

UNCLASSIFIED

AD 740 990

ENCAPSULATION

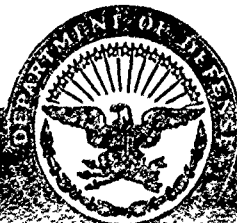
A DDC BIBLIOGRAPHY

DDC-TAS-72-19-1

MAY 1972

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Security Classification

DOCUMENT CONTROL DATA - R & D

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

1. ORIGINATING ACTIVITY (Corporate author) DEFENSE DOCUMENTATION CENTER Cameron Station Alexandria, Virginia 22314		2a. REPORT SECURITY CLASSIFICATION UNCLASSIFIED	
3. REPORT TITLE ENCAPSULATION		2b. GROUP	
4. DESCRIPTIVE NOTES (Type of report and inclusive dates) Bibliography (October 1955 - September 1971)			
5. AUTHOR(S) (First name, middle initial, last name)			
6. REPORT DATE May 1972		7a. TOTAL NO. OF PAGES 114	7b. NO. OF REFS 77
8a. CONTRACT OR GRANT NO.		9a. ORIGINATOR'S REPORT NUMBER(S) DDC-TAS-72-19-1	
b. PROJECT NO.		9b. OTHER REPORT NO(S) (Any other numbers that may be assigned this report) AD- 740 990	
c.			
d.			
10. DISTRIBUTION STATEMENT Approved for public release; distribution unlimited			
11. SUPPLEMENTARY NOTES		12. SPONSORING MILITARY ACTIVITY	
13. ABSTRACT Encapsulation used as a protective covering for electronic circuits, insulation from moisture and heat, and lacquer film and thin film coatings of capacitors, is the subject of this bibliography. References dealing with failures, cracks, and deterioration effects are amply represented. Corporate Author-Monitoring Agency, Subject, Title, and Personal Author Indexes are included.			

DD FORM 1473
1 NOV 63

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Security Classification

14. KEY WORDS	LINK A		LINK B		LINK C	
	ROLE	WT	ROLE	WT	ROLE	WT
*Bibliographies						
*Encapsulation						
Embedding Substances						
Transistors						
Manufacturing Methods						
Films						
Aerosols						
Lacquer Films						
Coatings						
Electronic Equipment						
Integrated Circuits						
Mica						
Microminiaturization(Electronics)						
Naval Equipment						
Packaged Circuits						
Packaging						
Dielectrics						

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AD-743 990

ENCAPSULATION

A DDC BIBLIOGRAPHY

DDC-TAS-72-19-1

October 1955 - September 1971

MAY 1972

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CAMERON STATION

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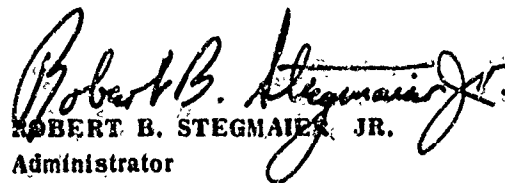
FOREWORD

This bibliography contains the pertinent (weighted) references in the DDC collection on *Encapsulation*. The time coverage is January 1953 to January 1972. In addition to the weighted references, it also contains selective citations related to the subject.

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

BY ORDER OF THE DIRECTOR, DEFENSE SUPPLY AGENCY

OFFICIAL


ROBERT B. STEGMAIER, JR.
Administrator
Defense Documentation Center

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TITLE.....	T-1
PERSONAL AUTHOR.....	P-1

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD- 96 112

ARMY ELECTRONICS LABS FORT MONMOUTH N J

ENCAPSULATING RESINS AND POTTING COMPOUNDS

(U)

OCT 55 JV LINDEN, ERIK G.
REPT. NO. ER E 1101

UNCLASSIFIED REPORT

DESCRIPTORS: *EMBEDDING SUBSTANCES, *PLASTICS,
ENCAPSULATION

(H)

1
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/ZZZHT

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ODC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD-251 485

GENERAL ELECTRIC CO UTICA N Y

RESEARCH AND DEVELOPMENT OF THERMOCOUPLE ENERGY
CONVERTERS

(U)

DESCRIPTIVE NOTE: MONTHLY PROGRESS REPT. NO. 4, 29 DEC

60-28 JAN 61

AUG 60 9P

CONTRACT: DA-18-108-405-CML-941, DA-18-108-CML-
6561

UNCLASSIFIED REPORT

DESCRIPTORS: •ENCAPSULATION, •THERMOCOUPLES, DESIGN,
LEAD COMPOUNDS, PRODUCTION, TELLURIDES, THEORY

(U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD-255 010

STANFORD RESEARCH INST MENLO PARK CALIF

ENCAPSULATED AEROSOLS

(U)

IV ROBBINS, ROBERT C.;

UNCLASSIFIED REPORT

DESCRIPTORS: *AEROSOLS, *CHEMICAL WARFARE AGENTS,
*COATINGS, *ENCAPSULATION, AMMONIUM COMPOUNDS,
BENZENE BORONIC ACID, CHLORIDES, COAGULATION,
CONDENSATION, DIOXIDES, ELECTROSTATICS, ETHYLENES,
FILMS, LIQUIDS, NITROGEN COMPOUNDS, PHOSPHATES,
PHOSPHITES, PHOSPHORIC ACIDS, PHthalATES,
POLYMERIZATION, POLYMERS, SOLIDS, VAPORS

(U)

VARIOUS METHODS OF AEROSOL ENCAPSULATION WERE
STUDIED: (1) LIQUID PHASE MICROENCAPSULATION,
(2) CONDENSATION, AND (3) COAGULATION.
AEROSOL ENCAPSULATION BY CONDENSATION, USING THE
CORE PARTICLES OR DROPLETS AS CONDENSATION NUCLEI,
PROVED TO BE A GENERALLY SUCCESSFUL TECHNIQUE.
COAGULATION WITH INERTIAL FORCES, USING SIMPLE LOW-
POWERED DEVICES, SHOWED LITTLE PROMISE AS A PRACTICAL
AEROSOL ENCAPSULATION METHOD. COAGULATION WITH
ELECTROSTATIC CHARGING OF THE PARTICLES WAS ONLY
PARTIALLY SUCCESSFUL IN SOLID ON LIQUID AND LIQUID ON
LIQUID SYSTEMS, BUT WORKED QUITE WELL IN
ENCAPSULATING SOLID CORES WITH LIQUID FILMS. LIQUID
PHASE MICROENCAPSULATION WAS QUITE SUCCESSFUL, WHERE
APPLICABLE. A NUMBER OF LIQUID CORES WERE
SUCCESSFULLY POLYMERIZED. (AUTHOR)

(U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD-255 962

NAVAL ORDNANCE TEST STATION CHINA LAKE CALIF

EFFECT OF PROCESS VARIABLES ON THE DIMENSIONS AND
QUALITY OF EXTRUSION-COATED PROPELLANT GRAINS (U)

DEC 60 IV METCALF, H.F.; SUTHERLAND, RODNEY;
REPT. NO. TP 2597
MONITOR: NAVWEPS 7604

UNCLASSIFIED REPORT

DESCRIPTORS: •COATINGS, •ENCAPSULATION, •EXTRUSION,
•PLASTIC COATINGS, •PROPELLANT GRAINS, CELLULOSE, ETHYL
CELLULOSE, MACHINE TOOLS, MANUFACTURING METHODS,
PROCESSING, QUALITY CONTROL, SOLID ROCKET PROPELLANTS (U)

THE SECOND PHASE OF AN EXPERIMENT TO EVALUATE AN
EXTRUSION-COATING PROCESS FOR INHIBITING
ROCKET PROPELLANT GRAINS WITH ETHYLCELLULOSE IS
DESCRIBED. THE OBJECTIVES OF THIS PHASE OF THE
EXPERIMENT ARE TO APPLY A SET OF CHOSEN OPERATING
CONDITIONS IN THE 2 1/2-INCH EXTRUDER AND TO CONSIDER
THE EFFECT OF EIGHT ADDITIONAL PROCESS FACTORS ON THE
QUALITY AND DIMENSIONS OF THE INHIBITED PROPELLANT
GRAINS. DATA RESULTING FROM THESE APPLICATIONS ARE
PRESENTED IN TABULAR AND GRAPHICAL FORM, AND AN
INTERPRETATION OF THE DATA IS INCLUDED IN THE TEXT.
(AUTHOR) (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD-257 829

WESTERN ELECTRIC CO INC WINSTON-SALEM N C

INDUSTRIAL PREPAREDNESS STUDY. LACQUER FILM
CAPACITORS

(U)

MAY 51 YV LLOYD, H.E.;
CONTRACT: DA26 029SC81268

UNCLASSIFIED REPORT

DESCRIPTORS: *CAPACITORS, ALUMINUM COATINGS, CELLULOSE
ACETATES, COATINGS, DIELECTRIC FILMS, ELECTRIC
INSULATION, ENCAPSULATION, FILMS, MANUFACTURING METHODS,
METAL COATINGS, PAPER, PLASTIC COATINGS, PRODUCTION,
QUALITY CONTROL, RESISTANCE (ELECTRICAL), TESTS, THIN
FILMS (STORAGE DEVICES), VARNISHES (U)

IDENTIFIERS: THIN FILMS, THIN FILMS
ELECTRONICS (M)

EFFORT HAS BEEN DIRECTED PRIMARILY TOWARD
IMPROVEMENTS IN THE QUALITY OF THE LACQUER FILM
CAPACITORS. DIFFICULTIES EXPERIENCED WITH
DETERIORATION OF INSULATION RESISTANCE AND EFFECTIVE
SERIES RESISTANCE UPON THE APPLICATION OF HEAT HAVE
BEEN RESOLVED. ALSO, EXCESSIVE CAPACITANCE GROWTH
HAS BEEN BROUGHT UNDER CONTROL. DATA WERE PRESENTED
TO SHOW THE PRESENT LEVEL OF QUALITY. ALSO,
PREVIOUSLY COLLECTED DATA IS USED TO MAKE COMPARISONS
WITH THE CURRENT EXPERIENCE. PREPRODUCTION SAMPLES
FOR THE 1.0 AND 0.1 MICROFARAD SIZES ARE UNDERGOING
ELECTRICAL TEST. SAMPLES FOR THE 5.6 MICROFARAD
SIZE ARE IN AN ADVANCED STAGE OF PRODUCTION.
(AUTHOR)

(U)

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD-258 395

SYNTHETIC MICA CO WEST CALDWELL N J

DEVELOPMENT OF ULTRA HIGH TEMPERATURE DIELECTRIC
MATERIALS FOR EMBEDDING AND ENCAPSULATING ELECTRONIC
COMPONENTS (U)

NOV 60 IV BARR, F.A.; MCCARTHY, J.P.;
CONTRACT: NOBS78714

UNCLASSIFIED REPORT

DESCRIPTORS: *EMBEDDING SUBSTANCES, *ENCAPSULATION,
*MICA, ALUMINUM COMPOUNDS, BINDERS, COATINGS,
DIELECTRICS, ELECTRICAL PROPERTIES, ELECTRONIC
EQUIPMENT, GLASS, HIGH-TEMPERATURE RESEARCH, MATERIALS,
PHOSPHATES, PHYSICAL PROPERTIES, POROSITY (U)

INCREASING THE CONCENTRATION OF AQUEOUS ALUMINUM
PHOSPHATE DECREASED THE POROSITY OF PHOSPHATEBONDED
SYNTHETIC MICA COMPOUND. POROSITY CAN BE DECREASED
BY GLASS COATINGS BUT THE THERMAL EXPANSION OF THE
GLASS MUST MATCH THAT OF THE SAMPLE. A VOLUME
SHRINKAGE OF APPROXIMATELY 7% WAS CALCULATED FOR A
STANDARD PHOSPHATE-BONDED SYNTHETIC MICA COMPOUND.
INITIAL RESULTS OF ELECTRICAL PROPERTIES AT
ELEVATED TEMPERATURES INDICATE THAT THE PHOSPHATE-
BONDED SYNTHETIC MICA SYSTEMS ARE SUITABLE FOR 500
C USE. COMMERCIAL ELECTRONIC COMPONENTS
(MAGNETIC AMPLIFIERS, CAPACITORS, AND SMALL
MOTORS) WERE SUCCESSFULLY POTTED AND ENCAPSULATED
WITH THE BONDED SYNTHETIC MICA COMPOUND.
(AUTHOR) (U)

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD-260 926

STANFORD RESEARCH INST MENLO PARK CALIF

ENCAPSULATED AEROSOLS

(U)

IV ROBBINS, ROBERT C.;

UNCLASSIFIED REPORT

DESCRIPTORS: •AFROSOLS, •ENCAPSULATION, ACETATES, ACRYLIC RESINS, BUTYL RADICALS, CHEMICAL WARFARE AGENTS, COATINGS, CONDENSATION, CONTAINERS, ETHYLENES, FILMS, LIQUIDS, NITROCELLULOSE, PHOSPHITES, POLYMERIZATION, POLYMERS, RUBBER, VAPORS, VINYL RADICAL (U)

CONDENSATION POLYMERIZATION OF A NUMBER OF VAPOR PHASE MONOMERS, AS A MEANS OF ENCAPSULATING AEROSOL DROPLETS, WAS STUDIED. THE BEST OF THESE, VINYL ACETATE, POLYMERIZED RAPIDLY AND PRODUCED SOME POLYMER FILM ENCAPSULATION OF THE AEROSOL DROPLETS. A TWO-STAGE MICROCAPSULE GENERATOR WAS DESIGNED, FABRICATED, AND OPERATED. DIBUTYL PHOSPHITE DROPLETS OF ABOUT 5-MICRON DIAMETER WERE ENCAPSULATED WITH A LIQUID GLYCERINE FILM. BY USING SOLUTIONS OF ENCAPSULATING MATERIAL, THE GENERATOR ALSO PRODUCED MICROCAPSULES OF DIBUTYL PHOSPHITE IN POLYETHYLENE, NITROCELLULOSE, AND NATURAL RUBBER. (AUTHOR) (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD-261 938

BELL TELEPHONE LABS INC WHIPPANY N J

ENGINEERING SERVICES ON TRANSISTORS

(U)

MAY 61 IV ATALLA, M.M.; DODSON, G.A.;
CONTRACT: DA36 039SC85352

UNCLASSIFIED REPORT

DESCRIPTORS: ♦DIODES, ♦TRANSISTOR AMPLIFIERS,
♦TRANSISTORS, AGING (PHYSIOLOGY), DESIGN, ELECTRICAL
PROPERTIES, ENCAPSULATION, FAILURE (MECHANICS),
GERMANIUM, IMPURITIES, MEASUREMENT, MICROWAVE EQUIPMENT,
RELIABILITY, SILICON, STORAGE, STRESSES, SWITCHING
CIRCUITS, TEMPERATURE, TEST METHODS, TESTS (U)

STUDIES AND INVESTIGATIONS WERE CONTINUED ON
TRANSISTORS AND TRANSISTOR-LIKE DEVICES WITH A VIEW
TOWARD DEMONSTRATING AND INCREASING THE
PRACTICABILITY OF THEIR USE IN OPERATING EQUIPMENT.
STATUS REPORTS ARE PRESENTED ON: (1)
ACCELERATED STEP-STRESS AGING OF DIODES, (2) A
3000-MC MICROWAVE GERMANIUM TRANSISTOR, (3) A 1-
WATT, 1000 MC GERMANIUM TRANSISTOR, (4)
INTEGRATED CIRCUIT DEVELOPMENT, (5) TRANSISTOR
REQUIREMENTS FOR DCTL, AND (6) AN ANALYSIS OF
STORAGE TIME BEHAVIOR OF DIFFUSED EPITAXIAL SILICON
TRANSISTORS. (AUTHOR) (U)

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD-265 314

STANFORD RESEARCH INST MENLO PARK CALIF

ENCAPSULATED AEROSOLS

(U)

IV ROBBINS, ROBERT C.;

UNCLASSIFIED REPORT

DESCRIPTORS: •AEROSOLS, •ENCAPSULATION, AEROSOL GENERATORS, BUTYL RADICALS, CHEMICAL WARFARE AGENTS, COATINGS, DESIGN, DROPS, EFFECTIVENESS, ETHYLENES, LIQUIDS, PHOSPHITES, POLYMERS, RUBBER, WAXES (U)

A TWO-STAGE MICROCAPSULE GENERATOR HAS BEEN UTILIZED TO PRODUCE A VARIETY OF LIQUID CORE MICROCAPSULES. A NUMBER OF OPERATIONAL AND DESIGN CHANGES HAVE BEEN MADE TO IMPROVE THE PERFORMANCE OF THE GENERATOR AND TO INCREASE ITS VERSATILITY. THE GENERATOR HAS BEEN USED TO PROVIDE MICROCAPSULES OF DIBUTYL PHOSPHITE IN RUBBER, DIBUTYL PHOSPHITE IN PARAFFIN, AND DIBUTYL PHOSPHITE IN POLYETHYLENE. STUDIES WERE MADE OF THE EFFECT OF FILM COATING ON THE EVAPORATION RATE OF DIBUTYL PHOSPHITE MICRODROPLETS. AN INVESTIGATION WAS MADE OF THE EFFECT OF SOLUTION CONCENTRATION ON COAT THICKNESS IN SPRAYDRIED MICROCAPSULES. NOZZLE DESIGN WAS FOUND TO BE A CRITICAL PARAMETER. (AUTHOR) (U)

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD-265 461

GENERAL ELECTRIC CO SYRACUSE N Y

OPTIMIZATION OF THERMOELECTRIC ENERGY CONVERTERS (U)

DEC 60 1V KLEIN, PHILIPP H.;

CONTRACT: NOBS78402

UNCLASSIFIED REPORT

DESCRIPTORS: *ELECTRIC POWER PRODUCTION; *GENERATORS;
*THERMAL CONDUCTIVITY; *THERMOELECTRICITY; ANTIMONY
ALLOYS, BISMUTH ALLOYS, CALCIUM COMPOUNDS, CHROMIUM
COMPOUNDS, ENCAPSULATION, HEAT TRANSFER, INTERMETALLIC
COMPOUNDS, LEAD COMPOUNDS, MAGNESIUM COMPOUNDS,
MATERIALS, SILICATES, TANTALUM, TELLURIDES, THERMAL
INSULATION (U)

DESCRIPTORS: *THERMOELECTRICITY; *GENERATORS;
*THERMAL CONDUCTIVITY, ENCAPSULATION, LEAD
COMPOUNDS, BISMUTH ALLOYS.
CONSIDERATION OF THERMAL SYSTEM NO. 1 WAS
CONTINUED. THE SOURCE OF HEAT FOR THIS SYSTEM IS
SATURATED STEAM AT 533 K (500 F), AND THE HEAT
SINK IS SEA WATER AT 291 K (65 F). RESULTS FOR
FORCED-CONVECTION COOLING HAVE BEEN COMPARED WITH
THOSE FOR FREE-CONVECTION COOLING. IN ADDITION,
THE POSSIBLE IMPROVEMENTS IN PERFORMANCE THAT MAY
RESULT FROM USE OF BETTER THERMOELECTRIC MATERIALS
THAN ARE CURRENTLY AVAILABLE HAVE BEEN COMPUTED.
THESE RESULTS WERE OBTAINED WITH THE AID OF A
COMPUTER PROGRAM DESIGNATED NOBS-2. PROGRESS WAS
ALSO MADE IN THE PREPARATION OF COMPUTER PROGRAM
NOBS-3, WHICH PROVIDES A MORE ACCURATE
REPRESENTATION OF THE LOSSES IN ELECTRICAL
CONDUCTORS, ELECTRICAL CONTACTS, AND THERMAL SHUNTS
THAN IS POSSIBLE WITH THE NOBS-2 PROGRAM. IN
ADDITION, GENERAL CHARACTERISTICS HAVE BEEN EVOLVED
FOR THE NEXT THERMAL SYSTEM TO BE ANALYZED.
(AUTHOR) (U)

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DOC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD-265 499

SYNTHETIC MICA CO. WEST CALDWELL N J

DEVELOPMENT OF ULTRA HIGH TEMPERATURE DIELECTRIC
MATERIALS FOR EMBEDDING AND ENCAPSULATING ELECTRONIC
COMPONENTS (U)

MAY 61 IV BARR, F.A.; MCCARTHY, J.P.;
CONTRACT: NOBS78714

UNCLASSIFIED REPORT

DESCRIPTORS: •DIELECTRICS; •ELECTRONIC EQUIPMENT;
•F BEDDING SUBSTANCES, •ENCAPSULATION, •MICA; ADHESIVES;
A INATES, ALUMINUM COMPOUNDS, BINDERS, BORON
COMPOUNDS, COATINGS, DIELECTRIC PROPERTIES, GLASS;
GYPSUM, HIGH-TEMPERATURE RESEARCH, MEASUREMENT,
MECHANICAL PROPERTIES, PARTICLES, PHOSPHATES, PHYSICAL
PROPERTIES, POROSITY, THERMAL EXPANSION;
THERMODYNAMICS (U)

PHOSPHATE SYNTHETIC MICA WAS INVESTIGATED AS A
DIELECTRIC MATERIAL FOR ENCAPSULATING AND EMBEDDING
ELECTRONIC COMPONENTS FOR 500 C USE. PHYSICAL
PROPERTIES OF THE SYSTEM WERE DETERMINED AND FOUND TO
BE SUITABLE FOR HIGH TEMPERATURE USE. VARIOUS
METHODS OF REDUCING POROSITY WERE INVESTIGATED
INCLUDING DRY PRESSING, GLASS COATING, ADDITIVES AND
VARIOUS PHOSPHATE BONDS. THE USE OF A DEVITRIFIED
GLASS SEALING CEMENT AS A COATING FOR THE PHOSPHATE
SYNTHETIC MICA RESULTED IN A COMPOSITE MATERIAL
CURED BELOW 500 C, HAVING GOOD PHYSICAL PROPERTIES
WITH WATER ABSORPTION LESS THAN 1%. COMMERCIAL
CAPACITORS, TRANSFORMERS, AND MOTORS WERE
ENCAPSULATED AND TESTED. PROTOTYPE HIGH
TEMPERATURE RESISTORS WERE CONSTRUCTED AND
ENCAPSULATED FOR 500 C APPLICATIONS USING CERAMO-
PLASTIC INJECTION MOLDING TECHNIQUES IN COMBINATION
WITH THE PHOSPHATE-MICA DIELECTRIC MATERIAL.
(AUTHOR) (U)

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD-265 857

GENERAL ELECTRIC CO SYRACUSE N Y

OPTIMIZATION OF THERMOELECTRIC ENERGY CONVERTERS (U)

FEB 61 IV LUFT, L.;
CONTRACT. NOBS78402

UNCLASSIFIED REPORT

DESCRIPTORS: *ELECTRIC POWER PRODUCTION, *POWER SUPPLIES, *THERMOELECTRICITY, ANTIMONY ALLOYS, ARSENIDES, BISMUTH ALLOYS, CALCIUM COMPOUNDS, CERAMIC MATERIALS, CHEMICAL PROPERTIES, CHROMIUM COMPOUNDS, CRYSTAL STRUCTURE, DESIGN, ELECTRICAL PROPERTIES, ENCAPSULATION, GENERATORS, HALL EFFECT, HEAT, HEAT TRANSFER, INTERMETALLIC COMPOUNDS, LEAD COMPOUNDS, MAGNESIUM COMPOUNDS, MEASUREMENT, MECHANICAL PROPERTIES, OXIDES, SELENIDES, SOURCES, TANTALUM, TELLURIDES, TESTS (U)

THE WORK ON A SELECTED SYSTEM, DESIGNATED THERMAL SYSTEM NO. 1, WAS COMPLETED USING A COMPUTER PROGRAM. THERMAL SYSTEM NO. 1 IS BASED ON SATURATED STEAM AT 523 K AS THE HEAT SOURCE AND 291 K WATER AS THE HEAT SINK. MGO-TIO2 CERAMIC WAS MADE INTO CAP ULE BODIES AND USED FOR SUCCESSFUL ENCAPSULATION OF LEAD TELLURIDE. SEEBECK COEFFICIENT OF MG2SB2 WAS MEASURED IN THE 300 TO 1250 K TEMPERATURE RANGE, THE VALUES RANGING FROM 100 TO 159 MICROVOLTS PER DEGREES K. ELECTRICAL MEASUREMENTS WERE PERFORMED ON CRSBO.9SE0.1, INCLUDING SEEBECK COEFFICIENT AND ELECTRICAL RESISTANCE. A NUMBER OF II-IV COMPOUNDS WAS PREPARED AND THEIR THERMOELECTRIC PROPERTIES MEASURED. (AUTHOR) (U)

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD-265 866

LOCKHEED MISSILES AND SPACE CO SUNNYVALE CALIF

ENCAPSULATING, POTTING, AND EMBEDDING MATERIALS FOR
ELECTRONIC COMPONENTS AND MODULES. AN ANNOTATED
BIBLIOGRAPHY

(U)

AUG 61 1V OWENS, GEORGE E.;
REPT. NO. SB 61 50
CONTRACT: AFO4 647 787

UNCLASSIFIED REPORT

DESCRIPTORS: •BIBLIOGRAPHIES, •EMBEDDING SUBSTANCES,
•ENCAPSULATION, •INSULATING MATERIALS, ELECTRIC
INSULATION, ELECTRONIC EQUIPMENT

(U)

THIS BIBLIOGRAPHY RESULTS FROM A SEARCH FOR
INFORMATION ON MATERIALS USED FOR ENCAPSULATING,
POTTING, AND EMBEDDING ELECTRONIC COMPONENTS.
THERE ARE 97 REFERENCES, ARRANGED BY TITLE, WITH
PUBLICATION DATES BETWEEN JANUARY 1958 AND AUGUST
1961. FOLLOWING THE REFERENCES ARE INDEXES OF
AUTHORS AND SPONSORS, JOURNAL SOURCES, AND REPORT
NUMBERS. THE FOLLOWING SOURCES WERE CONSULTED
DURING THE SEARCH: LMSC TECHNICAL INFORMATION
CENTER CARD CATALOGS, APPLIED SCIENCE AND
TECHNOLOGY INDEX, 1958-1961, ASTIA TECHNICAL
ABSTRACT BULLETIN, 1958-1961, ELECTRICAL
ENGINEERING ABSTRACTS, 1958-1961, ENGINEERING
INDEX, 1958-1961, U.S. GOVERNMENT RESEARCH
REPORTS, 1960-1961, AND PERTINENT JOURNALS, 1961.
(AUTHOR)

(U)

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD-265 894

NATIONAL CASH REGISTER CO DAYTON OHIO

A STUDY OF THE ENCAPSULATION APPLICABLE TO LIQUID
ROCKET FUEL

(U)

JUN 61 1V HSIEN, PAUL Y.;
CONTRACT: NONR284800

UNCLASSIFIED REPORT

DESCRIPTORS: •AMIDES, •DROPS, •ENCAPSULATION, •FILMS,
•HYDRAZINES, •LIQUID ROCKET PROPELLANTS, •METHYL
HYDRAZINES, COATINGS, COPOLYMERIZATION, ETHYLENES, GELS,
LIQUIDS, MEMBRANES, ORGANIC COMPOUNDS, PHYSICAL
PROPERTIES, POLYMERIZATION, POLYMERS, PRODUCTION, ROCKET
FUELS, ROCKET OXIDIZERS

(U)

THE PHENOMENA INVOLVED IN ENCAPSULATION FROM
NONAQUEOUS MEDIA IS DISCUSSED. STUDIES INCLUDED:
(1) ESTABLISHMENT OF THE ESSENTIAL CONDITIONS FOR
THE ACCUMULATION OF MACROMOLECULES AROUND A
DISPERSED LIQUID DROPLET TO BE ENCAPSULATED
(INTERNAL PHASE); (2) ENCAPSULATION OF
LIQUIDS BY INTERFACIAL POLYMERIZATION APPROACH; AND
(3) TESTING OF THE COMPATIBILITY OF ETHYLENE
DIAMINE, 1,1-DIMETHYL HYDRAZINE, AND HYDRAZINE WITH
VARIOUS SOLVENTS. AMINES, ESPECIALLY ETHYLENE
DIAMINE, WERE SELECTED AS MODEL COMPOUNDS.
(AUTHOR)

(U)

UNCLASSIFIED

DDG REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD-265 895

NATIONAL CASH REGISTER CO DAYTON OHIO

A STUDY OF THE ENCAPSULATION APPLICABLE TO LIQUID
ROCKET FUELS

(U)

JAN 61 IV HSIEH, PAUL Y.
CONTRACT: NONR204800

UNCLASSIFIED REPORT

DESCRIPTORS: *ENCAPSULATION, *ETHYL CELLULOSE, *FILMS,
*GASES, *NITROCELLULOSE, *POLYMERS, *SEMI PERMEABILITY,
*VAPORS, AMMONIA, ARGON, CARBON DIOXIDE, COATINGS,
DIFFUSION, DIPOLE ANTENNAS, HELIUM, LIQUID ROCKET
PROPELLANTS, MEMBRANES, NITROGEN, OXYGEN, PLASTIC
COATINGS, ROCKET FUELS, SOLUBILITY, SULFUR COMPOUNDS,
WATER VAPOR

(U)

PERMEABILITY OF ETHYLCELLULOSE AND NITROCELLULOSE
FILMS TO 13 DIFFERENT GASES AND VAPORS WAS
DETERMINED. THE SOLUBILITY OF THESE GASES AND
VAPORS IN ETHYLCELLULOSE AND NITROCELLULOSE WAS ALSO
MEASURED BY GRAVIMETRIC AND VOLUMETRIC METHODS OF
EQUILIBRIUM SORPTION. FROM THESE DATA FOR
PERMEABILITY AND SOLUBILITY, DIFFUSION CONSTANTS OF
THE GASES AND VAPORS IN THE POLYMERIC FILMS WERE
CALCULATED BY MEANS OF THE RELATION, P EQUALS DS .
IT WAS FOUND THAT THE DIFFUSION CONSTANT DECREASED
LINEARLY WITH AN INCREASE OF MOLECULAR WEIGHT;
HOWEVER, THE SHAPE FACTOR OF THE MOLECULES PLAYED AN
IMPORTANT ROLE IN DIFFUSION. THE SOLUBILITY
CONSTANTS DECREASED LINEARLY WITH AN INCREASE OF THE
LENNARD-JONES FORCE CONSTANTS WHEN SOLUBILITY WAS
EXPRESSED ON A WT. INCL. IL WEIGHT BASIS RATHER
THAN A VOLUME BASIS. IT IS POSSIBLE TO ESTIMATE
PERMEABILITIES OF OTHER GASES AND VAPORS IN THESE
FILMS FROM THEIR MOLECULAR WEIGHTS AND LENNARD-
JONES FORCE CONSTANTS. (AUTHOR)

(U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD-266 861

SYNTHETIC MICA CO WEST CALDWELL N J

DEVELOPMENT OF ULTRA HIGH TEMPERATURE DIELECTRIC
MATERIALS FOR EMBEDDING AND ENCAPSULATING ELECTRONIC
COMPONENTS (U)

FEB 61 IV BARR, F. A. MCCARTHY, J. P.
CONTRACT: NOBS7(714

UNCLASSIFIED REPORT

DESCRIPTORS: • EMBEDDING SUBSTANCES, • ENCAPSULATION,
• MICA, ALUMINUM COMPOUNDS, BINDERS, BORATES, CASTING,
DIELECTRIC PROPERTIES, DIELECTRICS, ELECTRICAL
PROPERTIES, ELECTRONIC EQUIPMENT, GLASS, LEAD COMPOUNDS,
MOLDING MATERIALS, PHOSPHATES, PHYSICAL PROPERTIES,
POROSITY, PRESSURE, PROCESSING, SILICONES, SYNTHETIC
RUBBER (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD-274 642

DEPUTY COMMANDER AEROSPACE SYSTEMS INGLEWOOD CALIF

CRYSTAL GROWTH AND CRYSTALLOGRAPHY. A LITERATURE
SURVEY

(U)

JAN 62 IV CHERON, THEODORE;
REPT. NO. TDR62 5
CONTRACT: AF04 647 930
MONITOR: DCAS TDR62 5

UNCLASSIFIED REPORT

DESCRIPTORS: •BIBLIOGRAPHIES, •CORUNDUM, •CRYSTALS,
•GARNET, •RUBY, •SPINELS, ALUMINUM COMPOUNDS, CRYSTAL
STRUCTURE, FERRITES, GROWTH, LASERS, METALLIC COMPOUNDS,
OXIDES, PREPARATION, REFRACTORY MATERIALS, SAPPHIRES,
SPECTROGRAPHIC ANALYSIS

(U)

THIS BIBLIOGRAPHY, CONSISTING OF 162 ENTRIES,
COVERS THE PERIOD FROM 1950 TO 1961. IT REVIEWS
THE LITERATURE ON THE PREPARATION OF CRYSTALS FOR
LASERS, COVERING MAGNETIC AND NON-MAGNETIC GARNETS,
RUBIES, CRYSTALLOGRAPHY, AND HIGH-MELTING METAL
OXIDES. (AUTHOR)

(U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD-283 325

STANFORD RESEARCH INST MENLO PARK CALIF

ENCAPSULATED AEROSOLS

(U)

APR 62

IV

ROBBINS, ROBERT C.;

UNCLASSIFIED REPORT

DESCRIPTORS: •AEROSOLS, •COATINGS, •ENCAPSULATION, AMMONIUM COMPOUNDS, BENZOIC ACIDS, CHEMICAL WARFARE AGENTS, CHLORIDES, COAGULATION, CONDENSATION, DIOXIDES, ELECTROSTATICS, ETHYLENES, FILMS, LIQUIDS, NITROGEN COMPOUNDS, PHOSPHATES, PHOSPHITES, PHOSPHORIC ACIDS, PHTHALATES, POLYMERIZATION, POLYMERS, SOLIDS, VAPORS (U)

METHODS OF AEROSOL ENCAPSULATION INCLUDED: PREENCAPSULATION, COLLECTION, THEN REDISPERSION; ENCAPSULATION BY CONDENSATION FROM A SUPERSATURATED VAPOR, OR BY CONDENSATION INVOLVING CATALYTIC POLYMERIZATION; AND VARIOUS COAGULATION METHODS. THE PHYSICAL AND CHEMICAL PROPERTIES OF THE CORE AND COAT MATERIALS DETERMINE THE RANGE OF APPLICABILITY OF EACH METHOD. A USEFUL MICROENCAPSULATION METHOD, BASED ON COAGULATION BY INERTIAL FORCE WAS DEVELOPED. THE GENERATION APPARATUS, CONSISTING OF TWO AEROSOL GENERATORS IN SERIES, WAS UTILIZED TO PRODUCE MANY KINDS OF MICROCAPSULES. A FLUID ENERGY MILL WAS FOUND USEFUL FOR THE PRODUCTION OF SOME MICROCAPSULES. THE PERMEABILITY OF MICROCAPSULE FILMS AND THE EFFECT OF EXPOSURE TIME AND HUMIDITY WERE STUDIED USING DIBUTYL PHOSPHITE CORES. PHYSICAL PROPERTIES OF MICROCAPSULE CORE AND COAT MATERIALS BELIEVED TO BE IMPORTANT IN ENCAPSULATION WERE MEASURED. (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD-284 D, 5

SOUTHWEST RESEARCH INST SAN ANTONIO TEX

ENCAPSULATION OF FOODS

(U)

IV SCHUETZE, CLARKE E.; MCHAHON, WILLIAM

E.;

REPT. NO. TDR62 53

CONTRACT: AF33 616 7717

MONITOR: 6570 AMRL TDR62 53

UNCLASSIFIED REPORT

DESCRIPTORS: •CONTAINERS, •ENCAPSULATION, •FOOD,
COATINGS, PRESERVATION, PROCESSING, SPACE FLIGHT (U)

BARRIER MATERIALS MEETING FOOD AND DRUG ADMINISTRATION STANDARDS WERE STUDIED FOR USE IN THE ENCAPSULATION OF FOODS, AND FOR THE PREPARATION OF SAMPLE CAPSULES OF FOOD ITEMS FOR EVALUATION. THE ENCAPSULATING MATERIAL MUST BE CAULE CONTENTS UNDER AMBIENT CONDITIONS AND ALSO IN HIGH TEMPERATURE AND HIGH VACUUM ENVIRONMENTS. THE FOOD IN THE CAPSULES MUST REMAIN UNCONTAMINATED AND HIGHLY STABLE FOR SIX MONTHS WITHOUT REFRIGERATION. FOOD OF LOW MOISTURE CONTENT WERE ENCAPSULATED IN TWO STEPS, USING A SOFT-SHELLED CAPSULE WITH AN OVERWRAP. FUDGE, POUND CAKE, AND BROWNIES WERE FIRST PLACED IN PREFORMED CONTAINERS; CARAMELS AND PECANS WERE FIRST SPRAY COATED OF MAINTAINING ITS ESSENTIAL PROPERTIES AND THOSE OF THE CAPSULE CONTENTS UNDER AMBIENT CONDITIONS AND ALSO IN HIGH TEMPERATURE AND HIGH VACUUM ENVIRONMENTS. THE FOOD IN THE CAPSULES MUST REMAIN UNCONTAMINATED AND HIGHLY STABLE FOR SIX MONTHS WITHOUT REFRIGERATION. FOODS OF LOW MOISTURE CONTENT WERE ENCAPSULATED IN TWO STEPS, USING A SOFT-SHELLED CAPSULE WITH AN OVERWRAP. FUDGE, POUND CAKE, AND BROWNIES WERE FIRST PLACED IN PREFORMED CONTAINERS; CARAMELS AND PECANS WERE FIRST SPRAY COATED. IN EACH CASE THE BITE-SIZED PORTIONS WERE HEAT-SEALED INTO PLASTIC BAGS. FOODS OF MODERATE MOISTURE CONTENT, EXEMPLIFIED BY MEAT, AND FOODS OF HIGH MOISTURE CONTENT, SUCH AS VEGETABLES AND FRUITS, WERE ENCAPSULATED IN LAMINATED CONTAINERS WITH AN OVERWRAP. (AUTHOR) (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD-286 907

PHILCO CORP LANSDALE PA

PEM FOR TRANSISTOR MANUFACTURING PROCESS
IMPROVEMENT

(U)

JUL 62 1V SANDERS, J. 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 ON TRANSISTORS
FABRICATED 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)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD-289 291

WESTINGHOUSE ELECTRIC CORP WASHINGTON D C

HIGH CURRENT AND HIGH VOLTAGE SILICON CONTROLLED
RECTIFIERS

(U)

OCT 62 1V

CONTRACT: NCBSR87646

UNCLASSIFIED REPORT

DESCRIPTORS: *POWER, *RECTIFIERS, ALUMINUM, ANTIMONY,
BORON, COOLING, CRYSTALLIZATION, CRYSTALS, DIFFUSION,
ELECTRIC CURRENTS, ELECTRIC POTENTIAL, ENCAPSULATION,
GOLD ALLOYS, MOLYBDENUM, SILICON, SWITCHING CIRCUITS,
TRANSIENTS

(U)

DEVELOPMENT OF A HIGH CURRENT, HIGH VOLTAGE SILICON
CONTROLLED RECTIFIER.

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD-294 110

TOW SEMICONDUCTORS INC LAWDALE CALIF

PRODUCTION ENGINEERING MEASURE RELIABILITY THRU
PROCESS IMPROVEMENT

(U)

SEP 62 IV BARNES, S.H.; CHIEN, F.;

UNCLASSIFIED REPORT

DESCRIPTORS: *MANUFACTURING METHODS, *TRANSISTORS,
DIFFUSION, ELECTRICAL PROPERTIES, ENCAPSULATION,
EVAPORATION, FAILURE (MECHANICS), LIFE EXPECTANCY,
PROCESSING, PRODUCTION, QUALITY CONTROL, RELIABILITY (U)

EFFORT IS PRESENTED ON THE PRODUCTION ENGINEERING
MEASURE TO INCREASE TRANSISTOR RELIABILITY.
PROCESS IMPROVEMENTS WITHIN THE MAJOR TASKS OF
MATERIAL EVALUATION, DIFFUSION AND PHOTORESIST,
CONTACT METALLIZING, LEAD ATTACHMENT, AND
ENCAPSULATION WERE ACCOMPLISHED. EMPHASIS WAS
PLACED ON THE METHOD OF CONTACT METALLIZING AND LEAD
ATTACHMENT. SAMPLE QUANTITIES OF DEVICES UTILIZING
AN EVAPORATED ALUMINUM LAYER FOR BASE AND EMITTER
CONTACTS WERE PLACED ON LIFE TEST. EQUIPMENT WAS
RECEIVED TO BEGIN ALUMINUM WIRE BONDING.
FEASIBILITY TESTS TO DETERMINE STRESS LEVELS OF THE
STEP-STRESS AGING WERE STARTED. RELIABILITY
EVALUATION OF PRODUCTION DEVICES CONTINUED TO FURTHER
SUBSTANTIATE THE FAILURE RATE BASIS FROM WHICH THE
EFFECTS OF THE PROCESS IMPROVEMENT TASKS WILL BE
MEASURED. (AUTHOR)

(U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD-295 538

MCDONNELL AIRCRAFT CORP ST LOUIS MO

ELECTRICAL POTTING COMPOUNDS - SURFACE AND VOLUME
RESISTIVITY AT ELEVATED TEMPERATURES FOR PROTRACTED
TIMES (PHASE 11: ELECTRICAL TESTS) (U)

JAN. 63 80P

REPT. NO. 9354

CONTRACT: AF33 657 7749

UNCLASSIFIED REPORT

DESCRIPTORS: •ELECTRONIC EQUIPMENT, •EMBEDDING
SUBSTANCES, •ENCAPSULATION, CONTAINERS, ELECTRIC
CONNECTORS, ELECTRICAL PROPERTIES, PACKAGED CIRCUITS,
PLASTICS, RESISTANCE (ELECTRICAL), TEMPERATURE, TESTS (U)

POTTING COMPOUNDS FOR ELECTRONIC CIRCUITS; SURFACE
AND VOLUME RESISTIVITY AT ELEVATED TEMPERATURE
FOR PROTRACTED PERIODS OF TIME.

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD-296 356

LOCKHEED MISSILES AND SPACE CO SUNNYVALE CALIF

INSPECTING AND TESTING OF EMBEDDING MATERIALS AND
COMPONENTS OF ELECTRICAL MODULES BEFORE, DURING AND
AFTER ASSEMBLY: A PARTIALLY ANNOTATED
BIBLIOGRAPHY (U)

NOV. 62 1V PIERCE, CHARLIE M.;
REPT. NO. SB62 433 80 62 28

UNCLASSIFIED REPORT

DESCRIPTORS: *EMBEDDING SUBSTANCES, *ENCAPSULATION,
AGING (MATERIALS), BIBLIOGRAPHIES, CONTAMINATION,
DEGRADATION, EFFECTIVENESS, ELECTRON MICROSCOPY,
ELECTRONIC EQUIPMENT, EPOXY PLASTICS, ISOCYANATE
PLASTICS, MEASURING DEVICES (ELECTRICAL + ELECTRONIC),
MICROORGANISMS, MINE STERILIZERS, NON-DESTRUCTIVE
TESTING, PLASTICS, POLAROGRAPHIC ANALYSIS, PRINTED
CIRCUITS, RADIOGRAPHY, RESISTANCE (ELECTRICAL), SEALING
COMPOUNDS, SPACECRAFT, STRAIN GAGES, STRESSES, TEST
METHODS (U)

AD-296 3569N4 +++BIBLIOGRAPHY ON INSPECTION
AND TESTING OF EMBEDDING MATERIALS AND COMPONENTS OF
ELECTRONICS MODULES BEFORE, DURING, AND AFTER
ASSEMBLY. (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD-412 282

LOCKHEED MISSILES AND SPACE CO SUNNYVALE CALIF

VACUUM DE-GASSING OF ENCAPSULANTS,

(U)

JUN 61 17P DEFELICE, A. I
REPT. NO. MRI267 01

UNCLASSIFIED REPORT

DESCRIPTORS: (•ENCAPSULATION, MANUFACTURING
METHODS), (•MODULES (ELECTRONIC), DEGASIFI
CATION), VACUUM APPARATUS, EPOXY PLASTICS,
POLYETHYLENE PLASTICS, TEMPERATURE, TESTS,
BUBBLES, CRAZING, HARDNESS, CASTING.
IDENTIFIERS: 1961, VACUUM IMPREGNATOR.

(U)

(U)

PROCESSES AND TECHNIQUES FOR THE OPERATION OF THE
VACUUM IMPREGNATOR FOR DE-GASSING THE RESINS USED
FOR ENCAPSULATING ELECTRONIC MODULES IS REPORTED. A
TOTAL OF 225 DISTINCT TESTS WERE RUN USING 9
DIFFERENT RESIN FORMULATIONS. RESIN TYPES IN
CLUDED EPOXIES AND POLYURETHANES. TWO FACTORS,
PRE-MIX TEMPERATURE OF INGREDIENTS AND APPLICATION
OF VACUUM WERE VARIED. THE RESULTING SAMPLES WERE
EVALUATED FOR BUBBLES, CRACKS, CRAZING AND HARDNESS.
APPLICATION OF VACUUM TO BATCHES PRIOR TO CASTING
AND CURING PROVED EFFECTIVE FOR DE-GASSING
ENCAPSULATING MATERIALS FOR MOST OF THE FORMULATIONS
TESTED. TAKEN OVER ALL THE RESULTS VARIED WIDELY,
RANGING FROM PERFECT TO UNACCEPTABLE. (AUTHOR)

(U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD-427 412

PICATINNY ARSENAL DOVER N J AMMUNITION ENGINEERING
DIRECTORATE

ENCAPSULATING PROPELLANTS BY MEANS OF ULTRASONIC
WELDING, (U)

DEC 63 16P ZGLENICKI, CHARLES ; SILBERMAN,
LOUIS ;
REPT. NO. AED-TM-1208

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:

DESCRIPTORS: (•ULTRASONIC RADIATION, WELDING),
(•PROPELLANT TANKS, WELDING), (•WELDING, PROPELLANT
TANKS), ENCAPSULATION, ALUMINUM, TESTS, INDUSTRIAL
EQUIPMENT, STORAGE (U)
IDENTIFIERS: ULTRASONIC WELDING, 1963 (U)

AN AL CONTAINER HOLDING M5 PROPELLANT HAS
CAUSED FUNCTIONAL PROBLEMS BECAUSE OF INADEQUATE
SEALING. THE ULTRASONIC WELDING APPROACH PROVIDED
THE MOST EFFECTIVE AND DURABLE SEAL. ONE HUNDRED
AND THIRTY-THREE CONTAINERS SEALED BY ULTRASONIC
WELDING WITHSTOOD 28 DAYS TEMPERATURE CYCLING WITHOUT
ANY DETECTABLE LEAKAGE. THIRTY-FIVE CONTAINERS
FILLED WITH M5 PROPELLANT WERE TEMPERATURE-CYCLED
AND EXPOSED TO A SOLVENT-SATURATED ATMOSPHERE FOR 11
DAYS. CLOSED BOMB TESTS OF THE PROPELLANT
AFTERWARD INDICATED AN EFFECTIVE SEAL WAS ACHIEVED.
METICULOUS ATTENTION TO SURFACE CLEANLINESS IS NOT
REQUISITE TO ACHIEVE SOUND WELDS. FOIL THIN COVERS
WHICH PRESENT A MINIMUM RESISTANCE TO PROPAGATION OF
EXPLOSIVE EFFECTS CAN BE WELDED. PROPELLANT
TRAPPED IN THE WELD ZONE DID NOT IGNITE.
SIGNIFICANT COST SAVINGS CAN BE REALIZED IN HIGH
VOLUME PRODUCTION OVER METHODS USING SPECIAL
SEALANTS. (AUTHOR) (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD-430 751

NAVAL RESEARCH LAB WASHINGTON D C

ENCAPSULATION TECHNIQUES FOR NRL IRRADIATION EFFECTS
STUDIES. (U)

DESCRIPTIVE NOTE: PROGRESS REPT.,
DEC 63 23P STEELE, L. E. ; HAWTHORNE, J. R.

REPT. NO. NRL-MR-1481

PROJ: SR007 01 01

TASK: 0858

UNCLASSIFIED REPORT

DESCRIPTORS: (*STEEL, RADIATION DAMAGE); (*CONTAINERS;
DESIGN); ENCAPSULATION, NUCLEAR REACTORS, REACTOR
MATERIALS, TEST REACTORS, MECHANICAL PROPERTIES,
THERMAL RADIATION, POWER REACTORS, STAINLESS STEEL,
ALUMINUM, TEST FACILITIES (U)
IDENTIFIERS: 1963, NUCLEAR RADIATION (U)

VARIOUS SYSTEMS AND TECHNIQUES FOR ENCAPSULATION OF
IRRADIATION EXPERIMENTS HAVE BEEN DEVISED IN THE
COURSE OF SEVERAL YEARS OF RESEARCH USING SEVERAL
AEC TEST REACTOR FACILITIES. A CAPSULE DESIGN
PHILOSOPHY HAS EVOLVED WHICH IS BASED UPON THE USE
OF TWO TYPES OF CAPSULES, SEALED UNITS AND EXTERNALLY
CONTROLLED UNITS FOR THE IRRADIATION OF LARGE NUMBERS
OF METALLURGICAL SPECIMENS UNDER A RANGE OF THERMAL
AND NUCLEAR CONDITIONS. THE BASIC PHILOSOPHY OF
CAPSULE DESIGN IS DESCRIBED ALONG WITH SPECIFIC
TECHNIQUES UTILIZED FOR VARIOUS TEST REACTOR CAPSULES
AND FOR LONG-TERM POWER REACTOR SURVEILLANCE
CAPSULES. (AUTHOR) (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD-432 229

NAVAL BOILER AND TURBINE LAB PHILADELPHIA PA

EVALUATION OF HIGH TEMPERATURE INSTRUMENTATION FOR
DYNAMIC ANALYSIS. ENCAPSULATED STRAIN GAGE
INSTALLATION FOR USE IN STEAM ENVIRONMENT, (U)

FEB 64 49P TOLOTTA, S. ;

PROJ: A384

TASK: SFO13 06 20 ,SUBTASK 3950

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:

DESCRIPTORS: (•STRAIN GAGES, STEAM), (•BOILERS,
INSTRUMENTATION), SEALS (STOPPERS), INSTALLATION),
WELDS, ENCAPSULATION, FRACTURE (MECHANICS) THERMAL
STRESSES, HIGH TEMPERATURE RESEARCH (U)

IDENTIFIERS: 1964 (U)

AN INSPECTION OF THE INTERIOR OF A STEAM DRUM
ABOARD THE USS DECATUR REVEALED A CRACK EXTENDING
AROUND THE UPPER HALF OF THE MANWAY. THE STRESSES
CAUSING THE FAILURE WERE THOUGHT TO BE HIGHLY
CONCENTRATED; THEREFORE, IT WAS NECESSARY TO USE A
STRAIN GAGE WITH A SHORT GAGE LENGTH (1/8 IN)
THAT COULD OPERATE IN A SATURATED STEAM ATMOSPHERE AT
1200 PSIG. BECAUSE THERE WERE NO KNOWN CEMENTS OR
PROTECTIVE COATINGS WHICH WERE CAPABLE OF OPERATION
IN THE PROPOSED ENVIRONMENT, IT WAS NECESSARY TO
DEVELOP A SPECIAL GAGE INSTALLATION. THE UNIT
DEVELOPED CONSISTED OF A STRAIN GAGE CEMENTED ATOP A
STAINLESS STEEL SHIM WHICH HAD BEEN TACK WELDED TO
THE TEST SPECIMEN AND THEN SEALED BY SILVER
SOLDERING. THIS TYPE INSTALLATION WAS CAPABLE OF
MEETING THE REQUIREMENTS. DETAILED INSTRUCTIONS
FOR CONSTRUCTION, INSTALLATION AND CALIBRATION ARE
DESCRIBED IN APPENDIXED INSTRUMENT STANDARDS.
(AUTHOR) (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD-433 654

PHILCO CORP LANSDALE PA

PEM FOR TRANSISTOR MANUFACTURING PROCESS
IMPROVEMENT.

(U)

DESCRIPTIVE NOTE: FINAL PROGRESS REPT., 30 APR 62-31
DEC 63,

DEC 63 210P SANDERS, J. G. ;

CONTRACT: DA36 039SC06720

PROJ: R232

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:

DESCRIPTORS: (TRANSISTORS, MANUFACTURING METHODS);
(SPECIFICATIONS, PROCESSING), GERMANIUM, ELECTRODES,
NICKEL, TIN ALLOYS, ZINC ALLOYS, GALLIUM ALLOYS, HEAT
RESISTANT METALS AND ALLOYS, DEGASIFICATION,
ENCAPSULATION, EMISSIVITY, COATINGS, MASS SPECTROSCOPY,
TEST METHODS, LIFE EXPECTANCY, QUALITY CONTROL (U)
IDENTIFIERS: JET ETCH TYPE TRANSISTOR, 1963, THERMAL
RESISTANCE (U)

THE WORK FOR RELIABILITY IMPROVEMENT OF THE JET
ETCH TYPE TRANSISTOR THROUGH PROCESS IMPROVEMENTS IS
COMPLETE. THE REPORT INCLUDES THE OVER-ALL
PROCESSING SPECIFICATION FOR THE IMPROVED TRANSISTOR,
AND THE APPLICABLE INSPECTION AND QUALITY
CONTROL PLAN. DATA ARE GIVEN ON THE FINAL TEST
LOT OF THE IMPROVED DEVICE AND INDICATE THE LOT
ACCEPTANCE TEST WAS PASSED. THE METHOD DEvised
FOR ACCELERATED TESTING AND EXTRAPOLATION OF
RELIABILITY LEVELS UNDER USE CONDITIONS WAS
EFFECTIVELY DEMONSTRATED. ACCUMULATED DATA ON
TRANSISTORS PRODUCED USING THE IMPROVED PROCESSES
SHOW THAT AN ACCELERATION CURVE HAVING A SLOPE
EQUIVALENT TO AN ACTIVATION ENERGY OF 19.6 KCAL/
MOLE IS REALISTIC FOR THE IMPROVED DEVICE. THERMAL
RESISTANCE MEASUREMENT STUDIES SHOWED THAT THE D-C
BETA METHOD OF TEST WITH VOLTAGE COMPENSATION GIVES
RESULTS THAT ARE REPRODUCIBLE AND CLOSELY APPROACH
THE VALUES OF EFFECTIVE THERMAL RESISTANCE DETERMINED
FROM OPERATING AND STORAGE LIFE TESTS. THE MAXIMUM
OPERATING RATING OF THE IMPROVED TRANSISTOR IS
REPORTED AS 150 MW AT 25 C AT A $\lambda = 0.78$.
(AUTHOR)

(U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD-435 114

RADIO CORP OF AMERICA SOMERVILLE N J

PRODUCTION ENGINEERING MEASURE ON 2N1708 SILICON
PLANAR EPITAXIAL TRANSISTOR. VOLUME 1.

(U)

DESCRIPTIVE NOTE: FINAL REPT. 1 MAY 62-30 NOV 63,
NOV 63 160P GRANGER, G. F. ; POSSEMATO, L.

R. ;

CONTRACT: DA36 039SC86729

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:

DESCRIPTORS: (*TRANSISTORS, EPITAXIAL GROWTH),
RELIABILITY, SILICON, ELECTRONIC SWITCHES, ELECTRICAL
PROPERTIES, PROCESSING, MANUFACTURING METHODS, CRYSTAL
SUBSTRUCTURES, PHOTOENGRAVING, SEMICONDUCTOR DEVICES,
DIFFUSION, METALLURGY, GOLD ALLOYS, WIRE, GOLD,
ALUMINUM, PELLETS, ENVIRONMENTAL TESTS, FIXED CONTACTS,
METAL SEALS, NICKEL, ENCAPSULATED, STORAGE, TESTS,
STRESSES, ACCELERATION, FAILURE (MECHANICS),
DISSIPATION, OPERATION, LIFE EXPECTANCY, AGING
(MATERIALS), SWITCHING CIRCUITS

(U)

IDENTIFIERS: 1963

(U)

A PRODUCTION RUN WAS MADE TO DEMONSTRATE THE
RELIABILITY ACHIEVED AS A RESULT OF PROCESS
IMPROVEMENTS INCORPORATED INTO THE PROCESSING. A
SUMMARY OF THE WORK PERFORMED IN EACH OF THE MAJOR
PROCESSING AREAS TO EFFECT THE IMPROVEMENT IS
DESCRIBED IN THIS REPORT. A PROGRAM OF LIFE
TESTING, ANALYSIS OF EXISTING LIFE TEST DATA AND
FAILURE ANALYSIS WAS PERFORMED CONCURRENTLY WITH THE
WORK IN THE PROCESSING AREA. THIS PROGRAM INCLUDED
ACCELERATED TESTING ON BOTH STORAGE AND OPERATING
LIFE TESTS WHICH LEAD TO THE ESTABLISHMENT OF
ACCELERATION CURVES, THE ANALYSIS OF RESULTS ON
EXTENDED LIFE TESTS, THE ANALYSIS OF FAILURES, AND A
STUDY OF THE EFFECT OF AGING. (AUTHOR)

(U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO: /ZZZHT

AD-443 097

SYLVANIA ELECTRONIC SYSTEMS-WEST MOUNTAIN VIEW CALIF
ELECTRONIC DEFENSE LABS

NONCOMMUNICATIONS EXPENDABLE JAMMER INVESTIGATIONS.
VOLUME 3. MECHANICAL DEVELOPMENT, (U)

APR 64 55P FIRTH, MILTON ; REICHOLD,
RALPH ;
REPT. NO. EDL G220 , VOL. 3
CONTRACT: DA36 039AMC00088E

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:

DESCRIPTORS: (•RADIO JAMMING, LANDING IMPACT), (•LANDING
IMPACT, PACKAGING), RADAR JAMMING, AIR DROP OPERATIONS,
SEMICONDUCTOR DEVICES, MODULES (ELECTRONIC), SHOCK
(MECHANICS), ENCAPSULATION, DROP TESTING, MATHEMATICAL
ANALYSIS, SUBMINIATURE ELECTRONIC EQUIPMENT,
MICROMINIATURIZATION (ELECTRONICS), SHOCK RESISTANCE,
MOUNTING BRACKETS (U)
IDENTIFIERS: EXPENDABLE JAMMER (U)

RESULTS ARE REPORTED OF A STUDY TO DETERMINE
OPTIMUM PACKAGING TECHNIQUES FOR THE ELECTRONIC
EQUIPMENT AND THE SHOCK LEVELS THAT THE DIFFERENT
PACKAGES AND CERTAIN ELECTRONIC COMPONENTS COULD
WITHSTAND, AS WELL AS LANDING TECHNIQUES AND SHOCK
ATTENUATION DEVICES. (AUTHOR) (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD-489 906 9/1
SPEER CARBON CO NIAGARA FALLS N Y

RESISTORS FOR MICROPOWER CIRCUITS.

(U)

DESCRIPTIVE NOTE: QUARTERLY REPT. NO. 4, 1 APR-30 JUN 66,

OCT. 66 13P PARKS, CHARLES F. ;
REPT. NO. SCC-24, R-140
CONTRACT: DA-28-043-AMC-01524(E)
PROJ: DA-1P6-22001-A-057
TASK: 1P6-22001-A-057-06
MONITOR: ECOM 01524-4

UNCLASSIFIED REPORT

DESCRIPTORS: (•RESISTORS, DESIGN), SURFACE
PROPERTIES, OPTIMIZATION, ENCAPSULATION, ELECTRIC
CONNECTORS, ELECTRIC WIRE, PROCESSING,
PREPARATION, SUBSTRATES, ELECTRICAL PROPERTIES,
TEMPERATURE, RESISTANCE(ELECTRICAL),
NOISE(RADIO), FILMS

(U)

IDENTIFIERS: MICROPOWER RESISTORS

(U)

MICROPOWER RESISTORS OF 4.7 MEGOHM RESISTANCE VALUE
HAVE BEEN PREPARED IN FINISHED FORM FOR TESTING
ACCORDING TO SPECIFICATIONS. PRELIMINARY
INVESTIGATIONS INCIDENT TO THEIR PREPARATION HAVE
BEEN COMPLETED. THE STRENGTH OF SUBSTRATES HAS
BEEN STUDIED, AND PROCESSING PARAMETERS IN THE
PRESSING OPERATION HAVE BEEN EVALUATED.
FABRICATION OF SUBSTRATES UNDER CONDITIONS
INDICATED IN THIS INVESTIGATION HAS BEEN
ACCOMPLISHED, AND SUBSTRATES OF SATISFACTORY STRENGTH
HAVE BEEN PRODUCED. A NUMBER OF OTHER RESISTOR
PROCESSING VARIABLES HAVE ALSO BEEN EXAMINED. THE
SURFACE PREPARATION OF SUBSTRATES AND THE USE OF
VARIOUS TERMINATING MATERIALS HAVE BEEN INVESTIGATED
FOR EFFECTS ON RESISTANCE AND NOISE. IMPROVEMENT
IN PROPERTIES OF RESISTORS HAS BEEN OBTAINED.
DIFFERENT RESISTIVE PASTES HAVE BEEN COMPARED TO
PERMIT SELECTION OF ONE PRODUCING AN OPTIMUM
COMBINATION OF FIRED PROPERTIES. FIRED RESISTIVE
FILMS ON THE NEW SUBSTRATE SYSTEM HAVE BEEN HELIXED
SUCCESSFULLY USING THE IMPROVED HELIXING MACHINE, AND
A NEWLY INSTALLED BRIDGE CIRCUIT HAS PERMITTED
REPRODUCIBLE HELIXING TO VALUE. ENCAPSULATION OF
HELIXED UNITS HAS BEEN INVESTIGATED AND EFFECTS ON
RESISTANCE VALUE AND TEMPERATURE COEFFICIENT OF
RESISTANCE HAVE BEEN FOUND TO BE ESSENTIALLY
NEGLECTIBLE. (AUTHOR)

(U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD-601 772

NATIONAL CASH REGISTER CO DAYTON OHIO

A STUDY OF THE ENCAPSULATION OF HIGH ENERGY
SUBSTANCES.

(U)

DESCRIPTIVE NOTE: FINAL REPT.; 1 APR 59-31 DEC 63.
APR 64 69P PETROPOULOS, CONSTANTINE C. ;
CONTRACT: NONR2848 DD

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:

DESCRIPTORS: (•LIQUID ROCKET PROPELLANTS,
ENCAPSULATION), (•ENCAPSULATION, LIQUID ROCKET
PROPELLANTS), (•PLASTICS, COMPATIBILITY), FILMS,
PERMEABILITY, HYDRAZINE, POLYAMIDE PLASTICS, ACRYLIC
RESINS, POLYMERIZATION COPOLYMERIZATION (U)
IDENTIFIERS: GLYCIDYL METHACRYLATE, HYDROXYETHYL
METHACRYLATES, METHALLYL METHACRYLATE, VINYL OXYETHYL
METHACRYLATES (U)

INITIAL WORK WAS DIRECTED TOWARDS THE UNDERSTANDING
OF BASIC FACTORS RESPONSIBLE FOR SMALL MOLECULES
PERMEATING POLYMERIC FILMS. PROGRESS WAS MADE IN
THIS AREA. IN ADDITION, RESEARCH WAS CONDUCTED IN
THE AREA OF ENCAPSULATION. THIS RESEARCH INCLUDED
THE STUDY OF BASIC MECHANISMS ASSOCIATED WITH
ENCAPSULATION, COMPATIBILITY OF POLYMERS WITH
POTENTIAL LIQUID FUELS (E. G. HYDRAZINE),
SYNTHESIS OF NEW POLYMERS, AND THE ENCAPSULATION OF
LIQUID FUELS OR MODEL COMPOUNDS. (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD-602 270

MOTOROLA INC SCOTTSDALE ARIZ

MINIATURE THIN FILM INDUCTORS (MODIFICATION NO.
2).

(U)

DESCRIPTIVE NOTE: FINAL DEVELOPMENT REPT. FOR 27 MAY 63-

27 MAY 64,

JUN 64 78P

GLEASON, F. R. ;

REPT. NO. 4003

CONTRACT: NOBSR85397

PROJ: SR00803

TASK: 9636

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:

DESCRIPTORS: (MINIATURE ELECTRONIC EQUIPMENT, (COILS),
(COILS, METAL FILMS), FILMS, GOLD, ENCAPSULATION,
FERRITES, NICKEL ALLOYS, ZINC ALLOYS, COBALT ALLOYS,
INDUCTANCE, SPRAYS, CHLORIDES, VAPOR PLATING,
EVAPORATION, ELECTRODEPOSITION
IDENTIFIERS: THIN FILMS

(U)

(M)

THE REPORT DESCRIBES A PROGRAM DIRECTED TOWARD THE DEVELOPMENT OF TECHNIQUES FOR FABRICATING MINIATURE THIN-FILM INDUCTORS. THE BASIC DEVICE CONSISTS OF A FLAT SPIRAL CONDUCTING PATH DEPOSITED ON A BULK FERRITE SUBSTRATE AND ENCAPSULATED WITH A FERRITE FILM DEPOSIT. THE GOAL OF THE PROGRAM WAS TO FABRICATE THESE INDUCTANCES IN A RANGE FROM 38 TO 1000 MICROHENRIES WITH A Q-VALUE OF 100 MEASURED AT 1 MC. THE TECHNIQUE FOR DEPOSITING THE FERRITE FILM BY THE SPRAY HYDROLYSIS OF A CHLORIDE SOLUTION IS DESCRIBED. THE SPIRAL COILS WERE MADE FROM GOLD AND DEPOSITED BY A COMBINATION OF VACUUM EVAPORATION AND ELECTRODEPOSITION TECHNIQUES. THE MAXIMUM AIR CORE COIL INDUCTANCE OBTAINED IN AN AREA 0.3 INCH SQUARE WAS 1.8 MICROHENRIES. THE LARGEST INDUCTANCE VALUE OBTAINED FOR A SINGLE ENCAPSULATED COIL WAS 54 MICROHENRIES WITH A Q-VALUE OF 6 AT 1 MC. (AUTHOR)

(U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD-602 939

TEXAS INSTRUMENTS INC DALLAS

PRODUCTION ENGINEERING MEASURES TO INCREASE
TRANSISTOR RELIABILITY FOR THE 2N656.

(U)

DESCRIPTIVE NOTE: FINAL PROGRESS REPT. FOR 1 JUL 62-31
MAR 64.

MAR 64 248P

REPT. NO. 03 64 43

CONTRACT: DA36-039SC86730

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: A PORTION OF THIS DOCUMENT IS
ILLEGIBLE OR NONREPRODUCIBLE.

DESCRIPTORS: (•TRANSISTORS, RELIABILITY (ELECTRONICS)),
(•QUALITY CONTROL, TRANSISTORS), ENGINEERING, PRODUCTION
CONTROL, SILICON, COATINGS, DIFFUSION, BANDING, WELDING,
ENCAPSULATION, TEST METHODS, GOLD ALLOYS, STRESSES,
TESTS, MILITARY REQUIREMENT

(U)

IDENTIFIERS: THICK FILMS, PLANAR

(U)

THE PROCESS IMPROVEMENT WORK ON THE 2N656 DEVICE
WAS COMPLETED DURING THE FIRST TWELVE MONTHS OF THE
CONTRACT. THE RESULTANT TRANSISTOR IS A RUGGED
PLANAR DEVICE UTILIZING GOLD ALLOY WAFER MOUNTING,
ULTRASONIC LEAD BONDING WITH NO INLINE ETCH OR WAFER
COATING AND IS CAPABLE OF 15 WATTS DISSIPATION AT
100C CASE TEMPERATURE. IMPROVED FACILITIES,
PROCESSES AND PROCESS CONTROLS IN THE DIFFUSION,
PHOTO RESIST, CONTRACT EVAPORATION AND ASSEMBLY AREAS
HAVE ALL CONTRIBUTED TO THE SIGNIFICANTLY IMPROVED
PRODUCT QUALITY AND UNIFORMITY. THE MAJOR PORTION
OF RELIABILITY IMPROVEMENT HAS RESULTED FROM THE
PLANARIZATION OF THE DEVICE AND THE RE-DESIGN OF THE
PACKAGE WHICH REPLACED THE SINGLE 0.017 IN. DIAMETER
WIRE SLUG SUPPORT WITH TWO APPROXIMATELY 0.015 IN.
THICK BY 0.090 IN. WIDE TABS. STRESS TESTS
CONDUCTED ON 1,100 PRODUCTION PLANAR DEVICES CONFIRM
THAT THE IMPROVED TRANSISTOR EXCEEDS THE CONTRACT
OBJECTIVE OF 0.01% PER THOUSAND OPERATING HOURS AT
A 90% CONFIDENCE LEVEL. (AUTHOR)

(U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD-604 196

CLEVITE TRANSISTOR PRODUCTS WALTHAM MASS

PRODUCTION ENGINEERING MEASURE FOR THE IMPROVEMENT OF
GERMANIUM ALLOY POWER TRANSISTORS. (U)

DESCRIPTIVE NOTE: QUARTERLY PROGRESS REPT. NO. 7, 31 OCT
63-31 JAN 64,

JAN 64 24P KELLEY, LUCILLE T.; LOCONTE,
JEREMIAH A. ;

CONTRACT: DA26 039SC86724

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:

DESCRIPTORS: (•TRANSISTORS, GERMANIUM); (•MANUFACTURING
METHODS, TRANSISTORS); DESIGN, QUALITY CONTROL;
RELIABILITY (ELECTRONICS); FAILURE (MECHANICS);
STRESSES, LIFE EXPECTANCY, ALLOYS, SOLDERING, CHEMICAL
MILLING, ENCAPULATION, DESSICANTS, ENVIRONMENTAL TESTS,
SEMICONDUCTOR DEVICES (U)

ENGINEERING DESIGN CHANGES HAVE BEEN COMPLETED AND
EVALUATED. THE NEW PROCESS AND PRODUCTION
TECHNIQUES HAVE BEEN EVALUATED AND IMPLEMENTED INTO
THE PRODUCTION LINE FLOW. ALL UNITS IN THE FINAL
PRODUCTION RUN WERE ASSEMBLED ACCORDING TO CONDITIONS
SPECIFIED IN THE FINAL CONTRACT AGREEMENT. QUALITY
CONTROL PROCEDURES HAVE BEEN REVIEWED. THE Q.
C. MANUAL WILL BE INCLUDED IN THE FINAL REPORT.
FINAL RELIABILITY PROOF TESTING IS IN PROCESS. AN
IMPROVED FAILURE RATE IS INDICATED, BUT AT THIS DATE
THE DATA IS INSUFFICIENT TO DRAW FINAL CONCLUSIONS.
(AUTHOR) (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD-605 159

JOHNS HOPKINS UNIV BALTIMORE MD

ANALOG COMPUTER RESEARCH INTO THE ENERGY-EXCHANGE
BETWEEN GASES AND SOLIDS.

(U)

DESCRIPTIVE NOTE: SCIENTIFIC REPT.;

MAY 64 316P ROGERS, MILTON ;

CONTRACT: AF49 638 496

MONITOR: AFOSR ; 1001

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:

DESCRIPTORS: (•TRANSPORT PROPERTIES, THERMODYNAMICS),
(•ENERGY, TRANSPORT PROPERTIES); GASES, SOLIDS,
PARTICLES, FLUID MECHANICS, TEMPERATURE, SURFACES,
CHEMISORPTION, ADSORPTION, MATHEMATICAL ANALYSIS, ANALOG
COMPUTERS (U)

IDENTIFIERS: ENERGY EXCHANGE (U)

A COMPARISON IS MADE BETWEEN VARIOUS MODELS OF THE
INTERACTION. A DESCRIPTION IS GIVEN OF THE
CIRCUITRY AND TECHNIQUES USED TO INVESTIGATE THE
PROBLEM OF ENERGY EXCHANGE BETWEEN GASES AND SOLIDS.
BOUNDS ON THE APPLICABILITY AND INTERPRETATION OF
DATA OBTAINED SOLELY FROM COMPUTATIONAL EXPERIMENTS,
WHETHER PERFORMED WITH AN ANALOG OR A DIGITAL
COMPUTER, ARE DELINEATED IN SOME DETAIL. DATA ARE
PRESENTED WHICH WAS OBTAINED IN A SERIES OF ANALOG
COMPUTER EXPERIMENTS IN GAS SURFACE INTERACTIONS
USING SEVERAL VARIATIONS OF A VERY SIMPLE MODEL OF
THE INTERACTION POTENTIAL, THE LATTICE, AND THE
PHYSICAL STATE OF THE SOLID, PARTICULARLY
TEMPERATURE. FOR THE MAJORITY OF THE RESEARCH, A
NON-LINEAR COUPLING (POTENTIAL) WAS USED BETWEEN
GAS PARTICLES AND SURFACE ATOM. SEVERAL MAJOR
APPROXIMATIONS WERE MADE IN THE FORMULATION OF THE
MODELS INVESTIGATED.

(U)

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD-605 984

TRW SPACE TECHNOLOGY LABS LOS ANGELES CALIF

LOW PRESSURE ELECTRICAL DISCHARGE STUDIES, (U)

DEC 59 72P KREBS, W. H. ; REED, A. C. ;
REPT. NO. STL/TR-59-0000-09931
CONTRACT: AF04 647 309

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:

DESCRIPTORS: (*ELECTRIC DISCHARGES, HIGH ALTITUDE),
(*GUIDED MISSILE COMPONENTS, MALFUNCTIONS), AIR, WATER,
VAPOR, SPARKS, SECONDARY EMISSION, ELECTRICAL EQUIPMENT,
LOW-PRESSURE RESEARCH, ELECTRODES, ELECTRICAL
PROPERTIES, GEOMETRIC FORMS, ENCAPSULATION, CASTING,
REVIEWS, BIBLIOGRAPHIES (U)
IDENTIFIERS: BREAKDOWN (ELECTRICAL) (U)

THE REPORT CONCERNS ELECTRICAL BREAKDOWN OF AIR AT
LOW PRESSURES OR HIGH ALTITUDES (70,000 TO 250,000
FEET) DUE TO SECONDARY EMISSION. INFORMATION
PERTINENT TO THE PROBLEM OF LOW FREQUENCY (0 TO
1000 CPS) SPARKING WAS COMPILED THROUGH A
LITERATURE SURVEY. A BIBLIOGRAPHY CONCERNING
ELECTRICAL BREAKDOWN AT BOTH LOW AND HIGH FREQUENCIES
WAS COMPILED. A TEST PROGRAM YIELDED THE FOLLOWING
RESULTS: NO STATISTICALLY SIGNIFICANT DEVIATION
FROM PASCHEN'S LAW WAS DETECTED. THE ADDITION
OF WATER VAPOR TO THE AIR CONSTITUTING THE TEST
ENVIRONMENT CAUSED A SIGNIFICANT LOWERING OF THE
MINIMUM SPARKING VOLTAGE. RECOMMENDATIONS ARE MADE
RELATIVE TO TEST PROGRAMS FOR MISSILE ELECTRICAL
COMPONENTS EMPLOYING VOLTAGES HIGHER THAN 200 VOLTS.
(AUTHOR) (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD-611 752

MITRE CORP BEDFORD MASS

LEAD ATTACHMENT AND ENCAPSULATION TECHNIQUES FOR THIN
FILM MICROCIRCUITS, (U)

FEB 65 16P EVERETT, PATRICK N. ;
REPT. NO. W-6353
CONTRACT: AF19 628 2390
PROJ: 708 0
MONITOR: ESD ; TDR-64-630

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:

DESCRIPTORS: (*PACKAGED CIRCUITS, MANUFACTURING
METHODS), (*ENCAPSULATION, PACKAGED CIRCUITS),
(*MICROMINIATURIZATION (ELECTRONICS), ELECTRIC
CONNECTORS), ELECTRIC WIRE, ATTACHMENT, METAL FILMS,
BONDING, SOLDERING, EPOXY PLASTICS, MODULES
(ELECTRONICS), RESISTORS, SEMICONDUCTOR DEVICES, PRINTED
CIRCUITS (U)
IDENTIFIERS: THIN FILMS (M)

THE TECHNIQUES DESCRIBED WERE DEVELOPED FOR
ENCAPSULATING EXPERIMENTAL THIN FILM CIRCUITS
DEPOSITED ON 0.5-INCH SQUARE GLASS SUBSTRATES. THE
ENCAPSULATION IS EPOXY, WITH FINAL PACKAGE DIMENSIONS
OF 0.6-INCH SQUARE X .125-INCH THICK. UP TO 32
RIBBON LEADS EMERGE, ON .050 CENTERS, ARRANGED ON THE
PERIPHERY OF THE PACKAGE. A FACTOR COMPLICATING
THE ENCAPSULATION WAS THE REQUIREMENT THAT THE LEADS
EMERGE ON THE FOUR EDGES OF THE UNIT. A MOLDING
PROCESS USING SILICONE RUBBER MOLDS, AND A HYPODERMIC
FILLING ARRANGEMENT WAS EVOLVED. (AUTHOR) (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD-620 933

NATIONAL CASH REGISTER CO DAYTON OHIO CAPSULAR RESEARCH
AND PRODUCT DEVELOPMENT DEPT

ENCAPSULATION OF VIRUSES.

(U)

DESCRIPTIVE NOTE: REPT. FOR MAR-OCT 64;
AUG 65 40P ANDERSON, JERROLD L. ; BUTZ,
S. DAVID ;
CONTRACT: AF29 601 6344
PROJ: AF-8803
MONITOR: AFWL TR-64-167

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:

DESCRIPTORS: (•VIRUSES, ENCAPSULATION);
(•ENCAPSULATION, BACTERIOPHAGES), (•BACTERIOPHAGES,
ENCAPSULATION), VIABILITY, TOXICITY, ETHYL
CELLULOSE, SPACE BIOLOGY, RADIATION EFFECTS,
RADIOLOGICAL DOSAGE, DOSIMETERS, PHOTOGRAPHIC
EMULSIONS
IDENTIFIERS: LYOPHILIZATION

(U)

(U)

RESEARCH EFFORTS WERE DIRECTED TOWARD DEVELOPMENT
OF A METHOD OF ENCAPSULATING VIRUSES IN SPHERES
CONTAINING A PREDICTABLE PHAGE TITER TO BE USED IN
BIOLOGICAL DOSIMETRY EXPERIMENTS. INITIAL STUDIES
DEMONSTRATED THE ABILITY OF THE BACTERIOPHAGE TO
UNDERGO LYOPHILIZATION AND ENCAPSULATION YIELDING A
PRODUCT OF ADEQUATE VIABILITY. THE BUTAREZ
TOLUENE ETHYLCELLULOSE ENCAPSULATION SYSTEM
PROVED SATISFACTORY FOR PRODUCING SPHEROIDAL
VIRUSETHYLCELLULOSE CAPSULES OF TWENTY-FIVE TO FIFTY
MICRONS DIAMETER, THE MEAN DIAMETER BEING FORTY-TWO
MICRONS. VIABILITY DETERMINATIONS YIELDED A PHAGE
TITER OF 1.7×10 TO THE 11TH POWER PHAGES PER GRAM
OF CAPSULES; HENCE, A CAPSULE OF AVERAGE DIAMETER
POSSESSED A THEORETICAL TITER OF 8×1000 PHAGES.
SIMULATED END-USE TESTS PROVED PHOTOGRAPHIC
DEVELOPER CHEMICALS, SUCH AS COULD BE USED FOR THE
PROCESSING OF VIRUS-BEARING NUCLEAR EMULSIONS, TO BE
NONTOXIC TO THE ENCAPSULATED PHAGES. A MODIFICATION
IN THE SCOPE OF THE PROGRAM DIRECTED THE CONCLUDING
WORK TO THE PREPARATION OF CAPSULES LESS THAN FIFTEEN
MICRONS IN DIAMETER. SAMPLES OF
VIRUSETHYLCELLULOSE CAPSULES WERE SUBMITTED TO THE
AIR FORCE. (AUTHOR)

(U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD-625 956 9/1
SYLVANIA ELECTRIC PRODUCTS INC WOBURN MASS SEMICONDUCTOR
DIV

RELIABILITY ANALYSIS OF X-BAND TUNNEL DIODES. (U)

DESCRIPTIVE NOTE: FINAL TECHNICAL REPT.,
DEC 65 74P DAVIS, CHARLES ; LUECK, ARTHUR

CONTRACT: AF30(602)-3487
PROJ: AF-4519
TASK: 451901
MONITOR: RADC ; TR-65-291

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: SEE ALSO AD-615 498.

DESCRIPTORS: (•TUNNEL DIODES,
RELIABILITY(ELECTRONICS)), X-BAND,
MANUFACTURING METHODS, PROCESSING, SEMICONDUCTOR
DEVICES, ENCAPSULATION, GERMANIUM ALLOYS, TIN
ALLOYS, ARSENIC, GALLIUM (U)

THE REPORT PRESENTS AN ACCOUNT OF A MICROWAVE
TUNNEL DIODE IMPROVEMENT PROGRAM, AND THE RESULTS
OBTAINED FROM RELIABILITY TESTS PERFORMED ON DEVICES
FABRICATED BY THE IMPROVED PROCESSES. A NEW SOLID
STRUCTURE TUNNEL DIODE WAS DEVELOPED DURING THIS
CONTRACT WHICH EXHIBITS SUPERIOR RELIABILITY
CHARACTERISTICS TO ANY PREVIOUSLY TESTED TUNNEL
DIODE. THE PROCESS AND FABRICATION DETAILS FOR
THIS DEVICE ALONG WITH RELIABILITY DATA ARE INCLUDED
IN THE REPORT. (AUTHOR) (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD-628 537 11/9 9/1
HARRY DIAMOND LABS WASHINGTON D C

LOW-LOSS STYRENE-TYPE FOAM-IN-PLACE ENCAPSULATING
RESINS, (U)

OCT 65 24P ENGELHARDT, F. J. O. ;
REPT. NO. TR-1308,
PROJ: DA-1P523801A300 , HDL-96300

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:

DESCRIPTORS: (*ENCAPSULATION, STYRENE PLASTICS),
(*STYRENE PLASTICS, ENCAPSULATION), (*EXPANDED
PLASTICS, ENCAPSULATION), STYRENES, PROPELLANTS,
POLYMERIZATION, POWDERS, DIELECTRIC PROPERTIES,
RADIOFREQUENCY, COMPRESSIVE PROPERTIES, DENSITY (U)
IDENTIFIERS: POTTING COMPOUNDS (U)

LOW-DIELECTRIC-LOSS STYRENE-TYPE FOAM-IN-PLACE
ENCAPSULATING RESINS ARE NOT AVAILABLE COMMERCIALY.
SUCH A RESIN HAS NOW BEEN DEVELOPED. A
PROPELLANT WAS ADDED TO THE CATALYZED STYRENE-
POLYSTYRENE MIXTURE; AS THE TEMPERATURE OF THE
POLYMERIZING RESIN ROSE, THE PROPELLANT EXPANDED THE
RESIN INTO A CELLULAR STRUCTURE. HOMOGENEOUS FOAMS
WERE OBTAINED IN THE PRESENCE OF FINELY POWDERED
POLYMERS, WHICH ACTED AS BUBBLE NUCLEATORS. THE
RESULTANT RIGID FOAMS, HAD DIELECTRIC CONSTANTS
RANGING FROM 1.2 TO 1.8, AND LOSS TANGENTS FROM
0.0002 TO 0.001 OVER THE FREQUENCY RANGE 102 AND 108
CPS. SOME OF THESE MATERIALS HAD REMARKABLY FLAT
LOSS-FREQUENCY CURVES, LOSSES RANGING ONLY BETWEEN
0.0004 AND 0.0005 OVER THE SAME FREQUENCY RANGE.
DENSITIES WERE VARIED BETWEEN 0.194 AND 0.850 G/CU
CM, OR BETWEEN 12 AND 53 LB/CU FT. THESE DATA
INDICATE THE USEFULNESS OF THE NEW CELLULAR MATERIALS
AS RF ENCAPSULATING RESINS. (AUTHOR) (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD-628 618 9/1 13/8
PHILCO CORP LANSDALE PA

RESEARCH AND DEVELOPMENT LOW COST INTEGRATED CIRCUIT
TECHNIQUES. (U)

DESCRIPTIVE NOTE: QUARTERLY PROGRESS REPT. NO. 1, 15
JUN-14 SEP 65,
SEP 65 72P WAGNER, S. ; WALKER, M. ;
REPT. NO. PHILCO R-506,
CONTRACT: DA-28-043-AMC-01424(E),
PROJ: DA-1P622001056
TASK: 1P62200105602

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:

DESCRIPTORS: (*INTEGRATED CIRCUITS, MANUFACTURING
METHODS), (*ENCAPSULATION, INTEGRATED CIRCUITS),
(*ELECTRIC CONNECTORS, INTEGRATED CIRCUITS),
ELECTRIC WIRE, BONDING, SEMICONDUCTOR DEVICES,
GLASS, COATINGS, DEPOSITION, EVAPORATION,
VAPOR PLATING, PROCESSING, ASSEMBLING,
PACKAGING, HERMETIC SEALS, PRINTED CIRCUITS (U)

THE USE OF AN ADHERENT IMPERVIOUS COATING FOR
ENCAPSULATING SILICON INTEGRATED CIRCUITS, COMBINED
WITH A BATCH MOUNTING AND INTERCONNECTION TECHNIQUE,
WILL RESULT IN (1) DECREASED COST AS A RESULT OF
PACKAGE ELIMINATION; (2) INCREASED PACKING
DENSITY; (3) IMPROVED RELIABILITY DUE TO
REDUCTION IN THE NUMBER OF CONTACTS AND ELIMINATION
OF AU-AL THERMOCOMPRESSSION BONDS. THIS REPORT
DESCRIBES A TECHNIQUE FOR SELECTIVE DEPOSITION OF 1
TO 2 MICRON THICK GLASS ON SILICON INTEGRATED
CIRCUITS AND ATTACHING THESE CIRCUITS TO A PRINTED
CIRCUIT BOARD BY MEANS OF 'FLIP CHIP' MOUNTING.
GLASS HAS BEEN DEPOSITED BY MEANS OF EVAPORATION
AND PYROLYTIC VAPOR PLATING. EVAPORATION APPEARS
TO HAVE SOME ADVANTAGES. EVALUATION OF TWO HIGH
TEMPERATURE METALIZATION SYSTEMS (TI-AG-TI AND
CR-AG-CR) HAS INDICATED SATISFACTORY
PROPERTIES. A TEST MODEL EMPLOYING THESE
TECHNIQUES HAS BEEN DESIGNED FOR ENVIRONMENTAL
TESTING AND TECHNIQUE EVALUATION. (AUTHOR) (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD-628 833 9/5 12/4
DOUGLAS AIRCRAFT CO INC SANTA MONICA CALIF MISSILE AND
SPACE SYSTEMS DIV

STRESS ANALYSIS OF ENCAPSULATION MATERIALS FOR WELDED
MODULES, (U)

FEB 66 61P SMITH, M. H. ;
REPT. NO. SM-48410;

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:

DESCRIPTORS: (MODULES(ELECTRONIC),
ENCAPSULATION), (ENCAPSULATION, MATERIALS),
(PACKAGING, TEST EQUIPMENT(ELECTRONICS)),
WELDS, STRAIN GAGES, EPOXY PLASTICS,
TRANSDUCERS, STRESSES, MATHEMATICAL ANALYSIS,
EMBEDDING SUBSTANCES (U)

A STRAIN-GAUGE LOAD TRANSDUCER, SIMULATING AN
AXIAL-LEADED DISCRETE COMPONENT, WAS DEVELOPED AND
FABRICATED BY DAC TO MEASURE THE MAGNITUDE AND
DIRECTION OF AXIAL STRESSES EXERTED BY AN
ENCAPSULATING MATERIAL. THE EPOXY ENCAPSULATION
MATERIALS EXHIBITED RESIDUAL COMPRESSIVE STRESSES DUE
TO THE INITIAL CURE OF RESIN. THERMAL CYCLING
SUBSTANTIALLY INCREASED THESE COMPRESSIVE STRESSES AT
THE LOWEST TEMPERATURES. TENSILE STRESSES WERE
RECORDED DURING THE ELEVATED TEMPERATURE PHASE OF THE
TEST. COMPRESSIVE STRESSES WERE PRODUCED AS THE
CYCLE WAS COMPLETED FORMING A CLOSED HYSTERESIS LOOP,
CHARACTERISTIC OF THESE MATERIALS, ON THE STRESS VS.
TEMPERATURE CURVE. WITHIN A TYPICAL CORDWOOD
WELDED MODULE WITH COMPONENT DENSITY LEVELS OF 10-30
PERCENT, THE STRESS LEVELS WERE REDUCED BY INCREASING
LEVELS OF COMPONENT LOADING. THE LOW-DENSITY,
MICROBALLOON-FILLED STYCAST 1090/11 EPOXY MATERIAL
EXHIBITED SIGNIFICANTLY LOWER, MORE UNIFORM TENSILE
AND COMPRESSIVE STRESSES THAN THE MEDIUM-DENSITY,
MINERAL-FILLED HYSOL 4215/3561 (9709466, TYPE
1) EPOXY MATERIAL WITHIN THIS SAME TEST
CONFIGURATION. (AUTHOR) (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD-630 566 11/9 9/3 12/10
NAVY MARINE ENGINEERING LAB ANNAPOLIS MD

EFFECT OF WATER ABSORPTION ON DIMENSIONAL STABILITY
OF ELECTRIC MOTOR ENCAPSULATING MATERIALS. (U)

DESCRIPTIVE NOTE: RESEARCH AND DEVELOPMENT PHASE REPT.,
MAR 66 15P TOBIN, JOHN F. ;
REPT. NO. MEL-421/65,
PROJ: S-F013 12 15,

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE:

DESCRIPTORS: (*EPOXY PLASTICS, ENCAPSULATION);
(*ENCAPSULATION, EPOXY PLASTICS), (*ELECTRIC
MOTORS, ENCAPSULATION),
PERFORMANCE(ENGINEERING); WATER;
ABSORPTION(PHYSICAL), WINDING, DEEP SUBMERGENCE;
STATISTICAL ANALYSIS, UNDERWATER EQUIPMENT,
DEGRADATION, STABILITY (U)

EXPERIMENTS WITH EPOXY MATERIALS TO DETERMINE THEIR
DIMENSIONAL CHANGE AS CAUSED BY WATER ABSORPTION
(WHEN USED AS ENCAPSULATING MATERIALS FOR
SUBMERSIBLE ELECTRIC MOTOR WINDINGS) WERE CONDUCTED
WITH SUFFICIENT SAMPLE POPULATION TO ALLOW
STATISTICAL ANALYSIS. THE STUDIES SHOWED THAT THE
WATER ABSORPTION RATES OF THE THREE EPOXIES WERE
IDENTICAL AND THAT DEEP SUBMERGENCE PRESSURES DID NOT
ACCELERATE THE ABSORPTION RATE OR THE DIMENSIONAL
GROWTH OF THE EPOXIES. DIMENSIONAL CHANGES DUE TO
WATER ABSORPTION WERE FOUND TO BE VERY SMALL IN ALL
CASES. (AUTHOR) (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD-621 491 9/1 12/8
PHILCO CORP LANSDALE PA

LOW COST INTEGRATED CIRCUIT TECHNIQUES.

(U)

DESCRIPTIVE NOTE: QUARTERLY PROGRESS REPT. NO. 2, 15
SEP-14 DEC 65,
APR 66 68P WAGNER, STURGER; WALKER, MAURO

CONTRACT: DA-28-043-AMC-01424(E)
PROJ: 1P622001A056,
MONITOR: ECOM, 01424-2

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: SEE ALSO AD-628 618.

DESCRIPTORS: (•INTEGRATED CIRCUITS, MANUFACTURING
METHODS), (•ENCAPSULATION, INTEGRATED CIRCUITS),
GLASS, EVAPORATION, DEPOSITION, CAPACITORS,
PRINTED CIRCUITS, VAPOR PLATING, SILICON
COMPOUNDS, DIOXIDES, MASKING, OXIDES, METALS,
SILICON, VOLTAGE, CAPACITANCE, ALUMINUM,
ETCHING

(U)

IDENTIFIERS: SILICON DIOXIDE

(U)

BOTH THE EVAPORATED AND PYROLYTIC GLASS DEPOSITION
TECHNIQUES HAVE BEEN IMPROVED, RESULTING IN
ENCAPSULATING DEPOSITS OF HIGHER QUALITY. THE
PINHOLE PROBLEM ASSOCIATED WITH THE EVAPORATED GLASS
HAS BEEN NEARLY ELIMINATED. ALSO, IMPROVED
ADHERENCE HAS BEEN OBTAINED WITH THE PYROLYTICALLY
DEPOSITED GLASS. GLASS DELINEATION WAS IMPROVED BY
USING AN IMPROVED FIXTURE FOR EVAPORATION THROUGH A
METAL MASK. SOME IMPROVEMENT WAS ALSO MADE IN THE
DELINEATION OF PYROLYTICALLY DEPOSITED GLASS. IN
THE WORK ON GLASS EVALUATION TECHNIQUES, A METHOD
INVOLVING PRESSURIZED STEAM HAS PROVEN TO BE
EFFECTIVE IN THE RELATIVE EVALUATION OF THE
PASSIVATING PROPERTIES OF GLASS. ALSO, MOBILE
CHARGE CONCENTRATION STUDIES WERE PERFORMED ON BOTH
EVAPORATED AND PYROLYTICALLY DEPOSITED GLASS.
PROBLEMS ENCOUNTERED IN METALIZATION INCLUDE
INCREASED OHMIC CONTACT RESISTANCE AND POOR
DELINEATION. SOME TEST MODELS HAVE BEEN PRODUCED,
ALTHOUGH DEVICE AND METAL DELINEATION PROBLEMS HAVE
DELAYED THE COMPLETION OF THE VEHICLES. THE
VEHICLES HAVE BEEN SUBJECTED TO PRELIMINARY
ELECTRICAL AND ENVIRONMENTAL EVALUATION. A PLAN
FOR THE TESTING AND SPECIFICATION OF THE PRELIMINARY
EXPLORATORY DEVELOPMENT MODELS WAS PREPARED.

(AUTHOR)

(U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD-635 183 9/1 13/8
PHILCO CORP LANSDALE PA

LOW COST INTEGRATED CIRCUIT TECHNIQUES. (U)

DESCRIPTIVE NOTE: PROGRESS REPT. NO. 3, 15 DEC 65-14
MAR 66 (TECHNICAL).

JUL 66 44P WAGNER, STURGER ;WALKER,

MAURO ;

CONTRACT: DA-28-043-AMC-01424(E),

PROJ: DA-1P6-22001-A056,

TASK: 02,

MONITOR: ECOM 01424-3

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: SEE ALSO AD-631 491.

DESCRIPTORS: (•INTEGRATED CIRCUITS, MANUFACTURING
METHODS), (•ENCAPSULATION, INTEGRATED CIRCUITS),
COSTS, VAPOR PLATING, GLASS,
PERFORMANCE (ENGINEERING) (U)

EVALUATION STUDIES OF EVAPORATED AND VAPOR PLATED
GLASS HAVE LED TO THE RECOMMENDATION THAT ONLY THE
VAPOR PLATED GLASS PROCESS BE USED IN CONTINUING THE
REMAINDER OF THE PROGRAM. VAPOR PLATED GLASS HAS
SHOWN SUPERIOR PROPERTIES AS A DIELECTRIC AND IN
MOBILE CHARGE CONTENT. AN IMPORTANT CONSIDERATION
IS THE COMPATIBILITY OF VAPOR PLATED GLASS WITH
EXISTING METALIZATION SYSTEMS. A NUMBER OF
CONSTRUCTION METHODS HAVE BEEN EVOLVED AND PROVEN
FEASIBLE, ALTHOUGH SEVERAL PROBLEMS REMAIN.
HOWEVER, THE PROBLEMS ARE BASICALLY THOSE OF
PROCESSING AND THUS CAPABLE OF RESOLUTION DURING
FABRICATION OF THE TEST VEHICLES. CONTINUED
IMPROVEMENTS IN BATCH ASSEMBLY TECHNIQUES HAVE LED TO
MORE REPRODUCIBLE AND BETTER DEFINED SOLDER JOINTS.
FURTHER ELECTRICAL EVALUATIONS HAVE BEEN MADE OF
DEVICES TO DETERMINE THE EFFECTS OF GLASSING. THESE
EVALUATIONS HAVE ALSO EVIDENCED THE SUPERIORITY OF
VAPOR PLATED GLASS. AN ERROR IN ONE OF THE MASKS
PROVED TO BE RESPONSIBLE FOR A SATURATION VOLTAGE
PROBLEM. A SPECIFICATION QUESTION HAS ARISEN
BECAUSE OF THE RATHER WIDE RANGE OF LEAKAGE CURRENTS
RESULTING FROM GOLD DOPING. THIS LEAKAGE CURRENT
VARIATION MADE THE TEST VEHICLES WHICH WERE
CONSTRUCTED UNSATISFACTORY FOR ENVIRONMENTAL TESTING.
A REVISED APPROACH TO THE FINAL EXPLORATORY
DEVELOPMENT MODELS IS RECOMMENDED TO PERMIT EMPHASIS
ON THE CONSTRUCTION TECHNIQUES WHICH UTILIZE VAPOR
PLATED GLASS. (AUTHOR)

(U)

UNCLASSIFIED

/ZZZHT

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD-646 915 11/9 9/3
JOHNS HOPKINS UNIV SILVER SPRING MD APPLIED PHYSICS
LAB

THE IMPROVEMENT OF ENCAPSULATING FOAMS AND QUALITY
ASSURANCE OF POTTING PLASTIC. (U)

DESCRIPTIVE NOTE: TECHNICAL MEMO.,
AUG 66 39P WINCKLER, G. A. F.; EVANS, R. C.

REPT. NO. TG-817
CONTRACT: NOW-62-0604
MONITOR: IDEP 501.32.19.45-S6-01

UNCLASSIFIED REPORT

DESCRIPTORS: (•EXPANDED PLASTICS; •ENCAPSULATION);
(•EMBEDDING SUBSTANCES, TEST METHODS); CIRCUITS,
DAMAGE, PRESSURE, VISCOSITY, HARDENING,
CATALYSTS, QUALITY CONTROL, DIELECTRIC PROPERTIES;
RESISTANCE(ELECTRICAL), DENSITY, INSTRUCTION
MANUALS (U)

PLASTIC FOAMS USED FOR ENCAPSULATING ELECTRONIC
CIRCUITS MAY, DURING THEIR FORMATION, EXERT
SUFFICIENT PRESSURES TO DAMAGE COMPONENTS AND
CONNECTIVE WIRING. THIS PROBABLY CAUSED BY THE
INCREASING VISCOSITY OF THE PLASTIC WHILE GAS IS
STILL BEING GENERATED. THE DANGER MAY BE
ALLEVIATED BY ALTERING THE FORMULATION CHEMICALLY SO
THAT GAS GENERATION IS COMPLETED BEFORE THE PLASTIC
BEGINS TO HARDEN. THE CONSEQUENCES WHICH WOULD
RESULT FROM THE USE OF A MISLABELLED OR SUBSTANDARD
CAN OF POTTING PLASTIC IN FLIGHT HARDWARE ARE SO
SERIOUS THAT EACH CAN MUST BE INDIVIDUALLY TESTED TO
ELIMINATE THAT POSSIBILITY. THIS MAY READILY BE
ACCOMPLISHED BY CASTING A TEST DISK AND THEN
MEASURING ITS DIELECTRIC CONSTANT, VOLUME
RESISTIVITY, SURFACE RESISTIVITY AND DENSITY. THE
ELECTRICAL TESTING CAN BE PERFORMED IN LESS THAN TEN
MINUTES AND IS, THEREFORE, FEASIBLE AS A STANDARD
QUALITY ASSURANCE PROCEDURE. (AUTHOR) (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD-648 420 13/8 11/9 9/3
PLASTICS TECHNICAL EVALUATION CENTER DOVER N J

ENCAPSULATION OF ELECTRONIC PARTS IN PLASTICS: A
REVIEW,

(U)

FEB 67 67P MOLZON, ARNOLD E. ;
REPT. NO. PLASTEC-29

UNCLASSIFIED REPORT

DESCRIPTORS: (•ELECTRONIC EQUIPMENT;
ENCAPSULATION), (•ENCAPSULATION, PLASTICS),
COATINGS, FOAMS, EMBEDDING SUBSTANCES, POLYMERS,
CASTING, MATERIAL FORMING, MOLDING, THERMAL
PROPERTIES

(U)

THE ADVANCES AND TRENDS IN THE PLASTICS
ENCAPSULATION OF ELECTRONIC PARTS AND CIRCUITS ARE
REVIEWED. IN LESS THAN 20 YEARS THIS INDUSTRY HAS
DEVELOPED INTO A HIGH PRODUCTION OPERATION.
INCLUDED IN THIS REPORT ARE: TYPES OF PLASTICS
USED, MATERIAL REQUIREMENTS AND MATERIAL CONSUMPTION.
KNOWN MATERIAL SUPPLIERS AND EQUIPMENT SUPPLIERS
ARE LISTED AND THEIR PRODUCTS IDENTIFIED. ALSO
TABULATED ARE 47 PERTINENT SPECIFICATIONS, 111
CONTRACTS (WITH REPORTS), AND 57 GOVERNMENT
LABORATORY REPORTS. THESE REFLECT THE MATERIALS
RESEARCH AND DEVELOPMENT IN THE DEPARTMENT OF
DEFENSE, IN NASA, AND IN INDUSTRY. THE
AVAILABILITY OF INFORMATION IS ALSO DISCUSSED. THE
REPORT CONTAINS A BIBLIOGRAPHY OF 207 ITEMS ON
ENCAPSULATION.

(U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD-660 349 9/1 14/4
ARMY ELECTRONICS COMMAND FORT MONMOUTH N J

PRELIMINARY INVESTIGATION OF PLASTIC ENCAPSULATED
TRANSISTORS. (U)

DESCRIPTIVE NOTE: TECHNICAL REPT.,
SEP 67 17P NAKIM, E. B. ; CANEPA, R. ;
REPT. NO. ECOM-2879
PROJ: DA-1H6-22001-A-056
TASK: 1H6-22001-A-056-01-14

UNCLASSIFIED REPORT

DESCRIPTORS: (*TRANSISTORS, ENCAPSULATION),
PERFORMANCE(ENGINEERING), PLASTICS,
RELIABILITY(ELECTRONICS), ENVIRONMENTAL TESTS,
EPOXY PLASTICS, SILICONE PLASTICS (U)

AN EVALUATION OF EPOXY AND SILICONE TRANSISTOR
PACKAGES WAS CARRIED OUT ON SEVEN DEVICE TYPES.
ALL PACKAGES APPEARED FAVORABLE UNDER STANDARD
MIL TESTS BELOW 170C. HOWEVER, A NEW REALISTIC
ENVIRONMENTAL TEST HAS BEEN DEVISED WHICH APPEARS TO
DETECT POTENTIALLY UNRELIABLE DEVICES IN LESS THAN
500 HOURS. THE RESULTS FROM THIS TEST INDICATE
THAT SILICONE PACKAGES ARE GENERALLY MORE DESIRABLE
THAN EPOXY. HOWEVER, THIS CAN VARY BETWEEN
MANUFACTURERS AND SOME EPOXY UNITS HAVE BEEN FOUND TO
BE AS STABLE AS SILICONE, DEPENDING ON THE
MANUFACTURER. RESULTS OF TESTS ARE DISCUSSED AS
WELL AS VARIOUS PROBLEM AREAS. (AUTHOR) (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD-669 850 9/1
ITT SEMICONDUCTOR PRODUCTS LABS PALO ALTO CALIF

FOUR-LAYER DIODE DEVELOPMENT PROGRAM. (U)

DESCRIPTIVE NOTE: FINAL REPT.,
APR 68 74P SCARLETT, ROBERT M. ;
CONTRACT: AF 30(602)-4045
PROJ: AF-5573
MONITOR: RADC TR-68-136

UNCLASSIFIED REPORT

DESCRIPTORS: (*ELECTRONIC SWITCHES,
DIODES(SEMICONDUCTOR)),
(*DIODES(SEMICONDUCTOR), MANUFACTURING
METHODS), MODULATORS,
RELIABILITY(ELECTRONICS), VOLTAGE,
FAILURE(ELECTRONICS), THERMAL STABILITY,
LEAKAGE(ELECTRICAL), SILICON, BORON,
DIFFUSION, SURFACE PROPERTIES, ENCAPSULATION (U)

THIS EFFORT IS THE CULMINATION OF SEVERAL YEARS
WORK TO IMPROVE AND DEMONSTRATE THE FOUR-LAYER DIODE
IN HIGH POWER SWITCH SERVICE. THE FABRICATION OF
THE DEVICE, ITS CHARACTERISTICS AND AN EVALUATION OF
PERFORMANCE OF THE DEVICE IN A HIGH VOLTAGE HIGH
CURRENT ENVIRONMENT IS DISCUSSED. SEVERAL DEVICE
PROBLEMS BECAME EVIDENT DURING THIS EFFORT AND ARE
CHARACTERIZED IN THE TEXT. THE FAILURE RATES,
THERMAL DISSIPATION PROBLEMS, VOLTAGE DISTRIBUTION,
REPETITION RATE LIMITATIONS AND GENERAL DEVICE
BEHAVIOR ARE THOROUGHLY DISCUSSED. (AUTHOR) (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD-671 797 9/5
NAVAL AMMUNITION DEPOT CRANE IND

MICRO-NOTES. INFORMATION ON MICROELECTRONICS FOR
NAVY EQUIPMENTS.

(U)

JUL 68 222P
REPT. NO. NAD-CR-MICRO-NOTES-24
MONITOR: IDEP 515.00.00.00-X9-10

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: SPONSORED BY NAVAL AIR SYSTEMS
COMMAND, WASHINGTON, D.C. AND NAVAL ELECTRONICS
SYSTEM COMMAND, WASHINGTON, D.C. SEE ALSO AD-
667 719.

DESCRIPTORS: (*NAVAL EQUIPMENT;
*MICROMINIATURIZATION(ELECTRONICS));
(*INTEGRATED CIRCUITS, TESTS), RADIO RECEIVERS;
FREQUENCY SHIFT CONVERTERS, RADIATION DAMAGE,
GATES(CIRCUITS), LOGIC CIRCUITS, SWITCHING
CIRCUITS, RELAXATION OSCILLATORS, AMPLIFIERS,
PERFORMANCE(ENGINEERING), SEMICONDUCTOR DEVICES,
ENCAPSULATION

(U)

CONTENTS INCLUDE: MICROELECTRONICS FSK
RECEIVER; EVALUATION OF DIGITAL UNITS; EVALUATION
OF ANALOG UNITS; PLASTIC ENCAPSULATED SEMICONDUCTOR
DEVICES AND MICROCIRCUITS; INTRODUCTION TO
RADIATION EFFECTS IN INTEGRATED CIRCUITS.

(U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD-689 224 9/5
ROME AIR DEVELOPMENT CENTER GRIFFISS AFB N Y

FAILURE MECHANISMS IN PLASTIC ENCAPSULATED
MICROCIRCUITS.

(U)

DESCRIPTIVE NOTE: TECHNICAL REPT.;
MAY 69 34P TAMBURRINO, ALFRED L. ;
KAPFER, VINCENT C. ;
REPT. NO. RADC-TR-69-111
PROJ: AF-5519
TASK: 551906
MONITOR: IDEP 515.00.00.00-F9-01

UNCLASSIFIED REPORT

DESCRIPTORS: (*INTEGRATED CIRCUITS,
RELIABILITY(ELECTRONICS)); TEST METHODS,
ENCAPSULATION, EPOXY PLASTICS, PHENOLIC PLASTICS,
SILICONE PLASTICS, THERMAL STRESSES, SALT SPRAY
TESTS, LIQUID IMMERSION TESTS, STRESSES,
CORROSION, ALUMINUM ALLOYS,
FAILURE(MECHANICS)

(U)

THIS PAPER DEALS WITH THE QUESTION OF MILITARY
ACCEPTANCE OF MICROCIRCUITS ENCAPSULATED IN PLASTIC
MATERIALS. A DISCUSSION OF MILITARY APPLICATIONS
AND REQUIREMENTS AND THEIR RELATION TO DEVICE
QUALIFICATION TESTING AND SCREENING IS GIVEN. IT
IS POINTED OUT THAT QUALIFICATION TESTS ARE BASED
NEITH. UPON ABSOLUTE MINIMUM STANDARDS NOR VALIDLY
DERIVED ACCELERATION FACTORS, BUT ON EXPERIENCE WITH
SIMILAR DEVICES, AND KNOWLEDGE OF THE EXPECTED
CAPABILITIES OF GOOD DEVICES. EPOXY, PHENOLIC, AND
SILICONE ENCAPSULATED MICROCIRCUITS HAVE BEEN
SUBJECTED TO A VARIETY OF HIGH STRESS TESTS AND FOUR
BASIC TYPES OF FAILURES OBSERVED: EXTERNAL SURFACE
CONDUCTION, INTERNAL (SILICON CHIP) SURFACE
EFFECTS, ALUMINUM METALLIZATION CORROSION, AND BOND
BREAKAGE DUE TO THERMAL MISMATCH. (AUTHOR)

(U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD-690 445 9/5
NAVAL AMMUNITION DEPOT CRANE IND

MICRO-NOTES. INFORMATION ON MICROELECTRONICS
FOR NAVY EQUIPMENTS.

(U)

JUL 69 131P
REPT. NO. NAD-CR-MICRO-NOTES-28

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: SPONSORED BY NAVAL AIR SYSTEMS
COMMAND, WASHINGTON, D. C., AND NAVAL
ELECTRONICS SYSTEM COMMAND, WASHINGTON, D. C.

DESCRIPTORS: (•NAVAL EQUIPMENT,
•MICROMINIATURIZATION(ELECTRONICS)),
(•INTEGRATED CIRCUITS, NAVAL RESEARCH),
SEMICONDUCTOR DEVICES, ENCAPSULATION, LOGIC
CIRCUITS, TABLES, ENVIRONMENTAL TESTS, ION
BOMBARDMENT, DOPING, GATES(CIRCUITS),
RELIABILITY(ELECTRONICS)

(U)

IDENTIFIERS: LSIC(LARGE SCALE INTEGRATED
CIRCUITS), LARGE SCALE INTEGRATED CIRCUITS

(U)

THE REPORT DISCUSSES THE RESULTS OF A JOINT EFFORT
TO DISSEMINATE INFORMATION ON EVALUATION,
APPLICATION, AVAILABILITY, RESEARCH AND DEVELOPMENT,
AND STANDARDIZATION ACTIVITY PERTAINING TO STATE-OF-
THE-ART MICROELECTRONIC CIRCUITS, DEVICES, AND
MATERIALS, WITH A VIEW TOWARD AVOIDING DUPLICATION OF
EFFORT AND MAKING MAXIMUM USE OF TECHNICAL RESOURCES.

(AUTHOR)

(U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD-703 292 9/5

GENERAL MOTORS CORP KOKOMO IND DELCO RADIO DIV

RELIABILITY EVALUATION OF PLASTIC INTEGRATED
CIRCUITS.

(U)

DESCRIPTIVE NOTE: TECHNICAL REPT. 9 JAN-9 NOV 69,
FEB 70 84P BEVINGTON, JOHN R. ;LITTLE,

DAVID R. ;

CONTRACT: F30602-69-C-0154

PROJ: AF-5519

TASK: 551906

MONITOR: RADC, IDEP

TR-69-451, 515.00.00.00-F9-

07

UNCLASSIFIED REPORT

DESCRIPTORS: (*INTEGRATED CIRCUITS,
RELIABILITY(ELECTRONICS)), (*ENCAPSULATION,
INTEGRATED CIRCUITS), PLASTICS,
MOISTUREPROOFING, THERMAL STRESSES,
FAILURE(MECHANICS)

(U)

INSUFFICIENT DATA EXISTS WITH RESPECT TO THE LONG
TERM STABILITY OF PLASTIC-ENCAPSULATED MICROCIRCUITS.
OF SPECIAL INTEREST IS THE DEGREE OF SUSCEPTIBILITY
OF THESE PLASTIC PACKAGES TO SUCH ENVIRONMENTAL
STRESSES AS MOISTURE RESISTANCE (WITH AND WITHOUT
BIAS) AND THERMAL SHOCK. THE OBJECTIVE OF THIS
STUDY IS TO DETERMINE THE SUITABILITY OF
REPRESENTATIVE, PRODUCTION, PLASTIC-ENCAPSULATED
INTEGRATED CIRCUITS FOR MILITARY APPLICATIONS, AND TO
DEVELOP METHODS AND TECHNIQUES FOR ASSESSING AND
ASSURING THE RELIABILITY OF SUCH CIRCUITS. A SERIES
OF SCREENS AND TESTS ARE BEING PERFORMED ON SELECTED
CIRCUITS, AND DETAILED FAILURE ANALYSES ARE BEING
PERFORMED TO DETERMINE THE FAILURE MODES AND
MECHANISMS CHARACTERISTIC OF THE VARIOUS TYPES OF
PLASTIC ENCAPSULATIONS. THE RESULTS TO DATE HAVE
INDICATED CONTRASTS IN PERFORMANCE BETWEEN PACKAGE
TYPES AND BETWEEN SCREENED AND UNSCREENED GROUPS, AS
WELL AS SIGNIFICANT LOT-TO-LOT VARIATIONS. SEVERAL
TENTATIVE CONCLUSIONS HAVE BEEN DRAWN BASED ON TEST
RESULTS TO DATE; HOWEVER, FINAL CONCLUSIONS MUST
AWAIT COMPLETION OF THIS STUDY. (AUTHOR)

(U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD-704 925 9/5
DEFENSE DOCUMENTATION CENTER ALEXANDRIA VA

PACKAGED CIRCUITS. VOLUME 1.

(U)

DESCRIPTIVE NOTE: REPORT BIBLIOGRAPHY MAR 59-FEB 69.
APR 70 159P
REPT. NO. DDC-TAS-70-39-1

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: SEE ALSO VOLUME 2, AD-868 525 AND
VOLUME 3, AD-508 800.

DESCRIPTORS: (*PACKAGED CIRCUITS,
*BIBLIOGRAPHIES), PACKAGING, ELECTRONIC
EQUIPMENT, INTEGRATED CIRCUITS,
MICROMINIATURIZATION(ELECTRONICS),
RELIABILITY(ELECTRONICS),
MODULES(ELECTRONICS), PRINTED CIRCUITS,
MOLECULAR ELECTRONICS, ELECTRIC CONNECTORS,
MANUFACTURING METHODS, WELDING, SEMICONDUCTOR
DEVICES, ENCAPSULATION, COMPUTERS, DATA STORAGE
SYSTEMS, DATA PROCESSING SYSTEMS, COMPUTER LOGIC (U)
IDENTIFIERS: THIN FILMS (U)

SELECTIVE REFERENCES INCLUDE: COMPATIBLE
TECHNIQUES FOR INTEGRATED CIRCUITRY; RESULTS OF
STUDIES TO DETERMINE OPTIMUM PACKAGING TECHNIQUES FOR
THE ELECTRONIC EQUIPMENT AND THE SHOCK LEVELS THAT
THE DIFFERENT PACKAGES AND CERTAIN ELECTRONIC
COMPONENTS COULD WITHSTAND; A SYSTEM FOR COMPUTER-
AIDED SELECTION AND ASSIGNMENT OF ELECTRONIC MODULES;
AN ELECTRONIC PACKAGING PROGRAM WAS INITIATED TO
DEVELOP AND EVALUATE INTEGRATED CIRCUIT PACKAGING
TECHNIQUES APPLICABLE TO UNMANNED SCIENTIFIC
SPACECRAFT DATA SYSTEM; AND ALL ASPECTS OF
MICROCIRCUIT PACKAGING ARE STUDIED AND EACH OF THE
THREE BASIC APPROACHES TO THE PACKAGING OF
MICROCIRCUITS ARE INVESTIGATED AND EVALUATED, NAMELY,
TYPE OF CONTAINERS, GLASS AND METAL FLAT PACKAGES,
AND ENCAPSULATED TYPE PACKAGES. (AUTHOR) (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD-715 108 9/5
NAVAL AMMUNITION DEPOT CRANE IND

MICRO-NOTES. INFORMATION ON MICROELECTRONICS
FOR NAVY EQUIPMENTS. (U)

OCT 70 80P
REPT. NO. NAD-CR-MICRO NOTES-30

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: SEE ALSO REPORT DATED 1 FEB 70,
AD-702 751.

DESCRIPTORS: (MICROMINIATURIZATION(ELECTRONICS),
NAVAL EQUIPMENT), INTEGRATED CIRCUITS, COUNTING
METHODS, CORRELATORS, STANDARDIZATION,
ENCAPSULATION, PLASTICS (U)

CONTENTS: A CONTINUING REPORT ON EFFORTS TO
DETERMINE THE THEORY AND METHODS REQUIRED TO
FABRICATE MICROCIRCUIT ULTRA HIGH SPEED PRESCALERS;
A SUMMARY OF THE WORK DONE ON DEVELOPMENT OF AN
LSI CORRELATOR; MINUTES OF THE SECOND MEETING OF
THE DOD/NASA COMMITTEE ON RESEARCH AND
DEVELOPMENT OF PLASTIC DEVICES AND MATERIALS (WGR
AND D); A COMPLETE SUMMARY OF WORK-TO-DATE DONE
ON EVALUATION OF PLASTIC ENCAPSULATED INTEGRATED
CIRCUITS. (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD-715 984 9/5

ROME AIR DEVELOPMENT CENTER GRIFFISS AFB N Y

STRESS INDUCED INTERMITTENT FAILURES IN
ENCAPSULATED MICROCIRCUITS.

(U)

DESCRIPTIVE NOTE: TECHNICAL REPT.,
OCT 70 60P HABERER, JOHN R. ;
REPT. NO. RADC-TR-70-213
PROJ: DE-69-3

UNCLASSIFIED REPORT

DESCRIPTORS: (•INTEGRATED CIRCUITS,
FAILURE(ELECTRONICS)),
RELIABILITY(ELECTRONICS); ENCAPSULATION,
CIRCUIT INTERCONNECTIONS

(U)

THE PROBLEM OF TEMPERATURE INTERMITTENT OPERATION
IN ENCAPSULATED INTEGRATED CIRCUIT IS DISCUSSED AND A
TECHNIQUE IS PRESENTED WHICH HAS BEEN EFFECTIVE IN
DETECTING POTENTIAL FAILURES RESULTING FROM
METALLIZATION, BOND OR LEAD WIRE TEMPERATURE
INTERMITTENTS. THESE ARE THE MAIN CAUSES OF
INTERMITTENT OPERATION IN ENCAPSULATED MICROCIRCUITS
AT PRESENT, AND THIS TECHNIQUE SHOULD LEAD TO
IMPROVEMENT IN ENCAPSULATED DEVICE RELIABILITY IF
IMPLEMENTED AS A SCREENING OR QUALIFICATION TEST.
THE INSTRUMENTATION USED AT RADC FOR THIS
TECHNIQUE, CALLED THE MONITORED THERMAL CYCLE
TEST (MTC), IS PRESENTED AND A PROPOSED STANDARD
TEST METHOD, BASED ON THIS TEST IS INCLUDED AS AN
APPENDIX. SEVERAL REPRESENTATIVE DEVICE FAILURE
ANALYSIS SUMMARIES ARE INCLUDED TO ILLUSTRATE THE
CAUSE OF TYPICAL ENCAPSULATED INTEGRATED CIRCUIT
INTERMITTENTS RESULTING FROM FAILURE OF THE LEAD
WIRE-BOND-INTERCONNECT SYSTEM. (AUTHOR)

(U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD-718 336 13/9 20/11
NAVAL AIR ENGINEERING CENTER PHILADELPHIA PA ENGINEERING
DEPT (SI)

A STUDY IN TERMINAL BENDING OF UNIFORM AND
ENCAPSULATED WIRE ROPE WITH LINEAR AND NON-
LINEAR CONSTITUTIVE EQUATIONS;

(U)

JAN 71 114P BLACK, ROBERT ;
REPT. NO. NAEC-ENG-7683
PROJ: A3405373/2008/1F32461402

UNCLASSIFIED REPORT

DESCRIPTORS: (*CABLES(MECHANICAL); BENDING);
LOADING(MECHANICS); BENDING; DEFORMATION;
CORDAGE; STRAIN(MECHANICS); ENCAPSULATION;
ARRESTING GEAR

(U)

THE REPORT DEVELOPS EQUATIONS FOR THE CALCULATION
OF THE TERMINAL FORCES AND MOMENTS ABOUT A BUILT-IN
END OF A WIRE ROPE WHEN THE UPSTREAM END IS SUBJECTED
TO A TENSILE LOAD APPLIED AT AN ANGLE MEASURED FROM
THE DIRECTION TAKEN BY THE LONGITUDINAL AXIS OF THE
ROPE AT THE POINT OF ATTACHMENT. SOLUTIONS FOR
THESE FORCES AND MOMENTS AND THE ROPE CURVATURE ARE
GIVEN ALONG THE LENGTH OF THE CABLE AND THE EFFECT OF
THESE QUANTITIES UPON THE STRANDS ARE DETERMINED.
THE ANALYSES ARE PRESENTED FOR WIRE ROPE LINEAR AND
NONLINEAR CONSTITUTIVE EQUATIONS. (AUTHOR)

(U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD-722 043 9/5
GENERAL MOTORS CORP KOKOMO IND DELCO ELECTRONICS DIV

RELIABILITY EVALUATION OF PLASTIC INTEGRATED
CIRCUITS.

(U)

DESCRIPTIVE NOTE: FINAL REPT. 9 JAN 69-9 SEP 70,
JAN 71 171P BEVINGTON, JOHN R. ; COOK,
JAMES P. ; LITTLE, DAVID R. ; SINGLE, L. V. ;
CONTRACT: F30602-69-C-0154
MONITOR: RADCGIDEP TR-71-8, 515.00.00.00-F9-10

UNCLASSIFIED REPORT

DESCRIPTORS: (*INTEGRATED CIRCUITS,
*ENCAPSULATION), PLASTICS,
RELIABILITY(ELECTRONICS), ACCEPTABILITY

(U)

INSUFFICIENT INFORMATION HAS BEEN AVAILABLE WITH
RESPECT TO THE LONG-TERM STABILITY OF PLASTIC-
ENCAPSULATED MICROCIRCUITS. OF SPECIAL INTEREST IS
THE DEGREE OF SUSCEPTIBILITY OF THESE PLASTIC
PACKAGES TO SUCH ENVIRONMENTAL STRESSES AS MOISTURE
RESISTANCE (WITH AND WITHOUT BIAS) AND THERMAL
SHOCK. THE OBJECTIVES OF THE STUDY ARE TO DETERMINE
THE SUITABILITY OF REPRESENTATIVE, PRODUCTION,
PLASTIC-ENCAPSULATED INTEGRATED CIRCUITS FOR MILITARY
APPLICATIONS, AND TO DEVELOP METHODS AND TECHNIQUES
FOR ASSESSING AND ASSURING THE RELIABILITY OF SUCH
CIRCUITS. A SERIES OF SCREENS AND TESTS WERE
PERFORMED ON SELECTED CIRCUITS, AND DETAILED FAILURE
ANALYSES WERE MADE TO DETERMINE THE FAILURE MODES AND
MECHANISMS CHARACTERISTIC OF THE VARIOUS TYPES OF
PLASTIC ENCAPSULATION. THE REPORT INCLUDES DETAILED
TEST RESULTS FROM LONG-TERM TESTS AND FROM SHORT-TERM
HIGHLY ACCELERATED TESTS. COMPARISONS ARE MADE
BETWEEN PACKAGE TYPES UNDER THE SAME STRESS
CONDITIONS, BETWEEN SCREENED AND UNSCREENED GROUPS,
AND BETWEEN STANDARD AND ACCELERATED TEST RESULTS.
A STRESS TO DESTRUCTION TEST PROGRAM, INCLUDING
EQUIVALENT HERMETIC TYPES FOR DIRECT COMPARISON WITH
PLASTIC-ENCAPSULATED DEVICES UNDER SELECTED
ACCELERATED TEST CONDITIONS, WAS PERFORMED.
(AUTHOR)

(U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD-722 405 9/5 1/4
GENERAL DYNAMICS/CONVAIR SAN DIEGO CALIF

THERMAL ANALYSIS. ADVANCED AUTOPILOT
FLATPAK MODULE DESIGN RECOMMENDATIONS;

(U)

DEC 67 38P HALL, J. E. ;
REPT. NO. GDC-8TD67-144
CONTRACT: AF 04(695)-710
MONITOR: SAMSO TR-71-86

UNCLASSIFIED REPORT

DESCRIPTORS: (MODULES(ELECTRONICS)), THERMAL
ANALYSIS), (AUTOMATIC PILOTS,
MODULES(ELECTRONICS)), (ENCAPSULATION,
MODULES(ELECTRONICS)), DESIGN, THERMAL
INSULATION, THERMAL CONDUCTIVITY, HEAT SINKS,
EXPANDED PLASTICS, ISOCYANATE PLASTICS, EPOXY
PLASTICS, COMPOSITE MATERIALS, COPPER
IDENTIFIERS: METAL PARTICLE COMPOSITES

(U)

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A THERMAL MODEL OF A TYPICAL ELECTRONIC FLATPAK
MODULE WAS CONSTRUCTED AND ANALYZED. POLYURETHANE
FOAM AND ALUMINUM-FILLED EPOXY WERE ASSESSED FOR USE
AS ENCAPSULATION MATERIALS. THE VALUE OF UTILIZING
COPPER SHEETS AS HEAT CONDUCTIVE PATHS FROM HEAT
GENERATORS TO THE FLATPAK FRAMES WAS ASSESSED. FROM
A LARGE NUMBER OF DIGITAL COMPUTER CALCULATIONS,
ACCUMULATED DATA WERE CORRELATED WITH SOME
PRELIMINARY TEST DATA. WITH THIS INFORMATION,
DESIGN RECOMMENDATIONS WERE MADE TO ASSIST THE
FLATPAK DESIGNER. IN GENERAL, THE ECONOMICS OF
MATERIAL AND FABRICATION COSTS MUST BE COMPARED, BY
THE DESIGNER, WITH THERMAL CHARACTERISTICS OF THE
ENCAPSULATION METHODS. TEMPERATURES ATTAINED BY
CRITICAL HEAT GENERATING ELEMENTS ARE DEPENDENT
UPON: (1) LOCATION RELATIVE TO THE FLATPAK
FRAME, (2) LENGTH OF ELECTRICAL LEADS AND
CONNECTIONS, AND (3) CONTACT RESISTANCES OF THE
ELECTRICAL CONNECTIONS AND HEAT CONDUCTIVE SHEETS.
RECOMMENDATIONS INCLUDE A TABULATION OF ALLOWABLE
THERMAL RESISTANCE FOR EACH HEAT GENERATOR
CONFIGURATION. (AUTHOR)

(U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD-722 448 11/3 4/2
NATIONAL CASH REGISTER CO DAYTON OHIO CAPSULAR RESEARCH
AND PRODUCT DEVELOPMENT DEPT

MICROENCAPSULATED CLOUD SEEDING
MATERIALS.

(U)

DESCRIPTIVE NOTE: FINAL REPT. 15 AUG 69-14 JAN 71,
FEB 71 158P ANDERSON, JERROLD L. ;
CONTRACT: F19628-70-C-0011
PROJ: AF-8620, ILIR-7-69
TASK: 862008, ILIR-7-69-01
MONITOR: AFCRL 71-0151

UNCLASSIFIED REPORT

DESCRIPTORS: (*ETHYL CELLULOSE, COATINGS),
(*ARTIFICIAL PRECIPITATION, MATERIALS), (*SODIUM
CHLORIDE, *ENCAPSULATION), (*UREA,
ENCAPSULATION), POLYMERS, FOG, PARTICLE SIZE,
PHOSPHATES, OPTICAL PROPERTIES, ADSORPTION,
PRODUCTION, SCATTERING, FEASIBILITY STUDIES,
POWDERS

(U)

IDENTIFIERS: *CLOUD SEEDING,
MICROENCAPSULATION

(U)

A PROCESS WAS DEVELOPED FOR ENCAPSULATING
HYGROSCOPIC, CLOUD-SEEDING AGENTS, SODIUM CHLORIDE
AND UREA. THE ENCAPSULATION PROCESS INVOLVES
DEPOSITING THE COATING POLYMER, ETHYLCELLULOSE, ONTO
FINELY DIVIDED POWDERS, USING A PHASE SEPARATION-
COACERVATION TECHNIQUE. THE PROCESS PRODUCES SMALL
ENCAPSULATED AGGREGATES, THE SIZE AND DISTRIBUTION OF
WHICH CAN BE VARIED. ENCAPSULATED MATERIALS
PREPARED BY THE PROCESS ARE UNIQUE IN THAT THEY ARE
VOID, ESSENTIALLY, OF POWDER FINES. LABORATORY
TESTS OF BOTH ENCAPSULATED SODIUM CHLORIDE AND UREA
PROVED THE POWDERS TO BE RESISTANT TO CLUMPING AND
CAKING ASSOCIATED WITH PREMATURE MOISTURE SORPTION
OCCURRING DURING STORAGE AND HANDLING. THE
ENCAPSULATION COATING POLYMER, ETHYLCELLULOSE, IS
WATER INSOLUBLE, BUT IS PERMEABLE TO WATER VAPOR,
WATER AND SOLUTES. HENCE, WATER SORPTION AND
PARTICLE GROWTH PROPERTIES RESULTING FROM EXPOSURE OF
THE ENCAPSULATED PARTICLES TO HUMID ATMOSPHERES ARE
EFFECTED BY DIFFUSION-MASS TRANSPORT PROCESSES.
LABORATORY TESTING OF ENCAPSULATED SODIUM CHLORIDE
AND UREA MATERIALS IN SIMULATED WARM FOG ATMOSPHERES
REVEALED WATER SORPTION CHARACTERISTICS WHICH WERE
COMPARABLE TO UNENCAPSULATED PARTICLES HAVING
EQUIVALENT DIMENSION. (AUTHOR)

(U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD-726 018 14/2 13/8 9/1
ARMY ELECTRONICS COMMAND FORT MONMOUTH N J

1.5-KW SOLID-STATE POWER CYCLER. (U)

DESCRIPTIVE NOTE: RESEARCH AND DEVELOPMENT TECHNICAL
REPT.,

APR 71 18P MALINOWSKI, GREGORY J. ;
REPT. NO. ECOM-3410
PROJ: DA-1-H-662705-A-056
TASK: 1-H-662705-A-05601

UNCLASSIFIED REPORT

DESCRIPTORS: (*EMBEDDING SUBSTANCES, *TEST
EQUIPMENT(ELECTRONICS)), (*TRANSISTORS,
ENCAPSULATION), TIMING CIRCUITS, RELAXATION
OSCILLATORS, SEMICONDUCTOR DEVICES, PULSE
AMPLIFIERS, THERMAL PROPERTIES (U)
IDENTIFIERS: POWER CYCLERS (U)

THE REPORT DESCRIBES THE DESIGN AND OPERATION OF A
SOLID-STATE POWER CYCLER USED IN THE EVALUATION OF
PLASTIC ENCAPSULATED SEMICONDUCTOR DEVICES. THE
CYCLER CAN SWITCH LOADS UP TO 2.0 KW WITH A
VARIABLE DUTY CYCLE. THIS REPORT ALSO SHOWS THE
PERFORMANCE OF THE CYCLER AS DESIGNED AND RECOMMENDS
FUTURE MODIFICATIONS FOR ADDED VERSATILITY.
(AUTHOR) (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD-727 680 6/8
ARMY NATICK LABS MASS FOOD LAB

DEVELOPMENT OF A STABLE LEAVENING SYSTEM FOR
BAKERY MIXES.

(U)

DESCRIPTIVE NOTE: TECHNICAL REPT.,
MAY 71 27P UMI/NA, ANTHONY ; KELLEY, NANCY
; EVERSON, THOMAS ; WESTCOTT, DONALD E. ;
REPT. NO. FL-123
PROJ: PE-728012.12
MONITOR: USA-NLABS TR-71-54-FL

UNCLASSIFIED REPORT

DESCRIPTORS: (*FOOD, STORAGE); CARBON DIOXIDE;
MOISTURE, TEMPERATURE, STABILITY, SODIUM
COMPOUNDS, CARBONATES, PHOSPHATES, ALUMINUM
COMPOUNDS, SEPARATION, ENCAPSULATION, PACKAGING,
MILITARY REQUIREMENTS (U)
IDENTIFIERS: *CAKE MIXES, CAKE MIX SHELF LIFE,
SODIUM BICARBONATES, SODIUM ALUMINUM PHOSPHATES,
*FOOD STORAGE (U)

IN ORDER TO PROLONG THE SHELF LIFE OF A PREPARED
BAKERY MIX A LEAVENING SYSTEM WAS DESIRED WHICH WOULD
PREVENT THE PREMATURE ESCAPE OF CARBON DIOXIDE DUE TO
INTERACTION WITH MOISTURE IN THE PRODUCT DURING
PROLONGED HIGH TEMPERATURE STORAGE. A VARIETY OF
METHODS WAS TRIED WHICH WOULD PROVIDE A BARRIER
BETWEEN THE SODIUM BICARBONATE AND THE LEAVENING
ACID, SODIUM ALUMINUM PHOSPHATE, AND AVAILABLE
MOISTURE IN THE MIX. THESE INCLUDED ENCAPSULATING
THE SODIUM BICARBONATE PARTICLES WITH HYDROPHOBIC
MATERIALS SUCH AS HYDROGENATED VEGETABLE OR ANIMAL
OILS. THE SHORTENING PROTECTED SODIUM BICARBONATE
METHOD WAS DEVELOPED INTO A TWO LAYERED BAKERY MIX,
SEPARATING THE SODIUM BICARBONATE FROM THE MOISTURE
CONTAINING INGREDIENTS OF THE MIX. PHYSICAL
SEPARATION OF THE SODIUM BICARBONATE WAS ALSO
INVESTIGATED BY PACKAGING THE SODIUM BICARBONATE IN A
MOISTURE PROOF POUCH FROM WHICH IT COULD BE MIXED
WITH THE REMAINING INGREDIENTS AT THE TIME OF BAKING.
IT WAS FOUND THAT BOTH THE PHYSICALLY SEPARATED AND
THE SHORTENING - PROTECTED SODIUM BICARBONATE IN A
LAYERED MIX METHOD WERE SUCCESSFUL IN PREVENTING THE
PREMATURE ESCAPE OF CARBON DIOXIDE. (AUTHOR) (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD-729 680 8/7 20/11
BATTELLE MEMORIAL INST COLUMBUS OHIO COLUMBUS LABS

THE EFFECT OF FLUIDS AND CYCLIC LOADING ON
THE ELASTIC CONSTANTS OF ROCKS.

(U)

DESCRIPTIVE NOTE: SEMIANNUAL REPT. 18 DEC 70-18 JUN
71,

AUG 71 39P. LA MORI, PHILLIP N. ;
CONTRACT: HC210007, ARPA ORDER-1579

UNCLASSIFIED REPORT

DESCRIPTORS: (*SEDIMENTARY ROCK, STRUCTURAL
PROPERTIES), LOADING (MECHANICS), CRACKS,
POROSITY, ELASTICITY, COMPRESSIVE PROPERTIES,
ACOUSTIC PROPERTIES, EXPERIMENTAL DATA
IDENTIFIERS: ACOUSTIC VELOCITY

(U)

(U)

SIMULTANEOUS MEASUREMENTS OF ACOUSTIC VELOCITY AND
LINEAR STRAIN HAVE BEEN MADE ON SAMPLES OF SALEM
LIMESTONE AND BEREA SANDSTONE. CYCLIC LOADING
CONDITIONS OF 0-1-0-5-0-8-0 KB WERE MADE ON THESE
SAMPLES. THE RESULTS SHOW THAT THIN CRACKS HAVE A
LARGE EFFECT ON ACOUSTICALLY MEASURED PROPERTIES AND
LITTLE EFFECT ON LINEAR STRAIN. BOTH ROCK SAMPLES
ARE QUITE POROUS AND EXHIBIT THE CRUSHING MODE OF
FAILURE; AT 1.5 KB FOR THE LIMESTONE, 5 KB FOR
THE SANDSTONE. THIS CRUSHING GREATLY DECREASES THE
STATIC MODULUS BUT CHANGES THE ACOUSTIC MODULUS ONLY
SLIGHTLY. A PECULIAR KNEE DEVELOPS IN THE VELOCITY
CURVE NEAR THE PRESSURE OF THE CRUSH-UP AND APPEARS
TO BE AN INDICATOR OF IT. THE RESULTS SUGGEST THAT
VOLUME MEASUREMENTS OF ELASTIC CONSTANTS ARE TO BE
PREFERRED TO ACOUSTIC MEASUREMENTS FOR EVALUATING
EXCAVATION OF ROCK. (AUTHOR)

(U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD-729 691 12/8
SOUTHWEST RESEARCH INST SAN ANTONIO TEX

PREPARATION OF CAPSULES.

(U)

DESCRIPTIVE NOTE: FINAL REPT. 1 AUG 70-31 JUL 71,
SEP 71 8P ADAMS, LEON M. ;
CONTRACT: N00014-71-C-0027
PROJ: NR-356-509, SWRI-01-2928-01

UNCLASSIFIED REPORT

DESCRIPTORS: (ENCAPSULATION, REVIEWS),
POLYVINYL ALCOHOL, PREPARATION, MATERIALS

(U)

A GOVERNMENT-FURNISHED MATERIAL WAS SUCCESSFULLY
ENCAPSULATED, AND A NUMBER OF SMALL VIALS OF THE
RESULTING CAPSULES WERE SUPPLIED TO THE OFFICE OF
NAVAL RESEARCH FOR TESTING. THE BEST CAPSULE
SHELL FORMULATION EVALUATED WAS PREDOMINANTLY
POLY(VINYL ALCOHOL). (AUTHOR)

(U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO, /ZZZHT

AD-770 908 11/1
NATIONAL CASH REGISTER CO DAYTON OHIO CAPSULAR PRODUCTS
RESEARCH AND DEVELOPMENT

DEVELOPMENT OF MULTIPURPOSE CAPSULAR ADHESIVE
SYSTEMS.

(U)

DESCRIPTIVE NOTE: FINAL REPT.,
MAY 71 60P PETERS, GAVIN H.; SCHAAB,
CARL K.; HILBELINK, RONALD D.; DAVIS, TERRY
R.;

CONTRACT: DAAA21-68-C-0581

MONITOR: PA TR-4215

UNCLASSIFIED REPORT

DESCRIPTORS: (*ADHESIVES, PLASTICS), EPOXY
PLASTICS, POLYESTER PLASTICS, AGING (MATERIALS),
ENCAPSULATION, STABILITY, UNDERWATER

(U)

A UNIQUE, POLYESTER-EPOXY ADHESIVE SYSTEM WAS DEVELOPED WHICH CURES VERY RAPIDLY UPON MIXING OF ITS TWO COMPONENTS AND ADHERES TO A MULTITUDE OF SUBSTRATES UNDER VARIOUS ENVIRONMENTAL CONDITIONS. EACH OF THE TWO LIQUID ADHESIVE COMPONENTS CAN BE ENCAPSULATED TO FORM 'PSEUDO SOLIDS'. MIXING TOGETHER OF THE TWO CAPSULAR COMPONENTS INTO THE PROPER RATIO FORMS A STABLE, 'ONE CAN,' DRY POWDER ADHESIVE THAT IS EASILY ACTIVATED UPON RUPTURE OF THE CAPSULES. THIS RAPID CURING CAPSULAR ADHESIVE SYSTEM, WITH ITS IMPROVED STABILITY, HANDLING AND LOGISTICS CHARACTERISTICS DUE TO ENCAPSULATION, WAS FURTHER CHARACTERIZED DURING THE SECOND PHASE OF THE PROGRAM. CAPSULAR ADHESIVE STABILITY WAS FOUND TO BE NINE MONTHS UNDER LABORATORY CONDITIONS WITH THE EPOXY COMPONENT BEING THE LIMITING FACTOR. SEVERAL FORMULATION VARIATIONS WERE MADE THAT AFFECTED CURE TIME, BOND STRENGTH AND ADHESION PROPERTIES. ENCAPSULATION OF EACH OF THE TWO COMPONENTS WAS EASILY SCALED UP THROUGH THE PILOT-PLANT STAGE. SEVERAL MECHANICAL ADHESIVE APPLICATOR DESIGNS WERE DEVELOPED AND EVALUATED FOR THE EXTRUSION AND APPLICATION OF BOTH THE CAPSULAR ADHESIVES AND THE SAME FORMULATIONS IN THEIR LIQUID, UNENCAPSULATED FORMS. (AUTHOR)

(U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD-804 551 9/1 9/5
RADIO CORP OF AMERICA SOMERVILLE N J ELECTRONIC COMPONENTS
AND DEVICES

TRANSISTOR, VHF, SILICON, POWER, LINEAR, 30-MHZ, 100
WATTS PEP. (U)

DESCRIPTIVE NOTE: FINAL REPT. 1 JUN 65-30 JUN 66,
DEC 66 123P ROSENZWEIG, R. ; CHANG, Z. F.

CONTRACT: DA-38-043-AMC-01387(E)
PROJ: DA-1E6-22001-A-056
MONITOR: ECOM 01387-F

UNCLASSIFIED REPORT

DESCRIPTORS: (*TRANSISTORS, *VERY HIGH FREQUENCY),
(*POWER AMPLIFIERS, *SILICON), ELECTRIC POWER
PRODUCTION, GAIN, MODULATION, DISTORTION,
CAPACITANCE, ELECTRICAL IMPEDANCE, RESISTORS,
STORAGE, LIFE EXPECTANCY, RADIOFREQUENCY
INTERFERENCE, ENCAPSULATION, SILICONE PLASTICS (U)

THIS REPORT DESCRIBES THE WORK PERFORMED IN THE
DEVELOPMENT AND FABRICATION OF A LINEAR AMPLIFIER
TRANSISTOR WITH A GOAL OF 100 WATTS PEP AT 30
MEGAHERTZ WITH -30 DB INTERMODULATION DISTORTION,
15-DB POWER GAIN, AND EFFICIENCY GREATER THAN 35
PERCENT. THE TRANSISTOR STRUCTURE INCORPORATES
DIFFUSED BALLAST RESISTANCE FOR SECOND-BREAKDOWN
PROTECTION. A TEMPERATURE-COMPENSATING DIODE HAS
BEEN PLACED INSIDE THE TRANSISTOR PACKAGE TO PROVIDE
CLASS AB BIAS-POINT CONTROL. THE PACKAGE IS A
UNIQUELY DESIGNED STUD PACKAGE HAVING SHORT, FLAT,
LOW INDUCTANCE, ISOLATED TERMINALS. THERE ARE FOUR
ISOLATED TERMINALS: THREE TERMINALS FOR THE
TRANSISTOR AND ONE TERMINAL FOR THE DIODE. THE
PILLET IS SEALED BY ENCAPSULATION IN A SILICON RESIN.
PERFORMANCE DATA ON THE SUBMITTED FINAL SAMPLES
REVEALS THAT 20 PERCENT OF THE TRANSISTORS WERE
CAPABLE OF ATTAINING THE MAJOR GOAL OF 100 WATTS
PEP WITH -30 DB INTERMODULATION DISTORTION.
MEDIAN POWER GAIN ON SAMPLE TRANSISTORS WAS 14 DB
AND COLLECTOR DIFFERENCES WERE NEAR 50 PERCENT. THE
DEVICE WAS CAPABLE OF 150 WATTS DISSIPATION AT ROOM
TEMPERATURE. (AUTHOR) (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD-815 470 9/5 13/8
GENERAL DYNAMICS/POMONA CALIF

CORROSION PREVENTION/DETERIORATION CONTROL IN
ELECTRONIC COMPONENTS AND ASSEMBLIES.

(U)

DESCRIPTIVE NOTE: FINAL SUMMARY ENGINEERING REPT.,
66 152P SPARLING, R. H. ;
REPT. NO. CR-6-347-958-001
CONTRACT: DA-01-021-AMC-12641(Z)
PROJ: DA-1400-A019

UNCLASSIFIED REPORT

DESCRIPTORS: (*ELECTRONIC EQUIPMENT; *CORROSION
INHIBITION); (*RELIABILITY(ELECTRONICS);
CORROSION INHIBITION); DEGRADATION, MATERIALS;
PROCESSING; SELECTION, ENVIRONMENT, PROTECTIVE
TREATMENTS, COATINGS, ENCAPSULATION, BONDING,
SOLDERING, WELDING, PACKAGING

(U)

THE PURPOSE OF THIS DOCUMENT IS TO FOCUS THE
ATTENTION OF DESIGNERS ON CORROSION AND THE
CONSEQUENT DEGRADATION OF RELIABILITY OF ELECTRONIC
ITEMS. THE REPORT POINTS OUT DANGEROUS
COMBINATIONS OF MATERIALS AND PROCESSES, EMPHASIZES
THE IMPORTANCE OF PROPER SELECTION OF MATERIALS, AND
PROVIDES THE DESIGNER WITH MODERN TECHNIQUES FOR
PREVENTION OF DETERIORATION. THE AIM OF THIS
REPORT IS NOT TO DICTATE DESIGN, BUT TO HELP THE
DESIGNER MEET ENVIRONMENTAL REQUIREMENTS.

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UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD-821 915 9/5 20/12
WESTERN ELECTRIC CO INC NEW YORK

MICROWAVE DIODE RESEARCH.

(U)

DESCRIPTIVE NOTE: REPT. NO. 26 (FINAL), 10 JUN 65-9
JUN 67,

OCT. 67 35P CICCOLELLA, D. F.; DE
LOACH, B. C.; JR.; MARINACCIO, L. P.; MISAWA,
T.; SMITH, K. D.;

CONTRACT: DA-28-043-AMC-01445(E)

PROJ: DA-1E6-22001-A-056

TASK: 1E6-22001-A-056-04

MONITOR: ECOM 01445-F

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: PREPARED IN COOPERATION WITH BELL
TELEPHONE LABS., INC., WHIPPANY, N. J.

DESCRIPTORS: (•AVALANCHE DIODES; •MICROWAVE
OSCILLATORS); MICROWAVE FREQUENCY, GERMANIUM,
SILICON, ENCAPSULATION, CRYSTAL OSCILLATORS,
MANUFACTURING METHODS

(U)

IDENTIFIERS: •IMPATT OSCILLATORS

(U)

THE WORK DESCRIBED IN THIS REPORT IS PART OF A
BROAD PROGRAM OF CONTINUING THEORETICAL AND
EXPERIMENTAL STUDIES TO ACHIEVE IMPROVED MICROWAVE
SEMICONDUCTOR DIODES AND COMBINATION MICROWAVE
DEVICES. OF IMMEDIATE PARTICULAR INTEREST IS THE
RESEARCH AND DEVELOPMENT EFFORT DIRECTED TOWARD
CLARIFYING THE RELATIONSHIP BETWEEN STRUCTURE AND
BEHAVIOR OF AVALANCHE TRANSIT-TIME DIODE OSCILLATORS
AND IMPROVING THEIR MICROWAVE PERFORMANCE. CHAPTER
1 DESCRIBES EXPERIMENTAL WORK PERFORMED IN AN EFFORT
TO OBTAIN MAXIMUM MICROWAVE CW OUTPUT FROM A SINGLE
ENCAPSULATION, SPECIFICALLY BY USE OF SEVERAL SMALL
SILICON WAFERS MOUNTED ON A COMMON PEDESTAL.
CHAPTER 2 EXPLORES, ANALYTICALLY AND BY
EXPERIMENTS, THE POSSIBILITIES OF OPERATING SEVERAL
AVALANCHE WAFERS IN PARALLEL FOR HIGHER POWER AND/OR
HIGHER EFFICIENCY. CHAPTER 3 SUMMARIZES AND PLACES
IN PERSPECTIVE THE RESULTS ACHIEVED IN TWO YEARS'
WORK ON THE PRESENT CONTRACT, WHICH HAS COVERED THE
EVOLUTION OF AN EXPERIMENTAL DEVICE INTO AN
EFFICIENT, RUGGED MICROWAVE SOURCE. (AUTHOR)

(U)

UNCLASSIFIED

ODC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD-822 016 9/5
WESTERN ELECTRIC CO INC NEW YORK

MICROWAVE DIODE RESEARCH.

(U)

DESCRIPTIVE NOTE: INTERIM REPT. NO. 4; 10 SEP 66-9 MAR 67;

OCT 67 JIP CICCOLELLA, D. F.; GIBBONS, G.; RULISON, R. L.;
CONTRACT: DA-28-042-AMC-01445(E)
PROJ: DA-1E6-22001-A-056
TASK: 1E6-22001-A-056-04
MONITOR: ECOM 01445-4

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: PREPARED IN COOPERATION WITH BELL TELEPHONE LABS., INC., WHIPPANY, N. J.

DESCRIPTORS: (*AVALANCHE DIODES, *MICROWAVE OSCILLATORS), THERMAL STRESSES, SILICON, ENCAPSULATION, RADIOFREQUENCY POWER, GERMANIUM, SUPERHIGH FREQUENCY, EFFICIENCY, THERMAL PROPERTIES, PACKAGING

(U)

IDENTIFIERS: IMPATT (IMPACT AVALANCHE TRANSIT TIME)

(U)

WORK ON THE FABRICATION AND TESTS OF IMPROVED SILICON IMPATT OSCILLATORS IS DESCRIBED IN CHAPTER I. EFFORT HAS BEEN CONCENTRATED ON THE P-N DIODE STRUCTURE BECAUSE OF ADVANTAGES IN PROCESS YIELD AND IN DIODE PERFORMANCE. A NEW AND MORE RUGGED ENCAPSULATION HAS BEEN USED FOR MOST OF THE DIODES FABRICATED IN THIS PERIOD; THIS FACILITATES CIRCUIT MOUNTING AND THERMAL DESIGN. IN THIS ENCAPSULATION A SINGLE SILICON DIODE HAS PROVIDED 1500-MW CW OUTPUT POWER, AND MANY UNITS IN THE 4-TO 6-GHZ RANGE HAVE GIVEN POWER OUTPUT GREATER THAN ONE WATT. FABRICATION AND TEST RESULTS OBTAINED WITH GERMANIUM P-N IMPATT DIODES, SUPPORTED IN PART BY THE PRESENT CONTRACT, ARE REPORTED IN CHAPTER II. THIS WORK HAS RESULTED IN THE HIGHEST CW EFFICIENCY (12.1 PERCENT) SO FAR OBTAINED WITH IMPATT DEVICES, AND CW POWER OUTPUT IN EXCESS OF 500 MW AT 6 GHZ. THERMAL DISSIPATION PROBLEMS ARE MORE SEVERE WITH GERMANIUM THAN SILICON; THE AVERAGE BURNOUT TEMPERATURE APPEARS TO BE ABOUT 150 C. (AUTHOR)

(U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD-823 785 15/2
STANFORD RESEARCH INST MENLO PARK CALIF

MICROENCAPSULATION.

(U)

DESCRIPTIVE NOTE: SPECIAL TECHNICAL REPT. NO. 17, APR
64-JUN 67,
JUN 67 94P BREEN, W. H. ; GIBSON, R.
W. ; RADDING, S. B. ; SIRINE, G. F. ; BROWN, A.
G. ;

CONTRACT: DA-18-035-AMC-122(A)
PROJ: SRI-PAU-4900
TASK: 1B522301A08101

UNCLASSIFIED REPORT

DESCRIPTORS: (*ENCAPSULATION, *CHEMICAL WARFARE
AGENTS), (*DISSEMINATION, CHEMICAL WARFARE
AGENTS), (*CS AGENTS, ENCAPSULATION),
POLYMERS, SOLUTIONS, POLYVINYL ALCOHOL,
COATINGS, DRYING, SPRAYS, AIR, SOLVENTS,
FREEZE DRYING

(U)

IDENTIFIERS: MICROENCAPSULATION

(U)

POTENTIAL CONTRIBUTIONS OF MICROENCAPSULATION TO
DISSEMINATION SYSTEMS INCLUDE REDUCTION OF AGENT-
HANDLING HAZARDS, PRESIZING, STABILIZATION BY
ISOLATION, PROTECTION FROM HOSTILE ENVIRONMENTS, AND
SUSTAINED RELEASE, AS WELL AS POSSIBILITIES FOR NEW
SYSTEMS BASED ON IMPACTION CAPSULES OR LARGE,
EXPLOSIVE-COATED, SELF-DISSEMINATING CAPSULES. IN
THIS PROGRAM ENCAPSULATION OF A WIDE RANGE OF ACTIVE
AND INACTIVE MATERIALS WAS CARRIED OUT USING NCR-
TYPE PROCESSES TO ASSESS REAL CAPABILITIES AND
LIMITATIONS FOR APPLICATIONS TO BOTH EXISTING AND NEW
DISSEMINATION SYSTEMS. GENERIC PROCEDURES WERE
DEVELOPED FOR ADAPTATION OF MICROENCAPSULATION TO NEW
MATERIALS, PRIMARILY USING GELATIN OR POLYVINYL
ALCOHOL (PVA) AS WALL MATERIALS, AND A VARIETY OF
SPECIAL SAMPLES WAS PREPARED FOR EVALUATION STUDIES
AT STANFORD RESEARCH INSTITUTE AND AT
EDGEWOOD ARSENAL. MAJOR EFFORTS WERE DEVOTED
TO PRODUCTION AND STUDY OF SUSTAINED- RELEASE
INHALABLE CAPSULES, 1-10 MICROONS IN DIAMETER,
PARTICULARLY IN RESPECT TO POSSIBILITIES FOR
PROLONGED-EFFECT CS. CS CAPSULES WITH BOTH
GELATIN AND PVA WALLS WERE PREPARED IN THIS SIZE
RANGE AND CS RELEASE INTO AQUEOUS MEDIA WAS SHOWN
TO BE CONTROLLABLE IN RATE OVER A RANGE TO TWO ORDERS
OF MAGNITUDE LESS THAN FOR NONCAPSULAR CS.

(U)

72

UNCLASSIFIED

/ZZZHT

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD-827 272 15/2 7/4
STANFORD RESEARCH INST MENLO PARK CALIF

RESEARCH STUDIES ON THE DISSEMINATION OF SOLID AND
LIQUID AGENTS. (U)

DESCRIPTIVE NOTE: FINAL REPT. APR 64-DEC 67,
DEC 67 138P POPPOFF, I. G. ; THUMAN, W.
C. ;

CONTRACT: DA-18-035-AMC-122(A)
PROJ: DA-18522301A081, SRI-PAU-4900
TASK: 18522301A08101

UNCLASSIFIED REPORT

DESCRIPTORS: (CHEMICAL WARFARE AGENTS,
DISSEMINATION), SOLIDS, LIQUIDS, AEROSOLS,
EXPLOSIVE MATERIALS, ELECTROSTATICS, DETONATIONS,
SHOCK WAVES, IGNITION, PYROTECHNICS, PYROLYSIS,
OXIDATION, DEGRADATION, CONDENSATION, ULTRASONIC
RADIATION, PNEUMATIC SYSTEMS, ENCAPSULATION,
HYDROLYSIS, EQUATIONS OF STATE, ENTROPY,
ATOMIZATION, POWDERS (U)

IDENTIFIERS: POINT-SOURCE DISSEMINATION (U)

THE OBJECTIVE OF THE PROGRAM WAS TO PROVIDE BASIC
INFORMATION NECESSARY FOR AN OVERALL IMPROVEMENT OF
CHEMICAL AGENT DISSEMINATION TECHNIQUES. STUDIES
WERE MADE OF EXPLOSIVE GENERATIONS OF AEROSOLS
(MECHANICS OF EXPLOSIVE PROCESSES; DETONATION,
SHOCK, AND REACTION PROCESSES; IGNITION PROCESSES;
COMMINUTION PROCESSES); THERMAL AND PYROTECHNIC
GENERATION OF AEROSOLS (THERMAL AND PYROTECHNIC
PROCESSES; PYROLYTIC AND OXIDATIVE DEGRADATION
PROCESSES; CONDENSATION PROCESSES); ULTRASONIC,
PNEUMATIC, AND ATOMIZATION PROCESSES; ELECTROSTATIC
PHENOMENA ASSOCIATED WITH AEROSOL PRODUCTION; THE
APPLICATION OF MICROENCAPSULATION TO AEROSOL
GENERATION AND ENHANCEMENT; AND NATURAL AEROSOL
GENERATION. A CRITICAL SUMMARY OF THE PROGRAM AND
RECOMMENDATIONS FOR FUTURE WORK IS FIRST PRESENTED.
THIS IS FOLLOWED BY A DISCUSSION OF ACCOMPLISHMENTS
AND RECOMMENDATIONS FOR FUTURE RESEARCH IN EACH OF
THE STUDY AREAS LISTED ABOVE, WITH REFERENCE TO
PROGRAM REPORTS (22 SPECIAL TECHNICAL REPORTS
AND 13 QUARTERLY PROGRESS REPORTS) FOR
DETAILS. (AUTHOR) (U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD-838 791 9/1 13/8
NAVAL AMMUNITION DEPOT CRANE IND

MICRO-NOTES. INFORMATION ON MICROELECTRONICS FOR
NAVY EQUIPMENTS.

(U)

AUG 68 53P
REPT. NO. NAD-CR-MICRO NOTES-25
MONITOR: IDEP 515.00.00.00-X9-11

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: SPONSORED BY NAVAL AIR SYSTEMS
COMMAND, WASHINGTON, D. C. AND NAVAL ELECTRONICS
SYSTEM COMMAND, WASHINGTON, D. C.

DESCRIPTORS: (*NAVAL EQUIPMENT;
*MICROMINIATURIZATION(ELECTRONICS));
(*SEMICONDUCTOR DEVICES, *ENCAPSULATION);
RELIABILITY(ELECTRONICS), EPOXY PLASTICS,
TRANSISTORS, SEMICONDUCTORS, MILITARY
REQUIREMENTS, INTEGRATED CIRCUITS, PLASTIC COATINGS,
REPORTS

(U)

CONTENTS: RELIABILITY ASSESSMENT OF EPOXY
TRANSISTORS; PRESENT RELIABILITY STATUS OF PLASTIC
- ENCAPSULATED SEMICONDUCTORS AND AN EVALUATION OF
THEIR POTENTIAL FOR USE IN MILITARY SYSTEMS;
SUMMARY OF SIGNETICS PRESENTATION INCLUDING
PROPOSED GENERAL SPECIFICATION; PLASTIC
SEMICONDUCTORS; WESTINGHOUSE GOLDDIOLX INTEGRATED
CIRCUITS OFFER MILITARY RELIABILITY IN PLASTIC
PACKAGES; PLASTICS FOR SEMICONDUCTOR PACKAGING;
RELIABILITY OF PLASTIC INTEGRATED CIRCUITS; G-12
REPORT ON 'PLASTIC' INTEGRATED CIRCUITS; PLASTIC/
EPOXY SEMICONDUCTORS; USE OF PLASTIC ENCAPSULATED
TRANSISTORS AT HAZELTINE; AN EVALUATION OF
PLASTIC ENCASED SEMICONDUCTORS; SELECTION AND
CONTROL OF PLASTICS FOR SEMICONDUCTOR PACKAGING;
PLASTIC MICROCIRCUIT RELIABILITY; SUMMARY OF
PRESENTATION ON PLASTIC ENCAPSULATED TRANSISTORS;
SUMMARY OF PRESENTATION ON PLASTIC ENCAPSULATED
TRANSISTORS; POSITION OF THE NAVAL APPLIED
SCIENCE LABORATORY ON THE MILITARY USE OF PLASTIC
ENCAPSULATED SEMICONDUCTOR DEVICES; AN R AND D
PROGRAM TO DEVELOP POLYMERIC ENCAPSULANTS FOR SOLID
STATE ELECTRONIC COMPONENTS.

(U)

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD-846 071 9/1 13/8
NAVAL AMMUNITION DEPOT CRANE IND

MICRO NOTES. INFORMATION ON MICROELECTRONICS
FOR NAVY EQUIPMENTS.

(U)

JAN 69 82P
REPT. NO. NAD-CR-MICRO NOTES-27
MONITOR: IDEP 515.00.00.00-X9-13

UNCLASSIFIED REPORT

DESCRIPTORS: (*NAVAL EQUIPMENT;
*MICROMINIATURIZATION(ELECTRONICS));
(*SEMICONDUCTOR DEVICES, *ENCAPSULATION),
RELIABILITY(ELECTRONICS), EPOXY PLASTICS,
TRANSISTORS, SEMICONDUCTORS, INTEGRATED CIRCUITS,
PLASTIC COATINGS, REPORTS

(U)

IDENTIFIERS: AN/AWS-27, METAL OXIDE
SEMICONDUCTORS, AVIONICS

(U)

THE REPORT IS AN EFFORT TO DISSEMINATE INFORMATION
ON EVALUATION, APPLICATION, AVAILABILITY, RESEARCH
AND DEVELOPMENT, AND STANDARDIZATION ACTIVITY
PERTAINING TO STATE-OF-THE-ART MICROELECTRONIC
CIRCUITS, DEVICES, AND MATERIALS, WITH A VIEW TOWARD
AVOIDING DUPLICATION OF EFFORT AND MAKING MAXIMUM USE
OF TECHNICAL RESOURCES. (AUTHOR)

(U)

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DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD-849 285 11/4 20/13
MONSANTO RESEARCH CORP ST LOUIS MO

RHEOLOGY OF ROD-LIKE PARTICLES IN VISCOUS
MEDIA. PART I. FORMATION OF COMPOSITES
FROM SINGLE FIBERS;

(U)

FEB. 69 46P TAKANO, MASAHARU ;
REPT. NO. N00014-67-C-0218
CONTRACT: N00014-66-C-0218, ARPA ORDER-873
PROJ: NR-356-484

UNCLASSIFIED REPORT

SUPPLEMENTARY NOTE: REPORT ON MONSANTO/WASHINGTON
UNIV., ARPA ASSOCIATION PROJECT DEVELOPMENT OF HIGH
PERFORMANCE COMPOSITES.

DESCRIPTORS: (COMPOSITE MATERIALS, MANUFACTURING
METHODS), GRAPHITE, BORON, CARBON FIBERS,
FIBERS, GLASS TEXTILES, RHEOLOGY, ANISOTROPY,
SCATTERING, MATHEMATICAL MODELS, ENCAPSULATION,
MECHANICAL PROPERTIES, DENSITY, EPOXY PLASTICS,
SOLVENTS

(U)

THE TECHNIQUE DEVELOPED FOR PREPARING MOLDING
COMPOUNDS OF HIGH MODULUS FIBERS BY ENCAPSULATING
BUNDLES OF SHORT FIBERS WITH RESIN IS DIFFICULT TO
APPLY TO INDIVIDUALLY DISPERSED FIBERS.
PRELIMINARY MODEL STUDIES CARRIED OUT ON SHORT
GLASS FIBERS HAVE DEMONSTRATED THAT THE CRITICAL
CONCENTRATION FOR PROCESSING SINGLE FIBERS, RATHER
THAN FIBER BUNDLES, IS VERY LOW IN AQUEOUS SYSTEMS,
BUT CAN BE SIGNIFICANTLY INCREASED BY USE OF VISCOUS
MEDIA AND HIGH RATES OF SHEAR. (AUTHOR)

(U)

UNCLASSIFIED

DDC REPORT BIBLIOGRAPHY SEARCH CONTROL NO. /ZZZHT

AD-854 306 9/1
AUTONETICS ANAHEIM CALIF

INVESTIGATION OF PLASTIC EFFECTS ON
SEMICONDUCTOR RELIABILITY.

(U)

DESCRIPTIVE NOTE: FINAL REPT., 22 DEC 67-31 DEC 68,
MAY 69 IGIP VALLES, A. C. ; ANDERSON, R.

J. ;

REPT. NO. C8-387/501

CONTRACT: F30602-68-C-0125

PROJ: AF-5519

TASK: 551904

MONITOR: RADC, IDEP

TR-69-82,742.00.00.00-F9-01

UNCLASSIFIED REPORT

DESCRIPTORS: (*TRANSISTORS,
RELIABILITY(ELECTRONICS)), (*EMBEDDING
SUBSTANCES, CHEMICAL CONTAMINATION), TRANSISTORS,
EPOXY PLASTICS, SILICONE PLASTICS, IMPURITIES,
IONS, FAILURE(ELECTRONICS), STRESSES,
ENCAPSULATION

(U)

THE OBJECTIVE OF THE PROGRAM WAS TO STUDY THE
EFFECTS PRODUCED WHEN IONS PURPOSELY WERE INTRODUCED
INTO PLASTICS AND USED ON TRANSISTORS. A MATERIALS
SURVEY RESULTED IN THE SELECTION OF SEVERAL CANDIDATE
HIGH PURITY EPOXY RESINS AND SEMICONDUCTOR GRADE
SILICONE COATINGS. THESE PLASTICS WERE THEN
SCREENED USING MECHANICAL, PHYSICAL, AND CHEMICAL
TESTS. ONE EPOXY AND ONE SILICONE WERE SELECTED
FOR FURTHER FUNCTIONAL TESTING AS SEMICONDUCTOR
COATINGS. A METHOD WAS DEVELOPED FOR DOPING THE
TWO SELECTED RESINS WITH IONS BY DISPERSING THEREIN
METAL SALTS OF ORGANIC ACIDS OF ORGANO-METALLIC
COMPOUNDS. DOPANTS WERE ORGANIC SALTS OF SODIUM,
MAGNESIUM, ZINC, OR AN ORGANO-METALLIC COMPOUND
CONTAINING CHLORIDE IONS. THE DOPED PLASTICS WERE
THEN APPLIED AND CURED OVER TEST NPN TRANSISTORS.
THE EFFECTS OF EACH ION ON THE TRANSISTOR
PARAMETERS WERE ASCERTAINED AFTER SUBJECTING THE
DEVICES TO ELEVATED TEMPERATURE-REVERSE BIAS AND HIGH
HUMIDITY REVERSE BIAS STRESSES. (AUTHOR)

(U)

77

UNCLASSIFIED

/ZZZHT

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CORPORATE AUTHOR - MONITORING AGENCY

*AIR FORCE CAMBRIDGE RESEARCH LABS L G
HANSCOM FIELD MASS

AFCRL-71-0151
MICROENCAPSULATED CLOUD SEEDING
MATERIALS.
AD-722 448

*AIR FORCE OFFICE OF SCIENTIFIC
RESEARCH ARLINGTON VA

AFOSR-1001
ANALOG COMPUTER RESEARCH INTO
THE ENERGY-EXCHANGE BETWEEN GASES
AND SOLIDS.
AD-605 159

*AIR FORCE WEAPONS LAB KIRTLAND AFB N
MEX

AFWL-TR-64-167
ENCAPSULATION OF VIRUSES.
AD-620 933

*ARMY ELECTRONICS COMMAND FORT
MONMOUTH N J

ECOM-01387-F
TRANSISTOR, VHF, SILICON,
POWER, LINEAR, 30-MHZ, 100 WATTS
PEP.
AD-804 551

ECOM-01424-2
LOW COST INTEGRATED CIRCUIT
TECHNIQUES.
AD-631 491

ECOM-01424-3
LOW COST INTEGRATED CIRCUIT
TECHNIQUES.
AD-635 183

ECOM-01445-F
MICROWAVE DIODE RESEARCH.
AD-821 915

ECOM-01445-4
MICROWAVE DIODE RESEARCH.
AD-822 016

ECOM-01524-4
RESISTORS FOR MICROPOWER
CIRCUITS.
AD-489 906

ECOM-2879
PRELIMINARY INVESTIGATION OF
PLASTIC ENCAPSULATED TRANSISTORS.
AD-660 349

ECOM-3410
1.5-KW SOLID-STATE POWER
CYCLER.
AD-726 018

*ARMY ELECTRONICS LABS FORT MONMOUTH N
J

ER E 1101
ENCAPSULATING RESINS AND
POTTING COMPOUNDS
AD-096 112

*ARMY NATICK LABS MASS FOOD LAB

FL-133
DEVELOPMENT OF A STABLE
LEAVENING SYSTEM FOR BAKERY MIXES.
(USA-NLABS-TR-71-54-FL)
AD-727 680

*ARMY NATICK LABS MASS

USA-NLABS-TR-71-54-FL
DEVELOPMENT OF A STABLE
LEAVENING SYSTEM FOR BAKERY MIXES.
AD-727 680

*AUTONETICS ANAHEIM CALIF

C8-387/501
INVSTIGATION OF PLASTIC
EFFECTS ON SEMICONDUCTOR
RELIABILITY.
(RADC-TR-6C-82)
AD-854 306

*BATTELLE MEMORIAL INST COLUMBUS OHIO
COLUMBUS LABS

THE EFFECT OF FLUIDS AND CYCLIC

UNCLASSIFIED

BEL-GEN

LOADING ON THE ELASTIC CONSTANTS OF
ROCKS.
AD-729 680

*BELL TELEPHONE LABS INC WHIPPANY N J
* * *
ENGINEERING SERVICES ON
TRANSISTORS
AD-261 938

*BUREAU OF NAVAL WEAPONS WASHINGTON D
C
* * *
NAVWEPS-7604
EFFECT OF PROCESS VARIABLES ON
THE DIMENSIONS AND QUALITY OF
EXTRUSION-COATED PROPELLANT GRAINS
AD-255 962

*CLEVITE TRANSISTOR PRODUCTS WALTHAM
MASS
* * *
PRODUCTION ENGINEERING MEASURE
FOR THE IMPROVEMENT OF GERMANIUM
ALLOY POWER TRANSISTORS.
AD-604 196

*DEFENSE DOCUMENTATION CENTER
ALEXANDRIA VA
* * *
DDC-TAS-70-39-1
PACKAGED CIRCUITS. VOLUME I.
AD-704 925

*DEPUTY COMMANDER AEROSPACE SYSTEMS
INGLEWOOD CALIF
* * *
DCAS-TDR62 5
CRYSTAL GROWTH AND
CRYSTALLOGRAPHY. A LITERATURE
SURVEY
AD-274 642

* * *
TDR62 5
CRYSTAL GROWTH AND
CRYSTALLOGRAPHY. A LITERATURE
SURVEY
(DCAS-TDR62 5)
AD-274 642

*DOUGLAS AIRCRAFT CO INC SANTA MONICA

CALIF MISSILE AND SPACE SYSTEMS
DIV

* * *
SM-48410
STRESS ANALYSIS OF
ENCAPSULATION MATERIALS FOR WELDED
MODULES,
AD-628 833

*ELECTRONIC SYSTEMS DIV L G HANSCOM
FIELD MASS
* * *
ESD-TDR-64-630
LEAD ATTACHMENT AND
ENCAPSULATION TECHNIQUES FOR THIN
FILM MICROCIRCUITS,
AD-611 752

*GENERAL DYNAMICS/CONVAIR SAN DIEGO
CALIF
* * *
GDC-BTD67-144
THERMAL ANALYSIS. ADVANCED
AUTOPILOT FLATPAK MODULE DESIGN
RECOMMENDATIONS,
(SAMSO-TR-71-86)
AD-722 405

*GENERAL DYNAMICS/POMONA CALIF
* * *
CR-6-347-958-001
CORROSION
PREVENTION/DETERIORATION CONTROL IN
ELECTRONIC COMPONENTS AND
ASSEMBLIES.
AD-815 470

*GENERAL ELECTRIC CO SYRACUSE N Y
* * *
OPTIMIZATION OF THERMOELECTRIC
ENERGY CONVERTERS
AD-265 461

* * *
OPTIMIZATION OF THERMOELECTRIC
ENERGY CONVERTERS
AD-265 857

*GENERAL ELECTRIC CO UTICA N Y
* * *
RESEARCH AND DEVELOPMENT OF
THERMOCOUPLE ENERGY CONVERTERS

UNCLASSIFIED

GEN-JOH

AD-251 485

*GENERAL MOTORS CORP KOKOMO IND DELCO
ELECTRONICS DIV

RELIABILITY EVALUATION OF
PLASTIC INTEGRATED CIRCUITS.
(RADC-TR-71-8)

AD-722 043

*GENERAL MOTORS CORP KOKOMO IND DELCO
RADIO DIV

RELIABILITY EVALUATION OF
PLASTIC INTEGRATED CIRCUITS.
(RADC-TR-69-451)

AD-703 292

*GOVERNMENT-INDUSTRY DATA EXCHANGE
PROGRAM

GIDEP-515.00.00.00-F9-10
RELIABILITY EVALUATION OF
PLASTIC INTEGRATED CIRCUITS.
AD-722 043

*HARRY DIAMOND LABS WASHINGTON D C

TR-1308
LOW-LOSS STYRENE-TYPE FOAM-IN-
PLACE ENCAPSULATING RESINS,
AD-628 537

*INTERAGENCY DATA EXCHANGE PROGRAM

IDEP-501.32.19.45-S6-01
THE IMPROVEMENT OF
ENCAPSULATING FOAMS AND QUALITY
ASSURANCE OF POTTING PLASTIC.
AD-646 915

IDEP-515.00.00.00-F9-01
FAILURE MECHANISMS IN PLASTIC
ENCAPSULATED MICROCIRCUITS.
AD-689 224

IDEP-515.00.00.00-X9-10
MICRO-NOTES. INFORMATION ON
MICROELECTRONICS FOR NAVY
EQUIPMENTS.
AD-571 797

IDEP-515.00.00.00-X9-11
MICRO-NOTES. INFORMATION ON
MICROELECTRONICS FOR NAVY
EQUIPMENTS.
AD-838 791

IDEP-515.00.00.00-X9-13
MICRO NOTES. INFORMATION ON
MICROELECTRONICS FOR NAVY
EQUIPMENTS.
AD-846 071

IDEP-742.00.00.00-F9-01
INVESTIGATION OF PLASTIC
EFFECTS ON SEMICONDUCTOR
RELIABILITY.
AD-854 306

*INTERAGENCY DATA EXCHANGE PROGRAM

IDEP-515.00.00.00-F9-07
RELIABILITY EVALUATION OF
PLASTIC INTEGRATED CIRCUITS.
AD-703 292

*ITT SEMICONDUCTOR PRODUCTS LABS PALO
ALTO CALIF

FOUR-LAYER DIODE DEVELOPMENT
PROGRAM.
(RADC-TR-68-136)
AD-669 850

*JOHNS HOPKINS UNIV BALTIMORE MD

ANALOG COMPUTER RESEARCH INTO
THE ENERGY-EXCHANGE BETWEEN GASES
AND SOLIDS.
(AFOSR-1001)
AD-605 159

*JOHNS HOPKINS UNIV SILVER SPRING MD
APPLIED PHYSICS LAB

TG-817
THE IMPROVEMENT OF
ENCAPSULATING FOAMS AND QUALITY
ASSURANCE OF POTTING PLASTIC.
(IDEP-501.32.19.45-S6-01)
AD-646 915

0-3

UNCLASSIFIED

LOC-NAV

UNCLASSIFIED

*LOCKHEED MISSILES AND SPACE CO
SUNNYVALE CALIF

* * *

MRI267 01
VACUUM DE-GASSING OF
ENCAPSULANTS,
AD-412 282

* * *

SB 61 50
ENCAPSULATING, POTTING, AND
EMBEDDING MATERIALS FOR ELECTRONIC
COMPONENTS AND MODULES. AN
ANNOTATED BIBLIOGRAPHY
AD-265 866

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SB62 433 80 62 28
INSPECTING AND TESTING OF
EMBEDDING MATERIALS AND COMPONENTS
OF ELECTRICAL MODULES BEFORE,
DURING AND AFTER ASSEMBLY: A
PARTIALLY ANNOTATED BIBLIOGRAPHY
AD-296 356

*MCDONNELL AIRCRAFT CORP ST LOUIS MO

* * *

9354
ELECTRICAL POTTING COMPOUNDS -
SURFACE AND VOLUME RESISTIVITY AT
ELEVATED TEMPERATURES FOR
PROTRACTED TIMES (PHASE 11:
ELECTRICAL TESTS)
AD-295 538

*MITRE CORP BEDFORD MASS

* * *

W-6353
LEAD ATTACHMENT AND
ENCAPSULATION TECHNIQUES FOR THIN
FILM MICROCIRCUITS,
(ESD-TDR-64-630)
AD-611 752

*MONSANTO RESEARCH CORP ST LOUIS MO

* * *

200014-67-C-0218
RHEOLOGY OF ROD-LIKE PARTICLES
IN VISCOUS MEDIA. PART I.
FORMATION OF COMPOSITES FROM SINGLE
FIBERS,
AD-849 285

*MOTOROLA INC SCOTTSDALE ARIZ

* * *

4003
MINIATURE THIN FILM INDUCTORS
(MODIFICATION NO. 2).
AD-602 270

*NATIONAL CASH REGISTER CO DAYTON
OHIO CAPSULAR PRODUCTS RESEARCH
AND DEVELOPMENT

* * *

DEVELOPMENT OF MULTIPURPOSE
CAPSULAR ADHESIVE SYSTEMS.
(PA-TR-4215)
AD-730 908

*NATIONAL CASH REGISTER CO DAYTON
OHIO CAPSULAR RESEARCH AND PRODUCT
DEVELOPMENT DEPT

* * *

ENCAPSULATION OF VIRUSES.
(AFWL-TR-64-167)
AD-620 933

* * *

MICROENCAPSULATED CLOUD SEEDING
MATERIALS.
(AFCRL-71-0151)
AD-722 443

*NATIONAL CASH REGISTER CO DAYTON
OHIO

* * *

A STUDY OF THE ENCAPSULATION
APPLICABLE TO LIQUID ROCKET FUEL
AD-265 894

* * *

A STUDY OF THE ENCAPSULATION
APPLICABLE TO LIQUID ROCKET FUEL
AD-265 895

* * *

A STUDY OF THE ENCAPSULATION OF
HIGH ENERGY SUBSTANCES.
AD-601 772

*NAVAL AIR ENGINEERING CENTER
PHILADELPHIA PA ENGINEERING DEPT
(SI)

* * *

NAEC-ENG-7683
A STUDY IN TERMINAL BENDING OF
UNIFORM AND ENCAPSULATED WIRE ROPE

0-4

UNCLASSIFIED

UNCLASSIFIED

NAV-PIC

WITH LINEAR AND NON-LINEAR
CONSTITUTIVE EQUATIONS,
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DOCUMENT CONTROL DATA - R & D

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

1. ORIGINATING ACTIVITY (Corporate author) DEFENSE DOCUMENTATION CENTER Cameron Station Alexandria, Virginia 22314		2a. REPORT SECURITY CLASSIFICATION UNCLASSIFIED	
3. REPORT TITLE ENCAPSULATION		2b. GROUP	
4. DESCRIPTIVE NOTES (Type of report and inclusive dates) Bibliography (October 1955 - September 1971)			
5. AUTHOR(S) (First name, middle initial, last name)			
3. REPORT DATE May 1972		7a. TOTAL NO. OF PAGES 114	7b. NO. OF REFS 77
8a. CONTRACT OR GRANT NO.		9a. ORIGINATOR'S REPORT NUMBER(S) DDC-TAS-72-19-I	
8b. PROJECT NO.		9b. OTHER REPORT NO(S) (Any other numbers that may be assigned this report) AD- 740 990	
10. DISTRIBUTION STATEMENT Approved for public release; distribution unlimited			
11. SUPPLEMENTARY NOTES		12. SPONSORING MILITARY ACTIVITY	
13. ABSTRACT Encapsulation used as a protective covering for electronic circuits, insulation from moisture and heat, and lacquer film and thin film coatings of capacitors, is the subject of this bibliography. References dealing with failures, cracks, and deterioration effects are amply represented. Corporate Author-Monitoring Agency, Subject, Title, and Personal Author Indexes are included.			

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14. KEY WORDS	LINK A		LINK B		LINK C	
	ROLE	WT	ROLE	WT	ROLE	WT
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