

2/2 022

UNCLASSIFIED

PROCESSING DATE--04DEC70

CIRC ACCESSION NO--AP0136633

ABSTRACT/EXTRACT--(U) GP-0-

ABSTRACT. SATD. VAPOR PRESSURE (P) OF THE  
SNCL SUB2, (RB, CS) CL SYSTEMS WAS DETD. AND THE VALUES OF THE A AND B  
COEFFS. OF THE LOG P EQUALS MINUS A-T PLUS B EQUATION FOR THESE SYSTEMS  
ARE TABULATED. MASS SPECTRA PROVED EXISTENCE OF MSNCL SUB3 (I) (M  
EQUALS RB OR CS) IN THE VAPOR PHASE. THERMODYNAMIC PARAMETERS OF I  
DECOMPNS. ARE DETD. FACILITY: LENINGRAD. GOS. UNIV., LENINGRAD,  
USSR.

UNCLASSIFIED

1/2 028 UNCLASSIFIED PROCESSING DATE--20NOV70  
TITLE--APPROXIMATE SOLUTION TO THE PROBLEM OF A JET FLOW PAST THE ARC OF A  
CURVE -U-  
AUTHOR--KARPENKO, P.D. K  
COUNTRY OF INFO--USSR  
SOURCE--UKRAINSKII MATEMATICHESKII ZHURNAL, VOL. 22, NO. 2, 1970, P.  
232-236  
DATE PUBLISHED--70  
SUBJECT AREAS--PHYSICS  
TCPIC TAGS--JET FLOW, CURVE GEOMETRY  
CONTROL MARKING--NO RESTRICTIONS  
DOCUMENT CLASS--UNCLASSIFIED  
PROXY REEL/FRAME--1998/0568 STEP NO--UR/0041/70/022/002/0232/0236  
CIRC ACCESSION NO--AP0121240  
UNCLASSIFIED

2/2 028

UNCLASSIFIED

PROCESSING DATE--20NOV70

CIRC ACCESSION NO--AP0121240

ABSTRACT/EXTRACT--(U) GP-0-- ABSTRACT. APPLICATION OF SUCCESSIVE CONFORMAL MAPPING TO THE PROBLEM OF A JET FLOW PAST AN ARBITRARY CURVE. AN APPROXIMATE SOLUTION IS OBTAINED BY (APPROXIMATELY) MAPPING THE CURVE ONTO A WEDGE WHOSE APEX SPLITS THE ONCOMING FLOW. IN THIS APPROACH, THE CURVE IS MAPPED FIRST ONTO A CIRCLE AND THEN ONTO THE WEDGE.  
FACILITY: ZHITOMIRSKII PEDAGOGICHESKII INZTITUT, ZHITOMIR, UKRAINIAN SSR.

UNCLASSIFIED

K  
USSR

UDC 621.375.4

KARPENKO, R. A., NECHITAYLO, L. S.

"Analysis of the Stability of a Cascade Transistor Amplifier Using a Digital Computer"

Tr. Uralskogo politekhn. in-ta (Works of the Urals Polytechnical Institute), 1970, collection 182, pp 156-161 (from RZh-Radiotekhnika, No 8, Aug 70, Abstract No. 8D56)

Translation: The stability of a transistor cascade amplifier is analyzed on the basis of the Nyquist number. The results are presented in the form permitting use of a digital computer for the calculations. The flow diagram of the calculation program used by the authors on the Razdan-2 digital computer is presented. The bibliography has seven entries.

1/1

USSR

UDC 632.95

STOYANOVICH, F. M., KARPENKO, R. G., GRORUSHKINA, G. I., GOL'DFARB, YA. L.,  
Institute of Organic Chemistry imeni N. D. Zelinskiy

"A Method of making Dibenzothiophene Derivatives"

USSR Author's Certificate No 349692, filed 13 Aug 70, published 6 Sep 72  
(from RZh-Khimiya, No 10, May 73, Abstract No 10N621P by T. G. Chekareva)

Translation: Dibenzothiophene derivatives, which are of interest as herbicides and insecticides, and can also be used as intermediates in organic synthesis, are synthesized by cyclizing 2-tert-Bu-2'-diphenylsulfonic acids or their halides in the presence of acid catalysts at 0-200°C. Cyclization takes place with splitting of the tert-butyl group. Example: 1 g of 2-tert-Bu-2'-diphenylsulfonic acid (I) and 10 ml of SOCl<sub>2</sub> are boiled for 2 hours, the excess SOCl<sub>2</sub> is driven off in a vacuum, the residue is dissolved in 20 ml of C<sub>2</sub>H<sub>4</sub>Cl<sub>2</sub> and 0.5 g of anhydrous AlCl<sub>3</sub> is added at 0°C with agitation for 20 minutes at that temperature, which is then raised to about 20°C, and the resultant reaction mass is allowed to stand for about 12 hours. The mixture is then poured into water, the organic layer is removed, washed in a 5% solution of NaOH, in water, and dried. After eliminating the solvent, the  
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USSR

· STOYANOVICH, F. M., et al., USSR Author's Certificate No 349692, filed 13 Aug 70, published 6 Sep 72

result is 0.4 g of dibenzothiophen-5-oxide, melting point 185-7°C (dilute alcohol). A similar process is used to synthesize dibenzothiophen-5-oxide-1-carboxylic acid, melting point 235-7°C (alcohol). 0.95 g of I is heated with boiling in 10 ml of  $Ac_2O$ . The anhydride is driven off in a vacuum, and the residue is treated with hexane. After evaporating the solvent, the residue is distilled in a vacuum at 150°C/0.1 mm; the sublimate is dissolved in 5 ml of hot alcohol, the solution is filtered, evaporated to 2 ml, and cooled. The residue contains dibenzothiophene with a melting point of 98.5-9.5°C. A similar procedure gives dibenzothiophene-1-carboxylic acid with a melting point of 176-7°C (hexane-benzene), methyl ether, melting point 68-9°C.

2/2

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Acc. Nr.

APO041534

Abstracting Service:  
CHEMICAL ABST.

4/70

Ref. Code

UR 0366

89982d Reaction of arylsulfonyl compounds with an excess of organolithium reagent. III. Synthesis of 2,6-disubstituted alkylbenzenes. Karpenko, R. G.; Stoyanovich, F. M.; Raputo, S. P.; ~~Sofinab, Ya. D.~~ (Inst. Org. Khim. im. Zelin-skogo, Moscow, USSR); *Zh. Org. Khim.* 1970, 1(1), 112-16 (Russ). The reaction of 1,2,6-BuLi, C<sub>6</sub>H<sub>5</sub> (I) with HCONMe<sub>2</sub>, S-Mel mixt., Me<sub>2</sub>SO, PhCHO, or Ph<sub>2</sub>CO gave resp.: 1,2,6-Bu(OCH)<sub>2</sub>C<sub>6</sub>H<sub>3</sub>, 1,2,6-Bu(MeS)<sub>2</sub>C<sub>6</sub>H<sub>3</sub> (II), 1,2,6-BuMe<sub>2</sub>C<sub>6</sub>H<sub>3</sub>, 1,2,6-Bu[PhCH(OH)]<sub>2</sub>C<sub>6</sub>H<sub>3</sub>, or 1,2,6-Bu[Ph<sub>2</sub>C(OH)]<sub>2</sub>C<sub>6</sub>H<sub>3</sub>. The oxidn. of II with H<sub>2</sub>O<sub>2</sub> in AcOH gave 1,2,6-Bu(MeSO)<sub>2</sub>C<sub>6</sub>H<sub>3</sub>. The action of BuLi-MeLi mixt. on PhSO<sub>2</sub> Bu-*tert* gave PhMe, PhBu, 1,3,2-(HO<sub>2</sub>C)<sub>2</sub>MeC<sub>6</sub>H<sub>3</sub> (on treatment with CO<sub>2</sub>), 1,3,2-(HO<sub>2</sub>C)<sub>2</sub>BuC<sub>6</sub>H<sub>3</sub> (on treatment with CO<sub>2</sub>), I, 1,2,6-MeLi<sub>2</sub>C<sub>6</sub>H<sub>3</sub>, and 2-*tert*-BuSO<sub>2</sub>C<sub>6</sub>H<sub>3</sub>CO<sub>2</sub>H (on treatment with CO<sub>2</sub>). The formation of all these products supports the transient existence of 1,2,6-*tert*-(BuSO<sub>2</sub>)Li<sub>2</sub>C<sub>6</sub>H<sub>3</sub>. CPJR

REEL/FRAME

19751402

USSR

UDC: 535.31

VOROB'YEV, K. I., KARPENKO, S. G., KOROTKOV, P. A., and POGORELOV, V. Ye.

"Electro-Optical Modulator Using Barium Titanate"

Tomsk, Izvestiya VUZ--Fizika, No 7, 1973, pp 35-38

Abstract: A fundamental parameter of electrooptical modulators is the controlling critical intensity of the electric field to provide close to 100% modulation. In this first article, subtitled "Estimation of the Controlling Critical Intensities," of the series with the general title given above, the authors describe research to determine these critical intensities for a BaTiO<sub>3</sub> crystal for various mutual orientations of the crystal's optical axis, the vector of the controlling field intensity, and the vector of the modulated radiation wave, for the cases of linear and square electro-optical effect. The phase shift between oscillations in the two beams propagated in the crystal is determined for various directions of the external electric field in the linear effect, and a table of the results obtained in investigating the linear effect is given. It is concluded that the linear effect in the BaTiO<sub>3</sub> crystal should be good for modulating lasers operating in the visible spectrum.

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KARPENKO

Adrianova, I. I., Vol-  
brodovich, N. A., Vol-  
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Lobkova, L. N.,  
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Lobkova, L. N.,  
Chistyakov, A. B.,  
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TECHNICAL TRANSLATION

15

PROJ | PSTCJIT-23-2015-72  
29 Jul 72

ENGLISH TITLE: PROBLEMS OF LASER BEAM DATA TRANSMISSION  
PROCEEDINGS OF THE FIRST ALL-UNION CONFERENCE, KIEV,  
SEPTEMBER 1968

RUSSIAN TITLE: PROBLEMY PEREDACHI INFORMATSII LAZERNYM IZLUCHENIEM

AUTHOR: I. A. DERUGIN, ET AL.

SOURCE: KIEV ORDER OF LENIN STATE UNIVERSITY  
IMENI T.G. SHEVCHENKO

Translated for FSTC by AGSI

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The contents of this publication have been translated as presented in the original text. No attempt has been made to verify the accuracy of any statement contained herein. This translation is published with a minimum of copy editing and graphics preparation in order to expedite the dissemination of information.

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File Back

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USSR

UDC 621.382.002

AMIRKHANOVA, I.B., GVERDTSITSELI, I.G., GILDAMASHVILI, A.I., GOLUBKOV, V.B.,  
DANSAMIDZE, E.M., ZASLAVSKIY, S.A., KARPENKO, T.T.

"Doping Of Silicon By Ion Bombardment"

V sb. Radiats. fiz. nemet kristallov (Radiation Physics Of Nonmetallic Crystals--Collection Of Works), Vol 3, Part 2, Kiev, "Nauk.dumka." 1971, pp 111-122 (from RZh--Elektronika i yeye primeneniye, No 10, October 1971, Abstract No 10B436)

Translation: Doping of n-silicon with a resistivity of 0.035--150 ohm.cm was conducted by polyenergetic beams of boron ions with a current density of 10 ma.cm<sup>-2</sup>, and maximum energy of 300 plus or minus 0.150 kev with doses of 1 . 10<sup>17</sup> -- 1 . 10<sup>17</sup> cm<sup>-2</sup>. The uniformity of doping was attained by scanning and amounted to 10 percent. Annesling of the doped specimens was conducted in a vacuum at a temperature of 500--700° 0 during the course of 30 min. The method of studying the specimens and the results obtained are described. 7 ill. 8 ref. I.R.

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USSR

UDC 621.372.826

KARPENKO, V. A.

"Diffraction of Electromagnetic Waves at the Open End of a Flat Dielectric Wave Guide"

- Materialy 1 Resp. konferentsii molodykh uchenykh. In-t fiz. AN BSSR, 1970, Sekts. fiziki -- V sb. (Materials of the First Republic Conference of Young Scientists. Physics Institute of the Belorussian SSR Academy of Sciences, 1970, Physics Section -- collection of works), Minsk, 1970, pp 20-21 (from RZh-Radiotekhnika, No 4, Apr 71, Abstract No. 4B115)

Translation: An approximate method of solving the stated problem is illustrated in the example of TE-waves. The bibliography has 1 entry.

1/1

AA00-14250

K

Karpenko, V. G.

UR 0482

Soviet Inventions Illustrated, Section II Electrical, Derwent,

2/70

243902 HEAT FLOW RECORDER in particular for bread baking ovens can measure directly the heat flow during the baking process. The heating surface is covered by a substance, the heat absorption of which is equal to the mean average of absorbing capacity of the material being baked while draining channels (4) are provided in the body of the plate 1. Thermo-electrodes are placed inside the plate. The heat absorbing surface is covered with a layer of a mass 2 with an absorption equal to that of the baked material 3. The coating consists of a mixture of amorphous carbon, pumice and liquid glass. The body of the plate is made of a material with a heat absorption capacity equal to that of the crust of the baked bread.

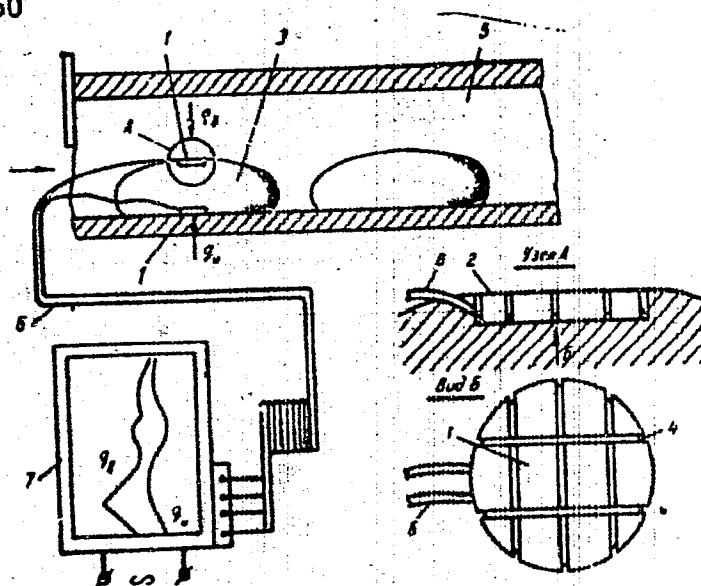
27.11.67 as 1199288/28-13. A.T. LISOVENKO et al.  
 KIYEV INST. OF FOOD IND. (26.9.69) Bul 17/14.5.69.  
 Class 42i, 2a. Int. Cl. G 01k.A21b.

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21

19770760

AA0044250



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19770761

AA0044250

AUTHORS: Lisovenko, A. T., Gerashchenko, O. A., Karpenko, V. G.

Kiyevskiy Tekhnologicheskiy Institut Pishchevoy Promyshlennosti

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19770762

USSR

UDC 536.628

GERASHCHENKO, O. A., KARPENKO, V. G., TATARINOV, E. A.

"Adiabatic Calorimeter for Contact Calibration of Thermal Flow Gauges"

Teplofiz. i teplotekhnika. Resp. mezhved. sb. (Thermal Physics and Power Engineering -- republic interdepartmental collection of works), 1970, Vol 16, pp 83-86 (from RZh-Metrologiya i Izmeritel'naya Tekhnika, No 8, Aug 70, Abstract No 8.32.644)

Translation: The peculiarities of calibration of thermal flow gauges by the radiation and contact methods are considered. The design and principal of operation of the low-inertia adiabatic calorimeter with automatic compensation of heat losses developed by the Institute TTF of the Ukrainian Academy of Sciences is described. As the source of zero-indicator which controls absence of heat escape from the low-inertia adiabatic calorimeter, is used a high-sensitivity thermoelectric battery with  $n \gg 3 \cdot 10^3$  number of microelements due to which the thermal losses of the low-inertia adiabatic calorimeter do not exceed  $\pm 0.1-0.2\%$ . The low-inertia adiabatic calorimeter is designed for contact calibration of thermal flow gauges. 3 ill., 2 bibl. entries.

Resume

1/1

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1/2 028 UNCLASSIFIED PROCESSING DATE--11SEP70  
 TITLE--SELECTING THE PREHEATING TEMPERATURE FOR SURFACING DIES -U-  
 AUTHOR--KARPENKO, V.M., KASSOV, D.S.  
 COUNTRY OF INFO--USSR  
 SOURCE--SVAR. PROIZVOD. 1970, (1), 24-6  
 DATE PUBLISHED-----70

*K*

SUBJECT AREAS--MATERIALS, MECH., IND., CIVIL AND MARINE ENGR  
 TOPIC TAGS--METAL HEATING, WELD FACING, DIE STEEL, MARTENSITIC  
 TRANSFORMATION, WELD JOINT CRACKING, TRANSITION TEMPERATURE, TEMPERATURE  
 DEPENDENCE, STEEL WELDING, DIE/(U)8KH3GSV2F STEEL, (U)7KH3GS4 STEEL,  
 (U)7KHG2NFM STEEL, (U)KH2V2FM STEEL, (U)KH12 STEEL, (U)P18 STEEL

CONTROL MARKING--NO RESTRICTIONS

DOCUMENT CLASS--UNCLASSIFIED  
 PROXY REEL/FRAME--1989/1376

STEP NO--UR/0135/70/000/001/0024/0026

CIRC ACCESSION NO--AP0107849

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UNCLASSIFIED

2/2 028

UNCLASSIFIED

PROCESSING DATE--11SEP70

CIRC ACCESSION NO--A0107849

ABSTRACT/EXTRACT--(U) GP-0- ABSTRACT. THE DEPENDENCE WAS STUDIED OF PREHEATING TEMP. ON THE COMPLETE EQUIV. OF C AND THE TEMP. OF BEGINNING MARTENSITE TRANSFORMATION IN SURFACING DIES OF STEELS 8KH3GSV2F, 7KH3GSM, 7KHG2NFM, 7KH2GSVM, 6KH6GVS2F, KH2V2FM, KH12, AND R18. THE COMPLETE EQUIV. (C SUBE) OF C CAN BE DETD. BY THE FOLLOWING EQUATION: (SHOWN ON MICROFICHE), WHERE C IS C CONC. IN THE SURFACED METAL (WELDED ON METAL), R IS THE CONTENT OF ALLOYING ELEMENT IN PERCENT, N IS THE NO. OF ALLOYING ELEMENTS, AND K IS THE COEFF. DETG. THE CHEM. AFFINITY OF THE ELEMENT TO C. THE SURFACING WAS DONE IN 12-15 LAYERS ON PLATES (60 TIMES 60 TIMES 300 MM) FROM STEEL 45 WITH SUBSEQUENT COOLING IN SAND (DIRECT WELDING CURRENT 130-70 A AT 24-6V). MIN. PREHEATING TEMPS. WERE DETD. BY THE ABSENCE OF CRACKS IN THE NEAR WELD ZONE. WITH THE RISE OF THE COMPLETE C SUBE FROM 1.0 TO 3.0 THE MIN. PREHEATING TEMP. ROSE FROM 370 TO 500DEGREES; HOWEVER, FURTHER INCREASE OF C SUBE DID NOT AFFECT THE MIN. TEMP. ANY FURTHER. WITH THE INCREASE OF THE MIN. PREHEATING TEMP. FROM 250 TO 500DEGREES, THE TEMP. OF BEGINNING MARTENSITE TRANSFORMATION DECREASED FROM 300 TO 70DEGREES.

UNCLASSIFIED

USSR

UDC 577.1:615.7/9

BURKATSKAYA, YE. N., OSTROUKHOVA, V. A., ~~KARPENKO, V. N.~~, ANINA, I. A., OLEFIR, A. I.

"Characteristic Features of the Reactions of the Organism under the Prolonged Effect of Various Classes of Chemicals"

V sb. Nauch. osnovy sovrem. metodov gigiye. normirovaniya khim. veshchestv v okruzhayushchey srede (Scientific Principles of Modern Methods of Hygienic Normalization of Chemicals in the Environment -- collection of works), Moscow, 1971, pp 135-141 (from RZh-Biologicheskaya Khimiya, No 14, Jul 72, Abstract No 14F2050)

Translation: On the basis of a study of the effect of organochlorine and organophosphorus and carbamate pesticides (experiments on rats) on certain biochemical systems of the organisms, the morphological composition of the blood and the immunological reactivity, it is considered that during hygienic normalization of chemicals as integral tests, the biochemical, hematologic and immunologic indexes can be used.

1/1

USSR

UDC 615.777/.779-015:612.014.461

BURKATSKAYA, YE. N., and KARPENKO, V. N. Kiev Scientific Research Institute  
of Industrial Hygiene and Occupational Diseases

"Effect of Dinitrophenol Pesticides on Water and Electrolyte Metabolism"

Kiev, Vrachebnoye Delo, No 2, 1971, pp 126-130

Abstract: The effects of five compounds - dinitrophenol (DNP), dinitroortho-  
cresol (DNOC), dinitro-isopropylphenol (DNIPP), dinitrosecondarybutylphenol  
(DNBPP), and dichloronitrophenol (DCNFP) - on the concentration of potassium and  
sodium in plasma, erythrocytes, myocardium, liver, and kidneys were studied  
in white rats. Despite the differences in chemical structure, all the pesti-  
cides increased blood sodium and form of them increased the potassium con-  
centration. DNOC, DNIPP, and DNBPP substantially increased the sodium content  
of all the viscera. DCNFP had no effect in this respect, while DNP decreased  
the sodium and potassium concentrations in the myocardium and liver. Total  
water in the myocardium and liver decreased after administration of the pesti-  
cides and in some cases the amount of intracellular water increased proportio-  
nately. The above changes in water and electrolyte metabolism account for  
some of the clinical symptoms associated with poisoning by dinitrophenol  
derivatives in man - thirst, elevated temperature, sensation of fear, and  
motor restlessness. 1/1

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USSR

UDC: 616.411-003971:616.151.57  
-07:615.777/.779

KARPENKO, V. N., Kiev Scientific Research Institute of Labor Hygiene and Occupational Diseases

"Investigation of Hemopoiesis and the Blood Coagulating System During Intoxication With Some Carbamate Pesticides"

Kiev, Vrachebnoye Delo, No 1, Jan 71, pp 130-133

Abstract: Experiments were conducted to determine the effect of TMTD and sevin on hemopoiesis and the blood coagulating system. The preparations were administered to rabbits weighing 2.3-2.8 kg per os in doses of LD<sub>50</sub> (25 mg/kg for TMTD, 70 mg/kg for sevin) every other day for a total of 15 times. Blood drawn from the animals was examined for content of hemoglobin, erythrocytes, reticulocytes, thrombocytes, coagulating properties, and bone marrow hemopoiesis. It was found that intoxication with TMTD initially depresses leukopoiesis, reduces the bone marrow content of granulocytes, and induces the development of leukopenia. Thrombopenia also develops on TMTD intoxication which is thought to be one of the main reasons for the retardation of blood coagulation and the development of hemorrhagic manifestations such as hemorrhages in the organs of experimental animals.


USSR

KARPENKO, V. N., Vrachebnoye Delo, No 1, Jan 71, pp 130-133

Under similar experimental conditions, sevin has hardly any effect on either hemopoiesis or the blood coagulating system. The tendency noted toward hypercoagulation is ascribed to a decline in the activity of serum cholinesterase and erythrocytes. During intoxication with TMD or sevin, it is necessary to initially study the blood picture, particularly with respect to the level of leukocytes and thrombocytes, and also to determine the condition of the hemopoietic system.

USSR

UDC 621.315.592

  
KARPENKO, V.P., KASHERININOV, P.G., MATVEYEV, O.A.

"Surface-Barrier Cadmium Telluride Junction Photomemory"

Leningrad, Fizika i Tekhnika Poluprovodnikov, Vol 4, No 5, 1970, pp 937-940

Abstract: The mechanism of a surface-barrier junction photomemory using cadmium telluride is discussed from the theoretical point of view, and an experiment is described in which the surface-barrier junctions in n-CdTe with an initial electron concentration of  $2.7 \cdot 10^{16} \text{ cm}^{-3}$  were investigated. The volt-capacitance characteristics of the junction were measured. The volt-capacitance and volt-ampere characteristics of the investigated junctions in the dark were described by ordinary classical expressions for a sharp transition. Curves are presented for the variation of the capacitance of the junctions illuminated by extrinsic light  $\lambda = 0.83-1.5$  microns with different illumination intensities.

It was discovered that the capacitance of the surface-barrier junctions created in low-resistance n-CdTe has photosensitivity in the range of extrinsic absorption. After switching off the illumination, the perturbation caused by the extrinsic light is retained for a long time when  $T = 300^\circ \text{ K}$  (photomemory). On illumination of the junction storing the perturbation by strongly absorbed

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USSR

KARPENKO, V.O., et al., Fizika i Tekhnika Poluprovodnikov, Vol 4, No 5, 1970, pp 937-940

short-wave light the magnitude of the capacitance decreases, and the photomemory disappears. A decrease in the capacitance of such a junction takes place also on illuminating it with light with  $h\nu = 1.0-1.2$  electron volts. The observed phenomena are explained by the presence of two groups of impurity levels in the initial material. One group of deep levels is responsible for the photomemory effect of the junctions, and their concentration is equal to  $0.96 \cdot 10^{16} \text{ cm}^{-3}$ ,  $\gamma = 1.3 \cdot 10^{-17} \text{ cm}^2$ . The second group of shallow levels located at the edge of the valence zone is responsible for the capacitive relaxations on switching off the illumination and the photocurrent when illuminating the junction by light with  $h\nu < E_g$ .

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1/2 020 UNCLASSIFIED PROCESSING DATE--3000:70  
TITLE--ELECTRICAL PROPERTIES OF SURFACE BARRIER P-N JUNCTIONS ON HIGH  
RESISTANCE CADMIUM TELLURIDE -U-  
AUTHOR--(05)-BOGOMAZOV, A.P., ~~KARPENKO, V.P.~~ KASHERININOV, P.G., MATVEYEV,  
O.A., STETSYUK, R.S.  
COUNTRY OF INFO--USSR  
SOURCE--FIZ. TEKH. POLUPROV. 1970, 4(4), 813-14  
DATE PUBLISHED-----70  
SUBJECT AREAS--MATERIALS, PHYSICS  
TOPIC TAGS--CADMIUM TELLURIDE, ELECTRIC PROPERTY, PN JUNCTION, ELECTRIC  
FIELD, VOLT AMPERE CHARACTERISTIC  
CONTROL MARKING--NO RESTRICTIONS  
DOCUMENT CLASS--UNCLASSIFIED  
PROXY REEL/FRAE--1998/0932 STEP NO--UR/0449/70/004/004/0813/0814  
CIRC ACCESSION NO--AP0121534  
UNCLASSIFIED

2/2 020

UNCLASSIFIED

PROCESSING DATE--30OCT70

CIRC ACCESSION NO--AP0121534

ABSTRACT/EXTRACT--(U) GP-0- ABSTRACT. DARK CURRENT VOLTAGE CHARACTERISTICS OF SURFACE BARRIER P-N JUNCTIONS ON HIGH RESISTANCE CDTE ARE QUADRATIC AND MORE INFLUENCED BY THE ELEC. FIELD IN THE BASE AREA THAN BY THE RESISTANCE OF THE JUNCTION ITSELF. THE LATTER BECOMES IMPORTANT WHEN THE BASE RESISTIVITY IS REDUCED BY ILLUNINATION; IN THIS CASE, THE CURRENT VOLTAGE CURVE IS EXPONENTIAL. FACILITY: FIZ. TEKH. INST. IM. IOFFE, LENINGRAD, USSR.

UNCLASSIFIED

1/2 011 UNCLASSIFIED PROCESSING DATE--11SEP70  
 TITLE--EXPERIMENTAL DETERMINATION OF THE EXTENT OF LONG RANGE ORDERING IN  
 ALLOYS OF THE COPPER PLATINUM SYSTEM -U-  
 AUTHOR--KARPENYUK, A.N., PRESNYAKOV, A.A., OZHANBUSINOV, YE.A., MELIKHOV,  
 V.D.  
 COUNTRY OF INFO--USSR  
 SOURCE--UKR. FIZ. ZH. (RUSS. ED.) 1970, 15(1), 140-2  
 DATE PUBLISHED-----70  
 SUBJECT AREAS--MATERIALS  
 TOPIC TAGS--COPPER ALLOY, PLATINUM ALLOY, ALLOY PHASE COMPOSITION, ORDERED  
 ALLOY  
 CONTROL MARKING--NO PESTRICTIONS  
 DOCUMENT CLASS--UNCLASSIFIED  
 PROXY REEL/FRAME--1989/1278 STEP NO--UR/0185/70/015/001/0140/0142  
 CIRC ACCESSION NO--AP0107754  
 3777777777 UNCLASSIFIED

2/2 011

UNCLASSIFIED

PROCESSING DATE--11SEP70

CIRC ACCESSION NO--AP0107754

ABSTRACT/EXTRACT--(U) GP-0- ABSTRACT. CONC. CHANGES WERE DETD. AS A FUNCTION OF RELATIVE INTEGRAL INTENSITY OF HIGH RESOLN. (321) AND (410) LINES AND AS A FUNCTION OF THE EXTENT OF LONG RANGE ORDER IN A CU,PT ALLOY (ANNEALED FOR 1732 AND 2164 HR). THE EXTENT OF LONG RANGE ORDER CHANGED MARKEDLY AT 12.5-20 ATOM PERCENT PT, APPARENTLY, DUE TO FORMATION OF ORDERED CU SUB7 PT AND CU SUB4 PT PHASES.

UNCLASSIFIED

1/2 011 UNCLASSIFIED PROCESSING DATE--11SEP70  
 TITLE--EXPERIMENTAL DETERMINATION OF THE EXTENT OF LONG RANGE ORDERING IN  
 ALLOYS OF THE COPPER PLATINUM SYSTEM -U-  
 AUTHOR--KARPENYUK, A.N., PRESNYAKOV, A.A., DZHANBUSINOV, YE.A., MELIKHOV,  
 V.D. *K*  
 COUNTRY OF INFO--USSR  
 SOURCE--UKR. FIZ. ZH. (RUSS. ED.) 1970, 15(1), 140-2  
 DATE PUBLISHED-----70  
 SUBJECT AREAS--MATERIALS  
 TOPIC TAGS--COPPER ALLOY, PLATINUM ALLOY, ALLOY PHASE COMPOSITION, ORDERED  
 ALLOY  
 CONTROL MARKING--NO RESTRICTIONS  
 DOCUMENT CLASS--UNCLASSIFIED  
 PROXY REEL/FRAME--1989/1278 STEP NO--UR/0185/70/015/001/0140/0142  
 CIRC ACCESSION NO--AP0107754  
 1111777777 UNCLASSIFIED

2/2 Q11

UNCLASSIFIED

PROCESSING DATE--11SEP70

CIRC ACCESSION NO--AP0107754

ABSTRACT/EXTRACT--(U) GP-0- ABSTRACT. CONCN. CHANGES WERE DETD. AS A FUNCTION OF RELATIVE INTEGRAL INTENSITY OF HIGH RESOLN. (321) AND (410) LINES AND AS A FUNCTION OF THE EXTENT OF LONG RANGE ORDER IN A CU,PT ALLOY (ANNEALED FOR 1732 AND 2164 HR). THE EXTENT OF LONG RANGE ORDER CHANGED MARKEDLY AT 12.5-20 ATOM PERCENT PT, APPARENTLY, DUE TO FORMATION OF ORDERED CU SUB7 PT AND CU SUB4 PT PHASES.

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UNCLASSIFIED

USSR

UDC: 621.373:530.145.6

ALEYNIKOV, V. S., KARPETSKIY, V. V.

"Analysis of the Change in Concentration of the Components of a Gas Mixture in an Electrical Discharge in Carbon Dioxide"

Elektron. tekhnika. Nauch.-tekhn. sb. Elektron. SVCh (Electronic Technology. Scientific and Technical Collection. SHF Electronics), 1971, vyp. 3, pp 88-96 (from RZh-Radiotekhnika, No 6, Jun 71, Abstract No 6D188)

Translation: A simple theory is outlined for the change in concentration of a molecular gas in an electric discharge, which can be used to evaluate the effect which a number of parameters of the discharge tube have on the rate of change in the composition of the working mixture (the lifetime of the laser). As an example, the authors examine the change in concentration of carbon dioxide in the positive column of a glow discharge used in a laser. The effect which the additional volume, tube diameter and addition of oxygen to the gas mixture have on the lifetime of the laser is estimated.

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USSR

UDC 532.582.31

IVANYUTA, Yu. F., KARPEYEV, Yu. N., and KOROVICHEV, B. K.,  
Leningrad

"Autooscillating Motions of a Cylinder Towed in a Weakly Aqueous  
Polymer Solution"

Moscow, Izvestiya Akademii Nauk USSR, Mekhanika Zhidkosti i Gaza,  
No 1, Jan-Feb 73, pp 162-164

Abstract: The action of polymer additions on characteristics of the nonstationary oscillating motion of a towed cylinder, R. number= $3 \cdot 10^3 - 10^4$ , was investigated. The cylinder had the possibility of lateral dislocations under the action of the force conditional to the asymmetry of the periodic break-off of the boundary layer. The towing speed, resistance, and the lateral dislocations of the cylinder were registered. Average amplitudes of settled lateral autooscillations and the resistance of the cylinder are shown as functions of its towing speed. The increment of hydrodynamic resistance of the oscillating cylinder is the more the greater the amplitude of oscillations; it is in a freshly prepared solution of polyethylene oxide much lower than in water. Explanations are given for the decrease of the amplitude of autooscillations of the cylinder when towed in weak polymer solution. Four figures, three bibliographic references.



1/3 022 UNCLASSIFIED PROCESSING DATE--02DCT70  
TITLE--MECHANISM OF THE DIENE SYNTHESIS WITH 5,ALKOXYOXAZOLES -U-

AUTHOR--(05)--DROBINSKAYA, N.A., IONOVA, L.V., KARPEYSKIY, M.YA., PADYUKOVA,  
N.SH., TURCHIN, K.F.  
COUNTRY OF INFO--USSR

SOURCE--KHIM. GETEROTSIKL. SOEDIN. 1970, (1), 37-42

DATE PUBLISHED-----70

SUBJECT AREAS--CHEMISTRY, BIOLOGICAL AND MEDICAL SCIENCES

TOPIC TAGS--MOLECULAR STRUCTURE, CONDENSATION REACTION, ORGANIC AZOLE  
COMPOUND, CHEMICAL SYNTHESIS, ISOMERIZATION, PYRIDINE, CHEMICAL REACTION  
MECHANISM, ACETYLENE, ELECTRON DENSITY

CONTROL MARKING--NO RESTRICTIONS

DOCUMENT CLASS--UNCLASSIFIED

PROXY REEL/FRAME--1986/1368

STEP NO--UR/0409/70/000/001/0037/0042

CIRC ACCESSION NO--APO103222

UNCLASSIFIED

2/3 022

UNCLASSIFIED

PROCESSING DATE--02OCT70

CIRC ACCESSION NO--AP0103222

ABSTRACT/EXTRACT--(U) GP-0- ABSTRACT. THE HETERODIENE CONDENSATION OF 5, ALKOXYOXAZOLES TAKES PLACE IN TWO STAGES: REACTION OF OXAZOLES WITH DIENOPHILES GIVING UNSTABLE ADDUCTS, AND ISOMERIZATION OF THESE ADDUCTS TO SUBSTITUTED 3, HYDROXYPYRIDINES. THUS, ET BETA, ACETYLACRYLATE (I) REACTS WITH 4, METHYL, 5, ETHOXYOXAZOLE (II) TO GIVE 2, METHYL, 3, HYDROXY, 4, ACETYL, 5, CARBETHOXYPYRIDINE (III) THROUGH THE UNSTABLE ADDUCT IIIA. THIS MECHANISM IS SUPPORTED BY PI ELECTRON DENSITY CALCNS. FOR I AND II, ACTUAL ISOLATION OF III AS THEIR MAIN REACTION PRODUCT, ITS CHEM. CONVERSION, AND FINALLY BY PMA AND IR STUDIES. REACTIONS BETWEEN II AND BETA, ACETYLACRYLIC ACID (GIVING 2, METHYL, 3, HYDROXY, 5, ACETILPYRIDINE) (IV), AND BETWEEN I AND CYCLOPENTEN, 3, ONE (FORMING 5, METHYL, 4, HYDROXY, 6, AZAHYDRINDEN, 3, ONE) (V) ALSO VERIFIED THIS TYPE OF MECHANISM. THUS, TO A SOLN. OF 17.9 G I IN 20 ML ABS. ET SUB2 O WAS ADDED 8.87 G II, 1 ML ACOH, AND 200 MG HYDROQUINONE, AND THE SOLN. KEPT 1 WEEK AT ROOM TEMP. IN THE DARK TO GIVE 8 G III, M. 151-20DEGREES (HEPTANE). A SOLN. OF 2.5 G II AND 3.42 G BETA, ACETYLACRYLIC ACID IN 40 ML ABS. ET SUB2 O WAS KEPT 5 DAYS UNDER A CACL SUB2 TUBE TO GIVE 0.64 G IV, M. 253-4DEGREES (DECOMPN.) (MEDH). TO A SUSPENSION OF 1.14 G LIALH SUB4 IN 50 ML THF WAS ADDED DROPWISE WITH COOLING 2.1 G III IN 50 ML THF, AND THE MIXT. REFLUXED 6 HR AND LEFT OVERNIGHT AT ROOM TEMP. TO GIVE 1.74 G 2, METHYL, 3, HYDROXY, 4, (ALPHA, HYDROXYETHYL), 5, HYDROXYMETHYLPYRIDINE, M. 172-3DEGREES (ETOH-ET SUB2 O).

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3/3 022

UNCLASSIFIED

PROCESSING DATE--02DCT70

CIRC ACCESSION NO--AP0103222

ABSTRACT/EXTRACT--A MOXT. OF 0.8 G CYCLOPENTEN,3,ONE, 0.63 G II, AND 0.1 G  
PYROGALLGL WAS HEATED 2 HR AT 110DEGREES, COOLED, TREATED WITH 1 ML  
25PERCENT DRY HCL IN ETOH, CAREFULLY SHAKEN WITH 70 ML ABS. ET SUB2 O,  
AND LEFT OVERNIGHT IN A REFRIGERATOR TO GIVE 0.22 G V, M. LARGER THAN  
170DEGREES (ETOH-ET SUB2 O).

UNCLASSIFIED

USSR

UDC: 547.823.07:542.945.32

~~KARPEYSKIY, M.YA.~~  
DROBINSKAYA, N.A., IONOVA, L.V., ~~KARPEYSKIY, M.YA.~~, and FLORENT'YEV, V.L.,  
Institute of Molecular Biology, Ukrainian SSR, Academy of Sciences USSR, Second  
Moscow Order of Lenin Medical Institute, Moscow

"Synthesis of Pyridoxal-5'-phosphate and Pyridoxamine-5'-Phosphate Derivatives"

Riga, Khimiya Geterotsiklicheskikh Soyedineniy, No 6, Nov-Dec 69, pp 1037-1043

Abstract: A synthetic method based on direct phosphorylation of respective amines is reported for the following pyridoxamine-5'-phosphates (PAMP): 2-nor-PAMP, 2-nor-6-methylPAMP, and 6-methyl-PAMP. The yields were 50% or better, with some difficulty in phosphorylation due to two ortho-substituents (at the carbons 2 and 6). The pyridoxal-5'-phosphate (PP) derivatives were obtained via phosphorylation of Schiff bases of the respective aldehydes and p-phenetidine followed by hydrolysis. The following compounds were obtained: 2-nor-PP, 2-nor-6-methyl-PP and 6-methyl-PP in yields ranging from 53 to 73%. These compounds had to be chromatographed on a sulfuresin and it was discovered that direct hydrolysis on the resin column gave higher yields. UV spectra are reported for all compounds in acid, neutral and basic media.

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USSR

K UDC: 547.823'722.3:543.422.6:542.942.4

FLORENT'YEV, V.L., DROBINSKAYA, N.A., IONOVA, L.V., KARPEYSKIY, M. YA., Institute of Molecular Biology, Ukrainian SSR, Academy of Sciences USSR; Second Moscow Order of Lenin Medical Institute, Moscow

"Synthesis of Pyridoxal Analogues and Their Properties"

Riga, Khimiya Geterotsiklicheskikh Soyedineniy, No 6, Nov-Dec 69, pp 1028-1936

Abstract: Cyclization of N-acylaminoacid esters in the presence of phosphorus pentoxide gave 5-ethoxyoxazoles, which were reacted with maleic acid diesters to yield diesters of substituted 3-hydroxycynchomeric acid. Reduction of the latter over lithium aluminum hydride gave analogues of pyridoxime, which could then be converted to pyridoxal derivatives by oxidation with manganese dioxide. The aldehydes were converted to oximes and Schiff bases with p-phenetidine. Hydrogenation of oximes gave pyridoxamine derivatives. Most of the yields exceeded 60% UV maxima are reported for the compounds obtained.

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USSR

UDC 537.312.5

BARPIKOV, I. I., LITVINOV, R. O., and BYASHOK, A. P.

"Effect of Laser Radiation on the Electrical Parameters of MOS Structures"

Kiev, Poluprovodnikovaya tekhnika i mikroelektronika, No. 4, 1970, pp 105-107

Abstract: The purpose of this article is to investigate the effects of laser radiation, used for welding, perforating, and resistor adjusting in integrated circuits, on the semiconductor devices going into these circuits. Specifically, the article studies laser-made metal-oxide-semiconductor transistors of the planar structure, using n- and p-type silicon, as well as MOS varactors made of n-type Si. The laser used as the radiation source in the experiments was of the "Luch-1" type operating in the pulse mode, in which the active material was ruby with a 0.05% admixture of Cr. The MOS structures were irradiated with an unfocused beam whose energy was insufficient to damage the target surfaces. Changes of transient characteristics in the MOS transistors were investigated; the varactors were investigated for changes in the voltampere characteristics and in the capacitance as a function of the voltage applied in the cut-off direction.

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USSR

UDC: 621.375.82

KARPIKOV, I. I., LITVINOV, P. O., LYASHOK, A. P.

"Influence of Laser Radiation on Electrical Parameters of Metal-Oxide-Semiconductor Structures"

Poluprovodn. Tekhn. i Mikroelektronika, Resp. Mezhd. Sb. [Semiconductor Technology and Microelectronics. Republic Interdepartmental Collection], No. 4, 1970, pp 105-107, (Translated from Referativnyy Zhurnal Fizika, No. 8, 1970, Abstract #8D1145, by the authors).

Translation: The influence of laser radiation on the characteristics of MOS (metal-oxide-semiconductor) devices is discovered. In the case of MOS transistors, devices of n-type silicon are most strongly affected. The discharge current is increased by 2-3 times. For MOS varactors, a decrease in capacitance and an increase in leakage current are noted after irradiation. The changes which develop are stable and irreversible. The presumed nature of the changes is discussed. 8 biblio. refs.

1/2 013 UNCLASSIFIED PROCESSING DATE--16OCT70  
TITLE--SYNTHESIS OF SILICON OXYNITRIDE -U-  
AUTHOR--(04)-GUZMAN, I.YA., PURUSOVA, T.N., POLUBOYARINOV, D.N.,  
KARPILOVSKAYA, M.N.  
COUNTRY OF INFO--USSR *K*  
SOURCE--OGNEUPORY 1970, 35(3), 41-6  
DATE PUBLISHED-----70  
SUBJECT AREAS--CHEMISTRY  
TOPIC TAGS--SILICON COMPOUND, NITRIDE, DILATOMETRIC ANALYSIS  
CONTROL MARKING--NO RESTRICTIONS  
DOCUMENT CLASS--UNCLASSIFIED  
PROXY REEL/FRAME--1996/0879 STEP NO--UR/0131/70/035/003/0041/0046  
CIRC ACCESSION NO--AP0118048  
UNCLASSIFIED



2/2 013

UNCLASSIFIED

PROCESSING DATE--16OCT70

CIRC ACCESSION NO--AP0118048

ABSTRACT/EXTRACT--(U) GP-0- ABSTRACT. ACCORDING TO THE REACTION  $Si$  PLUS  $SiO$  SUB2 PLUS  $N$  SUB2 EQUALS  $Si$  SUB2 ON SUB2 PLUS ONEHALF  $O$  SUB2 (1) OR  $3Si$  PLUS  $SiO$  SUB2 PLUS  $2N$  SUB2 EQUALS  $2Si$  SUB2 ON SUB2 (2) SYNTHETIC SILICON OXYNITRIDE WAS PREPD. THE THERMOGRAVIMETRIC AND X RAY ANAL. DATA SHOW THAT THE REACTIONS BEGIN AT 1000DEGREES AND FINISH AT 1450DEGREES. REACTION (2) HAS BETTER PROSPECTS FOR USE. TO PROVE THE ASSUMPTION THAT  $Si$  SUB2 ON SUB2 IS CREATED VIA THE INTERMEIDATE  $SiO$ , SAMPLES FROM A MIXT.  $SiO$  PLUS  $Si$  IN WT. RATIO 1.52:1 WERE PREPD. AND HEATED IN  $N$  AT 1450-70DEGREES. BY X RAYS ONLY THE PHASE  $Si$  SUB2 ON SUB2 WAS FOUND. A SLIGHTLY LOWERED WT. INCREASE (IN COMPARISON WITH THE THEORETICAL ONE) IN (2) IS CAUSED BY THE  $SiO$  ESCAPE. THE DILATOMETRIC MEASUREMENTS AT 20-700DEGREES OF SMAPLES WITH VARIOUS  $Si:SiO$  SUB2 RATIOS CONFIRM THE X RAY DATA. SAMPLES HEATED AT 1350DEGREES AND CUNTG. A LARGE AMT. OF  $SiO$  SUB2 SHOW THE QUARTZ EFFECT CONNECTED WITH TRANSFORMATION OF BETA TO ALPHA QUARTZ. THE COURSE OF DILATOMETRIC CURVES OF SAMPLES HEATED AT 1450DEGREES DEPENDS ON THE INITIAL COMPN. OF THE MASS. AT  $Si:SiO$  SUB2 EQUALS 31.85:65.15 AT 170-280DEGREES THE EFFECT CORRESPONDING TO THE EXISTENCE OF CRISTOBALITE IS CLEARLY SHOWN. THE AV. COEFF. OF THERMAL EXPANSION IF R.EE TIMES 10 PRIME NEGATIVE6 DEGREES. AT A RATIO 58.37:41.63 THE SMOOTH COURSE OF DILATOMETRIC CURVES IS EVIDENT. THE COEFF. OF THERMAL EXPANSION EQUALS 2.13 TIMES 10 PRIME NEGATIVE6-DEGREE. FACILITY: MOSK. KHIM.-TEKHNOL. INST. IM. MENDELEEVA, MOSCOW, USSR.

UNCLASSIFIED

K  
USSR

GUZMAN, I. YA., PURUSOVA, T. N., POLUBOYARINOV, D. N.,  
~~KARPILOVSKAYA, M. N.~~

"Synthesis of Silicon Oxynitride"

Moscow, Ogneupory, No 3, Mar 70, pp 41-46

Abstract: A refractory material has been produced, consisting primarily of silicon oxynitride ( $\text{Si}_2\text{ON}_2$ ); the optimal technological parameters for its synthesis are determined, and certain properties of the materials produced are described.

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USSR

UDC:519.44

KARPILOVSKIY, G. I.

"The Least Power of the Precise Representation of Abelian Groups"

Vestn. Khar'kovsk. Un-ta [Herald of Khar'kov University], No. 53, 1970,  
Mechanics-Mathematics Series, No. 34, pp. 107-115 (Translated from  
Referativnyy Zhurnal Matematika, No. 12, 1970, Abstract No. 12A184 by  
P. Gudivok)

Translation: The primary result is determination of the least power of  
the precise representation of a finite abelian group in an algebraically  
closed field of arbitrary characteristics.

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USSR

UDC 621.317.726

KARPILOVSKIY, L. N.

"New Method of Measuring the Amplitudes of Pulse Signals of Nanosecond Length"

Materialy nauchno-tekhn. konferentsii. Leningr. electrotekhn. in-t svyazi. Vyp. 2 (Materials of the Scientific and Technical Conference. Leningrad Electrotechnical Communications Institute. Vyp. 2), Leningrad, 1970, pp 249-252 (from RZh-Radiotekhnika, No 8, Aug 70, Abstract No 8A353)

Translation: This article contains a discussion of a method of measuring pulse amplitudes based on the principles of frequency compensation conversion. A description of the operation of the block diagram of the instrument is presented. The accuracy of the procedure is estimated.

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USSR

UDC 621.317.726

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KARPILOVSKIY, L. N.

"Method of Frequency Compensation Conversion and Some Characteristic Features of It"

Materialy nauchno-tekhn konferentsii. Leningr. elektrotekhn. in-t svyazi. Vyp. 2 (Materials of the Scientific and Technical Conference. Leningrad Electrotechnical Communications Institute. Vyp. 2), Leningrad, 1970, pp 244-249 (from RZh-Radiotekhnika, No 8, Aug 70, Abstract No 3A352)

Translation: This article contains a discussion of the essence of the method of frequency compensation conversion. Some characteristic features of conversion of the measured signals are investigated. They affect the selection of the measurement limit while retaining the given accuracy. Defined formulas for calculating the charge and discharge time of a nonlinear capacitance of a p-n junction used in the investigated method were obtained. Recommendations are made with respect to expansion of the measurement limits and methods of constructing measuring instruments implementing the given principle.

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1/2 006 UNCLASSIFIED PROCESSING DATE--27NOV70  
TITLE--POSSIBLE USE OF VARIOUS PRINCIPLES OF IMPROVING THE ADHERENCE OF  
PRINTING INKS FOR METALS AND GLASS -U-  
AUTHOR-(04)-GUREVICH, YE.I., KARPILOVSKIY, P., POLYAKOV, V., GRINEVA, YE.  
COUNTRY OF INFO--USSR  
SOURCE--POLIGRAFIYA 1970, (2), 33-5  
DATE PUBLISHED-----70  
SUBJECT AREAS--METHODS AND EQUIPMENT  
TOPIC TAGS--PRINTING INK, ALUMINOSILICATE GLASS, ADHESION  
CONTROL MARKING--NO RESTRICTIONS  
DOCUMENT CLASS--UNCLASSIFIED  
PROXY REEL/FRAE--3006/0725 STEP NO--UR/0543/70/000/002/0033/0035  
CIRC ACCESSION NO--AP0134460  
UNCLASSIFIED

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272 006 UNCLASSIFIED PROCESSING DATE--27NOV70  
CIRC ACCESSION NO--AP0134460  
ABSTRACT/EXTRACT--(U) GP-0- ABSTRACT. THE USE OF  
POLY(ALUMINOPHENYLSILOXANE) AS THE HARDENER FOR EPOXY RESINS USED IN  
PRINTING INKS FOR NONPOROUS SURFACES IS DESCRIBED.

UNCLASSIFIED

USSR

UDC: 51

SEMENOV, Ye. V., KARPILOVSKIY, Ye. B., REDIN, Yu. A.

"Organization of Repair of Basic Equipment Using Mathematical Methods"

Tr. VNI Moloch. Prom-sti [Works of All-union Scientific Research Institute of the Milk Industry], 1972, No 28, pp 25-56 (Translated from Referativnyy Zhurnal Kibernetika, No 11, 1972, Abstract No 11V488; by the authors)

Translation: Problems of organization of repair work at enterprises using precise methods are studied. The apparatus of linear programming is used. Several simple examples are calculated.

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Theoretical Automation

USSR

UDC 51

SEMENOV, Ye. V., KARPILOVSKIY, Ye. B., REDIN, Yu. A.

"Organization of the Repair of Basic Equipment Using Mathematical Methods"

Tr. VINII Moloch. prom-sti (Works of the All-Union Scientific Research Institute of the Dairy Industry), 1972, No. 28, pp 25-36 (from RZh-Matematika, No 11, Nov 72, Abstract No 11V488)

Translation: Problems of the organization of repair work in enterprises using exact methods in which linear programming is used are discussed. Several simple examples are calculated. Authors abstract.

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USSR

UDC 51

ZARETSKIY, L. S., KARPILOVSKIY, Ye. B., KHALEPSKIY, L. D.

"Planning of the Production Activity of Enterprises of the Dairy Industry Using Methods of Mathematical Economics"

Tr. VNII moloch. prom-sti. (Works of the All-Union Scientific Research Institute of the Dairy Industry), 1972, No. 28, pp 17-23 (from RZh-Matematika, No 11, Nov 72, Abstract No 11V495)

Translation: A technique for constructing a mathematical model of a dairy plant is discussed. The problem of operational control of the plant using dynamic programming is formulated. The necessary recurrence relationships are derived. Authors abstract.

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USSR

UDC: 51

ZAKETSKIY, L. S., KARPILOVSKIY, Ye. B., KHALEPSKIY, L. D.

"Planning of Production Activity of Milk Industry Enterprises Using Mathematical Economics Methods"

Tr. VNI Moloch. Prom-sti [Works of All-union Scientific Research Institute of the Milk Industry], No 28, pp 17-25 (Translated from Referativnyy Zhurnal Kibernetika, No 11, 1972, Abstract No 11V495, by the authors)

Translation: A method is studied for construction of a mathematical model of a milk plant. The task of operative planning of the plant using dynamic programming is stated. The necessary recurrent relationships are produced.

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USSR

UDO 621.572.6

KONDRAT'YEV, S.L., KARPIN, YU.V. (Members Of The Scientific-Technical Society of Radio Engineering, Electronics, And Communication imoni A.S. Popov)

"Concerning Correlation Evaluation Of The Quality Of Communication Channel"

Radiotekhnika, Vol 27, No 3, Mar 1972, pp 93-95

Abstract: It is shown that an autocorrelated function can serve as a criterion of the quality of a synchronous discrete communication channel. This concept was experimentally verified with the aid of functional simulation on a digital computer. Models were investigated of AM and FM channels with additive normal noise and interference in the form of AM signals at frequencies close to the frequency of the effective signal. The levels of noise and interference were changed within wide limits. 2 fig. 3 ref. Received, 7 Jun 1970; after revision into short communication, 25 Oct 71.

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USSR

UDC 666.764.36

KARPINOS, D. M., GROSHEVA, V. M., MIKHASHCHUK, YE. P., and TOTSKAYA, G. A.,  
Institute of Problems of Material Science, Academy of Sciences UkrSSR

"A Refractory Based on Chromium Oxide"

Moscow, Ogneupory, No 1, 1974, pp 55-56

Abstract: Studies are performed on the production of refractory materials from chromium oxide, reinforced with mullite single crystal fibers. The promise of the use of mullite fiber as a reinforcing component to increase the thermal and impact strength of products of chromium oxide is demonstrated.

1/1

USSR

UDC 621.762.5.001

KARPINOS, D. M., TUCHINSKIY, L. I., and FEFER, V. YA., Institute of Problems of Material Science, Academy of Sciences UkrSSR

"Calculation of the Corrected Work of Compacting During Dynamic Hot Pressing of Stratified Reinforced Materials"

Kiev, Poroshkovaya Metallurgiya, No 12, Dec 73, pp 7-13

Abstract: Energy expenditures are analyzed, producing an equation for calculation of the work of dynamic hot pressing of reinforced materials as a function of the plastic properties of the matrix and the geometric parameters of the composition considering the distribution of stress on the contact surface between fiber and matrix and the friction between them. The results of experimental testing of the equation during dynamic hot pressing of copper-molybdenum wire and nickel-molybdenum wire systems show that the work of compacting defined by the formula agrees well with the experimental results.

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USSR

UDC 621.763:669.01

KARPINOS, D. M., FEDORENKO, V. K., BURYKINA, A. L., and GORSKIY, V. V.,  
Institute of Problems of Material Science, Academy of Sciences UkrSSR,  
Institute of Metal Physics, Academy of Sciences UkrSSR

"Study of Interactions at the Phase Division Boundary in Composite  
Materials with a Nichrome Matrix and Fibers Based on Tungsten and  
Molybdenum"

Kiev, Poroshkovaya Metallurgiya, No 2, Feb 74, pp 64-75

Abstract: This work studies the structure and phase composition of the transition zones, determination of the mechanism and kinetics of growth of interaction zones, the influence of alloy elements in the fiber and matrix on the mechanism and kinetics, the study of recrystallization in the fibers and determination of the influence of all these factors on some of the strength characteristics of fiber-reinforced materials. It is established that the phase composition of the reaction zone does not influence the quantitative relationships of layer growth. The kinetics of diffusion processes in the system studied correspond to a vacancy mechanism. The alloying elements in the fiber and matrix have

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USSR

KARPINOS, D. M., et al., Poroshkovaya Metallurgiya, No 2, Feb 74, pp 64-75

a significant influence on the parameters of layer growth. The diffusion of nickel and chromium in the fiber is rapid. Recrystallization phenomena in fibers represent one of the main causes of the reduction in strength of fiber reinforced materials during long-term operation.

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USSR

UDC 621.762.4.044.2

KARFINOS, D. M., BESPYATYY, V. A., SUKHIKH, L. L., SHIYANOVSKAYA, I. YE.,  
and BESPYATYY, A. A., Institute of Problems of Material Sciences, Academy  
of Sciences UkrSSR, Zaporozh'ye Aluminum Plant "Kommunar"

"Some Properties of Reinforced Cylindrical Shells"

Kiev, Poroshkovaya Metallurgiya, No 11(131), Nov 73, pp 31-35

Abstract: The described technological schema of the formation of cylindrical shells includes the explosive squeezing with subsequent heat treatment (heating up to 850° C and 50 min aging) of a composite consisting of a plastic matrix in the form of a foil on a nickel base and reinforcing tungsten fibers, 0.03 mm in diam., in the form of a grid. The results of an investigation of the high-temperature short-duration strength of the shells show that the short-duration strength of the composite at 800, 950, and 1100° C considerably exceeds the strength of the matrix. At 950° C the strengthening effect of the composite reaches 6, at 1100° C it reaches 12, with a simultaneous decrease in plasticity properties. After heat treatment the composites reveal thermal stresses which develop from the difference in the linear elongation and the elastic constants of the components of the composite.

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USSR

UDC 621.762.001.541.1:669.01.84

KARPINOS, D. M., and LISTOVNICHAYA, S. P., Institute of Problems of Materials Science, Academy of Sciences Ukrainina SSR

"Interaction of Certain Oxide Diffusion Barriers with the Matrix Phase and Hardening Elements of Materials Reinforced with Fibers"

Kiev, Poroshkovaya Metallurgiya, No 1, Jan 74, pp 101-107

Abstract: An attempt was made to use oxide, one micron thick, as diffusion barriers to prevent the formation of brittle intermetallics. This was done by studying the interaction of the matrix phase with reinforced-fiber hardening elements, being protected by the diffusion barriers. Silicon dioxide, aluminum oxide, and aluminosilicate coatings were used as the diffusion barriers, produced by electron-beam vaporization or high-frequency discharge. From tests using the above-mentioned coatings on steel Kh18N9T and Co, Ni, nichrome, Mo, and W it was found that the temperature stability of these coatings increased in the order given, i.e., the thermal stability of 0.35 micron films of silicon dioxide increased with the order of the steel and metals listed above, aluminum oxide coatings were stable at higher temperatures which increased in the order of the metals and steel listed above, e.g., 1100-1200° C for

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USSR

KARFINOS, D. M., and LISTOVNICHAYA, S. P., Poroshkovaya Metallurgiya, No 1, Jan 74, pp 101-107

for Kh18N9T up to 1500-1600 for tungsten, with a lower thermal stability noted for the aluminosilicate coatings. Annealing of the coated materials produces different coating thicknesses depending on the compatibility of the coating and matrix and the fiber used. The major factor involved is the degree to which mass transfer of the coating penetrates the substrate. It was concluded that the use of diffusion barriers opens new avenues for use in the development of materials reinforced with fibers. Four figures, three tables, 18 bibliographic references.

2/2

USSR

UDC 620.181.4.536.4

KARPINOS, D. M., TUGHINSKIY, L. I., MIRCOSHNIKOVA, T. K., and VISHNYAKOV, L. R., Institute of Problems of Material Science, Academy of Sciences Ukrainian SSR

"Calculation of the Thermal Expansion of Reinforced Metals"

Kiev, Poroshkovaya Metallurgiya, No 1, Jan 74, pp 80-84

Abstract: A method was proposed for calculating the thermal expansion of composites, reinforced by unidirectionally oriented fibers, in which one or both of the materials in the composite possesses plastic rather than elastic properties. Tungsten wire of alloy KhN6OV (VZh98) was used as the experimental material where the reinforcing fiber used was tungsten wire VA with its content in VZh98 varied. Tests showed that pure tungsten has a very low coefficient of thermal expansion and alloy VZh98 has a relatively high coefficient between 300 and 1300°C and increases with temperature. When reinforced with VA fibers, the thermal expansion is not as high as for the unreinforced alloy and starts decreasing between 700 and 900°C, depending on the VA content. The reason for this that at comparatively low temperatures the matrix has a yield strength high enough to cause substantial tensile stresses in the tungsten

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USSR

KARFINGS, D. M., et al., Poroshkovaya Metallurgiya, No 1, Jan 74, pp 80-84

fibers and, consequently, to cause additional temperature deformation in them. At high temperatures the matrix assimilates an ideal plastic body, its yield strength remains small and, therefore, the coefficient of thermal expansion of the composite is basically determined by the thermal expansion of the fibers. Thus, the matrix (VZh98) coefficient is greater than tungsten (fibers) and at low temperatures the coefficient increases, but as temperature rises the pure matrix becomes plastic, and the coefficient is governed then by the fibers, and the overall coefficient diminishes. Three figures, one table, five bibliographic references.

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KARPINS, D.M.

TECHNOLOGY OF PRODUCING NEW MATERIALS

Translation of Russian-language collection: Tekhnologiya Polucheniya Novykh Materialov, 1972, Kiev.

JPRS 50873  
23 August 1975

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[ : USSR - 1 ]

Powder Metallurgy

USSR

UDC: 621.762.5.001

KARPINOS, D. M., TUCHINSKIY, L. I., FEFER, V. Ya., Institute of Problems of  
Material Sciences, Academy of Sciences UkrSSR

"The Problem of Compacting of Sandwich Materials by Hot Pressing"

Kiev, Poroshkovaya Metallurgiya, No 7, Jul 73, pp 43-50.

Abstract: An analytic dependence is produced, describing the compacting of sandwich-type reinforced material during hot pressing, considering the influence of smoothing of matrix projections pressed into the intervals between fibers. It is assumed that the compacting rate is controlled by the rate of steady-state creep of the matrix. It is shown that in the initial stages of hot pressing, compacting results only from fibers pressing into the matrix, after which the smoothing of the portions of the matrix pressed into the spaces between the fibers becomes significant. Experimental testing with reinforced copper-molybdenum and nickel-molybdenum specimens shows that the dependence produced describes the actual process of compacting of a reinforced material during hot pressing satisfactorily.

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USSR

UDC: 666.764.36

KARPINOS, D. M., PAVLIKOV, V. N., MIKHASHCHUK, Ye. P., PILIPOVSKIY, Yu. L.,  
"Order of the Red Banner of Labor" Institute of Problems of Material  
Science Academy of Sciences of the Ukrainian SSR

"A Composite Material"

Moscow, Otkrytiya, Izobreneniya, Promyshlennyye Obraztsy, Tovarnyye Znaki,  
No 22, Aug 72, Author's Certificate No 345111, Division C, filed 22 Jun 70,  
published 14 Jul 72, p 86

Translation: This Author's Certificate introduces a composite material  
based on aluminum oxide. As a distinguishing feature of the patent,  
thermal stability is improved without sacrificing flame resistance and  
impact strength by adding lamellar single crystals of chromic oxide with  
the following ratios of components (in wt.%): aluminum oxide -- 80-95,  
lamellar single crystals of chromic oxide -- 5-20.

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Composite Materials

USSE

FRANTSEVICH, I. N., and KARPINAS, D. M., Eds.

Kompozitsionnyye Materialy Voloknistogo Stroyeniya (Composite Materials With a Fibrous Filament Structure), Kiev, "Naukova Dumka" Press, 1970, 403 pp

Translation of Introduction: For the solution of problems of the construction of machines and mechanisms in various branches of the new technologies, especially the high-parameter technologies, new materials are required with a complex of different, occasionally even contradictory properties, which have been stipulated by the requirements of the designer. The materials scientist can solve these problems effectively and expeditiously only by the rational synthesis of materials with advanced, pre-established complex properties. It is therefore necessary to have a thorough understanding of solid-state physics, which will open the way to predicting the properties expected in fabricated materials, as well as to point to options of variants of the most flexible technology, resulting in the synthesis or construction of materials with any combination of constituents in a homogeneous, or sometimes, complex composite material.

There is another side of the problem under consideration -- information and its processing. Information in the area of materials science is especially

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USSR

FRANTSEVICH, I. N., and KARPINAS, D. M., "Naukova Dumka" Press, 1970, 403 pp

complex, not only because of the abundance of sources but also because it is necessary to understand new, additional information from allied sciences -- mathematics, physics, chemistry, and mechanics.

Consequently, in research in materials science, particularly for the designer, one must proceed not from the original, even if it is only systematized material information, but from material reprocessed by highly qualified specialists and published in the form of a monograph. This monograph must include for each narrow subject, sufficiently complete and strictly stated physical questions and a fundamental theoretical presentation for a given area, a detailed and exhaustive description of the technological scheme of production, both of original compounds and materials and basic-purpose materials and, finally, a comprehensive and exhaustive description of a complete range of literature sources relating to properties of materials in a given class and to the area of their use.

This monograph, prepared by specialists having wide experience in the given area, must not merely be a compilation. To a certain extent it must also be

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USSR

FRANTSEVICH, I. N., and KARPINAS, D. M., "Naukova Dumka" Press, 1970, 403 pp

original, reflecting the subjective feelings of the authors. The reader is thus engaged with the authors in a creative search in a given area of composite materials. The monograph, "Composite Materials With a Fibrous Filament Structure," has been written according to this method and is presented for the attention of the reader.

The book is devoted to one of the very real problems of contemporary materials studies. Materials, about which much has been said, to a significant degree predetermine further progress in aviation and rocket technology. For their development numerous associations of outstanding scientists of all disciplines have been attracted, and yearly the number of publications in scientific periodicals and in monographic literature have increased. Until the publication of the present monograph, "Composite Materials With a Fibrous Filament Structure," no generalized monograph of this type had been published, either here or abroad.

The first nine chapters of the monograph were written by G. A. Van Fo Fy. This is original material, dealing with calculations of stability and other characteristics of reinforced composite materials. Continuous models were

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USSR

FRANTSEVICH, I. N., and KARPINAS, D. M., "Naukova Dumka" Press, 1970, 403 pp

used in a consideration of the elastic and rheonomic properties of fibrous materials, processes of heat conductivity and heat diffusion in them, questions of thermoelectromotive force and loss during their preparation and work at high temperatures, and also the electromagnetic properties and propagation of elastic waves in such materials. Methods of analogy in the theory of composite materials and methods of manufacturing parts from them are described.

Chapter ten, written by D. M. Karpinos and L. I. Tuchinskiy, also has a theoretical character. Consideration is given to the reinforcement and stability of properties of the materials, reinforced by continuous and discrete fibers, the effect of electromotive forces on the stability of the materials, a statistical model of breakdown, defects in composite materials, and types of breakdown in composite materials.

The last chapters deal with a description of the technology of the preparation of different forms of fibrous materials and their use.

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USSR

FRANTSEVICH, I. N., and KARPINAS, D. M., "Naukova Dumka" Press, 1970, 403 pp

Technological schemes for the production of metallic and ceramic materials, reinforced by fibers, and their physical-mechanical properties are described in Chapter 11 by D. M. Karpinos, L. I. Tuchinskiy, and V. G. Zil'berberg.

In Chapter 12, D. M. Karpinos and V. M. Grosheva discuss reinforced plastics.

Permeable fibrous materials, such as filters, transpirators, packing, and shock absorbers are described in Chapter 13, which was written by A. G. Kostornov and I. M. Fedorchenko.

Chapter 14, which was written by A. G. Kostornov, V. G. Zil'berberg, D. M. Karpinos, and A. V. Tkachenko, describes technological methods of preparing metallic and nonmetallic reinforcing elements, i.e., fibers and filaments.

The final chapter describes specific forms of metallic materials with fibrous structure which are created in the process of crystallization and other forms of thermal processing. The chapter was written by D. M. Karpinos and Ye. N. Denbnovetskiy.

I. N. Frantsevich,  
Academy of Sciences UxrSSR

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USSR

FRANTSEVICH, I. N., and KARPINAS, D. M., "Naukova Dumka" Press, 1970, 403 pp

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USSR

UDC 620.192.43:541.12.014

KARPINOS, D. M., TUCHINSKIY, L. I., and VISHNYAKOV, L. R., Institute of Problems of Material Science, Academy of Sciences Ukrainian SSR

"Selection of a Matrix for a Composite Material Which Does Not Dissolve the Reinforcing Fiber"

Kiev, Poroshkovaya Metallurgiya, No 5, May 73, pp 68-72

Abstract: On the basis of concepts of alloy thermodynamics, the composition of a multicomponent matrix of a composite material was calculated for a matrix which does not dissolve single-component reinforcing fibers. A calculation was made for the case when the matrix forms a solid solution with the fibers with limited solubility of the components. An experimental check of one of the calculated compositions of a four-component Ni-Cr-W-Al matrix, reinforced with tungsten fibers, confirmed the correctness of the obtained relationships. The experimental check showed that the tungsten fibers were not dissolved in the matrix after 100 hours of annealing at 1200°C. 2 figures, 9 bibliographic references.

1/1



USSR

UDC 621.793.75

KARPINOS, D. M., ZIL'BERGBERG, V. G., and SHARIVKER, S. YU., Institute of Problems of Material Science, Ukrainian SSR Academy of Sciences

"Plasma Spraying With Submersion of the Nozzle In Water"

Kiev, Poroshkovaya Metallurgiya, No 4, Apr 73, pp 95-96

Abstract: A description is given of a method of plasma spraying involving submersion of the nozzle and the article being sprayed in water during spraying. This method prevents oxidation of the sprayed powder, using zirconium carbide as an example, and allows the spraying distance to be shortened to 25-30 mm while increasing the coating density.

1/1

USSR

UDC 620.193.43

CHUKREYEV, N. YA., VOROB'YEVA, N. P., ZIL'BERBERG, V. G., and KARPINOS, D. M.,  
Academy of Sciences UkrSSR, Institute of General and Inorganic Chemistry,  
Institute of Problems of Material Science

"On the Resistance of  $Al_2O_3$  Coatings on Nickel, Molybdenum, and Titanium in  
Melted LiCl-KCl Eutectic"

Moscow, Zashchita Metallov, Vol 19, No 2, Mar-Apr 73, pp 195-196

Abstract: The corrosion resistance in melted LiCl-KCl eutectic of  $Al_2O_3$  coatings (200  $\mu$  m thick, 12-15% porosity), applied in argon on wire specimens of Ni, Mo, and Ti, was investigated. In comparison with unprotected Ni-, Mo-, and Ti-specimens, the coating decreased the corrosion by 2.3-2.4 times at 400° and by more than 3-6 times at 500°; at the same time, aluminum oxide dissolved at rates of  $8.0 \cdot 10^{-5}$  and  $1.3 \cdot 10^{-4}$  g/cm<sup>2</sup> hr, respectively. The unprotected Ni-specimens corroded at 400° at the rate of  $3.6 \cdot 10^{-4}$  and at 500° at the rate of  $3.6 \cdot 10^{-3}$  g/cm<sup>2</sup> hr. The corresponding values for Mo are  $5.4 \cdot 10^{-4}$  and  $7.7 \cdot 10^{-4}$  and  $4.6 \cdot 10^{-4}$  and  $9.2 \cdot 10^{-4}$  g/cm<sup>2</sup> hr for Ti. The aluminum oxide coating on Ti proved to be non-resistant. Plasma oxide coatings can be applied to protect metals against corrosion under conditions of melted salts. A further increase of corrosion resistance would probably result by increasing the plasma flux temperature and by decreasing the coating porosity.

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KARPINOS, D. M.

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fractional exponent equal to  $-1/2$ , an integral kernel representation is derived, and time dependencies of the real and imaginary parts are computed and plotted. A graphical analysis shows that the representation of an elastic modulus by a complex  $Q^*$  operator assures an energy decrease with tension relaxation in agreement with the second law of thermodynamics.

Karpinos, D. M., L. I. Tschinsky, M. L. Gorb, E. S. Umansky, and V. Ya. Fefer.  
Mechanical properties of titanium reinforced by unidirectional molybdenum wires. Problemy prochnosti, no. 6, 1972, 28-32.

The mechanical properties of type VT 1-0 titanium, reinforced with unidirectional wires of molybdenum M4, were investigated. Reinforcement wires 0.8 mm in diameter were wound unidirectionally on titanium matrix plates 0.08 mm thick. The wire volumetric content was regulated by the winding pitch, and comprised 10, 20, 32, and 44% by volume. Tensile strength and impact viscosity tests were conducted. Non-reinforced titanium plates were tested for comparison. The tensile strength was tested at 20, 400, 600, and 800° C; five specimens for each volumetric content of the reinforcement wire were tested at each temperature. At all investigated temperatures, a practically linear relationship was observed between the short-term tensile strength and the volumetric wire content  $V_w$ . An increase of titanium strength due to reinforcement is characterized by the strengthening coefficient  $K$ , which represents the ratio of the composition strength to the titanium strength at a specific temperature.

Instrumentation and Equipment

USSR

UDC: 620.17:62-416

UMANSKIY, E. S., Engineer, SVIRIDOVSKIY, Yu. M., Engineer, ALEKSYUK, M. M., Engineer, ~~KARPINOS~~, D. M., Engineer, KADYROV, V. Kh., Engineer, Institute of Problems of Strength, Academy of Sciences UkrSSR

"An Installation for Studying the Mechanical Properties of Metal Foil Materials"

Kiev, Tekhnologiya i Organizatsiya Proizvodstva, No 4, Jul/Aug 72, pp 108-109

Abstract: The paper describes an installation for studying the strength and deformability characteristics of foils and fibers over a wide temperature range. The device is basically a water-cooled vacuum chamber mounted on a special table. A control panel is provided with instrumentation for various kinds of tests. A vacuum of  $10^{-6}$ - $10^{-5}$  mm Hg ( $1.33 \cdot 10^{-4}$ - $1.33 \cdot 10^{-3}$  N·m<sup>-2</sup>) is produced by the exhaust system. Micromechanical tests are done on a precision breaking machine with maximum breaking force of 250 kgf (2450 N). A diagram of the unit is given and its operation is described. Test results are given for the mechanical properties of aluminum foil of two different thicknesses as a function of temperature.

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Glass and Ceramics

USSR

UDC 621.002.3:666.6

KARPIVOS, D. M. (Professor, Doctor of Technical Sciences), and GROSHEVA, V. M.  
(Candidate of Technical Sciences)

"New Ceramic Material"

Moscow, Mashinostroitel', No 5, May 72, p 11

Abstract: The creation of structural materials on a nonmetallic base is one of the current central problems. Ceramics featuring high refractoriness, chemical inertness, high wear resistance, and low specific density hold high promise in this respect. However, their low resistance to impact stresses and equally low resistance to cyclic heating pose limitations on their applications for machine parts. The Institute for Problems in Science of Materials, Academy of Sciences UkrSSR has developed a method of producing ceramic materials in which the aforementioned shortcomings have been overcome by reinforcing the ceramic matrices with filamentary crystals of mullite. The high principal properties of the new materials (density,  $3.1 \text{ g/cm}^3$ ; tensile strength  $170 \text{ kgf/mm}^2$ ; refractoriness,  $1910^\circ\text{C}$ ; insolubility in acids) make them suitable for use as structural parts for service under high thermal and stress conditions both in chemical machinery and metallurgy. (1 table, 1 bibliographic reference)

1/1

USSR

UDC 539.4

~~KARPINOS, D. M.~~ TUCHINSKIY, L. I., GORB, M. L., UMANSKIY, E. S., FEFER,  
V. Ya., Kiev

"Mechanical Properties of Titanium Reinforced with Unidirectional Molybdenum Wires"

Kiev, Problemy Prochnosti, No 6, 1972, pp 28-32.

Abstract: This work presents a study of the mechanical properties of reinforced titanium-based materials. Compositions based on type VT-1-0 alloy reinforced with unidirectional M4 molybdenum wires were studied. The specimens were made by vacuum dynamic hot pressing. The volumetric content of wire was adjusted by the winding step and amounted to 10, 20, 32 and 44 vol.%. Each specimen consisted of 20 to 30 plates with wound wires. The dependence of tensile strength, yield point,  $\sigma_{0.2}$ , Young modulus and impact toughness on molybdenum content was studied. It was found that the tensile strength and modulus of elasticity of compositions increased linearly with increasing volumetric content of wire, which agrees with the additive rule. It is demonstrated that as temperature rises, the strengthening factor of the compositions increases significantly. Impact toughness was found to be dependent on composition and orientation of reinforcing elements.

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Infrared Rays

USSR

UDC 535.853.4

KARPINOS, D. M., LISTOVNICHAYA, S. P., AYVAZOV, V. YA.

"Reflecting Attachment for an Infrared Spectrometer"

Moscow, Pribery i Tekhnika Eksperimenta, No 6, 1971, pp 190-191

Abstract: The known devices for obtaining the infrared reflection and transmission spectra of thin films are highly complex. A simple design of an attachment for studying the reflection and transmission spectra of thin films at angles of incidence close to  $78^\circ$  for single and double-beam devices is described. The device makes it possible to obtain spectra for films the thickness of which is much less than the wavelength. This provides information about the film structure and makes it possible to study the boundary interaction of the contacting phases of a different physical-chemical nature.

The investigated sample is attached at an angle of  $75-78^\circ$  to the axis of the incident radiation as the mirror closest to the entrance slit of the monochromator. The other two mirrors are aluminum plated glass plates made of KF-8 glass. All three mirrors are installed in a special mounting which is attached in a sealed tube of an illuminator. The slit is covered by a rubber plate. To increase the sensitivity of the method (isolate the radiation component parallel to the plane of incidence), a polarizer -- a diffraction

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KARPINOS, D. M., et al., Pribery i Tekhnika Eksperimenta, No 6, 1971, pp 190-191

grating applied to an aluminum-coated polyethylene film -- is added to the attachment.

In the spectra of  $\text{SiO}_2$  films, in addition to the usually observed absorption band, new absorption bands were detected in the  $1,300$  and  $500 \text{ cm}^{-1}$  region which are absent in the spectra of films applied to monocrystalline Si. These new bands are explained by the polarizing effect of the substrate. Analogously, in the  $1,000 \text{ cm}^{-1}$  region, an absorption peak was detected for  $\text{Al}_2\text{O}_3$  films obtained by the high frequency deposition method.

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Coatings

USSR

UDC 621.763

FRANTSEVICH, I. N., KARPINOS, D. M., BESPYATYY, V. A., BESPYATYY, A. A., and REPECHENKO, G. A., Institute of Problems of Material Sciences, Academy of Sciences Ukrainian SSR; Zaporozh'ye "Kommunar" Automobile Plant

"Barrier Coating on Tungsten Fibers for Reinforced Nickel-Base Compositions"

Kiev, Poroshkovaya Metallurgiya, No. 10, Oct 70, pp 38-43

Abstract: The potentials of metal-base reinforced compositions appear to be limited due to the problem of stability of this class of materials, particularly by the stability of the interphase boundary of the composition at high temperatures. This study concerns a new technology of applying an antidiffusion coating to tungsten fibers as well as its reinforcing properties in a nickel-base composition. The experiment involved a  $WAl_{12}$  compound applied by spraying in vacuum to tungsten fibers. The compound was

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FRANTSEVICH, I. N., et al., Poroshkovaya Metallurgiya, No 10,  
Oct 70, pp 38-43

found to provide a stable interphase boundary in a nickel-base composition at 1200° C for a minimum of 100 hours and at 1100° C for a minimum of 300 hours. The findings were confirmed by microstructural x-ray spectral analysis of the interphase boundary in a  $W_{12}$  coating applied in 0.01-mm layers. Use was made of an MAR-1 microanalyzer to study the tungsten distribution in the composition along the interphase boundary after various durations of heat treatment.

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Refractory Materials

UDC 549.2

USSR

GROSHEVA, V. M., KARPINOS, D. M., PILIPOVSKIY, Yu. L., PANASEVICH, V. M.,  
GAYOVA, T. I., AND SHAMATOV, Yu. M., Institute of Problems of Material Science,  
Academy of Sciences Ukr SSR

"Refractory Material on an Aluminum Nitride Base"

Moscow, Ogneupory, No 5, May 71, pp 54-56

Abstract: An investigation was made of the reinforcement of aluminum nitride by fiberlike single crystals of mullite ( $3\text{Al}_2\text{O}_3 \cdot 2\text{SiO}_2$ ) synthesized at the Institute of Problems of Material Science, Academy of Sciences Ukr SSR. The refractory material is characterized by chemical inertness and high resistance to thermal shock. It is recommended for lining of high-temperature installations operating in aggressive media, in the presence of abrupt thermal cyclings, and by high mechanical loadings. Three figures, two tables, six bibliographic references.

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UDC 621.763

USSR

KARPINOS, D. M., and BESPYATYY, V. A., Institute of Problems of Material Science, Academy of Sciences UkrSSR

"Studies of the Disintegration of the Reinforcement Composition on a Nickel Base"

Poroshkovaya Metallurgiya, No 4(100), Apr 71, pp 69-73

Abstract: Inspection of samples of composites of nickel reinforced by tungsten fibers showed that internal disintegration occurred upon loading which was not caused by macroscopic deformation. A study was made to determine the process of disintegration in an early state, pointing up the factors affecting the kinetics of this process, and to determine the degree of damage to the reinforced composite under elastic load. Samples with different amounts of reinforcing fibers and a nickel matrix alloyed with tungsten or chromium were tested under a constant linear load at room and elevated temperatures.

Under load in the elastic region, the reinforced composite shows a breakdown of the fibers. The stability of the reinforced composite essentially is affected by the uniformity of distribution of the wires in the matrix cross section. Irregular distribution increases the number of points of dis-

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KARPINOS, D. M., and BESPYATYY, V. A., et al. *Poroshlovaya Metallurgiya*,  
No 4(100), Apr 71, pp 69-73

integration in the elastic region of load. Increased temperatures increase  
the lengthwise transfer of the load from the matrix to the fibers and  
decrease the number of broken wires.

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KARPINOS, D. M., KRAVCHENKO, A. A., PILIPOVSKIY, Yu. Ya., TKACHENKO, V. G.,  
SHAMATOV, Yu. M., KHARCHENKO, V. K., Kiev

"Study of Mechanical Characteristics of Hot Pressed Tungsten-Copper Pseudo-  
alloys"

Kiev, Problemy Prochnosti, No. 12, Dec 70, pp. 64-68

Abstract: Studies are made of the mechanical characteristics of hot-pressed tungsten-copper pseudoalloys and their dependence on the density of the tungsten framework containing the lower-melting component and the time of isothermal holding at the pressing temperature. It is demonstrated that the strength, plasticity and impact toughness increase with increasing density of the refractory framework and holding time in the 1900-2200°C temperature interval during pressing. The hardness and strength in compression depend primarily on the density of the framework and the degree of filling of the pores with copper.

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USSR

UDC 536.2.023

KARPINOS, D. M., KONDRAT'YEV, YU. V., KLIMENKO, V. S., BARANT-SEVA, I. G., FILIPOVSKIY, YU. L., DOBROVOL'SKIY, O. A., and SHAMATOV, YU. M., Institute of Problems of Material Science, Academy of Sciences, Ukrainian SSR

"Physical Properties of Hot-Extruded W-Cu Pseudoalloy"

Minsk, Inzhenerno-Fizicheskiy Zhurnal, Vol 20, No 1, Jan 71, pp 96-99

Abstract: A study was made of a number of physical properties of W-Cu pseudoalloys in a wide range of temperatures: thermal conductivity from 370 to 2200°K, electrical conductivity from 300 to 1970°K, and thermal expansion from 300 to 870 and 1370 to 2200°K. The investigated alloys contained 8-9 wt% Cu.

Results showed that the thermal and electrical conductivities of W-Cu pseudoalloys exceed those of tungsten. The higher conductivity is caused by the effect of copper, where both conductivities in the solid state are 2.5-3 times greater than for tungsten. The sharper lowering of thermal and electrical conductivity

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KARPINOS, D. M., et al., Inzhenerno-Fizicheskiy Zhurnal,  
Vol 20, No 1, Jan 71, pp 96-99

of the pseudoalloys, observed at temperatures above the melting point of copper, is caused partially by a decrease of copper conductivity due to its transition to the liquid state. At temperature above the melting point of copper the pseudoalloy is depleted of copper, and after the high temperature tests the Cu content did not exceed 2-3%.

Values for the coefficient of thermal expansion (CTE) of the pseudoalloys exceed those for tungsten. This attributed to the presence of a significant amount of copper in the samples. As in conductivity tests, at temperatures close to 2200°K the copper melts and flows from the tungsten skeleton, thus reducing the copper content and resulting in an alloy with a thermal expansion close to that of tungsten.

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Composite Materials

USSR

UDC 669.71:669.24.27.28

KARPINOS, D. M., TUCHINSKIY, L. I., VISHNYAKOV, L. R., PERESELENTSEVA, L. N., KLIMENKO, L. N., and DEYMONTOVICH, V. B., Kiev

"Effect of Alloying a Nickel Matrix With Reinforcing Metal Fibers on the Structural Stability of Ni-W and Ni-Mo Composites"

Moscow, Fizika i Khimiya Obrabotki Materialov, No 6, Nov-Dec 72, pp 107-113

Abstract: The problem of creating structurally stable composites for the Ni-W and Ni-Mo system was examined. By alloying the nickel matrix with tungsten up to the maximum saturation of the nickel solid solution, reinforced tungsten fibers were obtained in which the fibers did not dissolve at 1000-1200°C. At these temperatures the Ni-Mo composite was not so stable because an intermetallic compound is formed at the fiber-matrix interface and the maximum saturation of the nickel matrix with molybdenum does not prevent dissolution of the molybdenum fibers. Four figures, 2 tables, and 8 bibliographic references.

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USSR

UDC 666.3.022.519

GROSHEVA, V. M., KARPINOS, L. M., PILIPOVSKIY, YU. L., Candidates of Technical Sciences, GAYOVAYA, T. I., SHAMATOV, YU. M., Institute of Problems of Materials Science, Academy of Sciences, Ukrainian SSR

"Impact-Resistant Ceramic Materials"

Moscow, Steklo i Keramika, No 11, Nov 70, pp 36-37

Abstract: The authors have conducted a project on increasing the impact strength of ceramic material on the basis of boron nitride by the method of reinforcement with filamentary monocrystals of mullite ( $3Al_2O_3 \cdot 2SiO_2$ ), obtained in the Institute of Research on the Problems of Materials, Academy of Sciences, Ukrainian SSR. The reinforcement method developed by them makes it possible to obtain products on the basis of boron nitride, which possess high impact strength. The thermal stability of the products permits their use as insulating materials in high-temperature units with cyclical heating. The chemical inertness and the high impact strength permits the use of the obtained

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GROSHEVA, V. M., et al, Steklo i Keramika, No 11, Nov 70,  
pp 36-37

material in chemical machine building. 1 figure, 1 table, 1  
footnote bibliographic reference, 3 bibliographic entries.

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USSR

UDC 539.4

KARPINOS, O. M., UMANSKIY, E. S., RUDEKNO, V. N., TUCHINSKIY, L. I.

"The High-Temperature Strength of Copper Reinforced With Tungsten Fibers"

Problemy Prochnosti, No 5, May, 1970, pp 33-37

Abstract: A promising method recently developed for the reinforcement of metals is the dynamic hot pressing of compositions. This method has been used with compositions of nickel and copper, reinforced with tungsten fibers and networks. The results of research on the short-term strength and plasticity of nickel, reinforced with tungsten networks, have been presented in a previously published communication. The present work deals with the mechanical properties of copper reinforced with tungsten fibers, oriented along the axis of elongation, as well as with specially woven tungsten networks. All the materials were obtained by dynamic pressing at a temperature of 950-1000° C. It is found that the nature of the destruction of compositions depends mainly upon their constituents and upon the strength of the alloy between the strands and the matrix. With respect to short-term strength, such materials surpass the best modern copper heat-resistant alloys. This is particularly noticeable at high temperatures. Furthermore, the employed regimes of dynamic hot pressing did not provide for a sufficiently firm bond between the copper matrix and the unidirectional fibers if  
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