1/2   008   UNCLASSIFIED   PROCESSING DATE--11SEP70
TITLE--KINETICS OF SYNTAN TANNING -U-

AUTHOR--ZAKHAROV, M.P.

COUNTRY OF INFO--USSR

SOURCE--KOZH., OBUV. PROM. 1970, 12(1) 32-3

DATE PUBLISHED-------70

SUBJECT AREAS--MATERIALS

TOPIC TAGS--CHROMIUM COMPOUND, TANNING MATERIAL, LEATHER/(U)FB2 SYNTAN

CONTROL MARKING--NO RESTRICTIONS

DOCUMENT CLASS--UNCLASSIFIED
PROXY REEL/FRAME--1989/0189   STEP NO--UR/0498/70/012/001/0032/0033

CIRC ACCESSION NO--AP0106845
                UNCLASSIFIED

CIRC ACCESSION NO--AP0106845   UNCLASSIFIED   PROCESSING DATE--11SEP70

ABSTRACT/EXTRACT--(U) GP-0-   ABSTRACT. LEATHER WAS CHROME TANNED,
0.6PERCNET CR SUB2 O SUB3 BY WT. OF HIDE BEING USED, WITH SULFITE PULP
EXT. ADDED TO THE TANNING BATH. THE LEATHER WAS TREATED WITH 28PERCENT
BY WT. OF HIDES OF SPS AND FB-2 SYNTANS IN A 4:1 RATIO. SIX HR AFTER
THE BEGINNING OF SYNTAN TREATMENT 7.4PERCENT K ALUM HAS ADDED TO THE
TANNING BATH. THE PROGRESS OF TANNING WAS ESTIMATED BY DETN. OF THE
"WELDING TEMP." (A MEASURE OF THE CHEM. AFFINITY OF THE TANNING AGENT TO
COLLAGEN) AND THE EXTN OF CR SBU2 O SUB3 FROM THE LEATHER BY SYNTANS WAS
DETD. AN INCREASE IN WELDING TEMP. FROM SIMILAR TO 55 TO 86DEGREES.
OCCURRED MAINLY DURING CHROMING.   DURING SYNTAN TREATMENT, SIMILAR TO
25DEGREES OF THE CR SUB2 O SUB3 WAS EXTD. FROM THE LEATHER. A SIMILAR
EXTN. OF CR SUB2 O SUB3 OCCURRED DURING TANNING OF CHROMED LEATHER WITH
TANNIDES; THE DEGREE OF EXTN. INCREASED WITH INCREASING AMT. OF CR SUB2
O SUB3 IN THE LEATHER. DURING SYNTAN TREATMENT, THE EXTN. OF CR SUB2 O
SUB3 WAS COMPENSATED FOR BY INTRODUCTION OF AL COMPDS. INTO THE LEATHER.

UNCLASSIFIED

1/2   027   UNCLASSIFIED   PROCESSING DATE--23OCT70
TITLE--STUDY OF THE TERNARY DIAGRAM COPPER, IRON, TITANIUM -U-

AUTHOR-(03)-KHAN, M.G., ZAKHAROV, A.M., ZAKHAROV, M.V.

COUNTRY OF INFO--USSR

SOURCE--ISVETNAIA METALLURGIIA, VOL. 13 NO 1 1970 P 104-109

DATE PUBLISHED-------70

SUBJECT AREAS--MATERIALS

TOPIC TAGS--COPPER ALLOY, IRON ALLOY, TITANIUM ALLOY, BIBLIOGRAPHY,
  THERMAL ANALYSIS, INTERMETALLIC COMPOUND, ELECTRIC RESISTANCE,
  SOLUBILITY, TERNARY ALLOY, CARBON

CONTROL MARKING--NO RESTRICTIONS

DOCUMENT CLASS--UNCLASSIFIED
PROXY REEL/FRAME--1998/0444   STEP NO--UR/0149/70/013/001/0104/0109

CIRC ACCESSION NO--AP0121118
                         UNCLASSIFIED

UNCLASSIFIED   PROCESSING DATE--23OCT70

CIRC ACCESSION NO--AP0121118
ABSTRACT/EXTRACT--(U) GP-0- ABSTRACT. STUDY OF THE TERNARY SYSTEM
CU-FE-TI CONTAINING TO 5PERCENT FE AND TO 5PERCENT TI, USING
MICROSCOPIC, X RAY, AND THERMAL ANALYSES, MEASUREMENTS OF MICROHARDNESS
AND ELECTRICAL RESISTIVITY, AND MAGNETOMETRY.   ISOTHERMAL SECTIONS OF
THIS SYSTEM ARE CONSTRUCTED FOR 650, 850, AND 900DEGC; THE QUASI BINARY
SYSTEM CU-TIFE2 IS ALSO STUDIED. THE SOLVUS LINE OF THE INTERMETALLIC
COMPOUND IN COPPER IS DETERMINED. IT IS FOUND THAT THE MAXIMUM
SOLUBILITY OF TIFE2 IN COPPER AT 1095DEG C IS ABOUT 2PERCENT AND
DECREASES TO 0.4PERCENT AT 650DEGC.   FACILITY: MOSKOVSKII
INSTITUT STALI I SPLAVOV, MOSCOW, USSR.

UNCLASSIFIED

1/2   048   UNCLASSIFIED   PROCESSING DATE--27NOV70
TITLE--PRINCIPLES OF ALLOYING HEAT RESISTANT ELECTRICALLY CONDUCTING
  COPPER AND ALUMINIUM ALLOYS -U-
AUTHOR--ZAKHAROV, M.V.

COUNTRY OF INFO--USSR

SOURCE--IZVEST. V.U.Z. TSVETNAYA MET., 1970, (2), 111-119

DATE PUBLISHED-------70

SUBJECT AREAS--MATERIALS

TOPIC TAGS--ELECTRIC CONDUCTOR, COPPER ALLOY, ALUMINUM ALLOY, PHASE
  DIAGRAM, BORON, DUCTILITY, SURFACE ACTIVE AGENT, HIGH TEMPERATURE ALLOY

CONTROL MARKING--NO RESTRICTIONS

DOCUMENT CLASS--UNCLASSIFIED
PROXY REEL/FRAME--3003/1490   STEP NO--UR/0149/70/000/002/0111/0119

CIRC ACCESSION NO--AT0130419
                            UNCLASSIFIED

CIRC ACCESSION NO--AT0130419   UNCLASSIFIED   PROCESSING DATE--27NOV70

ABSTRACT/EXTRACT--(U) GP-0- ABSTRACT. THE GENRAL PRINCIPLES UNDERLYING THE PREPARATION OF HIGH TEMP. CU AND AL ALLOYS FOR ELECTRICAL CONDUCTORS ARE DESCRIBED AND DISCUSSED. ALLOYS LYING ON OR NEAR THE QUASI BINARY SECTIONS OF THE CORRESPONDING MULTIPLE PHASE DIAGRAMS TEND TO BE THE BEST IN THIS RESPECT. ALLOYING ADDITIONALLY WITH SURFACE ACTIVE ELEMENTS SUCH AS B SUBSTANTIALLY INCREASES THE DUCTILITY AS WELL AS THE ELECTRICAL CONDUCTIVITY WITHIN A LIMITED TEMP. RANGE. TWO NEW GROUPS OF ELECTRICALLY CONDUCTING, HIGH TEMP. ALLOYS HAVE BEEN DEVELOPED ON THE BASIS OF THESE GENERAL PRINCIPLES.

UNCLASSIFIED

USSR

UDC 548.52

BEREZHKOVA, G. V., TSVETKOVA, I. N., ZAKHAROV, N. D., ROZHANSKIY, V. N., and KORYUKIN, V. I., Institute of Crystallography, Academy of Sciences USSR

"Growth Mechanisms of AlN Whiskers"

Moscow, Kristallografiya, Vol 16, No 5, Sep-Oct 71, pp 978-981

Abstract: The article describes results of a study of AlN whisker growth under isothermal conditions during the reduction of aluminum oxide with simultaneous nitration. The whiskers were grown in a horizontal graphite furnace in a flow of commercial nitrogen from an Al_2O_3 charge at 1950-1980° C. The resultant specimens were studied in a scanning and a transmission electron microscope and their brittle strength measured at room temperature. The results indicate both top growth from the vapor phase and bottom growth from the melt. In neither case is the presence of an axial screw dislocation a necessary condition for crystallization in whisker form. The article discusses possible growth mechanisms.

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1/2   009

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TITLE--EFFECT OF THE TRANSITION LAYER AT THE RUBBER-RUBBER INTERFACE ON THE COHESIVE ENERGY DENSITY AND ADHESION BETWEEN LAYERS OF VULCANIZATES

PROCESSING DATE--16OCT70

AUTHOR-(04)-OREKHOV, S.V., ZAKHAROV, N.D., KULEZNEV, V.N., DOGADKIN, B.A.

COUNTRY OF INFO--USSR

SOURCE--KOLLOIDNYY ZHURNAL, 1970, VOL 32, NR 2, PP 245-250

DATE PUBLISHED------70

SUBJECT AREAS--MATERIALS

TOPIC TAGS--VULCANIZATE, ADHESION, ELASTOMER COHESION

CONTROL MARKING--NO RESTRICTIONS

DOCUMENT CLASS--UNCLASSIFIED

PROXY REEL/FRAME--1993/0397

STEP NO--UR/0069/70/032/002/0245/0250

CIRC ACCESSION NO--AP0113315

UNCLASSIFIED

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UNCLASSIFIED

PROCESSING DATE--16OCT70

ABSTRACT/EXTRACT--(U) GP-0- ABSTRACT. ADHESION BETWEEN RUBBERS HAS BEEN STUDIED FOR A NUMBER OF RUBBERS. ADHESION BETWEEN PLIED UP RUBBERS DEPENDS ON THE RATIO OF THEIR MOLAR COHESIVE ENERGIES AND CAN SERVE AS A QUALITATIVE CHARACTERISTIC OF THE THICKNESS OF THE TRANSITION LAYER FORMED DURING BLENDING OR PLYING UP OF RUBBERS. THE ADHESION BETWEEN VULCANIZATE LAYERS OF PLIED UP RUBBERS HAS BEEN DETERMINED BY STATIC AND DYNAMIC METHODS. THE DYNAMIC TEST RESULTS ARE IN QUALITATIVE AGREEMENT WITH THE DATA ON ADHESION OF UNCURED POLYMERS AND CAN BE USED TO ASSESS THE EFFECT OF THE TRANSITION LAYER ON CU VULCANIZATION OF RUBBERS. THE RELATIONSHIP BETWEEN THE COHESIVE ENERGY DENSITY AND THE COMPONENTS RATIO, DETERMINED FOR A NUMBER OF BLENDS, DEPENDS ON THE TRANSITION LAYER THICKNESS AND ON THE DIFFERENCE IN COHESIVE ENERGIES OF THE BLENDED RUBBERS.

UNCLASSIFIED

1/2   023

UNCLASSIFIED

PROCESSING DATE--16OCT70

TITLE--THERMAL BREAKDOWN OF RUBBER IN SUPERHEATED WATER VAPOR AT ATMOSPHERIC PRESSURE -U-

AUTHOR-(05)-MAKAROV, V.M., EPSHTEYN, V.G., ZAKHAROV, N.D., MAKAROV, M.R., KALOSHINA, A.V.

COUNTRY OF INFO--USSR

SOURCE--KAUCH. REZINA 1970, 29(2), 25-7

DATE PUBLISHED--------70

SUBJECT AREAS--MATERIALS

TOPIC TAGS--THERMAL DECOMPOSITION, STYRENE, WEAR RESISTANCE, SYNTHETIC RUBBER/(U)SKMS50ARKM15 STYRENE RUBBER

CONTROL MARKING--NO RESTRICTIONS

DOCUMENT CLASS--UNCLASSIFIED

PROXY REEL/FRAME--1993/0387

STEP NO--UR/0138/70/029/002/0025/0027

CIRC ACCESSION NO--AP0113305

UNCLASSIFIED

UNCLASSIFIED   PROCESSING DATE--16OCT70
CIRC ACCESSION NO--AP0113305
ABSTRACT/EXTRACT--(U) GP-0- ABSTRACT. THE STRAIN RELAXATION PARAMETERS
(V. M. MAKAROV, 1969) OF SYNTHETIC RECLAIMED RUBBER SKMS-30-ARKM-15
SHOWED THAT THE OPTIMUM TEMP. AND TIME OF RECLAIMING WITH SUPERHEATED
STEAM (M. M. MAKAROV, ET AL., 1962) WERE 300DEGREES AND 180 SEC WHEN
15PERCENT PETROLEUM OIL (MAZUT) WAS ADDED TO THE RUBBER. THE PRESENCE
OF MAZUT SLOWED THE CROSSLINKING OF THE RECLAIMED RUBBER WITHOUT
AFFECTING THE DEVULCANIZATION RATES. THE RECLAIMED RUBBER OBTAINED BY
THIS METHOD HAD BETTER HEAT STABILITY, WEAR RESISTANCE, AND FATIGUE
RESISTANCE THAN OTHER RECLAIMED RUBBERS.   FACILITY: YAROSLAV.
TEKHNOL. INST., YAROSLAVL, USSR.

UNCLASSIFIED

1/2   028
UNCLASSIFIED
TITLE--QUANTITATIVE STUDY OF CRYSTALLIZATION IN CHLOROPRENE RUBBERS AND
VULCANIZATES -U-
PROCESSING DATE--23OCT70

AUTHOR-(03)-KOSTRYKINA, G.I.; ZAKHAROV, N.D., EPSHTEYN, V.G.

COUNTRY OF INFO--USSR

SOURCE--ZAVOD. LAB. 1970, 36(2), 179-80

DATE PUBLISHED-------70

SUBJECT AREAS--MATERIALS

TOPIC TAGS--CRYSTALLIZATION, CHLOROPRENE, SYNTHETIC RUBBER, VULCANIZATE,
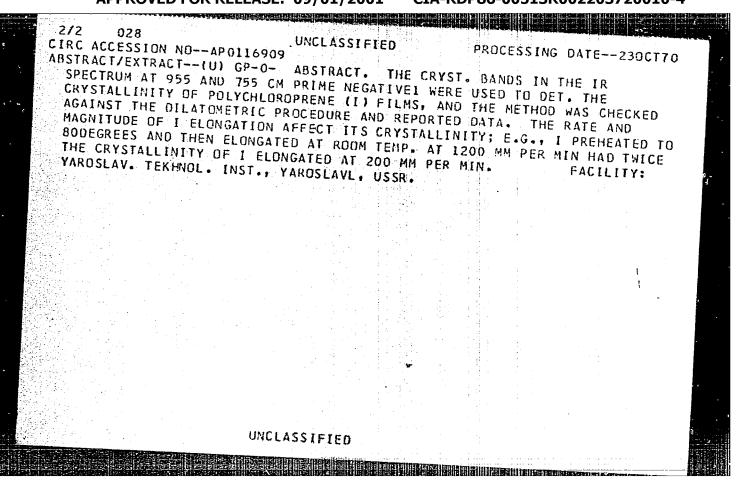IR SPECTRUM, ELONGATION

CONTROL MARKING--NO RESTRICTIONS

DOCUMENT CLASS--UNCLASSIFIED
PROXY REEL/FRAME--1995/1472

STEP NO--UR/0032/70/036/002/0179/0180

CIRC ACCESSION NO--AP0116909
UNCLASSIFIED

UNCLASSIFIED

CIRC ACCESSION NO--AP0116909

PROCESSING DATE--23OCT70

ABSTRACT/EXTRACT--(U) GP-0- ABSTRACT. THE CRYST. BANDS IN THE IR
SPECTRUM AT 955 AND 755 CM PRIME NEGATIVE1 WERE USED TO DET. THE
CRYSTALLINITY OF POLYCHLOROPRENE (I) FILMS, AND THE METHOD WAS CHECKED
AGAINST THE DILATOMETRIC PROCEDURE AND REPORTED DATA. THE RATE AND
MAGNITUDE OF I ELONGATION AFFECT ITS CRYSTALLINITY; E.G., I PREHEATED TO
80DEGREES AND THEN ELONGATED AT ROOM TEMP. AT 1200 MM PER MIN HAD TWICE
THE CRYSTALLINITY OF I ELONGATED AT 200 MM PER MIN.   FACILITY:
YAROSLAV. TEKHNOL. INST., YAROSLAVL, USSR.

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UDC: 8.74

ZAKHAROV, N. I.

"Concerning the Problem of Organizing Normative Data Blocks on Magnetic Tape"

V sb. Vychisl. mashiny i programmir. (Computers and Programming—collection of works), Moscow, 1971, pp 198-204 (from RZh-Kibernetika, No 6, Jun 72, Abstract No 6V516)

Translation: The following basic requirements are formulated for organizing data blocks: 1) the necessity for selecting an effective system of coding normative data; 2) the necessity for minimizing the volume of redundant data; 3) the necessity for optimizing the distribution of data blocks among the stages of the memory devices to minimize the quantity of normative data in the process of retrieval and alteration; 4) the possibility of recording and composing normatives of data blocks of any volumes (both from punched tape and from punched cards); 5) the possibility of checking all operations of organizing the data blocks on magnetic tapes; 6) the possibility of correcting normative data blocks recorded on magnetic tape. The general principles of constructing data blocks are defined in accordance with these requirements. A method is described for transferring normative data from punched cards of normative management to magnetic tape. It is

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ZAKHAROV, N. I., Vychisl. mashiny i programmir., Moscow, 1971, pp 198-204

noted that in organizing data blocks of normative information, it is es-
pecially important to provide for timely introduction of all changes which
arise in the process of improving technology and production technique. In
this regard, the following changes are possible in normative data blocks:
correction of outdated requisites of record; insertion of a new record;
removal of an outdated record. It is concluded that effective organization
of normative information on magnetic tapes and insertion of changes appre-
ciably reduces expenditures of work and time in utilizing automated produc-
tion management systems.

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USSR

ZAKHAROV, O. V., KOVALENKO, V. V., KOLOBASHKIN, V. M.

UDC: 53.07/.08+53.001.5

"Calculating the Gamma Radiation Dose Rate of a Gas Jet Propagating in the Ground Layer of the Atmosphere"

V sb. Vopr. dozimetrii i zashchity ot izluch. (Problems of Dosimetry and Radiation Shielding -- collection of works), vyp. 12, Moscow, Atomizdat, 1971, pp 94-97 (from RZh-Fizika, No 4, Apr 72, Abstract No 4A696)

Translation: The gamma radiation dose rate of a gas jet is calculated using data on distribution of the concentration of activity in the ground layer of the atmosphere. The results of the computation are presented in the form of the reduced dose rate created by the gamma radiation of a jet escaping from a source with a rate of 1 curie/s at a wind speed of 1 m/s for a long-lived isotope with $K_y = 1$ r·m²/hr·curie. The reduced dose rate depends weakly on the gamma radiation energy: in the energy range from 0.1 to 2.5 MeV it changes by ±30% from the value at $E = 1$ MeV. Accounting for the radioactive decay of isotopes with $T_{1/2} \geq 20$ min gives a correction to the dose rate calculated for long-lived isotopes of no more than 8%. The position of the maximum for the ground-layer dose rate in the case of

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ZAKHAROV, O. V. et al., Vopr. dozimetrii i zashchity ot izluch., vyp. 12,
Moscow, Atomizdat, 1971, pp 94-97

a source raised above the surface does not coincide with the position of
the maximum for the ground-layer concentration of an isotope for all in-
vestigated gamma radiation energies and meteorological parameters. The
maximum for the ground-level concentration of gases is located much fur-
ther from the source than the maximum for the ground-level dose rate.
A. A. Smetanin.

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UNCLASSIFIED   PROCESSING DATE--30OCT70

TITLE--SYNTHESIS AND EQUILIBRIUM DURING THE DISSOCIATION OF SOLID SOLUTIONS OF IRON AND MANGANESE ORTHOTITANATES -U-

AUTHOR-(04)-SHCHEPETKIN, A.A., ANTONOV, V.K., ZAKHAROV, R.G., CHUFAROV, G.I.

COUNTRY OF INFO--USSR

SOURCE--IZV. AKAD. NAUK SSSR, METAL. 1970, (2), 144-6

DATE PUBLISHED-------70

SUBJECT AREAS--CHEMISTRY, MATERIALS

TOPIC TAGS--CHEMICAL SYNTHESIS, SOLID SOLUTION, CHEMICAL REDUCTION, SPINEL, CRYSTAL LATTICE STRUCTURE, TITANATE, MANGANESE COMPOUND

CONTROL MARKING--NO RESTRICTIONS

DOCUMENT CLASS--UNCLASSIFIED

PROXY REEL/FRAME--1998/1122   STEP NO--UR/0370/70/000/002/0144/0146

CIRC ACCESSION NO--AP0121682

UNCLASSIFIED

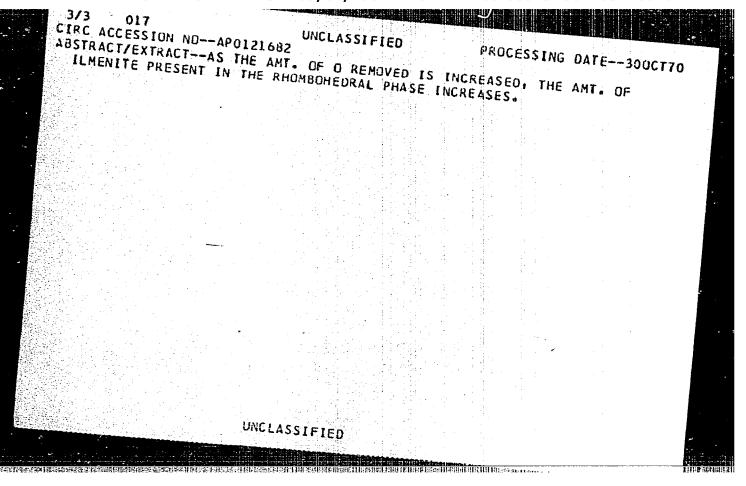CIRC ACCESSION NO--AP0121682   UNCLASSIFIED   PROCESSING DATE--30OCT70

ABSTRACT/EXTRACT--(U) GP-0- ABSTRACT. THE FORMATION OF SOLID SOLNS. OF
FE SUB2 TIO SUB4 AND MN SUB2 TIO SUB4 AND THE PHASE EQUIL. PROCESSES
OCCURING DURING THE REDN. OF SOLID SOLNS. WERE STUDIED. SYNTHETIC FE
SUB2 TIO SUB4 AND MN SUB2 TIO SUB4 WERE PRESSED INTO TABLETS AND HEATED
FOR 10 HR AT 1100DEGREES UNDER AN ATM. OF 88 VOL.PERCENT CO AND 12
VOL.PERCENT CO SUB2. THE SAMPLES THEN WERE TEMPERED IN WATER AND
ANALYZED BY USING AN X RAY METHOD. FE SUB2 TIO SUB4 AND MN SUB2 TIO
SUB4 ARE PERFECTLY MISCIBLE, FORMING A CONTINUOUS SERIES OF SOLID SOLNS.
HAVING A CRYSTAL LATTICE OF SPINEL STRUCTURE. THE PERIOD OF THE LATTICE
INCREASES WITH INCREASING CONCN. OF MN SUB2 TIO SUB4 IN THE SOLID SOLN.
AND RANGES WITHIN THOSE OF PURE FE SUB2 TIO SUB4 AND MN SUB2 TIO SUB4
(8.535-8.679 ANGSTROM). THE STUDY OF THE EQUIL. COMPN. OF THE SAMPLES
AS A FUNCTION OF THE AMT. OF O PRESENT WAS PERFORMED BY HEATING THE
SAMPLES AT 1000DEGREES UNDER AN ATM. OF H AND H SUB2 O. THE AMT. OF O
PRESENT IN THE SAMPLE (EXPRESSED IN PERCENT OF THE TOTAL AMT. OF O
PRESENT) WAS CONTROLLED BY CHANGING THE PARTIAL PRESSURE OF H IN THE
REDUCING ATM. ON REMOVAL OF O-25PERCENT O, SPINEL, RHOMBOHEDRAL, AND
METALLIC FE PHASES ARE IN EQUIL. THE SPINEL PHASE CONSISTS OF A SOLID
SOLN. OF MN SUB2 TIO SUB4 AND FE SUB2 TIO SUB4. THE RHOMBOHEDRAL PHASE
CONSISTS OF SOLID SOLN. OF ILMENITE AND PYROPHANITE. ON INCREASING OF
THE AMT. OF O REMOVED, THE CONCN. OF FE SUB2 TIO SUB4 IN THE SPINEL
PHASE DECREASES AND THE CONCN. OF PYROPHANITE IN THE RHOMBOHEDRAL PHASE
INCREASES. AT 25-35PERCENT O REMOVAL, A RHOMBOHEDRAL PHASE EXISTS IN
EQUIL. WITH A TIO SUB2 PHASE AND A METALLIC FE PHASE.

UNCLASSIFIED

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CIRC ACCESSION NO--AP0121682   UNCLASSIFIED

ABSTRACT/EXTRACT--AS THE AMT. OF O REMOVED IS INCREASED, THE AMT. OF ILMENITE PRESENT IN THE RHOMBOHEDRAL PHASE INCREASES.

PROCESSING DATE--30OCT70

UNCLASSIFIED

USSR

BASOV, N. G., ZARITSKIY, A. R., ZAKHAROV, S. D., KRYUKOV, P. G., MAT-
VEYETS, Yu. A., SENATSKIY, Yu. V., FEDOSIMOV, A. I., CHEKALIN, S. V.

"Producing High-Power Light Pulses on Wavelengths of 1.06 and 0.53 μm
and Using Them to Heat a Plasma. II. A Neodymium Glass Laser With Con-
version of Emission to the Second Harmonic"

Translation: Investigations of processes of heating by means of laser
sources with different wavelengths are of considerable importance for
explaining mechanisms of energy transfer in laser heating of a plasma.
This paper tells of the development of a high-power light source for
heating experiments with emission on two wavelengths: the wavelength of
a neodymium laser (1.06 μm) and its second harmonic (0.53 μm). An ef-
ficiency of greater than 50% in converting 1.06-μm emission to the second
harmonic is achieved in a KDP crystal. The emission energy on the 0.53-μm
wavelength is 10 j with a pulse duration of 1.0 ns. Part I, see RZhFiz,
1973, 6G239.
1/1

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USSR

ZARITSKIY, A. R., ZAKHAROV, S. D., KRYUKOV, P. G., FEDOSIMOV, A. I.

UDC: 621.378.9:533.9.02

"Measuring the Polarization of Back-Scattered Radiation Accompanying Laser Heating of a Plasma"

Moscow, Kvantovaya Elektronika, Sbornik Statey, No 2(8), 1972, pp 89-90

Abstract: When a plasma is heated by powerful laser emission with the use of solid targets, the laser light is strongly back-scattered. Polarization measurements are made on a wavelength of 530 nm using polaroid films; the degree of polarization of the reflected emission comes to 90-95%. Bibliography of three titles.

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USSR

BASOV, N.G., ZARITSKIY, A.R., ZAKHAROV, S.D., KRYUKOV, P.G., MATVEYETS, YU.A.,
SENATSKIY, YU.V., FEDOSIMOV, A.I., CHEKALIN, S.V.

UDC 621.378.325 + 543.46

"Achievement Of Powerful Light Pulses At A Wavelength Of 1.06 And 0.53 Micron
And Their Use For Plasma Heating. II--Nd-Glass Laser With Conversion Of Radi-
ation To The Second Harmonic"

Kvantovaya elektronika (Quantum Electronics), Moscow, No 6(12), 1972, pp 50-55

Abstract: The construction is described and the characteristics presented of a
multistage Nd-glass laser. The laser assembly consists of the following: 1)
Active elements of GLS-1 neodymium glass, 700 mm long with ends cut at a
Brewsterian angle; 2) Resonator mirror; 3) Cells with clearing absorber; 4)
Aperture diaphragms; 5) Selectors of longitudinal types of oscillations in
oscillator; 7) Lenses; and 8) Electrooptical gate with a laser discharger.
A driving oscillator assembled according to the scheme of an oscillator with
self-synchronization of modes serves as the source of short light pulses in the
device. The length of the oscillator resonator, formed by two mirrors with re-
flection coefficients of 100 and 20 percent, amounts to 6 m. Cells with a non-
linear absorber -- a solution of No. 3955 dye in nitrobenzene -- were in con-
tact with an opaque mirror. Two selectors of axial modes in the form of
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inclined Fabry-Perot interferometers were used for narrowing of the generation spectrum. With the aid of these interferometers the generation spectrum was narrowed to $\sim$0.05 Å and in so doing the pulses emitted by the oscillator were expanded to 1 nanosec. In the KDP crystal the radiation at the output is converted into a second harmonic with an efficiency greater than 50 percent. The radiation energy at a 0.53 micron wavelength amounts to 10 joule. The authors thank M.F. Stel'makh, I.S. Rez, A.I.Kovrigin, and V.F.Polov for assistance in conducting experiments with KDP crystals. 3 ill. 16 ref. Received by editors, 25 Oct 1971.

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USSR

BASOV, N.G., ZARITSKIY, A.R., ZAKHAROV, S.D., KROKHIN, O.N., KRYUKOV, P.G.,
MATVEYETS, YU.A., SENATSKIY, YU.V., FEDOSIMOV, A.I.

"Achievement Of Powerful Light Pulses At 1.06 And 0.53 Micron Wavelengths And
Their Use For Plasma Heating. I. Experimental Study Of The Processes Of Radiat-
ion Reflection During Laser Heating Of Plasma At Two Wavelengths"

Abstract: The experimental results are presented of calorimetric, temporal,
spectral and polarization measurements of radiation reflected back from plasma
which is heated by nanosecond laser pulses with a wavelength of 1.06 and 0.53
micron with fluxes at targets of various materials exceeding 10^{14} watt/cm².
The results discussed represent the first attempt to study laser heating of
plasma which is produced at solid targets in the green region of the spectrum.
It is found that plasma absorption of the heating light at a 0.53 micron wave-
length is three times greater than at a 1.06 micron wavelength. The authors
express their appreciation to V.B. Rozanov for discussion of the results of the
work. 3 fig. 19 ref. Received by editors, 25 Oct 1971.

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ZARITSKIY, A. R., ZAKHAROV, S. D., KRYUKOV, P. G., MATVEYETS, YU. A., and
FEDOSIMOV, A. I., Physics Institute imeni P. N. Lebedev, Academy of Sciences
USSR

"Variations in Back-Scattered Radiation Spectrum During Laser Heating of
Plasma"

Abstract: It is known that strong back-scattering of laser light occurs
during the high-power laser radiation heating of a plasma with the use of
solid targets. The authors measured the spectrum of the laser light reflected
by the plasma. The targets used were LiD, $(CD_2)_n$, heavy ice, Al. The radia-
tion source was a self-mode-locking Nd laser consisting of a master oscillator
and a six-stage amplifier. The plasma heating and spectral measurements were
carried out on the fundamental frequency ($\lambda = 1.06$ microns), as well as on
the second harmonic frequency ($\lambda = 0.53$ micron). The measurements were

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ZARITSKIY, A. R., et al., Pis'ma v Zhurnal Eksperimental'noy i Teoreticheskoy Fiziki, Vol 15, No 4, 20 Feb 72, pp 184-186

made on a grating spectrograph with $f = 130$ cm. The back-scattered radiation spectrum was found to have a large number of equidistant lines, situated generally both in the Stokes and the anti-Stokes part of the spectrum. This is due to the presence at the line of incident radiation from weak satellites, the distance between which equals the interval between the lines of reflected light. The observed process is of a stimulated character. Its explanation may be related to the phase modulation of high-power light pulses in the plasma layer.

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UDC 662.215.2

ZAKHAROV, S. D., LIKHOV, G. M., MIZYAKIN, S. D., Moscow

"Determination of Dynamic Compressibility of Soil on the Basis of Parameters of Flat Explosive Waves"

Zhurnal Prikladnoy Mekhaniki i Tekhnicheskoy Fiziki, No 1, 1972, pp 137-140.

Abstract: The dynamic compressibility of soil has been determined on the basis of experimental values of the parameters of flat, cylindrical and spherical explosive waves at stresses generally not exceeding 80-100, some-times 250 kg/cm^2. This article presents results of experimental studies of flat waves at stresses of up to 1,000 kg/cm^2. These data are used to construct a stress-strain diagram corresponding to shock compression at the leading edge of the wave. The degree of compacting of the soil is determined. It is demonstrated that deformations continue to increase behind the leading edge of the wave. The residual deformations are greater than those that occur at the leading edge. This indicates a significant influence of viscous and plastic properties of soils on the wave process.

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Magnetohydrodynamics

USSR

BASOV, N. G., ZAKHAROV, S. D., KROKHIN, O. N., KRYUKOV, P. G., SENATSKIY, Yu. V.,
TYURIN, Ye. L., FEDOSIMOV, A. I., CHEKALIN, S. V., SHCHELEV, M. Ya.

UDC 621.378.9:533.9.02

"Studies of a Plasma Formed by Ultrashort Laser Pulses"

Moscow, Kvantovaya Elektronika, No. 1, 1971, pp 4-28

Abstract: Experimental studies of processes occurring in the high-temperature
heating of a plasma by focusing ultrashort laser radiation on the surface of
lithium deuteride are described. Studies of plasma heating with laser radiation
of duration 10^{-11}-10^{-12} sec were begun in 1968 at the Laboratory of Quantum Radio-
physics of the Physics Institute imeni P. N. Lebedev. Fast neutrons were recorded
upon focusing these pulses on the surface of a lithium deuteride target, indicat-
ing the rise of conditions for a thermonuclear db-reaction and for obtaining a
plasma of high temperature and density. Subsequent research raised the following
questions: how does absorption of energy by a solid occur if the laser radiation
is concentrated in a pulse with a duration of several picoseconds? How is the
strong reflection of laser radiation from the target explained? What are the
possibilities of raising ion temperature, and consequently neutron yield, in

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BASOV, N. G., et al, Kvantovaya Elektronika, No. 1, 1971, pp 4-28

heating a plasma with ultrashort pulses? Shadow photographs of the plasma with illumination by ultrashort pulses and the recording of plasma dispersion with the aid of an electron-optical converter are described. The same electron-optical converter was used to study the change in the reflection of laser pulses with time, and x-ray measurements were made of the electron temperature of the plasma. A review of the basic experimental data indicates that the results are from laser pulses consisting not of one, but of several subpulses. Experiments show that the interaction of each subpulse with the target is not the same but a function of the previous history and repetition time of the subpulse relative to the beginning of the process. Heating of the plasma occurs as follows: one of the first subpulses incident on the target ionizes it to a depth approximately equal to the wavelength of the laser radiation. When the value of n_e becomes comparable to the value of n_{cr}, the remaining part of the subpulse is reflected. Heating of the plasma to a temperature of several electron-volts occurs simultaneously with ionization. As a result, the plasma formed is slowly dispersed. All subpulses incident on the target at this stage will be reflected until the particle density drops, as a result of dispersion, to a value corresponding to n_{cr}. At this time high-temperature heating of the plasma is possible. It is thus established that reflection of ultrasonic pulses arises in plasma regions where the electron density is close to critical. Other subjects discussed in the article include plasma radiation and heat conductivity, the effect of laser radiation pressure, and electron-ion relaxation in a plasma formed by a powerful ultrashort laser pulse.
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UDC: 621.385:530.145-6:53

BASOV, N. G., ZAKHAROV, S. D., KROKHIN, O. N., KRYUKOV, P. G., SENATSKIY, Yu. V., CHEKALIN, S. V., FEDOSIMOV, A. I., SHCHELEV, M. Ya.

"Investigation of Heating of a Plasma Formed by Ultrashort Laser Pulses"

Kratk. soobshch. po fiz. (Brief Reports on Physics), 1970, No 8, pp 48-52 (from RZh-Radiotekhnika, No 12, Dec 70, Abstract No 12D464)

Translation: In order to form a plasma, ultrashort pulses of emission from a neodymium glass laser operating under conditions of self-synchronization of modes on a wavelength of 1.06 μ were focused on a target of LiD in a vacuum. The period between pulses was 15 nsec. The individual laser pulse is not simple, but rather consists of a series of peaks, the interval between them and the number of peaks varying from flash to flash. The overall pulse duration reaches 10 nsec, the duration of an individual peak being in the range of $10^{-11}-10^{-12}$ s. The output energy is ~0.1 J. The diameter of the focal spot on the target is $2 \cdot 10^{-2}$ cm. Heating of the plasma was studied by the methods of shadow photography and schlieren photography. A. K.

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USSR

DYTNERSKII, YU. I., ZAKHAROV, S. L., Moscow Chemical Technology Institute
imeni D. I. Mendeleeva

UDC 532.71:66.066.6

"Additivity of the Process of Separation of Two Aqueous Solutions of Salts
by Reverse Osmosis"

Abstract: Experimental data obtained with cellulose acetate membranes and K,
Na, and Ca chlorides and nitrates in aqueous solution showed that the selec-
tivity of the membrane for each salt in a mixture is the same as for the indi-
vidual salts alone. The constant porosity of the membrane was shown by de-
termination, before each experiment, of its penetrability to pure water. The
selectivity and lower penetrability of the membrane to the strongly hydrated
Ca^{++} ion than to solutions containing the weakly hydrated Na^+ and K^+ ions can
be explained by a capillary model. The additivity of processes for separating
chlorides and nitrates by reverse osmosis makes it possible to calculate the
expected separation from data on individual salts.

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BASOV, N. G., BOYKO, V. A., ZAKHAROV, S. M., KROKHIN, O. N.,
MIKHAYLOV, Yu. A., SKLIZKOV, G. V., and FEDOTOV, S. I.

UDC: None

"Mechanisms of Neutron Generation in a Laser Plasma"

Moscow, Pis'ma v ZhETF, vol 18, No 5, 5 September 1973, pp 314-317

Abstract: This letter gives the results of experiments performed to
investigate the mechanisms which give rise to neutrons in laser
plasmas. The experiments here described proved that, depending on
the experimental conditions, both hot and cold neutrons are pro-
duced. The measurements involved were conducted in a variant of
the sharp focusing of a single-channel laser on a massive CD_2 tar-
get, as well as in spherically symmetrical irradiation of CD_2
particles measuring about 100 μ in diameter by the output of a
multichannel laser. Both methods were discussed in earlier papers
by the first-named author above, et al (Pis'ma v ZhETF, 13, 1971,
p 691; 15, 1972, p 589; ZhETF, 62, 1972, p 203). Results of both
types of measurement are separately examined. Some of these cast
doubt on the assertion of previous researchers that the appearance
of fast ions is connected with acceleration in the critical den-
sity region.
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USSR

BASOV, N. G., BOYKO, V. A., GRIBKOV, V. A., ZAKHAROV, S. M., KROKHIN, O. N.,
and SKLIZKOV, G. V., Physics Institute imeni P. N. Lebedev, Academy of
Sciences USSR

"Gas Dynamics of a Laser Plasma in the Process of Heating"

Abstract: One of the two well-known approaches to the problem of heating
plasma to thermonuclear temperatures by irradiating it with a laser is the
method in which a substantial portion of the energy of the laser is converted
into the energy of directed, gas-dynamic movement. In the present article,
an attempt is made for the first time to measure the distribution of the
density and speed of movement of the plasma, to evaluate the pressure of the
plasma during the process of heating. A multimode, Q-switched laser and a
carbon target were used, and measurements were made by slit scanning of an
interferogram on an image converter. It was found that the maximum pressure
(10^6 atmospheres) and temperature occur at the beginning of the laser pulse.
At later times, the profile of the density is elevated, and the area of the
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USSR

BASOV, N. G., et al., Zhurnal Eksperimental'noy i Teoreticheskoy Fiziki,
Vol 61, No 1 (7), Jul 71, pp 154-161

plasma in which absorption takes place draws back from the target and
increases. The mass of the gas heated directly by the laser beam also increases.
The temperature in the hot portion drops, and an increasingly greater part
of the radiation energy is converted directly into the kinetic energy of
the disintegrating substance. In this manner, by varying the dependence
of the dispersion of the radiation on time, it ispossible to shift the maximum
pressure and to achieve optimal utilization of the laser's energy when
heating plasma under real conditions.

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UDC 533.916

USSR

BASOV, N. G., Academician, BOYKO, V. A., DROZHBIN, Yu. A., ZAKHAROV, S. M., KROKHIN, O. N., SKLIZKOV, G. V., and YAKOVLEV, Y. A., Physics Institute imeni P. N. Lebedev of the Academy of Sciences USSR, Moscow

"Investigation of the Initial Stage of the Gas-Dynamic Dispersion of a Laser Jet Plasma"

Abstract: Since previous experiments study the radiation spectra and gas-dynamic parameters of a plasma in large time intervals exceeding the length of the laser pulse, the present study covers the dynamics of the motion and the kinetics of ionization processes in a laser plasma with a high time resolution. It is noted that the gas-dynamic motion of a plasma accompanying the high-temperature heating of condensed material with focused laser radiation has been investigated because of the importance of the possible use of a laser plasma for thermonuclear fusion, as a source of multicharged ions for spectroscopic studies of astrophysical interest, for accelerator technology, etc. The study of the dispersion of a plasma during the action of a laser pulse and at distances r from the surface of the target comparable with the diameter d of the focusing spot of the laser radiation made it possible to trace different phases of the motion of the material,

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USSR

BASOV, N. G., et al, Doklady Akademii Nauk SSSR, Vol 192, No 6, 21 Jun 70, pp 1248-1250

including the initial stage of heating and the "freezing" of the ionization state of the plasma. The radiation of a neodymium laser with an energy of 10 j and a half-length of 15 nsec was focused with a 5-cm lens on the surface of a carbon target in a vacuum of 10^{-6} torr, and the structure of the dispersing plasma was investigated on the basis of its luminosity. Space-time diagrams of ion dispersion were obtained from analysis of the data (see Fig.); for $r \leq 1$ mm the plasma emits a continuous spectrum in the visible region (lines are observed only at distances $r \geq 1$ mm). As the distance increases to 10 mm, a break is observed in the luminosity of ions CVI and CV from the target. The regions occupied by ions of different charges partially intersect, although there are no discontinuities in the density of material in the plasma. The following model of the gas-dynamic motion of the heated matter is constructed from an analysis of the experimental data: The plasma moves from the region of heating ($r < d$), where the electron temperature $T_e \sim 120$ ev on the basis of measurements of the recombination x-radiation, into the vacuum perpendicular to the surface with a velocity $u \sim 6 \cdot 10^6$ cm/sec. In this region the velocity of the plasma is close to the speed of sound and the ion temperature corresponding to this

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velocity is ~ 125 ev. A considerable acceleration of the plasma is observed at distances $r \leq 1$ mm. The velocity here is several times greater than the initial. The effect of "freezing" is obtained, since the density drops as $u^{-1}r^{-2}$ along the trajectory of the ion and the recombination time becomes much greater than the characteristic dispersion time. In one process the freezing of the maximum degree of ionization occurs several nanoseconds after the beginning of the motion of the "elementary volume" of the plasma. This freezing process also occurs for the remaining ions. The laminar structure of the jet which is observed in photographs is explained on this basis. The energy lost by the plasma contained in the region $r < d$ to radiation in the range 20-100 Å over a time of 40 nsec is estimated to be about 0.5 joule.

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1/2   023   UNCLASSIFIED   PROCESSING DATE---30OCT70
TITLE--EFFECT OF TEST CONDITIONS ON A COMPARATIVE EVALUATION OF THE WEAR
   RESISTANCE OF TIRES -U-
AUTHOR-(04)-GENNIKH, M.E., GUSLITSER, R.L., ZAKHAROV, S.P., MISHNEV, G.V.

COUNTRY OF INFO--USSR

SOURCE--KAUCH. REZINA, 1970, 29(3), 38-41

DATE PUBLISHED------70

SUBJECT AREAS--MATERIALS, MECH., IND., CIVIL AND MARINE ENGR

TOPIC TAGS--MOTOR VEHICLE TIRE, WEAR RESISTANCE, TEST METHOD

CONTROL MARKING--NO RESTRICTIONS

DOCUMENT CLASS--UNCLASSIFIED
PROXY REEL/FRAME--2000/0836   STEP NO--UR/0138/70/029/003/0038/0041

CIRC ACCESSION NO--AP0124503
                    UNCLASSIFIED

CIRC ACCESSION NO--AP0124503
ABSTRACT/EXTRACT--(U) GP-0- ABSTRACT. AUTOMOBILE TIRES WERE TRACK TESTED
 TO DEVELOP A RELIABLE METHOD FOR EVALUATING THEIR WEAR RESISTANCE.
 SEVERAL RECOMMENDATIONS WERE GIVEN.   FACILITY: NAUCH.-ISSLED.
 INST. SHINNOI PRCM., MOSCOW, USSR.

UNCLASSIFIED

USSR

UDC 620.179.14

ZAKHAROV, V. A., MIKHEYEV, M. N., FRANTSEVICH, V. M.

"Design of a Ferroprobe Coercitimeter with an Attached Electromagnet and Compensation Winding"

Defektoskopiya, No 4, 1971, pp 21-31.

Abstract: Results are presented from a study of the dependence of the ampere turns of demagnetization and compensation on the parameters of the magnetic circuit of a ferroprobe coercitimeter with an attached electromagnet and compensation winding, as well as certain experimental results. Simplified formulas are given for calculation of the ampere turns, as well as an example of calculation and a schematic diagram of the semiautomatic ferroprobe coercitimeter for testing the quality of heat treatment of products.

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Miscellaneous

USSR   UDC   669.15-196:669-974

ZAKHAROV, V. A., LAZAREVA, N. K., and CHICHAGOVA, N. P., Gor'kiy Automobile Plant

"Austenite Stability in Alloyed Cast Iron at Low Temperatures"

Moscow, Metallovedeniye i Termicheskaya Obrabotka Metallov, No 12, 1970,
pp 49-50

Abstract: Nickel-copper-chromium cast irons have an austenite structure at
room temperature. At below-zero temperatures, however, the austenite in these
cast irons turns to martensite, which is followed by volumetric changes, an
increase in hardness, and a decrease in metal plasticity. This paper discusses
the effect of chromium, nickel, manganese, and copper contents on austenite
stability. The study involved 20 melts produced in an MGP-2 150-kg induction-
type furnace with nickel contents ranging from 10 to 17%, manganese -- from
0.9 to 3.0%. With a decrease in temperature, the amount of transformed auste-
nite in the cast irons increases. As cast, the cast irons of all melts, with
the exception of melt 1 with 10% Ni, are structurally stable down to -76°C.
Heat treating of the cast irons according to a specified technique increases
the temperature of α-γ transformation, i.e., narrows down the stability range

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USSR

ZAKHAROV, V. A., et al, Metallovedeniye i Termicheskaya Obrabotka Metallov, No 12, 1970, pp 49-50

of austenite. Increasing the nickel and manganese contents moves the beginning of the martensite transformation to a lower temperature range. At 16% Ni and 1.5 Mn, austenite cast irons have a stable structure at $-76°C$. In order to preclude structural (and dimensional) changes in austenite cast iron parts at temperatures down to $-76°C$, it is necessary that the cast iron comprise a minimum of 15% Ni, 1.5-2.0% Mn. Intensive cooling to be used in conjunction with heat treating at $700-750°C$ is proposed.

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TITLE--INITIATION DURING ETHYLENE POLYMERIZATION ON A CHROMIUM OXIDE
   CATALYST -L-
AUTHOR-(04)-YERMAKOV, YU.I., ZAKHAROV, V.A., GRABOVSKIY, YU.P.,
   KUSHNAREVA, E.G.
COUNTRY OF INFO--USSR

SOURCE--KINET. KATAL. 1970, 11(2), 519-23

DATE PUBLISHED--------70

SUBJECT AREAS--CHEMISTRY

TOPIC TAGS--ETHYLENE, POLYMERIZATION, CHROMIUM OXIDE

CONTROL MARKING--NO RESTRICTIONS

DOCUMENT CLASS--UNCLASSIFIED
PROXY REEL/FRAME--2000/1728   STEP NO--UR/0195/70/011/002/0519/0523

CIRC ACCESSION NO--AP0125349
                    UNCLASSIFIED

CIRC ACCESSION NO--AP0125349
ABSTRACT/EXTRACT--(U) GP-0- ABSTRACT. THE NOS. OF CENTERS OF GROWTH
    DURING CR OXIDE CATALYZED ETHYLENE POLYMN., (AT 25-75DEGREES-15--35 ATM
    ON SIC SUB2 OR AL SILICATE CATALYST SUPPORT) ARE COMPARED WITH THE
    CONTENT OF CR IN DIFFERENT VALENCE STATES.   CR(VI) IS APPARENTLY THE
    ACTIVE COMPONENT OF THE CATALYST. INITIATION IS ACCOMPANIED BY REDN. OF
    CR; AND IN THE CENTER OF GROWTH, THE VALENCE OF CR IS LESS THAN OR EQUAL
    TO 3.   FACILITY: INST. KATAL., NOVOSIBIRSK, USSR.

UNCLASSIFIED

UNCLASSIFIED
PROCESSING DATE--18SEP70
TITLE--AMPEROMETRIC TITRATION OF SCANDIUM AND LANTHANUM WITH POTASSIUM
FERROCYANIDE -U-

AUTHOR-(03)-SONGINA, O.A., ZAKHAROV, V.A., TOKUSHEVA, G.T.

COUNTRY OF INFO--USSR

SOURCE--ZH. ANAL. KHIM. 1970, 25(1), 64-7

DATE PUBLISHED-------70

SUBJECT AREAS--CHEMISTRY

TOPIC TAGS--SCANDIUM, LANTHANUM, AMPEROMETRIC TITRATION

CONTROL MARKING--NO RESTRICTIONS

DOCUMENT CLASS--UNCLASSIFIED

PROXY REEL/FRAME--1989/1746

STEP NO--UR/0075/70/025/001/0064/0067

CIRC ACCESSION NO--AP0108113

UNCLASSIFIED

CIRC ACCESSION NO--AP0108113
ABSTRACT/EXTRACT--(U) GP-0- ABSTRACT. THE ACTION OF SC AND LA WITH
  (FE(CN)SUB6)PRIME4 NEGATIVE IN SOLNS. OF LINO SUB3, KNO SUB3, NANO SUB3,
  AND NH SUB4 NO SUB3 AT PH 1.0-6.0 WAS STUDIED BY AMPEROMETRIC TITRN. AT
  PH 2.2-4.8 SC FORMS SC SUB4(FE(CN)SUB6)SUB3 IN A LINO SUB3 MEDIUM AND
  SCM FE(CN)SUB6 AT PH 5.0-6.0, WHERE M IS THE SUPPORTING ELECTROLYTE
  CATION. IN A NANO SUB3 MEDIUM SCMFE(CN)SUB6 FORMS AT PH 2.5-3.5 AND SC
  SUB4(FE(CN)SUB6)SUB3 AT PH 4.0-6.0. LA FORMS ONLY COMPLEX SALTS OF THE
  TYPE LAMFE(CN)SUB6 AND ITS ACTION WITH (FE(CN)SUB6)PRIME3 NEGATIVE
  DEPENDS ON THE NATURE AND CONCN. OF THE SUPPORTING ELECTROLYTE CATION.
  SC CAN BE DETD. AMPEROMETRICALLY IN THE PRESENCE OF LA AND CA. THE
  SENSITIVITY OF THE DETN. IS 3 MUG SC-ML. IN LINO SUB3 MEDIUM THE SUM OF
  SC AND LA IS TITRATED; IN M NH SUB4 NO SUB3 ONLY SC IS TITRATED; 100
  FOLD AMTS. OF CA DO NOT INTERFERE.

UNCLASSIFIED

1/2   013   UNCLASSIFIED   PROCESSING DATE--18SEP70
TITLE--TEMPERATURE DEPENDENCE OF THE GROWTH RATE CONSTANT DURING THE
   POLYMERIZATION OF ETHYLENE ON A CHROMIUM OXIDE CATALYST -U-
AUTHOR-(03)-ZAKHAROV, V.A., YERMAKOV, YU.I., KUSHNAREVA, E.G.

COUNTRY OF INFO--USSR

SOURCE--VYSOKOMOL. SOEDIN., SER. B 1970, 12(1) 64-7

DATE PUBLISHED-------70

SUBJECT AREAS--CHEMISTRY, MATERIALS

TOPIC TAGS--TEMPERATURE DEPENDENCE, POLYMERIZATION RATE, CHROMIUM OXIDE,
   ETHYLENE, CATALYST ACTIVITY

CONTROL MARKING--NO RESTRICTIONS

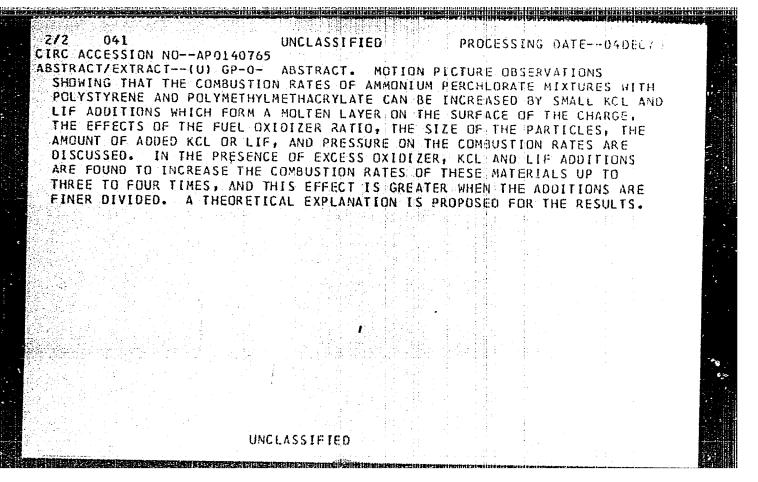DOCUMENT CLASS--UNCLASSIFIED
PROXY REEL/FRAME--1986/0251   STEP NO--UR/0460/70/012/001/0064/0067

CIRC ACCESSION NO--AP0102301
                        UNCLASSIFIED

CIRC ACCESSION NO--AP0102301

ABSTRACT/EXTRACT--(U) GP-0- ABSTRACT. C SUB2 H SUB4 WAS POLYMD. IN THE
PRESENCE OF AN ACTIVATED CRO SUB3 CATALYST (CONTG. 90PERCENT LARGER THAN
OR EQUAL TO CR PRIMEVI) DEPOSITED ON SILICA GEL IN ORDER TO EVALUATE THE
ACTIVATION ENERGY OF PROPAGATION (E SUBP) AND EFFECTIVE ACTIVATION
ENERGY (E SUBEF). A PLOT OF STEADY STATE POLYMN. RATE VS. RECIPROCAL OF
ABS. TEMP. (1-T) GAVE E SUBEF EQUALS 10 PLUS OR MINUS 1 KCAL-MOLE,
WHEREAS A PLOT OF LOG K SUBP VS. 1-T (WHERE K SUBP IS THE PROPAGATION
RATE CONST.) GAVE E SUBP EQUALS 4.2 PLUS OR MINUS 0.5 KCAL-MOLE AND THE
PREEXPONENTIAL FACTOR EQUALS 1 TIMES 10 PRIME9 1. TIMES (MOLE TIMES HR)
PRIME NEGATIVE1. THE DIFFERENCE BETWEEN E SUBP AND E SUBEF IS DUE TO
INCREASED CONCN. OF PROPAGATION SITES IN THE CATALYST AT HIGHER TEMPS.
THE FORMATION OF PROPAGATION SITES ON THE CATALYST IS AN IRREVERSIBLE
REACTION.

UNCLASSIFIED

1/2   041
UNCLASSIFIED
TITLE--COMBUSTION RATE ACCELERATION WITH THE AID OF ADDITIONS FORMING A
MOLTEN LAYER ON THE SURFACE OF THE CHARGE -U-
PROCESSING DATE--04DEC70

AUTHOR-(03)-BAKHMAN, N.N., TSYGANOV, S.A., ZAKHAROV, V.B.

COUNTRY OF INFO--USSR

SOURCE--FIZIKA GORENIIA I VZRYVA, VOL. 6, MAR. 1970, P. 98-102

DATE PUBLISHED----MAR70

SUBJECT AREAS--MATERIALS, PROPULSION AND FUELS

TOPIC TAGS--METHYLMETHACRYLATE, AMMONIUM PERCHLORATE, STYRENE, COMBUSTION
RATE, POTASSIUM CHLORIDE, LITHIUM FLUORIDE, PROPELLANT ADDITIVE, SOLID
PROPELLANT COMBUSTION

CONTROL MARKING--NO RESTRICTIONS

DOCUMENT CLASS--UNCLASSIFIED

PROXY FICHE NO----FD70/605017/FOL   STEP NO--UR/0414/70/006/000/0098/0102

CIRC ACCESSION NO--AP0140765
UNCLASSIFIED

2/2   041   UNCLASSIFIED   PROCESSING DATE--04DEC/
CIRC ACCESSION NO--AP0140765
ABSTRACT/EXTRACT--(U) GP-0- ABSTRACT. MOTION PICTURE OBSERVATIONS
 SHOWING THAT THE COMBUSTION RATES OF AMMONIUM PERCHLORATE MIXTURES WITH
 POLYSTYRENE AND POLYMETHYLMETHACRYLATE CAN BE INCREASED BY SMALL KCL AND
 LIF ADDITIONS WHICH FORM A MOLTEN LAYER ON THE SURFACE OF THE CHARGE.
 THE EFFECTS OF THE FUEL OXIDIZER RATIO, THE SIZE OF THE PARTICLES, THE
 AMOUNT OF ADDED KCL OR LIF, AND PRESSURE ON THE COMBUSTION RATES ARE
 DISCUSSED. IN THE PRESENCE OF EXCESS OXIDIZER, KCL AND LIF ADDITIONS
 ARE FOUND TO INCREASE THE COMBUSTION RATES OF THESE MATERIALS UP TO
 THREE TO FOUR TIMES, AND THIS EFFECT IS GREATER WHEN THE ADDITIONS ARE
 FINER DIVIDED. A THEORETICAL EXPLANATION IS PROPOSED FOR THE RESULTS.

UNCLASSIFIED

UNCLASSIFIED PROCESSING DATE--13NOV70

1/2 017
TITLE--SURFACE DECARBURIZATION OF STEEL IN THE PRODUCTION OF ROLLED
MATERIALS -U-
AUTHOR-(04)-POTEMKIN, K.D., NAGOVITSIN, V.V., ZAKHAROV, V.O., FEDOROVA,
Z.N.
COUNTRY OF INFO--USSR

SOURCE--METALLURG, FEB. 1970, (2), 36-39

DATE PUBLISHED-------70

SUBJECT AREAS--MECH., IND., CIVIL AND MARINE ENGR, MATERIALS

TOPIC TAGS--METAL ROLLING, METAL DECARBURIZATION, STEEL

CONTROL MARKING--NO RESTRICTIONS

DOCUMENT CLASS--UNCLASSIFIED
PROXY REEL/FRAME--2000/0918   STEP NO--UR/0130/70/000/002/0036/0039

CIRC ACCESSION NO--AP0124579
                    UNCLASSIFIED

2/2   017

CIRC ACCESSION NO--AP0124579

ABSTRACT/EXTRACT--(U) GP-0- ABSTRACT. THE SURFACE DECARBURIZATION OF STEEL IN THE PRODUCTION OF ROLLED SHEET AND STRIP WAS STUDIED. FACTORS AFFECTING DECARBURIZATION INCLUDE THE FACT THAT THE ORIGINAL BILLETS UNDERGO STRUCTURAL CHANGES AND THAT THESE ARE DISTRIBUTED IN A NON UNIFORM MANNER AROUND THE PERIMETER AND ALONG THE LENGTH. SIMILAR CHANGES ALSO TAKE PLACE WHILE HEATING THE MATERIAL BEFORE ROLLING. IN SOME CASES FURTHER DECARBURIZATION OCCURS WHILE COOLING THE ROLLED MATERIAL.

UNCLASSIFIED

UNCLASSIFIED   PROCESSING DATE--23OCT70

1/2   009
TITLE--DETERMINATION OF GLYCOLS BY GAS LIQUID CHROMATOGRAPHY -U-

AUTHOR-(04)-NOVOSELOV, A.I., AFANASYEV, A.M., KALYAZIN, YE.P., ZAKHAROV,
V.F.

COUNTRY OF INFO--USSR

SOURCE--ZH. ANAL. KHIM. 1970, 25(2), 386-8

DATE PUBLISHED-------70

SUBJECT AREAS--CHEMISTRY

TOPIC TAGS--GLYCOL, CHROMATOGRAPHIC ANALYSIS, PROPANE, ETHANE,
BUTANE/(U)PEG600 CHROMATOGRAPH PACKING, (U)PE62000 CHROMATOGRAPH
PACKING, (U)INZ600 CHROMATOGRAPH PACKING, (U)TNDSM CHROMATOGRAPH
PACKING, (U)SPHEROCAROMI CHROMATOGRAPH PACK, (U)STERCHAMOL CHROMATOGRAPH
PACKING

CONTROL MARKING--NO RESTRICTIONS

DOCUMENT CLASS--UNCLASSIFIED
PROXY REEL/FRAME--1993/0687   STEP NO--UR/0075/70/025/002/0386/0388

CIRC ACCESSION NO--AP0113558
                              UNCLASSIFIED

UNCLASSIFIED   PROCESSING DATE--23OCT70

CIRC ACCESSION NO--AP0113558
ABSTRACT/EXTRACT--(U) GP-0-   ABSTRACT.   A TECHNIQUE FOR THE GAS
CHROMATOGRAPHIC DETN. OF ETHANE, 1, 2 PROPANE, 2,3 BUTANE(RACEMATE)-, 2,
3 BUTANE (MESO FORM)-, 1,3 BUTANE-, 1,4 BUTANEDIOL AND DIETHYLENE GLYCOL
IN DILD. SOLNS. OF ALCS. OR H SUB2 O ALCSS. MIXTS. IS SUGGESTED. SOME
CORRELATION OF THE RESPONSE IN A FLAME IONIZATION DETECTOR WITH THE
STRUCTURE OF GLYCOL MOLS. IS OBSERVED.   THE SEPN. WAS CARRIED OUT ON A 2
M LONG COLUMN FILLED WITH 12- 15PERCENT POLY (ETHYLENE GLYCOL) PEG 600
OR PEG 2000 ON INZ 600 TND SM, SPHEROCHROM 1, OR STERCHAMOL, AT A COLUMN
TEMP. OF 105-30DEGREES, WITH N CARRIER GAS AT 80-100DEGREES ML- MIN.
FACILITY: MOSCOW STATE UNIV., MOSCOW, USSR.

UNCLASSIFIED

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UDC 669.778.053.4.094

USSR

NIKOLAYEV, A. V., GINDIN, L. M., SOKOLOV, A. P., ZAKHAROV, V. F., KHOMAYKO, I. A.

"Leaching Antimony out of the Khovu-Aksinsk Arsenates of Cobalt-Nickel Concentrates by Caustic Soda Solutions"

V sb. Sintez, ochistka i analiz neorgan. materialov (Synthesis, Purification and Analysis of Inorganic Materials -- collection of works), Novosibirsk, Nauka Press, 1971, pp 171-174 (from RZh--Metallurgiya, No 4, Apr 72, Abstract No 4G309)

Translation: The technological scheme for refining arsenate concentrates was developed using the method of two-stage leaching out in NaOH solutions under optimal conditions: 1) the first leaching out stage: initial NaOH concentration 250 g/ℓ, S:L = 1:4, temperature 80°, duration 1 hour; 2) second leaching out stage: initial NaOH concentration 250 g/ℓ, S:L = 1:4, temperature 80°, duration 2 hours. Aqueous repulping of the hydroxide cake took place under these conditions: S:L = 1:7, temperature 60°, duration 2 hours. The separation of the trisodium arsenate or regeneration of the alkali from trisodium phosphate by lime was carried out under the following conditions: S:L = 1:4-5 (with respect to lime), temperature 90°, duration 1.5 hours. The extraction of As in the solution was 98.5-99%. Nonferrous metals convert in practice wholly to the hydroxide concentrates, extraction of the metal in which is: 99.9% Co, 99.9%

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USSR

NIKOLAYEV, A. V., et al., <u>Sintez, ochistka i analiz neorgan. materialov</u>, Novo-sibirsk, Nauka Press, 1971, pp 171-174

Ni, and 99.7% Cu. The concentrate yield is 48-55% by weight of the arsenate concentrate. The technological scheme was checked on a semiindustrial scale.

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USSR

NAUMOV, B. N., ZAKHAROV, V. G., FILINOV, Ye. N.

"Basic Principles of Creation of Combined Complexes of Computer Equipment for Control Systems"

Translation: The basic principles are presented for the creation of combined computer equipment complexes for the construction of ACS at various levels; the composition of systems developed and planned for developemtn is indicated, and problems of their utilization in systems of varying complexity are described.

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UDC 620.184.6:539.562

USSR

VESELYANSKIY, YU. S., GORUSHKINA, L. P., ZAKHAROV, V. I., JURILO, YU. P., and SOMOV, A. I., Ukrainian Correspondence Polytechnic Institute

"Impact Ductility of a Composite Material"

Abstract: The impact ductility of an $Al-Al_3Ni$ composite was investigated on specimens of the Al-Ni eutectic alloy grown in vacuum, depending on the cross section of Al_3Ni fiber. The impact ductility was found to be independent of the testing temperature and to depend on the crystallization rate. According to fractographic data, in impact bending of specimens of an $Al-Al_3Ni$ composite with great interfiber distances, the crack propagates more slowly than on specimens with small interfiber distances. This results in increased fracture of an $Al-Al_3Ni$ composite obtained at low crystallization rates. The $Al-Al_3Ni$ material possesses a low notch sensitivity; on the macrorelief of fractures of notchless specimens, local zones of brittle failure are absent. One figure, ten bibliographic references.

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USSR

BOGOMOL'NYY, YE. B., DOLGOV, A. D., ZAKHAROV, V. I., OKUN', L. B., and
TERENT'YEV, M. V., Institute of Theoretical and Experimental Physics, State
Committee on the Use of Atomic Energy

"On Possible Effects of CPT-Invariance Violation and $K_L \to 2\mu$ Decay"

Abstract: An earlier article by the authors noted that the experimental data
of A. L. CLARK, T. ELIOTT, R. C. FIELD et al. on $K_L \to 2\mu$ decay can be fitted
to unitarity if it is assumed that there is a CPT-noninvariant interaction
which makes a contribution to the $K_L \to 2\mu$ decay amplitude in the form

$$ibK_s\bar{\mu}\gamma_5\mu \qquad\qquad (1)$$

and partly compensates for the contribution of the two-photon intermediate

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- USSR

state to the absorptive CPT-invariant part of the amplitude. If the absorptive part, which results from other real transitions, is ignored, there is no conflict with the CLARK et al. experiment if $b \simeq 0.5 a \simeq 10^{-12}$. The present article gives a detailed discussion of properties of such an interaction and experimentally observed effects in which it might appear. Properties of the K_L^0, K_S^0 system are considered, followed by a discussion of possible leptonic decays of K mesons with the participation of neutral currents and charged currents, nonleptonic decays, radiative decays, and muon decays.

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USSR

DOLGOV, A. D., ZAKHAROV, V. I., OKUN', L. B., Institute of Theoretical and Experimental Physics of the State Committee on the Use of Atomic Energy

"Shrinkage Characteristics of Amplitudes and the Asymptotic Behavior of Weak Interaction Cross Sections"

Abstract: The so-called shrinkage characteristic of the amplitude caused by constriction of the scattering cone at asymptotically high energies is discussed. It is noted that the amplitude at $t = 0$ is nonregular and the usual Froissart limitation does not occur in the case of weak interaction when exchange of massless particles (the neutrino) is possible. This would indicate that as $s \to 0$, the cross section increases exponentially: $\sigma_{tot} \sim s^\alpha$, where $\alpha > 0$. This article discusses possible restrictions on the value of α, assuming that for $t \leq 0$ the amplitude satisfies the dispersion relationship for s with a finite number of subtractions. The basic idea of the approach here is to study the singularities which are caused by constriction of the scattering cone at high energies and to compare them with ordinary threshold singularities caused by

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USSR

DOLGOV, A. D., et al, Yadernaya Fizika, No. 4, Apr 72, pp 808-819

particle exchange (called diagram singularities). The narrowing of the cone on the strength of unitarity is an unavoidable consequence of the growth of the total cross section. It is shown that if it is required that the singularity in the amplitude be no greater than $t^2 \ln t$, as occurs with diagrams with exchange of neutrino pairs, the total cross section σ_{tot} as $s \rightarrow \infty$ cannot rise more rapidly than $\sigma^{1/3}$. If it is required that the shrinkage singularity be absent, σ_{tot} cannot rise in terms of powers of s. All conclusions are based on the assumption of the validity of dispersion relationships with a finite number of subtractions for $t > 0$. It is noted, in conclusion, that the problem of the asymptotic behavior of the cross section when exchange of massless particles is possible is not limited to the scope of weak interactions for which neutrino exchange is essential. It also has a direct relationship to electromagnetic interaction caused by photon exchange. For the case of massless particles many theorems of quantum field theory are inapplicable in the form in which they are ordinarily formulated. This is attributed to the fact that they assume the presence of an energy slit between the vacuum and the spectrum of physical states. It is suggested that it would be of interest to obtain a more detailed description of the asymptotic behavior of amplitudes on the basis of these ideas and to understand better their relationship with the basic principles of quantum field theory.

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USSR   UDC: 621.371.34

ZAKHAROV, V. I.

"Measurement of Distributed Reflections With the Aid of Wide-Band Frequency Modulation"

Dokl. Vses. nauchno-tekhn. konferentsii po radiotekhn. izmereniyam. T. 2 (Reports of the All-Union Scientific and Technical Conference on Radio Engineering Measurements. Vol. 2), Novosibirsk, 1970, pp 139-143 (from RZh-Radiotekhnika, No 12, Dec 70, Abstract No 12A389)

Translation: It is pointed out that in contrast to classical methods (measurement lines, bridges, etc.), radar methods as applied to probing of transmission lines and extended SHF loads make it possible to determine not only the distribution of extremely small discrete reflections along the channel, but also the precise frequency dependence of any specific reflection over a wide frequency range. A brief description is given of a measurement device in which a continuously radiated signal with linear frequency modulation is used, together with a description of the extraction of necessary information, processing of these data, which is done by the methods of low-frequency technology, permitting increased measurement precision. Consideration is given to the effect of a number of factors (modulation non-

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USSR

ZAKHAROV, V. I., Dokl. Vses. nauchno-tekhn. konferentsii po radiotekhn. iz-mereniyam. T. 2, pp 139-143

linearity, etc.) on the resolution of the device. In addition to this de-vice, a modification is given and two possible modes of operation are indi-cated. The topicality and future-oriented nature of these methods are pointed out. Bibliography of three titles. E. L.

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USSR   UDC 621.382.3

GUSEV, V.M., SHCHIGOL', F.A., NAUMENKO, V.G., LEVITSKIY, K.B., SHCHELOCHKOV, B.I.,
KOZLOV, YU. G., ZAKHAROV, V.I.

"Silicon Planar n-p-nn^{+} Microwave Transistor Obtained By The Method Of Ion
Implantation"

V sb. Radiatsion. fiz. nemet. kristallov (Radiation Physics Of Nonmetal Crystals--
Collection Of Works), Minsk, Nauka i tekhn., 1970, pp 155-158 (from
RZh--Elektronika i yeye primeneniye, No 1, January 1971, Abstract No 1B221)

Translation: The method of ion implantation in conjunction with planar technology
makes it possible to obtain n-p-nn^{+} microwave transistors with a critical freq-
uency of amplification with respect to the current of $f_{T} \approx 2$ GHz. Specimens were
obtained and investigated with a diffusion base and an ion-implantation emitter,
and devices in which both the collector and emitter junctions were produced by
the method of ion implantation. Basic static and frequency parameters of the
devices are presented and also the dependences $V_{ct} = f(I_{e})$, $\beta_{P} = f(I_{k})$. 3 ill.
6 ref. Summary.

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USSR   UDC 621.382:621.317.799

ZAKHAROV, V.I.

"Measurement Of The Scattering Parameters Of High-Frequency Transistors"

Tr. Mosk. elektrotekhn. in-ta svyazi (Works Of The Moscow Electrical Engineering
Institute Of Communications), 1970, No [Not shown], pp 74-79 (from RZh--Elektronika
i yeye primeneniye, No 12, December 1970, Abstract No 12B448)

Translation: A method is proposed for measurement of the scattering parameters (S)
characteristic of the operation of microwave transistor amplifiers. Measurement of
the scattering parameters is conducted with a resistance connected at the input
and output of the transistor being investigated, which assures a regime close to
the operating conditions of an amplifier. A block diagram of the unit is presented
as well as the principal circuit for biasing the transistor and the results of
measurements of the scattering parameters of microwave low-noise diffused transis-
tors connected in a circuit with a common emitter and a common base. 5 ill. 6 ref.
V.S.

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USSR

DOLGOV, A. D., DOLGOLENKO, A. G., ZAKHAROV, V. I., OKUN', L. B.,
Institute of Theoretical and Experimental Physics, State Com-
mission on Utilization of Nuclear Power

"$K_L \to 2\mu$ Decay and the Possibility of Existence of a Light Vec-
tor Meson"

Abstract: The authors discuss the hypothesis which holds that
the existence of a light vector meson χ_0 is responsible for
the failure of experiments set up to detect $K_L \to 2\mu$ decay. The
analysis shows that existence of a χ-meson with the properties
necessary for compensating the two-photon contribution to
$\mathrm{Im}\, F(K_1 \to 2\mu)$ contradicts experiment. This and other diffi-
culties seem to rule out the existence of such a particle.
If the hypothetical χ-meson does exist, it would have to decay
into new light neutral particles or undergo interaction $\chi\gamma\mu\bar{\mu}$,
both unlikely possibilities. The authors thank V. V. Barmin,
V. S. Demidov, A. G. Meshkovskiy, N. N. Nikolayev and V. A. She-
banov for constructive criticism.

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USSR

BOGOMOL'NYY, YE. B., DOLGOV, A. D., ZAKHAROV, V. I., OKUN', L. B.,
SHIFMAN, M. A., SHMATIKOV, M. ZH., Institute of Theoretical and Experi-
mental Physics of the State Committee for the Use of Atomic Energy

"$K_L^0 \to \mu^+\mu^-$ and the Anomalous Interaction of Muons With Hadrons"

Abstract: The possible contribution of the 3π-intermediate state in the
imaginary part of the amplitude of $K_L^0 \to \mu^+\mu^-$ decay and the possibility of
the existence of anomalous muon-pion interaction which could balance the
imaginary part of the amplitude of $K_L^0 \to \mu^+\mu^-$ decay arising through the

2γ-intermediate state are discussed. It is noted that the existence of
an anomalously strong pion-muon interaction could resolve the contradiction
between the experimental results of Clark, Field, et al and the theory,
but it is shown that the anomalous interactions $\pi^0 - 2\mu$ and $3\pi - 2\mu$ do
not contradict existing experimental data on elastic and inelastic scatter-
ing of a muon by a nucleon, on the generation of muon pairs by pions, and
by data on $(g - 2)$ for the muon. It is noted that in this approach series
difficulties arise which are associated with the very large value of Re $M_{KL}^{(3\pi)} \to$
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USSR

BOGOMOL'NYY, YE. B., et al., Yadernaya Fizika, Vol 16, No 1, Jul 72, pp 129-142

$\rightarrow 2\mu$ and with the necessity for compensating for it with a high degree of accuracy. Experimental observation of the anomalous muon-pion interaction was complicated by two circumstances: the smallness of the anomalous cross section ($\sim 10^{34}$ cm^2) and the large value of the cross sections for background processes which exceed the anomalous processes by a factor of 10-1000. Elastic backscattering of the μ-meson by a proton at an energy of ~ 1 Gev, measurement of $(g - 2)$ of the μ-meson, and a study of the $\mu p \rightarrow \mu p \pi^0$ process at $E_\mu \geq 10$ Gev are recommended as the most sensitive methods for observing this interaction. It is proposed that $\text{Im} M(2\gamma)_{K \rightarrow 2\mu}$ is compensated not by the contribution of the 3π-intermediate state but by the contribution of other intermediate states arising in $K_L^0 \rightarrow \mu^+\mu^-$ decay, such as $2\pi\gamma$. A discussion of the consequences of possible $2\pi\gamma - 2\mu$-anomalous interaction will be the subject of a later paper.

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USSR   UDC   539.12.01

DOLGOV, A. D., ZAKHAROV, V. I., and OKUN', L. B:

"$K_L \rightarrow 2\mu$ Decay"

Moscow, Uspekhi Fizicheskikh Nauk, vol 107, No 4, 1972, pp 537-557

Abstract: This paper is in the nature of a review of the vexatious
problem of the decay of the K_L meson. There has been a great deal
of contradictory experimental and theoretical data concerning this
problem, and the authors review the experimental and theoretical
evidence thoroughly, questioning it as they go. They question the
reliability of the experimental findings -- some of which have led
to the negative result that no decay was detected -- and apply
equally radical examination to the reliability of the various
theories. After this introductory discussion, the authors examine
a mathematical expression of the decay, as found from a highly ac-
curate experiment, and consider its consequences. Then, to plot an
exact path through this confusion of doubtful facts and erratic
theory, they carefully analyze the new interactions of known par-
ticles arising from the decay, the new particles and particularly
the new light particles that have been found, and the theory of
conservation as applied to the decay in addition to apparent vio-
lations of the theory. In discussing this last, the authors touch
1/2

on the unitarity condition, through which a limitation on the probability of the $K_L \to \mu^+\mu^-$ decay is obtained. With regard to the question of the existence of new decay particles, they review the basic limiting conditions such new particles must satisfy. Finally, in their efforts to verify the apparent contradictions to classical physics theory, they reconsider the mathematical decay expression already mentioned for an examination of the theoretical principles on which it is based. They conclude by thanking Ye. B. Bogomol'nyy, G. V. Grigoryan, N. N. Nikolayev, M. V. Terent'yev, M. A. Shifman, and M. Zh. Shmatikov, colleagues who helped clarify many problems, as well as V. B. Berestetskiy, B. L. Ioffe, I. Yu. Kobzarev, M. S. Marinov, S. G. Matinyan, B. M. Pontekorvo, I. V. Chuvilo, I. S. Shapiro, and Ye. P. Shabalin for having read the review and for their useful comments on it. In an appendix, they mathematically develop the contribution of the two-photon state to the absorptive part of the $K_2 \to 2\mu$ decay amplitude, and the unitarity condition as applied to K_L meson decays.

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APPROVED FOR RELEASE: 09/01/2001   CIA-RDP86-00513R002203720010-4

USSR

UDC 541.67:547.341

ZAKHAROV, V. I., BELOV, YU. V., IONIN, B. I., and PETROV, A. A., Leningrad
Technological Institute imeni Lensovet

"Study of the Spin-Spin Coupling in Fluoroanhydrides of Phosphoric Acids by
the Method of Double and Triple Nuclear Magnetic Resonance"

Moscow, Doklady Akademii Nauk SSSR, Vol 209, No 6, Apr 73, pp 1343-1346

Abstract: Analysis of double and triple resonance spectra was carried out by
the method of subspectra; selective exposure to a high frequency field H_2
of one of the subspectra in the resonance of the nucleus X leads to the merging
of resonance lines of other nuclei in the same subspectrum. For example,
in the spectrum of the difluoroanhydride of methanephosphonic acid, when the
low frequency subspectrum P^{31} is exposed to high frequency field, the high
frequency lines of the triplets H^1 merge, and conversely, when the high
frequency subspectrum P^{31} is exposed, the low frequency H^1 triplet lines
become merged. It follows from this that the constants H-F and F-P have
the opposite signs, the constant $3_{J_{HF}}$ being positive. To perform similar
analysis in case of the 2-chloro-X-propene-1-phosphonic acid difluoride, it
is necessary to solve the spin-spin coupling of the ethylene proton with
the protons of the methyl group, that is under conditions of triple resonance.
1/1

APPROVED FOR RELEASE: 09/01/2001   CIA-RDP86-00513R002203720010-4"

USSR

UDC 666.266.52

DOTSENKO, A. V. and ZAKHAROV, V. K., and TSEKHOMSKIY, V. A., Candidate of Sciences

"Determination of the Constants of the Relaxation Process in Photochrome Glass"

Leningrad, Optiko-Mekhanicheskaya Promyshlennost', No 11, Nov 73, pp 29-31

Abstract: There is conducted a brief critical discussion of works dealing with investigation of the relaxation mechanisms in photochrome glass, that is to say, parameters of the relaxation process, the values of which do not depend upon the conditions of exposure, but are functions only of the composition of the glass and of the temperature at which decolorization takes place. An expression is proposed, which describes the process of destruction of the color centers. The constants of the relaxation process are found, and an investigation is made of the relationship of the relaxation constants to the wave length of the control beam. 1 figure. 4 tables. 7 references.

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USSR

UDC 629.783.014:525(47)

BALAYFV, N. F., GRODZOVSKIY. G. L., DANILOV, Yu. I., ZAKHAROV, V. M.,
KRAVTSEV, N. P., KUZ'MIN, R. N., MAROV, M. Ya., MOROZOV, P. M.,
NIKITIN, V. Ye., PEROV, S. P., PETUNIN, A. N., UTKIN, V. M., and
SHVIDKOVSKIY, Ye. G.

"Scientific Data on the Flight of Automatic Ionospheric "Yantar"
Laboratories"

Abstract: Launches of automatic ionospheric "Yantar' " laboratories
with gaseous plasma-ionic engines up to 100-400 km altitudes were
conducted with the aid of geophysical rockets, for the purpose of
studying prospects of controlled flight, in upper layers of the
atmosphere. Performance of gaseous plasma-ionic engines under iono-
spheric conditions was studied. Parameters characterizing the
ion jet-ionospheric plasma interaction, as well as parameters of
neutral atmosphere were measured. Scientific data on conducted ex-
periments is presented. 8 figures, 1 table, 11 references.

USSR   UDC 619.611.9-022.6 + 636.1 + 636.2 + 636.4 + 636.52/.58

ONUFRIYEV, V. P.; DUDNIKOV, A. I.; MURAVYEV, V. K.; SHVETSOV,
Yu. F.; CHUMAYEV, Yu. V.; KRAVCHENKO, V. M.; ZAKHAROV, V. M.;
PRONIN, I. A.; NIKITIN, A. Y.

"Diatelic Immunization of Cows with Foot-and-Mouth Disease and
Prospects for Obtaining Immune Milk"

Vladimir, V sb. Yashchur. T. 1 (Foot-and-Mouth Disease, Vol 1 --
Collection of Works), 1970, pp 160-172 (from RZh-58. Zhivotno-
vodstvo i Veterinariya, No 4, Apr 71, Abstract No 4.58.573)

Translation: Diatelic immunization of cows with foot-and-mouth
disease antibodies provides lactoserum and immunolactone with a
high concentration of foot-and-mouth disease antibodies. The
foot-and-mouth disease immunolactone has pronounced preventive
properties in research with baby mice, guinea pigs, bull calves,
and suckling pigs. Polyvalent foot-and-mouth disease immuno-
lactone has a more pronounced virus-neutralizing activity with
respect to heterologous strains of foot-and-mouth disease virus

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USSR

ONUFRIYEV, V. P., et al, V sb. <u>Yashchur. T. 1</u>, 1970, pp 160-172

than the monovalent one. The high specific activity of the
foot-and-mouth disease lactone, obtained under biological pro-
duction conditions by immunization of cows with inactivated
foot-and-mouth disease virus, indicates a promising use of the
diatelic immunization method under industrial conditions.

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USSR   UDC 536.46+662.311

ZAKHAROV, V. M. and KLYACHKO, L. A.

"Concerning the Combustion Rate of a Model Gunpowder Mixture"

Novosibirsk, Fizika Goreniya i Vzryva, No 1, 1972, pp 15-26

Abstract: This paper deals with the combustion scheme of a model 2-component
gunpowder mixture, consisting of finely divided potassium nitrate and charcoal.
It is found that the position of the concentration limits of the combustion of
a model gunpowder mixture is determined by the temperature equality of the
combustion products within the zone of influence of the ignition temperature
of the mixture, namely the temperature of the transition of potassium nitrate
into nitrite ($T_f \approx 1,000$ K). Increased pressure increases the combustion rate,
as does also an increase of the initial gunpowder temperature. An opinion is
given with regard to the heretofore unexplained influence of the addition of
sulfur upon the combustion rate of smoke powder. The combustion rate is said
to increase due to the formation of K_2S in the combustion products, instead of
K_2O, thus releasing approximately 40% more heat and liberating more oxygen for
oxidation of the charcoal. 5 figures, 18 references.
1/1

USSR   UDC 669-157:669.15-194.56

GOL'DSHTEYN, M. I., DENISOVA, I. K., ZAKHAROV, V. N., and
KOPYLOVA, V. A., Ural Polytechnic Institute imeni S. M. Kirov

"Change of the Fine Structure of Heat-Resistant Austenitic
Steel During Aging"

Abstract: An experimental study was made of fine structure
changes of three melts (1 - containing Mo, V, and Nb,
2 - not containing Mo and Nb, and 3 - not containing Mo, V,
and Nb) of EI481 austenitic heat-resistant steel in the pro-
cess of aging. The results are discussed by reference to dia-
grams showing the changes in width of the interferential line
$(311)_{\alpha_1}$ of the austenite, the blocks and microdistortions, the
density of dislocations, and of the lattice parameter. The fine
austenitic structure of steel alloyed with Mo, V, and Nb (melt 1)

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USSR

GOL'DSHTEYN, M. I., et al., Fizika Metallov i Metallovedeniye, Vol 36, No 4, Oct 73, pp 742-746

and alloyed with only V (melt 2) were found to undergo considerable changes during aging; a crushing of blocks and a growing of microdistortions and of the density of dislocations take place. These changes in the structure of the matrix are accompanied by a considerable enlargement of interferential lines and by a change of the lattice parameter. The discussed changes of the fine structure of the matrix together with the influence of the very dispersion particles result in a considerable strengthening of steel in the process of dispersion hardening. Five figures, one table, ten bibliographic references.

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USSR   UDC   577.4

ZAKHAROV, V. N.

"A Method for Minimizing Sequential Descriptions of Automatons"

Moscow, V sb. Ekon.-mat. metody i programmir. plan.-ekon. zadach
(Economic-Mathematical Methods and Plan-Economy Programming--
collection of works) 1972, pp 103-113 (from RZh--Matematika, No 12,
1972, Abstract No 12V245)

Translation: A finite automaton in the form of sequences is con-
sidered in RZhMat, 1972, 8V440. In its simplest case, the sequence
has the form $x_t s_t \vdash s_{t+1}$, where x_t is the input symbol at the mo-
ment t, and s_t and s_{t+1} are states at moments t and $t+1$. A method
for the maximum possible reduction in the number of sequences spe-
cifying the automaton is described. V. Shevyakov

USSR

UDC: 681.2.083:531.787.913:531.768

BARBAS, I. G., ZAKHAROV, V. N., ITIN, M. Ye., KRUTIKOV, I. A.

"Use of Semiconductor Strain Gauges for Measuring Accelerations"

Materialy Yubileyn. nauchno-tekhn. konferentsii Dnepropetr. in-ta inzh. Zh.-d. transp. (Materials of the Jubilee Scientific and Technical Conference of the Dnepropetrovsk Institute of Railway Transportation Engineers), Dnepropetrovsk, 1970, p 266 (from RZh-Metrologiya i Izmeritel'naya Tekhnika, No 11, Nov 70, Abstract No 11.32.448)

Translation: The authors present the design and construction of an acceleration pickup in which semiconductor strain-gauge resistors were used as the sensing elements. The pickup can be used to measure the acceleration of processes with frequencies ranging from 0 to 200 Hz and amplitudes of up to 50 g (g is the acceleration due to gravity). Consideration is given to the possibility of introducing critical damping of the elastic element of the pickup by various methods, as well as using electrical damping in the amplification channels. The suitability of the given pickup for measuring accelerations of the various elements of rolling stock was checked out on test runs.

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USSR   UDC 577.4

ZAKHAROV, V. N.

"A Procedure for Minimizing a Sequential Description of Automata"

V sb. Ekon.-mat. metody i programmir. plan.-ekon. zadach (Mathematical Economic
Methods and Programming Economic Planning Problems—collection of works), Mos-
cow, 1972, pp 103-113 (from RZh-Kibernetika, No 12, Dec 72, Abstract No 12V245)

Translation: The assignment of a finite automaton in the form of sequences is
investigated, for example, in RZh-Matematika, 1972, 8V440. In the simplest
case the sequence has the form $x_t s_t | -s_{t+1}$ where x_t is the input symbol at the
time t, s_t and s_{t+1} are the states at the times t and t + 1. The procedure
for maximum possible decrease in the number of sequences giving the automaton
is described.

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Thin Films

ZAKHAROV, V. P., ZALIVA, V. I.

"Phase Transition from Amorphous State to Polycrystal in Thin Films of C, Si, Ge, GeSe and GeTe and its Influence on Conductivity and Optical Density"

Abstract: This work studies certain regularities of the phase transition from the amorphous state to the polycrystalline state in thin films of C, Si, Ge, GeSe and GeTe and the influence of this transition on conductivity and optical properties. The phase transition occurs under the experimental conditions (films 10^{-5} cm thick, prepared by vacuum sputtering onto unheated glass substrates and transferred to capron holders, transition stimulated by the powerful light pulse of a gas discharge tube) in such a way as to indicate the qualitative identity of the conversion in all of the substances tested. The threshold energy required to stimulate the transition indicates that the amorphous state is relatively stable in these compounds. The transition changes the conductivity, optical reflection spectra, transmission spectra and integral optical density of the films.

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USSR   UDC 535.44:621.378

BELOKRINITSKIY, N. S., GNATOVSKIY, A. V., DANILEYKO, N. V., ZAKHAROV, V. P., and SHPAK, M. T.

"Holographic Recording of Information on Amorphous Semiconductor Films"

Leningrad, Doklady Akademii Nauk SSSR, Vol 209, No 2, 1973, pp 330-332

Abstract: This paper is a report on the application of local variations in the structural and optical characteristics of InSb, InSe, InTe, GaTe, GeTe, and Te for holographic information recording. In an earlier paper (N. S. Belokrinitskiy, et al, Pis'ma v ZhETF, 15, No 4, 1972, p 198) it was found that in GeTe films under strong light pulses a growth of crystallites was observed, accompanied by changes in the physical and optical characteristics of the compound. Similar characteristics, including the transmission and absorption spectra, were explored in the present paper for the compounds listed above. The equipment used for the holographic recording is shown in schematic form. Records of objects measuring 2X2 mm^2 to 15X15 mm^2 were made by illuminating them directly with neodymium and ruby lasers. Samples of the images obtained are shown. The authors thank V. N. Pavlyuk for running the experiment.
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ZAKHAROV, V. P., GERASIMENKO, V. S., KUCHERENKO, L. P.

"Optical Phonons in Amorphous Arsenic Chalcogenide Films"

Leningrad, Fizika Tverdogo Tela, Vol 14, No 8, Aug 72, pp 2466-2468

Abstract: An investigation is made of the vibrational spectrum of binary mixtures of arsenic chalcogenides of various compositions in the form of amorphous thin films produced by thermal deposition in a vacuum. A study of the infrared transmission spectra of As_2S_3 and As_2Se_3 showed the absorption bands typical of these substances in the crystal state for As_2S_3 and in the vitreous state for As_2Se_3. No absorption band was observed in the $400-33$ cm^{-1} frequency interval in the IR-spectrum of thin films of As_2Te_3. An examination of the transmission spectra of mixtures of $As_2(S_xSe_{1-x})_3$ and $As_2(S_xTe_{1-x})_3$ deposited from suspensions of various compositions showed that the presence of atoms of heavier chalcogenides in the mixture changes the relative intensity of the bands of the As_2S_3 spectrum. When selenium is introduced into the films, the most noticeable change is observed for the low-frequency band, and the center of gravity of the entire absorption band for As_2S_3 is displaced toward the

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ZAKHAROV, V. P., Fizika Tverdogo Tela, Vol 14, No 8, Aug 72, pp 2466-2468

high-frequency region, occupying a position defined by two stable bands in the As_2S_3 spectrum. The relative intensity of the As_2Se_3 absorption band increases with an increase in its content in the film, and a slight displacement is observed in the position of the band maximum toward the low-frequency region of the spectrum. It is concluded that the solubility of As_2S_3 and As_2Se_3 in chalcogenide mixtures is higher than that of As_2Te_3.

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USSR   UDC: 621.315.592

ZALIVA, V. I. and ZAKHAROV, V. P.

"Physical Nature of the Switching Effects in Amorphous Semiconductors"

Leningrad, Fizika i tekhnika poluprovodnikov, No 7, 1972, pp 1252-1255

Abstract: This paper describes comparative experiments in the investigation of kinetics of the phase transition from the amorphous state to the polycrystal and of the switching effects and "memory" in amorphous GeTe films. The purpose of these experiments is to clarify the physical nature of the reversible switching effect. Such effects were observed in films of such materials as Ge-Si-As-Te compounds and in stoichiometric GeTe, all of them amorphous. Also investigated was the thermally stimulated crystallization of amorphous GeTe with an electric field of up to $4 \cdot 10^4$ V/cm in intensity applied to the substance. The effect of this experiment was negative, with the applied electric field having no influence in the kinetics of crystallization. The authors find that the physical nature of phase transformations is universal, and that they are connected with the formation of "memory" in amorphous
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ZALIVA, V. I., et al, Fizika i tekhnika poluprovodnikov, No 7,
1972, pp 1252-1255

GeTe and with its crystallization under the action of rapid heating
by powerful light pulses. They find also that the growth of crys-
tals measuring 10^{-4}-10^{-3} cm and taking the form of threads, causes
the memory effect and occurs in a time of the order of 10^{-5} to
10^{-4} seconds, corresponding to the experimentally determined time
for the formation of the memory.

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ZAKHAROV, V.P.

XVI-8. FORMATION OF THE FILM STRUCTURE OF CERTAIN SEMICONDUCTORS IN THE CASE
OF LASER DEPOSITION OF SPECIMENS

[Article by Yu. G. Poltavtsev, V. P. Zakharov, L. N. Fedas, Kiev: Dovgalishrak,
II Simpozium Po Protsessam Rosta I Sinteza Poluprovodnikovykh Kristallov i
Plenok, Russian, 11-1] June 1972, p 222]

Thermal deposition of chemical compounds contains components with
high vapor pressures frequently cannot be used to obtain condensed films of
stoichiometric composition. Definite progress has been made in this direction
in the presence of laser deposition of the samples. An estimate was made of
the role of the molecular composition of the vapor and the interatomic inter-
actions with this type of deposition for the process of formation of amor-
phous film structures on a glass substrate. The research subjects were semi-
conductors of the $AIII_B VI$ and $A_2 B_3 VI$ type. The molecular composition of the
vapor was investigated mass-spectrometrically; the structure of the amorphous
films was investigated by the method of integral analysis of the electron scat-
tering intensity curves.

It is established that the GaAs vapor contains ionized and neutral com-
ponents comprising atoms of the same and different types, and the structure of
the amorphous films is well described by the model of the net of dispersed
crystals. In contrast to this, in GaP vapor complexes of atoms of different
types are completely absent, and in the amorphous film structure in addition
to the "crystal-like" regions there are regions containing atoms of one type
with the structure of amorphous phosphorous and gallium.

For As_2S_3, As_2Se_3 and $AsSe$, the molecular composition of the vapor
turned out to be similar whereas the structure of the amorphous films was
different. Thus, for example, in the As_2S_3 films the value of the radius of
the first coordination sphere and the coordination numbers are the same as in
the crystal, and in the As_2Se_3 films they are appreciably less.

The results obtained have permitted evaluation of the effect of the
molecular vapor composition on the processes of the formation of the film
structures of the investigated substances. A description is given for the
probable kinetics for the formation of the film structure.

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UDC 547.944/661.2

ASLANOV, KH. A., TSHKHXXV, A. I., FXOXATOVA, K., XXXXXX XX., SIDYKOV, A. S., and ZAXXXXXX W. X., Order of the Labor Red Banner XXXX XXX State University Imeni V. I. Lenin

"New Method for Isolation of the Anabasis Aphylla Alkaloids"

Tashkent, Khimiya Prirodnykh Soyedineniy, No 3, 1972, pp 324-328

Abstract: A new method has been developed for isolation of individual Anabasis aphylla alkaloids from technical anabasin sulfate. Direct extraction of anabasine sulfate with XXXXXXXX yields aphylline, aphyllidine, and some anabasine. XXXX XXX XXXXXX of XXXXXX and lupinine is obtained by converting them to XXXXX derivatives followed by hydrolysis with 15% hydrochloric acid at 90-100°C. Also a modification was developed for production of the XXXXXX XXXX. The commonly used sulfation method required 40% H₂SO₄ at 70-80°C, leading to considerable hydrolysis of the alkaloids. This could be avoided preserving most of the alkaloids by the use of 40% H₂SO₄ at 90-80°C.

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BELOKRINITSKIY, N. S., GNATOVSKIY, A. V., DANILEYKO, M. V., ZAKHAROV, V. P., KOZLOV, A. V., and SHPAK, M. T., Physics Institute, Academy of Sciences Ukrainian SSR

"Recording of Optical Information on Amorphous Films of Semiconducting Compounds"

Abstract: The article describes a new optical information method based on local variations in structural and optical characteristics of some semiconducting compounds under the action of laser radiation. This opens up the possibility of creating carriers with a high recording speed (10^{-4}-10^{-5} sec) and high spatial resolution without the need for subsequent processing. Amorphous GeTe and InSb films, vacuum-evaporated on glass and NaCl substrates, were used by the authors as carriers for optical signal recording. Laser radiation by a semitransparent mirror was separated into two beams approximately equal in intensity and directed at the sample at a convergence angle of $\sim 55^\circ$ for GeTe

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BELOKRINITSKIY, N. S., et al., Pis'ma v Zhurnal Eksperimental'noy i Teoreti-
cheskoy Fiziki, Vol 15, No 4, 20 Feb 72, pp 198-200

and ~ 25° for InSb. The interference hologram grating of the radiation field
was recorded on the film. Samples were exposed to radiation pulses of a free-
running ruby (λ = 0.69 micron) and neodymium (λ = 1.06 microns) laser. Given
a sufficiently homogeneous laser field amplitude distribution, interference
gratings with a spatial frequency of up to 1000 lines/mm were obtained, repre-
senting alternating segments with different spectral and structural properties.
There was found to be a relation between the sample preparation conditions and
the maximum attainable spatial frequency. There are optimal radiation ener-
gies for the pulse-mode recording of gratings (e.g., ~ 0.1 j/sq mm for record-
ing on GeTe films with pulsed neodymium laser radiation ~ 500 microseconds in
duration). The authors observed two forms of film structural changes accompany-
ing the information recording, depending on the density of the recorded grating.
In the recording of gratings with a spatial frequency of ~ 100-200 lines/mm, the
lines represent bands of polycrystalline material, films in an amorphous state
divided in segments. In the recording of gratings with a spatial frequency of

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~1000 lines/mm, grain enlargement is observed over the entire area of the film segment being treated with luminous radiation, but the optical density of the interference grating lines differs, making it possible to obtain a grating with sufficient efficiency in this case as well.

Work is continuing on the further kinetic study of the amorphous state-polycrystal phase transition of the above-indicated materials and a number of others, as well as the study of their use as carriers for recording information in the visible and IR region of the spectrum.

The authors thank V. S. SAMOYLOV for useful discussions of the results.

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ZAKHAROV, V. P., PROTAS, I. M.

"Mass-Spectrometric Study of the Evaporation of Type $A^{III}B^{V}$ Semiconductor Compounds by Laser Emission"

Abstract: Mass-spectrometric studies of vapor composition were performed during evaporation of single GaAs and GaP crystals by ruby laser emission. The qualitative composition of the vapor in both cases was similar (the Ga^{+}, As^{+} and As_2^{+} ions for GaAs predominate, and the Ga^{+}, P^{+}, P_2^{+} for GaP); however, the relative intensity distribution between them is not retained. The predominant composition of the part of the vapor not ionized by the laser emission was established by using additional ionization of the vapor by a high frequency spark. The causes of the quantitative differences in the vapor during evaporation of single GaAs and GaP crystals by ruby laser emission were discussed. The results were compared with analogous results for thermal evaporation. In the case of additional ionization of the plasma, the A: As and Ga: P ratios found from the mass spectra approach stoichiometric. Thus, the degree of ionization of Ga during evaporation by laser emission is appreciably higher than for thermal evaporation, and the part of the vapor ionized by the light

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ZAKHAROV, V. P., et al., Zhurnal Tekhnicheskoy Fiziki, Vol XLII, No 3, 1972, pp 670-672

pulse comprises primarily single or multiatom particles of the B-element (for compounds of the $A^{III}B^{V}$ type).

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"Structural Studies of Graphitization of Thin Carbon Films Under the Influence of Powerful Light Pulses"

Abstract: Changes in near order structure upon graphitization of carbon films under the influence of powerful light pulses are studied. Amorphous carbon films were irradiated with light pulses of various energies, the process of graphitization being continued to various stages. The intensities of scattering of electrons by the irradiated films were measured, and the curves of the radial distribution of atoms were calculated. The near order parameters were determined for various stages of graphitization. A probable kinetics is suggested for the transition of amorphous carbon to graphite upon irradiation of the initial films with light pulses of very high energy. It is suggested that a double C = C bond is produced between some of the atoms in addition to the single C - C bond in the graphitized films.

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ZAKHAROV, V. P., POL'SKIY, YU. M., and CHUGAYEV, V. N. (Kiev)

"Kinetics of Structural Changes in Thin Films of Germanium and
Carbon During Their Interaction With Laser Radiation"

Abstract: The article describes results of a study of the
process of crystal growth in thin germanium films during their
interaction with laser radiation. An FEU-31 photomultiplier was
used as the recording device. The germanium films were obtained
by evaporation in a vacuum of the order of $5 \cdot 10^{-6}$ mm Hg on cold
glass substrates. The interaction of thin germanium films with
focused laser radiation results in the growth of single crystals
within individual cells of the supporting grid on which the film
was placed. The crystals reached 15-20 microns in length. Os-
cillograms disclosed a difference in the duration of changes in
the optical density of the films when they were irradiated with
laser radiation in air or in a vacuum. Since changes in the

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ZAKHAROV, V. P., et al., Fizika i Khimiya Obrabotki Materialov,
No 5, Sep-Oct 70, pp 55-60

optical density of germanium film in a vacuum begin following
the completion of the laser pulse action, it may be considered
that the single crystals grow in the film as it cools off. The
temperature for the start of single-crystal growth is strictly
determined. In air the appearance of significant temperature
gradients determines a higher rate of single-crystal growth in
the films than under vacuum conditions. Crystal growth within
different cells takes place sequentially as the film crystalli-
zation temperature is reached during cooling. The use of the
photomultiplier makes it possible to estimate mean crystal
growth rates. For 15-20-micron single crystals the mean rate of
their growth in the film is of the order of 10 cm/sec.

     The same method was used to study the time characteris-
tics of the graphitization of carbon film in its interaction
with a laser pulse. Unlike germanium films, where ordering of
the microstructure occurs during their cooling, carbon films are

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ZAKHAROV, V. P., et al., Fizika i Khimiya Obrabotki Materialov,
No 5, Sep-Oct 70, pp 55-60

graphitized on heating. Oscillograms of variations in the opti-
cal density of the carbon film show that the graphitization
process begins 200 microseconds after the start of the laser
pulse. The rate of movement of the film graphitization front
in an individual cell is estimated to be of the order of 30
cm/sec.

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