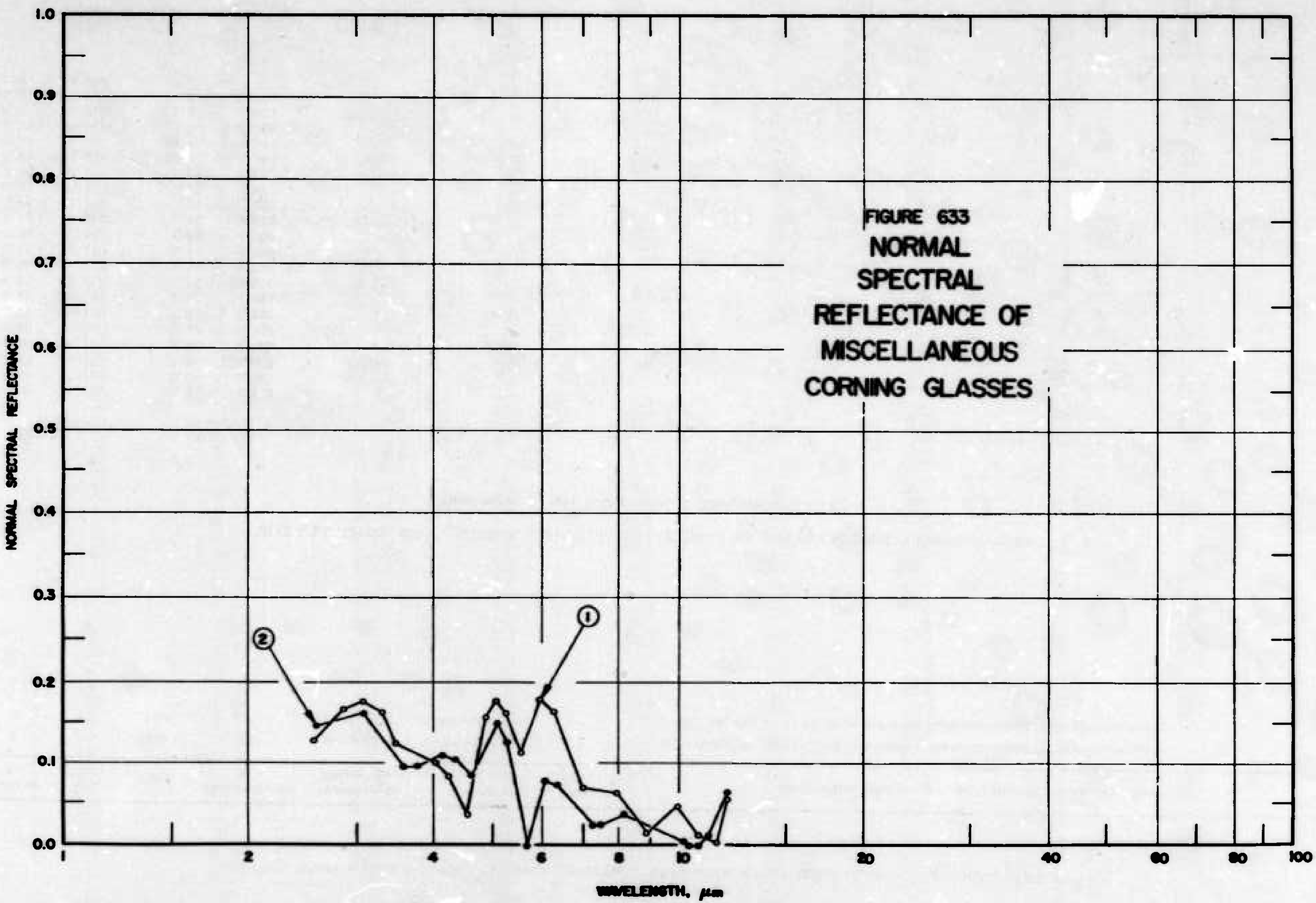


FIGURE 633 NORMAL SPECTRAL REFLECTANCE OF MISCELLANEOUS CORNING GLASSES

SPECIFICATION TABLE NO. 633 NORMAL SPECTRAL REFLECTANCE OF MISCELLANEOUS CORNING GLASSES

Curve No.	Ref. No.	Year	Temperature K	Wavelength Range, μm	Geometry θ θ' ω'	Reported Error, %	Composition (weight percent), Specifications, and Remarks
1	235	1960	643	2.55-12.0	~0° ~0°		Corning No. 9752 (3.05 mm thick); data extracted from smooth curve.
2	235	1960	533	2.57-12.0	~0° ~0°		Corning No. 9752 (3.05 mm thick); data extracted from smooth curve.

DATA TABLE NO. 633 NORMAL SPECTRAL REFLECTANCE OF MISCELLANEOUS CORNING GLASSES

[Wavelength, λ, μm; Reflectance, ρ; Temperature, T, K]

λ	ρ	λ	ρ
CURVE 1	T = 643	CURVE 2	T = 533
2.55	0.128	2.57	0.148
2.85	0.167	3.08	0.161
3.07	0.176	3.56	0.095
3.30	0.163	3.76	0.095
3.46	0.125	4.12	0.110
4.01	0.100	4.31	0.102
4.21	0.081	4.60	0.063
4.52	0.038	5.09	0.150
4.88	0.159	5.29	0.126
5.09	0.179	5.67	0.000
5.25	0.162	6.03	0.079
5.53	0.111	6.35	0.072
5.99	0.180	7.21	0.025
6.25	0.165	7.47	0.025
7.00	0.070	8.12	0.037
7.99	0.063	10.0	0.004
8.85	0.015	10.4	0.000
9.99	0.047	10.7	0.000
10.7	0.012	11.2	0.011
11.1	0.002	12.0	0.063
12.0	0.055		

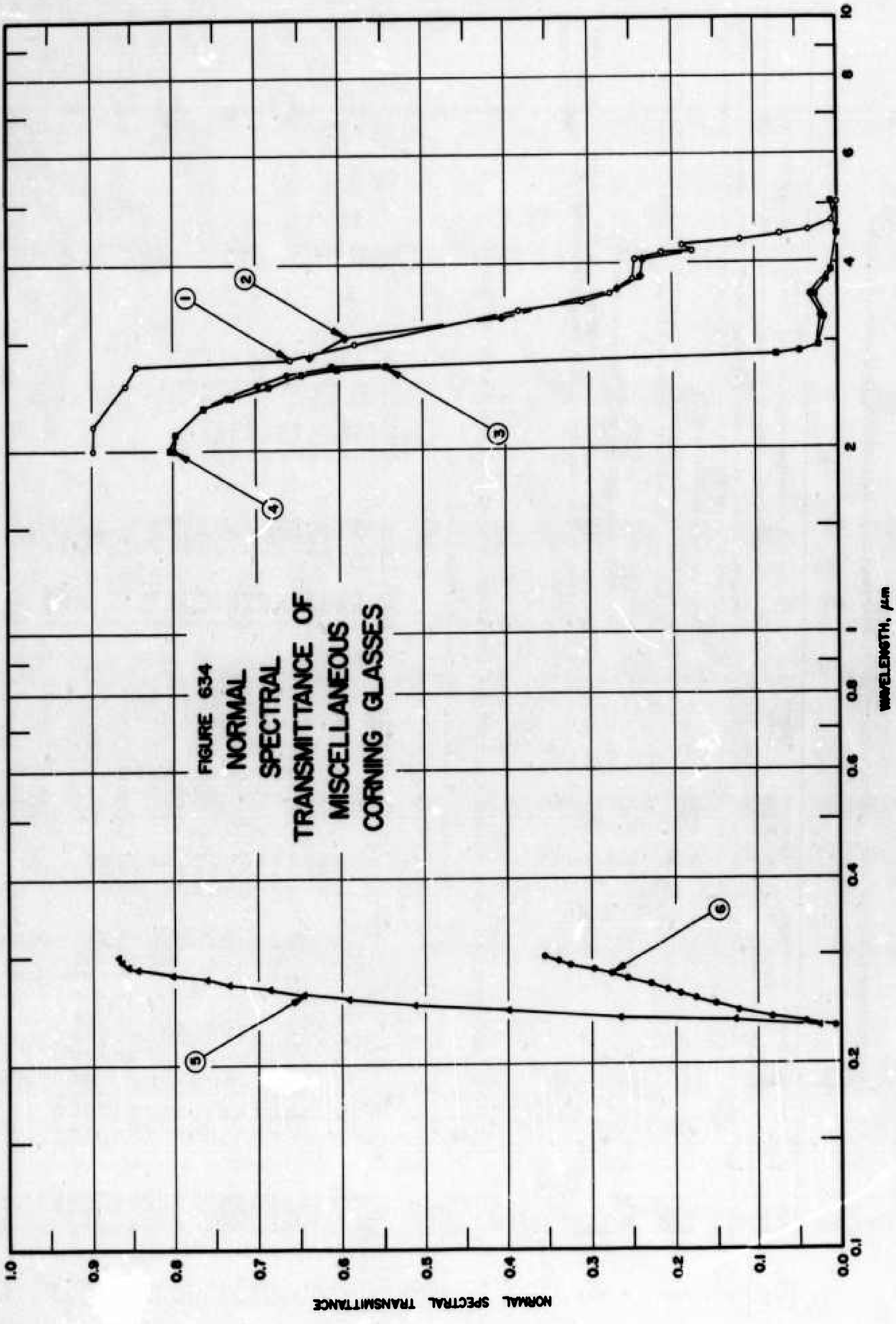


FIGURE 634 NORMAL SPECTRAL TRANSMITTANCE OF MISCELLANEOUS CORNING GLASSES

SPECIFICATION TABLE NO. 634 NORMAL SPECTRAL TRANSMITTANCE OF MISCELLANEOUS CORNING GLASSES

Curve No.	Ref. No.	Year	Temperature K	Wavelength Range, μm	Geometry θ	θ'	ω'	Reported Error, %	Composition (weight percent), Specifications, and Remarks
1	288	1965	298	2.00-5.00	0°	0°			Corning No. 0160 (2.80 mm thick); polished optically flat to within five green mercury fringes and a parallelism tolerance of ± 2.5 μm; data extracted from smooth curve.
2	288	1965	673	2.00-5.00	0°	0°			Above specimen and conditions.
3	288	1965	573	2.00-5.00	0°	0°			Corning No. 8363 (2.80 mm thick); polished optically flat to within five green mercury fringes and a parallelism tolerance of ± 2.5 μm; data extracted from smooth curve.
4	288	1965	298	2.00-5.00	0°	0°			Above specimen and conditions.
5	291	1966	~298	0.230-0.300	0°	0°			Corning No. 9863 (3.02 mm thick); measured in vacuum.
6	291	1966	~298	0.230-0.300	0°	0°			Above specimen and conditions except irradiated with 10^{14} electrons cm^{-2} at 2.0 MeV incident through a sapphire shield (6.4 mm thick); turned a black color after irradiation.

DATA TABLE NO. 634 NORMAL SPECTRAL TRANSMITTANCE OF MISCELLANEOUS CORNING GLASSES

[Wavelength, λ, μm; Transmittance, τ; Temperature, T, K]

CURVE 1 T = 298

λ	τ
2.00	0.899
2.18	0.899
2.55	0.859
2.72	0.843
2.82	0.660
2.98	0.631
3.34	0.382
3.47	0.306
3.57	0.276
3.79	0.247
4.04	0.243
4.17	0.211
4.20	0.173
4.24	0.188*
4.28	0.188
4.34	0.118
4.41	0.070
4.50	0.035
4.65	0.007
5.00	0.000

CURVE 2 T = 673

λ	τ
2.00	0.899*
2.18	0.899*
2.55	0.859*
2.72	0.843*
2.81	0.637
3.01	0.594
3.29	0.402
3.44	0.307*
3.61	0.266
3.80	0.237
4.04	0.235
4.20	0.173*
4.24	0.188*
4.28	0.188*
4.34	0.118*
4.41	0.070*
4.50	0.035*
4.65	0.007*
5.00	0.000*

CURVE 3 T = 573

λ	τ
2.00	0.801
2.12	0.797
2.34	0.761
2.42	0.730
2.54	0.686
2.64	0.646
2.70	0.602
2.74	0.545
2.83	0.075
2.86	0.046
2.93	0.021
3.27	0.016
3.52	0.028
3.71	0.015
3.89	0.008
4.45	0.000
5.00	0.006

CURVE 4 T = 298

λ	τ
2.00	0.800
2.12	0.797*
2.33	0.762*
2.43	0.732
2.55	0.698
2.64	0.664
2.72	0.610
2.83	0.075*
2.86	0.046*
2.93	0.021*
3.27	0.018
3.52	0.032
3.89	0.008*
4.45	0.000*
5.00	0.006*

CURVE 5 T ~ 298

λ	τ
0.230	0.027
0.235	0.129
0.239	0.266
0.245	0.400
0.250	0.512
0.255	0.593
0.260	0.646
0.265	0.687
0.270	0.735
0.275	0.761
0.280	0.804
0.285	0.846
0.290	0.859
0.295	0.864
0.300	0.869

CURVE 6 T ~ 298

λ	τ
0.230	0.009
0.234	0.042
0.239	0.081
0.244	0.123
0.250	0.152
0.255	0.175
0.260	0.192
0.264	0.210
0.270	0.230
0.275	0.256
0.280	0.277
0.285	0.298
0.290	0.324
0.295	0.339
0.300	0.356

*Not shown on plot

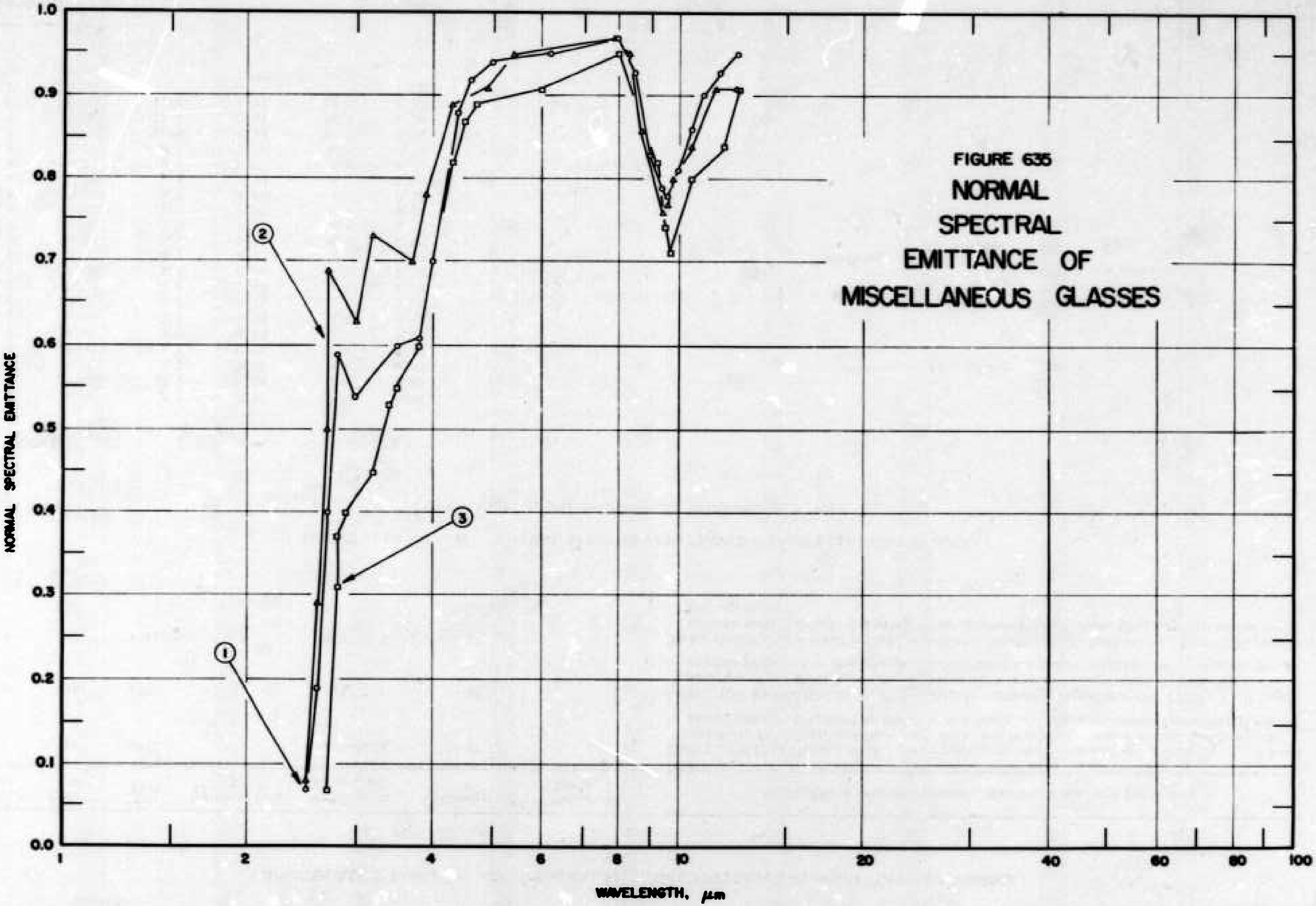


FIGURE 635
NORMAL
SPECTRAL
EMITTANCE OF
MISCELLANEOUS GLASSES

SPECIFICATION TABLE NO. 635 NORMAL SPECTRAL EMITTANCE OF MISCELLANEOUS GLASSES

Curve No.	Ref. No.	Year	Temperature K	Wavelength Range, μm	Geometry θ'	Reported Error, %	Composition (weight percent), Specifications, and Remarks
1	407	1951	811	2.5-12.5	~0°		FLINT CONTAINER GLASS (3.17 mm thick); nominal composition: 71.7 SiO_2, 13.3 Na_2O and K_2O, 11.9 CaO, 1.8 R_2O_3, 0.6 BaO, and 0.3 MgO; ground and polished on both sides; sample prepared by the Owens-Illinois Co.; data extracted from smooth curve.
2	407	1951	811	2.5-12.4	~0°		LOW-IRON FLINT GLASS (3.17 mm thick); nominal composition: 72.2 SiO_2, 13.0 Na_2O and K_2O, 12.7 CaO, 1.1 R_2O_3, and 0.2 MgO; ground and polished on both sides; sample prepared by the Owens-Illinois Glass Co.; data extracted from smooth curve.
3	407	1951	811	2.7-12.5	~0°		TELEVISION TUBE GLASS (3.17 mm thick); containing 30 lead oxide; ground and polished on both sides; sample prepared by the Owens-Illinois Glass Co.; data extracted from smooth curve.

DATA TABLE NO. 635 NORMAL SPECTRAL EMITTANCE OF MISCELLANEOUS GLASSES

[Wavelength, λ, μm; Emittance, ϵ; Temperature, T, K]

λ	ϵ	λ	ϵ	λ	ϵ
CURVE 1 T = 811		**CURVE 2** T = 811		**CURVE 3** T = 811	
2.5	0.07	2.5	0.08	2.7	0.07
2.6	0.19	2.6	0.29	2.8	0.31
2.7	0.40	2.7	0.50	2.8	0.37
2.8	0.59	2.7	0.69	2.9	0.40
3.0	0.54	3.0	0.63	3.2	0.45
3.5	0.60	3.3	0.73	3.4	0.53
3.8	0.61	3.7	0.70	3.5	0.55
4.0	0.70	3.9	0.78	3.8	0.60
4.4	0.88	4.3	0.89	4.0	0.70*
4.6	0.92	4.9	0.91	4.3	0.82
5.0	0.94	5.4	0.95	4.5	0.87
6.2	0.95	7.9	0.97	4.7	0.89
8.0	0.97	8.3	0.95	6.0	0.91
8.5	0.93	8.7	0.86	8.0	0.95
9.0	0.83	9.4	0.76	9.2	0.82
9.4	0.79	9.6	0.77	9.5	0.74
9.6	0.78	9.8	0.80	9.7	0.72
10.0	0.82	10.5	0.84	10.5	0.80
10.5	0.86	11.5	0.91	11.8	0.89
11.0	0.90	12.4	0.91	12.5	0.91
11.7	0.93				
12.5	0.95				

*Not shown on plot

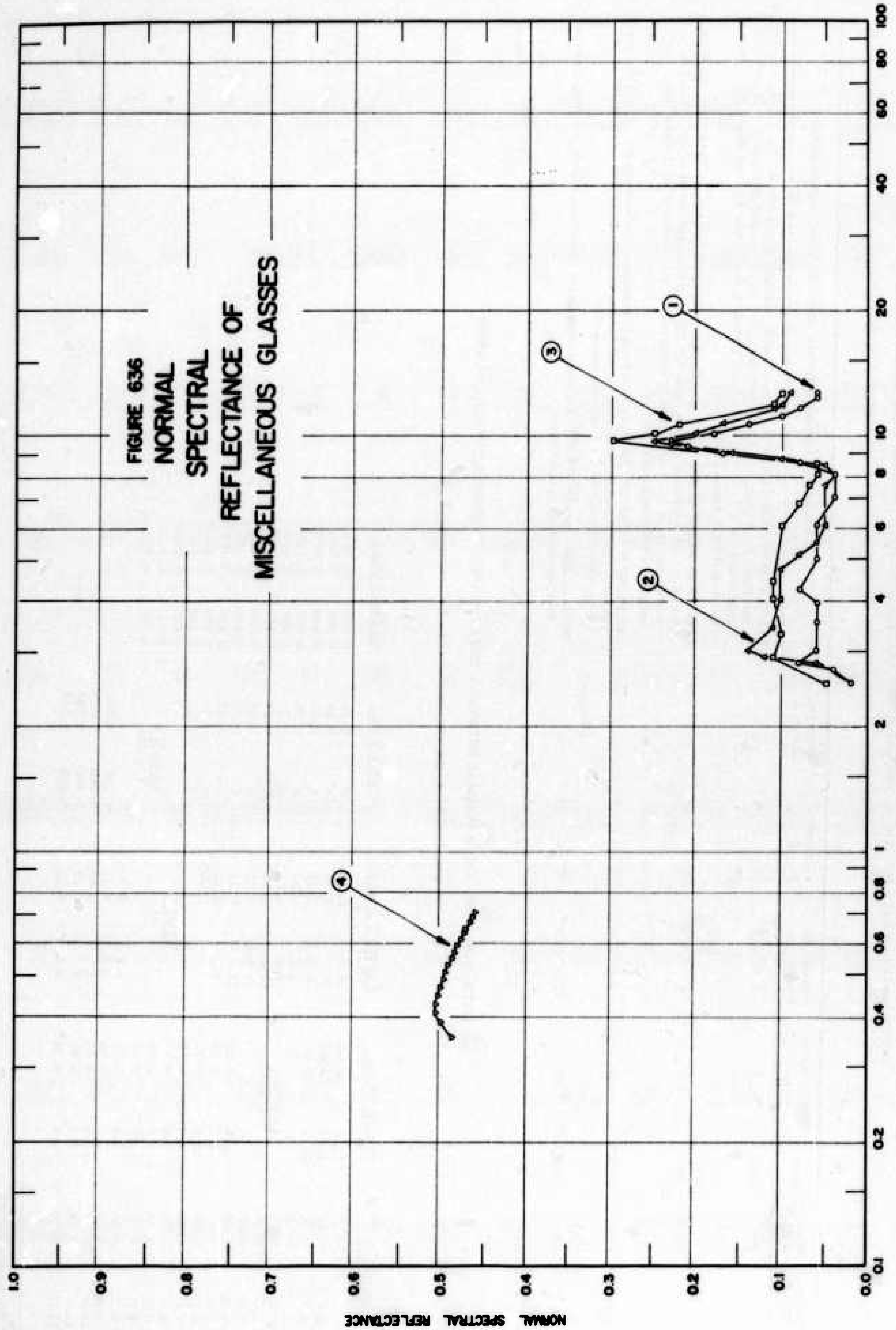


FIGURE 636 NORMAL SPECTRAL REFLECTANCE OF MISCELLANEOUS GLASSES

SPECIFICATION TABLE NO. 636 NORMAL SPECTRAL REFLECTANCE OF MISCELLANEOUS GLASSES

Curve No.	Ref. No.	Year	Temperature K	Wavelength Range, μm	Geometry θ	θ'	ω'	Reported Error, %	Composition (weight percent), Specifications, and Remarks
1	407	1951	811	2.5-12.5	~0°		2π		FLINT CONTAINER GLASS (3.17 mm thick); nominal composition: 71.7 SiO_2, 13.3 Na_2O and K_2O, 11.9 CaO, 1.8 R_2O_3, 0.6 BaO, 0.3 MgO; ground and polished on both sides; calculated from 1- (ε+τ); sample prepared by the Owens-Illinois Glass Co.; data extracted from smooth curve.
2	407	1951	811	2.5-12.5	~0°		2π		LOW-IRON FLINT GLASS (3.17 mm thick): nominal composition: 72.2 SiO_2, 13.0 Na_2O and K_2O, 12.7 CaO, 1.1 R_2O_3, and 0.2 MgO; ground and polished on both sides; calculated from 1- (ε+τ); sample prepared by the Owens-Illinois Glass Co.; data extracted from smooth curve.
3	407	1951	811	2.5-12.5	~0°		2π		TELEVISION TUBE GLASS (3.17 mm thick); containing 30 lead oxide; ground and polished on both sides; sample prepared by the Owens-Illinois Glass Co.; calculated from 1- (ε+τ); data extracted from smooth curve.
4	124	1956	298	0.35-0.79	~0°		2π	±4	OPAL GLASS; specimen had a thin opalescent layer sandwiched between thick and very thin transparent glass layers.

DATA TABLE NO. 636 NORMAL SPECTRAL REFLECTANCE OF MISCELLANEOUS GLASSES

[Wavelength, λ, μm; Reflectance, ρ; Temperature, T, K]

λ	ρ	λ	ρ	λ	ρ	λ	ρ	λ	ρ
CURVE 1		CURVE 1 (cont.)		CURVE 2 (cont.)		CURVE 3 (cont.)		CURVE 4 (cont.)	
T = 811									
		11.5	0.08	8.4	0.05	6.0	0.10	0.440	0.501
2.5	0.02	12.1	0.06	8.7	0.10	6.9	0.08	0.460	0.499
2.7	0.04	12.5	0.06	9.0	0.16	7.5	0.07	0.480	0.496
2.8	0.08			9.4	0.23	8.0	0.06	0.500	0.493
3.0	0.06	CURVE 2		9.6	0.25	8.5	0.11	0.520	0.490
3.5	0.06	T = 811		10.0	0.20	9.0	0.17*	0.540	0.486
3.9	0.06			10.6	0.17	9.6	0.30	0.560	0.483
4.2	0.08	2.5	0.02*	11.4	0.11	10.0	0.25	0.580	0.480
5.0	0.06	2.8	0.06	11.7	0.10	10.6	0.22	0.600	0.476
6.0	0.06	2.9	0.12	12.5	0.09*	11.8	0.11	0.620	0.473*
7.0	0.04	3.0	0.14			12.5	0.10	0.640	0.470
8.0	0.04	3.4	0.11	CURVE 3				0.660	0.466
8.5	0.08	4.0	0.10	T = 811		CURVE 4		0.680	0.463
9.0	0.17	4.7	0.10			T = 298		0.700	0.459
9.3	0.21	5.1	0.08	2.5	0.05				
9.6	0.23	5.5	0.06	2.9	0.11	0.350	0.484		
10.0	0.18	6.0	0.05	3.3	0.10	0.380	0.499		
10.5	0.14	7.5	0.05	4.0	0.11	0.400	0.504		
11.0	0.10	8.0	0.04*	4.4	0.11	0.420	0.504		

*Not shown on plot

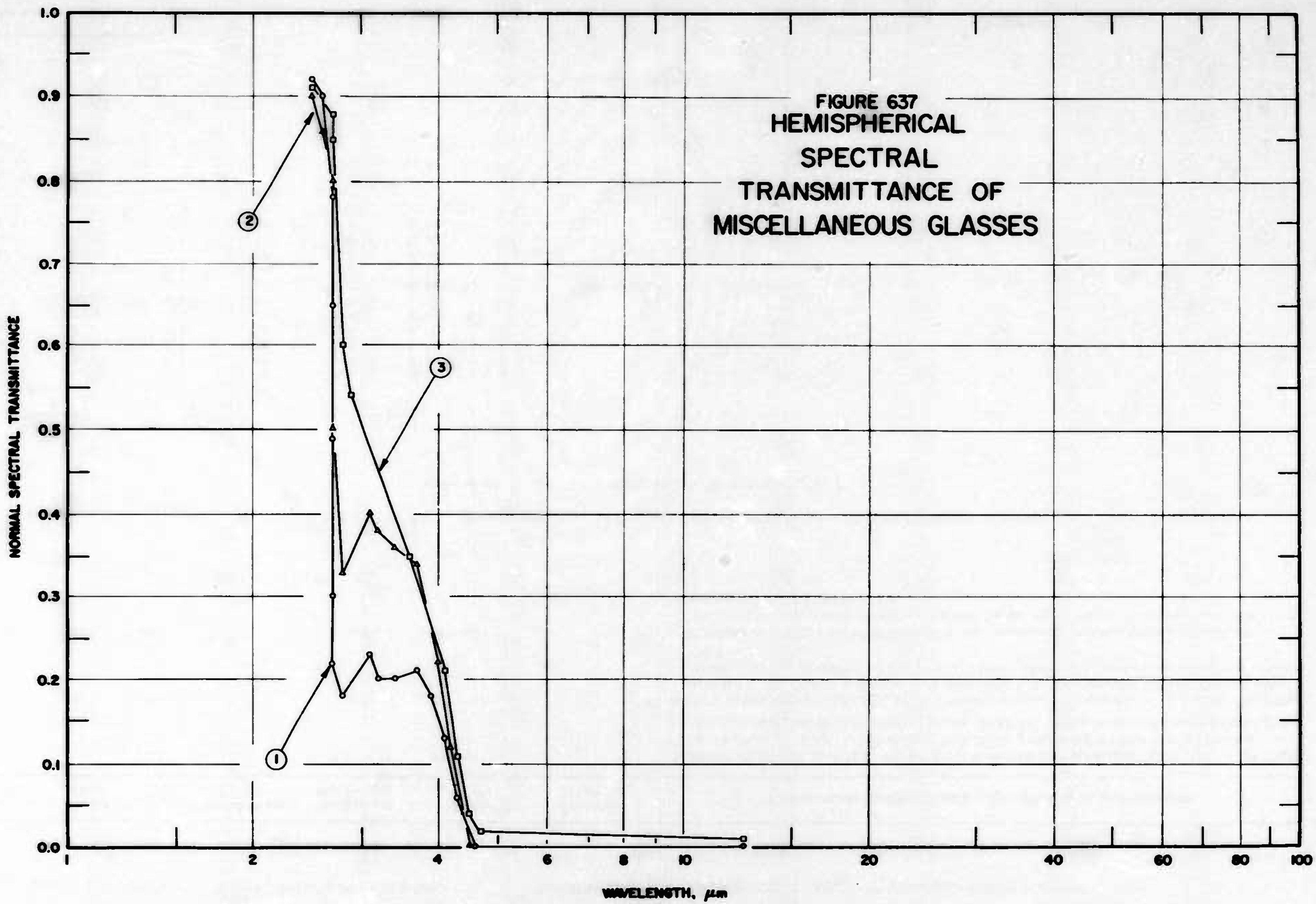


FIGURE 637
HEMISPHERICAL
SPECTRAL
TRANSMITTANCE OF
MISCELLANEOUS GLASSES
NORMAL SPECTRAL TRANSMITTANCE
WAVELENGTH, μm
1.0
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0.0
1
2
4
6
8
10
20
40
60
80
100
1
2
3

SPECIFICATION TABLE NO. 637 HEMISPHERICAL SPECTRAL TRANSMITTANCE OF MISCELLANEOUS GLASSES

Curve No.	Ref. No.	Year	Temperature K	Wavelength Range, μm	Geometry ω	θ'	ω'	Reported Error, %	Composition (weight percent), Specifications, and Remarks
1	407	1951	811	2.5-12.5	2π	~0°			LOW-IRON FLINT GLASS (3.17 mm thick); nominal composition: 72.2 SiO_2, 13.0 Na_2O and K_2O, 12.7 CaO, 1.1 R_2O_3, and 0.2 MgO; ground and polished on both sides; sample prepared by the Owens-Illinois Glass Co.; data extracted from smooth curve.
2	407	1951	811	2.5-12.5	2π	~0°			FLINT CONTAINER GLASS (3.17 mm thick); nominal composition: 71.7 SiO_2, 13.3 Na_2O and K_2O, 11.9 CaO, 1.8 R_2O_3, 0.6 BaO, and 0.3 MgO; ground and polished on both sides; sample prepared by the Owens-Illi ois Glass Co.; data extracted from smooth curve.
3	407	1951	811	2.5-12.5	2π	~0°			TELEVISION TUBE GLASS (3.17 mm thick); containing 30 lead oxide; ground and polished on both sides; sample prepared by the Owens-Illinois Glass Co.; data extracted from smooth curve.

DATA TABLE NO. 637 HEMISPHERICAL SPECTRAL TRANSMITTANCE OF MISCELLANEOUS GLASSES

[Wavelength, λ, μm; Transmittance, τ; Temperature, T, K]

λ	τ	λ	τ	λ	τ
CURVE 1 T = 811		CURVE 2 T = 811		CURVE 3 T = 811	
2.5	0.92	2.5	0.90	2.5	0.91
2.6	0.90	2.6	0.86	2.7	0.88
2.7	0.78	2.7	0.80	2.7	0.85
2.7	0.65	2.7	0.50	2.8	0.60
2.7	0.49	2.8	0.33	2.9	0.54
2.7	0.30	3.1	0.40	3.6	0.35
2.7	0.22	3.2	0.38	4.1	0.21
2.8	0.18	3.4	0.36	4.3	0.11
3.1	0.23	3.7	0.34	4.5	0.04
3.2	0.20	4.0	0.22	4.7	0.02
3.4	0.20	4.2	0.12	12.5	0.01*
3.7	0.21	4.5	0.00		
3.9	0.18	12.5	0.00*		
4.1	0.13				
4.3	0.06				
4.6	0.00				
12.5	0.00				

* Not shown on plot

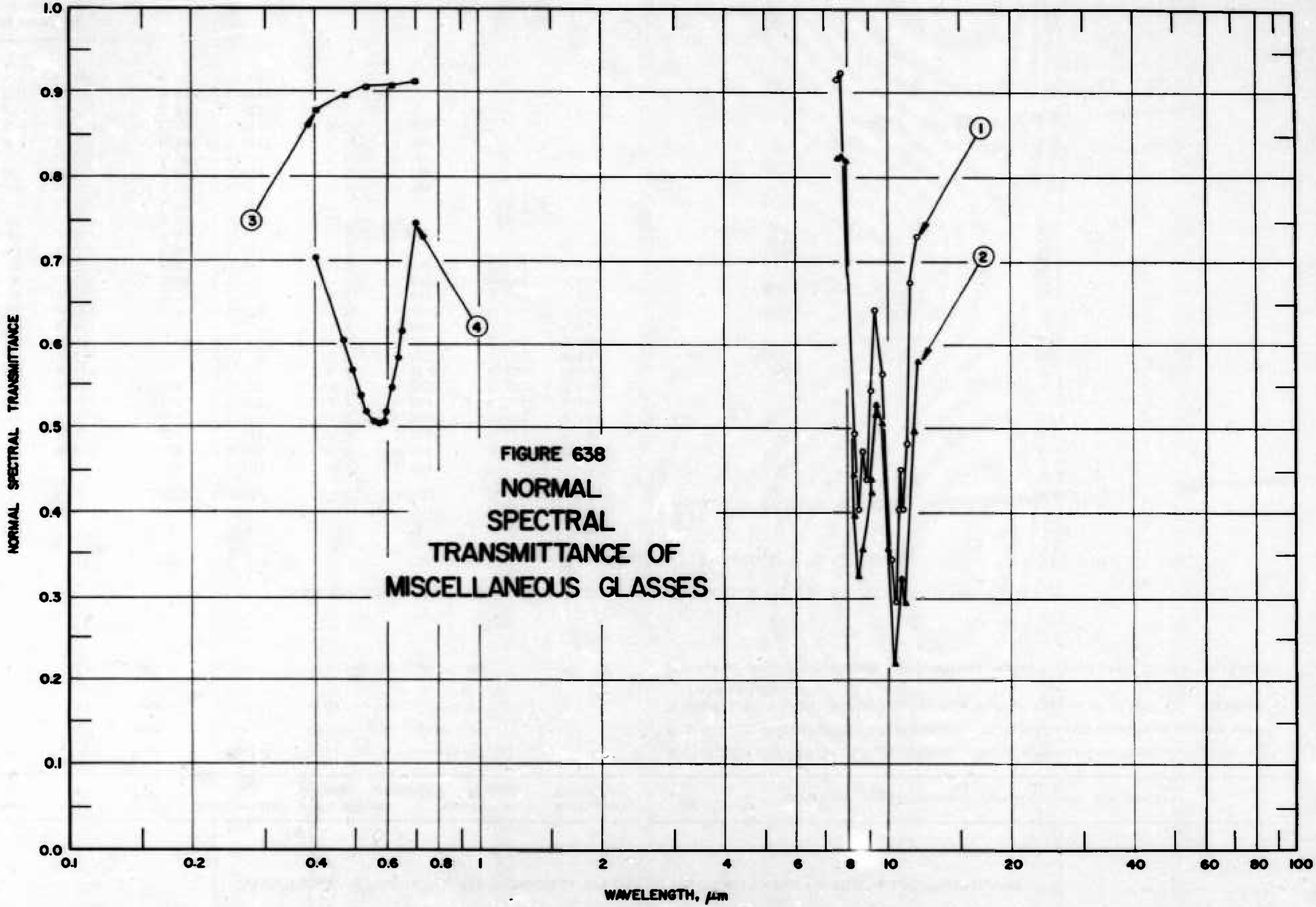


FIGURE 638
NORMAL
SPECTRAL
TRANSMITTANCE OF
MISCELLANEOUS GLASSES
NORMAL SPECTRAL TRANSMITTANCE
WAVELENGTH, μm
1
2
3
4
0.0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
1.0
0.1
0.2
0.4
0.6
0.8
1
2
4
6
8
10
20
40
60
80
100

SPECIFICATION TABLE NO. 638 NORMAL SPECTRAL TRANSMITTANCE OF MISCELLANEOUS GLASSES

Curve No.	Ref. No.	Year	Temperature K	Wavelength Range, μm	Geometry θ θ' ω'	Reported Error, %	Composition (weight percent), Specifications, and Remarks
1	410	1968	~298	7.58-11.8	~0° ~0°		NATURAL CORDIERITE, $2MgO \cdot 2Al_2O_3 \cdot 5SiO_2$; data extracted from smooth curve.
2	410	1968	~298	7.59-11.9	~0° ~0°		SYNTHETIC CORDIERITE, $2MgO \cdot 2Al_2O_3 \cdot 5SiO_2$; data extracted from smooth curve.
3	411	1965	~298	0.400-0.700	~0° ~0°		SODA-SILICA GLASS; 33 Na_2O and 67 SiO_2 with an addition of 50 ppm Zr; extracted from smooth curve.
4	411	1965	~298	0.400-0.700	~0° ~0°		Similar to the above specimen and conditions except colored under 2537 A irradiation.

DATA TABLE NO. 638 NORMAL SPECTRAL TRANSMITTANCE OF MISCELLANEOUS GLASSES

[Wavelength, λ, μm; Transmittance, τ; Temperature, T, K]

λ	τ	λ	τ	λ	τ	λ	τ
CURVE 1		CURVE 1 (cont.)		CURVE 2 (cont.)		CURVE 4	
T ~ 296						T ~ 298	
		10.9	0.403	9.78	0.494*		
7.58	0.918	11.2	0.482	10.0	0.356	0.400	0.701
7.76	0.924	11.3	0.619*	10.3	0.254*	0.465	0.604
7.93	0.922*	11.4	0.676	10.4	0.225*	0.592	0.568
8.36	0.492	11.5	0.702*	10.4	0.220	0.516	0.536
8.50	0.403	11.8	0.731	10.5	0.235*	0.532	0.518
8.58	0.413*			10.7	0.317*	0.550	0.506
8.70	0.471	CURVE 2		10.8	0.323	0.566	0.502
8.83	0.440	T ~ 298		10.9	0.292*	0.583	0.506
8.92	0.466*			11.0	0.293	0.598	0.519
9.03	0.545	7.59	0.824	11.3	0.434*	0.615	0.545
9.15	0.553*	7.72	0.830	11.5	0.497	0.633	0.583
9.23	0.605*	7.90	0.822	11.7	0.534*	0.649	0.618
9.29	0.634*	8.27	0.446	11.9	0.580	0.700	0.748
9.35	0.643	8.34	0.397				
9.45	0.637*	8.48	0.326	CURVE 3			
9.57	0.588*	8.55	0.324*	T ~ 298			
9.69	0.563	8.67	0.346*				
9.87	0.553*	8.72	0.355	0.400	0.878		
10.2	0.343	9.01	0.440	0.467	0.898		
10.3	0.319*	9.09	0.424	0.527	0.907		
10.4	0.294	9.19	0.445*	0.615	0.909		
10.6	0.330*	9.33	0.514	0.700	0.912		
10.6	0.405	9.40	0.528				
10.7	0.451	9.57	0.528*				
10.8	0.446*	9.66	0.505				

* Not shown on plot

10. MINERALS AND ROCKS

SPECIFICATION TABLE NO. 639 HEMISPHERICAL TOTAL EMITTANCE OF CARBONATE MINERALS

Curve No.	Ref. No.	Year	Temperature Range, K	Reported Error, %	Composition (weight percent), Specifications and Remarks
1*	105	1965	2000		KAOLIN; insulation brick.

DATA TABLE NO. 639 HEMISPHERICAL TOTAL EMITTANCE OF CARBONATE MINERALS

[Temperature, T, K; Emittance, ϵ]

T	ϵ
CURVE 1*	
2000	0.48

*No plot given

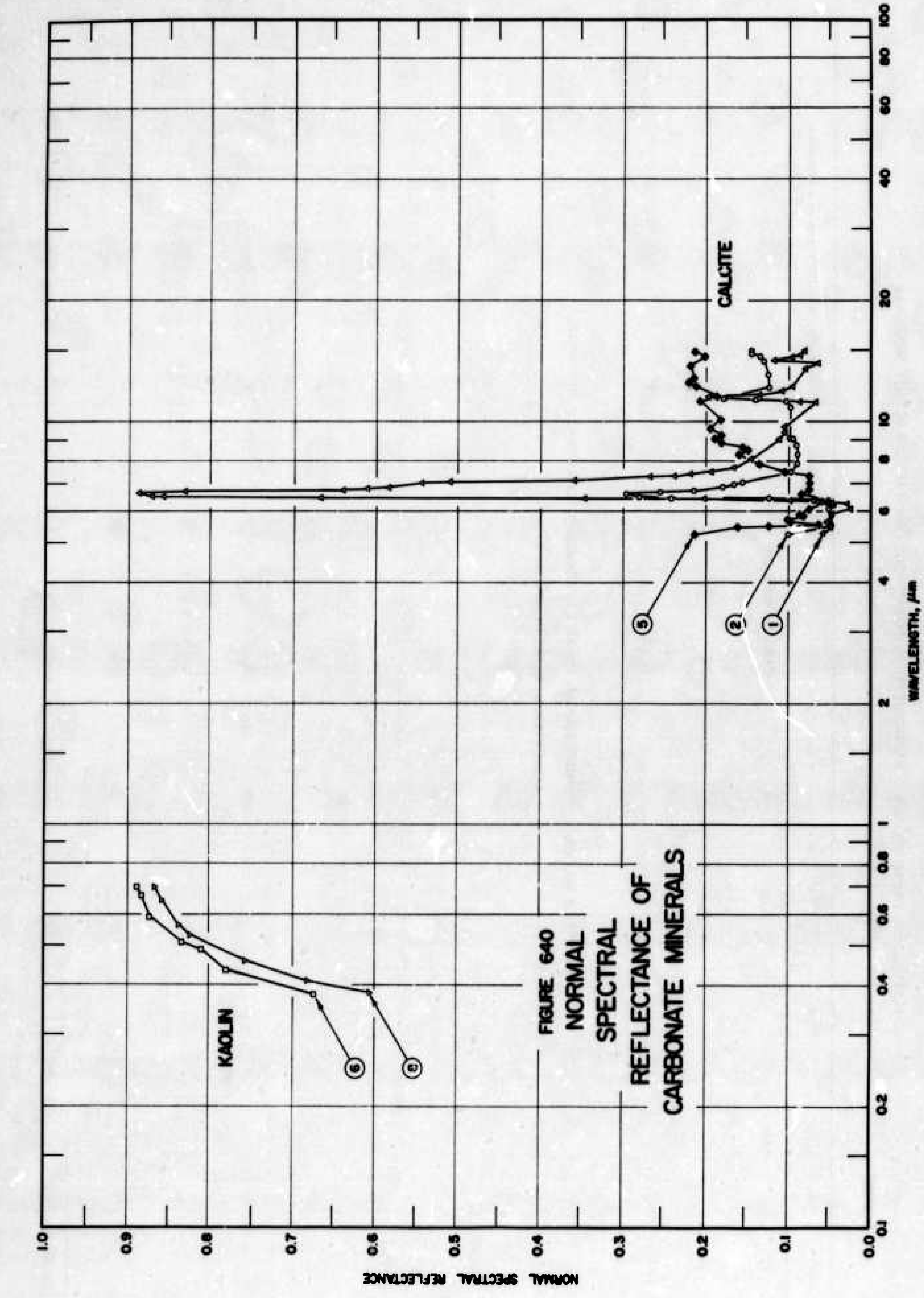


FIGURE 640 NORMAL SPECTRAL REFLECTANCE OF CARBONATE MINERALS

SPECIFICATION TABLE NO. 640 NORMAL SPECTRAL REFLECTANCE OF CARBONATE MINERALS

Curve No.	Ref. No.	Year	Temperature K	Wavelength Range, μm	Geometry θ	θ'	ω'	Reported Error, %	Composition (weight percent), Specifications, and Remarks
1	378	1968	~298	5.29-15.0	7°	7°			CALCITE, $CaCO_3$; polished sample from Cherokee County, Kansas; aluminized mirror reference standard; data extracted from smooth curve.
2	378	1968	~298	5.26-15.0	7°	7°			Similar to the above specimen and conditions except mat surface and grain size is 250 to 1200 μm.
3*	378	1968	~298	5.26-15.0	7°	7°			Similar to the above specimen and conditions except grain size is 74 to 250 microns.
4*	378	1968	~298	5.26-15.0	7°	7°			Similar to the above specimen and conditions except grain size is 0 to 74 microns.
5	378	1968	~298	5.26-15.0	7°	7°			Similar to the above specimen and conditions except grain size less than 5 microns.
6	246	1962	298	0.380-0.700	0°		2π		KAOLIN; Ajax SC, calcined; powder (compact pressure 10^4 psi); data extracted from smooth curve; [Author's designation: Sample 6].
7*	246	1962	298	0.380-0.700	0°		2π		Above specimen and conditions except being exposed to simulated solar radiation at 4 suns for 67 hrs.
8	246	1962	298	0.382-0.700	0°		2π		KAOLIN; Ajax P, uncalcined; powder (compact pressure 10^4 psi); data extracted from smooth curve; [Author's designation: Sample t].
9*	246	1962	298	0.380-0.700	0°		2π		Above specimen and conditions except being exposed to simulated solar radiation at 4 suns for 60 hrs.

*Not shown on plot

DATA TABLE NO. 640 NORMAL SPECTRAL REFLECTANCE OF CARBONATE MINERALS

[Wavelength, λ, μm; Reflectance, ρ; Temperature, T, K]

CURVE 1
T = 298

λ	ρ
5.29	0.058
5.40	0.058*
5.49	0.049
5.56	0.058*
5.61	0.054
5.70	0.049
5.93	0.047
6.13	0.026
6.24	0.029
6.31	0.048
6.35	0.065
6.37	0.099
6.41	0.202
6.43	0.347
6.46	0.667
6.53	0.859
6.54	0.873
6.62	0.890
6.69	0.888*
6.72	0.832
6.79	0.641
6.82	0.611
6.88	0.585
7.01	0.544
7.07	0.509
7.18	0.358
7.28	0.267
7.35	0.237
7.41	0.218
7.57	0.192
7.78	0.165
8.10	0.145
9.04	0.112
9.41	0.105
9.75	0.105
11.2	0.068
11.2	0.086
11.4	0.504
11.5	0.198
11.5	0.165
11.6	0.135
11.9	0.108
12.3	0.095
13.6	0.080
14.0	0.063
14.2	0.119
14.4	0.095
14.6	0.086
15.0	0.081

CURVE 2
T ~ 298

λ	ρ
5.26	0.100
5.46	0.052*
5.54	0.049
6.04	0.051
6.22	0.047
6.29	0.050
6.33	0.054
6.39	0.070
6.43	0.123
6.46	0.242
6.51	0.280
6.60	0.297
6.72	0.255
6.79	0.215
6.89	0.179
7.00	0.165
7.10	0.155
7.27	0.188
7.47	0.098
7.84	0.089
8.32	0.090
8.76	0.091
9.07	0.096
9.15	0.100
10.8	0.099
11.2	0.103
11.3	0.140
11.4	0.177
11.5	0.158
11.7	0.135
12.1	0.122
13.1	0.123
14.1	0.130
14.5	0.135
14.7	0.145
15.0	0.145

CURVE 3*
T ~ 298

λ	ρ
5.26	0.135
5.37	0.107
5.42	0.085
5.54	0.049
6.04	0.051
6.22	0.047
6.29	0.050
6.33	0.054
6.39	0.070
6.42	0.121
6.51	0.190
6.60	0.206
6.69	0.203
6.75	0.175
6.83	0.156
6.93	0.140
7.12	0.130
7.25	0.100
7.40	0.091
7.85	0.087
8.30	0.089
8.75	0.092
9.13	0.113
9.82	0.121
10.0	0.119
11.2	0.138
11.5	0.162
11.6	0.145
11.9	0.141
12.1	0.153
13.1	0.157
13.5	0.170
14.4	0.157
15.0	0.184

CURVE 4*
T ~ 298

λ	ρ
5.26	0.228
5.38	0.187
5.49	0.119
5.58	0.057
5.65	0.077
5.82	0.070
5.88	0.075
6.07	0.061
6.29	0.050
6.33	0.054
6.39	0.070
6.47	0.122
6.53	0.138
6.58	0.143
6.64	0.140
6.81	0.124
7.00	0.107
7.13	0.107
7.26	0.097
7.36	0.089
7.73	0.105
7.81	0.121
7.99	0.116
8.29	0.128
8.53	0.118
8.64	0.121
9.11	0.172
9.41	0.169
9.61	0.177
9.95	0.168
10.7	0.179
11.1	0.189
11.6	0.155
12.4	0.212
13.0	0.205
13.8	0.211
14.3	0.190
15.0	0.199

CURVE 5
T ~ 298

λ	ρ
5.26	0.214
5.35	0.186*
5.46	0.160
5.51	0.123
5.58	0.063
5.63	0.098
5.69	0.101
5.81	0.082
5.87	0.087
6.00	0.079*
6.08	0.074
6.33	0.054
6.39	0.070*
6.61	0.084
6.80	0.075
7.02	0.073
7.34	0.074
7.52	0.104
7.84	0.136
8.31	0.160
8.57	0.149
8.66	0.154
8.95	0.181
9.07	0.189
9.29	0.181
9.61	0.195
10.1	0.182
10.6	0.190*
11.1	0.206
11.4	0.185*
11.7	0.165
12.2	0.213
12.5	0.221
12.9	0.216
13.8	0.220
14.5	0.201
15.0	0.216

CURVE 6
T = 298

λ	ρ
0.380	0.673
0.419	0.764*
0.427	0.773*
0.434	0.780
0.492	0.820
0.507	0.834
0.531	0.849*
0.595	0.873
0.645	0.882*
0.666	0.884
0.681	0.883*
0.690	0.889
0.700	0.890

CURVE 7*
T = 298

λ	ρ
0.380	0.504
0.389	0.521
0.429	0.639
0.434	0.648
0.442	0.657
0.462	0.689
0.520	0.761
0.559	0.793
0.590	0.807
0.624	0.815
0.634	0.817
0.660	0.827
0.674	0.835
0.700	0.843

CURVE 8
T = 298

λ	ρ
0.382	0.606
0.392	0.627*
0.410	0.682
0.423	0.709*
0.460	0.759
0.536	0.823
0.564	0.839
0.602	0.851*
0.628	0.855*
0.646	0.860
0.686	0.865*
0.700	0.868

CURVE 9*
T = 298

λ	ρ
0.380	0.361
0.429	0.453
0.479	0.510
0.516	0.548
0.550	0.573
0.588	0.590
0.611	0.606
0.644	0.622
0.676	0.646
0.700	0.661

* Not shown on plot

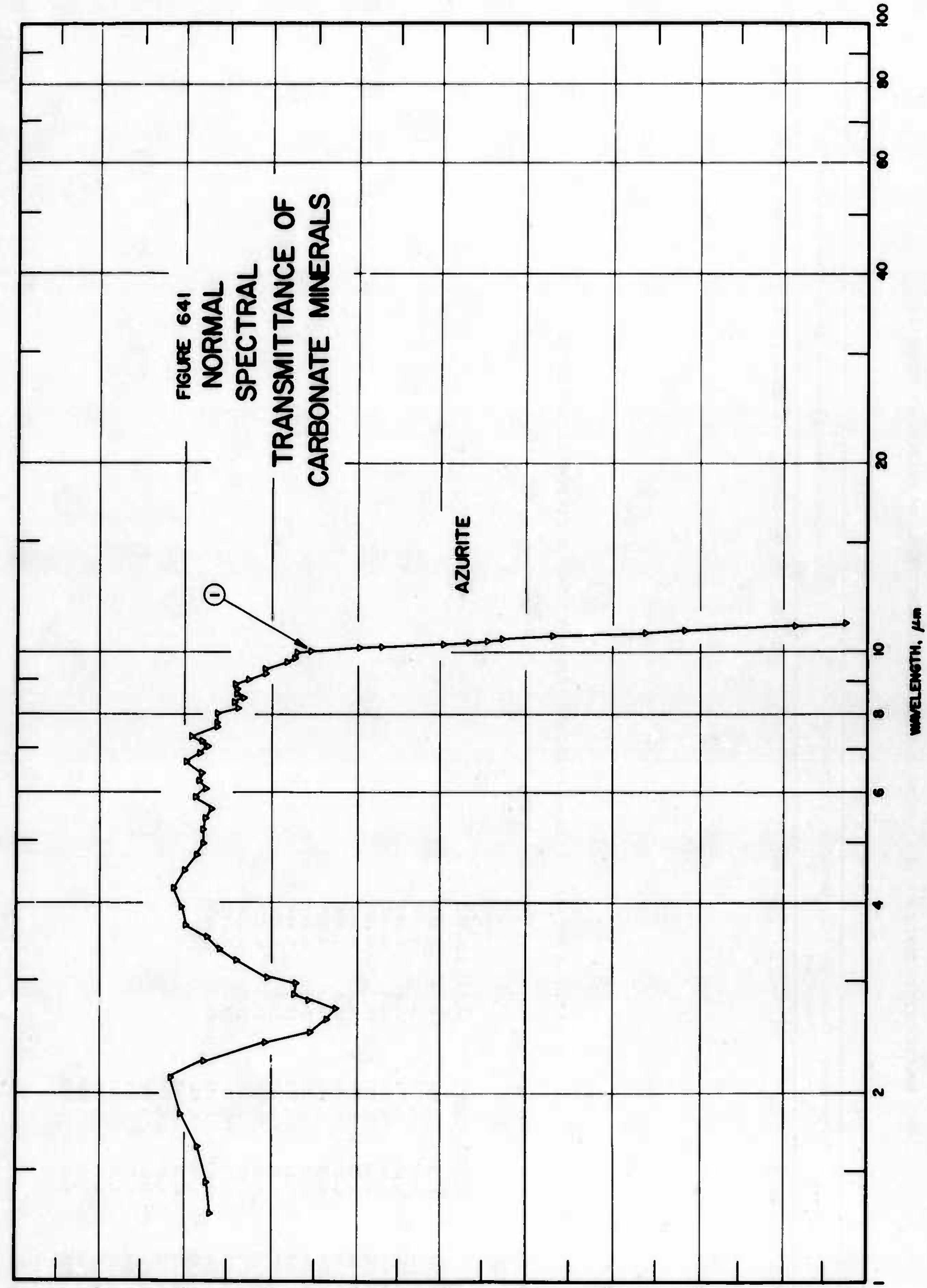


FIGURE 641
NORMAL
SPECTRAL
TRANSMITTANCE OF
CARBONATE MINERALS
AZURITE
1
NORMAL SPECTRAL TRANSMITTANCE
WAVELENGTH, μm
0.0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
1.0
1
2
4
6
8
10
20
40
60
80
100

SPECIFICATION TABLE NO. 641 NORMAL SPECTRAL TRANSMITTANCE OF CARBONATE MINERALS

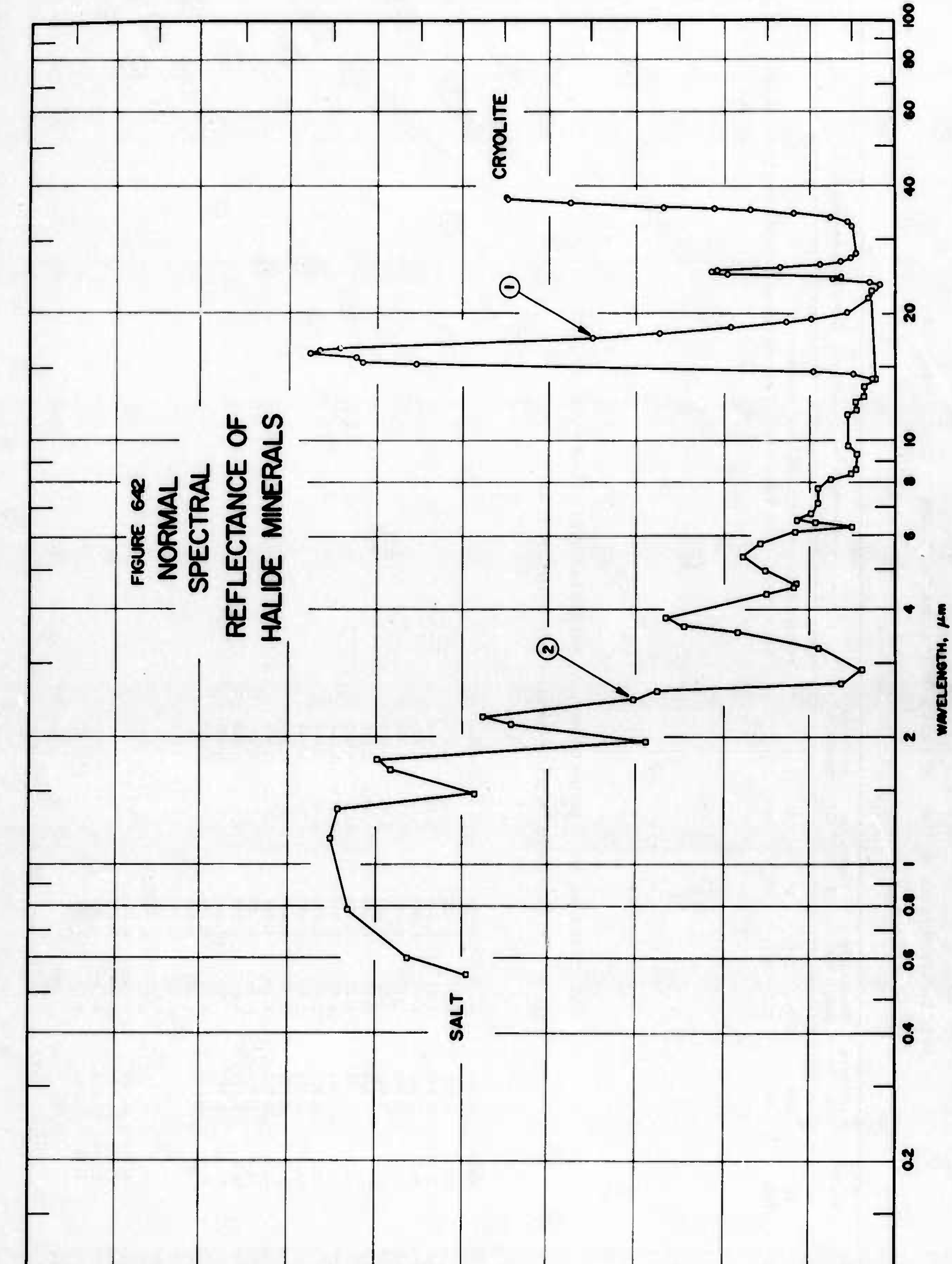
Curve No.	Ref. No.	Year	Temperature K	Wavelength Range, μm	Geometry θ θ' ω'	Reported Error, %	Composition (weight percent), Specifications, and Remarks
1	294	1906	~298	1.29-12.2	~0° ~0°		AZURITE, $2CuCO_3 \cdot Cu(OH)_2$; translucent, sample cut parallel to c-axis; 0.35 mm thick.

DATA TABLE NO. 641 NORMAL SPECTRAL TRANSMITTANCE OF CARBONATE MINERALS

[Wavelength, λ, μm; Transmittance, τ; Temperature, T, K]

λ	τ	λ	τ	λ	τ
CURVE 1 T ~ 298		CURVE 1 (cont.)		CURVE 1 (cont.)	
		5.25	0.780	9.65	0.684
1.29	0.771	5.47	0.778	9.79	0.677
1.45	0.775	5.66	0.771	10.0	0.673
1.64	0.784	5.90	0.789	10.1	0.657
1.86	0.805	6.09	0.777	10.3	0.600
2.13	0.819	6.29	0.784	10.4	0.572
2.25	0.779	6.47	0.782	10.6	0.498
2.41	0.709	6.71	0.800	10.8	0.469
2.50	0.658	6.91	0.783	10.9	0.447
2.63	0.644	7.11	0.775	11.0	0.430
2.72	0.627	7.26	0.782	11.2	0.370
2.81	0.659	7.38	0.795	11.5	0.267
2.88	0.676	7.62	0.765	11.7	0.219
3.00	0.673	7.78	0.765	12.0	0.085
3.06	0.704	8.03	0.764	12.2	0.027
3.26	0.742	8.19	0.740		
3.39	0.761	8.34	0.745		
3.54	0.775	8.48	0.736		
3.79	0.800	8.61	0.742		
3.97	0.804	8.77	0.741		
4.24	0.814	8.94	0.743		
4.51	0.802	9.09	0.729		
4.78	0.787	9.25	0.709		
5.00	0.780	9.41	0.710		

FIGURE 642 NORMAL SPECTRAL REFLECTANCE OF HALIDE MINERALS



SPECIFICATION TABLE NO. 642 NORMAL SPECTRAL REFLECTANCE OF HALIDE MINERALS

Curve No.	Ref. No.	Year	Temperature K	Wavelength Range, μm	Geometry θ	Geometry θ'	Geometry ω'	Reported Error, %	Composition (weight percent), Specifications, and Remarks
1	83	1962	298	14.0-37.6	0°		2π		CRYOLITE; data extracted from smooth curve.
2	308	1966	~298	0.55-22.7	0°		2π		SALT POOL, Death Valley, Calif.; sample intact; data extracted from smooth curve.

DATA TABLE NO. 642 NORMAL SPECTRAL REFLECTANCE OF HALIDE MINERALS

[Wavelength, λ, μm; Reflectance, ρ; Temperature, T, K]

λ	ρ	λ	ρ	λ	ρ	λ	ρ
CURVE 1		CURVE 1 (cont.)		CURVE 2 (cont.)		CURVE 2 (cont.)	
T = 298							
		25.4	0.208	1.35	0.643	6.53	0.115
14.0	0.027	25.8	0.135	1.47	0.486	6.79	0.098
14.4	0.049	26.2	0.088	1.67	0.584	7.14	0.089
14.6	0.094	26.7	0.063	1.77	0.600	7.78	0.089
15.2	0.556	27.2	0.051	1.95	0.287	8.12	0.073
15.3	0.619	27.8	0.046	2.13	0.441	8.40	0.050
15.5	0.661	32.2	0.050	2.22	0.475	8.59	0.045
15.8	0.675	33.0	0.055	2.44	0.301	9.36	0.043
16.1	0.677	33.8	0.075	2.57	0.275	9.76	0.054
16.4	0.666	34.6	0.119	2.68	0.062	11.5	0.054
16.6	0.643	35.1	0.170	2.89	0.038	11.8	0.044
17.6	0.349	35.4	0.212	3.23	0.089	12.3	0.046
18.0	0.272	35.8	0.269	3.52	0.183	12.7	0.036
18.6	0.191	36.6	0.374	3.65	0.245	13.4	0.036
19.1	0.128	37.3	0.447	3.81	0.265	14.0	0.025
19.4	0.098	37.6	0.480	4.27	0.150	22.7	0.028
20.1	0.056			4.51	0.118		
21.8	0.031	CURVE 2		4.60	0.115		
23.5	0.019	T ~ 298		4.96	0.152		
23.9	0.030			5.35	0.178		
24.2	0.072	0.550	0.495	5.71	0.158		
24.6	0.162	0.600	0.563	6.08	0.117		
24.9	0.197	0.780	0.632	6.25	0.050		
25.1	0.214	1.15	0.651	6.40	0.093		

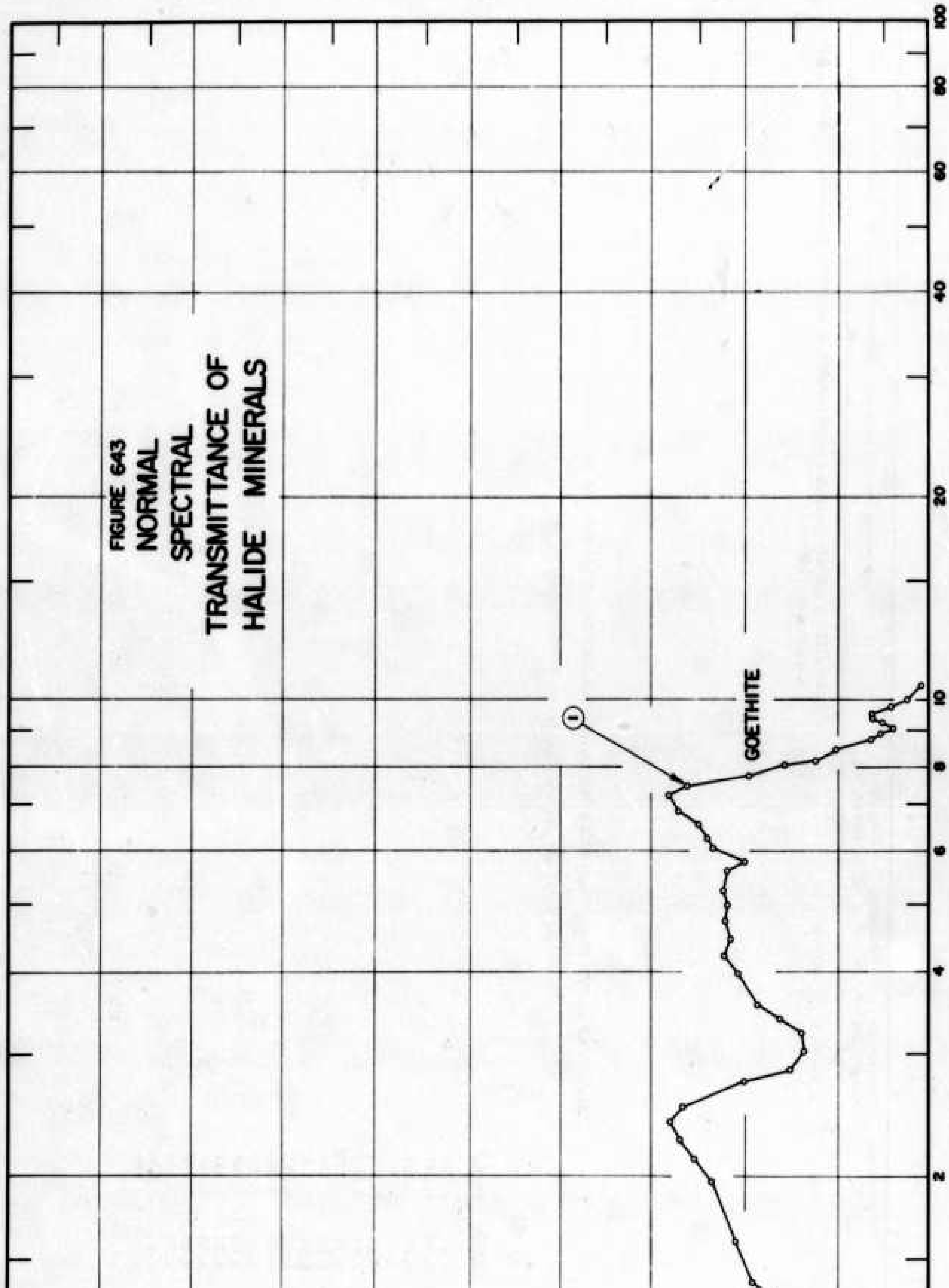


FIGURE 643 NORMAL SPECTRAL TRANSMITTANCE OF HALIDE MINERALS

SPECIFICATION TABLE NO. 643 NORMAL SPECTRAL TRANSMITTANCE OF HALIDE MINERALS

Curve No.	Ref. No.	Year	Temperature K	Wavelength Range, μm	Geometry θ θ' ω'	Reported Error, %	Composition (weight percent), Specifications, and Remarks
1	294	1906	~298	1.04-10.1	~0° ~0°		GOETHITE, FeO(OH); section ground parallel to b-axis to thickness 0.15 mm; opaque, black metallic luster.

DATA TABLE NO. 643 NORMAL SPECTRAL TRANSMITTANCE OF HALIDE MINERALS

[Wavelength, λ, μm; Transmittance, τ; Temperature, T, K]

λ	τ	λ	τ
CURVE 1		CURVE 1 (cont.)	
T ~ 298		6.04	0.235
1.04	0.019	6.26	0.241
1.25	0.142	6.54	0.251
1.40	0.191	6.87	0.271
1.60	0.210	7.25	0.282
1.97	0.236	7.48	0.263
2.12	0.254	7.74	0.197
2.26	0.270	8.03	0.158
2.40	0.280	8.24	0.126
2.51	0.257	8.42	0.103
2.74	0.200	8.75	0.066
2.86	0.151	8.92	0.052
3.04	0.138	9.06	0.040
3.24	0.140	9.22	0.051
3.40	0.163	9.38	0.063
3.67	0.187	9.56	0.064
3.96	0.208	9.75	0.042
4.21	0.223	10.0	0.023
4.45	0.217	10.1	0.009
4.74	0.222		
5.01	0.220		
5.25	0.224		
5.60	0.220		
5.78	0.220		

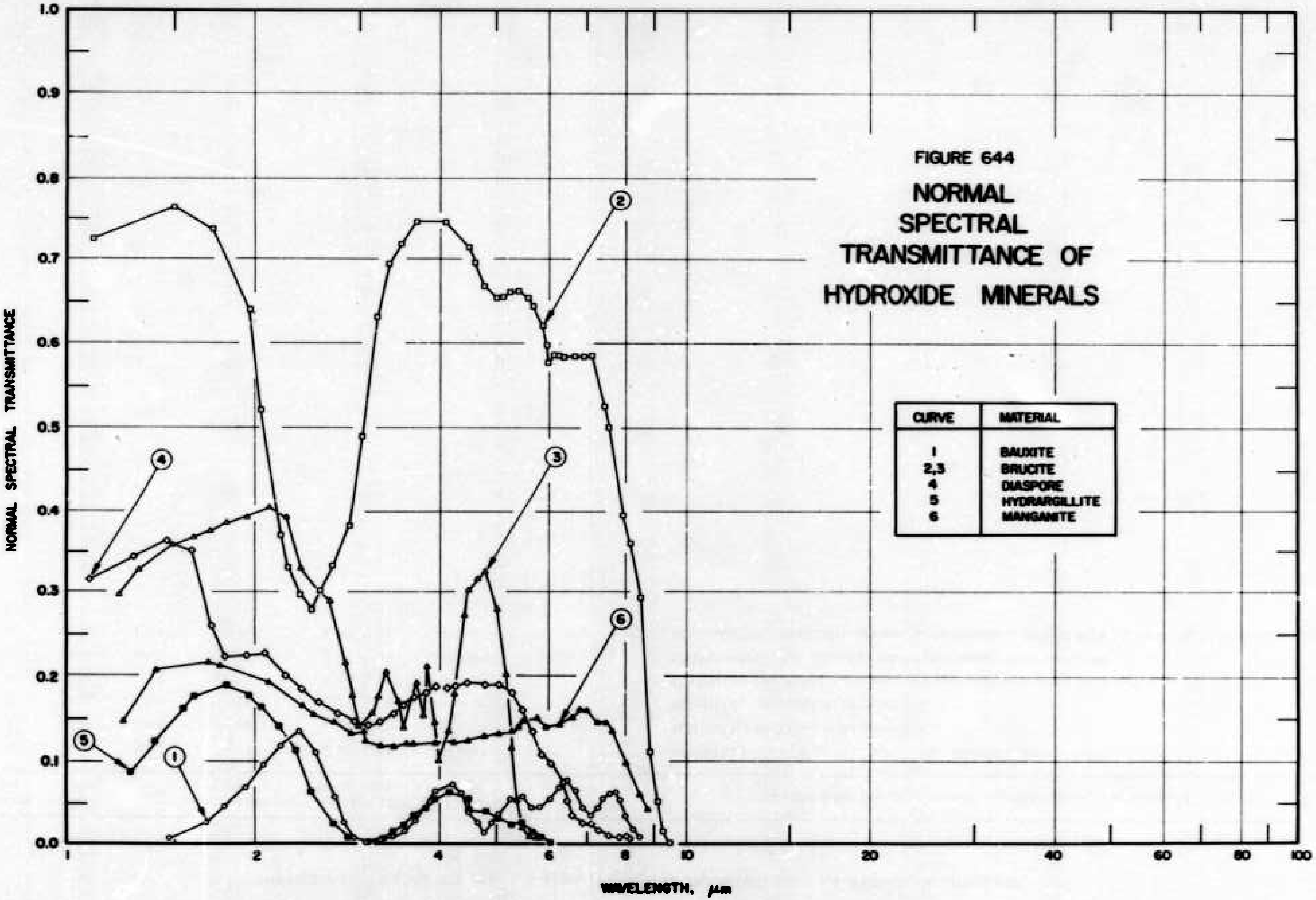


FIGURE 644
NORMAL SPECTRAL TRANSMITTANCE OF HYDROXIDE MINERALS

SPECIFICATION TABLE NO. 644 NORMAL SPECTRAL TRANSMITTANCE OF HYDROXIDE MINERALS

Curve No.	Ref. No.	Year	Temperature K	Wavelength Range, μm	Geometry θ	θ'	ω'	Reported Error, %	Composition (weight percent), Specifications, and Remarks
1	294	1906	~298	1.47-8.43	~0°	~0°			BAUXITE, $Al_2O(OH)_4$; 0.11 mm thick; chocolate brown color.
2	294	1906	~298	1.10-9.45	~0°	~0°			BRUCITE, $Mg(OH)_2$; 0.05 mm thick.
3	294	1906	~298	1.23-5.75	~0°	~0°			BRUCITE, $Mg(OH)_2$; 0.19 mm thick.
4	294	1906	~298	1.08-8.23	~0°	~0°			DIASPORE, AlO(OH); cleavage piece parallel to b-axis; 0.18 mm thick.
5	294	1906	~298	1.27-6.07	~0°	~0°			HYDRARGILLITE, $Al(OH)_3$, stalactitic mass; 0.02 mm thick.
6	294	1906	~298	1.04-8.71	~0°	~0°			MANGANITE, MnO(OH); opaque, orthorhombic, ground parallel to m; 0.08 mm thick.

DATA TABLE NO. 644   NORMAL SPECTRAL TRANSMITTANCE OF HYDROXIDE MINERALS

[Wavelength, λ, μm; Transmittance, τ; Temperature, T, K]

CURVE 1
T ~ 298

λ	τ
1.47	0.006
1.68	0.025
1.80	0.045
1.95	0.069
2.08	0.095
2.21	0.117
2.38	0.134
2.52	0.110
2.71	0.057
2.80	0.026
2.92	0.006
3.04	0.000
3.21	0.004
3.37	0.008
3.51	0.015
3.66	0.028
3.95	0.064
4.21	0.072
4.36	0.062
4.49	0.038
4.62	0.026
4.73	0.017
4.88	0.025
5.00	0.037
5.21	0.054
5.46	0.058
5.65	0.045
5.82	0.045
6.05	0.055
6.28	0.070
6.46	0.078
6.65	0.066
6.85	0.046
7.04	0.035
7.22	0.045
7.37	0.053
7.56	0.063
7.75	0.064
7.88	0.054
8.01	0.035
8.24	0.019
8.43	0.009

CURVE 2
T ~ 209

λ	τ
1.10	0.723
1.48	0.763
1.72	0.735
1.97	0.640
2.06	0.520
2.21	0.370
2.27	0.330
2.39	0.295
2.48	0.279
2.56	0.300
2.68	0.331
2.86	0.381
3.00	0.490
3.17	0.632
3.32	0.694
3.47	0.718
3.67	0.746
4.10	0.745
4.46	0.713
4.56	0.695
4.57	0.695
4.72	0.669
4.96	0.654
5.07	0.655
5.20	0.661
5.39	0.662
5.56	0.655
5.66	0.644
5.87	0.622
5.97	0.598
6.00	0.577
6.13	0.586
6.24	0.585
6.37	0.584
6.61	0.585
6.87	0.585
7.06	0.586
7.40	0.526
7.54	0.500
7.95	0.395
8.15	0.360
8.47	0.293
8.88	0.111
9.03	0.051

CURVE 2 (cont.)

λ	τ
9.19	0.015
9.45	0.000

CURVE 3
T ~ 298

λ	τ
1.23	0.296
1.30	0.327
1.48	0.357
1.60	0.367
1.70	0.374
1.81	0.385
1.95	0.392
2.12	0.403
2.26	0.391
2.39	0.328
2.56	0.298
2.64	0.289
2.82	0.215
2.89	0.177
2.95	0.140
3.02	0.135
3.11	0.157
3.19	0.176
3.28	0.203
3.43	0.170
3.50	0.138
3.68	0.191
3.77	0.252
3.82	0.211
3.93	0.146
4.00	0.100
4.14	0.135
4.23	0.178
4.40	0.273
4.46	0.301
4.61	0.315
4.74	0.326
4.97	0.279
5.13	0.200
5.23	0.116
5.35	0.051
5.46	0.019
5.61	0.007
5.75	0.006

CURVE 4
T ~ 298

λ	τ
1.08	0.313
1.28	0.342
1.45	0.362
1.59	0.350
1.72	0.259
1.80	0.223
1.95	0.224
2.09	0.227
2.26	0.200
2.40	0.185
2.55	0.169
2.74	0.156
2.92	0.147
3.08	0.141
3.21	0.146
3.37	0.155
3.50	0.166
3.64	0.175
3.81	0.180
3.95	0.187
4.12	0.186
4.27	0.189
4.44	0.192
4.75	0.190
5.00	0.190
5.26	0.182
5.45	0.160
5.66	0.134
5.88	0.108
6.07	0.097
6.35	0.075
6.48	0.052
6.58	0.034
6.81	0.026
7.07	0.024
7.26	0.017
7.52	0.010
7.83	0.009
8.04	0.010
8.23	0.007

CURVE 5
T ~ 298

λ	τ
1.27	0.087
1.38	0.122
1.54	0.161
1.61	0.176
1.81	0.189
1.97	0.177
2.06	0.162
2.20	0.140
2.34	0.112
2.49	0.063
2.70	0.024
2.85	0.007
3.04	0.000
3.23	0.005
3.37	0.015
3.51	0.022
3.65	0.035
3.81	0.043
3.94	0.054
4.17	0.063
4.48	0.056
4.77	0.040
5.00	0.031
5.24	0.025
5.46	0.026
5.66	0.015
5.85	0.009
6.07	0.000

CURVE 6
T ~ 298

λ	τ
1.04	0.019
1.23	0.146
1.39	0.206
1.59	0.214
1.77	0.211
2.12	0.193
2.40	0.165
2.50	0.154
2.70	0.146
2.89	0.132
3.03	0.123
3.22	0.118

CURVE 6 (cont.)

λ	τ
3.37	0.118
3.53	0.120
3.64	0.120
3.95	0.122
4.23	0.122
4.45	0.124
4.73	0.129
5.00	0.131
5.25	0.135
5.38	0.140
5.48	0.147
5.77	0.150
5.98	0.140
6.27	0.143
6.57	0.152
6.77	0.160
6.98	0.160
7.23	0.146
7.46	0.144
7.64	0.135
8.03	0.098
8.42	0.062
8.71	0.043

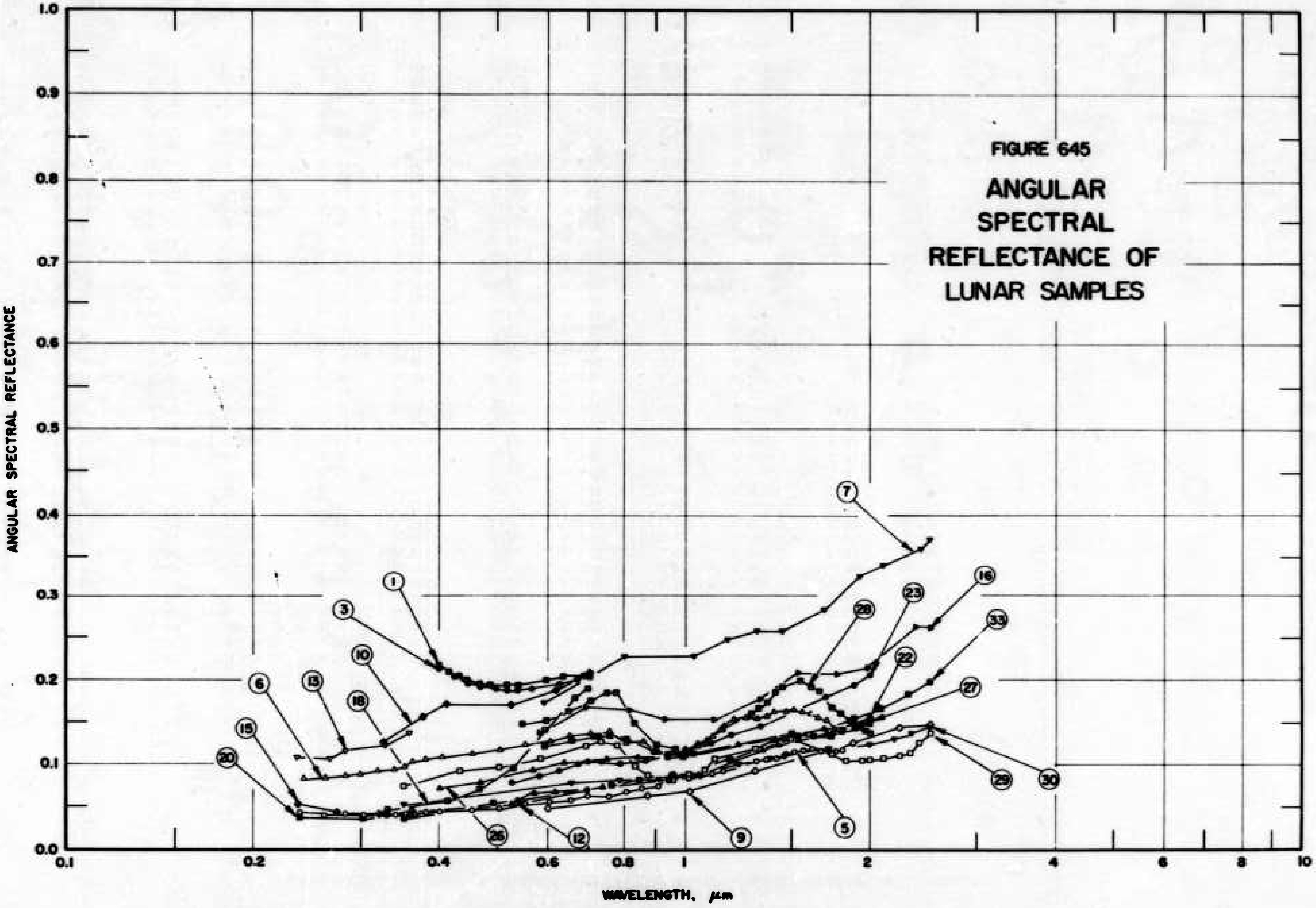


FIGURE 645
ANGULAR SPECTRAL REFLECTANCE OF LUNAR SAMPLES
ANGULAR SPECTRAL REFLECTANCE
1.0
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0.0
0.1
0.2
0.4
0.6
0.8
1
2
4
6
8
10
WAVELENGTH, μm

SPECIFICATION TABLE NO. 645 ANGULAR SPECTRAL REFLECTANCE OF LUNAR SAMPLES

Curve No.	Ref. No.	Year	Temperature K	Wavelength Range, μm	Geometry θ	θ'	ω'	Reported Error, %	Composition (weight percent), Specifications, and Remarks
1	426	1970	~298	0.400-0.700	~0°	~0°			Sample 85.4.16 from Apollo 11 mission; ilmenite crystal on the edge of rock fragment; appears that a nearly shock metamorphism affected this part also; measured in air; data extracted from smooth curve.
2*	426	1970	295.7	0.400-0.700	~0°	~0°			The above specimen and conditions except measured in Cargille type A immersion oil.
3	426	1970	~298	0.400-0.700	~0°	~0°			Sample 45.35.5 from Apollo 11 mission; ilmenite; measured in air; data extracted from smooth curve.
4*	426	1970	295.7	0.400-0.700	~0°	~0°			The above specimen and conditions except measured in Cargille type A immersion oil.
5	437	1970	~298	0.239-1.80	~0°		2π		Lunar dust sample from Apollo 11 mission.
6	437	1970	~298	0.243-1.79	~0°		2π		Lunar rock sample from Apollo 11 mission.
7	438	1970	~298	0.590-2.50	~0°	~0°			Sample 10020 from Apollo 11 mission; fine-grained crystalline material powdered to <50μm; data extracted from smooth curve; MgO reference standard.
8*	438	1970	~298	0.590-2.50	~0°	~0°			Above specimen and conditions except measured after irradiation with 4 x 10^{19} cm^{-2} 2 kev protons to simulate 2 x 10^4 yrs of solar wind.
9	438	1970	~298	0.600-2.50	~0°	~0°			Soil sample from Apollo 11 mission; fines <1.0 mm; data extracted from smooth curve; MgO reference standard.
10	438	1970	~298	0.325-0.703	~0°	~0°			Similar to curve 7 specimen and conditions.
11*	438	1970	~298	0.329-0.698	~0°	~0°			Above specimen and conditions except measured after irradiation with 4 x 10^{19} cm^{-2} 2 kev protons to simulate 2 x 10^4 yrs of solar wind.
12	438	1970	~298	0.325-0.696	~0°	~0°			Similar to curve 9 specimen and conditions.
13	438	1970	~298	0.236-0.359	~0°	~0°			Similar to curve 7 specimen and conditions.
14*	438	1970	~298	0.236-0.354	~0°	~0°			Above specimen and conditions except measured after irradiation with 4 x 10^{19} cm^{-2} 2 kev protons to simulate 2 x 10^4 yrs of solar wind.
15	438	1970	~298	0.237-0.361	~0°	~0°			Similar to curve 9 specimen and conditions.
16	438	1970	~298	0.580-2.50	~0°	~0°			Sample 10020 from Apollo 11 mission; fine-grained crystalline material; fused; powdered to <50μm; data extracted from smooth curve; MgO reference standard.
17*	438	1970	~298	0.590-2.49	~0°	~0°			Above specimen and conditions except measured after irradiation with 2 x 10^{19} cm^{-2} 2 kev protons to simulate 10^4 yrs of solar wind.
18	438	1970	~298	0.330-0.699	~0°	~0°			Similar to curve 16 specimen and conditions.
19*	438	1970	~298	0.330-0.699	~0°	~0°			Above specimen and conditions except measured after irradiation with 2 x 10^{19} cm^{-2} 2 kev protons to simulate 10^4 yrs of solar wind.
20	438	1970	~298	0.238-0.360	~0°	~0°			Similar to curve 16 specimen and conditions.
21*	438	1970	~298	0.233-0.360	~0°	~0°			Above specimen and conditions except measured after irradiation with 2 x 10^{19} cm^{-2} 2 kev protons to simulate 10^4 yrs of solar wind.

*Not shown on plot

SPECIFICATION TABLE NO. 645 (continued)

Curve No.	Ref. No.	Year	Temperature K	Wavelength Range, μm	Geometry θ	Geometry θ'	Geometry ω'	Reported Error, %	Composition (weight percent), Specifications, and Remarks
22	439	1970	~298	0.526-2.00	20°		2π		Sample 10084,68,1 from Apollo 11 mission; powder; received in dry nitrogen, measured in vacuum ($< 10^{-5}$ mm Hg); data extracted from smooth curve; converted from $R(2\pi, 20^\circ)$.
23	439	1970	~298	0.525-2.00	60°		2π		Above specimen and conditions.
24*	439	1970	~298	0.520-2.00	10°		2π		Sample 10084,68,2 from Apollo 11 mission; powder; received in dry nitrogen; opened and then resealed in original shipping container; measured in air two months after receipt; data extracted from smooth curve; converted from $R(2\pi, 10^\circ)$.
25*	439	1970	~298	0.528-2.00	60°		2π		Above specimen and conditions.
26	439	1970	~298	0.400-2.00	10°		2π		Sample 10047,23,2 from Apollo 11 mission; rock chip; measured in air; data extracted from smooth curve; converted from $R(2\pi, 10^\circ)$.
27	439	1970	~298	0.592-2.00	10°		2π		Sample 10057,29,1 from Apollo 11 mission; crystalline type rock chip with cinder-like appearance; measured in air; data extracted from smooth curve; converted from $R(2\pi, 10^\circ)$.
28	439	1970	~298	0.546-2.00	10°		2π		Sample 10048,21,1 from Apollo 11 mission; breccia type rock chip; measured in air; data extracted from smooth curve; converted from $R(2\pi, 10^\circ)$.
29	440	1970	~298	0.350-2.50	$\sim 0^\circ$		2π		Sample 3-33 from Apollo 11 mission; crystalline rock chip; data extracted from smooth curve; MgO reference standard.
30*	440	1970	~298	0.350-2.50	$\sim 0^\circ$		2π		Sample 20-38 from Apollo 11 mission; crystalline rock chip; data extracted from smooth curve; MgO reference standard.
31	440	1970	~298	0.350-2.50	$\sim 0^\circ$		2π		Sample 46-39 from Apollo 11 mission; breccias rock chip; data extracted from smooth curve; MgO reference standard.
32*	440	1970	~298	0.350-2.50	$\sim 0^\circ$		2π		Sample 48-29 from Apollo 11 mission; breccias rock chip; data extracted from smooth curve; MgO reference standard.
33	440	1970	~298	0.350-2.50	$\sim 0^\circ$		2π		Sample 84-66 from Apollo 11 mission; surface fines; data extracted from smooth curve; MgO reference standard.

*Not shown on plot

DATA TABLE NO. 345 ANGULAR SPECTRAL REFLECTANCE OF LUNAR SAMPLES

[Wavelength, λ, μm; Reflectance, ρ; Temperature, T, K]

CURVE 1
T ~ 298

λ	ρ
0.400	0.217
0.414	0.210
0.430	0.204
0.444	0.200
0.464	0.196
0.485	0.195
0.512	0.194
0.539	0.194
0.599	0.200
0.634	0.202
0.681	0.203
0.700	0.203

CURVE 2*
T = 295.7

λ	ρ
0.400	0.0773
0.417	0.0739
0.436	0.0705
0.453	0.0684
0.473	0.0667
0.495	0.0658
0.506	0.0658
0.566	0.0704
0.611	0.0735
0.649	0.0752
0.677	0.0758
0.700	0.0760

CURVE 3
T ~ 298

λ	ρ
0.400	0.213
0.425	0.204
0.448	0.198
0.469	0.194
0.496	0.190
0.516	0.189
0.538	0.189
0.565	0.190
0.622	0.195
0.670	0.200
0.687	0.202*
0.700	0.203*

CURVE 4*
T = 295.7

λ	ρ
0.400	0.0711
0.421	0.0683
0.448	0.0655
0.471	0.0636
0.492	0.0627
0.511	0.0627
0.535	0.0637
0.592	0.0674
0.640	0.0709
0.674	0.0736
0.694	0.0750
0.700	0.0750

CURVE 5
T ~ 298

λ	ρ
0.239	0.0433
0.262	0.0423
0.282	0.0423
0.302	0.0418
0.320	0.0401
0.340	0.0409
0.354	0.0419
0.367	0.0419
0.381	0.0427
0.402	0.0433
0.453	0.0469
0.501	0.0493
0.553	0.0520
0.601	0.0551
0.651	0.0588
0.699	0.0625
0.752	0.0646
0.801	0.0676
0.850	0.0701
0.905	0.0750
0.953	0.0789
1.00	0.0804
1.05	0.0833
1.10	0.0888
1.15	0.0929
1.20	0.0971
1.25	0.101
1.30	0.101

CURVE 5 (cont.)

λ	ρ
1.35	0.102
1.40	0.105
1.45	0.110
1.50	0.114
1.55	0.116
1.60	0.118
1.65	0.116
1.70	0.115
1.75	0.115
1.80	0.111

CURVE 6
T ~ 298

λ	ρ
0.243	0.0826
0.261	0.0840
0.282	0.0864
0.299	0.0895
0.319	0.0923
0.339	0.0949
0.351	0.0981
0.362	0.101
0.380	0.105
0.405	0.107
0.452	0.113
0.503	0.117
0.553	0.123
0.601	0.128
0.650	0.133
0.701	0.136
0.754	0.137
0.804	0.126
0.854	0.120
0.901	0.113
0.954	0.114
1.00	0.117
1.05	0.125
1.10	0.134
1.15	0.147
1.20	0.153
1.25	0.155
1.30	0.154
1.35	0.158
1.39	0.161
1.45	0.164

CURVE 6 (cont.)

λ	ρ
1.50	0.165
1.55	0.163
1.60	0.161
1.64	0.156
1.69	0.151
1.75	0.144
1.79	0.139

CURVE 7
T ~ 298

λ	ρ
0.590	0.174
0.800	0.227
1.03	0.227
1.17	0.249
1.31	0.259
1.44	0.259
1.68	0.284
1.93	0.326
2.10	0.340
2.42	0.360
2.50	0.371

CURVE 8*
T ~ 298

λ	ρ
0.590	0.153
0.790	0.199
0.990	0.199
1.27	0.253
1.76	0.309
2.11	0.340
2.36	0.350
2.50	0.358

CURVE 9
T ~ 298

λ	ρ
0.600	0.048
0.870	0.064
1.02	0.068
1.30	0.092
1.87	0.125
2.23	0.143
2.50	0.148

CURVE 10
T ~ 298

λ	ρ
0.325	0.127
0.374	0.158
0.411	0.172
0.523	0.171
0.618	0.188
0.703	0.207

CURVE 11*
T ~ 298

λ	ρ
0.329	0.100
0.369	0.123
0.423	0.141
0.506	0.151
0.574	0.160
0.698	0.188

CURVE 12
T ~ 298

λ	ρ
0.325	0.042
0.543	0.053
0.696	0.070

CURVE 13
T ~ 298

λ	ρ
0.236	0.109
0.266	0.106
0.281	0.116
0.328	0.121
0.359	0.138

CURVE 14*
T ~ 298

λ	ρ
0.236	0.076
0.270	0.077
0.324	0.094
0.354	0.104

CURVE 15
T ~ 298

λ	ρ
0.237	0.052
0.274	0.044
0.320	0.041
0.361	0.045

CURVE 16
T ~ 298

λ	ρ
0.580	0.138
0.690	0.169
0.810	0.165
0.920	0.152
1.12	0.152
1.33	0.178
1.52	0.208
1.77	0.208
1.98	0.215
2.37	0.263
2.50	0.263

CURVE 17*
T ~ 298

λ	ρ
0.590	0.116
0.670	0.141
0.750	0.145
0.900	0.132
1.04	0.132
1.41	0.176
1.75	0.212
1.94	0.222
2.49	0.283

CURVE 18
T ~ 298

λ	ρ
0.330	0.046
0.414	0.058
0.467	0.070
0.526	0.095
0.593	0.140
0.663	0.178
0.699	0.190

CURVE 19*
T ~ 298

λ	ρ
0.330	0.037
0.441	0.048
0.509	0.065
0.605	0.118
0.667	0.154
0.699	0.163

CURVE 20
T ~ 298

λ	ρ
0.238	0.038
0.300	0.038
0.360	0.044

CURVE 21*
T ~ 298

λ	ρ
0.233	0.054
0.261	0.045
0.304	0.038
0.360	0.030

CURVE 22
T ~ 298

λ	ρ
0.526	0.0522
0.535	0.0581
0.570	0.0657
0.614	0.0698
0.737	0.0728
0.911	0.0813*
1.05	0.0898
1.20	0.102
1.33	0.117
1.41	0.123
1.53	0.129
1.70	0.138
1.88	0.149
2.00	0.157

CURVE 23
T ~ 298

λ	ρ
0.525	0.0795
0.581	0.0859
0.625	0.0918
0.671	0.100
0.698	0.102
0.733	0.102
0.788	0.100
0.862	0.103
0.970	0.112
1.10	0.126
1.19	0.136
1.33	0.146
1.69	0.180
1.88	0.196
2.00	0.204

CURVE 24*
T ~ 298

λ	ρ
0.520	0.0561
0.587	0.0602
0.652	0.0675
0.956	0.0770
1.03	0.0788
1.17	0.0904
1.31	0.0987
1.51	0.108
1.79	0.120
2.00	0.128

CURVE 25*
T ~ 298

λ	ρ
0.528	0.0647
0.603	0.0730
0.710	0.0800
0.748	0.0845
0.827	0.0903
0.948	0.0934
1.15	0.109
1.26	0.120
1.32	0.123
1.39	0.125
1.48	0.132

*Not shown on plot.

DATA TABLE NO. 645 (continued)

λ	ρ
CURVE 25(cont.)*	
T ~ 298	
1.53	0.137
1.58	0.139
1.64	0.141
1.85	0.154
2.00	0.162
CURVE 26	
T ~ 298	
0.400	0.0717
0.469	0.0783
0.568	0.0948
0.639	0.101
0.745	0.106
0.838	0.109
0.936	0.107
0.997	0.107
1.22	0.124
1.40	0.130
1.67	0.141
2.00	0.149
CURVE 27	
T ~ 298	
0.592	0.122
0.659	0.128
0.710	0.133
0.725	0.134
0.759	0.134
0.804	0.130
0.897	0.115
0.938	0.110
0.986	0.110
1.03	0.114
1.13	0.125
1.23	0.133
1.36	0.138
1.49	0.138
1.61	0.136
1.65	0.135
1.73	0.135
1.80	0.140
1.89	0.143
1.94	0.147
2.00	0.151
CURVE 28	
T ~ 298	
0.546	0.148
0.596	0.151
0.648	0.163
0.701	0.178
0.749	0.187
0.773	0.185
0.829	0.149
0.867	0.134
0.900	0.124
0.963	0.117
1.00	0.117
1.05	0.122
1.09	0.127
1.15	0.141
1.27	0.160
1.32	0.167
1.36	0.173
1.40	0.185
1.44	0.191
1.47	0.194
1.54	0.196
1.60	0.192
1.65	0.187
1.73	0.169
1.79	0.160
1.85	0.151
1.90	0.145
1.96	0.140
2.00	0.139
CURVE 29	
T ~ 298	
0.350	0.0748
0.431	0.0913
0.500	0.0966
0.581	0.1057
0.690	0.1207
0.731	0.1270
0.778	0.1216
0.828	0.0986
0.870	0.0876
0.940	0.0828
0.955	0.0828
1.01	0.0871
1.07	0.0933
CURVE 29 (cont.)	
1.11	0.105
1.30	0.119
1.39	0.129
1.49	0.130
1.74	0.113
1.83	0.108
1.94	0.104
2.00	0.104
2.10	0.106
2.22	0.110
2.31	0.116
2.40	0.125
2.50	0.136
CURVE 30*	
T ~ 298	
0.350	0.0655
0.407	0.0755
0.448	0.0779
0.500	0.0779
0.566	0.0813
0.717	0.0919
0.751	0.0943
0.801	0.0931
0.884	0.0801
1.00	0.0734
1.04	0.0746
1.15	0.0860
1.22	0.0892
1.30	0.0901
1.37	0.0922
1.46	0.0955
1.65	0.0990
1.85	0.0996
2.00	0.100
2.10	0.102
2.24	0.105
2.36	0.111
2.41	0.114
2.50	0.121
CURVE 31	
T ~ 298	
0.350	0.0538
0.656	0.0791
CURVE 31 (cont.)	
0.785	0.0841
0.904	0.0813
0.950	0.0813
0.992	0.0828
1.23	0.100
1.37	0.106
1.45	0.110
1.71	0.119
2.00	0.124
2.19	0.130
2.32	0.136
2.50	0.148
CURVE 32*	
T ~ 298	
0.350	0.0500
0.419	0.0592
0.568	0.0695
0.768	0.0784
0.839	0.0793
0.950	0.0793
1.04	0.0827
1.21	0.0929
1.51	0.104
1.83	0.112
1.99	0.115
2.24	0.120
2.31	0.122
2.50	0.128
CURVE 33	
T ~ 298	
0.350	0.0356
0.490	0.0532
0.761	0.0763
0.840	0.0812
0.950	0.0855
1.18	0.105
1.53	0.132
1.87	0.154
2.08	0.166
2.30	0.181
2.50	0.197

*Not shown on plot.

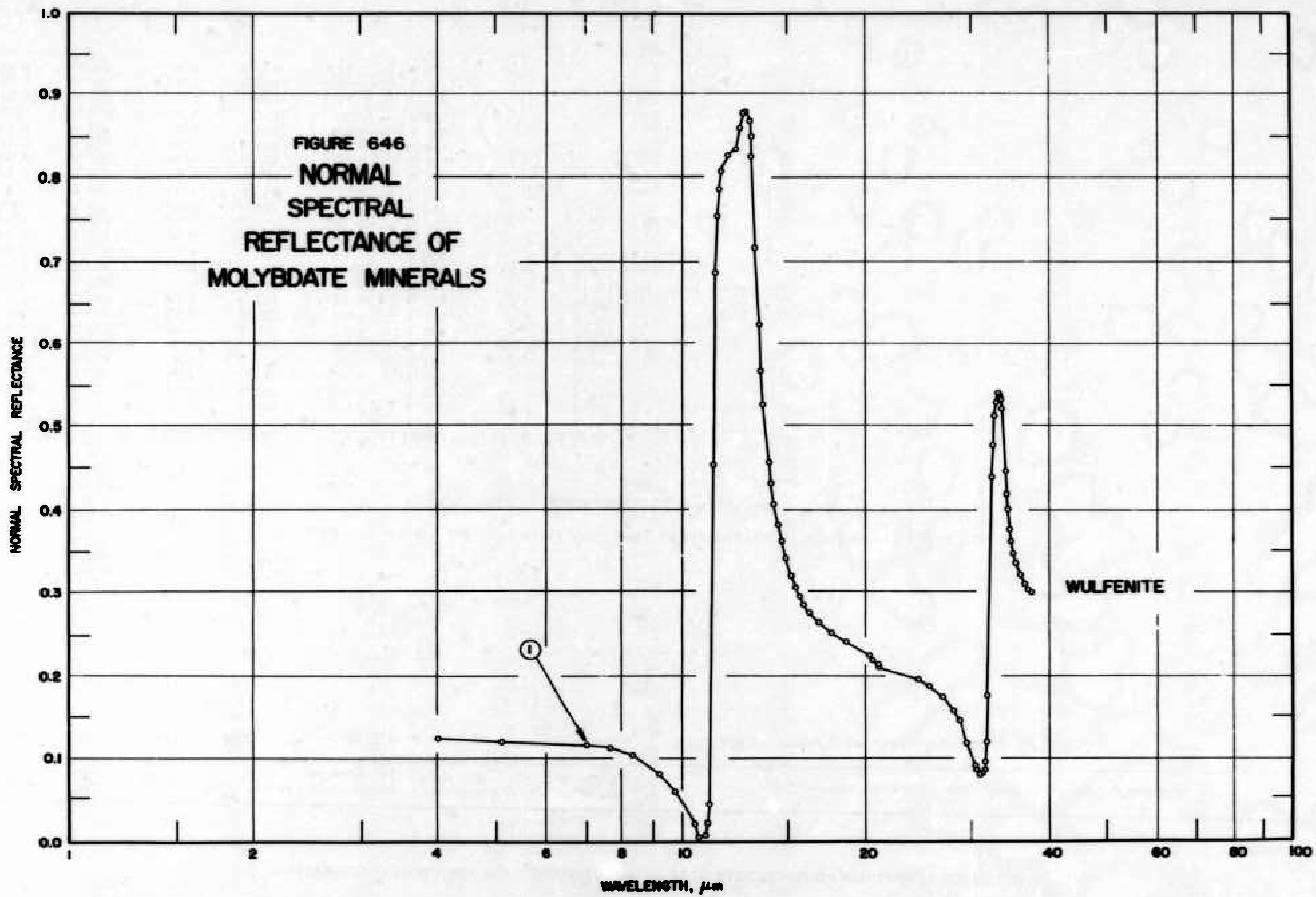


FIGURE 646
NORMAL
SPECTRAL
REFLECTANCE OF
MOLYBDATE MINERALS
WULFENITE
1
NORMAL SPECTRAL REFLECTANCE
WAVELENGTH, μm
1.0
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0.0
1
2
4
6
8
10
20
40
60
80
100

SPECIFICATION TABLE NO. 646 NORMAL SPECTRAL REFLECTANCE OF MOLYBDATE MINERALS

Curve No.	Ref. No.	Year	Temperature K	Wavelength Range, μm	Geometry θ θ' ω'	Reported Error, %	Composition (weight percent), Specifications, and Remarks
1	287	1967	~298	4.00-37.2	~0° ~0°		WULFENITE, $PbMoO_4$; polished mineral rock.

DATA TABLE NO. 646 NORMAL SPECTRAL REFLECTANCE OF MOLYBDATE MINERALS

[Wavelength, λ, μm; Reflectance, ρ; Temperature, T, K]

λ	ρ	λ	ρ	λ	ρ	λ	ρ
CURVE 1		CURVE 1 (cont.)		CURVE 1 (cont.)		CURVE 1 (cont.)	
T ~ 298		13.0	0.872	21.0	0.213	33.5	0.521
4.00	0.123	13.1	0.852	21.0	0.209	33.9	0.444
5.08	0.119	13.1	0.826	24.3	0.195	34.0	0.419
7.00	0.115	13.2	0.718	25.4	0.188	34.2	0.400
7.63	0.112	13.4	0.627	26.8	0.173	34.5	0.377
8.30	0.101	13.5	0.570	27.9	0.158	34.7	0.361
9.13	0.080	13.6	0.527	28.4	0.145	35.0	0.347
9.72	0.058	13.9	0.457	29.2	0.119	35.3	0.336
10.5	0.021	14.0	0.431	30.1	0.090	35.9	0.321
10.7	0.006	14.2	0.407	30.3	0.086	36.4	0.311
10.9	0.008	14.4	0.382	30.8	0.079	36.8	0.303
11.0	0.021	14.6	0.363	31.1	0.081	37.2	0.300
11.1	0.042	14.8	0.341	31.3	0.086		
11.3	0.453	15.1	0.321	31.4	0.094		
11.4	0.688	15.4	0.306	31.6	0.119		
11.5	0.756	15.6	0.295	31.7	0.176		
11.6	0.789	15.8	0.285	32.3	0.438		
11.7	0.809	16.2	0.276	32.4	0.479		
11.9	0.827	16.8	0.265	32.6	0.512		
12.3	0.835	17.6	0.253	32.8	0.529		
12.5	0.862	18.6	0.242	33.1	0.540		
12.7	0.881	20.2	0.225	33.2	0.539		
12.8	0.882	20.6	0.219	33.3	0.533		

SPECIFICATION TABLE NO. 647 NORMAL TOTAL EMITTANCE OF OXIDE MINERALS

Curve No.	Ref. No.	Year	Temperature Range, K	Geometry θ'	Reported Error, %	Composition (weight percent), Specifications and Remarks
1*	371	1965	1200	~0°		SPINEL, $MgAl_2O_4$; sintered.

DATA TABLE NO. 647 NORMAL TOTAL EMITTANCE OF OXIDE MINERALS

[Temperature, T, K; Emittance, ϵ]

T	ϵ
CURVE 1*	
1200	0.26

*No plot given

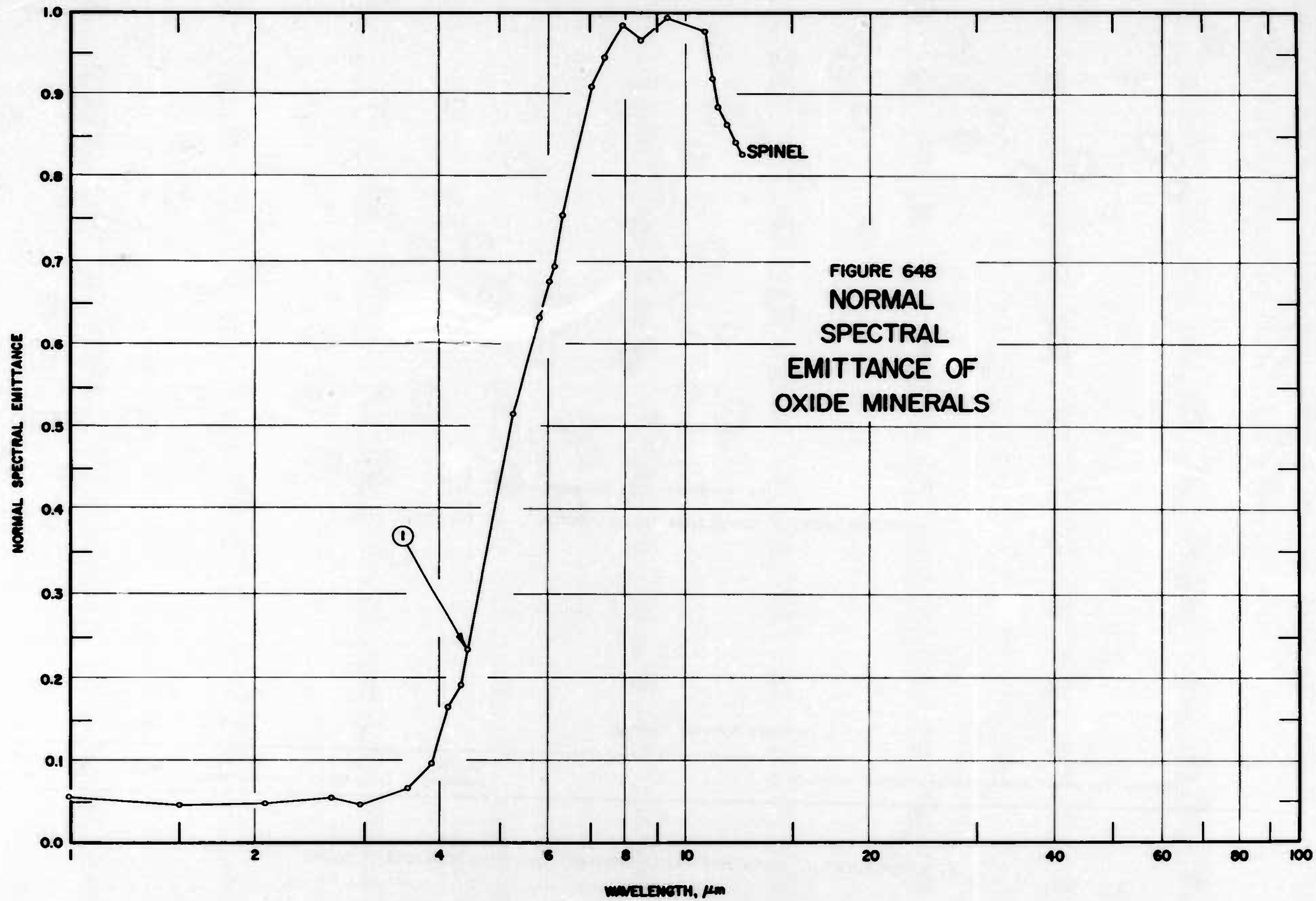


FIGURE 648
NORMAL
SPECTRAL
EMITTANCE OF
OXIDE MINERALS
SPINEL
1
NORMAL SPECTRAL EMITTANCE
WAVELENGTH, μm
1.0
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0.0
1
2
4
6
8
10
20
40
60
80
100

SPECIFICATION TABLE NO. 648 NORMAL SPECTRAL EMITTANCE OF OXIDE MINERALS

Curve No.	Ref. No.	Year	Temperature K	Wavelength Range, μm	Geometry θ'	Reported Error, %	Composition (weight percent), Specifications, and Remarks
1	371	1965	1200	1.00-14.9	~0°		SPINEL, $MgAl_2O_4$; sintered; data extracted from smooth curve.

DATA TABLE NO. 648 NORMAL SPECTRAL EMITTANCE OF OXIDE MINERALS

[Wavelength, λ, μm; Emittance, ϵ; Temperature, T, K]

λ	ϵ	λ	ϵ
CURVE 1		CURVE 1 (cont.)	
T = 1200			
		11.0	1.00*
1.00	0.055	11.6	0.976
1.51	0.045	12.2	0.920
2.08	0.047	12.8	0.887
2.67	0.053	13.4	0.864
2.98	0.046	14.2	0.841
3.55	0.067	14.9	0.829
3.89	0.097		
4.13	0.166		
4.35	0.191		
4.44	0.236		
5.28	0.517		
5.80	0.632		
6.03	0.676		
6.14	0.695		
6.33	0.753		
7.08	0.911		
7.42	0.946		
7.98	0.982		
8.47	0.965		
9.35	0.994		
9.88	1.00*		
10.3	1.01*		

*Not shown on plot

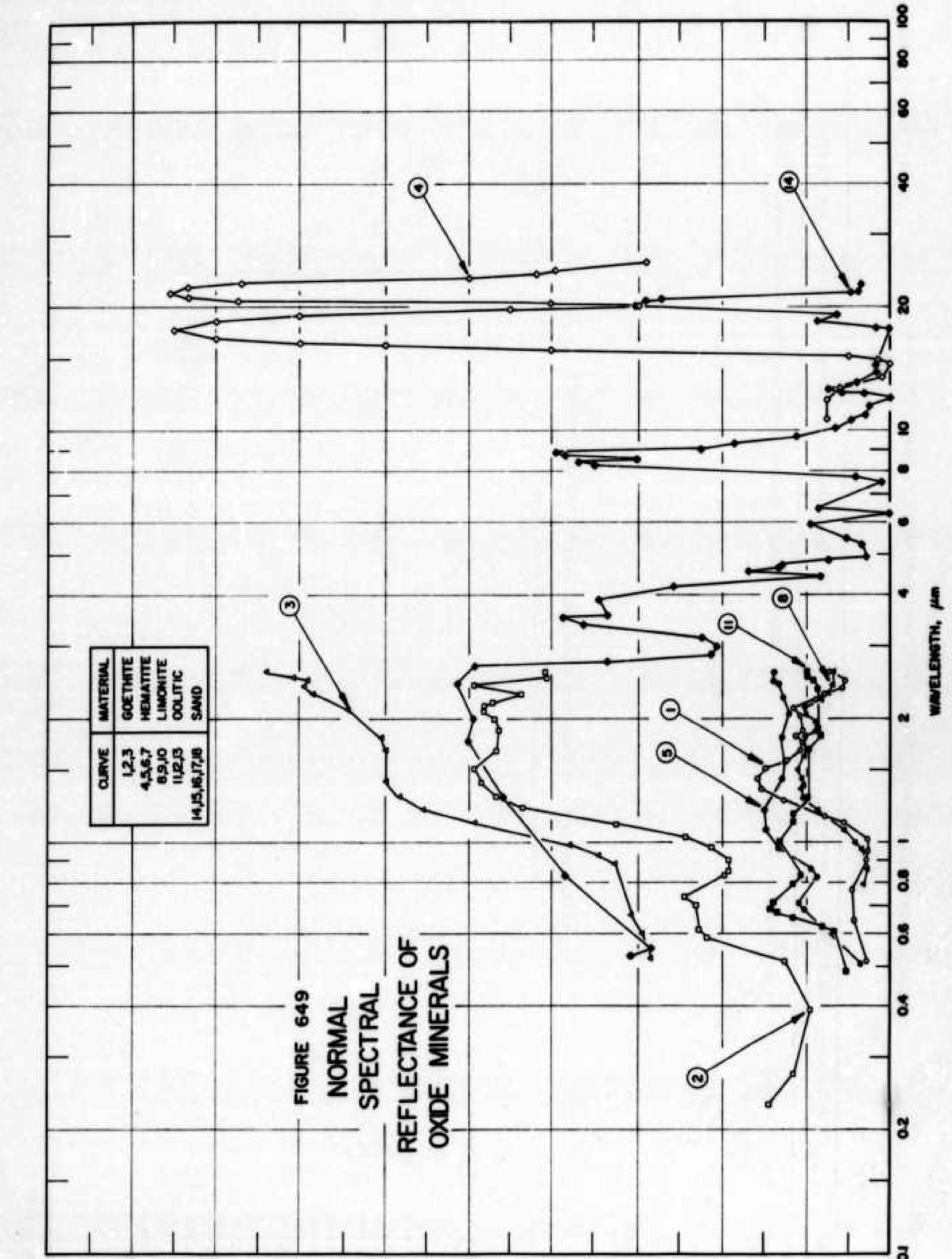


FIGURE 649
NORMAL
SPECTRAL
REFLECTANCE OF
OXIDE MINERALS

SPECIFICATION TABLE NO. 649 NORMAL SPECTRAL REFLECTANCE OF OXIDE MINERALS

Curve No.	Ref. No.	Year	Temperature K	Wavelength Range, μm	Geometry θ	θ'	ω'	Reported Error, %	Composition (weight percent), Specifications, and Remarks
1	425	1965	~298	0.517-2.60	~0°		2π		GOETHITE; solid sample from Biwabik, Minnesota; data extracted from smooth curve; [Authors' designation: Variety 3].
2	425	1965	~298	0.231-2.60	~0°		2π		GOETHITE; powder from Biwalhik, Minnesota; mean particle size 130 μm; data extracted from smooth curve; [Authors' designation: Variety 3].
3	425	1965	~298	0.511-2.60	~0°		2π		Similar to the above specimen and conditions except sample taken through thermogravimetric analysis to 1473 K with resultant 9.8% mass loss (H_2O); particle size 180 μm.
4	209	1960	298	10.7-25.9	~0°	~0°			HEMATITE, αFe_2O_3; crystal; polished section of unknown orientation cut; measured in air; data extracted from smooth curve.
5	425	1965	~298	0.508-2.60	~0°		2π		HEMATITE from Ironton, Minnesota; solid sample; data extracted from smooth curve; [Authors' designation: Variety 2].
6*	425	1965	~298	0.504-2.56	~0°		2π		HEMATITE powder from Ironton, Minnesota; mean particle size 10 μm; data extracted from smooth curve; [Authors' designation: Variety 2].
7*	425	1965	~298	0.511-2.60	~0°		2π		Similar to the above specimen and conditions except sample taken through thermogravimetric analysis to 1473 K with resultant <0.3% mass loss; mean particle size 21 μm.
8	425	1965	~298	0.787-2.60	~0°		2π		LIMONITE, $Fe_2O_3 \cdot nH_2O$; solid sample from Tuscaloosa, Alabama; data extracted from smooth curve; [Authors' designation: Variety 1].
9*	425	1965	~298	0.238-2.60	~0°		2π		LIMINONITE, $Fe_2O_3 \cdot nH_2O$; powder from Tuscaloosa, Alabama; mean particle size 127 μm; data extracted from smooth curve; [Authors' designation: Variety 1].
10*	425	1965	~298	0.516-2.60	~0°		2π		Similar to the above specimen and conditions except sample taken through thermogravimetric analysis to 1473 K with resultant 10% mass loss (H_2O); mean particle size 131 μm.
11	425	1965	~298	0.488-2.60	~0°		2π		OOLITIC HEMATITE; solid sample from Chilton, N.Y.; data extracted from smooth curve; [Authors' designation: Variety 5].
12*	425	1965	~298	0.490-2.54	~0°		2π		OOLITIC HEMATITE powder from Chilton, N.Y.; mean particle size 74 μm; data extracted from smooth curve; [Authors' designation: Variety 5].
13*	425	1965	~298	0.505-2.60	~0°		2π		Similar to the above specimen and conditions except sample taken through thermogravimetric analysis to 1473 K with resultant 19.0% mass loss (CO_3^{2-}); mean particle size 130 μm.
14	308	1966	~298	0.55-22.7	0°		2π		QUARTZ SAND from Atlantic City, N.J.; data extracted from smooth curve.
15*	308	1966	~298	0.55-22.7	0°		2π		QUARTZ SAND from Daytona Beach, Fla.; data extracted from smooth curve.
16*	308	1966	~298	0.54-22.7	0°		2π		SANDY SOIL from Mojave Desert; data extracted from smooth curve.
17*	308	1966	~298	0.54-22.8	0°		2π		WASHED SILICA SAND; particles 0.25 to 0.50 mm; data extracted from smooth curve.
18*	308	1966	~298	0.59-22.7	0°		2π		Similar to above specimen and conditions except particles <0.105 mm.

*Not shown on plot

DATA TABLE NO. 649 NORMAL SPECTRAL REFLECTANCE OF OXIDE MINERALS

[Wavelength, λ, μm; Reflectance, ρ; Temperature, T, K]

CURVE 1
T ~ 298

λ	ρ
0.517	0.028
0.645	0.043
0.767	0.046
0.910	0.030
0.956	0.027
1.02	0.027
1.11	0.055
1.16	0.079
1.27	0.129
1.35	0.152
1.43	0.157
1.52	0.149
1.59	0.124
1.68	0.109
1.76	0.106
1.83	0.115
1.89	0.105
2.03	0.108
2.11	0.117
2.23	0.088
2.30	0.079
2.39	0.057
2.49	0.054
2.60	0.072

CURVE 2
T ~ 298

λ	ρ
0.231	0.146
0.274	0.118
0.391	0.097
0.514	0.128
0.586	0.220
0.618	0.228
0.702	0.231
0.738	0.245
0.839	0.199
0.859	0.193
0.902	0.193
0.978	0.215
1.03	0.242
1.11	0.324
1.22	0.436
1.29	0.469

CURVE 2 (cont.)

λ	ρ
1.38	0.486
1.51	0.493
1.67	0.468
1.87	0.464
2.00	0.469
2.08	0.482
2.14	0.482
2.20	0.472
2.30	0.437
2.41	0.397
2.50	0.406
2.60	0.409

CURVE 3
T ~ 298

λ	ρ
0.511	0.286
0.600	0.295
0.686	0.308
0.885	0.327
0.936	0.345
0.989	0.378
1.12	0.493
1.21	0.555
1.29	0.585
1.42	0.600
1.67	0.600
1.80	0.605
2.10	0.645
2.30	0.686
2.40	0.697
2.47	0.692
2.53	0.709
2.60	0.742

CURVE 4
T = 298

λ	ρ
10.7	0.075
11.9	0.075
12.7	0.060
13.5	0.010
14.5	0.000
14.9	0.015
15.2	0.100

CURVE 4 (cont.)

λ	ρ
15.7	0.400
16.1	0.600
16.4	0.700
16.8	0.800
17.7	0.850
18.5	0.800
19.1	0.700
19.8	0.450
20.1	0.300
20.4	0.400
20.8	0.775
21.2	0.835
21.7	0.855
2.24	0.835
23.0	0.770
23.5	0.500
24.1	0.420
24.7	0.395
25.9	0.290

CURVE 5
T ~ 298

λ	ρ
0.508	0.036
0.690	0.103
0.719	0.111
0.825	0.088
0.862	0.095
0.969	0.134
1.07	0.149
1.20	0.150
1.43	0.131
1.58	0.126
1.81	0.130
2.06	0.123
2.26	0.129
2.43	0.134
2.47	0.140
2.60	0.140

CURVE 6*
T ~ 298

λ	ρ
0.504	0.125
0.598	0.163

CURVE 6 (cont.)*

λ	ρ
0.648	0.191
0.696	0.228
0.722	0.232
0.779	0.210
0.807	0.201
0.831	0.197
0.869	0.218
0.916	0.257
0.962	0.322
0.992	0.366
1.08	0.420
1.13	0.428
1.24	0.428
1.38	0.408
1.54	0.410
1.77	0.421
2.03	0.445
2.14	0.454
2.33	0.479
2.56	0.492

CURVE 7*
T ~ 298

λ	ρ
0.511	0.114
0.619	0.149
0.683	0.177
0.709	0.194
0.742	0.194
0.830	0.152
0.901	0.220
1.05	0.473
1.11	0.553
1.21	0.630
1.32	0.646
1.40	0.658
1.52	0.666
1.77	0.694
1.85	0.701
1.94	0.712
2.04	0.714
2.18	0.736
2.29	0.765
2.40	0.782
2.60	0.798

CURVE 8
T ~ 298

λ	ρ
0.787	0.032
0.860	0.028
0.930	0.034
0.997	0.041
1.07	0.057
1.20	0.086
1.28	0.107
1.34	0.108
1.37	0.105
1.42	0.107
1.50	0.112
1.63	0.102
1.81	0.101
1.87	0.089
1.96	0.089
2.04	0.101
2.12	0.103
2.23	0.082
2.31	0.075
2.42	0.069
2.60	0.069

CURVE 9*
T ~ 298

λ	ρ
0.238	0.125
0.273	0.097
0.303	0.097
0.316	0.090
0.428	0.090
0.466	0.106
0.507	0.111
0.545	0.147
0.584	0.189
0.629	0.208
0.667	0.221
0.724	0.257
0.753	0.257
0.846	0.220
0.886	0.211
0.927	0.212
0.976	0.231
1.03	0.266
1.08	0.319

CURVE 9 (cont.)

λ	ρ
1.17	0.414
1.24	0.470
1.30	0.499
1.42	0.494
1.53	0.500
1.79	0.486
1.86	0.453
1.91	0.445
2.09	0.473
2.17	0.462
2.27	0.424
2.33	0.390
2.44	0.367
2.56	0.356
2.60	0.349

CURVE 10*
T ~ 298

λ	ρ
0.516	0.077
0.661	0.183
0.700	0.199
0.748	0.204
0.799	0.189
0.843	0.192
0.878	0.211
0.922	0.246
1.00	0.358
1.10	0.511
1.18	0.618
1.26	0.682
1.50	0.744
1.59	0.757
1.74	0.762
1.81	0.740
1.88	0.676
1.97	0.715
2.06	0.745
2.14	0.750
2.30	0.724
2.48	0.648
2.60	0.601

CURVE 11
T ~ 298

λ	ρ
0.488	0.052
0.607	0.067
0.625	0.080
0.654	0.118
0.673	0.137
0.692	0.144
0.720	0.140
0.797	0.118
0.834	0.109
1.02	0.133
1.12	0.118
1.17	0.118
1.29	0.100
1.69	0.098
1.83	0.083
1.90	0.087
2.37	0.088
2.49	0.093
2.54	0.100
2.60	0.100

CURVE 12*
T ~ 298

λ	ρ
0.490	0.095
0.531	0.130
0.636	0.241
0.705	0.279
0.734	0.279
0.818	0.251
0.847	0.251
0.968	0.295
1.00	0.303
1.24	0.28'
1.38	0.267
1.87	0.268
2.15	0.280
2.39	0.303
2.49	0.305
2.54	0.300

CURVE 13*
T ~ 298

λ	ρ
0.505	0.269
0.642	0.307
0.720	0.333
0.863	0.350
0.911	0.363
1.07	0.449
1.24	0.519
1.35	0.554
1.54	0.581
1.97	0.681
2.12	0.706
2.26	0.755
2.49	0.813
2.60	0.828

CURVE 14
T ~ 298

λ	ρ
0.53	0.309
0.55	0.286
0.83	0.383
1.29	0.459
1.77	0.502
2.00	0.496
2.14	0.511
2.43	0.515
2.69	0.493
2.74	0.334
2.86	0.216
3.00	0.208
3.14	0.225
3.40	0.362
3.51	0.386
3.67	0.334
3.90	0.344
4.19	0.259
4.43	0.082
4.57	0.167
4.64	0.135
4.75	0.130
4.85	0.073
4.99	0.039
5.14	0.034
5.46	0.052

*Not shown on plot

DATA TABLE NO. 649 (continued)

CURVE 14 (cont.)
T ~ 298

λ	ρ
5.95	0.095
6.28	0.000
6.50	0.085
7.55	0.010
7.78	0.043
8.25	0.349
8.42	0.368
8.59	0.302
8.79	0.383
8.91	0.394
9.02	0.225
9.39	0.185
9.68	0.107
10.1	0.064
10.6	0.047
10.9	0.030
11.5	0.024
12.0	0.000
12.3	0.031
12.4	0.058
12.6	0.073
13.1	0.040
13.8	0.016
14.4	0.017
14.9	0.000
17.7	0.000
17.9	0.017
18.5	0.087
19.1	0.063
20.1	0.301
20.7	0.291
20.9	0.272
21.7	0.048
21.9	0.039
22.7	0.035

CURVE 15*
T ~ 298

λ	ρ
0.55	0.384
1.04	0.555
1.85	0.694
2.06	0.676
2.35	0.709
2.63	0.693
2.82	0.695

CURVE 15 (cont.)*

λ	ρ
2.90	0.320
2.98	0.312
3.24	0.40[illegible]
3.36	0.490
3.59	0.505
3.68	0.466
4.01	0.407
4.23	0.298
4.43	0.175
4.55	0.293
4.65	0.237
4.73	0.251
4.90	0.096
4.98	0.045
5.01	0.040
5.61	0.092
5.68	0.167
5.91	0.186
6.10	0.168
6.31	0.034
6.46	0.139
6.61	0.146
7.21	0.037
7.49	0.030
7.89	0.058
8.05	0.227
8.23	0.339
8.49	0.419
8.60	0.318
8.65	0.334
8.71	0.326
8.86	0.426
9.03	0.458
9.14	0.461
9.34	0.433
9.42	0.254
9.58	0.162
9.88	0.098
10.3	0.054
10.7	0.047
11.2	0.051
11.7	0.044
12.2	0.000
12.5	0.079
12.7	0.094
13.1	0.051
13.3	0.042

CURVE 15 (cont.)*

λ	ρ
14.2	0.042
15.0	0.029
16.7	0.029
17.4	0.012
17.9	0.041
18.5	0.124
18.8	0.115
19.9	0.294
20.1	0.335
20.4	0.357
21.4	0.299
22.2	0.260
22.7	0.240

CURVE 16*
T ~ 298

λ	ρ
0.54	0.207
0.89	0.365
1.04	0.374
1.18	0.410
1.39	0.448
1.46	0.412
1.57	0.466
1.66	0.475
1.78	0.500
1.94	0.478
2.00	0.408
2.08	0.460
2.19	0.396
2.28	0.409
2.64	0.285
2.79	0.044
2.91	0.041
3.09	0.062
3.33	0.136
3.51	0.188
3.85	0.220
4.36	0.138
4.64	0.068
5.12	0.031
5.63	0.046
6.02	0.053
6.18	0.041
6.27	0.023
6.55	0.044

CURVE 16 (cont.)*

λ	ρ
6.97	0.023
7.44	0.013
7.66	0.012
7.92	0.032
8.28	0.121
8.66	0.127
8.91	0.118
9.22	0.131
9.61	0.119
10.5	0.045
11.2	0.045
11.9	0.025
12.2	0.023
12.7	0.032
13.1	0.023
14.0	0.025
15.0	0.013
15.8	0.022
16.6	0.041
16.8	0.044
17.7	0.047
18.5	0.062
19.1	0.045
20.2	0.077
20.8	0.094
21.8	0.082
22.7	0.064

CURVE 17*
T ~ 298

λ	ρ
0.54	0.475
0.73	0.578
0.96	0.613
1.47	0.680
2.07	0.718
2.37	0.736
2.54	0.720
2.60	0.702
2.69	0.323
2.92	0.283
3.11	0.325
3.21	0.469
3.36	0.529
3.48	0.535
3.56	0.455
3.68	0.373

CURVE 17 (cont.)*

λ	ρ
3.92	0.395
4.13	0.335
4.24	0.253
4.45	0.119
4.61	0.217
4.63	0.148
4.83	0.144
4.90	0.052
5.12	0.047
5.48	0.067
5.95	0.119
6.13	0.129
6.29	0.029
6.46	0.076
6.71	0.100
6.89	0.088
7.53	0.005
7.78	0.057
7.90	0.085
8.05	0.272
8.16	0.335
8.28	0.385
8.35	0.389
8.44	0.375
8.58	0.281
8.79	0.418
8.81	0.445
9.13	0.478
9.44	0.187
9.62	0.116
10.0	0.067
10.7	0.050
11.4	0.036
12.1	0.015
12.3	0.043
12.4	0.072
12.6	0.077
12.7	0.093
13.2	0.038
14.2	0.023
14.8	0.032
15.5	0.045
16.4	0.036
17.3	0.022
17.7	0.026
18.0	0.063
18.4	0.117

CURVE 17 (cont.)*

λ	ρ
19.1	0.093
19.8	0.308
19.9	0.350
20.4	0.367
20.9	0.350
21.4	0.292
22.1	0.243
22.8	0.208

CURVE 18*
T ~ 298

λ	ρ
0.59	0.477
0.80	0.551
0.97	0.604
1.12	0.627
2.16	0.715
2.84	0.724
2.60	0.712
2.74	0.351
2.83	0.379
2.89	0.463
3.01	0.434
3.31	0.547
3.47	0.594
3.62	0.560
3.77	0.469
3.96	0.496
4.47	0.266
4.58	0.396
4.63	0.304
4.72	0.330
4.93	0.057
5.10	0.048
5.32	0.075
5.55	0.126
5.73	0.185
5.94	0.209
6.09	0.177
6.25	0.027
6.42	0.130
6.47	0.184
6.66	0.190
6.80	0.179
6.91	0.124
7.12	0.097
7.34	0.018

CURVE 18 (cont.)*

λ	ρ
7.55	0.006
7.77	0.056
7.98	0.207
8.25	0.380
8.42	0.369
8.53	0.286
8.82	0.423
8.97	0.418
9.20	0.425
9.41	0.180
9.59	0.114
10.0	0.066
10.9	0.046
11.7	0.027
12.1	0.014
12.4	0.072
12.5	0.066
12.7	0.097
13.0	0.045
13.7	0.026
14.5	0.021
15.0	0.037
15.7	0.041
16.5	0.029
17.0	0.020
17.5	0.020
17.9	0.041
18.5	0.113
19.1	0.088
19.9	0.303
20.1	0.321
20.3	0.323
20.7	0.311
21.0	0.268
21.6	0.185
22.7	0.106

* Not shown on plot

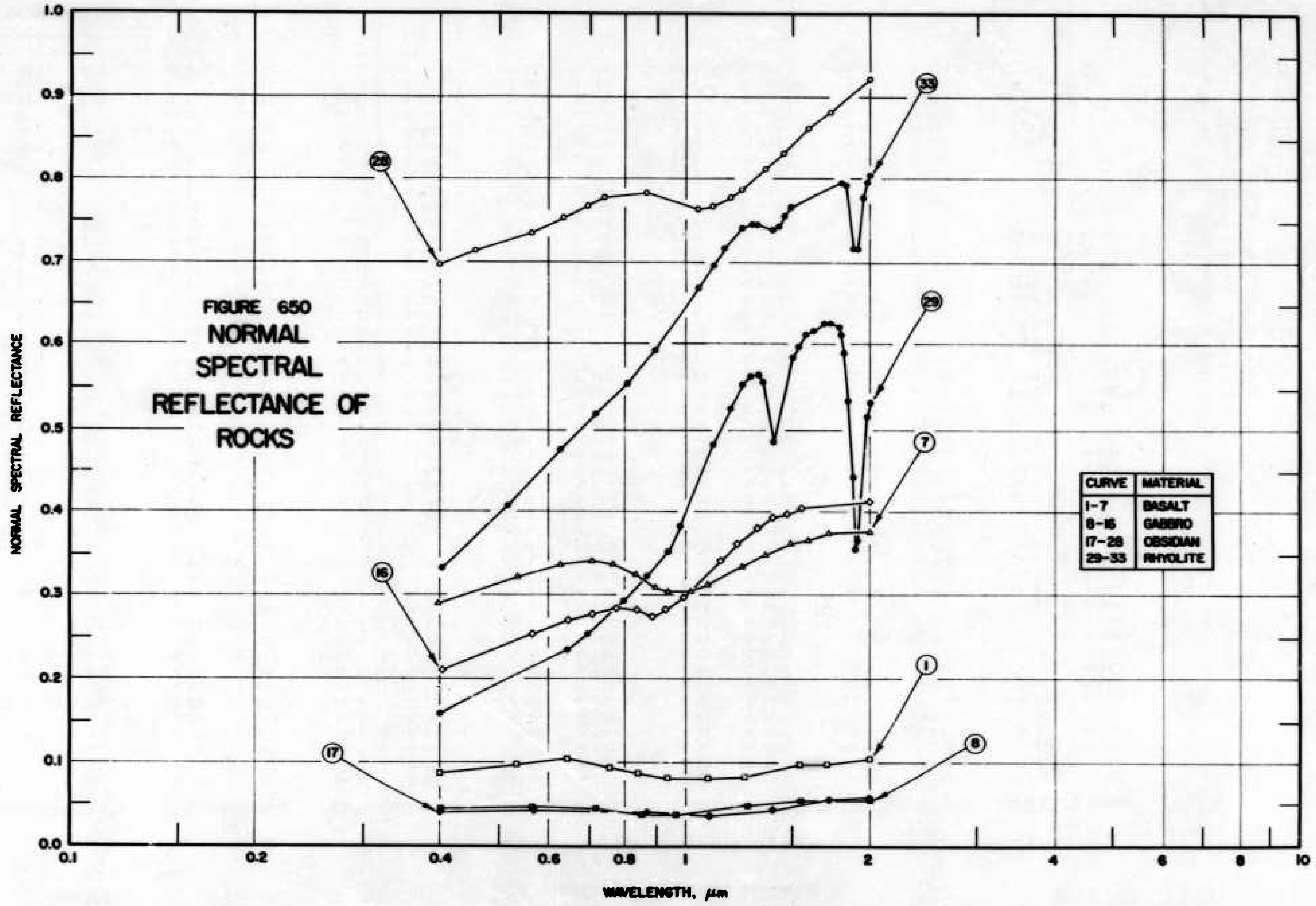


FIGURE 650
NORMAL
SPECTRAL
REFLECTANCE OF
ROCKS

SPECIFICATION TABLE NO. 350 NORMAL SPECTRAL REFLECTANCE OF ROCKS

Curve No.	Ref. No.	Year	Temperature K	Wavelength Range, μm	Geometry θ	Geometry θ'	Geometry ω'	Reported Error, %	Composition (weight percent), Specifications, and Remarks
1	427	1967	~298	0.400-2.00	~0°		2π		BASALT from Little Lake; crystalline basic rock; pulverized, sieved, and washed to yield particles >354 μm; data extracted from smooth curve; [Authors' designation: Samples 1-5].
2*	427	1967	~298	4.00-2.00	~0°		2π		Similar to the above specimens and conditions except particle size 354-250 μm; [Authors' designation: Sample 6].
3*	427	1967	~298	4.00-2.00	~0°		2π		Similar to the above specimen and conditions except particle size 250-149 μm; [Authors' designation: Sample 7].
4*	427	1967	~298	4.00-2.00	~0°		2π		Similar to the above specimen and conditions except particle size 149-74 μm; [Authors' designation: Samples 8-9].
5*	427	1967	~298	4.00-2.00	~0°		2π		Similar to the above specimen and conditions except particle size 74-53 μm; [Authors' designation: Sample 10].
6*	427	1967	~298	4.00-2.00	~0°		2π		Similar to the above specimen and conditions except particle size 53-37 μm; [Authors' designation: Sample 11].
7	427	1967	~298	0.399-2.00	~0°		2π		Similar to the above specimen and conditions except particle size <40 μm; [Authors' designation: Sample 12].
8	427	1967	~298	0.400-2.00	~0°		2π		GABBRO from San Marcos; crystalline basic rock; pulverized, sieved, and washed to yield particles >50 mm; data extracted from smooth curve; [Authors' designation: Samples 1-4].
9*	427	1967	~298	0.402-2.00	~0°		2π		Similar to the above specimen and conditions except particle size 500-354 μm; [Authors' designation: Sample 5].
10*	427	1967	~298	0.402-2.00	~0°		2π		Similar to the above specimen and conditions except particle size 354-250 μm; [Authors' designation: Sample 6].
11*	427	1967	~298	0.402-2.00	~0°		2π		Similar to the above specimen and conditions except particle size 250-149 μm; [Authors' designation: Sample 7].
12*	427	1967	~298	0.402-2.00	~0°		2π		Similar to the above specimen and conditions except particle size 149-105 μm; [Authors' designation: Sample 8].
13*	427	1967	~298	0.402-2.00	~0°		2π		Similar to the above specimen and conditions except particle size 105-74 μm; [Authors' designation: Sample 9].
14*	427	1967	~298	0.400-2.00	~0°		2π		Similar to the above specimen and conditions except particle size 74-53 μm; [Authors' designation: Sample 10].
15*	427	1967	~298	0.402-2.00	~0°		2π		Similar to the above specimen and conditions except particle size 53-37 μm; [Authors' designation: Sample 11].
16	427	1967	~298	0.402-2.00	~0°		2π		Similar to the above specimen and conditions except particle size <40 μm; [Authors' designation: Sample 12].
17	427	1967	~298	0.400-2.00	~0°		2π		OBSIDIAN from Mono Craters; pulverized, sieved, and washed to yield particles of >2.83 mm; data extracted from smooth curve; [Authors' designation: Sample 1].

* Not shown on plot

SPECIFICATION TABLE NO. 650 (continued)

Curve No.	Ref. No.	Year	Temperature K	Wavelength Range, µm	Geometry θ	θ'	ω'	Reported Error, %	Composition (weight percent), Specifications, and Remarks
18*	427	1967	~298	0.400-2.00	~0°		2π		Similar to the above specimen and conditions except particle size 283-168 mm; [Authors' designation: Sample 2].
19*	427	1967	~298	0.401-2.00	~0°		2π		Similar to the above specimen and conditions except particle size 168-100 mm; [Authors' designation: Sample 3].
20*	427	1967	~298	0.400-2.00	~0°		2π		Similar to the above specimen and conditions except particle size 100-50 mm; [Authors' designation: Sample 4].
21*	427	1967	~298	0.400-2.00	~0°		2π		Similar to the above specimen and conditions except particle size 500-354 µm; [Authors' designation: Sample 5].
22*	427	1967	~298	0.400-2.00	~0°		2π		Similar to the above specimen and conditions except particle size 354-250 µm; [Authors' designation: Sample 6].
23*	427	1967	~298	0.400-2.00	~0°		2π		Similar to the above specimen and conditions except particle size 250-149 µm; [Authors' designation: Sample 7].
24*	427	1967	~298	0.401-2.00	~0°		2π		Similar to the above specimen and conditions except particle size 149-105 µm; [Authors' designation: Sample 8].
25*	427	1967	~298	0.400-2.00	~0°		2π		Similar to the above specimen and conditions except particle size 105-74 µm; [Authors' designation: Sample 9].
26*	427	1967	~298	0.401-2.00	~0°		2π		Similar to the above specimen and conditions except particle size 74-53 µm; [Authors' designation: Sample 10].
27*	427	1967	~298	0.400-2.00	~0°		2π		Similar to the above specimen and conditions except particle size 53-37 µm; [Authors' designation: Sample 11].
28	427	1967	~298	0.400-2.00	~0°		2π		Similar to the above specimen and conditions except particle size <40 µm; [Authors' designation: Sample 12].
29	427	1967	~298	0.400-2.00	~0°		2π		RHYOLITE TUFF from Yucca Mountain; crystalline acidic rock; pulverized, sieved, and washed to yield particles >283 mm; data extracted from smooth curve; [Authors' designation: Sample 1].
30*	427	1967	~298	0.400-2.00	~0°		2π		Similar to the above specimen and conditions except particle size 168-100 mm; [Authors' designation: Sample 3].
31*	427	1967	~298	0.400-2.00	~0°		2π		Similar to the above specimen and conditions except particle size 354-250 µm; [Authors' designation: Sample 6].
32*	427	1967	~298	0.400-2.00	~0°		2π		Similar to the above specimen and conditions except particle size 105-74 µm; [Authors' designation: Sample 9].
33	427	1967	~298	0.401-2.00	~0°		2π		Similar to the above specimen and conditions except particle size <40 µm; [Authors' designation: Sample 12].

* Not shown on plot

DATA TABLE NO. 650 NORMAL SPECTRAL REFLECTANCE OF ROCKS

[Wavelength, λ, μm; Reflectance, ρ; Temperature, T, K]

CURVE 1
T ~ 298

λ	ρ
0.400	0.089
0.533	0.098
0.643	0.101
0.752	0.094
0.837	0.089
0.939	0.082
1.09	0.081
1.25	0.083
1.54	0.097
1.70	0.099
2.00	0.103

CURVE 2*
T ~ 298

λ	ρ
0.400	0.105
0.467	0.111
0.538	0.116
0.620	0.119
0.679	0.119
0.762	0.113
0.835	0.106
0.490	0.096
1.03	0.094
1.15	0.100
1.23	0.104
1.33	0.110
1.50	0.113
2.00	0.115

CURVE 3*
T ~ 298

λ	ρ
0.400	0.105
0.538	0.121
0.611	0.124
0.686	0.124
0.845	0.111
0.941	0.103
1.01	0.101
1.07	0.101
1.15	0.106
1.22	0.112
1.32	0.120

CURVE 3 (cont.)*

λ	ρ
1.49	0.126
1.85	0.131
2.00	0.133

CURVE 4*
T ~ 298

λ	ρ
0.400	0.116
0.529	0.135
0.594	0.140
0.652	0.144
0.720	0.144
0.884	0.126
0.962	0.120
1.05	0.120
1.20	0.134
1.34	0.144
1.44	0.149
1.60	0.153
2.00	0.161

CURVE 5*
T ~ 298

λ	ρ
0.400	0.125
0.521	0.144
0.580	0.152
0.648	0.160
0.716	0.160
0.844	0.145
0.936	0.134
1.00	0.132
1.05	0.133
1.13	0.140
1.19	0.145
1.25	0.152
1.33	0.160
1.43	0.166
1.60	0.171
2.00	0.172

CURVE 6*
T ~ 298

λ	ρ
0.400	0.149
0.540	0.178
0.611	0.190
0.679	0.194
0.718	0.194
0.772	0.189
0.848	0.173
0.912	0.164
0.970	0.161
1.02	0.161
1.11	0.166
1.24	0.184
1.40	0.203
1.55	0.216
1.67	0.224
1.80	0.229
2.00	0.229

CURVE 7
T ~ 298

λ	ρ
0.399	0.290
0.534	0.321
0.627	0.337
0.701	0.342
0.767	0.339
0.830	0.326
0.897	0.310
0.938	0.303
1.02	0.303
1.08	0.311
1.24	0.335
1.35	0.350
1.47	0.362
1.57	0.368
1.71	0.374
2.00	0.378

CURVE 8
T ~ 298

λ	ρ
0.400	0.043
0.562	0.047
0.717	0.045

CURVE 8 (cont.)

λ	ρ
0.849	0.039
0.962	0.039
1.26	0.048
1.54	0.052
2.00	0.052

CURVE 9*
T ~ 298

λ	ρ
0.402	0.050
0.476	0.056
0.603	0.062
0.731	0.062
0.926	0.059
1.00	0.062
1.12	0.071
1.28	0.084
1.43	0.091
1.85	0.091
2.00	0.089

CURVE 10*
T ~ 298

λ	ρ
0.402	0.061
0.550	0.071
0.662	0.075
0.763	0.076
0.857	0.069
0.919	0.070
0.995	0.075
1.11	0.087
1.23	0.099
1.36	0.106
1.49	0.110
1.64	0.110
2.00	0.106

CURVE 11*
T ~ 298

λ	ρ
0.402	0.078
0.524	0.093
0.621	0.105
0.718	0.111

CURVE 11 (cont.)*

λ	ρ
0.798	0.108
0.872	0.105
0.942	0.108
1.03	0.119
1.18	0.142
1.32	0.158
1.43	0.165
1.56	0.169
2.00	0.167

CURVE 12*
T ~ 298

λ	ρ
0.402	0.091
0.588	0.119
0.653	0.128
0.720	0.131
0.763	0.131
0.875	0.120
0.925	0.120
0.989	0.128
1.05	0.139
1.13	0.154
1.21	0.166
1.31	0.178
1.39	0.187
1.52	0.194
1.66	0.195
2.00	0.190

CURVE 13*
T ~ 298

λ	ρ
0.402	0.106
0.581	0.138
0.657	0.147
0.713	0.151
0.761	0.151
0.844	0.143
0.896	0.141
0.945	0.146
0.996	0.154
1.23	0.208
1.33	0.228
1.44	0.242

CURVE 13 (cont.)*

λ	ρ
1.52	0.246
2.00	0.248

CURVE 14*
T ~ 298

λ	ρ
0.400	0.121
0.565	0.154
0.658	0.169
0.726	0.174
0.790	0.174
0.854	0.168
0.902	0.165
0.934	0.169
0.980	0.178
1.17	0.231
1.29	0.262
1.37	0.280
1.43	0.290
1.49	0.295
1.59	0.297
2.00	0.306

CURVE 15*
T ~ 298

λ	ρ
0.402	0.129
0.567	0.163
0.644	0.175
0.702	0.182
0.784	0.184
0.872	0.175
0.902	0.176
0.955	0.185
1.06	0.223
1.19	0.262
1.28	0.287
1.39	0.311
1.44	0.320
1.49	0.326
1.70	0.333
2.00	0.340

CURVE 16
T ~ 298

λ	ρ
0.402	0.210
0.564	0.253
0.643	0.270
0.705	0.279
0.774	0.285
0.832	0.281
0.886	0.276
0.922	0.281
0.997	0.299
1.14	0.341
1.22	0.362
1.31	0.380
1.39	0.393
1.46	0.398
1.55	0.405
2.00	0.411

CURVE 17
T ~ 298

λ	ρ
0.400	0.040
0.568	0.044
0.869	0.040
1.09	0.036
1.38	0.042
1.71	0.054
2.00	0.058

CURVE 18*
T ~ 298

λ	ρ
0.400	0.067
0.524	0.077
0.643	0.080
0.749	0.076
1.04	0.059
1.20	0.060
1.35	0.066
1.71	0.086
2.00	0.100

CURVE 19*
T ~ 298

λ	ρ
0.401	0.079
0.513	0.085
0.641	0.091
0.753	0.090
0.878	0.083
0.962	0.075
1.05	0.072
1.14	0.072
1.27	0.078
1.65	0.099
2.00	0.119

CURVE 20*
T ~ 298

λ	ρ
0.400	0.140
0.451	0.140
0.515	0.149
0.586	0.161
0.657	0.169
0.714	0.172
0.780	0.170
0.868	0.162
0.948	0.150
1.01	0.136
1.10	0.131
1.17	0.134
1.25	0.143
1.45	0.168
1.74	0.206
1.82	0.213
1.90	0.218
2.00	0.218

CURVE 21*
T ~ 298

λ	ρ
0.400	0.173
0.474	0.181
0.582	0.197
0.664	0.209
0.705	0.211
0.770	0.204
0.931	0.184

*Not shown on plot

DATA TABLE NO. 650 (continued)

CURVE 21 (cont.)*
T ~ 298

λ	ρ
0.999	0.176
1.05	0.173
1.16	0.173
1.24	0.181
1.34	0.199
1.53	0.237
1.62	0.250
1.71	0.263
1.83	0.273
2.00	0.284

CURVE 22*
T ~ 298

λ	ρ
0.400	0.195
0.474	0.207
0.586	0.223
0.693	0.241
0.734	0.241
0.789	0.232
0.881	0.216
0.955	0.203
1.02	0.194
1.09	0.191
1.16	0.198
1.22	0.205
1.27	0.213
1.45	0.250
1.61	0.275
1.78	0.299
2.00	0.321

CURVE 23*
T ~ 298

λ	ρ
0.400	0.257
0.453	0.264
0.510	0.274
0.636	0.303
0.669	0.309
0.761	0.310
0.833	0.305
0.892	0.296
1.01	0.268
1.06	0.263

CURVE 23 (cont.)*

λ	ρ
1.11	0.261
1.16	0.265
1.21	0.272
1.26	0.287
1.36	0.311
1.45	0.334
1.59	0.361
1.74	0.384
2.00	0.419

CURVE 24*
T ~ 298

λ	ρ
0.401	0.360
0.462	0.372
0.505	0.378
0.572	0.392
0.626	0.405
0.669	0.420
0.708	0.424
0.753	0.417
0.888	0.388
0.962	0.375
1.03	0.368
1.13	0.366
1.19	0.374
1.23	0.382
1.41	0.441
1.52	0.472
1.65	0.505
1.74	0.527
1.85	0.544
1.92	0.554
2.00	0.562

CURVE 25*
T ~ 298

λ	ρ
0.400	0.406
0.452	0.423
0.534	0.437
0.599	0.455
0.635	0.467
0.672	0.477
0.701	0.481
0.753	0.481

CURVE 25 (cont.)*

λ	ρ
0.815	0.472
0.940	0.443
1.01	0.429
1.08	0.423
1.12	0.426
1.18	0.438
1.26	0.457
1.44	0.511
1.57	0.550
1.69	0.579
1.80	0.603
1.88	0.616
1.94	0.623
2.00	0.628

CURVE 26*
T ~ 298

λ	ρ
0.401	0.475
0.633	0.537
0.693	0.549
0.743	0.552
0.825	0.542
0.911	0.522
0.972	0.513
1.03	0.506
1.11	0.506
1.18	0.518
1.23	0.532
1.30	0.549
1.50	0.613
1.59	0.638
1.67	0.660
1.78	0.683
1.89	0.699
2.00	0.714

CURVE 27*
T ~ 298

λ	ρ
0.400	0.492
0.672	0.559
0.722	0.572
0.765	0.575
0.830	0.570
0.971	0.547

CURVE 27 (cont.)*

λ	ρ
1.06	0.539
1.11	0.541
1.16	0.547
1.22	0.558
1.30	0.575
1.50	0.634
1.56	0.654
1.65	0.674
1.74	0.692
1.82	0.706
1.90	0.718
2.00	0.729

CURVE 28
T ~ 298

λ	ρ
0.400	0.699
0.459	0.715
0.566	0.736
0.634	0.754
0.695	0.769
0.740	0.778
0.866	0.781
1.05	0.764
1.11	0.769
1.19	0.778
1.24	0.787
1.35	0.811
1.45	0.833
1.59	0.861
1.73	0.882
2.00	0.921

CURVE 29
T ~ 298

λ	ρ
0.400	0.160
0.641	0.235
0.697	0.253
0.795	0.293
0.869	0.324
0.931	0.352
0.972	0.382
1.11	0.484
1.18	0.526
1.24	0.553

CURVE 29 (cont.)

λ	ρ
1.28	0.564
1.32	0.566
1.34	0.559
1.39	0.488
1.50	0.586
1.52	0.599
1.56	0.611
1.61	0.619
1.68	0.627
1.72	0.627
1.77	0.621
1.79	0.611
1.81	0.591
1.84	0.536
1.87	0.441
1.89	0.357
1.90	0.366
1.98	0.518
2.00	0.534

CURVE 30*
T ~ 298

λ	ρ
0.400	0.162
0.674	0.263
0.767	0.300
0.847	0.336
0.904	0.366
0.960	0.399
1.00	0.433
1.11	0.518
1.14	0.542
1.19	0.566
1.26	0.591
1.30	0.599
1.32	0.599
1.35	0.590
1.40	0.514
1.45	0.575
1.48	0.605
1.52	0.633
1.56	0.645
1.60	0.655
1.66	0.660
1.74	0.660
1.77	0.656

CURVE 30 (cont.)*

λ	ρ
1.79	0.649
1.81	0.626
1.83	0.593
1.86	0.508
1.89	0.373
1.98	0.552
2.00	0.585

CURVE 31*
T ~ 298

λ	ρ
0.400	0.182
0.526	0.245
0.742	0.334
0.835	0.378
0.909	0.422
0.943	0.445
1.11	0.576
1.16	0.609
1.23	0.637
1.29	0.656
1.32	0.656
1.34	0.647
1.40	0.575
1.42	0.589
1.46	0.639
1.50	0.671
1.53	0.687
1.58	0.702
1.63	0.713
1.71	0.716
1.75	0.713
1.78	0.705
1.81	0.689
1.84	0.643
1.85	0.578
1.90	0.428
1.93	0.504
1.97	0.603
2.00	0.638

CURVE 32*
T ~ 298

λ	ρ
0.400	0.256
0.485	0.323

CURVE 32 (cont.)*

λ	ρ
0.569	0.374
0.647	0.413
0.773	0.465
0.868	0.514
0.940	0.559
1.05	0.634
1.12	0.686
1.17	0.720
1.23	0.731
1.32	0.745
1.35	0.738
1.40	0.665
1.42	0.669
1.44	0.705
1.47	0.738
1.51	0.765
1.55	0.779
1.60	0.790
1.67	0.798
1.74	0.798
1.78	0.786
1.81	0.770
1.83	0.749
1.85	0.692
1.88	0.577
1.89	0.512
1.90	0.512
1.96	0.671
1.97	0.700
2.00	0.729

CURVE 33
T ~ 298

λ	ρ
0.401	0.331
0.517	0.408
0.629	0.477
0.712	0.520
0.803	0.556
0.897	0.594
1.05	0.670
1.11	0.697
1.17	0.718
1.24	0.741
1.28	0.748
1.31	0.748

CURVE 33 (cont.)

λ	ρ
1.39	0.740
1.42	0.746
1.45	0.758
1.49	0.768
1.80	0.795
1.83	0.792
1.84	0.788*
1.89	0.717
1.90	0.717
1.95	0.779
1.97	0.798
2.00	0.805

* Not shown on plot

SPECIFICATION TABLE NO. 651 NORMAL TOTAL EMITTANCE OF SILICATE MINERALS

Curve No.	Ref. No.	Year	Temperature Range, K	Geometry θ'	Reported Error, %	Composition (weight percent), Specifications and Remarks
1*	371	1965	1200	~0°		MULLITE, $Al_6Si_2O_{13}$; sintered.
2*	371	1965	1200	~0°		ZIRCON, $Zr(SiO_4)$; sintered.

DATA TABLE NO. 651 NORMAL TOTAL EMITTANCE OF SILICATE MINERALS

[Temperature, T, K; Emittance, ϵ]

T	ϵ
CURVE 1*	
1200	0.40
CURVE 2*	
1200	0.39

*No plot given

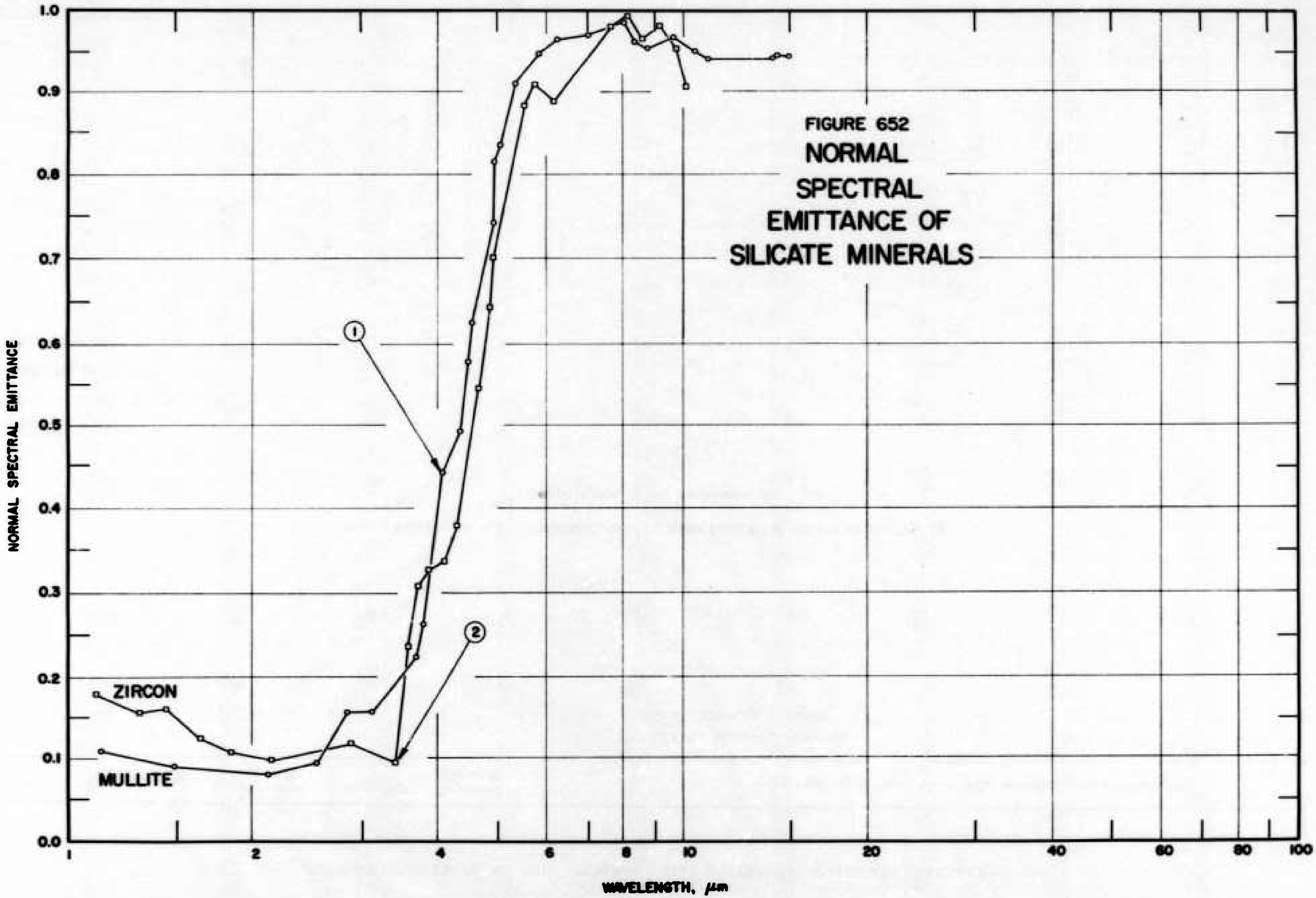


FIGURE 652
NORMAL SPECTRAL EMITTANCE OF SILICATE MINERALS

SPECIFICATION TABLE NO. 652 NORMAL SPECTRAL EMITTANCE OF SILICATE MINERALS

Curve No.	Ref. No.	Year	Temperature K	Wavelength Range, μm	Geometry θ'	Reported Error, %	Composition (weight percent), Specifications, and Remarks
1	371	1965	1200	1.13-14.9	~0°		MULLITE, $Al_6Si_2O_{13}$; sintered; data extracted from smooth curve.
2	371	1965	1200	1.11-15.0	~0°		ZIRCON, $ZrSiO_4$; sintered; data extracted from smooth curve.

DATA TABLE NO. 652 NORMAL SPECTRAL EMITTANCE OF SILICATE MINERALS

[Wavelength, λ, μm; Emittance, ∈; Temperature, T, K]

λ	∈	λ	∈	λ	∈
CURVE 1 T = 1200		CURVE 1 (cont.)		CURVE 2 (cont.)	
		10.5	0.951	4.91	0.702
1.13	0.110	11.0	0.942	5.51	0.886
1.48	0.090	14.0	0.942	5.73	0.910
2.10	0.080	14.3	0.947	6.17	0.890
2.62	0.095	14.9	0.946	7.67	0.982
2.82	0.158			8.15	0.995
3.10	0.158	CURVE 2		8.60	0.968
3.66	0.225	T = 1200		9.18	0.982
3.76	0.263			9.74	0.955
4.05	0.441	1.11	0.180	10.1	0.909
4.33	0.493	1.30	0.157	10.8	0.830
4.46	0.579	1.44	0.161	11.1	0.824
4.53	0.628	1.63	0.125	11.6	0.838
4.92	0.741	1.83	0.104	12.4	0.901
4.94	0.766	2.13	0.099	12.8	0.921
5.06	0.835	2.87	0.119	13.9	0.944
5.35	0.911	3.38	0.195	15.0	0.957
5.85	0.949	3.54	0.238		
6.24	0.966	3.69	0.309		
7.01	0.971	3.84	0.327		
8.04	0.986	4.08	0.337		
8.37	0.962	4.27	0.380		
8.77	0.954	4.63	0.547		
9.68	0.968	4.85	0.647		

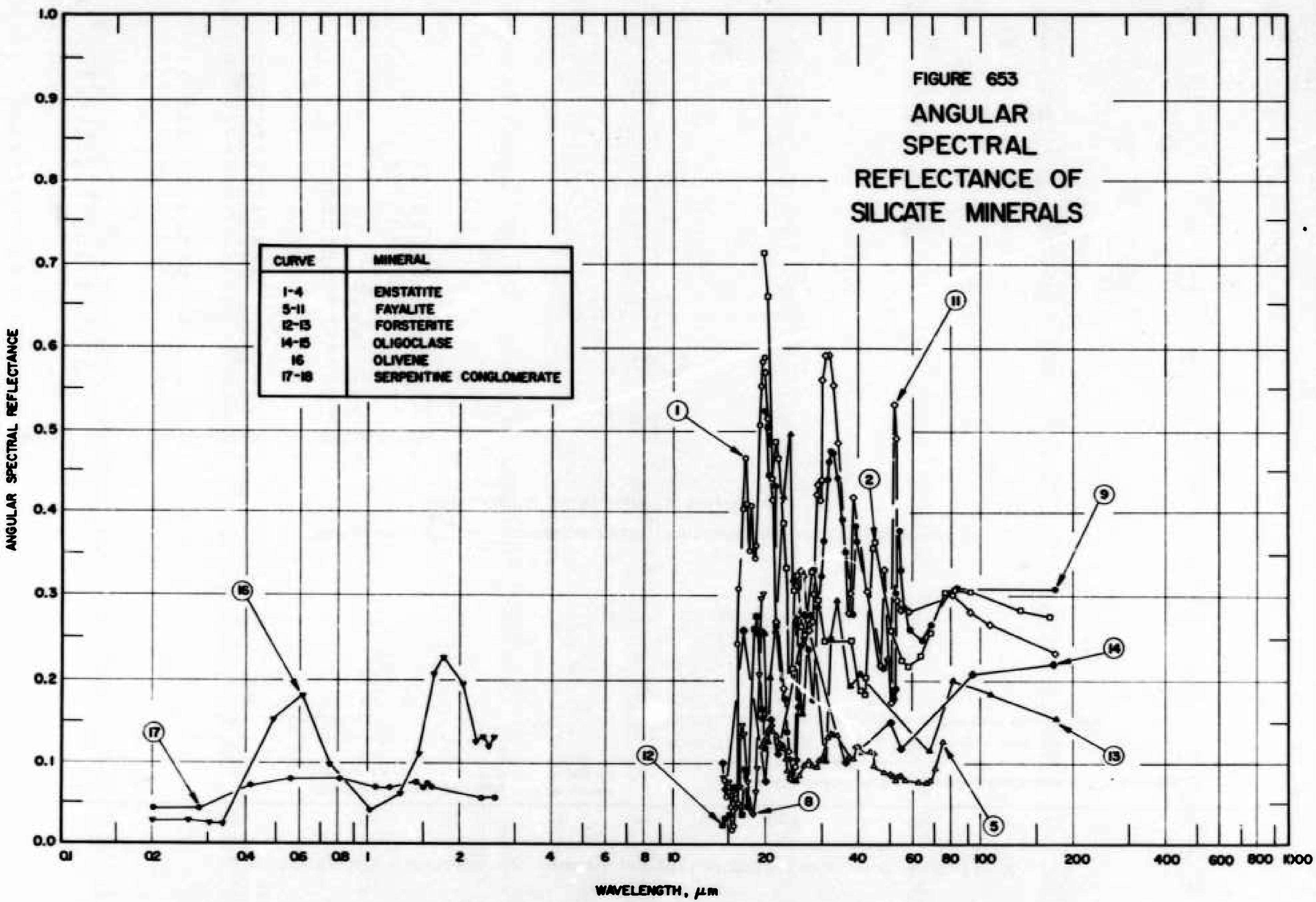


FIGURE 653
ANGULAR SPECTRAL REFLECTANCE OF SILICATE MINERALS
CURVE | MINERAL
1-4 | ENSTATITE
5-11 | FAYALITE
12-13 | FORSTERITE
14-15 | OLIGOCLASE
16 | OLIVENE
17-18 | SERPENTINE CONGLOMERATE
ANGULAR SPECTRAL REFLECTANCE
WAVELENGTH, μm
1
2
5
8
9
11
12
13
14
15
16
17
0.0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
1.0
0.1
0.2
0.4
0.6
0.8
1
2
4
6
8
10
20
40
60
80
100
200
400
600
800
1000

SPECIFICATION TABLE NO. 653 ANGULAR SPECTRAL REFLECTANCE OF SILICATE MINERALS

Curve No.	Ref. No.	Year	Temperature K	Wavelength Range, μm	Geometry θ	θ'	ω'	Reported Error, %	Composition (weight percent), Specifications, and Remarks
1	229	1966	~298	14.8-19.9	45°	45°			ENSTATITE; single chain; data extracted from smooth curve.
2	229	1966	~298	19.9-169	45°	45°			Above specimen and conditions.
3*	229	1966	77	14.8-19.7	45°	45°			Above specimen and conditions.
4*	229	1966	77	19.9-175	45°	45°			Above specimen and conditions.
5	229	1966	~298	19.4-75.1	45°	45°			FAYALITE powder; data extracted from smooth curve.
6*	229	1966	~298	20.0-28.4	45°	45°			FAYALITE powder; data extracted from smooth curve.
7*	229	1966	~298	20.0-178	45°	45°			Above specimen and conditions.
8	229	1966	~298	14.7-19.8	45°	45°			FAYALITE; isolated SiO_4 tetrahedra; data extracted from smooth curve.
9	229	1966	~298	19.9-175	45°	45°			Above specimen and conditions.
10*	229	1966	77	14.8-19.8	45°	45°			Above specimen and conditions.
11	229	1966	77	19.9-175	45°	45°			Above specimen and conditions.
12	229	1966	~298	14.6-19.8	45°	45°			FORSTERITE; pure; isolated SiO_4 tetrahedra; data extracted from smooth curve.
13	229	1966	~298	19.8-178	45°	45°			Above specimen and conditions.
14	229	1966	~298	14.5-172	45°	45°			OLIGOCLASE framework; data extracted from smooth curve.
15*	229	1966	77	14.5-200	45°	45°			Above specimen and conditions.
16	425	1965	~298	0.200-2.60	~0°		2π		OLIVENE, $(Mg, Fe)_2SiO_4$; solid sample; data extracted from smooth curve.
17	425	1965	~298	0.200-2.60	~0°		2π		SERPENTINE CONGLOMERATE, $3MgO \cdot 2SiO_2 \cdot 2H_2O$; data extracted from smooth curve.
18*	425	1965	~298	0.200-2.60	~0°		2π		Above specimen and conditions except different different face measured.

*Not shown on plot

DATA TABLE NO. 653 ANGULAR SPECTRAL REFLECTANCE OF SILICATE MINERALS

[Wavelength, λ, μm; Reflectance, ρ; Temperature, T, K]

CURVE 1
T ~ 298

λ	ρ
14.8	0.079
15.0	0.057
15.2	0.063
15.4	0.044
15.6	0.016
15.8	0.021
16.0	0.055
16.1	0.161
16.2	0.244
16.4	0.310
17.1	0.403
17.4	0.466
17.6	0.410
17.9	0.355
18.2	0.408
18.6	0.347
18.7	0.360
19.1	0.509
19.4	0.556
19.6	0.585
19.9	0.589

CURVE 2
T ~ 298

λ	ρ
19.9	0.714
20.0	0.662
21.1	0.442
21.5	0.487
22.0	0.467
22.9	0.388
23.3	0.335
23.9	0.208
24.4	0.216
24.7	0.307
25.3	0.326
26.3	0.264
26.9	0.254
27.5	0.272
28.1	0.330
28.5	0.331
29.7	0.295
31.1	0.248
35.8	0.147

CURVE 2 (cont.)

λ	ρ
36.3	0.161
36.7	0.213
38.0	0.249
41.1	0.189
42.0	0.187
42.5	0.204
44.8	0.358
45.8	0.364
51.0	0.260
55.2	0.226
58.4	0.219
64.1	0.230
68.9	0.258
76.3	0.304
82.6	0.308
93.4	0.305
136	0.281
169	0.275

CURVE 3*
T = 77

λ	ρ
14.8	0.080
15.0	0.059
15.1	0.065
15.3	0.087
15.4	0.051
15.7	0.022
15.8	0.041
16.0	0.085
16.1	0.258
16.2	0.326
16.4	0.357
16.7	0.382
17.0	0.427
17.2	0.541
17.4	0.555
17.5	0.468
17.7	0.366
18.1	0.478
18.3	0.410
18.4	0.350
18.7	0.440
19.1	0.653
19.4	0.685
19.7	0.674

CURVE 4*
T = 77

λ	ρ
19.9	0.714
20.0	0.662
20.8	0.493
21.0	0.398
21.3	0.499
21.5	0.527
22.0	0.469
22.9	0.387
23.2	0.334
23.4	0.287
23.8	0.201
24.1	0.183
24.4	0.214
24.5	0.298
24.6	0.348
24.9	0.348
25.5	0.300
26.2	0.256
26.8	0.241
27.3	0.261
27.8	0.370
28.2	0.379
28.8	0.358
30.1	0.278
35.7	0.143
36.3	0.217
37.3	0.266
38.3	0.236
39.6	0.200
41.4	0.147
42.3	0.191
44.0	0.373
44.6	0.395
46.2	0.354
49.5	0.256
52.3	0.222
58.1	0.203
65.7	0.204
74.0	0.258
80.6	0.275
114	0.261
175	0.250

CURVE 5
T ~ 298

λ	ρ
19.4	0.1199
19.8	0.1285
20.5	0.1406
21.0	0.1491
21.2	0.1397
21.5	0.1406
21.7	0.1348
22.2	0.1245
22.7	0.1229
22.9	0.1186
23.1	0.1044
23.3	0.0904
24.1	0.0850
24.7	0.0791
25.1	0.0780
25.7	0.0847
26.8	0.0992
27.5	0.1028
27.7	0.1030*
28.5	0.0979
29.1	0.0966
29.8	0.1015
30.3	0.1071
31.9	0.1315
32.6	0.1375
33.3	0.1379
34.1	0.1344
37.1	0.1096
38.3	0.1054
39.3	0.1205
40.0	0.1221
41.4	0.1125
42.5	0.1110
44.0	0.1139
44.8	0.1126
45.8	0.0982
48.7	0.0895
51.0	0.0825
53.1	0.0789
54.3	0.0830
55.5	0.0841
58.8	0.0789
63.2	0.0753
66.6	0.0748

CURVE 5 (cont.)

λ	ρ
68.9	0.0773
70.9	0.0924
75.1	0.1273

CURVE 6*
T ~ 298

λ	ρ
20.0	0.117
20.4	0.124
20.9	0.134
22.6	0.115
23.8	0.079
24.8	0.072
25.9	0.084
27.3	0.098
28.4	0.083

CURVE 7*
T ~ 298

λ	ρ
20.0	0.047
20.6	0.050
24.2	0.030
27.9	0.029
31.3	0.043
51.5	0.031
60.6	0.032
90.9	0.046
100	0.043
129	0.043
178	0.032

CURVE 8
T ~ 298

λ	ρ
14.7	0.080
15.3	0.075
15.7	0.062
16.0	0.044
16.2	0.049*
16.4	0.070
16.7	0.132
16.9	0.147
17.1	0.134
17.6	0.076

CURVE 8 (cont.)

λ	ρ
18.0	0.039
18.3	0.037
18.6	0.063
18.7	0.095
19.0	0.208
19.2	0.260
19.4	0.297
19.8	0.302

CURVE 9
T ~ 298

λ	ρ
19.9	0.524
20.2	0.504
20.6	0.456
21.5	0.318
21.8	0.265
23.1	0.180
23.5	0.139
23.9	0.105
24.4	0.086
24.9	0.080*
25.3	0.104
25.7	0.169
26.2	0.242
26.8	0.251
27.6	0.237
28.5	0.178
29.4	0.286
30.2	0.324
31.0	0.366
32.0	0.441
32.4	0.462
32.8	0.474
33.5	0.473
34.6	0.443
35.8	0.392
36.7	0.353
38.4	0.278
39.3	0.384
39.9	0.366
48.3	0.215
50.0	0.223
52.3	0.180
53.1	0.192

CURVE 9 (cont.)

λ	ρ
53.1	0.303
54.3	0.380
55.2	0.332
56.4	0.284
58.4	0.262
64.9	0.249
69.9	0.266
78.1	0.302
84.0	0.309
175	0.309

CURVE 10*
T = 77

λ	ρ
14.8	0.070
15.3	0.078
15.6	0.075
16.1	0.056
16.3	0.092
16.6	0.203
16.8	0.215
17.0	0.195
17.4	0.159
17.8	0.131
18.1	0.099
18.4	0.115
18.6	0.172
18.8	0.279
19.0	0.436
19.3	0.527
19.4	0.544
19.8	0.549

CURVE 11
T = 77

λ	ρ
19.9	0.572
20.5	0.517
21.1	0.416
21.8	0.267
22.9	0.192
23.7	0.115
24.5	0.080
25.0	0.096
25.5	0.279

CURVE 11 (cont.)

λ	ρ
26.1	0.331
26.6	0.325
27.7	0.260
28.3	0.271
28.6	0.302
29.2	0.422
29.4	0.434
30.1	0.414
30.3	0.441
30.9	0.563
31.4	0.592
32.0	0.593
33.5	0.557
34.6	0.494
36.1	0.393*
37.5	0.279
37.8	0.303
38.6	0.419
43.2	0.305
47.8	0.219
48.5	0.335
50.0	0.226
51.0	0.174
52.3	0.531
53.4	0.491
53.7	0.295
55.2	0.282
58.4	0.281
80.6	0.301
93.4	0.280
107	0.267
175	0.232

CURVE 12
T ~ 298

λ	ρ
14.6	0.021
14.9	0.030
15.3	0.034
15.7	0.064*
15.9	0.067
16.2	0.060*
16.8	0.034
17.3	0.091
17.6	0.045

*Not shown on plot

DATA TABLE NO. 653 (continued)

λ	ρ	λ	ρ	λ	ρ	λ	ρ	λ	ρ
CURVE 12 (cont.)		CURVE 13 (cont.)		CURVE 14 (cont.)		CURVE 15 (cont.)*		CURVE 17	
T ~ 298								T ~ 298	
		34.2	0.293	25.8	0.234*	35.9	0.107		
18.4	0.262	34.9	0.265*	27.1	0.273	39.2	0.102	0.200	0.042
18.6	0.277	35.9	0.227*	28.5	0.202*	44.2	0.089	0.280	0.042
18.9	0.257	36.6	0.222*	29.9	0.161*	47.8	0.128	0.416	0.070
19.4	0.166	37.8	0.195	31.7	0.137*	50.7	0.132	0.558	0.079
19.5	0.156	38.7	0.203*	34.2	0.112*	55.8	0.110	0.814	0.079
19.6	0.160*	40.1	0.210	36.6	0.101	66.6	0.125	1.06	0.068
19.8	0.119	46.7	0.159*	44.8	0.112*	70.4	0.147	1.17	0.068
		54.6	0.133*	47.6	0.143*	80.0	0.190	1.43	0.075
CURVE 13		68.4	0.114	50.2	0.151	93.4	0.199	1.51	0.068
T ~ 298		70.4	0.131*	55.5	0.118	200	0.201	1.57	0.072
		74.0	0.178*	65.7	0.134*			1.83	0.068
19.8	0.257	76.9	0.195*	74.0	0.185*	CURVE 16		2.35	0.055
20.2	0.139*	81.3	0.201	79.3	0.202*	T ~ 298		2.60	0.055
20.4	0.126	108	0.186	94.3	0.210				
20.6	0.160*	178	0.155	172	0.220	0.200	0.027	CURVE 18*	
20.8	0.204					0.260	0.027	T ~ 298	
21.0	0.212*	CURVE 14		CURVE 15*		0.305	0.023		
21.3	0.207*	T ~ 298		T = 77		0.334	0.032	0.200	0.053
21.7	0.260					0.493	0.152	0.252	0.061
22.2	0.341*	14.5	0.100	14.5	0.053	0.526	0.171*	0.297	0.089
22.4	0.345*	14.9	0.067	15.0	0.064	0.553	0.177*	0.385	0.154
22.7	0.419	15.1	0.070*	15.3	0.102	0.618	0.182	0.503	0.200
22.8	0.475*	15.5	0.107*	15.7	0.184	0.673	0.173*	0.766	0.194
23.0	0.497	16.3	0.203*	16.2	0.250	0.713	0.140*	0.969	0.165
23.2	0.466*	16.5	0.213*	16.4	0.242	0.748	0.099	1.06	0.156
23.9	0.434*	16.8	0.251*	16.8	0.295	0.804	0.062*	1.21	0.161
24.0	0.392*	17.0	0.260	17.1	0.285	1.02	0.040	1.42	0.145
24.1	0.339*	17.1	0.252*	17.6	0.205	1.29	0.060	1.66	0.145
24.3	0.325*	17.6	0.205*	18.2	0.101	1.42	0.091*	1.87	0.132
24.6	0.369	18.3	0.124*	18.8	0.072	1.47	0.110	2.16	0.123
24.9	0.350*	18.7	0.093*	20.2	0.067	1.61	0.182*	2.29	0.101
25.7	0.219*	19.1	0.077*	20.5	0.090	1.66	0.208	2.60	0.102
26.1	0.223*	20.0	0.077	20.9	0.146	1.70	0.219*		
26.5	0.161	20.4	0.093*	21.8	0.087	1.77	0.227		
26.9	0.242*	20.7	0.128*	22.3	0.096	1.83	0.213*		
27.3	0.270*	21.0	0.153	23.2	0.162	1.88	0.191*		
27.8	0.275	21.3	0.149*	23.7	0.151	1.91	0.183*		
28.4	0.247*	21.6	0.119*	24.1	0.177	2.00	0.196*		
30.1	0.143*	22.1	0.111	24.7	0.242	2.06	0.197		
31.4	0.102	22.5	0.120*	25.3	0.266	2.13	0.187*		
31.9	0.128*	23.2	0.167*	26.0	0.246	2.17	0.184*		
32.2	0.216*	23.8	0.165*	27.1	0.280	2.24	0.144*		
32.6	0.251	24.3	0.186*	28.4	0.220	2.28	0.125		
33.3	0.267*	24.8	0.223*	29.5	0.180	2.40	0.132		
33.7	0.366*	25.3	0.239*	32.4	0.141	2.48	0.120		
						2.60	0.131		

* Not shown on plot

SPECIFICATION TABLE NO. 654 NORMAL SOLAR ABSORPTANCE OF SILICATE MINERALS

Curve No.	Ref. No.	Year	Temperature Range, K	Geometry θ	Reported Error, %	Composition (weight percent), Specifications and Remarks
1*	277	1966	~298	~0°		ENSTATITE, $Mg_2(Si_2O_6)$ powder; "as received"; compacted at 50-60 psi; computed from spectral reflectance data; [Authors' designation: Specimen 7198].
2*	277	1966	~298	~0°		Above specimen and conditions except exposed to ESH uv radiation at solar factor 5 suns.
3*	277	1966	~298	~0°		FORSTERITE, Mg_2SiO_4 powder; "as received"; compacted at 50-60 psi; computed from spectral reflectance data; [Authors' designation: Specimen 7199].
4*	277	1966	~298	~0°		Above specimen and conditions except exposed to 2000 ESH uv radiation at solar factor 5 suns.

DATA TABLE NO. 654 NORMAL SOLAR ABSORPTANCE OF SILICATE MINERALS

[Temperature, T, K; Absorptance, α]

T	α
CURVE 1*	
298	0.193
CURVE 2*	
298	0.328
CURVE 3*	
298	0.227
CURVE 4*	
298	0.242

*No plot given

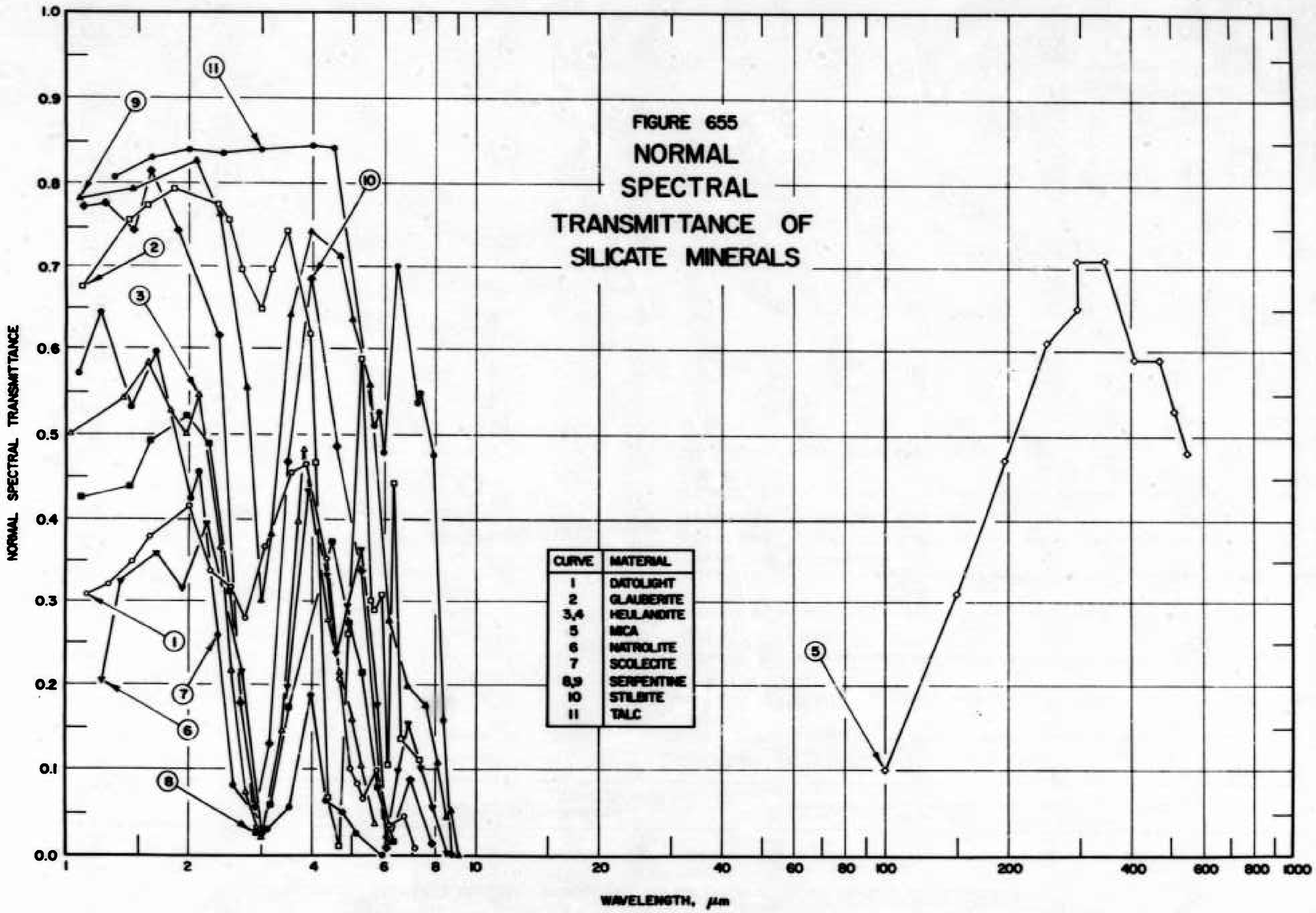


FIGURE 655
NORMAL
SPECTRAL
TRANSMITTANCE OF
SILICATE MINERALS
CURVE MATERIAL
1 DATOLIGHT
2 GLAUBERITE
3,4 HEULANDITE
5 MICA
6 NATROLITE
7 SCOLECITE
8,9 SERPENTINE
10 STILBITE
11 TALC
NORMAL SPECTRAL TRANSMITTANCE
WAVELENGTH, μm
0.0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
1.0
1
2
4
6
8
10
20
40
60
80
100
200
400
600
800
1000
1
2
3
5
6
7
8
9
10
11

SPECIFICATION TABLE NO. 655 NORMAL SPECTRAL TRANSMITTANCE OF SILICATE MINERALS

Curve No.	Ref. No.	Year	Temperature K	Wavelength Range, μm	Geometry θ θ' ω'	Reported Error, %	Composition (weight percent), Specifications, and Remarks
1	294	1906	~298	1.13-7.12	~0° ~0°		DATOLIGHT, $Ca(BOH)SiO_4$; ground to 0.23 mm thick.
2	294	1906	~298	1.10-7.27	~0° ~0°		GLAUBERITE, $Na_2SO_3CaSO_4$; monoclinic; cleavage section parallel to c-axis; 1.26 mm thick.
3	294	1906	~298	1.03-5.68	~0° ~0°		HEULANDITE, $H_4CaAl_2Si_6O_{18}$ + $3H_2O$; section ground parallel to b-axis; semitransparent; ~0.21 mm thick.
4*	294	1906	~298	1.03-5.92	~0° ~0°		Similar to above specimen and conditions; transparency and homogeneity different.
5	292	1950	~298	100-548	~0° ~0°		MICA (0.063 mm thick).
6	294	1906	~298	1.23-8.49	~0° ~0°		NATROLITE, $Na_2Al_2Si_3O_2O_{10}$ + $2H_2O$, subtranslucent; orthorhombic section ground parallel to m; 0.11 mm thick.
7	294	1906	~298	1.08-5.95	~0° ~0°		SCOLECITE, $CaAl_2Si_3O_{10}$ + $3H_2O$, perfectly transparent; monoclinic section split parallel to m; 0.565 mm thick.
8	294	1906	~298	1.09-6.29	~0° ~0°		SERPENTINE, $H_4(MgFe)_3SiO_9$; 0.225 mm thick; massive, subtranslucent.
9	294	1906	~298	1.08-9.14	~0° ~0°		SERPENTINE, $H_4(MgFe)_3SiO_9$; 0.08 mm thick.
10	294	1906	~298	1.11-7.87	~0° ~0°		STILBITE, $CaAl_2Si_6O_{16}$ + $6H_2O$, transparent; cut perpendicular to optic axis; 0.11 mm thick.
11	294	1906	~298	1.31-8.89	~0° ~0°		TALC, $H_2Mg_3Si_4O_{12}$; 0.06 mm thick.

*Not shown on plot

DATA TABLE NO. 655 NORMAL SPECTRAL TRANSMITTANCE OF SILICATE MINERALS

[Wavelength, λ, μm; Transmittance, τ; Temperature, T, K]

CURVE 1
T ~ 298

λ	τ
1.13	0.308
1.27	0.320
1.45	0.347
1.60	0.379
1.84	0.416*
2.00	0.415
2.15	0.347*
2.25	0.338
2.40	0.332*
2.53	0.318
2.64	0.299*
2.74	0.278
2.89	0.283*
3.06	0.367
3.24	0.427*
3.54	0.454
3.83	0.464
4.10	0.408*
4.32	0.351
4.48	0.270*
4.63	0.207
4.72	0.158*
4.87	0.126*
4.98	0.100
5.00	0.096*
5.13	0.082
5.30	0.065
5.42	0.078*
5.66	0.098
5.75	0.078*
5.85	0.059*
5.96	0.044*
6.16	0.033
6.35	0.036*
6.70	0.045
6.90	0.031*
7.12	0.008

CURVE 2
T ~ 298

λ	τ
1.10	0.675
1.43	0.758
1.58	0.775
1.84	0.794

CURVE 2 (cont.)

λ	τ
2.08	0.791*
2.34	0.778
2.50	0.759
2.69	0.697
2.86	0.651*
3.00	0.648
3.04	0.655*
3.19	0.697
3.33	0.727*
3.48	0.746
3.64	0.736*
3.93	0.618*
3.93	0.618*
4.05	0.466
4.37	0.067
4.44	0.018*
4.61	0.010
4.74	0.136*
4.86	0.259
5.00	0.426*
5.23	0.589
5.44	0.417*
5.56	0.300
5.65	0.288
5.77	0.300*
5.87	0.308
5.97	0.200*
6.08	0.103
6.17	0.046*
6.30	0.042
6.38	0.067*
6.46	0.117*
6.59	0.134
6.68	0.129*
6.85	0.103*
7.03	0.056*
7.27	0.011

CURVE 3
T ~ 298

λ	τ
1.03	0.500
1.25	0.532*
1.38	0.541
1.46	0.563*
1.59	0.583

CURVE 3 (cont.)

λ	τ
1.69	0.574*
1.80	0.528
1.96	0.500
2.05	0.521*
2.10	0.546
2.21	0.508*
2.39	0.365
2.54	0.215
2.75	0.072
2.86	0.030*
3.00	0.020
3.15	0.032*
3.22	0.046*
3.37	0.144
3.53	0.288*
3.69	0.398
3.80	0.482
3.95	0.456*
4.23	0.338*
4.36	0.275
4.47	0.233*
4.64	0.214
4.87	0.192*
5.00	0.158
5.14	0.124*
5.24	0.102
5.46	0.067*
5.68	0.036

CURVE 4*
T ~ 298

λ	τ
1.03	0.299
1.30	0.286
1.34	0.256
1.38	0.243
1.62	0.262
1.71	0.256
1.94	0.234
2.21	0.226
2.41	0.164
2.54	0.101
2.70	0.069
2.89	0.040
3.07	0.020
3.37	0.057

CURVE 4 (cont.)*

λ	τ
3.51	0.100
3.63	0.143
3.97	0.200
4.08	0.198
4.22	0.167
4.35	0.131
4.44	0.122
4.54	0.101
4.84	0.080
5.03	0.063
5.20	0.046
5.51	0.027
5.73	0.013
5.92	0.006

CURVE 5
T ~ 298

λ	τ
100	0.10
149	0.31
196	0.47
249	0.61
295	0.65
295	0.71
354	0.71
404	0.59
469	0.59
509	0.53
548	0.48

CURVE 6
T ~ 298

λ	τ
1.23	0.205
1.26	0.256*
1.36	0.324
1.46	0.280*
1.54	0.305*
1.66	0.359
1.83	0.349*
1.92	0.315
2.02	0.326*
2.09	0.354*
2.20	0.396
2.41	0.375*
2.50	0.332*

CURVE 6 (cont.)

λ	τ
2.69	0.215
2.87	0.094*
2.96	0.049*
3.01	0.025
3.16	0.032*
3.32	0.114*
3.47	0.197
3.66	0.341*
3.90	0.433
4.18	0.428*
4.33	0.332
4.47	0.242*
4.59	0.236
4.73	0.259*
4.86	0.294
4.99	0.348*
5.24	0.363
5.44	0.309*
5.64	0.217*
5.74	0.175
5.87	0.115*
5.97	0.064*
6.05	0.020
6.26	0.034*
6.45	0.098
6.64	0.147*
6.84	0.153
7.04	0.145*
7.23	0.125*
7.39	0.101
7.63	0.084*
7.82	0.054
8.07	0.023*
8.26	0.005*
8.49	0.002

CURVE 7
T ~ 298

λ	τ
1.08	0.570
1.13	0.593*
1.22	0.643
1.36	0.569*
1.38	0.541*
1.44	0.531
1.51	0.539*

CURVE 7 (cont.)

λ	τ
1.58	0.583*
1.66	0.597
1.82	0.542*
1.92	0.434*
2.01	0.422
2.11	0.455
2.21	0.415*
2.36	0.257
2.57	0.080
2.70	0.030*
2.97	0.003*
3.11	0.003
3.34	0.015*
3.51	0.055
3.65	0.140*
3.81	0.175*
3.98	0.187
4.07	0.177*
4.21	0.105*
4.35	0.065
4.48	0.065*
4.62	0.057*
4.74	0.050
4.88	0.040*
5.01	0.035*
5.12	0.026
5.26	0.019*
5.44	0.008*
5.73	0.002*
5.95	0.000

CURVE 8
T ~ 298

λ	τ
1.09	0.426
1.29	0.432*
1.43	0.438
1.52	0.462*
1.60	0.492
1.73	0.500*
1.83	0.514*
1.98	0.522
2.22	0.505*
2.23	0.489
2.38	0.420*
2.38	0.397*

CURVE 8 (cont.)

λ	τ
2.51	0.311
2.69	0.145*
2.76	0.074*
2.87	0.045*
2.93	0.026
3.07	0.033*
3.19	0.058
3.33	0.104*
3.36	0.122*
3.50	0.171
3.66	0.246*
3.96	0.355*
4.22	0.373
4.51	0.372*
4.77	0.326*
4.88	0.273
5.00	0.240*
5.14	0.225*
5.29	0.224
5.36	0.200*
5.57	0.129*
5.77	0.079
5.98	0.036*
6.29	0.616

CURVE 9
T ~ 298

λ	τ
1.08	0.783
1.24	0.790*
1.46	0.794
1.59	0.805*
1.79	0.817*
2.07	0.828
2.23	0.900*
2.38	0.765
2.54	0.712*
2.75	0.554
2.82	0.398*
2.89	0.306*
3.00	0.300
3.08	0.326*
3.17	0.381
3.23	0.438*
3.36	0.513*
3.53	0.641

CURVE 9 (cont.)

λ	τ
3.65	0.675*
3.97	0.746
4.20	0.727*
4.46	0.732*
4.65	0.714
4.77	0.695*
4.88	0.662*
5.00	0.636
5.27	0.621*
5.37	0.600*
5.48	0.559
5.67	0.474*
5.86	0.398*
6.09	0.307*
6.19	0.276
6.27	0.242*
6.46	0.215*
6.67	0.198*
6.83	0.198
7.05	0.188*
7.26	0.177*
7.40	0.168*
7.56	0.173
7.73	0.177*
7.89	0.149*
7.98	0.135*
8.05	0.109
8.21	0.098*
8.37	0.075*
8.50	0.046
8.71	0.053
8.89	0.050*
9.00	0.028*
9.14	0.000

CURVE 10
T ~ 298

λ	τ
1.11	0.773
1.25	0.779
1.34	0.757*
1.47	0.747
1.56	0.784*
1.56	0.800*
1.61	0.815
1.73	0.800*

*Not shown on plot

DATA TABLE NO. 655 (continued)

λ	τ	λ	τ
CURVE 10 (cont.) T ~ 298		CURVE 11 T ~ 298	
1.81	0.770*	1.31	0.808
1.88	0.746	1.48	0.819*
1.99	0.754*	1.62	0.830
2.08	0.778*	1.79	0.833*
2.22	0.765*	2.00	0.840
2.36	0.616	2.17	0.838*
2.51	0.435*	2.42	0.835
2.64	0.218*	2.72	0.837*
2.69	0.177	3.08	0.829
2.78	0.093*	3.55	0.833*
2.79	0.069*	3.74	0.835*
2.92	0.055	4.00	0.844
3.03	0.064*	4.32	0.842*
3.11	0.088*	4.52	0.842
3.16	0.129	4.81	0.800*
3.23	0.156*	5.00	0.742*
3.34	0.297*	5.18	0.649*
3.49	0.467	5.30	0.587
3.49	0.510*	5.46	0.516*
3.61	0.629*	5.62	0.510
3.76	0.688*	5.79	0.526
3.97	0.685	5.89	0.514*
4.06	0.658*	5.97	0.479
4.19	0.578*	6.10	0.578*
4.31	0.541*	6.19	0.683*
4.43	0.512*	6.40	0.700
4.58	0.486	6.63	0.682*
4.70	0.483*	6.79	0.667*
4.85	0.460*	7.00	0.612
4.96	0.431*	7.07	0.587*
5.11	0.370*	7.20	0.537
5.23	0.337	7.34	0.548
5.32	0.298*	7.53	0.534*
5.51	0.213*	7.72	0.500*
5.71	0.118*	7.84	0.475
5.94	0.028*	7.98	0.406*
6.02	0.009	8.13	0.313*
6.13	0.022*	8.25	0.240*
6.33	0.058*	8.38	0.157
6.54	0.078*	8.52	0.078*
5.74	0.083*	8.66	0.022*
6.98	0.087	8.89	0.000
7.19	0.079*		
7.35	0.071*		
7.60	0.033*		
7.87	0.012		

*Not shown on plot

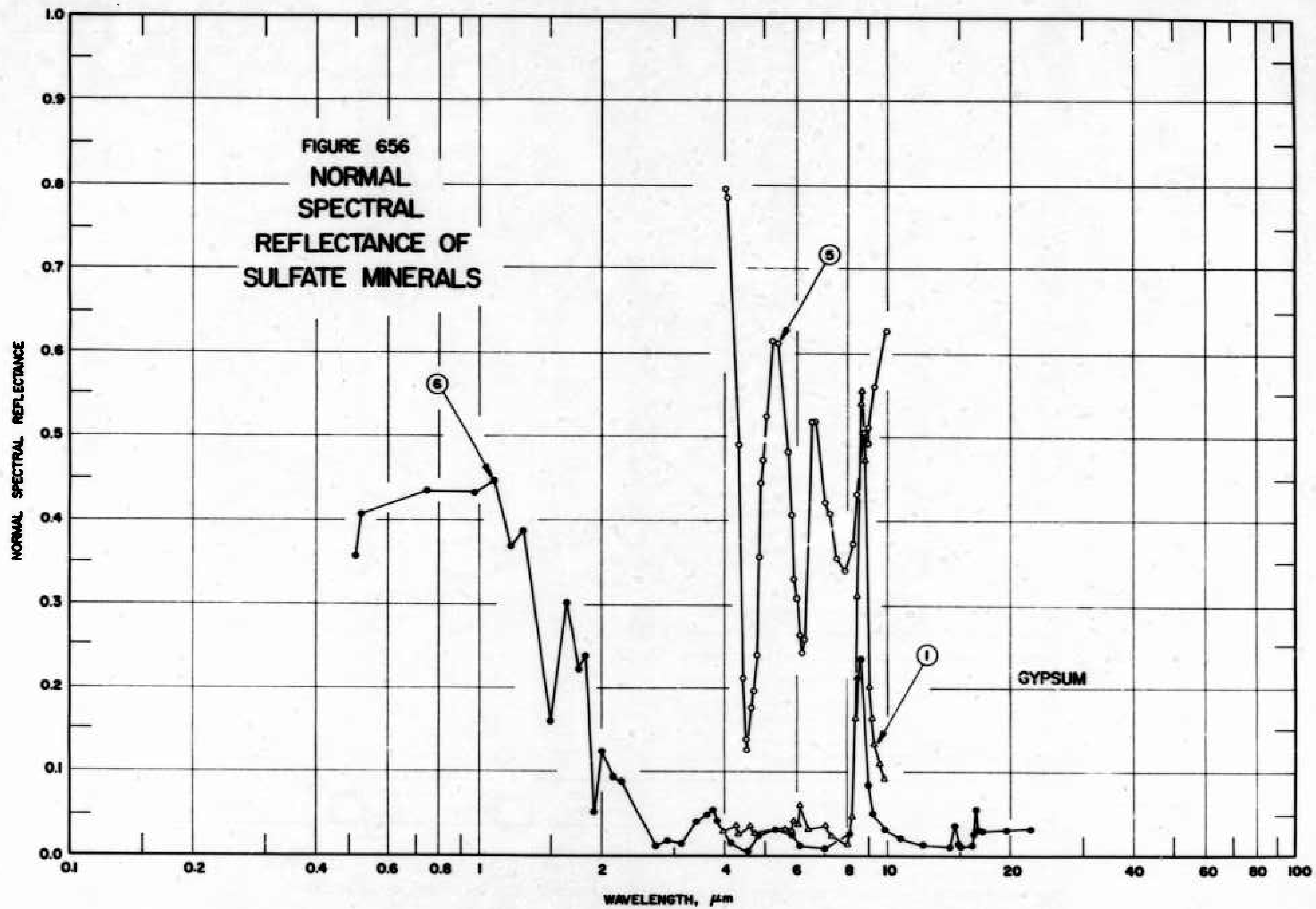


FIGURE 656
NORMAL
SPECTRAL
REFLECTANCE OF
SULFATE MINERALS
GYPSUM
1
5
6
NORMAL SPECTRAL REFLECTANCE
WAVELENGTH, μm
1.0
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0.0
0.1
0.2
0.4
0.6
0.8
1
2
4
6
8
10
20
40
60
80
100

SPECIFICATION TABLE NO. 656 NORMAL SPECTRAL REFLECTANCE OF SULFATE MINERALS

Curve No.	Ref. No.	Year	Temperature K	Wavelength Range, μm	Geometry θ	θ'	ω'	Reported Error, %	Composition (weight percent), Specifications, and Remarks
1	278	1968	~298	4.00-9.95	7°	7°			GYPSUM; polished sample from Pomaia, Italy; aluminized mirror reference standard; data extracted from smooth curve.
2*	278	1968	~298	4.01-10.0	7°	7°			Similar to the above specimen and conditions except mat surface and grain size is 250-1200 microns.
3*	278	1968	~298	4.01-10.0	7°	7°			Similar to the above specimen and conditions except grain size is 74-250 microns.
4*	278	1968	~298	4.01-10.0	7°	7°			Similar to the above specimen and conditions except grain size is 0 to 74 microns.
5	278	1968	~298	4.01-10.0	7°	7°			Similar to the above specimen and conditions except grain size <5 μm.
6	308	1966	~298	0.51-22.6	0°		2π		GYPSUM SAND, White Sands, N. M.; data extracted from smooth curve.

* Not shown on plot

DATA TABLE NO. 656 NORMAL SPECTRAL REFLECTANCE OF SULFATE MINERALS

[Wavelength, λ, μm; Reflectance, ρ; Temperature, T, K]

λ	ρ	λ	ρ	λ	ρ	λ	ρ	λ	ρ	λ	ρ
CURVE 1		CURVE 2 (cont.)*		CURVE 3 (cont.)*		CURVE 4 (cont.)*		CURVE 6		CURVE 6 (cont.)	
T ~ 298								T ~ 298			
		6.30	0.00161	8.14	0.00278	8.84	0.00491			16.5	0.061
4.00	0.031	6.60	0.00260	8.28	0.00330	9.17	0.00472	0.51	0.358	16.8	0.034
4.25	0.035*	6.66	0.00269	8.55	0.00424	10.0	0.00530	0.57	0.408	17.2	0.032
4.29	0.039	6.70	0.00265	8.68	0.00473			0.75	0.437	19.7	0.034
4.33	0.028	6.92	0.00224	8.84	0.00491	CURVE 5		0.98	0.434	22.6	0.036
4.64	0.038	7.09	0.00217	9.17	0.00467	T ~ 298		1.09	0.451		
4.75	0.029	7.78	0.00227	9.66	0.00468			1.21	0.371		
5.68	0.036	7.89	0.00242	10.0	0.00494	4.01	0.00800	1.29	0.389		
5.88	0.032	8.20	0.00271			4.06	0.00790	1.51	0.160		
5.97	0.045	8.36	0.00324	CURVE 4*		4.36	0.00492	1.65	0.303		
6.13	0.040	8.53	0.00428	T ~ 298		4.45	0.00213	1.77	0.233		
6.18	0.063	8.85	0.00516			4.49	0.00149*	1.84	0.240		
6.45	0.035	9.17	0.00463	4.01	0.00642	4.53	0.00140	1.93	0.055		
7.11	0.039	9.26	0.00443	4.08	0.00610	4.57	0.00127	2.01	0.124		
7.35	0.027	9.41	0.00433	4.18	0.00427	4.66	0.00177	2.15	0.093		
8.06	0.017	10.0	0.00446	4.36	0.00231	4.76	0.00198	2.26	0.090		
8.25	0.050			4.41	0.00145	4.81	0.00241	2.72	0.014		
8.40	0.164	CURVE 3*		4.45	0.00114	4.87	0.00359	2.91	0.020		
8.51	0.312	T ~ 298		4.51	0.00089	4.91	0.00449	3.16	0.017		
8.64	0.540			4.56	0.00083	5.00	0.00523	3.43	0.043		
8.68	0.557	4.01	0.00313	4.60	0.00110	5.16	0.00577	3.64	0.102		
8.87	0.476	4.06	0.00298	4.63	0.00125	5.26	0.00618	3.76	0.109		
9.12	0.203	4.17	0.00200	4.73	0.00143	5.41	0.00614	3.85	0.094		
9.21	0.166	4.23	0.00171	4.82	0.00232	5.75	0.00483	4.18	0.019		
9.37	0.136	4.29	0.00156	4.92	0.00332	5.89	0.00410	4.60	0.009		
9.67	0.111	4.47	0.00078	5.19	0.00458	5.96	0.00332	4.95	0.027		
9.95	0.094	4.55	0.00068	5.31	0.00475	6.01	0.00310	5.38	0.034		
		4.66	0.00087	5.41	0.00469	6.09	0.00309*	5.86	0.028		
CURVE 2*		4.81	0.00120	5.54	0.00422	6.15	0.00264	6.16	0.015		
T ~ 298		4.98	0.00169	5.96	0.00300	6.21	0.00244	7.07	0.011		
4.01	0.00118	5.08	0.00188	6.03	0.00268	6.28	0.00260	8.07	0.018		
4.08	0.00108	5.31	0.00201	6.10	0.00263	6.59	0.00520	8.18	0.030		
4.44	0.00013	5.54	0.00196	6.24	0.00228	6.70	0.00520	8.50	0.215		
4.50	0.00009	5.67	0.00192	6.35	0.00248	7.06	0.00425	8.68	0.238		
4.64	0.00038	5.77	0.00198	6.52	0.00387	7.26	0.00411	9.07	0.087		
4.69	0.00051	5.90	0.00219	6.65	0.00410	7.58	0.00358	9.33	0.055		
4.82	0.00067	6.03	0.00198	6.78	0.00384	7.97	0.00342	9.98	0.035		
5.05	0.00099	6.12	0.00199	6.91	0.00378	8.30	0.00376	10.8	0.024		
5.18	0.00119	6.26	0.00186	7.11	0.00348	8.47	0.00434	12.3	0.018		
5.40	0.00131	6.35	0.00201	7.57	0.00292	8.83	0.00507	14.3	0.015		
5.52	0.00136	6.53	0.00283	7.72	0.00288	9.03	0.00495	14.7	0.040		
5.71	0.00157	6.66	0.00304	7.88	0.00292	9.13	0.00514	15.0	0.019		
5.87	0.00197	6.95	0.00244	8.20	0.00349	9.38	0.00562	15.2	0.013		
6.01	0.00190	7.41	0.00235	8.33	0.00387	10.0	0.00630	16.2	0.016		
6.12	0.00194	7.92	0.00253	8.68	0.00473			16.3	0.030		

* Not shown on plot

SPECIFICATION TABLE NO. 657 NORMAL SOLAR ABSORPTANCE OF SULFATE MINERALS

Curve No.	Ref. No.	Year	Temperature Range, K	Geometry θ	Reported Error, %	Composition (weight percent), Specifications and Remarks
1*	367	1964	~298	~0°		WHITE BARYTES; pressed powder calcinated at 1073 K for 16 hrs; measured in vacuum ($<10^{6}$ mm Hg); calculated from N-Sol-R; [Authors' designation: Sample No. 7035].
2*	367	1964	~298	~0°		Above specimen and conditions except after 230 equivalent sun hrs of exposure to ultraviolet irradiation in vacuum; avg solar factor 8.5.

DATA TABLE NO. 657 NORMAL SOLAR ABSORPTANCE OF SULFATE MINERALS

[Temperature, T, K; Absorptance, α]

T	α
CURVE 1*	
~298	0.13
CURVE 2*	
298	0.208

*No plot given

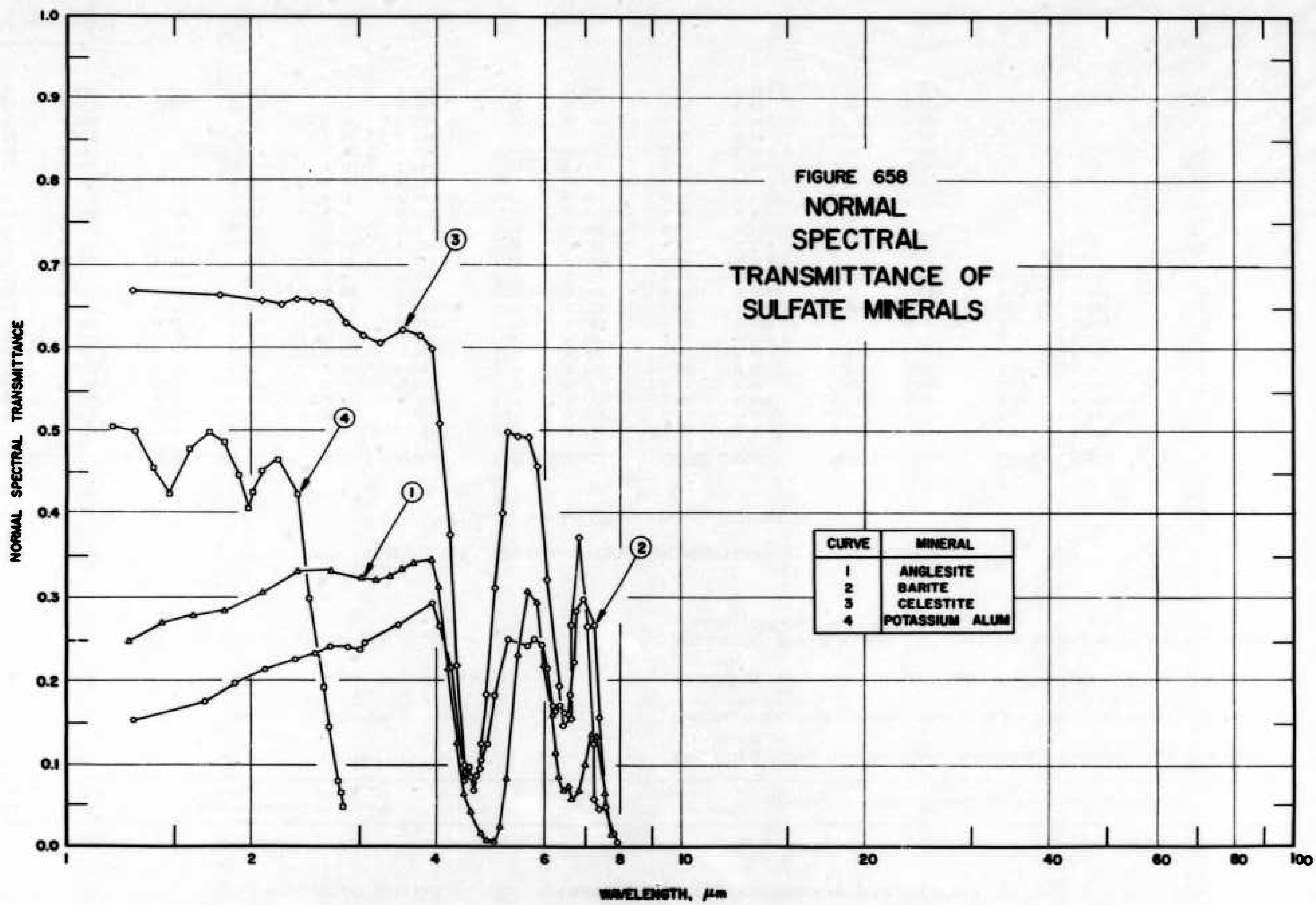


FIGURE 658
NORMAL
SPECTRAL
TRANSMITTANCE OF
SULFATE MINERALS
NORMAL SPECTRAL TRANSMITTANCE
WAVELENGTH, μm
CURVE MINERAL
1 ANGLESITE
2 BARITE
3 CELESTITE
4 POTASSIUM ALUM
1.0
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0.0
1
2
4
6
8
10
20
40
60
80
100

SPECIFICATION TABLE NO. 658 NORMAL SPECTRAL TRANSMITTANCE OF SULFATE MINERALS

Curve No.	Ref. No.	Year	Temperature K	Wavelength Range, μm	Geometry θ θ' ω'	Reported Error, %	Composition (weight percent), Specifications, and Remarks
1	294	1906	~298	1.27-7.71	~0° ~0°		ANGLESITE, $PbSO_4$, from Monte Poni, Sardinia (0.7 mm thick); translucent section parallel to m.
2	294	1906	~298	1.28-7.93	~0° ~0°		BARITE, $BaSO_4$, from Cheshire, Conn. (0.25 mm thick); orthorhombic; section parallel to c-axis.
3	294	1906	~298	1.28-7.37	~0° ~0°		CELESTITE, $SiSO_4$; from Lampasao, Texas (0.67 mm thick); cleavage parallel to c-axis.
4	294	1906	~298	1.18-2.82	~0° ~0°		POTASSIUM ALUM, $K_2SO_4Al_2(SO_4)_3 + 24H_2O$, transparent; cut perpendicular to optic axis; 0.085 mm thick.

DATA TABLE NO. 658 NORMAL SPECTRAL TRANSMITTANCE OF SULFATE MINERALS

[Wavelength, λ, μm; Transmittance, τ; Temperature, T, K]

λ	τ	λ	τ	λ	τ	λ	τ	λ	τ	λ	τ	λ	τ
CURVE 1 T ~ 298		CURVE 1 (cont.)		CURVE 2 (cont.)		CURVE 2 (cont.)		CURVE 3 (cont.)		CURVE 3 (cont.)		CURVE 4 (cont.)	
		5.21	0.083	1.88	0.197	5.97	0.246	2.23	0.654	5.87	0.457	1.97	0.405
1.27	0.250	5.43	0.232	2.12	0.214	6.06	0.218	2.38	0.660	6.06	0.323	2.01	0.427
1.43	0.270	5.63	0.309	2.37	0.228	6.20	0.172	2.52	0.658	6.27	0.194	2.09	0.452
1.61	0.274	5.82	0.296	2.53	0.235	6.28	0.167	2.68	0.655	6.42	0.148	2.21	0.468
1.82	0.284	6.00	0.220	2.70	0.243	6.39	0.172	2.85	0.631	6.55	0.157	2.38	0.423
2.09	0.308	6.18	0.161	2.87	0.242	6.47	0.163	3.04	0.619	6.66	0.269	2.49	0.300
2.38	0.332	6.27	0.115	3.00	0.240	6.58	0.161	3.23	0.609	6.84	0.371	2.63	0.193
2.70	0.333	6.33	0.085	3.17	0.249	6.61	0.186	3.52	0.625	6.97	0.300*	2.68	0.146
3.02	0.326	6.46	0.068	3.49	0.269	6.71	0.224	3.79	0.618	7.06	0.267	2.77	0.080
3.20	0.324	6.57	0.073	3.95	0.293	6.78	0.284	3.96	0.600	7.22	0.124	2.80	0.067
3.37	0.329	6.65	0.058	4.07	0.269	6.96	0.300	4.06	0.510	7.37	0.036	2.82	0.048
3.51	0.336	6.83	0.069	4.24	0.218	7.23	0.268	4.22	0.374				
3.68	0.341	7.00	0.100	4.36	0.130	7.39	0.154	4.32	0.220	CURVE 4 T ~ 298			
3.93	0.347	7.19	0.134	4.43	0.098	7.56	0.049	4.46	0.100				
4.05	0.316	7.32	0.132	4.46	0.083	7.75	0.015	4.60	0.063				
4.20	0.215	7.52	0.065	4.61	0.069	7.93	0.004	4.71	0.096	1.13	0.505		
4.33	0.126	7.71	0.014	4.66	0.086			4.75	0.125	1.30	0.500		
4.45	0.063			4.76	0.104	CURVE 3 T ~ 298		4.85	0.185	1.38	0.456		
4.58	0.041	CURVE 2 T ~ 298		4.86	0.125			5.00	0.316	1.47	0.424		
4.74	0.017			5.00	0.184			5.12	0.400	1.59	0.480		
4.86	0.009			5.25	0.252	1.28	0.670	5.26	0.500	1.72	0.500		
5.00	0.007	1.28	0.153	5.65	0.246	1.68	0.665	5.44	0.496	1.81	0.488		
5.10	0.033	1.68	0.178	5.79	0.252	2.09	0.658	5.68	0.493	1.92	0.448		

* Not shown on plot

11. POLYMERS

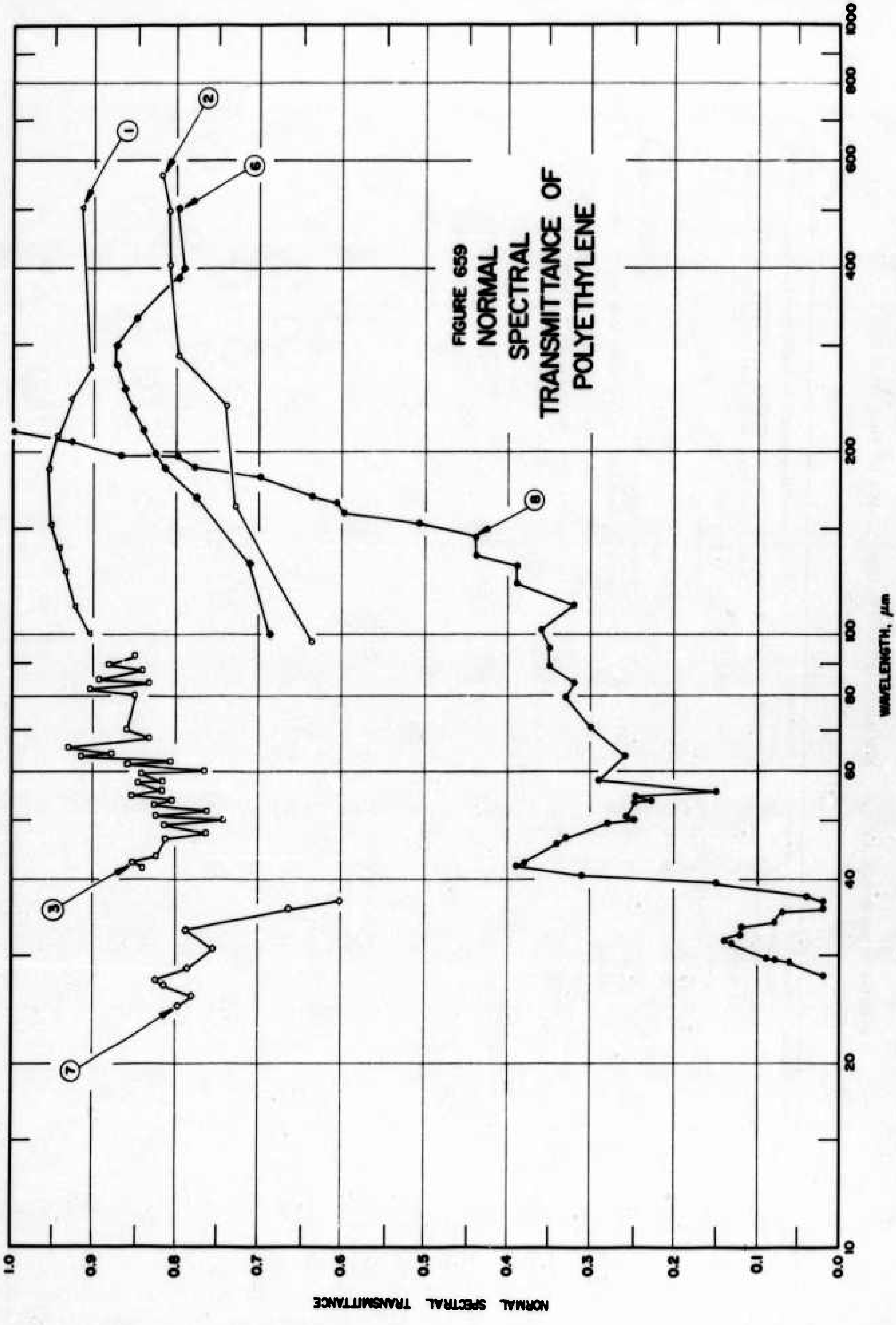


FIGURE 659 NORMAL SPECTRAL TRANSMITTANCE OF POLYETHYLENE

SPECIFICATION TABLE NO. 659 NORMAL SPECTRAL TRANSMITTANCE OF POLYETHYLENE

Curve No.	Ref. No.	Year	Temperature K	Wavelength Range, μm	Geometry θ	θ'	ω'	Reported Error, %	Composition (weight percent), Specifications, and Remarks
1	281	1969	~298	100-500	0°	0°			Clear sample (50 μm thick); data extracted from smooth curve.
2	292	1950	~298	97-564	~0°	~0°			3.21 mm thick.
3	71	1963	298	41.6-92.3	0°	0°			550 μm thick.
4*	234	1961	293	45-1000	0°	0°			Plate (1800 μm thick); the transmittance is about constant in the 45-1000 μm region.
5*	234	1961	98	45-1000	0°	0°			1800 μm thick, the transmittance is about constant in the 45-1000 μm region.
6	281	1969	~298	100-500	0°	0°			100 μm thick; black; data extracted from smooth curve.
7	399	1948	~298	24.9-36.7	~0°	~0°			240 μm thick; data extracted from smooth curve.
8	195	1966	1.5	27.9-215	~0°	~0°			483 μm thick; black; supplied by Block Engineering Co.

*Not shown on plot

DATA TABLE NO. 659 NORMAL SPECTRAL TRANSMITTANCE OF POLYETHYLENE

[Wavelength, λ, μm; Transmittance, τ; Temperature, T, K]

CURVE 1
$T \sim 298$

λ	τ
100	0.908
111	0.926
127	0.939
138	0.948
151	0.954
186	0.957
212	0.948
243	0.931
275	0.909
500	0.915

CURVE 2
$T \sim 298$

λ	τ
97	0.64
162	0.73
236	0.74
289	0.80
401	0.81
492	0.81
564	0.82

CURVE 3
$T = 298$

λ	τ
41.6	0.841
42.7	0.856
43.7	0.823
44.8	0.828*
45.8	0.813*
46.7	0.813
47.8	0.763
49.0	0.815
50.0	0.741
50.8	0.826
51.9	0.761
52.9	0.828
53.9	0.802
54.9	0.859
55.9	0.819
57.1	0.850
57.9	0.817
59.1	0.844
60.0	0.769

CURVE 3 (cont.)

λ	τ
61.2	0.861
62.0	0.809
63.1	0.919
64.0	0.880
65.2	0.932
67.1	0.839*
68.0	0.839
69.1	0.839*
70.0	0.863
71.1	0.863*
76.9	0.856*
80.0	0.852
81.9	0.908
83.8	0.834
84.8	0.895
85.8	0.880*
87.8	0.841
89.9	0.884
91.7	0.852*
92.3	0.852

CURVE 4*
$T = 293$

λ	τ
45	0.70
1000	0.70

CURVE 5*
$T = 98$

λ	τ
45	0.70
1000	0.70

CURVE 6
$T \sim 298$

λ	τ
100	0.689
131	0.712
168	0.779
187	0.816
199	0.829
214	0.843
231	0.858
251	0.868
276	0.875

CURVE 6 (cont.)

λ	τ
297	0.875
330	0.851
385	0.800
400	0.797
500	0.800

CURVE 7
$T \sim 298$

λ	τ
24.9	0.799
25.2	0.786*
25.6	0.781
26.1	0.789*
26.8	0.813
27.3	0.824
27.8	0.815*
28.5	0.787
29.6	0.764*
30.7	0.758
31.9	0.766*
33.0	0.790
33.4	0.785*
35.8	0.664
36.7	0.601

CURVE 8
$T = 1.5$

λ	τ
27.9	0.02
29.1	0.06
29.4	0.08
29.8	0.09
31.3	0.13
31.9	0.14
32.3	0.12
33.1	0.12
34.0	0.08
35.1	0.07
35.9	0.02
36.8	0.02
37.4	0.04
39.3	0.15
40.6	0.31
42.0	0.39
42.5	0.38

CURVE 8 (cont.)

λ	τ
43.0	0.38*
45.7	0.34
46.6	0.33
49.4	0.28
50.0	0.25
50.8	0.26
53.1	0.25
53.5	0.23
54.7	0.25
55.6	0.15
56.3	0.27*
57.9	0.29
62.5	0.28*
63.7	0.26
68.5	0.29*
70.8	0.30
77.1	0.33*
79.9	0.33
83.6	0.32
89.0	0.35
95.0	0.35
102	0.36
108	0.33
113	0.32
122	0.39
130	0.39
135	0.44
145	0.44
153	0.51
159	0.60
165	0.61
168	0.64
181	0.70
189	0.78
196	0.80
196	0.87
208	0.93
215	1.02

* Not shown on plot

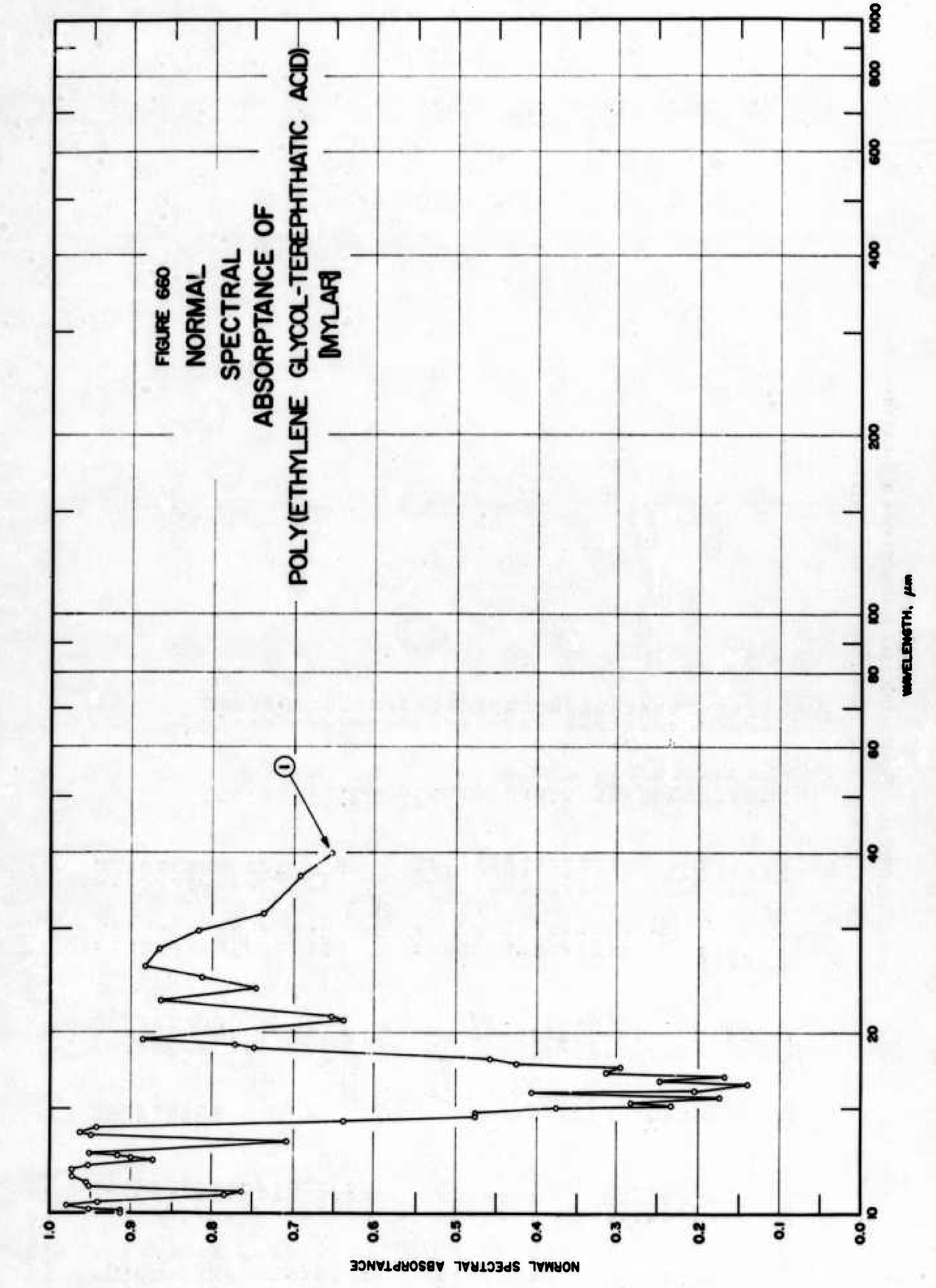


FIGURE 660 NORMAL SPECTRAL ABSORPTANCE OF POLY(ETHYLENE GLYCOL-TEREPHTHATIC ACID) [MYLAR]

SPECIFICATION TABLE NO. 660 NORMAL SPECTRAL ABSORPTANCE OF POLY(ETHYLENE GLYCOL-TEREPHTHATIC ACID) [MYLAR]

Curve No.	Ref. No.	Year	Temperature K	Wavelength Range, μm	Geometry θ	Reported Error, %	Composition (weight percent), Specifications, and Remarks
1	435	1965	~298	10.0-40.0	~0°		120 μm thick; data extracted from smooth curve.

DATA TABLE NO. 660 NORMAL SPECTRAL ABSORPTANCE OF POLY(ETHYLENE GLYCOL-TEREPHTHATIC ACID) [MYLAR]

[Wavelength, λ, μm; Absorptance, α; Temperature, T, K]

λ	α	λ	α
CURVE 1 T ~298		CURVE 1 (cont.)	
		15.3	0.282
10.0	0.914	15.6	0.175
10.1	0.914	15.9	0.408
10.1	0.953	16.0	0.202
10.3	0.980	16.2	0.231
10.4	0.941	16.4	0.139
10.7	0.785	16.6	0.246
10.8	0.764	16.9	0.169
11.1	0.951	17.2	0.314
11.3	0.956	17.5	0.296
11.5	0.973	17.8	0.427
11.8	0.973	18.1	0.458
12.0	0.954	18.9	0.749
12.3	0.873	19.1	0.771
12.4	0.900	19.5	0.887
12.5	0.917	21.0	0.637
12.6	0.951	21.4	0.651
13.2	0.709	22.8	0.855
13.5	0.950	23.8	0.745
13.6	0.964	24.8	0.812
13.9	0.944	25.9	0.883
14.3	0.637	27.5	0.866
14.5	0.477	29.6	0.818
14.7	0.477	31.8	0.736
15.0	0.375	36.4	0.694
15.1	0.231	40.0	0.651

SPECIFICATION TABLE NO. 661 ANGULAR SOLAR ABSORPTANCE OF POLY(ETHYLENE GLYCOL-TEREPHTHATIC ACID) [MYLAR]

Curve No.	Ref. No.	Year	Temperature Range, K	Geometry θ'	Reported Error, %	Composition (weight percent), Specifications, and Remarks
1*	454	1960	298	15°		Type 418, white Scotchcal from Minnesota Mining and Mfg. Co.; computed from spectral reflectance data for above atmosphere conditions; [Authors' designation: Sample 13].
2*	454	1960	298	15°		Similar to the above specimen and conditions except exposed to 700 Mev protons; [Authors' designation: Sample 14].
3*	454	1960	298	15°		Similar to the curve 1 specimen and conditions except exposed 2.5 in. from UA-2 Hg lamp for 10 days in air; [Authors' designation: Sample 15].

DATA TABLE NO. 661 ANGULAR SOLAR ABSORPTANCE OF POLY(ETHYLENE GLYCOL-TEREPHTHATIC ACID) [MYLAR]

[Temperature, T, K; Absorptance, α]

T	α
CURVE 1*	
298	0.23
CURVE 2*	
298	0.25
CURVE 3*	
298	0.25

* No plot given

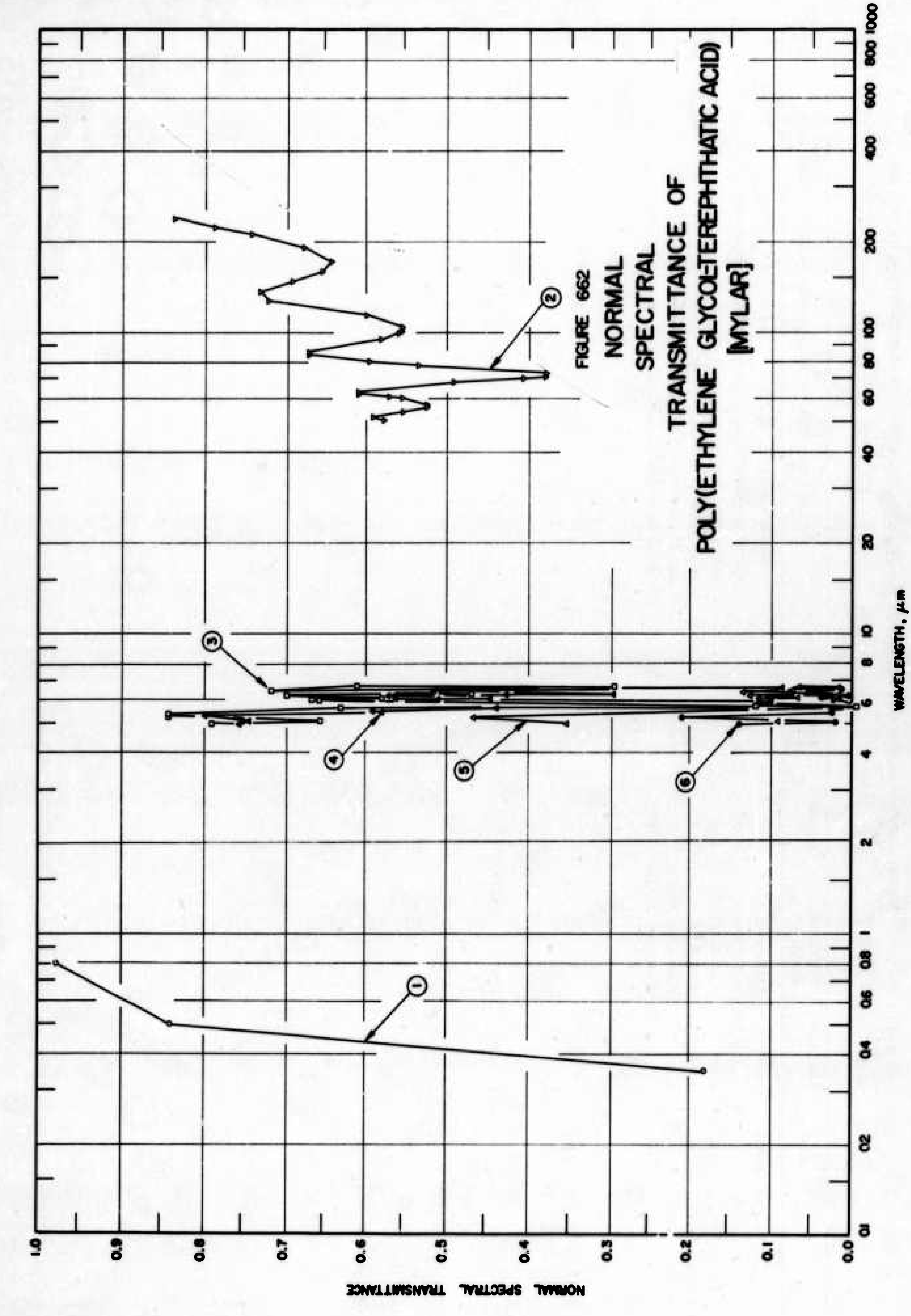


FIGURE 662 NORMAL SPECTRAL TRANSMITTANCE OF POLY(ETHYLENE GLYCOL-TEREPHTHATIC ACID) [MYLAR]

SPECIFICATION TABLE NO. 662 NORMAL SPECTRAL TRANSMITTANCE OF POLY(ETHYLENE GLYCOL–TEREPHTHATIC ACID) [MYLAR]

Curve No.	Ref. No.	Year	Temperature, K	Wavelength Range, μm	Geometry θ	θ'	ω'	Reported Error, %	Composition (weight percent), Specifications, and Remarks
1	431	1967	321	0.35–0.8	~0°	~0°			0.0254 mm thick; measured in vacuum (3×10^{-6} mm Hg).
2	432	1965	~298	51.0–240	~0°	~0°			0.0762 mm thick; obtained from six data sets taken over a three month period.
3	435	1965	~298	5.00–6.62	~0°	~0°			12 μm thick; data extracted from smooth curve.
4	435	1965	~298	5.00–6.62	~0°	~0°			24 μm thick; data extracted from smooth curve.
5	435	1965	~298	5.00–6.62	~0°	~0°			120 μm thick; data extracted from smooth curve.
6	435	1965	~298	5.00–6.58	~0°	~0°			240 μm thick; data extracted from smooth curve.

DATA TABLE NO. 662 NORMAL SPECTRAL TRANSMITTANCE OF POLY(ETHYLENE GLYCOL–TEREPHTHATIC ACID) [MYLAR]

[Wavelength, λ, μm; Transmittance, τ; Temperature, T, K]

CURVE 1
T = 321

λ	τ
0.35	0.18
0.50	0.84
0.80	0.98

CURVE 2
T ~ 298

λ	τ
51.0	0.579
51.6	0.587*
52.1	0.591
52.9	0.583*
53.6	0.570*
54.3	0.553
55.0	0.538*
55.9	0.531*
56.7	0.525
57.4	0.525
58.3	0.531*
59.0	0.541*
60.1	0.555
60.9	0.572
61.8	0.598*
62.8	0.610
63.9	0.610
65.1	0.601*
65.8	0.588*
66.8	0.551*
67.1	0.531*
68.2	0.492
69.3	0.448*
70.3	0.408*
71.6	0.381
72.9	0.381
74.2	0.419*
75.5	0.476*
77.1	0.534
78.4	0.565*
80.0	0.597
83.4	0.658*
85.3	0.674
86.8	0.674
89.0	0.661*
90.9	0.642*
93.3	0.607*

CURVE 2 (cont.)

λ	τ
95.7	0.582
97.8	0.567*
100	0.559
103	0.556
105	0.556
108	0.566
111	0.580
115	0.600
118	0.630*
122	0.663*
124	0.698*
129	0.724
133	0.732*
138	0.733
143	0.719*
147	0.695
153	0.671*
160	0.657
167	0.648*
174	0.647
181	0.653*
191	0.680
201	0.709*
211	0.745
222	0.789
234	0.825*
240	0.837

CURVE 3
T ~ 298

λ	τ
5.00	0.792
5.03	0.777*
5.06	0.718*
5.08	0.658
5.15	0.723*
5.26	0.794*
5.32	0.843
5.35	0.843
5.43	0.766*
5.56	0.673*
5.60	0.631
5.64	0.577*
5.67	0.461*
5.69	0.117*

CURVE 3 (cont.)

λ	τ
5.71	0.023*
5.73	-0.008
5.81	-0.008
5.84	0.057*
5.88	0.278*
5.91	0.286*
6.00	0.660
6.01	0.669
6.09	0.654*
6.13	0.617*
6.16	0.580
6.17	0.620*
6.24	0.651
6.26	0.642*
6.27	0.527*
6.29	0.509*
6.30	0.469
6.34	0.618*
6.37	0.689*
6.42	0.720
6.49	0.703
6.53	0.670*
6.56	0.590*
6.61	0.296
6.62	0.611

CURVE 4
T ~ 298

λ	τ
5.00	0.757
5.03	0.733*
5.06	0.687*
5.09	0.547
5.10	0.562*
5.12	0.635*
5.17	0.672*
5.29	0.800*
5.30	0.800*
5.33	0.766*
5.39	0.628*
5.43	0.581
5.46	0.581
5.50	0.591
5.53	0.575*
5.60	0.483*

CURVE 4 (cont.)

λ	τ
5.62	0.440
5.68	0.062*
5.69	0.018*
5.72	-0.008
5.82	-0.008
5.87	0.113*
5.89	0.116
5.90	0.104
5.96	0.257*
6.02	0.450*
6.05	0.510
6.08	0.564
6.12	0.537*
6.16	0.449
6.21	0.573
6.23	0.573
6.28	0.429
6.31	0.299
6.32	0.433*
6.37	0.524*
6.40	0.533*
6.45	0.516
6.57	0.470*
6.60	0.086
6.62	0.611*

CURVE 5
T ~ 298

λ	τ
5.00	0.356
5.04	0.267*
5.07	0.100*
5.08	0.091
5.10	0.105*
5.17	0.380*
5.21	0.437*
5.25	0.468
5.29	0.463*
5.31	0.446*
5.33	0.415*
5.38	0.268*
5.42	0.149*
5.45	0.127*
5.52	0.122*
5.56	0.111*

CURVE 5 (cont.)

λ	τ
5.59	0.075*
5.64	0.009*
5.72	-0.008*
5.89	-0.008*
5.93	0.000*
5.95	0.012*
6.06	0.100*
6.10	0.114
6.13	0.098*
6.15	0.067
6.17	0.067
6.22	0.149*
6.25	0.125
6.28	0.025*
6.30	0.015
6.36	0.102*
6.40	0.133
6.45	0.133
6.51	0.071
6.54	0.074
6.60	0.016
6.61	0.037*
6.62	0.066

CURVE 6
T ~ 298

λ	τ
5.00	0.138
5.03	0.099*
5.07	0.020
5.11	0.058*
5.18	0.150*
5.26	0.210
5.30	0.199*
5.33	0.155*
5.37	0.082*
5.39	0.045*
5.48	0.025*
5.53	0.025*
5.65	0.008*
5.72	-0.008*
5.98	-0.008*
6.05	0.015*
6.06	0.023
6.17	0.015
6.18	0.028*

CURVE 6 (cont.)

λ	τ
6.22	0.039
6.25	0.032*
6.28	0.004
6.30	0.004
6.40	0.044*
6.43	0.053
6.46	0.053
6.50	0.037*
6.52	0.019*
6.58	0.013

* Not shown on plot

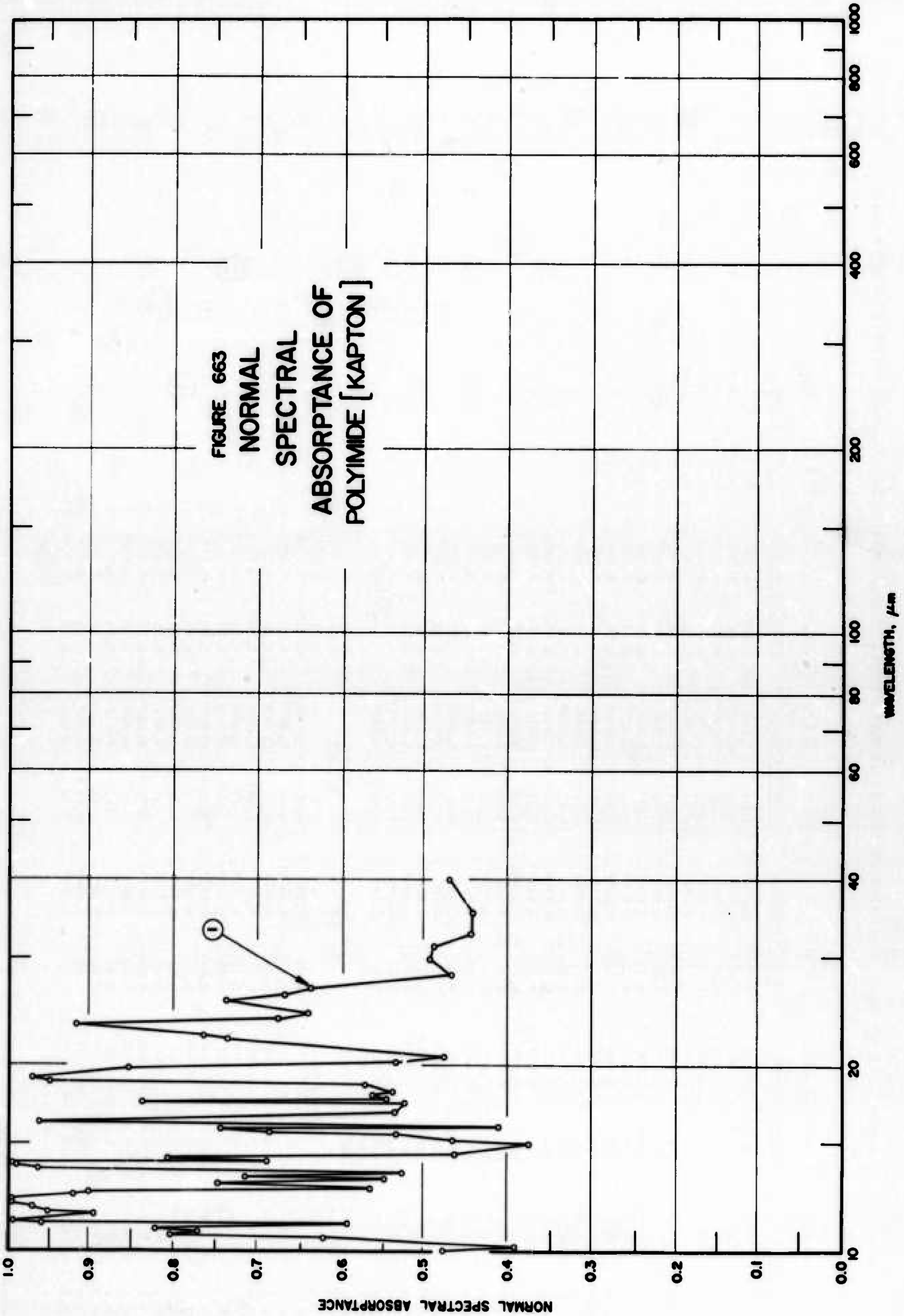


FIGURE 663 NORMAL SPECTRAL ABSORPTANCE OF POLYIMIDE [KAPTON]

SPECIFICATION TABLE NO. 663 NORMAL SPECTRAL ABSORPTANCE OF POLYIMIDE [KAPTON]

Curve No.	Ref. No.	Year	Temperature K	Wavelength Range, μm	Geometry θ	Reported Error, %	Composition (weight percent), Specifications, and Remarks
1	435	1965	~298	10.0-40.0	~0°		"H" film (5 μm thick) from Dupont; data extracted from smooth curve.

DATA TABLE NO. 663 NORMAL SPECTRAL ABSORPTANCE OF POLYIMIDE [KAPTON]

[Wavelength, λ, μm; Absorptance, α; Temperature, T, K]

λ	α	λ	α	λ	α
CURVE 1		CURVE 1 (cont.)		CURVE 1 (cont.)	
T ~ 298		14.4	0.461	26.7	0.639
10.0	0.477	14.9	0.375	28.0	0.466
10.2	0.392	15.2	0.464	29.9	0.494
10.5	0.623	15.5	0.534	31.2	0.489
10.6	0.809	15.6	0.684	32.7	0.443
10.7	0.770	15.8	0.743	35.3	0.443
10.9	0.822	15.9	0.411	40.0	0.470
11.1	0.595	16.3	0.962		
11.2	0.959	16.7	0.537		
11.3	0.996	16.9	0.522		
11.5	0.895	17.2	0.546		
11.6	0.952	17.5	0.837		
11.8	0.972	17.9	0.564		
12.0	0.998	18.1	0.539		
12.2	0.998	18.6	0.572		
12.4	0.920	18.9	0.950		
12.5	0.900	19.2	0.972		
12.7	0.566	19.7	0.853		
12.9	0.748	20.3	0.532		
13.1	0.549	20.7	0.475		
13.3	0.713	22.1	0.735		
13.4	0.526	22.4	0.763		
13.7	0.963	23.3	0.917		
13.8	0.991	23.9	0.677		
13.9	0.966	24.3	0.641		
14.0	0.688	25.5	0.738		
14.2	0.806	26.0	0.669		

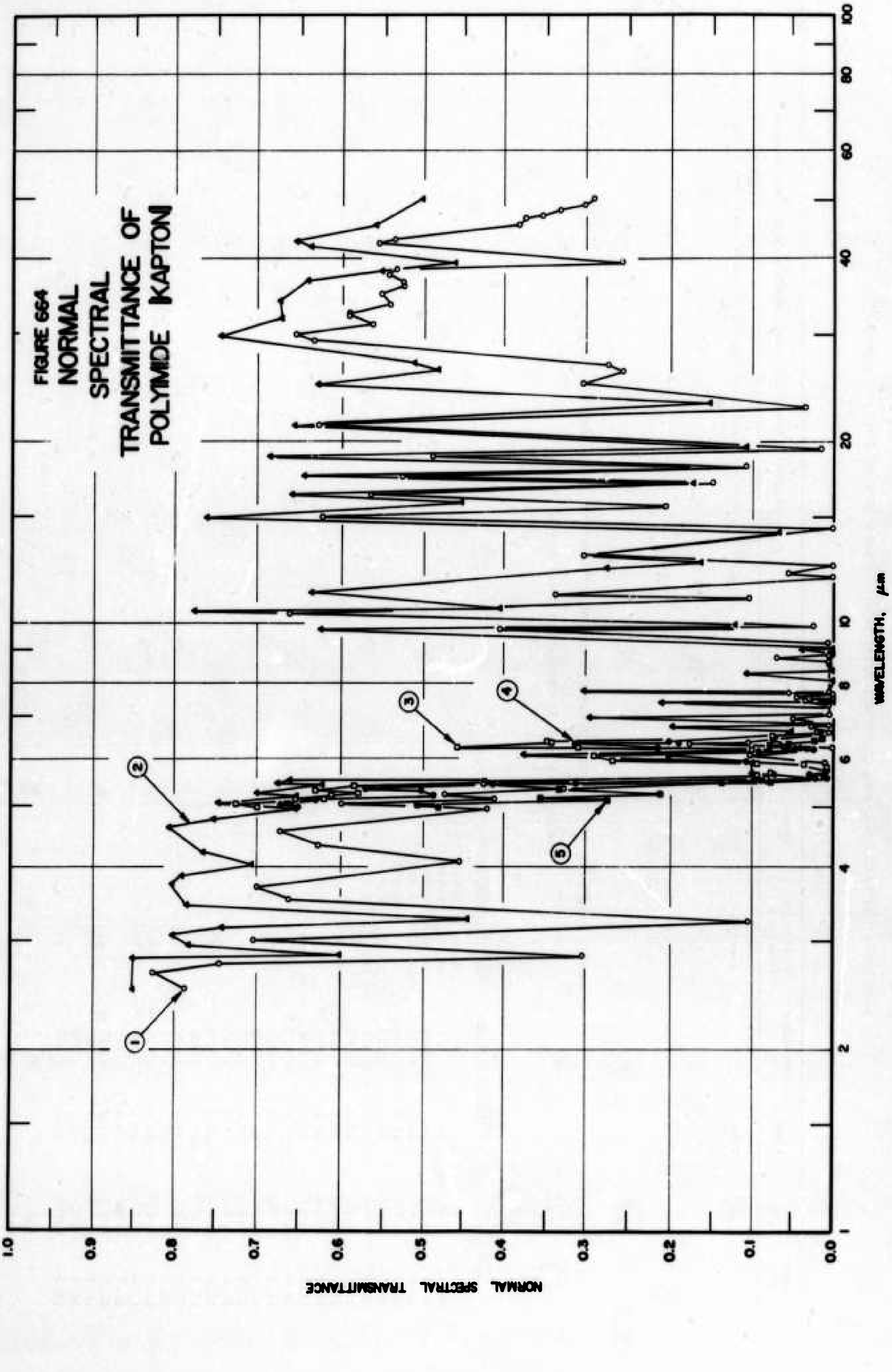


FIGURE 664 NORMAL SPECTRAL TRANSMITTANCE OF POLYIMIDE (KAPTON)

SPECIFICATION TABLE NO. 664 NORMAL SPECTRAL TRANSMITTANCE OF POLYIMIDE [KAPTON]

Curve No.	Ref. No.	Year	Temperature K	Wavelength Range, μm	Geometry θ	θ'	ω'	Reported Error, %	Composition (weight percent), Specifications, and Remarks
1	434	1966	300	2.52-50.0	$\sim 0^{\circ}$	$\sim 0^{\circ}$			"H" film (7.62×10^{-3} cm) from Dupont; data extracted from smooth curve.
2	434	1966	300	2.52-50.0	$\sim 0^{\circ}$	$\sim 0^{\circ}$			"H" film (2.54×10^{-3} cm) from Dupont; data extracted from smooth curve.
3	435	1965	~298	5.00-6.62	$\sim 0^{\circ}$	$\sim 0^{\circ}$			"H"film (5×10^{-3} cm) from Dupont; data extracted from smooth curve.
4	435	1965	~298	5.00-6.62	$\sim 0^{\circ}$	$\sim 0^{\circ}$			"H" film (7.5×10^{-3} cm) from Dupont; data extracted from smooth curve.
5	435	1965	~298	5.00-6.62	$\sim 0^{\circ}$	$\sim 0^{\circ}$			"H" film (12×10^{-3} cm) from Dupont; data extracted from smooth curve.

DATA TABLE NO. 664 NORMAL SPECTRAL TRANSMITTANCE OF POLYIMIDE [KAPTON]

[Wavelength, λ, μm; Transmittance, τ; Temperature, T, K]

CURVE 1
T = 300

λ	τ
2.52	0.789
2.67	0.827
2.77	0.764
2.85	0.305
3.01	0.704
3.25	0.105
3.52	0.661
3.70	0.700
4.08	0.453
4.31	0.629
4.57	0.673
4.98	0.420
5.08	0.600
5.17	0.411
5.25	0.474
5.37	0.329
5.46	0.425
5.59	0.010
5.90	0.010
6.08	0.101
6.22	0.000
6.36	0.177
6.39	0.105
6.63	0.005
6.74	0.026
6.[illegible]	0.005
6.89	0.005*
6.98	0.048
7.07	0.005
7.31	0.005
7.45	0.034
7.54	0.000
7.56	0.043
7.64	0.000
7.70	0.052
7.71	0.005
8.62	0.005
8.76	0.069
8.86	0.005
9.23	0.005
9.74	0.405
9.86	0.024
10.4	0.662
11.0	0.104
11.2	0.339
11.9	0.000
12.1	0.053
12.4	0.000
12.9	0.303
14.3	0.000
15.0	0.624
15.6	0.207
16.3	0.569
17.0	0.015
17.5	0.528
18.1	0.106
18.8	0.490
19.4	0.015
21.3	0.629
22.6	0.032
24.9	0.303
26.0	0.257
26.6	0.275
29.3	0.633
30.0	0.655
31.1	0.565
32.2	0.593
32.5	0.593
33.7	0.543
35.0	0.555
36.0	0.526
36.5	0.526
37.5	0.545
38.2	0.535
39.1	0.259
42.4	0.557
43.0	0.537
45.1	0.381
46.5	0.375
46.9	0.355
47.9	0.334
48.8	0.301
50.0	0.292

CURVE 2
T = 300

λ	τ
2.52	0.851
2.83	0.851
2.84	0.601
2.97	0.781
3.08	0.802
3.19	0.744
3.27	0.443
3.45	0.785
3.74	0.802
3.85	0.792
4.02	0.707
4.21	0.765
4.61	0.807
4.78	0.753
4.96	0.655
5.07	0.749
5.20	0.653
5.27	0.700
5.41	0.622
5.48	0.676
5.53	0.662
5.57	0.023
5.65	0.073
5.69	0.010
5.90	0.010
6.08	0.377
6.21	0.040
6.43	0.475
6.65	0.005
6.77	0.199
6.88	0.005*
7.00	0.297
7.15	0.005*
7.29	0.005
7.40	0.221
7.54	0.000
7.58	0.043*
7.64	0.000*
7.70	0.052*
7.71	0.005*
8.09	0.000
8.25	0.107
8.34	0.000
8.62	0.005
8.75	0.304
8.86	0.000*
8.92	0.000
9.01	0.039
9.08	0.000
9.23	0.005
9.75	0.626
9.92	0.122
10.5	0.776
10.6	0.405
11.2	0.636
11.7	0.077
12.3	0.277
12.6	0.165
12.9	0.302*
14.1	0.066
15.0	0.761
15.8	0.454
16.3	0.660
17.0	0.175
17.5	0.646
18.1	0.108*
18.8	0.688
19.5	0.107
21.3	0.658
23.0	0.153
24.9	0.630
26.1	0.483
26.9	0.513
29.8	0.748
31.8	0.674
34.0	0.625
36.6	0.592
38.0	0.555
39.1	0.460
41.9	0.639
42.5	0.656
45.1	0.561
50.0	0.502

CURVE 3
T ~ 298

λ	τ
5.00	0.700
5.05	0.728
5.06	0.698*
5.11	0.622
5.16	0.654
5.21	0.612
5.22	0.586*
5.24	0.581
5.31	0.631
5.37	0.613*
5.40	0.587
5.43	0.509*
5.49	0.424
5.55	0.083
5.59	0.016
5.63	0.094
5.66	0.077
5.68	0.023*
5.71	0.007*
5.80	0.007
5.85	0.035
5.90	0.195
5.98	0.269
6.04	0.291
6.08	0.273*
6.16	0.171*
6.19	0.100*
6.23	0.310
6.29	0.458
6.31	0.434
6.33	0.369
6.37	0.343
6.39	0.349
6.46	0.185*
6.51	0.075
6.52	0.042*
6.57	0.022*
6.62	0.019

CURVE 4
T ~ 298

λ	τ
5.00	0.651
5.05	0.672
5.08	0.661*
5.09	0.578*
5.13	0.530
5.18	0.560*
5.21	0.551*
5.26	0.484
5.29	0.484*
5.31	0.501
5.36	0.574
5.37	0.574*
5.38	0.522*
5.41	0.479*
5.42	0.428*
5.45	0.413
5.49	0.312
5.53	0.089
5.55	0.041*
5.58	0.007
5.59	0.007
5.63	0.028
5.65	0.028
5.71	0.007
5.82	0.007*
5.88	0.039*
5.92	0.109
6.06	0.202
6.16	0.092
6.20	0.022
6.25	0.216
6.29	0.253*
6.30	0.289*
6.33	0.315
6.37	0.191
6.40	0.202
6.49	0.077*
6.53	0.022*
6.62	0.016

CURVE 5
T ~ 298

λ	τ
5.00	0.481
5.03	0.507
5.06	0.473*
5.07	0.363*
5.09	0.291*
5.11	0.275
5.16	0.357
5.22	0.222*
5.24	0.212
5.29	0.270*
5.34	0.334
5.38	0.288*
5.41	0.194*
5.47	0.139
5.49	0.077
5.55	0.007*
6.20	0.012*
6.23	0.023*
6.29	0.079
6.32	0.054
6.40	0.023
6.46	0.013
6.57	0.006*
6.62	0.008*

* Not shown on plot

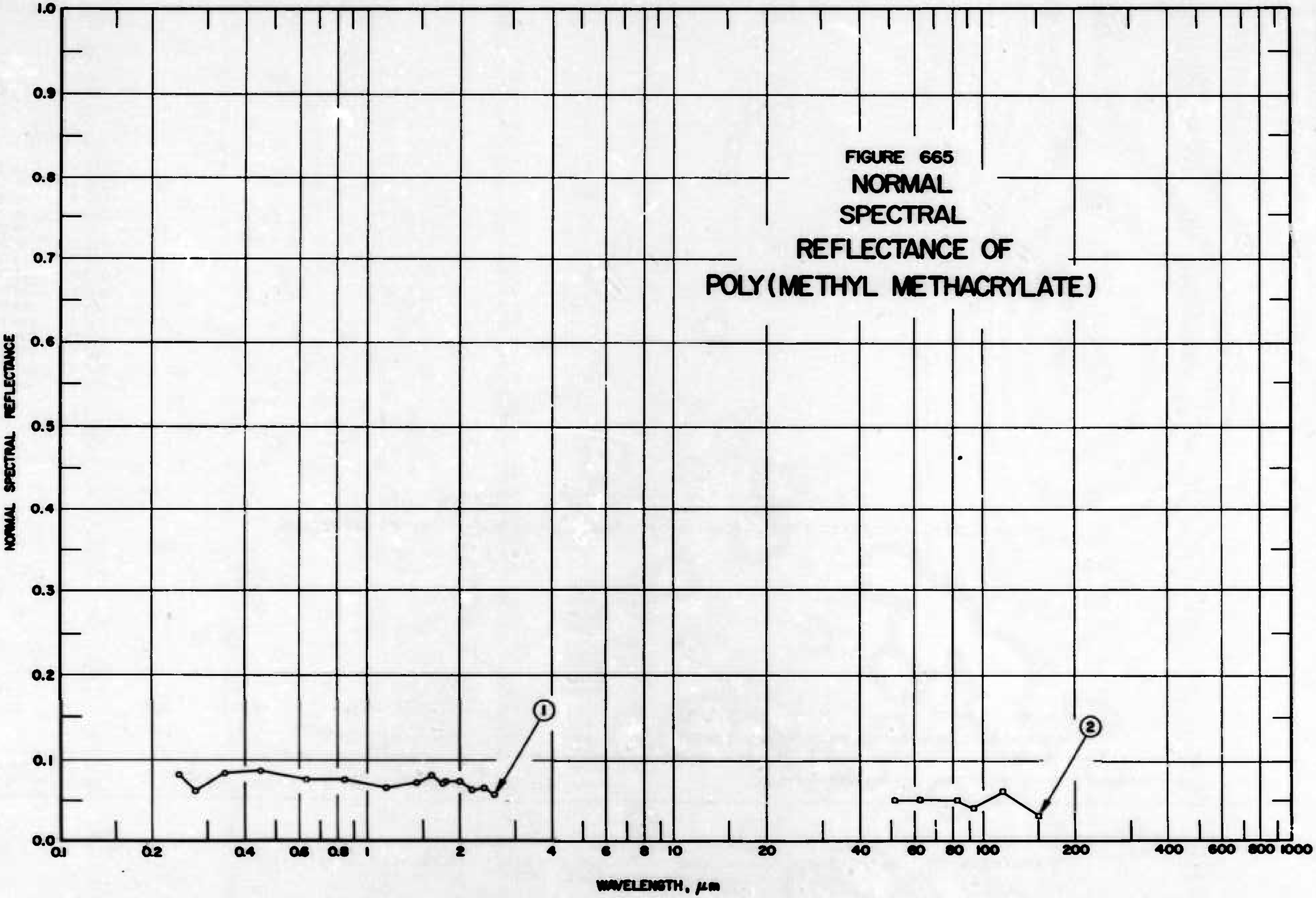


FIGURE 665
NORMAL
SPECTRAL
REFLECTANCE OF
POLY(METHYL METHACRYLATE)

SPECIFICATION TABLE NO. 665 NORMAL SPECTRAL REFLECTANCE OF POLY(METHYL METHACRYLATE)

Curve No.	Ref. No.	Year	Temperature K	Wavelength Range, μm	Geometry θ	θ'	ω'	Reported Error, %	Composition (weight percent), Specifications, and Remarks
1	262	1954	~298	0.242-2.60	~0°		2π	≤5	Lucite (~0.32 cm thick); data extracted from smooth curve.
2	47	1940	298	52-152	~0°	~0°			Plate (0.28 mm thick); [Authors' designation: Sample No. 1].

DATA TABLE NO. 665 NORMAL SPECTRAL REFLECTANCE OF POLY(METHYL METHACRYLATE)

[Wavelength, λ, μm; Reflectance, ρ; Temperature, T, K]

λ	ρ
CURVE 1	
T ~ 298	
0.242	0.080
0.275	0.061
0.333	0.082
0.451	0.085
0.632	0.075
0.840	0.076
1.14	0.065
1.44	0.070
1.61	0.080
1.77	0.070
1.80	0.072
2.00	0.072
2.20	0.062
2.40	0.065
2.60	0.067
CURVE 2	
T = 298	
52	0.05
63	0.05
83	0.05
CURVE 2 (cont.)	
94	0.04
117	0.06
152	0.03

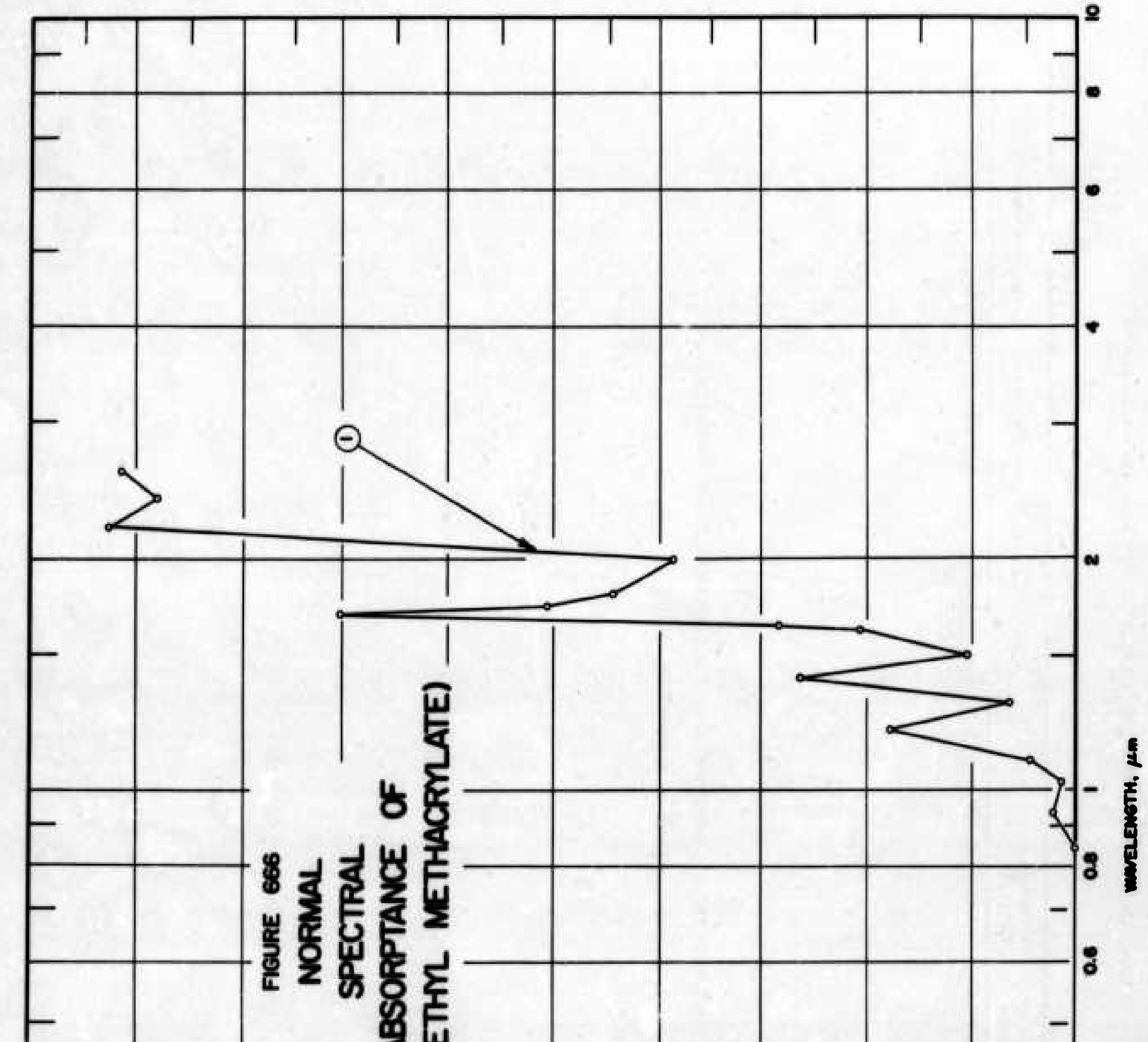


FIGURE 666 NORMAL SPECTRAL ABSORPTANCE OF POLY(METHYL METHACRYLATE)

SPECIFICATION TABLE NO. 666 NORMAL SPECTRAL ABSORPTANCE OF POLY(METHYL METHACRYLATE)

Curve No.	Ref. No.	Year	Temperature K	Wavelength Range, μm	Geometry θ	Reported Error, %	Composition (weight percent), Specifications, and Remarks
1	262	1954	~298	0.256-2.60	~0°		Lucite (~0.32 cm thick); data extracted from smooth curve.

DATA TABLE NO. 666 NORMAL SPECTRAL ABSORPTANCE OF POLY(METHYL METHACRYLATE)

[Wavelength, λ, μm; Absorptance, α; Temperature, T, K]

λ	α
CURVE 1	
T ~ 298	
0.256	0.938
0.296	0.920
0.307	0.165
0.336	0.047
0.420	0.000
0.841	0.000
0.931	0.022
1.02	0.015
1.09	0.045
1.20	0.177
1.30	0.065
1.40	0.261
1.50	0.102
1.62	0.205
1.64	0.281
1.70	0.703
1.74	0.507
1.80	0.445
2.00	0.386
2.20	0.928
2.40	0.880
2.60	0.914

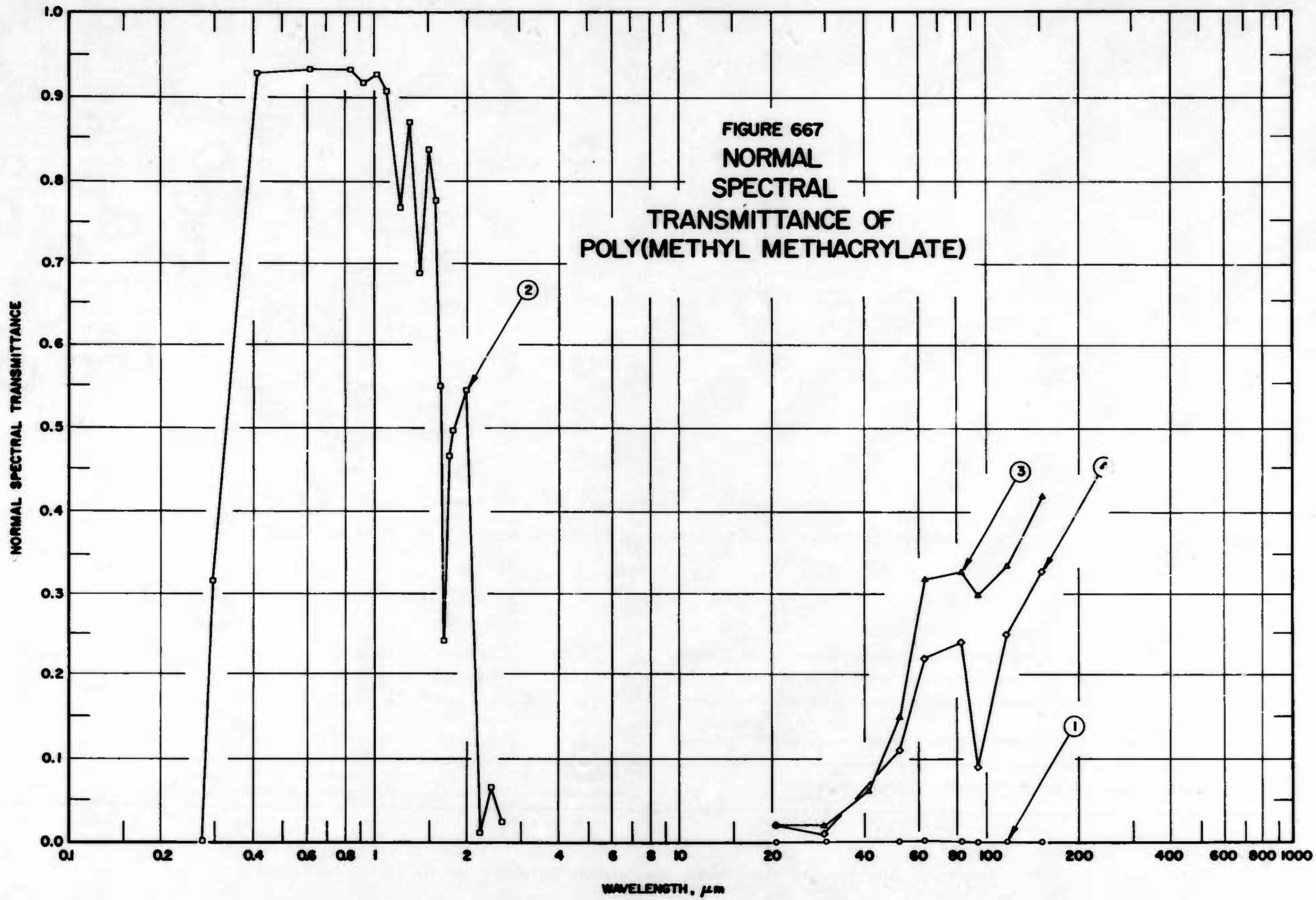


FIGURE 667
NORMAL
SPECTRAL
TRANSMITTANCE OF
POLY(METHYL METHACRYLATE)
NORMAL SPECTRAL TRANSMITTANCE
WAVELENGTH, µm
1.0
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0.0
0.1
0.2
0.4
0.6
0.8
1
2
4
6
8
10
20
40
60
80
100
200
400
600
800
1000
1
2
3

SPECIFICATION TABLE NO. 667 NORMAL SPECTRAL TRANSMITTANCE OF POLY(METHYL METHACRYLATE)

Curve No.	Ref. No.	Year	Temperature K	Wavelength Range, μm	Geometry θ	θ'	ω'	Reported Error, %	Composition (weight percent), Specifications, and Remarks
1	47	1940	298	20.7-152	~0°	~0°			Plexiglas plate (4.93 mm thick); from Rohm and Hass Co.; [Authors' designation: Sample No. 7].
2	262	1954	~298	0.270-2.60	~0°		2π	≤2	Lucite (~0.32 cm thick); data extracted from smooth curve.
3	47	1940	298	20.7-152	~0°	~0°			Lucite; [Authors' designation: Sample No. 40].
4	47	1940	298	20.7-152	~0°	~0°			Plate (0.28 mm thick); [Authors' designation: Sample No. 1].

DATA TABLE NO. 667 NORMAL SPECTRAL TRANSMITTANCE OF POLY(METHYL METHACRYLATE)

[Wavelength, λ, μm; Transmittance, τ; Temperature, T, K]

λ	τ
CURVE 1	
T = 298	
20.7	0.00
29.4	0.00
52	0.00
63	0.01
83	0.02
94	0.00
117	0.00
152	0.00
CURVE 2	
T ~ 298	
0.270	0.000
0.298	0.318
0.315	0.623
0.335	0.843
0.409	0.930
0.607	0.935
0.837	0.935
0.918	0.918
1.01	0.928
1.09	0.908
CURVE 2 (cont.)	
1.19	0.770
1.30	0.869
1.40	0.687
1.50	0.837
1.59	0.778
1.64	0.550
1.69	0.241
1.75	0.465
1.80	0.497
2.00	0.546
2.20	0.011
2.40	0.064
2.60	0.0[illegible]3
CURVE 3	
T = 298	
20.7	0.02
29.4	0.02
41	0.06
52	0.15
63	0.32
83	0.33
CURVE 3 (cont.)	
94	0.30
117	0.38
152	0.42
CURVE 4	
T = 298	
20.7	0.02
29.4	0.01
52	0.11
63	0.22
83	0.24
94	0.19
117	0.25
152	0.33

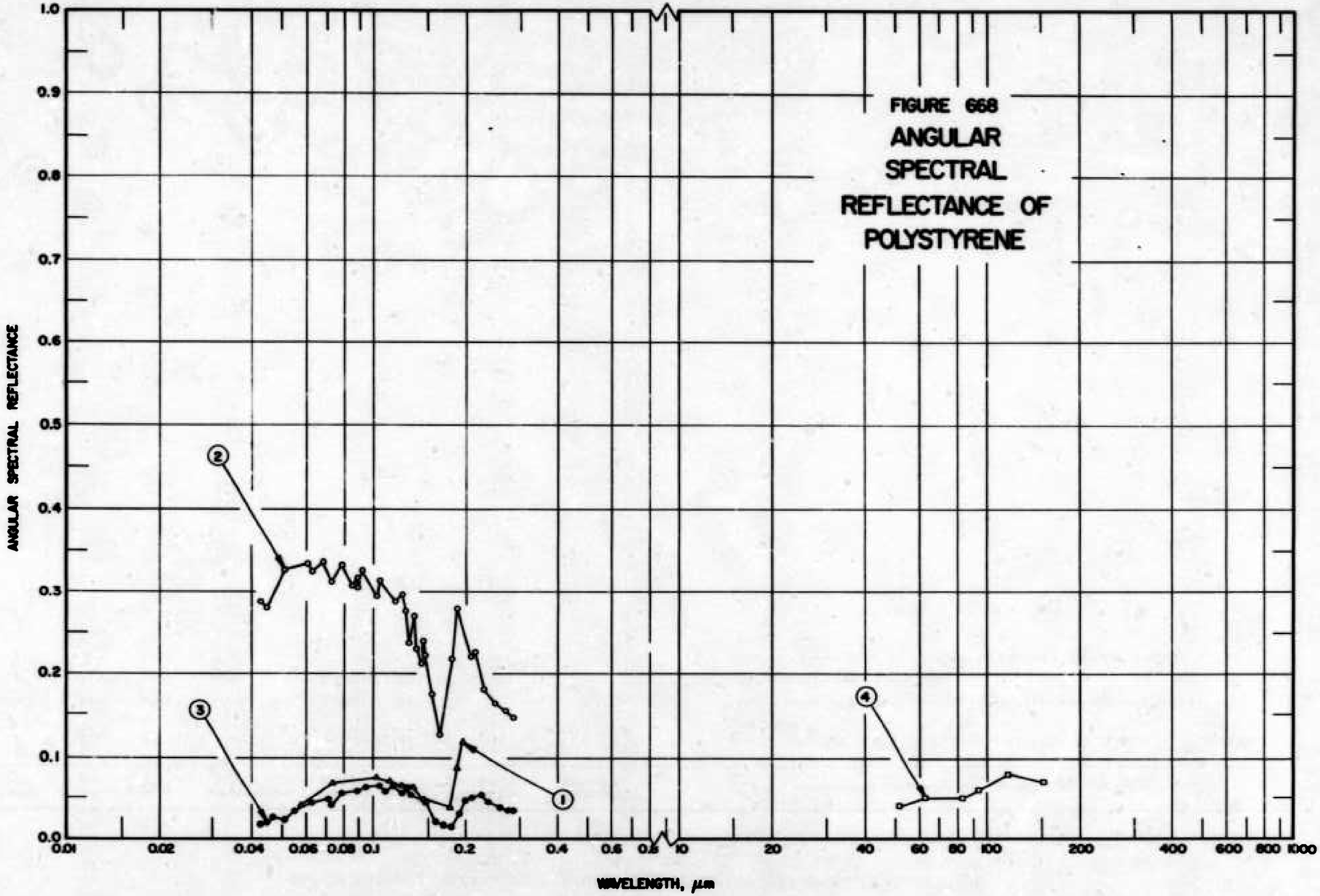


FIGURE 668
ANGULAR
SPECTRAL
REFLECTANCE OF
POLYSTYRENE
ANGULAR SPECTRAL REFLECTANCE
WAVELENGTH, μm
1.0
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0.0
0.01
0.02
0.04
0.06
0.08
0.1
0.2
0.4
0.6
0.8
10
20
40
60
80
100
200
400
600
800
1000
1
2
3
4

SPECIFICATION TABLE NO. 668 ANGULAR SPECTRAL REFLECTANCE OF POLYSTYRENE

Curve No.	Ref. No.	Year	Temperature K	Wavelength Range, μm	Geometry θ	Geometry θ'	Geometry ω'	Reported Error, %	Composition (weight percent), Specifications, and Remarks
1	423	1968	~298	0.0581-0.199	30°	30°		<5	Bulk sample; buffed and polished; washed, blown dry to avoid damaging the surface.
2	429	1966	~298	0.0427-0.2857	7°	7°			Bulk sample; buffed and polished; annealed; and then lapped to 0.838 μm.
3	429	1966	~298	0.0426-0.2858	20°	20°			Above specimen and conditions.
4	47	1940	298	52-152	~0°	~0°			Plate (2.59 mm thick) from Dow Co.; [Authors' designation: Sample 8].

DATA TABLE NO. 668 ANGULAR SPECTRAL REFLECTANCE OF POLYSTYRENE

[Wavelength, λ, μm; Reflectance, ρ; Temperature, T, K]

CURVE 1
T ~ 298

λ	ρ
0.058	0.040
0.073	0.069
0.102	0.075
0.102	0.074*
0.111	0.070
0.121	0.065
0.134	0.062
0.134	0.060*
0.145	0.049
0.179	0.036
0.179	0.049*
0.189	0.089
0.189	0.103*
0.199	0.115

CURVE 2
T ~ 298

λ	ρ
0.0427	0.286
0.0449	0.280
0.0476	0.280*
0.0503	0.328
0.0525	0.328*
0.0601	0.335
0.0631	0.326
0.0680	0.337
0.0721	0.312
0.0743	0.329*
0.0771	0.332*
0.0796	0.332
0.0826	0.314*
0.0850	0.309
0.0887	0.319
0.0898	0.303
0.0923	0.327
0.0959	0.315*
0.0982	0.296
0.1005	0.296*
0.1022	0.293
0.1037	0.314
0.1047	0.289*
0.1145	0.290*
0.1163	0.287*
0.1186	0.287

CURVE 2 (cont.)

λ	ρ
0.1222	0.299
0.1229	0.285*
0.1250	0.277*
0.1278	0.274
0.1292	0.237*
0.1308	0.237
0.1323	0.244*
0.1345	0.244*
0.1356	0.270
0.1375	0.263*
0.1398	0.250*
0.1397	0.230
0.1417	0.212
0.1437	0.240
0.1436	0.228*
0.1465	0.234*
0.1465	0.211
0.1492	0.213*
0.1516	0.174
0.1556	0.146*
0.1603	0.124*
0.1644	0.121
0.1699	0.128*
0.1754	0.159*
0.1800	0.219
0.1854	0.230*
0.1896	0.279
0.1943	0.275*
0.2005	0.260*
0.2050	0.225*
0.2103	0.220
0.2152	0.224
0.2200	0.200*
0.2250	0.198*
0.2300	0.180
0.2354	0.176*
0.2404	0.172*
0.2448	0.168*
0.2501	0.163
0.2551	0.161*
0.2603	0.159*
0.2655	0.156*
0.2703	0.153
0.2758	0.145*
0.2801	0.146*
0.2857	0.146

CURVE 3
T ~ 298

λ	ρ
0.0426	0.017
0.0451	0.020
0.0472	0.024
0.0508	0.021
0.0527	0.025*
0.0551	0.031
0.0596	0.037*
0.0624	0.041
0.0649	0.041*
0.0677	0.044*
0.0709	0.049
0.0722	0.040
0.0738	0.052*
0.0772	0.054*
0.0792	0.054
0.0815	0.054*
0.0849	0.056*
0.0882	0.058
0.0902	0.058*
0.0927	0.060*
0.0947	0.061
0.0985	0.061*
0.1000	0.061*
0.1041	0.062
0.1061	0.059*
0.1098	0.059
0.1144	0.062
0.1163	0.057*
0.1181	0.057*
0.1198	0.058*
0.1220	0.055
0.1240	0.059*
0.1265	0.059*
0.1297	0.060
0.1319	0.052
0.1338	0.061*
0.1365	0.064*
0.1398	0.058*
0.1411	0.058*
0.1432	0.052*
0.1459	0.046
0.1492	0.044
0.1513	0.032*
0.1577	0.026*
0.1607	0.020

CURVE 3 (cont.)

λ	ρ
0.1708	0.017
0.1748	0.014*
0.1800	0.014
0.1849	0.015*
0.1902	0.030
0.1949	0.043*
0.2000	0.045
0.2048	0.048*
0.2100	0.050
0.2151	0.051*
0.2206	0.051*
0.2249	0.051
0.2299	0.050*
0.2355	0.048*
0.2397	0.043
0.2451	0.043*
0.2500	0.040*
0.2549	0.040*
0.2603	0.038
0.2654	0.035*
0.2708	0.032*
0.2756	0.032
0.2801	0.032*
0.2858	0.032

CURVE 4
T = 298

λ	ρ
52	0.04
63	0.05
83	0.05
94	0.06
117	0.08
152	0.07

* Not shown on plot

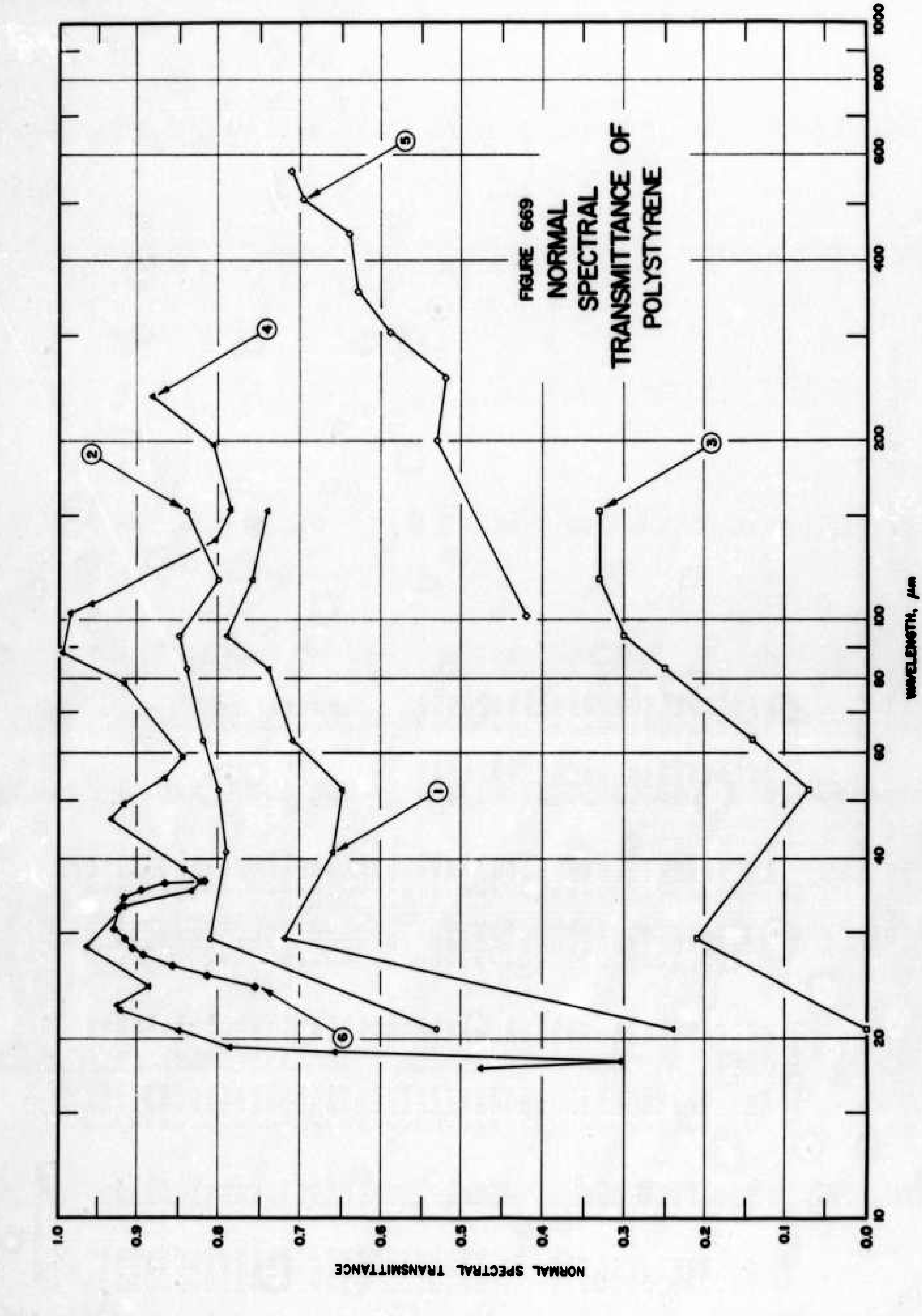


FIGURE 669 NORMAL SPECTRAL TRANSMITTANCE OF POLYSTYRENE

SPECIFICATION TABLE NO. 669 NORMAL SPECTRAL TRANSMITTANCE OF POLYSTYRENE

Curve No.	Ref. No.	Year	Temperature K	Wavelength Range, μm	Geometry θ θ' ω'	Reported Error, %	Composition (weight percent), Specifications, and Remarks
1	47	1940	298	20.7-152	~0° ~0°		(0.32 mm thick) from Dow Co.; [Authors' designation: Sample No. 37].
2	47	1940	298	20.7-152	~0° ~0°		Plate (0.09 mm thick) from U. of Michigan; [Authors' designation: Sample No. 35].
3	47	1940	298	20.7-152	~0° ~0°		Plate (2.59 mm thick) from Dow Co.; [Authors' designation: Sample No. 8].
4	73	1965	300	17.9-238	~0° ~0°		Film (30 μm thick); data extracted from smooth curve.
5	292	1950	~298	101-562	~0° ~0°		1.80 mm thick.
6	399	1948	~298	24.4-36.8	~0° ~0°		25 μm thick; data extracted from smooth curve.

DATA TABLE NO. 669 NORMAL SPECTRAL TRANSMITTANCE OF POLYSTYRENE

[Wavelength, λ, μm; Transmittance, τ; Temperature, T, K]

λ	τ	λ	τ	λ	τ	λ	τ	λ	τ
CURVE 1 T = 298		CURVE 2 (cont.)		CURVE 4 (cont.)		CURVE 4 (cont.)		CURVE 6 T ~ 298	
20.7	0.24	94	0.85	19.0	0.659	106	0.958	24.4	0.756
29.4	0.72	117	0.80	19.4	0.788	111	0.898*	25.5	0.813
41	0.66	152	0.84	20.7	0.850	136	0.802	26.5	0.859
52	0.65			22.3	0.922	154	0.787	27.7	0.893
63	0.71	CURVE 3 T = 298		22.8	0.926	172	0.795*	28.3	0.908
83	0.74	20.7	0.00	24.5	0.886	196	0.808	29.5	0.918
94	0.79	29.4	0.21	28.8	0.963	219	0.847*	30.9	0.930
117	0.76	52	0.07	31.9	0.956*	238	0.881	33.0	0.924
152	0.74	63	0.14	33.4	0.919			34.4	0.917
		83	0.25	35.1	0.834	CURVE 5 T ~ 298		35.6	0.896
CURVE 2 T = 298		94	0.30	36.8	0.822	101	[illegible]	36.4	0.866
20.7	0.53	117	0.33	38.1	0.842	200	0.53	36.6	0.848*
29.4	0.81	152	0.33	39.3	0.890*	256	0.52	36.8	0.819
41	0.79			46.7	0.935	301	0.59		
52	0.80	CURVE 4 T = 300		49.4	0.919	356	0.63		
63	0.82	17.9	0.474	54.8	0.867	443	0.64		
83	0.84	18.4	0.304	59.1	0.849	507	0.69		
				69.1	0.876*	562	0.71		
				78.5	0.917				
				88.3	0.996				
				103	0.985				

* Not shown on plot

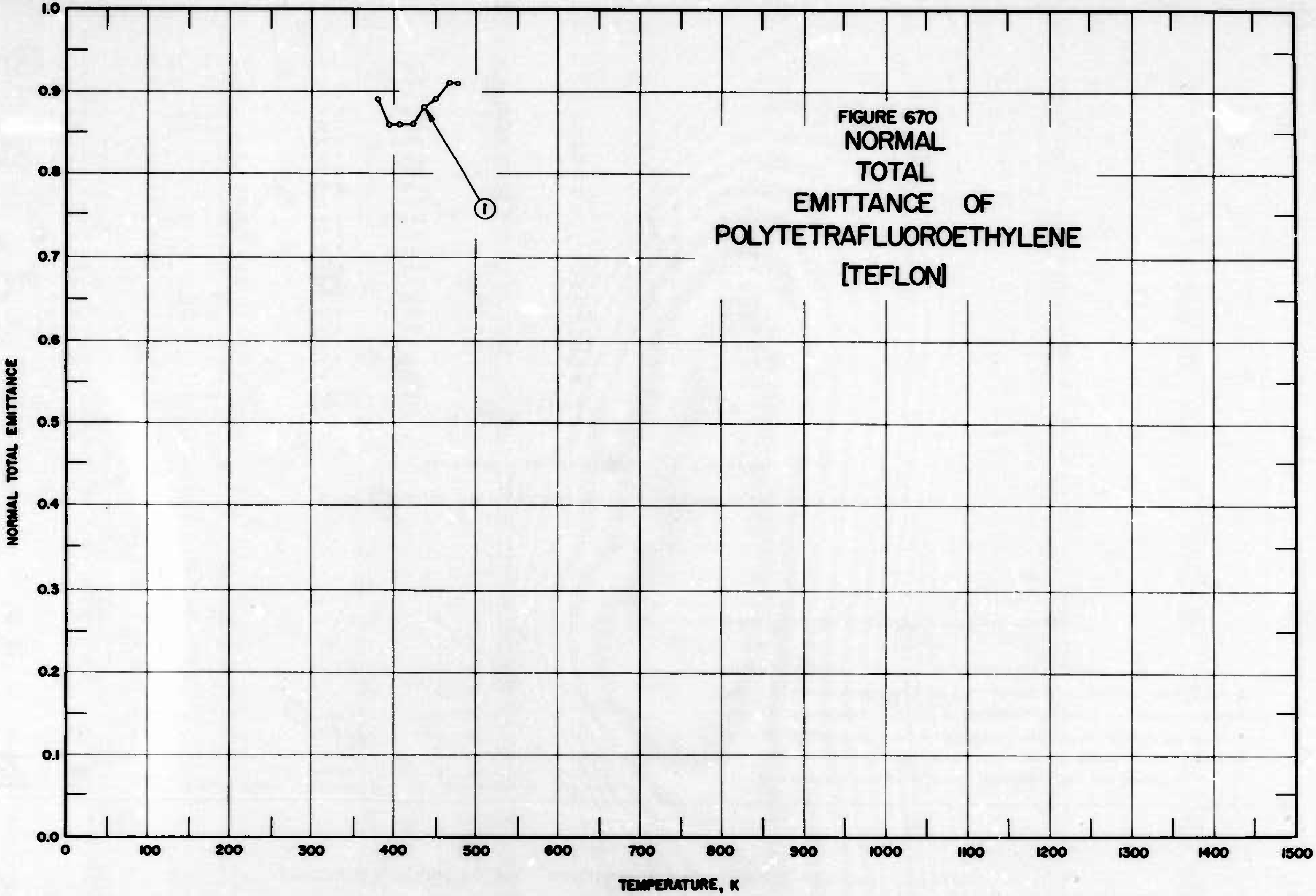


FIGURE 670 NORMAL TOTAL EMITTANCE OF POLYTETRAFLUOROETHYLENE [TEFLON]

SPECIFICATION TABLE NO. 670 NORMAL TOTAL EMITTANCE OF POLYTETRAFLUOROETHYLENE [TEFLON]

Curve No.	Ref. No.	Year	Temperature Range, K	Geometry θ'	Reported Error, %	Composition (weight percent), Specifications, and Remarks
1	453	1950	380-478	$\sim 0^{\circ}$		Heated at 583 K for 4 hrs; specific gravity 2.18.

DATA TABLE NO. 670 NORMAL TOTAL EMITTANCE OF POLYTETRAFLUOROETHYLENE [TEFLON]

[Temperature, T, K; Emittance, ϵ]

T	ϵ
CURVE 1	
380	0.89
394	0.86
408	0.86
422	0.86
436	0.88
450	0.89
464	0.91
478	0.91

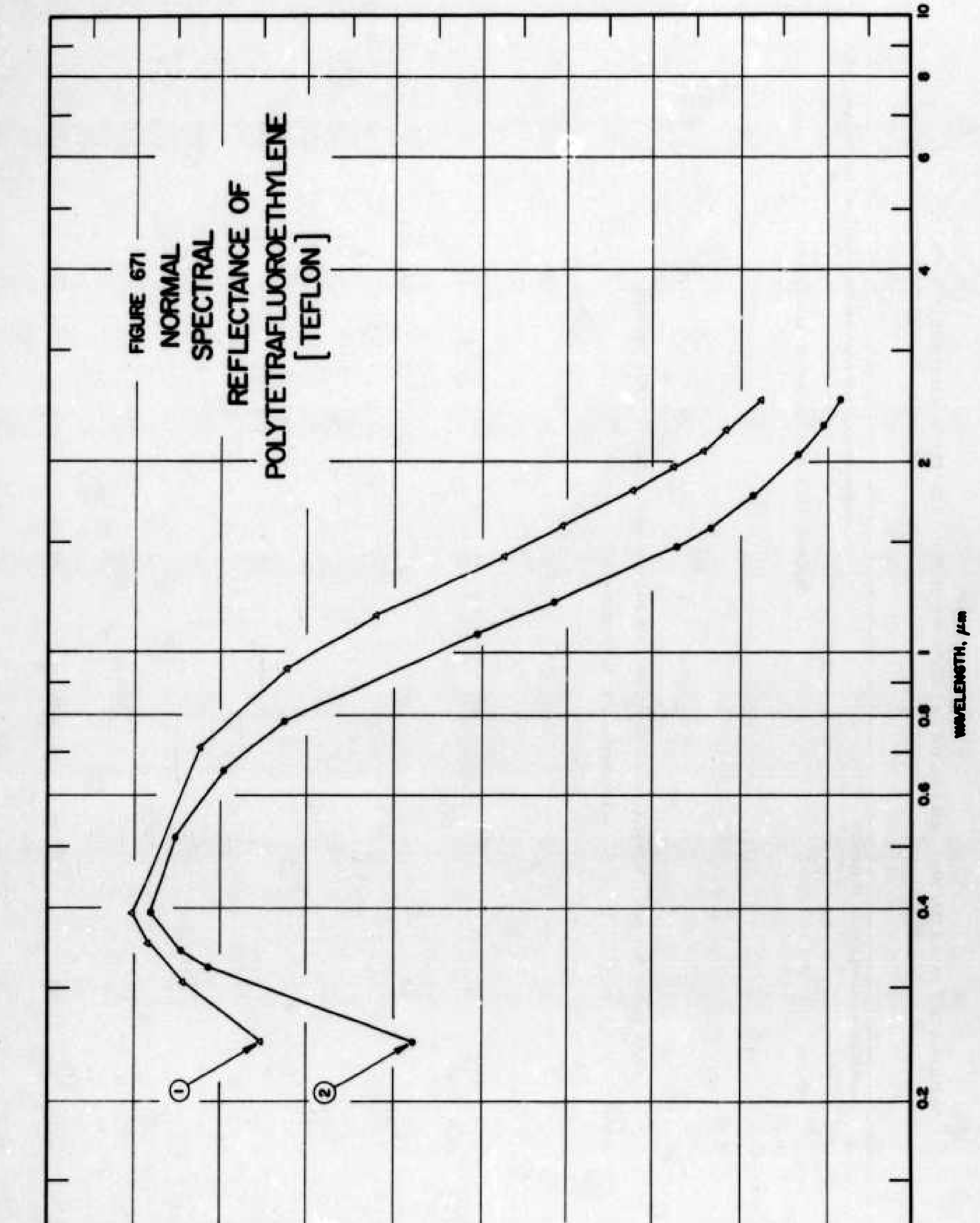


FIGURE 671
NORMAL
SPECTRAL
REFLECTANCE OF
POLYTETRAFLUOROETHYLENE
[TEFLON]
NORMAL SPECTRAL REFLECTANCE
WAVELENGTH, μm
1.0
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0.0
0.1
0.2
0.4
0.6
0.8
1
2
4
6
8
10
1
2

SPECIFICATION TABLE NO. 671 NORMAL SPECTRAL REFLECTANCE OF POLYTETRAFLUOROETHYLENE [TEFLON]

Curve No.	Ref. No.	Year	Temperature K	Wavelength Range, μm	Geometry θ	θ'	ω'	Reported Error, %	Composition (weight percent), Specifications, and Remarks
1	422	1964	300	0.249-2.50	5°		2π		AMS 3651 (10.16 mm thick); converted from R(2π, 5°); data extracted from smooth curve.
2	422	1963	300	0.248-2.50	5°		2π		BMS-8-71 (8.89 mm thick); converted from R(2π, 5°); data extracted from smooth curve.

DATA TABLE NO. 671 NORMAL SPECTRAL REFLECTANCE OF POLYTETRAFLUOROETHYLENE [TEFLON]

[Wavelength, λ, μm; Reflectance, ρ; Temperature, T, K]

λ	ρ
CURVE 1 T = 300	
0.249	0.751
0.308	0.846
0.351	0.889
0.393	0.902
0.713	0.825
0.947	0.722
1.15	0.622
1.42	0.476
1.59	0.403
1.80	0.324
1.96	0.278
2.09	0.242
2.23	0.216
2.50	0.179
CURVE 2 T = 300	
0.248	0.580
0.323	0.812
0.341	0.848
CURVE 2 (cont.)	
0.393	0.883
0.516	0.853
0.659	0.796
0.782	0.726
1.07	0.506
1.20	0.414
1.47	0.273
1.57	0.234
1.77	0.186
2.04	0.133
2.28	0.102
2.50	0.084

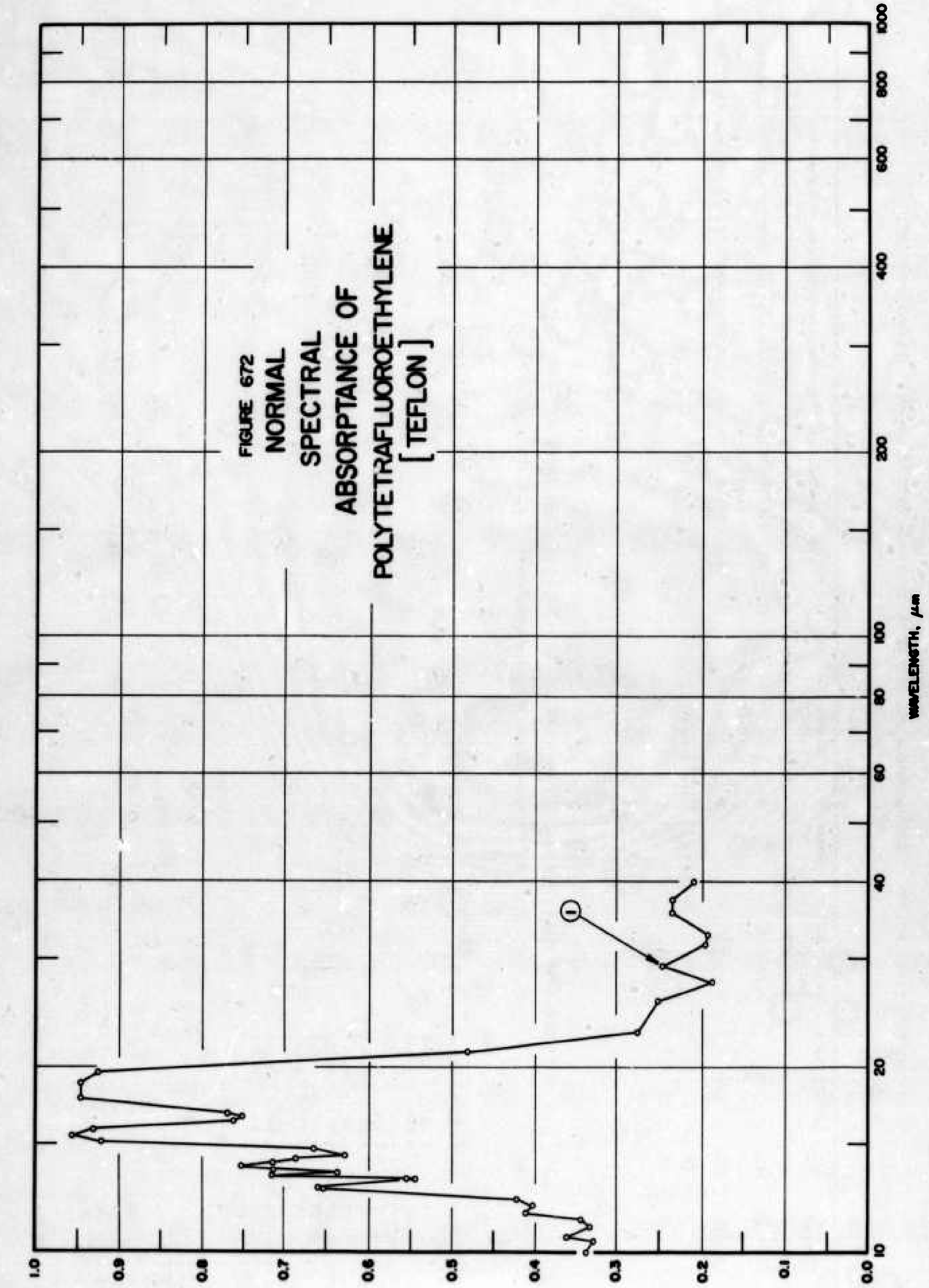


FIGURE 672 NORMAL SPECTRAL ABSORPTANCE OF POLYTETRAFLUOROETHYLENE [TEFLON]

SPECIFICATION TABLE NO. 672 NORMAL SPECTRAL ABSORPTANCE OF POLYTETRAFLUOROETHYLENE [TEFLON]

Curve No.	Ref. No.	Year	Temperature K	Wavelength Range, μm	Geometry θ	Reported Error, %	Composition (weight percent), Specifications, and Remarks
1	435	1965	~298	10.0-40.0	0°		50 μm thick; data extracted from smooth curve.

DATA TABLE NO. 672 NORMAL SPECTRAL ABSORPTANCE OF POLYTETRAFLUOROETHYLENE [TEFLON]

[Wavelength, λ, μm; Absorptance, α; Temperature, T, K]

λ	α	λ	α
CURVE 1		**CURVE 1 (cont.)**	
T ~ 298		16.8	0.770
10.0	0.337	17.8	0.949
10.4	0.329	18.8	0.949
10.6	0.361	19.6	0.928
11.0	0.334	21.1	0.481
11.3	0.345	22.8	0.276
11.6	0.412	25.6	0.252
11.9	0.40[illegible]	27.4	0.187
12.3	0.424	29.1	0.247
12.7	0.654	31.6	0.196
12.8	0.660	32.9	0.193
13.2	0.544	35.5	0.236
13.2	0.556	37.3	0.236
13.4	0.715	40.0	0.210
13.5	0.637		
13.6	0.712		
13.8	0.754		
14.0	0.714		
14.2	0.686		
14.4	0.629		
14.7	0.665		
15.2	0.922		
15.5	0.958		
15.9	0.934		
16.4	0.762		
16.6	0.751		

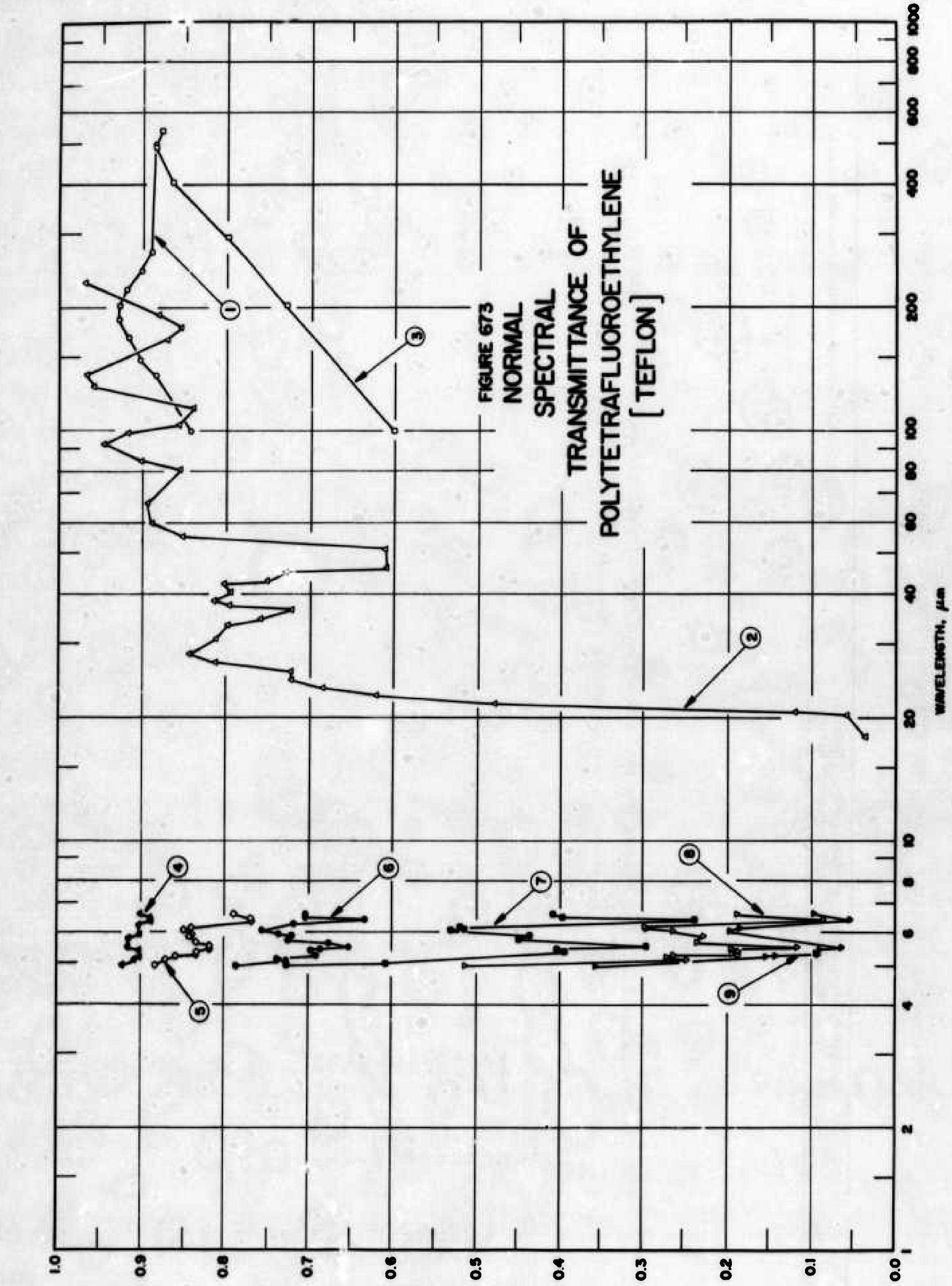


FIGURE 673 NORMAL SPECTRAL TRANSMITTANCE OF POLYTETRAFLUOROETHYLENE [TEFLON]

SPECIFICATION TABLE NO. 673 NORMAL SPECTRAL TRANSMITTANCE OF POLYTETRAFLUOROETHYLENE [TEFLON]

Curve No.	Ref. No.	Year	Temperature K	Wavelength Range, μm	Geometry θ	θ'	ω'	Reported Error, %	Composition (weight percent), Specifications, and Remarks
1	281	1969	~298	100-500	~0°	~0°			75 μm thick; data extracted from smooth curve.
2	73	1965	300	18.0-233	~0°	~0°			Film (95 μm thick); data extracted from smooth curve.
3	292	1950	~298	100-540	~0°	~0°			181 μm thick.
4	435	1965	~298	5.00-6.62	~0°	~0°			12 μm thick; data extracted from smooth curve.
5	435	1965	~298	5.00-6.62	~0°	~0°			48 μm thick; data extracted from smooth curve.
6	435	1965	~298	5.00-6.62	~0°	~0°			120 μm thick; data extracted from smooth curve.
7	435	1965	~298	5.00-6.62	~0°	~0°			240 μm thick; data extracted fro m smooth curve.
8	435	1965	~298	5.00-6.62	~0°	~0°			480 μm thick; data extracted from smooth curve.
9	435	1965	~298	5.00-6.62	~0°	~0°			720 μm thick; data extracted from smooth curve.

DATA TABLE NO. 673 NORMAL SPECTRAL TRANSMITTANCE OF POLYTETRAFLUOROETHYLENE [TEFLON]

[Wavelength, λ, μm; Transmittance, τ; Temperature, T, K]

CURVE 1
T ~ 298

λ	τ
100	0.846
137	0.889
149	0.905
169	0.920
187	0.931
203	0.931
221	0.921
248	0.905
271	0.892
500	0.888

CURVE 2
T = 300

λ	τ
18.0	0.037
20.3	0.058
20.7	0.120
21.7	0.480
22.8	0.621
23.7	0.687
24.8	0.723
26.0	0.723
27.2	0.815
28.7	0.846
31.2	0.814
33.8	0.799
34.9	0.761
36.8	0.723
37.6	0.798
38.8	0.817
40.4	0.798
42.1	0.803
43.3	0.752
45.2	0.729
46.4	0.608
49.3	0.049
51.4	0.610*
52.9	0.763
55.0	0.855
59.8	0.892
66.8	0.896
80.3	0.858
84.3	0.904
93.3	0.948

CURVE 2 (cont.)

λ	τ
98.8	0.920
104	0.859
114	0.844
129	0.959
137	0.969
167	0.875
179	0.857
191	0.884
233	0.971

CURVE 3
T ~ 298

λ	τ
100	0.60
201	0.73
297	0.80
403	0.87
499	0.89
540	0.88

CURVE 4
T ~ 298

λ	τ
5.00	0.922
5.05	0.922
5.16	0.908
5.25	0.902
5.43	0.902
5.59	0.918
5.80	0.918
5.87	0.909*
5.96	0.902
6.28	0.902
6.41	0.890
6.51	0.890
6.62	0.901

CURVE 5
T ~ 298

λ	τ
5.00	0.884
5.09	0.868*
5.16	0.872
5.21	0.860
5.27	0.837

CURVE 5 (cont.)

λ	τ
5.39	0.837
5.49	0.818
5.52	0.818
5.69	0.836
5.74	0.829*
5.85	0.844
5.91	0.842
6.08	0.850
6.15	0.842
6.40	0.770
6.48	0.770
6.57	0.780*
6.62	0.792

CURVE 6
T ~ 298

λ	τ
5.00	0.788
5.04	0.759*
5.08	0.752*
5.12	0.729
5.14	0.729*
5.17	0.739*
5.19	0.739
5.23	0.707*
5.28	0.692
5.42	0.697
5.47	0.686
5.52	0.652
5.61	0.677
5.71	0.716
5.76	0.724
5.87	0.720
5.97	0.736
6.03	0.757*
6.06	0.757
6.13	0.745*
6.18	0.743*
6.24	0.734*
6.29	0.719
6.33	0.689*
6.41	0.632
6.45	0.637*
6.51	0.689*
6.57	0.704
6.62	0.704

CURVE 7
T ~ 298

λ	τ
5.00	0.726
5.04	0.607
5.10	0.534*
5.13	0.510*
5.16	0.463*
5.22	0.487*
5.31	0.392*
5.39	0.392*
5.43	0.402*
5.45	0.402*
5.49	0.389*
5.51	0.349*
5.58	0.295
5.64	0.395*
5.69	0.435*
5.75	0.448
5.84	0.435*
5.87	0.435*
5.91	0.452*
5.93	0.468*
5.99	0.493*
6.04	0.524*
6.06	0.530
6.12	0.514
6.20	0.518
6.26	0.467*
6.32	0.424*
6.40	0.336*
6.42	0.294*
6.45	0.236
6.58	0.397
6.62	0.409

CURVE 8
T ~ 298

λ	τ
5.00	0.515
5.04	0.420*
5.06	0.357*
5.09	0.320*
5.13	0.291*
5.16	0.247*
5.17	0.247*
5.21	0.270
5.24	0.263

CURVE 8 (cont.)

λ	τ
5.29	0.195*
5.31	0.186
5.34	0.192
5.38	0.186
5.45	0.195
5.49	0.1[illegible]*
5.55	0.122*
5.57	0.117
5.59	0.128*
5.67	0.215*
5.71	0.235
5.87	0.229
5.90	0.235*
5.98	0.276*
6.05	0.312
6.13	0.295*
6.16	0.295*
6.20	0.299
6.27	0.251*
6.29	0.215*
6.37	0.185*
6.38	0.163*
6.41	0.143*
6.43	0.111*
6.46	0.085
6.62	0.189

CURVE 9
T ~ 298

λ	τ
5.00	0.356
5.03	0.323*
5.06	0.215*
5.14	0.169*
5.17	0.134*
5.21	0.153*
5.23	0.153*
5.26	0.143*
5.31	0.092*
5.33	0.092*
5.37	0.096
5.41	0.090
5.45	0.096*
5.53	0.066*
5.56	0.061
5.60	0.067*

CURVE 9 (cont.)

λ	τ
5.66	0.107*
5.71	0.125*
5.89	0.129*
5.93	0.141*
5.98	0.159*
6.06	0.198
6.12	0.185*
6.19	0.185*
6.26	0.155*
6.32	0.112*
6.41	0.078*
6.44	0.053*
6.48	0.053*
6.56	0.081
6.62	0.099

* Not shown on plot

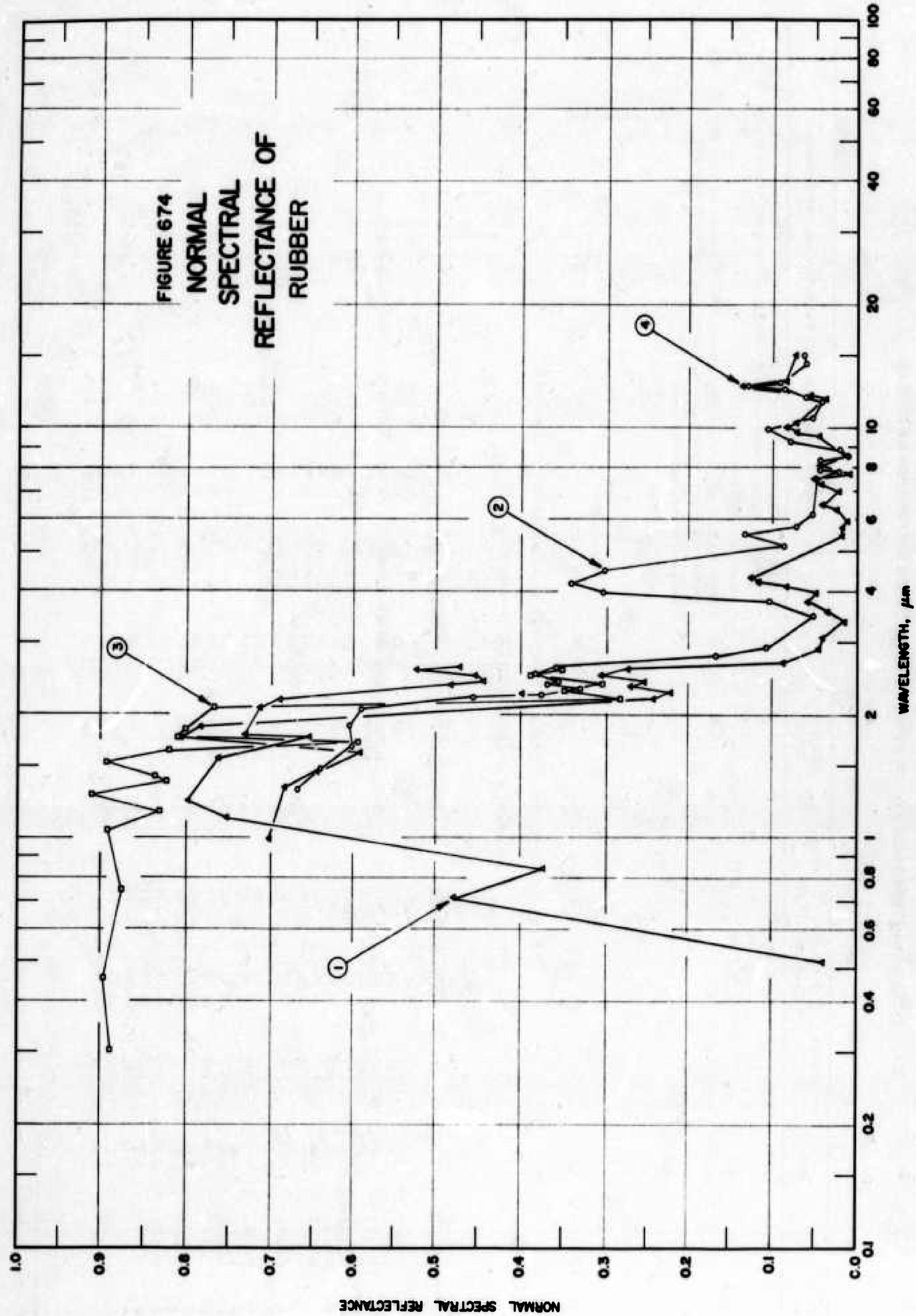


FIGURE 674 NORMAL SPECTRAL REFLECTANCE OF RUBBER

SPECIFICATION TABLE NO. 674 NORMAL SPECTRAL REFLECTANCE OF RUBBER

Curve No.	Ref. No.	Year	Temperature K	Wavelength Range, μm	Geometry θ	Geometry θ'	Geometry ω'	Reported Error, %	Composition (weight percent), Specifications, and Remarks
1	422	1964	300	0.50-2.60	5°		2π		PR-1910 (0.38 mm thick); clean, glossy surface; converted from R(2π, 5°); data extracted from smooth curve; [Author's designation: Sample 7].
2	422	1964	422	1.3-15.0	5°		2π		Above specimen and conditions.
3	422	1964	300	0.3-2.55	5°		2π		RTV-77 (0.38 mm thick); clean, glossy surface; converted from R(2π, 5°); data extracted from smooth curve; [Author's designation: Sample 8].
4	422	1964	439	0.99-15.0	5°		2π		Above specimen and conditions.

DATA TABLE NO. 674 NORMAL SPECTRAL REFLECTANCE OF RUBBER

[Wavelength, λ, μm; Reflectance, ρ; Temperature, T, K]

CURVE 1 T = 300

λ	ρ
0.50	0.040
0.71	0.480
0.84	0.375
1.11	0.755
1.23	0.800
1.56	0.765
1.74	0.657
1.78	0.734
2.06	0.719
2.14	0.691
2.22	0.400
2.28	0.407*
2.34	0.484
2.40	0.443
2.49	0.455
2.55	0.525
2.60	0.471

CURVE 2 T = 422

λ	ρ
1.30	0.670
1.47	0.641
1.66	0.602
1.87	0.607
2.04	0.592
2.20	0.458
2.21	0.376
2.30	0.332
2.36	0.370
2.40	0.357
2.50	0.383
2.60	0.360
2.76	0.167
2.90	0.107
3.46	0.051
3.78	0.102
3.99	0.306
4.18	0.342
4.47	0.302
5.15	0.087

CURVE 2 (cont.)

λ	ρ
5.47	0.132
5.79	0.071
6.16	0.054
7.53	0.050
7.80	0.023
7.95	0.047
8.24	0.047
8.59	0.011
8.86	0.023
9.21	0.080
9.59	0.080
9.91	0.106
10.42	0.055
11.50	0.043
11.99	0.062
12.21	0.088
12.43	0.130
12.58	0.130*
12.99	0.091
14.23	0.062
15.00	0.063

CURVE 3 T = 300

λ	ρ
0.30	0.890
0.45	0.899
0.74	0.878
1.04	0.894
1.15	0.833
1.26	0.911
1.37	0.827
1.40	0.840
1.51	0.894
1.62	0.821
1.70	0.596
1.74	0.811
1.83	0.802
1.87	0.786*
2.07	0.770
2.19	0.283
2.25	0.283
2.28	0.350
2.35	0.306
2.47	0.390
2.55	0.351

CURVE 4 T = 439

λ	ρ
0.99	0.703
1.31	0.688
1.46	0.649
1.60	0.593
1.74	0.597*
1.74	0.810
1.86	0.789
2.05	0.772*
2.18	0.242
2.25	0.222
2.32	0.272
2.40	0.253
2.49	0.309
2.59	0.275
2.68	0.088
2.86	0.049
3.08	0.042
3.39	0.017
3.59	0.036
3.71	0.060
3.93	0.050

CURVE 4 (cont.)

λ	ρ
4.08	0.085
4.20	0.116
4.29	0.125
5.46	0.020
5.74	0.020
5.98	0.013
6.25	0.027
6.48	0.041
7.00	0.023
7.22	0.043
7.51	0.051
7.74	0.010
7.92	0.048*
8.08	0.048
8.48	0.014
9.19	0.048*
9.59	0.048
9.79	0.073
10.01	0.085
10.34	0.072
10.56	0.051*
11.85	0.040

CURVE 4 (cont.)

λ	ρ
12.07	0.057
12.49	0.136
13.02	0.085
15.00	0.075

* Not shown on plot

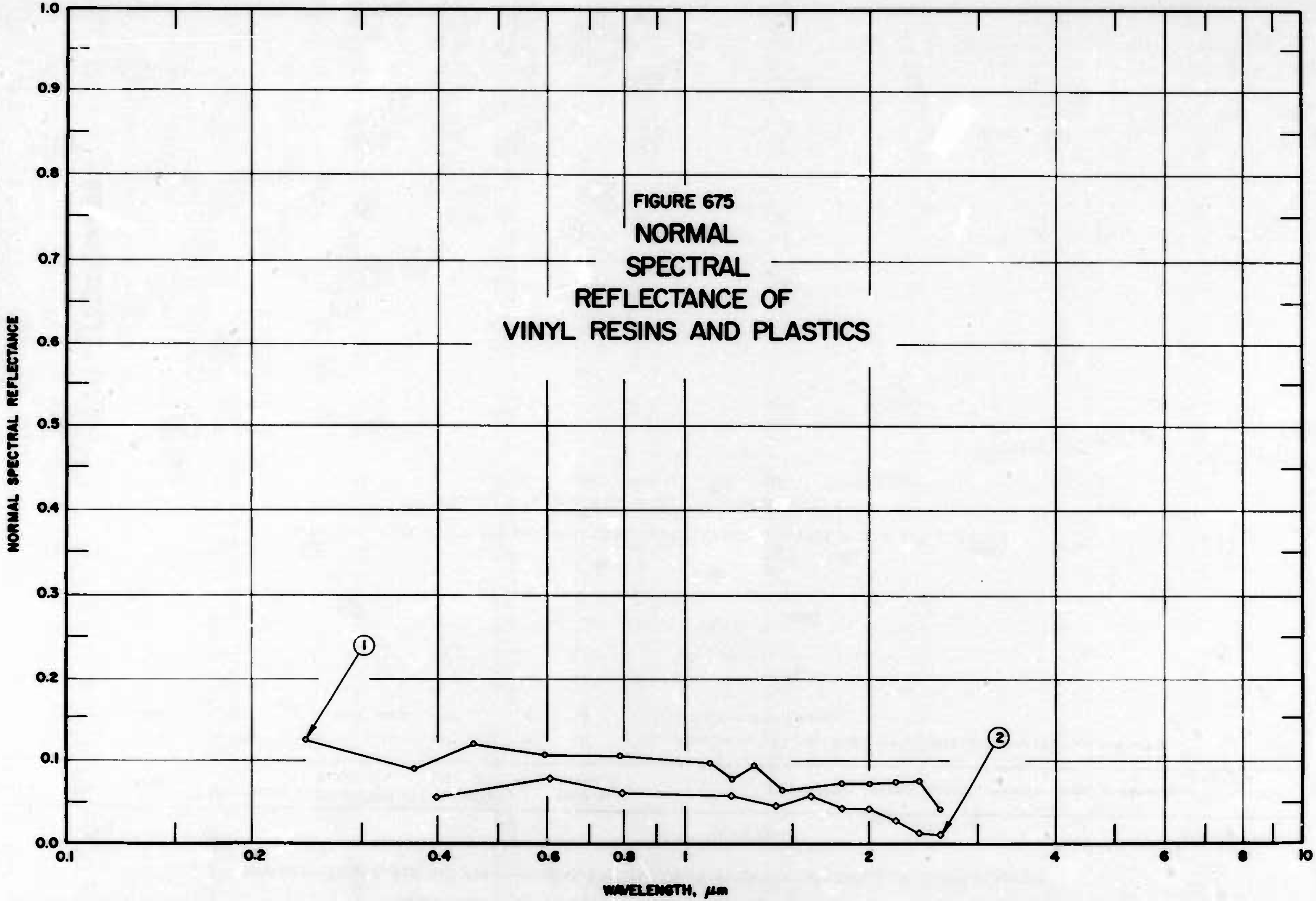


FIGURE 675
NORMAL
SPECTRAL
REFLECTANCE OF
VINYL RESINS AND PLASTICS

SPECIFICATION TABLE NO. 675 NORMAL SPECTRAL REFLECTANCE OF VINYL RESINS AND PLASTICS

Curve No.	Ref. No.	Year	Temperature K	Wavelength Range, μm	Geometry θ	θ'	ω'	Reported Error, %	Composition (weight percent), Specifications, and Remarks
1	262	1954	~298	0.245-2.60	~0°		2π	≤5	Bakelite (~0.32 mm thick); clear; data extracted from smooth curve.
2	262	1954	~298	0.399-2.60	~0°		2π	≤5	Vinyl (~0.8 mm thick).

DATA TABLE NO. 675 NORMAL SPECTRAL REFLECTANCE OF VINYL RESINS AND PLASTICS

[Wavelength, λ, μm; Reflectance, ρ; Temperature, T, K]

λ	ρ	λ	ρ
CURVE 1 T ~ 298		CURVE 2 (cont.)	
		1.41	0.046
0.245	0.121	1.60	0.057
0.367	0.089	1.80	0.043
0.459	0.118	2.00	0.042
0.599	0.104	2.20	0.027
0.790	0.104	2.40	0.012
1.10	0.096	2.60	0.010
1.19	0.078		
1.30	0.092		
1.44	0.064		
1.80	0.072		
2.00	0.072		
2.20	0.073		
2.40	0.075		
2.60	0.041		
CURVE 2 T ~ 298			
0.399	0.056		
0.605	0.078		
0.799	0.061		
1.19	0.058		

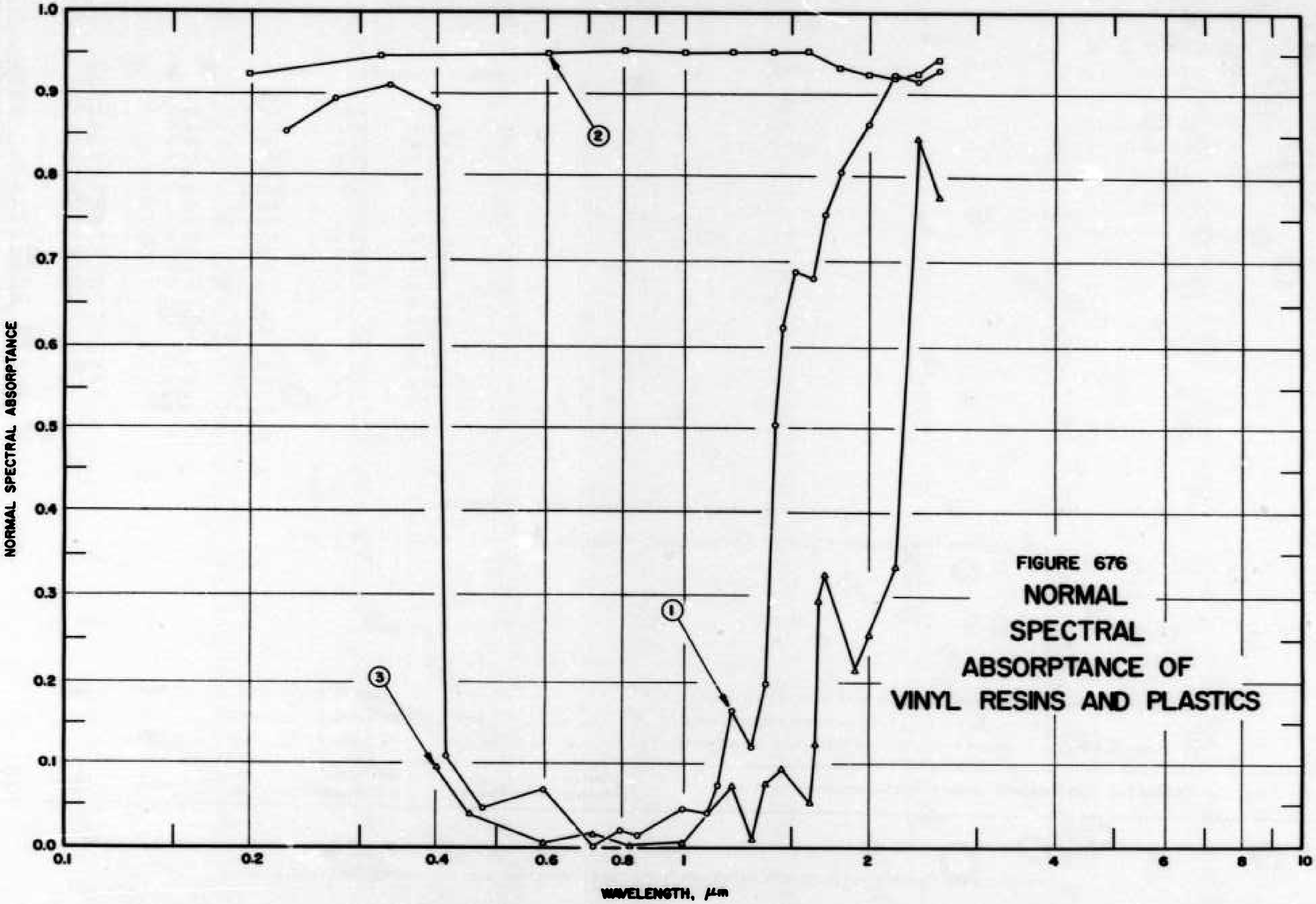


FIGURE 676
NORMAL
SPECTRAL
ABSORPTANCE OF
VINYL RESINS AND PLASTICS

SPECIFICATION TABLE NO. 676 NORMAL SPECTRAL ABSORPTANCE OF VINYL RESINS AND PLASTICS

Curve No.	Ref. No.	Year	Temperature K	Wavelength Range, μm	Geometry θ'	Reported Error, %	Composition (weight percent), Specifications, and Remarks
1	262	1954	~298	0.228-2.60	~0°		Bakelite, clear, ~0.125 in. thick; data extracted from smooth curve.
2	262	1954	~298	0.200-2.60	~0°		Black bakelite; data extracted from smooth curve.
3	262	1954	~298	0.401-2.60	~0°		Vinyl (0.8 mm thick); data extracted from smooth curve.

DATA TABLE NO. 676 NORMAL SPECTRAL ABSORPTANCE OF VINYL RESINS AND PLASTICS

[Wavelength, λ, μm; Absorptance, α; Temperature, T, K]

λ	α	λ	α	λ	α
CURVE 1	T ~ 298	CURVE 1 (cont.)		CURVE 3	T ~ 298
		2.00	0.864		
0.228	0.853	2.20	0.926	0.401	0.094
0.273	0.895	2.40	0.918	0.454	0.039
0.336	0.911	2.60	0.931	0.596	0.004
0.400	0.883			0.712	0.015
0.414	0.108	CURVE 2	T ~ 298	0.820	0.000
0.477	0.046			0.994	0.004
0.596	0.068			1.20	0.073
0.716	0.000	0.200	0.925	1.29	0.010
0.796	0.020	0.325	0.949	1.37	0.075
0.841	0.015	0.603	0.951	1.44	0.094
0.996	0.045	0.804	0.954	1.60	0.051
1.09	0.040	1.01	0.952	1.63	0.123
1.14	0.074	1.20	0.954	1.65	0.295
1.20	0.166	1.40	0.954	1.69	0.325
1.29	0.120	1.59	0.953	1.80	0.214
1.36	0.199	1.79	0.936	2.00	0.256
1.41	0.505	2.00	0.927	2.20	0.334
1.45	0.625	2.20	0.922	2.40	0.847
1.52	0.689	2.40	0.927	2.60	0.779
1.62	0.681	2.60	0.944		
1.70	0.758				
1.80	0.807				

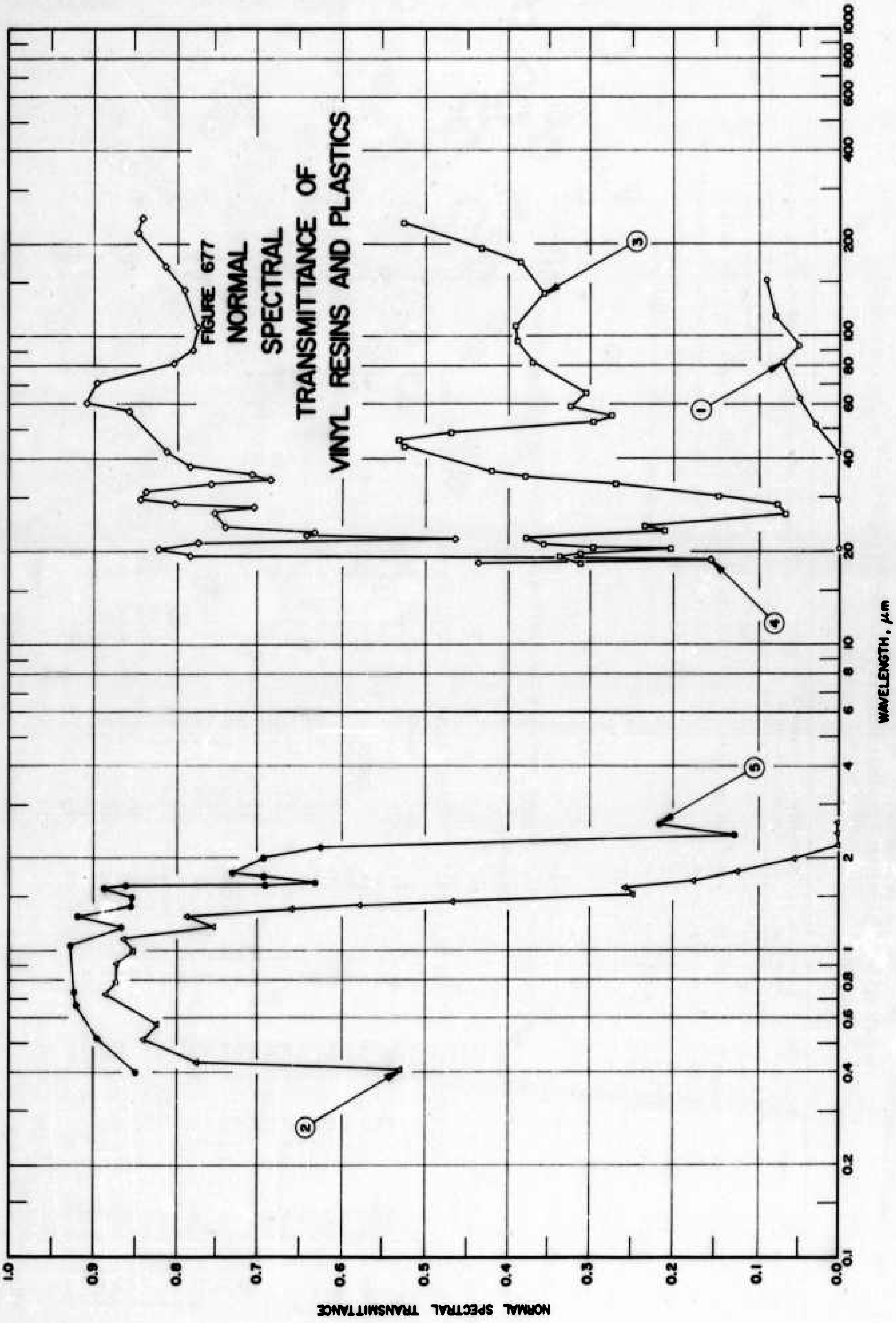


FIGURE 677 NORMAL SPECTRAL TRANSMITTANCE OF VINYL RESINS AND PLASTICS

SPECIFICATION TABLE NO. 677 NORMAL SPECTRAL TRANSMITTANCE OF VINYL RESINS AND PLASTICS

Curve No.	Ref. No.	Year	Temperature K	Wavelength Range, μm	Geometry θ	θ'	ω'	Reported Error, %	Composition (weight percent), Specifications, and Remarks
1	47	1940	298	20.7-152	~0°	~0°			Bakelite, plate (0.44 mm thick); [Authors' designation: Sample No. 42].
2	262	1954	~298	0.361-2.60	~0°		2π	≤2	Bakelite (~0.32 cm thick); data extracted from smooth curve.
3	73	1965	300	18.4-234	~0°	~0°			Polyvinyl chloride film (200 μm thick); data extracted from smooth curve.
4	73	1965	300	18.4-242	~0°	~0°			Polyvinylidene chloride film (25 μm thick); data extracted from smooth curve.
5	262	1954	~298	0.401-2.60	~0°		2π	≤2	Vinyl (~0.8 mm thick); data extracted from smooth curve.

DATA TABLE NO. 677 NORMAL SPECTRAL TRANSMITTANCE OF VINYL RESINS AND PLASTICS

[Wavelength, λ, μm; Transmittance, τ; Temperature, T, K]

λ	τ	λ	τ	λ	τ	λ	τ	λ	τ	λ	τ
CURVE 1		CURVE 2 (cont.)		CURVE 3 (cont.)		CURVE 3 (cont.)		CURVE 4 (cont.)		CURVE 5 (cont.)	
T = 298		1.00	0.855	20.7	0.297	194	0.435	38.0	0.784	1.40	0.857
20.7	0.00	1.08	0.866	21.3	0.357	234	0.527	42.6	0.813	1.49	0.857
29.4	0.00	1.19	0.752	22.1	0.380			56.4	0.859	1.60	0.890
41	0.00	1.30	0.789	23.2	0.212	CURVE 4		60.6	0.910	1.63	0.863
52	0.03	1.36	0.662	24.2	0.234	T = 300		70.3	0.899	1.65	0.691
63	0.05	1.40	0.580	26.7	0.067			82.0	0.804	1.69	0.632
83	0.07	1.44	0.468	28.3	0.078	18.4	0.439	90.3	0.781	1.76	0.694
94	0.05	1.51	0.249	30.2	0.147	18.8	0.156	107	0.774	1.80	0.731
117	0.08	1.60	0.258	33.4	0.271	19.4	0.785	142	0.792	2.00	0.695
152	0.09	1.70	0.174	35.3	0.380	20.3	0.823	171	0.814	2.20	0.627
		1.80	0.122	36.8	0.421	21.2	0.775	219	0.850	2.40	0.126
CURVE 2		2.00	0.054	44.0	0.525	22.0	0.466	242	0.843	2.60	0.215
T ~ 298		2.20	0.000	46.0	0.531	22.4	0.644				
		2.40	0.000	48.6	0.472	23.0	0.633	CURVE 5			
0.361	0.000	2.60	0.000	52.8	0.296	24.0	0.741	T ~ 298			
0.387	0.028			55.5	0.274	26.9	0.754				
0.403	0.529	CURVE 3		59.7	0.324	27.8	0.705	0.401	0.851		
0.427	0.777	T = 300		65.4	0.304	28.5	0.805	0.507	0.899		
0.505	0.841			82.9	0.370	29.7	0.847	0.650	0.922		
0.564	0.826	18.4	0.312	96.8	0.390	31.6	0.838	0.802	0.925		
0.719	0.888	19.3	0.338	109	0.390	33.3	0.757	1.03	0.930		
0.783	0.875	19.7	0.312	138	0.357	34.4	0.686	1.19	0.867		
0.917	0.875	20.5	0.205	174	0.386	35.9	0.708	1.30	0.920		

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Material Index

Material Index to Thermal Radiative Properties Companion Volumes 7 and 8

MATERIAL NAME	VOLUME	EMITTANCE Total Hemispherical	EMITTANCE Total Normal	EMITTANCE Total Angular	EMITTANCE Spectral Hemispherical	EMITTANCE Spectral Normal	EMITTANCE Spectral Angular	REFLECTANCE Integrated Hemispherical	REFLECTANCE Integrated Normal	REFLECTANCE Integrated Angular	REFLECTANCE Spectral Hemispherical	REFLECTANCE Spectral Normal	REFLECTANCE Spectral Angular	REFLECTANCE Solar Hemispherical	REFLECTANCE Solar Normal	REFLECTANCE Solar Angular	ABSORPTANCE Integrated Hemispherical	ABSORPTANCE Integrated Normal	ABSORPTANCE Integrated Angular	ABSORPTANCE Spectral Hemispherical	ABSORPTANCE Spectral Normal	ABSORPTANCE Spectral Angular	ABSORPTANCE Solar Hemispherical	ABSORPTANCE Solar Normal	ABSORPTANCE Solar Angular	TRANSMITTANCE Integrated Hemispherical	TRANSMITTANCE Integrated Normal	TRANSMITTANCE Integrated Angular	TRANSMITTANCE Spectral Hemispherical	TRANSMITTANCE Spectral Normal	TRANSMITTANCE Spectral Angular	TRANSMITTANCE Solar Hemispherical	TRANSMITTANCE Solar Normal	TRANSMITTANCE Solar Angular
ADP, See Ammonium Dihydrogen Phosphate																																					
Ag_2Al	8	-	-	-	-	-	-	-	-	-	-	1352	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
AgCd	8	-	-	-	-	-	-	-	-	-	-	-	1326	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
AgZn	8	-	-	-	-	-	-	-	-	-	-	-	1328	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
$Al + SiO_2$	8	-	-	-	-	-	-	-	-	-	-	1428	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
$Al + TaAl_3$	8	-	-	-	-	-	-	-	-	-	-	1431	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
$Al + ZrO_2$	8	-	-	-	-	-	-	-	-	-	-	1442	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Alcoa No. 2 Reflector Plate	7	4 5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	42 43	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Alleghany Alloy No. 66	7	-	1180	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Alleghany Metal	7	-	1225	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
$Al_2O_3 + Cr + \Sigma X_i$ Cermet	8	-	1355	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
$Al_2O_3 + Cr_2O_3$ Powders	8	-	-	-	-	554	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Al_2O_3 + NiAl Cermet	8	-	1358	-	-	1359	-	-	-	-	-	1363	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Al_2O_3 + NiO Powders	8	-	-	-	-	556	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
$Al_2O_3 + SiO_2$ Powders	8	-	-	-	-	558	-	-	-	-	-	560	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
$Al_2O_3 + W + \Sigma X_i$ Cermet	8	-	1375	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
AlSb	8	-	-	-	-	-	-	-	-	-	-	1352	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Aluminates:																																					
Calcium Aluminate	8	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	573	-	-	-	-
Magnesium Aluminate	8	-	-	-	-	-	-	-	-	-	-	576	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	577	-	-	-	-
Yttrium Aluminate	8	-	-	-	-	-	-	-	-	-	-	579	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Aluminum	7	2	8	-	-	12	15	-	-	18	20	24	34 38	-	40	-	42	45	-	-	47	50	-	52	55	-	-	-	-	57	60	-	-	-

MATERIAL NAME	VOLUME	EMITTANCE						REFLECTANCE									ABSORPTANCE									TRANSMITTANCE								
		Total			Spectral			Integrated			Spectral			Solar			Integrated			Spectral			Solar			Integrated			Spectral			Solar		
		Hemispherical	Normal	Angular	Hemispherical	Normal	Angular	Hemispherical	Normal	Angular	Hemispherical	Normal	Angular	Hemispherical	Normal	Angular	Hemispherical	Normal	Angular	Hemispherical	Normal	Angular	Hemispherical	Normal	Angular	Hemispherical	Normal	Angular	Hemispherical	Normal	Angular	Hemispherical	Normal	Angular
Aluminum Foil	7	5 6	9	-	-	-	-	-	-	-	-	26 27	-	-	40	-	43	-	-	-	-	50	-	-	55	-	-	-	-	-	60	-	-	-
Aluminum Alloys:																																		
24-ST	7	1063	1068 1069	-	-	-	-	-	-	-	-	1078	-	-	1084	-	-	-	-	-	-	-	-	1087	-	-	-	-	-	-	-	-	-	-
53-SO	7	-	1101	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
75-ST	7	-	1119	-	-	-	-	-	-	-	-	-	-	-	1129	-	-	-	-	-	-	-	-	1132	-	-	-	-	-	-	-	-	-	-
1075	7	-	-	-	-	-	-	-	-	-	-	28	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1100	7	-	10	-	-	-	16	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2024	7	1063	-	-	-	1074	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1087	-	-	-	-	-	-	-	-	-	-
2024-T (see 24-ST)																																		
2219	7	-	-	-	-	-	-	-	-	-	-	1078	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3003	7	1112	1114	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
5053-O (see 53-SO)																																		
6061	7	1098	-	-	-	-	-	-	-	-	-	1106	-	-	-	-	-	-	-	-	-	-	-	1110	-	-	-	-	-	-	-	-	-	-
7075	7	-	-	-	-	1122	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
7075-T (see 75-ST)																																		
7075-T6	7	-	-	-	-	-	1126	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Alclad 24-SO	7	-	-	-	-	-	-	-	-	-	-	-	-	-	1084	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Alclad 24-ST	7	-	1068 1069	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Alclad 75-ST	7	1116	1119	-	-	-	-	-	-	-	-	-	-	-	1129	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Alclad 2024-O (see Alclad 24-SO)																																		
Alclad 2024-T (see Alclad 24-ST)																																		
Alclad 7075-T (see Alclad 75-ST)																																		
L34	7	-	-	-	-	-	-	-	-	-	-	1092	-	-	1095	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
L72	7	-	-	-	-	-	-	-	-	-	-	-	-	-	1084	-	-	-	-	-	-	-	-	1087	-	-	-	-	-	-	-	-	-	-

MATERIAL NAME	VOLUME	EMITTANCE						REFLECTANCE									ABSORPTANCE									TRANSMITTANCE								
		Total			Spectral			Integrated			Spectral			Solar			Integrated			Spectral			Solar			Integrated			Spectral			Solar		
		Hemispherical	Normal	Angular	Hemispherical	Normal	Angular	Hemispherical	Normal	Angular	Hemispherical	Normal	Angular	Hemispherical	Normal	Angular	Hemispherical	Normal	Angular	Hemispherical	Normal	Angular	Hemispherical	Normal	Angular	Hemispherical	Normal	Angular	Hemispherical	Normal	Angular	Hemispherical	Normal	Angular
Aluminum Bronze	7	-	1160	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Aluminum + Cobalt	7	-	-	-	-	-	-	-	-	-	-	887	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Aluminum + Copper + ΣX_i	7	1062	1066	-	-	1072	-	-	-	-	-	1076	-	-	1083	-	-	-	-	-	-	-	-	1086	-	-	-	-	-	-	-	-	-	-
Aluminum + Iron + ΣX_i	7	-	-	-	-	-	-	-	-	-	-	1090	-	-	1094	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Aluminum + Magnesium	7	-	-	-	-	-	-	-	-	-	-	890	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Aluminum + Magnesium + ΣX_i	7	1098	1100	-	-	-	-	-	-	-	-	1105	-	-	-	-	-	-	-	-	-	-	-	1110	-	-	-	-	-	-	-	-	-	-
Aluminum + Manganese + ΣX_i	7	1112	1114	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Aluminum + Silicon	7	-	-	-	-	-	-	-	-	-	-	893	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Aluminum + Silver	7	-	-	-	-	-	-	-	-	-	-	896	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Aluminum + Zinc + ΣX_i	7	1116	1118	-	-	1121	1124	-	-	-	-	-	-	-	1128	-	-	-	-	-	-	-	-	1131	-	-	-	-	-	-	-	-	-	-
Aluminum Dodecaboride	8	-	-	-	-	732	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Aluminum Nitride	8	-	1030	-	-	1031 1033	-	-	-	-	-	1035	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Aluminum Oxide	8	141	142	-	-	146 148	-	-	-	-	-	157	163	-	-	-	-	-	-	-	166	-	-	168	-	-	-	-	-	169	-	-	-	-
Aluminum Oxide (Ruby)	8	-	-	-	-	-	-	-	-	-	-	-	174	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	176	-	-	-	-
Aluminum Oxide (Sapphire)	8	179	181	-	-	183	-	-	-	-	-	-	187	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	190	-	-	-	-
Aluminum Phosphate	8	-	-	-	-	-	-	-	-	-	-	602	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Aluminum Silicate	8	-	-	-	-	-	-	-	-	-	-	618	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Aluminum Silicate Glass	8	-	1523	-	-	~~[illegible]~~	-	-	-	-	-	1525	-	-	-	-	-	-	-	-	-	-	-	1527	-	-	1528	-	-	1530	-	-	-	-
Ammonium Dihydrogen Phosphate	8	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	604	-	-	-	-
Anatase	8	-	-	-	-	-	-	-	-	-	-	464	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Anglesite	8	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1702	-	-	-	-
Anhydrite	8	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	630	-	-	-	-
Antimony	7	-	-	-	-	-	-	-	-	-	-	-	-	-	-	63	-	-	-	-	-	-	-	-	-	-	-	-	-	66	-	-	-	-
Diantimony Trioxide	8	-	-	-	-	-	-	-	-	-	-	198	-	-	-	-	-	-	-	-	-	-	-	200	-	-	-	-	-	-	-	-	-	-
AO-1053 Glass	8	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1533	-	-	-	-
Armco Iron	7	303	308	-	-	-	-	-	-	-	-	322	-	-	-	-	-	-	-	-	-	-	-	332	-	-	-	-	-	-	-	-	-	-
Arsenic	8	-	-	-	-	-	-	-	-	-	-	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Arsenic Glasses	8	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1535	-	-	-	-

MATERIAL NAME	VOLUME	EMITTANCE						REFLECTANCE									ABSORPTANCE									TRANSMITTANCE								
		Total			Spectral			Integrated			Spectral			Solar			Integrated			Spectral			Solar			Integrated			Spectral			Solar		
		Hemispherical	Normal	Angular	Hemispherical	Normal	Angular	Hemispherical	Normal	Angular	Hemispherical	Normal	Angular	Hemispherical	Normal	Angular	Hemispherical	Normal	Angular	Hemispherical	Normal	Angular	Hemispherical	Normal	Angular	Hemispherical	Normal	Angular	Hemispherical	Normal	Angular	Hemispherical	Normal	Angular
Arsenides																																		
Gallium Arsenide	8	-	-	-	-	-	-	-	-	-	-	679	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	683	-	-	-	-
Indium Arsenide	8	-	-	-	-	685	-	-	-	-	-	687	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	689	-	-	-	-
Diarsenic Triselenide	8	-	-	-	-	-	-	-	-	-	-	1130	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1133	-	-	-	-
Diarsenic Trisulfide	8	-	-	-	-	-	-	-	-	-	-	1177	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1179	-	-	-	-
Astrolloy	7	-	-	-	-	1363 1412	-	-	-	-	-	1377 1418	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
$AuAl_2$	8	-	-	-	-	-	-	-	-	-	-	1295	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
$AuGa_2$	8	-	-	-	-	-	-	-	-	-	-	1295	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
$AuIn_2$	8	-	-	-	-	-	-	-	-	-	-	1295	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
AuZn	8	-	-	-	-	-	-	-	-	-	-	1292	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
AZ-31	7	-	1328	-	-	-	-	-	-	-	-	1332	-	-	-	-	-	-	-	-	-	-	-	1334	-	-	-	-	-	-	-	-	-	-
AZ-31B	7	-	-	-	-	-	-	-	-	-	-	1332	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
AZO-33	8	-	-	-	-	-	-	-	-	-	-	510- 518	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
AZO-55LO	8	-	-	-	-	-	-	-	-	-	-	510- 518	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
AZO-66	8	-	-	-	-	-	-	-	-	-	-	510- 518	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Azurite	8	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1658	-	-	-	-
B + TiB_2 Powders	8	-	-	-	-	-	-	-	-	-	-	1447	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Bakelite	8	-	-	-	-	-	-	-	-	-	-	1742	-	-	-	-	-	-	-	-	1744	-	-	-	-	-	-	-	-	1746	-	-	-	-
Barite	8	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1702	-	-	-	-
Barium	7	-	-	-	-	-	-	-	-	-	-	-	68	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Barium Hexaboride	8	-	-	-	-	732	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Barium Carbonate	8	-	-	-	-	-	-	-	-	-	-	592	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Barium Fluoride	8	-	-	-	-	-	-	-	-	-	-	-	909	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	912	-	-	-	-
Barium Oxide	8	-	-	-	-	-	-	-	-	-	-	546	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Barium Phosphate	8	-	-	-	-	-	-	-	-	-	-	608	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
$Ba_xSr_{1-x}F_2$	8	-	-	-	-	-	-	-	-	-	-	992	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

MATERIAL NAME	VOLUME	EMITTANCE						REFLECTANCE									ABSORPTANCE									TRANSMITTANCE								
		Total			Spectral			Integrated			Spectral			Solar			Integrated			Spectral			Solar			Integrated			Spectral			Solar		
		Hemispherical	Normal	Angular	Hemispherical	Normal	Angular	Hemispherical	Normal	Angular	Hemispherical	Normal	Angular	Hemispherical	Normal	Angular	Hemispherical	Normal	Angular	Hemispherical	Normal	Angular	Hemispherical	Normal	Angular	Hemispherical	Normal	Angular	Hemispherical	Normal	Angular	Hemispherical	Normal	Angular
Barium Sulfate	8	-	-	-	-	-	-	-	-	-	-	623	-	-	-	-	-	-	-	-	-	-	-	627	-	-	-	-	-	-	-	-	-	-
Barium Titanate	8	-	-	-	-	-	-	-	-	-	-	635 637	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	642	-	-	-	-
Barium Tungstate	8	-	-	-	-	-	-	-	-	-	-	666	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Barium Zirconate	8	-	-	-	-	-	-	-	-	-	-	676	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Barium Zirconium Silicate	8	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	616	-	-	-	-	-	-	-	-	-	-
Barytes	8	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	704	-	-	-	-	-	-	-	-	-	-
Basalt	8	-	-	-	-	-	-	-	-	-	-	698	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Bauxite	8	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	670	-	-	-	-
$B_4C + MoO_3$ Powders	8	-	-	-	-	-	-	-	-	-	-	1455	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Be_2Cr	8	-	-	-	-	1275	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
$Be_{12}Nb$	8	-	1273	-	-	-	-	-	-	-	-	1280	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
$Be_{17}Nb_2$	8	-	1273	-	-	1277	-	-	-	-	-	1280	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
$BeO + Be_{12}Ta$ Cermet	8	-	1377	-	-	1378	-	-	-	-	-	1382	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Be_2Re	8	-	-	-	-	1275	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Beryllia (see Beryllium Oxide)																																		
Beryllium	7	-	71	-	-	74	-	-	-	-	-	78	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	82	-	-	-	-
Beryllium Extrusion #30	7	-	-	-	-	-	-	-	-	-	-	79	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Beryllium + Iron + ΣX_i	7	-	-	-	-	-	-	-	-	-	-	-	1134	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Pentaberyllium Boride	8	-	-	-	-	732	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Beryllium Intermetallic Compounds	8	-	1273	-	-	1274 1276	-	-	-	-	-	1279	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Be_2Cr	8	-	-	-	-	1275	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Be_2Re	8	-	-	-	-	1275	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Be_2Ti	8	-	-	-	-	1275	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
$Be_{12}Nb$	8	-	1273	-	-	-	-	-	-	-	-	1280	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
$Be_{12}Ta$	8	-	1273	-	-	1277	-	-	-	-	-	1280	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
$Be_{13}Sc$	8	-	-	-	-	1275	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
$Be_{13}Zr$	8	-	-	-	-	-	-	-	-	-	-	1280	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
$Be_{17}Nb_2$	8	-	1273	-	-	1277	-	-	-	-	-	1280	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

MATERIAL NAME	VOLUME	EMITTANCE						REFLECTANCE									ABSORPTANCE									TRANSMITTANCE								
		Total			Spectral			Integrated			Spectral			Solar			Integrated			Spectral			Solar			Integrated			Spectral			Solar		
		Hemispherical	Normal	Angular	Hemispherical	Normal	Angular	Hemispherical	Normal	Angular	Hemispherical	Normal	Angular	Hemispherical	Normal	Angular	Hemispherical	Normal	Angular	Hemispherical	Normal	Angular	Hemispherical	Normal	Angular	Hemispherical	Normal	Angular	Hemispherical	Normal	Angular	Hemispherical	Normal	Angular
Beryllium Intermetallic Compounds (continued)																																		
Be$_{17}$Ta$_2$	8	-	1273	-	-	1277	-	-	-	-	-	1280	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Be$_{17}$Zr$_2$		-	-	-	-	-	-	-	-	-	-	1280	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Beryllium Oxide	8	-	201	-	-	203 205	-	-	-	-	-	-	-	-	-	208	-	-	-	-	210	-	-	212	-	-	-	-	-	213	-	-	-	-
Be$_{13}$Sc	8	-	-	-	-	1275	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Be$_{12}$Ta	8	-	1273	-	-	1277	-	-	-	-	-	1280	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Be$_{17}$Ta$_2$	8	-	1273	-	-	1277	-	-	-	-	-	1280	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Be$_2$Ti	8	-	-	-	-	1275	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Be$_{13}$Zr	8	-	-	-	-	-	-	-	-	-	-	1280	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Be$_{17}$Zr$_2$	8	-	-	-	-	-	-	-	-	-	-	1280	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Bismuth	7	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	85	88	-	-	-
Bismuth + Tin	7	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	899	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Bismuth Triiodide	8	-	-	-	-	-	-	-	-	-	-	1027	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Dibismuth Triselenide	8	-	-	-	-	-	-	-	-	-	-	1130	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Bismuth Tellurium Selenide	8	-	-	-	-	-	-	-	-	-	-	1130	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Dibismuth Tritelluride	8	-	-	-	-	-	-	-	-	-	-	1238	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Bismuth Titanate	8	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	644	-	-	-	-
Borates	8	-	-	-	-	-	-	-	-	-	-	582	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Borides																																		
Molybdenum Borides	8	-	-	-	-	691	-	-	-	-	-	693	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Niobium Diboride	8	-	697	-	-	701	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Titanium Diboride	8	-	703	-	-	705 709	-	-	-	-	-	710	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Zirconium Diboride	8	-	712	-	-	715 717	-	-	-	-	-	720	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Rare Earth Borides	8	-	-	-	-	722	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	726	-	-	-	-
Miscellaneous Borides	8	-	729	-	-	721	-	-	-	-	-	734	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tetraboron Carbide	8	-	-	-	-	852	-	-	-	-	-	855	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

MATERIAL NAME	VOLUME	EMITTANCE						REFLECTANCE									ABSORPTANCE									TRANSMITTANCE								
		Total			Spectral			Integrated			Spectral			Solar			Integrated			Spectral			Solar			Integrated			Spectral			Solar		
		Hemispherical	Normal	Angular	Hemispherical	Normal	Angular	Hemispherical	Normal	Angular	Hemispherical	Normal	Angular	Hemispherical	Normal	Angular	Hemispherical	Normal	Angular	Hemispherical	Normal	Angular	Hemispherical	Normal	Angular	Hemispherical	Normal	Angular	Hemispherical	Normal	Angular	Hemispherical	Normal	Angular
Boron Nitride	8	-	1037	-	-	1040 1042	-	-	-	-	-	1047	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1054	-	-	-	-
Boron Phosphate	8	-	-	-	-	-	-	-	-	-	-	608	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Boron Phosphide	8	-	-	-	-	1105	-	-	-	-	-	1107	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tetraboron Silicide	8	-	1134	-	-	1136	-	-	-	-	-	1138	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Hexaboron Silicide	8	-	1134	-	-	1136	-	-	-	-	-	1138	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Borosilicate Glass	8	-	1539	-	-	1541	-	-	-	-	-	1543	-	-	-	-	-	-	-	-	-	-	-	1545	-	-	1546	-	1547	1549	-	-	-	-
Brass	7	912	915	-	-	-	-	-	-	-	-	-	-	-	-	-	-	925	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Brass, α	7	-	-	-	-	-	-	-	-	-	-	-	-	921	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Brass, β	7	-	-	-	-	-	-	-	-	-	-	-	-	921	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Brass, yellow	7	912	-	-	-	-	-	-	-	-	-	-	-	-	-	-	923	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Bromides																																		
Cesium Bromide	8	-	-	-	-	-	-	-	-	-	-	-	-	-	-	737	-	-	-	-	-	-	-	-	-	-	-	-	-	739	-	-	-	-
Copper Bromide	8	-	-	-	-	-	-	-	-	-	-	741	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	743	-	-	-	-
Lead Bromide	8	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	745	-	-	-	-
Dimercury Dibromide	8	-	-	-	-	-	-	-	-	-	-	747	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Potassium Bromide	8	-	-	-	-	749	-	-	-	-	-	751 753	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	759	-	-	-	-
Rubidium Bromide	8	-	-	-	-	764	-	-	-	-	-	-	766	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	768	-	-	-	-
Silver Bromide	8	-	-	-	-	-	-	-	-	-	-	770	773	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	775	-	-	-	-
Thallium Bromide	8	-	-	-	-	-	-	-	-	-	-	778	780 782	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	783	-	-	-	-
Bronze	7	-	-	-	-	1163	-	-	-	-	-	918 1167	-	-	-	-	-	-	-	-	-	-	-	1170	-	-	-	-	-	-	-	-	-	-
Brucite	8	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1662	-	-	-	-
Brush S. P.	8	-	202	-	-	204	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
B. S. 1433 Copper	7	-	-	-	-	-	-	-	-	-	-	-	-	-	173	-	-	-	-	-	-	-	-	194	-	-	-	-	-	-	-	-	-	-
Cadmium	7	91	-	-	-	-	-	-	-	-	-	-	93	-	-	-	96	-	-	-	-	98	-	-	-	-	-	-	-	-	-	-	-	-
Cadmium Antimonide	8	-	-	-	-	-	-	-	-	-	-	1282	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cadmium Fluoride	8	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	919	-	-	-	-
Cadmium Oxide	8	-	-	-	-	216	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

MATERIAL NAME	VOLUME	EMITTANCE						REFLECTANCE									ABSORPTANCE									TRANSMITTANCE								
		Total			Spectral			Integrated			Spectral			Solar			Integrated			Spectral			Solar			Integrated			Spectral			Solar		
		Hemispherical	Normal	Angular	Hemispherical	Normal	Angular	Hemispherical	Normal	Angular	Hemispherical	Normal	Angular	Hemispherical	Normal	Angular	Hemispherical	Normal	Angular	Hemispherical	Normal	Angular	Hemispherical	Normal	Angular	Hemispherical	Normal	Angular	Hemispherical	Normal	Angular	Hemispherical	Normal	Angular
Cadmium Selenide	8	-	-	-	-	-	-	-	1103	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1110	-	-	-	-
Cadmium Sulfide	8	-	1181	-	-	1183	-	-	-	-	-	1188	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1194	-	-	-	-
Cadmium Telluride	8	1239	-	-	-	-	-	-	-	-	-	1241	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1244	-	-	-	-
Calcite	8	-	-	-	-	-	-	-	-	-	-	584 1653	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	586	-	-	-	-
Calcium Aluminate	8	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	573	-	-	-	-
Calcium Aluminate Glass	8	-	-	-	-	-	-	-	-	-	-	1551	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1553	-	-	-	-
Calcium Hexaboride	8	-	-	-	-	732	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Calcium Carbonate	8	-	-	-	-	-	-	-	-	-	-	583	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	585	-	-	-	-
Calcium Fluoride	8	-	-	-	-	921	-	-	-	-	-	-	924	-	-	-	-	-	-	-	929	-	-	-	-	-	-	-	-	931	-	-	-	-
Calcium Oxide	8	-	-	-	-	-	-	-	-	-	-	218	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	220	-	-	-	-
Calcium Silicate	8	-	-	-	-	-	-	-	-	-	-	618	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Calcium Sulfate	8	-	-	-	-	-	-	-	-	-	-	627	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	629	-	-	-	-
Calcium Tungstates	8	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	663	-	-	-	-
Calcium Zirconium Silicate	8	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	616	-	-	-	-	-	-	-	-	-	-
Carbides																																		
Niobium Monocarbide	8	785	787	-	-	789	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Silicon Monocarbide	8	791	792	-	-	796 798	-	-	-	-	-	802	-	-	-	-	-	-	-	-	808	-	-	810	-	-	-	-	-	-	-	-	-	-
Tantalum Carbide	8	811	813	-	-	815 817	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Titanium Carbide	8	819	821	-	-	823	825	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tungsten Carbides	8	-	826	-	-	828 830	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Zirconium Carbide	8	833	835	-	-	837 841	-	-	-	-	-	843	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Miscellaneous Carbides	8	847	849	-	-	851	-	-	-	-	-	854	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Carbon	8	-	5	-	8 10	12 14	16	-	-	-	18 20	22	24 25	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	27	-	-	-	-
Carbon (Graphite)	8	30	31	38	40 42	44 51	57	-	-	-	59 61	63 65	70 71	-	-	-	74	-	-	-	-	-	-	76	-	-	-	-	-	-	-	-	-	-

MATERIAL NAME	VOLUME	EMITTANCE						REFLECTANCE									ABSORPTANCE									TRANSMITTANCE								
		Total			Spectral			Integrated			Spectral			Solar			Integrated			Spectral			Solar			Integrated			Spectral			Solar		
		Hemispherical	Normal	Angular	Hemispherical	Normal	Angular	Hemispherical	Normal	Angular	Hemispherical	Normal	Angular	Hemispherical	Normal	Angular	Hemispherical	Normal	Angular	Hemispherical	Normal	Angular	Hemispherical	Normal	Angular	Hemispherical	Normal	Angular	Hemispherical	Normal	Angular	Hemispherical	Normal	Angular
Carbonates																																		
Calcium Carbonate	8	-	-	-	-	-	-	-	-	-	-	583	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	585	-	-	-	-
Lead Carbonate	8	-	-	-	-	-	-	-	-	-	-	587	-	-	-	-	-	-	-	-	-	-	-	589	-	-	-	-	-	-	-	-	-	-
Magnesium Carbonate	8	-	-	-	-	-	-	-	-	-	-	590	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Miscellaneous Carbonates	8	-	-	-	-	-	-	-	-	-	-	592	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cassiterite	8	-	-	-	-	-	-	-	-	-	-	451	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CdSb	8	-	-	-	-	-	-	-	-	-	-	1282	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Celestite	8	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1791	-	-	-	-
Cerium Hexaboride	8	-	-	-	-	722	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cerium Dioxide	8	-	225	-	-	-	-	-	-	-	-	227	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Dicerium Trisulfide	8	-	-	-	-	1231	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cesium Bromide	8	-	-	-	-	-	-	-	-	-	-	-	737	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	739	-	-	-	-
Cesium Iodide	8	-	-	-	-	-	-	-	-	-	-	995	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	997	-	-	-	-
Chlorates																																		
Sodium Chlorate	8	-	-	-	-	-	-	-	-	-	-	594 596	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chlorides																																		
Copper Chloride	8	-	-	-	-	-	-	-	-	-	-	856	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	858	-	-	-	-
Potassium Chloride	8	-	-	-	-	862	-	-	-	-	-	-	864	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	873	-	-	-	-
Silver Chloride	8	-	-	-	-	-	-	-	-	-	-	-	876	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	879	-	-	-	-
Sodium Chloride	8	881	-	-	-	883	-	-	-	-	885 886	888	893	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	895	-	-	-	-
Thallium Chloride	8	-	-	-	-	-	-	-	-	-	-	899	901	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	903	-	-	-	-
Miscellaneous Chlorides	8	-	-	-	-	-	-	-	-	-	-	905	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	907	-	-	-	-
Chromium	7	101	103	-	-	106	-	-	-	-	-	110	113	-	-	-	-	-	-	-	115	-	-	118	-	-	-	-	-	120	-	-	-	-
Chromium Boride	8	-	-	-	-	-	-	-	-	-	-	734	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chromium Diboride	8	-	-	-	-	731	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Dichromium Boride	8	-	-	-	-	-	-	-	-	-	-	734	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Trichromium Dicarbide	8	-	-	-	-	852	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
7-Chromium Tricarbide	8	-	-	-	-	852	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

MATERIAL NAME	VOLUME	EMITTANCE Total Hemispherical	EMITTANCE Total Normal	EMITTANCE Total Angular	EMITTANCE Spectral Hemispherical	EMITTANCE Spectral Normal	EMITTANCE Spectral Angular	REFLECTANCE Integrated Hemispherical	REFLECTANCE Integrated Normal	REFLECTANCE Integrated Angular	REFLECTANCE Spectral Hemispherical	REFLECTANCE Spectral Normal	REFLECTANCE Spectral Angular	REFLECTANCE Solar Hemispherical	REFLECTANCE Solar Normal	REFLECTANCE Solar Angular
Chromium Nitride	8	-	-	-	-	1087	-	-	-	-	-	-	-	-	-	-
Dichromium Nitride	8	-	-	-	-	1087	-	-	-	-	-	-	-	-	-	-
Chromium Trioxide	8	-	-	-	-	-	-	-	-	-	-	236	-	-	-	-
Dichromium Trioxide	8	-	231	-	-	233	-	-	-	-	-	236	-	-	-	-
Chromium Monosilicide	8	-	-	-	-	1140 1142	-	-	-	-	-	-	-	-	-	-
Chromium Disilicide	8	-	-	-	-	1140 1142	-	-	-	-	-	-	-	-	-	-
Trichromium Silicide	8	-	1139	-	-	1140 1142	-	-	-	-	-	1144	-	-	-	-
Trichromium Disilicide	8	-	-	-	-	1140 1142	-	-	-	-	-	-	-	-	-	-
Hexachromium Silicide	8	-	1139	-	-	1140 1142	-	-	-	-	-	-	-	-	-	-
Cobalt	7	-	123	-	-	126	-	-	-	-	-	-	132	-	-	-
Cobalt Alloy N-155	7	1180 1181 1222 1226	-	-	-	1186 1236	-	-	-	-	-	1198 1266	-	-	-	-
Cobalt + Aluminum	7	-	-	-	-	-	-	-	-	-	-	901	-	-	-	-
Cobalt + Chromium + ΣX_i	7	1138	1142	-	-	1145 1148	-	-	-	-	-	1152	-	-	-	-
Cobalt + Iron	7	-	-	-	-	904	-	-	-	-	-	-	-	-	-	-
Cobalt + Nickel	7	-	-	-	-	906	-	-	-	-	-	-	-	-	-	-
CoAl	8	-	-	-	-	-	-	-	-	-	-	1352	-	-	-	-
Dicobalt Boride	8	-	-	-	-	731	-	-	-	-	-	-	-	-	-	-
Cobalt Monoxide	8	-	238	-	-	240	-	-	-	-	-	242	-	-	-	-
Cockron Home Foil	7	4 5	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cobalt Silicide	8	-	-	-	-	1172	-	-	-	-	-	-	-	-	-	-
Coors AD85	8	-	-	-	-	150	-	-	-	-	-	-	-	-	-	-
Coors AD94	8	-	-	-	-	150	-	-	-	-	-	-	-	-	-	-
Coors AD96	8	-	-	-	-	150	-	-	-	-	-	-	-	-	-	-
Coors AD99	8	-	144	-	-	147 150	-	-	-	-	-	-	-	-	-	-

MATERIAL NAME	ABSORPTANCE Integrated Hemispherical	ABSORPTANCE Integrated Normal	ABSORPTANCE Integrated Angular	ABSORPTANCE Spectral Hemispherical	ABSORPTANCE Spectral Normal	ABSORPTANCE Spectral Angular	ABSORPTANCE Solar Hemispherical	ABSORPTANCE Solar Normal	ABSORPTANCE Solar Angular	TRANSMITTANCE Integrated Hemispherical	TRANSMITTANCE Integrated Normal	TRANSMITTANCE Integrated Angular	TRANSMITTANCE Spectral Hemispherical	TRANSMITTANCE Spectral Normal	TRANSMITTANCE Spectral Angular	TRANSMITTANCE Solar Hemispherical	TRANSMITTANCE Solar Normal	TRANSMITTANCE Solar Angular
Chromium Nitride	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Dichromium Nitride	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chromium Trioxide	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Dichromium Trioxide	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chromium Monosilicide	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chromium Disilicide	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Trichromium Silicide	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Trichromium Disilicide	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Hexachromium Silicide	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cobalt	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cobalt Alloy N-155	-	-	-	-	-	-	-	1207 1301 1303	-	-	-	-	-	-	-	-	-	-
Cobalt + Aluminum	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cobalt + Chromium + ΣX_i	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cobalt + Iron	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cobalt + Nickel	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CoAl	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Dicobalt Boride	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cobalt Monoxide	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cockron Home Foil	-	-	-	42 43	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cobalt Silicide	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Coors AD85	-	-	-	-	-	-	-	-	-	-	-	-	-	172	-	-	-	-
Coors AD94	-	-	-	-	-	-	-	-	-	-	-	-	-	172	-	-	-	-
Coors AD96	-	-	-	-	-	-	-	-	-	-	-	-	-	172	-	-	-	-
Coors AD99	-	-	-	-	-	-	-	-	-	-	-	-	-	172	-	-	-	-

MATERIAL NAME	VOLUME	EMITTANCE Total Hemispherical	EMITTANCE Total Normal	EMITTANCE Total Angular	EMITTANCE Spectral Hemispherical	EMITTANCE Spectral Normal	EMITTANCE Spectral Angular	REFLECTANCE Integrated Hemispherical	REFLECTANCE Integrated Normal	REFLECTANCE Integrated Angular	REFLECTANCE Spectral Hemispherical	REFLECTANCE Spectral Normal	REFLECTANCE Spectral Angular	REFLECTANCE Solar Hemispherical	REFLECTANCE Solar Normal	REFLECTANCE Solar Angular	ABSORPTANCE Integrated Hemispherical	ABSORPTANCE Integrated Normal	ABSORPTANCE Integrated Angular	ABSORPTANCE Spectral Hemispherical	ABSORPTANCE Spectral Normal	ABSORPTANCE Spectral Angular	ABSORPTANCE Solar Hemispherical	ABSORPTANCE Solar Normal	ABSORPTANCE Solar Angular	TRANSMITTANCE Integrated Hemispherical	TRANSMITTANCE Integrated Normal	TRANSMITTANCE Integrated Angular	TRANSMITTANCE Spectral Hemispherical	TRANSMITTANCE Spectral Normal	TRANSMITTANCE Spectral Angular	TRANSMITTANCE Solar Hemispherical	TRANSMITTANCE Solar Normal	TRANSMITTANCE Solar Angular
Coors AD 995	8	-	-	-	-	150	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Coors BD 96	8	-	-	-	-	206	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	214	-	-	-	-
Coors BD 98	8	-	-	-	-	206	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	214	-	-	-	-
Copper	7	136	142	-	-	149 152	-	-	-	-	-	158	165 169	-	172	-	177	179	-	-	181 184	188	191	193	-	-	-	-	-	199	-	-	-	-
Copper, B. S. 1433	7	-	-	-	-	-	-	-	-	-	-	-	-	-	173 174	-	-	-	-	-	-	-	-	194	-	-	-	-	-	-	-	-	-	-
Copper, OFHC	7	138	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	189	-	-	-	-	-	-	-	-	-	-	-	-
Copper + Aluminum + ΣX_i	7	-	1159	-	-	1162	-	-	-	-	-	1166	-	-	-	-	-	-	-	-	-	-	-	1169	-	-	-	-	-	-	-	-	-	-
Copper + Nickel	7	-	908	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Copper + Nickel + ΣX_i	7	-	-	-	-	-	-	-	-	-	-	1172	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Copper + Tin	7	-	-	-	-	-	-	-	-	-	-	910	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Copper + Tin + ΣX_i	7	-	-	-	-	-	-	-	-	-	-	1174	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Copper + Zinc	7	912	914	-	-	-	-	-	-	-	-	917	920	-	-	-	923	925	-	-	-	928	-	-	-	-	-	-	-	-	-	-	-	-
Copper Bromide	8	-	-	-	-	-	-	-	-	-	-	741	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	743	-	-	-	-
Copper Chloride	8	-	-	-	-	-	-	-	-	-	-	856	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	858	-	-	-	-
Copper Iodide	8	-	-	-	-	-	-	-	-	-	-	999	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1001	-	-	-	-
Copper Monoxide	8	-	-	-	-	-	-	-	-	-	-	247	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	249	-	-	-	-
Dicopper Oxide	8	-	-	243	-	-	245	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	249	-	-	-	-
Cordierite	8	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1650	-	-	-	-
Corning 0160 Glass	8	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1642	-	-	-	-
Corning 1723 Glass	8	-	1524	-	-	-	-	-	-	-	-	1526	-	-	-	-	-	-	-	-	-	-	-	1527	-	-	1529	-	-	1531	-	-	-	-
Corning 7740 Glass	8	-	1580	-	-	-	-	-	-	-	-	-	1588	-	-	-	-	-	-	-	-	-	-	1589	-	-	1590	-	-	1594	-	-	-	-
Corning 7900 Glass	8	-	1622	-	-	-	-	-	-	-	-	1626	-	-	-	-	-	-	-	-	-	-	-	1627	-	-	1629	-	-	1633	-	-	-	-
Corning 7905 Glass	8	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1633	-	-	-	-
Corning 7910 Glass	8	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1633	-	-	-	-
Corning 7940 Glass	8	1566	1570	-	-	-	-	-	-	-	-	1572	-	-	-	-	-	-	-	-	-	-	-	1573	-	-	1575	-	-	1577	-	-	1578	-
Corning 8363 Glass	8	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1642	-	-	-	-
Corning 9690 Glass	8	-	1622	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Corning 9752 Glass	8	-	-	-	-	1637	-	-	-	-	-	1640	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Corning 9863 Glass	8	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1642	-	-	-	-

MATERIAL NAME	VOLUME	EMITTANCE						REFLECTANCE									ABSORPTANCE									TRANSMITTANCE								
		Total			Spectral			Integrated			Spectral			Solar			Integrated			Spectral			Solar			Integrated			Spectral			Solar		
		Hemispherical	Normal	Angular	Hemispherical	Normal	Angular	Hemispherical	Normal	Angular	Hemispherical	Normal	Angular	Hemispherical	Normal	Angular	Hemispherical	Normal	Angular	Hemispherical	Normal	Angular	Hemispherical	Normal	Angular	Hemispherical	Normal	Angular	Hemispherical	Normal	Angular	Hemispherical	Normal	Angular
$Cr_2O_3 + Al_2O_3$ Powders	8	-	-	-	-	553	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
$Cr_2O_3 + TiCr_2 + \Sigma X_i$ Cermet	8	-	1385	-	-	1386	-	-	-	-	-	1390	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
$Cr_2O_3 + Y_2O_3$ Powders	8	-	-	-	-	570	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cryolite	8	-	-	-	-	-	-	-	-	-	-	1660	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Crystolon	8	-	-	-	-	800	-	-	-	-	-	805	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cupric Oxide (see Copper Monoxide)																																		
Cuprous Oxide (see Dicopper Oxide)																																		
CuZn	8	-	-	-	-	-	-	-	-	-	-	-	1285	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cu_4Sn	8	-	-	-	-	-	-	-	-	-	-	1352	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Crystex	8	-	-	-	-	-	-	-	-	-	-	117	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
D-43	7	1470	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Diaspore	8	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1664	-	-	-	-
Dysprosium Hexaboride	8	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	727	-	-	-	-
Dysprosium Nitride	8	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1090	-	-	-	-
Dysprosium Oxide	8	-	-	-	-	-	-	-	-	-	-	252	-	-	-	-	-	-	-	-	-	-	-	254	-	-	-	-	-	-	-	-	-	-
Electroconducting Glass	8	-	1559	-	-	-	-	-	-	-	-	1561	-	-	-	-	-	-	-	-	-	-	-	1563	-	-	1564	-	-	1566	-	-	-	-
Enstatite	8	-	-	-	-	-	-	-	-	-	-	-	1689	-	-	-	-	-	-	-	-	-	-	1692	-	-	-	-	-	-	-	-	-	-
Erbium	7	-	-	-	-	202	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Erbium Hexaboride	8	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	727	-	-	-	-
Erbium Nitride	8	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1090	-	-	-	-
Erbium Oxide	8	-	255	-	257	259 261	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Europium Hexaboride	8	-	-	-	-	723	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Dieuropium Trioxide	8	-	-	-	-	-	-	-	-	-	-	546	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Europium Silicate	8	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	622	-	-	-	-
Europium Sulfide	8	-	-	-	-	-	-	-	-	-	-	1234	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Fayalite	8	-	-	-	-	-	-	-	-	-	-	1689	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ferric Oxide (see Diiron Trioxide)																																		

MATERIAL NAME	VOLUME	EMITTANCE						REFLECTANCE									ABSORPTANCE									TRANSMITTANCE								
		Total			Spectral			Integrated			Spectral			Solar			Integrated			Spectral			Solar			Integrated			Spectral			Solar		
		Hemispherical	Normal	Angular	Hemispherical	Normal	Angular	Hemispherical	Normal	Angular	Hemispherical	Normal	Angular	Hemispherical	Normal	Angular	Hemispherical	Normal	Angular	Hemispherical	Normal	Angular	Hemispherical	Normal	Angular	Hemispherical	Normal	Angular	Hemispherical	Normal	Angular	Hemispherical	Normal	Angular
Ferroferric Oxide (see Triiron Tetraoxide)																																		
Flint Glass	8	-	1644	-	-	-	-	-	-	-	-	1646	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1648	-	-	-	-
Fluorides																																		
Barium Fluoride	8	-	-	-	-	-	-	-	-	-	-	-	909	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	912	-	-	-	-
Cadmium Fluoride	8	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	919	-	-	-	-
Calcium Fluoride	8	-	-	-	-	921	-	-	-	-	-	924	-	-	-	-	-	-	-	-	929	-	-	-	-	-	-	-	-	931	-	-	-	-
Lithium Fluoride	8	-	-	-	-	-	-	-	-	-	-	937	942	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	944	-	-	-	-
Magnesium Difluoride	8	-	-	-	-	950	-	-	-	-	-	952	-	-	-	-	-	-	-	-	955	-	-	-	-	-	-	-	-	957	-	-	-	-
Sodium Fluoride	8	-	-	-	-	-	-	-	-	-	-	963	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	966	-	-	-	-
Strontium Fluoride	8	-	-	-	-	-	-	-	-	-	-	968	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	971	-	-	-	-
Potassium Magnesium Trifluoride	8	-	-	-	-	-	-	-	-	-	-	975	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	977	-	-	-	-
Potassium Nickel Trifluoride	8	-	-	-	-	-	-	-	-	-	-	979	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	981	-	-	-	-
Rubidium Manganese Trifluoride	8	-	-	-	-	-	-	-	-	-	-	983	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	985	-	-	-	-
Miscellaneous Cubic Perovskite Fluorides	8	-	-	-	-	-	-	-	-	-	-	987	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	989	-	-	-	-
Miscellaneous Fluorides	8	-	-	-	-	-	-	-	-	-	-	991	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	993	-	-	-	-
Fluorite	8	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	933	-	-	-	-
Flowers of Sulfur	8	-	-	-	-	-	-	-	-	-	-	117	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Forsterite	8	-	-	-	-	-	-	-	-	-	-	-	-	1689	-	-	-	-	-	-	-	-	-	1692	-	-	-	-	-	-	-	-	-	-
Frenchtown 4402	8	-	144	-	-	147	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Fused Quartz [see Silicon Dioxide (Fused)]																																		
Fused Silica [see Silicon Dioxide (Fused)]																																		
Fused Silica Glass	8	1568	1569	-	-	-	-	-	-	-	-	1571	-	-	-	-	-	-	-	-	-	-	-	1573	-	-	1574	-	-	1576	-	-	1578	-
Gabbro	8	-	-	-	-	-	-	-	-	-	-	1681	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Gadolinium	7	-	-	-	-	-	-	-	-	-	-	204	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	207	-	-	-	-
Gadolinium Hexaboride	8	-	-	-	-	723	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	727	-	-	-	-
Gadolinium Oxide	8	-	263	-	265	267 269	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

MATERIAL NAME	VOLUME	EMITTANCE Total Hemispherical	EMITTANCE Total Normal	EMITTANCE Total Angular	EMITTANCE Spectral Hemispherical	EMITTANCE Spectral Normal	EMITTANCE Spectral Angular	REFLECTANCE Integrated Hemispherical	REFLECTANCE Integrated Normal	REFLECTANCE Integrated Angular	REFLECTANCE Spectral Hemispherical	REFLECTANCE Spectral Normal	REFLECTANCE Spectral Angular	REFLECTANCE Solar Hemispherical	REFLECTANCE Solar Normal	REFLECTANCE Solar Angular	ABSORPTANCE Integrated Hemispherical	ABSORPTANCE Integrated Normal	ABSORPTANCE Integrated Angular	ABSORPTANCE Spectral Hemispherical	ABSORPTANCE Spectral Normal	ABSORPTANCE Spectral Angular	ABSORPTANCE Solar Hemispherical	ABSORPTANCE Solar Normal	ABSORPTANCE Solar Angular	TRANSMITTANCE Integrated Hemispherical	TRANSMITTANCE Integrated Normal	TRANSMITTANCE Integrated Angular	TRANSMITTANCE Spectral Hemispherical	TRANSMITTANCE Spectral Normal	TRANSMITTANCE Spectral Angular	TRANSMITTANCE Solar Hemispherical	TRANSMITTANCE Solar Normal	TRANSMITTANCE Solar Angular
Gadolinium Disilicide	8	-	-	-	-	1173	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Galena	8	-	-	-	-	-	-	-	-	-	-	1199	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Gallium	7	-	-	-	-	-	-	-	-	-	-	210	-	-	-	-	-	-	-	-	213	-	-	-	-	-	-	-	-	216	-	-	-	-
Gallium Antimonide	8	-	-	-	-	-	-	-	-	-	-	1287	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1290	-	-	-	-
Gallium Arsenide	8	-	-	-	-	-	-	-	-	-	-	679	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	683	-	-	-	-
Gallium Nitride	8	-	-	-	-	1087	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Gallium Phosphide		-	-	-	-	1092	-	-	-	-	-	1094	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1098	-	-	-	-
Gallium Arsenic Phosphide	8	-	-	-	-	-	-	-	-	-	-	1107	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
GaSb	8	-	-	-	-	-	-	-	-	-	-	1287	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1290	-	-	-	-
G. E. 106	8	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	421	-	-	-	-
Germanium	7	-	219	-	-	222 224	-	-	-	-	-	231	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	236	240	-	-	-
Germanium Monoxide	8	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	574	-	-	-	-
Germanium Dioxide	8	-	-	-	-	-	-	-	-	-	-	271	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Germanium Telluride	8	-	-	-	-	-	-	-	-	-	-	1250	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Glauberite	8	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1694	-	-	-	-
Glasses (see individual glass)																																		
Globar	8	-	-	-	-	798	-	-	-	-	-	-	-	-	-	-	-	-	-	-	808	-	-	810	-	-	-	-	-	-	-	-	-	-
Goethite	8	-	-	-	-	-	-	-	-	-	-	1675	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1661	-	-	-	-
Gold	7	244	248	-	-	250 254	-	-	-	-	-	258	264	-	267	-	269	-	-	-	271 273	275	-	277	-	-	-	-	-	-	-	-	-	-
Gold + Silver	7	-	-	-	-	-	-	-	-	-	-	932	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Graphite	8	30	31	38	40 42	44 51	57	59 61	63 65	70 73	-	-	-	-	-	-	75	-	-	-	-	-	-	76	-	-	-	-	-	-	-	-	-	-
Acheson Graphite	8	-	-	-	-	45	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Pyrolytic Graphite	8	30	33	-	-	53	-	-	-	-	-	66	70	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Grade 580 Graphite	8	-	33	-	-	46	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Grade 3474D Graphite	8	-	33	-	-	46	-	-	-	-	-	66	-	-	-	-	75	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Grade 7087 Graphite	8	-	34	-	-	46	-	-	-	-	-	66	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Grade 7100 Graphite	8	-	34	-	-	47	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

MATERIAL NAME	VOLUME	EMITTANCE						REFLECTANCE									ABSORPTANCE									TRANSMITTANCE								
		Total			Spectral			Integrated			Spectral			Solar			Integrated			Spectral			Solar			Integrated			Spectral			Solar		
		Hemispherical	Normal	Angular	Hemispherical	Normal	Angular	Hemispherical	Normal	Angular	Hemispherical	Normal	Angular	Hemispherical	Normal	Angular	Hemispherical	Normal	Angular	Hemispherical	Normal	Angular	Hemispherical	Normal	Angular	Hemispherical	Normal	Angular	Hemispherical	Normal	Angular	Hemispherical	Normal	Angular
Graphites (continued)																																		
Grade 8665 Graphite	8	-	-	-	-	53	-	-	-	-	-	-	-	-	-	-	75	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Grade AGKSP Graphite	8	-	-	-	41 43	-	58	-	-	-	60 62	-	70 74	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Grade AGX Graphite	8	-	32	-	-	45	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Grade ATJ Graphite	8	-	32	39	-	45	-	-	-	-	-	-	70	-	-	-	75	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Grade AUC Graphite	8	-	32	-	-	45	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Grade CEP Graphite	8	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	75	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Grade GBE Graphite	8	-	32	-	-	45	-	-	-	-	-	66	-	-	-	-	-	-	-	-	-	-	-	76	-	-	-	-	-	-	-	-	-	-
Grade GBH Graphite	8	-	33	-	-	45	-	-	-	-	-	66	-	-	-	-	-	-	-	-	-	-	-	76	-	-	-	-	-	-	-	-	-	-
Grade H1LM Graphite	8	-	33	-	-	46	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Grade H3LM Graphite	8	-	33	-	-	46	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Grade SPK Graphite	8	-	-	-	-	-	58	-	-	-	-	-	70 74	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Grade UT6 Graphite	8	-	-	-	-	-	-	-	-	-	-	64	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Gypsum	8	-	-	-	-	-	-	-	-	-	-	1698	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
"H"-Film (see Polyimide)																																		
Hafnates	8	-	-	-	-	-	-	-	-	-	-	596	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Hafnium	7	280	-	-	-	282 284	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Hafnium Diboride	8	-	730	-	-	732	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Hafnium Carbide	8	-	850	-	-	852	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Hafnium Nitride	8	-	1056	-	-	1058 1060	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Hafnium Oxide	8	273	-	-	-	-	-	-	-	-	-	275	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Hastelloy B	7	-	1448	-	-	1452	-	-	-	-	-	1455	-	-	-	-	-	-	-	-	-	-	-	1458	-	-	-	-	-	-	-	-	-	-
Hastelloy C	7	-	1448	-	-	1452	-	-	-	-	-	1455	-	-	-	-	-	-	-	-	-	-	-	1458	-	-	-	-	-	-	-	-	-	-
Hastelloy X	7	-	-	-	-	1364	-	-	-	-	-	1378	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Haynes Alloy C	7	1444	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Haynes Alloy No. 25	7	1140	1143	-	-	1146 1149	-	-	-	-	-	1154	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

MATERIAL NAME	VOLUME	EMITTANCE						REFLECTANCE									ABSORPTANCE									TRANSMITTANCE								
		Total			Spectral			Integrated			Spectral			Solar			Integrated			Spectral			Solar			Integrated			Spectral			Solar		
		Hemispherical	Normal	Angular	Hemispherical	Normal	Angular	Hemispherical	Normal	Angular	Hemispherical	Normal	Angular	Hemispherical	Normal	Angular	Hemispherical	Normal	Angular	Hemispherical	Normal	Angular	Hemispherical	Normal	Angular	Hemispherical	Normal	Angular	Hemispherical	Normal	Angular	Hemispherical	Normal	Angular
Haynes Alloy N-155	7	-	1227	-	-	1238	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Haynes Alloy X	7	1344	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Haynes LT-1	8	-	1356	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Haynes LT-1B	8	-	1356	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Haynes LT-2	8	-	1375	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
H_3BO_3 + TiB_2	8	-	1468	-	-	1468	-	-	-	-	-	1471	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-			-	-	-	-
H_3BO_3 + TiB_2 + TiO_2 Powders	8	-	1515	-	-	1516	-	-	-	-	-	1518	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Hematite	8	-	-	-	-	-	-	-	-	-	-	1677	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Heulandite	8	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1694	-	-	-	-
HK-31	7	-	1336	-	-	-	-	-	-	-	-	1338	-	-	-	-	-	-	-	-	-	-	-	1340	-	-	-	-	-	-	-	-	-	-
Holmium Hexaboride	8	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	727	-	-	-	-
Holmium Nitride	8	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1088	-	-	-	-
Holmium Oxide	8	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2707	-	-	-	-
Hurwich home foil	7	4 5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	42 43	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Hydrargillite	8	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1664	-	-	-	-
Inconel	7	1344 1345	1351 1352	-	-	1363 1366	-	-	-	-	-	1382	-	-	-	-	-	-	-	-	-	1396	-	-	-	-	-	-	-	-	-	-	-	-
Inconel 600 (see Inconel)																																		
Inconel 702	7	1345	-	-	-	1364	-	-	-	-	-	1378	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Inconel B	7	-	1350	-	-	-	-	-	-	-	-	-	-	-	1393	-	-	-	-	-	-	-	-	1401	-	-	-	-	-	-	-	-	-	-
Inconel X	7	1344 1345	1351 1352 1353	-	-	1358 1365	-	-	-	-	-	1377 1379	-	-	1393	-	-	-	-	-	-	1398	-	1401 1402	-	-	-	-	-	-	-	-	-	-
Inconel X-750 (see Inconel X)																																		
Indium	7	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	286	-	-	-	-	-	-	-	-	-	-	-	-
Indium Antimonide	8	-	-	-	-	-	-	-	-	-	-	1298	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1305	-	-	-	-
Indium Arsenide	8	-	-	-	-	685	-	-	-	-	-	687	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	698	-	-	-	-
Diindium Trioxide	8	-	-	-	-	-	-	-	-	-	-	546	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Indium Phosphide	8	-	-	-	-	-	-	-	-	-	-	1100	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1103	-	-	-	-

MATERIAL NAME	VOLUME	EMITTANCE						REFLECTANCE									ABSORPTANCE									TRANSMITTANCE								
		Total			Spectral			Integrated			Spectral			Solar			Integrated			Spectral			Solar			Integrated			Spectral			Solar		
		Hemispherical	Normal	Angular	Hemispherical	Normal	Angular	Hemispherical	Normal	Angular	Hemispherical	Normal	Angular	Hemispherical	Normal	Angular	Hemispherical	Normal	Angular	Hemispherical	Normal	Angular	Hemispherical	Normal	Angular	Hemispherical	Normal	Angular	Hemispherical	Normal	Angular	Hemispherical	Normal	Angular
$In_{0.56}Ga_{0.44}Sb$	8	-	-	-	-	-	-	-	-	-	-	1297	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
$In_{0.225}Ga_{0.775}Sb$	8	-	-	-	-	-	-	-	-	-	-	1297	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Inor-8	7	1444	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Iodide Hafnium	7	280	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Iodides																																		
Cesium Iodide	8	-	-	-	-	-	-	-	-	-	-	995	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	997	-	-	-	-
Copper Iodide	8	-	-	-	-	-	-	-	-	-	-	999	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1001	-	-	-	-
Lead Diiodide	8	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1003	-	-	-	-
Potassium Iodide	8	-	-	-	-	-	-	-	-	-	-	1005	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1010	-	-	-	-
Rubidium Iodide	8	-	-	-	-	-	-	-	-	-	-	1014	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1018	-	-	-	-
Silver Iodide	8	-	-	-	-	-	-	-	-	-	-	1022	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1024	-	-	-	-
Miscellaneous Iodides	8	-	-	-	-	-	-	-	-	-	-	1026	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1028	-	-	-	-
Iodine	8	-	-	-	-	-	-	-	-	-	-	78	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Iridium	7	-	-	-	-	289 291	-	-	-	-	-	294	297 299	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Iron	7	302	306	-	-	310 316	-	-	-	-	-	319 321	324	-	-	-	-	-	-	-	327 329	-	-	332	-	-	-	-	-	-	-	-	-	-
~~Iron + Carbon~~	~~6~~	-	~~305~~	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Iron + Chromium	7	-	-	-	-	-	-	-	-	-	-	938	940	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Iron + Chromium + ΣX_i	7	-	1178	-	-	1184 1190	-	-	-	-	-	1196	-	-	-	-	-	-	-	-	1203	-	-	1206	-	-	-	-	-	-	-	-	-	-
Iron + Chromium + Nickel + ΣX_i	7	1210	1217	1231	-	1235 1242	1253 1256	-	-	-	-	1264	1283 1285	-	1287	-	1291	-	-	-	1293	1296	-	1299	-	-	-	-	-	-	-	-	-	-
Iron + Manganese + ΣX_i	7	1305	1307	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1309	-	-	-	-	-	-	-	-	-	-
Iron + Nickel	7	-	-	-	-	942	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Iron + Nickel + ΣX_i	7	-	-	-	-	-	-	-	-	-	-	1312	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Iron + Nickel + Chromium + ΣX_i	7	1317	-	-	-	1320	-	-	-	-	-	1324	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Iron + Tungsten	7	-	-	-	-	945	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Diiron Trioxide	8	-	280	-	-	282	-	-	-	-	-	284	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Triiron Tetraoxide	8	-	-	-	-	282	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
IRC Solar Cell	8	-	88	-	-	92	-	-	-	-	-	100	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

MATERIAL NAME	VOLUME	EMITTANCE						REFLECTANCE									ABSORPTANCE									TRANSMITTANCE								
		Total			Spectral			Integrated			Spectral			Solar			Integrated			Spectral			Solar			Integrated			Spectral			Solar		
		Hemispherical	Normal	Angular	Hemispherical	Normal	Angular	Hemispherical	Normal	Angular	Hemispherical	Normal	Angular	Hemispherical	Normal	Angular	Hemispherical	Normal	Angular	Hemispherical	Normal	Angular	Hemispherical	Normal	Angular	Hemispherical	Normal	Angular	Hemispherical	Normal	Angular	Hemispherical	Normal	Angular
Irtran 1 (MgF_2)	8	-	-	-	-	951	-	-	-	-	-	-	953	-	-	-	-	-	-	-	956	-	-	-	-	-	-	-	-	960	-	-	-	-
Irtran 2 (ZnS)	8	1214	-	-	-	1216	-	-	-	-	-	-	1223	-	-	-	-	-	-	-	1225	-	-	-	-	-	-	-	-	1228	-	-	-	-
Irtran 3 (CaF_2)	8	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	930	-	-	-	-	-	-	-	-	933	-	-	-	-
Irtran 4 (ZnSe)	8	1113	-	-	-	1115	-	-	-	-	-	1119	-	-	-	-	-	-	-	-	1122	-	-	-	-	-	-	-	-	1125	-	-	-	-
Irtran 5 (MgO)	8	-	-	-	-	296	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	325	-	-	-	-
Irtran 6 (CdTe)	8	1240	-	-	-	-	-	-	-	-	-	1242	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1247	-	-	-	-
K Monel	7	-	1428	-	-	-	-	-	-	-	-	-	-	-	1434	-	-	-	-	-	-	-	-	1437	-	-	-	-	-	-	-	-	-	-
Kaiser foil	7	4 5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	42	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Kanthal	7	-	-	-	-	1192	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1204	-	-	-	-	-	-	-	-	-	-	-	-	-
Kanthal A	7	-	-	-	-	1192	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Kaolin	8	1653	-	-	-	-	-	-	-	-	-	618 1655	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Kapton	8	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1714	-	-	-	-	-	-	-	-	1716	-	-	-	-
KDP (see Potassium Dihydrogen Phosphate)																																		
Kennametal K150A	8	1413	1415	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Kennametal K151A	8	1413	1415	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Kennametal K152B	8	1413	1415	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Kennametal K153B	8	1413	1415	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Kennametal K163B	8	1413	1415	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Kennametal K184B	8	1413	1415	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Kimbel N-51A Glass	8	-	-	-	-	1542	-	-	-	-	-	1544	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1548	-	-	-	-
Konel	7	1404	-	-	-	1407	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Kovar	7	-	-	-	-	-	-	-	-	-	-	1313	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Kodok 515	8	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	521	-	-	-	-	-	-	-	-	-	-
KP	8	-	-	-	-	-	-	-	-	-	-	199	-	-	-	-	-	-	-	-	-	-	-	200	-	-	-	-	-	-	-	-	-	-
KRS-5 (see Thallium Bromide-Iodide)																																		
KRS-6 (see Thallium Bromide-Chloride)																																		

MATERIAL NAME	VOLUME	EMITTANCE						REFLECTANCE									ABSORPTANCE									TRANSMITTANCE								
		Total			Spectral			Integrated			Spectral			Solar			Integrated			Spectral			Solar			Integrated			Spectral			Solar		
		Hemispherical	Normal	Angular	Hemispherical	Normal	Angular	Hemispherical	Normal	Angular	Hemispherical	Normal	Angular	Hemispherical	Normal	Angular	Hemispherical	Normal	Angular	Hemispherical	Normal	Angular	Hemispherical	Normal	Angular	Hemispherical	Normal	Angular	Hemispherical	Normal	Angular	Hemispherical	Normal	Angular
KT Silicon Carbide	8	-	794	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
L34	7	-	-	-	-	-	-	-	-	-	-	1092	-	-	1095	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
L72	7	-	-	-	-	-	-	-	-	-	-	-	-	-	1084	-	-	-	-	-	-	-	-	1087	-	-	-	-	-	-	-	-	-	-
L120 Magnesium	7	-	-	-	-	-	-	-	-	-	-	-	-	-	361 362	-	-	-	-	-	-	-	-	365	-	-	-	-	-	-	-	-	-	-
Lanthanum Hexaboride	8	-	-	-	-	723	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	727	-	-	-	-
Lanthanum Trifluoride	8	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	994	-	-	-	-
Dilanthanum Trioxide	8	-	-	-	-	-	-	-	-	-	-	546	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Dilanthanum Trisulfide	8	-	-	-	-	1232	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
LaSb	8	-	-	-	-	-	-	-	-	-	-	1352	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Lead	7	335	337	-	-	-	-	-	-	-	-	-	-	-	-	-	339	341	-	-	343	345	-	-	-	-	-	-	-	-	-	-	-	-
Lead + Tin	7	948	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Lead Dibromide	8	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	745	-	-	-	-
Lead Carbonate	8	-	-	-	-	-	-	-	-	-	-	587	-	-	-	-	-	-	-	-	-	-	-	589	-	-	-	-	-	-	-	-	-	-
Lead Dichloride	8	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	908	-	-	-	-
Lead Difluoride	8	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	994	-	-	-	-
Lead Diiodide	8	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1003	-	-	-	-
Lead Hafnate	8	-	-	-	-	-	-	-	-	-	-	597	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Lead Oxide	8	-	-	-	-	-	-	-	-	-	-	546	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Lead Selenide	8	-	-	-	-	-	-	-	-	-	-	1130	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1133	-	-	-	-
Lead Sulfate	8	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	631	-	-	-	-
Lead Sulfide	8	-	-	-	-	-	-	-	-	-	-	1197	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1204	-	-	-	-
Lead Sulfite	8	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	631	-	-	-	-
Lead Telluride	8	-	-	-	-	-	-	-	-	-	-	1253	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1255	-	-	-	-
Lead Titanate	8	-	-	-	-	-	-	-	646	-	-	648	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	650	-	-	-	-
Lead Tungstate	8	-	-	-	-	-	-	-	-	-	-	666	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Lead Zirconate	8	-	-	-	-	-	-	-	-	-	-	676	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Limonite	8	-	-	-	-	-	-	-	-	-	-	1678	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Lithium Borate	8	-	-	-	-	-	-	-	-	-	-	582	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

MATERIAL NAME	VOLUME	EMITTANCE Total Hemispherical	EMITTANCE Total Normal	EMITTANCE Total Angular	EMITTANCE Spectral Hemispherical	EMITTANCE Spectral Normal	EMITTANCE Spectral Angular	REFLECTANCE Integrated Hemispherical	REFLECTANCE Integrated Normal	REFLECTANCE Integrated Angular	REFLECTANCE Spectral Hemispherical	REFLECTANCE Spectral Normal	REFLECTANCE Spectral Angular	REFLECTANCE Solar Hemispherical	REFLECTANCE Solar Normal	REFLECTANCE Solar Angular	ABSORPTANCE Integrated Hemispherical	ABSORPTANCE Integrated Normal	ABSORPTANCE Integrated Angular	ABSORPTANCE Spectral Hemispherical	ABSORPTANCE Spectral Normal	ABSORPTANCE Spectral Angular	ABSORPTANCE Solar Hemispherical	ABSORPTANCE Solar Normal	ABSORPTANCE Solar Angular	TRANSMITTANCE Integrated Hemispherical	TRANSMITTANCE Integrated Normal	TRANSMITTANCE Integrated Angular	TRANSMITTANCE Spectral Hemispherical	TRANSMITTANCE Spectral Normal	TRANSMITTANCE Spectral Angular	TRANSMITTANCE Solar Hemispherical	TRANSMITTANCE Solar Normal	TRANSMITTANCE Solar Angular
Lithium Fluoride	8	-	-	-	-	-	-	-	-	-	-	937	942	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	944	-	-	-	-
Lithium Niobate	8	-	-	-	-	-	-	-	-	-	-	598	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Lutetium Oxide	8	-	-	-	-	286 288	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Lithium Yttrium Tetrafluoride	8	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	994	-	-	-	-
L. O. F. 81E 19778 Glass	8	-	1560	-	-	-	-	-	-	-	-	1562	-	-	-	-	-	-	-	-	-	-	-	1563	-	-	1565	-	-	1567	-	-	-	-
L. O. F. PB 19195 Glass	8	-	1560	-	-	-	-	-	-	-	-	1562	-	-	-	-	-	-	-	-	-	-	-	1563	-	-	1565	-	-	1567	-	-	-	-
Lucite	8	-	-	-	-	-	-	-	-	-	-	1720	-	-	-	-	-	-	-	-	1722	-	-	-	-	-	-	-	-	1724	-	-	-	-
Lunar Samples	8	-	-	-	-	-	-	-	-	-	-	-	1666	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Lutetium	7	-	-	-	-	-	-	-	-	-	-	347	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	350	-	-	-	-
M252	7	-	-	-	-	1366	-	-	-	-	-	1382	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Magnesium	7	353	-	-	-	-	-	-	-	-	-	356	358	-	360	-	-	-	-	-	-	-	-	364	-	-	-	-	-	367	-	-	-	-
Magnesium, L120	7	-	-	-	-	-	-	-	-	-	-	-	-	-	361 362	-	-	-	-	-	-	-	-	365	-	-	-	-	-	-	-	-	-	-
Magnesium Alloys:																																		
AZ-31	7	-	1328	-	-	-	-	-	-	-	-	1332	-	-	-	-	-	-	-	-	-	-	-	1334	-	-	-	-	-	-	-	-	-	-
AZ-31B	7	-	-	-	-	-	-	-	-	-	-	1332	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
HK-31	7	-	1336	-	-	-	-	-	-	-	-	1338	-	-	-	-	-	-	-	-	-	-	-	1340	-	-	-	-	-	-	-	-	-	-
Magensium + Aluminum	7	-	-	-	-	—	-	-	-	-	-	950	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Magnesium + Aluminum + ΣX_i	7	-	1327	-	-	-	-	-	-	-	-	1330	-	-	-	-	-	-	-	-	-	-	-	1334	-	-	-	-	-	-	-	-	-	-
Magnesium + Thorium + ΣX_i	7	-	1336	-	-	-	-	-	-	-	-	1338	-	-	-	-	-	-	-	-	-	-	-	1340	-	-	-	-	-	-	-	-	-	-
Magnesium Aluminate	8	-	-	-	-	-	-	-	-	-	-	576	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	577	-	-	-	-
Magnesium Carbonate	8	-	-	-	-	-	-	-	-	-	-	590	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Magnesium Difluoride	8	-	-	-	-	950	-	-	-	-	-	-	952	-	-	-	-	-	-	-	955	-	-	-	-	-	-	-	-	957	-	-	-	-
Magnesium Oxide	8	290	291	-	-	293 295	-	298	-	-	-	299	314	-	-	-	-	-	-	-	319	-	-	322	-	-	-	-	-	323	-	-	-	-
Magnesium Phosphate	8	-	-	-	-	-	-	-	-	-	-	608	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Magnesium Silicate	8	-	-	-	-	-	-	-	-	-	-	618	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Magnesium Trisilicate	8	-	-	-	-	-	-	-	-	-	-	618	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Magnesium Zirconium Silicate	8	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	616	-	-	-	-	-	-	-	-	-	-

MATERIAL NAME	VOLUME	EMITTANCE						REFLECTANCE									ABSORPTANCE									TRANSMITTANCE								
		Total			Spectral			Integrated			Spectral			Solar			Integrated			Spectral			Solar			Integrated			Spectral			Solar		
		Hemispherical	Normal	Angular	Hemispherical	Normal	Angular	Hemispherical	Normal	Angular	Hemispherical	Normal	Angular	Hemispherical	Normal	Angular	Hemispherical	Normal	Angular	Hemispherical	Normal	Angular	Hemispherical	Normal	Angular	Hemispherical	Normal	Angular	Hemispherical	Normal	Angular	Hemispherical	Normal	Angular
Dimagnesium Silicide	8	-	-	-	-	1173	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Manganese Monoxide	8	-	-	-	-	-	-	-	-	-	-	329	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Trimanganese Tetraoxide	8	-	-	-	-	-	-	-	-	-	-	329	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Manganese Telluride	8	-	-	-	-	-	-	-	-	-	-	1256	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Manganese Disilicide	8	-	-	-	-	1173	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Trimanganese Silicide	8	-	-	-	-	1173	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Manganese Sulfide	8	-	-	-	-	-	-	-	-	-	-	1234	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Manganite	8	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1664	-	-	-	-
McDanel AV 30	8	-	-	-	-	151	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	172	-	-	-	-
McDanel AP 35	8	-	-	-	-	151	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	172	-	-	-	-
Dimercury Dibromide	8	-	-	-	-	-	-	-	-	-	-	747	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Mercury Dichloride	8	-	-	-	-	-	-	-	-	-	-	908	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Dimercury Dichloride	8	-	-	-	-	-	-	-	-	-	-	908	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Mercury Diiodide	8	-	-	-	-	-	-	-	-	-	-	1027	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1029	-	-	-	-
Dimercury Diiodide	8	-	-	-	-	-	-	-	-	-	-	1027	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Mercury Monoxide	8	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	549	-	-	-	-
Mg_2Al_3	8	-	-	-	-	-	-	-	-	-	-	1310	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Mg_3Al_2	8	-	-	-	-	-	-	-	-	-	-	1310	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Mg_2Sn	8	-	-	-	-	-	-	-	-	-	-	1311	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Mica	8	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1694	-	-	-	-
Mild Steel	7	1305	1307	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1310	-	-	-	-	-	-	-	-	-	-
Miscellaneous Borates	8	-	-	-	-	-	-	-	-	-	-	581	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Miscellaneous Carbonates	8	-	-	-	-	-	-	-	-	-	-	592	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Miscellaneous Fluorides	8	-	-	-	-	-	-	-	-	-	-	991	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	993	-	-	-	-
Miscellaneous Glasses	8	-	-	-	-	1643	-	-	-	-	-	1645	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1647	1649	-	-	-	-
Miscellaneous Hafnates	8	-	-	-	-	-	-	-	-	-	-	596	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Miscellaneous Intermetallics	8	-	-	-	-	-	-	-	-	-	-	1351	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Miscellaneous Oxides	8	-	-	-	-	-	-	-	-	-	-	545	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	548	-	-	-	-
Miscellaneous Phosphates	8	-	-	-	-	-	-	-	-	-	-	607	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

MATERIAL NAME	VOLUME	EMITTANCE						REFLECTANCE									ABSORPTANCE									TRANSMITTANCE								
		Total			Spectral			Integrated			Spectral			Solar			Integrated			Spectral			Solar			Integrated			Spectral			Solar		
		Hemispherical	Normal	Angular	Hemispherical	Normal	Angular	Hemispherical	Normal	Angular	Hemispherical	Normal	Angular	Hemispherical	Normal	Angular	Hemispherical	Normal	Angular	Hemispherical	Normal	Angular	Hemispherical	Normal	Angular	Hemispherical	Normal	Angular	Hemispherical	Normal	Angular	Hemispherical	Normal	Angular
Miscellaneous Silicates	8	-	-	-	-	-	-	-	-	-	-	617	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	621	-	-	-	-
Miscellaneous Zirconates	8	-	-	-	-	-	-	-	-	-	-	675	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
MnO + TiO_2 Powders	8	-	-	-	-	-	-	-	-	-	-	563	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Mo + 0.5 Ti Alloy	7	-	954	957	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Molybdenum	7	376	383	-	-	387 392	-	-	-	-	-	398	402	-	-	-	-	-	-	-	404	407	-	410	-	-	-	-	-	-	-	-	-	-
Molybdenum + Titanium	7	-	953	956	-	959	-	-	-	-	-	962	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Molybdenum + Tungsten	7	967	-	-	-	969	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Molybdenum Disilicide	8	-	1148	-	-	1150 1152	-	-	-	-	-	1155	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Molybdenum Monoboride	8	-	-	-	-	692	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Molybdenum Diboride	8	-	-	-	-	-	-	-	-	-	-	695	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Dimolybdenum Pentaboride	8	-	-	-	-	-	-	-	-	-	-	695	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Dimolybdenum Carbide	8	-	850	-	-	852	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Trimolybdenum Silicide	8	-	-	-	-	1150	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Molybdenum Trioxide	8	-	-	-	-	-	-	-	-	-	-	330	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Pentamolybdenum Trisilicide	8	-	-	-	-	1150	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Molybdenum Disulfide	8	-	-	-	-	-	-	-	-	-	-	1207	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1210	-	-	-	-
Monel	7	1423	1428	-	-	-	-	-	-	-	-	1431	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Monel 400 (see Monel)																																		
Monel K-500 (see K Monel)																																		
Monel 501 (see KR Monel)																																		
MoO_3 + MoSi Powders	8	-	1473	-	-	1474	-	-	-	-	-	1476	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
MoO_3 + $MoSi_2$ + SiO_2 Powders	8	-	1510	-	-	1511	-	-	-	-	-	1513	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
MoO_3 + Ni	8	-	-	-	-	-	-	-	-	-	-	1425	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
MoO_3 + SiO_2 Powders	8	-	-	-	-	-	-	-	-	-	-	566	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
$MoSi_2$ + MoO_3	8	-	1473	-	-	1474	-	-	-	-	-	1476	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
$MoSi_2$ + MoO_3 + SiO_2 Powders	8	-	1510	-	-	1511	-	-	-	-	-	1513	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
$MoSi_2$ + SiO_2 Powders	8	-	1478	-	-	1479	-	-	-	-	-	1482	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Mullite	8	-	1685	-	-	1687	-	-	-	-	-	618	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

MATERIAL NAME	VOLUME	EMITTANCE						REFLECTANCE									ABSORPTANCE									TRANSMITTANCE								
		Total			Spectral			Integrated			Spectral			Solar			Integrated			Spectral			Solar			Integrated			Spectral			Solar		
		Hemispherical	Normal	Angular	Hemispherical	Normal	Angular	Hemispherical	Normal	Angular	Hemispherical	Normal	Angular	Hemispherical	Normal	Angular	Hemispherical	Normal	Angular	Hemispherical	Normal	Angular	Hemispherical	Normal	Angular	Hemispherical	Normal	Angular	Hemispherical	Normal	Angular	Hemispherical	Normal	Angular
Multimet	7	1214	1227	-	-	1238	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Mylar	8	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1708	-	-	-	1710	-	-	-	-	1711	-	-	-	-
Natrolite	8	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1694	-	-	-	-
Nb - 1 Zr Alloy	7	990	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
$NbAl_3$	8	-	-	-	-	-	-	-	-	-	-	1322	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Neodymium Hexaboride	8	-	-	-	-	723	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	727	-	-	-	-
Neodymium Oxide	8	-	-	-	-	-	-	-	-	-	-	335	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Neodymium Silicate	8	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	622	-	-	-	-
Dineodymium Trisulfide	8	-	-	-	-	1232	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
$Ni + MoO_3$	8	-	-	-	-	-	-	-	-	-	-	1425	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
$Ni + TiB_2$	8	-	-	-	-	-	-	-	-	-	-	1435	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
NiAl	8	-	1316	-	-	1318	-	-	-	-	-	1321	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ni_3Al	8	-	1316	-	-	1318	-	-	-	-	-	1321	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Nickel Monoxides	8	-	337	-	-	339	-	-	-	-	-	342	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Nichrome	7	1344	1353	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Nickel	7	413	416	-	-	424 434	-	-	440	446	-	454	457	-	-	-	-	460	-	-	462	465	468	470	-	-	-	-	-	-	-	-	-	-
Nickel, Grade A	7	-	418 419 420	-	-	426 427 428 429	-	-	-	-	-	455	-	-	-	-	-	-	-	-	-	-	-	471	-	-	-	-	-	-	-	-	-	-
Nickel, Grade NP-3	7	-	-	-	-	435	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Nickel + Chromium	7	-	-	-	-	972	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Nickel + Chromium + ΣX_i	7	1342	1347	-	-	1356 1360	-	-	-	-	-	1374	-	-	1392	-	-	-	-	-	1395	1398	-	1400	-	-	-	-	-	-	-	-	-	-
Nickel + Cobalt + ΣX_i	7	1404	-	-	-	1406 1410	-	-	-	-	-	1416	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Nickel + Copper + ΣX_i	7	1423	1426	-	-	-	-	-	-	-	-	1430	-	-	1433	-	-	-	-	-	-	-	-	1436	-	-	-	-	-	-	-	-	-	-
Nickel + Iron	7	-	-	-	-	976	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Nickel + Iron + ΣX_i	7	-	-	-	-	1439	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Nickel + Molybdenum + ΣX_i	7	1442	1446	-	-	1450	-	-	-	-	-	1454	-	-	-	-	-	-	-	-	-	-	-	1457	-	-	-	-	-	-	-	-	-	-
~~Nickel + Silver~~	~~7~~	-	~~[illegible]~~	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

MATERIAL NAME	VOLUME	EMITTANCE						REFLECTANCE									ABSORPTANCE									TRANSMITTANCE								
		Total			Spectral			Integrated			Spectral			Solar			Integrated			Spectral			Solar			Integrated			Spectral			Solar		
		Hemispherical	Normal	Angular	Hemispherical	Normal	Angular	Hemispherical	Normal	Angular	Hemispherical	Normal	Angular	Hemispherical	Normal	Angular	Hemispherical	Normal	Angular	Hemispherical	Normal	Angular	Hemispherical	Normal	Angular	Hemispherical	Normal	Angular	Hemispherical	Normal	Angular	Hemispherical	Normal	Angular
Dinickel Trioxide	8	-	-	-	-	-	-	-	-	-	-	342	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Nickel Disilicide	8	-	-	-	-	1173	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Nimonic 75	7	1345	1350	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
NiO + Al_2O_3 Powders	8	-	-	-	-	556	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
NiO + NiAl + ΣX_i Cermets	8	-	1393	-	-	1394	-	-	-	-	-	1398	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Niobates																																		
Lithium Niobate	8	-	-	-	-	-	-	-	-	-	-	598	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Niobium	7	474	480	-	-	482 486	-	-	-	-	-	492	-	-	-	-	-	-	-	-	-	497	-	-	-	-	-	-	-	-	-	-	-	-
Niobium + Molybdenum + ΣX_i	7	-	1460	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Niobium + Tantalum + ΣX_i	7	1463	-	-	-	1466	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Niobium + Tungsten	7	981	-	-	-	984	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Niobium + Tungsten + ΣX_i	7	1469	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Niobium + Zirconium	7	988	992	-	-	994	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Niobium Diboride	8	697	699 701	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Niobium Monocarbide	8	785	787	-	-	789	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Niobium Nitride	8	-	-	-	-	1087	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Diniobium Nitride	8	-	-	-	-	1087	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Diniobium Pentoxide	8	-	-	-	-	347	-	-	-	-	-	349	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Niobium Disilicide	8	-	-	-	-	1173	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Norton A 402	8	-	-	-	-	150	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Norton LA 603	8	-	144	-	-	147	-	-	-	-	-	160	-	-	-	-	-	-	-	-	-	-	-	168	-	-	-	-	-	-	-	-	-	-
Norton RA 4213	8	-	144	-	-	147	-	-	-	-	-	160	-	-	-	-	-	-	-	-	-	-	-	168	-	-	-	-	-	-	-	-	-	-
Norton RZ	8	-	-	-	-	534	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Norton 5190	8	-	-	-	-	150	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Nitrides																																		
Aluminum Nitride	8	-	1030	-	-	1031 1033	-	-	-	-	-	1035	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Boron Nitride	8	-	1037	-	-	1040 1042	-	-	-	-	-	1047	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1054	-	-	-	-
Hafnium Nitride	8	-	1056	-	-	1058 1060	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

MATERIAL NAME	VOLUME	EMITTANCE						REFLECTANCE									ABSORPTANCE									TRANSMITTANCE								
		Total			Spectral			Integrated			Spectral			Solar			Integrated			Spectral			Solar			Integrated			Spectral			Solar		
		Hemispherical	Normal	Angular	Hemispherical	Normal	Angular	Hemispherical	Normal	Angular	Hemispherical	Normal	Angular	Hemispherical	Normal	Angular	Hemispherical	Normal	Angular	Hemispherical	Normal	Angular	Hemispherical	Normal	Angular	Hemispherical	Normal	Angular	Hemispherical	Normal	Angular	Hemispherical	Normal	Angular
Nitrides (continued)																																		
Silicon Nitride	8	-	1062	-	-	1065 1067	-	-	-	-	-	1069	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tantalum Nitrides	8	-	1072	-	-	1074 1076	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Zirconium Nitride	8	-	1078	-	-	1080 1082	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Miscellaneous Nitrides	8	-	1084	-	-	1086	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1089	-	-	-	-
Obsidian	8	-	-	-	-	-	-	-	-	-	-	1681	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
OFHC Copper	7	138	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	189	-	-	-	-	-	-	-	-	-	-	-	-
Oligoclase	8	-	-	-	-	-	-	-	-	-	-	-	1689	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Olivene	8	-	-	-	-	-	-	-	-	-	-	-	1689	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Oolitic Hematite	8	-	-	-	-	-	-	-	-	-	-	1678	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Opal	8	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	421	-	-	-	-
Opal Glass	8	-	-	-	-	-	-	-	-	-	-	1646	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Osmium	7	-	-	-	-	500	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Palladium	7	502	504	-	-	507 510	-	-	-	-	-	512	-	-	-	-	-	-	-	-	515	-	-	518	-	-	-	-	-	520	-	-	-	-
PdIn	8	-	-	-	-	-	-	-	-	-	-	1352	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Perovskite Fluorides	8	-	-	-	-	-	-	-	-	-	-	976 980 984 9[illegible]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	978 982 986 990	-	-	-	-
Phosphates																																		
Aluminum Phosphate	8	-	-	-	-	-	-	-	-	-	-	602	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ammonium and Potassium Dihydrogen Phosphates	8	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	604	-	-	-	-
Miscellaneous Phosphates	8	-	-	-	-	-	-	-	-	-	-	607	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Phosphides																																		
Gallium Phosphide	8	-	-	-	-	1092	-	-	-	-	-	1094	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1098	-	-	-	-
Indium Phosphide	8	-	-	-	-	-	-	-	-	-	-	1100	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1102	-	-	-	-	-
Miscellaneous Phosphides	8	-	-	-	-	1104	-	-	-	-	-	1106	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Phosphor Bronze	7	-	-	-	-	-	-	-	-	-	-	1175	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

MATERIAL NAME	VOLUME	EMITTANCE						REFLECTANCE								
		Total			Spectral			Integrated			Spectral			Solar		
		Hemispherical	Normal	Angular	Hemispherical	Normal	Angular	Hemispherical	Normal	Angular	Hemispherical	Normal	Angular	Hemispherical	Normal	Angular
Platinum	7	524	529	-	-	532 536	-	-	-	-	-	544	547 549	-	-	-
Platinum, NBS	7	-	-	-	-	538	-	-	-	-	-	-	-	-	-	-
Platinum wire, Grade MPTU 4292-53	7	526	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Platinum + Rhodium	7	997	1000	-	-	1004	-	-	-	-	-	-	-	-	-	-
Plexiglas	8	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Polyethylene	8	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Poly(Ethylene glycol - Terephthalic acid) [Mylar]	8	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Polyimide [Kapton]	8	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Poly(Methyl Methacrylate)	8	-	-	-	-	-	-	-	-	-	-	1719	-	-	-	-
Polystyrene	8	-	-	-	-	-	-	-	-	-	-	-	1725	-	-	-
Polytetrafluoroethylene [Teflon]	8	-	1730	-	-	-	-	-	-	-	-	1732	-	-	-	-
Polyvinyl Chloride	8	-	-	-	-	-	-	-	-	-	-	1742	-	-	-	-
Polyvinylidene Chloride	8	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Poroloy	7	-	1226	-	-	-	-	-	-	-	-	-	-	-	-	-
Potassium Alum	8	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Potassium Bromide	8	-	-	-	-	749	-	-	-	-	-	-	751 753	-	-	-
Potassium Chloride	8	-	-	-	-	862	-	-	-	-	-	864	-	-	-	-
Potassium Cobalt Trifluoride	8	-	-	-	-	-	-	-	-	-	-	988	-	-	-	-
Potassium Fluoride	8	-	-	-	-	-	-	-	-	-	-	992	-	-	-	-
Potassium Dihydrogen Phosphate	8	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Potassium Iodide	8	-	-	-	-	-	-	-	-	-	-	1005	-	-	-	-
Potassium Magnesium Trifluoride	8	-	-	-	-	-	-	-	-	-	-	975	-	-	-	-
Potassium Manganese Trifluoride	8	-	-	-	-	-	-	-	-	-	-	988	-	-	-	-
Potassium Nickel Trifluoride	8	-	-	-	-	-	-	-	-	-	-	979	-	-	-	-
Potassium Phosphate	8	-	-	-	-	-	-	-	-	-	-	608	-	-	-	-
Dipotassium Silicon Hexafluoride	8	-	-	-	-	-	-	-	-	-	-	992	-	-	-	-
Potassium Tantalate	8	-	-	-	-	-	-	-	-	-	-	633	-	-	-	-

MATERIAL NAME	VOLUME	ABSORPTANCE								
		Integrated			Spectral			Solar		
		Hemispherical	Normal	Angular	Hemispherical	Normal	Angular	Hemispherical	Normal	Angular
Platinum	7	-	-	-	-	551	554	-	557	-
Platinum, NBS	7	-	-	-	-	552	-	-	-	-
Platinum wire, Grade MPTU 4292-53	7	-	-	-	-	-	-	-	-	-
Platinum + Rhodium	7	-	-	-	-	-	-	-	-	-
Plexiglas	8	-	-	-	-	-	-	-	-	-
Polyethylene	8	-	-	-	-	-	-	-	-	-
Poly(Ethylene glycol - Terephthalic acid) [Mylar]	8	-	-	-	-	1708	-	-	-	1710
Polyimide [Kapton]	8	-	-	-	-	1714	-	-	-	-
Poly(Methyl Methacrylate)	8	-	-	-	-	1721	-	-	-	-
Polystyrene	8	-	-	-	-	-	-	-	-	-
Polytetrafluoroethylene [Teflon]	8	-	-	-	-	1734	-	-	-	-
Polyvinyl Chloride	8	-	-	-	-	-	-	-	-	-
Polyvinylidene Chloride	8	-	-	-	-	-	-	-	-	-
Poroloy	7	-	-	-	-	-	-	-	1303	-
Potassium Alum	8	-	-	-	-	-	-	-	-	-
Potassium Bromide	8	-	-	-	-	-	-	-	-	-
Potassium Chloride	8	-	-	-	-	-	-	-	-	-
Potassium Cobalt Trifluoride	8	-	-	-	-	-	-	-	-	-
Potassium Fluoride	8	-	-	-	-	-	-	-	-	-
Potassium Dihydrogen Phosphate	8	-	-	-	-	-	-	-	-	-
Potassium Iodide	8	-	-	-	-	-	-	-	-	-
Potassium Magnesium Trifluoride	8	-	-	-	-	-	-	-	-	-
Potassium Manganese Trifluoride	8	-	-	-	-	-	-	-	-	-
Potassium Nickel Trifluoride	8	-	-	-	-	-	-	-	-	-
Potassium Phosphate	8	-	-	-	-	-	-	-	-	-
Dipotassium Silicon Hexafluoride	8	-	-	-	-	-	-	-	-	-
Potassium Tantalate	8	-	-	-	-	-	-	-	-	-

MATERIAL NAME	VOLUME	TRANSMITTANCE								
		Integrated			Spectral			Solar		
		Hemispherical	Normal	Angular	Hemispherical	Normal	Angular	Hemispherical	Normal	Angular
Platinum	7	-	-	-	-	-	-	-	-	-
Platinum, NBS	7	-	-	-	-	-	-	-	-	-
Platinum wire, Grade MPTU 4292-53	7	-	-	-	-	-	-	-	-	-
Platinum + Rhodium	7	-	-	-	-	-	-	-	-	-
Plexiglas	8	-	-	-	-	1724	-	-	-	-
Polyethylene	8	-	-	-	-	1705	-	-	-	-
Poly(Ethylene glycol - Terephthalic acid) [Mylar]	8	-	-	-	-	1711	-	-	-	-
Polyimide [Kapton]	8	-	-	-	-	1716	-	-	-	-
Poly(Methyl Methacrylate)	8	-	-	-	-	1723	-	-	-	-
Polystyrene	8	-	-	-	-	1728	-	-	-	-
Polytetrafluoroethylene [Teflon]	8	-	-	-	-	1736	-	-	-	-
Polyvinyl Chloride	8	-	-	-	-	1746	-	-	-	-
Polyvinylidene Chloride	8	-	-	-	-	1746	-	-	-	-
Poroloy	7	-	-	-	-	-	-	-	-	-
Potassium Alum	8	-	-	-	-	1702	-	-	-	-
Potassium Bromide	8	-	-	-	-	759	-	-	-	-
Potassium Chloride	8	-	-	-	-	873	-	-	-	-
Potassium Cobalt Trifluoride	8	-	-	-	-	-	-	-	-	-
Potassium Fluoride	8	-	-	-	-	-	-	-	-	-
Potassium Dihydrogen Phosphate	8	-	-	-	-	604	-	-	-	-
Potassium Iodide	8	-	-	-	-	1010	-	-	-	-
Potassium Magnesium Trifluoride	8	-	-	-	-	977	-	-	-	-
Potassium Manganese Trifluoride	8	-	-	-	-	-	-	-	-	-
Potassium Nickel Trifluoride	8	-	-	-	-	981	-	-	-	-
Potassium Phosphate	8	-	-	-	-	-	-	-	-	-
Dipotassium Silicon Hexafluoride	8	-	-	-	-	-	-	-	-	-
Potassium Tantalate	8	-	-	-	-	-	-	-	-	-

MATERIAL NAME	VOLUME	EMITTANCE						REFLECTANCE									ABSORPTANCE									TRANSMITTANCE								
		Total			Spectral			Integrated			Spectral			Solar			Integrated			Spectral			Solar			Integrated			Spectral			Solar		
		Hemispherical	Normal	Angular	Hemispherical	Normal	Angular	Hemispherical	Normal	Angular	Hemispherical	Normal	Angular	Hemispherical	Normal	Angular	Hemispherical	Normal	Angular	Hemispherical	Normal	Angular	Hemispherical	Normal	Angular	Hemispherical	Normal	Angular	Hemispherical	Normal	Angular	Hemispherical	Normal	Angular
Potassium Zinc Trifluoride	8	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	990	-	-	-	-
Potomac A	7	-	-	-	-	1192	-	-	-	-	-	1198	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Praseodymium Hexaboride	8	-	-	-	-	723	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	727	-	-	-	-
Praseodymium Trifluoride	8	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	727	-	-	-	-
Dipraseodymium Trisulfide	8	-	-	-	-	1232	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Pt-10 Rh Alloy	7	997	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Pt-13 Rh Alloy	7	-	1002	-	-	1005	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Pyrex 774	8	-	-	-	-	1582 1584	-	-	-	-	-	1586	1588	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1592	-	-	-	-	-
Pyroceram 9606	8	1595	1597	-	-	1599 1601	-	-	-	-	-	1603	-	-	-	-	-	-	-	-	-	-	-	1606	-	-	-	-	-	-	-	-	-	-
Pyroceram 9608	8	1595	1597	-	-	1599 1601	-	-	-	-	-	1603	-	-	-	-	-	-	-	-	-	-	-	1606	-	-	-	-	-	1608	-	-	-	-
Quartz, Crystal (see Silicon Dioxide, crystalline)																																		
Quartz, Fused (see Silicon Dioxide, fused)																																		
Rare Earth Borides	8	-	-	-	-	722	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	726	-	-	-	-
René 41	7	-	1353	-	-	1365 1366	-	-	-	-	-	1380 1382	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Reynolds Wrap	7	-	-	-	-	-	-	-	-	-	-	-	-	-	40	-	-	-	-	-	-	-	-	-	55	-	-	-	-	-	-	-	-	-
Rhenium	7	559	562	-	-	565 568	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Rhenium Trioxide	8	-	-	-	-	-	-	-	-	-	-	546	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Rhenium Disilicide	8	-	-	-	-	1173	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Rhodium	7	571	573	-	-	576 579	-	-	-	-	-	581	584	-	-	-	-	-	-	-	-	587	-	589	-	-	-	-	-	-	-	-	-	-
Rhyolite Tuff	8	-	-	-	-	-	-	-	-	-	-	1682	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Rockes	8	-	-	-	-	-	-	-	-	-	-	1680	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Rubber	8	-	-	-	-	-	-	-	-	-	-	1739	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
PR 19-10	8	-	-	-	-	-	-	-	-	-	-	1740	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
RTV-77	8	-	-	-	-	-	-	-	-	-	-	1740	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Rubidium Bromide	8	-	-	-	-	764	-	-	-	-	-	766	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	768	-	-	-	-

MATERIAL NAME	VOLUME	EMITTANCE						REFLECTANCE									ABSORPTANCE									TRANSMITTANCE								
		Total			Spectral			Integrated			Spectral			Solar			Integrated			Spectral			Solar			Integrated			Spectral			Solar		
		Hemispherical	Normal	Angular	Hemispherical	Normal	Angular	Hemispherical	Normal	Angular	Hemispherical	Normal	Angular	Hemispherical	Normal	Angular	Hemispherical	Normal	Angular	Hemispherical	Normal	Angular	Hemispherical	Normal	Angular	Hemispherical	Normal	Angular	Hemispherical	Normal	Angular	Hemispherical	Normal	Angular
Rubidium Chloride	8	-	-	-	-	-	-	-	-	-	-	-	906	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	908	-	-	-	-
Rubidium Iodide	8	-	-	-	-	-	-	-	-	-	-	1014	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1018	-	-	-	-
Rubidium Manganese Trifluoride	8	-	-	-	-	-	-	-	-	-	-	983	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	985	-	-	-	-
Ruby	8	-	-	-	-	-	-	-	-	-	-	-	174	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	176	-	-	-	-
Ruthenium	7	-	-	-	-	591	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Rutile	8	-	-	-	-	-	-	-	-	-	-	464 465	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		-	-	-	-
Salt Pool	8	-	-	-	-	-	-	-	-	-	-	1660	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		-	-	-	-
Samarium Hexaboride	8	-	-	-	-	723	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		-	-	-	-
Disamarium Trioxide	8	-	352	-	354	356 358	-	-	-	-	-	360	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Samarium Silicate	8	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	622	-	-	-	-
Sand	8	-	-	-	-	-	-	-	-	-	-	1678	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sapphire	8	179	181	-	-	183	-	-	-	-	-	-	187	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	190	-	-	-	-
Scandium Diboride	8	-	-	-	-	732	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Scandium Nitride	8	-	-	-	-	1087	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1090	-	-	-	-
Scolecite	8	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1694	-	-	-	-
Schott B & L 529516 Glass	8	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1533	-	-	-	-
Schott BK 8 Glass	8	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1533	-	-	-	-
Schott K5 Glass	8	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1533	-	-	-	-
Schott K_2SF-4 Glass	8	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1533	-	-	-	-
Schott SF-2 Glass	8	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1533	-	-	-	-
Selenides																																		
Cadmium Selenide	8	-	-	-	-	-	-	-	-	-	-	1108	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1110	-	-	-	-
Zinc Selenide	8	1112	-	-	-	1114	-	-	-	-	-	1117	-	-	-	-	-	-	-	-	1121	-	-	-	-	-	-	-	-	1123	-	-	-	-
Miscellaneous Selenides	8	-	-	-	-	-	-	-	-	-	-	1129	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1132	-	-	-	-
Selenite	8	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	630	-	-	-	-
Selenium	8	-	-	-	-	-	-	-	-	-	-	80	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	84	-	-	-	-
Serpentine	8	-	-	-	-	-	-	-	-	-	-	-	1689	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1694	-	-	-	-

MATERIAL NAME	VOLUME	Emittance Total Hemispherical	Emittance Total Normal	Emittance Total Angular	Emittance Spectral Hemispherical	Emittance Spectral Normal	Emittance Spectral Angular	Reflectance Integrated Hemispherical	Reflectance Integrated Normal	Reflectance Integrated Angular	Reflectance Spectral Hemispherical	Reflectance Spectral Normal	Reflectance Spectral Angular	Reflectance Solar Hemispherical	Reflectance Solar Normal	Reflectance Solar Angular	Absorptance Integrated Hemispherical	Absorptance Integrated Normal	Absorptance Integrated Angular	Absorptance Spectral Hemispherical	Absorptance Spectral Normal	Absorptance Spectral Angular	Absorptance Solar Hemispherical	Absorptance Solar Normal	Absorptance Solar Angular	Transmittance Integrated Hemispherical	Transmittance Integrated Normal	Transmittance Integrated Angular	Transmittance Spectral Hemispherical	Transmittance Spectral Normal	Transmittance Spectral Angular	Transmittance Solar Hemispherical	Transmittance Solar Normal	Transmittance Solar Angular
Silica (Crystal) [see Silicon Dioxide (Crystalline)]																																		
Silica (Fused) [see Silicon Dioxide (Fused)]																																		
Silica Gel	8	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	422	-	-	-	-
Silicates																																		
Zirconium Silicate	8	-	-	-	-	610	-	-	-	-	-	612	-	-	-	-	-	-	-	-	-	-	-	615	-	-	-	-	-	-	-	-	-	-
Zirconium Silicate Compounds	8	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	616	-	-	-	-	-	-	-	-	-	-
Miscellaneous Silicates	8	-	-	-	-	-	-	-	-	-	-	617	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	621	-	-	-	-
Silicides																																		
Boron Silicide	8	-	1134	-	-	1135	-	-	-	-	-	1137	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chromium Silicides	8	-	1139	-	-	1140 1142	-	-	-	-	-	1144	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Molybdenum Silicides	8	-	1147	-	-	1149 1151	-	-	-	-	-	1154	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tantalum Disilicide	8	-	1156	-	-	1157 1159	-	-	-	-	-	1161	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Titanium Silicides	8	-	1163	-	-	1164 1166	-	-	-	-	-	1168	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Miscellaneous Silicides	8	-	-	-	-	1172	-	-	-	-	-	1175	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Silicon	7	-	593	-	-	595 598	-	-	-	-	-	604	611	-	-	-	-	-	-	-	614	-	-	-	-	-	-	-	-	616	-	-	-	-
Silicon	8	-	88	-	-	89 90	-	-	-	-	-	97	106	-	-	-	-	-	-	-	108	-	-	-	-	-	-	-	-	110	-	-	-	-
Silicon Monocarbide	8	791	792	-	-	796 798	-	-	-	-	-	802	-	-	-	-	-	-	-	-	808	-	-	810	-	-	-	-	-	-	-	-	-	-
Silicon Nitride	8	-	1062	-	-	1065 1067	-	-	-	-	-	1069	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Silicon Monoxide	8	-	-	-	-	362	-	-	-	-	-	365	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	367	-	-	-	-
Silicon Dioxide (Crystalline)	8	-	371	-	-	372	-	-	-	-	-	374	385 387	-	-	-	-	-	-	-	389	-	-	-	-	-	-	-	-	391	-	-	-	-
Silicon Dioxide (Fused)	8	403	-	-	-	405	-	-	-	-	-	409	413	-	-	-	-	-	-	-	415	-	-	-	-	-	-	-	-	417	-	-	426	-
Silver	7	620	623	-	-	625 627	-	-	-	-	-	630	636	-	-	-	639	-	-	-	641 643	645	-	648	-	-	-	-	-	651	-	-	-	-
Silver + Aluminum	7	-	-	-	-	-	-	-	-	-	-	1007	1009	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

MATERIAL NAME	VOLUME	EMITTANCE						REFLECTANCE									ABSORPTANCE									TRANSMITTANCE								
		Total			Spectral			Integrated			Spectral			Solar			Integrated			Spectral			Solar			Integrated			Spectral			Solar		
		Hemispherical	Normal	Angular	Hemispherical	Normal	Angular	Hemispherical	Normal	Angular	Hemispherical	Normal	Angular	Hemispherical	Normal	Angular	Hemispherical	Normal	Angular	Hemispherical	Normal	Angular	Hemispherical	Normal	Angular	Hemispherical	Normal	Angular	Hemispherical	Normal	Angular	Hemispherical	Normal	Angular
Silver + Beryllium	7	-	-	-	-	-	-	-	-	-	-	-	1012	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Silver + Cadmium + ΣX_i	7	-	-	-	-	-	-	-	-	-	-	-	1472	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Silver + Copper + ΣX_i	7	-	-	-	-	-	-	-	-	-	-	-	1475	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Silver + Gold	7	-	-	-	-	-	-	-	-	-	-	1015	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Silver + Silicon	7	-	-	-	-	-	-	-	-	-	-	-	1018	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Silver + Zinc + ΣX_i	7	-	-	-	-	-	-	-	-	-	-	-	1478	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Silver Bromide	8	-	-	-	-	-	-	-	-	-	-	770	773	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	775	-	-	-	-
Silver Chloride	8	-	-	-	-	-	-	-	-	-	-	-	876	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	879	-	-	-	-
Silver Iodide	8	-	-	-	-	-	-	-	-	-	-	1022	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1024	-	-	-	-
SiO_2 + Al	8	-	-	-	-	-	-	-	-	-	-	1428	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SiO_2 + Al_2O_3 Powders	8	-	-	-	-	558	-	-	-	-	-	560	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SiO + Cr Cermets	8	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1401	-	-	-	-
SiO_2 + MoO_3 Powders	8	-	-	-	-	-	-	-	-	-	-	566	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SiO_2 + $MoSi_2$ Powders	8	-	1478	-	-	1479	-	-	-	-	-	1482	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SiO_2 + $MoSi_2$ + MoO_3 Powders	8	-	1510	-	-	1511	-	-	-	-	-	1513	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SiO_2 + TiB_2 Powders	8	-	-	-	-	-	-	-	-	-	-	1484	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Soda Lime Glass	8	-	1609	-	-	-	-	-	-	-	-	1612	-	-	-	-	-	-	-	-	-	-	-	1614	-	-	1615	-	-	1617	-	-	-	-
Soda Silica Glass	8	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1650	-	-	-	-
Sodium Borate	8	-	-	-	-	-	-	-	-	-	-	582	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sodium Carbonate	8	-	-	-	-	-	-	-	-	-	-	593	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sodium Chlorate	8	-	-	-	-	-	-	-	-	-	-	594	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sodium Chloride	8	881	-	-	-	883	-	-	-	-	885 886	880	893	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	895	-	-	-	-
Sodium Fluoride	8	-	-	-	-	-	-	-	-	-	-	963	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	966	-	-	-	-
Sodium Nickle Trifluoride	8	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	990	-	-	-	-
Sodium Nitrate	8	-	-	-	-	-	-	-	-	-	-	600	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sodium Phosphate	8	-	-	-	-	-	-	-	-	-	-	608	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sodium Tripolyphosphate	8	-	-	-	-	-	-	-	-	-	-	608	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sodium Silicate	8	-	-	-	-	-	-	-	-	-	-	618	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

MATERIAL NAME	VOLUME	EMITTANCE						REFLECTANCE									ABSORPTANCE									TRANSMITTANCE								
		Total			Spectral			Integrated			Spectral			Solar			Integrated			Spectral			Solar			Integrated			Spectral			Solar		
		Hemispherical	Normal	Angular	Hemispherical	Normal	Angular	Hemispherical	Normal	Angular	Hemispherical	Normal	Angular	Hemispherical	Normal	Angular	Hemispherical	Normal	Angular	Hemispherical	Normal	Angular	Hemispherical	Normal	Angular	Hemispherical	Normal	Angular	Hemispherical	Normal	Angular	Hemispherical	Normal	Angular
Sodium Disilicate	8	-	-	-	-	-	-	-	-	-	-	618	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sodium Metasilicate	8	-	-	-	-	-	-	-	-	-	-	618	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sodium Tungstate	8	-	-	-	-	-	-	-	-	-	-	666	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sodium Vanadate	8	-	-	-	-	-	-	-	-	-	-	667	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Solar Cell	8	-	88	-	-	92	-	-	-	-	-	100	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Solder	7	948	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SP 500	8	-	-	-	-	-	-	-	-	-	-	510 511 512	-	-	-	-	-	-	-	-	-	-	-	521	-	-	-	-	-	-	-	-	-	-
Spinel	8	-	1674	-	-	1676	-	-	-	-	-	576	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	578	-	-	-	-
Stainless Steels:																																		
17-7 PH	7	-	1223	-	-	1237 1245	-	-	-	-	-	1266 1268	-	-	-	-	-	-	-	-	-	-	-	1302	-	-	-	-	-	-	-	-	-	-
18-8	7	1212 1214	1225 1226	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1303	-	-	-	-	-	-	-	-	-	-
301	7	-	1221 1226	-	-	-	-	-	-	-	-	1269	-	-	1288	-	-	-	-	-	-	-	-	1300	-	-	-	-	-	-	-	-	-	-
302	7	1212 1213	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1291	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
303	7	1212 1213	1226	-	-	-	1254 1258 1259 1260	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1297	-	-	-	-	-	-	-	-	-	-	-	-
304	7	1213	1227	-	-	1244	-	-	-	-	-	1270	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
304 ELC	7	1213	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
310	7	1212 1213	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
316	7	-	1221 1224	-	-	1237 1244	-	-	-	-	-	1266 1270 1271	-	-	1288	-	-	-	-	-	-	-	-	1300 1302	-	-	-	-	-	-	-	-	-	-
321	7	-	1224 1225 1226	-	-	1237 1238 1244 1246	-	-	-	-	-	1266 1267 1270 1272	1285	-	-	-	-	-	-	-	1294	-	-	1302 1303	-	-	-	-	-	-	-	-	-	-
347	7	1212	1222	-	-	-	-	-	-	-	-	-	-	-	1288	-	-	-	-	-	-	-	-	1301	-	-	-	-	-	-	-	-	-	-
430	7	-	-	-	-	1193	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

MATERIAL NAME	VOLUME	EMITTANCE Total Hemispherical	EMITTANCE Total Normal	EMITTANCE Total Angular	EMITTANCE Spectral Hemispherical	EMITTANCE Spectral Normal	EMITTANCE Spectral Angular	REFLECTANCE Integrated Hemispherical	REFLECTANCE Integrated Normal	REFLECTANCE Integrated Angular	REFLECTANCE Spectral Hemispherical	REFLECTANCE Spectral Normal	REFLECTANCE Spectral Angular	REFLECTANCE Solar Hemispherical	REFLECTANCE Solar Normal	REFLECTANCE Solar Angular	ABSORPTANCE Integrated Hemispherical	ABSORPTANCE Integrated Normal	ABSORPTANCE Integrated Angular	ABSORPTANCE Spectral Hemispherical	ABSORPTANCE Spectral Normal	ABSORPTANCE Spectral Angular	ABSORPTANCE Solar Hemispherical	ABSORPTANCE Solar Normal	ABSORPTANCE Solar Angular	TRANSMITTANCE Integrated Hemispherical	TRANSMITTANCE Integrated Normal	TRANSMITTANCE Integrated Angular	TRANSMITTANCE Spectral Hemispherical	TRANSMITTANCE Spectral Normal	TRANSMITTANCE Spectral Angular	TRANSMITTANCE Solar Hemispherical	TRANSMITTANCE Solar Normal	TRANSMITTANCE Solar Angular
Stainless Steels (continued)																																		
446	7	-	1180	-	-	1187	-	-	-	-	-	1198	-	-	-	-	-	-	-	-	-	-	-	1207	-	-	-	-	-	-	-	-	-	-
A286	7	-	-	-	-	1322	-	-	-	-	-	1325	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
AM 350	7	-	1225	-	-	1238 1245	-	-	-	-	-	1266 1267 1268	-	-	-	-	-	-	-	-	-	-	-	1302 1303	-	-	-	-	-	-	-	-	-	-
PH 15-7 Mo	7	-	1223	-	-	1237 1245	-	-	-	-	-	1266 1267	-	-	-	-	-	-	-	-	-	-	-	1301	-	-	-	-	-	-	-	-	-	-
SF 11	7	-	-	-	-	-	-	-	-	-	-	938	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SF 20	7	-	-	-	-	-	-	-	-	-	-	1266	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Stannic Oxide (see Tin Dioxide)																																		
Stannous Telluride (see Tin Monotelluride)																																		
Stellite	7	-	-	-	-	-	-	-	-	-	-	1154	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Stil[illegible]te	8	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1694	-	-	-	-
Strontium Hexaboride	8	-	-	-	-	732	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Strontium Fluoride	8	-	-	-	-	-	-	-	-	-	-	968	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	971	-	-	-	-
Strontium Hafnate	8	-	-	-	-	-	-	-	-	-	-	597	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Strontium Oxide	8	-	-	-	-	-	-	-	-	-	-	546	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Strontium Titanate	8	-	-	-	-	651	-	-	-	-	-	653	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	657	-	-	-	-
Strontium Zirconate	8	-	-	-	-	-	-	-	-	-	-	676	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sulfates																																		
Barium Sulfate	8	-	-	-	-	-	-	-	-	-	-	623	-	-	-	-	-	-	-	-	-	-	-	626	-	-	-	-	-	-	-	-	-	-
Calcium Sulfates	8	-	-	-	-	-	-	-	-	-	-	627	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	629	-	-	-	-
Lead Sulfate and Sulfite	8	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	631	-	-	-	-
Sulfides																																		
Diarsenic Trisulfide	8	-	-	-	-	-	-	-	-	-	-	1177	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1179	-	-	-	-
Cadmium Sulfide	8	-	1181	-	-	1183	-	-	-	-	-	1188	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1194	-	-	-	-
Lead Sulfide	8	-	-	-	-	-	-	-	-	-	-	1197	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1204	-	-	-	-
Molybdenum Disulfide	8	-	-	-	-	-	-	-	-	-	-	1207	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1210	-	-	-	-

MATERIAL NAME	VOLUME	EMITTANCE						REFLECTANCE									ABSORPTANCE									TRANSMITTANCE								
		Total			Spectral			Integrated			Spectral			Solar			Integrated			Spectral			Solar			Integrated			Spectral			Solar		
		Hemispherical	Normal	Angular	Hemispherical	Normal	Angular	Hemispherical	Normal	Angular	Hemispherical	Normal	Angular	Hemispherical	Normal	Angular	Hemispherical	Normal	Angular	Hemispherical	Normal	Angular	Hemispherical	Normal	Angular	Hemispherical	Normal	Angular	Hemispherical	Normal	Angular	Hemispherical	Normal	Angular
Sulfides (continued)																																		
Zinc Sulfide	8	1213	-	-	-	1215	-	-	-	-	-	1217	1222	-	-	-	-	-	-	-	1224	-	-	1226	-	-	-	-	-	1227	-	-	-	-
Miscellaneous Sulfides	8	-	-	-	-	1231	-	-	-	-	-	1233	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1235	-	-	-	-
Sulfur	8	-	-	-	-	-	-	-	-	-	-	115	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	121	-	-	-	-
Superlith XXXN	8	-	-	-	-	-	-	-	-	-	-	1219	-	-	-	-	-	-	-	-	-	-	-	1226	-	-	-	-	-	-	-	-	-	-
Superpax	8	-	-	-	-	-	-	-	-	-	-	613	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
T-12 Commercial Optical Material	8	-	-	-	-	-	-	-	-	-	-	-	1451	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1453	-	-	-	-
T-111	7	1481	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ta + $TaAl_3$	8	-	-	-	-	-	-	-	-	-	-	1433	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
$TaAl_3$	8	-	-	-	-	1330	-	-	-	-	-	1332	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
$TaAl_3$ + Al	8	-	-	-	-	-	-	-	-	-	-	1431	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
$TaAl_3$ + Ta	8	-	-	-	-	-	-	-	-	-	-	1433	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Talc	8	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1694	-	-	-	-
TAM Zirconia	8	-	-	-	-	-	-	-	-	-	-	540	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tantalum	7	654	661	-	-	666 672	-	-	-	-	-	678	684	-	-	-	-	-	-	-	-	-	-	687	-	-	-	-	-	-	-	-	-	-
Tantalum + Tungsten	7	-	1021	-	-	1024	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tantalum + Tungsten + ΣX_i	7	1481	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tantalates																																		
Potassium Tantalate	8	-	-	-	-	-	-	-	-	-	-	634	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tantalum Carbide	8	811	813	-	-	815 817	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tantalum Nitride	8	-	1072	-	-	1074 1076	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ditantalum Nitride	8	-	-	-	-	1075	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tantalum Oxide	8	-	427	-	-	428	-	-	-	-	-	430	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tantalum Disilicide	8	-	1156	-	-	1157 1159	-	-	-	-	-	1161	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ta_2O_5 + $Be_{12}Ta$ Cermet	8	-	1403	-	-	1404	-	-	-	-	-	1406	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Teflon	8	-	1730	-	-	-	-	-	-	-	-	1732	-	-	-	-	-	-	-	-	1734	-	-	-	-	-	-	-	-	1736	-	-	-	-

MATERIAL NAME	VOLUME	EMITTANCE						REFLECTANCE									ABSORPTANCE									TRANSMITTANCE								
		Total			Spectral			Integrated			Spectral			Solar			Integrated			Spectral			Solar			Integrated			Spectral			Solar		
		Hemispherical	Normal	Angular	Hemispherical	Normal	Angular	Hemispherical	Normal	Angular	Hemispherical	Normal	Angular	Hemispherical	Normal	Angular	Hemispherical	Normal	Angular	Hemispherical	Normal	Angular	Hemispherical	Normal	Angular	Hemispherical	Normal	Angular	Hemispherical	Normal	Angular	Hemispherical	Normal	Angular
Teflon (continued)																																		
AMS 3651	8	-	-	-	-	-	-	-	-	-	-	1733	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
BMS-8-71	8	-	-	-	-	-	-	-	-	-	-	1733	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Television Tube Glass	8	-	-	-	-	1644	-	-	-	-	-	1646	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1648	-	-	-	-	-
Tellurides																																		
Dibismuth Tritelluride	8	-	-	-	-	-	-	-	-	-	-	1237	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cadmium Telluride	8	1239	-	-	-	-	-	-	-	-	-	1241	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1244	-	-	-	-
Germanium Telluride	8	-	-	-	-	-	-	-	-	-	-	1250	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Lead Telluride	8	-	-	-	-	-	-	-	-	-	-	1252	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1254	-	-	-	-
Manganese Telluride	8	-	-	-	-	-	-	-	-	-	-	1256	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tin Telluride	8	-	-	-	-	-	-	-	-	-	-	1259	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1264	-	-	-	-
Zinc Telluride	8	-	-	-	-	-	-	-	-	-	-	1266	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1268	-	-	-	-
Tellurium	8	-	-	-	-	-	-	-	-	-	-	123 125	128	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	130	136	-	-	-
Tellurium Dioxide	8	-	-	-	-	432	-	-	-	-	-	434	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	436	-	-	-	-
Terbium Hexaboride	8	-	-	-	-	723	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Thallium	7	-	-	-	-	-	-	-	-	-	-	690	693	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	696	-	-	-	-
Thallium Bromide	8	-	-	-	-	-	-	-	-	-	-	778	780 782	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	783	-	-	-	-
TlBr + TlCl (KRS-6)	8	-	-	-	-	-	-	-	-	-	-	-	1455	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1457	-	-	-	-
TlBr + TlI (KRS-5)	8	-	-	-	-	1459	-	-	-	-	-	-	1461	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1463	-	-	-	-
Thallium Bromide Chloride	8	-	-	-	-	-	-	-	-	-	-	-	1455	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1457	-	-	-	-
Thallium Bromide Iodide	8	-	-	-	-	1459	-	-	-	-	-	-	1461	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1463	-	-	-	-
Thallium Chloride	8	-	-	-	-	-	-	-	-	-	-	899	901	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	903	-	-	-	-
TlCl + TlBr (KRS-6)	8	-	-	-	-	-	-	-	-	-	-	-	1455	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1457	-	-	-	-
Thallium Iodide	8	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1029	-	-	-	-
TlI + TlBr (KRS-5)	8	-	-	-	-	1459	-	-	-	-	-	-	1461	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1463	-	-	-	-
ThO_2 + Ni Cermet	8	-	1408	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Thoria (see Thorium Oxide)																																		

MATERIAL NAME	VOLUME	EMITTANCE						REFLECTANCE									ABSORPTANCE									TRANSMITTANCE								
		Total			Spectral			Integrated			Spectral			Solar			Integrated			Spectral			Solar			Integrated			Spectral			Solar		
		Hemispherical	Normal	Angular	Hemispherical	Normal	Angular	Hemispherical	Normal	Angular	Hemispherical	Normal	Angular	Hemispherical	Normal	Angular	Hemispherical	Normal	Angular	Hemispherical	Normal	Angular	Hemispherical	Normal	Angular	Hemispherical	Normal	Angular	Hemispherical	Normal	Angular	Hemispherical	Normal	Angular
Thorium	7	-	-	-	-	699 701	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Thorium Tetraboride	8	-	730	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Thorium Monocarbide	8	-	-	-	-	852	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Thorium Dicarbide	8	-	-	-	-	852	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Thorium Oxide	8	-	438	-	-	440	-	-	-	-	-	442 444	-	-	-	-	-	-	-	-	-	-	-	446	-	-	-	-	-	-	-	-	-	-
Thulia (see Thulium Oxide)																																		
Thulium Hexaboride	8	-	-	-	-	723	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Thulium Oxide	8	-	-	-	447 450	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ti + TiB_2	8	-	-	-	-	-	-	-	-	-	-	1437	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ti + TiO_2	8	-	-	-	-	-	-	-	-	-	-	1439	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TiAl	8	-	1338	-	-	1339	-	-	-	-	-	1341	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TiB_2 + B Powders	8	-	-	-	-	-	-	-	-	-	-	1447	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TiB_2 + H_3BO_3	8	-	1468	-	-	1469	-	-	-	-	-	1471	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TiB_2 + Ni	8	-	-	-	-	-	-	-	-	-	-	1435	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TiB_2 + Ti Cermet	8	-	-	-	-	1410	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TiB_2 + Ti	8	-	-	-	-	-	-	-	-	-	-	1437	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TiB_2 + TiO_2 Powders	8	-	1489	-	-	1490	-	-	-	-	-	1493	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TiC + Ni + ΣX_i Cermet	8	1412	1415	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
$TiCr_2$	8	-	1343	-	-	1344	-	-	-	-	-	1346	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tin	7	703	705	-	-	-	-	-	-	-	-	707	-	-	-	-	710	712	-	-	714	717	-	-	-	-	-	-	-	720	-	-	-	-
Tin + Indium	7	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1026	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tin Dioxide	8	-	-	-	-	-	-	-	-	-	-	451	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tin Sulfide	8	-	-	-	-	-	-	-	-	-	-	1233	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tin Monotelluride	8	-	-	-	-	-	-	-	-	-	-	1259	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1264	-	-	-	-
TiO_2 + HBO_3 + TiB_2 Powders	8	-	1515	-	-	1516	-	-	-	-	-	1518	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TiO_2 + MnO Powders	8	-	-	-	-	-	-	-	-	-	-	563	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TiO_2 + Ti	8	-	-	-	-	-	-	-	-	-	-	1439	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

MATERIAL NAME	VOLUME	Emittance, Total, Hemispherical	Emittance, Total, Normal	Emittance, Total, Angular	Emittance, Spectral, Hemispherical	Emittance, Spectral, Normal	Emittance, Spectral, Angular	Reflectance, Integrated, Hemispherical	Reflectance, Integrated, Normal	Reflectance, Integrated, Angular	Reflectance, Spectral, Hemispherical	Reflectance, Spectral, Normal	Reflectance, Spectral, Angular	Reflectance, Solar, Hemispherical	Reflectance, Solar, Normal	Reflectance, Solar, Angular	Absorptance, Integrated, Hemispherical	Absorptance, Integrated, Normal	Absorptance, Integrated, Angular	Absorptance, Spectral, Hemispherical	Absorptance, Spectral, Normal	Absorptance, Spectral, Angular	Absorptance, Solar, Hemispherical	Absorptance, Solar, Normal	Absorptance, Solar, Angular	Transmittance, Integrated, Hemispherical	Transmittance, Integrated, Normal	Transmittance, Integrated, Angular	Transmittance, Spectral, Hemispherical	Transmittance, Spectral, Normal	Transmittance, Spectral, Angular	Transmittance, Solar, Hemispherical	Transmittance, Solar, Normal	Transmittance, Solar, Angular
$TiO_2 + TiB_2$	8	-	1489	-	-	1490	-	-	-	-	-	1493	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
$TiO_2 + TiCr_3$ Cermet	8	-	1419	-	-	1420	-	-	-	-	-	1421	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
$TiB_2 + TiO_2 + H_3BO_3$ Powders	8	-	1515	-	-	1516	-	-	-	-	-	1518	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
$TiB_2 + ZrSi_2$ Powders	8	-	-	-	-	-	-	-	-	-	-	1495	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Titanates																																		
Barium Titanate	8	-	-	-	-	-	-	-	-	-	-	635 637	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	642	-	-	-	-
Bismuth Titanate	8	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	644	-	-	-	-
Lead Titanate	8	-	-	-	-	-	-	646	-	-	-	647	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	649	-	-	-	-
Strontium Titanate	8	-	-	-	-	651	-	-	-	-	-	653	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	657	-	-	-	-
Zinc Titanate	8	-	-	-	-	-	-	-	-	-	-	660	-	-	-	-	-	-	-	-	-	-	-	662	-	-	-	-	-	-	-	-	-	-
Titania (see Titanium Dioxide)																																		
Titanium	7	723	726	-	-	729 732	735 738	-	-	-	-	744	751	-	769	-	-	-	-	-	-	771	-	-	-	-	-	-	-	773	-	-	-	-
Titanium, AMS 4901	7	-	727	-	-	-	-	-	-	-	-	746	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Titanium, Ti-75 A	7	724	727	-	-	-	-	-	-	-	-	746	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Titanium Alloys:																																		
6Al-4V	7	1484	1488	-	-	1492 1493	-	-	-	-	-	1498	-	-	-	-	-	-	-	-	-	-	-	1501	-	-	-	-	-	-	-	-	-	-
A-110-AT	7	-	1488	-	-	1492	-	-	-	-	-	1498	-	-	-	-	-	-	-	-	-	-	-	1501	-	-	-	-	-	-	-	-	-	-
AMS 4908	7	-	1030	-	-	-	-	-	-	-	-	1038	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
B120 VAC	7	-	-	-	-	-	-	-	-	-	-	1509	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
C-110 M	7	-	1030	-	-	1034	-	-	-	-	-	1038	-	-	-	-	-	-	-	-	-	-	-	1041	-	-	-	-	-	-	-	-	-	-
RS-120	7	1503	1506	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TA5E	7	1484	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TA6V	7	148[illegible]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Titanium + Aluminum + ΣX_i	7	1483	1486	-	-	1490	-	-	-	-	-	1497	-	-	-	-	-	-	-	-	-	-	-	1500	-	-	-	-	-	-	-	-	-	-
Titanium + Manganese	7	-	1028	-	-	1032	-	-	-	-	-	1037	-	-	-	-	-	-	-	-	-	-	-	1041	-	-	-	-	-	-	-	-	-	-
Titanium + Manganese + ΣX_i	7	1503	1505	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Titanium + Vanadium + ΣX_i	7	-	-	-	-	-	-	-	-	-	-	1508	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

MATERIAL NAME	VOLUME	EMITTANCE						REFLECTANCE									ABSORPTANCE									TRANSMITTANCE								
		Total			Spectral			Integrated			Spectral			Solar			Integrated			Spectral			Solar			Integrated			Spectral			Solar		
		Hemispherical	Normal	Angular	Hemispherical	Normal	Angular	Hemispherical	Normal	Angular	Hemispherical	Normal	Angular	Hemispherical	Normal	Angular	Hemispherical	Normal	Angular	Hemispherical	Normal	Angular	Hemispherical	Normal	Angular	Hemispherical	Normal	Angular	Hemispherical	Normal	Angular	Hemispherical	Normal	Angular
Titanium Diboride	8	-	703	-	-	705 707	-	-	-	-	-	710	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Titanium Carbide	8	819	821	-	-	823	825	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Titanium Nitride	8	-	1084	-	-	1086	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Titanium Monoxide	8	-	-	-	-	-	-	-	-	-	-	454	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Titanium Dioxide	8	-	456	-	-	458	-	-	-	-	-	461	473	-	-	-	-	-	-	-	-	-	-	475	-	-	-	-	-	476	-	-	-	-
TiO_2 + Ti	8	-	-	-	-	-	-	-	-	-	-	1439	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TiO_2 + TiB_2 + H_3BO_3	8	-	1515	-	-	1516	-	-	-	-	-	1518	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
TiO_2 + $ZrSi_2$	8	-	-	-	-	-	-	-	-	-	-	1507	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
$TiSi_2$ + Ti_5Si_3 Powders	8	-	1498	-	-	1500	-	-	-	-	-	1504	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ti_5Si_3 + $TiSi_2$ Powders	8	-	1498	-	-	1500	-	-	-	-	-	1504	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Titanium Phosphide	8	-	-	-	-	1105	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Titanium Disilicide	8	-	1163	-	-	1165 1167	-	-	-	-	-	1169	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Trititanium Trisilicide	8	-	-	-	-	-	-	-	-	-	-	1169	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Pentatitanium Trisilicide	8	-	-	-	-	-	-	-	-	-	-	1169	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tungstates																																		
Calcium Tungstates	8	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	663	-	-	-	-
Miscellaneous Tungstates	8	-	-	-	-	-	-	-	-	-	-	665	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tungsten	7	776	782	-	-	790 796	808 810	-	-	812	-	814 819	823	-	-	-	-	-	-	-	-	825	-	-	-	-	-	-	-	-	-	-	-	-
Tungsten Alloys:																																		
VR-27-VT	7	1049	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tungsten + Molybdenum	7	1043	-	-	-	1045	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tungsten + Rhenium	7	1048		-	-	1051	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tungsten Boride	8	-	730	-	-	-	-	-	-	-	-	735	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ditungsten Pentaboride	8	-	-	-	-	732	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tungsten Monocarbide	8	-	827	-	-	829 832	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ditungsten Carbide	8	-	-	-	-	829 832	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

MATERIAL NAME	VOLUME	EMITTANCE						REFLECTANCE									ABSORPTANCE									TRANSMITTANCE								
		Total			Spectral			Integrated			Spectral			Solar			Integrated			Spectral			Solar			Integrated			Spectral			Solar		
		Hemispherical	Normal	Angular	Hemispherical	Normal	Angular	Hemispherical	Normal	Angular	Hemispherical	Normal	Angular	H mispherical	Normal	Angular	Hemispherical	Normal	Angular	Hemispherical	Normal	Angular	Hemispherical	Normal	Angular	Hemispherical	Normal	Angular	Hemispherical	Normal	Angular	Hemispherical	Normal	Angular
Tungsten Disilicide	8	-	-	-	-	-	-	-	-	-	-	1176	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Tritungsten Silicide	8	-	-	-	-	1173	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Udimet 500	7	-	-	-	-	1365 1412	-	-	-	-	-	1381 1418	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Unitemp No. 41	7	-	936 1352	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ultrox 1000 W	8	-	-	-	-	-	-	-	-	-	-	613	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Unitane	8	-	-	-	-	-	-	-	-	-	-	465	-	-	-	-	-	-	-	-	-	-	-	475	-	-	-	-	-	-	-	-	-	-
Uranium	7	828	-	-	-	834 838	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Uranium + Niobium	7	1053	-	-	-	1056	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Uranium + Zirconium + ΣX_i	7	1511	-	-	-	1514	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Uranium Dodecaboride	8	-	-	-	-	732	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Uranium Dicarbide	8	848	-	-	-	852	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Uranium Dioxide	8	-	-	-	478	485	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	486	-	-	-
Uranus 10	7	-	-	-	-	-	-	-	-	-	-	-	1283	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Vanadates																																		
Sodium Vanadate	8	-	-	-	-	-	-	-	-	-	-	667	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Yttrium Vanadate	8	-	-	-	-	669	-	-	-	-	-	671	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Vanadium	7	-	-	-	-	840	-	-	-	-	-	844	848	-	-	-	-	-	-	-	-	850	-	-	-	-	-	-	-	-	-	-	-	-
Vanadium Diboride	8	-	-	-	-	732	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Vanadium Carbide	8	-	850	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Vanadium Nitride	8	-	-	-	-	1087	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Trivanadium Nitride	8	-	-	-	-	1087	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Divanadium Pentaoxide	8	-	-	-	-	-	-	-	-	-	-	546	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Vanadium Disilicide	8	-	-	-	-	1173	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Vascojet 1000	7	-	-	-	-	1192	-	-	-	-	-	1199	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Vickers F. D. P.	7	-	1221	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Vitreous Silica [see Silicon Dioxide (Fused)]																																		
Vycor 790	8	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1633	-	-	-

MATERIAL NAME	VOLUME	EMITTANCE						REFLECTANCE									ABSORPTANCE									TRANSMITTANCE								
		Total			Spectral			Integrated			Spectral			Solar			Integrated			Spectral			Solar			Integrated			Spectral			Solar		
		Hemispherical	Normal	Angular	Hemispherical	Normal	Angular	Hemispherical	Normal	Angular	Hemispherical	Normal	Angular	Hemispherical	Normal	Angular	Hemispherical	Normal	Angular	Hemispherical	Normal	Angular	Hemispherical	Normal	Angular	Hemispherical	Normal	Angular	Hemispherical	Normal	Angular	Hemispherical	Normal	Angular
Vycor 791	8	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1633	-	-	-	-
Vinyl Plastics	8	-	-	-	-	-	-	-	-	-	-	1741	-	-	-	-	-	-	-	-	1743	-	-	-	-	-	-	-	-	1745	-	-	-	-
Vinyl Resins	8	-	-	-	-	-	-	-	-	-	-	1741	-	-	-	-	-	-	-	-	1743	-	-	-	-	-	-	-	-	1745	-	-	-	-
VR-27-VT	7	1049	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Wollastonite	8	-	-	-	-	-	-	-	-	-	-	618	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Wulfenite	8	-	-	-	-	-	-	-	-	-	-	1673	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
YAG (see Yttrium Aluminate)																																		
Yellow Brass	7	912	-	-	-	-	-	-	-	-	-	-	-	-	-	-	923	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Y_2O_3 + Cr_2O_3 Powders	8	-	-	-	-	509	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ytterbium Hexaboride	8	-	-	-	-	723	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ytterbium Oxide	8	-	-	-	488	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	490	-	-	-	-
Yttrium	7	-	-	-	-	853	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Yttrium Aluminate	8	-	-	-	-	-	-	-	-	-	-	579	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Yttrium Aluminate Garnet (see Yttrium Aluminate)																																		
Yttrium Hexaboride	8	-	-	-	-	723	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Yttrium Carbide	8	-	-	-	-	852	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Yttrium Dicarbide	8	-	-	-	-	852	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Diyttrium Tricarbide	8	-	-	-	-	852	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Yttrium Nitride	8	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1090	-	-	-	-
Yttrium Oxide	8	-	492	-	494	496 498	-	-	-	-	-	501	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	504	-	-	-	-
Yttrium Phosphate	8	-	-	-	-	-	-	-	-	-	-	607	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Yttrium Vanadate	8	-	-	-	-	669	-	-	-	-	-	671	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Zinc	7	855	857	-	-	-	-	-	-	-	-	860	-	-	-	-	864	-	-	-	866	869	-	-	-	-	-	-	-	-	-	-	-	-
Zinc + Aluminum	7	-	-	-	-	-	-	-	-	-	-	1059	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Zinc Antimonide	8	-	-	-	-	-	-	-	-	-	-	1348	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Zinc Diiodine Tetrasulfide	8	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1236	-	-	-	-
Trizinc Diiodine Hexasulfide	8	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1236	-	-	-	-

MATERIAL NAME	VOLUME	EMITTANCE						REFLECTANCE									ABSORPTANCE									TRANSMITTANCE								
		Total			Spectral			Integrated			Spectral			Solar			Integrated			Spectral			Solar			Integrated			Spectral			Solar		
		Hemispherical	Normal	Angular	Hemispherical	Normal	Angular	Hemispherical	Normal	Angular	Hemispherical	Normal	Angular	Hemispherical	Normal	Angular	Hemispherical	Normal	Angular	Hemispherical	Normal	Angular	Hemispherical	Normal	Angular	Hemispherical	Normal	Angular	Hemispherical	Normal	Angular	Hemispherical	Normal	Angular
Zinc Oxide	8	506	-	-	-	-	-	-	-	-	-	507	-	-	-	-	-	-	-	-	519	-	-	521	-	-	-	-	-	522	-	-	-	-
Zinc Selenide	8	1112	-	-	-	1114	-	-	-	-	-	1117	-	-	-	-	-	-	-	-	1121	-	-	-	-	-	-	-	-	1123	-	-	-	-
Zinc Sulfide	8	1213	-	-	-	1215	-	-	-	-	-	1217	1222	-	-	-	-	-	-	-	1224	-	-	1226	-	-	-	-	-	1227	-	-	-	-
Zinc Telluride	8	-	-	-	-	-	-	-	-	-	-	1266	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1268	-	-	-	-
Zinc Titanate	8	-	-	-	-	-	-	-	-	-	-	660	-	-	-	-	-	-	-	-	-	-	-	662	-	-	-	-	-	-	-	-	-	-
Zinc Zirconium Silicate	8	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	616	-	-	-	-	-	-	-	-	-	-
Zircalloy 2	7	-	1520	-	-	1523	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Zircoa (AH-C)	8	-	-	-	-	-	-	-	-	-	-	540	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Zircon	8	-	1685	-	-	1687	-	-	-	-	-	613	-	-	-	-	-	-	-	-	-	-	-	615	-	-	-	-	-	-	-	-	-	-
Zirconates	8	-	-	-	-	-	-	-	-	-	-	675	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Zirconia (see Zirconium Dioxide)																																		
Zirconium	7	-	872	-	-	875 878	-	-	-	-	-	881	-	-	-	-	-	-	-	-	-	883	-	-	-	-	-	-	-	-	-	-	-	-
Zirconium + Hafnium + ΣX_i	7	-	-	-	-	1517	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Zirconium + Tin + ΣX_i	7	-	1519	-	-	1522	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Zirconium + Uranium + ΣX_i	7	1525	-	-	-	1528	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Zirconium Diboride	8	-	713	-	-	715 717	-	-	-	-	-	720	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Zirconium Carbide	8	833	835	-	-	837 841	-	-	-	-	-	843	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Zirconium Nitride	8	1078	-	-	-	1080 1082	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Zirconium Dioxide	8	524	526	-	529	531 533	-	-	-	-	-	536	-	-	-	-	-	-	-	-	-	-	-	544	-	-	-	-	-	-	-	-	-	-
Zirconium Dioxide, Stabalized	8	-	527	-	-	532	-	-	-	-	-	538	-	-	-	-	-	-	-	-	-	-	-	544	-	-	-	-	-	-	-	-	-	-
Zirconium Silicate	8	-	-	-	-	610	-	-	-	-	-	612	-	-	-	-	-	-	-	-	-	-	-	615	-	-	-	-	-	-	-	-	-	-
Zirconium Disilicate	8	-	-	-	-	1173	-	-	-	-	-	1176	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Zircopax	8	-	-	-	-	611	-	-	-	-	-	613	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ZnSb	8	-	-	-	-	-	-	-	-	-	-	1352	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ZrO_2 + Al	8	-	-	-	-	-	-	-	-	-	-	1442	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

MATERIAL NAME	VOLUME	EMITTANCE						REFLECTANCE									ABSORPTANCE									TRANSMITTANCE								
		Total			Spectral			Integrated			Spectral			Solar			Integrated			Spectral			Solar			Integrated			Spectral			Solar		
		Hemispherical	Normal	Angular	Hemispherical	Normal	Angular	Hemispherical	Normal	Angular	Hemispherical	Normal	Angular	Hemispherical	Normal	Angular	Hemispherical	Normal	Angular	Hemispherical	Normal	Angular	Hemispherical	Normal	Angular	Hemispherical	Normal	Angular	Hemispherical	Normal	Angular	Hemispherical	Normal	Angular
$ZrSi_2 + TiB_2$ Powders	8	-	-	-	-	-	-	-	-	-	-	1495	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
$ZrSi_2 + TiO_2$ Powders	8	-	-	-	-	-	-	-	-	-	-	1507	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-