GUSSAK, Veniamin Borisovich; NASYROV, Yakh'ya Mirsaidovich; SKVORTSOV, Yuriy Aleksandrovich; BOYKO, A.N., red.; SOROKINA, Z.I., tekhn. red.

[Soil formation on loess accumulations of various ages and the fertility of Sierozems] Pochvoobrazovanie na lessovykh akkumuliatsiiakh raznogo vozrasta i plodorodie serozemov. Tashkent, In-t pochvovedeniia, 1961. 159 p. (MIRA 15:7)
(Uzbekistan--Sierozem soils)
(Uzbekistan--Loess)

L 51414-65 EWT(d)/EED-2/EWP(1) Pq-4/Pg-4/Pk-4 IJP(c) BB/GG
ACCESSION NR: AP5015523 UR/0286/65/000/008/0064/0064
681.14

AUTHOR: Boyko, A. N.; Sitnikov, L. S.; Sigorskiy, V. P.; Utyakov, L. L.

TITLE: An adder. Class 42, No. 170202

SOURCE: Byulleten' izobreteniy i tovarnykh znakov, no. 8, 1965, 64

TOPIC TAGS: logic, circuit, adder, computer

ABSTRACT: This Author's Certificate introduces an adder which contains a chronotron, pulse shift logic circuits, flip-flops, "AND" or "OR" logical elements. The device is designed for improving the reliability of adders with pulse-time number representation. The first logical shift circuit is connected to the chronotron where the first addend is stored and to the first input of the second logical shift circuit. The first input of the first logical shift circuit is connected to a source which supplies a sequence of short trigger pulses. The second input of the first logical shift circuit is connected to the carry output for the preceding digit. The second input of the second logical shift circuit is connected to the chronotron where the first addend is stored, while the output of this circuit is

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L 51414-65
ACCESSION NR: AP5015523

connected to the first input of the third logical shift circuit. The second input of the third logical shift circuit is connected to the chronotron where the second addend is stored, the output of the third circuit is connected to the unit input of the first flip-flop for storage of the sum, and the neutral input of this circuit is connected to the source of short trigger pulses. The chronotrons for storage of the first and second addends are connected to the first and second inputs of the "OR" gate respectively. The output of the "OR" gate is connected to the first input of the first "AND" gate. The second input of the "AND" gate is connected to a source of short pulses which are shifted with respect to the pedestal pulse sequence by an interval which corresponds to some number greater than the base of the number system minus 1 and less than the base of the number system. The output of the first "AND" gate is connected to the unit input of the first flip-flop. The neutral input of this flip-flop is connected to a source of pulses which are shifted by half a period. The flip-flop output is connected to the first input of the "AND" gate which forms the carry. The second input of this gate is connected to a source of unit duration pulses. The phase of these pulses coincides with the phase of the pedestal pulse sequence.

ASSOCIATION: Institut matematiki SO AN SSSR (Institute of Mathematics ,SO AH SSSR)

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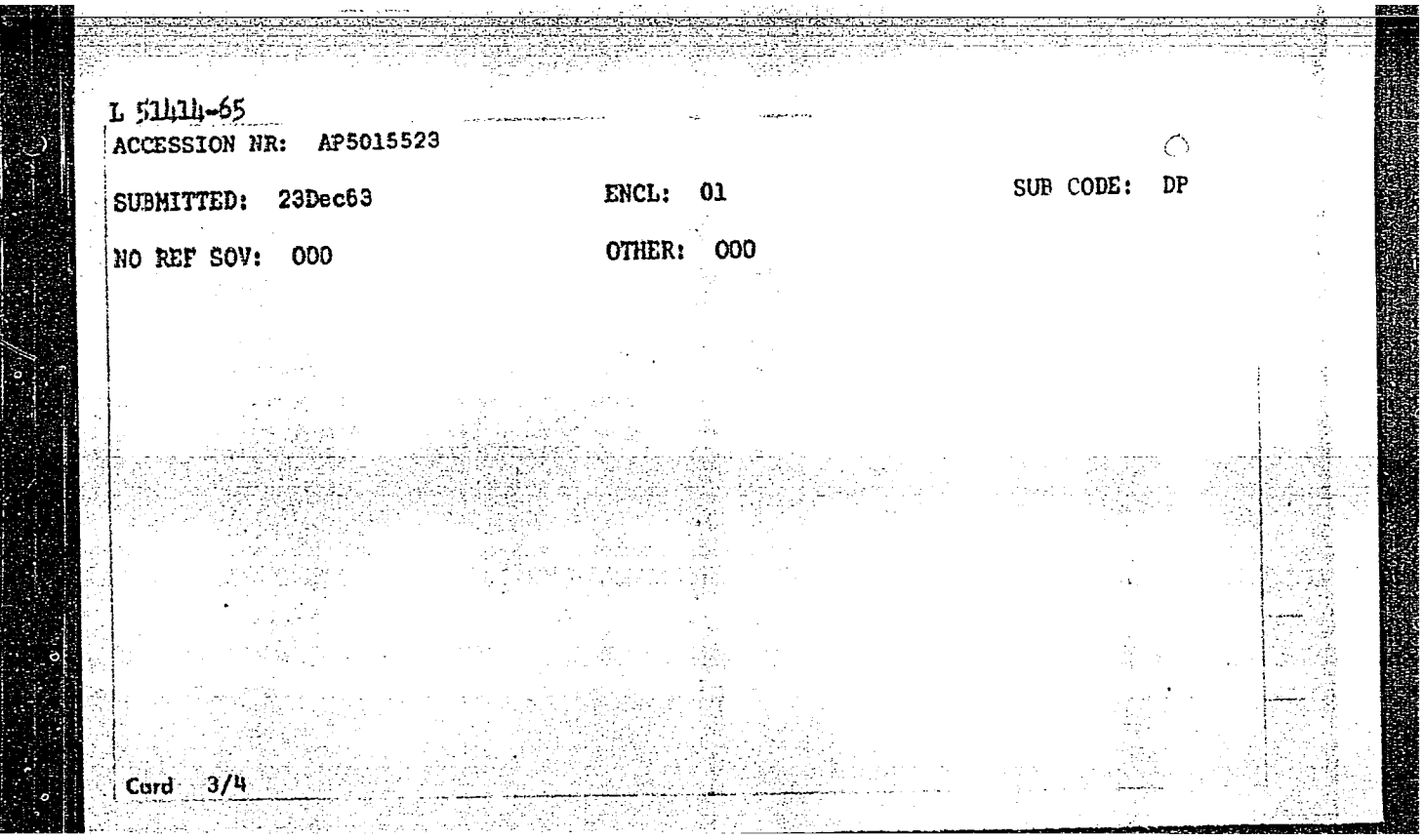

L 51414-65

ACCESSION NR: AP5015523

SUBMITTED: 23Dec63 ENCL: 01 SUB CODE: DP

NO REF SOV: 000 OTHER: 000

Card 3/4

L 51414-65

ACCESSION NR: AP5015523 ENCLOSURE: 01

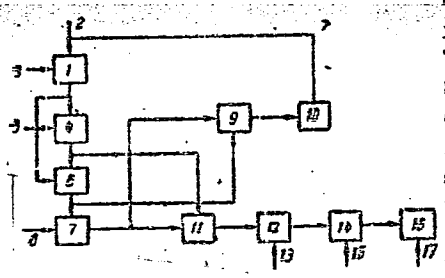

Fig. 1. 1--logical shift circuit; 2--short trigger pulse sequence; 3--carry for previous digital place; 4--chronotron where the first addend is stored; 5--input for the first addend; 6--logical shift circuit; 7--chronotron where the second addend is stored; 8--input for the second addend; 9--logical shift circuit; 10--sum flip-flop; 11--logical "OR" gate; 12--logical "AND" gate; 13--sequence of pulses which are shifted with respect to the pedestal pulses by an interval greater than $R-1$ and less than R, where R is the base of the number system; 14--flip-flop; 15--pulses for return to the initial state which are shifted by half a period with respect to the pedestal pulses; 16--"AND" gate; 17--pulse of unit duration

Card 4/4

BOYKO, Aleksey Nikitich DECEASED '60

Metrology- instruments
measuring radiant energy see IIC

LEV, Vasiliy Tarasovich; PAK, Susan; BOYKO, A.N., red.; SOROKINA, Z.I., tekhn. red.

[Practices in obtaining high bast-fiber crops on the Sverdlov Collective Farm in the Verkhne-Chirchik District of Tashkent Province] Opyt polucheniia vysokogo urozhaia lubianykh kul'tur v kolhoze im. Sverdlova Verkhne-chirchikskogo raiona Tashkentskoi oblasti. Tashkent, M-vo sel'skogo khoziaistva UzSSR, 1962. 34 p. (MIRA 17:2)

KOLYAROVA, Lidiya Fedotovna, kand. sel'khoz. nauk; KANASH, S.S., akademik, otv. red.; BOYKO, A.N., red.; SOROKINA, Z.I., tekhn. red.

[Cottonseed production in the Uzbek S.S.R.] Semenovodstvo khlopchatnika v Uzbekskoi SSR. Tashkent, M-vo sel'skogo khoz.UzSSR, 1962. 59 p. (MIRA 17:1)

L 42042-65 EWT(1)/EWA(h) Peb CG

ACCESSION NR: AP5010948 UR/0286/65/000/007/0131/0132

AUTHOR: Boyko, A. N.; Sigorskiy, V. P., Sitnikov, L. S.; Utyakov, L. L.

TITLE: Reversible counter. Class 42, No. 169879

SOURCE: Byulleten' izobreteniy i tovarnykh znakov, no. 7, 1965, 131-132

TOPIC TAGS: reversible counter, counter, pulse counter

ABSTRACT: The proposed reversible counter utilizes a high-stability pulse-phase element. To improve stability, the counter is constructed as shown in Fig. 1 of Enclosure. Orig. art. has: 1 figure. [DW]

ASSOCIATION: Institut matematiki SO AN SSSR (Institute of Mathematics, SO AN SSSR)

SUBMITTED: 04Jun64 ENCL: 01 SUB CODE: EC

NO REF SOV: 000 OTHER: 000 ATD PRESS: 3239

Card 1/2

L 42042-65

ACCESSION NR: AP5010948 ENCLOSURE: 01

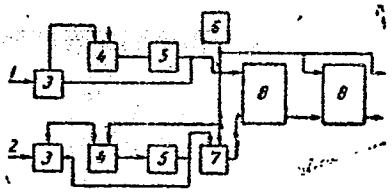

Fig. 1. Reversible counter

1 - Direct-count pulse source; 2 - reverse-count pulse source; 3 - trigger; 4 - AND gate; 5 - shaper; 6 - generator of high-repetition pulses; 7 - anticoincidence circuit; 8 - high-stability pulse-phase element.

Card 2/2

L 42030-65 EWT(1)/EWA(h) Peb

ACCESSION NR: AP5010956 UR/0286/65/000/007/0134/0134

AUTHORS: Boyko, A. N.; Gorodetskiy, V. V.; Sigorskiy, V. P.; Sitnikov, L. S.; Utyakov, L. A.

TITLE: Summator. Class 42, No. 169887

SOURCE: Byulleten' izobreteniy i tovarnykh znakov, no. 7, 1965, 134

TOPIC TAGS: summator

ABSTRACT: This Author Certificate presents a summator containing chronotrons, logic "AND" and "OR" circuits, and a transfer shaper circuit. To sum numbers the digital orders of which are represented in the time-pulse form with an arbitrary numerical base, the chronotron storing the digital order of the first term is connected to the chronotron storing the second term and also to the "OR" circuit summing the length of the first term with the unit transfer length (see Fig. 1 on the Enclosure). The output of the "OR" circuit is connected to the "OR" circuit summing the length of the terms and transfer and to the "AND" circuit separating the difference of the sum and the numerical base. The latter two circuits are also connected to the output of the chronotron storing the second term. The output of the circuit summing the length of the terms and transfer is connected to the logic transfer shaper circuit and to the decoupling "OR" circuit whose second input is connected to the "AND"

Card 1/2

L 42030-65

ACCESSION NR: AP5010956

circuit. The output of the "CR" circuit is connected to the chronotron storing the sum. Orig. art. has: 1 diagram.

ASSOCIATION: none

SUBMITTED: 14Jan63 ENCL: 01 SUB CODE: DP

NO REF SOV: 000 OTHER: 000

Card 2/3

1. BOYKO, A. P. Eng.

2. USSR (600)

4. Lumbering - Carpathian Mountains

7. Log-pulling by cable in the forests of the Carpathian Mountains. Mekh. trud. rab. 7, No. 2, 1953.

9. Monthly List of Russian Accessions, Library of Congress, May 1953. Unclassified.

PLAKSIN, M.V.; BOYKO, A.P., otv.red.; BLIKH, V.V., red.; SARANYUK, T.V., tekhred.

[Fundamentals of the efficient organization of lumbering] Osnovy ratsional'nogo postroeniia proizvodstvennogo protsessa lesorazrabotok. Izd-vo L'vovskogo univ., 1958, 124 p. (MIRA 12:1)
(Lumbering)

KORDYUM, Ye.L. [Kordium, IE.L.]; BOYKO, A.P.

Embryology of Gerbera anandria Schultz. Dop. AN URSR no.8:1109-1112 '62. (MIRA 18:2)

1. Institut botaniki AN UkrSSR.

BOYKO, A.P.

Hydrodynamic forecasting of pressure fields on a mean atmospheric level for the whole globe taking mountains into account. Dokl. AN SSSR 153 no.6:1303-1306 D '63. (MIRA 17:1)

1. Vychislitel'nyy meteorologicheskiy tsentr. Predstavleno akademikom A.A. Dorodnitsynym.

BOYKO, A.P.

Forecast of the mean monthly values of the altitudes of the 500 mb. surface for the earth's northern hemisphere. Trudy MMTS no.5:35-40 '65. (MIRA 18:12)

L 16612-65 EWT(1)/FCC GW
ACCESSION NR: AT4048452 S/3118/64/000/002/0033/0044

AUTHOR: Boyko, A.P. B+1

TITLE: Hydrodynamic long-range forecasting of pressure fields for the entire earth with orography of the northern and southern hemispheres taken into account

SOURCE: Mirovoy meteorologicheskiy tsentr. Trudy*, no. 2, 1964. Voprosy* gidrodinamicheskogo dolgosrochnogo prognoza pogody* (Problems of hydrodynamic long-range weather forecasting), 33-44

TOPIC TAGS: long-range weather forecasting, weather forecasting, hydrodynamic weather forecasting, atmospheric pressure field

ABSTRACT: This article describes a new method for long-range hydrodynamic forecasting of the pressure field at the mean level of the atmosphere and gives examples of the use of this method in worldwide forecasts; the paper was presented at the Vsesoyuzny*y nauchnoy konferentsii po dolgosrochny*m prognozam pogody* (All-Union Scientific Conference on Long-Range Weather Forecasting), 20 March 1963. The point of departure in a forecast for the entire earth is a nonlinear vorticity transport equation for the mean level and a linearized balance equation. The problem is broken down into three parts:

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L 16612-65
ACCESSION NR: AT4048452

2

a. determination of the stream function field for an initial time on the basis of the known initial distribution of heights H of the 500-mb surface; b. forecasting of the stream function for some moment of time; and determination of H from the predicted values of the stream function. The solution of each part of this problem is presented. The author presents an example of such a world forecast of the pressure field. Initial data were AT_{500} charts for 0300 Moscow time on 20 July 1962 (Fig. 1 of the Enclosure); predicted charts are shown in Fig. 2 of the Enclosure; actual pressure fields are shown in Fig. 3 of the Enclosure. On these charts B = highs and H = lows Comparison of these predicted charts with charts computed using influence functions reveals that when trigonometric polynomials are used the forecast is better than when influence functions are used and computation of trigonometric polynomials on an electronic computer is faster. "In conclusion, the author expresses appreciation to Ye. N. Blinova, Corresponding Member of the SSSR Academy of Sciences, for formulating the problem and valuable advice." Orig. art. has: 49 formulas and 3 figures.

ASSOCIATION: Mirovoy meteorologicheskiy tsentr (World Meteorological Center)

Card 2/9

L 16612-65
ACCESSION NR: AT4048452

SUBMITTED: 00 ENCL: 06 SUB CODE: ES

NO REF SOV: 002 OTHER: 002

Card 3/9

BOYKO, A.P., inzh.; KRUK, M.T., inzh.

Adjustment of a gas combustion process in a boiler with turbulent burners. Elek. sta. 34 no.5:16-19 My '63. (MIRA 16:7)

(Boilers)

YANKO, P.I., inzh.; STEPANOV, L.A., inzh.; BOYKO, A.P., inzh.

Washing of regenerative air heaters of boilers operating on sulfur containing mazut. Energetik 12 no.3:12-13 Mr '64. (MIRA 17:4)

USSR/Cultivated Plants. Decorative Plants. M

Abs Jour : Ref Zhur-Biol., No 15, 1958, 68424

Author : Kostryukova, K. Yu., Boyko, A. P.
Inst : Kiev University.
Title : Observations on the Flowering of the Striped Hippeastrum (Hippeastrum vittatum Herb.).

Orig Pub : Nauk. zap. Kiyvs'k. un-t, 1957, 16, No 1, 13-21

Abstract : In a total number of 35 seedlings, the characteristics of the parental form were found in only two Hippeastrum vittatum seedlings; the remaining seedlings differed greatly from the parental form. Subsequently, five forms were isolated which differ from the

Card : 1/2

USSR/Cultivated Plants. Decorative Plants. M

Abs Jour : Ref Zhur-Biol., No 15, 1956, 68424

parental form of Hippeastrum vittatum in both pattern and the coloring of the blossoms. These forms can reproduce both vegetatively and from seed.

Card : 2/2

ACC NR: AP6036826 (N) SOURCE CODE: UR/0021/66/000/011/1416/1417

AUTHOR: Kostets'kyy, B. I.; Ivzhenko, I. P.; Boyko, A. S.

ORG: Institute of Civil Aviation Engineers (Instytut inzheneriv tsyvil'noyi aviatsiyi)

TITLE: Diffusion phenomena in plastic deformation of friction surfaces

SOURCE: AN UkrSSR. Dopovidi, no. 11, 1966, 1416-1417

TOPIC TAGS: metal diffusion, metal plastic deformation, metal friction, friction surface, friction surface deformation

ABSTRACT: The chemical composition of the surface layer of an L62 brass specimens subjected to friction tests in couple with heat-treated ShKh15 steel specimens has been studied. It was found that plastic deformation of brass induced by friction was accompanied by a diffusion of the greater mobility component, in this case zinc, to the friction surface. The depth of the diffusion-affected zone and the degree of heterogeneity depended on the specific stress and the rate of relative motion. The maximum concentration of zinc was found to be at the surface of the specimen (see Fig. 1). Orig. art. has: 1 figure.

Card 1/2

ACC NR: AP6036826

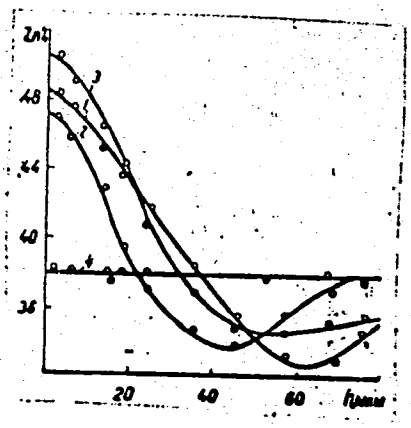

Fig. 1. Variation of zinc content along the depth of diffusion zone

1 - Relative displacement velocity 0.003 m/sec, surface layer temperature 20C, specific load 0.40 n/m^2; 2 - same but a specific load of 0.20 n/m^2; 3 - relative displacement velocity 5 m/sec, surface layer temperature 150C, specific load 0.001 n/m^2; 4 - initial specimen.

SUB CODE: 11,20/ SUBM DATE: 03Dec65/ ORIG REF: 007/ OTH REF: 003/

Card 2/2

BOYKO, A. T.

Automobile Industry and Trade - Moscow

Practices in economizing electric energy at the I. V. Stalin Automobile Plant. Prom. energ. 9, No. 4, 1952.

9. Monthly List of Russian Accessions, Library of Congress, June 1953, Uncl.

BOYKO, A.T.

Artificial insemination in controlling trichomoniasis in cattle.
Veterinariia 35 no.3:62-64 Mr '58. (MIRA 11:3)

1. Glavnyy vetvrach Kirovogradskogo Sakhsveklotresta Ukrainskoy SSR.
(Trichomoniasis) (Artificial insemination)

DOYKO, P.V.

Effect of the degree of thickness of the planted pines on the water regime and physical properties of forest soil. A. V. Boiko. *Izvest. Akad. Nauk Belorussk. S.S.R.* 1954, No. 1, 75-83.—The water regime and phys. properties of forest soils change with the amt. of the trees grown per unit area. Decreasing the amt. of trees per unit area (lifting) increases the moisture content of the upper layer of the soil 2 m. thick. The phys. properties of such soils are closely assocd. with their moisture content. The amt. of the movable plant nutrients, K and P, in the upper, org., humus-like layer of the soils increases by lifting the forest lands.

—B. Wierbicki

APPROVED FOR RELEASE: 06/09/2000 CIA-RDP86-00513R000206630009-5"

BOYKO, A. V.

BOYKO, A. V. -- "The Effect of Cutting Drains on the Water Economy and Physicochemical Properties of Soil and the Growth of Plants in Cranberry-Mossy and Pteridium-Fern Pine Forests." Acad Sci Belorussian SSR. Inst of Socialist Agriculture. Minsk, 1955. (Dissertation for the Degree of Candidate in Agricultural Sciences)

SO: Knizhnaya Letopis', No 1, 1956

BOYKO, A.V.

KOSTSYUKEVICH, N.I. [Kastsiukevich, N.I.], kand.sel'skokhozyaystvennykh nauk; BOYKO, A.V. [Boika, A.V.], kand.sel'skokhozyaystvennykh nauk

Effect of improvement cuttings on the gross productivity of pine plantations. Vestsi AN BSSR. Ser. biial. nav. no.4:37-44 '57. (MIRA 11:6)

(FOREST MANAGEMENT) (PINE)

BOYKO, B., starshiy leytenant

Tank company takes a concealed firing position. Voen. vest. 42 no.10:102-104 O '62. (MIRA 15:10)
(Tanks (Military science))

BOYKO, B.A.

Detecting molecular beams of metals. Prib.i tekh.eksp. 6 no.5:126-128 S-O '61. (MIRA 14:10)

1. Kiyevskiy gosudarstvennyy universitet.
(Molecular beams)

124-57-2-2543

Translation from: Referativnyy zhurnal, Mekhanika, 1957, Nr 2, p 145 (USSR)

AUTHORS: Boyko, B. B., Gubkin, S. I.

TITLE: Establishment of the Value of a Band in Optically Sensitive materials During Plastic Deformation (Opredeleniye tseny polosy opticheski chuvstvitel'nykh materialov pri ikh plasticheskoy deformatsii)

PERIODICAL: Sb. nauch. tr. Fiz.-tekhn. in-ta AN BSSR, 1955, Nr 2, pp 54-65

ABSTRACT: Examination of the construction of a "band-width versus maximal tangential stress" relationship for optically sensitive materials during plastic deformation. The authors apply plane concentric torsion to accomplish this. Two concentric rings are provided, of which the outer one is fixed, while the inner one is capable of rotation at a given angular velocity. The annular gap between the two rings is filled with a material to be investigated; after pouring the material is allowed to cool until it adheres firmly to the lateral surfaces of the rings. Rotation of the inner ring then sets up a pure shear strain in

Card 1/2

Establishment of the Value of a Band (cont.)

the specimen. The quantitative results were evaluated in terms of the bands and the wave length of the light (the light source was an Hg lamp with a wave length λ = 5770/90A). It is noted that the extent to which the specimen material becomes double-refracting, in the material investigated, was proportional to the values of the maximal tangential stresses for the stress interval from 0 to 26 kg/cm^2 (at still higher stresses the specimens disintegrated). From the linear relationship obtained it follows that the value of a band in the material is constant for the maximum tangential-stress range investigated. Inasmuch as this conclusion is founded on concentric torsion, which is characterized by an absence of hydrostatic pressure throughout the specimen, the author further investigated the effect of hydrostatic pressure on the value of a band (this problem is experimentally solved by extruding the specimen through a square opening in a draw plate) and show that the value of a band in the material does not depend on the hydrostatic pressure.

1. Optical materials--Plasticity 2. Optical materials --Stresses 3. Mercury lamps--Performance 4. Light--Refractive properties

V. P. Netrebko

AKIMOVA, K.I.; BAZHENOV, M.F.; BAKHVALOV, G.T.; BEZKLUBENKO, N.P.; BERMAN,S.I.; BOGDANOV, Ye.S.; BODYAKO, M.N.; BOYKO, B.B.; VINOGRADOV, S.V.; GAGEN-TORN, K.V.; GLEK, T.P.; GOREV, K.V.; GRADUSOV, P.I.; GUSHCHINA,T.N.; YEMEL'YANOV, A.K.; YESIKOV, M.P.; ZDZIARSKIY, A.V.; ZAKHAROV, M.V.; ZAKHAROVA, M.I.: KARCHEVSKIY, V.A.; KOMAROV, A.M.; KORZHENKO, O.T.; LAYNER, V.I.; MAL'TSEV, M.V.; MILLER, L.Ye.; MILOVANOV, A.I.; MIRONOV, S.S.; NIKONOROVA, N.A.; OL'KHOV, N.P.: OSIPOVA, T.V.; OSOKIN, N.Ye.; PERLIN, I.L.; PLAKSIN, I.N.: PROKOF'YEV, A.D.; RUMYANTSEV, M.V.; SEVERENKO, V.P.; SEREDIN, P.I.; SMIRYAGIN, A.P.; SPASSKIY, A.G.; TITOV, P.S.; TURKOVSKAYA, A.V.; SHAKHNAZAROV, A.K.; SHPICHINETSKIY, Ye.S.; YURKSHTOVICH, N.A.; YUSHKOV, A.V.; YANUSHEVICH, L.V.

Sergei Ivanovich Gubkin. TSvet.met. 28 no.6:60-61 N-D '55. (MIRA 10:11)
(Gubkin, Sergei Ivanovich, 1898-1955)

BOYKO, B.B.

Call Nr: TA 406.G83

AUTHORS: Gubkin, S.I. (deceased), Dobrovol'skiy, S.I., Boyko, B. B.

TITLE: Photoplasticity (fotoplastichnost')

PUB. DATA: Izdatel'stvo Akademii nauk Belorusskoy SSR,Minsk, 1957, 164 pp. 4,000 copies

ORIG. AGENCY: Akademiya nauk USSR. Fiziko-Tekhnicheskiy Institut

EDITOR: Gorev, K.V. Academician, Academy ofSciences, BSSR; Ed. of Publ. House: Kholyavskiy, S.; Tech.Ed.: Aleksandrovich, Kh.

PURPOSE: This monograph is intended for engineers and scientific workers familiar with the methods of photoelasticity.

COVERAGE: The monograph describes the fundamentals of a new experimental method for investigation of plastic deformation processes and states of stress. This consists of passing polarized light through optically sensitive materials which are subjected to residual deformation. This method is called photoplasticity by its authors.

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Call Nr: TA 406.G83

Photoplasticity (fotoplastichnost') (cont)

The results of this work may be applied to modeling (i.e., model testing, etc.) various plastic deformation processes. The origin of the present volume is described in the foreword as follows: "One of the co-authors of this monograph, S.I. Gubkin, organized a laboratory in 1949 at the Physico-Technical Institute of the Belorussian Academy of Sciences to develop the photoplasticity method. Initial investigations in this laboratory were conducted by S.I. Gubkin and S.I. Dobrovol'skiy. Some results of these investigations were published in Doklady AN SSR in 1950 and 1953. B.B. Boyko joined the laboratory in 1952. By the end of 1954 the investigations carried out by the laboratory provided a preliminary solution to one of the basic problems of photoplasticity, namely, determination of the stress condition using the method of photoplasticity under conditions of a viscous flow. With the solution of this problem which revealed the basic characteristics of the method, we can now consider photoplasticity acceptable as an independent method of research. In order to accelerate the refinement and introduce this useful method, the Scientific Council of the Physico-Technical Institute of the Belorussian Academy of Sciences recommended that the laboratory publish a pertinent monograph. This volume generalizes

Card 2/6

Call Nr: TA 406.G83

Photoplasticity (cont)

the results of these investigations as carried out at the Physico-Technical Institute of the Belorussian Academy of Science under the supervision and with the participation of Academician S.I. Gubkin. The task of preparing the monograph for publication was apportioned as follows: S.I. Gubkin drew up the plan and prepared the first and sixth chapters for printing and also did the general editing; B.B. Boyko prepared the fourth chapter for printing and also the second paragraph of the fifth chapter; S.I. Dobrovol'skiy prepared the second and third chapters and the first and third paragraphs of the fifth chapter." All problems of modeling plastic deformation processes where the photo-plasticity method is used can be subdivided into two groups:

1) Analysis of stress distribution in plastically deformed bodies, and
2) Study of physical phenomena during plastic flow (such as the mechanics of flow and destruction, the nature of residual stresses, the nature of material fatigue, relaxation, creep, elastic after-effects, contact friction, etc.)

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Call Nr: TA 406.083

Photoplasticity (cont)

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Call Nr: TA 406.G83

Photoplasticity (cont)

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Photoplasticity (cont)

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AVAILABLE: Library of Congress

Card 6/6

BOYKO, B.B.

"Obtaining Specimens of Silver Chloride with a Finegrained Structure by Means of Cyclical Deformation"

Sbornik nauchnykh trudov, vyp. IV, Minsk, Izd-vo-An BSSR, 1958, 261p.

BOYKO, B.B.

Preparing fine-grained silver chloride specimens by cyclic deformations. Sbor.nauch.trud. Fiz.-tekh.inst. AN BSSR no.4:229-240 '58. (MIRA 11:11)
(Silver chloride--Metallography)

BOYKO, B.B.

Forced optical anisotropy in the flow of amorphous media. Dokl. AN BSSR 4 no.8:332-336 Ag '60. (MIRA 13:8)

1. Institut fiziki AN BSSR. Predstavleno akad. AN BSSR B.I. Stepanovym.
(Anisotropy) (Deformations (Mechanics))

L 47049-65 EWA(k)/FBD/EWG(m)/EWT(l)/EEC(k)-2/EEC(t)/T/EEC(b)-2/ENP(k)/EWA(m)-2/
EWA(h) Pe-4/Pa-4/Pi-4/Peb/Pi-4/Pl-4 IJP(c) WG
ACCESSION NR: AP5000[illegible] S/0368/65/002/001/0084/0087

AUTHOR: Petrov, N. S.; Boyko, B. B.

TITLE: On generation in a laser with external mirrors

SOURCE: Zhurnal prikladnoy spektroskopii, v. 2, no. 1, 1965, 84-87

TOPIC TAGS: laser, laser mirror system, laser action, iptimum lasing condition

ABSTRACT: In view of the possibility of interference effects in a laser with external mirrors, due to the high monochromaticity of the laser emission, the authors obtained a regular solution of Maxwell's equations for the laser system under the assumption that diffraction effects can be neglected. It is shown that a frequency corresponding to optimal lasing conditions is always present among the possible laser generation frequencies and that at this frequency the reflection coefficients are closer to maximal than to average values. The effect of light propagation at an angle to the axis of the rod is analyzed, an expression for the maximum Q of the system, and it is shown that the same [illegible] maxima is obtained for different angles, but at different frequencies [illegible] to a dependence of the frequency on the angle. "In conclusion the authors thank

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L 47049-65

ACCESSION NR: AP5007549 2

B. I. Stepanov and B. A. Sotskiy for a useful discussion of the results." Orig. art. has: 13 formulas and 1 figure.

ASSOCIATION: None

SUBMITTED: 01Sep64 ENCL: 00 SUB CODE: EC

NR REF ACV: 004 OTHER: 000

Card 2/2

L 5413-66 EWA(k)/FBD/EWT(1)/EEC(k)-2/T/EWP(k)/EWA(m)-2/EWA(h) SCTB/IJP(c) WG
ACCESSION NR: AP5025090 UR/0368/65/003/003/0234/0237
621.375.9 : 535.89

AUTHOR: Boyko, B. B.[44]; Petrov, N. S.[44]; Valyavko, V. V.[44]; Vashkevich, I. M.[44]

TITLE: Plane parallel plates as laser reflectors [25,44]

SOURCE: Zhurnal prikladnoy spektroskopii, v. 3, no. 3, 1965, 234-237

TOPIC TAGS: laser, ruby laser, resonator, geometric optics, laser pumping, reflection coefficient

ABSTRACT: The assumption that near-maximum reflection coefficients occur in experiments with laser reflection systems is directly verified. A simple method is used: reflectors with well-known reflection coefficients are replaced by the test plates and the operation of the laser in the first configuration is compared with that in the second. The ruby crystal used was a rod 120 mm long and 12 mm in diameter and had matte lateral surfaces. An IFP-2000 lamp was used for excitation. According to the experimental methodology, one reflector was used, consisting of a multilayer dielectric mirror having a reflection coefficient very close to unity. In this case the reflection at the other end is determined purely by the Fresnel

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L 5413-66

ACCESSION NR: AP5025090

6

coefficient, which is 0.076 at a wavelength of 6943 Å. Next, two identical plane parallel reflectors were selected such that the same threshold pumping energy was required. These quartz plates, were 10 mm thick, flat to within 0.1 λ, parallel to within 1.5" and formed a configuration equivalent to one with a single ideal mirror with respect to the threshold pumping energy. In all of the numerous experiments, both with a single mirror and with the plates, generation occurred at a threshold energy of 2070 joules and was absent at 2010 joules; losses were therefore assumed to be identical. It is shown, in approximation, that the calculated reflection of 27.6% is close to the maximum of 33.2%, and closer approach to absolute maximum can be achieved with thicker plates. Tests were also made with glass plates, the outer surfaces (away from the ruby) of which were spoiled by a special coating. The threshold pumping energy was only 3% greater than for the previous case. Here too the reflection coefficient was very close to maximum. Uncoated plane-parallel glass plates, it is found, can provide reflectivity of 30 to 50% in lasers. Among other advantages, such plates are stable and reliable and provide laser tuning capabilities. The authors acknowledge discussions with B. A. Cotskiy, A. M. Goncharenko and F. I. Fedorov. Orig. art. has: 1 figure. [14] 44

ASSOCIATION: none 44 44

SUBMITTED: 25Dec64 ENCL: 00 SUB CODE: EC, OP

NO REF SOV: 003 OTHER: 000 ATD PRESS: 4134

BVK

Card 2/2

ACC NR: AP7004142 SOURCE CODE: UR/0051/67/022/001/0119/0122

AUTHOR: Boyko, B. B.; Petrov, N. S.; Valyavko, V. V.; Vashkevich, I. M.

ORG: none

TITLE: Prism reflectors to reduce laser beam divergence

SOURCE: Optika i spektroskopiya, v. 22, no. 1, 1967, 119-122

TOPIC TAGS: laser beam, beam focusing, solid state laser, laser output, optic prism, light reflection

ABSTRACT: The discussed prism reflectors make use of total internal reflection near the limiting angle. The advantages claimed over right-angle total internal reflection prisms are that their efficiency does not depend on the cavity length and that they produce less noise, luminescence, or various parasitic modes. Tests made by the authors have shown a rhomboidal prism with acute angle equal to the limiting angle to be the most effective with respect to reducing beam divergence. These prisms were also compared in the experiments with the prisms described by J. A. Giordmaine and W. Kaiser (J. Appl. Phys. v. 35, 3446, 1964) (both types of prism were made of fused quartz). The rhomboidal prism with limiting angle 43°24'10" ± 02" proved most effective for a ruby laser (120 x 12 mm with ground lateral surface) operating at about 3 times the threshold. The generation of inclined rays rather than those of the desired beam is suppressed in such prisms by the strong dependence

Card 1/2 UDC: 621.375.9: 535

ACC NR: AP7004142

of the reflection coefficient on the incidence angle of the beam. Replacement of the ordinary cavity mirrors with rhomboidal prisms in mutually crossed position reduced the beam diameter by about one-half, whereas a right prism produced practically no reduction in the beam diameter. Although the use of the rhomboidal prisms caused some reduction in the absolute value of the generated energy, the energy density increased by approximately 3 times. It is concluded that the use of rhomboidal prisms to decrease the angular divergence can be used in various solid-state lasers. Orig. art. has: 4 figures. [02]

SUB CODE: 20/ SUBM DATE: 12Jul65/ ORIG REF: 001/ OTH REF: 003
ATD PRESS: 5115

Card 2/2

Boyko, B. F.

AUTHOR: Boyko, B. F. 76-1-5/32

TITLE: The Determination of the Chemical Composition of Finely-Dispersed Solid Phases in Multicomponent Systems by Means of the Indifferent Component Method (Opredeleniye khimicheskogo sostava tonkodispersnykh tverdykh faz v mnogokomponentnykh sistemakh po metodu indifferentnogo komponenta)

PERIODICAL: Zhurnal Fizicheskoy Khimii, 1958, Vol. 32, Nr 1, pp. 35-42 (USSR)

ABSTRACT: At first the motivation as well as the characteristics of the method of indifferent components is given. The method for the arrangement of the phase diagram for multi-component systems with 4, 5, 6 and 7 components is shown. By means of an example of the Fe_2O_3-H_2O - NaCl - $CaCl_2$ system with a solid phase (Fe_2O_3 - H_2O) the author shows that in the presence of several components in a system, which can be absorbed by the solid phase, the positive adsorption of one of these causes a negative adsorption of the other components. Thus calcium chloride displaces sodium chloride from the adsorption layer in this system and forms its adsorption

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layer with boundary concentration on the surface of the solid phase. The intensity of practical boundary adsorption of $CaCl_2$ is equal to 3,9%. The author shows that sodium chloride has negative adsorption and that it amounts to 2,01%. With the investigation of the ternary system Fe_2O_3 - - H_2O - NaCl with the same solid phase sodium chloride was adsorbed more positively. The amount of adsorption was 0,88%. It is obvious that the negative adsorption of sodium chloride developed because of its displacement from the adsorption layer by potassium chloride. The author points to the incorrectness of the final conclusions in reference 3 of Danil'chenko and Fridman, as thea are based on a diagram which in reality was not obtained when investigating the Fe_2O_3 - H_2O - NaCl - $CaCl_2$ system. The composition of the investigated solid phase calculated according to reference 1 proves the result obtained the graphical way. Thus the investigation of the Fe_2O_3 - H_2O - NaCl - $CaCl_2$ system shows that the method of the indifferent component can be used successfully in the determination of the

The Determination of the Chemical Composition of Finely-Dispersed Solid Phases in Multicomponent Systems by Means of the Indifferent Component Method

fine-disperse solid phase in multi-component systems. This especially where other methods of analysis fail. The advantage of this method furthermore consists of the fact that it does not call for special equipment or expensive reagents. There are 6 figures, 2 tables, and 8 references, 7 of which are Slavic.

ASSOCIATION: Kuban Institute of Agriculture, Krasnodar (Kubanskiy sel'skokhozyaystvennyy institut, Krasnodar)

SUBMITTED: July 31, 1956

AVAILABLE: Library of Congress

Card 3/3

SKOROKHODOV, A.N.; TARNOVSKIY, I.Ya.; BOYKO, B.M.

Investigating contact stresses during the rolling of complex shapes. Izv.vys.ucheb.zav.; chern. met. 8 no.4:112-116 '65.
(MIRA 18:4)

1. Ural'skiy politekhnicheskiy institut.

25814
S/142/60/003/006/004/016
E033/E135

9.4220

AUTHORS: Boyko, B.P., Minakova, I.I., and Savel'yeva, Z.I.

TITLE: Synchronisation of a reflex klystron loaded by a resonator

PERIODICAL: Izvestiya vysshikh uchebnykh zavedeniy, Radiotekhnika, 1960, Vol.3, No.6, pp. 581-591

TEXT: After brief mention of previous investigations, the author considers the theory of synchronisation, by an external sinusoidal e.m.f., of an oscillator having two degrees of freedom, i.e. of a reflex klystron inductively coupled to an auxiliary loading resonator. The external e.m.f. is connected in series with the loading circuit. Letting the voltages on the oscillator circuit capacity and on the loading circuit capacity be x and y respectively, then in a soft regime with symmetrical valve characteristics, the equations of the system in the dimensionless form are:

$$\ddot{x} + x = (1 - \xi^2)x - 2\varepsilon\,(1 - x^2)\,\dot{x} - \alpha\,\ddot{y}\,;$$
$$\ddot{y} + y = (1 - \xi_1^2)y - 2\varepsilon_1\dot{y} - \alpha_1\,\ddot{x} + {}_1^2\,E_o \sin\tau, \qquad (1)$$

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where: ξ, ξ_1 are the ratios of the partial frequencies of the circuits to the frequency of the external e.m.f; $\varepsilon < 0$ is the dimensionless increment of the oscillator circuit; $\varepsilon_1 > 0$ is the dimensionless decrement of the auxiliary circuit; α, α_1 are the coupling coefficients between the circuits. The solution of Eq.(1) for detuning slightly greater than the synchronisation band is sought in the form

$$\left.\begin{aligned} x &= A \sin(\tau - \varphi) \\ y &= B \sin(\tau - \varphi) \end{aligned}\right\}$$

The case when $\xi = \xi_1$ and $\alpha = \alpha_1$ is considered and the equation for the family of amplitude curves is:

$$z^3 - z^2\left[8 + \frac{2\varepsilon_1\alpha^2}{\varepsilon(\varepsilon_1^2 + \Delta^2)}\right] + z\left[16\,\frac{\varepsilon^2 + \Delta^2}{\varepsilon^2} + \frac{8\varepsilon_1\varepsilon\alpha^2 + \alpha^4 - 8\alpha^2\Delta^2}{\varepsilon^2(\varepsilon_1^2 + \Delta^2)}\right] - \frac{\alpha^2 E_0^2}{\varepsilon^2(\varepsilon_1^2 + \Delta^2)} = 0 \qquad (3)$$

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where: $z = A^2$ and $1 - \xi^2 \approx 2(1 - \xi) = 2\Delta$.
Since the general expressions for the boundaries of the regions of stability are very unwieldy, only the particular case of a fixed ratio $c_1/|c| = 1/2$ (which is often approximately true in practice) is considered. Then the conditions for stability are:

(1) $z > 1$;

(2) $z^3 - 2z^2 + \left(\frac{16}{3}\Delta_2^2 + \frac{4}{3}\eta^2\right)z + -\frac{16}{3}\Delta_2^2 - \frac{4}{3}\eta^2 + \frac{4}{3} > 0$;

(3) $z^5 + \left(\frac{4}{3}\eta^2 - \frac{22}{3}\right)z^4 + \left(\frac{256}{9}\Delta_2^2 - \frac{56}{9}\eta^2 + \frac{184}{9}\right)z^3 +$

$+ \left(-\frac{1024}{9}\Delta_2^2 + \frac{256}{9}\Delta_2^2\eta^2 + \frac{92}{9}\eta^2 - \frac{80}{3}\right)z^2 +$ (4)

$+ \left(\frac{1280}{9}\Delta_2^2 - \frac{512}{9}\Delta_2^2\eta^2 - \frac{64}{9}\eta^2 + 16\right)z + \left(-\frac{512}{9}\Delta_2^2 +\right.$

$\left. + \frac{256}{9}\Delta_2^2\eta^2 + \frac{16}{9}\eta^2 - \frac{32}{9}\right) > 0$;

$$(4)\ (12\Delta_2^2 + 3)z^2 + (-64\Delta_2^2 + 8\eta^2 - 16)z + 64\Delta_2^4 + (80 - 32\eta^2)\Delta_2^2 + 4(\eta^2 - 2)^2 > 0. \qquad (4)$$

where: $\Delta_2^2 = \Delta^2/4\varepsilon_1^2$; $\eta^2 = \alpha^2/4\varepsilon_1^2$; $E_o^2/4\varepsilon_1^2 = p^2$.

The family of amplitude curves $z = f(\Delta_2)$ for fixed external e.m.f. and inter-circuit coupling values are plotted and the instability regions found (as shown in the figures which are reproduced in the paper). When $\eta^2 > 1$ and the equality of the partial frequencies of the circuits does not depend on the coupling, then the first condition of stability can be written

$$z = \frac{u_o}{2}$$

where $u_o = 4(1 - \frac{\varepsilon_1}{|\varepsilon|})$.

When $\eta^2 < 1$ then the first condition for stability is:

$$z = \frac{v_o}{2}$$

Synchronisation of a reflex klystron ...

where $v_o = 4(1 - \eta^2 \frac{\varepsilon_1}{|\varepsilon|})$.

The significance of Eq.(4) is discussed. By substituting $z = u_o = 4(1 - \frac{\varepsilon_1}{|\varepsilon|})$ in Eq.(3), the dependence of the absolute value of the synchronisation bandwidth on the external e.m.f. amplitude and on the coupling is obtained:

$$\Delta_2 = \sqrt{(\eta^2 - 1) \pm \eta \frac{P}{A_{o2}}}$$

and

$$\Delta_{2\,max}^2 = \frac{P^2}{A_{02}^2} + \sqrt{4 \frac{P^2}{A_{02}^2} \frac{P^4}{A_{02}^4}} \qquad (6)$$

where $A_{02} = \sqrt{u_o}$ = the amplitude of the oscillations of an autonomous system with two degrees of freedom. The synchronisation bandwidths of oscillators with one and two degrees of freedom are then compared. It is shown that with coupling greater than critical

Synchronisation of a reflex klystron ...

and with small external amplitudes, the synchronisation band divides into two bands which merge into one when the coupling is reduced or when the synchronising amplitude is increased. This bandwidth is substantially wider than the synchronisation bandwidth of an oscillator with only one degree of freedom. The synchronisation of a centimetric reflex klystron oscillator with an auxiliary resonator, consisting of a standard waveguide closed at one end by a piston and at the other by a diaphragm with a rectangular slot, was investigated experimentally. The experimental layout is shown in Fig.5. The following were investigated: 1) the dependence of the power of the synchronised oscillations on the detuning, with fixed coupling between the oscillator and the external resonator and with different synchronising powers; 2) the dependence of the power of the synchronised oscillations on the detuning, with constant synchronising power and variable coupling; 3) the dependence of the synchronisation bandwidth on the ratio of the synchronising power and the power of the synchronised klystron, both with and without the auxiliary resonator. The theoretical and experimental results agreed qualitatively and the data show that, by using the auxiliary resonator, a considerable increase

Synchronisation of a reflex klystron ...

(2 to 4 times) in the synchronisation bandwidth can be achieved. There are 8 figures and 5 Soviet-bloc references.

ASSOCIATION: Fizicheskiy fakul'tet, Moskovskiy gos. universitet im. M.V. Lomonosova (Physics Division of the Moscow State University imeni M.V. Lomonosov)

SUBMITTED: to the Editors of NDVSh, July 15 1959.
to the Editors of Izv. vuz Radiotekhnika, March 24 1960

Card 7/8

BOYKO, B.P.; MINAKOVA, I.I.

Synchronizing a klystron with a signal sent through the load circuit. Vest. Mosk. un. Ser.3: Fiz., astron. 17 no.1:22-32 Ja-F '62. (MIRA 15:2)

1. Kafedra teorii kolebaniy fizicheskogo fakul'teta.
(Klystrons)

BOYKO, B.P.; CHEREPANOV, A.A.

Synchronization by a [redacted]-side signal from a 600 Mc/s klystron and an 800 kc. LC-oscillator. Vest.Mosk.un.Ser.3: Fiz.,astron.18no.1:51-53 Ja-F '63. (MIRA 16:5)

1. Kafedra teorii kolebaniy Moskovskogo universiteta.
(Oscillators, Electric) (Klystrons)

L 15251-66 EWT(1)/EWA(h) JM
ACC NR: AP5025160 SOURCE CODE: UR/0188/65/000/005/0064/0073

AUTHOR: Boyko, B. P.

ORG: Theory of Oscillation Department, Moscow University (Kafedra teorii kolebaniy, Moskovskogo universiteta)

TITLE: Synchronization of a reflex klystron, loaded with a resonator having a p-n junction of nonlinear capacitance, on the third harmonic

SOURCE: Moscow. Universitet. Vestnik. Seriya III. Fizika, astronomiya, no. 5, 1965, 64-73

TOPIC TAGS: reflex klystron, resonator, harmonic oscillation

ABSTRACT: This article contains a study of a particular case of a non-autonomous mode of a self-oscillating system with two degrees-of-freedom, when the frequency of the external signal and the frequency of the system are in a fractional-rational relationship and when one of the circuits contains a nonlinear reactance. The experimental investigation was conducted in the SHF band. A study was made of the synchronization of a three-centimeter reflex klystron, loaded with a resonator with nonlinear capacitance for the p-n junction of a semiconductor diode, by means of an external 10-cm signal (synchroniza-

Card 1/2 UDC: 621.385.623.5.001.5

L 15251-66
ACC NR: AP5025160

tion on the third harmonic). The theoretical analysis was made by means of an equivalent circuit. The limiting properties of the waveguide resonator were taken into account. Amplitude curves were derived. The instruments and methods used in the measurements are described. A study was made of the amplitude-frequency functions at different, but fixed detuning between resonators, diode bias values and external signal power levels. In the synchronized system a certain gain was achieved in comparison with the third-harmonic signal in a passive resonator. The experimental results show good qualitative agreement with theoretically derived conclusions. In conclusion, author expresses his deep gratitude to Docent I. I. Minakova for a discussion of the results of the work and valuable comments. Orig. art. has: 4 formulas and 6 figures.

SUB CODE: 09/ SUBM DATE: 23May64/ ORIG REF: 009

Card 2/2

L 47342-65 EEC(b)-2/EWA(h)/EWT(l) Pi-4/Pj-4/Pm-4/Pn-4/Pac-4/Peb JW

ACCESSION NR: AR5009718 UR/0058/65/000/007/H027/H027

SOURCE: Ref. zh. Fizika, Abs. 2Zh187

AUTHOR: Boyko, B. P. 25

TITLE: Synchronization of 3-cm reflex klystron with nonlinear reactance at the third undertone

CITED SOURCE: Sb. Itog. nauchn. konferentsiya Kazansk. un-ta za 1962 g. Kazan', Kazansk. un-t 1963, 69-71

TOPIC TAGS: reflex klystron, klystron synchronization, nonlinear reactance, nonlinear capacitance, frequency locking, parametric diode

TRANSLATION: Results are presented of an experimental investigation of the synchronization of a 3-cm klyston oscillator, the resonator system of which includes a nonlinear capacitance, by means of a signal in the 10-cm band. It is indicated that the synchronization of the klystron is due to the presence of the nonlinear capacitance, on which a harmonic of the locked-in signal is produced. It is noted that the influence of the external reactance of parametric diodes used for synchronization purposes is small and be manifest only at large amplitudes and for

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L 47342-65
ACCESSION NR: AR5009718

diodes with low losses. E. Ratbil'.

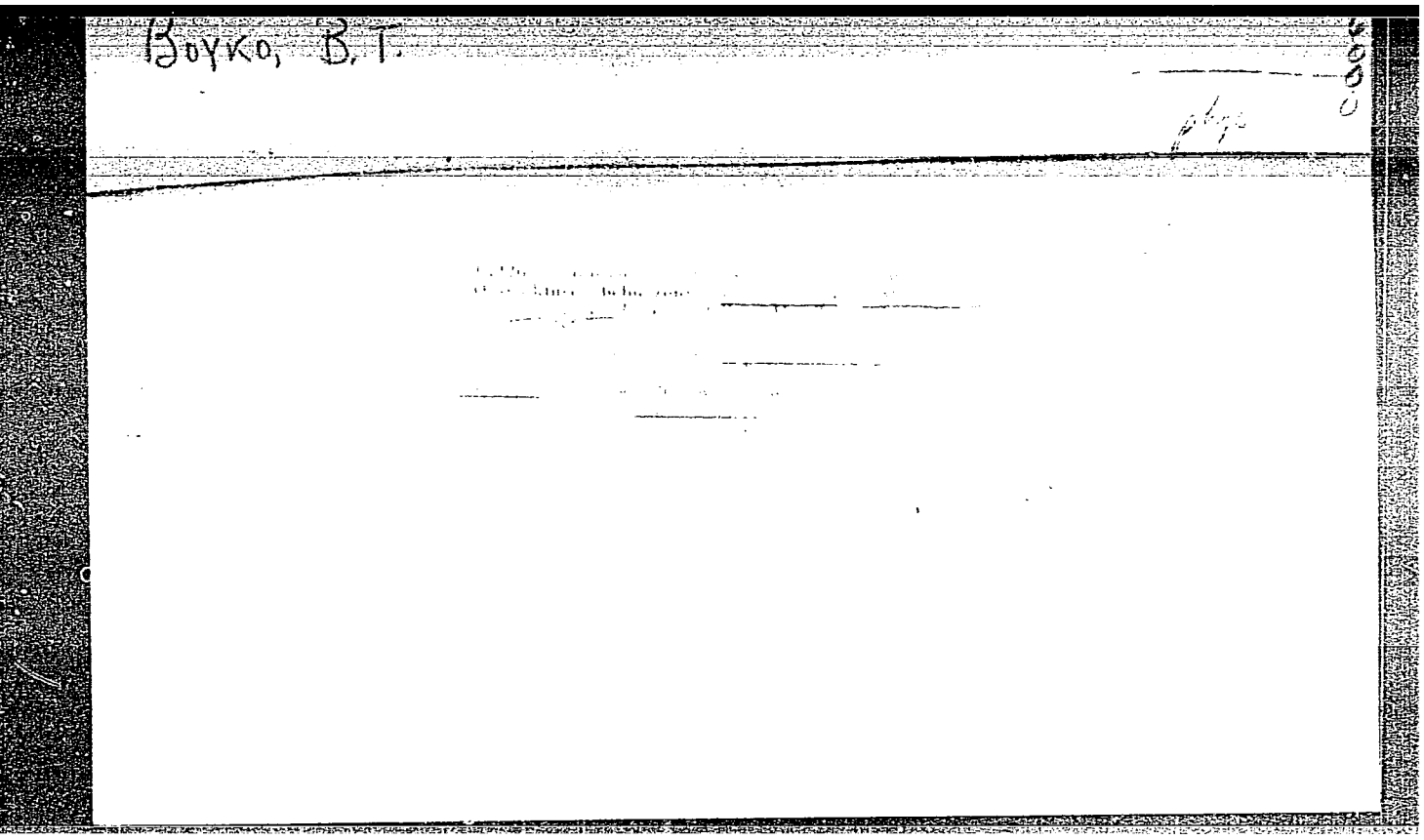
SUB CODE: EC ENCL: 00

Card 2/2 cc

BOYKO, B.P.

Synchronization of a reflecting clystron loaded with a resonator having a nonlinear p-n junction capacitance at the third harmonic. Vest. Mosk. un. Ser. 3: Fiz., astron. 20 no.5:64-73 S-O '65. (MIRA 18:11)

1. Kafedra teorii kolebaniy Moskovskogo universiteta. Submitted May 23, 1964.



BOYKO, B.T., Cand Tech Sci -- (diss) "Study of the processes of decomposition of a supersaturated α - solid solution in fine films of Al-Cu alloys." Khar'kov, 1958, 15 pp (Min of Higher Education UkSSR. Khar'kov Polytechnic Inst im V.I. Lenin) 150 copies (KL, 50-58, 123)

α - alpha

PALATNIK, L.S.; BOYKO, B.T.

Aging of Al-Cu alloys of variable composition [1] in thin films. Izv. vys. ucheb. zav.; fiz. no.3:112-116 '58. (MIRA 11:9)

1. Khar'kovskiy gosuniversitet imeni A.M. Gor'kogo i Khar'kovskiy politekhnicheskiy institut imeni V.I. Lenina.
(Aluminum-copper alloys--Metallography)

SOV/126-7-3-39/44

AUTHORS: Palatnik, L. S., Lyubarskiy, I. M. and Boyko, B. T.

TITLE: A Contribution to the Nature of the "White Zone" (K voprosu o prirode "beloy zony") (A reply to the article "X-Ray Investigation of the Structure of Surface Friction" by Kostetskiy et alii (Ref.4))

PERIODICAL: Fizika metallov i metallovedeniye, Vol 7, Nr 3, pp 473-474 (USSR) 1958

ABSTRACT: B. I. Kostetskiy and co-workers (Refs.1 and 2) have expressed the assumption that the "white zone" which forms at the friction surface at certain rates of slip of the rubbing surfaces, consists either of a layer of oxides ("oxidizing wear" according to Kostetskiy's classification), or a secondary quenched structure (thermal wear). Palatnik (Ref.3) did not find iron oxides in the portion of "white zone" which he investigated by X-rays. The authors of this paper have come to the conclusion that Kostetskiy's hypothesis is erroneous. The basic objections of Kostetskiy and his co-workers (Ref.4) in connection with the present authors' article (Ref.3) are the following:

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A Contribution to the Nature of the "White Zone"

(a) In the paper by the present authors (Ref.3) the already well-known fact that the layer formed during thermal wear is a hardening structure has only been confirmed again.
(b) A white layer which forms in thermal and not in oxidizing wear appears to have been investigated in the paper (Ref.3). It has been shown by the authors of the present paper that the great hardness of the "white zone" (in spite of the great quantity of austenite) is due, not to the absorption of oxygen or nitrogen from without (Ref.5) etc., but to the formation of a definite highly dispersed heterogeneous structure as the product of a solution of carbides and the subsequent very rapid quenching in which dispersed carbides are precipitated.
There are 5 Soviet references.

SUBMITTED: January 19, 1958

AUTHORS: Palatnik, L.S., Boyko, B.T., Kosevich, V.M. 32-24-4-17/67

TITLE: On the Preparation Methodics and the Calculation of Samples With Different Compositions (K metodike prepariravaniya i rascheta obraztsov peremennogo sostava)

PERIODICAL: Zavodskaya Laboratoriya, 1958, Vol. 24, Nr 4, pp. 422-424 (USSR)

ABSTRACT: On the basis of the method worked out by S.A.Vekshinskiy(Ref 1), the following method was worked out for electronographic investigation. In principle it consists in the fact that on a horizontal plate (the collector), which is divided into three surface sections by means of two vertical plates, the metal vapors emerging from the test crucibles are collected. Outside of the two separating plates the pure metal condensates, whereas between them the alloy is separated. For the purpose of calculating the concentration of the alloy two methods can be applied: Firstly, the method of symmetric lines, and, secondly, the method based upon the radius. For the control of the arrangement of the separating plates the photometrization of the plates of the pure components may be used.

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On the Preparation Methodics and the Calculation of Samples With Different Compositions

32-24-4-17/67

Photometric curves of copper and bismuth plates are given from which the symmetry of distribution may be seen. Two varieties of the method are mentioned; in one of them a horizontal plate collector of glass with three slots is used, the arrangement of which can be displaced in the vacuum, so that several experiments can be carried out continuously. The composition of the alloy can be modified by modifying the heating of the crucible. In the case of the second variety a glass plate with only one slot is used, so that the pure metals and the alloy are deposited on one and the same strip. Investigations were carried out with simultaneous and successive evaporation of copper and aluminum. The method described can be applied only if certain conditions are satisfied, which is, however, not difficult at certain evaporation- and condensation conditions. The method can also be applied for three-component systems. There are 4 figures, and 4 references, 3 of which are Soviet.

ASSOCIATION: Khar'kovskiy politekhnicheskiy institut im. V.I. Lenina (Khar'kov Polytechnic Institute imeni V.I. Lenin)

Card 2/2 1. Alloys--Analysis 2. Metallic vapors--Condensation 3. Photometry--Applications 4. Metals--Vaporization

AUTHORS: Palatnik, L. S., Boyko, B. T. SOV/20-120-5-23/67

TITLE: The Investigation of the Processes Involved in a Repeated Decomposition of a Solid Al-Cu Solution (Issledovaniye protsessov povtornogo raspada tverdogo rastvora Al-Cu)

PERIODICAL: Doklady Akademii nauk SSSR, 1958, Vol. 120, Nr 5, pp.1015-1017 (USSR)

ABSTRACT: This is a study by the methods of electron diffraction and electron microscopy of the processes of the repeated decomposition of the Θ-phase and of their separation from a solid α-phase in films of the alloy Al-Cu with a thickness of 500 Å. This alloy was prepared according to the method of S. A. Vekshinskiy (Ref 3). Both components were evaporated simultaneously and were condensed upon a cold collector. An Al-Cu alloy in a chilled state takes the structure of a chilled oversaturated (monophase) solid α-solution. By heating this alloy to 50 - 300° the homogeneous solid α-solution decomposes, separating a finely disperse Θ-phase. The particles of the Θ-phase have a size of about 10^2 Å. At ~400° the particles of the Θ-phase coalesce to a considerable degree. If the alloy is heated to 480° the coalesced particles

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are completely dissolved in the solid α-solution. When the sample is cooled down to 440°, the Θ-phase is again separated from the solid α-solution. This process of the dissolution of the Θ-phase and the subsequent decomposition of the solid α-solution is reproduced as the heating to 480° and the subsequent cooling is repeated. The electron-microscopical pictures and the diffraction patterns are also repeated. The experimental evidence can be explained as follows: 1) When the thin film of Al-Cu solution is condensed, a finely disperse, homogeneous solid α-solution, which is considerably oversaturated, is formed, exhibiting a strong tendency towards decomposition. The pronounced orientation of the Θ-phase after the dissolution of their coarsely grained particles at 480° and after a further repeated decomposition of the oversaturated solid α-solution at cooling down, the "memory phenomena" and their disappearance at a considerable overheating is connected with the diffusion mechanism of the dissolution process. The overheating of the solid α-solution favors an assimilation of the inhomogeneities of the concentration and increases the probability of the formation

The Investigation of the Processes Involved in a Repeated Decomposition of a Solid Al-Cu Solution

and of the growth of the nuclei of the θ-phase in the alloy. Thus the concentration of copper in the local domains in the surface layer of atoms decreases. There are 2 figures and 6 references, 5 of which are Soviet.

ASSOCIATION: Khar'kovskiy gosudarstvennyy universitet im. A.M.Gor'kogo (Khar'kov State University imeni A. M. Gor'kiy)
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PRESENTED: March 25, 1958, by S. A. Vekshinskiy, Member, Academy of Sciences, USSR

SUBMITTED: March 23, 1958

1. Aluminum-copper alloy films--Decomposition 2. Aluminum-copper alloy films--Electron diffraction analysis 3. Aluminum-copper alloy films--Phase studies 4. Electron microscopy--Applications

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SOV/126-8-2-26/26

AUTHORS: Palatnik, L.S. and Boyko, B.T.

TITLE: Electronographic Analysis by a Superposition Method

PERIODICAL: Fizika metallov i metallovedeniye, 1959, Vol 8, Nr 2, pp 318 - 320 (USSR)

ABSTRACT: The proposed method is a further development of the superposition method in X-radiography. In the present method, however, the position of the samples (thin films) is unchanged and the electron beam is displaced to penetrate them alternately. Thus, the oscillating beam produces two displaced electronograms on one photograph. Deflection of the beam is brought about by feeding impulses to two divergent plates placed between the diaphragm and the object (Figure 1). The displacement can be varied by varying the amplitude. Examples of photographs are shown in Figure 2. The method can be used in two ways. The first is to use standard electronograms of a two-phase system, e.g. Figure 2a for Al - Bi. From a comparison of lines on the standard with those of an unknown heterogeneous alloy, the volume-concentration of a phase in the alloy can be determined. The superposition of two thin films can be used in other

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Electronographic Analysis by a Superposition Method

ways, e.g. for a determination of thickness. In the second use of the described method, the quantity of an element is determined by weakening the intensity of its line until it is on the limit of visibility, somewhat analogous to X-ray spectrographic analysis. This is very effective in the study of oxidation and chemico-thermal treatments where thin films are formed.
There are 2 figures and 2 Soviet references.

ASSOCIATIONS: Khar'kovskiy gosudarstvennyy universitet im. A.M. Gor'kogo (Khar'kov State University im. A.M. Gor'kiy)
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SUBMITTED: January 25, 1959

Card 2/2

USCOMM-DC-61,763

9(6) SOV/32-25-6-16/53

AUTHORS: Palatnik, L. S., Boyko, B. T.

TITLE: Electron Diffraction Semiquantitative Phase Analysis (Elektronograficheskiy polukolichestvennyy fazovyy analiz)

PERIODICAL: Zavodskaya Laboratoriya, 1959, Vol 25, Nr 6, pp 690 - 696 (USSR)

ABSTRACT: The present paper gives a description of a method of electron diffraction phase analysis; it has been developed from the method of superposition in radiography (Ref 3). Unlike the radiographic method, the position of the samples is not changed, but the electron beam is shifted, so that two dislocated electron diffraction patterns form on the same photographic plate (Fig 1). The dislocation of the primary electron beam is effected by a voltage pulse (of rectangular shape) from a pulse generator of the type 26 I. In taking the electron diffraction picture the intensity of the line of the given free component is expressed by an equation (1) (Ref 3). To take two different free structure components of a two-component alloy, equation (1) is correspondingly transformed and equation (6) is obtained. A delaying multivibrator (Fig 2, Scheme) may be used to widen

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the frequency range of the 26 I generator. Examples of electron diffraction analyses (with superposed electron diffraction pictures, figures 3,4,5) are shown, and it is stated that the sensitivity of analysis depends on the sensitivity threshold $\Delta B/B$ for the determination of the diffraction line. (B= blackening of the background, ΔB = difference of blackening of the line and of the background); $\Delta B/B$ with given B may be determined according to the Neff curves (Ref 5). The sensitivity of the method was investigated on metal foils of Al, Ag and Bi (Table). The semiquantitative phase analysis described is based on the fact that in the electron diffraction investigation of a mixture of two components which differ relevantly as to the ordinal number (e.g. Al and Bi) in films of a thickness of 100-300 Å the weaking of intensity of the diffraction lines of a component may be avoided at the expense of the absorption in the other component. This is proven also by experiments carried out to develop the experimental technique on Ag-Bi and Al-Bi mixtures. The analysis of the mixture Ag-Bi was based on the sensitivity threshold of the diffraction line (111) Ag (Fig 6, electron diffraction picture), and it is stated

that the pre-determination of the sensitivity threshold of the diffraction line satisfies only one component. There are 7 figures, 1 table, and 7 Soviet references.

ASSOCIATION: Khar'kovskiy gosudarstvennyy universitet im. A. M. Gor'kogo (Khar'kov State University imeni A. M. Gor'kiy)

18.9200 1145

S/126/61/011/001/012/019
E021/E406

AUTHORS: Palatnik, L.S. and Boyko, B.T.

TITLE: The Phase Diagram of Al-Cu Alloys in Thin Films

PERIODICAL: Fizika metallov i metallovedeniye, 1961, Vol.11, No.1, pp.123-127

TEXT: An electronographic study of the phase diagram of Al-$CuAl_2$ alloys in thin films has been carried out. Films containing from 0 to 30 wt.% Cu with thickness of about 150, 250 and 300 Å was made by simultaneous evaporation and condensation of weighed portions of Cu and Al. The films were heated in the electronographic apparatus with continuous measurement of temperature. The phase transformation temperature was found by a change in diffraction pattern. In films 250 Å thick, unstable supersaturated solutions were formed with a copper content of more than 25%. The (110) and (200) lines of the θ phase were observed after quenching as well as the α solid solution lines. Heating at 100°C led to further decomposition of the solid solution. In alloys containing 25% copper, when heated to 500°C only the diffraction lines of the θ phase were observed. Thus a solid solution of Al in $CuAl_2$ must have been formed. Alloys with less than 25% copper in the

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The Phase Diagram of Al-Cu Alloys in Thin Films

quenched state consisted of homogeneous metastable α solid solution. With less than 18% copper, precipitation occurred on heating up to 100°C. At higher temperatures, the θ phase dissolved in the α phase and at 520°C was completely dissolved. With a copper content of 18 to 25%, complete solution did not occur and a metastable eutectic transformation occurred at 520°C. With increase in thickness of the film the limiting solubility of copper decreased and the temperature for the reversible transformation $\alpha + \theta \rightleftarrows \alpha$ increased. Thus the equilibrium diagram for thin films is different from that in the massive state. Fig.4 shows the equilibrium diagram for a film 250 Å thick. There are 4 figures, 1 table and 6 references: 5 Soviet and 1 non-Soviet.

ASSOCIATIONS: Khar'kovskiy gosudarstvennyy universitet im. A.M.Gor'kogo (Khar'kov State University imeni A.M.Gor'kiy)
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24,7200

24475
S/126/61/011/006/001/011
E021/E306

AUTHORS: Palatnik, L.S., Fuks, M.Ya., Boyko, B.T. and Pariyskiy, V.B.

TITLE: Electronographic Study of Substructure of Thin Condensates of Aluminium by the "Microbeam" Method

PERIODICAL: Fizika metallov i metallovedeniye, 1961, Vol. 11, No. 6, pp. 864 - 869 + 1 plate

TEXT: The electron microbeam is suitable for studying individual reflections from crystallites of dimensions 100 - 300 Å and for evaluating the relative misorientation between crystallites. Thus, the electronographic microbeam is a direct method of observing the substructure of crystals. Aluminium films 60 - 200 Å thick, condensed in vacuo on a cold surface, were studied by this technique. The films were transferred to aluminium foil with holes of 20 to 70 μ^2. The thickness of the film was estimated by a photometric method with an accuracy of 10%. Photographs were taken in a high-temperature electronograph with electrostatic focusing. The films were heated at a rate of 30 °C/min and electron-diffraction

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patterns were taken at room temperature, 200, 300, 400 and 450 °C. The mean linear dimension of a coherent reflecting region for films heated to 400 °C was 140 - 335 Å. This is similar to the mean dimensions of mosaic blocks determined by X-ray investigation of deformed polycrystals. The Debye ring at 20 and 200 °C appears continuous and diffuse. Heating to 300 °C results in the appearance of intensive spots but the general background is still retained. At 400 °C this background is very weak and at 450 °C it disappears. The number of spots remains practically unchanged on increasing the temperature from 300 to 450 °C. Photographs are included for the (111) and (200) lines taken from a film 125 Å thick on an area of 20 μ^2, heated to 300, 450, 400 and 450 °C (X15). At a magnification of 60, spots of increased blackness can be seen on the electron-diffraction patterns taken at 20 and 200 °C. The complete results are tabulated. The mean linear dimension of the crystallites was calculated from two formulae:

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$$L_{cp} = \sqrt[3]{v_o} \qquad (2)$$

and

$$L = \sqrt{v_o/h} \qquad (3)$$

where v_o is the mean volume of the region giving coherent reflections and
h is the film thickness.

The size of the crystallites increases with increase in temperature. The degree of misorientation of crystals in condensed films is somewhat greater than the values for ordinary crystals. This may explain the high resistance to plastic deformation and high rate of diffusion of such films. There are 2 figures, 1 table and 11 references: 7 Soviet and 4 non Soviet. The two English-language references quoted are: Ref. 10. Quarrel, A.G., Roebuck, J.S. Proc. Roy.

Card 3/6

S/126/61/011/006/001/011
E021/E306

Electronographic Study ....

Soc., 1934, A.145, 676: Weaver, C., Hill, R.M. Advances in Physics, 1959, Vol. 8, 375.

ASSOCIATION: Khar'kovskiy gosudarstvennyy universitet im. A.M. Gor'kogo (Khar'kov State University im. A.M. Gor'kiy)
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SUBMITTED: January 21, 1961

Card 4/6

35946

S/126/62/013/001/005/018
E021/E580

24,7700

AUTHORS: Palatnik, L.S., Boyko, B.T., Fuks, M.Ya. and Pariyskiy, V.B.

TITLE: Electron diffraction study of the substructure of thin films of aluminium, silver and gold, condensed in vacuo

PERIODICAL: Fizika metallov i metallovedeniye, v.13, no.1, 1962, 71-76

TEXT: The influence of film thickness and substrate temperature on the mean size of mosaic blocks was investigated in thin condensed films of aluminium, silver and gold. Aluminium of 99.999% purity and silver and gold of 99.9% purity was used. Evaporation was carried out from a cone-shaped tungsten spiral at rates of 4×10^{-4}, 5×10^{-4} and 10^{-4} g/sec for Al, Ag and Au, respectively. Condensation occurred on a heated glass plate. The films were separated by immersion in distilled water and caught on metallic holders of foil containing 0.2-0.4 mm holes. The films were examined by electron diffraction using the (220) ring. The effect of heating the films was studied. The true diffraction broadening was found by harmonic analysis (Ref.6: B.Ya.Pines

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Ostrofokusnyye rentgenovskiye trubki i prikladnoy rentgeno-strukturnyy analiz (Fine focussing X-ray tubes and applied X-ray structural analysis), GITTL, 1955). The main contribution to the broadening arises from the small size of the mosaic blocks. When there is a marked difference in the coefficients of expansion of the holder and the film, the latter is subjected to plastic deformation in the process of heating which is accompanied by a refining of the blocks. With rapid heating, recyrstallisation does not remove this effect. Therefore, thermal coefficients of the film and holding material should be approximately equal. With increasing film thickness of aluminium and silver, the broadening of the lines decreases both in the initial and annealed states. Continuous heating of aluminium films up to 150°C in 2-3 min leads to refining of the mosaic blocks, whereas heating to higher than 150°C results in coarsening. Heating silver and gold in the region 20-400°C also results in coarsening. The mean linear dimension of the blocks in aluminium film is about half that in silver and gold films, and coarsening during heating takes place less intensively in aluminium. The probable reason for this difference is the formation of highly dispersed aluminium oxide. The mosaic

structure is more dispersed in condensed films than in ordinary massive samples after cold deformation. The high dispersion of the blocks and their strong misorientation can be judged from the high strength of thin condensed films. There are 4 tables.

ASSOCIATION: Khar'kovskiy politekhnicheskiy institut im. V. I. Lenina
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SUBMITTED: May 20, 1961

37701

S/126/62/013/004/009/022
E111/E435

18.7540

AUTHORS: Boyko, B.T., Palatnik, L.S., Rod'kina, N.I.

TITLE: Electron-diffraction investigation of the structure of superheated and supercooled liquid metals

PERIODICAL: Fizika metallov i metallovedeniye, v.13, no.4, 1962, 555-560

TEXT: The tendency for supercooling to occur increases with decreasing thickness of a liquid-metal layer and can be very small with very thin films. The structures of liquid tin (99.99% pure) during supercooling and superheating, and of liquid indium (99.999% pure) on superheating, were studied by electron diffraction. Films of the test metals were heated directly in the electron-diffraction apparatus by passing d.c. through their holder (a tantalum strip). At supercooling by 10°C the intensity curves show four very pronounced maxima. This is less pronounced on superheating by 30°C and disappears on superheating by 70°C. On the radial-distribution curves for the supercooled tin there are six maxima; the third and fifth disappear on superheating by 30°C and there is a radial change, the curve having only three

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maxima. Comparison with data for closest packing and for white tin showed that on supercooling the short range order of the distribution of the atoms is similar to that of crystalline white tin; on superheating by 70°C the atoms are almost in closest packing. Crystalline indium has almost closest packing. On superheating indium by 35°C and 80°C and comparing the obtained intensity and radial distribution curves, it can be seen that the number of atoms in the first coordination sphere decreases to 7.2 and 6 at the lower and higher temperature, respectively. Indium behaves on fusion differently from other closest packed metals in that the number of atoms in its first coordination sphere decreases but behaves similarly on increasing the superheating. Apparently a coordination number of 8 for liquid indium is the highest. There are 4 figures and 4 tables.

ASSOCIATION: Khar'kovskiy politekhnicheskiy institut im. V.I.Lenina (Khar'kov Polytechnical Institute imeni V.I.Lenin)

SUBMITTED: July 31, 1961

34321
S/032/62/028/003/007/017
B101/B138

1.1800
18.9100 (2408)

AUTHORS: Fuks, M. Ya., and Boyko, B. T.

TITLE: Electron diffraction investigation of the substructure of condensed metal films

PERIODICAL: Zavodskaya laboratoriya, v. 28, no. 3, 1962, 300 - 305

TEXT: Pure aluminum was vacuum evaporated on to various bases (film thickness 65 - 240 Å), and the substructure was studied by electron diffraction analysis. It was found that harmonic analysis of interference lines can only be used to eliminate instrumental effect and not to determine lattice micro stresses. A series of tests with aluminum films on tantalum bases showed strong deformations due to differences in the coefficients of thermal expansion of the two metals. Therefore when studying the substructure of thin films bases should be used whose expansion coefficients do not greatly differ from those of the film to be investigated. To determine block sizes, a microbeam was used which irradiated only a 10 - 20μ^2 sector of the film. Aluminum foils about 10μ thick were perforated by a needle or an electric spark, and the film was

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Electron diffraction investigation...

deposited on the sector contained by this opening. "Microdot" electron diffraction patterns of lines (111) and (200) were obtained for film of 125 Å thickness at 300 - 400°C, and measured photometrically. At 400°C, the linear dimension of the reflecting blocks was 200 - 300 Å; this is the same size as that obtained for mosaic blocks by X-ray diffraction analysis of deformed polycrystals. The angle of disorientation of adjacent blocks was found to be more than 3°. Photographs of the aluminum foil backing did not reveal any substructure. The background between the point reflexes indicates that there are some smaller blocks besides those due to annealing. Thus, the sizes obtained by the microbeam method are not averages, but those of the larger blocks. The average size can be found from the diffraction broadening of the lines; it was 90 Å at 300°C. This method may permit an investigation of the substructure of films of refractory metals, if the irradiated area is reduced to 1 - 2 μ^2 and the light intensity of the electron diffraction photography is increased. The following authors are mentioned: B. Ya. Pines (Ostrofokusnyye rentgenovskiye trubki i prikladnoy rentgenostrukturnyy analiz (Focusing x-ray tubes and applied x-ray diffraction analysis), GITTL (1955), and B. Ya. Pines and A. F. Sirenko (Kristallografiya, 7, 1 (1962)). There are

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Electron diffraction investigation...

3 figures, 2 tables, and 13 references: 10 Soviet and 3 non-Soviet. The two references to English-language publications read as follows: J. W. Menter, D. W. Pashley. Structure and Properties of Thin Films, New York - London, 111 (1959); C. Weaver, R. M. Hill. Adv. in Phys., 8, 32, 375 (1959).

ASSOCIATION: Khar'kovskiy politekhnicheskiy institut im. V. I. Lenina (Khar'kov Polytechnic Institute imeni V. I. Lenin)

Card 3/3

L 14356-63 EWT(1)/EWP(q)/EWT(m)/BDS AFFTC/ASD/ESD-3 JD/IJF(C)

ACCESSION NR: AP3003850 S/0020/63/151/003/0556/0559

AUTHORS: Palatnik, L. S.; Fuks, M. Ya.; Boyko, B. T.; Pugachev, A. T. 63

TITLE: Electron-diffraction studies of elastic deformation in thin, polycrystalline deposited films of aluminum and silver

SOURCE: AN SSSR. Doklady*, v. 151, no. 3, 1963, 556-559

TOPIC TAGS: electron diffraction, elastic deformation of metal, condensed thin metal film, aluminum, silver

ABSTRACT: Macroscopic deformation in polycrystalline films depends not only on the structure and properites of the crystals forming the film but also on their interaction and on the boundary structure. Electron-diffraction permits the determination of elastic deformations of the crystalline lattice by measurement the interplanar distances. The deformation limit depends on interatomic interactions and on the degree of perfection of the crystals themselves - the regions of coherent electron diffraction (r.c.e.d.). A method of r.c.e.d. has been developed by the authors. Films were formed on glass plates covered by powdered NaCl, by evaporation and condensation of pure metals removed in water and caught on a metal slit 0.1mm wide. The deformation of the lattice in two perpendicular

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ACCESSION NR: AP3003850

directions is given in 2 figures for aluminum and silver. The results indicate high degree of perfection of crystals grown from individual nuclei. Their strength approaches the theoretical one. Orig. art. has: 2 figures.

ASSOCIATION: none

SUBMITTED: 04May63 DATE ACQ: 15Aug63 ENCL: 00

SUB CODE: PH NO REF SOV: 005 OTHER: 005

Card 2/2