L 32051-66

ACC NR: AP6013344

by compounds having the same univalent cation (Ag or Cu). In conclusion, the authors thank A. Ye. Voytsekhovskiy for assistance in performing the thermographic analysis. Orig. art. has: 8 figures and 1 table.

SUB CODE: 11 / SUBM DATE: 18Aug65 / ORIG REF: 002 / OTH REF: 004

Card 2/2

L 32056-66 EWT(m)/T/EWP(t)/ETI IJP(c) RDW/JD/JG

ACC NR: AP6013354 SOURCE CODE: UR/0363/66/002/004/0770/0771

AUTHOR: Palatnik, L. S.; Belova, Ye. K.

ORG: Polytechnic Institute im. V. L. Lenin, Khar'kov (Politekhnicheskiy institut)

B

TITLE: Study of the Ga-Se phase diagram

SOURCE: AN SSSR. Izvestiya. Neorganicheskiye materialy, v. 2, no. 4, 1966, 770-771

TOPIC TAGS: gallium alloy, selenium alloy, alloy phase diagram

ABSTRACT: The phase composition of Ga-Se alloys was studied in the concentration range of 50—100 at. % Se. Microscopic, x-ray phase, and thermal analyses were employed. The phase diagram obtained (see Fig. 1) shows that in the vicinity of 100% Se the eutectic Ga_2Se_3+Se is formed; its crystallization temperature is 205 ± 10C. At the boundary of the region of homogeneity of Ga_2Se_3 at 60.2 at. % Se, a cation-vacancy ordering takes place (β phase of Ga_2Se_3). This phase was not observed in alloys with over 60.4 at. % Se because such alloys decompose during annealing (~600C). Only the lines of the α phase of Ga_2Se_3 appeared on the x-ray patterns of these alloys. Ga_2Se_3-GaSe alloys (59.76—50 at. % Se) were shown by x-ray data to consist of the two phases Ga_2Se_3 and GaSe. At about 55.4 at. % Se, they form a eutectic whose melting temperature is 780 ± 10C. The authors thank A. Ye. Voytsekhovskiy for recording the thermograms. Orig. art. has: 2 figures.

UDC 546.681+546.23

Card 1/2

L 28858-66 EPF(n)-2/EWT(m)/ETC(f)/EWG(m)/T/EWP(e)/EWP(t)/ETI IJP(c) WH/DS/WW/
ACC NR: AP6010408 JW/JD/JG SOURCE CODE: UR/0126/66/021/003/0409/0413

AUTHOR: Palatnik, L. S.; Pedorov, G. V.; Bogatov, P. M.

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

TITLE: Patterns of evaporation of alloys

SOURCE: Fizika metallov i metallovedeniye, v. 21, no. 3, 1966, 409-413

TOPIC TAGS: evaporation, lead containing alloy, cadmium containing alloy, zinc, bismuth, magnesium, argon, temperature dependence, vapor condensation, vapor pressure

ABSTRACT: The investigation of these patterns in the presence of inert atmospheres is of interest in connection with the research into the processes of the volume condensation of metals. Pb-Bi, Pb-Sb, Zn-Cd, and Mg-Cd alloys were accordingly evaporated in a vacuum apparatus which was evacuated to a pressure of $1 \cdot 10^{-3}$ mm Hg, washed with argon and then evacuated to the specified pressure of argon (0.1-10 mm Hg). The metals were evaporated from alundum crucibles with the aid of tunsten or nichrome heaters. The resulting powdery condensates were investigated by methods of spectral and x-ray phase analysis. For uniform evaporation during spectral analysis the powdery condensate was mixed with graphite powder (1:4); the mixture was evaporated from a cylindrical recess in a graphite electrode. Pb-Sb and Pb-Bi alloys were evaporated at

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UDC: 536.422:669.018

L 28858-66

ACC NR: AP6010408

T_{ev} of from 800 to 1300°C, condensation temperature T_c = 80°C and argon pressure p = =3 mm Hg. Findings: at T_{ev} = 800°C a marked selective evaporation of Sb takes place, since the vapor pressure of Sb is roughly 3.5 times as high as that of Pb. With increasing T_{ev}, however, the Pb content of the condensates increases and for $T_{ev} \geq$ ≥ 1200°C the composition of the condensate is identical with that of the initial alloy. The same pattern of evaporation is observed for alloys of the Pb-Bi system, where also Pb is the less volatile component; in this case too the evaporation rates of the components of the Pb-Bi alloys become equalized when $T_{ev} \geq$ 1200°C. Zn-Cd alloys were evaporated at argon pressure 10 mm Hg, T_c = 80°C and T_{ev} = 400-900°C, and Mg-Cd alloys, at P_{Ar} = 10 mm Hg, T_c = 80°C and T_{ev} = 500-1000°C. In both alloy systems Cd is the more volatile component and thus is the first to evaporate. The vapor pressure of Cd is 13 times higher than that of Zn (at 400°C) and the content of the less volatile component (Zn) increases with increasing T_{ev}. Hence the temperature at which the composition of the condensate is the same as that of the initial alloy can be estimated (by extrapolation) at 1500±100°C for Zn-Cd. By analogy, for Cd-Mg (P_{Cd}/P_{Mg} = = 170) we extrapolate $T_{ev.cond.}$ = 2200±200°C. These experiments give reason to believe that the greater is the difference in the vapor pressures of alloy components the higher is the evaporation temperature of condensate $T_{ev.cond.}$ at which the condensate's composition approaches that of the initial alloy and the evaporation rates of both components become the same. Thus, T_{ev} markedly affects the composition

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ACC NR: AP6010408

of volume condensates. At relatively low T_{ev} of alloys containing components with sharply different vapor pressures, their condensates differ considerably in composition from the initial alloys; as T_{ev} increases, this difference diminishes.

Orig. art. has: 6 figures, 1 table.

SUB CODE: 11, 20/ SUBM DATE: 27Apr65/ ORIG REF: 008/ OTH REF: 001

Card 3/3

L 14855-66 EWT(m)/ETC(f)/EWP(b)/EWP(t)/EWG(m) IJP(c) RDW/JD

ACC NR: AP6001727 SOURCE CODE: UR/0020/65/165/004/0809/0812

AUTHORS: Palatnik, L. S.; Atroshchenko, L. B.; Gal'chinetskiy, L. P.; Koshkin, V. M.

59
B

ORG: Khar'kov Polytechnic Institute im. V. I. Lenin (Kar'kovskiy politekhnicheskiy institut)

TITLE: On the effect of deviation from stoichiometry in the semiconductor In_2Te_3

SOURCE: AN SSSR. Doklady, v. 165, no. 4, 1965, 809-812

TOPIC TAGS: stoichiometry, indium compound, telluride, resistivity, thermoelectric power, hardness, impurity conductivity

ABSTRACT: The authors have studied the deviations from stoichiometry in compounds of the type $A_2^{III}V_3^{VI}$ using In_2Te_3 as an example. The alloys were synthesized by a standard technique in sealed quartz ampoules. From a study of the phase diagram and from the analysis of the resistivity, hardness, and thermoelectric power of the compound it

Card 1/2 UDC: 621.315.592.9:532.739.2:539.219.1:541.412

L 14855-66

ACC NR: AP6001727

is deduced that a solid solution based on the In_2Te_3 compound is a variable-composition phase, the region of existence of which is shifted somewhat from stoichiometric towards an excess of In. The resistivity changes within the single-phase region by less than one order of magnitude. Deviations from stoichiometry do not give rise to impurity conductivity. Various possible crystal-chemical mechanisms of the solution of impurity and super-stoichiometric atoms in compounds of the $A_2^{III}B_3^{VI}$ are discussed. It is concluded that the observed deviation from stoichiometry in In_2Te_3 is connected not with formation of vacancies, as in other semiconductor compounds, but with intrusion of superstoichiometric atoms in the non-ionized state. This report was presented by Academician S. A. Vekshinskiy. Orig. art. has: 2 figures.

SUB CODE: 20/ SUBM DATE: 17Apr65/ ORIG REF: 011/ OTH REF: 005

Card 2/2

PALATNIK, L.S.; GORBAN', N.D.

Study of corrosion processes on samples of varying composition. Fiz.met. i metalloved. 18 no.5:735-739 N '64.

(MIRA 18:4)

1. Khar'kovskiy gosudarstvennyy universitet im. A.M.Gor'kogo i Khar'kovskiy politekhnicheskiy institut im. V.I.Lenina.

SVECHNIKOV, V.N., akademik, otv. red.; PALATNIK, L.S., doktor fiz.-matem. nauk, zam. otv. red.; KOVALENKO, L.D., red.

[Phase transformations in metals and alloys] Fazovye prevrashcheniia v metallakh i splavakh. Kiev, Naukova dumka, 1965. 174 p. (MIRA 18:9)

1. AN Ukr.SSR (for Svechnikov).

L 2728-66 EWT(l)/EWT(m)/EWP(i)/T/EWP(t)/EWP(b)/EWA(h) IJP(c) JD/AT
ACCESSION NR: AP5017176 UR/0139/65/000/003/0048/0052

44,55 44,55 46 43

AUTHOR: Palatnik, L. S.; Sorokin, V. K. 21, 44, 65

TITLE: Preparation of PbTe semiconductor films by the method of variable-composition samples

SOURCE: IVUZ. Fizika, no. 3, 1965, 48-52

TOPIC TAGS: lead compound, telluride, semiconducting film, thermoelectric power, resistivity

ABSTRACT: The method used for the condensation of PbTe was originally proposed by S. A. Vekshinskiy (Novyy metod metallograficheskogo issledovaniya splavov [New Method of Metallographic Investigation of Alloys], Gostekhizdat, 1944). It consists of sublimating the film from PbTe vapor which contains a small amount (1%) of free tellurium. The produced films contained sections with stoichiometric component ratio, sections with variable concentration of the excess Pb and Te, and a linear pn junction. The authors describe the details of the process and the results of measurements of the thermoelectric potential difference and the specific resistivity of the PbTe-Pb films prepared by this method. The resistivity of the films was 40--50 ohm-cm and the differential thermal emf reached 1,000 μv/degC. An important role in the control of the properties is exerted by the adsorption of oxygen during

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ACCESSION NR: AP5017176

the preparation of the semiconducting film. At pressures on the order of 10^{-2} mm Hg and above, the resistivity decreases and the thermal emf increases. In some cases the largest thermal emf is obtained at atmospheric pressure, so that PbTe films can possibly be used for the development of thermoelectric pickups operating at atmospheric pressure. Orig. art. has: 5 figures and 1 table.

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

SUBMITTED: 29Nov63 ENCL: 00 SUB CODE: SS

NR REF SOV: 006 OTHER: 004

Card 2/2

L 1735-66 EWT(l)/EWT(m)/ETC/EWG(m)/T/EWP(t)/EWP(b)/EWA(h)/EWA(c) IJP(c)
JG/AT

ACCESSION NR: AP5016477 UR/0021/65/000/006/0731/0734

AUTHORS: Palatnik, L. S.; Koshkin, V. M.

TITLE: The effect of ordering on the physical properties of multi-component semiconductors

SOURCE: AN UkrRSR. Dopovidi, no. 6, 1965, 731-734

TOPIC TAGS: semiconductor alloy, crystal lattice structure, melting point, forbidden band, solid solution

ABSTRACT: In distorted tetragonal chalcopyrite crystals the sp^3 hybrid states do not give maximum overlap and therefore the bond energy is smaller than in the same crystals with a disordered cubic lattice. This leads in the overwhelmingly covalent crystals which are being considered to an appreciable energy decrease of the crystal and a depression of its melting point. A table comparing $AgB^{III}C_2^{IV}$ (very large distortion) and $CuB^{III}C_2^{IV}$ (small distortion) melting points

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ACCESSION NR: AP5016477

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shows that the melting points of the former are indeed much lower. The table also shows that compounds with considerably lower energy of covalent interaction, resulting from the distortion, have broader forbidden bands than the corresponding compounds with small distortion. The ordering effects should also be observable in other multicomponent systems; they have been observed in alloys and compounds containing stochiometric defects and in certain solid solutions. The authors observed increases in the width of the forbidden zone of annealed alloys of the $CuGaSe_2$ -- Ga_2Se_3 system. It is concluded that experiments confirm that inter-cation ordering in multicomponent diamond-like semiconductors gives rise to appreciable changes of their characteristics. This report was presented by S. I. Pekar. Orig. art. has: 1 table and 1 figure.

44,55

ASSOCIATION: Kharkivs'kyy politekhnichnyy instytut [Khar'kovskiy politekhnicheskiy institut] (Khar'kov Polytechnic Institute); 44,55 N.-d. instytut osnovnoyi khimiyi [N.-i. institut osnovnoy khimii] (Scientific Research Institute of Basic Chemistry)

44,55

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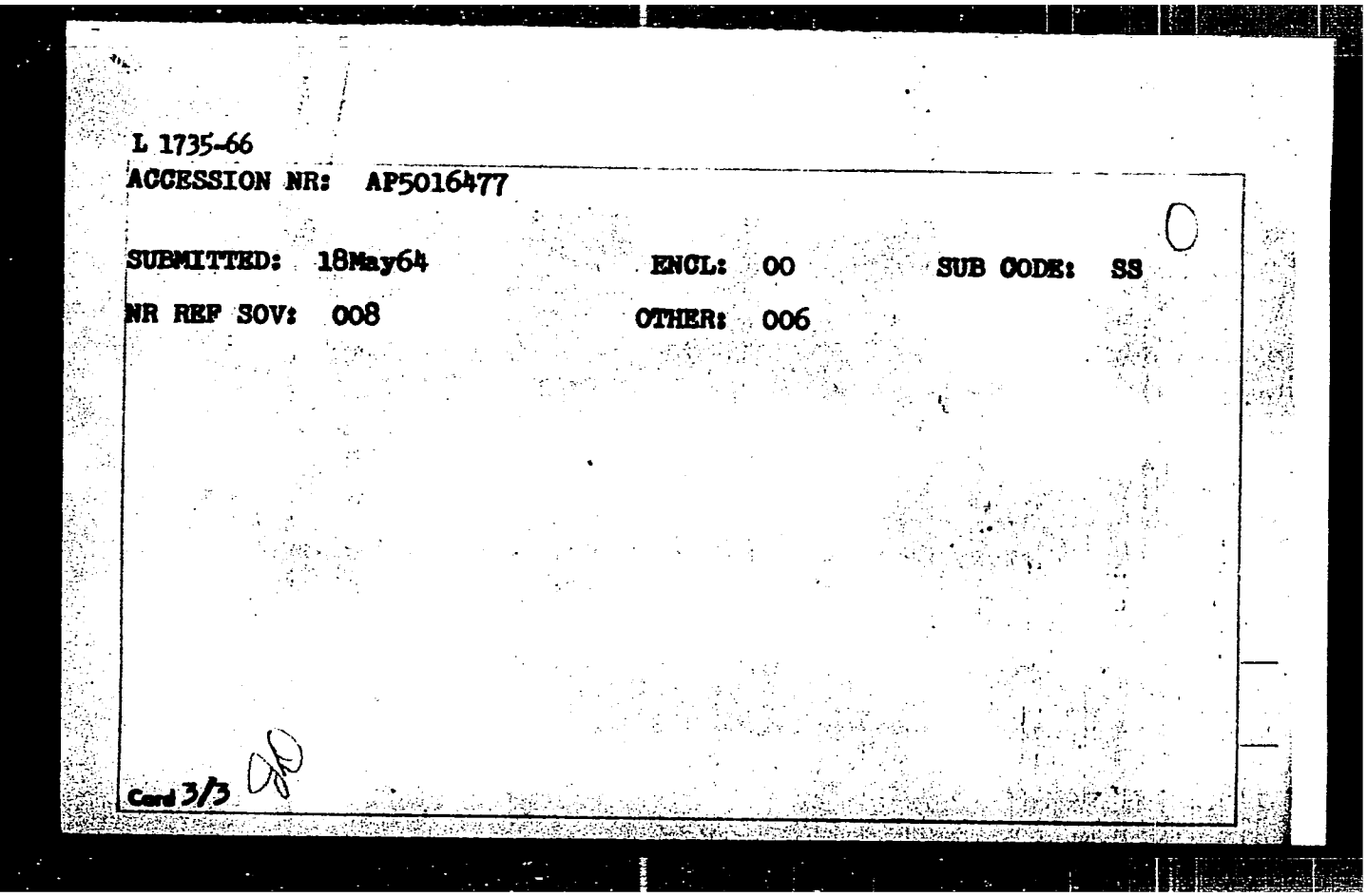

L 1735-66
ACCESSION NR: AP5016477

SUBMITTED: 18May64 ENCL: 00 SUB CODE: SS

NR REF SOV: 008 OTHER: 006

Card 3/3

KOMNIK, Yu.F.; PALATNIK, L.S.

Effect of the structure on the electroconductivity of thin films.
Fiz. tver. tela 7 no.2:533-542 F '65. (MIRA 18:8)

1. Politekhnicheskiy institut imeni Lenina i Fiziko-tekhnicheskiy institut nizkikh temperatur AN UkrSSR, Khar'kov.

L 2291-66 EWT(1)/EWT(m)/EWP(1)/ETC/EWG(m)/T/EWP(t)/EWP(b) IJP(c) RDW/JD/GG

ACCESSION NR: AP5014568 UR/0181/65/007/006/1699/1705

AUTHOR: Palatnik, L. S.; Serokin, V. K.; Lebedeva, M. V.

TITLE: On the influence of the substrate on the structure and properties of PbTe films

SOURCE: Fizika tverdogo tela, v. 7, no. 6, 1965, 1699-1705

TOPIC TAGS: thin film growing, epitaxial growing, lead compound, telluride, single crystal

ABSTRACT: The authors investigate the influence temperature and of the real structure of the surface of a NaCl substrate, used for oriented growing of PbTe single-crystal film, on the structure and the properties of the film. The films were prepared by an epitaxial growth technique on a plate of rock salt fastened to an annular copper strip, across which a temperature drop 50—3500 was produced. The PbTe was evaporated in a vacuum of 5×10^{-4} mm Hg. A series of samples, differing from one another only in the substrate temperature, were tested in a single experiment. The effect of the perfection

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L 2291-66
ACCESSION NR: AP5014568

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of the NaCl surface was also studied. The results indicate that two types of condensation nuclei are produced, one distributed uniformly over the entire surface of the substrate and the other located near the jogs on the relief of the surface. At high temperatures, the crystal layers of PbTe serve as continuations of the jogs of the NaCl, whereas at medium temperatures the crystal formation along the jogs competes with the crystal formation uniformly distributed over the entire surface of the substrate. The competition between these mechanisms, occurring at 180--220C, hinders the oriented growth of the films with large single-crystal fragments and reduces the mobility of the carriers in the film. It is concluded that if the substrates are chosen with a small number of jogs or other defects on the surface, and are protected against moisture, then very good single-crystal films can be grown even at 140--160C. The carrier mobility in such films increases by a factor 2--3, at 140--160C and by 30--50% at 250--300C and reaches the same value as in bulk material at 300C. Orig. art. has: 7 figures and 1 table.

ASSOCIATION: Khar'kovskiy politekhnicheskiy institut im. V. Lenina (Khar'kov polytechnic Institute)

SUBMITTED: 18Dec64 44,55 ENCL: 00 SUB CODE: SS, IC

NR REF SOV: 004 OTHER: 002

Card 2/2 DP

L 00735-66 EWP(e)/EWT(m)/EWP(k)/EWP(t)/EWP(z)/EWP(b) IJP(c) JD

ACCESSION NR: AP5022699 UR/0181/65/007/009/2648/2654

AUTHOR: Palatnik, L. S.; Fedorov, G. V.; Bogatov, P. N. 50 47 B

TITLE: Some characteristics of volume condensation of metals and alloys

SOURCE: Fizika tverdogo tela, v. 7, no. 9, 1965, 2648-2654

TOPIC TAGS: powder metal production, lead, antimony, bismuth, vapor condensation

ABSTRACT: When metal is vaporized in a high vacuum where the mean free path is greater than the dimensions of the vacuum equipment, metal vapor condenses in a solid film on the walls. The mean free path of the metal atoms can be reduced by increasing the density of the residual gas. The metal atoms then gradually lose their excess energy through collisions with atoms of inert gas, and are thrown into Brownian movement. When these atoms are sufficiently concentrated, volume condensation takes place, forming an exceptionally fine metal powder. The process of volume condensation of metal vapor may be divided into two stages: 1) the formation of nucleating centers for condensation; 2) growth of these nuclei in the supersaturated vapor. The second stage of the volume condensation process is quite similar to surface condensation of metals, therefore it may be assumed that the general characteristics of metal condensation on a substrate are also true in vol-

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L 00735-66

ACCESSION NR: AP5022699

ume concentration. The authors study some of the characteristics of volume condensation of pure metals and alloys in an inert gas atmosphere (argon). Volume condensation of lead showed a variation in the shape and size of the particles with temperature. When the condensation temperature was 80°C, the particles are well-defined faceted crystals with dimensions of 200-300 Å. At 140°C, there is a mixture of faceted and spherical particles with sizes of 0.1-0.2 μ. At 240°C, the particles are only spherical and measure 0.3-0.5 μ. X-ray analysis shows that the particles are single crystals at 80° and polycrystalline above 80°. This change in the structure and shape of the particles is explained by a change in the condensation mechanism. The two condensation mechanisms are: vapor → crystal; and vapor → → liquid (→ crystal). Antimony begins to vaporize at a temperature 100-150°C below the melting point. The particles are rhombic in form and their dimensions increase sharply with temperature. These particles are single crystals which indicates that only the first condensation mechanism (vapor → crystal) operates in the case of antimony. Apparently the triple point lies at a very high vapor pressure, which was not reached in these experiments. Volume condensation of Pb-Sb alloys gives a mechanical mixture of particles of the components. Condensation of a Bi-Sb alloy gives two types of particles. Some particles are a solid solution of antimony in bismuth while others are a solid solution of bismuth in antimony. A

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ACCESSION NR: AP5022699

similar situation was observed in the Pb-Bi system. A theoretical explanation is given for the experimental data. Orig. art. has: 7 figures.

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

SUBMITTED: 06Mar65 ENCL: 00 SUB CODE: MM, SS

NO REF SOV: 013 OTHER: 005

Card 3/3

L 00733-66 EWT(m)/EWP(i)/EWP(t)/EWP(b) IJP(c) JD

ACCESSION NR: AP5022738 UR/0181/65/007/009/2850/2852

AUTHOR: Palatnik, L. S.; Gladkikh, N. T.; Naboka, M. N.

TITLE: Zinc sulfide-cadmium sulfide and variable composition zinc-cadmium-sulfur condensed films

SOURCE: Fizika tverdogo tela, v. 7, no. 9, 1965, 2850-2852

TOPIC TAGS: zinc sulfide containing alloy, cadmium sulfide containing alloy, polycrystalline film, semiconducting film, cadmium sulfide, zinc sulfide, ternary alloy, alloy composition, phase composition, alloy phase diagram, cadmium compound, zinc compound, zinc alloy, cadmium alloy, alloy system, thin film, thin film deposition, quasibinary alloy

ABSTRACT: Thin (15—20 μ) sulfide films have been vacuum deposited by simultaneous vaporization of either ZnS and CdS or their components in variable proportions on a frosted glass substrate which had a temperature of 20 or 80—100C. The films were composed of quasibinary ZnS—CdS alloys or ternary Zn—Cd—S alloys of variable composition. Micrographic and x-ray structure analysis of the films and microhardness determinations made it possible to establish the triangular phase diagram of the Zn—Cd—S system and to define clearly the regions of different phase compositions. Five regions were detected, each containing one, two, or three phases.

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L 00733-66

ACCESSION NR: AP5022738

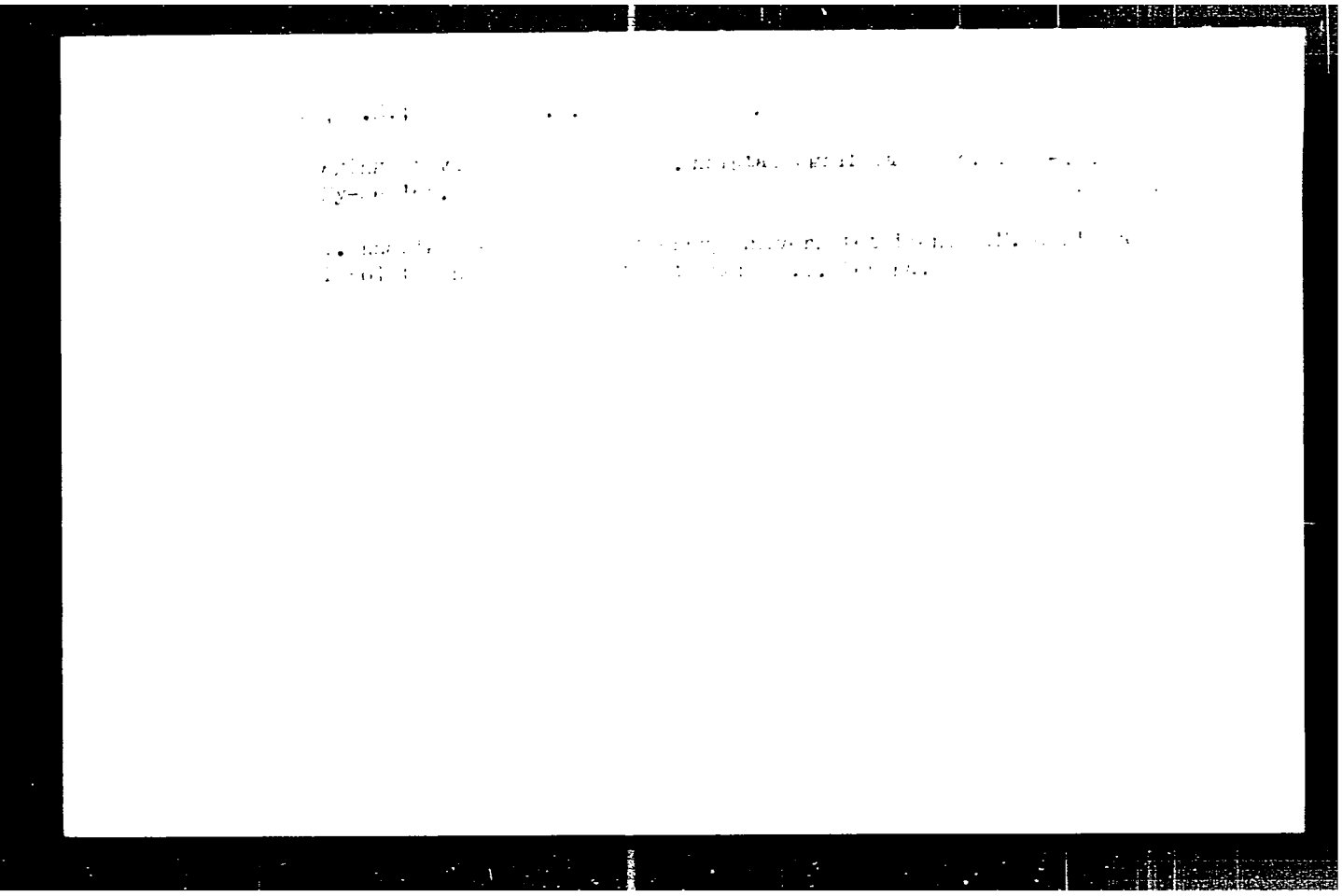
Separation of sulfur crystals was observed in the (S + δ) phase region after aging the films of ternary Zn—Cd—S alloys for two years (δ-phase is a series of ZnS-CdS solid solutions). Sinusoidal cracks observed earlier in CdS films on ordinary glass substrate did not appear in the films on frosted glass substrate. Orig. art. has: 2 figures. [JK]

ASSOCIATION: Politekhnicheskiy institut im. V. I. Lenina, Khar'kov (Khar'kov Polytechnical Institute)

SUBMITTED: 01Apr65 ENCL: 00 SUB CODE: SS

NO REF SOV: 005 OTHER: 001 ATD PRESS: 4086

Card 2/2



PALATNIK, L.S.; RAVLIK, A.G.

Inhomogeneity of the phase structure and composition in condensed cobalt films. Kristallografiia 10 no.3:439-441 My-Je '65. (MIRA 18:7)

1. Khar'kovskiy politekhnicheskiy institut.

L 64786-65 EWA(h)/EWT(1)/EWT(m)/EWG(m)/EWP(b)/T/EWP(t) IJP(c) RDW/AT/JD

ACCESSION NR: AP5018714 UR/0070/65/010/004/0474/0479

AUTHORS: Palatnik, L.S.; Belova, Ye.K.; Atroshchenko, L.V.; Komnik, Yu.F.

TITLE: Investigation of semiconducting alloys of $CuGaSe_2$ and Ga_2Se_3

SOURCE: Kristallografiya, v. 10, no. 4, 1965, 474-479, and insert facing p. 474

TOPIC TAGS: gallium compound, semiconducting material, crystal lattice parameter, crystal lattice structure

ABSTRACT: The structure of alloys in the quasibinary system formed by the tertiary compound $CuGaSe_2$ and by the binary defect compound Ga_2Se_3 is investigated. The alloy synthesis was carried out by melting the initial components in evacuated quartz ampoules. After five hours at 1150C, the alloys were cooled for 15 hours down to room temperature. The x-ray studies were carried out with Debye-

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L 64786-65

ACCESSION NR: AP5018714

Scherrer photographs taken in a 57.3-mm camera and copper radiation. The lattice constants were determined more precisely, silver being used as a standard. The microstructure of the alloys was investigated on an MIM-8M microscope after etching. The microhardness was measured by the standard method (PMT-3 instrument with automatic loading). The following lattice constants were found: $CuGaSe_2$ -- a = 5.603 ± ± 0.003 kX, c = 11.006 ± 0.006 kX, c/a = 1.96; Ga_2Se_3 -- a = 5.411 ± ± 0.001 kX. The $(CuGaSe_2)_{3(1-x)} \cdot (Ga_2Se_3)_{2x}$ alloys with large $CuGaSe_2$ contents were single phase for $x < 0.20$ (crystallizing with the chalcopyrite lattice). With increasing x the tetragonal distortion decreases and the microhardness increases. Microphotographs of samples with $0.235 \leq x \leq 0.428$ show subgrains inside grains. For $0.428 < x < 0.521$ microphotographs of etched sections exhibit a very perfect Wiedmanstatt-type structure resulting from the disintegration of the solid solution; each grain contains platelike oriented regions of the second phase. The mixture of two phases for $0.2 < x \leq 0.52$ was con-

Card 2/4

L 64786-65

ACCESSION NR: AP5018714

firmed by the x-ray analysis: one with a tetragonal and one with a sphalerite cubic lattice. After high-temperature annealing with subsequent fast quenching, alloys with $x < 0.4$ were of a single tetragonal phase, the lattice constants decreasing with increasing x. The alloy with $x = 0.428$ consisted after cooling of a mixture of two phases (tetragonal and cubic). Alloys with $x > 0.521$ are single phase with a sphalerite lattice. In the range $0.52 < x < 0.85$ the dependence of the lattice constant on x is almost linear. X-ray photos of the $CuGa_5Se_8$ ($x = 0.75$) alloy exhibit superstructure lines indicating ordering of the cations and cation vacancies. Similar lines appear in the range $0.521 < x < 0.85$. Studies of the microstructure for $0.70 < x < 0.85$ indicate that homogenization of the alloys requires prolonged annealing. For $0.85 < x < 1$ there appear solid solutions in Ga_2Se_3. Peculiarities observed on the x-ray patterns (sharp and diffuse lines, differences in the lines obtained when the sample was stationary, differences in the lattice parameter calculated from various lines) are noted and explained by the lack of

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L 61786-65

ACCESSION NR: AP5018714

stoichiometry, ordering, and layer defects. The homogeneous regions formed by the defect and nondefect compounds with tetragonal coordination are: 0--20 mole % ($2Ga_2Se_3$), 52--70 mole % ($2Ga_2Se_3$), and 85--100 mole % ($2Ga_2Se_3$). The heterogeneity regions separating the regions of solid solution are $0.20 < x < 0.52$ and $0.70 < x < 0.85$. Orig. art. has: 2 formulas, 1 table, 2 photographs, and 3 figures.

ASSOCIATION: Nauchno-issledovatel'skiy institut osnovnoy khimii (Scientific Research Institute of Basic Chemistry)

SUBMITTED: 01Jul64 ENCL: 00 SUB CODE: SS

NR REF SOV: 009 OTHER: 005

Card 4/4

PALATNIK, L.S.; GORBAN', N.D.

Investigating the corrosion of condensed metallic films in a mixture of air and hydrogen sulfide. Fiz. met. i metalloved. 18 no.2:220-225 Ag '64. (MIRA 18:8)

1. Khar'kovskiy gosudarstvennyy universitet imeni A.M.Gor'kogo.

L 4187-66 EWT(m)/EWP(i)/EWP(t)/EWP(b) IJP(c) JD/HW
ACCESSION NR: AP5016536 UR/0126/65/019/006/0935/0937
669.018

AUTHOR: Palatnik, L. S.; Levchenko, A. A. 55

TITLE: Some characteristics of the electroerosion of binary alloys

SOURCE: Fizika metallov i metallovedeniye, v. 19, no. 6, 1965, 935-937

TOPIC TAGS: electroerosion, platinum alloy, silver alloy, cobalt alloy, copper alloy, iron alloy, metal vapor deposition, metal surface, metal etching

ABSTRACT: The electroerosion of polycrystalline binary alloys of the system Pt-Ag, Co-Cu, and Fe-Cu were studied. The source of spark discharges was an IG-2 generator with a special attachment for producing aperiodic discharges. The results show that electroerosion processes at the cathode have much in common with the phenomenon of cathode sputtering at low pressures. Long treatment of structurally homogeneous (Pt-Ag) and inhomogeneous alloys (Pt-Ag, Co-Cu, Fe-Cu) produced a typical cathodic etching of the surface, which revealed grain boundaries in the single-phase alloys and phase structure in the heterogeneous ones. The results are of interest for elucidating the mechanism by which the electrode material passes

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ACCESSION NR: AP5016536

into the vapor phase and for determining its composition during the spark discharge. This mechanism is different for the anode and cathode: the relatively quiet course of the erosion processes at the anode apparently promotes a selective vaporization of the components; the eruptive erosion at the cathode, however, causes ejection of material whose chemical composition is the same as that of the electrode microvolume attacked by the spark. Orig. art. has: 2 figures.

ASSOCIATION: Khar'kovskiy politekhnicheskiy institut im. V. I. Lenina (Kharkov Polytechnic Institute) 55

SUBMITTED: 16Jun64 ENCL: 00 SUB CODE: MM

NO REF SOV: 003 OTHER: 002

L 62919-65 EWT(m)/EWP(i)/EWA(d)/T/EWP(t)/EWP(z)/EWP(b)/EWA(c) IJP(c)
JD/HW

ACCESSION NR: AP5018859 UR/0126/65/020/001/0103/0110
539.23 : 548.73

AUTHOR: Fuks, M. Ya.; Koz'ma, A. A.; Palatnik, L. S.

TITLE: Investigation of packing defects, dispersion in the range of coherent scattering, and microdeformation in condensed films of permalloy and nickel

SOURCE: Fizika metallov i metallovedeniye, v. 20, no. 1, 1965, 103-110

TOPIC TAGS: crystal lattice defect, material deformation, x ray diffraction, coherent scattering, metal film, statistic analysis, probability

ABSTRACT: A statistical method is presented for approximation of packing defect probability. The method does not require the accuracy of measurement of diffraction lines that the center-of-gravity method requires. Dispersion in the range of coherent scattering, microdeformation, and packing defect probability are studied in relation to condensation conditions and subsequent annealing. Materials tested are permalloy with 50 percent nickel, permalloy with 75 percent nickel, and pure nickel, in the form of condensed films 1-2 microns thick, and in the form of filings. Probability of size packing defects in the films is higher than the probability of de-

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L 62919-65

ACCESSION NR: AP5018859 3

formation packing defects while the reverse is true in the filings. Packing defect probability is greater in permalloy films than in nickel films. Microdeformation and dispersion in the range of coherent scattering are greater in the films than in the filings. Orig. art. has: 3 figures, 3 tables, 12 formulas.

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

SUBMITTED: 04Jun64 ENCL: 00 SUB CODE: MM

NO REF SOV: 008 OTHER: 006

Card 2/2

L 1355-66 EWT(m)/EWP(i)/EWP(t)/EWP(b) IJP(c) JD/EW

ACCESSION NR: AP5021938 UR/0126/65/020/002/0280/0287 56 53 B
539.292; 548.4

AUTHOR: Palatnik, L. S.; Kos'ma, A. A.; Puko, M. Ya.; Filipenko, V. V.

TITLE: X-ray examination of packing defects in vacuum-condensed cobalt films

SOURCE: Fizika metallov i metallovedeniye, v. 20, no. 2, 1965, 280-287

TOPIC TAGS: crystal lattice defect, cobalt, metal film, vaporization, crystal lattice structure

ABSTRACT: Crystal-structure defects in vacuum-condensed Co films are relatively uninvestigated. Yet they are of special interest in view of the presence in Co of a polymorphic transformation with signs of a martensitic nature. Hence, the authors investigated, by means of a X-ray diffractometer, the packing defects, dispersity of regions of coherent scattering, and randomness of distribution of microdeformations in specimens of ~4 μ thick vacuum-evaporated pure (99.95%) cobalt film with different proportions of hexagonal and cubic Co modifications. Deformation-caused packing defects were detected in hexagonal cobalt Co$^{\alpha}$. In the presence of substrate temperature T_s = 240°C their probability is α = 0.037,

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L 1355-66

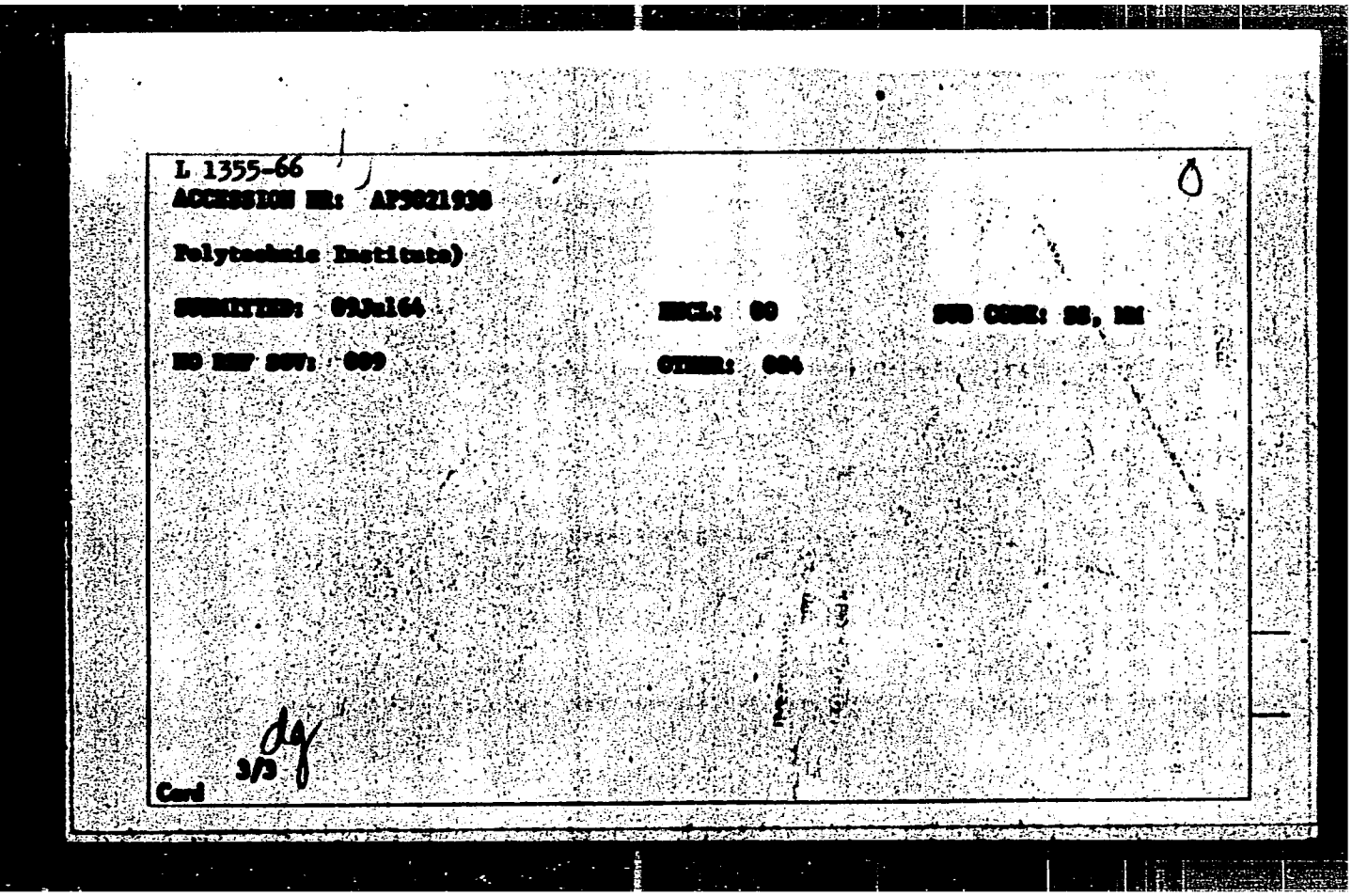
ACCESSION NR: AP5021938

3

whereas at T_g = 475° they were not detected at all. The dependence of the dimensions of regions of coherent scattering (r.c.s.) and magnitude of microdeformations on T_g is nonmonotonic. At T_g = ~ 380°C the r.c.s. decrease and microdeformations increase, which is in agreement with the decrease in the microhardness of the film. The film containing mostly cubic cobalt Co^C displays both types of packing defects at T_g = 240°C. Deformation-caused packing defects are less heat-resistant than growth defects; at 530°C they can no longer be detected, whereas the probability of growth defects persists as far as 610°C, at which temperature two varieties of cubic Co can be detected: one defect-free, forming in the process of heating, and the other with growth defects, forming in the process of condensation. The high probability of packing defects in vacuum-condensed cobalt films as compared with the vacuum-condensed films of other metals is conditioned by the specific nature of polymorphism in cobalt as well as by the low energy of packing defects in this metal. Harmonic analysis of line profile is the most reliable method of determining the probability of packing defects in vacuum-condensed cobalt. Orig. art. has: 3 figures, 3 tables, 4 formulas.

ASSOCIATION: Kher'kovskiy politekhnicheskiy institut im. V. I. Lenina (Kher'kov 44,55

Card 2/3



L 1355-66

ACCESSION NR: AP5021938

Polytechnic Institute)

SUBMITTED: 03Jul64 ENCL: 00 SUB CODE: GE, NM

NO REF SOV: 009 OTHER: 004

Card 3/3

L 4913-66 EWT(m)/EWP(i)/EWP(t)/EWP(z)/EWP(b) IJP(c) JD/HW

ACCESSION NR: AP5025324 UR/0126/65/020/003/0396/0400
621.785.3

AUTHOR: Palatnik, L. S.; Gladkikh, N.T.; Gerlovskaya, L.V.

TITLE: Effect of annealing on structure of vacuum-condensed metals

SOURCE: Fizika metallov i metallovedeniye, v. 20, no. 3, 1965, 396-400

TOPIC TAGS: metal film, vacuum, annealing, porosity, metal vapor deposition

ABSTRACT: Metal films, condensed in a vacuum, have a structure and physico-chemical properties different from these of the annealed massive metals. The Cu, Ag, Ni, and Fe films were condensed in the 5×10^{-5} torr vacuum directly on the clean polished metal base layer, or after coating it with a thin NaCl layer. The film samples were pretreated at various temperatures and then annealed at temperatures $t_a \leq 1060C$ for 0-1200 minutes. The microstructure and microhardness of samples were studied in thin cross sections before and after annealing. The curves of the dependence of the microhardness (H_μ) of condesed metal before and after annealing on the temperature of the base layer (T_b), of the dependence of H_μ on annealing time (τ_a) and temperature (T_a), of the dependence of the total volume of pores

Card 1/3

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(V) and their average size (d) on T_a were plotted only for Cu and Ni, because the changes in properties of Ag and Fe were similar to those of Cu and Ni. An anomalous decrease in the microhardness of Cu was observed at $T_b \approx 1/3\ T_s$ (T_s is a melting point). An annealing of Ni (t_a 1060C, τ_a 0 min.) decreased its microhardness H_μ from 400 to 100 kg./sq.mm. The presence of micropores was observed in vacuum-condensed metals after annealing. The number of pores, their size, and their distribution along the thickness of the condensed layer depended on the temperature of the base layer during condensation. The changes in structure and properties of the vacuum-condensed metals were controlled by their porosity. The following interpretation of the porosity formation is given. The highly dispersed metal layers were formed at $T_b < 1/3\ T_s$ because the condensation passed through an intermediate metastable liquid phase (mechanism: vapor → liquid → crystal). This layer had a very distorted structure: it contained the submicropores of vacancy origin and submicrofractures caused by internal stresses. At $1/3\ T_s < T_b < 2/3\ T_s$, during which the condensation occurred through formation of the crystal phase nuclei and their growth (mechanism: vapor → crystal), the submicropores were formed in the boundary between crystals by the mutual screening. The macroporosity appeared after annealing because of the pore growth and possibly because of the effect of residual gases adsorbed by the film during condensation. Orig. art.

L 4913-66
ACCESSION NR: AP5025324

has: 4 figures and 1 table.

ASSOCIATION: Khar'kovskiy gosuniversitet im. A. M. Gor'kogo (Khar'kov State University); Khar'kovskiy politekhnicheskiy institut im. V. I. Lenina (Khar'kov Polytechnic Institute)

SUBMITTED: 20Oct64 ENCL: 00 SUB CODE: MM, SS

NO REF SOV: 016 OTHER: 000

Card 3/3

PALATNIK, L.S.; GORBAN', N.D.

Study of multicomponent heterogeneous systems by phase mass measurement. Part. 3. Zhur. fiz. khim. 36 no.6:1276-1279 Je'62 (MIRA 17:7)

1. Khar'kovskiy gosudarstvennyy universitet.

ACCESSION NR: AP4000624 S/0126/63/016/004/0567/0573

AUTHORS: Palatnik, L. S.; Tomenko, Yu. S.

TITLE: Problem of the mechanical nature of structural steel temper brittleness

SOURCE: Fizika metallov i metallovedeniye, v. 16, no. 4, 1963, 567-573

TOPIC TAGS: structural steel temper brittleness, structural steel, temper brittleness, structural steel embrittlement, structural steel mechanical property, temperature dependence, subzero temperature, mechanical property, structural steel notch sensitivity, structural steel crack resistance, structural steel crack propagation resistance, notch sensitivity, crack resistance, crack initiation, crack propagation, steel cracking, embrittlement, steel

ABSTRACT: The temper brittleness of 30KhGSA commercial steel quenched in oil from 900C and tempered at 640C for two hours was investigated. One half of the 0.5 m specimen was then cooled in water (ductile steel) and the other in a furnace at 300C, followed by further cooling in air (brittle steel). A detailed study was then made of the temperature-yield point and temperature-rupture strength curves of both the ductile and brittle specimens under notched and unnotched conditions. The results show identical rupture strength for both specimens at

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ACCESSION NR: AT4012869 S/3060/63/000/000/0104/0112

AUTHOR: Palatnik, L. S.; Levchenko, A. A.; Kosevich, V. M.

TITLE: A study of defects in the crystal structure of pure metals caused by a spark discharge

SOURCE: AN SSSR. Tsentr. n.-i. lab. elektr. obrabotki metallov. Elektroiskrovaya obrabotka metallov. Moscow, 1963, 104-112

TOPIC TAGS: crystal structure defect, spark discharge, dislocation density, lattice vacancy, lattice packing, metal crystal structure, electron hole, electrical erosion, bismuth monocrystal, antimony monocrystal, tin monocrystal, gold polycrystal, silver polycrystal, copper polycrystal

ABSTRACT: Rapid heating and cooling of the electrode due to a spark discharge produce a number of defects in the crystal structure of the metal. These are of interest in the study of mechanisms of electrical erosion. In the present paper, the dislocation effects in monocrystals of bismuth, antimony, and tin were studied by selective depth etching and microphotography, while the increase in lattice vacancies and the lattice packing defects in polycrystals of gold, silver, and copper were studied by means of X-ray

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ACCESSION NR: AT4012869

techniques. In the dislocation study, the crystal surface was initially etched, then subjected to a spark discharge, and then etched again at selective depths to expose layers of various dislocation densities. The resulting dislocation density curves for bismuth (anode trace) are shown in Fig. 1 and the corresponding density depth profile is shown in Fig. 2 of the Enclosure. The cathode trace density distribution is shown in Fig. 3 of the Enclosure. Three distinct physical mechanisms present in the electric spark discharge explain the shape of the above density curves. The air shock wave contributes heavily to the creation of dislocations in thin surface layers and is pronounced in the cathode trace (segment nl'p in Fig. 3). The point hardening due to local crystal melting is prominent in the anode trace (segment abc in Curve I of Fig. 1) at the surface. The impulse field of thermal potential is by far the largest contributor to the dislocation effect in volume (segment klm in Fig. 3, segment db'l of curve I and curves III - VII in Fig. 1) and is more pronounced in the anode trace. This is explained by the fact that the time duration of the thermal potential wave in the anode is much longer, due to local melting. The packing and vacancy defects were investigated using 9.99% pure polycrystalline copper, silver, and gold. The changes in lattice parameters after the spark discharge were observed by comparing initial and final X-ray spectra using cobalt radiation with the following standards: silver for gold and copper and iron for silver. The line (420) was used for calculations. The decrease in the lattice parameter "a" after spark discharge

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ACCESSION NR: AT4012869

was found to be related to the vacancy concentration, C, by the formula:

$$C = \frac{a}{a - \sqrt[3]{0.44a}} \quad 100\% \qquad (1)$$

It was found that the parameter "a" decreases due to a spark discharge effect. This decrease was found to be different for different lines, as shown in Fig. 4 of the Enclosure, from which the existence of packing defects in the crystal lattice is evident, since the distances between atoms in various lines can either increase or decrease (decrease for line 331). The concentration of this defect was calculated to be of the order of 1%. The parameter "a" tends to return to its initial value, the return rate being faster when a high-temperature annealing process is used (6 minutes at 300C which fully corresponds to the annealing time for hardened vacancies). The packing defects having higher thermal stability require higher annealing temperatures for $a = a_{420} - a_{331}$ to achieve its normal value (600C for 20 min.). Such unusually high concentrations of vacancies (0.29% to 0.40%) have not previously been observed and are attributed to rapid heating and cooling of metal when subjected to a spark discharge. Orig. art. has: 8 figures, 1 table and 1 formula.

Card 3/9

ACCESSION NR: AT4012869

ASSOCIATION: Tsentr. n.-i. lab. elektr. obrabotka metallov AN SSSR (Central Scientific Research Laboratory for Electrical Metal Finishing AN SSSR)

SUBMITTED: 00 DATE ACQ: 13Feb64 ENCL: 05

SUB CODE: MM NO REF SOV: 007 OTHER: 004

4/0

Card

ACCESSION NR: AP4034922 S/0181/64/006/005/1418/1423

AUTHORS: Palatnik, L. S.; Gladkikh, N. T.; Gerlovskaya, L. V.; Taran, N. M.

TITLE: The mechanism of ionic compound condensation in a vacuum

SOURCE: Fizika tverdogo tela, v. 6, no. 5, 1964, 1418-1423

TOPIC TAGS: condensation, ionic compound, temperature dependence, vacuum, sodium chloride, potassium chloride, potassium bromide

ABSTRACT: The mechanism of condensation in a vacuum was investigated with NaCl, KCl, and KBr. Samples of the vacuum condensates were prepared by evaporation from cylindrical aluminum oxide crucibles and deposition onto backings of polished copper sheets. A temperature drop in the interval 150-600C was produced along a sheet. In all cases a boundary was clearly observed, corresponding to a critical condensation temperature T_k, above which there was no deposition. The dependence of T_k on the condensation rate ω was found to be well described by the expression $\omega = Ae^{-\frac{Q_k}{RT_k}}$, where Q_k is the heat of condensation and A is a constant.

A detailed investigation of the condensate microstructure depending on the

Card 1/2

L 1bl25-65 EPA(s)-2/EWT(m)/EPF(n)-2/EWP(t)/EWP(b) Pt-10/Pu-4 IJP(c)/
AFWL/ASD(a)-5/SSD/ESD(dp)/ESD(t) JD/WW/JG
ACCESSION NR: AP4048394 S/0181/64/006/011/3240/3246

AUTHORS: Kosevich, V. M.; Palatnik, L. S.; Shevchenko, S. I.; Antonova, V. A.

TITLE: Concerning the shape of particles of metallic condensates during the initial growth stages

SOURCE: Fizika tverdogo tela, v. 6, no. 11, 1964, 3240-3246

TOPIC TAGS: condensation, thin film, electron microscopy, bismuth, lead, tin, silver, vapor phase, liquid phase, solid phase

ABSTRACT: The purpose of the investigation was to study the connection between the crystal shape and the evaporation mechanism of metals in which evaporation can proceed either directly from the vapor to the solid phase (V--S) or else with an intermediate liquid phase (V--L--S). The authors have shown earlier (DAN SSSR v. 124, 808, 1959) that bismuth, lead, and tin condensed on an amorphous

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L 10425465
ACCESSION NR: AP4048394

substrate exhibit both mechanisms, depending on the substrate temperature. In the present investigation vacuum condensates of these metals, and also silver, were examined in transmitted radiation with the UEMV-100 electron microscope at an accelerating voltage 75--100 kV and a diaphragm aperture 10 μ. The film thicknesses were ~10--300 Å and the substrate had an appreciable temperature gradient. The procedure was described in FMM v. 15, 3, 1963. Three temperature ranges were investigated: a) $T_{sub} > \frac{2}{3}T_{melt}$, b) $\frac{1}{3}T_{melt} < T_{sub} < \frac{2}{3}T_{melt}$, c) $T_{sub} < \frac{1}{3}T_{melt}$ (T_{sub}, T_{melt} -- substrate and melting temperatures). The most common growth shapes are shown in Fig. 1 of the enclosure. Opinions are expressed concerning the manner in which this growth occurs and concerning the effect of this shape on macrostructure characteristics of the condensed film (such as continuity, surface relief, microdefects, etc.). Orig. art. has: 6 figures.

Card 2/4

L 11425-65
ACCESSION NR: AP4048394

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

SUBMITTED: 04May64 ENCL: 01

SUB CODE: MM, SS NR REF SOV: 012 OTHER: 005

Card 3/4

L 11425-65
ACCESSION NR: AP4048394

ENCLOSURE: 01

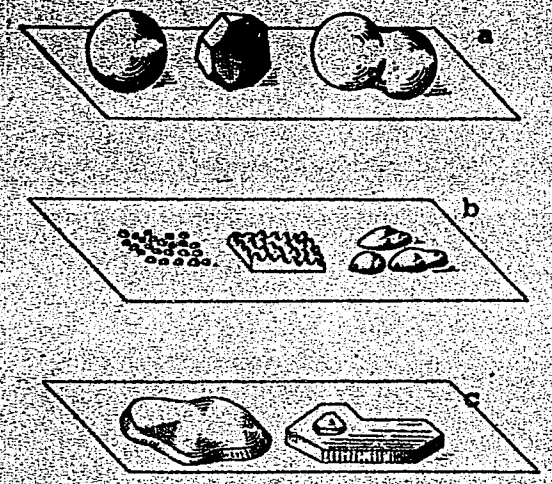


Fig. 1. Typical shapes of vacuum condensate particles.

a - Condensation with intermediate liquid phase.

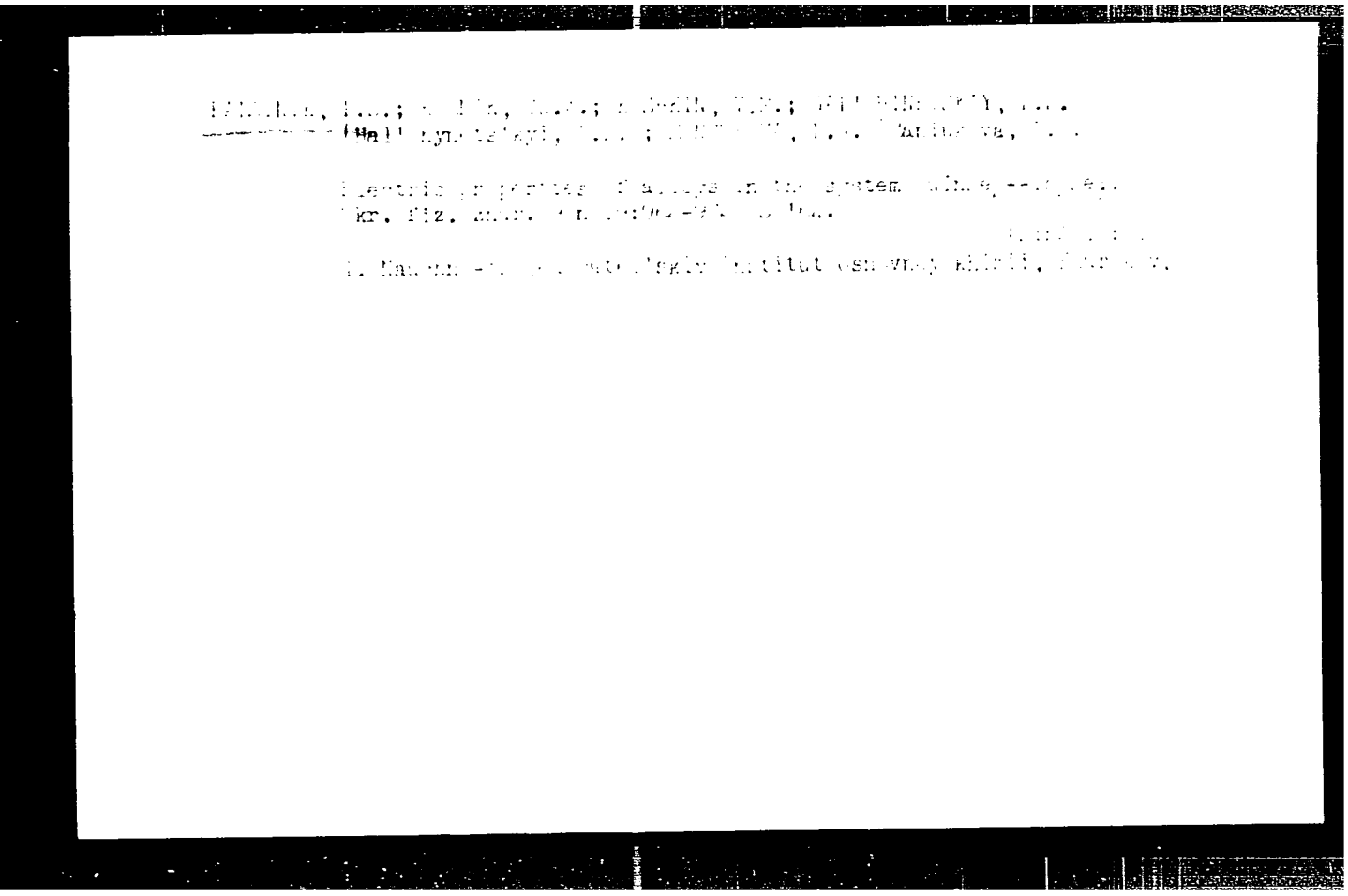
b - Direct crystallization from the vapor phase at different ratios of the melting and substrate temperatures.

Card 4/4

PALATNIK, L.S.; TANANKO, I.A.; BOBRO, Yu.G.; Prinimala uchastiye RODCHENKOVA, Yu.S., inzh.

Nature of the χ-phase in Fe - Al - C alloys. Kristallografiia 9 no.2:209-212 Mr-Ap'64. (MIRA 17:5)

1. Khar'kovskiy politekhnicheskiy institut imeni Lenina.



PALATNIK, L.S.; FEDORENKO, A.I.

Growth of beryllium condensates. Fiz. met. i metalloved. 17
no.6:866-871 Je '64. (MIRA 17:?)

1. Khar'kovskiy politekhnicheskiy institut imeni Lenina.

ACCESSION NR: AP4039600 S/0126/64/017/005/0726/0731

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

TITLE: Electronographic and roentgenographic investigation of substructure of thin nickel and iron films condensed in vacuum

SOURCE: Fizika metallov i metallovedeniye, v. 17, no. 5, 1964, 726-731

TOPIC TAGS: nickel, iron, thin film, vacuum condensation, electronographic analysis, x ray analysis, gold, aluminum, silver, electronograph EG, diffractometer URS 50Im, metal film substructure, elasticity limit

ABSTRACT: Thin nickel and iron films precipitated in vacuum were investigated to compare their structures to those of gold, aluminum, and silver. The samples consisted of metal films 200 Å thick condensed on unheated base plates. These plates were made of glass and of NaCl crystals. Some films were precipitated on thin collodion films. Samples prepared in the above way were analyzed in transient light in the electronograph EG. The x-ray study was performed with a diffractometer URS-50Im. For this purpose, samples consisting of 30 overlying films were prepared.

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ACCESSION NR: AP4039600

The results obtained by these two methods supplemented each other because the x-ray analysis revealed substructural characteristics in the direction perpendicular to the film surface, while the electronographic analysis showed them in the direction parallel to the surface. Average linear size of the block crystals, measured parallel to the surface, was 20-30 Å; it was 80-90 Å in the perpendicular direction. These block crystals had a columnar structure and occurred in a plane-stressed state. The microstress magnitude varied from 200 to 300 $kg \cdot mm^{-2}$. Its origin was explained by the condensation process rather than by the deformation induced during separation of films from their base plates. Large microstresses were regarded as evidence of a high elastic deformation limit in the block crystals. This assumption was sustained by results of a direct load-testing of the film. Orig. art. has: 2 tables, 4 figures, and 1 formula.

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

SUBMITTED: 24Jun63 DATE ACQ: 19Jun64 ENCL: 00

SUB CODE: MM NO REF SOV: 008 OTHER: 001

Card 2/2

L 16453-65 EWP(e)/EPA(s)-2/EWT(m)/EPF(n)-2/EWP(t)/EWP(b) Pt-10/Pu-4/ IJP(c)
WW/JD/JG
ACCESSION NR: AP4042043 S/0126/64/017/006/0866/0871

AUTHOR: Palatnik, L. S.; Fedorenko, A. I.

TITLE: The growth of beryllium condensates

SOURCE: Fizika metallov i metallovedeniye, v. 17, no. 6, 1964, 866-871

TOPIC TAGS: condensation, Fe base, NaCl sublayer, thickness, structure, precipitation, whisker growth, Be

ABSTRACT: The authors investigate the most important parameters of condensation (temperature of the base layer, precipitation rate, thickness) and their effect on the structure of Be films. Topological microanalysis of the film surfaces and X-ray examinations were applied. After evaporation, high-purity Be was deposited on a polished iron base layer with an NaCl sublayer to facilitate the separation of the film from the iron base. Film thickness was 1 to 50 microns. A baselayer temperature of < 300C produced a Be condensate growth according to the mechanism vapor → crystal while at ≥ 300C growth proceeded according to two mechanisms: vapor → crystal and vapor → liquid → crystal. Furthermore, 2 — 8 · 10^3 drops appear on the Be crystals which form near the surface of the condensate. At a rate of

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L 16453-65
ACCESSION NR: AP4042043

precipitation of 2 Å/sec and a base layer temperature of 450 — 700 C whisker growth was observed. At a base layer temperature of > 300C a high-rate development of the condensate surface and thickening occur as a result of the preferred growth of favorable oriented crystals. At base layer temperatures of < 200C, the Be films have a smooth surface until they reach a thickness of several tens of microns as a result of a quasi-amorphous structure. Orig. art. has: 5 figures.

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

SUBMITTED: 26Jun63 ENCL: 00

SUB CODE: MM NO REF SOV: 013 OTHER: 006

Card 2/2

L 16452-65 EWT(m)/EWP(t)/EWP(b) Pad ASD(a)-5 JD/HW

ACCESSION NR: AP4042044 S/0126/64/017/006/0872/0876

AUTHOR: Antonova, V. A.; Kosevich, V. M./ Palatnik, L. S. 21 B

TITLE: The transformation of hexagonal cobalt into cubic cobalt in condensed films

SOURCE: Fizika metallov i metallovedeniye, v. 17, no. 6, 1964, 872-876

TOPIC TAGS: crystal structure, polymorphic transformation, Co film, hexagonal structure, cubic structure, carboncoating

ABSTRACT: The authors investigate the transformation of hexagonal cobalt into cubic cobalt at low temperatures in films having a 15 to 200 Å thickness. They also observed the temperature range within which this transformation occurs as well as its kinetic characteristics. Two types of specimens were employed: free films from which collodion was removed with aceton and films reinforced with a carbon coating. The authors found that in free Co and Co+C films, the temperature of the beginning of transformation within the thickness range of $40 < h < 200$ Å coincides with that of solid specimens. At $20 \leq h < 40$ Å the temperature at which transformation sets in rises by ~40 C. A decrease in the thickness from 90 to 15 Å is accompanied by an increase of ~250 C of the temperature at which the transformation

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L 16452-65

ACCESSION NR: AP4042044

of Co + C is completed. Inner stresses develop because of accumulated dislocations that inhibit the grain boundaries. The magnitude of these stresses grows with diminished grain size. The grain size, in turn, is refined as the film thickness is diminished. In free Co films the transformation retains a martensite character up to the recrystallization point. Above that point, the transformation acquires a diffusive character. In the films condensed from Co + C solid solutions the transformation has a martensite character only until the temperature is reached at which Co + C transformation is completed. The transformation range is wide and increases from 300 to 500 after film thickness is decreased from 200 to 20 Å. The authors explain the laws governing the polymorphic transformation in Co by the dislocation mechanism of that process. Orig. art. has: 2 figures.

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

SUBMITTED: 10Jun63 ENCL: 00

SUB CODE: MM NO REF SOV: 008 OTHER: 006

Card 2/2

ACCESSION NR: AP4042808 S/0126/64/018/001/0069/0072

AUTHOR: Palatnik, L. S.; Fedorenko, A. I.

TITLE: Investigation of vacuum-deposited beryllium films

SOURCE: Fizika metallov i metallovedeniye, v. 18, no. 1, 1964, 69-72

TOPIC TAGS: beryllium film, beryllium film deposition, film deposition rate, film thickness, film cracking, film property, substrate temperature

ABSTRACT: By evaporating 99.987% pure Be in a vacuum of $5 \cdot 10^{-5}$ mm Hg, beryllium films varying in thickness from 0.1 to 50μ were produced at a rate of 0.5, 2, 10, 50, or 140A/sec on a NCL-coated iron substrate, along which a constant temperature gradient from 20 to 200C was maintained. The experiments showed that at all rates of Be deposition on the substrate at a temperature varying from 20 to 120C, films thicker than 0.2—0.3μ crack and curl into narrow strips connected to one another and to the substrate only at spots. Cracking begins at the coldest spot of the substrate (temperature = 20C). With

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ACCESSION NR: AP4042808

continued deposition, cracking extends to the hotter substrate portions (T_p = 100—150C) and, at a film thickness of 1μ, stops at a spot on the substrate with a definite temperature T_δ (between 100 and 150C for the deposition rates investigated), which increases as the deposition rate ω is increased. Thus, at any fixed ω, a critical film thickness h_{cr} corresponds to each $T_p < T_\delta$ above which the film begins to crack. With continued deposition, cracking of films thicker than 2μ extends to hotter portions of the substrate. As a result, the film peels off the substrate in the form of narrow parallel strips 0.5—1 mm wide, at a rate which increases as ω is increased. Beryllium films thicker than 1μ deposited on an iron substrate at $T_p < T_\delta$ are brittle. The cracking and destruction of beryllium films during deposition at $T_p < T_\delta$ was also observed with Be deposition on molybdenum, copper, and other substrates, and cannot be ascribed, therefore, to the difference in the physical properties of Be and the substrate. The experimental data show that destruction of such films should be ascribed to high internal stresses which originate during film growth and result from a high density of defects in the film structure. To obtain strong, dense Be films, substrate temperature T_p should be 20—30C higher than the specific temperature T_δ. Orig. art. has: 4 figures.

Card 2/3

ACCESSION NR: AP4042808

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

SUBMITTED: 28Jun63 ATD PRESS: 3072 ENCL: 00

SUB CODE: MM NO REF SOV: 004 OTHER: 003

Card 3/3

L 13779-65 EWT(m)/EWA(d)/EWP(t)/EPA(bb)-2/EWP(b) IJP(c)/ASD(m)-3/SSD/ASD(a)-5/
AFFC(p) JD/WB
ACCESSION NR: AP4044150 S/0126/64/018/002/0220/0225

AUTHOR: Palatnik, L. S.; Gorban', N. D.

TITLE: Corrosion of vacuum-deposited metallic films in a mixture of air and hydrogen sulfide

SOURCE: Fizika metallov i metallovedeniye, v. 18, no. 2, 1964, 220-225

TOPIC TAGS: vacuum deposited film corrosion, vacuum deposited film, corrosion, copper film corrosion, silver film corrosion, lead film corrosion, cadmium film corrosion, zinc film corrosion, germanium film corrosion, beryllium film corrosion

ABSTRACT: The corrosion kinetics of vacuum-deposited films of Cu, Ag, Pb, Cd, Zn, Cr, Mg, Sn, Fe, Ge, Al, and Be in a mixture of air with 50% hydrogen sulfide has been investigated at 20C and a relative humidity of 50%. The films, 50—60μ thick, were deposited on a glass substrate at 30—40C in a vacuum of $3—5 \cdot 10^{-5}$ mm Hg; the exposure time was 24 days for Cu and 30 days for other metals. No corrosion was detected on Al and Be films. Ge, Fe, Sn, Mg, Cr, Zn, Cd, and Pb underwent

Card 1/2

L 13779-65
ACCESSION NR: AP4044150

an insignificant corrosion, with a weight loss (P, in $g/cm^2 \cdot 10^6$) ranging from 1.32 and 2.02 in Ge and Fe to 15.14 and 27.67 in Cd and Pb, respectively. Since corrosion also had no effect on the surface structure of these metals, they can be classified as resistant against the corrosion described. The time dependence of the corrosion is logarithmic for Ge, Fe, Sn, Mg, and Cr and parabolic for Zn, Cd, and Ag. Ag and Cu showed greatest corrosion with a respective weight loss of 107.45 and 315.23. After the initial 10-min exposure, corrosion of Cu increased linearly with the exposure time. The products of the corrosion of Ag and Cu were sulfides of single valence metals. Orig. art. has: 3 figures, 5 formulas, and 3 tables.

ASSOCIATION: Khar'kovskiy gosuniversitet im. A. M. Gor'kogo (Khar'kov State University)

SUBMITTED: 20Jul63 ATD PRESS: 3131 ENCL: 00

SUB CODE: MM NO REF SOV: 005 OTHER: 000

Card 2/2

L 16316-65 EWT(m)/EWP(w)/EWA(d)/EWP(t)/EWP(b) IJP(c)/ASD(a)-5 JD
ACCESSION NR: AP4046098 S/0126/64/018/003/0461/0464

AUTHOR: Palatnik, L. S.; D'yachenko, S. S.; Il'inskiy, A. I.; Volovik, L. D.

TITLE: An electron microscope study of vacuum deposited copper condensates

SOURCE: Fizika metallov i metallovedeniye, v. 18, no. 3, 1964, 461-464

TOPIC TAGS: vacuum copper condensate, vacuum deposited copper film, vacuum deposited film, copper film, film microhardness, copper film structure

ABSTRACT: Copper films 20—50 μ thick deposited in a 10^{-5} Torr vacuum at a condensation rate of 1 μ/min on a copper substrate having a temperature of 120 to 340C were studied by means of an electron microscope in an attempt to determine factors contributing to their strength. The study revealed that the structure of the film depends on the temperature of the substrate. Films deposited at lower temperatures of substrate had a more dispersed structure and

Card 1/3

L 16316-65
ACCESSION NR: AP4046098

a higher microhardness than those deposited on hotter substrates (see Enclosure). The films deposited on the 120C substrate had a more dispersed structure than foil cold-rolled with 80% reduction. Vacuum condensates deposited at 160C had the same size of crystallites as cold-rolled foils but considerably higher hardness (240 kg/mm^2 versus 125 kg/cm^2). In Leavine films, a finely dispersed structure is observed on the very surface only; the grain size increases toward the substrate. Deeper lying layers have a heterogeneous structure consisting of fine grains mixed with coarse. The surface layer consisting of uniformly dispersed fine grains amounts to 10—20% of the total film thickness of 50 μ obtained at a condensation rate of 0.5—1 μ/min. Orig. art. has: 4 figures and 1 table.

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

SUBMITTED: 30Jul63 ENCL: 01 SUB CODE: MM, SS

NO REF SOV: 004 OTHER: 001

Card 2/3

L 16316-65
ACCESSION NR: AP4046098

ENCLOSURE: 01

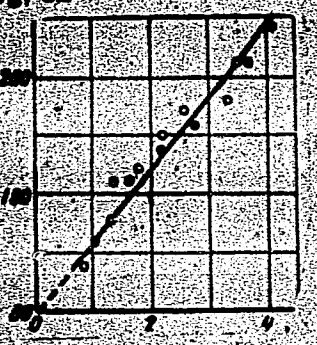

Fig. 1. Dependence of grain size and microhardness on substrate temperature.

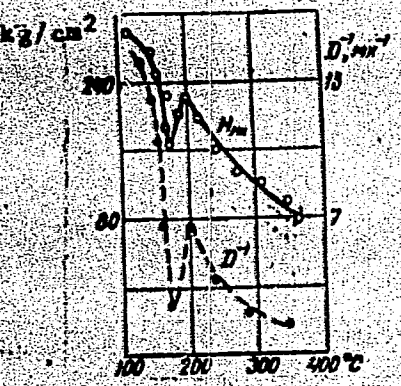

Fig. 2. Dependence of microhardness on grain size.

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L 13852-65 EWT(m)/EWP(t)/EWP(b) Pad IJP(c) JD/BW
ACCESSION NR: AP4048779 S/0126/64/018/004/0632/0634

15
14
B

AUTHOR: Palatnik, L. S.; Ravlik, A. G.; Stetsenko, A. N.

TITLE: On phase composition of vacuum condensates of cobalt

SOURCE: Fizika metallov i metallovedeniye, v. 18, no. 4, 1964, 632-634

TOPIC TAGS: phase composition, cobalt, vacuum cobalt deposition, alpha cobalt, beta cobalt, polymorphic cobalt modification

ABSTRACT: The authors have experimentally investigated the influence of temperature and the nature of the substrate on the phase composition of vacuum deposited cobalt. The substrates (carbon film, condensate of NaCl, or glass) had a measured temperature gradient. The composition of the films was analyzed with the x-ray diffraction method. It was found that of lower temperatures (in the 20 to 200 C range) the α Co is formed (hexagonal closely packed lattice), and at higher temperatures (200 to 450 C)- the β Co is formed (cubic face centered lattice). It is possible that β-phase which is formed at lower temperatures is

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L 43852-65
ACCESSION NR: AP4048779

transformed into α-phase through the action of dislocation centers. This transformation is impeded at higher temperatures. Orig. art. has: 1 figure and 1 table.

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

SUBMITTED: 02Aug63 ENCL: 00 SUB CODE: MM, SS

NR REF SOV: 006 OTHER: 007

Card 2/2

L 55158-65 JD/GG EWI(l)/EWI(m)/T/EWP(t)/EEC(b)-2/EWP(b)/EWA(c) Pi-4 IJP(c)
ACCESSION NR AM5006622 BOOK EXPLOITATION UR/
548.0

Palatnik, Lev Samoylovich; Papirov, Igor' Isaakovich

Oriented crystallization (Orientirovannaya kristallizatsiya), Moscow, Izd-vo "Metallurgiya", 1964, 407 p. illus., biblio. Errata slip inserted. 2,830 copies printed.

TOPIC TAGS: crystal orientation, crystal structure, crystal growth, metal crystallization, ionization, metal, semiconductor device, election microscopy

PURPOSE AND COVERAGE: The book is devoted to problems of oriented crystallization, i. e., epitaxy - the oriented growth of crystalline substances and endotaxy - the oriented selection within crystalline bodies which results from phase transformations. This is the first attempt to make inferences from the large volume of separate materials concerned with the various aspects of oriented crystallization which has accumulated in Soviet and foreign periodical literature. The mechanism of the process of oriented crystallization is considered with the help of both general laws and numerous hypotheses which have been attempted to explain it. Much attention is given to the application of oriented crystallization in the investigation of the structure of crystalline surfaces, in rapid-solving electron microscopy, in the growth of monocrystals, in the preparation of semiconductor

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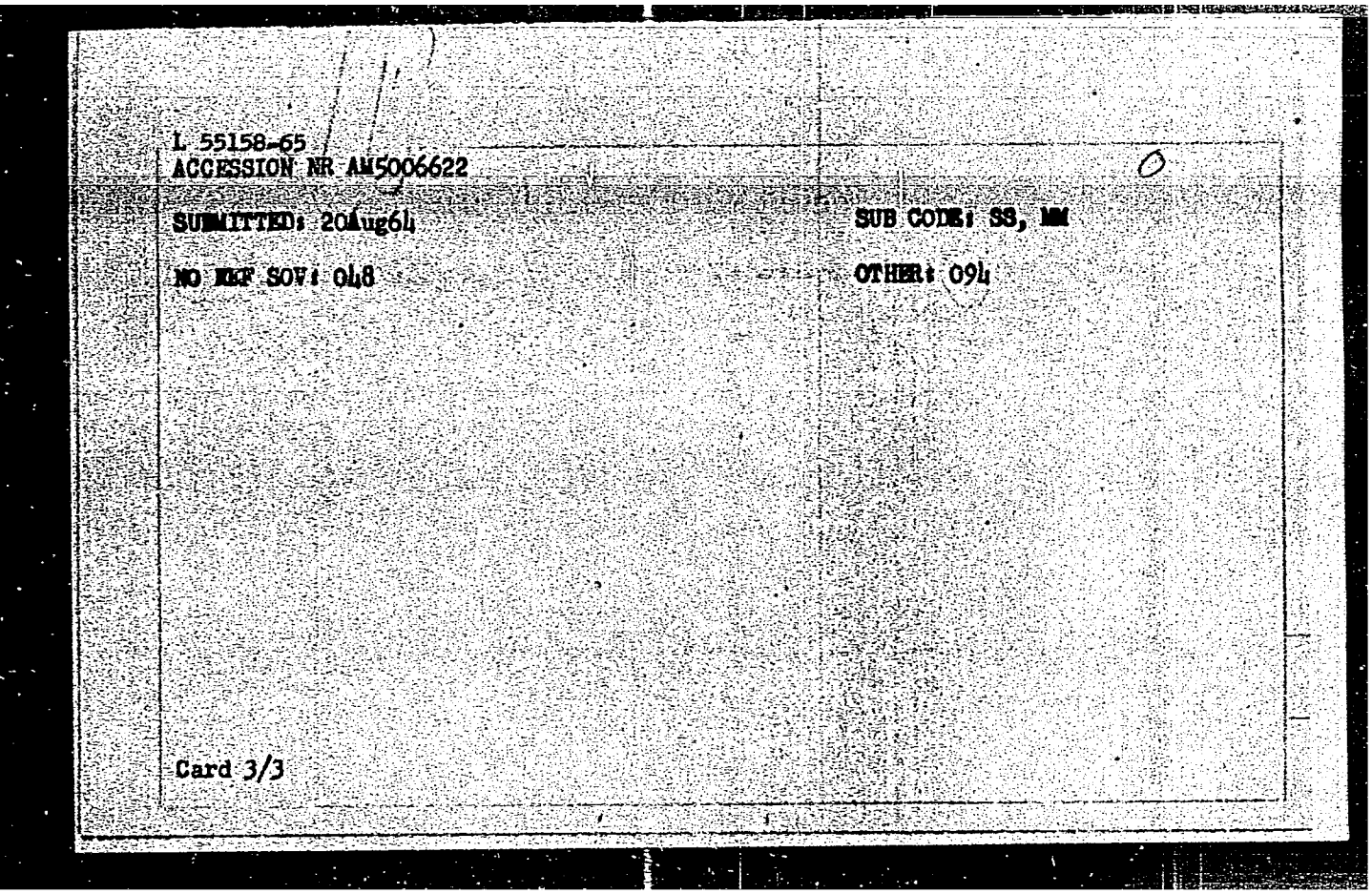
compounds, and in the study of structural changes in metals and alloys. The book is intended for a wide circle of engineers and scientific personnal - metallurgists and physicists concerned with problems of crustallization, the physics of thin plates, electron microscopy and defraction. The book can also be used by students and candidates specializing in the area of solid state physics and the physics and chemistry of surface phenomena.

TABLE OF CONTENTS (abridged):



L 55158-65
ACCESSION NR AM5006622

SUBMITTED: 20Aug64 SUB CODE: SS, MM

NO REF SOV: 048 OTHER: 094

Card 3/3

PALATNIK, L.S.; FEDORENKO, A.I.

Mechanism underlying the formation of textures of growth in beryllium condensates. Fiz. tver. tela 7 no.3:819-822 Mr '65. (MIRA 18:4)

1. Khar'kovskiy politekhnicheskiy institut imeni Lenina.

L 52522-65 EWT(m)/EWP(1)/EWP(t)/EWP(b) LJP(c) JD UR/0181/65/007/004/1105/1109
ACCESSION NR: AP5010719

17
15
B

AUTHOR: Palatnik, L. S.; Gladkikh, N. T.; Naboka, M. N.

TITLE: On the condensation diagram of Bi-Sb alloys

SOURCE: Fizika tverdogo tela, v. 7, no. 4, 1965, 1105-1109

TOPIC TAGS: bismuth compound, alloy condensation, condensation diagram, microhardness, thermal emf, phase composition

ABSTRACT: This investigation is analogous to an earlier study (DAN SSSR v. 140, 1297, 1961) of Cu-Ni alloys, except that the condensation diagram was plotted in a temperature region in which an increase in temperature is accompanied by a change in the condensation mechanism from direct crystallization from the vapor to a crystallization via the liquid phase. The authors measured the microhardness, thermal emf, and phase composition of Bi and Sb condensates with different compositions, prepared by simultaneous evaporation and condensation of the components in vacuum (10^{-5} mm Hg) at substrate temperatures 80, 120, 170, and 220C. The alloy preparation and the measurements are briefly described. The results are illustrated in

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L 52522-65

ACCESSION NR: AP5010719

Fig. 1 of the Enclosure and show that the condensation of alloys of variable composition, whose components have unlimited mutual solubility in the liquid and solid states, is well described by a "cigar-shaped" condensation curve both in the upper temperature interval (substrate temperature approximately 2/3 the melting temperature of the alloy), as in the present experiment with Bi-Sb, and in the lower interval (approximately 1/3 the temperature) as found in the earlier investigation of the Cu-Ni alloy. Orig. art. has: 5 figures.

ASSOCIATION: Khar'kovskiy gosudarstvennyy universitet (Khar'kov State University)

SUBMITTED: 19Oct64 ENCL: 01 SUB CODE: SS

NR REF SOV: 009 OTHER: 000

Card 2/3

L 52522-65

ACCESSION NR: AP5010719

ENCLOSURE: 01

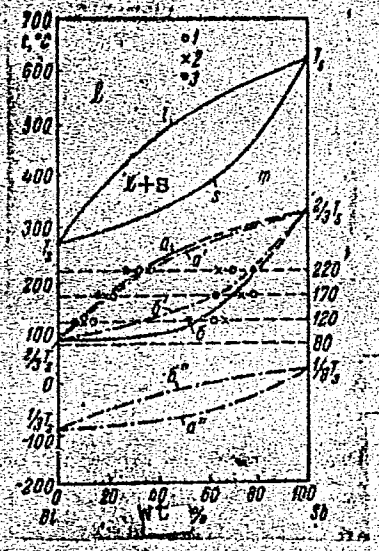

Fig. 1. Melting diagram (ℓ - s) and condensation diagram (a - b) of Bi-Sb.

1 - Microhardness, 2 - x-ray data, 3 - thermal emf.

The dash-dot lines show the calculated condensation diagram for a substrate temperature approximately two-thirds the melting temperature (a'-b') and approximately one-third the melting temperature (a - b).

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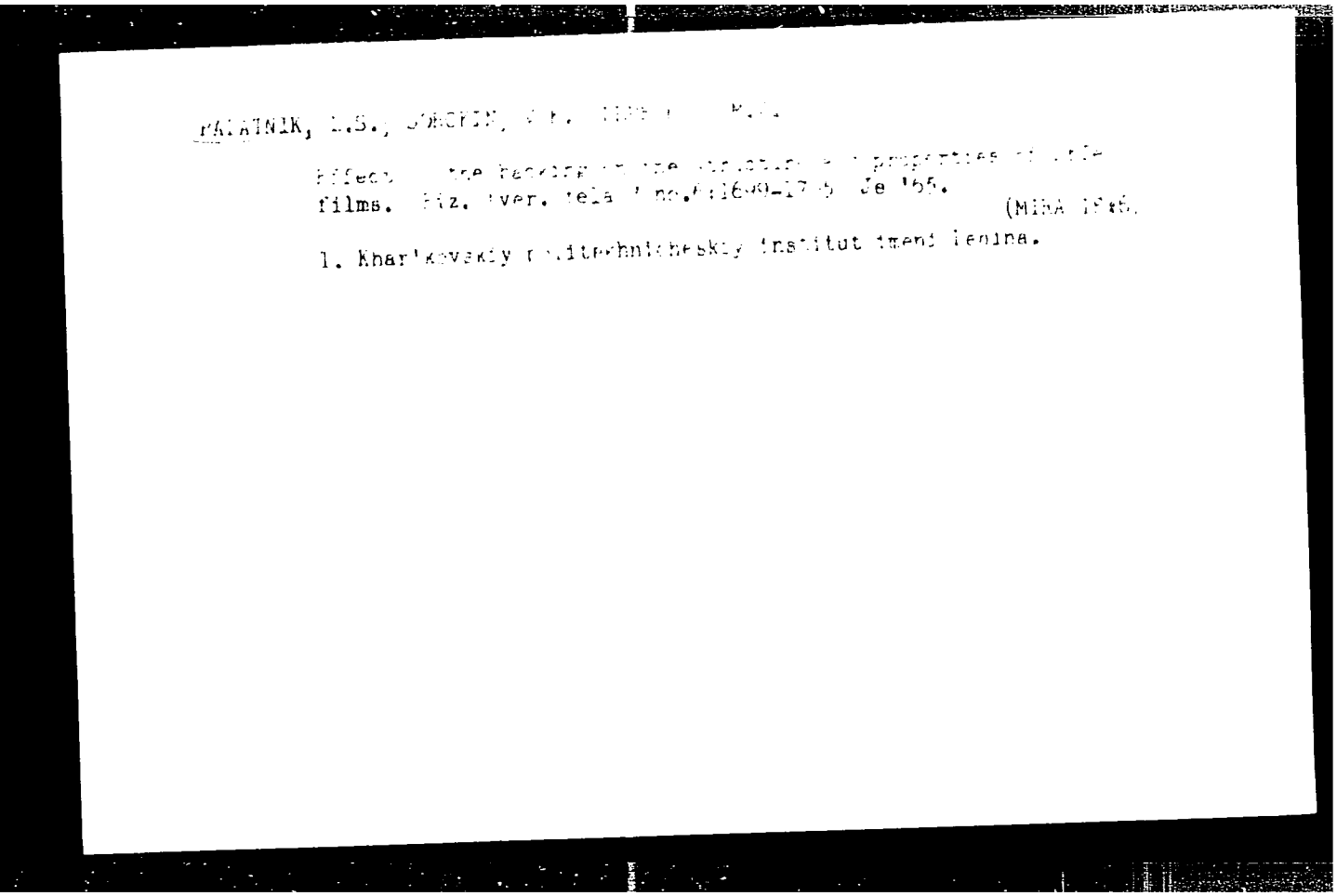

MAZNIK, L.S., [illegible]

Effect [illegible] properties [illegible] films. Fiz. tver. tela [illegible] no.4:1640-1745 Je '65. (MIRA 18:6)

1. Khar'kovskiy politekhnicheskiy institut imeni Lenina.

L 51970-65 EWT(l)/EPA(s)-2/EWT(m)/EPF(n)-2/EWG(m)/T/EWP(t)/EWP(z)/EWP(b)
Pt-7/Pu-4 IJP(c) RWH/JD/HW/WW/JG UR/0057/65/035/005/0883/0888

ACCESSION NR: AP5012053

AUTHOR: Palatnik, L.S.; Levchenko, A.A.

TITLE: On the passage of electrode material into the gas cloud surrounding a spark discharge

SOURCE: Zhurnal tekhnicheskoy fiziki, v. 35, no. 5, 1965, 883-888

TOPIC TAGS: spark discharge, electrode, copper alloy, nickel alloy, cobalt alloy, platinum alloy, silver alloy

ABSTRACT: The authors have investigated ac sparks between identical binary alloy electrodes or different pure metal electrodes and have spectroscopically determined the ratio of the concentrations of the two electrode metals in the gas cloud surrounding the spark. Co-Ni, Co-Cu, and Pt-Ag alloys were studied. In the case of the Co-Ni alloys, which were solid solutions, the relative concentration of Ni and Co in the vapor phase was roughly the same as in the solid phase and was constant in time. The results obtained with the other metals were less simple and are discussed in some detail. It is concluded that in the case of single-phase alloys the composition of the gas is determined by selective vaporization at the anode,

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L 51970-65

ACCESSION NR: AP5012053

that in other cases selective erosion of the separate phases at the cathode is also involved, and that changes in time of the gas composition are due to changes in the composition of the surface layers of the electrodes resulting from selective vaporization, selective erosion, transfer of material from one electrode to the other, or a combination of these processes. Orig. art. has: 1 formula, 3 figures, and 2 tables.

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

SUBMITTED: 15Jul64 ENCL: 00 SUB CODE: EM

NR REF SOV: 008 OTHER: 000

Card 2/2

ACCESSION NR: AP4044898 S/0032/64/030/009/1097/1100

AUTHORS: Palatnik, L. S.; Gladkikh, N. T.

TITLE: On the microhardness of vacuum condensates of metals

SOURCE: Zavodskaya laboratoriya, v. 30, no. 9, 1964, 1097-1100

TOPIC TAGS: microhardness, vacuum condensation/ PMT3 load machine, MIM 8 microscope

ABSTRACT: The relationships between condensation conditions, structure, and condensate properties were investigated. Condensates of silver, copper, nickel, and iron were formed and tested under varying loads between 2 and 200 grams. Microhardness was measured by means of a PMT-3 load machine with an automatic loading feature. Machine calibration was done by first testing a sodium chloride sample. Results of test measurements are presented in four plots showing: 1) the comparative microhardness characteristics of nickel and silver condensates formed at 260C; 2) microhardness measurements for copper prepared at 70, 100, 130, 160, 270, 350, 170, and 180C for various phases of metastable liquid and crystal transitions; 3) comparative microhardness for copper condensed at both 80 and 210C; 4) microhardness for cadmium condensate prepared at 30C. Results indicated that thin condensate surface layers exhibit variable hardness. Deeper layers are quite

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ACCESSION NR: AP4044898

dependent upon the surface layers because of secondary processes occurring during the experiment and the disguising influence of the condensation mechanism. Orig. art. has: 5 figures.

ASSOCIATION: Khar'kovskiy gosudarstvenny*y universitet (Kharkov State University)

ENCL: 00

SUBMITTED: 00

OTHER: 001

SUB CODE: MM NO REF SOV: 008

Card 2/2

L 27902-65 EWT(m)/EWP(t)/T/EWP(b) IJP(c) JD
ACCESSION NR: AP4013328 S/0020/64/154/003/0575/0577

AUTHORS: Palatnik, L. S.; Il'inskiy, A. I.

25
24
B

TITLE: Stabilization of high-strength vacuum condensates

SOURCE: AN SSSR. Doklady , v. 154, no. 3, 1964, 575-577

TOPIC TAGS: vacuum condensate, metallic film, crystal lattice defect, copper film, silver film, metallic layer composition, metallic layer

ABSTRACT: It has been shown that metallic films (thickness $h=10^{-3}$ to 10^{-2} cm) condensed in a vacuum are considerably more durable than solid annealed metals. High-strength vacuum condensates have a large number of crystal lattice defects (dislocations, vacancies) which cause considerable non-equilibrium of the structure. One possible method of stabilizing high-strength condensates at elevated temperatures is the development of vacuum condensates of alloys. Study of the condensed films of copper and silver revealed that the rate of development of recrystallization processes (and consequently of softening) depends on the specimen thickness. A method of forming layer compositions was developed. This device is schematically

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L 27902-65

ACCESSION NR: AP4013328

shown in Figure 1 of the enclosure. During conversion from ordinary metallic condensates to layer compositions the temperature interval in which high strength is maintained is significantly broadened. With a change in the ratio of thickness and strength values of the separator films and base metals, possibilities for variations of the mechanical properties of the condensates can be achieved. A significant prospect is noted for layer condensates in which the basic advantage is long-term stabilization at high temperatures for macroscopic objects. The method of forming layer compositions can also be used to develop films with other very valuable physical, electrical and magnetic properties. Orig. art. has: 3 figures.

ASSOCIATION: Khar'kovskiy politekhnicheskiy institut, im. V. I. Lenina (Kharkov Polytechnic Institute)

SUBMITTED: 24Nov63 ENCL: 01

SUB CODE: MM NR REF SOV: 004 OTHER: 000

Card 2/3

L 27902-65
ACCESSION NR: AP4013328

ENCLOSURE: 01

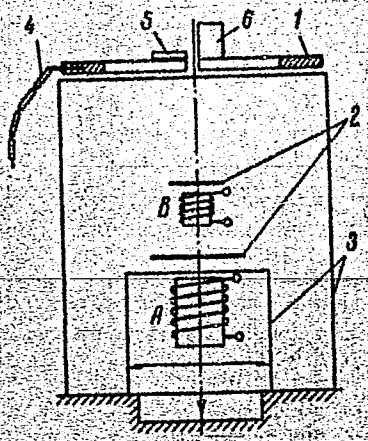

Fig. 1

Diagram of Cu(Cr) layer condensate preparation. A-crucible for copper evaporation; B-crucible for chromium evaporation; 1-annular backing with temperature gradient; 2 and 3-shield; 4-thermocouple; 5-attachment for cooling the backing; 6-oven for heating the backing

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L 11457-65 EWP(e)/EPA(s)-2/EWT(m)/EPF(n)-2/EWP(k)/EWP(t)/EPA(bb)-2/EWP(b) Pf-4/
Pt-10/Pu-4 IJP(c) JD/WW/JG

ACCESSION NR: AP4046373 S/0020/64/158/003/0586/0589

AUTHORS: Pelatnik, L. S.; Fedorov, G. V.; Bogatov, P. N. 8

TITLE: Investigation of the processes of evaporation and volume condensation of alloys

SOURCE: AN SSSR. Doklady*, v. 158, no. 3, 1964, 586-589, and insert facing p. 588

TOPIC TAGS: alloy diagram, evaporation, condensation, volume condensation, lead alloy, zinc alloy, alloy composition 18

ABSTRACT: In view of the relatively few publications devoted to evaporation and condensation of metals and alloys in the absence of ready-made solid condensation surfaces, the authors evaporated metals from alundum crucibles in a vacuum chamber (volume of approximately 15 liters) filled with argon. Because of the small mean free path of the molecules, the metals condensed not on the walls

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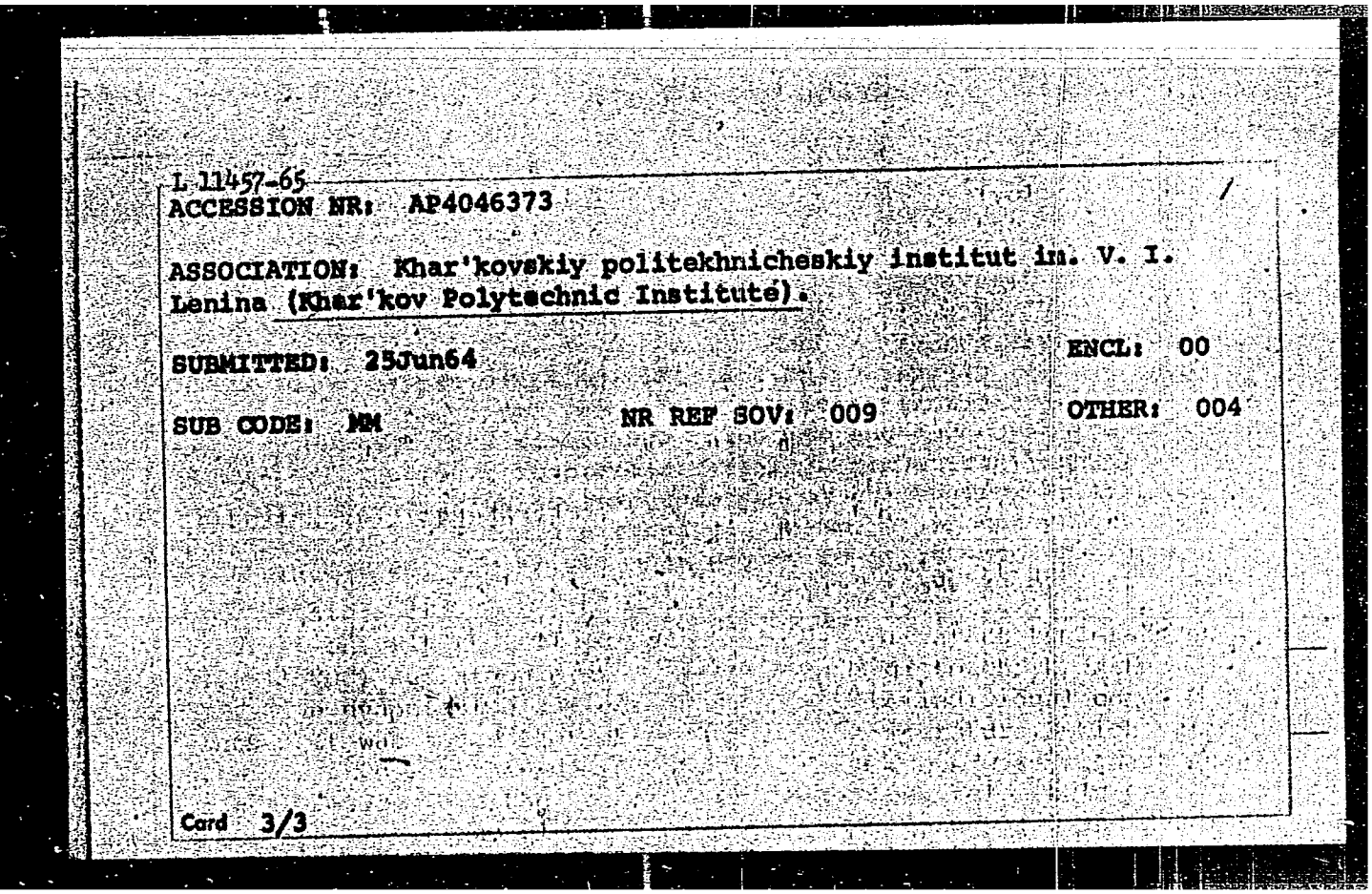
of the vacuum chamber but inside the volume of inert gas. The systems studied were Pb-Sb, Zn-Cd, and Pb-Bi. Two sets of tests were made: in one set the alloys were heated to different temperatures (450--1300C) and argon pressures (3--10 mm Hg) to check on the selective evaporation and condensation of the individual components. It was found that above a certain temperature, which varies with the alloy, both components evaporate and condense without change in composition. In the second set of tests several metals were condensed simultaneously at temperatures low enough (80 and 250C) to produce supersaturation of the metal vapor. In the case of the Pb-Sb system, the condensed powders were a mechanical mixture of particles of pure components. In the case of Bi-Sb condensates, the particles were solid solutions with a wide range of component concentrations. It is concluded that volume condensation of alloys is greatly influenced by the type of the state diagram of the alloy and by the evaporation temperature. This report was presented by S. A. Vekshinskiy. Orig. art. has: 3 figures.



L 11457-65
ACCESSION NR: AP4046373

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

SUBMITTED: 25Jun64 ENCL: 00

SUB CODE: MM NR REF SOV: 009 OTHER: 004

Card 3/3

L 11825-65 AEDC(a)
ACCESSION NR: AP4048037 S/0020/64/158/006/1314/1317

AUTHORS: Kosevich, V. M.; Palatnik, L. S.

TITLE: Possible mechanisms for the formation of vacuum condensates

SOURCE: AN SSSR. Doklady*, v. 158, no. 6, 1964, 1314-1317

TOPIC TAGS: condensed phase, vacuum condensation, substrate, temperature dependence

ABSTRACT: An attempt is made to establish general laws governing the condensation of matter on a substrate and several anomalies observed during the source of condensation of some substances. Assuming that the condensed matter is the result of gathering of individual atoms or molecules in a three-dimensional medium, the author considers the following systems: one-dimensional (1M) chains, two-dimensional (2M) and three-dimensional (3M) vapor, two- and three-dimensional liquid, and two- and three-dimensional crystal. The

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ACCESSION NR: AP4048037

possible transitions between these states and the corresponding transition temperatures are analyzed, with attention to the temperature limits between which the intermediate states are possible. A survey of the published data discloses that the existence of some of the possible corresponding six critical temperatures has not been suspected in the past. It is claimed that the proposed analysis explains the occurrence of microheterogeneous regions in the condensate, some of the electron-microscopic data on the structure of thin films, the influence of crystalline substrates on some of the critical temperatures, and the occurrence of one-dimensional epitaxy. This report was presented by S. A. Vekshinskiy. Orig. art. has: 1 figure.

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

SUBMITTED: 14May64 ENCL: 00

SUB CODE: GC, GP NR REF SOV: 012 OTHER: 003

Card 2/2

L 16388-65 EWT(m)/EWP(t)/EWP(b) IJP(c)/ESD(gs)/APWL RDW/JD
ACCESSION NR: AP4049133 S/0020/64/159/001/0068/0071

AUTHORS: Palatnik, L. S.; Belova, Ye. K.; Koz'ma, A. A. 8

TITLE: Anomalous effects seen on x-ray patterns of gallium selenide and its alloys 27 27

SOURCE: AN SSSR. Doklady*, v. 159, no. 1, 1964, 68-71, and bottom half of insert facing p. 54

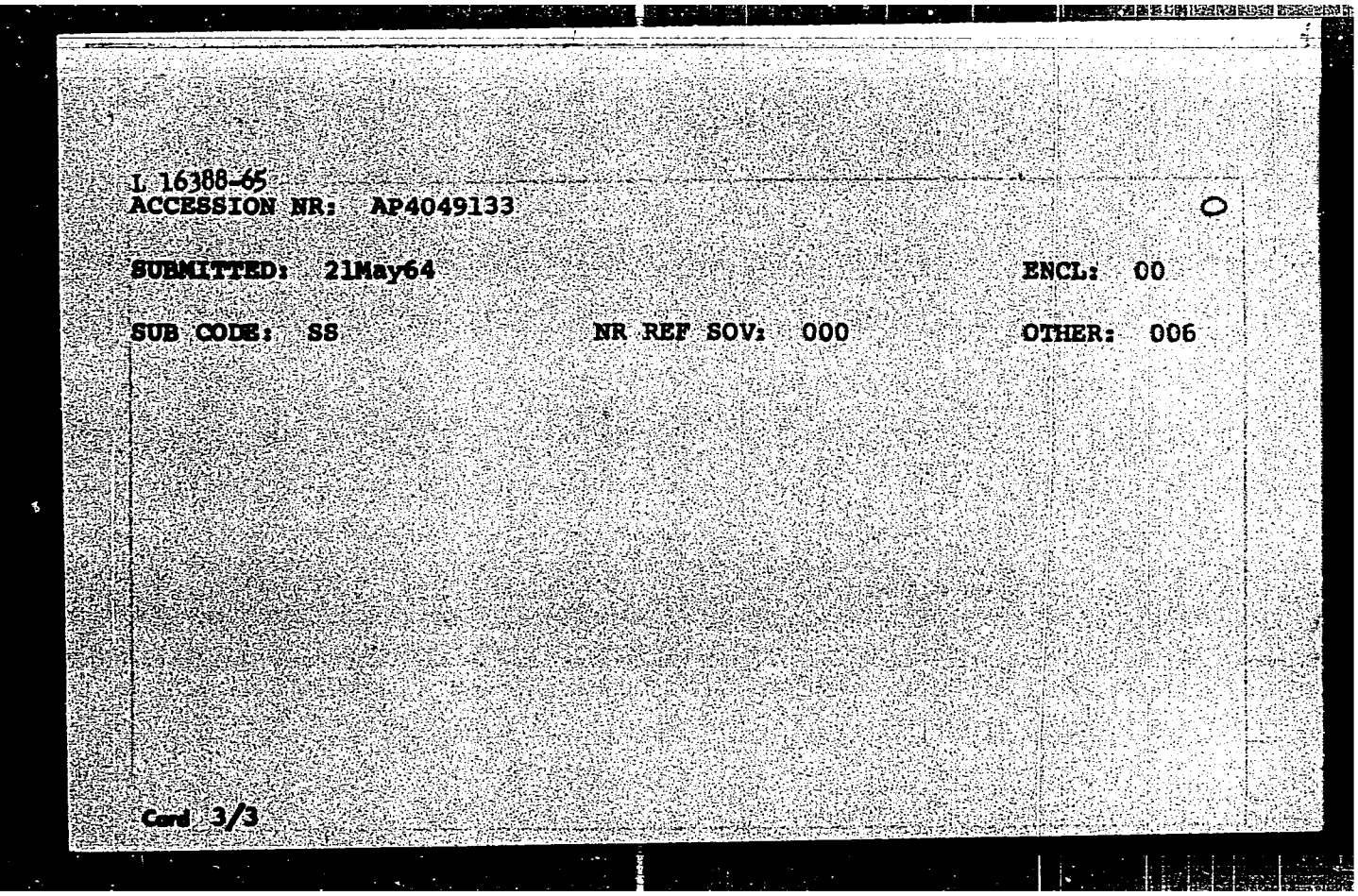
TOPIC TAGS: gallium compound, state diagram, x ray diffraction pattern, line broadening, heat treatment, ordered alloy

ABSTRACT: In view of the scarcity of studies on the Ga-Se diagram of state, the authors studied Ga_2Se_3 and the alloys Ga-Se, Ga_2Se_3-$CuGaSe_2$ and Ga_2Se_3-$AgGaSe_2$, rich in Ga_2Se_3. The alloys were made by fusing the initial components, soaking at 1150°, and slowly cooling with the oven to room temperature (15 hours). X-ray analysis

Card 1/3

and microstructure studies showed the gallium selenide to have high uniformity. Some of the Debye-pattern lines were sharp and others diffuse, and various tests showed that the smearing of the lines had a behavior different from that caused by the customary physical factors such as dispersion, crystal lattice distortion, or microstresses. It was found that the anomalous line broadening had a noticeable dependence on the heat treatment, thus indicating a connection with the degree of ordering. It is concluded that the anomalous effects are due to defects in the stratification of the crystal lattice in the cation sublattice, and to the existence of stacking faults. This report was presented by S. A. Vekshinskiy. Orig. art. has: 3 figures, 2 formulas, and 3 tables.

ASSOCIATION: Nauchno-issledovatel'skiy institut osnovnoy khimii (Scientific Research Institute of Fundamental Chemistry); Khar'kovskiy politekhnicheskiy institut im. V. I. Lenina (Khar'kov Polytechnic Institute)



L 16388-65
ACCESSION NR: AP4049133

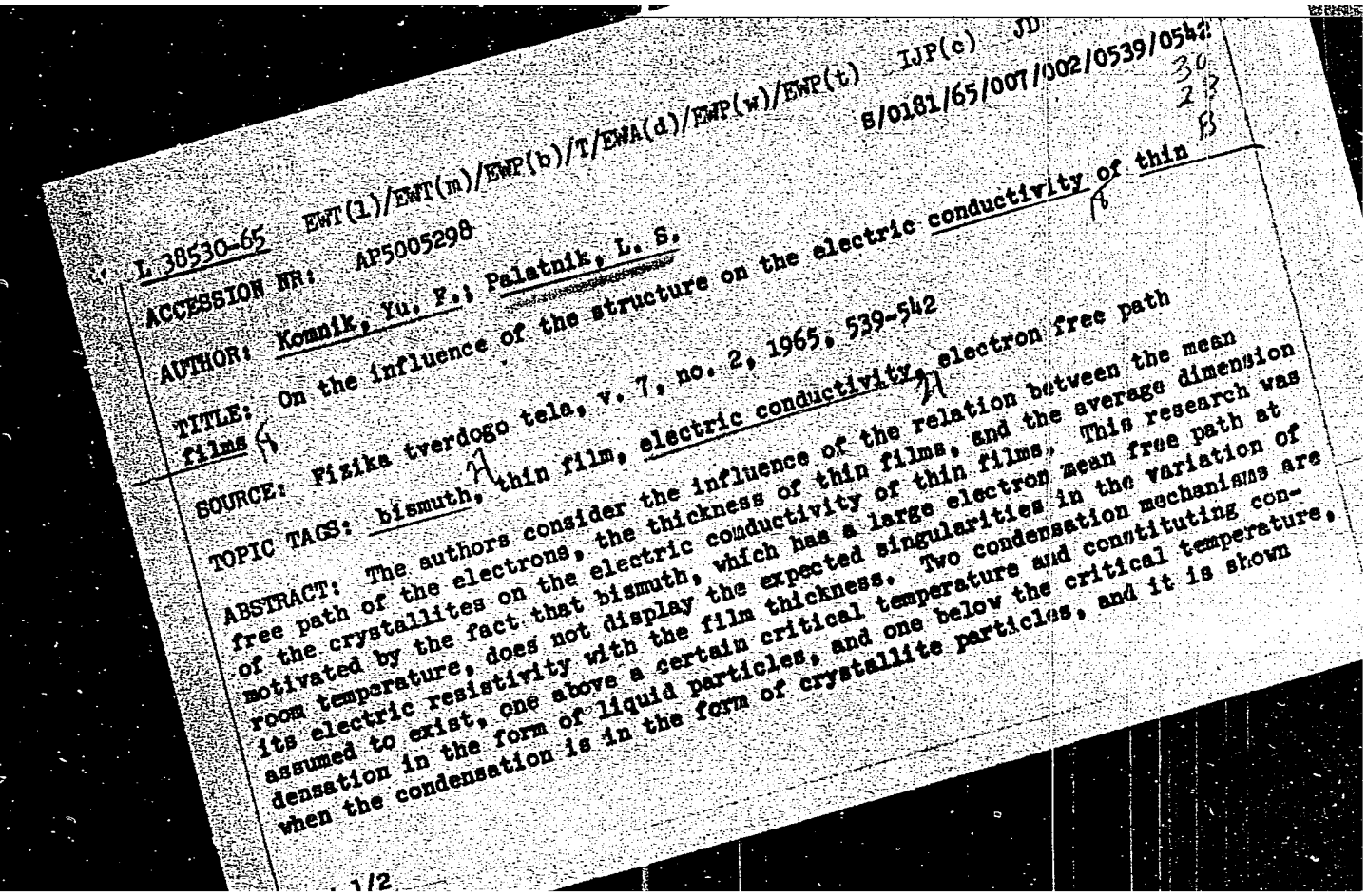
SUBMITTED: 21May64 ENCL: 00

SUB CODE: SS NR REF SOV: 000 OTHER: 006

Card 3/3

PALATNIK, Lev Samoylovich; FAKIROV, Igor' Isaakovich; LEMMLEYN, G.G., prof., retsenzent; CHERKOV, A.A., kand. fiz.-mat. nauk, retsenzent; MALTSEV, M.V., prof., retsenzent; CHISTYAKOV, Yu.D., dots., kand. tekhn. nauk, nauchn.red.

[Oriented crystallization] Orientirovannaia kristallizatsiia. Moskva, Metallurgiia, 1964. 407 p. (MIRA 17:12)



L 38530-65 EWT(1)/EWT(m)/EWP(b)/T/EWA(d)/EWP(w)/EWP(t) IJP(c) JD
ACCESSION NR: AP5005298 S/0181/65/007/002/0539/0542
AUTHOR: Komnik, Yu. F.; Palatnik, L. S.
TITLE: On the influence of the structure on the electric conductivity of thin films
SOURCE: Fizika tverdogo tela, v. 7, no. 2, 1965, 539-542
TOPIC TAGS: bismuth, thin film, electric conductivity, electron free path
ABSTRACT: The authors consider the influence of the relation between the mean free path of the electrons, the thickness of thin films, and the average dimension of the crystallites on the electric conductivity of thin films. This research was motivated by the fact that bismuth, which has a large electron mean free path at room temperature, does not display the expected singularities in the variation of its electric resistivity with the film thickness. Two condensation mechanisms are assumed to exist, one above a certain critical temperature and constituting condensation in the form of liquid particles, and one below the critical temperature, when the condensation is in the form of crystallite particles, and it is shown

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that under certain conditions the expected irregularieties in the thickness variation of the electric resistivity can occur in bismuth, in qualitative agreement with the existing theory. This deduction was confirmed by an x-ray diffraction study of bismuth films 0.4 and 0.8 μ thick, obtained with substrate temperatures 80 and 130°. Orig. art. has: 1 figure and 5 formulas.

ASSOCIATION: Politekhnicheskiy institut im. V. I. Lenina (Polytechnic Institute); Fiziko-tekhnicheskiy institut nizkikh temperature AN UkrSSR, Khar'kov (Physicotechnical Institute of Low Temperatures, AN UkrSSR)

SUBMITTED: 05Aug64 ENCL: 00 SUB CODE: SS, EM

NR REF SOV: 007 OTHER: 005

L 49048-65 EWA(c)/EWT(m)/EWP(b)/T/EWP(t) IJP(c) JD/JG

ACCESSION NR: AP5006887 S/0181/65/007/003/0819/0822

AUTHOR: Palatnik, L. S.; Fedorenko, A. I.

TITLE: On the mechanism of formation of growth textures in beryllium condensates

SOURCE: Fizika tverdogo tela, v. 7, no. 3, 1965, 819-822

TOPIC TAGS: beryllium, thin film, film condensation, growth texture

ABSTRACT: X-ray diffraction, electron diffraction, optical, and electron microscopy methods were used to study the formation of growth textures and the forms of growth in beryllium films condensed on polycrystalline substrates. The films were condensed by a procedure described in an earlier paper (FMM v. 18, 866, 1964). The texture was investigated as a function of the substrate temperature, the rate of precipitation, and the film thickness. Microphotograms of the surface films and a plot of the dependence of the position of the texture axes and of the degree of its perfection on the substrate temperature are presented. The results show that the initial stage of growth texture formation is observed at a certain fixed condensate thickness, which increases with increasing substrate temperature. This

Card 1/2

L 49048-65
ACCESSION NR: AP5006887

effect is connected with the degree of disperseness of the condensate crystal. The different effect of the crystal disperseness and of the diffusion mobility of the atoms on the growth texture formation result in an optimal substrate temperature necessary to ensure the most perfect texture in the condensate. Knowledge of this optimal temperature is of importance for the growth of single-crystal forms of different materials. Orig. art. has: 3 figures.

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

SUBMITTED: 12Sep64 ENCL: 00 SUB CODE: SS

NR REF SOV: 003 OTHER: 001

Card 2/2

L 57579-65 EWT(1)/EWT(m)/EWP(i)/EPF(n)-2/EWG(m)/T/EWP(t)/EEC(b)-2/EWP(b)/EWA(c)
Pu-4 IJP(c) RDW/JD/JG/GG
ACCESSION NR: AP5013719 UR/0070/65/010/003/0399/0404
548.526

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37
B

AUTHOR: Palatnik, L. S.; Naboka, M. N.; Gladkikh, N. T.

TITLE: The aging of vacuum condensates

SOURCE: Kristallografiya, v. 10, no. 3, 1965, 399-404

TOPIC TAGS: vacuum metallurgy, alloy film, thin film

ABSTRACT: The following were investigated: a) phase transformations in heavy Cd-S and Sb-Se alloy films (h ~ 80 μ) of variable concentration resulting from their aging at room temperature for a period of 2 and 5 years respectively; b) the condensation mechanism and structural variations in condensates of pure sulfur during prolonged aging. Cd-S alloy samples of variable composition were prepared by the simultaneous evaporation and condensation of components on an etched glass base. In the investigation of pure sulfur condensation mechanism the samples were prepared on an amorphous (glass) and polycrystalline (molybdenum) base while a temperature gradient was maintained. One end of the base was cooled by liquid nitrogen while the other was maintained at 20°C. The microstructure of the sulfur conden-

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sates was investigated by means of the MIM-8 optical microscope. It was established that in the initial period where the temperature of the glass base was 20°C the condensation of sulfur was from vapor to liquid. At -80°C the condensation was from vapor to crystal. The growth of spherulites was observed during condensation in sulfur films on a molybdenum base at -80°C and in Cd-S, Zn-S and Sb-Se-S alloy films on a glass base at 20°C. It was established that the aging of the Cd-S solid solution for a period of two years at room temperature was accompanied by the growth (liberation) of thread-like (5-18% S) and cone-like (18-50% S) cadmium crystals while in alloys with a high sulfur content (70-80% S) by the growth of sulfur polycrystals. When Sb-Se alloys were aged, thread-like antimony crystals were liberated. Orig. art. has: 6 figures, 1 table.

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ACCESSION NR: AP5006341 S/0126/65/019/002/0310/0311

AUTHOR: Palatnik, L. S.; Il'inskiy, A. I.; Ravlik, A. G.

TITLE: The strength of vapor-deposited nickel and iron films

SOURCE: Fizika metallov i metallovedeniye, v. 19, no. 2, 1965, 310-311

TOPIC TAGS: nickel, nickel film, iron, iron film, vapor deposited film, film strength, film hardness, film property

ABSTRACT: Films, 20 ± 5 μ thick, of 99.99%-pure nickel and 99.9%-pure iron, vapor deposited at a rate of 0.2—0.3 μ/min on substrates having a temperature of 220—420C, were tested for microhardness and tensile strength. Nickel films deposited at lower temperatures had the highest strength (σ_b) and microhardness (H_μ). For example, the films deposited at 250—210C had a σ_b of 110—130 kg/mm^2 and an H_μ of 540—620 kg/mm^2, compared with a σ_b of 33 kg/mm^2 and a hardness HB of 60—70 kg/mm^2 for annealed solid nickel. Both σ_b and H_μ sharply decrease with increasing temperature of the substrate. But even the films deposited at substrate temperatures as high as 400—420C have a strength and hardness, 63—77 and 160 kg/mm^2, equal to the maximum strength and hardness of strain-hardened solid nickel. The form of the stress-strain curves for Ni films indicates a very effective blocking of the generation and motion of disloca-

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