AD-773 550

PROTECTIVE TREATMENTS (INDUSTRIAL PROCESS)

DEFENSE DOCUMENTATION CENTER

FEBRUARY 1974

UNCLASSIFIED

SECURITY CLASSIFICATION OF THIS PAGE (When Data Entered)

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19 KEY WORDS (Continue on reverse side if necessary and identify by block number)

*Bibliographies	Aluminum	Steel
*Diffusion Coatings	Aluminum Alloys	Stress Corrosion
*Antifouling Coatings	Corrosion Inhibition	Corrosion
*Anodic Coatings	Nickel Alloys	*(See Reverse)*
*Protective Treatments	Ship Hulls	

20. ABSTRACT (Continue on reverse side if necessary and identify by block number)

This unclassified and unlimited bibliography on Protective Treatments (Industrial Process) is grouped under three major headings: Section 1 - Anodic Coatings, Section 2 - Antifouling Coatings, and Section 3 - Diffusion Coatings.

Corporate Author-Monitoring Agency, Subject, Title, and Personal Author Indexes are included.

DD FORM 1 JAN 73 1473 EDITION OF 1 NOV 65 IS OBSOLETE

UNCLASSIFIED

SECURITY CLASSIFICATION OF THIS PAGE (When Data Entered)

(Item 19, cont'd) KEYWORDS

Titanium Alloys	Plastic Coatings
Wood	Films
Preservation	Paints
Metal Coatings	Barrier Coatings

F O R E W O R D

This unclassified and unlimited bibliography contains 116 citations of reports on *Protective Treatments(Industrial Process)*. These references were selected from entries processed into the Defense Documentation Center's data bank during the period of January 1953 to August 1973.

This bibliography supersedes Protective Treatments, AD-722 800, DDC-TAS-70-84-I, dated March 1971.

This report is topically arranged in alphabetical order into the following subtopics:

Section I Anodic Coatings

Section II Antifouling Coatings

Section III Diffusion Coatings

Entries are sequenced by AD number in each section. Computer generated indexes of Corporate Author-Monitoring Agency, Subject, Title, and Personal Author are included.

BY ORDER OF THE DIRECTOR, DEFENSE SUPPLY AGENCY

OFFICIAL

Hubert E. Sauter

HUBERT E. SAUTER
Administrator
Defense Documentation Center

C O N T E N T S

I

ANODIC COATINGS

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZQM04

AD-263 996
FRANKFORD ARSENAL PHILADELPHIA PA

CORROSION RESISTANCE OF ANODIC COATINGS FOR ALUMINUM ALLOYS (U)

FEB 61 IV SIGISMUND,MARK I
REPT. NO. T61 12 1

UNCLASSIFIED REPORT

DESCRIPTORS: *ALUMINUM ALLOYS, *COATINGS, *CORROSION INHIBITION, ALUMINUM COMPOUNDS, ANODES (ELECTROLYTIC CELL), CHEMICAL REACTIONS, CHLORIDES, CHROMATES, CHROMIC ACIDS, CORROSION, CORROSIVE GASES, MILITARY REQUIREMENTS, OXIDES, SALTS, SOLUTIONS, SULFATES, SULFURIC ACID, TEST METHODS, TESTS, VAPORS (U)

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOM04

AD-439 085
NAVAL AIR ENGINEERING CENTER PHILADELPHIA PA AERONAUTICAL MATERIALS LAB

EVALUATION OF FINE, ANODIZED BERYLLIUM WIRE. (U)

MAY 64 2P
REPT. NO. NAEC-AML-1943

UNCLASSIFIED REPORT

DESCRIPTORS: (*BERYLLIUM, MECHANICAL PROPERTIES), (*WIRE, BERYLLIUM), COATINGS, ANODES (ELECTROLYTIC CELLS), TENSILE PROPERTIES, DEGRADATION, OXIDATION (U)
IDENTIFIERS: ANODIC COATINGS (U)

TENSILE DATA ON FINE, ANODIZED BERYLLIUM WIRE ARE PRESENTED. TENSILE STRENGTH OF THE AS-DRAWN WIRE WAS REPORTED AT ABOUT 179,000 PSI AND ELONGATION FELL IN THE RANGE 1.0 TO 2.1%. THE TENSILE STRENGTH OF THE WIRE DEFINITELY SHOWS A SIGNIFICANT LOSS WHEN COMPARED WITH THE VALUE REPORTED FOR AS-DRAWN MATERIAL. IT IS DIFICULT NOT TO ATTRIBUTE THIS LOSS TO THE ANODIZING TREATMENT OR POSSIBLY TO SOME INTERMEDIATE CHEMICAL TREATMENT USED IN THE ANODIZING PROCESS. DAMAGE CONCEIVABLY COULD COME FROM STRESS CORROSION AND/OR PITTING. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOM04

AD-465 429
TYCO LABS INC WALTHAM MASS

AGEING EFFECTS IN THIN ANODIC OXIDE FILMS ON AU IN HCLO4. (U)

DESCRIPTIVE NOTE: TECHNICAL MEMORANDUM,
JUN 65 10P BRUMMER,S. B. ;
REPT. NO. TM-20
CONTRACT: NONR376500
PROJ: 9800,ARPA ORDER 302-62

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:

DESCRIPTORS: (*GOLD, ELECTRODES), (*FILMS, OXIDES), (*ELECTRODES, OXIDATION), ELECTROCHEMISTRY, PERCHLORIC ACID, VOLTAGE, REDUCTION(CHEMISTRY), REACTION KINETICS, AGING(MATERIALS), COATINGS, ANODES (U)
IDENTIFIERS: ANDOIC COATING (U)

THE PROPERTIES OF ANODIC OXIDE FILMS ON AU IN LN HCLO4 WERE STUDIES AS A FUNCTION OF TIME (2 SEC TO 5 MIN) AND OF POTENTIAL OF FORMATION (1450 TO 1850 MV VS. PT, H2/H+ IN THE SAME SOLUTION). OVER THE RANGE OBSERVED (10-20% OF THE TOTAL OXIDE), THE OXIDE GROWS SLOWLY WITH TIME, APPARENTLY ACCORDING TO ELOVICH KINETICS, ALTHOUGH THE CONSTANTS ARE POTENTIAL-DEPENDENT. OXIDES FORMED AT LONGER TIMES AT A GIVEN POTENTIAL ARE HARDER TO REDUCE. THIS AGING EFFECT IS GREATEST AT THE LOWER POTENTIALS OF FORMATION, DESPITE THE GREATER THICKNESS OF THE OXIDE AT THE HIGHER POTENTIALS AND DESPITE THE LARGER CHANGE IN THE AMOUNT OF OXIDE AT THE HIGHER POTENTIALS. BECAUSE OF THESE AGING EFFECTS, THE TRIANGULAR SWEEP METHOD OF WILL AND KNORR IS NOT SUITABLE TO STUDY THESE FILMS. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOM04

AD-469 954
BRITISH NON-FERROUS METALS RESEARCH ASSOCIATION LONDON (ENGLAND)

SURFACE TREATMENT OF TITANIUM ALLOYS: A REVIEW OF PUBLISHED INFORMATION. (U)

DESCRIPTIVE NOTE: RESEARCH REPT.,
MAY 65 17P FINCH,N. J. ;BOWERS,J. E. ;
REPT. NO. A-1536MAL/E
MONITOR: MA S/T-MEMO-9/65

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:

DESCRIPTORS: (*TITANIUM ALLOYS, SURFACES), (*SURFACES, PROTECTIVE TREATMENTS), WEAR RESISTANCE, OPTIMIZATION, LUBRICANTS, FRICTION, REVIEWS, PLATING, CHROMIUM, ADHESION, NICKEL, COATING, SPRAYS, METALS, NICKEL ALLOYS, IRON ALLOYS, COBALT ALLOYS, MOLYBDENUM, PLASMA JETS, REFRACTORY MATERIALS, VAPOR PLATING, PLASTIC COATINGS, SURFACE PROPERTIES (U)
IDENTIFIERS: ANODIC COATINGS, CHEMICAL CONVERSION COATINGS (U)

THIS REPORT REVIEWS THE USE OF LUBRICANTS AND SURFACE COATINGS TO IMPROVE THE WEAR AND GALLING RESISTANCE OF TITANIUM ALLOYS. THE METHODS OF COATING DISCUSSED ARE ANODIC OXIDATION, PLATING, METAL SPRAYING, DEPOSITION FROM A VAPOUR PHASE, DIFFUSION TREATMENTS WITH GASES AND IN ACTIVE SALT BATHS, METALLIC DIFFUSION COATINGS, SURFACE HARDENING BY HEAT TREATMENT, CHEMICAL CONVERSION COATINGS AND PLASTIC COATINGS. IT IS CONCLUDED THAT THE MOST IMPORTANT CRITERIA FOR A COATING FOR HIGHLY STRESSED COMPONENTS WITH HEAVY SURFACE LOADS ARE: (1) WEAR AND GALLING RESISTANCE MUST BE GOOD; (2) STRONG ADHESION BETWEEN COATING AND SUBSTRATE MUST BE ACHIEVED; (3) THE COATING MUST WITHSTAND HIGH LOADS AND SLIDING FORCES, AND (4) MECHANICAL PROPERTIES OF THE UNDERLYING TITANIUM ALLOY SHOULD NOT BE IMPAIRED BY THE COATING. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOM04

AD-476 464 7/4 11/3
HOLMAN (JOHN F) CO INC WASHINGTON D C

THE STRUCTURE OF THIN ANODIC FILMS ON ALUMINUM SURFACES, (U)

JAN 66 22P GINSBERG ,H. IWEFERS,K.)

CONTRACT: DA-44-009-AMC-930(T)
PROJ: DA-1-C-024401-A-328
MONITOR: AERDL T-1813-65

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: TRANS. FROM ZUR STRUKTUR DER ANODISCHEN DECKSCHICHTEN AUF ALUMINIUMOBERFLACHEN, METALL, 17:3, MAR 63.

DESCRIPTORS: (*ALUMINUM, ANODIC COATINGS), (*ANODIC COATINGS, MICROSTRUCTURE), FILMS, ELECTRODEPOSITION, SURFACES, SULFURIC ACID, ELECTRON MICROSCOPY, X-RAY DIFFRACTION ANALYSIS, INFRARED SPECTROSCOPY, REFRACTIVE INDEX, DIFFERENTIAL THERMAL ANALYSIS, CRYSTALS, FIBERS, ALUMINUM COMPOUNDS, HYDROXIDES, OXIDES, CARBOXYLIC ACIDS, OXALIC ACIDS, FOILS (U)
IDENTIFIERS: ELOXAL FILMS (U)

FROM THE RESULTS OF PHYSICAL MEASUREMENTS AND MORPHOLOGICAL INVESTIGATIONS THE STRUCTURE OF THE ELOXAL FILMS IS DESCRIBED. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOM04

AD-612 774
AIR FORCE MATERIALS LAB WRIGHT-PATTERSON AFB OHIO

EFFECTS OF VACUUM-ULTRAVIOLET ENVIRONMENT OF THE OPTICAL PROPERTIES OF BRIGHT ANODIZED ALUMINUM. (U)

DESCRIPTIVE NOTE: REPT. FOR 1 JAN 63-1 AUG 64, JAN 65 23P WEAVER, JAMES H. I
REPT. NO. TR-64-355
PROJ: 7349
TASK: 734007

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:

DESCRIPTORS: (*SPACE ENVIRONMENTAL CONDITIONS, ALUMINUM), (*ALUMINUM, COATINGS), (*COATINGS, ALUMINUM), (*PROTECTIVE TREATMENTS, ALUMINUM), OPTICAL PROPERTIES, TEMPERATURE CONTROL, ENVIRONMENTAL TESTS, ULTRAVIOLET RADIATION, LOW PRESSURE RESEARCH, DEGRADATION, THERMAL RADIATION, VACUUM, COLOR CENTERS, ABSORPTION, ALUMINUM COMPOUNDS, OXIDES (U)
IDENTIFIERS: ANODIC COATINGS (U)

THE RAPID INCREASE IN SPACE VEHICLE DESIGN RELIABILITY AND LIFETIME REQUIREMENTS HAS CREATED A SERIOUS PROBLEM IN THE SELECTION OF MATERIALS FOR PASSIVE TEMPERATURE CONTROL. THE MAJOR DIFFICULTY IS THE PREDICTION OF THE DEGRADATION OF THE THERMAL RADIATION PROPERTIES OF THESE MATERIALS UNDER THE SPACE ENVIRONMENT. BRIGHT ANODIZED ALUMINUM COATINGS ARE KNOWN TO POSSESS THE DESIRED OPTICAL PROPERTIES FOR PASSIVE TEMPERATURE CONTROL AND ARE BEING CONSIDERED FOR SPACE VEHICLE APPLICATION. THE EFFECTS OF THE VACUUM-ULTRAVIOLET ENVIRONMENT ON THE OPTICAL PROPERTIES OF BRIGHT ANODIZED ALUMINUM HAVE BEEN DETERMINED. THE OPTICAL PROPERTIES OF THE BRIGHT ANODIZED ALUMINUM SYSTEM ARE ONLY SLIGHTLY ALTERED BY ULTRAVIOLET RADIATION IN AIR. HOWEVER, THE COMBINED VACUUM-ULTRAVIOLET RADIATION IS THE MOST DETRIMENTAL TO THE REFLECTANCE OF BRIGHT ANODIZED COATINGS PREPARED BY THE SULFURIC ACID PROCESS. THE COLOR CENTERS FORMED DURING EXPOSURE CAUSES A GRADUAL INCREASE IN ABSORPTION UP TO 120 HOURS EXPOSURE. THIS INCREASE IN SOLAR ABSORPTION CAUSES THE ALPHA SUB S/EPSILON RATION TO INCREASE TO 0.42 AFTER APPROXIMATELY 120 HOURS EXPOSURE, BUT AFTER THIS CHANGE, VERY LITTLE FURTHER CHANGE IS NOTED, UNLIKE MOST ORGANIC AND INORGANIC COATINGS. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOM04

AD-624 993 11/3
SPRINGFIELD ARMORY MASS

DEVELOPMENT OF A FIXTURE AND A PROCEDURE FOR HARD-ANODIZING THE SURFACES OF A LONG ALUMINUM TUBE WITH A DEEP BLIND-HOLE. (U)

DESCRIPTIVE NOTE: TECHNICAL REPT.,
OCT 65 22P SPIVAK,M. S. ;
REPT. NO. SA-TR[8-1095
PROJ: AF-D7-3-20037-01-D7-M6

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:

DESCRIPTORS: (*ALUMINUM, ANODIC COATINGS), (*ANODIC COATINGS, ALUMINUM), (*PIPES, ANODIC COATINGS), POSITIONING DEVICES(MACHINERY), PROCESSING (U)

A RACK WAS DESIGNED AND A METHOD DEVELOPED FOR THE HARD-ANODIZING OF EXTERIOR AND INTERIOR DIAMETERS OF A LONG TUBE. THE DEVELOPMENT OF THE PROCEDURE WAS COMPLICATED BY THE NECESSITY OF HARD-ANODIZING THE INTERIOR DIAMETER OF AN EXTREMELY DEEP BLIND-HOLE. THE DESIGN OF THE FIXTURE IS DISCUSSED AND THE METHOD IS OUTLINED. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOM04

AD-630 688 13/8 11/6
INSTITUTE OF MODERN LANGUAGES INC WASHINGTON D C

HARD ANODIZING OF BAKED ALUMINUM POWDER, (U)

66 9P ZAREZKI,E. M. ;PAVLOVSKAYA,T. G. ;

CONTRACT: DA-44-009-AMC-1563(T),
PROJ: DA-1C024401A328,
MONITOR: AERDL ,TT T-1823-66 ,66-60912

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: TVERDOE ANODIROVANIE SPECHENOGO ALUMINIEVOGO POROSHKA, TRANS. OF VESTNIK MASHINOSTROENIYA (USSR) N11 1963.

DESCRIPTORS: (*ALUMINUM, POWDER METALS), (*POWDER METALS, ELECTROPLATING), (*ANODIC COATINGS, ALUMINUM ALLOYS), USSR, HARDNESS (U)
IDENTIFIERS: ANODIZE (U)

TRANSLATION OF RUSSIAN RESEARCH: HARD ANODIZING OF BAKED ALUMINUM POWDER.

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOM04

AD-631 171 11/6 11/3
INSTITUTE OF MODERN LANGUAGES INC WASHINGTON D C

OPTICAL STUDIES ON ANODIC OXIDE FILMS ON ALUMINIUM (I/II). (U)

APR 66 31P SAKAE,TAJIMA ;
CONTRACT: DA-44-009-AMC-1E63(T),
PROJ: DA-1C024401A328
MONITOR: AERDL ,TT T-1824-66 ,66-61029

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: TRANS. OF KEIKINZOKU (JAPAN) V14 N4(66) 1964.

DESCRIPTORS: (*ALUMINUM, ANODIC COATINGS), (*ANODIC COATINGS, ALUMINUM), OXIDATION, OXIDES, OPTICAL PROPERTIES, SULFATES, ALUMINUM COMPOUNDS, OXIDES, JAPAN, ALUMINUM ALLOYS, TITANIUM ALLOYS, REFRACTIVE INDEX, FILMS (U)
IDENTIFIERS: ALUMINUM OXIDES (U)

OPTICAL ANALYSIS OF THE MECHANISM OF FORMATION OF ALPHA-ALUMINA FILM: MAIN CONSTITUENTS OF THE FILMS PRODUCED IN SODIUM AND POTASSIUM BISULPHATE MELTS OR THEIR MIXTURES WERE CONFIRMED TO BE ALPHA-AL2O3. THE FILM FORMED IN AMMONIUM BISULPHATE MELT CONTAINED AN APPRECIABLE AMOUNT OF GAMMA-ALUMINA. THE FILMS FORMED IN CONC. H2SO4 OR IN CONC. H2SO4+OLEUM, CONSIST MAINLY OF GAMMA-AL2O3, BUT BY LONGER FORMATION, IT WAS PARTLY CONVERTED TO ALPHA-AL2O3. REFRACTIVE INDICES AND DOUBLE REFRACTION OF VARIOUS ANODIC OXIDE FILMS: ANODIC OXIDE FILMS SUCH AS OXALIC, SULPHURIC ACID FILMS FORMED AT NORMAL ANODIZING CONDITIONS AND AT LOWER TEMPERATURE (HARD-COATING), CHROMIC, SULPHAMIC, PHOSPHORIC, BORIC (PLUS SULPHURIC) ACID FILMS, EMATAL AND KALCOLOR FILMS AND BORIC ACID-FORMAMIDE FILMS DEVELOPED BY THE AUTHORS, WERE OBSERVED UNDER POLARIZING MICROSCOPY AND THE REFRACTIVE INDICES WERE DETERMINED AND THE EXISTENCE OF DOUBLY-REFRACTING PROPERTIES WAS CHECKED. REFRACTIVE INDICES OF THESE FILMS ARE USUALLY LOWER THAN PURE CRYSTALLINE OR AMORPHOUS ALUMINA (1.67 PLUS OR MINUS). (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOH04

AD-631 174 13/8 11/6 11/3
INSTITUTE OF MODERN LANGUAGES INC WASHINGTON D C

ORIGINAL FOUNDRY ALUMINUM 'AL 99.9H' AS NEWER GLAZING MATERIAL, (U)

APR 66 12P GINSBERG,H. ;LATTEY,R. ; NEUNZIG,H. ;

CONTRACT: DA-44-009-AMC-1563(T),
PROJ: DA-1C024-401A328,
MONITOR: AERDL ,TT T-1837-66 ,66-61032

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: ORIGINAL-HUTTEN-ALUMINIUM 'AL 99.9H' ALS NEUER GLANZWERKSTOFF, TRANS. OF DAS METALL (WEST GERMANY) N3 P183-6 1960.

DESCRIPTORS: (*ALUMINUM, ANODIC COATINGS), (*ALUMINUM ALLOYS, COATINGS), MAGNESIUM ALLOYS, SILICON ALLOYS, IRON ALLOYS, WEST GERMANY (U)

METHODS ARE DESCRIBED WHEREBY ALUMINUM AND ITS ALLOYS ARE GIVEN A GLAZE BY THE ELOXAL OR ALUMILITE ANODIC PROTECTION TREATMENTS. THE TREATMENTS IMPART SMOOTHNESS AND GLAZE AND A HARD, THICK AND TRANSPARENT OXIDE LAYER. GLAZING PROCESSES CURRENTLY IN USE ARE: THE ERFT PROCESS, BASED ON A NITRIC ACID-AMMONIUM HYDROGEN FLUORIDE SOLUTION; THE ALUPOL II (R5 BRIGHT DIP) PROCESS, BASED ON PHOSPHORIC AND NITRIC ACIDS; THE ALUFLEX PROCESS, BASED ON SULFURIC AND CHROMIC ACIDS; AND THE BRYTAL PROCESS, BASED ON A TRISODIUM AND SODA SOLUTION. RELATIONSHIPS WERE DETERMINED BETWEEN GLAZING AND GLAZING PROCESS IN ELOXAL-TREATED ORIGINAL-FOUNDRY QUALITY ALLOY ERFTAL AND THE ALLOYS WITH MAGNESIUM, THE RAFFINALS. (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOM04

AD-632 835 11/3 13/8
PITMAN-DUNN RESEARCH LABS FRANKFORD ARSENAL PHILADELPHIA PA

PROTECTION OF BERYLLIUM AGAINST HIGH TEMPERATURE OXIDATION. (U)

DESCRIPTIVE NOTE: TECHNICAL RESEARCH ARTICLE,
JAN 66 8P PEARLSTEIN,FRED IWICK,REYBURN W. ;GALLACCIO,ANTHONY ;
PROJ: DA-1C024401A328,
MONITOR: FA , A66-6

UNCLASSIFIED REPORT
AVAILABILITY: PUBLISHED IN METAL FINISHING JAN 1966.
SUPPLEMENTARY NOTE:

DESCRIPTORS: (*BERYLLIUM, *ANODIC COATINGS), CHROMATES, OXIDATION, HIGH-TEMPERATURE RESEARCH, CHROMIC ACIDS (U)

THE INFLUENCE OF CHEMICAL CHROMATE FILM ON THE HIGH TEMPERATURE OXIDATION BEHAVIOR OF BERYLLIUM WAS INVESTIGATED. CHROMATE CONVERSION COATINGS WERE APPLIED TO BERYLLIUM FROM SOLUTION NORMALLY UTILIZED FOR ALUMINUM. CHROMATED BERYLLIUM WAS UNOXIDIZED AFTER 24 HOURS' EXPOSURE TO MOIST AIR AT 900? C; UNTREATED BERYLLIUM WAS CATASTROPHICALLY OXIDIZED UNDER THE SAME CONDITIONS. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOM04

AD-633 986 11/6 11/2 11/3
WATERVLIET ARSENAL N Y BENET LABS

PROCESS FOR ANODIZING TITANIUM. (U)

DESCRIPTIVE NOTE: TECHNICAL REPT.,
APR 66 44P POCHILY,THEODORE M. I
PROJ: DA-66267,
MONITOR: WVT , 6605

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:

DESCRIPTORS: (•TITANIUM, •ANODIC COATINGS),
BEARINGS, WEAR RESISTANCE, MECHANICAL PROPERTIES,
ELECTROLYSIS, ELECTROLESS PLATING (U)

THE REQUIREMENTS OF AN ADVANCING TECHNOLOGY IN WEAPONRY, AIRCRAFT, AND AEROSPACE HAVE NECESSITATED A CONSIDERATION OF LIGHT METALS AS A SUBSTITUTE FOR STEEL. IN THE SEARCH TO REDUCE WEIGHT, AND CONSEQUENTLY INCREASE MOBILITY, TITANIUM OFFERS VALUABLE ASSISTANCE. THE USE OF TITANIUM AS AN ENGINEERING AND STRUCTURAL MATERIAL HAS BEEN ACCEPTED FOR A COMPARATIVELY SHORT TIME. THIS ACCEPTANCE WAS PREDICATED ON TWO IMPORTANT FACTORS, STRENGTH/WEIGHT RATIO AND CORROSION RESISTANCE. THE TENDENCY OF TITANIUM TO GALL AND SEIZE, WHEN USED AS A BEARING OR MATING SURFACE, HAS RESTRICTED A FULL UTILIZATION OF THE METAL. WORK CONDUCTED AT WATERVLIET ARSENAL TO DEVELOP A PROCESS THAT REDUCES OR ELIMINATES THIS CONDITION WAS EVALUATED. PROCESSING DETAILS, A SUMMARY OF TEST DATA COVERING WEAR RESISTANCE, AND THE EFFECTS OF THE PROCESS ON THE MECHANICAL PROPERTIES OF TITANIUM ARE DISCUSSED. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOH04

AD-635 408 11/3
NORTHERN ELECTRIC CO LTD OTTAWA (ONTARIO)

IONIC CONDUCTIVITY, DIELECTRIC CONSTANT, AND OPTICAL PROPERTIES OF ANODIC OXIDE FILMS ON TWO TYPES OF SPUTTERED TANTALUM FILMS. (U)

DESCRIPTIVE NOTE: REVISED ED.
DEC 65 4P MILLS, D. /YOUNG,L. /ZOBEL,F. G. R. /

UNCLASSIFIED REPORT
AVAILABILITY: PUBLISHED IN JOURNAL OF APPLIED PHYSICS V37 N4 P1821-4 15 MAR 1966. PREPARED IN COOPERATION WITH BRITISH COLUMBIA UNIV. VANCOUVER. ELECTRICAL ENGINEERING LABS.
SUPPLEMENTARY NOTE: REVISION OF MANUSCRIPT SUBMITTED 18 OCT 1965.

DESCRIPTORS: (*ANODIC COATINGS, FILMS), (*TANTALUM, FILMS), OXIDES, IONIC CURRENT, ELECTRICAL CONDUCTANCE, DIELECTRIC PROPERTIES, OPTICAL PROPERTIES, SPUTTERING, METAL FILMS, SURFACE PROPERTIES, SUBSTRATES (U)

THE GROWTH OF ANODIC OXIDE FILMS ON SPUTTERED TANTALUM FILMS IN DILUTE SULFURIC ACID HAS BEEN STUDIED BY IN SITU ELLIPSOMETRY. TWO TYPES OF TANTALUM FILM WERE USED WHICH HAD BEEN DEPOSITED ONTO SUBSTRATES AT DIFFERENT TEMPERATURES GIVING TWO STRUCTURAL FORMS OF TANTALUM ('BETA' AND BCC). THE OPTICAL PROPERTIES OF THE METAL FILMS DIFFERED FROM EACH OTHER AND FROM THOSE OF THE BULK METAL BUT THE REFRACTIVE INDEX AND DIELECTRIC CONSTANT OF THE OXIDES WERE NEVERTHELESS VERY SIMILAR TO THOSE FOR THE OXIDE ON BULK TANTALUM. HOWEVER, THE FIELD E IN THE OXIDE REQUIRED TO PRODUCE A GIVEN IONIC CURRENT DENSITY I WAS ABOUT 4% HIGHER THAN FOR THE OXIDE ON THE BULK METAL AND DETA LOG I/DETA E WAS SLIGHTLY LESS THAN FOR THE BULK METAL. THIS APPEARS TO SHOW AN EFFECT OF THE METAL/OXIDE INTERFACE AS PREDICTED BY MOTT AND CABRERA. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOM04

AD-[illegible] 647 11/3 11/6 13/8
INSTITUTE OF MODERN LANGUAGES INC WASHINGTON D C

ON ANODIC OXIDATION OF ALUMINUM IN CHROMIC ACID. (U)

JUN 66 35P MODIC, F. I
CONTRACT: DA-44-009-AMC-1563(T),
PROJ: DA-1-C-024401-A-328
MONITOR: AERDL,TT T-1854-66 ,66-61781

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: NEUERE ERFAHRUNGEN AUF DEM GEBIETE DER ANODISCHEN OXYDATION VON ALUMINUM IN CHROMSAURE, TRANS. OF ALUMINUM (WEST GERMANY) V39 P169-80 1963.

DESCRIPTORS: (*ANODIC COATINGS, *ALUMINUM), OXIDATION, CHROMIC ACIDS, DIRECT CURRENT, PROCESSING, WEST GERMANY (U)

PARTICULAR ATTENTION WAS HERE GIVEN TO WORKING WITH BATH TEMPERATURES ABOVE 45 DEGREES C. OXIDE FILMS ARE HERE FORMED MUCH QUICKER THAN WITH THE EARLIER LOW BATH TEMPERATURES AND ARE CHARACTERIZED BY AN ATTRACTIVE AND COMPLETELY OPAQUE APPEARANCE. THEY CAN ALSO BE DYED RELATIVELY QUICKLY IN SATURATED TINTS. THEY THUS BECOME HIGHLY SUITABLE FOR DECORATIVE PURPOSES WHICH WAS NOT THE CASE IN THE PAST. THE REPORT ALSO DISCUSSES IN DETAIL THE INFLUENCE OF IMPURITY ANIONS IN THE CHROMIC ACID BATH AND SPECIFICALLY THE EFFECT OF SULFATE IONS ON THE OPAQUENESS OF THE ANODIZED ITEMS. IT FURTHER MAKES SUGGESTIONS ON THE CONTROL OF THE BATH AND/OR POSSIBILITIES OF REGENERATION IN THE CHROMIC ACID PROCESS AND GIVES SOME INDICATIONS IN REGARD TO COST CALCULATION. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOM04

AD-635 648 1176 1173
INSTITUTE OF MODERN LANGUAGES INC WASHINGTON D C

ON THE FORMATION OF NOT COMPLETELY WEAR-RESISTANT COATINGS ON THE ANODIC OXIDE FILM WHEN ADDING CERTAIN DYES TO THE SEALING BATH. (U)

JUN 66 15P MODIC, F. I

CONTRACT: DA-44-009-AMC-1563(T),
PROJ: DA-1-C-024401-A-328
MONITOR: AERDL,TT T-1855-66 ,66-61782

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: UEBER DIE BILDUNG NICHT ABRIEBFESTER AUFLAGEN AUF DER ANODISCHEN OXYDSCHICHT BEIM ZUSATZ GEWISSER FARBSTOFFE ZUM SEALBAD, TRANS. OF ALUMINUM (WEST GERMANY) V36 P457-61 1960.

DESCRIPTORS: (*ALUMINUM, ANODIC COATINGS), (*ANODIC COATINGS, *DYES), WEAR RESISTANCE, OXIDES, FILMS, SEALING COMPOUNDS, COMPLEX COMPOUNDS, MOLECULAR PROPERTIES, SOLUBILITY, SALICYLICACIDS, WEST GERMANY (U)

THE REPORT DISCUSSES THE PHENOMENON OF SEAL-ACTION OF CERTAIN DYESTUFFS ADDED IN SMALL AMOUNTS TO THE SEALING BATH. IT WAS CONFIRMED THAT THE SEAL-ACTION CAN BE RELATED IN ALL DYESTUFFS CONCERNED TO THEIR MOLECULAR CONSTITUTION. FOR THEIR RESPECTIVE BAHAVIOR ARE RESPONSIBLE CERTAIN SPECIFIC CHELATE-FORMING GROUPINGS IN THE DYESTUFF MOLECULE. CORRESPONDING TO THESE GROUPINGS, ALL SEAL-ACTIVE DYESTUFF WERE SUBDIVIDED INTO FOUR CLASSES. DYESTUFFS WITH THESE GROUPINGS ARE CAPABLE OF ENTERING INTO A METALLIC COMPLEX DURING THE SEALING PROCESS WITH THE NOT WEAR-RESISTANT COATING FORMED ON THE SURFACE OF THE ANODIC FILM. IT IS MOST PROBABLE THAT THE ALUMINUM-COMPLEX DYESTUFF THUS FORMED BECOMES WATER-SOLUBLE. THIS IS THE REASON WHY THIS PROCESS PRODUCES AFTER SEALING ALWAYS A SHINY AND WEAR-RESISTANT ANODIC OXIDE FILM WHERE THE SURFACE OF THE LATTER IS COMPLETELY FREE OF NOT WEAR-RESISTANT REACTION PRODUCTS. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOM04

AD-635 649 13/8 11/3
INSTITUTE OF MODERN LANGUAGES INC WASHINGTON D C

RECENT DEVELOPMENTS IN THE FIELD OF HIGH-GLOSS ALUMINUM. (U)

JUL 66 17P TRAGNER, E. (KAPPEL,G. ;
CONTRACT: DA-44-009-AMC-1563(T),
PROJ: DA-1C024401-A328,
MONITOR: TT ,AERDL 66-61783 ,T-1852-66

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: NEUERE ENTWICKLUNG AUF DEM GEBIET DER ALUMINUM-GLANZWERK-STOFFE. TRANS. OF ALUMINUM (WEST GERMANY) V36 N5 P267-71 MAY 1960.

DESCRIPTORS: (*ALUMINUM, BRIGHTNESS), (*ANODIC COATINGS, ALUMINUM), WEST GERMANY, ALUMINUM ALLOYS, MAGNESIUM ALLOYS, PRECISION FINISHING, REFLECTION, FOILS, SURFACE PROPERTIES (U)

THE REFLECTAL MATERIALS FOR BRIGHT ANODIZING, MADE FROM 99.99% AL, HAVE GIVEN EXCELLENT RESULTS IN THE MOST DIVERSE APPLICATIONS WITH RESPECT TO GLOSS AND REFLECTANCE; IN RECENT TIMES, HOWEVER, ATTEMPTS ARE BEING MADE FOR ECONOMIC REASONS, TO REPLACE THESE HIGH-PURITY ALLOYS BY LESS PURE AND THUS CHEAPER MATERIALS, E.G., ON BASIS OF AL 99.9 (REMIRAL) OR EVEN 99.8/99.85. THE IMPROVEMENT OF THE BRIGHT ANODIZING METHODS AND THE MANY YEARS OF EXPERIENCE GAINED BY THE PROCESSORS OF THESE MATERIALS HAVE MADE SUCH A REPLACEMENT FEASIBLE. IT MUST BE REMEMBERED, HOWEVER, THAT AN INCREASE IN THE IMPURITY LEVEL MAKES THE ACHIEVEMENT OF HIGH, UNIFORM GLOSS MORE DIFFICULT, PARTICULARLY UNDER ACTUAL PRODUCTION CONDITIONS, SO THAT COMPROMISES WITH REGARD TO THE BRIGHTNESS CHARACTERISTICS, PARTICULARLY FOR LARGE, PLANE SURFACES, MUST BE ACCEPTED. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOM04

AD-635 667 7/4 11/6 11/3
BRITISH COLUMBIA UNIV VANCOUVER DEPT OF ELECTRICAL ENGINEERING

AN ELLIPSOMETRIC STUDY OF STEADY-STATE HIGH FIELD IONIC CONDUCTION IN ANODIC OXIDE FILMS ON TANTALUM, NIOBIUM, AND SILICON. (U)

DESCRIPTIVE NOTE: REVISED ED.
NOV 65 9P YOUNG, L. IZOBEL, F. G. R. J

UNCLASSIFIED REPORT
AVAILABILITY: PUBLISHED IN JOURNAL OF THE ELECTROCHEMICAL SOCIETY V113 N3 P277-84 MAR 1966.
SUPPLEMENTARY NOTE: REVISION OF MANUSCRIPT SUBMITTED 2 AUG 65.

DESCRIPTORS: (*ANODIC COATINGS, IONIC CURRENT), (*TANTALUM, ANODIC COATINGS), (*NIOBIUM, ANODIC COATINGS), (*SILICON, ANODIC COATINGS), HEAT OF ACTIVATION, THEORY, ELECTRIC FIELDS, CANADA (U)

THE CLASSICAL THEORY OF IONIC CONDUCTION IN SOLIDS AT HIGH FIELD STRENGTHS (1,000,000 TO 10,000,000 PREDICTS THAT THE RELATION BETWEEN THE IONIC CURRENT DENSITY I AND THE FELD STRENGTH E SHOULD BE I = IO EXP (-W (E)/KT) WHERE THE ACTIVATION ENERGY W(E) = WO - QAE, Q IS THE MAGNITUDE OF THE CHARGE ON THE IONS, A IS HALF THE DISTANCE BETWEEN SUCCESSIVE SITES OCCUPIED BY THE IONS, AND IO IS A CONSTANT. DEVIATIONS FROM THIS SUPPOSED LAW HAVE BEEN REPORTED IN VARIOUS FORMS. NEW EXPERIMENTAL RESULTS FOR STEADY-STATE CONDITIONS ARE REPORTED WHICH WERE OBTAINED BY IN SITU ELLIPSOMETRY. THESE CONFIRM FOR TANTALUM AND ESTABLISH FOR THE FIRST TIME FOR NIOBIUM THAT THE DEVIATIONS MAY BE SIMPLY AND ACCURATELY DESCRIBED BY TAKING THE ACTIVATION ENERGY TO BE NONLINEAR IN E IN A WAY WHICH MAY BE REPRESENTED OVER THE EXPERIMENTAL RANGE OF E BY WO - Q (ALPHA-BETA(E). DATA WERE ALSO OBTAINED FOR SILICON, BUT WERE NOT SUFFICIENTLY ACCURATE TO DETECT NONLINEARITY. MODELS ARE DISCUSSED WHICH MIGHT GIVE THIS EFFECT. A MODEL IN WHICH IONS MOVE FAIRLY FREELY IN CHANNELS WITH INFREQUENT TRAPPING BY A COULOMBIC POTENTIAL LEADS TO A LAW OF THE FORM I = IO EXP (- (WO = GAMMA (SQ ROOT OF E)/KT, ANALOGOUS TO THE SCHOTTKY AND POOLE-FRENKEL LAWS FOR ELECTRONIC CURRENTS. SUCH A LAW FITS THE DATA WELL ENOUGH FOR THE MODEL TO BE CONSIDERED AS REALISTIC (AUTHOR) (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOM04

AD-635 687 11/3 11/6
INSTITUTE OF MODERN LANGUAGES INC WASHINGTON D C

ON THE FORMATION OF OXIDE FILMS ON ALUMINUM. (U)

JUN 66 31P KADEN, W. T

CONTRACT: DA-44-009-AMC-1563(T),
PROJ: DA-1C024401A328,
MONITOR: TT ,AERDL 66-61785 ,T-1849-66

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: BEITRAG ZU DEN WACHSTUMSVORGANGEN VON OXIDSCHICHT-EN AUF ALUMINUM, TRANS. OF ALUMINUM, (WEST GERMANY) V39 P33-41 1963.

DESCRIPTORS: (*ANODIC COATINGS, ALUMINUM), (*FILMS, OXIDES), (*ALUMINUM, OXIDATION), WEST GERMANY, MEASUREMENT, THICKNESS, PREPARATION (U)

ALUMINUM SPECIMENS PROVIDED WITH DIFFERENT TYPES OF OXIDE FILMS WERE INVESTIGATED FOR THE PURPOSE OF OBTAINING A NEW INSIGHT INTO THE MECHANISM OF DEVELOPMENT OF THE OXIDE FILMS. IT WAS DESIRABLE HERE TO CARRY OUT THE MEASUREMENTS ON OPTIMUM DEFINED LAYERS WITH OPTIMUM ABSENCE OF IMPURITIES. THIS REQUIREMENT WAS BEST SATISFIED, AS FOUND FROM A COMPARISON OF ALUMINUM OF DIFFERENT DEGREES OF PURITY, BY ERFTAL, A 99.9-% PURE COMMERCIAL GRADE. COMPARISON OF DIFFERENT MEASURING METHODS AND THE PREPARATION OF SPECIMENS OF KNOWN BARRIER-LAYER THICKNESS DETERMINED THAT THE LATTER CAN BE MEASURED THROUGH CAPACITANCE OF THE SPECIMENS AND INDEPENDENTLY OF THE POSSIBLE EXISTENCE OF A COVER LAYER. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZONO4

AD-641 932 11/6 11/3
INSTITUTE OF MODERN LANGUAGES INC WASHINGTON D C

NEW FINDINGS ON ANODIC OXIDATION OF ALUMINUM. (U)

JUN 66 13P KADEN,W. !

CONTRACT: DA-44-009-AMC-1563(T)
PROJ: DA-1-C-024401-A-328
MONITOR: AERDL,TT T-1853-66,66-62593

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: NEUERE ERKENNTNISSE UND ERFAHRUNDEN UEBER VESCHIEDENE VARIATIONEN DER ANODISCHEN OXYDATION DES ALUMINIUMS, TRANS. OF ALUMINIUM (WEST GERMANY) V39 N7 P424-8 JUL 1963.

DESCRIPTORS: (*ALUMINUM, OXIDATION), (*ANODIC COATINGS, ALUMINUM), WEST GERMANY, HARDNESS, POROSITY, COLORS, DENSITY, PROCESSING (U)

ONE OF THE ANODIC-OXIDATION PROCESSES DISCUSSED IS THE 'VEROXAL' PROCESS WHICH PRODUCES FILMS CHARACTERIZED BY SPECIAL HIGH HARDNESS AND CHARACTERISTIC COLORATION. THE VEROXAL PROCESS PRODUCES FILMS WITH TINTS FROM SILVER YELLOW OVER BROWN AND VARIOUS BRONZE TINTS TO BLACK. THE COLORATIONS ARE ABSOLUTELY LIGHT PROOF AND ARE ALL OBTAINED WITH THE SAME BATH COMPOSITION. THE COLOR DIFFERENCES ARE OBTAINED BY EMPLOYING DIFFERENT ALLOYS AND, TO A LIMITED EXTENT, THROUGH DIFFERENT FILM THICKNESS. SHADING OF COLOR CAN BE OBTAINED BY EMPLOYING DIFFERENT DENSITIES AND BATH TEMPERATURES. (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOM04

AD-651 088 11/3 7/4 13/8 11/6
FOREIGN TECHNOLOGY DIV WRIGHT-PATTERSON AFB OHIO

MATTING OF ALUMINUM AND ITS ALLOYS. (U)

MAR 67 17P SHAMES,S. I. I

REPT. NO. FTD-MT-65-395
MONITOR: TT 67-61678

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: EMATALIROVANIE ALYUMINIYA I EGO SPLAVOV. TRANS. OF MONO. ANODNAYA ZASHCHITA METALLOV, MOSCOW, 1964 P222-32.

DESCRIPTORS: (*ALUMINUM, ANODIC COATINGS), (*ALUMINUM ALLOYS, ANODIC COATINGS), (*ANODIC COATINGS, REACTION KINETICS), USSR, FILMS, CORROSION INHIBITION, COATINGS, OXIDATION, DIELECTRIC PROPERTIES, WEAR RESISTANCE, HARDNESS, RESISTANCE(ELECTRICAL) (U)

THE REPORT COVERS A STUDY OF FILM FORMATION KINETICS AND THE PROPERTIES OF ANODIC OXIDE FILMS PRODUCED IN AN OXALIC ACID ELECTROLYTE WITH THE TITANIUM SALT TIO(KC2O4)2. 2H2O ON ALUMINUM AD-1 AND AL ALLOYS AMTSM AND D16-T (UNCLAD). SAMPLES WERE WIPED WITH BENZINE, CHEMICALLY DEGREASED (BATH COMPOSITIONS GIVEN, 3 MIN., 60-70C FOR UNPOLISHED AND 3-5 MIN., 70-80C FOR POLISHED SAMPLES), HOT AND COLD WATER RINSED, BLEACHED (1-2 MIN., 40-50% HNO3, 18-20C), THEN ANODIZED (BATH COMPOSITION GIVEN). THE OPTIMAL CONDITIONS WERE 55C AND 40 MIN. AT 2 A/SQ DM OR 30 MIN. AT 3 A/SQ DM. CORROSION RESISTANCE WAS HIGH AND INCREASED WITH PROCESS DURATION. INCREASING THE PH TO A VALUE OF 3 DID NOT AFFECT FILM QUALITY. CORROSION RESISTANCE, ABRASIVE AND FRICTION WEAR, HARDNESS, VOLUME RESISTIVITY AND DIELECTRIC STRENGTH CHARACTERISTICS OF THESE FILMS WERE BETTER THAN FOR STANDARD OXIDE FILMS PRODUCED IN SULFATE OR OXALATE BATHS. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOM04

AD-640 411 11/3
ATOMIC WEAPONS RESEARCH ESTABLISHMENT ALDERMASTON (ENGLAND)

FACTORS AFFECTING THE ADHESION OF SURFACE COATINGS TO ANODISED ALUMINIUM ALLOYS. (U)

DESCRIPTIVE NOTE: REPT. FOR 1 OCT-31 MAR 66, JUN 67 137P
POPLEY,A. R.; TERRY,C. A.; WALKER,P.;
REPT. NO. AWRE-O-22/67
MONITOR: D-MAT 146

UNCLASSIFIED REPORT

DESCRIPTORS: (*AIRCRAFT FINISHES, ALUMINUM ALLOYS), (*ALUMINUM ALLOYS, *ANODIC COATINGS), GREAT BRITAIN, PAINTS, ADHESION, CLEANING, FINISHES(FINISHING), FAILURE(MECHANICS), CONTAMINATION, EXPERIMENTAL DATA, PERFORMANCE(ENGINEERING) (U)

AN INVESTIGATION WAS MADE OF THE FACTORS EFFECTING THE ADHESION OF AIRCRAFT PAINT SYSTEMS TO ANODISED ALUMINIUM AND ALUMINIUM ALLOYS. THE EQUIPMENT USED IN THE CHROMIC AND SULPHURIC ACID PROCESSES ON BOTH PLANT AND LABORATORY SCALE IS DESCRIBED IN DETAIL AND ANALYSIS FIGURES FOR THE BATHS AND POST ANODISING TREATMENTS ARE DETAILED. THE PANEL PREPARATION AND EXPERIMENTAL PROCEDURE FOR THE DETERMINATION OF THE ADHESION OF THE SURFACE COATINGS BY THE DIRECT PULL-OFF SANDWICH TECHNIQUE ARE DESCRIBED. THE EFFECT OF SUCH BATH COMPOSITION VARIABLES AS AGE OF BATH, THE PRESENCE OF INORGANIC AND ORGANIC CONTAMINATION, CrO_3 CONTENT AND TYPE OF WATER, TOGETHER WITH THE EFFECT OF RINSING WATERS, CHROMATE CONTAMINATION, SEALING TEMPERATURE, AND DELAY PERIOD BEFORE APPLICATION OF THE PAINTS WAS STUDIED. THE ADHESION OF THE TEST PAINT SYSTEMS WAS ASSESSED UNDER THREE CONDITIONS OF AGEING. INORGANIC CONTAMINATION PRESENT DURING POST ANODISING TREATMENTS HAS AN ADVERSE EFFECT ON PAINT ADHESION, BUT WHEN PRESENT DURING ANODISING, DOES NOT APPEAR TO HAVE ANY MARKED EFFECT. ORGANIC CONTAMINATION PRESENT DURING ANODISING IS ALSO ASSOCIATED WITH AN INCREASE IN APPARENT ADHESION FAILURES PARTICULARLY WHEN ETCH PRIMERS ARE USED. THE MAJORITY OF ADHESION FAILURES ARE ASSOCIATED WITH THE ANODIC FILM ON L70 ALLOY ESPECIALLY WHEN PHENOLIC MODIFIED ETCH PRIMER TO DTD5555 IS USED.

(U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOM04

AD-663 757 4/2
MASSACHUSETTS INST OF TECH CAMBRIDGE DEPT OF METEOROLOGY

PERFORMANCE OF THIN FILM HUMIDITY SENSORS, (U)

OCT 67 76P DELPICO,JOSEPH ;
REPT. NO. SCIENTIFIC-1
CONTRACT: F19628-67-C-0228
PROJ: AF-6670
TASK: 667001
MONITOR: AFCRL 67-0543

UNCLASSIFIED REPORT

DESCRIPTORS: (*HYGROMETERS, *DIELECTRICS), HUMIDITY, FILMS, WATER VAPOR, ABSORPTION, SENSORS, ANODIC COATINGS, ALUMINA, ELECTROLYTES, POLYMERS, SOLIDS, MICROPHOTOGRAPHY, PERFORMANCE(ENGINEERING) (U)

VARIOUS HYGROSCOPIC MATERIALS HAVE BEEN CONSIDERED FOR USE AS THE THIN FILM DIELECTRIC IN A CONDENSER, WHICH IS TO BE USED AS THE HUMIDITY SENSING ELEMENT IN AN ELECTRIC HYGROMETER. THE REQUIREMENT OF SUCH A DIELECTRIC IS THAT IT APPROACH EQUILIBRIUM RAPIDLY AND DISPLAY BOTH REVERSIBLE AND REPRODUCIBLE HUMIDITY-ELECTRICAL CHARACTERISTICS. POLYMEROUS DIELECTRICS HAVE SHOWN AN EXTREMELY SLOW RATE OF RESPONSE AND IT IS SUSPECTED THAT THE RATE OF KNUDSEN DIFFUSION THROUGH MANY FINE TORTUOUS PORES IS RESPONSIBLE. ANODIC ALUMINUM OXIDE FILMS PRODUCED IN A SULFURIC ACID ELECTROLYTE HAVE RECENTLY SHOWN A RAPID RATE OF RESPONSE AS WELL AS A REPRODUCIBLE RESPONSE TOWARD HUMIDITY CHANGES. THE MAJOR LIMITATION HINDERING THE USE OF SUCH HUMIDITY SENSING ELEMENTS IS THEIR LONG-TERM CALIBRATION DRIFT, WHICH CAUSES THE ELEMENTS TO BECOME LESS SENSITIVE TOWARD HUMIDITY VARIATIONS. RESULTS HAVE SHOWN THAT A CHANGE IN THE CONCENTRATION OF VARIOUS SPECIES OF CHEMISORBED WATER VAPOR INITIALLY PRESENT ON THE PORE WALLS MAY BE RESPONSIBLE FOR THE OBSERVED CALIBRATION DRIFT AND THAT FURTHER EXPERIMENTATION IN THIS AREA IS WARRANTED. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOH04

AD-665 243 11/6 7/4
FRANKFORD ARSENAL PHILADELPHIA PA

GAS PHASE ANODIZATION OF TANTALUM. (U)

DESCRIPTIVE NOTE: REVISED ED.,
MAY 67 6P JENNINGS,T. A. ;MCNEILL,
W. ;SALOMON,R. E. ;
REPT. NO. FA-A67-22
MONITOR: AROD 423:2-C

UNCLASSIFIED REPORT
AVAILABILITY: PUBLISHED IN JOURNAL OF THE ELECTROCHEMICAL SOCIETY, V114 N11 P1134-7 NOV 1967.
SUPPLEMENTARY NOTE: MASTER'S THESIS. REVISION OF MANUSCRIPT SUBMITTED 8 DEC 66.

DESCRIPTORS: (*TANTALUM, *ANODIC COATINGS), VAPORS, OXIDATION, ELECTROCHEMISTRY, TANTALUM COMPOUNDS, OXIDES, FILMS, ELECTROLYTIC CELLS, GASES (U)
IDENTIFIERS: TANTALUM OXIDE, OXIDE FILMS (U)

THE ANODIC OXIDATION OF TANTALUM IN THE GAS PHASE WAS STUDIED USING AN ELECTROMAGNETIC ION CATHODE. THE ANODIC FILMS WERE PREPARED AT CONSTANT CURRENT DENSITIES OF 1.0 AND 2.0 MA/SQ CM. THE GROWTH CHARACTERISTICS OF ANODIC TANTALUM OXIDE FILMS, IN THE GAS PHASE, WERE FOUND TO BE SIMILAR TO FILMS PREPARED IN LIQUID ELECTROLYTES. A COMPARISON IS MADE BETWEEN THE RESULTS OF THIS STUDY AND OTHER REPORTED GAS PHASE REACTIONS WITH VARIOUS ANODE SURFACES. THE TANTALUM OXIDE GROWTH, FOR THE EXPERIMENTAL CONDITIONS REPORTED HERE, IS SHOWN TO BE LINEARLY DEPENDENT ON THE TOTAL CHARGE PASSED IN THE ANODE CIRCUIT DURING THE REACTION UP TO A FORMATION VOLTAGE OF 200V. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOH04

AD-665 763 1L/6 13/8
RENSSELAER POLYTECHNIC INST TROY N Y

ELECTRODE KINETIC BEHAVIOR OF METALLIC SURFACES. (U)

DESCRIPTIVE NOTE: FINAL TECHNICAL REPT.,
FEB 68 8P GREENE,NORBERT D. I
REPT. NO. TR-6
CONTRACT: NONR-591(17)
PROJ: PR-007-08-01

UNCLASSIFIED REPORT

DESCRIPTORS: (*CORROSION, *ELECTROCHEMISTRY), (*ANODIC COATINGS, *CORROSION INHIBITION), ELECTRODES, DYNAMICS, STAINLESS STEEL, CRACKS, ETCHING, POLARIZATION, SURFACES (U)

THE PRIMARY PURPOSE OF THIS PROGRAM WAS TO RELATE THE ELECTRODE KINETIC AND CORROSION BEHAVIOR OF METALLIC SURFACES TO METALLOGRAPHIC STRUCTURE AND FUNCTION. ONLY THE MOST IMPORTANT RESULTS ARE BRIEFLY SUMMARIZED IN THIS FINAL REPORT. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOM04

AD-665 788 1378 117.
RENSSELAER POLYTECHNIC INST TROY N Y

PASSIVATION OF CREVICES DURING ANODIC PROTECTION. (U)

DESCRIPTIVE NOTE: TECHNICAL REPT.,
FEB 68 25P FRANCE,W. DE WAYNE , JR.;
GREENE,NORBERT D. ;
REPT. NO. TR-4
CONTRACT: NONR-591(17)
PROJ: PR-007-08-01

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: SEE ALSO TECHNICAL REPORT NO. 3, AD-624 017.

DESCRIPTORS: (*STAINLESS STEEL, ANODIC COATINGS), (*CORROSION INHIBITION, STAINLESS STEEL), CORROSION, CRACKS, POLARIZATION (U)
IDENTIFIERS: *CREVICE PASSIVATION (U)

THE PROTECTION OF CREVICES IS AN IMPORTANT PROBLEM IN THE APPLICATION OF ANODIC PROTECTION. THEORETICAL ANALYSES AND EXPERIMENTAL STUDIES WITH A SPECIAL CREVICE ASSEMBLY SHOW THAT THE CREVICE-PASSIVATING ABILITY OF A SYSTEM IS CONTROLLED BY ELECTROLYTE CHARACTERISTICS, CREVICE GEOMETRY, AND THE ELECTROCHEMICAL BEHAVIOR OF THE PROTECTED METAL. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO: /ZOH04

AD-666 217 11/6 13/8
ARMY MOBILITY EQUIPMENT RESEARCH AND DEVELOPMENT CENTER
FORT BELVOIR VA

CATASTROPHIC PITTING OF ALUMINUM-ALLOY (ALMAG 35) CASTINGS DURING SULFURIC ACID ANODIZING, (U)

JAN 68 20P LASSER,HOWARD G. FASHER, EMERSON ;

REPT. NO. USAMERDC-1919
PROJ: DA-1C024401A328

UNCLASSIFIED REPORT

DESCRIPTORS: (*ALUMINUM ALLOYS, CORROSION), CASTINGS, ANODIC COATINGS, CORROSION INHIBITION, CLEANING, DEFECTS(MATERIALS), MAGNESIUM ALLOYS, SULFURIC ACID (U)

A PROBLEM CONCERNED WITH THE CATASTROPHIC PITTING OF ALUMINUM-ALLOY (ALMAG 35) CASTINGS WHILE BEING ANODIZED IS DESCRIBED. A METHOD FOR OVERCOMING THIS PROBLEM MAKES USE OF RECOGNIZED PREANODIZING CLEANING TECHNIQUES. A PROPOSED MECHANISM FOR THE ENCOUNTERED CORROSION IS PRESENTED AS AN EXPLANATION TO THIS PROBLEM. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOM04

AD-675 754 7/4 11/3
FRANKFORD ARSENAL PHILADELPHIA PA PITMAN-DUNN RESEARCH LABS

ANODIC FILM GROWTH BY ANION DEPOSITION IN ALUMINATE, TUNGSTATE, AND PHOSPHATE SOLUTIONS. (U)

FEB 63 7P MCNEILL,WILLIAM IGRUSS, LEONARD L. ;
PROJ: DA-1-T-061102-B-32-A
MONITOR: FA A63-26

UNCLASSIFIED REPORT
AVAILABILITY: PUB. IN JNL. OF THE ELECTROCHEMICAL SOCIETY, V110 N8 P853-855 AUG 63.
SUPPLEMENTARY NOTE: REVISION OF REPORT DATED 2 NOV 62.

DESCRIPTORS: (*ANODIC COATINGS, ELECTROCHEMISTRY), ALUMINUM, MAGNESIUM, NICKEL, IRON, ZINC, BISMUTH, CADMIUM, COBALT, COPPER, FILMS, ELECTRODEPOSITION, ALUMINATES, TUNGSTATES, PHOSPHATES, PHOSPHATE COATINGS (U)

FILMS WERE OBTAINED BY ANODIC TREATMENT OF AL, MG, NI, FE, ZN, BI, CD, CO, AND CU IN 0.1N NAALO2 AND AL, BI, CD, CU, AND ZN IN 0.1N NA2WO4. A FORMATION VOLTAGE OF 30V WAS APPLIED FOR 10 MIN IN ALL CASES EXCEPT AL IN NAALO2 WHERE THE MAXIMUM FORMATION VOLTAGE WAS 100V. THE ANODIC FILMS WERE STUDIED BY ELECTRON DIFFRACTION AND CHEMICAL ANALYSES. FILMS OBTAINED IN NAALO2 SOLUTION APPEARED TO BE BETA-AL2O3.3H2O, AND THOSE OBTAINED IN NA2WO4 SOLUTION WERE OXIDES OF THE ANODE METAL, OR MIXTURES OF THE ANODE METAL OXIDE WITH WO3. THE INCORPORATION OF PHOSPHORUS COMPOUNDS IN ANODIC FILMS FORMED ON AL IN 0.1N NA2HPO4 SOLUTIONS WAS ALSO OBSERVED. THE MECHANISM OF ANION DEPOSITION AND FILM GROWTH IN THESE SOLUTIONS IS DISCUSSED. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOM04

AD-676 446 11/6 7/4
FRANKFORD ARSENAL PHILADELPHIA PA PITMAN-DUNN RESEARCH LABS

THE ANODIC SYNTHESIS OF CDS FILMS, (U)

MAR 65 7P MCNEILL,WILLIAM ;GRUSS, 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. /ZOH04

AD-680 852 11/3 11/6
MINISTRY OF TECHNOLOGY ORPINGTON (ENGLAND) TIL REPORTS CENTRE

EVALUATION OF HARD ANODISING AS A WEAR RESISTANT COATING FOR ALUMINUM ALLOYS WITH PARTICULAR REFERENCE TO ITS USE AS A SUBSTRATE FOR SOLID PHASE LUBRICANTS. (U)

JUN 68 14/P KEYWORTH,D. I
REPT. NO. S/T-MEMO-6-68

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: CONTAINS ADDENDUM.

DESCRIPTORS: (*ALUMINUM ALLOYS, *ANODIC COATINGS), WEAR RESISTANCE, COPPER ALLOYS, MANGANESE ALLOYS, NICKEL ALLOYS, ZINC ALLOYS, LUBRICANTS, ENVIRONMENTAL TESTS, FRICTION, COLD WORKING, FATIGUE(MECHANICS), SURFACE PROPERTIES, CORROSION RESISTANCE, GREAT BRITAIN (U)

THE REPORT DESCRIBES INVESTIGATIONS OF: COMPARISON OF MAJOR TYPES OF HARD ANODIC FILM; EXAMINATION OF ABRASION RESISTANCE; WEAR RESISTANCE WITH VARIOUS SURFACE TREATMENTS, WITH OR WITHOUT SOLID PHASE LUBRICANT; MEASUREMENT OF COEFFICIENT OF FRICTION WHEN SUITABLE LUBRICANTS ARE ADDED; MEASUREMENT OF BEARING PROPERTIES ON FILMS OF VARIOUS THICKNESSES; EFFECT ON FATIGUE PROPERTIES OF SHOT-PEENING, SURFACE FINISHING PRIOR TO ANODISING AND VARIOUS SEALING TREATMENTS AFTER ANODISING; CORROSION RESISTANCE WHEN FILM IS SEALED WITH VARIOUS SOLID PHASE LUBRICANTS AND IN CONTACT WITH VARIOUS MATERIALS. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOM04

AD-685 577 1173 1176
BOEING SCIENTIFIC RESEARCH LABS SEATTLE WASH SOLID STATE PHYSICS LAB

DIELECTRIC PROPERTIES OF SURFACE OXIDES ON ALUMINUM, (U)

FEB 69 65P BEGEMANN,S. H. A. ISMITH, A. W. ;
REPT. NO. DI-82-0824

UNCLASSIFIED REPORT

DESCRIPTORS: (*ALUMINUM ALLOYS, ANODIC COATINGS), (*ANODIC COATINGS, DIELECTRIC PROPERTIES), SURFACE PROPERTIES, ELECTROCHEMISTRY, ALUMINA, OXIDES, SUBSTRATES, AMMONIUM COMPOUNDS, TARTRATES, CHROMIC ACIDS, MEASUREMENT, THICKNESS (U)
IDENTIFIERS: AMMONIUM TARTRATES (U)

DIELECTRIC PROPERTY MEASUREMENTS HAVE BEEN PERFORMED ON VARIOUS TYPES OF ALUMINUM SURFACE OXIDES. THE RESULTS, OBTAINED WITH DIFFERENT ELECTRODE MATERIALS ARE INTERPRETED BY ANALOGY WITH A SERIES PARALLEL NETWORK OF CAPACITORS AND RESISTORS. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOM04

AD-686 835 1 1/3
BRITISH COLUMBIA RESEARCH COUNCIL VANCOUVER

HIGH RESISTANCE ANODIC OXIDE FILMS ON ALUMINIUM.
(U)

OCT 65 6P HARKNESS,A. C. ;YOUNG,L. ;
MONITOR: DRB REPRINT-2707

UNCLASSIFIED REPORT
AVAILABILITY: PUB. IN CANADIAN JNL. OF CHEMISTRY, V44 P2409-2413 1966. NO COPIES FURNISHED.
SUPPLEMENTARY NOTE: PREPARED IN COOPERATION WITH BRITISH COLUMBIA UNIV., VANCOUVER. DEPT. OF ELECTRICAL ENGINEERING.

DESCRIPTORS: (*ALUMINUM, *ANODIC COATINGS), FILMS, THICKNESS, DIELECTRIC PROPERTIES, RESISTANCE(ELECTRICAL), BORATES, SOLUTIONS, CANADA
(U)

THE THICKNESSES OF OXIDE FILMS FORMED IN AQUEOUS BORATE SOLUTIONS WERE OBTAINED BY THE SPECTROPHOTOMETRIC METHOD AFTER DEVELOPING THE INTERFERENCE COLORS BY EVAPORATING A VERY THIN FILM OF GOLD OR BISMUTH ONTO THE OXIDE. THE REFRACTIVE INDEX OF THE STRIPPED FILMS WAS DETERMINED BY THE BECKE IMMERSION METHOD AS 1.57 TO 1.58 AT 5 900A WAVELENGTH. THE DIELECTRIC CONSTANT WAS ESTIMATED AS 9.8 PLUS OR MINUS 0.5.
(U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZDM04

AD-697 117 11/3
BOEING SCIENTIFIC RESEARCH LABS SEATTLE WASH

ELECTRICAL IMPEDANCE OF ALUMINUM SURFACE OXIDE, (U)

SEP 69 32P SMITH,ALAN W. ;POLLOCK,ANN

REPT. NO. D1-82-0926

UNCLASSIFIED REPORT

DESCRIPTORS: (*ANODIC COATINGS, ELECTRICAL IMPEDANCE), ALUMINUM, DIELECTRIC FILMS, DIELECTRIC PROPERTIES, OXIDES, SURFACE ROUGHNESS (U)

THE IMPEDANCE OF SURFACE OXIDES, PRESENT AFTER ETCHING OR OTHER TREATMENT OF ALUMINUM, IS SHOWN TO BE CHARACTERISTIC OF THAT OF AMORPHOUS DIELECTRICS WITH A FREQUENCY INDEPENDENT DIELECTRIC LOSS. RESULTS WITH BOTH ELECTROLYTIC SOLUTION CONTACTS AND EVAPORATED METAL CONTACTS INDICATE A THIN BARRIER LAYER COVERED BY A THICKER PERMEABLE LAYER AS OCCURS ON A POROUS, ANODIZED SURFACE. METHODS FOR DETERMINING THE DIELECTRIC CONSTANT AND THE ROUGHNESS ARE DEVELOPED. THE DIELECTRIC LOSS IS RELATED TO HYDRATION OF THE SURFACE. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOM04

AD-697 544 11/3 10/2
FOREIGN TECHNOLOGY DIV WRIGHT-PATTERSON AFB OHIO

SCIENCE PICTORIAL. NUMBER 6, 1966 (SELECTED ARTICLES). (U)

MAY 69 12P CHU,FU-NING (CHIAO,YING (

REPT. NO. FTD-HT-23-839-68
PROJ: FTD-7230178

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: EDITED TRANS. OF K'O HSUEH HUA PAO (MAINLAND CHINA) N6 P242-243 1966.

DESCRIPTORS: (*ALUMINUM, ANODIC COATINGS), (*POWER SUPPLIES, WAVE TRANSMISSION), CERAMIC COATINGS, DIRECT CURRENT, RADIO TRANSMISSION, UNDERGROUND STRUCTURES, CORROSION, MICROWAVES, RADIOFREQUENCY POWER, CHINA (U)
IDENTIFIERS: TRANSLATIONS (U)

CONTENTS: ALUMINUM CERAMIC ANODIC OXIDATION(AND POWER TRANSMISSION WITHOUT CONDUCTORS. (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOM04

AD-699 350 11/3
ARMY MOBILITY EQUIPMENT RESEARCH AND DEVELOPMENT CENTER FORT BELVOIR VA

DEVELOPMENT OF A CONTINUOUS, HARD-ANODIZED ALUMINUM SURFACE, (U)

MAY 69 15P HARRIS,FRANK L. ;LEVINE, SIDNEY ;

REPT. NO. USAMERDC-1952
PROJ: DA-1-T-062105-A-328
TASK: 1-T-062105-A-32803

UNCLASSIFIED REPORT

DESCRIPTORS: (*ANODIC COATINGS, *ALUMINUM ALLOYS), BARRIER COATINGS, CRACKS, CORROSION INHIBITION (U)

A METHOD IS DESCRIBED FOR MINIMIZING THE EFFECTS OF THE DISCONTINUITIES INHERENT IN HARD-ANODIZED COATINGS ON ALUMINUM BY THE INTRODUCTION OF A SECONDARY ANODIC FILM. PHOTOMICROGRAPHS SHOW THE LOCATION OF THE SECONDARY COATING BENEATH THE ORIGINAL HARD-ANODIZED FINISH. DATA ARE PRESENTED WHICH INDICATE THAT THE METHOD DESCRIBED HAS NO ILL EFFECT ON THE ORIGINAL ABRASION RESISTANCE AND THAT THE CONTINUITY OF THE COATING IS SIGNIFICANTLY INCREASED. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOM04

AD-711 008 11/6
ARMY WEAPONS COMMAND ROCK ISLAND ILL RESEARCH AND ENGINEERING DIRECTORATE

ELLIPSOMETRIC STUDY OF THE OXIDATION OF MILD STEEL IN AQUEOUS SOLUTIONS. (U)

DESCRIPTIVE NOTE: TECHNICAL REPT.,
MAR 70 28P BORNONG,BERNARD J. ;
REPT. NO. AMSWE-RE-70-129
PROJ: DA-1-T-061102-B-13-A

UNCLASSIFIED REPORT

DESCRIPTORS: (*STEEL, *CORROSION), (*CORROSION INHIBITION, *ANODIC COATINGS), ELECTROCHEMISTRY, OXIDATION, SURFACES, CHLORIDES, SULFONATES, AMINES, ADSORPTION, MONOMOLECULAR FILMS, BARIUM COMPOUNDS (U)
IDENTIFIERS: *NAPHTHALENE SULFONIC ACID/DINONYL-(BARIUM-SALT), NAPHTHALENE SULFONATES, *OCTADECYLAMINES, POLARIMETRY (U)

COMBINED ELLIPSOMETRIC AND POTENTIOSTATIC MEASUREMENTS WERE MADE ON THE OXIDATION OF MILD STEEL IN PH 7.4 BORATE-BORIC ACID BUFFER SOLUTIONS. THE ELLIPSOMETRIC RESULTS ARE DESCRIBED IN THIS REPORT. THE POTENTIOSTATIC DATA ARE PRESENTED IN A REPORT ON ANOTHER WORK UNIT. ANODIC FILM THICKNESSES ON THE STEEL SURFACE RANGED FROM 19 TO 88A IN THE ANODIC OVERPOTENTIAL RANGE OF 0.7 TO 1.7 VOLTS. FILM THICKNESSES INCREASED RAPIDLY NEAR THE POTENTIAL FOR PITTING. CHLORIDE IONS IN THE SOLUTION NARROWED THE POTENTIAL RANGE FOR STABILITY OF THE ANODIC FILM, BUT DID NOT CHANGE ITS THICKNESS APPRECIABLY. FILMS FORMED BY AGING THE STEEL IN THE BUFFER SOLUTION WITH NO POTENTIAL APPLIED, DEVELOPED TO AVERAGE THICKNESSES OF 58-60A IN THREE HOURS. ADSORBED FILMS OF BARIUM DINONYLNAPHTHALENE SULFONATE DESORBED RAPIDLY FROM THE STEEL SURFACE UNDER ANODIC POLARIZATION, BUT WERE STABLE IN AN OVERPOTENTIAL RANGE OF 0.1 TO 0.2 VOLT CATHODIC. DESORPTION OF THE SULFONATE FILM, AS OBSERVED ELLIPSOMETRICALLY, OCCURRED AT AN ELECTRODE POTENTIAL OF APPROXIMATELY -400 MILLIVOLTS VS. THE STANDARD CALOMEL ELECTRODE. THE BEHAVIOR OF THE OCTADECYLAMINE ADSORBED FILMS WAS SIMILAR TO THAT OF THE SULFONATE. STEARIC ACID UNDER SOME CONDITIONS REACTS WITH THE STEEL OR ITS OXIDE-COATED SURFACE. (AUTHOR) (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOM04

AD-704 882 1176
NATIONAL BUREAU OF STANDARDS WASHINGTON D C

THE ROLE OF PASSIVE FILM GROWTH KINETICS AND PROPERTIES IN STRESS CORROSION SUSCEPTIBILITY. (U)

DESCRIPTIVE NOTE: TECHNICAL SUMMARY REPT. NO. 1, 1 MAR 69-28 FEB 70,
FEB 70 56P KRUGER,JEROME !ESCALANTE, EDWARD !AMBROSE,JOHN !
REPT. NO. NBS-10191
CONTRACT: NAONR-18-69
PROJ: NBS-3120448, NR-036-082

UNCLASSIFIED REPORT

DESCRIPTORS: (*STRESS CORROSION, ANODIC COATINGS), REACTION KINETICS, FILMS, IRON, COPPER, BRASS, DUCTILITY (U)
IDENTIFIERS: PASSIVITY (U)

THE ROLE OF PASSIVATION KINETICS, FILM DUCTILITY, AND TARNISH FILM FORMATION IN STRESS CORROSION CRACKING WERE EACH EXAMINED IN THE FOLLOWING STUDIES: (1) ELLIPSOMETRY MEASUREMENTS OF FILM GROWTH KINETICS ON IRON HAVE BEEN MADE FOR TWO ANIONS WHOSE SOLUTION CAUSE STRESS CRACKING OF STEEL (NITRATE AND HYDROXIDE) AND TWO THAT DO NOT (CHLORIDE AND NITRITE). (2) A TECHNIQUE HAS BEEN DEVELOPED TO MEASURE FILM DUCTILITY DIRECTLY. THIS TECHNIQUE COUPLES AN ELLIPSOMETER WITH A TENSILE MACHINE. THIN FILMS ON TA SHOW A DUCTILITY OF 3-4% IN THE PRESENCE AND ABSENCE OF F(-), AN ION THOUGHT TO DECREASE DUCTILITY. (3) PURE COPPER FORMS TARNISH FILMS IN CUPRIC ACETATE AND SULFATE SOLUTIONS. IT IS SUSCEPTIBLE TO STRESS CORROSION CRACKING IN CUPRIC ACETATE SOLUTION. IN THE ABSENCE OF STRESS, OXIDE FORMS ALL OVER THE COPPER SURFACE, WHILE STRESS CONCENTRATES OXIDE FORMATION AT THE GRAIN BOUNDARIES. THESE EXPERIMENTS POINT OT A BRITTLE-FILM RUPTURE MECHANISM OF STRESS CRACKING. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOM04

AD-711 008 11/6
ARMY WEAPONS COMMAND ROCK ISLAND ILL RESEARCH AND ENGINEERING DIRECTORATE

ELLIPSOMETRIC STUDY OF THE OXIDATION OF MILD STEEL IN AQUEOUS SOLUTIONS. (U)

DESCRIPTIVE NOTE: TECHNICAL REPT.,
MAR 70 28P BORNONG,BERNARD J. ;
REPT. NO. AMSWE-RE-70-129
PROJ: DA-1-T-061102-B-13-A

UNCLASSIFIED REPORT

DESCRIPTORS: (*STEEL, *CORROSION), (*CORROSION INHIBITION, *ANODIC COATINGS), ELECTROCHEMISTRY, OXIDATION, SURFACES, CHLORIDES, SULFONATES, AMINES, ADSORPTION, MONOMOLECULAR FILMS, BARIUM COMPOUNDS (U)
IDENTIFIERS: *NAPHTHALENE SULFONIC ACID/DINONYL-(BARIUM-SALT), NAPHTHALENE SULFONATES, *OCTADECYLAMINES, POLARIMETRY (U)

COMBINED ELLIPSOMETRIC AND POTENTIOSTATIC MEASUREMENTS WERE MADE ON THE OXIDATION OF MILD STEEL IN PH 7.4 BORATE-BORIC ACID BUFFER SOLUTIONS. THE ELLIPSOMETRIC RESULTS ARE DESCRIBED IN THIS REPORT. THE POTENTIOSTATIC DATA ARE PRESENTED IN A REPORT ON ANOTHER WORK UNIT. ANODIC FILM THICKNESSES ON THE STEEL SURFACE RANGED FROM 19 TO 88A IN THE ANODIC OVERPOTENTIAL RANGE OF 0.7 TO 1.7 VOLTS. FILM THICKNESSES INCREASED RAPIDLY NEAR THE POTENTIAL FOR PITTING. CHLORIDE IONS IN THE SOLUTION NARROWED THE POTENTIAL RANGE FOR STABILITY OF THE ANODIC FILM, BUT DID NOT CHANGE ITS THICKNESS APPRECIABLY. FILMS FORMED BY AGING THE STEEL IN THE BUFFER SOLUTION WITH NO POTENTIAL APPLIED, DEVELOPED TO AVERAGE THICKNESSES OF 58-60A IN THREE HOURS. ADSORBED FILMS OF BARIUM DINONYLNAPHTHALENE SULFONATE DESORBED RAPIDLY FROM THE STEEL SURFACE UNDER ANODIC POLARIZATION, BUT WERE STABLE IN AN OVERPOTENTIAL RANGE OF 0.1 TO 0.2 VOLT CATHODIC. DESORPTION OF THE SULFONATE FILM, AS OBSERVED ELLIPSOMETRICALLY, OCCURRED AT AN ELECTRODE POTENTIAL OF APPROXIMATELY -400 MILLIVOLTS VS. THE STANDARD CALOMEL ELECTRODE. THE BEHAVIOR OF THE OCTADECYLAMINE ADSORBED FILMS WAS SIMILAR TO THAT OF THE SULFONATE. STEARIC ACID UNDER SOME CONDITIONS REACTS WITH THE STEEL OR ITS OXIDE-COATED SURFACE. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZDM04

AD-722 490 1/1/3
BRITISH COLUMBIA UNIV VANCOUVER DEPT OF ELECTRICAL ENGINEERING

PLASMA ANODIZATION. (U)

DESCRIPTIVE NOTE: FINAL TECHNICAL REPT. 5 NOV 69-31 OCT 70,
MAR 71 56P PULFREY,DAVID L. (YOUNG, LAWRENCE ;
CONTRACT: F33615-70-C-1225
MONITOR: AFAL TR-70-328

UNCLASSIFIED REPORT

DESCRIPTORS: (*ANODIC COATINGS, PLASMA MEDIUM), (*DIELECTRIC FILMS, PLASMA MEDIUM), TANTALUM, NIOBIUM, SILICON, SILICON DIOXIDE (U)
IDENTIFIERS: *ANODIZING, THIN FILMS (U)

THE ANODIZATION OF TA, NB AND SI WAS CARRIED OUT IN OXYGEN PLASMAS GENERATED BY BOTH HOT AND COLD CATHODE DISCHARGES AND BY AN EXTERNALLY-COUPLED R.F. VOLTAGE. FOR THE ANODIZATION OF NB IN A.D.C. COLD CATHODE DISCHARGE, THE EXISTENCE OF A HIGH FIELD IONIC CONDUCTION MECHANISM AS THE OPERATIVE GROWTH PROCESS HAS BEEN CONFIRMED. HOWEVER, ON THE BASIS OF A SIMPLE MODEL FOR THE METAL/OXIDE/PLASMA SYSTEM, IT APPEARS THAT UNDER SOME CIRCUMSTANCES THE FIELD IN THE OXIDE IS CONTROLLED BY THE LARGE ELECTRONIC CURRENTS FLOWING, AND FURTHERMORE, THAT THE NEGATIVE OXYGEN IONS RELEVANT TO THE OXIDE GROWTH ARE FORMED EITHER AT THE SAMPLE SURFACE OR IN THE SHEATH SURROUNDING IT. ANODIZATION IN A HOT CATHODE DISCHARGE IMPROVES THE OXIDE GROWTH RATE BUT INTRODUCES PROBLEMS AS REGARDS SAMPLE HEATING AND CONTAMINATION. THESE LATTER TWO FACTORS CAN LEAD TO REDUCED QUALITY OF THE RESULTING DIELECTRIC FILMS. ANODIZATION OF SI IN AN R.F. PLASMA GIVES RELATIVELY FAST GROWTH RATES (ABOUT 15 A/MIN) AND PRELIMINARY DATA INDICATE THAT THE MECHANISM OF OXIDE GROWTH INVOLVES AN IMPACT IONIZATION PROCESS. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZDH04

AD-725 166 11/6
NATIONAL BUREAU OF STANDARDS WASHINGTON D C

THE ROLE OF PASSIVE FILM GROWTH KINETICS AND PROPERTIES IN STRESS CORROSION SUSCEPTIBILITY. (U)

DESCRIPTIVE NOTE: TECHNICAL SUMMARY REPT. NO. 2, 1 MAR 70-28 FEB 71,
MAY 71 67P KRUGER,JEROME ;AMBROSE,JOHN R. ;ESCALANTE,EDWARD ;
REPT. NO. NBS-10594
CONTRACT: NAONR-18-69
PROJ: NBS-3120448, NR-036-082

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: SEE ALSO TECHNICAL SUMMARY REPT. NO. 1, AD-704 882.

DESCRIPTORS: (*STRESS CORROSION, REACTION KINETICS), (*ANODIC COATINGS, DUCTILITY), STEEL, FRACTURE(MECHANICS), NITRATES, FILMS, ALUMINUM, TANTALUM, ALUMINUM ALLOYS (U)
IDENTIFIERS: PASSIVITY, METAL OXIDE FILMS (U)

A NEW TECHNIQUE HAS BEEN DEVELOPED FOR STUDYING THE RATE OF REPASSIVATION OF A STRESSED METAL SURFACE EXPOSED BY FILM RUPTURE. THIS TECHNIQUE, WHICH REMOVES THE FILM ON A METAL BY ABRASION AND THEN FOLLOWS FILM REGROWTH AND METAL DISSOLUTION BY TRANSIENT ELLIPSOMETRY AND CURRENT TRANSIENTS, WAS APPLIED TO LOW CARBON STEEL IN A NITRATE SOLUTION WHERE IT STRESS CRACKS AND A NITRITE WHERE IT DOES NOT. THE RATE OF REPASSIVATION WAS GREATER IN THE NON-SUSCEPTIBLE SOLUTION WHILE THE RATIO OF CURRENT GOING INTO FILM FORMATION TO THAT PRODUCING METAL DISSOLUTION WAS LESS. ANOTHER NEW TECHNIQUE WAS DEVELOPED WHICH MEASURES THE DUCTILITY OF FILMS ON METAL SURFACES BY DETERMINING BY ELLIPSOMETRY THE AMOUNT OF THINNING THE FILM UNDERGOES UPON STRAINING THE METAL. THE TECHNIQUE GIVES VALUES FOR MAXIMUM DUCTILITY OF THE FILM RATHER THAN THE FRACTURE STRAIN THAT OTHER TECHNIQUES GIVE. MEASUREMENTS WERE MADE ON ANODIC FILMS ON TA, AL AND AL-4% CU.
(AUTHOR) (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOM04

AD-725 469 7/4 11/2
NAVAL RESEARCH LAB WASHINGTON D C

ANODIC CRYSTALLIZATION ON PURE AND ANTIMONIAL LEAD IN SULFURIC ACID. (U)

DESCRIPTIVE NOTE: INTERIM REPT.,
MAY 71 33P BURBANK,JEANNE I
REPT. NO. NRL-7256
PROJ: NRL-C05-14; RR010-01-45-4755

UNCLASSIFIED REPORT

DESCRIPTORS: (*LEAD, *ANODIC COATINGS), (*ELECTRODES, LEAD), (*CRYSTALLIZATION, *LEAD COMPOUNDS), OXIDES, ELECTROCHEMISTRY, CRYSTAL STRUCTURE, ANTIMONY ALLOYS, LEAD ALLOYS, SULFATES, X-RAY DIFFRACTION ANALYSIS (U)
IDENTIFIERS: *LEAD OXIDES, LEAD SULFATES (U)

ELECTROCHEMICAL CYCLING, X-RAY DIFFRACTION, AND ELECTRON MICROSCOPY WERE USED TO STUDY ANODIC CRYSTALLIZATION ON PURE AND ANTIMONIAL PB IN H2SO4. ON PURE PB A MAXIMUM ELECTROCHEMICAL CAPACITY DEVELOPED THAT DID NOT INCREASE WITH FURTHER CYCLING. THE ANODIC COATING WAS COMPRISED OF SMALL NEEDLELIKE CRYSTALS THAT GREW WITH CYCLING. THE AMOUNT AND CRYSTALLINITY OF BETA PBO2 GRADUALLY INCREASED IN A SOFT POROUS OUTER LAYER. ATTACHED TO THE METAL WAS A LAYER OF ALPHA PBO2. ON THE SB-PB ALLOY THE CAPACITY CONTINUALLY INCREASED WITH CYCLING. A COMPACT EUTECTOIDAL COATING OF SMALL CRYSTALS OF ALPHA AND BETA PBO2 WAS FORMED. IT WAS CONCLUDED THAT ON PURE PB BETA PBO2 DOES NOT BOND TO ALPHA PBO2 AND THAT SB IN THE SB-PB ALLOY ACTS AS A NUCLEATING CATALYST FOR BETA PBO2 IN THE CORROSION PRODUCT ATTACHED TO THE METAL SURFACE. ANTIMONY ALSO PROMOTES INTERCRYSTAL BONDING BETWEEN THE TWO POLYMORPHS OF PBO2. THE MORPHOLOGIES OF THE PBSO4 CRYSTALS WERE ALSO STUDIED. THE CRYSTALS FORMED ON SOAKING IN THE ELECTROLYTE, AND DURING DISCHARGE OF PBO2 COATINGS, DEVELOPED BY ELECTROCHEMICAL CYCLING, WERE EXAMINED. WELL-DEVELOPED PRISMS, DENDRITES, AND HOPPER CRYSTALS WERE OBSERVED. THE DISCHARGE OF THE ANTIMONIAL COATINGS APPEARED TO BE LIMITED BY THE GROWTH RATE OF THE PBSO4 CRYSTALS. THE FUNDAMENTAL ASPECTS OF ELECTROCRYSTALLIZATION ARE DISCUSSED, AND A CRYSTAL CHEMICAL MECHANISM IS PROPOSED FOR THE ACTION OF SB IN THE PBO2 ELECTRODE. (U)

UNCLASSIFIED /ZOM04

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOM04

AD-728 431 11/3 10/3
NAVAL RESEARCH LAB WASHINGTON D C

CYCLING ANODIC COATINGS ON PURE AND ANTIMONIAL LEAD IN H2SO4, (U)

71 23P BURBANK,JEANNE I

UNCLASSIFIED REPORT
AVAILABILITY: PUB. IN POWER SOURCES, V3 P13-34 1971.

DESCRIPTORS: (*ANODIC COATINGS, *LEAD), (*LEAD ALLOYS, ANODIC COATINGS), (*STORAGE BATTERIES, ELECTRODES), SULFURIC ACID, ANTIMONY ALLOYS, X-RAY DIFFRACTION ANALYSIS, ELECTRON MICROSCOPY (U)
IDENTIFIERS: LEAD ACID CELLS (U)

ELECTROCHEMICAL CYCLING, X-RAY DIFFRACTION AND ELECTRON MICROSCOPY WERE USED TO STUDY ANODIC COATINGS ON PURE AND ANTIMONIAL LEAD. ON PURE LEAD A MAXIMUM CAPACITY DEVELOPED THAT DID NOT INCREASE WITH FURTHER CYCLING. THE ANODIC OXIDE COMPRISED SMALL NEEDLE-LIKE CRYSTALS WHICH GREW WITH CYCLING. THERE WAS A GRADUAL INCREASE IN THE AMOUNT AND CRYSTALLINITY OF BETA-PBO2 IN A SOFT POROUS OUTER LAYER. ATTACHED TO THE METAL WAS A LAYER OF ALPHA-PBO2. ON ANTIMONY ALLOY THE CAPACITY CONTINUALLY INCREASED WITH CYCLING. A COMPACT COATING OF SMALL CRYSTALS OF ALPHA- AND BETA-PBO2 WAS FORMED. IT WAS CONCLUDED THAT BETA-PBO2 DOES NOT BOND TO ALPHA-PBO2 AND THAT ANTIMONY ACTS AS A NUCLEATING CATALYST FOR BETA-PBO2 IN THE CORROSION PRODUCT. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZDH04

AD-734 864 11/3
FOREIGN TECHNOLOGY DIV WRIGHT-PATTERSON AFB OHIO

PROTECTION OF ALUMINUM IN A MARINE CLIMATE, (U)

OCT 71 7P STRAT,L. IOPREAN,L. I
REPT. NO. FTD-HC-23-964-71
PROJ: AF-6010
TASK: 601080

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: UNEDITED ROUGH DRAFT TRANS. OF REVISTA CONSTRUCTILLOR SI A MATERIALELOR DE CONSTRUCTII (RUMANIA) V21 N9 P477-479 1969.

DESCRIPTORS: (*COATINGS, CORROSION INHIBITION), (*ALUMINUM ALLOYS, *CORROSION INHIBITION), (*ANODIC COATINGS, ALUMINUM ALLOYS), DYES, ELECTROPLATING, PAINTS, RUMANIA (U)
IDENTIFIERS: TRANSLATIONS (U)

THE FOLLOWING CONCLUSIONS WERE DRAWN FROM THE EXPERIMENTS: ANODIC OXIDATION COMPACTED WITH ORGANIC DYES, APPLIED ON POLISHED ALUMINUM EXHIBITED THE BEST BEHAVIOR; UNPOLISHED ALUMINUM REQUIRES A 20 MU M THICK LAYER TO ENSURE A SERVICE LIFE OF MORE THAN 5 YEARS; IN ORDER TO RETAIN THE DECORATIVE APPEARANCE, A SUNLIGHT-RESISTANT DYE MUST BE USED; PAINTING OF THE ALUMINUM IS VERY EFFICIENT, ASSUMING THAT THE PAINTS ARE RESISTANT AGAINST THE ENVIRONMENT TO WHICH THEY ARE EXPOSED. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOM04

AD-732 718 11/3
ILLINOIS UNIV URBANA DEPT OF METALLURGY AND MINING ENGINEERING

ELECTROLYTIC BREAKDOWN OF ANODIC FILMS ON ALUMINUM, (U)

71 5P ZAHAVI,J. METZGER,M.

CONTRACT: DA-31-124-ARO(D)-289
PROJ: DA-2-0-061102-B-32-D, AROD-5063-MC
MONITOR: AROD 5063:6-MC

UNCLASSIFIED REPORT
AVAILABILITY: PUB. IN ANNUAL PROCEEDINGS, ELECTRON MICROSCOPY SOCIETY OF AMERICA (29TH), BOSTON, MASS., 1971.
SUPPLEMENTARY NOTE: SPONSORED IN PART BY THE ATOMIC ENERGY COMMISSION, WASHINGTON, D. C., AND THE ADVANCED RESEARCH PROJECTS AGENCY, WASHINGTON, D. C.

DESCRIPTORS: (*ANODIC COATINGS, DEFECTS(MATERIALS)), ELECTRON MICROSCOPY, ALUMINUM, CORROSION (U)

ELECTRON MICROSCOPY HAS BEEN USED TO STUDY THE ANODIC FILMS ON ALUMINUM. EVIDENCE WAS FOUND OF MANY BREAKDOWN AND REPAIR EVENTS ON BOTH GROSS AND FINE SCALES. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOM04

AD-735 631 11/3
FOREIGN TECHNOLOGY DIV WRIGHT-PATTERSON AFB OHIO

SURFACE FINISHES FOR ALUMINUM PRODUCTS BY DIRECT ANODIZING, (U)

NOV 71 14P CSOKAN,PAL ;
REPT. NO. FTD-HC-23-1536-71
PROJ: AF-6010
TASK: 601080

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: UNEDITED ROUGH DRAFT TRANS. OF MAGYAR ALUMINUM (HUNGARY) V6 N12 P360-363 1969.

DESCRIPTORS: (*ANODIC COATINGS, ALUMINUM ALLOYS), COLORS, CORROSION INHIBITION, PHYSICAL PROPERTIES, HUNGARY (U)
IDENTIFIERS: TRANSLATIONS (U)

THE ARTICLE DISCUSSES THE NEED FOR A MORE UP-TO-DATE SURFACE FINISHING TECHNOLOGY FOR ALUMINUM PRODUCTS BY DIRECT COLOR ANODIZING. (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOH04

AD-737 159 20/12 7/4
FRANKFORD ARSENAL PHILADELPHIA PA

ELECTRICAL PROPERTIES OF ANODIC OXIDE FILMS OF TA, NB, ZR, TI, W, AND V FORMED BY THE ION-CATHODE METHOD. (U)

DESCRIPTIVE NOTE: TECHNICAL RESEARCH ARTICLE,
AUG 71 8P HUSTED,DORSEY G. ;GRUSS, LEONARD W. ;MACKUS,THOMAS J. ;
REPT. NO. FA-A71-11
PROJ: DA-2-0-0611-0-2-B-31-E, DA-1-T-061102-B-32-A

UNCLASSIFIED REPORT

AVAILABILITY: PUB. IN JNL. OF THE ELECTROCHEMICAL SOCIETY, SOLID STATE SCIENCE, V118 N12 P1989-1992 DEC 71.
SUPPLEMENTARY NOTE: REVISION OF REPORT DATED 8 FEB 71.

DESCRIPTORS: (*REFRACTORY METALS, ANODIC COATINGS), (*ANODIC COATINGS, ELECTRICAL PROPERTIES), FILMS, OXIDES, TANTALUM COMPOUNDS, NIOBIUM COMPOUNDS, ZIRCONIUM OXIDES, TUNGSTEN COMPOUNDS, VANADIUM COMPOUNDS (U)
IDENTIFIERS: *OXIDE FILMS, TANTALUM OXIDES, ZIRCONIUM OXIDES, TUNSTEN OXIDES, VANADIUM OXIDES, AMORPHOUS MATERIALS (U)

AMORPHOUS OXIDE FILMS HAVE BEEN GROWN ON ZR, TI, W, TA, NB, AND V BY IONIZED GAS ANODIZATION USING THE ION CATHODE AS A SOURCE OF NEGATIVE IONS. FILMS WERE GROWN ON EACH METAL AT CONSTANT CURRENT TO 175V FOLLOWED BY CONSTANT VOLTAGE FOR ABOUT 4 HR. SEVERAL ELECTRICAL AND OPTICAL PROPERTIES WERE MEASURED FOR THE ANODIC FILMS PRODUCED ON THESE REFRACTORY METALS. THE PROPERTIES OF FILMS PREPARED BY THE ION CATHODE METHOD ARE COMPARED WITH THOSE PRODUCED BY PLASMA AND SOLUTION METHODS REPORTED BY OTHERS. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOM04

AD-737 876 11/3
FOREIGN TECHNOLOGY DIV WRIGHT-PATTERSON AFB OHIO

OXIDE LAYER ON THE SURFACE OF OBJECTS COATED WITH ALUMINUM IN VACUUM, (U)

NOV 71 7P SVOBODA,MIROSLAV ;SOUREK, VLASTIMIL ;KOS,JIRI ;
REPT. NO. FTD-HC-23-1534-71
PROJ: AF-7343

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: UNEDITED ROUGH DRAFT TRANS. OF PATENT (CZECHOSLOVAKIA) 134 171 P1-2 1969.

DESCRIPTORS: (*ANODIC COATINGS, *ALUMINUM COATINGS), VAPOR PLATING, VACUUM APPARATUS, ALUMINA, STEAM, AMMONIA, OZONE, AMINES, ADDITIVES, PATENTS, CZECHOSLOVAKIA (U)
IDENTIFIERS: TRANSLATIONS (U)

IT IS SHOWN THAT THE METHOD OF MAKING AN OXIDE LAYER ON THE SURFACE OF OBJECTS WHICH HAVE BEEN COATED WITH ALUMINUM IN VACUUM IS CHARACTERIZED BY THE FACT THAT A CLEANED OBJECT WHICH HAS BEEN COATED WITH ALUMINUM IN VACUUM IS SUBJECTED TO THE EFFECTS OF STEAM, THE PRESSURE AND TEMPERATURE OF WHICH ARE SELECTED IN SUCH A WAY THAT THE DRYNESS OF THE STEAM WOULD BE LESS THAN ONE; THAT AMMONIA IS ADDED TO STEAM IN THE AMOUNT OF 0.1 TO 50 GRAMS PER KILOGRAM OF STEAM; THAT OZONE IS ADDED TO STEAM IN THE AMOUNT OF 0.01 TO 10 GRAMS PER KILOGRAM OF STEAM; AND THAT AT LEAST ONE ORGANIC AMINE IS ADDED TO STEAM IN THE AMOUNT OF 0.1 TO 50 GRAMS PER KILOGRAM OF STEAM. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOM04

AD-739 395 11/6
OHIO STATE UNIV COLUMBUS DEPT OF METALLURGICAL ENGINEERING

FUNDAMENTAL STUDIES OF DISSOLUTION AND PASSIVITY OF ALLOYS AND COMPOUNDS. (U)

DESCRIPTIVE NOTE: REPT. FOR 1 MAR 70-28 FEB 71,
FEB 71 85P SATEHLE,R. W. ;
CONTRACT: N00014-67-A-0232-0006
PROJ: NR-036-085

UNCLASSIFIED REPORT

DESCRIPTORS: (*CORROSION, ANODIC COATINGS), (*ANODIC COATINGS, SOLUBILITY), (*ELECTROCHEMISTRY, ANODIC COATINGS), THERMODYNAMICS, CORROSION INHIBITION, STABILITY, OXIDES, IRON COMPOUNDS, CHROMIUM COMPOUNDS, PHASE STUDIES, ALLOYS, REACTION KINETICS, IRON OXIDES, NICKEL COMPOUNDS (U)
IDENTIFIERS: DISSOLVING, CHROMIUM OXIDES, NICKEL OXIDES (U)

THE WORK IS CONCERNED WITH THE DISSOLUTION BEHAVIOR OF THREE MATERIALS IN AQUEOUS SOLUTIONS: METALLIC OXIDES, IRON BASE COMPOUNDS, AND METAL ALLOYS. DURING THE FIRST YEAR, THE SIGNIFICANT LITERATURE WAS REVIEWED FOR THE DISSOLUTION OF THE OXIDES AND IRON BASE COMPOUNDS. A SERIES OF EXPLORATORY STUDIES ON THE DISSOLUTION AND OXIDES WAS ALSO COMPLETED. A BRIEF STUDY OF TUBERCLE FORMATION WAS CONDUCTED. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOM04

AD-744 605 7/4
OTTAWA UNIV (ONTARIO) DEPT OF CHEMISTRY

ELECTROCHEMISTRY OF THE NICKEL-OXIDE ELECTRODE. V. SELF-PASSIVATION EFFECTS IN OXYGEN-EVOLUTION KINETICS, (U)

MAR 68 18P CONWAY,B. E. ;SATTAR,M. A. ;GILROY,D. ;

UNCLASSIFIED REPORT
AVAILABILITY: PUB. IN ELECTROCHIMICA ACTA, V14 P677-694 1969.
SUPPLEMENTARY NOTE: SPONSORED IN PART BY ARMY ENGINEER RESEARCH AND DEVELOPMENT LABS., FORT BELVOIR, VA. SEE ALSO AD-742 879.

DESCRIPTORS: (*NICKEL, *ELECTROCHEMISTRY), (*ANODIC COATINGS, NICKEL), OXIDES, NICKEL COMPOUNDS, REACTION KINETICS, OXIDATION, ELECTRODES, HYDROXIDES, ALKALINE CELLS, CANADA (U)
IDENTIFIERS: PASSIVITY, NICKEL OXIDES (U)

POTENTIOSTATIC STUDIES ON THE OXYGEN-EVOLUTION REACTION AT NICKEL AND OXIDIZED NICKEL SURFACES REVEAL INHIBITION EFFECTS (SELF-PASSIVATION) ANALOGOUS TO THOSE FOUND IN ANODIC ORGANIC OXIDATIONS AT THE NOBLE METALS. HERE, HOWEVER, THE INHIBITING SPECIES, SURFACE OXIDES, ARE DIRECTLY INVOLVED IN THE OVER-ALL REACTION ITSELF. SIMILAR EFFECTS ARE SHOWN TO ARISE AT PLATINUM IN ALKALINE SOLUTIONS AND COMPARATIVE EXPERIMENTS ARE ALSO REPORTED FOR SILVER, WHERE EASILY DISTINGUISHABLE STATES OF SURFACE OXIDATION CAN BE RELATED TO THE OXYGEN-EVOLUTION KINETICS AT OXIDIZED SILVER SURFACES. A KINETIC THEORY OF THE SELF-INHIBITION EFFECTS IS PRESENTED IN GENERAL TERMS FOR VARIOUS SUPPOSED OXIDATION STATES OF THE SURFACE REGION OF THE ELECTRODE INTERPHASE. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZDH04

AD-746 003 13/8 9/1
AIR FORCE INST OF TECH WRIGHT-PATTERSON AFB OHIO SCHOOL OF ENGINEERING

MULTI-WAFER PLASMA ANODIZATION. (U)

DESCRIPTIVE NOTE: MASTER'S THESIS,
JUN 72 71P ORCUTT,WILLIAM B. I
REPT. NO. GGC/EE/72-12

UNCLASSIFIED REPORT

DESCRIPTORS: (*ANODIC COATINGS, PLASMA MEDIUM), (*SEMICONDUCTORS, ANODIC COATINGS), OXIDES, TANTALUM COMPOUNDS, CRYSTAL GROWTH, GAS DISCHARGES, SURFACE PROPERTIES, THESES (U)
IDENTIFIERS: *PLASMA ANODIZATION (U)

A PROTOTYPE MULTI-WAFER PLASMA ANODIZATION APPARATUS WAS DESIGNED AND CONSTRUCTED TO INVESTIGATE THE MULTI-WAFER PROCESS. THE APPARATUS USES A HOT HOLLOW CATHODE TO GENERATE A DENSE DISCHARGE CAPABLE OF YIELDING HIGH OXIDE GROWTH RATES. THE SAMPLES ARE PLACED PARALLEL TO THE AXIS OF THE DISCHARGE IN ORDER TO STUDY THE EFFECTS ON OXIDE GROWTH AND QUALITY OF SAMPLE POSITION WITH RESPECT TO DISCHARGE REGIONS. PLASMA AND ANODIZATION PARAMETERS WERE VARIED TO STUDY THE EFFECT ON OXIDE GROWTH RATES. THE QUALITY OF THE TANTALUM OXIDE SAMPLES WAS DETERMINED BY VISUAL AND MICROSCOPIC INSPECTION OF SURFACES AND BY PLOTTING CAPACITANCE AND DISSIPATION FACTOR PROFILES. RESULTS INDICATE THAT THE MULTI-WAFER PROCESS IS FEASIBLE AND THAT SAMPLES SHOULD BE PLACED IN THE POSITIVE COLUMN OF THE DISCHARGE NEAR THE ANODE. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOM04

AD-749 598 14/2 13/8
AIR FORCE CAMBRIDGE RESEARCH LABS L G HANSCOM FIELD MASS

CONTROLLED SECTIONING TECHNIQUE FOR SMALL GALLIUM ARSENIDE SAMPLES, (U)

MAY 72 4P MAGEE,T. J. ;COMER,J. J.
;
REPT. NO. AFCRL-72-0546
PROJ: AF-5620
TASK: 562001

UNCLASSIFIED REPORT
AVAILABILITY: PUB. IN REVIEW OF SCIENTIFIC INSTRUMENTS, V43 N8 P1218-1220 AUG 72.

DESCRIPTORS: (*GALLIUM ARSENIDES, ANODIC COATINGS), (*SEMICONDUCTOR DEVICES, MANUFACTURING METHODS), OXIDATION, SURFACE PROPERTIES, TEST METHODS, TEST EQUIPMENT (U)

A TECHNIQUE HAS BEEN DEVELOPED FOR SECTIONING SMALL GALLIM ARSENIDE SAMPLES USING ANODIC OXIDATION AND SUBSEQUENT REMOVAL OF THE OXIDE LAYERS. IT DIFFERS FROM THOSE PREVIOUSLY REPORTED IN THAT ONLY ONE SURFACE OF THE WAFER IS EXPOSED DURING ANODIZATION AND TOTAL IMMERSION IN THE ELECTROLYTE IS NOT REQUIRED. THE USE OF AN AMMONIUM PENTABORATE SOLUTION AS THE ELECTROLYTE AND A RELATIVELY SIMPLE ANODIZATION APPARATUS HAS YIELDED OXIDE LAYERS OF UNIFORM THICKNESS ON THE SURFACES OF GALLIUM ARSENISDE WAFERS. AFTER REMOVING THE OXIDE LAYERS, THE SURFACES OF THE WAFTERS WERE FOUND TO BE RELATIVELY FREE OF PITTING AND MACROSCOPIC DEFECTS. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOM04

AD-750 286 11/6 7/4
OHIO STATE UNIV COLUMBUS DEPT OF METALLURGICAL ENGINEERING

FUNDAMENTAL STUDIES OF DISSOLUTION AND PASSIVITY OF ALLOYS AND COMPOUNDS. (U)

DESCRIPTIVE NOTE: REPT. FOR 1 MAR 71-28 FEB 72,
FEB 72 73P STAEHLE,R. W. ;
CONTRACT: N00014-67-A-0232-0006
PROJ.: NR-036-085

UNCLASSIFIED REPORT

DESCRIPTORS: (*CORROSION INHIBITION, *BARRIER COATINGS), (*ANODIC COATINGS, SOLUBILITY), (*STAINLESS STEEL, CORROSION INHIBITION), SOLUTIONS, THICKNESS, SULFATES, NITRATES, PHOSPHATES, MOLYBDATES, TUNGSTATES, CARBONATES, PH (U)
IDENTIFIERS: PASSIVITY, DISSOLVING, STEEL 304, ELLIPSOMETRY (U)

STUDIES ARE REPORTED ON THE DISSOLUTION OF PROTECTIVE FILMS AND ON THE TRANSIENT DISSOLUTION BEHAVIOR OF FE-CR-NI ALLOYS. THE PROPERTIES OF PASSIVE FILMS WERE STUDIED USING AN OPTICAL ELLIPSOMETER TOGETHER WITH SIMULTANEOUS COULOMETRIC MEASUREMENTS. IT WAS POSSIBLE TO MEASURE FILM GROWTH AND DISSOLUTION PROCESSES SIMULTANEOUSLY. THE DISSOLUTION OF BULK OXIDES WAS ALSO STUDIED IN ACID AND CAUSTIC SOLUTIONS TO ASSESS EFFECTS OF ANIONS AND CATIONS. FINALLY, TRANSIENT DISSOLUTION AND REPASSIVATION WAS STUDIED USING TRANSIENTLY STRAINED ELECTRODES HELD AT CONSTANT POTENTIAL. (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZDM04

AD-750 410 11/6
CALIFORNIA UNIV LOS ANGELES SCHOOL OF ENGINEERING AND APPLIED SCIENCE

THE PROPERTIES OF RARE EARTH METALS AND ALLOYS. (U)

DESCRIPTIVE NOTE: SEMI-ANNUAL TECHNICAL REPT. 1 MAR-31 JUL 72,
SEP 72 20P DOUGLAS,D. L. ;KUENZLY,J. D. ;
REPT. NO. UCLA-ENG-7283
CONTRACT: DAHC15-70-G-15, APRA ORDER-1643

UNCLASSIFIED REPORT

DESCRIPTORS: (*NICKEL ALLOYS, *CORROSION RESISTANCE), (*ANODIC COATINGS, NICKEL ALLOYS), ADDITIVES, HEAT-RESISTANT METALS + ALLOYS, OXIDATION, REACTION KINETICS, X-RAY DIFFRACTION ANALYSIS, RARE EARTH ELEMENTS, ALUMINA, YTTRIUM, OXIDES, ALUMINUM ALLOYS, SCALE, SPALLATION (U)
IDENTIFIERS: *RARE EARTH CONTAINING ALLOYS (U)

THE HIGH-TEMPERATURE OXIDATION BEHAVIOR OF NI3AL (NI-13 W/O AL) WITH AND WITHOUT ADDITIONS OF 0.5% YTTRIUM HAS BEEN STUDIED OVER THE RANGE OF 900 TO 1200C IN AIR. NONE OF THE COMMONLY ACCEPTED RATE LAWS WERE FOLLOWED BY THE KINETICS. ALTHOUGH THE WEIGHT GAINS OF SAMPLES CONTAINING YTTRIUM WERE CONSISTENTLY 10 TO 20% GREATER THAN THOSE WITHOUT YTTRIUM, THE STEADY-STATE SCALING RATES WERE IDENTICAL. A QUANTITATIVE X-RAY DIFFRACTION TECHNIQUE WAS USED TO DETERMINE THE KINETICS OF GROWTH OF THE PROTECTIVE ALPHA-AL203 LAYER (ONE OF SEVERAL OXIDES FORMED). THE ALUMINA GROWTH FOLLOWED THE PARABOLIC RATE LAW UNDER ALL CONDITIONS STUDIED. THE PRESENCE OF YTTRIUM GREATLY INCREASED THE SHORT-TIME SCALE ADHERENCE. AT LONGER TIMES, HOWEVER, THE OUTER LAYER OF NIAL2O4 AND UNREACTED NIO SPALLED OFF ALONG WITH SOME OF THE INNER AL03 LAYER. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOM04

AD-750 896 11/6 11/3 13/11
NAVAL INTELLIGENCE SUPPORT CENTER WASHINGTON D C
TRANSLATION SERVICES DIV

FIZIKO-KHIMICHESKAYA MEKHANIKA MATERIALOV, NUMBER 7, 1971. (SELECTED TRANSLATIONS). SOVIET MATERIALS SCIENCE. (U)

SEP 72 20P
REPT. NO. NISC-TRANS-3343

UNCLASSIFIED REPORT
AVAILABILITY: AVAILABLE IN MICROFICHE ONLY.
SUPPLEMENTARY NOTE: TRANS. OF FIZIKO-KHIMICHESKAYA MEKHANIKA MATERIALOV, N7 P10-15, 18-21, 87-91 1971.

DESCRIPTORS: (*STEEL, *BARRIER COATINGS), (*PIPES, CORROSION RESISTANCE), (*STRESS CORROSION, CRACK PROPAGATION), (*ALUMINUM, ANODIC COATINGS), (*TITANIUM ALLOYS, FATIGUE(MECHANICS)), ALUMINUM COATINGS, NICKEL, HARDENING, FAILURE(MECHANICS), STRESSES, SHEETS, USSR (U)
IDENTIFIERS: *DRILL PIPE, *ELECTROMECHANICAL HARDENING, THERMOMECHANICAL TREATMENT, TRANSLATIONS (U)

CONTENTS: EFFECT OF THE BARRIER LAYER ON CERTAIN PROPERTIES OF ALUMINIZED MEDIUM CARBON STEEL; EFFECT OF ELECTROMECHANICAL HARDENING ON RESISTANCE OF DRILL PIPES TO CORROSION FATIGUE FAILURE; CORROSION-CRACK TRAJECTORY IN BIAXIAL PLANE STATE OF STRESS; EFFECT OF ANODIZING ON FATIGUE LIMIT AND CORROSION-FATIGUE STRENGTH OF DURALUMINUM SHEETS WITH STRESS CONCENTRATORS; EFFECT OF STRUCTURE ON FATIGUE STRENGTH OF CERTAIN TITANIUM ALLOYS. (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZDM04

AD-751 203 11/3 7/4
TEXAS UNIV AUSTIN ELECTRONICS RESEARCH CENTER

LOW TEMPERATURE METAL OXIDE DEPOSITION BY ALKOXIDE HYDROLYSIS, (U)

72 20P SLADEK,KARL J. ;GIBERT,W. WAYNE ;

CONTRACT: F44620-71-C-0091
PROJ: AF-4751
MONITOR: AFOSR TR-72-2091

UNCLASSIFIED REPORT
AVAILABILITY: PUB. IN PROCEEDINGS OF THE INTERNATIONAL CONFERENCE ON CHEMICAL VAPOR DEPOSITION (3RD), SALT LAKE CITY, UTAH, 24-27 APR 72 P215-231 1972.

DESCRIPTORS: (*ANODIC COATINGS, DEPOSITION), (*OXIDES, DEPOSITION), (*METALORGANIC COMPOUNDS, *HYDROLYSIS), (*DIELECTRIC FILMS, DEPOSITION), RESISTANCE(ELECTRICAL), ANNEALING, REFRACTIVE INDEX, ALUMINA, NIOBIUM COMPOUNDS, ANTIMONY COMPOUNDS, TITANIUM COMPOUNDS, ZIRCONIUM OXIDES, REACTION KINETICS (U)
IDENTIFIERS: *ALCOHOLATES, *CHEMICAL VAPOR DEPOSITION, VAPOR DEPOSITION, *OXIDE COATINGS, NIOBIUM OXIDES, ANTIMONY OXIDES, TITANIUM DIOXIDE (U)

ALKOXIDES, M(OR)N, WHERE M = METAL AND R = ALKYL, REACT READILY WITH WATER IN ORGANIC SOLVENTS. THIS GENERAL REACTION WAS TRANSLATED INTO THE VAPOR PHASE TO PRODUCE A FAMILY OF METAL OXIDE CVD REACTIONS. WATER AND ALKOXIDE VAPORS IN N2 WERE PASSED OVER A SUBSTRATE IN AN ISOTHERMAL RECTANGULAR REACTOR. FILMS OF AL203, NB205, SB203, TIO2, AND ZRO2 WERE OBTAINED AT 25 -130C. FILMS OF VOX AND BOX WERE OBTAINED BUT WERE NOT TESTED FURTHER. ALL FILMS WERE AMORPHOUS AS GROWN, BUT AIR ANNEALING AT 350 -1000C CAUSED CRYSTALLIZATION, THICK[illegible] SHRINKAGE, AND INCREASE IN REFRACTIVE INDEX. RESIS[illegible]ITIES AND BREAKDOWN VOLTAGES WERE FOUND. WITH EXCEPTION OF AL203 GROWTH RATES AGREED WITH A QUANTITATIVE MODEL OF DIFFUSION LIMITED SURFACE REACTION. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOM04

AD-752 907 11/3
COATING AND CHEMICAL LAB ABERDEEN PROVING GROUND MD

SEVEN YEARS TROPICAL EXPOSURE OF FINISHING SYSTEMS FOR ALUMINUM AND MAGNESIUM. (U)

DESCRIPTIVE NOTE: PROGRESS REPT.,
NOV 72 52P SANDLER,MELVIN H. I
REPT. NO. CCL-319
PROJ: DA-1-T-062105-A-329

UNCLASSIFIED REPORT

DESCRIPTORS: (*COATINGS, *CORROSION INHIBITION), (*ALUMINUM ALLOYS, CORROSION INHIBITION), (*MAGNESIUM ALLOYS, CORROSION INHIBITION), TROPICAL TESTS, CLEANING, ANODIC COATINGS, PAINT PRIMERS, PLASTIC COATINGS, PROTECTIVE TREATMENTS (U)
IDENTIFIERS: ALUMINUM ALLOY 2024, MAGNESIUM ALLOY AZ31, PROTECTIVE COATINGS (U)

THE REPORT COVERS A STUDY OF THE CORROSION RESISTANCE PROVIDED BY SPECIFICATION FINISHING SYSTEMS TO ALUMINUM AND MAGNESIUM EXPOSED IN A TROPICAL ENVIRONMENT. THE SYSTEMS INCLUDE CHEMICAL, ANODIC, AND WASH PRIMER METAL PRETREATMENTS; PRIMERS SPECIFIED FOR THESE METALS IN MILITARY STANDARD NO. 171 'FINISHING OF METAL AND WOOD SURFACES'; SEVERAL OTHER SPECIFICATION PRIMERS THAT HAVE BEEN USED FOR THESE METALS; AND AN EXPERIMENTAL EPOXY PRIMER. FINISH COATS INCLUDED SPECIFICATION LUSTRELESS, SEMI-GLOSS, AND GLOSS ALKYD RESIN ENAMELS AND A GLOSS POLYAMIDE-EPOXY ENAMEL. SEVEN YEARS EXPOSURE, SHOWS FINISHING SYSTEMS ARE AVAILABLE FOR THE PROTECTION OF ALUMINUM AND MAGNESIUM. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOM04

AD-756 472 11/3 7/4
MCMASTER UNIV HAMILTON (ONTARIO) INST FOR MATERIALS RESEARCH

A RADIOCHEMICAL TECHNIQUE FOR DETERMINING DEPTH DISTRIBUTIONS IN MO, (U)

OCT 71 6P ARORA,M. R. ;KELLY,ROGER ;

UNCLASSIFIED REPORT
AVAILABILITY: PUB. IN JNL. OF THE ELECTROCHEMICAL SOCIETY, V119 N2 P270-274 FEB 72.
SUPPLEMENTARY NOTE: REVISION OF REPORT DATED 30 JUL 71.

DESCRIPTORS: (*OXIDES, *ION BOMBARDMENT), (*ANODIC COATINGS, *THICKNESS), (*ION BOMBARDMENT, THICKNESS), MEASUREMENT, KRYPTON, RADIOCHEMISTRY, CALIBRATION, ELECTPOCHEMISTRY, CANADA (U)
IDENTIFIERS: *MOLYBDENUM OXIDES (U)

MOLYBDENUM CAN BE ANODIZED AT UP TO 235V IN AN ELECTROLYTE CONTAINING GLACIAL ACETIC ACID, NA2B407.10 H20, AND WATER. THE RESULTING OXIDE FILMS, WHICH MUST BE STABILIZED BY COMPRESSED-AIR DRYING, SHOW BRILLIANT INTERFERENCE COLORS, HAVE A LINEAR (OR NEARLY LINEAR) THICKNESS-VOLTAGE RELATION, AND CAN BE FORMED WITH THICKNESSES OF UP TO 380 MICROGRAM/SQ CM OF OXIDE. WHEN EXPOSED TO 1.0 G/LITTER AQUEOUS KOH, THE FILMS DISSOLVE (STRIP) WITHIN 30 SEC, WHEREAS THE UNDERLYING METAL DISSOLVES AT A RATE OF ONLY 20 A/HR. THE FILM THICKNESSES FORMED ON MO WHICH HAS BEEN SUBJECTED TO KR ION BOMBARDMENT ARE SIMILAR TO THOSE ON UNBOMBARDED SPECIMENS. IT FOLLOWS FROM THESE RESULTS THAT THE USE OF AN ANODIZING-STRIPPING SEQUENCE FOR DETERMINING DEPTH DISTRIBUTIONS IN MO SHOULD BE POSSIBLE. EXAMPLES OF DEPTH DISTRIBUTIONS FOR 10-KEV KR ARE GIVEN AND ARE SHOWN, BY COMPARISON BOTH WITH THEORY AND WITH PREVIOUSLY OBTAINED RESULTS FOR W, TO BE NUMERICALLY PLAUSIBLE. (AUTHOR MODIFIED ABSTRACT) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZONO4

AD-760 171 11/3
BRITISH COLUMBIA UNIV VANCOUVER DEPT OF ELECTRICAL ENGINEERING

PLASMA ANODIZATION. (U)

DESCRIPTIVE NOTE: FINAL REPT. 21 JUN 71-20 JUN 72,
NOV 72 50P PULFREY,DAVID L. ;YOUNG, LAWRENCE ;OLIVE,GRAHAM ;
CONTRACT: F33615-71-C-1886
MONITOR: AFAL TR-72-362

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: SEE ALSO REPORT DATED MAR 71, AD-722 490.

DESCRIPTORS: (*ANODIC COATINGS, PLASMA MEDIUM), (*DIELECTRIC FILMS, PLASMA MEDIUM), TANTALUM, NIOBIUM, SILICON DIOXIDE, THIN FILM STORAGE DEVICES, CANADA (U)
IDENTIFIERS: *ANODIZING, THIN FILMS, METAL OXIDE SEMICONDUCTORS, SEMICONDUCTOR COMPUTER STORAGE (U)

THE PROCESS OF PLASMA ANODIZATION HAS BEEN INVESTIGATED USING TWO SYSTEMS. THE FIRST WAS A COLD CATHODE DC DISCHARGE SYSTEM (REPLACING APPARATUS DESCRIBED IN OUR EARLIER REPORTS) WITH AUTOMATED ELLIPSOMETRY TO CONTINUOUSLY FOLLOW THE GROWTH OF THE OXIDE. THE SECOND SYSTEM EMPLOYED AN R.F. DISCHARGE WITH GROWTH OF THE OXIDE BEING FOLLOWED BY MONITORING THE INTENSITY REFLECTIVITY OF S-LIGHT FROM A HE/NE LASER. EXPERIMENTS ARE DESCRIBED WHICH INDICATE THAT NEGATIVE OXYGEN IONS FORM THE PLASMA ARE NOT DIRECTLY INVOLVED IN THE GROWTH OF OXIDES ON TANTALUM IN A D.C. DISCHARGE. ALSO REPORTED ARE DATA ON THE THICKNESS-AND TEMPERATURE-DEPENDENCE OF THE RELATION BETWEEN OXIDE FIELD AND OXIDE GROWTH RATE FOR THE CASE OF SI ANODIZATION IN AN R.F. DICHARGE. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOH04

AD-762 995 11/3
ILLINOIS UNIV URBANA MATERIALS RESEARCH LAB

ELECTRON MICROSCOPE STUDY OF BREAKDOWN AND REPAIR OF ANODIC FILMS ON ALUMINUM, (U)

JUN 72 9P ZAHAVI,J. ;METZGER,M. ;

CONTRACT: DA-ARO-D-31-124-72-G28
PROJ: DA-2-0-061102-B-32-D
MONITOR: AROD 5063:3-MC

UNCLASSIFIED REPORT
AVAILABILITY: PUB. IN JNL. OF THE ELECTROCHEMICAL SOCIETY, V119 N11 P1479-1485 NOV 72.
SUPPLEMENTARY NOTE: REVISION OF REPORT DATED 12 AUG 71. SPONSORED IN PART BY ATOMIC ENERGY COMMISSION, WASHINGTON, D. C. AND THE ADVANCED RESEARCH PROJECTS AGENCY, ARLINGTON, VA.

DESCRIPTORS: (*ANODIC COATINGS, *ALUMINUM), ELECTRON MICROSCOPY, INTERFACES, SURFACE PROPERTIES, STABILITY (U)
IDENTIFIERS: THIN FILMS, SURFACE CHEMISTRY (U)

IN FILMS FORMING IN 2.4M H2SO4, AT 5 MA/CM SQ, MANY BREAKDOWN EVENTS INCLUDING PIT INITIATION WERE FOUND TO OCCUR CONTINUALLY BUT TO BE FOLLOWED BY ALMOST IMMEDIATE REPAIR, SO THAT THE STABILITY OF FILM GROWTH WAS DUE NOT TO THE ABSENCE OF BREAKDOWN BUT TO THE EFFICACY OF REPAIR. A RELATION BETWEEN THE SITES OF BREAKDOWN AND SUBSTRATE STRUCTURE WAS NOT INDICATED. FILM GROWTH WAS INTERPRETED AS OCCURRING THROUGH A COMPACT FILM AT PORE BASES, AS IN THE CLASSICAL MECHANISM, AND ALSO THROUGH BREAKDOWN - EXTENSION OF A PORE NEAR TO THE METAL INTERFACE - AND REPAIR BY REANODIZATION TO FORM A HEMISPHERE OF COMPACT FILM EXTENDING INTO THE SUBSTRATE. AN INTERPRETATION OF THE GEOMETRICAL STRUCTURE OF THE FILM IS PROPOSED. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOM04

AD-764 253 10/3
ESB INC YARDLEY PA

MAGNESIUM FILM STUDY. (U)

DESCRIPTIVE NOTE: SEMIANNUAL REPT. NO. 1, 15 MAY-15 NOV 72,
JUL 73 127P BUTLER,W. O. ;DAFLER,J. R. ;DOE,J. B. ;HULL,M. H. ;
CONTRACT: DAAB07-72-C-0184
PROJ: 1-T-662705-A-053
TASK: 1-T-662705-A-05302
MONITOR: ECOM 0184-S-72

UNCLASSIFIED REPORT

DESCRIPTORS: (*DRY CELLS, *ANODIC COATINGS), (*MAGNESIUM, DRY CELLS), HYDROXIDES, MAGNESIUM OXIDES, FILMS, CORROSION, PRIMARY CELLS, SURFACE PROPERTIES, CHROMATES, RELIABILITY(ELECTRONICS) (U)
IDENTIFIERS: *MAGNESIUM CELLS, MAGNESIUM HYDROXIDES (U)

THE REPORT DISCUSSES A STUDY OF THE STRUCTURE AND COMPOSITION OF THE VARIOUS FILMS THAT ARE FORMED ON THE MAGNESIUM DRY CELL ANODE PRIOR TO AND DURING STORAGE, AND DURING DISCHARGE, FOR THE PURPOSE OF ELIMINATING OR REDUCING THE DELAYED ACTION AND THE UNPRODUCTIVE CORROSION ENCOUNTERED IN THE MAGNESIUM DRY CELL. SPECIAL EMPHASIS IS PLACED UPON CORRELATION OF TEST DATA WITH APPLICABLE DRY CELL PARAMETERS. (MODIFIED AUTHOR ABSTRACT) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOH04

AD-767 001 7/4
FRANKFORD ARSENAL PHILADELPHIA PA

ANODIC ELECTROLUMINESCENCE OF ANODIC FILMS ON ERBIUM AND HOLMIUM METALS IN SODIUM ALUMINATE SOLUTION, (U)

MAR 73 16P GRUSS,LEONARD L. ;MACKUS, THOMAS J. ;SALOMON,R. E. ;
REPT. NO. FA-A73-4
PROJ: DA-1-T-061102-B-32-A

UNCLASSIFIED REPORT
AVAILABILITY: PUB. IN PROCEEDINGS OF THE SYMPOSIUM ON OXIDE-ELECTROLYTE INTERFACES, P276-287 1973.

DESCRIPTORS: (*ELECTROLUMINESCENCE, *ANODIC COATINGS), ERBIUM, HOLMIUM, ELECTRODES, SOLUTIONS, ELECTROCHEMISTRY, TEMPERATURE, SPECTRA(VISIBLE + ULTRAVIOLET), ALUMINATES (U)

ANODIC ELECTROLUMINESCENCE OF ANODIC FILMS ON ERBIUM AND HOLMIUM METALS WAS STUDIED IN SODIUM ALUMINATE SOLUTIONS AS A FUNCTION OF TEMPERATURE AND VOLTAGE. THE RESULTS SUGGEST THAT ELECTROLUMINESCENCE OCCURS AT THE OXIDE-ELECTROLYTE INTERFACE. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOM04

AD-812 998 11/3 11/6
PHILCO-FORD CORP NEWPORT BEACH CALIF AERONUTRONIC DIV

OPTIMIZATION AND EVALUATION OF ALUMINUM SEALING. (U)

DESCRIPTIVE NOTE: FINAL REPT. 1 JUN 65-15 DEC 66,
MAR 67 84P FASSELL,W. M. , JR;
CONTRACT: AF 33(615)-2747
PROJ: AF-7381
TASK: 738107
MONITOR: AFML TR-67-71

UNCLASSIFIED REPORT

DESCRIPTORS: (*ALUMINUM ALL YS, *CORROSION), (*CORROSION INHIBITION, *ANODIC COATINGS), COLLOIDS, NICKEL COMPOUNDS, ACETATES, SODIUM COMPOUNDS, SILICATES, AGING(MATERIALS), CHROMATES, HEAVY WATER, ELECTROLYTES, SURFACE PROPERTIES, FILMS, OPTIMIZATION, CORROSION-RESISTANT ALLOYS, X-RAY DIFFRACTION ANALYSIS, SALT SPRAY TESTS, NITROGEN OXIDES, PH, MOLYBDATES, POLYMERS, OXIDES, SPECTRA(INFRARED), SURFACE AREA, DIELECTRIC PROPERTIES, ELECTRON MICROSCOPY, FATIGUE(MECHANICS) (U)
IDENTIFIERS: NITROGEN TETROXIDE, ALUMINUM ALLOY 7075, DICHROMATES, TITAN, ALUMINUM ALLOY 2024, ALUMINUM ALLOY 7178, ALUMINUM ALLOY 7079 (U)

PRELIMINARY STUDIES SHOWED THAT OUTSTANDING CORROSION RESISTANCE TO HUMID N2O4 AND SALT FOG COULD BE ACHIEVED ON SULFURIC ACID ANODIZED 7075-T6 ALUMINUM ALLOYS WHEN SEALED FIRST WITH NICKEL ACETATE FOLLOWED BY SODIUM DICHROMATE. IN THIS STUDY, THE NICKEL ACETATE-SODIUM DICHROMATE SEALING PROCEDURE, TERMED DUPLEX SEALING, WAS INVESTIGATED IN DETAIL FOR 2024-T3, 7075-T6, 7178-T6 AND 7079-T6 ALUMINUM ALLOYS TO IDENTIFY THE TREATMENT COMBINATIONS GIVING OPTIMUM CORROSION RESISTANCE. THE PROCESS VARIABLES STUDIED WERE SEAL SOLUTION IMMERSION TIMES, TEMPERATURES AND CONCENTRATIONS. FACTORIAL DESIGNED EXPERIMENTS WERE USED, FOLLOWED BY STATISTICAL ANALYSES OF THE CORROSION RESISTANCE OF THE TREATMENT COMBINATIONS. THE NICKEL ACETATE SEAL TEMPERATURE WAS FOUND TO BE THE PREDOMINANT VARIABLE AFFECTING CORROSION RESISTANCE. THE LOWEST TEMPERATURE, 180 F, RESULTED IN THE BEST CORROSION RESISTANCE. (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOH04

AD-836 534 11/3 22/2
AIR FORCE MATERIALS LAB WRIGHT-PATTERSON AFB OHIO

EFFECTS OF VACUUM-ULTRAVIOLET ENVIRONMENT ON OPTICAL PROPERTIES OF BRIGHT ANODIZED ALUMINUM TEMPERATURE CONTROL COATINGS. (U)

DESCRIPTIVE NOTE: REPT. FOR MAR-SEP 67,
MAY 68 32P WEAVER, JAMES H. ;
REPT. NO. AFML-TR-67-421
PROJ: AF-7340
TASK: 734007

UNCLASSIFIED REPORT

DESCRIPTORS: (*ALUMINUM COATINGS, *ANODIC COATINGS), SPACECRAFT, DEGRADATION, ABSORPTION, EMISSIVITY, OPTICAL PROPERTIES, SPACE ENVIRONMENTAL CONDITIONS, TEMPERATURE, SOLAR RADIATION, ULTRAVIOLET RADIATION (U)
IDENTIFIERS: ANODIZED ALUMINUM, GRAPHS(CHARTS) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZDM04

AD-845 116 11/3
ARMY MISSILE COMMAND REDSTONE ARSENAL ALA STRUCTURES AND MECHANICS LAB

SELF-HEALING PROTECTIVE COATINGS. (U)

DESCRIPTIVE NOTE: FINAL REPT.,
SEP 68 13P FRUCHTNICHT,OCKE C. ;PARK, BOOBY C. ;
REPT. NO. RS-TR-68-11
PROJ: DA-1-C-024401-A-328

UNCLASSIFIED REPORT

DESCRIPTORS: (*MAGNESIUM ALLOYS, *ANODIC COATINGS), VANADATES, FLUORIDES, AMMONIUM COMPOUNDS, ELECTROCHEMISTRY, SOLUTIONS, DIFFUSION (U)
IDENTIFIERS: PROTECTIVE COATINGS (U)

LABORATORY RESEARCH WAS CONDUCTED ON THE DEVELOPMENT OF PROTECTIVE (SELF-HEALING) COATINGS ON MAGNESIUM ALLOYS. GASEOUS DIFFUSION, REACTIVE SOLUTIONS, AND ELECTROCHEMICAL METHODS OF APPLICATION WERE INVESTIGATED. THE FIRST TWO METHODS WERE UNSUCCESSFUL; HOWEVER, ELECTROCHEMICAL METHODS EMPLOYING A BIFLUORIDE, META-VANADATE SOLUTION YIELDED COATINGS OF A HIGHLY PROTECTIVE NATURE ON MAGNESIUM AND ITS ALLOYS. (AUTHOR) (U)

II

ANTIFOULING COATINGS

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /20M05

AD-257 204
CLAPP (WILLIAM F) LABS INC DUXBURY MASS

PRESERVATIVE TREATED MARINE EXPOSURE TEST PANELS, NSIA 1953 SERIES (U)

DESCRIPTIVE NOTE: FINAL REPT.
MAY 61 19P
REPT. NO. 11842
CONTRACT: NOBS78875
PROJ: NS-032-001

UNCLASSIFIED REPORT
AVAILABILITY: REFERENCE ONLY AFTER ORIGINAL COPIES ARE EXHAUSTED.

DESCRIPTORS: *ANTIFOULING COATINGS, *SHIP HULLS, *WOOD, ARSENIC COMPOUNDS, CHROMATES, COATINGS, COPPER COATINGS, COPPER COMPOUNDS, EFFECTIVENESS, FUNGUSPROOFING, INSECTICIDES, MARINE BORERS, MOISTUREPROOFING, PAINTS, PRESERVATION, SHIPS, TEST METHODS, TESTS (U)

A SERIES OF MARINE EXPOSURE TEST PANELS WERE DEVISED TO STUDY PRESERVATIVE RETENTION AND EFFECTIVENESS OF COPPER-TREATED WOODEN HULLS. A NUMBER OF SPECIMENS WERE PAINTED WITH NAVY FORMULATIONS 16K AND VINYL ANTIFOULING PAINT FORMULA 121. CELCURE (ACID COPPER CHROMATE), CHEMONITE (AMMONIACAL COPPER ARSENITE), AND GREENSALT (CHROMATED COPPER ARSENATE), WERE SUPERIOR TO COPPERIZED CHROMATED ZINC CHLORIDE AND COPPER NAPHTHANATE. THE 16X AND 121 PAINT FORMULATIONS WERE COMPATIBLE WITH THE TREATMENTS; THE 16X FORMULATION WAS EFFECTIVE FOR 2 YEARS, WHILE THE 121 FORMULATION WAS EFFECTIVE FOR 3 YEARS. (U)

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOH05

AD-264 367
MIAMI UNIV FLA MARINE LAB

ANTIFOULING POTENTIALS OF PESTICIDAL MATERIALS (U)

MAR 61 IV
REPT. NO. 61070
CONTRACT: NOAS59 6182

UNCLASSIFIED REPORT

DESCRIPTORS: *ANTIFOULING COATINGS, *FUNGUSPROOFING, *GERMICIDES, *MARINE BIOLOGY, *PESTICIDES, *POROUS MATERIALS, ALGAE, AQUATIC ANIMALS, BARNACLES, COATINGS, DIFFUSION, EFFECTIVENESS, FOULING, INSTALLATION, MARINE BORERS, METALORGANIC COMPOUNDS, ORGANIC COATINGS, ORGANIC COMPOUNDS, PAINTS, SEA WATER, TEST EQUIPMENT, TEST METHODS, TROPICAL DETERIORATION (U)

RESULTS OF INVESTIGATIONS CONDUCTED BY THE MARINE LABORATORY DURING THE PERIOD MAY 1, 1959 THROUGH JUNE 30, 1960, CONCERNING THE ANTIFOULING POTENTIALS OF PESTICIDAL MATERIALS ARE PRESENTED. THE ULTIMATE OBJECTIVE OF THIS PROGRAM WAS TO SELECT CHEMICALS WHICH USED SINGLY OR IN ASSOCIATION WITH OTHER CHEMICALS WOULD OFFER COMPLETE PROTECTION AGAINST THE ENTIRE SPECTRUM OF FOULING ORGANISMS USUALLY FOUND IN TROPICAL WATERS. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOH05

AD-278 356
NAVAL CIVIL ENGINEERING LAB PORT HUENEME CALIF

PROTECTIVE COATINGS FOR STEEL PILING: RESULTS OF 30-MONTH TESTS (U)

JUN 62 52P ALUMBAUGH,R.L.;
REPT. NO. NCEL-TR-194
PROJ: Y-R007-08-401

UNCLASSIFIED REPORT

DESCRIPTORS: ABRASIVES, ALUMINUM COATINGS, ANTIFOULING COATINGS, APPROACH LIGHTS, ASPHALT, COANDA EFFECT, CORROSION INHIBITION, DEGRADATION, PHENOLIC PLASTICS, PLASTICS, SEA WATER, STEEL, STRUCTURES, SYNTHETIC RUBBER, UNDERWATER, VARNISHES, VINYL RADICAL, ZINC COATINGS (U)

EIGHT COATING SYSTEMS WERE EVALUATED AS PROTECTIVE COATING SYSTEMS FOR STEEL PILES. COATED SHEET AND H PILES WERE DRIVEN IN THE SURF AT PORT HUENEME AND EXPOSED 12 TO 30 MONTHS. A VINYL MASTIC COATING WAS THE MOST ECONOMICAL PROTECTION.

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOH05

AD-281 865
PUGET SOUND NAVAL SHIPYARD BREMERTON WASH MATERIAL LABS

REINFORCED PLASTIC COATINGS FOR THE PROTECTION OF STEEL SURFACES. (U)

DESCRIPTIVE NOTE: PROGRESS REPT.,
JUN 62 36P PHELPS,M. E. ;
REPT. NO. P 300 13

UNCLASSIFIED REPORT

DESCRIPTORS: *ANTIFOULING COATINGS, *PLASTIC COATINGS, CORROSION, DEGRADATION, EFFECTIVENESS, METAL PLATES, PLASTICS, SEA WATER, STEEL, SURFACES (U)

ANTIFOULING PAINTS APPLIED OVER PLASTIC COATED MILD STEEL PANELS HAVE BEEN EXPOSED TO EITHER FULL OR PART TIME SALTWATER IMMERSION FOR APPROXIMATELY FIVE YEARS. THE EFFECTIVENESS OF THE ANTIFOULING PAINTS AND THE PLASTIC SUBCOATS IS EVALUATED. (AUTHOR)
(M)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOMOB

AD-281 866
PUGET SOUND NAVAL SHIPYARD BREMERTON WASH MATERIAL LABS

REINFORCED PLASTIC COATINGS FOR THE PROTECTION OF STEEL SURFACES. (U)

DESCRIPTIVE NOTE: FINAL REPT.,
JUN 62 39P PHELPS,H. E. ;
REPT. NO. P 300 14

UNCLASSIFIED REPORT

DESCRIPTORS: *ANTIFOULING COATINGS, *PLASTIC COATINGS, ATMOSPHERE, CORROSION, DEGRADATION, EFFECTIVENESS, METAL PLATES, PLASTICS, SEA WATER, STEEL, SURFACES (U)

PLASTIC COVERED MILD STEEL PANELS COATED WITH EITHER BOOTTOP OR TOPSIDE PAINTS HAVE BEEN EXPOSED TO EITHER PART TIME SALT WATER IMMERSION OR ATMOSPHERIC CONDITIONS FOR FIVE YEARS. THE EFFECTIVENESS OF THE PAINTS AND THE UNDERLYING PLASTICS IS EVALUATED. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOH05

AD-290 716
FOREST PRODUCTS LAB MADISON WIS

PRESENT STATUS OF RESULTS-TYPE SPECIFICATIONS FOR TREATED WOOD (U)

NOV 62 IV BAECHLER,R.H.

REPT. NO. 2260

UNCLASSIFIED REPORT

DESCRIPTORS: *ACTINIUM, *ANTIFOULING COATINGS, *WOOD, COATINGS, CREOSOTE, DEGRADATION, GRILLES, PHENOLS, PRESERVATION, PROCESSING, TEST METHODS (U)

RESULTS-TYPE SPECIFICATIONS FOR TREATED WOOD. RELIABILITY AND STANDARDIZATION OF PRESERVATIVE RETENTION ASSAYS FOR POLES, PILING AND LUMBER. INSPECTIONS AT TREATING PLANT AND/OR AT DESTINATION. ASSAY OF BORINGS.

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZDN05

AD-412 769
NAVAL APPLIED SCIENCE LAB BROOKLYN N Y

PATROL CRAFT (HYDROFOIL), PCH-1. (U)

AUG 63 5P
REPT. NO. NASL-4759-14

UNCLASSIFIED REPORT

DESCRIPTORS: (*COATINGS, CORROSION INHIBITION), (*CAVITATION, EROSION), (*ANTIFOULING COATINGS, PAINTS), FOILS, FLAPS, MARINE RUDDERS, PROTECTIVE TREATMENTS, HALOCARBON PLASTICS. (U)
IDENTIFIERS: 1963, POLYISOBUTYLENE, NEOPRENE. (U)

CAVITATION EROSION RESISTANT COATINGS WERE APPLIED TO FOILS, STRUTS, FLAPS AND RUDDERS. CONDITION AFTER STATIC IMMERSION FOR FOUR MONTH PERIOD WAS OBSERVED. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOH05

AD-600 397
CLAPP (WILLIAM F) LABS INC DUXBURY MASS

THAMES 'CELPLY' PANELS. (U)

DESCRIPTIVE NOTE: FINAL REPT.
MAR 64 5P
REPT. NO. WFCL12813
CONTRACT: NOBS90044

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:

DESCRIPTORS: (*PLYWOOD, PROTECTIVE TREATMENTS), (*ANTIFOULING COATINGS, LIQUID IMMERSION TESTS), PROTECTIVE TREATMENTS, IMPREGNATION, MARINE BORERS, LIQUID IMMERSION TESTS, SEA WATER, LIFE EXPECTANCY, PRESERVATION (U)
IDENTIFIERS: CELCURE (U)

THE RESULTS OF SEA WATER IMMERSION TESTS INDICATE THAT: THE CELCURE-TREATED MAHOGANY PLYWOOD KNOWN AS THAMESCELPLY WAS SUFFICIENTLY RESISTANT TO MARINE BORER ATTACK TO MERIT FURTHER CONSIDERATION FOR MARINE USE, BUT THE LENGTH OF THIS TEST, 36 MONTHS, WAS NOT ENOUGH TO CONCLUSIVELY PREDICT AN EXTENDED LIFE FOR THIS PRODUCT. FORMULA 105 AF PAINT, BOTH ALONE AND APPLIED OVER FORMULA 117 PRETREATMENT, IS COMPATIBLE WITH THIS PRODUCT AND SHOWS A GOOD SERVICE LIFE OF AT LEAST 36 MONTHS. FORMULA 121 AF PAINT IS COMPATIBLE WITH THIS PRODUCT AND SHOWS A GOOD SERVICE LIFE OF AT LEAST 36 MONTHS. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOM05

AD-600 399
CLAPP (WILLIAM F) LABS INC DUXBURY MASS

PARINARIUM SP. - LIBERIAN PINE-AFRICAN OAKAFRICAN WISHMORE. (U)

DESCRIPTIVE NOTE: FINAL REPT.
FEB 64 8P
REPT. NO. WFCL-12307
CONTRACT: NOBS90044

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: REPORT ON AFRICAN WOODS.

DESCRIPTORS: (*WOOD, ANTIFOULING COATINGS), (*ANTIFOULING COATINGS, LIQUID IMMERSION TESTS), LIQUID IMMERSION TESTS, SEA WATER, PRESERVATION, MARINE BORERS (U)

AFTER SEA WATER IMMERSION TESTS ALL PANELS COATED WITH FORMULA 121 ANTI-FOULING PAINT REMAINED INTACT AND THE PAINT COAT REMAINED SERVICEABLE AND RETAINED ITS ANTI-FOULING PROPERTIES FOR THE ENTIRE 33 MONTH PERIOD. THE LIBERIAN PINE, AFRICAN OAK AND WISHMORE PANELS COATED WITH FORMULA 105 ANTI-FOULING PAINT REMAINED INTACT. THE PAINT COAT ITSELF REMAINED SERVICEABLE AND RETAINED ITS ANTI-FOULING PROPERTIES FOR THE ENTIRE 33 MONTH PERIOD. TWO OF THE THREE PARINARIUM PANELS COATED WITH FORMULA 105 ANTI-FOULING PAINT WERE ATTACKED BY FEW TO SEVERAL ABORTIVE BANKIA AND A FEW SMALL PHOLADS. ON THE PARINARIUM PANELS THE FORMULA 105 PAINT RETAINED ITS ANTI-FOULING PROPERTIES TO THE END OF THE TEST PERIOD BUT FAILED AS A COATING AT 24 MONTHS. (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /Z0M05

AD-600 415
CLAPP (WILLIAM F) LABS INC DUXBURY MASS

SOUTHERN YELLOW PINE SAPWOOD PANELS WITH COPPER SULPHONATE. (U)

DESCRIPTIVE NOTE: FINAL REPT.
MAR 64 6P
REPT. NO. 12814
CONTRACT: NOBS90044

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:

DESCRIPTORS: (*WOOD, PROTECTIVE TREATMENTS), (*PROTECTIVE TREATMENTS, LIQUID IMMERSION TESTS), LIQUID IMMERSION TESTS, SEA WATER, IMPREGNATION, COPPER COMPOUNDS, SULFONATES, ANTIFOULING COATINGS, MARINE BORERS, PRESERVATION (U)

THIS REPORT PRESENTS THE RESULTS OF SEAWATER IMMERSION TESTS. AFTER SIX AND ONE-HALF YEARS EXPOSURE, UNPAINTED PANELS TREATED WITH COPPER SULPHONATE SHOWED REMARKABLE RESISTANCE TO MARINE BORER ACTIVITY. THERE WERE SPASMODIC EVIDENCES OF EMBRYONIC BANKIA AND PHOLADS, BUT NO PENETRATION. ALL PANELS WERE IN GOOD CONDITION AT THE CONCLUSION OF THE TEST AND THEIR PROBABLE SERVICE LIFE COULD BE PROJECTED SEVERAL MORE YEARS. COPPER SULPHONATE TREATED PANELS AT ALL RETENTIONS TESTED SHOWED A DEFINITE ANTIFOULING INFLUENCE OVER A 24 MONTH PERIOD. BECAUSE OF PEELING AND CRACKING, FAILURE OF FORMULA 121 ANTIFOULING PAINT BEGAN AFTER A YEAR'S EXPOSURE AND THE PAINT WAS ALL GONE BY 24 MONTHS. THE TREATED PANEL (NOW EXPOSED UNCOATED) EXHIBITED THE SAME ANTIFOULING PROPERTIES AS THE ORIGINAL UNCOATED TREATED PANELS. FORMULA 105 ANTIFOULING PAINT WAS MORE SUCCESSFUL THAN THE 121 ANTIFOULING PAINT. CRACKING AND PEELING STARTED AT A YEAR'S EXPOSURE BUT THE COATING LASTED UP TO 36 MONTHS. THERE WAS NO EVIDENCE OF MARINE BORER ATTACK IN THE COATED PANELS AS LONG AS THE PAINT WAS PRESENT. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /20M05

AD-628 194 11/3 14/2 13/10
DEPARTMENT OF THE NAVY WASHINGTON D C

RAPID METHODS OF TESTING ANTIFOULING PAINTS FOR OCEAN-GOING SHIPS, (U)

66 12P GLOTEV,V. N. ;GUREVICH,E. S. ; GEINE,E. I. ;
REPT. NO. TRANSLATION-2059,
MONITOR; TT , 66-60557

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: OB USKORENNYKH METODAKH ISPYTANIYA NEOBRASTAIUSHCHIKH KRASOK DLYA MORSKIKH SUDOV, TRANS. OF LAKAKRASOCHNE MATERIALY I IKH PRIMENENIE (USSR) N6 P53-6 1964.

DESCRIPTORS: (*ANTIFOULING COATINGS, MODEL TESTS), (*MODEL TESTS, ANTIFOULING COATINGS), (*TEST METHODS, ANTIFOULING COATINGS), SHIPS, SEA WATER, LIFE EXPECTANCY, TOXICITY, USSR (U)

THE KINETICS OF THE PROCESS WHEREBY COPPER IONS TOXIC FOR MARINE ORGANISMS ARE LEACHED FROM ANTIFOULING COATINGS OF KHV-53 AND KHS-79 PAINTS WERE STUDIED. IT WAS SHOWN THAT THIS PROCESS TAKES PLACE AT DIFFERING TEMPERATURES, CHLORION CONCENTRATIONS AND LEACHING MEDIUM PH, AND THAT IT FOLLOWS EQUAL REGULAR PATTERNS FOR BOTH PAINTS; TEMPERATURE, HOWEVER, IS THE MOST IMPORTANT FACTOR DETERMINING THE LEACHING SPEED OF COPPER FROM COATINGS. IT IS RECOMMENDED THAT A FAST METHOD OF DETERMINING THE EFFECTIVENESS OF ANTIFOULING COATINGS BE USED EMPLOYING A GLYCINE SOLUTION; IT IS ESSENTIAL THAT THE SAMPLES BEING TESTED BE THERMOSTATICALLY CONTROLLED AND ROTATED IN THE LEACHING MEDIUM. AN IMPROVED QUICK METHOD HAS BEEN DEVELOPED FOR DETERMINING THE LEACHING SPEED OF COPPER FROM ANTIFOULING COATINGS IN A THERMOSTATICALLY CONTROLLED APPARATUS. THIS METHOD IS SUITABLE FOR CHECKING THE EFFICIENCY OF ANTIFOULING PAINTS BOTH WHEN PAINT FORMULAS AND COATING SYSTEMS ARE BEING DEVELOPED AND WHEN THE QUALITY OF INDUSTRIAL OUTPUT IS BEING INSPECTED. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOMOS

AD-629 863 11/3
DEPARTMENT OF THE NAVY WASHINGTON D C

USE OF ANTI-CORROSION AND ANTI-FOULING PAINTS BASED ON COAL TAR AND ITS MIXTURES WITH PHENOL OR EPOXY RESINS. (U)

66 6P IZRALYANTS,E. D. ;MUROMTSEV, A. K. ;

REPT. NO. TRANSLATION-2057,

UNCLASSIFIED REPORT

AVAILABILITY: MICROFICHE ONLY AFTER ORIGINAL COPIES EXHAUSTED.

SUPPLEMENTARY NOTE: PRIMENENIE ANTIKORROZIONNYKH I NEOBRASTAIUSHCHIKH KRASOK NA OSNOV KAMENNOUGOLNOGO PEKA ILI SMESI EGO S FENOLNYMI I EPOKSIDNYMI SMOLAMI, TRANS. OF LAKOKRASOCHNE MATERIALY I IKH PRIMENENIE (USSR) N5 P44-6 1964.

DESCRIPTORS: (*ANTIFOULING COATINGS, TAR), (*CORROSION INHIBITION, TAR), (*TAR, ANTIFOULING COATINGS), COAL, MIXTURES, PHENOLS, EPOXY PLASTICS, EFFECTIVENESS, USSR (U)

TRANSLATION OF RUSSIAN RESEARCH: USE OF ANTI-CORROSION AND ANTI-FOULING PAINTS BASED ON COAL TAR AND ITS MIXTURES WITH PENOL OR EPOXY RESINS.

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZDM05

AD-686 933 11/3
CENTRAL INST OF FISHERIES TECHNOLOGY COCHIN (INDIA)

ANTIFOULING PROPERTIES OF 'EMERALD GREEN': A PRELIMINARY OBSERVATION. (U)

64 4P BALASUBRAHMANYAN,R. IRAVINDRAN, K. ;

UNCLASSIFIED REPORT
AVAILABILITY: PUB. IN PROCEEDINGS OF THE SYMPOSIUM ON MARINE PAINTS, TECHNICAL SESSION NO. 3, MARINE FOULING (PREVENTION), HELD IN NEW DELHI (INDIA), 20-21 NOV 64, 3P. NO COPIES FURNISHED.

DESCRIPTORS: (*ANTIFOULING COATINGS, *ARSENIC COMPOUNDS), (*COPPER COMPOUNDS, ANTIFOULING COATINGS), SHIPS, INDIA, TEST METHODS, TOXICITY (U)
IDENTIFIERS: *EMERALD GREEN-COPPER(II) ACETOARSENITE, COPPER(II) ACETOARSENITE, ARSENIC ORGANIC COMPOUNDS (U)

THE PAPER DESCRIBES THE WORK CARRIED OUT ON AN ANTIFOULING COMPOSITION INCORPORATING EMERALD GREEN, A COPPER ARSENIC COMPOUND, AS THE TOXIC PIGMENT. EXPOSURE TRIALS AT DIFFERENT SITES SHOWED THE FOULING-FREE LIFE OF THE COMPOSITION TO BE 6 TO 7 MONTHS WHICH WAS HIGHER THAN THAT OF THE COMMERCIAL COMPOSITIONS EXPOSED SIMULTANEOUSLY. EMERALD GREEN IS REGARDED AS A SATISFACTORY TOXICANT. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOH05

D-687 727 13/10

NAVAL SHIP SYSTEMS COMMAND WASHINGTON D C SCIENTIFIC DOCUMENTATION DIV

ELECTROCHEMICAL PROTECTION OF SHIP HULLS (PRIMENENIE ELEKTROKHIMICHESKOI ZASCHITY KORPUSA SUDNA), (U)

DEC 68 12P KAGANSKII,G. YA. ;

MONITOR: NAVSHIPS TRANS-1156

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: TRANS. OF SUDOSTROENIE (USSR) V58 N5 P58-62 1968, BY LLOYD G. ROBBINS.

DESCRIPTORS: (*SHIP HULLS, *PROTECTIVE TREATMENTS), (*ELECTROCHEMISTRY, PROTECTIVE TREATMENTS), MARINE ENGINEERING, SHIPS, CORROSION, FOULING, CORROSION INHIBITION, COATINGS, ANTIFOULING COATINGS, PAINTS, VARNISHES, ZINC COMPOUNDS, CORROSION-RESISTANT ALLOYS, SHIELDING, SHIPYARDS, USSR (U)

IDENTIFIERS: SHIPBUILDING, GALVANIC SHIELDING, TRANSLATIONS (U)

PAINT - AND - VARNISH COATINGS ARE NOT A RELIABLE MEANS OF PROTECTION FROM CORROSION AND FOULING OF SHIP HULLS FOR THE INTER-DOCKING PERIOD. IN SOVIET AND FOREIGN SHIPBUILDING, ELECTROCHEMICAL PROTECTION IS USED IN COMBINATION WITH PAINT - AND - VARNISH COATINGS. PROTECTOR-TYPE (GALVANIC) SHIELDING AND THE IMPRESSED CURRENT CATHODIC PROTECTION SYSTEM ARE DISCUSSED AND EVALUATED. (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOH05

AD-688 536 11/3
ARMY FOREIGN SCIENCE AND TECHNOLOGY CENTER WASHINGTON D C

SILICATE-ZINC ANTIFOULING PAINTS. STUDIES ON ANTIFOULING PROPERTIES. (U)

MAY 69 14P JEDLINSKI,ZBIGNIEW ; LUKASZCZYK,JAN ;SEKURADZKI,ANDRZEJ ;
REPT. NO. FSTC-HT-23-141-69
PROJ: FSTC-92236282301

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: TRANS. OF PRZEMYSL CHEMICZNY (POLAND) N11 P687-689 1968.

DESCRIPTORS: (*ANTIFOULING COATINGS, *COPPER COMPOUNDS), SILICATES, OXIDES, ZINC, CORROSION, BARNACLES, POLAND (U)
IDENTIFIERS: COPPER OXIDES, TRANSLATIONS (U)

ACCELERATED AND LAND TESTS PROVED THAT THE ACTION OF PRESERVATIVE COATINGS CONSISTING OF SILICATE PAINTS DEPENDS ON THE CONTENT OF OXIDES OF COPPER IN THE PAINT MAKING UP THE EXTERNAL LAYER OF THE COATING. THE CONTENT OF CU2O IS INCREASED, THE ANTICORROSION PROPERTIES DECREASE AND ANTIFOULING PROPERTIES BECOME BETTER. COATINGS WITH 21.1% CU2O HAVE GOOD ANTICORROSION PROPERTIES BUT INSUFFICIENT ANTIFOULING PROPERTIES, PRIMARILY AS CONCERNS BARNACLES. THE ADDITION OF ZINC OXIDE (21% CU2O AND 33.5% ZN AT THE OPTIMUM) IMPROVES ANTIFOULING WITHOUT HARMING ANTICORROSION PROPERTIES. (AUTHOR) (U)

ODC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOH05

AD-689 134 11/3
DEFENCE STANDARDS LABS MARIBYRNONG (AUSTRALIA)

THE APPLICATION OF SCANNING ELECTRON MICROSCOPY TO ANTIFOULING PAINT RESEARCH. (U)

JUN 68 5P BISHOP,J. H. I

UNCLASSIFIED REPORT
AVAILABILITY: PUB. IN AUSTRALIAN OCCA PROCEEDINGS AND NEWS, P13-16 MAR 69. NO COPIES FURNISHED.

DESCRIPTORS: (*ELECTRON MICROSCOPY, *ANTIFOULING COATINGS), FILMS, PAINTS, AUSTRALIA (U)
IDENTIFIERS: SCANNING ELECTRON MICROSCOPY (U)

ELECTRON MICROSCOPY IS BRIEFLY REVIEWED, WITH PARTICULAR REFERENCE TO THE RECENTLY ESTABLISHED TECHNIQUE OF SCANNING ELECTRON MICROSCOPY. THE USE OF THE SCANNING ELECTRON MICROSCOPE FOR THE STUDY OF PAINT FILMS IS ILLUSTRATED WITH EXAMPLES OBTAINED DURING ANTIFOULING PAINT RESEARCH, AND ITS POTENTIAL USES FOR THE EXAMINATION OF PAINTS IN GENERAL ARE INDICATED. (AUTHOR) (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZDH05

AD-691 725 7/3 6/6 11/3 11/8
6/12

ARMY NATICK LABS MASS CLOTHING AND PERSONAL LIFE SUPPORT EQUIPMENT LAB

ORGANOLEAD CHEMISTRY: SYNTHESES AND APPLICATIONS. (U)

DESCRIPTIVE NOTE: SUMMARY TECHNICAL REPT. 1961-1968,
MAY 69 49P HENRY,MALCOLM C. ;PANT, BHUVAN C. ;
REPT. NO. C/PLSEL-64
PROJ: DA-1-T-062105-A-329
MONITOR: USA-NLABS TR-69-55-CE

UNCLASSIFIED REPORT

DESCRIPTORS: (*LEAD, *METALORGANIC COMPOUNDS), (*HERBICIDES, *LEAD COMPOUNDS), (*LUBRICANT ADDITIVES, LEAD COMPOUNDS), (*ANTIFOULING COATINGS, LEAD COMPOUNDS), (*GERMICIDES, LEAD COMPOUNDS), (*INSECT CONTROL, LEAD COMPOUNDS), SYNTHESIS(CHEMISTRY), TOXICITY, FLUORINE COMPOUNDS, HALOGENATED HYDROCARBONS, MOLLUSCACIDES, FUNGUS DETERIORATION, COTTON TEXTILES, ORGANIC SULFUR COMPOUNDS, CHLORINE COMPOUNDS, AZIDES, THIOLS (U)

IDENTIFIERS: *PLUMBANES, PLUMBANE/PROPYLTHIO-TRIPHENYL, PLUMBANE/ACETOXY-TRIPHENYL, PLUMBANE/METHYLTHIO-TRIPHENYL, PLUMBANE/CHLORO-TRIPHENYL, PLUMBANE/ETHYLTHIO-TRIPHENYL, LEAD ORGANIC COMPOUNDS, CHEMOSTERILANTS (U)

THE CHEMISTRY, SCREENING AND TESTING OF ORGANOLEAD COMPOUNDS SYNTHESIZED AT THE U. S. ARMY NATICK LABORATORIES ARE REPORTED AND ANALYZED. THE RESEARCH CONDUCTED HAS RESULTED IN THE DEVELOPMENT OF NUMEROUS NEW SYNTHETIC ROUTES TO ORGANOLEAD COMPOUNDS NOT PREVIOUSLY KNOWN. THESE NEW SYNTHETIC ROUTES, IN TURN, HAVE OPENED UP A WIDE VARIETY OF POSSIBILITIES FOR FURTHER SYNTHESIS OF ADDITIONAL NEW ORGANOLEAD STRUCTURES. THE SCREENING, TESTING AND EVALUATION OF ORGANOLEAD CHEMICALS SYNTHESIZED UNDER THIS PROGRAM SHOW THAT THESE CHEMICALS HAVE A WIDE SPECTRUM OF POTENTIAL APPLICATIONS. THUS THESE CHEMICALS MAY BE USEFUL AS LUBRICANT ADDITIVES, BIOCIDES SUCH AS COTTON PRESERVATIVES AND ANTI-FOULING PAINTS, AND RODENT REPELLENTS.

(U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOHO5

AD-692 212 11/3
DEFENCE STANDARDS LABS MARIBYRNONG (AUSTRALIA).

THE EXAMINATION OF THE STRUCTURE OF ANTIFOULING COATINGS BY SCANNING ELECTRON MICROSCOPY. (U)

NOV 68 19P BISHOP,J. H. ISILVA,S. R. ;

UNCLASSIFIED REPORT
AVAILABILITY: PUB. IN JNL. OF THE OIL AND COLOUR CHEMIST'S ASSOCIATION, V52 P201-218 1969. NO COPIES FURNISHED.

DESCRIPTORS: (*ANTIFOULING COATINGS, *ELECTRON MICROSCOPY), SURFACE PROPERTIES, VINYL PLASTICS, PAINTS, COPPER COMPOUNDS, OXIDES, AUSTRALIA (U)
IDENTIFIERS: SCANNING ELECTRON MICROSCOPY, COPPER OXIDES, LEACHING (U)

THE RECENTLY DEVELOPED SCANNING ELECTRON MICROSCOPE YIELDED INFORMATION OF MUCH MORE VALUE IN THE STUDY OF ANTIFOULING PAINT FILMS THAN WAS OBTAINED FROM THE CONVENTIONAL TRANSMISSION INSTRUMENT. THE SIGNIFICANCE OF THE INFORMATION OBTAINED IS DISCUSSED AND IT IS SHOWN THAT CURRENT THEORIES OF THE MECHANISM BY WHICH TOXICANT IS RELEASED FROM THE FILM REQUIRE REVISION. FILM POROSITY AND SURFACE TEXTURE, WHICH ARE DEPENDENT UPON THE PIGMENT LOADING, AND ALSO THE WIDE VARIATION IN PARTICLE SIZE AND SHAPE ARE SHOWN TO BE IMPORTANT CONTROLLING FACTORS. THE CRITICAL PIGMENT VOLUME CONCENTRATION IS THE PARAMETER WHICH DETERMINES WHETHER OR NOT A FILM IS POROUS, RATHER THAN A PIGMENT LOADING CALCULATING ON THE ASSUMPTION THAT THE PIGMENT PARTICLES CAN BE REGARDED AS UNIFORM SPHERES AS PREVIOUSLY SURMISED. THE THICKNESS OF THE LAYER OF MATRIX MATERIAL OVER THE SURFACE OF THE CUPROUS OXIDE PARTICLES AND THE DEGREE TO WHICH THE LAYER IS RUPTURED, PROBABLY BY OSMOTIC PRESSURE FORCES, ALSO HAVE A BEARING ON THE RATE OF LEACHING. DEFECTS IN ANTIFOULING PAINT FILMS ARE EASILY DETECTED. A GREEN PATINA OBSERVED ON SOME SURFACE AREAS OF ANTIFOULING PAINT FILMS REMOVED FROM SHIPS AFTER SERVICE AT SEA IS ATTRIBUTED TO THE PRESENCE OF LARGE NUMBERS OF DIATOMS AND NOT NECESSARILY TO THE PRESENCE OF PRECIPITATED COPPER SALTS.
(AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOMOS

AD-692 595 11/3
DEFENCE STANDARDS LABS MARIBYRNONG (AUSTRALIA)

ANTI-FOULING PAINTS. I. THEORETICAL APPROACH TO LEACHING OF SOLUBLE PIGMENTS FROM INSOLUBLE PAINT VEHICLES. (U)

SEP 68 7P MARSON,F. I

UNCLASSIFIED REPORT
AVAILABILITY: PUB. IN JNL. OF APPLIED CHEMISTRY, V19 P93-99 APR 69. NO COPIES FURNISHED.

DESCRIPTORS: (*ANTIFOULING COATINGS, SOLUBILITY), PAINTS, DIFFUSION, OXIDES, COPPER COMPOUNDS, SURFACE PROPERTIES, AUSTRALIA (U)
IDENTIFIERS: LEACHING, COPPER OXIDES, SURFACE CHEMISTRY (U)

A THEORETICAL APPROACH TO THE PROBLEM OF HOW CONTACT LEACHING ANTI-FOULING PAINTS WORK IS DISCUSSED; A POSSIBLE MECHANISM IS SELECTED AND APPLIED TO AN IDEALISED MODEL OF A PAINT FILM. A PRECISE MATHEMATICAL TREATMENT IS THEN ATTEMPTED OF THE RELATIONSHIP BETWEEN THE LEACHING RATE, THE PHYSICAL PROPERTIES, AND IF APPLICABLE THE CHEMICAL PROPERTIES OF THE ENVISAGED PAINT FILM AND ITS ENVIRONMENT. A MECHANISM PREVIOUSLY PROPOSED HAS BEEN EXAMINED BY THIS METHOD. AN EQUATION IS DERIVED FOR AN IDEALISED PAINT FILM RELATING THE LEACHING RATE TO THE PHYSICAL PROPERTIES OF THE PAINT FILM AND THE LEACHATE. IT IS ASSUMED THAT THE RATE OF SOLUTION OF A SOLUBLE PIGMENT FROM AN INSOLUBLE VEHICLE IS DEPENDENT ONLY ON THE PHYSICAL PROPERTIES OF THE PAINT FILM AND THE DIFFUSION OF THE SOLVATED PIGMENT THROUGH THE EXHAUSTED MATRIX AND THE DIFFUSION LAYER OF LEACHATE IN DIRECT CONTACT WITH THE SURFACE OF THE PAINT. AN EQUATION IS DERIVED FOR AN IDEALISED PAINT FILM WHICH RELATES THE LEACHING RATE TO SOME PHYSICAL PROPERTIES OF THE PAINT FILM AND OF THE LEACHATE. THE EQUATION IS SHOWN TO PREDICT QUALITATIVELY THE EFFECT OF MOST VARIABLES KNOWN TO AFFECT THE LEACHING OF CONTACT LEACHING PAINTS. SOME EVIDENCE IS GIVEN TO SUPPORT THE QUANTITATIVE PREDICTION OF THE RELATIONSHIP BETWEEN THE PIGMENT VOLUME CONTENT AND THE INITIAL LEACHING RATE, THE EFFECT OF DISSOLVED PIGMENT IN SOLUTION ON THE LEACHING RATE, THE INCREASE IN LEACHING RATE FOR A GIVEN TEMPERATURE INCREASE, AND THE EFFECT OF VELOCITY OF FLOW PAST THE SURFACE OF THE PAINT FILM. (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOMO5

AD-698 013 13/8 11/3 13/10
DEFENCE RESEARCH ESTABLISHMENT PACIFIC VICTORIA (BRITISH COLUMBIA)

CATHODIC REDUCTION OF CUPROUS OXIDE IN VINYL ANTIFOULING PAINTS. (U)

MAR 69 12P ANDERTON,W. A.
REPT. NO. REPRINT-69-4

UNCLASSIFIED REPORT
AVAILABILITY: PUB. IN JNL. OF THE OIL AND COLOUR CHEMISTS' ASSOCIATION, V52 P711-726 1969. NO COPIES FURNISHED.

DESCRIPTORS: (*CATHODIC PROTECTION, *ANTIFOULING COATINGS), (*COPPER COMPOUNDS, *REDUCTION(CHEMISTRY)), PAINT PRIMERS, COPPER, VINYL PLASTICS, ELECTROCHEMISTRY, SHIP HULLS (U)
IDENTIFIERS: COPPER OXIDES (U)

ON THE CATHODICALLY PROTECTED BOTTOMS OF CANADIAN NAVAL SHIPS, WHEN COATED WITH A VINYL SYSTEM INCLUDING A CUPROUS OXIDE PIGMENTED ANTIFOULING PAINT, BLACK PATCHES ARE FREQUENTLY OBSERVED. IT HAS BEEN SHOWN THAT THESE PATCHES ARE ELECTRICALLY CONDUCTIVE AND THAT THE COLOUR IS THE RESULT OF THE REDUCTION OF CUPROUS OXIDE TO METALLIC COPPER. THIS PHENOMENON IS OF PRACTICAL IMPORTANCE BECAUSE THESE AREAS TRANSMIT A RELATIVELY LARGE CATHODIC CURRENT, WITH THE POSSIBLE CONSEQUENCE THAT THE CATHODIC PROTECTION SYSTEM MAY BE UNABLE TO SUPPLY SUFFICIENT CURRENT FOR COMPLETE PROTECTION OF THE HULL. THE METALLIC COPPER, BEING CATHODICALLY PROTECTED, WILL NOT GO INTO SOLUTION AND SO FOULING MAY OCCUR. CATHODIC DEPOSIT ON THE CONDUCTIVE AREAS MAY INCREASE THE DRAG ON THE SHIP. A MECHANISM FOR THIS PHENOMENON IS DESCRIBED. EXPERIMENTAL WORK HAS SHOWN THE CONDITIONS UNDER WHICH IT OCCURS, AND HOW IT MAY BE LESSENED. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZDH05

AD-721 029 11/3 11/9
FOREIGN TECHNOLOGY DIV WRIGHT-PATTERSON AFB OHIO

ANTIADHESION COMPOSITION, (U)

DEC 70 8P ROSHCHUPKIN,V. I. ; FAINTSIMER,R. Z. ;CHANYSHEV,R. O. ;SHVARTS, YA. D.;YANOVSKII,E. A. ;
REPT. NO. FTD-HT-23-791-70
PROJ: FTD-7343

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: EDITED TRANS. OF PATENT (USSR) 253 345 2P, 6 OCT 67, BY D. KOOLBECK.

DESCRIPTORS: (*ANTIFOULING COATINGS, POLYMERIZATION), (*POLYETHYLENE PLASTICS, MANUFACTURING METHODS), POLYVINYL ALCOHOL, GELATINS, GLYCOLS, PATENTS, USSR (U)
IDENTIFIERS: *CHEMICAL REACTORS, TRANSLATIONS (U)

AN ANTIADHESION COMPOSITION CONTAINING POLYVINYL ALCOHOL, ETHYLENE GLYCOL, AND DILUENTS WAS DISTINGUISHED BY THE FACT THAT IN ORDER TO INCREASE THE DURATION OF ITS ACTION, A HIGH-MOLECULAR GELATINOUS COMPOUND WAS INTRODUCED, E.G., ALGINATE, SODIUM CARBOXYMETHYLCELLULOSE, AGAR, OR GELATIN IN A QUANTITY OF 5-10 PERCENT 58-35 PERCENT GLYCERIN, 10-20 PERCENT SULFONATED OIL, AND 7-5 PERCENT FILLER, WHILE POLYVINYL ALCOHOL, ETHYLENE GLYCOL, AND DILUENTS WERE ADDED IN QUANTITIES OF 10-15, 5-8, AND 5-7 PERCENT RESPECTIVELY. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOMOS

AD-730 436 11/6
NAVAL RESEARCH LAB WASHINGTON D C

MARINE CORROSION STUDIES: THE EFFECTS OF CU2O ANTIFOULING PAINT AND COUPLING TO A COPPER ALLOY ON THE CORROSION RESISTANCE OF 6AL-4V TITANIUM ALLOY IN SEAWATER. (U)

DESCRIPTIVE NOTE: INTERIM PROGRESS REPT. NO. 11,
JUL 71 16P LENNOX,T. J. , JR.;
PETERSON,M. H. ;GROOVER,R. E. ;
REPT. NO. NRL-MR-2333
PROJ: SF51-542-602-12431, NRL-M04-02

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: REPORT ON MARINE CORROSION STUDIES.

DESCRIPTORS: (*TITANIUM ALLOYS, *CORROSION RESISTANCE), ANTIFOULING COATINGS, SEA WATER, BRASS, CATHODIC PROTECTION, COPPER COMPOUNDS, OXIDES, COMPATIBILITY, DEGRADATION (U)
IDENTIFIERS: TITANIUM ALLOY 6AL4V (U)

THE 6AL-4V TITANIUM ALLOY EXHIBITED THE EXPECTED EXCELLENT CORROSION RESISTANCE IN QUIESCENT SEAWATER; COATING IT WITH CU2O-TYPE ANTIFOULING PAINT OR COUPLING TO YELLOW BRASS HAD NO DELETERIOUS EFFECTS ON THE TITANIUM. THE YELLOW BRASS, HOWEVER, WAS SUBJECT TO SEVERE DEALLOYING WHICH WAS NOT COMPLETELY ELIMINATED BY CATHODIC PROTECTION FROM A ZINC ANODE. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZDM05

AD-746 099 11/6 13/3
NAVAL RESEARCH LAB WASHINGTON D C

MARINE CORROSION STUDIES: THE EFFECTS OF DISSIMILAR METAL COUPLES AND TOXICANTS FROM ANTIFOULING PAINTS ON THE CORROSION OF 5086 AND 6061 ALUMINUM ALLOYS AND THEIR RESPONSE TO CATHODIC PROTECTION. (U)

DESCRIPTIVE NOTE: INTERIM PROGRESS REPT. NO. 14, MAY 72 86P LENNOX,T. J. , JR.; PETERSON,M. H. ;SMITH,J. A. ;GROOVER,R. E. ;
REPT. NO. NRL-MR-2444
PROJ: SF51-542-602, NRL-63M04-02
TASK: 12431

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: SEE ALSO REPORT DATED OCT 71, AD-736 617.

DESCRIPTORS: (*ANTIFOULING COATINGS, ALUMINUM ALLOYS), (*ALUMINUM ALLOYS, *CATHODIC PROTECTION), SEA WATER, CORROSION INHIBITION, CRACKS, WELDS, LIQUID IMMERSION TESTS, POTOMAC RIVER (U)
IDENTIFIERS: ALUMINUM ALLOY 5086, ALUMINUM ALLOY 6061, DISSIMILAR METAL COUPLES, *GALVANIC CORROSION (U)

ALUMINUM ALLOY 5086-H32 WHEN NOT COUPLED TO DISSIMILAR METALS WAS OBSERVED TO BE CORROSION RESISTANT IN SEAWATER OR IN THE POTOMAC RIVER AT WASHINGTON, D.C. SEVERE CORROSION OCCURRED IN SEAWATER HOWEVER WHEN COUPLED TO ANY OF THE FOLLOWING DISSIMILAR METALS: COPPER NICKEL, 10%; YELLOW BRASS; 304 STAINLESS STEEL; OR MILD STEEL. THIS GALVANIC CORROSION COULD NOT BE COMPLETELY PREVENTED BY CATHODIC PROTECTION. A MAGNESIUM ANODE ALSO CAUSED SEVERE CORROSION OF THE ALUMINUM IN SEAWATER. ALUMINUM ALLOY 6061-T6 WAS SEVERELY CORRODED WHEN CONTINUOUSLY IMMERSED IN QUIESCENT SEAWATER OR IN THE POTOMAC RIVER. IN SEAWATER CORROSION CAUSED BY THE CUPROUS OXIDE TOXICANT WAS NOT AS SEVERE AS THAT OBSERVED ON UNCOATED AND UNPROTECTED 6061-T6 ALUMINUM, BUT IN THE POTOMAC RIVER THE DEPTH OF CORROSION WAS SIGNIFICANTLY INCREASED BY THE CUPROUS OXIDE ANTIFOULING COATING. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /Z0H05

AD-750 122 11/3
NAVAL SHIP RESEARCH AND DEVELOPMENT CENTER ANNAPOLIS MD

ANTISLIME COATINGS. PART II - PRECONDITIONING VALUE OF SLIME FOR BARNACLE ATTACHMENT. (U)

AUG 72 28P LIBERATORE,G. L. !DYCKMAN, E. J. !MONTEMARANO,J. A. !COHN,M. L. !

REPT. NO. NSRDC-28-233
PROJ: ZF61-412-001
MONITOR: NSRDC 3597

UNCLASSIFIED REPORT

DESCRIPTORS: (*ANTIFOULING COATINGS, EFFECTIVENESS), BARNACLES, SURFACES, FILMS, BACTERIA, YEASTS, POLYSACCHARIDES, ACIDS, SEA WATER, EXPOSURE, TEST METHODS, STATISTICAL ANALYSIS, NAVAL RESEARCH (U)
IDENTIFIERS: SLIME, SUBMERGED SURFACES, BARNACLE ATTACHMENT (U)

INVESTIGATIONS OF THE RELATIONSHIP BETWEEN BARNACLE ATTACHMENT AND THE PRESENCE OF A PRIMARY SLIME FILM ON SUBMERGED SURFACES HAS BEEN COMPLETED. USING LABORATORY-REARED BARNACLE CYPRIDS IN A STATISTICAL SETTLEMENT SURVEY, IT HAS BEEN DETERMINED THAT THE NUMBER OF BARNACLE CYPRIDS SETTLING ON A SLIMED SURFACE CONSISTENTLY EXCEEDS BY A FACTOR OF TEN THE NUMBER THAT SETTLE ON A CLEANED CONTROL SURFACE. DATA DESCRIBING THE SLIME FACTOR AS A NATURALLY OCCURRING SURFACE-PRECONDITIONING AGENT AFFECTING THE SETTLEMENT OF OTHER SESSILE ORGANISMS ARE EVALUATED. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZONO5

AD-767 639 13/10 11/3
NAVAL SHIP RESEARCH AND DEVELOPMENT CENTER BETHESDA MD

THE EFFECT OF SURFACE PREPARATION AND REPAINTING PROCEDURES ON THE FRICTIONAL RESISTANCE OF OLD SHIP BOTTOM PLATES AS PREDICTED FROM NSRDC FRICTION PLANE MODEL 4125. (U)

MAY 73 30P WEST, EUGENE E. ;
REPT. NO. NSRDC-4084

UNCLASSIFIED REPORT

DESCRIPTORS: (*SHIP PLATES, SURFACE ROUGHNESS), (*SHIP HULLS, *ANTIFOULING COATINGS), PAINTS, FRICTION, SURFACE PROPERTIES, MEASUREMENT (U)
IDENTIFIERS: PROFILOMETERS (U)

THE NAVAL SHIP RESEARCH AND DEVELOPMENT CENTER USED A FRICTION PLANE (NSRDC MODEL 4125) TO ESTIMATE THE DIFFERENCES IN FRICTIONAL RESISTANCE OF TWO TYPES OF ANTIFOULING PAINTS AND OF OLD SHIP BOTTOM PLATES IN THREE SURFACE CONDITIONS. PHOTOGRAPHS AND ROUGHNESS MEASUREMENTS ARE INCLUDED FOR EACH SURFACE INVESTIGATED TOGETHER WITH EXPERIMENTAL DATA EXPRESSED AS VALUES OF ROUGHNESS ALLOWANCE COEFFICIENT VERSUS REYNOLDS NUMBER. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOM05

AD-829 344 6/3 11/3 11/1 6/16
SAN FRANCISCO BAY NAVAL SHIPYARD VALLEJO CALIF PAINT LAB

ATTACHMENT MECHANISM OF BARNACLES. FOULING PREVENTION THE STUDY OF THE ADHESION OF CALCAREOUS TYPES ATTACHING MARINE ORGANISMS. (U)

DESCRIPTIVE NOTE: PROGRESS REPT. NO. 1,
FEB 68 58P SAROYAN,JOHN R. ;LINDNER, ELEK ;DOOLEY,CAROL A. ;
REPT. NO. SFRAN-BAY-68-1
PROJ: SF-020-99-02
TASK: 11906

UNCLASSIFIED REPORT

DESCRIPTORS: (*BARNACLES, ATTACHMENT), (*ANTIFOULING COATINGS, DESIGN), (*ADHESIVES, DESIGN), FOULING, ADHESION, PHYSICAL PROPERTIES, CHEMICAL PROPERTIES, BONDING, WETTING, SECRETION, CRUSTACEA, FORCE(MECHANICS), OCEAN CURRENTS, VELOCITY, DRAG, APPROXIMATION(MATHEMATICS) (U)
IDENTIFIERS: CIRRIPEDIA, BALANUS, LEPADIDAE (U)

THE INITIAL ATTACHMENT OF THE BARNACLE IS SHOWN TO BE A PURELY MECHANICAL HOLD BY THE SUCTION CUPS OF THE CYPRID ANTENNAE. AN ADHESIVE CEMENT MAY BE SECRETED FOR REINFORCEMENT BUT IS NOT ESSENTIAL FOR PERMANENT ATTACHMENT. THE BALANIDAE HAVE PERMANENT, PERIODICALLY FUNCTIONING GLANDS WHICH ARE LOCATED IN THE LIVING MANTLE TISSUE. THESE GLANDS DEVELOP DIRECTLY FROM THE CYPRID CEMENT GLANDS. THE CEMENT GLANDS AND THE REST OF THE CEMENTING APPARATUS OF THE BALANIDAE ARE BASICALLY IDENTICAL WITH THOSE OF THE LEPADIDAE. THE CEMENTING APPARATUS IS FLUSHED AFTER EACH CEMENT SECRETION. IN THIS WAY, OLD DUCTS ARE KEPT OPEN FOR EMERGENCY REPAIR OR REATTACHMENT. THIS EMERGENCY SECRETION IS EXPECTED TO BE CHEMICALLY IDENTICAL TO THE CYPRID AND THE NORMALLY SECRETED ADULT CEMENT. (U)

III

DIFFUSION COATINGS

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZDM06

AD-603 002
CHANCE VOUGHT CORP DALLAS TEX

DIFFUSION COATING PROCESS FOR COLUMBIUM BASE ALLOYS. (U)

DESCRIPTIVE NOTE: REPT. FOR FEB 61-FEB 62, JUN 64 166P
AVES,WILLIAM L. ,JR.;
BOURLAND,GORDON W. ;FEATHERSTON,ALECK B. ;FORCHT,
BRENNAN A. ;O'KELLY,KENT P. ;
REPT. NO. 00-122
CONTRACT: AF33 616 7896
PROJ: AF-7381
TASK: 738102
MONITOR: AFML TDR64 71

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:

DESCRIPTORS: (*COATINGS, REFRACTORY METAL ALLOYS), (*NIOBIUM ALLOYS, COATINGS), (*DIFFUSION, COATINGS), SILICON COATINGS, OXIDATION, SHEETS, MECHANICAL PROPERTIES, HIGH-TEMPERATURE RESEARCH, REFRACTORY COATINGS, HEAT SHIELDS, SILICIDES, ENVIRONMENTAL TESTS, VANADIUM ALLOYS, TITANIUM ALLOYS, ZIRCONIUM ALLOYS, CHROMIUM ALLOYS, ALUMINUM ALLOYS, SILICON ALLOYS, MOLYBDENUM ALLOYS, CHROMIUM, ALUMINUM, BORON, HALIDES, DENSITY, ELECTROPLATING, PARTICLE SIZE, FLAME SPRAYING, CLADDING, VAPOR PLATING (U)
IDENTIFIERS: NIOBIUM ALLOY D-31, NIOBIUM ALLOY C-103, NIOBIUM ALLOY 1ZR, NIOBIUM ALLOY FS-80, NIOBIUM ALLOY FS-82, DIFFUSION COATING (U)

A STUDY WAS CONDUCTED TO IMPROVE AND OPTIMIZE COATINGS FOR COLUMBIUM ALLOYS, PROTECTIVE IN AIR TO 2600F FOR AT LEAST 10 HOURS. PROCESS VARIABLES OF TWO DIFFERENT SILICIDE BASE COATING SYSTEMS (SI-CR-AL AND SI-CR-B) APPLIED BY A TWOSTEP PACK CEMENTATION PROCESS WERE OPTIMIZED BY STATISTICAL METHODS. COATINGS WERE EVALUATED ON D-31, C-103, CB-1ZR (FS-80), AND FS-82 COLUMBIUM ALLOYS. OXIDATION RESISTANCE TESTING INCLUDED FURNACE TESTING IN MOVING AIR, SUSTAINED LOAD THERMAL CYCLING, PROPANE TORCH AND RAM-JET TESTS. TENSILE STRENGTH AND BEND PROPERTIES OF UNCOATED AND COATED ALLOYS WERE EVALUATED AT ROOM AND ELEVATED TEMPERATURES. AN ANALYTICAL EVALUATION OF THESE SYSTEMS WAS CONDUCTED TO CHARACTERIZE THE COATING COMPONENTS. (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOM06

AD-641 277 20/12 13/8
INSTITUTE OF MODERN LANGUAGES INC WASHINGTON D C

DIFFUSED LAYERS OF SEMICONDUCTIVE COMPOUNDS OF GROUP III AND V. (U)

OCT 66 7P GUNTHER,K. H

CONTRACT: DA-44-009-AMC-1563(T),
PROJ: DA-1-Z-624201-D-466
MONITOR: AERDL,TT T-1877-66;66-62543

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: AUFDAMPFSCHICHTEN AUS HALBLEITENDEN III - VVERBONDUNGEN, TRANS. OF DIE NATURWISSENSCHAFTEN (WEST GERMANY) V45 P415-5 1958.

DESCRIPTORS: (*SEMICONDUCTING FILMS, *DIFFUSION COATING), WEST GERMANY, INDIUM ALLOYS, ANTIMONY ALLOYS, ARSENIC ALLOYS, CRYSTAL GROWTH, HALL EFFECT (U)
IDENTIFIERS: THIN FILMS (U)

WITH THE SEMICONDUCTIVE COMPOUNDS OF ELEMENTS OF GROUP III AND GROUP V (INDICATE IN REF. 1,) WE HAVE AVAILABLE SUBSTANCES CHARACTERIZED BY A HIGH HALL COEFFICIENT AND HIGH ELECTRON MOBILITY AND CONSEQUENTLY PARTICULARLY SUITABLE FOR THE PRODUCTION OF EFFICIENT HALL ELEMENTS, SO-CALLED HALL GENERATORS. AMONG THESE COMPOUNDS, INDIUM ANTIMONIDE AND ARSENIDE ARE ESPECIALLY APPROPRIATE FOR THIS PURPOSE. IN ORDER TO INCREASE SENSITIVITY AS WELL AS FOR REASONS OF MATCHING, IT IS DESIRABLE TO PRODUCE COMPOUNDS OF THIS TYPE IN THE FORM OF THIN FILMS. IF WE UTILIZE THE METHOD OF VACUUM DIFFUSION, CONSIDERABLE DIFFICULTIES RESULT WHICH ARE BASED, IN THE LAST ANALYSIS, ON THE DIFFERENT VAPOR PRESSURES OF THE TWO INDIVIDUAL COMPONENTS. AS A CONSEQUENCE, THE SUBSTANCES, UNDER HEATING IN VACUUM, DECOMPOSE, DIFFUSE IN FRACTIONS AND GIVE RISE TO THE FORMATION OF INHOMOGENEOUS FILMS WHICH CONSIST OF SUPERPOSED ZONES OF THE INDIVIDUAL COMPONENTS. (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOM06

AD-643 803 7/4 11/6
REDSTONE SCIENTIFIC INFORMATION CENTER REDSTONE ARSENAL ALA

DETERMINATION OF THE DIFFUSION COEFFICIENTS IN ALLOYS WITH SEVERAL PHASES. (U)

OCT 66 14P BORISOV,V. T. ;GOLIKOV,V. M. ; DUBININ,G. N. ;
REPT. NO. RSIC-604
MONITOR: TT 67-60229

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: TRANS. OF AKADEMIYA NAUK SSSR. IZVESTIYA, METALLURGIYA I GORNOE DELO, N4 P147-52 1964.

DESCRIPTORS: (*SURFACES, DIFFUSION COATING), (*DIFFUSION COATING, ALLOYS), THERMOCHEMISTRY, PHASE STUDIES, CHROMIZING, SILICON COATINGS, ALUMINUM COATINGS, CORROSION RESISTANCE, ELECTRICAL PROPERTIES, MAGNETIC PROPERTIES (U)

INVESTIGATED IS THE METHOD FOR DETERMINING THE DIFFUSION COEFFICIENT IN CASES WHEN A MULTIPHASE DIFFUSION LAYER IS FORMED ON THE SURFACE ZONE OF A METAL. THE CALCULATION OF THE DIFFUSION COEFFICIENT IS MADE BY USING AS AN EXAMPLE THE CHROMIUM-SATURATION OF IRON IN A GAS PHASE. (AUTHOR) (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOM06

AD-697 919 13/8 11/3
FOREIGN TECHNOLOGY DIV WRIGHT-PATTERSON AFB OHIO

DIFFUSION SILICONIZING OF MOLYBDENUM, TUNGSTEN, AND NIOBIUM IN MOLTEN SALTS, (U)

SEP 69 11P ANFINOGENOV,A. I. ; ILYUSHCHENKO,N. G. ;BELYAEVA,G. I. ; FINKELSHTEIN,S. D. ;
REPT. NO. FTD-HT-23-440-69
PROJ: FTD-7230178

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: EDITED TRANS. OF AKADEMIYA NAUK SSSR. URALSKII FILIAL, SVERDLOVSK. INSTITUT ELEKTROKHIMII. TRUDY, NI. P67-73 1968, BY D. KOOLBECK.

DESCRIPTORS: (*REFRACTORY METALS, *SILICON COATINGS), (*DIFFUSION COATING, REFRACTORY METALS), CORROSION INHIBITION, MOLYBDENUM, TUNGSTEN, NIOBIUM, SILICIDES, CORROSION RESISTANCE, SALTS, SILICATES, FLUORIDES, SODIUM COMPOUNDS, POTASSIUM COMPOUNDS, SODIUM CHLORIDE, CHLORIDES (U)
IDENTIFIERS: TRANSLATIONS, FUSED SALTS, SODIUM FLUORIDES, SILICATE/HEXAFLUORO, SODIUM HEXAFLUOROSILICATE, POTASSIUM CHLORIDE (U)

THE REPORT CONCERNS SILICONIZING (SILICIDING) OF MO, W, AND NB IN MOLTEN SALTS IN AN ARGON ATMOSPHERE. THE OBTAINED COATINGS WERE STUDIED METALLOGRAPHICALLY AND BY X-RAY DIFFRACTION METHODS (IN THE LATTER CASE, ONLY FOR SILICIDE COATINGS ON MOLYBDENUM). DATA ON COATING THICKNESS AND WEIGHT INCREMENTS, ALONG WITH RESULTS OF TESTS FOR OXIDATION RESISTANCE, ARE PRESENTED. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZDH06

AD-706 368 11/3
FOREIGN TECHNOLOGY DIV WRIGHT-PATTERSON AFB OHIO

PROTECTIVE COATINGS ON METALS. NUMBER 2, 1968 (SELECTED ARTICLES), (U)

FEB 70 120P RUZINOV,L. P. ;LAINER,D. I. ;ALEKSYUK,M. M. ;BORISOV,E. V. ;ZEMSKOV, G. V. ;

REPT. NO. FTD-MT-24-21-70
PROJ: FTD-6010704
TASK: DIA-T68-01-02

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: EDITED MACHINE TRANS. OF ZASHCHITNYE POKRYTIYA NA METALLAKH (USSR) N2 P39-45, 73-80, 94-98, 104-117, 124-133, 150-154, 170-188, 272, 274-277, 282-283, 286-289 1968, BY ROBERT A. POTTS.

DESCRIPTORS: (*DIFFUSION COATING, METALS), DEPOSITION, HEAT-RESISTANT METALS + ALLOYS, REACTION KINETICS, OXIDATION, REFRACTORY COATINGS, NICKEL ALLOYS, DIFFUSION, STEEL, SUPERCONDUCTORS, CHROMIUM ALLOYS, CLADDING, DIFFUSION BONDING, USSR (U)
IDENTIFIERS: TRANSLATIONS, *PROTECTIVE COATINGS (U)

CONTENTS: CHEMICAL THERMODYNAMICS OF COMPLEX DEPOSITION OF ELEMENTS ON THE SURFACE OF CERTAIN METALS; METHODS OF CALCULATION OF CONSTANTS, CHARACTERIZING THE DIFFUSION PROCESSES DURING OXIDATION, FOR CASES OF HETEROPHASE INTERACTION WITH COMPLEX KINETICS; METHODOLOGY OF HIGH-TEMPERATURE MECHANICAL TESTS OF MATERIALS WITH COATINGS; DISSUSION DURING HIGH-TEMPERATURE SERVICE OF PROTECTIVE COATINGS ON MOLYBDENUM; SURFACE ALLOYING OF ZHS6-K ALLOY WITH THREE ELEMENTS; HEAT RESISTANCE OF ALLOY ZHS-6K AFTER MULITCOMPONENT DIFFUSION SATURATION; SCORE-RESISTANT VACUUM DIFFUSION COATINGS ON STEELS AND ALLOYS, USED IN TURBINE CONSTRUCTION; THERMAL DIFFUSION SATURATION OF MOLYBDENUM IN TERMS OF BORON; CLADDING OF PARTS IN POWDERS AND SOME QUESTIONS OF THEORY OF DIFFUSION SATURATION; STUDY OF STRUCTURAL FEATURES OF THE DIFFUSION ZONE AND KINETICS OF DEFORMATION OF CLAD STEEL WITH A PROTECTIVE CHROMIUM-NICKEL LAYER; COATING WIRE WITH SUPERCONDUCTING COMPOUND. (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOH06

AD-708 707 11/2 13/8
IOWA STATE UNIV AMES ENGINEERING RESEARCH INST

CHEMICAL STRENGTHENING OF AL203. (U)

DESCRIPTIVE NOTE: SPECIAL REPT.,
NOV 69 22P JONES,JOHN T. ;FRASIER,
JOHN T. ;
REPT. NO. ERI-62100
CONTRACT: F33615-68-C-1034
PROJ: ERI-713-5

UNCLASSIFIED REPORT

DESCRIPTORS: (*ALUMINA, *DIFFUSION COATING), (*SAPPHIRES, MECHANICAL PROPERTIES), SURFACE PROPERTIES, ANNEALING, IRON OXIDES, CHROMIUM COMPOUNDS, COBALT COMPOUNDS, NIOBIUM COMPOUNDS, OXIDES (U)
IDENTIFIERS: *VAPOR DEPOSITION, CHROMIUM OXIDES, COBALT OXIDES, NIOBIUM OXIDES, *SURFACE HARDENING, THEMIS PROJECT (U)

SURFACE LAYERS WERE CHEMICALLY FORMED ON SAPPHIRE AND 99+% POLYCRYSTALLINE ALUMINA SPECIMENS BY ANNEALING THE SAMPLES WHILE ENVELOPED IN VARIOUS OXIDE POWDERS. QUANTITATIVE OBSERVATIONS WERE MADE BY MEASURING THE CHANGE IN STRENGTH BETWEEN THE CHEMICALLY TREATED SPECIMENS AND THOSE WHICH WERE NOT CHEMICALLY TREATED. THE POLYCRYSTALLINE SPECIMENS WERE TREATED WITH CR203, CO(X)O(Y), NB205, FE203 OR CR203 + CRCL3. ALL TREATMENTS WITH THE EXCEPTION OF FE203 AND NB205 RESULTED IN SIGNIFICANT STRENGTH INCREASES. SAPPHIRE EXHIBITED CONSIDERABLE STRENGTH INCREASES WHEN TREATED WITH CR203 OR CR203 + CRCL3. (AUTHOR) (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOM06

AD-719 783 11/3
FOREIGN TECHNOLOGY DIV WRIGHT-PATTERSON AFB OHIO

CARBIDIZING OF SPHERICAL POWDERS OF NIOBIUM, MOLYBDENUM, AND TUNGSTEN. (U)

NOV 70 12P KRASKOV,A. N. IBURYKINA,A. L. ;

REPT. NO. FTD-HT-23-552-70
PROJ: FTD-604010
TASK: DIA-T69-04-09

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: EDITED TRANS. OF ZASHCHITNYE POKRYTIYA NA METALLAKH (USSR) N2 P261-268 1968, BY V. MESENZEFF.

DESCRIPTORS: (*REFRACTORY COATINGS, DIFFUSION COATING), (*DIFFUSION COATINGS, REFRACTORY METALS), CARBIDES, NIOBIUM, MOLYBDENUM, TUNGSTEN, POWDER METALS, USSR (U)
IDENTIFIERS: TRANSLATIONS (U)

THE DEALS WITH THE CARBIDIZING (IN LAMP-BLACK) OF SUCH REFRACTORY METALS AS NB, MO AND W, OBTAINED IN POWDER FORM BY MEANS OF PLASMA-JET ATOMIZING. THE FOLLOWING POWDER FRACTIONS WERE USED: 1200, 800, 700, 500, 400, 300, 250, 200 AND 100 MU M. DIFFUSION ANNEALING WAS CARRIED OUT AT 1973K FOR NB, 1673 AND 1773K FOR MO AND 1873K AND 1973K FOR W, AND THE TIME OF THE DIFFUSION PLATING OF EACH OF THE ABOVE SPHERICAL PARTICLE FRACTIONS IN RELATION TO THE ABOVE TEMPERATURES, REQUIRED TO OBTAIN A CARBIDE COATING OF SPECIFIED DEPTH, WAS CALCULATED WITH THE AID OF A MINSK-12 COMPUTER. (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOM06

AD-720 365 11/3
FOREIGN TECHNOLOGY DIV WRIGHT-PATTERSON AFB OHIO

A STUDY OF ALUMOSILICONIZED DIFFUSION LAYERS ON NICKEL-CHROMIUM ALLOY. (U)

NOV 70 10P ZEMSKOV,G. V. !KOGAN,R. P. !KOSTENKO,A. V. !VIDERMAN,V. S. !
REPT. NO. FTD-HT-23-845-70

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: EDITED TRANS. OF KHIMIKO-TERMICHESKAYA OBRABOTKA STALI I SPLAVOV (USSR) N6 P96-100 1969. BY LOUISE HEENAN.

DESCRIPTORS: (*DIFFUSION COATING, SILICIDES), (*NICKEL ALLOYS, DIFFUSION COATING), (*COATINGS, CORROSION INHIBITION), CHROMIUM ALLOYS, ALUMINUM COMPOUNDS, USSR (U)
IDENTIFIERS: ALUMINUM SILICIDES, TRANSLATIONS (U)

IN THE STUDY OF ALUMOSILICONIZED COATINGS, THE FOLLOWING DIFFERENCES FROM CALORIZED COATINGS WERE OBSERVED: (1) THE PRESENCE OF 5-7% SI; (2) INCREASED ALUMINUM CONTENT AND A CORRESPONDINGLY DECREASED NICKEL CONTENT; (3) A REDUCTION IN THE NUMBER OF OTHER PHASES, BESIDES THE PHASE ON A NI2AL3 BASE. ALL THE INDICATED DIFFERENCES CONTRIBUTE TO THE HEIGHTENED OXIDATION RESISTANCE OF THE COMPLEX DIFFUSION LAYER. (AUTHOR) (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOM06

AD-720 370 11/6 11/3
FOREIGN TECHNOLOGY DIV WRIGHT-PATTERSON AFB OHIO

STRUCTURE OF THE DIFFUSION LAYERS AND THE PROPERTIES OF THE ZHS6K ALLOY ALUMINIZED BY THE CIRCULATION METHOD. (U)

DEC 70 10P PROKOSHKIN,D. A. ;ARZAMASOV, B. N. ;KOLMAKOV,B. G. ;
REPT. NO. FTD-MT-24-301-70

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: EDITED MACHINE TRANS. OF IZVESTIYA VYSSHIKH UCHEBNYKH ZAVEDENII. MASHINOSTROENIE (USSR) N1 P123-125 N.D., BY LEE D. THOMPSON.

DESCRIPTORS: (*NICKEL ALLOYS, *DIFFUSION COATING), HEAT-RESISTANT METALS + ALLOYS, INTERMETALLIC COMPOUNDS, USSR (U)
IDENTIFIERS: TRANSLATIONS (U)

THE STRUCTURE OF THE DIFFUSION LAYERS OF THE ZHS6K ALLOY AFTER GAS ALUMINIZATION BY THE CIRCULATION METHOD, AND ALSO THE EFFECT OF ALUMINIZING ON THE HEAT RESISTANCE AND LASTING STRENGTH OF THE ALLOY IS STUDIED. COMPARATIVE RESEARCH OF THESE PROPERTIES AFTER ALUMINIZING THE ALLOY BY CIRCULATION METHOD AND IN A POWDER MIXTURE WAS ACCOMPLISHED. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOM06

AD-726 954 11/3
ARMY MATERIALS AND MECHANICS RESEARCH CENTER WATERTOWN MASS

WEAR- AND EROSION-RESISTANT COATINGS FOR TITANIUM ALLOYS IN ARMY AIRCRAFT. (U)

DESCRIPTIVE NOTE: TECHNICAL REPT.,
DEC 70 23P LEVY,MILTON IMORROSSI,JOSEPH L. I
REPT. NO. AMMRC-TR-70-36
PROJ: DA-1-T-062105-A-320

UNCLASSIFIED REPORT

DESCRIPTORS: (*COATINGS, *TITANIUM ALLOYS), (*ELECTROLESS PLATING, *NICKEL), WEAR RESISTANCE, EROSION, INHIBITION, ARMY AIRCRAFT, DIFFUSION COATING (U)
IDENTIFIERS: PROTECTIVE COATINGS, TITANIUM ALLOY 6AL2SN6V, TITANIUM ALLOY 8A1IMO1V (U)

DIFFUSION-BONDED ELECTROLESS NICKEL PLATE WAS INVESTIGATED AS A WEAR-RESISTANT COATING FOR TITANIUM ALLOYS 6A1-6V-2SN AND 8A1-1MO1V. PLATE ADHESION AND DIFFUSION ZONE STRUCTURE WERE ASSESSED BY METALLOGRAPHIC AND X-RAY DIFFRACTION TECHNIQUES. EFFECTS OF THE DIFFUSION HEAT TREATMENTS ON MECHANICAL PROPERTIES AND WEAR CHARACTERISTICS OF THE TITANIUM ALLOYS WERE DETERMINED. THE DIFFUSION BONDING PRODUCED A SURFACE OF NICKEL-RICH INTERMETALLICS WHICH SIGNIFICANTLY IMPROVED THE WEAR RESISTANCE OF THE TITANIUM ALLOYS WITHOUT ANY APPRECIABLE DEGRADATION OF THEIR STRUCTURAL INTEGRITY. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOM06

AD-727 937 11/3
FOREIGN TECHNOLOGY DIV WRIGHT-PATTERSON AFB OHIO

BORONIZING OF MACHINE AND TOOL PARTS IN POWDERED MIXTURES. (U)

JUN 71 11P EPIK,A. F. ;BERKACH,V. D. ;KOTLYARENKO,L. A. ;SOSNOVSKII,L. A. ;
REPT. NO. FTD-HC-23-342-71
PROJ: AF-7343

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: EDITED TRANS. OF TEKHNOLOGIYA I ORGANIZATSIYA PROIZVODSTVA (USSR) N2 P69-71 1970.

DESCRIPTORS: (*DIFFUSION COATING, BORIDES); WEAR RESISTANCE, USSR (U)
IDENTIFIERS: TRANSLATIONS (U)

A TECHNOLOGICAL SCHEME IS PRESENTED FOR BORONIZING IN SATURATING POWDER MIXTURES. SOME DATA ARE GIVEN ON THE USE OF THIS METHOD OF BORATION FOR INCREASING THE SERVICE LIFE OF MACHINE PARTS AND INSTRUMENTS. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOM06

AD-729 826 11/3 13/8 19/6
TRW INC CLEVELAND OHIO

A STUDY AND EVALUATION OF THE EFFECTS OF VARIOUS NEW SURFACE DIFFUSION TREATMENTS. (U)

DESCRIPTIVE NOTE: TECHNICAL REPT.,
AUG 71 94P CHASE,JOSEPH J. ;CRUMP,D.
N. ;
REPT. NO. ER-7437-2
CONTRACT: DAAF01-70-C-0260
MONITOR: AMSWE-RE 71-50

UNCLASSIFIED REPORT

DESCRIPTORS: (*DIFFUSION COATING, STEEL), (*CASE HARDENING, *SMALL ARMS), SMALL ARMS, HARDNESS, FATIGUE(MECHANICS), METALLOGRAPHY, EROSION (U)

A SERIES OF STEELS WERE TREATED WITH VARIOUS SURFACE COATING PROCESSES. WITH THE EXCEPTION OF CHROMIUM PLATING, ALL SURFACE TREATMENTS INVOLVED DIFFUSION. FOLLOWING METALLOGRAPHIC EXAMINATION, HOT HARDNESS AND BEND TESTING CONDUCTED DURING THE INITIAL PHASE OF THE PROGRAM, TEN MATERIAL/SURFACE COATING TREATMENTS WERE SELECTED FOR FURTHER TEST EVALUATION. THESE INCLUDED: CHROMIUM PLATED, CHROMIZED AND BORONIZED 4150 STEEL; LONITRIDED NITRALLOY 135 MODIFIED NITRIDING STEEL; CARBURIZED, DIFFUSION NITRIDED AND TUFFTRIDED LOW CARBON H-12 STEEL; AND BORONIZED, SILICONIZED AND ALUMINIZED 250 MARAGING STEEL. THESE MATERIAL SYSTEMS WERE SUBJECTED TO MECHANICAL FATIGUE, THERMAL FATIGUE AND CHEMICAL EROSION TESTS. CONSIDERING THE RESULTS OF ALL TESTS PERFORMED, THE TUFFTRIDED AND THE DIFFUSION NITRIDED LOW CARBON H-12 STEEL APPEAR MOST PROMISING. THE 250 MARAGING STEEL WITH VARIOUS METALLIC DIFFUSION COATINGS EXHIBITED EXCELLENT RESISTANCE TO THERMAL FATIGUE, BUT WAS POOR IN MECHANICAL FATIGUE. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOM06

AD-734 899 11/8
FOREIGN TECHNOLOGY DIV WRIGHT-PATTERSON AFB OHIO

INCREASING THE RESISTANCE OF MACHINE PARTS TO SEIZING, (U)

OCT 71 16P NAINAR, JIRI ;
REPT. NO. FTD-HC-23-961-71
PROJ: AF-7343

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: UNEDITED ROUGH DRAFT TRANS. OF MONO. MATERIALOVY SBORNIK 1969. MATERIALY ODOLNE PROTI OPOTREBENI A METODY JEHO ZKOUSENI (MATERIAL COLLECTION 1969. MATERIALS RESISTANT TO WEAR AND METHODS OF TESTING IT), PRAGUE, 1969 P81-92.

DESCRIPTORS: (*ANTISEIZE COMPOUNDS, *SULFIDES), (*LUBRICANTS, *MOLYBDENUM COMPOUNDS), (*DIFFUSION COATING, ANTISEIZE COMPOUNDS), LUBRICATION, FRICTION, MACHINES, CZECHOSLOVAKIA (U)
IDENTIFIERS: TRANSLATIONS, MOLYBDENUM DISULFIDE, SULFURIZATION (U)

A REVIEW IS GIVEN OF THE RESULTS OBTAINED IN CZECHOSLOVAKIA WITH THE USE OF SULFURIZATION OF FRICTION SURFACES, AND OF THE MOS (SUBSCRIPT 2) LUBRICANT. (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZDM06

AD-742 371 13/9 11/3
FOREIGN TECHNOLOGY DIV WRIGHT-PATTERSON AFB OHIO

PRODUCTION TESTS OF BORONATED, BOROCHROMIZED, BOROCALORIZED, AND BOROTITANIUMIZED PARTS OF TWISTING AND DRAWING MACHINES, (U)

FEB 72 7P PASECHNIK,S. YA. ;KOROTKOV, V. D. ;LOKOTOCH ,O. V. ;AFAKASEV,A. A. ; TUTOV,G. S. ;
REPT. NO. FTD-HT-23-1229-71
PROJ: AF-7343

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: EDITED TRANS. OF ZASHCHITNYE POKRYTIYA NA METALLAKH (USSR) N3 P220-222 1970, BY V. MESENZEFF.

DESCRIPTORS: (*MACHINE TOOLS, WEAR RESISTANCE), (*DIFFUSION COATING, MACHINE TOOLS), HEAT TREATMENT, DRAWING(MACHINE PROCESSING), NYLON, USSR (U)
IDENTIFIERS: TRANSLATIONS, BORIDING, COLORIZING, PROTECTIVE COATINGS (U)

IT IS SHOWN THAT PARTS WERE INSTALLED ON MACHINES USED FOR HOT DRAWING OF CAPRON FIBER. THE WEAR RESISTANCE OF HEADPIECES STRENGTHENED BY METHODS OF THERMOCHEMICAL TREATMENT IS HIGH, AND THE QUALITY OF FIBER PREPARED ON EXPERIMENTAL HEADPIECES IS INCREASED BY THIS APPROACH. (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOM06

AD-747 429 11/6
FOREIGN TECHNOLOGY DIV WRIGHT-PATTERSON AFB OHIO

DIFFUSION INTERACTION OF COMPONENTS DURING THE CALORIZING OF NIOBIUM-TITANIUM ALLOYS. (U)

MAY 72 14P VERGASOV,L. I. ;LAZAREV,E. M. ;

REPT. NO. FTD-MT-24-1874-71
PROJ: AF-3066

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: EDITED MACHINE TRANS. OF FIZIKA I KHIMIYA OBRABOTKI MATERIALOV (USSR) N6 P46-49 1970, BY RENE E. COURVILLE.

DESCRIPTORS: (*DIFFUSION COATING, NIOBIUM ALLOYS), (*NIOBIUM ALLOYS, ALUMINUM COATINGS), (*TITANIUM ALLOYS, ALUMINUM COATINGS), HEAT-RESISTANT METALS + ALLOYS, DIFFUSION, INTERACTIONS, USSR (U)
IDENTIFIERS: CALORIZING, TRANSLATIONS (U)

THE STUDY CONCERNS THE PROCESS OF THERMAL DIFFUSION CALORIZATION OF NIOBIUM ALLOYS WITH TITANIUM (FROM 5 TO 50 WT. PERCENT), THE REDISTRIBUTION OF COMPONENTS IN BOTH THE ALLOY AND COATING, AND THE 'ASCENDING' DIFFUSION OF TITANIUM INTO THE COATING, WHICH IS EXPLAINED BY THE HIGH DIFFUSION MOBILITY OF TITANIUM AND THE THERMODYNAMIC CHARACTERISTICS OF ITS INTERACTION WITH ALUMINUM. THE RESISTANCE OF THE COATING TO OXIDATION AT 1100 AND 1200 DEGREES C HAS BEEN ANALYZED AND THE COMPOSITION OF THE CORROSION PRODUCTS OF THE ALITIZED ALLOYS DETERMINED.
(AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZDM06

AD-748 021 11/3
FOREIGN TECHNOLOGY DIV WRIGHT-PATTERSON AFB OHIO

THE RESULTS OF TESTS OF METALLIC AND POLYMER COATINGS OF STEEL PIPELINES OF SHIPS, (U)

JUN 72 22P ZHUR,N. V. ILENLOVA,L. N. ISUPRUN,A. I

REPT. NO. FTD-MT-24-1738-71
PROJ: FTD-60108010A

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: EDITED MACHINE TRANS. OF TSENTRALNYI NAUCHNO-ISSLEDOVATELSKII INSTITUT, MORSKOGO FLOTA. TEKHNICHESKAYA EKSPLUATATSIYA MORSKOGO FLOTA (USSR) N116 P82-97 1969, BY FRANCIS T. RUSSELL.

DESCRIPTORS: (*COATINGS, *CORROSION INHIBITION), PIPES, STEEL, PLASTIC COATINGS, METAL COATINGS, ZINC COATINGS, ALUMINUM COATINGS, CHROMIUM, DIFFUSION COATING, USSR, SHIPS (U)
IDENTIFIERS: TRANSLATIONS (U)

RESULTS OF LABORATORY, STAND, AND FULL-SCALE TESTS OF SEA WATER-RESISTANCE SHOWN BY THERMODIFFUSION-CHROMIUM, ALUMINUM, AND POLYMORIC COATINGS ARE PRESENTED. BASED ON THESE TEST RESULTS, THE EFFECTIVENESS OF EACH OF THE COATINGS LISTED IS EXAMINED, AS IS THEIR USEFULNESS IN PROTECTING STEEL SHIP PIPELINES AGAINST CORROSION. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOM06

AD-749 089 11/3
ARMY FOREIGN SCIENCE AND TECHNOLOGY CENTER CHARLOTTESVILLE VA

INFLUENCE OF DIFFUSION COATINGS ON STEEL PRODUCT STRENGTH. (U)

AUG 72 179P KARPENKO,G. V. ;POKHMURSKII, V. I. ;DALISOV,V. B. ;ZAMIKHOVSKII,V. S. ;

REPT. NO. FSTC-HT-23-1139-72
PROJ: FSTC-T702301230

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: TRANS. OF MONO. VLIYANIE DIFFUZIONNYKH POKRYTII NA PROCHNOST STALNYKH IZDELII, KIEV, 1971 167P.

DESCRIPTORS: (*DIFFUSION COATING, *STEEL), METAL COATINGS, STRESSES, CASE HARDENING, PROTECTIVE TREATMENTS, MICROSTRUCTURE, CORROSION, USSR (U)
IDENTIFIERS: TRANSLATIONS, PROTECTIVE COATINGS, RESIDUAL STRESSES (U)

THE EFFECT OF GALVANIC AND PRINCIPALLY OF DIFFUSION COATINGS OF STEEL PRODUCTS ON THEIR SHORT-TERM STATIC AND FATIGUE STRENGTH IN AIR AND IN CERTAIN WORKING MEDIA IS EXAMINED. THE ROLE OF RESIDUAL STRESSES IS EXAMINED AND A NEW CLASSIFICATION OF THEM IS PROPOSED. IT IS SHOWN POSSIBLE TO CURE CRACK-TYPE DEFECTS BY MEANS OF DIFFUSION METALLIZATION AND RESTORATION OF THE INTEGRITY AND STRENGTH OF DEFECTIVE PARTS. CERTAIN METHODS OF INTENSIFYING THE PROCESSES OF DIFFUSION SATURATION ARE OFFERED. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOM06

AD-750 533 11/3 13/5
FOREIGN TECHNOLOGY DIV WRIGHT-PATTERSON AFB OHIO

THE INFLUENCE OF SOME GALVANIC AND THERMODIFFUSIVE COATINGS ON THE DURABILITY OF SHAFTS AND HINGED JOINTS. (U)

AUG 72 11P PAVLENKO,V. S. ;PREIS,G. A. ;

REPT. NO. FTD-MT-24-109-72
PROJ: AF-7343

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: EDITED MACHINE TRANS. OF TEKHNOLOGIYA I ORGANIZATSIYA PROIZVODSTVA (USSR) N4 P27-29 1970, BY CHARLES T. OSTERTAG, JR.

DESCRIPTORS: (*COATINGS, WEAR RESISTANCE), METAL COATINGS, DIFFUSION COATING, CHROMIZING, BUSHINGS, STEEL, ANODIC COATINGS, METAL JOINTS, USSR (U)
IDENTIFIERS: TRANSLATIONS (U)

THE EFFECT OF CERTAIN GALVANIC AND THERMODIFFUSIVE COATINGS ON THE WEAR RESISTANCE OF PARTS OF LOW LOAD HIGH SPEED HINGED ASSEMBLIES IN ROCKER MOTION IS DESCRIBED. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOH06

AD-753 327 19/6 13/8
IIT RESEARCH INST CHICAGO ILL

GAS-PRESSURE BONDING OF MULTILAYER GUN BARRELS. (U)

DESCRIPTIVE NOTE: TECHNICAL REPT.,
JUL 72 55P BEAL,ROY E. ;WATMOUGH, THOMAS ;
REPT. NO. IITRI-B6108-4
CONTRACT: DAAF01-71-C-0021
MONITOR: SWERR TR-72-42

UNCLASSIFIED REPORT

DESCRIPTORS: (*REFRACTORY METAL ALLOYS, *DIFFUSION COATING), (*GUN BARRELS, *RIFLING), INERT GAS WELDING, COMPOSITE MATERIALS, MANUFACTURING METHODS, BONDING, TEST METHODS (U)
IDENTIFIERS: GAS PRESSURE BONDING, GUN BARREL LINERS (U)

A PROGRAM WAS UNDERTAKEN BY THE RESEARCH DIRECTORATE, WEAPONS LABORATORY AT ROCK ISLAND, TO DETERMINE THE FEASIBILITY OF USING GAS PRESSURE TECHNIQUES FOR PRODUCTION OF LINED, PRERIFLED GUN BARRELS. PRESSURE CONTAINERS CONSTRUCTED FROM SHORT-LENGTH TUBULAR STEEL SECTIONS MACHINED TO GUN BARREL BORE DIMENSIONS WERE USED IN THIS EXPERIMENT. FROM THE RESULTS OF THE TESTS PERFORMED WITH LOW-YIELD STRENGTH MATERIALS (COPPER AND MONEL), A SUITABLE PROFILE REPLICATION WAS NOT ATTAINED ON THE RIFLE SURFACE. ON THE BASIS OF TEST DATA OBTAINED, FORMING A RIFLING PROFILE AND BONDING WITH A TANTALUM ALLOY ON AISI 4130 STEEL WERE FOUND TO BE IMPRACTICAL WITH GAS PRESSURE BONDING TECHNIQUES. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZDM06

AD-758 885 11/3 13/8 11/6
DEFENCE RESEARCH INFORMATION CENTRE ORPINGTON (ENGLAND)

THE INFLUENCE OF ENVIRONMENT AND SURFACE CONDITION ON THE PROPERTIES OF MATERIALS. THE STRENGTH OF MEDIUM CARBON STEEL, CHROMED BY VARIOUS METHODS, (U)

APR 73 9P KARPENKO, B. I; GORBUNOV, N. S. ;

REPT. NO. DRIC-TRANS-2156, DRIC-BR-30436

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: TRANS. OF FIZIKO-KHIMICHESKAYA MEKHANIKA MATERIALOV (USSR) V4 N2 P119-123 1968, BY P. N. HILES.

DESCRIPTORS: (*STEEL, *CHROMIZING), DIFFUSION COATING, PROTECTIVE TREATMENTS, FATIGUE(MECHANICS), IMPREGNATION, CORROSION RESISTANCE, FATIGUE(MECHANICS), MANUFACTURING METHODS, USSR (U)
IDENTIFIERS: TRANSLATIONS (U)

EQUIPMENT IS DESCRIBED FOR CHROMING STEEL BY GASEOUS AND VAPOUR-PHASE METHODS. THE STRUCTURE OF DIFFUSION LAYERS FORMED BY A VARIETY OF CHROMING METHODS ARE STUDIED. AT EQUAL THICKNESS OF DIFFUSION LAYERS THE GREATEST FATIGUE STRENGTH IS OBSERVED IN STEELS CHROMED BY VAPOUR-PHASE AND GASEOUS CONTACT METHODS. CORROSION FATIGUE STRENGTH DEPENDS ON THE THICKNESS AND DENSITY OF THE DIFFUSION LAYER IT HAS ITS GREATEST VALUE IN STEELS AFTER GAS CONTACT CHROMING. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOM06

AD-760 365 11/3
CARNEGIE-MELLON UNIV PITTSBURGH PA DEPT OF METALLURGY AND MATERIALS SCIENCE

KINETICS OF PHASE LAYER GROWTH DURING ALUMINIDE COATING OF NICKEL. (U)

DESCRIPTIVE NOTE: TECHNICAL REPT.,
APR 73 31P HICKL,ANTHONY J. HECKEL, RICHARD W. ;
REPT. NO. TR-1
CONTRACT: N00014-67-A-0314-0017
PROJ: NR-031-714

UNCLASSIFIED REPORT

DESCRIPTORS: (*ALUMINUM COATINGS, *NICKEL ALLOYS), DIFFUSION COATING, PHASE STUDIES, MATHEMATICAL MODELS (U)

THE DIFFUSION COATING OF NICKEL WITH ALUMINUM WAS STUDIED BY A TWO-STEP PROCESS INVOLVING INITIALLY AN INFLUX OF ALUMINUM AT THE SURFACE (ALUMINIZATION) AND LATER A PARTIAL HOMOGENIZATION OF THE ALUMINUM-RICH REGION UNDER CONDITIONS OF ZERO SURFACE FLUX. THE TWO-STEP PROCESS WAS STUDIED IN THE TEMPERATURE RANGE FROM 870 TO 1000C. THE ALUMINIZATION STEP WAS CHARACTERIZED MAINLY AS THE RAPID, PARABOLIC GROWTH OF THE NI2AL3 PHASE (GAMMA) AT THE SURFACE. THE HOMOGENIZATION STEP WAS CHARACTERIZED MAINLY AS THE RELATIVELY SLOW THICKENING OF THE NIAL PHASE (DELTA), PRIMARILY BY THE SOLUTION OF THE GAMMA PHASE. A MATHEMATICAL MODEL WAS DEVELOPED, USING NUMERICAL METHODS AND COMPUTER TECHNIQUES, WHICH YIELDED GROWTH RATE PREDICTIONS FOR THE VARIOUS PHASE LAYERS IN AGREEMENT WITH EXPERIMENTAL DATA. THE MODEL WAS USED TO DEFINE THE CRITICAL PARAMETERS CONTROLLING GROWTH KINETICS FOR THE TWO-STEP PROCESS. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOM06

AD-808 520 11/6 13/8
DU PONT DE NEMOURS (E I) AND CO INC WILMINGTON DEL
PIGMENTS DEPT

DEVELOPMENT OF COATINGS FOR PROTECTION OF DISPERSION STRENGTHENED NICKEL FROM OXIDATION, PART II. DEVELOPMENT OF CR-AL COATINGS BY VACUUM PACK TECHNIQUES. (U)

DESCRIPTIVE NOTE: FINAL SUMMARY REPT. 1 FEB-31 DEC 65,
MAR 66 112P GADD,J. D. I
CONTRACT: AF 33(615)-1704
PROJ: AF-7312
TASK: 731201
MONITOR: AFML TR-66-47-PT-2

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: SEE ALSO PART 3, AD-808 523. PREPARED IN COOPERATION WITH TRW, INC., CLEVELAND, OHIO. MATERIALS AND PROCESSES DEPT.

DESCRIPTORS: (*NICKEL ALLOYS, *DISPERSION HARDENING), (*ALUMINUM COATINGS, NICKEL ALLOYS), (*CHROMIUM, *DIFFUSION COATING), MICROSTRUCTURE, OXIDATION, PROTECTION, EFFECTIVENESS, THERMAL SHOCK, TENSILE PROPERTIES, STRESSES, RUPTURE, COATINGS, CORROSION INHIBITION, CHROMIZING, ACTIVE, OXIDES, CHROMIUM COMPOUNDS, CHLORIDES, FLUORIDES, IODIDES, AMMONIUM COMPOUNDS, SODIUM COMPOUNDS, ALUMINA, SPRAYS, SLURRY COATING, VACUUM (U)

IDENTIFIERS: NICKEL TD(NI-2THO2), PACK CEMENTATION PROCESS, CHROMIUM(III) CHLORIDE, AMMONIUM CHLORIDE, AMMONIUM IODIDE, SODIUM FLUORIDE, ALUMINUM OXIDE (U)

A PROGRAM WAS CONDUCTED TO DEVELOP VACUUM PACK PROCESSING PARAMETERS FOR REPRODUCIBLY FORMING THE DUPLEX CR-AL COATING SYSTEM ON TD NICKEL. TARGET PROTECTIVE CAPABILITIES OF 500 HOURS CYCLIC OXIDATION PROTECTION AT 2200 F AND 100 HOURS PROTECTION AT 2400 F WERE ACHIEVED AND DEMONSTRATED WITH THE VACUUM PACK CR-AL COATING. DATA ARE PRESENTED DETAILING THE PARAMETERS REQUIRED TO FORM THE CR-AL COATING ON TD NICKEL BY THE VACUUM PACK PROCESS. PARAMETRIC STUDIES WERE CONDUCTED IN BOTH LABORATORY SIZE (3 IN DIAMETER X 8 IN RETORT) AND PILOT SCALE (8 IN DIAMETER X 20 IN RETORT) COATING FURANCES. A SPRAY-DIFFUSION TECHNIQUE WAS ALSO DEVELOPED FOR FORMATION OF THE DUPLEX CR-AL COATING ON TD NICKEL. (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOM06

AD-836 775 13/8 20/11
IIT RESEARCH INST CHICAGO ILL

EVALUATION OF NONDESTRUCTIVE TESTING TECHNIQUES OF DIFFUSION COATINGS. (U)

DESCRIPTIVE NOTE: FINAL REPT. APR 66-JUL 67, MAY 68 92P KARPLUS,H. B. ISEMMLER,R. A. ;ARNESEN,B. E. ;
REPT. NO. IITRI-M6127
CONTRACT: AF 33(615)-5294
PROJ: AF-7351
TASK: 735109
MONITOR: AFML TR-67-358

UNCLASSIFIED REPORT

DESCRIPTORS: (*DIFFUSION COATING, NON-DESTRUCTIVE TESTING), VISUAL INSPECTION, NUCLEAR INDUSTRIAL APPLICATIONS, FLUORESCENCE, BACKSCATTERING, X RAYS, ULTRASONIC PROPERTIES, SEEBECK EFFECT, BETA-RAY SPECTRUM (U)
IDENTIFIERS: X-RAY FLUORESCENCE, EDDY CURRENTS (U)

THREE NOVEL NONDESTRUCTIVE TESTING METHODS OF DIFFUSION COATINGS WERE COMPARED WITH OTHER METHODS AND CHECKED AGAINST MICROSCOPIC EXAMINATION BY SUBSEQUENT SECTIONING OF SUSPECTED DEFECTS. METHODS USED CONSISTED OF A BETA BACKSCATTER, X-RAY FLUORESCENCE AND A MAGNETIC EDDY CURRENT TECHNIQUE. THE EDDY CURRENT TECHNIQUE SHOWED THAT VARIATIONS IN COATING THICKNESS AND LOCAL DEFECTS CAN BE READILY OBSERVED. THIS METHOD CAN BE USED TO SCAN LARGE AREAS. SCANNING SPEED WAS LIMITED BY THE MECHANICAL SYSTEM USED FOR SCANNING PURPOSES. THE BETA BACKSCATTER METHOD YIELDED LOW SENSITIVITY AND A RATHER LOW SCANNING SPEED OF ABOUT 0.5 SQUARE CENTIMETER PER MINUTE. X-RAY FLUORESCENCE WAS CARRIED OUT ONLY AT A FEW SPOTS. SCANNING RATES OF THE ORDER OF 1 SQUARE CENTIMETER PER HOUR WERE OBTAINED. IMPROVED GEOMETRY CAN INCREASE THIS BY AN ORDER OF MAGNITUDE BUT EVEN SUCH IMPROVEMENT IS NOT LIKELY TO BE COMPETITIVE. (AUTHOR) (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOM06

AD-842 889 11/6 13/8
BATTELLE MEMORIAL INST COLUMBUS OHIO DEFENSE METALS INFORMATION CENTER

REVIEW OF RECENT DEVELOPMENTS, OXIDATION-RESISTANT COATINGS FOR REFRACTORY METALS. (U)

NOV 68 3P ALLEN,B. C. !

UNCLASSIFIED REPORT

DESCRIPTORS: (*REFRACTORY METAL ALLOYS, DIFFUSION COATING), HIGH-TEMPERATURE RESEARCH, LIFE EXPECTANCY, INTERMETALLIC COMPOUNDS, NIOBIUM ALLOYS, SLURRY COATING, TURBINE BLADES, HEAT TREATMENT, IRIDIUM ALLOYS, CHROMIUM ALLOYS, IRON ALLOYS, SILICON ALLOYS, VANADIUM ALLOYS, NICKEL ALLOYS, NON-DESTRUCTIVE TESTING (U)
IDENTIFIERS: ANNOUNCEMENT BULLETINS, EVALUATION, NIOBIUM ALLOY B-66, NIOBIUM ALLOY C-129Y, NIOBIUM ALLOY C6-72, NIOBIUM ALLOY XB-88 (U)

A MANUFACTURING METHOD FOR PRODUCING CHROMIUM-TITANIUM-SILICON COATINGS ON LARGE COLUMBIUM-ALLOY PARTS HAS BEEN DEVELOPED. THE PROGRAM WAS ACCOMPLISHED IN THREE PRINCIPAL AREAS AS FOLLOWS: (1) SCALE-UP OF THE DIFFUSION PACK PROCESS, (2) SCALE-UP OF THE SLURRY DIFFUSION PROCESS, AND (3) PRODUCTION PROOF OF THE SLURRY-DIFFUSION PROCESS. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOMO6

AD-848 767 13/9 11/3 11/8
FOREIGN TECHNOLOGY DIV WRIGHT-PATTERSON AFB OHIO

INCREASING THE WEAR RESISTANCE OF MACHINE PARTS BY DIFFUSIVE SULFIDIZATION AND MOLYBDENUM DISULFIDE. (U)

AUG 68 31P NAINAR,J. IHASIL,F. I
REPT. NO. FTD-HT-23-242-68

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: EDITED TRANS. OF STROJIRENSTVI (CZECHOSLOVAKIA) V17 N6 P426-436 1967, BY H. PECK.

DESCRIPTORS: (*MACHINES, *WEAR RESISTANCE), (*LUBRICANTS, DIFFUSION COATING), SOLIDS, MOLYBDENUM COMPOUNDS, SULFIDES, MICROSTRUCTURE, FRICTION, HARDNESS, CZECHOSLOVAKIA (U)
IDENTIFIERS: TRANSLATIONS, MOLYBDENUM DISULFIDE, SOLID LUBRICANTS (U)

THE AUTHORS REVIEW THE RESULTS OF CZECH RESEARCH ON METHODS OF ANTIFRICTION SURFACE-TREATMENT OF IRON-BASE MATERIALS AND THE EXPERIENCE OF THE INDUSTRY WITH THESE METHODS. TWO METHODS ARE DISCUSSED: SULFIDIZING AND THE USE OF SOLID MOLYBDENUM-DISULFIDE-BASE LUBRICANTS. ORIGINALLY SULFIDIZING WAS DONE IN A FUZED-SALT BATH, BUT LATELY NUMEROUS PLANTS HAVE INTRODUCED SULFIDIZING IN A GASEOUS ATMOSPHERE (SULFONITRIDING). THE PRESENT CAPACITY OF SULFIDIZING EQUIPMENT IS ABOUT 3000 TONS PER YEAR WITH TWO DAILY SHIFTS. A WIDER USE OF SOL'D MOLYBDENUM-DISULFIDE BASE LUBRICANTS DATES BACK TO 1960 WHEN SOME CZECH CHEMICAL PLANTS BEGAN TO PRODUCE MOLYBDENUM DISULFIDE. LATELY MOLYBDENUM DISULFIDE HAS BEEN USED AS SUCH AND IN COMBINATIONS WITH CONVENTIONAL LUBRICANTS IN NUMEROUS APPLICATIONS, INCLUDING THE LUBRICATION OF MOVING MACHINE PARTS AND METAL-FORMING OPERATIONS. (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOM06

AD-883 046 11/3 11/6 21/5
TRW EQUIPMENT GROUP CLEVELAND OHIO

DEVELOPMENT OF IMPROVED COATINGS FOR NICKEL- AND COBALT-BASE ALLOYS. (U)

DESCRIPTIVE NOTE: FINAL TECHNICAL SUMMARY REPT. 1 JUN 68-31 JUL 70,
DEC 70 311P NEJEDLIK,JAMES F. ;
REPT. NO. ER-7305-F
CONTRACT: F33615-68-C-1628
PROJ: AF-7312
TASK: 731201
MONITOR: AFML TR-70-208

UNCLASSIFIED REPORT

DESCRIPTORS: (*COATINGS, *CORROSION INHIBITION); (*NICKEL ALLOYS, COATINGS), (*COBALT ALLOYS, COATINGS), (*GAS TURBINE BLADES, PROTECTIVE TREATMENTS), DIFFUSION COATING, HEAT-RESISTANT METALS + ALLOYS, ALUMINUM ALLOYS, IRON ALLOYS, CHROMIUM ALLOYS, MECHANICAL PROPERTIES (U)
IDENTIFIERS: SUPERALLOYS, *PROTECTIVE COATINGS (U)

THE PURPOSE OF THIS STUDY WAS TO DEVELOP AND UPGRADE ALUMINUM CONTAINING COATING SYSTEMS FOR THE PROTECTION OF NICKEL AND COBALT ALLOYS USED IN GAS TURBINE HOT SECTION COMPONENTS. A COMPREHENSIVE INVESTIGATION OF MODIFYING ELEMENTS WAS UNDERTAKEN AND CORRELATED WITH HOT CORROSION RESISTANCE AND DIFFUSIONAL STABILITY UNDER BLADE AND VANE CYCLE CONDITIONS (1950 AND 2200F PEAK TEMPERATURES, RESPECTIVELY). THE MODIFYING ELEMENTS AND COMBINATIONS EVALUATED WERE CO, MN, CR, TA, FE, MG, SI, Y, CR-MN, CO-CR AND FE-CR. THE INFLUENCE OF THE MODIFIED COATINGS ON MECHANICAL PROPERTIES, STRESS-OXIDATION, IMPACT AND THERMAL SHOCK OF THE SUPERALLOYS WAS ALSO DETERMINED. (AUTHOR) (U)

CORPORATE AUTHOR - MONITORING AGENCY

*AIR FORCE AVIONICS LAB WRIGHT-PATTERSON AFB OHIO

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AFAL-TR-70-328
PLASMA ANODIZATION.
AD-722 490

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AFAL-TR-72-362
PLASMA ANODIZATION.
AD-760 171

*AIR FORCE CAMBRIDGE RESEARCH LABS L G HANSCOM FIELD MASS

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AFCRL-67-0543
PERFORMANCE OF THIN FILM HUMIDITY SENSORS.
AD-663 757

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AD-749 598

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MULTI-WAFER PLASMA ANODIZATION.
AD-746 003

*AIR FORCE MATERIALS LAB WRIGHT-PATTERSON AFB OHIO

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AFML-TDR64 71
DIFFUSION COATING PROCESS FOR COLUMBIUM BASE ALLOYS.
AD-603 002

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DEVELOPMENT OF COATINGS FOR PROTECTION OF DISPERSION STHENGTHENED NICKEL FROM OXIDATION. PART II. DEVELOPMENT OF CR-AL COATINGS BY VACUUM PACK TECHNIQUES.
AD-806 520

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AFML-TR-67-71
OPTIMIZATION AND EVALUATION OF ALUMINUM SEALING.
AD-812 998

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AFML-TR-67-358
EVALUATION OF NONDESTRUCTIVE TESTING TECHNIQUES OF DIFFUSION COATINGS.
AD-836 775

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AFML-TR-67-421
EFFECTS OF VACUUM-ULTRAVIOLET ENVIRONMENT ON OPTICAL PROPERTIES OF BRIGHT ANODIZED ALUMINUM TEMPERATURE CONTROL COATINGS.
AD-836 534

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AFML-TR-70-206
DEVELOPMENT OF IMPROVED COATINGS FOR NICKEL-AND COBALT-BASE ALLOYS.
AD-883 046

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TR-64-355
EFFECTS OF VACUUM-ULTRAVIOLET ENVIRONMENT OF THE OPTICAL PROPERTIES OF BRIGHT ANODIZED ALUMINUM.
AD-612 774

*AIR FORCE OFFICE OF SCIENTIFIC RESEARCH ARLINGTON VA

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AFOSR-TR-72-2091
LOW TEMPERATURE METAL OXIDE DEPOSITION BY ALKOXIDE HYDROLYSIS.
AD-751 203

*ARMY ELECTRONICS COMMAND FORT MONMOUTH N J

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ECOM-0184-5-72
MAGNESIUM FILM STUDY.
AD-764 253

*ARMY ENGINEER RESEARCH AND DEVELOPMENT LABS FORT BELVOIR VA

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AERDL-T-1813-65
THE STRUCTURE OF THIN ANODIC FILMS ON ALUMINUM SURFACES.
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HARD ANODIZING OF BAKED ALUMINUM POWDER.
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AD-631 171

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ORIGINAL FOUNDRY ALUMINUM 'AL 99.99' AS NEWER GLAZING MATERIAL.
AD-631 174

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NEW FINDINGS ON ANODIC OXIDATION OF ALUMINUM.
AD-641 932

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AERDL-T-1854-66
ON ANODIC OXIDATION OF ALUMINUM IN CHROMIC ACID.
AD-635 647

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AERDL-T-1855-66
ON THE FORMATION OF NOT COMPLETELY WEAR-RESISTANT COAYINGS ON THE ANODIC OXIDE FILM WHEN ADDING CERTAIN DYES TO THE SEALING BATH.
AD-635 648

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AERDL-T-1877-66
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AD-641 277

*ARMY FOREIGN SCIENCE AND TECHNOLOGY CENTER CHARLOTTES ILLE VA

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FSTC-HT-23-1139-72
INFLUENCE OF DIFFUSION COATINGS ON STEEL PRODUCT STRENGTH.
AD-749 089

*ARMY FOREIGN SCIENCE AND TECHNOLOGY CENTER WASHINGTON D C

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FSTC-HT-23-141-69
SILICATE-ZINC ANTIFOULING PAINTS. STUDIES ON ANTIFOULING PROPERTIES.
AD-688 536

*ARMY MATERIALS AND MECHANICS RESEARCH CENTER WATERTOWN MASS

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AMMRC-TR-70-36
WEAR- AND EROSION-RESISTANT COATINGS FOR TITANIUM ALLOYS IN ARMY AIRCRAFT.
AD-726 954

*ARMY MISSILE COMMAND REDSTONE ARSENAL ALA STRUCTURES AND MECHANICS LAB

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RS-TR-68-11
SELF-HEALING PROTECTIVE COATINGS.
AD-845 116

*ARMY MOBILITY EQUIPMENT RESEARCH AND DEVELOPMENT CENTER FORT BELVOIR VA

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CATASTROPHIC PITTING OF ALUMINUM-ALLOY (ALMAG 35) CASTINGS DURING SULFURIC ACID ANODIZING.
AD-666 217

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AD-699 350

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USA-NLABS-TR-69-55-CE
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AD-691 725

*ARMY NATICK LABS MASS CLOTHING AND PERSONAL LIFE SUPPORT EQUIPMENT LAB

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C/PLSEL-64
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(USA-NLABS-TR-69-55-CE)

AD-691 725

*ARMY RESEARCH OFFICE DURHAM N C

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GAS PHASE ANODIZATION OF TANTALUM.
AD-665 243

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AROD-5063:3-MC
ELECTRON MICROSCOPE STUDY OF BREAKDOWN AND REPAIR OF ANODIC FILMS ON ALUMINUM,
AD-762 995

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AROD-5063:6-MC
ELECTROLYTIC BREAKDOWN OF ANODIC FILMS ON ALUMINUM,
AD-732 718

*ARMY WEAPONS COMMAND ROCK ISLAND ILL GENERAL THOMAS J RODMAN LAB

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SWERR-TR-72-42
GAS-PRESSURE BONDING OF MULTILAYER GUN BARRELS.
AD-753 327

*ARMY WEAPONS COMMAND ROCK ISLAND ILL RESEARCH AND ENGINEERING DIRECTORATE

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AMSWE-RE-70-129
ELLIPSOMETRIC STUDY OF THE OXIDATION OF MILD STEEL IN AQUEOUS SOLUTIONS.
AD-711 008

*ARMY WEAPONS COMMAND ROCK ISLAND ILL RESEARCH DEVELOPMENT AND ENGINEERING DIRECTORATE

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AMSWE-RE-71-50
A STUDY AND EVALUATION OF THE EFFECTS OF VARIOUS NEW SURFACE DIFFUSION TREATMENTS.
AD-729 826

*ATOMIC WEAPONS RESEARCH ESTABLISHMENT ALDERMASTON (ENGLAND)

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AWRE-O-22/67
FACTORS AFFECTING THE ADHESION OF SURFACE COATINGS TO ANODISED ALUMINIUM ALLOYS.
(D-MAT-146)
AD-660 411

*BATTELLE MEMORIAL INST COLUMBUS OHIO DEFENSE METALS INFORMATION CENTER

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REVIEW OF RECENT DEVELOPMENTS. OXIDATION-RESISTANT COATINGS FOR REFRACTORY METALS.
AD-852 869

*BOEING SCIENTIFIC RESEARCH LABS SEATTLE WASH SOLID STATE PHYSICS LAB

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D1-82-0824
DIELECTRIC PROPERTIES OF SURFACE OXIDES ON ALUMINUM,
AD-685 577

*BOEING SCIENTIFIC RESEARCH LABS SEATTLE WASH

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D1-82-0926
ELECTRICAL IMPEDANCE OF ALUMINUM SURFACE OXIDE,
AD-697 117

*BRITISH COLUMBIA RESEARCH COUNCIL VANCOUVER

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HIGH RESISTANCE ANODIC OXIDE FILMS ON ALUMINIUM,
(ORB-REPRINT-2707)
AD-687 835

*BRITISH COLUMBIA UNIV VANCOUVER DEPT OF ELECTRICAL ENGINEERING

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AN ELLIPSOMETRIC STUDY OF STEADY-STATE HIGH FIELD IONIC CONDUCTION IN ANODIC OXIDE FILMS ON TANTALUM, NIOBIUM, AND SILICON.
AD-635 667

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PLASMA ANODIZATION.
(AFAL-TR-70-328)

AD-722 490

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PLASMA ANODIZATION.
(AFAL-TR-72-362)
AD-760 171

•BRITISH NON-FERROUS METALS RESEARCH ASSOCIATION LONDON (ENGLAND)

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A-1536MAL/E
SURFACE TREATMENT OF TITANIUM ALLOYS; A REVIEW OF PUBLISHED INFORMATION.
(MA-S/T-MEMO-9/65)
AD-469 954

•CALIFORNIA UNIV LOS ANGELES SCHOOL OF ENGINEERING AND APPLIED SCIENCE

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UCLA-ENG-7283
THE PROPERTIES OF RARE EARTH METALS AND ALLOYS.
AD-750 410

•CARNEGIE-MELLON UNIV PITTSBURGH PA DEPT OF METALLURGY AND MATERIALS SCIENCE

• • •

TR-1
KINETICS OF PHASE LAYER GROWTH DURING ALUMINIDE COATING OF NICKEL.
AD-760 365

•CENTRAL INST OF FISHERIES TECHNOLOGY COCHIN (INDIA)

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ANTIFOULING PROPERTIES OF 'EMERALD GREEN': A PRELIMINARY OBSERVATION.
AD-686 933

•CLAPP (WILLIAM F) LABS INC DUXBURY MASS

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11842
PRESERVATIVE TREATED MARINE EXPOSURE TEST PANELS, NSIA 1953 SERIES
AD-457 204

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12814
SOUTHERN YELLOW PINE SAPWOOD PANELS WITH COPPER SULPHONATE.
AD-600 415

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WFCL-12807
PARINARIUM SP. - LIBERIAN PINE-AFRICAN OAKAFRICAN WISHMORE.
AD-600 399

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WFCL12813
THANES 'CELPLY' PANELS.
AD-600 397

•COATING AND CHEMICAL LAB ABERDEEN PROVING GROUND MD

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CCL-319
SEVEN YEARS TROPICAL EXPOSURE OF FINISHING SYSTEMS FOR ALUMINUM AND MAGNESIUM.
AD-752 907

•DEFENCE RESEARCH BOARD OTTAWA (ONTARIO)

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DRB-REPRINT-2707
HIGH RESISTANCE ANODIC OXIDE FILMS ON ALUMINIUM.
AD-686 835

•DEFENCE RESEARCH ESTABLISHMENT PACIFIC VICTORIA (BRITISH COLUMBIA)

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REPRINT-69-4
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