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AD-742 200

CdS CRYSTALS

A DDC BIBLIOGRAPHY

DDC-TAS-72-36

MAY 1972

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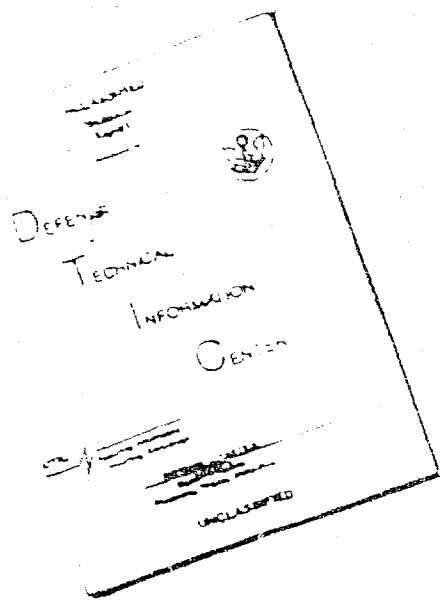

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(Security classification of title, body of abstract and indexing annotation must be entered when the overall report is classified)

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CdS CRYSTALS

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10. DISTRIBUTION STATEMENT

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11. SUPPLEMENTARY NOTES	12. SPONSORING MILITARY ACTIVITY

13. ABSTRACT

The references in this bibliography on Cadmium Sulfides cover the whole range of studies from the crystal growth, to the physical properties, to the uses and limitations in semiconductors, and the electronic interactions and configurations. Corporate Author-Monitoring Agency, Subject, and Title Indexes are included.

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Security Classification

KEY WORDS	LINK A		LINK B		LINK C	
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*Semiconductors						
*Cadmium Sulfides						
*Crystal Growth						
*Bibliographies						
Semiconductor Devices						
Piezoelectric Transducers						
Crystals						
Single Crystals						
Solar Cells						
Excitons						
Electroluminescence						
Doping						
Raman Spectroscopy						
Acoustic Equipment						
Band Theory of Solids						
Cadmium Alloys						
Transistors						
Cadmium Selenides						
Electrical Conductance						
Photoconductivity						
Schottky Barriers						
Spin Lattice Relaxation						
Piezoelectric Crystals						
Molecular Electronics						
Transport Properties						
Zinc Compounds						
Semiconducting Films						
Triodes						
Carriers(Semiconductors)						
Delay Lines						
Phonons						
Diodes(Semiconductor)						
Field Effect Transistors						
Integrated Circuits						
Phototubes						
Lasers						
Luminescence						
Photoelectric Cells(Semiconductor)						
Photoelectric Materials						

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19 M-SERIES					
20 R-CLASS					

22 DISTRIBUTION/AVAILABILITY STATEMENTS

23	DESCRIPTORS	*	DESCRIPTORS
X	CADMIUM SULFIDES	X	BIREFRINGENCE
	SEMICONDUCTOR DOPING		ELECTRO-OPTIC EFFECT
	PIEZOELECTRIC PROPERTIES		MOLECULAR [illegible]
	SEMICONDUCTORS // CADMIUM		[illegible] // [illegible]
	SINGLE CRYSTALS // SOLAR CELLS		SEMICONDUCTORS // [illegible]
↓	CRYSTAL GROWTH // EXCITONS		CRYSTALS (SEMICONDUCTORS)
	ELECTROLUMINESCENCE // DOPING		[illegible] // PHONONS
	RAMAN SPECTRA // [illegible]		DIODES (SEMICONDUCTOR)
	ACOUSTIC [illegible]		[illegible]
	BAND THEORY // SOLIDS		[illegible]
	[illegible] // THERMISTORS		GASES // LUMINESCENCE
	CADMIUM SELENIDES		[illegible]
	ELECTRICAL [illegible]		[illegible]
	PHOTOCONDUCTIVITY		24 DESCRIPTOR CLASSIFICATION U CMHA C CRD CFRD S SRD SFRD

25	IDENTIFIERS		OPEN-ENDED TERMS
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	SPIN LATTICE RELAXATION		

9 DESC. NOTE	17 TASK
10 AUTHOR	18 M-ACRONYM
11 DATE	19 M-SERIES
12 PP	20 R-CLASS

22 DISTRIBUTION/AVAILABILITY STATEMENTS

23	DESCRIPTORS	*	DESCRIPTORS
*	CADMIUM SULFIDE	*	BIBLIOGRAPHIES
	SEMICONDUCTOR DEVICES		ELECTRONIC EQUIPMENT
	PIEZOELECTRIC TRANSDUCERS		MOLECULAR ELECTRONICS
	* SEMICONDUCTORS (CRYSTALS)		PHOTOCELLS // ZINC COMPOUNDS
	SINGLE CRYSTALS // SULFIDES		SEMICONDUCTORS (MATERIALS) // TRIODES
↓	CRYSTAL GROWTH // EPITAXY		CRYSTALS // CONTAMINANTS
	ELECTROLUMINESCENCE // DOPING		ELECTRONS // PHONONS
	RAMAN SPECTROSCOPY		DIODES (SEMICONDUCTOR)
	ACOUSTIC EMISSION		I.D.
	DARLINGTON TRANSISTORS		INTEGRATED CIRCUITS // TRANSISTORS
	CADMIUM SELENIDES // TRIODES		CdSe (LUMINESCENCE)
	CADMIUM SELENIDES		TRANSISTOR CIRCUITS (SWITCHING)
	ELECTRICAL CONTACTS		
	PHOTOCONDUCTIVITY		

24 DESCRIPTOR CLASSIFICATION U C S CMHA CRD CFRD SRD SFRD

25	IDENTIFIERS		OPEN-ENDED TERMS
	SCHOTTKY BARRIERS		
	SPIN LATTICE RELAXATION		

26 IDENT. & O. E. TERMS CLASSIFICATION U C S CMHA CRD CFRD SRD SFRD

27 COMPLETE ABSTRACT: [ ] NO ABSTRACT [ ] SEE BACK
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CdS CRYSTALS

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Bibliography (March 1961 - January 1972)

5. AUTHOR(S) (First name, middle initial, last name)

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10. DISTRIBUTION STATEMENT

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11. SUPPLEMENTARY NOTES	12. SPONSORING MILITARY ACTIVITY

13. ABSTRACT

The references in this bibliography on Cadmium Sulfides cover the whole range of studies from the crystal growth, to the physical properties, to the uses and limitations in semiconductors, and the electronic interactions and configurations. Corporate Author-Monitoring Agency, Subject, and Title Indexes are included.

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UNCLASSIFIED

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*Cadmium Sulfides						
*Crystal Growth						
*Bibliographies						
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Piezoelectric Transducers						
Crystals						
Single Crystals						
Solar Cells						
Excitons						
Electroluminescence						
Doping						
Raman Spectroscopy						
Acoustic Equipment						
Band Theory of Solids						
Cadmium Alloys						
Transistors						
Cadmium Selenides						
Electrical Conductance						
Photoconductivity						
Schottky Barriers						
Spin Lattice Relaxation						
Piezoelectric Crystals						
Molecular Electronics						
Transport Properties						
Zinc Compounds						
Semiconducting Films						
Triodes						
Carriers(Semiconductors)						
Delay Lines						
Phonons						
Diodes(Semiconductor)						
Field Effect Transistors						
Integrated Circuits						
Phototubes						
Lasers						
Luminescence						
Photoelectric Cells(Semiconductor)						
Photoelectric Materials						

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January 1963 - January 1972

MAY 1972

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FOREWORD

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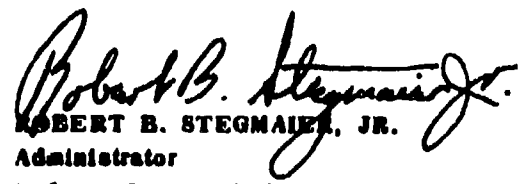

ROBERT B. STEGMAIER, JR.
Administrator
Defense Documentation Center

C O N T E N T S

	Page
FOREWORD	iii
AD BIBLIOGRAPHIC REFERENCES	1
INDEXES	
CORPORATE AUTHOR-MONITORING AGENCY	O-1
SUBJECT	D-1
TITLE	T-1

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD-256 674
WESTERN RESERVE UNIV CLEVELAND OHIO

RESEARCH ON SEMICONDUCTOR SURFACES. 1. THE ANOMALOUS FIELD EFFECT IN GERMANIUM. 2. THE FIELD EFFECT IN CADMIUM SULFIDE (U)

MAY 61 1V NIXON,JOHN D.;

CONTRACT: DA33 019ORD3098
MONITOR: ARDD 2172 1

UNCLASSIFIED REPORT

DESCRIPTORS: *CADMIUM COMPOUNDS, *ELECTRIC FIELDS, *ELECTRON TRANSITIONS, *GERMANIUM, *SEMICONDUCTORS, *SULFIDES, CRYSTAL LATTICES, ELECTRICAL CONDUCTANCE, ELECTRONS, FUNCTIONS, MATERIALS, MATHEMATICAL ANALYSIS, POLARIZATION, SINGLE CRYSTALS, SURFACES, TEMPERATURE (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD-256 763
LOCKHEED MISSILES AND SPACE CO SUNNYVALE CALIF

PROPERTIES OF CADMIUM SULFIDE, ZINC SULFIDE AND MERCURIC SULFIDE. PARTS I-III. VOLUME I. AN ANNOTATED BIBLIOGRAPHY (U)

MAR 61 IV ABBOTT,HELEN M.
REPT. NO. 3RD 61 2

UNCLASSIFIED REPORT

DESCRIPTORS: *BIBLIOGRAPHIES, *CADMIUM COMPOUNDS, *LUMINESCENCE, *MERCURY COMPOUNDS, *PHOSPHORESCENT MATERIALS, *SEMICONDUCTORS, *SULFIDES, *ZINC COMPOUNDS, CRYSTAL STRUCTURE, CRYSTALLIZATION, CRYSTALS, ELECTRICAL PROPERTIES, FLUORESCENCE, GROWTH, OPTICS, PHOSPHORESCENCE, PHOTOCONDUCTIVITY, SINGLE CRYSTALS (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD-256 764
LOCKHEED MISSILES AND SPACE CO SUNNYVALE CALIF

PROPERTIES OF CADMIUM SULFIDE, ZINC SULFIDE AND MERCURIC SULFIDE. PART IV. VOLUME II. AN ANNOTATED BIBLIOGRAPHY (U)

MAR 61 IV
REPT. NO. SRB 61 2

UNCLASSIFIED REPORT

DESCRIPTORS: *BIBLIOGRAPHIES, *LUMINESCENCE, *MERCURY COMPOUNDS, *PHOSPHORESCENT MATERIALS, *SEMICONDUCTORS, *SULFIDES, *ZINC COMPOUNDS, CADMIUM COMPOUNDS, CRYSTALS, ELECTRICAL PROPERTIES, OPTICS, PHOSPHORESCENCE, PHOTOCONDUCTIVITY, PHOTOELECTRIC CELLS (SEMICONDUCTOR), PHOTOELECTRIC EFFECT, PHOTOTUBES, SINGLE CRYSTALS (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD-257 072
WESTERN RESERVE UNIV CLEVELAND OHIO

ENHANCED PHOTOCONDUCTANCE AND SHADOWS ON CADMIUM SULFIDE SINGLE CRYSTALS (U)

MAY 61 1V
CONTRACT: DA33 019ORD3098
MONITOR: ARDO 2172 2

UNCLASSIFIED REPORT

DESCRIPTORS: *PHOTOCONDUCTIVITY, *SEMICONDUCTORS, *SINGLE CRYSTALS, CADMIUM COMPOUNDS, CRYSTALS, DENSITY, ELECTRIC FIELDS, ELECTRICAL CONDUCTANCE, ELECTRONS, ENERGY, SULFIDES, SURFACE PROPERTIES (U)

IT IS WELL KNOWN THAT A CAPACITIVE ELECTRIC FIELD APPLIED NORMALLY TO THE SURFACE OF MANY SEMICONDUCTORS PRODUCES AN OBSERVABLE EFFECT ON THE CONDUCTIVITY OF THE SEMICONDUCTOR. THE EFFECTS ON THE RESISTANCE OF SUCH A CAPACITIVE FIELD ARE EXPECTED TO VARY DIRECTLY WITH THE SQUARE OF THE RESISTIVITY OF THE MATERIAL. THE DISCREPANCY BETWEEN THE OBSERVED AND EXPECTED CHANGE IN CONDUCTANCE ARISING FROM AN APPLIED FIELD IS USED TO STUDY THE DENSITY AND ENERGIES OF THE SURFACE STATES ON SEMICONDUCTORS. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD-259 365
DAVID SARNOFF RESEARCH CENTER PRINCETON N J

INVESTIGATION OF CARRIER INJECTION ELECTROLUMINESCENCE (U)

MAY 61 1V DREEBEN,A.B.;FISCHER,A.G.;MASON, A.S.;
REPT. NO. SRI
CONTRACT: AF19 604 8018
MONITOR: AFCRL 360

UNCLASSIFIED REPORT

DESCRIPTORS: *CRYSTALS, *LUMINESCENCE, BRIGHTNESS, CADMIUM COMPOUNDS, CRYSTAL LATTICES, ELECTRICAL PROPERTIES, ELECTROCHEMISTRY, ELECTRON TRANSITIONS, GROWTH, IMPURITIES, INTERMETALLIC COMPOUNDS, LASERS, LIGHT, PHOSPHORESCENT MATERIALS, SELENIDES, SEMICONDUCTORS, SULFIDES, SYNTHESIS, TELLURIDES, VACUUM APPARATUS, ZINC COMPOUNDS (U)

INJECTION ELECTROLUMINESCENCE IS THE CONVERSION OF ELECTRICAL ENERGY INTO LIGHT ENERGY BY WAY OF RADIATIVE RECOMBINATION OF ELECTRONS AND HOLES WHICH ARE INJECTED FROM TWO SEPARATE, OHMIC CONTACTS, INTO THE VOLUME OF A CRYSTAL. MANY IMPORTANT APPLICATIONS AWAIT THE PRACTICAL AVAILABILITY OF INJECTION EL LIGHT SOURCES. SINCE THE LIGHT SOURCE IS COMPACT, SHOCK-RESISTANT AND COOL, IT MIGHT BE SUITABLE FOR SPECIAL APPLICATIONS SUCH AS LASER EXCITATION. THE PREPARATION OF ZNSE CRYSTALS SUITABLE FOR INJECTION EL IS DISCUSSED. IN ORDER TO GROW BETTER CRYSTALS, SEVERAL METHODS WERE DEVELOPED FOR MELTING SELENIDES AND SULFIDES ABOVE ATMOSPHERIC PRESSURE IN SELENIUM OR SULFUR VAPORS RESPECTIVELY. A NEW APPARATUS FOR CZOCHRALSKI PULLING OF DECOMPOSABLE SOLIDS UNDER PRESSURE ETROLLED ZONE-SUBLIMATION-RECRYSTALLIZATION FOR VAPOR-PHASE GROWTH OF ZNTE AND ZNSE ARE DESCRIBED. THE DESIGN AND OPERATION OF A NEW VACUUM SYSTEM FOR EPITAXIAL GROWTH OF MULTIPLE LAYERS IS OUTLINED. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD-259 061
AIR FORCE INST OF TECH WRIGHT-PATTERSON AFB OHIO

ELECTRON MOBILITY IN CADMIUM SULPHIDE SINGLE CRYSTALS AT LOW TEMPERATURES (U)

MAR 61 1V DEL DO,LOUIS JOSEPH;
REPT. NO. GNE PHYS 61 4

UNCLASSIFIED REPORT

DESCRIPTORS: *CADMIUM COMPOUNDS, *ELECTRON TRANSITIONS, *HALL EFFECT, *SEMICONDUCTORS, *SINGLE CRYSTALS, *SOLID STATE PHYSICS, DETERMINATION, ELECTRIC POTENTIAL, ELECTRICAL PROPERTIES, ELECTRONS, LOW TEMPERATURE RESEARCH, MEASUREMENT, RESISTANCE (ELECTRICAL), SULFIDES, TEMPERATURE, THEORY (U)

THE DEPENDENCE OF ELECTRON MOBILITY ON TEMPERATURE FOR CHARGE CARRIERS IN SINGLE CRYSTALS OF CDS WAS INVESTIGATED BETWEEN 4.2 AND 273 K. THE MOBILITY, MU, WAS OBTAINED BY DETERMINING THE VALUE OF THE HALL CONSTANT AND THE CRYSTAL RESISTIVITY. THE CRYSTALS WERE SHAPED INTO PARALLELPIPEDS AND PREPARED FOR ELECTRICAL MEASUREMENTS BY APPLYING INDIUM CONTACTS ON THEIR SURFACES BY ULTRASONIC TECHNIQUES. ELECTRICAL MEASUREMENTS WERE CONDUCTED IN A LIQUID HELIUM CRYOSTAT. THE MOBILITY, THE HALL CONSTANT, THE RESISTIVITY, AND THE CHARGE CARRIER DENSITY WERE PLOTTED AS A FUNCTION OF 1/T. THE MOBILITY INCREASED RAPIDLY FROM 273 K TO A MAXIMUM NEAR 25 K AND THEN DECREASED SHARPLY NEAR 4.2 K. ANALYSIS OF THE DATA INDICATED THAT THE EXPERIMENTAL BEHAVIOR OF THE MOBILITY OF CHARGE CARRIERS AT LOW TEMPERATURES CAN BE EXPLAINED IN TERMS OF IMPURITY BAND CONDUCTION. (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD-259 883
EAGLE-PICHER RESEARCH LABS MIAMI OKLA

RESEARCH IN PURIFICATION OF CADMIUM SULFIDE CRYSTALS (U)

APR 61 IV FAHRIG,R.H.;BEAN,K.E.;
CONTRACT: AF33 616 6203
MONITOR: ARL 14

UNCLASSIFIED REPORT

DESCRIPTORS: *CADMIUM, *CADMIUM COMPOUNDS, *PHOTOELECTRIC CELLS (SEMICONDUCTOR), *PHOTOTUBES, *SEMICONDUCTORS, *SINGLE CRYSTALS, *SOLAR CELLS, *SULFIDES, *SULFUR, CRUCIBLES, CRYSTALLIZATION, CRYSTALS, ENERGY CONVERSION, GROWTH, HEAT TREATMENT, MATERIALS, MELTING, PREPARATION, PROCESSING, PURIFICATION, REFRACTIVE INDEX, RESISTANCE (ELECTRICAL), SINTERING, SYNTHESIS (U)

THE PURIFICATION OF CD AND S, AND THE SUBSEQUENT SYNTHESIS OF SPECTROGRAPHICALLY PURE CDS FROM THE REFINED ELEMENTS IS DESCRIBED. THE GROWTH OF LARGE CRYSTALS OF CDS BY THE METHOD OF VAPOR PHASE DEPOSITION IS DISCUSSED. MODIFICATIONS OF APPARATUS AND METHOD ARE DESCRIBED AND ILLUSTRATED. THE RESULTS OF STUDIES CONCERNING RAW MATERIALS, SINTERING, DOPING, DIFFUSION AND HEAT TREATING ARE GIVEN. A SECTION DEALING WITH THE MELTING AND CRYSTALLIZATION OF CADMIUM SULFIDE AND OTHER MATERIALS IN A PRESSURE MELTING FURNACE IS PRESENTED. THE TESTING AN EVALUATION OF CADMIUM SULFIDE CRYSTALS SUITABLE FOR SOLAR CELLS IS DESCRIBED. (AUTHOR) (U)

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AD-261 116
AERONAUTICAL SYSTEMS DIV WRIGHT-PATTERSON AFB OHIO PHYSICS LAB

PHOTOCONDUCTIVITY IN CDS CRYSTALS AS A MECHANISM FOR GAMMA RAY DOSIMETRY (U)

IV SESSOMS,O. VAN P.I

UNCLASSIFIED REPORT

DESCRIPTORS: *CADMIUM COMPOUNDS, *PHOTOCONDUCTIVITY, CRYSTALS, DETECTION, DOSE RATE, DOSIMETERS, ELECTRIC CURRENTS, GAMMA RAYS, MEASUREMENT, PHOTOELECTRIC EFFECT (GAMMA RAYS), PHOTOELECTRIC MATERIALS, RADIATION DAMAGE, RADIATION MEASUREMENT SYSTEMS COMPONENTS, SEMICONDUCTORS, SULFIDES (U)

GAMMA RAY INDUCE CHANGES IN THE CONDUCTIVITY OF CDS CRYSTALS ARE STUDIED AS A POSSIBLE MECHANISM FOR MONITORING GAMMA DOSE RATES. DATA ARE PRESENTED ON THE CHANGE IN CONDUCTIVITY DUE TO GAMMA EXPOSURE OVER A RANGE OF 140,000 ERGS/G HR TTOO 55 AX 1100 TTOO TTHHEE 77TTHH PPOOWWEERR EERRGGSS//GG HHRR (C)). TT HH EE (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD-264 310
GENERAL ELECTRIC CO SCHENECTADY N Y

INVESTIGATION OF SEMICONDUCTING PROPERTIES OF II-VI COMPOUNDS (U)

AUG 61 IV AVEN,M.;PIPER,W.W.;

REPT. NO. SRI
CONTRACT: AF19 604 8512
MONITOR: AFCRL 776

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DESCRIPTORS: *COPPER, *GOLD, *SEMICONDUCTING FILMS, *SEMICONDUCTORS, *SINGLE CRYSTALS, BROMINE, CADMIUM COMPOUNDS, CRYSTALS, DIFFUSION, ELECTRICAL PROPERTIES, EPITAXIAL GROWTH, GALLIUM, GROWTH, HALL EFFECT, IMPURITIES, SELENIDES, SULFIDES, TELLURIDES, VAPOR PLATING, ZINC COMPOUNDS (U)

THE POSSIBILITY OF USING CU OR AU AS P-TYPE DOPANTS IN CDS HAS BEEN EXPLORED. ANALYTICAL TECHNIQUES FOR DETERMINING THE AMOUNT OF TOTAL AND THE APPROXIMATE PROPORTION OF UNCOMPENSATED CU IN CDS HAVE BEEN DEVELOPED. INVESTIGATION OF DIFFERENT METHODS OF PRODUCING UNCOMPENSATED ZNSE HAS LED TO A NOVEL TECHNIQUE OF PRODUCING N-TYPE ZNSE WITH FAIRLY GOOD TRANSPORT PROPERTIES. STRUCTURES CONSISTING OF EPITAXIAL FILMS OF HEXAGONAL N-TYPE CDS ON CUBIC P-TYPE ZNTE SINGLE CRYSTALS HAVE BEEN STUDIED WITH RESPECT TO THEIR CRYSTALLOGRAPHIC AND ELECTRICAL PROPERTIES. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD-264 433
DAVID SARNOFF RESEARCH CENTER PRINCETON N J

INVESTIGATION OF CARRIER INJECTION ELECTROLUMINESCENCE (U)

AUG 61 IV FISCHER,A.G.;MASON,A.S.;

REPT. NO. SR2
CONTRACT: AF19 604 8J18
MONITOR: AFCRL 721

UNCLASSIFIED REPORT

DESCRIPTORS: *LUMINESCENCE, ARSENIC, BROMINE, CADMIUM COMPOUNDS, CIRCUITS, CONTROL SYSTEMS, CRYSTALS, FEEDBACK, GALLIUM COMPOUNDS, GLASS, GROWTH, NITROGEN, PHOSPHORUS, RADIOFREQUENCY POWER, SELENIDES, SOLID STATE PHYSICS, SULFIDES, TELLURIDES, ZINC COMPOUNDS (U)

IT WAS FOUND THAT VERTICAL CRYSTAL PULLING OF ZNSE AND CDS IS POSSIBLE ONLY IN PRESSURIZEDATMOSPHERES OF UNSATURATED VAPORS, SINCE SATURATED VAPORS ARE TOO OPAQUE TO PERMIT VISIBILITY. SEVERAL NEW SYSTEMS FOR CRYSTAL GROWTH UNDER PRESSURE ARE DESCRIBED, AND A NEW FEEDBACK CIRCUIT FOR CONTROL OF THE RF GENERATOR HAS BEEN INVENTED. THE PROPERTIES OF MELT-GROWN ZNSE HAVE BEEN INVESTIGATED, AND AN EXTENSIVE SURVEY OF CONTACTS TO ZNSE WAS INITIATED. ZNSE AND CDS FORM SOLID SOLUTIONS, WHEREAS CDS AND ZNTE ARE IMMISCIBLE. MATERIALS WHICH HOLD PROMISE FOR THE PREPARATION OF ALLOYED CONTACTS HAVE BEEN FOUND. SEVERAL SINGLE AND MULTIPLE FILMS WITH INTERESTING PROPERTIES HAVE BEEN OBTAINED BY EVAPORATION, AND AN ANALYSIS OF SCL HOLE CURRENTS IN ZNSE HAS BEEN CARRIED OUT. IT HAS BEEN FOUND THAT A GLASS CONSISTING OF AS-S-BR IS TRANSPARENT FROM .5 TO 13 MICRONS GAP CRYSTALS HAVE BEEN PREPARED BY VAPOR PHASE REACTION STARTING FROM GAN. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD-267 944
LABORATOIRE D'INFRA ROUGE TECHNIQUE ET APPLIQUE GIF-SUR-YVETTE (FRANCE)

SEP 61 IV
CONTRACT: N62558 2720

UNCLASSIFIED REPORT

DESCRIPTORS: CADMIUM COMPOUNDS, CRYSTALS, ELECTRON BOMBARDMENT, ELECTRON TRANSITIONS, INFRARED SPECTROPHOTOMETERS, PHOTOELECTRIC EFFECT, PHOTOMULTIPLIERS, POTENTIOMETERS, RADIATION EFFECTS, SECONDARY EMISSION, SEMICONDUCTORS, SILICON, SOLID STATE PHYSICS, SULFIDES, TEST EQUIPMENT, THEORY, ZINC COMPOUNDS (U)

MIXED CADMIUM AND ZINC SULFIDES WERE OBTAINED WITH A VIEW TO TESTING WHETHER A COINCIDENCE IS STILL OBSERVED BETWEEN THE ABSORPTION EDGE OF THE SPECTRUM AND THE WAVELENGTH OF THE LIGHT EMITTED. THE MAIN RESULTS ARE THOSE OBTAINED FROM STUDIES AT LIQUID AIR TEMPERATURE. ON CERTAIN SAMPLES A COMPLEX LIGHT IS OBTAINED, CONTAINING A YELLOW BAND, A GREEN BAND AND A BLUE BAND AT ABOUT 4900 ANGSTROMS, THIS WAVELENGTH CORRESPONDING TO THAT OF THE ABSORPTION EDGE AT THE SAME TEMPERATURE. ON OTHER CRYSTALS HOWEVER, THIS BAND IS VERY WEAK OR DISAPPEARS COMPLETELY. IN THESE CASES ONLY THE GREEN BAND, FAIRLY COMPLEX IN STRUCTURE, AND THE YELLOW BAND APPEAR. ALL THE CHARACTERISTICS OF THE PHENOMENON APPEAR TO INDICATE THAT THE LIGHT OBSERVED IS DUE TO A DIRECT RETURN FROM THE CONDUCTION BAND TO THE VALENCE BAND, OR TO A RETURN FROM A LEVEL VERY CLOSE TO THE CONDUCTION BAND TO THE VALENCE BAND. (AUTHOR) (U)

UDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD-268 932
PHILCO CORP BLUE BELL PA

ELECTROQUENCHABLE PHOSPHOR INVESTIGATION (U)

DEC 61 IV

UNCLASSIFIED REPORT

DESCRIPTORS: *CATHODE RAY TUBE SCREENS, *PHOSPHORESCENCE, *PHOSPHORESCENT MATERIALS, BRIGHTNESS, CADMIUM COMPOUNDS, DISPLAY SYSTEMS, FILMS, LUMINESCENCE, MEASUREMENT, SULFIDES, ZINC COMPOUNDS (U)

RESEARCH WAS DEVOTED TO THE INVESTIGATION OF ELECTROPHOTOLUMINESCENT EFFECTS IN PHOSPHORS AND THE DEVELOPMENT OF TECHNIQUES LEADING TO THE UTILIZATION OF THESE EFFECTS IN USEFUL DISPLAY DEVICES. IT IS SHOWN THAT EFFICIENT ELECTROQUENCHABLE (EQ) CELLS CAN BE MADE, USING EVAPORATED PHOSPHOR FILMS AND SOLID CONTACTS. THE PHOSPHOR FILMS THEMSELVES HAVE A VERY HIGH PHOTOLUMINESCENT EFFICIENCY, AND MAY HAVE FUTURE USE AS HIGH RESOLUTION SCREENS IN CATHODE-RAY TUBES, ETC. VERY HIGH EFFICIENCIES, AS FAR AS QUENCHING IS CONCERNED, WERE MEASURED. THE THEORETICAL CURRENT REQUIRED FOR COMPLETE QUENCHING OF A PHOSPHOR HAVING 10 FT-LAMBERTS OF BRIGHTNESS IS 7.5 MICROAMPERE PER SQ CM IF THE PHOSPHOR IS 100% EFFICIENT. CURRENT CORRESPONDING TO APPROXIMATELY 100 MICROAMPERE SQ CM WAS MEASURED ON SOME CELLS. THE SWITCHING SPEED OF THESE CELLS CAN BE HIGH. SWITCHING SPEEDS WERE MEASURED BY CONTROLLING A CELL WITH A 60-OHMPER-SQUARE-WAVE VOLTAGE. THE CELLS MEASURED WERE COMPLETELY QUENCHED IN LESS THAN 20 MICROSECONDS, AND REACHED THEIR FULL BRIGHTNESS IN LESS THAN 20 MICROSECONDS AFTER THE QUENCHING VOLTAGE WAS REMOVED. (AUTHOR) (U)

CDC REPORT BIBLIOGRAPHY SEARCH CONTROL No. /ZZZHT

AD-273 974
GIANNINI CONTROLS CORP DUARTE CALIF

A NEW FORM OF SOLID STATE SOLAR GENERATOR (U)

JAN 62 1V FABRICIUS,E.D.I

REPT. NO. TR61 564
CONTRACT: AF33 616 7637
MONITOR: ASD TR61 564

UNCLASSIFIED REPORT

DESCRIPTORS: •ELECTRIC POWER PRODUCTION, •GENERATORS, •PHOTOCONDUCTIVITY, •PHOTOELECTRIC CELLS (SEMICONDUCTOR), •PHOTOTUBES, •SEMICONDUCTORS, •SONAR DOMES, CADMIUM COMPOUNDS, DESIGN, METALS, SOLID STATE PHYSICS, SULFIDES (U)

AN INVESTIGATION WAS MADE OF VARIABLE VOLTAGE PHOTOVOLTAIC CONVERTERS FOR A NEW FORM OF SOLID STATE SOLAR GENERATOR. VALUABLE INFORMATION RELATED TO THE ORIGIN OF THE PHOTOCONDUCTING ELECTRONS IN THE PHOTOVOLTAIC EFFECT IN CDS WAS OBTAINED. THIS INFORMATION IS PERTINENT TO THE DESIGN AND CONSTRUCTION OF METAL-SEMICONDUCTOR SOLAR CELLS, IN THAT BOTH THE PHOTOVOLTAGE AND THE EFFICIENCY OF METAL-SEMICONDUCTOR CELLS IS DEPENDENT UPON WHETHER ELECTRONS ARE INJECTED FROM THE METAL OR EXCITED ACROSS THE FORBIDDEN GAP OF THE SEMICONDUCTOR. THE EFFECTS OF GEOMETRY, FILM THICKNESS OF RECTIFYING ELECTRODE, AND RESISTIVITY OF CDS UPON THE PHOTOVOLTAGE OBTAINABLE WERE ALSO STUDIED. THE ORIGIN OF THE ELECTRONS PRODUCING THE PHOTOCURRENT WAS DETERMINED AND A GEOMETRY FOR OPTIMIZING THE PHOTOCURRENT IS GIVEN. CELLS DESIGNED BY EVAPORATING CONTACTS CONNECTED IN SERIES ARE SHOWN TO GIVE AN ADDITIVE PHOTOVOLTAGE. SUGGESTIONS FOR IMPROVING THE EFFICIENCY ARE GIVEN IN THE LIGHT OF EXPERIMENTAL EVIDENCE. WHILE BATTERIES PRODUCING 9V WERE NOT SUCCESSFULLY CONSTRUCTED DUE TO EXPERIMENTAL DIFFICULTIES, THE EVIDENCE OBTAINED VERIFIES THE FEASIBILITY OF THE BASIC DESIGN. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD-276 416
AEROSPACE RESEARCH LABS WRIGHT-PATTERSON AFB OHIO

RESEARCH IN PURIFICATION OF CADMIUM SULFIDE CRYSTALS AND OTHER II-IV COMPOUNDS (U)

MAR 62 IV BEAN,K.E.;FAHRIG,R.H.;
REPT. NO. 62 319

UNCLASSIFIED REPORT

DESCRIPTORS: *CADMIUM COMPOUNDS, *PHOTOELECTRIC CELLS (SEMICONDUCTOR), *PHOTOTUBES, *SEMICONDUCTORS, *SINGLE CRYSTALS, *SOLAR ATMOSPHERE, *ZINC COMPOUNDS, CRUCIBLES, ENERGY CONVERSION, GROWTH, IMPURITIES, MANUFACTURING METHODS, METALLIC SMOKE DEPOSITS, OPTICS, OXIDES, PRODUCTION, PURIFICATION, SELENIDES, SULFIDES, SYNTHESIS, TELLURIDES, VAPOR PLATING (U)

SELECTED ELEMENTS FROM GROUPS II AND VI WERE PURIFIED AND SYNTHESIZED TO FORM HIGH PURITY COMPOUNDS AS FOLLOWS: CADMIUM SULFIDE; ZINC SULFIDE; CADMIUM TELLURIDE; CADMIUM OXIDE; AND CADMIUM SELENIDE. THE GROWTH OF CRYSTALS FROM THESE COMPOUNDS BY BOTH THE MELT AND VAPOR PHASE METHODS IS DISCUSSED. EVALUATIONS OF THE ELECTRICAL AND OPTICAL PROPERTIES OF THESE MATERIALS ARE PRESENTED. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD-281 716
CLEVITE CORP CLEVELAND OHIO

RESEARCH ON II-VI COMPOUND SEMICONDUCTORS. (U)

DESCRIPTIVE NOTE: FINAL TECHNICAL REPT.,
JUN 62 162P SHIOZAWA ,L. R. ;BARRETT, J. L. ;
CONTRACT: AF 33(616)6865
PROJ: 7021
MONITOR: ARL 62-365

UNCLASSIFIED REPORT

DESCRIPTORS: *CADMIUM COMPOUNDS, *SEMICONDUCTORS, *SINGLE CRYSTALS, *ZINC COMPOUNDS, CRYSTAL LATTICES, CRYSTALS, DIELECTRIC PROPERTIES, DIFFERENTIAL GEOMETRY, ELECTRICAL PROPERTIES, GROUP II ELEMENTS, GROUP VI ELEMENTS, GROWTH, HALL EFFECT, MATERIALS, PHYSICAL PROPERTIES, PREPARATION, PURIFICATION, REFRACTIVE INDEX, SELENIDES, SOLID STATE PHYSICS, SULFIDES, TELLURIDES, ZONE MELTING (U)

PREPARATION, PURIFICATION, CRYSTAL GROWTH, AND MEASUREMENT OF THE FUNDAMENTAL BULK PROPERTIES OF CDS, CDSE, ZNTE, AND CDS-CDSE MIXED CRYSTALS ARE SUMMARIZED. LARGE SINGLE CRYSTALS OF CDS, CDSE, AND ZNTE WERE PREPARED BY THE REYNOLDSGREENE SUBLIMATION METHOD. CDSE CRYSTALS WERE ALSO PREPARED BY GRADIENT FREEZING. METHODS FOR PREPARING TEST SPECIMENS FOR ELECTRICAL AND OPTICAL MEASUREMENTS ARE PRESENTED. PROCEDURES FOR CONDUCTING HIGH-TEMPERATURE EQUILIBRIUM STUDIES ON CDSE ARE DISCUSSED. EXTENSIVE HALL-EFFECT AND CONDUCTIVITY MEASUREMENTS BETWEEN 77 AND 500 K WERE MADE ON MISCELLANEOUS CRYSTALS. OTHER MEASUREMENTS INCLUDED MELTING POINTS, REFRACTIVE INDEXES, ELASTIC, DIELECTRIC, PIEZOELECTRIC AND LATTICE CONSTANTS. CORRELATIONS WERE OBTAINED BETWEEN THE SIGN OF THE POLAR AXIS IN CDSE AND ZNTE AND THE X-RAY DETERMINED AB L YER ORDER. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD-282 527
AIR FORCE CAMBRIDGE RESEARCH LABS L G HANSCOM FIELD MASS

INVESTIGATION OF SEMICONDUCTING PROPERTIES OF II-VI COMPOUNDS (U)

JUN 62 1V AVEN,M.;WOODBURY,H.H.;

UNCLASSIFIED REPORT

DESCRIPTORS: •SEMICONDUCTING FILMS, •SEMICONDUCTORS, •SINGLE CRYSTALS, ATOMIC ENERGY LEVELS, CADMIUM COMPOUNDS, COPPER, CRYSTAL STRUCTURE, ELECTRICAL PROPERTIES, EPITAXIAL GROWTH, GROUP II ELEMENTS, HALL EFFECT, IMPURITIES, SELENIDES, SOLID STATE PHYSICS, SULFIDES, TELLURIDES, TRANSPORT PROPERTIES, ZINC COMPOUNDS (U)

USING A RADIOACTIVE TRACER TECHNIQUE, IT WAS DEMONSTRATED THAT BY FIRING II-VI COMPOUNDS IN SUITABLE LIQUID METALS, CU CAN BE EFFECTIVELY EXTRACTED FROM THESE MATERIALS. ENERGY LEVELS APPROXIMATELY 1 EV BELOW THE CONDUCTION BAND EDGE WERE FOUND IN CDS FIRED UNDER HIGH SULFUR PRESSURES. THE PRESENCE OF THESE LEVELS APPEAR TO FIX THE FERMI LEVEL IN SEMI-INSULATING CDS, AND IT HAS NOT BEEN FOUND POSSIBLE TO FURTHER LOWER THE FERMI LEVEL EITHER BY VERY HIGH PRESSURE SULFUR FIRING OR THE INCORPORATION OF THE ACCEPTOR IMPURITIES CU, AG OR AU. LIQUID CD FIRING OF SOME HIGH PURITY CDS SAMPLES HAS YIELDED A MATERIAL SHOWING AN ELECTRON MOBILITY MAXIMUM OF 11,000 SQ. CM/VOLT SEC. STUDY OF THE GROWTH HABITS OF CDS ON ZNTE SHOWED THAT AN EPITAXIAL DEPOSIT OF CDS CAN BE OBTAINED ONLY ON THE (111) ZN FACES OF ZNTE. REASONS FOR THIS FINDING ARE DISCUSSED IN TERMS OF THE THERMAL ETCH PATTERNS AND THE BONDING CHARACTERISTICS OF II-VI COMPOUNDS. DOUBLE INJECTION AND NEGATIVE RESISTANCE BEHAVIOR HAS BEEN OBSERVED IN ZNTE-CDS HETEROJUNCTIONS WITH WIDE COMPENSATED REGIONS BETWEEN THE P AND THE N PARTS OF THE JUNCTION. A TENTATIVE BAND MODEL HAS BEEN PROPOSED FOR THE ZNTE-CDS JUNCTIONS ON THE BASIS OF THIS AND OTHER EXPERIMENTAL FINDINGS. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD-282 547
NATIONAL CASH REGISTER CO DAYTON OHIO

FEASIBILITY INVESTIGATION OF CHEMICALLY SPRAYED THIN FILM PHOTOVOLTAIC CONVERTERS (U)

APR 62 1V CHAMBERLIN,R.R.;
REPT. NO. 62 637TP1058 822
CONTRACT: AF19 604 6201
MONITOR: AFCRL 62 637

UNCLASSIFIED REPORT

DESCRIPTORS: •PHOTOELECTRIC CELLS (SEMICONDUCTOR), •PHOTOTUBES, •SEMICONDUCTING FILMS, •SEMICONDUCTORS, CADMIUM COMPOUNDS, COATINGS, CONDUCTORS, COPPER COMPOUNDS, CRYSTALS, ELECTRODEPOSITION, ELECTRODES, ELECTRON MICROSCOPY, FEASIBILITY STUDIES, GALLIUM, GOLD, INDIUM, INDIUM COMPOUNDS, MANUFACTURING METHODS, MATERIALS, OXIDES, SULFIDES, TIN COMPOUNDS, X-RAY DIFFRACTION ANALYSIS (U)
IDENTIFIERS: THIN FILMS, THIN FILMS ELECTRONICS (U)

THE FEASIBILITY OF A CHEMICAL SPRAY PROCESS FOR ITS APPLICATION TO THE FABRICATION OF THIN FILM PHOTOVOLTAIC CONVERTERS USING EITHER CDS OR CDSE AS THE SEMICONDUCTING LAYER IS BEING INVESTIGATED. EVALUATION OF THE SEMICONDUCTING LAYER (CDS) AND THE INITIAL WORK IN FABRICATING A PHOTOVOLTAIC CONVERTER UTILIZING A BARRIER FORMED AT THE INTERFACE BETWEEN A THIN (.5 MICRON) FILM OF CDS AND A THIN FILM (.05 MICRON) OF CU9-XS5(DIGENITE) IS REPORTED. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD-283 953
AIR FORCE INST OF TECH WRIGHT-PATTERSON AFB OHIO

ANISOTROPY IN THE ELECTRON MOBILITY OF SINGLE CADMIUM SULFIDE CRYSTALS AT LOW TEMPERATURES (U)

MAY 62 IV GOODSON,HARRY C.I
REPT. NO. GNE PHYS 62 8

UNCLASSIFIED REPORT

DESCRIPTORS: *CADMIUM COMPOUNDS, *ELECTRONS, *SINGLE CRYSTALS, *SULFIDES, ANISOTROPY, CRYSTAL STRUCTURE, ELECTRICAL CONDUCTANCE, ELECTRICAL PROPERTIES, HALL EFFECT, LABORATORY EQUIPMENT, LOW TEMPERATURE RESEARCH, PREPARATION, RESISTANCE (ELECTRICAL), SEMICONDUCTORS, SOLID STATE PHYSICS (U)

THE POSSIBILITY OF THE EXISTENCE OF A MEASURABLE ANISOTROPY IN THE ELECTRON MOBILITY OF CDS WAS INVESTIGATED BETWEEN 8 AND 293 K, USING CROSSSHAPED, BULK SI GLE CRYSTALS. THE MOBILITY MAT EACH TEMPERATURE WAS OBTAINED FROM THE RELATION M = E SUB Y/E SUB X B WHERE E SUB Y IS THE HALL FIELD, E SUB X THE CRYSTAL FIELD, AND B THE MAGNETIC FIELD. DY AMIC MEASUREMENTS LEADING TO THE CALCULATED MOBILITIES BETWEEN 8 AND 293 K WERE MADE IN A LIQUID HELIUM CRYOSTAT. A POTENTIOME RIC, MULTI-CHANNEL RECORDER WAS USED TO RECORD ALL ELECTRICAL MEASUREMENTS. THE CURRENT WAS DIRECTED PARALLEL TO THE C-AXIS OF THE CRYSTAL IN ONE TEST; THE CONTACTS AND LEADS WERE THEN REORIENTED AT A 90 EGREE ANGLE, AND THE CURRENT WAS DIRECTED PERPENDICULAR TO THE C-A IS. THE ELECTRON MOBILITY WAS PLOT ED AS A FUNCTION OF 1/T BETWEEN 8 AND 293 K . ANALYSIS INDICATES THAT MEASURABLE ANISOTROPY ODES EXIST, AND THAT A REVERSAL OCCURS AT ABOUT 30 K. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD-284 015
AIR FORCE INST OF TECH WRIGHT-PATTERSON AFB OHIO

TEMPERATURE DEPENDENCE OF LINE STRUCTURE OF CADMIUM SULFIDE EDGE EMISSION (U)

MAY 62 IV ANDERS,WILLIAM ALISON
REPT. NO. GNE PHYS 62 1

UNCLASSIFIED REPORT

DESCRIPTORS: *CADMIUM COMPOUNDS, *FLUORESCENCE, *SEMICONDUCTORS, *SULFIDES, CRYSTALS, LOW TEMPERATURE RESEARCH, PHOTOCONDUCTIVITY, PHOTOELECTRIC EFFECT, TEMPERATURE, TEST EQUIPMENT, ULTRAVIOLET RADIATION (U)

THE TEMPERATURE DEPENDENCE OF THE LINE STRUCTURE IN CDS EDGE EMISSION STIMULATED BY UV LIGHT WAS INVESTIGATED FROM 4.2 K TO 367 K. THE SPECTRAL SHIFT OF THE FINE STRUCTURE OBSERVED AT 4.2 K WAS FOLLOWED TO 77 K WHERE THE INDIVIDUAL LINES BROADENED AND MERGED INTO GROUPS. THE TEMPERATURE DEPENDENCE OF THE PRIMARY LINE GROUPS IS A LINEAR FUNCTION OF TEMPERATURE ABOVE 220 K WITH COEFFICIENTS OF CHANGE OF 1.27 AND 1.8 ANGSTROMS DEGREE K FOR THE LINES OBSERVED. BELOW 220 K THE DEPENDENCE DEPARTS FROM LINEARITY AND APPROACHES ITS LIMITING VALUE MORE RAPIDLY WITH DECREASING TEMPERATURE. STRIATIONS, DUE TO VARIATIONS OF THE LUMINESCENT PROPERTIES OVER THE SURFACE OF THE CRYSTAL, WERE OBSERVED IN EMISSION SPECTRA. THESE STRIATIONS WERE USED TO ADVANTAGE IN THE RESOLUTION OF THE VARIOUS BROAD OVERLAPPING BANDS FOUND IN THE EMISSION SPECTRUM AT HIGHER TEMPERATURE. TWO INDIVIDUAL BANDS WERE RESOLVED IN THE ROOM TEMPERATURE SPECTRUM WITH PEAKS AT 5090 AND 5275 ANGSTROMS. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD-284 020
AIR FORCE INST OF TECH WRIGHT-PATTERSON AFB OHIO

AN EVALUATION OF CADMIUM SULFIDE AS A NUCLEAR RADIATION DETECTOR (U)

AUG 62 IV MILLS,DARREL LEROY;
REPT. NO. GNE PHYS 62 10

UNCLASSIFIED REPORT

DESCRIPTORS: •CADMIUM COMPOUNDS, •CRYSTALS, •DETECTORS, •SULFIDES, RADIATION MEASUREMENT SYSTEMS COMPONENTS, SOLID STATE PHYSICS (U)

SOLID STATE RADIATION DETECTORS WERE CONSTRUCTED USING CRYSTAL PLATELETS OF CDS. BOTH INTRINSIC AND P-N JUNCTION DETECTORS WERE MADE AND EVALUATED. ALTHOUGH ALPHA PARTICLES WERE DETECTED BY BOTH TYPES OF DETECTORS, THE MOBILITY-LIFETIME PRODUCT OF THE CHARGE CARRIERS RESULTED IN THE PULSE RESPONSE NOT BEING PROPORTIONAL TO THE ENERGY OF THE INCIDENT PARTICLE. THE BEST EXPERIMENTAL VALUE FOR THE MOBILITY-LIFETIME PRODUCT IN CDS WAS 4.6 X 1 OVER 10 TO THE SIXTH POWER SQ CM/VOLT FOR THE ELECTRONS AND 2.1 X 1 OVER 10 TO THE SIXTH POWER SQ CM/VOLT FOR THE HOLES. ALSO AN EXPERIMENTAL VALUE OF 5.2 ELECTRON VOLTS DISSIPATED PER HOLE-ELECTRON PAIR FORMED WAS DETERMINED. A RESOLUTION OF 6.8% WAS OBTAINED WITH ONE DETECTOR. OTHER PHENOMENA SUCH AS THE TRAPPING OF THE CHARGE CARRIERS AND THE IONIZATION OF NEUTRAL IMPURITY ATOMS ALSO WERE EVIDENT IN THE CRYSTAL. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD-284 032
HARSHAW CHEMICAL CO CLEVELAND OHIO

RESEARCH ON SOLAR-ENERGY CONVERSION EMPLOYING CADMIUM SULFIDE (U)

APR 62 1V SHIRLAND,FRED A.;WOLFF,G.A.;NIXON, JOHN D.;
REPT. NO. 4
CONTRACT: DA36 039SC87289
MONITOR: ASD TDR-62-69

UNCLASSIFIED REPORT

DESCRIPTORS: *CADMIUM COMPOUNDS, *SOLAR CELLS, *SOLAR RADIATION, FILMS, MANUFACTURING METHODS, SEMICONDUCTORS, SINGLE CRYSTALS, SULFIDES (U)

RESEARCH ON SOLAR ENERGY CONVERSION EMPLOYING CDS GROWTH, ANNEALING, ETCHING AND ORIENTATION OF CDS SINGLE CRYSTALS AND FILMS.

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD-286 829
WESTINGHOUSE ELECTRIC CORP PITTSBURGH PA

ELECTROLUMINESCENT-PHOTOCONDUCTOR ELEMENTS (U)

AUG 62 IV WOLFE,P.N.;JOHNSON,J.E.;HARPER,W.J.;
REPT. NO. TDR62 533
CONTRACT: AF33 616 8020
MONITOR: ASD TDR62 533

UNCLASSIFIED REPORT

DESCRIPTORS: *CADMIUM COMPOUNDS, *LUMINESCENCE, *PHOTOCONDUCTIVITY, *SULFIDES, ABSORPTION, EVAPORATION, GROWTH, INFRARED PHOTOCONDUCTORS, PHOTOELASTICITY, PHOTOELECTRIC CELLS (SEMICONDUCTOR), PHOTOELECTRIC EFFECT, PHOTOTUBES, PULSE MODULATION, SINGLE CRYSTALS, THIN FILMS (STORAGE DEVICES) (U)

A MATERIALS IMPROVEMENT PROGRAM WAS UNDERTAKEN. ELECTROLUMINESCENCE STUDIES WERE CONCENTRATED ON DC-PULSE-EXCITED THIN FILM ELECTROLUMINORS, WHOSE RELEVANT PROPERTIES SUCH AS RESPONSE SPEED, QUANTUM EFFICIENCY, SPECTRAL OUTPUT, TEMPERATURE DEPENDENCE, AND MAINTENANCE ARE SUMMARIZED. RESEARCH ON PHOTOCONDUCTORS WAS CONCERNED WITH PREPARATION TECHNIQUES FOR HIGH-PURITY SINGLE CRYSTALS AND EVAPORATED FILMS OF CADMIUM SULFIDE, AND WITH PERFORMANCE IMPROVEMENTS ATTAINABLE IN SINGLE CRYSTALS BY OPTIMIZING TRAP DISTRIBUTIONS. IT WAS CONCLUDED THAT THE DESIRED LOGIC ELEMENT SPEED IS NOT LIKELY TO BE ATTAINED WITH SIMPLE, TWO-TERMINAL ELECTROLUMINORS AND PHOTOCONDUCTORS, BUT RATHER WILL REQUIRE THE USE OF DEVICES INCORPORATING ADDITIONAL GAIN, POSSIBLY THREETERMINAL ELECTROLUMINORS. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZ4HT

AD-288 060
HARSHAW CHEMICAL CO CLEVELAND OHIO

AUG 62 IV HEYERDAHL,NORMAN E.;

REPT. NO. 62 395
CONTRACT: AF33 616 6548
MONITOR: ARL 62 395

UNCLASSIFIED REPORT

DESCRIPTORS: *PHOTOELECTRIC CELLS (SEMICONDUCTOR), *PHOTOTUBES, *POWER SUPPLIES, *SOLAR CELLS, *STORAGE BATTERIES, CADMIUM COMPOUNDS, CRYSTALS, ELECTRIC CONNECTORS, EVAPORATION, GROWTH, OPTICS, PROCESSING, SELENIDES, SEMICONDUCTING FILMS, SEMICONDUCTORS, SINGLE CRYSTALS, SOLID STATE PHYSICS, SOLVENT ACTION, SPECTROGRAPHIC ANALYSIS, SULFIDES, TELLURIDES, THIN FILMS (STORAGE DEVICES), VACUUM APPARATUS, ZINC COMPOUNDS (U)
IDENTIFIERS: THIN FILMS, THIN FILMS ELECTRONICS (U)

INVESTIGATION ON THE FEASIBILITY OF STACKING PHOTOVOLTAIC LAYERS OF DIFFERENT II-VI SEMICONDUCTIN COMPOUNDS IN INTIMATE ELECTRICAL CONTACT IN ORDER TO CONVERT A LARGER FRACTION OF THE SUN'S RADIATION INTO ELECTRICAL POWER THAN IS POSSIBLE IN A SINGLE LAYER. FIVE PROBLEMS ARE DESCRIBED AND THE RESULTS ARE TABULATED. THESE PROBLEMS ARE: THE PRODUCTION OF ZNS, ZNSE, ZNTE, CDSE, CDS, AND CDTE CRYSTALS AND/OR THIN FILMS; CDS SOLAR CELL MECHANISM; THE PREPARATION OF VARIOUS CONFIGURATIONS FOR A STUDY OF HETEROJUNCTIONS INCLUDING ZNS-CDS, ZNTE-CDS, CDSE-CDS, CDTE-CDS, ZNSE-CDSE; AND THEORETICAL EXAMINATIONS OF THE ABRUPT P-N JUNCTION AND THE EFFECT OF SURFACE STATES UPON THE ELECTRICAL PROPERTIES OF SEMI-CONDUCTING CRYSTALS. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD-286 571
MELPAR INC FALLS CHURCH VA

MOLECULAR CIRCUIT DEVELOPMENT (U)

NOV 62 77P LAYTON,WILBUR T.;
CONTRACT: NOw-60-0362

UNCLASSIFIED REPORT

DESCRIPTORS: *CIRCUITS, *DIELECTRIC FILMS, *MICROMETERS, *MOLECULAR ELECTRONICS, *SEMICONDUCTING FILMS, AIRFRAME BEARINGS, ANTIMONY ALLOYS, CADMIUM COMPOUNDS, CRYSTALS, DIELECTRIC PROPERTIES, ELECTRICAL PROPERTIES, GERMANIUM, GROWTH, INDIUM COMPOUNDS, INTERMETALLIC COMPOUNDS, NITRIDES, OXIDES, PYROGENS, REFRACTORY MATERIALS, SELENIDES, SILICON COMPOUNDS, SULFIDES, TELLURIDES, TEMPERATURE, THICKNESS, THIN FILMS (STORAGE DEVICES), VACUUM APPARATUS, VAPOR PLATING (U)
IDENTIFIERS: THIN FILMS, THIN FILMS ELECTRONICS (U)

THE USE OF A NEW APPARATUS HAS RESULTED IN OBTAINING BOTH UNIFORM FILMS AND CRYSTALLITES. IT WAS DETERMINED THAT INTERMEDIATE SUBSTRATE TEMPERATURES (1050 -1100 C) WILL LEAD TO UNIFORM SILICON FILMS IF CERTAIN CONDITIONS ARE MET. THE STUDY OF THE EFFECTS OF POST-DEPOSITION HEAT TREATMENT ON SPUTTERED III-V COMPOUNDS WAS CONTINUED. NUMEROUS ARSENIDE FILMS WERE SPUTTERED AND THEIR ELECTRICAL PROPERTIES EXAMINED. WORK WAS BEGUN ON THE SPUTTERING OF SILICON CARBIDE. THE FILMS OBTAINED VARIED GREATLY IN THEIR PROPERTIES. THE THICKNESS DEPENDENCE OF THE DIELECTRIC CONSTANTS OF FILMS OF CEO2, SIO2, AND SI3N4, WAS INVESTIGATED. FILMS OF CEO2 AND SIO2 SHOWED THE DIELECTRIC ANOMALY. FILMS OF NUMEROUS MATERIALS WERE VACUUM DEPOSITED. FILMS OF LEAD AND CADMIUM SULFIDE, SELENIDE AND TELLURIDE, ZINC OXIDE AND SULFIDE, AND TIN OXIDE WERE FORMED. MANY ALL-DEPOSITED, LAYERED FIELD EFFECT DEVICES WERE FORMED AND, THEIR CHARACTERISTICS DETERMINED. SIGNIFICANT IMPROVEMENT IN DEVICE PARAMETERS WAS ACHIEVED. VOLTAGE-AMPLIFICATION FACTORS AS HIGH AS 600 WERE OBTAINED. TUNNEL DIODES WERE FORMED IN SILICON CRYSTALLITES. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD-289 278
NATIONAL CASH REGISTER CO DAYTON OHIO

FEASIBILITY INVESTIGATION OF CHEMICALLY SPRAYED THIN FILM PHOTOVOLTAIC CONVERTERS (U)

OCT 62 IV CHAMBERLIN,R.R.;
CONTRACT: AF33 657 7919

UNCLASSIFIED REPORT

DESCRIPTORS: •PHOTOELECTRIC CELLS (SEMICONDUCTOR), •PHOTOTUBES, •SEMICONDUCTING FILMS, •SEMICONDUCTORS, CADMIUM COMPOUNDS, COATINGS, COPPER COMPOUNDS, CRYSTALS, DEPOSITS, DIODES, FOILS, GLASS, HEAT-RESISTANT GLASS, HEAT TREATMENT, IMPURITIES, MANUFACTURING METHODS, OXIDES, SELENIDES, SULFIDES, THIN FILMS (STORAGE DEVICES), TIN COMPOUNDS (U)
IDENTIFIERS: THIN FILMS, THIN FILMS ELECTRONICS (U)

STUDIES INCLUDED: POSSIBLE VARIATIONS IN THE PHYSICAL STRUCTURE (CRYSTALLINITY AND CRYSTALLITE ORIENTATION) OF THE SEMICONDUCTING LAYER (CDS AND CDSE) DUE TO CHANGES IN THE DEPOSITION PARAMETERS; THE EFFECT ON DIFFERENT ORIENTATIONS DUE TO HEAT TREATMENT; CHANGES IN RESISTIVITY DUE TO HEAT TREAT AND DOPING; IMPROVEMENT OF THE DEPOSITION OF THE BARRIER LAYER; INVESTIGATION OF A BARRIER LAYER USING COPPER SELENIDE; SEARCH FOR A FLEXIBLE (METAL FOIL) SUBSTRATE COMPATIBLE WITH THE FILM DEPOSITION CONDITIONS; INVESTIGATION OF THE POSSIBLE CORRELATION BETWEEN CRYSTALLITE ORIENTATION AND CRYSTALLINITY TO PHOTOVOLTAIC RESPONSE; AND THE SPECTRAL CHARACTERISTICS OF THE CDSE, CDS, AND CDSE-CDS PHOTOVOLTAIC CELLS. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD-292 324
WHEELER AND WHEELER ASSOCIATES BRANFORD CONN

RESEARCH IN CRYOGENICS AND MAGNETO-OPTICS (U)

SEP 62 1V WHEELER,R.G.;WHEELER,G.W.;
REPT. NO. 62 433
CONTRACT: AF33 616 8314
MONITOR: ARL 62 433

UNCLASSIFIED REPORT

DESCRIPTORS: *CRYOGENICS, *MAGNETIC PROPERTIES, *PARAMAGNETIC MATERIALS, *QUANTUM MECHANICS, *SINGLE CRYSTALS, *SOLID STATE PHYSICS, ATOMIC ENERGY LEVELS, CADMIUM COMPOUNDS, IMPURITIES, LABORATORY EQUIPMENT, MATERIALS, MOLECULAR SPECTROSCOPY, OPTICS, PARAMAGNETIC RESONANCE, SELENIDES, SULFIDES, THERMOMETERS, ZINC COMPOUNDS (U)

RESEARCH IN CRYOGENICS AND MAGNETO-OPTICS. MAGNETO-OPTICAL AND MAGNETIC SUSCEPTIBILITY RESEARCH SYSTEM AT THE AERONAUTICAL RESEARCH LABORATORIES. DOPED CDS AND ZNS SINGLE CRYSTALS AS ULTRA-LOW TEMPERATURE PARAMAGNETIC SALTS. POSSIBILITY OF OBSERVING THE MOLECULAR SPECTRA ASSOCIATED WITH IMPURITY-EXCITON COMPLEXES IN CDS AND CDSE.

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD-294 010
HARSHAW CHEMICAL CO CLEVELAND OHIO

LARGE AREA THIN FILM CADMIUM SULFIDE SOLAR CELL ARRAY INVESTIGATION (U)

JAN 63 IV SHIRLAND,F.A.;SCHAEFER,J.C.;

CONTRACT: AF33 657 9975

UNCLASSIFIED REPORT

DESCRIPTORS: *AUXILIARY POWER PLANTS, *POWER SUPPLIES; *SOLAR CELLS, ACCELERATION, CADMIUM COMPOUNDS, DESIGN; LAMINATES, PHOTOELECTRIC CELLS (SEMICONDUCTOR), PHOTOTUBES, PLASTICS, SHEETS, SHOCK RESISTANCE, SINGLE CRYSTALS, SULFIDES, TEMPERATURE, TESTS, THIN FILMS (STORAGE DEVICES) (U)

THE MAJOR FACTOR IN PREVENTI G CC PTA CE OF E C S FILM SOLAR CELL AS P OTOVOL IC CONVER ER FOR P C U ILLI RY POWER SYS EMS IS THAT IT IS UN ES UNPROVEN IN THE SPACE ENVIRO . T TI G OF HE C S FIL CELL UNDER THE CONDITIONS OF SPACE AND THE CONDITIONS THA WOUL B NCOUNTER D IN GETTING ARRAYS INTO SP CE IS E PRINCIPAL OBJEC IV ECU RY OBJECTIVES AR TO IMPROVE THE P RFOR A CE OF TH CDS FILM CELL AN TO OB I B R UNDERS NDI G OF E FU DAM NTAL GOV RNING T E OPERATION OF T IS C LL. F ULL C LE EFFORTS WERE EXERTED ON THE D SIGN OF CDS FILM CELL ARRAYS ON TABILI Y S U IE AND ENVIRONMENTAL AND PERFORMANCE T STING AND ON T E CONS RUC IO OF C LL A ARRAYS FOR HE ORBITAL EVALUATION PANELS. A FINAL DESIGN OF C DS FILM CELL RR YS FOR HE ORBI AL TEST WAS EVOLVED, AND ARR YS OF THIS DESIG SUCCE SFULLY MET REQUIRE ENTS FOR S OCK ACC LERATION AND T MPERATURE CYCLING WITH NO DISC R IBLE ILL FFECT . A STOCK PILE OF LARGE ARE CDS FILM CELLS OF GR ATER TH 8 CO V R IO EFFICIENCY WAS BUIL UP. AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD-294 301
GENERAL ELECTRIC CO SYRACUSE N Y

RESEARCH AND DEVELOPMENT FOR FIELD EFFECT TRIODES AND SPACE CHARGE LIMITED TRIODES (U)

AUG 62 1V BLANK,J.M.;TANTRAPORN,W.T.;

CONTRACT: DA36 039SC90756

UNCLASSIFIED REPORT

DESCRIPTORS: *TRANSISTORS, *TRIODES, CADMIUM COMPOUNDS, COATINGS, DIELECTRICS, ELECTRIC FIELDS, ELECTRODES, HALIDES, MATERIALS, MEASUREMENT, PHOTOCONDUCTIVITY, RESISTANCE (ELECTRICAL), SEMICONDUCTORS, SOLID STATE PHYSICS, SPACE CHARGES, SULFIDES, THEORY, THIN FILMS (STORAGE DEVICES) (U)

IDENTIFIERS: THIN FILMS, THIN FILMS ELECTRONICS (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD-294 655
MOTOROLA INC PHOENIX ARIZ

COMPATIBLE TECHNIQUES FOR INTEGRATED CIRCUITRY (U)

DESCRIPTIVE NOTE: QUARTERLY REPORT NO. 5
JUL 62 1V
CONTRACT: AF 33(616)-8276

UNCLASSIFIED REPORT

DESCRIPTORS: (*MICROMINIATURIZATION(ELECTRONICS)),
CADMIUM COMPOUNDS, CRYSTALS, DIELECTRICS,
ELECTRIC CURRENT, ELECTRODES, FEASIBILITY STUDIES,
MEASUREMENT, SEMICONDUCTORS, SPACE CHARGES,
SULFIDES, THEORY, TRIODES (U)
IDENTIFIERS: THIN FILMS, THIN FILMS
ELECTRONICS (U)

PROCESS TECHNIQUES IN INTEGRATED CIRCUIT FABRICATION.

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD-295 358
RADIO CORP OF AMERICA PRINCETON N J DEFENSE ELECTRONIC PRODUCTS

SOLAR CELL ARRAY OPTIMIZATION (U)

DEC 62 1V

UNCLASSIFIED REPORT

DESCRIPTORS: *CRYSTALS, *POWER SUPPLIES, CADMIUM COMPOUNDS, DESIGN, ELECTRICAL PROPERTIES, ELECTRONS, FILMS, MANUFACTURING METHODS, PHOTOELECTRIC CELLS (SEMICONDUCTOR), PHOTOELECTRIC MATERIALS, PHOTOTUBES, PLASTICS, PROTONS, RADIATION DAMAGE, RESISTANCE (ELECTRICAL), SEMICONDUCTORS, SOLAR CELLS, SULFIDES, THIN FILMS (STORAGE DEVICES) (U)
IDENTIFIERS: THIN FILMS, THIN FILMS ELECTRONICS (M)

SOLAR CELL ARRAY OPTIMIZATION. RESEARCH AND FABRICATION PHASES OF THIS WORK WERE DIRECTED TOWARDS DEMONSTRATING THE POTENTIAL OF LARGE AREA, THIN-FILM CADMIUM SULFIDE PHOTOVOLTAIC MATERIALS. POWER-TO-WEIGHT RATIO FOR FOUR-INCH SQUARE CELLS APPROACHES 20 WATTS/LB.

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD-295 659
AIR FORCE CAMBRIDGE RESEARCH LABS L G HANSCOM FIELD
MASS

MAXIMIZING THE PERFORMANCE OF PHOTOCONDUCTORS (U)

NOV 62 IV ANDERSON,W.M.;BUBE,R.H.;

UNCLASSIFIED REPORT

DESCRIPTORS: •CRYSTALS, •PHOTOCONDUCTIVITY, •PHOTOELECTRIC MATERIALS, •SINGLE CRYSTALS, CADMIUM COMPOUNDS, ELECTRIC CURRENTS, ELECTRIC INSULATION, ELECTRODES, HALL EFFECT, INSULATING MATERIALS, LABORATORY EQUIPMENT, MANUFACTURING METHODS, MATHEMATICAL ANALYSIS, MEASUREMENT, ORGANIC COMPOUNDS, PROBABILITY, RESISTANCE (ELECTRICAL), SELENIUM, SEMICONDUCTORS, SOLID STATE PHYSICS, SPACE CHARGES, SULFIDES, TRANSIENTS (U)

HALL EFFECT MEASUREMENTS IN INSULATORS, A •TIME-OF-FLIGHT• METHOD OF STUDYING CARRIER TRANSPORT IN INSULATORS, A GENERAL ANALYSIS OF UNIPOLAR STEADY STATE SPACE CHARGE LIMITED CURRENTS IN INSULATORS, ORGANIC SEMICONDUCTORS, AND CDS ARE TOPICS INVESTIGATED IN PHOTOCONDUCTOR RESEARCH.

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZ4HT

AD-296 305
HONEYWELL INC HOPKINS MINN

LOW INPUT VOLTAGE CONVERSION (U)

SEP 62 IV LINGLE,JOHN I.;LONG,DONALD;
REPT. NO. 565031
CONTRACT: DA36 039SC90808

UNCLASSIFIED REPORT

DESCRIPTORS: *POWER TRANSFORMERS, CADMIUM COMPOUNDS, CIRCUITS, CRYOGENICS, DIODES, ELECTRICAL PROPERTIES, ELECTROMECHANICAL CONVERTERS, FEASIBILITY STUDIES, FEEDBACK, HALL EFFECT, HELIUM, LIQUEFIED GASES, LIQUID METALS, MAGNETIC PROPERTIES, MAGNETOHYDRODYNAMICS, OSCILLATORS, PHOTOELECTRIC CELLS (SEMICONDUCTOR), PHOTOELECTRIC MATERIALS, POWER SUPPLIES, PUSH-PULL AMPLIFIERS, SEMICONDUCTORS, SHORT TAKE-OFF PLANES, SULFIDES, SUPERCONDUCTIVITY, SUPERCONDUCTORS, THEORY (U)

IDENTIFIERS: CRYOTRONS, VOLTAGE CONVERTERS, TUNNEL DIODES, MAGNETORESISTIVE POWER CONVERTERS, PHOTORESISTIVE POWER CONVERTERS.A LITERATURE SEARCH WAS MADE TO DETERMINE ALL KNOWN METHODS OF POWER CONVERSION AND TO OBTAIN PERFORMANCE DATA ON THESE METHODS AND DATA ON TRANSDUCER DEVICES. THE FOLLOWING APPROACHES WERE INVESTIGATED IN DETAIL: TRANSISTOR APPROACH; TUNNEL DIODE APPROACH; ELECTROMECHANICAL APPROACH; HALL EFFECT APPROACH; MAGNETORESISTIVE APPROACH; SUPERCONDUCTIVE APPROACH; PHOTORESISTIVE APPROACH. CALCULATIONS HAVE BEEN MADE TO DETERMINE TRANSDUCER REQUIREMENTS FOR EACH APPROACH. FORMULAS HAVE BEEN DERIVED AND CALCULATIONS MADE WHICH DETERMINE THE RESISTANCE RATIOS NECESSARY BETWEEN THE 'OFF' AND 'ON' TRANDUCERS IN A PUSH-PULL CIRCUIT TO ACHIEVE ANY GIVEN EFFICIENCY. THIS INFORMATION HAS BEEN USED TO DETERMINE REQUIREMENTS AND FEASIBILITY OF VARIOUS APPROACHES. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD-296 440
GENERAL ELECTRIC CO SYRACUSE N Y

PHONON-PHONON INTERACTION IN CRYSTALS (U)

NOV 62 IV
CONTRACT: DA36 039SC87209

UNCLASSIFIED REPORT

DESCRIPTORS: *PHONONS, *SINGLE CRYSTALS, *SOLID STATE PHYSICS, CADMIUM COMPOUNDS, CRYSTAL LATTICES, CRYSTALS, ELECTROMAGNETS, EXCITATION, GERMANIUM, MAGNETOSTRICTIVE ELEMENTS, MICROWAVES, PIEZOELECTRIC CRYSTALS, PROPAGATION, QUARTZ, SILICON, SULFIDES, TELLURIDES (U)

THE GENERATION, PROPAGATION AND INTERACTION OF PHONONS ARE STUDIED WITH EMPHASIS ON THE PHONON INTERACTIONS IN CRYSTALS. THEORETICAL CURVES BASED ON THE SELECTION RULES HAVE BEEN DRAWN FOR THE VARIOUS MODES OF OPERATION FOR PHONONPHONON INTERACTION IN SOLIDS. THEY ARE ANALYZED WITH REGARD TO THE VARIOUS TYPES OF PARAMETRIC INTERACTIONS THAT ARE POSSIBLE. EXPERIMENTAL RESULTS AND OBSERVATIONS ARE DISCUSSED PERTAINING TO PHONON GENERATION AND ATTENUATION IN VARIOUS TYPES OF SINGLE CRYSTALS. EXPERIMENTAL STUDIES INVOLVING THE SEARCH FOR PHONON INTERACTIONS ARE REPORTED. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD-296 929
RCA LABS PRINCETON N J

EVAPORATED THIN FILM DEVICES (U)

NOV 62 1V WEIMER,P.K.;BORKAN,H.I
CONTRACT: AF19 628 1617
MONITOR: AFCRL 62 965

UNCLASSIFIED REPORT

DESCRIPTORS: CADMIUM COMPOUNDS, CAPACITANCE, CRYSTAL STRUCTURE, ELECTRIC INSULATION, ELECTRICAL CONDUCTANCE, ELECTRICAL IMPEDANCE, ELECTRODES, ELECTRONIC SWITCHES, EVAPORATION, GATES (CIRCUITS), HALL EFFECT, MATHEMATICAL ANALYSIS, PREPARATION, PROCESSING, SEMICONDUCTING FILMS, SEMICONDUCTOR DEVICES, SULFIDES (U)
IDENTIFIERS: THIN FILMS, THIN FILMS ELECTRONICS (U)

EVIDENCE IS PRESENTED TO SHOW THAT THE DOMINANT CURRENT CONTROL MECHANISM IN THE INSULATED-GATE CADMIUM SULFIDE THIN FILM TRANSISTOR (TFT) IS CONDUCTIVITY MODULATION IN THE SEMICONDUCTOR BY FIELD EFFECT ACTION OF THE GATE. THE CHARACTERISTICS OF THE COPLANAR-ELECTRODE TFT HAVING OVERLYING "OHMIC" CONTACTS WERE DEMONSTRATED TO BE EQUIVALENT TO THE EARLIER STAGGERED-ELECTRODE STRUCTURE HAVING UNDERLYING GOLD CONTACTS. THE MEASURED DRIFT MOBILITY AS CALCULATED FROM THE RATIO OF TRANSCONDUCTANCE TO INPUT CAPACITANCE MAY BE EITHER HIGHER OR LOWER THAN THE MEASURED HALL MOBILITY DEPENDING UPON THE METHOD OF PREPARATION OF THE SEMICONDUCTOR FILM. AN INCREASE IN THE HALL MOBILITY AS A FUNCTION OF POSITIVE GATE BIAS WAS FOUND, CONTRARY TO PREDICTIONS BASED UPON THE EFFECT OF SCATTERING AT THE SURFACE OF A HOMOGENEOUS SEMICONDUCTOR. TESTS ON VARIOUS PROCESSING PROCEDURES AND ELECTRODE CONTACTS WERE CARRIED OUT FOR CADMIUM SULFIDE AND OTHER MATERIALS POTENTIALLY USEFUL FOR TFT FABRICATION. (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD-297 203
IIT RESEARCH INST CHICAGO ILL

UNCOOLED IR DETECTOR FOR THE TEN MICRON REGION (U)

FEB 63 31P BRENNAN,WILLIAM D.;
REPT. NO. 1208 12 A
CONTRACT: NOW-62-0751

UNCLASSIFIED REPORT

DESCRIPTORS: *CRYSTAL DETECTORS, *INFRARED DETECTORS, *INFRARED RADIATION, *PHOTOCONDUCTIVITY, ABSORPTION, CADMIUM COMPOUNDS, CRYSTAL LATTICE DEFECTS, CRYSTAL LATTICES, CRYSTAL STRUCTURE, CRYSTALS, ELECTRONS, ELECTROSTATICS, ENERGY, IONIZATION, OPTICAL EQUIPMENT, PHOTOELECTRIC MATERIALS, SEMICONDUCTORS, SENSITIVITY, SULFIDES (U)

UNCOOLED IR DETECTOR FOR THE TEN MICRON REGION; EXCITONS IN CADMIUM SULFIDE.

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD-297 135
LOUVAIN UNIV (BELGIUM)

PHOTO-MAGNETO-ELECTRIC STUDY OF CDS SINGLE CRYSTALS AND ROLLED BISMUTH FOILS (U)

FEB 63 IV LUYCKX,ANDRE;
REPT. NO. BRISR2
CONTRACT: AF61 052 166

UNCLASSIFIED REPORT

DESCRIPTORS: *BISMUTH, *CADMIUM COMPOUNDS, *SEMICONDUCTORS, CRYSTAL LATTICE DEFECTS, ELECTROMAGNETIC FIELDS, FOILS, MAGNETIC FIELDS, PHOTOELECTRIC MATERIALS, PHOTOGRAPHIC ANALYSIS, POLARIZATION, SINGLE CRYSTALS, SULFIDES (U)

PHOTO-MAGNETO-ELECTRIC STUDY OF CDS SINGLE CRYSTALS AND ROLLED BI FOILS.

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD-400 290
TEXAS INSTRUMENTS INC DALLAS

MATERIAL PROCESSING AND PHENOMENA INVESTIGATION OF FUNCTIONAL ELECTRONIC BLOCKS (U)

FEB 63 IV JOHNSON,ROWLAND E.;SANGSTER,R.C.;
PHIPPS,CHARLES M.;
REPT. NO. 08 63 27
CONTRACT: AF33 657 9196

UNCLASSIFIED REPORT

DESCRIPTORS: *INTEGRATED CIRCUITS, *MOLECULAR ELECTRONICS, ARSENIDES, CADMIUM COMPOUNDS, CAPACITORS, CRYSTAL GROWTH, DIFFUSION, DIODES(SEMICONDUCTOR), DIOXIDES, EPITAXIAL GROWTH, FILMS, GALLIUM COMPOUNDS, LIGHT, MANUFACTURING METHODS, RESISTANCE(ELECTRICAL), SILICON COMPOUNDS, SULFIDES, VOLTAGE (U)
IDENTIFIERS: *THIN FILMS, ELECTRIC POTENTIAL, THREE DIMENSIONAL ARRAYS, THIN FILMS ELECTRONICS (U)

GAAS EPITAXIAL DEPOSITION, SIO2 MASKING, DIFFUSION FROM SIO2 FILMS INTO GAAS; STUDY OF HIGH RESISTIVITY MECHANISMS, VOLTAGE BREAKDOWN ACROSS THIN LAYERS, MAXIMUM COMPONENT PACKING DENSITY, PREPARATION OF SINGLE CRYSTAL CDS AND LIGHT PRODUCING DIODES.

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD-400 759
LIBRARY OF CONGRESS WASHINGTON D C AEROSPACE TECHNOLOGY DIV

ELECTRIC CONDUCTIVITY AND HALL EFFECT IN SEMICONDUCTORS WITH LOOPS OF EXTREMA (U)

DEC 61 1V PREPELITSA,B.V.;POKATILOV,YE. P.;

UNCLASSIFIED REPORT

DESCRIPTORS: *SEMICONDUCTORS, CADMIUM COMPOUNDS, CRYSTALS, ELECTRICAL CONDUCTANCE, HALL EFFECT, RELAXATION TIME, SULFIDES (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD-401 699
HARSHAW CHEMICAL CO CLEVELAND OHIO

LARGE AREA THIN FILM CADMIUM SULFIDE SOLAR CELL ARRAY INVESTIGATION (U)

MAR 63 IV SCHAEFER,J.C.;WOLFF,G.A.;HILL,E.R.;

CONTRACT: AF33 657 9975

UNCLASSIFIED REPORT

DESCRIPTORS: *CADMIUM COMPOUNDS, *SOLAR CELLS, *THIN FILMS (STORAGE DEVICES), ACCELERATION, ACRYLIC RESINS, COATINGS, COPPER, CRYSTAL GROWTH, CRYSTALS, ELECTRODEPOSITION, EXPERIMENTAL DATA, FILMS, GLASS, GOLD, LOADING (MECHANICS), MANUFACTURING METHODS, MOLYBDENUM, NICKEL, PLASTICS, SHOCK RESISTANCE, SILVER, SOLAR PANELS, SONAR SOUND ANALYZERS, SULFIDES, TESTS (U)
IDENTIFIERS: THIN FILMS (U)

LARGE-AREA, THIN-FILM, CADMIUM SULFIDE SOLAR CELL ARRAY INVESTIGATION.

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD-403 053
NATIONAL CASH REGISTER CO DAYTON OHIO

FEASIBILITY INVESTIGATION OF CHEMICALLY SPRAYED THIN FILM PHOTOVOLTAIC CONVERTERS. (U)

DESCRIPTIVE NOTE: REPT. FOR 1 FEB 62-JAN 63,
MAR 63 111P CHAMBERLIN,R.R.;SKARMAN, J.S.;KOUPMAN,D.E.;BLAKELY,L.E.;
CONTRACT: AF 33 657 7919
PROJ: 8173
TASK: 817301
MONITOR: ASD TDR63 223, VOL. 1

UNCLASSIFIED REPORT

DESCRIPTORS: *PHOTOELECTRIC CELLS (SEMICONDUCTOR), *SEMICONDUCTOR FILMS, *SOLAR CELLS, CADMIUM COMPOUNDS, SULFIDES, SELENIDES, COPPER COMPOUNDS, SOLAR RADIATION, SPRAYS, THIN FILMS (STORAGE DEVICES), VAPOR PLATING, FEASIBILITY STUDIES. (U)
IDENTIFIERS: THIN FILMS, THIN FILMS ELECTRONICS (M)

THE OBJECTIVES WERE (1) TO DEMONSTRATE THE FEASIBILITY OF FABRICATING A THIN FILM PHOTO VOLTAIC CONVERTER USING A CHEMICAL SPRAY PROCESS FOR THE DEPOSITION OF THE ACTIVE ELEMENTS AND (2) TO FABRICATE FOR DELIVERY SIX EXPERIMENTAL CELLS, FOUR USING CDS AND TWO USING CDSE AS THE N-TYPE SEMICONDUCTING LAYER. RESEARCH HAS SHOWN THE FEASIBILITY OF FABRICATING PHOTOVOLTAIC CONVERTERS USING THIN FILMS OF CADMIUM AND COPPER SULFIDE (.6 MICRON AND .05 MICRON RESPECTIVELY) AND HAS SHOWN THAT THE DEPOSITION PROCESS USED IS APPLICABLE TO LARGE AREA, MULTIPLE LAYER (CDS CDSE-CU2S) CONFIGURATIONS, SOLID SOLUTION (CD(S, SE)-CU2S) CELLS, AND CONTINUOUS LINE PRODUCTION. THIS RESEARCH HAS ALSO SHOWN THAT A HETEROGENEOUS JUNCTION PHOTOVOLTAIC CONVERTER CAN BE FORMED USING CDS AND CU2S. SIX (4 CDS AND 2 CDSE) CELLS OF 16 SQ IN AREA WERE FABRICATED FOR DELIVERY. THE FOUR CDS CELLS HAD AN AVERAGE EFFICIENCY OF .2% AND THE TWO CDSE CELLS HAD AN AVERAGE EFFICIENCY OF LESS THAN .01%. THE EFFICIENCIES OF THE FOUR INCH SQUARE CELLS DO NOT INDICATE THE POTENTIAL OF THE CHEMICAL SPRAY PROCESS SINCE CDS CELLS OF ONE SQUARE INCH WERE MADE WITH 1.2% EFFICIENCY AND CDS CELLS OF ONE SQUARE CENTIMETER WERE MADE WITH 3.5% (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD-403 780
LABORATOIRE D'INFRA ROUGE TECHNIQUE ET APPLIQUE GIF-SUR-YVETTE (FRANCE)

STUDY OF THE RADIATIVE RECOMBINATION OF FREE CARRIERS PRODUCED BY ELECTRON BOMBARDMENT OF CADMIUM SULFIDE. (U)

62 29P DE GAALON,GILLES I
CONTRACT: N62558 2720

UNCLASSIFIED REPORT

DESCRIPTORS: *ELECTRON BOMBARDMENT, *LUMINESCENCE, SULFIDES, SEMICONDUCTORS, SOLID STATE PHYSICS, EXCITATION, IMPURITIES, IONIZATION, CRYOGENICS, CALCIUM COMPOUNDS. (U)
IDENTIFIERS: RECOMBINATION CARRIERS. (U)

STUDY OF THE RADIATIVE RECOMBINATION OF FREE CARRIERS PRODUCED BY ELECTRONIC BOMBARDMENT OF CADMIUM SULPHIDE.

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD-407 529
HARSHAW CHEMICAL CO CLEVELAND OHIO

LARGE AREA THIN FILM CADMIUM SULFIDE SOLAR CELL ARRAY INVESTIGATION. (U)

DESCRIPTIVE NOTE: QUARTERLY TECHNICAL PROGRESS REPT. NO. 3, 15 MAR-15 JUNE 63,
JUN 63 25P SCHAEFER,J.C.;HUMRICK,R.J.; HILL,E.R.;
CONTRACT: AF33 657 9975
PROJ: 8173
TASK: 817301

UNCLASSIFIED REPORT

DESCRIPTORS: *SOLAR CELLS, *X-RAY DIFFRACTION ANALYSIS, CRYSTALS, CADMIUM, SULFIDES, PHOTOGRAPHIC ANALYSIS, X-RAY PHOTOGRAPHY, PURIFICATION, DISTILLATION, SEMICONDUCTING FILMS, SULFUR, DIODES (SEMICONDUCTOR), LUMINESCENCE, CADMIUM COMPOUNDS, MICROSCOPY. (U)
IDENTIFIERS: THIN FILMS, THIN FILMS ELECTRONICS (U)

A 5.1% THIN-FILM CELL WAS PRODUCED ON A 1 IN. X 1 IN. SUBSTRATE. THIS RESULT COMPARES FAVORABLY WITH THE MAXIMUM EFFICIENCY OF 5.4% REPORTED FOR A SINGLE CRYSTAL CDS CELL. A PROCEDURE FOR UP GRADING LOW EFFICIENCY CELLS TO THE AVERAGE EFFICIENCY LEEVEL WAS ALSO DEVELOPED. A NON DESTRUCTIVE X-RAY TECHNIQUE WAS USED SUCCESS FULLY TO PHOTOGRAPH DISLOCATIONS IN SINGLE CRYSTAL CDS. THIS PROCEDURE PROMISES TO YIELD A FUND OF INFORMATION. EFFORTS TO PRODUCE AN ULTRAPURE CDS BY DISTILLATION OF THE ELEMENTS AND SUBSEQUENT REACTION IS UNDERWAY. WORK WAS CARRIED ON IN THE ANALYSIS OF THE I-V DATA AND SPECTRAL RESPONSE IN AN EFFORT TO CATALOG THIS DATA IN THE FORM OF A. THE PRESENT DATA CAN BE IN AN EFFORT TO CATALOG THIS DATA IN THE FORM OF A MODEL. THE PRESENT DATA CAN BE MADE TO FIT A P-N JUNCTION WITH PHOTOCONDUCTIVE SERIES AND SHUNT RESISTANCES. SOME REJECT 'SHORTED' CELLS WERE STUDIED AT LOW TEMPERATURES WHERE THE I-V CURVE BEGINS TO RESEMBLE A BACK WARD DIODE. INJECTION LUMINESCENCE WITH VERY LOW CONVERSION EFFICIENCY WAS OBSERVED WITH THE RADIATION LYING IN THE BAND BETWEEN 1 AND 1.5 EV. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD-408 472
PHILCO CORP BLUE BELL PA

THIN FILM ACTIVE DEVICES. (U)

DESCRIPTIVE NOTE: QUARTERLY REPT. NO. 2, 22 SEP-22 DEC 62,
DEC 62 1V SPRATT,JAMES P.;
CONTRACT: DA49 186URD1056

UNCLASSIFIED REPORT

DESCRIPTORS: (*SEMICONDUCTING FILMS, SANDWICH CONSTRUCTION), (*DIODES (SEMICONDUCTOR), METAL FILMS), (*TRANSISTORS, METAL FILMS), PHONONS, ALUMINUM COMPOUNDS, OXIDES, INDIUM, CADMIUM COMPOUNDS, SULFIDES, CAPACITANCE, VAPOR PLATING, GERMANIUM, DIELECTRIC PROPERTIES, TEST EQUIPMENT (ELECTRONICS), ONS, PHOTOSENSITIVITY. (U)
IDENTIFIERS: THIN FILMS, THIN FILMS ELECTRONICS (U)

THE USE OF EVAPORATED, RATHER THAN THERMALLY GROWN, LAYERS OF AL203 HAS ALLEVIATED THE SHORTING PROBLEM IN THE MEA TUNNEL EMISSION DEVICE. HIGH INPUT IMPEDANCE DEVICES SHOWING TRANSCONDUCTANCE VALUES AS HIGH AS 25,000 MICRO MHOS HAVE BEEN OBTAINED IN THIS WAY. A TENTATIVE EQUIVALENT CIRCUIT FOR THE DEVICE IS PRESENTED. STUDIES OF THE CONDUCTION PROCESSES IN CDS-AL203-AL DIODES CONTINUE. THIN FILMS OF CDS SHOW RESISTIVITIES OF APPROXIMATELY 0.1 OHM-CM, MOBILITIES OF 10 CM SQUARED/V-SEC, AND CARRIER CONCENTRATIONS OF 7 X 10 TO THE 18TH POWER/CM CUBED. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD-408 664
GENERAL ELECTRIC CO SCHENECTADY N Y

SEMICONDUCTOR DEVICE CONCEPTS, (U)

FEB 63 62P HALL,R.N.;
REPT. NO. 58J8A
CONTRACT: AF19 628 329
PROJ: 4608
TASK: 460804
MONITOR: AFCRL 63 120 A

UNCLASSIFIED REPORT

DESCRIPTORS: (*SEMICONDUCTORS, SCIENTIFIC RESEARCH), CADMIUM, CADMIUM COMPOUNDS, SULFIDES, TELURIDES, ALUMINUM ALLOYS, ZINC ALLOYS, CRYSTALS, LUMINESCENCE, LASERS, GALLIUM ALLOYS, ANTIMONY ALLOYS, ARSENIDES, HIGH TEMPERATURE RESEARCH, ELECTRICAL PROPERTIES, SELENIDES. (U)
IDENTIFIERS: HALL MEASUREMENTS. (U)

THE CD-CDS LIQUIDUS WAS MEASURED BETWEEN 700 DEGREES AND 1250 DEGREES C. IN THE LOW-TEMPERATURE REGION, THE LIQUIDUS RISES EXPONENTIALLY WITH TEMPERATURE SIMILAR TO THAT OBSERVED IN III-V SEMICONDUCTING COMPOUND SYSTEMS. A NEW ELECTRICALLY ACTIVE DEFECT CENTER, BELIEVED TO BE A NATIVE DOUBLE ACCEPTOR, WAS OBSERVED IN CDS. IT SHOWS IDENTICAL BEHAVIOR TO A CENTER CONCURRENTLY OBSERVED IN CDTE IN THIS LABORATORY. THESE CENTERS ARE FORMED DURING HEAT TREATMENT IN A CD ATMOSPHERE. THE CENTERS ARE SIMILAR TO THE DOUBLE ACCEPTOR CENTERS OBSERVED IN GE IN THAT THEY BECOME VERY EFFECTIVE HOLE TRAPS AT LOW TEMPERATURES. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL No. /ZZZHT

AD-409 102
GENERAL ELECTRIC CO SYRACUSE N Y

FIELD EFFECT TRIODES AND SPACE CHARGE LIMITED TRIODES. (U)

DESCRIPTIVE NOTE: QUARTERLY REPT. NO. 3, 1 DEC 62-28 FEB 63,
FEB 63 67P BLANK ,J. M. ;TRANTRAPORN , W. ;REINHARTZ ,K. K. ;WILLIS ,W. L. ; CAHILL,A. E. ;
CONTRACT: DA36 039SC90756
PROJ: 3A99 21 003

UNCLASSIFIED REPORT

DESCRIPTORS: *TRANSISTORS, *SEMICONDUCTING FILMS, MANUFACTURING METHODS, ZINC ALLOYS, OXIDES, CADMIUM ALLOYS, SULFIDES, VACUUM APPARATUS, VAPOR PLATING, SANDWICH CONSTRUCTION, METAL FILMS, AGING(MATERIALS), SOLID STATE PHYSICS, RESISTANCE(ELECTRICAL), HALL EFFECT, PHOTOCONDUCTIVITY, SPACE CHARGES, MOLECULAR BEAMS (U)
IDENTIFIERS: *THIN FILMS, FIELD EFFECT TRANSISTORS, SPACE CHARGE LIMITED DEVICES, THIN FILMS ELECTRONICS (U)

FIELD EFFECT TRIODES. A DETAILED CONDUCTION MECHANISM FOR THIN-FILM FIELD EFFECT TRIODES IS PRESENTED. NEW EXPERIMENTAL FINDINGS SEEM TO SUBSTANTIATE THE TRAP-EMPTYING MECHANISM. THE RESULTS OF VARYING SIO AND CDS THICKNESS IN FIELD-EFFECT TRIODES AND THEIR EFFECT ON DEVICE PERFORMANCE ARE SHOWN. EFFECTS OF DEVICE AGING AND ELECTRODE CONFIGURATIONS ON DEVICE PERFOR MANCE ARE ALSO DISCUSSED. SPACE CHARGE LIMITED TRIODES. THE REQUIREMENTS FOR PRODUCING SPACE CHARGE LIMITED CURRENT IN DEVICES ARE DISCUSSED, AND POSSIBLE METHODS OF FULFILLING THEM ARE PRE SENTED. CADMIUM SULFIDE IMPROVEMENT. A POST DEPOSITION TREATMENT OF CADMIUM SULFIDE FILMS IS OUTLINED AND RESULTS ARE PRESENTED. ZINC OXIDE MATERIAL IMPROVEMENT. THE DIFFICULTIES EVA PORATION OF ZINC OXIDE ARE DISCUSSED AND THE RE SULTS OF THESE EXPERIMENTS ARE PRESENTED. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD-409 475
TEXAS INSTRUMENTS INC DALLAS

MATERIAL PROCESSING AND PHENOMENA INVESTIGATION OF FUNCTIONAL ELECTRONIC BLOCKS. (U)

DESCRIPTIVE NOTE: QUARTERLY PROGRESS REPT. NO. 3, 1 MAR-31 MAY 63,
MAY 63 IV JOHNSON,ROWLAND E.;SANGSTER, R.C.;PHIPPS,CHARLES H.;
REPT. NO. 08 63 80
CONTRACT: AF33 657 9196

UNCLASSIFIED REPORT

DESCRIPTORS: (*MOLECULAR ELECTRONICS, MANUFACTURING METHODS), (*SEMICONDUCTING FILMS, EPITAXIAL GROWTH), (*EPITAXIAL GROWTH, MOLECULAR ELECTRONICS), SEMICONDUCTORS, SILICON COMPOUNDS, DIODES, GALLIUM ALLOYS, ARSENIC ALLOYS, DIFFUSION, VAPOR PLATING, VACUUM APPARATUS, PHOTOELECTRIC MATERIALS, PHOTOSENSITIVITY, PHOSPHORUS ALLOYS, IMPURITIES, ZINC, IRON, CHROMIUM, ELECTRICAL PROPERTIES, CAPACITORS, TELLURIUM, ADMIUM COMPOUNDS, SULFIDES, INDIUM, TRANSISTORS, DIODES (SEMICONDUCTOR). (U)

IDENTIFIERS: DOPING, 1963. (U)

GAAS EPITAXIAL DEPOSITION TECHNOLOGY WAS OPTIMIZED TO INCLUDE EFFECTS OF SEED ORIENTATION, VAPOR STREAM COMPOSITION, TEMPERATURE, AND THERMAL GRADIENT. DIFFUSION OF ZINC FROM DOPED SIO2 IS WELL CHARACTERIZED AND IS USED ROUTINELY. WORK ON DIFFUSION OF TE AND A DOUBLE DIFFUSED TRANSISTOR STRUCTURE WAS STARTED. VOLTAGE BREAKDOWN MECHANISMS AND PARAMETERS HAVE BEEN STUDIED FOR VARIOUS HIGH RESISTIVITY SAMPLES. DOPED CDS PREPARATION AND INDIUM DIFFUSION FOR SURFACE TREATMENT OF HIGH RESISTIVITY CDS ARE ROUTINE. A COMPREHENSIVE ANALYSIS OF THE PHOTOCAPACITOR IS PRESENTED. GAAS(X)P(1-X) WAS PREPARED FOR ALL VALUES OF X. ADHERENT LAYERS OF GAP HAVE BEEN PRODUCED ON A GAAS SEED BY USE OF AN INTERMEDIATE LAYER OF GAAS(X)P(1-X).
(AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD-411 383
DAVID SARNOFF RESEARCH CENTER PRINCETON N J

MAXIMIZING THE PERFORMANCE OF PHOTOCONDUCTORS. (U)

DESCRIPTIVE NOTE: FINAL REPT., 15 SEP 62-15 MAR 63,
APR 63 65P ANDERSON,W.M.;DREEBEN,A.B.;
DRESNER,J.;MARK,P.;
CONTRACT: AF19 604 8353
PROJ: PROJ 4608
TASK: 460804
MONITOR: AFCRL 63 145

UNCLASSIFIED REPORT

DESCRIPTORS: (*HALL EFFECT, MEASUREMENT), (*SELENIUM, HALL EFFECT), PHOTOCONDUCTIVITY, X-RAY DIFFRACTION ANALYSIS, SCATTERING, ELECTRONS, DRIFT, ELECTRON BEAMS, ELECTRONIC EQUIPMENT, ELECTROMETER, VACUUM APPARATUS, EVAPORATION, COPPER COMPOUNDS, CADMIUM COMPOUNDS, SULFIDES, CRYSTALS, IMPURITIES, PHOTOMICROGRAPHY, CHEMICAL ANALYSIS, VALENCE, PHOTOELECTRIC EFFECT. (U)
IDENTIFIERS: 1963. (U)

HALL EFFECT MEASUREMENTS FOR PHOTOGENERATED CARRIERS IN VITREOUS SE SHOWED THAT N-TYPE PHOTOCONDUCTIVITY PREDOMINATES IN ILLUMINATED LAYERS, WHILE CURRENT IS CARRIED MAINLY BY HOLES IN UNEXCITED SE. THE ELECTRON MOBILITY IS 0.32 PLUS OR MINUS 0.1 CM SQUARED/V S. THE FORMATION OF PRECIPITATES OF ACCEPTOR IMPURITIES IN LARGE CDS CRYSTALS HAS BEEN DEMONSTRATED FOR CONCENTRATIONS AS LOW AS 2 X 10 TO THE -2%, THE UPPER LIMIT FOR THE SOLUBILITY OF CU IN CDS. CU AND AG SULFIDES EXIST AS RODS AT LOW CONCENTRATIONS. AT CONCENTRATIONS NEAR 1%, CU FORMS LARGE DISCS. AU SEGREGATES AS HEXAGONAL PLATELETS OF ELEMENTAL AU. INCLUSIONS HAVE A PARTICULAR ORIENTATION WITH RESPECT TO THE C-AXIS OF CDS.
(AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD-413 667
HUGHES TOOL CO CULVER CITY CALIF

CADMIUM SULFIDE SUMMARY REVIEW AND DATA SHEETS. (U)

APR 63 155P NEUBERGER,M.;
REPT. NO. DS-124
CONTRACT: AF 33(616)-8438
PROJ: AF-7381
TASK: 738103

UNCLASSIFIED REPORT

DESCRIPTORS: (*CADMIUM COMPOUNDS, SULFIDES), SEMICONDUCTORS, ABSORPTION, OPTICAL PROPERTIES, DIFFUSION, DIELECTRIC PROPERTIES, ELECTRICAL CONDUCTANCE, RESISTANCE (ELECTRICAL), HALL EFFECT, RADIATION DAMAGE, LIFE EXPECTANCY, THERMOELECTRICITY, PHOTOCONDUCTIVITY, REFRACTIVE INDEX, REFLECTION, DATA, EXPERIMENTAL DATA. (U)

REVIEW AND DATA SHEETS ON CADMIUM SULFIDE.

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD-414 853
MASSACHUSETTS INST OF TECH CAMBRIDGE LAB FOR INSULATION RESEARCH

PIEZOELECTRIC COUPLING BETWEEN ULTRASONIC WAVES AND FREE ELECTRONS IN CADMIUM SULFIDE, (U)

JUL 63 20P NILL,KENNETH W. I
REPT. NO. 181
CONTRACT: NONR184110

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:

DESCRIPTORS: (*PIEZOELECTRIC EFFECT, SEMICONDUCTORS), (*ULTRASONIC PROPERTIES, PHONONS), SCATTERING, ELECTRONS, ELECTRIC CURRENTS, CRYSTAL LATTICES, ATTENUATION, ELECTRIC FIELDS, SPACE CHARGES, CADMIUM COMPOUNDS, SULFIDES, ENERGY CONVERSION, PROPAGATION, EQUATIONS (U)
IDENTIFIERS: 1963 (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD-415 755
HP ASSOCIATES PALO ALTO CALIF

INVESTIGATION OF HOT ELECTRON EMITTER. (U)

DESCRIPTIVE NOTE: SCIENTIFIC REPT. NO. 4, 1 MAR-31 MAY 63.
MAY 63 16P
MONITOR: AFCRL 63 336

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:

DESCRIPTORS: (*TRANSISTORS, TRIODES), (*METAL FILMS, GOLD), QUANTUM MECHANICS, RESISTANCE (ELECTRICAL), GALLIUM COMPOUNDS, ARSENIDES, SILICON, CADMIUM COMPOUNDS, SULFIDES, SEMICONDUCTOR DEVICES, MANUFACTURING METHODS (U)
IDENTIFIERS: HOT ELECTRONS, THIN FILMS, THIN FILMS ELECTRONICS (U)

THE RESISTIVITY OF THIN GOLD FILMS ON SILICON SUBSTRATES HAS BEEN STUDIED. THE BEST FILMS WERE EVAPORATED AT PRESSURES LESS THAN 10 TO THE -8TH POWER TORR AND ON A 200 C SUBSTRATE. EVIDENCE IS PRESENTED FOR SOME SPECTRAL REFLECTION OF CONDUCTION ELECTRONS BY THE FILM BOUNDARIES. GOLD FILMS ABOUT 100 ANGSTROMS THICK HAVE BEEN PREPARED WITH SHEET RESISTANCE AS LOW AS 6 OHMS. A HOT ELECTRON TRIODE WITH A SINGLE CRYSTAL GAAS POINT EMITTER, A GOLD BASE, AND A SINGLE CRYSTAL SI COLLECTOR IS DESCRIBED. THIS TRIODE EXHIBITS A CURRENT TRANSFER RATIO ALPHA OF 0.05 OVER SEVERAL DECADES OF COLLECTOR CURRENT, AND THE EMITTER AND COLLECTOR CURRENTS ARE PROPORTIONAL TO EXP (Q VEB/1.04 KT). A DISCUSSION IS GIVEN OF THE FABRICATION OF HOT ELECTRON TRIODES UTILIZING AN EVAPORATED CDS COLLECTOR. THE TECHNIQUES OF CDS DOPING AND EVAPORATION ARE DESCRIBED. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD-410 264
GENERAL ELECTRIC CO SCHENECTADY N Y

SEMICONDUCTOR DEVICE CONCEPTS. (U)

JUN 63 1V
REPT. NO. SCIENTIFIC REPT. NO. 4A
CONTRACT: AF19 628 329
MONITOR: AFCRL
UNCLASSIFIED REPORT

DESCRIPTORS: 63 323 4A , (*SEMICONDUCTOR DEVICES, MATERIALS), (*SEMICONDUCTORS, ELECTROLUMINESCENCE), GROUP II ELEMENTS, GROUP VI ELEMENTS, INTERMETALLIC COMPOUNDS, CADMIUM COMPOUNDS, SULFIDES, COPPER COMPOUNDS, ZINC COMPOUNDS, COPPER ALLOYS, ZINC ALLOYS, SELENIUM ALLOYS, MANUFACTURING METHODS, SINGLE CRYSTALS. (U)
IDENTIFIERS: 1963. (U)

INJECTION ELECTROLUMINESCENCE HAS BEEN OBSERVED IN CU2S-ZNS AND CU2SE-ZNSE HETEROJUNCTIONS. THE LIGHT EMISSION OCCURS THROUGH HOLE INJECTION FROM THE P-TYPE CU CHALOGENIDE INTO N-TYPE ZNS OR ZNSE. AT ROOM TEMPERATURE THE LIGHT EMISSION FROM THE CU2S-ZNS AND THE CU2SE-ZNSE JUNCTIONS ORIGINATES AT THE CU OR SELF-ACTIVATED LUMINESCENCE CENTERS. AT 77K EDGE EMISSION PEAKING AT 2.68 EV HAS BEEN OBSERVED FROM THE CU2SE-ZNSE DIODES WITH 2V DC APPLIED ACROSS THE JUNCTION. A TENTATIVE MODEL FOR THE BAND STRUCTURE OF THE CU CHALCOGENIDE-II-VI COMPOUND HETEROJUNCTIONS IS PRESENTED. STUDIES ON THE DOUBLE ACCEPTOR CENTER IN CDS HAVE CONTINUED WITH THE DISCOVERY THAT THESE CENTERS CAN BE PRODUCED BY ELECTRON IR RADIATION AS WELL AS BY CD FIRING. SOME PRELIMINARY CONCLUSIONS FROM STUDIES OF THE DIFFUSION OF CD IN CDS ARE ALSO PRESENTED. THE JUNCTION LASER THRESHOLD ANALYSIS HAS BEEN EXTENDED. MOST OF THE ASSUMPTIONS AND APPROXIMATIONS PREVIOUSLY PRESENT HAVE BEEN ELIMINATED. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD-417 747
HARSHAW CHEMICAL CO CLEVELAND OHIO

RESEARCH ON PHOTOCONDUCTIVITY IN THIN FILMS. (U)

DESCRIPTIVE NOTE: FINAL REPT., JUNE 62-JULY 63,
JUL 63 51P LIND,E.L.;LANCIA,F.N.;
HILL,E.K.;
CONTRACT: AF33 657 9194
PROJ: PROJ. 4156
TASK: 415605
MONITOR: ASD TDR63 654

UNCLASSIFIED REPORT

DESCRIPTORS: (*PHOTOCONDUCTIVITY, FILMS), (*PHOTOSENSITIVITY, MATERIALS), PREPARATIONS, PHOTONS, GRAIN BOUNDARIES, EQUATIONS, SULFIDES, ANTIMONY COMPOUNDS, CADMIUM COMPOUNDS, SELENIUM COMPOUNDS, TEMPERATURE, SINGLE CRYSTALS, ELECTRIC POTENTIAL, MEASUREMENT, HIGH TEMPERATURE RESEARCH, EVAPORATION, TEST ENT, VACUUM APPARATUS, TABLES, DATA, RESISTANCE (ELECTRICAL). (U)
IDENTIFIERS: 1963, TRAPPING, FERMI LEVEL, BLOCK DIAGRAM. (U)

RESEARCH ON PHOTOCONDUCTIVITY IN THIN FILMS.

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD-418 516
AIR FORCE INST OF TECH WRIGHT-PATTERSON AFB OHIO

FEASIBILITY OF CADMIUM SULFIDE FOR SOLID STATE DETECTOR APPLICATION. (U)

AUG 63 69P GALE,KENNETH ALLEN I
MONITOR: AFIT GNE PHYS 63 9,

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: MASTER'S THESIS.

DESCRIPTORS: (*CADMIUM COMPOUNDS, SULFIDES), (*NUCLEAR PARTICLES, DETECTORS), (*DETECTORS, NUCLEAR PARTICLES), (*SOLID STATE PHYSICS, DETECTORS), ALPHA PARTICLES, ELECTRONS, PLASMA OSCILLATION, THEORY, MEASUREMENT, ATOMIC ENERGY LEVELS, PHOTONS, CRYSTAL HOLDERS, PHOTOCONDUCTIVITY, FEASIBILITY STUDIES. (U)
IDENTIFIERS: 1963. (U)

SOLID STATE RADIATION DETECTORS WERE CONSTRUCTED USING CDS CRYSTAL PLATELETS. THE DETECTORS WERE TESTED USING BOTH ALPHA AND PHOTON IRRADIATION. ATTEMPTS TO MEASURE THE LIFETIMES OF THE HOLES AND ELECTRONS WITH ALPHA AND PHOTON IRRADIATION AND TO MEASURE THE ENERGY OF THE TRAP LEVELS FOR THE ELECTRONS FAILED FOR VARIOUS REASONS. THE ONLY QUANTITATIVE RESULT SECURED WERE A VALUE OF 2.48 X 10 TO THE -6TH POWER SQ CM/V FOR THE MOBILITY-LIFETIME PRODUCT OF ELECTRONS AND A VALUE OF 5.06 EV/ION PAIR FOR THE AVERAGE ENERGY REQUIRED TO PRODUCE AN ION PAIR. OTHER QUALITATIVE FEATURES SUCH AS THE TRAPPING OF CARRIERS AND THE FORMATION OF A PLASMA IN THE DETECTOR WERE OBSERVED. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD-419 017
AIR FORCE INST OF TECH WRIGHT-PATTERSON AFB OHIO

THE SYNTHESIS OF A VOLATILE CADMIUM CHELATE AND THE STUDY OF ITS VAPOR PHASE REACTION WITH HYDROGEN SULFIDE. (U)

MAY 63 IV CUPKA,ALBERT GEORGE;

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: UNCLASSIFIED REPORT MASTERS THESIS

DESCRIPTORS: (*COMPLEX COMPOUNDS, SYNTHESIS (CHEMISTRY)), (*CADMIUM COMPOUNDS, ORGANIC COMPOUNDS), (*ORGANIC COMPOUNDS, COMPLEX COMPOUNDS), (*METALORGANIC COMPOUNDS, CADMIUM COMPOUNDS), FILMS, CRYSTALS, CADMIUM, SEMICONDUCTORS, PHYSICAL PROPERTIES, VAPORS, CHEMICAL REACTIONS, FLUORINE COMPOUNDS, HYDROGEN COMPOUNDS, SULFIDES, VAPOR PLATING, CHEMICAL ANALYSIS, SPECTROSCOPY, CHROMATOGRAPHIC ANALYSIS, CARBONYL GROUP. (U)
IDENTIFIERS: 1963, CHELATE, ACETYLACETONATES. (U)

A CHEMICAL APPROACH TO DEPOSITION OF THIN FILMS OR CRYSTALS OF METAL COMPOUNDS WAS INVESTIGATED. IT WAS OF INTEREST TO DETERMIINE WHETHER METAL CHELATES WOULD UNDERGO A VAPOR PHASE REACTION TO FORM THE DESIRED PRODUCTS. REACTIONS TO PRODUCE MATERIALS OF IMPORTANCE AS SEMICONDUCTORS WERE OF SPECIAL INTEREST. TWO METAL DERIVATIVES OF FLUORINATED ACETYLACETONE CONTAINING CADMIUM WERE PD, ONE IONIC IN NATURE AND THE OTHER COVALENT. COMPOSITION AND STRUCTURE OF THE TWO COMPOUNDS IS PRESENTED, TOGETHER WITH A FEW OF THEIR PHYSICAL PROPERTIES. THE COVALENT CADMIUM CHELATE WAS REACTED IN THE VAPOR PHASE WITH HYDROGEN SULFIDE. THE EXPERIMENTS WERE CONDUCTED AT ATMOSPHERIC PRESSURE AND REACTION TEMPERATURES OF 140 TO 240 C. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD-421 739
TEXAS INSTRUMENTS INC DALLAS

ADVANCED FUNCTIONAL ELECTRONIC BLOCK DEVELOPMENT. (U)

DESCRIPTIVE NOTE: INTERIM ENGINEERING REPT. NO. 1, 15 AUG 62, MAY 63 57P BIARD,J. R. ;
REPT. NO. 0363 12
CONTRACT: AF33 657 9024
PROJ: 4159
TASK: 415906

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTES:

DESCRIPTORS: (*SEMICONDUCTOR DEVICES, SCIENTIFIC RESEARCH), (*OPTICAL PHENOMENA, SEMICONDUCTORS), (*SEMICONDUCTORS, PIEZOELECTRIC EFFECT), (*OSCILLATORS, THERMAL CONDUCTIVITY), (*MOLECULAR ELECTRONICS, SCIENTIFIC RESEARCH), GALLIUM ALLOYS, ARSENIC ALLOYS, LASERS, RECOMBINATION REACTIONS, MULTIPLEX, INFRARED PULSES, TRANSISTORS, PHOTOELECTRIC CELLS (SEMICONDUCTOR), SILICON, PACKAGED CIRCUITS, PHOTONS, CADMIUM ALLOYS, SULFIDES, TEST FACILITIES, INFRARED RADIATION, BONDING, INDIUM, TEST EQUIPMENT (ELECTRONICS) (U)
IDENTIFIERS: 1963, ACOUSTIC AMPLIFIER, LIGHT MULTIPLEXING, THERMAL OSCILLATOR

EFFORTS CONTINUED ON INVESTIGATIONS OF NEW SEMICONDUCTOR PHENOMENA FOR APPLICATION IN ADVANCED FUNCTIONAL ELECTRONIC BLOCKS. THE WORK IS DIVIDED INTO FOUR SPECIFIC TASKS: THE FIRST TWO RELATE TO OPTICAL PHENOMENA, THE THIRD TO PIEZOELECTRICITY, AND THE FOURTH TO THERMAL EFFECTS. THE RADIATIVE RECOMBINATION MECHANISMS IN GAAS P-N JUNCTIONS AND THE OVERALL EFFICIENCY OF THESE DEVICES AS LIGHT EMITTERS WERE INVESTIGATED. THIS REPORT DESCRIBES THE OPTICAL AND ELECTRICAL CHARACTERISTICS OF BOTH SPONTANEOUS EMISSION SOURCES AND LASERS. A DISCUSSION OF THE POSSIBLE RADIATIVE RECOMBINATION MECHANISMS IS ALSO INCLUDED. A MULTIPLEX NETWORK OR LOWLEVEL PHOTOCHOPPER HAS BEEN SELECTED AS THE FIRST APPLICATION OF THE GAAS INFRARED SOURCE TO FEB'S. THIS REPORT DESCRIBES GEOMETRICAL AND OPTICAL TECHNIQUES WHICH MAY BE EMPLOYED TO OPTIMIZE THE OPTICAL COUPLING BETWEEN THE GAAS LIGHT SOURCE AND SILICON PHOTODETECTOR. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD-423 387
GENERAL DYNAMICS/FORT WORTH TEX

STRESS CORROSION CRACKING IN HIGH STRENGTH FERROUS ALLOYS, (U)

NOV 63 42P HILDEBRAND,J. F. ITURNS,E. W. INGRAHAM,F. C.;
REPT. NO. FZM2690
CONTRACT: AF33 657 11214

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:

DESCRIPTORS: (*STEEL, CORROSION), (*STRESSES, CORROSION), (*CORROSION, FRACTURE (MECHANICS)), (*PROTECTIVE TREATMENTS, STEEL), SALT SPRAY TESTS, COATINGS, METAL COATINGS, VAPOR PLATING, FLAME SPRAYING, ELECTRODEPOSITION, PLATING, LUBRICANTS, PAINTS, DIFFUSION, COLD WORKING, CORROSIVE LIQUIDS, ALUMINUM COATINGS, NICKEL, CADMIUM, COPPER, SILVER, SURFACES, MOLYBDENUM COMPOUNDS, SULFIDES, FILMS, SILICONE PLASTICS, CORROSION INHIBITION, TESTS, TEST METHODS (U)
IDENTIFIERS: 1963, 4340 STEEL, SHOT PEENING, ELECTROLESS PLATING (U)

THIS PAPE DESCRIBES TESTS PERFORMED TO INVESTIGATE THE STRESS CORROSION CRACKING OF AISI TYPE 4340 STEEL IN THE 260,000 TO 292,000 PSI STRENGTH RANGE. VARIOUS PROTECTIVE COATINGS WERE EVALUATED COMPARATIVELY ON THE BASIS OF A SUSTAINED AXIAL TENSILE LOAD EQUIVALENT TO 70% OF THE ULTIMATE STRENGTH. ROUND, TENSILETYPE SPECIMENS TESTED THE COATINGS AS APPLIED TO A MACHINED OR SHOT-PEENED SURFACE BY ALTERNATE IMMERSION IN 5% SALT WATER. THE RESULTS INDICATED THAT THE PEENED SURFACE HAD MORE RESISTANCE TO CRACKING THAN THE MACHINED SURFACE. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD-423 684
HARSHAW CHEMICAL CO CLEVELAND OHIO

INVESTIGATION OF THIN FILM CADMIUM SULFIDE SOLAR CELLS. (U)

DESCRIPTIVE NOTE: REPT. FOR SEP 62-NOV 63,
NOV 63 60P SCHAEFER,J. C. HUMRICK,N. J.
HILL,E. R. BELT,R. F. ;
CONTRACT: AF33 657 9975
PROJ: 8173
TASK: 817301 32
MONITOR: ASD TDR63 743

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:

DESCRIPTORS: (*SOLAR CELLS, CADMIUM COMPOUNDS), (*SEMICONDUCTING FILMS, CADMIUM COMPOUNDS), (*CADMIUM COMPOUNDS, SULFIDES), PHOTOELECTRIC CELLS (SEMICONDUCTOR), DESIGN, MATERIALS, ELECTRODES, LIFE EXPECTANCY, RADIATION DAMAGE, ELECTRONS, CRYSTAL LATTICE DEFECTS, STABILITY, MANUFACTURING METHODS, CRYSTAL GROWTH, ENCAPSULATION, SANDWICH CONSTRUCTION, PLASTICS, PHOTONS, ENERGY, ELECTRICAL PROPERTIES, SPACECRAFT (U)
IDENTIFIERS: THIN FILMS, QUANTUM YIELD (U)

RESEARCH AND DEVELOPMENT OF A LARGE AREA CDS, VACUUM EVAPORATED, THIN FILM, FLEXIBLE, LIGHTWEIGHT, FRONT WALL SOLAR CELL WAS CONTINUED IN AN EFFORT TO IMPROVE THE PERFORMANCE CHARACTERISTICS. EFFICIENCIES WERE INCREASED TO A MAXIMUM OF 5.1%. POWER TO WEIGHT RATIOS OF 15 WATTS PER POUND ARE NORMAL WITH 30 AS A MAXIMUM. AN UPGRADING PROCEDURE FOR LOW EFFICIENCY CELLS WAS DEVELOPED. TEST PANELS WERE SUBMITTED FOR A 30 DAY ORBITAL SPACE FLIGHT EVALUATION. ELECTRON DAMAGE EXPERIMENTS INDICATE LITTLE EFFECT ON THE CDS SOLAR CELLS. X-RAY TECHNIQUES HAVE BEEN USED TO PHOTOGRAPH DISLOCATIONS IN SINGLE CRYSTAL CDS. CURRENT-VOLTAGE CURVES AND SPECTRAL RESPONSE DATA ANALYSES RESULTED IN A ONE-TRAP MODEL OF THE CDS PHOTOVOLTAIC CELL. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD-424 852
DAVID SARNOFF RESEARCH CENTER PRINCETON N J

INVESTIGATION OF CARRIER INJECTION ELECTROLUMINESCENCE. (U)

DESCRIPTIVE NOTE: SEMIANNUAL SCIENTIFIC REPT. NO. 4, 16 JAN31 JUL 63,
AUG 63 57P FISCHER,A. G. ;FONGER,W. H. ;MOSS,H. L. ;PETERSON,R. L. ;DONAHUE,P. ;
CONTRACT: AF19 604 8018
PROJ: 4608
TASK: 460804
MONITOR: AFCRL 63 389

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:

DESCRIPTORS: (*SEMICONDUCTING FILMS, ELECTROLUMINESCENCE), (*ELECTROLUMINESCENCE, SEMICONDUCTORS), (*SEMICONDUCTORS, ELECTROLUMINESCENCE), (*LUMINESCENCE, SEMICONDUCTORS), SOLID STATE PHYSICS, ZINC ALLOYS, TELLURIUM ALLOYS, IMPURITIES, GALLIUM ALLOYS, ARSENIC ALLOYS, SELENIUM ALLOYS, SINGLE CRYSTALS, MATERIALS, ELECTRIC CURRENTS, ELECTRONS, INJECTION, CRYSTAL GROWTH, ZINC COMPOUNDS, SULFIDES, CADMIUM COMPOUNDS, EPITAXIAL GROWTH, OPTICAL PHENOMENA, REFRACTIVE INDEX, LIGHT TRANSMISSION, OPTICAL PROPERTIES, BROADBAND, PHOSPHIDES, ARSENIDES, GALLIUM COMPOUNDS (U)
IDENTIFIERS: 1963, INJECTION ELECTROLUMINESCENCE (U)

CARRIER INJECTION ELECTROLUMINESCENCE; LUMINESCENT JUNCTIONS IN WIDE-GAP SEMICONDUCTORS; TUNNEL INJECTION ELECTROLUMINESCENCE; A GALLIUM ARSENIDE-GALLIUM PHOSPHIDE LIGHT SOURCE; EVAPORATED ZNSE AND ZNTE FILMS AND CELLS.

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD-425 523
HP ASSOCIATES PALO ALTO CALIF

INVESTIGATION OF HOT ELECTRON EMITTER. (U)

DESCRIPTIVE NOTE: SCIENTIFIC REPT. NO. 5, 1 JUNE-31 AUG 63.
AUG 63 24P
CONTRACT: AF19 628 1637
PROJ: 4608
TASK: 460804
MONITOR: AFCRL 63 553

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:

DESCRIPTORS: (*SEMICONDUCTOR FILMS, CADMIUM ALLOYS), (*CADMIUM ALLOYS, SEMICONDUCTOR FILMS), DIODES (SEMICONDUCTOR), VAPOR PLATING, SULFIDES, IMPURITIES, SELENIUM ALLOYS, VACUUM APPARATUS, GOLD, SILICON, PLATINUM (U)
IDENTIFIERS: 1963, SCHOTTKY BARRIERS, HOT ELECTRONS (U)

A NEWTYPE OF CADMIUM SULFIDE EVAPORATION SOURCE IN WHICH THE RATE IS DIFFUSION LIMITED IS DISCUSSED. TYPICAL THICKNESS VERSUS TIME AND RATE VERSUS TEMPERATURE DEPENDENCES ARE PRESENTED AND THE RATE IS FOUND TO BE DEPENDENT ONLY ON SOURCE TEMPERATURE. SPECTROCHEMICAL ANALYSIS OF THE FILMS INDICATE THAT THE FILM DOPANT CONCENTRATION IS APPROXIMATELY 20% OF THE SOURCE CONCENTRATION. THIS MEASUREMENT IS VERIFIED BY ELECTRICAL MEASUREMENTS ON THE FILMS. A DISCUSSION OF POSSIBLE ADVANTAGES OF EVAPORATING CDSE INSTEAD OF CDS FOR A TRIODE COLLECTOR IS PRESENTED. THE CAPACITY-VOLTAGE AND CURRENTVOLTAGE OF A GOLD TO CADMIUM SELENIDE BARRIER ARE PRESENTED AND THE INTERNAL BARRIER HEIGHT IS FOUND TO BE 0.82 EV, WHICH IS COMPATIBLE WITH A GALLIUM ARSENIDE EMITTER. FURTHER DATA IS PRESENTED FOR THE REVERSE LEAKAGE MECHANISM OF IMAGE FORCE LOWERING OF THE BARRIER. THE DATA SUPPORTS THE CONTENTION THAT THE INFRARED FREQUENCY VALUE OF SEMICONDUCTOR PERMITTIVITY, VIZ. 12 FOR SI, SHOULD BE USED FOR BARRIER LOWERING CALCULATIONS. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD-426 170
RCA LABS PRINCETON N J

EVAPORATED THIN-FILM TECHNIQUES. (U)

DESCRIPTIVE NOTE: FINAL REPT., 15 MAY 62-31 JULY 63,
JUL 63 30P QUINN,R. E. ;
CONTRACT: NONR3854(00

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:

DESCRIPTORS: (*INTEGRATED CIRCUITS, SEMICONDUCTING FILMS), (*TRANSISTORS, INTEGRATED CIRCUITS), (*SEMICONDUCTING FILMS, INTEGRATED CIRCUITS), MANUFACTURING METHODS, PROCESSING, ELECTRIC FIELDS, ELECTRODES, CADMIUM COMPOUNDS, CADMIUM ALLOYS, SULFIDES, ELECTRIC CURENTS, FIXED CONTACTS, THICKNESS, ELECTRIC INSULATION, LIFE EXPECTNCY, AMPLIFIERS (U)
IDENTIFIERS: 1963, SHIFT REGISTERS, THIN FILMS (U)

THE REQUIREMENTS PECULIAR TO ACTIVE INTEGRATED CIRCUIT ELEMENTS ARE SET FORTH IN DETAIL AND THE PRESENT CHARACTERISTICS OF THE THIN-FILM TRANSISTOR (TFT) ARE MEASURED AGAINST THESE REQUIREMENTS. SOME OF THE PROBLEMS IMPEDING SUCCESSFUL UTILIZATION OF THE TFT IN INTEGRATED CIRCUITS WERE SOLVED, BUT OTHERS PERSIST. NONE OF THESE DIFFICULTIES ARE BELIEVED TO BE FUNDAMENTAL TO THE OPERATION OF THE DEVICE. THE DESIGN AND FABRICATION OF AN INTEGRATED AMPLIFIER AND AN INTEGRATED SHIFT REGISTER EMPLOYING TFT'S IS DESCRIBED. THE TECHNIQUES REQUIRED FOR TFT FABRICATION WERE FOUND COMPATIBLE WITH THOSE USED FOR THIN-FILM PASSIVE COMPONENT FABRICATION. A SUMMARY OF TFT FABRICATION TECHNIQUES IS GIVEN.
(AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD-426 258
GENERAL ELECTRIC CO SCHENECTADY N Y

SEMICONDUCTOR DEVICE CONCEPTS. (U)

OCT 63 IV
REPT. NO. SRSA
CONTRACT: AF19 628 329
PROJ: 4608
TASK: 460004
MONITOR: AFCRL 63 552A

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:

DESCRIPTORS: (*SEMICONDUCTOR DEVICES, LUMINESCENCE), (*DIODES (SEMICONDUCTOR), LUMINESCENCE), (*SEMICONDUCTORS, LUMINESCENCE), (*LUMINESCENCE, SEMICONDUCTORS), (*ELECTROLUMINESCENCE, SEMICONDUCTORS), CADMIUM COMPOUNDS, SULFIDES, COPPER ALLOYS, ZINC ALLOYS, SELENIUM ALLOYS, SILICON COMPOUNDS, CARBIDES, GALLIUM ALLOYS, ANTIMONY ALLOYS, INDIUM ALLOYS, GALLIUM COMPOUNDS, ARSENIDES, PHOSPHIDES, CADMIUM, DIFFUSION, IMPURITIES, CRYSTAL GROWTH, INTENSITY, LOW-TEMPERATURE RESEARCH, LASERS (U)
IDENTIFIERS: 1963, CADMIUM SULFIDE, COPPER SELENIDE, ZINC SELENIDE, SILICON CARBIDE, GALLIUM ARSENIDE, GALLIUM PHOSPHIDE, GALLIUM ANTIMONIDE (U)

THE SELF-DIFFUSION OF CD IN CDS HAS BEEN MEASURED UNDER A VARIETY OF DOPING AND FIRING CONDITIONS. UNDER SATURATED CD PRESSURE THE DIFFUSION COEFFICIENT IS GIVEN BY D = 3 EXP(-2.0 EV/KT). UNDER S PRESSURE AT 800 C THE DIFFUSION COEFFICIENT IS FOUND TO BE LINEARLY DEPENDENT ON THE DONOR IMPURITY CONCENTRATION. BY MEASURING THE POSITION OF THE PEAK OF THE EDGE EMISSION EXCITON BAND IT HAS BEEN POSSIBLE TO MONITOR ACCURATELY THE TEMPERATURE OF OPERATING CU2SE2NSE INJECTION ELECTROLUMINESCENT HETEROJUNCTIONS. LUMINESCENCE FROM TRAVELING SOLVENT SIC DIODES IS DISCUSSED. MIXED CRYSTALS OF GAAS-GAP WERE GROWN FROM EXCESS GA. COHERENT LIGHT EMISSION WAS OBTAINED FROM DIODES MADE FROM THESE CRYSTALS. LUMINESCENCE FROM GASB DIODES SHOWS LINE NARROWING, BUT COHERENT LIGHT EMISSION WAS NOT ACHIEVED. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD-426 463
DAVID SARNOFF RESEARCH CENTER PRINCETON N J

INVESTIGATION OF CARRIER INJECTION ELECTROLUMINESCENCE. (U)

DESCRIPTIVE NOTE: FINAL REPT., 15 JAN 61-14 SEP 63,
OCT 63 27P FISCHER,A. G. ;
CONTRACT: AF19 604 8018
PROJ: 4600
TASK: 460804
MONITOR: AFCRL 63 526

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:

DESCRIPTORS: (*ELECTROLUMINESCENCE, SEMICONDUCTOR DEVICES), (*SEMICONDUCTING FILMS, ELECTROLUMINESCENCE), (*SEMICONDUCTOR DEVICES, ELECTROLUMINESCENCE), POWDERS, ZINC COMPOUNDS, SULFIDES, SELENIUM COMPOUNDS, TELLURIUM COMPOUNDS, CADMIUM COMPOUNDS, GALLIUM COMPOUNDS, PHOSPHIDES, CRYSTAL GROWTH, MANUFACTURING METHODS, LUMINESCENCE, LIGHT, SOURCES, SELENIDES (U)
IDENTIFIERS: 1963, ELECTROLUMINESCENT JUNCTIONS, TUNNEL INJECTION, CARRIER INJECTION, WIDE BAND-GAP SEMICONDUCTORS, ZINC SULFIDE, THIN FILMS (U)

TO DEVELOP A SOLID-STATE LIGHT SOURCE, FIRST STUDIED WAS THE MECHANISM OF THE EXISTING ELECTROLUMINESCENCE OF ZINC SULFIDE POWDER, WHICH WAS FOUND TO BE BASED ON BIPOLAR ALTERNATING INJECTION OF ELECTRONS AND HOLES FROM CONDUCTING, COPPER-DECORATED IMPERFECTION LINES, AND RECOMBINATION AT FIELD REVERSAL. TO EXTEND THIS PRINCIPLE TO EFFICIENT DC OPERATION, THE TECHNOLOGY WAS DEVELOPED OF CRYSTAL GROWTH LUMINESCENT, CONDUCTING II-VI COMPOUNDS FROM THE MELT UNDER PRESSURE, AND INJECTION MECHANISMS WERE FOUND ACTIVE IN RESULTING BROAD P-I-N HETEROJUNCTIONS. A NEW TYPE OF INJECTING HETEROJUNCTION, BASED ON TUNNELING THROUGH THIN INSULATING FILMS, WAS INVENTED, PERMITTING MINORITY CARRIER INJECTION INTO LUMINESCENT SEMICONDUCTORS REGARDLESS OF COMPENSATION. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD-427 362
RCA LABS PRINCETON N J

EVAPORATED THIN-FILM DEVICES. (U)

DESCRIPTIVE NOTE: FINAL REPT., 1 JUNE 62-30 SEP 63,
OCT 63 58P BORKAN,H. ;HENRICH,V. E. ;
SHALLCROSS,F. V. ;WAXMAN,A. ;WEIMER,P. K. ;
CONTRACT: AF19 628 1017
PROJ: AF-4608
TASK: 460804
MONITOR: AFCRL 63-529

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:

DESCRIPTORS: (*TRANSISTORS, SEMICONDUCTING FILMS), (*SEMICONDUCTING FILMS, TRANSISTORS), ELECTRIC INSULATION, ELECTRODES, VAPOR PLATING, TELLURIUM, SPACE CHARGES, CADMIUM COMPOUNDS, SULFIDES, SURFACE PROPERTIES, FIXED CONTACTS, DIODES (SEMICONDUCTORS), HALL EFFECT, RESISTANCE (ELECTRICAL), ELECTRIC FIELDS(U)
IDENTIFIERS: THIN FILMS, 1963, FIELD EFFECT TRANSISTORS, CARRIER MOBILITY (U)

RESEARCH CONCERNED THIN-FILM DEVICES WHICH HAD EVAPORATED. THE OPERATING CHARACTERISTICS OF THE INSULATED-GATE THIN-FILM TRANSISTOR (TFT) ARE SHOWN IN GOOD AGREEMENT WITH A SIMPLE FIELD-EFFECT ANALYSIS. A COPLANAR-ELECTRODE TFT STRUCTURE HAS YIELDED IMPROVED PERFORMANCE AND IS SIMPLER TO FABRICATE THAN THE EARLIER STAGGEREDELECTRODE STRUCTURE. A P-TYPE TFT, HAVING EXCELLENT ENHANCEMENT-TYPE CHARACTERISTICS, WAS MADE USING EVAPORATED TELLURIUM AS THE SEMICONDUCTOR. STUDIES OF MOBILITY IN THE SPACE-CHARGE LAYER USING THE TFT AS A RESEARCH TOOL HAVE SHOWN THE EXISTENCE OF BARRIERS BETWEEN CRYSTALLITES IN A POLYCRYSTALLINE CADMIUM SULFIDE FILM. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD-429 412
BARUS RESEARCH LAB OF PHYSICS BROWN UNIV PROVIDENCE R
I

STUDY OF SURFACE PROPERTIES OF ATOMICALLY-CLEAN METALS AND SEMICONDUCTORS. (U)

DESCRIPTIVE NOTE: PROGRESS REPT. NO. 4, 1 JUNE-31 DEC 63.
DEC 63 14P FARNSWORTH,H. E. ;CAMPBELL,B. D. ;
CONTRACT: DA36 039SC89069
PROJ: 3A99 25 001

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:

DESCRIPTORS: (*CADMIUM COMPOUNDS, SURFACE PROPERTIES), (*SEMICONDUCTORS, ELECTRON DIFFRACTION ANALYSIS), CLEANING, SULFIDES, SINGLE CRYSTAL, ETCHED CRYSTALS, ADSORPTION, OXYGEN, HEAT TREATMENT (U)
IDENTIFIERS: 1963 (U)

THE (0001) SURFACES OF CDS WERE EXAMINED BY MEANS OF LOW-ENERGY ELECTRON DIFFRACTION. HEATING THE CDS CRYSTAL IN OXYGEN AT 200C INDUCES ADSORPTION ON THE (0001) SPECULAR SURFACE. THE (0001) MATTE SURFACE OF A HIGH PURITY CDS CRYSTAL WAS EX AMINED. THE RESULTS FOR THIS CRYSTAL SHOWED THE PRESENCE OF SURFACE PLANES IN AGREEMENT WITH THE RESULTS FOR THE SAME FACE OF ANOTHER CDS CRYSTAL WHOSE PURITY WAS UNKNOWN. THE (0001) MATTE SURFACE OF A HIGH PURITY CDS CRYSTAL WAS PREPARED FOR EXAMINATION WITHOUT CHEMICAL ETCH AND WITHOUT EXPOSURE TO TEMPERATURES HIGHER THAN 400C. A WEAK DIFFRACTION PATTERN CHARACTERISTIC OF DIFFRACTION FROM A (0001) PLANE AND CONTAINING HALF INTEGRAL AS WELL AS INTEGRAL ORDER BEAMS IN TWO MAJOR AZIMUTHS WAS OBTAINED IN AGREEMENT WITH THE RESULTS FOR THE (0001) SPECULAR SURFACE. THESE RESULTS SHOW THAT THE CHEMICAL ETCH EXPOSES THE PLANES ON THE MATTE SURFACE. HEATING THE CRYSTAL NEAR 500C IN A VACUUM CAUSED THE APPEARANCE OF PLANES AS IN THE CASE OF THE CHEMICAL ETCH. THUS THE PLANE ON THE MATTE SURFACE IS UNSTABLE UNDER THE CONDITIONS OF CHEMICAL ETCH OR HEAT TREATMENT NEAR 500C IN A VACUUM. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD-431 975
RCA LABS PRINCETON N J

INTERACTIONS OF COHERENT OPTICAL RADIATION WITH SOLIDS. (U)

DESCRIPTIVE NOTE: SEMIANNUAL TECHNICAL SUMMARY REPT., 1 MAY 6331 DEC 63,
DEC 63 37P BRAUNSTEIN,R. ;OCKMAN,N. ;
CONTRACT: NONR412800
PROJ: 306 62

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:

DESCRIPTORS: (*LASERS, INJECTION), (*SOLIDS, OPTICAL PHENOMENA), SEMICONDUCTORS, PHOTONS, EXCITATION, ABSORPTION, CADMIUM COMPOUNDS, SULFIDES, MEASUREMENT, TUNED AMPLIFIERS, LINE SPECTRUM, EMISSIVITY, STRESSES, COMPRESSIVE PROPERTIES, RUBY, DIFFUSION, SELECTION RULES (U)
IDENTIFIERS: 1963, Q-SWITCHING, FREQUENCY TUNING (U)

THE STUDY OF DOUBLE-PHOTON ABSORPTION, HARMONIC GENERATION IN SEMICONDUCTORS, AND THE FREQUENCY TUNING OF INJECTION LASERS BY UNIAXIAL STRESS ARE REPORTED. OBSERVATIONS HAVE BEEN MADE OF THE TWO-PHOTON EXCITATION OF AN ELECTRON FROM THE VALENCE TO THE CONDUCTION BAND IN CDS. THE RADIATIVE RECOMBINATION EMISSION FROM EXCITON AND IMPURITY LEVELS SUBSEQUENT TO THE SIMULTANEOUS ABSORPTION OF TWO QUANTA WAS OBSERVED AS A FUNCTION OF LASER INTENSITY AND COMPARED TO THE EMISSION EXCITED BY SINGLE-QUANTA ABSORPTION FOR PHOTONS. THE FREQUENCY OF A GAAS LASER CAN BE READILY TUNED BY THE APPLICATION OF UNIAXIAL STRESS. ANALYSIS OF THE FREQUENCY CHANGES WITH STRESS OF DIODES PREPARED IN DIFFERENT FASHIONS INDICATES THAT DIFFERENT EMISSION PROCESSES MAY BE TAKING PLACE.
(AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD-432 272
DAVID SARNOFF RESEARCH CENTER PRINCETON N J

SYNTHESIS AND CHARACTERIZATION OF ELECTRONICALLY ACTIVE MATERIALS. (U)

DESCRIPTIVE NOTE: TECHNICAL REPT. NO. 1, 15 MAY 63-15 FEB 64.
MAR 64 156P WEISBERG,L. R. ;LEVERENZ,H. W. ;
CONTRACT: SD182
PROJ: 446

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE;

DESCRIPTORS: (*SEMICONDUCTORS, SOLID STATE PHYSICS), (*CRYSTAL GROWTH, SEMICONDUCTORS), (*SOLID STATE PHYSICS, SEMICONDUCTORS), PHTHALOCYANINES, VAPOR PLATING, SINGLE CRYSTALS, ALUMINUM COMPOUNDS, GALLIUM COMPOUNDS, PHOSPHIDES, ARSENIDES, DIFFUSION, IMPURITIES, ELECTRON BOMBARDMENT, OPTICAL PROPERTIES, BISMUTH ALLOYS, ANTIMONY ALLOYS, TIN ALLOYS, ORGANIC COMPOUNDS, GALLIUM ALLOYS, ARSENIC ALLOYS, INDIUM ALLOYS, PHONONS, CADMIUM COMPOUNDS, SULFIDES, ACOUSTICS, MOLYBDENUM, REFRACTORY MATERIALS, REFRACTORY METALS + ALLOYS, THERMIONIC EMISSION, TUNGSTEN ALLOYS, RHENIUM ALLOYS (U)
IDENTIFIERS: 1964, MICROWAVE ULTRASONICS, GALLIUM ARSENIDE, GALLIUM PHOSPHIDE, CADMIUM SULFIDE, BISMUTH ALLOY-SB-SN, BISMUTH ALLOY-SB, INDIUM ALLOY-SB, TUNGSTEN ALLOY-RE (U)

CONTENTS: RESEARCH ON III-V COMPOUND SEMICONDUCTORS--ALP, GAAS, GAP, AND GAAS-GAP ALLOYS, GROWTH OF GAP FROM THE MELT, REVIEW OF DIFFUSION IN GAAS, ON THE ROLE OF THERMAL SPIKES IN ELECTRON BOMBARDED SEMICONDUCTORS; SEMIMETALS AND LOW BAND-GAP SEMICONDUCTORS; PHONON INTERACTIONS IN SEMICONDUCTORS--III-A MICROWAVE ULTRASONICS, III-B ACOUSTOELECTRIC EFFECTS IN CDS; OPTICAL PROPERTIES OF SEMICONDUCTORS; RESEARCH ON REFRACTORY MATERIALS--V-A ARC-IMAGE FURNACE GROWTH OF REFRACTORY MATERIALS, V-B THERMIONIC EMISSION FROM REFRACTORY METALS. (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD-433 671
GENERAL ELECTRIC CO SYRACUSE N Y

IMPROVED PHOTOCONDUCTORS FOR DISPLAY SWITCHING. (U)

DESCRIPTIVE NOTE: FINAL REPT.,
FEB 64 76P ING,S. ;
CONTRACT: AF30 602 2918
PROJ: 5578
TASK: 557803
MONITOR: RADC TDR63 554

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:

DESCRIPTORS: (*PHOTOELECTRIC CELLS (SEMICONDUCTOR), DISPLAY SYSTEMS), (*SEMICONDUCTORS, PHOTOCONDUCTIVITY), ELECTROLUMINESCENCE, SEMICONDUCTOR DEVICES, SINGLE CRYSTALS, CADMIUM COMPOUNDS, SULFIDES, SELENIDES (U)
IDENTIFIERS: 1964 (U)

RESEARCH AND DEVELOPMENT WORK ON POLYCRYSTALLINE CDSE PHOTOCONDUCTORS FOR (EVENTUAL) SWITCHING OF LARGE ELECTROLUMINESCENT DISPLAYS IS DESCRIBED. A POWDER SINTERING PROCEDURE, FOLLOWED BY EITHER A SPRAY OR A SETTLING TECHNIQUE FOR DEPOSITING THE POWDER ONTO THE SUBSTRATE, WAS USED TO FABRICATE THE PHOTOCONDUCTOR CELLS. THE SETTLING TECHNIQUE WAS FOUND TO BE MORE REPRODUCIBLE, EASIER TO CONTROL AND LESS COSTLY THAN THE SPRAY METHOD. VARIOUS PERTINENT PROCESSING VARIABLES WERE STUDIED INCLUDING THE AMOUNT OF DOPANT AND FLUXING AGENT ADDED, THE SINTERING TEMPERATURE AND TIME, THE CONCENTRATION OF OXYGEN IN THE SINTERING AMBIENT AND THE PARTICLE SIZE. A NUMBER OF MEASUREMENTS WERE MADE IN ORDER TO FULLY CHARACTERIZE THE PHOTOCONDUCTORS, CLARIFY THE ROLE OF VARIOUS PROCESSING VARIABLES AND UNDERSTAND THE MANY ASPECTS OF THE PHOTOCONDUCTIVE PROCESSES. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD-433 894
HP ASSOCIATES PALO ALTO CALIF

INVESTIGATION OF HOT ELECTTON EMITTER. (U)

DESCRIPTIVE NUTE: SCIENTIFIC REPT. NO. 6, 1 SEP-31 DEC 63.
DEC 63 43P
CONTRACT: AF19 628 1637
PROJ: 4608
TASK: 460805
MONITOR: AFCRL 64 134

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:

DESCRIPTORS: (*ELECTRONS, HEAT), (*EMISSIVITY, ELECTRONS), CADMIUM COMPOUNDS, SULFIDES, RESISTANCE (ELECTRICAL), EVAPORATION, GOLD, PLATINUM, VACUUM APPARATUS, SELENIDES, METAL FILMS, SILICON, MEASUREMENTS, HEAT TREATMENT, PHOTOELECTRIC EFFECT (U)
IDENTIFIERS: THIN FILMS, SUBSTRATES (U)

A SUMMARY OF THE WORK ON CDS IS PRESENTED, AND IT IS CONCLUDED THAT RESISTIVITY OF THE EVAPORATED FILMS DOES NOT DEPEND ON THE CONTROLLED EVAPORATION PARAMETERS. IT IS OBSERVED THAT GOLD SUBSTRATES ARE DESTROYED BY THE EVAPORATION OF CDS ONTO A 300 C SUBSTRATE WHEREAS PLATINUM SUBSTRATES ARE NOT. THE EVAPORATION OF CDS HAS BEEN DROPPED IN FAVOR OF CDSE WHICH APPEARS TO BE A MORE REPRODUCIBLE SYSTEM. THE RANGE OF 0.95 EV HOT ELECTRONS IN GOLD FILMS HAS BEEN PHOTOELECTRICALLY DETERMINED TO BE 330 + 30 ANGSTROM UNITS. THIS VALUE IS OBTAINED WITH GOLD FILMS ON CHEMICALLY PREPARED SILICON AS WELL AS SAMPLES CLEAVED IN AN EVAPORATING GOLD STREAM. A DISCUSSION OF THE RANGE MEASUREMENTS IS PRESENTED, AND THIS VALUE OF RANGE IS COMPARED TO THAT MEASURED BY OTHER INVESTIGATORS. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD-435 548
LION (KURT S) BELMONT MASS

INVESTIGATION IN THE FIELD OF IMAGE INTENSIFICATION. (U)

DESCRIPTIVE NOTE: FINAL REPT.,
JAN 64 69P LION,KURT S. ;VANDERSCHMIDT, G. F. ;
CONTRACT: AF19 604 5709
PROJ: 7661
TASK: 76612
MONITOR: AFCRL 64 133

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:

DESCRIPTORS: (*IMAGE INTENSIFIERS (ELECTRONICS), SANDWICH CONSTRUCTION), DESIGN, THEORY, PHOTOGRAPHIC RECORDING SYSTEMS, PHOTOCONDUCTIVITY, CADMIUM COMPOUNDS, SULFIDES, ELECTRICAL PROPERTIES, OPTICAL PROPERTIES, PHOTOGRAPHIC EMULSIONS, ELECTROLUMINESCENCE, PHOSPHORESCENT MATERIALS, PHOTOGRAPHIC IMAGES, SOLID STATE PHYSICS, ELECTRIC FIELDS, GAS DISCHARGES (U)
IDENTIFIERS: 1964 (U)

THE OBJECT OF THIS STUDY IS AN INVESTIGATION OF A SOLID STATE IMAGE INTENSIFIER CONSISTING OF A PHOTOCONDUCTIVE LAYER AND A PHOTOGRAPHIC EMULSION IN AN ELECTRIC FIELD. AN INCIDENT RADIATION PATTERN PRODUCES A LOCAL CONDUCTIVITY OF THE PHOTOCONDUCTIVE LAYER AND CAUSES A CURRENT PATTERN AND A CORRESPONDING BLACKENING IN THE PHOTOGRAPHIC EMULSION. INTENSIFICATION IN EXCESS OF 1000 WERE OBTAINED AT WAVELENGTHS BETWEEN 800 AND 850 MILLIMICRONS. THE RESOLUTION IS OF THE ORDER OF 100 TO 300 MICRONS. THE INTENSIFICATION CAN BE FURTHER IMPROVED BY THE USE OF THIN LAYERS OF DC EXCITED ELECTROLUMINESCENT LAYERS. THE INVESTIGATION SHOWS THAT SEVERAL PHYSICAL EFFECTS CONTRIBUTE TO THE BLACKENING OF THE EMULSION. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD-442 635
RAYTHEON CO WALTHAM MASS

FIELD EFFECT AND SPACE-CHARGE-LIMITED THIN FILM TRIODES. (U)

DESCRIPTIVE NOTE: QUARTERLY REPT. NO. 3, 1 JAN-31 MAR 64,
APR 64 33P BOWE,J. J. ;LAZNOVSKY,W. H. ;SHALLCROSS,F. V. ;WALLMARK,J. T. ;WEIMER,D. K. ;

CONTRACT: DA36 039AMC02374

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:

DESCRIPTORS: (*SEMICONDUCTOR DEVICES, SEMICONDUCTING FILMS), DIELECTRIC FILMS, STABILITY, ELECTRICAL CONDUCTANCE, TRANSISTORS, LIFE EXPECTANCY, ENCAPSULATION, TESTS, TEMPERATURE, SELENIUM, COATINGS, ELECTRODES, CADMIUM COMPOUNDS, SULFIDES, TELLURIUM, MANUFACTURING METHODS, X-RAY DIFFRACTION ANALYSIS, VAPOR PLATING, SURFACE PROPERTIES (U)
IDENTIFIERS: THIN FILMS, THIN FILMS ELECTRONICS, THIN FILM TRIODES (U)

SHELF AND OPERATIONAL LIFE TESTS CONTINUED. VACUUM AND SELENIUM ENCAPSULATED TFT UNITS NOW SHOW A STABILITY EQUIVALENT TO THAT OF GERMANIUM TRANSISTORS. A STUDY HAS BEEN MADE OF VARIOUS PHASES OF INSTABILITY WHICH OCCUR IN ENCAPSULATED THIN-FILM TRANSISTORS WHEN BIAS IS APPLIED. IT HAS BEEN FOUND THAT THE CHANNEL CONDUCTIVITY DECREASES FOR POSITIVE GATE BIAS AND INCREASES FOR NEGATIVE GATE BIAS. A STEADY-STATE CONDUCTIVITY IS REACHED AFTER ABOUT FOUR HOURS AND REMAINS STEADY FOR AS LONG AS 1000 HOURS WHILE BIAS IS APPLIED. AFTER REMOVAL OF THE BIAS, THE CONDUCTIVITY RETURNS TO ITS INITIAL VALUE IN ABOUT 24 HOURS. AT 70 C THE TIME CONSTANTS ARE ABOUT HALF OF THE VALUES AT ROOM TEMPERATURE. THE AMOUNT OF CHANGE VARIES FROM UNIT TO UNIT, BEING LARGER (25 PER CENT AVERAGE) FOR LOW-CONDUCTIVITY UNITS AND NEGLIGIBLE FOR HIGH-CONDUCTIVITY UNITS. RELATED TO THESE INSTABILITIES ARE CHANGES IN CHANNEL CONDUCTIVITY WHICH OCCUR WHEN UNITS ARE HANDLED. THESE ARE ATTRIBUTED TO STATIC DISCHARGES THROUGH THE INSULATOR. A PRELIMINARY COMPARISON (ONE UNIT OPERATED FOR 1000 HOURS) OF EVAPORATED SELENIUM COATING OF THE FINISHED TFT AND VACUUM ENCAPSULATION INDICATES THAT THE FORMER PROCESS MAY BE AS GOOD AS THE LATTER. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD-442 774
GENERAL ELECTRIC CO SYRACUSE N Y

RESEARCH AND DEVELOPMENT FOR FIELD EFFECT TRIODES AND SPACE CHARGE LIMITED TRIODES. (U)

DESCRIPTIVE NOTE: FINAL REPT., 1 JUN 62-31 MAY 63,
MAY 63 70P BLANK,J. M. ;CAHILL,A. E.
;HEINHARTZ,K. K. ;RUSSELL,V. A. ;TANTRAPORN,W.
;
REPT. NO. 4
CONTRACT: DA36 039SC90756
PROJ: 3A99 21 003

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:

DESCRIPTORS: (*TRANSISTORS, ELECTRIC FIELDS), (*ELECTRIC FIELDS, TRANSISTORS), (*SPACE CHARGES, TRANSISTORS), SEMICONDUCTING FILMS, ELECTRICAL CONDUCTANCE, METAL FILMS, DIELECTRIC FILMS, GAIN, POWER, TEMPERATURE, SILICON COMPOUNDS, OXIDES, CADMIUM COMPOUNDS, SULFIDES, ZINC COMPOUNDS, THICKNESS, AGING (MATERIALS), ELECTRODES, CONFIGURATION, ELECTRIC CURRENTS, SANDWICH CONSTRUCTION, MANUFACTURING METHODS, VACUUM, VAPOR PLATING, ELECTRICAL PROPERTIES, FIXED CONTACTS, MOLECULAR BEAMS (U)
IDENTIFIERS: THIN FILMS, FIELDISTORS, SILICON OXIDE, CADMIUM SULFIDE, ZINC OXIDE, SPACE CHARGE LIMITED TRANSISTOR, SUBSTRATES(ELECTRONICS) (U)

RESEARCH CONCERNED THE THEORETICAL INVESTIGATION, DESIGN, AND DEVELOPMENT OF THIN FILM METALDIELECTRIC ACTIVE SOLID STATE ELECTRONIC DEVICE WITH USABLE POWER GAINS THAT ARE RELATIVELY INSENSITIVE TO TEMPERATURE CHANGES. A DETAILED CONDUCTION MECHANISM FOR THIN-FILM FIELD EFFECT TRIODES IS PRESENTED. NEW EXPERIMENTAL FINDINGS WHICH SEEM TO SUBSTANTIATE THE TRAP EMPTYING MECHANISM ARE OUTLINED. THE RESULTS OF EXPERIMENTS IN VARYING SIO AND CDS THICKNESS IN FIELD EFFECT TRIODES AND THEIR EFFECT ON DEVICE PERFORMANCE ARE SHOWN. EFFECTS OF DEVICE AGING AND ELECTRODE CONFIGURATIONS ON DEVICE PERFORMANCE ARE ALSO DISCUSSED. SOME THEORETICAL CONSIDERATIONS FOR OBSERVATION OF SPACE CHARGE LIMITED CURRENT IN CDS FILMS ARE DISCUSSED, THE METHODS OF FABRICATION OF SCL DEVICES ARE PRESENTED. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZ2HT

AD-450 756
RCA LABS PRINCETON N J

INTERACTIONS OF COHERENT OPTICAL RADIATION WITH SOLIDS. (U)

DESCRIPTIVE NOTE: FINAL REPT.,
AUG 64 67P BRUNSTEIN,R. ;OCKMAN,N. ;
CONTRACT: NONR412800
PROJ: 306 62

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:

DESCRIPTORS: (*LIGHT TRANSMISSION, SOLIDS), (*SEMICONDUCTORS, LIGHT), (*SOLID STATE PHYSICS, LASERS), RECOMBINATION REACTIONS, POLARIZATION, DIODES (SEMICONDUCTOR), LASERS, RUBY, PHOTONS, ABSORPTION, SEMICONDUCTOR DEVICES, GALLIUM COMPOUNDS, ARSENIDES, CADMIUM COMPOUNDS, SULFIDES, ALUMINUM COMPOUNDS, NEODYMIUM, CRYSTAL MIXERS, EXCITATION, ANTIMONY ALLOYS, GERMANIUM, PHOSPHIDES, INDIUM COMPOUNDS, ARSENIDES, ABSORPTION, IMPURITIES, QUANTUM MECHANIS, SILICON, CRYSTALS (U)
IDENTIFIERS: 1964 (U)

THE STUDY OF DOUBLE-PHOTON ABSORPTION, HARMONIC GENERATION, AND FREQUENCY-MIXING IN SEMICONDUCTORS, AND THE FREQUENCY TUNING OF INJECTION LASERS BY UNIAXIAL STRESS ARE REPORTED. CALCULATIONS WERE ALSO MADE OF THE CROSS SECTIONS FOR DOUBLE-PHOTON ABSORPTION IN VARIOUS SUBSTANCE. THESE RESULTS INDICATE THAT DOUBLEPHOTON ABSORPTION CAN READILY SET AN INTRINSIC UPPER LIMIT TO THE POWER DENSITY THAT CAN BE TRANSMITTED THROUGH A MEDIUM. MIXING OF THE AXIAL MODES OF BOTH A RUBY AND A ND(3+) GLASS LASER OBSERVED IN SAMPLES OF GE, GAAS, AND SI WHICH WERE SUBJECTED TO AN EXTERNAL DC BIAS FIELD. THE OBSERVED DEPENDENCE OF THE INTENSITY OF THE DIFFERENCE FREQUENCIES ON THE BIAS, EXCITATION INTENSITY. THE EFFECT OF UNIAXIAL STRESS ON THE EMISSION OF GAAS DIODES OPERATING BOTH IN THE LASING AND NONLASING MODES HAVE BEEN STUDIED. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD-451 775
RAYTHEON CO WALTHAM MASS

FIELD-EFFECT AND SPACE-CHARGE-LIMITED INFILM TRIODES. (U)

DESCRIPTIVE NOTE: REPT. NO. 4 (FINAL), 1 JUL 63-30 JUN 64,
JUL 64 86P LAZNOVSKY,W. H. ;SHALLCROSS, F. V. ;WEIMER,P. K. ;WENNIK,L. P. ;
CONTRACT: DA36 039AMC023/4

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTES:

DESCRIPTORS: (*SEMICONDUCTOR DEVICES, SEMICONDUCTING FILMS), VAPOR PLATING, MANUFACTURING METHODS, STABILITY, ELECTRICAL CONDUCTANCE, TRANSISTORS, LIFE EXPECTANCY, ENCAPSULATION, TESTS, TEMPERATURE, ELECTRODES, COATINGS, CADMIUM COMPOUNDS, SULFIDES, TELLURIUM, SURFACE PROPERTIES, SPACE CHARGES (U)
IDENTIFIERS: 1964 (U)

DURING THIS PROGRAM, MATERIALS AND TECHNIQUES WERE STUDIED TO IMPROVE THE REPRODUCIBILITY AND STABILITY OF CDS TFTS, AND TO OBTAIN AN UNDERSTANDING OF THE FAILURE MECHANISMS. EARLY IN THE PROGRAM THE AVERAGE LIFE OF TFTS (AS MEASURED, FOR EXAMPLE, BY THE HALF-LIFE OF THE VALUE OF G SUB M) WAS ON THE ORDER OF DAYS. AT THE CONCLUSION OF THE PROGRAM LIFE HAS BEEN EXTENDED TO OVER A YEAR. THE FALL-OFF IN G SUB M FOR CDS TFTS IS NOW COMPARABLE TO THE DEGRADATION RATE OF GERMANIUM TRANSISTORS WHICH HAVE NOT BEEN AGED. SUCCESS WITH VACUUM-ENCAPSULATED HERMETICALLY SEALED UNITS SHOWS THE SIGNIFICANCE OF ADVERSE AMBIENTS, PARTICULARLY OXYGEN. VITREOUS SELENIUM ENCAPSULATION IS EQUALLY EFFECTIVE, JUDGING FROM EARLY RESULTS OF TESTING. CROWDING OF CHARACTERISTICS IS ASSOCIATED WITH OXIDATION OF CONTACT INTERFACES. A SECOND TYPE OF INSTABILITY-A SHORT TIME VARIATION-WAS STUDIED; THIS IS ASSOCIATED WITH TRAPPED CHARGE AND CHARGE MIGRATION UNDER FIELD. CONTROL OF THIS CALLS FOR CONTROL OF CHARGE INCLUDED IN THE EVAPORATED FILM. RESULTS OF THE PROGRAM SHOW THAT A STABLE TFT MAY BE ACHIEVED BY PROPER FABRICATION AND SEALING. INDICATIOS ARE THAT A POSTFABRICATION AGING PROCESS WOULD YIELD EXTREMELY STABLE DEVICES. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD-455 519
OFFICE OF AEROSPACE RESEARCH ARLINGTON VA

CADMIUM SULFIDE. A HISTORY OF SEMICONDUCTOR RESEARCH AT THE AEROSPACE RESEARCH LABORATORIES. (U)

SEP 64 77P KOMONS,NICK A. I
REPT. NO. 64 11

UNCLASSIFIED REPORT

DESCRIPTORS: (*SEMICONDUCTORS, AIR FORCE RESEARCH), (*AIR FORCE RESEARCH, SEMICONDUCTORS), (*CADMIUM COMPOUNDS, SULFIDES), SEMICONDUCTING FILMS, REVIEWS, SOLAR CELLS, CRYSTALS, CRYSTAL GROWTH, TRANSISTORS, SEMICONDUCTOR DEVICES, RESEARCH PROGRAM ADMINISTRATION, FLUORESCENCE, HISTORY, ATOMIC ENERGY LEVELS, SINGLE CRYSTALS, BIBLIOGRAPHIES, SOLID STATE PHYSICS (U)
IDENTIFIERS: CADMIUM SULFIDE (U)

AN HISTORICAL ACCOUNT IS GIVEN OF ARL'S PROGRAM IN GROUP II-VI COMPOUND SEMICONDUCTORS FROM THE BEGINNING OF THE PROGRAM IN 1951 TO THE PRESENT. STUDIES RELATING TO THE ELECTRICAL AND OPTICAL PROPERTIES OF CADMIUM SULFIDE ARE EMPHASIZED. THE STORY IS TOLD IN THE CHANGING CONTEXT OF AIR FORCE RESEARCH. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD-455 972
RCA LABS PRINCETON N J

THIN-FILM POLYCRYSTALLINE FIELD-EFFECT TRIODE. (U)

DESCRIPTIVE NOTE: QUARTERLY REPT. NO. 1, 1 JUL-30 SEP 64,
JAN 65 37P WEIMER,P. K. ;BROWN,J. J. ;
FRANTZ,V. L. ;LAZNOVSKY,W. H. ;SCHELHORN,R. L.
;
CONTRACT: DA28 043AMC00231E

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:

DESCRIPTORS: (*TRIODES, ARMY RESEARCH), SEMICONDUCTING FILMS, CADMIUM COMPOUNDS, SULFIDES, ELECTRICAL PROPERTIES, IMPURITIES, INDIUM COMPOUNDS, ANTIMONY ALLOYS, TRANSISTORS, MANUFACTURING METHODS, CRYSTAL STRUCTURE, CRYSTAL SUBSTRUCTURE, CRYSTAL LATTICE DEFECTS, ELECTRON DIFFRACTION ANALYSIS, HALL EFFECT (U)
IDENTIFIERS: THIN FILMS (U)

THE MICROSTRUCTURE AND ELECTRICAL CHARACTERISTICS OF CADMIUM SULFIDE FILMS WERE STUDIED AS A FUNCTION OF SUBSTRATE TEMPERATURE, FILM THICKNESS, AND DEPOSITION RATE. PHYSICAL FACTORS WHICH WERE EXAMINED INCLUDED FILM STRESS, FILM ROUGHNESS, CRYSTALLITE SIZE, AND DEGREE OF PREFERRED ORIENTATION. ELECTRICAL PROPERTIES STUDIED INCLUDED HALL MOBILITY, RESISTIVITY, AND PERFORMANCE IN TFT STRUCTURES. A SIMPLE ELECTRICAL METHOD OF MEASURING THE SEMICONDUCTOR DOPING DENSITY IN THIN-FILM STRUCTURES WAS DEVISED. TFT'S USING INDIUM ANTIMONIDE FILMS AS THE SEMICONDUCTOR WERE SHOWN TO OPERATE BY FIELD-EFFECT CONTROL OF EITHER ELECTRONS OR HOLES. CADMIUM SELENIDE TFT'S HAVING GOOD PERFORMANCE WERE PREPARED BY EVAPORATION OF ALL CONSTITUENTS IN A SINGLE VACUUM UPON A SUBSTRATE HELD AT ROOM TEMPERATURE. FABRICATION FACILITIES WERE CONSTRUCTED FOR PRODUCING TWELVE TFT'S ON ONE SUBSTRATE WITH AN EVAPORATED OVERCOAT AND UNDERCOAT TO IMPROVE UNIFORMITY AND LIFE. A 0.2-MIL WIRE MASK IN CONTACT WITH THE GLASS IS EXPECTED TO PRODUCE SMALLER SOURCE-DRAIN SPACING AND HIGHER PERFORMANCE THAN HAS BEEN OBTAINED PREVIOUSLY. A TEST FACILITY WAS CONSTRUCTED FOR LIFE-TESTING A GROUP OF 14 TFT'S UNDER VARIOUS CONDITIONS. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD-459 964
LIBRARY OF CONGRESS WASHINGTON D C AEROSPACE TECHNOLOGY DIV

RADIATION DAMAGE IN SOLIDS. COMPILATION OF ABSTRACTS. (U)

DESCRIPTIVE NOTE: SURVEYS OF SOVIET-BLOC SCIENTIFIC AND TECHNICAL LITERATURE.
MAY 64 90P
REPT. NO. AID-U-64-43

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:

DESCRIPTORS: (*SEMICONDUCTORS, RADIATION DAMAGE), (*SOLID STATE PHYSICS, BIBLIOGRAPHIES), USSR, THEORY, GERMANIUM, SILICON, CADMIUM COMPOUNDS, INDIUM COMPOUNDS, CRYSTALS, HALIDES, TITANATES, ABSTRACTING, POLYMERS, GLASS, MAGNESIUM, ZINC, SELENIDES, SULFIDES, ANTIMONY ALLOYS, DIELECTRIC PROPERTIES (U)

THIS IS A COMPILATION OF SCIENTIFIC PAPERS ON THE SUBJECT OF RADIATION DAMAGE IN SOLIDS PUBLISHED IN THE PERIODICAL FIZIKA TVERDOGO TELA (SOLID STATE PHYSICS), DURING THE PERIOD FROM JANUARY 1961 TO NOVEMBER 1963. THE REPORT IS DIVIDED INTO FOUR SECTIONS: SEMICONDUCTORS, SILICON, GERMANIUM, CADMIUM SULFIDE, AND CADMIUM SELENIDE AND INDIUM ANTIMONIDE, IONIC CRYSTALS (EXCLUDING SEMICONDUCTORS) ALKALI HALIDES, AND MAGNESIUM AND ZINC TITANATES; OTHER MATERIALS (COVALENT SUBSTANCES INCLUDING POLYMERS, GLASSES, ROCHELLE SALT,...)] AND PURELY THEORETICAL SUBJECTS. WITHIN EACH SECTION OR SUBSECTION THE PAPERS ARE ARRANGED CHRONOLOGICALLY STARTING WITH THE EARLIEST PUBLISHED ARTICLES. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD-467 489
STANFORD UNIV CALIF STANFORD ELECTRONICS LABS

SURFACE STATES AND BARRIER HEIGHT IN METAL-SEMICONDUCTOR SURFACE BARRIER DIODES. (U)

DESCRIPTIVE NOTE: TECHNICAL REPT.,
MAY 65 18/P COWLEY,A. M. ;
REPT. NO. TR-0414-1 ,SU-SEL-65-051
CONTRACT: NONR22583
PROJ: NR373 360

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:

DESCRIPTORS: (*DIODES(SEMICONDUCTOR), SURFACE PROPERTIES), METALS, ELECTRONS, ENERGY, EXCITATION, ATOMIC ENERGY LEVELS, GALLIUM ALLOYS, PHOSPHORUS ALLOYS, THEORY, STATIC ELECTRICITY, MATHEMATICAL ANALYSES, DIFFUSION, EMISSIVITY, JOINTS, CRYSTALS, DISTRIBUTION, ELECTRON DENSITY, ELECTRICAL PROPERTIES, EXPERIMENTAL DATA, SILICON, CADMIUM COMPOUNDS, SULFIDE, ARSENIC ALLOYS (U)
IDENTIFIERS: FERINI LEVEL, JUNCTION (SEMICONDUCTORS), BARRIER LAYERS, MOS JUNCTION, CONDUCTION BOND, SUBSTRATE, PHOTOTHRESHOLD (U)

METAL-SEMICONDUCTOR SURFACE BARRIER DIODES WERE INVESTIGATED FROM THE STANDPOINT OF THE MECHANISM FOR THE FORMATION OF THE POTENTIAL BARRIER AT THE METAL-SEMICONDUCTOR INTERFACE AND THE MEASUREMENT OF THE BARRIER HEIGHT. THE DEPENDENCE OF THE BARRIER HEIGHT OF METAL-SEMICONDUCTOR SYSTEMS UPON THE METAL WORK FUNCTION WAS DERIVED WITH THE FOLLOWING ASSUMPTIONS: (1) THE CONTACT BETWEEN THE METAL AND THE SEMICONDUCTOR HAS AN INTERFACIAL LAYER OF THE ORDER OF ATOMIC DIMENSIONS; IT WAS FURTHER ASSUMED THAT THIS LAYER IS TRANSPARENT TO ELECTRONS WITH ENERGY GREATER THAN THE POTENTIAL BARRIER, BUT CAN WITHSTAND POTENTIAL ACROSS IT. (2) THE SURFACE STATE DENSITY (PER UNIT AREA PER ELECTRON VOLT) AT THE INTERFACE IS A PROPERTY ONLY OF THE SEMICONDUCTOR SURFACE AND IS INDEPENDENT OF THE METAL. SEVERAL MODELS FOR DESCRIBING THE BIAS BEHAVIOR OF THE MOS STRUCTURE WITH SURFACE STATES ARE ALSO DISCUSSED.

(U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD-475 206 9/1
CLEVITE CORP CLEVELAND OHIO ELECTRONIC RESEARCH DIV

FERROMAGNETIC, FERROELECTRIC AND ACOUSTIC DEVICES. (U)

DESCRIPTIVE NOTE: QUARTERLY REPT. NO. 1, 1 JUN-31 AUG 65,
SEP 65 37P SLIKER,T. R. I
CONTRACT: DA-28-043-AMC-01359(E)
PROJ: DA-1P622001A055
TASK: 1P622001A05504
MONITOR: ECOM 01359-1-TR

UNCLASSIFIED REPORT

DESCRIPTORS: (*DELAY LINES, ARMY RESEARCH), PIEZOELECTRIC CRYSTALS, SEMICONDUCTORS, CADMIUM COMPOUNDS, SULFIDES, SEMICONDUCTING FILMS, FERROMAGNETISM, FERROELECTRICITY, PIEZOELECTRIC TRANSDUCERS, CADMIUM ALLOYS, SELENIUM ALLOYS, ELECTRICAL IMPEDANCE, ULTRASONIC RADIATION (U)
IDENTIFIERS: EQUIVALENT CIRCUITS (U)

THIS WORK BEING CARRIED OUT UNDER THIS CONTRACT IS AIMED AT THE DEVELOPMENT OF ULTRASONIC DELAY LINES WHICH UTILIZE PIEZOELECTRIC SEMICONDUCTORS. TO THIS END THE UNDERSTANDING OF CDS FILM-FUSED SILICA DELAY LINES WAS SIGNIFICANTLY INCREASED DURING THE FIRST QUARTER. CALCULATION SHOWED THAT CROSS COUPLING EFFECTS BETWEEN LONGITUDINAL AND SHEAR MODES WILL BE RELATIVELY SMALL. IT WAS FOUND THAT FOR CERTAIN ANGLES OF THE C-AXIS WITH RESPECT TO THE ELECTRODES THE GENERATION OF SHEAR WAVES IS MAXIMIZED RELATIVE TO THE GENERATION OF LONGITUDINAL WAVES. AN EQUIVALENT CIRCUIT WAS DERIVED FROM THE BASIC PIEZOELECTRIC EQUATIONS. WITH THIS IT WAS SHOWN THAT THE MIDBAND LOSS CAN IN THEORY BE ZERO. ALSO IT WAS FOUND THAT THE INPUT IMPEDANCE CAN BE MADE TO MATCH COMMONLY AVAILABLE COAXIAL LINES. PRELIMINARY EXPERIMENTAL WORK PRODUCED CDS FILMS OF HIGH RESISTIVITY AND GOOD ADHERENCE. IT WAS FOUND THAT THE DEGREE OF ORIENTATION OF THE CDS FILMS WAS DEPENDENT ON THE KIND OF METAL USED FOR THE BASE ELECTRODE. GOOD PROGRESS WAS MADE ON A SUBSTRATE HOLDER AND THREE POSITION MASK CHANGER WHICH WILL INCORPORATE A QUARTZ CRYSTAL MICROBALANCE. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD-601 459
HARSHAW CHEMICAL CO CLEVELAND OHIO

INVESTIGATION OF THIN FILM CADMIUM SULFIDE SOLAR CELLS. (U)

DESCRIPTIVE NOTE: QUARTERLY TECHNICAL PROGRESS REPT. NO. 2, 25 FEB-25 MAY 64
MAY 64 46P SCHAEFER,J. C. ;HUMRICK,R. J. ;BELT,R. F. ;
CONTRACT: AF33 615 1248
PROJ: 8173
TASK: 81301, 817332

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:

DESCRIPTORS: (*SOLAR CELLS, FILMS), (*CADMIUM COMPOUNDS, SULFIDES), VAPOR PLATING, VACUUM APPARATUS, SINGLE CRYSTALS, TITANIUM, COPPER COMPOUNDS, CHLORIDES, INDIUM, MOLYBDENUM, SILICON COMPOUNDS, MONOXIDES, SURFACE PROPERTIES, ENERGY CONVERSION, EFFECTIVENESS (U)
IDENTIFIERS: THIN FILMS (U)

CONSIDERABLE EMPHASIS HAS BEEN PLACED ON THE DEVELOPMENT OF THE CHEMIPLATED OR IMMERSION TECHNIQUE FOR THE BARRIER FORMATION. GAINS OF ABOUT 40% IN CONVERSION EFFICIENCY HAVE BEEN REALIZED OVER THE STANDARD EFFICIENCY OF 2.5%. LIGHTER WEIGHT SOLAR CELLS HAVE BEEN FABRICATED ON TITANIUM SUBSTRATES WITH HIGH POWER TO WEIGHT RATIOS. SOLAR CELLS USING H-FILM AS THE SUBSTRATE MATERIAL HAVE BEEN MADE WITH EFFICIENCIES OF OVER 4% AND POWER TO WEIGHT RATIOS GREATER THAN 40. THE VACUUM DEPOSITION OF CDS ON SINGLE CRYSTAL CDS HAS BEEN PERFORMED TO STUDY EFFECTS OF SUBSTRATE PERFECTION ON THE QUALITY OF THE FILM. SOLID STATE REACTIONS OF CUCL AND CDS WERE INVESTIGATED IN ORDER TO PREPARE MORE EFFECTIVE BARRIERS. INDIUM PLATED MO SUBSTRATES WERE UTILIZED TO PROVIDE OHMIC CONTACTS AT THE CDS SUBSTRATE INTERFACE. SPECTRAL RESPONSE OF ELECTROPLATED AND CHEMIPLATED CELLS AS A FUNCTION OF TIME SHOWS THAT THE LATTER APPEAR TO BE MORE STABLE IN ORDINARY AMBIENTS. THE USE OF SIO THIN FILMS ON THE TOP SURFACE OF THE CELLS HAS LED TO A MORE STABLE CELL IN THE PRESENCE OF WATER VAPOR. OPTICAL STUDIES ON THE CHEMIPLATED BARRIER LAYER HAVE CONFIRMED A CU2-XS COMPOUND OF A THICKNESS OF ABOUT 1800A AND EXHIBITING FREE CARRIER ABSORPTION. (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD-601 566
MOTOROLA INC PHOENIX ARIZ

MICROWAVE ACOUSTIC DELAY LINE AND RELATED ACTIVE DEVICES. (U)

DESCRIPTIVE NOTE: QUARTERLY PROGRESS REPT. NO. 2, 17 AUG-17 NOV 63,
MAR 64 79P HICKERNELL,F. ;BRENDECKE,W. ;MEDINA,M. ;
CONTRACT: AF30 602 3076
PROJ: 5578
TASK: 557802
MONITOR: RADC TDR64 22

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTES:

DESCRIPTORS: (*MICROWAVE EQUIPMENT, DELAY LINES), (*DELAY LINES, ACOUSTIC EQUIPMENT, SEMICONDUCTORS, SOLID STATE PHYSICS, ACOUSTICS, SINGLE CRYSTALS, CADMIUM COMPOUNDS, SULFIDES, VERY HIGH FREQUENCY, HIGH FREQUENCY, QUARTZ, ELECTROACOUSTIC TRANSDUCERS, PHONONS, ULTRASONIC PROPERTIES, HALL EFFECT, PIEZOELECTRIC EFFECT, GAIN, MANUFACTURING METHODS, AMPLIFIERS, RESISTANCE (ELECTRICAL) (U)

PRIMARILY EXPERIMENTAL EFFORTS DURING THIS PERIOD HAVE PRODUCED 60 MC CDS AMPLIFIERS WITH 40 DB NET ELECTRICAL GAIN AND 120 DB/CM GAIN VALUES, WITH POWER OUTPUT LEVELS OF 20 MW. BROADBAND, 60 MC, DIFFUSED SURFACE-TRANSDUCERS IN CDS HAVE BEEN MADE WITH LESS THAN 12 DB LOSSES, AND QUARTZ TRANSDUCER LOSSES AT 60 MC HAVE BEEN REDUCED BELOW 3 DB. ELECTRICALLY TUNABLE MILLIHENRY INDUCTANCES WITH Q GREATER THAN 10 AND HALL EFFECT, NON-RECIPROCAL NEGATIVE RESISTANCE CIRCUITS OPERATING OVER A 30:1 FREQUENCY RANGE ARE DESCRIBED ALONG WITH METHODS FOR ACHIEVING LOW TEMPERATURE OHMIC CONTACTS TO CDS CRYSTALS. THESE RESULTS REPRESENT MAJOR PROGRESS TOWARD THE OBJECTIVE OF COMPLEX FUNCTIONAL ELECTRONIC CIRCUITS IN SINGLE CRYSTAL STRUCTURES WITHOUT DISCRETE ELEMENTS OR INTERCONNECTIONS. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD-602 212
STANFORD UNIV CALIF STANFORD ELECTRONICS LABS

OPTICAL SECOND-HARMONIC GENERATION IN SEMICONDUCTOR ALLOYS. (U)

DESCRIPTIVE NOTE: INTERIM REPT. FOR JAN 62-DEC 63,
DEC 63 102P SOREF,R. A. ;
REPT. NO. SEL-TR0556-8, 63-145
CONTRACT: AF 33(657)-11144, NSG-331
PROJ: 4036
TASK: 403602
MONITOR: AFAL TDR64 78

UNCLASSIFIED REPORT

DESCRIPTORS: (*SEMICONDUCTORS, OPTICAL PROPERTIES), ABSORPTION SPECTRUM, CRYSTAL LATTICES, ZINC COMPOUNDS, SULFIDES, CADMIUM COMPOUNDS, SELENIDES, SINGLE CRYSTALS, GALLIUM COMPOUNDS, LIGHT, ELECTROMAGNETIC WAVES, QUANTUM MECHANICS, PHOTONS, CADMIUM ALLOYS, LASERS, POLARIZATION, ARSENIDES, PROPAGATION, WAVE FUNCTIONS, GALLIUM ALLOYS, CRYSTAL STRUCTURE, MATHEMATICAL MODELS, TELLURIDES, PHOSPHIDES (U)
IDENTIFIERS: WURTZITE (U)

OPTICAL SECOND-HARMONIC GENERATION IN SEMICONDUCTORS HAS BEEN STUDIED EXPERIMENTALLY AND THEORETICALLY TO LEARN HOW ENERGY-BAND STRUCTURE AND LATTICE SYMMETRY INFLUENCE THE EFFICIENCY OF HARMONIC CONVERSION. USING A PULSED ND3+: GLASS LASER, HARMONIC GENERATION WAS MEASURED AS A FUNCTION OF ALLOY COMPOSITION IN WURTZITE ZNS-CDS AND CDS-CDSE MONOCRYSTALS TO DETERMINE THE EFFECT OF SETTING THE ENERGY GAP AT VALUES EITHER GREATER OR LESS THAN THE HARMONIC PHOTON ENERGY. IN THE CDS-CDSE SERIES, THE HARMONIC RADIATION WAS READILY OBSERVABLE DESPITE THE STRONG ABSORPTION OF HARMONIC LIGHT. THE INFLUENCE OF LATTICE SYMMETRY WAS STUDIED BY COMPARING HARMONIC GENERATION IN ZINC-BLENDE AND WURTZITE SEMICONDUCTORS HAVING SIMILAR ENERGY GAPS, NAMELY ZNSE, ZNTE, GAP, GAAS, CDS, CDSE, CUBIC ZNS, AND HEXAGONAL ZNS. IT WAS FOUND THAT THE LATTICE STRUCTURE HAD LESS EFFECT UPON THE MAGNITUDE OF THESE SUSCEPTIBILITY-TENSOR COMPONENTS THAN THE BAND STRUCTURE. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD-602 482
TEXAS INSTRUMENTS INC DALLAS

MATERIAL PROCESSING AND PHENOMENA INVESTIGATION OF FUNCTIONAL ELECTRONIC BLOCKS. (U)

DESCRIPTIVE NOTE: FINAL REPT. SEP 62-AUG 63,
JUL 64 217P JOHNSON,ROWLAND E. I
REPT. NO. TI-08-64-62
CONTRACT: AF 33(657)-9196
PROJ: AF-4159
TASK: 41509
MONITOR: AFAL TDR-64-135

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:

DESCRIPTORS: (*EPITAXIAL GROWTH, SEMICONDUCTING FILMS), (*SEMICONDUCTORS, MOLECULAR ELECTRONICS), (*MOLECULAR ELECTRONICS, SEMICONDUCTORS), GALLIUM ALLOYS, ARSENIC ALLOYS, PHOSPHORUS ALLOYS, CADMIUM COMPOUNDS, SULFIDES, CHEMICAL ELEMENTS, INTERMETALLIC COMPOUNDS, VAPOR PLATING, DIFFUSION, TRANSPORT PROPERTIES, ELECTRIC DISCHARGES, CRYSTAL GROWTH, SURFACE PROPERTIES, PHOTOELECTRIC MATERIALS, PHOTOSENSITIVITY, PHOTOELECTRONS, DIODES (SEMICONDUCTOR), SEMICONDUCTOR DEVICES, MANUFACTURING METHODS, IMPURITIES, SILICON (U)
IDENTIFIERS: FUNCTIONAL ELECTRONIC BLOCKS, THREE DIMENSIONAL ARRAYS, EPITAXIAL DIFFUSION (U)

CONTENTS: HIGH RESISTIVITY GAAS AND DEPOSITION ON GAAS TECHNOLOGY OF THREE-DIMENSIONAL ARRAYS, INVESTIGATION OF PHENOMENA IN II-VI COMPOUNDS, GAP AND GAASXP (1-X) IN EPITAXIAL DEVICES. (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD-603 075
DELAWARE UNIV NEWARK

ELECTRO-OPTICAL METHOD FOR INVESTIGATION OF FIELD AND CURRENT DISTRIBUTIONS IN SEMICONDUCTORS AND LAYER-LIKE FIELD DISTRIBUTIONS IN PHOTOCONDUCTORS. (U)

DESCRIPTIVE NOTE: PROGRESS REPT. NO. 1, 15 NOV 63-30 JUN 64,
JUN 64 6P BOER,K. W. ;
CONTRACT: NONR 6000(46) 63

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:

DESCRIPTORS: (*SEMICONDUCTORS, SINGLE CRYSTALS), (*PHOTOELECTRIC MATERIALS, SINGLE CRYSTALS), (*SINGLE CRYSTALS, CRYSTAL GROWTH), CADMIUM COMPOUNDS, SULFIDES, ELECTROLUMINESCENCE, CRYSTAL HOLDERS, EXCITATION, DISTRIBUTION, TEST FACILITIES (U)
IDENTIFIERS: ELECTRO-OPTIC EFFECT, CADMIUM SULFIDE (U)

ELECTRO-OPTICAL METHOD FOR INVESTIGATION OF FIELD AND CURRENT DISTRIBUTIONS IN SEMICONDUCTORS ANDLAYER-LIKE FIELD DISTRIBUTIONS IN PHOTOCONDUCTORS.

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD-603 379
DAYTON UNIV OHIO RESEARCH INST

OPTICAL PROPERTIES OF SEMICONDUCTING CRYSTALS, (U)

DESCRIPTIVE NOTE: FINAL REPT., 15 NOV 60-30 APR 64,
JUN 64 54P RAMBAUSKE,WERNER R. ;
CONTRACT: AF33 616 7500
PROJ: 7885
TASK: 788503
MONITOR: ARL , 64 98

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:

DESCRIPTORS: (*SEMICONDUCTORS, OPTICAL PROPERTIES), (*CRYSTALS, OPTICAL PROPERTIES), CADMIUM COMPOUNDS, ZINC COMPOUNDS, SELENIDES, SULFIDES, EMISSIVITY, ABSORPTION, IMPURITIES, TEMPERATURE, PRESSURE, MAGNETIC FIELDS, ELECTRICAL FIELDS (U)
IDENTIFIERS: CADMIUM SELENIDE, CADMIUM SULFIDE, ZINC SELENIDE, ZINC SULFIDE (U)

AN EXTENDED PROGRAM ABOUT OPTICAL PROPERTIES OF SOME SELECTED SEMICONDUCTING CRYSTALS UNDER VARIED CONDITIONS OF TEMPERATURE, PRESSURE, MAGNETIC AND ELECTRIC FIELDS, MEANS OF EXCITATION, AND INFLUENCE OF IMPURITIES IS BRIEFLY SUMMARIZED. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD-603 391
FOREIGN TECHNOLOGY DIV WRIGHT-PATTERSON AFB OHIO

METHOD OF CONTACTLESS INVESTIGATING ELECTRICAL CONDUCTION OF CADMIUM SULFIDE TYPE SEMI-CONDUCTORS, (U)

JUL 64 14P KYNEV,S. ;SHEINKMAN,M. ; FURSENKO,V. ;
REPT. NO. FTD-TT-64-155

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: UNEDITED ROUGH DRAFT TRANS. OF BULGARSKA AKADEMIYA NA NAUKITE. FIZICHESKI INSTITUT. IZVESTIYA, 1962, V. 10, NO. 2. P. 29-36.

DESCRIPTORS: (*PHOTOSENSITIVITY, SINGLE CRYSTALS), (*SEMICONDUCTORS, PHOTOCONDUCTIVITY), (*SINGLE CRYSTALS, PHOTOELECTRIC EFFECT), ELECTRICAL CONDUCTANCE, DIELECTRIC PROPERTIES, ELECTRODES, GENERATORS, MEASUREMENT, HIGH FREQUENCY, CADMIUM COMPOUNDS, SULFIDES, BULGARIA (U)
IDENTIFIERS: CADMIUM SULFIDE (U)

INVESTIGATIONS OF LOCAL PHOTOSENSITIVITY ON CDS-MONOCRYSTALS WERE CARRIED OUT BY THREE METHODS: A) WITH THE AID OF A GENERATOR THE RELATIVE PHOTOSENSITIVITY ALONG THE LENGTH OF THE CRYSTAL WAS MEASURED; B) BY AN ORDINARY METHOD WITH CONSTANT VOLTAGE; C) SIMILARLY WITH THE CONSTANT VOLTAGE, THE ELECTRODES WERE APPLIED OVER THE ENTIRE LENGTH OF THE CRYSTAL. LOCAL MEASUREMENTS WITH THE HIGH FREQUENCY GENERATOR OFFERED PRACTICALLY TRUE RESULTS, JUST AS BY DIRECTLY MEASURING THE CURRENT AND LARGE NUMBER OF ELECTRODES. THE LOCALLY MEASURED PROPERTIES, BY MEANS OF THE THIRD METHOD, DID NOT LEAD TO SATISFACTORY RESULTS. (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD-603 490
LOUVAIN UNIV (BELGIUM)

PHOTO-MAGNETIC-ELECTRIC STUDY OF CDS CRYSTALS. TRANSPORT PROPERTIES OF BISMUTH ROLLED THIN FOILS. (U)

DESCRIPTIVE NOTE: FINAL REPT. FOR 15 NOV 58-31 DEC 63,

APR 64 93P LUYCKX,ANDRE ;VANDEWAUWER, JEAN ;ISSI,JEAN-PAUL ;LONTIE,GUY ;STOWUART, JACWUES ;

CONTRACT: AF61 052 166
MONITOR: RADC , TDR64 349

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:

DESCRIPTORS: (*SEMICONDUCTORS, SINGLE CRYSTALS), (*SINGLE CRYSTALS, SEMICONDUCTORS), (*BISMUTH, TRANSPORT PROPERTIES), (*FOILS, BISMUTH), CADMIUM COMPOUNDS, SULFIDES, PHOTOCONDUCTIVITY, CRYSTAL GROWTH, ELECTROLYSIS, ABSORPTION, GASES, POLARIZATION, RESISTANCE (ELECTRICAL), THERMOELECTRICITY, MAGNETIC PROPERTIES, COLD WORKING, INFRARED RADIATION, ROLLING (METALLURGY), HEAT TREATMENT, HALL EFFECT, PHOTOELECTRIC EFFECT, ELECTROLUMINESCENCE, ELECTROMAGNETIC PROPERTI (U)

PHOTO-MAGNETO-ELECTRIC PHENOMENA IN CDS SINGLE CRYSTALS ARE INTERPRETED BY PHOTOPOLARIZATION. HIGH FREQUENCY FORMING OF CDS IS INTERPRETED BY SOLID REVERSIBLE ELECTROLYSIS. PHOTOVOLTAGES AND ADSORBED GASES. STUDY OF PHOTOCURRENTS INDUCED BY POST-IRRADIATION INFRARED QUENCHING WAVELENGTHS. TRANSPORT PROPERTIES OF BISMUTH ROLLED THIN FOILS AT 80 AND 295 K, RESISTIVITY, THERMOELECTRIC POWER, MAGNETORESISTANCE, HALL CONSTANT, MAGNETO-SEEBECK COEFFICIENT, ARE COMPARED WITH THE SIMILAR PROPERTIES OF UNDEFORMED SAMPLES. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD-603 521
GENERAL ELECTRIC CO SYRACUSE N Y

RESEARCH ON MICROWAVE INTERACTIONS IN SEMICONDUCTORS. (U)

DESCRIPTIVE NOTE: QUARTERLY REPT. NO. 4, DEC 63 60P ALDRICH,R. W. ;BOYD,C. R. ; DIETZ,J. P. ;WANUGA,S. ;
CONTRACT: AF33 657 10088

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:

DESCRIPTORS: (*AUDIO AMPLIFIERS, SEMICONDUCTOR DEVICES), (*PHASE SHIFTERS, WAVEGUIDES), (*SEMICONDUCTORS, PIEZOELECTRIC CRYSTALS), MICROWAVE AMPLIFIERS, PULSE AMPLIFIERS, DIODES (SEMICONDUCTOR), SINGLE CRYSTALS, SILICON, CADMIUM COMPOUNDS, SULFIDES, TRANSDUCERS, ULTRASONIC RADIATION (U)
IDENTIFIERS: CADMIUM SULFIDE (U)

THE FIRST TASK WAS TO DEVELOP THREE INCH LONG P-N JUNCTIONS IN SINGLE CRYSTAL SILICON WHICH COULD BE INCORPORATED IN WAVEGUIDES AS ACTIVE PHASE-SHIFTING ELEMENTS FOR MEASUREMENT PURPOSES. RECENT ADVANCES IN THE FIELD OF ULTRASONICS HAVE PRODUCED DIRECT OBSERVATION OF ELECTRONPHONON INTERACTION IN PIEZOELECTRIC SEMICONDUCTORS. THE MOST IMPORTANT DEVICE TO EMERGE FROM THIS WORK IS THE ULTRASONIC PIEZOELECTRIC SEMICONDUCTOR AMPLIFIER. IN THIS DEVICE, WHEN THE DRIFT VELOCITY OF CONDUCTION ELECTRONS IN A PIEZOELECTRIC SEMICONDUCTING CRYSTAL EXCEEDS THE VELOCITY OF AN ACOUSTIC WAVE TRAVELING IN THE SAME DIRECTION, ENERGY IS TRANSFERRED FROM THE ELECTRONS TO THE ACOUSTIC WAVE SUCH THAT ACOUSTIC AMPLIFICATION TAKES PLACE. A SHEAR WAVE CDS AMPLIFIER CENTERED AT 48.5 MEGACYCLES SHOWED 23 DB INSERTION GAIN OPERATING IN PULSED CONDITION. RELATED EXPERIMENTAL DATA OBSERVED IN THIS AMPLIFIER SUCH AS GAIN SATURATION AND LIMITER ACTION ARE GIVEN. PARTS OF THE AMPLIFIER STRUCTURES SUCH AS TRANSDUCERS, BONDS, AND CONTACTS ARE DISCUSSED AS WELL AS EXPERIMENTAL MEASUREMENTS ON OTHER AMPLIFIER STRUCTURES. (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD-603 604
AIR FORCE INST OF TECH WRIGHT-PATTERSON AFB OHIO

HOMOGENEITY OF CADMIUM SELENIDE-CADMIUM SULFIDE SOLID SOLUTIONS BY X-RAY FLUORESCENCE. (U)

DESCRIPTIVE NOTE: MASTER'S THESIS,
AUG 64 135P BROOKS,DONALD ARTHUR ;
MONITOR: AFIT , NE/PHYS/64 4

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:

DESCRIPTORS: (*CADMIUM COMPOUNDS, FLUORESCENCE), (*SOLID SOLUTIONS, CADMIUM COMPOUNDS), SELENIDES, SULFIDES, SINGLE CRYSTALS, X-RAY SPECTROSCOPY, CRYSTAL GROWTH, SEMICONDUCTORS (U)
IDENTIFIERS: CADMIUM SELENIDE, CADMIUM SULFIDE (U)

THE HOMOGENEITY OF CADMIUM SELENIDE-CADMIUM SULFIDE SOLID SOLUTIONS WAS INVESTIGATED BY THE X-RAY FLUORESCENCE METHOD. BOTH 'AS GROWN' OR ASSUMED HOMOGENEOUS CRYSTALS AND PURPOSELY MANUFACTURED NON-HOMOGENEOUS CRYSTALS WERE USED. IT WAS CONCLUDED FROM THE X-RAY FLUORESCENCE ANALYSIS OF STANDARDS THAT ANY RESULTS WITHIN 3% OF EACH OTHER WERE DUE TO STATISTICAL VARIATIONS, BUT RESULTS WITH DEVIATIONS GREATER THAN 3% WERE DUE TO THE COMPOSITION CHANGE WITHIN THE CRYSTAL. THE HOMOGENEITY OF FOUR ASSUMED HOMOGENEOUS AND FOUR NON-HOMOGENEOUS CRYSTALS WAS EXAMINED BY SCANNING THE CRYSTALS WITH STATIONARY COLLIMATORS OF SMALL APERTURE. THE ASSUMED HOMOGENEOUS CRYSTALS SHOWED RESULTS WITHIN 3% THEREFORE THEY WERE CONSIDERED HOMOGENEOUS, BUT THE PURPOSELY MANUFACTURED NON-HOMOGENEOUS CRYSTALS WERE FOUND TO BE TRUELY NONHOMOGENEOUS. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD-603 611
AIR FORCE INST OF TECH WRIGHT-PATTERSON AFB OHIO

ACOUSTIC AMPLIFICATION AND ELECTRON MOBILITY IN LITHIUM AND SODIUM DOPED CADMIUM SULFIDE. (U)

DESCRIPTIVE NOTE: MASTER'S THESIS,
JUN 64 82P HUBBARD,JOHN ALLEN I
MONITOR: AFIT , GNE/PHYS/64 11

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:

DESCRIPTORS: (*IMPURITIES, SEMICONDUCTORS), (*SEMICONDUCTORS, ACOUSTIC PROPERTIES), (*PIEZOELECTRIC CRYSTALS, ELECTRICAL PROPERTIES), (*CADMIUM COMPOUNDS, SULFIDES), CRYSTALS, LITHIUM, SODIUM, CRYSTAL GROWTH, ELECTRONS, DRIFT, HALL EFFECT, GAIN, ATTENUATION, MEASUREMENT, CONDUCTIVITY, DELAY LINES, PULSE AMPLIFIERS, AMPLIFIERS (U)

THE ACOUSTIC AMPLIFICATION, DRIFT MOBILITY AND HALL MOBILITY WERE MEASURED IN THIRTEEN CADMIUM SULFIDE CRYSTALS TO DETERMINE THE EFFECT OF IMPURITIES ON THESE PROPERTIES. TEN OF THE MEASURED CRYSTALS WERE GROWN DOPED WITH LITHIUM, SODIUM OR A COMBINATION OF BOTH SODIUM AND LITHIUM AND THREE CRYSTALS WERE GROWN UNDOPED. THE UNDOPED CRYSTALS HAVE A MAXIMUM ACOUSTIC GAIN OF ABOUT 70 DB/CM, A HALL MOBILITY OF 170 SQ CM/VOLT-SEC AND A DRIFT MOBILITY OF 160 SQ CM/VOLT-SEC. THE LITHIUM DOPED CRYSTALS HAVE A MAXIMUM GAIN OF ABOUT 100 DB/CM, A HALL MOBILITY OF 300 SQ CM/VOLT-SEC AND A DRIFT MOBILITY OF 100 SQ CM/VOLT-SEC. THE SODIUM DOPED CRYSTALS HAVE A MAXIMUM GAIN OF 3 DB/CM, A HALL MOBILITY 100 SQ CM/ VOLT-SEC AND A DRIFT MOBILITY OF 50 SQ CM/VOLT-SEC. THE SODIUM-PLUS-LITHIUM DOPED CRYSTALS HAVE A MAXIMUM GAIN OF ABOUT 25 DB/CM, A HALL MOBILITY OF 200 SQ CM/VOLT-SEC AND A DRIFT MOBILITY OF 150 SQ CM/VOLT-SEC. THE MEASUREMENTS INDICATE THAT IMPURITIES IN THE CRYSTAL CAN EITHER INCREASE OR REDUCE THE ACOUSTIC AMPLIFICATION AND IMPURITIES INCREASE ELECTRON TRAPPING WITHIN THE CRYSTAL, THUS REDUCING THE DRIFT MOBILITY. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD-603 783
GENERAL ELECTRIC CO SCHENECTADY N Y

SEMICONDUCTOR DEVICE CONCEPTS. (U)

DESCRIPTIVE NOTE: SCIENTIFIC REPT. NO. 7,
MAY 64 67P WOODBURY,H. H. ;AVEN,M. ;
HEUMANN,F. K. ;HALL,R. N. ;
CONTRACT: AF19 628 329
PROJ: 4608
TASK: 460805
MONITOR: AFCRL , 64 467

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:

DESCRIPTORS: (*SEMICONDUCTOR DEVICES, PREPARATION), CADMIUM COMPOUNDS, TELLURIDES, SULFIDES, ZINC COMPOUNDS, SELENIDES, ELECTRICAL PROPERTIES, HEAT TREATMENT, ELECTRON BOMBARDMENT, IMPURITIES, COPPER, CHLORINE, ALUMINUM, TRACER STUDIES, CRYSTAL LATTICE DEFECTS, OPTICAL PROPERTIES, SINGLE CRYSTALS, GALLIUM ALLOYS, ARSENIC ALLOYS, CRYSTAL GROWTH, LUMINESCENCE, ABSORPTION SPECTRUM (U)
IDENTIFIERS: CADMIUM SULFIDE, CADMIUM TELLURIDE, GALLIUM ARSENIDE, ZINC SELENIDE, ZINC SULFIDE (U)

STUDIES OF THE DEFECT CHEMISTRY OF THE II-VI COMPOUNDS WERE CONTINUED (SEE AD-433 975) AND A COMPARISON WAS MADE OF THE ELECTRICAL BEHAVIOR OF CDTE, CDS, AND ZNSE FOLLOWING EITHER THERMAL FIRINGS OR 1.5 MEV ELECTRON BOMBARDMENT. THE DIFFUSION OF CU INTO UNDOPED ZNS AS WELL AS CL-DOPED AND AL-DOPED ZNSE WAS INVESTIGATED BY RADIOTRACER TECHNIQUES. THE RESULTS WERE USED TO CORRELATE THE ELECTRICAL AND OPTICAL ACTIVITY OF SOME DEFECT CENTERS IN II-VI COMPOUNDS. THE HALOGEN TRANSPORT GROWTH OF GAAS(X)P(1-X) CRYSTALS CONTINUED. LASER QUALITY MATERIAL IS BEING PRODUCED, BUT THE INGOTS, WHILE RELATIVELY HOMOGENEOUS, ARE POLYCRYSTALLINE. SEVERAL INGOTS OF GAAS AND GAAS(X)P(1-X) WERE MADE USING A LOWER FURNACE TEMPERATURE. THESE INGOTS HAVE LARGE SINGLE-CRYSTAL REGIONS AND ARE MORE HOMOGENEOUSLY DOPED THAN PREVIOUS ONES. EXCITON AND RELATED LUMINESCENCE PHENOMENA THAT OCCUR NEAR THE BAND EDGE OF A SEMICONDUCTOR ARE DISCUSSED AND COMPARED WITH THE ABSORPTION SPECTRUM. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZ4HT

AD-604 250
MOTOROLA INC PHOENIX ARIZ

MICROWAVE ACOUSTIC DELAY LINE AND RELATED ACTIVE DEVICES. (U)

JUL 64 159P
CONTRACT: AF30 602 3076
PROJ: 5578
TASK: 557802
MONITOR: RADC , TDR64 246

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:

DESCRIPTORS: (*DELAY LINES, MICROWAVE FREQUENCY), (*ACOUSTIC EQUIPMENT, SEMICONDUCTOR DEVICES), (*CADMIUM COMPOUNDS, SULFIDES), ELECTROACOUSTIC TRANSDUCERS, ENERGY CONVERSION, SINGLE CRYSTALS, MICROWAVE AMPLIFIERS, HEAT EXCHANGERS, CRYSTAL OSCILLATORS, ELECTRODES, NEGATIVE RESISTANCE CIRCUITS, HALL EFFECT, GENERATORS, PHONONS, ULTRASONIC RADIATION (U)
IDENTIFIERS: CADMIUM SULFIDE, GYRATORS (U)

GENERATION OF USEFUL RF POWER OUTPUTS IN CDS CRYSTALS WAS DEMONSTRATED WITH OUTPUTS UP TO 156 MW AT THE TERMINALS WITHOUT THE NEED FOR TRANSDUCERS. HIGH EFFICIENCY (3 DB CONVERSION LOSS) DIFFUSION LAYER INTEGRAL TRANSDUCERS WERE ACHIEVED IN ULTRA HIGH PURITY CDS CRYSTALS. FEASIBILITY OF COMPLETE FUNCTIONAL DEVICES FROM A SINGLE CRYSTAL OF MATERIAL WAS SHOWN WITH INTEGRAL DELAY LINES AND AMPLIFIERS. THE USE OF THERMAL HEAT SINKS AND PROPER CHOICE OF CRYSTAL GEOMETRY WERE SHOWN TO OVERCOME MOST OF THE OBSTACLES TO ACHIEVEMENT OF CONTINUOUS OPERATION OF ELECTROACOUSTIC DEVICES. INITIAL RESULTS INCLUDED SATISFACTORY OPERATION OF A CDS OSCILLATOR AT A DUTY FACTOR GREATER THAN 0.1. EFFORTS WERE CONTINUED WITH SIGNIFICANT RESULTS IN THE GENERAL AREAS OF MORE EFFICIENT ELECTRIC/ACOUSTIC TRANSDUCERS, SUITABLE DRIFT FIELD ELECTRODES AND NEGATIVE RESISTANCE ELEMENTS AND CIRCUITS. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD-604 341
LIBRARY OF CONGRESS WASHINGTON D C AEROSPACE TECHNOLOGY DIV

RADIATION DAMAGE IN SOLIDS: COMPILATION OF ABSTRACTS. (U)

DESCRIPTIVE NOTE: SURVEYS OF SOVIET-BLOC SCIENTIFIC AND TECHNICAL LITERATURE (REPT. NO. 1).
AUG 64 40P
REPT. NO. ATD-P-64-50

UNCLASSIFIED REPORT

DESCRIPTORS: (*SEMICONDUCTORS, RADIATION DAMAGE), (*CRYSTALS, RADIATION DAMAGE), (*RADIATION DAMAGE, MATERIALS), (*ABSTRACTING, RADIATION DAMAGE), SILICON, GERMANIUM, CADMIUM COMPOUNDS, SULFIDES, SELENIDES, INDIUM ALLOYS, ANTIMONY ALLOYS, GALLIUM ALLOYS, ARSENIC ALLOYS, MAGNESIUM COMPOUNDS, ZINC COMPOUNDS, TITANATES, ALKALI METAL COMPOUNDS, HALIDES, POTASSIUM COMPOUNDS, NITRATES, PHOSPHATE GLASS, QUARTZ, POLYMERS, SALTS, DIELECTRICS, USSR (U)
IDENTIFIERS: CADMIUM SULFIDE, CADMIUM SELENIDE, INDIUM ANTIMONIDE, GALLIUM ARSENIDE, MAGNESIUM TITANATES, ZINC TITANATES (U)

ABSTRACTS ON RADIATION DAMAGE IN SEMICONDUCTORS (SILICON, GERMANIUM, CADMIUM SULFIDE, CADMIUM SELENIDE, INDIUM ANTIMONIDE, AND GALLIUM ARSENIDE); IONIC CRYSTALS (ALKALI HALIDES, MAGNESIUM AND ZINC TITANATES); AND OTHER MATERIALS (COVALENT, OTHER CRYSTALLINE, AND AMORPHOUS SUBSTANCES). (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD-604 742
WESTINGHOUSE ELECTRIC CORP ELMIRA N Y

APPLICATION OF LIGHT AND IMAGE INTENSIFICATION. (U)

DESCRIPTIVE NOTE: MONTHLY TECHNICAL ENGINEERING REPT. NO. 7, 1-31 JAN 64,
FEB 64 7P SZEPESI,Z. ;THORNTON,W. A. ;
LAKE,R. E. W. ;
CONTRACT: N61339 1440

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: SEE ALSO AD-603 526.

DESCRIPTORS: (*IMAGE INTENSIFIERS(ELECTRONIC), PREPARATION), (*PHOTOELECTRIC MATERIALS, IMAGE INTENSIFIERS (ELECTRONIC)), (*LUMINESCENCE, IMAGE INTENSIFIERS (ELECTRONIC)), PLASTICS, CAPACITANCE, LAMINATES, PHOTOCONDUCTIVITY, POWDERS, PHOTOELECTRIC CELLS (SEMICONDUCTOR), CADMIUM COMPOUNDS, SULFIDES, LIGHT, INTENSITY, BRIGHTNESS, FILMS, ZINC COMPOUNDS, ELECTRICAL INSULATION, SILICON COMPOUNDS, MONOXIDES, MAGNESIUM COMPOUNDS, FLUORIDES (U)
IDENTIFIERS: CADMIUM SULFIDE, MAGNESIUM FLUORIDE, SILICON MONOXIDE, ZINC SULFIDE (U)

THE EFFECT OF DIFFERENT PLASTIC MATERIALS ON THE CHARACTERISTICS, AND CHIEFLY ON THE CAPACITANCE OF PC LAYERS WAS STUDIED. THE EFFECT OF THE SUBSTRATE MATERIAL WAS INVESTIGATED ALSO. SEVERAL BATCHES OF PC POWDERS WERE PREPARED AND SOME IMAGE INTENSIFIER PANELS WERE FABRICATED. A SIMPLE LIGHTMETER, USING A LINEAR (CURRENT VS. LIGHT INTENSITY) CDS PC CELL, FOR THE EASY MEASUREMENT OF LIGHT INTENSITIES AND BRIGHTNESSES, WAS CONSTRUCTED. IN THE EVAPORATED EL FILM PROGRAM THE EFFECT OF AN INSULATING FILM ON EITHER OR BOTH SIDES OF THE EL FILM WAS STUDIED. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD-605 425
HARSHAW CHEMICAL CO CLEVELAND OHIO

INVESTIGATION OF THIN FILM CADMIUM SULFIDE SOLAR CELLS. (U)

DESCRIPTIVE NOTE: QUARTERLY TECHNICAL PROGRESS REPT. NO. 3, 26 MAY-25 AUG 64,
AUG 64 8P SCHAEFER,J. C. ;HUMRICK,R. J. ; BELT,R. F. ;
CONTRACT: AF33 615 1248
PROJ: 8173
TASK: 817301,817332

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: SEE ALSO AD-601 459.

DESCRIPTORS: (*SOLAR CELLS, FILMS), (*CADMIUM COMPOUNDS, SULFIDES), ENERGY CONVERSION, BATTERIES AND COMPONENTS, ELECTROPLATING, VAPOR PLATING, DEGRADATION, CHEMICAL MILLING, COPPER COMPOUNDS, CHLORIDES, SILICON COMPOUNDS, MONOXIDES, SURFACE PROPERTIES, EFFECTIVENESS (U)
IDENTIFIERS: THIN FILMS (U)

THE DEGRADATION OF ELECTROPLATED CELLS HAS BEEN CLOSELY OBSERVED AND IT HAS BEEN FOUND THAT RECOVERY CAN BE ACCOMPLISHED UNDER PROPER CONDITIONS. CHEMICAL MILLING OF THE SUBSTRATE IS AN EXCELLENT METHOD FOR PRODUCING HIGH POWER TO WEIGHT RATIO CELLS. FABRICATION OF THE ONE-HALF AND ONE SQUARE FOOT MECHANICAL SAMPLE ARRAYS INDICATE IMPROVED TOTAL AREA UTILIZATION FACTORS. PHOTOVOLTAIC CELLS AND DIODES HAVE BEEN PREPARED BY FIRST DEPOSITING A THIN FILM OF CUCL ON CDS. THE CUCL WAS SUBSEQUENTLY CONVERTED TO CU9,5S5 BY MEANS OF H2S. OPTICAL STUDIES ON ELECTROPLATED AND CHEMIPLATED BARRIERS HAVE SERVED TO CONFIRM THE PRESENCE OF CU2S ALONE OR MIXED WITH CUS. THIN LAYERS OF SIO HAVE BEEN UTILIZED AS A WATER VAPOR BARRIER TO SIGNIFICANTLY DECREASE DEGRADATION OF CELLS. ADDITIONAL THEORETICAL WORK HAS BEEN PERFORMED ON A HETEROJUNCTION MODEL OF THE CELL OPERATION. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD-605 528
GIANNINI CONTROLS CORP DUARTE CALIF

BRUSHLESS PRECISION POTENTIOMETER. (U)

DESCRIPTIVE NOTE: INTERIM DEVELOPMENT REPT. FOR 5 MAY 19 JUL 64.
JUL 64 IV
REPT. NO. GCC-ER-8645-1
CONTRACT: NOBSR91175

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:

DESCRIPTORS: (*POTENTIOMETERS, PHOTOELECTIVE EFFECT), PHOTOCONDUCTIVITY, PHOTOELECTRIC MATERIALS, CADMIUM COMPOUNDS, SULPHIDES, PHOTOSENSITIVITY, METAL FILMS, DESIGN, PROCESSING, VOLTAGE (U)
IDENTIFIERS: PHOTOPOTENTIOMETERS (U)

THE PURPOSE OF THE PROGRAM IS TO PERFORM STUDIES LEADING TO THE FABRICATION OF EIGHT BRUSHLESS PRECISION POTENTIOMETERS. A DETAILED DESCRIPTION OF THE PREPARATION OF CADMIUM SULPHIDE PHOTOSWITCHES AND RESULTS OF PRELIMINARY TESTS TO DETERMINE PROPER SENSITIZING TECHNIQUES ARE DESCRIBED. ALSO INCLUDED ARE PRELIMINARY RESULTS OF TESTS TO DETERMINE A CORRELATION BETWEEN PHOTOCONDUCTIVITY AND PHOTOSENSITIVE SURFACE GAP GEOMETRY. THE RESULTS OF THE TESTS PERFORMED TO DATE, THAT ARE DESCRIBED IN THE REPORT, HAVE NOT FURNISHED ANY CONCLUSIVE DATA. (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD-606 311
GENERAL ELECTRIC CO SCHENECTADY N Y

SEMICONDUCTOR DEVICE CONNCEPTS. (U)

DESCRIPTIVE NOTE: SCIENTIFIC REPT. NO. 8,
AUG 64 66P WOODBURY,H. H. ;AVEN,M. ;
KENNICOTT,P. R. ;HALL,R. N. ;
CONTRACT: AF19 628 329
PROJ: 4608
TASK: 460805
MONITOR: AFCRL , 64 702

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: A PORTION OF THE ORIGINAL DOCUMENT CONTAINS FINE DETAIL WHICH MAY MAKE READING OF PHOTOCOPY DIFFICULT. ALSO SEE AD-603 783.

DESCRIPTORS: (*SEMICONDUCTOR DEVICES, SCIENTIFIC RESEARCH), (*LASERS, DESIGN), SOLUBILITY, DIFFUSION, SINGLE CRYSTALS, IMPURITIES, CADMIUM COMPOUNDS, SULFIDES, COPPER, SILVER, ZINC COMPOUNDS, SELENIUM COMPOUNDS, ELECTRICAL PROPERTIES, FREQUENCY MODULATION (U)

STUDIES ON THE SYSTEMS CDS:CU AND CDS:AG HAVE LED TO THE FOLLOWING RESULTS: COPPER AND AG DIFFUSE VERY RAPIDLY IN CDS EVEN BELOW 500C; THE SEGREGATION COEFFICIENT OF AG FOR CDS:CD CHANGES FROM 5 X 10 TO THE 7TH POWER TO .001 BETWEEN 500 AND 1000C; AND, THE SOLUBILITY OF AG IN CDS DEPENDS STRONGLY ON THE PARTIAL PRESSURE OF CD OVER THE CRYSTAL. THE EFFECT OF IMPURITIES ON THE ELECTRICAL CHARACTERISTICS OF ZNSE SINGLE CRYSTALS ARE INVESTIGATED BY HALL EFFECT STUDIES COUPLED WITH MASS SPECTROMETRIC MEASUREMENTS. CONSIDERABLE DIFFERENCES IN THE IMPURITY SPECTRUM AS WELL AS THE ELECTRICAL BEHAVIOR OF THE CRYSTALS WERE FOUND TO EXIST DEPENDING ON THE STARTING MATERIALS, THE CRYSTAL GROWTH METHOD, AND THE PURIFICATION TECHNIQUES USED. A JUNCTION LASER STRUCTURE CAPABLE OF FREQUENCY MODULATION IS DISCUSSED. FREQUENCY DEVIATIONS OF THE ORDER OF 100 GC AT MODULATION FREQUENCIES OF SEVERAL GC APPEAR REASONABLE. MODULATION SIGNALS OF 200 VOLTS PEAK-TO-PEAK ARE REQUIRED INTO A LOAD CONSISTING OF A PURE CAPACITY OF A FRACTION OF A PF. (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD-607 035
AIR FORCE INST OF TECH WRIGHT-PATTERSON AFB OHIO

EXPERIMENTAL INVESTIGATION OF CURRENT LIMITING AND OSCILLATION IN CDS. (U)

DESCRIPTIVE NOTE: MASTER'S THESIS,
AUG 64 77P GARNER,DAVID R. ;KUTTENKULER, QUENTIN A. ;
MONITOR: AFIT , GE/EE/64 9

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:

DESCRIPTORS: (*CADMIUM COMPOUNDS, SULFIDES), (*SINGLE CRYSTALS, OSCILLATION), LIMITERS, ELECTRIC CURRENTS, ULTRASONIC RADIATION, AMPLIFIERS, PULSE GENERATORS, SEMICONDUCTORS (U)
IDENTIFIERS: CADMIUM SULFIDE (U)

THE CURRENT LIMITING AND OSCILLATIONS WHICH OCCUR WHEN LOW RESISTIVITY CDS IS SUBJECTED TO HIGH LEVEL VOLTAGE PULSES ARE EXPERIMENTALLY INVESTIGATED, AND SEVERAL THEORIES PROPOSED TO EXPLAIN THE PHENOMENA. THE MANUFACTURE OF THE TEST SAMPLES AND THE DESIGN OF A PULSE GENERATOR UTILIZING A LUMPED ELEMENT DELAY LINE AND A SILICON CONTROLLED RECTIFIER ARE DESCRIBED. FROM THE EXPERIMENTAL RESULTS, A DEPENDENCE OF THE FREQUENCY AND AMPLITUDE OF THE OSCILLATIONS ON THE APPLIED VOLTAGE IS SHOWN. THE THEORY WHICH BEST EXPLAINS THE PHENOMENA IS FOUND TO BE THE TRANSFER OF ELECTRONIC MOMENTUM. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD-607 297
MELPAR INC FALLS CHURCH VA

THIN-FILM MONOTRONICS. (U)

DESCRIPTIVE NOTE: QUARTERLY REPT. NO. 2, 12 JUN-12 SEP 64,
SEP 64 119P SMITH,RICHARD C. I
CONTRACT: NOW-64-0568

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: ALSO SEE AD-602 672.

DESCRIPTORS: (*MOLECULAR ELECTRONICS, CIRCUITS), (*SEMICONDUCTING FILMS, MATERIALS), (*SEMICONDUCTOR DEVICES, MANUFACTURING METHODS), PRINTED CIRCUITS, INTEGRATED CIRCUITS, DIELECTRIC FILMS, FILMS, VAPOR PLATING, VACUUM APPARATUS, HIGH TEMPERATURE RESEARCH, DIODES (SEMICONDUCTOR), RADIATION DAMAGE, TRIODES, AMPLIFIERS, INTERMETALLIC COMPOUNDS, MICROMINIATURIZATION (ELECTRONICS), CADMIUM COMPOUNDS, SELENIDES, SULFIDES, TELLURIDES, ZINC ALLOYS, GADOLINIUM ALLOYS, GERMANIUM, BORON, SILICON COMPOUNDS, NEODYMIUM COMPOUNDS, DYSPROSIUM COMPOUNDS (U)
IDENTIFIERS: THIN FILMS (U)

THE CURRENT EMPHASIS IN THE AREA OF MATERIALS RESEARCH IS ON SEMICONDUCTING AND DIELECTRIC FILMS FOR HIGHTEMPERATURE APPLICATION. SEMICONDUCTING AND DIELECTRIC FILMS ARE BEING DEPOSITED BY THERMAL EVAPORATION IN VACUUM, USING RESISTANCE HEATING OR ELECTRON-BEAM BOMBARDMENT. THE CHARACTERIZATION OF THE NEODYMIUM OXIDE-THIN DIELECTRIC FILM SYSTEM WAS COMPLETED, AND EFFORT WAS DIRECTED TOWARD FINDING ANOTHER DIELECTRIC FILM SYSTEM HAVING NOT ONLY THE HIGH-TEMPERATURE ELECTRICAL STABILITY OF THE NEODYMIUM OXIDE SYSTEM BUT ALSO THE PHYSICAL STABILITY AT HIGH TEMPERATURES WHICH THE LATTER SYSTEM LACKS. INTENSIVE WORK ON FIELD-EFFECT DEVICES FOR HIGHTEMPERATURE CIRCUIT APPLICATION CONTINUES. TEMPERATURE DATA ON CADMIUM SELENIDE FIELD-EFFECT DEVICES ARE BEING GATHERED FOR USE IN THE DESIGN OF THE OPERATIONAL AMPLIFIER. RADIATION-RESISTANCE STUDIES ARE BEING CONDUCTED IN ACCORDANCE WITH THE CONTRACTUAL REQUIREMENTS. (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /4ZZHT

AD-609 204
NATIONAL CASH REGISTER CO DAYTON OHIO

INVESTIGATION OF CHEMICALLY SPRAYED THINFILM PHOTOVOLTAIC CELLS. (U)

DESCRIPTIVE NOTE: QUARTERLY REPT. NO. 2, 15 AUG-14 NOV 64,
NOV 64 36P CHAMBERLIN,R. R. ISKARMAN,J. S.

CONTRACT: AF33 615 1578
PROJ: 8173
TASK: 817301

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: LEGIBILITY OF THIS DOCUMENT IS IN PART UNSATISFACTORY. REPRODUCTION HAS BEEN MADE FROM THE BEST AVAILABLE COPY.

DESCRIPTORS: (*SOLAR CELLS, MANUFACTURING METHODS), (*PHOTOELECTRIC CELLS (SEMICONDUCTOR), MANUFACTURING METHODS), (*SEMICONDUCTING FILMS, SULFIDES), COPPER COMPOUNDS, CADMIUM COMPOUNDS, SPRAYS, BRONZE, STEEL, TEST FACILITIES, COMPLEX COMPOUNDS (U)
IDENTIFIERS: CADMIUM SULFIDE, COPPER SULFIDES, THIN FILMS (U)

THE REPORT DISCUSSES THE DETAILS OF THE CHEMICAL SPRAY DEPOSITION TECHNIQUE THAT WAS USED FOR THE DEPOSITION OF THE CDS AND CU SUB X S SUB Y SEMICONDUCTOR FILMS. TOPICS INCLUDE FILM DEPOSITION TECHNIQUES, FILM STUDIES, CELL FABRICATION, AND TEST INSTALLATION. (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD-609 434
NORWEGIAN DEFENCE RESEARCH ESTABLISHMENT KJELLER

RESEARCH ON THE THEORY AND DESIGN OF ACTIVE NETWORKS. (U)

DESCRIPTIVE NOTE: ANNUAL SUMMARY REPT. NO. 3, 1 JUL 63-30 JUN 64,
JUL 64 36P BLOTEKJAER,KJELL ISCHAUG-PETTERSEN,TOR ;
REPT. NO. NDRE-E-36
CONTRACT: AF61 052 484
MONITOR: AFCRL , 64 823

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: LEGIBILITY OF THIS DOCUMENT IS IN PART UNSATISFACTORY. REPRODUCTION HAS BEEN MADE FROM THE BEST AVAILABLE COPY.

DESCRIPTORS: (*SOLID STATE PHYSICS, ACOUSTICS), (*MICROWAVES, ULTRASONIC RADIATION), (*ACOUSTICS, PIEZOELECTRIC CRYSTALS), (*ULTRASONIC RADIATION, PIEZOELECTRIC CRYSTALS), NETWORKS, CADMIUM COMPOUNDS, SULFIDES, HARMONIC ANALYSIS, NOISE, PROPAGATION, SEMICONDUCTORS, ELECTROMAGNETIC WAVES, AMPLIFIERS, TRANSDUCERS, ELECTRONS, PHONONS, TRAVELING-WAVE TUBES, OSCILLATION (U)
IDENTIFIERS: ELECTROACOUSTICS (U)

THE REPORT IS CONCERNED WITH STUDIES IN MICROWAVE ULTRASONICS AND ACOUSTIC WAVE PROPAGATION IN PIEZOELECTRIC SEMICONDUCTORS. SATURATION DUE TO ACOUSTIC OSCILLATIONS IN CADMIUM SULPHIDE HAVE BEEN OBSERVED EXPERIMENTALLY, AND THE DRIFT MOBILITY OF ELECTRONS IN THE SAMPLE HAS BEEN DETERMINED TO 210 SQUARE CM/VS AT ROOM TEMPERATURE. A NONLINEAR COUPLING BETWEEN ACOUSTIC WAVES AND ELECTROMAGNETIC WAVES IN PIEZOELECTRIC MATERIALS IS DESCRIBED, AND AN EXPERIMENT FOR PARAMETRIC EXCITATION OF SUBHARMONICS IS OUTLINED. THE THERMAL NOISE DUE TO FREE CARRIERS IN ELECTROACOUSTIC AMPLIFIERS IS CALCULATED. THE EQUIVALENT NOISE TEMPERATURE CAN BE MADE CONSIDERABLY LOWER THAN THE TEMPERATURE OF THE AMPLIFYING CRYSTAL. A NOVEL DESIGN OF AN EFFICIENT PIEZOELECTRIC TRANSDUCER FOR HYPERSONIC WAVES IS DESCRIBED. THE COUPLER COMPRISES A NUMBER OF PIEZOELECTRIC DISCS IN A SPECIFIC ARRANGEMENT LOCATED IN THE GAP OF A REENTRANT MICROWAVE CAVITY. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD-610 012
GENERAL ELECTRIC CO SCHENECTADY N Y

RESEARCH ON CDTE. (U)

DESCRIPTIVE NOTE: QUARTERLY PROGRESS REPT. NO. 13, OCT 64 9P HALSTED,R. E. ;MARPLE,D. T. F. ; SEGALL,B. ;
CONTRACT: AF33 616 8264

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: THIS REPT. INCLUDES APPENDIX: PHOTOLUMINESCENCE OF DEFECT-EXCITON COMPLEXES IN II-VI COMPOUNDS. SEE ALSO AD-601 674.

DESCRIPTORS: (*SEMICONDUCTORS, IMPURITIES), (*CADMIUM ALLOYS, TELLURIUM ALLOYS), (*LUMINESCENCE, IMPURITIES), (*MOLECULAR SPECTROSCOPY, SEMICONDUCTORS), SINGLE CRYSTALS, CRYSTAL LATTICES, ZINC COMPOUNDS, SELENIDES, SULFIDES, EMISSIVITY, FLUORESCENCE, BAND SPECTRUM (U)

DURING THE PERIOD OF THIS REPORT TWO AREAS OF RESEARCH ACTIVITY HAVE BEEN EMPHASIZED. ATTEMPTS TO PREPARE CDTE SAMPLES WITH BAND-EDGE FLUORESCENT EMISSION SPECTRA CORRELATED WITH THE IDENTITY OF IMPURITY ADDITIONS HAVE BEEN SUCCESSFUL. A THEORETICAL STUDY OF THE SHAPE OF THE ABSORPTION EDGE HAS BEEN CONTINUED. IN ADDITION, RESEARCH PERFORMED UNDER THIS CONTRACT HAS STIMULATED A THEORETICAL STUDY WHICH HAS ACCOUNTED FOR A DISCREPANCY BETWEEN THEORY AND EXPERIMENT ON THE TEMPERATURE DEPENDENCE OF THE BAND GAP IN CDTE. THE RESULTS ON E SUB G(T) ARE SIGNIFICANT FOR A NUMBER OF OTHER COMPOUNDS WHERE THE EXISTENCE OF A SIMILAR PROBLEM IS WELL ESTABLISHED. (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD-610 366
HUGHES AIRCRAFT CO NEWPORT BEACH CALIF

ADVANCED FUNCTIONAL ELECTRONIC BLOCK DEVELOPMENT. (U)

DESCRIPTIVE NOTE: INTERIM ENGINEERING REPT. NO. 3, 15 APR-15 JUN 63,
JUN 63 47P DILL,H. G. ;
CONTRACT: AF33 657 9771

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: SEE ALSO AD-403 654.

DESCRIPTORS: (*SEMICONDUCTING FILMS, PREPARATION), (*INTEGRATED CIRCUITS, TRANSISTORS), (*TRANSISTORS, SEMICONDUCTING FILMS), CADMIUM COMPOUNDS, SULFIDES, ETCHED CRYSTALS, VAPOR PLATING, EVAPORATORS, PENTODES, CIRCUITS, ELECTRICAL PROPERTIES, TRANSISTOR AMPLIFIERS, BROADBAND, BANDPASS AMPLIFIERS, OSCILLATORS (U)
IDENTIFIERS: CADMIUM SULFIDES, THIN FILMS (U)

THE FIRST PART OF THE REPORT DISCUSSES SOME PROBLEMS OF THIN FILM TRANSISTOR (TFT) FABRICATION FOR THE PURPOSE OF IMPROVING THE TFT AND TO GET NEW INFORMATION FOR IMPROVING THE DESIGN OF FULLY INTEGRATED THIN FILM CIRCUITRY. THE SECOND AND MAIN PART OF THE REPORT DISCUSSES THE PROPERTIES OF TFT IN COMPARISON WITH VACUUM PENTODES AND DEFINES SOME REQUIREMENTS OF THIN FILM CIRCUITRY. THE SURVEY LEADS TO A PROMISING LINEAR AMPLIFIER COMBINATION OF HIGH DC AND AC STABILITY. A DESIGN OF A WIDE BAND AMPLIFIER CIRCUIT BASED ON THAT PRINCIPLE AND SOME MEASUREMENT RESULTS ARE GIVEN. (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL No. /ZZZHT

AD-610 395
RCA LABS PRINCETON N J

ACTIVE LOGIC ELEMENTS USING NON-GALVANIC MODIFYING INPUTS. (U)

DESCRIPTIVE NOTE: FINAL REPT. FOR 1 JUL 62-30 SEP 64, OCT 64 36P HERZOG,G. ;HU,K. C. ILEWIN,M. H. ;
CONTRACT: AF19 628 1629
PROJ: 4641
TASK: 464104
MONITOR: AFCRL , 64 896

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:

DESCRIPTORS: (*COMPUTER LOGIC, INTEGRATED CIRCUITS), (*INTEGRATED CIRCUITS, COMPUTERS), (*TRANSISTORS, MATERIALS), SEMICONDUCTOR DEVICES, PHOTOELECTRIC MATERIALS, CADMIUM COMPOUNDS, SULFIDES, TELLURIDES, SEMICONDUCTING FILMS, VAPOR PLATING, EVAPORATION, AGING (MATERIALS) (U)
IDENTIFIERS: CADMIUM SULFIDE, CADMIUM TELLURIDE (U)

LARGE ARRAYS OF BATCH-FABRICATED ACTIVE ELEMENTS PRESENT A PROBLEM OF INTERCONNECTIONS. A GENERAL INTERCONNECTION SCHEME WHICH CAN BE MODIFIED AT THE CONVENIENCE OF THE USER IS SOUGHT. AN ARRAY OF 128 INSULATED-GATE FIELDEFFECT TRANSISTORS (IGFET) OF THE METAL-OXIDE-SEMICONDUCTOR (MOS) TYPE WAS ASSEMBLED TOGETHER WITH PHOTOSENSITIVE CONTROL OF SIGNAL PATHS. SIXTY-FOUR OF THE MOS TRANSISTORS ACT AS NOR LOGIC GATES WITH THE REMAINING 64 MOS TRANSISTORS ACTING AS ON-OFF SWITCHES IN SERIES WITH THE SIGNAL PATH. THESE LATTER MOS TRANSISTORS ARE CONTROLLED BY PHOTOSENSITIVE ELEMENTS STIMULATED BY A LIGHT PATTERN. THE LIGHT PATTERN IS GENERATED BY HOLES IN A DATA-PROCESSING PUNCHED CARD. THE PHOTOSENSITIVE ELEMENTS IN THE PRESENT ARRAY ARE CADMIUM SULFIDE PHOTOCONDUCTORS FABRICATED ON CERAMIC PLATES, BUT EXTENSIVE WORK WAS DONE ON CADMIUM TELLURIDE HIGH-VOLTAGE PHOTOVOLTAIC FILMS INTENDED FOR USE DIRECTLY ON THE SUBSTRATE OF THE ACTIVE LOGIC ELEMENTS. THE TEST ARRAY FABRICATED DEMONSTRATES HOW THE SIGNAL PATH OF A COMPUTER MIGHT BE CONTROLLED BY A PUNCHED CARD PREPARED EITHER BY ITS OWN OUTPUT OR THE OUTPUT OF OTHER COMPUTERS. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD-610 718
GIANNINI CONTROLS CORP DUARTE CALIF

BRUSHLESS PRECISION POTENTIOMETER. (U)

DESCRIPTIVE NOTE: INTERIM DEVELOPMENT REPT. FOR 20 JUL-5 NOV 64.
FEB 65 22P
REPT. NO. GCC-ER-8645-2
CONTRACT: NOBSR91175

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: SEE ALSO AD-605 528.

DESCRIPTORS: (*POTENTIOMETERS, PHOTOELECTRIC EFFECT), PHOTOELECTRIC MATERIALS, PHOTOSENSITIVITY, METAL FILMS, SINTERING, TEMPERATURE, HEAT-RESISTANT GLASS, CADMIUM COMPOUNDS, SULFIDES, SELENIDES, ALUMINUM COMPOUNDS, OXIDES (U)
IDENTIFIERS: CADMIUM SULFIDE, CADMIUM SELENIDE, ALUMINUM OXIDES, PHOTOPOTENTIOMETERS (U)

TWO TECHNIQUES ARE DESCRIBED FOR THE DEPOSITION OF PHOTOSENSITIVE LAYERS. ONE OF THESE IS A TECHNIQUE FOR SENSITIZING EVAPORATED LAYERS OF CDS OR CDSE AND THE OTHER A TECHNIQUE FOR DEPOSITING A REASONABLE REPRODUCIBLE LAYER OF PHOTOSENSITIVE MATERIAL FOR SINTERING. ALSO INCLUDED ARE PRELIMINARY RESULTS OF TESTS TO DETERMINE A CORRELATION OF PHOTOCONDUCTIVITY AND GAP GEOMETRY. SOME MEASUREMENTS HAVE BEEN MADE ON THE LINEARITY OF A RESISTIVE STRIP EQUAL TO CIRCUMFERENCE OF A BRUSHLESS POTENTIOMETER. PHOTOCONDUCTIVITY AS A FUNCTION OF SINTERING TIME AND TEMPERATURE WAS STUDIED AND SHOWED THAT THERE IS NO APPARENT CORRELATION. HOWEVER, PHOTOCONDUCTORS ON AL2O3 ARE STATISTICALLY MORE SENSITIVE THAN THOSE ON GLASS. (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD-610 738
STANFORD UNIV CALIF STANFORD ELECTRONICS LABS

BAND STRUCTURE AND SURFACE EFFECTS IN CADMIUM SULFIDE PHOTOEMISSION STUDIES, (U)

AUG 64 179P KINDIG,NEAL B. ;
REPT. NO. SEL-64-095,SEL-TR-5201-1
CONTRACT: SD87 GRANT ,NSF GP1033
PROJ: ARPA ORDER157

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:

DESCRIPTORS: (*PHOTOELECTRIC EFFECT, SEMICONDUCTORS), (*CADMIUM COMPOUNDS, SULFIDES), MEASUREMENT, SINGLE CRYSTALS, ELECTRON TRANSITIONS, ATOMIC ENERGY LEVELS, SURFACE PROPERTIES, EXCITATION, CONDUCTIVITY, THEORY, QUANTUM STATISTICS, EXPERIMENTAL DATA, TEST METHODS (U)
IDENTIFIERS: CADMIUM SULFIDE (U)

PHOTOEMISSION MEASUREMENTS HAVE BEEN MADE ON SINGLE CRYSTALS OF CADMIUM SULFIDE WHICH WERE CLEAVED AND TESTED IN HIGH VACUUM AT PHOTON ENERGIES BETWEEN 7.2 AND 11.6 EV. THE ELECTRON AFFINITY IS FOUND TO BE 4.8 EV. ADDITIONAL MEASUREMENTS HAVE BEEN MADE IN AN EXTENDED RANGE FROM 6 TO 21.2 EV USING SURFACES CLEAVED IN AIR OR IN LOW VACUUM AND TESTED IN LOW VACUUM. THE APPARATUS FOR CLEAVING AND MEASURING PHOTOEMISSION IS DESCRIBED. IMPORTANT FEATURES OF THE BAND STRUCTURE ARE DEDUCED FROM THE ENERGY DISTRIBUTION AND QUANTUM YIELD MEASUREMENTS. TWO CONDUCTION BAND MAXIMA ARE LOCATED ABOUT 6.7 AND 8.2 EV ABOVE THE TOP OF THE VALENCE BAND. TWO VALENCE BAND MAXIMA ARE LOCATED ABOUT 1.2 AND 9.4 EV BELOW THE TOP OF THE VALENCE BAND. THE EFFECTS OF SURFACE CONDITIONS ON PHOTOEMISSION FROM CADMIUM SULFIDE HAVE BEEN STUDIED BY COMPARING MEASUREMENTS MADE ON SAMPLES CLEAVED IN HIGH VACUUM WITH THE CORRESPONDING RESULTS FROM SURFACES PREPARED BY OTHER TECHNIQUES. (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD-612 679
IIT RESEARCH INST CHICAGO ILL

THIN FILMS FOR COMPOSITE MOLECULAR ELECTRONICS. (U)

DESCRIPTIVE NOTE: FINAL REPT. FOR 1 JAN 62-31 JAN 63,
MAY 63 56P SCHOSSBERGER,F. V. ;
REPT. NO. ARF-3213-13
CONTRACT: AF33 657 7823
PROJ: 4150
TASK: 415003
MONITOR: ASD , TDR-63-460

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: LIMITED NUMBER OF COPIES CONTAINING COLOR OTHER THAN BLACK AND WHITE ARE AVAILABLE UNTIL STOCK IS EXHAUSTED. REPRODUCTIONS WILL BE MADE IN BLACK AND WHITE ONLY.

DESCRIPTORS: (*MOLECULAR ELECTRONICS, MATERIALS), (*SEMICONDUCTOR FILMS, PREPARATION), (*ZINC COMPOUNDS, SULFIDES), (*CADMIUM COMPOUNDS, SULFIDES), SINGLE CRYSTALS, HYDROGEN COMPOUNDS, SULFIDES, X-RAY DIFFRACTION ANALYSIS, ELECTRON DIFFRACTION ANALYSIS, ELECTRON MICROSCOPY, CRYSTAL STRUCTURE, RESISTANCE (ELECTRICAL), HALL EFFECT, DIODES (SEMICONDUCTOR), VAPOR PLATING, COMPOSITE MATERIALS (U)
IDENTIFIERS: THICK FILMS, CADMIUM SULFIDE, HYDROGEN SULFIDE, ZINC SULFIDE (U)

MONOCRYSTALLINE FILMS OF ZINC SULFIDE AND CADMIUM SULFIDE 2 X 1 CM IN SIZE WERE PREPARED BY REACTION OF MONOCRYSTALLINE (002) ZINC OR (101) CADMIUM SURFACES WITH HYDROGEN SULFIDE. THE FORMATION OF ZINC SULFIDE FILMS AT 235C AND OF CADMIUM SULFIDE FILMS AT 135C WAS MONITORED IN A SPECIALLY BUILT HIGH-TEMPERATURE X-RAY DIFFRACTOMETER ATTACHMENT. REACTION TEMPERATURES AROUND 300C PRODUCED POLYCRYSTALLINE FILMS. THE FILM THICKNESS VARIED FROM 10 TO 1000 A AND THE RATE OF GROWTH FROM 3 TO 250 A PER HOUR. SELECTED FILMS WERE INVESTIGATED BY POLARIZED-LIGHT AND ELECTRON MICROSCOPY AND BY X-RAY AND ELECTRON DIFFRACTION. THE HEXAGONAL WURTZITE STRUCTURE WAS FOUND, ALTHOUGH ONE CADMIUM SULFIDE FILM HAD A DIFFERENT HEXAGONAL STRUCTURE. FOR ELECTRICAL MEASUREMENTS OF CADMIUM SULFIDE FILMS, THE FILMS WERE ISOLATED BY COATING WITH LACQUER AND DISSOLVING THE SUBSTRATE IN MERCURY. THE RESISTIVITY WAS BETWEEN 0.001 AND 40 OHM-CM. SOME AREAS SHOWED GOOD N-TYPE ASYMMETRICAL DIODE CHARACTERISTICS. (AUTHOR) 106 (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD-612 703
MOTOROLA INC PHOENIX ARIZ SEMICONDUCTOR PRODUCTS DIV

ACTIVE ACOUSTIC DEVICES. (U)

DESCRIPTIVE NOTE: INTERIM REPT. FOR 17 JUN-30 SEP 64,
FEB 65 31P BRENDECKE,W. H. ;
CONTRACT: AF30 602 3478
PROJ: 5578
TASK: 557802
MONITOR: RADC , TR-64-517

UNCLASSIFIED REPORT

SUPPLEMENTARY NOT

DESCRIPTORS: (*TRANSDUCERS, SEMICONDUCTOR DEVICES), (*ACOUSTIC EQUIPMENT, SEMICONDUCTOR DEVICES), (*SEMICONDUCTOR DEVICES, TRANSDUCERS), ELECTROACOUSTIC TRANSDUCERS, FILMS, VAPOR PLATING, VACUUM APPARATUS, CADMIUM COMPOUNDS, SULFIDES, EPITAXIAL GROWTH, PIEZOELECTRIC CRYSTALS, QUARTZ, RADIOFREQUENCY AMPLIFIERS, ULTRASONIC PROPERTIES, SURFACE PROPERTIES, RESONANCE, ZINC COMPOUNDS, OXIDES, VERY HIGH FREQUENCY, ULTRAHIGH FREQUENCY, SOLID STATE PHYSICS, BROADBAND, PHONONS, ENERGY CONVERSION (U)
IDENTIFIERS: CADMIUM SULFIDES (U)

INVESTIGATIONS OF THE SIX MAJOR TRANSDUCER TYPES WERE INITIATED TO DETERMINE THE FEASIBILITY OF USING EACH TYPE IN CONTINUOUS WAVE (CW) DEVICES. THE MOST PROMISING IS THE THIN FILM TRANSDUCER DUE TO THE CLOSE CONTROL OF GEOMETRIC FACTORS. EXACT CONTROL OVER PLACEMENT, SIZE AND THICKNESS CAN BE ACHIEVED THROUGH SELECTIVE MASKING AND PROCESS DEPOSITION RATES. MECHANICAL POLISHING LIMITS THE BONDED QUARTZ TRANSDUCER TO A MAXIMUM FREQUENCY OF 175 MC/SEC. COMPENSATED REGION TRANSDUCERS WITH 2 TO 3 DB LOSS HAVE BEEN CONSTRUCTED BETWEEN 10 AND 30 MC/SEC. THE DIFFICULT GROWTH PROCESS WILL LIMIT EPITAXIAL TRANSDUCERS TO VERY PRELIMINARY EXPERIMENTS. DEPLETION LAYER TRANSDUCERS WILL BE ELIMINATED FROM FURTHER INVESTIGATIONS DUE TO THE INABILITY OF II-VI COMPOUNDS TO FORM P-N JUNCTIONS. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD-613 036
GENERAL ELECTRIC CO SYRACUSE N Y

FAILURE MECHANISMS AT SURFACES AND INTERFACES. (U)

DESCRIPTIVE NOTE: FINAL REPT. FOR 1 JUL 63-1AUG 64, FEB 65 112P REINHARTZ,K. K. ;RUSSELL,V. A. ;STOCKMAN,D. L. ;VAN DER GRINTEN,W. J. ; WILLIS,W. L. ;
CONTRACT: AF30 602 3085
PROJ: 5519
TASK: 551906
MONITOR: RADC , TDR64 454

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: SEE ALSO AD-604 349.

DESCRIPTORS: (*SEMICONDUCTING FILMS, SURFACE PROPERTIES), (*SEMICONDUCTOR DEVICES, RELIABILITY (ELECTRONICS)), (*FAILURE (MECHANICS), SEMICONDUCTING FILMS), TRANSISTORS, STRESSES, STORAGE, AGING (MATERIALS), VOLTAGE, DEGRADATION, CONTROLLED ATMOSPHERES, ELECTRICAL PROPERTIES, TEMPERATURE, SURFACES, HUMIDITY, GATES (CIRCUITS), GLASS CAPACITORS, DIELECTRICS, CADMIUM COMPOUNDS, SULFIDES, SELENIUM, SILICON COMPOUNDS, OXIDES (U)
IDENTIFIERS: FIELD EFFECT DEVICES (U)

A STUDY OF THE AGING AND FAILURE CHARACTERISTICS OF THIN FILM FIELD EFFECT TRIODES WAS CARRIED OUT. TECHNIQUES FOR APPLYING STRESS TO THE SAMPLE DEVICES UNDER CONTROLLED CONDITIONS WERE DEVELOPED AND THE RESULTING CHANGES OF THE CHARACTERISTICS WERE MEASURED. SAMPLES STORED UNDER DRY ARGON AT 30C REMAINED STABLE AFTER 1 YEAR. AN INCREASE OF THE HUMIDITY TO 30% CAUSED A DECREASE OF THE THRESHOLD VOLTAGE. DURING STORAGE AT A CONSTANT TEMPERATURE FROM 50C TO 122C, THE THRESHOLD VOLTAGE INCREASED REACHING A STABLE VALUE WITHIN A FEW DAYS. DURING D.C. ELECTRICAL STRESS THE THRESHOLD VOLTAGE EITHER DECREASED OR INCREASED REACHING A STABLE VALUE AT CONSTANT GATE VOLTAGE AFTER A FEW HUNDRED HOURS. THESE DIFFERENT FAILURE MODES UNDER ELECTRICAL STRESS COULD BE CORRELATED WITH DIFFERENCES IN THE SLOW RELAXATION CHARACTERISTIC OF THE FIELD EFFECT CONDUCTIVITY WHICH IN TURN WAS TRACED TO THE TREATMENT OF THE SEMICONDUCTOR SURFACE DURING DEVICE FABRICATION. THE THRESHOLD VOLTAGE WAS THE ONLY PARAMETER WHICH APPEARED TO BE CHANGING APPRECIABLY INDICATING THAT THE CHANGES WERE OCCURRING AT THE SEMICONDUCTOR-INSULATOR INTERFACE. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD-613 187
HARSHAW CHEMICAL CO CLEVELAND OHIO

INVESTIGATION OF CDS THIN-FILM SOLAR CELLS. (U)

DESCRIPTIVE NOTE: REPT. FOR NOV 63-DEC 64.
FEB 65 122P
CONTRACT: AF 33(615)-1248
PROJ: AF-8173
TASK: 817301
MONITOR: AFAPL TR-65-1

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: SEE ALSO AD-605 425.

DESCRIPTORS: (•SEMICONDUCTING FILMS, SOLAR CELLS), (•SOLAR CELLS, FILMS), (•CADMIUM COMPOUNDS, SULFIDES), ENERGY CONVERSION, PLATING, COPPER COMPOUNDS, CHLORIDES, VAPOR PLATING, VACUUM APPARATUS, SILICON COMPOUNDS, MONOXIDES, DEGRADATION, SURFACE PROPERTIES, RADIATION DAMAGE, EFFECTIVENESS, ENVIRONMENTAL TESTS, MOLYBDENUM, QUARTZ, TANTALUM, SILICON, CALCIUM COMPOUNDS, FLUORIDES, TITANIUM, NICKEL ALLOYS, IRON ALLOYS, SINGLE CRYSTALS (U)
IDENTIFIERS: CADMIUM SULFIDE, THIN FILMS (U)

RESEARCH AND DEVELOPMENT OF FRONT WALL, THIN FILM, FLEXIBLE, LIGHT WEIGHT CDS SOLAR CELLS WAS CONTINUED AND DECIDED IMPROVEMENTS HAVE BEEN ACCOMPLISHED. A ONE SQUARE FOOT ARRAY SHOWS A POWER TO WEIGHT RATIO OF ABOUT 35.0 WATTS/LB. WITH AN OVERALL AREA UTILIZATION FACTOR OF OVER 0.80. A NEW CHEMICAL BARRIER FORMATION PROCESS WAS DEVELOPED PROVIDING HIGHER CELL EFFICIENCES. EXPOSURE OF CELLS TO ELECTRON, PROTON AND COBALT 60 RADIATION SHOW LITTLE OR NO DAMAGE. STUDIES ON THE FORMATION OF THE CDS LAYER INDICATE A HIGHER DEGREE OF PREFERRED ORIENTATION AND CRYSTALLITE SIZE AS THE SUBSTRATE TEMPERATURE INCREASES. CRYSTALLITES OF 100 MICRON DIMENSION WERE OBSERVED. OPTICAL MEASUREMENTS ON THE P-LAYER CONFIRM THE CONCLUSION THAT THE BARRIER LAYER IS A HIGHLY CONDUCTING COPPER SULFIDE. OVERLAYERS OF SIO DEPOSITED ON THE CELL DECREASE THE RATE OF WATER VAPOR DEGRADATION, BUT MECHANICAL IMPERFECTIONS RESTRICT THE THICKNESS OF THE DEPOSITED LAYER. THEORETICAL ANALYSIS OF THE EXPERIMENTAL DATA SHOW SERIOUS AND PROBABLY INSURMOUNTABLE PROBLEMS WITH APPLICATION OF EITHER A SURFACE STATE OR TRAP MODEL FOR THE CDS SOLAR CELL. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD-613 540
WESTINGHOUSE RESEARCH LABS PITTSBURGH PA

VAPOR DEPOSITED THIN FILM PIEZOELECTRIC TRANSDUCERS, (U)

FEB 65 27P DE KLERK,J. ;KELLY,E. F. ;
REPT. NO. SP-64-9F5-108-P1 ,SR-1
CONTRACT: AF19 628 4372
PROJ: 4600
TASK: 460003
MONITOR: AFCRL , 65-73

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:

DESCRIPTORS: (*PIEZOELECTRIC TRANSDUCERS, FILMS), (*FILMS, VAPOR PLATING), VACUUM APPARATUS, CADMIUM COMPOUNDS, SULFIDES, ZINC COMPOUNDS, PULSE GENERATORS, MICROWAVE FREQUENCY, ELECTRON DIFFRACTION ANALYSIS, CRYSTAL STRUCTURE (U)
IDENTIFIERS: CADMIUM SULFIDE, ZINC SULFIDE, THIN FILMS (U)

A NEW VAPOR DEPOSITION TECHNIQUE HAS BEEN DEVELOPED FOR THE PRODUCTION OF INSULATING THIN FILM CDS AND ZNS PIEZOELECTRIC TRANSDUCERS. THESE HIGH EFFICIENCY TRANSDUCERS HAVE BEEN USED TO GENERATE EITHER SHEAR OR COMPRESSIONAL WAVES IN DIELECTRIC MATERIALS AT FREQUENCIES IN THE GIGACYCLE RANGE. THE THICKNESS, WHICH IS MEASURED BY MEANS OF A QUARTZ CRYSTAL MICROBALANCE, IS CONTROLLED TO PRODUCE FILMS WHICH OPERATE AT THEIR FUNDAMENTAL RESONANCE. THE MODE OF THE GENERATED WAVES IS DETERMINED BY THE ORIENTATION OF THE DRIVING ELECTRIC FIELD WITH RESPECT TO THE CRYSTAL AXES OF THE FILM TRANSDUCER. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD-613 699
BARUS RESEARCH LAB OF PHYSICS BROWN UNIV PROVIDENCE R I

STUDY OF SURFACE PROPERTIES OF ATOMICALLYCLEAN METALS AND SEMICONDUCTORS. (U)

DESCRIPTIVE NOTE: PROGRESS REPT. NO. 6, 1 JUN-31 DEC 64,
JAN 65 26P FARNSWORTH,H. E. ;CAMPBELL,B. D. ;
CONTRACT: DA48 043AMC00299E
PROJ: 1AU105U18010

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:

DESCRIPTORS: (*CADMIUM COMPOUNDS, SULFIDES), (*SURFACE PROPERTIES, CADIUM COMPOUNDS), (*SEMICONDUCTORS, SURFACE PROPERTIES), OXYGEN, ADSORPTION, MASS SPECTROSCOPY, CRYSTALS, X-RAY DIFFRACTION ANALYSIS, ION BOMBARDMENT, CATALYSIS, ELECTRICAL PROPERTIES, METALS, ELECTRON DIFFRACTION ANALYSIS (U)
IDENTIFIERS: CADIUM SULFIDE (U)

OXYGEN ADSORPTION ON THE (0001) MATTE SURFACE OF CDS WAS ENHANCED WHEN AN INTENSE LIGHT WAS INCIDENT ON THE CRYSTAL. A 3 TO 5 TORR-MIN OXYGEN EXPOSURE IN INTENSE LIGHT EXTINGUISHED THE DIFFRACTION PATTERN, WHEREAS A 750 TORR-MIN EXPOSURE IN THE DARK HAD LITTLE EFFECT ON THE PATTERN, ALTHOUGH IT CAUSED A SLIGHT DECREASE IN THE CONDUCTIVITY OF THE SURFACE. HIGH TEMPERATURE HEATING IN VACUUM (850C) PRODUCED (1103) THERMAL ETCH PLANES ON THE (0001) MATTE SURFACE. IT WAS FOUND THAT THE PRESENCE OF OXYGEN BEFORE OR DURING THE LIGHT EXPOSURE INCREASED THE EFFECT OF THE LIGHT. IT WAS ALSO FOUND THAT ION BOMBARDMENT INCREASED THE DARK CONDUCTIVITY AND GREATLY DECREASED THE EFFECT OF AN INTENSE LIGHT. FROM THESE OBSERVATIONS IT IS NOTED THAT (1) THE OBSERVED CHANGES IN CONDUCTIVITY TOOK PLACE IN A REGION CLOSE TO OR AT THE SURFACE AS SUGGESTED BY THE EFFECT OF ION BOMBARDMENT, AND (2) EXPOSURE OF THE CRYSTAL TO OXYGEN AND/OR AN INTENSE LIGHT DECREASED THE CONDUCTIVITY NEAR THE SURFACE, POSSIBLY INDICATING PHOTOABSORPTION OF OXYGEN. UNLIKE THE (0001) MATTE SURFACE THE (0001) SPECULAR SURFACE WAS NOT AFFECTED BY EXPOSURE TO AN INTENSE LIGHT.

111 (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD-614 439
DELAWARE UNIV NEWARK DEPT OF PHYSICS

ELECTRO-OPTICAL METHOD FOR INVESTIGATION OF FIELD AND CURRENT DISTRIBUTIONS IN SEMICONDUCTORS AND LAYER-LIKE FIELD DISTRIBUTIONS IN PHOTOCONDUCTORS. (U)

DESCRIPTIVE NOTE: STATUS REPT. NO. 3, 1 OCT-31 DEC 64.

DEC 64 4P BOER,K. W. ;
CONTRACT: NONR433600 ,DA31 124ARO D173

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: SEE ALSO AD-608 273.

DESCRIPTORS: (*SEMICONDUCTORS, FIELD THEORY), (*PHOTOELECTRIC MATERIALS, FIELD THEORY), SINGLE CRYSTALS, CRYSTAL GROWTH, CADMIUM COMPOUNDS, SULFIDES, LUMINESCENCE, ELECTRICAL PROPERTIES, ELECTRON OPTICS, DIELECTRICS (U)

ELECTRO-OPTICAL METHOD FOR INVESTIGATION OF FIELD AND CURRENT DISTRIBUTIONS IN SEMICONDUCTORS AND LAYER-LIKE FIELD DISTRIBUTIONS IN PHOTOCONDUCTORS.

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD-614 494
RCA LABS PRINCETON N J

TUNNELING PROCESSES ACROSS THE CDSELECTROLYTE INTERFACE, (U)

AUG 64 8P MANY,A. ;
CONTRACT: DA31 124ARODB4
MONITOR: ARDD , 4017:6

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: PUB. IN JOURNAL OF PHYSICS AND CHEMISTRY OF SOLIDS V26 P587-93 1965 (COPIES AVAILABLE ONLY TO DDC USERS).

DESCRIPTORS: (*TUNNELING (ELECTRONICS), CADMIUM COMPOUNDS), (*CADMIUM COMPOUNDS, SULFIDES), FIELD EMISSION, ELECTROLYTES, SEMICONDUCTORS, CRYSTALS, SURFACE PROPERTIES, SULFUR (U)
IDENTIFIERS: CADMIUM SULFIDE, SCHOTTKY BARRIERS (U)

THE HIGH-FIELD BEHAVIOR OF THE INTERFACE BETWEEN A CONDUCTING CDS CRYSTAL AND A BLOCKING ELECTROLYTE CONTACT IS STUDIED BY THE USE OF PULSE TECHNIQUES. THE METHOD EMPLOYED IS VERY SUITABLE FOR DETERMINING THE CHARACTERISTICS OF THE SPACE-CHARGE REGION AT THE CRYSTAL SURFACE. IN CONTRAST TO THE CASE OF D.C. MEASUREMENTS, WHERE BREAKDOWN OF THE BLOCKING CONTACT IS NOT APPARENT UP TO FIELDS OF AT LEAST 2X 10,000,000 V/CM, LARGE TRANSIENT CURRENTS THROUGH THE INTERFACE ARE OBSERVED IN THE RANGE 5 X 1,000,000 TO 10,000,000 V/CM. THESE CURRENTS ARE ASCRIBED TO FIELD EMISSION FROM SURFACE STATES INTO THE CONDUCTION BAND OF THE CDS CRUSTA*/YSTAL. THE SURFACE STATES ARE SHOWN TO BE INTIMATELY CORRELATED WITH ELECTROLYTICALLY DEPOSITED SULPHUR. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD-614 909
DELAWARE UNIV NEWARK DEPT OF PHYSICS

LAYERLIKE FIELD INHOMOGENEITIES IN HOMOGENEOUS SEMICONDUCTORS IN THE RANGE OF 'NEGATIVE DIFFERENTIAL CONDUCTIVITY', (U)

64 40P BOER,K. W. ;
CONTRACT: NONR433600

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: AVAILABLE COPY WILL NOT PERMIT FULLY LEGIBLE REPRODUCTION. REPRODUCTION WILL BE MADE IF REQUESTED BY USERS OF DDC. COPY IS AVAILABLE FOR PUBLIC SALE.

DESCRIPTORS: (*SEMICONDUCTORS, FIELD THEORY), (*CADMIUM COMPOUNDS, SULFIDES), ELECTRICAL CONDUCTANCE, ELECTRONS, PARTIAL DIFFERENTIAL EQUATIONS, INTEGRAL EQUATIONS, MATHEMATICAL MODELS, ELECTRIC CURRENTS, PHOTOELECTRIC EFFECT, INFRARED RADIATION, SINGLE CRYSTALS (U)
IDENTIFIERS: CADMIUM SULFIDE, NEGATIVE DIFFERENTIAL CONDUCTIVITY (U)

CHARACTERISTIC LAYERLIKE FIELD INHOMOGENEITIES ARE SHOWN TO OCCUR IN HOMOGENEOUS SEMICONDUCTORS IF THE DECREASE IN CONDUCTIVITY IS STRONGER THAN LINEAR WITH INCREASING FIELD, AND ARE DISCUSSED UNDER A GENERAL ASPECT IN A MODEL USING POISSON- AND TRANSPORT-EQUATIONS AND THE FACT THAT THE NEUTRAL DENSITY OF ELECTRONS AND/OR THE MOBILITY DECREASES WITH INCREASING FIELD STRENGTH. THE METHOD OF CHARACTERISTICS IS USED FOR DISCUSSION AND PERMITS AN ANALYSIS OF THE EXPERIMENTAL OBSERVATIONS EASILY. FURTHER EXPERIMENTAL RESULTS ABOUT LAYERLIKE FIELD INHOMOGENEITIES IN CDS CONCERNING DOMAIN-WIDTH AND FIELD STRENGTHS, INFLUENCE OF OPTICAL EXCITATION AND QUENCHING, AND NET CHARGING OF CDS CRYSTALS ARE GIVEN AND SHOW GOOD AGREEMENT WITH THE PROPOSED THEORY. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD-615 269
HARRY DIAMOND LABS WASHINGTON D C

MECHANISM OF HIGH CONDUCTIVITY IN VACUUMDEPOSITED CADMIUM SULFIDE FILMS, (U)

MAR 65 45P READEY,D. W. ;
REPT. NO. TR-1280
PROJ: 96300 ,1P523801A300

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:

DESCRIPTORS: (*SEMICONDUCTING FILMS, ELECTRICAL CONDUCTANCE), (*CADMIUM COMPOUNDS, SULFIDES), VAPOR PLATING, VACUUM APPARATUS, HEAT TREATMENT, DIFFUSION ATOMIC ENERGY LEVELS, CRYSTAL LATTICES, X-RAY DIFFRACTION ANALYSIS, DYNAMICS (U)
IDENTIFIERS: CADMIUM SULFIDE, THIN FILMS (U)

CADMIUM SULFIDE THIN FILMS ARE OF INTEREST FOR VARIOUS ELECTRONIC DEVICE APPLICATIONS. FILMS DEPOSITED ON COLD SUBSTRATES HAVE HIGH CONDUCTIVITIES UNSUITABLE FOR DEVICE UTILIZATION AND MUST BE HEAT-TREATED TO IMPROVE THEIR PROPERTIES. THIS INVESTIGATION WAS THEREFORE CONCERNED WITH THE HIGH CONDUCTIVITY AND PHENOMENA RESULTING FROM HEAT-TREATMENT TO ELUCIDATE THE MECHANISM THAT GIVES RISE TO THEM. BASED ON KINETIC MEASUREMENTS MADE DURING HEAT-TREATMENT AND OTHER EXPERIMENTS, IT IS CONCLUDED THAT THE HIGH CONDUCTIVITY IS CAUSED BY A NONSTOICHIOMETRIC EXCESS OF CADMIUM IN THE FILMS. DURING HEAT-TREATMENT, THE EXCESS CADMIUM DIFFUSES TO THE FILM SURFACE WHERE IT EVAPORATES, WITH DIFFUSION BEING THE RATE-CONTROLLING MECHANISM. ALSO, THE AS-DEPOSITED FILMS CONTAIN A NUMBER OF ELECTRON TRAPPING SITES, MOST OF WHICH ARE ANNEALED OUT DURING HEAT TREATMENT. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD-615 868
FOREIGN TECHNOLOGY DIV WRIGHT-PATTERSON AFB OHIO

INVESTIGATING THE EFFECT OF GAMMA-RAYS, X-RAYS AND NEUTRONS ON ELECTRIC PROPERTIES OF CDS-SE AND CDSE-SE RECTIFYING SYSTEMS, (U)

MAY 65 5P TALIBI,M. A. ;ABDULAEV,G. B.

REPT. NO. FTD-TT-64-1389
MONITOR: TT , 65-62392

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: UNEDITED ROUGH DRAFT TRANS. OF MONO. FOTOELEKTRICHESKIE I OPTICHESKIE YAVLENIYA V POLUPROVODNIKAKH (PHOTOELECTRIC AND OPTIC PHENOMENA IN SEMICONDUCTORS) KIEV 1959, 1P.

DESCRIPTORS: (*SEMICONDUCTORS, RADIATION DAMAGE), (*CRYSTAL RECTIFIERS, PHOTOCONDUCTIVITY), (*PHOTOCONDUCTIVITY, CRYSTAL RECTIFIERS), (*CADMIUM COMPOUNDS, PHOTOCONDUCTIVITY), GAMMA RAYS, LIGHT, X-RAYS, NEUTRON BOMBARDMENT, SULFIDES, SELENIDES, IMPURITIES, SELENIUM, ELECTRICAL PROPERTIES, USSR, CADMIUM ALLOYS, SELENIUM ALLOYS (U)
IDENTIFIERS: CADMIUM SELENIDES, CADMIUM SULFIDES (U)

THE EFFECTS OF LIGHT, GAMMA RAYS, X-RAYS, AND NEUTRONS WERE STUDIED ON SEMICONDUCTING RECTIFIER SYSTEMS OF SELENIUM DOPED CADMIUM SULFIDE AND CADMIUM SELENIDE. THE RESULTS INDICATE THAT QUANTUM ENERGY OF RADIATION IS NOT RELATED TO THE EFFECTS (VOLT-AMPERE, VOLT-OHM, LUXAMPERE, ETC.) PRODUCED. (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD-616 013
BATTELLE MEMORIAL INST COLUMBUS OHIO

RADIATION EFFECTS IN GAAS. (U)

DESCRIPTIVE NOTE: REVISED ED.,
JAN 63 10P AUKERMAN,L. W. ;DAVIS,P. W. ;
GNAFT,R. D. ;SHILLIDAY,T. S. ;

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: PUB. IN JOURNAL OF APPLIED PHYSICS V34 N12 P3590-9 DEC 1963 (COPIES NOT AVAILABLE TO DDC OR CLEARINGHOUSE CUSTOMERS) SUPPORTED BY AERONAUTICAL RESEARCH LAB., U. S. AIR FORCE.

DESCRIPTORS: (*RADIATION DAMAGE, SEMICONDUCTORS), (*SEMICONDUCTORS, RADIATION DAMAGE), (*GALLIUM ALLOYS, ARSENIC ALLOYS), HEAT TREATMENT, RESISTANCE(ELECTRICAL), ATOMIC ENERGY LEVELS, NEUTRONS, LIGHT TRANSMISSION, ATTENUATION, HEAT OF ACTIVATION, ELECTRICAL PROPERTIES, OPTICAL PROPERTIES, TELLURIUM ALLOYS, CADMIUM ALLOYS, SULFIDES, CADMIUM COMPOUNDS (U)
IDENTIFIERS: GALLIUM ARSENIDE, CADMIUM TELLURIDES, CADMIUM SULFIDE (U)

COMPARISON OF THE ANNEALING PROPERTIES OF RADIATIONINDUCED CONDUCTIVITY CHANGES IN GAAS INDICATES THAT ABOUT 10% OF THE DAMAGE CREATED BY REACTOR IRRADIATIONS ANNEALS IN A MANNER QUITE SIMILAR TO BUT NOT IDENTICAL WITH THAT CREATED BY 1-MEV ELECTRONS. THE REMAINING NEUTRON DAMAGE REQUIRES MUCH HIGHER ANNEALING TEMPERATURES AND IS PRESUMED TO RESULT FROM COMPLICATED DAMAGE STRUCTURES CHARACTERISTIC OF HIGHLY ENERGETIC KNOCK-ON ATOMS (E.G., DISORDERED REGIONS). HEAVY NEUTRON IRRADIATION OF EITHER P- OR N-TYPE GAAS RESULTS IN VERY HIGH RESISTIVITIES WHICH APPEAR TO BE INFLUENCED BY THE PRESENCE OF SLOW SURFACE STATES. ENERGY LEVELS RESULTING FROM NEUTRON IRRADIATION ARE ESTIMATED TO LIE AT APPROXIMATELY 0.1 AND 0.5 EV BELOW THE CONDUCTION BAND AND AT 0.6 EV ABOVE THE VALENCE BAND. MODERATE IRRADIATION OF GAAS BY FAST NEUTRONS GIVES RISE TO A CONTINUOUS OPTICAL ABSORPTION SPECTRUM FOR WAVELENGTHS BEYOND THE FUNDAMENTAL ABSORPTION EDGE, WITH THE ABSORPTION INCREASING AS THE INVERSE SQUARE OF THE WAVELENGTH. SIMILAR BEHAVIOR OCCURS IN CDTE AND CDS AFTER NEUTRON IRRADIATION.

(U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD-616 350
GENERAL ELECTRIC RESEARCH LAB SCHENECTADY N Y

NEW SOLID-STATE DEVICE CONCEPTS, (U)

APR 65 39P AVEN,M. ;CARLSON,R. O. ;EHLE, R. S. ;HALL,R. N. ;WOODBURY,H. H. ;

REPT. NO. SR-1 ,65-GC-0304G
CONTRACT: AF19 628 4976
PROJ: 4608
TASK: 460805
MONITOR: AFCRL , 65-296

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:

DESCRIPTORS: (*SEMICONDUCTORS, MATERIALS), (*CADMIUM COMPOUNDS, SULFIDES), (*ZINC COMPOUNDS, OPTICAL PROPERTIES), (*SEMICONDUCTING FILMS, PHYSICAL PROPERTIES), SILVER, DIFFUSION, SOLUBILITY, IMPURITIES, SELENIDES, TELLURIDES, CRYSTALS, ABSORPTION SPECTRUM, LUMINESCENCE, ELECTROLUMINESCENCE, EMISSIVITY, REFLECTION, ELECTRICAL PROPERTIES, GALLIUM ALLOYS, ARSENIC ALLOYS, METAL FILMS (U)
IDENTIFIERS: CADMIUM SULFIDES, CADMIUM SELENOTELLURIDES, GALLIUM ARSENIDE (U)

THE SOLUBILITY OF AG IN CDS WAS MEASURED BETWEEN 375 AND 900C AND THE RESULTS ARE INTERPRETED TO INDICATE AT LEAST TWO AND PROBABLY THREE DIFFERENT FORMS OF AG IN CDS. DIFFUSION PROFILES WERE OBTAINED BETWEEN 300 AND 500C. THE RATE OF DIFFUSION OF AG SHOWS A STRONG CONCENTRATION DEPENDENCE AND IS EXTREMELY RAPID FOR DILUTE AG CONCENTRATIONS. THE PROFILES ARE DISCUSSED IN TERMS OF THREE INDEPENDENT STEPS IN THE INCORPORATION OF AG IN CDS. OPTICAL ABSORPTION OF ZNSE-X TE1-X CRYSTALS IN THE BAND EDGE REGION AND THEIR EMISSION CHARACTERISTICS UNDER PHOTOLUMINESCENT AND ELECTROLUMINESCENT EXCITATION WERE EXAMINED. THE EXISTENCE OF A MINIMUM IN THE BAND GAPCOMPOSITION RELATIONSHIP WAS CONFIRMED. CONSIDERABLE BROADENING OF THE BAND EDGE PROPERTIES WAS OBSERVED IN BOTH ABSORPTION AND EMISSION FOR THE COMPOSITION RANGE OF 0.09 < X < OR = 0.90. P-N JUNCTIONS FABRICATED FROM ZNSE0.36 TE0.64 CRYSTALS DEMONSTRATED EXTERNAL QUANTUM EFFICIENCIES OF 2.4% WITH THE MAJOR PEAK OF THE ELECTROLUMINESCENCE SPECTRUM AT 2.0 EV. (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD-616 685
AIR FORCE INST OF TECH WRIGHT-PATTERSON AFB OHIO SCHOOL OF ENGINEERING

MULTIPHONON PROCESSES IN THE PHOTOCONDUCTIVITY OF CADMIUM SULFIDE AND CADMIUM SELENIDE SINGLE CRYSTALS. (U)

DESCRIPTIVE NOTE: MASTER'S THESIS,
MAR 65 87P BELL,JAMES ALBERT ;
REPT. NO. GSP-65A

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:

DESCRIPTORS: (*PHOTOCONDUCTIVITY, CADMIUM COMPOUNDS), (*CADMIUM COMPOUNDS, PHOTOCONDUCTIVITY), (*SULFIDES, CADMIUM COMPOUNDS), (*SELENIDES, CADMIUM COMPOUNDS), (*SINGLE CRYSTALS, CADMIUM COMPOUNDS), CRYOGENICS, PHONONS, MEASUREMENT, SEMICONDUCTORS, ELECTRIC CURRENTS, CRYSTAL LATTICES, ATOMIC ENERGY LEVELS, ELECTRON TRANSITIONS, EXCITATION (U)
IDENTIFIERS: CADMIUM SULFIDE, CADMIUM SELENIDE, MULTIPHONON PROCESS (U)

THE PHOTOCONDUCTIVITY OF SINGLE CRYSTALS OF CDS AND CDSE WAS INVESTIGATED AT 4.2K TO ASCERTAIN WHETHER THE MULTIPHONON PROCESS DOES EXIST IN CDSE, TO PROVIDE ADDITIONAL EVIDENCE OF THIS PREVIOUSLY OBSERVED PHENOMENON IN CDS, AND TO SHOW THAT SIMILAR ELECTRON AND PHONON PROCESSES WERE RESPONSIBLE FOR THE MULTIPHONON PROCESS IN BOTH CRYSTALS. PHOTOCONDUCTIVITY WAS INDUCED WITH MONOCHROMATIC LIGHT PROVIDED BY A 1000 WATT TUNGSTEN SOURCE COUPLED WITH A GRATING MONOCHROMATOR. THE PHOTOCURRENTS WERE MEASURED BY A VARIABLE ELECTROMETER AND SIMULTANEOUSLY PLOTTED AGAINST EXCITING PHOTON ENERGIES BY AN X-Y RECORDER. ANALYSIS OF DATA HAS INDICATED THAT THE MULTIPHONON PROCESS DOES EXIST IN CDSE AND THAT THE MULTIPHONON PROCESS IN BOTH CDS AND CDSE CAN BE ATTRIBUTED TO SIMILAR ELECTRON AND PHONON PROCESSES. IT WAS OBSERVED IN THE CDSE DATA THAT BOTH FREE EXCITON AND BOUND EXCITON STATES COULD ACT AS RECOMBINATION CENTERS FOR THE MULTIPHONON PROCESS; ONLY FREE EXCITONS SEEMED TO DO SO IN CDS. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD-616 684
AIR FORCE INST OF TECH WRIGHT-PATTERSON AFB OHIO SCHOOL OF ENGINEERING

LENGTH CHANGE MEASUREMENTS OF ELECTRON IRRADIATED CADMIUM SULFIDE IN THE ENERGY RANGE 275-935 KEV. (U)

DESCRIPTIVE NOTE: MASTER'S THESIS,
JUN 65 73P RICHARD,STEPHEN PIERCE ;
REPT. NO. GSP-65B

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:

DESCRIPTORS: (*SINGLE CRYSTALS, ELECTRON BOMBARDMENT), (*CADMIUM COMPOUNDS, SULFIDES), (*ELECTRON BOMBARDMENT, SINGLE CRYSTALS), CRYSTAL LATTICE DEFECTS, IMPURITIES, CRYOGENICS, TEMPERATURE, SEMICONDUCTORS, SULFUR, DEFORMATION, MEASUREMENT (U)
IDENTIFIERS: CADMIUM SULFIDE (U)

SINGLE CRYSTAL CADMIUM SULFIDE WAS BOMBARDED WITH 275-935 KEV ELECTRONS FROM A VAN DE GRAAFF ACCELERATOR AND THE CHANGE IN LENGTH WAS OBSERVED AT ROOM (295K) AND LIQUID NITROGEN (77K) TEMPERATURES. THE CRYSTAL SHOWED A BARELY DETECTABLE CHANGE IN LENGTH, (-5.7=7.6) X 10 TO THE MINUS 22ND POWER PER ELECTRON PER SQ CM, WHEN BOMBARDED WITH ELECTRONS BELOW THE CADMIUM DISPLACEMENT THRESHOLD AT 295K. ABOVE THE CADMIUM THRESHOLD AN INITIAL CONTRACTION NOT PREDICTED BY THE SIMPLE DISPLACEMENT THEORY OF THE ORDER OF (-6.0 X 0.001) WAS OBSERVED. AFTER THE INITIAL CONTRACTION, AT 550 KEV THE LENGTH CHANGE WAS (+ 1.0=9.8) X 10 TO THE MINUS 23RD POWER PER ELECTRON PER SQ CM, WHILE AT 755 AND 935 KEV, THE LENGTH CHANGES WERE (+4.6=1.5) X 10 TO THE MINUS 22ND POWER PER ELECTRON PER SQ CM AND (-1.5= 2.6) X 10 TO THE MINUS 22ND POWER PER ELECTRON PER SQ CM, RESPECTIVELY. THESE LENGTH CHANGES SHOW THE EFFECT OF AN ANNEALING STAGE WHICH BECOMES DOMINANT AT LARGE CONCENTRATIONS OF DISPLACED CADMIUM ATOMS. THE 77K BOMBARDMENTS AT 275 AND 755 KEV SHOW CONTRACTIONS OF (-1.8=0.6) X 10 TO THE MINUS 22ND POWER PER ELECTRON PER SQ CM AND (-2.9=1.3) X 10 TO THE MINUS 21ST POWER PER ELECTRON PER SQ CM, RESPECTIVELY, WHICH ARE POSTULATED AS CAUSED BY THE DIFFUSION OF INTERSTITIALS THROUGH THE LATTICE AND THE SUBSEQUENT ACCUMULATION OF VACANCIES. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD-616 687
AIR FORCE INST OF TECH WRIGHT-PATTERSON AFB OHIO SCHOOL OF ENGINEERING

MEASUREMENT OF ELECTRON FREE LIFETIME AND TRAPPING FACTOR IN HIGH PURITY CADMIUM SULFIDE, CADMIUM SULFIDE/SELENIDE AND CADMIUM SELENIDE USING THE METHOD OF ULTRASONIC AMPLIFICATION. (U)

DESCRIPTIVE NOTE: MASTER'S THESIS,
MAR 65 99P KRAWETZ,BARTON ;
REPT. NO. SP/PH/65-13

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:

DESCRIPTORS: (*SEMICONDUCTORS, TRANSPORT PROPERTIES), (*CADMIUM COMPOUNDS, TRANSPORT PROPERTIES), (*SULFIDES, TRANSPORT PROPERTIES), (*SELENIDES, TRANSPORT PROPERTIES), TEST METHODS, ULTRASONIC RADIATION, ELECTRON TRANSITIONS, STRESSES, MECHANICAL WAVES, SINGLE CRYSTALS, OXIDES, CRYSTAL GROWTH, PHOTOCONDUCTIVITY, ABSORPTION, PROPAGATION, ATTENUATION, AMPLIFIERS, HALL EFFECT, ACOUSTICS, CADMIUM ALLOYS, SELENIUM ALLOYS (U)
IDENTIFIERS: CADMIUM SELENIDES, CADMIUM SULFIDES (U)

CADMIUM SULFIDE, CADMIUM SULFIDE/SELENIDE, AND CADMIUM SELENIDE WERE STUDIED IN AN EFFORT TO ARRIVE AT ESTIMATES OF SEVERAL ELECTRON TRANSPORT PARAMETERS. ELECTRON FREE LIFETIMES, TRAPPING FACTORS, AND EFFECTIVE DRIFT MOBILITY WERE ALL DEDUCED FROM DIRECT MEASUREMENT OF THE VARIATION OF STRESS WAVE GAIN WITH APPLIED ELECTRIC FIELD AND HALL MOBILITY. ATTEMPTS TO ISOLATE THE CHARACTERISTIC ENERGY LEVEL STRUCTURE OF HIGH QUALITY AMPLIFIER CRYSTALS WERE MADE BY MEANS OF PHOTOCONDUCTIVITY AND ABSORPTION MEASUREMENTS AT BOTH 77K AND 300K. THESE METHODS, IN GENERAL, FAILED TO INDICATE ANY PECULIARITIES WHICH COULD BE READILY CORRELATED WITH AMPLIFIER PERFORMANCE. THE ONE EXCEPTION, A SAMPLE OF CDS COMPENSATED IN SELENIUM, SHOWED A SEVERE DECREASE IN SLOPE AND A BROADENING OF THE PRIMARY ABSORPTION EDGE. DURING ATTEMPTS TO COMPENSATE CDS IN FLOWING OXYGEN, IT WAS DISCOVERED THAT 3 MM. CUBIC CRYSTALS FORMED ON THAT PORTION OF THE CDS DIRECTLY EXPOSED TO THE OXYGEN SOURCE. X-RAY POWDER MEASUREMENTS CONFIRMED THAT THESE CRYSTALS WERE CDO. (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD-616 828
AEROSPACE RESEARCH LABS WRIGHT-PATTERSON AFB OHIO

OSCILLATORY PHOTOCONDUCTIVITY OF CDS, (U)

JUL 64 5P PARK,Y. S. ;LANGER,D. W. ;
REPT. NO. 65-57

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: PUB. IN PHYSICAL REVIEW LETTERS V13 N13 P392-4 SEP 28 1964. (COPIES NOT AVAILABLE TO DDC OR CLEARINGHOUSE CUSTOMERS).

DESCRIPTORS: (*PHOTOCONDUCTIVITY, SEMICONDUCTORS), (*CADMIUM COMPOUNDS, PHOTOCONDUCTIVITY), (*SULFIDES, CADMIUM COMPOUNDS), OSCILLATION, SINGLE CRYSTALS, ATOMIC ENERGY LEVELS, ELECTRON TRANSITIONS, PHOTONS, ENERGY, CRYOGENICS (U)
IDENTIFIERS: CADMIUM SULFIDE (U)

A DISCUSSION IS PRESENTED OF PERIODIC OSCILLATIONS OF THE PHOTOCONDUCTIVITY IN THE IMPURITY REGION MADE AT 4 K ON SELECTED CDS SINGLE CRYSTALS. (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD-617 125
CINCINNATI UNIV OHIO

EXCITON STRUCTURE IN PHOTOCONDUCTIVITY OF CDS, CDSE, AND CDS:SE SINGLE CRYSTALS. (U)

DESCRIPTIVE NOTE: REVISED ED.,
JUL 63 10P PARK,Y. S. ;REYNOLDS,D. C. ;
MONITOR: ARL , 65-56

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: PUB. IN PHYSICAL REVIEW V132 N6 P2450-7 DEC 15 1963 (COPIES NOT AVAILABLE TO DDC OR CLEARINGHOUSE CUSTOMERS) REVISION OF MANUSCRIPT SUBMITTED 24 JUN 63.

DESCRIPTORS: (*CADMIUM COMPOUNDS, PHOTOCONDUCTIVITY), (*CADMIUM ALLOYS, PHOTOCONDUCTIVITY), (*SINGLE CRYSTALS, CADMIUM COMPOUNDS), (*PHOTOCONDUCTIVITY, CRYOGENICS), SEMICONDUCTORS, SELENIUM ALLOYS, SULFIDES, ATOMIC ENERGY LEVELS, ELECTRON TRANSITIONS, EXCITATION, INTERMETALLIC COMPOUNDS, GROUND STATE, SOLID SOLUTIONS, ABSORPTION SPECTRUM (U)
IDENTIFIERS: CADMIUM SULFIDE, CADMIUM SELENIDE (U)

EXCITON-LIKE STRUCTURE HAS BEEN OBSERVED IN THE PHOTOCONDUCTIVE SPECTRAL RESPONSE CURVES OF CDS, CDSE, AND CDS:SE SINGLE CRYSTALS AT 77 AND 4.2K. IT IS OBSERVED THAT A NUMBER OF PEAKS IN THE PHOTOCONDUCTIVITY SPECTRA OF CDS AND CDSE CORRESPOND TO THE EXCITON SPECTRA IDENTIFIED BY OTHER OPTICAL MEASUREMENTS. IN CDS THE PHOTOCONDUCTIVITY PEAKS CORRESPONDING TO N = 1, 2, 3 STATES AND THE SERIES LIMIT OF THE EXCITON FROM THE FIRST AND SECOND VALENCE BANDS AND THE GROUND STATE OF THE EXCITON ASSOCIATED WITH THE THIRD VALENCE BAND WERE OBSERVED. FOR CDSE THE PEAKS CORRESPONDING TO THE N = 1, 2, 3 STATES OF THE EXCITON FROM THE FIRST AND SECOND VALENCE BANDS WERE IDENTIFIED. ONLY THE GROUND STATE WAS IDENTIFIED IN THE SOLID SOLUTIONS. ASSIGNMENT OF THE OBSERVED PHOTOCONDUCTIVITY PEAKS WAS CARRIED OUT BY OBSERVING OPTICAL SELECTION RULES IN POLARIZED LIGHT. WITHIN A GIVEN SERIES THE PEAKS FORM NEARLY HYDROGEN-LIKE ENERGY SPACINGS, AND IT IS OBSERVED THAT THE EXCITON ABSORPTION LINES ALWAYS CORRESPONDED TO PHOTOCURRENT MAXIMA. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD-617 693
HUGHES AIRCRAFT CO FULLERTON CALIF

IMPROVED DELAY LINE TECHNIQUES STUDY. (U)

DESCRIPTIVE NOTE: FINAL REPT.
MAY 65 84P
REPT. NO. FR-65-14-010
CONTRACT: AF30 602 3474
PROJ: AF-4506
MONITOR: RADC , TR-65-45

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:

DESCRIPTORS: (*DELAY LINES, PULSE COMPRESSION), (*PULSE COMPRESSION, DELAY LINES), BANDWIDTH, TRANSDUCERS, HIGH FREQUENCY, FILMS, YTTRIUM, IRON, GARNET, CADMIUM COMPOUNDS, SULFIDES (U)
IDENTIFIERS: CADMIUM SULFIDE (U)

DISPERSIVE DELAY LINES ARE A VERY STABLE AND RELIABLE PULSE COMPRESSION TECHNIQUE. AS A RESULT OF INCREASED REQUIREMENTS PLACED ON PULSE COMPRESSION SYSTEMS SUCH AS BANDWIDTH, AND TIME-BANDWIDTH PRODUCTS, DISPERSIVE DELAY LINE TECHNIQUES MUST BE IMPROVED. IMPROVED DISPERSIVE DELAY LINE TECHNOLOGY AS APPLIED TO PULSE COMPRESSION SYSTEMS WAS INVESTIGATED. HIGHER FREQUENCY OF OPERATION, BROADER BANDWIDTH AND GREATER EASE OF FABRICATION WERE THE PRIMARY AREAS OF INTEREST. TWO DISPERSIVE DELAY LINE CONFIGURATIONS WERE INVESTIGATED. THE FIRST CONFIGURATION WAS A TECHNIQUE BASED ON THE DISPERSIVE CHARACTERISTIC WHICH RESULTS FROM ELASTIC WAVES PROPAGATING IN THIN METAL STRIPS, AND THE SECOND CONFIGURATION WAS BASED ON SLOW WAVE PROPAGATION IN A YTTRIUM IRON GARNET. AN INVESTIGATION WAS UNDERTAKEN TO DETERMINE A HIGHLY EFFICIENT TRANSDUCER TO BE USED IN CONJUNCTION WITH THE DISPERSIVE DELAY LINES. VACUUM DEPOSITED CADMIUM SULFIDE TRANSDUCERS PROVED TO BE MOST DESIRABLE AND SUCCESSFUL IN CONSTRUCTING DELAY LINES OF BROAD INSTANTANEOUS BANDWIDTH. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD-617 749
MOTOROLA INC PHOENIX ARIZ SEMICONDUCTOR PRODUCTS DIV

ACTIVE ACOUSTIC DEVICES. (U)

DESCRIPTIVE NOTE: INTERIM QUARTERLY RPT. NO. 2, 1 OCT-31 DEC 64,
MAY 65 63P SAKIOTIS,N. G. ;BRENDECKE,W. H. ;HICKERNELL,F. S. ;
CONTRACT: AF30 602 3478
PROJ: 5578
TASK: 557802
MONITOR: RADC , TR-65-89

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: SEE ALSO AD-612 703.

DESCRIPTORS: (*TRANSDUCERS, SEMICONDUCTOR DEVICES), (*ACOUSTIC EQUIPMENT, SEMICONDUCTOR DEVICES), (*SEMICONDUCTOR DEVICES, TRANSDUCERS), PHONONS, SOLID STATE PHYSICS, ULTRASONIC PROPERTIES, PIEZOELECTRIC CRYSTALS, EPITAXIAL GROWTH, CADMIUM COMPOUNDS, SULFIDES, FILMS, VAPOR PLATING, VACUUM APPARATUS, ZINC COMPOUNDS, OXIDES (U)
IDENTIFIERS: CADMIUM SULFIDES (U)

INVESTIGATIONS OF SUITABLE HEAT SINK MATERIAL NEEDED FOR CW OPERATION RESULTED IN THE DEVELOPMENT OF A BEOLOADED EPOXY WITH A THERMAL CONDUCTIVITY OF 1.6 BTU/HRFT-DEGREES F. THIS APPEARS COMPATIBLE WITH THE REQUIREMENTS AS PREVIOUSLY DETERMINED. THE OPEN-TUBE OR DYNAMIC TECHNIQUE WAS DETERMINED TO BE THE MOST FEASIBLE FOR THE EPITAXIAL GROWTH OF CDS TRANSDUCERS. THEORETICAL AND EXPERIMENTAL INVESTIGATIONS OF THE VACUUM DEPOSITION OF CDS RESULTED IN FILMS WITH RESISTIVITY VALUES RANGING FROM 300 OHM-CM TO 7 X 10 TO THE 6TH POWER OHM-CM. GOOD QUALITY CDS CRYSTALS WITH HIGH MOBILITY AND INTERMEDIATE RESISTIVITY LEVELS WERE OBTAINED BY ANNEALING IN A SULPHUR ATMOSPHERE. INVESTIGATION OF THE PROPERTIES OF ZINC OXIDE CRYSTALS WERE INITIATED. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD-619 190
DELAWARE UNIV NEWARK DEPT OF PHYSICS

ELECTRO-OPTICAL METHOD FOR INVESTIGATION OF FIELD AND CURRENT DISTRIBUTIONS IN SEMICONDUCTORS AND LAYER-LIKE FIELD DISTRIBUTIONS IN PHOTOCONDUCTORS. (U)

DESCRIPTIVE NOTE: STATUS REPT. NO. 5, 1 APR-30 JUL 65,

JUL 65 4P BOER,K. W. ;
CONTRACT: NONR433600

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: SEE ALSO AD-614 439.

DESCRIPTORS: (*SEMICONDUCTORS, FIELD THEORY), (*PHOTOELECTRIC MATERIALS, FIELD THEORY), ELECTRON OPTICS, CADMIUM COMPOUNDS, SULFIDES, CRYSTAL GROWTH, ELECTRODES, SINGLE CRYSTALS, CRYSTAL GROWTH, DIELECTRICS (U)
IDENTIFIERS: CADMIUM SULFIDE (U)

ELECTRO-OPTICAL METHOD FOR INVESTIGATION OF FIELD AND CURRENT DISTRIBUTIONS IN SEMICONDUCTORS AND LAYER-LIKE FIELD DISTRIBUTIONS IN PHOTOCONDUCTORS.

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD-619 279
EAGLE-PICHER RESEARCH LABS MIAMI OKLA

RESEARCH IN PURIFICATION AND SINGLE CRYSTAL GROWTH OF II-VI COMPOUNDS. (U)

DESCRIPTIVE NOTE: FINAL REPT. FOR 1 MAR 62-28 FEB 65, MAY 65 131P BROWN,LLOYD W. |BUFORD,JOHN T. |FAHRIG,R. H. |FLUESMEIER,A. L. |MUSGRAVE,JOHN R. |
CONTRACT: AF33 657 7127
PROJ: 7885
TASK: 788503
MONITOR: ARL , 65-100

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: SEE ALSO AD-276 416.

DESCRIPTORS: (*SEMICONDUCTORS, PURIFICATION), (*CRYSTAL GROWTH, SEMICONDUCTORS), (*SYNTHESIS(CHEMISTRY), SEMICONDUCTORS), CADMIUM, ZONE MELTING, CADMIUM COMPOUNDS, SULFIDES, CADMIUM ALLOYS, SELENIUM ALLOYS, ZINC COMPOUNDS, ZINC ALLOYS, TELLURIUM ALLOYS, MERCURY COMPOUNDS, MERCURY ALLOYS, BARIUM ALLOYS, IMPURITIES, OXIDES, SINGLE CRYSTALS, ENERGY CONVERSION (U)
IDENTIFIERS: CADMIUM SULFIDE, CADMIUM SELENIDE, ZINC SULFIDE, ZINC SELENIDE, ZINC TELLURIDE, MERCURIC SULFIDE, MERCURIC SELENIDE, MERCURIC TELLURIDE, BARIUM TELLURIDE (U)

THE PREPARATION AND PURIFICATION OF ELEMENTAL CADMIUM BY ZONE REFINING ARE DESCRIBED. A COMPARISON OF THE EMISSION AND MASS SPECTROGRAPHIC RESULTS ON THE ZONING OF A DOPED CADMIUM TEST BAR IS PRESENTED. THE SYNTHESES OF HIGH PURITY CADMIUM SULFIDE, CADMIUM SELENIDE, ZINC SULFIDE, AND ZINC SELENIDE BY THE DIRECT REACTION OF THEIR GASEOUS ELEMENTAL CONSTITUENTS ARE DISCUSSED. EMISSION AND MASS SPECTROGRAPHIC DATA ON SYNTHESIZED CADMIUM SULFIDE ARE COMPARED. THE SYNTHESES OF ZINC TELLURIDE, MERCURIC SULFIDE, MERCURIC SELENIDE, AND MERCURIC TELLURIDE BY THE COMBINATION OF THE ELEMENTS IN THE LIQUID PHASE ARE OUTLINED. A METHOD FOR PREPARING BARIUM TELLURIDE BY THE REDUCTION OF BARIUM TELLURATE IS GIVEN. SPECIAL HANDLING TECHNIQUES AND X-RAY CHARACTERIZATION OF THIS MATERIAL ARE PRESENTED. CRYSTAL GROWTH OF CADMIUM SULFIDE, ZINC SULFIDE, CADMIUM SELENIDE, ZINC SELENIDE, AND MIXED CRYSTALS OF ZINC SULFIDE-ZINC SELENIDE FROM THE MELT IN A HIGH PRESSURE FURNACE IS DISCUSSED. (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD-620 297
CLEVITE CORP CLEVELAND OHIO ELECTRONIC RESEARCH DIV

RESEARCH ON II-VI COMPOUND SEMICONDUCTORS. (U)

DESCRIPTIVE NOTE: FINAL TECHNICAL REPT. FOR 1 JAN 62-31 JAN 65,
MAY 65 218P SHIOZAWA,L. R. ;JOST,J. M. ;
CONTRACT: AF33 657 7399
PROJ: 7885
TASK: 788503
MONITOR: ARL , 65-98

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:

DESCRIPTORS: (*SEMICONDUCTORS, MATERIALS), (*CRYSTAL GROWTH, SEMICONDUCTORS), (*LUMINESCENCE, SEMICONDUCTORS), CADMIUM ALLOYS, CADMIUM COMPOUNDS, ZINC ALLOYS, SULFIDES, SELENIUM ALLOYS, TELLURIUM ALLOYS, PURIFICATION, SINTERING, CRYSTAL LATTICE DEFECTS, ELECTRICAL PROPERTIES, MECHANICAL PROPERTIES, PHASE STUDIES, SOLID SOLUTIONS, DEFORMATION, INTERMETALLIC COMPOUNDS (U)
IDENTIFIERS: CADMIUM SELENIDE, CADMIUM SULFIDE, ZINC SELENIDE, ZINC TELLURIDE (U)

THE REPORT SUMMARIZES THREE YEARS OF RESEARCH ON MATERIAL PURIFICATION AND CRYSTAL GROWTH OF CDS, CDSE, ZNTE, AND CDSE-ZNSE AND ON THE MEASUREMENT OF THE FUNDAMENTAL PROPERTIES OF THE CRYSTALS. IN ADDITION, A PRELIMINARY INVESTIGATION HAS BEEN MADE INTO THE LUMINESCENT PHENOMENA IN CDS. (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD-620 854
MOTOROLA INC PHOENIX ARIZ SEMICONDUCTOR PRODUCTS DIV

ACTIVE ACOUSTIC DEVICES. (U)

DESCRIPTIVE NOTE: QUARTERLY REPT. NO. 3, JAN-31 MAR 65,
AUG 65 78P SAKIOTIS,N. G. (BRENDECKE,W. H. (HICKERNELL,F. S.)
CONTRACT: AF30 602 3478
PROJ: 5570
TASK: 557802
MONITOR: RADC , TR-65-203

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: SEE ALSO AD-612 703.

DESCRIPTORS: (*TRANSDUCERS, SEMICONDUCTOR DEVICES), (*ACOUSTIC EQUIPMENT, SEMICONDUCTOR DEVICES), (*SEMICONDUCTOR DEVICES, TRANSDUCERS), SEMICONDUCTING FILMS, CADMIUM COMPOUNDS, SULFIDES, PIEZOELECTRIC CRYSTALS, SOLID STATE PHYSICS, VAPOR PLATING, VACUUM, GAIN, BERYLLIUM COMPOUNDS, OXIDES, QUARTZ, VERY HIGH FREQUENCY, SURFACE PROPERTIES, AMPLIFIERS, THERMAL CONDUCTIVITY, ULTRASONIC PROPERTIES (U)
IDENTIFIERS: CADMIUM SULFIDES (U)

A HEAT SINK DESIGN HAS BEEN DEMONSTRATED WHICH MAINTAINS THE MAXIMUM CRYSTAL TEMPERATURE RISE TO LESS THAN 10 C ABOVE AMBIENT FOR A RANGE OF VALUES OF DRIFT FIELD POWER DENSITY REQUIRED FOR USEFUL CONTINUOUS ACOUSTIC GAIN. THE WORK ON THIN FILM TRANSDUCERS HAS YIELDED PROCESSES AND TECHNIQUES FOR THE DEPOSITION OF INSULATING CDS FILMS ON CDS SUBSTRATES RESULTING IN CONVERSION LOSSES IN THE RANGE OF 6-8 DB AND BANDWIDTHS OF THE ORDER OF 50% IN THE FREQUENCY OF 100-300 MC/SEC. BONDED QUARTZ TRANSDUCERS OPERATING IN THE FIRST OVERTONE MODE AT 180 MC/SEC WITH CONVERSION LOSSES OF LESS THAN 10 DB WERE DEMONSTRATED. ACOUSTIC AMPLIFIER UTILIZING CDS MATERIAL WAS SHOWN TO OPERATE SATISFACTORILY AT MAXIMUM CRYSTAL TEMPERATURES OF AT LEAST 70 C. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD-620 973
FOREIGN TECHNOLOGY DIV WRIGHT-PATTERSON AFB OHIO

OPTICAL QUANTUM CRYSTAL GENERATOR WITH EXCITATION BY FAST ELECTRONS, (U)

JUN 65 8P BASOV,N. G. ;BUGDANKEVICH,O. V. ;DEVYATKOV,A. G. ;

REPT. NO. FTD-TT-65-555
MONITOR: TT , 65-63914

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: UNEDITED ROUGH DRAFT TRANS. OF AKADEMIYA NUAK SSSR. FIZICHESKII INSTITUT, 1964 7P.

DESCRIPTORS: (*SEMICONDUCTOR DEVICES, LASERS), (*LASERS, ELECTRON BOMBARDMENT), SINGLE CRYSTALS, CADMIUM COMPOUNDS, SULFIDES, ELECTRON BOMBARDMENT, EXCITATION, INTENSITY, PUMPING(ELECTRONICS), LINE SPECTRUM, USSR (U)
IDENTIFIERS: CADMIUM SULFIDE (U)

AN OPTICAL QUANTUM GENERATOR (LASER) WAS OBTAINED PUMPING A CADMIUM SULFIDE SINGLE CRYSTAL WITH AN ELECTRON BEAM, AND ITS SPECTRUM WAS STUDIED. (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD-621 138
NEW YORK UNIV N Y DEPT OF PHYSICS

STUDY OF THE MECHANISM AND PROPERTIES OF THE PHOTOVOLTAIC AND PHOTOCONDUCTIVE EFFECTS IN ORGANIC SUBSTANCES. (U)

DESCRIPTIVE NOTE: FINAL REPT. FOR 1 NOV 63-31 OCT 64,
MAR 65 23P KALLMANN,HARTMUT P. ;
CONTRACT: AF19 628 2446
PROJ: 8659
TASK: 865901
MONITOR: AFCRL , 65-240

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:

DESCRIPTORS: (*ORGANIC MATERIALS, PHOTOELECTRIC EFFECT), (*PHOTOELECTRIC EFFECT, ORGANIC MATERIALS), (*PHOTOCONDUCTIVITY, ORGANIC MATERIALS), POLYCYCLIC COMPOUNDS, GERMANIUM, ZINC COMPOUNDS, SULFIDES, SEMICONDUCTING FILMS, ILLUMINATION, ABSORPTION, PHOTOCHEMISTRY, SOLUTIONS, CADMIUM COMPOUNDS, SINGLE CRYSTALS (U)
IDENTIFIERS: ANTHRACENES, CADMIUM SULFIDE, ZINC SULFIDE (U)

RESEARCH RESULTS IN THE FOLLOWING AREAS ARE REPORTED: LARGER THAN BAND GAP PHOTOVOLTAGES IN ANTHRACENE, GERMANIUM LAYERS, AND EVAPORATED ZINC SULFIDE LAYERS; AND PHOTOVOLTAGES DUE TO INHOMOGENEOUS ABSORPTION OF LIGHT AND TO CHEMICAL EFFECTS IN ORGANIC SOLUTIONS (E.G., ALPHA-METHYL NAPHTHALENE, BENZENE, HEMIMELLITINE, MESITYLENE) AND IN CADMIUM SULFIDE SINGLE CRYSTALS. (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD-621 424
AMERICAN METEOROLOGICAL SOCIETY BOSTON MASS

INTRODUCTION OF MICROIMPURITIES INTO SINGLE CRYSTALS OF CDS DURING THEIR GROWTH AND SOME CHARACTERISTICS OF THE ALLOYED SAMPLES (VVEDENNIA MIKRODOMISHOK V MONOKRYSTALY CDS V PROTSESI IKH ROSTU TA DEIAKI KHARAKTERYSTYKY LEGOVANYKH ZRAZKIV). (U)

DESCRIPTIVE NOTE: RESEARCH TRANSLATION,
SEP 64 9P BULAKH,B. M. IMIZETSKA,I. B.
;
REPT. NO. T-U-3
CONTRACT: AF19 628 3880
MONITOR: TT , 65-63977

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: TRANS. OF UKRAYINSKYII FIZYCHNYI ZHURNAL (USSR) V7 N10 P1125-7 1962.

DESCRIPTORS: (*SEMICONDUCTORS, IMPURITIES), (*CADMIUM COMPOUNDS, SULFIDES), (*SINGLE CRYSTALS, SEMICONDUCTORS), GERMANIUM, GOLD, SILVER, COPPER, CHLORINE, CRYSTAL GROWTH, PHOTOSENSITIVITY, PHOTOCONDUCTIVITY, USSR (U)

THE OBJECT OF THE WORK WAS TO DEVELOP A METHOD OF ALLOYING SINGLE CRYSTALS OF CDS DURING THEIR GROWTH AND TO STUDY THE EFFECT OF MICROIMPURITIES ON CERTAIN PHYSICAL PROPERTIES OF THE ALLOYED SEMICONDUCTORS. (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD-621 454
HARSHAW CHEMICAL CO CLEVELAND OHIO

RESEARCH ON PHOTOVOLTAIC CELLS. (U)

DESCRIPTIVE NOTE: FINAL REPT. FOR 1 MAY 62-30 APR 65, JUN 65 125P HEYERDAHL,NORMAN E. ;HARVEY, DONALD J. ;
CONTRACT: AF33 657 7916
PROJ: 7885
TASK: 788502
MONITOR: ARL , 65-111

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: SEE ALSO AD-439 672.

DESCRIPTORS: (*SOLAR CELLS, SEMICONDUCTING FILMS), (*SEMICONDUCTING FILMS, SOLAR CELLS), CADMIUM COMPOUNDS, SULFIDES, SELENIUM, CADMIUM ALLOYS, SELENIUM ALLOYS, TELLURIUM ALLOYS, ZINC ALLOYS, GALLIUM ALLOYS, ARSENIC ALLOYS, CHEMICAL MILLING, VAPOR PLATING, MAGNETIC PROPERTIES, ELECTRICAL PROPERTIES, THERMOELECTRICITY, LIGHT TRANSMISSION (U)
IDENTIFIERS: THIN FILMS (U)

THE REPORT DESCRIBES RESEARCH AND DEVELOPMENT ON THIN FILM SOLAR BATTERIES. THE FABRICATION AND STUDY OF THIN FILMS OF CDS:SE, CDSE, CDTE, ZNSE, AND GAAS AND THIN FILM SOLAR BATTERIES OF CDS:SE, CDSE, AND CDTE IS DISCUSSED IN DETAIL. A STUDY OF THE ETCHING BEHAVIOUR OF II-VI COMPOUNDS, COMPLETED AS A PART OF THIS PROGRAM, HAS BEEN PUBLISHED ELSEWHERE. AN ABSTRACT OF THE WORK IS INCLUDED IN THIS REPORT. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD-621 941
GENERAL ELECTRIC CO SCHENECTADY N Y RESEARCH AND DEVELOPMENT CENTER

NEW SOLID-STATE DEVICE CONCEPTS. (U)

DESCRIPTIVE NOTE: SCIENTIFIC REPT.,
JUL 65 35P AVEN,M. ICARLSON,R. O. IEHLE, R. S. IHALL,R. N. IWOODBURY,H. H. I
REPT. NO. SR-2 ,65GC-0313G
CONTRACT: AF19 628 4976
PROJ: 4608
TASK: 460805
MONITOR: AFCRL , 65-611

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: SEE ALSO AD-616 350.

DESCRIPTORS: (*SEMICONDUCTOR DEVICES, MATERIALS), (*LASERS, SEMICONDUCTOR DEVICES), (*CADMIUM COMPOUNDS, SULFIDES), (*ZINC COMPOUNDS, ELECTRICAL PROPERTIES), (*SEMICONDUCTING FILMS, PHYSICAL PROPERTIES), OXYGEN, SULFUR COMPOUNDS, OXIDES, SULFIDES, TRANSPORT PROPERTIES, ELECTROLUMINESCENCE, SELENIDES, TELLURIDES, METAL FILMS, SILVER, GOLD, ALUMINUM, GALLIUM ALLOYS, ARSENIC ALLOYS, OPTICAL PROPERTIES (U)
IDENTIFIERS: CADMIUM SULFIDE, GALLIUM ARSENIDE, ZINC SELENOTELLURIDES, ZINC SULFIDE (U)

ATTENTION ON CDS WAS SHIFTED TO STOICHIOMETRIC PROBLEMS AND THE EFFECTS OF 02. BECAUSE OF THE HIGH STABILITY OF S02, FIRING CDS IN 02 PRODUCES A 'REDUCING' ACTION ON THE BULK CRYSTAL, EQUIVALENT TO A SMALL EXCESS CD FIRING. ELECTRICAL TRANSPORT AND CONTACT PROPERTIES OF 1 TO 10 OHM-CM NTYPE ZNS CRYSTALS WERE STUDIED. TWO TYPES OF LEVELS WERE FOUND BELOW THE CONDUCTION BAND OF ZNS: SHALLOW DONOR LEVELS AT 0.014 EV AND DEEPER LEVELS BETWEEN 0.10 AND 0.29 EV. INJECTION ELECTROLUMINESCENT P-N JUNCTIONS HAVE BEEN PREPARED FROM ZNSE0.36TE0.64 WHICH SHOW EXTERNAL QUANTUM EFFICIENCIES OF 18% AT 70K. THE RESISTANCE OF VARIOUS ALLOYED CONTACTS AND GOLD THERMOCOMPRESSION BONDS TO N- AND P-TYPE GAAS WAS MEASURED. THE INTERFACE RESISTANCE OF EVAPORATED FILMS OF AG, AU, AND AL APPLIED TO GAAS IS HIGH UNLESS THE FILMS ARE SUBJECTED TO A HIGH-TEMPERATURE ALLOYING STEP WHICH DAMAGES THEIR REFLECTING PROPERTIES.

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD-622 695
HARRY DIAMOND LABS WASHINGTON D C

VACUUM-DEPOSITED CADMIUM SULFIDE THIN FILMS, (U.

JUL 65 41P AVIS,G. G. IBOLSMAN,H. C. ;
READEY,D. W. ;
REPT. NO. TR-1297
PROJ: DA1P523801A300 ,HDL96300

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:

DESCRIPTORS: (*SEMICONDUCTING FILMS, VAPOR PLATING), (*CADMIUN COMPOUNDS, SULFIDES), VACUUM APPARATUS, RESISTANCE(ELECTRICAL), HEAT TREATMENT, CRYSTAL STRUCTURE, SANDWICH CONSTRUCTION, ELECTRICAL PROPERTIES (U)
IDENTIFIERS: THIN FILMS (U)

CADMIUM SULFIDES WAS VACUUM-DEPOSITED ONTO GLASS SUBSTRATES AT APPROXIMATELY 0.00002 TORR USING ELECTRON BEAM HEATING. INITIAL RESISTIVITIES WERE IN THE RANGE 0.1 TO 1 OHM-CM. AFTER HEATING IN VACUUM AT 360 TO 370C FOR 1/2 HR, THE RESISTIVITIES INCREASED TO THE RANGE 0.3 TO 300,000 OHM-CM. TO CORRELATE RESISTIVITY WITH CRYSTAL STRUCTURE, THE CADMIUM SULFIDE FILMS WERE STUDIED BY MEANS OF X-RAY AND ELECTRON DIFFRACTION, AND SPECTROPHOTOMETRY. IT WAS FOUND THAT THESE CADMIUM SULFIDE FILMS WERE HEXAGONAL AND HIGHLY ORIENTED WITH THE C-AXIS PERPENDICULAR TO THE PLANE OF THE SUBSTRATE. GRAIN SIZE PERPENDICULAR TO THE C-AXIS WAS MUCH LESS THAN 100 A AFTER DEPOSITION ONTO ROOM-TEMPERATURE SUBSTRATES, AND INCREASED TO 100 TO 200 A IN DIAMETER AFTER HEAT TREATMENT. TO DETERMINE THE TYPE OF CONTACT THE COMMONLY DEPOSITED METALS MAKE TO CADMIUM SULFIDE, A MASK CHANGER WAS EMPLOYED TO ALLOW THE DEPOSITION OF LAYERIZED ARRAYS OF METAL-CADMIUM SULFIDE-METAL IN A SINGLE PUMPDOWN. ALUMINUM, INDIUM, SILVER, AND GOLD WERE THEREBY DEPOSITED IN SEVERAL DIFFERENT ELECTRODE COMBINATIONS. COMBINATIONS HAVING ALUMINUM AS ONE (OR BOTH) OF THE ELECTRODES EXHIBITED RECTIFYING CHARACTERISTICS; ALL OTHER COMBINATIONS EXHIBITED OHMIC CHARACTERISTICS. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD-623 045
STANFORD UNIV CALIF DEPT OF MATERIALS SCIENCE

PHOTO-HALL STUDIES OF OXYGEN ADSORPTION EFFECTS ON PHOTOCONDUCTIVITY IN SINTERED LAYERS. (U)

DESCRIPTIVE NOTE: MASTER'S THESIS,
APR 65 6P ROBINSON,ARTHUR L. ;BUBE, RICHARD H. ;
MONITOR: AROD , 4119:6

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: PUB. IN JOURNAL OF THE ELECTROCHEMICAL SOCIETY V112 N10 P1002-5 OCT 1965 (COPIES NOT AVAILABLE TO DDC OR CLEARINGHOUSE CUSTOMERS).

DESCRIPTORS: (*SEMICONDUCTORS, CHEMISORPTION), (*HALL EFFECT, CHEMISORPTION), (*PHOTOCONDUCTIVITY, CHEMISORPTION), (*CADIUM COMPOUNDS, PHOTOCONDUCTIVITY), (*CHEMISORPTION, SEMICONDUCTORS), SULFIDES, SELENIDES, OXYGEN, ADSORPTION, HEAT TREATMENT (U)
IDENTIFIERS: PHOTOADSORPTIVE EFFECT (U)

THE HALL MOBILITY AND THE FREE ELECTRON DENSITY IN SINTERED LAYERS OF CDS-CDSE WERE MEASURED AS A FUNCTION OF PHOTOEXCITATION INTENSITY, TEMPERATURE, AND AMBIENT ATMOSPHERE. BOTH FREE CARRIER DENSITY AND HALL MOBILITY ARE REDUCED BY THE ADSORPTION OF OXYGEN AND INCREASED BY THE DESORPTION OF OXYGEN. THE MAGNITUDES OF THE EFFECTS ARE SUCH THAT IN ALL CASES THE HALL MOBILITY CHANGE DUE TO ADSORPTION CONTRIBUTES SIGNIFICANTLY TO THE PHOTOCONDUCTIVITY CHANGE. EFFECTS ASSOCIATED WITH PHOTOADSORPTION OF OXYGEN ARE REVERSIBLE BY ANNEALING IN VACUUM. RESULTS CAN BE CONSISTENTLY DESCRIBED IN TERMS OF THE MODEL FOR CHEMISORPTION OF OXYGEN ON SINTERED LAYERS PROPOSED BY SHEAR, HILTON, AND BUBE. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD-623 165
BELL AND HOWELL RESEARCH CENTER PASADENA CALIF

ANALYTICAL TECHNIQUES FOR THE DETERMINATION OF TRACE IMPURITIES IN CADMIUM SULFIDE. (U)

DESCRIPTIVE NOTE: TECHNICAL DOCUMENTARY REPT. FOR 1 JUN 62-31 MAY 65,
JUN 65 61P WILLARDSON,R. K. ;SOCHA,A. J.
;
CONTRACT: AF33 657 8976
PROJ: 7865
TASK: 786503
MONITOR: ARL , 65-130

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:

DESCRIPTORS: (*SEMICONDUCTORS, IMPURITIES), (*CADMIUM COMPOUNDS, SULFIDES), (*MASS SPECTROSCOPY, SEMICONDUCTORS), SPECTRUM ANALYZERS, SPARKS, POWDERS, SINGLE CRYSTALS, CONTAMINATION, IONIZATION POTENTIALS, ZINC ALLOYS, ZINC COMPOUNDS, SELENIUM ALLOYS, SOLID SOLUTIONS, CADMIUM, ZINC, CADMIUM ALLOYS (U)
IDENTIFIERS: CADMIUM SELENIDE, CADMIUM SULFIDE, ZINC SELENIDE, ZINC SULFIDE (U)

ANALYTICAL TECHNIQUES WERE DEVELOPED FOR THE ANALYSIS OF TRACE IMPURITIES IN CADMIUM SULFIDE. THE DETECTION LIMIT FOR MOST IMPURITIES IS LESS THAN 10 PARTS PER BILLION (ATOMIC). MATERIALS ANALYZED WERE IN THE FORM OF FINE POWDERS, FRAGILE NEEDLES AND PLATELETS, AS WELL AS BULK CRYSTALS OF CDS, CDSE, ZNS, ZNSE, CDS:CDSE, CDS:ZNSE, CD AND ZN. THE APPROACHES USED FOR OBTAINING ACCURATE ANALYTICAL RESULTS ARE APPLICABLE TO MOST SOLID STATE MATERIALS. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZ/HT

AD-623 174
BROWN UNIV PROVIDENCE R I

STUDY OF SURFACE PROPERTIES OF ATOMICALLYCLEAN METALS AND SEMICONDUCTORS. PART 1. STUDY OF CDS SURFACES BY LEED. PART 2. COMBINED LEED AND MASS SPECTROMETER MEASUREMENTS FOR ADSORPTION AND CATALYSIS. (U)

DESCRIPTIVE NOTE: PROGRESS REPT. NO. 7, 1 JAN-30 JUN 65,
JUL 65 29P FARNSWORTH,H. E. ;CAMBELL,B. D. ;ONCHI,M. ;
CONTRACT: DA28 043AMCOO299E
PROJ: DA 1A0 10501B010

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTES: SEE ALSO AD-623 174.

DESCRIPTORS: (*SEMICONDUCTORS, SURFACE PROPERTIES), (*CADMIUM COMPOUNDS, SULFIDES), (*NICKEL, SURFACE PROPERTIES), CRYSTAL GROWTH, PURIFICATION, ION BOMBARDMENT, HEAT TREATMENT, OXYGEN, ADSORPTION, PHOTOELECTRIC EFFECT, X-RAY DIFFRACTION ANALYSIS, CATALYSIS, CARBON COMPOUNDS, MONOXIDES, MASS SPECTROSCOPY (U)
IDENTIFIERS: CADMIUM SULFIDE, CARBON MONOXIDE (U)

THE (000/1) MATTE NATURAL GROWTH SURFACE OF A VAPOR GROWN CDS CRYSTAL WHICH HAD NOT BEEN POLISHED OR ETCHED WAS STUDIED. IT WAS NOT POSSIBLE TO OBTAIN A CLEAN SURFACE BY HEATING ALONE BECAUSE OF CONTAMINATION FROM THE BULK. ION BOMBARDMENT AND ANNEALING PRODUCED (10/1/4) PLANES AS WAS FOUND ON PREVIOUSLY STUDIED CRYSTALS. OXYGEN ADSORPTION STUDIES OF THE (000/1) MATTE SURFACE, AFTER USING GA-IN EUTECTIC TO MAKE CONTACT TO THE CRYSTAL MOUNT, WERE MADE. HOWEVER, THE MAGNITUDE OF THESE CHANGES WAS NOT REPRODUCIBLE. OXYGEN ADSORPTION STUDIES OF THE (0001) SPECULAR SURFACE WITH NO GA-IN CONTACT REVEALED THAT PHOTOASSISTED ADSORPTION OCCURRED. THE CHANGE IN SURFACE POTENTIAL WAS APPROXIMATELY DIRECTLY PROPORTIONAL TO THE CHANGE IN OXYGEN COVERAGE AS ESTIMATED FROM DECREASES IN DIFFRACTION PATTERN INTENSITIES. THIS INDICATES THAT THE OXYGEN FORMS NEGATIVE SURFACE STATES. THE SYSTEM INVOLVING A COMBINATION OF LEED AND QUADRUPOLE MASS SPECTROMETER WAS ASSEMBLED AND TESTED WITH SELF OXIDATION OF CO ON A (100) NICKEL CRYSTAL SURFACE. (THE DIAGONAL MARK (/) IS HERE USED TO INDICATE THE ROTATION-INVERSION AXIS). (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD-623 363
DELAWARE UNIV NEWARK DEPT OF PHYSICS

LAYER-LIKE FIELD INHOMOGENEITIES IN HOMOGENEOUS SEMICONDUCTORS IN THE RANGE OF 'N-SHAPED NEGATIVE DIFFERENTIAL CONDUCTIVITY', (U)

MAR 65 12P BOER,K. W. I
CONTRACT: DA-31-124-ARO(D)-173, NONR-4336(00)
MONITOR: AROD , 4461:4

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: PUB. IN THE PHYSICAL REVIEW V139 N6A PA1949-59 SEP 13 1965 (COPIES NOT AVAILABLE TO DDC OR CLEARINGHOUSE CUSTOMERS).

DESCRIPTORS: (*SEMICONDUCTORS, FIELD THEORY), (*TRANSPORT PROPERTIES, SEMICONDUCTORS), ELECTRIC FIELDS, ABSORPTION SPECTRUM, ELECTRICAL CONDUCTANCE, VOLTAGE, EXCITATION, QUENCHING(INHIBITION), SINGLE CRYSTALS, CADMIUM COMPOUNDS, SULFIDES (U)
IDENTIFIERS: CADMIUM SULFIDE (U)

CHARACTERISTIC LAYER-LIKE FIELD INHOMOGENEITIES ARE SHOWN TO OCCUR IN HOMOGENEOUS SEMICONDUCTORS IF THE DECREASE IN CONDUCTIVITY IS STRONGER THAN LINEAR WITH INCREASING FIELD. THESE INHOMOGENEITIES ARE DISCUSSED GENERALLY IN A MODEL USING POISSON AND TRANSPORT EQUATIONS, AND THE FACT THAT THE NEUTRAL DENSITY OF ELECTRONS AND/OR THE MOBILITY DECREASES WITH INCREASING FIELD STRENGTH. THE METHOD OF CHARACTERISTICS IS USED FOR DISCUSSION IN ORDER TO FACILITATE ANALYSIS OF THE EXPERIMENTAL OBSERVATIONS. FURTHER EXPERIMENTAL RESULTS ABOUT LAYER-LIKE FIELD INHOMOGENEITIES IN CDS CONCERNING DOMAIN WIDTH AND FIELD STRENGTHS, INFLUENCE OF OPTICAL EXCITATION AND QUENCHING, AND NET CHARGING OF CDS CRYSTALS ARE GIVEN AND SHOW GOOD AGREEMENT WITH THE PROPOSED THEORY. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD-623 895 20/2 20/12
DELAWARE UNIV NEWARK DEPT OF PHYSICS

X-RAY DAMAGE AND ANNEALING OF THESE DEFECTS IN CDS SINGLE CRYSTALS. (U)

DESCRIPTIVE NOTE: TECHNICAL REPT.,
NOV 65 12P BOER,K. W. ;O'CONNELL,J. C. ;
SCHUBERT,R. ;
REPT. NO. TR-3
CONTRACT: NONR-4336(00)

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:

DESCRIPTORS: (*SINGLE CRYSTALS, DEGRADATION), (*CADMIUM COMPOUNDS, SULFIDES), CRYSTAL LATTICE DEFECTS, X RAYS, ANNEALING, PHOTOCONDUCTIVITY, ELECTRICAL PROPERTIES, ELECTRIC CURRENTS, TEST METHODS, SEMICONDUCTORS (U)

THE INFLUENCE OF X-RAY DAMAGE AT 250 KEV AND 300 KEV IN ULTRA-HIGH VACUO ON THE SPECTRAL DISTRIBUTION OF PHOTOCONDUCTIVITY AND CONDUCTIVITY GLOW CURVES IS DESCRIBED. THE OBSERVED DAMAGE CAN BE EXPLAINED BY ASSUMING A PRODUCTION OF SULFUR VACANCIES BY X-RAYS AND A LATER DIFFUSION DETERMINED FORMATION OF ASSOCIATES OF THESE VACANCIES WITH ACCEPTORS RESULTING IN RECOMBINATION CENTERS. THE THRESHOLD ENERGY FOR SULFUR VACANCY FORMATION LIES AT ABOUT 250 KEV. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD-625 476 20/12
BROWN UNIV PROVIDENCE R I METALS RESEARCH LAB

PHYSICAL RESEARCH ON PROPERTIES OF II-VI COMPOUND SEMI CONDUCTORS. (U)

DESCRIPTIVE NOTE: FINAL REPT., APR 62-APR 65,
JUN 65 52P ELBAUM,CHARLES ;LORD,ARTHUR
;TRUELL,RHON ;
CONTRACT: AF33(657)-8317
PROJ: AF-7385
TASK: 738503
MONITOR: ARL , 65-123

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:

DESCRIPTORS: (*SEMICONDUCTORS, SOLID STATE PHYSICS), (*CADMIUM COMPOUNDS, SULFIDES), ULTRASONIC PROPERTIES, ELECTRICAL PROPERTIES, MECHANICAL WAVES, STRESSES, ULTRASONIC RADIATION, DAMPING, HARMONIC GENERATORS, TEMPERATURE, PIEZOELECTRIC EFFECT, ANNEALING (U)
IDENTIFIERS: CADMIUM SULFIDE (U)

THE WORK DESCRIBED IN THIS REPORT WAS CONCERNED PRIMARILY WITH ULTRASONIC AND ELECTRICAL MEASUREMENTS MADE ON CADMIUM SULPHIDE SINGLE CRYSTALS FOR THE PURPOSE OF STUDYING THE INTERACTION OF HIGH FRQUENCY STRESS WAVES WITH CHARGE CARRIERS. THE TEMPERATURE DEPENDENCE OF ULTRASONIC ATTENUATION, ABOVE ROOM TEMPERATURE, WAS FOUND TO FOLLOW THE PREDICTED DEPENDENCE ON THE DENSITY OF THERMALLY EXCITED CHARGE CARRIERS. THE GENERATION OF THE SECOND HARMONIC OF AN ULTRASONIC WAVE HAS BEEN STUDIED AS A FUNCTION OF LIGHT INTENSITY (DENSITY OF CHARGE CARRIERS). THE AMPLITUDE OF THE SECOND HARMONIC GENERALLY INCREASES INITIALLY WITH INCREASING LIGHT INTENSITY AND THEN REACHES A SATURATION VALUE OR BROAD MAXIMUM. THE GENERAL BEHAVIOR OF THE SECOND HARMONIC IS QUITE COMPLICATED AND IT CANNOT AT PRESENT BE FITTED WITH ANY SIMPLE FORMALISM OF NONLINEAR PHENOMENA IN SOLIDS. MEASUREMENTS OF ELECTRICAL RESISTIVITY AS A FUNCTION OF POSITION IN THE SAMPLE AND AS A FUNCTION OF LOCALIZED ILLUMINATION REVEAL VERY SUBSTANTIAL INHOMOGENEITY IN RESPONSE TO LIGHT OF ALL THE SPECIMENS STUDIED THUS FAR. THE TRANSDUCING PROPERTIES OF CADMIUM SULPHIDE HAVE BEEN FOUND TO DEPEND ON HEAT TREATMENT THROUGH THE FORMATION OF SURFACE FILMS WHICH CAN BE MECHANICALLY REMOVED AND REFORMED. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD-626 530 20/12 20/2
CLEVITE CORP CLEVELAND OHIO ELECTRONIC RESEARCH DIV

RESEARCH ON II-VI COMPOUND SEMICONDUCTORS. (U)

DESCRIPTIVE NOTE: QUARTERLY REPT. NO. 1, 1 JAN-31 MAR 62,
APR 62 51P SHIOZAWA,LEBO R. ;BARRETT,J. L. ;CHOTKEVYS,G. P. ;DEVLIN,S. S. ;JOST,J. M. ;
CONTRACT: AF33(657)-7399

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: SEE ALSO AD-626 532.

DESCRIPTORS: (*SEMICONDUCTORS, SOLID STATE PHYSICS), PURIFICATION, CRYSTAL GROWTH, CADMIUM COMPOUNDS, SULFIDES, SELENIUM ALLOYS, CADMIUM ALLOYS, ZINC ALLOYS, TELLURIUM ALLOYS, INTERMETALLIC COMPOUNDS, ZONE MELTING, VAPOR PRESSURE, DIFFUSION, ELECTRICAL PROPERTIES, CRYSTAL GROWTH (U)
IDENTIFIERS: CADMIUM SULFIDE, CADMIUM SELENIDE, ZINCTELLURIDE (U)

FIRST QUARTER PROGRESS ON THE PURIFICATION, CRYSTAL GROWTH, AND PROPERTIES OF CDS, CDSE, AND ZNTE ARE SUMMARIZED. DIFFICULTIES WERE ENCOUNTERED WHEN ZONE REFINING OF CDSE WAS ATTEMPTED. THE ADVANTAGES OF USING SHAPED TUBES FOR VAPOR-PHASE GROWTH OF CRYSTALS ARE DESCRIBED. THE VAPOR PRESSURE OF CDSE IS DISCUSSED AND COMPARED WITH EXPERIMENTAL DATA. THE DIFFUSION OF CD IN CDSE WAS ANALYZED BY CONDUCTIVITY MEASUREMENTS; AND THE DATA ARE SHOWN TO AGREE CLOSELY WITH SIMPLE DIFFUSION THEORY. A DIFFUSION CONSTANT OF 5.41 X 10-1 TO THE MINUS 10TH POWER SQ CM/SEC IS OBTAINED FOR A CRYSTAL TEMPERATURE OF 1000C. THE TEMPERATURE DEPENDENCE OF THE CARRIER MOBILITY SHOWS THAT THE DOMINANT LATTICE SCATTERING IN CDSE AND ZNTE IS DUE TO OPTICAL MODES AS IN CDS. THE MOBILITY OF THE CARRIERS IN N-TYPE CDSE AND P-TYPE ZNTE IS 5300 SQ CM/VOLT SEC AND 2550 SQ CM/VOLT SEC RESPECTIVELY AT 79K IN THE PARTICULAR CRYSTALS MEASURED. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZ/HT

AD-626 532 20/12 20/2
CLEVITE CORP CLEVELAND OHIO ELECTRONIC RESEARCH DIV

RESEARCH ON II-VI COMPOUND SEMICONDUCTORS. (U)

DESCRIPTIVE NOTE: QUARTERLY REPT. NO. 2, 1 APR-30 JUN 62,
AUG 62 33P SHIOZAWA,LEBO R. ;JOST,J. M. ; DEVLIN,S. S. ;CHOTKEVYS,G. P. ;BARRETT,J. L. ;
CONTRACT: AF33(657)-7399

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: SEE ALSO AD-626 530.

DESCRIPTORS: (*SEMICONDUCTORS, SOLID STATE PHYSICS), CADMIUM ALLOYS, SELENIUM ALLOYS, PHASE STUDIES, CADMIUM COMPOUNDS, SULFIDES, ZINC ALLOYS, TELLURIUM ALLOYS, VAPOR PRESSURE, DIFFUSION, THERMAL EXPANSION, ELECTRICAL PROPERTIES, SOUND TRANSMISSION, OPTICAL PROPERTIES, COLORS, HEAT OF SUBLIMATION, ENTROPY, HEAT OF ACTIVATION, ELASTICITY, INTERMETALLIC COMPOUNDS, CRYSTAL GROWTH (U)
IDENTIFIERS: CADMIUM SULFIDE, CADMIUM SELENIDE, ZINCTELLURIDE (U)

EFFORTS IN THE SECOND QUARTER CONTINUE TO EMPHASIZE PHASE EQUILIBRIA IN THE SYSTEM CD:SE. THE VAPOR PRESSURE OF CDSE DETERMINED BY A FREE SUBLIMATION METHOD IN THE TEMPERATURE RANGE 972 TO 1247C YIELDED A STANDARD HEAT AND ENTROPY OF SUBLIMATION OF 87 KCAL/MOLE AND 53 CAL/ MOLE/K RESPECTIVELY. THE TEMPERATURE-PRESSURE PROJECTION OF THE SE-RICH PORTION OF THE CD:SE PHASE DIAGRAM WAS APPROXIMATELY DEFINED. NEW DIFFUSION MEASUREMENTS AT 1052 AND 1100C GIVE AN ACTIVATION ENERGY FOR DIFFUSION OF CD DONORS IN CDSE OF 88 KCAL/MOLE, AND A PRE-EXPONENTIAL TERM OF 900,000 SQ CM /SEC. THERMAL EXPANSION COEFFICIENTS FOR ZNTE, CDSE, AND CDSE WERE DETERMINED IN THE RANGE 0 - 300C. A COMPLETE SET OF ELASTIC, PIEZOELECTRIC, AND DIELECTRIC CONSTANTS OF ZNSE WERE OBTAINED AND ARE FOUND TO BE INTERMEDIATE IN VALUE BETWEEN THOSE OF ZNS AND ZNTE. THE VELOCITY OF SOUND IN CDSE AND CDS CALCULATED FROM ELASTIC CONSTANTS ARE FOUND TO BE IN GOOD AGREEMENT WITH DIRECT PULSE-ECHO MEASUREMENTS. THE CRITICAL FIELD FOR SOUND AMPLIFICATION IN CDS AND CDSE FOR DIFFERENT MODES OF WAVE PROPAGATION ARE TABULATED. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD-626 533 20/12 20/2
CLEVITE CORP CLEVELAND OHIO ELECTRONIC RESEARCH DIV

RESEARCH ON II-VI COMPOUND SEMICONDUCTORS. (U)

DESCRIPTIVE NOTE: QUARTERLY REPT. NO. 3, 1 JUL-30 SEP 62,
NOV 62 23P SHIOZAWA,LEBO ;JOST,J. M. ;
DEVLIN,S. S. ;CHOTKEVYS,G. P.;BARRETT,J. L. ;
CONTRACT: AF33(657)-7399

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: SEE ALSO AD-626 532.

DESCRIPTORS: (*SEMICONDUCTORS, SOLID STATE PHYSICS), CADMIUM ALLOYS, SELENIUM ALLOYS, CADMIUM COMPOUNDS, SULFIDES, ZINC ALLOYS, TELLURIUM ALLOYS, INTERMETALLIC COMPOUNDS, VAPOR PRESSURE, HEAT OF SUBLIMATION, ENTROPY, PHASE STUDIES, DIFFUSION, THERMAL EPANSION, ELECTRICAL PROPERTIES, ELASTICITY, IONIZATION, CRYSTAL GROWTH, CRYOGENICS (U)

IDENTIFIERS: CADMIUM SULFIDE, CADMIUM SELENIDE, ZINCTELLURIDE (U)

NEW DATA ON THE TEMPERATURE DEPENDENCE OF THE VAPOR PRESSURE OF CDSE, DETERMINED BY A FREE-SUBLIMATION METHOD, YIELDED IMPROVED VALUES FOR THE STANDARD HEAT AND ENTROPY OF SUBLIMATION OF 84 KCAL/MOLE AND 51 CAL/MOLE/K RESPECTIVELY. THE PRESSURE-TEMPERATURE PROJECTION OF THE CD-RICH PORTION OF THE CD:SE PHASE DIAGRAM HAS ESTABLISHED BY OBSERVING THE STATE OF CDSE CRYSTALS SUBJECTED TO KNOWN TEMPERATURES AND CD-PRESSURES. THE MAXIMUM CD-PRESSURE WITH WHICH SOLID CDSE CAN BE IN EQUILIBRIUM IS 16.6 ATM. THIS OCCURS AT A CRYSTAL TEMPERATURE OF 1145C. THE DIFFUSION CONSTANT OF CD IN CDSE WAS FOUND TO BE 4.4 X 10 TO THE 11TH POWER SQ CM /SEC AT 904C. THIS IS IN APPROXIMATE AGREEMENT WITH EARLIER MEASUREMENTS. THE THERMAL EXPANSION COEFFICIENTS OF CDS AND CDSE PARALLEL TO C WERE FOUND TO BE APPROXIMATELY 60% OF THOSE PERPENDICULAR TO C. A COMPLETE SET OF ELASTIC, DIELECTRIC, AND PIEZOELECTRIC CONSTANTS OF CDTE AT 77K WERE ESTABLISHED. ANALYSIS OF HALL EFFECT MEASUREMENTS ON ZNTE YIELDS A HOLE EFFECTIVE MASS OF 0.60 = .05M AND AN ACCEPTOR IONIZATION ENERGY OF 0.155 EV. A HYDROGENIC ACCEPTOR LEVEL AT APPROXIMATELY 0.05 EV WAS ALSO FOUND. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD-626 534 20/12 20/2
CLEVITE CORP CLEVELAND OHIO ELECTRONIC RESEARCH DIV

RESEARCH ON II-VI COMPOUND SEMICONDUCTORS. (U)

DESCRIPTIVE NOTE: QUARTERLY REPT. NO. 4, 1 OCT-31 DEC 62,
FEB 63 35P SHIOZAWA,L. R. ;JOST,J. M. ; DEVLIN,S. S. ;CHOTKEVYS,G. P. ;BARRETT,J. L. ;

CONTRACT: AF33(657)-7399

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: SEE ALSO AD-626 533.

DESCRIPTORS: (*SEMICONDUCTORS, SOLID STATE PHYSICS), SELENIUM ALLOYS, CADMIUM ALLOYS, CADMIUM COMPOUNDS, SULFIDES, ZINC ALLOYS, TELLURIUM ALLOYS, INTERMETALLIC COMPOUNDS, CRYSTAL GROWTH, EMISSIVITY, CRYSTAL LATTICE DEFECTS, THERMAL EXPANSION, DIFFUSION, HEAT TREATMENT, HALL EFFECT, PURIFICATION, CRYOGENICS, LUMINESECENCE (U)
IDENTIFIERS: CADMIUM SULFIDE, CADMIUM SELENIDE, ZINC TELLURIDE (U)

FOURTH QUARTER PROGRESS IN THE PREPARATION AND PROPERTIES OF II-VI COMPOUNDS IS SUMMARIZED. VAPOR PHASE GROWTH ON LARGE AREA SEED CRYSTALS WERE ATTEMPTED AND RESULTS ARE ENCOURAGING. A DIFFUSION-PRECIPITATION PROCESS INVOLVING CD INTERSTITIALS AND SE VACANCIES IS DEVELOPED TO EXPLAIN RESISTIVITY PROFILES THAT RESULT FROM HEAT TREATMENTS IN ELEMENTAL VAPORS. LIGHT EMISSION FROM CDS JUNCTIONS AT 77K BY HOLE INJECTION WAS ACHIEVED AND ELEMENTARY DESIGN CONSIDERATIONS ON ACHIEVING COHERENT EMISSION ARE DISCUSSED. THE FIRST PHOTOGRAPH OF IMPERFECTIONS IN CDS TAKEN BY AN X-RAY DIFFRACTION TECHNIQUE ARE SHOWN AND DISCUSSED. NEW MEASUREMENTS INCLUDE THE THERMAL EXPANSION OF CDS AND CDSE PARALLEL TO C, AND THE ENERGY GAPS AND LATTICE CONSTANTS OF ZNSEZNTE MIXED CRYSTALS. A THEORETICAL ANALYSIS OF THE TEMPERATURE DEPENDENCE OF HALL CARRIER CONCENTRATION LEADS TO A SET OF LINEARIZED EQUATIONS WHICH INCLUDES AS A VARIABLE A TEMPERATURE DEPENDENT HALL FACTOR R = NER. (AUTHOR) (U)

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD-626 535 20/12 20/2
CLEVITE CORP CLEVELAND OHIO ELECTRONIC RESEARCH DIV

RESEARCH ON II-VI COMPOUND SEMICONDUCTORS. (U)

DESCRIPTIVE NOTE: QUARTERLY REPT. NO. 5, 1 JAN-31 MAR 63,
MAY 63 28P SHIOZAWA,L. R. ;JOST,J. M. ; DEVLIN,S. S. ;CHOTKEVYS,G. P. ;BARRETT,J. L. ;

CONTRACT: AF33(657)-7399

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: SEE ALSO AD-626 534.

DESCRIPTORS: (*SEMICONDUCTORS, SOLID STATE PHYSICS), CADMIUM COMPOUNDS, SULFIDES, CADMIUM ALLOYS, SELENIUM ALLOYS, ZINC ALLOYS, CRYSTAL GROWTH, EPITAXIAL GROWTH, TWINNING(CRYSTALLOGRAPHY), CRYSTAL STRUCTURE, IMPURITIES, PHASE STUDIES, INTERMETALLIC COMPOUNDS, SOLID SOLUTIONS, SURFACE PROPERTIES, ETCHING, HALL EFFECT, VAPOR PRESSURE, LUMINESCENCE, CRYOGENICS (U)
IDENTIFIERS: CADMIUM SULFIDE, CADMIUM SELENIDE, ZINCSELENIUM (U)

IN THE FIFTH QUARTER, EPITAXIAL GROWTH ON LARGE-AREA SEED CRYSTALS OF CDS WAS ACHIEVED FOR THE FIRST TIME. IMPROVEMENTS WERE MADE IN THE VERTICAL TUBE METHOD OF CRYSTAL GROWTH. RADIOISOTOPIC STUDIES OF THE SEGREGATION OF IMPURITIES DURING SINTERING AND CRYSTAL GROWTH HAVE BEGUN. THE SIMILARITY OF THE STRUCTURE OF TWINS IN CUBIC II-VI CRYSTALS AND IN ANNEALED METALS LEADS TO THE HYPOTHESIS THAT THEY HAVE IDENTICAL ORIGINS. TWINNING OCCURS DURING GRAIN GROWTH WHENEVER A NET DECREASE IN INTERFACIAL ENERGY RESULTS. THE MINIMUM VAPOR PRESSURE OF CDSE MEASURED IN THIS LABORATORY IS COMPARED WITH THOSE MEASURED IN THREE OTHER LABORATORIES AND LEADS TO WHAT IS NOW BELIEVED TO BE FIRM VALUES FOR THIS QUANTITY. IMPROVED DATA ON THREE-PHASE EQUILIBRIA IN THE SYSTEM CDSE ARE PRESENTED. LATTICE CONSTANT MEASUREMENTS IN THE SYSTEM CDSE:ZNSE INDICATE A WURTZITE-SPHALERITE TRANSITION IN THE VICINITY OF 50 MOLE %, AND ALSO AN IMMISCIBILITY DOME WITHIN THE SOLID-SOLUBILITY FIELD OF THE PHASE DIAGRAM. A CONSOLUTE TEMPERATURE OF 1030C IS ESTIMATED. THE (0001) SURFACE OF CDS IS SHOWN TO ETCH IN 6N HCL ABOUT 50% FASTER THAN THE (000I) SURFACE. (AUTHOR) (U)

UNCLASSIFIED /ZZZHT

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD-626 536 20/12 20/2
CLEVITE CORP CLEVELAND OHIO ELECTRONIC RESEARCH DIV

RESEARCH ON II-VI COMPOUND SEMICONDUCTORS. (U)

DESCRIPTIVE NOTE: QUARTERLY REPT. NO. 6, 1 APR-30 JUN 63,
AUG 63 46P SHIOZAWA,L. R. ;JOST,J. M. ;
CHOTKEVYS,G. P. ;DEVLIN,S. S. ;BARRETT,J. L. ;
CONTRACT: AF33(657)-7399

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: SEE ALSO AD-626 535.

DESCRIPTORS: (*SEMICONDUCTORS, SOLID STATE PHYSICS), CADMIUM COMPOUNDS, SULFIDES, CADMIUM ALLOYS, SELENIUM ALLOYS, ZINC ALLOYS, TELLURIUM ALLOYS, INTERMETALLIC COMPOUNDS, PURIFICATION, RADIOACTIVATION ANALYSIS, LUMINESCENCE, REFRACTIVE INDEX, OPTICAL PROPERTIES, EPITAXIAL GROWTH, ELECTRON OPTICS, TRANSDUCERS, DELAY LINES, DOPING (U)

IDENTIFIERS: CADMIUM SULFIDE, CADMIUM SELENIDE, ZINCTELLURIDE (U)

EPITAXIAL GROWTH OF CDS AND CDSE FROM THE VAPOR PHASE WAS EXAMINED BY DIRECT VISUAL OBSERVATIONS. THE RELATIVE EASE WITH WHICH LARGE CRYSTALS WERE PRODUCED INDICATES THAT THIS SHOULD SOON BECOME THE PREFERRED METHOD OF GROWTH. RADIOISOTOPIC STUDIES, CARRIED OUT IN NEWLY DESIGNED MINIATURE GROWTH FURNACES, SHOW THAT IN114 ACCUMULATES IN THE SUPPLY WHICH LEADS TO CONCENTRATION GRADIENTS IN THE SUBLIMED CRYSTALS. CRYSTAL COLOR AND LOWTEMPERATURE FLUORESCENCE ARE CORRELATED WITH IN114 CONCENTRATION. NEW MEASUREMENTS ON INJECTION LUMINESCENCE FROM FORWARD BIASED CDS CELLS AT 7/K YIELD: SOURCE BRIGHTNESS APPROXIMATELY 0.01 WATTS/SW CM, POWER EFFICIENCY = 10 TO THE MINUS 8TH POWER TO 0.00001 RISING RAPIDLY WITH VOLTAGE, RISE TIME <0.2 MICROSEC, DECAY TIME APPROXIMATELY/MICRO SEC AND POLARIZATION E PERPENDICULAR TO C > 90%. REFRACTIVE INDEX MEASUREMENTS (BAND EDGE TO 1.5 MICRONS YIELD LONG-WAVELENGTH OPTICAL DIELECTRIC CONSTANTS OF 7.26 = 0.03 FOR ZNTE AND 5.96 = 0.02 (E PERPENDICULAR TO C) AND 6.05 = 0.02 (E PARALLEL TO C) FOR CDSE. ELECTRO-OPTIC COEFFICIENTS (R SUB 13 -R SUB 33) AND R SUB 51 FOR CDS WERE DETERMINED AS 4X10 TO THE MINUS 12TH POWER AND 3.7 X 10 TO THE MINUS 12TH POWER M/V. (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD-626 537 20/12 20/2
CLEVITE CORP CLEVELAND OHIO ELECTRONIC RESEARCH DIV

RESEARCH ON II-VI COMPOUND SEMICONDUCTORS. (U)

DESCRIPTIVE NOTE: QUARTERLY REPT. NO. 7, 1 JUL-30 SEP 63,
DEC 63 61P SHIOZAWA,L. R. ;JOST,J. M. ; DEVLIN,D. S. ;CHOTKEVYS,G. P. ;
CONTRACT: AF33(657)-7399

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: SEE ALSO AD-626 536.

DESCRIPTORS: (*SEMICONDUCTORS, SOLID STATE PHYSICS), CADMIUM COMPOUNDS, SULFIDES, CADMIUM ALLOYS, SELENIUM ALLOYS, ZINC ALLOYS, TELLURIUM ALLOYS, INTERMETALLIC COMPOUNDS, PURIFICATION, SUBLIMATION, CRYSTAL GROWTH, REFRACTIVE INDEX, OPTICAL PROPERTIES, LUMINESCENCE, ABSORPTION, TRANSPORT PROPERTIES, TRANSDUCERS, DELAY LINES, INFRARED RADIATION, CRYOGENICS (U)
IDENTIFIERS: CADMIUM SULFIDE, CADMIUM SELENIDE, ZINC TELLURIDE (U)

THE SEPARATION OF RADIOACTIVE Ag DURING SUBLIMATION OF CdS AND CdSe WAS INVESTIGATED AND EFFECTIVE DISTRIBUTION COEFFICIENTS OF 0.5 AND 0.15, RESPECTIVELY, ARE ESTIMATED. TRIAL RUNS IN A NEW, TRAVELLING-HOT-ZONE FURNACE SHOW THAT LARGE, SEED-ORIENTED, CRYSTALS OF CdSe CAN BE SUCCESSFULLY GROWN. AN ANALYSIS OF PRECIPITATION MECHANISMS IN II-VI CRYSTALS LEADS TO THE CONCLUSION THAT PRECIPITATION OF VACANCIES IS REQUIRED IN ALL CASES. NEW MEASUREMENTS OF THE REFRACTIVE INDICES OF CdS (BAND EDGE TO 1.4 MICRONS) YIELD LONG-WAVE OPTICAL DIELECTRIC CONSTANTS OF 5.16 ± 0.02 FOR E PERPENDICULAR TO C AND 5.23 ± 0.02 FOR E PARALLEL TO C. BIREFRINGENCE DATA FOR CdS AND CdSe ARE COMPARED WITH THE RESULTS OF OTHERS. MEASUREMENTS ON INJECTION LUMINESCENCE IN CdS DIODES SHOW THAT THE GREEN EMISSION AT 77K PEAKS AT 5194A AND HAS A HALFWIDTH OF 150A. A RED BAND AT APPROXIMATELY 6500A IS ALSO NOTED. PULSE MEASUREMENTS INDICATE A 0.2 MICROSEC DELAY BETWEEN THE START OF EXCITATION AND THE ONSET OF EMISSION. SOME MEASUREMENTS AT 4.2K ARE ALSO DESCRIBED. THE EXPRESSIONS FOR THE TRANSPORT PROPERTIES, APPLICABLE WHEN MORE THAN ONE SCATTERING MECHANISM IS PRESENT, ARE OBTAINED IN THE RELAXATION TIME APPROXIMATION. (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL No. /ZZZHT

AD-626 538 20/12 20/2
CLEVITE CORP CLEVELAND OHIO ELECTRONIC RESEARCH DIV

RESEARCH ON II-VI COMPOUND SEMICONDUCTORS. (U)

DESCRIPTIVE NOTE: QUARTERLY REPT. NO. 8, 1 OCT-31 DEC 63,
MAR 64 32P SHIOZAWA,L. R. ;JOST,J. M. ; DEVLIN,S. S. ;BROUDY,R. M. ;
CONTRACT: AF33(657)-7399
PROJ: 302860

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: SEE ALSO AD-626 537.

DESCRIPTORS: (*SEMICONDUCTORS, SOLID STATE PHYSICS), SELENIUM ALLOYS, CADMIUM ALLOYS, CADMIUM COMPOUNDS, SULFIDES, ZINC ALLOYS, TELLURIUM ALLOYS, INTERMETALLIC COMPOUNDS, CRYSTAL GROWTH, DEFORMATION, CRYSTAL LATTICE DEFECTS, PHASE STUDIES, SCATTERING, LUMINESCENCE, TRANSPORT PROPERTIES (U)
IDENTIFIERS: CADMIUM SULFIDES, CADMIUM SELENIDE, ZINC TELLURIDE (U)

VAPOR-PHASE GROWTH ON ORIENTED SEED CRYSTALS WAS EMPHASIZED IN THE EIGHTH QUARTER. A NOTEWORTHY ACCOMPLISHMENT WAS THE GROWTH OF A LARGE TWIN-FREE ZNTE CRYSTAL BY THIS METHOD. PLASTIC DEFORMATION OF CDS CRYSTALS BY THREE-POINT BENDING WAS INITIATED IN THIS QUARTER. EARLY RESULTS INDICATE THAT SLIP OCCURS ON (1010) AND (1120) PLANES AND THAT THE SLIP DIRECTION IS (1120). RAPID DEFORMATION OCCURS ABOVE 700C; AND THE CRITICAL RESOLVED SHEAR STRESS IS ESTIMATED TO BE 0.3 KG/SQ MM. THE SYSTEM CDSE-ZNSE WAS INVESTIGATED AND COMPLETE SOLID MISCIBILITY IS SHOWN TO EXIST BETWEEN 900 AND 1200C. THE SYSTEM ZNS-ZNTE WAS ALSO INVESTIGATED AND A PLAUSIBLE PHASE DIAGRAM IS DERIVED FROM THE X-RAY RESULTS. THE VARIATIONAL METHOD OF SOLVING THE BOLTZMANN EQUATION WAS EXTENDED TO COVER MORE THAN ONE SCATTERING MECHANISM. DETAILED RESULTS ARE PRESENTED FOR MIXTURES OF OPTICAL MODE AND PIEZOELECTRIC SCATTERING. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD-626 539 20/12 20/2
CLEVITE CORP CLEVELAND OHIO ELECTRONIC RESEARCH DIV

RESEARCH ON II-VI COMPOUND SEMICONDUCTORS. (U)

DESCRIPTIVE NOTE: QUARTERLY REPT. NO. 9, 1 JAN-31 MAR 64,
MAY 64 28P SHIOZAWA,L. R. DEVLIN,S. S. JOST,J. M.
CONTRACT: AF33(657)-7399
PROJ: 302860

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: SEE ALSO AD-626 538.

DESCRIPTORS: (*SEMICONDUCTORS, SOLID STATE PHYSICS), CADMIUM COMPOUNDS, CADMIUM ALLOYS, SULFIDES, SELENIUM ALLOYS, ZINC ALLOYS, TELLURIUM ALLOYS, INTERMETALLIC COMPOUNDS, CRYSTAL GROWTH, IMPURITIES, EPITAXIAL GROWTH, SINGLE CRYSTALS, DEFORMATION, LUMINESCENCE, TRANSPORT PROPERTIES, CRYSTAL LATTICE DEFECTS (U)
IDENTIFIERS: CADMIUM SULFIDE, CADMIUM SELENIDE, ZINCTELLURIDE (U)

EXPERIMENTAL WORK IN THE NINTH QUARTER CONTINUED TO EMPHASIZE VAPOR-PHASE CRYSTAL GROWTH ON ORIENTED SEED CRYSTALS OF CDS. THE EFFECTS OF INERT GAS AND NONSTOICHIOMETRIC VAPOR IN THE GROWTH TUBE ARE EXAMINED. A POSSIBLE ORIGIN OF SMALL-ANGLE BOUNDARIES IS DISCUSSED IN TERMS OF DISLOCATIONS RESULTING FROM VACANCY PRECIPITATION DURING GROWTH. A NEWLY RECOGNIZED MODE OF CRYSTAL CONTAMINATION INVOLVING VAPOR TRANSPORT AGENTS IS DISCUSSED. SPECIFIC EXAMPLES OF EPITAXIAL GROWTH EXPERIMENTS AND SOME OF THE DIFFICULTIES ENCOUNTERED ARE PRESENTED. THE INTRINSIC MOBILITY OF CDS, CDSE AND ZNTE WAS CALCULATED USING A VARIATIONAL METHOD AND THE RESULTS COMPARED WITH EXPERIMENT. THE AGREEMENT WAS EXCELLENT. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD-626 540 20/12 20/2
CLEVITE CORP CLEVELAND OHIO ELECTRONIC RESEARCH DIV

RESEARCH ON II-VI COMPOUND SEMICONDUCTORS. (U)

DESCRIPTIVE NOTE: QUARTERLY REPT. NO. 10, 1 APR-30 JUN 64,
AUG 64 41P SHIOZAWA,L. R. ;DEVLIN,S. S. ;JOST,J. M. ;
CONTRACT: AF33(657)-7399
PROJ: 302860

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: SEE ALSO AD-626 539.

DESCRIPTORS: (*SEMICONDUCTORS, SOLID STATE PHYSICS), CADMIUM COMPOUNDS, SULFIDES, CADMIUM ALLOYS, SELENIUM ALLOYS, ZINC ALLOYS, TELLURIUM ALLOYS, INTERMETALLIC COMPOUNDS, CRYSTAL GROWTH, DEFORMATION, CRYSTAL LATTICE DEFECTS, ELECTRICAL PROPERTIES, DOPING, HARDNESS, TRANSPORT PROPERTIES, EPITAXIAL GROWTH, ANISOTROPY, LITHIUM, SODIUM, OPTICAL PROPERTIES (U)
IDENTIFIERS: CADMIUM SULFIDE, CADMIUM SELENIDE, ZINCTELLURIDE (U)

EXPERIMENTAL VAPOR PHASE GROWTH OF CDS ON ORIENTED SEEDS HAS RESULTED IN A BETTER UNDERSTANDING OF INITIATING SEED GROWTH. THE HEAT BALANCE AT THE SEED, DETERMINED MAINLY BY RADIATION, IS THE MOST IMPORTANT FACTOR AFFECTING THE TEMPERATURE OF THE GROWTH SURFACE. THE ELECTRICAL PROPERTIES OF CDS ARE GREATLY MODIFIED BY PLASTIC DEFORMATION DUE MAINLY TO THE EFFECT OF DISLOCATION CLIMB. KNOOP MICROHARDNESS TESTS HAVE SHOWN HARDNESS ANISOTROPIES ON THE DIFFERENT SURFACES OF CDS, IN COMPARING BOTH SIMILAR DIRECTIONS ON DIFFERENT SURFACES AND DIFFERENT DIRECTIONS ON THE SAME SURFACE. ELECTROELASTIC MEASUREMENTS HAVE BEEN MADE ON LI- AND NA-DOPED CDS CRYSTALS WITH SOME UNACCOUNTABLE RESULTS. THE ANISOTROPIES OF THE MOBILITY AND HALL EFFECT IN SEMICONDUCTORS WITH SLIGHTLY ELLIPTICAL BANDS AND OPTICAL MODE SCATTERING WERE CALCULATED UNDER VERY RESTRICTIVE ASSUMPTIONS. THE NUMERICAL VALUES ARE NOT SIGNIFICANT BUT THE EXPLICIT TEMPERATURE DEPENDENCE OF THE ANISOTROPIES IS OF INTEREST. THE MOBILITY OF SEVERAL SAMPLES OF CDS AND CDSE WERE FITTED TO THE THEORY TAKING INTO ACCOUNT ALL SCATTERING MECHANISMS. THE FIT WAS USED TO DETERMINE THE IMPURITY CONCENTRATIONS. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD-626 595 7/4 20/12
IIT RESEARCH INST CHICAGO ILL

OPTICAL VIBRATION SPECTRA OF SOLIDS. (U)

DESCRIPTIVE NOTE: FINAL REPT. 14 JAN 63-13 MAY 65,
AUG 65 232P MITRA,SHASHANKA S. ;
REPT. NO. IITRI-A6019
CONTRACT: AF19(628)-2418
PROJ: AF-5621
TASK: 562105
MONITOR: AFCRL , 65-828

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:

DESCRIPTORS: (*INFRARED SPECTROSCOPY, SOLIDS), (*RAMAN SPECTROSCOPY, SOLIDS), (*ULTRAVIOLET SPECTROSCOPY, SOLIDS), (*SEMICONDUCTORS, PHONONS), CADMIUM COMPOUNDS, ZINC COMPOUNDS, BORON COMPOUNDS, NICKEL COMPOUNDS, COBALT COMPOUNDS, MANGANESE COMPOUNDS, ALUMINUM COMPOUNDS, MAGNESIUM COMPOUNDS, COPPER COMPOUNDS, OXIDES, SULFIDES, NITRIDES, HYDROXIDES, ALKALI METAL COMPOUNDS, HALIDES, CRYSTALS, CRYSTAL LATTICE DEFECTS, ABSORPTION SPECTRUM (U)

THE INFRARED REFLECTION AND/OR TRANSMISSION SPECTRA OF CDS, ZNS, ZNO, BN, NIO, COO, AND THEIR MIXED CRYSTALS, MNO, AL2O3, MG(OH)2 AND CU2S ARE REPORTED AT ONE OR MORE TEMPERATURES. THE RAMAN SPECTRUM OF ZNO IS ALSO REPORTED. THE EXPERIMENTAL INVESTIGATIONS ALSO INCLUDED THE STUDY OF CRYSTAL FIELD SPECTRA OF NI(2+), CO(2+) AND MN(2+) IN THEIR RESPECTIVE MONOXIDES. THE INFRARED AND THE ULTRAVIOLET ABSORPTION BY U-CENTERS IN ALKALI HALIDES WAS STUDIED AND INTERPRETED IN TERMS OF LOCALIZED VIRATIONAL MODES OF THE IMPURITY CENTERS. THEORETICAL INVESTIGATIONS INCLUDE DISCUSSIONS ON: (I) THE TRENDS IN THE CHARACTERISTIC PHONON FREQUENCIES OF THE II-VI COMPOUNDS, (II) THE ASSIGNMENT OF THE MULTIPHONON INFRARED ABSORPTION IN GAAS USING THE SPACE GROUP SELECTION RULES, (III) THE VALIDITY OF THE LYDDANESACHS-TELLER RELATIONSHIP AT LONG WAVELENGTHS, (IV) THE COMBINATION OF THE LATTICE MODES WITH THE INTERNAL MODES IN A CRYSTAL CONTAINING POLYATOMIC GROUPS, AND (V) THE GRUNEISEN PARAMETER FOR LONG WAVELENGTH OPTICAL MODES IN IONIC CRYSTALS. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD-626 734 20/12 20/3 20/6
HARVARD UNIV CAMBRIDGE MASS DIV OF ENGINEERING AND APPLIED PHYSICS

HIGH PRESSURE RESEARCH. (U)

DESCRIPTIVE NOTE: PROGRESS REPT. NO. 36 ON HIGH PRESSURE,
AUG 65 14P ZALLEN,RICHARD ;
CONTRACT: NONR-1866(10)

UNCLASSIFIED REPORT

DESCRIPTORS: (*HIGH-PRESSURE RESEARCH, SEMICONDUCTORS), (*SEMICONDUCTORS, HIGH-PRESSURE RESEARCH), (*METALS, HIGH-PRESSURE RESEARCH), OPTICAL PROPERTIES, ELECTRICAL PROPERTIES, LEAD COMPOUNDS, TIN, REFLECTIVITY, ELECTRON SPIN RESONANCE, TRANSITION ELEMENTS, OXIDES, NICKEL COMPOUNDS, SPECTRUM ANALYZERS, MAGNETO-OPTIC EFFECT, FILMS, GERMANIUM, SULFIDES, CADMIUM ALLOYS, MERCURY ALLOYS, TELLURIUM ALLOYS, BAND THEORY OF SOLIDS, DIODES(SEMICONDUCTOR) (U)
IDENTIFIERS: THIN FILMS (U)

WORK IS SUMMARIZED ON THE FOLLOWING TOPICS: OPTICAL AND ELECTRICAL PROPERTIES OF THE LEAD SALTS UNDER PRESSURE; ELECTRICAL PROPERTIES OF GRAY TIN AS A FUNCTION OF PRESSURE; EFFECT OF PRESSURE ON REFLECTIVITY SPECTRA; SPIN RESONANCE MEASUREMENTS ON SEMICONDUCTORS; PROPERTIES OF THE TRANSITION METAL OXIDES; RATIO TYPE SPECTROMETER FOR THE MEASUREMENT OF SMALL INCREMENTS IN ABSORPTION COEFFICIENTS; SEMICONDUCTING PROPERTIES OF FORSTERITE; FARADAY ROTATION IN SEMICONDUCTORS; OPTICAL PROPERTIES OF SEMICONDUCTOR THIN FILMS; BAND STRUCTURE OF GALLIUM ANTIMONIDE; INFRARED SHIFT OF THE EMISSION OF LEAD SALT DIODES WITH PRESSURE. (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZ/HT

AD-627 381 20/12 20/2
CLEVITE CORP CLEVELAND OHIO ELECTRONIC RESEARCH DIV

RESEARCH ON II-VI COMPOUND SEMICONDUCTORS. (U)

DESCRIPTIVE NOTE: QUARTERLY REPT. NO. 11, 1 JUL-30 SEP 64,
NOV 64 25P SHIOZAWA,L. R. ;JOST,J. M. ; DEVLIN,S. S. ;
CONTRACT: AF33(657)-7399

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: SEE ALSO AD-626 540.

DESCRIPTORS: (*SEMICONDUCTORS, SOLID STATE PHYSICS), CADMIUM COMPOUNDS, SULFIDES, CADMIUM ALLOYS, SELENIUM ALLOYS, PURIFICATION, IMPURITIES, SINGLE CRYSTALS, SILICON COMPOUNDS, DIOXIDES, CRYSTAL LATTICE DEFECTS, LUMINESCENCE, HALL EFFECT, THERMAL CONDUCTIVITY, CRYOGENICS (U)
IDENTIFIERS: CADMIUM SULFIDE, CADMIUM SELENIDE (U)

PURIFICATION OF CDS BY VACUUM SUBLIMATION HAS RESULTED IN MORE CONSISTANT YIELDS OF BRIGHT YELLOW SINGLE CRYSTALS HAVING NEAR INTRINSIC LOW-TEMPERATURE ELECTRON MOBILITY. THE LOW-ANGLE GRAIN-BOUNDARIES PRESENT IN SEED-GROWN CRYSTALS WAS TRACED TO SURFACE DAMAGE ON THE SEEDS. DEEP ETCHING OF SEEDS HAS ELIMINATED THIS PROBLEM. EFFORTS TO REDUCE THE AMOUNT OF SIO2 INCLUSION HAVE RESULTED IN ONLY MINOR IMPROVEMENTS. THE FORMATION OF SCREW DISLOCATIONS WAS TRACED TO THE SIO2 PARTICLES. THE THERMALLY STIMULATED 'TAP EFFECT' IN CDS WAS INVESTIGATED AND IS SHOWN TO BE AN ELECTROLUMINESCENT EFFECT WHICH RESULTS FROM THE PYROELECTRIC NATURE OF CDS. ROOM TEMPERATURE EDGE EMISSION IN CDS WAS OBTAINED WHEN A CRYSTAL CONTAINED IN AN EVACUATED TUBE WAS EXCITED BY A HIGH VOLTAGE, HIGH FREQUENCY DISCHARGE ON THE OUTSIDE OF THE TUBES. THE EXPERIMENTAL HALL MOBILITY OF CDSE IS COMPARED WITH THE COMPLETE THEORY AND RESULTS INDICATE THAT THESE CRYSTALS ARE ONLY WEAKLY COMPENSATED. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD-627 426 20/6 9/1 9/5
WESTINGHOUSE ELECTRIC CORP ELMIRA N Y ELECTRONIC TUBE DIV

APPLICATION OF LIGHT AND IMAGE INTENSIFICATION. (U)

DESCRIPTIVE NOTE: MONTHLY TECHNICAL ENGINEERING REPT. NO. 27, 1-30 SEP 65,
OCT 65 10P FOWLIS,D. C. ;HARDER,R. D. ; SZEPESI,Z. ;
CONTRACT: N61339-1440

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: SEE ALSO AD-620 318.

DESCRIPTORS: (*IMAGE INTENSIFIERS(ELECTRONICS), PREPARATION), (*PHOTOELECTRIC MATERIALS, IMAGE INTENSIFIERS(ELECTRONICS)), LUMINESCENCE, PHOTOCONDUCTIVITY, CADMIUM ALLOYS, SELENIUM ALLOYS, ZINC COMPOUNDS, SULFIDES, CADMIUM COMPOUNDS, POWDERS, FILMS, SINTERING, SANDWICH PANELS, GAIN (U)
IDENTIFIERS: CADMIUM SULFIDE, CADMIUM SELENIDE (U)

SEVERAL 6 IN X 6 IN SIZE LOW RESOLUTION TYPE IMAGE INTENSIFIER PANELS WERE FABRICATED. THE PANELS COULD BE CLASSIFIED IN TWO GROUPS: (1) HIGH GAIN-SLOW PANELS WITH STANDARD LUMINOUS GAINS OF SEVERAL HUNDRED; (2) LOW GAINFAST PANELS WITH GAINS IN THE ORDER OF TEN. PANELS OF THE LAST GROUP HAD DECAY TIME CONSTANTS LOWER THAN 20 MILLISECONDS AND PROVED TO BE ACCEPTABLE FOR MOVIE FILM PROJECTION DISPLAY. THE FABRICATION OF DOUBLE-LAYER CDS-CDSE PANELS WAS UNSUCCESSFUL. SOME IMAGE INTENSIFIER PANELS WERE CONSTRUCTED USING THE EVAPORATED EI FILMS SANDWICHED WITH CDS PC POWDER EMBEDDED IN EPOXY RESIN. THE MAXIMUM RESOLUTION OF THESE PANELS WAS 250 LINES/INCH, AND THE MAXIMUM GAIN WAS AROUND TEN. A VERY DISTURBING NONUNIFORMITY EXISTS ON THESE PANELS WHICH HAS TO BE ELIMINATED BEFORE ANY PRACTICAL USE CAN BE MADE OF THEM. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD-628 453 20/12 20/2 20/6
DELAWARE UNIV NEWARK DEPT OF PHYSICS

HIGH AMPLITUDE CURRENT AND OPTICAL TRANSMISSION OSCILLATIONS IN CDS SINGLE CRYSTALS. (U)

DESCRIPTIVE NOTE: TECHNICAL REPT.,
FEB 66 9P WARD, JOSEPH J. ;
REPT. NO. TR-5,
CONTRACT: DA-31-124-ARO(D)-173,
MONITOR: AROD , 4461:5

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:

DESCRIPTORS: (*SEMICONDUCTORS, ELECTRIC CURRENTS), (*CADMIUM COMPOUNDS, SULFIDES), (*SINGLE CRYSTALS, OPTICAL PROPERTIES), ELECTRIC FIELDS, MODULATION, ILLUMINATION, LIGHT TRANSMISSION, PHOTOCONDUCTIVITY, MONOCHROMATIC LIGHT, INTENSITY, VOLTAGE, OSCILLATION, TEMPERATURE (U)
IDENTIFIERS: CADMIUM SULFIDE (U)

LOW FREQUENCY CURRENT OSCILLATIONS WITH CURRENT MODULATION OF TWO ORDERS OF MAGNITUDE OR MORE HAVE BEEN OBSERVED IN CDS SINGLE CRYSTAL PLATELETS UNDER CONDITIONS OF HIGH ELECTRIC FIELD AND ILLUMINATION WITH MONOCHROMATIC LIGHT NEAR THE FUNDAMENTAL ABSORPTION EDGE. THE OBSERVED FREQUENCIES OF OSCILLATIONS WERE IN THE RANGE FROM 0.1 TO 5.0 CPS, INCREASING WITH INCREASING LIGHT INTENSITY AND VOLTAGE. FOR MOST CRYSTALS THE TEMPERATURE OF MAXIMUM PHOTOCONDUCTIVITY OCCURRED AT APPROXIMATELY 130K. OSCILLATIONS FOR THESE CRYSTALS WERE OBSERVED ONLY IF THE TEMPERATURE WITHOUT FIELD WAS BELOW 120K. ONLY CERTAIN KINDS OF CRYSTALS EXHIBITED THE ABOVE DESCRIBED OSCILLATIONS. BESIDES THE TEMPERATURE DEPENDENCE OF THE PHOTOCONDUCTIVITY, THESE CRYSTALS SHOW A PRONOUNCED THERMALLY STIMULATED CURRENT (CONDUCTIVITY GLOW)-PEAK AT 280K, AND THOSE WHICH OSCILLATE ONLY AT THE LOWER TEMPERATURE SHOW ANOTHER PEAK AT 140K. (EXTRACTED) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD-628 770 20/12 9/1
GENERAL ELECTRIC CO SCHENECTADY N Y RESEARCH AND DEVELOPMENT CENTER

NEW SOLID-STATE DEVICE CONCEPTS. (U)

DESCRIPTIVE NOTE: SCIENTIFIC REPT.,
DEC 65 42P AVEN,M. ;HALL,R. N. ;ROSENBERG, L. M. ;WOODBURY,H. H. ;
REPT. NO. SCIENTIFIC-3,65-GC-0319
CONTRACT: AF 19(628)-4976,
PROJ: AF-4608,
TASK: 460805,
MONITOR: AFCRL , 65-896

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: SEE ALSO AD 621 941.

DESCRIPTORS: (*SEMICONDUCTOR DEVICES, MATERIALS), (*LASERS, SEMICONDUCTOR DEVICES), SEMICONDUCTORS, CADMIUM COMPOUNDS, SULFIDES, DOPING, SELENIUM, DIFFUSION, TRACER STUDIES, ZINC ALLOYS, SELENIUM ALLOYS, TELLURIUM ALLOYS, TRANSPORT PROPERTIES, ELECTROLUMINESCENCE, SEMICONDUCTING FILMS, GALLIUM ALLOYS, ARSENIC ALLOYS, OPTICAL PROPERTIES, ELECTRONIC SWITCHING, DIODES(SEMICONDUCTOR) (U)
IDENTIFIERS: THIN FILMS (U)

DATA ON THE DIFFUSION OF SE INTO CDS AS FUNCTIONS OF TIME AND SULFUR PRESSURE BETWEEN 900 AND 1000C SHOW THAT THE DIFFUSION PROFILES ARE INDEPENDENT OF PREDOPING WITH SE, PREANNEALING THE CRYSTALS, SURFACE PREPARATION, AND IN DOPING. THE DIFFUSION IS NOT SIMPLE, AND THE DATA ARE BEING ANALYZED TO DETERMINE A SUITABLE MODEL. A SUCCESSFUL NEW TECHNIQUE FOR GROWING ZNSE SUB X, TE SUB (1-X) CRYSTALS IS DESCRIBED, AND DATA ON THE PROPERTIES OF JUNCTIONS PREPARED FROM A NEW COMPOSITION CORRESPONDING TO X = 0.14 ARE GIVEN. LIGHT INTENSITY VS CURRENT AND TEMPERATURE ARE GIVEN AND DISCUSSED IN TERMS OF A PROPOSED ENERGY LEVEL DIAGRAM. THIN-FILM GAAS SWITCHING DIODES HAVE BEEN CONSTRUCTED BY EVAPORATION OF GA AND AS ONTO MO SUBSTRATES. THE CHARACTERISTICS RESEMBLE THOSE DESCRIBED BY MIZUSHIMA EXCEPT THAT THEY ARE ASYMMETRICAL WITH RESPECT TO VOLTAGE. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD-629 423 20/12
FOREIGN TECHNOLOGY DIV WRIGHT-PATTERSON AFB OHIO

NEWS OF INSTITUTIONS OF HIGHER LEARNING. PHYSICS. (SELECTED ARTICLES). (U)

JAN 66 25P
REPT. NO. FTD-TT-65-1452,
MONITOR: TT , 66-60725

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: UNEDITED ROUGH DRAFT TRANS. OF IZVESTIYA VYSSHIKH UCHEBNYKH ZAVEDENII. FIZIKA (USSR) N3 P134-43 1964.

DESCRIPTORS: (*SEMICONDUCTORS, PHYSICAL PROPERTIES), (*CADMIUM COMPOUNDS, SULFIDES), (*SEMICONDUCTING FILMS, SULFIDES), ELECTRICAL CONDUCTANCE, MOBILITY, THICKNESS, SCATTERING, ABSORPTION SPECTRUM, SUBLIMATION, OPTICAL PROPERTIES, USSR (U)
IDENTIFIERS: CADMIUM SULFIDE (U)

CONTENTS: ELECTRIC PROPERTIES OF POLYCRYSTALLINE CADMIUM SULFIDE FILMS; CONCERNING THE NATURE OF OPTICAL ABSORPTION OF POLYCRYSTALLINE FILMS OF CADMIUM SULFIDE. (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD-629 493 20/12
AEROSPACE RESEARCH LABS OFFICE OF AEROSPACE RESEARCH
WRIGHT-PATTERSON AFB OHIO

A STUDY OF HOMOGENEITY OF SOLID SOLUTIONS OF CADMIUM SULFIDE AND CADMIUM SELENIDE BY X-RAY FLUORESCENCE. (U)

64 19P CHAN,FRANK L. ;BROOKS, DONALD A. ;
REPT. NO. ARL-65-269.
PROJ: AF-7023.
TASK: 702300 ,702307

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AVAILABILITY: PUBLISHED IN ADVANCES IN X-RAY ANALYSIS V8 P420-30 1965. COPIES TO DDC USERS ONLY.
SUPPLEMENTARY NOTE:

DESCRIPTORS: (*SEMICONDUCTORS, SOLID SOLUTIONS), (*CADMIUM COMPOUNDS, SEMICONDUCTORS), (*CADMIUM ALLOYS, SEMICONDUCTORS), SULFIDES, SELENIUM ALLOYS, FLUORESCENCE, PHASE STUDIES, CHEMICAL ANALYSIS, TEST METHODS (U)
IDENTIFIERS: CADMIUM SELENIDE, CADMIUM SULFIDE (U)

THE HOMOGENEITY OF SOLID SOLUTIONS OF CADMIUM SELENIDE AND CADMIUM SULFIDE WAS INVESTIGATED. CRYSTALS OF THE SOLID SOLUTIONS HAVIN. DIFFERENT SELENIUM CONTENTS WERE GROWN IN THE AEROSPACE RESEARCH LABORATORIES BY THE CONVENTIONAL METHODS AS DESCRIBED IN THE EARLIER CONFERENCES. THE COMPOSITION OF THESE SOLID SOLUTIONS WERE ANALYZED CHEMICALLY FOR THEIR SELENIUM CONTENT BY A PROCEDURE PERFECTED IN THE AEROSPACE RESEARCH LABORATORIES. CRYSTALS IN THE FORM OF LUMPS WERE CUT TO OPTIMUM SIZE SUITABLE TO BE INSERTED INTO THE COMMERCIALLY AVAILABLE SAMPLE HOLDER. THE SELENIUM CONTENT OF THESE CRYSTALS WAS ASCERTAINED BY SCANNING THE SAMPLES WITH STATIONARY COLLIMATORS OF SMALL APERTURE. THE SPECTOGRAPH USED FOR THE PRESENT STUDY WAS OPERATED AT 75 KVP AND 50 MA. THE TARGET TUBE WAS CONSTRUCTED OF MOLYBDENUM. THE RESULTS FROM THE CHEMICAL METHOD WERE USED TO CORRELATE THE COUNTS PER SECOND OBTAINED FROM THE X-RAY SPECTROGRAPH. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD-630 022 9/2 9/5
RCA LABS PRINCETON N J

ACTIVE LOGIC ELEMENTS USING NON-GALVANIC MODIFYING INPUTS. (U)

DESCRIPTIVE NOTE: FINAL REPT. 1 OCT 64-30 SEP 65,
MAR 66 29P HERZOG,G. ;GUARRACINI,J. ;
POWLUS,R. A. ;
CONTRACT: AF 19(628)-4387,
PROJ: AF-4641,
TASK: 464104,
MONITOR: AFCRL , 66-29

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:

DESCRIPTORS: (*COMPUTERS, INTEGRATED CIRCUITS), (*PHOTOELECTRIC EFFECT, COMPUTERS), (*INTEGRATED CIRCUITS, COMPUTERS), (*OPTICAL EQUIPMENT, COMPUTERS), COMPUTER LOGIC, TRANSISTORS, SEMICONDUCTOR DEVICES, OSCILLATORS, PUNCHED CARDS, PHOTOELECTRIC MATERIALS, GATES(CIRCUITS), SEMICONDUCTING FILMS, DIODES(SEMICONDUCTOR), CADMIUM COMPOUNDS, SULFIDES, TELLURIDES (U)
IDENTIFIERS: THIN FILMS, CADMIUM SULFIDE, CADMIUM TELLURIDE, FIELD-EFFECT TRANSISTORS, METAL OXIDE SEMICONDUCTORS (U)

A LOGIC ARRAY OF 128 MOS TRANSISTORS WAS CONSTRUCTED THAT HAS THE ABILITY TO OPERATE AS A HALF-ADDER, A RING OSCILLATOR WITH ANY ODD NUMBER OF STAGES UP TO 15, A GROUP OF COUPLED FLIP-FLOPS OR ANY ONE OF MANY OTHER SPECIAL CONFIGURATIONS. THE DESIRED LOGIC NETWORK IS SPECIFIED BY AN OPTICAL RADIATION PATTERN DETERMINED BY THE HOLES PUNCHED IN A STANDARD BUSINESS DATA CARD. PHOTOCONDUCTORS SENSE THE RADIATION AND TURN ON MOS TRANSISTORS THAT CLOSE THE SIGNAL PATHS BETWEEN MOS TRANSISTOR-NOR GATES. THE LOGIC PERFORMED THEREFORE DEPENDS ON WHICH PATHS ARE CLOSED BETWEEN THE VARIOUS NOR GATES. INSULATED-GATE FIELD-EFFECT TRANSISTORS (IGFET) OF THE METAL-OXIDE-SEMICONDUCTOR (MOS) VARIETY WERE SELECTED FOR THIS USE BECAUSE OF THE SMALL AMOUNT OF ENERGY REQUIRED TO CONTROL THEIR CONDUCTION. EXPERIMENTS WITH THIN-FILM VERSIONS OF THE IGFET INDICATE EQUIVALENT USEFULNESS AND THE PROMISE OF LARGE LOW-COST MODIFIABLE ARRAYS OF LOGIC GATES. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD-630 491 20/12
AEROSPACE RESEARCH LABS OFFICE OF AEROSPACE RESEARCH
WRIGHT-PATTERSON AFB OHIO

IMPURITY CONDUCTIVITY IN SINGLE CRYSTAL CDS. (U)

APR 65 9P KULP,B. A. ;GALE,K. A. ;
SCHULTZE,R. G. ;
REPT. NO. ARL-66-0050,

UNCLASSIFIED REPORT
AVAILABILITY: PUBLISHED IN THE PHYSICAL REVIEW V140 N1A PA252-6 OCT 4 1965. COPIES TO DDC USERS ONLY.
SUPPLEMENTARY NOTE:

DESCRIPTORS: (*SEMICONDUCTORS, ELECTRICAL CONDUCTANCE), (*CADMIUM COMPOUNDS, SULFIDES), IMPURITIES, SINGLE CRYSTALS, TRANSPORT PROPERTIES, ELECTRONS, BAND THEORY OF SOLIDS, HEAT OF ACTIVATION, RESISTANCE(ELECTRICAL), DOPING (U)
IDENTIFIERS: CADMIUM SULFIDE (U)

THE TRANSPORT PROPERTIES OF ELECTRONS IN CDS GROWN WITH GROUP I IMPURITIES WHICH SHOW THE PHENOMENON OF 'STORAGE' HAVE BEEN STUDIED TO DETERMINE THE MECHANISM OF CONDUCTION. THE MOBILITY PARALLEL TO THE C AXIS AT LOW TEMPERATURE IS OF THE ORDER OF 1 TO 10 SQ CM/ VOLT SEC AND IS VERY ANISOTROPIC. THE MOBILITY PERPENDICULAR TO THE C AXIS BEING 10 TO 30 TIMES THAT PARALLEL TO THE C AXIS. THE RESISTIVITY OF THE CRYSTALS SHOWS AN ACTIVATION ENERGY OF ABOUT 0.001 EV AT LOW TEMPERATURE. THE RESISTIVITY IS VERY SENSITIVE TO EITHER DONOR OR ACCEPTOR CONCENTRATION. THESE CHARACTERISTICS INDICATE THAT THE CONDUCTION MECHANISM IS NOT A RESULT OF ELECTRONS IN THE NORMAL CONDUCTION BAND BUT IS A RESULT OF AN IMPURITY CONDUCTIVITY. THE ACTIVATION ENERGY OF 0.001 EV IS THOUGHT TO CORRESPOND TO EPSILON SUB 3 IN SILICON AND GERMANIUM IMPURITY-CONDUCTION THEORY. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD-630 680 9/1 20/12
CALIFORNIA UNIV BERKELEY ELECTRONICS RESEARCH LAB

INSULATED-GATE FIELD-EFFECT TRANSISTOR USING SINGLE CRYSTAL CADMIUM SULFIDE. (U)

DESCRIPTIVE NOTE: REVISED ED.,
SEP 65 3P CONRAGAN,J. ;MULLER,R. S. ;
CONTRACT: DA-31-124-ARO(D)-385,
MONITOR: AROD , 5537:1

UNCLASSIFIED REPORT
AVAILABLILITY: PUBLISHED IN SOLID STATE ELECTRONICS V9 P182 1966. COPIES TO DDC USERS ONLY.
SUPPLEMENTARY NOTE: REVISION OF MANUSCRIPT SUBMITTED 27 JUL 65.

DESCRIPTORS: (*TRANSISTORS, *SEMICONDUCTORS), INORGANIC COMPOUNDS, OXIDES, CADMIUM COMPOUNDS, SULFIDES, FILMS, SINGLE CRYSTALS, ELECTRIC CURRENTS, VOLTAGE, FIELD THEORY, GATES(CIRCUITS), VAPOR PLATING, VACUUM APPARATUS (U)
IDENTIFIERS: THIN FILMS, CADMIUM SULFIDE, FIELD-EFFECT TRANSISTORS (U)

METAL-OXIDE-SEMICONDUCTOR (MOS) TRANSISTORS WERE CONSTRUCTED ON PREPARED SUBSTRATES OF HIGH RESISTIVITY, SINGLE-CRYSTAL CADMIUM SULFIDE. THE TRANSCONDUCTANCE, OUTPUT CONDUCTANCE, GATE-SOURCE AND GATE-DRAIN CAPACITANCES FOR THESE DEVICES WERE OF THE SAME GENERAL MAGNITUDES AS WERE OBTAINED ON DEPOSITED POLYCRYSTALLINE CDS THIN-FILM TRANSISTORS (TFT'S) OF SIMILAR DIMENSIONS. INITIAL TESTS INDICATE THAT THE DRAIN CURRENT-DRAIN VOLTAGE CHARACTERISTICS OF THE SINGLE-CRYSTAL CDS MOS TRANSISTOR ARE LESS TEMPERATURE SENSITIVE THAN ARE THE CHARACTERISTICS OF DEPOSITED, POLYCRYSTALLINE, THIN-FILM, CDS DEVICES (TFT'S). IN BOTH SINGLE CRYSTAL AND THIN-FILM TRANSISTORS, THE OXIDE LAYER AND ELECTRODES ARE VACUUM DEPOSITED USING SIMILAR PROCEDURES. THE LARGE DIFFERENCE IN THE TEMPERATURE STABILITIES OF THE TWO TYPES OF DEVICES INDICATES THAT THE SOURCE OF THE TEMPERATURE DEPENDENCE LIES IN THE DEPOSITED, THIN-FILM NATURE OF THE SEMICONDUCTOR LAYER. (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD-630 863 20/12 7/4
BROWN UNIV PROVIDENCE R I

STUDY OF SURFACE PROPERTIES OF ATOMICALLY-CLEAN METALS AND SEMICONDUCTORS. PART I. STUDY OF CDS SURFACES BY LEED. PART II. COMBINED LEED AND MASS SPECTROMETER MEASUREMENTS FOR ADSORPTION AND CATALYSIS. (U)

DESCRIPTIVE NOTE: PROGRESS REPT. NO. 8 (SEMI-ANNUAL), 1 JUL-31 DEC 65,
MAR 66 49P FARNSWORTH,H. E. ICAMPBELL,B. D. IONCHI,M. I
CONTRACT: DA-28-043-AMC-00299(E),
PROJ: DA-200-14501-B118

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: SEE ALSO AD-623 174.

DESCRIPTORS: (*SEMICONDUCTORS, SURFACE PROPERTIES), (*CATALYSTS, SURFACE PROPERTIES), (*CADMIUM COMPOUNDS, SULFIDES), (*NICKEL, ADSORPTION), METALS, ELECTRON DIFFRACTION ANALYSIS, MASS SPECTROSCOPY, ILLUMINATION, OXYGEN, HEATING, VOLTAGE CARBON MONOXIDE, OXIDATION, CATALYSIS (U)
IDENTIFIERS: CADMIUM SULFIDE, LEED (U)

A STUDY WAS MADE OF CADMIUM SULFIDE SURFACES BY LOW ENERGY ELECTRON DIFFRACTION (LEED). THE INFLUENCE OF ILLUMINATION ON THE ADSORPTION OF OXYGEN WAS OBSERVED FOR VARIOUS CONDITIONS OF THE SURFACE. THE PHOTO-STIMULATED ADSORPTION OF OXYGEN WAS COMPARED WITH THE ADSORPTION PROMOTED BY THE PRESENCE OF A HOT FILAMENT NEAR THE SAMPLE. FROM THE CHANGES IN POTENTIAL MEASURED DURING THE ADSORPTION PROCESS IT WAS CONCLUDED THAT ATOMIC OXYGEN IS PROBABLY THE ADSORBATE SPECIES. COMBINED ELECTRON DIFFRACTION AND MASS SPECTROMETER MEASUREMENTS WERE APPLIED TO THE ADSORPTION OF CARBON MONOXIDE ON NICKEL. THESE TECHNIQUES ENABLED THE OBSERVATION OF SURFACE STRUCTURES AS A FUNCTION OF THE ADSORBED SPECIES AS WELL AS THE CONDITIONS OF THE SURFACE WHICH ENHANCED THE ADSORPTION OF THE CARBON MONOXIDE AND DESORPTION WITH SELF-OXIDATION TO FORM CARBON DIOXIDE. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD-631 408 9/1
RCA LABS PRINCETON N J

THIN-FILM POLYCRYSTALLINE FIELD-EFFECT TRIODE. (U)

DESCRIPTIVE NOTE: QUARTERLY REPT. NO. 3, 1 JAN-31 MAR 65,
JUN 65 56P WEIMER,P. K. ;BORKAN,H. ;
BOWE,J. J. ;FRANTZ,V. L. ;HOPKINS,R. S. ;
CONTRACT: DA-28-043-AMC-00231(E),
PROJ: DA-1P622001A056,

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:

DESCRIPTORS: (*TRIODES, SEMICONDUCTING FILMS), (*TRANSISTORS, SEMICONDUCTING FILMS), CADMIUM COMPOUNDS, SELENIDES, SULFIDES, CADMIUM ALLOYS, HALL EFFECT, RESISTANCE(ELECTRICAL), VAPOR PLATING, VACUUM APPARATUS, MANUFACTURING METHODS, SEMICONDUCTOR DEVICES, EVAPORATION, SELENIUM ALLOYS (U)
IDENTIFIERS: CADMIUM SELENIDE, CADMIUM SULFIDE, THIN FILMS (U)

A PROCESS FOR FABRICATING CDSE THIN-FILM-TRANSISTORS (TFT'S) REPRODUCIBLY IN LARGE ARRAYS HAS BEEN DEVELOPED. THE DEPOSITION OF THE SEMICONDUCTOR BY EVAPORATION UPON AN UNHEATED SUBSTRATE IS CONTROLLED BY MEANS OF ELECTRICAL MONITORING OF A SAMPLE TFT DEPOSITED ON THE SAME BLANK WITH THE CIRCUIT ARRAY. WIRE GRILL MASKS IN THE VACUUM SYSTEM ARE USED TO DEFINE THE PATTERNS. INTEGRATED THIN-FILM CIRCUITS INCORPORATING 540 CDSE TFT'S HAVE OPERATED CONTINUOUSLY FOR MORE THAN 500 HOURS WITHOUT FAILURE. THE HALL MOBILITY AND RESISTIVITY OF VACUUM -DEPOSITED CDSE FILMS HAVE BEEN STUDIED FOR VARIOUS DEPOSITION CONDITIONS. METAL-INSULATOR-SEMICONDUCTOR (M-I-S) STRUCTURES HAVE BEEN USED TO STUDY INSTABILITY MECHANISMS IN THE TFT. A SYSTEMATIC PROGRAM OF FABRICATION AND LIFE-TESTING OF CDS TFT'S IS BEING CARRIED OUT. ANALOG AND DIGITAL CIRCUITS INCORPORATING TFT'S WERE STUDIED. MASKS WERE DESIGNED AND ORDERED FOR A THREE-INPUT DIGITAL GATE. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD-631 409 9/1
RCA LABS PRINCETON N J

THIN-FILM POLYCRYSTALLINE FIELD-EFFECT TRIODE. (U)

DESCRIPTIVE NOTE: QUARTERLY REPT. NO. 4, 1 APR-30 JUN 65,
SEP 65 41P WEIMER,P. K. ;OWE,J. J. ;
LAZNOVSKY,W. H. ;SADASIV,A. G. ;SCHELHORN,R. L. ;

CONTRACT: DA-28-043-AMC-00231(E),
PROJ: DA-1P622001A055,

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: SEE ALSO AD-631 408.

DESCRIPTORS: (*TRIODES, SEMICONDUCTING FILMS), (*TRANSISTORS, SEMICONDUCTING FILMS), CADMIUM COMPOUNDS, SELENIDES, SULFIDES, CADMIUM ALLOYS, SELENIUM ALLOYS, LIFE EXPECTANCY, FAILURE(ELECTRONICS), STABILITY, DEPOSITION, GATES(CIRCUITS), RESISTORS, NICKEL ALLOYS, CHROMIUM ALLOYS (U)
IDENTIFIERS: NICHROME, THIN FILMS (U)

A PROCESS OF STABILIZING CADMIUM SULFIDE TFT'S HAS BEEN DEVELOPED. PRELIMINARY DATA BASED ON 1000-HOUR SHELF-LIFE AND OPERATING-LIFE TESTS INDICATE THAT THE STABLIZED TFT'S DO NOT HAVE THE REVERSIBLE GATE INSULATOR-SEMICONDUCTOR INSTABILITY. SHELF LIFE AND OPERATING LIFE HAVE REVEALED THAT RANDOM I SUB D INSTABILITIES HAVE BEEN GREATLY REDUCED. FROM EARLY OPERATING LIFE-TEST COMPARISONS, THE LONG-TERM DECAY OBSERVED IN PREVIOUS TFT'S HAS ALSO BEEN GREATLY REDUCED. OPERATING TESTS OF UNITS AT 130C AND 185C FOR 300-HOUR PERIODS INDICATE THE PRESENCE OF A LONG-TERM DECAY MECHANISM. INTEGRATED THIN-FILM THREE-INPUT GATE CIRCUITS INCORPORATING CDS TFT'S AND NICHROME RESISTORS HAVE BEEN FABRICATED AND TESTED. A PROCEDURE FOR DEPOSITING CDSE TFT'S UPON AN UNHEATED SUBSTRATE HAS YIELDED GOOD REPRODUCIBILITY, STABILITY, AND LIFE. AN UNENCAPSULATED CIRCUIT INCORPORATING 540 CDSE TFT'S WAS OPERATED OVER 2000 HOURS AT ROOM TEMPERATURE BEFORE ANY UNITS FAILED. ANOTHER CIRCUIT OF THE SAME TYPE HAS OPERATED 700 HOURS AT 85C WITHOUT FAILURE. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD-631 744 20/12 20/2
STANFORD UNIV CALIF DEPT OF MATERIALS SCIENCE

FURTHER CONSIDERATIONS ON A THEORY OF SUPERLINEARITY IN CDS AND RELATED MATERIALS, (U)

APR 65 9P DUSSEL,GUSTAVO A. ;BUBE, RICHARD H. ;

CONTRACT: DA-31-124-ARO(D)-73,
MONITOR: AROD , 4119:7

UNCLASSIFIED REPORT
AVAILABILITY: PUBLISHED IN JOURNAL OF APPLIED PHYSICS V37 N1 P13-21 JAN 1966. COPIES TO DDC USERS ONLY.
SUPPLEMENTARY NOTE:

DESCRIPTORS: (*SEMICONDUCTORS, *PHOTOCONDUCTIVITY), (*CARRIERS(SEMICONDUCTORS), PHOTOCONDUCTIVITY), (*CADMIUM COMPOUNDS, SULFIDES), SELENIDES, SINGLE CRYSTALS, IONIZATION, ELECTRON TRANSITIONS, BAND THEORY OF SOLIDS (U)
IDENTIFIERS: CADMIUM SELENIDE, CADMIUM SULFIDE, ELECTRON TRAPPING (U)

A THEORY OF SUPERLINEARITY BY CARDON AND BUBE IS EXTENDED BY CONSIDERING THE EFFECT OF A HIGH DENSITY OF SHALLOW TRAPS, EITHER DISCRETE OR WITH A QUASIEXPONENTIAL DISTRIBUTION. NEW CONDITIONS FOR THE BREAKPOINTS OF SUPERLINEARITY ARE INTRODUCED. THESE NEW CONDITIONS ALLOW THE EXPLANATION OF SEVERAL FEATURES OF SUPERLINEARITY IN SINTERED LAYERS, INCLUDING THE 'ANOMALOUS' OBSERVATION OF LIFETIME DECREASE ABOVE THE SUPERLINEAR REGION, AS DESCRIBED IN INVESTIGATIONS ON CDSE BY STUPP. A POSSIBLE RELATIONSHIP BETWEEN SUCH TRAP DISTRIBUTIONS AND AN APPARENT DECREASE IN SENSITIZING CENTER HOLE IONIZATION ENERGY IN HIGHLY IMPURE SINGLE CRYSTALS OF CDS IS SUGGESTED. A SUMMARY OF ALL THE BASIC SUPERLINEARITY CONDITIONS IS GIVEN, WITH PRINCIPAL EMPHASIS ON THE PHYSICS OF THE INVOLVED MECHANISMS. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD-631 791 20/12
STANFORD UNIV CALIF DEPT OF MATERIALS SCIENCE

DETERMINATION OF ELECTRON TRAPPING PARAMETERS, (U)

MAY 65 11P BUBE,RICHARD H. ;DUSSEL, GUSTAVO A. ;HO,CHING-TAO;MILLER,LEWIS D. ;
CONTRACT: DA-31-124-ARO(D)-73,
MONITOR: AROD , 4119:8

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SUPPLEMENTARY NOTE:

DESCRIPTORS: (*SEMICONDUCTORS, ELECTRON CAPTURE), (*CARRIERS(SEMICONDUCTORS), MATHEMATICAL ANALYSIS), CADMIUM COMPOUNDS, SULFIDES, SELENIDES, PHOTOCONDUCTIVITY, THERMAL PROPERTIES, PROBABILITY, CRYSTALS, ELECTRONS (U)
IDENTIFIERS: ELECTRON TRAPPING, THERMALLY STIMULATEDCONDUCTIVITY, CADMIUM SELENIDE, CADMIUM SULFIDE (U)

A DETAILED INVESTIGATION OF DIFFERENT METHODS FOR DETERMINING ELECTRON TRAP PARAMETERS WAS MADE ON CRYSTALS OF CDS-CDSE. THE PRINCIPAL TECHNIQUES INVOLVED ARE DECAY OF PHOTOCONDUCTIVITY AND THERMALLY STIMULATED CONDUCTIVITY (TSC). DIRECT EVIDENCE OF A QUASICONTINUOUS TRAP DISTRIBUTION WITH TOTAL DENSITY OF 5X10 TO THE 15TH POWER/CU CM, TRAP DEPTH RANGE OF 0.1-0.7 EV, AND CAPTURE CROSS SECTIONS OF THE ORDER OF 10 TO THE -16TH POWER SQ CM IS OBTAINED, FOR WHICH CORRECT VALUES OF THE PARAMETERS CAN BE CALCULATED FROM FERMI-LEVEL ANALYSIS OF EITHER DECAY OR TSC DATA. IN THE SAME CRYSTALS A DISCRETE TRAP LEVEL WITH DENSITY OF 2X10 TO THE 14TH POWER /CU CM, DEPTH OF 0.73 EV, AND APPARENT CROSS SECTION OF 10 TO THE -14TH POWER SQ CM IS ALSO FOUND. IN SPITE OF THE LARGE VALUE OF CROSS SECTION DERIVED FROM THE FREEING OF TRAPPED ELECTRONS, THESE TRAPS EXACTLY OBEY MONOMOLECULAR KINETICS. A TEMPERATURE THRESHOLD AT 180K IS FOUND, BELOW WHICH IT IS NOT POSSIBLE TO FILL THESE TRAPS. EXAMINATION OF A NUMBER OF POSSIBILITIES FAVORS THE PROPOSAL THAT THESE TRAPS ARE CHARACTERIZED BY A COULOMB -REPULSIVE BARRIER. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD-632 998 20/12 20/5 9/1 11/6
LINCOLN LAB MASS INST OF TECH LEXINGTON

SOLID STATE RESEARCH 1966-1. (U)

DESCRIPTIVE NOTE: QUARTERLY TECHNICAL SUMMARY REPT. 1 NOV 65-31 JAN 66,
JAN 66 76P MCWHORTER,ALAN L. ;
CONTRACT: AF 19(628)-5167.
PROJ: AF-649L.
MONITOR: ESD , TR-66-42

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: SEE ALSO AD-629 048.

DESCRIPTORS: (*SOLID STATE PHYSICS, SCIENTIFIC RESEARCH), (*SEMICONDUCTOR DEVICES, SCIENTIFIC RESEARCH), (*LASERS, SCIENTIFIC RESEARCH), (*INTERMETALLIC COMPOUNDS, SCIENTIFIC RESEARCH), PUMPING(ELECTRONICS), ELECTRON BEAMS, SELENIDES, SULFIDES, CADMIUM COMPOUNDS, GALLIUM ALLOYS, ARSENIC ALLOYS, PHOSPHORESCENT MATERIALS, ZINC COMPOUNDS, TITANIUM COMPOUNDS, OXIDES, IRON, CYCLOTRON RESONANCE PHENOMENA, MAGNETISM, SPINELS, MAGNETIC RESONANCE, THULIUM, ELECTRICAL PROPERTIES, MERCURY COMPOUNDS, TELLURIDES, LEAD COMPOUNDS, RHENIUM COMPOUNDS (U)
IDENTIFIERS: CADMIUM SELENIDE, CADMIUM SULFIDE, CADMIUM TELLURIDE, GALLIUM ARSENIDE, LEAD SELENIDE,MERCURIC TELLURIDE, TITANIUM OXIDES, RHENIUM OXIDES (U)

CONTENTS: SOLID STATE DEVICE RESEARCH; OPTICAL TECHNIQUES AND DEVICES; MATERIALS RESEARCH; PHYSICS OF SOLIDS. (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD-633 645 20/12 7/4 20/6
AIR FORCE INST OF TECH WRIGHT-PATTERSON AFB OHIO SCHOOL OF ENGINEERING

ULTRAVIOLET REFLECTIVITY STUDIES OF CdS:Se SINGLE CRYSTAL SOLID SOLUTIONS. (U)

DESCRIPTIVE NOTE: MASTER'S THESIS,
JUN 66 106P GUTHEINZ,LEE MORGAN I
REPT. NO. GSP/PH/66-8,

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:

DESCRIPTORS: (*ULTRAVIOLET SPECTROSCOPY, *SEMICONDUCTORS), (*CADMIUM ALLOYS, ULTRAVIOLET SPECTROSCOPY), (*SELENIUM ALLOYS, ULTRAVIOLET SPECTROSCOPY), SINGLE CRYSTALS, SOLID SOLUTIONS, BAND THEORY OF SOLIDS, ATOMIC ENERGY LEVELS, ELECTRON TRANSITIONS, CRYSTALLOGRAPHY, CADMIUM COMPOUNDS, SULFIDES (U)

THE REFLECTION SPECTRA OF CdS:CdSe SOLID SOLUTION ALLOYS HAVE BEEN MEASURED AT ROOM TEMPERATURE FOR PHOTON ENERGIES IN THE RANGE 4.0 - 10.0 EV. THE SHIFT IN ENERGY OF SEVERAL DIRECT INTERBAND TRANSITIONS (E0, E'0, E1, E2) WITH VARYING CATION COMPOSITION HAS BEEN OBSERVED. THE STRUCTURE IS INTERPRETED IN TERMS OF AN ANALOGOUS ZINCBLENDE MODEL, WHICH HAS BEEN SHOWN TO DIFFER FROM THE WURTZITE IN THE (0, 0, 1) DIRECTION IN THE FOLDED ZONE SCHEME OF BIRMAN ONLY BY THE OMISSION OF A SMALL TRIGONAL FIELD PERTURBATION. THE OBSERVED MONOTONICALLY INCREASING VARIATION IN E0 IS IN GOOD AGREEMENT WITH THAT REPORTED BY HANDELMAN AND KAISER. THE VARIATION IN THE TRANSITIONS IS QUALITATIVELY INTERPRETED AS RESULTING FROM AN EFFECTIVE LATTICE PARAMETER DILATION WHICH OCCURS IN THE ALLOYING PROCESS. THIS DILATION IS SHOWN TO GIVE RISE TO A POTENTIAL OF DEFORMATION WHICH HAS A PERTURBING EFFECT ON THE BAND EDGES. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD-633 715 20/12 20/2
AIR FORCE INST OF TECH WRIGHT-PATTERSON AFB OHIO SCHOOL OF ENGINEERING

ULTRASONIC STRESS WAVES IN CADMIUM SULFIDE. (U)

DESCRIPTIVE NOTE: MASTER'S THESIS.
MAR 66 100P MAHAFFY,CRAIG EUGENE ;
REPT. NO. GSP/PH/66-12.

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:

DESCRIPTORS: (*ULTRASONIC PROPERTIES, SEMICONDUCTORS), (*CADMIUM COMPOUNDS, SULFIDES), STRESSES, SINGLE CRYSTALS, RELAXATION TIME, ELECTRON CAPTURE, COPPER, SILVER, IMPURITIES (U)
IDENTIFIERS: THESES (U)

THE COPPER AND SILVER DOPED CADMIUM SULFIDE CRYSTALS OBSERVED IN THE EXPERIMENT EXHIBITED ESSENTIALLY THE SAME ULTRASONIC AMPLIFICATION CHARACTERISTICS AS CRYSTALS GROWN FROM UNDOPED, HIGH-PURITY, CADMIUM SULFIDE POWDER. THE RELAXATION TIME OF ELECTRON TRAPPING IS NOT AFFECTED BY THE PRESENCE OF THE IMPURITY ELEMENTS COPPER AND SILVER, AT LEAST IF THE IMPURITY-ELEMENT CONCENTRATIONS ARE RESTRICTED TO THOSE USED IN THIS EXPERIMENT. THE CALCULATED VALUE OF .3 FOR THE TRAPPING FACTOR IN CRYSTAL 4 (CDS:CU-30PPM), AS COMPARED TO .5 CALCULATED FOR ALL OTHER CRYSTALS, IS A POSSIBLE INDICATION THAT THE IMPURITY ATOMS FORMED TRAPPING CENTERS NOT PRESENT IN THE OTHER, LESS HEAVILY DOPED, CRYSTALS. IF THE RESTRICTIONS IMPOSED BY THE LINEAR (SMALL SIGNAL) APPROXIMATION ARE NOT VIOLATED, THE MODIFIED AMPLIFICATION EQUATION OF UCHIDA ET AL. CORRECTLY DESCRIBES THE EXPERIMENTALLY OBSERVED ULTRASONIC AMPLIFICATION IN CADMIUM SULFIDE. THE DISADVANTAGE OF THE MODIFIED EQUATION, IN THE EXPERIMENTAL SITUATION, IS THAT IT IS POSSIBLE TO OBTAIN APPARENT AGREEMENT BETWEEN THEORY AND EXPERIMENT WHEN NONLINEAR CONDITIONS ARE ACTUALLY PRESENT IN THE CRYSTAL. THIS SITUATION IS MADE POSSIBLE BY THE DEPENDENCE OF THE THEORETICALLY PREDICTED GAIN VALUES ON THE EXPERIMENTALLY OBSERVED VALUES OF MAXIMUM AND MINIMUM GAIN. FOR EXAMPLE, THE EFFECTS OF ACOUSTIC GAIN SATURATION CAN REDUCE THE OBSERVED MAXIMUM GAIN WHICH IN TURN WILL RESULT IN THE RATIO OF THE THEORETICALLY PREDICTED MAXIMUM GAIN TO MINIMUM GAIN BEING REDUCED AS WELL. (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD-634 032 20/12 20/2 20/3
DELAWARE UNIV NEWARK DEPT OF PHYSICS

THE INFLUENCE OF OXYGEN IN THE ULTRAHIGH VACUUM RANGE ON ELECTRICAL PROPERTIES OF CDS. (U)

DESCRIPTIVE NOTE: TECHNICAL REPT.,
MAY 66 17P BOER,KARL W. ISCHUBERT,R.
;
REPT. NO. TR-7,
CONTRACT: DA-31-124-ARO(D)-173,
MONITOR: AROD , 4461:8

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE;

DESCRIPTORS: (*CADMIUM COMPOUNDS, SULFIDES), (*SULFIDES, ELECTRICAL PROPERTIES), SINGLE CRYSTALS, ADSORPTION, OXYGEN, HYDROGEN, CARBON DIOXIDE, VACUUM, TEMPERATURE, PHOTOCONDUCTIVITY, MASS SPECTRUM, PRESSURE, SEMICONDUCTORS (U)
IDENTIFIERS: CADMIUM SULFIDE (U)

UNDOPED CDS SINGLE CRYSTALS ARE KEPT IN A VACUO OF P < 10 TO THE -9TH POWER TORR. ADSORPTION OF DIFFERENT GASES (O2, H, CO2) WAS ALLOWED BY BACKFILLING THE SYSTEM UP TO A PRESSURE IN THE 0.00001 TORR RANGE THROUGH A SENSITIVE LEAK VALVE; CRYSTAL CONDUCTANCE IS MONITORED SIMULTANEOUSLY. CHANGES OF THE PHOTOCURRENT UP TO 0.000003 AMPERES AND SENSITIVITY TO CHANGES IN THE PARTIAL PRESSURE OF OXYGEN AS SMALL AS 10 TO THE -10TH POWER TORR ARE REPORTED FOR DIFFERENT TEMPERATURES. GASES ARE DESORBED BY A TIME LINEAR INCREASE OF TEMPERATURE FROM 80K TO 600K. THE DESORPTION IS MONITORED WITH A MASS SPECTROMETER LOCKED IN THE INVESTIGATED MASS NUMBER. SIMULTANEOUS CHANGES OF ELECTRICAL PROPERTIES ARE STUDIED USING TSC CURVES. CONSEQUENT DESORPTION SHOW, IN GENERAL, MORE THAN ONE DESORPTION PEAK, INDICATING MULTISITE ADSORPTION. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD-634 088 9/1
RADIO CORP OF AMERICA SOMERVILLE N J DEFENSE MICROELECTRONICS

THIN-FILM POLYCRYSTALLINE FIELD-EFFECT TRIODE. (U)

DESCRIPTIVE NOTE: QUARTERLY REPT. NO. 6, 1 OCT-31 DEC 65,
MAY 66 61P BOWE,J. J. ;SCHELHORN,R. L. ;SHALLCROSS,F. V. ;WAXMAN,A. S. ;WEIMER,P. K. ;
CONTRACT: DA-28-043-AMC-00231(E),
PROJ: DA-1P6-22001-A056,
TASK: 1P6-22001-A05602,
MONITOR: ECOM , 00231-6

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: SEE ALSO AD-631 409.

DESCRIPTORS: (*TRIODES, SEMICONDUCTING FILMS), (*TRANSISTORS, SEMICONDUCTING FILMS), MICROSTRUCTURE, CADMIUM ALLOYS, SELENIUM ALLOYS, CADMIUM COMPOUNDS, SILICON COMPOUNDS, SULFIDES, OXIDES, PHOTOELECTRIC EFFECT, VOLTAGE (U)
IDENTIFIERS: THIN FILMS (U)

CAPACITANCE MEASUREMENTS ON CDS-SIO-AL STRUCTURES AT VARIOUS WELL-CONTROLLED TEMPERATURES HAVE INDICATED THAT THE NATURE OF THE INSTABILITIES UNDER APPLIED BIAS CAN BE IRREVERSIBLY CHANGED BY HEATING THE SAMPLE IN VACUUM FROM 25 TO 50 C. SEVERAL MECHANISMS APPEAR TO BE INVOLVED IN THESE INSTABILITIES. SILICA FILMS DEPOSITED BY RESISTANCE HEATING OF SIO2 ARE UNDER STUDY AS ENCAPSULANTS FOR M-I-S STRUCTURES; REFRACTIVE INDEX DATA IMPLY THAT THE SIO2 FILMS ARE NOT COMPLETELY STOICHIOMETRIC. PHOTOEMISSION OF ELECTRONS INTO THIN-FILM VAPOR-DEPOSITED INSULATORS HAS BEEN USED TO STUDY THE ENERGY BAND DIAGRAM OF THIN-FILM VAPOR-DEPOSITED METAL-INSULATOR-SEMICONDUCTOR CONTACTS AND THIN-FILM METAL-INSULATOR-METAL CONTACTS. THE INSULATORS STUDIED TO DATE HAVE BEEN SIO AND SIO2. WE HAVE FOUND A BARRIER BETWEEN SIO AND AU OF 3.6 PLUS OR MINUS 0.15 EV AND AN ENERGY BARRIER OF 4.8 PLUS OR MINUS 0.2 EV BETWEEN SIO AND CDSE. THE PHOTOCURRENT-VOLTAGE RELATIONSHIPS OF M-I-S STRUCTURES AND METAL-INSULATOR-METAL STRUCTURES ARE BRIEFLY DISCUSSED. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD-634 591 20/12 20/2
EAGLE-PICHER INDUSTRIES INC MIAMI OKLA MIAMI RESEARCH LABS

RESEARCH IN PURIFICATION AND SINGLE CRYSTAL GROWTH OF II-VI COMPOUNDS. (U)

DESCRIPTIVE NOTE: QUARTERLY PROGRESS REPT. NO. 4, 15 JAN-14 APR 66,
APR 66 26P FAHRIG, R. H. ;BROWN,L. W. ; WEBB,G. N. ;
CONTRACT: AF 33(615)-2947,

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: SEE ALSO AD-470 918.

DESCRIPTORS: (*SINGLE CRYSTALS, SEMICONDUCTORS), (*SEMICONDUCTORS, SINGLE CRYSTALS), (*CRYSTAL GROWTH, SINGLE CRYSTALS), SULFIDES, SELENIDES, TELLURIDES, IMPURITIES, SYNTHESIS(CHEMISTRY), PURIFICATION, LABORATORY FURNACES, SEMICONDUCTORS, ZINC ALLOYS, CADMIUM ALLOYS, SELENIUM ALLOYS, TELLURIUM ALLOYS, CADMIUM COMPOUNDS, ZINC COMPOUNDS, INTERMETALLIC COMPOUNDS (U)
IDENTIFIERS: CADMIUM SULFIDE, ZINC SELENIDE, CADMIUM TELLURIDE (U)

A STUDY WAS MADE OF THE FACTORS INFLUENCING THE SYNTHESIS, PURITY, AND CRYSTALLIZATION OF GROUP II-VI COMPOUND SEMICONDUCTOR MATERIALS. SYNTHESIS OPERATIONS WERE LIMITED TO CDS, ZNSE AND CDTE. A MILESTONE IN PURITY WAS REACHED IN CDS LOT 274 WHEN ONLY 325 PARTS PER BILLION TOTAL IMPURITIES WERE FOUND BY MASS SPECTROGRAPHIC ANALYSIS. PURITIES IN GENERAL WERE BELIEVED TO BE SOMEWHAT BETTER THAN USUAL ALTHOUGH THIS CANNOT BE SUPPORTED BY THE EMISSION SPECTROGRAPHIC DATA RECEIVED. CRYSTALS OF CDS, ZNS, CDTE, AND ZNSE WERE GROWN FROM THE MELT. MIXED CRYSTALS OF CDZNS, ZNSETE, AND ZNCDSE WERE ALSO GROWN. TESTS OF THE CONTROLLER AND PROGRAMMER FOR THE NEW PRESSURE FURNACE SYSTEM WERE CONCLUDED. THE UNITS FUNCTIONED AS ANTICIPATED AND DEMONSTRATED THAT CRYSTALS GROWN USING THIS APPARATUS ARE SUPERIOR IN APPEARANCE TO ONES GROWN BY MANUAL CONTROL. ALSO TESTED WAS THE COVER FOR THE NEW PRESSURE FURNACE. THE SUCCESSFUL COMPLETION OF THE TESTS ON THIS ITEM CLEARED THE WAY FOR HARDENING OF THE FURNACE DESIGN AND PROCEEDING WITH THE CONSTRUCTION. (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD-635 332 20/12 20/10
LINCOLN LAB MASS INST OF TECH LEXINGTON

CYCLOTRON RESONANCE OF PIEZOELECTRIC POLARONS. (U)

AUG 65 9P LARSEN, DAVID M. I
REPT. NO. JA-2625,
CONTRACT: AF 19(628)-5167;
MONITOR: ESD TR-66-183

UNCLASSIFIED REPORT
AVAILABILITY: PUBLISHED IN PHYSICAL REVIEW V142 N2 P428-35 FEB 11 1966.
SUPPLEMENTARY NOTE:

DESCRIPTORS: (*CADMIUM COMPOUNDS, SULFIDES), (*PHONONS, *CYCLOTRON RESONANCE PHENOMENA), (*PIEZOELECTRIC EFFECT, QUANTUM MECHANICS), ELECTRONS, MAGNETIC FIELDS, PERTURBATION THEORY, SEMICONDUCTORS, PIEZOELECTRIC CRYSTALS (U)
IDENTIFIERS: POLARONS (U)

THE MAGNETIC FIELD DEPENDENCE OF THE ENERGY AND LINEWIDTH OF THE TRANSITION FROM THE N = 1 TO THE N= 0 LANDAU LEVEL OF A PIEZOELECTRIC POLARON HAS BEEN CALCULATED NUMERICALLY FOR POLARONS AT ZERO TEMPERATURE. A WEAK ISOTROPIC PIEZOELECTRIC COUPLING BETWEEN THE ELECTRON AND THE ACOUSTIC PHONON MODES IS ASSUMED, AND IS TREATED AS A PERTURBATION ON FREE-ELECTRON MAGNETIC EIGENSTATES. IT IS FOUND THAT THE SHIFT IN THE CYCLOTRON RESONANCE FREQUENCY DUE TO PIEZOELECTRIC ELECTRON-PHONON INTERACTION BEGINS TO DIFFER DRASTICALLY FROM THAT EXPECTED FROM THE POLARON EFFECTIVE-MASS THEORY WHEN (H-BAR(OMEGA SUB 0)/MC SQ. > 1, WHERE (H-BAR(OMEGA SUB C) IS THE SEPARATION IN ENERGY OF THE UNPERTURBED MAGNETIC LEVELS, M IS THE BAND MASS OF THE ELECTRON, AND C IS THE VELOCITY OF SOUND IN THE CRYSTAL. THE SEMICLASSICAL THEORY OF MAHAN AND HOPFIELD IS REVIEWED AND SHOWN NOT TO BE SUITABLE FOR INTERPRETING RECENTLY REPORTED CYCLOTRON-RESONANCE EXPERIMENTS IN CDS, WHERE THE LANDAU-LEVEL SPACINGS WERE SUBSTANTIALLY GREATER THAN THE MEAN THERMAL ENERGY PER ELECTRON. DIFFICULTIES ENCOUNTERED IN EXTENDING THE PRESENT PERTURBATION CALCULATION TO FINITE TEMPERATURE ARE POINTED OUT. FINALLY, THE WEAK-COUPLING ENERGY SHIFT OF THE N = 0 TO N = 1 TRANSITION FOR OPTICAL POLARONS (ELECTRONS COUPLED TO LONGITUDINAL OPTICAL PHONONS) IS EVALUATED AS A FUNCTION OF MAGNETIC FIELD AND COMPARED TO PREVIOUS RESULTS DERIVED FOR WEAK FIELDS. (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD-636 420 9/1 13/8
DELAWARE UNIV NEWARK DEPT OF PHYSICS

MULTILAYER OHMIC CONTACTS ON CDS. (U)

DESCRIPTIVE NOTE: TECHNICAL REPT.
JUL 66 22P BOER, KARL W. ;HALL,ROBERT B. ;
REPT. NO. TR-10,
CONTRACT: NONR-4336(00),

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: SUPPORTED IN PART BY NASA.

DESCRIPTORS: (*SEMICONDUCTOR DEVICES, *ELECTRIC TERMINALS), (*CADMIUM COMPOUNDS, SULFIDES), CIRCUIT INTERCONNECTIONS, ELECTRODES, VAPOR PLATING, TITANIUM, ALUMINUM, PLATINUM, EVAPORATION, ELECTRICAL PROPERTIES, LAMINATES (U)
IDENTIFIERS: CADMIUM SULFIDE (U)

A MULTILAYER TECHNIQUE IS PROPOSED FOR EVAPORATION OF OHMIC CONTACTS ONTO CDS WHICH DOES NOT CHANGE THEIR ELECTRICAL PROPERTIES AFTER HEAT TREATMENT UP TO 350C. THIS TECHNIQUE CONSISTS OF A SEQUENTIAL EVAPORATION OF A PREPARATIVE LAYER, AN ACTIVE METAL AND POSSIBLE A COVERING METAL. THE TI (PREPARATIVE)-AL (ACTIVE)-PT (COVER) SEQUENCE WAS FOUND MOST SUCCESSFUL. ALL OF THE MORE THAN FORTY EVAPORATIONS INVESTIGATED -ON CDS SINGLE CRYSTALS, OR ON EVAPORATED RECRYSTALLIZED LAYERS- SHOWED OHMIC CHARACTERISTICS BETWEEN 2 MV AND 200 V AND SHOWED GENERATION-RECOMBINATION NOISE ABOVE (AT MOST) 500 HZ. THE ELECTRICAL PROPERTIES OF THE CONTACTS DID NOT MARKEDLY CHANGE AFTER VACUUM HEAT TREATMENT UP TO 350C. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD-636 502 20/12 9/1
RCA LABS PRINCETON N J

LOW TEMPERATURE INFRARED PHOTOCONDUCTORS. (U)

DESCRIPTIVE NOTE: SUMMARY REPT., 31 MAY 65-30 MAY 66.
AUG 66 40P SCHULTZ, M. L. ;DALVEN,R. ;
ROWLEY,C. D. ;
CONTRACT: NONR-2225(00),

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: SEE ALSO AD-617 325.

DESCRIPTORS: (*INFRARED PHOTOCONDUCTORS, CRYOGENICS), (*PHOTOMULTIPLIERS, INFRARED PHOTOCONDUCTORS), CARRIERS(SEMICONDUCTOR), FILMS, PHOTOCONDUCTIVITY, SEMICONDUCTORS, BAND THEORY OF SOLIDS, IONIZATION, SELENIUM, SILVER COMPOUNDS, CHLORIDES, CADMIUM COMPOUNDS, SULFIDES, GERMANIUM, LEAD ALLOYS, TELLURIUM ALLOYS (U)

THE FIRST RESULTS OBTAINED IN STUDIES DIRECTED TOWARD THE DEVELOPMENT OF AN INFRARED PHOTOCONDUCTIVE MULTIPLIER ARE SUMMARIZED. THIS DEVICE, WHICH IS A SOLID STATE ANALOG OF THE SECONDARY EMISSION MULTIPLIER FOR PHOTOELECTRONS, IS TO BE A MULTI-LAYERED STRUCTURE CONSISTING OF A SUITABLE PHOTOCONDUCTOR FOLLOWED BY ALTERNATE LAYERS OF WIDE AND NARROW BAND GAP SEMICONDUCTORS. CARRIERS OPTICALLY EXCITED IN THE PHOTOCONDUCTOR ARE ACCELERATED IN THE FIRST WIDE BAND GAP SEMICONDUCTOR LAYER. WHEN THESE ENTER THE NARROW BAND GAP MATERIAL, THEIR EXCESS ENERGY IS LOST IN PRODUCTION OF ELECTRON-HOLE PARIS BY INTRINSIC IMPACT IONIZATION. THE ADDITIONAL CARRIERS SO PRODUCED ARE ACCELERATED IN THE SECOND WIDE BAND GAP LAYER TO PRODUCE ADDITIONAL MULTIPLICATION IN THE SECOND NARROW BAND GAP LAYER, AND SO ON. THE PROBLEM CONSIDERED IN THE PRESENT REPORT IS THE CHOICE OF SUITABLE MATERIALS FOR THE WIDE BAND GAP LAYERS. ONE SUCH MATERIAL IS AMORPHOUS SELENIUM. HOLES PHOTOEXCITED IN A PHOTOCONDUCTOR CAN BE INJECTED INTO AND TRANSPORTED THROUGH SE LAYERS. ELECTRONS ARE NOT TRANSPORTED. OTHER POSSIBLE WIDE BAND GAP MATERIALS INCLUDE SILVER CHLORIDE AND CADMIUM SULFIDE. THESE HAVE NOT YET BEEN EXTENSIVELY INVESTIGATED. THE PROBLEM OF ACCELERATING CARRIERS TO HIGH ENERGIES IN THE WIDE BAND GAP MATERIAL WILL RECEIVE PRIMARY ATTENTION IN THE NEXT PHASE OF THE WORK. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD-637 171 9/1
WESTINGHOUSE ELECTRIC CORP ELMIRA N Y ELECTRONIC TUBE DIV

SOLID STATE IMAGE INTENSIFIERS. (U)

DESCRIPTIVE NOTE: MONTHLY TECHNICAL ENGINEERING REPT. NO. 3, 1 JUN-30 JUN 66.
JUL 66 8P FOWLIS,D. C. INOVICE,M. A. ; SZEPESI,Z. ;
CONTRACT: N61339-66-C-0064,
PROJ: 7270-2,

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:

DESCRIPTORS: (*IMAGE INTENSIFIERS(ELECTRONICS), SEMICONDUCTOR DEVICES), SEMICONDUCTOR FILMS, CADMIUM COMPOUNDS, SULFIDES, VAPOR PLATING, SINTERING, REFLECTION (U)

CDS MIXTURES OF DIFFERENT COMPOSITION WERE PREPARED FOR MAKING SINTERED PC LAYERS. SEMI-TRANSPARENT BLACK FILMS DEPOSITED ON TOP OF THE EL LAYER SHOWED MUCH HIGHER LIGHT REFLECTION THAN THOSE ON GLASS SUBSTRATES. SMOOTHENING OF THE EL SURFACE WITH A THICK PLASTIC COATING IS PLANNED TO ELIMINATE THIS EFFECT. THE EVAPORATION TECHNIQUE FOR MAKING OPAQUE BLACK FILMS WAS IMPROVED, BUT FURTHER WORK IS NEEDED TO ELIMINATE THE HEATING OF THE SUBSTRATE AND TO HAVE MORE UNIFORM FILMS FOR LARGER AREAS. WHITE EL CELLS WERE MADE BY MIXING BLUE AND YELLOW EL POWDERS. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD-637 725 11/7 7/4 13/8
DELAWARE UNIV NEWARK DEPT OF PHYSICS

EVAPORATED AND RECRYSTALLIZED CDS LAYERS. (U)

DESCRIPTIVE NOTE: TECHNICAL REPT.
JUL 66 63P BOER,K. W. ;
REPT. NO. TR-11,
CONTRACT: NONR-4336(00)

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:

DESCRIPTORS: (*CADMIUM COMPOUNDS, SULFIDES), (*FILMS, PHOTOELECTRIC MATERIALS), VAPOR PLATING, VACUUM APPARATUS, RECRYSTALLIZATION, PHOTOCONDUCTIVITY, COPPER, DOPING, DEFECTS(MATERIALS), HEAT TREATMENT (U)
IDENTIFIERS: CADMIUM SULFIDE (U)

HEAT TREATMENTS OF EVAPORATED CDS LAYERS IN NITROGEN CONTAINING HC AND TRACES OF OXYGEN, AND PROVIDING A TRANSPORT OF CDS AND COPPER ARE REPORTED. RECRYSTALLIZATION OF AREAS UP TO SEVERAL SQ MM ARE OBSERVED. AT 25C, THE TREATED LAYERS SHOW MOBILITIES OF 140 TO 230 SQ CM/VS, PHOTOCONDUCTIVITIES OF 0.001 TO 0.2/OHMS/CM AT 750 FT-C (2600K WHITE LIGHT) WITH LIGHT-TO-DARK-CURRENT RATIOS OF 10 TO THE 8TH POWER - 10 TO THE 9TH POWER AND RESPONSE TIME (DECAY) OF 300 MICROSIC TO 1.2 MS AT 100 FT-C. THE LEVEL DISTRIBUTION AND CAPTURE CROSS SECTION FOR ELECTRONS IS INVESTIGATED USING SPECTRAL DISTRIBUTION, LIGHT INTENSITY, AND TEMPERATURE DEPENDENCE OF PHOTOCONDUCTIVITY, THERMALLY STIMULATED CURRENT AND RESPONSE TIME ANALYSES. LEVELS AT 0.23, 0.43, 0.67, 1.05 AND 2.05 EV ARE OBSERVED AND THE LETTER THREE ATTRIBUTED TO CU-CENTERS. COMPARED TO OTHER LAYERS AND SINGLE CRYSTALS, THESE LAYERS SHOW A DENSITY OF <10 TO THE 12TH POWER/CU CM OF LEVELS ATTRIBUTED TO SULFUR VACANCIES IN THE RANGE BETWEEN 0.3 AND 0.65 EV AND A NOT DETECTABLE AMOUNT OF INTRINSIC DEFECTS ACTING AS QUENCHING CENTERS AT 0.9 AND 1.35 EV. THIS IS EXPLAINED BY A CU-ENHANCED RECRYSTALLIZATION IN A CDS-SUPPLYING ATMOSPHERE AT TEMPERATURES (620 TO 650C) BELOW THE TEMPERATURES OTHERWISE USED FOR CRYSTAL GROWTH, AND THEREBY EFFICIENT ANNEALING OF INTRINSIC DEFECTS. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD-637 856 20/12
DELAWARE UNIV NEWARK DEPT OF PHYSICS

SURFACE PINNED LAYER-LIKE FIELD INHOMOGENEITIES IN CDS. (U)

DESCRIPTIVE NOTE: TECHNICAL REPT.
JUL 66 10P BOER,K. W. IVOSS,PETER I
REPT. NO. TR-11,
CONTRACT: DA-31-124-ARO(D)-173,
MONITOR: AROD 4461:12

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:

DESCRIPTORS: (*SEMICONDUCTORS, *ELECTRIC FIELDS), (*CADMIUM COMPOUNDS, *SULFIDES), CRYSTALS, SURFACE PROPERTIES, PHOTOGRAPHIC ANALYSIS, CARRIERS(SEMICONDUCTORS) (U)
IDENTIFIERS: CADMIUM SULFIDE, NEGATIVE DIFFERENTIAL CONDUCTIVITY,FRANZ-KELDYSH EFFECT (U)

IN A CDS PLATELET A SLOW-MOVING HIGH ELECTRIC FIELD DOMAIN WHICH CHANGES IT WIDTH APPRECIABLY IN TIME WAS OBSERVED USING THE FRANZ-KELDYSH EFFECT. PHOTOGRAPHS AND A CURRENT-VERSUS-TIME CURVE ARE PRESENTED, WHICH WHO THAT THE CHANGING HIGH FIELD DOMAIN IS ACTUALLY THE PROJECTION OF A NARROW HIGH FIELD LAYER SPREAD IN THE BULK OF THE CRYSTAL, WHOSE EDGES MOVE AT THE CRYSTAL SURFACES WITH DIFFERENT VELOCITIES. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD-637 857 20/12
DELAWARE UNIV NEWARK DEPT OF PHYSICS

THE INFLUENCE OF OXYGEN IN THE ULTRAHIGH VACUUM RANGE ON ELECTRICAL PROPERTIES OF CDS. (U)

DESCRIPTIVE NOTE: TECHANICAL REPT.
JUL 66 17P BOER,K. W. ISCHUBERT,R. J
REPT. NO. TR-8,
CONTRACT: DA-31-124-ARO(D)-173,
MONITOR: AROD 4461:13

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:

DESCRIPTORS: (*SEMICONDUCTORS, *VACUUM), (*CADMIUM COMPOUNDS, *SULFIDES), (*OXYGEN, ADSORPTION), SINGLE CRYSTALS, ELECTRICAL PROPERTIES, PHOTOCONDUCTIVITY, VAPOR PRESSURE, MASS SPECTRUM, IMPURITIES, HYDROGEN, CARBON DIOXIDE (U)
IDENTIFIERS: CADMIUM SULFIDE, DESORPTION (U)

MEASUREMENT OF ADSORPTION AND DESORPTION OF OXYGEN IN THE RANGE BETWEEN 2 X 10 TO THE -12 POWER AND 5 X 10 TO THE -6 POWER TORR AND CORRESPONDING INFLUENCES ON PHOTOCONDUCTANCE ON CDS SINGLE CRYSTALS ARE REPORTED. PARTIAL PRESSURES WERE MEASURED WITH A SENSITIVE MASS SPECTROMETER LOCATED DIRECTLY IN FRONT OF THE CRYSTAL. A TYPICAL DESORPTION CURVE IS GIVEN FOR AMU 16. EFFECTS OF OTHER GASES PREDOMINANT IN THE VACUUM SYSTEM SUCH AS HYDROGEN AND CARBON DIOXIDE WERE ALSO STUDIED. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD-637 919 20/12
STANFORD UNIV CALIF DEPT OF MATERIALS SCIENCE

ELECTRIC FIELD EFFECTS IN TRAPPING PROCESSES. (U)

JAN 66 8P DUSSEL,GUSTAVO A. (BUBE, RICHARD H. (

MONITOR: AROD 4119:10

UNCLASSIFIED REPORT

AVAILABILITY: PUBLISHED IN JOURNAL OF APPLIED PHYSICS V37 N7 P2797-2804 JUN 1966.

SUPPLEMENTARY NOTE:

DESCRIPTORS: (*SEMICONDUCTORS, *ELECTRIC FIELDS), (*CARRIERS(SEMICONDUCTORS), ELECTRIC FIELDS), CADMIUM COMPOUNDS, SULFIDES, SELENIDES, PHOTOCONDUCTIVITY, POLARIZATION, HEATING, ELECTROCHEMISTRY, IONIZATION, TUNNELING(ELECTRONICS), PROBABILITY (U)

IDENTIFIERS: CADMIUM SELENIDE, CADMIUM SULFIDE, HEAT EFFECT (U)

THE EFFECTS OF MODERATE ELECTRIC FIELDS (< OR = 3,000 V/CM) ON THE TRAPPING PROCESSES IN PHOTOSENSITIVE CDS-CDSE SINGLE CRYSTALS WERE INVESTIGATED USING PHOTOELECTRONIC TECHNIQUES. POSSIBLE MECHANISMS SUCH AS INJECTION OF ELECTRONS, EXTRACTION OF HOLES, DIELECTRIC POLARIZATION DUE TO INHOMOGENEITIES, JOULE HEATING, ELECTROCHEMICAL EFFECTS, IMPACT IONIZATION, FIELD-ASSISTED TUNNELING, AND FIELD-ASSOCIATED CHANGES IN THE CAPTURE CROSS SECTIONS AND/OR THERMAL EMISSION PROBABILITIES OF TRAPS WERE CONSIDERED. EVIDENCE IS PRESENTED FOR THE REALITY OF FIELD-ASSOCIATED CHANGES IN TRAPPING PARAMETERS IN THE ABSENCE OF ALL THE OTHER POSSIBLE EFFECTS. RESULTS ARE CONSISTENT WITH A FIELD EMPTYING OF COULOMB-ATTRACTIVE TRAPS BY A DECREASE IN THE TRAP DEPTH AND A DECREASE IN THE CAPTURE CROSS SECTION OF TRAPS. THE CONCLUSIONS MAY BE RELEVANT TO THE INTERPRETATION OF SPACE-CHARGE-LIMITED CURRENT DATA AND TO MECHANISMS CAPABLE OF LEADING TO IMPROVE PHOTOCONDUCTOR SPEED FOR LOW INTENSITY EXCITATION. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD-638 016 20/12
DELAWARE UNIV NEWARK DEPT OF PHYSICS

GAS DESORPTION FROM VIRGINAL CDS CRYSTALS. (U)

DESCRIPTIVE NOTE: TECHNICAL REPT.
66 8P BOER,K. W. ;
REPT. NO. TR-10,
CONTRACT: DA-31-124-ARO(D)-173,
MONITOR: AROD 4461:14

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:

DESCRIPTORS: (*SEMICONDUCTORS, PURIFICATION), (*CADMIUM COMPOUNDS, *SULFIDES), MASS SPECTRUM, HEAT OF ACTIVATION, SURFACE PROPERTIES, PHOTOCONDUCTIVITY, CHEMISORPTION (U)
IDENTIFIERS: CADMIUM SULFIDE, DESORPTION (U)

CDS SINGLE CRYSTALS ARE HEATED LINEARLY IN TIME WHILE THE DESORPTION OF GAS IS MONITORED CONTINUOUSLY ON A MASS SPECTROMETRIC LOCATED DIRECTLY IN FRONT OF THE CRYSTAL. A DESORPTION CURVE OF CDS FOR AMU 16 IS GIVEN FOR A TEMPERATURE RANGE OF -180C TO + 225C. FOUR SITES (OR LAYERS) ARE SEEN TO DESORB WITH CERTAIN ACTIVATION ENERGIES. CHANGES IN SURFACE STRUCTURE ARE SUGGESTED SINCE THE PROCESS IS NOT REPRODUCIBLE. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD-639 345 20/2 7/4
BROWN UNIV PROVIDENCE R I

STUDY OF SURFACE PROPERTIES OF ATOMICALLY-CLEAN METALS AND SEMICONDUCTORS. (U)

DESCRIPTIVE NOTE: REPT. NO. 9, 1 JAN-30 JUN 66 (FINAL).
SEP 66 58P FARNSWORTH,H. E. ;CAMPBELL,B. D. ;ONCHI,M. ;
CONTRACT: DA-28-043-AMC-00299(E),
PROJ: DA-200-14501-B118,
MONITOR: ECOM 00299-F

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: SEE ALSO AD-630 863.

DESCRIPTORS: (*SEMICONDUCTORS, SURFACE PROPERTIES), (*NICKEL, ADSORPTION), OXYGEN, CADMIUM COMPOUNDS, SULFIDES, ZINC COMPOUNDS, NITROGEN COMPOUNDS, HEAT OF ACTIVATION, ELECTRON DIFFRACTION ANALYSIS, MASS SPECTROSCOPY, WORK FUNCTIONS (U)
IDENTIFIERS: CADMIUM SULFIDE, ZINC OXIDE (U)

ACTIVATION ENERGIES WERE MEASURED FOR THE ADSORPTION AND DESORPTION OF OXYGEN ON CADMIUM SULFIDE SURFACES. ON THE BASIS OF THESE AND OTHER RESULTS IT IS SUGGESTED THAT THERE ARE TWO TYPES OF OXYGEN ADSORPTION. ONE TYPE PRODUCES CHARGED SURFACE STATES, THE OTHER LEADS TO A DIPOLE LAYER. PRELIMINARY OBSERVATIONS WERE MADE ON A ZINC OXIDE CRYSTAL. NO PHOTOENHANCED UPTAKE OF OXYGEN WAS NOTED AND NO CHANGES IN SURFACE PHOTOVOLTAGE WERE OBTAINED. (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD-639 395 20/2
WISCONSIN UNIV MADISON

CYCLOTRON RESONANCE EXPERIMENTS. (U)

DESCRIPTIVE NOTE: FINAL SCIENTIFIC REPT., 1 APR 63-31 MAR 66.
APR 66 19P DEXTER,RICHARD N. ;PEERCY, PAUL S. ;HUPPE,FRANCIS F. ;RADOFF,PHILIP L. ; VEAL,BOYD ;
CONTRACT: AF 33(657)-11515,
PROJ: AF-7885,
MONITOR: ARL 66-0078

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:

DESCRIPTORS: (*CYCLOTRON RESONANCE PHENOMENA, SEMICONDUCTORS), (*SEMICONDUCTORS, TRANSPORT PROPERTIES), (*METALLOIDS, TRANSPORT PROPERTIES), TIN, TELLURIUM, ANTIMONY, INDIUM ALLOYS, ANTIMONY ALLOYS, CADMIUM COMPOUNDS, SULFIDES, MERCURY COMPOUNDS, TELLURIDES, CARRIERS(SEMICONDUCTORS), MICROWAVES, PROPAGATION, OSCILLATION, MODULATION, BAND THEORY OF SOLIDS (U)
IDENTIFIERS: CADMIUM SULFIDE, DEHAAS-VANALPHEN EFFECT,FERMI SURFACES, HELICONS, INDIUM ANTIMONIDE, MERCURIC TELLURIDE (U)

VARIOUS EXPERIMENTS INCLUDING CYCLOTRON RESONANCE, HELICON PROPAGATION AND DE HAAS - VAN ALPHEN EFFECT WERE CONDUCTED FOR PURPOSES OF STUDYING TRANSPORT PROPERTIES OF SEVERAL SEMICONDUCTORS AND SEMIMETALS. THESE MATERIALS INCLUDE ALPHA-SN, TE, INSB, SB, CDS AND HGTE. IN MOST CASES IT WAS POSSIBLE TO OBTAIN NEW INFORMATION ON EFFECTIVE MASSES, CARRIER DENSITIES OR SCATTERING TIMES. INSTRUMENTATION WHICH WAS CONSTRUCTED TO PERMIT THE USE OF LARGE UNIAXIAL STRESS IN CYCLOTRON RESONANCE AND DE HAAS - VAN ALPHEN EXPERIMENTS IS DESCRIBED ALONG WITH A DISCUSSION OF THE MORE SUCCESSFUL RESEARCH AREAS. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD-639 667 9/5 20/12
WESTINGHOUSE RESEARCH LABS PITTSBURGH PA

TUNED INTEGRATED CIRCUITS. (U)

DESCRIPTIVE NOTE: QUARTERLY REPT. NO. 1, 1 APR-1 JUL 66,
SEP 66 72P NEWELL,W. E. IZALAH,S. M. I MCAVOY,B. R. I
REPT. NO. 66-9F1-NEWSC-R1,
CONTRACT: DA-28-043-AMC-02045(E),
PROJ: DA-1E6-22001-A-440,
TASK: 03,
MONITOR: ECOM 02045-1

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:

DESCRIPTORS: (*TUNING DEVICES, *INTEGRATED CIRCUITS), SEMICONDUCTOR DEVICES, MICROMINIATURIZATION(ELECTRONICS), CADMIUM COMPOUNDS, SULFIDES, PIEZOELECTRIC CRYSTALS (U)

THE PURPOSE OF THE CONTRACT IS TO INVESTIGATE TUNING DEVICES AND PHYSICAL PHENOMENA WHICH COULD LEAD TO STABLE FREQUENCY SELECTIVE SILICON INTEGRATED CIRCUITS OVER THE RANGE FROM 150 KHZ TO 150 MHZ. THIS FIRST QUARTERLY REPORT INCLUDES THE DESCRIPTION OF THE METHOD FOR PRODUCING STOICHIOMETRIC, WELL-ORIENTED AND INSULATING THICK FILMS OF CDS BY VACUUM CO-EVAPORATION, DISCUSSES THE STRUCTURAL HEXAGONALITY OF THE PRODUCED CDS FILMS AND DESCRIBES THE EXPERIMENTAL ANALYSIS OF PIEZOELECTRIC RESONANCES. (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD-641 002 14/2 9/1
LINCOLN LAB MASS INST OF TECH LEXINGTON

COMPARATIVE DATA ON CDS TRANSDUCERS FROM 14 MC/S TO 70 GC/S. (U)

DEC 65 3P WEBER,ROBERT ;
REPT. NO. JA-2731,
CONTRACT: AF 19(628)-5167,
MONITOR: ESD TR-66-234

UNCLASSIFIED REPORT
AVAILABILITY: PUBLISHED IN PROCEEDINGS OF THE IEEE V54 N2 P333-4 FEB 1966.
SUPPLEMENTARY NOTE:

DESCRIPTORS: (*CADMIUM COMPOUNDS, SULFIDES), (*TRANSDUCERS, SEMICONDUCTING FILMS), PERFORMANCE(ENGINEERING), ELECTRON BOMBARDMENT, HIGH FREQUENCY, VERY HIGH FREQUENCY, VAPOR PLATING, ACOUSTICS, ULTRAHIGH FREQUENCY, MICROWAVE FREQUENCY, PIEZOELECTRIC TRANSDUCERS (U)

THE LETTER REPORTS THE RESULTS OF USING A STRAIGHTFORWARD ELECTRON-BOMBARDMENT TECHNIQUE AS OPPOSED TO OTHER TECHNIQUES FOR THE REPRODUCIBLE, INDIRECT-VAPOR DEPOSITION OF INSULATING PIEZOELECTRIC CADMIUM SULFIDE FILM TRANSDUCERS ONTO METALLIC, NONMETALLIC, AND SEMICONDUCTING MATERIALS. PRELIMINARY COMPARATIVE DATA ARE PRESENTED CONCERNING THE PERFORMANCE OF THESE TRANSDUCERS COMPARED TO AT LEAST ONE OTHER POSSIBLE METHOD OF ACOUSTIC EXCITATION COMMONLY USED IN THE SAME SITUATION. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD-641 400 20/12
DELAWARE UNIV NEWARK DEPT OF PHYSICS

INJECTION CAUSED P-N JUNCTION IN CDS. (U)

DESCRIPTIVE NOTE: TECHNICAL REPT.,
OCT 66 25P BOER,K. W. ; WARD,J. J. ;
REPT. NO. TR-15
CONTRACT: NONR-4336(00)

UNCLASSIFIED REPORT

DESCRIPTORS: (*SEMICONDUCTORS, ELECTRICAL PROPERTIES), (*CADMIUM COMPOUNDS, SULFIDES), CARRIERS(SEMICONDUCTORS), PHOTOCONDUCTIVITY, INFRARED RADIATION, VOLTAGE (U)
IDENTIFIERS: CADMIUM SULFIDE (U)

IT IS OBSERVED USING THE FRANZ-KELDYSH EFFECT THAT CERTAIN 'VERY PURE' CDS CRYSTALS SHOW A HIGH FIELD LAYER CLOSE TO, BUT WELL SEPARATED FROM, A HOLE INJECTING ANODE (AU). THIS LAYER IS IDENTIFIED AS A P-N JUNCTION CAUSED BY HOLE INJECTION. INVERSION OF A IR QUENCHING SPECTRUM INTO A SIMILAR IR EXCITATION SPECTRUM IS OBSERVED AT AN APPLIED VOLTAGE WHERE THIS HIGH FIELD LAYER BECOMES 'VISIBLE', AND EXPLAINED AS CAUSED BY A CURRENT CONTROLLING P-TYPE REGION IN CDS. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD-641 456 9/1 20/12
GENERAL ELECTRIC CO SCHENECTADY N Y RESEARCH AND DEVELOPMENT CENTER

NEW SOLID-STATE DEVICE CONCEPTS, (U)

SEP 66 61P AVEN,M. ;GARWACKI,W. ;HALL, R. B. ;RICHARDSON,J. R. ;WOODBURY,H. H. ;
REPT. NO. SCIENTIFIC-6
CONTRACT: AF 19(628)-4976
PROJ: AF-4608
TASK: 460805
MONITOR: AFCRL 66-657

UNCLASSIFIED REPORT

DESCRIPTORS: (*SEMICONDUCTOR DEVICES, SOLID STATE PHYSICS), ELECTROLUMINESCENCE, SEMICONDUCTORS, CADMIUM ALLOYS, CADMIUM COMPOUNDS, SELENIUM ALLOYS, SULFIDES, ZINC ALLOYS, SILICON, MASKING, DIFFUSION, SOLUBILITY, PHOTOCONDUCTIVITY, OXIDATION, SEMICONDUCTING FILMS, DIODES(SEMICONDUCTOR), OXIDES (U)
IDENTIFIERS: THIN FILMS, THIN FILMS ELECTRONICS (U)

THE DIFFUSION OF SE IN CDSE IS FOUND TO BE SIMILAR TO THAT IN CDS. NA DIFFUSES RAPIDLY IN CDS, INDICATING AN INTERSTITIAL DIFFUSION MECHANISM. ENHANCED NA SOLUBILITY IN DONOR-DOPED MATERIAL INDICATES, IN ADDITION, A SUBSTITUTIONAL FORM. IN CL-DOPED CDS IT FORMS A RATHER STABLE NACL COMPLEX 'MOLECULE.' A METHOD OF MEASURING THE DIFFUSION PROFILE OF CL USING RADIOACTIVE NA IS INDICATED. MEASUREMENTS SHOW CONSIDERABLE OVERLAP BETWEEN THE PHOTOCONDUCTIVITY EXCITATION BANDS IN P- AND N-TYPE ZNSE(X)TE(1-X) AND THE ELECTROLUMINESCENT EMISSION BAND OF THE DIODES, THUS CONFIRMING THE TURN-ON MECHANISM POSTULATED EARLIER. REDUCTION OF THE CONTACT RESISTANCE TO THE P-TYPE SIDE OF THE ZNSE(X)TE(1-X) DIODES HAS MADE IT POSSIBLE TO TURN THEM ON AT 77K WITHOUT AN EXTERNAL LIGHT PULSE. THE ELECTROCHEMICAL PHENOMENA TAKING PLACE DURING THE OXIDATION OF SILICON ARE DISCUSSED. WITH THIN-FILM GAAS DIODES PREPARED UNDER MORE CAREFULLY CONTROLLED EVAPORATION CONDITIONS, IT HAS BEEN FOUND THAT ONLY FILMS DEPOSITED ON SUBSTRATES BETWEEN 350 AND 450C HAVE OPTICAL PROPERTIES APPROACHING THOSE OF BULK GAAS. (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD-641 711 9/5
CALIFORNIA UNIV BERKELEY DEPT OF ELECTRICAL ENGINEERING

MONOCHROMATIC ILLUMINATION OF CADMIUM-SULFIDE OSCILLATOR, (U)

APR 65 3P WHITE,R. M. ;
CONTRACT: AF-AFOSR-139-64
PROJ: AF-4751
MONITOR: AFOSR 66-0043

UNCLASSIFIED REPORT
AVAILABILITY: PUBLISHED IN PROCEEDINGS OF THE IEEE V53 N7 P745-6 JUL 1965.

DESCRIPTORS: (*CRYSTAL OSCILLATORS, ILLUMINATION), (*CADMIUN COMPOUNDS, SULFIDES), MONOCHROMATIC LIGHT, OSCILLATION, INTENSITY, RESISTANCE(ELECTRICAL), SEMICONDUCTORS, SINGLE CRYSTALS, ELECTRIC CURRENTS (U)

THE PERIOD, WAVEFORM, AND AMPLITUDE OF CURRENT OSCILLATIONS IN A UNIFORMLY ILLUMINATED CADMIUM-SULFIDE OSCILLATOR HAVE BEEN FOUND TO DEPEND STRONGLY UPON THE WAVE-LENGTH AND INTENSITY OF THE LIGHT USED. THE OBSERVATIONS DESCRIBED HERE SHOW THAT A GIVEN FEATURE OF THE OSCILLATION (E.G., A PARTICULAR WAVESHAPE) IS NOT ASSOCIATED SOLELY WITH A SINGLE WAVELENGTH, BUT RATHER THAT THE WAVE-LENGTH AT WHICH THE FEATURE OCCURS DEPENDS UPON THE LIGHT INTENSITY. THE OBSERVATIONS STRONGLY SUGGEST THAT THE WAVELENGTH AND INTENSITY OF ILLUMINATION ARE NOT PRIMARY PARAMETERS, BUT RATHER, BY THEIR EFFECTS UPON RESISTIVITY OF THE CDS, THEY AFFECT THE OSCILLATIONS. (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD-642 201 20/5
MASSACHUSETTS INST OF TECH LEXINGTON LINCOLN LAB

ELECTRON-BEAM PUMPED LASERS OF CDSE AND CDS, (U)

JAN 66 5P HURWITZ,CHARLES E. I
REPT. NO. JA-2757
CONTRACT: AF 19(628)-5167
MONITOR: ESD TR-66-235

UNCLASSIFIED REPORT
AVAILABILITY: PUBLISHED IN APPLIED PHYSICS LETTERS V8 N5 P121-4 MAR 1966.

DESCRIPTORS: (*LASERS, *SEMICONDUCTOR DEVICES), (*PUMPING(OPTICAL), *ELECTRON BEAMS), CADMIUM COMPOUNDS, SELENIDES, SULFIDES, EXCITATION, EMISSIVITY, POWER, SINGLE CRYSTALS (U)
IDENTIFIERS: CADMIUM SELENIDE, CADMIUM SULFIDE, SEMICONDUCTOR LASERS (U)

LASER ACTION WAS OBTAINED IN SINGLE CRYSTAL PLATELETS OF CDS AND CDSE EXCITED BY A 20-75KEV ELECTRON BEAM. THE LASER EMISSION IS CENTERED AT 4910 AND 4950A IN CDS AND AT 6840 AND 6910A IN CDSE, FOR TEMPERATURES OF 4.2 AND 77K, RESPECTIVELY. PEAK OUTPUT POWERS OF 16W WITH A CORRESPONDING POWER EFFICIENCY OF 8% IN CDSE AND 10W WITH AN EFFICIENCY OF 0.7% IN CDS WERE OBTAINED AT 4.2K. CORRESPONDING VALUE OF POWER AND EFFICIENCY AT 77K WERE SOMEWHAT LOWER. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL No. /ZZZHT

AD-642 217 14/2
MASSACHUSETTS INST OF TECH LEXINGTON LINCOLN LAB

ELECTRON BOMBARDMENT TECHNIQUE FOR DEPOSITION OF CDS FILM TRANSDUCERS. (U)

FEB 66 3P WEBER,ROBERT I

REPT. NO. JA-2762
CONTRACT: AF 19(628)-5167
MONITOR: ESD TR-66-422

UNCLASSIFIED REPORT
AVAILABILITY: PUBLISHED IN REVIEW OF SCIENTIFIC INSTRUMENTS V37 N7 P955-6 JUL 1966.

DESCRIPTORS: (•TRANSDUCERS, FILMS), (•PIEZOELECTRIC TRANSDUCERS, PREPARATION), (•CADMIUM COMPOUNDS, •VAPOR PLATING), (•SULFIDES, VAPOR PLATING), ELECTROACOUSTIC TRANSDUCERS, DEPOSITION, ELECTRON BOMBARDMENT, DIELECTRICS, ACOUSTIC PROPERTIES, PHONONS (U)
IDENTIFIERS: CADMIUM SULFIDE, THIN FILMS (U)

A SIMPLE ELECTRON BOMBARDMENT TECHNIQUE FOR THE REPRODUCIBLE, INDIRECT VAPOR DEPOSITION OF INSULATING PIEZOELECTRIC CADMIUM SULFIDE FILM TRANSDUCERS IS DESCRIBED IN DETAIL. BY THIS TECHNIQUE, HIGH RESISTIVITY FILMS RANGING IN THICKNESS FROM 0.1 TO 62 MICRONS WERE DEPOSITED ONTO INSULATORS, SEMICONDUCTORS AND METALS. THESE FILM TRANSDUCERS WERE ACOUSTICALLY ACTIVE FROM 70 GC TO 14 MC. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD-642 450 20/12 20/2
EAGLE-PICHER INDUSTRIES INC MIAMI OKLA MIAMI RESEARCH LABS

RESEARCH IN PURIFICATION AND SINGLE CRYSTAL GROWTH OF II-VI COMPOUNDS. (U)

DESCRIPTIVE NOTE: QUARTERLY PROGRESS REPT. NO. 6, 15 JUL-14 OCT 66,
OCT 66 32P FAHRIG,R. H. ;BROWN,L. W. ; WEBB,G. N. ;
CONTRACT: AF 33(615)-2947

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: SEE ALSO AD-634 591.

DESCRIPTORS: (*SINGLE CRYSTALS, *SEMICONDUCTORS), (*CRYSTAL GROWTH, SINGLE CRYSTALS), SYNTHESIS(CHEMISTRY), PURIFICATION, CADMIUM, SULFUR, CADMIUM COMPOUNDS, SULFIDES, ZINC ALLOYS, SELENIUM ALLOYS, ZINC COMPOUNDS, CADMIUM ALLOYS, INTERMETALLIC COMPOUNDS (U)
IDENTIFIERS: CADMIUM SULFIDE, CADMIUM SELENIDE, ZINC SULFIDE, ZINC SELENIDE (U)

COMPOUNDS SYNTHESIZED WERE CDS, ZNS, CDSE AND ZNSE. THE PURITY OF THE CDS REMAINED AT A LEVEL OF ABOUT 6 - 9'S. ANALYSIS OF THE ZINC COMPOUNDS INDICATES SOMEWHAT LOWER PURITY AND EFFORTS TO IMPROVE THIS SITUATION WERE INITIATED. CRYSTALLIZATION OF CDS, CDSE, AND ZNS WAS ACCOMPLISHED FROM THE VAPOR PHASE. (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD-642 524 9/1 13/8
PHILCO BLUE BELL PA APPLIED RESEARCH LAB

METAL BASE TRANSISTOR II. (U)

DESCRIPTIVE NOTE: REPT. NO. 4 (FINAL) 1 JUL 64-30 JUN 65,
JUL 66 71P KANE,WALTER IHERSHINGER,
LINCOLN I
REPT. NO. A051-F
CONTRACT: DA-28-043-AMC-00161(E)
PROJ: DA-1P6-22001-A-056
TASK: 1P6-22001-A-05602
MONITOR: ECOM 00161-F

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: SEE ALSO AD-621 362.

DESCRIPTORS: (*TRANSISTORS, *FILMS), METAL FILMS, SEMICONDUCTING FILMS, DIODES(SEMICONDUCTOR), RESISTANCE(ELECTRICAL), GAIN, THICKNESS, GOLD, MANUFACTURING METHODS, SULFIDES, VAPOR PLATING, ELECTRICAL CONDUCTANCE, SUBSTRATES, ZINC COMPOUNDS, CADMIUM COMPOUNDS, AGING(MATERIALS) (U)
IDENTIFIERS: THIN FILMS, THIN FILMS ELECTRONICS (U)

THE MEAN-FREE-PATH OF ELECTRONS IN SEVERAL METAL FILMS WAS DETERMINED AND FOUND TO BE INDEPENDENT OF DEPOSITION RATE AND SUBSTRATE TEMPERATURE. THE MINIMUM THICKNESS FOR CONTINUITY OF SUCH FILMS WAS ALSO FOUND TO BE INDEPENDENT OF SUBSTRATE TEMPERATURES, AND VARIES WITH DEPOSITION RATE ONLY FOR LOW RATES. VALUES OF MEAN-FREE-PATH AND MINIMUM THICKNESS ARE GIVEN. IT IS INDICATED THAT THE VERY LOW VALUES OF T SUB MIN/HOT-ELECTRON MEAN-FREE-PATH NECESSARY FOR A HIGH-GAIN METAL-BASE TRANSISTOR ARE NOT LIKELY TO BE OBTAINED. THE CHARACTERISTICS OF THE TRIODES FABRICATED DURING THIS PROGRAM HAVE BEEN ANALYZED, AND IT HAS BEEN CONCLUDED THAT THE IMPORTANT GAIN MECHANISM IS THE CONTROL OF CURRENT FLOW THROUGH A GRID-LIKE STRUCTURE, FORMED BY A PARTIALLY AGGLOMERATED BASE FILM. THE CONTROL OF COMPOSITION GRADIENT IN ZNCDS FILMS IS SEEN TO PERMIT FABRICATION OF THIN-FILM SCHOTTKY DIODES HAVING PREDICTABLE BARRIER HEIGHTS, YIELDING A METHOD OF CONTROLLING DIODE CHARACTERISTICS. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD-642 933 9/1
WESTINGHOUSE ELECTRIC CORP ELMIRA N Y ELECTRONIC TUBE DIV

SOLID STATE IMAGE INTENSIFIERS. (U)

DESCRIPTIVE NOTE: MONTHLY TECHNICAL ENGINEERING REPT. NO. 4, 1-31 JUL 66,
AUG 66 6P FOWLIS,D. C. ;NOVICE,M. A. ; SZEPESI,Z. ;
CONTRACT: N61339-66-C0064
PROJ: 7270-2

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: SEE ALSO AD-637 171.

DESCRIPTORS: (*IMAGE INTENSIFIERS(ELECTRONICS), SOLID STATE PHYSICS), CADMIUM COMPOUNDS, SULFIDES, SINTERING, FILMS, OPTICAL COATINGS, GERMANIUM, MAGNESIUM COMPOUNDS, FLUORIDES, CHROMIUM, SILICON COMPOUNDS, MONOXIDES, RESISTANCE(ELECTRICAL), LIGHT TRANSMISSION, DISPLAY SYSTEMS, LASERS, SCANNING, CADMIUM ALLOYS, SELENIUM ALLOYS, PHOSPHORESCENT MATERIALS (U)
IDENTIFIERS: CADMIUM SULFIDE, CADMIUM SELENIDE (U)

SERIES OF EXPERIMENTS WERE CARRIED OUT FOR DECREASING IN DARK CURRENTS IN SINTERED CDSE LAYERS. A BATCH OF CDS POWDER WITH 1% ZNS WAS PREPARED AND IS BEING EVALUATED. CR-SIO FILMS WERE DEPOSITED AND IMAGE INTENSIFIER PANELS ARE BEING BUILT ON THEM. IMAGE INTENSIFIER PANELS WERE BUILT WITH INSULATING OPTICAL BLACK FILMS BETWEEN THE PC AND EL LAYERS. A COMBINATION DISPLAY SYSTEM BY PROJECTING A LASER SCANNED IMAGE ON THE PC-EL IMAGE INTENSIFIER WAS DEMONSTRATED. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD-643 519 9/5
WESTINGHOUSE RESEARCH LABS PITTSBURGH PA

TUNED INTEGRATED CIRCUITS. (U)

DESCRIPTIVE NOTE: QUARTERLY REPT., NO. 2, 1 JUL-30 SEP 66,
DEC 66 37P NEWELL,W. E. IZALAR,S. M. ;
CONTRACT: DA-28-043-AMC-02045(E)
PROJ: DA-1E6-22001-A-440
TASK: 1E6-22001-A-440 03
MONITOR: ECOM 02045-2

UNCLASSIFIED REPORT

DESCRIPTORS: (*INTEGRATED CIRCUITS, *TUNING DEVICES), VAPOR PLATING, VACUUM APPARATUS, CADMIUM COMPOUNDS, SULFIDES, FILMS, RESONATORS, PIEZOELECTRIC CRYSTALS, RESONANCE, SILICON, GOLD, IMPEDANCE MATCHING (U)
IDENTIFIERS: CADMIUM SULFIDE, THIN FILMS, THIN FILMS ELECTRONICS (U)

APPARATUS AND IMPROVED PROCEDURES FOR THE VACUUM CO-EVAPORATION OF THICK CDS FILMS (5 TO 15 MICRONS) ARE DESCRIBED. A CORRELATION BETWEEN THE THICKNESS OF CDS FILM PIEZORESONATORS, THEIR RESONANT FREQUENCY AND THE ELECTRODE AREAS, REQUIRED FOR THE 50 OHM IMPEDANCE MATCHING, WAS WORKED OUT. FIRST FILM RESONANCES (AS DISTINGUISHED FROM SUBSTRATE RESONANCES) WITH Q OF ABOUT 15 WERE OBSERVED IN GOLD-CDS-GOLD PIEZOELECTRIC STRUCTURES, DEPOSITED ON THIN AND THICK GLASS SUBSTRATES. (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD-643 779 9/1 13/8
RADIO CORP OF AMERICA SOMERVILLE N J DEFENSE
MICROELECTRONICS

THIN-FILM POLYCRYSTALLINE FIELD-EFFECT TRIODE. (U)

DESCRIPTIVE NOTE: FINAL REPT., 1 JUL 64-30 JUN 66,
NOV 66 139P TOPFER,M. L. ;BOWE,J. J. ;
DANIS,A. H. ;ELLIS,S. G. ;FABULA,J. J. ;
CONTRACT: DA-28-043-AMC-00231(E)
PROJ: DA-1P6-22001-AU56
TASK: 02
MONITOR: ECOM 00231-F

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: SEE ALSO AD-639 433.

DESCRIPTORS: (*TRANSISTORS, SEMICONDUCTING FILMS), MICROSTRUCTURE, CADMIUM COMPOUNDS, SULFIDES, SEMICONDUCTOR DEVICES, CADMIUM ALLOYS, SELENIUM ALLOYS, PHOTOELECTRIC EFFECT, MANUFACTURING METHODS, SILICON COMPOUNDS, OXIDES, CAPACITANCE, VOLTAGE, SURFACE PROPERTIES, MASKING, GATES(CIRCUITS) (U)
IDENTIFIERS: THIN FILMS, THIN FILMS ELECTRONICS (U)

THE REPORT COVERS THE WORK ON THE THIN-FILM POLYCRYSTALLINE FIELD-EFFECT TRIODE DURING THE PERIOD OF JULY 1, 1964 TO JUNE 30, 1966. ALL OF THE WORK ON THE CONTRACT IS REVIEWED. THE FOLLOWING WORK DONE DURING THE EIGHTH QUARTER IS ALSO COVERED. THE BEHAVIOR OF THE REVERSIBLE GATE INSTABILITY AT TEMPERATURES BETWEEN -40C AND +60C IS DISCUSSED. THE INVESTIGATION WAS CARRIED OUT TO DETERMINE THE VARIATION OF THE INSTABILITY MECHANISM WITH TEMPERATURE. THESE INITIAL MEASUREMENTS ARE TOO PRELIMINARY TO DRAW CONCLUSIONS. THE MASKS FOR THE FOUR-INPUT NOR/OR GATE CIRCUIT WERE RECEIVED, AND THE WIRE GRILLE WAS FABRICATED. INITIAL TRIAL RUNS WITH THESE MASKS TO EVALUATE THE ALIGNMENT WERE COMPLETED AND PROVED SATISFACTORY. FABRICATION OF THE INTEGRATED CIRCUIT WAS INITIATED. WORK WAS INITIATED TO INVESTIGATE THE CONTROLLED DEPOSITION AND NUCLEATION OF SEMICONDUCTOR FILMS, AND AN INVESTIGATION OF GATE THRESHOLD SHIFTS WAS CARRIED OUT, IN ORDER TO GAIN A BETTER UNDERSTANDING OF THE MECHANISM OF THE TFT INSTABILITY. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD-646 262 9/1 9/5
RADIO CORP OF AMERICA SOMERVILLE N J DEFENSE
MICROELECTRONICS

THIN-FILM POLYCRYSTALLINE FIELD-EFFECT TRIODE. (U)

DESCRIPTIVE NOTE: QUARTERLY REPT. NO. 1, 1 JUL-30 SEP 66,
DEC 66 29P TOPFER,M. L. ;FABULA,J. J. ; RAPP,A. K. ;SCHELHORN,R. L. ;
CONTRACT: DA-28-043-AMC-02432(E)
PROJ: DA-1E6-22001-A440
TASK: 1E6-22001-A440-03
MONITOR: ECOM 02432-1

UNCLASSIFIED REPORT

DESCRIPTORS: (*FIELD EFFECT TRANSISTORS, FILMS), LIFE EXPECTANCY, MICROSTRUCTURE, CADMIUM SULFIDES, CADMIUM SELENIDES, SILICON COMPOUNDS, OXIDES, PHOTOELECTRIC EFFECT, CAPACITANCE, VOLTAGE, INTERFACES, GATES(CIRCUITS), INTEGRATED CIRCUITS (U)
IDENTIFIERS: THIN FILMS, THIN FILMS ELECTRONICS (U)

LIFE TEST DATA ARE PRESENTED ON THIN-FILM TRANSISTORS WHICH HAVE BEEN ON LOAD LIFE TEST FOR OVER 2,000 HOURS. SOME OF THE PROBLEMS ASSOCIATED WITH THE MASKING TECHNIQUE USED TO FABRICATE THE FOUR-INPUT NOR/OR GATE CIRCUIT ARE DISCUSSED. TESTING PROCEDURES TO BE USED TO EVALUATE THE CIRCUIT ARE DISCUSSED IN DETAIL. SOME OF THE TEST DATA ON THE INITIAL CIRCUITS FABRICATED ARE PRESENTED. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD-646 041 20/1
WESTINGHOUSE RESEARCH LABS PITTSBURGH PA

MULTILAYER ENHANCEMENT OF MICROWAVE PIEZOELECTRIC CONVERSION IN CDS-SIO LAYERS, (U)

SEP 65 6P DE KLERK,J. IKLEMENS,P. G. I KELLY,E. F. I

REPT. NO. SCIENTIFIC-3 ,65-9F5-108-P2
CONTRACT: AF 19(628)-4372
PROJ: AF-8683
TASK: 868301
MONITOR: AFCRL 67-0017

UNCLASSIFIED REPORT
AVAILABILITY: PUBLISHED IN APPLIED PHYSICS LETTERS V7 N10 P264-5 NOV 15 1965.

DESCRIPTONS: (*PIEZOELECTRIC TRANSDUCERS, FILMS), CADMIUM SULFIDES, SILICON COMPOUNDS, MONOXIDES, GAIN, SANDWICH CONSTRUCTION, MICROWAVES, ENERGY CONVERSION, ULTRASONIC RADIATION, PHONONS (U)

IT WAS FOUND POSSIBLE TO INCREASE THE ELECTROMAGNETIC CONVERSION EFFICIENCY OF CDS PIEZOELECTRIC THIN FILM TRANSDUCERS UNDER FREE FIELD CONDITIONS BY USING A MULTILAYER STRUCTURE OF ALTERNATE LAYERS OF ACTIVE AND PASSIVE MATERIAL. UNDER THESE CONDITIONS THE POWER GAIN INCREASES DIRECTLY AS THE SQUARE OF THE NUMBER OF ACTIVE LAYERS. 9.5 DB GAIN HAS BEEN ACHIEVED WITH A THREE ACTIVE LAYER TRANSDUCER. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD-646 046 20/1
WESTINGHOUSE RESEARCH LABS PITTSBURGH PA

MULTILAYER THIN FILM PIEZOELECTRIC TRANSDUCERS, (U)

DEC 65 8P DE KLERK,JOHN ;
REPT. NO. SCIENTIFIC-5 ,65-9F5-WAVES-P4
CONTRACT: AF 19(628)-4372
PROJ: AF-8683
TASK: 868301
MONITOR: AFCRL 67-0019

UNCLASSIFIED REPORT
AVAILABILITY: PUBLISHED IN IEEE TRANSACTIONS ON SONICS AND ULTRASONICS VSU-13 N3 P99-103 AUG 1966.
SUPPLEMENTARY NOTE: PRESENTED AT THE MICROWAVE PHYSICS LAB. ACOUSTICS SYMPOSIUM, BEDFORD, MASS., 28-29 OCT 65.

DESCRIPTORS: (*PIEZOELECTRIC TRANSDUCERS, FILMS), SANDWICH CONSTRUCTION, ACOUSTICS, VAPOR PLATING, CADMIUM SULFIDES, ZINC SULFIDES, SILICON COMPOUNDS, MONOXIDES, ACOUSTIC IMPEDANCE (U)
IDENTIFIERS: THIN FILMS (U)

SINGLE LAYER THIN FILM TRANSDUCERS, WHEN USED IN DEVICES SUCH AS DELAY LINES, ARE LIMITED TO THEIR POWER HANDLING CAPABILITIES AND AT VERY HIGH FREQUENCIES HAVE LARGE CAPACITIES WHICH INTRODUCE ELECTRICAL MATCHING PROBLEMS. SOME OF THESE DIFFICULTIES CAN BE OVERCOME BY EMPLOYING MULTILAYER TRANSDUCERS WHICH HAVE LOWER CAPACITIES AND HIGHER POWER HANDLING CAPABILITIES THAN SINGLE LAYER TRANSDUCERS. MULTILAYER TRANSDUCERS, USING ALTERNATE ACTIVE CDS AND PASSIVE SIO LAMBDA/2 FILMS HAVE BEEN FABRICATED, AND THE INCREASE IN POWER OUTPUT FOR CONSTANT ELECTRIC FIELD GRADIENT IS FOUND TO BE PROPORTIONAL TO THE SQUARE OF THE NUMBER OF ACTIVE LAYERS. THE ACOUSTIC REFLECTION AND TRANSMISSION COEFFICIENTS AT A BOUNDARY, BETWEEN TWO MEDIA OF DIFFERENT ACOUSTIC IMPEDANCES, ARE PRESENTED IN GRAPHICAL FORM. A TABLE GIVING ACOUSTIC VELOCITIES AND IMPEDANCES OF SEVERAL MATERIALS FOR DIFFERENT MODES OF PROPAGATION IS INCLUDED. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD-647 312 20/12 20/3
DELAWARE UNIV NEWARK DEPT OF PHYSICS

STUDY OF LAYER-LIKE FIELD INHOMOGENEITIES IN CDS USING FRANZ-KELDYSH EFFECT. (U)

DESCRIPTIVE NOTE: TECHNICAL REPT.,
JUN 67 134P BOER,K. W. ;
REPT. NO. TR-16
CONTRACT: NONR-4336(00), DA-31-124-ARO(D)-173

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: MASTER'S THESIS.

DESCRIPTORS: (*FIELD THEORY, *CADMIUM SULFIDES), SINGLE CRYSTALS, ELECTRICAL CONDUCTANCE, ELECTROOPTICS, BAND THEORY OF SOLIDS, SEMICONDUCTORS, CARRIERS(SEMICONDUCTORS), ELECTRON DENSITY (U)

SOME EXPERIMENTALLY OBSERVED PROPERTIES OF LAYER-LIKE FIELD INHOMOGENEITIES IN CDS SINGLE CRYSTALS ARE REPORTED. APPARENT DEVIATIONS OF THE RESULTS FROM THE THEORY PROPOSED BY BOER ARE SHOWN TO BE RESOLVABLE BASED ON A FORM OF LAYER FORMATION PROPOSED BY VOSS. THE BEHAVIOR OF MOVING SUBLAYERS, OBSERVED IN MOVING LAYER-LIKE FIELD INHOMOGENEITIES, IS REPORTED. THESE SUBLAYERS ARE FOUND TO CAUSE CURRENT OSCILLATIONS IN A RANGE FROM 2 TO 9 HZ WITH THE FREQUENCY PROPORTIONAL TO THE ELECTRON DENSITY TO THE 1.3 POWER. THE EFFECT OF JOULE HEATING IN THE 'S' SHAPED RANGE ALSO CAUSES THE ABSORPTION EDGE OF THE ENTIRE INTERELECTRODE REGION TO PERIODICALLY SHIFT MORE THAN 100A. THESE PERIODIC TRANSITIONS ARE ATTRIBUTED TO THE REPETITION OF THE INITIATION OF CURRENT CHANNEL FORMATION FOLLOWED BY THE FORMATION OF UNSTABLE LAYER-LIKE FIELD INHOMOGENEITIES. IN ADDITION, A NEW TYPE OF FIELD INHOMOGENEITY IS REPORTED THAT FORMS AS A 'RING' AROUND BUT WELL-SEPARATED FROM THE ANODE IN 'PURE' CDS CRYSTALS. THE PROPERTIES THAT DISTINGUISH THIS FIELD INHOMOGENEITY FROM THOSE ALREADY OBSERVED ARE GIVEN. THE BEHAVIOR INDICATES THAT THE CRYSTAL CURRENT IS RECOMBINATION LIMITED AND THAT THE HIGH FIELD ANODE 'RING' ACTS AS A P-N JUNCTION. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD-647 649 9/1 20/6
MATSUSHITA RESEARCH INST TOKYO INC KAWASAKI (JAPAN)

STUDIES OF INFRARED IMAGE CONVERTER (SOLID-STATE TYPE AND VACUUM TYPE). (U)

DESCRIPTIVE NOTE: PROGRESS REPT.,
DEC 66 157P MIYAJI,KOH-ICHI ;
CONTRACT: DA-92-557-FEC-38337

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: ORIGINAL CONTAINS COLOR, AVAILABLE IN BLACK AND WHITE AFTER ORIGINAL COPIES ARE EXHAUSTED.

DESCRIPTORS: (*IMAGE CONVERTERS, *INFRARED EQUIPMENT), JAPAN, INFRARED PHOTOCONDUCTORS, SOLID STATE PHYSICS, PHOSPHORESCENT MATERIALS, QUENCHING(INHIBITION), INFRARED OPTICAL MATERIALS, INFRARED IMAGES, PHOTOCATHODES, PHOTODIODES, CADMIUM SELENIDES, CADMIUM SULFIDES, CADMIUM ALLOYS, TELLURIUM ALLOYS, DOPING (U)

THEORETICAL AND EXPERIMENTAL STUDIES WERE PERFORMED IN AN EFFORT TO OBTAIN AN INFRARED IMAGE CONVERTER. THE PROGRAM WAS DIVIDED INTO THREE PARTS. PART I WAS CONCERNED WITH THE PHYSICS AND MATERIAL RESEARCH IN TERMS OF THE IMAGE CONVERSION. EFFORTS WERE DEVOTED TO A STUDY ON THE INFRARED PHOTOCONDUCTIVE MATERIALS WITH HIGH SENSITIVITY IN THE NEAR INFRARED REGION, AND ON THE PHOTOCONDUCTOR WHICH SHOWS GOOD PHOTOCONDUCTIVE QUENCHING PROPERTIES. SOME ANALYSIS OF QUENCHING MECHANISM WAS ALSO DONE. PART II COVERED ALL KIND OF THE SOLID STATE INFRARED IMAGE CONVERTERS SUITABLE TO THE INFRARED REGION. EFFORT OF THIS INTERVAL EFFORTS WERE CONCENTRATED TO THREE PROBLEMS: THE PHOTOCONDUCTOR QUENCHING SYSTEM, DIRECT RECEIVER OF THE INFRARED IMAGE, AND THE HIGHLY SENSITIVE IMAGE CONVERTER SYSTEM. PART III WAS ANOTHER APPROACH TO THE INFRARED IMAGE CONVERTER. POSSIBILITY OF A NEW TYPE PHOTOCATHODE SUITABLE TO THE INFRARED REGION WAS STUDIED. FOR THIS PURPOSE P-SI-AL DIODE WAS TAKEN UP, AND PHOTOINDUCED HOT ELECTRON EMISSION WAS EXPERIMENTALLY OBSERVED. SOME IMPROVEMENT OF EMISSION WAS OBTAINED. FURTHER, THE ANALYSIS OF EMISSION AND SOME NEW PROPOSALS WERE DESCRIBED. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD-647 699 20/12 20/1 9/1
FORSVARETS FORSKNINGSINSTITUTT KJELLER (NORWAY)

RESEARCH ON THE THEORY AND DESIGN OF ACTIVE NETWORKS. (U)

DESCRIPTIVE NOTE: ANNUAL SUMMARY REPT. NO. 4, 1 JUL 64-30 JUN 65,
AUG 65 45P BLOTEKJER,K. ;FOSSUM,H. J. ;RANNESTAD,A. ;SVAASAND,L. O. ;
REPT. NO. INTERN RAPPORT-E-60
CONTRACT: AF 61(052)-484
MONITOR: AFCRL 66-13

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: SEE ALSO AD-609 434.

DESCRIPTORS: (*ACOUSTICS, *PIEZOELECTRIC CRYSTALS), (*NETWORKS, DESIGN), ULTRASONIC RADIATION, AMPLIFIERS, ELECTRONS, MOBILITY, SEMICONDUCTOR DEVICES, CADMIUM SULFIDES, NORWAY (U)

THE REPORT IS CONCERNED WITH AN EXPERIMENTAL INVESTIGATION OF INTERACTIONS BETWEEN ACOUSTIC WAVES AND CONDUCTION ELECTRONS IN THE PIEZOELECTRIC SEMICONDUCTOR CDS. AN ACOUSTIC AMPLIFIER HAS BEEN BUILT AND TESTED. NET GAIN OF 20 DB AT 60 MHZ HAS BEEN OBSERVED. OBSERVATIONS OF GAIN, ATTENUATION AND PHASE VELOCITY AGREE WITHIN A FACTOR OF TWO WITH THE ORIGINAL THEORY OF WHITE. SATURATION IS OBSERVED WHEN THE RF CHARGE DENSITY APPROACHES THE TOTAL CHARGE DENSITY. THE CRYSTAL BECOMES INSTABLE AND CURRENT SATURATION OCCURS WHEN THE SOUND TRIP GAIN EXCEEDS UNITY. THE CURRENT SATURATION HAS BEEN EMPLOIED TO MEASURE DRIFT MOBILITY IN THE TEMPERATURE RANGE FROM 184 TO 438 DEGREES KELVIN. THE TEMPERATURE DEPENDENCE CAN BE EXPLAINED BY A COMBINATION OF SCATTERING FROM LATTICE VIBRATION AND TRAPPING IN TWO IMPURITY LEVELS. AN ADVANTAGE OF THE METHOD IS THE FACT THAT ALL EXPERIMENTAL ERRORS ACT IN THE SAME DIRECTION, AND AN ABSOLUTE LOWER BOUND FOR THE MOBILITY IS OBTAINED. DOUBLE CURRENT SATURATION WAS OBSERVED IN SOME SAMPLES. THESE ARE PROBABLY DUE TO OSCILLATIONS IN TWO DIFFERENT ACOUSTIC MODES, THE PRINCIPAL MODE OF THE CUT AND A MIXED MODE PROPAGATING OBLIQUELY TO THE END PLANES OF THE SAMPLE. COHERENT CURRENT OSCILLATIONS OF 30 MHZ WERE OBSERVED. THEY APPEAR TO BE RELATED TO THE DOUBLE SATURATION, BUT THEIR ORIGIN IS NOT KNOWN. (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD-648 055 20/6 20/12
MASSACHUSETTS INST OF TECH LEXINGTON LINCOLN LAB

ELECTRON BEAM PUMPED SEMICONDUCTOR LASERS. (U)

DESCRIPTIVE NOTE: MEETING SPEECH,
JUL 66 3P HURWITZ,C. E. ;
REPT. NO. MS-1726
CONTRACT: AF 19(628)-5167
MONITOR: ESD TR-67-157

UNCLASSIFIED REPORT
AVAILABILITY: PUBLISHED IN NEREM RECORD P194-5 1966.

DESCRIPTORS: (•SEMICONDUC[illegible]EVICES, LASERS), (•LASERS, PUMPING(ELECTRON,)), (•PUMPING(ELECTRONICS), •ELECTRON BEAMS), EMISSIVITY, LIGHT, ULTRAVIOLET RADIATION, INFRARED RADIATION, CADMIUM SELENIDES, CADMIUM SULFIDES, ZINC SULFIDES, SOLID SOLUTIONS, CARRIERS(SEMICONDUCTORS), INJECTION (U)

SEMICONDUCTOR LASERS WITH EMISSION WAVELENGTHS RANGING FROM 8.5 MICRONS IN THE INFRARED TO 3250 A IN THE ULTRAVIOLET WERE OBTAINED BY ELECTRON BEAM EXCITATION. IN THE VISIBLE AND ULTRAVIOLET, LASERS WITH SUBSTANTIAL OUTPUT POWER AND HIGH EFFICIENCY WERE ACHIEVED UTILIZING CDSE, CDS AND ZNS AND THEIR MIXED ALLOYS. (AUTHOR) (U)

UDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD-648 169 20/12
DELAWARE UNIV NEWARK DEPT OF PHYSICS

CHANGE OF ELECTRICAL CONDUCTIVITY OF CDS SINGLE CRYSTALS DURING HEAT TREATMENTS IN SULFUR VAPOR BETWEEN 500 AND 700C. (U)

DESCRIPTIVE NOTE: TECHNICAL REPT.,
67 13P BOER,K. W. ;
REPT. NO. TR-17
CONTRACT: NONR-4336(00), NSG-573

UNCLASSIFIED REPORT

DESCRIPTORS: (*SEMICONDUCTORS, HEAT TREATMENT), (*CADMIUM SULFIDES, ELECTRICAL CONDUCTANCE), SULFUR, VAPORS, VAPOR PRESSURE, SINGLE CRYSTALS, CRYSTAL LATTICE DEFECTS, BAND THEORY OF SOLIDS, IONIZATION (U)

THE ELECTRICAL CONDUCTIVITY OF CDS SINGLE CRYSTALS WAS MEASURED, USING A FOUR-ELECTRODE METHOD, AS A FUNCTION OF THE S VAPOR PRESSURE IN THE RANGE FROM 10 TO 1000 TORR IN A DOUBLE FURNACE ALLOWING FOR INDEPENDENT VARIATION OF THE CRYSTAL TEMPERATURE AND S-VAPOR PRESSURE. IN AGREEMENT WITH EARLIER MEASUREMENTS, THE CURRENT WAS OBSERVED TO DECREASE WITH INCREASING S-VAPOR PRESSURE FOLLOWING A POWER LAW SIGMA VARIES AS P EXP. -1/M. THE EXPONENT 1/M DEPENDS ON THE CRYSTAL TEMPERATURE AND IS ABOUT 1/24 FOR 500C < T < 520C, 1/4 FOR 530C < T < 630C, AND ABOUT 1/12 FOR 640C < T < 700C. A SIMPLE MODEL USING S VACANCIES, CD INTERSTITIALS AND CD VACANCIES IS USED TO EXPLAIN THE OBSERVED BEHAVIOR. DOUBLY IONIZED S VACANCIES ARE ASSUMED TO BE PREDOMINANT IN THE LOWEST TEMPERATURE RANGE, SINGLE IONIZED FRENKEL DEFECTS IN THE INTERMEDIATE TEMPERATURE RANGE, AND DOUBLY IONIZED CD INTERSTITIALS IN THE HIGHEST TEMPERATURE RANGE. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD-648 782 20/1 20/12
WESTINGHOUSE RESEARCH LABS PITTSBURGH PA

THIN-FILM PIEZOELECTRIC TRANSDUCERS USED AS GENERATORS AND DETECTORS OF MICROWAVE PHONONS, WITH SOME ATTENUATION MEASUREMENTS IN SIO2. (U)

FEB 66 11P DE KLERK,J. ;
REPT. NO. SCIENTIFIC-6, 65-9F5-WAVES-P3
CONTRACT: AF 19(628)-4372
PROJ: AF-8683
TASK: 868301
MONITOR: AFCRL 67-0079

UNCLASSIFIED REPORT
AVAILABILITY: PUBLISHED IN JOURNAL OF APPLIED PHYSICS V37 N12 P4522-8 NOV 1966.

DESCRIPTORS: (*PIEZOELECTRIC TRANSDUCERS, FILMS), (*PHONONS, PIEZOELECTRIC TRANSDUCERS), MICROWAVE FREQUENCY, GENERATORS, DETECTORS, QUARTZ, ALUMINA, ZINC SULFIDES, CADMIUM SULFIDES, SILICON DIOXIDE, ATTENUATION, ENERGY CONVERSION, ULTRASONIC RADIATION (U)
IDENTIFIERS: THIN FILMS, THIN FILMS ELECTRONICS (U)

THE MANNER IN WHICH THIN-FILM PIEZOELECTRIC TRANSDUCERS ARE USED IS DETERMINED BY THEIR INTENDED APPLICATION. ATTENUATION MEASUREMENT TRANSDUCERS SHOULD BE CAPABLE OF INDEPENDENT GENERATION OF EACH OF THE THREE PURE ACOUSTIC MODES AND SHOULD EXHIBIT LOW ELECTROMECHANICAL CONVERSION EFFICIENCY, WHEREAS DEVICE TRANSDUCERS SHOULD EXHIBIT MAXIMUM POSSIBLE ELECTROMECHANICAL CONVERSION EFFICIENCY. MULTILAYER TRANSDUCERS OFFER INCREASED POWER HANDLING CAPABILITIES AND HIGHER ELECTRICAL IMPEDANCES THAN SINGLE-LAYER TRANSDUCERS AT HIGH FREQUENCIES. AN ANOMALOUS BEHAVIOR OF QUARTZ IN THE PRESENCE OF CDS IS DISCUSSED. ATTENUATION MEASUREMENTS OF THE L, T1, AND T2 MODES ALONG THE X1 AXIS OF SYNTHETIC QUARTZ ARE PRESENTED. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD-649 242 20/12 20/1
BROWN UNIV PROVIDENCE R I METALS RESEARCH LAB

PHYSICAL RESEARCH ON FUNDAMENTAL PROPERTIES OF II-VI COMPOUND SEMICONDUCTORS. (U)

DESCRIPTIVE NOTE: FINAL REPT.,
NOV 66 75P ELBAUM,CHARLES ;LORD,ARTHUR ;TRUELL,ROHN ;
CONTRACT: AF 33(615)-2946
PROJ: AF-7885
TASK: 788503
MONITOR: AML 66-0225

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: REPORT ON PROJECT RESEARCH IN SOLID STATE PHYSICS.

DESCRIPTORS: (*SEMICONDUCTORS, ACOUSTIC PROPERTIES), CADMIUM SULFIDES, ZINC SULFIDES, ULTRASONIC RADIATION, ATTENUATION, DISTORTION, FILMS, SEMICONDUCTING FILMS, PIEZOELECTRIC TRANSDUCERS, VAPOR PLATING, VACUUM APPARATUS, CRYOGENICS, MICROSTRUCTURE (U)
IDENTIFIERS: THIN FILMS, THIN FILMS ELECTRONICS (U)

IT IS WELL KNOWN THAT CADMIUM SULFIDE CAN ACT AS A VERY NONLINEAR ACOUSTIC CONDUCTOR UNDER THE APPROPRIATE CONDITIONS OF ACOUSTIC FREQUENCY, SPECIMEN CONDUCTIVITY AND APPLIED DC ELECTRIC FIELD. DIRECT DISTORTION OF THE ACOUSTIC WAVEFORM WAS OBSERVED, AT 20 MC/SEC, AS A FUNCTION OF CONDUCTIVITY AND APPLIED ELECTRIC FIELD. THE MAXIMUM DISTORTION APPEARS TO OCCUR AT THE VALUE OF ELECTRIC FIELD WHERE THE ACOUSTIC VELOCITY (SHEAR WAVES WERE USED) EQUALS THE CHARGE CARRIER DRIFT VELOCITY. ULTRASONIC ATTENUATION MEASUREMENTS HAVE BEEN MADE AT 12, 30 AND 46 MC/SEC AND FROM ROOM TEMPERATURE TO 1.8K ON A CADMIUM SULFIDE SPECIMEN. THE SPECIMEN HAD A DARK ROOM TEMPERATURE CONDUCTIVITY OF ABOUT 10 TO THE MINUS 2ND POWER/(OHM-CM). A VERY LARGE ATTENUATION PEAK WAS OBSERVED IN THE NEIGHBORHOOD OF 15 - 20K. CONDUCTIVITY MEASUREMENTS, MADE CONCURRENTLY WITH THE ATTENUATION MEASUREMENTS, SHOWED THAT THE PEAK WAS ALMOST SURELY CAUSED BY THE RELAXATION ASSOCIATED WITH SPACE CHARGE BUNCHING. THE ATTENUATION DATA DID NOT SEEM TO SHOW THE PROPER FREQUENCY DEPENDENCE ABOVE THE PEAK TEMPERATURE, BUT THIS ISSUE IS CLOUDED BECAUSE THERE WAS CONSIDERABLE UNCERTAINTY. (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /4ZZHT

AD-650 482 20/12
LOCKHEED MISSILES AND SPACE CO PALO ALTO CALIF LOCKHEED PALO ALTO RESEARCH LAB

ELASTIC WAVE AND INFRARED LIGHT INTERACTIONS WITH A MOVING HIGH-FIELD DOMAIN IN A PIEZOELECTRIC SEMICONDUCTOR. (U)

OCT 66 3P TSAI,C. S. ;

UNCLASSIFIED REPORT
AVAILABILITY: PUBLISHED IN APPLIED PHYSICS LETTERS V9 N11 P400-2 DEC 1 1966.

DESCRIPTORS: (*SEMICONDUCTORS, PROPAGATION), MECHANICAL WAVES, INFRARED RADIATION, INTERACTIONS, PIEZOELECTRIC CRYSTALS, ACOUSTIC IMPEDANCE, CADMIUM SULFIDES, ZINC COMPOUNDS, OXIDES, GALLIUM ARSENIDES, DOPPLER EFFECT (U)

A DOUBLE-DOPPLER-EFFECT EXPERIMENT FOR ELASTIC WAVES OR INFRARED LIGHT, USING THE MOVING HIGH-FIELD DOMAIN IN A PIEZOELECTRIC SEMICONDUCTOR AS THE MOVING BOUNDARY, IS PROPOSED. A POSSIBLE EXPERIMENTAL CONFIGURATION FOR THE ELASTIC WAVE CASE IS DESCRIBED AND THE PARAMETERS RELEVANT TO THE EXPERIMENT ARE EVALUATED FOR THREE POTENTIAL PIEZOELECTRIC SEMICONDUCTORS. THE MOST IMPORTANT PARAMETER IS THE CHANGE OF ACOUSTIC IMPEDANCE ACROSS THE BOUNDARIES OF THE HIGH-FIELD DOMAIN. THE POSSIBILITY OF EMPLOYING THE PROPOSED EXPERIMENTS AS THE MEANS FOR PROBING THE ELASTIC AND OPTICAL PROPERTIES OF THE HIGH-FIELD DOMAIN IS ALSO DISCUSSED. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD-650 244 20/12 20/10 20/6
NEW YORK UNIV N Y DEPT OF PHYSICS

THEORY OF ENHANCED RAMAN SCATTERING AND VIRTUAL QUASIPARTICLES IN CRYSTALS, (U)

JUL 66 3P BIRMAN,JOSEPH L. ;GANGULY, ACHINTYA K. ;

CONTRACT: AF 33(615)-1746, DA-ARO(D)-31-124-G792
MONITOR: AROD 4054:16

UNCLASSIFIED REPORT
AVAILABILITY: PUBLISHED IN PHYSICAL REVIEW LETTERS V17 N12 P647-9 SEP 19 1966.

DESCRIPTORS: (*CRYSTALS, *RAMAN SPECTROSCOPY), (*CADMIUM SULFIDES, RAMAN SPECTROSCOPY), (*EXCITONS, RAMAN SPECTROSCOPY), CARRIERS(SEMICONDUCTORS), TRANSPORT PROPERTIES, PHOTONS, HAMILTONIAN, SCATTERING, INTENSITY, BAND THEORY OF SOLIDS (U)
IDENTIFIERS: QUASIPARTICLES, RAMAN SCATTERING (U)

THE PAPER IS TO PROVIDE AN EXPLANATION FOR THE ENHANCED RAMAN-SCATTERING CROSS SECTIONS IN CDS RECENTLY REPORTED BY LEITE AND PORTO AND TO POINT OUT THE LIKELY GENERALITY OF THE PHENOMENON INVOLVED. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD0651 003 20/12
STANFORD UNIV CALIF MICROWAVE LAB

CURRENT INSTABILITIES IN PIEZOELECTRIC SEMICONDUCTORS. (U)

DESCRIPTIVE NOTE: TECHNICAL REPT.,
MAR 67 207P HAYDL,W. H. ;
REPT. NO. ML-1517
CONTRACT: NONR-225(48)

UNCLASSIFIED REPORT

DESCRIPTORS: (*SEMICONDUCTORS, PIEZOELECTRIC CRYSTALS), ELECTRIC CURRENTS, CARRIERS(SEMICONDUCTORS), ACOUSTICS, CADMIUM SULFIDES, OSCILLATION, STABILITY, THEORY, INTERACTIONS (U)

THE REPORT DESCRIBES THE DISCOVERY OF 'SQUARE-WAVE' TYPE CURRENT OSCILLATIONS AND THE TRAVELING HIGH ELECTRIC FIELD DOMAINS IN CADMIUM SULFIDE. NUMEROUS EXPERIMENTS WERE PERFORMED TO DETERMINE THE BEHAVIOR OF THE TRAVELING DOMAIN, THE OSCILLATION CONDITIONS AND IMPORTANT PARAMETERS. EXPERIMENTAL RESULTS LEAD TO THE CONCLUSION THAT BOTH CURRENT SATURATION AND CURRENT OSCILLATIONS AS OBSERVED ARE DUE TO AMPLIFICATION OF THE SHEAR WAVE COMPONENTS OF THERMAL ACOUSTIC NOISE. A SIMPLE LINEAR THEORY WHICH PREDICTS THE OCCURRENCE OF CURRENT OSCILLATIONS IN PIEZOELECTRIC SEMICONDUCTORS HAS BEEN DEVELOPED. THE SATURATION OF THE SAMPLE CURRENT IS ALSO TREATED THEORETICALLY. GOOD AGREEMENT WITH EXPERIMENTAL RESULTS IS OBTAINED WITH BOTH THEORIES. THE EFFECT OF THE CURRENT SATURATION AND THE OSCILLATIONS ON THE AMPLIFICATION OF AN ACOUSTIC SIGNAL IS DISCUSSED. THEORY INDICATES THAT THE MAXIMUM POSSIBLE ACOUSTIC GAIN IS OF THE ORDER OF 75-100 DB. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD-651 140 20/12 20/2
EAGLE-PICHER INDUSTRIES INC MIAMI OKLA MIAMI RESEARCH LABS

RESEARCH IN PURIFICATION AND SINGLE CRYSTAL GROWTH OF II-VI COMPOUNDS. (U)

DESCRIPTIVE NOTE: QUARTERLY PROGRESS REPT., NO. 7, 16 OCT 66-14 JAN 67,
67 31P FAHRIG,R. H. ;BROWN,L. W. ;WEBB,G. N. ;
CONTRACT: AF 33(615)-2947

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: SEE ALSO AD-642 450.

DESCRIPTORS: (*SEMICONDUCTORS, PREPARATION), (*CRYSTAL GROWTH, SEMICONDUCTORS), (*SINGLE CRYSTALS, PURIFICATION), (*CADMIUM COMPOUNDS, CRYSTAL GROWTH), (*ZINC COMPOUNDS, CRYSTAL GROWTH), IMPURITIES, MASS SPECTROSCOPY, SOLID SOLUTIONS, CADMIUM SULFIDES, ZINC SULFIDES, SELENIDES, ABSORPTION SPECTRUM, EMISSIVITY, DOPING, OPTICAL PROPERTIES, CRYSTAL LATTICE DEFECTS (U)
IDENTIFIERS: ZINC SELENIDE (U)

CADMIUM SULFIDE AND ZINC SELENIDE WERE SYNTHESIZED. IMPURITIES PRESENT IN THESE AND IN ZINC SULFIDE WERE DETERMINED BY MASS AND EMISSION SPECTROGRAPHY AND BY THE ATOMIC ABSORPTION METHOD. PURITIES OF THE ZINC COMPOUNDS ARE GENERALLY LOWER THAN THAT OF THE CDS. THE GROWTH OF CRYSTALS OF II-VI COMPOUNDS FROM THE MELT WAS CONTINUED. A NUMBER OF CUSTOM DOPED CRYSTALS OF ZNS, ZNSE, AND MIXTURES OF THE TWO WERE GROWN. THE LIGHT TRANSMISSION CHARACTERISTICS OF A ZNSE SPECIMEN WERE DETERMINED FROM A SPECTROPHOTOMETRIC PLOT. THE CRYSTAL SLICE USED FOR A WINDOW IN THIS EXPERIMENT, EXHIBITED A PATTERN OF INTERESTING IMPERFECTIONS FROM WHICH SOME OF THE CRYSTAL GROWTH CONDITIONS MIGHT BE DEDUCED. CADMIUM SULFIDE CRYSTALS WERE GROWN ROUTINELY BY THE METHOD OF VAPOR PHASE DEPOSITION. (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD-651 614 9/1
AIR FORCE INST OF TECH WRIGHT-PATTERSON AFB OHIO SCHOOL OF ENGINEERING

SINGLE CRYSTAL CADMIUM SULFIDE AND CADMIUM SELENIDE INSULATED-GATE FIELD-EFFECT TRIODES. (U)

DESCRIPTIVE NOTE: MASTER'S THESIS,
MAR 67 105P BOMBER,THOMAS M. ;RUNYAN, KENNETH R. ;
REPT. NO. GE/EE/67A-1

UNCLASSIFIED REPORT

DESCRIPTORS: (*FIELD EFFECT TRANSISTORS, GAIN), (*SEMICONDUCTING FILMS, *TRIODES), (*CADMIUM SELENIDES, TRIODES), (*CADMIUM SULFIDES, TRIODES), SINGLE CRYSTALS, VAPOR PLATING, MASKING, RESISTANCE(ELECTRICAL), HALL EFFECT, CARRIERS(SEMICONDUCTORS), THERMAL STABILITY, AGING(MATERIALS), ELECTRIC CONNECTORS (U)

INSULATED-GATE FIELD-EFFECT TRIODES WERE FABRICATED ON SINGLE CRYSTAL CADMIUM SULFIDE AND CADMIUM SELENIDE. BOTH BULK CRYSTALS AND PLATELETS WERE USED FOR SINGLE CRYSTAL SAMPLES. CHROMIUM AND ALUMINUM WERE FOUND TO MAKE LOW IMPEDANCE CONTACTS TO CADMIUM SULFIDE AND CADMIUM SELENIDE. THE CALCULATED EFFECTIVE DRIFT MOBILITIES OF THE FABRICATED SINGLE CRYSTAL IGFET'S WERE THREE TO FOUR TIMES GREATER THAN THE HIGHEST REPORTED VALUE OF POLYCRYSTALLINE CADMIUM SULFIDE AND CADMIUM SELENIDE IGFET'S. THE CHARACTERISTICS OF THE FABRICATED DEVICES WERE UNSTABLE WITH RESPECT TO TIME AND TEMPERATURE. THIS INSTABILITY WAS PARTIALLY ATTRIBUTED TO THE INSTABILITY OF THE EVAPORATED SILICON MONOXIDE LAYER. AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZ2HT

AD-651 816 9/1
RADIO CORP OF AMERICA SOMERVILLE N J DEFENSE MICROELECTRONICS

THIN-FILM POLYCRYSTALLINE FIELD-EFFECT TRIODE. (U)

DESCRIPTIVE NOTE: QUARTERLY REPT. NO. 2, 1 OCT-31 DEC 66,
MAY 67 35P TOPFER,M. L. ;DANIS,A. H. ;RAPP,A. K. ;SCHELHORN,R. L. ;
CONTRACT: DA-28-043-AMC-02432(E)
PROJ: DA-1E6-22001-A440
TASK: 1E6-22001-A440-03
MONITOR: ECOM 02432-2

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: SEE ALSO AD-634 088.

DESCRIPTORS: (*FILMS, *TRANSISTORS), (*TRIODES, FILMS), PHOTOELECTRIC EFFECT, MICROMINIATURIZATION(ELECTRONICS), CADMIUM SULFIDES, SILICON DIOXIDE, CADMIUM SELENIDES, SILICON COMPOUNDS, CAPACITANCE, SURFACE PROPERTIES, VOLTAGE, TESTS, FIELD EFFECT TRANSISTORS (U)
IDENTIFIERS: THIN FILMS, THIN FILMS ELECTRONICS (U)

DURING THIS REPORT PERIOD, A CHANGE IN THE CIRCUIT TO BE WORKED ON WAS MADE. THE PROBLEMS ASSOCIATED WITH THE FOUR-INPUT NOR/OR GATE CIRCUIT DESCRIBED IN THE FIRST QUARTERLY REPORT HAVE PERSISTED, WHICH HAS LED TO THE TEMPORARY ABANDONMENT OF THIS CIRCUIT. IN ITS PLACE, WORK ON A COMPLEMENTARY THREE-INPUT NAND GATE CIRCUIT WAS INITIATED. MUCH BETTER RESULTS WERE ACHIEVED WITH THIS CIRCUIT. TWENTY-FOUR OF THESE CIRCUITS WERE DELIVERED TO FORT MONMOUTH FOR EVALUATION. LIFE TEST DATA ON THIN-FILM TRANSISTORS THAT HAVE RECENTLY BEEN PUT ON LIFE IS PRESENTED. TEST DATA ON THE DELIVERED CIRCUITS IS PRESENTED ALSO. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /4Z2HT

AD-652 611 20/12 20/3
DELAWARE UNIV NEWARK DEPT OF PHYSICS

PRODUCTION AND ANNEALING OF INTRINSIC DEFECTS IN X-RAY IRRADIATED CDS SINGLE CRYSTALS. (U)

DESCRIPTIVE NOTE: TECHNICAL REPT.,
67 15P BOER,K. W. O'CONNELL,J.
C. 1
REPT. NO. TR-18, TR-13
CONTRACT: NONR-4336(00), NSG-573

UNCLASSIFIED REPORT

DESCRIPTORS: (*CADMIUM SULFIDES, RADIATION DAMAGE), (*CRYSTAL LATTICE DEFECTS, CADMIUM SULFIDES), X RAYS, ANNEALING, EXPERIMENTAL DATA, VACUUM, PHOTOCONDUCTIVITY, BAND THEORY OF SOLIDS, SEMICONDUCTORS (U)

X-RAYS (300 KEV) HAVE BEEN USED TO PRODUCE CHANGES IN THE DEFECT STRUCTURE OF (1) 'PURE' SINGLE-CRYSTAL PLATELETS OF CDS AND (2) PLATELETS WHICH HAVE BEEN PRE-HEAT TREATED IN THE VAPOR OF ONE OF ITS COMPONENTS. THE CHANGES WERE STUDIED BY MEANS OF THE SPECTRAL DISTRIBUTION OF PHOTOCURRENT AND T.S.C. CURVES. ALL MEASUREMENTS WERE MADE IN ULTRAHIGH VACUUM (10 TO THE -10TH POWER TORR). THE DAMAGE PRODUCED ANNEALED AT TEMPERATURES BETWEEN 100 AND 150C. THE REPRODUCIBLE DAMAGE-ANNEALING CYCLE HAS BEEN EXPLAINED IN TERMS OF INTRINSIC DEFECTS PRODUCED IN THE SULFUR SUBLATTICE. DAMAGE-ANNEALING CYCLES FOR CRYSTALS PRE-HEAT TREATED IN CD OR S VAPOR (STOICHIOMETRY SHIFT) PROVIDE ADDITIONAL CONFIRMATION FOR THE PROPOSED MODEL. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD-653 248 20/12
DELAWARE UNIV NEWARK DEPT OF PHYSICS

UNIFORMLY PROPAGATING SOLUTIONS OF TRANSPORT AND POISSON EQUATIONS FOR PERIODIC FIELD DOMAINS, (U)

AUG 66 12P BOER,K. W. DUSSEL,G. A.

;

CONTRACT: DA-31-124-ARO(D)-173
PROJ: 20014501B11B
MONITOR: AROD 4461:17

UNCLASSIFIED REPORT
AVAILABILITY: PUBLISHED IN THE PHYSICAL REVIEW, V154 N2 P292-301, 10 FEB 1967.

DESCRIPTORS: (*SEMICONDUCTORS, TRANSPORT PROPERTIES), (*CARRIERS(SEMICONDUCTORS), PROPAGATION), DIFFERENTIAL EQUATIONS, NUMERICAL ANALYSIS, CRYSTAL LATTICES, DIFFUSION, ELECTROMAGNETIC FIELDS, CADMIUM SULFIDES, GALLIUM ARSENIDES (U)
IDENTIFIERS: DOMAINS(CRYSTALLOGRAPHY), GUNN EFFECT (U)

TIME-DEPENDENT SOLUTIONS OF THE POISSON AND TRANSPORT EQUATIONS CONTAINING DRIFT AND DIFFUSION FOR THE CASE OF FIELD DOMAINS PROPAGATING UNDEFORMED AND WITH CONSTANT VELOCITY THROUGH A CRYSTAL ARE DISCUSSED IN TERMS OF AN ANALYSIS OF THEIR PROJECTIONS IN THE N-E PLANE, WHERE N IS THE CARRIER CONCENTRATION AND E THE MAGNITUDE OF THE ELECTRIC FIELD. TWO PRINCIPAL MODELS ARE DISCUSSED: ONE FOR A TRAP-CONTROLLED CRYSTAL (CDS TYPE), AND THE OTHER FOR A TRAP-FREE CRYSTAL (GAAS TYPE, GUNN EFFECT) FOR FIELD-DEPENDENT RECOMBINATION OR FIELD-DEPENDENT MOBILITY. IT IS FOUND THAT, IN ADDITION TO THE 'TRIANGULAR' DOMAINS, PERIODIC PROPAGATING SOLUTIONS CAN EXIST. CONDITIONS ON THE VALUES OF THE DOMAIN VELOCITY AND THE CURRENT ARE DERIVED. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD-653 364 20/5 20/12
MASSACHUSETTS INST OF TECH LEXINGTON LINCOLN LAB

HIGH POWER AND EFFICIENCY IN CDS ELECTRON BEAM PUMPED LASERS. (U)

NOV 66 5P HURWITZ,C. E. ;
REPT. NO. JA-2932
CONTRACT: AF 19(628)-5167
MONITOR: ESD TR-67-261

UNCLASSIFIED REPORT
AVAILABILITY: PUBLISHED IN APPLIED PHYSICS LETTERS V9 N12 P420-2 DEC 15 1966.

DESCRIPTORS: (*SEMICONDUCTOR DEVICES, LASERS), (*CADMIUM SULFIDES, *LASERS), PUMPING(ELECTRONICS), ELECTRON BEAMS, CRYSTAL GROWTH, EMISSIVITY, INFRARED RADIATION, POWER, EFFICIENCY, CRYSIAL STRUCTURE (U)
IDENTIFIERS: SEMICONDUCTOR LASERS (U)

ELECTRON BEAM EXCITATION OF CDS CRYSTALS GROWN IN AN ATMOSPHERE OF EXCESS CD RESULTED IN LASER EMISSION NEAR 4900 A WITH 350 W OF PEAK OUTPUT POWER AND 26.5% OVERALL (35% INTERNAL) POWER EFFICIENCY AT TEMPERATURES AS HIGH AS 110K. LASER ACTION WAS OBSERVED, ALTHOUGH AT CONSIDERABLY REDUCED LEVELS OF POWER AND EFFICIENCY, AT TEMPERATURES UP TO 250K. THE HIGH PERFORMANCE OF THE LASERS APPEARS TO BE DUE TO INCREASED CRYSTAL UNIFORMITY AND TO THE INTRODUCTION OR ENHANCEMENT OF HIGHLY EFFICIENT RADIATIVE TRANSITIONS, BOTH OF WHICH RESULT FROM THE CD-RICH GROWTH CONDITIONS.
(AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD-654 003 20/12 20/1
FORSVARETS FORSKNINGSINSTITUTT KJELLER (NORWAY)

ACOUSTOELECTRIC OSCILLATIONS, CURRENT SATURATION AND ELECTRON DRIFT MOBILITY IN CADMIUM SULPHIDE CRYSTALS. (U)

NOV 66 27P RANNESRAD,ANDREAS I
REPT. NO. SCIENTIFIC-1, INTERN RAPPORT E-90
CONTRACT: AF 61(052)-484, AF 61(052)-958
PROJ: AF-4600
TASK: 460003
MONITOR: AFCRL 67-0285

UNCLASSIFIED REPORT

DESCRIPTORS: (*CADMIUM SULFIDES, ELECTRICAL PROPERTIES), (*ACOUSTIC PROPERTIES, CADMIUM SULFIDES), SEMICONDUCTORS, MOBILITY, ELECTRIC CURRENTS, SOLID STATE PHYSICS, PIEZOELECTRIC CRYSTALS (U)
IDENTIFIERS: ACOUSTOELECTRIC EFFECT (U)

INTERACTION BETWEEN ACOUSTIC WAVES AND CONDUCTION ELECTRONS IN THE PIEZOELECTRIC SEMICONDUCTOR CDS IS CONSIDERED. A SHORT THEORETICAL DISCUSSION OF ACOUSTIC AMPLIFICATION, CURRENT SATURATION AND THE TEMPERATURE DEPENDENCE OF ELECTRON DRIFT MOBILITY IS GIVEN. CURRENT SATURATION DUE TO ACOUSTIC OSCILLATIONS IN CDS IS OBSERVED, BOTH IN A TRANSVERSE MODE AND IN A LONGITUDINAL MODE. A METHOD FOR DETERMINING THE THRESHOLD FIELD FOR OSCILLATION, UTILIZING THE BUILD UP TIME FOR CURRENT SATURATION UNDER APPLIED PULSED DC ELECTRIC FIELD, IS DISCUSSED. THE THRESHOLD FIELD IS USED TO DETERMINE THE ELECTRON DRIFT MOBILITY FOR PHOTOCONDUCTING CDS IN THE TEMPERATURE RANGE FROM 209 DEGREES K TO 436 DEGREES K. THE TEMPERATURE DEPENDENCE OF THE MOBILITY CAN BE DESCRIBED AS A COMBINATION OF SCATTERING FROM LATTICE VIBRATION AND TRAPPING BY TWO IMPURITY LEVELS. (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD-654 009 20/12
ILLINOIS UNIV URBANA DEPT OF ELECTRICAL ENGINEERING

JUNCTION EFFECTS IN COMPOUND SEMICONDUCTORS. (U)

DESCRIPTIVE NOTE: STATUS REPT.,
APR 67 14P HOLONYAK,N. , JR.;BLOUKE,
M. M. ;STREETMAN,B. G. ;CRAWFORD,M. G. ;
STILLMAN,G. E. ;
REPT. NO. 8
CONTRACT: AF 19(628)-4337
PROJ: AF-4608
TASK: 460805
MONITOR: AFCRL 67-0292

UNCLASSIFIED REPORT

DESCRIPTORS: (*SEMICONDUCTORS, *GALLIUM ARSENIDES), PHOSPHIDES, LASERS, STABILITY, LUMINESCENCE, SILICON, EXCITATION, CADMIUM SELENIDES, CADMIUM SULFIDES, SELENIUM, SPECTRA(VISIBLE + ULTRAVIOLET), DOPING, OSCILLATION (U)

THE EFFECT OF DONOR IMPURITY STATES NEAR THE INDIRECT <100> CONDUCTION BAND MINIMA ON THE DIRECT-INDIRECT TRANSITION IN GA(ASP) IS DISCUSSED. ULTRATHIN PLATELET LASERS OF CDSE AND CD(SES), INCLUDING VISIBLE SPECTRUM CONTINUOUS (CW) OPERATION, ARE DESCRIBED. INSTABILITIES AND SELF-OSCILLATION PHENOMENA IN BULK SAMPLES OF SI COMPENSATED WITH DEEP LEVELS (AU, CO, ETC.) ARE DISCUSSED. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD-655 559 20/12
DELAWARE UNIV NEWARK DEPT OF PHYSICS

NEW KIND OF FIELD INSTABILITY IN CDS IN THE RANGE OF NEGATIVE DIFFERENTIAL RESISTIVITY, (U)

MAR 67 7P BOER,K. W. ;
REPT. NO. TR-15, TR-19
CONTRACT: DA-31-124-ARO(D)-173, NONR-4336(00)

UNCLASSIFIED REPORT
AVAILABILITY: PUBLISHED IN SOLID STATE COMMUNICATIONS V5 P467-9 1967.

DESCRIPTORS: (*CADMIUM SULFIDES, TRANSPORT PROPERTIES), CARRIERS(SEMICONDUCTORS), RESISTANCE(ELECTRICAL), ELECTRIC FIELDS, OSCILLATION, STABILITY, ANOMALIES, PHOTOCONDUCTIVITY (U)
IDENTIFIERS: SEMICONDUCTOR JUNCTIONS (U)

SUBDOMAINS ARE OBSERVED, WHICH OCCUR WITHIN THE HIGH FIELD DOMAIN OF CDS AND MOVE FROM THE ANODE TO THE CATHODE EDGE OF THE MAIN DOMAIN, INDICATING A P-TYPE TRANSPORT MECHANISM AND CAUSING HIGHER FREQUENCY OSCILLATIONS SUPER IMPOSED ON THE CURRENT OSCILLATIONS DUE TO MAIN DOMAIN CREATION AND ANNIHILATION. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZMT

AD-656 151 20/12
AEROSPACE MEDICAL RESEARCH LABS WRIGHT-PATTERSON AFB OHIO

PHONON COUPLING IN EDGE EMISSION AND PHOTOCONDUCTIVITY OF CDSE, CDS, AND CDISE SUB X S SUB 1-X). (U)

JUL 66 12P LANGER,D. W. ;PARK,Y. S. ;EUWEMA,R. N. ;

REPT. NO. ARL-67-0032
PROJ: AF-7885
TASK: 788502

UNCLASSIFIED REPORT
AVAILABILITY: PUBLISHED IN THE PHYSICAL REVIEW V152 N2 P788-96 DEC 9 1966.

DESCRIPTORS: (*SEMICONDUCTORS, *PHONONS), (*CADMIUM SELENIDES, TRANSPORT PROPERTIES), (*CADMIUM SULFIDES, TRANSPORT PROPERTIES), CONTINUOUS SPECTRUM, EMISSIVITY, PHOTOCONDUCTIVITY, CRYSTAL LATTICES, CRYSTAL LATTICE DEFECTS, BAND THEORY OF SOLIDS, CARRIERS(SEMICONDUCTORS) (U)
IDENTIFIERS: CADMIUM SULFOSELLENIDES (U)

IN MIXTURES OF CDISE SUB X S SUB 1-X) TWO LONGITUDINAL OPTICAL (LO) PHONONS (AND THEIR ADDITIVE COMBINATIONS) COUPLE TO THE EDGE EMISSION CENTERS AND TO THE CONDUCTION ELECTRONS. THE PHONON FREQUENCIES AS A FUNCTION OF THE CDSE/CDS RATIO--WHICH ARE OBSERVED IN THE EDGE EMISSION SPECTRA--AGREE WELL WITH THE EIGENFREQUENCIES CALCULATED FOR A LINEAR CHAIN OF CD-SE-CD-S-CD-...ATOMS. THE SPECTRAL RESPONSE OF THE PHOTOCONDUCTIVITY OF PURE CDS AND CDSE SHOWS OSCILLATIONS AT THE HIGH-ENERGY SIDE OF THE ABSORPTION EDGE. THE ENERGY SEPARATION BETWEEN SUCCESSIVE PHOTOCURRENT MAXIMA OR MINIMA CORRESPONDS APPROXIMATELY TO THE LO PHONON ENERGY OF EACH CRYSTAL LATTICE. THE MINIMA ARE EXPLAINED BY A SHORTENED ELECTRON LIFETIME AT THE RESPECTIVE ENERGIES, BECAUSE ELECTRONS HAVING SUCH ENERGIES MAY EASILY DROP TO A RECOMBINATION CENTER (EXCITON OR IMPURITY NEAR BAND EDGE) BY THE EMISSION OF ONE OR SEVERAL LO PHONONS. IT IS SHOWN THAT IN MIXED CRYSTALS THE TWO LO PHONONS (AND THEIR COMBINATIONS) SHORTEN THE LIFETIME OF THE CONDUCTION ELECTRONS. THUS, WHEN EXCITATION OCCURS VIA THE CONDUCTI : BAND, THE RECOMBINATION CENTER WILL BE POPULATED FASTER IN MIXED CRYSTALS. (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD-656 745 20/12
DELAWARE UNIV NEWARK DEPT OF PHYSICS

SLOW MOVING FIELD DOMAINS IN CDS IN THE RANGE OF NEGATIVE DIFFERENTIAL CONDUCTIVITY. (U)

DESCRIPTIVE NOTE: TECHNICAL REPT.,
JUL 67 14P BOER,K. W. ;
REPT. NO. TR-16
CONTRACT: DA-31-124-ARO(D)-173
MONITOR: AROD 4461:19-P

UNCLASSIFIED REPORT

DESCRIPTORS: (*CADMIUM SULFIDES, TRANSPORT PROPERTIES), CARRIERS(SEMICONDUCTORS), POLARIZATION, ELECTRIC FIELDS, DIFFERENTIAL EQUATIONS, ELECTRICAL CONDUCTANCE (U)
IDENTIFIERS: DOMAINS(CRYSTALLOGRAPHY), NEGATIVE DIFFERENTIAL CONDUCTIVITY (U)

TIME PERIODIC SOLUTIONS OF POISSON AND TRANSPORT EQUATIONS IN THE RANGE OF NEGATIVE DIFFERENTIAL CONDUCTIVITY DUE TO FIELD QUENCHING WERE CALCULATED BY MACHINE COMPUTATION USING PARAMETERS AS OBTAINED FOR CADMIUM SULFIDE AND SHOW THE POSSIBILITY THAT THE HOLE CONCENTRATION INCREASES ABOVE THE ELECTRON CONCENTRATION IN THE HIGH FIELD DOMAIN. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZ/HT

AD-656 954 20/12 9/1
SIMON FRASER UNIV BURNABY (BRITISH COLUMBIA) DEPT OF PHYSICS

CONTROL OF THE SURFACE POTENTIAL OF EVAPORATED CDS LAYERS. (U)

FEB 67 2P HAERING,R. R. ;O'HANLON, J. F. ;

UNCLASSIFIED REPORT
AVAILABILITY: PUBLISHED IN PROCEEDINGS OF THE IEEE 1P MAY 1967.

DESCRIPTORS: (*SEMICONDUCTING FILMS, SURFACE PROPERTIES), (*CADMIUM SULFIDES, SURFACE PROPERTIES), VOLTAGE, CONTROL, ELECTRICAL CONDUCTANCE, CARRIERS(SEMICONDUCTORS), DIELECTRIC FILMS, CALCIUM FLUORIDES, SILICON DIOXIDE, CANADA (U)

A SIMPLE METHOD IS DESCRIBED FOR CONTROLLING THE SURFACE POTENTIAL OF SEMICONDUCTING FILMS WHICH ARE COVERED WITH EVAPORATED INSULATING LAYERS. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD-657 045 20/12 20/2
EAGLE-PICHER INDUSTRIES INC MIAMI OKLA MIAMI RESEARCH LABS

RESEARCH IN PURIFICATION AND SINGLE GROWTH OF II-VI COMPOUNDS. (U)

DESCRIPTIVE NOTE: INTERIM REPT. 15 APR 65-14 APR 67,
APR 67 61P FAHRIG,RICHARD H. ;WEBB,
GEORGE N. ;BROWN,LLOYD W. ;
CONTRACT: AF 33(615)-2947
PROJ: AF-7885
MONITOR: ARL 67-0070

UNCLASSIFIED REPORT

DESCRIPTORS: (*SEMICONDUCTORS, PREPARATION), (*CRYSTAL GROWTH, SEMICONDUCTORS), CADMIUM, PURIFICATION, IMPURITIES, SPECTROSCOPY, CADMIUM SULFIDES, CRYSTALLIZATION, ZINC SULFIDES, CADMIUM SELENIDES, CADMIUM COMPOUNDS, ZINC COMPOUNDS, SELENIDES, TELLURIDES, OXIDES, DOPING, FURNACES (U)
IDENTIFIERS: CADMIUM TELLURIDE, ZINC OXIDE, ZINC SELENIDE, ZINC TELLURIDE (U)

A PROCESS FOR THE PURIFICATION OF CADMIUM METAL BY MULTIPLE TREATMENT STEPS IS DESCRIBED. IMPURITIES IN CADMIUM, AS DETERMINED BY EMISSION SPECTROGRAPHIC, MASS SPECTROGRAPHIC, AND ATOMIC ABSORPTION ARE GIVEN IN TABULAR FORM. THE PREPARATION OF VARIOUS PURE SEMICONDUCTOR MATERIALS OF THE GROUP II-VI COMPOUND TYPE IS DISCUSSED AND TABLES OF ANALYTICAL DATA FOR EACH ARE INCLUDED. THE LEVEL OF IMPURITY CONCENTRATION IN SYNTHESIZED CADMIUM SULFIDE WAS SIGNIFICANTLY LOWERED. LESS THAN 1 PART PER MILLION (ATOMIC) TOTAL IMPURITIES WAS FOUND BY THE MASS SPECTROGRAPH IN TWO BATCHES OF CDS. THE GROWTH OF CRYSTALS OF PURE II-VI COMPOUNDS AND MIXTURES OF COMPOUNDS FROM THE MELT IS REPORTED. INCLUDED ARE DATA CONCERNING DOPING OF MELT GROWN CRYSTALS WITH VARIOUS ELEMENTAL DOPANTS, AND, IN THE CASE OF SOME COMPOUND SEMICONDUCTORS, THE MAXIMUM DOPING LEVELS POSSIBLE BY THIS METHOD. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD-657 274 20/12
CALIFORNIA UNIV BERKELEY ELECTRONICS RESEARCH LAB

STATISTICAL CONSIDERATIONS IN MOSFET CALCULATIONS. (U)

DESCRIPTIVE NOTE: REVISED ED.,
DEC 66 IV KAMINS,T. I. ;MULLER,R.
S. ;
CONTRACT: DA-31-124-ARO(D)-385
PROJ: DA-20014501B11B
MONITOR: AROD 5537;3

UNCLASSIFIED REPORT
AVAILABILITY: PUBLISHED IN SOLID-STATE ELECTRONICS V10 P423-31 1967.
SUPPLEMENTARY NOTE: REVISION OF MANUSCRIPT RECEIVED 25 OCT 66.

DESCRIPTORS: (*FIELD EFFECT TRANSISTORS, STATISTICAL MECHANICS), (*SEMICONDUCTORS, ELECTRICAL CONDUCTANCE), CARRIERS(SEMICONDUCTORS), CADMIUM SULFIDES, SILICON, FILMS, TRANSPORT PROPERTIES, APPROXIMATION(MATHEMATICS), PERFORMANCE(ENGINEERING), SURFACE PROPERTIES, QUANTUM STATISTICS (U)
IDENTIFIERS: MAXWELL-BOLTZMANN STATISTICS, FERMI-DIRAC STATISTICS (U)

THE USE OF STATISTICS IN THE CALCULATION OF THE PERFORMANCE OF MOS FIELD-EFFECT DEVICES IS CONSIDERED. SINCE MOSFET'S FREQUENTLY OPERATE WITH DEGENERATE FREE-CARRIER CONCENTRATIONS AT THEIR SURFACES, THE PROPER FORMULATION OF THE DEPENDENCE OF SOURCE-DRAIN CONDUCTANCE IN TERMS OF FERMI-DIRAC STATISTICS IS DISCUSSED. EXACT CALCULATIONS ARE COMPARED WITH RESULTS BASED ON APPROXIMATIONS THAT EMPLOY MAXWELL-BOLTZMANN STATISTICS. COMPUTER SOLUTIONS FOR BOTH THE ACCURATE AND THE APPROXIMATE STATISTICAL FORMULATIONS ARE GIVEN. THE RESULTS ARE INTERPRETED IN TERMS OF PRESENT TECHNOLOGIES FOR SILICON MOS STRUCTURES AND DEPOSITED CDS THIN-FILM TRANSISTORS. INEQUALITIES ARE DERIVED WHICH PERMIT AN EVALUATION OF THE ACCURACY OF MAXWELL-BOLTZMANN STATISTICS FOR CALCULATION OF SOURCE-DRAIN CONDUCTANCE FOR AN UNSPECIFIED SEMICONDUCTOR. IT IS SHOWN THAT THIS APPROXIMATE PROCEDURE SUFFICES FOR PRACTICAL DEVICES. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD-659 777 20/12
DELAWARE UNIV NEWARK DEPT OF PHYSICS

CHARACTERISTIC FIELD INHOMOGENEITIES IN HOMOGENEOUS DIELECTRICS IN THE PRE-BREAKDOWN RANGE. (U)

DESCRIPTIVE NOTE: FINAL REPT.,
JUL 67 7P BOER,K. W. I
CONTRACT: DA-31-124-ARO(D)-173
PROJ: DA-2001450181 18
MONITOR: AROD 4461:20-P

UNCLASSIFIED REPORT

DESCRIPTORS: (*CADMIUM SULFIDES, TRANSPORT PROPERTIES), FIELD THEORY, SEMICONDUCTORS, SINGLE CRYSTALS, DIELECTRICS, CARRIERS(SEMICONDUCTORS), ELECTRICAL PROPERTIES, ELECTRIC FIELDS (U)

FIELD INSTABILITIES IN CADMIUM SULFIDE SINGLE CRYSTALS, CAUSED BY FIELD QUENCHING, AND RELATED EFFECTS WERE INVESTIGATED. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD-659 788 9/1 9/5
RADIO CORP OF AMERICA SOMERVILLE N J DEFENSE
MICROELECTRONICS

THIN-FILM POLYCRYSTALLINE FIELD-EFFECT TRIODE. (U)

DESCRIPTIVE NOTE: FINAL REPT. 1 JUL 66-30 JUN 67,
OCT 67 28P TOPFER,M. L. ;DANIS,A.
H. ;RAPP,A. K. ;
REPT. NO. 4
CONTRACT: DA-28-043-AMC-02432(E)
PROJ: DA-1E6-22001-A-440
TASK: 1E6-22001-A-440-03
MONITOR: ECOM 02432-F

UNCLASSIFIED REPORT

DESCRIPTORS: (*FIELD EFFECT TRANSISTORS, FILMS), CADMIUM SULFIDES, TELLURIUM, SEMICONDUCTORS, GATES(CIRCUITS), MASKING, MANUFACTURING METHODS, TESTS, INTEGRATED CIRCUITS (U)

THE REPORT INCLUDES DATA COVERING ALL WORK DONE ON THIS CONTRACT. THE LAST HALF OF THE PROGRAM PHASED INTO THE DEVELOPMENT OF COMPLEMENTARY THIN-FILM TRANSISTOR CIRCUITS, USING TELLURIUM FOR THE P-TYPE AND CADMIUM SELENIDE FOR THE N-TYPE SEMICONDUCTORS. THE CIRCUIT USED WAS A THREE-INPUT NAND GATE. TO INCREASE YIELD AND TO IMPROVE CIRCUIT OPERATION AND STABILITY, A NEW MASK WAS INTRODUCED INTO THE FABRICATION PROCEDURE. SINCE THIS MASK DEFINED THE SOURCE-DRAIN LANDS AND GAP IN ONE EVAPORATION INSTEAD OF TWO, THE PREVIOUS SIZE AND ALIGNMENT PROBLEMS WERE ELIMINATED. THE AMOUNT OF PENUMBRA WAS APPRECIABLY REDUCED BECAUSE OF SMALLER WIRE DIAMETER. FASTER SWITCHING WAS OBTAINED, AND CIRCUIT EVALUATION DATA GAVE EVIDENCE THAT MANY OF THE LAST CIRCUITS FABRICATED APPROACHED IDEAL PERFORMANCE. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD-660 142 20/12
LOUVAIN UNIV (BELGIUM)

PHOTOMAGNETOELECTRIC EFFECT OF CDS SINGLE CRYSTALS AND OF BISMUTH ROLLED FOILS. THERMOMAGNETOELECTRIC EFFECT OF CONTACTS BI-CU, GE-CU AND SI-CU. (U)

DESCRIPTIVE NOTE: TECHNICAL NOTE SEP-30 DEC 61,
DEC 61 81P LUYCK,A. ;LONTIE,G. ;ISSI,
J. P. ;COUPMANS,P. ;
REPT. NO. TN-2
CONTRACT: AF 61(052)-166

UNCLASSIFIED REPORT

DESCRIPTORS: (*CADMIUM SULFIDES, TRANSPORT PROPERTIES), (*BISMUTH, TRANSPORT PROPERTIES), SINGLE CRYSTALS, FOILS, PHOTOCONDUCTIVITY, SEMICONDUCTORS, CARRIERS(SEMICONDUCTORS), GERMANIUM, MAGNETIC FIELDS, OPTICAL PROPERTIES, SEEBECK EFFECT, TEMPERATURE, COPPER, SILICON (U)
IDENTIFIERS: CONTACTS(ELECTRICAL), MAGNETORESISTIVE EFFECT (U)

CONTENTS: PHOTOMAGNETOELECTRIC EFFECT OF CDS SINGLE CRYSTALS: (A) IRRADIATION OF CDS SINGLE CRYSTALS WITH WHITE LIGHT; (B) IRRADIATION OF CDS WITH COLORED LIGHT.PMR; (C) INVESTIGATION FOR A PMR INDEPENDENT ON THE SIGN OF THE MAGNETIC FIELD. MEASUREMENTS IN THE PERIOD OF POST-IRRADIATION IN THE DARK; (D) PMR OF CDS WITH WEAK COLORED IRRADIATION; (E) INVESTIGATION FOR A PME EFFECT ON CDS CRYSTALS. MAGNETORESISTANCE ON BI - REPRODUCTION OF CLASSICAL EXPERIMENTS AND NEW FEATURES. PHOTOMAGNETORESISTANCE AND PHOTOMAGNETOVOLTAIC EFFECTS ON ROLLED BI FOILS. THERMOMAGNETOELECTRIC EFFECT ON BI-CU CONTACTS AND CU-GE OR CU-SI CONTACTS. (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /4ZZHT

AD-660 760 20/12 20/2
AEROSPACE RESEARCH LABS WRIGHT-PATTERSON AFB OHIO

RECOVERY OF ROCKSALT STRUCTURE CDS TO ROOM PRESSURE. (U)

DESCRIPTIVE NOTE: REVISED ED.,
NOV 66 7P GALE,K. A. ;KULP,B. A. ;
REPT. NO. ARL 67-0177
PROJ: AF-7885

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: J. PHYS. CHEM. SOLIDS, V28 P1233-5 1967. REVISION OF MANUSCRIPT RECEIVED 2 AUG 66.

DESCRIPTORS: (*CADMIUM SULFIDES, *CRYSTAL STRUCTURE), (*SEMICONDUCTORS, PHASE STUDIES), SINGLE CRYSTALS, CRYSTAL LATTICES, CRYOGENICS, ANNEALING, ABSORPTION SPECTRUM (U)

THE HIGH PRESSURE PHASE OF CDS WAS RECOVERED TO ROOM PRESSURE AT 77K. THE STARTING MATERIAL WAS SINGLE CRYSTAL CDS, AND THE RECOVERED MATERIAL VARIED FROM POWDER TO SINGLE CRYSTAL NACL STRUCTURE CDS. THE ANNEALING TEMPERATURE OF THE REVERSE TRANSFORMATION OF THE NACL PHASE WAS MEASURED AS WAS THE ANNEALING TEMPERATURE OF THE ZINCBLENDE TO WURTZITE PHASE TRANSFORMATION. EG OF THE HIGH PRESSURE PHASE IS 2.04 PLUS OR MINUS 0.02 EV. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD-660 874 20/12 20/2
CLEVITE CORP CLEVELAND OHIO ELECTRONIC RESEARCH DIV

RESEARCH ON IMPROVED II-VI CRYSTALS. (U)

DESCRIPTIVE NOTE: TECHNICAL REPT. 8 MAY 66-7 MAY 67,
JUL 67 61P SHIOZAWA,L. R. JOST,J.
M. ;
CONTRACT: AF 33(615)-2708
PROJ: AF-7885
MONITOR: ARL 67-0149

UNCLASSIFIED REPORT

DESCRIPTORS: (*SEMICONDUCTORS, CRYSTALLOGRAPHY), (*CADMIUM SULFIDES, CRYSTALLOGRAPHY), (*CADMIUM SELENIDES, CRYSTALLOGRAPHY), (*TELLURIDES, CRYSTALLOGRAPHY), ZINC COMPOUNDS, CRYSTAL LATTICE DEFECTS, PHASE STUDIES, IMPURITIES, COPPER, SOLUBILITY, SOLID SOLUTIONS, CRYSTAL GROWTH, ADDITIVES, SULFUR (U)
IDENTIFIERS: ZINC TELLURIDE (U)

THE MAIN GOAL OF THE RESEARCH EFFORT DESCRIBED IN THE REPORT WAS TO ACHIEVE SUBSTANTIAL IMPROVEMENTS IN THE QUALITY OF CDS AND RELATED CRYSTALS SUCH AS CDSE AND ZNTE. TWO ASPECTS REGARDING COMPOSITIONAL CHANGES IN THE II-VI COMPOUNDS ARE PRESENTED: (1) AN INVESTIGATION WAS MADE OF POINT-DEFECT EQUILIBRIA BOTH FOR COMPLETE EQUILIBRIUM AND UNDER IDEALLY QUENCHED CONDITIONS, WITH ATTENTION AT THIS TIME TO ZNTE, AND (2) THE IMPORTANCE OF KINETICS IS EMPHASIZED, PARTICULARLY IN REGARD TO THE LENGTH OF TIME REQUIRED TO ATTAIN COMPLETE EQUILIBRIUM IN A CRYSTAL. A NEW, PROMISING PROCEDURE IS ALSO DISCUSSED FOR CONTROLLING THE COMPOSITION OF THE SOLID IN CRYSTAL GROWTH BY USE OF AN EFFUSION ORIFICE DURING PREPARATION OF THE SUPPLY. (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD-661 192 20/12
DELAWARE UNIV NEWARK DEPT OF PHYSICS

STATIONARY HIGH FIELD DOMAINS IN THE RANGE OF NEGATIVE DIFFERENTIAL CONDUCTIVITY IN CDS SINGLE CRYSTALS. (U)

DESCRIPTIVE NOTE: TECHNICAL REPT.,
OCT 67 29P BOER,KARL W. ;VOSS,PETER ;
REPT. NO. TR-21
CONTRACT: NONR-4336(00)

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: SEE ALSO AD-661 191.

DESCRIPTORS: (*CADMIUM SULFIDES, TRANSPORT PROPERTIES), ELECTRIC FIELDS, SINGLE CRYSTALS, CARRIERS(SEMICONDUCTORS), CONDUCTIVITY, WORK FUNCTIONS, STABILITY, ELECTRON DENSITY (U)

IN CDS CRYSTALS WITH AN N-SHAPED NEGATIVE DIFFERENTIAL CONDUCTIVITY RANGE STATIONARY HIGH FIELD DOMAINS ADJACENT TO THE ELECTRODES ARE OBSERVED. WITH INCREASING APPLIED VOLTAGE THESE STEPLIKE DOMAINS INCREASE IN WIDTH STAYING ATTACHED TO THE CATHODE UNTIL THEY FILL THE ENTIRE CRYSTAL, THEN A STILL HIGHER FIELD DOMAIN IS FORMED AT THE ANODE AND INCREASES IN WIDTH. THESE DOMAINS CAN BE EXPLAINED WITHIN AN EARLIER PUBLISHED THEORY AND ALLOW THE DETERMINATION OF ELECTRON DENSITIES AT THE CATHODE-CDS BOUNDARY, AND IN THE FIELD QUENCHED REGION. THE ANALYSIS OF THESE STATIONARY DOMAINS PRESENTS A NEW TOOL FOR WORK FUNCTION (METAL SEMICONDUCTOR) INVESTIGATIONS. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD-661 557 20/12 10/2 20/3
CLEVITE CORP CLEVELAND OHIO

RESEARCH ON THE MECHANISM OF THE PHOTOVOLTAIC EFFECT IN HIGH-EFFICIENCY CDS THIN-FILM SOLAR CELLS. (U)

DESCRIPTIVE NOTE: INTERIM REPT. 1 JUN 66-31 MAY 67,
SEP 67 94P SHIOZAWA,L. R. SULLIVAN.
GEORGE A. AUGUSTINE,FRANK ;
CONTRACT: AF 33(615)-5224
PROJ: AF-7885
MONITOR: ARL 67-0190

UNCLASSIFIED REPORT

DESCRIPTORS: (*SOLAR CELLS, CADMIUM SULFIDES), (*CADMIUM SULFIDES, FILMS), TRANSPORT PROPERTIES, CARRIERS(SEMICONDUCTORS), SULFIDES, COPPER COMPOUNDS, PHOTOCONDUCTIVITY, SEMICONDUCTORS, OPTICAL PROPERTIES, BAND THEORY OF SOLIDS, MODELS(SIMULATIONS), SINGLE CRYSTALS, ELECTRICAL PROPERTIES (U)
IDENTIFIERS: PHOTOVOLTAIC EFFECT (U)

DURING THE FIRST YEAR OF THIS PROJECT 'MODEL 1066,' AN EXPLANATION OF THE MECHANISM RESPONSIBLE FOR THE PHOTOVOLTAIC EFFECT IN THIN-FILM CDS SOLAR CELLS WAS DEVELOPED. EMPHASIS HAS SINCE BEEN PLACED ON CRITICAL EXPERIMENTS DESIGNED TO TEST THIS MODEL, AND TO ESTABLISH CELL PARAMETERS ESSENTIAL TO FURTHER REFINEMENT OF THE MODEL. EXPERIMENTS WHICH HAVE BEEN CARRIED OUT INCLUDE MEASUREMENTS OF THE THICKNESS OF THE CU2S LAYER, EXAMINATION OF THE GRAIN STRUCTURE OF THE CDS LAYER, MEASUREMENTS OF OPTICAL ABSORPTION IN AND EXAMINATION OF THE CRYSTALLOGRAPHY AND STOICHIOMETRY OF THE CU2S LAYER, DIFFUSION AND SOLUBILITY MEASUREMENTS FOR CU IN CDS, AND MEASUREMENTS OF JUNCTION CAPACITANCE, CURRENT-VOLTAGE CHARACTERISTICS AND SPECTRAL RESPONSE OF CDS SOLAR CELLS. IN ADDITION, A UNIQUE EVAPORATION SYSTEM HAS BEEN DEVELOPED AND IS BEING USED SUCCESSFULLY. FINDINGS OF THESE INVESTIGATIONS HAVE ALL BEEN IN GENERAL AGREEMENT WITH 'MODEL 1066,' WHICH INVOLVES LIGHT ABSORPTION BY HOLE-ELECTRON PAIR GENERATION IN THE P-TYPE CU2S LAYER, FOLLOWED BY DIFFUSION OF THE MINORITY ELECTRONS INTO A COPPER-COMPENSATED DARK-INSULATING CDS LAYER, AND COLLECTION OF THESE AT AN I-N CDS HOMOJUNCTION. (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD-661 882 20/12
AEROSPACE RESEARCH LABS WRIGHT-PATTERSON AFB OHIO

EFFECT OF STRESS ON CDS SINGLE CRYSTALS, (U)

NOV 66 8P KULP,B. A. IGALE,K. A. ;
REPT. NO. ARL-67-0143
PROJ: AF-7885

UNCLASSIFIED REPORT
AVAILABILITY: PUBLISHED IN PHYSICAL REVIEW V156 N3 P877-80 APR 15 1967.

DESCRIPTORS: (*SEMICONDUCTORS, CADMIUM SULFIDES), (*CADMIUM SULFIDES, STRESSES), LUMINESCENCE, HYDROSTATIC PRESSURE, TEMPERATURE, ABSORPTION, ELECTRICAL CONDUCTANCE, BAND THEORY OF SOLIDS, PHOTOCONDUCTIVITY (U)

THE ELECTRICAL AND LUMINESCENCE PROPERTIES OF CDS CRYSTALS, WHICH SHOW THE PHENOMENON OF STORAGE, WERE STUDIED AS A FUNCTION OF HYDROSTATIC PRESSURE AND UNIAXIAL STRESS. IN THE EXCITED STATE, UNIAXIAL STRESS APPLIED PARALLEL TO THE C AXIS RESULTED IN AN IRREVERSIBLE INCREASE OF SIX ORDERS OF MAGNITUDE IN THE RESISTANCE. UNIAXIAL STRESS APPLIED PERPENDICULAR TO THE C AXIS AND HYDROSTATIC PRESSURE HAD NO EFFECT ON THE RESISTANCE. WHILE UNIAXIAL STRESS WAS BEING APPLIED TO THE CRYSTAL IN THE LOW-RESISTIVITY STATE, LUMINESCENCE WAS OBSERVED. THE INTEGRATED INTENSITY WAS INDEPENDENT OF THE RATE OF APPLICATION OF THE STRESS OVER A RANGE OF TEN TO ONE, AND THE LUMINESCENCE CONSISTED OF THE CHARACTERISTIC GREEN-EDGE EMISSION AND A RED LUMINESCENCE CENTERING AT ABOUT 6600A. AT ROOM TEMPERATURE, THE DECAY CONSTANT OF THE PHOTOCURRENT INCREASED WITH HYDROSTATIC PRESSURE. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD-661 907 20/6 20/12
AEROSPACE RESEARCH LABS WRIGHT-PATTERSON AFB OHIO

COHERENT AND NONCOHERENT LIGHT EMISSION IN II-VI COMPOUNDS, (U)

66 15P REYNOLDS,DONALD C. ;
REPT. NO. ARL-67-0174
PROJ: AF-7885
TASK: 788504

UNCLASSIFIED REPORT
AVAILABILITY: PUBLISHED IN THE PHYSICAL REVIEW V157 N3 P515-7 1967.

DESCRIPTORS: (*SEMICONDUCTOR DEVICES, *LASERS), SEMICONDUCTORS, EMISSIVITY, COHERENT RADIATION, ZINC SULFIDES, CADMIUM SULFIDES, CADMIUM SELENIDES, ZINC COMPOUNDS, CADMIUM COMPOUNDS, TELLURIDES, MERCURY ALLOYS, ELECTRON TRANSITIONS, CRYSTAL GROWTH, TRANSPORT PROPERTIES, REVIEWS (U)
IDENTIFIERS: CADMIUM MERCURY TELLURIDES, CADMIUM SULFOSELENIDES, CADMIUM TELLURIDE, ZINC OXIDE (U)

RECENT EXPERIMENTS WITH II-VI COMPOUNDS HAVE SHOWN THAT THEY HAVE CONSIDERABLE POTENTIAL FOR LASER APPLICATIONS OVER A BROAD REGION OF THE OPTICAL SPECTRUM. IT MAY BE POSSIBLE TO COVER THE SPECTRUM CONTINUOUSLY FROM 3200A (ZNS) TO THE FAR INFRARED (CDHG:TE) SINCE HGTE IS A SEMIMETAL. LASER ACTION HAS BEEN OBSERVED IN ZNS, ZNO, CDS, CDSE, CDS:SE, CDTE, AND SOME OF THE CDHG:TE ALLOYS. OF PARTICULAR INTEREST ARE THOSE LASERS OPERATING IN THE VISIBLE AND NEAR ULTRAVIOLET REGIONS OF THE SPECTRUM WHERE DETECTORS OF HIGH SENSITIVITY ARE AVAILABLE. THE LASING TRANSITIONS IN II-VI COMPOUNDS ARE BOUND EXCITON TRANSITIONS SOME OF WHICH HAVE BEEN IDENTIFIED IN AUXILIARY EXPERIMENTS. HIGH EFFICIENCIES AND LOW THRESHOLDS FOR LASING HAVE BEEN ACHIEVED ALMOST EXCLUSIVELY IN PLATELET-TYPE CRYSTALS. THE GREATER CRYSTALLINE QUALITY EXHIBITED BY THE PLATELET-TYPE MATERIAL IS SHOWN TO RESULT FROM THE CRYSTAL GROWTH HABIT. PHONON SCATTERING OF CONDUCTION ELECTRONS TO THE GROUND-STATE EXCITON IS DISCUSSED IN RELATION TO LOW THRESHOLDS AND HIGH EFFICIENCIES FOR LASING OBSERVED IN THE CDS:SE SOLID SOLUTIONS. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD-662 534 9/1 14/2
WESTINGHOUSE RESEARCH LABS PITTSBURGH PA

FABRICATION OF VAPOR-DEPOSITED THIN FILM PIEZOELECTRIC TRANSDUCERS FOR THE STUDY OF PHONON BEHAVIOR IN DIELECTRIC MATERIALS AT MICROWAVE FREQUENCIES. (U)

DESCRIPTIVE NOTE: INTERIM REPT.,
NOV 67 33P DE KLERK,JOHN ;
REPT. NO. SCIENTIFIC-7
CONTRACT: AF 19(628)-4372
PROJ: AF-5635
TASK: 563503
MONITOR: AFCRL 67-0627

UNCLASSIFIED REPORT
AVAILABILITY: PUBLISHED IN PHYSICAL ACOUSTICS V4A P195-223 1966.
SUPPLEMENTARY NOTE: SEE ALSO AD-648 782.

DESCRIPTORS: (*PIEZOELECTRIC TRANSDUCERS, FILMS), VAPOR PLATING, MICROWAVE FREQUENCY, DIELECTRIC PROPERTIES, CADMIUM SULFIDES, ZINC SULFIDES, QUARTZ, BALANCES, ACOUSTICS, PHONONS, DIELECTRICS (U)

A METHOD OF FABRICATING STOICHIOMETRIC CDS AND ZNS THIN FILM PIEZOELECTRIC TRANSDUCERS IS DESCRIBED, TOGETHER WITH A QUARTZ CRYSTAL MICROBALANCE METHOD OF FILM THICKNESS MEASUREMENT. MICROWAVE ACOUSTIC ATTENUATION MEASUREMENT ON AL2O3, MGO AND TIO2 AS A FUNCTION OF TEMPERATURE WHILE USING CDS THIN FILM TRANSDUCERS, ARE INCLUDED. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD-663 779 9/1
CALIFORNIA UNIV BERKELEY ELECTRONICS RESEARCH LAB

ELECTRICAL PERFORMANCE OF METAL-INSULATOR-PIEZOELECTRIC SEMICONDUCTOR TRANDUCERS. (U)

DESCRIPTIVE NOTE: REVISED ED.,
NOV 66 10P FIEBIGER,J. K. MULLER,R. S. ;
CONTRACT: AF-AFOSR-139-66
PROJ: AF-4751
MONITOR: AFOSR 68-0081

UNCLASSIFIED REPORT
AVAILABILITY: PUBLISHED IN JOURNAL OF APPLIED PHYSICS V38 N4 P1948-55 15 MAR 1967.
SUPPLEMENTARY NOTE: REVISION OF MANUSCRIPT SUBMITTED 1 JUL 66.

DESCRIPTORS: (*PIEZOELECTRIC TRANSDUCERS, SEMICONDUCTOR DEVICES), FILMS, TRANSISTORS, SEMICONDUCTORS, CADMIUM SULFIDES, SEMICONDUCTING FILMS, CADMIUM SELENIDES, PERFORMANCE(ENGINEERING) (U)
IDENTIFIERS: METAL OXIDES SEMICONDUCTORS (U)

THE THEORY UNDERLYING THE OPERATION OF METAL-INSULATOR-PIEZOELECTRIC (MIPS) ELECTROMECHANICAL TRANSDUCERS IS VERIFIED EXPERIMENTALLY FOR TIME-VARYING LOADS ON DEVICES MADE FROM CDS PIEZOELECTRIC FILM MATERIALS. EAPERIMENTAL TRANSDUCERS EXHIBIT SENSITIVITIES OF THE SAME ORDER AS THOSE OBSERVED UNDER STATIC LOADING WITHIN TIMES SHORTER THAN ONE MICROSECOND AFTER THE APPLICATION OF MECHANICAL STRESS. THE FREQUENCY LIMITATIONS FOR THE TRANSDUCER APPEAR TO BE DETERMINED BY THE ELECTRICAL PROPERTIES OF THE MOS STRUCTURE. THE MIPS EFFECT IS DEMONSTRATED EXPERIMENTALLY IN CDSE TRANSDUCERS. TRANSDUCERS FABRICATED ON A FLEXIBLE POLYIMIDE FILM ARE DESCRIBED, AND A MICROPHONE EMBODYING THIS CONSTRUCTION IS DISCUSSED. TRANSDUCERS MADE WITH CDS FILMS HAVE PROPERTIES WHICH ARE MORE REPRODUCIBLE THAN ARE OBTAINED FROM TRANSDUCERS USING CDSE FILMS. X-RAY STUDIES SHOW THIS RESULT TO BE LINKED TO CRYSTAL STRUCTURE IN THE SEMICONDUCTOR LAYERS. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD-664 581 20/12
ECOLE NORMALE SUPERIEURE PARIS (FRANCE) LABORATOIRE DE PHYSIQUE

BAND STRUCTURE AND DISPERSION RELATIONS IN II-VI COMPOUNDS. (U)

DESCRIPTIVE NOTE: FINAL REPT. 1 OCT 63-30 SEP 67,
OCT 67 6P BALKANSKI,M. ;
CONTRACT: AF 61(052)-757
MONITOR: ARL 67-0285

UNCLASSIFIED REPORT

DESCRIPTORS: (*SEMICONDUCTORS, TRANSPORT PROPERTIES), BAND THEORY OF SOLIDS, CRYSTAL LATTICES, PHONONS, DISPERSION RELATIONS, CADMIUM SULFIDES, ZINC SULFIDES, MAGNETO-OPTIC EFFECT, FRANCE (U)

A BRIEF SUMMARY IS GIVEN OF STUDIES INVOLVING LATTICE DYNAMICS AND PHONON INTERACTIONS IN WURTZITE AND ZINC BLENDE II-IV SEMICONDUCTOR COMPOUNDS. A LIST OF RESULTANT PUBLICATIONS IS INCLUDED. (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD-664 582 20/12
ECOLE NORMALE SUPERIEURE PARIS (FRANCE) LABORATOIRE DE PHYSIQUE

BAND PARAMETERS DETERMINATION FROM FARADAY ROTATION MEASUREMENTS, (U)

JUL 67 44P BALKANSKI,M. LAMZALLAG,E. I

REPT. NO. SCIENTIFIC-3
CONTRACT: AF 61(052)-75
PROJ: AF-7885
MONITOR: ARL 67-0284

UNCLASSIFIED REPORT

DESCRIPTORS: (*SEMICONDUCTORS, MAGNETO-OPTIC EFFECT), (*MAGNETO-OPTIC EFFECT, *BAND THEORY OF SOLIDS), CARRIERS(SEMICONDUCTORS), CADMIUM SULFIDES, INDIUM ANTIMONIDES, GALLIUM ARSENIDES, CADMIUM SELENIDES, TRANSPORT PROPERTIES, FRANCE (U)

IT IS THE PURPOSE OF THE REVIEW TO SUMMARIZE SOME OF THE RECENT THEORETICAL AND EXPERIMENTAL WORK ON FREE-CARRIERS AND INTERBAND FARADAY ROTATION, AND TO EXAMINE THE DIFFICULTIES ENCOUNTERED AND THE RESULTS OBTAINED SINCE THE FORMULATION OF THE EFFECT IN SEMICONDUCTORS. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /4ZZHT

AD-665 025 20/12
DELAWARE UNIV NEWARK DEPT OF PHYSICS

FIELD ENHANCED IONIZATION OF TRAPS. (U)

DESCRIPTIVE NOTE: TECHNICAL REPT.,
FEB 68 19P BOER,K. W. ;
REPT. NO. TR-22
CONTRACT: NONR-4336(00)

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: SEE ALSO TECHNICAL REPORT 21, AD-661 192.

DESCRIPTORS: (*CADMIUM SULFIDES, ELECTRIC FIELDS), (*CARRIERS(SEMICONDUCTORS), INTERACTIONS), ELECTRON DENSITY, IONIZATION, EXCITATION, BAND THEORY OF SOLIDS, SPACE CHARGES, TRANSPORT PROPERTIES, EXPERIMENTAL DATA, ELECTRICAL CONDUCTANCE (U)
IDENTIFIERS: MINORITY CARRIERS, CARRIER RECOMBINATION (U)

STATIONARY STEPLIKE HIGH-FIELD DOMAINS IN THE RANGE OF NEGATIVE DIFFERENTIAL CONDUCTIVITY PROVIDE THE POSSIBILITY TO DETERMINE EXPERIMENTALLY THE CARRIER DENSITY AS A FUNCTION OF THE ELECTRIC FIELD. MEASUREMENTS DONE WITH CDS SHOW THAT THE ELECTRON DENSITY DECREASES BY ABOUT 2 ORDERS OF MAGNITUDE WITH INCREASING FIELD BETWEEN 30 AND 70 KV/CM. IT CAN BE SHOWN THAT THIS IS CAUSED BY FIELD QUENCHING, I.E., FIELD EXCITATION OF MINORITY CARRIERS FROM HOLE TRAPS AND THEREBY ENHANCED RECOMBINATION. THIS FIELD EXCITATION OF HOLES, HOWEVER, CANNOT BE DESCRIBED QUANTITATIVELY BY ANY CLASSICAL FIELD EXCITATION MECHANISM, I.E., BY IMPACT IONIZATION OR BY TUNNEL EFFECT. THESE MECHANISMS WOULD NEED A CONSIDERABLY HIGHER FIELD THAN OBSERVED FOR CAUSING THE MEASURED EFFECT. AGREEMENT BETWEEN EXPERIMENT AND THEORY CAN BE REACHED BY FIELD ENHANCED IONIZATION OF COULOMB-ATTRACTIVE CENTERS. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD-665 876 7/4 20/2
GENERAL ELECTRIC CO SCHENECTADY N Y RESEARCH AND DEVELOPMENT CENTER

CRYSTAL CHEMISTRY OF NEW HIGH-PRESSURE PHASES. (U)

DESCRIPTIVE NOTE: SCIENTIFIC REPT. (FINAL) 1 JAN 64-31 DEC 67.
JAN 68 67P KASPER,JOHN S. ;
REPT. NO. S-68-1017
CONTRACT: AF 49(638)-1361
PROJ: AF-9710
TASK: 971003
MONITOR: AFOSR 68-0342

UNCLASSIFIED REPORT
AVAILABILITY: PUBLISHED IN VARIOUS JOURNALS.

DESCRIPTORS: (*PHASE STUDIES, *HIGH-PRESSURE RESEARCH), (*CRYSTAL STRUCTURE, HIGH-PRESSURE RESEARCH), INDIUM ANTIMONIDES, CADMIUM SULFIDES, CADMIUM COMPOUNDS, MERCURY COMPOUNDS, GALLIUM COMPOUNDS, INDIUM COMPOUNDS, COPPER COMPOUNDS, IRON COMPOUNDS, SILVER COMPOUNDS, ZINC COMPOUNDS, TIN COMPOUNDS, GOLD COMPOUNDS, ANTIMONY ALLOYS, SELENIDES, SULFIDES, TELLURIDES, IODIDES, GERMANIUM, SILICON, DIAMONDS, POLYETHYLENE PLASTICS, SEMICONDUCTORS, X-RAY DIFFRACTION ANALYSIS, COLOR PHOTOGRAPHY, STABILITY (U)

THE MAIN OBJECTIVE OF THIS 4-YEAR RESEARCH PROGRAM HAS BEEN TO LEARN THE NATURE OF HIGH-PRESSURE PHASES AND THEREBY CONTRIBUTE TOWARD A BETTER UNDERSTANDING OF CRYSTAL CHEMISTRY AND STRUCTURAL PRINCIPLES UNDERLYING THE SOLID STATE. MUCH PROGRESS HAS BEEN MADE IN THE STUDY AND CHARACTERIZATION OF A WIDE VARIETY OF CHEMICAL COMPOUNDS AT HIGH PRESSURE. IMPROVEMENTS IN EXPERIMENTAL TECHNIQUES HAVE CONTRIBUTED GREATLY TOWARD THIS PROGRESS. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD-666 401 20/2 20/12 5/1
CLEVITE CORP CLEVELAND OHIO ELECTRONIC RESEARCH DIV

IMPROVED II-VI CRYSTALS. (U)

DESCRIPTIVE NOTE: QUARTERLY PROGRESS REPT. NO. 2, 8 JUN-7 SEP 65,
DEC 65 42P SHIOZAWA,L. R. JOST,J. M. ;
CONTRACT: AF 33(615)-2708
PROJ: 303240

UNCLASSIFIED REPORT

DESCRIPTORS: (*SEMICONDUCTORS, CRYSTAL GROWTH), (*CADMIUM SULFIDES, PREPARATION), POWDERS, SINTERING, DEGASIFICATION, SUBLIMATION, ELECTRICAL PROPERTIES, PHOTOCONDUCTIVITY, THERMOELECTRICITY, BIREFRINGENCE, CRYSTAL LATTICE DEFECTS, ZINC COMPOUNDS, TELLURIDES, OPTICAL PROPERTIES, ACOUSTIC PROPERTIES (U)
IDENTIFIERS: ZINC TELLURIDE (U)

OUTGASSING STUDIES MADE ON CDS POWDER, THE ORIGINAL SOURCE MATERIAL FOR CRYSTAL GROWTH, INDICATED THAT GASES EVOLVED DURING SINTERING RESULT CHIEFLY FROM PHASE CHANGES AND CHEMICAL REACTIONS OF IMPURITIES. CONTINUED RE-EXAMINATION OF THE STANDARD SINTERING PROCESS FOR PURIFYING CDS SOURCE MATERIAL RESULTED IN SMALL BUT IMPORTANT IMPROVEMENTS, SUCH AS LOWERING THE SUBLIMATION RATE TO REDUCE CONTAMINATION BY 'CARRY-OVER' AND INCREASING THE MAXIMUM TEMPERATURE TO IMPROVE OUTGASSING. A STUDY OF THE PRESENT CRYSTAL GROWTH METHODS SHOWS THAT SEED GROWTH UNDER ARGON AT AN ACCEPTABLE LOW GROWTH RATE SEEMS TO HOLD THE BEST PROMISE FOR HIGHER-QUALITY CRYSTALS. A PRELIMINARY EVALUATION OF CDS CRYSTALS BY THERMALLY-STIMULATED CURRENT MEASUREMENTS REVEALED A RELATIVELY SIMPLE CURVE WITH ONLY TWO SUBSTANTIAL PEAKS. OPTICAL EVALUATION OF CDS CRYSTALS CONTINUED BY EXAMINATION FOR STRAIN AND DISLOCATIONS. THE RELATIONSHIP OF PHOTOSENSITIVITY OF CDS, IMPORTANT FOR SOUND AMPLIFIERS, AND SULFUR-VAPOR TREATMENT HAS BEEN EXPLAINED, SUBJECT TO FURTHER VERIFICATION. MEASUREMENTS OF THE ELECTRO-OPTIC EFFECT IN ZNTE WERE MADE, AND IT IS RECOMMENDED FOR CONSIDERATION FOR OPTICAL MODULATORS. (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD-666 402 20/2 20/12 9/1
CLEVITE CORP CLEVELAND OHIO ELECTRONIC RESEARCH DIV

IMPROVED II-VI CRYSTALS. (U)

DESCRIPTIVE NOTE: QUARTERLY PROGRESS REPT. NO. 3, 8 SEP-7 DEC 65,
MAR 66 38P SHIOZAWA,L. R. JOST,J. M. ;
CONTRACT: AF 33(615)-2708
PROJ: AF-30240

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: SEE ALSO AD-666 401.

DESCRIPTORS: (*SEMICONDUCTORS, *CRYSTAL GROWTH), (*CADMIUM SULFIDES, PREPARATION), POWDERS, SINTERING, DEGASIFICATION, IMPURITIES, SULFATES, SILICON DIOXIDE, EPITAXIAL GROWTH, X-RAY SPECTROSCOPY, CADMIUM SELENIDES, VAPOR PRESSURE, CRYSTAL LATTICE DEFECTS, ELECTRICAL PROPERTIES, ACOUSTIC PROPERTIES, SULFUR (U)

THE RESULTS OF THE OUTGASSING STUDY CDS POWDER SHOWS THAT MOST OF THE GASES EVOLVED DURING VACUUM SINTERING ARE DUE TO THE PRESENCE OF ABOUT 0.1 MOLE % HYDRATED CDSO4. IT WAS FOUND THAT A REDUCED AMOUNT OF SIO2 INCLUSIONS RESULTS IF EPITAXIAL CRYSTAL GROWTH OF CDS IS CARRIED OUT IN AN UNSEALED TUBE UNDER 1 ATM AR. X-RAY FLUORESCENCE MEASUREMENTS SHOW THAT CDSE CRYSTALS GROWN IN THIS LABORATORY CONTAIN ABOUT 2 MOLE % S, WHICH CAN BE REDUCED BY A SE-VAPOR TREATMENT. ANALYSIS OF THE SOLID-VAPOR EQUILIBRIA FOR CDS-CDSE MIXED CRYSTALS SHOWS A VARIATION OF KP WITH COMPOSITION, WITH A PRONOUNCED MINIMUM AT 0.57 MOLE FRACTION CDS. OF EXTREME IMPORTANCE IN DETERMINING THE ELECTRICAL PROPERTIES OF II-VI SEMICONDUCTORS ARE NATIVE POINT DEFECTS. A THEORETICAL ANALYSIS OF THEIR EQUILIBRIA SHOWS A COMPLEX INTERDEPENDENCE OF THE VARIOUS DEFECTS AND A NECESSITY FOR EXPERIMENTALLY DETERMINING THE VARIOUS EQUILIBRIUM CONSTANTS. A VERIFICATION OF THE DEPENDENCE OF ACOUSTIC AMPLIFICATION PROPERTIES ON S PRESSURE WAS MADE, WITH OPTIMUM CURRENT OSCILLATIONS OCCURRING WHEN A MINIMAL S PRESSURE OF ABOUT 0.2 ATM AT 65UC IS USED. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD-666 403 20/2 20/12 9/1
CLEVITE CORP CLEVELAND OHIO ELECTRONIC RESEARCH DIV

IMPROVED II-VI CRYSTALS. (U)

DESCRIPTIVE NOTE: QUARTERLY PROGRESS SUMMARY REPT. NO. 4, 8 MAR 65-7 MAY 66,
AUG 66 36P SHIOZAWA,L. H. IJOST,J. M. I
CONTRACT: AF 33(615)-2708
PROJ: 303240

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: SEE ALSO AD-666 402.

DESCRIPTORS: (*SEMICONDUCTORS, *CRYSTAL GROWTH), (*CADMIUM SULFIDES, PREPARATION), POWDERS, SINTERING, SUBLIMATION, NUCLEATION, EPITAXIAL GROWTH, MICROSTRUCTURE, OPTICAL PROPERTIES, ELECTRICAL PROPERTIES, PHOTOCONDUCTIVITY, THERMOELECTRICITY, CRYSTAL LATTICE DEFECTS, ZINC COMPOUNDS, TELLURIDES (U)
IDENTIFIERS: ZINC TELLURIDE (U)

THE PROGRAM FOR PURIFICATION OF THE ORIGINAL SOURCE MATERIAL FOR CRYSTAL GROWTH CONSISTS OF (1) SINTERING UNDER VACUUM AT 900C FOR 1 HR FOLLOWED BY FURTHER SINTERING UNDER APPROX. 1 ATM AR AT 1200C FOR AN ADDITIONAL HOUR AND (2) ONE OR MORE VACUUM FRACTIONAL SUBLIMATIONS AT 1100C. IN CRYSTAL GROWTH, DEPENDENCE FOR HIGH QUALITY CRYSTALS IS MAINLY ON THE OPEN-TUBE, SPONTANEOUS-NUCLEATION METHOD AT 1200C AND UNDER APPROX. 1 ATM AR. THE ADVANTAGES OF EPITAXIAL CRYSTAL GROWTH UNDER VACUUM HAVE NOT YET BEEN COMPLETELY REALIZED. A COMBINATION OF THE ADVANTAGES OF BOTH METHODS HAS GIVEN ENCOURAGING RESULTS. SOME WORK ON THE USE OF SMALL SEEDS HAS SHOWN THAT CONDITIONS FOR PROMOTING EPITAXIAL GROWTH ARE VERY CRITICAL. MECHANICAL AND CHEMICAL POLISHING TECHNIQUES ARE GIVEN IN DETAIL FOR THE PREPARATION OF CRYSTAL SPECIMENS FOR MICROSCOPIC EXAMINATION. CRYSTALS ARE BEING EVALUATED OPTICALLY USING NONCOHERENT AND COHERENT LIGHT, AND ELECTRICALLY BY PHOTOCONDUCTIVITY, THERMALLY-STIMULATED CURRENTS, AND CURRENT SATURATION AND OSCILLATIONS. A THEORETICAL ANALYSIS OF NATIVE POINT DEFECT EQUILIBRIA WAS MADE. (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD-666 404 20/2 20/12 9/1
CLEVITE CORP CLEVELAND OHIO ELECTRONIC RESEARCH DIV

RESEARCH ON IMPROVED II-VI CRYSTALS. (U)

DESCRIPTIVE NOTE: QUARTERLY PROGRESS REPT. NO. 5, 8 MAY-7 AUG 66,
OCT 66 22P SHIOZAWA,L. R. IJOST,J. M. ;
CONTRACT: AF 33(615)-2708
PROJ: 303241

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: SEE ALSO AD-666 403.

DESCRIPTORS: (*SEMICONDUCTORS, *CRYSTAL GROWTH), (*CADMIUM SULFIDES, PREPARATION), ZINC COMPOUNDS, TELLURIDES, CRYSTAL LATTICE DEFECTS, DISTRIBUTION, CARRIERS(SEMICONDUCTORS), STABILITY (U)
IDENTIFIERS: ZINC TELLURIDE (U)

ANALYSIS OF THE DATA OF VARIOUS PHENOMENA OBSERVED IN ZNTE HAS GIVEN THE BASIS FOR A SOLID ZNTE STABILITY FIELD WITH ZN VACANCY CONCENTRATIONS CONSIDERABLY HIGHER THAN PREVIOUSLY PROPOSED. THE ESSENTIAL MECHANISM OF THE FORMATION OF VOIDS IN ZNTE WAS SHOWN TO BE, IN PART, THE STOICHIOMETRIC COPRECIPITATION OF ZN AND TE VACANCIES, BUT MAINLY, THE STOICHIOMETRIC COPRECIPITATION OF ZN VACANCIES AND TE ATOMS. CONTRARY TO THE PREVIOUS ASSUMPTION OF SHALLOW S VACANCIES IN CDS, WHICH HAD RESULTED IN INCONSISTENCIES IN THE INTERPRETATION OF EXPERIMENTAL DATA, FURTHER EVIDENCE INDICATES THAT S VACANCIES ARE MODERATELY DEEP. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD-666 405 20/2 20/12 9/1
CLEVITE CORP CLEVELAND OHIO ELECTRONIC RESEARCH DIV

RESEARCH ON IMPROVED II-VI CRYSTALS. (U)

DESCRIPTIVE NOTE: QUARTERLY PROGRESS REPT. NO. 6, 8 AUG-7 NOV 66,
FEB 67 27P SHIOZAWA,L. R. ;JOST,J. M. ;
CONTRACT: AF 33(615)-2708

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: SEE ALSO AD-666 404.

DESCRIPTORS: (*SEMICONDUCTORS, *CRYSTAL GROWTH), (*CADMIUM SULFIDES, PREPARATION), CRYSTAL LATTICE DEFECTS, CARRIERS(SEMICONDUCTORS), SULFUR, VAPORS, PHASE STUDIES, THERMAL PROPERTIES, ZINC COMPOUNDS, TELLURIDES (U)
IDENTIFIERS: ZINC TELLURIDES (U)

'SULFUR COMPENSATION' OF EXCESS DONORS IN CDS TO OBTAIN UNIFORM, HIGH-RESISTIVITY CRYSTALS WITHOUT APPRECIABLE OVERCOMPENSATION MAY REQUIRE A COMPOSITE HEAT-TREATING PROCEDURE, SINCE AN ACCEPTABLE SHORT HEAT-TREATING TIME WITH THE REQUIRED HIGH S PRESSURE IS NOT COMPATIBLE WITH UNIFORM CRYSTAL PROPERTIES. THE ELECTRONEUTRALITY EQUATION IS PUT INTO A GENERAL, SOLVABLE FORM BY EVALUATION OF THE VARIOUS EQUILIBRIUM CONSTANTS DEFINING THE FORMATION AND RELATIONSHIP OF ALL OF THE PROBABLE NATIVE AND FOREIGN CENTERS OCCURRING IN II-VI COMPOUNDS. BY USE OF A COMPUTER, THE TEMPERATURE DEPENDENCE OF THE CONCENTRATION FOR THESE VARIOUS CENTERS ARE READILY CALCULATED AND THE STABILITY FIELD OF THE SOLID IS THEN DEFINED. INITIAL APPLICATION OF THIS PROCEDURE IS TO ZNTE. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD-666 406 20/12 20/2
CLEVITE CORP CLEVELAND OHIO ELECTRONIC RESEARCH DIV

RESEARCH ON IMPROVED II-VI CRYSTALS. (U)

DESCRIPTIVE NOTE: QUARTERLY PROGRESS REPT. NO. 7, 8 NOV 66-7 FEB 67,
APR 67 20P SHIOZAWA,L. R. LOST,J.
M. I
CONTRACT: AF 33(615)-2708
PROJ: 303241

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: SEE ALSO PROGRESS REPT. NO. 6, AD-666 405.

DESCRIPTORS: (*SEMICONDUCTORS, CRYSTALLOGRAPHY), (*CADMIUM SULFIDES, CRYSTALLOGRAPHY), (*CADMIUM SELENIDES, CRYSTALLOGRAPHY), TELLURIDES, ZINC COMPOUNDS, CRYSTAL LATTICE DEFECTS, PHASE STUDIES, IMPURITIES, COLORS, DIFFUSION, CRYSTAL GROWTH, CARRIERS(SEMICONDUCTORS), FREE ENERGY (U)
IDENTIFIERS: ZINC TELLURIDE (U)

SOLUTION OF THE ELECTRONEUTRALITY EQUATION FOR ZNTE CONTAINING VARIOUS CONCENTRATIONS OF A FOREIGN DONOR SHOWS CORRESPONDING LARGE CHANGES IN THE CONCENTRATIONS OF THE VACANCIES. THE IDEAL QUENCHING OF II-VI COMPOUNDS TO ROOM TEMPERATURE FROM HIGHER EQUILIBRATION TEMPERATURES HAS BEEN STUDIED USING A NEW COMPUTER PROGRAM. SPECIFIC RESULTS FOR ZNTE HAVE BEEN COMPUTED AND ARE PRESENTED IN GRAPHICAL FORM. THE STANDARD FREE ENERGIES OF REACTION INVOLVING THE VARIOUS SPECIES FOR ZNTE HAVE BEEN CALCULATED FROM THE EQUILIBRIUM CONSTANTS. EQULIBRATION OF ZNTE HAS BEEN STUDIED AND WAS FOUND TO REQUIRE LONGER TIMES THAN WAS ORIGINALLY BELIEVED. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD-666 439 10/2 20/12
CLEVITE CORP CLEVELAND OHIO ELECTRONIC RESEARCH DIV

FABRICATION OF CADMIUM SULFIDE THIN FILM SOLAR CELLS FOR SPACE VEHICLE TESTING. (U)

DESCRIPTIVE NOTE: FINAL REPT. 1 SEP 65-15 AUG 67,
DEC 67 48P NASTELIN,H. E. (HIETANEN, J. R. (SHIRLAND,F. A. (
REPT. NO. 30J280
CONTRACT: AF 33(615)-3253
PROJ: AF-7885
MONITOR: ARL 67-0282

UNCLASSIFIED REPORT

DESCRIPTORS: (*SOLAR CELLS, PERFORMANCE(ENGINEERING)), (*SEMICONDUCTING FILMS, CADMIUM SULFIDES), (*SPACECRAFT COMPONENTS, SOLAR CELLS), FLIGHT TESTING, EFFICIENCY, STABILITY, DOPING, LIGHT TRANSMISSION, BALLOONS, BAND THEORY OF SOLIDS, MANUFACTURING METHODS, COPPER COMPOUNDS, SULFIDES (U)

FIVE SERIES OF FLIGHT PANELS FOR SATELLITE AND BALLOON FLIGHT TESTING WERE PREPARED. PANELS AR-1 THROUGH 6 WERE DELIVERED TO APL IN SEPTEMBER OF 1965. PANELS AR-8 THROUGH 10, OF SIMILAR FABRICATION, WERE DELIVERED IN MARCH OF 1966. PANELS ARA-701-1 THROUGH 4 WERE DELIVERED IN APRIL OF 1967 FOR INCLUSION IN THE OV1-13 SATELLITE EXPERIMENT. THREE BALLOON FLIGHT MODULES, AFAPL-CDS-1, -2, AND -3, WERE DELIVERED TO APL IN MAY OF 1966, AND THREE ADDITIONAL BALLOON FLIGHT MODULES, AFAPL-CDS-005, 006, 007, WERE DELIVERED IN MAY OF 1967, BOTH FOR JPL BALLOON FLIGHT EXPERIMENTS. WORK WAS PERFORMED ON INCREASING THE EFFICIENCY AND STABILITY OF CDS THIN FILM SOLAR CELLS. MOST OF THE WORK WAS CONCERNED WITH IMPROVEMENTS IN THE FORMATION OF THE BARRIER LAYER AND INCLUDED TREATMENTS OF THE CDS FILM PRIOR TO THE FORMATION OF THE BARRIER LAYER, VARIATIONS IN THE BARRIER FORMATION PROCESS, AND TREATMENTS OF THE FILM AND BARRIER AFTER FORMATION OF THE BARRIER. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /4ZZHT

AD-666 452 20/12
NORWEGIAN DEFENCE RESEARCH ESTABLISHMENT KJELLER

ACOUSTOELECTRIC EFFECTS IN SOLIDS. (U)

DESCRIPTIVE NOTE: PROGRESS REPT. NO. 4, 1 APR 66-31 MAR 67,
JUN 67 /P RANNESTAD,ANDREAS ;
CONTRACT: AF 61(052)-958
PROJ: AF-460U
TASK: 460003
MONITOR: AFCRL 67-U636

UNCLASSIFIED REPORT

DESCRIPTORS: (*SEMICONDUCTORS, ELECTRICAL PROPERTIES), PHOTOCONDUCTIVITY, ELECTRIC FIELDS, MOBILITY, BAND THEORY OF SOLIDS, ELECTROOPTICS, CARRIERS(SEMICONDUCTORS), CADMIUM SULFIDES, ZINC COMPOUNDS, GALLIUM ARSENIDES, OXIDES (U)
IDENTIFIERS: ACOUSTIC WAVES, ACOUSTOELECTRIC EFFECT, PULSED OPERATION, THRESHOLD (U)

THE REPORT GIVES A BRIEF SUMMARY OF THE INVESTIGATIONS UNDERTAKEN IN THE PERIOD 1 APRIL 1966 - 31 MARCH 1967, AND IS CONCERNED WITH THE ACOUSTOELECTRIC EFFECTS IN SOLIDS. PARTICULAR EMPHASIS HAS BEEN PLACED ON ACOUSTOELECTRIC SATURATION AND CURRENT OSCILLATIONS IN CDS AND ZNO AND ELECTRICAL FIELD DISTRIBUTION IN CDS. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /4ZZHT

AD-667 022 20/12
AEROSPACE RESEARCH LABS WRIGHT-PATTERSON AFB OHIO

CONVERGENCE STUDY OF A SELF-CONSISTANT ORTHOGONALIZED-PLANE-WAVE BAND CALCULATION FOR HEXAGONAL CDS. (U)

FEB 68 8P EUWEMA,R. N. ;COLLINS,T. C. ;SHANKLAND,D. G. ;DEWITT,J. S. ;

PROJ: AF-7d85
TASK: 788500
MONITOR: ARL 68-0007

UNCLASSIFIED REPORT
AVAILABILITY: PUBLISHED IN THE PHYSICAL REVIEW, V162 N3 P710-15 15 OCT 67.

DESCRIPTORS: (*SEMICONDUCTORS, *BAND THEORY OF SOLIDS), (*CADMIUM SULFIDES, BAND THEORY OF SOLIDS), SOLID STATE PHYSICS, BRILLOUIN ZONES, MATHEMATICAL MODELS, WAVE FUNCTIONS, APPROXIMATION(MATHEMATICS), CONVERGENCE (U)

THE ELECTRONIC BAND STRUCTURE OF HEXAGONAL CDS IS CALCULATED BY MEANS OF A SELF-CONSISTENT ORTHOGONALIZED-PLANE-WAVE MODEL, USING SLATER'S APPROXIMATION FOR THE EXCHANGE TERM. IN ORDER TO DETERMINE THE NUMBER OF PLANE WAVES TO BE USED IN THE FOURIER EXPANSION OF THE VALENCE STATES, A CONVERGENCE STUDY IS DISCUSSED FOR THE STARTING MODEL AND FOR THE FINAL SELF-CONSISTENT MODEL. IT IS CONCLUDED THAT THE STARTING MODEL IS UNSATISFACTORY FROM A CONVERGENCE STANDPOINT, WHILE THE SELF-CONSISTENT MODEL HAS SUFFICIENTLY WELL CONVERGED FOR 245 PLANE WAVES. THE RESULTING BAND STRUCTURE IS PRESENTED FOR THE HIGH SYMMETRY POINTS OF THE BRILLOUIN ZONE. THE SPIN-ORBIT SPLITTING OF THE TOP VALENCE BAND AND THE EFFECTIVE MASS ALONG THE C AXIS OF THE ZONE ARE CALCULATED FROM THIS BAND STRUCTURE. THE RESULTS ARE THEN COMPARED WITH EXPERIMENT. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD-667 094 20/12
TEXAS INSTRUMENTS INC DALLAS

RARE EARTH IMPURITIES IN II-VI COMPOUNDS. (U)

DESCRIPTIVE NOTE: SCIENTIFIC INTERIM REPT.,
DEC 67 12P WATTS,R. KENT THULTON,
WILLIAM C. I
CONTRACT: F44620-67-C-0073
PROJ: AF-9763
TASK: 976302
MONITOR: AFOSR 68-0542

UNCLASSIFIED REPORT
AVAILABILITY: PUBLISHED IN PROCEEDINGS II-VI
SEMICONDUCTING COMPOUNDS INTERNATIONAL CONFERENCE,
N. Y. P1390-9 1967.

DESCRIPTORS: (*SEMICONDUCTORS, *CRYSTAL LATTICE
DEFECTS), (*RARE EARTH ELEMENTS, ELECTRON SPIN
RESONANCE), ZINC SULFIDES, ZINC COMPOUNDS,
CADMIUM COMPOUNDS, SELENIDES, TELLURIDES,
CADMIUM SELENIDES, CADMIUM SULFIDES, IMPURITIES,
ERBIUM, DYSPROSIUM, NEODYMIUM, YTTERBIUM,
THULIUM, IONS, CRYSTAL LATTICES (U)
IDENTIFIERS: CADMIUM TELLURIDE, ZINC SELENIDE,
ZINC TELLURIDE (U)

THE RARE EARTH IMPURITIES ER(3+), DY(3+
), ND(3+), YB(3+), AND TM(2+) WERE
OBSERVED BY ELECTRON SPIN TO OCCUPY SEVERAL DIFFERENT
SITES IN II-VI COMPOUNDS. THE ELECTRON SPIN
RESONANCE (ESR) OF RARE EARTH IMPURITIES IN THE
ZINC AND CADMIUM CHALCOGENIDES WAS STUDIED TO
DETERMINE THE ATOMIC ENVIRONMENT OF THE RARE EARTH
ION. THIS IS ACCOMPLISHED BY COMPARISON OF THE LOW
TEMPERATURE ESR EXPERIMENTAL RESULTS WITH THE G
FACTOR CALCULATED FOR EACH OF THE GAMMA-I LEVELS OF
THE CRYSTAL FIELD-SPLIT GROUND STATE, THUS
DISTINGUISHING WHICH GAMMA-I IS LOWEST; THEN,
ASSUMING A POINT CHARGE MODEL FOR THE CRYSTAL,
DETERMINING THE POSSIBLE SITES FOR WHICH THIS GAMMA-I
IS LOWEST. THE DISADVANTAGES OF THE POINT CHARGE
MODEL ARE WELL KNOWN; NEVERTHELESS, THE RESULTS OF
THE MODEL ARE FOUND TO BE FAIRLY ACCURATE IN THE FEW
CASES WHERE INDEPENDENT CHECKS EXIST. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD-667 233 20/12 20/2 20/6 20/3
NAVAL WEAPONS CENTER CORONA LABS CALIF

SEMICONDUCTING THIN FILMS: AN ANNOTATED BIBLIOGRAPHY, 1967 SUPPLEMENT, (U)

MAR 68 157P TURNBULL,W. R. ;
REPT. NO. NOLC-745
TASK: A3153212/2111/R008-03-02

UNCLASSIFIED REPORT

DESCRIPTORS: (*SEMICONDUCTING FILMS, *BIBLIOGRAPHIES), REVIEWS, SOLID STATE PHYSICS, PHYSICAL PROPERTIES, CRYSTAL GROWTH, ELECTROLUMINESCENCE, BAND THEORY OF SOLIDS, LASERS, GERMANIUM, SILICON, BORON, ARSENIDES, PHOSPHIDES, SELENIDES, TELLURIDES, SULFIDES, INDIUM ANTIMONIDES, CADMIUM SELENIDES, GALLIUM ARSENIDES, CADMIUM SULFIDES, ZINC SULFIDES, SILICON CARBIDES, ALUMINUM COMPOUNDS, CADMIUM COMPOUNDS, GALLIUM COMPOUNDS, GERMANIUM COMPOUNDS, INDIUM COMPOUNDS, MERCURY COMPOUNDS, TIN COMPOUNDS, ZINC COMPOUNDS (U)
IDENTIFIERS: HETEROJUNCTIONS, JUNCTIONS(SEMICONDUCTORS), THIN FILMS, THIN FILMS ELECTRONICS (U)

THE 1967 SUPPLEMENT TO NOLC REPORT 712, SEMICONDUCTING THIN FILMS, AN ANNOTATED BIBLIOGRAPHY (1956-1966) (AD-655 100) CONTINUES THE COMPREHENSIVE BIBLIOGRAPHIC SURVEY ON THE PREPARATION, PROPERTIES, APPLICATIONS, AND THEORY OF SEMICONDUCTING THIN FILMS. IT IS COMPRISED OF 485 REFERENCES, THE MAJORITY OF WHICH WERE PUBLISHED IN 1967, FROM ENGLISH AND FOREIGN LANGUAGE PERIODICAL LITERATURE. THE ABSTRACTS ARE ARRANGED BY AUTHOR UNDER THE FOLLOWING CLASSES: (1) ELEMENTAL, (2) GROUP III-V, (3) GROUP II-VI, (4) GROUP IV-VI, (5) GROUP IV-IV, AND (6) MISCELLANEOUS COMPOUNDS. ALL OF THE MATERIALS ARE INDEXED WITH THE EXCEPTION OF THE MISCELLANEOUS COMPOUNDS (GROUPS I-V, I-VI, AND I-VII). (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD-667 519 10/2
MASSACHUSETTS INST OF TECH LEXINGTON LINCOLN LAB

PRESENT STATUS OF CADMIUM SULFIDE THIN FILM SOLAR CELLS. (U)

DESCRIPTIVE NOTE: TECHNICAL NOTE,
DEC 67 40P STANLEY,A. G. ;
REPT. NO. TN-1967-52
CONTRACT: AF 19(628)-5167
PROJ: AF-649L
MONITOR: ESD TR-67-574

UNCLASSIFIED REPORT

DESCRIPTORS: (*SOLAR CELLS, CADMIUM SULFIDES), FILMS, ELECTRICAL PROPERTIES, DEGRADATION, THERMAL PROPERTIES, INFRARED SPECTROSCOPY, STRESSES, FAILURE(MECHANICS), CHARGED PARTICLES, SPECTRA(VISIBLE + ULTRAVIOLET), CONDUCTIVITY, TENSILE PROPERTIES, MEASUREMENT (U)
IDENTIFIERS: THIN FILMS (U)

CADMIUM SULFIDE THIN FILM SOLAR CELLS, ESPECIALLY SELECTED FOR STABILITY UNDER AMBIENT CONDITIONS, EXPERIENCED SEVERE DEGRADATION IN THEIR I-V CHARACTERISTICS WHEN SUBJECTED TO THERMAL CYCLING IN VACUUM. A NUMBER OF DIAGNOSTIC TECHNIQUES WERE APPLIED TO DETERMINE THE FAILURE MECHANISM. THESE INCLUDED CROSS-SECTIONING, INFRARED MEASUREMENTS, MECHANICAL STRESS TESTS AND THE MEASUREMENT OF SERIES AND SHUNT RESISTANCE. DIFFERENT TYPES OF FAILURE MODES ARE DISCUSSED. THE RESULTS OF RADIATION EXPERIMENTS ARE SUMMARIZED. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /4Z2HT

AD-467 576 20/4 20/12 9/1
CLEVITE CORP CLEVELAND OHIO ELECTRONIC RESEARCH DIV

IMPROVED II-VI CRYSTALS. (U)

DESCRIPTIVE NOTE: QUARTERLY PROGRESS REPT. NO. 1, 8 MAR-8 JUN 65,
AUG 65 29P SHIOZAWA,L. R. JOST,J. M. ;
CONTRACT: AF 33(615)-2708
PROJ: 303240

UNCLASSIFIED REPORT

DESCRIPTORS: (*SEMICONDUCTORS, CRYSTAL GROWTH), (*CADMIUM SULFIDES, PREPARATION), PURIFICATION, SINTERING, DEGASIFICATION, VACUUM APPARATUS, POWDERS, PHOTOCONDUCTIVITY, THERMOELECTRICITY, ACOUSTIC PROPERTIES, EPITAXIAL GROWTH, CRYSTAL LATTICE DEFECTS (U)

EMPHASIS WAS PLACED ON THE CONSTRUCTION OF EQUIPMENT NEEDED FOR IMPROVING AND EVALUATING THE QUALITY OF CDS AND RELATED CRYSTALS. A PROCEDURE FOR CLEANING FUSED-QUARTZ TUBES USED FOR PURIFICATION AND CRYSTAL GROWTH HAS BEEN DEVELOPED, WHICH, ALONG WITH BETTER PURIFICATION METHODS, PROMISES TO RESULT IN IMPROVEMENT IN CRYSTAL QUALITY. A VACUUM APPARATUS HAS BEEN ASSEMBLED FOR STUDYING THE OUTGASSING CHARACTERISTICS OF CDS POWDERS DURING SINTERING. BY PROPER USE OF LIQUID NITROGEN TRAPS, PRESSURES BELOW 0.000005 TORR WERE ACHIEVED WITH A SMALL MECHANICAL PUMP RATED AT 0.0001 TORR ULTIMATE PRESSURE. A NEW FURNACE FOR CONTINUING WORK ON SEED GROWTH HAS BEEN BUILT AND A MODERATELY-SUCCESSFUL RUN HAS BEEN COMPLETED. ALTHOUGH CONSIDERABLE RELIANCE IS STILL PLACED ON MICROSCOPIC OBSERVATIONS AND ELECTRICAL MEASUREMENTS FOR JUDGING CRYSTAL QUALITY, MEASUREMENTS OF PHOTOCONDUCTIVITY, THERMALLY-STIMULATED CURRENTS, AND ACOUSTIC PHENOMENA WILL BE EMPHASIZED NOW THAT THE NECESSARY EQUIPMENT HAS BEEN COMPLETED. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD-668 503 20/12 20/3
NORWEGIAN DEFENCE RESEARCH ESTABLISHMENT KJELLER

ACOUSTOELECTRIC EFFECTS IN SOLIDS. (U)

DESCRIPTIVE NOTE: SCIENTIFIC REPT. (FINAL), 1 APR 66-30 SEP 67,
OCT 67 13P RANNESTAD,ANDREAS ;
REPT. NO. NDRE-E-113
CONTRACT: AF 61(052)-958
PROJ: AF-4600
TASK: 460003
MONITOR: AFCRL 68-0136

UNCLASSIFIED REPORT

DESCRIPTORS: (*SEMICONDUCTORS, ELECTRICAL PROPERTIES), (*PIEZOELECTRIC CRYSTALS, SEMICONDUCTORS), CADMIUM SULFIDES, ZINC COMPOUNDS, OXIDES, MOBILITY, ELECTRIC FIELDS, ELECTRIC CURRENTS, ELECTROOPTICS, OSCILLATION, CARRIERS(SEMICONDUCTORS), CRYSTAL LATTICES, PHOTOELECTRIC MATERIALS, NORWAY (U)
IDENTIFIERS: *ACOUSTOELECTRIC EFFECT, ACOUSTIC WAVES (U)

THE REPORT GIVES A SUMMARY OF THE INVESTIGATIONS UNDERTAKEN DURING THE CONTRACT PERIOD, AND IS CONCERNED WITH THE ELECTROACOUSTIC AND ELECTROOPTIC INTERACTION IN PIEZOELECTRIC SEMICONDUCTORS. PARTICULAR EMPHASIS HAS BEEN PLACED ON CURRENT SATURATION AND ELECTRON DRIFT MOBILITY IN CDS AND ZNO AND THE ELECTRIC FIELD DISTRIBUTION IN CDS. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD-670 014 20/12
ARMY ELECTRONICS COMMAND FORT MONMOUTH N J

STATUS OF DIFFUSION DATA FOR BINARY COMPOUND SEMICONDUCTORS. (U)

DESCRIPTIVE NOTE: TECHNICAL REPT.,
MAR 68 69P YARBROUGH,DAVID W. ;
REPT. NO. ECOM-2942
PROJ: DA-1M622001-A-440
TASK: 1M622001-A-440-03

UNCLASSIFIED REPORT

DESCRIPTORS: (•SEMICONDUCTORS, DIFFUSION), (•CRYSTAL LATTICE DEFECTS, DIFFUSION), DOPING, TRANSPORT PROPERTIES, SILICON CARBIDES, GALLIUM ARSENIDES, INDIUM ANTIMONIDES, ZINC SULFIDES, CADMIUM SELENIDES, CADMIUM SULFIDES, ALUMINUM COMPOUNDS, GALLIUM COMPOUNDS, INDIUM COMPOUNDS, ZINC COMPOUNDS, CADMIUM COMPOUNDS, MERCURY COMPOUNDS, ANTIMONY ALLOYS, PHOSPHIDES, ARSENIC ALLOYS, SELENIDES, TELLURIDES, REVIEWS (U)
IDENTIFIERS: ALUMINUM ANTIMONIDE, GALLIUM PHOSPHIDE, GALLIUM ANTIMONIDE, INDIUM PHOSPHIDE, INDIUM ARSENIDE, ZINC SELENIDE, CADMIUM TELLURIDE, MERCURIC SELENIDE (U)

A SURVEY OF THE LITERATURE WAS COMPLETED IN AN EFFORT TO ESTABLISH THE STATUS OF DIFFUSION DATA IN III-V COMPOUNDS, II-VI COMPOUNDS, AND SIC. THIS REPORT WILL BE USEFUL IN PROVIDING A RELATIVELY COMPLETE REVIEW AND BIBLIOGRAPHY OF PUBLISHED DIFFUSION DATA. AN EFFORT WAS MADE TO INDICATE THOSE SPECIES WHICH EXHIBIT NON-FICKIAN BEHAVIOR. IN MANY CASES, DIFFUSION DATA ARE CORRELATED IN TERMS OF CONCENTRATION DEPENDENT DIFFUSION COEFFICIENTS. FOR THOSE SPECIES INDICATING FICKIAN BEHAVIOR OVER SOME RANGE OF TEMPERATURE OR CONCENTRATION THE IMPORTANT TEMPERATURE VARIATION PARAMETERS ARE GIVEN. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD-670 611 20/12
HARVARD UNIV CAMBRIDGE MASS DIV OF ENGINEERING AND APPLIED PHYSICS

THE EFFECT OF HYDROSTATIC PRESSURE ON THE PROPERTIES OF SEMICONDUCTORS. (U)

DESCRIPTIVE NOTE: FINAL REPT. 1 SEP 58-31 AUG 67.
MAY 68 44P BROOKS,HARVEY ;PAUL,WILLIAM
;
REPT. NO. HP-23
CONTRACT: NONR-1866(10)
PROJ: NR-017-308

UNCLASSIFIED REPORT

DESCRIPTORS: (*SEMICONDUCTORS, HYDROSTATIC PRESSURE), GALLIUM ARSENIDES, GERMANIUM, SILICON, ALKALI METALS, TIN, LEAD COMPOUNDS, GALLIUM COMPOUNDS, SELENIDES, TELLURIDES, SULFIDES, PHOSPHIDES, CRYOGENICS, ABSTRACTS, TUNNELING(ELECTRONICS), LASERS, ELECTRICAL PROPERTIES, OPTICAL PROPERTIES, BAND THEORY OF SOLIDS, SEMICONDUCTING FILMS, TRANSPORT PROPERTIES, CARRIERS(SEMICONDUCTORS) (U)
IDENTIFIERS: GALLIUM ANTIMONIDE, GALLIUM PHOSPHIDE, FORSTERITE, LEAD SULFIDE, LEAD SELENIDE, LEAD TELLURIDE, CADMIUM TELLURIDE, GUNN EFFECT (U)

THE REPORT GIVES A GENERAL DESCRIPTION OF RESEARCH ON THE EFFECT OF HYDROSTATIC PRESSURE ON THE PROPERTIES OF SEMICONDUCTORS CARRIED OUT OVER A TEN-YEAR PERIOD. IT CONTAINS A COMPLETE BIBLIOGRAPHY OF PUBLICATIONS, A LIST OF GRADUATE STUDENTS AWARDED THE PH. D. OF REE, AND BRIEF RESUMES OF THEIR THESES WHICH WERE ISSUED AS EARLIER TECHNICAL REPORTS IN THE SERIES. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /4ZZHT

AD-671 689 9/1
HARRY DIAMOND LABS WASHINGTON D C

ELECTROACOUSTIC DELAY LINES FOR MICROWAVE FREQUENCIES, (U)

MAR 68 40P REGGIA,FRANK ;MAK,TING H.
;
REPT. NO. HDL-TR-1382
PROJ: DA-1T014501831A, HDL-28300

UNCLASSIFIED REPORT

DESCRIPTORS: (*DELAY LINES, MICROWAVE FREQUENCY), (*MECHANICAL WAVES, PROPAGATION), PIEZOELECTRIC EFFECT, ELECTROACOUSTIC TRANSDUCERS, CADMIUM SULFIDES, VAPOR PLATING, VACUUM APPARATUS, SINGLE CRYSTALS, SEMICONDUCTING FILMS, PERFORMANCE(ENGINEERING), MANUFACTURING METHODS, TRANSMISSION LINES (U)
IDENTIFIERS: THIN FILMS, TIME DELAY, ACOUSTIC WAVES (U)

THE PAPER DESCRIBES TECHNIQUES FOR THE GENERATION AND PROPAGATION OF ELASTIC WAVES IN THE FREQUENCY RANGE 1 TO 3 GHZ. THESE TECHNIQUES INCLUDE THE DESIGN, FABRICATION, AND EVALUATION OF MICROWAVE ACOUSTIC DELAY LINES CONSISTING OF HIGHLY ORIENTED ELECTROACOUSTIC CDS TRANSDUCERS VACUUM DEPOSITED ON SINGLE-CRYSTAL SAPPHIRE PROPAGATING MEDIA. TYPICAL ELECTRICAL CHARACTERISTICS AT 2 GHZ OF THESE THIN-FILM (APPROXIMATELY ONE MICRON) TRANSDUCERS AND DELAY MEDIA COMBINATION, IN BOTH COAXIAL AND STRIP TRANSMISSION LINES, INCLUDE DELAY OF 6 MICROSEC, INSERTION LOSS LESS THAN 40 DB, INPUT VSWR LESS THAN 2.0 OVER A 20-PERCENT BANDWIDTH AND OPERATING TEMPERATURE FROM -74 TO + 96C. ACOUSTIC PROPAGATION VELOCITY, POWER HANDLING CAPABILITIES, AND IMPEDANCE MATCHING TECHNIQUES USED WITH THESE ELECTROACOUSTIC DELAY LINES ARE ALSO DISCUSSED. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD-671 980 9/1 11/7
SIGMATRON INC GOLETA CALIF

DEVELOPMENT OF PHOTORESISTIVE ELEMENTS FOR AN ANALOG MULTIPLIER. (U)

DESCRIPTIVE NOTE: FINAL REPT. 1 FEB-31 JUL 67, DEC 67 46P HEINZ,DAVID M. IHEBERT, HENRY J. ;SHARP,WINSTON N. ;
REPT. NO. 2010
CONTRACT: F33615-67-C-1468
PROJ: AF-6114
TASK: 611408
MONITOR: AMRL TR-67-168

UNCLASSIFIED REPORT

DESCRIPTORS: (*PHOTOELECTRIC CELLS(SEMICONDUCTOR), MANUFACTURING METHODS), CADMIUM SULFIDES, VAPOR PLATING, VACUUM APPARATUS, HEAT TREATMENT, RECRYSTALLIZATION, PHOTOELECTRIC EFFECT, ENCAPSULATION, EPOXY PLASTICS, ISOCYANATE PLASTICS, WIRING DIAGRAMS, SUBSTRATES, VOLTAGE, FREQUENCY MULTIPLIERS, PHOTOELECTRIC MATERIALS (U)

CADMIUM SULFIDE LAYER PHOTORESISTIVE CELLS HAVING IMPROVED PROPERTIES AND IMPROVED CELL-TO-CELL UNIFORMITY HAVE BEEN DEVELOPED FOR USE IN AN ANALOG MULTIPLIER. EACH PROGRAM OBJECTIVE -- A TEMPERATURE COEFFICIENT BELOW 0.1 PERCENT PER C DEG., A VOLTAGE EFFECT COEFFICIENT BELOW 0.02 PERCENT PER VOLT, AND A RESPONSE TIME OF LESS THAN 10 MSEC. -- HAS BEEN REALIZED IN AN INDIVIDUAL PHOTOCELL BUT ALL OF THESE CHARACTERISTICS HAVE NOT BEEN EMBODIED IN A SINGLE PHOTOCELL. THE FABRICATION TECHNIQUES EMPLOYED ON THIS PROGRAM, INCLUDING VACUUM DEPOSITION, HEAT TREATMENT, ELECTRODING AND ENCAPSULATION ARE DESCRIBED. MEASUREMENT TECHNIQUES FOR EVALUATING TEMPERATURE EFFECT, VOLTAGE EFFECT, RESPONSE TIME, AND LONG-TERM STABILITY ARE PRESENTED. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD-672 139 9/1
MINNESOTA UNIV MINNEAPOLIS DEPT OF ELECTRICAL ENGINEERING

ON THE LIMITING NOISE OF SPACE-CHARGE-LIMITED SOLID STATE DIODES. (U)

68 9P LIU,S. T. (VAN DER ZIEL,A.
(JATNIEKS,G. U.)
CONTRACT: DA-31-124-ARO(D)-291
PROJ: DA-2001450183IE
MONITOR: AROD 5117:12

UNCLASSIFIED REPORT
AVAILABILITY: PUB. IN PHYSICA, V38 P279-284 1968.

DESCRIPTORS: (*DIODES(SEMICONDUCTOR), NOISE(RADIO)), SPACE CHARGES, SEMICONDUCTING FILMS, CADMIUM SULFIDES, MEASURING DEVICES(ELECTRICAL + ELECTRONIC), ELECTRICAL PROPERTIES, SINGLE CRYSTALS (U)
IDENTIFIERS: PULSED OPERATION, SPACE CHARGE LIMITED DIODES (U)

MEASUREMENTS ON NOISE IN SPACE-CHARGE-LIMITED SOLID STATE DIODES ARE REPORTED. THE RESULTS SHOW THAT THE LIMITING NOISE IS TWICE THE THERMAL NOISE OF THE DIFFERENTIAL CONDUCTANCE OF THE DEVICE IF TRANSIT TIME EFFECTS ARE UNIMPORTANT. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD-672 467 20/12
OHIO STATE UNIV RESEARCH FOUNDATION COLUMBUS

SPLITTING OF EXCITON LINES IN WURTZITE-TYPE II-VI CRYSTALS BY UNIAXIAL STRESS. (U)

MAR 68 7P KODA,T. ;LANGER,D. W. ;

CONTRACT: AF 33(615)-1915
PROJ: AF-7885
TASK: 788500
MONITOR: ARL 68-0059

UNCLASSIFIED REPORT
AVAILABILITY: PUB. IN PHYSICAL REVIEW LETTERS, V20 N2 P50-53, 8 JAN 68.

DESCRIPTORS: (*SEMICONDUCTORS, BAND THEORY OF SOLIDS), (*EXCITONS, SEMICONDUCTORS), CADMIUM SULFIDES, CADMIUM SELENIDES, ZINC COMPOUNDS, OXIDES, SINGLE CRYSTALS, CRYOGENICS, CARRIERS(SEMICONDUCTORS), REFLECTION, LINE SPECTRUM, STRESSES, POLARIZATION (U)
IDENTIFIERS: ZINC OXIDE (U)

USUALLY THE EFFECTS OF UNIAXIAL STRESS ON EXCITON LINES OF SEMICONDUCTORS ARE CONSIDERED TO BE MAINLY DETERMINED BY THE CHANGE OF THE ONE-ELECTRON ENERGY BAND STRUCTURE BY THE EXTERNAL STRESS. ENERGY SHIFTS AND SPLITTINGS OF EXCITON LINES ARE RELATED TO THE CHANGE OF ENERGY GAPS, EFFECTIVE MASSES, AND DEGENERACIES OF THE ENERGY BANDS INVOLVED IN THE EXCITON STATE, LEADING TO AN INTERPRETATION IN TERMS OF THE DEFORMATION POTENTIAL THEORY BASED ON THE ONE-ELECTRON ENERGY BAND SCHEME. IN THIS LETTER, HOWEVER, WE REPORT STRAIN-INDUCED SPLITTING OF EXCITON LINES OBSERVED IN THE WURTZITE-TYPE II-VI CRYSTALS, ZNO, CDS, AND CDSE, WHICH CANNOT BE ACCOUNTED FOR BY SUCH A SIMPLE DEFORMATION-POTENTIAL THEORY. THE BASIC FEATURES OF THE EXPERIMENTAL RESULTS ARE PRESENTED HERE ALONG WITH BRIEF DISCUSSIONS ON THE POSSIBLE INTERPRETATION OF THE PHENOMENA. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD-673 189 9/1 9/3 5/2
FOREIGN TECHNOLOGY DIV WRIGHT-PATTERSON AFB OHIO

SEMICONDUCTOR TECHNOLOGY AND MICROELECTRONICS (COLLECTION OF ARTICLES). (U)

AUG 67 197P
REPT. NO. FTD-MT-24-135-67

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: EDITED MACHINE TRANS. OF MONO. POLUPROVODNIKOVAYA TEKHNIKA I MIKROELEKTRONIKA, KIEV, 1966 P5-192.

DESCRIPTORS: (*SEMICONDUCTOR DEVICES, USSR), (*MICROMINIATURIZATION(ELECTRONICS), REPORTS), SEMICONDUCTING FILMS, DIODES(SEMICONDUCTOR), TRANSISTORS, RESISTORS, THERMISTORS, ELECTROLUMINESCENCE, CIRCUITS, PHOTODIODES, SPUTTERING, CADMIUM SULFIDES, ELECTRODEPOSITION, CADMIUM SELENIDES, ELECTRICAL CONDUCTANCE, CHEMICAL PRECIPITATION, IMPURITIES, REVIEWS (U)
IDENTIFIERS: TRANSLATIONS (U)

THE ARTICLE DISCUSSES THE TREND TOWARDS MICROELECTRONICS, PARTICULARLY OPTOELECTRONIC DEVICES, SUCH AS PHOTOELECTRICAL FUNCTION CONVERTERS WHEREBY A LIGHT RAY IS USED AS A CONTROL SIGNAL, COUPLING ELEMENT, OR CONVERTING LINK. MOST PROMISING TYPE APPEARS TO BE OF THE ELECTROLUMINESCENT CATEGORY, WITH ADVANTAGES IN LONG LIFE AND MICROMINIATURE DIMENSIONS. THE FUNDAMENTAL ARRANGEMENT OF AN ELECTROLUMINESCENT CELL IS OUTLINED. POWDER PHOSPHORS ARE COMPARED FOR SUITABILITY. IT CONCLUDES WITH A DETAILED DISCUSSION OF ELEMENTARY OPTRONS, THEIR CHARACTERISTICS AND AREAS OF APPLICATION. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD-673 810 20/12
FOREIGN TECHNOLOGY DIV WRIGHT-PATTERSON AFB OHIO

THERMALLY AND OPTICALLY STIMULATED PHENOMENA IN CADMIUM-SULFIDE SINGLE CRYSTALS (TEKHMICHESKI I OPTICHESKI STIMULIROVANNYE YAVLENIYA V MONOKRISTALLAKH SULFIDA KADMIYA). (U)

AUG 67 14P AIDLA,A. ;KIRS,YA ;
REPT. NO. FTD-HT-67-199

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: EDITED TRANS. OF AKADEMIYA NAUK ESTONSKOI SSR, TALLINN, IZVESTIYA. SERIYA FIZIKO-MATEMATICHESKIKH I TEKHNICHESKIKH NAUK N3 P354-359 1966.

DESCRIPTORS: (*CADMIUM SULFIDES, EXCITATION), THERMOELECTRICITY, PHOTOCONDUCTIVITY, LUMINESCENCE, PUMPING(OPTICAL), QUENCHING(INHIBITION), SEMICONDUCTORS, PHOSPHORESCENT MATERIALS, USSR (U)
IDENTIFIERS: TRANSLATIONS (U)

RESULTS ARE REPORTED OF AN INVESTIGATION OF THE THERMO-LUMINESCENCE, THE THERMALLY STIMULATED CURRENT, THE OPTICAL FLASH AND OPTICAL QUENCHING OF THE PHOTOCONDUCTIVITY AND LUMINESCENCE OF A NUMBER OF CDS SINGLE CRYSTALS. (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD-674 697 20/12
ILLINOIS UNIV URBANA DEPT OF PHYSICS

NONLINEAR PHONON INTERACTION IN PIEZOELECTRIC SEMICONDUCTORS AND EFFECT ON CURRENT SATURATION. (U)

JAN 68 12P YAMADA,KAZUO I

CONTRACT: AF-AFOSR-328-67
PROJ: AF-9761
TASK: 976101
MONITOR: AFOSR 68-1743

UNCLASSIFIED REPORT
AVAILABILITY: PUB. IN PHYSICAL REVIEW, V169 N3 P690-699, 15 MAY 68.
SUPPLEMENTARY NOTE: REVISION OF REPORT DATED 7 AUG 67.

DESCRIPTORS: (*SEMICONDUCTORS, *PIEZOELECTRIC CRYSTALS), (*PHONONS, INTERACTIONS), ELECTRIC CURRENTS, ELECTRONS, TRANSPORT PROPERTIES, CADMIUM SULFIDES, SOUND SIGNALS, PLASMA MEDIUM (U)
IDENTIFIERS: *PIEZOELECTRIC SEMICONDUCTORS, ELECTRON PHONON INTERACTIONS, ACOUSTOELECTRIC CURRENTS (U)

THE NONLINEAR TRANSPORT PROBLEM FOR THE UNSTABLE PHONON IN PIEZOELECTRIC SEMICONDUCTORS IS DESCRIBED IN A PICTURE OF ELECTRON-PHONON INTERACTION; THE HYDRODYNAMICAL APPROACH IS FOLLOWED FOR THE PURPOSE OF DISCUSSING THE COLLISION-FREQUENT REGIME OF ELECTRONS (Q1<1). WITH THE AID OF AN ITERATION METHOD FOR THE NONLINEAR TERMS WHICH DESCRIBE THE COUPLING BETWEEN THE ELECTRONS AND THE PHONONS, THE KINETIC EQUATION FOR PHONON DISTRIBUTION FUNCTION N SUB Q IS DERIVED; THE EQUATION INCLUDES A NONLINEAR COLLISION TERM DUE TO THE THREE-PHONON PROCESSES COMING FROM THE THIRD ORDER IN ELECTRON-PHONON INTERACTION. THE STEADY-STATE SOLUTION OF THIS EQUATION IS DISCUSSED. IT IS FOUND THAT FOR PHONONS OF EXTREMELY LOW WAVE VECTOR THE THREE-PHONON PROCESS CAN NOT EFFECTIVELY LIMIT THEIR GROWTH; BUT IN A RESTRICTED WAVE-VECTOR REGION, THE STEADY-STATE SOLUTION DUE TO THIS PROCESS IS OBTAINED UNDER A CERTAIN ASSUMPTION. THE ACOUSTOELECTRIC CURRENT IS ESTIMATED WITH USE OF THE PHONON DISTRIBUTION FUNCTION DETERMINED IN THIS REGION. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD-675 664 20/12
DELAWARE UNIV NEWARK DEPT OF PHYSICS

STATIONARY ANODE-ADJACENT HIGH-FIELD DOMAINS IN CADMIUM SULFIDE. (U)

DESCRIPTIVE NOTE: TECHNICAL REPT.,
JUL 68 12P BOER,K. W. ;VOSS,P. J
REPT. NO. TR-25
CONTRACT: NONR-4336(00)

UNCLASSIFIED REPORT
AVAILABILITY: PUB. IN PHYS. STAT. SOL., V28 P355-364 1968.

DESCRIPTORS: (*CADMIUM SULFIDES, SPACE CHARGES), ELECTRON DENSITY, ELECTRIC FIELDS, TRANSPORT PROPERTIES, ELECTRICAL CONDUCTANCE, ELECTRODES, QUENCHING(INHIBITION), VOLTAGE, SEMICONDUCTORS, DOPING, SILVER, ALUMINUM, BAND THEORY OF SOLIDS (U)
IDENTIFIERS: HIGH FIELD DOMAINS, SCHOTTKY BARRIERS (U)

IT IS SHOWN THAT IN N-TYPE MATERIAL WITH NEGATIVE DIFFERENTIAL CONDUCTIVITY DUE TO FIELD QUENCHING, STATIONARY CATHODE- OR ANODE-ADJACENT HIGH-FIELD DOMAINS OCCUR DEPENDENT ON ELECTRON DENSITY AT THE CATHODE AND APPLIED VOLTAGE. CATHODE-ADJACENT HIGH-FIELD DOMAINS CAN BE OBSERVED ONLY WITH A BLOCKING CATHODE. ANODE-ADJACENT HIGH-FIELD DOMAINS OCCUR WITH A SLIGHTLY BLOCKING CATHODE AT APPLIED VOLTAGES ABOVE THE RANGE AT WHICH CATHODE-ADJACENT DOMAINS ARE OBSERVED OR AS THE ONLY DOMAIN TYPE POSSIBLE WITH AN INJECTING CATHODE. WITH DIFFERENT CATHODE METALS EVAPORATED ONTO THE SAME CDS:AG, AL CRYSTAL THE ELECTRON DENSITY IN THE CONDUCTION BAND N1(E) FOR SPACE CHARGE FREE CONDITIONS HAS BEEN DETERMINED AS A FUNCTION OF THE ACTUAL FIELD BETWEEN 0 AND 240 KV/CM.
(AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD-675 972 20/12
ILLINOIS UNIV URBANA DEPT OF PHYSICS

CYCLOTRON RESONANCE OF PIEZOELECTRIC POLARONS IN THE QUANTUM LIMIT. (U)

NOV 67 10P MIYAKE,SATORU J. I
CONTRACT: DA-31-124-ARO(D)-114
PROJ: DA-20014501-B-11-B
MONITOR: AROD 431:88

UNCLASSIFIED REPORT
AVAILABILITY: PUB. IN PHYSICAL REVIEW, V170 N3 P726-732, 15 JUN 68.
SUPPLEMENTARY NOTE: REVISION OF REPORT DATED 26 JUN 67.

DESCRIPTORS: (*CARRIERS(SEMICONDUCTORS), *CYCLOTRON RESONANCE PHENOMENA), (*PIEZOELECTRIC CRYSTALS, SEMICONDUCTORS), CADMIUM SULFIDES, PHONONS, ELECTRONS, GREEN'S FUNCTION, HAMILTONIAN (U)
IDENTIFIERS: PIEZOELECTRIC SEMICONDUCTORS, LANDAU LEVELS, ELECTRON PHONON INTERACTIONS, POLARONS, QUASIPARTICLES (U)

THE SHIFT OF THE CYCLOTRON RESONANCE FREQUENCY OF ELECTRONS IN PIEZOELECTRIC SEMICONDUCTORS AT FINITE TEMPERATURE IS CALCULATED FOR THE CASE OF SUCH A STRONG MAGNETIC FIELD THAT THE ENERGY SEPARATION OF THE LANDAU LEVELS IS LARGER THAN THERMAL ENERGY. THE THERMAL GREEN-FUNCTION METHOD IS USED TO CALCULATE THE ENERGY SHIFTS OF THE TWO LOWEST LANDAU LEVELS BETWEEN WHICH THE TRANSITION OCCURS; THE DYSON EQUATION FOR THE ELECTRON SELF-ENERGY PART IS SOLVED IN AN APPROXIMATE WAY, TAKING INTO ACCOUNT THE BROADENING AND THE SHIFT OF ELECTRONIC STATES SELF-CONSISTENTLY. THE SHIFT OBTAINED AGREES IN SIGN, AND ROUGHLY IN MAGNITUDE, WITH THAT GIVEN BY A SEMICLASSICAL THEORY, AND WITH THAT OBSERVED IN CDS BY BAER AND DEXTER.
(AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD-676 043 7/2 20/12
BELL AND HOWELL RESEARCH LABS PASADENA CALIF

ANALYTICAL TECHNIQUES FOR THE DETERMINATION OF TRACE IMPURITIES IN CADMIUM SULFIDE. (U)

DESCRIPTIVE NOTE: FINAL REPT. 1 JUN 65-31 MAY 68, JUL 68 104P SOCHA,A. J. (WILLARDSON,H. K. ;
CONTRACT: AF 33(615)-2761
PROJ: AF-7685
MONITOR: ARL 68-0132

UNCLASSIFIED REPORT

DESCRIPTORS: (*SEMICONDUCTORS, CHEMICAL ANALYSIS), (*CADMIUM SULFIDES, CHEMICAL ANALYSIS), CADMIUM SELENIDES, ZINC SULFIDES, ZINC COMPOUNDS, CADMIUM COMPOUNDS, OXIDES, SELENIDES, IMPURITIES, MASS SPECTROSCOPY, SPECTRUM ANALYZERS (U)

MASS SPECTROGRAPHIC TECHNIQUES WERE DEVELOPED FOR THE ANALYSIS OF ALL II-VI COMPOUNDS. THE DETECTION LIMITS FOR MOST IMPURITIES ARE LESS THAN 10 PARTS PER BILLION ATOMIC. COVERED IN DETAIL ARE NEW TECHNIQUES WHICH SIGNIFICANTLY REDUCED THE TIME REQUIRED TO PERFORM ANALYSES AS COMPARED TO WORK PERFORMED UNDER A PRIOR CONTRACT. A TOTAL OF 286 SAMPLES WERE ANALYZED. PRIMARY INTEREST WAS IN THE ANALYSIS OF ALL FORMS OF CDS, CDSE, ZNS, ZNSE, AND OTHER II-VI COMPOUNDS. EXTENSIVE WORK WAS PERFORMED IN THE AREA OF SELECTIVE IONIZATION OF ATOMS BY THE SPARK SOURCE MASS SPECTROMETER. STUDIES WERE ALSO MADE COVERING THE EFFECTS OF RESIDUAL GASES IN THE SOURCE OF THE MASS SPECTROMETER ON ANALYSES FOR O, C, N, AND H. AUTOMATIC EXPOSURE EQUIPMENT, MULTIPLE SAMPLE HOLDERS, AND SPECIAL SAMPLE HOLDERS AND THEIR VALUE WITH RELATION TO THIS WORK IS DISCUSSED. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD-676 448 11/6 /14
FRANKFORD ARSENAL PHILADELPHIA PA PITMAN-DUNN RESEARCH LABS

THE ANODIC SYNTHESIS OF CDS FILMS, (U)

MAR 68 /P MCNEILL,WILLIAM IGRUSS, LEONARD L. HUSTED,DORSEY G. ;
PROJ: DA-1-T-061102-B-3-A
MONITOR: FA A65-18

UNCLASSIFIED REPORT
AVAILABILITY: PUB. IN JNL. OF THE ELECTROCHEMICAL SOCIETY, V112 N7 P713-715 JUL 65.
SUPPLEMENTARY NOTE: REVISION OF REPORT DATED 17 DEC 64.

DESCRIPTORS: (*SEMICONDUCTING FILMS, CADMIUM SULFIDES), (*CADMIUM SULFIDES, SYNTHESIS), CADMIUM COMPOUNDS, BARRIER COATINGS, FILMS, DIELECTRIC PROPERTIES, X-RAY DIFFRACTION ANALYSIS, ANODES(ELECTROLYTIC CELL), ANODIC COATINGS, THICKNESS, INTERFEROMETERS, SODIUM COMPOUNDS, SULFIDES, CADMIUM ALLOYS, ETHANOLS (U)
IDENTIFIERS: SODIUM SULFIDES (U)

CD IS SHOWN TO BEHAVE AS A TYPICAL 'VALVE ANODE' IN SOLUTIONS OF NA2S.9H2O IN ETHANOL AND BECOMES COVERED WITH A FILM WHICH ACTS AS AN ELECTRICAL BARRIER, EXHIBITS INTERFERENCE COLORS, INCREASES IN THICKNESS AS VOLTAGE IS INCREASED, AND GIVES RISE TO SPARKING AT VOLTAGES IN EXCESS OF 150 V. VOLTAGE-TIME CURVES, FILM THICKNESS AND ELECTRICAL RESISTANCE, AND X-RAY DIFFRACTION ANALYSES SHOWING THE FILMS TO BE CDS ARE PRESENTED. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /4ZZHT

AD-676 049 20/12
PARIS UNIV (FRANCE) LABORATOIRE DE PHYSIQUE DES SOLIDES

OPTICAL STUDIES OF LATTICE VIBRATION IN II-VI SEMICONDUCTING COMPOUNDS. (U)

APR 68 58P BALKANSKI, M.

REPT. NO. SCIENTIFIC-1
CONTRACT: EOOAR-68-0016
PROJ: AF-7885
MONITOR: ARL 68-0184

UNCLASSIFIED REPORT

DESCRIPTORS: (*SEMICONDUCTORS, CRYSTAL LATTICES), (*INFRARED SPECTROSCOPY, SEMICONDUCTORS), ABSORPTION SPECTRUM, DIELECTRIC PROPERTIES, CRYSTAL LATTICE DEFECTS, BAND THEORY OF SOLIDS, BRILLOUIN ZONES, GREEN'S FUNCTION, ZINC COMPOUNDS, CADMIUM COMPOUNDS, ZINC SULFIDES, CADMIUM SULFIDES, CADMIUM SELENIDES, OXIDES, SULFIDES, SELENIDES, TELLURIDES, IMPURITIES, PHONONS, FRANCE (U)
IDENTIFIERS: *LATTICE VIBRATIONS, RAMAN SPECTRA, ZINC OXIDE, CADMIUM TELLURIDE, ZINC SELENIDE, ZINC TELLURIDE (U)

PARALLEL TO THE EXPERIMENTAL INVESTIGATIONS, THEORETICAL STUDIES HAVE BEEN DEVELOPED AND THE DISPERSION RELATIONS CALCULATED FOR SOME OF THE II-VI SEMICONDUCTORS COMPOUNDS. THE PRESENCE OF FOREIGN ATOMS LEADS TO LOCALIZED OR RESONANTS MODES OF VIBRATION; WHICH HAVE BEEN EXPERIMENTALLY STUDIED IN MANY II-VI SEMICONDUCTORS COMPOUNDS.
(AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD-677 026 20/12
LOCKHEED MISSILES AND SPACE CO PALO ALTO CALIF LOCKHEED PALO ALTO RESEARCH LAB

SELF-CONSISTENT OPW AND EMPIRICALLY-REFINED OPW BAND MODELS FOR CUBIC ZNS, ZNSE, CDS, AND CDSE. (U)

DESCRIPTIVE NOTE: TECHNICAL REPT.,
68 54P STUKEL,D. J. ;EUWEMA,R. N. ;COLLINS,T. C. ;HERMAN,F. ;KORTUM,R. L. ;
REPT. NO. LMSD-9-87-68-3
CONTRACT: AF 19(628)-5750, AF 33(615)-5072

UNCLASSIFIED REPORT

DESCRIPTORS: (*SEMICONDUCTORS, BAND THEORY OF SOLIDS), ZINC SULFIDES, CADMIUM SULFIDES, CADMIUM SELENIDES, ZINC COMPOUNDS, SELENIDES, CRYSTAL STRUCTURE, PERTURBATION THEORY, SPECTROSCOPY, THESES (U)
IDENTIFIERS: ZINC SELENIDE (U)

FIRST-PRINCIPLES OPW ENERGY BAND CALCULATIONS HAVE BEEN CARRIED OUT FOR CUBIC ZNS, ZNSE, CDS, AND CDSE USING A NON-RELATIVISTIC FORMALISM AND SLATER'S FREE-ELECTRON EXCHANGE APPROXIMATION. THE CALCULATIONS WERE FIRST CARRIED OUT IN TERMS OF A PHYSICALLY REALISTIC TRIAL CRYSTAL POTENTIAL, AND THEN ITERATED TO OBTAIN A SELF-CONSISTENT SOLUTION. IN SPITE OF THE SIMPLIFIED TREATMENT OF EXCHANGE EFFECTS, AND THE NEGLECT OF RELATIVISTIC AND CORRELATION EFFECTS, THE FIRST-PRINCIPLES SOLUTIONS ARE IN QUALITATIVE AND SEMI-QUANTITATIVE AGREEMENT WITH EXPERIMENT IN ALL CASES. IT IS SHOWN BRIEFLY HOW IMPROVED SOLUTIONS CAN BE OBTAINED BY INTRODUCING SMALL, CAREFULLY CHOSEN EMPIRICAL CORRECTIONS. THE ADEQUACY OF VARIOUS ENERGY BAND MODELS WAS TESTED BY CALCULATING THE OPTICAL SPECTRUM (ACTUALLY EPSILON SUB 2) AND COMPARING THIS WITH THE EXPERIMENTAL SPECTRUM. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD-678 247 20/12
NORWEGIAN DEFENCE RESEARCH ESTABLISHMENT KJELLER

FIELD DISTRIBUTION AND CURRENT SATURATION IN PHOTOCONDUCTIVE CDS, (U)

AUG 67 6P FOSSUM,H. J. IRGNNESTAD,A.

CONTRACT: AF 61(052)-958
PROJ: AF-4600
TASK: 460003
MONITOR: AFCRL 68-0534

UNCLASSIFIED REPORT
AVAILABILITY: PUB. IN JNL. OF APPLIED PHYSICS, V38 N13 P5177-5182 DEC 67.
SUPPLEMENTARY NOTE: REVISION OF REPORT DATED 10 JUL 67.

DESCRIPTORS: (*CADMIUM SULFIDES, ELECTRIC FIELDS), (*PHOTOELECTRIC MATERIALS, CADMIUM SULFIDES), (*ELECTROOPTICS, CADMIUM SULFIDES), SEMICONDUCTORS, SINGLE CRYSTALS, COHERENT RADIATION, PIEZOELECTRIC CRYSTALS, ELECTRIC CURRENTS, NORWAY (U)
IDENTIFIERS: PIEZOELECTRIC SEMICONDUCTORS, ACOUSTOELECTRIC EFFECT, CURRENT SATURATION (U)

THE INTERNAL ELECTRIC FIELD DISTRIBUTION HAS BEEN MEASURED IN PHOTOCONDUCTING CDS SINGLE CRYSTALS USING THE LINEAR ELECTRO-OPTIC EFFECT. THE EXPERIMENTAL RESULTS SHOW A NEARLY HOMOGENEOUS FIELD DISTRIBUTION IN THE CRYSTALS FOR APPLIED FIELDS BELOW THE THRESHOLD FOR ACOUSTO-ELECTRIC OSCILLATIONS, WHILE A HIGH FIELD REGION WAS CREATED NEAR THE ANODE FOR FIELDS ABOVE THE THRESHOLD FIELD. THE REPRODUCIBILITY FROM SAMPLE TO SAMPLE WAS RATHER POOR. THE LINEAR ELECTRO-OPTIC CONSTANT WAS CALCULATED FROM THE EXPERIMENTAL RESULTS: (R' SUB (113) - R' SUB (333)) = 2.7 X 10 TO THE -12TH POWER M/V AT THE OPTICAL WAVELENGTH 6328 A. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD-678 540 20/12 10/2 20/3
CLEVITE CORP CLEVELAND OHIO ELECTRONIC RESEARCH DIV

RESEARCH ON THE MECHANISM OF THE PHOTOVOLTAIC EFFECT IN HIGH-EFFICIENCY CDS THIN-FILM SOLAR CELLS. (U)

DESCRIPTIVE NOTE: QUARTERLY PROGRESS REPT. NO. 1, 1 JUN-31 AUG 66,
SEP 66 25P SHIOZAWA,L. R. ;SULLIVAN, GEORGE A. ;AUGUSTINE,F. ;JOST,J. M. ;
CONTRACT: AF 33(615)-5224
PROJ: AF-3033
TASK: 303330

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: SEE ALSO QUARTERLY PROGRESS REPORT NO. 2, AD-678 542.

DESCRIPTORS: (*CADMIUM SULFIDES, *SEMICONDUCTING FILMS), (*SOLAR CELLS, CADMIUM SULFIDES), DIFFUSION, COPPER, COPPER COMPOUNDS, VACUUM APPARATUS, FILMS, LABORATORY EQUIPMENT, VOLTAGE (U)
IDENTIFIERS: COPPER SULFIDE, PHOTOVOLTAIC EFFECT (U)

EMPHASIS IN THIS REPORT WAS PLACED ON THE PLANNING AND INITIATION OF SEVERAL EXPERIMENTS DESIGNED TO LEAD TO AN UNDERSTANDING OF THE PHOTOVOLTAIC MECHANISM OPERATIVE IN CDS SOLAR CELLS WHICH HAVE BEEN DEVELOPED IN THIS LABORATORY. EXPERIMENTS INCLUDE MEASUREMENTS OF THE DIFFUSION AND SOLUBILITY OF COPPER IN CDS CRYSTALS, AND A MEASUREMENT OF THE THICKNESS OF THE CU2S LAYER IN TYPICAL SOLAR CELLS. ALSO MENTIONED IS WORK ON THE CONSTRUCTION OF A VACUUM EVAPORATION SYSTEM AND THE DEVELOPMENT OF OHMIC CONTACTS TO CDS CRYSTALS, BOTH OF WHICH ARE ESSENTIAL TO THIS RESEARCH PROGRAM. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD-678 541 20/12 10/2 20/3
CLEVITE CORP CLEVELAND OHIO ELECTRONIC RESEARCH DIV

RESEARCH ON THE MECHANISM OF THE PHOTOVOLTAIC EFFECT IN HIGH-EFFICIENCY CDS THIN-FILM SOLAR CELLS. (U)

DESCRIPTIVE NOTE: QUARTERLY PROGRESS REPT. NO. 3, 1 DEC 66-28 FEB 67,
MAR 67 30P SHIOZAWA,L. R. ;SULLIVAN, GEORGE A. ;AUGUSTINE,FRANK ;
CONTRACT: AF 33(615)-5224
PROJ: AF-3033
TASK: 303330

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: SEE ALSO AD-678 542.

DESCRIPTORS: (*SOLAR CELLS, CADMIUM SULFIDES), (*CADMIUM SULFIDES, SEMICONDUCTING FILMS), VACUUM APPARATUS, REFRACTIVE INDEX, ABSORPTION SPECTRUM, COPPER COMPOUNDS, SULFIDES, DIFFUSION, VAPOR PLATING (U)
IDENTIFIERS: COPPER SULFIDES, *PHOTOVOLTAIC EFFECT (U)

THE EMPHASIS DURING THE THIRD QUARTER WAS PLACED ON A CONTINUATION OF EXPERIMENTS NECESSARY TO THE UNDERSTANDING OF THE THIN FILM CDS SOLAR CELL. INCLUDED WERE DIFFUSION AND SOLUBILITY MEASUREMENTS OF COPPER IN CDS, PERFECTION OF A NEW VACUUM EVAPORATION SYSTEM, AND MEASUREMENTS OF THE INDEX OF REFRACTION AND ABSORPTION COEFFICIENTS OF EVAPORATED THIN CU2S FILMS AS A FUNCTION OF WAVELENGTH. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD-678 542 20/12 10/2 20/3
CLEVITE CORP CLEVELAND OHIO ELECTRONIC RESEARCH DIV

RESEARCH ON THE MECHANISM OF THE PHOTOVOLTAIC EFFECT IN HIGH-EFFICIENCY CDS THIN-FILM SOLAR CELLS. (U)

DESCRIPTIVE NOTE: QUARTERLY PROGRESS REPT. NO. 2, 1 SEP-30 NOV 66,
DEC 66 37P SHIOZAWA,L. K. ISULLIVAN, GEORGE A. IAUGUSTINE,F. IJOST,J. M. I
CONTRACT: AF 33(615)-5224
PROJ: AF-3033
TASK: 303330

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: SEE ALSO QUARTERLY PROGRESS REPORT NO. 1, AD-678 540.

DESCRIPTORS: (*CADMIUM SULFIDES, *SEMICONDUCTING FILMS), (*SOLAR CELLS, CADMIUM SULFIDES), CARRIERS(SEMICONDUCTORS), DIFFUSION, COPPER, COPPER COMPOUNDS, SULFIDES, VACUUM APPARATUS, FILMS, VOLTAGE, EFFICIENCY (U)
IDENTIFIERS: QUANTUM EFFICIENCY, COPPER SULFIDE, PHOTOVOLTAIC EFFECT (U)

THIS REPORT GIVES A TENTATIVE EXPLANATION OF THE MECHANISM RESPONSIBLE FOR THE PHOTOVOLTAIC EFFECT IN THE THIN-FILM CDS CELLS, AND A DISCUSSION OF CRITICAL EXPERIMENTS WHICH MIGHT BE PERFORMED TO TEST THIS MODEL. ALSO REPORTED IS THE CONTINUATION OF THE WORK ON THE DIFFUSION OF COPPER INTO CDS SINGLE CRYSTALS, AND THIS HAS BEEN EXTENDED TO INCLUDE DIFFUSION OF CU IN THE CDS SOLAR CELLS. A NEW VACUUM EVAPORATION SYSTEM FOR THE PROJECT HAS BEEN INSTALLED AND IS NOW OPERATIONAL. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD-679 130 9/1 20/1 20/12
MOTOROLA INC PHOENIX ARIZ SEMICONDUCTOR PRODUCTS DIV

ACTIVE ACOUSTIC DEVICES. (U)

DESCRIPTIVE NOTE: FINAL REPT. JUN 64-APR 66,
NOV 68 163P SAKIOTIS,NICHOLAS G. ;
HICKERNELL,FRED S. ;
CONTRACT: AF 30(602)-3476
PROJ: AF-4159
MONITOR: RADC TR-66-352

UNCLASSIFIED REPORT

DESCRIPTORS: (*ACOUSTIC EQUIPMENT, *SEMICONDUCTOR DEVICES), (*PIEZOELECTRIC CRYSTALS, ULTRASONIC RADIATION), SEMICONDUCTING FILMS, CADMIUM SULFIDES, ZINC COMPOUNDS, OXIDES, PIEZOELECTRIC TRANSDUCERS, PERFORMANCE(ENGINEERING) (U)
IDENTIFIERS: PIEZOELECTRIC SEMICONDUCTORS, ELECTRON PHONON INTERACTIONS, ACOUSTOELECTRIC EFFECT, ZINC OXIDE, TRAVELING WAVE AMPLIFICATION, CONTINUOUS RADIATION (U)

THE REPORT DESCRIBES EFFORTS TO DETERMINE THE FEASIBILITY OF CONTINUOUS WAVE DEVICES AND TO DEMONSTRATE THE CAPABILITY FOR PERFORMING ACTIVE ELECTRONIC FUNCTIONS USING ELECTROACOUSTIC PHENOMENA IN LOW NOISE, POWER AND RADIO FREQUENCY AMPLIFIERS WITHIN THE FREQUENCY RANGE 1 MHZ TO 1000 MHZ. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD-679 566 20/4 20/12
CLEVITE CORP CLEVELAND OHIO ELECTRONIC RESEARCH DIV

RESEARCH ON IMPROVED II-VI CRYSTALS. (U)

DESCRIPTIVE NOTE: FINAL TECHNICAL REPT. 8 MAR 65-7 MAY 68,
AUG 68 191P SHIOZAWA,L. R. LJOST,J. M. ;SULLIVAN,G. A. ;
CONTRACT: AF 33(615)-2708
PROJ: AF-7885
MONITOR: ARL 68-0153

UNCLASSIFIED REPORT

DESCRIPTORS: (*CRYSTAL GROWTH, *CADMIUM COMPOUNDS), (*SEMICONDUCTORS, CRYSTAL GROWTH), CADMIUM SULFIDES, CADMIUM SELENIDES, ZINC COMPOUNDS, TELLURIDES, SUBLIMATION, PURIFICATION, SINTERING, CRYSTAL LATTICE DEFECTS, MICROSCOPY, PHOTOCONDUCTIVITY, DIFFUSION, PROGRAMMING(COMPUTERS), PHASE DIAGRAMS (U)
IDENTIFIERS: ZINC TELLURIDES (U)

THIS RESEARCH PROGRAM HAS BEEN DIRECTED TOWARD IMPROVING THE QUALITY OF VAPOR-GROWN CDS, CDSE, AND ZNTE CRYSTALS FROM THE STANDPOINT OF BOTH FOREIGN IMPURITIES AND INTRINSIC STRUCTURAL DEFECTS. MEASURABLE IMPROVEMENTS IN PURITY OF THE FINAL CRYSTALS HAVE BEEN OBTAINED BY SPECIFIC PURIFICATION STEPS, CONSISTING OF A SINTERING PROCEDURE AND ONE OR MORE FRACTIONAL VACUUM SUBLIMATIONS, APPLIED TO AVAILABLE SEMICONDUCTOR-GRADE MATERIAL. CRYSTAL QUALITY AS RELATED TO INTRINSIC DEFECTS HAS BEEN IMPROVED, BOTH DURING CRYSTAL GROWTH AND TREATMENT AFTER GROWTH, THROUGH A BETTER UNDERSTANDING OF PHASE EQUILIBRIA AND POINT-DEFECT EQUILIBRIA AND THEIR RELATIONSHIPS. A COMPUTER PROGRAM HAS BEEN SET UP AND SPECIFIC CALCULATIONS WERE MADE FOR ZNTE. EVIDENCE FROM DIFFUSION EXPERIMENTS AND FROM THE EXAMINATION OF THE VOID-PRECIPITATION PHENOMENON IN ZNTE HAS SHOWN THAT ZN VACANCIES ARE THE SIGNIFICANT INTRINSIC POINT DEFECTS IN THIS MATERIAL. EVALUATION OF CRYSTAL QUALITY HAS PRIMARILY BEEN PLACED ON MICROSCOPIC OBSERVATIONS AND ELECTRICAL MEASUREMENTS SUCH AS PHOTOCONDUCTIVITY, THERMALLY-STIMULATED CURRENTS, AND CURRENT OSCILLATIONS. (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD-679 636 20/2 20/12
EAGLE-PICHER INDUSTRIES INC MIAMI OKLA MIAMI RESEARCH LABS

RESEARCH IN PURIFICATION AND SINGLE CRYSTAL GROWTH OF II-VI COMPOUNDS. (U)

DESCRIPTIVE NOTE: FINAL REPT. 15 APR 65-14 APR 68, MAY 68 146P FAHRIG,RICHARD H. ;WEBB, GEORGE N. ;BROWN,LLOYD W. ;
CONTRACT: F33615-67-C-1575
PROJ: AF-7885
TASK: 788503
MONITOR: ARL 68-0096

UNCLASSIFIED REPORT

DESCRIPTORS: (*SEMICONDUCTORS, *CRYSTAL GROWTH), (*CADMIUM COMPOUNDS, SEMICONDUCTORS), (*ZINC COMPOUNDS, SEMICONDUCTORS), SINGLE CRYSTALS, PURIFICATION, SUBLIMATION, DIFFUSION, GELS, DOPING, IMPURITIES, MASS SPECTROSCOPY, ATOMIC SPECTROSCOPY, CADMIUM SULFIDES, CADMIUM SELENIDES, ZINC SULFIDES, CADMIUM (U)
IDENTIFIERS: ZINC SELENIDE, ZINC TELLURIDE, CADMIUM TELLURIDES, EMISSION SPECTROSCOPY, MIXED CRYSTALS (U)

A PROCESS FOR THE PURIFICATION OF CADMIUM METAL BY MULTIPLE TREATMENT STEPS IS DESCRIBED. IMPURITIES IN CADMIUM, AS DETERMINED BY EMISSION SPECTROGRAPHIC, MASS SPECTROGRAPHIC, AND ATOMIC ABSORPTION ARE GIVEN IN TABULAR FORM. THE PREPARATION OF VARIOUS PURE SEMICONDUCTOR MATERIALS OF THE GROUP II-VI COMPOUND TYPE IS DISCUSSED AND TABLES OF ANALYTICAL DATA FOR EACH ARE INCLUDED. THE LEVEL OF IMPURITY CONCENTRATION IN SYNTHESIZED CADMIUM SULFIDE WAS SIGNIFICANTLY LOWERED. LESS THAN 1 PART PER MILLION (ATOMIC) TOTAL IMPURITIES WAS FOUND BY THE MASS SPECTROGRAPH IN TWO BATCHES OF CDS. THE GROWTH OF CRYSTALS OF PURE II-VI COMPOUNDS AND MIXTURES OF COMPOUNDS FROM THE MELT IS REPORTED. INCLUDED ARE DATA CONCERNING DOPING OF MELT GROWN CRYSTALS WITH VARIOUS ELEMENTAL DOPANTS, AND, IN THE CASE OF SOME COMPOUND SEMICONDUCTORS, THE MAXIMUM DOPING LEVELS POSSIBLE BY THIS METHOD. THE RESULTS OF VAPOR PHASE CRYSTAL GROWTH OF CDS AND ZNS, ARE GIVEN. PRELIMINARY EXPERIMENTS WITH HYDROTHERMAL AND GEL DIFFUSION CRYSTAL GROWTH ARE REPORTED. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD-679 946 20/12 9/1
OXFORD UNIV (ENGLAND) ENGINEERING LAB

FIELD-AND PHOTON-ENHANCED FIELD EMISSION FROM THIN-FILM FIELD-EMISSION DEVICES, (U)

JUN 68 3P ADHAM-HUSAIN,S. ;WALSH,D.
;
CONTRACT: AF-EOAR-33-67
PROJ: AF-9767
TASK: 976702
MONITOR: AFOSR 68-2659

UNCLASSIFIED REPORT
AVAILABILITY: PUB. IN ELECTRONICS LETTERS, V4 N16, 9 AUG 68.

DESCRIPTORS: (*CADMIUM SULFIDES, *FIELD EMISSION), (*SEMICONDUCTING FILMS, FIELD EMISSION), SILICON COMPOUNDS, OXIDES, SILICON COATINGS, PHOTOELECTRIC EFFECT, GAS LASERS, LIGHT PULSES, GREAT BRITAIN (U)
IDENTIFIERS: SILICON MONOXIDE (U)

THIN-FILM SANDWICH DEVICES OF CDS-SIO-METAL HAVE BEEN MADE. THEY HAVE CURRENT/VOLTAGE BEHAVIOUR CHARACTERISTICS OF FIELD EMISSION FROM SEMICONDUCTORS. WITH REVERSE BIAS, THE CURRENT IS VERY MUCH SMALLER. THE FIELD-EMISSION CURRENT IS GREATLY ENHANCED BY ILLUMINATING THE DEVICE WITH 2.41 AND 2.54 EV PHOTONS (FROM AN ARGON-ION LASER). UNDER PULSED LASER EXCITATION (PULSE DURATION 1 MICROSECOND) THE ENHANCED EMISSION PERSISTED FOR MORE THAN 20MS. THESE EXPERIMENTS ARE ANALOGOUS TO SOME PREVIOUS WORK ON VACUUM FIELD EMISSION. A POSSIBLE MECHANISM FOR THE ENHANCED EMISSION IS DISCUSSED. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /4Z4HT

AD-680 583 20/12 7/4
DELAWARE UNIV NEWARK

THEORETICAL ASPECTS OF POINT AND ASSOCIATED LUMINESCENT CENTERS. (U)

66 16P WILLIAMS,FERD ;
CONTRACT: DA-ARO(D)-31-124-G815
PROJ: DA-2001450I-B-11-B
MONITOR: AROD 4169:9

UNCLASSIFIED REPORT
AVAILABILITY: PUB. IN PROCEEDINGS OF THE INTERNATIONAL CONFERENCE ON LUMINESCENCE, P113-123 1966.

DESCRIPTORS: (*SEMICONDUCTORS, *LUMINESCENCE), (*BAND THEORY OF SOLIDS, LUMINESCENCE), (*CRYSTAL LATTICE DEFECTS, LUMINESCENCE), MOLECULAR ENERGY LEVELS, CRYSTALS, CRYSTAL LATTICES, INORGANIC COMPOUNDS, CONDUCTIVITY, COLOR CENTERS, WAVE FUNCTIONS, SEMICONDUCTORS, CADMIUM SULFIDES, ZINC SULFIDES, CHROMIUM, MANGANESE, POTASSIUM COMPOUNDS, CHLORIDES, DOPING (U)
IDENTIFIERS: CRYSTAL FIELD THEORY, POTASSIUM CHLORIDE, DONOR ACCEPTOR PAIRS, DOPED CRYSTALS (U)

THE REPORT DISCUSSES THE ELECTRONIC ENERGY LEVELS AND RADIATIVE TRANSITIONS OF POINT AND ASSOCIATED DEFECTS IN INORGANIC LUMINESCENT CRYSTALS. THERE ARE SOME QUITE GENERAL THEORETICAL PROBLEMS REGARDING THE ELECTRONIC STATES OF LUMINESCENT CENTERS. AMONG THESE ARE: (1) THE DETERMINATION OF ENERGIES OF LOCALIZED STATES OF IMPERFECTIONS WITH RESPECT TO THE BAND STRUCTURE OF THE CRYSTAL; (2) THE QUESTION OF DISCRETE IMPURITY STATES WITHIN THE ALLOWED BANDS; (3) THE POSSIBILITY OF ANTI-STOKES' LUMINESCENCE BASED ON ADIABATIC RELAXATION OF EXCITED DEFECTS FROM TIGHT-BINDING TO EFFECTIVE-MASS STATES; (4) THE INCLUSION OF EXCHANGE IN THE THEORY OF DONOR--ACCEPTOR PAIRS (WHICH WERE PROPOSED AS LUMINESCENT CENTERS ONLY A DECADE AGO); (5) THE ANALYSIS OF ENERGY TRANSFER BETWEEN ASSOCIATED AND POINT DEFECTS, AND WITHIN COMPLEX ASSOCIATED DEFECTS; AND (6) THE CHARACTERISTICS OF THE STATES OF IMPERFECTIONS IN INHOMOGENEOUS LUMINESCENT CRYSTALS (A UNIQUE CLASS OF MATERIALS JUST BEGINNING TO BE INVESTIGATED). THESE ARE SOME OF THE THEORETICAL PROBLEMS WHICH SHALL BE CONSIDERED, AND BECAUSE OF THEIR GENERALITY AND DIFFICULTY, IN A PRELIMINARY AND SOMETIMES SPECULATIVE WAY. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD-681 458 20/12
LOCKHEED MISSILES AND SPACE CO PALO ALTO CALIF LOCKHEED PALO ALTO RESEARCH LAB

ENERGY BAND STRUCTURE OF SEMICONDUCTORS. (U)

DESCRIPTIVE NOTE: FINAL SCIENTIFIC REPT. 1 FEB 66-30 NOV 68,
DEC 68 41UP HERMAN,FRANK ;KORTUM,RICHARD L. ;ORTENBURGER,IRENE B. ;VAN DYKE,JOHN P.
;
CONTRACT: AF 19(628)-5750
PROJ: AF-5620
TASK: 562008
MONITOR: AFCRL 68-0631

UNCLASSIFIED REPORT
AVAILABILITY: PUB. IN VARIOUS JNLS.

DESCRIPTORS: (*SEMICONDUCTORS, *BAND THEORY OF SOLIDS), PHOTOELECTRIC EFFECT, REFLECTIVITY, OPTICAL PROPERTIES, CRYSTAL STRUCTURE, METALLOIDS, SILICON CARBIDES, CADMIUM SULFIDES, GALLIUM ARSENIDES, ZINC SULFIDES, DIAMONDS, SILICON, GERMANIUM, TIN (U)
IDENTIFIERS: ELECTROREFLECTANCE, AMORPHOUS SEMICONDUCTORS (U)

THE ELECTRONIC STRUCTURE AND RELATED OPTICAL PROPERTIES OF OVER 50 ELEMENTAL AND COMPOUND SEMICONDUCTORS WERE INVESTIGATED. THE STUDIES HAVE COVERED THE DIAMOND-TYPE CRYSTALS: CUBIC AND HEXAGONAL SIC; SEVERAL III-V, II-VI, AND I-VII COMPOUNDS; A NUMBER OF II-IV COMPOUNDS; AND VARIOUS IV-VI COMPOUNDS; AMONG OTHERS. IN MOST CASES ONE IS ABLE TO OBTAIN A QUALITATIVELY RELIABLE ENERGY BAND MODEL BY CARRYING OUT A FIRST-PRINCIPLES OPW (ORTHOGONALIZED PLANE WAVE) ENERGY BAND CALCULATION USING A SIMPLE BUT PHYSICALLY REALISTIC CRYSTAL POTENTIAL. WITH SUCH AN ENERGY BAND MODEL IN HAND, ONE IS USUALLY ABLE TO ACCOUNT FOR A WIDE VARIETY OF EXPERIMENTAL INFORMATION. A METHOD FOR OBTAINING MORE ACCURATE ENERGY BAND MODELS WAS DEVELOPED. THE EMPIRICALLY-REFINED FIRST-PRINCIPLES METHOD HAS BEEN USED WITH CONSIDERABLE SUCCESS IN A WIDE VARIETY OF APPLICATIONS. THE PRESENT REPORT INCLUDES THE COMPLETE TEXTS OF SEVERAL RECENT SCIENTIFIC PAPERS WHICH ADEQUATELY DISCUSS AND ILLUSTRATE THE EMPIRICALLY-REFINED FIRST-PRINCIPLES APPROACH TO ENERGY BAND PROBLEMS. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD-681 705 9/1 20/12
ILLINOIS UNIV URBANA COORDINATED SCIENCE LAB

A STUDY OF ELECTROLUMINESCENT CADMIUM SULFIDE DIODES. (U)

DEC 66 56P KASTNING,JERRY ALBERT ;
REPT. NO. R-400
CONTRACT: DAABU7-67-C-0199, DAAKU2-67-C-0546

UNCLASSIFIED REPORT

DESCRIPTORS: (*DIODES(SEMICONDUCTOR), ELECTROLUMINESCENCE), CADMIUM SULFIDES, TELLURIUM, CRYOGENICS, EXCITATION, IONIZATION, TUNNELING(ELECTRONICS), CARRIERS(SEMICONDUCTORS) (U)
IDENTIFIERS: HETEROJUNCTIONS (U)

THE PURPOSE OF THIS THESIS IS TO PRESENT AN EXPERIMENTAL DESCRIPTION OF A NUMBER OF TELLURIUM-CADMIUM SULFIDE HETEROJUNCTION DEVICES AND A THEORY TO EXPLAIN THEIR MECHANISM OF OPERATION. THESE DEVICES EXHIBIT ELECTROLUMINESCENCE WHEN OPERATED AT LIQUID NITROGEN TEMPERATURES. LIQUID EMISSION FROM A P-N JUNCTION WAS FIRST OBSERVED BY LOSSEV, IN 1923, IN NATURALLY OCCURRING JUNCTIONS. SINCE THE EFFICIENCY FOR CONVERSION OF ELECTRIC ENERGY INTO LIGHT WAS VERY LOW, THESE JUNCTIONS DID NOT SEEM TO BE OF MUCH IMPORTANCE UNTIL THE DISCOVERY OF THE P-N JUNCTION LASER IN 1963. THEREFORE, WITHIN THE PAST SEVERAL YEARS, THERE HAS BEEN CONSIDERABLE INTEREST IN THE PHENOMENON OF P-N JUNCTION LUMINESCENCE WHICH HAS RESULTED IN NUMEROUS INVESTIGATION OF THE PROPERTIES AND POTENTIAL APPLICATIONS OF SEMICONDUCTOR-DIODE LIGHT SOURCES. FROM AN APPLICATION POINT OF VIEW, THE FACT THAT LUMINESCENT EMISSION IS SUCH A BASIC WAY OF EFFICIENTLY COMMUNICATING INFORMATION TO THE EYE MAKES IT A TOOL WHOSE UTILITY EXTENDS TO PRACTICALLY EVERY AREA OF TECHNOLOGY. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD-681 719 20/12
ILLINOIS UNIV URBANA COORDINATED SCIENCE LAB

TEMPERATURE DEPENDENCE OF THE RESISTIVITY AND HALL EFFECT OF THIN CDS FILMS. (U)

DEC 68 62P JIMENEZ,RICARDO ;
REPT. NO. R-401
CONTRACT: DAAB07-67-C-0199, DA\KD2-67-C-0546

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: SPONSORED IN PART BY NATIONAL SCIENCE FOUNDATION, WASHINGTON, D. C.

DESCRIPTORS: (*SEMICONDUCTING FILMS, *CADMIUM SULFIDES), RESISTANCE(ELECTRICAL), HALL EFFECT, CRYOGENICS, HIGH-TEMPERATURE RESEARCH, FILMS (U)
IDENTIFIERS: THIN FILMS (U)

A SYSTEM WAS SET UP TO STUDY THE RESISTIVITY AND HALL MOBILITY IN THIN SEMICONDUCTOR FILMS AS A FUNCTION OF TEMPERATURE. FOR VACUUM DEPOSITED CDS FILMS EXHIBITING PHOTOLUMINESCENCE RESISTIVITY DATA WERE TAKEN FOR THE TEMPERATURE RANGE FROM 77K TO 400K, WHILE THE HALL MOBILITY WAS MEASURED BETWEEN 300K AND 400K. A PLOT OF THE RESISTIVITY DATA SHOWED AN EXPONENTIAL VARIATION WITH TEMPERATURES FROM 250K TO 400K. FROM THEORETICAL CONSIDERATIONS, IT WAS INFERRED THAT THE DONOR LEVELS WERE NOT DISCRETE WITHIN THE ENERGY BANDGAP. NO SYSTEMATIC VARIATION OF THE RESISTIVITY WAS OBSERVED AT TEMPERATURES BETWEEN 77K AND 200K. THE RESISTIVITIES OF THE SAMPLES VARIED OVER A WIDE RANGE FROM 1 OHM-CM TO 10 TO THE 7TH POWER OHM-CM AT 300K. THE HALL MOBILITY DATA FOR THE CDS FILMS SHOWED MOBILITIES BETWEEN ONE AND TWO SQ CM/V-SEC, AND ALSO A CONSISTENT EXPONENTIAL VARIATION WITH TEMPERATURE. THE MEASURED VALUES OF THE MOBILITY AND ITS EXPONENTIAL BEHAVIOR WERE IN GOOD AGREEMENT WITH REPORTED VALUES FOR CDS FILMS. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD-683 612 4/1 20/12
CALIFORNIA UNIV BERKELEY ELECTRONICS RESEARCH LAB

RESEARCH IN EXPERIMENTAL AND THEORETICAL PHYSICS. (U)

DESCRIPTIVE NOTE: FINAL REPT. 1 JUN 65-31 DEC 68,
FEB 69 15P MULLER,R. S. ;
CONTRACT: DA-31-124-ARO(D)-385
PROJ: DA-2-0-014501-B-11-B
MONITOR: AROD 553/;11-E

UNCLASSIFIED REPORT

DESCRIPTORS: (*FIELD EFFECT TRANSISTORS, ANALYSIS), (*CARRIERS(SEMICONDUCTORS), QUANTUM STATISTICS), SEMICONDUCTING FILMS, METAL FILMS, CADMIUM SULFIDES, CADMIUM COMPOUNDS, SELENIDES, SILICON, CESIUM, MOBILITY (U)
IDENTIFIERS: METAL OXIDE SEMICONDUCTORS, MOSFET(METAL OXIDE SEMICONDUCTOR FIELD EFFECT TRANSISTORS), METAL OXIDE SEMICONDUCTOR FIELD EFFECT TRANSISTORS, CADMIUM SELENIDES, FERMI-DIRAC STATISTICS, COMPUTER ANALYSIS (U)

THE RESEARCH INVOLVED THE STUDY OF FIELD-EFFECT DEVICES. THE TWO PRIMARY AREAS WERE: (1) ANALYSIS INVOLVING THE IMPORTANT SILICON METAL-OXIDE-SEMICONDUCTOR FIELD-EFFECT TRANSISTORS (MOSFET) AND (2) CONSIDERATION OF NOVEL FIELD-EFFECT DEVICES. SINCE MOSFET'S FREQUENTLY ARE USED WITH DEGENERATE CARRIER CONCENTRATIONS IN THE CHANNEL, FERMI-DIRAC STATISTICS, RATHER THAN MAXWELL-BOLTZMANN STATISTICS, ARE APPROPRIATE IN THE ANALYSIS. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD-684 159 20/12
PARIS UNIV (FRANCE) LABORATOIRE DE PHYSIQUE DES SOLIDES

PHOTON-PHONON INTERACTION IN THIN FILMS. (U)

69 27P BALKANSI,M. ITOULLEC,R. LE
;
REPT. NO. SCIENTIFIC-2
CONTRACT: AF-EOAR-0016-68

UNCLASSIFIED REPORT

DESCRIPTORS: (*SEMICONDUCTING FILMS, PHONONS), CADMIUM SULFIDES, REFLECTIVITY, DISPERSION RELATIONS, LIGHT TRANSMISSION, INTERACTIONS, FRANCE (U)
IDENTIFIERS: LATTICE VIBRATIONS, PHONON PHOTON INTERACTIONS (U)

THE NORMAL MODES OF VIBRATIONS IN A PERFECT CRYSTAL LATTICE RESULTING INTO NET ELECTRIC DIPOLE MOMENT WITH ELECTRIC VECTOR PERPENDICULAR TO THE PROPAGATION VECTOR ARE STRONGLY COUPLED WITH THE RADIATION FIELD. THE RESULTING OPTICAL ABSORPTION IS VERY STRONG AT THE FREQUENCIES OF THE TRANSVERSE OPTICAL MODES. DIRECT ABSORPTION STUDIES CAN THEREFORE BE CONDUCTED ONLY ON THIN FILMS. WE EXAMINE HERE THE PARTICULAR CASE OF THIN FILMS WHERE THE PHOTON-PHONON INTERACTION CAN BE TREATED IN THE FRAME OF THE COLLISION THEORY FOR TWO TYPES OF PARTICLES, AS A TWO-STEP PROCESS; FIRST THE STRONG COUPLING OF THE RADIATION FIELD WITH THE PHONON FIELD IN TERMS OF POLARITONS AND THE CONSEQUENT POLARITON DECAY AS A SECOND STEP. THE OPTICAL ABSORPTION AT THE NORMAL MODE FREQUENCIES IS CALCULATED IN TERMS OF BAND WIDTH RELATED RESPECTIVELY TO THE POLARITON LIFE TIME, TO THE PHONON LIFE TIME AND TO THE ELASTIC DIFFUSION OF PHOTONS. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD-684 160 20/12
PARIS UNIV (FRANCE) LABORATOIRE DE PHYSIQUE DES SOLIDES

INFRARED MEASUREMENTS ON CDS THIN FILMS DEPOSITED ON ALUMINUM, (U)

69 24P PROIA,F. (BALKANSKI,M.)

REPT. NO. SCIENTIFIC-3
CONTRACT: EOOAR-68-0016
PROJ: AF-7685
MONITOR: ARL 69-0026

UNCLASSIFIED REPORT

DESCRIPTORS: (*SEMICONDUCTING FILMS, CADMIUM SULFIDES), (*CADMIUM SULFIDES, INFRARED RADIATION), PHONONS, REFLECTIVITY, ABSORPTION, FRANCE (U)
IDENTIFIERS: *LATTICE VIBRATIONS, PHONON PHOTON INTERACTIONS (U)

THE REFLECTIVITY SPECTRA OF THREE CDS THIN FILMS (THICKNESS = 0.086 AND 0.66 MICROMETERS) DEPOSITED ON ALUMINIUM HAVE BEEN DETERMINED AT ROOM TEMPERATURE. THE MEASUREMENTS WERE CARRIED OUT IN THE SPECTRAL RANGE FROM 180 TO 740 CM(-1) AT AN INCIDENCE OF 45 DEG, FOR LIGHT POLARIZED WITH THE ELECTRIC FIELD IN THE PLANE OF INCIDENCE. A SMALL ABSORPTION PEAK IS OBSERVED NEAR OMEGA SUB TO FOR THE THICKER SAMPLES, AND A MUCH STRONGER ABSORPTION PEAK NEAR OMEGA SUB TO FOR ALL SAMPLES. THE RESULTS ARE ANALYSED IN TERMS OF THE THEORY OF FUCHS AND KLIEWER. THE FREQUENCIES OF THE PEAKS AND THE PARTIAL WIDTHS ASSOCIATED WITH THE VIRTUAL MODES ARE IN VERY GOOD AGREEMENT WITH THE THEORY. IT IS ALSO FOUND THAT THE ANHARMONIC WIDTH OF THE PEAKS IS MUCH LARGER THAN IN CDS SINGLE CRYSTALS. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD-684 901 9/1 20/12
CALIFORNIA UNIV BERKELEY DEPT OF ELECTRICAL ENGINEERING

CIRCUIT-CONTROLLED MODES OF ACOUSTOELECTRIC OSCILLATIONS IN PIEZOELECTRIC SEMICONDUCTORS. (U)

JUN 68 3P TURNER,C. W. ;BRYSON,D. R. ;

CONTRACT: AF-AFOSR-139-67
PROJ: AF-4751
MONITOR: AFOSR 69-0822TR

UNCLASSIFIED REPORT
AVAILABILITY: PUB. IN ELECTRONICS LETTERS, V4 N13 JUN 68.

DESCRIPTORS: (*CRYSTAL OSCILLATORS, TUNING DEVICES), (*PIEZOELECTRIC CRYSTALS, *SEMICONDUCTORS), ALTERNATING CURRENT, CADMIUM SULFIDES, INDIUM ANTIMONIDES (U)

RESULTS ARE PRESENTED FOR EXPERIMENTS IN WHICH CIRCUIT-CONTROLLED MODES OF ACOUSTOELECTRIC CURRENT OSCILLATIONS WERE OBTAINED IN PIEZOELECTRIC SEMICONDUCTORS. THE REACTIVE CIRCUITS USED ALLOWED A 6 : 1 TUNING RANGE FROM A SINGLE SPECIMEN. THE POSSIBLE REALISATION OF BULK DEVICE R.F. GENERATORS GIVING LARGE PEAK POWERS IN THE REGION OF 1 MHZ IS DISCUSSED. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD-685 280 1/3 21/5 14/4
LOGISTICS MANAGEMENT INST WASHINGTON D C

WORKLOAD FORECASTING AND ALTERNATIVE OVERHAUL SCHEDULES FOR NAVY AIRCRAFT AND AIRCRAFT ENGINES. (U)

JAN 69 115P
CONTRACT: SD-271
PROJ: SD-271-91

UNCLASSIFIED REPORT

DESCRIPTORS: (*NAVAL AIRCRAFT, MAINTENANCE), (*AIRCRAFT ENGINES, MAINTENANCE), SCHEDULING, NAVAL OPERATIONS, PREDICTIONS, MANAGEMENT PLANNING (U)
IDENTIFIERS: FORECASTING (U)

THE REPORT PROPOSES SYSTEMS TO IMPROVE THE PLANNING, SCHEDULING, AND MANAGEMENT OF THE OVERHAUL AND REPAIR OF NAVY AIRCRAFT AND AIRCRAFT ENGINES. GENERAL DESCRIPTIONS OF THESE SYSTEMS ARE PROVIDED AS MANAGEMENT OVERVIEWS FOR THE NAVAL AIR SYSTEMS COMMAND EXECUTIVE LEVEL. AN APPENDIX IS PROVIDED WHICH (1) DESCRIBES IN GENERAL TERMS THE OVERALL PROCESS BY WHICH THE OVERHAUL AND REPAIR OF AIRCRAFT AND ENGINES ARE PLANNED AND SCHEDULED AND (2) INDICATES THOSE PARTICULAR PROCESSES WHICH ARE ADDRESSED BY THE REPORT. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD-685 673 20/12
AEROSPACE RESEARCH LABS WRIGHT-PATTERSON AFB OHIO

THE EDGE EMISSION BANDS IN CADMIUM SULFIDE. (U)

DESCRIPTIVE NOTE: INTERIM REPT.,
JUL 68 5P KINGSTON,DAVID L. ;GREENE,
LAWRENCE C. ;CROFT,LAKE W. ;
REPT. NO. ARL-68-0233
PROJ: AF-7885
TASK: 788500

UNCLASSIFIED REPORT
AVAILABILITY: PUB. IN JUL. OF APPLIED PHYSICS,
V39 N13 P5949-5952 DEC 68.

DESCRIPTORS: (*BAND SPECTRUM, CADMIUM SULFIDES),
(*CADMIUM SULFIDES, BAND THEORY OF SOLIDS),
SEMICONDUCTORS, CRYOGENICS, PHONONS,
EXCITATION (U)
IDENTIFIERS: EMISSION SPECTRA (U)

IT IS SHOWN THAT THERE ARE FIVE CLEARLY DEFINED SERIES OF EDGE EMISSION BANDS IN PURE CADMIUM SULFIDE CRYSTALS. THESE SERIES HAVE THEIR ZERO PHONON PEAKS AT 5128, 5140, 5163, 5179, AND 5234 A AT 4.2 DEGREES K. THE TEMPERATURE DEPENDENCE OF THE PEAK WAVELENGTHS AND INTENSITIES OF THESE SERIES IS DISCUSSED AND A BAND MODEL PRESENTED. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD-685 674 20/12
AEROSPACE RESEARCH LABS WRIGHT-PATTERSON AFB OHIO

OSCILLATIONS IN EXCITON EMISSION IN THE EXCITATION SPECTRA OF ZNSE AND CDS. (U)

FEB 69 6P PARK,Y. S. ;
REPT. NO. ARL-68-0246
PROJ: AF-7885
TASK: 788500

UNCLASSIFIED REPORT
AVAILABILITY: PUB. IN PHYSICAL REVIEW LETTERS, V21 N12 P798-800, 16 SEP 68.

DESCRIPTORS: (*CADMIUM SULFIDES, CARRIERS(SEMICONDUCTORS)), (*ZINC COMPOUNDS, CARRIERS(SEMICONDUCTORS)), SELENIDES, PHONONS, EXCITATION, LINE SPECTRUM (U)
IDENTIFIERS: EXCITONS (U)

OSCILLATIONS PERIODIC IN AN ENERGY EQUAL TO LO PHONON HAVE BEEN OBSERVED IN THE EXCITATION SPECTRUM FOR THE BOUND EXCITON COMPLEXES IN ZNSE AND CDS. THE DATA IS INTERPRETED IN TERMS OF DIRECT PHONON-ASSISTED GENERATION OF THE FOUND EXCITON COMPLEXES. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD-685 676 20/12 20/3
AEROSPACE RESEARCH LABS WRIGHT-PATTERSON AFB OHIO

OSCILLATORY PHASE OF PHOTOCONDUCTIVITY OF CDS. (U)

JUL 68 5P WEI,DAVID T. Y. ;PENCHINA, CLAUDE M. ;PARK,Y. S. ;

REPT. NO. ARL-68-0231
PROJ: AF-7885
TASK: 788500

UNCLASSIFIED REPORT
AVAILABILITY: PUB. IN PHYSICS LETTERS, V27A N8 P562-563, 9 SEP 68.

DESCRIPTORS: (*CADMIUM SULFIDES, *PHOTOCONDUCTIVITY), CARRIERS(SEMICONDUCTORS), OSCILLATION, PHONONS, ALTERNATING CURRENT (U)

THE PHOTORESPONSE OF CDS TO CHOPPED LIGHT SHOWS A PHASE DELAY WHICH OSCILLATES WITH PHOTON ENERGY. THE PERIOD OF OSCILLATION CORRESPONDS TO THE ENERGY OF AN LO-PHONON. THE PHOTOCURRENT CAN BE SEPARATED INTO TWO DISTINCT COMPONENTS: ONE OSCILLATORY! AND THE OTHER NON-OSCILLATORY. THEIR ORIGINS ARE DESCRIBED IN TERMS OF LIFETIME VARIATIONS AND TRAPPING. EXPERIMENTS ARE REPORTED OVER THE TEMPERATURE RANGE OF 20K TO 55K. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD-686 496 10/2 20/12
GENERAL DYNAMICS/ASTRONAUTICS SAN DIEGO CALIF

PHOTOVOLTAIC AND THERMOELECTRIC SOLAR ENERGY CONVERSION USING THIN FILMS. (U)

DEC 61 65P ZIMMERMAN,W. B. IEVANS,J. C. , JR;
REPT. NO. GDA-ERR-AN-103

UNCLASSIFIED REPORT

DESCRIPTORS: (•SOLAR CELLS, FILMS), PHOTOELECTRIC EFFECT, SEEBECK EFFECT, SILICON, SEMICONDUCTORS, BAND THEORY OF SOLIDS, CADMIUM SULFIDES, DEPOSITION (U)
IDENTIFIERS: THIN FILMS (U)

SOLAR ENERGY CONVERSION BY THE USE OF THIN FILMS IN PHOTOVOLTAIC AND THERMOELECTRIC DEVICES IS DISCUSSED. EXPERIMENTAL WORK IS PRESENTED ON THE FABRICATION OF A THIN FILM CADMIUM SULFIDE CELL WHICH UTILIZES THE PHOTOVOLTAIC EFFECT. A THEORETICAL INVESTIGATION IS MADE OF THE TEMPERATURE DIFFERENCES OBTAINABLE IN SPACE BY USING THIN, LIGHT-WEIGHT PLASTIC SHEETS, AND THE USE OF SUCH PLASTICS FOR THERMOELECTRIC GENERATORS IS DISCUSSED. TEMPERATURE DIFFERENCES OF SEVERAL HUNDRED CENTRIGRADE DEGREES CAN BE OBTAINED. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD-687 673 20/2
CHICAGO UNIV ILL JAMES FRANCK INST

PROTON BLOCKING PATTERNS FOR HCP AND WURTZITE STRUCTURES, (U)

SEP 68 4P BARRETT,C. S. ;MUELLER,R. M. ;WHITE,W. I

CONTRACT: DAHC04-67-C-0050
PROJ: DA-2-0-061102-B-32-D
MONITOR: AROD 4886120-MC

UNCLASSIFIED REPORT
AVAILABILITY: PUB. IN TRANSACTIONS OF THE METALLURGICAL SOCIETY OF AIME, V245 P427-429 FEB 69.
SUPPLEMENTARY NOTE: PREPARED IN COOPERATION WITH NUCLEAR-CHICAGO CORP., DES PLAINES, ILL.

DESCRIPTORS: (*CRYSTAL STRUCTURE, PROTON SCATTERING), PROTON BOMBARDMENT, SEMICONDUCTORS, METAL FILMS, COBALT, ZINC, MAGNESIUM, COPPER ALLOYS, GERMANIUM ALLOYS, CADMIUM SULFIDES, CADMIUM SELENIDES (U)
IDENTIFIERS: PROTON BLOCKING PATTERNS, HEXAGONAL CLOSE PACKED LATTICES (U)

FILM-RECORDED LOW-ENERGY PROTON BLOCKING PATTERNS FOR HCP AND WURTZITE CRYSTALS ARE REPORTED. THE SEQUENCE OF RELATIVE LINE INTENSITIES (CORRESPONDING TO PLANAR BLOCKING) OF COMMON HCP METALS IS COMPARED WITH THOSE OF THE WURTZITE SEMICONDUCTORS CDS AND CDSE. THE RESULTS SHOW THAT THE SEQUENCE IS CHARACTERISTIC OF STRUCTURE, FOR CLOSELY SIMILAR STRUCTURES, SUCH AS THOSE OF CDS AND CDSE, DIFFERENCES OF LINE INTENSITY ATTRIBUTABLE TO THE DIFFERENCE IN ATOMIC NUMBER OF THE SCATTERING CENTERS MAY ALSO BE SEEN. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /4ZZHT

AD-687 900 20/12 13/8
DEFENSE DOCUMENTATION CENTER ALEXANDRIA VA

DOPING OF SEMICONDUCTORS AND SEMICONDUCTING FILM. VOLUME I. (U)

DESCRIPTIVE NOTE: REPORT BIBLIOGRAPHY JAN 63-FEB 69.
MAY 69 14UP
REPT. NO. DDC-TAS-69-28

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE. SEE ALSO VOLUME 2, AD-853 000.

DESCRIPTORS: (*SEMICONDUCTORS, *DOPING), (*SEMICONDUCTING FILMS, DOPING), (*BIBLIOGRAPHIES, SEMICONDUCTORS), BAND THEORY OF SOLIDS, CRYSTAL LATTICE DEFECTS, CARRIERS(SEMICONDUCTORS), CRYSTAL GROWTH, LUMINESCENCE, SUBSTRATES, IMPURITIES, CADMIUM COMPOUNDS, GALLIUM COMPOUNDS, LEAD COMPOUNDS, ZINC COMPOUNDS, ANTIMONY ALLOYS, INDIUM ALLOYS, ARSENIDES, SULFIDES, TELLURIDES, GERMANIUM, SILICON, INDEXES (U)
IDENTIFIERS: SEMICONDUCTOR JUNCTIONS, METAL OXIDE SEMICONDUCTORS, ION IMPLANTATION (U)

THIS IS VOLUME I OF A TWO-VOLUME SET ON DOPING OF SEMICONDUCTORS AND SEMICONDUCTING FILMS, WHICH HAS BEEN PREPARED FROM THE DDC COLLECTION FROM JANUARY 1963 TO FEBRUARY 1969, AND IT CONTAINS 107 UNCLASSIFIED AND UNLIMITED REFERENCES. INDIVIDUAL ENTRIES ARE ARRANGED BY AD NUMBER. COMPUTER GENERATED INDEXES OF CORPORATE AUTHOR-MONITORING AGENCY, PERSONAL AUTHOR, AND TITLE ARE PROVIDED. VOLUME II, AD-853 000, WHICH SUPPLEMENTS THIS VOLUME, IS A CUMULATIVE VOLUME. IT INCLUDES ALL THE REFERENCES FROM VOLUME I, AS WELL AS THE 164 UNCLASSIFIED AND LIMITED DISTRIBUTION ENTRIES. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /4ZZHT

AD-688 903 20/4
DELAWARE UNIV NEWARK DEPT OF PHYSICS

GROWTH OF SINGLE CRYSTAL PLATELETS OF CADMIUM SULFIDE. (U)

DESCRIPTIVE NOTE: MASTER'S THESIS,
JUN 69 90P VAN DEN BERG,LODEWIJK ;
REPT. NO. TR-32

UNCLASSIFIED REPORT

DESCRIPTORS: (*CADMIUM SULFIDES, SINGLE CRYSTALS), (*SINGLE CRYSTALS, *CRYSTAL GROWTH), CRYSTALLIZATION, SEMICONDUCTORS, VAPOR PLATING, TEMPERATURE, HYDROGEN COMPOUNDS, MODELS(SIMULATIONS), THESES (U)
IDENTIFIERS: CHEMICAL VAPOR DEPOSITION, PLATELETS (U)

SINGLE CRYSTAL PLATELETS OF CADMIUM SULFIDE WERE GROWN BY EVAPORATION OF PURE CADMIUM SULFIDE POWDER IN A GAS STREAM AND SUBSEQUENT CRYSTALLIZATION BY GRADUAL COOLING OF THE VAPOR PHASE. PARAMETERS WHICH INFLUENCE THE RATE OF GROWTH WERE DEFINED AND VARIED IN ORDER TO OPTIMIZE THE GROWTH PROCESS. TWO VARIABLES, THE CONCENTRATION OF HYDROGEN SULFIDE IN THE CARRIER GAS AND THE TEMPERATURE GRADIENT IN THE CRYSTALLIZATION REGION, WERE SELECTED FOR FURTHER INVESTIGATION. A THEORETICAL MODEL HAS BEEN DEVELOPED WHICH MAKES IT POSSIBLE TO CALCULATE THE SUPERSATURATION IN THE GAS PHASE FOR THE DIFFERENT GROWTH CONDITIONS AND WHICH RELATES THIS SUPERSATURATION WITH THE HABIT OF THE CRYSTALS. THE RESULTS OF THE MODEL ARE COMPARED WITH THE EXPERIMENTAL RESULTS. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD-688 904 20/2 20/12
DELAWARE UNIV NEWARK DEPT OF PHYSICS

DESORPTION OF OXYGEN AND ITS EFFECTS ON THE ELECTRICAL PROPERTIES OF CDS SINGLE CRYSTAL PLATELETS. (U)

DESCRIPTIVE NOTE: TECHNICAL REP.,
JUN 69 90P SCHUBERT,RUDOLF ;
REPT. NO. TR-33

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: SPONSORED IN PART BY OFFICE OF NAVAL RESEARCH, WASHINGTON, D. C., AND DEPARTMENT OF THE ARMY, ABERDEEN PROVING GROUND, MD. DOCTORAL THESIS.

DESCRIPTORS: (*SEMICONDUCTORS, SORPTION), (*CADMIUM SULFIDES, ELECTRICAL PROPERTIES), BAND THEORY OF SOLIDS, OXYGEN, PHOTOCONDUCTIVITY, SURFACE PROPERTIES, CARRIERS(SEMICONDUCTORS), SINGLE CRYSTALS, MODELS(SIMULATIONS), THESES (U)
IDENTIFIERS: DESORPTION, ELECTRON TRAPS (U)

OXYGEN EFFECTS ON CDS SINGLE CRYSTAL PLATELETS ARE SHOWN TO MANIFEST THEMSELVES IN SEVERAL WAYS AND ALLOW ONE TO DIVIDE THE CRYSTALS INTO TWO BASIC CLASSES. THERMALLY STIMULATED DESORPTION STUDIES, WITH A SENSITIVE PARTIAL PRESSURE ANALYZER IN ULTRA HIGH VACUUM, SHOW THAT THERE ARE SEVERAL LAYERS OF MONATOMIC OXYGEN ADSORBED ON THE CRYSTAL SURFACE FOR THE ASSUMPTION THAT THE REAL SURFACE EQUALS THE GEOMETRICAL SURFACE. A SENSITIZATION AND COMPENSATION MODEL IS SHOWN TO ACCOUNT QUANTITATIVELY FOR THE OBSERVED CHANGES IN PHOTOCONDUCTANCE AND RISING FERMI LEVEL DUE TO OXYGEN DESORPTION. IN THIS CASE SOME OF THE SURFACE STATES WHICH ORIGINALLY CONTAINED ADSORBED OXYGEN ACT AS SENSITIZATION CENTERS AFTER THE OXYGEN IS DESORBED, WHEREAS OTHERS ACT AS CHARGE COMPENSATION CENTERS. ON THE OTHER HAND A MODEL WHICH IS BASED ON THE ADSORBED OXYGEN CAUSING FAST SURFACE RECOMBINATION IS SHOWN TO BE INCAPABLE OF ACCOUNTING FOR THE RISING FERMI LEVEL. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD-688 945 20/2 20/12
PRINCETON UNIV N J DEPT OF ELECTRICAL ENGINEERING

THE INFLUENCE OF CHEMISORPTION ON THE ELECTRONIC PROPERTIES OF THIN SEMICONDUCTORS: OXYGEN CHEMISORPTION ON THE (11-20) SURFACE OF CDS. (U)

DESCRIPTIVE NOTE: TECHNICAL REPT.,
JUN 69 169P GOODWIN,THOMAS A. ;MARK, PETER ;
REPT. NO. TR-2
CONTRACT: N00014-67-A-0151-0014
PROJ: NR-051-492

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: DOCTORAL THESIS.

DESCRIPTORS: (*SEMICONDUCTORS, *CHEMISORPTION), (*CADMIUM SULFIDES, ELECTRICAL PROPERTIES), BAND THEORY OF SOLIDS, OXYGEN, SURFACE PROPERTIES, ELECTRICAL CONDUCTANCE, THESES (U)

A THEORETICAL INVESTIGATION OF THE EFFECTS OF CHEMISORPTION SURFACE STATES ON THE EQUILIBRIUM CONDUCTIVITY OF THIN, WIDE BANDGAP SEMICONDUCTORS IS PRESENTED. CRITERIA ARE ESTABLISHED FOR THE DETECTION AND CHARACTERIZATION OF CHEMISORPTION BY ELECTRICAL MEASUREMENTS ON THE ADSORBENT. MEASUREMENTS WITH OXYGEN (ACCEPTOR ADSORBATE) ON CDS (N-TYPE ADSORBENT) CONFIRM THE ESSENTIALS OF THE THEORY: (1) THERE IS LITTLE OR NO CHANGE IN THE ADSORBENT CONDUCTIVITY UNLESS THE (PRESSURE DEPENDENT) ADSORBATE SURFACE STATE CONCENTRATION EXCEEDS THE ADSORBENT BULK ELECTRON DENSITY PER UNIT SURFACE AREA, AND THE DEPTH OF THE SURFACE STATE BELOW THE CONDUCTION BAND EXCEEDS THE SURFACE POTENTIAL NECESSARY TO COMPLETELY DEPLETE THE ADSORBENT BULK. (2) SATISFACTION OF THESE CONDITIONS PRODUCE LARGE CHANGES IN THE ELECTRICAL PROPERTIES OF THE ADSORBENT ON CHEMISORPTION, IN BOTH THE MAGNITUDE OF THE EQUILIBRIUM CONDUCTIVITY AND IN ITS ACTIVATION ENERGY. A QUANTITATIVE STUDY OF THESE EFFECTS YIELDS THE ENERGY LEVEL OF THE ADSORBATE AND THE PRESSURE DEPENDENT SURFACE STATE CONCENTRATION. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /4ZZHT

AD-689 057 20/12
DELAWARE UNIV NEWARK DEPT OF PHYSICS

ELECTRON MOBILITY IN CDS AT HIGH ELECTRIC FIELDS. (U)

DESCRIPTIVE NOTE: TECHNICAL REPT.,
MAY 68 4P BOER,K. W. (BOGUS,K.)
REPT. NO. TR-30
CONTRACT: NONR-4336(00)

UNCLASSIFIED REPORT
AVAILABILITY: PUB. IN THE PHYSICAL REVIEW, V176 NO P899-900, 15 DEC 68.

DESCRIPTORS: (*CADMIUM SULFIDES, HALL EFFECT), (*CARRIERS(SEMICONDUCTORS), MOBILITY), ELECTRONS, ELECTRIC FIELDS, ELECTRICAL CONDUCTANCE, PHONONS (U)
IDENTIFIERS: ELECTRON MOBILITY, HOT ELECTRONS, ELECTRON PHONON INTERACTIONS, HIGH FIELD DOMAINS, NEGATIVE DIFFERENTIAL CONDUCTIVITY (U)

THE HALL MOBILITY OF ELECTRONS IN CDS PLATELETS HAS BEEN MEASURED AT 230 DEGREES K AS A FUNCTION OF THE ELECTRIC FIELD USING STATIONARY CATHODE-ADJACENT HIGH-FIELD DOMAINS IN THE RANGE OF NEGATIVE DIFFERENTIAL CONDUCTIVITY. THE ELECTRON MOBILITY IS OBSERVED TO BE FIELD-INDEPENDENT UP TO 30 KV/CM. ABOVE 30 KV/CM IT DECREASES LINEARLY WITH THE FIELD FROM ITS LOW-FIELD VALUE OF ABOUT 620 CM SQUARED/V SEC, TO ABOUT 300 CM SQUARED/V SEC AT 70 KV/CM, INDICATING SCATTERING OF HOT ELECTRONS WITH OPTICAL PHONONS. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD-689 059 20/12
DELAWARE UNIV NEWARK DEPT OF PHYSICS

CRITICAL CONDITIONS FOR TRANSITIONS BETWEEN STATIONARY AND NON-STATIONARY HIGH-FIELD DOMAINS IN SEMI-INSULATORS. (U)

DESCRIPTIVE NOTE: TECHNICAL REPT.,
SEP 68 12P DOEHLER,G. ;
REPT. NO. TR-27
CONTRACT: NONR-4336(00)

UNCLASSIFIED REPORT
AVAILABILITY: PUB. IN PHYSICA STATUS SOLIDI, V30 P627-636 1968.

DESCRIPTORS: (*SEMICONDUCTORS, ELECTRICAL CONDUCTANCE), (*CARRIERS(SEMICONDUCTORS), TRANSPORT PROPERTIES), BAND THEORY OF SOLIDS, RECOMBINATION REACTIONS, PERTURBATION THEORY, ELECTRIC FIELDS, CADMIUM SULFIDES, GERMANIUM, STABILITY (U)
IDENTIFIERS: HIGH FIELD DOMAINS, CARRIER RECOMBINATION, NEGATIVE DIFFERENTIAL CONDUCTIVITY (U)

AN ANALYSIS OF A FLUCTUATION IN THE NEIGHBORHOOD OF SINGULAR POINTS OF THE POISSON AND TRANSPORT EQUATIONS FOR A SEMI-INSULATOR WITH NEGATIVE DIFFERENTIAL CONDUCTIVITY DUE TO FIELD ENHANCED RECOMBINATION YIELDS A CRITERION FOR THE TRANSITIONS BETWEEN STATIONARY AND NON-STATIONARY HIGH-FIELD DOMAINS. CRITICAL VOLTAGES (DOMAIN LENGTHS) AND CURRENT OSCILLATION FREQUENCIES ARE GIVEN FOR DIFFERENT SATURATION CURRENTS AND AGREE WELL WITH EXPERIMENTAL RESULTS REPORTED FOR FIELD-QUENCHED CDS. IT HAS BEEN SHOWN THAT, WITH INCREASING APPLIED VOLTAGE, ALTERNATING REGIMES OF STATIONARY AND NON-STATIONARY SOLUTIONS EXIST FOR THE MODEL DISCUSSED, IN AGREEMENT WITH RECENTLY REPORTED EXPERIMENTAL INDICATIONS. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD-689 060 20/12
DELAWARE UNIV NEWARK DEPT OF PHYSICS

SEMICONDUCTIVITY OF CDS AS A FUNCTION OF S-VAPOR PRESSURE DURING HEAT TREATMENT BETWEEN 500 DEGREES AND 700 DEGREES C. (U)

DESCRIPTIVE NOTE: TECHNICAL REPT.,
JAN 69 10P BOER,K. W. ;NALESNIK,W. J. ;
REPT. NO. TR-38

UNCLASSIFIED REPORT
AVAILABILITY: PUB. IN MAT. RES. BULL., V4 P153-160, 1969.
SUPPLEMENTARY NOTE: SPONSORED IN PART BY OFFICE OF NAVAL RESEARCH, WASHINGTON, D. C., ABERDEEN PROVING GROUND, MD., AND NATIONAL AERONAUTICS AND SPACE ADMINISTRATION, GREENBELT, MD. GODDARD SPACE FLIGHT CENTER. REVISION OF REPT. DATED 6 DEC 68.

DESCRIPTORS: (*SEMICONDUCTORS, *CRYSTAL LATTICE DEFECTS), (*CADMIUM SULFIDES, ELECTRICAL CONDUCTANCE), BAND THEORY OF SOLIDS, HEAT TREATMENT, HIGH-TEMPERATURE RESEARCH, VAPOR PRESSURE, SULFUR (U)
IDENTIFIERS: ORDER DISORDER TRANSFORMATIONS (U)

THE DARK CONDUCTIVITY OF CDS AS A FUNCTION OF THE SULFUR VAPOR PRESSURE IS INVESTIGATED DURING HEAT TREATMENT IN A TEMPERATURE RANGE 500 DEGREES < T < 700 DEGREES C. THE RESULTS ARE EXPLAINED BY THERMODYNAMIC DISORDER AND A CD-RICH NONSTOICHIOMETRIC EQUILIBRIUM BELOW 525 DEGREES C. SCHOTTKY-WAGNER DISORDER MOST PROBABLY IS DOMINANT ABOVE 525 DEGREES C. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD-691 964 20/12
OHIO STATE UNIV COLUMBUS

DIFFUSION OF RARE EARTH INTO II-VI COMPOUNDS. (U)

69 7P GIRTON,D. G. ;ANDERSON,W. W. ;

CONTRACT: DAHC04-67-C-0043
PROJ: DA-2-0-061102-B-31-E
MONITOR: AROD 683511-E

UNCLASSIFIED REPORT
AVAILABILITY: PUB. IN TRANSACTIONS OF THE METALLURGICAL SOCIETY OF AIME, V245 P465-466 MAR 69.

DESCRIPTORS: (*SEMICONDUCTORS, LUMINESCENCE), (*RARE EARTH ELEMENTS, DIFFUSION), CADMIUM SULFIDES, ZINC COMPOUNDS, SELENIDES, SINGLE CRYSTALS, LINE SPECTRUM (U)
IDENTIFIERS: ZINC SELENIDES, EMISSION SPECTRA, PHOTOLUMINESCENCE (U)

THE PHOTOLUMINESCENCE OF PR, ND, HO, ER, TM, AND YB IN CDS, AND HO, ER, TM, AND YB IN ZNSE HAS BEEN OBSERVED FROM CRYSTALS PREPARED BY DIFFUSION USING RARE EARTH METALS AND AN EXCESS CHALCOGEN PRESSURE. FOR A GIVEN TEMPERATURE, TIME, AND CHALCOGEN PRESSURE THE SPECTRAL CHARACTERISTICS WERE VERY REPRODUCIBLE FROM RUN TO RUN, AND THE EMISSION INTENSITY FOR ND, ER, AND YB IN CDS WAS AS HIGH OR HIGHER THAN THE BEST VAPOR PHASE DOPED CRYSTALS WE HAVE GROWN. FOR A FEW RARE EARTHS IT WAS FOUND THAT CERTAIN CONDITIONS OF DIFFUSION TEND TO YIELD OPTIMUM RARE EARTH EMISSION INTENSITY WITH RESPECT TO THE BACKGROUND LATTICE EMISSION. PHOTOLUMINESCENCE MEASUREMENTS OF YB IN CDS AS A FUNCTION OF DEPTH GAVE A PROFILE WHICH WAS NEITHER A GAUSSIAN NOR COMPLEMENTARY ERROR FUNCTION. PART OF THE PROFILE APPEARS TO ARISE FROM A FAST COMPONENT OF THE DIFFUSION AND THE OTHER PART FROM A SLOW DIFFUSING COMPONENT. AT 960C AND 33 ATM S PRESSURE, A COMPLIMENTARY ERROR FUNCTION APPROXIMATION OF THE SLOW DIFFUSING COMPUNENT GAVE A DIFFUSION COEFFICIENT OF D = 1.3 X 10 TO THE -9TH POWER SQ CM PER SEC. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD-692 745 20/12
LOCKHEED MISSILES AND SPACE CO PALO ALTO CALIF LOCKHEED RESEARCH LAB

ELECTRONIC STRUCTURE AND OPTICAL SPECTRUM OF SEMICONDUCTORS. (U)

DESCRIPTIVE NOTE: FINAL REPT. 1 MAY 66-15 MAY 69, MAY 69 416P HERMAN,FRANK ;KORTUM,RICHARD L. ;ORTENBURGER,IRENE B. ;VAN DYKE,JOHN P. ;
CONTRACT: F33615-67-C-1793
PROJ: AF-7885
MONITOR: ARL 69-0080

UNCLASSIFIED REPORT

DESCRIPTORS: (*SEMICONDUCTORS, *BAND THEORY OF SOLIDS), OPTICAL PROPERTIES, CRYSTAL STRUCTURE, PHOTOELECTRIC EFFECT, METALLOIDS, GERMANIUM, SILICON, TIN, CADMIUM SULFIDES, GALLIUM ARSENIDES, INDIUM ANTIMONIDES, SILICON CARBIDES, ZINC SULFIDES, ALUMINUM COMPOUNDS, BORON COMPOUNDS, LEAD COMPOUNDS, MAGNESIUM COMPOUNDS, ANTIMONY ALLOYS, ARSENIDES, PHOSPHIDES, SULFIDES, SELENIDES, TELLURIDES (U)
IDENTIFIERS: OPW(ORTHOGONALIZED PLANE WAVE), ORTHOGONALIZED PLANE WAVE (U)

DURING THE PAST FEW YEARS WE HAVE INVESTIGATED THE ELECTRONIC ENERGY BAND STRUCTURE AND RELATED OPTICAL PROPERTIES OF OVER 50 CRYSTALLINE SOLIDS, INCLUDING THE DIAMOND-TYPE CRYSTALS; CUBIC AND HEXAGONAL SIC; SEVERAL III-V, II-VI, AND I-VII COMPOUNDS HAVING THE SPHALERITE OR WURTZITE STRUCTURE; A NUMBER OF IV-VI, II-VI, AND I-VII COMPOUNDS HAVING THE ROCK-SALT STRUCTURE, SOME ANTI-FLUORITE-TYPE II-IV COMPOUNDS; AND A FEW SOLID RARE GASES; AMONG OTHERS. DURING THIS PERIOD, A LARGE NUMBER OF PAPERS WERE PUBLISHED DEALING WITH VARIOUS ASPECTS OF THE WORK. AS THESE PAPERS HAVE APPEARED IN WIDELY SCATTERED SCIENTIFIC JOURNALS, CONFERENCE PROCEEDINGS, AND BOOKS, WE THOUGHT IT WOULD SERVE A USEFUL PURPOSE TO BRING ALL OF THEM TOGETHER UNDER ONE COVER, AND HAVE THIS COLLECTION SERVE AS THE MAIN BODY OF THIS FINAL REPORT. ALSO INCLUDED IN THIS FINAL REPORT ARE TWO EARLIER PAPERS WRITTEN IN 1960 AND 1964, WHICH FORM THE BASIS OF OUR ORTHOGONALIZED PLANE WAVE (OPW) ENERGY BAND CALCULATIONS. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD-693 154 20/12
HUGHES RESEARCH LABS MALIBU CALIF

SELECTIVE DOPING OF PIEZOELECTRIC CRYSTALS BY ION IMPLANTATION. (U)

DESCRIPTIVE NOTE: SEMIANNUAL REPT. 1 JAN-30 JUN 69, AUG 69 54P SHIFRIN,G. A. ;ZANIO,K. R. ;JAMBA,D. M. ;JONES,W. R. ;MARSH,O. J. ;
CONTRACT: N00014-69-C-0171

UNCLASSIFIED REPORT

DESCRIPTORS: (*PIEZOELECTRIC CRYSTALS, ION BOMBARDMENT), (*SEMICONDUCTORS, DOPING), ELECTRICAL CONDUCTANCE, ULTRASONIC RADIATION, HALL EFFECT, CADMIUM SULFIDES, ZINC COMPOUNDS, OXIDES (U)
IDENTIFIERS: *ION IMPLANTATION, PIEZOELECTRIC SEMICONDUCTORS, ZINC OXIDES (U)

THE FEASIBILITY OF CREATING N-TYPE CONDUCTING REGIONS IN PIEZOELECTRIC CRYSTALS BY ION IMPLANTATION IS BEING INVESTIGATED. EXPERIMENTAL STUDIES HAVE BEEN PERFORMED WITH CRYSTALS OF CDS AND ZNO, AND DOPANT IONS OF H, B, F, AL, CL, AND GA. TO DATE, BOTH ZNO AND CDS HAVE BEEN DOPED BY ION IMPLANTATION. THE BEST SUCCESS HAS BEEN ACHIEVED WITH HYDROGEN IN ZNO IMPLANTED AT ROOM TEMPERATURE, IN WHICH AN N-TYPE CONDUCTION 1000 TIMES STRONGER THAN THE UNIMPLANTED PORTION WAS ATTAINED. IMPLANTATIONS OF B, AL, GA, F, AND CL IN CDS HAVE PRODUCED VARYING LESSER DEGREES N-TYPE CONDUCTIVITY, WITH AL THE BEST. RANGE-ENERGY CALCULATIONS HAVE BEEN PERFORMED FOR THE ION-SUBSTRATE COMBINATIONS OF INTEREST. A THEORETICAL INVESTIGATION OF A PIEZOELECTRIC SURFACE WAVE PROPAGATION IN THE PRESENCE OF AN ION-IMPLANTED LAYER IN A PIEZOELECTRIC CRYSTAL SUBSTRATE WITH THE OBJECTIVE OF APPLICATION TO AMPLIFICATION HAS RESULTED IN A COMPUTER PROGRAM WHICH WILL BE RUN IN THE SECOND PERIOD OF THE PROGRAM. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD-694 688 20/12 14/2
TEXAS UNIV AUSTIN ELECTRONICS RESEARCH CENTER

USE OF SUPERCONDUCTING CAVITIES TO RESOLVE CARRIER TRAPPING EFFECTS IN CDS. (U)

69 10P HARTWIG,WILLIAM H. ;HINDS, JAMES J. ;

CONTRACT: AF-AFOSR-766-67
PROJ: AF-4751
MONITOR: AFOSR 69-2528TR

UNCLASSIFIED REPORT
AVAILABILITY: PUB. IN JNL. OF APPLIED PHYSICS, V40 N5 P2020-2027 APR 69.

DESCRIPTORS: (*CADMIUM SULFIDES, BAND THEORY OF SOLIDS), (*CARRIERS(SEMICONDUCTORS), LIFE EXPECTANCY), PHOTOCONDUCTIVITY, CRYSTAL LATTICE DEFECTS, DIELECTRIC PROPERTIES, SUPERCONDUCTORS, CRYOGENICS (U)
IDENTIFIERS: PHOTODIELECTRIC EFFECTS, ELECTRON TRAPS, HOLE TRAPS, CARRIER RECOMBINATION, SUPERCONDUCTING CAVITIES (U)

THE EXCELLENT FREQUENCY STABILITY AND CRYOGENIC ENVIRONMENT OF A SUPERCONDUCTING RESONANT CAVITY PROVIDES A SENSITIVE METHOD FOR OBSERVING TRAP-FILLING IN CDS AND SIMILAR MATERIALS. WHEN USED WITH THERMALLY STIMULATED CONDUCTIVITY AND DC PHOTOCONDUCTIVITY, IT IS POSSIBLE TO SOLVE FOR TRAP ENERGY, CAPTURE CROSS SECTION, DENSITY OF TRAP STATES, AND FREE-CARRIER LIFETIME. THE TECHNIQUE IS THAT USED BY ARNDT, HARTWIG, AND STONE TO OBSERVE OPTICALLY INDUCED CHANGES IN THE COMPLEX DIELECTRIC CONSTANT BY INERTIA FORCES ON FREE CARRIERS IN SI AND OTHER INDIRECT-GAP SEMICONDUCTORS. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /4ZZHT

AD-694 893 10/4 22/2
MASSACHUSETTS INST OF TECH LEXINGTON LINCOLN LAB

PERFORMANCE OF CADMIUM SULFIDE THIN FILM SOLAR CELLS IN A SPACE ENVIRONMENT. (U)

DESCRIPTIVE NOTE: JOURNAL ARTICLE,
DEC 68 4P STANLEY,ALAN G. ;
REPT. NO. JA-3359
CONTRACT: AF 19(628)-5167
MONITOR: ESD TR-69-196

UNCLASSIFIED REPORT
AVAILABILITY: PUB. IN PROCEEDINGS OF THE INSTITUTE OF ELECTRICAL AND ELECTRONICS ENGINEERS, V57 N4 P692-694 APR 69.
SUPPLEMENTARY NOTE: REVISION OF REPORT DATED 30 OCT 68.

DESCRIPTORS: (*SATELLITES(ARTIFICIAL), SOLAR PANELS), (*CADMIUM SULFIDES, SOLAR CELLS), (*SOLAR CELLS, RELIABILITY(ELECTRONICS)), FILMS, SPACE ENVIRONMENTAL CONDITIONS, THERMAL STABILITY, ELECTRICAL PROPERTIES, DEGRADATION (U)
IDENTIFIERS: *CADMIUM SULFIDE SOLAR CELLS, EVALUATION (U)

CADMIUM SULFIDE THIN FILM SOLAR CELLS HAVE BEEN SUBJECTED TO EXTENDED THERMAL CYCLING TESTS IN VACUUM TO SIMULATE THE CONDITIONS OF AN EARTH ORBITING SATELLITE. WHEN CYCLED UNDER LOAD, THE SOLAR CELLS EXHIBIT A SLOW LOSS OF OUTPUT. SEVERAL POSSIBLE CAUSES OF THIS LOSS ARE SUGGESTED. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD-695 104 20/12
AEROSPACE RESEARCH LABS WRIGHT-PATTERSON AFB OHIO

EMISSION FROM EXCITED TERMINAL STATES OF BOUND EXCITON COMPLEXES. (U)

AUG 69 15P REYNOLDS,D. C. ;
REPT. NO. ARL-69-0125
PROJ: AF-7885
TASK: 788500

UNCLASSIFIED REPORT
AVAILABILITY: PUB. IN ELECTRONIC STRUCTURES IN SOLIDS, P110-121 1969.

DESCRIPTORS: (*SEMICONDUCTORS, BAND THEORY OF SOLIDS), (*CADMIUM SULFIDES, EXCITONS), (*CADMIUM SELENIDES, EXCITONS), LINE SPECTRUM, ZEEMAN EFFECT, CRYOGENICS, IMPURITIES (U)
IDENTIFIERS: EMISSION SPECTRA (U)

EMISSION FROM THE EXCITED TERMINAL STATES OF BOUND EXCITON-DONOR COMPLEXES HAS BEEN OBSERVED IN CDS AND CDSE CRYSTALS. STUDYING THESE OPTICAL TRANSITIONS ALLOWS ONE TO DETERMINE THE DONOR IONIZATION ENERGIES, THE ELECTRON EFFECTIVE MASSES AS WELL AS THE ELECTRON G-VALUES IN THESE MATERIALS. A GOOD THEORETICAL FIT TO THE EXPERIMENTAL DATA WAS OBTAINED, USING THE EFFECTIVE MASS APPROXIMATION. EMISSION FROM THE EXCITED TERMINAL STATES OF BOUND EXCITON-ACCEPTOR COMPLEXES HAS NOT YET BEEN OBSERVED IN THESE MATERIALS. THERE IS NO BASIC REASON WHY SUCH TRANSITIONS SHOULD NOT OCCUR. STUDYING TRANSITIONS OF THIS TYPE WOULD ALLOW ONE TO OBTAIN FUNDAMENTAL INFORMATION CONCERNING THE ACCEPTOR IMPURITIES IN THESE MATERIALS. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD-695 110 20/12
AEROSPACE RESEARCH LABS WRIGHT-PATTERSON AFB OHIO

SOLID SOLUTIONS OF CADMIUM SULFIDE-CADMIUM SELENIDE FILMS: PREPARATION AND DETERMINATION BY X-RAY FLUORESCENCE METHOD, (U)

JUL 69 24P CHAN,FRANK L. ;CARPENTER, JAMES T. ;

REPT. NO. ARL-69-0111
PROJ: AF-7023
TASK: 702300

UNCLASSIFIED REPORT
AVAILABILITY: PUB. IN ADVANCES IN X-RAY ANALYSIS, V12 P581-600 1969.

DESCRIPTORS: (*CADMIUM SELENIDES, FILMS), (*CADMIUM SULFIDES, FILMS), THICKNESS, SOLID SOLUTIONS, X-RAY SPECTROSCOPY, FLUORESCENCE, DEPOSITION (U)
IDENTIFIERS: *X-RAY FLUORESCENCE ANALYSIS (U)

SOLID SOLUTIONS OF CADMIUM SULFIDE AND CADMIUM SELENIDE PREPARED BY SEVERAL METHODS AT TEMPERATURE IN EXCESS OF 1000C IN INERT ATMOSPHERE ARE DESCRIBED. THE COMPOSITIONS OF THESE SOLID SOLUTIONS VARIED WIDELY, RANGING FROM PURE CADMIUM SULFIDE TO PURE CADMIUM SELENIDE. FILMS OF SOLID SOLUTIONS HAVE BEEN SUCCESSFULLY PREPARED BY THE VACUUM DEPOSITION ON VARIOUS SUBSTRATES USING A PROCEDURE PREVIOUSLY REPORTED. CONDITIONS FOR THE DEPOSITIONS HAVE BEEN INVESTIGATED TO PREVENT NOTICEABLE ALTERATION OF THE COMPOSITION OF THE SOLID SOLUTION DURING VACUUM DEPOSITION. FILMS OF VARIOUS THICKNESSES HAVE BEEN PREPARED TO DATE. PROCEDURES HAVE BEEN ESTABLISHED FOR THE DETERMINATION OF BOTH COMPOSITION AND FILM THICKNESS BASED ON FLUORESCENCE INTENSITY DATA. THERE IS A RELATIONSHIP BETWEEN THE FLUORESCENCE INTENSITY AND APPEARANCE WHEN DEPOSITED FILMS ARE NOT OF THE SAME THICKNESS. CORRELATION OF THESE PHENOMENA WILL BE DEMONSTRATED. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD-695 232 20/13 7/4
PENNSYLVANIA UNIV PHILADELPHIA LAB FOR RESEARCH ON THE STRUCTURE OF MATTER

EXCITON-ENHANCED RAMAN SCATTERING BY OPTICAL PHONONS, (U)

SEP 68 8P PINCZUK,A. !USHIODA,S. ! BURSTEIN,E. !MILLS,D. L. !
CONTRACT: DA-31-124-ARO(D)-239
PROJ: DA-2-0-061102-B-11-B
MONITOR: AROD 4882:12-P

UNCLASSIFIED REPORT
AVAILABILITY: PUB. IN PHYSICAL REVIEW LETTERS, V22 N8 P348-352, 24 FEB 69.
SUPPLEMENTARY NOTE: PREPARED IN COOPERATION WITH CALIFORNIA UNIV., IRVINE. DEPT. OF PHYSICS, GRANT AF-AFOSR-1448-68.

DESCRIPTORS: (*SEMICONDUCTORS, BAND THEORY OF SOLIDS), (*RAMAN SPECTROSCOPY, EXCITONS), CADMIUM SULFIDES, INDIUM ANTIMONIDES, ELECTROOPTICS, PHONONS (U)
IDENTIFIERS: POLARITONS (U)

THE THEORY OF EXCITON-ENHANCED RAMAN SCATTERING IS FORMULATED IN TERMS OF THE SCATTERING OF POLARITONS BY OPTICAL PHONONS VIA THE EXCITON PART OF THE COUPLED MODES. THE EXPRESSION FOR THE EXCITON CONTRIBUTION TO THE SCATTERING TENSOR IS GIVEN, WITHIN A CONSTANT FACTOR, IN TERMS OF THE SAME PARAMETERS THAT DETERMINE THE EXCITON CONTRIBUTION TO THE FREQUENCY-DEPENDENT DIELECTRIC CONSTANT. THE THEORY ALSO PROVIDES A NEW MECHANISM FOR THE EXCITON CONTRIBUTION TO THE ELECTRO-OPTIC EFFECT. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD-695 823 20/12
PRINCETON UNIV N J DEPT OF ELECTRICAL ENGINEERING

SURFACE CONDUCTION IN CDS. (U)

DESCRIPTIVE NOTE: TECHNICAL REPT. NO. 3, MAR-AUG 69,
SEP 69 97P BAKER,ROGER T. ;MARK,PETER
;
CONTRACT: N00014-67-A-0151
PROJ: NR-051-492

UNCLASSIFIED REPORT

DESCRIPTORS: (*SEMICONDUCTORS, SURFACE PROPERTIES), (*CADMIUM SULFIDES, ELECTRICAL CONDUCTANCE), BAND THEORY OF SOLIDS, ELECTRIC CURRENTS, HALL EFFECT, SEEBECK EFFECT, DOPING, THESES (U)
IDENTIFIERS: *SURFACE RESISTIVITY (U)

USING FOUR TERMINAL CURRENT VOLTAGE MEASUREMENTS THE AUTHORS ESTABLISHED THAT FOR THIN CRYSTALS OF HIGH RESISTIVITY CDS ALL THE DARK CURRENT FLOWS IN A THIN LAYER NEAR THE SURFACE. IT IS ESTIMATED THAT THE BULK RESISTIVITY IS AT LEAST 100 TIMES HIGHER THAN THE SURFACE RESISTIVITY. THIS NATURAL SANDWICH STRUCTURE (TWO CONDUCTION LAYERS SEPARATED BY AN INSULATING LAYER) PRODUCES SEVERAL INTERESTING EFFECTS INCLUDING A SELF-FIELD EFFECT WHICH CAUSES A STRONG CURRENT SATURATION SIMILAR TO THAT SEEN BUT NOT EXPLAINED BY BUBE AND BARTON. AFTER ESTABLISHING THAT A SURFACE CONDUCTIVITY EXISTED, HALL AND THERMOELECTRIC POWER MEASUREMENTS WERE MADE TO DETERMINE THE TRANSPORT PROPERTIES OF THE SURFACE LAYER. FROM THESE MEASUREMENTS IT WAS NOT POSSIBLE TO DETERMINE WHETHER THE SURFACE CONDUCTION WAS DUE TO A BENT CONDUCTION BAND CAUSED BY NONUNIFORM DOPING, BANDING OF SURFACE IMPURITIES, OR BANDING OF INTRINSIC SURFACE STATES. EXAMINATION OF THE LITERATURE ON THE CHEMICAL PROPERTIES OF CRYSTALLINE CDS INDICATED THAT EVEN AT ROOM TEMPERATURE THE SURFACE MAY REACT WITH OXYGEN ESPECIALLY IN THE PRESENCE OF BANDGAP ILLUMINATION AND MOISTURE. BASED ON THE CHEMICAL PROPERTIES OF CDS SURFACES A GENERAL MODEL IS PROPOSED TO EXPLAIN SOME OF THE ELECTRONIC PROPERTIES OF CDS. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD-697 002 20/12
DELAWARE UNIV NEWARK DEPT OF PHYSICS

EFFECTIVE WORK FUNCTION OF METAL CONTACTS TO VACUUM-CLEAVED PHOTOCONDUCTING CDS FOR HIGH PHOTOCURRENTS. (U)

DESCRIPTIVE NOTE: TECHNICAL REPT.,
NOV 69 14P STIRN,RICHARD J. ;BOER, KARL W. ;
REPT. NO. TR-28
CONTRACT: NONR-4336(00)

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: PRESENTED AT THE AMERICAN PHYSICAL SOCIETY IN MIAMI BEACH, FLA. NOV 68.

DESCRIPTORS: (*CADMIUM SULFIDES, NEGATIVE RESISTANCE CIRCUITS), (*ELECTRIC TERMINALS, WORK FUNCTIONS), ELECTRON DENSITY, CARRIERS(SEMICONDUCTORS), PHOTOCONDUCTIVITY, LOW-TEMPERATURE RESEARCH (U)
IDENTIFIERS: NEGATIVE DIFFERENTIAL CONDUCTIVITY, METAL SEMICONDUCTOR CONTACTS, ELECTRIC CONTACTS, HIGH FIELD DOMAINS (U)

STATIONARY CATHODE-ADJACENT HIGH-FIELD DOMAINS WHICH OCCUR IN A RANGE OF NEGATIVE DIFFERENTIAL CONDUCTIVITY HAVE BEEN USED TO DETERMINE THE ELECTRON DENSITY AT THE CATHODE FOR VARIOUS METALS DEPOSITED ON VACUUM-CLEAVED PHOTOCONDUCTING CDS. MEASUREMENTS WERE TAKEN IN BANDGAP LIGHT AT VARIOUS INTENSITIES AND AT TEMPERATURES RANGING FROM 155 TO 300 DEGREES K. THESE CRYSTALS (DOPED WITH AG AND AL) CONSISTENTLY HAVE GAINS GREATER THAN 10 EVEN WITH METAL CONTACTS OF AU OR PT. THE ANALYSIS SHOWS THAT THE 'EFFECTIVE BARRIER HEIGHTS' ARE ESSENTIALLY INDEPENDENT OF THE METAL WORK FUNCTION, ARE DEPENDENT ON THE LIGHT INTENSITY AND TEMPERATURE, AND ARE GENERALLY LOWER IN MAGNITUDE BY ABOUT 40% AS COMPARED TO VALUES OBTAINED FROM PHOTORESPONSE MEASUREMENTS ON CDS WITH NEGLIGIBLE PHOTOCURRENT. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD-697 237 20/12 9/1
CALIFORNIA UNIV BERKELEY ELECTRONICS RESEARCH LAB

EXCITATION AND DETECTION OF SURFACE ELASTIC WAVES IN PIEZOELECTRIC CRYSTALS. (U)

69 14P JOSHI,S. G. ;WHITE,R. M.

;
CONTRACT: DA-ARO(D)-31-124-G1057
MONITOR: AROD 5718:5-E

UNCLASSIFIED REPORT
AVAILABILITY: PUB. IN JNL. OF THE ACOUSTICAL SOCIETY OF AMERICA, V46 N1 (PART 1) P17-21 JUL 69.

DESCRIPTORS: (*PIEZOELECTRIC CRYSTALS, MECHANICAL WAVES), (*MECHANICAL WAVES, EXCITATION), PIEZOELECTRIC TRANSDUCERS, SINGLE CRYSTALS, CADMIUM SULFIDES, QUARTZ, ELASTICITY, ELECTRIC FIELDS, SEMICONDUCTORS, DETECTION, THESES (U)
IDENTIFIERS: PIEZOELECTRIC SEMICONDUCTORS (U)

THE AMPLITUDE OF THE SURFACE ELASTIC WAVE PRODUCED BY THE APPLICATION OF AN ALTERNATING VOLTAGE TO AN INTERDIGITAL ARRANGEMENT OF ELECTRODES ON THE SURFACE OF A PIEZOELECTRIC MEDIUM IS DETERMINED. THE ELECTRIC FIELD PRODUCED BY THE SURFACE ELECTRODES IS CALCULATED SUBJECT TO THE ASSUMPTION THAT THE PIEZOELECTRIC COUPLING OF THE MATERIAL CAN BE NEGLECTED. THIS ELECTRIC FIELD ACTS AS THE FORCING TERM FOR THE INHOMOGENEOUS ELASTIC EQUATION, WHICH IS THEN SOLVED TO OBTAIN THE AMPLITUDE OF THE SURFACE WAVE GENERATED BY THE TRANSDUCER. A RECIPROCAL RELATIONSHIP BETWEEN THE EXCITATION AND DETECTION PROBLEMS IS USED TO OBTAIN THE POWER EXTRACTED FROM THE SURFACE WAVE BY AN INTERDIGITAL ARRANGEMENT OF SURFACE ELECTRODES. MEASUREMENTS MADE ON SINGLE CRYSTALS OF QUARTZ AND CADMIUM SULFIDE ARE FOUND TO BE IN GOOD AGREEMENT WITH THEORETICAL PREDICTIONS. THE MAXIMUM VALUE OF THE PRODUCT (EFFICIENCY X FRACTIONAL BANDWIDTH) FOR A SURFACE-WAVE TRANSDUCER IS CALCULATED. FOR AN INTERDIGITAL SURFACE-WAVE TRANSDUCER ON THE BASAL PLANE OF CDS, THE MAXIMUM VALUE OF THIS PRODUCT IS FOUND TO BE 0.078. IT IS SHOWN THAT ONE CAN CONNECT LINEAR PAIRS OF SURFACE ELECTRODES IN AN APPROPRIATE BINARY CODE SO AS TO OBTAIN HIGH EFFICIENCY AND LARGE BANDWIDTH TRANSDUCERS. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD-698 341 20/12
HUGHES AIRCRAFT CO CULVER CITY CALIF ELECTRONIC PROPERTIES INFORMATION CENTER

II-VI SEMICONDUCTING COMPOUNDS DATA TABLES, (U)

OCT 69 166P NEUBERGER,METTA I

REPT. NO. EPIC-S-11
CONTRACT: F33615-68-C-1225
PROJ: AF7381, AF-8975
TASK: /38103, 897503

UNCLASSIFIED REPORT

DESCRIPTORS: (*SEMICONDUCTORS, PHYSICAL PROPERTIES), ELECTRICAL PROPERTIES, MAGNETIC PROPERTIES, MECHANICAL PROPERTIES, OPTICAL PROPERTIES, THERMAL PROPERTIES, CRYSTAL STRUCTURE, BARIUM COMPOUNDS, BERYLLIUM COMPOUNDS, CADMIUM COMPOUNDS, CALCIUM COMPOUNDS, MAGNESIUM COMPOUNDS, MERCURY COMPOUNDS, STRONTIUM COMPOUNDS, ZINC COMPOUNDS, OXIDES, SELENIDES, SULFIDES, TELLURIDES, TABLES (U)

THE TABLES INCLUDE THE MOST RELIABLE INFORMATION AVAILABLE TO DATE FOR THE MECHANICAL, CRYSTALLOGRAPHIC, PHYSICAL, THERMAL, MAGNETIC, ELECTRONIC AND OPTICAL PROPERTIES OF EACH OF THE 2-6 BINARY SEMICONDUCTING COMPOUNDS. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD-699 721 20/12
DELAWARE UNIV NEWARK DEPT OF PHYSICS

TRAP-CONTROLLED FIELD INSTABILITIES IN PHOTOCONDUCTING CDS CAUSED BY FIELD-QUENCHING, (U)

APR 69 8P BOEER,K. W. ;

UNCLASSIFIED REPORT
AVAILABILITY: PUB. IN IBM JNL. OF RESEARCH AND DEVELOPMENT, V13 N5 P573-579 SEP 69.
SUPPLEMENTARY NOTE: SPONSORED IN PART BY OFFICE OF NAVAL RESEARCH.

DESCRIPTORS: (*CADMIUM SULFIDES, ELECTRICAL CONDUCTANCE), CARRIERS(SEMICONDUCTORS), ELECTRIC FIELDS, ELECTRON DENSITY, PHOTOCONDUCTIVITY (U)
IDENTIFIERS: HIGH FIELD DOMAINS, NEGATIVE DIFFERENTIAL CONDUCTIVITY, SEMICONDUCTOR TRAPS (U)

THE FORMATION OF STATIONARY HIGH-FIELD DOMAINS ADJACENT TO CATHODE OR ANODE, DEPENDENT ON THE CONTACT POTENTIAL OF THE ELECTRODES, THEIR WIDENING WITH INCREASED APPLIED VOLTAGE AND THEIR TRANSITION INTO TWO TYPES OF MOVING DOMAINS ARE DISCUSSED. DOMAINS WHICH MOVE UNDER DEFORMATION OF THE DOMAIN PROFILE AND USUALLY DISSOLVE BEFORE THEY REACH THE ANODE, AND NEARLY UNDEFORMED MOVING DOMAINS ARE DESCRIBED. THE STRUCTURE AND KINETICS OF THESE DOMAINS ARE DIRECTLY OBSERVED USING THE FRANZ-KELDYSH EFFECT AND PHOTOGRAPHS OF TYPICAL DOMAIN FORMS ARE PRESENTED. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /4ZZHT

AD-700 269 20/12
ILLINOIS UNIV URBANA COORDINATED SCIENCE LAB

PHOTOLUMINESCENT PROPERTIES OF VACUUM DEPOSITED CADMIUM SULFIDE FILMS. (U)

DESCRIPTIVE NOTE: DOCTORAL THESIS,
JAN 70 159P BLEHA,WILLIAM PAUL , JR.
REPT. NO. R-454
CONTRACT: DAAB07-67-C-0199, DAAKU2-67-C-0546

UNCLASSIFIED REPORT

DESCRIPTORS: (*SEMICONDUCTING FILMS, VAPOR PLATING), (*CADMIUM SULFIDES, LUMINESCENCE), PHOTOSENSITIVITY, RESISTANCE(ELECTRICAL), HALL EFFECT, PHOTOCONDUCTIVITY, VACUUM APPARATUS, PHONONS, CRYOGENICS, THESES (U)
IDENTIFIERS: *PHOTOLUMINESCENCE (U)

GREEN AND BLUE PHOTOLUMINESCENCE HAS BEEN OBSERVED BELOW 100 DEGREES K IN VACUUM DEPOSITED, LOW RESISTIVITY CDS FILMS GIVEN NO POST DEPOSITION TREATMENT. THE FILMS WERE DEPOSITED IN A HEATED CHAMBER INSIDE THE BELL JAR ON FUSED QUARTZ SUBSTRATES HELD AT TEMPERATURES FROM 140-180 DEGREES C. THE BACKGROUND PRESSURE IN THE VACUUM SYSTEM WAS 0.000 001 TORR. THE EVAPORANT USED WAS CHLORINE-DOPED CDS POWDER. THE CHLORINE DOPING ACTIVATED THE LUMINESCENCE AND GAVE FILMS THAT HAD RESISTIVITIES AT 300 DEGREES K IN THE RANGE OF FROM 1 TO 100 OHM-CM PARALLEL TO THE SUBSTRATE. THE GREEN LUMINESCENCE IN THE FILMS AT 77 DEGREES K WAS SIMILAR TO THE EMISSION REPORTED FOR DONOR-DOPED CDS. THE GREEN EMISSION SPECTRA OBSERVED AT 10 DEGREES K BECAME BETTER RESOLVED THAN AT 77 DEGREES K, AND THE PEAK POSITION SHIFT WITH TEMPERATURE WAS SMALL. THE BLUE EMISSION PEAK OBSERVED IN THE FILMS WAS AT 4892 A AT 77 DEGREES K, WHICH IS IN THE FUNDAMENTAL ABSORPTION EDGE. SOME OF THE LITERATURE RELATING TO THE THEORY AND PRACTICE OF CDS VACUUM DEPOSITION IS REVIEWED. ALSO A SUMMARY OF THE PROPERTIES OF THE GREEN LUMINESCENCE OF PURE AND DONOR-DOPED CDS IS GIVEN.
(AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD-700 500 10/2 22/2
DEFENSE DOCUMENTATION CENTER ALEXANDRIA VA

SOLAR CELLS AND SOLAR PANELS. VOLUME I. (U)

DESCRIPTIVE NOTE: REPORT BIBLIOGRAPHY, JAN 58-OCT 69.
JAN 70 111P
REPT. NO. DDC-TAS-69-74-1

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: SEE ALSO VOLUME 2, AD-866 200, AND VOLUME 3, AD-866 201.

DESCRIPTORS: (*SOLAR CELLS, *BIBLIOGRAPHIES), (*SOLAR PANELS, BIBLIOGRAPHIES), PHOTOELECTRIC CELLS(SEMICONDUCTOR), ELECTRIC POWER PRODUCTION, EXTENDABLE STRUCTURES, SPACECRAFT COMPONENTS, SILICON, GALLIUM ARSENIDES, CADMIUM SULFIDES, OPTICAL COATINGS, RADIATION DAMAGE, MANUFACTURING METHODS, SEMICONDUCTING FILMS, RELIABILITY(ELECTRONICS), SOLAR RADIATION, POSITIONING DEVICES(MACHINERY), CRYSTAL STRUCTURE, FLIGHT TESTING (U)
IDENTIFIERS: THIN FILMS (U)

AN ANNOTATED BIBLIOGRAPHY IS PROVIDED OF DOCUMENTS IN WHICH PERFORMANCE CHARACTERISTICS OF VARIOUS SOLAR CELLS, PARTICULARLY TYPES CONTAINING GALLIUM ARSENIDES, SILICON, OR CADMIUM SULFIDES, ARE EVALUATED. OTHER REPORTS INCLUDE SOLAR-CELL FABRICATION, DEVELOPMENT OF SOLAR-CELL POWER SYSTEMS GENERATING HIGHER ELECTRICAL POWER LEVELS, IN-FLIGHT SOLAR-CELL DEGRADATION STUDIES, AND SYSTEMS FOR ORIENTING SOLAR PANELS CONTINUOUSLY TOWARD THE SUN. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD-700 554 14/2 11/3
AEROSPACE RESEARCH LABS WRIGHT-PATTERSON AFB OHIO

DISPERSIVE AND NONDISPERSIVE X-RAY FLUORESCENCE METHODS FOR THE MEASUREMENT OF THE THICKNESSES OF FILMS OF CADMIUM SULFIDE AND OTHER II-VI COMPOUNDS. (U)

DEC 69 31P CHAN,FRANK L. I
REPT. NO. ARL-69-0226
PROJ: AF-7023
TASK: 702300

UNCLASSIFIED REPORT
AVAILABILITY: PUB. IN DEVELOPMENTS IN APPLIED SPECTROSCOPY, V7A PP-30 1969.

DESCRIPTORS: (*SEMICONDUCTING FILMS, THICKNESS), (*CADMIUM SULFIDES, SEMICONDUCTING FILMS), SEMICONDUCTORS, X-RAY SPECTROSCOPY, MEASUREMENT, CADMIUM SULFIDES, CADMIUM SELENIDES (U)
IDENTIFIERS: *GROUP 2B-6A COMPOUNDS, *X-RAY FLUORESCENCE ANALYSIS (U)

CADMIUM SULFIDE AND OTHER II-VI COMPOUNDS HAVE BEEN DEPOSITED ON VARIOUS SUBSTRATES BY THE VACUUM TECHNIQUE USING A SET UP CONSISTING OF A MECHANICAL PUMP AND A DIFFUSION PUMP. ATTEMPTS ARE BEING MADE TO EMPLOY A HIGH-SPEED TURBOMOLECULAR PUMP TO PRODUCE THE NECESSARY VACUUM. SUCH PUMPS HAVE BEEN CLAIMED TO PRODUCE HIGHER VACUUM THAN THOSE OF EARLIER TYPES. THE USE OF X-RAY FLUORESCENCE SEEMS TO BE THE BEST METHOD FOR THE DETERMINATION OF THICKNESSES OF FILMS OF THESE COMPOUNDS. BY USING THIS METHOD THE DETERMINATION CAN BE CARRIED OUT BOTH RAPIDLY AND NONDESTRUCTIVELY, SO THAT THE SAMPLES CAN BE USED FOR FURTHER EXPERIMENTATION OR PRESERVED FOR FUTURE REFERENCE. BOTH THE VACUUM AND AIRPATH SPECTROMETERS WERE EMPLOYED WITH THE DISPERSIVE (CONVENTIONAL) X-RAY FLUORESCENCE METHOD, DEPENDING ON THE X-RAY SPECTRA USED AND THE FILM THICKNESS TO BE DETERMINED. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD-700 555 20/12
AEROSPACE RESEARCH LABS WRIGHT-PATTERSON AFB OHIO

EMISSION FROM EXCITED TERMINAL STATES OF BOUND EXCITON COMPLEXES. (U)

JUN 69 8P REYNOLDS,D. C. ;COLLINS,T. C. ;

REPT. NO. ARL-69-0221
PROJ: AF-7885

UNCLASSIFIED REPORT
AVAILABILITY: PUB. IN ZEITSCHRIFT FUER NATURFORSHUNG, V24A N9 P1311-1316 1969.

DESCRIPTORS: (*LUMINESCENCE, *EXCITONS), (*SEMICONDUCTORS, EXCITONS), CRYSTAL LATTICE DEFECTS, GERMANIUM COMPOUNDS, IMPURITIES, EXCITATION, MAGNETIC FIELDS, CADMIUM SULFIDES (U)
IDENTIFIERS: *GROUP 2A-6A COMPOUNDS, EMISSION SPECTRA (U)

EMISSION FROM THE EXCITED TERMINAL STATES OF BOUND EXCITON-DONOR COMPLEXES HAS BEEN OBSERVED IN SEVERAL II-VI COMPOUNDS. STUDYING THESE OPTICAL TRANSITIONS ALLOWS ONE TO DETERMINE THE DONOR IONIZATION ENERGIES, THE ELECTRON EFFECTIVE MASSES AS WELL AS THE ELECTRON G-VALUES IN THESE MATERIALS. A GOOD THEORETICAL FIT TO THE EXPERIMENTAL DATA WAS OBTAINED, USING THE EFFECTIVE MASS APPROXIMATION. EMISSION FROM THE EXCITED TERMINAL STATES OF BOUND EXCITON-ACCEPTOR COMPLEXES HAS NOT YET BEEN OBSERVED IN THESE MATERIALS. THERE IS NO BASIC REASON WHY SUCH TRANSITIONS SHOULD NOT OCCUR. STUDYING TRANSITIONS OF THIS TYPE WOULD ALLOW ONE TO OBTAIN FUNDAMENTAL INFORMATION CONCERNING THE ACCEPTOR IMPURITIES IN THESE MATERIALS. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD-700 891 9/1 17/7 17/9 20/2
20/12

THOMSON-CSF PARIS (FRANCE)

REVUE TECHNIQUE THOMSON-CSF. VOLUME 1, NUMERO 3, (U)

SEP 69 169P DELAGEBEAUDEUF,D. ;DIAMAND, F. ;MOULIN,M. ;WENDT,G. ;TIEN,TRAN DOC ;

UNCLASSIFIED REPORT
AVAILABILITY: PUB. IN REVUE TECHNIQUE THOMSON CSF, V1 N3 P309-480 SEP 69. NO COPIES FURNISHED.

DESCRIPTORS: (*AVALANCHE DIODES, SIGNALS), (*SEMICONDUCTING FILMS, ULTRASONIC RADIATION), (*CADMIUM SULFIDES, CRYSTAL GROWTH), (*IMAGE TUBES, *FIBER OPTICS), (*ION ACCELERATORS, OPERATION), (*RADAR ECHO AREAS, DETECTION), (*NAVIGATION SATELLITES, *NAVIGATIONAL AIDS), FRANCE (U)

IDENTIFIERS: TRAVELING WAVES, CHEMICAL VAPOR DEPOSITION, HOLOGRAPHY (U)

CONTENTS: ANALYSIS OF LARGE-SIGNAL OPERATION OF AVALANCHE DIODES IN THE TRANSIT MODE; THEORY OF THE TRAVELLING WAVE AMPLIFICATION IN A SEMICONDUCTOR FILM COUPLED TO AN ELECTROMAGNETIC DELAY LINE; STUDY OF THE GROWTH OF CADMIUM SULFIDE MONOCRYSTALS; PROBLEMS APPEARING AT MEASUREMENTS OF THE MODULATION TRANSFER FUNCTION OF OPTIC FIBERS FOR ELECTRONIC TUBES AND DETERMINATION OF SAID FUNCTION BY THE EDGE METHOD; AN APPROACH TO THE CALCULATION OF BEAM LOADING IN AN ACCELERATING STRUCTURE OPERATING UNDER STEADY-STATE AND TRANSIENT CONDITIONS; AUTOMATIC DETECTOR OF RADAR ECHOES WITH A CONSTANT FALSE ALARM RATIO; AND DIOMEDE, OPTICAL CORRELATOR SYSTEM FOR QUICK DISTANCE MEASUREMENT. (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD-701 043 20/12
DAYTON UNIV OHIO DEPT OF PHYSICS

LATTICE DYNAMICS OF CDS. I. NEAREST NEIGHBOR APPROXIMATION. (U)

NOV 69 58P FRANK,EUGENE N. I

CONTRACT: F33615-67-C-1027
PROJ: AF-7885
TASK: 788500
MONITOR: ARL 69-0184

UNCLASSIFIED REPORT

DESCRIPTORS: (*CADMIUM SULFIDES, *BRILLOUIN ZONES), CRYSTAL LATTICES, MATRIX ALGEBRA, SEMICONDUCTORS, PHONONS (U)
IDENTIFIERS: *LATTICE VIBRATIONS (U)

THE REPORT PRESENTS THE FIRST PART OF A STUDY ON THE LATTICE DYNAMICS OF CDS AND ASSUMES ONLY NEAREST-NEIGHBOR INTERACTION BETWEEN THE IONS. THE STRUCTURE OF CADMIUM SULFIDE IN ITS WURTZITE FORM IS DISCUSSED. A SHORT DISCUSSION OF THE FIRST BRILLOUIN ZONE OF THE CRYSTAL IS GIVEN. THE EQUATIONS OF MOTION OF THE LATTICE ARE DERIVED ASSUMING A ONE PARAMETER NEAREST NEIGHBOR TYPE OF POTENTIAL. THE USUAL FORM FOR DISPLACEMENTS IN A PERIODIC POTENTIAL IS ASSUMED. AS THERE ARE FOUR ATOMS IN THE BASIS, THERE ARE FOUR INDEPENDENT VECTOR DISPLACEMENTS INVOLVED. THE DYNAMICAL MATRIX OBTAINED IS DIAGONALIZED YIELDING THE EIGENVALUES AND EIGENVECTORS OF THE MATRIX. THE EIGENVALUES ARE THE NORMAL MODE FREQUENCIES SQUARED OF THE PHOTONS. THE EIGENVECTORS ARE CLOSELY RELATED TO THE NORMAL MODES OF THE LATTICE. THIS RELATIONSHIP IS DEMONSTRATED EXPLICITLY FOR THE WAVE VECTORS AT THE GAMMA POINT OF THE BRILLOUIN ZONE. DISPERSION CURVES ARE GIVEN INDICATING THE PHONON ENERGIES PREDICTED BY THIS MODEL FOR FOURTEEN SYMMETRY POINTS OF THE BRILLOUIN ZONE. IT IS FOUND THAT THIS MODEL GIVES ONLY QUALITATIVE AGREEMENT WITH EXPERIMENT. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD-702 095 20/12 20/3 10/2
CLEVITE CORP CLEVELAND OHIO ELECTRONIC RESEARCH DIV

RESEARCH ON THE MECHANISM OF THE PHOTOVOLTAIC EFFECT IN HIGH EFFICIENCY CDS THIN-FILM SOLAR CELLS. (U)

DESCRIPTIVE NOTE: FINAL TECHNICAL REPT. 1 JUN 66-31 MAY 69,
OCT 69 217P SHIOZAWA,L. R. (AUGUSTINE, F. (SULLIVAN,G. A. (SMITH,J. M. , III.) COOK,W. R. , JR)
CONTRACT: AF 33(615)-5224
PROJ: AF-7885, CLEVITE-30333D
MONITOR: ARL 69-0155

UNCLASSIFIED REPORT

DESCRIPTORS: (*SOLAR CELLS, PERFORMANCE(ENGINEERING)), (*SEMICONDUCTING FILMS, BAND THEORY OF SOLIDS), CADMIUM SULFIDES, COPPER COMPOUNDS, SULFIDES, PHOTOCONDUCTIVITY, EPITAXIAL GROWTH, SINGLE CRYSTALS, PHASE STUDIES, MICROSTRUCTURE (U)
IDENTIFIERS: *PHOTOVOLTAIC EFFECT, COPPER SULFIDES, HETEROJUNCTIONS (U)

THREE YEARS OF RESEARCH ON THE OPERATING MECHANISMS OF THE CDS THIN-FILM SOLAR CELL ARE DESCRIBED IN THIS REPORT. THE ESSENTIAL INFORMATION CONTAINED IN ALL REPORTS PREVIOUSLY ISSUED UNDER THIS CONTRACT HAS BEEN REASSEMBLED. NEW INFORMATION, NOT PREVIOUSLY REPORTED INCLUDE DATA ON THE ANTIMONOCHROMATIC SPECTRAL RESPONSE OF DIFFERENT TYPES OF CELLS, MEASUREMENTS OF THE THRESHOLD VOLTAGE FOR ELECTROLYTIC DEPOSITION OF COPPER FROM CU2S, OBSERVATIONS ON THE FORMATION OF COPPER WHISKERS ON CU2S BY HEATING, X-RAY CRYSTALLOGRAPHIC DATA ON LOW-TEMPERATURE PHASE TRANSFORMATIONS OF CUPROUS SULFIDE, MEASUREMENTS OF OPTICAL TRANSMISSION OF CU-SATURATED CDS SINGLE CRYSTALS, DATA ON THE PHOTOCONDUCTIVE RISE AND DECAY TIMES OF CU-COMPENSATED CDS, DISCUSSION OF THE BENEFICIAL ROLE OF OXYGEN IN PROMOTING THE PHOTOVOLTAIC EFFECT DURING CELL FABRICATION, AND THE SUBSEQUENT DEGRADING EFFECTS OF OXYGEN DURING HIGH TEMPERATURE EXPOSURE. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD-702 778 20/12
HUGHES RESEARCH LABS MALIBU CALIF

SELECTIVE DOPING FOR PIEZOELECTRIC CRYSTALS BY ION IMPLANTATION. (U)

DESCRIPTIVE NOTE: TECHNICAL REPT. NO. 2, 1 JUL-31 DEC 69,
DEC 69 19P SHIFRIN,G. A. ;JAMBA,D. M. ;JONES,W. R. ;MARSH,O. J. ;WAUK,M. T. ;
CONTRACT: N00014-69-C-0171
PROJ: NR-251-001, WR008-03

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: SEE ALSO SEMIANNUAL REPT. NO. 1, AD-693 154.

DESCRIPTORS: (*PIEZOELECTRIC CRYSTALS, ION BOMBARDMENT), (*SEMICONDUCTORS, DOPING), CADMIUM SULFIDES, GALLIUM ARSENIDES, ZINC COMPOUNDS, OXIDES, PIEZOELECTRIC TRANSDUCERS, ULTRASONIC RADIATION (U)
IDENTIFIERS: *ION IMPLANTATION, PIEZOELECTRIC SEMICONDUCTORS, ZINC OXIDES (U)

THE FEASIBILITY OF CREATING N-TYPE CONDUCTING REGIONS IN PIEZOELECTRIC CRYSTALS BY ION IMPLANTATION IS BEING INVESTIGATED. EXPERIMENTAL STUDIES HAVE BEEN PERFORMED WITH CRYSTALS OF CDS, ZNO, AND GAAS AND DOPANT IONS OF H, B, F, AL, CL, AND GA. TO DATE, ZNO, CDS, AND GAAS HAVE BEEN DOPED BY ION IMPLANTATION. THE ZNO WORK IS BEING EXTENDED TO INCLUDE HIGH RESISTIVITY LI-DOPED MATERIAL. SEMI-INSULATING GAAS WAS DOPED P-TYPE BY CD(+) IMPLANTATION; S(+) IMPLANTATION WILL BE USED TO PRODUCE THE DESIRED N-TYPE CONDUCTION. ACOUSTIC WAVE PROPAGATION AND TRANSDUCER INTERACTION CALCULATIONS ARE REPORTED FOR BOTH ZNO AND GAAS. PRELIMINARY CALCULATIONS FOR THE MONOLITHIC AMPLIFIER CONCEPT IN GAAS ARE REPORTED. A COMPUTER PROGRAM HAS BEEN DEVELOPED WHICH CALCULATES THE ATTENUATION IN THE AMPLIFICATION FOR PARALLEL ACOUSTIC PROPAGATION AND APPLIED ELECTRIC FIELD. PRELIMINARY RESULTS FOR ACOUSTIC MONOLITHIC AMPLIFIER OPERATION CHARACTERISTICS ARE REPORTED FOR BOTH ZNO AND GAAS; LARGE GAINS RESULT FOR ZNO. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD-705 725 20/1 20/12
MASSACHUSETTS INST OF TECH CAMBRIDGE RESEARCH LAB OF ELECTRONICS

A. ULTRASONIC DISPERSION IN PIEZOELECTRIC SEMICONDUCTORS. B. NONLINEAR SOUND TRANSMISSION THROUGH AN ORIFICE. (U)

DESCRIPTIVE NOTE: QUARTERLY PROGRESS REPT. NO. 97, 70 10P KRISCHER,CHARLES ;INGARD,UNO
;
CONTRACT: N0001467-A-0204-0019

UNCLASSIFIED REPORT
AVAILABILITY: PUB. IN PHYSICAL ACOUSTICS, P29-35, 15 APR 70.
SUPPLEMENTARY NOTE: SEE ALSO QUARTERLY PROGRESS REPT. NO. 96, AD-701 215.

DESCRIPTORS: (*SEMICONDUCTORS, PIEZOELECTRIC EFFECT), (*CADMIUM SULFIDES, ULTRASONIC RADIATION), (*SOUND TRANSMISSION, FLOW SEPARATION), MATHEMATICAL ANALYSIS, ORIFICES (U)
IDENTIFIERS: *PIEZOELECTRIC SEMICONDUCTORS, PHASE VELOCITY (U)

A. IT IS SHOWN THAT THE ULTRASONIC VELOCITY IN SEMICONDUCTING CDS, IN THE PRESENCE OF AN ELECTRIC DRIFT FIELD, CAN EXCEED THE PIEZOELECTRICALLY STIFFENED VALUE FOR THE INSULATING MATERIAL, IF THE ELECTRON-TRAPPING RELAXATION TIME IS NONZERO. B. WHEN SOUND OF SUFFICIENTLY HIGH AMPLITUDE IS TRANSMITTED THROUGH A SHARP-EDGED ORIFICE IN A PLATE, FLOW SEPARATION WILL OCCUR, AND THE VELOCITY OF THE OSCILLATORY FLOW THROUGH THE ORIFICE IS NO LONGER LINEARLY RELATED TO THE INCIDENT SOUND PRESSURE. AS A RESULT, THE TRANSMITTED SOUND WILL BE DISTORTED SO THAT ITS FREQUENCY SPECTRUM WILL BE DIFFERENT FROM THAT OF THE INCIDENT SOUND. THIS EFFECT HAS BEEN STUDIED EXPERIMENTALLY FOR THE CASE IN WHICH THE INCIDENT SOUND IS A PURE TONE. IN THIS EXPERIMENT THE ORIFICE PLATE WAS SET ACROSS A DUCT THAT WAS TERMINATED BY A 100% ABSORBER. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /4ZZHT

AD-706 097 20/12
COLORADO UNIV BOULDER PHOTOCONDUCTIVE SEMICONDUCTORS AND DEVICES LAB

SYNTHESIS AND CHARACTERIZATION OF THIN FERROELECTRIC AND SEMICONDUCTING FILMS. (U)

DESCRIPTIVE NOTE: FINAL TECHNICAL REPT. 1 OCT 66-30 SEP 69,
APR 70 143P CHERNOW,FRED I
CONTRACT: F33615-67-C-1050
PROJ: AF-7371
TASK: 737102
MONITOR: AFML TR-70-9

UNCLASSIFIED REPORT

DESCRIPTORS: (*FERROELECTRIC MATERIALS, SYNTHESIS(CHEMISTRY)), (*SEMICONDUCTING FILMS, SYNTHESIS(CHEMISTRY)), (*CADMIUM SULFIDES, DOPING), ION BOMBARDMENT, HALL EFFECT, LUMINESCENCE, SINGLE CRYSTALS, BISMUTH COMPOUNDS, TITANIUM COMPOUNDS, DIOXIDES, CRYOGENICS, FILMS (U)
IDENTIFIERS: *ION IMPLANTATION, THIN FILMS, *TITANIUM OXIDES, INJECTION LUMINESCENCE, SEMICONDUCTOR JUNCTIONS (U)

THE RESULTS OF A SERIES OF ELECTRICAL MEASUREMENTS ON THIN TIO2 FILMS ARE DESCRIBED HEREIN. SUCH FILMS CONSISTENTLY SHOW A NEGATIVE RESISTANCE EFFECT WHEN NOBLE METAL ELECTRODES ARE PLACED IN CONTACT WITH THEM. THE MAJOR PORTION OF THIS TECHNICAL REPORT IS CONCERNED WITH ION IMPLANTATION OF SINGLE CRYSTAL CADMIUM SULFIDE. THE EXPERIMENTAL PROGRAM STUDIED THE EFFECTS OF GROUP V IMPLANTS. IT WAS FOUND THAT BISMUTH IMPLANTATIONS TYPE CONVERTED CDS FROM ITS NATURAL N-TYPE STATE. P-N JUNCTIONS WERE CONSTRUCTED AND ROOM TEMPERATURE LIGHT EMISSION WAS OBSERVED IN THE FORWARD BIASED MODE. SOME OF THE ASPECTS OF LOW ENERGY ION IMPLANTATION (25-50 KEV) WERE INVESTIGATED SUCH AS PENETRATION DEPTH AND DAMAGE. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD-706 455 20/12
DELAWARE UNIV NEWARK DEPT OF PHYSICS

INFLUENCE OF BOUNDARY CONDITIONS ON HIGH-FIELD DOMAINS IN GUNN DIODES. (U)

MAY 69 8P BOER,K. W. IDOEHLER,G. I

UNCLASSIFIED REPORT
AVAILABILITY: PUB. IN THE PHYSICAL REVIEW, V186 N3 P793-800, 15 OCT 69.
SUPPLEMENTARY NOTE: SPONSORED IN PART BY OFFICE OF NAVAL RESEARCH, WASHINGTON, D. C.

DESCRIPTORS: (*MICROWAVE OSCILLATORS, *DIODES(SEMICONDUCTOR)), (*CARRIERS(SEMICONDUCTORS), MOBILITY), ELECTRICAL CONDUCTANCE, NEGATIVE RESISTANCE CIRCUITS, CADMIUM SULFIDES (U)
IDENTIFIERS: *GUNN DIODES, *HIGH FIELD DOMAINS, NEGATIVE DIFFERENTIAL CONDUCTIVITY (U)

USING THE METHOD OF THE FIELD OF DIRECTIONS, THE INFLUENCE OF THE BOUNDARY CONDITIONS ON STATIONARY AND MOVING HIGH-FIELD DOMAINS IN GUNN DIODES IS ANALYZED AND DISCUSSED. A CRITERION FOR SELF-INDUCED INSTABILITIES, ESPECIALLY THE GUNN OSCILLATIONS, IS GIVEN. IT IS SHOWN THAT STATIONARY DOMAINS MUST OCCUR PRECEDING THE GUNN OSCILLATIONS, AND THAT SUCH OSCILLATIONS CAN ONLY OCCUR FOR SLIGHTLY BLOCKING CONTACTS. THE ANALYSIS GIVEN IN THIS PAPER IS SIMILAR TO THE ONE DISCUSSED FOR FIELD-QUENCHED CDS. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD-706 505 20/12 14/2 9/1
CALIFORNIA UNIV BERKELEY DEPT OF ELECTRICAL ENGINEERING

TIME-RESOLVED SCANNING ELECTRON MICROSCOPY AND ITS APPLICATION TO BULK-EFFECT OSCILLATORS, (U)

FEB 69 15P MACDONALD,N. C. ;ROBINSON, G. Y. ;WHITE,R. M. ;
CONTRACT: AF-AFOSR-1488-68, NSF-GK-2797
PROJ: AF-4751
MONITOR: AFOSR 70-1422TR

UNCLASSIFIED REPORT
AVAILABILITY: PUB. IN JNL. OF APPLIED PHYSICS, V40 N11 P4516-4528 OCT 69.
SUPPLEMENTARY NOTE: SPONSORED IN PART BY NATIONAL INSTITUTES OF HEALTH, GRANT PHS-GM-13756-03.

DESCRIPTORS: (*ELECTRON MICROSCOPY, TEST METHODS), (*MICROWAVE OSCILLATORS, DIODES(SEMICONDUCTOR)), (*SEMICONDUCTORS, ELECTRICAL CONDUCTANCE), CADMIUM SULFIDES, GALLIUM ARSENIDES, ELECTRIC FIELDS, PHOTOCONDUCTIVITY, MOBILITY (U)
IDENTIFIERS: *GUNN DIODES, *HIGH FIELD DOMAINS, SCANNING ELECTRON MICROSCOPES (U)

THE APPLICATION OF THE SCANNING ELECTRON MICROSCOPE TO THE EXAMINATION OF TIME-VARYING PHENOMENA IS DISCUSSED. THE LIMITATIONS OF RESPONSE TIME ARE MENTIONED, AND METHODS FOR INCREASING RESPONSE SPEED ARE CONSIDERED. THESE INCLUDE THE USE OF ELECTROSTATIC DEFLECTION PLATES TO CHOP THE PRIMARY ELECTRON BEAM, THE USE OF SOLID-STATE SEMICONDUCTOR DIODES AS ELECTRON DETECTORS, AND THE USE OF SAMPLING AND THE STORAGE AND PROCESSING OF DATA PRIOR TO DISPLAY. TIME-RESOLVED TECHNIQUES ARE THEN APPLIED TO A STUDY OF THE MOTION OF DOMAINS OF HIGH ELECTRIC FIELD IN CDS ULTRASONIC OSCILLATOR DIODES AND IN GAAS GUNN EFFECT DIODES. IN BOTH PHOTOCONDUCTING AND SEMICONDUCTING CDS, THE DOMAIN FORMATION AND PROPAGATION IS CORRELATED TO THE CURRENT WAVEFORM OF THE OSCILLATOR. NONUNIFORM DOMAIN PROPAGATION IN TWO DIMENSIONS IS EXAMINED IN A GAAS OSCILLATOR. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD-706 802 20/12
MASSACHUSETTS INST OF TECH CAMBRIDGE NATIONAL MAGNET LAB

PIEZOELECTRIC POLARON-CYCLOTRON RESONANCE IN THE QUANTUM LIMIT IN N-CDS, (U)

JAN 70 8P BUTTON,KENNETH J. ;LAX, BENJAMIN ;COHN,DANIEL R. ;

CONTRACT: F44620-67-C-0047
PROJ: AF-9764
TASK: 976401
MONITOR: AFOSR 70-1559TR

UNCLASSIFIED REPORT
AVAILABILITY: PUB. IN PHYSICAL REVIEW LETTERS, V24 N8 P375-378, 23 FEB 70.

DESCRIPTORS: (*SEMICONDUCTORS, PIEZOELECTRIC CRYSTALS), (*CADMIUM SULFIDES, CYCLOTRON RESONANCE PHENOMENA), GAS LASERS, INFRARED RADIATION, ABSORPTION SPECTRUM, ELECTRONS, PHONONS, CRYOGENICS (U)
IDENTIFIERS: *PIEZOELECTRIC SEMICONDUCTORS, EFFECTIVE MASS, ELECTRON PHONON INTERACTIONS, POLARONS (U)

THE ZERO-TEMPERATURE CYCLOTRON RESONANCE OF THE ELECTRON SPLITS INTO TWO GROUPS AS THE TEMPERATURE IS INCREASED. ONE GROUP MOVES RAPIDLY TOWARD VERY SMALL MASS, THE OTHER TOWARD LARGER MASS. THIS SPLITTING HAS NOT BEEN PREDICTED BY PREVIOUS THEORIES. MOREOVER, THE FIRST MEMBER OF THE SMALL-MASS GROUP CAN BE ACCOUNTED FOR ONLY QUALITATIVELY BY THESE THEORIES. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD-706 819 20/12 20/6
STATE UNIV OF NEW YORK STONY BROOK DEPT OF ELECTRICAL SCIENCES

THERMAL LENS EFFECT IN CDS. (U)

SEP 69 7P THOMAS,GARY L. ;SOPORI, BHUSHAN L. ;

CONTRACT: AF-AFOSR-1116-66
PROJ: AF-9763
TASK: 976303
MONITOR: AFOSR 70-1563TR

UNCLASSIFIED REPORT
AVAILABILITY: PUB. IN JNL. OF APPLIED PHYSICS, V41 N2 P603-608 FEB 70.
SUPPLEMENTARY NOTE: REVISION OF REPORT DATED 31 JUL 69.

DESCRIPTORS: (*CADMIUM SULFIDES, PHOTOCONDUCTIVITY), (*COHERENT RADIATION, FOCUSING), REFRACTIVE INDEX, ELECTRIC CURRENTS, SEMICONDUCTORS, GAS LASERS, HEATING, CRYOGENICS (U)

IN THIS PAPER A THEORY IS PRESENTED TO EXPLAIN THE OBSERVED LENS EFFECT PRODUCED BY A PHOTOCURRENT IN CDS. AN APPLIED DC VOLTAGE CAUSES LOCAL HEATING DUE TO THE PRESENCE OF A LOCALIZED PHOTOCURRENT PRODUCED BY A FOCUSED LASER BEAM. THE LOCAL HEATING CAUSES AN INCREASE IN THE INDEX OF REFRACTION AND HENCE FOCUSING. THE THEORY PREDICTS THAT THE MAGNIFICATION SHOULD BE LINEAR IN THE POWER DISSIPATED BY THE PHOTOCURRENT AND THESE PREDICTIONS FALL VERY NEAR THE MEASURED VALUES OF MAGNIFICATION FOR DIFFERENT VALUES OF PHOTOCONDUCTANCE, WITH NO FITTED PARAMETERS. IN ORDER TO EXPLAIN THE THRESHOLD EFFECT OBSERVED IN SOME CDS SAMPLES THE CHANGE IN THE INDEX OF REFRACTION WITH TEMPERATURE OF CDS IS MEASURED OVER A TEMPERATURE RANGE OF 20 DEGREES-350 DEGREES AND IS FOUND TO BE DN/DT = 0.00015/DEGREE C. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD-707 173 20/6 20/12
SIGNALS RESEARCH AND DEVELOPMENT ESTABLISHMENT
CHRISTCHURCH (ENGLAND)

ANTI-STOKES EXCITED EDGE EMISSION IN CADMIUM SULPHIDE. (U)

DEC 69 27P BROWN,M. R. ;COX,A. F.
J. ;WILLIAMS,J. M. ;
REPT. NO. SRDE-7002
MONITOR: TRC BR-18618

UNCLASSIFIED REPORT

DESCRIPTORS: (*CADMIUM SULFIDES, *LUMINESCENCE), BAND THEORY OF SOLIDS, EXCITATION, SEMICONDUCTORS, EXCITONS, CRYOGENICS, GREAT BRITAIN (U)

THE REPORT PRESENTS A DETAILED STUDY OF THE VARIATIONS IN THE STRUCTURE OF BLUE AND GREEN EDGE EMISSIONS ON STOKES AND ANTI-STOKES EXCITATION FOR A RANGE OF DOPED AND UNDOPED CDS SAMPLES AT 4.2 DEGREES K. THE VARIATIONS OBSERVED ARE INTERPRETED ON A MODEL THAT LINKS THE VARIATIONS WITH THE STATE OF IONIZATION OF THE ANTI-STOKES ACTIVE CENTER IN THE TWO EXCITATION CONDITIONS. THE MODEL EMPHASISES THE ROLE OF THE CENTERS CORNALLY ASSOCIATED WITH DEEP CENTER LUMINESCENCE AS THE ONES THAT ARE ASSOCIATED WITH THE EDGE EMISSIONS. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD-707 555 20/12 20/6
CORNELL UNIV ITHACA N Y MATERIALS SCIENCE CENTER

EXCITON-EXCITON INTERACTION IN CDS, CDSE, AND ZNO. (U)

DESCRIPTIVE NOTE: TECHNICAL REPT.,
FEB 70 4P MAGDE,DOUGLAS ;MAHR,HERBERT
;
REPT. NO. MSC-1307, TR-31
CONTRACT: NONR-401(47)

UNCLASSIFIED REPORT
AVAILABILITY: PUB. IN PHYSICAL REVIEW LETTERS, V24 N16 P890-893, 20 APR 70.
SUPPLEMENTARY NOTE: SPONSORED IN PART BY ADVANCED RESEARCH PROJECTS AGENCY, WASHINGTON, D. C.

DESCRIPTORS: (*CADMIUM SULFIDES, *LUMINESCENCE), (*CADMIUM SELENIDES, LUMINESCENCE), (*ZINC COMPOUNDS, LUMINESCENCE), (*EXCITONS, INTERACTIONS), SEMICONDUCTORS, OXIDES (U)
IDENTIFIERS: *EXCITON EXCITON INTERACTIONS, *ZINC OXIDES (U)

AN EXTRA LUMINESCENCE BAND IS OBSERVED IN CDS, CDSE, AND ZNO UNDER INTENSE ILLUMINATION BY LASER LIGHT. IT IS SUGGESTED THAT THE ADDITIONAL LUMINESCENCE ARISES FROM A PARTICULAR EXCITON-EXCITON INTERACTION PROCESS COMMON TO THESE SEMICONDUCTING COMPOUNDS. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD-707 571 20/12
MASSACHUSETTS INST OF TECH LEXINGTON LINCOLN LAB

RESONANT RAMAN SCATTERING FROM LO PHONONS IN POLAR SEMICONDUCTORS. (U)

DESCRIPTIVE NOTE: JOURNAL ARTICLE,
JUN 69 5P HAMILTON,DAVID C. I
REPT. NO. JA-3517
CONTRACT: AF 19(628)-5167
MONITOR: ESD TR-70-107

UNCLASSIFIED REPORT
AVAILABILITY: PUB. IN THE PHYSICAL REVIEW, V188 N3 P1221-1224, 15 DEC 69.

DESCRIPTORS: (*SEMICONDUCTORS, RAMAN SPECTROSCOPY), (*PHONONS, SCATTERING), LASERS, CADMIUM SULFIDES (U)
IDENTIFIERS: LO PHONONS, ELECTRON PHONON INTERACTIONS (U)

MULTIPHONON RAMAN SCATTERING FROM LO PHONONS HAS PREVIOUSLY BEEN OBSERVED IN CDS IN THE CASE WHERE THE LASER FREQUENCY LIES NEAR THE ENERGY GAP. THE COMBINED EFFECTS OF FINITE WAVE VECTOR AND RESONANT ENERGY DENOMINATORS ARE OFFERED AS THE EXPLANATION FOR CERTAIN FEATURES OF THE SCATTERING. THESE FEATURES INCLUDE THE UNUSUAL POLARIZATION PROPERTIES OF THE SINGLE-PHONON SCATTERING AND THE UNEXPECTED SHARPNESS OF THE TWO-PHONON LINE. THE EFFECTS OF THE FROHLICH INTERACTION ARE CALCULATED IN LOWEST-ORDER PERTURBATION THEORY UNDER THE ASSUMPTION OF SPHERICAL, PARABOLIC BANDS. THE IMPORTANT PART OF THE SCATTERING AMPLITUDE IS DUE TO TERMS WHERE THE LASER IS RESONANT TO INTERBAND TRANSITIONS. SINCE THE PARAMETER QV/OMEGA SUB L IS OF ORDER UNITY, THE DIPOLE APPROXIMATION AS Q APPROACHES ZERO IS NOT APPLICABLE. (HERE V IS THE ELECTRON VELOCITY AT THAT POINT IN THE ZONE WHERE THE LASER CAN CAUSE REAL TRANSITIONS.) IN THE SINGLE-PHONON SCATTERING, Q IS THE DIFFERENCE BETWEEN THE WAVE VECTORS OF THE INCIDENT AND SCATTERED PHOTONS, WHILE FOR THE DOUBLE-PHONON CASE, Q IS THE WAVE VECTOR OF ONE OF THE TWO FINAL-STATE PHONONS. NO EXCITON EFFECTS ARE INCLUDED. THE TEMPERATURE IS TAKEN TO BE ZERO THROUGHOUT. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD-707 869 10/2 20/12
CLEVITE CORP CLEVELAND OHIO ELECTRONIC RESEARCH DIV

IMPROVEMENTS IN CDS THIN FILM SOLAR CELLS. (U)

DESCRIPTIVE NOTE: FINAL TECHNICAL REPT. 1 NOV 67-1 NOV 69,
MAR 70 82P DUNN,W. F. INASTELIN,H. E. I
CONTRACT: F33615-68-C-1182
PROJ: AF-7885
MONITOR: AML 70-0036

UNCLASSIFIED REPORT

DESCRIPTORS: (•SOLAR CELLS, PERFORMANCE(ENGINEERING)), (•SEMICONDUCTING FILMS, ELECTRIC TERMINALS), CADMIUM SULFIDES, SCIENTIFIC SATELLITES, BALLOONS, WORK FUNCTIONS, COPPER COMPOUNDS, SULFIDES (U)
IDENTIFIERS: OV1-13 SATELLITE, OV1-17 SATELLITE, COPPER SULFIDES, ELECTRIC CONTACTS, OHMIC CONTACTS (U)

THE REPORT IS CONCERNED WITH TWO AREAS IN THE CADMIUM SULFIDE SOLAR CELL DEVELOPMENT PROGRAM: (1) A PROGRAM OF FLIGHT PANEL CONSTRUCTION FOR SATELLITE AND BALLOON TESTING OF CDS SOLAR CELLS AND (2) A DEVELOPMENTAL EFFORT FOR IMPROVING THE STABILITY AND EFFICIENCY OF THE CDS SOLAR CELL. EXPERIMENTAL CDS SOLAR CELLS PANELS ARE BEING TESTED ON THE OV1-13 AND OV1-17 SATELLITE EXPERIMENTS. THE DEVELOPMENTAL EFFORT WAS CONCENTRATED INTO THE FOLLOWING AREAS: (1) CONTACT RESISTANCE MEASUREMENTS MADE ON THE CDS CURRENT COLLECTOR GRID ADHESIVE, (2) AN OPTIMIZATION OF THE CDS CELL FOR GOOD LOW LIGHT LEVEL PERFORMANCE, (3) AN OPTIMIZATION OF THE CU2S BARRIER FORMATION PROCESS AND (4) AN INVESTIGATION OF COPPER NODULES FOUND ON CDS CELLS THAT HAD BEEN DEGRADED IN THE OPEN CIRCUIT VOLTAGE MODE. (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD-708 638 20/12
AEROSPACE RESEARCH LABS WRIGHT-PATTERSON AFB OHIO

DONOR-ACCEPTOR PAIR RECOMBINATION SPECTRA IN CADMIUM SULFIDE CRYSTALS, (U)

JUN 69 8P REYNOLDS,D. C. (COLLINS,T. C.)

REPT. NO. ARL-70-0055
PROJ: AF-7885
TASK: 788500

UNCLASSIFIED REPORT
AVAILABILITY: PUB. IN THE PHYSICAL REVIEW, V188 N3 P1267-1271, 15 DEC 69.

DESCRIPTORS: (*CADMIUM SULFIDES, LINE SPECTRUM), (*CARRIERS(SEMICONDUCTORS), RECOMBINATION REACTIONS), SEMICONDUCTORS, ZEEMAN EFFECT, CRYOGENICS (U)
IDENTIFIERS: CARRIER RECOMBINATION, EMISSION SPECTRA (U)

DISCRETE DONOR-ACCEPTOR PAIR LINES CONVERGING TO THE 5163A BROAD GREEN PEAK ARE REPORTED. THE LINES ARE CHARACTERIZED IN ZERO MAGNETIC FIELD BY SPIN-EXCHANGE SPLITTING WHICH DECREASES WITH INCREASING PAIR SEPARATION. SOME OF THE LINES ALSO SHOW ZERO-MAGNETIC-FIELD SPLITTING DUE TO CRYSTAL-FIELD EFFECTS. ASSET OF CLOSELY SPACED LINES CONVERGING AT 2.518 EV IS ALSO REPORTED. SET THIS SET OF LINES CAN BE INTERPRETED AS DONOR-ACCEPTOR PAIR LINES IN WHICH THE RECOMBINATION GOES TO AN EXCITED STATE OF THE ACCEPTOR. A GOOD THEORETICAL FIT TO THE ENERGY PROFILE OF THE PAIR LINES WAS NOT ACHIEVED. THE DENSITY OF PAIR LINES CAN BE ACCOUNTED FOR BY A SINGLE DONOR AND ACCEPTOR. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD-708 818 20/12
DELAWARE UNIV NEWARK DEPT OF PHYSICS

TRANSITIONS BETWEEN CLASS I AND CLASS II CDS CRYSTALS INDUCED BY HEAT-TREATMENT, OXYGEN DE/ ADSORPTION AND ELECTRON BOMBARDMENT. (U)

DEC 69 5P WRIGHT,C. BOEER,K. H. I
CONTRACT: NONR-4336(00)

UNCLASSIFIED REPORT
AVAILABILITY: PUB. IN PHYSICA STATUS SOLIDI, V28 PK51-K55 1970.
SUPPLEMENTARY NOTE: SPONSORED IN PART BY JET PROPULSION LAB., PASADENA, CALIF.

DESCRIPTORS: (*SEMICONDUCTORS, PHOTOCONDUCTIVITY), (*CADMIUM SULFIDES, PHASE STUDIES), HEAT TREATMENT, ELECTRON BOMBARDMENT, OXYGEN, ADSORPTION, CRYSTAL LATTICE DEFECTS (U)
IDENTIFIERS: OXYGEN DESORPTION, DESORPTION (U)

IT IS KNOWN THAT OXYGEN DESORPTION CAN CAUSE THE PHOTOCONDUCTANCE OF CDS TO CHANGE MARKEDLY. RECENTLY IT WAS SHOWN DIRECTLY BY A MASS-SPECTROGRAPHIC ANALYSIS THAT OXYGEN DESORPTION IN ULTRA-HIGH VACUUM AT TEMPERATURES BETWEEN 100 AND 300C RESULTS IN AN INCREASE OF THE PHOTOCONDUCTANCE BY FOUR TO SEVEN ORDERS OF MAGNITUDE FOR UNDOPED CLASS I CDS SINGLE CRYSTAL PLATELETS. IT WAS SUGGESTED THAT A THIN LAYER WITH A HIGH DENSITY OF DONORS (PRESUMABLY CD SURPLUS) IS RESPONSIBLE FOR THE GREATLY ENHANCED PHOTOSENSITIVITY NEAR THE CRYSTAL SURFACE IN CLASS I CRYSTALS, AND THAT ABSORBED OXYGEN PARTLY COMPENSATES THIS ACCUMULATION LAYER. WITH DESORBED OXYGEN THE ACCUMULATION LAYER BECOMES FULLY ACTIVE AND THE PHOTOCONDUCTANCE THEREFORE INCREASES. AT ELEVATED TEMPERATURES THE CD SURPLUS DIFFUSES INTO THE CRYSTAL BULK AND CAUSES THERE SENSITIZATION. IT IS THE PURPOSE OF THIS SHORT NOTE TO GIVE FURTHER SUBSTANCE TO THIS MODEL BY PRESENTING A SERIES OF SPECTRAL DISTRIBUTION CURVES OF THE PHOTOCURRENT AFTER CERTAIN TREATMENTS IN ULTRA-HIGH VACUUM. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /4ZZHT

AD-709 779 20/6 20/5
AIR FORCE CAMBRIDGE RESEARCH LABS L G HANSCOM FIELD MASS

PULSE STRETCHING UTILIZING TWO-PHOTON-INDUCED LIGHT ABSORPTION. (U)

NOV 69 5P MORDVIK,A. I
MONITOR: AFCRL 70-0416

UNCLASSIFIED REPORT
AVAILABILITY: PUB. IN IEEE JNL. OF QUANTUM ELECTRONICS, VQE-6 N4 P199-203 APR 70.
SUPPLEMENTARY NOTE: REVISION OF REPORT DATED 15 AUG 69.

DESCRIPTORS: (*LASERS, *LIGHT PULSES), CADMIUM SULFIDES, SEMICONDUCTORS, FLUORESCENCE (U)
IDENTIFIERS: *TWO PHOTON ABSORPTION, Q SWITCHED LASERS, RUBY LASERS (U)

THE EFFECT OF INSETTING AN ELEMENT EXHIBITING INDUCED ABSORPTION INTO A Q-SWITCHED LASER CAVITY IS INVESTIGATED THEORETICALLY AND EXPERIMENTALLY. THE RATE EQUATIONS ARE SOLVED ASSUMING TWO TYPES OF NONLINEAR LOSS, ONE BEING PROPORTIONAL TO THE SQUARE OF THE LASER INTENSITY AND THE OTHER BEING PROPORTIONAL TO THE PRODUCT OF LASER INTENSITY AND DENSITY OF EXCITED ELECTRONS IN THE NONLINEAR ABSORBER. EXPERIMENTS ARE PERFORMED WITH A ROTATING-PRISM RUBY LASER WITH A CDS CRYSTAL IN ITS CAVITY. IT IS ESTABLISHED THAT TWO-PHOTON ABSORPTION TAKES PLACE, AND AS PREDICTED BY THE THEORY THAT THE OUTPUT INTENSITY AND OUTPUT ENERGY BOTH DECREASE AND PULSE LENGTH INCREASES AS COMPARED WITH THE NORMAL Q-SWITCHED CASE. IN ADDITION, THE OUTPUT PULSE HAS AN OSCILLATORY BEHAVIOR, AND IT IS SUGGESTED THAT THIS IS CAUSED BY LOSS DUE TO THE EXCITED ELECTRONS, WHICH ARE FOUND TO HAVE A LIFETIME OF APPROXIMATELY 24 NS. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD-709 890 20/2 20/12
EAGLE-PICHER INDUSTRIES INC MIAMI OKLA MIAMI RESEARCH LABS

RESEARCH IN PURIFICATION AND SINGLE CRYSTAL GROWTH OF II-VI COMPOUNDS. (U)

DESCRIPTIVE NOTE: FINAL TECHNICAL REPT. 1 MAY 68-30 APR 70,
JUN 70 133P FAHRIG,RICHARD H. ;WEBB, GEORGE N. ;PORTER,CLIFFORD R. ;
CONTRACT: F33615-67-C-1575
PROJ: AF-7885
MONITOR: ARL 70-0106

UNCLASSIFIED REPORT

DESCRIPTORS: (*ZINC COMPOUNDS, CRYSTAL GROWTH), (*CADMIUM COMPOUNDS, CRYSTAL GROWTH), (*SEMICONDUCTORS, *CRYSTAL GROWTH), CADMIUM SULFIDES, OXIDES, SULFIDES, SELENIDES, TELLURIDES, ZINC SULFIDES, CHEMICAL ANALYSIS, IMPURITIES, HIGH-PRESSURE RESEARCH (U)
IDENTIFIERS: *GROUP 2B-6A COMPOUNDS, *HYDROTHERMAL CRYSTAL GROWTH (U)

THE PURIFICATION, BY MULTIPLE TREATMENT STEPS, OF CADMIUM METAL AND ELEMENTAL SULFUR IS DESCRIBED. IMPURITIES IN CADMIUM, AS DETERMINED BY EMISSION SPECTROGRAPHIC AND ATOMIC ABSORPTION ANALYSES AND IMPURITIES IN SULFUR DETERMINED BY MASS SPECTROGRAPHIC ANALYSES ARE GIVEN. THE PREPARATION OF VARIOUS PURE SEMICONDUCTOR MATERIALS OF THE GROUP II-VI COMPOUND TYPE IS DISCUSSED AND TABLES OF ANALYTICAL DATA FOR EACH ARE INCLUDED. THE LEVEL OF IMPURITY CONCENTRATION IN SYNTHESIZED CADMIUM SULFIDE WAS SIGNIFICANTLY LOWERED. THE GROWTH OF CRYSTALS OF PURE II-VI COMPOUNDS AND MIXTURES OF COMPOUNDS FROM THE MELT IN THE PRESSURE FURNACES IS REPORTED, INCLUDED ARE DATA CONCERNING DOPING OF MELT GROWN CRYSTALS WITH VARIOUS ELEMENTAL DOPINGS BOTH SINGLY AND IN PAIRS. EXPERIMENTS ON THE GROWTH OF ZNO CRYSTALS BY THE HYDROTHERMAL METHOD ARE GIVEN, ALONG WITH THE PREPARATION AND OPERATING PROCEDURES USED WITH THE AUTOCLAVE. GEL DIFFUSION CRYSTAL GROWTH EXPERIMENTS ARE ALSO REPORTED. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /4ZZHT

AD-709 988 20/6 20/6
MASSACHUSETTS INST OF TECH CAMBRIDGE CRYSTAL PHYSICS LAB

GROWTH OF THIOSPINELS (INVESTIGATION OF CRYSTALS FOR CO2 HIGH POWER LASER WINDOWS). (U)

DESCRIPTIVE NOTE: FINAL REPT. 1 JUN 68-30-NOV 69.
JUL 70 51P SMAKULA,ALEXANDER (LINZ, ARTHUR)
REPT. NO. TR-15
CONTRACT: N00014-67-A-0204-0025
PROJ: NR-015-512

UNCLASSIFIED REPORT

DESCRIPTORS: (*GAS LASERS, *OPTICAL MATERIALS), (*INFRARED WINDOWS, *LASERS), SEMICONDUCTORS, RUBIDIUM COMPOUNDS, IODIDES, ULTRAVIOLET OPTICAL MATERIALS, SINGLE CRYSTALS, SPECTRA(VISIBLE & ULTRAVIOLET), SPECTRA(INFRARED), PURIFICATION, CRYSTAL GROWTH, INDIUM COMPOUNDS, SULFIDES, CADMIUM SULFIDES, CARBON DIOXIDE, CHLORIDES (U)
IDENTIFIERS: INDIUM SULFIDES, *CARBON DIOXIDE LASERS, RUBIDIUM CHLORIDE (U)

THE REPORT DEALS WITH THE INVESTIGATION OF SINGLE CRYSTALS FOR HIGHER POWER LASER WINDOWS. THE FOLLOWING CRYSTALS WERE GROWN AND THEIR OPTICAL PROPERTIES STUDIED: KF, RBF, CSF; NACL, KCL, RBCL; KBR, RBBR, CSBR; CSI; AGBR; CUCL; PBCL2, PBBR2; CDS, IN2S3, AND CDS.IN2S3. THE ULTRAVIOLET (OR VISIBLE) AND INFRARED ABSORPTION EDGES WERE MEASURED. THE INFLUENCE OF ABSORPTION MAXIMA, TEMPERATURE AND IMPURITIES ON THE ABSORPTION EDGES IS DISCUSSED. COMPARING THE ABSORPTION AT 10.6 MICRO M WITH INFRARED ABSORPTION EDGES, THERE IS AN EVIDENT RELATION; FOR MOST CRYSTALS THE ABSORPTION AT 10.6 MICRO M DECREASES WITH INCREASING SPECTRAL DISTANCE FROM THE ABSORPTION EDGES. RBCL HAS THE LOWEST ABSORPTION OF ALL INVESTIGATED CRYSTALS. DEVIATION FROM THE ABOVE RELATION IN SOME CRYSTALS IS CORRELATED TO CRYSTAL DEFECTS OR SURFACE CONTAMINATION. THE PURE POLYATOMIC SEMI-CONDUCTORS, CDS, IN2S3 AND CDS.IN2S3 SHOWED TWO ORDERS OF MAGNITUDE HIGHER ABSORPTION THAN MOST IONIC CRYSTALS AND THEREFORE ARE NOT SUITABLE FOR HIGH POWER LASER WINDOWS. FOR BETTER WINDOWS A FURTHER IMPROVEMENT OF CRYSTAL PURITY IS NECESSARY. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD-710 194 20/12
BROWN UNIV PROVIDENCE R I DEPT OF PHYSICS

MODULATED PIEZOREFLECTANCE IN SEMICONDUCTORS, (U)

JUL 69 14P GAVINI,ANIBAL (CARDONA, MANUEL ;

CONTRACT: DA-31-124-ARO(D)-454
PROJ: DA-2-0-061102-B-11-8
MONITOR: AROD 6412125-P

UNCLASSIFIED REPORT

AVAILABILITY: PUB. IN PHYSICAL REVIEW, V1 N2 P672-682, 15 JAN 70.

SUPPLEMENTARY NOTE: SPONSORED IN PART BY NATIONAL SCIENCE FOUNDATION.

DESCRIPTORS: (*SEMICONDUCTORS, *BAND THEORY OF SOLIDS), GERMANIUM, GALLIUM ARSENIDES, ZINC SULFIDES, CADMIUM SULFIDES, CADMIUM SELENIDES, INDIUM COMPOUNDS, ZINC COMPOUNDS, ANTIMONY COMPOUNDS, OXIDES, PHOSPHIDES, TELLURIDES, CRYOGENICS, PIEZOELECTRIC TRANSDUCERS (U)

IDENTIFIERS: PIEZOREFLECTANCE, GALLIUM ANTIMONIDES, INDIUM PHOSPHIDES, CADMIUM TELLURIDES, ZINC OXIDES (U)

THE DIRECT GAPS OF GE, GAAS, GASB, INP, ZNS, CDTE, CDSE, CDS, AND ZNO HAVE BEEN MEASURED USING THE PIEZOREFLECTANCE TECHNIQUE. THIN SINGLE CRYSTALS OF THESE MATERIALS WERE MOUNTED ON LEAD-ZIRCONATE-LEAD-TITANATE PIEZOELECTRIC TRANSDUCERS AND COOLED TO 77K. MEASUREMENTS WERE PERFORMED WITH THE STRESS APPLIED ALONG THE (100) AND (111) CRYSTALLOGRAPHIC DIRECTIONS OF THE CUBIC MATERIALS AND ALONG THE (0001) AND (11-20) DIRECTIONS OF THE HEXAGONAL MATERIALS. THE SHEAR DEFORMATION POTENTIALS B AND D OF THE HIGHEST VALENCE-BAND STATE OF THE CUBIC MATERIALS WERE DETERMINED FROM THE RATIO OF THE INTENSITY OF THE LIGHT POLARIZED PARALLEL AND PERPENDICULAR TO THE DIRECTION OF THE STRESS AND THE KNOWN VALUES OF THE HYDROSTATIC DEFORMATION POTENTIALS. THE RESULTS SHOW A CONTINUOUS INCREASE OF THE RATIO D/B FROM THE COVALENT MATERIALS GE AND SI TO THE PARTIALLY IONIC III-V AND II-VI COMPOUNDS. A SIMPLE POINT-ION MODEL IS PROPOSED TO EXPLAIN THE INCREASE IN THE RATIO D/B WITH INCREASING IONICITY FOR THE CUBIC MATERIALS. FOR THE WURTZITE MATERIALS, SIMILAR MEASUREMENTS YIELD RATIOS OF SHEAR TO HYDROSTATIC DEFORMATION POTENTIALS. (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD-710 240 20/1 20/12 9/1
ARMY ELECTRONICS COMMAND FORT MONMOUTH N J

ACTIVE ACOUSTO-OPTIC MODULATORS. (U)

DESCRIPTIVE NOTE: TECHNICAL REPT.,
JUL 70 65P MAURO,ROBERT I
REPT. NO. ECOM-3309
PROJ: DA-1-S-662704-A-199
TASK: 1-S-662704-A-19906

UNCLASSIFIED REPORT

DESCRIPTORS: (*ULTRASONIC RADIATION, SOURCES), (*PIEZOELECTRIC CRYSTALS, SEMICONDUCTOR DEVICES), MODULATORS, SEMICONDUCTORS, CADMIUM SULFIDES, LASERS, OSCILLATORS (U)
IDENTIFIERS: *ACOUSTOOPTIC MODULATORS, ACOUSTOOPTIC INTERACTIONS, PIEZOELECTRIC SEMICONDUCTORS, ULTRASONIC OSCILLATORS (U)

IN RECENT YEARS THERE HAS BEEN CONSIDERABLE INTEREST IN THE USE OF ACOUSTO-OPTICAL INTERACTION PHENOMENA FOR THE MODULATION, DEFLECTION, AND Q SWITCHING OF LASERS. THIS HAS BEEN DUE PRINCIPALLY TO THE DEVELOPMENT OF NEW MATERIALS AND TECHNIQUES WHICH HAVE MADE SUCH DEVICES COMPETITIVE WITH THE BETTER ESTABLISHED MECHANICAL AND ELECTRO-OPTIC METHODS. TYPICALLY AN ACOUSTO-OPTIC SYSTEM CONSISTS OF AN INTERACTION MEDIUM ONTO WHICH A PIEZOELECTRIC TRANSDUCER IS BONDED, AND AN R.F. POWER SOURCE WHICH EXCITES THE TRANSDUCER PRODUCING THE REQUIRED ACOUSTIC WAVES. THIS REPORT DISCUSSES A SIMPLIFIED ALTERNATE APPROACH TO THIS PROBLEM IN WHICH AN ACTIVE ULTRASONIC OSCILLATOR EXCITED BY A DC VOLTAGE SOURCE SERVES AS BOTH THE INTERACTION MEDIUM AND THE GENERATOR OF THE ULTRASONIC WAVES. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD-710 448 20/12
MASSACHUSETTS INST OF TECH LEXINGTON LINCOLN LAB

PHOTOLUMINESCENCE DUE TO ISOELECTRONIC OXYGEN AND TELLURIUM TRAPS IN II-VI ALLOYS. (U)

DESCRIPTIVE NOTE: JOURNAL ARTICLE,
OCT 69 18P ISELER,GERALD W. STRAUSS, ALAN J.
REPT. NO. JA-3579
CONTRACT: AF 19(628)-5167
MONITOR: ESD TR-70-218

UNCLASSIFIED REPORT
AVAILABILITY: PUB. IN JNL. OF LUMINESCENCE, V3 P1-17 1970.

DESCRIPTORS: (*SEMICONDUCTORS, *LUMINESCENCE), IMPURITIES, CRYSTAL LATTICE DEFECTS, OXYGEN, ZINC COMPOUNDS, TELLURIDES, SULFIDES, CADMIUM COMPOUNDS, SELENIDES, SOLID SOLUTIONS, CADMIUM SULFIDES, CADMIUM SELENIDES, ZINC SULFIDES, EXCITONS (U)
IDENTIFIERS: *PHOTOLUMINESCENCE (U)

PHOTOLUMINESCENCE SPECTRA AT 4.2K DUE TO OXYGEN AND TELLURIUM ISOELECTRONIC TRAPS HAVE BEEN OBSERVED IN THE FOLLOWING II-VI SOLID SOLUTIONS PREPARED BY ANNEALING POWDER MIXTURES OF THE BINARY COMPOUNDS: O IN ZNTE(1-X)SE(X), ZNTE(1-X)S(X), AND ZN(1-Y)CD(Y)TE; TE IN ZN(1-Y)CD(Y)S, ZN(1-Y)CD(Y)SE, ZNS(1-X)SE(X), CDS(1-X)SE(X), AND ZNTE(1-X)SE(X). IN ALL CASES THE QUALITATIVE CHANGE IN TRAPPING ENERGY WITH ALLOY COMPOSITION, AS INDICATED BY THE CHANGE IN PHOTOLUMINESCENCE ENERGY RELATIVE TO THE ENERGY GAP, IS CONSISTENT WITH THE ISOELECTRONIC TRAP MODEL. ACCORDING TO THIS MODEL, THE TRAPPING ENERGY FOR AN EXCITON BOUND TO THE TRAP SHOULD DEPEND PRIMARILY ON THE DIFFERENCE IN ELECTRONEGATIVITY BETWEEN THE IMPURITY AND THE HOST ATOM WHICH IT REPLACES. FOR ALLOYS INVOLVING SUBSTITUTION ON THE ANION SUB-LATTICE, THE TRAPPING ENERGY DECREASES MARKEDLY WITH INCREASING X EXCEPT FOR TE IN ZNTE(1-X)SE(X), WHERE THE OPPOSITE CHANGE OCCURS. FOR ALLOYS INVOLVING SUBSTITUTION ON THE CATION SUB-LATICE, THE TRAPPING ENERGY DOES NOT DEPEND STRONGLY ON Y. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD-710 636 10/2
CLEVITE CORP CLEVELAND OHIO ELECTRONIC RESEARCH DIV

THIN FILM CDS SOLAR CELL FABRICATION PARAMETER STUDY. (U)

DESCRIPTIVE NOTE: INTERIM TECHNICAL REPT.,
JUN 70 17P DEUCHER,T. F. ;
CONTRACT: F33615-68-C-1182
PROJ: AF-7885
TASK: 788500
MONITOR: ARL 70-0099

UNCLASSIFIED REPORT

DESCRIPTORS: (*SOLAR CELLS, MANUFACTURING METHODS), CADMIUM SULFIDES, METAL FILMS, SEMICONDUCTING FILMS, PLASTIC COATINGS, VAPOR PLATING, VACUUM APPARATUS, BARRIER COATINGS (U)
IDENTIFIERS: THIN FILMS (U)

THE STUDY IS, ESSENTIALLY, A BRIEF DESCRIPTION OF THE PROCESSES, CURRENTLY USED AND ALTERNATIVES, NECESSARY TO THE MANUFACTURE OF THIN FILM CDS SOLAR CELLS. THESE PROCESSES RELATE TO THE APPLICATION OF THE CONDUCTIVE LAYER TO THE PLASTIC FILM, PLATING ON OF A SUITABLE METALLIC INTERLAYER, DEPOSITION OF THE CDS LAYER, FORMATION OF THE BARRIER, ATTACHMENT OF THE CONDUCTIVE GRID AND COVER PLASTIC AND IN PROCESS AND FINAL TESTING. MATERIAL COSTS AND PRODUCTIVITY OF EACH OF THE PRESENT MANUFACTURING PROCESSES ARE LISTED, AND AS A COMPARISON, MATERIAL COSTS AND PRODUCTIVITY BASED ON HIGH PRODUCTION METHODS ARE ESTIMATED WHEREVER POSSIBLE. THOSE PROCESSES OR OPERATIONS WHICH LEND THEMSELVES PRESENTLY TO LARGE VOLUME PRODUCTION HAVE BEEN INCORPORATED INTO SUGGESTED MECHANISMS THAT ARE BRIEFLY DESCRIBED. A FEW, OF WHICH GRIDDING IS AN EXAMPLE, ARE IN NEED OF FURTHER STUDY, AS TO PROCESSES WHICH ARE MORE ADAPTABLE TO MECHANIZATION THAN AT PRESENT. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD-710 932 9/1 20/1 20/12
CALIFORNIA UNIV BERKELEY DEPT OF ELECTRICAL ENGINEERING

ACOUSTOELECTRIC DEVICE APPLICATIONS OF PIEZOELECTRIC AND SEMICONDUCTING THIN FILMS, (U)

NOV 69 7P TURNER,C. W. I
CONTRACT: AF-AFOSR-1488-68
PROJ: AF-4751
MONITOR: AFOSR 70-2302TR

UNCLASSIFIED REPORT
AVAILABILITY: PUB. IN JNL. OF VACUUM SCIENCE AND TECHNOLOGY, V7 N2 P304-308 1970.

DESCRIPTORS: (*PIEZOELECTRIC CRYSTALS, ULTRASONIC RADIATION), (*PIEZOELECTRIC TRANSDUCERS, DESIGN), (*SEMICONDUCTING FILMS, MICROWAVE FREQUENCY), SINGLE CRYSTALS, CADMIUM SULFIDES, LITHIUM COMPOUNDS, ZINC COMPOUNDS, NIOBATES, OXIDES (U)
IDENTIFIERS: *MICROWAVE ACOUSTICS, SURFACE WAVES, THIN FILMS, ACOUSTOELECTRIC EFFECT, ZINC OXIDES, LITHIUM NIOBATES (U)

RECENT ADVANCES IN MICROWAVE ACOUSTICS TECHNIQUES HAVE RESULTED IN A GROWING DEMAND FOR HIGH-QUALITY THIN FILMS FOR USE IN VARIOUS ACOUSTIC DEVICES. ORIENTED PIEZOELECTRIC FILMS WERE FIRST USED TO INCREASE THE EFFICIENCY OF TRANSDUCERS FOR BULK ACOUSTIC WAVES AT FREQUENCIES ABOVE THE LIMIT OF CRYSTAL PLATE RESONATORS. ALTHOUGH EXTENSIVE APPLICATION OF THESE TRANSDUCERS IN BOTH PASSIVE AND ACTIVE DEVICES HAS BECOME POSSIBLE WITH THE IMPROVEMENTS IN FILM QUALITY, IT NOW APPEARS THAT SURFACE ELASTIC WAVES WILL AFFORD THE MAIN VEHICLE FOR THIN-FILM ACOUSTIC DEVICE APPLICATIONS. THE PROPERTIES OF SURFACE WAVES ARE DISCUSSED HERE AND THE PRINCIPAL DEVICES CURRENTLY UNDER INVESTIGATION ARE DESCRIBED. THE DETAILED REQUIREMENTS OF THIN FILMS SUITABLE FOR SURFACE WAVE DEVICES ARE PRESENTED TOGETHER WITH EXAMPLES OF THE SHORTCOMINGS OF CURRENTLY AVAILABLE FILMS. PARTICULAR ATTENTION IS FOCUSED ON AMPLIFYING STRUCTURES EMPLOYING EITHER LARGE AREA ORIENTED PIEZOELECTRIC FILMS OR HIGH-MOBILITY SINGLE-CRYSTAL SEMICONDUCTOR FILMS. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /4ZZHT

AD-710 988 20/12 20/5
NAVAL ELECTRONICS LAB CENTER SAN DIEGO CALIF

PHYSICS OF STIMULATED EMISSION IN II-VI SEMICONDUCTING COMPOUNDS. (U)

DESCRIPTIVE NOTE: RESEARCH AND DEVELOPMENT REPT. NOV 69-APR 70.
JUN 70 41P TAYLOR,H. F. ;
REPT. NO. NELC-TR-1713
PROJ: NELC-Z212, ZF-52-512-003

UNCLASSIFIED REPORT

DESCRIPTORS: (*SEMICONDUCTORS, ABSORPTION SPECTRUM), (*LASERS, SEMICONDUCTOR DEVICES), (*CADMIUM SELENIDES, PUMPING(OPTICAL)), EXCITONS, PHONONS, CADMIUM SULFIDES (U)
IDENTIFIERS: *SEMICONDUCTOR LASERS (U)

THE LITERATURE RELATED TO STIMULATED EMISSION IN II-VI SEMICONDUCTING COMPOUNDS IS SUMMARIZED. STIMULATED EMISSION GAIN CURVES ARE CALCULATED FOR CDSE. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD-712 914 20/12
MASSACHUSETTS INST OF TECH CAMBRIDGE RESEARCH LAB OF ELECTRONICS

ENHANCEMENT OF THE PIEZOELECTRICALLY STIFFENED ULTRASONIC VELOCITY BY ELECTRON TRAPPING IN CDS. (U)

APR 70 5P KRISCHER,CHARLES ;INGARD,UNO
;
CONTRACT: N00014-67-A-0204-0019

UNCLASSIFIED REPORT
AVAILABILITY: PUB. IN PHYSICS LETTERS, V32A N1 P41-42, 1 JUN 70.

DESCRIPTORS: (*SEMICONDUCTORS, PIEZOELECTRIC CRYSTALS), (*CADMIUM SULFIDES, ULTRASONIC RADIATION), VELOCITY, CRYOGENICS (U)
IDENTIFIERS: PIEZOELECTRIC SEMICONDUCTORS, ELECTRON TRAPS (U)

IT IS SHOWN THAT THE ULTRASONIC VELOCITY IN SEMICONDUCTING CDS, IN THE PRESENCE OF AN APPLIED ELECTRIC DRIFT FIELD, CAN EXCEED THE PIEZOELECTRICALLY STIFFENED VALUE FOR THE INSULATING MATERIAL, IF THE ELECTRON-TRAPPING RELAXATION TIME IS NONZERO. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD-712 936 20/12 13/8 10/2
FOREIGN TECHNOLOGY DIV WRIGHT-PATTERSON AFB OHIO

PROPERTIES OF P-N JUNCTIONS IN CADMIUM SULFIDE AND CONSTRUCTION OF PHOTOELECTRIC TRANSDUCERS. (U)

JUN 70 dP KNEV,STEFAN ;STOYANOV,VASIL ;STEFANOV,RODOSLAV ;

REPT. NO. FTD-HC-23-133-70
PROJ: FTD-7230178

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: EDITED TRANS. OF BULGARSKA AKADEMIYA NA NAUKITE, SOFIA, FIZICHESKI INSTITUT. IZVESTIYA, V17 P13-20 1968.

DESCRIPTORS: (*SEMICONDUCTORS, INTERFACES), (*CADMIUM SULFIDES, PHOTOELECTRIC EFFECT), (*SOLAR CELLS, MANUFACTURING METHODS), PERFORMANCE(ENGINEERING), USSR (U)
IDENTIFIERS: *SEMICONDUCTOR JUNCTIONS, TRANSLATIONS (U)

THE DEVELOPMENT OF EFFICIENT PHOTOELECTRIC CONVERTERS BASED ON CDS IS DESCRIBED. THE PHOTOELECTRIC P-N JUNCTIONS WERE MADE AS FOLLOWS: CADMIUM SULFIDE POWDER WAS PRESSED INTO SMALL TABLETS UNDER A PRESSURE OF SEVERAL HUNDRED KILOGRAMS PER CM(SUPERSCRIPT 2). THE TABLETS WERE BAKED FOR 15 MIN UNDER CLOSELY CONTROLLED CONDITIONS TO FORM PURE MONOCRYSTALS (SIZE, UP TO 50 MU) ON ONE SIDE OF THE TABLET, I.E., TO FORM THE WORKING SURFACE OF THE CONVERTER. THIS WORKING SURFACE WAS THEN IMMERSED FOR SEVERAL SECONDS IN A BOILING, SATURATED WATER SOLUTION OF COPPER SULFATE TO COVER IT WITH A THIN COATING WHICH CONTAINED P-TYPE CARRIERS AND WAS PRESUMED TO BE FORMED BY THE CHEMICAL REACTION GIVEN. THE COATED TABLET WAS THEN HEATED AT A TEMPERATURE OF 350 DEGREES CENTIGRADE FOR ABOUT 20 SEC. THE CONVERTER WAS COMPLETED BY DEPOSITING ELECTRODES ON BOTH SIDES OF THE TABLET. EFFICIENCIES OF THE ORDER OF 8 PERCENT WERE OBTAINED WITH THE DESCRIBED PHOTOELECTRIC CONVERTERS. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD-713 181 20/12 20/6
CORNELL UNIV ITHACA N Y MATERIALS SCIENCE CENTER

LUMINESCENCE STUDY OF EXCITON-EXCITON INTERACTION IN CADMIUM SULFIDE, CADMIUM SELENIDE, AND ZINC OXIDE. (U)

DESCRIPTIVE NOTE: DOCTORAL THESIS,
JUN 70 140P MAGDE,MICHAEL DOUGLAS I
REPT. NO. MSC-1325, MSC-TR-32
CONTRACT: NONR-401(47)

UNCLASSIFIED REPORT

DESCRIPTORS: (•SEMICONDUCTORS, •LUMINESCENCE), (•CADMIUM SULFIDES, EXCITONS), (•CADMIUM SELENIDES, EXCITONS), BAND THEORY OF SOLIDS, ZINC COMPOUNDS, EXCITATION, PHONONS, CRYOGENICS, LASERS, OXIDES, THESES (U)
IDENTIFIERS: •EXCITON EXCITON INTERACTIONS, •ZINC OXIDES, TWO PHOTON ABSORPTION (U)

THE THESIS REPORTS THE RESULTS OF AN EXPERIMENTAL STUDY OF LUMINESCENCE IN SEVERAL 2-6 SEMICONDUCTING COMPOUNDS AT EXCITATION LEVELS, PROVIDED BY LASER PULSES, OF 1 KW/SQ CM TO 5 MW/SQ CM. UNDER SUCH CONDITIONS AN ADDITIONAL LUMINESCENCE BAND APPEARS WHICH IS NOT OBSERVED WHEN LUMINESCENCE IS EXCITED BY MUCH LOWER INTENSITY CONVENTIONAL MERCURY LAMPS. THE ADDITIONAL EMISSION WAS OBSERVED IN TWO DIFFERENT TYPES OF CDS AS WELL AS IN CDSE AND ZNO. IN EACH CASE IT INCREASED AT A RATE FASTER THAN LINEAR, BECOMING PROMINENT IN THE RANGE 10 - 100 KW/SQ CM WHEREAS LUMINESCENCE ATTRIBUTED T BOUND EXCITONS INCREASED LINEARLY WITH EXCITATION INTENSITY AT FIRST, BUT EVENTUALLY, IN ALL CASES EXCEPT ZNO, APPEARED TO SATURATE. A KINETIC TREATMENT OF THE MODEL YIELDS THE FOLLOWING VALUE FOR THE CROSS SECTION FOR THIS PROCESS: 10 TO THE 16TH POWER/SQ CM. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD-713 837 20/2
OHIO STATE UNIV RESEARCH FOUNDATION COLUMBUS

SURFACE MORPHOLOGY OF SUBLIMATED CRYSTALS OF CADMIUM AND ZINC SULFIDES. (U)

JAN 70 10P MUNIR,Z. A. ;HIRTH,J. P.
;

REPT. NO. USURF-2966-TR-1
CONTRACT: N00014-67-A-0232-0005, NONR-495(26)
PROJ: NR-036-047, USURF-2966

UNCLASSIFIED REPORT
AVAILABILITY: PUB. IN JNL. OF APPLIED PHYSICS, V41 N6 P2697-2704 MAY 70.
SUPPLEMENTARY NOTE: PREPARED IN COOPERATION WITH SAN JOSE STATE COLL., CALIF. DEPT. OF MATERIALS SCIENCE.

DESCRIPTORS: (*CRYSTAL GROWTH, *SUBLIMATION), (*CADMIUM SULFIDES, SURFACE PROPERTIES), (*ZINC SULFIDES, SURFACE PROPERTIES), SINGLE CRYSTALS, SEMICONDUCTORS, ETCHED CRYSTALS, DISLOCATIONS (U)

THE SURFACE STRUCTURE OF (0001)- AND (10(-1)0)-ORIENTED SINGLE CRYSTALS OF ZNS AND CDS SUBLIMATED UNDER CONTROLLED VARIABLE VAPOR PRESSURE WAS INVESTIGATED. THE RESULTS WERE FOUND TO BE CONSISTENT WITH THE TERRACE-LEDGE-KINK MODEL OF SUBLIMATION. POSSIBLE REVISIONS TO THE THEORY OF THE EFFECT OF CHARGED CARRIER CONCENTRATION ON SUBLIMATION OF II-VI COMPOUNDS ARE SUGGESTED. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD-714 314 7/4
MASSACHUSETTS INST OF TECH LEXINGTON LINCOLN LAB

QUANTITATIVE ANALYSIS OF TERNARY AND QUATERNARY SEMICONDUCTING ALLOYS WITH ELECTRON MICROPROBE. (U)

DESCRIPTIVE NOTE: JOURNAL ARTICLE.
JAN 70 4P FINN,MARY C. ;
REPT. NO. JA-3646
CONTRACT: AF 19(628)-5167
MONITOR: ESD TR-70-254

UNCLASSIFIED REPORT
AVAILABILITY: PUB. IN ANALYTICAL CHEMISTRY, V42 N9 P1084-1086 AUG 70.

DESCRIPTORS: (*SEMICONDUCTORS, *QUANTITATIVE ANALYSIS), CADMIUM SULFIDES, LEAD COMPOUNDS, CADMIUM SELENIDES, GERMAINIUM COMPOUNDS, TELLURIDES, SULFIDES, SELENIDES (U)
IDENTIFIERS: *GROUP 4A-6A COMPOUNDS, *GROUP 5B-6A COMPOUNDS, ELECTRON PROBES (U)

QUANTITATIVE ANALYSIS WITH THE ELECTRON MICROPROBE DEPENDS UPON THE CONVERSION OF MEASURED X-RAY INTENSITIES TO CHEMICAL COMPOSITIONS. THE PAPER DESCRIBES A METHOD WHICH USES THEORETICAL CALIBRATION CURVES IN THE DETERMINATION OF ELEMENTS A AND B IN TERNARY A(1-X)B(X)C ALLOYS WHICH ARE PSEUDOBINARY SOLID SOLUTIONS OF THE SEMICONDUCTING COMPOUNDS AC AND BC. THIS METHOD HAS BEEN USED FOR ANALYZING THE FOLLOWING ALLOYS: CDTE(1-X)SE(X), CDS(1-X)SE(X), ZN(1-X)CD(X)S, ZN(1-X)CD(X)TE, ZNTE(1-X)S(X), ZNTE(1-X)SE(X), ZNSE(1-X)S(X), HG(1-X)CD(X)TE, PB(1-X)GE(X)SE, PB(1-X)GE(X)TE, PB(1-X)SN(X)S, PB(1-X)SN(X)SE, PB(1-X)SN(X)TE, SN(1-X)GE(X)TE, GAAS(1-X)P(X), GA(1-X)IN(X)P, GA(1-X)IN(X)AS, INSB(1-X)TE(X), PB(1-X)CD(X)S, EXCEPT FOR THE SYSTEMS FORMED BETWEEN INSB AND INTE AND BETWEEN PBS AND CDS, BOTH CONSTITUENT COMPOUNDS IN EACH SYSTEM BELONG TO THE SAME GROUP OF SEMICONDUCTORS, EITHER THE II-VI, IV-VI, OR III-V GROUP. AN ITERATIVE PROCEDURE FOR USING THEORETICAL CALIBRATION CALCULATIONS IN DETERMINING ALL FOUR ELEMENTS IN THE QUATERNARY SOLID SOLUTION PB(1-X)SN(X)TE(1-Y)SE(Y) IS ALSO DESCRIBED. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD-715 167 20/12
YALE UNIV NEW HAVEN CONN DEPT OF ENGINEERING AND APPLIED SCIENCE

RESONANT CANCELLATION OF RAMAN SCATTERING FROM CDS AND SI. (U)

DESCRIPTIVE NOTE: TECHNICAL REPT.,
AUG 70 6P RALSTON,J. M. ;WADSACK,R. L. ;CHANG,R. K. ;
REPT. NO. TR-3
CONTRACT: N00014-67-A-0097-0005
PROJ: NR-016-203

UNCLASSIFIED REPORT
AVAILABILITY: PUB. IN PHYSICAL REVIEW LETTERS, V25 N12 P814-818, 21 SEP 70.

DESCRIPTORS: (*SEMICONDUCTORS, *RAMAN SPECTROSCOPY), (*CADMIUM SULFIDES, RAMAN SPECTROSCOPY), (*SILICON, RAMAN SPECTROSCOPY), MOLECULAR ENERGY LEVELS, BAND THEORY OF SOLIDS (U)
IDENTIFIERS: LASER SPECTROSCOPY (U)

A PRONOUNCED DECREASE IN THE TO RAMAN SCATTERING EFFICIENCIES OF CDS HAS BEEN OBSERVED AS THE INCIDENT PHOTON ENERGY APPROACHES THE DIRECT-ENERGY GAP. PREVIOUS RESONANT RAMAN MEASUREMENTS HAVE SHOWN ONLY MONOTONICALLY INCREASING EFFICIENCIES. A DECREASE OF THE F(2G) MODE IN SI HAS ALSO BEEN OBSERVED AS THE RESONANCE WITH THE INDIRECT-ENERGY GAP IS APPROACHED. THE OBSERVED DECREASES IN CDS AND SI CAN BOTH BE ACCOUNTED FOR BY EXTENDING LOUDON'S THEORY TO INCLUDE A DESTRUCTIVE INTERFERENCE BETWEEN THE RESONANT AND NONRESONANT CONTRIBUTIONS TO THE RAMAN SCATTERING AMPLITUDES. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD#715 285 10/2
MASSACHUSETTS INST OF TECH LEXINGTON LINCOLN LAB

DEGRADATION OF CDS THIN FILM SOLAR CELLS IN DIFFERENT ENVIRONMENTS. (U)

DESCRIPTIVE NOTE: TECHNICAL NOTE,
NOV 70 26P STANLEY,ALAN G. ;
REPT. NO. TN-1970-33
CONTRACT: F19628-70-C-0230
PROJ: AF-649L
MONITOR: ESD TR-70-341

UNCLASSIFIED REPORT

DESCRIPTORS: (*SOLAR CELLS, DEGRADATION), TEST METHODS, THERMAL STRESSES, SPACE ENVIRONMENTAL CONDITIONS, CADMIUM SULFIDES, FAILURE(ELECTRONICS), SEMICONDUCTOR DEVICES, RELIABILITY(ELECTRONICS) (U)
IDENTIFIERS: PHOTOVOLTIC EFFECT (U)

CADMIUM SULFIDE THIN FILM CELLS WERE OPERATED UNDER DIFFERENT BIAS CONDITIONS FOR PERIODS OF SIX MONTHS IN THE FOLLOWING ENVIRONMENTS: VACUUM THERMAL CYCLING BETWEEN -160 AND 60C, CONSTANT ILLUMINATION IN VACUUM AND IN DRY OXYGEN AT 60C. THE RESULTS WERE COMPARED TO THE DEGRADATION OF TEST CELLS IN SYNCHRONOUS ORBIT. IT WAS CONCLUDED FROM THE OBSERVED CHANGES IN THE I-V CHARACTERISTICS THAT THE DEGRADATION IS CAUSED PRIMARILY BY A COMBINATION OF LIGHT AND TEMPERATURE AND NOT BY PURELY THERMAL STRESSES. THE PRESENCE OF A VACUUM DOES NOT APPEAR TO BE A SIGNIFICANT CONTRIBUTORY FACTOR TO THE ULTIMATE DEGRADATION OF THE CELLS. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD-715 574 20/12
AEROSPACE RESEARCH LABS WRIGHT-PATTERSON AFB OHIO

LINEAR COMPRESSIBILITIES OF II-VI COMPOUND SINGLE CRYSTALS. (U)

APR 70 8P MONTALVO,R. A. LANGER,D. W. ;

REPT. NO. ARL-70-0260
PROJ: AF-7885
TASK: 788500

UNCLASSIFIED REPORT
AVAILABILITY: PUB. IN JNL. OF APPLIED PHYSICS, V41 N10 P4101-4104 SEP 70.
SUPPLEMENTARY NOTE: REVISION OF REPORT DATED 27 JAN 70.

DESCRIPTORS: (*ZINC COMPOUNDS, COMPRESSIVE PROPERTIES), (*CADMIUM COMPOUNDS, COMPRESSIVE PROPERTIES), SINGLE CRYSTALS, SULFIDES, SELENIDES, OXIDES, TELLURIDES, INTERFEROMETERS, CADMIUM SULFIDES, CADMIUM SELENIDES, ZINC SULFIDES, SEMICONDUCTORS (U)
IDENTIFIERS: *GROUP 2B-6A COMPOUNDS, ZINC SELENIDES, ZINC TELLURIDES, ZINC OXIDES, CADMIUM TELLURIDES (U)

THE ISOTHERMAL LINEAR COMPRESSIBILITIES OF THE II-VI COMPOUND SINGLE CRYSTALS, CDS, CDSE, CDTE, ZNO, ZNS, ZNSE, AND ZNTE WERE MEASURED BY AN OPTICAL INTERFEROMETER. THE CHANGE IN LENGTH OF THE CRYSTALS WAS OBTAINED RELATIVE TO IRON UNDER HYDROSTATIC PRESSURE TO OBTAIN THE INITIAL PARAMETERS OF THE INTERFEROMETER. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD-715 674 20/1 20/12
NORTHWESTERN UNIV EVANSTON ILL INFORMATION-PROCESSING AND CONTROL SYSTEMS LAB

SURFACE MICROACOUSTICS. (U)

DESCRIPTIVE NOTE: TECHNICAL REPT.,
SEP 70 89P EPSTEIN,MAX ;
REPT. NO. TR-70-101
CONTRACT: N00014-67-A-0356-0003, ARPA ORDER-1129

UNCLASSIFIED REPORT

DESCRIPTORS: (*ULTRASONIC RADIATION, MICROWAVE FREQUENCY), STATE-OF-THE-ART REVIEWS, BIBLIOGRAPHIES, PIEZOELECTRIC CRYSTALS, SEMICONDUCTORS, CADMIUM SULFIDES, MAGNETOSTRICTION, RADAR EQUIPMENT (U)
IDENTIFIERS: *MICROWAVE ACOUSTICS, *ACOUSTIC SURFACE WAVES, SURFACE WAVES, LOVE WAVES, *MICROACOUSTICS, INTERDIGITAL TRANSDUCERS, MAGNETOELASTIC EFFECTS, PIEZOELECTRIC SEMICONDUCTORS, LITHIUM NIOBATES, MAGNONS (U)

THE REPORT CONTAINS AN INTRODUCTION TO THE FIELD OF SURFACE MICROACOUSTICS. IT INCLUDES A REVIEW OF THE PRESENT STATE-OF-THE-ART, AND AN ANNOTATED BIBLIOGRAPHY. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD-716 097 20/12
DELAWARE UNIV NEWARK DEPT OF PHYSICS

FIELD QUENCHING AS MECHANISM OF NEGATIVE DIFFERENTIAL CONDUCTIVITY IN PHOTOCONDUCTING CDS. (U)

DESCRIPTIVE NOTE: TECHNICAL REPT.,
JAN 70 13P DUSSEL,G. A. ;BOER,K. W.
;
REPT. NO. TR-41
CONTRACT: NONR-4336(00)

UNCLASSIFIED REPORT
AVAILABILITY: PUB. IN PHYSICA STATUS SOLIDI, V39 P391-402 1970.

DESCRIPTORS: (*SEMICONDUCTORS, NEGATIVE RESISTANCE CIRCUITS), (*CADMIUM SULFIDES, ELECTRICAL CONDUCTANCE), BAND THEORY OF SOLIDS, CARRIERS(SEMICONDUCTORS), PHOTOCONDUCTIVITY, ELECTRON DENSITY (U)
IDENTIFIERS: *NEGATIVE DIFFERENTIAL CONDUCTIVITY (U)

IT IS SHOWN THAT THE OBSERVED STEEP DECREASE OF THE ELECTRON DENSITY IN PHOTOCONDUCTING CDS(AL, AG) WITH FIELD IN THE RANGE BETWEEN 20 AND 70 KV/CM IS CAUSED BY A REDISTRIBUTION OF HOLES FROM SLOW TO FAST RECOMBINATION CENTRES (FIELD QUENCHING). THIS REDISTRIBUTION IS PRODUCED BY FIELD-ENHANCED IONIZATION OF HOLES FROM COULOMB-ATTRACTIVE SLOW RECOMBINATION CENTERS. THE ABRUPT ONSET OF THE FIELD QUENCHING OCCURS BECAUSE OF THE SLOW RECOMBINATION TRAFFIC MASKING THE FAST CENTER TRAFFIC UNTIL IT BECOMES PREDOMINANT. COMPETING INFRARED QUENCHING REDUCES THE MASKING EFFECT AND UNCOVERS THE EARLIER PHASES OF FIELD QUENCHING ALREADY NEAR 1 KV/CM (AT 20DK). IMPACT IONIZATION AND ZENER EXTRACTION OF HOLES FROM SLOW CENTERS CANNOT EXPLAIN THE OBSERVED BEHAVIOR. HOWEVER, QUANTITATIVE AGREEMENT BETWEEN EXPERIMENT AND FIELD QUENCHING VIA FIELD-ENHANCED IONIZATION CAN BE REACHED. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD-716 210 20/12 20/2
PENNSYLVANIA UNIV PHILADELPHIA LAB FOR RESEARCH ON THE STRUCTURE OF MATTER

EPITAXIC SUBLIMATION METHODS FOR THE STUDY OF PSEUDO-BINARY SEMICONDUCTOR ALLOYS. (U)

DESCRIPTIVE NOTE: PROGRESS REPT. 1 JUN-30 NOV 70,
DEC 70 25P ZELMEL,JAY N. I
CONTRACT: N60921-70-C-0251

UNCLASSIFIED REPORT

DESCRIPTORS: (*SEMICONDUCTORS, *BAND THEORY OF SOLIDS), (*SEMICONDUCTING FILMS, *EPITAXIAL GROWTH), CADMIUM SULFIDES, GERMANIUM COMPOUNDS, LEAD COMPOUNDS, TIN COMPOUNDS, OXIDES, SULFIDES, TELLURIDES, ULTRASONIC RADIATION, PIEZOELECTRIC CRYSTALS (U)
IDENTIFIERS: LEAD SULFIDES, LEAD OXIDES, LEAD TELLURIDES, TIN TELLURIDES, CADMIUM TELLURIDES, GERMANIUM TELLURIDES, AUGMENTED PLANE WAVE METHOD (U)

THE FIRST SIX MONTHS HAVE SEEN THE INITIATION OF: RESEARCH ON A VARIETY OF PSEUDO-BINARY ALLOY MATERIALS; A SERIES OF FEASIBILITY STUDIES ON EXTENDING EXISTING TECHNIQUES NEVER PREVIOUSLY EMPLOYED ON HETERO-EPITAXIC FILMS TO THESE MATERIALS AS WELL AS CONSIDERING SOME OTHER METHODS UNIQUE TO FILM STUDIES; A PHYSIO-CHEMICAL RESEARCH PROGRAM ON THE PBS-PBO ALLOY SYSTEM; SUBSTANTIAL PROGRESS IN THEORETICAL BAND STRUCTURE CALCULATIONS ON END POINT MATERIALS (E.G. SNTE AND CDS); A REFORMULATION OF THE APW PROGRAM TO SIMPLIFY FUTURE CALCULATIONS. OF THE FIVE MATERIALS UNDER STUDY, FOUR ARE BEING PREPARED ROUTINELY AS EPITAXIC FILMS. THE EVAPORATION SYSTEM FOR THE FIFTH MATERIAL IS RAPIDLY APPROACHING COMPLETION. MEASUREMENT EQUIPMENT HAS BEEN ORDERED WHERE NEEDED AND SOME INITIAL PROGRESS HAS BEEN MADE IN TESTING THESE MATERIALS. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO: /4ZZHT

AD-716 892 20/12
DAYTON UNIV OHIO

CALCULATION OF THE EXCHANGE ENERGY FOR EXCITONS IN THE TWO BODY MODEL. (U)

DEC 70 12P ROHNER,PETER G. ;
CONTRACT: F33615-67-C-1027
PROJ: AF-7885
TASK: 788500
MONITOR: ARL 70-0308W

UNCLASSIFIED REPORT
AVAILABILITY: PUB. IN PHYSICAL REVIEW, VB3 N15 DEC 70.
SUPPLEMENTARY NOTE: PREPARED IN COOPERATION WITH THE TECHNICAL UNIV. OF BERLIN (GERMANY).

DESCRIPTORS: (*EXCITONS, ENERGY), BAND THEORY OF SOLIDS, APPROXIMATION(MATHEMATICS), CADMIUM SULFIDES, ZINC COMPOUNDS, OXIDES, SEMICONDUCTORS (U)
IDENTIFIERS: EFFECTIVE MASS (U)

THE EXCHANGE ENERGY FOR THE WANNIER EXCITON IS CALCULATED BY SOLVING A PREVIOUSLY DERIVED TWO BODY HAMILTONIAN H SUP (2). TWO DIFFERENT METHODS ARE GIVEN TO OBTAIN THE SOLUTION OF THE EIGENVALUE PROBLEM OF H SUP (2) IN THE EFFECTIVE MASS APPROXIMATION. BOTH CALCULATIONS YIELD THE SAME RESULTS. THE EXCHANGE ENERGY IS CALCULATED FOR SEVERAL EXAMPLES AND VALUES BETWEEN 10% AND 20% OF THE BINDING ENERGY OF THE PURE HYDROGENLIKE CASE WERE FOUND. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD-716 895 20/12
DAYTON UNIV OHIO

PHONON SIDEBANDS ON BOUND EXCITON TRANSITIONS IN CDS AND ZNO, (U)

70 7P FRANK,E. N. (REYNOLDS,D. C. (LITTON,C. W. (COLLINS,T. C. (

CONTRACT: F33615-67-C-1027
PROJ: AF-7885
TASK: 788500
MONITOR: ARL 70-0310W

UNCLASSIFIED REPORT
AVAILABILITY: PUB. IN PROCEEDINGS OF THE INTERNATIONAL CONFERENCE ON THE PHYSICS OF SEMICONDUCTORS (10TH), HELD AT OAK RIDGE, TENN., ON OCT 70, P519-524.

DESCRIPTORS: (*SEMICONDUCTORS, *PHONONS), (*CADMIUM SULFIDES, LINE SPECTRUM), (*ZINC COMPOUNDS, LINE SPECTRUM), EXCITONS, OXIDES, CRYOGENICS (U)
IDENTIFIERS: *ZINC OXIDES, EMISSION SPECTRA (U)

PHONON SIDEBANDS HAVE BEEN OBSERVED ON AN EMISSION LINE DUE TO AN EXCITON BOUND TO AN IONIZED DONOR AND ALSO ON AN EMISSION LINE DUE TO AN EXCITON BOUND TO A NEUTRAL ACCEPTOR IN CDS. THE PHONON ENERGY INDICATES THAT THE COUPLING IS THROUGH THE LONGITUDINAL OPTICAL PHONONS. THE PHONON ASSISTED LINES ARE VERY SHARP AND BOTH THE GAMMAA SUB 1 AND GAMM SUB 5 COMPONENTS ARE OBSERVED. PHONON SIDEBANDS ON THE 3688.46A EMISSION LINE IN ZNO HAVE BEEN OBSERVED. THIS LINE IS DUE TO AN EXCITON BOUND TO A NEUTRAL DONOR. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD-716 896 20/12
DAYTON UNIV OHIO RESEARCH INST

CONDUCTION ELECTRON HYPERFINE INTERACTION IN SEMICONDUCTING CDS. (U)

JAN 70 5P LOOK,D. C. ;
CONTRACT: F33615-67-C-1027
PROJ: AF-7685
TASK: 788500
MONITOR: ARL 70-0311W

UNCLASSIFIED REPORT
AVAILABILITY: PUB. IN JNL. OF PHYSICS AND CHEMISTRY OF SOLIDS, V31 P2151-2154 JUL 70.
SUPPLEMENTARY NOTE: REVISION OF REPORT DATED 1 DEC 69.

DESCRIPTORS: (*SEMICONDUCTORS, BAND THEORY OF SOLIDS), (*CADMIUM SULFIDES, NUCLEAR MAGNETIC RESONANCE), CARRIERS(SEMICONDUCTORS), HYPERFINE STRUCTURE, HALL EFFECT, SINGLE CRYSTALS, PIEZOELECTRIC CRYSTALS (U)
IDENTIFIERS: PIEZOELECTRIC SEMICONDUCTORS, SPIN LATTICE RELAXATION (U)

THE CONDUCTION-ELECTRON HYPERFINE INTERACTION IN CDS HAS BEEN MEASURED BY NMR AND HALL-EFFECT TECHNIQUES. RESULTS ARE DISCUSSED. (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD-717 296 20/12
YALE UNIV NEW HAVEN CONN DUNHAM LAB

TEMPERATURE DEPENDENCE OF RAMAN LINEWIDTH AND INTENSITY OF SEMICONDUCTORS. (U)

DESCRIPTIVE NOTE: TECHNICAL REPT.,
68 14P CHANG ,R. K. ;RALSTON,J. M. ;KEATING,D. E. ;
REPT. NO. TR-4
CONTRACT: N00014-67-A-0097-0005
PROJ: NR-016-203

UNCLASSIFIED REPORT
AVAILABILITY: PUB. IN LIGHT SCATTERING SPECTRA OF SOLIDS. PROCEEDINGS OF THE INTERNATIONAL CONFERENCE HELD AT NEW YORK UNIV., 3-6 SEP 68, P369-379 1969.

DESCRIPTORS: (*SEMICONDUCTORS, *RAMAN SPECTROSCOPY), CADMIUM SULFIDES, CADMIUM SELENIDES, GALLIUM ARSENIDES, SILICON, LASERS, CRYOGENICS (U)
IDENTIFIERS: LATTICE VIBRATIONS (U)

A PRONOUNCED DECREASE IN THE SILICON RAMAN INTENSITY AS THE TEMPERATURE WAS INCREASED HAS BEEN MEASURED WITH A ND:YAG LASER. A BRIEF EXTENSION OF RESONANCE RAMAN EFFECT IS MADE FOR SEMICONDUCTORS WITH INDIRECT ENERGY BAND GAP. THE PROGRESSION OF THE LO AND TO RAMAN ACTIVE MODES OF CDSE IS PRESENTED AS THE S CONCENTRATION WAS INCREASED FOR VARIOUS ALLOYS OF CDS(X)SE(1-X). THE EFFECT OF ANHARMONIC FORCES IN SHIFTING THE LO AND TO MODES OF GAAS AND IN BROADENING THE LINEWIDTHS OF THESE MODES AND THE TRIPLY DEGENERATE MODE OF SILICON HAS BEEN MEASURED FROM 10K TO 475K. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD-717 526 20/12
AEROSPACE RESEARCH LABS WRIGHT-PATTERSON AFB OHIO

SHORT WAVELENGTH IMPURITY EXCITON TRANSITIONS IN CDS AT 1.2 K. (U)

MAR 70 8P REYNOLDS,D. C. ILITTON,C. W. ICOLLINS,T. C. I

REPT. NO. ARL-70-0348
PROJ: AF-7885
TASK: 788500

UNCLASSIFIED REPORT

AVAILABILITY: PUB. IN JNL. PHYSICS, C: SOLID STATE PHYSICS, V3 N10 P2092-2097 1970.

SUPPLEMENTARY NOTE: REVISION OF REPORT DATED 22 DEC 69.

DESCRIPTORS: (*CADMIUM SULFIDES, EXCITONS), (*SEMICONDUCTORS, BAND THEORY OF SOLIDS), SPECTRA(VISIBLE + ULTRAVIOLET), ZEEMAN EFFECT, CRYOGENICS, IMPURITIES (U)

IDENTIFIERS: EMISSION SPECTRA (U)

EMISSION LINES ON THE HIGH ENERGY SIDE OF THE GROUND STATE EXCITON HAVE BEEN OBSERVED IN CDS CRYSTALS. THESE ARE VERY SHARP LINES CHARACTERISTIC OF BOUND EXCITON TRANSITIONS. ZEEMAN SPLITTINGS OF THE LINES CONFIRM THAT EXCITONS BOUND TO BOTH NEUTRAL AND IONIZED CENTRES ARE INVOLVED. THE MOST LOGICAL INTERPRETATION IS THAT THE EMISSION LINES ARE THE RESULT OF RADIATIVE DISSOCIATION OF EXCITED STATE EXCITON COMPLEXES WHOSE HOLES DERIVE FROM THE GAMMA SUB 9 VALENCE BAND. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD-718 162 20/12
CORNELL UNIV ITHACA N Y LAB OF ATOMIC AND SOLID STATE PHYSICS

KINETICS OF EXCITONS IN CDS AT TEMPERATURE. (U)

JUL 70 6P MAGDE,DOUGLAS ;MAHR,HERBERT ;

REPT. NO. TR-33, NSC-1395
CONTRACT: NONR-401(47)

UNCLASSIFIED REPORT
AVAILABILITY: PUB. IN PHYSICAL REVIEW B, V2 N10 P4098-4103, 15 NOV 70.

DESCRIPTORS: (*CADMIUM SULFIDES, *EXCITONS), (*SEMICONDUCTORS, LUMINESCENCE), CRYOGENICS, LASERS, LIFE EXPECTANCY, PHOTOSENSITIVITY, MATHEMATICAL MODELS (U)
IDENTIFIERS: PHOTOLUMINESCENCE, EXCITON EXCITON INTERACTIONS (U)

NEW EXPERIMENTAL RESULTS OF PHOTOLUMINESCENCE OF CDS AT HE TEMPERATURES SUGGEST TWO ALTERNATIVE MODELS FOR THE FATE OF AN EXCITON IN CDS. THE MODELS, INCLUDE EXCITON-EXCITON INTERACTION AND EXPLAIN IN A SELF-CONSISTENT WAY ALL KNOWN EXPERIMENTAL FACTS. ONE MODEL ASSUMES THAT THE LOW OVER-ALL LUMINESCENT EFFICIENCY OF CDS AT LOW TEMPERATURES IS DUE TO THE EXISTENCE OF A LARGE CONCENTRATION OF NONRADIATIVE TRAPS. THE ALTERNATIVE MODEL ASSUMES THAT THE OVER-ALL LOSS IN EXCITATION IS CAUSED BY THE PROCESS OF FORMATION OF EXCITONS FROM ELECTRON-HOLE PAIRS. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD-720 030 20/12
CALIFORNIA UNIV SAN DIEGO LA JOLLA DEPT OF PHYSICS

POLARITON THEORY OF RAMAN SCATTERING IN INSULATING CRYSTALS. II. (U)

DESCRIPTIVE NOTES: TECHNICAL REPT.,
FEB 70 14P BENDOW,BERNARD I
REPT. NO. TR-1
CONTRACT: N000014-69-A-0200-6026, AF-AFOSR-610-67
PROJ: NR-017-631
MONITOR: AFOSR TR-71-1833

UNCLASSIFIED REPORT
AVAILABILITY: PUB. IN PHYSICAL REVIEW B, V2 N12 P5051-5062, 15 DEC 70.

DESCRIPTORS: (*SEMICONDUCTORS, *RAMAN SPECTROSCOPY), (*DIELECTRICS, RAMAN SPECTROSCOPY), BAND THEORY OF SOLIDS, HAMILTONIAN, CADMIUM SULFIDES, EXCITONS, PHONONS (U)
IDENTIFIERS: POLARITONS, RAMAN SCATTERING (U)

A FORMAL THEORY OF POLARITON RAMAN SCATTERING IN INSULATORS IS DEVELOPED, USING BOTH THE EQUATION-OF-MOTION AND SCATTERING-OPERATOR TECHNIQUES, AND THE TEMPERATURE-DEPENDENT CROSS SECTION IS OBTAINED. EXPLICIT FORMS ARE DERIVED FOR POLARITON DISPERSIONS AND TRANSFORMATION COEFFICIENTS, AND FOR THE RAMAN CROSS SECTION, FOR VARIOUS SPECIFIC CASES, AMONG THEM A NON-DISPERSIVE HYDROGENIC EXCITON-BAND MODEL. NUMERICAL CALCULATIONS ARE CARRIED OUT FOR THE LATTER MODEL; THE RESULTING CROSS SECTION DISPLAYS CONSIDERABLE VARIATION WITH INCOMING FREQUENCY, DISPLAYING, AMONG OTHER THINGS, IN-OUT RESONANCES WITH DISCRETE STATES, AND INTERFERENCE BETWEEN DISCRETE AND CONTINUUM CONTRIBUTIONS TO SCATTERING. COMPARISON WITH OTHER RESULTS AND WITH EXPERIMENT IS GIVEN. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD-720 497 20/6 20/12
MISSOURI UNIV ROLLA

GENERALIZED PRINCIPAL ANGLE OF INCIDENCE AND CRITICAL ANGLE. (U)

OCT 69 3P ARMSTRONG,KANDALL R. IBELL, ROBERT J. ;

CONTRACT: F44620-69-C-0122
PROJ: AF-9556
MONITOR: AFOSR TR-71-0040

UNCLASSIFIED REPORT
AVAILABILITY: PUB. IN OPTICAL SOCIETY OF AMERICA. V60 N5 P701-702 MAY 70.

DESCRIPTORS: (*CADMIUM SULFIDES, LIGHT TRANSMISSION), (*SEMICONDUCTORS, SURFACE PROPERTIES), INDIUM ANTIMONIDES, REFLECTION, ABSORPTION, PHONONS (U)
IDENTIFIERS: ANGLE OF INCIDENCE, PLASMON PHONON INTERACTIONS, CRITICAL ANGLE REFLECTIVITY (U)

ON STUDYING SURFACE PHENOMENA IT IS SOMETIMES NECESSARY TO MEASURE VERY SMALL ABSORPTION OF ELECTROMAGNETIC FIELDS. ACCORDINGLY, THE PRINCIPLE ANGLE AND CRITICAL ANGLE MUST BE EXAMINED WITH CARE FOR SURFACE STATE EXPERIMENTS. IN A PREVIOUS PUBLICATION THE GENERALIZED LAWS OF REFRACTION AND REFLECTION WERE PRESENTED. THE RESULTS HAVE BEEN EXTENDED TO CALCULATE THE PRINCIPAL ANGLE OF INCIDENCE AND THE CRITICAL ANGLE FOR TOTAL INTERNAL REFLECTION. THE RESULTS WHICH HAVE BEEN APPROXIMATED APPEAR TO BE REASONABLY ACCURATE. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD-721 406 20/12
AEROSPACE RESEARCH LABS WRIGHT-PATTERSON AFB OHIO

SPIN EXCHANGE IN EXCITONS, THE QUASICUBIC MODEL AND DEFORMATION POTENTIALS IN II-VI COMPOUNDS. (U)

MAY 70 18P LANGER,D. W. ;EUWEMA,R. N. ;ERA,KOH ;KODA,TAKAO ;
REPT. NO. ARL-71-0009

UNCLASSIFIED REPORT
AVAILABILITY: PUB. IN PHYSICAL REVIEW B, V2 N10 P4005-4022, 15 NOV 70.

DESCRIPTORS: (*SEMICONDUCTORS, EXCITONS), BAND THEORY OF SOLIDS, CADMIUM SULFIDES, CADMIUM SELENIDES, ZINC SULFIDES, COMPRESSIVE PROPERTIES, CRYOGENICS, OXIDES, ZINC COMPOUNDS, SELENIDES (U)
IDENTIFIERS: ZINC OXIDES, ZINC SELENIDES, DEFORMATION POTENTIALS, SPIN ORBIT INTERACTIONS, LIGAND FIELDS (U)

THE EFFECT OF THE SPIN-EXCHANGE INTERACTION BETWEEN ELECTRON AND HOLE IS INVESTIGATED FOR THE CASE OF EXCITONS ORIGINATING FROM ONE OF THE P-LIKE VALENCE BANDS AND AN S-LIKE CONDUCTION BAND, AS IS THE CASE FOR 2B-6B COMPOUNDS. A GENERAL EXCITON MATRIX IS CONSTRUCTED, STARTING FROM THE WORK OF PIKUS. IT INCLUDES SPIN-ORBIT, CRYSTAL-FIELD, SPIN-EXCHANGE, AND DEFORMATION-POTENTIAL INTERACTIONS. USE OF THIS MATRIX THEN ALLOWS A THEORETICAL FIT TO THE EXPERIMENTAL DATA WHICH DESCRIBES THE SHIFT OF EXCITON LEVELS UNDER UNIAXIAL PRESSURE IN ZNO, CDS, AND CDSE. THIS FIT RESULTS IN THE DETERMINATION OF SIX DEFORMATION POTENTIALS, TWO SPIN-ORBIT PARAMETERS, THE CRYSTAL-FIELD PARAMETER, AND THE EXCHANGE PARAMETER. THE GENERAL THEORY, WHEN ADAPTED TO THE ZINC-BLENDE STRUCTURE, PERMITS THE AUTHORS TO FIT THEIR DATA ON CUBIC ZNS AND ZNSE, RESULTING IN A DETERMINATION OF TWO DEFORMATION POTENTIALS AND THE SPIN-EXCHANGE PARAMETER FOR EACH COMPOUND. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD-721 761 20/12
WASHINGTON UNIV SEATTLE

ACOUSTOELECTRIC AFTERCURRENT IN PHOTOCONDUCTING CDS. (U)

70 9P HIGGINS,THOMAS J. ;PARENT, ROBERT J. ;REDINBO,G. ROBERT ;MOHR,JUDITH ;

CONTRACT: DA-ARO-D-21-124-70-G58
PROJ: DA-2-0-061102-B-31-E
MONITOR: AROD 839111-E

UNCLASSIFIED REPORT
AVAILABILITY: PUB. IN PROCEEDINGS OF THE NATIONAL ELECTRONICS CONFERENCE, HELD IN CHICAGO, ILL., ON 7-9 DEC 70.

DESCRIPTORS: (*SEMICONDUCTORS, PIEZOELECTRIC CRYSTALS), (*CADMIUM SULFIDES, ELECTRIC CURRENTS), PHOTOCONDUCTIVITY, PHONONS, MATHEMATICAL MODELS (U)
IDENTIFIERS: PIEZOELECTRIC SEMICONDUCTORS (U)

IN A PIEZOELECTRIC SEMICONDUCTOR, IN WHICH THE DRIFT VELOCITY OF THE CURRENT CARRIERS IS FASTER THAN THE SOUND VELOCITY, ENERGY IS TRANSFERRED FROM THE CARRIERS TO THE ACOUSTIC SYSTEM OF THE MATERIAL. THIS ACOUSTOELECTRIC AFTER-CURRENT IS THE SUBJECT OF THIS PAPER. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD-721 786 20/1 20/12 9/1
CALIFORNIA UNIV BERKELEY

SURFACE ELASTIC WAVES, (U)

MAY 70 41P WHITE,RICHARD M. ;
CONTRACT: DA-ARO(D)-31-124-G1057
MONITOR: AROD 5718:9-E

UNCLASSIFIED REPORT
AVAILABILITY: PUB. IN PROCEEDINGS OF THE IEEE, V58 NB P1238-1276 AUG 70.
SUPPLEMENTARY NOTE: REVISION OF REPORT DATED 13 APR 70.

DESCRIPTORS: (*ULTRASONIC RADIATION, MICROWAVE FREQUENCY), (*PIEZOELECTRIC CRYSTALS, ULTRASONIC RADIATION), (*DELAY LINES, FEASIBILITY STUDIES), PIEZOELECTRIC TRANSDUCERS, SEMICONDUCTORS, LITHIUM COMPOUNDS, NIOBATES, CADMIUM SULFIDES, REVIEWS (U)
IDENTIFIERS: *ACOUSTIC SURFACE WAVES, SURFACE WAVES, MICROWAVE ACOUSTICS, LITHIUM NIOBATES, ACOUSTOOPTIC INTERACTIONS, PIEZOELECTRIC SEMICONDUCTORS, INTERDIGITAL TRANSDUCERS (U)

MANY OF THE RECENTLY DISCOVERED CHARACTERISTICS AND APPLICATIONS TO ELECTRONICS OF SURFACE ELASTIC WAVES ARE DISCUSSED. FIRST, THE PROPAGATION OF VARIOUS ELASTIC WAVES AT THE SURFACES OF SOLIDS IS CONSIDERED, FOLLOWED BY DESCRIPTIONS OF THE MANY WAYS WHICH HAVE BEEN DEMONSTRATED FOR TRANSDUCTION BETWEEN SURFACE ELASTIC WAVES AND ELECTROMAGNETIC WAVES. SURFACE-WAVE AMPLIFICATION, PRIMARILY IN SEMICONDUCTORS, AND WAVE GUIDING, FOCUSING, AND REFLECTION ARE EXAMINED. THE PROPERTIES OF THESE WAVES SUIT THEM FOR USE IN A NUMBER OF APPLICATIONS, WHICH ARE DISCUSSED, RANGING FROM REALIZATION OF ELECTRONIC AMPLIFIERS, FREQUENCY AND ANALOG TIME-DOMAIN FILTERS, AND CODING DEVICES, TO THE MODULATION OF LIGHT BEAMS AND THE MEASUREMENT OF SURFACE PROPERTIES OF SOLIDS. MANY REFERENCES TO THE RECENT SURFACE-WAVE LITERATURE ARE INCLUDED. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD-721 850 20/12
PRINCETON UNIV N J DEPT OF ELECTRICAL ENGINEERING

METHODS OF DETERMINING SURFACE STATE ENERGIES. (U)

DESCRIPTIVE NOTE: TECHNICAL REPT.,
APR 71 34P MARK,PETER I
REPT. NO. TR-11
CONTRACT: N00014-67-A-0151-0014
PROJ: NR-056-492

UNCLASSIFIED REPORT
AVAILABILITY: PUB. IN JNL. OF SURFACE SCIENCE, V25 P192-223, MAR 71.

DESCRIPTORS: (*BAND THEORY OF SOLIDS, SURFACES), SEMICONDUCTORS, DIELECTRICS, CADMIUM SULFIDES, BRILLOUIN ZONES, POTENTIAL THEORY, WORK FUNCTIONS (U)
IDENTIFIERS: SURFACE STATES (U)

THE SURFACES OF SOLIDS PRESENT ELECTRONIC STATES, SO-CALLED SURFACE STATES, IN ADDITION TO THE BAND STRUCTURE OF THE INFINITE LATTICE. THIS PAPER DISCUSSES THE ORIGIN OF THESE STATES, THEIR MAJOR FEATURES, AND SURVEYS THE PRINCIPAL EXPERIMENTAL TECHNIQUES FOR THEIR CHARACTERIZATION. IT ALSO STRESSES THE IMPORTANCE OF STRUCTURE IN SURFACE STATE THEORY, ENUMERATES THE DIFFICULTIES IN THE INTERPRETATION OF EXPERIMENTAL SURFACE STATE DISTRIBUTION MEASUREMENTS, AND SUGGEST THAT SUCH MEASUREMENTS MAY BE HELPFUL IN THE INTERPRETATION OF SURFACE STRUCTURE MEASUREMENTS. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD-722 112 10/2 20/12
CLEVITE CORP CLEVELAND OHIO

RESEARCH ON THE OPERATING AND FAILURE MECHANISMS IN CDS SOLAR CELLS. (U)

DESCRIPTIVE NOTE: FINAL TECHNICAL REPT. 1 JUN 69-31 MAY 70,
SEP 70 147P SHIOZAWA,L. R. ;AUGUSTINE, F. ;COOK,W. R. , JR;
CONTRACT: F33615-69-C-1732
PROJ: AF-7885, AF-916080/7885
MONITOR: ARL 70-0169

UNCLASSIFIED REPORT

DESCRIPTORS: (*SOLAR CELLS, FAILURE(ELECTRONICS)), (*SEMICONDUCTING FILMS, ELECTRICAL PROPERTIES), CADMIUM SULFIDES, COPPER COMPOUNDS, ELECTRIC CURRENTS, MANUFACTURING METHODS, VAPOR PLATING, PHASE STUDIES, PHASE DIAGRAMS (U)
IDENTIFIERS: COPPER SULFIDES, THIN FILMS (U)

THE OPERATING AND FAILURE MECHANISMS OF CU2S: CDS THIN FILM SOLAR CELLS WERE EXAMINED FURTHER DURING THE PAST YEAR. THE SHORT CIRCUIT CURRENT OF PILOT PRODUCTION CELLS WAS FOUND TO BE SENSITIVE TO THE UNIFORMITY OF ZN PLATING AND TO THE TEXTURE OF THE METALLIZED PLASTIC SUBSTRATE. EXTENSIVE LITERATURE AND EXPERIMENTAL STUDIES ON THE VARIOUS FORMS OF CUPROUS SULFIDE WERE CARRIED OUT. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD-722 701 20/12
YALE UNIV NEW HAVEN CONN DEPT OF ENGINEERING AND APPLIED SCIENCE

AN EXPERIMENTAL STUDY OF THE VIBRONIC AND ELECTRONIC RESONANCE RAMAN EFFECT IN SEMICONDUCTOR AND GARNET CRYSTALS. (U)

DESCRIPTIVE NOTE: TECHNICAL REPT.,
MAR 71 164P WADSACK,RONALD L. ;
REPT. NO. TR-5
CONTRACT: N00014-67-A-0097-0005
PROJ: NR-016-203

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: DOCTORAL THESIS.

DESCRIPTORS: (*SEMICONDUCTORS, *RAMAN SPECTROSCOPY), (*CADMIUM SULFIDES, RAMAN SPECTROSCOPY), (*GARNET, RAMAN SPECTROSCOPY), ALUMINUM COMPOUNDS, DYSPROSIUM COMPOUNDS, GALLIUM COMPOUNDS, LUTECIUM COMPOUNDS, YTTERBIUM COMPOUNDS, GAS LASERS, CRYOGENICS, PHONONS, THESES (U)
IDENTIFIERS: LATTICE VIBRATIONS, ARGON LASERS (U)

THE WORK DESCRIBES THE FIRST OBSERVATION OF 'RESONANT CANCELLATION' OF RAMAN SCATTERING FROM LATTICE VIBRATIONS IN CDS AND ELECTRONIC LEVELS IN DYALG. PREVIOUS EXPERIMENTAL MEASUREMENTS AND THEORETICAL PREDICTIONS HAD INDICATED THAT THE RAMAN SCATTERING CROSS SECTION SHOULD INCREASE MONOTONICALLY AS THE ENERGY OF THE INCIDENT RADIATION APPROACHED THAT OF A FUNDAMENTAL ELECTRONIC TRANSITION OF THE CRYSTAL. ESSENTIAL TO THIS INVESTIGATION WAS THE AVAILABILITY OF A MULTI-WAVELENGTH SOURCE OF INTENSE MONOCHROMATIC LIGHT. A SENSITIVE RAMAN SPECTROSCOPY SYSTEM WAS CONSTRUCTED WHICH EMPLOYED A FLOWING-GAS CW ARGON-KRYPTON-XENON LASER. A CONTROL OF 22 LASING TRANSITIONS WAS ACHIEVED: THE MAXIMUM OUTPUT POWER WAS 0.65W AT 514.5 NM. SAMPLES WERE MOUNTED IN A LIQUID NITROGEN COLD-FINGER DEWAR. RIGHT-ANGLE SCATTERING WAS EMPLOYED WITH THE SCATTERED RADIATION DETECTED BY THE USUAL COMBINATION OF A TANDEM DOUBLE-MONOCHROMATOR AND A PHOTOMULTIPLIER TUBE. A PHOTON COUNTER WITH DIGITAL/ANALOG OUTPUTS DROVE AN X-Y RECORDER WHICH DISPLAYED THE RESULTANT SPECTRA. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD=723 315 10/2
CLEVITE CORP CLEVELAND OHIO ELECTRONIC RESEARCH DIV

IMPROVEMENTS IN CDS THIN FILM SOLAR CELLS. (U)

DESCRIPTIVE NOTE: FINAL TECHNICAL REPT. 1 NOV 69-31 OCT 70,
JAN 71 81P DUNN,WILLIAM F. ;
CONTRACT: F33615-68-C-1182
PROJ: AF-7885
MONITOR: ARL 71-0015

UNCLASSIFIED REPORT

DESCRIPTORS: (*SOLAR CELLS, PERFORMANCE(ENGINEERING)), SEMICONDUCTOR DEVICES, CADMIUM SULFIDES, FLIGHT TESTING, SCIENTIFIC SATELLITES (U)
IDENTIFIERS: OV1-13 SATELLITE, OV1-17 SATELLITE, THIN FILMS (U)

THE REPORT IS CONCERNED WITH TWO AREAS IN THE CADMIUM SULFIDE THIN FILM SOLAR CELL DEVELOPMENT PROGRAM: (1) A REPORT ON SPACE FLIGHT TESTING OF CDS CELLS AND (2) RESULTS OF A DEVELOPMENT PROGRAM FOR IMPROVING THE STABILITY AND EFFICIENCY OF THE STANDARD CDS CELL. TWO SPACE FLIGHT TESTS OF CDS CELLS ARE REPORTED. THE FIRST TEST, ARX-701, CONTAINED TWO CDS PANELS ON THE OV1-13 SATELLITE. THE SECOND SPACE FLIGHT TEST CONTAINED ONE CDS PANEL, ARX-901, AND WAS FLOWN ON THE OV1-17 SATELLITE. A DEVELOPMENT PROGRAM FOR OBTAINING ENGINEERING MEASUREMENTS FROM THE CDS CELL WAS CARRIED OUT. A STUDY WAS MADE OF HEATING EFFECTS ON THE CADMIUM SULFIDE THIN FILM CELL AFTER FORMATION OF THE BARRIER LAYER. ADDITIONAL INVESTIGATIONS WERE MADE OF LOW PRESSURE LAMINATIONS, A SILVER COATED GLASS POWDER FOR METALLIZED SUBSTRATE USE AND VARIATIONS IN GRIDDING ATTACHMENT.
(AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD-723 373 20/12
MANITOBA UNIV WINNIPEG DEPT OF ELECTRICAL ENGINEERING

CURRENT SATURATION IN CDS FILMS AT VARIOUS TEMPERATURES, (U)

SEP 70 4P SADHU,A. KAO,K. C. I

UNCLASSIFIED REPORT
AVAILABILITY: PUB. IN SOLID STATE COMMUNICATIONS, V8 P2013-2015 1970. NO COPIES FURNISHED BY DDC OR NTIS.

DESCRIPTORS: (*SEMICONDUCTING FILMS, ELECTRIC CURRENTS), (*CADMIUM SULFIDES, PHOTOCONDUCTIVITY), PHONONS, PIEZOELECTRIC CRYSTALS (U)
IDENTIFIERS: PIEZOELECTRIC SEMICONDUCTORS, PHOTOELECTRIC EMISSION, ACOUSTIC SURFACE WAVES, SURFACE WAVES (U)

THE THRESHOLD FIELD FOR THE ONSET OF HIGH-FIELD PHOTOCURRENT SATURATION IN A CDS FILM INCREASES WITH INCREASING TEMPERATURE AND DECREASES WITH INCREASING ILLUMINATION INTENSITY. THIS PHENOMENON IS ATTRIBUTED TO THE ACOUSTIC WAVE INTERACTION WITH FREE CARRIERS IN THE FILM. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD-723 713 20/12
UNIVERSITY OF SOUTHERN CALIFORNIA LOS ANGELES ELECTRONIC SCIENCES LAB

MULTIPLE-PHONON RESONANT RAMAN SCATTERING THEORY. (U)

SEP 70 6P WILLIAMS,M. L. ISMIT,J. I

CONTRACT: AF-AFOSR-1622-69
PROJ: AF-4751
MONITOR: AFOSR TR-71-1292

UNCLASSIFIED REPORT
AVAILABILITY: PUB. IN SOLID STATE COMMUNICATIONS, V8 N23 P2009-2011 1970.
SUPPLEMENTARY NOTE: REVISION OF REPORT DATED 3 AUG 70.

DESCRIPTORS: (*SEMICONDUCTORS, RAMAN SPECTROSCOPY), (*CADMIUM SULFIDES, *RAMAN SPECTROSCOPY), PHONONS, COHERENT RADIATION, LASERS (U)

MULTIPLE-PHONON RAMAN SCATTERING IN CDS IS EXPLAINED BY A MODEL IN WHICH RESONANT ABSORPTION OCCURS FOR ELECTRONICALLY AND VIBRATIONALLY EXCITED LOCALIZED STATES. THE RADIUS OF THE LOCALIZED STATE IS ESTIMATED TO BE ABOUT 20A. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD-723 927 20/12
AEROSPACE RESEARCH LABS WRIGHT-PATTERSON AFB OHIO

SELF-CONSISTENT ORTHOGONALIZED-PLANE-WAVE CALCULATIONS. (U)

FEB 71 46P EUWEMA,R. N. ;STUKEL,D. J. ;COLLINS,T. C. ;

REPT. NO. ARL-71-0045
PROJ: AF-7085
TASK: 708500

UNCLASSIFIED REPORT
AVAILABILITY: PUB. IN COMPUTATIONAL METHODS IN BAND THEORY, P82-123 1971.

DESCRIPTORS: (*BAND THEORY OF SOLIDS, NUMERICAL ANALYSIS), (*SEMICONDUCTORS, BAND THEORY OF SOLIDS), FOURIER ANALYSIS, SERIES, WAVE FUNCTIONS, INTEGRAL TRANSFORMS, CONVERGENCE, DIAMONDS, ZINC SULFIDES, SILICON, CADMIUM SULFIDES, CADMIUM SELENIDES (U)
IDENTIFIERS: *ORTHOGONALIZED PLANE WAVE THEORY, FOURIER SERIES, FOURIER TRANSFORMATION, ENERGY BANDS (U)

A NATURAL WAY TO DESCRIBE MATHEMATICALLY A VALENCE WAVE FUNCTION IN A PERIODIC CRYSTAL IS IN TERMS OF A FOURIER SERIES. HOWEVER, CONVERGENCE OF SUCH A PLANE-WAVE SERIES IS VERY POOR BECAUSE THOUSANDS OF PLANE-WAVE TERMS ARE REQUIRED TO SIMULATE THE RAPID OSCILLATIONS OF THE WAVE FUNCTION CLOSE TO THE ATOMIC NUCLEI. TO IMPROVE CONVERGENCE, HERRING PROPOSED THE ORTHOGONALIZED-PLANE-WAVE (OPW) METHOD IN WHICH THE PLANE-WAVE TERMS MAKING UP THE FOURIER SERIES ARE ORTHOGONALIZED TO ALL THE TIGHTLY-BOUND, CORE WAVE FUNCTIONS. THIS ORTHOGONALIZATION VASTLY IMPROVES THE CONVERGENCE BECAUSE THE CORE FUNCTIONS PRESENT IN THE VALENCE WAVE FUNCTION EXPANSION CORRECTLY SIMULATE THE BEHAVIOR OF THE VALENCE WAVE FUNCTION IN THE CORE REGIONS, WHILE THE PLANE-WAVE TERMS ADEQUATELY DESCRIBE THE OVERALL CRYSTALLINE BEHAVIOR OF THE FUNCTION. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD-724 818 20/5 20/12
AEROSPACE RESEARCH LABS WRIGHT-PATTERSON AFB OHIO

SIMULATED EMISSION SPECTRA OF CDS PLATELETS UNDER VARIOUS EXCITATION LEVELS. (U)

AUG 70 10P ERA,KOH ;LANGER,DIETRICH W. ;

REPT. NO. ARL-71-0068
PROJ: AF-7885
TASK: 788500

UNCLASSIFIED REPORT
AVAILABILITY: PUB. IN JNL. OF APPLIED PHYSICS, V42 N3 P1021-1027, 1 MAR 71.

DESCRIPTORS: (*CADMIUM SULFIDES, COHERENT RADIATION), SPECTRA(VISIBLE + ULTRAVIOLET), GAS LASERS, SEMICONDUCTORS, CRYOGENICS, EXCITONS (U)
IDENTIFIERS: EMISSION SPECTRA, NITROGEN LASERS, STIMULATED RADIATION, EXCITON EXCITON INTERACTIONS, CADMIUM SULFIDE LASERS (U)

THE REPORT DISCUSSES THE STIMULATED EMISSION OF CDS PLATELETS EXCITED BY LIGHT PULSES FROM A N2 LASER AT 2 DEGREES AND 77 DEGREES K, AS A FUNCTION OF THE LEVEL OF EXCITATION AND FOR DIFFERENTLY PREPARED CRYSTALS. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD-724 886 20/2
DELAWARE UNIV NEWARK DEPT OF PHYSICS

GROWTH AND PROPERTIES OF STEEPLY GRADED ZN(F)CD(1-F)S CRYSTALS, (U)

OCT 70 13P BITER,W. J. ;WILLIAMS,FERD
;

CONTRACT: DA-ARO-D-31-124-71-G30
PROJ: DA-Z-0-061102-B-11-B
MONITOR: AROD 4169:16-P

UNCLASSIFIED REPORT
AVAILABILITY: PUB. IN JNL. OF LUMINESCENCE, V3 P395-404 1971.
SUPPLEMENTARY NOTE: REVISION OF REPORT DATED 27 JUL 70.

DESCRIPTORS: (*ZINC SULFIDES, *EPITAXIAL GROWTH), (*CADMIUM SULFIDES, EPITAXIAL GROWTH), LUMINESCENCE, ULTRAVIOLET RADIATION, ELECTRICAL PROPERTIES, OPTICAL PROPERTIES, SEMICONDUCTORS (U)
IDENTIFIERS: CHEMICAL VAPOR DEPOSITION, PHOTOLUMINESCENCE, MINORITY CARRIER LIFETIME (U)

STEEPLY GRADED MIXED CRYSTALS OF ZN(F)CD(1-F)S WERE GROWN BY A VAPOR PHASE DEPOSITION OF CDS ONTO CLEAVED SLICES OF ZNS FOLLOWED BY A PERIOD OF INTERDIFFUSION. THIS PRODUCED A GRADED REGION BETWEEN 50 AND 100 MICROMETERS WIDE WITH A BANDGAP GRADIENT D(E SUB G)/DX VARYING BETWEEN 10 AND 100 EV/CM. THE DIFFUSION COEFFICIENT WAS DETERMINED AS A FUNCTION OF POSITION. THE CRYSTALS HAVE GOOD PHOTOLUMINESCENT PROPERTIES. WITH UV EXCITATION, THE ZNS SIDE SHOWS BLUE EMISSION AT 77K WHILE THE CDS SIDE HAS RED PHOTOLUMINESCENCE. BY IRRADIATING THE GRADED REGION, THE PEAK OF THE PHOTOLUMINESCENCE SHIFTS AS A FUNCTION OF THE WAVELENGTH OF EXCITATION. THE CRYSTALS DO NOT EXHIBIT MEASURABLE ELECTROLUMINESCENCE OR DEPENDENCE OF THE PHOTOLUMINESCENCE ON APPLIED ELECTRICAL FIELD. A LOW MINORITY CARRIER LIFETIME IS EXPLAINED BY THE HIGH DENSITY OF DEEP ACCEPTORS. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD-725 062 20/2 20/12 7/4
CLEVITE CORP CLEVELAND OHIO ELECTRONIC RESEARCH DIV

RESEARCH ON IMPROVED II-VI CRYSTALS. (U)

DESCRIPTIVE NOTE: FINAL TECHNICAL REPT. 1 JUN 68-31 MAY 70,
JAN 71 119P SHIOZAWA,L. R. ;JOST,J. M. ;
CONTRACT: F33615-68-C-1601
PROJ: AF-7685
MONITOR: ARL 71-0017

UNCLASSIFIED REPORT

DESCRIPTORS: (*CADMIUM COMPOUNDS, CRYSTAL GROWTH), (*ZINC COMPOUNDS, CRYSTAL GROWTH), (*SEMICONDUCTORS, *CRYSTAL GROWTH), CADMIUM SULFIDES, CADMIUM SELENIDES, TELLURIDES, PHASE STUDIES, THERMODYNAMICS, ZINC SULFIDES, SELENIDES (U)
IDENTIFIERS: CADMIUM TELLURIDES, ZINC TELLURIDES, ZINC SELENIDES (U)

THERMODYNAMIC PROPERTIES ASSOCIATED WITH THE II-VI SYSTEMS HAVE BEEN DETERMINED FROM VARIOUS PUBLISHED DATA AND FROM EXPERIMENTAL WORK DONE HERE. ACCURATE VAPOR PRESSURE EQUATIONS HAVE BEEN OBTAINED FOR ZN, CD, S, SE, AND TE. THE PHASE DIAGRAMS OF THE ZN-S, CD-S, ZN-SE, CD-SE, ZN-TE, AND CD-TE SYSTEMS HAVE BEEN ESTABLISHED, ALTHOUGH IN SOME CASES ONLY TENTATIVELY. THE TEMPERATURE DEPENDENT EQUILIBRIUM CONSTANTS FOR THE SUBLIMATION OF ZNS, CDS, ZNSE, CDSE, ZNTE, AND CDTE HAVE BEEN ACCURATELY EVALUATED. THE COMPONENT PRESSURES AT THE SOLID STABILITY FIELD BOUNDARIES (P-T DIAGRAMS) OF CDS, CDSE, ZNTE, AND CDTE HAVE BEEN DETERMINED EXPERIMENTALLY. THE BOUNDARY PRESSURES FOR ZNS AND ZNSE ARE ESTIMATED BY ANALOGY. A THEORY OF THE CONSTITUTION OF THE EQUILIBRIUM LIQUID AT THE SOLID STABILITY FIELD BOUNDARIES INVOKING SPECIFIC MOLECULAR SPECIES HAS BEEN DEVELOPED AND APPLIED TO THE CD-TE SYSTEM. THE COMPOSITIONS AT THE SOLID STABILITY FIELD BOUNDARIES (X-T DIAGRAMS) OF CDS AND ZNTE HAVE BEEN TENTATIVELY EVALUATED. SOME APPLICATION OF THIS BASIC INFORMATION HAS BEEN MADE IN EXERCISING CONTROL OF II-VI CRYSTAL GROWTH AND TREATMENT. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD-725 177 20/12 7/4
PRINCETON UNIV N J DEPT OF ELECTRICAL ENGINEERING

SORPTION-INDUCED CONDUCTIVITY CHANGES IN COMPOUND SEMICONDUCTORS. (U)

DESCRIPTIVE NOTE: TECHNICAL REPT., SEP 69-JUN 71,
JUN 71 173P BAIDYAROY,SUPRASAD ;MARK,
PETER ;
REPT. NO. TR-9
CONTRACT: N00014-67-A-0151-0014
PROJ: NR-056-492

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: DOCTORAL THESIS.

DESCRIPTORS: (*SEMICONDUCTORS, ELECTRICAL CONDUCTANCE), (*CHEMISORPTION, SEMICONDUCTORS), CADMIUM SULFIDES, CADMIUM SELENIDES, LEAD COMPOUNDS, IODIDES, OXYGEN, SINGLE CRYSTALS, SURFACE PROPERTIES, PHOTOSENSITIVITY, SEMICONDUCTING FILMS, BAND THEORY OF SOLIDS (U)
IDENTIFIERS: LEAD IODIDES (U)

LARGE CHANGES IN THE EQUILIBRIUM SEMICONDUCTIVITY OF THIN COMPOUND SEMICONDUCTORS INDUCED BY CHEMISORPTION ARE INVESTIGATED. EVAPORATED FILMS AND SINGLE CRYSTALS OF CDS AND SINGLE CRYSTALS OF CDSE (BOTH N-TYPE) SHOW A GRADUAL REDUCTION IN SEMICONDUCTIVITY COUPLED WITH AN INCREASE IN ACTIVATION ENERGY WITH INCREASING OXYGEN PRESSURE ABOVE A CERTAIN THRESHOLD. EVAPORATED CDS FILMS ARE MORE SENSITIVE TO SUCH CHANGES AT LOWER PRESSURE AS ARE THE MORE HIGHLY COMPENSATED CU AND AU DOPED FILMS. OXYGEN CHEMISORPTION STATES OF CDS AND CDSE ARE DISTRIBUTED IN ENERGY IN THE SEMICONDUCTOR BANDGAP BEING LARGEST AT THE CONDUCTION BAND EDGE AND DECREASING EXPONENTIALLY WITH ENERGY INTO THE GAP. ATOMICALLY STRUCTURED CDS SINGLE CRYSTAL SURFACES, OBTAINED BY ION BOMBARDMENT AND VACUUM ANNEALING ARE INSENSITIVE TO CHEMISORPTION. THUS, ADSORPTION SITES CAN BE ASSOCIATED WITH SURFACE IMPURITIES AND/OR IMPERFECTIONS. PBI2 (P-TYPE) EXHIBITS AN INCREASE IN SEMICONDUCTIVITY WITH OXYGEN PRESSURE IN ACCORD WITH THE MODELS DEVELOPED IN THE REPORT. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD-725 634 20/12
MASSACHUSETTS INST OF TECH CAMBRIDGE FRANCIS BITTER NATIONAL MAGNET LAB

ANOMALOUS FAR INFRARED MAGNETOABSORPTION IN N-TYPE CADMIUM SULFIDE, (U)

DEC 70 6P COHN,DANIEL R. ;LAX, BENJAMIN ;BUTTON,KENNETH J. ;DREYBRODT,WOLFGANG ;

CONTRACT: F44620-67-C-0047
PROJ: AF-9764
TASK: 976401
MONITOR: AFOSR TR-71-1813

UNCLASSIFIED REPORT
AVAILABILITY: PUB. IN SOLID STATE COMMUNICATIONS, V9 N7 P441-444 1971.

DESCRIPTORS: (*SEMICONDUCTORS, CYCLOTRON RESONANCE PHENOMENA), (*CADMIUM SULFIDES, INFRARED RADIATION), ABSORPTION SPECTRUM, GAS LASERS, SUBMILLIMETER WAVES, MAGNETIC FIELDS, CRYOGENICS, ANOMALIES (U)
IDENTIFIERS: FAR INFRARED RADIATION, MAGNETOABSORPTION (U)

MAGNETIC FIELD DEPENDENT FAR INFRARED ABSORPTION IN N-CDS HAS BEEN STUDIED OVER A WIDE RANGE OF FREQUENCIES AND MAGNETIC FIELDS AT 1.4K. TWO STRONG ABSORPTIONS WHICH ARE CHARACTERIZED BY A LINEAR DEPENDENCE OF FREQUENCY UPON MAGNETIC FIELD ARE OBSERVED. HOWEVER, THE BEHAVIOR OF THESE ABSORPTIONS INDICATES THAT THEY ARE NOT DUE TO CYCLOTRON RESONANCE TRANSITIONS. THE EXISTENCE OF A VERY SHALLOW BOUND STATE IS POSTULATED IN ORDER TO EXPLAIN THE FEATURES OF THESE ABSORPTIONS. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD-725 942 20/12
PENNSYLVANIA UNIV PHILADELPHIA LAB FOR RESEARCH ON THE STRUCTURE OF MATTER

RESONANCE-ENHANCED BRILLOUIN SCATTERING IN CRYSTALS, (U)

MAR 70 16P BURSTEIN,E. ;ITO,R. ;
PINCZUK,A. ;SHAND,M. ;
CONTRACT: DA-31-124-ARO(D)-239
PROJ: DA-2-0-061102-B-11-B
MONITOR: AROD 4882:18-P

UNCLASSIFIED REPORT
AVAILABILITY: PUB. IN THE JNL. OF THE ACOUSTICAL SOCIETY OF AMERICA, V49 N3 PT3 P1013-1025 MAR 71.

DESCRIPTORS: (*LIGHT TRANSMISSION, CRYSTALS), RAMAN SPECTROSCOPY, EXCITONS, PHONONS, SEMICONDUCTORS, SCATTERING, CADMIUM SULFIDES, ZINC COMPOUNDS, OXIDES (U)
IDENTIFIERS: *BRILLOUIN SCATTERING, POLARITONS, LIGHT SCATTERING, ZINC OXIDES, ACOUSTOOPTIC INTERACTIONS, PHOTON PHONON INTERACTIONS (U)

THE PHENOMENOLOGICAL THEORY OF LIGHT SCATTERING BY OPTICAL AND ACOUSTICAL PHONONS IS REVIEWED. THE RESONANCE ENHANCEMENT OF BRILLOUIN SCATTERING BY ACOUSTICAL PHONONS IN THE VICINITY OF THE INTRINSIC ABSORPTION EDGE IS RELATED TO THE ENHANCEMENT OF THE ELASTO-OPTICAL CONSTANTS. A MACROSCOPIC THEORY OF RESONANCE-ENHANCED BRILLOUIN SCATTERING BY ACOUSTICAL PHONONS ANALOGOUS TO THAT OF RESONANCE-ENHANCED RAMAN SCATTERING BY OPTICAL PHONONS IS FORMULATED IN TERMS OF THE SCATTERING OF POLARITONS BY THE ACOUSTIC PHONONS VIA THE EXCITON AND CONTINUUM ELECTRON-HOLE PAIR EXCITATION PARTS OF THE INCIDENT AND SCATTERED POLARITONS. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD-725 995 9/1 20/1 20/12
HARRY DIAMOND LABS WASHINGTON D C

GENERATION AND PROPAGATION OF HYPERSONIC WAVES AND THEIR APPLICATIONS TO MICROWAVE FREQUENCIES. (U)

DESCRIPTIVE NOTE: MASTER'S THESIS,
MAY 71 49P REGGIA,FRANK J
REPT. NO. HDL-TR-153e
PROJ: DA-1-T-061101-B-31-A, HDL-REL25

UNCLASSIFIED REPORT

DESCRIPTORS: (*DELAY LINES, MICROWAVE FREQUENCY), (*ULTRASONIC RADIATION, MICROWAVE FREQUENCY), SEMICONDUCTOR DEVICES, PIEZOELECTRIC CRYSTALS, CADMIUM SULFIDES, ZINC COMPOUNDS, OXIDES, ALUMINA, PIEZOELECTRIC TRANSDUCERS, VAPOR PLATING, VACUUM APPARATUS, THESES (U)
IDENTIFIERS: *MICROWAVE ACOUSTICS, ZINC OXIDES, THIN FILMS, PIEZOELECTRIC SEMICONDUCTORS, ELASTIC WAVES (U)

THE PAPER DESCRIBES TECHNIQUES FOR THE GENERATION, AMPLIFICATION, AND PROPAGATION OF ELASTIC WAVES IN THE FREQUENCY RANGE 1 TO 3 GHZ. THESE TECHNIQUES INCLUDE THE DESIGN, FABRICATION, AND EVALUATION OF MICROWAVE ACOUSTIC DELAY LINES CONSISTING OF HIGHLY ORIENTED ELECTROACOUSTIC CDS AND ZNO TRANSDUCERS VACUUM-DEPOSITED ON SINGLE-CRYSTAL SAPPHIRE (AL203) PROPAGATING MEDIA. TYPICAL ELECTRICAL CHARACTERISTICS AT 2 GHZ OF THESE THIN-FILM TRANSDUCERS (ABOUT 1 MICROMETER THICK) AND DELAY MEDIA COMBINATION, IN BOTH 6 MICROSEC, INSERTION LOSS LESS THAN 40 DB, INPUT VSWR LESS THAN 2.0 OVER A 20-PERCENT BANDWIDTH, AND OPERATING TEMPERATURE FROM -74 DEGREES TO +96 DEGREES C. THESE FIXED, PASSIVE MICROWAVE ACOUSTIC DELAY LINES (MADL) ARE VERY RELIABLE AND ARE SMALL, LIGHTWEIGHT, AND RELATIVELY INEXPENSIVE TO FABRICATE. ACOUSTIC PROPAGATION VELOCITY, POWER HANDLING CAPABILITIES, IMPEDANCE MATCHING TECHNIQUES, AND APPLICATIONS OF THESE ELECTROACOUSTIC DELAY LINES ARE ALSO DISCUSSED. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD-726 138 20/12 20/3
INTERNATIONAL UNION OF PURE AND APPLIED PHYSICS LONDON (ENGLAND)

PROCEEDINGS OF THE INTERNATIONAL CONFERENCE ON PHOTOCONDUCTIVITY (3RD) HELD AT STANFORD UNIVERSITY, CALIFORNIA, ON 12-15 AUGUST 1969. (U)

71 421P PELL,ERIK M. ;

UNCLASSIFIED REPORT
AVAILABILITY: PAPER COPY AVAILABLE FROM: PERGAMON PRESS, INC., MAXWELL HOUSE, FAIRVIEW PARK, ELMSFORD, NEW YORK 10523 $33.75. NO COPIES FURNISHED BY DDC OR NTIS.
SUPPLEMENTARY NOTE: SPONSORED IN PART BY OFFICE OF NAVAL RESEARCH, WASHINGTON, D. C. PREPARED IN COOPERATION WITH AMERICAN PHYSICAL SOCIETY, NEW YORK.

DESCRIPTORS: (*PHOTOCONDUCTIVITY, SYMPOSIA), (*SEMICONDUCTORS, PHOTOCONDUCTIVITY), BAND THEORY OF SOLIDS, FERROELECTRIC CRYSTALS, GERMANIUM, SILICON, GALLIUM ARSENIDES, CADMIUM SULFIDES, ZINC SULFIDES, ANTHRACENES, STRONTIUM COMPOUNDS, BARIUM COMPOUNDS, INDIUM ANTIMONIDES, ALKALI METAL COMPOUNDS, HALIDES, TITANATES, DOPING, LUMINESCENCE, IMPURITIES, PHONONS, EXCITONS, GREAT BRITAIN (U)
IDENTIFIERS: METAL OXIDE SEMICONDUCTORS, ENERGY BANDS, PHOTOVOLTAIC EFFECT, HIGH FIELD DOMAINS, HETEROJUNCTIONS, SCHOTTKY BARRIERS, ELECTRON PHONON INTERACTIONS (U)

:CONTENTS: PHOTOCONDUCTIVITY GENERAL; SEMICONDUCTORS; PHOTOCONDUCTIVITY GENERAL, HIGH RESISTIVITY MATERIALS; PHOTOCONDUCTIVITY GENERAL, IONIC CRYSTALS; MOSTLY TERNARY COMPOUNDS; IMPURITIES AND DEFECTS; ORGANIC MATERIALS-PHONON EFFECTS; STRUCTURES, JUNCTIONS, BARRIERS. (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /4Z/HT

AD-727 048 20/4 20/12 13/8
CLEVITE CORP CLEVELAND OHIO ELECTRONIC RESEARCH DIV

RESEARCH ON IMPROVED II-VI CRYSTALS. (U)

DESCRIPTIVE NOTE: FINAL TECHNICAL REPT. 1 JUN 70-31 JAN 71,
MAR 71 36P SHIOZAWA,L. K. JOST,J. M. ;
CONTRACT: F33615-68-C-1601
PROJ: AF-7885
MONITOR: ARL 71-0054

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: SEE ALSO AD-725 062.

DESCRIPTORS: (*CADMIUM SULFIDES, CRYSTAL GROWTH), (*CADMIUM SELENIDES, CRYSTAL GROWTH), (*SEMICONDUCTORS, *CRYSTAL GROWTH), ZINC COMPOUNDS, ZINC SULFIDES, TELLURIDES, SELENIDES, PHASE STUDIES, TWINNING(CRYSTALLOGRAPHY) (U)
IDENTIFIERS: *CADMIUM TELLURIDES, *ZINC TELLURIDES, ZINC SELENIDES (U)

VAPOR PHASE GROWTH OF SINGLE-CRYSTAL BOULES OF CDTE, CDSE, ZNTE, AND CDS WAS ATTEMPTED BY THE SEED-GROWTH METHOD USING A CAPILLARY LEAK TO MAINTAIN A STOICHIOMETRICALLY-PROPORTIONED VAPOR COMPOSITION DURING THE GROWTH PROCESS. ALTHOUGH A MEASURE OF SUCCESS WAS ATTAINED, DIFFICULTIES AROSE SUCH AS FORMATION OF EXTRANEOUS NUCLEATION AND OCCURRENCE OF INCLUSIONS OF SIO2 PARTICLES. SINGLE-CRYSTAL GROWTH AT RELATIVELY HIGH GROWTH RATES OVER AT LEAST A LIMITED SEED AREA WAS OBTAINED FOR EACH COMPOUND FOR THE COMPLETE LENGTH OF THE BOULE. IMPROVED TECHNIQUES SHOULD ELIMINATE MUCH OF THE DIFFICULTY BUT SOME MODIFICATIONS OF THE METHOD MAY BE NECESSARY TO ATTAIN COMPLETE SUCCESS. AN ANALYSIS OF MULTIPLE TWINNING IN CDTE AND ZNTE CRYSTALS OCCURRING DURING THE GROWTH PROCESS IS ALSO GIVEN. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD-727 061 20/12 20/5
ILLINOIS UNIV URBANA COORDINATED SCIENCE LAB

RADIATION EFFECTS IN SEMICONDUCTING LASER MATERIALS. (U)

DESCRIPTIVE NOTE: FINAL REPT. 4 JAN 70-JAN 71,
MAR 71 45P ARORA,B. M. ;
CONTRACT: F33615-69-C-1251
PROJ: AF-7885
MONITOR: ARL 71-0064

UNCLASSIFIED REPORT

DESCRIPTORS: (*SEMICONDUCTORS, RADIATION DAMAGE), (*LASERS, SEMICONDUCTORS), CADMIUM SULFIDES, CADMIUM SELENIDES, DOPING, SODIUM CHLORIDE, LUMINESCENCE, NEUTRON REACTIONS (U)
IDENTIFIERS: *LASER MATERIALS, CADMIUM SULFIDE LASERS, CADMIUM SELENIDE LASERS, SEMICONDUCTOR LASERS, EMISSION SPECTRA (U)

LUMINESCENCE OF PURE CDSE, CDS AND CDSSE HAS BEEN INVESTIGATED IN THE TEMPERATURE RANGE FROM ABOUT 6K TO 80K. AT LOW TEMPERATURE, THE STIMULATED LUMINESCENCE OF A CDSE PLATELET CONSISTS OF SEVERAL LASER PEAKS DEPENDING UPON THE PLATELET UNDER STUDY AND THE LEVEL OF ITS EXCITATION. SOME OF THE LASER PEAKS APPEAR TO BE CORRELATED TO THE SPONTANEOUS LINES SEEN IN OUR MEASUREMENTS, AND REPORTED AS WELL AS INTERPRETED BY OTHER INVESTIGATORS. IRRADIATION OF CDSE PLATELETS WITH FAST NEUTRONS INTRODUCES NEW LASER LINES WHICH ARE SHIFTED TOWARDS LONGER WAVELENGTHS. THESE RESULTS ARE INTERPRETED IN TERMS OF THE DECAY OF EXCITONS BOUND TO DEFECTS. SOME EFFECTS OF CHEMICAL DOPING HAVE ALSO BEEN INVESTIGATED. BROAD BAND EDGE EMISSION, WHICH IS ABSENT IN THE PURE CRYSTALS, APPEARS VERY STRONG ON DOPING CDS AND CDSE WITH NACL. THIS SUGGESTS THAT NA AND CL ARE THE IMPURITIES RESPONSIBLE FOR THE PAIR EMISSION, WHICH IS CONSISTENT WITH THE SUGGESTION OF HENRY AND THOMAS THAT NA ACTS AS AN ACCEPTOR AND CL AS A DONOR IN THESE MATERIALS. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD-727 097 20/12
HUGHES RESEARCH LABS MALIBU CALIF

SELECTIVE DOPING OF PIEZOELECTRIC CRYSTALS BY ION IMPLANTATION. (U)

DESCRIPTIVE NOTE: FINAL REPT.,
MAY 71 107P MARSH,O. J. ;JONES,W. R. ;WALDNER,M. ;WAUK,M. T. ;HART,R. R. ;
CONTRACT: N00014-69-C-0171
PROJ: NR-251-001, NR008-03/RF52-545

UNCLASSIFIED REPORT

DESCRIPTORS: (*SEMICONDUCTORS, DOPING), (*PIEZOELECTRIC CRYSTALS, ION BOMBARDMENT), GALLIUM ARSENIDES, CADMIUM SULFIDES, ZINC COMPOUNDS, OXIDES (U)
IDENTIFIERS: *ION IMPLANTATION, ZINC OXIDES, SURFACE WAVES, SURFACE WAVE AMPLIFIERS (U)

THE FEASIBILITY OF CREATING N-TYPE CONDUCTING REGIONS IN SEMI-INSULATING (> 10 TO THE 7TH POWER CM) PIEZOELECTRIC CRYSTALS BY ION IMPLANTATION HAS BEEN INVESTIGATED. THE ULTIMATE PURPOSE WOULD BE TO FORM MONOLITHIC ACOUSTIC SURFACE-WAVE AMPLIFIERS. EXPERIMENTAL STUDIES HAVE BEEN PERFORMED WITH ZNO, CDS, AND GAAS. CADMIUM SULFIDE WAS IMPLANTED WITH B, AL, GA, FL, AND CL. SULFUR IMPLANTATIONS INTO GAAS PRODUCED N-TYPE LAYERS WITH MOBILITIES OF 2000 SQ CM/V-SEC. STUDIES OF IMPLANTATION DOPING WITH PROTONS INTO ZNO SHOWED THAT LAYERS OF CONTROLLED SHEET RESISTIVITIES COULD NOT BE PREDICTED BUT COULD BE PRODUCED. ADSORPTION AND DESORPTION OF OXYGEN DURING AND AFTER IMPLANTATION PLAYED A SIGNIFICANT ROLE IN DETERMINING THE CONDUCTIVITY OF THE IMPLANTED LAYER, SUGGESTING THAT CONSIDERABLE DIFFICULTY WITH STABILITY IN THE FINAL DEVICE MIGHT BE EXPECTED. CARRIER MOBILITIES IN THE PROTON IMPLANTED LAYERS AS HIGH AS 71 SQ CM/V-SEC WERE OBSERVED, WHICH IS SUFFICIENT FOR AMPLIFIER ACTION. THE MONOLITHIC AMPLIFIER DEVICE HAS BEEN ANALYZED THEORETICALLY, TREATING SEPARATELY THE PROPAGATING CHARACTERISTICS OF SURFACE WAVES AND THE AMPLIFYING SECTION UTILIZING A THIN DOPED CONDUCTING REGION. CALCULATIONS ON THE PERFORMANCE OF THE AMPLIFYING ELEMENT HAVE BEEN MADE IN TWO WAYS. FIRST, AN ANALYTICAL EXPRESSION IS DERIVED IN A SIMPLE WAY ON THE ASSUMPTION THAT THE CONDUCTING REGION IS VERY THIN.

(U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD-727 544 20/12
FOREIGN TECHNOLOGY DIV WRIGHT-PATTERSON AFB OHIO

THE OPTICAL PROPERTIES OF THIN SINGLE-CRYSTAL CDS FILMS IN A WIDE SPECTRAL INTERVAL. (U)

JUN 71 13P BRODIN,M. S. ISTRASHNIKOVA, M. I. ;

REPT. NO. FTD-MT-24-49-71

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: EDITED MACHINE TRANS. OF ELECTRON. PROTSESSY POVERKH. MONOKRIST SLOYAKH POLUPROV. SIBIRSKOE OTDELENIE. INSTITUT FIZ. POLUPROV. SIMPOZIUM, N.P., 1967. TRUDY (ELECTRONIC PROCESSES OF SINGLE-CRYSTAL LAYERS OF SEMICONDUCTORS. THE SIBERIAN BRANCH OF THE INSTITUTE OF PHYSICS OF SEMICONDUCTORS. SYMPOSIUM, N.P., 1967. TRANSACTIONS), N.P. 1967 P177-180. BY CHARLES T. OSTERTAG.

DESCRIPTORS: (*SEMICONDUCTING FILMS, BAND THEORY OF SOLIDS), (*CADMIUM SULFIDES, OPTICAL PROPERTIES), SINGLE CRYSTALS, POLARIZATION, ULTRAVIOLET SPECTROSCOPY, EXCITONS, CRYOGENICS, USSR (U)
IDENTIFIERS: TRANSLATIONS (U)

FOR REFLECTION, ABSORPTION, AND DISPERSION MEASUREMENTS, SINGLE-CRYSTAL CDS THIN FILMS OF VARIOUS THICKNESS WERE USED. THE THICKNESS OF THE PARTICULAR THIN FILM USED WAS DETERMINED. REFLECTION CURVES WERE MEASURED BY THE NORMAL INCIDENCE OF LIGHT ON THE CRYSTAL STUDIED. FOR THE MEASUREMENTS OF THE ABSORPTION AND DISPERSION CURVES, PHOTOGRAPHIC, PHOTOELECTRIC, AND INTERFERENCE METHODS WERE USED. THE CURVES OBTAINED ARE DISCUSSED IN DETAIL, AND THE MEASURED VALUE COMPARED WITH CALCULATED VALUES. THERE IS ESSENTIALLY NO DIFFERENCE BETWEEN THE SURFACE AND THE BULK LAYERS OF CDS CRYSTALS, INSOFAR AS THE OPTICAL PROPERTIES ARE CONCERNED. THE USE OF THIN SINGLE-CRYSTAL FILMS MAKES IT POSSIBLE TO MEASURE THE SPECTRAL DISTRIBUTION OF ABSORPTION AND DISPERSION IN A POLARIZED LIGHT IN A WIDE REGION BEYOND THE ABSORPTION LIMIT, CORRESPONDING TO THE EXCITATION OF THE DEPTH OF THE CONDUCTION BAND. (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD-728 219 7/2
BELL AND HOWELL CO PASADENA CALIF ELECTRONIC MATERIALS DIV

ANALYTICAL TECHNIQUES FOR THE DETERMINATION OF TRACE IMPURITIES IN II-VI COMPOUNDS. (U)

DESCRIPTIVE NOTE: FINAL REPT. 1 JUN 68-31 MAY 70,
SEP 70 95P SOCHA,ARTHUR J. ;MASUMOTO, ELEANOR M. ;MILLARDSON,ROBERT K. ;
CONTRACT: F33615-68-C-1635
PROJ: AF-7885
MONITOR: ARL 70-0170

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: SUPERSEDES AD-717 706.

DESCRIPTORS: (*SULFIDES, *MASS SPECTROSCOPY), (*SEMICONDUCTORS, CHEMICAL ANALYSIS), (*CADMIUM COMPOUNDS, CHEMICAL ANALYSIS), (*ZINC COMPOUNDS, CHEMICAL ANALYSIS), IMPURITIES, CADMIUM SULFIDES, CADMIUM SELENIDES, ZINC SULFIDES, ZINC OXIDES, SURFACES, IONIZATION, SPECTRUM ANALYZERS (U)
IDENTIFIERS: *GROUP 2B-6A COMPOUNDS (U)

ANALYSES OF II-VI COMPOUNDS WERE PERFORMED USING SPARK SOURCE MASS SPECTROMETER TECHNIQUES. OF A TOTAL OF 193 SAMPLES, 153 WERE ANALYZED USING PHOTOGRAPHIC TECHNIQUES AND 40 USING ELECTRONIC METHODS. THE COMPOUNDS OF PRIMARY INTEREST WERE CDS, CDSE, ZNS, AND ZNSE. DETECTION LIMITS WERE ON THE ORDER OF 1 TO 10 PARTS PER MILLION. A TECHNIQUE WAS DEVELOPED FOR DETERMINING OXYGEN IN CADMIUM SULFIDE. OXYGEN WAS FOUND IN CONCENTRATIONS OF A FEW PARTS PER MILLION. STUDIES WERE MADE INVOLVING PLATINUM AS A PROBE MATERIAL. THE EFFECTS OF USING 24 KV ACCELERATING VOLTAGE AS COMPARED WITH 16 KV WERE ALSO INVESTIGATED. A NEW TECHNIQUE WAS DEVELOPED FOR THE ANALYSIS OF SULFUR. DETECTION LIMITS OF <0.1 PARTS PER MILLION WERE OBTAINED. A NEW TYPE OF MASS SPECTROMETER WAS USED FOR THE FIRST TIME TO INVESTIGATE THE DISTRIBUTION OF IMPURITIES IN CADMIUM SULFIDE. THE INSTRUMENT, CALLED THE ION MICROANALYZER HAS THE CAPABILITY OF ANALYZING SURFACES BY SPUTTERING AWAY SUCCESSIVE MONOLAYERS OF MATERIAL WITH A BEAM OF IONIZED GAS. ION IMAGES, AND MASS SPECTRA WERE OBTAINED FOR SAMPLES OF SODIUM- AND COPPER-DOPED CADMIUM SULFIDE. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD-728 387 20/12
DELAWARE UNIV NEWARK DEPT OF PHYSICS

AG DOPING OF CADMIUM SULFIDE AND ITS INFLUENCE ON ELECTRICAL PROPERTIES. (U)

DESCRIPTIVE NOTE: TECHNICAL REPT.,
JUN 71 65P HADLEY,HENRY C. , JR;
REPT. NO. TR-2
CONTRACT: N00014-71-C-0169

UNCLASSIFIED REPORT

DESCRIPTORS: (*SEMICONDUCTORS, DOPING), (*CADMIUM SULFIDES, ELECTRICAL CONDUCTANCE), NEGATIVE RESISTANCE CIRCUITS, SILVER, ALUMINUM, IONIZATION, THESES (U)
IDENTIFIERS: *SEMICONDUCTOR DOPING, NEGATIVE DIFFERENTIAL CONDUCTIVITY, HIGH FIELD DOMAINS, ELECTRON TRAPS (U)

IT WAS RECOGNIZED THAT AG DOPING WAS A SIGNIFICANT FACTOR IN DETERMINING THE ELECTRICAL CHARACTERISTICS OF CDS THAT PRODUCE NEGATIVE DIFFERENTIAL CONDUCTIVITY (NDC) NECESSARY FOR HIGH FIELD DOMAINS (HFD) IN CDS. DOPING WITH NITRATES OF AG AND AL WAS A METHOD OF OBTAINING CDS CRYSTALS EXHIBITING SUCH PHENOMENA, ATTRIBUTED TO FIELD QUENCHING CAUSED BY FIELD ENHANCED IONIZATION. HOWEVER, VERY LITTLE WAS KNOWN ABOUT THE RELATIONSHIP BETWEEN DOPING AND THE ELECTRICAL CHARACTERISTICS THAT PRODUCE NDC. IN ORDER TO GAIN SOME UNDERSTANDING OF THIS RELATIONSHIP, THE STUDY OF THE EFFECTS OF AG DOPING ON NDC WAS UNDERTAKEN. IT WAS THE MAIN PURPOSE OF THIS STUDY TO GET A RELIABLE PROCEDURE FOR DOPING WITH AG AND AL TO OBTAIN CRYSTALS FOR FURTHER STUDIES OF NDC AND FIELD QUENCHING, AND TO WHAT MICROSCOPIC PROCESSES MAY BE INVOLVED IN THE DOPING. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD-728 544 20/12
AEROSPACE RESEARCH LABS WRIGHT-PATTERSON AFB OHIO

OSCILLATORY PHOTOCONDUCTIVE AND EXCITATION SPECTRA OF CDS AND ZNSE. (U)

69 10P WEI,D. T. Y. ;PENCHINA, C. M. ;PARK,Y. S. ;
REPT. NO. ARL-71-0111
PROJ: AF-7885
TASK: /886UD

UNCLASSIFIED REPORT
AVAILABILITY: PUB. IN PROCEEDINGS OF THE PHOTOCONDUCTIVITY CONFERENCE (3RD), STANFORD, 12-14 AUG 1969, P343-350.

DESCRIPTORS: (*SEMICONDUCTORS, *PHOTOCONDUCTIVITY), (*CADMIUM SULFIDES, LUMINESCENCE), ZINC COMPOUNDS, SELENIDES, EXCITATION, PHONONS, EXCITONS, CRYOGENICS (U)
IDENTIFIERS: *ZINC SELENIDES, OSCILLATORY PHOTOCONDUCTIVITY (U)

THE PHOTOCONDUCTIVE SPECTRA OF CDS AND ZNSE AT 4.2K HAVE OSCILLATIONS WITH PERIODS EQUAL TO AN LO-PHONON ENERGY. IN CDS THREE SERIES OF OSCILLATIONS OCCUR UP TO 35K. TWO SERIES APPEAR IN THE A.C.-PHOTOCURRENT AMPLITUDE WITH MINIMA AT THE GROUND STATE ENERGY OF EXCITON A PLUS MULTIPLES OF AN LO-PHONON ENERGY (A-SERIES), AND AT THE GROUND STATE ENERGY OF EXCITON B PLUS MULTIPLES OF AN LO-PHONON ENERGY (B-SERIES). A THIRD SERIES APPEARS IN THE PHASE OF A.C.-PHOTOCURRENT. THERE ARE INDICATIONS THAT ALL THREE SERIES ARE INDEPENDENT. IN ZNSE, ONLY ONE SERIES APPEARS, WITH ZERO PHONON LINE AT THE EXCITON GROUND STATE ENERGY. THE EXCITATION SPECTRA OF SEVERAL LUMINESCENT LINES OF CDS AND ZNSE ALSO HAVE OSCILLATIONS, WHOSE MAXIMA CORRESPOND TO MINIMA IN THE PHOTOCONDUCTIVE SPECTRA. THE MECHANISM OF OSCILLATION CAN BE EXPLAINED BY THE RESONANCE GENERATION OF LO-PHONONS COUPLED TO AN EXCITON, IN ADDITION TO THE PHOTOCONDUCTIVE CARRIERS. THIS MECHANISM IS CORROBORATED BY THE OSCILLATIONS IN LUMINESCENCE EXCITATION SPECTRA OF CDS AND ZNSE, AND BY OPTICAL QUENCHING OF A-SERIES PHOTOCONDUCTIVE OSCILLATIONS IN CDS. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD-728 564 20/12
NEW SOUTH WALES UNIV KENSINGTON (AUSTRALIA) DEPT OF PHYSICS

CARBON EPR SIGNAL FROM VACUUM HEATED SURFACES, (U)

AUG 70 5P MILLER,D. J. HANEMAN,D. I

CONTRACT: DA-CRD-AFE-592-544-69-G154
PROJ: DA-1-Z-624201-D-466
TASK: 1-Z-624201-D-46603
MONITOR: ARDG(FE) 440-AUG-70

UNCLASSIFIED REPORT
AVAILABILITY: PUB. IN SURFACE SCIENCE, V24 P639-642 1971.

DESCRIPTORS: (*SEMICONDUCTORS, SURFACES), (*CARBON, *PARAMAGNETIC RESONANCE), CARBIDES, IMPURITIES, HEAT TREATMENT, CADMIUM SELENIDES, CADMIUM SULFIDES, ZINC SULFIDES, SILICON, AUSTRALIA (U)
IDENTIFIERS: *ELECTRON PARAMAGNETIC RESONANCE (U)

RECENTLY A NARROW ELECTRON PARAMAGNETIC RESONANCE (E.P.R.) SIGNAL HAS BEEN REPORTED FROM THE SURFACES OF CDSE, CDS, AND ZNS POWDERS AFTER HEATING IN VACUUM. EACH OF THE SIGNALS WAS FORMED BY VACUUM HEAT TREATMENT IN THE RANGE 400-600C, WITH G=2.0027 AND WIDTH APPROX. ONE GAUSS, AND WAS REVERSIBLY BROADENED BEYOND DETECTION UPON ADMISSION OF AIR OR OXYGEN. IT WAS SUGGESTED THAT SURFACE VACANCIES CAUSED THE E.P.R. SIGNAL. THE AUTHORS HAVE PREVIOUSLY FOUND A SIGNAL WITH THE ABOVE PROPERTIES ON SEVERAL OTHER SUBSTANCES, AND FROM AN ANALYSIS OF ITS OCCURRENCE, HAVE CONCLUDED THAT IT WAS DUE TO CARBON CONTAMINATION FROM THE VACUUM SYSTEM. IT IS SUGGESTED THAT THE SIGNALS RECENTLY REPORTED ON CDSE, CDS AND ZNS ARE IN FACT ALL DUE TO CARBON CONTAMINATION. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD-728 645 20/12
AEROSPACE RESEARCH LABS WRIGHT-PATTERSON AFB OHIO

AN INVESTIGATION OF THE SEMICONDUCTOR-TO-METAL TRANSITION IN CHLORINE DOPED CADMIUM SULFIDE USING NUCLEAR MAGNETIC RESONANCE. (U)

MAY 71 212P ADAMS,FRANK D. ;
REPT. NO. ARL-71-0088
PROJ: AF-7885
TASK: 788501

UNCLASSIFIED REPORT

DESCRIPTORS: (*SEMICONDUCTORS, NUCLEAR MAGNETIC RESONANCE), (*CADMIUM SULFIDES, ELECTRICAL CONDUCTANCE), HALL EFFECT, DOPING, CHLORINE, BAND THEORY OF SOLIDS, IMPURITIES, CRYOGENICS, FREQUENCY SHIFT, THESES (U)
IDENTIFIERS: SEMICONDUCTOR METAL TRANSITION, SPIN LATTICE RELAXATION, KNIGHT SHIFT (U)

SPIN-LATTICE RELAXATION TIMES AND KNIGHT SHIFTS WERE MEASURED FOR CD113 NUCLEI IN TWELVE CDS CRYSTALS DOPED WITH VARIOUS AMOUNTS OF CHLORINE. HALL CONSTANTS WERE ALSO MEASURED TO OBTAIN THE CONDUCTION ELECTRON CONCENTRATIONS. DATA WERE OBTAINED ON ALL SAMPLES AT 300K AND FOR SOME HEAVILY DOPED SAMPLES AT 77K, 4.2K AND 2.13K. IT WAS FOUND THAT WITH INCREASED DOPING, AN IMPURITY CONDUCTION BAND IS FORMED IN AN ELECTRON CONCENTRATION RANGE (5. X 10 TO THE 17TH POWER < N < 1.6 X 10 TO THE 18TH POWER/CC). THE IMPURITY CONDUCTION BAND AND CDS CONDUCTION BAND ARE MERGED WHEN A FURTHER INCREASE IN DOPANT EXTENDS THE ELECTRON CONCENTRATION TO (1.6 X 10 TO THE 18TH POWER/CC < N < 2.4 X 10 TO THE 18TH POWER/CC. ALL SAMPLES WITH N = > 2.4 X 10 TO THE 18TH POWER/CC HAVE ESSENTIALLY METALLIC PROPERTIES. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /4ZZHT

AD-728 916 20/12
WASHINGTON UNIV SEATTLE DEPT OF ELECTRICAL ENGINEERING

OPTICAL PROBING OF RESISTIVITY PROFILES IN CDS AND THEIR RELATION WITH ACOUSTOELECTRIC CURRENT OSCILLATIONS. (U)

JUL 70 8P YEE,S. S. ;MCCARTHY,S. J. ;

CONTRACT: DA-ARO-D-31-124-70-G58
PROJ: DA-2-0-061102-B-31-E
MONITOR: AROD 839182-E

UNCLASSIFIED REPORT
AVAILABILITY: PUB. IN SOLID-STATE ELECTRONICS, V14 N4 P342-346 1971.

DESCRIPTORS: (*SEMICONDUCTORS, PIEZOELECTRIC EFFECT), (*CADMIUM SULFIDES, RESISTANCE(ELECTRICAL)), ELECTRIC CURRENTS, OSCILLATION (U)
IDENTIFIERS: ACOUSTOELECTRIC EFFECT, ELECTRICAL RESISTIVITY, PIEZOELECTRIC SEMICONDUCTORS (U)

THE CORRELATION OF CURRENT OSCILLATIONS WITH RESISTIVITY PROFILES IS PRESENTED FOR SAMPLES OF SEMICONDUCTING CDS. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD-729 725 20/12
AEROSPACE RESEARCH LABS WRIGHT-PATTERSON AFB OHIO

ELECTRONIC CORE LEVELS OF THE IIB-VIA COMPOUNDS. (U)

MAR 71 15P VESELY,C. J. ;LANGER,D. W. ;

REPT. NO. ARL-71-0143
PROJ: AF-7685
TASK: 768500

UNCLASSIFIED REPORT
AVAILABILITY: PUB. IN PHYSICAL REVIEW B, V4 N2 P451-462, 15 JUL 71.

DESCRIPTORS: (*SEMICONDUCTORS, *BAND THEORY OF SOLIDS), ZINC SULFIDES, CADMIUM SULFIDES, CADMIUM SELENIDES, ZINC COMPOUNDS, CADMIUM COMPOUNDS, MERCURY COMPOUNDS, OXIDES, SULFIDES, SELENIDES, TELLURIDES, PHOTOELECTRIC EFFECT (U)
IDENTIFIERS: ZINC OXIDES, ZINC SELENIDES, ZINC TELLURIDES, CADMIUM OXIDES, CADMIUM TELLURIDES, MERCURY SULFIDES, MERCURY SELENIDES, MERCURY TELLURIDES, EMISSION SPECTRA, SPIN ORBIT INTERACTIONS (U)

X-RAY INDUCED ELECTRON-EMISSION MEASUREMENTS WERE USED TO DETERMINE THE ENERGY LEVELS OF CORE ELECTRONS IN ZNO, ZNS, ZNSE, ZNTE, CDO, CDS, CDSE, CDTE, HGS, HGSE, AND HGTE. THE INVESTIGATED ENERGY RANGE EXTENDS FROM THE BOTTOM OF THE VALENCE BAND TO ABOUT 1200 EV BELOW THE FERMI LEVEL. CHEMICAL SHIFTS WERE DETERMINED BY COMPARING THESE RESULTS WITH EXPERIMENTAL VALUES FOR THE PURE ELEMENTS. THESE SHIFTS ARE PLOTTED AS A FUNCTION OF THE FRACTIONAL IONICITY VALUES DETERMINED BY PHILLIPS AND VAN VECHTEN, PAULING, AND COULSON. SPIN-ORBIT-SPLITTING VALUES WERE EXPERIMENTALLY DETERMINED FOR THE FIRST TIME FOR SEVERAL LEVELS INCLUDING THE ZN3D, CD4D, AND HG5D LEVELS. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD-729 908 20/12 9/1 9/5
FLORIDA UNIV GAINESVILLE DEPT OF ELECTRICAL ENGINEERING

A CENTER OF COMPETENCE IN SOLID STATE MATERIALS AND DEVICES. (U)

MAR 71 229P LINDHOLM,FRED A. ;BRUDERSEN, ARTHUR J. ;CHENETTE,EUGENE R. ;DIRECTOR, STEPHEN W. ;HENCH,LARRY L. ;
REPT. NO. SCIENTIFIC-7
CONTRACT: F19628-68-C-0058, ARPA ORDER-1060
PROJ: AF-8687
MONITOR: AFCRL 71-0309

UNCLASSIFIED REPORT

DESCRIPTORS: (*SEMICONDUCTORS, ELECTRICAL PROPERTIES), (*SEMICONDUCTOR DEVICES, ELECTRICAL PROPERTIES), (*INTEGRATED CIRCUITS, DESIGN), MATHEMATICAL MODELS, NOISE(RADIO), RADIATION DAMAGE, NEUTRON REACTIONS, HALL EFFECT, TRANSISTORS, CADMIUM SULFIDES, SILICON, IMPURITIES (U)
IDENTIFIERS: AMORPHOUS SEMICONDUCTORS, EQUIVALENT CIRCUITS, PHOTOMAGNETOELECTRIC EFFECT (U)

IN SEMICONDUCTOR AND SEMICONDUCTOR DEVICE RESEARCH, A COMPLETE EQUIVALENT CIRCUIT FOR THE NOISE PERFORMANCE OF PHOTOTRANSISTORS IS DEVELOPED AND THE CURRENT GAIN AND CUTOFF FREQUENCY ARE DERIVED FROM NOISE MEASUREMENTS. STUDY OF THE DESIGN OF A DETECTORS USING THE PME EFFECT IN GOLD-DOPED SILICON SHOWS THE COMPROMISES REQUIRED IN THE CONCENTRATIONS OF GOLD AND SHALLOW-LEVEL IMPURITIES TO YIELD BOTH SPEED AND SENSITIVITY. MEASUREMENT OF CONDUCTIVITY AND HALL EFFECT IN IN-DOPED AND CU-DOPED CDS REVEALS THE IMPURITY LEVELS AND DOMINANT SCATTERING MECHANISMS. MEASUREMENT OF THE PME AND PC EFFECTS IN GOLD-DOPED SILICON YIELDS THE RECOMBINATION PARAMETERS. A METHOD IS DESCRIBED THAT SO SELECTS MODEL COMPLEXITY IN THE SIMULATION OF TRANSISTOR CIRCUITS AS TO SAVE CPU TIME AND TO ACCOMMODATE LARGER CIRCUITS THAN HERETOFORE POSSIBLE. IN GLASS AND SEMICONDUCTING GLASS RESEARCH, EXPERIMENTS DEMONSTRATE THAT CRYSTALLITE SIZE DETERMINES THE THRESHOLD OF FAST-NEUTRON DAMAGE IN HETEROGENEOUS AMORPHOUS SEMICONDUCTORS. VARIOUS METHODS FOR SURFACE CHARACTERIZATION OF CERAMIC POWDERS ARE DETAILED. (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD-730 133 20/12
BROWN UNIV PROVIDENCE R I METALS RESEARCH LAB

ELECTRONIC ENERGY STATES OF DISLOCATIONS IN CDS-TYPE SEMICONDUCTORS. (U)

DESCRIPTIVE NOTE: TECHNICAL REPT.,
MAY 68 41P HOLMES,R. R. ;ELBAUM,C. ;
CONTRACT: NONR-562(27)

UNCLASSIFIED REPORT

DESCRIPTORS: (*SEMICONDUCTORS, BAND THEORY OF SOLIDS), (*CADMIUM SULFIDES, PHOTOCONDUCTIVITY), DISLOCATIONS, CRYSTAL LATTICE DEFECTS, ELECTRICAL CONDUCTANCE (U)

IT IS SHOWN THAT ELECTRONIC ENERGY BANDS ARE ASSOCIATED WITH DISLOCATIONS IN WIDE BAND GAP, COMPOUND SEMICONDUCTORS. THE EIGENVALUE PROBLEM FOR THE DISLOCATION BAND EDGE IS SOLVED FOR CDS TYPE CRYSTALS, AND THE OCCUPATION OF THE BAND IS CALCULATED. THE FERMI ENERGY IS THEN DETERMINED FOR CRYSTALS CONTAINING MANY DEEP LYING DISCRETE LEVELS AS WELL AS DISLOCATION BANDS. IT IS PREDICTED THAT WHEN A CRYSTAL IS ILLUMINATED WITH LIGHT OF APPROPRIATE WAVELENGTH AND INCREASING INTENSITY, THE THERMAL ACTIVATION ENERGY GOVERNING THE ELECTRICAL CONDUCTIVITY PASSES THROUGH A SERIES OF ENERGY PLATEAUS WHICH ARE EQUAL TO THE ENERGY OF THE DISCRETE LEVELS. IN A DISLOCATION FREE CRYSTAL, THESE PLATEAUS ARE CONNECTED BY STEP CHANGES, WHILE IN A CRYSTAL WITH DISLOCATIONS THEY ARE CONNECTED BY BROAD TRANSITION REGIONS. IN ORDER TO STUDY THE PREDICTIONS THE THERMAL ACTIVATION ENERGY WAS MEASURED AS A FUNCTION OF LIGHT INTENSITY IN BOTH DEFORMED AND UNDEFORMED SAMPLES OF CDS. IN ALL CASES, PLATEAUS AT 0.80 PLUS OR MINUS 0.02 EV AND 0.66 PLUS OR MINUS 0.02 EV WERE OBSERVED. THE TRANSITION BETWEEN THESE PLATEAUS WAS SHARP IN THE CASE OF THE UNDEFORMED SAMPLES AND BROAD IN THE CASE OF THE DEFORMED SAMPLES. THESE RESULTS CONFIRM THE PREDICTIONS MENTIONED ABOVE. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD-730 237 20/12
DELAWARE UNIV NEWARK DEPT OF PHYSICS

DETERMINATION OF FIELD-DEPENDENT CARRIER DENSITY AND MOBILITY IN PHOTOCONDUCTORS USING HIGH-FIELD DOMAINS. (U)

DESCRIPTIVE NOTE: TECHNICAL REPT.,
AUG 69 7P BOER,K. W. ;
REPT. NO. TR-45
CONTRACT: NONR-4336(00)

UNCLASSIFIED REPORT
AVAILABILITY: PUB. IN PROCEEDINGS OF THE PHOTOCONDUCTIVITY CONFERENCE (3RD) HELD IN STANFORD, CALIF. 12-15 AUG 69 P75-79.

DESCRIPTORS: (*CADMIUM SULFIDES, PHOTOCONDUCTIVITY), HALL EFFECT, CARRIERS(SEMICONDUCTORS), WORK FUNCTIONS, TRANSPORT PROPERTIES (U)
IDENTIFIERS: CARRIER MOBILITY (U)

UNDER CERTAIN EXPERIMENTAL CONDITIONS HIGH-FIELD DOMAINS WHICH OCCUR IN THE RANGE OF NEGATIVE DIFFERENTIAL CONDUCTIVITY REMAIN STATIONARY ADJACENT TO ONE ELECTRODE AND CAN BE USED TO ANALYZE THE FIELD-DEPENDENT CONDUCTIVITY. USING THE MEASURED CURRENT DENSITY AND FIELD STRENGTH IN THE DOMAIN, ONE OBTAINS THE CONDUCTIVITY AS A FUNCTION OF THE FIELD. THE HALL-EFFECT CAN BE USED TO DETERMINE THE MOBILITY WITHIN A HIGH-FIELD DOMAIN AND YIELDS MICRO(F). FROM THE CONDUCTIVITY ONE THEN OBTAINS THE FIELD-DEPENDENT CARRIER DENSITY. IN PHOTOCONDUCTORS, SUCH AS CDS, THE NEGATIVE DIFFERENTIAL CONDUCTIVITY IS CAUSED BY A STEEP DECREASE OF CARRIER DENSITY AND ONLY SLIGHTLY DECREASED MOBILITY WITH FIELD IN THE INVESTIGATED RANGE. WITH THIS METHOD THE CARRIER DENSITY AND MOBILITY CAN UNAMBIGUOUSLY AND QUITE ACCURATELY BE DETERMINED AS FUNCTIONS OF THE FIELD STRENGTH AND A DETAILED KINETIC ANALYSIS IS JUSTIFIED FOR INVESTIGATING THE FIELD EXCITATION MECHANISM. SUCH ANALYSIS IS DONE FOR CDS IN THE FIELD RANGE BETWEEN 30 AND 100KV/CM (AT 200K) AND SHOWS THAT A MODIFIED FRENKEL-POOLE FIELD-ENHANCED THERMAL EXCITATION OF HOLES FROM SLOW RECOMBINATION CENTERS INTO THE VALENCE BAND (FIELD QUENCHING) IS THE PREDOMINANT MECHANISM CAUSING THE NEGATIVE DIFFERENTIAL PHOTOCONDUCTIVITY. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD-731 547 20/12 9/1 20/5
MASSACHUSETTS INST OF TECH LEXINGTON LINCOLN LAB

SOLID STATE RESEARCH, 1971:3. (U)

DESCRIPTIVE NOTE: QUARTERLY TECHNICAL SUMMARY 1 MAY-31 JUL 71.
AUG 71 66P MCWHORTER,ALAN L. ;
CONTRACT: F19628-70-C-0230
PROJ: AF-649L
MONITOR: ESD TR-71-247

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: SEE ALSO REPORT DATED 15 FEB 71, AD-724 074.

DESCRIPTORS: (*SOLID STATE PHYSICS, PERIODICALS), (*SEMICONDUCTORS, SCIENTIFIC RESEARCH), PHOTODIODES, LASERS, RAMAN SPECTROSCOPY, ZEEMAN EFFECT, INTEGRATED CIRCUITS, MANUFACTURING METHODS, BAND THEORY OF SOLIDS, INDIUM ANTIMONIDES, CADMIUM SULFIDES, GALLIUM ARSENIDES, CRYSTAL STRUCTURE, CARBON MONOXIDE, ABSORPTION SPECTRUM, CRYOGENICS (U)
IDENTIFIERS: COMPUTER AIDED DESIGN, *SEMICONDUCTOR LASERS, RAMAN LASERS, FERROMAGNETIC SEMICONDUCTORS (U)

THE REPORT COVERS IN DETAIL THE SOLID STATE RESEARCH WORK OF THE SOLID STATE DIVISION AT LINCOLN LABORATORY FOR THE PERIOD 1 MAY THROUGH 31 JULY 1971. THE TOPICS COVERED ARE SOLID STATE DEVICE RESEARCH, QUANTUM ELECTRONICS, MATERIALS RESEARCH, PHYSICS OF SOLIDS, AND MICROELECTRONICS. THE MICROSOUND WORK IS SPONSORED BY ARMDA AND IS REPORTED UNDER THAT PROGRAM. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD-731 551 20/12
AEROSPACE RESEARCH LABS WRIGHT-PATTERSON AFB OHIO

ELECTRON EMISSION STUDIES OF THE IIB-VIA SEMICONDUCTOR COMPOUNDS, (U)

AUG 71 96P VESELY,CHARLES J. I

REPT. NO. ARL-71-0136
PROJ: AF-7885
TASK: 788500

UNCLASSIFIED REPORT

DESCRIPTORS: (*SEMICONDUCTORS, *BAND THEORY OF SOLIDS), (*PHOTOELECTRIC EFFECT, SEMICONDUCTORS), SPECTROSCOPY, PHOTON BOMBARDMENT, X RAYS, MOLECULAR ENERGY LEVELS, SULFIDES, TELLURIDES, SELENIDES, OXIDES, ZINC COMPOUNDS, CADMIUM COMPOUNDS, ZINC SULFIDES, MERCURY COMPOUNDS, CADMIUM SELENIDES, CADMIUM SULFIDES, SPECTROPHOTOMETERS (U)

IDENTIFIERS: *PHOTOELECTRON SPECTROSCOPY, *GROUP 2B-6A COMPOUNDS, EMISSION SPECTRA, ZINC SELENIDES, CADMIUM TELLURIDES, SPIN ORBIT INTERACTIONS (U)

X-RAY INDUCED ELECTRON EMISSION MEASUREMENTS WERE USED TO DETERMINE THE ENERGY LEVELS OF CORE ELECTRONS IN ZNO, ZNS, ZNSE, ZNTE, CDO, CDS, CDSE, CDTE, HGS, HGSE AND HGTE. THE INVESTIGATED ENERGY RANGE EXTENDS FROM THE BOTTOM OF THE VALENCE BAND (6-8 EV BELOW THE FERMI LEVEL) TO ABOUT 1200 EV BELOW THE FERMI LEVEL. CHEMICAL SHIFTS WERE DETERMINED BY COMPARING THE RESULTS OF THESE MEASUREMENTS WITH EXPERIMENTAL VALUES FOR THE PURE ELEMENTS. THESE SHIFTS ARE PLOTTED AS A FUNCTION OF THE FRACTIONAL IONICITY VALUES DETERMINED BY PHILLIPS AND VAN VECHTEN, PAULING AND COULSON. CORE LEVEL VALUES FOR ZNSE AND CDTE ARE COMPARED WITH SELF-CONSISTENT RELATIVISTIC ORTHOGONALIZED PLANE WAVE CALCULATIONS FOR THE EXCITATION ENERGIES OF THESE COMPOUNDS. AGREEMENT WITH THESE THEORETICAL CALCULATIONS IS BEST FOR THE LEVELS CLOSEST TO THE VALENCE BAND AND APPEARS TO BE ANGULAR-MOMENTUM DEPENDENT. FOR THE FIRST TIME, SPIN-ORBIT SPLITTING VALUES WERE EXPERIMENTALLY DETERMINED FOR SEVERAL LEVELS INCLUDING ZN 3D, CD 4D AND HG 5D LEVELS. THE MEASURED ENERGY VALUES FOR THE UPPER D-LEVELS ARE COMPARED WITH VALUES OBTAINED BY ULTRAVIOLET INDUCED ELECTRON EMISSION. (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD-732 301 9/5
HUGHES RESEARCH LABS MALIBU CALIF

BI-STABLE ELECTROPHOTOGRAPHIC DISPLAY DEVICE. (U)

DESCRIPTIVE NOTE: FINAL TECHNICAL REPT. FEB 70-JUN 71,
OCT 71 95P ROBERTSON,GLENN D. , JR
CONTRACT: F30602-69-C-0157
MONITOR: RADC TR-71-210

UNCLASSIFIED REPORT

DESCRIPTORS: (*DISPLAY SYSTEMS, *PHOTOELECTRIC MATERIALS), (*VIEWING SCREENS, *SEMICONDUCTING FILMS), (*CADMIUM SULFIDES, *PHOTOCONDUCTIVITY), DEPOSITION, DESIGN, ELECTRON BEAMS, PHOTON BOMBARDMENT, PHOTOGRAPHIC PROJECTORS, GLASS, ELECTRICAL CONDUCTANCE, PRODUCTION, EXCITATION, ELECTRIC CONNECTORS, OPTICAL PROPERTIES, RESOLUTION (U)
IDENTIFIERS: *SUSTAINED ELECTRON BOMBARDMENT INDUCED CONDUCTIVITY, *ELECTROCHROMIC FILMS, *SEBIC FILMS, ELECTRIC CONTACTS (U)

A STUDY HAS BEEN PERFORMED OF THE FEASIBILITY OF USING A SUSTAINED ELECTRON BOMBARDMENT INDUCED CONDUCTIVITY (SEBIC) LAYER TO CONTROL A LIGHT MODULATING ELECTROCHROMIC (EC) FILM IN A PROJECTION DISPLAY DEVICE. SUCH CONTROL WAS DEMONSTRATED BUT A VARIETY OF PRACTICAL PROBLEMS HAS PREVENTED FABRICATION OF A USABLE DEVICE. A MAJOR PROBLEM AREA IS THE INTERLAYER NEEDED TO SEPARATE THE EC AND SEBIC FILMS. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /4ZZHT

AD-734 239 20/12 18/8
AIR FORCE INST OF TECH WRIGHT-PATTERSON AFB OHIO SCHOOL OF ENGINEERING

RADIATION DAMAGE EFFECTS IN ELECTRON IRRADIATED CADMIUM SULFIDE PLATELETS AT LOW TEMPERATURE. (U)

DESCRIPTIVE NOTE: DOCTORAL THESIS.
AUG 71 143P ELSBY,C. NEALE ;
REPT. NO. DS/PH/71-5

UNCLASSIFIED REPORT

DESCRIPTORS: (*SEMICONDUCTORS, *RADIATION DAMAGE), (*CADMIUM SULFIDES, RADIATION DAMAGE), ELECTRON BOMBARDMENT, CRYOGENICS, LUMINESCENCE, ANNEALING, ATOMIC ENERGY LEVELS, BAND THEORY OF SOLIDS, THESES (U)

A STUDY WAS MADE OF THE LUMINESCENCE PROPERTIES OF CADMIUM SULFIDE PLATELETS WHICH WERE BOMBARDED AT NEAR LIQUID HELIUM TEMPERATURE WITH FAST ELECTRONS AT ENERGIES ABOVE 100 KEV. PHOTOLUMINESCENCE AND CATHODOLUMINESCENCE SPECTRA WERE EVALUATED. POST-IRRADIATION ANNEALING AND THERMAL AND OPTICAL QUENCHING EXPERIMENTS WERE CONDUCTED. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD-734 241 20/12
AIR FORCE INST OF TECH WRIGHT-PATTERSON AFB OHIO SCHOOL OF ENGINEERING

ELECTRON EMISSION STUDIES OF THE IIB-VIA SEMICONDUCTOR COMPOUNDS. (U)

DESCRIPTIVE NOTE: DOCTORAL THESIS.
JUN 71 100P VESELY,CHARLES JOSEPH ;
REPT. NO. DS/PH/71-2

UNCLASSIFIED REPORT

DESCRIPTORS: (*SEMICONDUCTORS, PHOTOELECTRIC EFFECT), X-RAY ABSORPTION ANALYSIS, BAND THEORY OF SOLIDS, ATOMIC ENERGY LEVELS, ELECTRON TRANSITIONS, ZINC SULFIDES, ZINC COMPOUNDS, OXIDES, TELLURIDES, SELENIDES, CADMIUM COMPOUNDS, CADMIUM SULFIDES, CADMIUM SELENIDES, MERCURY COMPOUNDS, ULTRAVIOLET RADIATION, THESES (U)
IDENTIFIERS: ELECTRON EMISSION, EMISSION SPECTRA, ZINC OXIDES, ZINC SELENIDES, ZINC TELLURIDES, CADMIUM OXIDES, MERCURY SULFIDES, MERCURY SELENIDES, MERCURY TELLURIDES, CADMIUM TELLURIDES, ORTHOGONALIZED PLANE WAVE THEORY (U)

X-RAY INDUCED ELECTRON EMISSION MEASUREMENTS WERE USED TO DETERMINE THE ENERGY LEVELS OF CORE ELECTRONS IN ZNO, ZNS, ZNSE, ZNTE, CDO, CDS, CDSE, CDTE, HGS, HGSE AND HGTE. THE INVESTIGATED ENERGY RANGE EXTENDS FROM THE BOTTOM OF THE VALENCE BAND (6-8 EV BELOW THE FERMI LEVEL) TO ABOUT 1200 EV BELOW THE FERMI LEVEL. CHEMICAL SHIFTS WERE DETERMINED BY COMPARING THE RESULTS OF THESE MEASUREMENTS WITH EXPERIMENTAL VALUES FOR THE PURE ELEMENTS. THESE SHIFTS ARE PLOTTED AS A FUNCTION OF THE FRACTIONAL IONICITY VALUES DETERMINED BY PHILLIPS AND VAN VECHTEN, PAULING AND COULSON. CORE LEVEL VALUES FOR ZNSE AND CDTE ARE COMPARED WITH SELF-CONSISTENT RELATIVISTIC ORTHOGONALIZED PLANE WAVE CALCULATIONS FOR THE EXCITATION ENERGIES OF THESE COMPOUNDS. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD-734 462 20/12
AEROSPACE RESEARCH LABS WRIGHT-PATTERSON AFB OHIO

BOUND-PHONON QUASIPARTICLE IN CDS. (U)

APR 71 8P REYNOLDS,D. C. ;LITTON,C. W. ;COLLINS,T. C. ;

PROJ: AF-7085
TASK: 708500
MONITOR: ARL 71-0247

UNCLASSIFIED REPORT
AVAILABILITY: PUB. IN PHYSICAL REVIEW B, V4 N6 P1868-1872, 15 SEP 71.

DESCRIPTORS: (*CADMIUM SULFIDES, PHONONS), SEMICONDUCTORS, LUMINESCENCE, MAGNETO-OPTIC EFFECT, WAVE FUNCTIONS, CRYOGENICS, EXCITONS (U)
IDENTIFIERS: ELECTRON PHONON INTERACTIONS, ELEMENTARY EXCITATIONS, EMISSION SPECTRA (U)

BOUND OPTICAL PHONONS ASSOCIATED WITH THE PHONON-ASSISTED I(1) (4880A) TRANSITION IN CDS HAVE BEEN OBSERVED. THESE STATES ARISE FROM THE BONDING OF AN LO PHONON TO A NEUTRAL ACCEPTOR, WHICH PROVIDES AN ATTRACTIVE INTERACTION FOR THE PHONON. THE INTERACTION IS WITH LO PHONONS OF SMALL WAVE VECTOR. BOTH THE GAMMA 1 AND GAMMA 5 LO PHONONS, WHICH RESULT FROM A SPLITTING DUE TO ANISOTROPIC SHORT-RANGE INTERATOMIC FORCES, ARE OBSERVED IN THE BOUND STATES. THE OPTICAL TRANSITIONS DESCRIBED IN THIS PAPER ARE SIMILAR TO THOSE DESCRIBED BY DEAN ET AL., WHICH INVOLVED OPTICAL PHONONS BOUND TO NEUTRAL DONORS IN GAP. THE OBSERVED BOUND STATES WERE IDENTIFIED AS 2S, 2P, AND 3D STATES WITH MEASURED BINDING ENERGIES OF 26.4, 21.6, AND 11.6 PER CM., RESPECTIVELY. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD-734 464 20/12
AEROSPACE RESEARCH LABS WRIGHT-PATTERSON AFB OHIO

EDGE EMISSION BANDS IN HIGH-PURITY CADMIUM SULFIDE. (U)

DEC 70 7P GREENE,LAWRENCE C. ;WILSON, HENRY A. ;

PROJ: AF-7885
TASK: 788500
MONITOR: ARL 71-0201

UNCLASSIFIED REPORT
AVAILABILITY: PUB. IN JNL. OF APPLIED PHYSICS, V12 N7 P2758-2761 JUN 71.
SUPPLEMENTARY NOTE: REVISION OF REPORT DATED 10 AUG 70.

DESCRIPTORS: (*SEMICONDUCTORS, SPECTRA(VISIBLE + ULTRAVIOLET)), (*CADMIUM SULFIDES, BAND SPECTRUM), PHONONS, SINGLE CRYSTALS, CRYOGENICS, CARRIERS(SEMICONDUCTORS), BAND THEORY OF SOLIDS (U)
IDENTIFIERS: EMISSION SPECTRA (U)

IT IS SHOWN THAT THERE ARE NINE CLEARLY DEFINED SERIES OF LOW-TEMPERATURE PHONON-ASSISTED EDGE EMISSION BANDS IN PURE CADMIUM SULFIDE CRYSTALS. OF THESE NINE SERIES, FOUR HAVE NOT BEEN PREVIOUSLY DISCUSSED. IT IS SHOWN THAT EIGHT OF THE SERIES CAN BE EXPLAINED AS ARISING FROM TRANSITIONS INVOLVING A BAND MODEL WITH TWO DONOR LEVELS AND THREE ACCEPTOR LEVELS. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD-734 466 20/12
AEROSPACE RESEARCH LABS WRIGHT-PATTERSON AFB OHIO

NUCLEAR-MAGNETIC-RESONANCE STUDIES OF THE SEMICONDUCTOR-TO-METAL TRANSITION IN CHLORINE-DOPED CADMIUM SULFIDE. (U)

MAY 71 12P ADAMS,FRANK D. ;LOOK,DAVID C. ;BROWN,L. CARLTON ;LOCKER,DONALD R. ;
PROJ: AF-7885
TASK: 788500
MONITOR: ARL 71-0238

UNCLASSIFIED REPORT
AVAILABILITY: PUB. IN PHYSICAL REVIEW B, V4 N7 P2115-2123, 1 OCT 71.

DESCRIPTORS: (*CADMIUM SULFIDES, NUCLEAR MAGNETIC RESONANCE), SEMICONDUCTORS, DOPING, CHLORINE, HALL EFFECT, PHOTOCONDUCTIVITY, FREQUENCY SHIFT, CRYOGENICS (U)
IDENTIFIERS: SPIN LATTICE RELAXATION, *SEMICONDUCTOR METAL TRANSITION (U)

SPIN-LATTICE RELAXATION TIMES AND KNIGHT SHIFTS WERE MEASURED FOR CD113 NUCLEI IN 12 CDS CRYSTALS DOPED WITH VARIOUS AMOUNTS OF CHLORINE. HALL COEFFICIENTS WERE MEASURED IN ORDER TO ESTIMATE CONDUCTION-ELECTRON CONCENTRATIONS. DATA WERE OBTAINED FOR ALL SAMPLES AT 300K AND FOR SOME HIGHLY DOPED SAMPLES AT 77, 4.2, AND 2.13K. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD-734 536 20/12 10/2
HUGHES AIRCRAFT CO CULVER CITY CALIF ELECTRONIC PROPERTIES INFORMATION CENTER

CUPROUS SULFIDE AND CUPROUS SULFIDE-CADMIUM SULFIDE HETEROJUNCTIONS. (U)

DESCRIPTIVE NOTE: INTERIM REPT.,
SEP 71 62P NEUBERGER,M. ;
REPT. NO. EPIC-IR-69-REV
CONTRACT: DSA900-72-C-1182

UNCLASSIFIED REPORT

DESCRIPTORS: (*SEMICONDUCTORS, PHYSICAL PROPERTIES), (*SOLAR CELLS, SULFIDES), COPPER COMPOUNDS, CADMIUM SULFIDES, SEMICONDUCTING FILMS, ELECTRICAL PROPERTIES, THERMAL PROPERTIES, OPTICAL PROPERTIES, PHOTOELECTRIC EFFECT, BAND THEORY OF SOLIDS (U)
IDENTIFIERS: SEMICONDUCTOR JUNCTIONS, HETEROJUNCTIONS, PHOTOVOLTAIC EFFECT, COPPER SULFIDES (U)

56 EXTRACTS OF DOCUMENTS WHICH PROVIDE INFORMATION ON CUPROUS SULFIDE AND CUPROUS SULFIDE-CADMIUM SULFIDE FROM THE ELECTRONIC PROPERTIES INFORMATION CENTER STORAGE AND RETRIEVAL SYSTEM ARE PROVIDED. CONSIDERABLE MINERALOGICAL INFORMATION AS WELL AS PHASE DIAGRAMS, PHYSICAL PROPERTIES AND PHOTOVOLTAIC PROPERTIES ARE INCLUDED. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /4Z2HT

AD-735 097 20/12
SPERRY RAND RESEARCH CENTER SUDBURY MASS

MAGNETOELASTIC SURFACE WAVES. (U)

DESCRIPTIVE NOTE: ANNUAL REPT.,
NOV 71 67P MATTHEWS,H. ;VAN DE VAART,H.
;
REPT. NO. SRRC-CR-71-14
CONTRACT: N00014-69-C-0027
PROJ: NR-017-502

UNCLASSIFIED REPORT

DESCRIPTORS: (*ULTRASONIC RADIATION, SURFACES), DELAY LINES, YTTRIUM COMPOUNDS, FERRATES, CADMIUM SULFIDES, SEMICONDUCTING FILMS, EPITAXIAL GROWTH, LITHIUM COMPOUNDS, NIOBATES, ANISOTROPY, DIELECTRICS, RAYLEIGH WAVES (U)
IDENTIFIERS: *MAGNETOELASTIC WAVES, SURFACE WAVES, LITHIUM NIOBATES, YTTRIUM IRON GARNETS, SIGNAL PROCESSING, MAGNETOSTATIC WAVES (U)

THE PROPERTIES OF MAGNETOELASTIC SURFACE WAVES IN A VARIETY OF PROPAGATING STRUCTURES ARE PRESENTED. THE CHARACTERISTICS OF MAGNETOSTATIC SURFACE WAVES IN A THIN MAGNETIC PLATE ARE DISCUSSED INCLUDING SOME NEW FEATURES INTRODUCED WHEN A CONDUCTING LAYER IS ON OR NEAR THE SURFACE OF THE PLATE, AND WHEN MAGNETOCRYSTALLINE ANISOTROPY IS TAKEN INTO ACCOUNT. CONVOLUTION AND PULSE COMPRESSION SIGNAL PROCESSING IS POSSIBLE WHEN THE NEW FEATURES ARE EMPLOYED. OPERATING PRINCIPLES ARE DISCUSSED. A DEMONSTRATION OF PULSE COMPRESSION BY 325 MHZ SURFACE WAVES IN CDS LAYERED LINBO3 IS DISCUSSED AND RESULTS ARE PRESENTED. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD-735 342 9/5
RCA LABS PRINCETON N J

DC-ELECTROLUMINESCENT FLAT PANEL DISPLAY. (U)

DESCRIPTIVE NOTE: QUARTERLY REPT. NO. 9, 1 JUL-30 SEP 71,
JAN 72 29P HANAK,JOSEPH J. ;YUCOM,P. NEIL ;DAVY,J. GORDON ;
REPT. NO. PRRL-71-CR-36
CONTRACT: DAAB07-69-C-0290
PROJ: DA-1-H-662705-A-055
TASK: 1-H-662705-A-05503
MONITOR: ECOM 0290-9

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: SEE ALSO QUARTERLY REPT. NO. 8, AD-889 911L.

DESCRIPTORS: (*DISPLAY SYSTEMS, ELECTROLUMINESCENCE), ZINC SULFIDES, ZINC COMPOUNDS, SELENIDES, CADMIUM SULFIDES, SEMICONDUCTING FILMS, SPUTTERING, SINGLE CRYSTALS (U)
IDENTIFIERS: *ELECTROLUMINESCENT PANELS, HETEROJUNCTIONS, ZINC SELENIDES (U)

THE OBJECT IS TO DEVELOP EFFICIENT ELECTROLUMINESCENT (EL) HETEROJUNCTIONS HAS BEEN INTENSIFIED. IN THE HETEROJUNCTION APPROACH SEVERAL CONCEPTS WERE STUDIED. THE MAIN EFFORT WAS ON THE SEMI-PERMEABLE BARRIER CONCEPT IN WHICH HIGH BANDGAP MATERIALS ARE SANDWICHED BETWEEN THE EL FILM AND THE METAL ELECTRODE. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /4ZZHT

AD-736 033 20/12
PARIS UNIV (FRANCE) LABORATOIRE DE PHYSIQUE DES SOLIDES

BAND STRUCTURE AND DISPERSION RELATIONS IN II-VI COMPOUNDS AND THEIR ALLOYS. (U)

DESCRIPTIVE NOTE: FINAL SCIENTIFIC REPT. 1 OCT 67-31 MAR 71,
MAR 71 7P BALKANSKI,M. I
CONTRACT: DOOAR-68-0016
PROJ: AF-7885
MONITOR: ARL 71-0301

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: PREPARED IN COOPERATION WITH CENTRE NATIONAL DE LA RECHERCHE SCIENTIFIQUE, PARIS (FRANCE).

DESCRIPTORS: (*SEMICONDUCTORS, *BAND THEORY OF SOLIDS), (*PHONONS, DISPERSION RELATIONS), CADMIUM SULFIDES, CADMIUM SELENIDES, ZINC SULFIDES, CADMIUM COMPOUNDS, ZINC COMPOUNDS, MERCURY COMPOUNDS, TELLURIDES, SELENIDES, SPECTRA(INFRARED), RAMAN SPECTROSCOPY, FRANCE (U)
IDENTIFIERS: RAMAN SPECTRA, CADMIUM TELLURIDES, MERCURY TELLURIDES, ZINC SELENIDES, ZINC TELLURIDES, LATTICE VIBRATIONS (U)

THE WORK DEALS WITH THE PHONON DISPERSION RELATIONS AND BAND STRUCTURES OF II - VI COMPOUNDS. AMONG THE MATERIALS INVESTIGATED ARE CDS, ZNS, MN DOPED ZNS, CDSE, CDTE, ZNTE, ZNSE, HGTE. EXPERIMENTAL STUDIES INCLUDED RAMAN SCATTERING, INFRARED SPECTRA AND ASSOCIATED TECHNIQUES. THEORETICAL INVESTIGATIONS WERE ALSO UNDERTAKEN. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /4ZZHT

AD-801 243 9/1 20/12
GENERAL TELEPHONE AND ELECTRONICS LABS INC BAYSIDE N Y

FREE CARRIER MICROWAVE SEMICONDUCTOR DEVICES. (U)

DESCRIPTIVE NOTE: SEMI-ANNUAL REPT. NO. 4, 15 JAN-15 JUL 66,
OCT 66 37P HARRISON,R. I. ;ZUCKER,J. ;CONWELL,E. M. ;FLERI,D. ;ZEMON,S. A. ;

REPT. NO. TR-66-731.7
CONTRACT: DA-28-043-AMC-01876(E)
PROJ: DA-1L6-22001-A-056
TASK: 04
MONITOR: ECOM 01876-4

UNCLASSIFIED REPORT

DESCRIPTORS: (*SEMICONDUCTOR DEVICES, CARRIERS(SEMICONDUCTORS)), MICROWAVE EQUIPMENT, EXTREMELY HIGH FREQUENCY, PIEZOELECTRIC CRYSTALS, CADMIUM COMPOUNDS, SULFIDES, DIRECT CURRENT, ELECTRIC FIELDS, ELECTRICAL IMPEDANCE, SOUND, MEASUREMENT, VOLTAGE, ELECTRONS, PHONONS, PHOTOELASTICITY, PHOTONS, LIGHT, SCATTERING, MAGNETIC FIELDS (U)
IDENTIFIERS: CADMIUM SULFIDE, ELECTRON-PHONON INTERACTIONS, BRILLOUIN SCATTERING (U)

A SMALL SIGNAL ANALYSIS IS PRESENTED BY THE BULK TERMINAL IMPEDANCE OF A CDS BAR IN WHICH THE DRIFTING CHARGE CARRIERS AND VIBRATING LATTICE INTERACT VIA THE PIEZOELECTRIC COUPLING. IT WAS SHOWN THROUGH A SAMPLE CALCULATION THAT FOR PRACTICAL RANGES OF APPLIED DRIFT VOLTAGE, MATERIAL PARAMETERS, AND SEMICONDUCTOR DIMENSIONS A NEGATIVE REAL PART TO THE TERMINAL IMPEDANCE COULD BE ACHIEVED AT ROOM TEMPERATURES. THE MAGNITUDE OF THIS NEGATIVE REAL PART OF THE TERMINAL IMPEDANCE MAKES POSSIBLE THE DESIGN OF PRACTICAL BULK AMPLIFIERS AND OSCILLATORS IN 50 OHM TEM MODE TRANSMISSION LINE. EXPERIMENTS ON LOW RESISTIVITY (SEMICONDUCTING) CDS INDICATE THAT ACOUSTOELECTRIC INTERACTION TAKES PLACE IN THE CRYSTAL FOR APPLIED PULSE DRIFT ELECTRIC FIELDS ABOVE A THRESHOLD FIELD CORRESPONDING TO THE SYNCHRONOUS CARRIER VELOCITY. MICROWAVE MEASUREMENTS SHOW THAT RF RADIATION EMANATES FROM THE BULK CDS SAMPLE AND IS ASSOCIATED WITH THE ACOUSTO-ELECTRIC INTERACTION. (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD-815 881 9/1
GENERAL TELEPHONE AND ELECTRONICS LABS INC BAYSIDE N Y

FREE CARRIER MICROWAVE SEMICONDUCTOR DEVICES. (U)

DESCRIPTIVE NOTE: REPT. NO. 13 (FINAL), 15 JAN 66-14 JAN 67,
JUN 67 101P HARRISON,R. I. ;ZUCKER,J. ;CONNELL,E. M. ;FLERI,D. ;WASKO,J. ;
CONTRACT: DA-28-043-AMC-01876(E)
PROJ: DA-1E6-22001-A-056
TASK: 1E6-22001-A-056-04
MONITOR: ECOM 01876-F

UNCLASSIFIED REPORT

DESCRIPTORS: (*SEMICONDUCTOR DEVICES, *MICROWAVE EQUIPMENT), CADMIUM SULFIDES, PIEZOELECTRIC CRYSTALS, ACOUSTIC PROPERTIES, ELECTRIC FIELDS, MICROWAVES, PARTIAL DIFFERENTIAL EQUATIONS, BRILLOUIN ZONES, SCATTERING, PHOTOELASTICITY, PHOTOELECTRIC MATERIALS, TEST METHODS, X BAND, OSCILLOSCOPES (U)

A SMALL-SIGNAL ANALYSIS IS PRESENTED OF THE BULK TERMINAL IMPEDANCE OF A CDS BAR IN WHICH THE DRIFTING CHARGE CARRIERS AND VIBRATING LATTICE INTERACT BY MEANS OF THE PIEZOELECTRIC COUPLING. EXPERIMENTS ON LOW-RESISTIVITY (SEMICONDUCTING) CDS INDICATE THAT ACOUSTOELECTRIC INTERACTION TAKES PLACE IN THE CRYSTAL FOR APPLIED PULSE DRIFT ELECTRIC FIELDS ABOVE A THRESHOLD FIELD CORRESPONDING TO THE SYNCHRONOUS CARRIER VELOCITY. ACOUSTO-ELECTRIC INTERACTION OCCURRING IN A CDS OBSTACLE IN A MICROWAVE TRANSMISSION LINE IS SHOWN TO PRODUCE AMPLITUDE MODULATION ON AN X-BAND CARRIER. LASER BEAM PROBING IS SHOWN TO BE AN EXCELLENT TECHNIQUE FOR THE INVESTIGATION OF ACOUSTO-ELECTRIC EFFECTS IN PIEZOELECTRIC SEMICONDUCTORS. IT WAS SHOWN THAT THE ACOUSTIC WAVES COULD ORIGINATE FROM PIEZOELECTRICALLY INDUCED SHOCK AT INHOMOGENIETIES AND ALSO FROM THERMAL NOISE DISTRIBUTED THROUGHOUT THE SAMPLE. THE RELATIONSHIP BETWEEN UHF AND MICROWAVE CURRENTS AND THE ACOUSTIC FLUX WAS ELUCIDATED. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /4ZZHT

AD-827 402 9/5
STANFORD RESEARCH INST MENLO PARK CALIF

DESIGN OF MICROWAVE FILTER NETWORKS. (U)

DESCRIPTIVE NOTE: FINAL REPT. 1 MAY-30 SEP 67,
JAN 68 113P CRISTAL,EDWARD G. ;COURT,
IAN N. ;ADAMS,DAVID K. ;KARP,ARTHUR ;BAHR,
ALFRED J. ;
CONTRACT: DA-28-043-AMC-02266(E)
PROJ: SRI-6025
MONITOR: ECOM 02266-F

UNCLASSIFIED REPORT

DESCRIPTORS: (*COMPUTER PROGRAMS, ELECTRICAL ENGINEERING), (*STRIP TRANSMISSION LINES, SYNTHESIS), (*TRANSDUCERS, FILMS), (*PARAMETRIC AMPLIFIERS, BROADBAND), (*RADIOFREQUENCY FILTERS, MICROWAVE FREQUENCY), CADMIUM SULFIDES, ELECTROACOUSTIC TRANSDUCERS, MICROMINIATURIZATION(ELECTRONICS), CIRCUITS, DIODES(SEMICONDUCTOR), VACUUM APPARATUS, VAPOR PLATING (U)
IDENTIFIERS: THIN FILMS, UP-CONVERTERS, THIN FILMS ELECTRONICS (U)

A DETAILED DESCRIPTION OF THE COMPUTER PROGRAM FOR THE ELECTRICAL PARAMETERS OF COUPLED AND UNCOUPLED MICROSTRIP TRANSMISSION LINES IS PRESENTED. EXPERIMENTAL DATA ARE ALSO GIVEN ON A TRIAL 10-DB DIRECTIONAL COUPLER DESIGNED FROM DATA OBTAINED FROM THE COMPUTER PROGRAM. THE DESIGN, FABRICATION, AND LOSS CHARACTERISTICS OF THIN-FILM CDS LONGITUDINAL-MODE TRANSDUCERS ARE DESCRIBED. INPUT ADMITTANCE DATA FOR THESE TRANSDUCERS ARE PRESENTED. THESE DATA ARE USED TO DEDUCE VALUES FOR THE TRANSDUCER CAPACITANCE, THICKNESS COUPLING FACTOR, AND SERIES RESISTANCE. DESIGN TECHNIQUES FOR UPPER-SIDEBAND UP-CONVERTERS WITH WIDE (10:1) TUNING RANGES ARE DISCUSSED. AN UP-CONVERTER HAS BEEN BUILT AND TESTED THAT OPERATES FROM 200 TO 2000 MHZ WITH AN INSTANTANEOUS BANDWIDTH OF 35 MHZ. EFFECTS OF THE LOWER SIDEBAND ARE IDENTIFIED AND ACCOUNTED FOR IN THE DESIGN. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD-828 614 20/12
AIR FORCE INST OF TECH WRIGHT-PATTERSON AFB OHIO SCHOOL OF ENGINEERING

ELECTROREFLECTANCE STUDY OF CDS AND ZNO SINGLE CRYSTALS. (U)

DESCRIPTIVE NOTE: MASTER'S THESIS,
DEC 67 113P HUTCHINSON,EDWIN D. I
REPT. NO. GE/EE/675-8

UNCLASSIFIED REPORT

DESCRIPTORS: (*SEMICONDUCTORS, BAND THEORY OF SOLIDS), ELECTRIC FIELDS, SINGLE CRYSTALS, BRILLOUIN ZONES, REFRACTIVE INDEX, DIELECTRIC PROPERTIES, OPTICAL PROPERTIES, CARRIERS(SEMICONDUCTORS), REFLECTIVITY, CADMIUM SULFIDES, ZINC COMPOUNDS, OXIDES, COMPUTER PROGRAMS, THESES (U)
IDENTIFIERS: ELECTROREFLECTANCE, ELECTROLYTE TECHNIQUE (U)

FUNDAMENTAL EDGE ELECTROREFLECTANCE SPECTRA OF CADMIUM SULFIDE (CDS) AND ZINC OXIDE (ZNO) SINGLE CRYSTALS WERE MEASURED AT ROOM TEMPERATURE USING THE ELECTROLYTE TECHNIQUE. MEASUREMENTS WERE MADE WITH THE ELECTRIC VECTOR OF THE INCIDENT LIGHT BOTH PARALLEL AND PERPENDICULAR TO THE HEXAGONAL AXIS OF THE CRYSTALS. THE SPECTRA WERE INTERPRETED IN TERMS OF THE ENERGY BAND STRUCTURE FOR DIRECT TRANSITIONS AT THE CENTER OF THE BRILLOUIN ZONE FOR THE WURTZITE STRUCTURES. A KRAMERS-KRONIG ANALYSIS WAS USED TO OBTAIN THE REAL AND IMAGINARY PARTS OF THE DIELECTRIC CONSTANT FOR CDS FROM THE ELECTROREFLECTANCE DATA AND THE REFRACTIVE INDEX OF THE MATERIAL. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD-835 201 20/8
AIR FORCE INST OF TECH WRIGHT-PATTERSON AFB OHIO SCHOOL OF ENGINEERING

NUCLEAR SPIN-LATTICE RELAXATION IN SINGLE CRYSTALS OF CADMIUM SULFIDE. (U)

DESCRIPTIVE NOTE: MASTER'S THESIS,
JUN 68 81P LAMMERS,KURT M. ;
REPT. NO. GNE/PH/68-8

UNCLASSIFIED REPORT

DESCRIPTORS: (*SINGLE CRYSTALS, NUCLEAR SPINS), CADMIUM SULFIDES, NUCLEAR MAGNETIC MOMENTS, CRYSTAL LATTICE DEFECTS, IMPURITIES, MASS SPECTROSCOPY, CRYOGENICS, DOPING, INTERACTIONS, SEMICONDUCTORS, MODELS(SIMULATIONS), TEMPERATURE, RESISTANCE(ELECTRICAL), NUCLEAR MAGNETIC RESONANCE, CHLORINE, LITHIUM, ELECTRICAL PROPERTIES, THESES (U)

THE NUCLEAR MAGNETIC RESONANCE SPIN-LATTICE RELAXATION (SLR) TIME T SUB 1 OF CD113 IN UNDOPED CDS, CDS:CL AND CDS:LI WAS MEASURED AS A FUNCTION OF TEMPERATURE (77K TO 500K) AT 2, 4, 7, AND 10 MHZ. THE CRYSTALS WERE N-TYPE BULK SINGLE CRYSTALS AND WERE GROWN BY THE VAPOR-PHASE-DEPOSITION METHOD. T1 VERSUS TEMPERATURE DATA IS PRESENTED AND THE CDS:LI SHOWS A FREQUENCY INVERSION IN THE HIGH TEMPERATURE REGION (340K AND ABOVE). THE THEORY OF NUCLEAR-ELECTRON MAGNETIC DIPOLAR INTERACTION WITH NUCLEAR SPIN DIFFUSION WAS USED TO FIT THE DATA IN THE LOW TEMPERATURE REGION. A MODEL PRESENTED CONSISTS OF ELECTRONS 'HOPPING' BETWEEN IMPURITY SITES MODULATING THE DIPOLAR COUPLING. THIS MODEL PREDICTS THE FEATURES OF THE HIGH TEMPERATURE DATA. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD-836 043 7/4 11/6
AIR FORCE INST OF TECH WRIGHT-PATTERSON AFB OHIO SCHOOL OF ENGINEERING

DETERMINATION OF THICKNESS AND COMPOSITION OF THIN FILMS BY THE METHOD OF X-RAY FLUORESCENCE. (U)

DESCRIPTIVE NOTE: MASTER'S THESIS,
FEB 68 73P CARPENTER,JAMES THOMAS I
REPT. NO. GSP/PH/68-2

UNCLASSIFIED REPORT

DESCRIPTORS: (*METAL FILMS, *X-RAY SPECTROSCOPY), THICKNESS, CADMIUM SULFIDES, INTENSITY, CADMIUM SELENIDES, SUBSTRATES, MOLYBDENUM, NIOBIUM, CRYSTALS, COPPER, GLASS, SOLIDS, CRYSTAL LATTICES, SPECTROMETERS, X-RAY DIFFRACTION ANALYSIS, THESES (U)
IDENTIFIERS: *THIN FILMS, *X RAY FLUORESCENCE (U)

X-RAY FLUORESCENCE TECHNIQUES WERE USED TO DETERMINE THE THICKNESS AND COMPOSITION OF FILMS OF SOLID SOLUTION CADMIUM SULFIDE/SELENIDE, USING A G.E.XRD-6 SYSTEM. STANDARD CURVES OF SE K LAMBDA AND CD K LAMBDA X-RAY FLUORESCENCE INTENSITIES VERSUS FILM THICKNESS WERE ESTABLISHED FOR FILMS (COSE PERCENTAGES 0,25,50,77, AND 100%) UP TO 10.00 MICRONS THICK ON ALUMINUM SUBSTRATES. FILM THICKNESS ACCURACIES WERE 0.200 PLUS OR MINUS 0.05-10.00 PLUS OR MINUS 0.40 MICRONS. SE K LAMBDA TO CD K LAMBDA INTENSITY RATIO WAS USED TO DETERMINE FILM COMPOSITION TO WITHIN 2%. EFFECTS OF MOLYBDENUM, NIOBIUM, COPPER, AND GLASS SUBSTRATES ON FLUORESCENCE INTENSITIES WERE DETERMINED. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD-843 544 20/6 17/5
ARMY FOREIGN SCIENCE AND TECHNOLOGY CENTER WASHINGTON D C

INDICATORS OF ULTRAVIOLET RADIATION BASED ON TYPE FSK-M1 PHOTORESISTORS. (U)

68 7P GORDIN,V. L. ;LEVITIN,A. I. ;

REPT. NO. FSTC-HT-23-801-68
PROJ: FSTC-9223627301

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: TRANS. OF ZHURNAL PRIKLADNOI SPEKTROSKOPII (USSR) V6 N5 P685-686 1967, BY STEPHEN EVANUSA.

DESCRIPTORS: (*ULTRAVIOLET DETECTORS, *PHOTOELECTRIC CELLS(SEMICONDUCTOR)), CADMIUM SULFIDES, MERCURY LAMPS, ULTRAVIOLET SPECTROSCOPY, SENSITIVITY, USSR (U)
IDENTIFIERS: TRANSLATIONS (U)

USING ELECTRODELESS HIGH-FREQUENCY MERCURY-ARC LAMPS, ALONG WITH SPECTRAL MEASUREMENTS, RAPID DETERMINATION OF INTEGRAL INTENSITY OF ULTRAVIOLET RADIATION MAY BE ACCOMPLISHED BY MEANS OF SPECIAL INDICATORS PRODUCED ON THE BASIS OF MONOCRYSTILLINE CADMIUM SULFIDE PHOTORESISTORS OF THE FSK-M1 TYPE. THESE INDICATORS CAN BE USED IN THE CONTROL OF RADIATION OF ULTRAVIOLET RADIATION SOURCES, BOTH IN MANUFACTURE AND APPLICATION. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD-851 282 20/12
NAVAL WEAPONS CENTER CORONA LABS CALIF

SEMICONDUCTING THIN FILMS: AN ANNOTATED BIBLIOGRAPHY. 1968 SUPPLEMENT. (U)

MAR 69 16UP
REPT. NO. NWCCL-TP-842
PROJ: A31533/216/69RU0803020

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: SEE ALSO REPORT NOS. NOLC-712, DATED 15 JUN 67, AD-655 100 AND NOLC-746 DATED 1 MAR 68, AD-667 233.

DESCRIPTORS: (*SEMICONDUCTING FILMS, BIBLIOGRAPHIES), CRYSTAL STRUCTURE, BAND THEORY OF SOLIDS, EPITAXIAL GROWTH, VAPOR PLATING, ELECTROLUMINESCENCE, PHOTOSENSITIVITY, LASERS, GERMANIUM, SILICON, BORON, ARSENIDES, PHOSPHIDES, SELENIDES, SULFIDES, TELLURIDES, CADMIUM SELENIDES, CADMIUM SULFIDES, GALLIUM ARSENIDES, INDIUM ANTIMONIDES, SILICON CARBIDES, ZINC SULFIDES, ALUMINUM COMPOUNDS, CADMIUM COMPOUNDS, GALLIUM COMPOUNDS, GERMANIUM COMPOUNDS, INDIUM COMPOUNDS, LEAD COMPOUNDS, MERCURY COMPOUNDS, TIN COMPOUNDS, ZINC COMPOUNDS (U)
IDENTIFIERS: THIN FILMS, HETEROJUNCTIONS, SEMICONDUCTOR JUNCTIONS, GUNN EFFECT (U)

THE 1968 SUPPLEMENT TO NOLC REPORT 712, SEMICONDUCTING THIN FILMS, AN ANNOTATED BIBLIOGRAPHY, 1956-1966, CONTINUES THE COMPREHENSIVE BIBLIOGRAPHIC SURVEY ON THE PREPARATION, PROPERTIES, APPLICATIONS, AND THEORY OF SEMICONDUCTING THIN FILMS. IT IS COMPRISED OF 451 REFERENCES, THE MAJORITY OF WHICH WERE PUBLISHED IN 1968, FROM ENGLISH AND FOREIGN LANGUAGE PERIODICAL LITERATURE. THE ABSTRACTS ARE ARRANGED BY AUTHOR UNDER THE FOLLOWING CLASSES: (1) ELEMENTAL, (2) GROUP III-V, (3) GROUP II-VI, (4) GROUP IV-VI, (5) GROUP IV-IV, (6) MISCELLANEOUS COMPOUNDS, AND (7) METHODS AND TECHNIQUES. ALL OF THE MATERIALS ARE INDEXED WITH THE EXCEPTION OF THE MISCELLANEOUS COMPOUNDS (GROUPS I-V, I-VI, AND I-VII). (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD-857 495 9/1
AIR FORCE INST OF TECH WRIGHT-PATTERSON AFB OHIO SCHOOL OF ENGINEERING

CADMIUM SULFIDE PLATELET CURRENT INJECTION ELECTROLUMINESCENT DIODES. (U)

DESCRIPTIVE NOTE: MASTER'S THESIS,
MAR 69 67P COLWICK,HAROLD D. ;
REPT. NO. GE/PH/69-2

UNCLASSIFIED REPORT

DESCRIPTORS: (*DIODES(SEMICONDUCTOR), *ELECTROLUMINESCENCE), (*CADMIUM SULFIDES, DIODES(SEMICONDUCTOR)), MANUFACTURING METHODS, THESES, ELECTRICAL PROPERTIES (U)

A SYSTEM FOR FABRICATING ELECTROLUMINESCENT CDS DIODES FROM PLATELET MATERIAL AND ASSEMBLY EQUIPMENT AND TECHNIQUES FOR MOUNTING THE DIODES WERE DEVELOPED. THE NECESSARY ELECTRONIC EQUIPMENT FOR MEASURING ELECTRICAL PROPERTIES OF THE DIODES WAS COMPLETED. THE DIODES WERE PREPARED BY DEPOSITING A THIN FILM OF CU AND DIFFUSING THE CU INTO THE CRYSTAL TO FORM THE BLOCKING CONTACT AND THEN DEPOSITING IN FOR THE OHMIC CONTACT. RESULTS INDICATED THAT REASONABLY EFFICIENT HOLE INJECTION WAS ACHIEVED BASED UPON THE LOW THRESHOLD VOLTAGE OF 1.7 VOLTS NECESSARY FOR THE ONSET OF ELECTROLUMINESCENCE. CURRENT-VOLTAGE AND DIFFERENTIAL CAPACITANCE MEASUREMENTS CONFIRMED THAT THE DIODES WERE P-I-N STRUCTURES. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD-850 005 20/12
AIR FORCE INST OF TECH WRIGHT-PATTERSON AFB OHIO SCHOOL OF ENGINEERING

COMPARISON OF ULTRAVIOLET REFLECTIVITY AND CHARACTERISTIC ELECTRON ENERGY LOSS MEASUREMENTS OF ZNO AND CDS SINGLE CRYSTALS. (U)

DESCRIPTIVE NOTE: MASTER'S THESIS,
JUN 69 95P ALMASSY,ROBERT JOSEPH ;
REPT. NO. GNE/PH/69-1

UNCLASSIFIED REPORT

DESCRIPTORS: (*SEMICONDUCTORS, BAND THEORY OF SOLIDS), (*CADMIUM SULFIDES, OPTICAL PROPERTIES), (*ZINC COMPOUNDS, OPTICAL PROPERTIES), OXIDES, ULTRAVIOLET RADIATION, DIELECTRIC PROPERTIES, SINGLE CRYSTALS, ELECTRON BEAMS, CORRELATION TECHNIQUES, COMPUTER PROGRAMS, SPECTROSCOPY, REFLECTIVITY, THESES (U)
IDENTIFIERS: ZINC OXIDES, ULTRAVIOLET REFLECTIVITY, KRAMERS-KRONIG DISPERSION RELATION, ELECTRON BEAM SPECTROSCOPY, PLASMONS (U)

AN EXPERIMENTAL STUDY WAS MADE TO DETERMINE THE NONPOLARIZED ULTRAVIOLET REFLECTIVITY AND CHARACTERISTIC ELECTRON ENERGY LOSS SPECTRA FOR ZNO AND CDS AND TO CORRELATE THESE DATA USING A KRAMERS-KRONIG DISPERSION RELATION. REFLECTIVITY MEASUREMENTS WERE MADE USING A 1-M JARRELL-ASH MONOCHROMATOR WITH LOW PRESSURE CAPILLARY DISCHARGE SOURCE. RUTHEMANN-LANG TYPE ENERGY LOSS MEASUREMENTS WERE MADE USING 10 KEV TRANSMITTED ELECTRONS. ALL SAMPLES WERE SINGLE CRYSTAL PLATELETS GROWN BY THE VAPOR PHASE TECHNIQUE. CORRELATION WAS MADE USING A FORTRAN IV CODE DEVELOPED FOR THE IBM 7090 SYSTEM. REPEATABLE SPECTRA WERE OBTAINED BY BOTH TECHNIQUES, AND PRELIMINARY CORRELATION INDICATED GOOD AGREEMENT BETWEEN DATA. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD-859 726 20/12 7/4
AIR FORCE INST OF TECH WRIGHT-PATTERSON AFB OHIO SCHOOL OF ENGINEERING

SELF CONSISTENT ORTHOGONALIZED PLANEWAVE ENERGY BAND MODEL FOR CUBIC ZNS, ZNSE, CDS AND CDSE. (U)

DESCRIPTIVE NOTE: DOCTORAL THESIS,
NOV 68 177P STUKEL,DONALD JOSEPH J
PROJ: AF-7885
TASK: 788500

UNCLASSIFIED REPORT

DESCRIPTORS: (*SEMICONDUCTORS, *BAND THEORY OF SOLIDS), (*ZINC SULFIDES, BAND THEORY OF SOLIDS), (*CADMIUM SULFIDES, BAND THEORY OF SOLIDS), (*CADMIUM SELENIDES, BAND THEORY OF SOLIDS), SELENIDES, WAVE FUNCTIONS, SYMMETRY(CRYSTALLOGRAPHY), HARTREE-FOCK APPROXIMATION, THESES, ZINC COMPOUNDS (U)
IDENTIFIERS: GROUP 2B-6A COMPOUNDS, SELF CONSISTANT FIELD WAVEFUNCTIONS, ZINC SELENIDES (U)

FIRST-PRINCIPLES ORTHOGONALIZED PLANEWAVE (OPW) ENERGY BAND CALCULATIONS HAVE BEEN CARRIED OUT FOR CUBIC ZNS, ZNSE, CDS AND CDSE WITH A NON-RELATIVISTIC FORMALISM. THESE ARE THE FIRST FULLY CONVERGENT, FULLY SELF-CONSISTENT ENERGY BAND SOLUTIONS REPORTED FOR II-VI CUBIC SEMICONDUCTING COMPOUNDS. IN ADDITION VARIOUS EXCHANGE APPROXIMATIONS HAVE BEEN COMPARED IN THE SELF-CONSISTENT OPW MODEL. THE ADEQUACY OF THE ENERGY BAND MODEL WAS TESTED BY CALCULATING THE OPTICAL SPECTRUM AND COMPARING THIS WITH THE EXPERIMENTAL SPECTRUM. THE SPIN-ORBIT SPLITTINGS HAVE BEEN CALCULATED USING PERTURBATION THEORY. THE CHARGE DENSITIES HAVE BEEN CALCULATED WITH ALL THREE EXCHANGE APPROXIMATIONS AND ARE COMPARED WITH EXPERIMENT. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD-875 370 20/12
AIR FORCE INST OF TECH WRIGHT-PATTERSON AFB OHIO SCHOOL OF ENGINEERING

TUNNELING SPECTROSCOPY STUDY OF GAAS, CDS AND ZNO SCHOTTKY BARRIER JUNCTIONS. (U)

DESCRIPTIVE NOTE: MASTER'S THESIS,
MAR 70 79P AMOS,DAVID H. ;
REPT. NO. GE/PH-70-1

UNCLASSIFIED REPORT

DESCRIPTORS: (*SEMICONDUCTORS, *TUNNELING(ELECTRONICS)), (*GALLIUM ARSENIDES, SPECTROSCOPY), (*CADMIUM SULFIDES, SPECTROSCOPY), (*ZINC COMPOUNDS, SPECTROSCOPY), OXIDES, CRYSTAL LATTICES, PHONONS, CRYOGENICS, TEST METHODS, LABORATORY EQUIPMENT, THESES (U)
IDENTIFIERS: *TUNNELING SPECTROSCOPY, PHONON SPECTRA, *ZINC OXIDES, SCHOTTKY BARRIERS (U)

AN EXPERIMENTAL STUDY WAS MADE OF PHONON SPECTRA IN GAAS, CDS, AND ZNO BY TUNNELING SPECTROSCOPY. RESULTS ON GAAS SHOWED STRUCTURE IN THE DV/DI AND THE SECOND DIFFERENTIAL OF V WITH RESPECT TO I CURVES AT THE TA, 2TA, LO PHONON ENERGIES. THE TA, LA, TO, AND THREE BRANCHES OF THE TO PHONON WERE IDENTIFIED IN CDS, AS WELL AS SEVERAL MULTI-PHONON PEAKS AND A ZERO-BIAS CONDUCTANCE MAXIMUM ATTRIBUTABLE TO MAGNETIC MOMENTS LOCALIZED IN THE BARRIER REGION. THE SAME ZERO-BIAS ANOMALY, AND STRUCTURE AT THE LO PHONON ENERGY WERE OBSERVED IN ZNO. (AUTHOR) (U)

CORPORATE AUTHOR - MONITORING AGENCY

*AERONAUTICAL SYSTEMS DIV WRIGHT-PATTERSON AFB OHIO

• • •

ASD-TDR-62-69
RESEARCH ON SOLAR-ENERGY CONVERSION EMPLOYING CADMIUM SULFIDE
AD-284 032

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ASD-TDR62 533
ELECTROLUMINESCENT-PHOTOCONDUCTOR ELEMENTS
AD-286 829

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ASD-TDR63 223
FEASIBILITY INVESTIGATION OF CHEMICALLY SPRAYED THIN FILM PHOTOVOLTAIC CONVENTERS.
AD-403 053

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ASD-TDR-63-460
THIN FILMS FOR COMPOSITE MOLECULAR ELECTRONICS.
AD-412 679

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ASD-TDR63 684
RESEARCH ON PHOTOCONDUCTIVITY IN THIN FILMS.
AD-417 747

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ASD-TDR63 743
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AD-423 684

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ASD-TR61 664
A NEW FORM OF SOLID STATE SOLAR GENERATOR
AD-273 974

*AERONAUTICAL SYSTEMS DIV WRIGHT-PATTERSON AFB OHIO PHYSICS LAB

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PHOTOCONDUCTIVITY IN CDS CRYSTALS AS A MECHANISM FOR GAMMA RAY DOSIMETRY
AD-261 116

*AEROSPACE MEDICAL RESEARCH LAB WRIGHT-PATTERSON AFB OHIO

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AMRL-TR-67-168
DEVELOPMENT OF PHOTORESISTIVE ELEMENTS FOR AN ANALOG MULTIPLIER.
AD-671 980

*AEROSPACE MEDICAL RESEARCH LABS WRIGHT-PATTERSON AFB OHIO

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ARL-67-0032
PHONON COUPLING IN EDGE EMISSION AND PHOTOCONDUCTIVITY OF CDSE, CDS, AND CDISE SUB X S SUB 1-X).
AD-656 181

*AEROSPACE RESEARCH LABS OFFICE OF AEROSPACE RESEARCH WRIGHT-PATTERSON AFB OHIO

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ARL-65-269
A STUDY OF HOMOGENEITY OF SOLID SOLUTIONS OF CADMIUM SULFIDE AND CADMIUM SELENIDE BY X-RAY FLUORESCENCE.
AD-629 493

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ARL-66-0060
IMPURITY CONDUCTIVITY IN SINGLE CRYSTAL CDS.
AD-630 491

*AEROSPACE RESEARCH LABS WRIGHT-PATTERSON AFB OHIO

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62 319
RESEARCH IN PURIFICATION OF CADMIUM SULFIDE CRYSTALS AND OTHER II-IV COMPOUNDS
AD-276 416

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65-67
OSCILLATORY PHOTOCONDUCTIVITY OF CDS.
AD-616 828

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ARL-14
RESEARCH IN PURIFICATION OF CADMIUM SULFIDE CRYSTALS
AD-259 883

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ARL-62-365

RESEARCH ON II-VI COMPOUND SEMICONDUCTORS.
AD-281 718

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ARL-62 398
FEASIBILITY STACKING PHOTOVOLTAIC LAYERS OF CD OR ZN SULFIDES, SELENIDES, AND TELLURIDES FOR CONVERSION OF SUN RADIATION INTO ELECTRICAL POWER, PREPARATION AND GROWTH, SINGLE CRYSTALS AND THIN FILMS; THEORY; ELECTRICAL PROPERTIES.
AD-288 080

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ARL-62 433
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AD-292 324

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ARL-64 98
OPTICAL PROPERTIES OF SEMICONDUCTING CRYSTALS.
AD-603 374

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ARL-65-86
EXCITON STRUCTURE IN PHOTOCONDUCTIVITY OF CDS, CDSE, AND CDSXSE1-X SINGLE CRYSTALS.
AD-617 125

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ARL-65-98
RESEARCH ON II-VI COMPOUND SEMICONDUCTORS.
AD-620 297

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ARL-65-100
RESEARCH IN PURIFICATION AND SINGLE CRYSTAL GROWTH OF II-VI COMPOUNDS.
AD-619 279

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ARL-65-111
RESEARCH ON PHOTOVOLTAIC CELLS.
AD-621 464

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ARL-65-123
PHYSICAL RESEARCH ON PROPERTIES OF II-VI COMPOUND SEMI CONDUCTORS.
AD-626 476

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ARL-65-130
ANALYTICAL TECHNIQUES FOR THE DETERMINATION OF TRACE IMPURITIES IN CADMIUM SULFIDE.
AD-623 165

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ARL-66-0078
CYCLOTRON RESONANCE EXPERIMENTS.
AD-639 395

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ARL-66-0225
PHYSICAL RESEARCH ON FUNDAMENTAL PROPERTIES OF II-VI COMPOUND SEMICONDUCTORS.
AD-649 242

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ARL-67-0070
RESEARCH IN PURIFICATION AND SINGLE GROWTH OF II-VI COMPOUNDS.
AD-657 946

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ARL-67-0143
EFFECT OF STRESS ON CDS SINGLE CRYSTALS.
AD-661 882

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ARL-67-0147
RESEARCH ON IMPROVED II-VI CRYSTALS.
AD-660 874

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ARL-67-0174
COHERENT AND NONCOHERENT LIGHT EMISSION IN II-VI COMPOUNDS.
AD-661 907

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ARL 67-0177
RECOVERY OF ROCKSALT STRUCTURE CDS TO ROOM PRESSURE.
AD-660 760

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ARL-67-0190
RESEARCH ON THE MECHANISM OF THE PHOTOVOLTAIC EFFECT IN HIGH-EFFICIENCY CDS THIN-FILM SOLAR CELLS.
AD-661 557

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ARL-67-0282
FABRICATION OF CADMIUM SULFIDE

THIN FILM SOLAR CELLS FOR SPACE VEHICLE TESTING.
AD-666 437

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ARL-67-0284
BAND PARAMETERS DETERMINATION FROM FARADAY ROTATION MEASUREMENTS.
AD-664 682

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ARL-67-0285
BAND STRUCTURE AND DISPERSION RELATIONS IN II-VI COMPOUNDS.
AD-664 581

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ARL-68-0007
CONVERGENCE STUDY OF A SELF-CONSISTANT ORTHOGONALIZED-PLANE-WAVE BAND CALCULATION FOR HEXAGONAL CDS.
AD-667 022

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ARL-68-0059
SPLITTING OF EXCITON LINES IN WURTZITE-TYPE II-VI CRYSTALS BY UNIAXIAL STRESS.
AD-672 467

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ARL-68-0096
RESEARCH IN PURIFICATION AND SINGLE CRYSTAL GROWTH OF II-VI COMPOUNDS.
AD-679 636

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ARL-68-0132
ANALYTICAL TECHNIQUES FOR THE DETERMINATION OF TRACE IMPURITIES IN CADMIUM SULFIDE.
AD-676 043

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ARL-68-0153
RESEARCH ON IMPROVED II-VI CRYSTALS.
AD-679 566

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ARL-68-0184
OPTICAL STUDIES OF LATTICE VIBRATION IN II-VI SEMICONDUCTING COMPOUNDS.
AD-676 649

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ARL-68-0231
OSCILLATORY PHASE OF PHOTOCONDUCTIVITY OF CDS.
AD-685 676

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ARL-68-0233
THE EDGE EMISSION BANDS IN CADMIUM SULFIDE.
AD-685 673

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ARL-68-0246
OSCILLATIONS IN EXCITON EMISSION IN THE EXCITATION SPECTRA OF ZNSE AND CDS.
AD-685 674

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ARL-69-0024
INFRARED MEASUREMENTS ON CDS THIN FILMS DEPOSITED ON ALUMINUM.
AD-684 160

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ARL-69-0080
ELECTRONIC STRUCTURE AND OPTICAL SPECTRUM OF SEMICONDUCTORS.
AD-692 745

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ARL-69-0111
SOLID SOLUTIONS OF CADMIUM SULFIDE-CADMIUM SELENIDE FILMS; PREPARATION AND DETERMINATION BY X-RAY FLUORESCENCE METHOD.
AD-698 110

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ARL-69-0125
EMISSION FROM EXCITED TERMINAL STATES OF BOUND EXCITON COMPLEXES.
AD-698 104

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ARL-69-0155
RESEARCH ON THE MECHANISM OF THE PHOTOVOLTAIC EFFECT IN HIGH EFFICIENCY CDS THIN-FILM SOLAR CELLS.
AD-702 095

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ARL-69-0184
LATTICE DYNAMICS OF CDS. I. NEAREST NEIGHBOR APPROXIMATION.
AD-701 043

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ARL-69-0221
EMISSION FROM EXCITED TERMINAL

STATES OF BOUND EXCITON COMPLEXES,
AD-700 555

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ARL-69-0226
DISPERSIVE AND NONDISPERSIVE X-RAY FLUORESCENCE METHODS FOR THE MEASUREMENT OF THE THICKNESSES OF FILMS OF CADMIUM SULFIDE AND OTHER II-VI COMPOUNDS,
AD-700 554

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ARL-70-0036
IMPROVEMENTS IN CDS THIN FILM SOLAR CELLS,
AD-707 869

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ARL-70-0055
DONOR-ACCEPTOR PAIR RECOMBINATION SPECTRA IN CADMIUM SULFIDE CRYSTALS,
AD-708 638

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ARL-70-0099
THIN FILM CDS SOLAR CELL FABRICATION PARAMETER STUDY,
AD-710 636

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ARL-70-0106
RESEARCH IN PURIFICATION AND SINGLE CRYSTAL GROWTH OF II-VI COMPOUNDS,
AD-709 890

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ARL-70-0169
RESEARCH ON THE OPERATING AND FAILURE MECHANISMS IN CDS SOLAR CELLS,
AD-722 112

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ARL-70-0170
ANALYTICAL TECHNIQUES FOR THE DETERMINATION OF TRACE IMPURITIES IN II-VI COMPOUNDS,
AD-724 219

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ARL-70-0260
LINEAR COMPRESSIBILITIES OF II-VI COMPOUND SINGLE CRYSTALS,
AD-715 974

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ARL-70-0308W
CALCULATION OF THE EXCHANGE ENERGY FOR EXCITONS IN THE TWO BODY MODEL,
AD-716 892

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ARL-70-0310W
PHONON SIDEBANDS ON BOUND EXCITON TRANSITIONS IN CDS AND ZNO,
AD-716 895

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ARL-70-0311W
CONDUCTION ELECTRON HYPERFINE INTERACTION IN SEMICONDUCTING CDS,
AD-716 896

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ARL-70-0348
SHORT WAVELENGTH IMPURITY EXCITON TRANSITIONS IN CDS AT 1.2 K,
AD-717 826

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ARL-71-0009
SPIN EXCHANGE IN EXCITONS, THE QUASICUBIC MODEL AND DEFORMATION POTENTIALS IN II-VI COMPOUNDS,
AD-721 906

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ARL-71-0015
IMPROVEMENTS IN CDS THIN FILM SOLAR CELLS,
AD-723 315

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ARL-71-0017
RESEARCH ON IMPROVED II-VI CRYSTALS,
AD-725 063

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ARL-71-0045
SELF-CONSISTENT ORTHOGONALIZED-PLANE-WAVE CALCULATIONS,
AD-723 927

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ARL-71-0059
RESEARCH ON IMPROVED II-VI CRYSTALS,
AD-727 048

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ARL-71-0069
RADIATION EFFECTS IN SEMICONDUCTING LASER MATERIALS,
AD-727 061

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ANL-71-0068
SIMULATED EMISSION SPECTRA OF CDS PLATELETS UNDER VARIOUS EXCITATION LEVELS.
AD-724 818

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ANL-71-0088
AN INVESTIGATION OF THE SEMICONDUCTOR-TO-METAL TRANSITION IN CHLORINE DOPED CADMIUM SULFIDE USING NUCLEAR MAGNETIC RESONANCE.
AD-728 645

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ANL-71-0111
OSCILLATORY PHOTOCONDUCTIVE AND EXCITATION SPECTRA OF CDS AND ZNSE.
AD-728 544

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AD-731 561

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ANL-71-0143
ELECTRONIC CORE LEVELS OF THE IIB-VIA COMPOUNDS.
AD-729 725

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ANL-71-0201
EDGE EMISSION BANDS IN HIGH-PURITY CADMIUM SULFIDE.
AD-734 464

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ANL-71-0238
NUCLEAR-MAGNETIC-RESONANCE STUDIES OF THE SEMICONDUCTOR-TO-METAL TRANSITION IN CHLORINE-DOPED CADMIUM SULFIDE.
AD-734 466

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ANL-71-0247
BOUND-PHONON QUASIPARTICLE IN CDS.
AD-734 462

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ANL-71-0301
BAND STRUCTURE AND DISPERSION RELATIONS IN II-VI COMPOUNDS AND THEIR ALLOYS.
AD-736 033

*AIR FORCE AERO PROPULSION LAB WRIGHT-PATTERSON AFB OHIO

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AFAPL-TR-65-1
INVESTIGATION OF CDS THIN-FILM SOLAR CELLS.
AD-613 187

*AIR FORCE AVIONICS LAB WRIGHT-PATTERSON AFB OHIO

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AFAL-TDR64 78
OPTICAL SECOND-HARMONIC GENERATION IN SEMICONDUCTOR ALLOYS.
AD-602 212

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AFAL-TDR-64-135
MATERIAL PROCESSING AND PHENOMENA INVESTIGATION OF FUNCTIONAL ELECTRONIC BLOCKS.
AD-602 482

*AIR FORCE CAMBRIDGE RESEARCH LABS L G HANSCOM FIELD MASS

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INVESTIGATION OF SEMICONDUCTING PROPERTIES OF II-VI COMPOUNDS
AD-282 527

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MAXIMIZING THE PERFORMANCE OF PHOTOCONDUCTORS
AD-295 659

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SEMICONDUCTOR DEVICE CONCEPTS.
AD-416 264

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AFCRL-62 637
FEASIBILITY INVESTIGATION OF CHEMICALLY SPRAYED THIN FILM PHOTOVOLTAIC CONVERTERS
AD-282 547

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AFCRL-62 965
EVAPORATED THIN FILM DEVICES
AD-296 929

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AFCRL-63 120 A
SEMICONDUCTOR DEVICE CONCEPTS,
AD-408 664

• • •

AFCRL-63 145
MAXIMIZING THE PERFORMANCE OF PHOTOCONDUCTORS.
AD-411 383

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AFCRL-63 334
INVESTIGATION OF HOT ELECTRON EMITTER.
AD-415 785

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AFCRL-63 389
INVESTIGATION OF CARRIER INJECTION ELECTROLUMINESCENCE.
AD-424 852

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AFCRL-63 526
INVESTIGATION OF CARRIER INJECTION ELECTROLUMINESCENCE.
AD-426 963

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AFCRL-63-829
EVAPORATED THIN-FILM DEVICES.
AD-427 362

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AFCRL-63 852A
SEMICONDUCTOR DEVICE CONCEPTS.
AD-426 258

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AFCRL-63 853
INVESTIGATION OF HOT ELECTRON EMITTER.
AD-426 523

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AFCRL-64 133
INVESTIGATION IN THE FIELD OF IMAGE INTENSIFICATION.
AD-435 548

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AFCRL-64 134
INVESTIGATION OF HOT ELECTTON EMITTEN.
AD-433 894

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AFCRL-64 467
SEMICONDUCTOR DEVICE CONCEPTS.
AD-603 783

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AFCRL-64 702
SEMICONDUCTOR DEVICE CONNCEPTS.
AD-606 311

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AFCRL-64 823
RESEARCH ON THE THEORY AND DESIGN OF ACTIVE NETWORKS.
AD-609 434

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AFCRL-64 896
ACTIVE LOGIC ELEMENTS USING NON-GALVANIC MODIFYING INPUTS.
AD-610 395

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AFCRL-65-73
VAPOR DEPOSITED THIN FILM PIEZOELECTRIC TRANSDUCERS.
AD-613 540

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AFCRL-65-240
STUDY OF THE MECHANISM AND PROPERTIES OF THE PHOTOVOLTAIC AND PHOTOCONDUCTIVE EFFECTS IN ONGANIC SUBSTANCES.
AD-621 138

• • •

AFCRL-65-296
NEW SOLID-STATE DEVICE CONCEPTS.
AD-616 380

• • •

AFCRL-65-611
NEW SOLID-STATE DEVICE CONCEPTS.
AD-621 941

• • •

AFCRL-65-828
OPTICAL VIBRATION SPECTRA OF SOLIDS.
AD-626 595

• • •

AFCRL-65-896
NEW SOLID-STATE DEVICE CONCEPTS.
AD-628 770

• • •

AFCRL-66-13
RESEARCH ON THE THEORY AND DESIGN OF ACTIVE NETWORKS.
AD-647 699

• • •

AFCRL-66-29
ACTIVE LOGIC ELEMENTS USING NON-GALVANIC MODIFYING INPUTS.

AD-630 022

• • •

AFCRL-66-657
NEW SOLID-STATE DEVICE CONCEPTS.
AD-641 456

• • •

AFCRL-67-0017
MULTILAYER ENHANCEMENT OF MICROWAVE PIEZOELECTRIC CONVERSION IN CDS-SIO LAYERS.
AD-646 041

• • •

AFCRL-67-0019
MULTILAYER THIN FILM PIEZOELECTRIC TRANSDUCERS.
AD-646 040

• • •

AFCRL-67-0079
THIN-FILM PIEZOELECTRIC TRANSDUCERS USED AS GENERATORS AND DETECTORS OF MICROWAVE PHONONS, WITH SOME ATTENUATION MEASUREMENTS IN SIO2.
AD-648 782

• • •

AFCRL-67-0285
ACOUSTOELECTRIC OSCILLATIONS, CURRENT SATURATION AND ELECTRON DRIFT MOBILITY IN CADMIUM SULPHIDE CRYSTALS.
AD-654 003

• • •

AFCRL-67-0292
JUNCTION EFFECTS IN COMPOUND SEMICONDUCTORS.
AD-654 009

• • •

AFCRL-67-0627
FABRICATION OF VAPOR-DEPOSITED THIN FILM PIEZOELECTRIC TRANSDUCERS FOR THE STUDY OF PHONON BEHAVIOR IN DIELECTRIC MATERIALS AT MICROWAVE FREQUENCIES.
AD-662 534

• • •

AFCRL-67-0636
ACOUSTOELECTRIC EFFECTS IN SOLIDS.
AD-666 452

• • •

AFCRL-68-0136
ACOUSTOELECTRIC EFFECTS IN SOLIDS.
AD-668 803

• • •

AFCRL-68-0534
FIELD DISTRIBUTION AND CURRENT SATURATION IN PHOTOCONDUCTIVE CDS.
AD-678 247

• • •

AFCRL-68-0631
ENERGY BAND STRUCTURE OF SEMICONDUCTORS.
AD-681 988

• • •

AFCRL-70-0916
PULSE STRETCHING UTILIZING TWO-PHOTON-INDUCED LIGHT ABSORPTION.
AD-709 779

• • •

AFCRL-71-0309
A CENTER OF COMPETENCE IN SOLID STATE MATERIALS AND DEVICES.
AD-729 908

• • •

AFCRL-360
INVESTIGATION OF CARRIER INJECTION ELECTROLUMINESCENCE
AD-259 365

• • •

AFCRL-721
INVESTIGATION OF CARRIER INJECTION ELECTROLUMINESCENCE
AD-264 433

• • •

AFCRL-776
INVESTIGATION OF SEMICONDUCTING PROPERTIES OF II-VI COMPOUNDS
AD-269 310

•AIR FORCE INST OF TECH WRIGHT-PATTERSON AFB OHIO SCHOOL OF ENGINEERING

• • •

GSP/PH/66-8
ULTRAVIOLET REFLECTIVITY STUDIES OF COSISE SINGLE CRYSTAL SOLID SOLUTIONS.
AD-633 648

• • •

GSP/PH/66-12

AIR-AIR

ULTRASONIC STRESS WAVES IN CADMIUM SULFIDE.
AD-633 718

•AIR FORCE INST OF TECH WRIGHT-PATTERSON AFB OHIO

• • •

THE SYNTHESIS OF A VOLATILE CADMIUM CHELATE AND THE STUDY OF ITS VAPOR PHASE REACTION WITH HYDROGEN SULFIDE.
AD-619 017

• • •

AFIT-GE/EE/69 9
EXPERIMENTAL INVESTIGATION OF CURRENT LIMITING AND OSCILLATION IN CDS.
AD-697 035

• • •

AFIT-GNE PHYS 69 9
FEASIBILITY OF CADMIUM SULFIDE FOR SOLID STATE DETECTOR APPLICATION.
AD-618 516

• • •

AFIT-GNE/PHYS/69 11
ACOUSTIC AMPLIFICATION AND ELECTRON MOBILITY IN LITHIUM AND SODIUM DOPED CADMIUM SULFIDE.
AD-693 611

• • •

AFIT-NE/PHYS/69 9
HOMOGENEITY OF CADMIUM SELENIDE-CADMIUM SULFIDE SOLID SOLUTIONS BY X-RAY FLUORESCENCE.
AD-693 609

• • •

GNE PHYS 61 9
ELECTRON MOBILITY IN CADMIUM SULPHIDE SINGLE CRYSTALS AT LOW TEMPERATURES
AD-259 661

• • •

GNE PHYS 62 1
TEMPERATURE DEPENDENCE OF LINE STRUCTURE OF CADMIUM SULFIDE EDGE EMISSION
AD-284 016

• • •

GNE PHYS 62 8
ANISOTROPY IN THE ELECTRON MOBILITY OF SINGLE CADMIUM SULFIDE CRYSTALS AT LOW TEMPERATURES
AD-283 963

• • •

GNE PHYS 62 10
AN EVALUATION OF CADMIUM SULFIDE AS A NUCLEAR RADIATION DETECTOR
AD-284 020

•AIR FORCE INST OF TECH WRIGHT-PATTERSON AFB OHIO SCHOOL OF ENGINEERING

• • •

SELF CONSISTENT ORTHOGONALIZED PLANEWAVE ENERGY BAND MODEL FOR CUBIC ZNS, ZNSE, CDS AND CDSE.
AD-859 726

• • •

DS/PH/71-2
ELECTRON EMISSION STUDIES OF THE IIB-VIA SEMICONDUCTOR COMPOUNDS.
AD-734 241

• • •

DS/PH/71-5
RADIATION DAMAGE EFFECTS IN ELECTRON IRRADIATED CADMIUM SULFIDE PLATELETS AT LOW TEMPERATURE.
AD-734 239

• • •

GE/EE/67A-1
SINGLE CRYSTAL CADMIUM SULFIDE AND CADMIUM SELENIDE INSULATED-GATE FIELD-EFFECT TRIODES.
AD-651 614

• • •

GE/EE/67S-8
ELECTROREFLECTANCE STUDY OF CDS AND ZNO SINGLE CRYSTALS.
AD-820 614

• • •

GE/PH/69-2
CADMIUM SULFIDE PLATELET CURRENT INJECTION ELECTROLUMINESCENT DIODES.
AD-857 495

• • •

GE/PH-70-1
TUNNELING SPECTROSCOPY STUDY OF GAAS, CDS AND ZNO SCHOTTKY BARRIER

JUNCTIONS.
AD-675 370

• • •

GNE/PH/68-8
NUCLEAR SPIN-LATTICE RELAXATION IN SINGLE CRYSTALS OF CADMIUM SULFIDE.
AD-835 201

• • •

GNE/PH/69-1
COMPARISON OF ULTRAVIOLET REFLECTIVITY AND CHARACTERISTIC ELECTRON ENERGY LOSS MEASUREMENTS OF ZNO AND CDS SINGLE CRYSTALS.
AD-858 006

• • •

GSP-65A
MULTIPHONON PROCESSES IN THE PHOTOCONDUCTIVITY OF CADMIUM SULFIDE AND CADMIUM SELENIDE SINGLE CRYSTALS.
AD-616 683

• • •

GSP-65B
LENGTH CHANGE MEASUREMENTS OF ELECTRON IRRADIATED CADMIUM SULFIDE IN THE ENERGY RANGE 275-935 KEV.
AD-616 684

• • •

GSP/PH/68-2
DETERMINATION OF THICKNESS AND COMPOSITION OF THIN FILMS BY THE METHOD OF X-RAY FLUORESCENCE.
AD-836 093

• • •

SP/PH/65-13
MEASUREMENT OF ELECTRON FREE LIFETIME AND TRAPPING FACTOR IN HIGH PURITY CADMIUM SULFIDE, CADMIUM SULFIDE/SELENIDE AND CADMIUM SELENIDE USING THE METHOD OF ULTRASONIC AMPLIFICATION.
AD-616 687

*AIR FORCE MATERIALS LAB WRIGHT-PATTERSON AFB OHIO

• • •

AFML-TR-70-9
SYNTHESIS AND CHARACTERIZATION OF THIN FERROELECTRIC AND SEMICONDUCTING FILMS.
AD-706 097

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• • •

AFOSR-66-0043
MONOCHROMATIC ILLUMINATION OF CADMIUM-SULFIDE OSCILLATOR.
AD-641 711

• • •

AFOSR-68-0081
ELECTRICAL PERFORMANCE OF METAL-INSULATOR-PIEZOELECTRIC SEMICONDUCTOR TRANDUCERS.
AD-663 779

• • •

AFOSR-68-0342
CRYSTAL CHEMISTRY OF NEW HIGH-PRESSURE PHASES.
AD-665 876

• • •

AFOSR-68-0542
RARE EARTH IMPURITIES IN II-VI COMPOUNDS.
AD-667 094

• • •

AFOSR-68-1743
NONLINEAR PHONON INTERACTION IN PIEZOELECTRIC SEMICONDUCTORS AND EFFECT ON CURRENT SATURATION.
AD-674 697

• • •

AFOSR-68-2659
FIELD-AND PHOTON-ENHANCED FIELD EMISSION FROM THIN-FILM FIELD-EMISSION DEVICES.
AD-679 946

• • •

AFOSR-69-0822TR
CIRCUIT-CONTROLLED MODES OF ACOUSTOELECTRIC OSCILLATIONS IN PIEZOELECTRIC SEMICONDUCTORS.
AD-684 901

• • •

AFOSR-69-2528TR
USE OF SUPERCONDUCTING CAVITIES TO RESOLVE CARRIER TRAPPING EFFECTS IN CDS.
AD-694 688

• • •

AFOSR-70-1922TR

TIME-RESOLVED SCANNING ELECTRON MICROSCOPY AND ITS APPLICATION TO BULK-EFFECT OSCILLATORS.
AD-706 505

• • •

AFOSR-70-1559TR
PIEZOELECTRIC POLARON-CYCLOTRON RESONANCE IN THE QUANTUM LIMIT IN N-CDS.
AD-706 802

• • •

AFOSR-70-1563TR
THERMAL LENS EFFECT IN CDS.
AD-706 819

• • •

AFOSR-70-2302TR
ACOUSTOELECTRIC DEVICE APPLICATIONS OF PIEZOELECTRIC AND SEMICONDUCTING THIN FILMS.
AD-710 932

• • •

AFOSR-TR-71-0690
GENERALIZED PRINCIPAL ANGLE OF INCIDENCE AND CRITICAL ANGLE.
AD-720 497

• • •

AFOSR-TR-71-1294
MULTIPLE-PHONON RESONANT RAMAN SCATTERING THEORY.
AD-723 713

• • •

AFOSR-TR-71-1813
ANOMALOUS FAR INFRARED MAGNETOABSORPTION IN N-TYPE CADMIUM SULFIDE.
AD-728 634

• • •

AFOSR-TR-71-1833
POLARITON THEORY OF RAMAN SCATTERING IN INSULATING CRYSTALS. II.
AD-720 030

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• • •

T-U-3
INTRODUCTION OF MICROIMPURITIES INTO SINGLE CRYSTALS OF CDS DURING THEIR GROWTH AND SOME CHARACTERISTICS OF THE ALLOYED SAMPLES (VVEDENNIA MIKRODOMISHOK V MONOKRYSTALY CDS V PROTSESI IKH ROSTU TA DEIAKI KHARAKTERYSTYKY LEGOVANYKH ZRAZKIV).
(TT-68-63977)
AD-621 424

•ARMY ELECTRONICS COMMAND FORT MONMOUTH N J

• • •

ECOM-00161-F
METAL BASE TRANSISTOR II.
AD-642 524

• • •

ECOM-00231-6
THIN-FILM POLYCRYSTALLINE FIELD-EFFECT TRIODE.
AD-634 088

• • •

ECOM-00231-F
THIN-FILM POLYCRYSTALLINE FIELD-EFFECT TRIODE.
AD-643 779

• • •

ECOM-0290-9
DC-ELECTROLUMINESCENT FLAT PANEL DISPLAY.
AD-736 342

• • •

ECOM-00299-F
STUDY OF SURFACE PROPERTIES OF ATOMICALLY-CLEAN METALS AND SEMICONDUCTORS.
AD-639 345

• • •

ECOM-01359-1-TR
FERROMAGNETIC, FERROELECTRIC AND ACOUSTIC DEVICES.
AD-775 206

• • •

ECOM-01876-4
FREE CARRIER MICROWAVE SEMICONDUCTOR DEVICES.
AD-801 243

• • •

ECOM-01876-F
FREE CARRIER MICROWAVE SEMICONDUCTOR DEVICES.
AD-815 881

• • •

ECOM-02046-1

TUNED INTEGRATED CIRCUITS.
AD-639 667

• • •

ECOM-02045-2
TUNED INTEGRATED CIRCUITS.
AD-643 519

• • •

ECOM-02266-F
DESIGN OF MICROWAVE FILTER NETWORKS.
AD-827 402

• • •

ECOM-02432-1
THIN-FILM POLYCRYSTALLINE FIELD-EFFECT TRIODE.
AD-645 262

• • •

ECOM-02432-2
THIN-FILM POLYCRYSTALLINE FIELD-EFFECT TRIODE.
AD-651 816

• • •

ECOM-02432-F
THIN-FILM POLYCRYSTALLINE FIELD-EFFECT TRIODE.
AD-684 786

• • •

ECOM-2942
STATUS OF DIFFUSION DATA FOR BINARY COMPOUND SEMICONDUCTORS.
AD-670 014

• • •

ECOM-3309
ACTIVE ACOUSTO-OPTIC MODULATORS.
AD-710 240

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• • •

FSTC-HT-23-401-68
INDICATORS OF ULTRAVIOLET RADIATION BASED ON TYPE FSK-M1 PHOTORESISTORS.
AD-693 544

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• • •

ANDG(FE)-440-AUG-70
CARBON EPR SIGNAL FROM VACUUM HEATED SURFACES.
AD-728 564

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• • •

AROD-431188
CYCLOTRON RESONANCE OF PIEZOELECTRIC POLARONS IN THE QUANTUM LIMIT.
AD-675 972

• • •

AROD-2172 1
RESEARCH ON SEMICONDUCTOR SURFACES. 1. THE ANOMALOUS FIELD EFFECT IN GERMANIUM. 2. THE FIELD EFFECT IN CADMIUM SULFIDE
AD-256 674

• • •

AROD-2172 2
ENHANCED PHOTOCONDUCTANCE AND SHADOWS ON CADMIUM SULFIDE SINGLE CRYSTALS
AD-287 072

• • •

AROD-401716
TUNNELING PROCESSES ACROSS THE OSELECTROLYTE INTERFACE.
AD-614 494

• • •

AROD-4054116
THEORY OF ENHANCED RAMAN SCATTERING AND VIRTUAL QUASIPARTICLES IN CRYSTALS.
AD-650 244

• • •

AROD-411916
PHOTO-HALL STUDIES OF OXYGEN ADSORPTION EFFECTS ON PHOTOCONDUCTIVITY IN SINTERED LAYERS.
AD-623 046

• • •

AROD-411917
FURTHER CONSIDERATIONS ON A THEORY OF SUPERLINEARITY IN CDS AND RELATED MATERIALS.
AD-631 744

• • •

AROD-411918
DETERMINATION OF ELECTRON TRAPPING PARAMETERS.

ARM-ARM

AD-631 791

• • •

AROD-4119:10
ELECTRIC FIELD EFFECTS IN TRAPPING PROCESSES.

AD-637 919

• • •

AROD-4169:9
THEORETICAL ASPECTS OF POINT AND ASSOCIATED LUMINESCENT CENTERS.

AD-680 583

• • •

AROD-4169:16-P
GROWTH AND PROPERTIES OF STEEPLY GRADED ZN(F)CD(1-F)S CRYSTALS.

AD-724 886

• • •

AROD-4461:4
LAYER-LIKE FIELD INHOMOGENEITIES IN HOMOGENEOUS SEMICONDUCTORS IN THE RANGE OF 'N-SHAPED NEGATIVE DIFFERENTIAL CONDUCTIVITY'.

AD-623 363

• • •

AROD-4461:5
HIGH AMPLITUDE CURRENT AND OPTICAL TRANSMISSION OSCILLATIONS IN C.S SINGLE CRYSTALS.

AD-628 453

• • •

AROD-4461:3
THE INFLUENCE OF OXYGEN IN THE ULTRAHIGH VACUUM RANGE ON ELECTRICAL PROPERTIES OF CDS.

AD-634 032

• • •

AROD-4461:12
SURFACE PINNED LAYER-LIKE FIELD INHOMOGENEITIES IN CDS.

AD-637 856

• • •

AROD-4461:13
THE INFLUENCE OF OXYGEN IN THE ULTRAHIGH VACUUM RANGE ON ELECTRICAL PROPERTIES OF CDS.

AD-637 857

• • •

AROD-4461:14
GAS DESORPTION FROM VIRGINAL CDS CRYSTALS.

AD-638 016

• • •

AROD-4461:17
UNIFORMLY PROPAGATING SOLUTIONS OF TRANSPORT AND POISSON EQUATIONS FOR PERIODIC FIELD DOMAINS.

AD-653 248

• • •

AROD-4461:19-P
SLOW MOVING FIELD DOMAINS IN CDS IN THE RANGE OF NEGATIVE DIFFERENTIAL CONDUCTIVITY.

AD-656 745

• • •

AROD-4461:20-P
CHARACTERISTIC FIELD INHOMOGENEITIES IN HOMOGENEOUS DIELECTRICS IN THE PRE-BREAKDOWN RANGE.

AD-659 777

• • •

AROD-4882:12-P
EXCITON-ENHANCED RAMAN SCATTERING BY OPTICAL PHONONS.

AD-695 232

• • •

AROD-4882:18-P
RESONANCE-ENHANCED BRILLOUIN SCATTERING IN CRYSTALS.

AD-726 942

• • •

AROD-4886:20-MC
PROTON BLOCKING PATTERNS FOR HCP AND WURTZITE STRUCTURES.

AD-687 673

• • •

AROD-5117:2
ON THE LIMITING NOISE OF SPACE-CHARGE-LIMITED SOLID STATE DIODES.

AD-672 139

• • •

AROD-5537:1
INSULATED-GATE FIELD-EFFECT TRANSISTOR USING SINGLE CRYSTAL CADMIUM SULFIDE.

AD-630 680

• • •

AROD-5537:3
STATISTICAL CONSIDERATIONS IN MOSFET CALCULATIONS.

AD-657 274

• • •

ARGD-5537.11-E
RESEARCH IN EXPERIMENTAL AND THEORETICAL PHYSICS.
AD-683 612

• • •

ARGD-5718.5-E
EXCITATION AND DETECTION OF SURFACE ELASTIC WAVES IN PIEZOELECTRIC CRYSTALS.
AD-697 237

• • •

ARGD-5718.9-E
SURFACE ELASTIC WAVES.
AD-721 786

• • •

ARGD-6412.26-P
MODULATED PIEZOREFLECTANCE IN SEMICONDUCTORS.
AD-710 194

• • •

ARGD-6835.1-E
DIFFUSION OF RARE EARTH INTO II-VI COMPOUNDS.
AD-691 964

• • •

ARGD-8391.1-E
ACOUSTOELECTRIC AFTERCURRENT IN PHOTOCONDUCTING CDS.
AD-721 761

• • •

ARGD-8391.2-E
OPTICAL PROBING OF RESISTIVITY PROFILES IN CDS AND THEIR RELATION WITH ACOUSTOELECTRIC CURRENT OSCILLATIONS.
AD-728 916

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RADIATION EFFECTS IN GAAS.
AD-616 013

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ANALYTICAL TECHNIQUES FOR THE DETERMINATION OF TRACE IMPURITIES IN II-VI COMPOUNDS.
(ARL-70-0170)
AD-728 219

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ANALYTICAL TECHNIQUES FOR THE DETERMINATION OF TRACE IMPURITIES IN CADMIUM SULFIDE.
(ARL-68-130)
AD-623 165

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ANALYTICAL TECHNIQUES FOR THE DETERMINATION OF TRACE IMPURITIES IN CADMIUM SULFIDE.
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AD-623 174

• • •

STUDY OF SURFACE PROPERTIES OF ATOMICALLY-CLEAN METALS AND SEMICONDUCTORS. PART I. STUDY OF CDS SURFACES BY LEED. PART II. COMBINED LEED AND MASS SPECTROMETER MEASUREMENTS FOR ADSORPTION AND CATALYSIS.
AD-630 863

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(ECOM-00299-F)
AD-639 348

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MODULATED PIEZOREFLECTANCE IN SEMICONDUCTORS.
(AROD-6912125-F)
AD-710 194

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PHYSICAL RESEARCH ON PROPERTIES OF II-VI COMPOUND SEMI CONDUCTORS.
(ANL-65-123)
AD-625 476

• • •

PHYSICAL RESEARCH ON FUNDAMENTAL PROPERTIES OF II-VI COMPOUND SEMICONDUCTORS.
(ANL-66-0245)
AD-649 242

• • •

ELECTRONIC ENERGY STATES OF DISLOCATIONS IN CDS-TYPE SEMICONDUCTORS.
AD-730 133

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• • •

SURFACE ELASTIC WAVES.
(AROD-5718?9-E)
AD-721 786

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• • •

MONOCHROMATIC ILLUMINATION OF CADMIUM-SULFIDE OSCILLATOR.
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AD-641 711

• • •

CIRCUIT-CONTROLLED MODES OF ACOUSTOELECTRIC OSCILLATIONS IN PIEZOELECTRIC SEMICONDUCTORS.
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AD-684 961

• • •

TIME-RESOLVED SCANNING ELECTRON MICROSCOPY AND ITS APPLICATION TO BULK-EFFECT OSCILLATORS.
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AD-706 506

• • •

ACOUSTOELECTRIC DEVICE APPLICATIONS OF PIEZOELECTRIC AND SEMICONDUCTING THIN FILMS.
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AD-710 932

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AD-630 680

• • •

STATISTICAL CONSIDERATIONS IN MOSFET CALCULATIONS.
(AROD-5537?3)
AD-657 274

• • •

ELECTRICAL PERFORMANCE OF METAL-INSULATOR-PIEZOELECTRIC SEMICONDUCTOR TRANDUCERS.
(AFOSR-68-0081)
AD-663 779

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RESEARCH IN EXPERIMENTAL AND THEORETICAL PHYSICS.
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AD-683 612

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EXCITATION AND DETECTION OF SURFACE ELASTIC WAVES IN PIEZOELECTRIC CRYSTALS.
(AROD-5718?5-E)
AD-697 237

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TR-1
POLARITON THEORY OF RAMAN

SCATTERING IN INSULATING CRYSTALS. II.
(AFOSR-TR-71-1833)
AD-730 230

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• • •
PROTON BLOCKING PATTERNS FOR HCP AND WURTZITE STRUCTURES.
(AROD-4926.20-MC)
AD-687 673

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• • •
EXCITON STRUCTURE IN PHOTOCONDUCTIVITY OF CDS, CDSE, AND CDSISE SINGLE CRYSTALS.
(ARL-65-56)
AD-617 128

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• • •
RESEARCH ON II-VI COMPOUND SEMICONDUCTORS.
(ARL-64-365)
AD-601 710
• • •
RESEARCH ON THE MECHANISM OF THE PHOTOVOLTAIC EFFECT IN HIGH-EFFICIENCY CDS THIN-FILM SOLAR CELLS.
(ARL-67-0190)
AD-661 557
• • •
RESEARCH ON THE OPERATING AND FAILURE MECHANISMS IN CDS SOLAR CELLS.
(ARL-70-0169)
AD-722 112

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FERROMAGNETIC, FERROELECTRIC AND ACOUSTIC DEVICES.
(ECOM-01359-1-TR)
AD-475 200
• • •
RESEARCH ON II-VI COMPOUND SEMICONDUCTORS.
(ARL-65-98)
AD-620 297
• • •
RESEARCH ON II-VI COMPOUND SEMICONDUCTORS.
AD-626 530
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RESEARCH ON II-VI COMPOUND SEMICONDUCTORS.
AD-626 532
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RESEARCH ON II-VI COMPOUND SEMICONDUCTORS.
AD-626 533
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RESEARCH ON II-VI COMPOUND SEMICONDUCTORS.
AD-626 534
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AD-626 539
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RESEARCH ON II-VI COMPOUND SEMICONDUCTORS.
AD-626 540
• • •
RESEARCH ON II-VI COMPOUND SEMICONDUCTORS.
AD-627 381
• • •
RESEARCH ON IMPROVED II-VI CRYSTALS.
(ARL-67-0149)
AD-660 874
• • •

IMPROVED II-VI CRYSTALS.
AD-666 401

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IMPROVED II-VI CRYSTALS.
AD-666 402

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IMPROVED II-VI CRYSTALS.
AD-666 403

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RESEARCH ON IMPROVED II-VI CRYSTALS.
AD-666 404

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RESEARCH ON IMPROVED II-VI CRYSTALS.
AD-666 405

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RESEARCH ON IMPROVED II-VI CRYSTALS.
AD-666 406

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IMPROVED II-VI CRYSTALS.
AD-667 576

• • •

RESEARCH ON THE MECHANISM OF THE PHOTOVOLTAIC EFFECT IN HIGH-EFFICIENCY CDS THIN-FILM SOLAR CELLS.
AD-678 540

• • •

RESEARCH ON THE MECHANISM OF THE PHOTOVOLTAIC EFFECT IN HIGH-EFFICIENCY CDS THIN-FILM SOLAR CELLS.
AD-678 541

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RESEARCH ON THE MECHANISM OF THE PHOTOVOLTAIC EFFECT IN HIGH-EFFICIENCY CDS THIN-FILM SOLAR CELLS.
AD-678 542

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RESEARCH ON IMPROVED II-VI CRYSTALS.
(ARL-68-0153)
AD-679 566

• • •

RESEARCH ON THE MECHANISM OF THE PHOTOVOLTAIC EFFECT IN HIGH EFFICIENCY CDS THIN-FILM SOLAR CELLS.
(ARL-69-0155)
AD-702 095

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IMPROVEMENTS IN CDS THIN FILM SOLAR CELLS.
(ARL-70-0036)
AD-707 8[illegible]

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THIN FILM CDS SOLAR CELL FABRICATION PARAMETER STUDY.
(ARL-70-0099)
AD-710 636

• • •

IMPROVEMENTS IN CDS THIN FILM SOLAR CELLS.
(ARL-71-0013)
AD-723 315

• • •

RESEARCH ON IMPROVED II-VI CRYSTALS.
(ARL-71-0017)
AD-725 062

• • •

RESEARCH ON IMPROVED II-VI CRYSTALS.
(ARL-71-0064)
AD-727 098

• • •

303280
FABRICATION OF CADMIUM SULFIDE THIN FILM SOLAR CELLS FOR SPACE VEHICLE TESTING.
(ARL-67-0282)
AD-666 439

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SYNTHESIS AND CHARACTERIZATION OF THIN FERROELECTRIC AND SEMICONDUCTING FILMS.
(AFML-TR-70-9)
AD-706 097

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• • •

NSC-1395
KINETICS OF EXCITONS IN CDS AT TEMPERATURE.

AD-718 162

• • •

TR-33
KINETICS OF EXCITONS IN CDS AT TEMPERATURE.
AD-718 162

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• • •

MSC-1307
EXCITON-EXCITON INTERACTION IN CDS, CDSE, AND ZNO.
AD-707 555

• • •

MSC-1325
LUMINESCENCE STUDY OF EXCITON-EXCITON INTERACTION IN CADMIUM SULFIDE, CADMIUM SELENIDE, AND ZINC OXIDE.
AD-713 181

• • •

MSC-TR-32
LUMINESCENCE STUDY OF EXCITON-EXCITON INTERACTION IN CADMIUM SULFIDE, CADMIUM SELENIDE, AND ZINC OXIDE.
AD-713 181

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TR-31
EXCITON-EXCITON INTERACTION IN CDS, CDSE, AND ZNO.
AD-707 555

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• • •

MAXIMIZING THE PERFORMANCE OF PHOTOCONDUCTORS.
(AFCRL-63 .45)
AD-411 383

• • •

INVESTIGATION OF CARRIER INJECTION ELECTROLUMINESCENCE.
(AFCRL-63 389)
AD-424 852

• • •

INVESTIGATION OF CARRIER INJECTION ELECTROLUMINESCENCE.
(AFCRL-63 526)
AD-426 463

• • •

SYNTHESIS AND CHARACTERIZATION OF ELECTRONICALLY ACTIVE MATERIALS.
AD-432 272

• • •

SR1
INVESTIGATION OF CARRIER INJECTION ELECTROLUMINESCENCE
(AFCRL-360)
AD-259 365

• • •

SR2
INVESTIGATION OF CARRIER INJECTION ELECTROLUMINESCENCE
(AFCRL-721)
AD-264 433

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CALCULATION OF THE EXCHANGE ENERGY FOR EXCITONS IN THE TWO BODY MODEL.
(ARL-70-0306a)
AD-716 892

• • •

PHONON SIDEBANDS ON BOUND EXCITON TRANSITIONS IN CDS AND ZNO.
(ARL-70-0310a)
AD-716 895

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LATTICE DYNAMICS OF CDS. I. NEAREST NEIGHBOR APPROXIMATION.
(ARL-69-0184)
AD-701 043

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OPTICAL PROPERTIES OF SEMICONDUCTING CRYSTALS.
(ARL-64 98)
AD-603 374

• • •

CONDUCTION ELECTRON HYPERFINE INTERACTION IN SEMICONDUCTING CDS.
(ARL-70-0311a)
AD-716 896

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DDC-TAS-69-28
DOPING OF SEMICONDUCTORS AND SEMICONDUCTING FILM. VOLUME I.
AD-687 900

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DDC-TAS-69-74-1
SOLAR CELLS AND SOLAR PANELS. VOLUME I.
AD-700 500

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ELECTRO-OPTICAL METHOD FOR INVESTIGATION OF FIELD AND CURRENT DISTRIBUTIONS IN SEMICONDUCTORS AND LAYER-LIKE FIELD DISTRIBUTIONS IN PHOTOCONDUCTORS.
AD-603 075

• • •

THEORETICAL ASPECTS OF POINT AND ASSOCIATED LUMINESCENT CENTERS.
(AROD-4169.9)
AD-690 583

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• • •

UNIFORMLY PROPAGATING SOLUTIONS OF TRANSPORT AND POISSON EQUATIONS FOR PERIODIC FIELD DOMAINS.
(AROD-4961.17)
AD-653 248

• • •

CHARACTERISTIC FIELD INHOMOGENEITIES IN HOMOGENEOUS DIELECTRICS IN THE PRE-BREAKDOWN RANGE.
(AROD-4961.20-P)
AD-659 777

• • •

TRAP-CONTROLLED FIELD INSTABILITIES IN PHOTOCONDUCTING CDS CAUSED BY FIELD-QUENCHING.
AD-699 721

• • •

INFLUENCE OF BOUNDARY CONDITIONS ON HIGH-FIELD DOMAINS IN GUNN DIODES.
AD-706 456

• • •

TRANSITIONS BETWEEN CLASS I AND CLASS II CDS CRYSTALS INDUCED BY HEAT-TREATMENT, OXYGEN DE/ADSORPTION AND ELECTRON BOMBARDMENT.
AD-708 818

• • •

GROWTH AND PROPERTIES OF STEEPLY GRADED ZNIF)CD(1-F)S CRYSTALS.
(AROD-4169.16-P)
AD-724 886

• • •

TR-2
AG DOPING OF CADMIUM SULFIDE AND ITS INFLUENCE ON ELECTRICAL PROPERTIES.
AD-728 387

• • •

TR-3
X-RAY DAMAGE AND ANNEALING OF THESE DEFECTS IN CDS SINGLE CRYSTALS.
AD-623 895

• • •

TR-6
HIGH AMPLITUDE CURRENT AND OPTICAL TRANSMISSION OSCILLATIONS IN CDS SINGLE CRYSTALS.
(AROD-4461.15)
AD-628 453

• • •

TR-7
THE INFLUENCE OF OXYGEN IN THE ULTRAHIGH VACUUM RANGE ON ELECTRICAL PROPERTIES OF CDS.
(AROD-4461.18)
AD-634 032

• • •

TR-8
THE INFLUENCE OF OXYGEN IN THE ULTRAHIGH VACUUM RANGE ON ELECTRICAL PROPERTIES OF CDS.
(AROD-4461.13)
AD-637 857

• • •

TR-10
MULTILAYER OHMIC CONTACTS ON CDS.
AD-636 420

• • •

TR-10
GAS DESORPTION FROM VIRGINAL CDS CRYSTALS.
(AMOD-4461114)
AD-638 016

• • •

TR-11
EVAPORATED AND RECRYSTALLIZED CDS LAYERS.
AD-637 725

• • •

TR-12
SURFACE PINNED LAYER-LIKE FIELD INHOMOGENEITIES IN CDS.
(AMOD-4461112)
AD-637 856

• • •

TR-13
PRODUCTION AND ANNEALING OF INTRINSIC DEFECTS IN X-RAY IRRADIATED CDS SINGLE CRYSTALS.
AD-652 611

• • •

TR-15
INJECTION CAUSED P-N JUNCTION IN CDS.
AD-641 400

• • •

TR-15
NEW KIND OF FIELD INSTABILITY IN CDS IN THE RANGE OF NEGATIVE DIFFERENTIAL RESISTIVITY.
AD-655 559

• • •

TR-16
STUDY OF LAYER-LIKE FIELD INHOMOGENEITIES IN CDS USING FRANZ-KELDYSH EFFECT.
AD-647 312

• • •

TR-16
SLOW MOVING FIELD DOMAINS IN CDS IN THE RANGE OF NEGATIVE DIFFERENTIAL CONDUCTIVITY.
(AMOD-4461119-P)
AD-656 745

• • •

TR-17
CHANGE OF ELECTRICAL CONDUCTIVITY OF CDS SINGLE CRYSTALS DURING HEAT TREATMENTS IN SULFUR VAPOR BETWEEN 600 AND 700C.
AD-648 169

• • •

TR-18
PRODUCTION AND ANNEALING OF INTRINSIC DEFECTS IN X-RAY IRRADIATED CDS SINGLE CRYSTALS.
AD-652 611

• • •

TR-19
NEW KIND OF FIELD INSTABILITY IN CDS IN THE RANGE OF NEGATIVE DIFFERENTIAL RESISTIVITY.
AD-655 559

• • •

TR-21
STATIONARY HIGH FIELD DOMAINS IN THE RANGE OF NEGATIVE DIFFERENTIAL CONDUCTIVITY IN CDS SINGLE CRYSTALS.
AD-681 192

• • •

TR-22
FIELD ENHANCED IONIZATION OF TRAPS.
AD-669 026

• • •

TR-25
STATIONARY ANODE-ADJACENT HIGH-FIELD DOMAINS IN CADMIUM SULFIDE.
AD-675 664

• • •

TR-27
CRITICAL CONDITIONS FOR TRANSITIONS BETWEEN STATIONARY AND NON-STATIONARY HIGH-FIELD DOMAINS IN SEMI-INSULATORS.
AD-689 059

• • •

TR-28
EFFECTIVE WORK FUNCTION OF METAL CONTACTS TO VACUUM-CLEAVED PHOTOCONDUCTING CDS FOR HIGH PHOTOCURRENTS.
AD-697 002

• • •

TR-30
ELECTRON MOBILITY IN CDS AT HIGH ELECTRIC FIELDS.
AD-689 057

• • •

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TR-32
GROWTH OF SINGLE CRYSTAL PLATELETS OF CADMIUM SULFIDE.
AD-688 903

• • •

TR-33
DESORPTION OF OXYGEN AND ITS EFFECTS ON THE ELECTRICAL PROPERTIES OF CDS SINGLE CRYSTAL PLATELETS.
AD-688 904

• • •

TR-38
SEMICONDUCTIVITY OF CDS AS A FUNCTION OF S-VAPOR PRESSURE DURING HEAT TREATMENT BETWEEN 500 DEGREES AND 700 DEGREES C.
AD-689 060

• • •

TR-41
FIELD QUENCHING AS MECHANISM OF NEGATIVE DIFFERENTIAL CONDUCTIVITY IN PHOTOCONDUCTING CDS.
AD-716 097

• • •

TR-45
DETERMINATION OF FIELD-DEPENDENT CARRIER DENSITY AND MOBILITY IN PHOTOCONDUCTORS USING HIGH-FIELD DOMAINS.
AD-730 237

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ELECTRO-OPTICAL METHOD FOR INVESTIGATION OF FIELD AND CURRENT DISTRIBUTIONS IN SEMICONDUCTORS AND LAYER-LIKE FIELD DISTRIBUTIONS IN PHOTOCONDUCTORS.
AD-614 439

• • •

LAYERLIKE FIELD INHOMOGENEITIES IN HOMOGENEOUS SEMICONDUCTORS IN THE RANGE OF 'NEGATIVE DIFFERENTIAL CONDUCTIVITY',
AD-614 909

• • •

ELECTRO-OPTICAL METHOD FOR INVESTIGATION OF FIELD AND CURRENT DISTRIBUTIONS IN SEMICONDUCTORS AND LAYER-LIKE FIELD DISTRIBUTIONS IN PHOTUCONDUCTORS.
AD-619 190

• • •

LAYER-LIKE FIELD INHOMOGENEITIES IN HOMOGENEOUS SEMICONDUCTORS IN THE RANGE OF 'N-SHAPED NEGATIVE DIFFERENTIAL CONDUCTIVITY',
(AROD-4961:4)
AD-623 363

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(ARL-67-0070)
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AD-679 636

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SCIENTIFIC-3

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(AHL-67-U284)
AD-664 582

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ESD-TR-66-42
SOLID STATE RESEARCH 1966-1.
AD-632 998

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ESD-TR-66-183
CYCLOTRON RESONANCE OF PIEZOELECTRIC POLARONS.
AD-638 332

• • •

ESD-TR-66-234
COMPARATIVE DATA ON CDS TRANSDUCERS FROM 14 MC/S TO 70 GC/S.
AD-641 002

• • •

ESD-TR-66-235
ELECTRON-BEAM PUMPED LASERS OF CDSE AND CDS.
AD-642 201

• • •

ESD-TR-66-422
ELECTRON BOMBARDMENT TECHNIQUE FOR DEPOSITION OF CDS FILM TRANSDUCERS.
AD-642 217

• • •

ESD-TR-67-157
ELECTRON BEAM PUMPED SEMICONDUCTOR LASERS.
AD-648 055

• • •

ESD-TR-67-261
HIGH POWER AND EFFICIENCY IN CDS ELECTRON BEAM PUMPED LASERS.
AD-653 364

• • •

ESD-TR-67-574
PRESENT STATUS OF CADMIUM SULFIDE THIN FILM SOLAR CELLS.
AD-667 819

• • •

ESD-TR-69-196
PERFORMANCE OF CADMIUM SULFIDE THIN FILM SOLAR CELLS IN A SPACE ENVIRONMENT.
AD-694 893

• • •

ESD-TR-70-107
RESONANT RAMAN SCATTERING FROM LO PHONONS IN POLAR SEMICONDUCTORS.
AD-707 571

• • •

ESD-TR-70-218
PHOTOLUMINESCENCE DUE TO ISOELECTRONIC OXYGEN AND TELLURIUM TRAPS IN II-VI ALLOYS.
AD-710 448

• • •

ESD-TR-70-264
QUANTITATIVE ANALYSIS OF TERNARY AND QUATERNARY SEMICONDUCTING ALLOYS WITH ELECTRON MICROPROBE.
AD-714 314

• • •

ESD-TR-70-341
DEGRADATION OF CDS THIN FILM SOLAR CELLS IN DIFFERENT ENVIRONMENTS.
AD-715 285

• • •

ESD-TR-71-247
SOLID STATE RESEARCH, 1971:3.
AD-731 547

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SCIENTIFIC-7
A CENTER OF COMPETENCE IN SOLID STATE MATERIALS AND DEVICES.
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AD-729 908

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FTD-MC-23-133-70
PROPERTIES OF P-N JUNCTIONS IN CADMIUM SULFIDE AND CONSTRUCTION OF PHOTOELECTRIC TRANSDUCERS.
AD-712 936

• • •

FTD-MT-67-199
THERMALLY AND OPTICALLY STIMULATED PHENOMENA IN CADMIUM-SULFIDE SINGLE CRYSTALS (TERMICHESKI I OPTICHESKI STIMULIROVANNYE YAVLENIYA V MONOKRISTALLAKH SULFIDA KADMIYA).
AD-673 810

• • •

FTD-MT-24-49-71
THE OPTICAL PROPERTIES OF THIN SINGLE-CRYSTAL CDS FILMS IN A WIDE SPECTRAL INTERVAL.
AD-727 544

• • •

FTD-MT-24-136-67
SEMICONDUCTOR TECHNOLOGY AND MICROELECTRONICS (COLLECTION OF ARTICLES).
AD-673 189

• • •

FTD-TT-64-165
METHOD OF CONTACTLESS INVESTIGATING ELECTRICAL CONDUCTION OF CADMIUM SULFIDE TYPE SEMICONDUCTORS.
AD-603 391

• • •

FTD-TT-64-1389
INVESTIGATING THE EFFECT OF GAMMA-RAYS, X-RAYS AND NEUTRONS ON ELECTRIC PROPERTIES OF CDS-SE AND CDSE-SE RECTIFYING SYSTEMS.
(TT-65-62392)
AD-615 868

• • •

FTD-TT-65-665
OPTICAL QUANTUM CRYSTAL GENERATOR WITH EXCITATION BY FAST ELECTRONS.
(TT-65-63914)
AD-620 973

• • •

FTD-TT-65-1452
NEWS OF INSTITUTIONS OF HIGHER LEARNING. PHYSICS. (SELECTED ARTICLES).
(TT-66-60726)
AD-629 423

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INTERN RAPPORT-E-60
RESEARCH ON THE THEORY AND DESIGN OF ACTIVE NETWORKS.
(AFCRL-66-13)
AD-647 699

• • •

INTERN RAPPORT E-90
ACOUSTOELECTRIC OSCILLATIONS, CURRENT SATURATION AND ELECTRON DRIFT MOBILITY IN CADMIUM SULPHIDE CRYSTALS.
(AFCRL-67-0285)
AD-654 003

• • •

SCIENTIFIC-1
ACOUSTOELECTRIC OSCILLATIONS, CURRENT SATURATION AND ELECTRON DRIFT MOBILITY IN CADMIUM SULPHIDE CRYSTALS.
(AFCRL-67-0285)
AD-654 003

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FA-A65-18
THE ANODIC SYNTHESIS OF CDS FILMS.
AD-676 498

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60A-ERR-AN-103
PHOTOVOLTAIC AND THERMOELECTRIC SOLAR ENERGY CONVENSION USING THIN FILMS.
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STRESS CORROSION CRACKING IN HIGH STRENGTH FERROUS ALLOYS.
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SEMICONDUCTOR DEVICE CONCEPTS.
(AFCRL-64 467)
AD-603 783

• • •

SEMICONDUCTOR DEVICE CONNCEPTS.
(AFCRL-64 702)
AD-606 311

• • •

RESEARCH ON CDTE.
AD-610 012

• • •

SCIENTIFIC REPT. NO. 4A
SEMICONDUCTOR DEVICE CONCEPTS.
AD-416 264

• • •

SR1
INVESTIGATION OF SEMICONDUCTING PROPERTIES OF II-VI COMPOUNDS
(AFCRL-776)
AD-264 310

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SR3A
SEMICONDUCTOR DEVICE CONCEPTS.
(AFCRL-63 120 A)
AD-408 664

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SR5A
SEMICONDUCTOR DEVICE CONCEPTS.
(AFCRL-63 552A)
AD-426 258

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65GC-0313G
NEW SOLID-STATE DEVICE CONCEPTS.
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AD-621 991

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65-GC-0319
NEW SOLID-STATE DEVICE CONCEPTS.
(AFCRL-65-896)
AD-628 770

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S-68-1017
CRYSTAL CHEMISTRY OF NEW HIGH-PRESSURE PHASES.
(AFOSR-68-0342)
AD-665 876

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SCIENTIFIC-3
NEW SOLID-STATE DEVICE CONCEPTS.
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AD-626 770

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SCIENTIFIC-6
NEW SOLID-STATE DEVICE CONCEPTS.
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SR-2
NEW SOLID-STATE DEVICE CONCEPTS.
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• • •

FIELD EFFECT TRIODES AND SPACE CHARGE LIMITED TRIODES.
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• • •

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RESEARCH ON MICROWAVE INTERACTIONS IN SEMICONDUCTORS.
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• • •

FAILURE MECHANISMS AT SURFACES AND INTERFACES.
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AD-613 336

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RESEARCH AND DEVELOPMENT FOR FIELD EFFECT TRIODES AND SPACE CHARGE LIMITED TRIODES.
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NEW SOLID-STATE DEVICE CONCEPTS.
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AD-815 881

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FREE CARRIER MICROWAVE SEMICONDUCTOR DEVICES.
(ECOM-01876-4)
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GCC-ER-6645-1
BRUSHLESS PRECISION POTENTIOMETER.
AD-605 528

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GCC-ER-6645-2
BRUSHLESS PRECISION POTENTIOMETER.
AD-610 718

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TR61 564
A NEW FORM OF SOLID STATE SOLAR GENERATOR
(ASD-TR61 564)
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HDL-TR-1382
ELECTROACOUSTIC DELAY LINES FOR MICROWAVE FREQUENCIES.
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HDL-TR-1538
GENERATION AND PROPAGATION OF HYPERSONIC WAVES AND THEIR APPLICATIONS TO MICROWAVE FREQUENCIES.
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• • •

TR-1280
MECHANISM OF HIGH CONDUCTIVITY IN VACUUMDEPOSITED CADMIUM SULFIDE FILMS.
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• • •

TR-1297
VACUUM-DEPOSITED CADMIUM SULFIDE THIN FILMS.
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LARGE AREA THIN FILM CADMIUM SULFIDE SOLAR CELL ARRAY INVESTIGATION

AD-401 699

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LARGE AREA THIN FILM CADMIUM SULFIDE SOLAR CELL ARRAY INVESTIGATION.
AD-407 825

• • •

RESEARCH ON PHOTOCONDUCTIVITY IN THIN FILMS.
(ASD-TDR63 664)
AD-417 747

• • •

INVESTIGATION OF THIN FILM CADMIUM SULFIDE SOLAR CELLS.
(ASD-TDR63 743)
AD-423 684

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INVESTIGATION OF THIN FILM CADMIUM SULFIDE SOLAR CELLS.
AD-601 469

• • •

INVESTIGATION OF THIN FILM CADMIUM SULFIDE SOLAR CELLS.
AD-605 425

• • •

INVESTIGATION OF CDS THIN-FILM SOLAR CELLS.
(AFAPL-TR-65-1)
AD-613 187

• • •

RESEARCH ON PHOTOVOLTAIC CELLS.
(ANL-65-111)
AD-621 484

• • •

RESEARCH ON SOLAR-ENERGY CONVERSION EMPLOYING CADMIUM SULFIDE
(ASD-TDR-62-69)
AD-284 032

• • •

62 395

FEASIBILITY STACKING PHOTOVOLTAIC LAYERS OF CD OR ZN SULFIDES, SELENIDES, AND TELLURIDES FOR CONVERSION OF SUN RADIATION INTO ELECTRICAL POWER, PREPARATION AND GROWTH, SINGLE CRYSTALS AND THIN FILMS; THEORY; ELECTRICAL PROPERTIES.
(ANL-62 395)

AD-286 060

*HARVARD UNIV CAMBRIDGE MASS DIV OF ENGINEERING AND APPLIED PHYSICS

• • •

HIGH PRESSURE RESEARCH.
AD-624 734

• • •

HP-23

THE EFFECT OF HYDROSTATIC PRESSURE ON THE PROPERTIES OF SEMICONDUCTORS.
AD-670 611

*HONEYWELL INC HOPKINS MINN

• • •

S6803

LOW INPUT VOLTAGE CONVERSION
AD-296 305

*HP ASSOCIATES PALO ALTO CALIF

• • •

INVESTIGATION OF HOT ELECTRON EMITTER.
(AFCRL-63 336)
AD-413 986

• • •

INVESTIGATION OF HOT ELECTRON EMITTER.
(AFCRL-63 663)
AD-425 823

• • •

INVESTIGATION OF HOT ELECTTON EMITTER.
(AFCRL-64 134)
AD-433 894

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• • •

EPIC-IR-69-REV

CUPROUS SULFIDE AND CUPROUS SULFIDE-CADMIUM SULFIDE HETEROJUNCTIONS.
AD-734 536

• • •

EPIC-S-11

II-VI SEMICONDUCTING COMPOUNDS DATA TABLES.
AD-698 341

HUG-ILL

*HUGHES AIRCRAFT CO FULLERTON CALIF
• • •
FR-65-14-010
IMPROVED DELAY LINE TECHNIQUES STUDY.
(RADC-TR-65-45)
AD-617 693

*HUGHES AIRCRAFT CO NEWPORT BEACH CALIF
• • •
ADVANCED FUNCTIONAL ELECTRONIC BLOCK DEVELOPMENT.
AD-610 366

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• • •
SELECTIVE DOPING OF PIEZOELECTRIC CRYSTALS BY ION IMPLANTATION.
AD-693 184
• • •
SELECTIVE DOPING FOR PIEZOELECTRIC CHYSTALS BY ION IMPLANTATION.
AD-702 778
• • •
SELECTIVE DOPING OF PIEZOELECTRIC CRYSTALS BY ION IMPLANTATION.
AD-727 097
• • •
BI-STABLE ELECTROPHOTOGRAPHIC DISPLAY DEVICE.
(RADC-TR-71-210)
AD-732 301

*HUGHES TOOL CO CULVER CITY CALIF
• • •
DS-124
CADMIUM SULFIDE SUMMARY REVIEW AND DATA SHEETS.
AD-413 467

*IIT RESEARCH INST CHICAGO ILL
• • •
1208 12 A
UNCOOLED IR DETECTOR FOR THE TEN MICRON REGION
AD-297 203
• • •
ARF-3213-13
THIN FILMS FOR COMPOSITE MOLECULAR ELECTRONICS.
(ASD-TDR-63-460)
AD-612 679
• • •
IITRI-A6019
OPTICAL VIBRATION SPECTRA OF SOLIDS.
(AFCRL-66-828)
AD-626 695

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• • •
RADIATION EFFECTS IN SEMICONDUCTING LASER MATERIALS.
(ARL-71-0064)
AD-727 061
• • •
R-400
A STUDY OF ELECTROLUMINESCENT CADMIUM SULFIDE DIODES.
AD-681 705
• • •
R-401
TEMPERATURE DEPENDENCE OF THE RESISTIVITY AND HALL EFFECT OF THIN CDS FILMS.
AD-681 719
• • •
R-454
PHOTOLUMINESCENT PROPERTIES OF VACUUM DEPOSITED CADMIUM SULFIDE FILMS.
AD-700 269

*ILLINOIS UNIV URBANA DEPT OF ELECTRICAL ENGINEERING
• • •
8
JUNCTION EFFECTS IN COMPOUND SEMICONDUCTORS.
(AFCRL-67-0292)
AD-654 009

*ILLINOIS UNIV URBANA DEPT OF PHYSICS
• • •
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(AFOSR-68-1743)
AD-674 697

• • •

CYCLOTRON RESONANCE OF PIEZOELECTRIC POLARONS IN THE QUANTUM LIMIT.
(AMOD-431(68)
AD-676 972

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• • •

PROCEEDINGS OF THE INTERNATIONAL CONFERENCE ON PHOTOCONDUCTIVITY (3RD) HELD AT STANFORD UNIVERSITY, CALIFORNIA, ON 12-16 AUGUST 1969.
AD-726 138

•LABORATOIRE D'INFRA ROUGE TECHNIQUE ET APPLIQUE GIF-SUR-YVETTE (FRANCE)

• • •

AD-267 944

• • •

STUDY OF THE RADIATIVE RECOMBINATION OF FREE CARRIERS PRODUCED BY ELECTRON BOMBARDMENT OF CADMIUM SULFIDE.
AD-403 786

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• • •

ELECTRIC CONDUCTIVITY AND HALL EFFECT IN SEMICONDUCTORS WITH LOOPS OF EXTREMA
AD-400 759

• • •

AID-U-64-43
RADIATION DAMAGE IN SOLIDS. COMPILATION OF ABSTRACTS.
AD-459 964

• • •

AID-P-64-50
RADIATION DAMAGE IN SOLIDS: COMPILATION OF ABSTRACTS.
AD-604 341

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AD-632 998

• • •

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(ESD-TR-66-183)
AD-635 332

• • •

JA-2731
COMPARATIVE DATA ON CDS TRANSDUCERS FROM 14 MC/S TO 70 GC/S.
(ESD-TR-66-234)
AD-641 002

•LION (KURT J) BELMONT MASS

• • •

INVESTIGATION IN THE FIELD OF IMAGE INTENSIFICATION.
(AFCRL-69 133)
AD-439 548

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• • •

ELASTIC WAVE AND INFRARED LIGHT INTERACTIONS WITH A MOVING HIGH-FIELD DOMAIN IN A PIEZOELECTRIC SEMICONDUCTOR.
AD-650 482

• • •

ENERGY BAND STRUCTURE OF SEMICONDUCTORS.
(AFCRL-68-0631)
AD-681 458

• • •

LMSD-9-67-68-3
SELF-CONSISTENT OPW AND EMPIRICALLY-REFINED OPW BAND MODELS FOR CUBIC ZNS, ZNSE, CDS, AND CDSE.
AD-677 026

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ELECTRONIC STRUCTURE AND OPTICAL SPECTRUM OF SEMICONDUCTORS.
(ANL-69-00801)
AD-692 745

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SRB 61 2
PROPERTIES OF CADMIUM SULFIDE, ZINC SULFIDE AND MERCURIC SULFIDE. PARTS I-III. VOLUME I. AN ANNOTATED BIBLIOGRAPHY
AD-256 763

• • •

SRB 61 2
PROPERTIES OF CADMIUM SULFIDE, ZINC SULFIDE AND MERCURIC SULFIDE. PART IV. VOLUME II. AN ANNOTATED BIBLIOGRAPHY
AD-256 764

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AD-685 280

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(RADC-TDR64 349)
AD-603 490

• • •

SR1SR2
PHOTO-MAGNETO-ELECTRIC STUDY OF CDS SINGLE CRYSTALS AND ROLLED BISMUTH FOILS
AD-299 135

• • •

TN-2
PHOTOMAGNETOELECTRIC EFFECT OF CDS SINGLE CRYSTALS AND OF BISMUTH ROLLED FOILS. THERMOMAGNETOELECTRIC EFFECT OF CONTACTS BI-CU, GE-CU AND SI-CU.
AD-660 142

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• • •

CURRENT SATURATION IN CDS FILMS AT VARIOUS TEMPERATURES.
AD-723 373

*MASSACHUSETTS INST OF TECH CAMBRIDGE CRYSTAL PHYSICS LAB

• • •

TN-15
GROWTH OF THIOSPINELS (INVESTIGATION OF CRYSTALS FOR CO2 HIGH POWER LASER WINDOWS).
AD-709 988

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ANOMALOUS FAR INFRARED MAGNETOABSORPTION IN N-TYPE CADMIUM SULFIDE.
(AFOSR-TR-71-1813)
AD-725 634

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• • •

181
PIEZOELECTRIC COUPLING BETWEEN ULTRASONIC WAVES AND FREE ELECTRONS IN CADMIUM SULFIDE.
AD-414 853

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PIEZOELECTRIC POLARON-CYCLOTRON RESONANCE IN THE QUANTUM LIMIT IN N-CDS.
(AFOSR-70-1559TR)
AD-706 802

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• • •

A. ULTRASONIC DISPERSION IN PIEZOELECTRIC SEMI-CONDUCTORS. B. NONLINEAR SOUND TRANSMISSION

THROUGH AN ORIFICE.
AD-705 726

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ENHANCEMENT OF THE PIEZOELECTRICALLY STIFFENED ULTRASONIC VELOCITY BY ELECTRON TRAPPING IN CDS.
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AD-642 201

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AD-642 217

• • •

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QUANTITATIVE ANALYSIS OF TERNARY AND QUATERNARY SEMICONDUCTING ALLOYS WITH ELECTRON MICROPROBE.
(ESD-TR-70-264)
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AD-288 571

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CHARGE-LIMITED SOLID STATE DIODES,
(ARGD-5117112)
AD-672 139

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(AFOSR-TR-71-0640)
AD-720 497

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AD-294 665
• • •
MICROWAVE ACOUSTIC DELAY LINE AND RELATED ACTIVE DEVICES,
(RADC-TDR64 22)
AD-601 566
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MICROWAVE ACOUSTIC DELAY LINE AND RELATED ACTIVE DEVICES,
(RADC-TDR64 246)
AD-604 250

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• • •
ACTIVE ACOUSTIC DEVICES,
(RADC-TR-64-617)
AD-612 703
• • •
ACTIVE ACOUSTIC DEVICES,
(RADC-TR-65-89)
AD-617 749
• • •
ACTIVE ACOUSTIC DEVICES,
(RADC-TR-66-203)
AD-620 884
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(RADC-TR-66-352)
AD-679 130

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FEASIBILITY INVESTIGATION OF CHEMICALLY SPRAYED THIN FILM PHOTOVOLTAIC CONVERTERS
AD-289 278
• • •
FEASIBILITY INVESTIGATION OF CHEMICALLY SPRAYED THIN FILM PHOTOVOLTAIC CONVERTERS,
(ASD-TDR63 223)
AD-409 353
• • •
INVESTIGATION OF CHEMICALLY SPRAYED THINFILM PHOTOVOLTAIC CELLS,
AD-609 204
• • •
62 637TP1058 822
FEASIBILITY INVESTIGATION OF CHEMICALLY SPRAYED THIN FILM PHOTOVOLTAIC CONVERTERS
(AFCHL-62 637)
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AD-667 233
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THEORY OF ENHANCED RAMAN SCATTERING AND VIRTUAL QUASIPARTICLES IN CRYSTALS.
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AD-676 649

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SCIENTIFIC-2
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AD-684 159

• • •

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AD-684 160

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AD-698 238

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AD-716 810

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AD-725 942

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ADSI-F
METAL BASE TRANSISTOR II. (ECOM-00161-F)
AD-642 524

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ELECTROQUENCHABLE PHOSPHOR INVESTIGATION
AD-248 932

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AD-408 472

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SURFACE CONDUCTION IN CDS.
AD-695 823

• • •

TR-2
THE INFLUENCE OF CHEMISORPTION ON THE ELECTRONIC PROPERTIES OF THIN SEMICONDUCTORS: OXYGEN CHEMISORPTION ON THE (11-20) SURFACE OF CDS.
AD-688 948

• • •

TR-9
SORPTION-INDUCED CONDUCTIVITY CHANGES IN COMPOUND SEMICONDUCTORS.
AD-725 177

• • •

TR-11
METHODS OF DETERMINING SURFACE STATE ENERGIES.
AD-728 850

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SOLAR CELL ARRAY OPTIMIZATION
AD-295 558

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AD-634 088

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AD-643 779

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FIELD EFFECT AND SPACE-CHARGE-LIMITED THIN FILM TRIODES.
AD-442 636

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FIELD-EFFECT AND SPACE-CHARGE-LIMITED THINFILM TRIODES.
AD-461 776

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EVAPORATED THIN FILM DEVICES
(AFCRL-62 966)
AD-298 929

• • •

EVAPORATED THIN-FILM TECHNIQUES.
AD-426 170

• • •

EVAPORATED THIN-FILM DEVICES.
(AFCRL-63-529)
AD-427 362

• • •

INTERACTIONS OF COHERENT OPTICAL RADIATION WITH SOLIDS.
AD-431 975

• • •

INTERACTIONS OF COHERENT OPTICAL RADIATION WITH SOLIDS.
AD-450 756

• • •

THIN-FILM POLYCRYSTALLINE FIELD-EFFECT TRIODE.
AD-466 972

• • •

ACTIVE LOGIC ELEMENTS USING NON-GALVANIC MODIFYING INPUTS.
(AFCRL-64 896)
AD-610 395

• • •

TUNNELING PROCESSES ACROSS THE CDSELECTROLYTE INTERFACE,
(AMOD-401716)
AD-614 494

• • •

ACTIVE LOGIC ELEMENTS USING NON-GALVANIC MODIFYING INPUTS.
(AFCRL-64-29)
AD-630 022

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AD-631 408

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THIN-FILM POLYCRYSTALLINE FIELD-EFFECT TRIODE.
AD-631 409

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LOW TEMPERATURE INFRARED PHOTOCONDUCTORS.
AD-636 802

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PRRL-71-CR-36
DC-ELECTROLUMINESCENT FLAT PANEL DISPLAY.
(ECOM-0290-9)
AD-735 342

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RADC-TDR63 554
IMPROVED PHOTOCONDUCTORS FOR DISPLAY SWITCHING.
AD-433 671

• • •

RADC-TDR64 22
MICROWAVE ACOUSTIC DELAY LINE AND RELATED ACTIVE DEVICES.
AD-601 566

• • •

RADC-TDR64 246
MICROWAVE ACOUSTIC DELAY LINE AND RELATED ACTIVE DEVICES,
AD-604 250

• • •

RADC-TDR64 349
PHOTO-MAGNETIC-ELECTRIC STUDY OF CDS CRYSTALS. TRANSPORT PROPERTIES OF BISMUTH ROLLED THIN FOILS.
AD-603 490

• • •

RADC-TDR64 454
FAILURE MECHANISMS AT SURFACES

AND INTERFACES.
AD-613 036

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RADC-TR-64-517
ACTIVE ACOUSTIC DEVICES.
AD-612 703

• • •

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IMPROVED DELAY LINE TECHNIQUES STUDY.
AD-617 693

• • •

RADC-TR-65-69
ACTIVE ACOUSTIC DEVICES.
AD-617 749

• • •

RADC-TR-65-203
ACTIVE ACOUSTIC DEVICES.
AD-620 884

• • •

RADC-TR-66-352
ACTIVE ACOUSTIC DEVICES.
AD-679 130

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RADC-TR-71-210
BI-STABLE ELECTROPHOTOGRAPHIC DISPLAY DEVICE.
AD-732 301

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DEVELOPMENT OF PHOTORESISTIVE ELEMENTS FOR AN ANALOG MULTIPLIER.
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AD-671 980

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(TRC-BR-18618)
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AD-656 984

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MAGNETOELASTIC SURFACE WAVES.
AD-735 097

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DESIGN OF MICROWAVE FILTER NETWORKS.
(ECOM-02266-F)
AD-827 402

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(ARGD-4119.6)
AD-623 045

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(ARGD-4119.7)
AD-631 744

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DETERMINATION OF ELECTRON TRAPPING PARAMETERS.
(ARGD-4119.8)
AD-631 791

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ELECTRIC FIELD EFFECTS IN TRAPPING PROCESSES.
(ARGD-4119.10)
AD-637 919

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• • •

ML-1517
CURRENT INSTABILITIES IN PIEZOELECTRIC SEMICONDUCTORS.
AD-651 003

•STANFORD UNIV CALIF STANFORD ELECTRONICS LABS

• • •

63-145
OPTICAL SECOND-HARMONIC GENERATION IN SEMICONDUCTOR ALLOYS.
(AFAL-TDR64 78)
AD-602 212

• • •

SEL-64-095
BAND STRUCTURE AND SURFACE EFFECTS IN CADMIUM SULFIDE PHOTOEMISSION STUDIES.
AD-610 738

• • •

S&L-TR0656-8
OPTICAL SECOND-HARMONIC GENERATION IN SEMICONDUCTOR ALLOYS.
(AFAL-TDR64 78)
AD-602 212

• • •

SEL-TR-6201-1
BAND STRUCTURE AND SURFACE EFFECTS IN CADMIUM SULFIDE PHOTOEMISSION STUDIES.
AD-610 738

• • •

SU-SEL-65-051
SURFACE STATES AND BARRIER HEIGHT IN METAL-SEMICONDUCTOR SURFACE BARRIER DIODES.
AD-467 489

• • •

TR-0414-1
SURFACE STATES AND BARRIER HEIGHT IN METAL-SEMICONDUCTOR SURFACE BARRIER DIODES.
AD-467 489

•STATE UNIV OF NEW YORK STONY BROOK DEPT OF ELECTRICAL SCIENCES

• • •

THERMAL LENS EFFECT IN CDS.
(AFOSR-70-1563TR)
AD-706 819

•TECHNOLOGY REPORTS CENTRE ORPINGTON (ENGLAND)

• • •

TRC-BR-18614
ANTI-STOKES EXCITED EDGE EMISSION IN CADMIUM SULPHIDE.
AD-707 173

•TEXAS INSTRUMENTS INC DALLAS

• • •

RARE EARTH IMPURITIES IN II-VI COMPOUNDS.
(AFOSR-68-0542)
AD-667 094

• • •

08 63 27
MATERIAL PROCESSING AND PHENOMENA INVESTIGATION OF FUNCTIONAL ELECTRONIC BLOCKS
AD-400 290

• • •

08 63 80
MATERIAL PROCESSING AND PHENOMENA INVESTIGATION OF FUNCTIONAL ELECTRONIC BLOCKS.
AD-409 475

• • •

0363 12
ADVANCED FUNCTIONAL ELECTRONIC BLOCK DEVELOPMENT.
AD-421 739

• • •

TI-08-64-62
MATERIAL PROCESSING AND PHENOMENA INVESTIGATION OF FUNCTIONAL ELECTRONIC BLOCKS.
(AFAL-TDR-64-135)
AD-602 482

•TEXAS UNIV AUSTIN ELECTRONICS RESEARCH CENTER

• • •

USE OF SUPERCONDUCTING CAVITIES TO RESOLVE CARRIER TRAPPING EFFECTS IN CDS.
(AFOSR-69-2528TR)
AD-699 688

•THOMSON-CSF PARIS (FRANCE)

• • •

REVUE TECHNIQUE THOMSON-CSF.
VOLUME 1, NUMERO 3.
AD-700 891

•UNIVERSITY OF SOUTHERN CALIFORNIA LOS ANGELES ELECTRONIC SCIENCES LAB

• • •
MULTIPLE-PHONON RESONANT RAMAN SCATTERING THEORY.
(AFOSR-TR-71-1292)
AD-723 713

*WASHINGTON UNIV SEATTLE
• • •
ACOUSTOELECTRIC AFTERCURRENT IN PHOTOCONDUCTING CDS.
(AROD-8391 11-E)
AD-721 761

*WASHINGTON UNIV SEATTLE DEPT OF ELECTRICAL ENGINEERING
• • •
OPTICAL PROBING OF RESISTIVITY PROFILES IN CDS AND THEIR RELATION WITH ACOUSTOELECTRIC CURRENT OSCILLATIONS.
(AROD-8391 12-E)
AD-728 916

*WESTERN RESERVE UNIV CLEVELAND OHIO
• • •
RESEARCH ON SEMICONDUCTOR SURFACES. 1. THE ANOMALOUS FIELD EFFECT IN GERMANIUM. 2. THE FIELD EFFECT IN CADMIUM SULFIDE
(AROD-2172 1)
AD-256 674
• • •
ENHANCED PHOTOCONDUCTANCE AND SHADOWS ON CADMIUM SULFIDE SINGLE CRYSTALS
(AROD-2172 2)
AD-257 072

*WESTINGHOUSE ELECTRIC CORP ELMIRA N Y
• • •
APPLICATION OF LIGHT AND IMAGE INTENSIFICATION.
AD-604 742

*WESTINGHOUSE ELECTRIC CORP ELMIRA N Y ELECTRONIC TUBE DIV
• • •
APPLICATION OF LIGHT AND IMAGE INTENSIFICATION.
AD-627 426

• • •
SOLID STATE IMAGE INTENSIFIERS.
AD-637 171
• • •
SOLID STATE IMAGE INTENSIFIERS.
AD-642 933

*WESTINGHOUSE ELECTRIC CORP PITTSBURGH PA
• • •
TDR62 533
ELECTROLUMINESCENT-PHOTOCONDUCTOR ELEMENTS
(ASD-TDR62 533)
AD-286 829

*WESTINGHOUSE RESEARCH LABS PITTSBURGH PA
• • •
TUNED INTEGRATED CIRCUITS.
(ECOM-02045-2)
AD-643 519
• • •
65-9F5-108-P2
MULTILAYER ENHANCEMENT OF MICROWAVE PIEZOELECTRIC CONVERSION IN CDS-SIO LAYERS.
(AFCRL-67-0017)
AD-646 041
• • •
65-9F5-WAVES-P3
THIN-FILM PIEZOELECTRIC TRANSDUCERS USED AS GENERATORS AND DETECTORS OF MICROWAVE PHONONS, WITH SOME ATTENUATION MEASUREMENTS IN SIO2.
(AFCRL-67-0079)
AD-648 782
• • •
65-9F5-WAVES-P4
MULTILAYER THIN FILM PIEZOELECTRIC TRANSDUCERS.
(AFCRL-67-0019)
AD-646 046
• • •
66-9F1-NEWSC-N1
TUNED INTEGRATED CIRCUITS.
(ECOM-02045-1)
AD-639 667
• • •
SCIENTIFIC-3

MULTILAYER ENHANCEMENT OF MICROWAVE PIEZOELECTRIC CONVERSION IN CDS-SIO LAYERS,
(AFCRL-67-0017)
AD-646 041

• • •

SCIENTIFIC-5
MULTILAYER THIN FILM PIEZOELECTRIC TRANSDUCERS,
(AFCRL-67-0019)
AD-646 046

• • •

SCIENTIFIC-6
THIN-FILM PIEZOELECTRIC TRANSDUCERS USED AS GENERATORS AND DETECTORS OF MICROWAVE PHONONS, WITH SOME ATTENUATION MEASUREMENTS IN SIO2,
(AFCRL-67-0079)
AD-648 782

• • •

SCIENTIFIC-7
FABRICATION OF VAPOR-DEPOSITED THIN FILM PIEZOELECTRIC TRANSDUCERS FOR THE STUDY OF PHONON BEHAVIOR IN DIELECTRIC MATERIALS AT MICROWAVE FREQUENCIES,
(AFCRL-67-0627)
AD-662 534

• • •

SP-64-PFS-108-P1
VAPOR DEPOSITED THIN FILM PIEZOELECTRIC TRANSDUCERS,
(AFCRL-65-73)
AD-613 540

• • •

SR-1
VAPOR DEPOSITED THIN FILM PIEZOELECTRIC TRANSDUCERS,
(AFCRL-65-73)
AD-613 540

*WHEELER AND WHEELER ASSOCIATES
*RANFORD CONN

• • •

62 433
RESEARCH IN CRYOGENICS AND MAGNETO-OPTICS
(ANL-62 433)
AD-292 324

*WISCONSIN UNIV MADISON

• • •

CYCLOTRON RESONANCE EXPERIMENTS,
(ARL-66-0078)
AD-639 395

*YALE UNIV NEW HAVEN CONN DEPT OF ENGINEERING AND APPLIED SCIENCE

• • •

TR-3
RESONANT CANCELLATION OF RAMAN SCATTERING FROM CDS AND SI,
AD-715 167

• • •

TR-5
AN EXPERIMENTAL STUDY OF THE VIBRONIC AND ELECTRONIC RESONANCE RAMAN EFFECT IN SEMICONDUCTOR AND GARNET CRYSTALS,
AD-722 701

*YALE UNIV NEW HAVEN CONN DUNHAM LAB

• • •

TR-4
TEMPERATURE DEPENDENCE OF RAMAN LINEWIDTH AND INTENSITY OF SEMICONDUCTORS,
AD-717 296

SUBJECT INDEX

•ABSTRACTING0
RADIATION DAMAGE
SURVEY OF SOVIET-BLOC LITERATURE: ABSTRACTS ON RADIATION DAMAGE IN SEMICONDUCTORS, IONIC CRYSTALS, AND OTHER MATERIALS.
AD-604 341

•ACOUSTIC EQUIPMENT
SEMICONDUCTOR DEVICES
MICROWAVE ACOUSTIC DELAY LINE AND RELATED ACTIVE DEVICES.
AD-604 250
ACTIVE ACOUSTIC DEVICES. USE OF TRANSDUCERS IN CW DEVICES.
AD-612 703
ACTIVE SEMICONDUCTON ACOUSTIC DEVICES.
AD-617 749
ACTIVE ACOUSTIC DEVICES.
AD-620 884
ACTIVE ACOUSTIC DEVICES.•
AD-679 130

•ACOUSTIC PROPERTIES
CADMIUM SULFIDES
ACOUSTOELECTRIC OSCILLATIONS, CURRENT SATURATION AND ELECTRON DRIFT MOBILITY IN CADMIUM SULPHIDE CRYSTALS.•
AD-654 003

•ACOUSTICS
PIEZOELECTRIC CRYSTALS
RESEARCH ON THE THEORY AND DESIGN OF ACTIVE NETWORKS; MICROWAVE ULTRASONICS AND ACOUSTIC WAVE PROPAGATION IN PIEZOELECTRIC SEMICONDUCTORS.
AD-609 434
RESEARCH ON THE THEORY AND DESIGN OF ACTIVE NETWORKS.•
AD-647 699

•AIR FORCE RESEARCH
SEMICONDUCTORS
HISTORY OF SEMICONDUCTOR RESEARCH AT THE AEROSPACE RESEARCH LABORATORIES: CADMIUM SULFIDE.
AD-655 519

•AIRCRAFT ENGINES
MAINTENANCE
WORKLOAD FORECASTING AND ALTERNATIVE OVERHAUL SCHEDULES FOR NAVY AIRCRAFT AND AIRCRAFT ENGINES.•
AD-685 280

•AUDIO AMPLIFIERS
SEMICONDUCTOR DEVICES
MICROWAVE INTERACTIONS IN SEMICONDUCTORS: DISTRIBUTED SINGLE CRYSTAL STRUCTURES: SOLID STATE ULTRASONIC AMPLIFIERS AND TRANSDUCERS.
AD-603 521

•AUXILIARY POWER PLANTS
- LARGE AREA THIN FILM CDS SOLAR CELL ARRAY INVESTIGATION. DESIGN OF CDS FILM CELL ARRAYS FOR PERFORMANCE AND ORBITAL TESTING.
AD-294 016

•AVALANCHE DIODES
SIGNALS
REPRINT: REVUE TECHNIQUE THOMSON-CSF. VOLUME 1, NUMERO 3.
AD-700 891

•BAND SPECTRUM
CADMIUM SULFIDES
REPRINT: THE EDGE EMISSION BANDS IN CADMIUM SULFIDE.
AD-685 673

•BAND THEORY OF SOLIDS
LUMINESCENCE
REPRINT: THEORETICAL ASPECTS OF POINT AND ASSOCIATED LUMINESCENT CENTERS.
AD-680 583

MAGNETO-OPTIC EFFECT
BAND PARAMETERS DETERMINATION FROM FARADAY ROTATION MEASUREMENTS.•
AD-664 582

NUMERICAL ANALYSIS
REPRINT: SELF-CONSISTENT

ORTHOGONALIZED-PLANE-WAVE CALCULATIONS.
AD-723 927

SEMICONDUCTORS
REPRINT: CONVERGENCE STUDY OF A SELF-CONSISTANT ORTHOGONALIZED-PLANE-WAVE BAND CALCULATION FOR HEXAGONAL CDS.
AD-667 022
REPRINT: ENERGY BAND STRUCTURE OF SEMICONDUCTORS.
AD-681 458
ELECTRONIC STRUCTURE AND OPTICAL SPECTRUM OF SEMICONDUCTORS.*
AD-692 745
REPRINT: MODULATED PIEZOREFLECTANCE IN SEMICONDUCTORS.
AD-710 194
EPITAXIC SUBLIMATION METHODS FOR THE STUDY OF PSEUDO-BINARY SEMICONDUCTOR ALLOYS.*
AD-716 210
REPRINT: ELECTRONIC CORE LEVELS OF THE IIB-VIA COMPOUNDS.
AD-729 726
ELECTRON EMISSION STUDIES OF THE IIB-VIA SEMICONDUCTOR COMPOUNDS.*
AD-731 551
BAND STRUCTURE AND DISPERSION RELATIONS IN II-VI COMPOUNDS AND THEIR ALLOYS.*
AD-736 033
SELF CONSISTENT ORTHOGONALIZED PLANEWAVE ENERGY BAND MODEL FOR CUBIC ZNS, ZNSE, CDS AND CDSE.*
AD-859 ,36

SURFACES
REPRINT: METHODS OF DETERMINING SURFACE STATE ENERGIES.
AD-721 850

*BIBLIOGRAPHIES
PROPERTIES OF CADMIUM SULFIDE, ZINC SULFIDE AND MERCURIC SULFIDE. PARTS I-III. VOLUME I. AN ANNOTATED BIBLIOGRAPHY.
AD-256 763
PROPERTIES OF CADMIUM SULFIDE, ZINC SULFIDE AND MERCURIC SULFIDE. PART IV. VOLUME II. AN ANNOTATED BIBLIOGRAPHY.
AD-256 764

SEMICONDUCTING FILMS
SEMICONDUCTING THIN FILMS: AN ANNOTATED BIBLIOGRAPHY, 1967 SUPPLEMENT.*
AD-667 233

SEMICONDUCTORS
DOPING OF SEMICONDUCTORS AND SEMICONDUCTING FILM. VOLUME I.*
AD-687 900

SOLAR CELLS
SOLAR CELLS AND SOLAR PANELS. VOLUME I.*
AD-700 500

*BISMUTH
PHOTO-MAGNETO-ELECTRIC STUDY OF CDS SINGLE CRYSTALS AND ROLLED BI FOILS.
AD-259 135

TRANSPORT PROPERTIES
PHOTO-MAGNETO-ELECTRIC STUDY OF CDS CRYSTALS. TRANSPORT PROPERTIES OF BISMUTH ROLLED THIN FOILS.
AD-603 490
PHOTOMAGNETOELECTRIC EFFECT OF CDS SINGLE CRYSTALS AND OF BISMUTH ROLLED FOILS.
THERMOMAGNETOELECTRIC EFFECT OF CONTACTS BI-CU, GE-CU AND SI-CU.*
AD-660 142

*BRILLOUIN ZONES
CADMIUM SULFIDES
LATTICE DYNAMICS OF CDS. I. NEAREST NEIGHBOR APPROXIMATION.*
AD-701 043

*CADIUM COMPOUNDS
PHOTOCONDUCTIVITY
REPRINT: PHOTO-HALL STUDIES OF OXYGEN ADSORPTION EFFECTS ON PHOTOCONDUCTIVITY IN SINTERED LAYERS.
AD-623 045

•CADMIUM
RESEARCH IN PURIFICATION OF CADMIUM SULFIDE CRYSTALS.
AD-259 883

•CADMIUM ALLOYS
PHOTOCONDUCTIVITY
REPRINT: EXCITON STRUCTURE IN PHOTOCONDUCTIVITY OF CDS, CDSE, AND CDSXSE1-X SINGLE CRYSTALS.
AD-617 125

SEMICONDUCTOR FILMS
INVESTIGATION OF HOT ELECTRON EMITTER..
AD-425 523

SEMICONDUCTORS
REPRINT: STUDY OF HOMOGENEITY OF SOLID SOLUTIONS OF CADMIUM SULFIDE AND CADMIUM SELENIDE BY X-RAY FLUORESCENCE.
AD-629 493

TELLURIUM ALLOYS
RESEARCH ON CDTE.
AD-610 012

ULTRAVIOLET SPECTROSCOPY
ULTRAVIOLET REFLECTIVITY STUDIES OF CDS1-XSE1-X SINGLE CRYSTAL SOLID SOLUTIONS..
AD-633 645

•CADMIUM COMPOUNDS
RESEARCH ON SEMICONDUCTOR SURFACES. 1. THE ANOMALOUS FIELD EFFECT IN GERMANIUM. 2. THE FIELD EFFECT IN CADMIUM SULFIDE.
AD-256 674
PROPERTIES OF CADMIUM SULFIDE, ZINC SULFIDE AND MERCURIC SULFIDE. PARTS I-III. VOLUME I. AN ANNOTATED BIBLIOGRAPHY.
AD-256 763
ELECTRON MOBILITY IN CADMIUM SULPHIDE SINGLE CRYSTALS AT LOW TEMPERATURES.
AD-259 661
RESEARCH IN PURIFICATION OF CADMIUM SULFIDE CRYSTALS.
AD-259 883
PHOTOCONDUCTIVITY IN CDS CRYSTALS AS A MECHANISM FOR GAMMA RAY DOSIMETRY.
AD-261 116
CDS AND OTHER II-IV COMPOUNDS1 SOLAR ENERGY CONVERTERS1 PURIFICATION1 CRYSTAL GROWTH.
AD-270 416
RESEARCH ON II-VI COMPOUND SEMICONDUCTORS INCLUDED PREPARATION, PURIFICATION AND GROWTH OF CDS1 CDSE, ZNTE AND CDS-CDSE CRYSTALS. PROPERTY STUDIES AND MEASUREMENTS INCLUDED MELTING POINTS1 REFRACTIVE INDEXES1 ELASTIC, DIELECTRIC, PIEZOELECTRIC, AND LATTICE CONSTANTS1 HALL EFFECT AND CONDUCTIVITY.
AD-281 718
THE ELECTRON MOBILITY OF CDS WAS PLOTTED AS A FUNCTION OF 1/T BETWEEN 8 AND 293 K. ANALYSIS OF THE DATA INDICATES THAT A MEASURABLE ANISOTROPY IN THE ELECTRON MOBILITY EXISTS AND THAT A REVERSAL OF THIS ANISOTROPY OCCURS AT APPROXIMATELY 30 K.
AD-283 953
TEMPERATURE DEPENDENCE OF LINE STRUCTURE OF CDS EDGE EMISSION. MASTER'S THESIS.
AD-284 015
SOLID STATE RADIATION DETECTORS WERE CONSTRUCTED USING CRYSTAL PLATELETS OF CDS. BOTH INTRINSIC AND P-N JUNCTION DETECTORS WERE MADE ANDEVALUATED.
AD-284 020
RESEARCH ON SOLAR ENERGY CONVERSION EMPLOYING CDS GROWTH, ANNEALING, ETCHING AND ORIENTATION OF CDS SINGLE CRYSTALS AND FILMS.
AD-284 032
ELECTROLUMINESCENCE STUDIES ON DC-PULSEEXCITED THIN FILM ELECTROLUMINORS1 PREPARATION OF HIGH PURITY SINGLE CRYSTALS AND EVAPORATED FILMS OF CDS1 HIGH

SPEED
PHOTOCONDUCTIVE LOGIC ELEMENTS.
AD-286 629
PHOTO-MAGNETO-ELECTRIC STUDY OF CDS SINGLE CRYSTALS AND ROLLED BI FOILS.
AD-299 135
LARGE-AREA, THIN-FILM, CADMIUM SULFIDE SOLAR CELL ARRAY INVESTIGATION.
AD-401 699

CHEMICAL ANALYSIS
ANALYTICAL TECHNIQUES FOR THE DETERMINATION OF TRACE IMPURITIES IN II-VI COMPOUNDS.*
AD-728 219

COMPRESSIVE PROPERTIES
REPRINT: LINEAR COMPRESSIBILITIES OF II-VI COMPOUND SINGLE CRYSTALS.
AD-715 574

CRYSTAL GROWTH
RESEARCH IN PURIFICATION AND SINGLE CRYSTAL GROWTH OF II-VI COMPOUNDS.*
AD-651 140
RESEARCH ON IMPROVED II-VI CRYSTALS.*
AD-679 566
RESEARCH IN PURIFICATION AND SINGLE CRYSTAL GROWTH OF II-VI COMPOUNDS.*
AD-709 890
RESEARCH ON IMPROVED II-VI CRYSTALS.*
AD-725 062

FLUORESCENCE
HOMOGENEITY OF CADMIUM SELENIDE-CADMIUM SULFIDE SOLID SOLUTIONS BY X-RAY FLUORESCENCE.
AD-603 604

PHOTOCONDUCTIVITY
TRANSLATION OF RUSSIAN RESEARCH: INVESTIGATING THE EFFECT OF GAMMA-RAYS, X-RAYS AND NEUTRONS ON ELECTRIC PROPERTIES OF CDS-SE AND CDSE-SE RECTIFYING SYSTEMS.
AD-615 868
MULTIPHONON PROCESSES IN THE PHOTOCONDUCTIVITY OF CADMIUM SULFIDE AND CADMIUM SELENIDE SINGLE CRYSTALS.
AD-616 683
REPRINT: OSCILLATORY PHOTOCONDUCTIVITY OF CDS.
AD-616 828
REPRINT: EXCITON STRUCTURE IN PHOTOCONDUCTIVITY OF CDS, CDSE, AND CDS:SE SINGLE CRYSTALS.
AD-617 125

SEMICONDUCTORS
REPRINT: STUDY OF HOMOGENEITY OF SOLID SOLUTIONS OF CADMIUM SULFIDE AND CADMIUM SELENIDE BY X-RAY FLUORESCENCE.
AD-629 493
RESEARCH IN PURIFICATION AND SINGLE CRYSTAL GROWTH OF II-VI COMPOUNDS.*
AD-679 636

SULFIDES
REVIEW AND DATA SHEETS ON CADMIUM SULFIDE.
AD-413 667
FEASIBILITY OF CDS FOR SOLID STATE DETECTOR APPLICATION: ALPHA AND PHOTON IRRADIATION: MOBILITY-LIFETIME VALUES OF ELECTRRAPPING OF CARRIERS: PLASMA FORMATION.
AD-418 516
INVESTIGATION OF THIN FILM CADMIUM SULFIDE SOLAR CELLS.*
AD-423 684
HISTORY OF SEMICONDUCTOR RESEARCH AT THE AEROSPACE RESEARCH LABORATORIES: CADMIUM SULFIDE.
AD-455 519
LARGE AREA, FLEXIBLE, LIGHT WEIGHT, THIN FILM CADMIUM SULFIDE SOLAR CELLS.
AD-601 459
ACOUSTIC AMPLIFICATION AND ELECTRON MOBILITY IN LITHIUM AND SODIUM DOPED CADMIUM SULFIDE.
AD-603 611

MICROWAVE ACOUSTIC DELAY LINE AND RELATED ACTIVE DEVICES.
AD-604 250
INVESTIGATION OF THIN FILM CADMIUM SULFIDE SOLAR CELLS.
AD-605 425
EXPERIMENTAL INVESTIGATION OF CURRENT LIMITING AND OSCILLATION IN CDS.
AD-607 035
BAND STRUCTURE AND SURFACE EFFECTS IN CADMIUM SULFIDE PHOTOEMISSION STUDIES.
AD-610 738
THIN CADMIUM SULFIDE AND ZINC SULFIDE FILMS FOR COMPOSITE MOLECULAR ELECTRONICS.
AD-612 679
CDS THIN-FILM SOLAR CELLS.
AD-613 187
STUDY OF SURFACE PROPERTIES OF ATOMICALLY-CLEAN METALS AND SEMICONDUCTORS.
AD-613 699
REPRINT: TUNNELING PROCESSES ACROSS THE CDS-ELECTROLYTE INTERFACE.
AD-614 494
LAYERLIKE FIELD INHOMOGENEITIES IN INHOMOGENEOUS SEMICONDUCTORS IN THE RANGE OF 'NEGATIVE DIFFERENTIAL CONDUCTIVITY'.
AD-614 909
MECHANISM OF HIGH CONDUCTIVITY IN VACUUM-DEPOSITED CADMIUM SULFIDE FILMS.
AD-616 269
NEW SOLID-STATE DEVICE CONCEPTS.
AD-616 350
LENGTH CHANGE MEASUREMENTS OF ELECTRON IRRADIATED CADMIUM SULFIDE IN THE ENERGY RANGE 275-935 KEV.
AD-616 684
TRANSLATION OF RUSSIAN RESEARCH: INTRODUCTION OF MICROIMPURITIES INTO SINGLE CRYSTALS OF CDS DURING THEIR GROWTH AND SOME CHARACTERISTICS OF THE ALLOYED SAMPLES.
AD-621 424
NEW SOLID-STATE DEVICE CONCEPTS.
AD-621 941
VACUUM-DEPOSITED CADMIUM SULFIDE THIN FILMS.
AD-622 695
ANALYTICAL TECHNIQUES FOR THE DETERMINATION OF TRACE IMPURITIES IN CADMIUM SULFIDE.
AD-623 165
PROPERTIES OF ATOMICALLY-CLEAN METALS AND SEMICONDUCTORS: GROWTH SURFACE OF CADMIUM SULFIDE; OXIDATION OF CO ON NICKEL SURFACE.
AD-623 174
X-RAY DAMAGE AND ANNEALING OF THESE DEFECTS IN CDS SINGLE CRYSTALS.
AD-623 895
PHYSICAL RESEARCH ON PROPERTIES OF II-VI COMPOUND SEMICONDUCTORS.
AD-625 476
HIGH AMPLITUDE CURRENT AND OPTICAL TRANSMISSION OSCILLATIONS IN CDS SINGLE CRYSTALS.
AD-628 493
TRANSLATION OF RUSSIAN RESEARCH: POLYCRYSTALLINE CADMIUM SULFIDE FILMS-ELECTRIC PROPERTIES AND OPTICAL ABSORPTION.
AD-629 423
REPRINT: IMPURITY CONDUCTIVITY IN SINGLE CRYSTAL CDS.
AD-630 491
STUDY OF SURFACE PROPERTIES OF ATOMICALLY-CLEAN METALS AND SEMICONDUCTORS. PART I. STUDY OF CDS SURFACES BY LEED. PART II. COMBINED LEED AND MASS SPECTROMETER MEASUREMENTS FOR ADSORPTION AND CATALYSIS.
AD-630 863
REPRINT: FURTHER CONSIDERATIONS ON A THEORY OF SUPERLINEARITY IN CDS AND RELATED MATERIALS.
AD-631 744
ULTRASONIC STRESS WAVES IN CADMIUM SULFIDE.
AD-633 715
CADMIUM SULFIDE: INFLUENCE OF OXYGEN IN THE ULTRAHIGH VACUUM RANGE ON ELECTRICAL PROPERTIES.
AD-634 032

REPRINT: CYCLOTRON RESONANCE OF PIEZOELECTRIC POLARONS.
AD-636 332

MULTILAYER OHMIC CONTACTS ON CDS.•
AD-636 420

EVAPORATED AND RECRYSTALLIZED CDS LAYERS.•
AD-637 725

SURFACE PINNED LAYER-LIKE FIELD INHOMOGENEITIES IN CDS.•
AD-637 856

THE INFLUENCE OF OXYGEN IN THE ULTRAHIGH VACUUM RANGE ON ELECTRICAL PROPERTIES OF CDS.•
AD-637 857

GAS DESORPTION FROM VIRGINAL CDS CRYSTALS.•
AD-638 016

REPRINT: COMPARATIVE DATA ON CDS TRANSDUCERS FROM 14 MC/S TO 70 GC/S.
AD-641 002

INJECTION CAUSED P-N JUNCTION IN CD...•
AD-64[illegible] 400

REPRINT: MONOCHROMATIC ILLUMINATION OF CADMIUM-SULFIDE OSCILLATOR.
AD-64[illegible] 711

SURFACE PROPERTIES
STUDY OF SURFACE PROPERTIES OF ATOMICALLY-CLEAN METALS AND SEMICONDUCTORS.
AD-42[illegible] 412

TRANSPORT PROPERTIES
MEASUREMENT OF ELECTRON FREE LIFETIME AND TRAPPING FACTOR IN HIGH PURITY CADMIUM SULFIDE, CADMIUM SULFIDE/SELENIDE AND CADMIUM SELENIDE USING THE METHOD OF ULTRASONIC AMPLIFICATION.
AD-616 687

VAPOR PLATING
REPRINT: ELECTRON BOMBARDMENT TECHNIQUE FOR DEPOSITION OF CDS FILM TRANSDUCERS.
AD-642 217

•CADMIUM SELENIDES
BAND THEORY OF SOLIDS
SELF CONSISTENT ORTHOGONALIZED PLANEWAVE ENERGY BAND MODEL FOR CUBIC ZNS, ZNSE, CDS AND CDSE.•
AD-859 726

CRYSTAL GROWTH
RESEARCH ON IMPROVED II-VI CRYSTALS.•
AD-727 048

CRYSTALLOGRAPHY
RESEARCH ON IMPROVED II-VI CRYSTALS.•
AD-660 874

RESEARCH ON IMPROVED II-VI CRYSTALS.•
AD-666 406

EXCITONS
REPRINT: EMISSION FROM EXCITED TERMINAL STATES OF BOUND EXCITON COMPLEXES.
AD-695 104

LUMINESCENCE STUDY OF EXCITON-EXCITON INTERACTION IN CADMIUM SULFIDE, CADMIUM SELENIDE, AND ZINC OXIDE.•
AD-713 181

FILMS
REPRINT: SOLID SOLUTIONS OF CADMIUM SULFIDE-CADMIUM SELENIDE FILMS: PREPARATION AND DETERMINATION BY X-RAY FLUORESCENCE METHOD.
AD-695 110

LUMINESCENCE
REPRINT: EXCITON-EXCITON INTERACTION IN CDS, CDSE, AND ZNO.
AD-707 555

PUMPING(OPTICAL)
PHYSICS OF STIMULATED EMISSION IN II-VI SEMICONDUCTING COMPOUNDS.•
AD-710 988

TRANSPORT PROPERTIES
REPRINT: PHONON COUPLING IN

EDGE EMISSION AND PHOTOCONDUCTIVITY OF CDSE, CDS, AND CDISE SUB X S SUB 1-X),
AD-656 151

TRIODES
SINGLE CRYSTAL CADMIUM SULFIDE AND CADMIUM SELENIDE INSULATED-GATE FIELD-EFFECT TRIODES.*
AD-651 614

*CADMIUM SULFIDES
BAND SPECTRUM
REPRINT: EDGE EMISSION BANDS IN HIGH-PURITY CADMIUM SULFIDE.
AD-734 464

BAND THEORY OF SOLIDS
REPRINT: CONVERGENCE STUDY OF A SELF-CONSISTANT ORTHOGONALIZED-PLANE-WAVE BAND CALCULATION FOR HEXAGONAL CDS.
AD-667 022
REPRINT: THE EDGE EMISSION BANDS IN CADMIUM SULFIDE.
AD-685 873
REPRINT: USE OF SUPERCONDUCTING CAVITIES TO RESOLVE CARRIER TRAPPING EFFECTS IN CDS.
AD-694 688
SELF CONSISTENT ORTHOGONALIZED PLANEWAVE ENERGY BAND MODEL FOR CUBIC ZNS, ZNSE, CDS AND CDSE.*
AD-859 726

BRILLOUIN ZONES
LATTICE DYNAMICS OF CDS. I. NEAREST NEIGHBOR APPROXIMATION.*
AD-701 043

CARRIERS(SEMICONDUCTORS)
REPRINT: OSCILLATIONS IN EXCITON EMISSION IN THE EXCITATION SPECTRA OF ZNSE AND CDS.
AD-685 674

CHEMICAL ANALYSIS
ANALYTICAL TECHNIQUES FOR THE DETERMINATION OF TRACE IMPURITIES IN CADMIUM SULFIDE.*
AD-676 043

COHERENT RADIATION
REPRINT: SIMULATED EMISSION SPECTRA OF CDS PLATELETS UNDER VARIOUS EXCITATION LEVELS.
AD-724 818

CRYSTAL GROWTH
REPRINT: REVUE TECHNIQUE THOMSON-CSF. VOLUME 1, NUMERO 3.
AD-700 891
RESEARCH ON IMPROVED II-VI CRYSTALS.*
AD-727 048

CRYSTAL STRUCTURE
RECOVERY OF ROCKSALT STRUCTURE CDS TO ROOM PRESSURE.*
AD-660 760

CRYSTALLOGRAPHY
RESEARCH ON IMPROVED II-VI CRYSTALS.*
AD-660 874
RESEARCH ON IMPROVED II-VI CRYSTALS.*
AD-666 406

CYCLOTRON RESONANCE PHENOMENA
REPRINT: PIEZOELECTRIC POLARON-CYCLOTRON RESONANCE IN THE QUANTUM LIMIT IN N-CDS.
AD-706 802

DIODES(SEMICONDUCTOR)
CADMIUM SULFIDE PLATELET CURRENT INJECTION ELECTROLUMINESCENT DIODES.*
AD-857 495

DOPING
SYNTHESIS AND CHARACTERIZATION OF THIN FERROELECTRIC AND SEMICONDUCTING FILMS.*
AD-706 097

ELECTRIC CURRENTS
REPRINT: ACOUSTOELECTRIC AFTERCURRENT IN PHOTOCONDUCTING CDS.
AD-721 761

ELECTRIC FIELDS
FIELD ENHANCED IONIZATION OF TRAPS.*
AD-666 025
REPRINT: FIELD DISTRIBUTION AND CURRENT SATURATION IN PHOTOCONDUCTIVE CDS.
AD-678 247

ELECTRICAL CONDUCTANCE
CHANGE OF ELECTRICAL CONDUCTIVITY OF CDS SINGLE CRYSTALS DURING HEAT TREATMENTS IN SULFUR VAPOR BETWEEN 500 AND 700C.*
AD-648 169
REPRINT: SEMICONDUCTIVITY OF CDS AS A FUNCTION OF S-VAPOR PRESSURE DURING HEAT TREATMENT BETWEEN 500 DEGREES AND 700 DEGREES C.
AD-689 060
SURFACE CONDUCTION IN CDS.*
AD-695 823
REPRINT: TRAP-CONTROLLED FIELD INSTABILITIES IN PHOTOCONDUCTING CDS CAUSED BY FIELD-QUENCHING.
AD-699 721
REPRINT: FIELD QUENCHING AS MECHANISM OF NEGATIVE DIFFERENTIAL CONDUCTIVITY IN PHOTOCONDUCTING CDS.
AD-716 097
AG DOPING OF CADMIUM SULFIDE AND ITS INFLUENCE ON ELECTRICAL PROPERTIES.*
AD-728 387
AN INVESTIGATION OF THE SEMICONDUCTOR-TO-METAL TRANSITION IN CHLORINE DOPED CADMIUM SULFIDE USING NUCLEAR MAGNETIC RESONANCE.*
AD-728 648

ELECTRICAL PROPERTIES
ACOUSTOELECTRIC OSCILLATIONS; CURRENT SATURATION AND ELECTRON DRIFT MOBILITY IN CADMIUM SULPHIDE CRYSTALS.*
AD-654 003
DESORPTION OF OXYGEN AND ITS EFFECTS ON THE ELECTRICAL PROPERTIES OF CDS SINGLE CRYSTAL PLATELETS.*
AD-688 904
THE INFLUENCE OF CHEMISORPTION ON THE ELECTRONIC PROPERTIES OF THIN SEMICONDUCTORS: OXYGEN CHEMISORPTION ON THE (11-20) SURFACE OF CDS.*
AD-688 945

EPITAXIAL GROWTH
REPRINT: GROWTH AND PROPERTIES OF STEEPLY GRADED ZN(F)CD(1-F)S CRYSTALS.
AD-724 886

EXCITATION
THERMALLY AND OPTICALLY STIMULATED PHENOMENA IN CADMIUM-SULFIDE SINGLE CRYSTALS--TRANSLATION.
AD-673 810

EXCITONS
REPRINT: EMISSION FROM EXCITED TERMINAL STATES OF BOUND EXCITON COMPLEXES.
AD-696 104
LUMINESCENCE STUDY OF EXCITON-EXCITON INTERACTION IN CADMIUM SULFIDE, CADMIUM SELENIDE, AND ZINC OXIDE.*
AD-713 181
REPRINT: SHORT WAVELENGTH IMPURITY EXCITON TRANSITIONS IN CDS AT 1.2 K.
AD-717 526
REPRINT: KINETICS OF EXCITONS IN CDS AT TEMPERATURE.
AD-718 162

FIELD EMISSION
REPRINT: FIELD-AND PHOTON-ENHANCED FIELD EMISSION FROM THIN-FILM FIELD-EMISSION DEVICES.
AD-679 946

FIELD THEORY
STUDY OF LAYER-LIKE FIELD INHOMOGENEITIES IN CDS USING FRANZ-KELDYSH EFFECT.*
AD-647 312

FILMS
RESEARCH ON THE MECHANISM OF THE PHOTOVOLTAIC EFFECT IN HIGH-EFFICIENCY CDS THIN-FILM SOLAR CELLS.*
AD-661 587
REPRINT: SOLID SOLUTIONS OF CADMIUM SULFIDE-CADMIUM SELENIDE FILMS: PREPARATION AND DETERMINATION BY X-RAY FLUORESCENCE METHOD.
AD-695 110

HALL EFFECT
REPRINT: ELECTRON MOBILITY IN CDS AT HIGH ELECTRIC FIELDS.
AD-689 057

INFRARED RADIATION
INFRARED MEASUREMENTS ON CDS THIN FILMS DEPOSITED ON ALUMINUM.*
AD-684 160
REPRINT: ANOMALOUS FAR INFRARED MAGNETOABSORPTION IN N-TYPE CADMIUM SULFIDE.
AD-726 634

LASERS
REPRINT: HIGH POWER AND EFFICIENCY IN CDS ELECTRON BEAM PUMPED LASERS.
AD-653 384

LIGHT TRANSMISSION
REPRINT: GENERALIZED PRINCIPAL ANGLE OF INCIDENCE AND CRITICAL ANGLE.
AD-720 497

LINE SPECTRUM
REPRINT: DONOR-ACCEPTOR PAIR RECOMBINATION SPECTRA IN CADMIUM SULFIDE CRYSTALS.
AD-708 638
REPRINT: PHONON SIDEBANDS ON BOUND EXCITON TRANSITIONS IN CDS AND ZNO.
AD-716 895

LUMINESCENCE
PHOTOLUMINESCENT PROPERTIES OF VACUUM DEPOSITED CADMIUM SULFIDE FILMS.*
AD-700 269
ANTI-STOKES EXCITED EDGE EMISSION IN CADMIUM SULPHIDE.*
AD-707 173
REPRINT: EXCITON-EXCITON INTERACTION IN CDS, CDSE, AND ZNO.
AD-707 555
REPRINT: OSCILLATORY PHOTOCONDUCTIVE AND EXCITATION SPECTRA OF CDS AND ZNSE.
AD-728 544

NEGATIVE RESISTANCE CIRCUITS
EFFECTIVE WORK FUNCTION OF METAL CONTACTS TO VACUUM-CLEAVED PHOTOCONDUCTING CDS FOR HIGH PHOTOCURRENTS.*
AD-697 002

NUCLEAR MAGNETIC RESONANCE
REPRINT: CONDUCTION ELECTRON HYPERFINE INTERACTION IN SEMICONDUCTING CDS.
AD-716 896
REPRINT: NUCLEAR-MAGNETIC-RESONANCE STUDIES OF THE SEMICONDUCTOR-TO-METAL TRANSITION IN CHLORINE-DOPED CADMIUM SULFIDE.
AD-734 466

OPTICAL PROPERTIES
THE OPTICAL PROPERTIES OF THIN SINGLE-CRYSTAL CDS FILMS IN A WIDE SPECTRAL INTERVAL--TRANSLATION.
AD-727 544
COMPARISON OF ULTRAVIOLET REFLECTIVITY AND CHARACTERISTIC ELECTRON ENERGY LOSS MEASUREMENTS OF ZNO AND CDS SINGLE CRYSTALS.*
AD-858 005

PHASE STUDIES
REPRINT: TRANSITIONS BETWEEN CLASS I AND CLASS II CDS CRYSTALS INDUCED BY HEAT-TREATMENT, OXYGEN DE/ADSORPTION AND ELECTRON BOMBARDMENT.
AD-708 818

PHONONS
REPRINT: BOUND-PHONON QUASIPARTICLE IN CDS.
AD-734 462

PHOTOCONDUCTIVITY
REPRINT: OSCILLATORY PHASE OF PHOTOCONDUCTIVITY OF CDS.
AD-685 676
REPRINT: THERMAL LENS EFFECT IN CDS.
AD-706 819
REPRINT: CURRENT SATURATION IN CDS FILMS AT VARIOUS TEMPERATURES.
AD-723 373
ELECTRONIC ENERGY STATES OF DISLOCATIONS IN CDS-TYPE SEMICONDUCTORS.*
AD-730 133
REPRINT: DETERMINATION OF FIELD-DEPENDENT CARRIER DENSITY AND MOBILITY IN PHOTOCONDUCTORS USING HIGH-FIELD DOMAINS.
AD-730 237
BI-STABLE ELECTROPHOTOGRAPHIC DISPLAY DEVICE.*
AD-732 301

PHOTOELECTRIC EFFECT
PROPERTIES OF P-N JUNCTIONS IN CADMIUM SULFIDE AND CONSTRUCTION OF PHOTOELECTRIC TRANSDUCERS--TRANSLATION.
AD-712 936

PREPARATION
IMPROVED II-VI CRYSTALS.*
AD-666 401
IMPROVED II-VI CRYSTALS.*
AD-666 402
IMPROVED II-VI CRYSTALS.*
AD-666 403
RESEARCH ON IMPROVED II-VI CRYSTALS.*
AD-666 404
RESEARCH ON IMPROVED II-VI CRYSTALS.*
AD-666 405
IMPROVED II-VI CRYSTALS.*
AD-667 576

RADIATION DAMAGE
PRODUCTION AND ANNEALING OF INTRINSIC DEFECTS IN X-RAY IRRADIATED CDS SINGLE CRYSTALS.*
AD-652 611
RADIATION DAMAGE EFFECTS IN ELECTRON IRRADIATED CADMIUM SULFIDE PLATELETS AT LOW TEMPERATURE.*
AD-734 239

RAMAN SPECTROSCOPY
REPRINT: THEORY OF ENHANCED RAMAN SCATTERING AND VIRTUAL QUASIPARTICLES IN CRYSTALS.
AD-650 244
REPRINT: RESONANT CANCELLATION OF RAMAN SCATTERING FROM CDS AND SI.
AD-715 167
AN EXPERIMENTAL STUDY OF THE VIBRONIC AND ELECTRONIC RESONANCE RAMAN EFFECT IN SEMICONDUCTOR AND GARNET CRYSTALS.*
AD-722 701
REPRINT: MULTIPLE-PHONON RESONANT RAMAN SCATTERING THEORY.
AD-723 713

RESISTANCE(ELECTRICAL)
REPRINT: OPTICAL PROBING OF RESISTIVITY PROFILES IN CDS AND THEIR RELATION WITH ACOUSTOELECTRIC CURRENT OSCILLATIONS.
AD-728 916

SEMICONDUCTING FILMS
RESEARCH ON THE MECHANISM OF THE PHOTOVOLTAIC EFFECT IN HIGH-EFFICIENCY CDS THIN-FILM SOLAR CELLS.*
AD-678 540
RESEARCH ON THE MECHANISM OF THE PHOTOVOLTAIC EFFECT IN HIGH-EFFICIENCY CDS THIN-FILM SOLAR CELLS.*
AD-678 541
RESEARCH ON THE MECHANISM OF THE PHOTOVOLTAIC EFFECT IN HIGH-EFFICIENCY CDS THIN-FILM SOLAR CELLS.*
AD-678 542

TEMPERATURE DEPENDENCE OF THE RESISTIVITY AND HALL EFFECT OF THIN CDS FILMS.
AD-681 719
REPRINT: DISPERSIVE AND NONDISPERSIVE X-RAY FLUORESCENCE METHODS FOR THE MEASUREMENT OF THE THICKNESS OF FILMS OF CADMIUM SULFIDE AND OTHER II-VI COMPOUNDS.
AD-700 554

SINGLE CRYSTALS
GROWTH OF SINGLE CRYSTAL PLATELETS OF CADMIUM SULFIDE.
AD-688 903

SOLAR CELLS
REPRINT: PERFORMANCE OF CADMIUM SULFIDE THIN FILM SOLAR CELLS IN A SPACE ENVIRONMENT.
AD-694 893

SPACE CHARGES
REPRINT: STATIONARY ANODE-ADJACENT HIGH-FIELD DOMAINS IN CADMIUM SULFIDE.
AD-675 664

SPECTROSCOPY
TUNNELING SPECTROSCOPY STUDY OF GAAS, CDS AND ZNO SCHOTTKY BARRIER JUNCTIONS.
AD-675 370

STRESSES
REPRINT: EFFECT OF STRESS ON CDS SINGLE CRYSTALS.
AD-661 882

SURFACE PROPERTIES
REPRINT: CONTROL OF THE SURFACE POTENTIAL OF EVAPORATED CDS LAYERS.
AD-656 954
REPRINT: SURFACE MORPHOLOGY OF SUBLIMATED CRYSTALS OF CADMIUM AND ZINC SULFIDES.
AD-713 837

SYNTHESIS
REPRINT: THE ANODIC SYNTHESIS OF CDS FILMS.
AD-676 448

TRANSPORT PROPERTIES
REPRINT: NEW KIND OF FIELD INSTABILITY IN CDS IN THE RANGE OF NEGATIVE DIFFERENTIAL RESISTIVITY.
AD-655 559
REPRINT: PHONON COUPLING IN EDGE EMISSION AND PHOTOCONDUCTIVITY OF CDSE, CDS, AND CDISE SUB X S SUB 1-X).
AD-656 151
SLOW MOVING FIELD DOMAINS IN CDS IN THE RANGE OF NEGATIVE DIFFERENTIAL CONDUCTIVITY.
AD-656 745
CHARACTERISTIC FIELD INHOMOGENEITIES IN HOMOGENEOUS DIELECTRICS IN THE PRE-BREAKDOWN RANGE.
AD-659 777
PHOTOMAGNETOELECTRIC EFFECT OF CDS SINGLE CRYSTALS AND OF BISMUTH ROLLED FOILS.
THERMOMAGNETUELECTRIC EFFECT OF CONTACTS BI-CU, GE-CU AND SI-CU.
AD-660 142
STATIONARY HIGH FIELD DOMAINS IN THE RANGE OF NEGATIVE DIFFERENTIAL CONDUCTIVITY IN CDS SINGLE CRYSTALS.
AD-661 192

TRIODES
SINGLE CRYSTAL CADMIUM SULFIDE AND CADMIUM SELENIDE INSULATED-GATE FIELD-EFFECT TRIODES.
AD-651 614

ULTRASONIC RADIATION
REPRINT: A. ULTRASONIC DISPERSION IN PIEZOELECTRIC SEMI-CONDUCTORS. B. NONLINEAR SOUND TRANSMISSION THROUGH AN ORIFICE.
AD-705 726
REPRINT: ENHANCEMENT OF THE PIEZOELECTRICALLY STIFFENED ULTRASONIC VELOCITY BY ELECTRON TRAPPING IN CDS.
AD-712 914

*CARBON
PARAMAGNETIC RESONANCE
REPRINT: CARBON E'R SIGNAL FROM VACUUM HEATED SURFACES.
AD-728 564

*CARRIERS(SEMICONDUCTORS)
CYCLOTRON RESONANCE PHENOMENA
REPRINT: CYCLOTRON RESONANCE OF PIEZOELECTRIC POLARONS IN THE QUANTUM LIMIT.
AD-675 972

ELECTRIC FIELDS
REPRINT: ELECTRIC FIELD EFFECTS IN TRAPPING PROCESSES.
AD-637 919

INTERACTIONS
FIELD ENHANCED IONIZATION OF TRAPS.*
AD-666 026

LIFE EXPECTANCY
REPRINT: USE OF SUPERCONDUCTING CAVITIES TO RESOLVE CARRIER TRAPPING EFFECTS IN CDS.
AD-694 688

MATHEMATICAL ANALYSIS
REPRINT: DETERMINATION OF ELECTRON TRAPPING PARAMETERS.
AD-631 791

MOBILITY
REPRINT: ELECTRON MOBILITY IN CDS AT HIGH ELECTRIC FIELDS.
AD-689 057
REPRINT: INFLUENCE OF BOUNDARY CONDITIONS ON HIGH-FIELD DOMAINS IN GUNN DIODES.
AD-706 455

PHOTOCONDUCTIVITY
REPRINT: FURTHER CONSIDERATIONS ON A THEORY OF SUPERLINEARITY IN CDS AND RELATED MATERIALS.
AD-631 744

PROPAGATION
REPRINT: UNIFORMLY PROPAGATING SOLUTIONS OF TRANSPORT AND POISSON EQUATIONS FOR PERIODIC FIELD DOMAINS.
AD-655 248

QUANTUM STATISTICS
RESEARCH IN EXPERIMENTAL AND THEORETICAL PHYSICS.*
AD-683 612

RECOMBINATION REACTIONS
REPRINT: DONOR-ACCEPTOR PAIR RECOMBINATION SPECTRA IN CADMIUM SULFIDE CRYSTALS.
AD-708 638

TRANSPORT PROPERTIES
REPRINT: CRITICAL CONDITIONS FOR TRANSITIONS BETWEEN STATIONARY AND NON-STATIONARY HIGH-FIELD DOMAINS IN SEMI-INSULATORS.
AD-689 059

*CATALYSTS
SURFACE PROPERTIES
STUDY OF SURFACE PROPERTIES OF ATOMICALLY-CLEAN METALS AND SEMICONDUCTORS. PART I. STUDY OF CDS SURFACES BY LEED. PART II. COMBINED LEED AND MASS SPECTROMETER MEASUREMENTS FOR ADSORPTION AND CATALYSIS.*
AD-630 863

*CATHODE RAY TUBE SCREENS
ELECTROQUENCHABLE PHOSPHOR INVESTIGATION*
AD-268 932

*CHEMISORPTION
SEMICONDUCTORS
REPRINT: PHOTO-HALL STUDIES OF OXYGEN ADSORPTION EFFECTS ON PHOTOCONDUCTIVITY IN SINTERED LAYERS.
AD-623 045
THE INFLUENCE OF CHEMISORPTION ON THE ELECTRONIC PROPERTIES OF THIN SEMICONDUCTORS: OXYGEN CHEMISORPTION ON THE (11-20) SURFACE OF CDS.*

AD-688 945
SORPTION-INDUCED CONDUCTIVITY CHANGES IN COMPOUND SEMICONDUCTORS.*
AD-726 177

*CIRCUITS
FORMING OF THIN FILM CIRCUITS AND SYSTEMS IN WHICH ELECTRONIC CIRCUIT ELEMENTS ARE INTEGRATED IN A MATERIAL MATRIX TO A DEGREE WHERE ELEMENTAL APPEARANCES ARE LOST.
AD-284 671

*COHERENT RADIATION
FOCUSING
REPRINT: THERMAL LENS EFFECT IN CDS.
AD-706 819

*COMPUTER LOGIC
INTEGRATED CIRCUITS
ACTIVE LOGIC ELEMENTS USING NON-GALVANIC MODIFYING INPUTS.
AD-610 395

*COMPUTER PROGRAMS
ELECTRICAL ENGINEERING
DESIGN OF MICROWAVE FILTER NETWORKS.*
AD-627 402

*COMPUTERS
INTEGRATED CIRCUITS
ACTIVE LOGIC ELEMENTS USING NON-GALVANIC MODIFYING INPUTS.
AD-630 022

*COPPER
INVESTIGATION OF SEMICONDUCTING PROPERTIES OF II-VI COMPOUNDS*
AD-264 310

*CORROSION
FRACTURE (MECHANICS)
STRESS CORROSION CRACKING IN HIGH STRENGTH FERROUS ALLOYS.*
AD-423 387

*CRYOGENICS
RESEARCH IN CRYOGENICS AND MAGNETO-OPTICS. MAGNETO-OPTICAL AND MAGNETIC SUSCEPTIBILITY RESEARCH SYSTEM AT THE AERONAUTICAL RESEARCH LABORATORIES. DOPED CDS AND ZNS SINGLE CRYSTALS AS ULTRA-LOW TEMPERATURE PARAMAGNETIC SALTS. POSSIBILITY OF OBSERVING THE MOLECULAR SPECTRA ASSOCIATED WITH IMPURITY-EXCITON COMPLEXES IN CDS AND CDSE.
AD-292 324

*CRYSTAL DETECTORS
UNCOOLED IR DETECTOR FOR THE TEN MICRON REGION: EXCITONS IN CADMIUM SULFIDE.
AD-297 203

*CRYSTAL GROWTH
CADMIUM COMPOUNDS
RESEARCH ON IMPROVED II-VI CRYSTALS.*
AD-679 666

SEMICONDUCTORS
ELECTRONICALLY ACTIVE MATERIALS RESEARCH. GROUP III-V COMPOUND SEMICONDUCTORS, SEMIMETALS AND LOW BAND-GAP SEMICONDUCTORS. PHONON INTERACTIONS, OPTICAL PROPERTIES, REFRACTORY MATERIALS.
AD-432 272
RESEARCH IN PURIFICATION AND SINGLE CRYSTAL GROWTH OF II-VI COMPOUNDS.
AD-619 279
RESEARCH ON II-VI COMPOUNDS SEMICONDUCTORS; PURIFICATION, CRYSTAL GROWTH, LUMINESCENCE, AND FUNDAMENTAL PROPERTIES.
AD-620 297
RESEARCH IN PURIFICATION AND SINGLE CRYSTAL GROWTH OF II-VI COMPOUNDS.*
AD-651 140
RESEARCH IN PURIFICATION AND SINGLE GROWTH OF II-VI COMPOUNDS.*
AD-657 045
IMPROVED II-VI CRYSTALS.*
AD-666 402

IMPROVED II-VI CRYSTALS.*
AD-666 403
RESEARCH ON IMPROVED II-VI CRYSTALS.*
AD-666 404
RESEARCH ON IMPROVED II-VI CRYSTALS.*
AD-666 405
RESEARCH IN PURIFICATION AND SINGLE CRYSTAL GROWTH OF II-VI COMPOUNDS.*
AD-679 636
RESEARCH IN PURIFICATION AND SINGLE CRYSTAL GROWTH OF II-VI COMPOUNDS.*
AD-709 890
RESEARCH ON IMPROVED II-VI CRYSTALS.*
AD-725 062
RESEARCH ON IMPROVED II-VI CRYSTALS.*
AD-727 048

SINGLE CRYSTALS
RESEARCH IN PURIFICATION AND SINGLE CRYSTAL GROWTH OF II-VI COMPOUNDS.
AD-634 091
RESEARCH IN PURIFICATION AND SINGLE CRYSTAL GROWTH OF II-VI COMPOUNDS.*
AD-642 450
GROWTH OF SINGLE CRYSTAL PLATELETS OF CADMIUM SULFIDE.*
AD-688 903

SUBLIMATION
REPRINT: SURFACE MORPHOLOGY OF SUBLIMATED CRYSTALS OF CADMIUM AND ZINC SULFIDES.
AD-713 837

*CRYSTAL LATTICE DEFECTS
CADMIUM SULFIDES
PRODUCTION AND ANNEALING OF INTRINSIC DEFECTS IN X-RAY IRRADIATED CDS SINGLE CRYSTALS.*
AD-652 611

DIFFUSION
STATUS OF DIFFUSION DATA FOR BINARY COMPOUND SEMICONDUCTORS.*
AD-670 014

LUMINESCENCE
REPRINT: THEORETICAL ASPECTS OF POINT AND ASSOCIATED LUMINESCENT CENTERS.
AD-680 583

SEMICONDUCTORS
REPRINT: RARE EARTH IMPURITIES IN II-VI COMPOUNDS.
AD-667 094
REPRINT: SEMICONDUCTIVITY OF CDS AS A FUNCTION OF S-VAPOR PRESSURE DURING HEAT TREATMENT BETWEEN 500 DEGREES AND 700 DEGREES C.
AD-689 060

*CRYSTAL OSCILLATORS
ILLUMINATION
REPRINT: MONOCHROMATIC ILLUMINATION OF CADMIUM-SULFIDE OSCILLATOR.
AD-641 711

TUNING DEVICES
REPRINT: CIRCUIT-CONTROLLED MODES OF ACOUSTOELECTRIC OSCILLATIONS IN PIEZOELECTRIC SEMICONDUCTORS.
AD-684 901

*CRYSTAL RECTIFIERS
PHOTOCONDUCTIVITY
TRANSLATION OF RUSSIAN RESEARCH INVESTIGATING THE EFFECT OF GAMMA-RAYS, X-RAYS AND NEUTRONS ON ELECTRIC PROPERTIES OF CDS-SE AND CDSE-SE RECTIFYING SYSTEMS.
AD-615 868

*CRYSTAL STRUCTURE
CADMIUM SULFIDES
RECOVERY OF ROCKSALT STRUCTURE CDS TO ROOM PRESSURE.*
AD-660 760

HIGH-PRESSURE RESEARCH
REPRINT: CRYSTAL CHEMISTRY OF

NEW HIGH-PRESSURE PHASES.
AD-665 876

PROTON SCATTERING
REPRINT: PROTON BLOCKING PATTERNS FOR HCP AND WURTZITE STRUCTURES.
AD-687 673

•CRYSTALS
INVESTIGATION OF CARRIER INJECTION ELECTROLUMINESCENCE.
AD-259 366
SOLID STATE RADIATION DETECTORS WERE CONSTRUCTED USING CRYSTAL PLATELETS OF CDS. BOTH INTRINSIC AND P-N JUNCTION DETECTORS WERE MADE ANDEVALUATED.
AD-284 020
SOLAR CELL ARRAY OPTIMIZATION. RESEARCH AND FABRICATION PHASES OF THIS WORK WERE DIRECTED TOWARDS DEMONSTRATING THE POTENTIAL OF LARGE AREA, THIN-FILM CADMIUM SULFIDE PHOTOVOLTAIC MATERIALS. POWER-TO-WEIGHT RATIO FOR FOUR-INCH SQUARE CELLS APPROACHES 20 WATTS/LB.
AD-295 558
HALL EFFECT MEASUREMENTS IN INSULATORS, A 'TIME-OF-FLIGHT' METHOD OF STUDYING CARRIER TRANSPORT IN INSULATORS, A GENERAL ANALYSIS OF UNIPOLAR STEADY STATE SPACE CHARGE LIMITED CURRENTS IN INSULATORS, ORGANIC SEMICONDUCTORS, AND CDS ARE TOPICS INVESTIGATED IN PHOTOCONDUCTOR RESEARCH.
AD-296 659

OPTICAL PROPERTIES
OPTICAL PROPERTIES OF SEMICONDUCTING CRYSTALS.
AD-603 374

RADIATION DAMAGE
SURVEY OF SOVIET-BLOC LITERATURE: ABSTRACTS ON RADIATION DAMAGE IN SEMICONDUCTORS, IONIC CRYSTALS, AND OTHER MATERIALS.
AD-604 341

RAMAN SPECTROSCOPY
REPRINT: THEORY OF ENHANCED RAMAN SCATTERING AND VIRTUAL QUASIPARTICLES IN CRYSTALS.
AD-650 244

•CYCLOTRON RESONANCE PHENOMENA
CARRIERS(SEMICONDUCTORS)
REPRINT: CYCLOTRON RESONANCE OF PIEZOELECTRIC POLARONS IN THE QUANTUM LIMIT.
AD-675 772

PHONONS
REPRINT: CYCLOTRON RESONANCE OF PIEZOELECTRIC POLARONS.
AD-635 332

SEMICONDUCTORS
CYCLOTRON RESONANCE EXPERIMENTS.
AD-639 396

•DELAY LINES
ARMY RESEARCH
FERROMAGNETIC, FERROELECTRIC AND ACOUSTIC DEVICES, QUARTERLY REPORT NO. 1.
AD-475 206

FEASIBILITY STUDIES
REPRINT: SURFACE ELASTIC WAVES.
AD-721 786

MICROWAVE FREQUENCY
MICROWAVE ACOUSTIC DELAY LINE AND RELATED ACTIVE DEVICES.
AD-604 250
ELECTROACOUSTIC DELAY LINES FOR MICROWAVE FREQUENCIES.
AD-671 689
GENERATION AND PROPAGATION OF HYPERSONIC WAVES AND THEIR APPLICATIONS TO MICROWAVE FREQUENCIES.
AD-725 995

PULSE COMPRESSION
IMPROVED DELAY LINE TECHNIQUES

STUDY.
AD-617 693

•DETECTORS
SOLID STATE RADIATION DETECTORS WERE CONSTRUCTED USING CRYSTAL PLATELETS OF CDS. BOTH INTRINSIC AND P-N JUNCTION DETECTORS WERE MADE ANDEVALUATED.
AD-284 020

NUCLEAR PARTICLES
FEASIBILITY OF CDS FOR SOLID STATE DETECTOR APPLICATION; ALPHA AND PHOTON IRRADIATION; MOBILITY-LIFETIME VALUES OF ELECTRRAPPING OF CARRIERS; PLASMA FORMATION.
AD-418 116

•DIELECTRIC FILMS
FORMING OF THIN FILM CIRCUITS AND SYSTEMS IN WHICH ELECTRONIC CIRCUIT ELEMENTS ARE INTEGRATED IN A MATERIAL MATRIX TO A DEGREE WHERE ELEMENTAL APPEARANCES ARE LOST.
AD-288 571

•DIELECTRICS
RAMAN SPECTROSCOPY
REPRINT: POLARITON THEORY OF RAMAN SCATTERING IN INSULATING CRYSTALS. II.
AD-720 030

•DIODES (SEMICONDUCTOR)
LUMINESCENCE
SEMICONDUCTOR DEVICE CONCEPTS.•
AD-426 258

METAL FILMS
THIN FILM ACTIVE DEVICES, METAL INTERFACE AMPLIFIER, MEA STRUCTURE, MOS DIODES. INVESTIGATION OF HOT ELECTRON STRUCTURES INVOLVING METALSEMICONDUCTOR INTERFACES FOR EMITTERS AND/OR COLLECTORS.
AD-408 472

•DIODES(SEMICONDUCTOR)
ELECTROLUMINESCENCE
A STUDY OF ELECTROLUMINESCENT CADMIUM SULFIDE DIODES.•
AD-681 705
CADMIUM SULFIDE PLATELET CURRENT INJECTION ELECTROLUMINESCENT DIODES.•
AD-857 495

MICROWAVE OSCILLATORS
REPRINT: INFLUENCE OF BOUNDARY CONDITIONS ON HIGH-FIELD DOMAINS IN GUNN DIODES.
AD-706 455

NOISE(RADIO)
REPRINT: ON THE LIMITING NOISE OF SPACE-CHARGE-LIMITED SOLID STATE DIODES.
AD-672 139

SURFACE PROPERTIES
SURFACE STATES AND BARRIER HEIGHT IN METAL-SEMICONDUCTOR SURFACE BARRIER DIODE.
AD-467 489

•DISPLAY SYSTEMS
ELECTROLUMINESCENCE
DC-ELECTROLUMINESCENT FLAT PANEL DISPLAY.•
AD-735 342

PHOTOELECTRIC MATERIALS
BI-STABLE ELECTROPHOTOGRAPHIC DISPLAY DEVICE.•
AD-732 301

•DOPING
SEMICONDUCTORS
DOPING OF SEMICONDUCTORS AND SEMICONDUCTING FILM. VOLUME I.•
AD-687 900

•ELECTRIC FIELDS
RESEARCH ON SEMICONDUCTOR SURFACES. 1. THE ANOMALOUS FIELD EFFECT IN GERMANIUM. 2. THE FIELD EFFECT IN CADMIUM SULFIDE.
AD-256 674

SEMICONDUCYORS

SURFACE PINNED LAYER-LIKE FIELD INHOMOGENEITIES IN CDS.*
AD-637 856
REPRINT: ELECTRIC FIELD EFFECTS IN TRAPPING PROCESSES.
AD-637 919

TRANSISTORS
RESEARCH AND DEVELOPMENT FOR FIELD EFFECT TRIODES AND SPACE CHARGE LIMITED TRIODES.*
AD-442 774

*ELECTRIC POWER PRODUCTION
A NEW FORM OF SOLID STATE SOLAR GENERATOR*
AD-273 974

*ELECTRIC TERMINALS
SEMICONDUCTOR DEVICES
MULTILAYER OHMIC CONTACTS ON CDS.*
AD-636 420

WORK FUNCTIONS
EFFECTIVE WORK FUNCTION OF METAL CONTACTS TO VACUUM-CLEAVED PHOTOCONDUCTING CDS FOR HIGH PHOTOCURRENTS.*
AD-697 002

*ELECTROLUMINESCENCE
DIODES(SEMICONDUCTOR)
CADMIUM SULFIDE PLATELET CURRENT INJECTION ELECTROLUMINESCENT DIODES.*
AD-457 496

SEMICONDUCTOR DEVICES
INVESTIGATION OF CARRIER INJECTION ELECTROLUMINESCENCE.*
AD-426 463

SEMICONDUCTORS
CARRIER INJECTION ELECTROLUMINESCENCE: LUMINESCENT JUNCTIONS IN WIDE-GAP SEMICONDUCTORS: TUNNEL INJECTION ELECTROLUMINESCENCE: A GALLIUM ARSENIDE-GALLIUM PHOSPHIDE LIGHT SOURCE: EVAPORATED ZNSE AND ZNTE FILMS AND CELLS.
AD-424 852
SEMICONDUCTOR DEVICE CONCEPTS.*
AD-426 258

*ELECTRON BEAMS
PUMPING(ELECTRONICS)
ELECTRON BEAM PUMPED SEMICONDUCTOR LASERS.*
AD-648 055

PUMPING(OPTICAL)
REPRINT: ELECTON-BEAM PUMPED LASERS OF CDSE AND CDS.
AD-642 201

*ELECTRON BOMBARDMENT
STUDY OF THE RADIATIVE RECOMBINATION OF FREE CARRIERS PRODUCED BY ELECTRONIC BOMBARDMENT OF CADMIUM SULPHIDE.
AD-403 786

SINGLE CRYSTALS
LENGTH CHANGE MEASUREMENTS OF ELECTRON IRRADIATED CADMIUM SULFIDE IN THE ENERGY RANGE 275-935 KEV.
AD-616 684

*ELECTRON MICROSCOPY
TEST METHODS
REPRINT: TIME-RESOLVED SCANNING ELECTRON MICROSCOPY AND ITS APPLICATION TO BULK-EFFECT OSCILLATORS.
AD-706 505

*ELECTRON TRANSITIONS
RESEARCH ON SEMICONDUCTOR SURFACES. 1. THE ANOMALOUS FIELD EFFECT IN GERMANIUM. 2. THE FIELD EFFECT IN CADMIUM SULFIDE.
AD-256 674
ELECTRON MOBILITY IN CADMIUM SULPHIDE SINGLE CRYSTALS AT LOW TEMPERATURES.
AD-259 661

*ELECTRONS
THE ELECTRON MOBILITY OF CDS WAS PLOTTED AS A FUNCTION OF 1/T

BETWEEN 0 AND 293 K. ANALYSIS OF THE DATA INDICATES THAT A MEASURABLE ANISOTROPY IN THE ELECTRON MOBILITY EXISTS AND THAT A REVERSAL OF THIS ANISOTROPY OCCURS AT APPROXIMATELY 30 K.
AD-283 953

HEAT
INVESTIGATION OF HOT ELECTRON EMITTER.*
AD-433 894

*ELECTROOPTICS
CADMIUM SULFIDES
REPRINT: FIELD DISTRIBUTION AND CURRENT SATURATION IN PHOTOCONDUCTIVE CDS.
AD-678 247

*EMISSIVITY
ELECTRONS
INVESTIGATION OF HOT ELECTRON EMITTER.*
AD-433 894

*EPITAXIAL GROWTH
MOLECULAR ELECTRONICS
MATERIAL PROCESSING AND PHENOMENAI INVESTIGATION OF FUNCTIONAL ELECTRONIC BLOCKS.
AD-409 475

SEMICONDUCTING FILMS
MATERIAL PROCESSING AND PHENOMENA INVESTIGATION OF FUNCTIONAL ELECTRONIC BLOCKS.
AD-602 482
EPITAXIC SUBLIMATION METHODS FOR THE STUDY OF PSEUDO-BINARY SEMICONDUCTOR ALLOYS.*
AD-716 210

ZINC SULFIDES
REPRINT: GROWTH AND PROPERTIES OF STEEPLY GRADED ZNIFICDII-FIS CRYSTALS.
AD-724 886

*EXCITONS
CADMIUM SULFIDES
REPRINT: KINETICS OF EXCITONS IN CDS AT TEMPERATURE.
AD-718 162

ENERGY
REPRINT: CALCULATION OF THE EXCHANGE ENERGY FOR EXCITONS IN THE TWO BODY MODEL.
AD-716 892

INTERACTIONS
REPRINT: EXCITON-EXCITON INTERACTION IN CDS, CDSE, AND ZNO.
AD-707 555

LUMINESCENCE
REPRINT: EMISSION FROM EXCITED TERMINAL STATES OF BOUND EXCITON COMPLEXES.
AD-700 555

RAMAN SPECTROSCOPY
REPRINT: THEORY OF ENHANCED RAMAN SCATTERING AND VIRTUAL QUASIPARTICLES IN CRYSTALS.
AD-650 244

SEMICONDUCTORS
REPRINT: SPLITTING OF EXCITON LINES IN WURTZITE-TYPE II-VI CRYSTALS BY UNIAXIAL STRESS.
AD-672 467

*FAILURE (MECHANICS)
SEMICONDUCTING FILMS
FAILURE MECHANISMS AT SURFACES AND INTERFACES OF THIN FILM FIELD EFFECT TRIODES.
AD-613 036

*FERROELECTRIC MATERIALS
SYNTHESIS(CHEMISTRY)
SYNTHESIS AND CHARACTERIZATION OF THIN FERROELECTRIC AND SEMICONDUCTING FILMS.*
AD-706 097

*FIBER OPTICS
IMAGE TUBES
REPRINT: REVUE TECHNIQUE THOMSON-CSF. VOLUME 1, NUMERO 3,

AD-700 891

•FIELD EFFECT TRANSISTORS
ANALYSIS
RESEARCH IN EXPERIMENTAL AND THEORETICAL PHYSICS.•
AD-683 612

FILMS
THIN-FILM POLYCRYSTALLINE FIELD-EFFECT TRIODE.•
AD-645 262
THIN-FILM POLYCRYSTALLINE FIELD-EFFECT TRIODE.•
AD-659 788

GAIN
SINGLE CRYSTAL CADMIUM SULFIDE AND CADMIUM SELENIDE INSULATED-GATE FIELD-EFFECT TRIODES.•
AD-651 614

STATISTICAL MECHANICS
REPRINT: STATISTICAL CONSIDERATIONS IN MOSFET CALCULATIONS.
AD-657 274

•FIELD EMISSION
CADMIUM SULFIDES
REPRINT: FIELD-AND PHOTON-ENHANCED FIELD EMISSION FROM THIN-FILM FIELD-EMISSION DEVICES.
AD-679 946

•FIELD THEORY
CADMIUM SULFIDES
STUDY OF LAYER-LIKE FIELD INHOMOGENEITIES IN CDS USING FRANZ-KELDYSH EFFECT.•
AD-647 312

•FILMS
PHOTOELECTRIC MATERIALS
EVAPORATED AND RECRYSTALLIZED CDS LAYERS.•
AD-637 725

TRANSISTORS
METAL BASE TRANSISTOR II.•
AD-642 524

THIN-FILM POLYCRYSTALLINE FIELD-EFFECT TRIODE.•
AD-651 816

VAPOR PLATING
VAPOR DEPOSITED THIN FILM PIEZOELECTRIC TRANSDUCERS.
AD-613 540

•FLUORESCENCE
TEMPERATURE DEPENDENCE OF LINE STRUCTURE OF CDS EDGE EMISSION. MASTER'S THESIS.
AD-284 015

•FOILS
BISMUTH
PHOTO-MAGNETO-ELECTRIC STUDY OF CDS CRYSTALS. TRANSPORT PROPERTIES OF BISMUTH ROLLED THIN FOILS.
AD-603 490

•GALLIUM ALLOYS
ARSENIC ALLOYS
REPRINT: RADIATION EFFECTS IN GAAS.
AD-616 013

•GALLIUM ARSENIDES
SEMICONDUCTORS
JUNCTION EFFECTS IN COMPOUND SEMICONDUCTORS.•
AD-654 009

SPECTROSCOPY
TUNNELING SPECTROSCOPY STUDY OF GAAS, CDS AND ZNO SCHOTTKY BARRIER JUNCTIONS.•
AD-875 370

•GARNET
RAMAN SPECTROSCOPY
AN EXPERIMENTAL STUDY OF THE VIBRONIC AND ELECTRONIC RESONANCE RAMAN EFFECT IN SEMICONDUCTOR AND GARNET CRYSTALS.•
AD-722 701

•GAS LASERS
OPTICAL MATERIALS
GROWTH OF THIOSPINELS

(INVESTIGATION OF CRYSTALS FOR CO2 HIGH POWER LASER WINDOWS).•
AD-709 98d

•GENERATORS
A NEW FORM OF SOLID STATE SOLAR GENERATOR•
AD-273 974

•GERMANIUM
RESEARCH ON SEMICONDUCTOR SURFACES. 1. THE ANOMALOUS FIELD EFFECT IN GERMANIUM. 2. THE FIELD EFFECT IN CADMIUM SULFIDE•
AD-256 674

•GOLD
INVESTIGATION OF SEMICONDUCTING PROPERTIES OF II-VI COMPOUNDS•
AD-264 310

•HALL EFFECT
ELECTRON MOBILITY IN CADMIUM SULPHIDE SINGLE CRYSTALS AT LOW TEMPERATURES•
AD-259 661

CHEMISORPTION
REPRINT: PHOTO-HALL STUDIES OF OXYGEN ADSORPTION EFFECTS ON PHOTOCONDUCTIVITY IN SINTERED LAYERS•
AD-623 045

MEASUREMENT
PERFORMANCE OF PHOTOCONDUCTORS: MEASURING THE HALL EFFECT.
AD-411 383

•HIGH-PRESSURE RESEARCH
PHASE STUDIES
REPRINT: CRYSTAL CHEMISTRY OF NEW HIGH-PRESSURE PHASES.
AD-665 876

SEMICONDUCTORS
HIGH PRESSURE RESEARCH.
AD-626 734

•IMAGE CONVERTERS
INFRARED EQUIPMENT
STUDIES OF INFRARED IMAGE CONVERTER (SOLID-STATE TYPE AND VACUUM TYPE).•
AD-647 649

•IMAGE INTENSIFIERS (ELECTRONICS)
SANDWICH CONSTRUCTION
INVESTIGATION IN THE FIELD OF IMAGE INTENSIFICATION. •
AD-435 548

•IMAGE INTENSIFIERS(ELECTRONIC)
PREPARATION
APPLICATION OF LIGHT AND IMAGE INTENSIFICATION.
AD-604 742

•IMAGE INTENSIFIERS(ELECTRONICS)
PREPARATION
APPLICATION OF LIGHT AND IMAGE INTENSIFICATION.
AD-627 426

SEMICONDUCTOR DEVICES
SOLID STATE IMAGE INTENSIFIERS.•
AD-637 171

SOLID STATE PHYSICS
SOLID STATE IMAGE INTENSIFIERS.•
AD-642 933

•IMAGE TUBES
FIBER OPTICS
REPRINT: REVUE TECHNIQUE THOMSON-CSF. VOLUME 1, NUMERO 3.
AD-700 891

•IMPURITIES
SEMICONDUCTORS
ACOUSTIC AMPLIFICATION AND ELECTRON MOBILITY IN LITHIUM AND SODIUM DOPED CADMIUM SULFIDE.
AD-603 611

•INFRARED DETECTORS
UNCOOLED IR DETECTOR FOR THE TEN MICRON REGION: EXCITONS IN CADMIUM SULFIDE.
AD-297 203

•INFRARED EQUIPMENT

IMAGE CONVERTERS
STUDIES OF INFRARED IMAGE CONVERTER (SOLID-STATE TYPE AND VACUUM TYPE).*
AD-647 649

*INFRARED PHOTOCONDUCTORS
CRYOGENICS
LOW TEMPERATURE INFRARED PHOTOCONDUCTORS.*
AD-636 502

*INFRARED RADIATION
UNCOOLED IR DETECTOR FOR THE TEN MICRON REGION: EXCITONS IN CADMIUM SULFIDE.
AD-297 203

*INFRARED SPECTROSCOPY
SEMICONDUCTORS
OPTICAL STUDIES OF LATTICE VIBRATION IN II-VI SEMICONDUCTING COMPOUNDS.*
AD-676 649

SOLIDS
OPTICAL VIBRATION SPECTRA OF SOLIDS.
AD-626 395

*INFRARED WINDOWS
LASERS
GROWTH OF THIOSPINELS (INVESTIGATION OF CRYSTALS FOR CO2 HIGH POWER LASER WINDOWS).*
AD-709 988

*INTEGRATED CIRCUITS
GAAS EPITAXIAL DEPOSITION, SIO2 MASKING, DIFFUSION FROM SIO2 FILMS INTO GAAS: STUDY OF HIGH RESISTIVITY MECHANISMS, VOLTAGE BREAKDOWN ACROSS THIN LAYERS, MAXIMUM COMPONENT PACKING DENSITY, PREPARATION OF SINGLE CRYSTAL CDS AND LIGHT PRODUCING DIODES.
AD-400 290

COMPUTERS
ACTIVE LOGIC ELEMENTS USING NON-GALVANIC MODIFYING INPUTS.
AD-610 395
ACTIVE LOGIC ELEMENTS USING NON-GALVANIC MODIFYING INPUTS.
AD-630 022

DESIGN
A CENTER OF COMPETENCE IN SOLID STATE MATERIALS AND DEVICES.*
AD-729 908

SEMICONDUCTING FILMS
EVAPORATED THIN-FILM TECHNIQUES.*
AD-426 170

TRANSISTORS
ADVANCED FUNCTIONAL ELECTRONIC BLOCK DEVELOPMENT: THIN FILM TRANSISTORS AND THEIR APPLICATION IN INTEGRATED CIRCUITS.
AD-610 366

TUNING DEVICES
TUNED INTEGRATED CIRCUITS.*
AD-639 667
TUNED INTEGRATED CIRCUITS.*
AD-643 519

*INTERMETALLIC COMPOUNDS
SCIENTIFIC RESEARCH
SOLID STATE RESEARCH.
AD-632 998

*ION ACCELERATORS
OPERATION
REPRINT: REVUE TECHNIQUE THOMSON-CSF. VOLUME 1, NUMERO 3.
AD-700 891

*LASERS
CADMIUM SULFIDES
REPRINT: HIGH POWER AND EFFICIENCY IN CDS ELECTRON BEAM PUMPED LASERS.
AD-653 364

DESIGN
SEMICONDUCTOR DEVICE CONCEPTS.
AD-606 311

ELECTRON BOMBARDMENT
TRANSLATION OF RUSSIAN RESEARCH: OPTICAL QUANTUM CRYSTAL GENERATON WITH EXCITATION BY FAST ELECTRONS.
AD-620 973

INFRARED WINDOWS
GROWTH OF THIOSPINELS [INVESTIGATION OF CRYSTALS FOR CO2 HIGH POWER LASER WINDOWS].*
AD-709 988

INJECTION
INTERACTIONS OF COHERENT OPTICAL RADIATION WITH SOLIDS.
AD-431 975

LIGHT PULSES
REPRINT: PULSE STRETCHING UTILIZING TWO-PHOTON-INDUCED LIGHT ABSORPTION.
AD-709 779

PUMPING(ELECTRONICS)
ELECTRON BEAM PUMPED SEMICONDUCTOR LASERS.*
AD-648 055

SCIENTIFIC RESEARCH
SOLID STATE RESEARCH.
AD-632 998

SEMICONDUCTOR DEVICES
NEW SOLID-STATE DEVICE CONCEPTS.
AD-621 941
NEW SOLID-STATE DEVICE CONCEPTS.
AD-628 770
REPRINT: ELECTON-BEAM PUMPED LASERS OF CDSE AND CDS.
AD-642 201
REPRINT: COHERENT AND NONCOHERENT LIGHT EMISSION IN II-VI COMPOUNDS.
AD-661 907
PHYSICS OF STIMULATED EMISSION IN II-VI SEMICONDUCTING COMPOUNDS.*
AD-710 986

SEMICONDUCTORS
RADIATION EFFECTS IN SEMICONDUCTING LASER MATERIALS.*
AD-727 061

*LIGHT PULSES
LASERS
REPRINT: PULSE STRETCHING UTILIZING TWO-PHOTON-INDUCED LIGHT ABSORPTION.
AD-709 779

*LIGHT TRANSMISSION
CRYSTALS
REPRINT: RESONANCE-ENHANCED BRILLOUIN SCATTERING IN CRYSTALS.
AD-725 942

SOLIDS
INTERACTIONS OF COHERENT OPTICAL RADIATION WITH SOLIDS.*
AD-450 756

*LUMINESCENCE
PROPERTIES OF CADMIUM SULFIDE, ZINC SULFIDE AND MERCURIC SULFIDE, PARTS I-III. VOLUME I. AN ANNOTATED BIBLIOGRAPHY.
AD-266 763
PROPERTIES OF CADMIUM SULFIDE, ZINC SULFIDE AND MERCURIC SULFIDE, PART IV. VOLUME II. AN ANNOTATED BIBLIOGRAPHY.
AD-254 764
INVESTIGATION OF CARRIER INJECTION ELECTROLUMINESCENCE.
AD-259 365
INVESTIGATION OF CARRIER INJECTION ELECTROLUMINESCENCE.
AD-264 433
ELECTROLUMINESCENCE STUDIES ON DC-PULSEEXCITED THIN FILM ELECTROLUMINORS: PREPARATION OF HIGH PURITY SINGLE CRYSTALS AND EVAPORATED FILMS OF CDS; HIGH SPEED PHOTOCONDUCTIVE LOGIC ELEMENTS.
AD-286 829

CADMIUM SULFIDES
ANTI-STOKES EXCITED EDGE EMISSION IN CADMIUM SULPHIDE.*
AD-707 173
REPRINT: EXCITON-EXCITON

INTERACTION IN CDS, CDSE, AND ZNO.
AD-707 555

EXCITONS
REPRINT: EMISSION FROM EXCITED TERMINAL STATES OF BOUND EXCITON COMPLEXES.
AD-700 555

IMAGE INTENSIFIERS (ELECTRONIC)
APPLICATION OF LIGHT AND IMAGE INTENSIFICATION.
AD-604 742

IMPURITIES
RESEARCH ON CDTE.
AD-610 012

SEMICONDUCTORS
CARRIER INJECTION ELECTROLUMINESCENCE: LUMINESCENT JUNCTIONS IN WIDE-GAP SEMICONDUCTORS: TUNNEL INJECTION ELECTROLUMINESCENCE: A GALLIUM ARSENIDE-GALLIUM PHOSPHIDE LIGHT SOURCE: EVAPORATED ZNSE AND ZNTE FILMS AND CELLS.
AD-424 852
SEMICONDUCTOR DEVICE CONCEPTS.*
AD-426 258
RESEARCH ON II-VI COMPOUNDS SEMICONDUCTORS: PURIFICATION, CRYSTAL GROWTH, LUMINESCENCE, AND FUNDAMENTAL PROPERTIES.
AD-620 297
REPRINT: THEORETICAL ASPECTS OF POINT AND ASSOCIATED LUMINESCENT CENTERS.
AD-680 583
REPRINT: PHOTOLUMINESCENCE DUE TO ISOELECTRONIC OXYGEN AND TELLURIUM TRAPS IN II-VI ALLOYS.
AD-710 448
LUMINESCENCE STUDY OF EXCITON-EXCITON INTERACTION IN CADMIUM SULFIDE, CADMIUM SELENIDE, AND ZINC OXIDE.*
AD-713 181

*MAGNETIC PROPERTIES
RESEARCH IN CRYOGENICS AND MAGNETO-OPTICS, MAGNETO-OPTICAL AND MAGNETIC SUSCEPTIBILITY RESEARCH SYSTEM AT THE AERONAUTICAL RESEARCH LABORATORIES, DOPED CDS AND ZNS SINGLE CRYSTALS AS ULTRA-LOW TEMPERATURE PARAMAGNETIC SALTS, POSSIBILITY OF OBSERVING THE MOLECULAR SPECTRA ASSOCIATED WITH IMPURITY-EXCITON COMPLEXES IN CDS AND CDSE.
AD-292 324

*MAGNETO-OPTIC EFFECT
BAND THEORY OF SOLIDS
BAND PARAMETERS DETERMINATION FROM FARADAY ROTATION MEASUREMENTS.*
AD-664 582

*MASS SPECTROSCOPY
SEMICONDUCTORS
ANALYTICAL TECHNIQUES FOR THE DETERMINATION OF TRACE IMPURITIES IN CADMIUM SULFIDE.
AD-623 165

SULFIDES
ANALYTICAL TECHNIQUES FOR THE DETERMINATION OF TRACE IMPURITIES IN II-VI COMPOUNDS.*
AD-720 219

*MECHANICAL WAVES
EXCITATION
REPRINT: EXCITATION AND DETECTION OF SURFACE ELASTIC WAVES IN PIEZOELECTRIC CRYSTALS.
AD-697 237

PROPAGATION
ELECTROACOUSTIC DELAY LINES FOR MICROWAVE FREQUENCIES.*
AD-671 689

*MERCURY COMPOUNDS
PROPERTIES OF CADMIUM SULFIDE, ZINC SULFIDE AND MERCURIC SULFIDE, PARTS I-III. VOLUME I. AN ANNOTATED BIBLIOGRAPHY.
AD-256 763
PROPERTIES OF CADMIUM SULFIDE.

ZINC SULFIDE AND MERCURIC SULFIDE. PART IV. VOLUME II. AN ANNOTATED BIBLIOGRAPHY.
AD-256 764

*METAL FILMS
GOLD
INVESTIGATION OF HOT ELECTRON EMITTER.
AD-418 755

X-RAY SPECTROSCOPY
DETERMINATION OF THICKNESS AND COMPOSITION OF THIN FILMS BY THE METHOD OF X-RAY FLUORESCENCE.*
AD-636 043

*METALLOIDS
TRANSPORT PROPERTIES
CYCLOTRON RESONANCE EXPERIMENTS*.
AD-639 395

*METALS
HIGH-PRESSURE RESEARCH
HIGH PRESSURE RESEARCH.
AD-626 734

*MICROMETERS
FORMING OF THIN FILM CIRCUITS AND SYSTEMS IN WHICH ELECTRONIC CIRCUIT ELEMENTS ARE INTEGRATED IN A MATERIAL MATRIX TO A DEGREE WHERE ELEMENTAL APPEARANCES ARE LOST.
AD-288 571

*MICROMINIATURIZATION(ELECTRONICS)
PROCESS TECHNIQUES IN INTEGRATED CIRCUIT FABRICATION.
AD-294 655

REPORTS
SEMICONDUCTOR TECHNOLOGY AND MICROELECTRONICS (COLLECTION OF ARTICLES)--TRANSLATION.
AD-673 189

*MICROWAVE EQUIPMENT
DELAY LINES
MICROWAVE ACOUSTIC DELAY LINE AND RELATED ACTIVE DEVICES.
AD-601 566

SEMICONDUCTOR DEVICES
FREE CARRIER MICROWAVE SEMICONDUCTOR DEVICES.*
AD-615 88.

*MICROWAVE OSCILLATORS
DIODES(SEMICONDUCTOR)
REPRINT: INFLUENCE OF BOUNDARY CONDITIONS ON HIGH-FIELD DOMAINS IN GUNN DIODES.
AD-706 455
REPRINT: TIME-RESOLVED SCANNING ELECTRON MICROSCOPY AND ITS APPLICATION TO BULK-EFFECT OSCILLATORS.
AD-706 505

*MICROWAVES
ULTRASONIC RADIATION
RESEARCH ON THE THEORY AND DESIGN OF ACTIVE NETWORKS; MICROWAVE ULTRASONICS AND ACOUSTIC WAVE PROPAGATION IN PIEZOELECTRIC SEMICONDUCTORS.
AD-609 434

*MOLECULAR ELECTRONICS
FORMING OF THIN FILM CIRCUITS AND SYSTEMS IN WHICH ELECTRONIC CIRCUIT ELEMENTS ARE INTEGRATED IN A MATERIAL MATRIX TO A DEGREE WHERE ELEMENTAL APPEARANCES ARE LOST.
AD-288 571

CIRCUITS
THIN-FILM MONOTRONICS.
AD-607 297

MANUFACTURING METHODS
MATERIAL PROCESSING AND PHENOMENA; INVESTIGATION OF FUNCTIONAL ELECTRONIC BLOCKS.
AD-409 475

MATERIALS
THIN CADMIUM SULFIDE AND ZINC SULFIDE FILMS FOR COMPOSITE

MOLECULAR ELECTRONICS.
AD-612 679

SCIENTIFIC RESEARCH
ADVANCED FUNCTIONAL ELECTRONIC BLOCK DEVELOPMENT.*
AD-421 739

SEMICONDUCTORS
MATERIAL PROCESSING AND PHENOMENA INVESTIGATION OF FUNCTIONAL ELECTRONIC BLOCKS.
AD-602 482

*MOLECULAR SPECTROSCOPY
SEMICONDUCTORS
RESEARCH ON COYE.
AD-610 012

*NAVAL AIRCRAFT
MAINTENANCE
WORKLOAD FORECASTING AND ALTERNATIVE OVERHAUL SCHEDULES FOR NAVY AIRCRAFT AND AIRCRAFT ENGINES.*
AD-686 280

*NAVIGATION SATELLITES
NAVIGATIONAL AIDS
REPRINT: REVUE TECHNIQUE THOMSON-CSF. VOLUME 1, NUMERO 3.
AD-700 891

*NAVIGATIONAL AIDS
NAVIGATION SATELLITES
REPRINT: REVUE TECHNIQUE THOMSON-CSF. VOLUME 1, NUMERO 3.
AD-700 891

*NETWORKS
DESIGN
RESEARCH ON THE THEORY AND DESIGN OF ACTIVE NETWORKS.*
AD-647 699

*NICKEL
ADSORPTION
STUDY OF SURFACE PROPERTIES OF ATOMICALLY-CLEAN METALS AND SEMICONDUCTORS. PART I. STUDY OF CDS SURFACES BY LEED. PART II. COMBINED LEED AND MASS SPECTROMETER MEASUREMENTS FOR ADSORPTION AND CATALYSIS.*
AD-630 863
STUDY OF SURFACE PROPERTIES OF ATOMICALLY-CLEAN METALS AND SEMICONDUCTORS.*
AD-639 345

SURFACE PROPERTIES
PROPERTIES OF ATOMICALLY-CLEAN METALS AND SEMICONDUCTORS: GROWTH SURFACE OF CADMIUM SULFIDE; OXIDATION OF CO ON NICKEL SURFACE.
AD-623 174

*NUCLEAR PARTICLES
DETECTORS
FEASIBILITY OF CDS FOR SOLID STATE DETECTOR APPLICATION; ALPHA AND PHOTON IRRADIATION; MOBILITY-LIFETIME VALUES OF ELECTRRAPPING OF CARRIERS; PLASMA FORMATION.
AD-418 516

*OPTICAL EQUIPMENT
COMPUTERS
ACTIVE LOGIC ELEMENTS USING NON-GALVANIC MODIFYING INPUTS.
AD-630 022

*OPTICAL MATERIALS
GAS LASERS
GROWTH OF THIOSPINELS (INVESTIGATION OF CRYSTALS FOR CO2 HIGH POWER LASER WINDOWS).*
AD-709 988

*OPTICAL PHENOMENA
SEMICONDUCTORS
ADVANCED FUNCTIONAL ELECTRONIC BLOCK DEVELOPMENT.*
AD-421 739

*ORGANIC MATERIALS
PHOTOELECTRIC EFFECT
STUDY OF THE MECHANISM AND PROPERTIES OF THE PHOTOVOLTAIC AND PHOTOCONDUCTIVE EFFECTS IN ORGANIC SUBSTANCES.
AD-621 138

•OSCILLATORS
THERMAL CONDUCTIVITY
ADVANCED FUNCTIONAL ELECTRONIC BLOCK DEVELOPMENT.•
AD-421 739

•OXYGEN
ADSORPTION
THE INFLUENCE OF OXYGEN IN THE ULTRAHIGH VACUUM RANGE ON ELECTRICAL PROPERTIES OF CDS.•
AD-637 857

•PARAMAGNETIC MATERIALS
RESEARCH IN CRYOGENICS AND MAGNETO-OPTICS. MAGNETO-OPTICAL AND MAGNETIC SUSCEPTIBILITY RESEARCH SYSTEM AT THE AERONAUTICAL RESEARCH LABORATORIES. DOPED CDS AND ZNS SINGLE CRYSTALS AS ULTRA-LOW TEMPERATURE PARAMAGNETIC SALTS. POSSIBILITY OF OBSERVING THE MOLECULAR SPECTRA ASSOCIATED WITH IMPURITY-EXCITON COMPLEXES IN CDS AND CDSE.
AD-292 324

•PARAMAGNETIC RESONANCE
CARBON
REPRINT: CARBON EPR SIGNAL FROM VACUUM HEATED SURFACES.
AD-728 564

•PARAMETRIC AMPLIFIERS
BROADBAND
DESIGN OF MICROWAVE FILTER NETWORKS.•
AD-827 402

•PHASE SHIFTERS
WAVEGUIDES
MICROWAVE INTERACTIONS IN SEMICONDUCTORS: DISTRIBUTED SINGLE CRYSTAL STRUCTURES: SOLID STATE ULTRASONIC AMPLIFIERS AND TRANSDUCERS.
AD-603 621

•PHASE STUDIES
HIGH-PRESSURE RESEARCH
REPRINT: CRYSTAL CHEMISTRY OF NEW HIGH-PRESSURE PHASES.
AD-665 676

•PHONONS
PHONON-PHONON INTERACTION IN CRYSTAL. THEORETICAL CURVES BASED ON SELECTION RULES AND DRAWN FOR VARIOUS MODES OF OPERATION FOR PHONONPHONON INTERACTIONS IN SOLIDS ARE PRESENTED.
AD-296 440

CYCLOTRON RESONANCE PHENOMENA
REPRINT: CYCLOTRON RESONANCE OF PIEZOELECTRIC POLARONS.
AD-635 332

DISPERSION RELATIONS
BAND STRUCTURE AND DISPERSION RELATIONS IN II-VI COMPOUNDS AND THEIR ALLOYS.•
AD-730 033

INTERACTIONS
REPRINT: NONLINEAR PHONON INTERACTION IN PIEZOELECTRIC SEMICONDUCTORS AND EFFECT ON CURRENT SATURATION.
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PIEZOELECTRIC TRANSDUCERS
REPRINT: THIN-FILM PIEZOELECTRIC TRANSDUCERS USED AS GENERATORS AND DETECTORS OF MICROWAVE PHONONS, WITH SOME ATTENUATION MEASUREMENTS IN SIO2.
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SCATTERING
REPRINT: RESONANT RAMAN SCATTERING FROM LO PHONONS IN POLAR SEMICONDUCTORS.
AD-707 571

SEMICONDUCTORS
REPRINT: PHONON COUPLING IN EDGE EMISSION AND PHOTOCONDUCTIVITY OF CDSE, CDS, AND CD(SE SUB X S SUB 1-X).
AD-656 161
REPRINT: PHONON SIDEBANDS ON

BOUND EXCITON TRANSITIONS IN CDS AND ZNO.
AD-716 895

•PHOSPHORESCENCE
ELECTROLUMINESCENCE PHOSPHOR INVESTIGATION.
AD-268 932

•PHOSPHORESCENT MATERIALS
PROPERTIES OF CADMIUM SULFIDE, ZINC SULFIDE AND MERCURIC SULFIDE. PARTS I-III. VOLUME I, AN ANNOTATED BIBLIOGRAPHY.
AD-256 763
PROPERTIES OF CADMIUM SULFIDE, ZINC SULFIDE AND MERCURIC SULFIDE. PART IV. VOLUME II. AN ANNOTATED BIBLIOGRAPHY.
AD-256 764
ELECTROLUMINESCENCE PHOSPHOR INVESTIGATION.
AD-268 932

•PHOTOCONDUCTIVITY
ENHANCED PHOTOCONDUCTANCE AND SHADOWS ON CADMIUM SULFIDE SINGLE CRYSTALS.
AD-257 072
PHOTOCONDUCTIVITY IN CDS CRYSTALS AS A MECHANISM FOR GAMMA RAY DOSIMETRY.
AD-261 116
A NEW FORM OF SOLID STATE SOLAR GENERATOR.
AD-273 974
ELECTROLUMINESCENCE STUDIES ON DC-PULSEEXCITED THIN FILM ELECTROLUMINORS: PREPARATION OF HIGH PURITY SINGLE CRYSTALS AND EVAPORATED FILMS OF CDS; HIGH SPEED PHOTOCONDUCTIVE LOGIC ELEMENTS.
AD-286 829
HALL EFFECT MEASUREMENTS IN INSULATORS, A 'TIME-OF-FLIGHT' METHOD OF STUDYING CARRIER TRANSPORT IN INSULATORS, A GENERAL ANALYSIS OF UNIPOLAR STEADY STATE SPACE CHARGE LIMITED CURRENTS IN INSULATORS, ORGANIC SEMICONDUCTORS, AND CDS ARE TOPICS INVESTIGATED IN PHOTOCONDUCTOR RESEARCH.
AD-295 657
UNCOOLED IR DETECTOR FOR THE TEN MICRON REGION: EXCITON IN CADMIUM SULFIDE.
AD-297 203

CADMIUM COMPOUNDS
MULTIPHONON PROCESSES IN THE PHOTOCONDUCTIVITY OF CADMIUM SULFIDE AND CADMIUM SELENIDE SINGLE CRYSTALS.
AD-616 683

CADMIUM SULFIDES
REPRINT: OSCILLATORY PHASE OF PHOTOCONDUCTIVITY OF CDS.
AD-685 676
BI-STABLE ELECTROPHOTOGRAPHIC DISPLAY DEVICE.
AD-732 301

CHEMISORPTION
REPRINT: PHOTO-HALL STUDIES OF OXYGEN ADSORPTION EFFECTS ON PHOTOCONDUCTIVITY IN SINTERED LAYERS.
AD-623 046

CRYOGENICS
REPRINT: EXCITON STRUCTURE IN PHOTOCONDUCTIVITY OF CDS, CDSE, AND CDS:SE SINGLE CRYSTALS.
AD-617 125

CRYSTAL RECTIFIERS
TRANSLATION OF RUSSIAN RESEARCH: INVESTIGATING THE EFFECT OF GAMMA-RAYS, X-RAYS AND NEUTRONS ON ELECTRIC PROPERTIES OF CDS-SE AND CDSE-SE RECTIFYING SYSTEMS.
AD-615 868

FILMS
RESEARCH ON PHOTOCONDUCTIVITY IN THIN FILMS.
AD-417 747

ORGANIC MATERIALS

STUDY OF THE MECHANISM AND PROPERTIES OF THE PHOTOVOLTAIC AND PHOTOCONDUCTIVE EFFECTS IN ONGANIC SUBSTANCES.
AD-621 138

SEMICONDUCTORS
REPRINT: OSCILLATORY PHOTOCONDUCTIVITY OF CDS.
AD-616 828
REPRINT: FURTHER CONSIDERATIONS ON A THEORY OF SUPERLINEARITY IN CDS AND RELATED MATERIALS.
AD-631 744
REPRINT: OSCILLATORY PHOTOCONDUCTIVE AND EXCITATION SPECTRA OF CDS AND ZNSE.
AD-728 544

SYMPOSIA
PROCEEDINGS OF THE INTERNATIONAL CONFERENCE ON PHOTOCONDUCTIVITY (3RD) HELD AT STANFORD UNIVERSITY, CALIFORNIA, ON 12-15 AUGUST 1969.
AD-726 138

*PHOTOELECTRIC CELLS (SEMICON DUCTOR)
CHEMICALLY SPRAYED THIN FILM PHOTOVOLTAIC CONVERTERS.
AD-403 053

*PHOTOELECTRIC CELLS (SEMICONDUCTOR)
RESEARCH IN PURIFICATION OF CADMIUM SULFIDE CRYSTALS.
AD-259 883
A NEW FORM OF SOLID STATE SOLAR GENERATOR.
AD-273 974
CDS AND OTHER II-IV COMPOUNDS: SOLAR ENERGY CONVERTERS; PURIFICATION; CRYSTAL GROWTH.
AD-276 416
FEASIBILITY INVESTIGATION OF CHEMICALLY SPRAYED THIN FILM PHOTOVOLTAIC CONVERTERS.
AD-282 547
FEASIBILITY STACKING PHOTOVOLTAIC LAYERS OF CD OR ZN SULFIDES, SELENIDES, AND TELLURIDES FOR CONVERSION OF SUN RADIATION INTO ELECTRICAL POWER, PREPARATION AND GROWTH, SINGLE CRYSTALS AND THIN FILMS; THEORY; ELECTRICAL PROPERTIES.
AD-288 060
FEASIBILITY OF FABRICATING A THIN FILM PHOTOVOLTAIC CONVERTER OF EITHER CDS OR CDSE USING A CHEMICAL SPRAY PROCESS.
AD-289 278

DISPLAY SYSTEMS
IMPROVED PHOTOCONDUCTORS FOR DISPLAY SWITCHING.
AD-433 671

MANUFACTURING METHODS
INVESTIGATION OF CHEMICALLY SPRAYED THIN-FILM PHOTOVOLTAIC CELLS.
AD-609 204

*PHOTOELECTRIC CELLS(SEMICONDUCTOR)
MANUFACTURING METHODS
DEVELOPMENT OF PHOTORESISTIVE ELEMENTS FOR AN ANALOG MULTIPLIER.
AD-671 980

ULTRAVIOLET DETECTORS
INDICATORS OF ULTRAVIOLET RADIATION BASED ON TYPE FSK-M1 PHOTORESISTORS--TRANSLATION.
AD-843 544

*PHOTOELECTRIC EFFECT
COMPUTERS
ACTIVE LOGIC ELEMENTS USING NON-GALVANIC MODIFYING INPUTS.
AD-630 022

ORGANIC MATERIALS
STUDY OF THE MECHANISM AND PROPERTIES OF THE PHOTOVOLTAIC AND PHOTOCONDUCTIVE EFFECTS IN ONGANIC SUBSTANCES.
AD-621 138

SEMICONDUCTORS
BAND STRUCTURE AND SURFACE EFFECTS IN CADMIUM SULFIDE PHOTOEMISSION STUDIES.

AD-610 728
ELECTRON EMISSION STUDIES OF THE IIB-VIA SEMICONDUCTOR COMPOUNDS.•
AD-731 661

•PHOTOELECTRIC MATERIALS
HALL EFFECT MEASUREMENTS IN INSULATORS, A 'TIME-OF-FLIGHT' METHOD OF STUDYING CARRIER TRANSPORT IN INSULATORS, A GENERAL ANALYSIS OF UNIPOLAR STEADY STATE SPACE CHARGE LIMITED CURRENTS IN INSULATORS, ORGANIC SEMICONDUCTORS, AND CDS ARE TOPICS INVESTIGATED IN PHOTOCONDUCTOR RESEARCH.
AD-295 659

CADMIUM SULFIDES
REPRINT; FIELD DISTRIBUTION AND CURRENT SATURATION IN PHOTOCONDUCTIVE CDS.
AD-678 297

DISPLAY SYSTEMS
BI-STABLE ELECTROPHOTOGRAPHIC DISPLAY DEVICE.•
AD-732 301

FIELD THEORY
ELECTRO-OPTICAL METHOD FOR INVESTIGATION OF FIELD AND CURRENT DISTRIBUTIONS IN SEMICONDUCTORS AND LAYER-LIKE FIELD DISTRIBUTIONS IN PHOTOCONDUCTORS.
AD-614 437
ELECTRO-OPTICAL METHOD FOR INVESTIGATION OF FIELD AND CURRENT DISTRIBUTIONS IN SEMICONDUCTORS AND LAYER-LIKE FIELD DISTRIBUTIONS IN PHOTOCONDUCTORS.
AD-619 190

IMAGE INTENSIFIERS (ELECTRONIC)
APPLICATION OF LIGHT AND IMAGE INTENSIFICATION.
AD-604 742

IMAGE INTENSIFIERS(ELECTRONICS)
APPLICATION OF LIGHT AND IMAGE INTENSIFICATION.
AD-627 926

SINGLE CRYSTALS
ELECTRO-OPTICAL METHOD FOR INVESTIGATION OF FIELD AND CURRENT DISTRIBUTIONS IN SEMICONDUCTORS ANDLAYER-LIKE FIELD DISTRIBUTIONS IN PHOTOCONDUCTORS.
AD-603 075

•PHOTOMULTIPLIERS
INFRARED PHOTOCONDUCTORS
LOW TEMPERATURE INFRARED PHOTOCONDUCTORS.•
AD-636 502

•PHOTOSENSITIVITY
MATERIALS
RESEARCH ON PHOTOCONDUCTIVITY IN THIN FILMS.
AD-417 797

SINGLE CRYSTALS
TRANSLATION OF BULGARIAN RESEARCH: INVESTIGATION OF ELECTRICAL CONDUCTION OF CADMIUM SULFIDE SEMI-CONDUCTORS USING HIGH FREQUENCY GENERATORS.
AD-603 391

•PHOTOTUBES
RESEARCH IN PURIFICATION OF CADMIUM SULFIDE CRYSTALS.
AD-259 883
A NEW FORM OF SOLID STATE SOLAR GENERATOR.
AD-273 974
CDS AND OTHER II-IV COMPOUNDS: SOLAR ENERGY CONVERTERS: PURIFICATION: CRYSTAL GROWTH.
AD-276 416
FEASIBILITY INVESTIGATION OF CHEMICALLY SPRAYED THIN FILM PHOTOVOLTAIC CONVERTERS.
AD-282 547
FEASIBILITY STACKING PHOTOVOLTAIC LAYERS OF CD OR ZN SULFIDES, SELENIDES, AND TELLURIDES FOR CONVERSION OF SUN RADIATION INTO ELECTRICAL POWER.

PREPARATION AND GROWTH, SINGLE CRYSTALS AND THIN FILMS; THEORY; ELECTRICAL PROPERTIES.
AD-288 060

FEASIBILITY OF FABRICATING A THIN FILM PHOTOVOLTAIC CONVERTER OF EITHER CDS OR CDSE USING A CHEMICAL SPRAY PROCESS.
AD-289 278

•PIEZOELECTRIC CRYSTALS
ACOUSTICS

RESEARCH ON THE THEORY AND DESIGN OF ACTIVE NETWORKS.•
AD-64? 699

ELECTRICAL PROPERTIES

ACOUSTIC AMPLIFICATION AND ELECTRON MOBILITY IN LITHIUM AND SODIUM DOPED CADMIUM SULFIDE.
AD-603 611

ION BOMBARDMENT

SELECTIVE DOPING OF PIEZOELECTRIC CRYSTALS BY ION IMPLANTATION.•
AD-693 154

SELECTIVE DOPING FOR PIEZOELECTRIC CRYSTALS BY ION IMPLANTATION.•
AD-702 778

SELECTIVE DOPING OF PIEZOELECTRIC CRYSTALS BY ION IMPLANTATION.•
AD-727 097

MECHANICAL WAVES

REPRINT: EXCITATION AND DETECTION OF SURFACE ELASTIC WAVES IN PIEZOELECTRIC CRYSTALS.
AD-697 237

SEMICONDUCTOR DEVICES

ACTIVE ACOUSTO-OPTIC MODULATORS.•
AD-710 240

SEMICONDUCTORS

ACOUSTOELECTRIC EFFECTS IN SOLIDS.•
AD-668 503

REPRINT: NONLINEAR PHONON INTERACTION IN PIEZOELECTRIC SEMICONDUCTORS AND EFFECT ON CURRENT SATURATION.
AD-674 697

REPRINT: CYCLOTRON RESONANCE OF PIEZOELECTRIC POLARONS IN THE QUANTUM LIMIT.
AD-675 972

REPRINT: CIRCUIT-CONTROLLED MODES OF ACOUSTOELECTRIC OSCILLATIONS IN PIEZOELECTRIC SEMICONDUCTORS.
AD-684 901

ULTRASONIC RADIATION

ACTIVE ACOUSTIC DEVICES.•
AD-679 130

REPRINT: ACOUSTOELECTRIC DEVICE APPLICATIONS OF PIEZOELECTRIC AND SEMICONDUCTING THIN FILMS.
AD-710 932

REPRINT: SURFACE ELASTIC WAVES.
AD-721 786

•PIEZOELECTRIC EFFECT
QUANTUM MECHANICS

REPRINT: CYCLOTRON RESONANCE OF PIEZOELECTRIC POLARONS.
AD-636 332

SEMICONDUCTORS

PIEZOELECTRIC COUPLING BETWEEN ULTRASONIC WAVES AND FREE ELECTRONS IN CADMIUM SULFIDE.•
AD-414 853

•PIEZOELECTRIC TRANSDUCERS
DESIGN

REPRINT: ACOUSTOELECTRIC DEVICE APPLICATIONS OF PIEZOELECTRIC AND SEMICONDUCTING THIN FILMS.
AD-710 932

FILMS

VAPOR DEPOSITED THIN FILM PIEZOELECTRIC TRANSDUCERS.
AD-613 540

REPRINT: MULTILAYER ENHANCEMENT OF MICROWAVE PIEZOELECTRIC CONVERSION IN CDS-SIO LAYERS.

AD-646 041
REPRINT: MULTILAYER THIN FILM PIEZOELECTRIC TRANSDUCERS.
AD-646 046
REPRINT: THIN-FILM PIEZOELECTRIC TRANSDUCERS USED AS GENERATORS AND DETECTORS OF MICROWAVE PHONONS, WITH SOME ATTENUATION MEASUREMENTS IN SIO2.
AD-648 782
REPRINT: FABRICATION OF VAPOR-DEPOSITED THIN FILM PIEZOELECTRIC TRANSDUCERS FOR THE STUDY OF PHONON BEHAVIOR IN DIELECTRIC MATERIALS AT MICROWAVE FREQUENCIES.
AD-662 534

PREPARATION
REPRINT: ELECTRON BOMBARDMENT TECHNIQUE FOR DEPOSITION OF CDS FILM TRANSDUCERS.
AD-642 217

SEMICONDUCTOR DEVICES
REPRINT: ELECTRICAL PERFORMANCE OF METAL-INSULATOR-PIEZOELECTRIC SEMICONDUCTOR TRANSDUCERS.
AD-663 779

*POTENTIOMETERS
PHOTOELECTIVE EFFECT
BRUSHLESS PRECISION POTENTIOMETER.
AD-605 528

PHOTOELECTRIC EFFECT
BRUSHLESS PRECISION POTENTIOMETER.
AD-610 718

*POWER SUPPLIES
FEASIBILITY STACKING PHOTOVOLTAIC LAYERS OF CD OR ZN SULFIDES, SELENIDES, AND TELLURIDES FOR CONVERSION OF SUN RADIATION INTO ELECTRICAL POWER, PREPARATION AND GROWTH, SINGLE CRYSTALS AND THIN FILMS; THEORY; ELECTRICAL PROPERTIES.
AD-288 660
LARGE AREA THIN FILM CDS SOLAR CELL ARRAY INVESTIGATION. DESIGN OF CDS FILM CELL ARRAYS FOR PERFORMANCE AND ORBITAL TESTING.
AD-299 016
SOLAR CELL ARRAY OPTIMIZATION. RESEARCH AND FABRICATION PHASES OF THIS WORK WERE DIRECTED TOWARDS DEMONSTRATING THE POTENTIAL OF LARGE AREA, THIN-FILM CADMIUM SULFIDE PHOTOVOLTAIC MATERIALS. POWER-TO-WEIGHT RATIO FOR FOUR-INCH SQUARE CELLS APPROACHES 20 WATTS/LB.
AD-295 558

*POWER TRANSFORMERS
LOW INPUT VOLTAGE CONVERSION. TRANSISTORS, TUNNEL DIODES, ELECTROMECHANICAL APPROACH, LIQUID METAL MAGNETOHYDRODYNAMIC CONVERTERS, HALL EFFECT, MAGNETORESISTIVE CONVERTERS, SUPERCONDUCTIVE CONVERTERS, PHOTOCONDUCTORS.
AD-298 305

*PROTECTIVE TREATMENTS
STEEL
STRESS CORROSION CRACKING IN HIGH STRENGTH FERROUS ALLOYS.*
AD-423 387

*PULSE COMPRESSION
DELAY LINES
IMPROVED DELAY LINE TECHNIQUES STUDY.
AD-617 693

*PUMPING(ELECTRONICS)
ELECTRON BEAMS
ELECTRON BEAM PUMPED SEMICONDUCTOR LASERS.*
AD-648 055

*PUMPING(OPTICAL)
ELECTRON BEAMS
REPRINT: ELECTON-BEAM PUMPED LASERS OF CDSE AND CDS.
AD-642 201

*QUANTITATIVE ANALYSIS

SEMICONDUCTORS
REPRINT: QUANTITATIVE ANALYSIS OF TERNARY AND QUATERNARY SEMICONDUCTING ALLOYS WITH ELECTRON MICROPROBE.
AD-714 3,4

*QUANTUM MECHANICS
RESEARCH IN CRYOGENICS AND MAGNETO-OPTICS. MAGNETO-OPTICAL AND MAGNETIC SUSCEPTIBILITY RESEARCH SYSTEM AT THE AERONAUTICAL RESEARCH LABORATORIES. DOPED CDS AND ZNS SINGLE CRYSTALS AS ULTRA-LOW TEMPERATURE PARAMAGNETIC SALTS. POSSIBILITY OF OBSERVING THE MOLECULAR SPECTRA ASSOCIATED WITH IMPURITY-EXCITON COMPLEXES IN CDS AND CDSE.
AD-292 324

*RADAR ECHO AREAS
DETECTION
REPRINT: REVUE TECHNIQUE THOMSON-CSF. VOLUME 1, NUMERO 3.
AD-700 891

*RADIATION DAMAGE
MATERIALS
SURVEY OF SOVIET-BLOC LITERATURE: ABSTRACTS ON RADIATION DAMAGE IN SEMICONDUCTORS, IONIC CRYSTALS, AND OTHER MATERIALS.
AD-604 341

SEMICONDUCTORS
REPRINT: RADIATION EFFECTS II. GAAS.
AD-616 013
RADIATION DAMAGE EFFECTS IN ELECTRON IRRADIATED CADMIUM SULFIDE PLATELETS AT LOW TEMPERATURE.*
AD-734 239

*RADIOFREQUENCY FILTERS
MICROWAVE FREQUENCY
DESIGN OF MICROWAVE FILTER NETWORKS.*
AD-827 402

*RAMAN SPECTROSCOPY

CADMIUM SULFIDES
REPRINT: MULTIPLE-PHONON RESONANT RAMAN SCATTERING THEORY.
AD-723 713

CRYSTALS
REPRINT: THEORY OF ENHANCED RAMAN SCATTERING AND VIRTUAL QUASIPARTICLES IN CRYSTALS.
AD-650 244

EXCITONS
REPRINT: EXCITON-ENHANCED RAMAN SCATTERING BY OPTICAL PHONONS.
AD-695 232

SEMICONDUCTORS
REPRINT: RESONANT CANCELLATION OF RAMAN SCATTERING FROM CDS AND SI.
AD-715 167
REPRINT: TEMPERATURE DEPENDENCE OF RAMAN LINEWIDTH AND INTENSITY OF SEMICONDUCTORS.
AD-717 296
REPRINT: POLARITON THEORY OF RAMAN SCATTERING IN INSULATING CRYSTALS. II.
AD-720 030
AN EXPERIMENTAL STUDY OF THE VIBRONIC AND ELECTRONIC RESONANCE RAMAN EFFECT IN SEMICONDUCTOR AND GARNET CRYSTALS.*
AD-722 701

SOLIDS
OPTICAL VIBRATION SPECTRA OF SOLIDS.
AD-628 695

*RARE EARTH ELEMENTS
DIFFUSION
REPRINT: DIFFUSION OF RARE EARTH INTO II-VI COMPOUNDS.
AD-691 964

ELECTRON SPIN RESONANCE
REPRINT: RARE EARTH IMPURITIES IN II-VI COMPOUNDS.
AD-667 094

•SATELLITES(ARTIFICIAL)
SOLAR PANELS
REPRINT: PERFORMANCE OF CADMIUM SULFIDE THIN FILM SOLAR CELLS IN A SPACE ENVIRONMENT.
AD-694 893

•SELENIDES
CADMIUM COMPOUNDS
MULTIPHONON PROCESSES IN THE PHOTOCONDUCTIVITY OF CADMIUM SULFIDE AND CADMIUM SELENIDE SINGLE CRYSTALS.
AD-616 683

TRANSPORT PROPERTIES
MEASUREMENT OF ELECTRON FREE LIFETIME AND TRAPPING FACTOR IN HIGH PURITY CADMIUM SULFIDE, CADMIUM SULFIDE/SELENIDE AND CADMIUM SELENIDE USING THE METHOD OF ULTRASONIC AMPLIFICATION.
AD-616 687

•SELENIUM
HALL EFFECT
PERFORMANCE OF PHOTOCONDUCTORS, MEASURING THE HALL EFFECT.
AD-411 3[illegible]

•SELENIUM ALLOYS
ULTRAVIOLET SPECTROSCOPY
ULTRAVIOLET REFLECTIVITY STUDIES OF CDS:SE SINGLE CRYSTAL SOLID SOLUTIONS.•
AD-633 645

•SEMICONDUCTING FILMS
INVESTIGATION OF SEMICONDUCTING PROPERTIES OF II-VI COMPOUNDS•
AD-264 310
INVESTIGATION OF SEMICONDUCTING PROPERTIES OF II-VI COMPOUNDS•
AD-282 527
FEASIBILITY INVESTIGATION OF CHEMICALLY SPRAYED THIN FILM PHOTOVOLTAIC CONVERTERS•
AD-282 547
FORMING OF THIN FILM CIRCUITS AND SYSTEMS IN WHICH ELECTRONIC CIRCUIT ELEMENTS ARE INTEGRATED IN A MATERIAL MATRIX TO A DEGREE WHERE ELEMENTAL APPEARANCES ARE LOST.
AD-288 571
FEASIBILITY OF FABRICATING A THIN FILM PHOTOVOLTAIC CONVERTER OF EITHER CDS OR $CdSe_x$ USING A CHEMICAL SPRAY PROCESS.
AD-289 278

BAND THEORY OF SOLIDS
RESEARCH ON THE MECHANISM OF THE PHOTOVOLTAIC EFFECT IN HIGH EFFICIENCY CDS THIN-FILM SOLAR CELLS.•
AD-702 095
THE OPTICAL PROPERTIES OF THIN SINGLE-CRYSTAL CDS FILMS IN A WIDE SPECTRAL INTERVAL--TRANSLATION.
AD-727 544

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AD-851 282

CADMIUM COMPOUNDS
INVESTIGATION OF THIN FILM CADMIUM SULFIDE SOLAR CELLS.•
AD-423 684

CADMIUM SULFIDES
FABRICATION OF CADMIUM SULFIDE THIN FILM SOLAR CELLS FOR SPACE VEHICLE TESTING.•
AD-666 439
REPRINT: THE ANODIC SYNTHESIS OF CDS FILMS.
AD-674 448
RESEARCH ON THE MECHANISM OF THE PHOTOVOLTAIC EFFECT IN HIGH-EFFICIENCY CDS THIN-FILM SOLAR CELLS.•
AD-678 540
RESEARCH ON THE MECHANISM OF THE PHOTOVOLTAIC EFFECT IN HIGH-

EFFICIENCY CDS THIN-FILM SOLAR CELLS.*
AD-678 542
TEMPERATURE DEPENDENCE OF THE RESISTIVITY AND HALL EFFECT OF THIN CDS FILMS.*
AD-681 719
INFRARED MEASUREMENTS ON CDS THIN FILMS DEPOSITED ON ALUMINUM.*
AD-684 160

DOPING
DOPING OF SEMICONDUCTORS AND SEMICONDUCTING FILM. VOLUME I.*
AD-687 900

ELECTRIC CURRENTS
REPRINT: CURRENT SATURATION IN CDS FILMS AT VARIOUS TEMPERATURES.
AD-723 373

ELECTRIC TERMINALS
IMPROVEMENTS IN CDS THIN FILM SOLAR CELLS.*
AD-707 869

ELECTRICAL CONDUCTANCE
MECHANISM OF HIGH CONDUCTIVITY IN VACUUM-DEPOSITED CADMIUM SULFIDE FILMS.
AD-615 269

ELECTRICAL PROPERTIES
RESEARCH ON THE OPERATING AND FAILURE MECHANISMS IN CDS SOLAR CELLS.*
AD-722 112

ELECTROLUMINESCENCE
CARRIER INJECTION ELECTROLUMINESCENCE: LUMINESCENT JUNCTIONS IN WIDE-GAP SEMICONDUCTORS: TUNNEL INJECTION ELECTROLUMINESCENCE: A GALLIUM ARSENIDE-GALLIUM PHOSPHIDE LIGHT SOURCE: EVAPORATED ZNSE AND ZNTE FILMS AND CELLS.
AD-424 852
INVESTIGATION OF CARRIER INJECTION ELECTROLUMINESCENCE.*
AD-426 963

EPITAXIAL GROWTH
MATERIAL PROCESSING AND PHENOMENA! INVESTIGATION OF FUNCTIONAL ELECTRONIC BLOCKS.
AD-409 475
EPITAXIC SUBLIMATION METHODS FOR THE STUDY OF PSEUDO-BINARY SEMICONDUCTOR ALLOYS.*
AD-716 210

FIELD EMISSION
REPRINT: FIELD-AND PHOTON-ENHANCED FIELD EMISSION FROM THIN-FILM FIELD-EMISSION DEVICES.
AD-679 946

INTEGRATED CIRCUITS
EVAPORATED THIN-FILM TECHNIQUES.*
AD-426 170

MATERIALS
THIN-FILM MONOTRONICS.
AD-607 297

MICROWAVE FREQUENCY
REPRINT: ACOUSTOELECTRIC DEVICE APPLICATIONS OF PIEZOELECTRIC AND SEMICONDUCTING THIN FILMS.
AD-710 932

PHONONS
PHOTON-PHONON INTERACTION IN THIN FILMS.*
AD-684 159

PHYSICAL PROPERTIES
NEW SOLID-STATE DEVICE CONCEPTS.
AD-616 350
NEW SOLID-STATE DEVICE CONCEPTS.
AD-621 941

PREPARATION
ADVANCED FUNCTIONAL ELECTRONIC BLOCK DEVELOPMENT: THIN FILM TRANSISTORS AND THEIR APPLICATION IN INTEGRATED CIRCUITS.
AD-610 366

SANDWICH CONSTRUCTION
THIN FILM ACTIVE DEVICES, METAL

INTERFACE AMPLIFIER, MEA STRUCTURE, MOS DIODES. INVESTIGATION OF HOT ELECTRON STRUCTURES INVOLVING METALSEMICONDUCTOR INTERFACES FOR EMITTERS AND/OR COLLECTORS.
AD-408 472

SOLAR CELLS
CDS THIN-FILM SOLAR CELLS.
AD-613 187
RESEARCH ON PHOTOVOLTAIC CELLS.
AD-621 454

SULFIDES
INVESTIGATION OF CHEMICALLY SPRAYED THIN-FILM PHOTOVOLTAIC CELLS.
AD-609 204
TRANSLATION OF RUSSIAN RESEARCH: POLYCRYSTALLINE CADMIUM SULFIDE FILMS-ELECTRIC PROPERTIES AND OPTICAL ABSORPTION.
AD-629 423

SURFACE PROPERTIES
FAILURE MECHANISMS AT SURFACES AND INTERFACES OF THIN FILM FIELD EFFECT TRIODES.
AD-613 036
REPRINT: CONTROL OF THE SURFACE POTENTIAL OF EVAPORATED CDS LAYERS.
AD-656 954

SYNTHESIS(CHEMISTRY)
SYNTHESIS AND CHARACTERIZATION OF THIN FERROELECTRIC AND SEMICONDUCTING FILMS.*
AD-706 097

THICKNESS
REPRINT: DISPENSIVE AND NONDISPENSIVE X-RAY FLUORESCENCE METHODS FOR THE MEASUREMENT OF THE THICKNESS OF FILMS OF CADMIUM SULFIDE AND OTHER II-VI COMPOUNDS.
AD-700 554

TRANSISTORS
EVAPORATED THIN-FILM DEVICES. INSULATED-GATE THIN-FILM TRANSISTOR. TELLURIUM AND CADMIUM SULFIDE FILMS.
AD-427 362

TRIODES
SINGLE CRYSTAL CADMIUM SULFIDE AND CADMIUM SELENIDE INSULATED-GATE FIELD-EFFECT TRIODES.*
AD-651 614

ULTRASONIC RADIATION
REPRINT: REVUE TECHNIQUE THOMSON-CSF. VOLUME 1, NUMERO 3.
AD-700 891

VAPOR PLATING
VACUUM-DEPOSITED CADMIUM SULFIDE THIN FILMS.
AD-622 695
PHOTOLUMINESCENT PROPERTIES OF VACUUM DEPOSITED CADMIUM SULFIDE FILMS.*
AD-700 269

VIEWING SCREENS
BI-STABLE ELECTROPHOTOGRAPHIC DISPLAY DEVICE.*
AD-732 301

*SEMICONDUCTOR DEVICES
SCIENTIFIC RESEARCH
SEMICONDUCTOR DEVICE CONCEPTS.
AD-604 311

*SEMICONDUCTOR DEVICES
ACOUSTIC EQUIPMENT
ACTIVE ACOUSTIC DEVICES.*
AD-679 130

CARRIERS(SEMICONDUCTORS)
FREE CARRIER MICROWAVE SEMICONDUCTON DEVICES.*
AD-801 243

ELECTRIC TERMINALS
MULTILAYER OHMIC CONTACTS ON CDS.*
AD-636 420

ELECTRICAL PROPERTIES
A CENTER OF COMPETENCE IN SOLID STATE MATERIALS AND DEVICES.*

AD-729 908

ELECTROLUMINESCENCE
INVESTIGATION OF CARRIER INJECTION ELECTROLUMINESCENCE.*
AD-426 463

LASERS
TRANSLATION OF RUSSIAN RESEARCH: OPTICAL QUANTUM CRYSTAL GENERATOR WITH EXCITATION BY FAST ELECTRONS.
AD-620 973
REPRINT: ELECTON-BEAM PUMPED LASER: OF CDSE AND CDS.
AD-642 201
ELECTRON BEAM PUMPED SEMICONDUCTOR LASERS.*
AD-648 055
REPRINT: HIGH POWER AND EFFICIENCY IN CDS ELECTRON BEAM PUMPED LASERS.
AD-653 364
REPRINT: COHERENT AND NONCOHERENT LIGHT EMISSION IN II-VI COMPOUNDS.
AD-661 907

LUMINESCENCE
SEMICONDUCTOR DEVICE CONCEPTS.*
AD-426 258

MANUFACTURING METHODS
THIN-FILM MONOTRONICS.
AD-607 297

MATERIALS
NEW SOLID-STATE DEVICE CONCEPTS.
AD-621 941
NEW SOLID-STATE DEVICE CONCEPTS.
AD-628 770

MICROWAVE EQUIPMENT
FREE CARRIER MICROWAVE SEMICONDUCTOR DEVICES.*
AD-616 881

PREPARATION
SEMICONDUCTOR DEVICE CONCEPTS: DEFECT CHEMISTRY; DIFFUSION OF IMPURITIES; HALOGEN TRANSPORT CRYSTAL GROWTH; LUMINESCENCE.
AD-603 783

RELIABILITY (ELECTRONICS)
FAILURE MECHANISMS AT SURFACES AND INTERFACES OF THIN FILM FIELD EFFECT TRIODES.
AD-613 036

SCIENTIFIC RESEARCH
ADVANCED FUNCTIONAL ELECTRONIC BLOCK DEVELOPMENT.*
AD-423 739
SOLID STATE RESEARCH.
AD-632 998

SEMICONDUCTING FILMS
FIELD EFFECT AND SPACE-CHARGE-LIMITED THIN FILM TRIODES.*
AD-442 635
FIELD EFFECT SPACE-CHARGELIMITED THIN FILM TRIODES.
AD-451 776

SOLID STATE PHYSICS
NEW SOLID-STATE DEVICE CONCEPTS.*
AD-641 456

TRANSDUCERS
ACTIVE ACOUSTIC DEVICES. USE OF TRANSDUCERS IN CW DEVICES.
AD-612 703
ACTIVE SEMICONDUCTOR ACOUSTIC DEVICES.
AD-617 749
ACTIVE ACOUSTIC DEVICES.
AD-620 854

USSR
SEMICONDUCTOR TECHNOLOGY AND MICROELECTRONICS (COLLECTION OF ARTICLES)--TRANSLATION.
AD-673 189

*SEMICONDUCTOR FILMS
CADMIUM ALLOYS
INVESTIGATION OF HOT ELECTRON EMITTER.*
AD-425 523

PREPARATION

THIN CADMIUM SULFIDE AND ZINC SULFIDE FILMS FOR COMPOSITE MOLECULAR ELECTRONICS.
AD-612 679

•SEMICONDUCTORS
RESEARCH ON SEMICONDUCTOR SURFACES. 1. THE ANOMALOUS FIELD EFFECT IN GERMANIUM. 2. THE FIELD EFFECT IN CADMIUM SULFIDE.
AD-256 674
PROPERTIES OF CADMIUM SULFIDE, ZINC SULFIDE AND MERCURIC SULFIDE. PARTS I-III. VOLUME I. AN ANNOTATED BIBLIOGRAPHY.
AD-256 763
PROPERTIES OF CADMIUM SULFIDE, ZINC SULFIDE AND MERCURIC SULFIDE. PART IV. VOLUME II. AN ANNOTATED BIBLIOGRAPHY.
AD-256 769
ENHANCED PHOTOCONDUCTANCE AND SHADOWS ON CADMIUM SULFIDE SINGLE CRYSTALS.
AD-257 872
ELECTRON MOBILITY IN CADMIUM SULPHIDE SINGLE CRYSTALS AT LOW TEMPERATURES.
AD-259 661
RESEARCH IN PURIFICATION OF CADMIUM SULFIDE CRYSTALS.
AD-259 883
INVESTIGATION OF SEMICONDUCTING PROPERTIES OF II-VI COMPOUNDS.
AD-264 310
A NEW FORM OF SOLID STATE SOLAR GENERATOR.
AD-273 974
CDS AND OTHER II-IV COMPOUNDS; SOLAR ENERGY CONVERTERS; PURIFICATION; CRYSTAL GROWTH.
AD-276 416
RESEARCH ON II-VI COMPOUND SEMICONDUCTORS INCLUDED PREPARATION, PURIFICATION AND GROWTH OF CDS, CDSE, ZNTE AND CDS-CDSE CRYSTALS. PROPERTY STUDIES AND MEASUREMENTS INCLUDED MELTING POINTS; REFRACTIVE INDEXES; ELASTIC, DIELECTRIC, PIEZOELECTRIC, AND LATTICE CONSTANTS; HALL EFFECT AND CONDUCTIVITY.
AD-281 718
INVESTIGATION OF SEMICONDUCTING PROPERTIES OF II-VI COMPOUNDS.
AD-282 527
FEASIBILITY INVESTIGATION OF CHEMICALLY SPRAYED THIN FILM PHOTOVOLTAIC CONVERTERS.
AD-282 547
TEMPERATURE DEPENDENCE OF LINE STRUCTURE OF CDS EDGE EMISSION. MASTER'S THESIS.
AD-284 015
FEASIBILITY OF FABRICATING A THIN FILM PHOTOVOLTAIC CONVERTER OF EITHER CDS OR CDSE USING A CHEMICAL SPRAY PROCESS.
AD-289 278
PHOTO-MAGNETO-ELECTRIC STUDY OF CDS SINGLE CRYSTALS AND ROLLED BI FOILS.
AD-299 135
ELECTRIC CONDUCTIVITY AND HALL EFFECT IN SEMICONDUCTORS WITH LOOPS OF EXTREMA.
AD-400 759

•ABSORPTION SPECTRUM
PHYSICS OF STIMULATED EMISSION IN II-VI SEMICONDUCTING COMPOUNDS.
AD-710 988

ACOUSTIC PROPERTIES
ACOUSTIC AMPLIFICATION AND ELECTRON MOBILITY IN LITHIUM AND SODIUM DOPED CADMIUM SULFIDE.
AD-603 611
PHYSICAL RESEARCH ON FUNDAMENTAL PROPERTIES OF II-VI COMPOUND SEMICONDUCTORS.
AD-649 242

AIR FORCE RESEARCH
HISTORY OF SEMICONDUCTOR RESEARCH AT THE AEROSPACE RESEARCH LABORATORIES; CADMIUM SULFIDE.
AD-465 519

BAND THEORY OF SOLIDS
REPRINT; CONVERGENCE STUDY OF A

SELF-CONSISTANT ORTHOGONALIZED-PLANE-WAVE BAND CALCULATION FOR HEXAGONAL CDS.
AD-667 022
REPRINT: SPLITTING OF EXCITON LINES IN WURTZITE-TYPE II-VI CRYSTALS BY UNIAXIAL STRESS.
AD-672 467
SELF-CONSISTENT OPW AND EMPIRICALLY-REFINED OPW BAND MODELS FOR CUBIC ZNS, ZNSE, CDS, AND CDSE.*
AD-677 026
REPRINT: ENERGY BAND STRUCTURE OF SEMICONDUCTORS.
AD-681 458
ELECTRONIC STRUCTURE AND OPTICAL SPECTRUM OF SEMICONDUCTORS.*
AD-692 745
REPRINT: EMISSION FROM EXCITED TERMINAL STATES OF BOUND EXCITON COMPLEXES.
AD-695 104
REPRINT: EXCITON-ENHANCED RAMAN SCATTERING BY OPTICAL PHONONS.
AD-695 232
REPRINT: MODULATED PIEZOREFLECTANCE IN SEMICONDUCTORS.
AD-710 194
EPITAXIC SUBLIMATION METHODS FOR THE STUDY OF PSEUDO-BINARY SEMICONDUCTOR ALLOYS.*
AD-716 210
REPRINT: CONDUCTION ELECTRON HYPERFINE INTERACTION IN SEMICONDUCTING CDS.
AD-716 896
REPRINT: SHORT WAVELENGTH IMPURITY EXCITON TRANSITIONS IN CDS AT 1.2 K.
AD-717 52*
REPRINT: SELF-CONSISTENT ORTHOGONALIZED-PLANE-WAVE CALCULATIONS.
AD-723 927
REPRINT: ELECTRONIC CORE LEVELS OF THE IIB-VIA COMPOUNDS.
AD-729 725
ELECTRONIC ENERGY STATES OF DISLOCATIONS IN CDS-TYPE SEMICONDUCTORS.*
AD-730 133
ELECTRON EMISSION STUDIES OF THE IIB-VIA SEMICONDUCTOR COMPOUNDS.*
AD-731 561
BAND STRUCTURE AND DISPERSION RELATIONS IN II-VI COMPOUNDS AND THEIR ALLOYS.*
AD-736 033
ELECTROREFLECTANCE STUDY OF CDS AND ZNO SINGLE CRYSTALS.*
AD-828 614
COMPARISON OF ULTRAVIOLET REFLECTIVITY AND CHARACTERISTIC ELECTRON ENERGY LOSS MEASUREMENTS OF ZNO AND CDS SINGLE CRYSTALS.*
AD-858 005
SELF CONSISTENT ORTHOGONALIZED PLANEWAVE ENERGY BAND MODEL FOR CUBIC ZNS, ZNSE, CDS AND CDSE.*
AD-859 726

CADMIUM SULFIDES
REPRINT: EFFECT OF STRESS ON CDS SINGLE CRYSTALS.
AD-661 882

CHEMICAL ANALYSIS
ANALYTICAL TECHNIQUES FOR THE DETERMINATION OF TRACE IMPURITIES IN CADMIUM SULFIDE.*
AD-676 043
ANALYTICAL TECHNIQUES FOR THE DETERMINATION OF TRACE IMPURITIES IN II-VI COMPOUNDS.*
AD-728 219

CHEMISORPTION
REPRINT: PHOTO-HALL STUDIES OF OXYGEN ADSORPTION EFFECTS ON PHOTOCONDUCTIVITY IN SINTERED LAYERS.
AD-623 045
THE INFLUENCE OF CHEMISORPTION ON THE ELECTRONIC PROPERTIES OF THIN SEMICONDUCTORS: OXYGEN CHEMISORPTION ON THE (11-20) SURFACE OF CDS.*
AD-688 945

CRYSTAL GROWTH
IMPROVED II-VI CRYSTALS.*

AD-666 401
IMPROVED II-VI CRYSTALS.•
AD-666 402
IMPROVED II-VI CRYSTALS.•
AD-666 403
RESEARCH ON IMPROVED II-VI CRYSTALS.•
AD-666 404
RESEARCH ON IMPROVED II-VI CRYSTALS.•
AD-666 405
IMPROVED II-VI CRYSTALS.•
AD-667 876
RESEARCH ON IMPROVED II-VI CRYSTALS.•
AD-679 566
RESEARCH IN PURIFICATION AND SINGLE CRYSTAL GROWTH OF II-VI COMPOUNDS.•
AD-679 635
RESEARCH IN PURIFICATION AND SINGLE CRYSTAL GROWTH OF II-VI COMPOUNDS.•
AD-709 890
RESEARCH ON IMPROVED II-VI CRYSTALS.•
AD-726 062
RESEARCH ON IMPROVED II-VI CRYSTALS.•
AD-727 048

CRYSTAL LATTICE DEFECTS
REPRINT: RARE EARTH IMPURITIES IN II-VI COMPOUNDS.
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REPRINT: SEMICONDUCTIVITY OF CDS AS A FUNCTION OF S-VAPOR PRESSURE DURING HEAT TREATMENT BETWEEN 500 DEGREES AND 700 DEGREES C.
AD-689 060

CRYSTAL LATTICES
OPTICAL STUDIES OF LATTICE VIBRATION IN II-VI SEMICONDUCTING COMPOUNDS.•
AD-676 649

CRYSTALLOGRAPHY
RESEARCH ON IMPROVED II-VI CRYSTALS.•
AD-660 874
RESEARCH ON IMPROVED II-VI CRYSTALS.•
AD-666 406

CYCLOTRON RESONANCE PHENOMENA
REPRINT: ANOMALOUS FAR INFRARED MAGNETOABSORPTION IN N-TYPE CADMIUM SULFIDE.
AD-725 634

DIFFUSION
STATUS OF DIFFUSION DATA FOR BINARY COMPOUND SEMICONDUCTORS.•
AD-670 014

DOPING
DOPING OF SEMICONDUCTORS AND SEMICONDUCTING FILM. VOLUME I.•
AD-687 900
SELECTIVE DOPING OF PIEZOELECTRIC CRYSTALS BY ION IMPLANTATION.•
AD-693 154
SELECTIVE DOPING FOR PIEZOELECTRIC CRYSTALS BY ION IMPLANTATION.•
AD-702 778
SELECTIVE DOPING OF PIEZOELECTRIC CRYSTALS BY ION IMPLANTATION.•
AD-727 097
AG DOPING OF CADMIUM SULFIDE AND ITS INFLUENCE ON ELECTRICAL PROPERTIES.•
AD-728 387

ELECTRIC CURRENTS
HIGH AMPLITUDE CURRENT AND OPTICAL TRANSMISSION OSCILLATIONS IN CDS SINGLE CRYSTALS.
AD-628 453

ELECTRIC FIELDS
SURFACE PINNED LAYER-LIKE FIELD INHOMOGENEITIES IN CDS.•
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REPRINT: ELECTRIC FIELD EFFECTS IN TRAPPING PROCESSES.
AD-637 919

ELECTRICAL CONDUCTANCE
REPRINT: IMPURITY CONDUCTIVITY IN SINGLE CRYSTAL CDS.
AD-630 991
REPRINT: STATISTICAL CONSIDERATIONS IN MOSFET CALCULATIONS.
AD-657 274
REPRINT: CRITICAL CONDITIONS FOR TRANSITIONS BETWEEN STATIONARY AND NON-STATIONARY HIGH-FIELD DOMAINS IN SEMI-INSULATORS.
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REPRINT: TIME-RESOLVED SCANNING ELECTRON MICROSCOPY AND ITS APPLICATION TO BULK-EFFECT OSCILLATORS.
AD-706 505
SORPTION-INDUCED CONDUCTIVITY CHANGES IN COMPOUND SEMICONDUCTORS.*
AD-726 177

ELECTRICAL PROPERTIES
INJECTION CAUSED P-N JUNCTION IN CDS.*
AD-641 400
ACOUSTOELECTRIC EFFECTS IN SOLIDS.*
AD-666 452
ACOUSTOELECTRIC EFFECTS IN SOLIDS.*
AD-668 603
A CENTER OF COMPETENCE IN SOLID STATE MATERIALS AND DEVICES.*
AD-729 908

ELECTROLUMINESCENCE
CARRIER INJECTION ELECTROLUMINESCENCE: LUMINESCENT JUNCTIONS IN WIDE-GAP SEMICONDUCTORS: TUNNEL INJECTION ELECTROLUMINESCENCE: A GALLIUM ARSENIDE-GALLIUM PHOSPHIDE LIGHT SOURCE: EVAPORATED ZNSE AND ZNTE FILMS AND CELLS.
AD-424 852

ELECTRON CAPTURE
REPRINT: DETERMINATION OF ELECTRON TRAPPING PARAMETERS.
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ELECTRON DIFFRACTION ANALYSIS
STUDY OF SURFACE PROPERTIES OF ATOMICALLY-CLEAN METALS AND SEMICONDUCTORS.
AD-429 412

EXCITONS
REPRINT: EMISSION FROM EXCITED TERMINAL STATES OF BOUND EXCITON COMPLEXES.
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REPRINT: SPIN EXCHANGE IN EXCITONS, THE QUASICUBIC MODEL AND DEFORMATION POTENTIALS IN II-VI COMPOUNDS.
AD-721 406

FIELD THEORY
ELECTRO-OPTICAL METHOD FOR INVESTIGATION OF FIELD AND CURRENT DISTRIBUTIONS IN SEMICONDUCTORS AND LAYER-LIKE FIELD DISTRIBUTIONS IN PHOTOCONDUCTORS.
AD-614 439
LAYERLIKE FIELD INHOMOGENEITIES IN HOMOGENEOUS SEMICONDUCTORS IN THE RANGE OF 'NEGATIVE DIFFERENTIAL CONDUCTIVITY'.*
AD-614 909
ELECTRO-OPTICAL METHOD FOR INVESTIGATION OF FIELD AND CURRENT DISTRIBUTIONS IN SEMICONDUCTORS AND LAYER-LIKE FIELD DISTRIBUTIONS IN PHOTOCONDUCTORS.
AD-619 190
REPRINT: LAYER-LIKE FIELD INHOMOGENEITIES IN HOMOGENEOUS SEMICONDUCTORS IN THE RANGE OF 'N-SHAPED NEGATIVE DIFFERENTIAL CONDUCTIVITY'.*
AD-623 363

GALLIUM ARSENIDES
JUNCTION EFFECTS IN COMPOUND SEMICONDUCTORS.*
AD-654 009

HEAT TREATMENT
CHANGE OF ELECTRICAL

CONDUCTIVITY OF CDS SINGLE CRYSTALS DURING HEAT TREATMENTS IN SULFUR VAPOR BETWEEN 600 AND 700C.*
AD-648 169

HIGH-PRESSURE RESEARCH
HIGH PRESSURE RESEARCH.
AD-626 734

HYDROSTATIC PRESSURE
THE EFFECT OF HYDROSTATIC PRESSURE ON THE PROPERTIES OF SEMICONDUCTORS.*
AD-670 611

IMPURITIES
RESEARCH ON CDTE.
AD-610 012
TRANSLATION OF RUSSIAN RESEARCH: INTRODUCTION OF MICROIMPURITIES INTO SINGLE CRYSTALS OF CDS DURING THEIR GROWTH AND SOME CHARACTERISTICS OF THE ALLOYED SAMPLES.
AD-621 424
ANALYTICAL TECHNIQUES FOR THE DETERMINATION OF TRACE IMPURITIES IN CADMIUM SULFIDE.
AD-623 165

INTERFACES
PROPERTIES OF P-N JUNCTIONS IN CADMIUM SULFIDE AND CONSTRUCTION OF PHOTOELECTRIC TRANSDUCERS--TRANSLATION.
AD-712 936

LIGHT
INTERACTIONS OF COHERENT OPTICAL RADIATION WITH SOLIDS.*
AD-450 756

LUMINESCENCE
SEMICONDUCTOR DEVICE CONCEPTS.*
AD-426 288
REPRINT: THEORETICAL ASPECTS OF POINT AND ASSOCIATED LUMINESCENT CENTERS.
AD-680 583
REPRINT: DIFFUSION OF RARE EARTH INTO II-VI COMPOUNDS.

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REPRINT: PHOTOLUMINESCENCE DUE TO ISOELECTRONIC OXYGEN AND TELLURIUM TRAPS IN II-VI ALLOYS.
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LUMINESCENCE STUDY OF EXCITON-EXCITON INTERACTION IN CADMIUM SULFIDE, CADMIUM SELENIDE, AND ZINC OXIDE.*
AD-713 181
REPRINT: KINETICS OF EXCITONS IN CDS AT TEMPERATURE.
AD-718 162

MAGNETO-OPTIC EFFECT
BAND PARAMETERS DETERMINATION FROM FARADAY ROTATION MEASUREMENTS.*
AD-664 582

MATERIALS
NEW SOLID-STATE DEVICE CONCEPTS.
AD-616 350
RESEARCH ON II-VI COMPOUNDS SEMICONDUCTORS: PURIFICATION, CRYSTAL GROWTH, LUMINESCENCE, AND FUNDAMENTAL PROPERTIES.
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MOLECULAR ELECTRONICS
MATERIAL PROCESSING AND PHENOMENA INVESTIGATION OF FUNCTIONAL ELECTRONIC BLOCKS.
AD-602 482

NEGATIVE RESISTANCE CIRCUITS
REPRINT: FIELD QUENCHING AS MECHANISM OF NEGATIVE DIFFERENTIAL CONDUCTIVITY IN PHOTOCONDUCTING CDS.
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NUCLEAR MAGNETIC RESONANCE
AN INVESTIGATION OF THE SEMICONDUCTOR-TO-METAL TRANSITION IN CHLORINE DOPED CADMIUM SULFIDE USING NUCLEAR MAGNETIC RESONANCE.*
AD-728 646

OPTICAL PROPERTIES
OPTICAL SECOND-HARMONIC

GENERATION IN SEMICONDUCTOR ALLOYS.
AD-602 212
OPTICAL PROPERTIES OF SEMICONDUCTING CRYSTALS.
AD-603 374

PHASE STUDIES
RECOVERY OF ROCKSALT STRUCTURE CDS TO ROOM PRESSURE.*
AD-660 760

PHONONS
OPTICAL VIBRATION SPECTRA OF SOLIDS.
AD-626 595
REPRINT: PHONON COUPLING IN EDGE EMISSION AND PHOTOCONDUCTIVITY OF CDSE, CDS, AND CDISE SUB X S SUB 1-X).
AD-656 151
REPRINT: PHONON SIDEBANDS ON BOUND EXCITON TRANSITIONS IN CDS AND ZNO.
AD-716 895

PHOTOCONDUCTIVITY
IMPROVED PHOTOCONDUCTORS FOR DISPLAY SWITCHING.*
AD-433 671
TRANSLATION OF BULGARIAN RESEARCH: INVESTIGATION OF ELECTRICAL CONDUCTION OF CADMIUM SULFIDE SEMI-CONDUCTORS USING HIGH FREQUENCY GENERATORS.
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REPRINT: FURTHER CONSIDERATIONS ON A THEORY OF SUPERLINEARITY IN CDS AND RELATED MATERIALS.
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REPRINT: TRANSITIONS BETWEEN CLASS I AND CLASS II CDS CRYSTALS INDUCED BY HEAT-TREATMENT, OXYGEN DE/ADSORPTION AND ELECTRON BOMBARDMENT.
AD-708 818
PROCEEDINGS OF THE INTERNATIONAL CONFERENCE ON PHOTOCONDUCTIVITY (3RD) HELD AT STANFORD UNIVERSITY, CALIFORNIA, ON 12-15 AUGUST 1969.*
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REPRINT: OSCILLATORY PHOTOCONDUCTIVE AND EXCITATION SPECTRA OF CDS AND ZNSE.
AD-720 544

PHOTOELECTRIC EFFECT
ELECTRON EMISSION STUDIES OF THE IIB-VIA SEMICONDUCTOR COMPOUNDS.*
AD-734 241

PHYSICAL PROPERTIES
TRANSLATION OF RUSSIAN RESEARCH: POLYCRYSTALLINE CADMIUM SULFIDE FILMS-ELECTRIC PROPERTIES AND OPTICAL ABSORPTION.
AD-629 423
II-VI SEMICONDUCTING COMPOUNDS DATA TABLES.*
AD-698 341
CUPROUS SULFIDE AND CUPROUS SULFIDE-CADMIUM SULFIDE HETEROJUNCTIONS.*
AD-734 636

PIEZOELECTRIC CRYSTALS
MICROWAVE INTERACTIONS IN SEMICONDUCTORS: DISTRIBUTED SINGLE CRYSTAL STRUCTURES: SOLID STATE ULTRASONIC AMPLIFIERS AND TRANSDUCERS.
AD-603 521
CURRENT INSTABILITIES IN PIEZOELECTRIC SEMICONDUCTORS.*
AD-651 003
REPRINT: NONLINEAR PHONON INTERACTION IN PIEZOELECTRIC SEMICONDUCTORS AND EFFECT ON CURRENT SATURATION.
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REPRINT: CIRCUIT-CONTROLLED MODES OF ACOUSTOELECTRIC OSCILLATIONS IN PIEZOELECTRIC SEMICONDUCTORS.
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REPRINT: PIEZOELECTRIC POLARON-CYCLOTRON RESONANCE IN THE QUANTUM LIMIT IN N-CDS.
AD-706 802
REPRINT: ENHANCEMENT OF THE PIEZOELECTRICALLY STIFFENED ULTRASONIC VELOCITY BY ELECTRON TRAPPING IN CDS.

AD-712 914
REPRINT: ACOUSTOELECTRIC AFTERCURRENT IN PHOTOCONDUCTING CDS.
AD-721 761

PIEZOELECTRIC EFFECT
ADVANCED FUNCTIONAL ELECTRONIC BLOCK DEVELOPMENT.
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REPRINT: A. ULTRASONIC DISPERSION IN PIEZOELECTRIC SEMICONDUCTORS. B. NONLINEAR SOUND TRANSMISSION THROUGH AN ORIFICE.
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REPRINT: OPTICAL PROBING OF RESISTIVITY PROFILES IN CDS AND THEIR RELATION WITH ACOUSTOELECTRIC CURRENT OSCILLATIONS.
AD-728 916

PREPARATION
RESEARCH IN PURIFICATION AND SINGLE CRYSTAL GROWTH OF II-VI COMPOUNDS.
AD-651 140
RESEARCH IN PURIFICATION AND SINGLE GROWTH OF II-VI COMPOUNDS.
AD-657 045

PROPAGATION
REPRINT: ELASTIC WAVE AND INFRARED LIGHT INTERACTIONS WITH A MOVING HIGH-FIELD DOMAIN IN A PIEZOELECTRIC SEMICONDUCTOR.
AD-650 482

PURIFICATION
RESEARCH IN PURIFICATION AND SINGLE CRYSTAL GROWTH OF II-VI COMPOUNDS.
AD-619 279
GAS DESORPTION FROM VIRGINAL CDS CRYSTALS.
AD-638 016

QUANTITATIVE ANALYSIS
REPRINT: QUANTITATIVE ANALYSIS OF TERNARY AND QUATERNARY SEMICONDUCTING ALLOYS WITH ELECTRON MICROPROBE.

AD-719 314

RADIATION DAMAGE
SOVIET ABSTRACTS ON RADIATION DAMAGE IN SOLIDS (TRANSLATION).
AD-459 964
SURVEY OF SOVIET-BLOC LITERATURE: ABSTRACTS ON RADIATION DAMAGE IN SEMICONDUCTORS, IONIC CRYSTALS, AND OTHER MATERIALS.
AD-604 341
TRANSLATION OF RUSSIAN RESEARCH: INVESTIGATING THE EFFECT OF GAMMA-RAYS, X-RAYS AND NEUTRONS ON ELECTRIC PROPERTIES OF CDS-SE AND CDSE-SE RECTIFYING SYSTEMS.
AD-615 868
REPRINT: RADIATION EFFECTS IN GAAS.
AD-618 013
RADIATION EFFECTS IN SEMICONDUCTING LASER MATERIALS.
AD-727 061
RADIATION DAMAGE EFFECTS IN ELECTRON IRRADIATED CADMIUM SULFIDE PLATELETS AT LOW TEMPERATURE.
AD-734 239

RAMAN SPECTROSCOPY
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AD-707 571
REPRINT: RESONANT CANCELLATION OF RAMAN SCATTERING FROM CDS AND SI.
AD-715 167
REPRINT: TEMPERATURE DEPENDENCE OF RAMAN LINEWIDTH AND INTENSITY OF SEMICONDUCTORS.
AD-717 296
REPRINT: POLARITON THEORY OF RAMAN SCATTERING IN INSULATING CRYSTALS. II.
AD-720 030
AN EXPERIMENTAL STUDY OF THE VIBRONIC AND ELECTRONIC RESONANCE RAMAN EFFECT IN SEMICONDUCTOR AND GARNET CRYSTALS.
AD-722 701
REPRINT: MULTIPLE-PHONON

RESONANT RAMAN SCATTERING THEORY.
AD-723 713

SCIENTIFIC RE SEARCH
SEMICONDUCTOR RESEARCH EXPLORING PROPERTIES AND CONCEPTS OF CDS LIQUIDUS, ZNSE CRYSTALS, AND GALLIUM ALLOY JUNCTIONS.
AD-408 664

SCIENTIFIC RESEARCH
SOLID STATE RESEARCH, 1971(3).*
AD-731 547

SINGLE CRYSTALS
ELECTRO-OPTICAL METHOD FOR INVESTIGATION OF FIELD AND CURRENT DISTRIBUTIONS IN SEMICONDUCTORS AND LAYER-LIKE FIELD DISTRIBUTIONS IN PHOTOCONDUCTORS.
AD-603 075
PHOTO-MAGNETO-ELECTRIC STUDY OF CDS CRYSTALS. TRANSPORT PROPERTIES OF BISMUTH ROLLED THIN FOILS.
AD-603 490
RESEARCH IN PURIFICATION AND SINGLE CRYSTAL GROWTH OF II-VI COMPOUNDS.
AD-634 691
RESEARCH IN PURIFICATION AND SINGLE CRYSTAL GROWTH OF II-VI COMPOUNDS.*
AD-642 450

SOLID SOLUTIONS
REPRINT: STUDY OF HOMOGENEITY OF SOLID SOLUTIONS OF CADMIUM SULFIDE AND CADMIUM SELENIDE BY X-RAY FLUORESCENCE.
AD-629 493

SOLID STATE PHYSICS
ELECTRONICALLY ACTIVE MATERIALS RESEARCH. GROUP III-V COMPOUND SEMICONDUCTORS. SEMIMETALS AND LOW BAND-GAP SEMICONDUCTORS. PHONON INTERACTIONS. OPTICAL PROPERTIES. REFRACTORY MATERIALS
AD-432 272
PHYSICAL RESEARCH ON PROPERTIES OF II-VI COMPOUND SEMICONDUCTORS.
AD-625 476
RESEARCH ON II-VI COMPOUND SEMICONDUCTORS.
AD-626 530
RESEARCH ON II-VI COMPOUND SEMICONDUCTORS.
AD-626 532
RESEARCH ON II-VI COMPOUND SEMICONDUCTORS.
AD-626 533
RESEARCH ON II-VI COMPOUND SEMICONDUCTORS.
AD-626 534
RESEARCH ON II-VI COMPOUND SEMICONDUCTORS.
AD-626 535
RESEARCH ON II-VI COMPOUND SEMICONDUCTORS.
AD-626 536
RESEARCH ON II-VI COMPOUND SEMICONDUCTORS.
AD-626 537
RESEARCH ON II-VI COMPOUND SEMICONDUCTORS.
AD-626 538
RESEARCH ON II-VI COMPOUND SEMICONDUCTORS.
AD-626 539
RESEARCH ON II-VI COMPOUND SEMICONDUCTORS.
AD-626 540
RESEARCH ON II-VI COMPOUND SEMICONDUCTORS CDS AND CDSE.
AD-627 381

SORPTION
DESORPTION OF OXYGEN AND ITS EFFECTS ON THE ELECTRICAL PROPERTIES OF CDS SINGLE CRYSTAL PLATELETS.*
AD-688 904

SPECTRA(VISIBLE + ULTRAVIOLET)
REPRINT: EDGE EMISSION BANDS IN HIGH-PURITY CADMIUM SULFIDE.
AD-739 464

SURFACE PROPERTIES
STUDY OF SURFACE PROPERTIES OF ATOMICALLY-CLEAN METALS AND SEMICONDUCTORS.

AD-613 699
PROPERTIES OF ATOMICALLY-CLEAN METALS AND SEMICONDUCTORS: GROWTH SURFACE OF CADMIUM SULFIDE; OXIDATION OF CO ON NICKEL SURFACE.
AD-623 174
STUDY OF SURFACE PROPERTIES OF ATOMICALLY-CLEAN METALS AND SEMICONDUCTORS. PART I. STUDY OF CDS SURFACES BY LEED. PART II. COMBINED LEED AND MASS SPECTROMETER MEASUREMENTS FOR ADSORPTION AND CATALYSIS.*
AD-630 863
STUDY OF SURFACE PROPERTIES OF ATOMICALLY-CLEAN METALS AND SEMICONDUCTORS.*
AD-639 345
SURFACE CONDUCTION IN CDS.*
AD-695 823
REPRINT: GENERALIZED PRINCIPAL ANGLE OF INCIDENCE AND CRITICAL ANGLE.
AD-720 497

SURFACES
REPRINT: CARBON EPR SIGNAL FROM VACUUM HEATED SURFACES.
AD-728 664

TRANSISTORS
REPRINT: INSULATED-GATE FIELD-EFFECT TRANSISTOR USING SINGLE CRYSTAL CADMIUM SULFIDE.
AD-630 880

TRANSPORT PROPERTIES
MEASUREMENT OF ELECTRON FREE LIFETIME AND TRAPPING FACTOR IN HIGH PURITY CADMIUM SULFIDE, CADMIUM SULFIDE/SELENIDE AND CADMIUM SELENIDE USING THE METHOD OF ULTRASONIC AMPLIFICATION.
AD-616 687
CYCLOTRON RESONANCE EXPERIMENTS.*
AD-639 395
REPRINT: UNIFORMLY PROPAGATING SOLUTIONS OF TRANSPORT AND POISSON EQUATIONS FOR PERIODIC FIELD DOMAINS.
AD-653 248
BAND STRUCTURE AND DISPERSION RELATIONS IN II-VI COMPOUNDS.*
AD-664 581

TUNNELING(ELECTRONICS)
TUNNELING SPECTROSCOPY STUDY OF GAAS, CDS AND ZNO SCHOTTKY BARRIER JUNCTIONS.*
AD-675 370

ULTRAVIOLET SPECTROSCOPY
ULTRAVIOLET REFLECTIVITY STUDIES OF CDS:SE SINGLE CRYSTAL SOLID SOLUTIONS.*
AD-633 645

VACUUM
THE INFLUENCE OF OXYGEN IN THE ULTRAHIGH VACUUM RANGE ON ELECTRICAL PROPERTIES OF CDS.*
AD-637 857

*SILICON
RAMAN SPECTROSCOPY
REPRINT: RESONANT CANCELLATION OF RAMAN SCATTERING FROM CDS AND SI.
AD-715 167

*SINGLE CRYSTALS
ENHANCED PHOTOCONDUCTANCE AND SHADOWS ON CADMIUM SULFIDE SINGLE CRYSTALS*
AD-257 072
ELECTRON MOBILITY IN CADMIUM SULPHIDE SINGLE CRYSTALS AT LOW TEMPERATURES*
AD-259 661
RESEARCH IN PURIFICATION OF CADMIUM SULFIDE CRYSYALS*
AD-259 883
INVESTIGATION OF SEMICONDUCTING PROPERTIES OF II-VI COMPOUNDS*
AD-264 310
CDS AND OTHER II-IV COMPOUNDS: SOLAR ENERGY CONVERTERS; PURIFICATION; CRYSTAL GROWTH.
AD-270 416
RESEARCH ON II-VI COMPOUND

SEMICONDUCTORS INCLUDED PREPARATION, PURIFICATION AND GROWTH OF CDS, CDSE, ZNTE AND CDS-CDSE CRYSTALS. PROPERTY STUDIES AND MEASUREMENTS INCLUDED MELTING POINTS; REFRACTIVE INDEXES; ELASTIC, DIELECTRIC, PIEZOELECTRIC, AND LATTICE CONSTANTS; HALL EFFECT AND CONDUCTIVITY.
AD-281 718

INVESTIGATION OF SEMICONDUCTING PROPERTIES OF II-VI COMPOUNDS.
AD-282 527

THE ELECTRON MOBILITY OF CDS WAS PLOTTED AS A FUNCTION OF 1/T BETWEEN 8 AND 293 K. ANALYSIS OF THE DATA INDICATES THAT A MEASURABLE ANISOTROPY IN THE ELECTRON MOBILITY EXISTS AND THAT A REVERSAL OF THIS ANISOTROPY OCCURS AT APPROXIMATELY 30 K.
AD-283 953

RESEARCH IN CRYOGENICS AND MAGNETO-OPTICS. MAGNETO-OPTICAL AND MAGNETIC SUSCEPTIBILITY RESEARCH SYSTEM AT THE AERONAUTICAL RESEARCH LABORATORIES. DOPED CDS AND ZNS SINGLE CRYSTALS AS ULTRA-LOW TEMPERATURE PARAMAGNETIC SALTS. POSSIBILITY OF OBSERVING THE MOLECULAR SPECTRA ASSOCIATED WITH IMPURITY-EXCITON COMPLEXES IN CDS AND CDSE.
AD-292 324

HALL EFFECT MEASUREMENTS IN INSULATORS, A 'TIME-OF-FLIGHT' METHOD OF STUDYING CARRIER TRANSPORT IN INSULATORS, A GENERAL ANALYSIS OF UNIPOLAR STEADY STATE SPACE CHARGE LIMITED CURRENTS IN INSULATORS, ORGANIC SEMICONDUCTORS, AND CDS ARE TOPICS INVESTIGATED IN PHOTOCONDUCTOR RESEARCH.
AD-295 659

PHONON-PHONON INTERACTION IN CRYSTAL. THEORETICAL CURVES BASED ON SELECTION RULES AND DRAWN FOR VARIOUS MODES OF OPERATION FOR PHONONPHONON INTERACTIONS IN SOLIDS ARE PRESENTED.
AD-296 440

CADMIUM COMPOUNDS
MULTIPHONON PROCESSES IN THE PHOTOCONDUCTIVITY OF CADMIUM SULFIDE AND CADMIUM SELENIDE SINGLE CRYSTALS.
AD-616 683

REPRINT; EXCITON STRUCTURE IN PHOTOCONDUCTIVITY OF CDS, CDSE, AND CDSISE SINGLE CRYSTALS.
AD-617 125

CRYSTAL GROWTH
ELECTRO-OPTICAL METHOD FOR INVESTIGATION OF FIELD AND CURRENT DISTRIBUTIONS IN SEMICONDUCTORS ANDLAYER-LIKE FIELD DISTRIBUTIONS IN PHOTOCONDUCTORS.
AD-603 075

GROWTH OF SINGLE CRYSTAL PLATELETS OF CADMIUM SULFIDE.
AD-608 903

DEGRADATION
X-RAY DAMAGE AND ANNEALING OF THESE DEFECTS IN CDS SINGLE CRYSTALS.
AD-623 895

ELECTRON BOMBARDMENT
LENGTH CHANGE MEASUREMENTS OF ELECTRON IRRADIATED CADMIUM SULFIDE IN THE ENERGY RANGE 275-935 KEV.
AD-616 684

NUCLEAR SPINS
NUCLEAR SPIN-LATTICE RELAXATION IN SINGLE CRYSTALS OF CADMIUM SULFIDE.
AD-636 201

OPTICAL PROPERTIES
HIGH AMPLITUDE CURRENT AND OPTICAL TRANSMISSION OSCILLATIONS IN CDS SINGLE CRYSTALS.
AD-628 453

OSCILLATION
EXPERIMENTAL INVESTIGATION OF CURRENT LIMITING AND OSCILLATION IN

CDS.
AD-607 036

PHOTOELECTRIC EFFECT
TRANSLATION OF BULGARIAN RESEARCH: INVESTIGATION OF ELECTRICAL CONDUCTION OF CADMIUM SULFIDE SEMI-CONDUCTORS USING HIGH FREQUENCY GENERATORS.
AD-603 391

PURIFICATION
RESEARCH IN PURIFICATION AND SINGLE CRYSTAL GROWTH OF II-VI COMPOUNDS.*
AD-661 140

SEMICONDUCTORS
PHOTO-MAGNETO-ELECTRIC STUDY OF CDS CRYSTALS. TRANSPORT PROPERTIES OF BISMUTH ROLLED THIN FOILS.
AD-603 490
TRANSLATION OF RUSSIAN RESEARCH: INTRODUCTION OF MICROIMPURITIES INTO SINGLE CRYSTALS OF CDS DURING THEIR GROWTH AND SOME CHARACTERISTICS OF THE ALLOYED SAMPLES.
AD-621 424
RESEARCH IN PURIFICATION AND SINGLE CRYSTAL GROWTH OF II-VI COMPOUNDS.
AD-634 591
RESEARCH IN PURIFICATION AND SINGLE CRYSTAL GROWTH OF II-VI COMPOUNDS.*
AD-642 [illegible]50

*SOLAR ATMOSPHERE
CDS AND OTHER II-IV COMPOUNDS; SOLAR ENERGY CONVERTERS; PURIFICATION; CRYSTAL GROWTH.
AD-276 416

*SOLAR CELLS
RESEARCH IN PURIFICATION OF CADMIUM SULFIDE CRYSTALS.
AD-259 883
RESEARCH ON SOLAR ENERGY CONVERSION EMPLOYING CDS GROWTH, ANNEALING, ETCHING AND ORIENTATION OF CDS SINGLE CRYSTALS AND FILMS.
AD-284-032
FEASIBILITY STACKING PHOTOVOLTAIC LAYERS OF CD OR ZN SULFIDES, SELENIDES, AND TELLURIDES FOR CONVERSION OF SUN RADIATION INTO ELECTRICAL POWER. PREPARATION AND GROWTH, SINGLE CRYSTALS AND THIN FILMS; THEORY; ELECTRICAL PROPERTIES.
AD-288 060
LARGE AREA THIN FILM CDS SOLAR CELL ARRAY INVESTIGATION. DESIGN OF CDS FILM CELL ARRAYS FOR PERFORMANCE AND ORBITAL TESTING.
AD-294 016
LARGE-AREA, THIN-FILM, CADMIUM SULFIDE SOLAR CELL ARRAY INVESTIGATION.
AD-401 699
LARGE-AREA, CADMIUM SULFIDE, THIN-FILM SOLAR CELL ARRAY INVESTIGATION; QUARTERLY TECHNICAL PROGRESS REPT. NO. 3.
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AD-700 500

CADMIUM COMPOUNDS
INVESTIGATION OF THIN FILM CADMIUM SULFIDE SOLAR CELLS.*
AD-423 684

CADMIUM SULFIDES
RESEARCH ON THE MECHANISM OF THE PHOTOVOLTAIC EFFECT IN HIGH-EFFICIENCY CDS THIN-FILM SOLAR CELLS.*
AD-661 557
PRESENT STATUS OF CADMIUM SULFIDE THIN FILM SOLAR CELLS.*
AD-667 519
RESEARCH ON THE MECHANISM OF THE PHOTOVOLTAIC EFFECT IN HIGH-EFFICIENCY CDS THIN-FILM SOLAR CELLS.*

AD-678 540
RESEARCH ON THE MECHANISM OF THE PHOTOVOLTAIC EFFECT IN HIGH-EFFICIENCY CDS THIN-FILM SOLAR CELLS.•
AD-678 541
RESEARCH ON THE MECHANISM OF THE PHOTOVOLTAIC EFFECT IN HIGH-EFFICIENCY CDS THIN-FILM SOLAR CELLS.•
AD-678 542

DEGRADATION
DEGRADATION OF CDS THIN FILM SOLAR CELLS IN DIFFERENT ENVIRONMENTS.•
AD-715 285

FAILURE(ELECTRONICS)
RESEARCH ON THE OPERATING AND FAILURE MECHANISMS IN CDS SOLAR CELLS.•
AD-722 112

FILMS
LARGE AREA, FLEXIBLE, LIGHT WEIGHT, THIN FILM CADMIUM SULFIDE SOLAR CELLS.
AD-601 459
INVESTIGATION OF THIN FILM CADMIUM SULFIDE SOLAR CELLS.
AD-605 425
CDS THIN-FILM SOLAR CELLS.
AD-613 187
PHOTOVOLTAIC AND THERMOELECTRIC SOLAR ENERGY CONVERSION USING THIN FILMS.
AD-686 496

MANUFACTURING METHODS
INVESTIGATION OF CHEMICALLY SPRAYED THIN-FILM PHOTOVOLTAIC CELLS.
AD-609 204
THIN FILM CDS SOLAR CELL FABRICATION PARAMETER STUDY.•
AD-710 636
PROPERTIES OF P-N JUNCTIONS IN CADMIUM SULFIDE AND CONSTRUCTION OF PHOTOELECTRIC TRANSDUCERS--TRANSLATION.
AD-712 936

PERFORMANCE(ENGINEERING)
FABRICATION OF CADMIUM SULFIDE THIN FILM SOLAR CELLS FOR SPACE VEHICLE TESTING.•
AD-666 439
RESEARCH ON THE MECHANISM OF THE PHOTOVOLTAIC EFFECT IN HIGH EFFICIENCY CDS THIN-FILM SOLAR CELLS.•
AD-702 095
IMPROVEMENTS IN CDS THIN FILM SOLAR CELLS.•
AD-707 869
IMPROVEMENTS IN CDS THIN FILM SOLAR CELLS.•
AD-723 315

RELIABILITY(ELECTRONICS)
REPRINT: PERFORMANCE OF CADMIUM SULFIDE THIN FILM SOLAR CELLS IN A SPACE ENVIRONMENT.
AD-699 893

SEMICONDUCTING FILMS
RESEARCH ON PHOTOVOLTAIC CELLS.
AD-621 454

SULFIDES
CUPROUS SULFIDE AND CUPROUS SULFIDE-CADMIUM SULFIDE HETEROJUNCTIONS.•
AD-734 536

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AD-284 032

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CADMIUM COMPOUNDS

HOMOGENEITY OF CADMIUM SELENIDE-CADMIUM SULFIDE SOLID SOLUTIONS BY X-RAY FLUORESCENCE.
AD-603 604

•SOLID STATE PHYSICS
ELECTRON MOBILITY IN CADMIUM SULPHIDE SINGLE CRYSTALS AT LOW TEMPERATURES.
AD-259 661
RESEARCH IN CRYOGENICS AND MAGNETO-OPTICS. MAGNETO-OPTICAL AND MAGNETIC SUSCEPTIBILITY RESEARCH SYSTEM AT THE AERONAUTICAL RESEARCH LABORATORIES. DOPED CDS AND ZNS SINGLE CRYSTALS AS ULTRA-LOW TEMPERATURE PARAMAGNETIC SALTS. POSSIBILITY OF OBSERVING THE MOLECULAR SPECTRA ASSOCIATED WITH IMPURITY-EXCITON COMPLEXES IN CDS AND CDSE.
AD-292 324
PHONON-PHONON INTERACTION IN CRYSTAL. THEORETICAL CURVES BASED ON SELECTION RULES AND DRAWN FOR VARIOUS MODES OF OPERATION FOR PHONONPHONON INTERACTIONS IN SOLIDS ARE PRESENTED.
AD-296 440

ACOUSTICS
RESEARCH ON THE THEORY AND DESIGN OF ACTIVE NETWORKS; MICROWAVE ULTRASONICS AND ACOUSTIC WAVE PROPAGATION IN PIEZOELECTRIC SEMICONDUCTORS.
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BIBLIOGRAPHIES
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FEASIBILITY OF CDS FOR SOLID STATE DETECTOR APPLICATION; ALPHA AND PHOTON IRRADIATION; MOBILITY-LIFETIME VALUES OF ELECTRRAPPING OF CARRIERS; PLASMA FORMATION.
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AD-432 272

•SOLIDS
OPTICAL PHENOMENA
INTERACTIONS OF COHERENT OPTICAL RADIATION WITH SOLIDS.
AD-431 975

•SONAR DOMES
A NEW FORM OF SOLID STATE SOLAR GENERATOR.
AD-273 974

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FLOW SEPARATION
REPRINT: A. ULTRASONIC DISPERSION IN PIEZOELECTRIC SEMI-CONDUCTORS. B. NONLINEAR SOUND TRANSMISSION THROUGH AN ORIFICE.
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TRANSISTORS
RESEARCH AND DEVELOPMENT FOR FIELD EFFECT TRIODES AND SPACE CHARGE LIMITED TRIODES.•
AD-442 774

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SOLAR CELLS
FABRICATION OF CADMIUM SULFIDE

THIN FILM SOLAR CELLS FOR SPACE VEHICLE TESTING.*
AD-666 434

*STEEL
CORROSION
STRESS CORROSION CRACKING IN HIGH STRENGTH FERROUS ALLOYS.*
AD-423 387

*STORAGE BATTERIES
FEASIBILITY STACKING PHOTOVOLTAIC LAYERS OF CD OR ZN SULFIDES, SELENIDES, AND TELLURIDES FOR CONVERSION OF SUN RADIATION INTO ELECTRICAL POWER, PREPARATION AND GROWTH, SINGLE CRYSTALS AND THIN FILMS; THEORY; ELECTRICAL PROPERTIES.
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*STRESSES
CORROSION
STRESS CORROSION CRACKING IN HIGH STRENGTH FERROUS ALLOYS.*
AD-423 387

*STRIP TRANSMISSION LINES
SYNTHESIS
DESIGN OF MICROWAVE FILTER METHODS.*
AD-627 402

*SUBLIMATION
CRYSTAL GROWTH
REPRINT: SURFACE MORPHOLOGY OF SUBLIMATED CRYSTALS OF CADMIUM AND ZINC SULFIDES.
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RESEARCH ON SEMICONDUCTOR SURFACES. 1. THE ANOMALOUS FIELD EFFECT IN GERMANIUM. 2. THE FIELD EFFECT IN CADMIUM SULFIDE.*
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PROPERTIES OF CADMIUM SULFIDE, ZINC SULFIDE AND MERCURIC SULFIDE. PARTS I-III. VOLUME I. AN ANNOTATED BIBLIOGRAPHY.*
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RESEARCH IN PURIFICATION OF CADMIUM SULFIDE CRYSTALS.*
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AD-283 953
TEMPERATURE DEPENDENCE OF LINE STRUCTURE OF CDS EDGE EMISSION. MASTER'S THESIS.
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SOLID STATE RADIATION DETECTORS WERE CONSTRUCTED USING CRYSTAL PLATELETS OF CDS. BOTH INTRINSIC AND P-N JUNCTION DETECTORS WERE MADE AND EVALUATED.
AD-284 020
ELECTROLUMINESCENCE STUDIES ON DC-PULSE EXCITED THIN FILM ELECTROLUMINORS; PREPARATION OF HIGH PURITY SINGLE CRYSTALS AND EVAPORATED FILMS OF CDS; HIGH SPEED PHOTOCONDUCTIVE LOGIC ELEMENTS.
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CADMIUM COMPOUNDS
MULTIPHONON PROCESSES IN THE PHOTOCONDUCTIVITY OF CADMIUM SULFIDE AND CADMIUM SELENIDE SINGLE CRYSTALS.
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REPRINT: OSCILLATORY PHOTOCONDUCTIVITY OF CDS.
AD-616 828
SURFACE PINNED LAYER-LIKE FIELD INHOMOGENEITIES IN CDS.*
AD-637 856
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AD-637 857
GAS DESORPTION FROM VIRGINAL CDS CRYSTALS.*
AD-638 016

ELECTRICAL PROPERTIES
CADMIUM SULFIDE: INFLUENCE OF OXYGEN IN THE ULTRAHIGH VACUUM RANGE ON ELECTRICAL PROPERTIES.
AD-634 032

MASS SPECTROSCOPY
ANALYTICAL TECHNIQUES FOR THE DETERMINATION OF TRACE IMPURITIES IN II-VI COMPOUNDS.*
AD-728 219

TRANSPORT PROPERTIES
MEASUREMENT OF ELECTRON FREE LIFETIME AND TRAPPING FACTOR IN HIGH PURITY CADMIUM SULFIDE, CADMIUM SULFIDE/SELENIDE AND CADMIUM SELENIDE USING THE METHOD OF ULTRASONIC AMPLIFICATION.
AD-616 687

VAPOR PLATING
REPRINT: ELECTRON BOMBARDMENT TECHNIQUE FOR DEPOSITION OF CDS FILM TRANSDUCERS.
AD-642 217

*SULFUR
RESEARCH IN PURIFICATION OF CADMIUM SULFIDE CRYSTALS.
AD-259 883

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CADIUM COMPOUNDS
STUDY OF SURFACE PROPERTIES OF ATOMICALLY-CLEAN METALS AND SEMICONDUCTORS.
AD-613 699

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SEMICONDUCTORS
RESEARCH IN PURIFICATION AND SINGLE CRYSTAL GROWTH OF II-VI COMPOUNDS.
AD-619 279

*TELLURIDES
CRYSTALLOGRAPHY
RESEARCH ON IMPROVED II-VI CRYSTALS.*
AD-660 874

*THIN FILMS (STORAGE DEVICES)
LARGE-AREA, THIN-FILM, CADMIUM SULFIDE SOLAR CELL ARRAY INVESTIGATION.
AD-401 699

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FILMS
REPRINT: ELECTRON BOMBARDMENT TECHNIQUE FOR DEPOSITION OF CDS FILM TRANSDUCERS.
AD-642 217
DESIGN OF MICROWAVE FILTER NETWORKS.*
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REPRINT: COMPARATIVE DATA ON CDS TRANSDUCERS FROM 14 MC/S TO 70 GC/S.
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ACTIVE SEMICONDUCTOR ACOUSTIC DEVICES.
AD-617 749
ACTIVE ACOUSTIC DEVICES.
AD-620 854

*TRANSISTORS
RESEARCH AND DEVELOPMENT FOR FIELD EFFECT TRIODES AND SPACE CHARGE LIMITED TRIODES.
AD-294 301
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AD-409 102

ELECTRIC FIELDS
RESEARCH AND DEVELOPMENT FOR

FIELD EFFECT TRIODES AND SPACE CHARGE LIMITED TRIODES.*
AD-442 774

FILMS
METAL BASE TRANSISTOR II.*
AD-642 524
THIN-FILM POLYCRYSTALLINE FIELD-EFFECT TRIODE.*
AD-651 816

INTEGRATED CIRCUITS
EVAPORATED THIN-FILM TECHNIQUES.*
AD-426 170

MATERIALS
ACTIVE LOGIC ELEMENTS USING NON-GALVANIC MODIFYING INPUTS.
AD-610 395

METAL FILMS
THIN FILM ACTIVE DEVICES, METAL INTERFACE AMPLIFIER, MEA STRUCTURE, MOS DIODES. INVESTIGATION OF HOT ELECTRON STRUCTURES INVOLVING METALSEMICONDUCTOR INTERFACES FOR EMITTERS AND/OR COLLECTORS.
AD-408 472

SEMICONDUCTING FILMS
EVAPORATED THIN-FILM DEVICES. INSULATED-GATE THIN-FILM TRANSISTOR. TELLURIUM AND CADMIUM SULFIDE FILMS.
AD-427 362
ADVANCED FUNCTIONAL ELECTRONIC BLOCK DEVELOPMENT: THIN FILM TRANSISTORS AND THEIR APPLICATION IN INTEGRATED CIRCUITS.
AD-610 366
THIN-FILM POLYCRYSTALLINE FIELD-EFFECT TRIODE.*
AD-631 408
THIN-FILM POLYCRYSTALLINE FIELD-EFFECT TRIODE.*
AD-631 409
THIN-FILM POLYCRYSTALLINE FIELD-EFFECT TRIODE.*
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THIN-FILM POLYCRYSTALLINE FIELD-EFFECT TRIODE.*
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SEMICONDUCTORS
REPRINT: INSULATED-GATE FIELD-EFFECT TRANSISTOR USING SINGLE CRYSTAL CADMIUM SULFIDE.
AD-630 680

TRIODES
INVESTIGATION OF HOT ELECTRON EMITTER.
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REPRINT: LAYER-LIKE FIELD INHOMOGENEITIES IN HOMOGENEOUS SEMICONDUCTORS IN THE RANGE OF 'N-SHAPED NEGATIVE DIFFERENTIAL CONDUCTIVITY'.*
AD-623 363

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RESEARCH AND DEVELOPMENT FOR FIELD EFFECT TRIODES AND SPACE CHARGE LIMITED TRIODES.
AD-294 301

ARMY RESEARCH
THIN FILM POLYCRYSTALLINE FIELD EFFECT TRIODE. FIRST QUARTERLY REPORT.
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FILMS
THIN-FILM POLYCRYSTALLINE FIELD-EFFECT TRIODE.*
AD-651 816

SEMICONDUCTING FILMS
THIN-FILM POLYCRYSTALLINE FIELD-EFFECT TRIODE.*
AD-631 408
THIN-FILM POLYCRYSTALLINE FIELD-EFFECT TRIODE.*
AD-631 409
THIN-FILM POLYCRYSTALLINE FIELD-EFFECT TRIODE.*
AD-634 088
SINGLE CRYSTAL CADMIUM SULFIDE

AND CADMIUM SELENIDE INSULATED-GATE FIELD-EFFECT TRIODES.*
AD-651 619

*TUNING DEVICES
INTEGRATED CIRCUITS
TUNED INTEGRATED CIRCUITS.*
AD-639 667
TUNED INTEGRATED CIRCUITS.*
AD-693 519

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CADMIUM COMPOUNDS
REPRINT: TUNNELING PROCESSES ACROSS THE CDS-ELECTROLYTE INTERFACE.
AD-614 494

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SEMICONDUCTORS
TUNNELING SPECTROSCOPY STUDY OF GAAS, CDS AND ZNO SCHOTTKY BARRIER JUNCTIONS.*
AD-875 370

*ULTRASONIC PROPERTIES
PHONONS
PIEZOELECTRIC COUPLING BETWEEN ULTRASONIC WAVES AND FREE ELECTRONS IN CADMIUM SULFIDE.*
AD-614 853

SEMICONDUCTORS
ULTRASONIC STRESS WAVES IN CADMIUM SULFIDE.*
AD-633 715

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MICROWAVE FREQUENCY
SURFACE MICROACOUSTICS.*
AD-716 674
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RESEARCH ON THE THEORY AND DESIGN OF ACTIVE NETWORKS; MICROWAVE ULTRASONICS AND ACOUSTIC WAVE PROPAGATION IN PIEZOELECTRIC SEMICONDUCTORS.
AD-609 434

SOURCES
ACTIVE ACOUSTO-OPTIC MODULATORS.*
AD-710 240

SURFACES
MAGNETOELASTIC SURFACE WAVES.*
AD-735 097

*ULTRAVIOLET DETECTORS
PHOTOELECTRIC CELLS(SEMICONDUCTOR)
INDICATORS OF ULTRAVIOLET RADIATION BASED ON TYPE FSK-M1 PHOTORESISTORS--TRANSLATION.
AD-843 544

*ULTRAVIOLET SPECTROSCOPY
SEMICONDUCTORS
ULTRAVIOLET REFLECTIVITY STUDIES OF CDSISE SINGLE CRYSTAL SOLID SOLUTIONS.*
AD-633 646

*SOLIDS
OPTICAL VIBRATION SPECTRA OF SOLIDS.
AD-626 595

*VACUUM
SEMICONDUCTORS
THE INFLUENCE OF OXYGEN IN THE ULTRAHIGH VACUUM RANGE ON ELECTRICAL PROPERTIES OF CDS.*
AD-637 857

*VAPOR PLATING
CADMIUM COMPOUNDS
REPRINT: ELECTRON BOMBARDMENT TECHNIQUE FOR DEPOSITION OF CDS FILM TRANSDUCERS.
AD-642 217

*VIEWING SCREENS
SEMICONDUCTING FILMS
BI-STABLE ELECTROPHOTOGRAPHIC

DISPLAY DEVICE.*
AD-732 301

*X-RAY SPECTROSCOPY
METAL FILMS
DETERMINATION OF THICKNESS AND COMPOSITION OF THIN FILMS BY THE METHOD OF X-RAY FLUORESCENCE.*
AD-636 043

*ZINC COMPOUNDS
PROPERTIES OF CADMIUM SULFIDE, ZINC SULFIDE AND MERCURIC SULFIDE. PARTS I-III. VOLUME I. AN ANNOTATED BIBLIOGRAPHY.
AD-256 763
PROPERTIES OF CADMIUM SULFIDE, ZINC SULFIDE AND MERCURIC SULFIDE. PART IV. VOLUME II. AN ANNOTATED BIBLIOGRAPHY.
AD-256 764
CDS AND OTHER II-IV COMPOUNDS; SOLAR ENERGY CONVERTERS; PURIFICATION; CRYSTAL GROWTH.
AD-276 416
RESEARCH ON II-VI COMPOUND SEMICONDUCTORS INCLUDED PREPARATION, PURIFICATION AND GROWTH OF CDS, CDSE, ZNTE AND CDS-CDSE CRYSTALS. PROPERTY STUDIES AND MEASUREMENTS INCLUDED MELTING POINTS; REFRACTIVE INDEXES; ELASTIC, DIELECTRIC, PIEZOELECTRIC, AND LATTICE CONSTANTS; HALL EFFECT AND CONDUCTIVITY.
AD-281 718

CARRIERS(SEMICONDUCTORS)
REPRINT: OSCILLATIONS IN EXCITON EMISSION IN THE EXCITATION SPECTRA OF ZNSE AND CDS.
AD-686 674

CHEMICAL ANALYSIS
ANALYTICAL TECHNIQUES FOR THE DETERMINATION OF TRACE IMPURITIES IN II-VI COMPOUNDS.*
AD-728 219

COMPRESSIVE PROPERTIES
REPRINT: LINEAR COMPRESSIBILITIES OF II-VI COMPOUND SINGLE CRYSTALS.
AD-715 574

CRYSTAL GROWTH
RESEARCH IN PURIFICATION AND SINGLE CRYSTAL GROWTH OF II-VI COMPOUNDS.*
AD-651 140
RESEARCH IN PURIFICATION AND SINGLE CRYSTAL GROWTH OF II-VI COMPOUNDS.*
AD-709 890
RESEARCH ON IMPROVED II-VI CRYSTALS.*
AD-725 062

ELECTRICAL PROPERTIES
NEW SOLID-STATE DEVICE CONCEPTS.
AD-621 941

LINE SPECTRUM
REPRINT: PHONON SIDEBANDS ON BOUND EXCITON TRANSITIONS IN CDS AND ZNO.
AD-716 895

LUMINESCENCE
REPRINT: EXCITON-EXCITON INTERACTION IN CDS, CDSE, AND ZNO.
AD-707 555

OPTICAL PROPERTIES
NEW SOLID-STATE DEVICE CONCEPTS.
AD-616 350
COMPARISON OF ULTRAVIOLET REFLECTIVITY AND CHARACTERISTIC ELECTRON ENERGY LOSS MEASUREMENTS OF ZNO AND CDS SINGLE CRYSTALS.*
AD-858 005

SEMICONDUCTORS
RESEARCH IN PURIFICATION AND SINGLE CRYSTAL GROWTH OF II-VI COMPOUNDS.*
AD-679 636

SPECTROSCOPY
TUNNELING SPECTROSCOPY STUDY OF GAAS, CDS AND ZNO SCHOTTKY BARRIER

JUNCTIONS.*
AD-876 370

SULFIDES
THIN CADMIUM SULFIDE AND ZINC SULFIDE FILMS FOR COMPOSITE MOLECULAR ELECTRONICS,
AD-612 679

*ZINC SULFIDES
BAND THEORY OF SOLIDS
SELF CONSISTENT ORTHOGONALIZED PLANEWAVE ENERGY BAND MODEL FOR CUBIC ZNS, ZNSE, CDS AND CDSE.*
AD-659 726

EPITAXIAL GROWTH
REPRINT: GROWTH AND PROPERTIES OF STEEPLY GRADED ZN(F)CD(1-F)S CRYSTALS.
AD-724 886

SURFACE PROPERTIES
REPRINT: SURFACE MORPHOLOGY OF SUBLIMATED CRYSTALS OF CADMIUM AND ZINC SULFIDES.
AD-713 837

TITLE INDEX

A. ULTRASONIC DISPERSION IN PIEZOELECTRIC SEMICONDUCTORS. B. NONLINEAR SOUND TRANSMISSION THROUGH AN ORIFICE.(U) AD-705 725
•SEMICONDUCTORS

ACOUSTIC AMPLIFICATION AND ELECTRON MOBILITY IN LITHIUM AND SODIUM DOPED CADMIUM SULFIDE.(U) AD-603 611
•IMPURITIES

ACOUSTOELECTRIC AFTERCURRENT IN PHOTOCONDUCTING CDS.(U) AD-721 761
•SEMICONDUCTORS

ACOUSTOELECTRIC DEVICE APPLICATIONS OF PIEZOELECTRIC AND SEMICONDUCTING THIN FILMS.(U) AD-710 932
•PIEZOELECTRIC CRYSTALS

ACOUSTOELECTRIC EFFECTS IN SOLIDS.(U) AD-666 952
•SEMICONDUCTORS

ACOUSTOELECTRIC EFFECTS IN SOLIDS.(U) AD-668 503
•SEMICONDUCTORS

ACOUSTOELECTRIC OSCILLATIONS, CURRENT SATURATION AND ELECTRON DRIFT MOBILITY IN CADMIUM SULPHIDE CRYSTALS.(U) AD-654 003
•CADMIUM SULFIDES

ACTIVE ACOUSTIC DEVICES.(U) AD-612 703
•TRANSDUCERS

ACTIVE ACOUSTIC DEVICES.(U) AD-617 749
•TRANSDUCERS

ACTIVE ACOUSTIC DEVICES.(U) AD-620 854
•TRANSDUCERS

ACTIVE ACOUSTIC DEVICES.(U) AD-679 130
•ACOUSTIC EQUIPMENT

ACTIVE ACOUSTO-OPTIC MODULATORS.(U) AD-710 240
•ULTRASONIC RADIATION

ACTIVE LOGIC ELEMENTS USING NON-GALVANIC MODIFYING INPUTS.(U) AD-610 395
•COMPUTER LOGIC

ACTIVE LOGIC ELEMENTS USING NON-GALVANIC MODIFYING INPUTS.(U) AD-630 022
•COMPUTERS

ADVANCED FUNCTIONAL ELECTRONIC BLOCK DEVELOPMENT.(U) AD-421 739
•SEMICONDUCTOR DEVICES

ADVANCED FUNCTIONAL ELECTRONIC BLOCK DEVELOPMENT.(U) AD-610 366
•SEMICONDUCTING FILMS

AG DOPING OF CADMIUM SULFIDE AND ITS INFLUENCE ON ELECTRICAL PROPERTIES.(U) AD-728 387
•SEMICONDUCTORS

ANALYTICAL TECHNIQUES FOR THE DETERMINATION OF TRACE IMPURITIES IN CADMIUM SULFIDE.(U) AD-623 165
•SEMICONDUCTORS

ANALYTICAL TECHNIQUES FOR THE DETERMINATION OF TRACE IMPURITIES IN CADMIUM SULFIDE.(U) AD-676 043
•SEMICONDUCTORS

ANALYTICAL TECHNIQUES FOR THE DETERMINATION OF TRACE IMPURITIES IN II-VI COMPOUNDS.(U) AD-728 219
•SULFIDES

ANISOTROPY IN THE ELECTRON MOBILITY OF SINGLE CADMIUM SULFIDE CRYSTALS AT LOW TEMPERATURES(U) AD-283 983
•CADMIUM COMPOUNDS

THE ANODIC SYNTHESIS OF CDS FILMS.(U) AD-674 498
•SEMICONDUCTING FILMS

ANOMALOUS FAR INFRARED MAGNETOABSORPTION IN N-TYPE CADMIUM SULFIDE.(U) AD-725 634
•SEMICONDUCTORS

ANTI-STOKES EXCITED EDGE EMISSION IN CADMIUM SULPHIDE.(U) AD-707 173
•CADMIUM SULFIDES

APPLICATION OF LIGHT AND IMAGE INTENSIFICATION.(U) AD-604 748
•IMAGE INTENSIFIERS(ELECTRONIC)

APPLICATION OF LIGHT AND IMAGE INTENSIFICATION.(U) AD-627 486
•IMAGE INTENSIFIERS(ELECTRONICS)

BAND PARAMETERS DETERMINATION FROM FARADAY ROTATION MEASUREMENTS.(U) AD-669 502
•SEMICONDUCTORS

BAND STRUCTURE AND DISPERSION RELATIONS IN II-VI COMPOUNDS AND THEIR ALLOYS.(U) AD-736 033
•SEMICONDUCTORS

BAND STRUCTURE AND DISPERSION RELATIONS IN II-VI COMPOUNDS.(U) AD-664 501
•SEMICONDUCTORS

BAND STRUCTURE AND SURFACE EFFECTS IN CADMIUM SULFIDE PHOTOEMISSION STUDIES.(U) AD-610 738
•PHOTOELECTRIC EFFECT

BI-STABLE ELECTROPHOTOGR APHIC DISPLAY DEVICE.(U) AD-732 301
•DISPLAY SYSTEMS

BOUND-PHONON QUASIPARTICLE IN CDS.(U) AD-734 462
•CADMIUM SULFIDES

BRUSHLESS PRECISION POTENTIOMETER.(U) AD-606 828
•POTENTIOMETERS

BRUSHLESS PRECISION POTENTIOMETER.(U) AD-610 710
•POTENTIOMETERS

CADMIUM SULFIDE. A HISTORY OF SEMICONDUCTOR RESEARCH AT THE AEROSPACE RESEARCH LABORATORIES.(U) AD-455 819
•SEMICONDUCTORS

CADMIUM SULFIDE PLATELET CURRENT INJECTION ELECTROLUMINESCENT DIODES.(U) AD-687 495
•DIODES(SEMICONDUCTOR)

CADMIUM SULFIDE SUMMARY REVIEW AND DATA SHEETS.(U) AD-413 667
•CADMIUM COMPOUNDS

CALCULATION OF THE EXCHANGE ENERGY FOR EXCITONS IN THE TWO BODY MODEL.(U) AD-716 892
•EXCITONS

CARBON EPR SIGNAL FROM VACUUM HEATED SURFACES.(U) AD-728 864
•SEMICONDUCTORS

A CENTER OF COMPETENCE IN SOLID STATE MATERIALS AND DEVICES.(U) AD-729 908
•SEMICONDUCTORS

CHANGE OF ELECTRICAL CONDUCTIVITY OF CDS SINGLE CRYSTALS DURING HEAT TREATMENTS IN SULFUR VAPOR BETWEEN 500 AND 700C.(U) AD-648 169
•SEMICONDUCTORS

CHARACTERISTIC FIELD INHOMOGENEITIES IN HOMOGENEOUS DIELECTRICS IN THE PRE-BREAKDOWN RANGE.(U) AD-659 777
•CADMIUM SULFIDES

CIRCUIT-CONTROLLED MODES OF ACOUSTOELECTRIC OSCILLATIONS IN PIEZOELECTRIC SEMICONDUCTORS.(U) AD-684 901
•CRYSTAL OSCILLATORS

COHERENT AND AD-661 907

NONCOHERENT LIGHT EMISSION IN II-VI COMPOUNDS.(U)
•SEMICONDUCTOR DEVICES

COMPARATIVE DATA ON CDS TRANSDUCERS FROM 14 MC/S TO 70 GC/S.(U) AD-841 802
•CADMIUM COMPOUNDS

COMPARISON OF ULTRAVIOLET REFLECTIVITY AND CHARACTERISTIC ELECTRON ENERGY LOSS MEASUREMENTS OF ZNO AND CDS SINGLE CRYSTALS.(U) AD-858 005
•SEMICONDUCTORS

COMPATIBLE TECHNIQUES FOR INTEGRATED CIRCUITRY(U) AD-294 656
•MICROMINIATURIZATION(ELECTRONICS))

CONDUCTION ELECTRON HYPERFINE INTERACTION IN SEMICONDUCTING CDS.(U) AD-716 896
•SEMICONDUCTORS

CONTROL OF THE SURFACE POTENTIAL OF EVAPORATED CDS LAYERS.(U) AD-686 984
•SEMICONDUCTING FILMS

CONVERGENCE STUDY OF A SELF-CONSISTANT ORTHOGONALIZED-PLANE-WAVE BAND CALCULATION FOR HEXAGONAL CDS.(U) AD-667 022
•SEMICONDUCTORS

CRITICAL CONDITIONS FOR TRANSITIONS BETWEEN STATIONARY AND NON-STATIONARY HIGH-FIELD DOMAINS IN SEMI-INSULATORS.(U) AD-689 089
•SEMICONDUCTORS

CRYSTAL CHEMISTRY OF NEW HIGH-PRESSURE PHASES.(U) AD-668 876
•PHASE STUDIES

CUPROUS SULFIDE AND CUPROUS SULFIDE-CADMIUM SULFIDE HETEROJUNCTIONS.(U) AD-734 836
•SEMICONDUCTORS

CURRENT INSTABILITIES IN PIEZOELECTRIC SEMICONDUCTORS.(U) AD-681 003
•SEMICONDUCTORS

CURRENT SATURATION IN CDS FILMS AT VARIOUS TEMPERATURES.(U) AD-783 373
•SEMICONDUCTING FILMS

CYCLOTRON RESONANCE EXPERIMENTS.(U) AD-639 398
•CYCLOTRON RESONANCE PHENOMENA

CYCLOTRON RESONANCE OF PIEZOELECTRIC POLARONS IN THE QUANTUM LIMIT.(U) AD-675 972
•CARRIERS(SEMICONDUCTORS)

CYCLOTRON RESONANCE OF PIEZOELECTRIC POLARONS.(U) AD-635 332
•CADMIUM COMPOUNDS

DC-ELECTROLUMINESCENT FLAT PANEL DISPLAY.(U) AD-735 342
•DISPLAY SYSTEMS

DEGRADATION OF CDS THIN FILM SOLAR CELLS IN DIFFERENT ENVIRONMENTS.(U) AD-716 285
•SOLAR CELLS

DESIGN OF MICROWAVE FILTER NETWORKS.(U) AD-827 402
•COMPUTER PROGRAMS

DESORPTION OF OXYGEN AND ITS EFFECTS ON THE ELECTRICAL PROPERTIES OF CDS SINGLE CRYSTAL PLATELETS.(U) AD-688 904
•SEMICONDUCTORS

DETERMINATION OF ELECTRON TRAPPING PARAMETERS.(U) AD-631 771
•SEMICONDUCTORS

DETERMINATION OF FIELD-DEPENDENT CARRIER DENSITY AND MOBILITY IN PHOTOCONDUCTORS USING HIGH-FIELD DOMAINS.(U) AD-730 237
•CADMIUM SULFIDES

DETERMINATION OF THICKNESS AND COMPOSITION OF THIN FILMS BY THE METHOD OF X-RAY FLUORESCENCE.(U) AD-836 093
•METAL FILMS

DEVELOPMENT OF PHOTORESISTIVE ELEMENTS FOR AN ANALOG MULTIPLIER.(U) AD-671 980
•PHOTOELECTRIC CELLS(SEMICONDUCTOR)

DIFFUSION OF RARE EARTH INTO II-VI COMPOUNDS.(U) AD-691 964
•SEMICONDUCTORS

DISPERSIVE AND NONDISPERSIVE X-RAY FLUORESCENCE METHODS FOR THE MEASUREMENT OF THE THICKNESSES OF FILMS OF CADMIUM SULFIDE AND OTHER II-VI COMPOUNDS.(U) AD-700 584
•SEMICONDUCTING FILMS

DONOR-ACCEPTOR PAIR RECOMBINATION SPECTRA IN CADMIUM SULFIDE CRYSTALS.(U) AD-708 638
•CADMIUM SULFIDES

DOPING OF SEMICONDUCTORS AND SEMICONDUCTING FILM. VOLUME I.(U) AD-687 900
•SEMICONDUCTORS

THE EDGE EMISSION BANDS IN CADMIUM SULFIDE.(U) AD-686 673
•BAND SPECTRUM

EDGE EMISSION BANDS IN HIGH-PURITY CADMIUM SULFIDE.(U) AD-734 464
•SEMICONDUCTORS

EFFECTIVE WORK FUNCTION OF METAL CONTACTS TO VACUUM-CLEAVED PHOTOCONDUCTING CDS FOR HIGH PHOTOCURRENTS.(U) AD-697 003
•CADMIUM SULFIDES

THE EFFECT OF HYDROSTATIC PRESSURE ON THE PROPERTIES OF SEMICONDUCTORS.(U) AD-670 611
•SEMICONDUCTORS

EFFECT OF STRESS ON CDS SINGLE CRYSTALS.(U) AD-661 882
•SEMICONDUCTORS

ELASTIC WAVE AND INFRARED LIGHT INTERACTIONS WITH A MOVING HIGH-FIELD DOMAIN IN A PIEZOELECTRIC SEMICONDUCTOR.(U) AD-650 482
•SEMICONDUCTORS

ELECTRIC CONDUCTIVITY AND HALL EFFECT IN SEMICONDUCTORS WITH LOOPS OF EXTREMA(U) AD-400 759
•SEMICONDUCTORS

ELECTRIC FIELD EFFECTS IN TRAPPING PROCESSES.(U) AD-637 919
•SEMICONDUCTORS

ELECTRICAL PERFORMANCE OF METAL-INSULATOR-PIEZOELECTRIC SEMICONDUCTOR TRANDUCERS.(U) AD-663 779
•PIEZOELECTRIC TRANSDUCERS

ELECTRO-OPTICAL METHOD FOR INVESTIGATION OF FIELD AND CURRENT DISTRIBUTIONS IN SEMICONDUCTORS AND LAYER-LIKE FIELD DISTRIBUTIONS IN PHOTOCONDUCTORS.(U) AD-603 075
•SEMICONDUCTORS

ELECTRO-OPTICAL METHOD FOR INVESTIGATION OF FIELD AND CURRENT DISTRIBUTIONS IN SEMICONDUCTORS AND LAYER-LIKE FIELD DISTRIBUTIONS IN PHOTOCONDUCTORS.(U) AD-619 439
•SEMICONDUCTORS

ELECTRO-OPTICAL METHOD FOR INVESTIGATION OF FIELD AND CURRENT DISTRIBUTIONS IN SEMICONDUCTORS AND LAYER-LIKE FIELD DISTRIBUTIONS IN PHOTOCONDUCTORS.(U) AD-619 190
•SEMICONDUCTORS

ELECTROACOUSTIC DELAY LINES FOR MICROWAVE FREQUENCIES.(U) AD-671 689
•DELAY LINES

ELECTROLUMINESCENT- AD-286 829
PHOTOCONDUCTOR ELEMENTS(U)
•CADMIUM COMPOUNDS

ELECTRON-BEAM PUMPED AD-642 201
LASERS OF CDSE AND CDS,(U)
•LASERS

ELECTRON BEAM PUMPED AD-698 058
SEMICONDUCTOR LASERS,(U)
•SEMICONDUCTOR DEVICES

ELECTRON BOMBARDMENT AD-692 217
TECHNIQUE FOR DEPOSITION OF CDS
FILM TRANSDUCERS,(U)
•TRANSDUCERS

ELECTRON EMISSION AD-731 551
STUDIES OF THE IIB-VIA
SEMICONDUCTOR COMPOUNDS,(U)
•SEMICONDUCTORS

ELECTRON EMISSION AD-734 291
STUDIES OF THE IIB-VIA
SEMICONDUCTOR COMPOUNDS,(U)
•SEMICONDUCTORS

ELECTRON MOBILITY IN AD-289 681
CADMIUM SULPHIDE SINGLE CRYSTALS AT
LOW TEMPERATURES(U)
•CADMIUM COMPOUNDS

ELECTRON MOBILITY IN AD-689 057
CDS AT HIGH ELECTRIC FIELDS,(U)
•CADMIUM SULFIDES

ELECTRONIC CORE LEVELS AD-729 725
OF THE IIB-VIA COMPOUNDS,(U)
•SEMICONDUCTORS

ELECTRONIC ENERGY AD-730 133
STATES OF DISLOCATIONS IN CDS-TYPE
SEMICONDUCTORS,(U)
•SEMICONDUCTORS

ELECTRONIC STRUCTURE AD-692 748
AND OPTICAL SPECTRUM OF
SEMICONDUCTORS,(U)
•SEMICONDUCTORS

ELECTROQUENCHABLE AD-268 932
PHOSPHOR INVESTIGATION(U)
•CATHODE RAY TUBE SCREENS

ELECTROREFLECTANCE AD-828 614
STUDY OF CDS AND ZNO SINGLE
CRYSTALS,(U)
•SEMICONDUCTORS

EMISSION FROM EXCITED AD-695 104
TERMINAL STATES OF BOUND EXCITON
COMPLEXES,(U)
•SEMICONDUCTORS

EMISSION FROM EXCITED AD-700 885
TERMINAL STATES OF BOUND EXCITON
COMPLEXES,(U)
•LUMINESCENCE

ENERGY BAND STRUCTURE AD-681 458
OF SEMICONDUCTORS,(U)
•SEMICONDUCTORS

ENHANCED PHOTOCONDUCTANC AD-257 072
E AND SHADOWS ON CADMIUM SULFIDE
SINGLE CRYSTALS(U)
•PHOTOCONDUCTIVITY

ENHANCEMENT OF THE AD-712 914
PIEZOELECTRICALLY STIFFENED
ULTRASONIC VELOCITY BY ELECTRON
TRAPPING IN CDS,(U)
•SEMICONDUCTORS

EPITAXIC SUBLIMATION AD-716 210
METHODS FOR THE STUDY OF PSEUDO-
BINARY SEMICONDUCTOR ALLOYS,(U)
•SEMICONDUCTORS

AN EVALUATION OF AD-284 020
CADMIUM SULFIDE AS A NUCLEAR
RADIATION DETECTOR(U)
•CADMIUM COMPOUNDS

EVAPORATED AND AD-637 725
RECRYSTALLIZED CDS LAYERS,(U)
•CADMIUM COMPOUNDS

EVAPORATED THIN FILM AD-296 929
DEVICES(U)
•CADMIUM COMPOUNDS

EVAPORATED THIN-FILM DEVICES.(U) AD-427 362
•TRANSISTORS

EVAPORATED THIN-FILM TECHNIQUES.(U) AD-426 170
•INTEGRATED CIRCUITS

EXCITATION AND DETECTION OF SURFACE ELASTIC WAVES IN PIEZOELECTRIC CRYSTALS.(U) AD-697 237
•PIEZOELECTRIC CRYSTALS

EXCITON-ENHANCED RAMAN SCATTERING BY OPTICAL PHONONS.(U) AD-698 232
•SEMICONDUCTORS

EXCITON-EXCITON INTERACTION IN CDS, CDSE, AND ZNO.(U) AD-707 588
•CADMIUM SULFIDES

EXCITON STRUCTURE IN PHOTOCONDUCTIVITY OF CDS, CDSE, AND CDSISE SINGLE CRYSTALS.(U) AD-617 125
•CADMIUM COMPOUNDS

EXPERIMENTAL INVESTIGATION OF CURRENT LIMITING AND OSCILLATION IN CDS.(U) AD-607 025
•CADMIUM COMPOUNDS

AN EXPERIMENTAL STUDY OF THE VIBRONIC AND ELECTRONIC RESONANCE RAMAN EFFECT IN SEMICONDUCTOR AND HARMEY CRYSTALS.(U) AD-722 701
•SEMICONDUCTORS

FABRICATION OF CADMIUM SULFIDE THIN FILM SOLAR CELLS FOR SPACE VEHICLE TESTING.(U) AD-666 439
•SOLAR CELLS

FABRICATION OF VAPOR-DEPOSITED THIN FILM PIEZOELECTRIC TRANSDUCERS FOR THE STUDY OF PHONON BEHAVIOR IN DIELECTRIC MATERIALS AT MICROWAVE FREQUENCIES.(U) AD-662 834
•PIEZOELECTRIC TRANSDUCERS

FAILURE MECHANISMS AT SURFACES AND INTERFACES.(U) AD-613 036
•SEMICONDUCTING FILMS

FEASIBILITY INVESTIGATION OF CHEMICALLY SPRAYED THIN FILM PHOTOVOLTAIC CONVERTERS(U) AD-282 847
•PHOTOELECTRIC CELLS (SEMICONDUCTOR)

FEASIBILITY INVESTIGATION OF CHEMICALLY SPRAYED THIN FILM PHOTOVOLTAIC CONVERTERS(U) AD-289 278
•PHOTOELECTRIC CELLS (SEMICONDUCTOR)

FEASIBILITY INVESTIGATION OF CHEMICALLY SPRAYED THIN FILM PHOTOVOLTAIC CONVERTERS.(U) AD-403 053
•PHOTOELECTRIC CELLS (SEMICON DUCTOR)

FEASIBILITY OF CADMIUM SULFIDE FOR SOLID STATE DETECTOR APPLICATION.(U) AD-418 814
•CADMIUM COMPOUNDS

FEASIBILITY STACKING PHOTOVOLTAIC LAYERS OF CD OR ZN SULFIDES, SELENIDES, AND TELLURIDES FOR CONVERSION OF SUN RADIATION INTO ELECTRICAL POWER, PREPARATION AND GROWTH, SINGLE CRYSTALS AND THIN FILMS(THEORY) ELECTRICAL PROPERTIES.•(U) AD-288 040
•PHOTOELECTRIC CELLS (SEMICONDUCTOR)

FERROMAGNETIC, FERROELECTRIC AND ACOUSTIC DEVICES.(U) AD-475 206
•DELAY LINES

FIELD-AND PHOTON-ENHANCED FIELD EMISSION FROM THIN-FILM FIELD-EMISSION DEVICES.(U) AD-679 996
•CADMIUM SULFIDES

FIELD DISTRIBUTION AND CURRENT SATURATION IN PHOTOCONDUCTIVE CDS.(U) AD-678 247
•CADMIUM SULFIDES

FIELD EFFECT AND SPACE-CHARGE-LIMITED THIN FILM TRIODES.(U) AD-442 638
•SEMICONDUCTOR DEVICES

FIELD-EFFECT AND SPACE-CHARGE-LIMITED THINFILM TRIODES.(U) AD-451 775
•SEMICONDUCTOR DEVICES

FIELD EFFECT TRIODES AND SPACE CHARGE LIMITED TRIODES.(U) AD-409 102
•TRANSISTORS

FIELD ENHANCED IONIZATION OF TRAPS.(U) AD-668 025
•CADMIUM SULFIDES

FIELD QUENCHING AS MECHANISM OF NEGATIVE DIFFERENTIAL CONDUCTIVITY IN PHOTOCONDUCTING CDS.(U) AD-716 097
•SEMICONDUCTORS

FREE CARRIER MICROWAVE SEMICONDUCTOR DEVICES.(U) AD-801 293
•SEMICONDUCTOR DEVICES

FREE CARRIER MICROWAVE SEMICONDUCTOR DEVICES.(U) AD-815 801
•SEMICONDUCTOR DEVICES

FURTHER CONSIDERATIONS ON A THEORY OF SUPERLINEARITY IN CDS AND RELATED MATERIALS.(U) AD-631 744
•SEMICONDUCTORS

GAS DESORPTION FROM VIRGINAL CDS CRYSTALS.(U) AD-636 016
•SEMICONDUCTORS

GENERALIZED PRINCIPAL ANGLE OF INCIDENCE AND CRITICAL ANGLE.(U) AD-720 497
•CADMIUM SULFIDES

GENERATION AND PROPAGATION OF HYPERSONIC WAVES AND THEIR APPLICATIONS TO MICROWAVE FREQUENCIES.(U) AD-725 995
•DELAY LINES

GROWTH AND PROPERTIES OF STEEPLY GRADED ZN(F)CD(1-F)S CRYSTALS.(U) AD-724 886
•ZINC SULFIDES

GROWTH OF SINGLE CRYSTAL PLATELETS OF CADMIUM SULFIDE.(U) AD-682 903
•CADMIUM SULFIDES

GROWTH OF THIOSPINELS (INVESTIGATION OF CRYSTALS FOR CO2 HIGH POWER LASER WINDOWS).(U) AD-709 988
•GAS LASERS

HIGH AMPLITUDE CURRENT AND OPTICAL TRANSMISSION OSCILLATIONS IN CDS SINGLE CRYSTALS.(U) AD-628 453
•SEMICONDUCTORS

HIGH POWER AND EFFICIENCY IN CDS ELECTRON BEAM PUMPED LASERS.(U) AD-683 364
•SEMICONDUCTOR DEVICES

HIGH PRESSURE RESEARCH.(U) AD-626 734
•HIGH-PRESSURE RESEARCH

HOMOGENEITY OF CADMIUM SELENIDE-CADMIUM SULFIDE SOLID SOLUTIONS BY X-RAY FLUORESCENCE.(U) AD-603 609
•CADMIUM COMPOUNDS

II-VI SEMICONDUCTING COMPOUNDS DATA TABLES.(U) AD-698 345
•SEMICONDUCTORS

IMPROVED DELAY LINE TECHNIQUES STUDY.(U) AD-617 693
•DELAY LINES

IMPROVED II-VI CRYSTALS.(U) AD-666 401
•SEMICONDUCTORS

IMPROVED II-VI CRYSTALS.(U) AD-666 402
•SEMICONDUCTORS

IMPROVED II-VI CRYSTALS.(U) AD-666 403
•SEMICONDUCTORS

IMPROVED II-VI CRYSTALS.(U) AD-667 576
•SEMICONDUCTORS

IMPROVED PHOTOCONDUCTORS FOR DISPLAY SWITCHING.(U) AD-633 671
•PHOTOELECTRIC CELLS (SEMICONDUCTOR)

IMPROVEMENTS IN CDS THIN FILM SOLAR CELLS.(U) AD-707 869
•SOLAR CELLS

IMPROVEMENTS IN CDS THIN FILM SOLAR CELLS.(U) AD-723 315
•SOLAR CELLS

IMPURITY CONDUCTIVITY IN SINGLE CRYSTAL CDS.(U) AD-630 491
•SEMICONDUCTORS

INDICATORS OF ULTRAVIOLET RADIATION BASED ON TYPE FSK-N) PHOTORESISTORS.(U) AD-693 544
•ULTRAVIOLET DETECTORS

INFLUENCE OF BOUNDARY CONDITIONS ON HIGH-FIELD DOMAINS IN GUNN DIODES.(U) AD-706 465
•MICROWAVE OSCILLATORS

THE INFLUENCE OF CHEMISORPTION ON THE ELECTRONIC PROPERTIES OF THIN SEMICONDUCTORS: OXYGEN CHEMISORPTION ON THE (11-20) SURFACE OF CDS.(U) AD-686 948
•SEMICONDUCTORS

THE INFLUENCE OF OXYGEN IN THE ULTRAHIGH VACUUM RANGE ON ELECTRICAL PROPERTIES OF CDS.(U) AD-634 032
•CADMIUM COMPOUNDS

THE INFLUENCE OF OXYGEN IN THE ULTRAHIGH VACUUM RANGE ON ELECTRICAL PROPERTIES OF CDS.(U) AD-637 037
•SEMICONDUCTORS

INFRARED MEASUREMENTS ON CDS THIN FILMS DEPOSITED ON ALUMINUM.(U) AD-684 160
•SEMICONDUCTING FILMS

INJECTION CAUSED P-N JUNCTION IN CDS.(U) AD-641 400
•SEMICONDUCTORS

INSULATED-GATE FIELD-EFFECT TRANSISTOR USING SINGLE CRYSTAL CADMIUM SULFIDE.(U) AD-630 680
•TRANSISTORS

INTERACTIONS OF COHERENT OPTICAL RADIATION WITH SOLIDS.(U) AD-631 975
•LASERS

INTERACTIONS OF COHERENT OPTICAL RADIATION WITH SOLIDS.(U) AD-680 754
•LIGHT TRANSMISSION

INTRODUCTION OF MICROIMPURITIES INTO SINGLE CRYSTALS OF CDS DURING THEIR GROWTH AND SOME CHARACTERISTICS OF THE ALLOYED SAMPLES IVVEDENNIA MIKRODOMISHOK V MONOKRYSTALY CDS V PROTSESI IKH ROSTU TA DEIAKI KHARAKTERYSTYKY LEGOVANYKH ZRAZKIV).(U) AD-621 424
•SEMICONDUCTORS

INVESTIGATING THE EFFECT OF GAMMA-RAYS, X-RAYS AND NEUTRONS ON ELECTRIC PROPERTIES OF CDS-SE AND CDSE-SE RECTIFYING SYSTEMS.(U) AD-615 648
•SEMICONDUCTORS

INVESTIGATION IN THE FIELD OF IMAGE INTENSIFICATION.(U) AD-635 548
•IMAGE INTENSIFIERS (ELECTRONICS)

INVESTIGATION OF CARRIER INJECTION ELECTROLUMINESCENCE.(U) AD-626 463
•ELECTROLUMINESCENCE

INVESTIGATION OF CARRIER INJECTION ELECTROLUMINESCENCE(U) AD-284 965
•CRYSTALS

INVESTIGATION OF CARRIER INJECTION ELECTROLUMINESCENCE(U) AD-284 933
•LUMINESCENCE

INVESTIGATION OF CARRIER INJECTION ELECTROLUMINESCENCE.(U) AD-424 883
•SEMICONDUCTING FILMS

INVESTIGATION OF CDS THIN-FILM SOLAR CELLS.(U) AD-613 187
•SEMICONDUCTING FILMS

INVESTIGATION OF CHEMICALLY SPRAYED THINFILM PHOTOVOLTAIC CELLS.(U) AD-689 284
•SOLAR CELLS

INVESTIGATION OF HOT ELECTRON EMITTER.(U) AD-415 759
•TRANSISTORS

INVESTIGATION OF HOT ELECT ON EMITTER.(U) AD-425 523
•SEMICONDUCTOR FILMS

INVESTIGATION OF HOT ELECTTON EMITTER.(U) AD-433 894
•ELECTRONS

INVESTIGATION OF SEMICONDUCTING PROPERTIES OF II-VI COMPOUNDS(U) AD-284 310
•COPPER

INVESTIGATION OF SEMICONDUCTING PROPERTIES OF II-VI COMPOUNDS(U) AD-282 827
•SEMICONDUCTING FILMS

AN INVESTIGATION OF THE SEMICONDUCTOR-TO-METAL TRANSITION IN CHLORINE DOPED CADMIUM SULFIDE USING NUCLEAR MAGNETIC RESONANCE.(U) AD-728 695
•SEMICONDUCTORS

INVESTIGATION OF THIN FILM CADMIUM SULFIDE SOLAR CELLS.(U) AD-423 664
•SOLAR CELLS

INVESTIGATION OF THIN FILM CADMIUM SULFIDE SOLAR CELLS.(U) AD-601 459
•SOLAR CELLS

INVESTIGATION OF THIN FILM CADMIUM SULFIDE SOLAR CELLS.(U) AD-605 425
•SOLAR CELLS

JUNCTION EFFECTS IN COMPOUND SEMICONDUCTORS.(U) AD-684 009
•SEMICONDUCTORS

KINETICS OF EXCITONS IN CDS AT TEMPERATURE.(U) AD-718 162
•CADMIUM SULFIDES

LARGE AREA THIN FILM CADMIUM SULFIDE SOLAR CELL ARRAY INVESTIGATION(U) AD-299 816
•AUXILIARY POWER PLANTS

LARGE AREA THIN FILM CADMIUM SULFIDE SOLAR CELL ARRAY INVESTIGATION(U) AD-401 699
•CADMIUM COMPOUNDS

LARGE AREA THIN FILM CADMIUM SULFIDE SOLAR CELL ARRAY INVESTIGATION.(U) AD-407 525
•SOLAR CELLS

LATTICE DYNAMICS OF CDS. 1. NEAREST NEIGHBOR APPROXIMATION.(U) AD-701 043
•CADMIUM SULFIDES

LAYER-LIKE FIELD INHOMOGENEITIES IN HOMOGENEOUS SEMICONDUCTORS IN THE RANGE OF 'N-SHAPED NEGATIVE DIFFERENTIAL CONDUCTIVITY'.(U) AD-623 363
•SEMICONDUCTORS

LAYER-LIKE FIELD AD-614 909
INHOMOGENEITIES IN HOMOGENEOUS SEMICONDUCTORS IN THE RANGE OF "NEGATIVE DIFFERENTIAL CONDUCTIVITY".(U)
•SEMICONDUCTORS

LENGTH CHANGE AD-616 684
MEASUREMENTS OF ELECTRON IRRADIATED CADMIUM SULFIDE IN THE ENERGY RANGE 275-935 KEV.(U)
•SINGLE CRYSTALS

LINEAR COMPRESSIBILITIES AD-718 574
OF II-VI COMPOUND SINGLE CRYSTALS.(U)
•ZINC COMPOUNDS

LOW INPUT VOLTAGE AD-296 305
CONVERSION(U)
•POWER TRANSFORMERS

LOW TEMPERATURE AD-636 502
INFRARED PHOTOCONDUCTORS.(U)
•INFRARED PHOTOCONDUCTORS

LUMINESCENCE STUDY OF AD-713 181
EXCITON-EXCITON INTERACTION IN CADMIUM SULFIDE, CADMIUM SELENIDE, AND ZINC OXIDE.(U)
•SEMICONDUCTORS

MAGNETOELASTIC SURFACE AD-735 097
WAVES.(U)
•ULTRASONIC RADIATION

MATERIAL PROCESSING AND AD-400 290
PHENOMENA INVESTIGATION OF FUNCTIONAL ELECTRONIC BLOCKS(U)
•INTEGRATED CIRCUITS

MATERIAL PROCESSING AND AD-409 475
PHENOMENA INVESTIGATION OF FUNCTIONAL ELECTRONIC BLOCKS. (U)
•MOLECULAR ELECTRONICS

MATERIAL PROCESSING AND AD-602 482
PHENOMENA INVESTIGATION OF FUNCTIONAL ELECTRONIC BLOCKS.(U)
•EPITAXIAL GROWTH

MAXIMIZING THE AD-298 689
PERFORMANCE OF PHOTOCONDUCTORS(U)
•CRYSTALS

MAXIMIZING THE AD-451 383
PERFORMANCE OF PHOTOCONDUCTORS.(U)
•HALL EFFECT

MEASUREMENT OF ELECTRON AD-616 687
FREE LIFETIME AND TRAPPING FACTOR IN HIGH PURITY CADMIUM SULFIDE, CADMIUM SULFIDE/SELENIDE AND CADMIUM SELENIDE USING THE METHOD OF ULTRASONIC AMPLIFICATION.(U)
•SEMICONDUCTORS

MECHANISM OF HIGH AD-615 269
CONDUCTIVITY IN VACUUMDEPOSITED CADMIUM SULFIDE FILMS.(U)
•SEMICONDUCTING FILMS

METAL BASE TRANSISTOR AD-692 529
II.(U)
•TRANSISTORS

METHOD OF CONTACTLESS AD-603 391
INVESTIGATING ELECTRICAL CONDUCTION OF CADMIUM SULFIDE TYPE SEMICONDUCTORS.(U)
•PHOTOSENSITIVITY

METHODS OF DETERMINING AD-781 850
SURFACE STATE ENERGIES.(U)
•BAND THEORY OF SOLIDS

MICROWAVE ACOUSTIC AD-601 566
DELAY LINE AND RELATED ACTIVE DEVICES.(U)
•MICROWAVE EQUIPMENT

MICROWAVE ACOUSTIC AD-604 250
DELAY LINE AND RELATED ACTIVE DEVICES.(U)
•DELAY LINES

MODULATED PIEZOREFLECTAN AD-710 194
CE IN SEMICONDUCTORS.(U)
•SEMICONDUCTORS

MOLECULAR CIRCUIT AD-288 571
DEVELOPMENT(U)

•CIRCUITS

[illegible]ONATIC AD-691 711
ILLUMINATION OF CADMIUM-SULFIDE OSCILLATOR.(U)
•CRYSTAL OSCILLATORS

MULTILAYER ENHANCEMENT AD-696 041
OF MICROWAVE PIEZOELECTRIC CONVERSION IN CDS-SIO LAYERS.(U)
•PIEZOELECTRIC TRANSDUCERS

MULTILAYER OHMIC AD-636 920
CONTACTS ON CDS.(U)
•SEMICONDUCTOR DEVICES

MULTILAYER THIN FILM AD-696 046
PIEZOELECTRIC TRANSDUCERS.(U)
•PIEZOELECTRIC TRANSDUCERS

MULTIPHOTON PROCESSES AD-616 603
IN THE PHOTOCONDUCTIVITY OF CADMIUM SULFIDE AND CADMIUM SELENIDE SINGLE CRYSTALS.(U)
•PHOTOCONDUCTIVITY

MULTIPLE-PHONON AD-723 713
RESONANT RAMAN SCATTERING THEORY.(U)
•SEMICONDUCTORS

A NEW FORM OF SOLID AD-273 974
STATE SOLAR GENERATOR(U)
•ELECTRIC POWER PRODUCTION

NEW KIND OF FIELD AD-655 559
INSTABILITY IN CDS IN THE RANGE OF NEGATIVE DIFFERENTIAL RESISTIVITY.(U)
•CADMIUM SULFIDES

NEW SOLID-STATE DEVICE AD-616 350
CONCEPTS.(U)
•SEMICONDUCTORS

NEW SOLID-STATE DEVICE AD-621 991
CONCEPTS.(U)
•SEMICONDUCTOR DEVICES

NEW SOLID-STATE DEVICE AD-628 770
CONCEPTS.(U)
•SEMICONDUCTOR DEVICES

NEW SOLID-STATE DEVICE AD-691 456
CONCEPTS.(U)
•SEMICONDUCTOR DEVICES

NEWS OF INSTITUTIONS OF AD-627 423
HIGHER LEARNING. PHYSICS. (SELECTED ARTICLES).(U)
•SEMICONDUCTORS

NO UNCLASSIFIED TITLE AD-267 999

NONLINEAR PHONON AD-679 697
INTERACTION IN PIEZOELECTRIC SEMICONDUCTORS AND EFFECT ON CURRENT SATURATION.(U)
•SEMICONDUCTORS

NUCLEAR-MAGNETIC- AD-739 466
RESONANCE STUDIES OF THE SEMICONDUCTOR-TO-METAL TRANSITION IN CHLORINE-DOPED CADMIUM SULFIDE.(U)
•CADMIUM SULFIDES

NUCLEAR SPIN-LATTICE AD-635 201
RELAXATION IN SINGLE CRYSTALS OF CADMIUM SULFIDE.(U)
•SINGLE CRYSTALS

ON THE LIMITING NOISE AD-672 139
OF SPACE-CHARGE-LIMITED SOLID STATE DIODES.(U)
•DIODES(SEMICONDUCTOR)

OPTICAL PROBING OF AD-728 916
RESISTIVITY PROFILES IN CDS AND THEIR RELATION WITH ACOUSTOELECTRIC CURRENT OSCILLATIONS.(U)
•SEMICONDUCTORS

OPTICAL PROPERTIES OF AD-603 379
SEMICONDUCTING CRYSTALS.(U)
•SEMICONDUCTORS

THE OPTICAL PROPERTIES AD-727 599
OF THIN SINGLE-CRYSTAL CDS FILMS IN A WIDE SPECTRAL INTERVAL.(U)
•SEMICONDUCTING FILMS

OPTICAL QUANTUM CRYSTAL GENERATON WITH EXCITATION BY FAST ELECTRONS.(U) AD-620 973
*SEMICONDUCTOR DEVICES

OPTICAL SECOND-HARMONIC GENERATION IN SEMICONDUCTOR ALLOYS.(U) AD-602 212
*SEMICONDUCTORS

OPTICAL STUDIES OF LATTICE VIBRATION IN II-VI SEMICONDUCTING COMPOUNDS.(U) AD-626 699
*SEMICONDUCTORS

OPTICAL VIBRATION SPECTRA OF SOLIDS.(U) AD-626 595
*INFRARED SPECTROSCOPY

OSCILLATIONS IN EXCITON EMISSION IN THE EXCITATION SPECTRA OF ZnSE AND CdS.(U) AD-605 674
*CADMIUM SULFIDES

OSCILLATORY PHASE OF PHOTOCONDUCTIVITY OF CdS.(U) AD-605 676
*CADMIUM SULFIDES

OSCILLATORY PHOTOCONDUCTIVE AND EXCITATION SPECTRA OF CdS AND ZnSE.(U) AD-728 844
*SEMICONDUCTORS

OSCILLATORY PHOTOCONDUCTIVITY OF CdS.(U) AD-616 828
*PHOTOCONDUCTIVITY

PERFORMANCE OF CADMIUM SULFIDE THIN FILM SOLAR CELLS IN A SPACE ENVIRONMENT.(U) AD-694 893
*SATELLITES(ARTIFICIAL)

PHONON COUPLING IN EDGE EMISSION AND PHOTOCONDUCTIVITY OF CdSe, CdS, AND Cd(SE SUB X S SUB 1-X).(U) AD-656 151
*SEMICONDUCTORS

PHONON-PHONON INTERACTION IN CRYSTALS(U) AD-296 990
*PHONONS

PHONON SIDEBANDS ON BOUND EXCITON TRANSITIONS IN CdS AND ZnO.(U) AD-716 895
*SEMICONDUCTORS

PHOTO-HALL STUDIES OF OXYGEN ADSORPTION EFFECTS ON PHOTOCONDUCTIVITY IN SINTERED LAYERS.(U) AD-623 048
*SEMICONDUCTORS

PHOTO-MAGNETIC-ELECTRIC STUDY OF CdS CRYSTALS. TRANSPORT PROPERTIES OF BISMUTH ROLLED THIN FOILS.(U) AD-603 490
*SEMICONDUCTORS

PHOTO-MAGNETO-ELECTRIC STUDY OF CdS SINGLE CRYSTALS AND ROLLED BISMUTH FOILS(U) AD-299 138
*BISMUTH

PHOTOCONDUCTIVITY IN CdS CRYSTALS AS A MECHANISM FOR GAMMA RAY DOSIMETRY(U) AD-261 116
*CADMIUM COMPOUNDS

PHOTOLUMINESCENCE DUE TO ISOELECTRONIC OXYGEN AND TELLURIUM TRAPS IN II-VI ALLOYS.(U) AD-710 448
*SEMICONDUCTORS

PHOTOLUMINESCENT PROPERTIES OF VACUUM DEPOSITED CADMIUM SULFIDE FILMS.(U) AD-700 269
*SEMICONDUCTING FILMS

PHOTOMAGNETOELECTRIC EFFECT OF CdS SINGLE CRYSTALS AND OF BISMUTH ROLLED FOILS. THERMOMAGNETOELECTRIC EFFECT OF CONTACTS BI-CU, GE-CU AND SI-CU.(U) AD-668 142
*CADMIUM SULFIDES

PHOTON-PHONON INTERACTION IN THIN FILMS,(U) AD-684 189
*SEMICONDUCTING FILMS

PHOTOVOLTAIC AND THERMOELECTRIC SOLAR ENERGY CONVERSION USING THIN FILMS,(U) AD-686 496

•SOLAR CELLS

PHYSICAL RESEARCH ON FUNDAMENTAL PROPERTIES OF II-VI COMPOUND SEMICONDUCTORS.(U) AD-699 298
•SEMICONDUCTORS

PHYSICAL RESEARCH ON PROPERTIES OF II-VI COMPOUND SEMI CONDUCTORS.(U) AD-625 976
•SEMICONDUCTORS

PHYSICS OF STIMULATED EMISSION IN II-VI SEMICONDUCTING COMPOUNDS.(U) AD-718 988
•SEMICONDUCTORS

PIEZOELECTRIC COUPLING BETWEEN ULTRASONIC WAVES AND FREE ELECTRONS IN CADMIUM SULFIDE.(U) AD-919 853
•PIEZOELECTRIC EFFECT

PIEZOELECTRIC POLARON-CYCLOTRON RESONANCE IN THE QUANTUM LIMIT IN N-CDS.(U) AD-704 802
•SEMICONDUCTORS

POLARITON THEORY OF RAMAN SCATTERING IN INSULATING CRYSTALS. II.(U) AD-720 038
•SEMICONDUCTORS

PRESENT STATUS OF CADMIUM SULFIDE THIN FILM SOLAR CELLS.(U) AD-667 819
•SOLAR CELLS

PROCEEDINGS OF THE INTERNATIONAL CONFERENCE ON PHOTOCONDUCTIVITY (3RD) HELD AT STANFORD UNIVERSITY, CALIFORNIA, ON 12-18 AUGUST 1969.(U) AD-726 138
•PHOTOCONDUCTIVITY

PRODUCTION AND ANNEALING OF INTRINSIC DEFECTS IN X-RAY IRRADIATED CDS SINGLE CRYSTALS.(U) AD-652 611
•CADMIUM SULFIDES

PROPERTIES OF CADMIUM SULFIDE, ZINC SULFIDE AND MERCURIC SULFIDE. PART IV. VOLUME II. AN ANNOTATED BIBLIOGRAPHY(U) AD-256 764
•BIBLIOGRAPHIES

PROPERTIES OF CADMIUM SULFIDE, ZINC SULFIDE AND MERCURIC SULFIDE. PARTS I-III, VOLUME I. AN ANNOTATED BIBLIOGRAPHY(U) AD-256 763
•BIBLIOGRAPHIES

PROPERTIES OF P-N JUNCTIONS IN CADMIUM SULFIDE AND CONSTRUCTION OF PHOTOELECTRIC TRANSDUCERS.(U) AD-718 936
•SEMICONDUCTORS

PROTON BLOCKING PATTERNS FOR HCP AND WURTZITE STRUCTURES.(U) AD-687 673
•CRYSTAL STRUCTURE

PULSE STRETCHING UTILIZING TWO-PHOTON-INDUCED LIGHT ABSORPTION.(U) AD-789 779
•LASERS

QUANTITATIVE ANALYSIS OF TERNARY AND QUATERNARY SEMICONDUCTING ALLOYS WITH ELECTRON MICROPROBE.(U) AD-719 319
•SEMICONDUCTORS

RADIATION DAMAGE EFFECTS IN ELECTRON IRRADIATED CADMIUM SULFIDE PLATELETS AT LOW TEMPERATURE.(U) AD-734 339
•SEMICONDUCTORS

RADIATION DAMAGE IN SOLIDS. COMPILATION OF ABSTRACTS.(U) AD-489 969
•SEMICONDUCTORS

RADIATION DAMAGE IN SOLIDS; COMPILATION OF ABSTRACTS.(U) AD-604 341
•SEMICONDUCTORS

RADIATION EFFECTS IN GAAS.(U) AD-616 013

•RADIATION DAMAGE

RADIATION EFFECTS IN SEMICONDUCTING LASER MATERIALS.(U) AD-727 041
•SEMICONDUCTORS

RARE EARTH IMPURITIES IN II-VI COMPOUNDS.(U) AD-667 094
•SEMICONDUCTORS

RECOVERY OF ROCKSALT STRUCTURE CDS TO ROOM PRESSURE.(U) AD-660 760
•CADMIUM SULFIDES

RESEARCH AND DEVELOPMENT FOR FIELD EFFECT TRIODES AND SPACE CHARGE LIMITED TRIODES(U) AD-294 301
•TRANSISTORS

RESEARCH AND DEVELOPMENT FOR FIELD EFFECT TRIODES AND SPACE CHARGE LIMITED TRIODES.(U) AD-442 774
•TRANSISTORS

RESEARCH IN CRYOGENICS AND MAGNETO-OPTICS(U) AD-292 324
•CRYOGENICS

RESEARCH IN EXPERIMENTAL AND THEORETICAL PHYSICS.(U) AD-683 612
•FIELD EFFECT TRANSISTORS

RESEARCH IN PURIFICATION AND SINGLE CRYSTAL GROWTH OF II-VI COMPOUNDS.(U) AD-619 279
•SEMICONDUCTORS

RESEARCH IN PURIFICATION AND SINGLE CRYSTAL GROWTH OF II-VI COMPOUNDS.(U) AD-634 591
•SINGLE CRYSTALS

RESEARCH IN PURIFICATION AND SINGLE CRYSTAL GROWTH OF II-VI COMPOUNDS.(U) AD-642 450
•SINGLE CRYSTALS

RESEARCH IN PURIFICATION AND SINGLE CRYSTAL GROWTH OF II-VI COMPOUNDS.(U) AD-681 140
•SEMICONDUCTORS

RESEARCH IN PURIFICATION AND SINGLE CRYSTAL GROWTH OF II-VI COMPOUNDS.(U) AD-677 636
•SEMICONDUCTORS

RESEARCH IN PURIFICATION AND SINGLE CRYSTAL GROWTH OF II-VI COMPOUNDS.(U) AD-709 890
•ZINC COMPOUNDS

RESEARCH IN PURIFICATION AND SINGLE GROWTH OF II-VI COMPOUNDS.(U) AD-687 095
•SEMICONDUCTORS

RESEARCH IN PURIFICATION OF CADMIUM SULFIDE CRYSTALS AND OTHER II-IV COMPOUNDS(U) AD-676 414
•CADMIUM COMPOUNDS

RESEARCH IN PURIFICATION OF CADMIUM SULFIDE CRYSTALS(U) AD-289 885
•CADMIUM

RESEARCH ON CDTE.(U) AD-630 012
•SEMICONDUCTORS

RESEARCH ON II-VI COMPOUND SEMICONDUCTORS.(U) AD-281 718
•CADMIUM COMPOUNDS

RESEARCH ON II-VI COMPOUND SEMICONDUCTORS.(U) AD-620 297
•SEMICONDUCTORS

RESEARCH ON II-VI COMPOUND SEMICONDUCTORS.(U) AD-626 530
•SEMICONDUCTORS

RESEARCH ON II-VI COMPOUND SEMICONDUCTORS.(U) AD-626 532
•SEMICONDUCTORS

RESEARCH ON II-VI COMPOUND SEMICONDUCTORS.(U) AD-626 533

•SEMICONDUCTORS

RESEARCH ON II-VI COMPOUND SEMICONDUCTORS.(U) AD-626 534
•SEMICONDUCTORS

RESEARCH ON II-VI COMPOUND SEMICONDUCTORS.(U) AD-626 535
•SEMICONDUCTORS

RESEARCH ON II-VI COMPOUND SEMICONDUCTORS.(U) AD-626 536
•SEMICONDUCTORS

RESEARCH ON II-VI COMPOUND SEMICONDUCTORS.(U) AD-626 537
•SEMICONDUCTORS

RESEARCH ON II-VI COMPOUND SEMICONDUCTORS.(U) AD-626 538
•SEMICONDUCTORS

RESEARCH ON II-VI COMPOUND SEMICONDUCTORS.(U) AD-626 539
•SEMICONDUCTORS

RESEARCH ON II-VI COMPOUND SEMICONDUCTORS.(U) AD-626 540
•SEMICONDUCTORS

RESEARCH ON II-VI COMPOUND SEMICONDUCTORS.(U) AD-627 381
•SEMICONDUCTORS

RESEARCH ON IMPROVED II-VI CRYSTALS.(U) AD-660 874
•SEMICONDUCTORS

RESEARCH ON IMPROVED II-VI CRYSTALS.(U) AD-666 904
•SEMICONDUCTORS

RESEARCH ON IMPROVED II-VI CRYSTALS.(U) AD-666 905
•SEMICONDUCTORS

RESEARCH ON IMPROVED II-VI CRYSTALS.(U) AD-666 906
•SEMICONDUCTORS

RESEARCH ON IMPROVED II-VI CRYSTALS.(U) AD-679 566
•CRYSTAL GROWTH

RESEARCH ON IMPROVED II-VI CRYSTALS.(U) AD-720 088
•CADMIUM COMPOUNDS

RESEARCH ON IMPROVED II-VI CRYSTALS.(U) AD-727 048
•CADMIUM SULFIDES

RESEARCH ON MICROWAVE INTERACTIONS IN SEMICONDUCTORS.(U) AD-603 821
•AUDIO AMPLIFIERS

RESEARCH ON PHOTOCONDUCTIVITY IN THIN FILMS.(U) AD-617 747
•PHOTOCONDUCTIVITY

RESEARCH ON PHOTOVOLTAIC CELLS.(U) AD-621 484
•SOLAR CELLS

RESEARCH ON SEMICONDUCTOR SURFACES. 1. THE ANOMALOUS FIELD EFFECT IN GERMANIUM. 2. THE FIELD EFFECT IN CADMIUM SULFIDE(U) AD-256 674
•CADMIUM COMPOUNDS

RESEARCH ON SOLAR-ENERGY CONVERSION EMPLOYING CADMIUM SULFIDE(U) AD-284 032
•CADMIUM COMPOUNDS

RESEARCH ON THE MECHANISM OF THE PHOTOVOLTAIC EFFECT IN HIGH-EFFICIENCY CDS THIN-FILM SOLAR CELLS.(U) AD-661 857
•SOLAR CELLS

RESEARCH ON THE MECHANISM OF THE PHOTOVOLTAIC EFFECT IN HIGH-EFFICIENCY CDS THIN-FILM SOLAR CELLS.(U) AD-678 840
•CADMIUM SULFIDES

RESEARCH ON THE MECHANISM OF THE PHOTOVOLTAIC EFFECT IN HIGH-EFFICIENCY CDS THIN-FILM SOLAR CELLS.(U) AD-678 841

•SOLAR CELLS

RESEARCH ON THE MECHANISM OF THE PHOTOVOLTAIC EFFECT IN HIGH-EFFICIENCY CDS THIN-FILM SOLAR CELLS.(U) AD-678 892
•CADMIUM SULFIDES

RESEARCH ON THE MECHANISM OF THE PHOTOVOLTAIC EFFECT IN HIGH EFFICIENCY CDS THIN-FILM SOLAR CELLS.(U) AD-702 098
•SOLAR CELLS

RESEARCH ON THE OPERATING AND FAILURE MECHANISMS IN CDS SOLAR CELLS.(U) AD-722 112
•SOLAR CELLS

RESEARCH ON THE THEORY AND DESIGN OF ACTIVE NETWORKS.(U) AD-689 434
•SOLID STATE PHYSICS

RESEARCH ON THE THEORY AND DESIGN OF ACTIVE NETWORKS.(U) AD-647 699
•ACOUSTICS

RESONANCE-ENHANCED BRILLOUIN SCATTERING IN CRYSTALS.(U) AD-726 942
•LIGHT TRANSMISSION

RESONANT CANCELLATION OF RAMAN SCATTERING FROM CDS AND SI.(U) AD-715 167
•SEMICONDUCTORS

RESONANT RAMAN SCATTERING FROM LO PHONONS IN POLAR SEMICONDUCTORS.(U) AD-707 571
•SEMICONDUCTORS

REVUE TECHNIQUE THOMSON-CSF. VOLUME 1, NUMERO 3.(U) AD-700 691
•AVALANCHE DIODES

SELECTIVE DOPING FOR PIEZOELECTRIC CRYSTALS BY ION IMPLANTATION.(U) AD-702 778
•PIEZOELECTRIC CRYSTALS

SELECTIVE DOPING OF PIEZOELECTRIC CRYSTALS BY ION IMPLANTATION.(U) AD-693 184
•PIEZOELECTRIC CRYSTALS

SELECTIVE DOPING OF PIEZOELECTRIC CRYSTALS BY ION IMPLANTATION.(U) AD-727 097
•SEMICONDUCTORS

SELF-CONSISTENT OPW AND EMPIRICALLY-REFINED OPW BAND MODELS FOR CUBIC ZNS, ZNSE, CDS, AND CDSE.(U) AD-677 026
•SEMICONDUCTORS

SELF-CONSISTENT ORTHOGONALIZED-PLANE-WAVE CALCULATIONS.(U) AD-722 927
•BAND THEORY OF SOLIDS

SELF CONSISTENT ORTHOGONALIZED PLANE-WAVE ENERGY BAND MODEL FOR CUBIC ZNS, ZNSE, CDS AND CDSE.(U) AD-859 726
•SEMICONDUCTORS

SEMICONDUCTING THIN FILMS; AN ANNOTATED BIBLIOGRAPHY, 1967 SUPPLEMENT.(U) AD-667 233
•SEMICONDUCTING FILMS

SEMICONDUCTING THIN FILMS; AN ANNOTATED BIBLIOGRAPHY, 1968 SUPPLEMENT.(U) AD-851 282
•SEMICONDUCTING FILMS

SEMICONDUCTIVITY OF CDS AS A FUNCTION OF S-VAPOR PRESSURE DURING HEAT TREATMENT BETWEEN 500 DEGREES AND 700 DEGREES C.(U) AD-689 060
•SEMICONDUCTORS

SEMICONDUCTOR DEVICE CONCEPTS.(U) AD-408 664
•SEMICONDUCTORS

SEMICONDUCTOR DEVICE CONCEPTS. (U) AD-416 264
•63 323 9A

SEMICONDUCTOR DEVICE CONCEPTS.(U) AD-426 258
•SEMICONDUCTOR DEVICES

SEMICONDUCTOR DEVICE CONCEPTS.(U) AD-603 783
•SEMICONDUCTOR DEVICES

SEMICONDUCTOR DEVICE CONNCEPTS.(U) AD-606 311
•SEMICONDUCTOR DEVICES

SEMICONDUCTOR TECHNOLOGY AND MICROELECTRONICS (COLLECTION OF ARTICLES).(U) AD-673 189
•SEMICONDUCTOR DEVICES

SHORT WAVELENGTH IMPURITY EXCITON TRANSITIONS IN CDS AT 1.2 K.(U) AD-717 526
•CADMIUM SULFIDES

SIMULATED EMISSION SPECTRA OF CDS PLATELETS UNDER VARIOUS EXCITATION LEVELS.(U) AD-729 818
•CADMIUM SULFIDES

SINGLE CRYSTAL CADMIUM SULFIDE AND CADMIUM SELENIDE INSULATED-GATE FIELD-EFFECT TRIODES.(U) AD-681 614
•FIELD EFFECT TRANSISTORS

SLOW MOVING FIELD DOMAINS IN CDS IN THE RANGE OF NEGATIVE DIFFERENTIAL CONDUCTIVITY.(U) AD-656 745
•CADMIUM SULFIDES

SOLAR CELL ARRAY OPTIMIZATION(U) AD-298 558
•CRYSTALS

SOLAR CELLS AND SOLAR PANELS. VOLUME 1.(U) AD-700 500
•SOLAR CELLS

SOLID SOLUTIONS OF CADMIUM SULFIDE-CADMIUM SELENIDE FILMS: PREPARATION AND DETERMINATION BY X-RAY FLUORESCENCE METHOD.(U) AD-695 110
•CADMIUM SELENIDES

SOLID STATE IMAGE INTENSIFIERS.(U) AD-637 171
•IMAGE INTENSIFIERS(ELECTRONICS)

SOLID STATE IMAGE INTENSIFIERS.(U) AD-642 933
•IMAGE INTENSIFIERS(ELECTRONICS)

SOLID STATE RESEARCH 1966-1.(U) AD-632 998
•SOLID STATE PHYSICS

SOLID STATE RESEARCH, 1971:3.(U) AD-731 547
•SOLID STATE PHYSICS

SORPTION-INDUCED CONDUCTIVITY CHANGES IN COMPOUND SEMICONDUCTORS.(U) AD-725 177
•SEMICONDUCTORS

SPIN EXCHANGE IN EXCITONS, THE QUASICUBIC MODEL AND DEFORMATION POTENTIALS IN II-VI COMPOUNDS.(U) AD-721 406
•SEMICONDUCTORS

SPLITTING OF EXCITON LINES IN WURTZITE-TYPE II-VI CRYSTALS BY UNIAXIAL STRESS.(U) AD-672 467
•SEMICONDUCTORS

STATIONARY ANODE- ADJACENT HIGH-FIELD DOMAINS IN CADMIUM SULFIDE.(U) AD-675 664
•CADMIUM SULFIDES

STATIONARY HIGH FIELD DOMAINS IN THE RANGE OF NEGATIVE DIFFERENTIAL CONDUCTIVITY IN CDS SINGLE CRYSTALS.(U) AD-661 192
•CADMIUM SULFIDES

STATISTICAL CONSIDERATIONS IN MOSFET CALCULATIONS.(U) AD-687 274
•FIELD EFFECT TRANSISTORS

STATUS OF DIFFUSION DATA FOR BINARY COMPOUND SEMICONDUCTORS.(U) AD-670 614
•SEMICONDUCTORS

STRESS CORROSION CRACKING IN HIGH STRENGTH FERROUS ALLOYS.(U) AD-423 387
•STEEL

STUDIES OF INFRARED IMAGE CONVERTER (SOLID-STATE TYPE AND VACUUM TYPE).(U) AD-647 649
•IMAGE CONVERTERS

A STUDY OF ELECTROLUMINESCENT CADMIUM SULFIDE DIODES.(U) AD-681 705
•DIODES(SEMICONDUCTOR)

A STUDY OF HOMOGENEITY OF SOLID SOLUTIONS OF CADMIUM SULFIDE AND CADMIUM SELENIDE BY X-RAY FLUORESCENCE.(U) AD-629 493
•SEMICONDUCTORS

STUDY OF LAYER-LIKE FIELD INHOMOGENEITIES IN CDS USING FRANZ-KELDYSH EFFECT.(U) AD-647 312
•FIELD THEORY

STUDY OF SURFACE PROPERTIES OF ATOMICALLY-CLEAN METALS AND SEMICONDUCTORS. PART I. STUDY OF CDS SURFACES BY LEED. PART II. COMBINED LEED AND MASS SPECTROMETER MEASUREMENTS FOR ADSORPTION AND CATALYSIS.(U) AD-630 863
•SEMICONDUCTORS

STUDY OF SURFACE PROPERTIES OF ATOMICALLY-CLEAN METALS AND SEMICONDUCTORS.(U) AD-427 412
•CADMIUM COMPOUNDS

STUDY OF SURFACE PROPERTIES OF ATOMICALLY-CLEAN METALS AND SEMICONDUCTORS.(U) AD-639 395
•SEMICONDUCTORS

STUDY OF SURFACE PROPERTIES OF ATOMICALLYCLEAN METALS AND SEMICONDUCTORS. PART I. STUDY OF CDS SURFACES BY LEED. PART 2. COMBINED LEED AND MASS SPECTROMETER MEASUREMENTS FOR ADSORPTION AND CATALYSIS.(U) AD-613 699
•SEMICONDUCTORS

STUDY OF SURFACE PROPERTIES OF ATOMICALLYCLEAN METALS AND SEMICONDUCTORS.(U) AD-613 699
•CADMIUM COMPOUNDS

STUDY OF THE MECHANISM AND PROPERTIES OF THE PHOTOVOLTAIC AND PHOTOCONDUCTIVE EFFECTS IN ORGANIC SUBSTANCES.(U) AD-623 138
•ORGANIC MATERIALS

STUDY OF THE RADIATIVE RECOMBINATION OF FREE CARRIERS PRODUCED BY ELECTRON BOMBARDMENT OF CADMIUM SULFIDE.(U) AD-403 786
•ELECTRON BOMBARDMENT

SURFACE CONDUCTION IN CDS.(U) AD-695 823
•SEMICONDUCTORS

SURFACE ELASTIC WAVES.(U) AD-721 786
•ULTRASONIC RADIATION

SURFACE MICROACOUSTICS.(U) AD-715 674
•ULTRASONIC RADIATION

SURFACE MORPHOLOGY OF SUBLIMATED CRYSTALS OF CADMIUM AND ZINC SULFIDES.(U) AD-713 337
•CRYSTAL GROWTH

SURFACE PINNED LAYER-LIKE FIELD INHOMOGENEITIES IN CDS.(U) AD-637 856
•SEMICONDUCTORS

SURFACE STATES AND BARRIER HEIGHT IN METAL-SEMICONDUCTOR SURFACE BARRIER DIODES.(U) AD-467 489
•DIODES(SEMICONDUCTOR)

SYNTHESIS AND CHARACTERIZATION OF ELECTRONICALLY ACTIVE MATERIALS.(U) AD-432 872
•SEMICONDUCTORS

SYNTHESIS AND CHARACTERIZATION OF THIN FERROELECTRIC AND SEMICONDUCTING FILMS.(U) AD-706 097
•FERROELECTRIC MATERIALS

THE SYNTHESIS OF A VOLATILE CADMIUM CHELATE AND THE STUDY OF ITS VAPOR PHASE REACTION WITH HYDROGEN SULFIDE.(U) AD-419 017
•COMPLEX COMPOUNDS

TEMPERATURE DEPENDENCE OF LINE STRUCTURE OF CADMIUM SULFIDE EDGE EMISSION(U) AD-289 015
•CADMIUM COMPOUNDS

TEMPERATURE DEPENDENCE OF RAMAN LINEWIDTH AND INTENSITY OF SEMICONDUCTORS.(U) AD-717 296
•SEMICONDUCTORS

TEMPERATURE DEPENDENCE OF THE RESISTIVITY AND HALL EFFECT OF THIN CDS FILMS.(U) AD-681 719
•SEMICONDUCTING FILMS

THEORETICAL ASPECTS OF POINT AND ASSOCIATED LUMINESCENT CENTERS.(U) AD-680 883
•SEMICONDUCTORS

THEORY OF ENHANCED RAMAN SCATTERING AND VIRTUAL QUASIPARTICLES IN CRYSTALS.(U) AD-650 244
•CRYSTALS

THERMAL LENS EFFECT IN CDS.(U) AD-706 819
•CADMIUM SULFIDES

THERMALLY AND OPTICALLY STIMULATED PHENOMENA IN CADMIUM-SULFIDE SINGLE CRYSTALS (TERMICHESKI I OPTICHESKI STIMULIROVANNYE YAVLENIYA V MONOKRISTALLAKH SULFIDA KADMIYA).(U) AD-673 810
•CADMIUM SULFIDES

THIN FILM ACTIVE DEVICES.(U) AD-408 472
•SEMICONDUCTING FILMS

THIN FILM CDS SOLAR CELL FABRICATION PARAMETER STUDY.(U) AD-710 634
•SOLAR CELLS

THIN-FILM MONOTRONICS.(U) AD-607 297
•MOLECULAR ELECTRONICS

THIN-FILM PIEZOELECTRIC TRANSDUCERS USED AS GENERATORS AND DETECTORS OF MICROWAVE PHONONS, WITH SOME ATTENUATION MEASUREMENTS IN SIO2.(U) AD-648 782
•PIEZOELECTRIC TRANSDUCERS

THIN-FILM POLYCRYSTALLIN E FIELD-EFFECT TRIODE.(U) AD-455 978
•TRIODES

THIN-FILM POLYCRYSTALLIN E FIELD-EFFECT TRIODE.(U) AD-631 408
•TRIODES

THIN-FILM POLYCRYSTALLIN E FIELD-EFFECT TRIODE.(U) AD-631 409
•TRIODES

THIN-FILM POLYCRYSTALLIN E FIELD-EFFECT TRIODE.(U) AD-634 088
•TRIODES

THIN-FILM POLYCRYSTALLIN E FIELD-EFFECT TRIODE.(U) AD-643 779
•TRANSISTORS

THIN-FILM POLYCRYSTALLIN E FIELD-EFFECT TRIODE.(U) AD-645 262
•FIELD EFFECT TRANSISTORS

THIN-FILM POLYCRYSTALLIN E FIELD-EFFECT TRIODE.(U) AD-651 816
•FILMS

THIN-FILM POLYCRYSTALLIN E FIELD-EFFECT TRIODE.(U) AD-689 788
•FIELD EFFECT TRANSISTORS

THIN FILMS FOR COMPOSITE MOLECULAR ELECTRONICS.(U) AD-618 677
•MOLECULAR ELECTRONICS

TIME-RESOLVED SCANNING ELECTRON MICROSCOPY AND ITS APPLICATION TO BULK-EFFECT OSCILLATORS.(U) AD-706 505
•ELECTRON MICROSCOPY

TRANSITIONS BETWEEN CLASS I AND CLASS II CDS CRYSTALS INDUCED BY HEAT-TREATMENT, OXYGEN DE/ADSORPTION AND ELECTRON BOMBARDMENT..(U) AD-708 818
•SEMICONDUCTORS

TRAP-CONTROLLED FIELD INSTABILITIES IN PHOTOCONDUCTING CDS CAUSED BY FIELD-QUENCHING.(U) AD-699 721
•CADMIUM SULFIDES

TUNED INTEGRATED CIRCUITS.(U) AD-639 667
•TUNING DEVICES

TUNED INTEGRATED CIRCUITS.(U) AD-643 519
•INTEGRATED CIRCUITS

TUNNELING PROCESSES ACROSS THE CDSELECTROLYTE INTERFACE.(U) AD-614 494
•TUNNELING (ELECTRONICS)

TUNNELING SPECTROSCOPY STUDY OF GAAS, CDS AND ZNO SCHOTTKY BARRIER JUNCTIONS.(U) AD-678 370
•SEMICONDUCTORS

ULTRASONIC STRESS WAVES IN CADMIUM SULFIDE.(U) AD-633 715
•ULTRASONIC PROPERTIES

ULTRAVIOLET REFLECTIVITY STUDIES OF CDSISE SINGLE CRYSTAL SOLID SOLUTIONS.(U) AD-633 645
•ULTRAVIOLET SPECTROSCOPY

UNCOOLED IR DETECTOR FOR THE TEN MICRON REGION(U) AD-297 203
•CRYSTAL DETECTORS

UNIFORMLY PROPAGATING SOLUTIONS OF TRANSPORT AND POISSON EQUATIONS FOR PERIODIC FIELD DOMAINS.(U) AD-653 298
•SEMICONDUCTORS

USE OF SUPERCONDUCTING CAVITIES TO RESOLVE CARRIER TRAPPING EFFECTS IN CDS.(U) AD-699 688
•CADMIUM SULFIDES

VACUUM-DEPOSITED CADMIUM SULFIDE THIN FILMS.(U) AD-682 695
•SEMICONDUCTING FILMS

VAPOR DEPOSITED THIN FILM PIEZOELECTRIC TRANSDUCERS.(U) AD-613 540
•PIEZOELECTRIC TRANSDUCERS

WORKLOAD FORECASTING AND ALTERNATIVE OVERHAUL SCHEDULES FOR NAVY AIRCRAFT AND AIRCRAFT ENGINES.(U) AD-688 280
•NAVAL AIRCRAFT

X-RAY DAMAGE AND ANNEALING OF THESE DEFECTS IN CDS SINGLE CRYSTALS.(U) AD-623 895
•SINGLE CRYSTALS

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The references in this bibliography on Cadmium Sulfides cover the whole range of studies from the crystal growth, to the physical properties, to the uses and limitations in semiconductors, and the electronic interactions and configurations. Corporate Author-Monitoring Agency, Subject, and Title Indexes are included.

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