RAKICEVIC, Smilja

Some economic and geographical peculiarities of Libya. Geogr hor 9 no.3:30-31 '63.

RAKICEVIC, Smilja

Assam and Kashmir, countries much talked about. Geogr hor 9 no.1/2:51-54 '63.

RAKICEVIC, Tomislav L.

Climatological and hydrologic characteristics of Zlatibor.
Glas Srp geogr dr 43 no.1:17-34 '63.

SEMENOV, S.A.; RAKICEVIC, T. [abstracter]

Why the Pygmies are of small height. Geogr hor 8 no.1/2:51-52 '62.

RAKICEVIC, T.L.

Economic geography and anthropogeography. Glas Srp geogr dr 42 no.2:182 '62.

RAKICEVIC, Tomislav L.

Utilization of the water of the Indus River. Glas Srp geogr dr 42 no.2:183 '62.

RAKIGEVIC, Tomislav L.

Mavrovo Lake. Geogr hor 4 no.4:17-23 '59.

RAKIC-MANDIC, G.

Contribution to the study of vitamin C in Plants; 1st communication. (EEAI 9:12)
Bul sci nat SAN 25 no.7:43-47 '59.
(Plants) (Ascorbic acid)

RAKIC-MANDIC, Gordana, mr. asistent Instituta za medicinska instrazivanja S.A.N.

Recent investigation on the role of vitamin C in the plant world. Arh. farm., Beogr. 4 no.4:121-123 Aug 54.

(PLANTS, metab.
vitamin C)
(VITAMIN C, metab.
plants)

Electrical Engineering Abst.
Vol. 57 No. 675
Mar. 1954
Electronics

6-2-54
pmf

621.384.6 : 621.317.7

4

191. Certain auxiliary instruments of the 1·5 MeV accelerator. B. S. MARIĆANIN AND M. D. KAĆIĆ. *Bull. Inst. Nuclear Sci. "Boris Kidrich,"* 3, 103–9 (Aug., 1953).

Several instruments for use with the 1·5 MeV Cockcroft–Walton generator at Vinča, near Belgrade, are described. The generator voltage is stabilized by means of a saturable reactor whose a.c. windings are in the generator feeder and whose d.c. windings are supplied from a differential d.c. amplifier controlled by the ion beam after 30° magnetic deflection. If the ion energy changes from the desired value, the beam moves over to one side of a defining slit; the two input terminals of the amplifier are fed from the two sides of the slit in such a way that a rise of current to one side produces a main-generator-voltage change which will restore the beam to its central position. A further 60° magnetic analyser is used to pick out a more closely defined energy range, the width of which can be controlled at will by variable slits. The magnetic field of this analyser is measured by means of a coil rotated by a tuning-fork-controlled synchronous motor. With the narrowest usable slits the energy spread was 4 keV. Finally, a current-integrator is described using two condensers one of which can be charged while the other is discharged; discharge can then be made complete, the time taken being unimportant. J. H. FREMLIN

IVANOV, [illegible]; ANGELOV, [illegible]; VA[illegible]V [illegible]; BAEVA, [illegible].

Attempted control of [illegible]ias and complications in legal abortion under total baytinal anesthesia using intravenous methylergometrine. Akush. ginek. (Sofiia) 3 no.1:71-74 '64.

RAKIN, A.G., kandidat tekhnicheskikh nauk

Hollow panels with a corrugated veneer filler. Der.prom.4 no.8: 9-13 Ag '55. (MLRA 8:10)

1. TSentral'nyy nauchno-issledovatel'skiy institut fanery i mebeli.
(Paneling)

SHEYDIN, I.A., kandidat tekhnicheskikh nauk; RAKIN, A.G., kandidat tekhnicheskikh nauk; DEMIDOVA, L.A., inzhener

Physical and mechanical properties of laminated wood plastics. Der. prom. 4 no.9:12-15 S '55. (MLRA 8:11)

1. TSentral'nyy nauchno-tekhnicheskiy institut fanery i mebeli
(Plywood) (Laminated plastics)

SHEYDIN, Iosif Aronovich, kandidat tekhnicheskikh nauk; SMIRNOV, Aleksandr Vasil'yevich, kandidat tekhnicheskikh nauk; DEMIDOVA, Lidiya Aleksandrovna; RAKIN, A.G., redaktor; SIDEL'NIKOVA, L.A., redaktor izdatel'stva; KARASIK, V.P., tekhnicheskiy redaktor

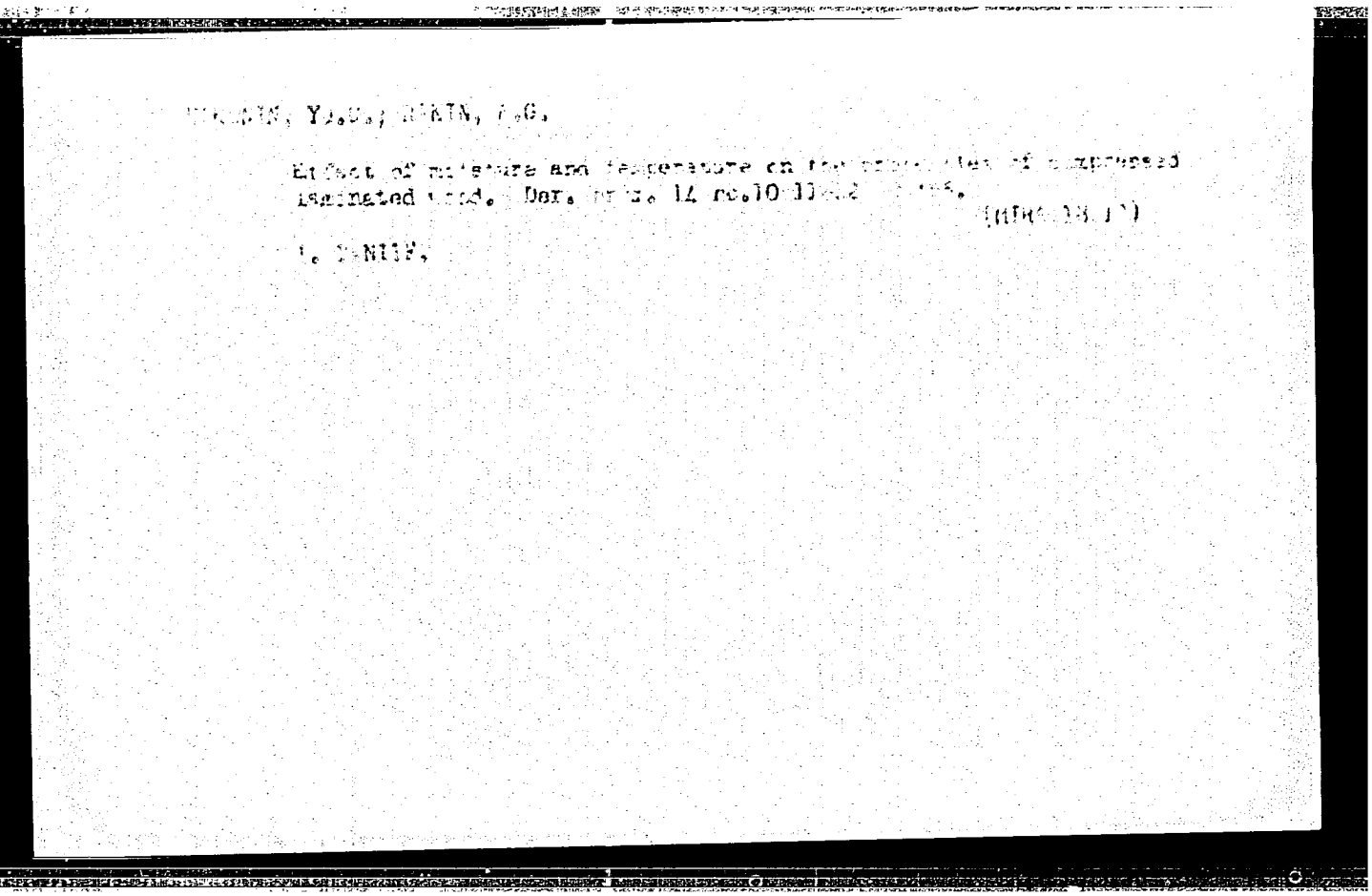
[Technology of wood plastics] Tekhnologiia drevesnykh plastikov. Moskva, Goslesbumizdat, 1956. 239 p. (MLRA 9:7)
(Wood) (Plastics)

LEONT'YEV, I.I.; RAKIN, A.G.; SMOLENSKIY, K.I.

Industrial manufacture of parquet boards. Der.prom. 5 no.7:17-19 Jl '56. (Parquetry) (MLRA 9:9)

KHUKHRYANSKIY, I.N.; ZHITKOV, P.N.; KOVYAZIN, F.Ya.; TSYPLAKOV, D.M.; OGARKOV, B.I.; OGARKOVA, T.V.; RAKIN, A.G., kand. tekhn. nauk; SHEYDIN, I.A.; PUMYANTSEVA, O.M.; MAL'TSEVSKAYA, R.P.; KUVAROVA, M.P.; PYUDIK, P.E.; MIROSHNICHENKO, S.N.; DORONIN, Yu.G.; ASOTSKIY, L.S.; MAREYEV, V.S.; SMOLENSKIY, K.I., inzh., retsenzent

[Compressed wood and wood plastics in the machinery industry; a manual] Pressovannaia drevesina i drevesnye plastiki v mashinostroenii; spravochnik. Moskva, Mashinostroenie, 1965. 147 p. (MIRA 18:3)



Effect of moisture and temperature on [illegible] of compressed
[illegible] acid. Dok. AN SSSR 14 no.10 [illegible]
(MIRA 11:1)

1. [illegible]

L 00667-67 EWT(m)/EWP(j)/T IJP(c) RM

ACC NR: AP6009867 (A) SOURCE CODE: UR/0413/66/000/004/0065/0065

INVENTOR: Kalnin'sh, A. I.; Rakin, A. G.; Berzin'sh, G. V.; Sheydin, I. A.; Darzin'sh, T. A.; Muzhits, V. I.; Doronin, Yu. G.; Ziyemelis, A. E.; Churina, Ye. A.

ORG: none

TITLE: Preparation of wood plastics. Class 38, No. 178971 [announced by the Institute of Wood Chemistry AN LatSSR (Institut khimii drevesiny AN Latviyskoy SSR) and Central Scientific-Research Institute of Plywood (Tsentral'nyy nauchno-issledovatel'skiy institut fanery)]

SOURCE: Izobreteniya, promyshlennyye obraztsy, tovarnyye znaki, no. 4, 1966, 65

TOPIC TAGS: plywood, wood chemistry, wood plastic, forest product

ABSTRACT: An Author Certificate has been issued describing a method of preparing wood plastics. To improve the physical and mechanical properties of the end product and lower the amount of binder for making wood plastic from veneer sheets or ground wood, the latter are treated, prior to pressing, with a 25-percent solution of ammonia for 4 hr at 18--20C. The treated sheets are combined with untreated sheets during pressing. [LD]

SUB CODE: 11/ SUBM DATE: 25Jan65

Card 1/1 vlr UDC: 674.812.2

RYZHKOV, Ye.V.; SHUR, L.M.; RAKIN, A.I.

Automatic panoramic ionosphere station. Elektrosviaz' 10 no.5:18-27 My '56. (MLRA 9:8)

(Radar) (Atmosphere, Upper)

USSR/Radiophysics - Radio-wave Propagation. Ionosphere, I-6

Abst Journal: Referat Zhur - Fizika, No 12, 1956, 35307

Author: Ryzhkov, Ye. V., Shur, L. M., Rakin, A. N.

Institution: None

Title: Automatic Panoramic Ionospheric Station

Original Periodical: Elektrosvyaz', 1956, No 5, 18-27

Abstract: Description of automatic panoramic ionospheric station for a wide band (0.5 - 20 Mc), developed and built by the Leningrad Electrotechnical Communications Institute imeni Prof. M. A. Bonch-Bryuevich. Discussion of problems involved in the design of such stations. Technical data of the station, the basic characteristics of its units, and consideration in the choice of antenna installations are given.

Card 1/1

L 29829-66 EWT(d)/EWT(m)/SWP(w)/ETI/ETC(m)/T/EWP(t)/ETI/IJP(c) WW/GD

ACC NR: AP6011327 SOURCE CODE: UR/0198/66/002/003/0001/0009

AUTHORS: Aleksandrov, A. Ya. (Novosibirsk); Akhmetzyanov, M. Kh.; Rakin, A. S.

ORG: Novosibirskiy Institute of Railroad Transport Engineers (Novosibirskiy institut inzhenerov zhel.-dor. transporta)

TITLE: A study of elastoplastic deformation of shells with openings and reinforcements by the method of photoelastic coverings

SOURCE: Prikladnaya mekhanika, v. 2, no. 3, 1966, 1-9

TOPIC TAGS: shell, cylindric shell, photoelasticity, stress measurement

ABSTRACT: Experiments were performed to study the stressed state of cylindrical shells with reinforced and nonreinforced circular, square, and rectangular openings in tension and in torsion. The experimental method used is the one of photoelastic coverings, in which the surface of the shell is covered with a thin covering of an optically active material. Shell deformations under loading are transmitted to the photoelastic covering and are manifested in the covering as the dual wave radiation, which is measured with the aid of a polarization device for reflected light. The equation

$$\delta = 2C \int_0^{z'} (e_1 - e_2)\, dz'$$

expresses the relationship of the optical difference of shift δ with the difference of

Card 1/2

L 29829-66

ACC NR: AP6011327

principal deformations in the covering in the absence of reversals of direction of the principal deformations along the thickness of the covering. C is the optical constant of the of the cover material and d is its thickness. Other working equations are developed, the accuracy of this testing method is discussed, and the results are compared with analytical solutions. The limits of applicability of the analytical solutions are established. It is shown that the method developed satisfies the accuracy requirements of the study while also avoiding the series of difficulties and limitations of other known means of polarization-optical studies of shells. Orig. art. has: 5 figures and 9 equations.

SUB CODE: 13/ SUBM DATE: 30Aug65/ ORIG REF: 014/ OTH REF: 002

Card 2/2 FV

ACC NR: AT7002111 (A) SOURCE CODE: UR/0000/66/000/000/0261/0268

AUTHOR: Rakin, A. S.

ORG: none

TITLE: An investigation of stress distribution in the vicinity of apertures in shells subjected to elastic and elasto-plastic deformations

SOURCE: Vsesoyuznaya konferentsiya po polyarizatsionno-opticheskomu metodu issledovaniya napryazheniy. 5th, Leningrad, 1964. Polyarizatsionno-opticheskiy metod issledovaniya napryazheniy (Polarizing-optical method of investigating stresses); trudy konferentsii. Leningrad, Izd-vo Leningr. univ., 1966, 261-268

TOPIC TAGS: stress, stress analysis, elastic stress, optic method, polarization, elastic deformation, shell structure

ABSTRACT: Several methods for stress analysis in shells are discussed and mathematical relations developed. Figure 1 shows various techniques for placing optically sensitive films on cylindrical surfaces with apertures. The mathematical relations applicable to the various methods of transillumination for calculation of deformations in the film are given. The experimental techniques and equipment (a modified polariscope) are described. Examples of stress analysis in cylindrical shells using duraluminum and steel models are included. Orig. art. has: 5 figures, 7 formulas.

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ACC NR: AT7002111

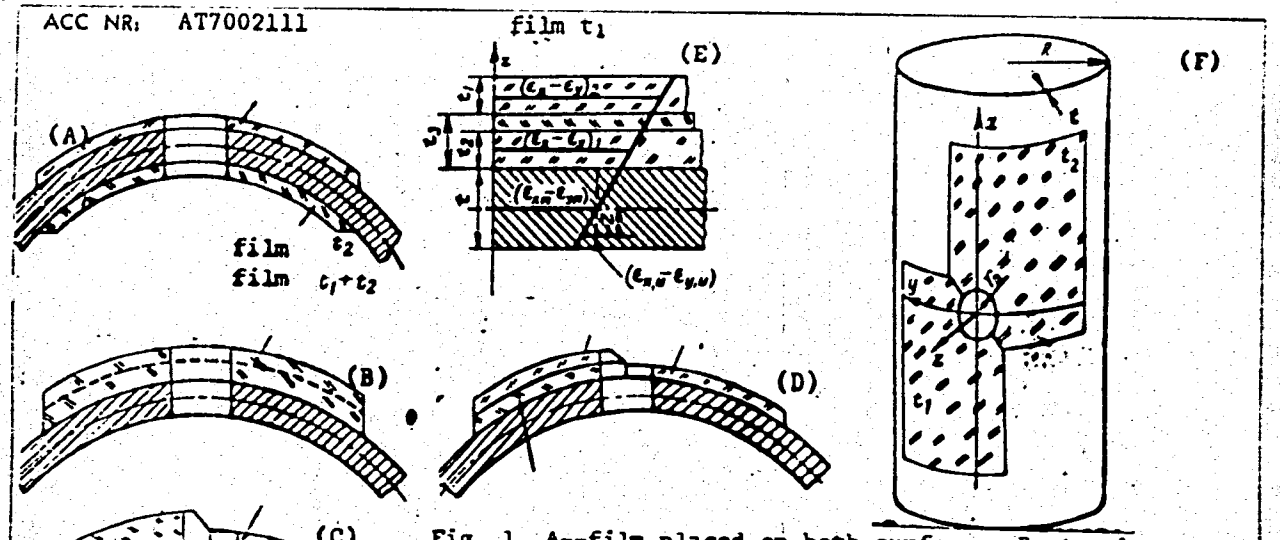

Fig. 1. A--film placed on both surfaces; B--two-layer film placed on one surface only; C--diagonally symmetrical positioning of single layer film having nonuniform thickness; D--diagonally symmetrical positioning of a single and a double layer film; E--normal section of the shell and the films bonded to it (with indication of differential deformations measured in the layers); F--cylindrical shell with an aperture.

SUB CODE: 20,17/ SUBM DATE: 14Jun66/ ORIG REF: 006/ OTH REF: 001

Card 2/2

24.7700(1136,1164,1385)

3095h
S/576/61/000/000/011/020
E073/E435

AUTHORS: Tovstyuk, K.D., Gusev, S.M., Rakin, G.V.

TITLE: Mobility of current carriers in cadmium antimonide

SOURCE: Soveshchaniye po poluprovodnikovym materialam, 4th. Voprosy metallurgii i fiziki poluprovodnikov; poluprovodnikovyye soyedineniya i tverdyye splavy. Trudy soveshchaniya. Moscow, Izd-vo AN SSSR, 1961. Akademiya nauk SSSR. Institut metallurgii imeni A.A.Baykova. Fiziko-tekhnicheskiy institut, 88-91

TEXT: The physical properties of CdSb were studied by measuring the temperature dependence of the electrical conductivity and the Hall effect on ten specimens of differing purities, using the graphical method of W.Dunlap (Ref.2: Phys. Rev. 1950, 79, 286). The CdSb was produced by using spectrally pure components obtained by multiple vacuum distillation. During fusion, continuous stirring was employed and the single crystals were grown by zone fusion in a nitrogen atmosphere. The measurements were made on uniform single crystal specimens which were carefully thermostated inside a liquid. The purest specimens

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had an impurity concentration of 10^{15} cm^{-3}. Plots are included of the temperature dependence of the electrical conductivity and of the Hall effect. In the temperature range 333 to 350°K, an inversion of the sign of the Hall effect was observed; the purer the specimens the lower was the point of inversion on the temperature scale. The ratio of the Hall mobility b of electrons to that of holes for two of the specimens were determined by the formula

$$\frac{R_{max}}{R_S} = -\frac{(b-1)^2}{4b} \qquad (1)$$

where R_S is the Hall effect in the saturation range of the curve; R_{max} is the Hall effect at the point of the maximum R(T). In the given case for T = 333°K, b = 1.135 and for T = 345°K, b = 1.390. As was shown by Dunlap and by Hunter (Ref.5: Phys. Rev., 1954, 94, 1157), the results of the measurements of the Hall effect and of the specific resistance can be conveniently interpreted by means of the graphical plotting of R/ρ as a function of ρ, which has the shape of an ellipse and the parameters of which permit determining the Hall mobility of the electrons and holes. The

Mobility of current carriers ...

authors plotted such elipses for the temperatures 274 and 294°K In both cases the centres of the ellipse are displaced along the R/ρ axis to the side of positive R/ρ values, which indicates that at these temperatures the holes are more mobile than the electrons in CdSb. for T = 274°K, b = 0.555 and for T = 294°K, b = 0.572. The authors did not possess adequate data for determining the law governing the temperature dependence of b However, the existence of an inversion of the sign of the Hall effect at temperatures above 335°K and the displacement of the centres of the ellipses towards positive R/ρ values at the temperatures 274 and 294°K indicate that b increases with increasing temperature. Consequently, the temperature dependence of the mobility of the holes is more pronounced (larger by approximately twice at T = 274°K) than that of the electrons The dependence of the Hall effect on the magnetic field strength H was measured at the temperatures T = 294 and 194.1°K. The results are plotted. In all cases the Hall effect increases with increasing intensity of the magnetic field. This indicates that in CdSb the Hall mobility of holes is smaller than the drift

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mobility, which can be explained by the complicated structure of the energy spectrum of the holes. There are 4 figures and 6 references: 3 Soviet and 3 non-Soviet. The English-language references are quoted in the text.

[Abstractor's Note: Slightly abridged translation.]

4

Card 4/4

GUSEV, S.M.; RAKHIN, G.V.

Thermoelectric properties of cadmium antimonide alloyed with elements of the I, II, IV, VI groups. Fiz. tver. tela 4 no.9:2328-2337 S '62. (MIRA 15:9)

1. Chernovitskiy gosudarstvennyy universitet.
(Cadmium antimonide) (Thermoelectricity)

ACCESSION NR: AT3007802 S/2959/63/000/000/0074/0078

AUTHOR: Gusev, S. M.; Rakin, G. V.

TITLE: Some properties of alloyed CdSb

SOURCE: Termoelektricheskiye svoystva poluprovodnikov; sbornik trudov I i II soveshchaniy po termoelektrichestvu. Moscow, 1963, 74-78

TOPIC TAGS: semiconductor electrical property, semiconductor thermal property, CdSb electrical property, CdSb thermal property, semiconductor electroconductivity, semiconductor thermoelectromotive force, semiconductor thermal conductivity, semiconductor property, semiconductor

ABSTRACT: The temperature dependence of electroconductivity, thermal emf, and thermal conductivity of CdSb have been investigated for specimens of stoichiometric composition and for alloys with Cu, Ga, In, Ge, Sn, Se, and Te. CdSb monocrystals obtained by zone melting had a carrier concentration of 10^{15} cm^{-3}. It was found that alloying

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ACCESSION NR: AT3007802

CdSb with up to 1% Cu, Ge, or Sn increases electroconductivity to 500 $ohm^{-1} \cdot cm^{-1}$, with an accompanying increase in carrier concentration. Alloying with Ga, In, Se, or Te in small concentrations increases electroconductivity at room temperatures; an increase in admixture concentration fails to produce any appreciable increase in conductivity, which indicates limited solubility of these elements in CdSb. Specific thermal emf increased with an increase in Cu, Ge, and Sn content at room temperature, but decreased somewhat at 100—130K. An admixture of In, Ga, Se, and Te produced a negative specific thermal emf at room temperature. Thermal conductivity of stoichiometric and alloyed specimens as a function of temperature was estimated by the comparison method at 150—400K. Thermal conductivity of the alloyed specimens decreased with an increase in temperature, up to room temperature; at higher temperatures it remained nearly constant at 2.1×10^{-2} w cm^{-1}/deg. The conductivity of specimens with a high content of Te (2.67 and 4.67%) or Se (1.66 and 3.25%) showed a marked increase at about 300—500K. A well defined semiconducting impurity region develops in specimens with a high Te and Se content, its slope increasing with the impurity concentration. The thermal emf in the impurity region has a positive

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ACCESSION NR: AT3007802

sign. The electrical properties of CdSb are also dependent upon heat treatment. Thus a specimen with 4.67% Te, heated at 350C for 30 hr and cooled for 24 hr, shows an increase in specific electro-conductivity at high temperatures. Se and Te admixtures in excess of one percent increase the melting point of the alloy to above 600C. The reasons for this increase are not clear. A two-phase region in the specimens was observed by microanalysis. X-ray structural analysis confirms the presence of CdTe and CdSe. It is concluded that CdSb alloyed with Cu, Ge, and Sn may be used for the positive electrode of a thermocouple, and CdSb alloyed with In, Ga, Se, and Te, for the negative electrode. Orig. art. has: 5 figures and 1 table.

ASSOCIATION: none

SUBMITTED: 00 DATE ACQ: 16Oct63 ENCL: 00

SUB CODE: PH NO REF SOV: 003 OTHER: 003

Card 3/3

L 47342-66 EWT(l)/EWT(m)/T/EWP(t)/ETI IJP(c) GG/JD

ACC NR: AR6025751 SOURCE CODE: UR/0058/66/000/004/A075/A075

AUTHOR: Rakin, G. V.

TITLE: Production and properties of doped CdSb single crystals

SOURCE: Ref. zh. Fizika, Abs. 4A629

REF SOURCE: Sb. Simpozium. Protsessy sinteza i rosta kristallov i plenok poluprovodnik. materia v, 1965. Tezisy dokl. Novosibirsk, 1965, 31-32

TOPIC TAGS: cadmium compound, antimonide, single crystal growing, zone melting, carrier density, semiconductor conductivity, Hall effect, thermal emf, temperature dependence

ABSTRACT: A procedure is presented for obtaining single crystal samples of n-type CdSb doped with group III elements. The "pure" CdSb was prepared by direct synthesis from purified elements with subsequent zone melting. The carrier density in the obtained single-crystal compound was 10^{15} cm^{-3}. Samples with Ga and In impurities were obtained by doping in the melt. The electric conductivity, the Hall effect, and the thermal emf were measured from room temperature to the temperature of liquid nitrogen. The resistance of doped CdSb increases almost abruptly by several orders of magnitude as the temperature is decreased in a narrow temperature interval. For some samples, the Hall effect has a double inversion, with the n-type region expanding with increasing impurity concentration. The thermal emf also depends strongly on the temperature. The change in its sign as a function of the temperature corresponds to the sign of the Hall coefficient. [Translation of abstract]

SUB CODE: 20

Card 1/1 pb

L 31934-66 EWT(m)/T/EWP(t)/ETI IJP(c) JD
ACC NR: AP6016044 (N) SOURCE CODE: UR/0185/66/011/005/0511/0519

AUTHOR: Rakin, H. V.-- Rakin, G. V.

ORG: Chernovtsy State University (Chernivets'kyy derzhuniversytet)

TITLE: Effect of silver and gold on the thermoelectric conductivity of CdSb

SOURCE: Ukrayins'kyy fizychnyy zhurnal, v. 11, no. 5, 1966, 511-519

TOPIC TAGS: silver, gold, CdSb crystal, thermoelectric conductivity, Hall effect
cadmium antimonide

ABSTRACT: The results are given of experimental investigation of electric conductivity, the Hall effect, the thermal emf, and the thermal conductivity of CdSb single crystal samples doped with silver and gold in amounts of 0.001, 0.01, 0.1, and 1%. The measurements were taken at temperatures from liquid oxygen to 380K. The thermoelectric conductivity was calculated on the basis of data obtained. The highest value (1×10^{-3} deg^{-1}) was obtained for samples doped (in the melt) with 1% silver. It was demonstrated that the silver and gold in CdSb were acceptors in all the above quantities. The concentration of charge carriers increases with increased chemical impurity. Maximum mobility of the carriers occurs with a 0.001% concentration of silver and gold. The dependence was found between the mobility of the charge carriers and the temperature for the given impurity admixtures. The

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L 31934-66

ACC NR: AP6016044

author thanks Docent K. D. Tovstyuk for his examination of this work. Orig. art. has: 9 figures, 4 formulas, and 1 table. [NT]

SUB CODE: 11, 20/ SUBM DATE: 26Jun65/ ORIG REF: 008/ OTH REF: 008

Card 2/2

ACC NR: AR6030487 SOURCE CODE: UR/0275/66/000/006/B011/B011

AUTHOR: Rakin, G. V.

TITLE: Production and properties of doped CdSb single crystals

SOURCE: Ref. zh. Elektronika i yeye primeneniye, Abs. 6B74

REF SOURCE: Sb. Simpozium. Protsessy sinteza i rosta kristallov i plenok poluprovodnik. materialov, 1965. Tezisy dokl. Novosibirsk, 1965, 31-32

TOPIC TAGS: semiconductor material, semiconductor single crystal, cadmium antimonide ~~semiconductor~~

ABSTRACT: A method of producing n-type CdSb single crystals doped with the elements of the 3rd group is reported. Pure CdSb was prepared by a direct synthesis from purified elements with a subsequent zone melting. The carrier concentration in the resulting single-crystal compound was 10^{15} per cm^3. Specimens with Ga and In impurities were produced by doping the melt. The resistivity of doped CdSb increased by several orders of magnitude almost stepwise when the temperature slightly decreased. For some specimens, the Hall effect exhibited a double inversion, the n-region widening with the increase of impurity concentration. The thermo-emf strongly depended on temperature; it changed the sign as the temperature varied depending on the sign of the Hall coefficient. G. P. [Translation of abstract]

Card 1/1 SUB CODE: 09, 11, 20 UDC: 621.315.592.548.552:546.48'86

ACC NR: AR7000875 SOURCE CODE: UR/0058/66/000/009/E078/E079

AUTHOR: Borets, A. N.; Rakin, G. V.

TITLE: Infrared absorption in indium dopped CdSb

SOURCE: Ref. zh. Fizika, Abs. 9E638

REF SOURCE: Sb. Tezisy dokl. k XIX Nauchn. konferentsii. Uzhgorodsk. un-t, 1965, Ser. fiz. Uzhgorod, 1965, 68-72

TOPIC TAGS: infrared absorption, absorption spectrum, indium ligand complex, Hall effect, cadmium antimonide, cadmium antimonide crystal

ABSTRACT: The temperature dependence on the Hall effect sign, reflective capacity and the absorption spectrum within the 4—15 μ wave range was investigated in indium dopped CdSb crystals (in concentration 0.001, 0.01, 0.1 and 1%). It has been shown that at 90 to 360K the 0.1% indium-containing samples possess n-type conductivity and the absorption is related to free electrons. At 0.001% concentration and cooling below 160K the Hall effect sign changes from negative to positive. These samples have an absorption band maximum at 14 μ. On the

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ACC NR: AR7000875

basis of these data it is concluded that indium produces in CdSb a donor level which at 130K is by 0.09 electron volts below the bottom of the conduction zone. Yu. Zakis. [Translation of abstract] [AM]

SUB CODE: 20/

Card 2/2

RAKIN, L.A.

Brick transportation in containers. Ogneupory 27 no.10: 477-478 '62. (MIRA 15:9)

1. Metallurgicheskiy zavod "Serp i molot".
(Firebrick--Transportation) (Unitized cargo systems)

RAKIN, L.A.; ZORIN, P.A., starshiy inzhener

Mechanization of repairs of metallurgical furnaces in the "Serp i Molot" Plant. Metallurg 6 no.9:34 S '61. (MIRA 14:9)

1. Zamestitel' nachal'nika tsekha remonta metallurgicheskikh pechey zavoda "Serp i molot" (for Rakin). 2. Zavod "Serp i molot" (for Zorin).
(Metallurgical furnaces--Maintenance and repair)

RAKIN, Vilenko, inz. (Pula)

Development, properties and usability of basic electrodes.
Zavarivanje 3 no.2:26-32 F '60

1. Brodogradiliste "Uljanik", Pula; clan Uredistva, "Zavarivanje".

SOV/126-6-4-17/31

AUTHOR: Rakin, V.G.,
Buynov, N.N.

TITLE: On the Nature of Etch-Figures in the Al-Cu Alloys
(O prirode figur travleniya v splavakh Al-Cu)

PERIODICAL: Fizika Metallov i Metallovedeniye, 1958, Vol 6, Nr 4, pp 686-691 (USSR)

ABSTRACT: The object of the present investigation was to establish the extent to which the structural changes occurring during decomposition of solid solutions are reflected in the nature of the etch-figures and to study the effect of mosaic structure on the age-hardening processes. The experimental Al-Cu alloys, prepared from high purity materials subjected to a preliminary vacuum treatment, contained 0.25, 0.5, 1.5, 4.0% Cu. The experimental specimens, both solution-treated and aged at 150, 190 or 250°C, were etched with "aqua regia", the Lacombe reagent (Ref.10) or the Tucker reagent (Ref.11), all of which produce cubic etch-figures on pure aluminium. The chemically or, in some cases, electrolytically etched surfaces were examined with the aid of an electron microscope, hardness measurements being used

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On the Nature of Etch-Figures in the Al-Cu Alloys

to check the progress of the ageing treatment. The alloys containing up to 0.5% Cu which do not age-harden, were characterised by etch-figures, cubical in shape (Fig.1-3). On the other hand, both cubic and octahedral or rhombo-dodekahedral etch-figures were observed on the 1.5% Cu alloy (Fig.4-7). The two latter forms were associated with the initial stages of age-hardening, but the octahedral etch-figures appeared also on alloys in which the second phase had been precipitated in the form of comparatively large particles. The electron microscope replicas of this alloy aged for 24 hrs. at 150°C showed white spots indicating the presence of the Hinde-Preston zones (Fig.6). In the case of the 4.0% Cu alloy aged at 250°C, the etch-figures lost their regular shape and decreased in size with increasing time of the ageing treatment, although large, octahedral etch-figures were formed on an over-aged alloy of this composition, characterised by large particles of the precipitated Θ' phase. On one occasion, a spiral

 etch-figure was observed on an electrolytically etched

On the Nature of Etch-Figures in the Al-Cu Alloys

specimen of this alloy. As regarding the white spots observed on some of the electron microscope replicas and corresponding to the Hinde-Preston zones, three distribution patterns were distinguished: (i) Spots randomly distributed (ii) spots forming a honeycomb pattern and (iii) spots forming a regular network or parallel chains. It is postulated that in the case (i) the white spots are either not associated with dislocations or correspond to dislocations distributed in a manner corresponding to the Taylor lattice. The honeycomb pattern is associated with the presence of very fine, sub-microscopic mosaic (0.1 - 0.2 μ) whose boundaries are formed by dislocations. The third pattern corresponds to dislocations forming the boundaries of subgrains, the size of which may vary from 0.3 - 0.5μ to several microns, depending on the degree of decomposition of the solid solution. The analysis of the experimental results led the present authors to the following conclusions: The etch-figures in the Al-Cu alloys are associated with the presence of large, screw or helicoidal dislocations. (It is not

On the Nature of Etch-Figures in the Al-Cu Alloys

possible to determine the magnitude of the Burgers vector or the pitch of the screw, owing to the small height of the spiral step.) The shape of the etch-figures depends not only on the degree of decomposition of the solid solution but also on the copper content and the age-hardening characteristics of the alloy. The etch-figures are closely associated with subgrains or mosaic blocks of the alloy and the dislocations are distributed along the sub-boundaries, forming characteristic, network-like patterns. There are 8 figures and 13 references of which 8 are Soviet and 5 English.

ASSOCIATION: Institut Fiziki Metallov Ural'skogo Filiala AN SSSR (Institute of Metal Physics, Ural Branch, Ac.Sc.USSR)

SUBMITTED: 9th May 1957.

SOV/20-121-2-21/53

AUTHORS: Rakin, V. G., Buynov, N. N.

TITLE: Experimental Observation of Dislocation Sources by Means of Separated Matter (Eksperimental'noye nablyudeniye istochnikov dislokatsiy s pomoshch'yu vydeleniy)

PERIODICAL: Doklady Akademii nauk SSSR, 1958, Vol. 121, Nr 2, pp. 271 - 273 (USSR)

ABSTRACT: The possibilities of detecting and visualizing dislocation sources by means of electron-microscopic photographs of alloys are investigated. Such investigations and attempts to give a theoretical explanation of the phenomena were already carried out by Frank and Read (Rid)(Ref 1) and by Kuhlmann-Wilsdorf (Kul'mann-Vil'sdorf)(Refs 2,3,5). The former ascertained almost round closed loops or meshes, the latter groups of little chains (in Al-Cu-alloys). In the present paper a report is presented on investigations of Al-Cu-alloys(4% Cu). Part of the samples was aged for 4 hours at 190°C and another part for 30 minutes at 250°C; in electron-microscopic photographs separate chains consisting of almost closed, closely adjoining or also torn meshes or links, respectively,were detected (Figs 1-3). Out of 43

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investigated photographs of sources the inclination of the levels in which the sources were located in 8 cases was approximately {111}, in 10 cases {112}, in 6 cases {122}, in 7 cases {123}, in 2 cases {110}, and in 2 other cases {110}. The authors ascertained that these meshes nearly always had "centers" (see Figs 1 and 2), which had an open hexagonal or round shape. It was found that the distance between the meshes increases with the distance from the center. The results of 17 measurements of distances are given: If the first mesh is 0,47μ removed from the center, between the first and second mesh there is a distance of 0,55μ, 0,72μ between the third and fourth; at greater distances 1,75μ were measured. Such centers can have two dislocations of inverse sign. The authors express their gratitude to A.N. Orlov for having taken interest in their work. There are 4 figures and 5 references, 0 of which is Soviet.

Experimental Observation of Dislocation Sources by Means of Separated Matter SOV/20-121-2-21/53

ASSOCIATION: Institut fizikii metallov Ural'skogo filiala Akademii nauk SSSR (Institute of Metal Physics, Ural Branch, AS USSR)

PRESENTED: January 15, 1958, by G.V.Kurdyumov, Member, Academy of Sciences, USSR

SUBMITTED: January 8, 1958

Card 3/3

RAKIN, V. G.

18(7) PHASE I BOOK EXPLOITATION SOV/3355

Akademiya nauk SSSR. Institut metallurgii. Nauchnyy sovet po probleme zharoprochnykh splavov

Issledovaniya po zharoprochnym splavam, t. IV (Studies on Heat-Resistant Alloys, vol. 4). Moscow, Izd-vo AN SSSR, 1959. 400 p. Errata slip inserted. 2,200 copies printed.

Ed. of Publishing House: V. A. Klimov; Tech. Ed.: A. P. Gusev; Editorial Board: I. P. Bardin, Academician; G. V. Kurdyumov, Academician; N. V. Ageyev; Corresponding Member, USSR Academy of Sciences; I. A. Oding, I. M. Pavlov, and I. P. Zudin, Candidate of Technical Sciences.

PURPOSE: This book is intended for metallurgists concerned with the structural metallurgy of alloys.

COVERAGE: This is a collection of specialized studies of various problems in the structural metallurgy of heat-resistant alloys. Some are concerned with theoretical principles, with properties of specific materials. Various phenomena occurring under specified conditions are studied and reported on. For details, see Table of Contents. The articles are accompanied by a number of references, both Soviet and non-Soviet.

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Card 7/12

RAKIN, V.G.; BUYNOV, N.N.

Experimental observation of dislocation sources revealed by etching. Issl.po zharopr.splav. 4:193-196 '59. (MIRA 13:5)

(Dislocation in crystals) (Metals--Etching)

SOV/126-7-6-23/24

AUTHORS: Rakin, V.G. and Buynov, N.N.

TITLE: Electron Microscope Study of Slip Lines in an Aluminium-Copper Alloy

PERIODICAL: Fizika metallov i metallovedeniye, 1959, Vol 7, Nr 6, pp 939-943 (USSR)

ABSTRACT: The investigation was carried out on electrolytically polished and etched polycrystalline specimens of an aluminium alloy containing 4% Cu, which were pulled to fracture. Oxide prints were obtained of the place of fracture, as well as of the side surface close to the fracture (within a distance of 4 mm). Prior to deformation the specimens, which had been quenched from 535°C, were aged at 190 and 250°C. The alloy was tested for hardness in relation to ageing time. For comparison, the structure of the deformed surface of pure aluminium (99.99%) was studied. The direction of slip, its magnitude and the distance between the slip lines in the initial stages of ageing of the alloy were determined from the etch figures, and in the later stages from the precipitates. Besides, the slip lines were also used for the determination of the crystallographic indices of the

Card 1/3

SOV/126-7-[illegible]

Electron Microscope Study of Slip Lines in an Aluminium-Copper Alloy

surface of the micro-section. The method for such measurements is described in various papers (Refs 1-4). As a result of the treatment of 700 electron exposures, curves were obtained showing the distribution of slip in the slip lines, as well as the distribution of the spacings between the lines (Figs 1 and 2). Graphs were plotted from electron photomicrographs of the side surface of the specimen. Each curve was plotted from 200-250 measurements. In the curves for aluminium and for the Al-Cu alloy aged at 190°C to maximum hardness, there is one maximum and in the other curves there are two maxima. From a consideration of the curves in the two figures, the authors conclude that micro-slip may be due to the following:

1. Dislocations which form readily in the vicinity of heterogeneous inclusions as a result of stress concentrations around them (Ref 6).
2. Dislocation sources arising from packing defects due to vacancy condensation (Ref 7).
3. Dislocations forming spontaneously in the material on

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Electron Microscope Study of Slip Lines in an Aluminium-Copper Alloy

applying a stress in excess of the U.T.S. (Ref 8). It is difficult to say which of these factors is actually responsible for micro-slip. The origin of slip lines with great slip in one atomic plane is the result of screw dislocations. According to Suzuki (Ref 5), coarse lines with slip in a packet of atomic planes form as the result of the action of terminal members of the dislocation network. This interpretation, however, cannot be taken as a final one, as the formation of new dislocations by the Frank-Reid mechanism can be disputed (Ref 10), and besides, other possible mechanism for multiplication of dislocations exist (Refs 8 and 11). The authors conclude that the final answer to the question regarding the origin of fine and coarse slip lines can be given only after the real mechanism of the formation of new dislocations and the nature of its action under conditions of plastic

Card 3/3 deformation have been clarified. There are 2 figures and 13 references, 1 of which is Soviet, 2 German and 10 English.

ASSOCIATION: Institut fiziki metallov AN SSSR (Institute of Metal Physics, Ac.Sc., USSR)

SUBMITTED: July 2, 1958

18.1210

66227

SOV/126-8-3-10/33

AUTHORS: Buynov, N.N., Shchegoleva, T.V., Rakin, V.G., Komarova, M.F. and Zakharova, R.R.

TITLE: Electron Microscopic Investigation of Etch Figures in Age Hardening Aluminium Alloys

PERIODICAL: Fizika metallov i metallovedeniye, 1959, Vol 8, Nr 3, pp 387-393 (USSR)

ABSTRACT: The results of an electron microscopic investigation of dimensions, form and structure of etch figures in age hardening aluminium alloys are discussed. In the table on p 388, data of the dimensions and shape of the etch figures for various alloys are given. The dimensions of the figures change within very wide limits from several microns to a few tenths. It is characteristic that for the majority of quenched, slightly aged specimens the etch figures are straight-sided (Fig 1) and for the hardened alloys they have an oval shape (Fig 2). Their dimensions decrease in relation to time and artificial ageing, when the hardness of the alloys increases. In Fig 3, an electron micrograph of an Al-Zn-Cu (10% Zn and 0.5% Cu) alloy, deformed by compression by 15% and aged at 180°C for 6 hours, is shown

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66227

SOV/126-6-3-10/33

Electron Microscopic Investigation of Etch Figures in Age Hardening Aluminium Alloys

Spiral stops can be seen. Fig 4 is an electron micrograph of an Al-Cu (4% Cu) alloy aged at 220°C for 5 min. Craters can be seen at the top of octahedra, suggesting screw dislocations. Fig 5 shows scheme for the layout of primary mosaic blocks in the crystalline alloy, the possible axes along which new blocks can form are shown by arrows. The authors arrive at the following conclusions: (1) The shape and dimensions of etch figures in aluminium alloys change with the time and temperature of ageing. (2) The relationship between etch figures and large screw or spiral dislocations justifies the assumption that they correspond to mosaic blocks. There are 5 figures, 1 table and 17 references, 7 of which are Soviet, 1 German, 1 Dutch and 8 English.

ASSOCIATION: Institut fiziki metallov AN SSSR (Institute of Metal Physics AS USSR)

SUBMITTED: August 12, 1958

Card 2/2

RAKIN, V. G.

81911

S/126/60/010/01/018/019
E073/E535

24.7500

AUTHORS: Rakin, V. G. and Buynov, N. N.

TITLE: On the Structure of Slip Lines in Metals

PERIODICAL: Fizika metallov i metallovedeniye, 1960, Vol.10, No.1, pp. 156-158

TEXT: In earlier work (Ref.1) the existence of two maxima in the curves of the distribution of the magnitude of slip lines and in the curves of the distribution of the distances between these slip lines were detected in an Al-Cu alloy. In this communication some results are described of the study of electron diffraction patterns of deformed single crystals of Al and of polycrystalline ageing alloys Al-Si (1.2% Si) and Al-Mg$_2$Si (1.4% Mg$_2$Si), which were preliminarily quenched from the homogenization temperature. The alloys did not have sufficiently pronounced etch figures and separated out particles which would help to determine the crystallographic orientation of the surface and the indices of the slip planes. Therefore, disregarding orientation, the width of the slip lines and of the distances between them were measured on the electron diffraction patterns and Figs. a and b,

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S/126/60/010/01/018/019
E073/E535

On the Structure of Slip Lines in Metals

p.157 represent plots of the distribution of these. Almost all the plotted curves show a maximum and, following that, a more or less pronounced flat section or a further maximum. This leads to the conclusion that maxima are characteristic for all crystalline materials. This may be due to the existence of two mechanisms of formation and development of dislocations, one of which leads to fine, the other to coarse slip lines or that two types of conditions may exist for the action of sources of dislocation in the material. The dependence of the quantitative relations between the two types of slip lines on the degree of deformation leads to the idea that the fine traces occur primarily during the initial stages of deformation when the stress state of the material is still relatively uniform, whilst the coarse stresses appear after a considerable degree of deformation and are due to relatively non-uniform stresses in the material. At present there is no reliable theory or experimental data which would elucidate satisfactorily the existence of fine and coarse slipping. There are 2 figures and 11 references, 1 of which is Soviet, 3 German and

Card 2/3

81911

S/126/60/010/01/018/019
E073/E535

On the Structure of Slip Lines in Metals

7 English.

ASSOCIATION: Institut fiziki metallov AN SSSR
(Institute of Physics of Metals, AS, USSR)

SUBMITTED: January 27, 1960

Card 3/3

4

40972

18.8200

S/659/62/009/000/002/030
1003/1203

AUTHORS Buynov, N. N. and Rakin, V. G.

TITLE Age hardening of alloys

SOURCE Akademiya nauk SSSR. Institut metallurgii. Issledovaniya po zhoroprochnym splavam v. 9. 1962. Materialy Nauchnoy sessii po zharoprochnym splavam (1961 g.). 14—23

TEXT According to the authors, the age hardening of alloys is mainly influenced by the Guinier-Preston zones and to a lesser degree by particles of the metastable phases and the breaking up of the mosaic structure. The internal stresses within the crystal lattice and its imperfections have little influence on the strengthening of the metal. The breaking up of the blocks of the mosaic structure increases the strength by not more than 20-30% even in the alloys which show great volume changes, such as the Ni-Be and Cu-Be alloys. The necessity is stressed for an investigation of the relationship between the dislocations on the one hand, and the Guinier-Preston zones, precipitations, and block boundaries on the other. V. C. Cherny did not agree with the above point of view, and maintained that the conclusions reached do not hold for all alloys, but the causes underlying the strengthening may be quite individual for each alloy. There are 4 figures.

Card 1/1

89941

S/126/61/011/001/007/019
E021/E406

18.7510, 1555, 1454

AUTHORS: Rakin, V.G. and Buynov, N.N.

TITLE: The Influence of Plastic Deformation on the Stability of the Particles Formed in the Decomposition of a Copper-Aluminium Alloy

PERIODICAL: Fizika metallov i metallovedeniye, 1961, Vol.11, No.1, pp.59-73

TEXT: The structure of deformed aluminium - 4% copper alloys has been investigated using the electron microscope to study the influence of deformation of the G.P. zones, the metastable θ' particles and the stable θ phase. The method of oxide replicas was used. The alloys were prepared from 99.99% aluminium and Kal'baum copper. In order to produce starting materials of different strength, the alloys were quenched in water from 535°C and naturally aged for three months, or artificially aged at 190°C for 30 minutes, 90 minutes, 4 hours and 12 hours, or aged at 250°C for 15, 40 and 70 minutes and 2 hours. Thus the alloys had different degrees of supersaturation and contained G.P. zones and precipitate. The specimens were electropolished, deformed to fracture and anodized to produce the oxide replica. From an analysis of

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89941

S/126/61/011/001/007/019
E021/E406

The Influence of Plastic Deformation on the Stability of the Particles Formed in the Decomposition of a Copper-Aluminium Alloy

700 electronmicrographs, the following changes in the microstructure after deformation were noted. The particles of the θ' phase were bent in the slip lines. The G.P. zones and the θ' phase were partially or completely dissolved in the slip lines. In some cases the G.P. zones and θ' phase were stabilized by transformation to θ' and θ phase respectively. This occurred in parts with greatest deformation. New G.P. zones appeared in some of the slip lines. Intensive decomposition often occurred between the slip lines. The platelets of the θ' phase were rotated parallel to the slip lines. The particles of the stable θ phase were bent by the slip lines. The observed effects of plastic deformation were explained by the resistances of the particles to the passage of dislocations through them, by their resistance to diffusion of copper atoms together with dislocations and vacancies and by the interaction of the copper atoms with the stress fields of the dislocations. The plastic deformation does not change the mechanism of decomposition but accelerates it. The degree of

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89941

S/126/61/011/001/007/019
E021/E406

The Influence of Plastic Deformation on the Stability of the Particles Formed in the Decomposition of a Copper-Aluminium Alloy

strengthening obtained by ageing is determined by the interaction of the atoms of the precipitating component with the dislocations. The main part in strengthening is played by the G.P. zone and a smaller part by the metastable particles. Acknowledgments are expressed to A.N.Orlov for his assistance. There are 6 figures and 64 references: 23 Soviet and 41 non-Soviet.

ASSOCIATION: Institut fiziki metallov AN SSSR
(Institute of Physics of Metals AS USSR)

SUBMITTED: July 15, 1960

Card 3/3

BUYNOV, N.N.; RAKIN, V.G.

Age hardening of alloys. Issl. po zharopr. splav. 9:14-23 '62. (MIRA 16:6)

(Alloys--Hardening) (Crystal lattices)

BUYNOV, N. N.; YARKOVA, R. K.; RAKIN, V. I.

"Electronmicroscopic studies of structure Guinier-Preston zones in aluminium-silver and aluminium-copper alloys."

report submitted for 3rd European Regional Conf, Electron Microscopy, Prague, 26 Aug-3 Sep 64.

S/0126/64/017/002/0288/0289

ACCESSION NR: AP4017365

AUTHORS: Rakin, V. G.; Buynov, N. N.

TITLE: On the relation of resistance properties of aluminum copper alloy to its structure

SOURCE: Fizika metallov i metallovedeniye, v. 17, no. 2, 1964, 288-289

TOPIC TAGS: aluminum copper alloy, plastic deformation, G P zone, yield limit, slip track, theta phase, interatomic force

ABSTRACT: The results of earlier work performed by V. G. Rakin and N. N. Buynov (FMM, 1959, 7, 939) were used to study the relation between the resistance properties of Al-Cu (4%) alloy during plastic deformation at various stages of failure and to explain the influence of the G-P zones and particle separation on the resistive properties of the material. It was found that the yield limit varied regularly with the toughness of the material. As the yield limit increased, the magnitude of deformation along the slip tracks and the distance between these tracks tended to decrease, while the number of thin tracks increased. From the results as shown by Fig. 1 of the Enclosures it can be deduced that the magnitude of the displacement along those tracks and the distance between the tracks is

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ACCESSION NR: AP4017365

minimum while the ratio of fine tracks to coarse ones is at a maximum for conditions in which the G-P 2 zone dominates. When the alloy was softened, the characteristic slip indicated a reduction in the number of atoms taking part in the deformation. The maximum participation of the volume of the alloy in plastic deformation corresponded to the dominance of the G-P 2 zone. At the predominance of the G-P 1 zone or the participation of the stable θ phase the resistance and the extent of volumetric participation of the alloy in plastic deformation decreased. The author thanks V. A. Pavlov for discussions of the results and his helpful observations. Orig. art. has: 2 figures.

ASSOCIATION: Institut fiziki metallov, AN SSSR (Institute for Physics of Metals, AN SSSR)

SUBMITTED: 12Aug63

SUB CODE: MM

NO REF SOV: 006

ENCL: 02

OTHER: 001

Card 2/4

ACCESSION NR: AP4017365

ENCLOSURE: 01

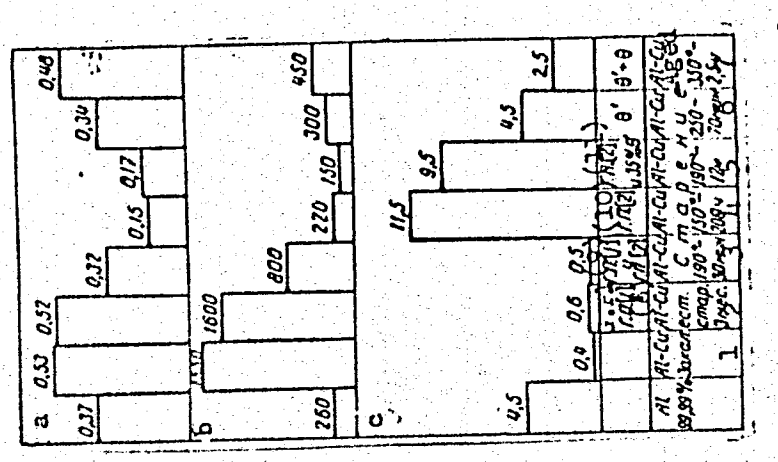

Fig. 1. Diagrams of dependence of characteristic slip on the structure of Al-Cu(4,5) alloy

a. mean distance between slip tracks
b. mean displacement in slip tracks in angstroms
c. ratio of number of thin tracks to number of coarse tracks

1. Al-Cu hardened (to Enclosure 02)

Card 3/4

ACCESSION NR: AP4017365 (from Enclosure 01) ENCLOSURE: 02

2. AL-CU nat. aged 3 months.
3. Aged at 190° for 30 min.
4. at 150° for 200 hrs.
5. at 190° for 12 hrs.
6. at 250° for 70 mins
7. at 350° for 2-5 hrs.
8. G.P. 1
9. G.P. 1 and G.P. 2
10. G.P. 2
11. G.P. 2 and 35% O'

Card 4/4

BUYNOV, N.N.; ZAKHAROVA, R.R.; RAKIN, V.G.

Structure of Guinier-Preston zones and metastable precipitates in aluminum-silver and aluminum-copper alloys. Fiz. met. i metalloved. 17 no.5:782-784 My '64. (MIRA 17:9)

1. Institut fiziki metallov AN SSSR.

L 36628-65 EWT(m)/EWP(w)/EWA(d)/EPR/T/EWP(t)/EWP(b)/EWA(c) IJP(c) JD
ACCESSION NR: AP5002345 S/0126/64/018/006/0877/0887

30
29
B

AUTHOR: Rakin, V. G.; Buynov, N. N.

TITLE: Observation of dislocations in aluminum-copper alloys by the straining method

SOURCE: Fizika metallov i metallovedeniye, v. 18, no. 6, 1964, 877-887

TOPIC TAGS: aluminum copper alloy, dislocation, dislocation formation, electron microscope, Guiner Preston zone, annealing, dislocation removal, stress relief

ABSTRACT: The different types of dislocation in the Al-(4%) Cu alloy formed after plastic deformation, high temperature annealing and aging were studied with an electron microscope: the distribution of the Guinier-Preston zones and of the separated metastable phase ' was examined. Precipitation at the dislocations formed different patterns; the origin of these was discussed. The dislocations did not multiply greatly under small stresses. But at higher stresses, exceeding the yield strength, there was an intensive formation of new dislocations distributed relatively uniformly throughout the mass of the alloy. The noticeable change

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L 36628-65
ACCESSION NR: AP5002345

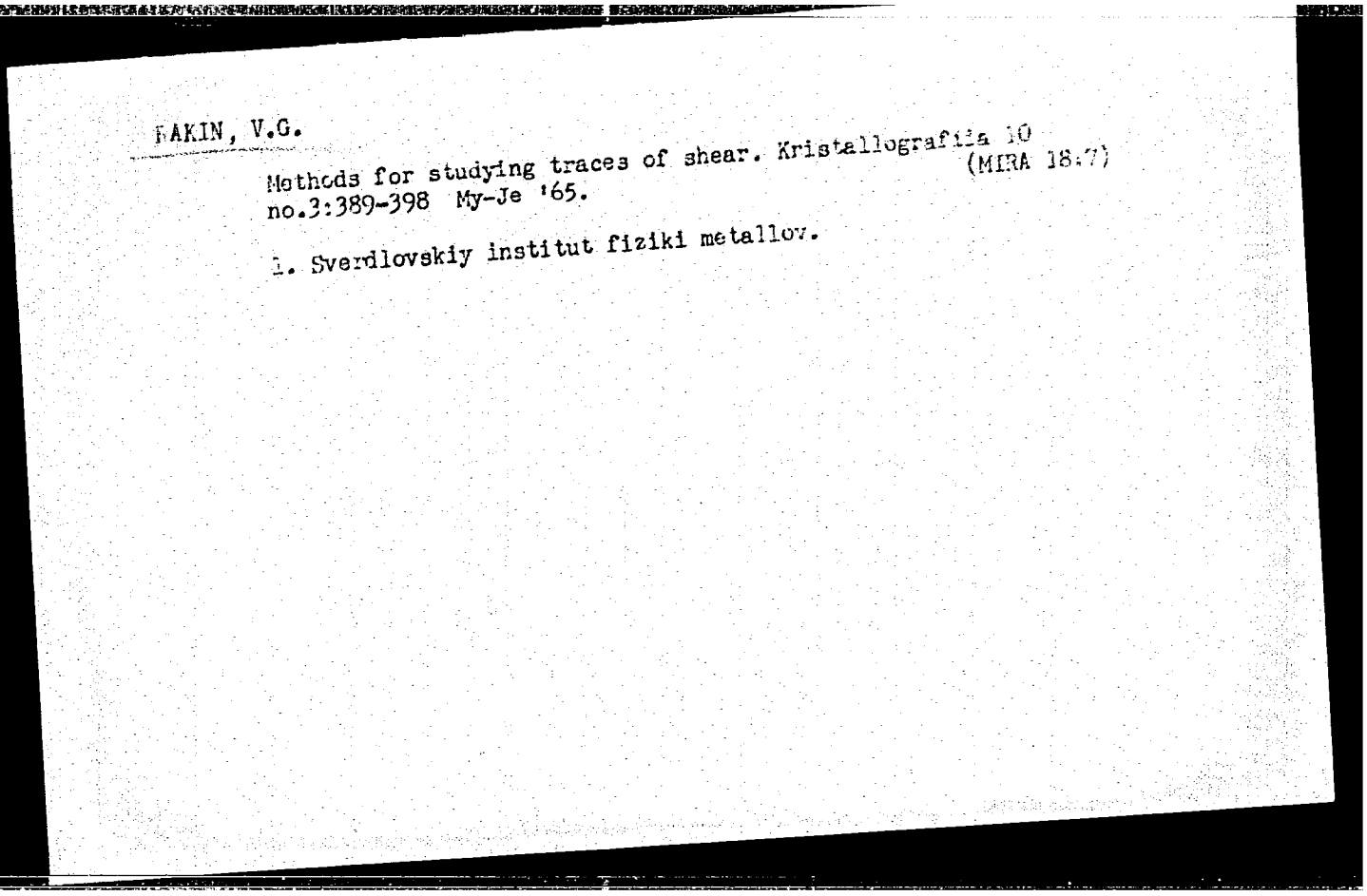
in the form of the dislocations observed upon annealing after deformation was apparently caused by the effect of excess vacancies for which the dislocations are suitable outlets. The density of dislocations quickly decreased on annealing after deformation to approximately the same density as in samples not subjected to deformation. From this investigation it was believed possible to study defects in a crystal lattice and especially dislocation in thick samples of aged alloys with the help of an electron microscope. Orig. art. has: 8 figures and 1 table

ASSOCIATION: Institut fiziki metallov AN SSSR (Institute of the Physics of Metals AN SSSR)

SUBMITTED: 03Feb64 ENCL: 00 SUB CODE: MM

NR REF SOV: 009 OTHER: 029

Card 2/2



BAKIN, V.G.

Methods for studying traces of shear. Kristallografiia 10 no.3:389-398 My-Je '65. (MIRA 18:7)

1. Sverdlovskiy institut fiziki metallov.

L 20642-66 EWT(l)/EWT(m)/EWP(w)/EPF(n)-2/T/EWP(t) IJP(c) JD/WW/JG/GJ
ACC NR: AP6010405 SOURCE CODE: UR/0126/66/021/003/0388/0395

AUTHOR: Sudareva, S. V.; Buynov, N. N.; Vozilkin, V. A.; Romanov, Ye. P.; Rakin, V.G.

ORG: Institute of Metal Physics, AN UkrSSR (Institut fiziki metallov AN UkrSSR) 38 13

TITLE: The relationship between the characteristics of superconductivity and structure of zirconium-4% niobium alloy

SOURCE: Fizika metallov i metallovedeniye, v. 21, no. 3, 1966, 388-395

TOPIC TAGS: zirconium alloy, niobium containing alloy, alloy structure, alloy superconductivity

ABSTRACT: Zirconium-base alloy containing 4% niobium melted from 99.8%-pure zirconium and 99.4%-pure niobium, rolled at 600—700C into bars, homogenized at 1280C for 50 hr, annealed at 1200C and water quenched, aged at 550C for up to 1000 min, and rolled at 550C with a reduction of 93% was tested for the effect of structure on the characteristics of superconductivity. It was found that alloy annealed at 1200C is not superconductive at 4.2K. Aging of annealed alloy at 550C for 15 min brings about a precipitation of the finely dispersed β-phase and the alloy becomes superconductive with a critical current density of 5000 amp/cm^2. The β-phase particles precipitate mainly at the boundaries of the martensitic needles and form a system of superconductive fibers in the nonsuperconductive matrix. Such a structure appears to have a favorable effect on the magnitude of the critical current density. Prolonged aging of annealed alloy has no additional effect on the critical current

UDC: 537.312.62:548.4

Card 1/2

L 20642-66

ACC NR: AP6010405 O

density. Alloy which, after annealing, was rolled at 550C also became superconductive after aging at 550C for 3 hr, but its critical current density was found to be 50,000 amp/cm^2 (one order higher than that of alloy aged without rolling). The structure of alloy in this condition is distinguished by a network of dislocations decorated by rather large (50—100 Å) particles of β-phase and forming a system of superconducting fibers. Such a structure appears to be a specific feature of all niobium-zirconium alloys with high values of critical current density. Orig. art. has: 4 figures. [DV]

SUB CODE: 20, 11/ SUBM DATE: 05Jul65/ ORIG REF: 004/ OTH REF: 008/ ATD PRESS: 4226

Card 2/2 BK

ACC NR: AP6032622 (N) SOURCE CODE: UR/0126/66/022/003/0424/0431

AUTHOR: Buynov, N. N.; Dobatkin, V. I.; Rakin, V. G.; Romanova, R. R.; Shashkov, O. D.; Dobromyslov, A. V,

ORG: Institute of Metal Physics, AN SSSR (Institut fiziki metallov, AN SSSR)

TITLE: Investigation of the structure of ATsM and V92 heat-treatable aluminum alloys

SOURCE: Fizika metallov i metallovedeniye, v. 22, no. 3, 1966, 424-431

TOPIC TAGS: metal aging, aluminum base alloy, aluminum zinc magnesium alloy, aluminum alloy aging, aluminum alloy structure/ATsM aluminum alloy, V92 aluminum alloy

ABSTRACT: Aging-induced structural changes and the kinetics of aging in aluminum-base alloys ATsM (4.72% zinc, 1.84% magnesium, 0.69% manganese, 0.35% zirconium, 0.03% titanium, and 0.5% copper) and V92 (3.34% zinc, 4.48% magnesium 0.8% manganese, and 0.005% beryllium) have been studied by means of electron microscopy and x-ray diffraction analysis. The aging kinetics were found to be the same in both alloys. The decomposition of solid solution begins with the formation of Guinier Preston zones with a high density of vacancies, which serve as nuclei for the precipitation of $MgZn_2$-phase and play an important part in the age hardening of the alloys. The temperature and duration of aging has little or no effect on the size of Guinier Preston zones, but a considerable effect on their composition. V92 alloy age hardens

UDC: 546.3-19'621'47'46 : 548.0

Card 1/2

ACC NR: AP6032622

more intensively than ATsM does owing to a higher total zinc and magnesium content of the former. Orig. art. has: 4 figures.

SUB CODE: 11/ SUBM DATE: 27Dec65/ ORIG REF: 008/ OTH REF: 007

Card 2/2

RAKINA V. N.

AID P - 562

Subject : USSR/Mining

Card 1/1 Pub. 78 - 19/22

Authors : Polanskiy, A. P., Rakina, V. N., and Grigor'yev, A. F.

Title : Experience with a multi-purpose and combined exploitation of wells in the Saratovgas Trust

Periodical : Neft. Khoz., v. 32, #8, 85-89, Ag 1954

Abstract : A description of coordinated management in training of the gas well operating and repair personnel; outline of the organization of the professional schools, special workers study groups and brigades for various coordinated emergency and safety works; description of two apparatuses specially designed for simple control of gas flow with definite rate and for automatic "blow-out" of liquid from the gas separator. Two drawings.

Institution : None

Submitted : No date

RAKINA, V. P.

COATINGS FOR HOT REPAIRS OF DINAS BRICKWORK IN COKE OVENS. A. A. Pirogov, L. A. Tseitlin, and V. P. Rakina. Ogneupory, 13 11 492-502 (1948). -- The coating mixtures were prepared from quartzites soda, clay, and liquid glass and tested on laboratory and plant scales. Both crystal-line and cemented quartzites were used; despite the rapidtransformation of the latter, it caused no substantial looseuing of the coating. Coatings having about half of their grains 0.066 mm. had the strongest bond with the Dinas and, after firing at 1100°C., possessed the greatest density and strength. An excess of coarse grains or of fines affected the bonding adversely. When using crystalline quartzites the optimum grain composition is 40 to 50% 0.066 mm. and not over 2 to 3% 0.5 mm. Air shrinkage was found to rise with increasing slay content; with 30% clay the coating cracked and frequently came off the brickwork. The compressive strengths and the apparent porosities of the different mixtures fired at 1100° varied little. All mextures, regardless of clay content, expanded at temperatures up to 600°C. and contracted at 600° to 1000°. Above 1000°, the mixtures showed a growth inversely proportional to the clay content up to 10%, but for 15 to 20% clay the mixtures showed a shrinkage. The clay content should be limited to 5 to 10%. Coatings intended for service at 800° to 1100°C. should have 15% liquid glass. The optimum soda content-is 2%; higher soda content reduces compressive strength and increases porosity. The addition of ground Dinas to the

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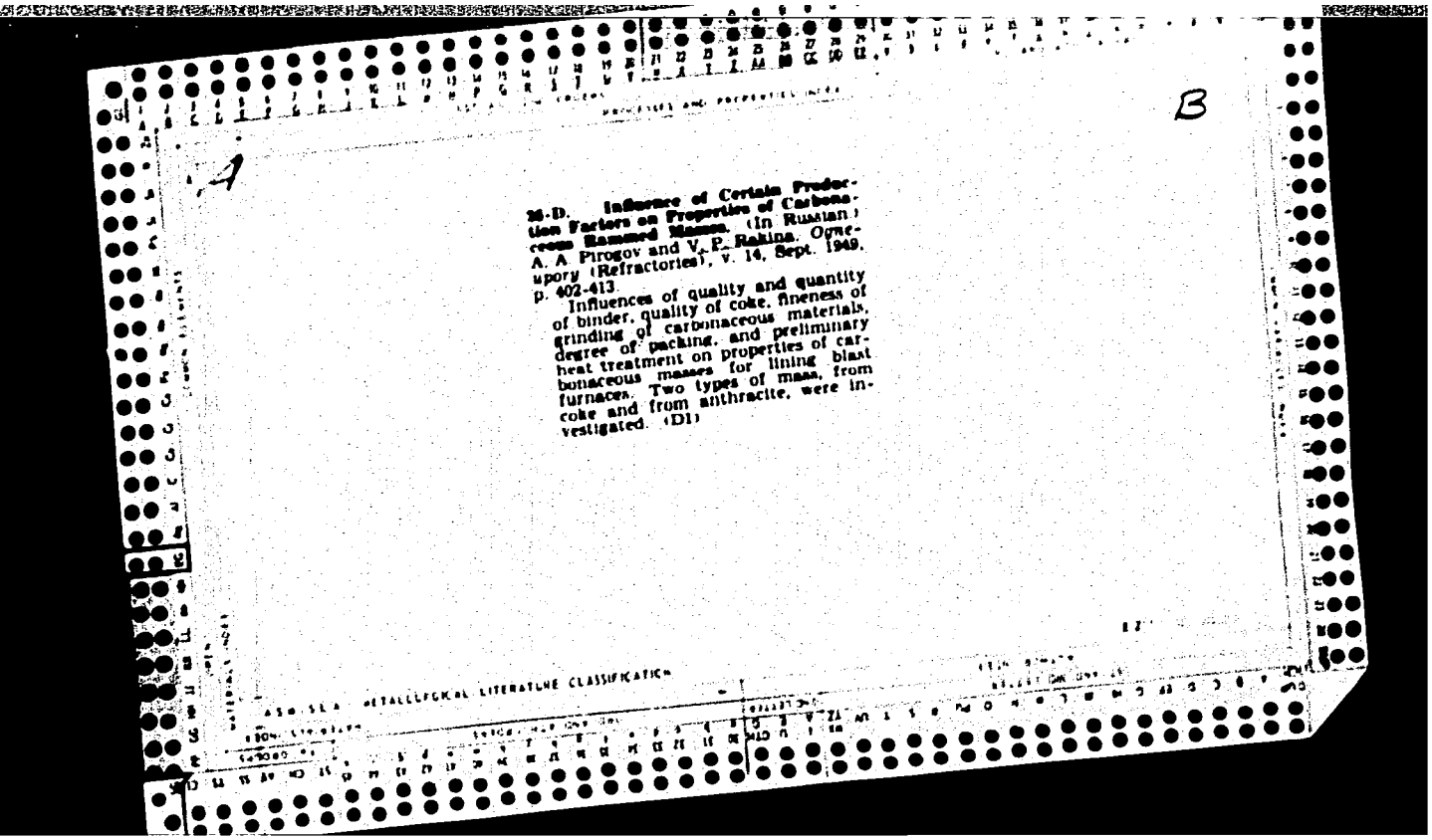

16-D. **Influence of Certain Production Factors on Properties of Carbonaceous Rammed Masses.** (In Russian.) A. A. Pirogov and V. P. Rakina. *Ogneupory* (Refractories), v. 14, Sept. 1949, p. 402-413.

Influences of quality and quantity of binder, quality of coke, fineness of grinding of carbonaceous materials, degree of packing, and preliminary heat treatment on properties of carbonaceous masses for lining blast furnaces. Two types of mass, from coke and from anthracite, were investigated. (D1)

RAKINA, V P.

USSR/Engineering - Refractories Jul 51

"Materials for Hot Repair of Open-Hearth Furnaces by Guniting," A. A. Pirogov, Cand Tech Sci, V. P. Rakina, Engr, Khar'kov Inst of Refractories

"Ogneupory," No 7, pp 291-299

Studied 4 types of gunite in laboratory: materials with low-melting addns, materials with silicon-contg forsterite-forming addns, chromite-magnesite products and those made of iron magnesite. Tested some in actual repair operations, using cement gun BI-90 with pressure at 3-5 atm. Discusses results and gives characteristics of exptl products.

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Dissertation: "Research into the Physicochemical [illegible] Service Properties of [illegible] for Heat Maintenance of the [illegible] Brickwork in [illegible] Furnaces." [illegible] Ural' Polytechnic Institute imeni S. M. Kirov, Khar'kov, 1953. (Referativnyy Zhurnal-Khimiya, No 8, Moscow, May 54)

[illegible] 1954

PIROGOV, A.A., kand.tekhn.nauk; RAKINA, V.P., inzh.

Manufacture of lightweight grog blocks by casting.
Ogneupory 19 no.4:195-200 '54. (MIRA 11:9)

1. Khar'kovskiy institut ogneuporov.
(Refractory materials)

SOV/137-58-10-20706

Translation from: Referativnyy zhurnal, Metallurgiya, 1958, Nr 10, p 53 (USSR)

AUTHORS: Pirogov, A.A., Rakina, V.P., Gul'ko, N.V.

TITLE: Service Life and Wear of Rammed Lining of Induction Furnaces for the Refining of Aluminum and Its Alloys (Sluzhba i iznos nabivnoy futerovki induktsionnykh pechey dlya rafinirovaniya alyuminiya i yego splavov)

PERIODICAL: Byul. nauchno-tekhn. inform. Vses. n.-i. in-t ogneuporov, 1956, Nr 1, pp 86-93

ABSTRACT: Materials made in this country are used to develop a rammed bulk refractory for the hearth stones of vacuum induction furnaces for the refining of Al and alloys thereof. The paste consists of Chasov Yar fireclay of <2 mm (50%) and 20% clay, 20% of Ovruch quartzite (<0.5 mm), and 10% barite. The chemical composition, in %, is: SiO_2 59, $Al_2O_3 + TiO_2$ 22.43, Fe_2O_3 1.17, CaO 1.07, MgO 1.24, BaO 6.58, SO_3 3.6, R_2O 1.98, and 2.68% impurities. After ramming by pneumatic tamper, the mass is dried in the air for 10 days and then for 14 days by roasting in a producer-gas furnace at 550°C.

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SOV/137-58-10-20706

Service Life and Wear of Rammed Lining of Induction Furnaces (cont.)

During the first 5 days, the oven was used to melt Al alloys with 3.5-4% Mg at 850-1010° and then alloys with $\leq$ 0.5% Mg at 820-880°. The furnace ran for 15 months and 10 days, after which the hearth stone was replaced. Investigation of the lining showed that in the process of operation it became impregnated with Al and became α-Al_2O_3-enriched, with simultaneous reduction in SiO_2 contents to 2-4%, the Si going into the alloy. The elevated Mg contents of the Al alloy results in the formation of $MgO \cdot Al_2O_3$ in the surface layer of the lining. This increases its life.

Ye.Z.

1. Induction furnaces--Equipment 2. Refractory materials--Development 3. Refractory materials--Life expectancy

Card 2/2

RAKINA, V. P.

1-P0

Air-hardening mixture for lining blast-furnace shafts. A. A. Pirogov and V. P. Rakina. *Metallurg* 1956, No. 11, 8–10.—The basic ~~formula, fireclay~~ (less than 0.5 mm. and a 50–60% 0.088 mm.) 90%, $Al(OH)_3$ 10% mixed with water glass 15% (based on clay-$Al(OH)_3$ mix), and water 25% gave a lining with working temp. limit of 1690–1700°, shrinkage after firing at 1250°, 2.9%; compressive strength, 590 kg./sq. cm.; shear strength 23 kg./sq. cm. To improve plasticity for lining the upper part, 4% fireclay with a small addn. of calcined soda was added. V. N. B.

2

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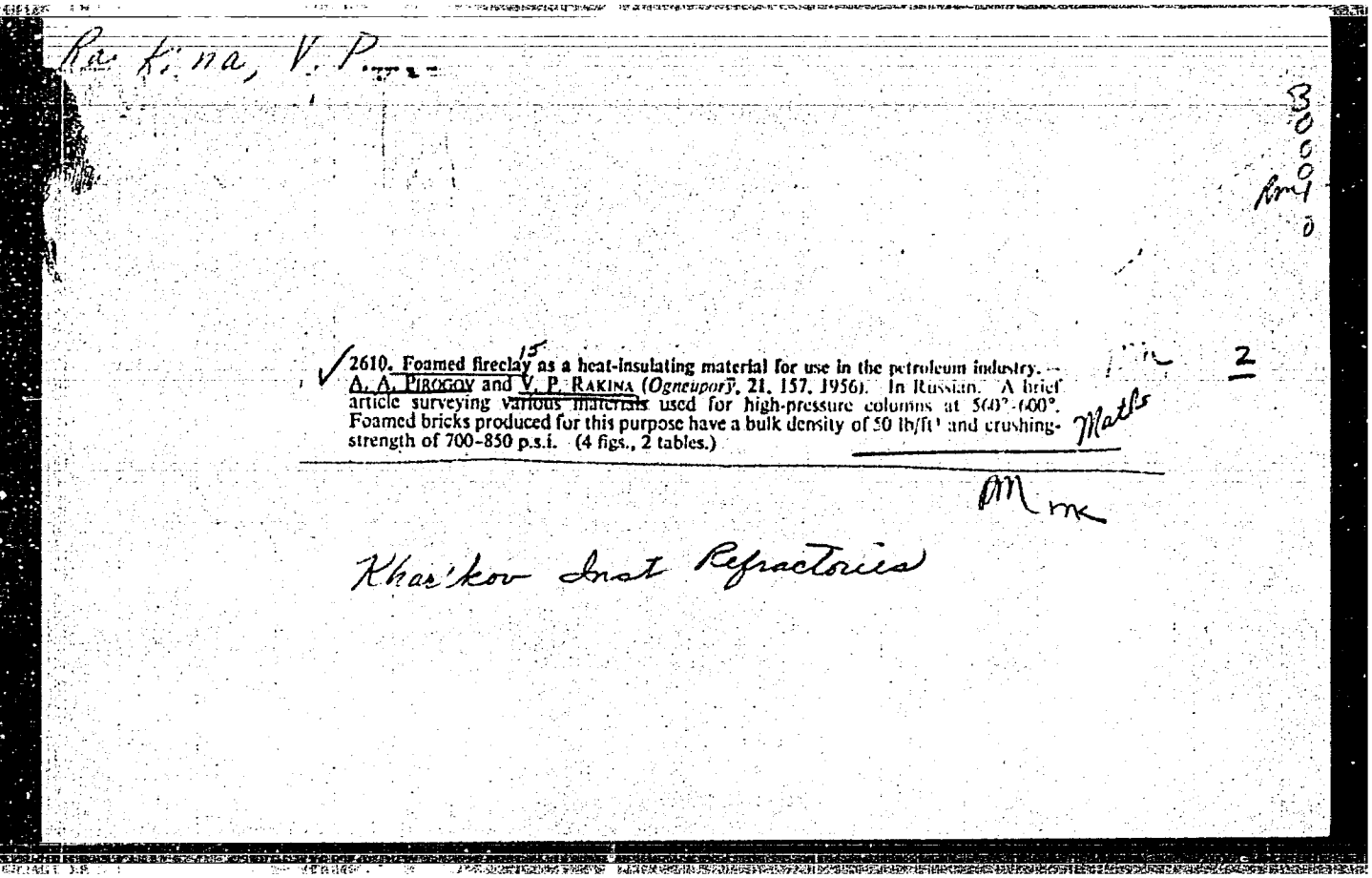

Rakina, V. P.

2610. Foamed fireclay as a heat-insulating material for use in the petroleum industry. — A. A. PIROGOV and V. P. RAKINA (*Ogneupory*, 21, 157, 1956). In Russian. A brief article surveying various materials used for high-pressure columns at 560°-600°. Foamed bricks produced for this purpose have a bulk density of 50 lb/ft³ and crushing-strength of 700-850 p.s.i. (4 figs., 2 tables.)

Khar'kov Inst Refractories

USSR/Chemical Technology. Chemical Products and their Application. J-12
Glass. Ceramics. Building Materials.

Abs Jour: Referat Zh.-Kh., No 8, 1957, 27694

Author : A.A. Pirogov, V.P. Rakina.
Inst :
Title : Foamy Chamotte as Heat-Insulating Material for Production of Artificial Liquid Fuel.

Orig Pub: Ogneupory, 1956, No 4, 157-161.

Abstract: The process of production of foamy chamotte refractory material of improved quality was developed. This material is suitable for lining high pressure reaction columns. The following was used for it: Chasov-Yar clay, fine ground chamotte (grains maximum 0.5 mm, content of fractions under 0.088 mm 40 to 50%), addition of a small amount of saw dust ($\leq$ 3 mm) into dross. The properties of products are: volumetric weight about 0.8 g per cub. cm, σ_{compr} - 50 to 60 kg per sq. cm, shearing modulus

Card : 1/2 -77-

Abs Jour: Referat Zh.-Kh., No 8, 1957, 27694

(kg per sq.cm) at 20° - 24,500 and at 800° - 25,900 thermal stability - satisfactory. The manufactured goods are not worse than those used in practice abroad.

137-1958-3-4597

Rakina, V. P.

Translation from: Referativnyy zhurnal, Metallurgiya, 1958, Nr 3, p 18 (USSR)

AUTHORS: Pirogov, A. A., Rakina, V. P.

TITLE: Air-hardening Chromomagnesite Solutions Possessing High Cementing Properties (Vozdushno-tverdeyushchiye khromomagnezitovyye rastvory s vysokimi tsementiruyushchimi svoystvami)

PERIODICAL: Byull. nauchno-tekhn. inform. Vses. n.-i. in-t ogneuporov, 1957, Vol 2, pp 45-52

ABSTRACT: Air and flame shrinkage as well as the apparent porosity of hydraulic mortars (M) employed in the lining of chromomagnesite refractories were investigated. M's were prepared from a mixture of following composition (by weight): 70 percent of Kimpersay or Saranov chromite, with a grain size between 0 and 1 mm; 30 percent metallurgical magnesite (85 percent of grains < 0.088 mm). The mixture was then slaked by a 16-22 percent solution of $MgSO_4$ (specific gravity 1.2) or of H_2SO_4 (specific gravity 1.07). A comparison of the gas-permeability of the seams of the lining, as well as a comparison of properties of M after

Air-hardening Chromomagnesite Solutions (cont.)

sintering at temperatures of 1100° and 1650°, showed that the total shrinkage of these M's is one-third to one-half that of ordinary M's made of chromite with a fire-resistant clay acting as a binder (5-10 percent); M's are sintered effectively with chromomagnesite brick and produce seams of low gas-permeability. The air-hardening M gave positive results when tested under industrial conditions in the lining of vertical surfaces of a 50-ton open-hearth furnace at the Petrovskiy plant, and in the 370-ton furnace of the Kirov plant.

S. G.

Card 2/2

TSEYTLIN, L.A.; RAKINA, V.P.

Plastic grog and high-alumina mortars. Ogneupory 22 no.11:513-519 '57. (MIRA 11:1)

1. Khar'kovskiy institut ogneuporov.
(Refractory materials) (Mortar)

PIROGOV, A.A.; RAKINA, V.P.

Rammed lining in induction furnaces for regining aluminum and its alloys. TSvet. met. 30 no.7:57-62 Jl '57. (MLRA 10:9)
(Aluminum--Electrometallurgy)
(Refractory materials)

AUTHORS: Pirogov, A.A., Rakina, V.P. 131-58-4-2/17

TITLE: Light Products Manufactured From Zirconium Dioxide (Legkovesiz dvuokisi tsirkoniya)

PERIODICAL: Ogneupory, 1958, Nr 4, pp. 145-150 (USSR)

ABSTRACT: Zirconium dioxide is a refractory with a melting temperature of ~ 2700°, which is of comparatively low thermal conductivity. It is used for the production of light insulation products. Tests were carried out with the collaboration of laboratory assistant L.R. Bil'son. Products made from light ZrO_2 had a volumetric weight of 2,6-2,7 g/cm³ and a porosity of 51-56%, and were used as heat-insulating material in high-frequency-induction- as well as in resistance furnaces. In the VNIIO experiments were carried out concerning the production of light products made from ZrO_2 by the method of burning additions. CaO was used as a stabilizing medium and mineral coke as a burning addition. Molasses served as an agglutinant. The production process is then described in detail. Fig. 1 shows the influence exercised by the quantity of coke upon the properties of light ZrO_2, and table 1 shows the influence

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exercised by the granular composition of the coke. Table 2 shows the influence exercised by powdered fractions of the ZrO_2. The influence exercised by the content of slightly stabilized ZrO_2 upon the properties of light ZrO_2 is shown by fig. 2, and that exercised by pressure from table 3. As fig. 3 shows, test samples showed only a low degree of strength up to a burning temperature of 1000-1100°. Furthermore, experiments concerning the production of light shaped materials from ZrO_2, which were carried out at the experimental plant of the Institute, were described in detail. It was found that, in order to obtain satisfactory results, it is necessary to employ a burning regime as shown in fig. 4. In fig.6 light products burned with cases are shown, and in fig. 5 such as were burned without cases, and it was found that the first-mentioned had a purer surface and a finer structure. Table 4 shows the properties of the products, which are discussed. Tests carried out with light products made from ZrO_2 for the lining of the induction furnace TsEP-8, which operates at a temperature of 1800°, showed good results. There are 6 figures, 4 tables, and 5 references, 2 of which are Soviet.

ASSOCIATION: Khar'kovskiy institut ogneuporov (Khar'kov Institute for Refractories)

AUTHOR: Rakina, V. P. 131-58 6-5/14

TITLE: Outside Plasterings for Sealing Metallurgical Furnaces (Naruzhnyye obmazki dlya uplotneniya metallurgicheskikh pechey)

PERIODICAL: Ogneupory, 1958, Nr 6, pp. 260-264 (USSR)

ABSTRACT: The VNIIO investigated various sealing plasterings with respect to their permeability for gas, cohesion with refractory bricks and unchangeability of the volume. In order to determine the effective character of the plasterings not only the permeability for gas of the plastering but also of the refractory sample with a mortar layer was investigated. The VNIIO Laboratory for Dinas developed a formula by means of which the permeability for gas of a brick walling can be approximately calculated. The granular composition of the plastering materials is mentioned in table 1. The plasterings were divided into 3 groups: 1) Chamotte-clay and sand-clay (with addition of liquid glass or without it); 2) With graphite content; 3) Plasterings with

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additions of binders (building cement and gypsum). By means of experiments it was found that chamotte plasterings with low content of dust fractions in the chamotte are characterized by an increased permeability for gas. An essential decrease of the permeability for gas was reached by the additions of finely ground lean materials. Chamotte and sand plasterings with additions of clayey cement, portland cement and gypsum display good properties (table 2). Calculation results of the influence on the sealing of the plasterings dependent on the permeability for gas are mentioned in table 3. The decrease of the permeability for gas of the walling of a thickness of 460 mm dependent on the coefficient of the permeability for gas of the plastering can be seen from the figure. Recommended compositions for plasterings are mentioned in table 4. The plastering no. 2 was used for sealing the vertical channels and front walls of the martin furnace at the metallurgical works imeni Kirov. An increase of the strength of the outside sealing plasterings is obtained by its application by means of

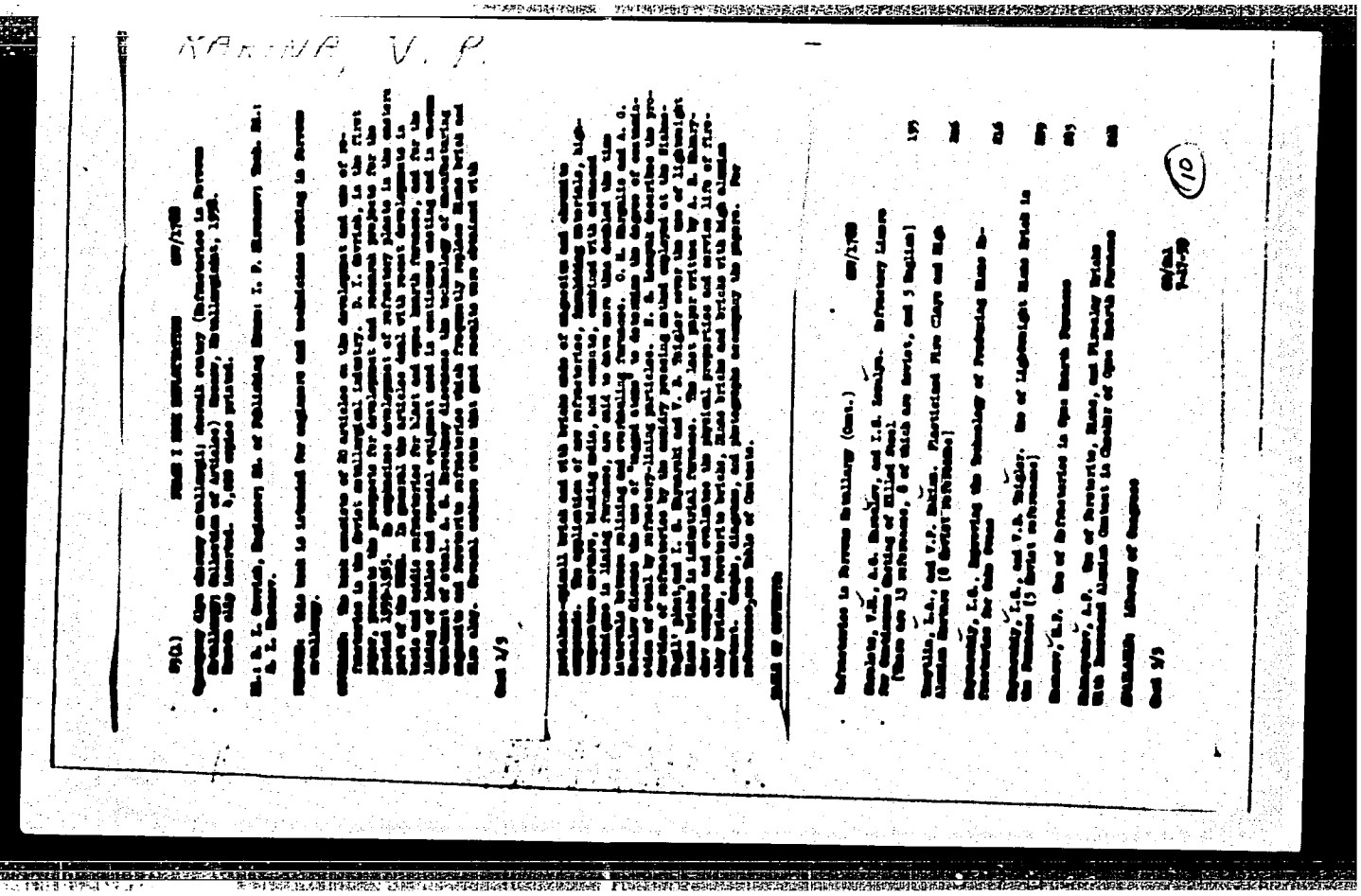
Outside Plasterings for Sealing Metallurgical Furnaces 131-58-3-5/14

pneumatic plastering, instead of doing it by hand. As the furnace walling is subject to changes of volume during the campaign it is necessary to periodically renew the plastering. The plasterings can be produced in the works for refractories or by the consumer respectively. The Krasnogorsk works imeni Lenina produces the dry mixture of plastering no. 2. There are 1 figure, 4 tables, and 4 references, which are Soviet.

ASSOCIATION: Vsesoyuznyy nauchno-issledovatel'skiy institut ogneuporov (All-Union Scientific Research Institute for Refractories)

1. Furnace--Maintenance 2. Refractory materials--Applications

Card 3/3



15(0),15(2)

AUTHORS: Pirogov, A. A., Rakina, V. P. SOV/131-59-3-8/18

TITLE: Chromium-magnesite Binding Masses Hardening in the Air (Mortar) (Vozdushno-tverdeyushchiye khromomagnezitovyye svyazuyushchiye massy (merteli))

PERIODICAL: Ogneupory, 1959, Nr 3, pp 125-129 (USSR)

ABSTRACT: The solution worked out by the authors is based upon the use of periclase cement hardening in the air as binding material (30 %) and of crushed chromite as filling material (70 %). For the purpose of obtaining cement a highly burnt magnesite is used with a well developed periclase crystallization. By wetting the fine ground magnesite with aqueous solutions of several salts ($MgCl_2$, $MgSO_4$, $FeSO_4$) it sets and hardens in the air at room temperature. In the course of 3 days the chromium-magnesite solution attains a high resistance to pressure (150-200 kg/cm^2) on periclase cement. Periclase cement cannot be used without filling material as in the case of high temperatures it shrinks up to 10 %. Crushed chromite may serve as a good filling material. In the case of heating the hardened solution in a temperature range of between 400 and 1000°

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Chromium-magnesite Binding Masses Hardening in the Air (Mortar) SOV/131-59-3-8/15

the resistance is considerably decreased (Figs 1 and 2). In the case of heating up to 600-800° a small gas permeability is maintained (Table 1). The testing of the chromium-magnesite solution worked out by the authors was carried out in the Makeyevskiy metallurgicheskiy zavod im. Kirova (Makeyevka Metallurgical Plant imeni Kirov) with the following scientists taking part in the experiments: S. V. Vasil'yev, M. L. Khil'ko, A. D. Pleskanovskiy, A. P. Targin, G. I. Kozmin, A. M. Seregin (Ref 1). Figure 3 shows a chromium-magnesite brick after having been used in an open-hearth furnace. Table 2 gives the properties of chromium-magnesite solutions hardening in the air. In an air saturated with moisture the cementing properties of the solution are reduced (Fig 4). Conclusions: The chromium-magnesite solution hardening in the air can be recommended for production. It is considered advantageous to make use of the cementing properties of this solution in the production of chromium-magnesite blocks.-There are 4 figures, 2 tables, and 2 Soviet references.

ASSOCIATION: Ukrainskiy nauchno-issledovatel'skiy institut ogneuporov (Ukrainian Scientific Research Institute of Refractories)

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