ZAKHAROVA, M.G.

Symposium on chemotherapy in pulmonary tuberculosis. Probl.tub. 36 no.6:119-122 '58 (MIRA 11:10)
(TUBERCULOSIS)

SUKACHEVA, M.P.; SHAKOVA, A.N.; ZAKHAROVA, M.G.

Stratigraphy and lithology of Paleogene sediments in the western Kopet-Dag. Trudy VSEGEI 46:229-253 '61. (MIRA 14:11)
(Kopet-Dag--Paleontology, Stratigraphic)

ZAKHAROVA, M.I.; BELYATSKAYA, N.S.

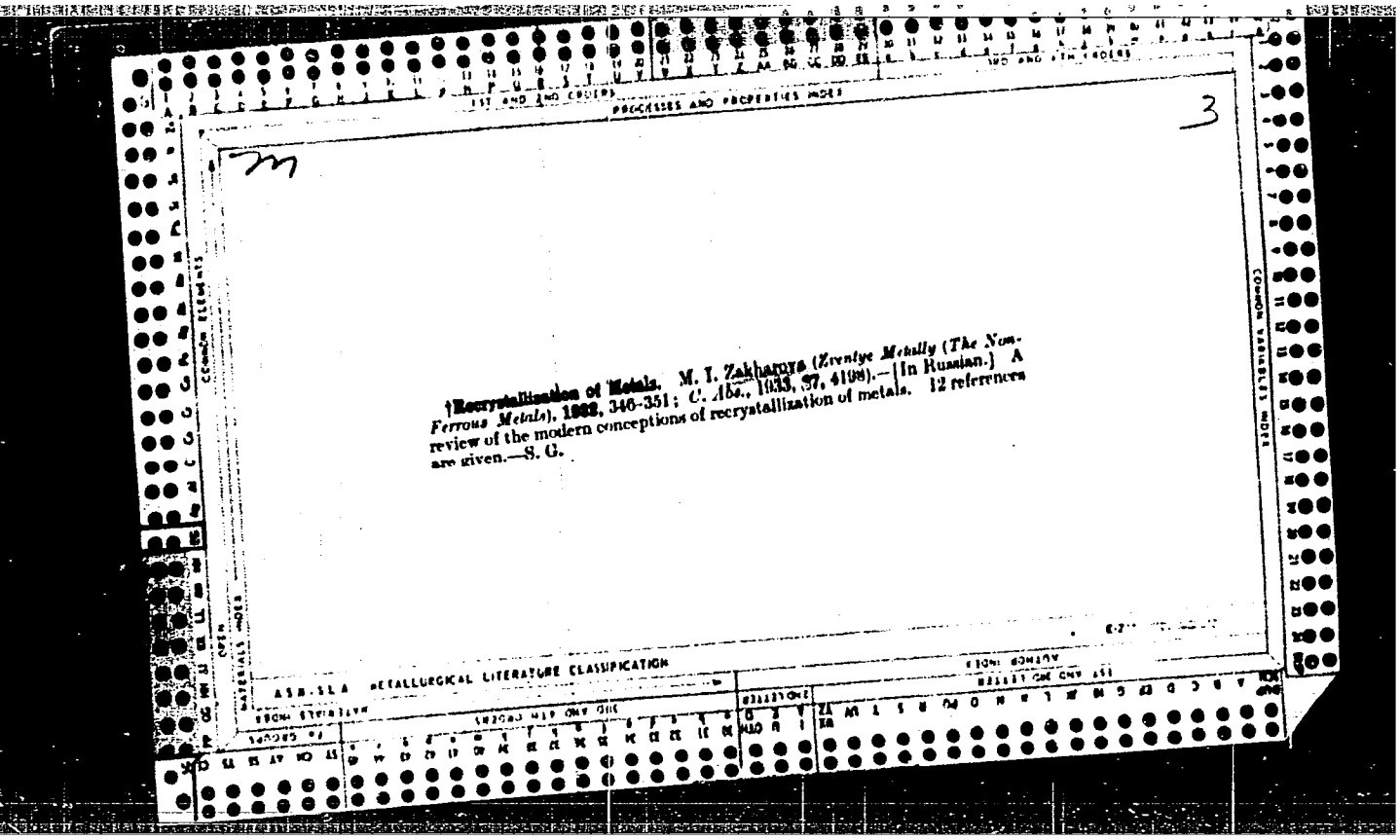
Substructure of crystals of a supersaturated solid solution of silver in aluminum during the decomposition process. Fiz.met.i metalloved. 14 no.5:678-682 N '62. (MIRA 15:12)

1. Moskovskiy gosudarstvennyy universitet im. M.V.Lomonosova.
(Solutions, Supersaturated)
(Aluminum-silver alloys--Metallography)

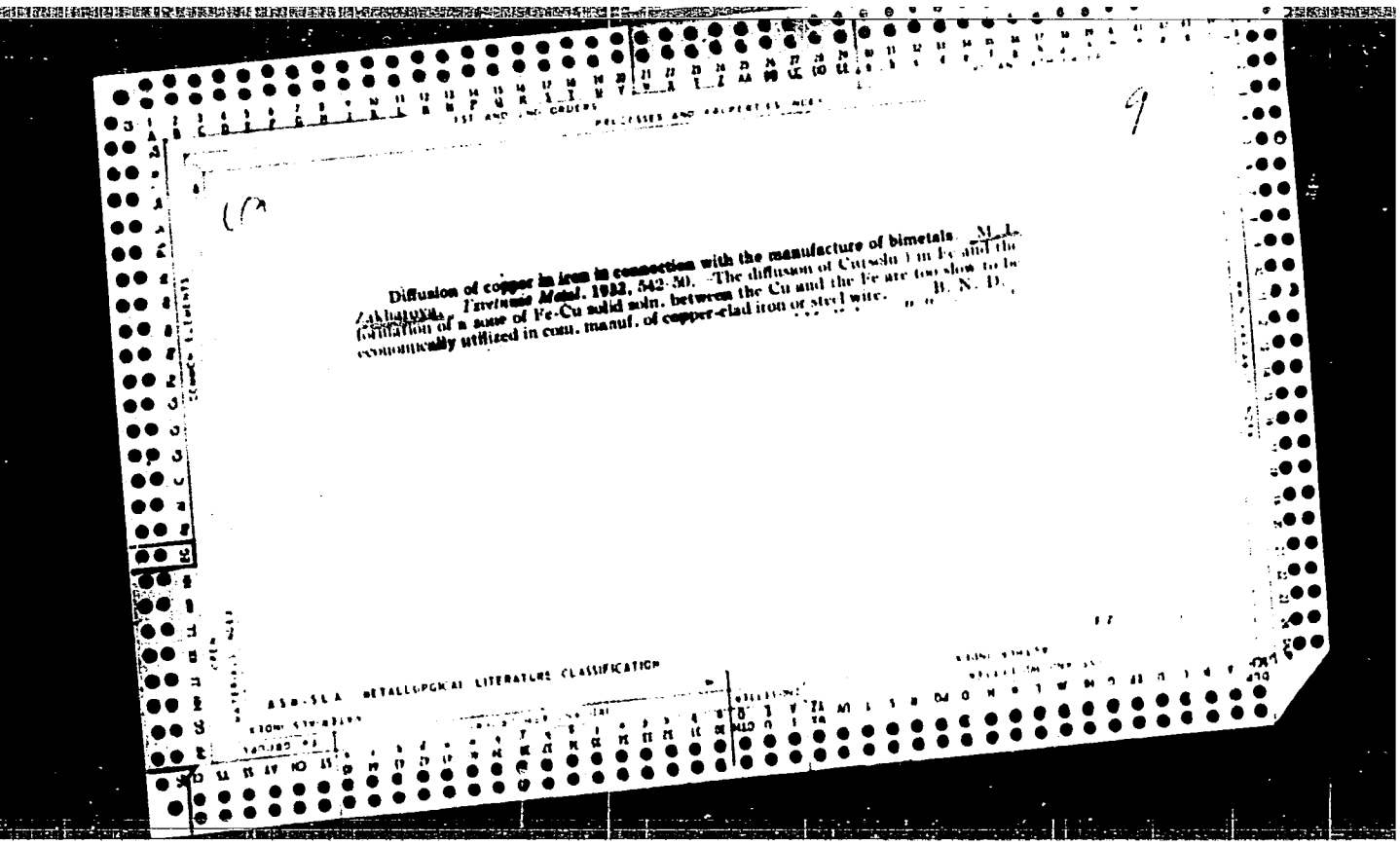
ZAKHAROVA, M.I.; TUMAN'YAN, Yu.A.

Precipitation of germanium in the breakdown of the al--Ge solid solution. Kristallografiia 9 no.4:498-500 Jl-Ag '64. (MIRA 17:11)

1. Moskovskiy gosudarstvennyy universitet imeni Lomonosova.

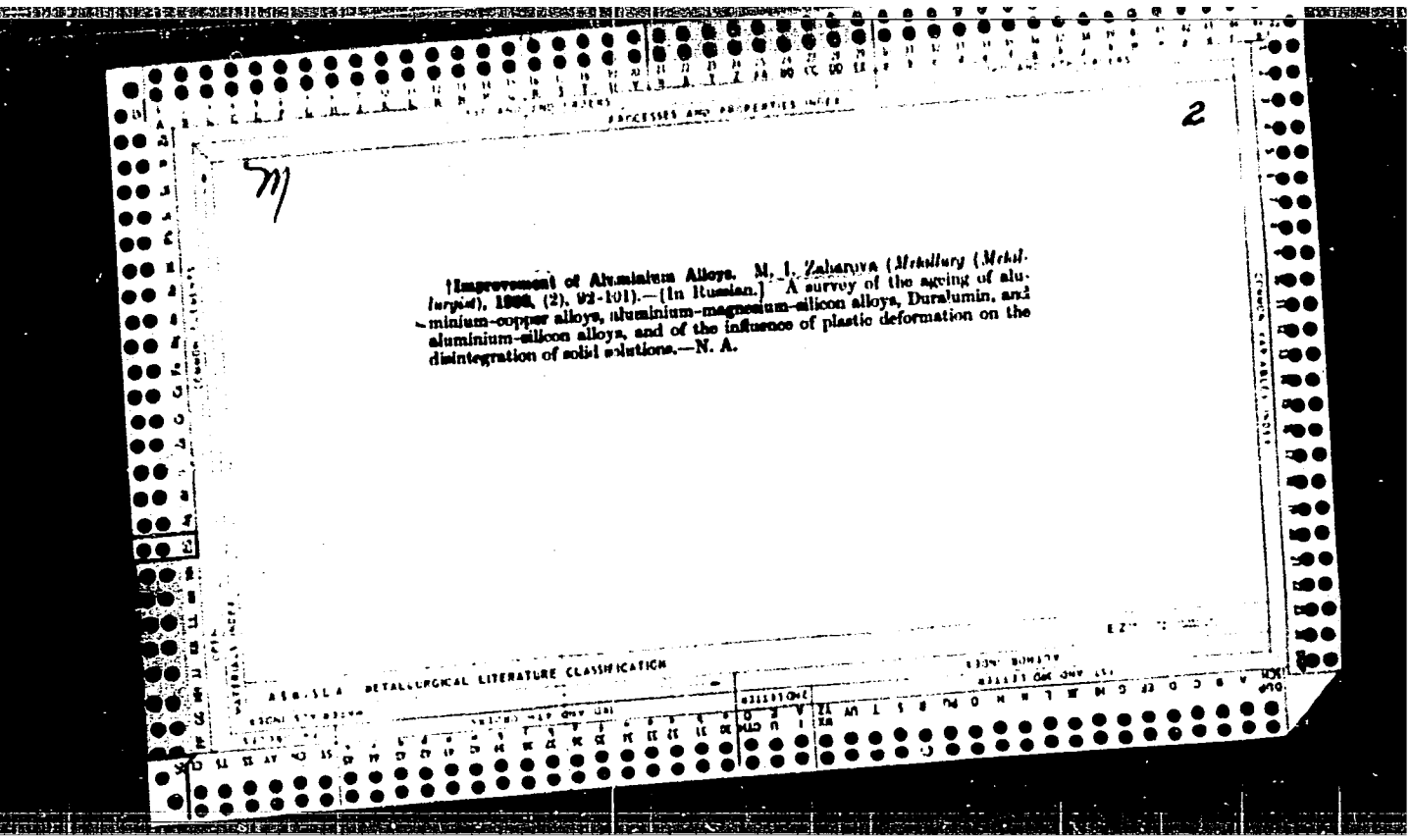


†**Recrystallization of Metals.** M. I. Zakharova (*Tsvetnye Metally* (*The Non-Ferrous Metals*), 1952, 346-351; *C. Abs.*, 1953, 47, 4109).—[In Russian.] A review of the modern conceptions of recrystallization of metals. 12 references are given.—S. G.

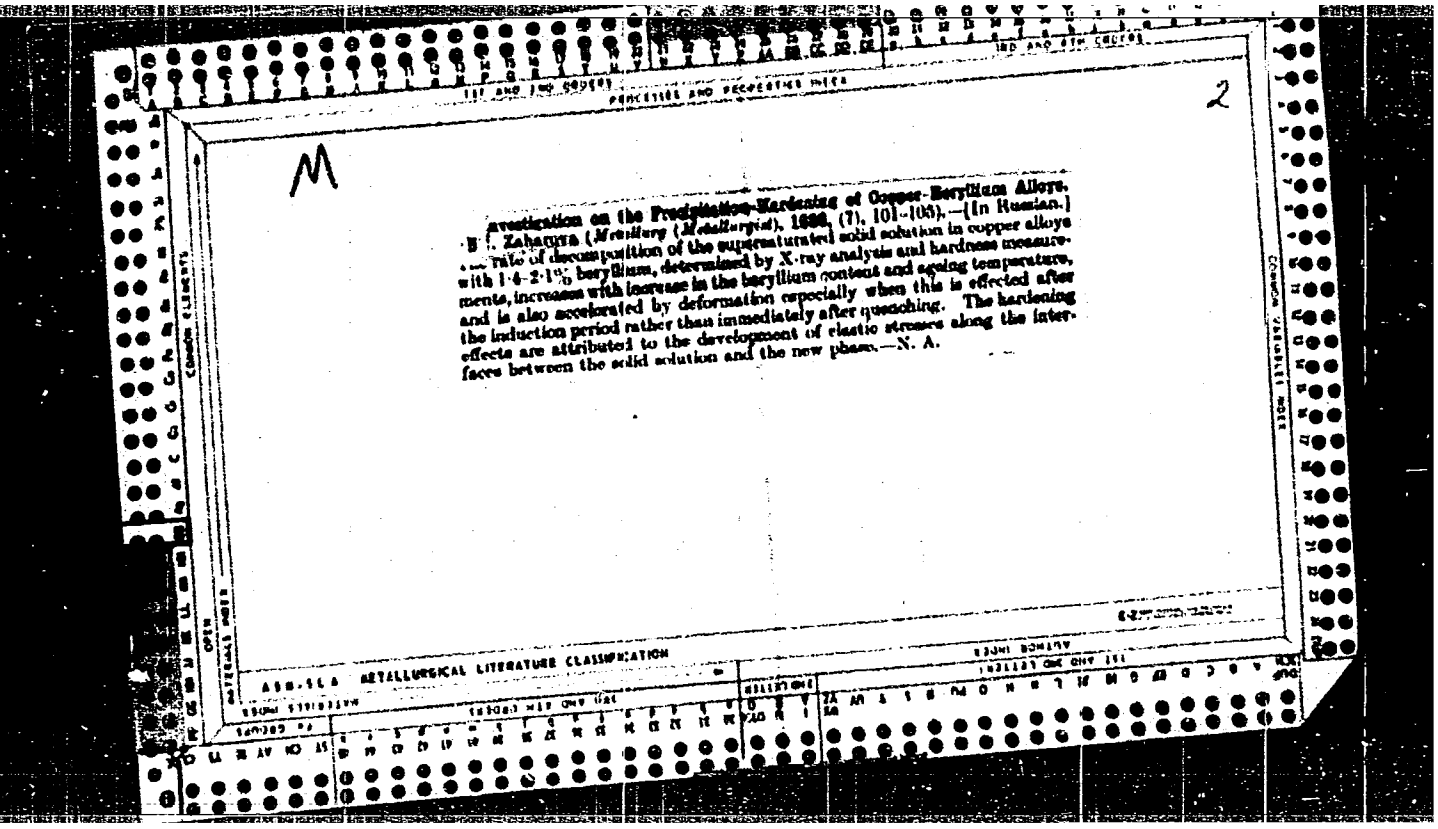


Diffusion of copper in iron in connection with the manufacture of bimetals. M. L. [illegible]. *Izvestiya Metal.* 1932, 542-50. The diffusion of Cu (soln.) in Fe and the formation of a zone of Fe-Cu solid soln. between the Cu and the Fe are too slow to be economically utilized in manuf. of copper-clad iron or steel wire. B. N. D.

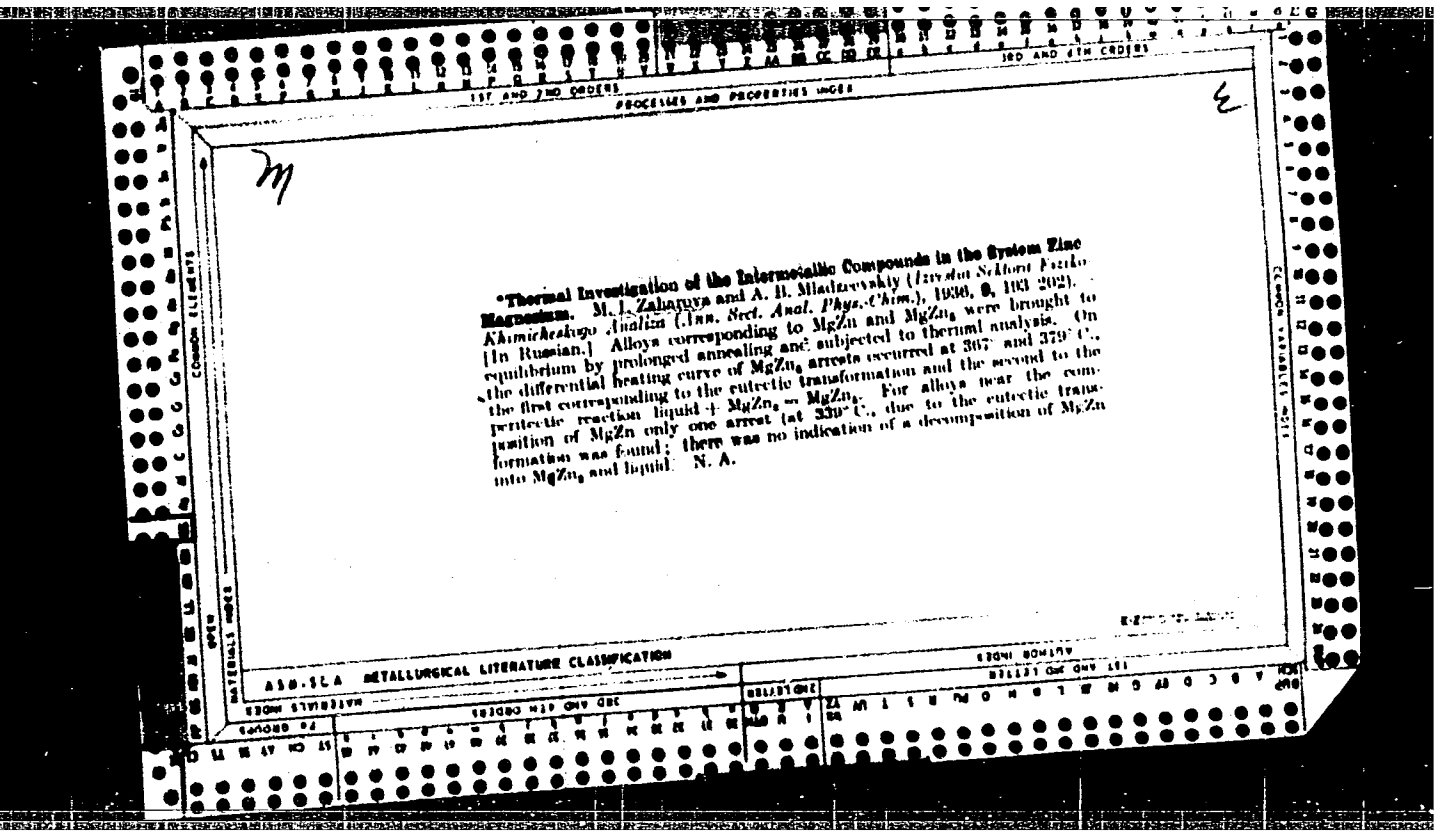
ASM-SLA METALLURGICAL LITERATURE CLASSIFICATION



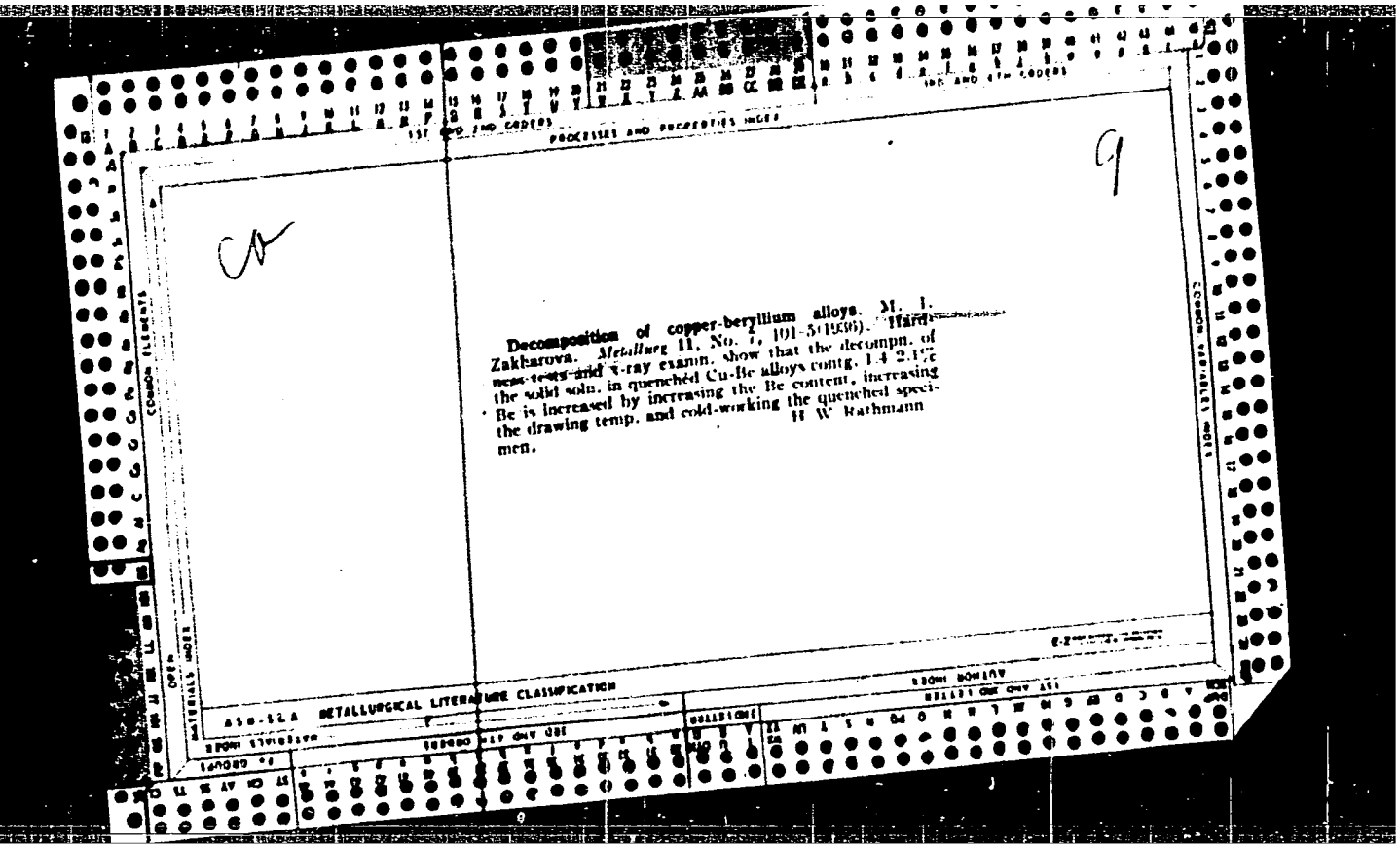
†Improvement of Aluminium Alloys. M. I. Zaharova (*Metallury (Metallurgiia)*, 1960, (2), 92-101).—[In Russian.] A survey of the ageing of aluminium-copper alloys, aluminium-magnesium-silicon alloys, Duralumin, and aluminium-silicon alloys, and of the influence of plastic deformation on the disintegration of solid solutions.—N. A.



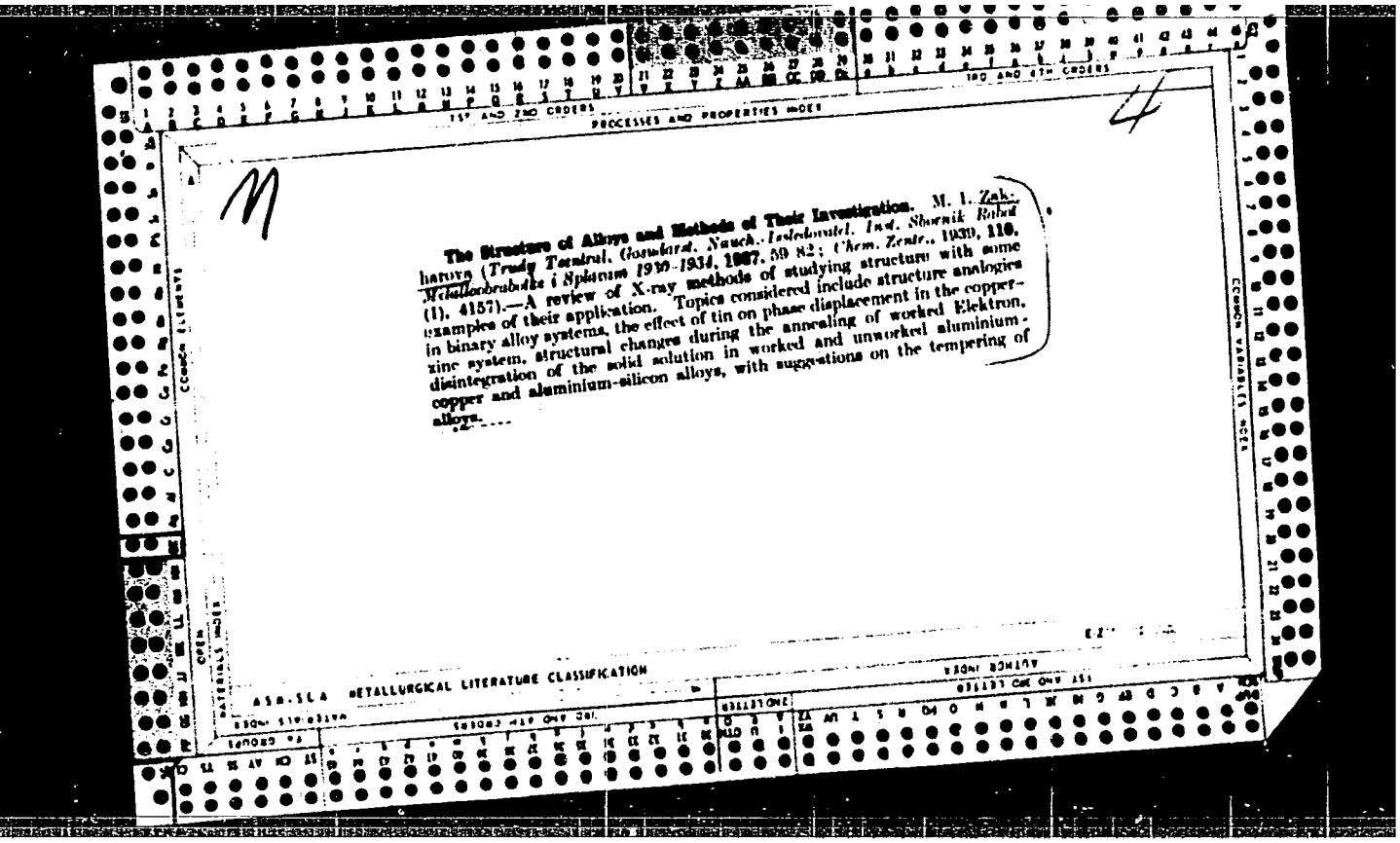
Investigation on the Precipitation-Hardening of Copper-Beryllium Alloys. V. F. Zaharova (*Metallovy* (*Metallurgist*), 1956, (7), 101–103).—[In Russian.] Rate of decomposition of the supersaturated solid solution in copper alloys with 1·4–2·1% beryllium, determined by X-ray analysis and hardness measurements, increases with increase in the beryllium content and ageing temperature, and is also accelerated by deformation especially when this is effected after the induction period rather than immediately after quenching. The hardening effects are attributed to the development of elastic stresses along the interfaces between the solid solution and the new phase.—N. A.



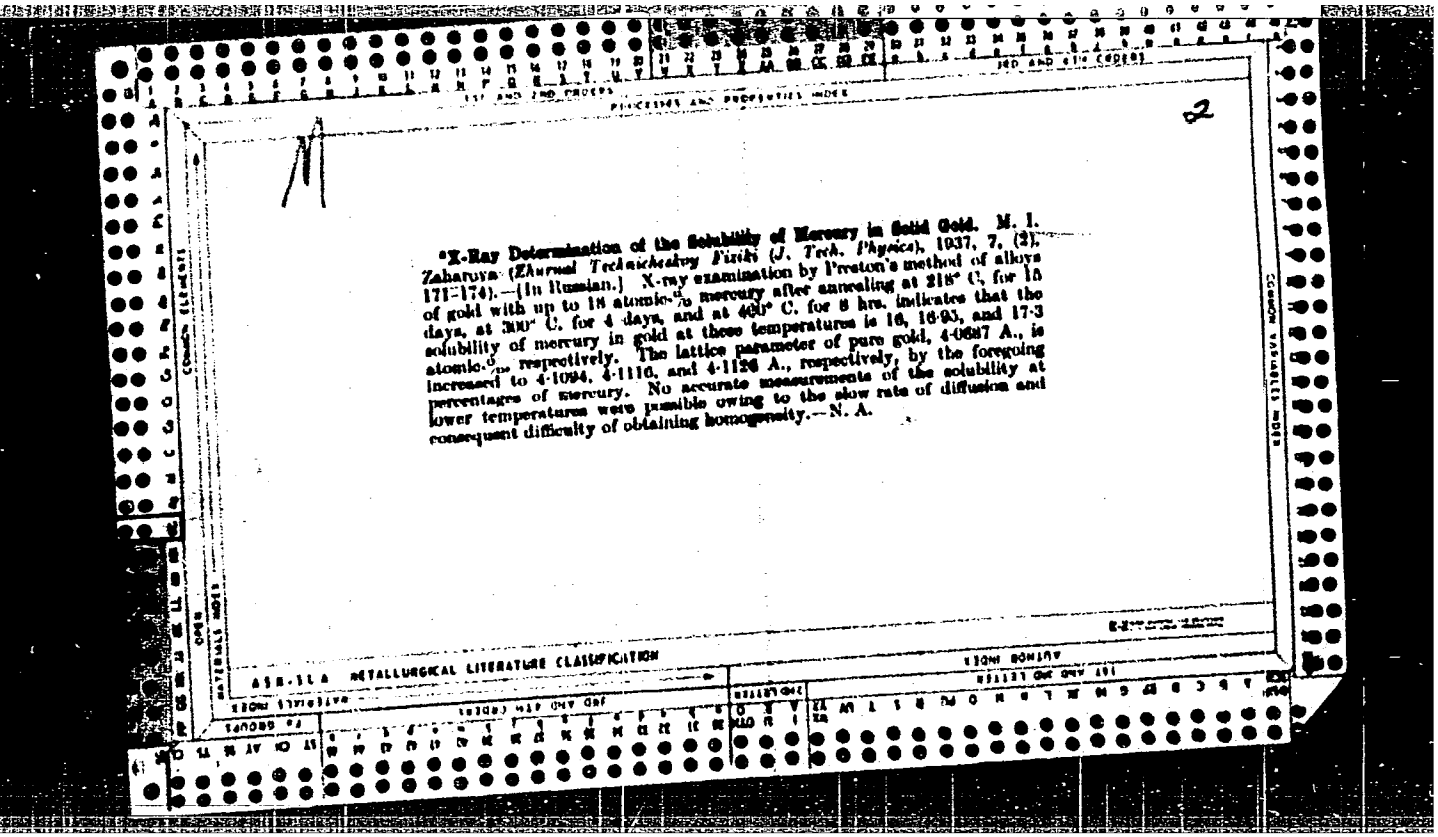
***Thermal Investigation of the Intermetallic Compounds in the System Zinc Magnesium.** M. I. Zaharova and A. B. Mladzievskiy (*Izvestiya Sektora Fiziko Khimicheskogo Analiza (Inst. Sect. Anal. Phys.-Chim.)*, 1930, **3**, 193–202). [In Russian.] Alloys corresponding to $MgZn$ and $MgZn_2$ were brought to equilibrium by prolonged annealing and subjected to thermal analysis. On the differential heating curve of $MgZn_2$ arrests occurred at 367° and 379° C., the first corresponding to the eutectic transformation and the second to the peritectic reaction liquid + $MgZn_2 \rightleftharpoons MgZn_3$. For alloys near the composition of $MgZn$ only one arrest (at 339° C., due to the eutectic transformation was found; there was no indication of a decomposition of $MgZn$ into $MgZn_2$ and liquid. N. A.



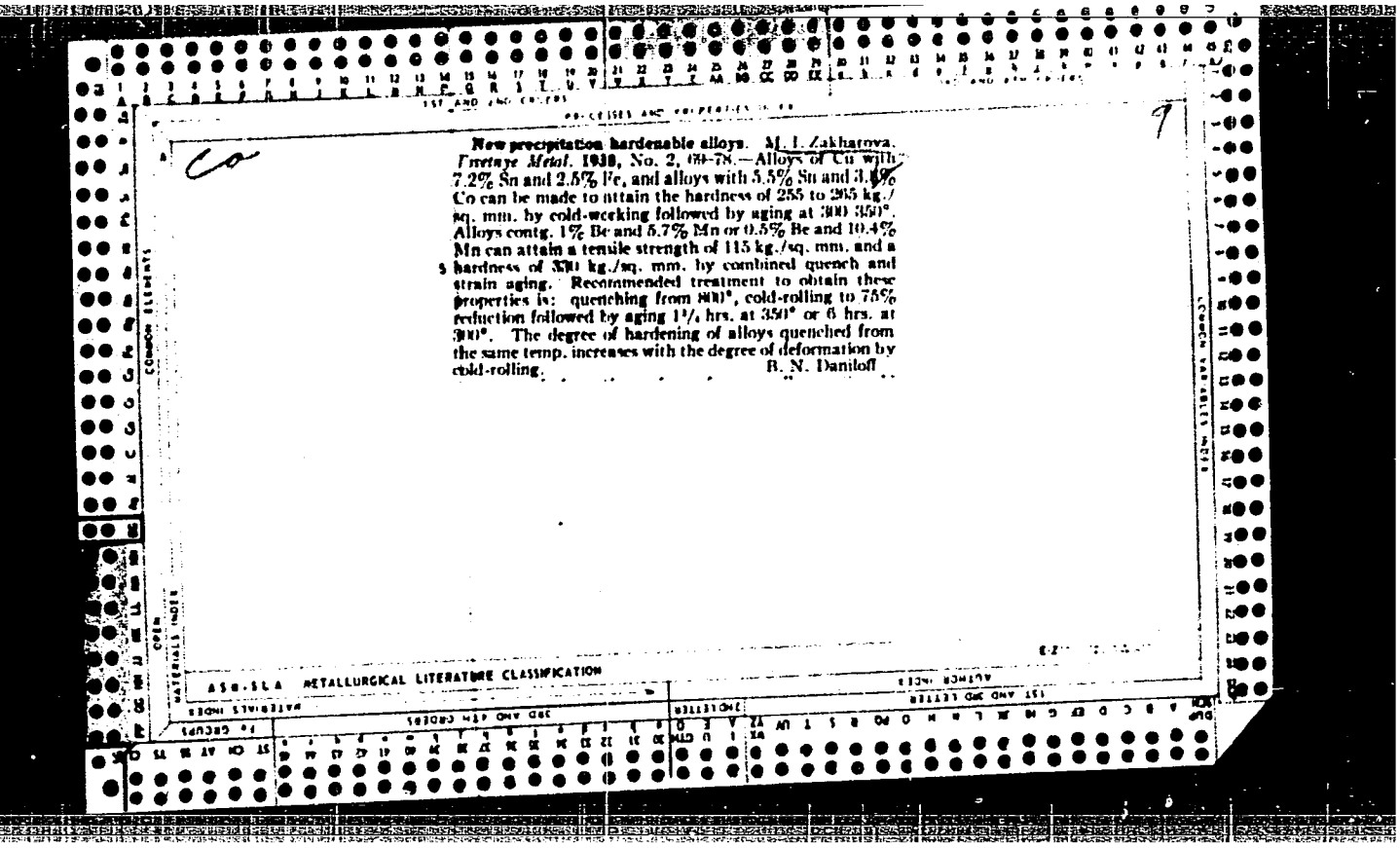
Decomposition of copper-beryllium alloys. M. I. Zakharova. *Metallurg* 11, No. 7, 101–5(1936). Hardness-temp-grid x-ray examin. show that the decompn. of the solid soln. in quenched Cu-Be alloys contg. 1.4–2.1% Be is increased by increasing the Be content, increasing the drawing temp. and cold-working the quenched specimen.
H. W. Rathmann



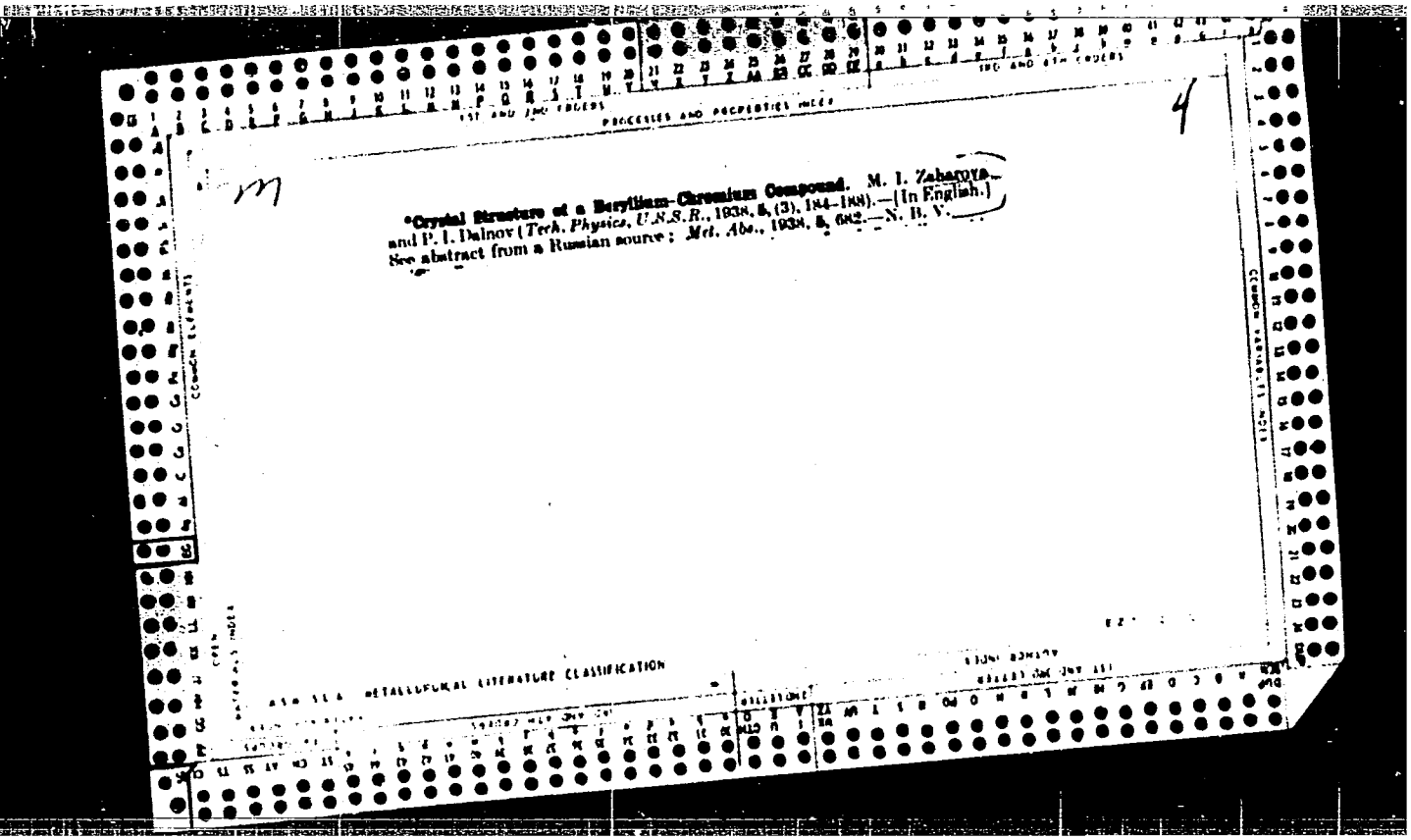
The Structure of Alloys and Methods of Their Investigation. M. I. Zak-harova (*Trudy Tsentral. Gosudarst. Nauch.-Issledovatel. Inst. Sbornik Rabot Metallograficheskikh i Spektrum* 1929–1934, **1937**, 59–82; *Chem. Zentr.*, 1939, **110**, (1), 4157).—A review of X-ray methods of studying structure with some examples of their application. Topics considered include structure analogies in binary alloy systems, the effect of tin on phase displacement in the copper-zinc system, structural changes during the annealing of worked Elektron, disintegration of the solid solution in worked and unworked aluminium-copper and aluminium-silicon alloys, with suggestions on the tempering of alloys.



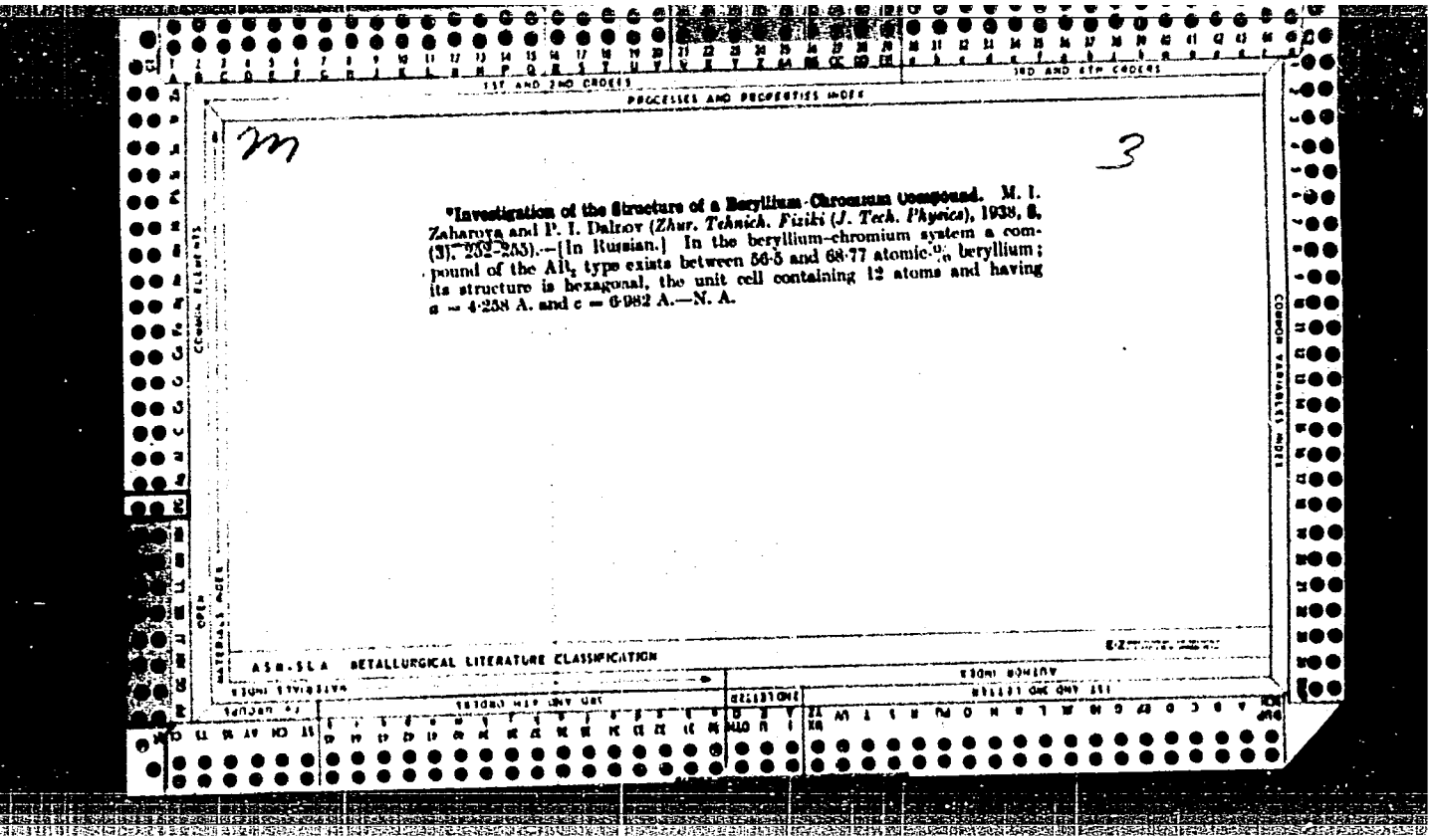
"X-Ray Determination of the Solubility of Mercury in Solid Gold. M. I. Zaharova (*Zhurnal Tekhnicheskoy Fiziki* (*J. Tech. Physics*), 1937, 7, (2), 171–174).—[In Russian.] X-ray examination by Preston's method of alloys of gold with up to 18 atomic-% mercury after annealing at 218° C. for 15 days, at 300° C. for 4 days, and at 495° C. for 8 hrs. indicates that the solubility of mercury in gold at these temperatures is 16, 16·95, and 17·3 atomic-% respectively. The lattice parameter of pure gold, 4·0687 A., is increased to 4·1094, 4·1110, and 4·1126 A., respectively, by the foregoing percentages of mercury. No accurate measurements of the solubility at lower temperatures were possible owing to the slow rate of diffusion and consequent difficulty of obtaining homogeneity.—N. A.



New precipitation hardenable alloys. M. I. Zakharova. *Tsvetnye Metal.* **1938**, No. 2, 69–78.—Alloys of Cu with 7.2% Sn and 2.5% Fe, and alloys with 5.5% Sn and 3.5% Co can be made to attain the hardness of 255 to 295 kg./sq. mm. by cold-working followed by aging at 300–350°. Alloys contg. 1% Be and 5.7% Mn or 0.5% Be and 10.4% Mn can attain a tensile strength of 115 kg./sq. mm. and a hardness of 330 kg./sq. mm. by combined quench and strain aging. Recommended treatment to obtain these properties is: quenching from 800°, cold-rolling to 75% reduction followed by aging 1¼ hrs. at 350° or 6 hrs. at 300°. The degree of hardening of alloys quenched from the same temp. increases with the degree of deformation by cold-rolling. B. N. Daniloff



*Crystal Structure of a Beryllium-Chromium Compound. M. I. Zaharova and P. I. Dalnov (*Tech. Physics, U.S.S.R.*, 1938, 5, (3), 184–188).—[In English.] See abstract from a Russian source; *Met. Abs.*, 1938, 5, 682.—N. B. V.

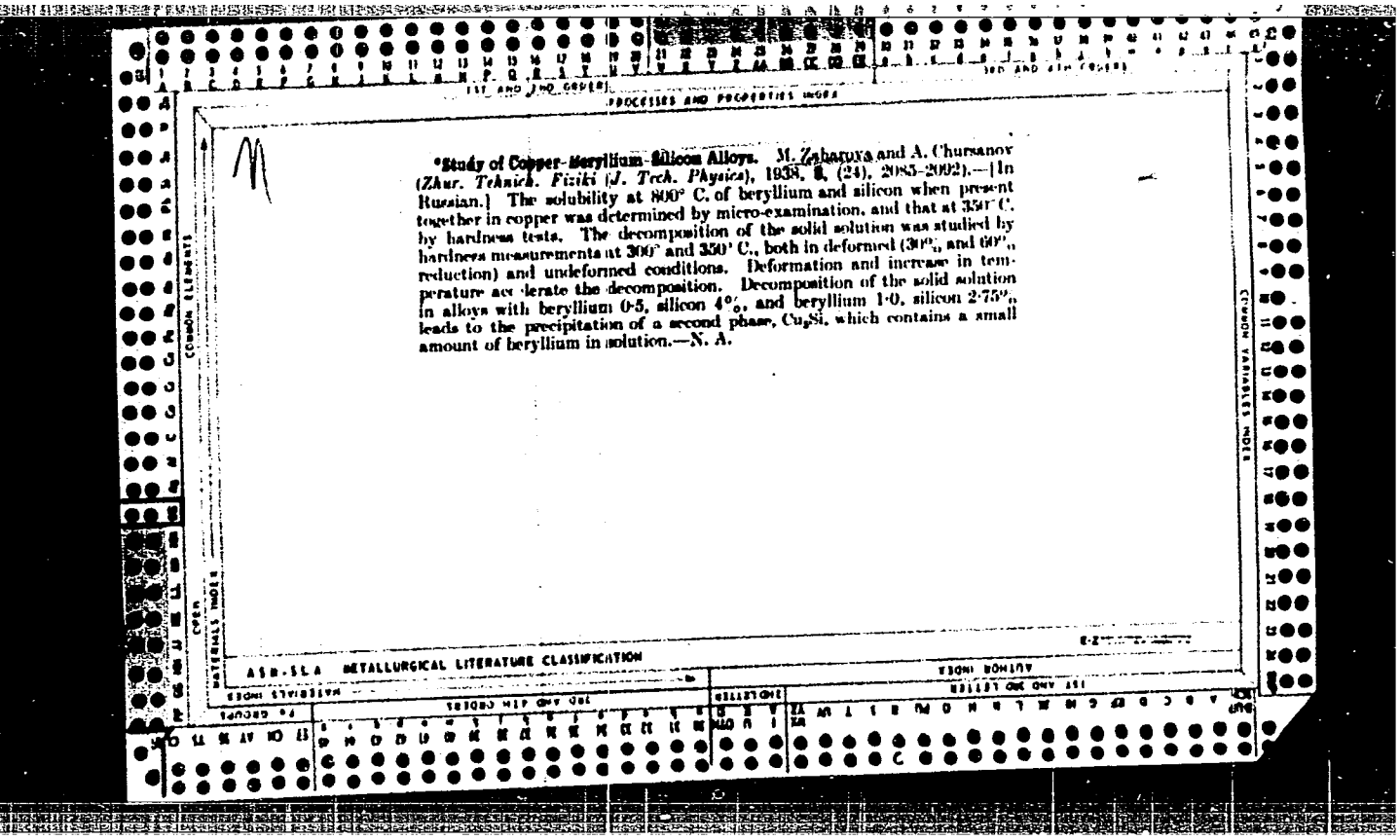


PROCESSES AND PROPERTIES INDEX

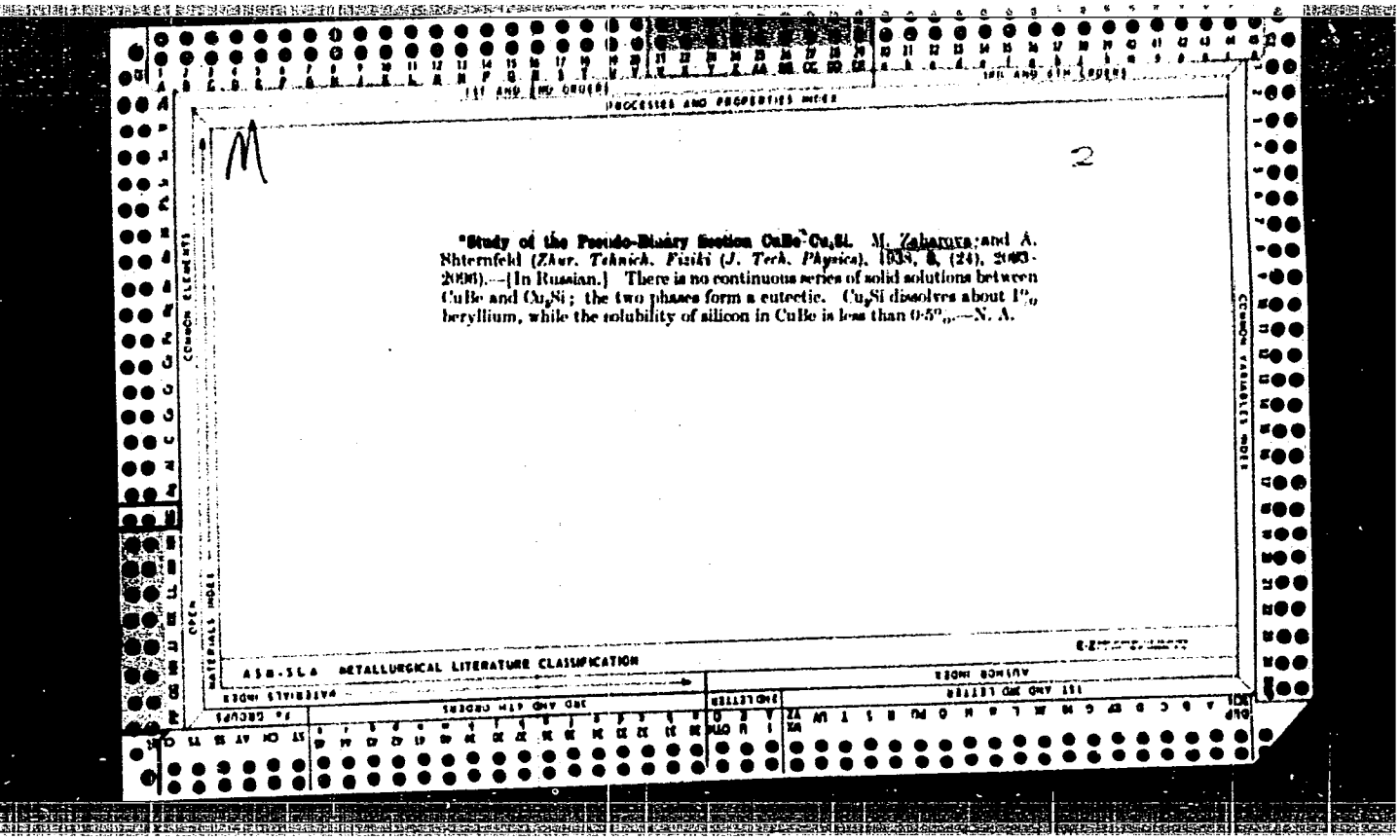
3

Investigation of the Structure of a Beryllium-Chromium Compound. M. I. Zaharova and P. I. Dalrov (*Zhur. Tekhnich. Fiziki* (*J. Tech. Physics*), 1938, **8**, (3), 252–255).—[In Russian.] In the beryllium–chromium system a compound of the AlI_3 type exists between 56·5 and 68·77 atomic-% beryllium; its structure is hexagonal, the unit cell containing 12 atoms and having $a = 4{\cdot}238$ A. and $c = 6{\cdot}982$ A.—N. A.

ASM-SLA METALLURGICAL LITERATURE CLASSIFICATION



***Study of Copper-Beryllium-Silicon Alloys.** M. Zaharuva and A. Chursanov (*Zhur. Tekhich. Fiziki* [*J. Tech. Physics*), 1938, **8**, (24), 2085–2092).—[In Russian.] The solubility at 800° C. of beryllium and silicon when present together in copper was determined by micro-examination, and that at 350° C. by hardness tests. The decomposition of the solid solution was studied by hardness measurements at 300° and 350° C., both in deformed (30% and 60% reduction) and undeformed conditions. Deformation and increase in temperature accelerate the decomposition. Decomposition of the solid solution in alloys with beryllium 0·5, silicon 4%, and beryllium 1·0, silicon 2·75% leads to the precipitation of a second phase, Cu_3Si, which contains a small amount of beryllium in solution.—N. A.

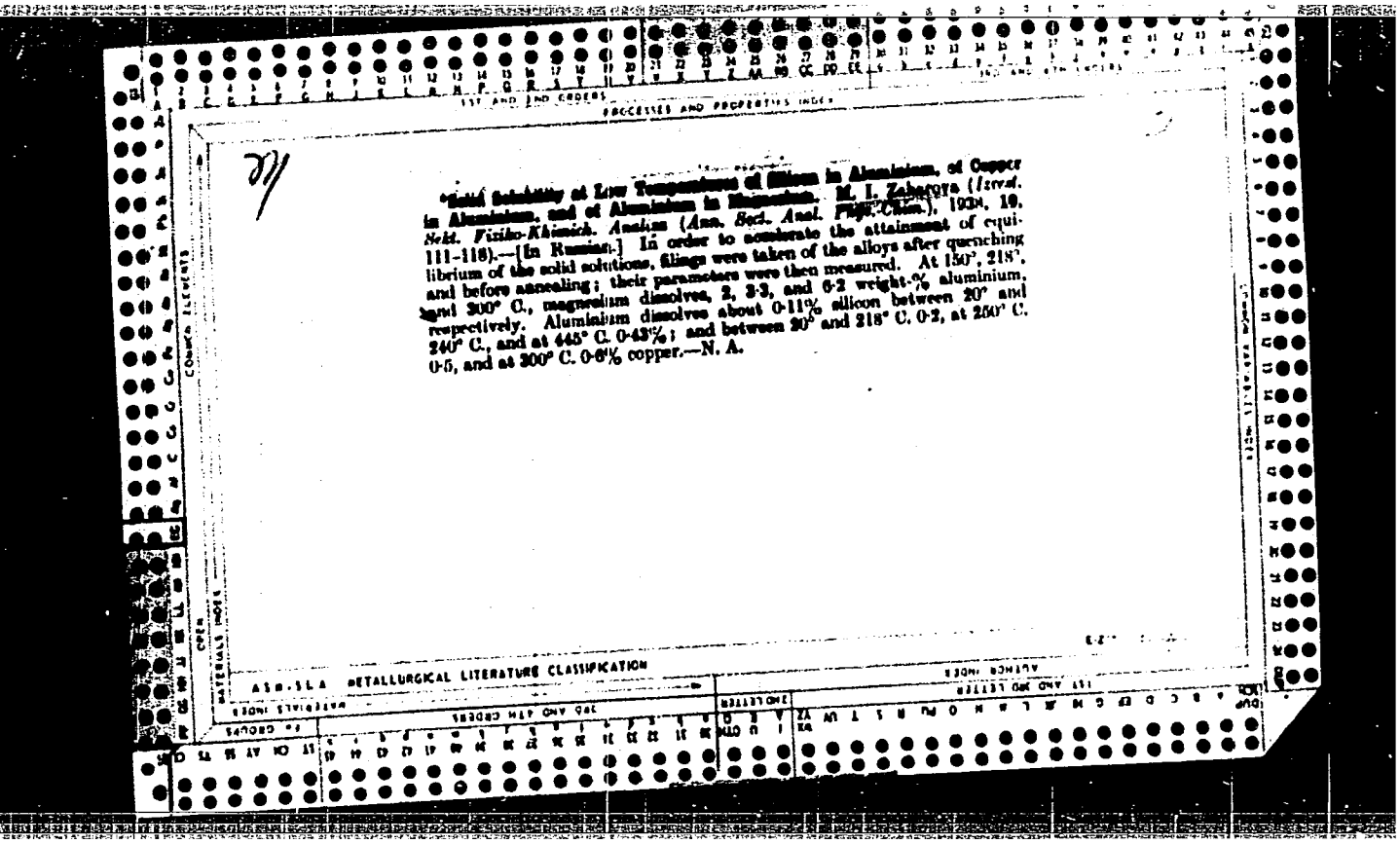


M

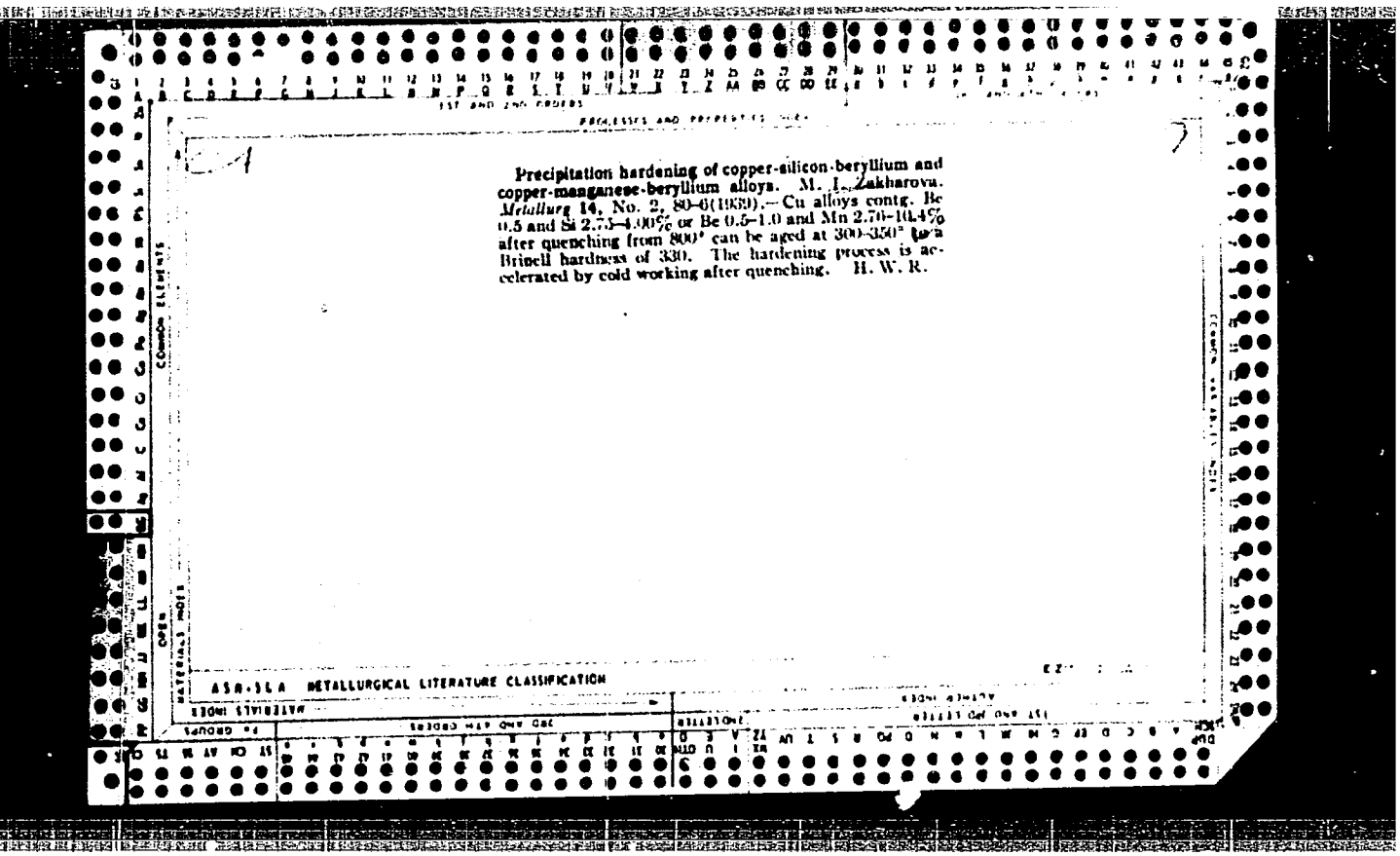
2

"Study of the Pseudo-Binary Section CuBe-Cu$_2$Si. M. Zaharova and A. Shternfeld (*Zhur. Tekhnich. Fiziki* (*J. Tech. Physics*), 1938, 8, (24), 2083-2090).—[In Russian.] There is no continuous series of solid solutions between CuBe and Cu$_2$Si; the two phases form a eutectic. Cu$_2$Si dissolves about 1% beryllium, while the solubility of silicon in CuBe is less than 0·5%.—N. A.

ASM-SLA METALLURGICAL LITERATURE CLASSIFICATION

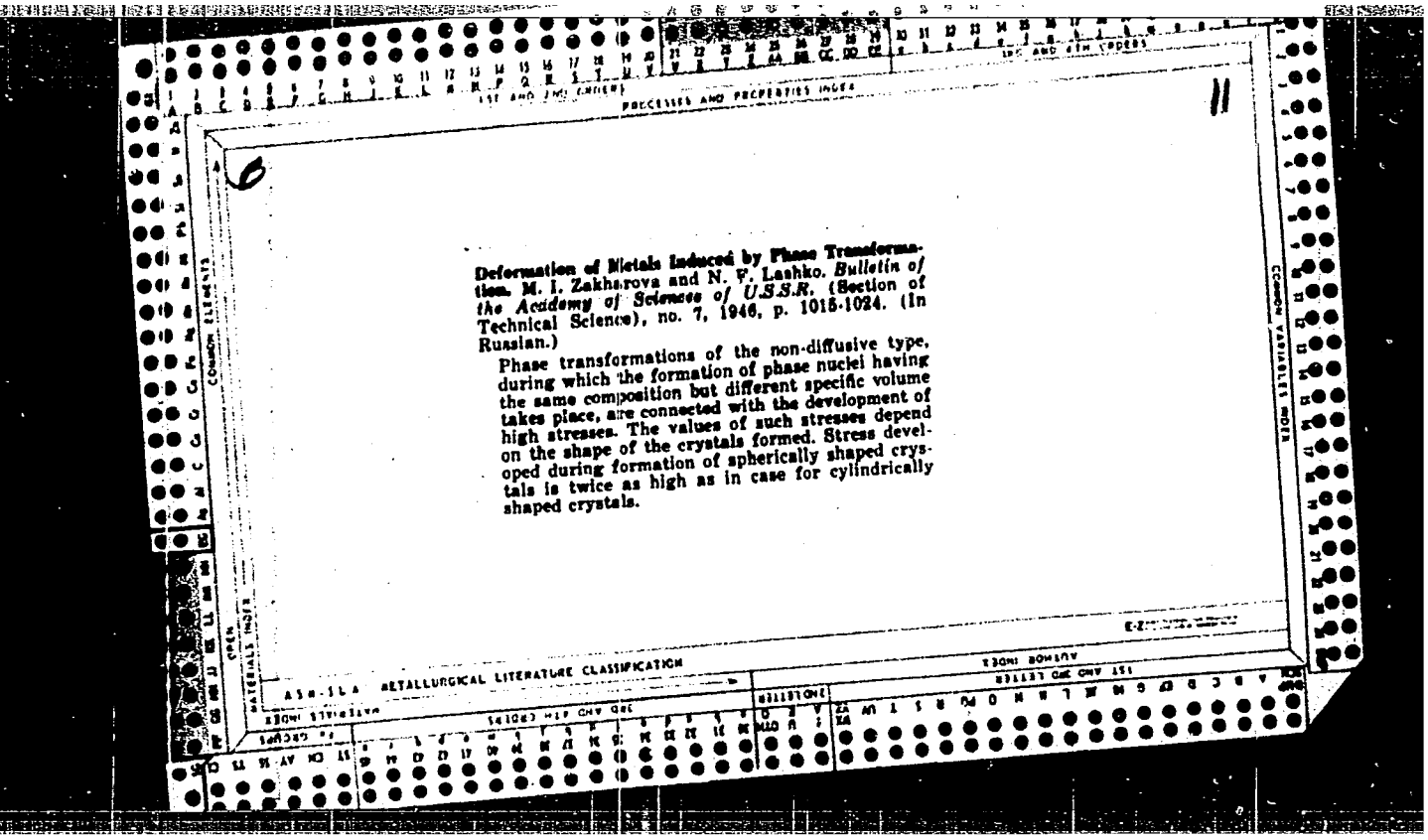


"Solid Solubility at Low Temperatures of Silicon in Aluminium, of Copper in Aluminium, and of Aluminium in Magnesium. M. I. Zaborova (*Izvest. Sekt. Fiziko-Khimich. Analiza* (*Ann. Sect. Anal. Phys.-Chim.*), 1938, 10, 111–118).—[In Russian.] In order to accelerate the attainment of equilibrium of the solid solutions, filings were taken of the alloys after quenching and before annealing; their parameters were then measured. At 150°, 218°, and 300° C., magnesium dissolves, 2, 3·3, and 6·2 weight-% aluminium, respectively. Aluminium dissolves about 0·11% silicon between 20° and 240° C., and at 445° C. 0·43%; and between 20° and 218° C. 0·2, at 250° C. 0·5, and at 300° C. 0·6% copper.—N. A.



Precipitation hardening of copper-silicon-beryllium and copper-manganese-beryllium alloys. M. I. Zakharova. *Metallurg* **14**, No. 2, 80–6(1939).—Cu alloys contg. Be 0.5 and Si 2.75–4.00% or Be 0.5–1.0 and Mn 2.70–10.4% after quenching from 800° can be aged at 300–350° to a Brinell hardness of 330. The hardening process is accelerated by cold working after quenching. H. W. R.

ASM-SLA METALLURGICAL LITERATURE CLASSIFICATION



Deformation of Metals Induced by Phase Transformation. M. I. Zakharova and N. F. Lashko. *Bulletin of the Academy of Sciences of U.S.S.R.* (Section of Technical Science), no. 7, 1946, p. 1015-1024. (In Russian.)

Phase transformations of the non-diffusive type, during which the formation of phase nuclei having the same composition but different specific volume takes place, are connected with the development of high stresses. The values of such stresses depend on the shape of the crystals formed. Stress developed during formation of spherically shaped crystals is twice as high as in case for cylindrically shaped crystals.

CA

Connection between diffusion and rate of growth of the new phase in solid solutions. L. A. Valnshtein and M. I. Zakharova. *Doklady Akad. Nauk S.S.S.R.* 58, 1621–4 (1947).—If the growth of a phase is considered as progressive adhesion of diffusing particles to a nucleus of a new phase, the mass of the nucleus can be given by: $M = 4\pi a^3 c_0[(Dt/a) + 2(Dt/\pi)^{1/2}]$, where D is diffusion coeff. and the rate of growth by: $dM/dt = 4\pi a^2 c_0[(D/a) + (D/\pi t)^{1/2}]$, where a is the radius of the nucleus initiated at time $t = 0$ in homogeneous medium, with c_0 supersatn. Cases of nuclei of various shapes are considered. G. M. K.

ZAKHAROVA, M. I.

PA 2/50T101

USSR/Physics - Compression | Sep 49
Metals, Solubility

"Variation in the Boundary Solubility of Metals in the Solid State Under the Influence of Pressure During Compression on All Sides," M. I. Zakharova, Phys Faculty, Moscow State U imeni M. V. Lomonosov, 3 pp

"Dok Ak Nauk SSSR Vol LXVIII, No 1

Concentration of a solid solution which is the equilibrium concentration for atmospheric pressure varies under action of high pressure during compression on all sides. It takes from 2 to several tens of hours to establish concentration

[redacted] 2/50T101

USSR/Physics - Compression | Sep 49
Metals, Solubility (Contd)

which is the equilibrium concentration for higher pressure. Submitted by Acad N. T. Gudtsov 4 Jul 49.

[redacted] 2/50T101

ZAKHAROVA, M. I.

(3)

Chemical Abst.
Vol. 48 No. 6
Mar. 25, 1954
Metallurgy and Metallography

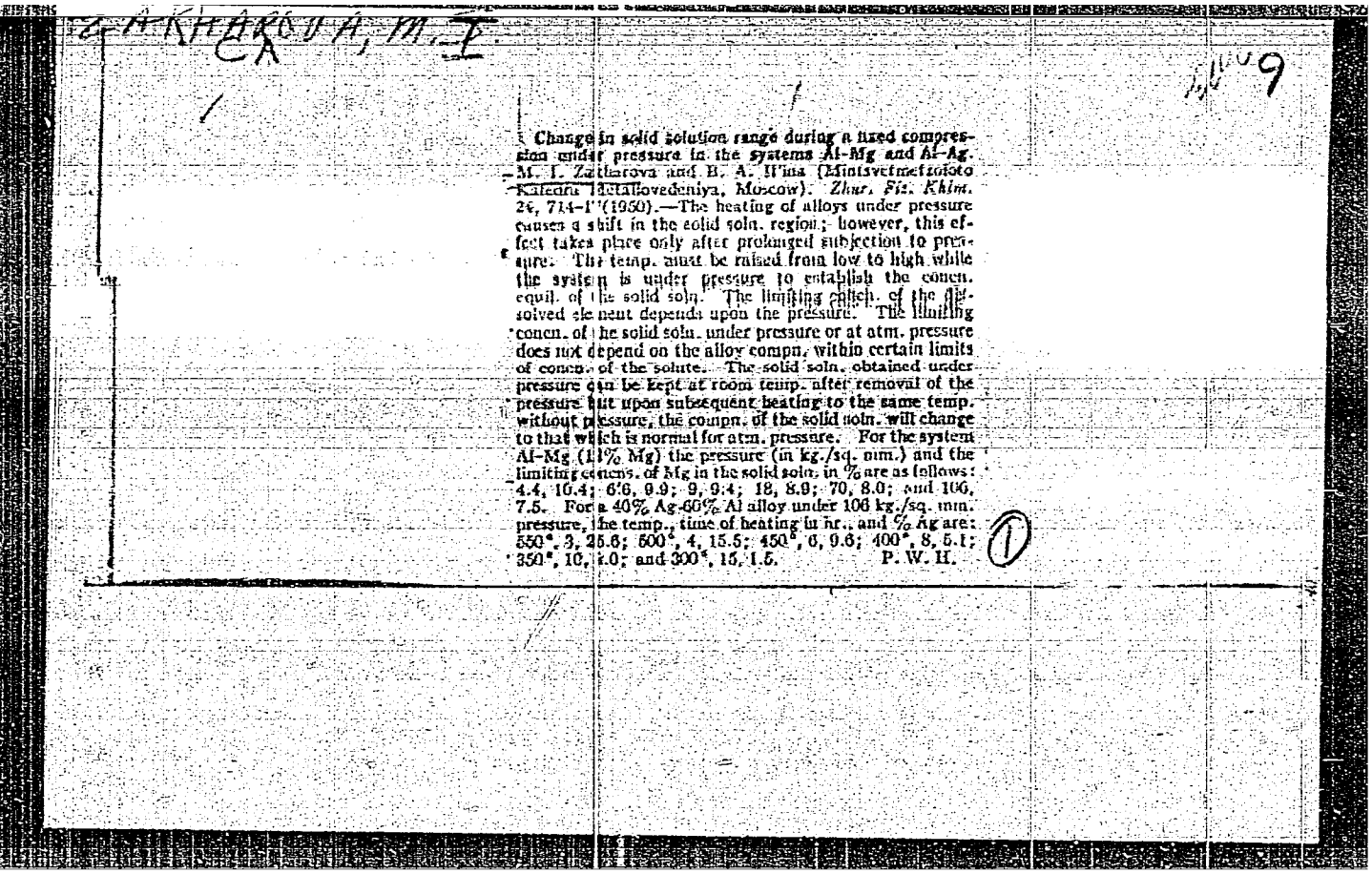
Decomposition of the solid solution of magnesium in aluminum. M. I. Zakharova and L. S. Baldina. *Uchenye Zapiski, Moskov. Gosudarstv. Univ. im. M. V. Lomonosova* No. 134, *Fiz.*, No. 5, 100–6(1949). Specimens of alloy contg. 10% Mg, balance essentially Al, were quenched from 475° into (1) water at 16°, (2) water at 100°, (3) a salt bath at 218 or 300°, or (4) water at 16°, then deformed. Lattice parameters were detd. after heating the specimens at 218 or 300° for periods up to 116 hrs. After heating at 218°, the decompn. of the Al-Mg solid soln. resulted in the formation of a series of solid solns. having a varying Mg content; the quenching rate had no significant effect on this decompn. After heating at 300°, a heterogeneous 2-phase transformation occurred in specimens quenched at 16° and deformed; a homogeneous transformation occurred in specimens quenched in a salt bath at 300°; specimens quenched in water at 10 and 100° indicated both homogeneous and heterogeneous transformations. H. W. Rathmann

ZAKHAROVA, M. I.

Chemical Abst.
Vol. 48 No. 6
Mar. 25, 1954
Metallurgy and Metallography

(3)

Investigation of the phenomenon of reversion during aging of duralumin. M. I. Zakharova and N. V. Lukyanova. *Uchenye Zapiski Moskov. Gosudarst. Univ. im. M. V. Lomonosova* No. 134, *Fiz.*, No. 5, 107–12(1940).—Specimens of alloy contg. Cu 3.88, Mn 0.77, Mg 0.62, Si 0.60, Fe 0.90%, and balance Al were quenched from 500° and aged at (1) 100° for 0 hrs., (2) 150° for 2 hrs., (3) 200° for 5, 20, or 45 min., or (4) 218° for 1, 5, or 30 min. Specimens from (1) and (2) were then heated at 235, 255, or 275° for periods up to 1 hr., and the Rockwell hardness was detd.; specimens from (3) and (4) were heated at 275° for periods up to 1 hr. and tested. In (1) and (2), the hardness decreased after a short heating period to approx. the hardness of the quenched alloy, then increased to a max. and decreased again. In (3) and (4), heating at 275° resulted in reversion of the alloy to the quenched hardness only if aging was limited to a very short period (1–5 min.). H. W. R.



ZAKHAROVA, M. I.

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Change in solid solution range during a fixed compression under pressure in the systems Al-Mg and Al-Ag. M. I. Zakharova and B. A. Il'ina (Mintsvetmetzoloto Kafedra Metallovedeniya, Moscow). *Zhur. Fiz. Khim.* 24, 714-17 (1950).—The heating of alloys under pressure causes a shift in the solid soln. region; however, this effect takes place only after prolonged subjection to pressure. The temp. must be raised from low to high while the system is under pressure to establish the concn. equil. of the solid soln. The limiting concn. of the dissolved element depends upon the pressure. The limiting concn. of the solid soln. under pressure or at atm. pressure does not depend on the alloy compn. within certain limits of concn. of the solute. The solid soln. obtained under pressure can be kept at room temp. after removal of the pressure but upon subsequent heating to the same temp. without pressure, the compn. of the solid soln. will change to that which is normal for atm. pressure. For the system Al-Mg (11% Mg) the pressure (in kg./sq. mm.) and the limiting concns. of Mg in the solid soln. in % are as follows: 4.4, 10.4; 6.6, 9.9; 9, 9.4; 18, 8.9; 70, 8.0; and 106, 7.5. For a 40% Ag-60% Al alloy under 106 kg./sq. mm. pressure, the temp., time of heating in hr., and % Ag are: 550°, 3, 25.6; 500°, 4, 15.5; 450°, 6, 9.6; 400°, 8, 5.1; 350°, 10, 2.0; and 300°, 15, 1.5. P. W. H.

(1)

ZAKHAROVA, M. I.

Structural changes on aging an aluminum alloy with 2% copper. M. I. Zakharova (M. V. Lomonosov State Univ., Moscow). *Doklady Akad. Nauk S.S.S.R.* 70, 55-6 (1950).—Laue x-ray patterns by using Mo radiation were obtained from single crystals of a 2% Cu alloy grown by recrystn. By deg. the Bragg angle of the end of the radial streak around the central beam it was found that the diam. of the two-dimensional diffracting regions was 70 A. after 2 months' natural aging, and 700 A. after 15 days' aging at 100°. On aging for 1½ hrs. at 270° 2-dimensional diffraction effects were found. Aging for 3½ hrs. at 270° and for 20 hrs. at 255° produced both 2- and 3-dimensional effects. After 3½ hrs. aging at 300° only 3-dimensional effects appeared. A. G. Guy

ZAKHAROVA, M. I. Prof.

"The Influence of Pressure on Phase Transformations in Alloys," a paper given at the All-University Scientific Conference "Lomonosov Lectures", Vest. Mosk. Un., No.8, 1953.

Translation U-7895, 1 Mar 56

ZAKHAROVA, M.I.

Chemical Abst.
Vol. 48 No. 4
Feb. 25, 1954
General and Physical Chemistry

Deformation of the lattice in the eutectoid dissociation of a solid solution. M. I. Zakharova (M. V. Lomonosov State Univ., Moscow). *Izvest. Akad. Nauk S.S.S.R., Ser. Fiz.* 17, 364-5(1953).—The deformation of the lattice resulting from the eutectoid dissocn. of a Cu alloy with 27% Sn was investigated. The β-phase dissocs. into 2 new phases at temps. below 520°. Monocrystals of β-phase were grown by cooling at a rate of 5°/hr. from the melt to the beginning of crystn. and 15°/hr. from this point to 700°, after which temp. th alloy was quenched in cold H_2O. The monocrystals were annealed at 150°, 218°, and 300°, and the eutectoid dissocn. appeared in x-ray photograms as a series of diffuse bands and spots, the size and no. of which depended on the annealing time. Complete recrystn. of the new phases was observed after a 31-hr. anneal at 250° and a 67-hr. anneal at 218°. A dislocation of the lattice is obtained not only by plastic deformation but also by eutectoid dissocn. S. Pakswer

6/1/54 BW

ZAKHAROVA, M. I.

Influence of pressure on the eutectoid decomposition in an alloy of copper with aluminum. M. I. Zakharova (M.V. Lomonosov State Univ., Moscow). *Doklady Akad. Nauk S.S.S.R.* 91, 287–9(1953).—An expt. study was made on an alloy of Cu with 12.5% Al prepd. from electrolytic metals. The alloy was homogenized after casting by heating at 850° for 8 hrs. A pressure of 10,000 kg./sq. cm. in compression was exerted on a specimen 5 mm. in diam. by using a cylindrical die in a Brinell press. The specimen and die were heated together by an elec. resistance furnace. The furnace was removed after the specimen had been at temp. for 15 min., and the specimen was quenched while still under pressure. The resulting structures were exaind. microscopically and by the Debye x-ray method with Cu and Ni radiations. Heat-treating temps. of 560–595° gave a fine-grained, lamellar eutectoid of α and δ. Temps. of 900–650° gave a martensitic structure of β'. Thus, the eutectoid temp. is 600 ± 4°. Tests under free compression also gave the β' phase. Studies were also made of the effect of pressure during quenching and during tempering on the decompn. of β' to α and δ. When quenching was done without pressure and tempering was done under pressure, tempering for 15 min. produced decompn. to α and δ at 490° and above. At 440° and lower no decompn. occurred. At 460 and 480° all 3 phases were present. After 4 hrs. at 480°, decompn. was complete. When both quenching and tempering were done without pressure the decompn. at 460° was as great as that at 490° in the previous case. When quenching was done under pressure and tempering without pressure 3 phases appeared at 440°, and the β' phase disappeared at 460°. When both quenching and tempering were done under pressure, 3 phases appeared at 460°.

A. G. Guy

ZAKHAROVA, M. I.

USSR/Physics

Card : 1/1

Authors : Balli, D., and Zakharova, M. I.

Title : Investigation of the structure and properties of Cu-Ni-Fe alloys

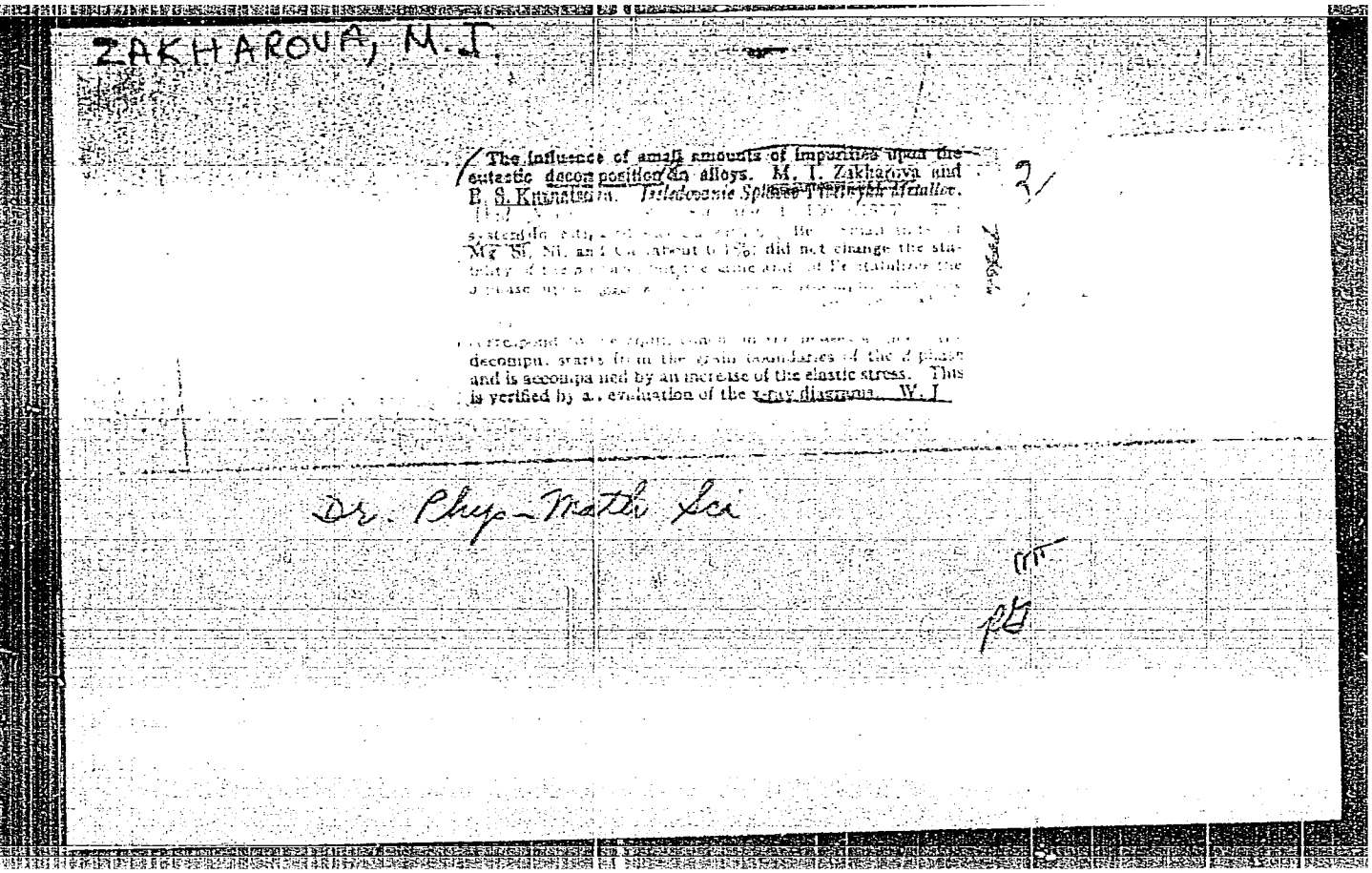
Periodical : Dokl. AN SSSR, 96, Ed. 4, 737 - 740, June 1954

Abstract : The structure and properties of ten Cu-Ni-Fe alloys, with varying copper, nickel and iron contents, were investigated. A comparison of the x-ray-analysis results, with the data of the measured coercive force and Curie point, showed that nuclei of new phases and non-equilibrium composition are formed in the basic crystalline lattice, during the initial stages of decomposition of the solid solution. The main role in this period is played by stresses of the third order and the coercive force reaches values of tens of Oerstedts for a majority of the alloys. Two references. Tables, graphs.

Institution : The M. V. Lomonosov State University, Moscow, USSR

Presented by: Academician G. V. Kurdyumov, March 4, 1954

Translation B-82533, 25 Feb 55



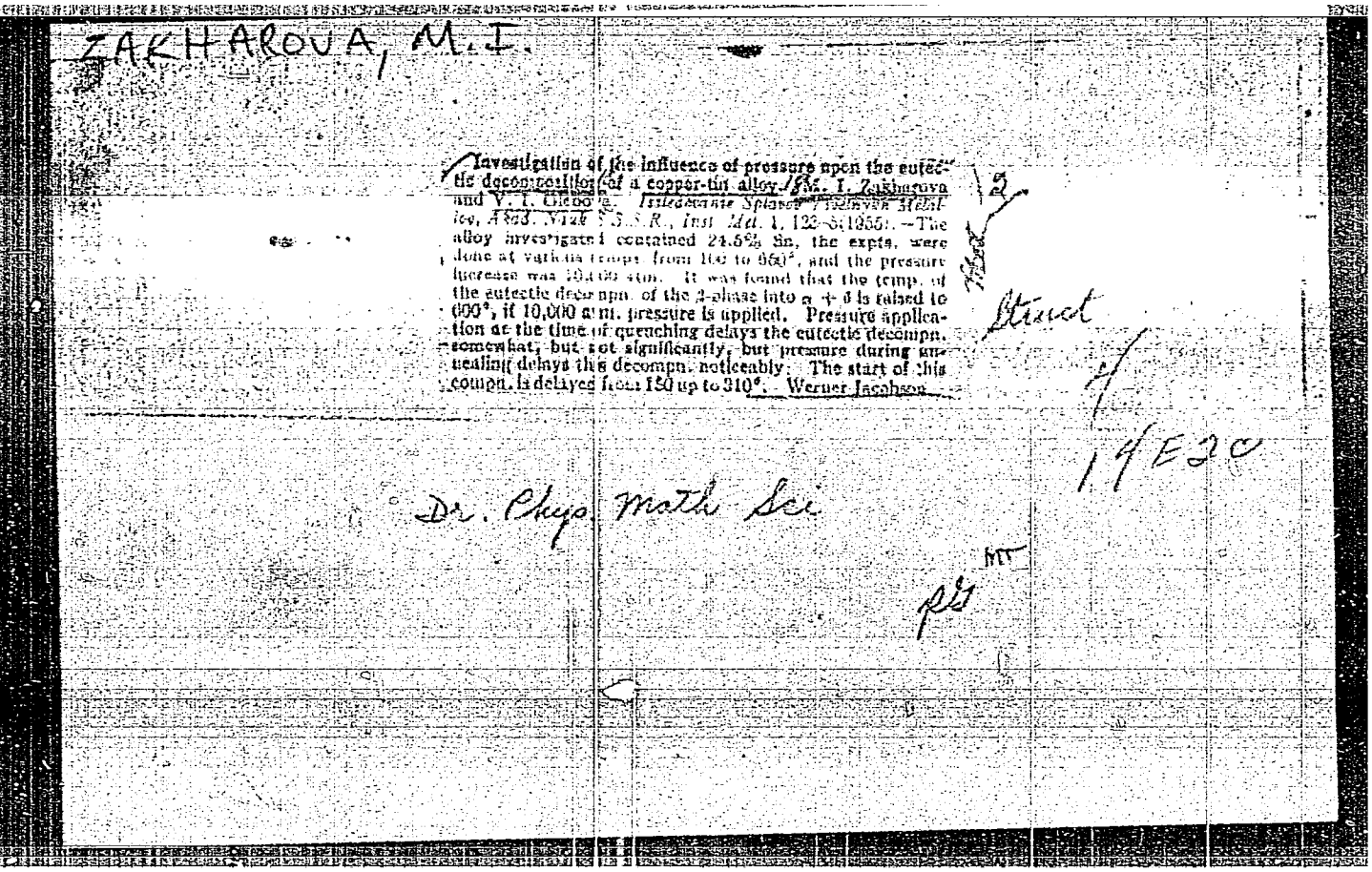
ZAKHAROVA, M. I.

The influence of small amounts of impurities upon the eutectic decomposition in alloys. M. I. Zakharova and B. S. Khmelevskaya. *Izvestiya Sektora Fiziko-Khimicheskogo Analiza*.

[illegible] Mg Si, Ni, and Cu in amount to 1% did not change the stability [illegible] and to stabilize the [illegible]

decompn. starts from the grain boundaries of the β phase and is accompanied by an increase of the elastic stress. This is verified by an evaluation of the x-ray diagrams. W. J.

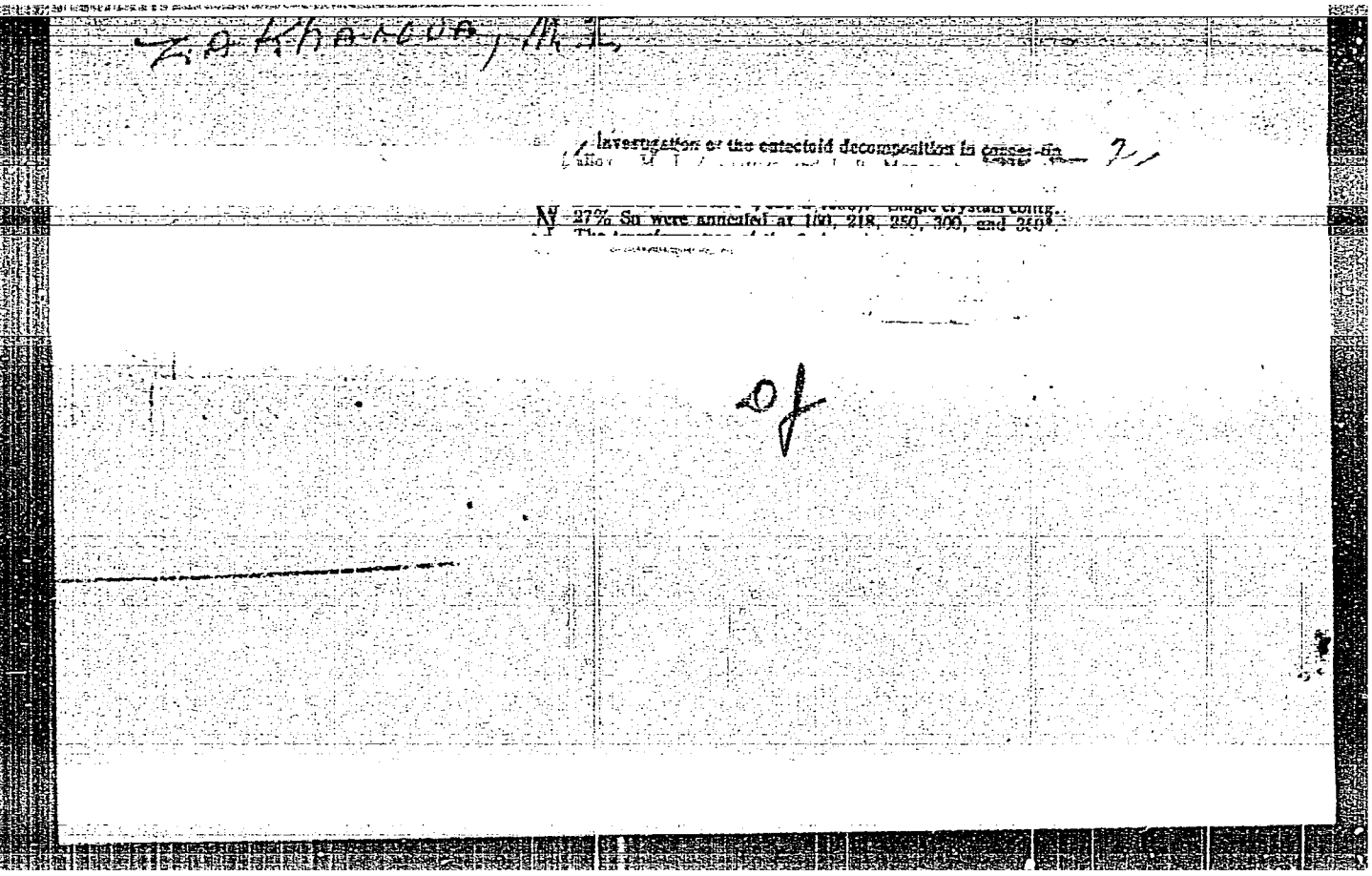
Dr. Phys-Math Sci



ZAKHAROVA, M. I.

Investigation of the influence of pressure upon the eutectic decomposition of a copper-tin alloy. M. I. Zakharova and V. I. Dicbo'e. *Issledovanie Splavov. Tsvetnye Metal.* Akad. Nauk S.S.S.R., *Inst. Met.* 1, 123–8(1955).—The alloy investigated contained 24.6% Sn, the expts. were done at various temps. from 100 to 960°, and the pressure increase was 10,000 atm. It was found that the temp. of the eutectic decompn. of the 2-phase into α + δ is raised to 600°, if 10,000 atm. pressure is applied. Pressure application at the time of quenching delays the eutectic decompn. somewhat, but not significantly, but pressure during annealing delays this decompn. noticeably. The start of this decompn. is delayed from 150 up to 310°. Werner Jacobson

Dr. Phys. Math Sci



Investigation of the eutectoid decomposition in cast-Fe

N 27% Si were annealed at 100, 218, 250, 300, and 210°

ZAKHAROVA, M.I.

CARD 1 / 2 PA - 1222

SUBJECT USSR / PHYSICS
AUTHOR ZACHAROVA, M.I., SOBOLEVA, I.N.
TITLE The Decay of a Solid Solution in Thin Plates.
PERIODICAL Dokl. Akad. Nauk, 108, 841-842 (1956)
Publ. 6 / 1956 reviewed 8 / 1956

According to N.N.BUJNOV and R.M.LERIMAN, Izv.Akad.Nauk. SSR, Ser.fis.No 3, 363 (1951) the decay of a solid solution probably takes a different course from a certain critical depth onwards than in thick samples. In order to find this out, the temperature dependence of the decay of a solid solution of Cu in Al was investigated in samples of 0,4; 0,02 and 0,004 mm thickness. After quenching, the plate-shaped samples were annealed for one hour at 180,200,220, ...300°. The decay process was radiographically analyzed from the modification of the lattice constant of the primary solid solution. Not only in samples of 0,004 mm thickness, but also in such as are 0,02 mm thick, decay develops in a different manner than in 0,4 mm samples. Domains with different degrees of oversaturation exist in samples of 0,02 and 0,004 mm thickness after tempering at 260 and 280° . After tempering at 260° (or 280°) crystal domains with a concentration similar to the initial concentration (i.e. with equilibrium concentration) predominate. In the samples of 0,4 mm thickness tempering at 260 and 280° causes homogeneous decay, on which occasion the lattice constant changes steadily. If temperature is further increased, the solid solution has a uniform concentration at all thicknesses from 0,004 to 0,4 mm within the entire domain, and the lattice constant diminishes by the increase of solubility.

ZAKHAROVA, M.I.; STETSENKO, P.N.

Magnetic properties and structure of an Fe - V(27%) alloy.
Vest. Mosk. un. Ser. mat., mekh., astron., fiz. khim., 12 no.5:
47-52 '57. (MIRA 11:9)

1.Kafedra magnetizma Moskovskogo gosudarstvennogo universiteta.
(Iron-vanadium alloys--Magnetic properties)

ZAKHAROVA, M.I.; STETSENKO, F.N.

Phase transformations in Fe-V alloys. Vest. Mosk. un. Ser. mat., mekh., astron., fiz. khim., 12 no.5:53-61 '57. (MIRA 11:9)

1.Kafedra magnetizma Moskovskogo gosudarstvennogo universiteta.
(Iron-vanadium alloys--Metallography)

ZAKHAROVA, M.I.; KHATANOVA, N.A.

Investigating structural changes during $\gamma \rightarrow (\gamma + \alpha)$ phase transformations in iron nickel alloys. Issl. po zharopr. splav. 3:178-182 '58. (MIRA 11:11)

(Iron-nickel alloys--Metallorgraphy) (Phase rule and equilibrium)

70-3-3-28/36

AUTHORS: Zakharova, M.I. and Khatanova, M.A.

TITLE: The Mutual Orientation of Crystals of the α and σ Phases on the Decay of the Solid Solution in Alloys of Iron and Vanadium (Vzaimnaya oriyentirovka kristallov α- i σ-faz pri raspade tverdogo rastvora v splavakh zheleza s vanadiyem)

PERIODICAL: Kristallografiya, 1958, Vol 3, Nr 3, pp 376 - 378 (USSR)

ABSTRACT: Fe-V alloys at temperatures above 1 234 °C form a solid solution α with a cubic face-centred lattice. Below this temperature the solid solution decays and a σ phase with the β - U structure having 30 atoms per unit cell separates. An alloy of 26% V in Fe was annealed at 975 °C and decayed to the two phases. Monocrystalline specimens, prepared by heating for 60 hours at 1 350 °C and quenching in water were used for X-ray examination. Specimens of 1 cm dia. were thus converted to single crystals and were cut up for examination. Laue photographs were taken after different annealing times at 975 °C. For times of 1-30 hours no changes were evident. After 40 hours, spots showed that the nuclei of the σ phase were oriented parallel to the 001 plane of the α phase. After 155 hours' annealing the orientation was seen to be such that

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70-3-3-29/36

AUTHORS: Zakharova, M.F. and Khatanova, N.A.

TITLE: The Substructure of Crystals of the γ Solid Solution of Nickel in Iron During Polymorphic Transformation (Substruktura kristallov γ-tverdogo rastvora nikelya v zheleze pri polimorfnom prevrashchenii)

PERIODICAL: Kristallografiya, 1958, Vol 3, Nr 3, pp 378 - 381 (USSR)

ABSTRACT: The investigation of the transformation $\gamma \rightarrow \gamma+\alpha$ in an alloy of iron with 32% nickel by the methods of X-ray and microscopic analysis showed that the initial stage proceeds following the martensitic type of transformation scheme. In this the layers of the α-phase are oriented parallel to the 111 plane of the γ-phase. Because of the low value of the elastic limit of the Fe-Ni alloys at 400 °C, the coherence of the lattices of the γ- and α-phases is destroyed in the initial stages of the transformation and the further growth of the nuclei of the α-phase proceeds by diffusion. In the matrix round the nuclei a zone of plastic deformation is formed clearly distinguishable under microscopic investigation. There are 4 figures and 7 references, 1 of which is Soviet, 1 German and 5 English.

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70-3-3-29/36

The Substructure of Crystals of the γ Solid Solution of Nickel in Iron During Polymorphic Transformation

ASSOCIATION: Mokovskiy gosudarstvennyy universitet imeni M.V. Lomonosova (Moscow State University imeni M.V. Lomonosov)

SUBMITTED: March 22, 1957

Card 2/2

SOV/126-6-3-12/32

AUTHORS: Zakharova, M. I., Ignatova, I. A. and Khatanova, N. A.

TITLE: Investigation of the Phase Transformation $\gamma \rightarrow (\gamma + \alpha)$ in Alloys of Iron with Nickel (Issledovaniye fazovogo prevrashcheniya $\gamma \rightarrow (\gamma + \alpha)$ v splavakh zheleza s nikelem)

PERIODICAL: Fizika Metallov i Metallovedeniye, 1958, Vol 6, Nr 3, pp 475-479 (USSR)

ABSTRACT: The polymorphous transformations in alloys of iron with 30 and 32% Ni are investigated since in spite of the fact that much work has been done on the problem of $\gamma \rightarrow (\gamma + \alpha)$ transformations in Fe-Ni alloys (Ref 1), the extreme stability of the non-equilibrium state in these alloys has so far not been satisfactorily clarified. The alloys were produced from electrolytic iron and electrolytic nickel. After casting, the alloys were subjected to homogenization annealing at 1000°C for ten hours, then to heating for 18 hours at 600°C which was followed by quenching in water. The single crystals were produced by the method of recrystallisation at 1200°C; after continuous annealing for 60 hours, crystals of 20 mm^2 grew in 1 mm thick plates. The investigations were effected by X-ray and microscopic analysis of polycrystalline specimens and

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SOV/126-6-3-12/32

Investigation of the Phase Transformations $\gamma \rightarrow (\gamma + \alpha)$ in Alloys of Iron with Nickel

X-ray analysis of static single crystals. The process of polymorphous transformation was studied for isothermal heating at a temperature of 400°C; at this temperature a 32% Ni containing alloy in the equilibrium state should contain about 27% of the α-phase. For investigating the $\gamma \rightarrow (\gamma + \alpha)$ transformation by X-ray structural analysis, powder was filed from the homogenized specimen which was heated at 600°C for 20 hours and then subjected to isothermal annealing at 400°C. The X-ray patterns were photographed using iron radiation in cameras of 114 cm dia; the specimen dia. equalled 0.4 mm. It was established that at 400°C the transformation is very slow. Deformation of the alloys at room temperature does not only accelerate the process of γ to α transformation; deformation of an alloy after being subjected to martensite transformation at -196°C will accelerate also the reverse γ to α transformation. At temperatures above the martensitic point, the initial stage of the γ to α transformation proceeds according to the relations governing the reconstruction of

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Investigation of the Phase Transformation $\gamma \rightarrow (\gamma + \alpha)$ in Alloys of Iron with Nickel

the lattice in the case of martensitic transformations. The forming inter-layer of the γ-phase is located parallel to the plane (111) of the γ-phase. Apparently for a tempering temperature of 400°C the lattice coherence is disturbed in the initial stage of transformation, which brings about a braking of the transformation process. Further increase in the growth of the nuclei of the α-phase is by diffusion; deformation zones are formed in the matrix around the nuclei.
There are 2 figures, 1 table and 4 references, 2 of which are Soviet, 2 English.

ASSOCIATION: Moskovskiy gosudarstvennyy universitet imeni M. V. Lomonosova (Moscow State University imeni M. V. Lomonosov)

SUBMITTED: June 23, 1956 (initially), Feb.8,1957 (after revision).

1. Iron-nickel alloys--Transformations 2. Iron-nickel alloys --Stability 3. Iron-nickel alloys--Casting 4. Iron-nickel alloys --Heat treatment 5. Iron-nickel alloys--X-ray analysis

ZAKHAROVA, M.I.; KHATANOVA, N.A.

Investigation of structural changes in Fe-Ni alloys during the polymorphic $\gamma \rightarrow \gamma + \alpha$ transformation. Izv. AN SSSR. Ser. fiz. 22 no.10:173-176 O '58. (MIRA 12:3)

1.Moskovskiy gosudarstvennyy universitete im. M.V. Lomonosova.
(Iron-nickel alloys)

ZAKHAROVA, M.I.; VAN KHUA-FOU [Wang Hua-fou]; ROGOVA, R.N.

Investigation of austenite decomposition in manganese steel. Izv. AN SSSR. Ser. fiz. 22 no.10:177-179 O '58. (MIRA 12:3)

1.Moskovskiy gosudarstvennyy universitete im. M.V. Lomonosova.
(Austenite)

20-119-3-27/65

AUTHORS: Zakharova, M. I., Ignatova, I. A., Semenova, L. A., Khatanova, N. A.

TITLE: An Investigation of the Phase Composition of Iron-Vanadium and Iron-Chromium Alloys (Issledovaniye fazovogo sostava splavov zheleza, s vanadiyem i zheleza s khromom)

PERIODICAL: Doklady Akademii Nauk SSSR, 1958, Vol. 119, Nr 3, pp. 498-500 (USSR)

ABSTRACT: Though there is a domain of the σ-phase in the state diagrams of the alloys in question which passes over into the domain of solid solutions of the α-phase at >1234°C for Fe-V-alloys and at 820°C for Fe-Cr-alloys, these transformations are assumed to be more complicated, because these alloys are transformed rapidly in the single-phase region of the σ- as well as of the α-phase. Thus the brittleness occurs very obviously after annealing at 400-550°C in these alloys that belong to the single-phase region. The plasticity is here reduced to zero, by this their practical applicability is restricted. According to references 3 and 4 a solid solution rich in chromium is assumed to precipitate at low annealing temperatures. An

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modification of the properties which does not correspond to the single-phase structure of the solid solution was observed also above the transformation temperature from σ- into the α-phase (ref. 6,7). It is difficult to be explained by the atomic regulation which is assumed at low as well as at high temperatures by several authors (ref 7). In the present paper the structure of the alloys in question was to be investigated after a heating between 1400 and 600°C with quenching in water. The investigation was carried out by means of X-ray diffraction methods in the polycrystal and by means of microscopical analysis. The alloys were homogenized after casting at 1300°C from 20 to 100 hours and immediately afterwards quenched in water. Structure of the iron-vanadium-alloys. The radiographs of the powder obtained by means of a file were taken with a chromium radiation. After a homogenization at 1300°C these alloys are (with a vanadium content of 28,5-74 %) not single-phase, but two-phase. It was proved microscopically that on a background of the crystals of the α-phase

(hardness $\sim$ 250 kg/mm^2) crystals of another phase with a hardness three times greater than the first mentioned become visible. The content of this last phase increases with increasing vanadium content. The radiograph confirmed this: 2 systems of lines appear on it. The other phase is denoted as β-phase by the authors. The content of the phases was determined in the case of different vanadium contents. The two phases still existed at temperatures above 1150°C. In the case of annealing at 800°C the alloy with V-content of 28,5 % consists of the α-phase only. From 43 % V on it consists of α- and σ-phase. In the case of annealing at 600:C and 49,5 % V it consists of the σ-phase only. Thus the course of the phase transformations in more complicated at a vanadium content of 28,5-74 % between 1400 and 600°C, than described by the phase diagram in publications, i.e.

$$(\alpha + \beta) \rightarrow \alpha \rightarrow (\alpha + \sigma) \rightarrow \sigma.$$

Chromium-iron-alloys. After the same treatment the

microscopical and radiographic investigation showed that the alloys with 35, 42 and 48 % Cr consist of the α- and β-phase crystals in the case of annealing at 1300°C. The amount of the β-phase decreases with dropping temperature (figure 1,2). In the chromium-iron-alloys with 35-48 % Cr the phase transformations consist of a polymorphous transformation of the σ- into the α-phase as well as of the α- into the β-phase, exactly as it was the case with the above mentioned vanadium.
There are 3 figures and 7 references, 2 of which are Soviet.

ASSOCIATION: Moskovskiy gosudarstvennyy universitet im. M. V. Lomonosova (Moscow State University imeni M. V. Lomonosov)

PRESENTED: November 12, 1957, by A. A. Bochvar, Member, Academy of Sciences, USSR

SUBMITTED: November 12, 1957

ZAKHAROVA, M.I.; IGNATOVA, M.N.; SEMENOVA, L.N.; KHATANOVA, N.A.

Investigating phase transformations in iron-vanadium and iron-chromium alloys. Issl.po zharopr.splav. 4:263-265 '59. (MIRA 13:5)

(Phase rule and equilibrium) (Iron-vanadium alloys) (Iron-chromium alloys)

67807

SOV/180-59-5-24/37

AUTHORS: Zakharova, M.I., Semenova, L.A., and Stetsenko, P.N. (Moscow)

TITLE: Phase Transformations in the System Iron-Vanadium

PERIODICAL: Izvestiya Akademii nauk SSSR, Otdeleniye tekhnicheskikh nauk, Metallurgiya i toplivo, 1959, Nr 5, pp 135-138 (USSR)

ABSTRACT: The deterioration of the properties of Fe-V alloys which follows the separation of the σ-phase on cooling has attracted considerable attention. In the present work an investigation was made of the structure of alloys of Fe with 27 and 47.7 weight % V after annealing followed by hardening from various temperatures. X-ray and microscopic analysis and measurement of magnetic properties were used. Both alloys were found to have a two-phase structure, the quantity of second phase being greater for a 1400 than a 1250 °C hardening temperature. The magnetic properties likewise indicate (Figs 1 and 2 show these as functions of temperature for various conditions), that the two-phase is the equilibrium structure at temperatures above the α-σ transition point. X-ray analysis pointed to the existence of a new phase, rapidly disappearing at 975 °C. The authors studied

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Phase Transformations in the System Iron-Vanadium

conditions for the formation of this new (β) phase. The quantity of α-phase in the 47.7 and 27% V alloy was found by Nechvolodov's method to be 35 and 10% respectively. The magnetic properties of the low- and high-vanadium alloys annealed at 1350 °C for 60 hours are shown as functions of temperature in Figs 3 and 4, respectively. The work shows that there are two polymorphic changes (β-α and α-σ) in the Fe-V alloys, both proceeding slowly in the 1000-1300 °C range. The β-phase has a Curie point of about 200 °C and crystallizes in a cubic face-centered lattice. There are 4 figures.

Card 2/2

ASSOCIATION: Otdeleniye stroyeniya veshchestva fizicheskogo fakul'teta MGU
(Structure of Matter Department, Faculty of Physics, MGU)

SUBMITTED: March 28, 1958

ZAKHAROVA, M.I.

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. Guseva; 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. F. 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, some with descriptions of new equipment and methods, others 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.

Studies (Cont.) SOV/3355

Card 9/12

18(7)
AUTHORS: Zakharova, M. I., Mogarycheva, I. B. SOV/48-23-5-23/31

TITLE: Investigation of the Phase Transformations in Copper - Tin Alloys (Issledovaniye fasovykh prevrashcheniy v splavakh med'-olovo)

PERIODICAL: Izvestiya Akademii nauk SSSR. Seriya fizicheskaya, 1959, Vol 23, Nr 5, pp 643 - 645 (USSR)

ABSTRACT: It is mentioned by way of an introduction that several earlier investigations had dealt with the decomposition of oversaturated solid solutions. The subject of the present paper is the eutectic transformation and the phase transformation $\beta \rightarrow \beta + \alpha$. Reference is then made to two papers by Isaichev and Kurdyumov concerning the disordered position of atoms at room temperature in the β phase, and the ordered position of atoms at 700°C, with 25 - 28% tin. The investigation under review deals with copper alloys with 25.5%, 27.5% and 30.5% tin. The samples are monocrystals which are investigated immediately after annealing at 700°C. In addition, a general investigation was made of the copper alloys with 32.6% tin, and the alloy with 27.8% tin was investigated with regard to the eutectic transformation at

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350 and 400°C. An alloy with 25.5% tin was used to investigate the phase transformation $\beta \rightarrow \beta + \alpha$ at 550°C. Investigation methods applied were the diffraction of X-rays in monocrystals, the crystal vibration and the monochromatic emission of molybdenum. The results are explained on the strength of roentgenograms and Laue diagrams. Picture (Fig 1) shows the beginning of separation of the γ phase in the alloy with 25.5% tin. Also the decomposition of the β phase in the alloy with 30.5% tin is dealt with. In these investigations, the phase transformations are inferred from the location of the diffraction maxima. For example, the diffraction pictures (Figs 2 and 4) of the alloy with 27.8% tin, taken at various time intervals after the thermal treatment, are shown, and the progressive phase transformation is investigated thereon. The eutectic transformation is investigated in the same way and described with a number of pictures. There are 7 figures and 13 references, 6 of which are Soviet.

Investigation of the Phase Transformations in Copper - Tin Alloys SOV/48-23-5-23/31

ASSOCIATION: Kafedra fiziki tverdogo tela Fizicheskogo fakul'teta Moskovskogo gos. universiteta im. M. V. Lomonosova (Chair of the Physics of Solids of the Physics Department of the Moscow State University imeni M. V. Lomonosov)

Card 3/3

ZAKHAROVA, M. I.

27

PHASE I BOOK EXPLOITATION SOV/5457

Nauchno-tekhnicheskoye obshchestvo mashinostroitel'noy promyshlennosti. Sektsiya metallovedeniya i termicheskoy obrabotki metallov.

Metallovedeniye i termicheskaya obrabotka metallov; trudy Sektsii metallovedeniya i termicheskoy obrabotki metallov (Physical Metallurgy and Heat Treatment of Metals; Transactions of the Section of Physical Metallurgy and Heat Treatment of Metals) no. 2. Moscow, Mashgiz, 1960. 242 p. 6,000 copies printed.

Sponsoring Agency: Nauchno-tekhnicheskoye obshchestvo mashinostroitel'noy promyshlennosti. Tsentral'noye pravleniye.

Editorial Board: G. I. Pogodin-Alekseyev, Yu. A. Geller, A. G. Rakhshtadt, and G. K. Shreyber; Ed. of Publishing House: I. I. Lesnichenko; Tech. Ed.: B. I. Model'; Managing Ed. for Literature on Metalworking and Machine-Tool Making: V. I. Mitin.

PURPOSE: This collection of articles is intended for metallurgists, mechanical engineers, and scientific research workers.

COVERAGE: The collection contains articles describing results of research conducted by members of NTO (Scientific Technical Society) of the machine-building industry in the field of physical metallurgy, and in the heat treatment of steel, cast iron, and nonferrous metals and alloys. No personalities are mentioned. Most of articles are accompanied by Soviet and non-Soviet references and contain conclusions drawn from investigations.

TABLE OF CONTENTS:

ZAKHAROVA, M. I., VAN CHYA-FOY

~~X~~3. Investigation of the Matrix Structure During the Ageing Process in High Manganese Steel and Aluminium Zinc Alloys."

Moscow State Univ., Faculty of Physics, Moscow, USSR.

paper submitted for 5th Gen. Assembly, Symposium on Lattice Defects, Intl. Union of Crystallography, Cambridge U.K. Aug 1960.

ZAKHAROVA, M.I., doktor fiz.-mat.nauk, prof.

Conditions for the formation of the sigma phase in alloys. Trudy Sek.metalloved.i term.obr.met.NTO mash.prom. no.2:39-51 '60. (MIRA 14:4)

(Alloys—Metallography) (Phase rule and equilibrium)

ZAKHAROVA, M.I., doktor fiz.-mat.nauk, prof.

Structural transformations in highly coercive alloys. Trudy Sek. metalloved.i term.ob. .met.NTO mash.prom. no.2:52-58 '60. (MIRA 14:4)

(Alloys—Magnetic properties) (Phase rule and equilibrium)

S/180/60/000/005/020/033
E111/E135

AUTHORS: Van Khua-Fou, and Zakharova, M.I. (Moscow)

TITLE: Investigation of Substructure in the Decomposition of the γ-Solid Solution in Manganese Steels

PERIODICAL: Izvestiya Akademii nauk SSSR, Otdeleniye tekhnicheskikh nauk, Metallurgiya i toplivo, 1960, No. 5, pp 167-170

TEXT: The authors describe their investigation of γ-solid solution structure changes in steels with 1.77 and 12% Mn and 2 and 1.2% C, respectively, after holding at 750 °C. X-ray analysis of polycrystals and stationary single crystals with mixed Mo and Fe radiation was used, supplemented by magnetic measurements. Single crystals were prepared by recrystallization after 5% extension. Heating of specimens for recrystallization, hardening and prolonged tempering was effected in evacuated quartz capillaries; salt baths were used for tempering for a few seconds. Fig.1 shows patterns from the low-Mn (top) and high-Mn steels after various heat treatments. The work showed that in the initial stage of ageing at 750 °C redistribution of dissolved components of carbon and manganese takes place. In the low-

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S/180/60/000/005/020/033
E111/E135

Investigation of Substructure in the Decomposition of the γ-Solid Solution in Manganese Steels

manganese steel the austenite in carbon-impoverished regions is converted into martensite on cooling from 750 °C: this produces plastic deformation of unchanged regions of austenite and conversion of a single into a polycrystal. In the high-manganese steel disorientation of matrix blocks occurs in the initial stage of ageing.
There are 2 figures and 4 references: 3 Soviet and 1 in Acta Crystallografica.

SUBMITTED: February 9, 1960

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68626

S/126/60/009/02/013/033
E111/E335

18.7500

AUTHORS: Zakharova, M.I. and Van Khua-fou

TITLE: Investigation of the Decomposition of Super-saturated Solid Solution in Manganese Steel

PERIODICAL: Fizika metallov i metallovedeniye, 1960, Vol 9, Nr 2, pp 236 - 242 (USSR)

ABSTRACT: The authors point out that in spite of much work the role of individual factors in alloy hardening is not clear. They report their investigation of the decomposition of super-saturated solid solution in a 12% Mn, 1.2% C steel after isothermal tempering at 750 °C. Its structure above 950 °C consists of austenite, which decomposes on lowering the temperature to 750 °C, precipitating carbides. 1-mm thick rolled plates were used. X-ray investigations showed that by quenching from 1 100 °C an austenite structure is obtained but tempering at 750 °C for 12 minutes gives rise to diffuse lines of carbides, further carbide lines appearing on prolonging tempering. At 750 °C, however, these remain weak. The Curie point of carbide in the steel rises from -90 to -70 °C when tempering time is increased from 1/2 to 3 hrs: the authors attribute this to

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S/126/60/009/02/013/033
E111/E335

Investigation of the Decomposition of Super-saturated Solid Solution in Manganese Steel

manganese-atom movement in the austenite lattice. For studying in detail structural changes in the first stage of decomposition X-ray diffraction with mixed and monochromatic radiation was used on single crystals (prepared by recrystallization of 5% elongated specimens) at 1 100 °C in evacuated quartz tubes. A special holder fixed the crystal to the goniometric head. Figure 1 shows the diffraction pattern from a hardened single crystal; Figures 2-4 those from single crystals tempered at 750 °C for 2, 20 and 180 min, respectively. Figure 5 shows individual regions of a series of patterns obtained when the crystal tempered at 750 °C for 2 min was rotated through 1.5 - 3.0° up to 25°. Some of the patterns include small bow-shaped lines and the authors discuss these in terms of the reciprocal lattice (Figures 6, 7). On the basis of their analysis of the

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S/126/60/009/02/013/033
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Investigation of the Decomposition of Super-saturated Solid Solution in Manganese Steel

geometry of diffraction patterns they consider nucleation and block effects: disorientation of blocks of the initial solid solution does not increase continuously with increasing size of crystals of the precipitating phase but decreases after reaching a maximum. There are 7 figures.

ASSOCIATION: Moskovskiy gosudarstvennyy universitet imeni M.V. Lomonosova (Moscow State University imeni M.V. Lomonosov)

SUBMITTED: July 22, 1959

Card 3/3

ZAKHAROVA, M.I.

S/126/60/010/01/008/019
E111/E335

AUTHORS: Zakharova, M.I. and Van Khua-Fou

TITLE: Investigation of Eutectoidal Transformation in Austenitic Steels

PERIODICAL: Fizika metallov i metallovedeniye, 1960, Vol.10, No. 1, pp 70 - 74

TEXT: The authors maintain that in spite of the numerous investigations of the eutectoidal transformation its initial stages need further study. They report their work on the transformation in a steel with 12% Mn and 1.2% C and one with 1.77% Mn and 2% C, using X-ray analysis of poly- and single crystals. For the 12% Mn steel the investigation was carried out after tempering at 670 °C. The authors discuss the patterns obtained and calculate stresses, crystal size and lattice deformations. Fig. 1 shows the pattern from a single crystal after hardening and tempering for 3 minutes; Figs. 2 and 3 after tempering for 14 and 40 minutes, respectively. A conclusion from the results is that the sequence of alpha-phase liberation is different at the same temperature in a

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S/126/60/010/01/008/019
E111/E335

Investigation of Eutectoidal Transformation in Austenitic Steels

polycrystal and a single crystal; after carbide liberation in the former, before it in the latter. The 1.77% Mn steel was investigated after tempering for different times at 700 °C and at 500 °C on polycrystalline specimens. The work shows that in the initial stages redistribution of carbon occurs; for carbon-impoverished areas the martensite point is above room temperature. There are 3 figures and 2 Soviet references.

ASSOCIATION: Moskovskiy gosudarstvennyy universitet im. M.V. Lomonosova (Moscow State University im. M.V. Lomonosov)

SUBMITTED: February 11, 1960

VB

Card 2/2

S/126/60/010/004/009/023
E021/E406

AUTHORS: Zakharova, M.I. and Yeliseyeva, I.I.

TITLE: Study of the Initial Stages of Ageing of Aluminium-Zinc Alloys

PERIODICAL: Fizika metallov i metallovedeniye, 1960, Vol.10, No.4, pp.560-563

TEXT: The ageing of aluminium-zinc alloys of single and polycrystals was investigated by X-ray analysis and by etch figure techniques. The starting materials were AB 000 (AV000) aluminium and 99.8% pure zinc. The single crystals were prepared by slowly cooling melts of the alloy. Fig.1 shows an X-ray photograph of a single crystal of aluminium - 10% zinc alloy after natural ageing. The presence of streaks indicates the formation of areas rich in zinc. Single crystals and coarse grained alloys were also polished electrolytically and chemically etched. Etch figures increased with increase of zinc content from 5 to 15%. After two days ageing at room temperature, the etch-figures were uniformly distributed within the grains. After five days natural ageing in individual crystals of the aluminium-10% zinc alloy, the etch figures were arranged in parallel lines (Fig.2). The uniformity of the etch

S/126/60/010/004/009/023
E021/E406

Study of the Initial Stages of Ageing of Aluminium-Zinc Alloys

figures depended on the orientation of the grains and the time of ageing. After seven months ageing, the etch figures were distributed uniformly in all the grains forming a network with an angle of 70° (Fig.3). After 50 hours ageing at 150°C, spots appear on the Debye rings corresponding to (311) reflections. After 255 hours, the intensity of these spots sharply increases and streaks appear in a radial direction across the Laue maxima. After 320 hours the intensity and angular length sharply decreases (Fig.5). This effect is caused by the reorientation of small volumes of the matrix as a result of differences in the specific volumes of the matrix and the precipitating planes. There are 5 figures and 2 Soviet references.

ASSOCIATION: Moskovskiy gosudarstvennyy universitet imeni M.V.Lomonosova (Moscow State University imeni M.V.Lomonosov)

SUBMITTED: February 11, 1960

Card 2/2

ACC NR: AP7006204 SOURCE CODE: UR/0363/67/003/001/0087/0093

AUTHOR: Prokoshkin, D. A.; Zakharova, M. I.

ORG: Metallurgy Institute im. A. A. Baykov, Academy of Sciences, SSSR (Institut metallurgii Akademii nauk SSSR)

TITLE: Isothermal sections at 600 and 750°C of the molybdenum-titanium-zirconium phase diagram

SOURCE: AN SSSR. Izvestiya. Neorganicheskiye materialy, v. 3, no. 1, 1967, 87-93

TOPIC TAGS: molybdenum alloy, zirconium alloy, titanium alloy, alloy phase diagram

ABSTRACT: On the basis of x-ray and microstructural analyses and measurements of the hardness of alloys after quenching from the equilibrium state at 750 and 600°C, isothermal sections at these two temperatures of the phase diagram of the Mo-Ti-Zr system were constructed. A sizable region of a β solid solution, extending continuously from the Mo-Ti system to the Ti-Zr system and bounded by a region of heterogeneous state of the alloys on the side of the Mo-Zr system, was found in the section at 600°C (see Fig. 1). The region of heterogeneous state of the alloys occupies a small part of the concentration triangle and protrudes toward the titanium corner (see Fig. 1). Unmixing of the β solid solution into two solid solutions occurs at an equiatomic content of Mo in Zr and 61 at. % Ti. Two three-phase regions, $\beta_1 + \beta_2 + \delta$ and $\alpha + \beta_2 + \delta$, exist inside the heterogeneous region. The δ phase extends up to 13 at. % Ti

Card 1/3 UDC: 546-3-19-77-821-831

ACC NR: AP7006204

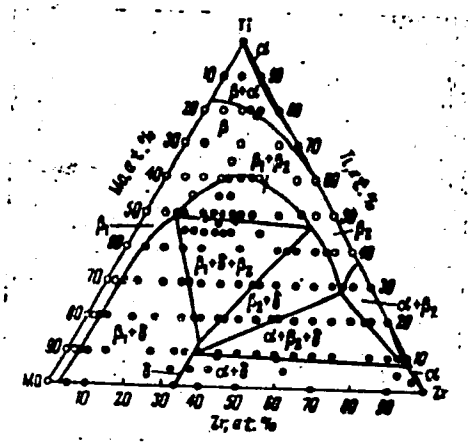

Fig. 1. Isothermal section at 600 °C of the phase diagram of the Mo-Ti-Zr system. ○ - boundary of phase regions based on x-ray diffraction data

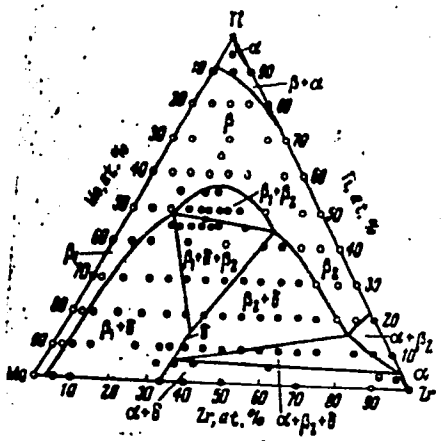

Fig. 2. Isothermal section at 750 °C of the phase diagram of the Mo-Ti-Zr system

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ACC NR: AP7006204

at 33.3 at. % Zr in the ternary system; no appreciable solubility has been noted in this phase. The isothermal section at 750°C (see Fig. 2) is basically no different from the section at 600°C, but the region of the β solid solution increases considerably both at the expense of the heterogeneous region (on the side of the Mo-Zr system) and at the expense of the two-phase α + β regions adjacent to the Ti and Zr corners of the section. Unmixing of the β solid solution takes place at 57 at. % Ti and 19 at. % Zr. At 750°C, the region of the δ phase degenerates into a line (as it does at 600°C) and exists in this section up to 15 at. % at 33.3 at. % Zr. Orig. art. has: 9 figures.

SUB CODE: 007/ SUBM DATE: 09Feb66/ ORIG REF: 004/ OTH REF: 008

Card 3/3

ZHDANOV, German Stepanovich; BELOV, N.V., akad., retsenzent; ARKHAROV, V.I., prof., retsenzent; BELOV, K.P., prof., retsenzent; ZAKHAROVA, M.I., prof., retsenzent; GOL'DENBERG, G.S., red.; GEORGIYEVA, G.I., tekhn. red.

[Solid-state physics] Fizika tverdogo tela. Moskva, Izd-vo Mosk. univ., 1961. 500 p. (MIRA 14:6)
(Solids)

ZAKHAROVA, M.I. (Moskva); PROKOSHKIN, D.A. (Moskva)

Investigating the system niobium - molydenum - chromium.
Izv. AN SSSR. Otd. tekh. nauk. Met. i topl. no.4:59-67
Jl-Ag '61. (MIRA 14:8)
(Niobium-molybdenum-chromium alloys--Metallography)
(Phase rule and equilibrium)

S/180/62/000/006/015/022
E071/E151

AUTHORS: Zakharova, M.I., and Mogarycheva, I.B. (Moscow)

TITLE: Ageing of a copper-tin eutectic alloy

PERIODICAL: Akademiya nauk SSSR. Izvestiya. Otdeleniye tekhnicheskikh nauk. Metallurgiya i toplivo, no.6, 1962, 147-149.

TEXT: An investigation was made of the structure of single crystals of alloys of copper with 27.8 and 25.5 wt.% of tin, together with hardness determinations on polycrystalline specimens (27.8 wt.% Sn) both after hardening and during natural ageing. The microhardness of the polycrystalline specimens increased from 200 to 450 kg/mm^2 during two years of ageing. To elucidate structural changes causing this increase in hardness, three single crystals with 27.8 wt.% Sn and one with 25.5 wt.% Sn were examined after ageing for 40 days, 8 months and 3 years. The single crystals were prepared by a slow crystallisation from the melt followed by a homogenising treatment at 600 °C for 26 hours. Mixed and monochromatic Mo radiation were used for the X-ray studies. The results obtained indicated that during natural

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Ageing of a copper-tin eutectic alloy

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ageing, separation of dispersed crystals of δ-phase and the deformation of the matrix take place. The latter causes work hardening of the alloy and an increase in the microhardness. There are 3 figures.

SUBMITTED: June 13, 1962

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S/659/62/008/000/002/028
I048/I248

AUTHORS: Zakharova, M.I., Mogarycheva, I.B., and Khatanova, N.A.

TITLE: Structure of the matrix during the initial stages of decomposition of the solid solution

SOURCE: Akademiya nauk SSSR. Institut metalurgii, Issledovania po zharoprochnym splavam. v.8. 1962. 27-31

TEXT: X-ray and microscopic examinations of various Al alloys and Mn steel during the initial stages of decomposition show that at 218°C of the Al-1.25% Si solid solution there is a generated stress not relieved by thermal relaxation, and the matrix is subject to plastic deformation. This is exhibited on the X-ray diagram by asterism and fragmentation of the Laue maxima for the solid solution. The same alloy, annealed for 10 minutes at 218°C, shows slip bands under the microscope, and disintegration of monocrystals into smaller structural blocks. Two slip-band systems, intersecting with each other at a 70° angle are observed under certain conditions. Essentially the same microstructure is observed in an Al -

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S/659/62/008/000/002/028
I048/I248

Structure of the matrix during the initial...

10% Zn alloy after natural aging for 7 months, and in steel containing 12% Mn and 1.2%C after annealing for 5 sec. at 670C; electrochemical etching shows that the nature of the microstructure remains unchanged to a considerable depth within the alloy. As all three alloys mentioned have an f.c.c. lattice, the slip plane being (111), it is assumed that the appearance of two slip-band systems intersecting at 70°C is associated with nucleation on the (111) and (1$\bar{1}$1) planes. There are 3 figures.

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S/659/62/008/000/009/028
I048/I248

AUTHORS: Prokoshkin, D.a., and Zakharova, M.I.

TITLE: The isothermal section at 1200°C of the phase diagram for the system niobium-molybdenum-chromium

SOURCE: Akademiya nauk SSSR. Institut metallurgii, Issledovaniya po zharoprochnym splavam. v.8. 1962. 70-74

TEXT: Alloys of the niobium-molybdenum-chromium system were tempered at 1200° and subjected to a series of microstructure, x-ray, and hardness studies; the results are summarized in the form of the isothermal section at 1200°, and of graphs showing the variations in the lattice parameters of the various phases as a function of the Cr content. The solubility of chromium in niobium at 1200° is 11% (all percentages given are atomic), that of Nb in

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The isothermal section....

Cr is 2%. In the binary Mo-Cr system, all alloys containing 10-15% Mo consist of a single phase with a b.c.c. lattice. In the ternary system Nb-Mo-Cr, all alloys containing above 50% Mo are composed of a single phase with a b.c.c. lattice, designated as the $\alpha(\beta)$ phase. Another single phase with a narrow range of homogeneity is confined within the points 62-68% Cr on the 0% Mo line and 11% Mo on the 61% Cr line; the structure of the phase corresponds to that of the intermetallic compound $NbCr_2$, and it is designated as the phase. The α and β phases exist in the Nb-rich and the Cr-rich corners of the isothermal section, respectively. There are three two-phase and one three-phase regions: $\alpha+\beta$, $\alpha+\delta$, $\beta+\delta$, and $\alpha+\beta+\delta$. There are 4 figures.

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S/126/62/014/004/012/017
E193/E383

AUTHORS: Zakharova, M.I. and Amosov, Ye.M.

TITLE: A study of the transformation of the β-phase in the copper-beryllium system

PERIODICAL: Fizika metallov i metallovedeniye, v. 14, no. 4, 1962, 559 - 563

TEXT: The object of the present investigation was to study solid-state transformations in the 9.34% beryllium-copper alloy by X-ray and metallographic analysis. Both polycrystalline and single-crystal specimens were used. The results are summarized below. 1) The β-phase, stable at 855 - 890 °C, could not be retained by quenching. Polycrystalline specimens, held at 870 °C for 5 hours and water-quenched, consisted of the γ-phase with a lattice parameter of 2.718 Å. On subsequent ageing at 500 °C the α-phase was formed, the intensity of the X-ray lines produced by this phase increasing as the ageing time increased from 3 min to 7 hours. Examination of microsections revealed that the α-phase particles were formed first at the grain boundaries; after 1-hour ageing at 500 °C the α-phase precipitates could be

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A study of S/126/62/014/004/012/017
E193/E383

observed in the interior of the grains along the slip lines formed as a result of plastic deformation caused by quenching stresses. 2) Single-crystal specimens, prepared by slow (10 °C/h) cooling of the melt in the crucible and quenched (with the crucible) on reaching 870 °C, had a structure which depended on the rate of cooling during quenching. Specimens quenched in porcelain crucibles consisted of the γ-phase; those quenched in a graphite crucible constituted single crystals of a metastable phase with a face-centred cubic lattice; air-cooling of a single crystal produced by the pulling-out technique resulted in the γ-phase, in which the process of precipitation of the α-phase had begun. 3) Slip on the (110) and (112) planes took place in water-quenched, single-crystal specimens; This was accompanied by the formation of atom aggregates with destroyed periodicity which, on subsequent ageing, became crystals of the α-phase, oriented in accordance with the principle of structural conformity. There are 7 figures.

ASSOCIATION: Moskovskiy gosudarstvennyy universitet im. M.V. Lomonosova (Moscow State University im.M.V.Lomonosov)

SUBMITTED: April 13, 1962

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35595
S/048/62/026/003/003/015
B139/B104

18.1210

AUTHORS: Zakharova, M. I., and Khatanova, N. A.

TITLE: Investigation of the structure of solid solutions dependent on crystallization conditions and heat treatment

PERIODICAL: Akademiya nauk SSSR. Izvestiya. Seriya fizicheskaya, v. 26, no. 3, 1962, 345 - 348

TEXT: The change in the block structure of the matrices with phase transformations of Al-Si and Al-Cu alloys was investigated. After being hardened at 550°C, single crystals of an alloy of Al with 1.2% Si were tempered at 218°C. The lattice constant changed from 4.0380 to 4.0386 A after 10 minutes; and the block boundaries were clearly discernible after 20 minutes. The angle of disorientation of the blocks was measured by an X-ray reflection method. Single crystal plates with an area of 1 - 2 cm^2 were grown in air in a furnace with a temperature gradient of 10 degree·cm^{-1}. The alloy had a dendrite structure immediately after crystallization. Most of the crystals were not ideal and composed of relatively few blocks. After 2 min annealing at 280°C the maxima halve,

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Investigation of the structure...

showing that the blocks are disorientated by 4'. The disorientation after 5 min is 6'. After an annealing at 280°C for 10 min the blocks turn, and after 20 min the orientation of the blocks in a crystal increases. Consequently, the formation of the second phase from a solid solution of Si in Al causes a disorientation of the blocks. The structural changes are irreversible. Al alloys with 4 per cent by volume of Cu have a band structure under the same crystallization conditions, and the crystals consist of a multitude of minute blocks. After 20 min annealing at 218°C the distance between some of the reflected maxima increases, while another group of maxima remains unchanged. After annealing times of 30 - 60 min the samples again show the same picture as immediately after quenching. Consequently, after the coherent bond between the newly formed material and the matrix has broken, the disorientated blocks return to their initial position. However, this elastic disorientation has a local nature and covers the total crystal volume non-uniformly. The degree of inhomogeneity is determined by the substructure of the initial crystal of the solid solution. There are 6 figures and 4 references: 3 Soviet and 1 non-Soviet. The reference to the English-language publication reads as follows: A. Guinier, J. Tennevin, Acta crystallogr. 2, 133 (1949).

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Investigation of the structure... S/048/62/026/003/003/015
B139/B104

ASSOCIATION: Moskovskiy gos. universitet im. M. V. Lomonosova (Moscow State University imeni M. V. Lomonosov)

Card 3/3

ZAKHAROVA, M.I.; MOGARYCHEVA, I.B.

Changes in the structure of γ-phase crystals in the Cu - Sn system during the process of natural aging. Fiz.met.i metalloved. 15 no.4:538-543 Ap '63. (MIRA 16:6)

1. Moskovskiy gosudarstvennyy universitet.
(Copper-tin alloys--Metallography)

ZAKHAROVA, M. I. (Moskva); MOGARYCHEVA, I. B. (Moskva)

Aging of eutectoid composition copper-tin alloy. Izv. AN SSSR. Otd. tekh. nauk. Met. i topl. no.6:147-149 N-D '62. (MIRA 16:1)

(Copper-tin alloys--Hardening)
(Phase rule and equilibrium)

ZAKHAROVA, M.I.(Moskva); MELIK-ADAMYAN, V.R.(Moskva)

Investigating the substructure during the decompostition of solid sloutions of zinc in aluminum.. Izv. AN SSSR.Otd.tekh.nauk. Met. i topl. no.5:210-211 S-O '62. (MIRA 15:10)
(Aluminum-zinc alloys—Metallography)

L 9958-65 EWT(m)/EPR/T/EWP(k)/EIP(b) Pt-4/Pad/Ps-4 AS(mp)-2/ASD(m)-3/
ACCESSION NR: AT4046861 ASD(f)-2/AFMDC S/0000/64/000/000/0318/0321
JD/HW/
MLK

AUTHOR: Zakharova, M.I.

TITLE: Variation in the substructure of metals and alloys under thermomechanical treatment

SOURCE: AN SSSR. Nauchnyy sovet po probleme zharoprochnykh splavov. Issledovaniya staley i splavov (Studies on steels and alloys). Moscow, Izd-vo Nauka, 1964, 318-321

TOPIC TAGS: metal structure, alloy structure, metal crystal, alloy crystal, thermomechanical treatment, alloy hardening, zinc, aluminum, plastic deformation, martensitic transformation, nickel alloy

ABSTRACT: Thermomechanical treatment is widely used for improving the properties of metals and alloys, particularly for increasing metal and alloy strength. The present article considers the resulting structural variations for both alloys and pure metals. The changes in crystal orientation may be measured by means of electron microscopes and special X-ray methods, but the best results are obtained by X-ray studies of single [illegible] method. First, a pure metal was investigated. Single [illegible] analysis prior

crystals of [illegible] and after annealing at [illegible]
to deformation; after deformation and after annealing at
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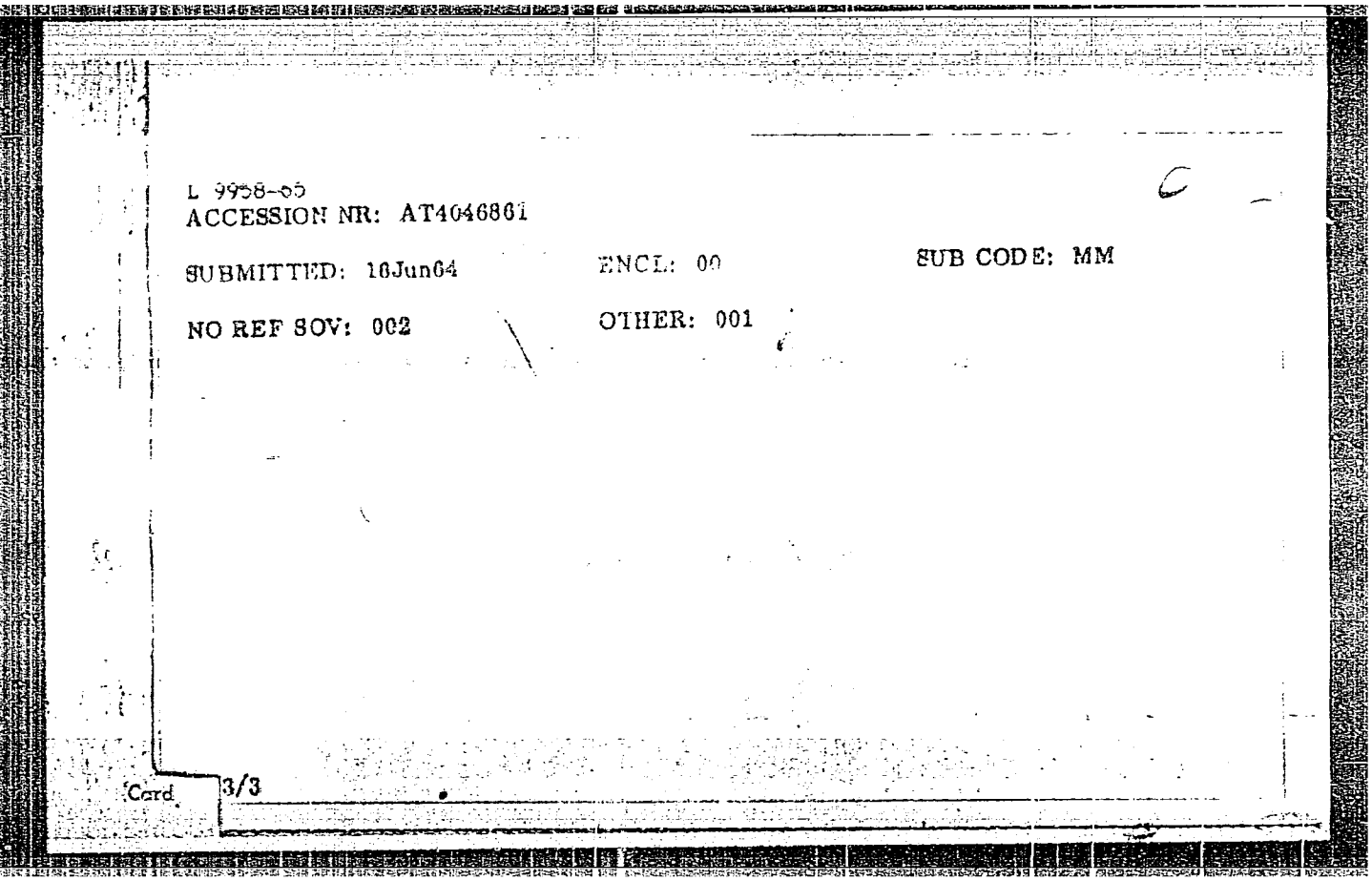
L 9958-65

ACCESSION NR: AT4046861

analysis showed that macro- and micro-blocks were formed after 12% elongation, while redistribution of micro-blocks could be observed after annealing at 450C for 2.5 hours. Only local redistribution occurred after 10 more hours. The tests performed resulted in homogeneous polygonization when the aluminum was stretched 12%; no change was observed after annealing at 630C for 70 hours. Thermomechanical treatment of alloys should lead to even higher hardening than in pure metals due to phase transformations. L.S. Maksimova and I.N. Bogachev showed that high-temperature plastic deformation as well as cold deformation of nickel alloys, leads to an increase in austenitic stability. These authors, as well as L.S. Yershova, did not investigate the structure but they noted that disintegration of the blocks results in stabilization by preliminary plastic deformation. Only direct investigation of the crystal structure of the initial solid solutions will clarify why low plastic deformation of many alloys activates martensitic transformation, while high preliminary deformation stabilizes the initial phase. Consequently, by "building" the structure of the initial solid solution, it is possible to control phase transformations and variation of properties as required. Orig. art. has: 1 figure.

ASSOCIATION: none

Card 2/3



L 9958-65
ACCESSION NR: AT4046861

SUBMITTED: 16Jun64 ENCL: 00 SUB CODE: MM

NO REF SOV: 002 OTHER: 001

Card 3/3

BR

ACCESSION NR: AP4039253 S/0032/64/030/006/0721/0724

AUTHORS: Zakharova, M. I.; Khatanova, N. A.

TITLE: Investigation of the substructure of single crystals by the x ray focusing method

SOURCE: Zavodskaya laboratoriya, v. 30, no. 6, 1964, 721-724

TOPIC TAGS: crystal substructure, x ray focusing, microblock, macroblock, goniometric measurement, aluminum alloy, angular disorientation, polycrystalline specimen, metal annealing, metal tempering, microscope UMV 100

ABSTRACT: The authors used the method of A. Guinier and I. Tennevin (Acta Crystal, 2, 133, 1949) to study the disorientation of a specimen of alloy during thermal or mechanical treatment. They measured the angular disorientation of a block to an accuracy of 10 seconds. The specimens they used had cross sections of the order of 1-2 cm^2. The thickness was determined by the atomic number of the alloy-forming element. For Al this is 1-2 mm. Goniometric measurements were made on specimens obtained from originally polycrystalline blocks by sending the latter through gradient furnaces at a speed of 10 mm/sec. The results of experiments on a block

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ACCESSION NR: AP4039253

of monocrystalline solid solution of 4% Cu in Al are given. The angular disorientation of the specimen tempered at 550C was found to be 1°. After annealing at 218C for 24 hours the value increased to 1°24', after 3 days it was 2°20', and after 6 days it was 2°56'. Orig. art. has: 3 figures and 4 formulas.

ASSOCIATION: Moskovskiy gosudarstvennyy universitet im. M. V. Lomonosova (Moscow State University)

SUBMITTED: 00 DATE ACQ: 18Jun64 ENCL: 00

SUB CODE: MM NO REF SOV: 000 OTHER: 001

Card 2/2

L 31853-65 EWT(m)/EPF(n)-2/T/EWP(t)/EWP(b) Pu-4 IJP(c) JD/JG

ACCESSION NR: AP5004276 S/0126/65/019/001/0145/0147

30
B

AUTHOR: Bykov, V. N.; Rudenko, V. A.; Zakharova, M. I.

TITLE: The redistribution of dislocations in a molybdenum single crystal by annealing

SOURCE: Fizika metallov i metallovedeniye, v. 19, no. 1, 1965, 145-147

TOPIC TAGS: dislocation redistribution, subgrain boundary, molybdenum single crystal, vacuum furnace, slip plane, subgrain fragmentation, dislocation rosette, pickling pit, vacuum annealing, lattice defect

ABSTRACT: A study has been made of the redistribution of dislocations and the formation of subgrain boundaries in the process of annealing a sample of monocrystalline molybdenum produced by electron-beam smelting. The groups of dislocations are usually arranged in the form of a dislocation "rosette," under the influence of concentrated local plastic deformations. In cast metals, local plastic deformation can be produced by the presence of submicroscopic pores which develop during the metal-cooling period. Annealing of the mentioned samples at temperatures of 1,500 and 2,000C results in a redistribution of the dislocations. Some of the latter shift to the boundaries of the subgrains and are absorbed by them. Others

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ACCESSION NR: AP5004276

contribute to the formation of new dislocation boundaries within the subgrains. The interaction between the dislocation grids and walls located in different planes results in the fragmentation of the old subgrains into smaller blocs. The formation of new subgrain boundaries also reveals intermittent and staggered shifts of dislocations. Orig. art. has: 7 photomicrographs.

ASSOCIATION: None

SUBMITTED: 02Apr64 ENCL: 00 SUB CODE: SS

NO REF SOV: 002 OTHER: 001

Card 2/2

ZAKHAROVA, M.I.; TUMAN'YAN, Yu.A.

Determination of the mutual orientation of crystals in solid solutions of Ge in Al and precipitating germanium crystals. Vest. Mosk.un. Ser. 3: Fiz., astron. 20 no.4:50-55 Jl-Ag '65. (MIRA 18:12)

1. Kafedra fiziki kristallov Moskovskogo gosudarstvennogo universiteta. Submitted April 26, 1964.

L 36560-66 EWT(m)/T/ETI/EWP(t) IJP(c) JD/JG

ACC NR: AP6015772 (A,N) SOURCE CODE: UR/0048/66/030/005/0808/0812

AUTHOR: Zakharova, M.I.; Mogarycheva, I.B.; Khatanova, N.A.

ORG: Physics Department, Moscow State University im M.V.Lomonosov (Fizicheskiy fakultet Moskovskogo gosudarstvennogo universiteta)

TITLE: Investigation of the initial stages of decomposition of the solid solution in Al-Cu-Ag and Cu-Be-Ag alloys /Report, Fifth All-Union Conference on Electron Microscopy held in Sumy 6-8 July 1965/

SOURCE: AN SSSR. Izvestiya. Seriya fizicheskaya, v. 30, no. 5, 1966, 808-812

TOPIC TAGS: aluminum base alloy, copper base alloy, solid solution, thermal decomposition, electron microscopy, electron diffraction, x ray diffraction

ABSTRACT: The changes in structure occurring incident to thermal-aging decomposition of the supersaturated solid solutions in Al + 3 % Cu + 7% Ag and Cu + 1.6% Be + 1.9% Ag alloys (the percentages are by weight) were studied by electron microscopy, electron diffraction and x-ray diffraction (single crystals) techniques. Most of the report is devoted to the results obtained for the aluminum-base alloy. The decomposition of the aluminum-base alloy was studied at aging temperatures of 130 and 218°C. The initial stage of decomposition at 130° is the zone stage, which is most clearly evinced after two days of aging. The electron micrographs of the aged alloy disclose spherical zones (diameter about 60 Å) and lamellar Guinier-Preston zones (transverse dimensions of 100

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to 200 Å). The former are enriched in silver; the latter - in copper. The crystallographic and other procedures employed for estimating the zone dimensions are described. A table gives the values of the spherical and Guinier-Preston zone dimensions as estimated from the x-ray diffraction and electron microscopic data for specimens aged for 2 days at 130° and for 30 min, 5 hours and 15 hours at 218°; the agreement is generally satisfactory. The same thing is true of the identified θ' and γ' phases (the phases were identified by plotting the reciprocal lattice and θ'-phase networks). The data for the ternary alloy are compared with the analogous data for the binary Al + 3% Cu alloy, obtained by Hardy and Hill (reference cited in Russian translation) and some significant differences are noted. The decomposition of the solid solution in the Cu + 1.6% Be + 1.9% Ag alloy was studied by similar techniques after 5 min, 30 min, 13 hours, and 30 hours isothermal annealing at 218°. The results for this alloy are given only briefly. The electron diffraction data indicate that after 30 hours annealing the structure of this alloy consists of the matrix, spherical zones, γ' and γ phases and silver crystals. The microhardness is increased from 80 kg/mm^2 after quenching to 200 kg/mm^2 after 30 hours anneal. Several micrographs and diffraction patterns are reproduced in the text. Orig. art. has: 4 figures and 1 table.

SUB CODE: 11, 20/ SUBM DATE: 00/ ORIG REF: 002/ OTH REF: 001

Card 2/2 mlp

L 04291-67 EWT(m)/T/EWP(t)/ETI IJP(c) JH/JD

ACC NR: AP6018945 SOURCE CODE: UR/0126/66/021/006/0868/0872

AUTHORS: Zakharova, M. I.; Tuman'yan, Yu. A. 38

ORG: Moscow State University im. M. V. Lomonosov (Moskovskiy gosuniversitet) B

TITLE: Decomposition of solid solution in Al-Ag-Ge and Al-Cu-Ge alloys

SOURCE: Fizika metallov i metallovedeniye, v. 21, no. 6, 1966, 868-872

TOPIC TAGS: thermal aging, aluminum base alloy, copper containing alloy, germanium containing alloy, silver containing alloy, solid solution decomposition

ABSTRACT: The effect of germanium upon the aging of Al-Ag and Al-Cu alloys has been investigated. Methods employed in the study were x-ray analysis of the rigid monocrystals, oscillation and rotation, and changes in hardness. The alloys were prepared of Al (99.996%), Cu (99.9%), Ag (99.9%), and Ge (99.99%) and had the following compositions: 1) Al--10% (by weight); Ag--2% Ge; 2) Al--4% Cu--0.4% Ge; 3) Al--3% Cu--1%Ge. Decomposition of the solid solution was observed after aging at 20, 100, 130, and 218C. It was established that introduction of 2% (by weight) of Ge in Al--10% Ag alloy almost entirely suppressed formation of Gin'ye-Preston zones during natural aging. Addition of Ge to Al-Cu alloys also has a retarding effect upon the formation of these zones and accelerates the separation of θ-phase at 130 and 218C. Orig. art. has: 4 figures.

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TITLE: A study of the initial stages of phase transitions in an Al-Cu-Ag alloy

SOURCE: Fizika metallov i metallovedeniye, v. 22, no. 1, 1966, 55-57

TOPIC TAGS: electron microscope, alloy phase diagram, aluminum base alloy, solid solution / UEMV electron microscope

ABSTRACT: The aging of the supersaturated solid solution of Cu in Al involves the formation of lamellar Guinier-Preston (G.P.) zones during the pre-segregation stage; the aging of the solid solution of Ag in Al involves the formation of spherical G.P. zones. In this connection the autors investigate the process of the decomposition of an Al-3 wt.% Cu-7 wt.% Ag alloy by analyzing anomalous effects on the roentgenograms of immobile monocrystals and by performing an electronmicroscopic analysis of thin foils following their aging at 130 and 218°C. Findings: the investigated specimens contain both lamellar and spherical G. P. zones. Following 30 min of aging at 218°C the photographs made with the aid of an UEMV-100 electron

UDC: 669.715:620.181.5:620.183.48:620.183.4

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