AD-752 050

CHEMICAL MILLING

Defense Documentation Center
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November 1972

AD-752 050

CHEMICAL MILLING

A DDC BIBLIOGRAPHY

DDC-TAS-72-60

NOVEMBER 1972

157

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DEFENSE SUPPLY AGENCY

UNCLASSIFIED

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13. ABSTRACT

This report includes references on the capabilities and limitations of Chemical Milling Techniques, materials for which it is suitable, and the quality of the finished surfaces.

Corporate Author-Monitoring Agency, Subject, Title, Personal Author, Contract Number and Report Number Indexes are provided.

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Electrolytes						
Beryllium Alloys						
Metallography						
Machining						
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Transistors						
Manufacturing Methods						
Nickel Alloys						
Reagents						
Cobalt Alloys						
Precision Finishing						
Crystals						
Copper Alloys						
Tin Alloys						
Zinc Alloys						
Refractory Metals						
Printed Circuits						

AD- 752 050

CHEMICAL MILLING

A DDC BIBLIOGRAPHY

August 1957 - January 1972

DDC-TAS-72-60

NOVEMBER 1972

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DEFENSE SUPPLY AGENCY
CAMERON STATION
ALEXANDRIA, VIRGINIA 22314

FOREWORD

This bibliography is a compilation of references on *Chemical Milling*. Entries were selected, using the authorized term chemical milling, from references processed into the AD data banks from January 1953 to July 1972 and supersedes AD-702 750.

Corporate Author-Monitoring Agency, Subject, Title, Personal Author, Contract Number and Report Number Indexes are provided.

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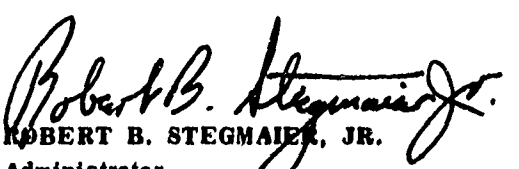

ROBERT B. STEGMAIER, JR.
Administrator
Defense Documentation Center

C O N T E N T S

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOML6

AD-252 129
WATERVLIET ARSENAL N Y

CHEMICAL MILLING (U)

DEC 60 23P ROSE,C.H.;
REPT. NO. WVT RI-60001 IRI 60001 I

UNCLASSIFIED REPORT

DESCRIPTORS: *CHEMICAL MILLING, ALLOYS, ALUMINUM ALLOYS, CASTING, CHEMICAL REACTIONS, CORROSION, GUNS, MACHINE TOOLS, MACHINING, MAGNESIUM ALLOYS, MANUFACTURING METHODS, MECHANICAL PROPERTIES, METALS, PHYSICAL PROPERTIES, PRECISION FINISHING, PROCESSING, PRODUCTION, SHEETS, STEEL, SURFACE PROPERTIES, TEMPLATES, TITANIUM ALLOYS (U)

A PROCESS STUDY, OUTLINING THE CAPABILITIES AND LIMITATIONS OF CHEMICAL MILLING, THE MATERIALS FOR WHICH IT IS SUITABLE, THE ACCURACIES AND SURFACE FINISHES EXPECTED; DERIVED FROM A STUDY OF THE AVAILABLE LITERATURE AND VISITS TO USERS OF THE PROCESS, ARE MADE TO DETERMINE THE APPLICABILITY OF THE METHO TO THE PILOT PRO UCTION REQUIREMENTS OF WATERVLIET ARSENAL. FORTY-TWO POUNDS OF 4340 STEEL WERE REMOVED FROM A 90MM M41 BREECH RING IN 61 HOURS BY CHEMICAL MILLING. SURFACE FINISH WAS 62 MICROINCHES. METAL REMOVAL RATE WAS .0007 IN. PER MINUTE. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL No. /ZOML6

AD-256 351
PENNSYLVANIA STATE UNIV UNIVERSITY PARK

INFLUENCE OF DISPLACIVE-SHEARING STRESSES ON THE KINETICS OF RECONSTRUCTIVE TRANSFORMATIONS EFFECTED BY PRESSURE IN THE RANGE 0-100,000 BARS (U)

IV DACHILLE,FRANK;ROY,RUSTUM;

UNCLASSIFIED REPORT

DESCRIPTORS: *CHEMICAL MILLING, *PHASE STUDIES, *TRANSFORMATIONS, CHEMICAL BONDS, CHEMICAL ENGINEERING, PRESSURE, REACTION KINETICS, SHEAR STRESSES, TEMPERATURE (U)

EARLIER RESULTS SHOWED THAT ORDINARY LABORATORY GRINDERS AND MIXERS WERE ABLE TO CONVERT SEVERAL PHASES (E.G. PBO2, MNF2, CACO3, BEF2, ETC.) INTO THEIR RESPECTIVE HIGH-PRESSURE FORMS WHICH, AT EQUILIBRIUM REQUIRE 10-15,000 ATMOSPHERES AT ROOM TEMPERATURE. HENCE, EXPERIMENTS WERE DEVISED TO ATTEMPT TO SEPARATE THE EFFECT OF HYDROSTATIC PRESSURE FROM THOSE OF SHEARING STRESSES AND BOND-BREAKAGE. A STUDY OF THE INFLUENCE OF SHEARING STRESSES SUPERIMPOSED UPON QUASIHYDROSTATIC PRESSURES OF UP TO 100,000 BARS AT TEMPERATURES BELOW 550 C WAS MADE POSSIBLE BY THE DEVELOPMENT OF SIMPLE APPARATUS. THIS CONSISTS OF THE BRIDGMAN UNIAXIAL-TYPE APPARATUS, WITH A PROVISION FOR CONTINUOUS ROTATION OF THE BOTTOM PISTON VERY SLOWLY BACK AND FORTH THROUGH A 2 DEGREE ARC. THE SAMPLE IS HEATED EXTERNALLY; DISPLACIVE-SHEARING RUNS WITH PRESSURE AND TEMPERATURE AUTOMATICALLY CONTROLLED CAN BE MADE FOR PERIODS EXCEEDING SEVERAL DAYS IF DESIRED. THE RESULTS CLEARLY SEPARATE THE INFLUENCE OF HYDROSTATIC PRESSURE ITSELF UPON REACTION RATES FROM THE EFFECT OF THE ADDED DISPLACIVE-SHEARING STRESSES. FROM THE RESULTS IT BECOMES CLEAR THAT EQUILIBRIUM RELATIONS BETWEEN PHASES ARE NOT ALTERED BY THE SHEARING STRESSES. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOML6

AD-261 959
AEROJET-GENERAL CORP SACRAMENTO CALIF

STRUCTURAL TESTS OF A CHEMICALLY MILLED LADISH D-6AC STEEL SECOND-STAGE MINUTEMAN AFT CLOSURE (U)

JUL 61 1V THOMAS,R.W.;
CONTRACT: AF33 600 36610

UNCLASSIFIED REPORT

DESCRIPTORS: *CHEMICAL MILLING, *ROCKET CASES, DEFORMATION, DESIGN, GUIDED MISSILES, HYDROSTATIC PRESSURE, MEASUREMENT, MECHANICAL PROPERTIES, PROCESSING, ROCKET MOTORS, STAGING, STEEL, STRESSES, SURFACE-TO-SURFACE, TESTS (U)
IDENTIFIERS: MINUTEMAN (U)

A STUDY WAS MADE TO DETERMINE IF THE STRUCTURAL STRENGTH REQUIREMENTS FOR THE AFT CLOSURE OF THE SECOND-STAGE MINUTEMAN ENGINE COULD BE MET WITH REDUCED-WEIGHT, CHEMICALLY MILLED CLOSURE OF LADISH D-6AC STEEL. THE STUDY INDICATED THAT THE CHEMICALLY MILLED AFT CLOSURE, WHICH WEIGHED 60 LB LESS THAN THE CONVENTIONAL STEEL CLOSURE, HAD SATISFACTORY STRUCTURAL STRENGTH. THE STRUCTURAL TESTS WERE MADE WITH AN AFT CLOSURE OF THE PRELIMINARY FLIGHT RATING TEST (PFRT) DESIGN. THE CLOSURE WAS CHEMICALLY-MILLED TWICE TO REDUCE THE THICKNESS OF PART OF THE SHELL, THE NOZZLE BOSSES, AND THE BOLTED JOINT. STRESSCOAT WAS APPLIED TO THE AFT CLOSURE AND THE UNIT WAS HYDROSTATICALLY TESTED AFTER EACH MILLING OPERATION. AN ANALYSIS OF STRESS AND STRAIN DATA INDICATED THAT THE REDUCED-WEIGHT CLOSURE SATISFACTORILY WITHSTOOD A PRESSURE OF 600 PSIG AND WILL MEET ULTIMATE STRENGTH DESIGN CRITERIA. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZDML6

AD-262 184
NORTHROP AIRCRAFT INC HAWTHORNE CALIF

DEVELOPMENT OF IMPROVED METHODS, PROCESSES, AND TECHNIQUES FOR PRODUCING STEEL EXTRUSIONS (U)

JUN 61 IV CHRISTENSEN,L.M.;ROSER,W.;
REPT. NO. NOR 61 199
CONTRACT: AF33 600 36713

UNCLASSIFIED REPORT

DESCRIPTORS: *AIRFRAMES, *EXTRUSION, *STEEL, CHEMICAL MILLING, CORROSION-RESISTANT ALLOYS, DIES, DIFFUSION, DRAWING (MACHINE PROCESSING), GLASS, HARDNESS, HEAT TREATMENT, LUBRICANTS, MANUFACTURING METHODS, MECHANICAL PROPERTIES, MICROSTRUCTURE, NICKEL, PLATING, PROCESSING, SURFACE PROPERTIES, TENSILE PROPERTIES (U)
IDENTIFIERS: B-70 AIRCRAFT (U)

DIMENSIONAL INTEGRITY AND SURFACE QUALITIES OBTAINED IN THE 0.06-IN. TEE SECTIONS OF PHASE IARE CONSIDERED SUFFICIENT FOR PROCEEDING TO PHASE II. LOW AND ERRATIC MECHANICAL PROPERTIES WERE NOTED IN THE EVALUATION OF PHASE I EXTRUSIONS IN BOTH H-11 AND PH 15-7MO MATERIALS. METALLURGICAL STUDIES INDICATED THAT THESE LOW PROPERTIES RESULTED FROM DIFFUSION OF THE NICKEL LUBRICANT MATERIAL INTO THE SURFACE OF THE EXTRUSIONS. AFTER REMOVAL OF THE CONTAMINANT COATING BY CHEMICAL ETCHING, THE RESULTANT MECHANICAL PROPERTIES WERE WELL WITHIN SPECIFICATIONS FOR THE MATERIALS. THE CHEMICAL ETCHING ALSO YIELDS IMPROVED SURFACE QUALITY. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOML6

AD-264 685
GENERAL DYNAMICS/CONVAIR SAN DIEGO CALIF

TITANIUM DEVELOPMENT PROGRAM. VOLUME IV. (U)

MAY 61 IV LANGLOIS,A.P.;MURPHY,J.F.;GREEN, E.D.;

CONTRACT: AF33 600 34876
MONITOR: ASD TR617 576

UNCLASSIFIED REPORT

DESCRIPTORS: *ALLOYS, *JOINTS, *MANUFACTURING METHODS, *TITANIUM ALLOYS, AIRPLANE ENGINE DUCTS, AIRPLANE PANELS, ALUMINUM ALLOYS, BOLTED JOINTS, BRAZING, CHEMICAL MILLING, CONFIGURATION, DESIGN, FUSELAGES, HEAT TREATMENT, MATERIALS, MOLYBDENUM ALLOYS, PROCESSING, RIVETED JOINTS, SMALL TOOLS, SPOT WELDS, STIFFENED CYLINDERS, TAILS (AIRCRAFT), TORPEDO COMPONENTS, VANADIUM ALLOYS, WELDING, WELDS, WINGS (U)

CONTENTS: MANUFACTURING METHOD EVELOPMENT DEVELOPMENT OF OPTIM M OPERATIONAL SEQUENCING PROCESS DEVELOPMENT CHEMICAL MILLING TOOLING CONCEPTS ROOM TEMPERATURE FORM - FURNACE HOT SIZE AND AGE ROOM TEMPERATURE FORM - HEATED PRESS HOT SIZE- FURNACE AGE SHORT CYCLE HOT FORM - AGE SEQUENCE TOOL MATERIALS PARTS MANUFACTURE TAIL CONE LEADING EDGE CANTED FUSELAGE BULKHEAD ASSEMBLIES ENGINE BLEED AIR DUCTS PANELS (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZDML6

AD-265 701
FOREIGN TECHNOLOGY DIV WRIGHT-PATTERSON AFB OHIO

ELECTRIC AND CHEMICO-MECHANICAL METHODS OF WORKING METALS (CHAPTER VII) (U)

IV POPILOV,L. YA.;

UNCLASSIFIED REPORT

DESCRIPTORS: *METALS, *PROCESSING, BRAZING, CHEMICAL MILLING, ELECTRODEPOSITION, ELECTROEROSIVE MACHINING, ELECTROLYTIC POLISHING, ELECTROPLATING, HEAT TREATMENT, HEATING, PICKLING, SINTERING, SOLDERING, SPARK MACHINING, TECHNOLOGICAL INTELLIGENCE, TRANSLATIONS (U)
IDENTIFIERS: USSR (U)

ELECTROCHEMICAL METHODS OF ELECTROPLATING AND ELECTROCHEMICAL POLISHING ARE DEMONSTRATED. CHEMICAL MILLING AND METAL HEATING PROCESSES ARE DISCUSSED. HEAT TREATING OF STEEL BY CONTACT ELECTROHEATING (N. V. GEVELING'S METHOD), HEATING IN ELECTROLYTES (I. Z. YASNOGODSKIY'S METHOD), AND SURFACE FLAME HARDENING ARE ALSO DISCUSSED. (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOML6

AD-267 806
METAL HYDRIDES INC BEVERLY MASS

DEC 61 1V
CONTRACT: DA91 591EUC1722

UNCLASSIFIED REPORT

DESCRIPTORS: *COPPER, ACETIC ACIDS, CADMIUM, CHEMICAL MILLING, CHLORIDES, CRYSTALLIZATION, DISKS, FEASIBILITY STUDIES, HEATING, IRON COMPOUNDS, MELTING, NITRIC ACID, PHOSPHORIC ACIDS, PRODUCTION, SHEETS, SINGLE CRYSTALS, SPACE NAVIGATION, TEST METHODS (U)

A METHOD WAS DEVELOPED FOR PRODUCING A STACK OF CU SINGLE CRYSTAL DISKS 50-MICRONS THICK WHICH UTILIZED THE SPAR PLANNING TECHNIQUE FOLLOWED BY CHEMICAL POLISHING. THE METHOD FOR PROCESSING 35- TO 50-MICRON THICK DISKS IS AS FOLLOWS: (1) GROW 2.5-MM THICK SLABS AS BIG AS POSSBLE, (2) SPARK-TEPAN 1-CM DIAM DICS AND SPARK PLANE TO 75 TO 100 MICRONS THICK, AND (3) CHEMICALLY THIN TO 35 TO 50 MICRONS. ATTEMPTS TO GROW SINGLE CRYSTAL CD DISKS RESULTED IN THE FORMATION OF POLYCRYSTALLINE SHEETS. (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOML6

AD-268 033
AIR FORCE CAMBRIDGE RESEARCH LABS L G HANSCOM FIELD MASS

A NOTE ON SEMICONDUCTOR DEVICE FABRICATION (U)

AUG 61 1V BERMAN,I.;
REPT. NO. 729

UNCLASSIFIED REPORT

DESCRIPTORS: ALLOYS, BONDING, CHEMICAL MILLING, ELECTROEROSIVE MACHINING, GERMANIUM COMPOUNDS, HEATING, IMPURITIES, INTERMETALLIC COMPOUNDS, PICKLING COMPOSITIONS, PLATING, PRODUCTION, SEMICONDUCTORS, SILICON COMPOUNDS, TEST METHODS (U)

A DISCUSSION IS PRESENTED OF THE BASIC STEPS IN THE MAKING OF GE AND SI JUNCTION DEVICES. IT INCLUDES A LIST OF THE COMMON ETCHANTS WITH THEIR RELATION TO VARIOUS PHASES OF DEVICE FABRICATION. CONSIDERATION IS GIVEN TO ALLOYING FOR JUNCTIONS AND OHMIC CONTACTS, AS WELL AS INFORMATION ON APPLYING THE DOPANT ALLOY. ELECTROLESS NI OR AU GOLD, FURNACE FIRING, AND PLATING ARE EXAMINED IN VIEW OF REQUIRED MODIFICATIONS. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZDML6

AD-269 209
BATTELLE MEMORIAL INST COLUMBUS OHIO DEFENSE METALS INFORMATION CENTER

A REVIEW OF RECENT DEVELOPMENTS IN TITANIUM AND TITANIUM ALLOY TECHNOLOGY (U)

DEC 61 1V WOOD,R.A.;
REPT. NO. M144

UNCLASSIFIED REPORT

DESCRIPTORS: *METALLURGY, *SHEETS, *TITANIUM ALLOYS, AIR, ANTIOXIDANTS, CHEMICAL MILLING, COATINGS, CONTAMINATION, CORROSION INHIBITION, EXTRUSION, GASES, HIGH-TEMPERATURE RESEARCH, IGNITION, IMPURITIES, MANUFACTURING METHODS, MECHANICAL PROPERTIES, OXIDATION, PROCESSING (U)

A STUDY OF THE AIR CONTAMINATION AND PROTECTION FOR 4 DOD TI SHEET ALLOYS INDICATED THAT TI-4AL3MO-1V AND TI-6AL-4V HAD ABOUT EQUAL RESISTANCE TO PENETRATION BY INTERSTITIAL CONTAMINANTS. THE HARDNESS PENETRATION TESTS SHOWED TI-13V11CR-3AL AND TI-2.5AL-16V ALLOYS HAD LOWER RESISTANCE TO CONTAMINATION IN THAT ORDER. THE TI-5AL-2.5SN, TI-6AL-4V, AND TI-13V-11CR-3AL ALLOYS WERE EVALUATED FOR SUSCEPTIBILITY TO H EMBRITTLEMENT INDUCED BY CHEMICALLY MILLING IN A HYDROFLUORIC ACID BATH. THE ALL-ALPHA TI-5AL2.5SN ALLOY WAS NOT EMBRITTLED. THE TI-6AL-4V ALLOY WAS ONLY SLIGHTLY EMBRITTLED, WHILE THE TI-13V-11CR-3AL ALLOY WAS SEVERELY EMBRITTLED. AN INVESTIGATION CONCERNING THE TITANIUM-LOX REACTION WAS CONDUCTED BY USING HIGH-PRESSURE GASEOUS O. THE STUDY ESTABLISHED THAT A FRESH TI SURFACE WOULD REACT WITH GASEOUS O UNDER ABOUT 100-PSIG PRESSURE BETWEEN -250 F AND ROOM TEMPERATURE. SEVERAL METHODS OF PRODUCING FLAT SOLUTION-TREATED TITANIUM ALLOY SHEET ARE REVIEWED AND A NEW CONCEPT IS DESCRIBED. BASICALLY, THE NEW METHOD INVOLVES HEATING AND COOLING THE SHEET UNDER TENSION. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOML6

AD-271 167
BOEING CO WICHITA KANS WICHITA DIV

BOEING-WICHITA MATERIALS AND RESEARCH DEVELOPMENT PROGRAMS, 1957-1961 (U)

SEP 61 XV POE,A.H.;SHIGLEY,H.E.;
CONTRACT: AF33 616 8141

UNCLASSIFIED REPORT

DESCRIPTORS: *AIRFRAMES, *MATERIALS, *RADOMES, ADHESIVES, ALLOYS, ALUMINUM, BONDING, BRAZING, CADMIUM, CERAMIC COATINGS, CERAMIC MATERIALS, CHEMICAL MILLING, COMPOSITE MATERIALS, HEAT-RESISTANT PLASTICS, HIGH-TEMPERATURE RESEARCH, IGNITION, JET ENGINE FUELS, LAMINATES, LUBRICANTS, MACHINING, MANGANESE, METAL JOINTS, METALS, ORGANIC COATINGS, PLASTICS, PLATING, POLYMERS, STAINLESS STEEL, TEXTILES, TITANIUM, VARNISHES (U)

CONTENTS: IRON AND STEEL: AM 350 STAINLESS STEEL, CHEMICAL ETCHING; LIGHT METALS AND ALLOYS: TI FASTENERS (6AL-4V); VACUUM PLATED AL, CORROSION RESISTANCE OF VARIOUS ALUMINUMS; HEAVY NON-FERROUS METALS AND ALLOYS: VACUUM PLATED CD, ELECTROPLATED MN; PLASTICS: METAL BONDING MATERIALS, ADHESIVES, PARAPLAST 33, EPOXY TUBING, 3M-471 PLASTIC TAPE, EPOXY MAT MOLD DIE; LIQUID AND SEMI-SOLID HIGH POLYMERS: ADHESIVES, HIGH TEMPERATURE LUBRICANTS, ENAMELS AND LACQUERS, EPOXY ORGANIC COATINGS, NEOPRENE ORGANIC COATING; FIBROUS AND FILAMENTARY MATERIALS: INVESTIGATION OF FABRICS FOR LINT FREE CONDITION; COMPOSITE MATERIALS: CERAMIC BRAZE, EPON 828 AND 143 GLASS FABRIC LAMINATES, 181 VOLAN AND 181-A-1100 SILANE FINISH FABRIC, REINFORCED LASTICS FOR RADOMES, DECALS, (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOML6

AD-271 536
DOUGLAS AIRCRAFT CO INC LONG BEACH CALIF

CHEMICAL COMPOUNDS FOR METAL SHAPING (U)

JAN 62 1V JAMIESON,J.L.;LOCKHART,F.J.;

CONTRACT: AF33 600 43027
MONITOR: ASD TR7 648 V1

UNCLASSIFIED REPORT

DESCRIPTORS: *ALLOYS, *CHEMICAL MILLING, *METALS, *REFRACTORY MATERIALS, AIRCRAFT, ALUMINUM ALLOYS, CARBOXYMETHYLCELLULOSE, CHEMICALS, CHROMIUM ALLOYS, GELS, HEAT RESISTANT METALS + ALLOYS, MATERIALS, MOLYBDENUM ALLOYS, NICKEL ALLOYS, NIOBIUM, POROUS MATERIALS, PROCESSING, PRODUCTION, SOLIDS, SOLUTIONS, STAINLESS STEEL, STEEL, STRUCTURES, TANTALUM, TITANIUM ALLOYS, VANADIUM ALLOYS (U)

SEVERAL GEL SYSTEMS WERE PREPARED WITH ACID SOLUTIONS SUSPENDED IN A GEL MATRIX OF ORGANIC, WATER SOLUBLE RESINS. THESE GEL ETCHANTS CAN BE CAST INTO SEMIRIGID SHAPES AND ARE STABLE AT TEMPERATURES UP TO 140 TO 160 F. IN CONTACT WITH A STEEL SURFACE, THE GEL ETCHANTS CHEMICALLY REACT AND REMOVE METAL AT A CONTROLLED RATE. THE REACTION PRODUCTS AND REACTANTS MIGRATE COUNTERCURRENTLY THROUGH THE GEL MEDIA. FURTHER DEVELOPMENT AND TESTING WILL DETERMINE APPLICABILITY AS NON-LIQUID ETCHANTS. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL No. /ZOML6

AD-271 965
METAL HYDRIDES INC BEVERLY MASS

INVESTIGATION OF SINGLE-CRYSTAL AND POLYCRYSTALLINE TITANIUM DIBORIDE: METALLOGRAPHIC PROCEDURES AND FINDINGS (U)

NOV 61 1V LYNCH,C.T.;VAHLDIEK,F.W.;
MONITOR: ASD TR61 350

UNCLASSIFIED REPORT

DESCRIPTORS: *BORIDES, *CRYSTALS, *SINGLE CRYSTALS, *TITANIUM COMPOUNDS, ABRASIVES, CHEMICAL MILLING, CRYSTAL STRUCTURE, ELECTROLYTIC POLISHING, GRINDERS, GRINDING WHEELS, HIGH-TEMPERATURE RESEARCH, PREPARATION, PROCESSING, REFRACTORY MATERIALS, SPECTROGRAPHIC ANALYSIS (U)

SINGLE-CRYSTAL AND POLYCRYSTALLINE TIB2 WAS EXAMINED TO DEVELOP APPLICABLE METALLOGRAPHIC TECHNIQUES FOR SECTIONING, MOUNTING, GRINDING, POLISHING, AND ETCHING OF TIB2 SPECIMENS. THIS WORK DEMONSTRATES THE USABILITY AND PRACTICABILITY OF USING VARIOUS SIC PAPERS TOGETHER WITH DIFFERENT GRADES OF DIAMOND PASTE ON POLISHING WHEELS IN PREFERENCE TO USING CLOTHS. IT HAS BEEN FOUND THAT H2SO4, AS A CONSTITUENT OF ETCHANTS, PRODUCES MORE RELIABLE AND MORE CONSISTENT RESULTS THAN HF. THE SAME IS TRUE OF H2SO4 WHEN USED AS A CONSTITUTENT OF ELECTROLYTES. SINGLE-CRYSTAL TIB2 WAS FOUND TO HAVE A TYPE OF WIDMANSTATTEN STRUCTURE WHILE POLYCRYSTALLINE TIB2 HAD A NEEDLE-LIKE PATTERN. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOML6

AD-272 227
GENERAL DYNAMICS/FORT WORTH TEX

MATERIALS - HONEYCOMB CORE RIBBON RELATIONSHIP BETWEEN FLOW CHARACTERISTICS OF BRAZING ALLOY AND OXIDE FILM FORMATIONS OF - DETERMINATION OF (U)

JAN 62 1V PRATT,W.M.;
REPT. NO. FGT 2510
CONTRACT: AF33 600 36200

UNCLASSIFIED REPORT

DESCRIPTORS: *BRAZING, *HONEYCOMB CORES, *SANDWICH PANELS, *STAINLESS STEEL, ALLOYS, CHEMICAL MILLING, CLEANING, CONTROLLED ATMOSPHERES, COPPER ALLOYS, ELECTRON DIFFRACTION ANALYSIS, FILMS, HEAT TREATMENT, HYDROGEN, LITHIUM ALLOYS, OXIDES, PROCESSING, SILVER ALLOYS, SPECTROGRAPHIC ANALYSIS, SURFACE PROPERTIES, SURFACES, ULTRASONIC RADIATION (U)

BRAZING FLOW TESTS WERE RUN ON 17-7PH .0015 IN.THICK STAINLESS STEEL SPECIMENS, USING THE 92.8-7-C.2 AG-CU-LI BRAZING ALLOY. SPECTROPHOTOMETRIC MEASUREMENTS, ELECTRON DIFFRACTION STUDIES, AND FERRIC CHLORIDE ETCH TESTS REVEALED DIFFERENCES IN COLOR AND REFLECTANCE, COMPOSITION, THICKNESS, PHYSICAL CHARACTERISTICS, AND ETCHING OF THE SURFACES OF SPECIMENS HAVING A DIFFERENT ANNEALING HISTORY. FLOW RESPONSE OF 17-7PH FOIL UNDER CONDITIONS OF CAPILLARITY CAN BE DETERMINED BY A SANDWICH FLOW TEST. WHEN THE MATERIAL WAS ANNEALED IN A HYDROGEN ATMOSPHERE OF VERY LOW DEW POINT (-85 F), VERY GOOD ALLOY FLOW WAS OBTAINED UPON BRAZING UNDER CAPILLARY CONDITIONS OF THE SANDWICH FLOW TEST. LIMITED SANDWICH FLOW TESTING OF THE ULTRASONICALLY CLEANED SPECIMENS GAVE EXCELLENT IMPROVEMENT IN BRAZING RESPONSE FOR DEW POINTS RANGING FROM -30 TO 41 F. AD- 72 2 9
SPONSE OF 17-7PH FOIL UNDER CONDITIONS OF CAPILLARITY CAN BE DETERMINED BY A SANDWICH FLOW TEST. WHEN THE MATERIAL WAS ANNEALED IN A HYDROGEN ATMOSPHERE OF VERY LOW DEW POINT (-85 F), VERY GOOD ALLOY FLOW WAS OBTAINED UPON BRAZING UNDER CAPILLARY CONDITIONS OF THE SANDWICH FLOW TEST. LIMITED SANDWICH FLOW TESTING OF THE ULTRASONICALLY CLEANED SPECIMENS GAVE EXCELLENT IMPROVEMENT IN BRAZING RESPONSE FOR DEW POINTS RANGING FROM -30 TO 41 F. (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOML6

AD-272 526
MCDONNELL AIRCRAFT CORP ST LOUIS MO

MOLYBDENUM STRUCTURAL COMPONENT PROGRAM (U)

FEB 62 12P
CONTRACT: NOW-61-0653

UNCLASSIFIED REPORT

DESCRIPTORS: *COATINGS, *MOLYBDENUM ALLOYS, *RIVETS, AIRFRAMES, ALUMINUM COATINGS, ANTIOXIDANTS, BOLTED JOINTS, BOLTS, CHEMICAL MILLING, CHROMIUM COMPOUNDS, COMPATIBILITY, COMPOSITE MATERIALS, DESIGN, FORGING, HIGH-TEMPERATURE RESEARCH, LOCKING FASTENER DEVICES, METAL COATINGS, METAL JOINTS, MOLYBDENUM, NIOBIUM, REFRACTORY COATINGS, RIVETED JOINTS, SILICON COATINGS, SPACECRAFT, STRUCTURES, TEMPLATES, TITANIUM ALLOYS, ZIRCONIUM ALLOYS (U)

PROGRESS IS REPORTED ON THE MO STRUCTURAL COMPONENTS. COATING VENDORS WERE INTERVIEWED TO DETERMINE THE MOST ECONOMICAL DESIGN AND ASSEMBLY PROCEDURE FOR THE RUDDER FROM A COATING STANDPOINT. COMPATIBILITY STUDIES OF MO-COATED AND NB-COATED PARTS WERE COMPLETED. PRE-PRODUCTION MO MATERIAL WHICH COULD BE USED FOR PRELIMINARY EVALUATION WAS SELECTED FOR ROLLING FOR THE DETAIL FABRICATION EVALUATION. THE RUDDER FITTINGS CANNOT BE MADE AS MO OR NB FORGINGS UNDER WESTINGHOUSE OR CRUCIBLE STEELS STUDY PROGRAM. THE BLANKING OF MO PARTS BY CHEM-MILLING WAS INVESTIGATED. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZDML6

AD-276 887
ALLOY ENGINEERING AND CASTING CO CHAMPAIGN ILL

A FUNDAMENTAL STUDY OF ROLLING CONTACT FATIGUE (U)

MAY 62 10P KIRSHENBAUM,N.W.;
CONTRACT: NOW-61-0656

UNCLASSIFIED REPORT

DESCRIPTORS: *CRYSTALS, *FATIGUE (MECHANICS), *FLUORIDES, *LITHIUM COMPOUNDS, CHEMICAL MILLING, ELECTRON BEAMS, HEAT TREATMENT, PHYSICAL PROPERTIES, PICKLING, PROCESSING, RADIATION EFFECTS, ROLLING MILL(U)

CHEMICAL POLISHING OF LIF CRYSTALS USING HBF4 WAS UNSATISFACTORY. POLISHING UNANNEALED IRRADIATED CRYSTALS IN AGITATED SOLUTIONS OF 2 TO 5% NH4OH WAS PROMISING. AN AQUEOUS SOLUTION OF 1.5 X 10 TO THE -4TH POWER M FEF3 WAS SUPERIOR TO FECL3 AS AN ETCHANT MEDIUM. CLEAVAGE OF LIF CRYSTALS AT LIQUID N TEMPERATURE APPARENTLY DECREASED BRITTLENESS. CLEAVED CRYSTALS ANNEALED BETWEEN 350 AND 500 C SHOWED EVIDENCE OF THERMAL ETCHING. HIGH VOLTAGE ELECTRON IRRADIATION OF LIF CRYSTALS PRODUCED ATOMISTIC EFFECTS SIMILAR TO GAMMA IRRADIATION. IRRADIATED CRYSTALS WERE CLEAVED WITH LESS EFFORT AND DEFORMATION THAN THE AS-RECEIVED CRYSTALS. A TECHNIQUE FOR OBSERVING DISLOCATIONS INTRODUCED BY ROLLING WAS DEVISED. (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOML6

AD-278 526
AERONCA MFG CORP MIDDLETOWN OHIO

BERYLLIUM COMPOSITE STRUCTURES. VOLUME II. MATERIALS AND PROCESSES (U)

MAY 62 1V KRUSOS,J.N.;KJELBY,A.S.;

REPT. NO. TR61 706 V2
CONTRACT: AF33 616 7050
MONITOR: ASD TR61 706 V2

UNCLASSIFIED REPORT

DESCRIPTORS: AEROSPACE CRAFT, ALLOYS, ALUMINUM COMPOUNDS, BRAZING, CERAMIC MATERIALS, CHEMICAL MILLING, DIOXIDES, FOAMS, FOILS, HEAT SHIELDS, HIGH-TEMPERATURE RESEARCH, HONEYCOMB CORES, MANUFACTURING METHODS, METAL PLATES, OSRD, OXIDES, REINFORCING MATERIALS, SHEETS, SHIELDING, SILICON COMPOUNDS, STAINLESS STEEL, TESTS, THERMAL INSULATION, ZIRCONIUM COMPOUNDS (U)

THE METHODS DEVELOPED FOR FABRICATION OF BE SHEET COMPOSITE STRUCTURES ARE DESCRIBED. DESCRIPTIONS AND PERFORMANCE EVALUATION ARE INCLUDED FOR A VARIETY OF PANELS FABRICATED UNDER THE CONTRACT CONSISTING OF BE LOAD BEARING PANELS AND POROUS CERAMIC HEAT SHIELDS DEVELOPED TO WITHSTAND TEMPERATURES IN EXCESS OF 3000 F. CONCEPTS ARE OUTLIN D DEFINING APPLICATION OF BE-CERAMIC COMPOSITES TO AEROSPACE VEHICLE STRUCTURES. BE SHEET FABRICATION METHODS AND TOOLING ARE DESCRIBED AND INCLUDE SUCH PROCESSES AS CUTTING, FORMING, CHEM-MILLING, AND BRAZING. BE SHEET FACES WERE BRAZED TO A VARIETY OF SUPERALLOY AND STAINLESS STEEL HONEYCOMB CORES. THREE BASIC POROUS CERAMIC FOAMS WERE DEVELOPED IN THE HEAT SHIELD: AL2O3, ZRO2, AND SIO2.
(AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOML6

AD-281 843
HARRY DIAMOND LABS WASHINGTON D C

MICROCIRCUITRY BY CHEMICAL DEPOSITION. (U)

JUN 62 47P HEBB,EMMA LEE ;
REPT. NO. TR-1052
PROJ: 96392

UNCLASSIFIED REPORT

DESCRIPTORS: *CIRCUITS, *METAL FILMS, *MICROMINIATURIZATION (ELECTRONICS), *RESISTORS, *SUBMINIATURE ELECTRONIC EQUIPMENT, CHEMICAL MILLING, COPPER, FILMS, MANUFACTURING METHODS, NICKEL, NICKEL ALLOYS, PHOSPHORUS ALLOYS, PLATING (U)
IDENTIFIERS: THIN FILMS, THIN FILMS ELECTRONICS (U)

TECHNIQUES FOR CHEMICALLY DEPOSITING NI ALLOY FILMS ON INSULATING SUBSTRATES AND FOR ETCHING PATTERNS IN THIN CU CONDUCTORS, WERE COMBINED AND MODIFIED TO PERMIT THE FABRICATION OF NI ALLOY THIN FILMS IN VARIED AND CONTROLLED GEOMETRIES. THE RESISTIVITIES OF THE FILMS PRODUCED WERE VARIED FROM A FEW OHMS PER SQUARE TO SEVERAL THOUSAND OHMS PER SQUARE, BUT, AT PRESENT, TOLERANCES ON REPRODUCIBILITY LIMIT THE WORKING RANGE TO A MAXIMUM OF ABOUT 500 OHMS PER SQUARE. RESISTIVE AND CONDUCTIVE PARTS MADE OF NICKEL ALLOY FILMS OF APPROXIMATELY 500 OHMS PER SQUARE HAVE BEEN EMPLOYED IN MICROCIRCUITS IN WHICH THE TOLERANCES ON RESISTANCE VALUES ARE ABOUT + OR - 30%. ALTHOUGH VARIATIONS IN FILMS RESISTIVITY BETWEEN BATCHES SOMETIMES EXCEEDS THESE TOLERANCES, THE CLOSE AGREEMENT AMONG FILMS FROM THE SAME BATCH AND THE ABILITY TO MEASURE RESISTIVITIES PRIOR TO COMMITTING FILMS TO CIRCUIT PRODUCTION ALLOWED SUCH CIRCUITS TO BE FABRICATED. MODIFICATIONS OF PROCEDURES TO INCREASE THE REPRODUCIBILITY OF RESISTANCE VALUES ARE BEING INVESTIGATED. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOML6

AD-282 017
MARTIN CO BALTIMORE MD

THE EFFECT OF SURFACE-ACTIVE AGENTS ON THE MECHANICAL PROPERTIES OF METALS. PART II. THE EFFECT OF SURFACE-ACTIVE AGENTS ON THE MECHANICAL BEHAVIOR OF ALUMINUM SINGLE CRYSTALS. (U)

DESCRIPTIVE NOTE: REPT. FOR JAN 60-JAN 61, ON RESEARCH ON NEW CHEMICAL SYSTEMS AND METHODS OF SYNTHESIS.
APR 61 20P
CONTRACT: AF33 616 6220
PROJ: 7023
MONITOR: WADD TR-61-58-PT-2

UNCLASSIFIED REPORT

DESCRIPTORS: (•METALLIC CRYSTALS), (•SINGLE CRYSTALS), SURFACE PROPERTIES, SHEAR STRESSES, WETTING AGENTS, STEARIC ACIDS, METALLIC SOAPS, ADSORPTION, MECHANICAL PROPERTIES, CHEMICAL MILLING, ALUMINUM (U)

SINGLE CRYSTALS OF AL WERE PULLED IN TENSION IN A SOLUTION OF PARAFFIN OIL AND STEARIC ACID. THE CRITICAL RESOLVED SHEAR STRESS DID NOT CHANGE WITH THE CONCENTRATION OF THE STEARIC ACID SOLUTION; HOWEVER, THE EXTENT AND SLOPES OF STAGES I AND II WERE AFFECTED GREATLY. THE OBSERVATIONS LEND EVIDENCE THAT THE WEAKENING EFFECT OF SURFACE-ACTIVE AGENTS IS CONTROLLED BY THE RATE OF DESORPTION OF THE METAL SOAP FORMED BY THE REACTION OF THE SURFACE-ACTIVE AGENT AND THE METAL SURFACE. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOML6

AD-282 920
DOUGLAS AIRCRAFT CO INC LONG BEACH CALIF

CHEMICAL COMPOUNDS FOR METAL SHAPING (U)

NOV 61 1V CADY,J.R.;JAMIESON,J.L.;
REPT. NO. 1111
CONTRACT: AF19 604 4556
MONITOR: AFCRL 1111

UNCLASSIFIED REPORT

DESCRIPTORS: *CHEMICAL MILLING, *GELS, *METALS, *STAINLESS STEEL, ACETATES, ACIDS, AIRCRAFT, ALLOYS, CARBOXYLIC ACIDS, CELLULOSE ACETATES, CHEMICAL PROPERTIES, CHEMICALS, CHLORIDES, COLLOIDS, HONEYCOMB CORES, IRON COMPOUNDS, MATERIALS, MECHANICAL PROPERTIES, METAL PLATES, METHANES (1 C), METHYL RADICALS, MOLDING, PLASTICS, POROUS MATERIALS, PROCESSING, REAGENTS, SOLIDS, SOLUTIONS, SURFACES, TESTS, VINYL RADICAL (U)

FURTHER DEVELOPMENT OF GEL SYSTEMS HAS IMPROVED PHYSICAL, CHEMICAL AND MECHANICAL PROPERTIES. MILLING METAL PLATE STOCK IS LIMITED BY THE AMOUNT OF CHEMICAL ENERGY PRESENTLY AVAILABLE IN THE GEL. STAINLESS STEEL HONEYCOMB WAS CHEMICALLY CONTOURED WITH GOOD DIMENSIONAL CONTROL. POROUS SOLIDS CARRYING LIQUID ETCHANTS FORMED PROFILE CUTS, BUT TOLERANCE AND SURFACE FINISH NEED IMPROVEMENT. COMPARATIVE TESTS WITH LIQUID AND NON-LIQUID ETCHANTS DETERMINED PROBABLE LIMITS OF PERFORMANCE. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZDML6

AD-285 085
ALLOY ENGINEERING AND CASTING CO CHAMPAIGN ILL

A FUNDAMENTAL STUDY OF ROLLING CONTACT FATIGUE (U)

AUG 62 17P HORDON,M.J.;
CONTRACT: NOW-61-0656

UNCLASSIFIED REPORT

DESCRIPTORS: *DEFORMATION, *FATIGUE (MECHANICS), *LITHIUM COMPOUNDS, CHEMICAL MILLING, CRYSTAL LATTICE DEFECTS, CRYSTALS; ETHYLENES, FLUORIDES, FRICTION, LOADING, NYLON, POLYMERS, PREPARATION, ROLLING MILLS, SINGLE CRYSTALS, SPHERES, STRESSES, SURFACES (U)

SPHERES OF NYLON AND TEFLON MATERIAL WERE ROLLED AT CONSTANT SPEED OVER A (001) SURFACE OF CAREFULLY PREPARED CRYSTALS OF LIF UNDER APPLIED LOADS RANGING FROM 1 TO 400 GMS. IN THE ROLLING CONTACT APPARATUS. UNDER THE IMPACT OF THE APPLIED LOAD; A NARROW DEFORMATION TRACK, REVEALED BY A HIGH DISLOCATION ETCH PIT DENSITY, WAS LEFT IN THE WAKE OF THE ROLLING SPHERE. WITHIN THE TRACK, ETCH PITS WERE CLUSTERED IN LOCALIZED AREAS PROBABLY CAUSED BY SUBMICROSCOPIC ASPERITIES IN THE SURFACES OF CONTACT. ORTHOGONAL (110) SLIP BANDS WERE GENERALLY OBSERVED TO BE ALIGNED PARALLEL AND NORMAL TO THE ROLLING DIRECTION AT MODERATE STRESS LEVELS; HOWEVER, AT HIGHER STRESSES, THE TWO OTHER AVAILABLE SLIP SYSTEMS WERE ALSO OBSERVED. THE EXPERIMENTAL LOAD DATA ARE GENERALLY IN GOOD AGREEMENT WITH THEORETICAL CONSIDERATIONS. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL No. /ZOML6

AD-266 074
GENERAL DYNAMICS/FORT WORTH TEX

WING - ALUMINUM SHEET AND PLATE - DYNAMIC ETCHED OR CHEM-MILLED - MECHANICAL PROPERTIES - DETERMINATION OF (U)

SEP 62 1V FARNER,H.B.;

REPT. NO. FGT 2100
CONTRACT: AF33 600 32841

UNCLASSIFIED REPORT

DESCRIPTORS: *ALUMINUM ALLOYS, *CHEMICAL MILLING, FATIGUE (MECHANICS), MECHANICAL PROPERTIES, METAL PLATES, PROCESSING, SHEETS, SURFACES, TENSILE PROPERTIES, TEST METHODS, THICKNESS (U)
IDENTIFIERS: 7075 T ALUMINUM ALLOYS (U)

THE EFFECT OF CHEMICAL MILLING ON MECHANICAL PROPERTIES OF 2024, 7075, 7079 AL ALLOYS WAS DETERMINED. THE TENSILE STRENGTHS WERE AFFECTED AS FOLLOWS: ALL THE 0.064 IN. GAGE 2024-T86 ALCLAD ALUMINUM SHOWED STRENGTH LOSSES. BARE 1.50 IN. GAGE 7075-T6 AND 7079-T6 ALUMINUM PLATE, SHOWED STRENGTHS APPROXIMATELY 10% BEL W THE STRENGTH OF THE CONTROL SPECIMENS. THERE WAS NO SIGNIFICANT CHANGE IN THE MECAHNICAL PROPERTIES WHEN THE .125 IN. THICK ALCLAD 2024-T86 WAS REDUCED TO 0.098 IN. THICKNESS, THE 0.312 IN. THICK 2024-T86 AND 7075-T6 WERE REDUCED TO 0.098 IN. THICKNESS; THE 1-1/2 IN. THICK 7075-T6 WAS REDUCED TO 0.030 IN. THICKNESS, OR THE 1-1/2 IN. THICK 7079-T6 IN THE LONGITU INAL DIRECTION WAS REDUCED TO 0.030 IN. THICKNESS. THE 7079-T6 IN THE TRANSVERSE DIRECTI N SHOWED A LOSS IN YIELD STRENGTH OF ABOUT 10%. THE 0.312 IN. THICK 2024-T86 PLATE REDUCE TO 0.015 IN. THICKNESS, SHOWED A LOSS OF APPPOXIMATELY 6% IN YIELD AND ULTIMATE STRENGTHS IN THE TRANSVERSE DIRECTION. GENERALLY, ALL THE MATERIALS SHOWED SOME LOSS OF DUCTILITY. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL No. /ZOML6

AD-286 872
GENERAL MOTORS CORP KOKOMO IND DELCO RADIO DIV

PRODUCTION ENGINEERING MEASURE TO IMPROVE PRODUCTION TECHNIQUES AND INCREASE THE RELIABILITY OF THE 2N1358A TRANSISTOR (U)

JUL 62 1V KUHNS,J.C.;
CONTRACT: DA36 039SC86725

UNCLASSIFIED REPORT

DESCRIPTORS: *MANUFACTURING METHODS, *TRANSISTORS, CHEMICAL MILLING, CRYSTALS, ELECTRIC CURRENTS, GERMANIUM, GROWTH, INDIUM ALLOYS, LIFE EXPECTANCY, MATERIALS, PROCESSING, RELIABILITY, SEMICONDUCTORS, TEMPERATURE, TEST EQUIPMENT, TEST METHODS, THERMAL STRESSES (U)

EFFORTS WERE MADE TO IMPROVE THE RELIABILITY OF 2N1358A TRANSISTORS BY IMPROVEMENT OF MANUFACTURING TECHNIQU S INCLUDING EQUIPMENT AND PROCESS MODIFICATIONS, RELIABILITY TESTS, FAILURE ANALYSIS AND ANALYTICAL-EMPIRICAL SURFACE STUDIES. THE WAFER FLASH-ETCH WAS INCORPORATED IN THE ALLOY AREA TO MINIMIZE THE TIME BETWEEN ETCH AND ALLOY. ALL OF THE GERMANIUM WAFERS FOR 2N1358 TYPE TRANSISTORS ARE CURRENTLY BEING SLICED BY THE INTERNAL SAWING METHOD. THE MAJOR RELIABILITY PROBLEMS ARE DEGRADATION OF THE COLLECTOR DIODE DUE TO SURFACE CONTAMINATION; EMITTER DIODE DEGRADATION DUE TO SURFACE DEFECTS; AND HIGH FLOATING POTE TIAL DUE TO FRACTURING OF SPUR REGROWTH AT THE COLLECTOR PERIPHERY. THE RESIDUAL GAS ANALYSIS HAS INDICATED ON ALL UNITS TESTED THE PRESENCE OF WATER VAPOR (POSSIBLY ADSORBED) BEYOND WHAT WAS EXP CT D IN VIEW OF THE BAKING AND DRY AIR CAPPING PROCEDURE IN PRODUCTION. THIS, IN CONJUNCTION WITH INDICATIONS OF ADSORBED GAS IN NICKEL PLATED PARTS, AND THE RESULTS OF BAKE-OUT RECOVERY TECHNIQUES ON DEGRADED COLLECTOR DIODES, PROVIDES CLUES AND SUGGESTS EXPERIMENTS TO DETERMINE CORRECTIVE ACTION FOR THE COLLECTOR DIODE DEGRADATION PROBLEM. (UTHOR) AD-286 872 9N2 +++THE RELIABILITY OF THE 2N1358A TRANSISTOR BY IMPROVEMENT OF MANUFACTURING TECHNIQUES INCLUDING EQUIPMENT AND PROCESS MODIFICATIONS, RELIABILITY TEST, FAILURE ANALYSIS AND ANALYTICAL-EMPIRICAL SURFACE STUDY. (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL No. /ZOML6

AD-285 886
GENERAL ELECTRIC CO SCHENECTADY N Y

SILICON PLANAR EPITAXIAL TRANSISTOR TYPE 2N2193 (U)

JUL 62 1V JOHNSON,S.O.;

CONTRACT: DA36 039SC86727

UNCLASSIFIED REPORT

DESCRIPTORS: *TRANSISTORS, ALLOYS, ALUMINUM ALLOYS, BORON COMPOUNDS, CHEMICAL MILLING, DIFFUSION, ELECTRIC POTENTIAL, ELECTRODES, EVAPORATION, FAILURE (MECHANICS), GASES, HEATING, HUMIDITY, HYDROGEN, INFRARED LAMPS, LIFE EXPECTANCY, MANUFACTURING METHODS, MATERIALS, NITROGEN, PHOSPHORUS, PROCESSING, RELIABILITY, SEMICONDUCTORS, SILICON, TEMPERATURE, TESTS, THERMAL STRESSES, TRANSONIC CHARACTERISTICS, VIBRATION (U)

CONTENTS: IMPROVED KPR RESOLUTION CONTACT EVAPORATION AND ALLOYING COLLECTOR ETCHING BORON DIFFUSION PHOSPHORUS DIFFUSION COLL CTOR CONTACT TO THE HEAD R INTERCO ECTIONS RELIABILITY MEASUR ME T FAILURE A ALYSIS (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOML6

AD-286 907
PHILCO CORP LANSDALE PA

PEM FOR TRANSISTOR MANUFACTURING PROCESS IMPROVEMENT (U)

JUL 62 IV SANDERS,J.;
REPT. NO. R 232 1
CONTRACT: DA36 039SC86720

UNCLASSIFIED REPORT

DESCRIPTORS: (*TRANSISTORS), (*MANUFACTURING METHODS), RELIABILITY, STRESSES, STORAGE, OPERATION, ENCAPSULATION, ELECTRODES, TEMPERATURE, SEALS(STOPPERS), DEGASIFICATION, CHEMICAL MILLING, HIGH-TEMPERATURE RESEARCH, PRODUCTION (M)

A PRODUCTION ENGINEERING MEASURE WAS STUDIED FOR IMPROVEMENT OF PRODUCTION TECHNIQUES TO INCREASE THE RELIABILITY FOR THE JET ETCH TRANSISTOR TYPE 2N501A, WITH A MAXIMUM OPERATING FAILURE RATE OF 0.01% PER 1000 HOURS AT A 90% CONFIDENCE LEVEL AT 25 C AS AN OBJECTIVE. EFFORTS WERE MADE TO IMPROVE THE FOLLOWING SEVEN MANUFACTURING PROCESSES: (1) PLATING EDGE DEFINITION, (2) HIGHER TEMPERATURE ALLOYS, (3) LEAD ATTACHMENTS (INCLUDES COLLECTOR ATTACHMENTS), (4) CONTROLLED FORMATION OF SURFACE OXIDES FOR SURFACE STABILIZATION, (5) GETTERING TECHNIQUES FOR ENCAPSULATING AND SEALING, (6) THERMAL DISSIPATION OF PACKAGE, AND (7) LEAK DETERMINATION. ESTABLISHMENT OF A PILOT LINE TO INCORPORATE THESE PROCESS IMPROVEMENTS IS REPORTED. PRELIMINARY OPERATING STRESS DATA O TRANSISTORS FABRIC TED ON THE PILOT LINE INDICATES AN IMPROVEMENT IN POWER HANDLING CAPABILITY AS A RESULT OF THE PROCESS IMPROVEMENTS COMPLETED. PROBLEMS ASSOCIATED WITH OPERATING STRESS TESTING AND WITH OBTAINING CORRELATION BETWEEN OPERATING STRESS TESTING AND STORAGE STRESS TESTING ARE DISCUSSED. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /Z0ML6

AD-287 594
IIT RESEARCH INST CHICAGO ILL

FIBER-REINFORCED METALS AND ALLOYS (U)

OCT 62 6P PARIKH,N.M.

REPT. NO. B241 3
CONTRACT: NOW-62-0650

UNCLASSIFIED REPORT

DESCRIPTORS: *COMPOSITE MATERIALS, *METALS, *REINFORCING MATERIALS, ALLOYS, ALUMINUM ALLOYS, BERYLLIUM, CHEMICAL MILLING, FIBERS, FLUORIDES, GERMANIUM, GERMANIUM ALLOYS, HYDROGEN COMPOUNDS, MELTING, METALLIC TEXTILES, MICROSTRUCTURE, NITRIC ACID, POWDER METALS, SOLIDS, WIRE (U)

BE FIBER-AG ALLOY MATRIX COMPOSITES WERE PREPARED FROM 0.0047 IN DIAM WIRES. ALTHOUGH THERE IS AN ETCHING EFFECT ON THE WIRE SURFACES DUE TO THE HIGH PROCESSING TEMPERATURES, THE BOND BETWEEN BE FIBER SURFACE AND AG MATRIX IS A COHERENT ONE. POWDERS WERE PREPARED BY METING AND ATOMIZATION. HE AL ALLOY MATRIX WS USED FOR PREPARING SOME EXTRUDED BARS FOR DETERMINING THE OPTIMUM HEAT TREATMENT CONDITIONS. ALL THESE COMPOSITES ARE BEING EVALUATED. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOML6

AD-291 600
TEXAS INSTRUMENTS INC DALLAS

SILICON SEMICONDUCTOR NETWORKS MANUFACTURING METHODS (U)

NOV 62 1V LATHROP,J.W.;BROWER,W.C.;

REPT. NO. IR7 865 V6
CONTRACT: AF33 600 42210
MONITOR: ASD IR7 865 V6

UNCLASSIFIED REPORT

DESCRIPTORS: •SEMICONDUCTORS, •SILICON, •SUBMINIATURE ELECTRONIC EQUIPMENT, BONDING, BRAZING, CHEMICAL MILLING, CIRCUITS, CONTAINERS, DESIGN, DIFFUSION, ELECTRON BEAMS, EVAPORATION, FILMS, GLASS, GROWTH, LEAD, MATERIALS, MATHEMATICAL ANALYSIS, PROCESSING, PRODUCTION, SWITCHING CIRCUITS, TEST EQUIPMENT, TEST METHODS, VAPOR PLATING, WELDING (U)

PROCESS STUDIES WERE CONCLUDED. TECHNIQUES HAVE BEEN DEVELOPED FOR EVALUATION OF ALL DIFFUSION PARAMETERS. ALL MACHINES FOR THE PILOT LINE ARE EITHER COMPLETED, BEING CONSTRUCTED OR MODIFIED, OR IN ADVANCED DESIGN STAGE. THE PHILOSOPHY GUIDING CREATION OF THESE MACHINES IS THAT ALL POSSIBLE OPERATIONS WILL BE PERFORMED ON THE FUNCTIONAL ELECTRONIC BLOCKS WHILE THEY ARE STILL IN SLICE FORM. THESE OPERATIONS INCLUDE CLEANING, POLISHING, PHOTORESIST APPLICATIONS, ETCHING, DIFFUSION, AND APPLICATION OF EVAPORATED LEADS AND CONTACTS. CONSIDERABLE PROGRESS HAS BEEN MADE TOWARD PERFECTING A WELDED PACKAGE. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOML6

AD-291 876
PHOTOCIRCUITS CORP GLEN COVE N Y

MICROMINIATURE LAYERED PRINTED WIRING (U)

SEP 62 IV MESSNER,G.;MCCAW,R.;PALUSZEK,M.;
CONTRACT: DA-36-039-SC-90763

UNCLASSIFIED REPORT

DESCRIPTORS: *MANUFACTURING METHODS, *MICROMINIATURIZATION (ELECTRONICS), *PRINTED CIRCUITS, CHEMICAL MILLING, COPPER, GELS, LAMINATES, METAL FILMS, PHOTOENGRAVING, PICTURES, PLATING, SANDWICH PANELS (U)

SPRAY ETCHING FOR PRODUCING THIN LINES, AND LAMINATING TECHNIQUES FOR MULTILAYER PRINTED CIRCUITS IN A MICROMINIATURIZATION PROGRAM.

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOML6

AD-293 259
IIT RESEARCH INST CHICAGO ILL

FIBER-REINFORCED METALS AND ALLOYS (U)

JAN 63 10P PARIKH,N.M.;
REPT. NO. 8241 4
CONTRACT: NOw-62-0650

UNCLASSIFIED REPORT

DESCRIPTORS: *COMPOSITE MATERIALS, *FIBERS, *METALS, *REINFORCING MATERIALS, ALLOYS, ALUMINUM ALLOYS, ATMOSPHERIC PRECIPITATION, BERYLLIUM ALLOYS, CARBIDES, CHEMICAL MILLING, CHEMICAL PRECIPITATION, EXTRUSION, GRAIN STRUCTURES (METALLURGY), HEAT TREATMENT, IRON ALLOYS, MICROSTRUCTURE, POWDER METALLURGY, POWDER METALS, PROCESSING, PRODUCTION, SILVER, SINTERING, TUNGSTEN ALLOYS, WIRE (U)

WORK WAS CONTINUED ON THE CHEMICAL ETCHI G OF RAWN BE WIRES TO REDUC THEIR DIAMETERS FROM 0.0047 TO ABOUT 0.001 INCH. SEVERAL MATRIX ALLOYS WERE PREPARED BY ATOMIZING. THESE WERE PREPARED BY FIRST MELTING 2S AL IN A CRUCIBLE, ADDING THE ALLOYING EL MENTS TO THE MELT, AND DISINTEGRA ING THE MOLTEN STREAM OF METAL OF ABOUT 100 PSI PRESSURE OF DRY COMPRESSE AIR. THE POWDERS THUS COLLECTED WERE SIEVED THROUGH A 60 MESH SCREEN AND COMPACTED IN A 1-INC DIE. IN THE WORK ON BE FIBER COMPOSITES, THE SPREAD IN THE SIZE OF THE FIBERS WAS SO GREAT THAT IT WAS DIFFICULT TO DESIGNATE AN AVERAGE SIZE. T E E FIBERS W RE MIXED WITH PLAIN 2S AL POWDER (-60 MESH), COMPACTED IN A 1-INCH DIE AT 15 TSI AND EXTRUDED AT TEMPERATURES BELOW 870F AT AN EXTRUSION RATIO OF ABOUT 40:1. THE TENSILE PROPERTIES AND ELASTIC MO ULUS WERE MEASURED ON A HOUNSFIELD TEN OMETER. IT WAS A CHIEF OBJECTIVE OF THIS SERIES OF EXPERIMENTS TO SEE IF THESE COMPOSITES COULD BE DENSIFIED BY XTRUSION TECHNIQUE , AND IT APPEARS THAT THIS TECHNIQUE IS SATISFACTORY. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZDML6

AD-293 445
INNSBRUCK UNIV (AUSTRIA)

DISLOCATION MOBILITY IN ZINC SINGLE CRYSTALS (U)

DEC 62 1V ADAMS,K.H.;VREELAND,T. JR.;
CONTRACT: NONR22037

UNCLASSIFIED REPORT

DESCRIPTORS: *DEFORMATION, *SINGLE CRYSTALS, *ZINC, CHEMICAL MILLING, CONFIGURATION, CRYSTAL LATTICE DEFECTS, DENSITY, LOADING, METALLIC CRYSTALS, SHEAR STRESSES, STRESSES, TEST METHODS (U)

RESULTS OF A STUDY OF DISLOC TION MOBILITY IN IG PURITY ZINC SINGLE CRYSTALS ARE PRESENTED. DISLOCATION POSITIONS WERE DETERMINED USING A SPECIAL ETCHING TECHNIQUE, AND THE DISLOCATION DEN ITY AND CONFIGURATION WERE DETERMINED BEFORE AND AFT R STATIC LOADING AND S RE PULSE LOADING. LOADING AT STRESS LEVELS SLIGHTLY BELOW HE FLOW STR PRODUCE LOCAL DISLOC ION R ARRA GEM NT, WITH THE MAXIMUM DISLOCATION DISPL CE NT SOMEW AT LESS THAN THE SUB-BOUNDARY SPACING. AT THE FLOW STRES DISLOC TIONS PENETRATE THE SUB-BOUNDARIES AND RELATIVELY LARGE DISLOC TION DISPLACEMENTS AR I DICATED (COMPARABLE TO THE SPECIMEN DIMENSIONS) IN STRESS PULSE TES S OF PPRO IMATELY 30 SEC DURATION. SHORT DURATION STRESS PULSE LOADING AT A STRES LEV L APPROXIMATELY 70 TIMES THE FLOW STRESS PRODUCED A MAXIMUM DISLOCATION VELOCI Y OF APPROXIM ELY 6 PER CENT OF THE SHEAR WAVE VELOCITY. (AUTHOR)
(U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZDML6

AD-294 786
ARMY ELECTRONICS LABS FORT MONMOUTH N J

DESIGN CONSIDERATIONS FOR MICROWAVE GERMANIUM TUNNEL DIODES (U)

SEP 62 19V WANDINGER,L.;KLOHN,K.;
REPT. NO. TR2318

UNCLASSIFIED REPORT

DESCRIPTORS: •DIODES, •MANUFACTURING METHODS, •SEMICONDUCTORS, CHEMICAL MILLING, ELECTROFORMING, ENCAPSULATION, GERMANIUM, MEASUREMENT, MICROWAVE EQUIPMENT, NEGATIVE RESISTANCE CIRCUITS, PRODUCTION, RESISTANCE (ELECTRICAL), SURFACE PROPERTIES (U)

A DISCUSSION IS PRESENTED ON THE TECHNOLOGY AND PROBLEMS INVOLVED IN THE DESIGN CONSIDERATIONS, FABRICATION, AND MEASUREMENT OF GERMANIUM TUNNEL DIODES. FABRICATION INCLUDES MATERIAL PREPARATION, METHODS OF CREATING ABRUPT P-N JUNCTIONS SUCH AS DOT ALLOYING, ELECTRICAL FORMING OR PULSE DISCHARGE FORMING AND SOLUTION GROWTH, ETCHING PROCEDURES NECESSARY TO OBTAIN LOW PEAK CURRENTS AND HIGH PEAK TO VALLEY CURRENT RATIOS, AND PACKAGING CONSIDERATIONS FOR LOW SERIES INDUCTANCE. MEASUREMENT TECHNIQUES TO DETERMINE THE IMPORTANT HIGH-FREQUENCY PARAMETERS, RS, LS, C, AND RN, OF THE DIODE ARE DISCUSSED. THE RESULTS OF EXPERIMENTAL UNITS EXHIBITING CUTOFF FREQUENCIES UP TO 5 GC ARE TABULATED. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /Z0ML6

AD-295 057
SPRAGUE ELECTRIC CO NORTH ADAMS MASS

PRODUCTION ENGINEERING MEASURE RELIABILITY IMPROVEMENT JET ETCH TRANSISTOR (U)

OCT 62 1V GAGNE,R.M.;KRANTZ,J.E.;FOLSTER, J.H.D.;

UNCLASSIFIED REPORT

DESCRIPTORS: *MANUFACTURING METHODS, CHEMICAL MILLING, ELECTRICAL PROPERTIES, LIFE EXPECTANCY, PRODUCTION, RELIABILITY, TRANSISTORS (U)

THE OPTIMUM COLLECTOR RESISTIVITY, THE OPTIMUM COLLECTOR THICKNESS, THE OPTIMUM ELECTRICAL BASEWIDTH, AND THE PROPER EMITTER PLACEMENT WERE DETERMINED. INVESTIGATIONS LEADING TO THESE DETERMINATIONS ARE DESCRIBED. WORK HAS CONTINUED TOWARD DEVISING A METHOD TO STOP AUTOMATICALLY THE DELINEATION ETCHING PROCESS AFTER THE COLLECTOR JUNCTION WAS DELINEATED. SOME PROGRESS WAS MADE IN THIS AREA, AND WORK IS CONTINUING. TWO NEW PROCESS STEPS WERE INTRODUCED AND DESCRIPTIONS OF THESE ARE ALSO GIVEN. THE STATUS OF THE PROGRAM, LIFE TEST RESULTS TO DATE, AND CURRENT FAILURE RATES ARE ALSO PRESENTED. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOML6

AD-295 752
DOUGLAS AIRCRAFT CO INC LONG BEACH CALIF

CHEMICAL COMPOUNDS FOR METAL SHAPING (U)

JAN 63 1V JAMIESON,J.L.;PARTRIDGE,E.G.;
REPT. NO. TR7 648 V3
CONTRACT: AF33 600 43027
MONITOR: ASD TR7 648 V3

UNCLASSIFIED REPORT

DESCRIPTORS: *HONEYCOMB CORES, *STAINLESS STEEL, ACIDS, CARBOXYMETHYLCELLULOSE, CELLULOSE ACETATES, CHEMICAL MILLING, CHEMICALS, ELECTRIC CURRENTS, ELECTROCHEMISTRY, ELECTRODES, ELECTROLYTES, ELECTROLYTIC CELLS, GELS, METALS, POLARIZATION, POROUS MATERIALS, PROCESSING, REDUCTION, RESISTANCE (ELECTRICAL), SOLIDS, SOLUTIONS, THICKNESS (U)

ELECTROLYTIC ETCHING OF STAINLESS STEEL PLATES AND HONEYCOMB CORES; VARIOUS CHEMICAL COMPOUNDS USED FOR METAL SHAPING; PROCESSING OF AIRCRAFT MATERIALS.

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOML6

AD-295 707
TEXAS INSTRUMENTS INC DALLAS

RESEARCH AND DEVELOPMENT OF HIGH TEMPERATURE SEMICONDUCTOR DEVICES (U)

DEC 61 17 WURST,E.C.;PETRITZ,R.L.;
CONTRACT: NOBSR85424

UNCLASSIFIED REPORT

DESCRIPTORS: ARSENIDES, CHEMICAL MILLING, DIFFUSION, ENCAPSULATION, GALLIUM COMPOUNDS, GOLD ALLOYS, MAGNESIUM, MANUFACTURING METHODS, OXIDES, SILICON COMPOUNDS, TEMPERATURE, TESTS, TIN ALLOYS (U)

GALLIUM ARSENIDE TRANSISTORS ARE FABRICATED AND TESTED AT 150 C; SEVERAL TECHNIQUES ARE INVESTIGATED, INCLUDING MAGNESIUM DIFFUSION IN GAAS AND THE FEASIBILITY OF SIO2 COATINGS ON GAAS AS A MASK AGAINST IMPURITY DIFFUSION; POSTALLOY DIFFUSION AND CHEMICAL POLISHING.

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZDML6

AD-400 732
PHOTOCIRCUITS CORP GLEN COVE N Y

MICROMINIATURE LAYERED PRINTED WIRING (U)

DEC 62 IV MESSNER,G.;MCCAW,R.;PALUSZEK,M.;
CONTRACT: DA-36-039-SC-90763

UNCLASSIFIED REPORT

DESCRIPTORS: CHEMICAL MILLING, CONFIGURATION, COPPER, DRILLING MACHINES, ELECTRIC CONNECTORS, ELECTRIC TERMINALS, EPOXY PLASTICS, GOLD, LAMINATED PLASTICS, LAMINATES, MANUFACTURING METHODS, METAL COATINGS, MICROMINIATURIZATION (ELECTRONICS), NICKEL, PANEL BOARDS (ELECTRICITY), PLATING, PRINTED CIRCUITS, PRODUCTION, SOLDERING (U)

PROCESS PARAMETERS FOR THE MANUFACTURE OF MICROMINIATURE LAYERED PRINTED WIRING WITH PLATED-THROUGH HOLES AS THE INTERCONNECTING LINK BETWEEN LAYERS.

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOML6

AD-402 164
GENERAL DYNAMICS/POMONA CALIF

EFFECT OF SURFACE FINISHES ON FATIGUE LIFE (U)

MAR 59 1V WINSLOW,E.K.;LINDENEAU,G.D.;WISE, W.E.;
REPT. NO. 8926 142
CONTRACT: AF33 657 8926

UNCLASSIFIED REPORT

DESCRIPTORS: ALLOYS, ALUMINUM ALLOYS, CHEMICAL MILLING, COLD WORKING, DATA, EFFECTIVENESS, FATIGUE (MECHANICS), HEAT TREATMENT, LIFE EXPECTANCY, MACHINING, STEEL, STRESSES
IDENTIFIERS: 4340 STEEL (U)
(U)

THE EFFECT OF SURFACE FINISHES PRODUCED BY CHEMICAL MILLING AND MICRO-GLASS-PEENING ON THE FATIGUE LIFE OF STEEL AND ALUMINUM ALLOYS.

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOML6

AD-404 185
GENERAL ELECTRIC CO SCHENECTADY N Y

SILICON PLANAR EPITAXIAL TRANSISTPE 2N2193. (U)

DESCRIPTIVE NOTE: QUARTERLY REPT. NO. 3, 31 OCT 62-31 JAN 63.
JAN 63 1V
CONTRACT: DA36 039SC86727

UNCLASSIFIED REPORT

DESCRIPTORS: *TRANSISTORS, VAPOR PLATING, VACUUM APPARATUS, SILICON, CHEMICAL MILLING, BONDING, CLEANING, ALLOYS, BORON, PHOSPHORUS, DIFFUSION, RELIABILITY (ELECTRONICS), MEASUREMENT, MANUFACTURING METHODS. (U)
IDENTIFIERS: PASSIVATION (SEMICONDUCTOR). (U)

CONTENTS: IMPROVED KPR RESOLUTION CONTACT EVAPORATION AND ALLOYING COLLECTOR ETCHING BORON DIFFUSION PHOSPHORUS DIFFUSION COLLECTOR CONTACT TO THE HEADER INTERCONNECTIONS RELIABILITY MEASUREMENT INSPECTION AND QUALITY CONTROL PLAN (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOML6

AD-404 537
RADIO CORP OF AMERICA SOMERVILLE N J

PRODUCTION ENGINEERING MEASURE ON 2N1708 SILICON PLANAR EPITAXIAL TRANSISTOR. (U)

DESCRIPTIVE NOTE: QUARTERLY REPT. NO. 3, 1 NOV 62-31 JAN 63,
JAN 63 36P POSSEMATO,L.R.;
CONTRACT: DA36 039SC86729

UNCLASSIFIED REPORT

DESCRIPTORS: *MANUFACTURING METHODS, *TRANSISTORS, SILICON, CLEANING, EPITAXIAL GROWTH, DIFFUSION, CHEMICAL MILLING, CONTAMINATION, IMPURITIES, PHOSPHORUS, FIXED CONTACTS, GOLD, MALFUNCTIONS, PROCESSING. (U)

A TECHNIQUE OF ETCHING THE WAFERS WITH ANHYDROUS HCL IN THE EPITAXIAL TUBE PRIOR TO EPITAXIAL DEPOSITION WAS INCORPORATED INTO THE PROCESS. THE OXIDE ON THE SURFACE OF THE WAFER SERVES AS A MASK DURING THE DIFFUSION OPERATION AND GENERALLY SERVES TO PROTECT THE SILICON SURFACES DURING WAFER PROCESSING. IN PERFORMING THESE FUNCTIONS, HOWEVER, IMPURITIES MAY BE DIFFUSED INTO THE OXIDE AT THE HIGH DIFFUSION TEMPERATURES. A METHOD WAS DEVELOPED PROVIDING THE CLEANEST POSSIBLE OXIDE TO IMPROVE THE SURFACE PROTECTION ON THE FINISHED PELLETS. EXPERIMENTS ARE ALSO BEING MADE ON BAKING OF OXIDE TO DIFFUSE ENTRAPPED WATER MOLECULES TO THE SURFACE FOR SUBSEQUENT EVAPORATION.
(AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOML6

AD-405 861
WESTINGHOUSE ELECTRIC CORP YOUNGWOOD PA

MICROMINIATURE INTEGRATED CIRCUIT PACKAGE. (U)

DESCRIPTIVE NOTE: QUARTERLY PROGRESS REPT. NO. 2, 1 OCT 62-1 JAN 63,
JAN 63 11P BARBARO,E.P.;
CONTRACT: DA36 039SC90850
PROJ: DA PROJ. 3A99 21 002 01

UNCLASSIFIED REPORT

DESCRIPTORS: *MICROMINIATURIZATION (ELECTRONICS), *INTEGRATED CIRCUITS, *PACKAGED CIRCUITS, *MODULES (ELECTRONICS), PROCESSING, SEALS (STOPPERS), GRAPHITE, GLASS, CHEMICAL MILLING, CLEANING, MECHANICAL PROPERTIES. (U)

TWO SUCCESSIVE DESIGN MODIFICATIONS WERE MADE TO THE GRAPHITE GLASSING BOATS IN ORDER TO ACHIEVE MORE UNIFORM PACKAGE APPEARANCE. FIFTY PACKAGE SAMPLES WERE SUBMITTED FOR MECHANICAL EVALUATION. TECHNIQUES FOR SEALING THE INTEGRATED CIRCUIT PACKAGE WERE ESTABLISHED. IMPROVED CLEANING TECHNIQUES WERE ESTABLISHED FOR DEOXIDIZING KOVAR PARTS PRIOR TO GOLD PLATING RESULTING IN LESS PITTING OF THE METAL. STAMPED LEAD PRE FORMS ECEIVED DURING THIS PERIOD. THE FIRST ONE HUNDRED MICROMINIATURE CIRCUIT PACKAGES SUBMITTED WERE FABRICATED WITH ETCHED LEADS. THE STAMPED LEADS ARE MORE UNIFORM IN CROSS SECTION. CERAMIC MICROMODULES WITH PADS WERE DESIGNED AND ORDERED. THIS MICROMODULE WILL BE UTILIZED TO DEVELOP AN INTEGRAL PACKAGE USING THE CERAMIC MICROMODULE AS A BASE. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOML6

AD-408 190
ARMY ELECTRONICS LABS FORT MONMOUTH N J

TECHNOLOGY FOR PNP PLANAR SILICON TRANSISTORS: SWITCHING AND AMPLIFYING. (U)

MAR 63 21P LAROCQUE,ARMOND P.;YATSKO, ROBERT S.;ROGEL,ALEX ;JACKSON,RAYMOND ;RIBLE, VINCENT E.;
REPT. NO. TR-2339
PROJ: DA-3-A-992100302

UNCLASSIFIED REPORT

DESCRIPTORS: (*TRANSISTORS, MANUFACTURING METHODS), DIFFUSION, IMPURITIES, ANTIMONY, BONDING, GAIN, CRYSTAL GROWTH, SILICON, CHEMICAL MILLING, POLISHES, PHOTOENGRAVING, BORON, METAL FILMS, TESTS, CAPACITORS, RESISTORS, ULTRAHIGH FREQUENCY, GOLD, MICRO MINIATURIZATION (ELECTRONICS). (U)
IDENTIFIERS: 1963, PLANAR TRANSISTORS. (U)

PROCESSES AND TECHNIQUES REQUIRED FOR FABRICATION OF EXPERIMENTAL PLANAR PNP SILICON TRANSISTORS WERE DEVELOPED AND DEMONSTRATED AS FEASIBLE. PROCESSES INVOLVED INCLUDE MATERIAL PREPARATION, ANTIMONY BASE DIFFUSION, BORON EMITTER DIFFUSION, OXIDE MASKING, PHOTORESIST TECHNIQUES, SIMULTANEOUS GOLD METALIZING OF EMITTER AND BASE REGIONS, COLLECTOR ALLOY CONTACT AND BASING, AND THMO COMPRESSION BONDING. INITIAL TRANSISTORS HAVE TYPICAL DC BETA VALUES OF 35 TO 40 AND FT VALUES AS HIGH AS 350 MCS. PROCESSES DESCRIBED WERE ALSO USED IN PRELIMINARY FABRICATION OF SOLID STATE MICROCIRCUIT PASSIVE COMPONENTS. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOML6

AD-412 841
LEAR SIEGLER INC SANTA MONICA CALIF

SEMICONDUCTOR THIN FILMS. (U)

DESCRIPTIVE NOTE: QUARTERLY REPT. NO. 6, 1 APR-30 JUNE 63.
63 18P
CONTRACT: AF33 657 7623

UNCLASSIFIED REPORT

DESCRIPTORS: (*SEMICONDUCTING FILMS), MANUFACTURING METHODS), VAPOR PLATING, VACUUM, GALLIUM COMPOUNDS, ARSENIDES, HALL EFFECT, MEASUREMENT, ELECTRON MICROSCOPY, CHEMICAL MILLING, X-RAY DIFFRACTION ANALYSIS. (U)
IDENTIFIERS: THIN FILMS (U)

(1) TO DEPOSIT FILMS IN A DYNAMIC 10 TO THE -8TH POWER VACUUM SYSTEM; (2) TO INVESTIGATE ANNEALING OF GAAS FILMS; (3) TO MAKE HALL MEASUREMENTS AT A SERIES OF TEMPERATURES; (4) TO INVESTIGATE DEPOSITION AT MICRONS PER SECOND; (5) TO IMPROVE THE RESOLUTION IN ELECTRON MICROSCOPE SURFACE STUDIES AND TO INVESTIGATE A SETUP FOR ETCHING THICKER FILMS DOWN TO THICKNESSES SUITABLE FOR ELECTRON MICROSCOPY; AND (6) TO CONTINUE DEVICE STUDIES WITH FILMS OF AVAILABLE QUALITY. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOML6

AD-414 913
RADIO CORP OF AMERICA SOMERVILLE N J

PRODUCTION ENGINEERING MEASURE ON 2N1708 SILICON PLANAR EPITOXIAL TRANSISTOR. (U)

DESCRIPTIVE NOTE: QUARTERLY REPT. NO. 4, 1 FEB-30 APR 63,
APR 63 87P WARREN,A.;POSSEMATO,L.R.;
CONTRACT: DA36 039SC86729

UNCLASSIFIED REPORT

DESCRIPTORS: (*TRANSISTORS, MANUFACTURING METHODS), (*MANUFACTURING METHODS, TRANSISTORS), CLEANING, EPITOXIAL GROWTH, SEMICONDUCTOR DEVICES, CHEMICAL MILLING, FIXED CONTACTS, GOLD, ALUMINUM, CONTAMINATION, BONDING, QUALITY CONTROL, RELIABILITY, PROCESSING, SURFACES. (U)
IDENTIFIERS: 1963. (U)

PROCESS IMPROVEMENTS WERE COMPLETED IN ALL AREAS INVESTIGATED. AN IMPROVED METHOD OF REMOVING PHOTORESIST WAS DEVELOPED. A STUDY OF INORGANIC REAGENT MATERIALS AS SOURCES OF SEMI-CONDUCTOR SURFACE CONTAMINATION WAS COMPLETED. CONCLUSIONS CONCERNING THE CONCENTRATIONS OF IMPURITIES AND THE EFFECTIVENESS OF VARIOUS DESORPTION YECHNI QUES ARE INCLUDED. THE USE OF THIN ALUMINUM CON TACTS HAS INHIBITED FORMATION OF **PURPLE PLAGUE**. EXPERIMENTS WITH GOLD CONTACTS WERE UNSUCCESSFUL. THE USE OF GOLD ALLOY WIRE DID NOT MATERIALLY IMPROVE THE BOND STRENGTH. NAILHEAD BONDING WITH A SMALLER DIAMETER GOLD WIRE TO REDUCE THE SIZE OF THE BALL MET WITH ONLY LIMITED SUCCESS. A PROGRAM OF RELIABILITY TESTING AND ANALYSIS AND STUDIES OF RMAL RESISTANCE MEAS UREMENTS FORM JUNCTION TO AMBIENT (T SUB J-A) WERE COMPLETED.
(AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZDML6

AD-418 226
KELSEY-HAYES CO ROMULUS MICH

THE DESIGN AND EVALUATION OF PERFORATED ION EMITTERS. (U)

DESCRIPTIVE NOTE: FINAL REPT. MAY 62-AUG 63.
SEP 63 IV PETRICK,E.N.;KRAUSS,J.J.;
CONTRACT: AF33 657 8638
PROJ: AF-3141
TASK: 314102
MONITOR: ASD TDR63 750

UNCLASSIFIED REPORT

DESCRIPTORS: (*ION ENGINES, ION SOURCES), (*ION SOURCES, CESIUM), (*CESIUM, IONIZATION), ELECTRIC PROPULSION, MANUFACTURING METHODS, ELECTRON BEAMS, CHEMICAL MILLING, SHEETS, RELIABILITY, FEASIBILITY STUDIES, POROUS METALS, GAS FLOW, NITROGEN, TUNGSTEN, MOLYBDENUM. (U)
IDENTIFIERS: 1963. (U)

THE FEASIBILITY OF UTILIZING EMITTERS OF PERFORATED SOLID SHEET RATHER THAN A SINTERED POWDER STRUCTURE WAS INVESTIGATED WITH THE OBJECTIVE OF INCREASING THE RELIABILITY AND DURABILITY OF ION ENGINES. VARIOUS TECHNIQUES FOR DRILLING MICRON-SIZE HOLES IN REFRACTORY METALS WERE EXPLORED. TWO OF THESE PROCESSES, ELECTRON BEAM DRILLING AND CHEMICAL PHOTO-ETCHING, WERE USED TO PROVIDE TEST EMITTERS WITH HOLE SIZES IN THE 10-MICRON RANGE. AN ELECTRON BEAM DRILLED EMITTER WAS CS FLOW TESTED FOR 83 HOURS AND EXHIBITED, WITHIN EXPERIMENTAL LIMITS, NO DISCERNIBLE CHANGE IN HOLE SIZE OR FLOW CONDUCTANCE. IN SEPARATE TESTS CORRELATION WAS MADE OF THEORETICAL AND MEASURED FLOW RATES OF N AND CS THROUGH THE EMITTERS. IT WAS DETERMINED THAT THE MEASURED CS FLOW RATE EXCEEDED THE THEORETICALLY CALCULABLE VALUE BASED ON AVAILABLE SURFACE DIFFUSION FORMULAE.
(AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOML6

AD-418 684
GENERAL ELECTRIC CO SYRACUSE N Y

MATRIX CONTROLLED DISPLAY DEVICE. (U)

DESCRIPTIVE NOTE: INTERIM DEVELOPMENT REPT. NO. 1, 1 JULY 16 SEP 63.
AUG 63 30P
CONTRACT: NOBSR89334
PROJ: SR080301
TASK: 9475

UNCLASSIFIED REPORT

DESCRIPTORS: (*DISPLAY SYSTEMS, ELECTRONIC RECORDING SYSTEMS), (*ELECTRONIC RECORDING SYSTEMS, GEOMETRIC FORMS), FEASIBILITY STUDIES, VIEWING SCREENS, BRIGHTNESS, THERMOPLASTICS, DEFORMATION, CIRCUITS, PHOTOENGRAVING, OPTICS, CHEMICAL MILLING, ELECTRODES, TEST EQUIPMENT. (U)
IDENTIFIERS: 1963, MATRIX CONTROLLED DISPLAY. (U)

A DISCRIPTION IS PRESENTED OF THE WORK ACCOMPLISHED TO DEVELOP A FEASIBILITY MODEL OF A MATRIX CONTROLLED DISPLAY DEVICE USING TECHNIQUES CALLED IN-AIR SURFACE DEFORMATION RECORDING AND TIRP (TOTAL INTERNAL REFLECTION PRISROJEC TION. TO INTRODUCE THE READER TO THESE TECH NIWUES, A BRIEF DESCRIPTION OF THEIR BASIC PRINCIPLES IS GIVEN. THE TEST SETUP TO PROVIDE AN ELEMENTAL PORTION OF THE LARGE SCREEN DISPLAY AT 20 TO 30 FOOT-LAMBERTS BRIGHTNESS BY OPTICAL READOUT OF DEFORMATIONS ON A THERMOPLASTIC OR OIL MEDIUM IS DISCUSSED. CIRCUITRY TO IMPLEMENT THE DEFORMATION RECORDING TECHNIQUE USING X-Y MATRIX CONTROL IS GIVEN. A BASIC MECHANICAL CON FIGURATION IS CONSIDERED. INFORMATION IS PRO VIDED ON THE PREPARATION OF ARTWORK AND A PHOTO GRAPHIC MASK NECESSARY TO FABRICATE MATRIX ELEC TRODES AT 5, 10, AND 20 LINE PAIRS PER MILLIMETER WITH THREE ELECTRODE WIDTHS. THE RESULTS OF INITIAL EXPERIMENTS IN ETCHING OF TRANSPARENT, CONDUCTIVE COATINGS TO FORM THE ELECTRODES ARE GIVEN. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOML6

AD-419 585
SYLVANIA ELECTRIC PRODUCTS INC WOBURN MASS

PRODUCTION ENGINEERING MEASURE FOR GALLIUM ARSENIDE VARACTOR DIODE. (U)

DESCRIPTIVE NOTE: QUARTERLY PROGRESS REPT. NO. 4, 1 MAR-31 MAY 63,
MAY 63 1V DAVIS,C.F.;FELDMAN,E.J.;
CONTRACT: DA36 039SC86736

UNCLASSIFIED REPORT

DESCRIPTORS: (*VARACTOR DIODES, PRODUCTION), (*MANUFACTURING METHODS, VARACTOR DIODES), GALLIUM ALLOYS, ARSENIC ALLOYS, EPITAXIAL GROWTH, FIXED CONTACTS, CONTAINERS, CAPACITANCE, ELECTRIC POTENTIAL, CHEMICAL MILLING, DIFFUSING, IMPURITIES, ZINC, TELLURIUM, ARSENIC, PHOTOENGRAVING. (U)
IDENTIFIERS: 1963, MESA (SEMICONDUCTOR). (U)

STUDIES TO OBTAIN THE PROCESSES NECESSARY FOR THE HIGH VOLUME PRODUCTION OF GALLIUM ARSENIDE VARACTOR DIODES ARE DESCRIBED IN THIS REPORT. THESE INVESTIGATIONS INCLUDE STUDIES OF MESA CONTACTS, EPITAXIAL MATERIAL, PACKAGING, OHMIC CONTACTS AND ETCHING PROCEDURES. THE RESULTS OF THE FABRICATION OF COMPLETELY EPITAXIAL DIODES AND DIFFUSED EPITAXIAL DIODES ARE DISCUSSED AS WELL AS CONTROLABLE ETCHING PROCEDURES FOR VOLUME PRODUCTION. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOML6

AD-420 375
WESTINGHOUSE ELECTRIC CORP DAYTON OHIO

500 C SILICON CARBIDE RECTIFIER PROGRAM. (U)

DESCRIPTIVE NOTE: INTERIM TECHNICAL PROGRESS REPT. NO. 8, 1 JULY30 SEP 63.
OCT 63 20P CHANG,H. C. ;JENNINGS,V. J. ;THORNBURG,D. R. ;KROKO,L. J. ;OSTROSKI,J. ;

CONTRACT: AF33 657 7027
PROJ: 7 727
MONITOR: ASD IR7 727, VOL. 8

UNCLASSIFIED REPORT

DESCRIPTORS: (•CRYSTAL RECTIFIERS, SILICON ALLOYS), (•SILICON ALLOYS, CRYSTAL RECTIFIERS), (•DIODES (SEMICONDUCTORS), SILICON ALLOYS), POWER EQUIPMENT PARTS, CARBON ALLOYS, HIGHTEMPERATURE RESEARCH, EPITAXIAL GROWTH, IMPURITIES, CHEMICAL MILLING, BORATES, SODIUM COMPOUNDS, LIFE EXPECTANCY, STORAGE, SURFACE PROPERTIES, MANUFACTURING METHODS, TESTS (U)
IDENTIFIERS: 1963 (U)

EFFORTS WERE CONTINUED ON THE DEVELOPMENT OF 500 DEGREE C SILICON CARBIDE RECTIFIERS. THE GROWTH RATE OF SILICON CARBIDE CRYSTALS PREPARED BY THE SUBLIMATION METHOD WAS DETERMINED BY MEASURING THE AMOUNT OF GROWTH BETWEEN SUCCESSIVE, TIMED DOPANT ADDITIONS. THIS WAS COMPARED WITH THE GROWTH RATE AS OBTAINED FROM A SIMPLE MODEL. ALL VALUES AGREE WITHIN A FACTOR OF FIVE. THE USE OF MOLTEN BORAX AS AN ETCHANT FOR SILICON CARBIDE WAS STUDIES. DUE TO ITS RELATIVELY SLOW ETCH RATE (ABOUT 30 TIMES SLOWER THAN A MOLTEN SODIUM PEROXIDE-SODIUM HYDROXIDE MIXTURE) A MUCH FINER CONTROL OF THE ETCHING IS POSSIBLE. DETAILS ARE GIVEN ON THE LIFE AND STORAGE TESTS WHICH WERE SUCCESSFULLY PASSED BY TWO SILICON CARBIDE RECTIFIERS. AN OPEN TUBE-FLOWING GAS SYSTEM WAS SHOWN SUITABLE FOR THE SURFACE PASSIVATION OF GROUPS OF SILICON CARBIDE RECTIFIERS. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOML6

AD-422 492
BELL TELEPHONE LABS INC WHIPPANY N J

ENGINEERING SERVICES ON TRANSISTORS. (U)

DESCRIPTIVE NOTE: QUARTERLY PROGRESS REPT. NO. 1, 1 APR-30 JUNE 63,
SEP 63 1V ARNOLD,S. R. ;DAVIS,R. E. ;
GIBBONS,G. ;KOCSIS,J. ;MARTERSTECK,K. E. ;
REPT. NO. 12
CONTRACT: DA36 039AMC02227
PROJ: 3A99 21 001

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: CONTINUATION OF CONTRACT DA36 039SC90759.

DESCRIPTORS: (*TRANSISTORS, MANUFACTURING METHODS), (*INTEGRATED CIRCUITS, TRANSISTORS), GERMANIUM, SILICON, ELECTRIC POTENTIAL, SUPERHIGH FREQUENCY, CHEMICAL MILLING, ELECTRIC CURRENTS, EPITAXIAL GROWTH, ELECTRICAL CONDUCTANCE, RESISTORS, AGING (MATERIALS), DIODES (SEMICONDUCTOR), CIRCUITS, ELECTRONIC SWITCHES, ULTRAHIGH FREQUENCY, TEMPERATURE, BONDING, OXIDES (U)
IDENTIFIERS: THIN FILMS, THIN FILMS ELECTRONICS (U)

RESEARCH CONCERNS STUDIES AND INVESTIGATIONS RELATED TO TRANSISTORS AND TRANSISTOR-LIKE DEVICES, WITH A VIEW TOWARD DEMONSTRATING AND INCREASING THE PRACTICABILITY OF THEIR USE IN OPERATING EQUIPMENT. WORK IS DISCUSSED ON A 6-GC GERMANIUM TRANSISTOR AND INTEGRATED CIRCUIT DEVICES. A COMPARISON IS MADE OF ELECTRICAL BREAKDOWN CHARACTERISTICS OF GERMANIUM DIODES MADE BY PLANAR TECHNIQUES AND BY MESA ETCHING. IT IS SHOWN THAT FOR THE PLANAR TYPE THE REVERSE CURRENT VOLTAGE CHARACTERISTIC WILL BE SOFTER THAN THAT OF A MESA DIODE FROM THE SAME MATERIAL AND THE BREAKDOWN VOLTAGE WILL BE LOWER. BREAKDOWN VOLTAGE IS CALCULATED FOR EPITAXIAL GERMANIUM AND SILICON STRUCTURES. IT IS SHOWN THAT WHEN THE CONDUCTIVITY OF THE SUBSTRATE AND THE DIFFUSED LAYER ARE BOTH MUCH GREATER THAN THAT OF THE EPITAXIAL LAYER, THEN FOR THIN LAYERS THE BREAKDOWN VOLTAGE DEPENDS ONLY ON THE THICKNESS BETWEEN THE DIFFUSED JUNCTION AND THE SUBSTRATE. FABRICATION TECHNIQUES AND PROBLEMS RELATED TO THE 6-GC TRANSISTOR ARE DISCUSSED. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOML6

AD-422 940
RAYTHEON CO LEWISTON MAINE

PRODUCTION ENGINEERING MEASURE ON SILICON ALLOY TRANSISTORS. (U)

DESCRIPTIVE NOTE: QUARTERLY REPT. NO. 3, 1 JAN-31 MAR 63,
MAR 63 28P JONES,R. W. ;
CONTRACT: DA36 039SC86744

UNCLASSIFIED REPORT

DESCRIPTORS: (*TRANSISTORS, PRODUCTION), (*MANUFACTURING METHODS, TRANSISTORS), RESISTANCE (ELECTRICAL), SILICON, RELIABILITY (ELECTRONICS), TIN, ALLOYS, FIXED CONTACTS, SOLDERING, CHEMICAL MILLING, FAILURE (MECHANICS), QUALITY CONTROL, CRYSTAL LATTICE DEFECTS, SOLDERING FLUXES (U)
IDENTIFIERS: 1963, JET ETCHING, VIBRATORY ETCHING, PASSIVATION (SEMICONDUCTOR) (U)

EFFORTS CONTINUED ON THE IMPROVEMENT OF PRODUCTION TECHNIQUES TO INCREASE THE RELIABILITY OF SILICON TRANSISTORS. FURTHER CONTROL OF CHIP DIMENSIONS WAS ACHIEVED. THE BULK MATERIAL PARAMETERS OF RESITIVITY AND DISLOCATION DENSITY WERE STUDIED. METALLOGRAPHIC ANALYSIS OF ALLOYING LED TO FIRING JIG REDESIGN. THE EFFECTS OF TIN, DISLOCATION DENSITY, AND CHIP THICKNESS ON ALLOYING WERE DETERMINED. AN IMPROVED EMITTER WHISKER WAS INTRODUCED. HIGH TEMPERATURE SOLDER WAS INTRODUCED WITH PARTIAL FLUX ELIMINATION. A NEW APPROACH TO MORE EFFICIENT ETCHING WAS EXPLORED. STEP-STRESS EQUIPMENT IS UNDER CONSTRUCTION. FORMAL FAILURE MODE ANALYSIS IS INITIATED. OPERATION STANDARDS, DRAWINGS, AND QUALITY INSPECTION PROCEDURES WERE ISSUED AND WORK ON THE INSPECTION AND QUALITY CONTROL PLAN WAS INITAIATED. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZDHL6

AD-423 325
GENERAL ELECTRIC CO IRMO S C

SOLID ELECTROLYTE TANTALUM FOIL CAPACITOR. (U)

DESCRIPTIVE NOTE: QUARTERLY RESEARCH AND DEVELOPMENT REPT. 1 JULY27 SEP 63.
SEP 63 27P JENNY,A. L. ;
CONTRACT: NOBSR89386
PROJ: SRU080303
TASK: 9636

UNCLASSIFIED REPORT

DESCRIPTORS: (*TANTALUM CAPACITORS, FOILS), ELECTROLYTES, SOLIDS, PHOSPHORIC ACIDS, CLEANING, MANGANESE COMPOUNDS, OXIDES, SEMICONDUCTORS, ELECTRODEPOSITION, AGING (MATERIALS), CATHODES, CHEMICAL MILLING (U)
IDENTIFIERS: 1963, ETCHING (U)

EXPERIMENTAL WORK HAS SHOWN THAT UNDER CERTAIN CONDITIONS PERMANENT DAMAGE TO THE ANODIC OXIDE CAN BE MADE DURING THE PROCESS OF DEPOSITING THE MANGANESE OXIDE. FROM THE VIEWPOINT OF THE SOLID FOIL TANTALUM CAPACITOR, THE RESULTS SUGGEST THAT A MINIMUM NUMBER OF DEPOSITION CYCLES MUST BE USED WITH CAREFUL CONTROL OF THE SOLUTION CONCENTRATION. THE BREAKDOWN VOLTAGE TESTS CONFIRM THAT THE TYPE OF TANTALUM FOIL, IN PARTICULAR, THE SURFACE CONDITION, HAS A CONTROLLING EFFECT ON SUBSEQUENT HIGH VOLTAGE PERFORMANCE. THE FORMATION CONDITIONS, FORMATION VOLTAGE, NUMBER OF COATS OF MANGANESE DIOXIDE, AREA OF DEPOSIT AND TIME AT DECOMPOSITION TEMPERATURE ARE ALSO VERY IMPORTANT IN CONTROLLING THE BREAKDOWN VOLTAGE. FOR THE 250 VOLT SOLID FOIL CAPACITOR APPLICATION, IT IS SOMEWHAT DISTURBING TO NOTE THAT THE BEHAVIOR OF THE TA2O5/MNOX INTERFACE APPEARS TO CHANGE FOR THICKNESS GREATER THAN THE EQUIVALENT OF 200 VOLTS FORMATION. MORE WORK IS NECESSARY TO DETERMINE WHETHER THE POORER PERFORMANCE AT THE HIGHER VOLTAGES IS DUE TO SOME BASIC PHYSICAL PHENOMENA OR DUE TO UNSUITABLE TANTALUM FOIL AND PROCESSING CONDITIONS WHICH ARE NOT THE OPTIMUM. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOML6

AD-423 367
NAVAL ORDNANCE LAB WHITE OAK MD

POLISHES AND ETCHES FOR TIN TELLURIDE, LEAD SULFIDE, LEAD SELENIDE, AND LEAD TELLURIDE, (U)

MAY 63 27P NORR,MARRINER K. :
REPT. NO. NOLTR-63-156

UNCLASSIFIED REPORT

DESCRIPTORS: (*CHEMICAL MILLING, CRYSTALS), (*ELECTROLYTIC POLISHING, CRYSTALS), (*CRYSTALS, PRECISION FINISHING), SELENIDES, SULFIDES, TELLURIDES, LEAD COMPOUNDS, TIN COMPOUNDS, ETCHED CRYSTALS, CASTINGS, CRYSTAL LATTICE DEFECTS, SOLUTIONS, REVIEWS, SELENIUM ALLOYS, TELLURIUM ALLOYS, LEAD ALLOYS, TIN ALLOYS (U)
IDENTIFIERS: 1963, ETCHES, POLISHES (U)

A REVIEW IS GIVEN OF CHEMICAL AND ELECTROLYTIC POLISHES AND DISLOCATION ETCHES FOR SNTE, PBS, PBSE, AND PBTE, COVERING THE PERIOD FROM 1907 TO 1962. RECIPES, CONDITIONS, AND RESULTS ARE DESCRIBED. SATISFACTORY POLISHES FOR ALL COMPOUNDS EXCEPT PBS AND ETCHES FOR ALL EXCEPT SNTE ARE INCLUDED. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZONL6

AD-423 388
GENERAL DYNAMICS/FORT WORTH TEX

DEVELOPMENT OF CHEMICAL MILLED WAFFLE GRID BERYLLIUM STRUCTURAL PANEL, (U)

NOV 63 31P ROGERS,C. W. ;FEHRLE,A. C. ; LOVE,T. S. ;
REPT. NO. ERR FW135
CONTRACT: AF33 657 11214

UNCLASSIFIED REPORT

DESCRIPTORS: (*BERYLLIUM, METAL PLATES), (*METAL PLATES, CHEMICAL MILLING), MATERIAL REMOVAL, TENSILE PROPERTIES, STRESSES, STRAIN (MECHANICS), COMPRESSIVE PROPERTIES, STRUCTURAL PROPERTIES, ELASTICITY, SHEAR STRESSES, STRUCTURAL PARTS, AEROSPACE CRAFT (U)
IDENTIFIERS: 1963 (U)

THIS REPORT CONCERNS THE RESEARCH AND DEVELOPMENT OF AN AEROSPACE STRUCTURAL PANEL MADE FROM QMV BERYLLIUM HOT-ROLLED PLATE. THE PROGRAM WAS A JOINT EFFORT OF THREE COMPANIES. THE BRUSH BERYLLIUM COMPANY MANUFACTURED THE BERYLLIUM PLATE. THE UNITED STATES CHEMICAL MILLING CORPORATION MILLED THE INTEGRALLY STIFFENED STRUCTURAL PANEL TO THE DESIGN SPECIFICATION ESTABLISHED BY THE GENERAL DYNAMICS CORPORATION/ FORT WORTH. GENERAL DYNAMICS CORPORATION/FORT WORTH CONDUCTED THE FINAL STRUCTURAL TESTS ON THE FINISHED PANEL. RESULTS OF THIS PROGRAM CONFIRM THE ABILITY OF TODAYS TECHNOLOGY TO PRODUCE A SATISFACTORY STRUCTURAL PANEL MADE FROM BERYLLIUM. THE MOST CRITICAL PROBLEM ENCOUNTERED WAS THE VARIATION OF APPARENT MODULUS OF ELASTICITY. STATIC STRENGTH WAS FOUND TO VARY EXCESSIVELY WITH SURFACE FINISH. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOML6

AD-425 102
MCDONNELL AIRCRAFT CORP ST LOUIS MO

CHEMICAL MILLING OF NARROW CLOSE TOLERANCE SLOTS IN ALUMINUM AND STAINLESS STEEL. (U)

DESCRIPTIVE NOTE: FINAL REPT.,
DEC 63 22P WEEKS,ROBERT F. ;MALAKELIS, ELIAS ;
REPT. NO. A239
CONTRACT: AF33 657 11215

UNCLASSIFIED REPORT

DESCRIPTORS: (*STAINLESS STEEL, CHEMICAL MILLING), (*ALUMINUM, CHEMICAL MILLING), (*CHEMICAL MILLING, FLUIDS), PANELS (STRUCTURAL), MATERIAL REMOVAL, VARNISHES, PHOTOSENSITIVITY, METALLOGRAPHY, SOLUTIONS, PHOTOMICROGRAPHY (U)
IDENTIFIERS: 7178-T6 ALUMINUM, 321 STAINLESS STEEL, ETCHANTS, MASKANTS, 1963 (U)

FIVE TYPES OF MASKANTS AND THREE ETCHANT SOLUTIONS WERE EVALUATED FOR THE PURPOSE OF PRODUCING PRECISION SLOTS IN STAINLESS STEEL AND ALUMINUM. THE SCREEN PRINTING MASKANTS TESTED WERE NELCO SILK SCREEN STOP-OFF LACQUER R-5018 AND MEAKER STOP-OFF LACQUER. THE PHOTOSENSITIVE MASKANTS TESTED WERE KODAK PHOTO RESIST, KODAK METAL ETCH RESIST, AND KODAK PHOTO LACQUER. COMBINATIONS OF THE DIFFERENT PHOTOSENSITIVE MASKANTS WERE ALSO TESTED. THE 321 STAINLESS STEEL PANELS WERE MILLED WITH STEEL CHEM-MILL ETCHANTS PER PS 20022.2 AND THE 7178-T6 ALUMINUM PANELS WERE MILLED WITH EITHER HCL SOLUTION OR AN ALKALINE ETCHANT SOLUTION PER PS 20023. THE HYDROGEN ION NORMALITY WAS KEPT WITHIN A SPECIFIED NORMALITY RANGE DURING THE STEEL CHEM-MILLING. THE CUTTING RATE OF THE ETCHANT SOLUTION VARRIED DEPENDING ON THE HYDROGEN ION CONCENTRATION, THE SPRAYING CONDITIONS, AND THE MASKANT CONFIGURATION. THE ONLY SUITABLE MASKANT TESTED ON STEEL WAS KODAK PHOTO RESIST OVER KODAK METAL ETCH RESIST. THE MEAKER AND NELCO MASKANTS WERE TESTED FOR CHEM-MILLING ALUMINUM. BOTH MASKANTS WERE SUITABLE FOR MILLING THE LARGER SLOT WIDTHS. THE CUTTING RATE VARIED DEPENDING ON ETCHANT SOLUTION AND MASKANT CONFIGURATION. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOML6

AD-426 356
CRYSTALONICS INC CAMBRIDGE MASS

PRODUCTION ENGINEERING MEASURE TO IMPROVE PRODUCTION TECHNIQUES AND TO INSURE THE RELIABILITY OF THE C600 SERIES FIELD EFFECT TRANSISTORS. (U)

DESCRIPTIVE NOTE: QUARTERLY REPT. NO. 1, 1 JULY-30 SEP 63,
SEP 63 41P WILLIAMS,JOHN R. ;
CONTRACT: DA36 039AMC01483E

UNCLASSIFIED REPORT

DESCRIPTORS: (•TRANSISTORS, PRODUCTION), SILICON, DIFFUSION, POSITIONING DEVICES (MACHINERY), BONDING, ULTRASONIC RADIATION, CHEMICAL MILLING, OXIDATION, BORON, RELIABILITY (ELECTRONICS) (U)
IDENTIFIERS: 163., FIELD EFFECT TRANSISTORS (U)

IMPROVEMENTS WERE MADE IN THE DIFFUSION EQUIPMENT AND TECHNIQUE. BULK-DIFFUSION WAS STUDIED AND GRAPHS PRESENTED OF DIFFUSION DISTANCE VERSUS TIME. STUDIES WERE ALSO MADE OF THE DIODE CHARACTERISTICS AS A FUNCTION OF DIFFUSION CONDITION. ULTRASONIC BONDING - AN ULTRASONIC BONDER WAS PURCHASED AND INSTALLED. PRELIMINARY EVALUATION OF USB DEVICES WERE MADE. MASKS AND ALIGNMENT SYSTEMS - A NEW MASK ALIGNMENT SYSTEM WAS PURCHASED AND INSTALLED. MASKS WERE ORDERED FOR INTERNAL SHORTING OF THE DEVICE. ETCHING FIXTURE - SEVERAL PROTOTYPE DESIGNS WERE FABRICATED AND EVALUATED. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOML6

AD-426 932
ARMY MISSILE COMMAND REDSTONE ARSENAL ALA ARMY INERTIAL GUIDANCE AND CONTROL LAB AND CENTER

MISSILE-BORNE TRACKING ANTENNA. (U)

DESCRIPTIVE NOTE: FINAL PROGRESS REPT. FOR 1963,
JUL 63 52P HOWELL,JAMES E.;
REPT. NO. RG-TR-63-20

UNCLASSIFIED REPORT

DESCRIPTORS: (•GUIDED MISSILE ANTENNAS, ELECTRONIC SCANNERS), PHASE MEASUREMENT, POLARIZATION, AUTOMATIC, TRACKING, ANTENNA FEEDS, IMPEDANCE MATCHING, COAXIAL CABLES, ANTENNA CONFIGURATIONS, ANTENNA LOBES, SUPERHIGH FREQUENCY, HELICAL ANTENNAS, SPIRAL ANTENNAS, PRINTED CIRCUITS, CHEMICAL MILLING, CAVITY RESONATORS, GRAIN, PHASE SHIFTERS, ANTENNA RADIATION PATTERNS. (U)
IDENTIFIERS: 1963, LOGARITHMIC SPIRAL ANTENNA, BALUN. (U)

THE DEVELOPMENT OF ELECTRONICALLY STEERABLE, AUTOMATICALLY SELF-DIRECTING, MISSILE-BORNE ANTENNAS IS DESCRIBED. THE LITERATURE WAS SEARCHED AND A PRELIMINARY STUDY WAS MADE ON THE USE OF CIRCULARLY POLARIZED ANTENNAS FOR PRODUCING THE NECESSARY PHASE SHIFTS REQUIRED IN THE LOBING OF ANTENNA ARRAYS. HELICAL ANTENNAS WERE USED FIRST IN TESTS AROUND 5,000 MC IN AN EFFORT TO DETERMINE THE PHASING CHARACTERISTICS AND FEASIBILITY OF CIRCULARLY POLARIZED ANTENNAS. NEXT, A CAVITY-BACKED ARCHIMEDEAN SPIRAL ANTENNA AND BALUN WERE DESIGNED AND FABRICATED FOR 5,000 MC OPERATION. A LOGARITHMIC SPIRAL ANTENNA WAS ALSO DESIGNED AND FABRICATED FOR USE IN THE DEVELOPMENTAL ANTENNA TESTS. THE SPIRAL ANTENNAS WERE FABRICATED FROM COPPER CLAD BOARD BY PRINTED CIRCUIT ETCHING TECHNIQUES. SOME OF THE PROBLEMS ENCOUNTERED DURING LABORATORY TESTS WERE BALUN UNBALANCE, RADIATION FROM THE BALUN AND THE DETRIMENTAL EFFECTS OF THE REFLECTED WAVE WHEN USING CAVITIES. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOML6

AD-431 602
MCDONNELL AIRCRAFT CORP ST LOUIS MO

ELECTROCHEMICAL DEBURRING OF MOLYBDENUM, ALUMINUM AND STAINLESS STEEL. (U)

DESCRIPTIVE NOTE: FINAL REPT.,
MAR 64 54P WOLF, JAMES E. ;
REPT. NO. A478
CONTRACT: AF33 657 11215

UNCLASSIFIED REPORT

DESCRIPTORS: (*METALS, MATERIAL REMOVAL), (*MATERIAL REMOVAL, ELECTROCHEMISTRY), CHEMICAL MILLING, ELECTROLYTIC POLISHING, MOLYBDENUM, ALUMINUM ALLOYS, STAINLESS STEEL, SOLUTIONS, ALCOHOLS, CHROMIC ACIDS, NITRIC ACID, SULFURIC ACID, FLUORINE COMPOUNDS, ACIDS(U)

SHARP EDGES LEFT AFTER CHEMICAL MILLING AND BLANKING ARE PRESENTLY BEING MECHANICALLY REMOVED AT HIGH COST. THE SHARP EDGES WOULD BE AREAS OF HIGH CURRENT DENSITY IN ELECTROCHEMICAL OPERATIONS AND COULD BE EASILY REMOVED IN ELECTROCHEMICA L SOLUTIONS. THE CRITERIA OF A GOOD ELECTROCHEMICAL DEBURRING SOLUTION WERE LEVELING CHARACTERISTICS AND REMOVAL RATE. VARIOUS SOLUTIONS WERE EVALUATED FOR BREAKING SHARP EDGES ON MOLYBDENUM, AMONG THEM BEING 25% BY WEIGHT NITRIC ACID, NITRIC-HYDROFLUORIC ACID SOLUTION FOR MILLING MOLYBDENUM AND VARIATIONS OF TURCO 105 STEEL ETCHANT. THESE SOLUTIONS WERE SUCCESSFUL IN A LEVELING ACTION ON SHARP BURRS, BUT WOULD NOT ROUND THE SIDE EDGES. A COMBINATION OF NITRIC ACID LEVELING AND SIDE EDGE BURNISHING PRODUCED THE MOST PROMISING RESULTS. ALUMINUM AND STAINLESS STEEL DEBURRING WAS EVALUATED IN PROPRIETARY SOLUTIONS, WITH GOOD RESULTS OBTAINED IN POLISHING AND BREAKING OF SHARP EDGES. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOML6

AD-431 617
MCDONNELL AIRCRAFT CORP ST LOUIS MO

DETERMINATION OF MECHANICAL PROPERTIES AND SURFACE CONDITION OF CHEM-MILLED CB-5ZR COLUMBIUM ALLOY SAMPLES. (U)

MAR 64 7P JACOBUS,H. ;
REPT. NO. A473
CONTRACT: AF33 657 11215

UNCLASSIFIED REPORT

DESCRIPTORS: (*NIOBIUM ALLOYS, MECHANICAL PROPERTIES), (*MECHANICAL PROPERTIES, NIOBIUM ALLOYS), SURFACE PROPERTIES, CHEMICAL MILLING, TENSILE PROPERTIES, ZIRCONIUM ALLOYS, EXPERIMENTAL DATA, METALLOGRAPHY (U)
IDENTIFIERS: 1964, CB-5ZR NIOBIUM ALLOY (U)

MECHANICAL PROPERTIES AND SURFACE CONDITION OF CHEMICALLY MILLED SPECIMENS OF CB-5ZR NIOBIUM ALLOY.

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOML6

AD-433 118
LOCKHEED MISSILES AND SPACE CO SUNNYVALE CALIF

PACKAGING MINIATURIZATION, CHARGE NUMBERS 31-8027-D201-01, 31-8027-0901 AND RES 2 AND 4, (U)

SEP 61 137P ABE,SHIRO ;CHURCHON,STUART ; NEWMAN,H. L. ;
REPT. NO. R5832 3 80 61 41

UNCLASSIFIED REPORT

DESCRIPTORS: (*MODULES (ELECTRONIC), MANUFACTURING METHODS), (*MANUFACTURING METHODS, MODULES (ELECTRONIC)), (*SWITCHING CIRCUITS, MODULES (ELECTRONIC)), AMPLIFIERS, POWER, ENCAPSULATION, TRANSISTORS, PRODUCTION, RESISTORS, CAPACITORS, WELDING, CHEMICAL MILLING, MINIATURE ELECTRONIC EQUIPMENT, PACKAGED CIRCUITS, TABLES, ELECTRICAL PROPERTIES, PERFORMANCE (ENGINEERING), DIODES (SEMICONDUCTOR), ELECTRIC TERMINALS, SOLDERING, WIRING DIAGRAMS, PRINTED CIRCUITS, TEMPERATURE, CONFIGURATION, RELIABILITY (ELECTRONICS) (U)
IDENTIFIERS: 1961 (U)

HIGH POWER AMPLIFIER PARA-PLATE MODULES WERE BUILT AND FUNCTIONALLY TESTED. A FEW PROTOTYPE MODULES USING WELD PACK AND CHEM-MILL TECHNIQUES WERE CONSTRUCTED. SOME PROTOTYPE PARA-PLATE LOW POWER FLIP FLOPS WERE ASSEMBLED BUT NOT EVALUATED. SEVERAL OTHER VERSIONS OF THE LOW POWER FLIP FLOP WERE INVESTIGATED. THIS REPORT DESCRIBES THE DESIGN WORK AND INCLUDES ILLUSTRATIONS AND TABLES PLUS PRELIMINARY TEST RESULTS, LAYOUT ARTWORK, DRAWINGS, ENCAPSULATION TECHNIQUES, CONCLUSIONS AND RECOMMENDATIONS. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOML6

AD-433 891
XEROX CORP ROCHESTER N Y

LOW-COST MICROCIRCUITS FOR MICROASSEMBLIES. (U)

DESCRIPTIVE NOTE: QUARTERLY REPT. NO. 2, 1 OCT 63-1 JAN 64,
JAN 64 55P MYTYCH,C. ;
CONTRACT: DA36 039AMC03257E

UNCLASSIFIED REPORT

DESCRIPTORS: (*MICROMINIATURIZATION (ELECTRONICS), MANUFACTURING METHODS), (*FIXED RESISTORS, MICROMINIATURIZATION (ELECTRONICS)), (*FIXED CAPACITORS, MICROMINIATURIZATION (ELECTRONICS)), PHOTO ENGRAVING, VAPOR PLATING, VACUUM APPARATUS, ENVIRONMENTAL TESTS, PRINTED CIRCUITS, MODULES (ELECTRONIC), METAL COATINGS, COPPER, CHROMIUM, CHEMICAL MILLING, METAL FILMS (U)
IDENTIFIERS: 1964, DOUBLE-ETCH PROCESS, MULTILAYERED FILMS (U)

AN APPROACH TO LOW-COST RESISTOR AND CAPACITOR ELEMENTS UTILIZING THE MICROELEMENT WAFER CONCEPT AND THE DOUBLE-ETCH PROCESS IS UNDER INVESTIGATION. MULTI-LAYERED FILMS WERE PLACED ON CERAMIC SUBSTRATES BY VACUMM AND ELECTROLESS DEPOSITION TECHNIQUES TO FORM MICROELEMENT WAFERS. THE MULTI-LAYERED FILMS ARE CONVERTED TO RESISTOR AND CAPACITOR ELEMENTS BY SUBTRACTIVE METHODS, UTILIZING XEROGRAPHIC STENCILING AND SELECTIVE ETCHING. DATA COVERING T.C.R., TEMPERATURE CYCLING, LOAD LIFE STABILITY AND YIELD FOR RESISTOR ELEMENTS IS PRESENTED. THE CAPACITOR AND MICROMODULE ASSEMBLY PROGRAMS ARE OUTLINED. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOML6

AD-438 138
GENERAL DYNAMICS/FORT WORTH TEX

MATERIAL BERYLLIUM WAFFLE PANEL. CHEMICAL MILLED, SHEAR TEST OF. (U)

APR 64 13P MAY,J. ;
REPT. NO. FTDM 3068

UNCLASSIFIED REPORT

DESCRIPTORS: (*BERYLLIUM, PANELS (STRUCTURAL)), (*PANELS (STRUCTURAL), BERYLLIUM), CHEMICAL MILLING, SHEAR STRESSES, LOADING (MECHANICS), STRAIN (MECHANICS) (U)

SHEAR TEST OF CHEMICAL MILLED BERYLLIUM WAFFLE PANEL.

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOML6

AD-438 478
NAVAL AIR ENGINEERING CENTER PHILADELPHIA PA AERONAUTICAL MATERIALS LAB

STUDY OF SIZE EFFECT IN FINE BERYLLIUM WIRE PHASE II, (U)

MAR 64 2P SOLTIS,PAUL ;
REPT. NO. NAEC-AML-1909

UNCLASSIFIED REPORT

DESCRIPTORS: (*BERYLLIUM, WIRE), (*METALLIC TEXTILES, BERYLLIUM), FIBERS, TENSILE PROPERTIES, CHEMICAL MILLING, TEST EQUIPMENT, HARDNESS, GRAIN STRUCTURES (METALLURGY), PHOTOMICROGRAPHY, FRACTURE (MECHANICS), DUCTILITY, SCALE (U)

THE 0.0046-IN. DIAMETER, AS-DRAWN, BERYLLIUM WIRE CAN BE CHEMICAL-MILLED TO SIZES NEAR 0.0010IN. DIAMETER WHICH SHOW DIMENSIONAL UNIFORMITY AND GOOD SURFACE QUALITY. A CONTINUOUS TREND TOWARD HIGHER STRENGTH WITH DECREASING DIAMETER OF THE WIRE WAS NOTED, AND IT APPEARS POSSIBLE THAT ULTRAFINE WIRE WITH STRENGTH APPROACHING THE 200,000 PSI LEVEL CAN BE PRODUCED WITH CONSISTENCY. A GOOD DEGREE OF DUCTILITY WAS NOTED IN WIRE CHEMICAL-MILLED BELOW 0.0025-IN. DIAMETER AS EVIDENT IN NECKING OF SPECIMENS; ALTHOUGH, THIS DUCTILITY DID NOT APPEAR IN TENSILE ELONGATION VALUES. FRACTURE STRENGTHS IN WIRE SHOWING DUCTILE FRACTURES REACHED VALUES NEAR 220,000 PSI. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOML6

AD-450 549
BIGNETICS CORP SUNNYVALE CALIF

AN ECONOMICAL FLAT PACKAGE FOR INTEGRATED CIRCUITS. (U)

DESCRIPTIVE NOTE: INTERIM DEVELOPMENT REPT. NO. 1, 15 JUNE15 SEP 64.
SEP 64 22P
CONTRACT: NOBSR91298

UNCLASSIFIED REPORT

DESCRIPTORS: (*PACKAGING, INTEGRATED CIRCUITS), (*INTEGRATED CIRCUITS, PACKAGING), CIRCUIT INTERCONNECTIONS, METAL FILMS, CHEMICAL MILLING, ELECTROPLATIG, PRODUCTION, MANUFACTURING METHODS, SILICON, ALUMINUM (U)

THE SCHEDULE FOR MAKING THE FIRST SEAL OF THE METAL LEADS TO THE PACKAGE SUBSTRATE IS COMPLETE. BY A PROCESS OF ELECTROPLATING AND ETCHING METAL FILM INTERCONNECTIONS HAVE BEEN LAID DOWN, BUT MANY PROBLEMS REMAIN IN THIS AREA. A FEW CIRCUITS WERE ASSEMBLED ON THIS SUBSTRATE AND WHERE ALL PREVIOUS STEPS WERE SATISFACTORY, ELECTRICAL CONTINUITY HAS BEEN ESTABLISHED. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOML6

AD-453 855
HONEYWELL RESEARCH CENTER HOPKINS MINN

THIN FILM IMAGE CONVERTER. (U)

DESCRIPTIVE NOTE: INTERIM TECHNICAL PROGRESS REPT. NO. 6, 24 JUL-23 OCT 64,
NOV 64 IV KRUSE,PAUL W. ;PRIBBLE, FRED C. ;SCHULZE,RICHARD G. ;
CONTRACT: DA44 009AMC168T
PROJ: 8F23 11 001 07

UNCLASSIFIED REPORT

DESCRIPTORS: (•SEMICONDUCTING FILMS, INFRARED IMAGES), (•INFRARED IMAGES, SEMICONDUCTING FILMS), EPITAXIAL GROWTH, THICKNESS, GALLIUM ALLOYS, ARSENIC ALLOYS, GERMANIUM, ELECTRICAL PROPERTIES, CHEMICAL MILLING, DIFFUSION, PROCESSING, FIXED CONTACTS, RESISTANCE (ELECTRICAL), PHOSPHORUS ALLOYS, METAL COATINGS, GOLD, SILVER, NICKEL, DIODES (SEMICONDUCTOR) (U)
IDENTIFIERS: IMAGE CONVERTERS, ETCHING, THICK FILMS (U)

EFFORTS WERE CONTINUED ON A PROGRAM TO CONDUCT FUNDAMENTAL STUDIES OF NEW APPROACHES TO IMAGE CONVERSION. THE EMPHASIS HAS BEEN UPON EVALUATION OF A CONCEPT OF A SOLID STATE THIN FILM IMAGE CONVERTER (TFIC). INVESTIGATIONS OF THE EPITAXIAL GROWTH OF N-GAAS ON P-GE HAVE MADE IT POSSIBLE TO PREPARE 200 MICRON THICK LAYERS OF SINGLE CRYSTAL GAAS ON GE. AN EVALUATION OF THE ELECTRICAL PROPERTIES OF SAMPLES ETCHED TO A MESA CONFIGURATION, TOGETHER WITH CHEMICAL STAINING STUDIES OF ANGLE LAPPED SAMPLES, REVEAL THAT AN N-GE LAYER IS FORMED BETWEEN THE N-GAAS AND P-GE REGIONS DURING THE INITIAL STAGES OF GROWTH. THE MOST PROBABLE DONOR IS AS, DIFFUSED FROM THE VAPOR INTO THE GE. METHODS FOR PREPARING STRONG, OHMIC, LOW RESISTANCE CONTACTS TO N-GAAS, P-GAAS, N-GAP, AND P-GAP HAVE BEEN DEVISED UTILIZING ULTRASONIC SOLDERING. THE BEST TECHNIQUES ARE SUMMARIZED. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOML6

AD-460 378
JOHNS HOPKINS UNIV SILVER SPRING MD APPLIED PHYSICS LAB

THE MINISTICK PROCESS FOR PACKAGING INTEGRATED CIRCUIT FLAT PACKS. (U)

DESCRIPTIVE NOTE: TECHNICAL MEMO.,
APR 65 39P NOYES,CARLTON F. ;
REPT. NO. TG-675
CONTRACT: NOW62 0604C

UNCLASSIFIED REPORT

DESCRIPTORS: (*INTEGRATED CIRCUITS, PACKAGING), (*PRINTED CIRCUITS, PACKAGING), PROCESSING, MANUFACTURING METHODS, TEMPLATES, CHEMICAL MILLING, GLASS TEXTILES, EPOXY PLASTICS, LAMINATED PLASTICS, BONDING, DIELECTRICS, MODULES(ELECTRONIC), WELDING (U)
IDENTIFIERS: MINISTICK PROCESS, SUBSTRATES (U)

THE MINISTICK PROCESS FOR FABRICATING FLAT-PACK TYPE MULTILAYER CIRCUITRY BOARDS HAS BEEN DEVELOPED BECAUSE OF THE NEED FOR SPACE CIRCUITRY THAT MEETS EASE OF DESIGN AND MANUFACTURE REQUIREMENTS. STARTING WITH A CIRCUIT DESIGN IN THE FORM OF A LOGIC DIAGRAM, THE DESIGN PHASE PROGRESSES TO THE FINAL ARTWORK TEMPLATE. THIS TEMPLATE, PHOTO REDUCED, IS THE BASIC TOOL IN THE FABRICATION OF THE ASSEMBLY FRAMES. THE CIRCUIT OF EACH LAYER OF AN ASSEMBLY FRAME IS PRODUCED BY CHEMICALLY MILLING SUBSTRATES WHICH HAVE BEEN SENSITIZED WITH THE DESIRED CIRCUIT BY USE OF THE FINAL ARTWORK TEMPLATE. THESE SUBSTRATES ARE MADE BY LAMINATING AN EPOXY GLASS CLOTH DIELECTRIC MATERIAL TO A KOVAR SHEET. INDIVIDUAL CIRCUIT LAYERS ARE THEN COMBINED TO FORM AN ASSEMBLY FRAME, AND INTEGRATED CIRCUIT MODULES ARE WELDED TO THE FRAME TO COMPLETE THE CIRCUITRY. WHEN MORE THAN ONE ASSEMBLY FRAME IS REQUIRED TO COMPLETE THE CIRCUITRY, THE FRAMES ARE ELECTRICALLY CONNECTED BY MEANS OF A MOTHER BOARD. ALTHOUGH MULTILAYER CIRCUIT BOARDS ARE USED IN THIS PROCEDURE, NO INTERLAYER CONNECTIONS ARE REQUIRED. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOML6

AD-485 297 13/8 11/6
AIR FORCE MACHINABILITY DATA CENTER CINCINNATI OHIO

MACHINING DATA FOR BERYLLIUM METAL. (U)

JUN 66 22P SNIDER ,ROBERT E. ;KAHLES, JOHN F. ;

REPT. NO. AFMDC-66-3
CONTRACT: AF 33(615)-5262
PROJ: AF-9-700

UNCLASSIFIED REPORT

DESCRIPTORS: (*BERYLLIUM ALLOYS, *MACHINING), (*BERYLLIUM, MACHINING), TOXICITY, CRYSTAL LATTICE DEFECTS, TWINNING(CRYSTALLOGRAPHY), FRACTURE(MECHANICS), CHEMICAL MILLING, MATERIAL REMOVAL, TENSILE PROPERTIES, HARDNESS, CARBIDES, MECHANICAL PROPERTIES, MICROSTRUCTURE (U)

THIS REPORT CONTAINS EVALUATED MACHINING INFORMATION FOR BERYLLIUM WHICH HAS BEEN EXTRACTED FROM MANY SOURCES. MACHINING DATA ARE TABULATED AND PRESENTED IN CHART FORM FOR THE FOLLOWING PROCESSES: TURNING, MILLING, DRILLING, BAND SAWING, GRINDING, BORING, TREPANNING, REAMING, ROUTING, TAPPING, ELECTRICAL DISCHARGE MACHINING, ELECTROCHEMICAL MACHINING, AND CHEMICAL MACHINING. ALSO INCLUDED IS A GENERAL COMMENT SECTION DEALING WITH THE PROBLEMS ASSOCIATED WITH BERYLLIUM MACHINING, SUCH AS TWINNING, MICROCRACKING, TOXICITY, CHIPOUT AND SPALLING, AND CUTTING FLUIDS. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOML6

AD-603 660
MOTOROLA INC PHOENIX ARIZ

PRODUCTION ENGINEERING MEASURE. HIGH SPEED SEMICONDUCTOR SWITCH (TWO TERMINAL) HIGH SPEED SEMICONDUCTOR SWITCH (GATE). (U)

DESCRIPTIVE NOTE: QUARTERLY REPT. NO. 4, 29 FEB-28 MAY 64,
MAY 64 32P BURLINGAME,B. G. ;
CONTRACT: DA36 039AMC01475E

UNCLASSIFIED REPORT

DESCRIPTORS: (*ELECTRONIC SWITCHES, SEMICONDUCTOR DEVICES), (*SEMICONDUCTOR DEVICES, MANUFACTURING METHODS), BONDING, ULTRASONIC RADIATION, ELECTRIC TERMINALS, DESIGN, PACKAGING, DIODES (SEMICONDUCTORS), DISKS, CHEMICAL MILLING, EPITAXIAL GROWTH, DIFFUSION, METAL COATINGS, ALLOYS, ELECTRICAL PROPERTIES, VAPOR PLATING, GOLD, BORON, ALUMINUM, PHOSPHORUS, TEST EQUIPMENT (ELECTRONICS) (U)

A PILOT PRODUCTION FACILITY CAPABLE OF PRODUCING HIGH SPEED SEMICONDUCTOR SWITCHES IN ACCORDANCE WITH SIGNAL CORPS TECHNICAL SPECIFICATIONS IS CONSIDERED. THE MAJOR PROBLEM AREAS TO BE OVERCOME IN ORDER TO ACHIEVE THE PURPOSE OF THIS PROGRAM ARE FORWARD BREAKOVER VOLTAGE AND CURRENT ON THE TWO-TERMINAL DEVICE, FORWARD BLOCKING CURRENT ON THE THREE-TERMINAL DEVICE, AND SWITCHING SPEEDS, CURRENT CARRYING CAPABILITIES, FORWARD ANODE VOLTAGE, AND RATE OF FORWARD VOLTAGE RISE ON BOTH DEVICES. WORK PERFORMED DURING THE PERIOD 29 FEBRUARY 1964 THROUGH 28 MAY 1964 IS COVERED. PACKAGE DESIGNS FOR BOTH DEVICES ARE DISCUSSED, AND PROGRESS MADE ON ASSEMBLY METHODS, GOLD DIFFUSION, EPITAXIAL, ALLOY, AND MOAT-ETCHING PROCEDURES IS REPORTED.
(AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOML6

AD-605 825
HARSHAW CHEMICAL CO CLEVELAND OHIO

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

DESCRIPTIVE NOTE: QUARTERLY TECHNICAL PROGRESS REPT. NO. 3, 26 MAY-25 AUG 64,
AUG 64 8P SCHAEFER,J. C. ;HUMRICK,R. J. ; BELT,R. F. ;
CONTRACT: AF33 615 1249
PROJ: 8173
TASK: 817301,817332

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: SEE ALSO AD-601 459.

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

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

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /Z0ML6

AD-606 191
SILICON TRANSISTOR CORP GARDEN CITY N Y

PRODUCTION ENGINEERING MEASURE TO INCREASE THE RELIABILITY OF THE TRANSISTOR TYPE 2N2034. (U)

DESCRIPTIVE NOTE: QUARTERLY PROGRESS REPT. NO. 4, 1 APR-30 JUN 64.
JUN 64 29P COCKING,J. ;COURIER,J. ;
DES ROCHES,F. ;HUGHES,D. ;MARTIN,E. ;
CONTRACT: DA36 039AMC01482E

UNCLASSIFIED REPORT

DESCRIPTORS: (*TRANSISTORS, RELIABILITY (ELECTRONICS)), PROCESSING, DISKS, SILICON, CLEANING, ABRASIVE BLASTING, SOLDERING, CHEMICAL MILLING, ENCAPSULATION, WELDING, HERMETIC SEALS, TESTS, CONTROLLED ATMOSPHERES, PERFORMANCE (ENGINEERING), NICKEL, PELLETS (U)

THE REPORT DESCRIBES THE PROCESSING DEVELOPMENTS IN WAFER CLEANING, MESA DELINEATION, SCRIBING OF WATER, PELLET TO NICKEL-PLATED HEADER SOLDERING, NICKEL-PLATED CLIP TO PELLET SOLDERING, FINAL ETCH OF SOLDERED UNIT, FINAL TEST AND ENCAPSULATION OF ETCHED UNITS, AND WELD AND HERMETIC SEAL TESTS FOR THE TRANSISTOR TYPE 2N2034. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOML6

AD-606 477
CRYSTALONICS INC CAMBRIDGE MASS

PRODUCTION ENGINEERING MEASURE TO IMPROVE PRODUCTION TECHNIQUES AND TO INSURE THE RELIABILITY OF THE C600 SERIES FIELD EFFECT TRANSISTORS. (U)

DESCRIPTIVE NOTE: QUARTERLY REPT. NO. 4, 1 APR-30 JUN 64.
JUN 64 40P WILLIAMS,JOHN R. ;
CONTRACT: DA36 039AMC01483E

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: LEGIBILITY OF THIS DOCUMENT IS IN PART UNSATISFACTORY. REPRODUCTION HAS BEEN MADE FROM BEST AVAILABLE COPY. SEE ALSO AD-601 433.

DESCRIPTORS: (*TRANSISTORS, MANUFACTURING METHODS), (*RELIABILITY (ELECTRONICS), TRANSISTORS), BONDING, DIES, CHEMICAL MILLING, VACUUM FURNACES, CONTROLLED ATMOSPHERES, ENCAPSULATION, INDUSTRIAL EQUIPMENT (U)

ULTRASONIC BONDING HAS BEEN DISCARDED IN PREFERENCE TO A NEW-METALLIZATION BALL-BONDING TECHNIQUE. ALL PRO DUCTION FETS ARE BEING DIE-TO-HEADER BONDED USING A HEAVY GOLD PLATE ON DICE AND HEADERS. A SLIGHT MODIFICATION HAS BEEN MADE IN THE MASK DESIGN TO FACILITATE BONDING. MESA ETCHING FIXTURES AND SLICE PREPARATION FIXTURES ARE COMPLETE AND ARE IN USE IN THE PRODUCTION PROCESS. VARIOUS EXPERIMENTS HAVE BEEN RUN UTILIZING VARIOUS DEW POINT AMBIENTS, COATING AGENTS, AND BAKEOUTS. AS A RESULT, PRODUCTION UNITS ARE BEING VACUUM BAKED AT 200C. AND PACKAGED IN A DRY NITROGEN ATMOSPHERE OF -60C. DEW POINT OR BETTER. LIFE TEST RACKS ARE BEING CONSTRUCTED. A MANUAL OF Q.C. PROCEDURES HAS BEEN PREPARED. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZDML6

AD-606 819
MARTIN CO DENVER COLO

MANUAL AND REPAIR WELDING OF CHEMICALLY MILLED 2014-T6 ALUMINUM SHEETING. (U)

AUG 57 27P AGRICOLA,K. R. ;
REPT. NO. WDD-M-MI-57-60

UNCLASSIFIED REPORT

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

DESCRIPTORS: (*ALUMINUM ALLOYS, WELDING), (*WELDING, ALUMINUM ALLOYS), SHEETS, CHEMICAL MILLING, WELDS, TENSILE PROPERTIES, HARDNESS, PANELS (STRUCTURAL), MAINTENANCE (U)
IDENTIFIERS: ALUMINUM ALLOY 2014-T6 (U)

A 2 INCH WIDE LAND 0.100 IN. THICK, WILL FULLY RETAIN THE WELD HEAT-AFFECTED ZONE OF REPAIRED WELDS (BASED ON HARDNESS DATA). PARENT METAL PROPERTIES ARE ONLY SLIGHTLY AFFECTED BY WELD HEAT ON REPAIRS OF 1.5 INCH LANDS. VALUES OF 59,000 PSI CAN BE EXPECTED WITH 90 PERCENT CONFIDENCE FOR REPAIRED 1.5 INCH LANDS. IF 95 AND 99 PERCENT CONFIDENCE IS REQUIRED, EXPECTED VALUES FOR REPAIRED 1.5 INCH LANDS ARE 57,300 AND 55,400 PSI. IF LAND WIDTHS OF 1.625 INCHES AND ABOVE ARE USED, PARENT METAL STRENGTH CAN BE EXPECTED FOR MANUAL WELDS FOLLOWED BY REPAIR WELDS. (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOML6

AD-607 426
WESTINGHOUSE DEFENSE AND SPACE CENTER BALTIMORE MD

FAILURE MECHANISMS IN MICROELECTRONICS. (U)

DESCRIPTIVE NOTE: FINAL REPT.
AUG 64 100P
REPT. NO. WDSC-385A4
CONTRACT: AF30 602 3017
PROJ: 5519
TASK: 551906
MONITOR: RADC , TDR64 252

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

DESCRIPTORS: (*MICROMINIATURIZATION (ELECTRONICS), FAILURE (MECHANICS)), (*FAILURE (MECHANICS), MICROMINIATURIZATION (ELECTRONICS)), DIODES (*SEMICONDUCTOR), DISKS, TRANSISTOR AMPLIFIERS, SILICON COMPOUNDS, OXIDES, SURFACE PROPERTIES, ELECTRICAL PROPERTIES, CHEMICAL MILLING, STRESSES, ELECTRICAL CONDUCTANCE, ELECTRONIC EQUIPMENT, RELIABILITY (ELECTRONICS), SILICON (U)

INVESTIGATIONS WERE PERFORMED ON THREE TYPES OF MICROELECTRONIC DEVICES: MULTIPLE DIODE WAFERS, INVERSION LAYER DIODE AMPLIFIERS, AND VERSATILE LINEAR AMPLIFIERS. TWO FAILURE MECHANISMS WERE IDENTIFIED AND STUDIED IN DETAIL: UNSUSPECTED DIFFUSION BARRIERS FROM PHOTOETCH PROCEDURES, AND VARIATIONS IN PASSIVATION LAYER PROPERTIES. THE RELATIONSHIP TO THESE, OF CURRENT AMPLIFICATION (BETA), OR REVERSE VOLTAGE BREAKDOWN, OF LEAKAGE, AND OTHER QUANTITIES WAS EXAMINED. EACH STEP IN MICROELECTRONIC DEVICE FABRICATION WAS INVESTIGATED FOR ITS CONTRIBUTION TO FAILURE MECHANISMS. A PARTIALLY CONDUCTING REGION IN THE PASSIVATING OXIDE WAS IDENTIFIED AND STUDIED, 300 ±100 A FROM THE SILICON. THIS CONTRIBUTES TO THE LEAKAGE IN MICROELECTRONIC DEVICES USUALLY ATTRIBUTED ENTIRELY TO CHANNELS IN THE SILICON. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOML6

AD-609 349
BATTELLE MEMORIAL INST COLUMBUS OHIO DEFENSE METALS INFORMATION CENTER

A SURVEY OF THE COMPARATIVE COSTS OF FABRICATING AIRFRAME FROM ALUMINUM AND FROM TITANIUM. (U)

DESCRIPTIVE NOTE: TECHNICAL NOTE.
APR 64 20P

UNCLASSIFIED REPORT

DESCRIPTORS: (*TITANIUM ALLOYS, AIRFRAMES), (*AIRFRAMES, COSTS), (*ALUMINUM ALLOYS, AIRFRAMES), MATERIAL FORMING, SHEETS, MACHINING, WELDING, CHEMICAL MILLING, FORGING, HEAT TREATMENT, SUPERSONIC PLANES, TRANSPORT PLANES (U)

BY PROCESS, THE COST RATIOS FOR FABRICATING TITANIUM AND ALUMINUM ARE ABOUT AS FOLLOWS: SHEET FORMING 1.5-2 TO 1, MACHINING 1.5-2 TO 1, WELDING .8-2 TO 1, CHEMICAL MILLING 3-4 TO 1, ASSEMBLING 1.1 TO 1, FORGING 1.5-2.3 TO 1, HEAT TREATING 1.5-5 TO 1. THE CURRENT COST ESTIMATES MADE BY THE EXPERIENCED TITANIUM FABRICATORS REPRESENT REALISTIC MINIMUM COST RATIOS FOR THE NEXT 2 OR 3 YEARS. THEY ARE RATIOS WHICH THE LESS EXPERIENCED FABRICATORS SHOULD BE ABLE TO APPROACH IN ACTUAL PRODUCTION. THE EXPERIENCED FABRICATORS COULD PROBABLY NOT IMPROVE ON THEM GREATLY IN THE NEXT YEAR OR TWO. THE ABOVE COST RATIOS APPLY ONLY TO SPECIFIC FABRICATION OPERATIONS (SUCH AS FORMING, MACHINING, WELDING, ETC.). THESE OPERATIONS ACCOUNT FOR ONLY A FRACTION OF THE TOTAL COST OF MANUFACTURING AN AIRCRAFT. MOST OF THE MANUFACTURING COSTS NOT COVERED BY THESE OPERATIONS WOULD BE LARGELY UNAFFECTED BY THE CHOICE OF AIRFRAME MATERIAL. (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOML6

AD-610 434
FRANKLIN INST PHILADELPHIA PA LABS FOR RESEARCH AND DEVELOPMENT

RESEARCH IN THE GENERAL FIELD OF SUBSTRUCTURE AND DISLOCATION NETWORKS IN METALLIC CRYSTALS. (U)

DESCRIPTIVE NOTE: FINAL REPT. FOR 1 APR 60-30 APR 62,
APR 62 48P DAMIANO,V. V. ;TINT,G. S. ;
HERMAN,M. ;
REPT. NO. F-A2400
CONTRACT: AF49 638 821
MONITOR: AFOSR , 2574

UNCLASSIFIED REPORT

DESCRIPTORS: (•METALLIC CRYSTALS, CRYSTAL STRUCTURE), (•CRYSTAL STRUCTURE, METALLIC CRYSTALS), CRYSTAL SUBSTRUCTURE, CRYSTAL LATTICE DEFECTS, CRYSTALS, ZINC, IMPURITIES, CADMIUM, CHEMICAL MILLING, PHOTOMICROGRAPHY, CRYSTALLOGRAPHY (U)

THE THREE DIMENSIONAL ASPECTS OF DISLOCATION SUBSTRUCTURES WERE STUDIED IN CADMIUM DOPED ZINC CRYSTALS GROWN FROM THE MELT. PRECIPITATES DELINEATING THE DIS LOCATIONS WERE REVEALED BY ETCHING A SURFACE CLOSELY PARALLEL TO THE SLIP PLANE. USING A TECHNIQUE OF CONTINUOUS ETCHING AND CINEPHOTOMICROGRAPHY, THE COURSE OF THE DISLOCATIONS WAS FOLLOWED THROUGH THE CRYSTAL. TANGLES OF DISLOCATIONS WERE OBSERVED IN DEFORMED CRYSTALS. AFTER ANNEALING A REARRANGEMENT OF DISLOCATIONS INTO LOW-ANGLE AND HEXAGONAL NETWORKS WAS EVIDENCED. CLOSED LOOPS AND SPIRAL DISLOCATIONS WERE FOUND TO BE ASSOCIATED WITH LARGE INCLUSIONS. A MECHANISM FOR THE MULTIPLICATION OF DISLOCATIONS AT INCLUSIONS WAS PROPOSED. DISLOCATION REACTIONS ACCOUNTING FOR THE OBSERVED SUBSTRUCTURES HAVE BEEN PROPOSED. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZDML6

AD-612 617.
TEXAS INSTRUMENTS INC DALLAS

PRODUCTION ENGINEERING MEASURES (PEM) FOR A GERMANIUM MICROWAVE TRANSISTOR. (U)

DESCRIPTIVE NOTE: QUARTERLY PROGRESS REPT. NO. 1, 30 JUN-30 SEP 64.
SEP 64 79P
REPT. NO. 03-64-73
CONTRACT: DA36 039AMC03632E
PROJ: 74057

UNCLASSIFIED REPORT

DESCRIPTORS: (*TRANSISTORS, MANUFACTURING METHODS), (*MICROWAVE EQUIPMENT, TRANSISTORS), (*GERMANIUM, TRANSISTORS), GAIN, NOISE (RADIO), VAPOR PLATING, SILICON COMPOUNDS, DIOXIDES, PACKAGING, ENCAPSULATION, INDUCTANCE, GALLIUM, IMPURITIES, VACUUM APPARATUS, CHEMICAL MILLING, DIFFUSION, ARSENIC, GOLD, RELIABILITY (ELECTRONICS) (U)

THE PROCESS FLOW USED IN FABRICATING THE L-78 PLANAR EPITAXIAL GERMANIUM DIFFUSED-BASE TRANSISTOR IS DESCRIBED. THE INITIAL INTRINSIC F SUB T OF PLANAR DEVICES, APPROXIMATELY 1600 MC COMPARED TO 2050 MC FOR A MESA DEVICE OF COMPARABLE DESIGN USING SIMILAR FABRICATION TECHNIQUES, WAS INCREASED TO EQUAL THAT OF THE MESA BY OPTIMIZING THE COMPOSITION OF THE EMITTER MATERIAL. THE L-78 PLANAR DEVICES FABRICATED EXHIBIT MINIMUM NOISE FIGURE AT 1.0 GGGC OF 4.5 TO 5.5 DB AT APPROXIMATELY 1.5 MA OF EMITTER CURRENT WHILE PEAK F SUB T OCCURS AT APPROXIMATELY 5.0 MA. A MODIFICATION OF THE L-78 PATTERN, DESIGNATED L-78A, VIA EMITTER AREA REDUCTION FROM 0.76 MIL SQUARED TO 0.27 MIL SQUARED MANIFESTED ITSELF BY A SHIFT IN PEAK F SUB T TOWARD LOWER VALUES OF EMITTER CURRENT. THE PURPOSE OF THIS MODIFICATION IS TO BRING INTO REGISTRY THE E PEAK GAIN OF THE DEVICE AND MINIMUM NOISE FIGURE AT ONE PARTICULAR BIAS LEVEL. THE MATERIALS USED FOR THE BASE STRIPES OF THE PLANAR UNIT WERE OPTIMIZED TO PROVIDE GOOD OHMIC CONTACT TO GERMANIUM, ADHERENCE OF EXPANDED CONTACTS TO THE ACTIVE REGION OF THE DEVICE, THE EMITTER AND BASE STRIPES, WAS IMPROVED BY EMPLOYING A CHEMICAL ETCH COMPRISED OF INORGANIC CONSTITUENTS. AN EXCELLENT TECHNIQUE FOR UNIFORMLY DEPOSITING SILICON DIOXIDE ONTO GERMANIUM WAS OBTAINED. (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOML6

AD-613 068
CRYSTALONICS INC CAMBRIDGE MASS

PRODUCTION ENGINEERING MEASURE TO IMPROVE PRODUCTION TECHNIQUES AND TO INSURE THE RELIABILITY OF THE C600 SERIES FIELD EFFECT TRANSISTORS. (U)

DESCRIPTIVE NOTE: QUARTERLY REPT. NO. 6, 1 OCT-31 DEC 64.
DEC 64 25P WILLIAMS,JOHN R. ;
CONTRACT: DA36 039AMC01483E

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: AVAILABLE COPY WILL NOT PERMIT FULLY LEGIBLE REPRODUCTION. REPRODUCTION WILL BE MADE IF REQUESTED BY USERS OF DDC. COPY IS AVAILABLE FOR PUBLIC SALE. SEE ALSO AD-609 596.

DESCRIPTORS: (*TRANSISTORS, MANUFACTURING METHODS), (*RELIABILITY (ELECTRONICS), TRANSISTORS), SILICON, PROCESSING, BORON, PHOSPHOROUS, DIFFUSION, CHEMICAL MILLING, ETCHED CRYSTALS, BONDING, TESTS, DATA PROCESSING SYSTEMS, PACKAGING, QUALITY CONTROL (U)
IDENTIFIERS: C600 TRANSISTORS, PERT (U)

THE PURPOSE OF THIS PROGRAM IS TO IMPROVE THE RELIABILITY OF THE C600 SERIES FIELD EFFECT TRANSISTORS BY SPECIFIC IMPROVEMENTS OF MANUFACTURING TECHNIQUES. THE BASIC PROGRAM HAS BEEN OUTLINED IN A PERT PLAN WHICH IS BEING USED AS A REFERENCE. IN AN EFFORT TO ACHIEVE THE FAILURE RATE OBJECTIVE, THE FOLLOWING PROCESSES ARE TO BE IMPROVED: (1) OXIDATION OF SLICES; (2) BORON DIFFUSION OF SLICES; (3) MASK ALIGNMENT; (4) ETCHING OF SLICES; (5) DIE-TO-HEADER BONDING; (6) WIRE BONDING; (7) PACKAGING. (AUTHOR)
(U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOML6

AD-613 261
BATTELLE MEMORIAL INST COLUMBUS OHIO DEFENSE METALS INFORMATION CENTER

METAL REMOVAL BY ELECTROCHEMICAL METHODS AND ITS EFFECTS ON MECHANICAL PROPERTIES OF METALS, (U)

JAN 65 45P GURKLIS,JOHN A. ;
REPT. NO. DMIC-213
CONTRACT: AF33 615 1121
PROJ: 8975

UNCLASSIFIED REPORT

DESCRIPTORS: (*ELECTROEROSIVE MACHINING, METALS), (*CHEMICAL MILLING, METALS), (*ELECTROLYTIC POLISHING, METALS), MECHANICAL PROPERTIES, HYDROGEN EMBRITTLEMENT, STEEL, BERYLLIUM, NICKEL ALLOYS, COBALT ALLOYS, REFRACTORY METALS, REFRACTORY METAL ALLOYS, TITANIUM ALLOYS, SURFACE PROPERTIES, OXIDATION (U)

THIS REPORT ASSEMBLES AND CORRELATES INFORMATION ON THE EFFECTS OF ELECTROCHEMICAL METAL-REMOVAL (ECMR) PROCESSES ON MECHANICAL PROPERTIES. OF SPECIAL INTEREST AND CONCERN ARE THE EFFECTS OF ECMR ON FATIGUE STRENGTH. THE REPORT COVERS FOUR ELECTROCHEMICAL METAL-REMOVAL PROCESSES: ELECTROCHEMICAL MACHINING (ECM), ELECTROLYTIC GRINDING (EG), ELECTROCHEMICAL MILLING, AND ELECTROPOLISHING. GENERAL CHARACTERISTICS AND APPLICATIONS OF THE FOUR METHODS ARE PRESENTED AND DISCUSSED; SPECIAL EMPHASIS IS PLACED ON ECM. THE ECMR PROCESSES ARE ESPECIALLY USEFUL IN SHAPING HIGH-STRENGTH AND DIFFICULT-TO-MACHINE METALS AND ALLOYS, AS WELL AS IN SHAPING PARTS WITH UNUSUAL, COMPLEX, OR FRAGILE CHARACTERISTICS. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOML6

AD-613 643
ARMY MATERIALS RESEARCH AGENCY WATERTOWN MASS

THE METALLOGRAPHY OF PYROLITIC GRAPHITE. (U)

DEC 64 19P TARPINIAN,ARAM ;
REPT. NO. AMRA-TR-64-41
PROJ: 1A010501B010
TASK: 35183

UNCLASSIFIED REPORT

DESCRIPTORS: (*PYROLITIC GRAPHITE, MICROSTRUCTURE), ION BOMBARDMENT, ARGON, MERCURY, CHEMICAL MILLING, ELECTROLYTIC POLISHING (U)

ETCHING OF PYROLYTIC GRAPHITE BY BOTH ARGON ION BOMBARDMENT AND MERCURY ION BOMBARDMENT IS DESCRIBED. THE DIFFERENCE BETWEEN THE MICROSTRUCTURES REVEALED BY THE TWO METHODS IS DISCUSSED, AND AN INTERPRETATION IS SUGGESTED. ARGON ION BOMBARDMENT CREATES A LEAF-LIKE PATTERN REMINISCENT OF STACKED SHINGLES. MERCURY ION BOMBARDMENT REVEALS A LAMINAR STRUCTURE UNLIKE THAT PRODUCED BY ARGON ION BOMBARDMENT. ELECTROCHEMICAL POLISHING AND ETCHING REVEALS MICROSTRUCTURES SIMILAR TO THOSE CREATED BY ION BOMBARDMENT. USING AN ELECTROLYTE BASED ON PHOSPHORIC ACID, MICROSTRUCTURES SIMILAR TO THOSE RESULTING FROM MERCURY ION BOMBARDMENT ARE REVEALED. REPLACING THE PHOSPHORIC ACID WITH NITRIC ACID RESULTS IN MICROSTRUCTURES SIMILAR TO THOSE OBTAINED BY ARGON ION BOMBARDMENT. BASED ON THE CORRELATION BETWEEN MICROSTRUCTURES DEVELOPED BY ION BOMBARDMENT AND ELECTROCHEMICAL ETCHING, IT IS CONCLUDED THAT THE MICROSTRUCTURES REVEALED REPRESENT THE TRUE STRUCTURE. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOML6

AD-614 467
LINDEN LABS INC STATE COLLEGE PA

MACHINING HIGH PURITY ALUMINA. (U)

DESCRIPTIVE NOTE: QUARTERLY REPT. NO. 2, 1 OCT-31 DEC 64,
DEC 64 27P MARSHALL,P. A. ,JR.;INFIELD, J. M. ;
CONTRACT: DA36 039AMC03634E

UNCLASSIFIED REPORT

DESCRIPTORS: (•MACHINING, •ALUMINA); SURFACE PROPERTIES, CHEMICAL MILLING, HYDROCHLORIC ACID, HYDROGEN COMPOUNDS, FLUORIDES, ACIDS, IMPREGNATION, SILICON COMPOUNDS, DIOXIDES, CUTTING TOOLS, DENSITY, HEAT TREATMENT (U)
IDENTIFIERS: HYDROFLUORIC ACID (U)

MATERIAL A-96 SELECTED FOR THE MACHINING DEMONSTRATION CAN BE DRILLED, GROUND, THREADED, SLOTTED, TAPPED AND TURNED. THE MATERIAL CAN BE READILY REMOVED BY EITHER A GRINDING WHEEL OR A SINGLE POINT CUTTING TOOL. CARE MUST BE EXERCISED WHEN USING A SINGLE POINT CUTTING TOOL WITH REGARD TO FEEDS, SPEEDS, TOOL GEOMETRY, AND CUTTING ANGLES. THE CHEMISTRY BEHIND THE ACID TREATING AND THE RECONSTITUTION ARE NOT FULLY UNDERSTOOD. THE MATERIAL A-96 TREATED ALUMINA APPEARS TO BE ABLE TO BE RECONSTITUTED TO A DENSE BODY OF HIGHER PURITY THAN THE ORIGINAL BODY. HYDROFLUORIC ACID SEEMS TO ATTACK MOST BODIES MORE READILY THAN HYDROCHLORIC ACID AND 52% AQUEOUS HF SEEMS TO ATTACK MORE READILY THAN 70% AQUEOUS HF. THERE APPEARS TO BE SOME OPTIMUM PER CENT AQUEOUS ACID BETWEEN 70% AND 40%. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOML6

AD-614 823
NATIONAL SEMICONDUCTOR CORP DANBURY CONN

PRODUCTION ENGINEERING MEASURE TO IMPROVE PRODUCTION TECHNIQUES AAND INCREASE THE RELIABILITY OF THE 2N328A TRANSISTOR. (U)

DESCRIPTIVE NOTE: FINAL REPT. FOR 30 JUN 63-30 DEC 64,

DEC 64 246P RAU,R. R. !DI PAOLA,R. !
CONTRACT: DA36 039AMC01480E

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: AVAILABLE COPY WILL NOT PERMIT FULLY LEGIBLE REPRODUCTION. REPRODUCTION WILL BE MADE IF REQUESTED BY USERS OF DDC. COPY IS AVAILABLE FOR PUBLIC SALE. SEE ALSO AD-608 583.

DESCRIPTORS: (•TRANSISTORS, MANUFACTURING METHODS), RELIABILITY (ELECTRONICS), PRODUCTION, FAILURE (MECHANICS), TESTS, SILICON ALLOYS, PROCESSING, SPECIFICATIONS, QUALITY CONTROL, LIFE EXPECTANCY, CHEMICAL MILLING, ALUMINUM, VAPOR PLATING, GAS ANALYSIS, WELDING, HEATING, FURNACES, INDUSTRIAL EQUIPMENT (U)

A SUMMARY IS GIVEN OF THE WORK PERFORMED FOR IMPROVING THE RELIABILITY OF THE PNP SILICON ALLOY TRANSISTOR TYPE 2N328A. THE FOLLOWING PROCESSES WERE MODIFIED DURING THE COURSE OF THE CONTRACT; AN ETCH WHEEL WAS INTRODUCED TO MORE ACCURATELY CONTROL FINAL DEVICE ETCHING; ADDITIONAL BAKE-OUT FURNACES WERE INTRODUCED AND EVALUATED TO INCREASE THE AMOUNT OF TIME WHICH THE UNITS ARE HEATED AFTER ETCHING; A GAS RECIRCULATOR WAS INTRODUCED INTO THE FINAL DRY LINE TO REDUCE THE WATER VAPOR CONCENTRATION; WELDING SHIELDS WERE INTRODUCED AT TWO WELDING OPERATIONS WHILE ONE OTHER PROCESS WAS MODIFIED; ALL THESE CHANGES WERE MADE IN ORDER TO DECREASE THE AMOUNT OF WELD SPLASH STRIKING THE ACTIVE REGION OF THE TRANSISTOR. DEVICES PRODUCED FOR THE FIRST MONTH OF OPERATION OF THE IMPROVED MANUFACTURING LINE WERE USED FOR THE LONG TERM RELIABILITY TESTING. MEASUREMENTS ON DEVICES MADE DURING THIS PERIOD OF MANUFACTURE ARE INCLUDED. THIS RELIABILITY EVALUATION CONSISTED OF OPERATIONAL TESTS FOR A 1000 HOURS AT POWER LEVELS OF 400, 450, AND 500 MILLIWATTS; A SPECIFICATION FOR AN IMPROVED 2N328A TYPE TRANSISTOR INCORPORATING SOME OF THE RESULTS OF EVALUATIONS MADE DURING THIS CONTRACT IS INCLUDED. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOML6

AD-616 786
RENSSELAER POLYTECHNIC INST TROY N Y

PRINCIPLES OF METALLOGRAPHIC ETCHING. (U)

DESCRIPTIVE NOTE: TECHNICAL REPT.,
JUN 65 26P GREENE,NORBERT D. ;RUDAW,
PETER S. ;LEE,LINDA ;
REPT. NO. TR-2
CONTRACT: NONR59117

UNCLASSIFIED REPORT

DESCRIPTORS: (*CHEMICAL MILLING, ALLOYS),
(*METALLOGRAPHY, CHEMICAL MILLING), TIN ALLOYS,
ZINC ALLOYS, SODIUM COMPOUNDS, HYDROXIDES,
ELECTROLYTES, ANALYSIS (U)

THE PRINCIPLES OF METALLOGRAPHIC ETCHING HAVE BEEN DETERMINED BY ELECTROCHEMICAL AND OPTICAL MEASUREMENTS ON TIN-ZINC ALLOYS IN SODIUM HYDROXIDE ELECTROLYTES. THE MINIMUM DISSOLUTION RATE RATIO AND THE MINIMUM AMOUNT OF SELECTIVE DISSOLUTION NECESSARY TO ACHIEVE METALLOGRAPHIC CONTRAST OF PHASES HAVE BEEN MEASURED. ETCHING RATE AND CONTRAST ARE UNIQUELY DEFINED BY ETCHING POTENTIAL BY POTENTIOSTATIC, ELECTROLYTIC AND CHEMICAL ETCHING METHODS. (AUTHOR (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOML6

AD-619 628
FOREIGN TECHNOLOGY DIV WRIGHT-PATTERSON AFB OHIO

CHEMICAL MILLING, (U)

JUL 65 7P RYBAK,P. T. ;SAVICH,V. V. ;
REPT. NO. FTD-TT-65-865
MONITOR: TT . 65-62694

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: UNEDITED ROUGH DRAFT TRANS. OF MASHINOSTROITEL' (USSR) N3 P34-5 1964. AVAILABLE COPY WILL NOT PERMIT FULLY LEGIBLE REPRODUCTION. REPRODUCTION WILL BE MADE IF REQUESTED BY USERS OF DDC. COPY IS AVAILABLE FOR PUBLIC SALE.

DESCRIPTORS: (*CHEMICAL MILLING, MANUFACTURING METHODS), USSR, PRINTED CIRCUITS, HEATING, INFRARED RADIATION, AUTOMATION (U)

TRANSLATION OF RUSSIAN RESEARCH: CHEMICAL MILLING.

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOML6

AD#619 295
MOTOROLA INC PHOENIX ARIZ SEMICONDUCTOR PRODUCTS DIV

PRODUCTION ENGINEERING MEASURE FOR SILICON OVERLAY TRANSISTORS. (U)

DESCRIPTIVE NOTE: QUARTERLY PROGRESS REPT. NO. 1, 1 JAN-31 MAR 65,
MAR 65 52P KEARKUFF,THOMAS ;
CONTRACT: DA36 039AMC06156E
PROJ: 74001

UNCLASSIFIED REPORT

DESCRIPTORS: (*TRANSISTORS, MANUFACTURING METHODS), (*SILICON, TRANSISTORS), DIFFUSION, GOLD, CHEMICAL MILLING, PRECISION FINISHING, PROCESSING, ENCAPSULATION, BONDING, GLASS, WIRE, STORAGE, EPETIXIAL GROWTH, RELIBILITY(ELECTRONICS) (U)

NEW BASE PREDEPOSITION AND BASE DIFFUSION SYSTEMS WERE PUT INTO PRODUCTION AND EVALUATED. WORK WAS STARTED ON A NEW EMITTER AND GOLD DIFFUSION PROCESS. WORK WAS STARTED ON THE EMITTER STRIPE WIDTH EVALUATION. CHEMICAL ETCHING WAS PLACED INTO PRODUCTION AND WORK ON SLURRY POLISHING IS ALMOST COMPLETE. A NEW PHOTORESIST WAS EVALUATED AND PRODUCTION CONTROLS ARE PRESENTLY BEING APPLIED. NEW ASSEMBLY PARTS AND PROCESSES WERE EVALUATED FROM THE ASSEMBLY VIEWPOINT. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOML6

AD-620 508
BATTELLE MEMORIAL INST COLUMBUS OHIO

MACHINING AND GRINDING OF TITANIUM AND ITS ALLOYS. (U)

DESCRIPTIVE NOTE: NASA TECHNICAL MEMO.,
AUG 65 131P OLOFSON,C. T. ;BOULGER,F. W. ;GURKLIS,J. A. ;
CONTRACT: DA01 02;AMC11651Z
MONITOR: NASA.RSIC TM-X-53312,409

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: SUBCONTRACTED TO REDSTONE SCIENTIFIC INFORMATION CENTER, REDSTONE ARSENAL, ALA.

DESCRIPTORS: (*TITANIUM, MATERIAL REMOVAL), (*TITANIUM ALLOYS, MATERIAL REMOVAL), (*MATERIAL REMOVAL, TITANIUM), MACHINING, MACHINE TOOLS, GRINDERS, PRECISION FINISHING, CHEMICAL MILLING, CUTTING TOOLS, PERFORMANCE(ENGINEERING) (U)

THE REPORT COVERS THE STATE OF THE ART OF METAL-REMOVAL OPERATIONS FOR TITANIUM AND ITS ALLOYS. IT DESCRIBES THE METHODS CURRENTLY EMPLOYED FOR CONVENTIONAL MACHINING, GRINDING, ELECTROLYTIC, AND CHEMICAL MACHINING PROCESSES. THE PRECAUTIONS WHICH SHOULD BE TAKEN TO AVOID TROUBLES RESULTING FROM THE CHARACTERISTICS TYPICAL OF TITANIUM ARE POINTED OUT. TEN MACHINING, TWO GRINDING, TWO CUTTING, AND TWO UNCONVENTIONAL METAL-REMOVAL OPERATIONS ARE DISCUSSED SEPARATELY. IN OTHER SECTIONS, THE MECHANICS OF CHIP-FORMING PROCESSES, THE RESPONSE TO MACHINING VARIABLES, COSTS, AND PRECAUTIONS DESIRABLE FROM THE STANDPOINT OF SAFETY ARE DISCUSSED. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOML6

AD-621 454
HARSHAW CHEMICAL CO CLEVELAND OHIO

RESEARCH ON PHOTOVOLTAIC CELLS. (U)

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

UNCLASSIFIED REPORT

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

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

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOML6

AD-622 879

TRW SEMICONDUCTORS INC LAWNDALE CALIF RESEARCH AND DEVELOPMENT DEPT

TRANSISTOR, VHF, SILICON, POWER (10W-500MC). (U)

DESCRIPTIVE NOTE: FINAL REPT. FOR 1 JUL 63-15 JAN 65,
JAN 65 12UP CLARKE,R. N. ICRISHAL,J. I
REPT. NO. 59-RD-F
CONTRACT: DA36 039AMC03189E
PROJ: 1P6 22001A056
TASK: 1P6 22001A056 01

UNCLASSIFIED REPORT

DESCRIPTORS: (*TRANSISTORS, SILICON), VERY HIGH FREQUENCY, RADIOFREQUENCY POWER, CRYSTALS, PROCESSING, PACKAGING, CHEMICAL MILLING, DIFFUSION, SILICONE PLASTICS, VAPOR PLATING, METAL FILMS (U)

THE TRANSISTOR PRODUCES 10 WATTS AT 500 MC WITH 5-6 DB OF POWER GAIN AND 30-40% COLLECTOR EFFICIENCY. THE CRYSTAL WAS ORIGINALLY DESIGNED ACCORDING TO PRESENT POWER GAIN THEORY, BUT IT ONLY HAD ONE TO TWO DB OF POWER GAIN AT 500 MC. THE SECOND CRYSTAL DESIGN WAS BASED UPON THE SMALLEST PRACTICAL PATTERN DIMENSIONS, OR A 0.1 MIL MINIMUM SPACING. THE REDESIGNED PATTERN ALSO HAD PROVISION FOR ANALYZING THE TRANSISTOR IN MULTIPLES OF SUB CELLS AS WELL AS IN ITS ENTIRETY. SUCH AN ANALYSIS SHOWED THE NECESSITY OF SYMMETRY OF BASE FEED IN COMMON EMITTER AMPLIFIERS TO GET ALL THE CELLS WORKING TOGETHER. PARALLELING OF CELLS ALSO INDICATED AN APPARENT LOSS IN F SUB T WITH INCREASED SIZE. PROCESSING AND ASSEMBLY WAS GENERALLY ALONG STANDARD INDUSTRY PRACTICE EXCEPT IN THE AREA OF PHOTORESIST. THERE, IMPROVED GLASS MASKS WERE USED, ALONG WITH THE NEW KTFR PHOTORESIST. SUCCESSFUL ETCHING OF FINE METALLIZED PATTERNS WAS ACCOMPLISHED THROUGH THE DEVELOPMENT OF A JET ETCHING TECHNIQUE. TO RETAIN AS MUCH OF THE INNATE CRYSTAL PERFORMANCE CAPABILITY AS POSSIBLE, CONSIDERABLE WORK WAS DONE ON PACKAGING. IT WAS CONCLUDED THAT NO AVAILABLE PACKAGE WAS TRULY ADEQUATE. THE BEST AVAILABLE FOR THE R.F. PERFORMANCE IS THE SILICONE MOLDED PACKAGE DUE TO ITS SHORT, LOW-LOSS LEADS. (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOML6

AD-625 317 9/1 13/8
MOTOROLA INC PHOENIX ARIZ SEMICONDUCTOR PRODUCTS DIV

PRODUCTION ENGINEERING MEASURE FOR SILICON OVERLAY TRANSISTORS. (U)

DESCRIPTIVE NOTE: QUARTERLY PROGRESS REPT. NO. 2, 1 APR-30 JUN 65,
JUN 65 31P CASSIDY,MICHAEL ;GREER,PAUL
;
CONTRACT: DA-36-039-AMC-06156(E)
PROJ: DA-74001

UNCLASSIFIED REPORT

DESCRIPTORS: (*TRANSISTORS, MANUFACTURING METHODS), (*SILICON, TRANSISTORS), DIFFUSION, GOLD, CHEMICAL MILLING, PRECISION FINISHING, PROCESSING, ENCAPSULATION, BONDING, GLASS, WIRE, EPITAXIAL GROWTH, RELIABILITY(ELECTRONICS), QUALITY CONTROL (U)

PROGRESS DURING THE REPORT PERIOD CONSISTED OF THE FOLLOWING: (1) FABRICATION OF DEVICES USING THE BORON TRIBROMIDE (BBR3) BASE DIFFUSION METHOD. WAFERS ARE ALSO IN PROCESS USING A COMBINATION OF THE BBR3 BASE DIFFUSION AND THE EMITTER-GOLD EMITTER DIFFUSION. (2) TRANSITION TO 2-INCH MASKS TO GIVE BETTER DEFINITION AND DETAIL. MASK MEASUREMENT BY PRECISE METHODS TO INSURE MASK ACCURACY AND REPEATABILITY. (3) EVALUATION OF EFFECTS OF VARIATIONS IN EMITTER STRIPE WIDTH. (4) FABRICATION OF WAFERS USING THE CHEMICAL ETCH PROCESS. (5) CONSTRUCTION OF WAFER STORAGER CABINET TO DETERMINE EFFECTS OF PROLONGED WAFER STORAGE BETWEEN VARIOUS PROCESS STEPS. (6) CONTINUED INVESTIGATION OF ULTRASONIC WIRE BONDING AND ANALYSIS OF THE RESULTS OBTAINED BY ULTRASONIC BONDING TO RAW KOVAR TOP POSTS. (7) DEVELOPMENT OF A PROCESS EVALUATION TEST PLAN AND AN ENVIRONMENTAL STEP STRESS TEST PLAN. COMPLETION OF INITIAL ELECTRICAL PARAMETER READOUTS. EVALUATION OF SAMPLES FABRICATED USING THE BBR3 BASE DIFFUSION METHOD. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOML6

AD-628 230 9/1 13/8
MOTOROLA INC PHOENIX ARIZ SEMICONDUCTOR PRODUCTS DIV

PRODUCTION ENGINEERING MEASURE FOR SILICON OVERLAY TRANSISTORS. (U)

DESCRIPTIVE NOTE: QUARTERLY PROGRESS REPT. NO. 3, 1 JUL-30 SEP 65,
SEP 65 32P KEARKUFF,THOMAS ;GREER,PAUL
;
CONTRACT: DA-36-039-AMC-06156(E),
PROJ: DA-74001,

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: SEE ALSO AD-625 317,

DESCRIPTORS: (*TRANSISTORS, MANUFACTURING METHODS), (*SILICON, TRANSISTORS), DOPING, GOLD, CHEMICAL MILLING, PRECISION FINISHING, PROCESSING, ENCAPSULATION, ULTRASONIC RADIATION, BONDING, WIRE, ASSEMBLING, RELIABILITY(ELECTRONICS) (U)

PROGRESS DURING THE REPORTING PERIOD CONSISTED OF THE FOLLOWING: (1)DIFFUSION SYSTEMS. WORK WAS COMPLETED ON THE BBR3 BASE DIFFUSION SYSTEM, AND SYSTEM FEASIBILITY WAS DETERMINED. THE EMITTER-GOLD EMITTER DIFFUSION SYSTEM WAS ALSO EVALUATED FOR FEASIBILITY. (2) WAFER PROCESSING. THE FEASIBILITY OF USING 1 1/2 INCH WAFERS WITH SLURRY POLISH AND CHEMICAL ETCH WAS INVESTIGATED. (3) WAFER STORAGE. DEVICES WHICH HAD BEEN STORED IN N2 FOR 15 DAYS AT VARIOUS STEPS WERE PROCESSED AND EVALUATED. (4) ASSEMBLY PROCESSING. UNITS WERE CONSTRUCTED USING ULTRASONIC WIRE BONDING OF ALUMINUM WIRE TO BARE KOVAR POSTS AND DEIONIZED WATER BOILING PRIOR TO ENCAPSULATION. (5) RELIABILITY. COMPLETED UNITS WERE EVALUATED. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOML6

AD-628 230 9/1 13/8
MOTOROLA INC PHOENIX ARIZ SEMICONDUCTOR PRODUCTS DIV

PRODUCTION ENGINEERING MEASURE FOR SILICON OVERLAY TRANSISTORS. (U)

DESCRIPTIVE NOTE: QUARTERLY PROGRESS REPT. NO. 3, 1 JUL-30 SEP 65,
SEP 65 32P KEARKUFF,THOMAS ;GREER,PAUL
;
CONTRACT: DA-36-039-AMC-06156(E),
PROJ: DA-74001,

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: SEE ALSO AD-625 317.

DESCRIPTORS: (*TRANSISTORS, MANUFACTURING METHODS), (*SILICON, TRANSISTORS), DOPING, GOLD, CHEMICAL MILLING, PRECISION FINISHING, PROCESSING, ENCAPSULATION, ULTRASONIC RADIATION, BONDING, WIRE, ASSEMBLING, RELIABILITY(ELECTRONICS) (U)

PROGRESS DURING THE REPORTING PERIOD CONSISTED OF THE FOLLOWING: (1)DIFFUSION SYSTEMS. WORK WAS COMPLETED ON THE BBR3 BASE DIFFUSION SYSTEM, AND SYSTEM FEASIBILITY WAS DETERMINED. THE EMITTER-GOLD EMITTER DIFFUSION SYSTEM WAS ALSO EVALUATED FOR FEASIBILITY. (2) WAFER PROCESSING. THE FEASIBILITY OF USING 1 1/2 INCH WAFERS WITH SLURRY POLISH AND CHEMICAL ETCH WAS INVESTIGATED. (3) WAFER STORAGE. DEVICES WHICH HAD BEEN STORED IN N2 FOR 15 DAYS AT VARIOUS STEPS WERE PROCESSED AND EVALUATED. (4) ASSEMBLY PROCESSING. UNITS WERE CONSTRUCTED USING ULTRASONIC WIRE BONDING OF ALUMINUM WIRE TO BARE KOVAR POSTS AND DEIONIZED WATER BOILING PRIOR TO ENCAPSULATION. (5) RELIABILITY. COMPLETED UNITS WERE EVALUATED. (AUTHOR) (U)

UDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOML6

AD#631 952 13/8
NAVAL AIR ENGINEERING CENTER PHILADELPHIA PA AERONAUTICAL MATERIALS LAB

CHEMICAL MILLING OF ALLOY STEELS. (U)

MAR 66 23P KETCHAM,SARA J. ;
REPT. NO. NAEC-AML-2418.
PROJ: RRMA-02-011/200-1/F020-01-01

UNCLASSIFIED REPORT

DESCRIPTORS: (*CHEMICAL MILLING, *STEEL), HYDROGEN EMBRITTLEMENT, STRESS CORROSION, FRACTURE(METALLURGY), SURFACE PROPERTIES (U)
IDENTIFIERS: STEEL H-11, STEEL 4340, STAINLESS STEEL17-7PH (U)

EXPERIMENTS WERE CONDUCTED TO DETERMINE THE EFFECT OF CHEMICAL MILLING ON SUSCEPTIBILITY OF HIGH STRENGTH STEELS TO HYDROGEN EMBRITTLEMENT AND STRESS CORROSION CRACKING. ALLOYS STUDIED INCLUDED H-11, 4340 AND 17-7 PH. RESULTS INDICATED THAT THE ACID BATHS USED FOR CHEMICAL MILLING DO INITIALLY EMBRITTLE THESE ALLOYS, BUT RECOVERY OF DUCTILITY TAKES PLACE AT ROOM TEMPERATURE WITHIN ONE WEEK IF THERE IS NO BARRIER TO THE ESCAPE OF HYDROGEN (SUCH AS A PLATING). A RECOVERY TREATMENT OF 48 HOURS AT ROOM TEMPERATURE FOLLOWED BY 4 HOURS AT 375F IS RECOMMENDED. A HIGH STRENGTH STEEL WITH A CHEM-MILLED SURFACE IS MORE SUSCEPTIBLE TO STRESS CORROSION CRACKING THAN ONE WITH A MACHINE GROUND SURFACE. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOML6

AD-634 075 13/8 11/6 13/9
BATTELLE MEMORIAL INST COLUMBUS OHIO

MACHINING AND GRINDING OF NICKEL-AND COBALT-BASE ALLOYS. (U)

APR 66 146P OLOFSON,C. T. ;GURKLIS,J. A. ;BOULGER,F. W. ;
CONTRACT: DA-01-021-AMC-11651(Z),
MONITOR: NASA ,RSIC TM-X-53446 ,482

UNCLASSIFIED REPORT

DESCRIPTORS: (*NICKEL ALLOYS, MATERIAL REMOVAL), (*COBALT ALLOYS, MATERIAL REMOVAL), (*MATERIAL REMOVAL, STATE-OF-THE-ART REVIEWS), MACHINING, GRINDERS, CHEMICAL MILLING, ELECTROEROSIVE MACHINING, CUTTING, CUTTING TOOLS, DRILLING, MACHINE SHOP PRACTICE, MACHINE TOOLS, MILLING MACHINES, REAMERS, LATHES, CUTTING FLUIDS, DRILLING MACHINES, PRECISION FINISHING, ABRASIVES, GRINDING, ELECTROLYTES, CLEANING, FRICTION, HEAT-RESISTANT METALS + ALLOYS, CORROSION-RESISTANT ALLOYS, MECHANICAL PROPERTIES, COPPER ALLOYS, IRON ALLOYS, CHROMIUM ALLOYS, CASTING ALLOYS (U)

THE REPORT COVERS THE STATE OF THE ART OF METAL-REMOVAL OPERATIONS FOR NICKEL AND COBALT-BASE ALLOYS. IT DESCRIBES THE METHODS CURRENTLY EMPLOYED FOR CONVENTIONAL MACHINING, GRINDING, ELECTROLYTIC, AND CHEMICAL-MACHINING PROCESSES. THE PRECAUTIONS THAT SHOULD BE TAKEN TO AVOID TROUBLES RESULTING FROM THE CHARACTERISTICS TYPICAL OF THESE ALLOYS ARE POINTED OUT. NINE MACHINING, TWO GRINDING, TWO CUTTING, AND TWO UNCONVENTIONAL METAL-REMOVAL OPERATIONS ARE DISCUSSED SEPARATELY. OTHER SECTIONS DISCUSS THE CLASSIFICATION OF THESE ALLOYS AND THEIR GENERAL RESPONSE TO MACHINING VARIABLES. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOML6

AD-634 392 13/8 20/2
NAVAL ORDNANCE LAB WHITE OAK MD

POLISHES AND ETCHES FOR TIN TELLURIDE, LEAD SULFIDE, LEAD SELENIDE, AND LEAD TELLURIDE: SUPPLEMENT. (U)

DESCRIPTIVE NOTE: FINAL REPT. JUN 63-FEB 66, MAR 66 15P NORR, MARRINER K. ;
REPT. NO. NOLTR-66-32.
PROJ: FR-46,

UNCLASSIFIED REPORT

DESCRIPTORS: (*CHEMICAL MILLING, CRYSTALS), (*ETCHING, CRYSTALS), (*ELECTROLYTIC POLISHING, CRYSTALS), (*CRYSTALS, PRECISION FINISHING), TIN ALLOYS, TELLURIUM ALLOYS, LEAD ALLOYS, LEAD COMPOUNDS, SULFIDES, SELENIUM ALLOYS, INTERMETALLIC COMPOUNDS, CRYSTAL LATTICE DEFECTS (U)
IDENTIFIERS: ETCHES, POLISHES, TIN TELLURIDE, LEAD SULFIDE, LEAD SELENIDE, LEAD TELLURIDE (U)

THIS REPORT IS A CONTINUATION OF NOLTR 63-156 (AD-423 367), TOGETHER, THE TWO REPORTS PRESENT A REVIEW OF CHEMICAL AND ELECTROLYTIC POLISHES AND DISLOCATION ETCHES FOR SNTE, PBS, PBSE, AND PBTE, COVERING THE PERIOD FROM 1907 THROUGH 1965. THE PRESENT REPORT ALSO DESCRIBES A NEW POLISH AND A NEW DISLOCATION ETCH FOR TIN TELLURIDE, AS WELL AS TESTS ON AND IMPROVEMENTS IN SOME OF THE POLISHES REPORTED IN EARLIER PUBLICATION. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOML6

AD-635 814 9/1 13/8
MOTOROLA INC PHOENIX ARIZ SEMICONDUCTOR PRODUCTS DIV

PRODUCTION ENGINEERING MEASURE FOR SILICON OVERLAY TRANSISTORS. (U)

DESCRIPTIVE NOTE: QUARTERLY PROGRESS REPT. NO. 4, 1 OCT-31 DEC 65.
DEC 65 37P CASSIDY, MICHAEL ;GREER,PAUL
;
CONTRACT: DA-36-039-AMC-06156(E),
PROJ: DA-7401,

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: SEE ALSO AD-635 118.

DESCRIPTORS: (*TRANSISTORS, MANUFACTURING METHODS), (*SILICON, TRANSISTORS), DISKS, PREPARATION, BONDING, DIFFUSION, STORAGE, RELIABILITY(ELECTRONICS), ULTRASONIC WELDING, CHEMICAL MILLING, ETCHING, ELECTRIC TERMINALS (U)

PROGRESS DURING THE PAST QUARTER HAS CONSISTED OF THE FOLLOWING: (1) WAFER PREPARATION: PROCESSING OF 1 1/2-INCH SLURRY-POLISHED AND CHEMICALLY ETCHED WAFERS USING THE NEW PREOHMIC TWO-STEP PHOTORESIST PROCESS. (2) MASK RESOLUTION AND ALIGNMENT: VERTICAL AND HORIZONTAL DIMENSIONAL INSPECTION OF MASKS TO ELIMINATE MASK VARIATIONS. (3) DEIONIZED WATER BOIL: EVALUATION OF ULTRASONICALLY WIRE-BONDED DEVICES AFTER SUBJECTION TO DEIONIZED WATER BOIL. (4) WIRE BONDING: EVALUATION OF UNITS FABRICATED USING A SONO BOND ULTRASONIC BONDER. (5) DIFFUSION SYSTEMS: FINAL EVALUATION OF THE BCL3 SYSTEM. EMITTER DIFFUSION EMPLOYING A CONTROLLED POCL3 SOURCE TEMPERATURE. (6) RELIABILITY EVALUATION: EVALUATION OF COMPLETED UNITS. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOML6

AD-639 654 13/8 13/9
BATTELLE MEMORIAL INST COLUMBUS OHIO

MACHINING AND GRINDING OF ULTRAHIGH-STRENGTH STEELS AND STAINLESS STEEL ALLOYS. (U)

OCT 65 214P OLOFSON,C. T. ;GURKLIS,J. A. ; BOULGER,F. W. ;
CONTRACT: DA-01-021-AMC-11651(Z),
MONITOR: NASA ,RSIC TM-X-53433 ,501

UNCLASSIFIED REPORT

DESCRIPTORS: (*STEEL, *MATERIAL REMOVAL), (*MACHINING, STEEL), (*GRINDING, STEEL), STAINLESS STEEL, STATE-OF-THE-ART REVIEWS, CHEMICAL MILLING, MACHINE TOOLS, CUTTING FLUIDS, CUTTING TOOLS, SMALL TOOLS (U)

THE REPORT COVERS THE STATE OF THE ART OF METAL-REMOVAL OPERATIONS FOR STAINLESS AND ULTRAHIGH-STRENGTH STEELS. IT DESCRIBES THE METHODS CURRENTLY EMPLOYED FOR CONVENTIONAL MACHINING, GRINDING, ELECTROLYTIC, ELECTRIC-DISCHARGE, AND CHEMICAL-MACHINING PROCESSES. THE PRECAUTIONS THAT SHOULD BE TAKEN TO AVOID TROUBLES RESULTING FROM THE CHARACTERISTICS TYPICAL OF THESE ALLOYS ARE POINTED OUT. NINE MACHINING, TWO GRINDING, TWO CUTTING, AND THREE UNCONVENTIONAL METAL-REMOVAL OPERATIONS ARE DISCUSSED SEPARATELY. OTHER SECTIONS DISCUSS THE CLASSIFICATION OF THESE ALLOYS AND THEIR GENERAL RESPONSE TO MACHINING VARIABLES. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOML6

AD-648 980 13/8
NAVAL AIR MATERIAL CENTER PHILADELPHIA PA AERONAUTICAL MATERIALS LAB

CHEMICAL MILLING OF METALS AND ALLOYS: ITS EFFECT ON STRESS CORROSION SUSCEPTIBILITY AND HYDROGEN EMBRITTLEMENT. (U)

MAY 61 4P KETCHAM,S. J. ;
REPT. NO. NAMC-AML-1236

UNCLASSIFIED REPORT

DESCRIPTORS: (*CHEMICAL MILLING, *ALUMINUM ALLOYS), (*STEEL, CHEMICAL MILLING), (*CORROSION-RESISTANT ALLOYS, TITANIUM), DEGRADATION, HYDROGEN EMBRITTLEMENT, TEMPERATURE, SOLUTIONS, SURFACE PROPERTIES (U)
IDENTIFIERS: ALUMINUM ALLOY 2024, ALUMINUM ALLOY 7075, ALUMINUM ALLOY X2020 (U)

THE PAPER CONTAINS SPECIFICATIONS TO CONTROL THE SOLUTIONS AND PROCESSES FOR THE VARIOUS METALS AND ALLOYS. A METHOD FOR DETERMINING WHETHER ANY STEP IN THE PROCESS CAN ACCELERATE STRESS CORROSION IN ALUMINUM ALLOYS AND CORROSION RESISTING STEELS, OR CAUSE HYDROGEN EMBRITTLEMENT IN STEEL AND TITANIUM ALLOYS SUSCEPTIBLE TO SUCH EMBRITTLEMENT, IS DESIRED FOR INCORPORATION INTO THE SPECIFICATION AS WELL AS ESTABLISHMENT OF CRITERIA FOR ASSESSING THE SEVERITY OF SUCH EFFECTS. THE PROJECT CONTAINS: ALUMINUM ALLOYS; STEELS; TITANIUM ALLOYS. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZDML6

AD-674 066 11/6 13/8
BATTELLE MEMORIAL INST COLUMBUS OHIO DEFENSE METALS INFORMATION CENTER

A REVIEW OF METALLOGRAPHIC PREPARATION PROCEDURES FOR BERYLLIUM AND BERYLLIUM ALLOYS, (U)

JUN 68 20P PRICE,C. W. ;MCCALL,J. L. ;

REPT. NO. DMIC-MEMO-237
CONTRACT: F33615-68-C-1325

UNCLASSIFIED REPORT

DESCRIPTORS: (*BERYLLIUM, METALLOGRAPHY), (*BERYLLIUM ALLOYS, METALLOGRAPHY), REVIEWS, ELECTRON MICROSCOPY, FINISHES + FINISHING, GRINDING, ETCHING, CUTTING, MACHINING, CHEMICAL MILLING (U)

THE MEMORANDUM IS DIVIDED INTO FOUR TOPICS: (1) GRINDING, (2) POLISHING, (3) ETCHING, AND (4) THINING FOR TRANSMISSION ELECTRON MICROSCOPY. PROCEDURES REVIEWED ARE ALSO LISTED IN TABULAR FORM FOR READY REFERENCE. IN ADDITION TO REVIEWING PUBLISHED REFERENCES, THE AUTHORS HAVE INCLUDED A CONSIDERABLE AMOUNT OF PREVIOUSLY UNPUBLISHED DATA BASED ON THEIR OWN EXPERIENCE AND PRIVATE COMMUNICATION WITH ASSOCIATES IN THE FIELD. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOML6

AD-677 066 11/6 13/8
GENERAL DYNAMICS/CONVAIR SAN DIEGO CALIF

REDUCING HAND STRAIGHTENING BY CHEM-MILLING 7075 AND 7178 ALUMINUM ALLOY IN THE 'W' (OR NATURALLY AGED) CONDITION. (U)

DESCRIPTIVE NOTE: FINAL REPT.,
OCT 60 23P WHITING,H. A. ;PLUMMER,C. E. ;
REPT. NO. GDC-PR919

UNCLASSIFIED REPORT

DESCRIPTORS: (*ALUMINUM ALLOYS, *CHEMICAL MILLING), ETCHING, SURFACE ROUGHNESS, FINISHES + FINISHING, AGING(MATERIALS), PANELS(STRUCTURAL), MECHANICAL WORKING, TOLERANCES(MECHANICS) (U)
IDENTIFIERS: ALUMINUM ALLOY 7075, ALUMINUM ALLOY 7185 (U)

THE OBJECTIVE AND PURPOSE OF THE PROJECT WAS TO ETCH 7075 AND 7178 ALUMINUM ALLOYS, 0.125 IN. THICK, IN THE 'W' (OR NATURALLY AGED CONDITION). A MAXIMUM SURFACE ROUGHNESS (RMS) OF 125 MICROINCHES WAS NOT TO BE EXCEEDED. (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZDML6

AD-677 494 11/6 13/8
GENERAL DYNAMICS/ASTRONAUTICS SAN DIEGO CALIF

STRIPPING PT201 THERMOSETTING RESIN COATINGS FROM 321 ANNEALED STAINLESS STEEL SURFACES, (PROPELLANT UTILIZATION MANOMETER HOUSINGS). (U)

SEP 61 15P SHIWANOV,E. ;
REPT. NO. GDA-AN61AMR4062

UNCLASSIFIED REPORT

DESCRIPTORS: (•STAINLESS STEEL, •CHEMICAL MILLING), THERMOSETTING PLASTICS, SULFURIC ACID, ULTRASONIC RADIATION, STAINLESS STEEL, REMOVAL, SURFACES, MANOMETERS, CLEANING, PLASTIC COATINGS (U)

THE REPORT DISCUSSES THE DEVELOPMENT OF A NEW CHEMICAL STRIPPER. IT WAS FOUND THAT THE USE OF SULFURIC ACID IN COMBINATION WITH ULTRASONIC VIBRATION (40KC.) WAS AN EFFICIENT METHOD TO STRIP AND DISINTEGRATE PT201 THERMOSETTING RESIN FROM THE SURFACE OF MANOMETER HOUSINGS. THREE SUCH HOUSINGS WERE EFFECTIVELY CLEANED BY THIS METHOD WITHIN A PERIOD OF TEN MINUTES AND WERE IN ACCORDANCE WITH THE REQUIREMENTS OF MS 60.148A, MAINTENANCE CLEANING OF PROPELLANT UTILIZATION MANOMETERS. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOML6

AD-678 154 13/8 13/13 11/6
GENERAL DYNAMICS/CONVAIR SAN DIEGO CALIF

CHEM-MILL PROCESS FOR CONTOURING ALUMINUM HONEYCOMB CORE. (U)

DESCRIPTIVE NOTE: FINAL REPT.,
NOV 60 77P GLENSKI,F. J. ;
REPT. NO. GDC-PR-920

UNCLASSIFIED REPORT

DESCRIPTORS: (*HONEYCOMB CORES, *CHEMICAL MILLING), (*ALUMINUM ALLOYS, CHEMICAL MILLING), BONDING, PRESSURE, THICKNESS, PANELS(STRUCTURAL), SANDWICH CONSTRUCTION, COSTS, FLEXURAL STRENGTH, SPECIFICATIONS, MASKING, FEASIBILITY STUDIES (U)

CONTOURING ALUMINUM HONEYCOMB CORE BY MECHANICAL MEANS IS DIFFICULT AND EXPENSIVE. A REVOLUTIONARY METHOD OF CONTOURING BY CHEMICAL MILLING HAS BEEN INVENTED. THIS PROCESS HAS BEEN SUCCESSFULLY APPLIED TO 1/4 INCH CELL-SIZED CORES. THE PROBLEM WAS TO CONTOUR 1/8 INCH CELL-SIZED CORES. SINCE THIS IS A PRODUCTION ITEM. THIS PROJECT WAS AN ATTEMPT TO ADAPT THE PROCESS TO 1/8 INCH CELL-SIZED CORES. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOML6

AD-680 561 13/8
FOREIGN TECHNOLOGY DIV WRIGHT-PATTERSON AFB OHIO

CHEMICAL MILLING (DEEP CONTOUR ETCHING). (U)

MAY 68 14P TARASOVA,V. A. I
REPT. NO. FTD-HT-23-1225-67

UNCLASSIFIED REPORT
PORTIONS OF THIS DOCUMENT ARE ILLEGIBLE. SEE INTRODUCTION SECTION OF THIS ANNOUNCEMENT JOURNAL FOR CFST; ORDERING INSTRUCTIONS.
SUPPLEMENTARY NOTE: UNEDITED ROUGH DRAFT TRANS. OF MONO. SPRAVOCHNIK MASHINOSTROITELYA (REFERENCE BOOK FOR THE MECHANICAL ENGINEER) N.P., 1963 V5 BK. 1 P387-393, BY E. HARTER.

DESCRIPTORS: (•CHEMICAL MILLING, REVIEWS), INORGANIC ACIDS, CLEANING, MASKING, ETCHING, LIQUID IMMERSION TESTS, ALUMINUM ALLOYS, TITANIUM ALLOYS, STAINLESS STEEL, TABLES, POLYVINYL CHLORIDE, USSR (U)
IDENTIFIERS: TRANSLATIONS (U)

FOR THE SHAPING OF PARTS, INSTEAD OF MECHANICAL REMOVING OF MATERIAL TO OBTAIN A GIVEN FORM THERE IS DESCRIBED A METHOD OF ETCHING THE MATERIAL AWAY WITH CHEMICALS. THERE ARE FOUR OPERATIONS INVOLVED IN THIS PROCESS. THE MATERIAL NOT TO BE REMOVED IS PROTECTED BY PAINTS AND VARNISHES, PREFERABLY CHLORINATED-POLYVINYL-CHLORIDE LACQUERS AND ENAMELS. ADHESIVE TAPES AND RUBBER ARE ALSO USED. THE SURFACE HAS TO BE PREPARED BEFOREHAND. NOT MORE THAN 24 HOURS SHOULD ELAPSE BETWEEN THE APPLYING OF THESE PROTECTIONS AND THE ETCHING WORK. WEAKENING AND WARPING IS AVOIDED BY USING CHEMICALS INSTEAD OF MACHINING. EXTENSIVE TABLES ARE ATTACHED GIVING DIRECTIONS FOR THE PREPARING AND APPLYING THE COATINGS TO PROTECT MATERIAL NOT TO BE REMOVED AND FOR REMOVING THE COATING AFTERWARDS. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOML6

AD-681 765 11/6
GENERAL DYNAMICS/ASTRONAUTICS SAN DIEGO CALIF

A NEW APPROACH TO BEND TESTING FOR THE DETERMINATION OF HYDROGEN EMBRITTLEMENT SUSCEPTIBILITY OF SHEET MATERIALS. (U)

JUN 61 31P JONES,R. L. ;
REPT. NO. GDA-MRG-235

UNCLASSIFIED REPORT

DESCRIPTORS: (*METAL PLATES, HYDROGEN EMBRITTLEMENT), (*HYDROGEN EMBRITTLEMENT, TEST METHODS), STEEL, BENDING, COMPRESSIVE PROPERTIES, CHEMICAL MILLING, ELECTROPLATING, CADMIUM, FAILURE(MECHANICS), DUCTILITY, STRESSES, HYDROGEN, DIFFUSION, STRESS RELIEVING (U)
IDENTIFIERS: STEEL 4340 (U)

A SERIES OF EXPERIMENTAL PROGRAMS WERE CARRIED OUT TO DETERMINE THE SUITABILITY AND SENSITIVITY OF A NEW TEST TECHNIQUE FOR THE DETERMINATION OF HYDROGEN EMBRITTLEMENT SUSCEPTIBILITY OF MATERIALS. A SIMPLE BEND TEST WAS USED TO STUDY THE EFFECT OF CHEMICAL MILLING AND CADMIUM PLATING ON HYDROGEN EMBRITTLEMENT OF HIGH STRENGTH 4340 STEEL SHEET. THE BEND TEST CONSISTED OF LOADING A COUPON IN THE FORM OF A SLENDER COLUMN IN COMPRESSION AT A SERIES OF FIXED BENDING SPEEDS. BEND DUCTILITY WAS MEASURED AS THE DEPRESSION OF COLUMN HEIGHT AT FRACTURE AND ALL DATA WERE REFERRED BACK TO A BASE LINE CONDITION (NON-EMBRITTLED) FOR COMPARISON. (AUTHOR) (U)

DOC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOML6

AD-683 061 13/8 11/6
BOEING CO RENTON WASH COMMERCIAL AIRPLANE DIV

DETERMINATION OF RESIDUAL STRESS PROFILES BY X-RAY DIFFRACTION AND STRAIN GAGE METHODS FOR BRAKE-PRESS FORMED TI-6AL-4V. (U)

DEC 68 41P ESQUIVEL,A. L. ;
REPT. NO. D6-23737

UNCLASSIFIED REPORT

DESCRIPTORS: (*TITANIUM ALLOYS, STRESSES), (*NON-DESTRUCTIVE TESTING, TITANIUM ALLOYS), X-RAY DIFFRACTION ANALYSIS, STRAIN GAGES, COLD WORKING, STRESS RELIEVING, CHEMICAL MILLING, METAL-FORMING BRAKES (U)
IDENTIFIERS: TITANIUM ALLOY 6AL 4V, *RESIDUAL STRESS (U)

THE RESIDUAL STRESS PROFILES (STRESS VERSUS DEPTH) FROM BRAKE-PRESS FORMED TI-6AL-4V (ANNEALED) RIGHT ANGLE BENDS WERE DETERMINED BY THE TWO-EXPOSURE X-RAY DIFFRACTION METHOD AND A STRESS RELAXATION STRAIN GAGE METHOD USING EITHER CONTINUOUS OR STEPWISE (INCREMENTAL) CHEM-MILLING. RESULTS FROM THE STRAIN GAGE METHOD WERE TESTED ON FOUR AVAILABLE STRESS FORMULATIONS. THE HAIGH EQUATION (COMPUTER PROGRAM: NORS) WAS FOUND MOST SUITABLE AND IS RECOMMENDED FOR FUTURE USE. A REASONABLE CORRESPONDENCE WAS FOUND BETWEEN THE RESIDUAL STRESSES CALCULATED FROM X-RAY PEAK SHIFT DATA AND THOSE FROM STRAIN GAGE DATA. RESIDUAL STRESSES OBTAINED BY THE STRAIN GAGE METHOD UTILIZING CHEM-MILLING WERE FOUND REPRODUCIBLE TO WITHIN 3 TO 5 KSI. RESIDUAL STRESS PROFILES OF THE BRAKE-PRESS FORMED BENDS INDICATE COMPRESSIVE STRESS (-30 KSI) NEAR THE OUTSIDE BEND SURFACE AND TENSILE STRESSES (40 TO 50 KSI) ON THE INSIDE BEND SURFACE. DEPTH OF THE COMPRESSIVE STRESSES VARIED FROM 0.008 TO 0.012 INCH. NO SIGNIFICANT DIFFERENCES WERE FOUND BETWEEN THE RESIDUAL STRESS PROFILES OF BENDS 0.045-INCH THICK AND THOSE 0.050-INCH THICK. (AUTHOR) (U)

UDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOML6

AD-725 614 13/8 5/2
NAVAL MATERIAL INDUSTRIAL RESOURCES OFFICE PHILADELPHIA PA

NAVMIRO MANUFACTURING TECHNOLOGY BULLETIN. NUMBERS 1 THRU 12, DECEMBER 1969-NOVEMBER 1970. (U)

NOV 70 79P

UNCLASSIFIED REPORT

DESCRIPTORS: (*MANUFACTURING METHODS, REVIEWS), MACHINE SHOP PRACTICE, PRECISION FINISHING, LASERS, POWDER METALLURGY, SINTERING, EXPLOSIVE FORMING, ULTRASONIC WELDING, COMPOSITE MATERIALS, CUTTING TOOLS, COOLING, CHEMICAL MILLING, ELECTRON BEAM MELTING, SPARK MACHINING, FORGING, NON-DESTRUCTIVE TESTING, CASTING (U)
IDENTIFIERS: COMPUTER AIDED DESIGN (U)

THE DOCUMENT IS A COMPILATION OF MANUFACTURING TECHNIQUES THAT CAN BE EMPLOYED IN VARIED INDUSTRIES(U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOML6

AD-727 620 :3/8
GRUMMAN AEROSPACE CORP BETHPAGE N Y

ADVANCED CHEMICAL MILLING PROCESSES. (U)

DESCRIPTIVE NOTE: FINAL TECHNICAL REPT. 1 JUL 69-31 DEC 70.
MAR 71 213P STAEBLER,CHRISTIAN J. , JR;
CONTRACT: F33615-69-C-1840
PROJ: AF-705-9
MONITOR: AFML TR-71-44

UNCLASSIFIED REPORT

DESCRIPTORS: (*CHEMICAL MILLING, *TITANIUM ALLOYS), AUTOMATION, INORGANIC ACIDS, MASKING, ETCHING, HEAT TREATMENT, MECHANICAL WORKING, AIR POLLUTION (U)
IDENTIFIERS: HYDROFLUORIC ACID (U)

THE PROGRAM OBJECTIVE WAS TO IMPROVE THE CAPABILITY, RELIABILITY, AND COST EFFECTIVENESS OF CHEMICAL MILLING WHEN APPLIED TO SELECTED AEROSPACE STRUCTURAL MATERIALS. A COMPLETELY AUTOMATED, CENTRIFUGAL REGENERATION SYSTEM FOR TITANIUM HYDROFLUORIC ACID ETCHANT WAS DESIGNED, FABRICATED, AND TESTED. THIS SYSTEM AUTOMATICALLY ANALYZES THE ETCHANT, ADDS FRESH ACID, DETERMINES THE TITANIUM CONCENTRATION, AND ACTIVES A CENTRIFUGE WHICH REMOVES PRECIPITATED TITANIUM AND RECLAIMS THE ETCHANT. A NEW, STYRENE-BUTADIENE MASKANT WAS DEVELOPED THAT GIVES EXCELLENT LINE DEFINITION ON TITANIUM SUBSTRATES AND THAT CAN BE MANUFACTURED FOR ABOUT ONE-HALF THE COST OF COMMERCIALLY AVAILABLE MASKANTS. THE FEASIBILITY OF USING A LASER-DRILLED, HIGH-ENERGY WATER JET TO SCRIBE CHEM-MILLING MASKANTS WAS ESTABLISHED. OPTIMUM CHEM-MILLING/FORMING METHODIZING SEQUENCES WERE ESTABLISHED THAT MINIMIZE DISTORTION OF TITANIUM ALLOY DETAIL PARTS. SAMPLING AND ANALYTICAL TECHNIQUES WERE ESTABLISHED FOR THE MAJOR POLLUTANTS EMITTED BY CHEM-MILLING OPERATIONS. AIR POLLUTION CONTROL AGENCIES AND EQUIPMENT MANUFACTURERS WERE SURVEYED. (AUTHOR) (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOML6

AD#738 271 13/8
BATTELLE COLUMBUS LABS OHIO METALS AND CERAMICS INFORMATION CENTER

NONTRADITIONAL MACHINING OF BERYLLIUM, (U)

JAN 72 91P GURKLIS,JOHN A. ;
REPT. NO. MCIC-72-03

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: LIBRARY OF CONGRESS CATALOG CARD NO. 78-190407.

DESCRIPTORS: (*ELECTROEROSIVE MACHINING, BERYLLIUM), (*CHEMICAL MILLING, BERYLLIUM), (*BERYLLIUM, MACHINING), MACHINE TOOLS (U)
IDENTIFIERS: *ELECTROCHEMICAL MACHINING (U)

THE REPORT DEALS WITH ELECTRICHEMICAL MACHINING (ECM), CHEMICAL MILLING, AND ELECTRIC-DISCHARGE MACHINING (EDM). THE GENERAL CHARACTERISTICS OF THESE PROCESSES AND THEIR APPLICATIONS TO THE PROCESSING OF BERYLLIUM PARTS ARE PRESENTED AND COVERED IN DETAIL. (U)

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZOML6

AD-870 146 13/8 11/6 1/3
METCUT RESEARCH ASSOCIATES INC CINCINNATI OHIO

SURFACE INTEGRITY OF MACHINED STRUCTURAL COMPONENTS. (U)

DESCRIPTIVE NOTE: FINAL TECHNICAL REPT. 1 FEB 68-30 NOV 69,
MAR 70 361P KOSTER,WILLIAM P. ;FIELD, MICHAEL ;KAHLES,JOHN F. ;FRITZ,LOUIS J. ; GATTO,LUCIANO R. ;
REPT. NO. 970-11700
CONTRACT: F33615-68-C-1003
PROJ: AF-721-8
MONITOR: AFML TR-70-11

UNCLASSIFIED REPORT

DESCRIPTORS: (*AIRFRAMES, STRUCTURAL PARTS), (*MATERIAL REMOVAL, EFFECTIVENESS), MILLING MACHINES, GRINDING, DRILLING, ELECTROLYTIC POLISHING, ELECTROEROSIVE MACHINING, CHEMICAL MILLING, MICROSTRUCTURE, MARTENSITE, DEFECTS(MATERIALS), SURFACE ROUGHNESS, STRESS CORROSION, FATIGUE(MECHANICS), AGING(MATERIALS) (U)
IDENTIFIERS: NICKEL ALLOY INCONEL 718, TITANIUM ALLOY 6AL 4V, STEEL 4340, ELECTROCHEMICAL MACHINING, ELECTRICAL DISCHARGE MACHINING, CHEMICAL MACHINING (U)

A PROGRAM HAS BEEN RUN TO EVALUATE THE EFFECTS OF DIFFERENT METAL REMOVAL METHODS AND VARIATIONS OF THESE METHODS ON SURFACE INTEGRITY. THREE ALLOYS WERE STUDIED: BETA ROLLED TI-6AL-4V; AISI 4340, QUENCHED AND TEMPERED, 50 RC; AND INCONEL 718, SOLUTION TREATED AND AGED. VARIOUS GRINDING PROCEDURES CAUSED THE TITANIUM ALLOY TO EXHIBIT A FATIGUE STRENGTH RANGE OF 13 TO 62 KSI. THE FATIGUE STRENGTH OF 4340 DUE TO GRINDING VARIABLES RANGED FROM 62 TO 102 KSI, WHILE INCONEL 718 SHOWED A RANGE OF 24 TO 60 KSI. ABUSIVE GRINDING CONDITIONS ALWAYS RESULTED IN FATIGUE STRENGTHS AT THE MINIMUM OF THESE RANGES. MILLING VARIABLES EXHIBITED A FATIGUE STRENGTH RANGE OF 32 TO 72 KSI IN THE BETA ROLLED TITANIUM ALLOY. EDM AND ECM ON INCONEL 718 YIELDED 22 AND 39 KSI, RESPECTIVELY, COMPARED TO 60 KSI FOR GENTLE GRINDING. GUIDELINES FOR PROCESSING AEROSPACE HARDWARE CONSIDERING SURFACE INTEGRITY REQUIREMENTS ARE PRESENTED IN THE REPORT. (U)

CORPORATE AUTHOR - MONITORING AGENCY

BERYLLIUM AND BERYLLIUM ALLOYS.
AD-674 066

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M144
A REVIEW OF RECENT DEVELOPMENTS IN TITANIUM AND TITANIUM ALLOY TECHNOLOGY
AD-269 209

•BELL TELEPHONE LABS INC WHIPPANY N J

• • •

12
ENGINEERING SERVICES ON TRANSISTORS.
AD-422 492

•BOEING CO RENTON WASH COMMERCIAL AIRPLANE DIV

• • •

D6-23737
DETERMINATION OF RESIDUAL STRESS PROFILES BY X-RAY DIFFRACTION AND STRAIN GAGE METHODS FOR BRAKE-PRESS FORMED TI-6AL-4V.
AD-683 041

•BOEING CO WICHITA KANS WICHITA DIV

• • •

BOEING-WICHITA MATERIALS AND RESEARCH DEVELOPMENT PROGRAMS, 1957-1961
AD-271 167

•CRYSTALONICS INC CAMBRIDGE MASS

• • •

PRODUCTION ENGINEERING MEASURE TO IMPROVE PRODUCTION TECHNIQUES AND TO INSURE THE RELIABILITY OF THE C600 SERIES FIELD EFFECT TRANSISTORS.
AD-426 956

• • •

PRODUCTION ENGINEERING MEASURE TO IMPROVE PRODUCTION TECHNIQUES AND TO INSURE THE RELIABILITY OF THE C600 SERIES FIELD EFFECT TRANSISTORS.
AD-606 477

• • •

PRODUCTION ENGINEERING MEASURE TO IMPROVE PRODUCTION TECHNIQUES AND TO INSURE THE RELIABILITY OF THE C600 SERIES FIELD EFFECT TRANSISTORS.
AD-613 068

•DOUGLAS AIRCRAFT CO INC LONG BEACH CALIF

• • •

CHEMICAL COMPOUNDS FOR METAL SHAPING
(ASD-TR7 643 V1)
AD-271 526

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CHEMICAL COMPOUNDS FOR METAL SHAPING
(AFCRL-1111)
AD-282 920

• • •

TR7 648 V3
CHEMICAL COMPOUNDS FOR METAL SHAPING
(ASD-TR7 648 V3)
AD-295 752

•ESTABLISHMENT MALVERN (ENGLAND)

• • •

RSIC-409
MACHINING AND GRINDING OF TITANIUM AND ITS ALLOYS.
AD-620 508

• • •

RSIC-482
MACHINING AND GRINDING OF NICKEL-AND COBALT-BASE ALLOYS.
AD-634 075

• • •

RSIC-501
MACHINING AND GRINDING OF ULTRAHIGH-STRENGTH STEELS AND STAINLESS STEEL ALLOYS.
AD-639 654

•FOREIGN TECHNOLOGY DIV WRIGHT-PATTERSON AFB OHIO

• • •

ELECTRIC AND CHEMICO-MECHANICAL METHODS OF WORKING METALS (CHAPTER VII)
AD-205 701

• • •

FTD-HT-23-1225-67
CHEMICAL MILLING (DEEP CONTOUR ETCHING),
AD-680 561

• • •

FTD-TT-65-805
CHEMICAL MILLING,
(TT-65-62694)
AD-618 628

• • •

FTD-TT-65-1539
SECONDARY ELECTRONIC EMISSION OF COPPER AND OF CERTAIN COATINGS,
(TT-66-61136)
AD-631 855

•FRANKLIN INST PHILADELPHIA PA LABS FOR RESEARCH AND DEVELOPMENT

• • •

F-A2400
RESEARCH IN THE GENERAL FIELD OF SUBSTRUCTURE AND DISLOCATION NETWORKS IN METALLIC CRYSTALS.
(AFOSR-2574)
AD-610 434

•GENERAL DYNAMICS/ASTRONAUTICS SAN DIEGO CALIF

• • •

GDA-AN61AMR4062
STRIPPING PT201 THERMOSETTING RESIN COATINGS FROM 321 ANNEALED STAINLESS STEEL SURFACES,
(PROPELLANT UTILIZATION MANOMETER HOUSINGS),
AD-677 494

• • •

GDA-MRG-235
A NEW APPROACH TO BEND TESTING FOR THE DETERMINATION OF HYDROGEN EMBRITTLEMENT SUSCEPTIBILITY OF SHEET MATERIALS,
AD-681 765

•GENERAL DYNAMICS/CONVAIR SAN DIEGO CALIF

• • •

TITANIUM DEVELOPMENT PROGRAM. VOLUME IV.
(ASD-TR6?7 576)
AD-264 685

• • •

GDC-PR919
REDUCING HAND STRAIGHTENING BY CHEM-MILLING 7075 AND 7178 ALUMINUM ALLOY IN THE 'W' (OR NATURALLY AGED) CONDITION.
AD-677 066

• • •

GDC-PR-920
CHEM-MILL PROCESS FOR CONTOURING ALUMINUM HONEYCOMB CORE.
AD-678 154

•GENERAL DYNAMICS/FORT WORTH TEX

• • •

ERR FW135
DEVELOPMENT OF CHEMICAL MILLED WAFFLE GRID BERYLLIUM STRUCTURAL PANEL,
AD-423 288

• • •

FGT 2100
WING - ALUMINUM SHEET AND PLATE - DYNAMIC ETCHED OR CHEM-MILLED - MECHANICAL PROPERTIES - DETERMINATION OF
AD-286 074

• • •

FGT 2510
MATERIALS - HONEYCOMB CORE RIBBON RELATIONSHIP BETWEEN FLOW CHARACTERISTICS OF BRAZING ALLOY AND OXIDE FILM FORMATIONS OF - DETERMINATION OF
AD-272 227

• • •

FTDM 3068
MATERIAL BERYLLIUM WAFFLE PANEL, CHEMICAL MILLED, SHEAR TEST OF,
AD-438 138

•GENERAL DYNAMICS/POMONA CALIF

• • •

8926 142
EFFECT OF SURFACE FINISHES ON FATIGUE LIFE
AD-402 164

•GENERAL ELECTRIC CO IRMC S C
• • •
SOLID ELECTROLYTE TANTALUM FOIL CAPACITOR.
AD-423 325

•GENERAL ELECTRIC CO SCHENECTADY N Y
• • •
SILICON PLANAR EPITAXIAL TRANSISTOR TYPE 2N2193
AD-286 886
• • •
SILICON PLANAR EPITAXIAL TRANSISTPE 2N2193.
AD-404 185

•GENERAL ELECTRIC CO SYRACUSE N Y
• • •
MATRIX CONTROLLED DISPLAY DEVICE.
AD-418 684

•GENERAL MOTORS CORP KOKOMO IND DELCO RADIO DIV
• • •
PRODUCTION ENGINEERING MEASURE TO IMPROVE PRODUCTION TECHNIQUES AND INCREASE THE RELIABILITY OF THE 2N1358A TRANSISTOR
AD-286 872

•GRUMMAN AEROSPACE CORP BETHPAGE N Y
• • •
ADVANCED CHEMICAL MILLING PROCESSES.
(AFML-TR-71-44)
AD-727 620

•HARRY DIAMOND LABS WASHINGTON D C
• • •
TR-1052
MICROCIRCUITRY BY CHEMICAL DEPOSITION.
AD-281 849

•HARSHAW CHEMICAL CO CLEVELAND OHIO
• • •
INVESTIGATION OF THIN FILM CADMIUM SULFIDE SOLAR CELLS.
AD-609 425
• • •
RESEARCH ON PHOTOVOLTAIC CELLS.
(ARL-A3-111)
AD-621 454

•HONEYWELL RESEARCH CENTER HOPKINS MINN
• • •
THIN FILM IMAGE CONVERTER.
AD-453 855

•IIT RESEARCH INST CHICAGO ILL
• • •
B241 3
FIBER-REINFORCED METALS AND ALLOYS
AD-287 594
• • •
B241 4
FIBER-REINFORCED METALS AND ALLOYS
AD-293 259

•INNSBRUCK UNIV (AUSTRIA)
• • •
DISLOCATION MOBILITY IN ZINC SINGLE CRYSTALS
AD-293 445

•JOHNS HOPKINS UNIV SILVER SPRING MD APPLIED PHYSICS LAB
• • •
TG-675
THE MINISTICK PROCESS FOR PACKAGING INTEGRATED CIRCUIT FLAT PACKS.
AD-468 374

•KELSEY-HAYES CO ROMULUS MICH
• • •
THE DESIGN AND EVALUATION OF PERFORATED ION EMITTERS.
(ASD-TDR62 750)
AD-418 226

•LEAR SIEGLER INC SANTA MONICA CALIF
• • •

SEMICONDUCTOR THIN FILMS.
AD-412 841

•LINDEN LABS INC STATE COLLEGE PA

• • •

MACHINING HIGH PURITY ALUMINA.
AD-614 467

•LOCKHEED MISSILES AND SPACE CO SUNNYVALE CALIF

• • •

R5632 3 80 61 41
PACKAGING MINIATURIZATION.
CHARGE NUMBERS 31-8027-0201-01, 31-8027-0901 AND RES 2 AND 4,
AD-433 115

•MARTIN CO BALTIMORE MD

• • •

THE EFFECT OF SURFACE-ACTIVE AGENTS ON THE MECHANICAL PROPERTIES OF METALS. PART II. THE EFFECT OF SURFACE-ACTIVE AGENTS ON THE MECHANICAL BEHAVIOR OF ALUMINUM SINGLE CRYSTALS.
(MADD-TR-61-58-PT-2)
AD-292 017

•MARTIN CO DENVER COLO

• • •

WDD-M-MI-57-60
MANUAL AND REPAIR WELDING OF CHEMICALLY MILLED 2014-T6 ALUMINUM SHEETING,
AD-606 819

•MCDONNELL AIRCRAFT CORP ST LOUIS MO

• • •

MOLYBDENUM STRUCTURAL COMPONENT PROGRAM
AD-272 526

• • •

A239
CHEMICAL MILLING OF NARROW CLOSE TOLERANCE SLOTS IN ALUMINUM AND STAINLESS STEEL.
AD-425 102

• • •

A473
DETERMINATION OF MECHANICAL PROPERTIES AND SURFACE CONDITION OF CHEM-MILLED CB-3ZR COLUMBIUM ALLOY SAMPLES,
AD-431 617

• • •

A478
ELECTROCHEMICAL DEBURRING OF MOLYBDENUM, ALUMINUM AND STAINLESS STEEL.
AD-431 602

•METAL HYDRIDES INC BEVERLY MASS

• • •

AD-267 806

• • •

INVESTIGATION OF SINGLE-CRYSTAL AND POLYCRYSTALLINE TITANIUM DIBORIDE; METALLOGRAPHIC PROCEDURES AND FINDINGS
(ASD-TR61 350)
AD-271 965

•METCUT RESEARCH ASSOCIATES INC CINCINNATI OHIO

• • •

970-11700
SURFACE INTEGRITY OF MACHINED STRUCTURAL COMPONENTS.
(AFML-TR-70-11)
AD-870 146

•MOTOROLA INC PHOENIX ARIZ

• • •

PRODUCTION ENG.NEERING MEASURE. HIGH SPEED SEMICONDUCTOR SWITCH (TWO TERMINAL) HIGH SPEED SEMICONDUCTOR SWITCH (GATE).
AD-603 660

•MOTOROLA INC PHOENIX ARIZ SEMICONDUCTOR PRODUCTS DIV

• • •

PRODUCTION ENGINEERING MEASURE FOR SILICON OVERLAY TRANSISTORS.
AD-619 295

• • •

PRODUCTION ENGINEERING MEASURE FOR SILICON OVERLAY TRANSISTORS.
AD-625 317

• • •

PRODUCTION ENGINEERING MEASURE

FOR SILICON OVERLAY TRANSISTORS.
AD-628 230

• • •

PRODUCTION ENGINEERING MEASURE FOR SILICON OVERLAY TRANSISTORS.
AD-635 814

•NATIONAL AERONAUTICS AND SPACE ADMINISTRATION WASHINGTON D C

• • •

NASA-TM-X-53312
MACHINING AND GRINDING OF TITANIUM AND ITS ALLOYS.
AD-620 508

• • •

NASA-TM-X-53433
MACHINING AND GRINDING OF ULTRAHIGH-STRENGTH STEELS AND STAINLESS STEEL ALLOYS.
AD-639 694

• • •

NASA-TM-X-53446
MACHINING AND GRINDING OF NICKEL- AND COBALT-BASE ALLOYS.
AD-634 075

•NATIONAL SEMICONDUCTOR CORP DANBURY CONN

• • •

PRODUCTION ENGINEERING MEASURE TO IMPROVE PRODUCTION TECHNIQUES AAND INCREASE THE RELIABILITY OF THE 2N328A TRANSISTOR.
AD-614 823

•Naval Air Engineering Center Philadelphia PA Aeronautical Materials Lab

• • •

NAEC-AML-1909
STUDY OF SIZE EFFECT IN FINE BERYLLIUM WIRE PHASE II,
AD-438 478

• • •

NAEC-AML-2418
CHEMICAL MILLING OF ALLOY STEELS,
AD-631 952

• • •

NAEC-AML-2441
INFLUENCE OF SOME PROCESSING VARIABLES UPON THE ELEVATED AND ROOM TEMPERATURE STRENGTH OF ULTRAFINE BERYLLIUM WIRES,
AD-633 992

•NAVAL AIR MATERIAL CENTER PHILADELPHIA PA AERONAUTICAL MATERIALS LAB

• • •

NAMC-AML-1236
CHEMICAL MILLING OF METALS AND ALLOYS: ITS EFFECT ON STRESS CORROSION SUSCEPTIBILITY AND HYDROGEN EMBRITTLEMENT,
AD-648 980

•NAVAL MATERIAL INDUSTRIAL RESOURCES OFFICE PHILADELPHIA PA

• • •

NAVMIRO MANUFACTURING TECHNOLOGY BULLETIN. NUMBERS 1 THRU 12, DECEMBER 1969-NOVEMBER 1970.
AD-728 614

•NAVAL ORDNANCE LAB WHITE OAK MD

• • •

NOLTR-[illegible]-196
POLISHES AND ETCHES FOR TIN TELLURIDE, LEAD SULFIDE, LEAD SELENIDE, AND LEAD TELLURIDE,
AD-423 367

• • •

NOLTR-66-32
POLISHES AND ETCHES FOR TIN TELLURIDE, LEAD SULFIDE, LEAD SELENIDE, AND LEAD TELLURIDE: SUPPLEMENT.
AD-634 342

•NORTHROP AIRCRAFT INC HAWTHORNE CALIF

• • •

NOR 61 199
DEVELOPMENT OF IMPROVED METHODS, PROCESSES, AND TECHNIQUES FOR PRODUCING STEEL EXTRUSIONS
AD-262 104

•PENNSYLVANIA STATE UNIV UNIVERSITY PARK

PHI-TEX

• • •

INFLUENCE OF DISPLACIVE-SHEARING STRESSES ON THE KINETICS OF RECONSTRUCTIVE TRANSFORMATIONS EFFECTED BY PRESSURE IN THE RANGE 0-100,000 BARS
AD-256 351

•PHILCO CORP LANSDALE PA

• • •

R 232 I
PEM FOR TRANSISTOR MANUFACTURING PROCESS IMPROVEMENT
AD-286 907

•PHOTOCIRCUITS CORP GLEN COVE N Y

• • •

MICROMINIATURE LAYERED PRINTED WIRING
AD-291 876

• • •

MICROMINIATURE LAYERED PRINTED WIRING
AD-400 732

•RADIO CORP OF AMERICA SOMERVILLE N J

• • •

PRODUCTION ENGINEERING MEASURE ON 2N1709 SILICON PLANAR EPITAXIAL TRANSISTOR.
AD-409 537

• • •

PRODUCTION ENGINEERING MEASURE ON 2N1708 SILICON PLANAR EPITOXIAL TRANSISTOR.
AD-414 913

•RAYTHEON CO LEWISTON MAINE

• • •

PRODUCTION ENGINEERING MEASURE ON SILICON ALLOY TRANSISTORS.
AD-422 940

•RENSSELAER POLYTECHNIC INST TROY N Y

• • •

TC-2
PRINCIPLES OF METALLOGRAPHIC ETCHING.
AD-616 786

•ROME AIR DEVELOPMENT CENTER GRIFFISS AFB N Y

• • •

RADC-TDR64 252
FAILURE MECHANISMS IN MICROELECTRONICS.
AD-607 426

•SIGNETICS CORP SUNNYVALE CALIF

• • •

AN ECONOMICAL FLAT PACKAGE FOR INTEGRATED CIRCUITS.
AD-450 549

•SILICON TRANSISTOR CORP GARDEN CITY N Y

• • •

PRODUCTION ENGINEERING MEASURE TO INCREASE THE RELIABILITY OF THE TRANSISTOR TYPE 2N2034.
AD-606 191

•SPRAGUE ELECTRIC CO NORTH ADAMS MASS

• • •

PRODUCTION ENGINEERING MEASURE RELIABILITY IMPROVEMENT JCI ETCH TRANSISTOR
AD-295 057

•SYLVANIA ELECTRIC PRODUCTS INC WOBURN MASS

• • •

PRODUCTION ENGINEERING MEASURE FOR GALLIUM ARSENIDE VARACTOR DIODE.
AD-419 585

•TEXAS INSTRUMENTS INC DALLAS

• • •

RESEARCH AND DEVELOPMENT OF HIGH TEMPERATURE SEMICONDUCTOR DEVICES
AD-298 707

• • •

03-64-71
PRODUCTION ENGINEERING MEASURES (PEM) FOR A GERMANIUM MICROWAVE TRANSISTOR.
AD-612 617

• • •

IR7 865 V6
SILICON SEMICONDUCTOR NETWORKS

MANUFACTURING METHODS
(ASD-TR7 865 V6)
AD-291 600

•TRW SEMICONDUCTORS INC LAWNDALE CALIF RESEARCH AND DEVELOPMENT DEPT

• • •

59-RD-F
TRANSISTOR, VHF, SILICON, POWER (10W-900MC).
AD-622 879

•WATERVLIET ARSENAL N Y

• • •

WVT RI 60001 (RI 60001 I
CHEMICAL MILLING
AD-252 129

•WESTINGHOUSE DEFENSE AND SPACE CENTER BALTIMORE MD

• • •

WDSC-385A4
FAILURE MECHANISMS IN MICROELECTRONICS.
(RADC-TDR64 252)
AD-607 426

•WESTINGHOUSE ELECTRIC CORP DAYTON OHIO

• • •

500 C SILI[illegible]CARBIDE RECTIFIER PROGRAM.
(ASD-TR7 727)
AD-420 373

•WESTINGHOUSE ELECTRIC CORP YOUNGWOOD PA

• • •

MICROMINIATURE INTEGRATED CIRCUIT PACKAGE.
AD-405 861

•WRIGHT AIR DEVELOPMENT DIV WRIGHT-PATTERSON AFB OHIO

• • •

WADD-TR-61-58-PT-2
THE EFFECT OF SURFACE-ACTIVE AGENTS ON THE MECHANICAL PROPERTIES OF METALS. PART II. THE EFFECT OF SURFACE-ACTIVE AGENTS ON THE MECHANICAL BEHAVIOR OF ALUMINUM SINGLE CRYSTALS.
AD-282 017

•XEROX CORP ROCHESTER N Y

• • •

LOW-COST MICROCIRCUITS FOR MICROASSEMBLIES.
AD-433 891

SUBJECT INDEX

CHEM-MILLING 7075 AND 7178 ALUMINUM ALLOY IN THE 'W' (OR NATURALLY AGED) CONDITION.•
AD-677 066

BERYLLIUM
NONTRADITIONAL MACHINING OF BERYLLIUM.•
AD-738 271

CRYSTALS
POLISHES AND ETCHES FOR TIN TELLURIDE, LEAD SULFIDE, LEAD SELENIDE, AND LEAD TELLURIDE.•
AD-423 367
POLISHES AND ETCHES FOR TIN TELLURIDE, LEAD SULFIDE, LEAD SELENIDE, AND LEAD TELLURIDE: SUPPLEMENT.•
AD-634 392

FLUIDS
CHEMICAL MILLING OF NARROW CLOSE TOLERANCE SLOTS IN ALUMINUM AND STAINLESS STEEL.•
AD-425 102

HONEYCOMB CORES
CHEM-MILL PROCESS FOR CONTOURING ALUMINUM HONEYCOMB CORE.•
AD-678 154

MANUFACTURING METHODS
TRANSLATION OF RUSSIAN RESEARCH: CHEMICAL MILLING.
AD-618 628

METALS
METAL REMOVAL BY ELECTROCHEMICAL METHODS AND ITS EFFECTS ON MECHANICAL PROPERTIES OF METALS.
AD-613 261

REVIEWS
CHEMICAL MILLING (DEEP CONTOUR ETCHING)--TRANSLATION.
AD-680 561

STAINLESS STEEL
STRIPPING PT201 THERMOSETTING RESIN COATINGS FROM 321 ANNEALED STAINLESS STEEL SURFACES, (PROPELLANT UTILIZATION MANOMETER HOUSINGS),•
AD-677 494

STEEL
CHEMICAL MILLING OF ALLOY STEELS.
AD-631 952

TITANIUM ALLOYS
ADVANCED CHEMICAL MILLING PROCESSES.•
AD-727 620

WIRE
INFLUENCE OF SOME PROCESSING VARIABLES UPON THE ELEVATED AND ROOM TEMPERATURE STRENGTH OF ULTRAFINE BERYLLIUM WIRES,•
AD-633 992

•CIRCUITS
MICROCIRCUITRY DEVELOPED BY CHEMICALLY DEPOSITING NI ALLOY FILMS ON INSULATING SUBSTRATES AND CHEMICAL ETCHING PATTERNS IN THIN CU CONDUCTORS. RESISTIVE AND CONDUCTIVE PARTS MADE OF NI ALLOY FILMS OF APPROX. 500 OHMS PER SQUARE WERE USED.
AD-281 843

•COATINGS
MOLYBDENUM STRUCTURAL COMPONENT PROGRAM•
AD-272 526

•COBALT ALLOYS
MATERIAL REMOVAL
MACHINING AND GRINDING OF NICKEL- AND COBALT-BASE ALLOYS.
AD-634 075

•COMPOSITE MATERIALS
DEVELOPMENT OF FIBER-REINFORCED METALS AND ALLOYS; PREPARATION OF BE FIBER-AG ALLOY MATRIX COMPOSITES.
AD-267 594
DEVELOPMENT OF FIBER-REINFORCED

METALS AND ALLOYS WITH HIGH STRENGTH-TO-WEIGHT RATIOS, HIGH ELASTIC MODULI; HOT EXTRUSION; FABRICATION; AL-BE ALLOYS.
AD-293 259

•COPPER ALLOYS
SECONDARY EMISSION
TRANSLATION OF RUSSIAN ARTICLE: SECONDARY ELECTRONIC EMISSION OF COPPER AND OF CERTAIN COATINGS.
AD-631 855

•CORROSION-RESISTANT ALLOYS
TITANIUM
CHEMICAL MILLING OF METALS AND ALLOYS; ITS EFFECT ON STRESS CORROSION SUSCEPTIBILITY AND HYDROGEN EMBRITTLEMENT.•
AD-648 980

•CRYSTAL RECTIFIERS
SILICON ALLOYS
900 C SILICON CARBIDE RECTIFIER PROGRAM.•
AD-420 279

•CRYSTAL STRUCTURE
METALLIC CRYSTALS
SUBSTRUCTURE AND DISLOCATION NETWORKS IN METALLIC CRYSTALS.
AD-610 434

•CRYSTALS
INVESTIGATION OF SINGLE-CRYSTAL AND POLYCRYSTALLINE TITANIUM DIBORIDE; METALLOGRAPHIC PROCEDURES AND FINDINGS.
AD-271 965
PREPARATION OF LIF CRYSTALS FOR ROLLING CONTACT STUDIES CLEAVAGE, POLISHING, AND ETCHING OF CRYSTALS. ELECTRON BEAM IRRADIATION; RADIATION EFFECTS.
AD-276 887

PRECISION FINISHING
POLISHES AND ETCHES FOR TIN TELLURIDE, LEAD SULFIDE, LEAD SELENIDE, AND LEAD TELLURIDE.•
AD-423 267
POLISHES AND ETCHES FOR TIN TELLURIDE, LEAD SULFIDE, LEAD SELENIDE, AND LEAD TELLURIDE: SUPPLEMENT.•
AD-634 392

•DEFORMATION
FUNDAMENTAL STUDY OF ROLLING CONTACT FATIGUE. NYLON AND TEFLON BALLS ROLLED UNDER LOAD UPON A PREPARED (001) SURFACE OF LIF LEFT A DISTINCTIVE DISLOCATION TRACE AS REVEALED BY AN ETCH PITTING TREATMENT.
AD-285 085
DISLOCATION MOBILITY IN ZN SINGLE CRYSTALS. DISLOCATION DENSITY AND CONFIGURATION WERE DETERMINED BEFORE AND AFTER STATIC LOADING AND STRESS PULSE LOADING.
AD-293 449

•DIODES
MICROWAVE GERMANIUM TUNNEL DIODES. DESIGN CONSIDERATIONS AND FABRICATION TECHNIQUES.
AD-294 788

•DIODES (SEMICONDUCTORS)
SILICON ALLOYS
900 C SILICON CARBIDE RECTIFIER PROGRAM.•
AD-420 279

•DISPLAY SYSTEMS
ELECTRONIC RECORDING SYSTEMS
MATRIX CONTROLLED DISPLAY DEVICE USING TECHNIQUES CALLED IN-AIR SURFACE DEFORMATION RECORDING AND TIRF (TOTAL INTERNAL REFLECTION PRISM) PROJECTION.
AD-418 684

•ELECTROEROSIVE MACHINING
BERYLLIUM
NONTRADITIONAL MACHINING OF BERYLLIUM.•
AD-738 271

A REVIEW OF RECENT DEVELOPMENTS IN TITANIUM AND TITANIUM ALLOY TECHNOLOGY.
AD-269 209

•METALS
ELECTRIC AND CHEMICO-MECHANICAL METHODS OF WORKING METALS (CHAPTER VII).
AD-265 701
CHEMICAL COMPOUNDS FOR METAL SHAPING.
AD-271 534
ETCH MILLING BY LIQUID AND NON-LIQUID ETCHANTS ON STAINLESS STEEL PLATES AND HONEYCOMB CORES.
AD-282 920
DEVELOPMENT OF FIBER-REINFORCED METALS AND ALLOYS; PREPARATION OF BE FIBER-AG ALLOY MATRIX COMPOSITES.
AD-287 594
DEVELOPMENT OF FIBER-REINFORCED METALS AND ALLOYS WITH HIGH STRENGTH-TO-WEIGHT RATIOS, HIGH ELASTIC MODULI FOR EXTRUSION; FABRICATION; AL-BE ALLOYS.
AD-293 259

MATERIAL REMOVAL
INVESTIGATION OF ELECTROCHEMICAL TECHNIQUES AND SOLUTIONS FOR DEBURRING SHARP EDGES RESULTING FROM CHEMICAL MILLING AND BLANKING MOLYBDENUM, ALUMINUM ALLOYS, AND STAINLESS STEEL.
AD-431 602

•MICROMINIATURIZATION (ELEC TRONICS)
AN INVESTIGATION TO DEVELOP A .225 X .225-INCH SQUARE PLANAR, HERMETIC, INTEGRATED CIRCUIT PACKAGE FOR MOUNTING ON .310-INCH SQUARE MICROMODULE WAFERS.
AD-405 861

•MICROMINIATURIZATION (ELECTRONICS)
MICROCIRCUITRY DEVELOPED BY CHEMICALLY DEPOSITING NI ALLOY FILMS ON INSULATING SUBSTRATES AND CHEMICAL ETCHING PATTERNS IN THIN CU CONDUCTORS. RESISTIVE AND CONDUCTIVE PARTS MADE OF NI ALLOY FILMS OF APPROX. 500 OHMS PER SQUARE WERE USED.
AD-281 843
SPRAY ETCHING FOR PRODUCING THIN LINES, AND LAMINATING TECHNIQUES FOR MULTILAYER PRINTED CIRCUITS IN A MICROMINIATURIZATION PROGRAM.
AD-291 876

FAILURE (MECHANICS)
FAILURE MECHANISMS IN MICROELECTRONICS.
AD-607 426

MANUFACTURING METHODS
LOW-COST MICROCIRCUITS FOR MICROASSEMBLIES.
AD-433 891

•MICROWAVE EQUIPMENT
TRANSISTORS
PRODUCTION ENGINEERING MEASURES (PEM) FOR A GERMANIUM MICROWAVE TRANSISTOR.
AD-612 617

•MODULES (ELECTRONIC)
MANUFACTURING METHODS
PACKAGING MINIATURIZATION; CHARGE NUMBERS 31-8027-0201-01, 31-8027-0901 AND RES 2 AND 4.
AD-433 115

•MOLYBDENUM ALLOYS
MOLYBDENUM STRUCTURAL COMPONENT PROGRAM.
AD-272 526

•NICKEL ALLOYS
MATERIAL REMOVAL
MACHINING AND GRINDING OF NICKEL-

TRANSISTORS.
AD-613 068

•RESISTORS
MICROCIRCUITRY DEVELOPED BY CHEMICALLY DEPOSITING NI ALLOY FILMS ON INSULATING SUBSTRATES AND CHEMICAL ETCHING PATTERNS IN THIN CU CONDUCTORS. RESISTIVE AND CONDUCTIVE PARTS MADE OF NI ALLOY FILMS OF APPROX. 500 OHMS PER SQUARE WERE USED.
AD-281 843

•RIVETS
MOLYBDENUM STRUCTURAL COMPONENT PROGRAM.
AD-272 926

•ROCKET CASES
STRUCTURAL TESTS OF A CHEMICALLY MILLED LADISH D-6AC STEEL SECOND-STAGE MINUTEMAN AFT CLOSURE.
AD-261 959

•SANDWICH PANELS
MATERIALS - HONEYCOMB CORE RIBBON RELATIONSHIP BETWEEN FLOW CHARACTERISTICS OF BRAZING ALLOY AND OXIDE FILM FORMATIONS OF - DETERMINATION OF.
AD-272 227

•SECONDARY EMISSION
COPPER ALLOYS
TRANSLATION OF RUSSIAN ARTICLE: SECONDARY ELECTRONIC EMISSION OF COPPER AND OF CERTAIN COATINGS.
AD-631 855

•SEMICONDUCTING FILMS
SEMICONDUCTOR THIN FILM STUDIES.
AD-412 841

INFRARED IMAGES
THIN FILM IMAGE CONVERTER.
AD-453 855

SOLAR CELLS
RESEARCH ON PHOTOVOLTAIC CELLS.
AD-621 454

•SEMICONDUCTOR DEVICES
MANUFACTURING METHODS
PRODUCTION ENGINEERING MEASURE. HIGH SPEED SEMICONDUCTOR SWITCH (TWO TERMINAL) HIGH SPEED SEMICONDUCTOR SWITCH (GATE).
AD-603 660

•SEMICONDUCTORS
PROCESSES AND TECHNIQUES FOR MANUFACTURING SILICON SEMICONDUCTOR NETWORKS; SUBMINIATURE ELECTRONIC EQUIPMENT; METHODS AND PILOT-LINE EQUIPMENT.
AD-291 600
MICROWAVE GERMANIUM TUNNEL DIODES. DESIGN CONSIDERATIONS AND FABRICATION TECHNIQUES.
AD-294 788

•SHEETS
A REVIEW OF RECENT DEVELOPMENTS IN TITANIUM AND TITANIUM ALLOY TECHNOLOGY.
AD-269 209

•SILICON
PROCESSES AND TECHNIQUES FOR MANUFACTURING SILICON SEMICONDUCTOR NETWORKS; SUBMINIATURE ELECTRONIC EQUIPMENT; METHODS AND PILOT-LINE EQUIPMENT.
AD-291 600

TRANSISTORS
PRODUCTION ENGINEERING MEASURE FOR SILICON OVERLAY TRANSISTORS.
AD-619 295
PRODUCTION ENGINEERING MEASURE FOR SILICON OVERLAY TRANSISTORS.
AD-625 217
PRODUCTION ENGINEERING MEASURE FOR SILICON OVERLAY TRANSISTORS.
AD-628 230
PRODUCTION ENGINEERING MEASURE FOR SILICON OVERLAY TRANSISTORS.
AD-635 814

•SILICON ALLOYS
CRYSTAL RECTIFIERS
900 C SILICON CARBIDE RECTIFIER

PROGRAM.•
AD-420 375

•SINGLE CRYSTALS
INVESTIGATION OF SINGLE-CRYSTAL AND POLYCRYSTALLINE TITANIUM DIBORIDE: METALLOGRAPHIC PROCEDURES AND FINDINGS•
AD-271 955

THE EFFECT OF SURFACE-ACTIVE AGENTS ON THE MECHANICAL PROPERTIES OF METALS. PART II. THE EFFECT OF SURFACE-ACTIVE AGENTS ON THE MECHANICAL BEHAVIOR OF ALUMINUM SINGLE CRYSTALS.•
AD-282 017

DISLOCATION MOBILITY IN ZN SINGLE CRYSTALS. DISLOCATION DENSITY AND CONFIGURATION WERE DETERMINED BEFORE AND AFTER STATIC LOADING AND STRESS PULSE LOADING.
AD-293 445

•SOLAR CELLS
FILMS
INVESTIGATION OF THIN FILM CADMIUM SULFIDE SOLAR CELLS.
AD-605 425

SEMICONDUCTING FILMS
RESEARCH ON PHOTOVOLTAIC CELLS.
AD-621 454

•STAINLESS STEEL
MATERIALS - HONEYCOMB CORE RIBBON RELATIONSHIP BETWEEN FLOW CHARACTERISTICS OF BRAZING ALLOY AND OXIDE FILM FORMATIONS OF - DETERMINATION OF•
AD-272 227

ETCH MILLING BY LIQUID AND NON-LIQUID ETCHANTS ON STAINLESS STEEL PLATES AND HONEYCOMB CORES.
AD-282 920

ELECTROLYTIC ETCHING OF STAINLESS STEEL PLATES AND HONEYCOMB CORES; VARIOUS CHEMICAL COMPOUNDS USED FOR METAL SHAPING; PROCESSING OF AIRCRAFT MATERIALS.•
AD-295 752

CHEMICAL MILLING
CHEMICAL MILLING OF NARROW CLOSE TOLERANCE SLOTS IN ALUMINUM AND STAINLESS STEEL.•
AD-425 102

STRIPPING PT201 THERMOSETTING RESIN COATINGS FROM 321 ANNEALED STAINLESS STEEL SURFACES, (PROPELLANT UTILIZATION MANOMETER HOUSINGS).•
AD-677 494

•STEEL
DEVELOPMENT OF IMPROVED METHODS, PROCESSES, AND TECHNIQUES FOR PRODUCING STEEL EXTRUSIONS•
AD-262 184

CHEMICAL MILLING
CHEMICAL MILLING OF ALLOY STEELS.•
AD-671 952

CHEMICAL MILLING OF METALS AND ALLOYS; ITS EFFECT ON STRESS CORROSION SUSCEPTIBILITY AND HYDROGEN EMBRITTLEMENT.•
AD-648 98[illegible]

MATERIAL REMOVAL
MACHINING AND GRINDING OF ULTRAHIGH-STRENGTH STEELS AND STAINLESS STEEL ALLOYS.•
AD-639 654

•SUBMINIATURE ELECTRONIC EQUIPMENT
MICROCIRCUITRY DEVELOPED BY CHEMICALLY DEPOSITING NI ALLOY FILMS ON INSULATING SUBSTRATES AND CHEMICAL ETCHING PATTERNS IN THIN CU CONDUCTORS. RESISTIVE AND CONDUCTIVE PARTS MADE OF NI ALLOY FILMS OF APPROX. 500

ACTIVE AGENTS ON THE MECHANICAL PROPERTIES OF METALS. PART II. THE EFFECT OF SURFACE-ACTIVE AGENTS ON THE MECHANICAL BEHAVIOR OF ALUMINUM SINGLE CRYSTALS.(U)
•METALLIC CRYSTALS)

EFFECT OF SURFACE FINISHES ON FATIGUE LIFE(U) AD-402 164
•ALLOYS

ELECTRIC AND CHEMICO-MECHANICAL METHODS OF WORKING METALS (CHAPTER VII)(U) AD-269 701
•METALS

ELECTROCHEMICAL DEBURRING OF MOLYBDENUM, ALUMINUM AND STAINLESS STEEL.(U) AD-421 602
•METALS

ENGINEERING SERVICES ON TRANSISTORS.(U) AD-422 492
•TRANSISTORS

FAILURE MECHANISMS IN MICROELECTRONICS.(U) AD-607 426
•MICROMINIATURIZATION (ELECTRONICS)

FIBER-REINFORCED METALS AND ALLOYS(U) AD-297 994
•COMPOSITE MATERIALS

FIBER-REINFORCED METALS AND ALLOYS(U) AD-293 259
•COMPOSITE MATERIALS

A FUNDAMENTAL STUDY OF ROLLING CONTACT FATIGUE(U) AD-276 887
•CRYSTALS

A FUNDAMENTAL STUDY OF ROLLING CONTACT FATIGUE(U) AD-288 089
•DEFORMATION

INFLUENCE OF DISPLACIVE-SHEARING STRESSES ON THE KINETICS OF RECONSTRUCTIVE TRANSFORMATIONS EFFECTED BY PRESSURE IN THE RANGE 0-100,000 BARS(U) AD-286 351
•CHEMICAL MILLING

INFLUENCE OF SOME PROCESSING VARIABLES UPON THE ELEVATED AND ROOM TEMPERATURE STRENGTH OF ULTRAFINE BERYLLIUM WIRES.(U) AD-622 992
•CHEMICAL MILLING

INVESTIGATION OF SINGLE-CRYSTAL AND POLYCRYSTALLINE TITANIUM DIBORIDE: METALLOGRAPHIC PROCEDURES AND FINDINGS(U) AD-271 969
•BORIDES

INVESTIGATION OF THIN FILM CADMIUM SULFIDE SOLAR CELLS.(U) AD-608 428
•SOLAR CELLS

LOW-COST MICROCIRCUITS FOR MICROASSEMBLIES.(U) AD-422 891
•MICROMINIATURIZATION (ELECTRONICS)

MACHINING AND GRINDING OF NICKEL-AND COBALT-BASE ALLOYS.(U) AD-624 079
•NICKEL ALLOYS

MACHINING AND GRINDING OF TITANIUM AND ITS ALLOYS.(U) AD-620 908
•TITANIUM

MACHINING AND GRINDING OF ULTRAHIGH-STRENGTH STEELS AND STAINLESS STEEL ALLOYS.(U) AD-639 694
•STEEL

MACHINING DATA FOR BERYLLIUM METAL.(U) AD-488 297
•BERYLLIUM ALLOYS

MACHINING HIGH PURITY ALUMINA.(U) AD-614 967
•MACHINING

MANUAL AND REPAIR WELDING OF CHEMICALLY MILLED 2014-T6 ALUMINUM SHEETING.(U) AD-604 819
•ALUMINUM ALLOYS

MATERIAL BERYLLIUM WAFFLE PANEL. CHEMICAL MILLED. AD-438 138

MEASURE FOR GALLIUM ARSENIDE VARACTOR DIODE.(U)
•VARACTOR DIODES

PRODUCTION ENGINEERING AD-619 295
MEASURE FOR SILICON OVERLAY TRANSISTORS.(U)
•TRANSISTORS

PRODUCTION ENGINEERING AD-628 217
MEASURE FOR SILICON OVERLAY TRANSISTORS.(U)
•TRANSISTORS

PRODUCTION ENGINEERING AD-628 230
MEASURE FOR SILICON OVERLAY TRANSISTORS.(U)
•TRANSISTORS

PRODUCTION ENGINEERING AD-628 814
MEASURE FOR SILICON OVERLAY TRANSISTORS.(U)
•TRANSISTORS

PRODUCTION ENGINEERING AD-603 660
MEASURE. HIGH SPEED SEMICONDUCTOR SWITCH (TWO TERMINAL) HIGH SPEED SEMICONDUCTOR SWITCH (GATE).(U)
•ELECTRONIC SWITCHES

PRODUCTION ENGINEERING AD-404 927
MEASURE ON 2N1708 SILICON PLANAR EPITAXIAL TRANSISTOR. (U)
•MANUFACTURING METHODS

PRODUCTION ENGINEERING AD-414 913
MEASURE ON 2N1708 SILICON PLANAR EPITOXIAL TRANSISTOR.(U)
•TRANSISTORS

PRODUCTION ENGINEERING AD-422 940
MEASURE ON SILICON ALLOY TRANSISTORS.(U)
•TRANSISTORS

PRODUCTION ENGINEERING AD-298 057
MEASURE RELIABILITY IMPROVEMENT JET ETCH TRANSISTOR(U)
•MANUFACTURING METHODS

PRODUCTION ENGINEERING AD-614 823
MEASURE TO IMPROVE PRODUCTION TECHNIQUES AAND INCREASE THE RELIABILITY OF THE 2N3728A TRANSISTOR.(U)
•TRANSISTORS

PRODUCTION ENGINEERING AD-284 872
MEASURE TO IMPROVE PRODUCTION TECHNIQUES AND INCREASE THE RELIABILITY OF THE 2N1598A TRANSISTOR(U)
•MANUFACTURING METHODS

PRODUCTION ENGINEERING AD-426 396
MEASURE TO IMPROVE PRODUCTION TECHNIQUES AND TO INSURE THE RELIABILITY OF THE C400 SERIES FIELD EFFECT TRANSISTORS.(U)
•TRANSISTORS

PRODUCTION ENGINEERING AD-606 477
MEASURE TO IMPROVE PRODUCTION TECHNIQUES AND TO INSURE THE RELIABILITY OF THE C400 SERIES FIELD EFFECT TRANSISTORS.(U)
•TRANSISTORS

PRODUCTION ENGINEERING AD-613 068
MEASURE TO IMPROVE PRODUCTION TECHNIQUES AND TO INSURE THE RELIABILITY OF THE C400 SERIES FIELD EFFECT TRANSISTORS.(U)
•TRANSISTORS

PRODUCTION ENGINEERING AD-606 191
MEASURE TO INCREASE THE RELIABILITY OF THE TRANSISTOR TYPE 22N2034.(U)
•TRANSISTORS

PRODUCTION ENGINEERING AD-612 617
MEASURES (PEM) FOR A GERMANIUM MICROWAVE TRANSISTOR.(U)
•TRANSISTORS

REDUCING HAND AD-677 066
STRAIGHTENING BY CHEM-HILLING 7075 AND 7178 ALUMINUM ALLOY IN THE 'W' (OR NATURALLY AGED) CONDITION.(U)
•ALUMINUM ALLOYS

RESEARCH AND AD-298 707

DEVELOPMENT OF HIGH TEMPERATURE SEMICONDUCTOR DEVICES(U)
•ARSENIDES

RESEARCH IN THE GENERAL FIELD OF SUBSTRUCTURE AND DISLOCATION NETWORKS IN METALLIC CRYSTALS.(U) AD-610 434
•METALLIC CRYSTALS

RESEARCH ON PHOTOVOLTAIC CELLS.(U) AD-621 484
•SOLAR CELLS

A REVIEW OF METALLOGRAPHIC PREPARATION PROCEDURES FOR BERYLLIUM AND BERYLLIUM ALLOYS.(U) AD-674 066
•BERYLLIUM

A REVIEW OF RECENT DEVELOPMENTS IN TITANIUM AND TITANIUM ALLOY TECHNOLOGY(U) AD-269 209
•METALLURGY

SECONDARY ELECTRONIC EMISSION OF COPPER AND OF CERTAIN COATINGS,(U) AD-621 835
•COPPER ALLOYS

SEMICONDUCTOR THIN FILMS.(U) AD-612 841
•SEMICONDUCTING FILMS)

SILICON PLANAR EPITAXIAL TRANSISTOR TYPE 2N2193(U) AD-286 886
•TRANSISTORS

SILICON PLANAR EPITAXIAL TRANSISTPE 2N2193.(U) AD-404 185
•TRANSISTORS

SILICON SEMICONDUCTOR NETWORKS MANUFACTURING METHODS(U) AD-291 600
•SEMICONDUCTORS

SOLID ELECTROLYTE TANTALUM FOIL CAPACITOR.(U) AD-423 225
•TANTALUM CAPACITORS

STRIPPING PT201 AD-677 494

THERMOSETTING RESIN COATINGS FROM 321 ANNEALED STAINLESS STEEL SURFACES, (PROPELLANT UTILIZATION MANOMETER HOUSINGS).(U)
•STAINLESS STEEL

STRUCTURAL TESTS OF A CHEMICALLY MILLED LADISH D-6AC STEEL SECOND-STAGE MINUTEMAN AFT CLOSURE(U) AD-261 999
•CHEMICAL MILLING

STUDY OF SIZE EFFECT IN FINE BERYLLIUM WIRE PHASE II, (U) AD-438 478
•BERYLLIUM

SURFACE INTEGRITY OF MACHINED STRUCTURAL COMPONENTS.(U) AD-670 146
•AIRFRAMES

A SURVEY OF THE COMPARATIVE COSTS OF FABRICATING AIRFRAME FROM ALUMINUM AND FROM TITANIUM,(U) AD-609 349
•TITANIUM ALLOYS

TECHNOLOGY FOR RNP PLANAR SILICON TRANSISTORS: SWITCHING AND AMPLIFYING,(U) AD-408 190
•TRANSISTORS

THIN FILM IMAGE CONVERTER. (U) AD-452 888
•SEMICONDUCTING FILMS

TITANIUM DEVELOPMENT PROGRAM. VOLUME IV.(U) AD-264 685
•ALLOYS

TRANSISTOR, VHF, SILICON, POWER (10W-500MC).(U) AD-622 879
•TRANSISTORS

WING - ALUMINUM SHEET AND PLATE - DYNAMIC ETCHED OR CHEM-MILLED - MECHANICAL PROPERTIES - AD-286 074

RES-WIN

DETERMINATION OF(U)
•ALUMINUM ALLOYS

PERSONAL AUTHOR INDEX

DETERMINATION OF
AD-286 074

•FEHRLE, A. C.

• • •

DEVELOPMENT OF CHEMICAL MILLED WAFFLE GRID BERYLLIUM STRUCTURAL PANEL,
AD-423 388

•FELDMAN, E.J

• • •

PRODUCTION ENGINEERING MEASURE FOR GALLIUM ARSENIDE VARACTOR DIODE.
AD-419 585

•FIELD, MICHAEL

• • •

SURFACE INTEGRITY OF MACHINED STRUCTURAL COMPONENTS.
AD-870 146

•FOLSTER, J.H.D

• • •

PRODUCTION ENGINEERING MEASURE RELIABILITY IMPROVEMENT JET ETCH TRANSISTOR
AD-295 057

•FRITZ, LOUIS J.

• • •

SURFACE INTEGRITY OF MACHINED STRUCTURAL COMPONENTS.
AD-870 146

•GAGNE, R.M

• • •

PRODUCTION ENGINEERING MEASURE RELIABILITY IMPROVEMENT JET ETCH TRANSISTOR
AD-295 057

•GATTO, LUCIANO R.

• • •

SURFACE INTEGRITY OF MACHINED STRUCTURAL COMPONENTS.
AD-870 146

•GIBBONS, G.

• • •

ENGINEERING SERVICES ON TRANSISTORS.
AD-422 492

•GLENSKI, F. J.

• • •

CHEM-MILL PROCESS FOR CONTOURING ALUMINUM HONEYCOMB CORE.
AD-678 154

•GOLDING, WILLIAM H.

• • •

INFLUENCE OF SOME PROCESSING VARIABLES UPON THE ELEVATED AND ROOM TEMPERATURE STRENGTH OF ULTRAFINE BERYLLIUM WIRES,
AD-633 992

•GREEN, E.D

• • •

TITANIUM DEVELOPMENT PROGRAM. VOLUME IV.
AD-264 685

•GREENE, NORBERT D.

• • •

PRINCIPLES OF METALLOGRAPHIC ETCHING.
AD-616 786

•GREER, PAUL

• • •

PRODUCTION ENGINEERING MEASURE FOR SILICON OVERLAY TRANSISTORS.
AD-625 317

• • •

PRODUCTION ENGINEERING MEASURE FOR SILICON OVERLAY TRANSISTORS.
AD-628 230

• • •

PRODUCTION ENGINEERING MEASURE FOR SILICON OVERLAY TRANSISTORS.
AD-635 814

•GURKLIS, J. A.

• • •

MACHINING AND GRINDING OF TITANIUM AND ITS ALLOYS.
AD-620 508

• • •

MACHINING AND GRINDING OF NICKEL- AND COBALT-BASE ALLOYS,

AD-639 075

• • •

MACHINING AND GRINDING OF ULTRAHIGH-STRENGTH STEELS AND STAINLESS STEEL ALLOYS,
AD-639 654

•GURKLIS, JOHN A.

• • •

METAL REMOVAL BY ELECTROCHEMICAL METHODS AND ITS EFFECTS ON MECHANICAL PROPERTIES OF METALS,
AD-613 261

• • •

NONTRADITIONAL MACHINING OF BERYLLIUM,
AD-738 271

•HARVEY, DONALD J.

• • •

RESEARCH ON PHOTOVOLTAIC CELLS.
AD-621 454

•HEBB, EMMA LEE

• • •

MICROCIRCUITRY BY CHEMICAL DEPOSITION,
AD-281 843

•HERMAN, M.

• • •

RESEARCH IN THE GENERAL FIELD OF SUBSTRUCTURE AND DISLOCATION NETWORKS IN METALLIC CRYSTALS.
AD-610 434

•HEYERDAHL, NORMAN E.

• • •

RESEARCH ON PHOTOVOLTAIC CELLS.
AD-621 454

•HORDON, M.J

• • •

A FUNDAMENTAL STUDY OF ROLLING CONTACT FATIGUE
AD-285 085

•HOWELL, JAMES E

• • •

MISSILE-BORNE TRACKING ANTENNA.
AD-426 932

•HUGHES, D.

• • •

PRODUCTION ENGINEERING MEASURE TO INCREASE THE RELIABILITY OF THE TRANSISTOR TYPE 22N2034.
AD-606 191

•HUMRICK, R. J.

• • •

INVESTIGATION OF THIN FILM CADMIUM SULFIDE SOLAR CELLS.
AD-605 425

•INFIELD, J. M.

• • •

MACHINING HIGH PURITY ALUMINA.
AD-614 467

•JACKSON, RAYMOND

• • •

TECHNOLOGY FOR PNP PLANAR SILICON TRANSISTORS: SWITCHING AND AMPLIFYING,
AD-408 190

•JACOBUS, H.

• • •

DETERMINATION OF MECHANICAL PROPERTIES AND SURFACE CONDITION OF CHEM-MILLED CB-5ZR COLUMBIUM ALLOY SAMPLES,
AD-431 617

•JAMIESON, J.L

• • •

CHEMICAL COMPOUNDS FOR METAL SHAPING
AD-271 536

• • •

CHEMICAL COMPOUNDS FOR METAL SHAPING
AD-282 920

• • •

CHEMICAL COMPOUNDS FOR METAL SHAPING
AD-295 752

•JENNINGS, V. J.

• • •

500 C SILICON CARBIDE RECTIFIER PROGRAM.

AD-420 375

*JENNY, A. L.

• • •

SOLID ELECTROLYTE TANTALUM FOIL CAPACITOR.
AD-423 325

*JOHNSON, S.O

• • •

SILICON PLANAR EPITAXIAL TRANSISTOR TYPE 2N2193
AD-286 886

*JONES, R. L.

• • •

A NEW APPROACH TO BEND TESTING FOR THE DETERMINATION OF HYDROGEN EMBRITTLEMENT SUSCEPTIBILITY OF SHEET MATERIALS.
AD-681 765

*JONES, R. W.

• • •

PRODUCTION ENGINEERING MEASURE ON SILICON ALLOY TRANSISTORS.
AD-422 940

*KAHLES, JOHN F.

• • •

MACHINING DATA FOR BERYLLIUM METAL,
AD-485 297

• • •

SURFACE INTEGRITY OF MACHINED STRUCTURAL COMPONENTS.
AD-870 146

*KEARKUFF, THOMAS

• • •

PRODUCTION ENGINEERING MEASURE FOR SILICON OVERLAY TRANSISTORS.
AD-619 295

• • •

PRODUCTION ENGINEERING MEASURE FOR SILICON OVERLAY TRANSISTORS.
AD-628 230

*KETCHAM, S. J.

• • •

CHEMICAL MILLING OF METALS AND ALLOYS: ITS EFFECT ON STRESS CORROSION SUSCEPTIBILITY AND HYDROGEN EMBRITTLEMENT,
AD-648 980

*KETCHAM, SARA J.

• • •

CHEMICAL MILLING OF ALLOY STEELS,
AD-631 952

*KIRSHENBAUM, N.W

• • •

A FUNDAMENTAL STUDY OF ROLLING CONTACT FATIGUE
AD-276 887

*KJELBY, A.S

• • •

BERYLLIUM COMPOSITE STRUCTURES. VOLUME II. MATERIALS AND PROCESSES
AD-278 526

*KLOHN, K

• • •

DESIGN CONSIDERATIONS FOR MICROWAVE GERMANIUM TUNNEL DIODES
AD-294 788

*KOCSIS, J.

• • •

ENGINEERING SERVICES ON TRANSISTORS.
AD-422 492

*KOSTER, WILLIAM P.

• • •

SURFACE INTEGRITY OF MACHINED STRUCTURAL COMPONENTS.
AD-870 146

*KRANTZ, J.E

• • •

PRODUCTION ENGINEERING MEASURE RELIABILITY IMPROVEMENT JET ETCH TRANSISTOR
AD-295 057

*KRAUSS, J.J.

• • •

THE DESIGN AND EVALUATION OF PERFORATED ION EMITTERS.
AD-418 226

AD-291 876

• • •

MICROMINIATURE LAYERED PRINTED WIRING
AD-400 732

•PARIKH, N.M

• • •

FIBER-REINFORCED METALS AND ALLOYS
AD-287 594

• • •

FIBER-REINFORCED METALS AND ALLOYS
AD-293 259

•PARTRIDGE, E.G

• • •

CHEMICAL COMPOUNDS FOR METAL SHAPING
AD-295 752

•PETRICK, E.N.

• • •

THE DESIGN AND EVALUATION OF PERFORATED ION EMITTERS.
AD-418 226

•PETRITZ, R.L

• • •

RESEARCH AND DEVELOPMENT OF HIGH TEMPERATURE SEMICONDUCTOR DEVICES
AD-298 707

•PLUMMER, C. E.

• • •

REDUCING HAND STRAIGHTENING BY CHEM-MILLING 7075 AND 7178 ALUMINUM ALLOY IN THE 'W' (OR NATURALLY AGED) CONDITION.
AD-677 066

•POE, A.H

• • •

BOEING-WICHITA MATERIALS AND RESEARCH DEVELOPMENT PROGRAMS, 1957-1961
AD-271 167

•POPILOV, L. YA

• • •

ELECTRIC AND CHEMICO-MECHANICAL METHODS OF WORKING METALS (CHAPTER VII)
AD-265 701

•POSSEMATO, L.R.

• • •

PRODUCTION ENGINEERING MEASURE ON 2N1708 SILICON PLANAR EPITAXIAL TRANSISTOR.
AD-404 537

• • •

PRODUCTION ENGINEERING MEASURE ON 2N1708 SILICON PLANAR EPITOXIAL TRANSISTOR.
AD-414 913

•PRATT, W.M

• • •

MATERIALS - HONEYCOMB CORE RIBBON RELATIONSHIP BETWEEN FLOW CHARACTERISTICS OF BRAZING ALLOY AND OXIDE FILM FORMATIONS OF - DETERMINATION OF
AD-272 227

•PRIBBLE, FRED C.

• • •

THIN FILM IMAGE CONVERTER.
AD-453 855

•PRICE, C. W.

• • •

A REVIEW OF METALLOGRAPHIC PREPARATION PROCEDURES FOR BERYLLIUM AND BERYLLIUM ALLOYS.
AD-674 066

•RAU, R. R.

• • •

PRODUCTION ENGINEERING MEASURE TO IMPROVE PRODUCTION TECHNIQUES AAND INCREASE THE RELIABILITY OF THE 2N3208 TRANSISTOR.
AD-614 823

•RIBLE, VINCENT E

• • •

TECHNOLOGY FOR PNP PLANAR SILICON TRANSISTORS: SWITCHING AND AMPLIFYING.
AD-408 190

CHEMICAL MILLING (DEEP CONTOUR ETCHING),
AD-680 561

*TARPINIAN, ARAM

• • •

THE METALLOGRAPHY OF PYROLITIC GRAPHITE,
AD-613 643

*THOMAS, R.W

• • •

STRUCTURAL TESTS OF A CHEMICALLY MILLED LADISH D-6AC STEEL SECOND-STAGE MINUTEMAN AFT CLOSURE
AD-261 959

*THORNBURG, D. R.

• • •

500 C SILICON CARBIDE RECTIFIER PROGRAM.
AD-420 375

*TINT, G. S.

• • •

RESEARCH IN THE GENERAL FIELD OF SUBSTRUCTURE AND DISLOCATION NETWORKS IN METALLIC CRYSTALS.
AD-610 434

*VAHLDIEK, F.W

• • •

INVESTIGATION OF SINGLE-CRYSTAL AND POLYCRYSTALLINE TITANIUM DIBORIDE: METALLOGRAPHIC PROCEDURES AND FINDINGS
AD-271 965

*VREELAND, T. JR

• • •

DISLOCATION MOBILITY IN ZINC SINGLE CRYSTALS
AD-293 445

*WANDINGER, L

• • •

DESIGN CONSIDERATIONS FOR MICROWAVE GERMANIUM TUNNEL DIODES
AD-294 788

*WARREN, A.

• • •

PRODUCTION ENGINEERING MEASURE ON 2N1708 SILICON PLANAR EPITOXIAL TRANSISTOR.
AD-414 913

*WEEKS, ROBERT F.

• • •

CHEMICAL MILLING OF NARROW CLOSE TOLERANCE SLOTS IN ALUMINUM AND STAINLESS STEEL.
AD-425 102

*WHITING, H. A.

• • •

REDUCING HAND STRAIGHTENING BY CHEM-MILLING 7075 AND 7178 ALUMINUM ALLOY IN THE 'W' (OR NATURALLY AGED) CONDITION.
AD-677 066

*WILLIAMS, JOHN R.

• • •

PRODUCTION ENGINEERING MEASURE TO IMPROVE PRODUCTION TECHNIQUES AND TO INSURE THE RELIABILITY OF THE C600 SERIES FIELD EFFECT TRANSISTORS.
AD-426 356

• • •

PRODUCTION ENGINEERING MEASURE TO IMPROVE PRODUCTION TECHNIQUES AND TO INSURE THE RELIABILITY OF THE C600 SERIES FIELD EFFECT TRANSISTORS.
AD-606 477

• • •

PRODUCTION ENGINEERING MEASURE TO IMPROVE PRODUCTION TECHNIQUES AND TO INSURE THE RELIABILITY OF THE C600 SERIES FIELD EFFECT TRANSISTORS.
AD-613 068

*WINSLOW, E.K

• • •

EFFECT OF SURFACE FINISHES ON FATIGUE LIFE
AD-402 164

*WISE, W.E

• • •

EFFECT OF SURFACE FINISHES ON
FATIGUE LIFE
AD-402 164

*WOOD, R.A

• • •

A REVIEW OF RECENT DEVELOPMENTS IN
TITANIUM AND TITANIUM ALLOY
TECHNOLOGY
AD-269 209

*WOOLF, JAMES E.

• • •

ELECTROCHEMICAL DEBURRING OF
MOLYBDENUM, ALUMINUM AND STAINLESS
STEEL.
AD-431 602

*WURST, E.C

• • •

RESEARCH AND DEVELOPMENT OF HIGH
TEMPERATURE SEMICONDUCTOR DEVICES
AD-298 707

*YATSKO, ROBERT S

• • •

TECHNOLOGY FOR PNP PLANAR SILICON
TRANSISTORS: SWITCHING AND
AMPLIFYING,
AD-408 190

CONTRACT INDEX

•AF19 604 4556
DOUGLAS AIRCRAFT CO INC LONG BEACH CALIF
1111
(AFCRL-1111)
AD-282 920

•AF30 602 9017
WESTINGHOUSE DEFENSE AND SPACE CENTER BALTIMORE MD
WDSC-385A4
(RADC-TDR64 252)
F AD-607 426

•AF33 600 22841
GENERAL DYNAMICS/FORT WORTH TEX
FGT 2100
AD-286 074

•AF33 600 24876
GENERAL DYNAMICS/CONVAIR SAN DIEGO CALIF
(ASD-TR617 576)
F AD-264 685

•AF33 600 26290
GENERAL DYNAMICS/FORT WORTH TEX
FGT 2510
AD-272 227

•AF33 600 26610
AEROJET-GENERAL CORP SACRAMENTO CALIF
AD-261 959

•AF33 600 26713
NORTHROP AIRCRAFT INC HAWTHORNE CALIF
NOR 61 199
AD-262 184

•AF33 600 42210
TEXAS INSTRUMENTS INC DALLAS
IR7 865 V6
(ASD-IR7 865 V6)
AD-291 600

•AF33 600 43027
DOUGLAS AIRCRAFT CO INC LONG BEACH CALIF
(ASD-TR7 648 V1)
AD-271 536
TR7 648 V2
(ASD-TR7 648 V2)
AD-295 792

•AF33 615 1121
BATTELLE MEMORIAL INST COLUMBUS OHIO DEFENSE METALS INFORMATION CENTER
DMIC-213
AD-613 261

•AF33 615 1248
HARSHAW CHEMICAL CO CLEVELAND OHIO
AD-605 425

•AF 33(615)-5262
AIR FORCE MACHINABILITY DATA CENTER CINCINNATI OHIO
AFMDC-66-3
AD-485 297

•AF33 616 6220
MARTIN CO BALTIMORE MD
(WADD-TR-61-58-PT-2)
AD-282 017

•AF33 616 7080
AERONCA MFG CORP MIDDLETOWN OHIO
TR61 706 V2
(ASD-TR61 706 V2)
F AD-278 926

•AF33 616 8141
BOEING CO WICHITA KANS WICHITA DIV
AD-271 167

•AF33 657 7027
WESTINGHOUSE ELECTRIC CORP DAYTON OHIO
(ASD-TR7 727)
AD-420 375

•AF33 657 7623
LEAR SIEGLER INC SANTA MONICA CALIF
AD-412 841

•AF33 657 7916
HARSHAW CHEMICAL CO CLEVELAND OHIO

(ARL-65-111)
F AD-621 454

•AF33 657 8638
KELSEY-HAYES CO. ROMULUS MICH
(ASD-TDR63-780)
F AD-418 226

•AF33 657 8926
GENERAL DYNAMICS/POMONA CALIF
8926 142
AD-402 164

•AF33 657 11214
GENERAL DYNAMICS/FORT WORTH TEX
ERR FW135
AD-423 388

•AF33 657 11215
MCDONNELL AIRCRAFT CORP ST LOUIS MO
A239
F AD-425 102
A478
F AD-431 602
A473
AD-431 617

•AF49 638 821
FRANKLIN INST PHILADELPHIA PA LABS FOR RESEARCH AND DEVELOPMENT
F-A2400
(AFOSR-2574)
F AD-610 434

•DA-01-021-AMC-11651(Z)
BATTELLE MEMORIAL INST COLUMBUS OHIO
(NASA-TM-X-53446)
AD-624 075
(NASA-TM-X-53433)
AD-629 654
BATTELLE MEMORIAL INST COLUMBUS OHIO
(NASA-TM-X-53312)
AD-620 508

•DA36 039AMC01479E
MOTOROLA INC PHOENIX ARIZ
AD-603 660

•DA36 039AMC01480E
NATIONAL SEMICONDUCTOR CORP DANBURY CONN
F AD-614 823

•DA36 039AMC01482E
SILICON TRANSISTOR CORP GARDEN CITY N Y
AD-606 151

•DA36 039AMC01483E
CRYSTALONICS INC CAMBRIDGE MASS
AD-426 256
AD-606 477
AD-613 668

•DA36 039AMC02227
BELL TELEPHONE LABS INC WHIPPANY N J
12
AD-422 492

•DA36 039AMC03189E
TRW SEMICONDUCTORS INC LAWNDALE CALIF RESEARCH AND DEVELOPMENT DEPT
59-RD-F
F AD-622 879

•DA36 039AMC03257E
XEROX CORP ROCHESTER N Y
AD-433 801

•DA36 039AMC03623E
TEXAS INSTRUMENTS INC DALLAS
03-64-73
AD-612 617

•DA36 039AMC03634E
LINDEN LABS INC STATE COLLEGE PA
AD-614 467

•DA36 039AMC06156E
MOTOROLA INC PHOENIX ARIZ
SEMICONDUCTOR PRODUCTS DIV

AD-619 295
AD-625 317
AD-628 230
AD-635 814

•DA36 039SC86720
PHILCO CORP LANSDALE PA
R 232 1
AD-286 907

•DA36 039SC86725
GENERAL MOTORS CORP KOKOMO IND
DELCO RADIO DIV.
AD-286 872

•DA36 039SC86727
GENERAL ELECTRIC CO SCHENECTADY N Y
AD-286 886
AD-404 185

•DA36 039SC86729
RADIO CORP OF AMERICA SOMERVILLE N J
AD-404 537
AD-414 913

•DA36 039SC86736
SYLVANIA ELECTRIC PRODUCTS INC
WOBURN MASS
AD-419 585

•DA36 039SC86744
RAYTHEON CO LEWISTON MAINE
AD-422 940

•DA-36-039-SC-90763
PHOTOCIRCUITS CORP GLEN COVE N Y
AD-291 876
AD-400 732

•DA36 039SC90850
WESTINGHOUSE ELECTRIC CORP
YOUNGWOOD PA
AD-405 861

•DA44 009AMC168T
HONEYWELL RESEARCH CENTER HOPKINS MINN
AD-453 855

•DA91 591EUC1722
METAL HYDRIDES INC BEVERLY MASS
AD-267 806

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CINCINNATI OHIO
970-11700
(AFML-TR-70-11)
F AD-870 146

•F33615-68-C-1225
BATTELLE MEMORIAL INST COLUMBUS OHIO DEFENSE METALS INFORMATION CENTER
DMIC-MEMO-237
AD-674 066

•F33615-69-C-1840
GRUMMAN AEROSPACE CORP BETHPAGE N Y
(AFML-TR-71-44)
F AD-727 620

•N0BSR85424
TEXAS INSTRUMENTS INC DALLAS
AD-298 707

•N0BSR89334
GENERAL ELECTRIC CO SYRACUSE N Y
AD-418 684

•N0BSR89380
GENERAL ELECTRIC CO IRMO S C
AD-423 225

•N0BSR91298
SIGNETICS CORP SUNNYVALE CALIF
AD-450 545

•NONR22037
INNSBRUCK UNIV (AUSTRIA)
F AD-293 445

•NONR59117
RENSSELAER POLYTECHNIC INST TROY N Y
TR-2
AD-616 786

•NOW-61-0653

NOW-NOW

MCDONNELL AIRCRAFT CORP ST LOUIS
MO
AD-272 526

•NOW-61-0656
ALLOY ENGINEERING AND CASTING CO
CHAMPAIGN ILL
AD-275 887
AD-285 085

•NOW62 06042
JOHNS HOPKINS UNIV SILVER SPRING
MD APPLIED PHYSICS LAB
TG-675
AD-468 378

•NOW-62-0650
IIT RESEARCH INST CHICAGO ILL
8241 3
AD-287 594
8241 4
AD-293 259

REPORT NUMBER INDEX

FTD-TT-

FST 2519
AD-672 227

FTD-HT-23-1225-67
AD-680 561

FTD-TT-65-865
AD-618 628

FTD-TT-65-1534
AD-621 855

FTDM 3068
AD-438 138

GDA-AN61AMR4062
AD-677 494

GDA-MRG-235
AD-681 765

GDC-PR919
AD-677 066

GDC-PR-920
AD-678 154

IR7 865 V6
AD-291 600

M144
AD-269 209

MCIC-72-03
AD-738 271

NAEC-AML-1909
AD-438 478

NAEC-AML-2418
AD-631 952

NAEC-AML-2441
AD-633 992

NAMC-AML-1236
AD-648 980

NASA-TM-X-53312
AD-620 508

NASA-TM-X-53433
AD-639 654

NASA-TM-X-53446
AD-634 075

NOLTR-63-156
AD-423 367

NOLTR-66-32
AD-634 392

NOR 61 199
AD-262 184

R 232 1
AD-286 907

R5832 3 80 61 51
AD-433 115

RADC-TDR64 252
AD-607 426

RS-TR-63-20
AD-426 932

TG-675
AD-468 378

TR-2
AD-616 786

TR7 648 V3
AD-295 752

TR61 706 V2
AD-278 526

TR-1052
AD-281 843

TR2318
AD-294 788

TR-2339
AD-408 190

TT-65-62694
AD-618 628

FTD-TT-

FST 2510
AD-672 227

FTD-HT-23-1225-67
AD-680 561

FTD-TT-65-865
AD-618 628

FTD-TT-65-1535
AD-621 855

FTDM 3068
AD-438 138

GDA-AN61AMR4062
AD-677 494

GDA-MRG-235
AD-681 765

GDC-PR919
AD-677 066

GDC-PR-920
AD-678 154

IR7 865 V6
AD-291 600

M144
AD-269 209

MCIC-72-03
AD-738 271

NAEC-AML-1909
AD-438 478

NAEC-AML-2418
AD-631 952

NAEC-AML-2441
AD-633 992

NAMC-AML-1236
AD-648 980

NASA-TM-X-53312
AD-620 508

NASA-TM-X-53433
AD-639 654

NASA-TM-X-53446
AD-634 075

NOLTR-63-156
AD-423 367

NOLTR-66-32
AD-634 392

NOR 61 199
AD-262 184

R 232 1
AD-286 907

R5832 3 80 61 51
AD-433 115

RADC-TDR64 252
AD-607 426

RG-TR-63-20
AD-426 932

TG-675
AD-468 378

TR-2
AD-616 786

TR7 648 V3
AD-295 752

TR61 706 V2
AD-278 526

TR-1052
AD-281 843

TR2318
AD-294 788

TR-2339
AD-408 190

TT-65-62694
AD-618 628