"APPROVED FOR RELEASE: 03/14/2001 CIA-RDP86-00513R001447420003-6

L 10437-65 EWT(m)/EWP(b) JD/JG

ACCESSION NR: AP4043587 S/0078/64/009/008/2036/2038

AUTHOR: Burov, I. V.; Terekhova, V. F.; Savitskiy, Ye. M.

B

TITLE: Terbium-gadolinium and erbium-gadolinium alloys

SOURCE: Zhurnal neorganicheskoy khimii, v. 9, no. 8, 1964, 2036-2038

TOPIC TAGS: Terbium, erbium, gadolinium, terbium gadolinium alloy, erbium gadolinium alloy, terbium gadolinium phase diagram, erbium gadolinium phase diagram, rare metal alloy, terbium gadolinium system, erbium gadolinium system

ABSTRACT: Two series of alloys, gadolinium-terbium and gadolinium-erbium, were melted from 98.5—99.0 wt% pure components in a nonconsumable electrode arc furnace and annealed at 1000C for 50 hr; they were subjected to thermal, microscopic, and x-ray diffraction analyses, a hardness test, and measuring of magnetic properties and electrical resistance. Gadolinium forms continuous series of solid solutions with both terbium and erbium (see Figs. 1 and 2 of the Enclosure). The Curie point decreases from +17C for pure gadolinium to -36C for pure terbium and to below the liquid nitrogen point for erbium-rich

Card 1/4

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L 10437-65

ACCESSION NR: AP4043587

alloys. X-ray diffraction patterns showed all the alloys to have the hexagonal, magnesium-type, close-packed lattice. The temperature dependence of magnetization for gadolinium-erbium alloys shows some anomalies. It is believed that the magnetic moments of gadolinium and erbium have an opposite direction which showed up in the maximum and minimum on the magnetization curve. Orig. art. has: 2 figures.

ASSOCIATION: none

SUBMITTED: 01Feb64 ATD PRESS: 3110 ENCL: 02

SUB CODE: MM NO REF SOV: 003 OTHER: 002

Card 2/4

APPROVED FOR RELEASE: 03/14/2001 CIA-RDP86-00513R001447420003-6"

"APPROVED FOR RELEASE: 03/14/2001 CIA-RDP86-00513R001447420003-6

L 10437-65

ACCESSION NR: AP4043587

ENCLOSURE: 01

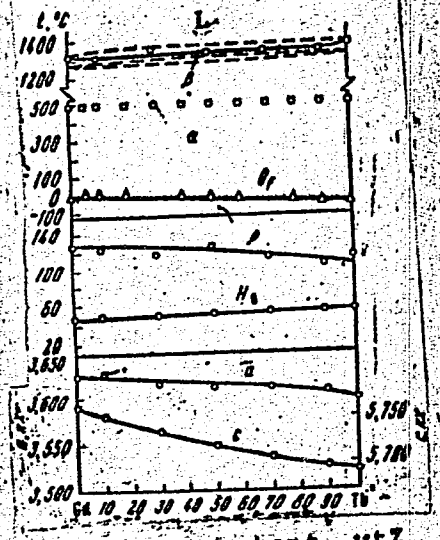

Fig. 1. Phase diagram and alloy properties of the gadolinium-terbium system

θ - Curie temperature, C; ρ - resistivity, μohm·cm; H - hardness, kg/mm²; a, c - lattice constants, kX units.

Card 3/4

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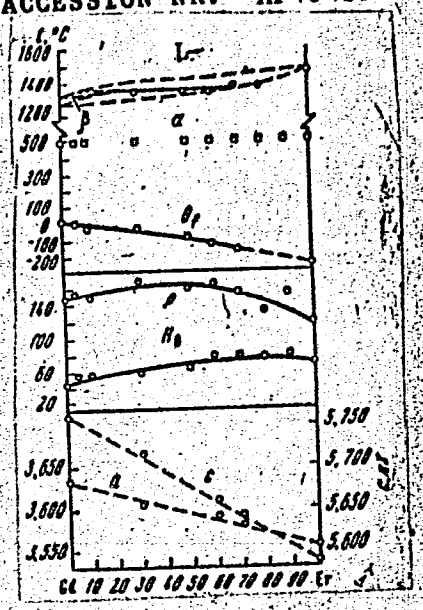
L 10437-65

ACCESSION NR: AP4043587

ENCLOSURE: 02



Erbium content, wt%

Fig. 2. Phase diagram and alloy properties of the gadolinium-erbium system

θ_f - Curie temperature, C; ρ - resistivity, μohm·cm; H_B - hardness, kg/mm²; a, c - lattice constants, kX.

Card 4/4

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"APPROVED FOR RELEASE: 03/14/2001 CIA-RDP86-00513R001447420003-6

L 8772-65 EWT(m)/EWP(b) ASD(a)-5/AS(mp)-2/AFWL/SSD/ESD(t)/RAEM(t) JD/JG

ACCESSION NR: AP4043590 S/0078/64/009/008/2045/2046

AUTHOR: Savitskiy, Ye. M.; Baron, V. V.; Yefimov, Yu. V.; Karasik, V. R.; Vy*legzhanina, T. V.; Glady*shevskiy, Ye. I.

TITLE: The V_3Si-V_3Ge system

SOURCE: Zhurnal neorganicheskoy khimii, v. 9, no. 8, 1964, 2045-2046, and insert facing p. 2035

TOPIC TAGS: superconductivity, superconductive alloy, vanadium alloy, silicon alloy, germanium alloy, superconductive vanadium silicon compound, superconductive vanadium germanium compound, vanadium silicide, vanadium germanide

ABSTRACT: A series of V_3Si-V_3Ge alloys containing up to 25 at% vanadium were melted from 99.8% vanadium, 99.8% silicon, and 99.9% germanium in a nonconsumable electrode arc furnace in helium under pressure of 0.7 atm and annealed at 800C for 2500 hr. Microscopic examination and x-ray diffraction patterns revealed that the components form a continuous series of solid solutions. T_k, the transition temperature to the superconductive state (all the alloys of the system are super-

Card 1/3

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"APPROVED FOR RELEASE: 03/14/2001 CIA-RDP86-00513R001447420003-6

L 8772-65

ACCESSION NR: AP4043590

conductors), was found to decrease continously from 17.1K for V_3Si to 6.01K for V_3Ge as shown in Fig. 1 of the Enclosure. Fig. 1 also shows the composition dependence of the microhardness and lattice constant of the solid solution and the transition curves for four alloys tested. Orig. art. has: 2 figures.

ASSOCIATION: none

SUBMITTED: 28Feb64 ATD PRESS: 3108 ENCL: 01

SUB CODE: MM, GP NO REF SOV: 004 OTHER: 004

Card 2/3

APPROVED FOR RELEASE: 03/14/2001 CIA-RDP86-00513R001447420003-6"

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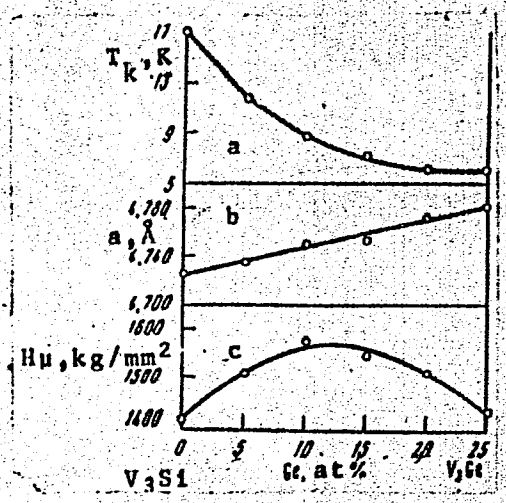
L 8772-65
ACCESSION NR: AP4043590 ENCLOSURE: 01



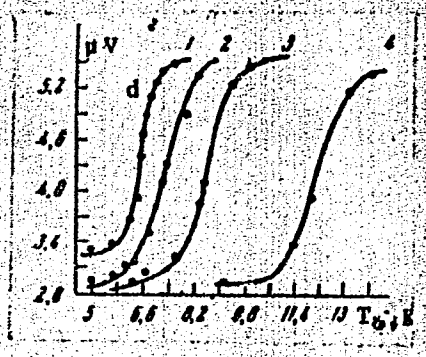


Fig. 1. Composition dependence of critical temperature a, lattice constant b, and microhardness c of V_3Si—V_3Ge alloys and transition curves d of the alloys tested.

Card 3/3

1 - $V_3(Si_{0.2}, Ge_{0.8})$; 2 - $V_3(Si_{0.4}, Ge_{0.6})$; 3 - $V_3(Si_{0.6}, Ge_{0.4})$; 4 - $V_3(Si_{0.8}, Ge_{0.2})$.

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"APPROVED FOR RELEASE: 03/14/2001 CIA-RDP86-00513R001447420003-6

L 15704-65 EWT(m)/EWP(w)/EPF(n)-2/EWA(d)/EWP(t)/EWP(b) Pu-4 ASD-3/SSD/AFFTC/ESD-3/IJP(c)/ESD(gs)/AFWL/ASD(a)-5/ASD(m)-3/AS(mp)-2/AFETR JD/WW/JG

ACCESSION NR: AP4044815 S/0078/64/009/009/2261/2263

AUTHORS: Savitskiy, Ye.M.; Zakharov, A.M.

TITLE Melts of the W_2Zr-Mo_2Fr cross section

SOURCE: Zhurnal neorganicheskoy khimii, v. 9, no. 9, 1964, 2261-2263

TOPIC TAGS: tungsten molybdenum zirconium system, W_2Zr Mo_2Zr system, structure, annealing, fusion temperature, specific electric resistivity, crystal lattice parameter, hardness, microhardness, $(W, Mo)_2Zr$, alpha solid solution, ternary alpha solid solution,

ABSTRACT: The structure and some of the properties of the W_2Zr-Mo_2Zr cross-section of the W-Mo-Zr system were investigated. Samples were prepared from metalloceramic tungsten and molybdenum and zirconium iodide in an arc furnace with a tungsten electrode in a helium atmosphere at pressures of 150-170 mm Hg; the melts were homogenized by annealing at 1800C for 18 hours. Data showing the fusion temperature, specific electric resistivity ρ, parameters of the crystal lattic, hardness and microhardness is summarized in the enclosed figure. It was concluded the melts consisted almost entirely of the

Card 1/3

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"APPROVED FOR RELEASE: 03/14/2001 CIA-RDP86-00513R001447420003-6

L 15704-65

ACCESSION NR: AP4044815

face-centered cubic $(W,Mo)_2Zr$ crystals with small inclusions of the body-centered cubic alpha-solid solutions rich in tungsten and molybdenum. In the W-Mo-Zr system there was a noticeable area of ternary alpha-solid solutions bordering on the binary W-Mo system. A continuous transition of the peritectic L (liquid) $+\alpha \rightarrow W_2Zr$ and of the eutectic $L \rightarrow \beta Zr + W_2Zr$ takes place in the binary W-Zr system at 2260 and 1640C, and analgous changes $L + \alpha \rightarrow Mo_2Zr$ and $L \rightarrow \beta Zr + Mo_2Zr$ occur in the binary Mo-Zr systems at 1890 and 1570C. Orig. art. has: 2 figures and 1 table.

ASSOCIATION: None

SUBMITTED: 18Jan64 ENCL: 01

SUB CODE: MM NR REF SOV: 005 OTHER: 005

Card 2/3

APPROVED FOR RELEASE: 03/14/2001 CIA-RDP86-00513R001447420003-6"

"APPROVED FOR RELEASE: 03/14/2001 CIA-RDP86-00513R001447420003-6

L 15704-65

ACCESSION NR: AP4044815

ENCLOSURE: 01

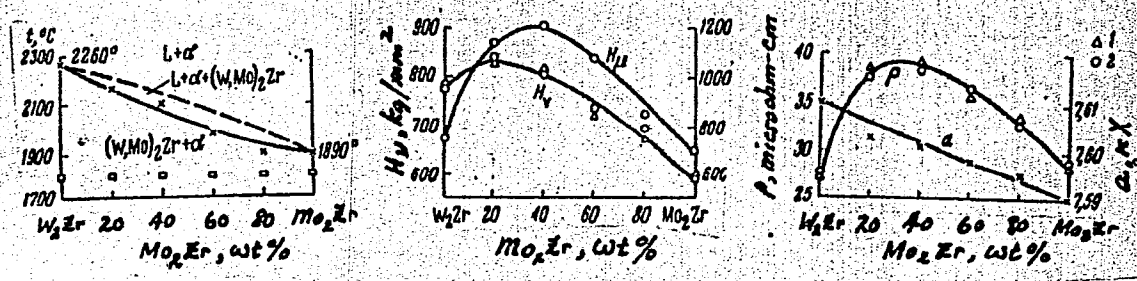

Figure 1

Change in the fusion temperature, specific electric resistivity ρ, crystal lattice parameter a, hardness H_v and microhardness H , depending on composition of the alloys in the W_2Zr-Mo_2Zr system. 1--cast alloys; 2--annealed (1800C, 18 hours).

Card 3/3

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"APPROVED FOR RELEASE: 03/14/2001 CIA-RDP86-00513R001447420003-6

L 20683-65 EWT(m)/EWP(b)/EWP(t) IJP(c) JD

ACCESSION NR: AP4044811 S/0078/64/009/009/2170/2173

AUTHOR: Baron, V. V.; My*zenkova, L. F.; Savitskiy, Ye. M.; Glady*shevskiy, Ye. I.

B

TITLE: The niobium-gallium system

SOURCE: Zhurnal neorganicheskoy khimii, v. 9, no. 9, 1964, 2170-2173

TOPIC TAGS: niobium gallium system, microstructure, microhardness, thermal analysis, x ray analysis, phase diagram, solid solution

ABSTRACT: The Nb-Ga system was subjected to microstructural, microhardness, thermal and x-ray analyses; the phase diagram was constructed (fig.1, Encl) Limited solid solutions based on Nb were formed: at 800C, 8-10% Ga dissolved in Nb, at the peritectic temperature, 16 wt. % of Ga dissolved. In addition to the known Nb_3Ga (melting 1720 C; Cr_3Si type structure; microhardness of 850 kg/mm^2), the following three compounds were found: Nb_2Ga_3 (melting 1530C; tetragonal structure of the W_5Si_3 type; 940 kg/mm^2), $NbGa_3$ (melting 1235C;

Card 1/3

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L 20683-65

ACCESSION NR: AP4044811

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tetragonal structure of the $TiAl_3$ type; 620 kg/mm^2), and a compound approximating Nb_2Ga_3 (melting 1350C; structure not interpreted by x-ray data; assumed to exist from thermal analysis data; microhardness 760 kg/mm^2). Nb and Ga are mutually soluble in the liquid state; some solution of Nb in Ga in the solid state is assumed. Orig. art. has: 2 tables and 3 figures

ASSOCIATION: None

SUBMITTED: 05May63 ENCL: 01

SUB CODE: MM, SS NO REF SOV: 003 OTHER: 002

Card 2/3

APPROVED FOR RELEASE: 03/14/2001 CIA-RDP86-00513R001447420003-6"

"APPROVED FOR RELEASE: 03/14/2001 CIA-RDP86-00513R001447420003-6

L 20683-65
ACCESSION NR: AP4044811

ENCLOSURE: 01

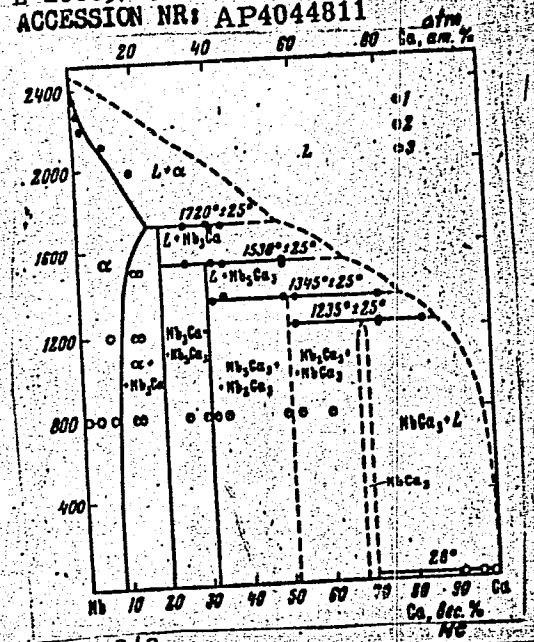

fig. 1

Phase diagram of the niobium-gallium system

1--thermal analysis data; 2--two-phase melts; 3--single phase melt

Card 3/3

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L 12669-65 EWT(m)/EPF(n)-2/EPA(w)-2/T/EWP(t)/EWP(b) Pab-10/Pu-4 ASD(m)-3/AFMDC/ASD(f)-2 S/0078/64/009/010/2424/2432
ACCESSION NR: AP4046453
RWH/JD/WW/JG

AUTHOR: Savitskiy, Ye. M.; Zakharov, A. M.

TITLE: Niobium-tungsten-molybdenum-zirconium system

SOURCE: Zhurnal neorganicheskoy khimii, v. 9, no. 10, 1964, 2424-2432

TOPIC TAGS: niobium base alloy, tungsten containing alloy, molybdenum containing alloy, zirconium containing alloy, refractory alloy, niobium, tungsten, molybdenum, zirconium

ABSTRACT: Six series of alloys of the niobium-tungsten-molybdenum-zirconium system, with total tungsten, molybdenum, and zirconium contents of 5, 7.5, 10, 15, 20, and 30%, were melted in a tungsten electrode arc furnace in purified helium and were studied in annealed and slowly cooled and in annealed and quenched conditions. Binary niobium-tungsten alloys were found to have the highest solidus temperature. Alloying with other elements progressively lowers the solidus temperature. For instance, an Nb-W alloy with 10% W has a solidus temperature of 2580C; alloying with 10% Mo lowers the solidus temperature to 2420C, and additional alloying with 10% Zr further lowers it to 2240C. For most of the quaternary

Card 1/3

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L 12469-65
ACCESSION NR: AP4046453

alloys, however, the solidus temperature remains at 2400C or over. Between the solidus temperature and 1100—2000C (depending on composition), most of the alloys tested have a single-phase structure of the α-quaternary solid solution. In alloys with 15% of the alloying elements a second phase, the $(W, Mo)_2Zr$ intermetallic compound, appears at 1500C. On the basis of the results obtained, a tridimensional projection of the quaternary system studied was constructed (see Fig. 1 of the Enclosure). Orig. art. has: 7 figures.

ASSOCIATION: none

SUBMITTED: 18Dec63 ENCL: 01 SUB CODE: MM

NO REF SOV: 011 OTHER: 003 ATD PRESS: 3126

Card 2/3

APPROVED FOR RELEASE: 03/14/2001 CIA-RDP86-00513R001447420003-6"

"APPROVED FOR RELEASE: 03/14/2001 CIA-RDP86-00513R001447420003-6

L 12469-65
ACCESSION NR: AP4046453

ENCLOSURE: 01

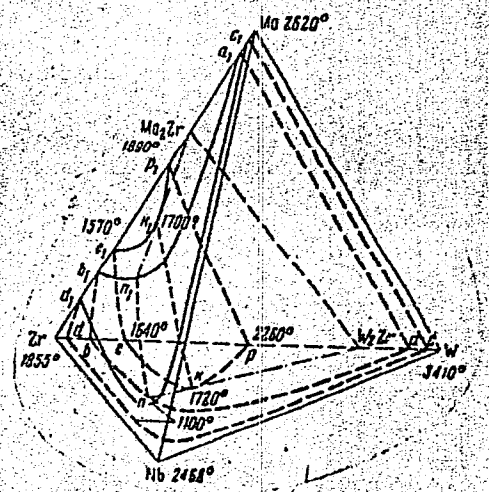

Fig. 1. Polythermal tetrahedron of the niobium-tungsten-molybdenum-zirconium system

Card 3/3

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"APPROVED FOR RELEASE: 03/14/2001 CIA-RDP86-00513R001447420003-6

L 12450-65 EWT(m)/EPF(c)/EWA(d)/EWP(t)/EWP(b) Pr-4 JD/JG/WB
ACCESSION NR: AP4046458 S/0078/64/009/010/2497/2498

AUTHOR: Naumkin, O. P.; Terekhova, V. F.; Savitskiy, Ye. M.

TITLE: Scandium-erbium and scandium-cerium systems

SOURCE: Zhurnal neorganicheskoy khimii, v. 9, no. 10, 1964, 2497-2498

TOPIC TAGS: erbium scandium alloy, cerium scandium alloy, erbium scandium system, cerium scandium system, erbium, scandium, cerium, erbium scandium alloy structure, cerium scandium alloy structure

ABSTRACT: A study was made of erbium-scandium and cerium-scandium systems. Nine erbium-scandium alloys and ten cerium-scandium alloys were melted in a tungsten electrode-arc furnace in purified helium from 98.16%- or 99.5%-pure scandium, 99.35%-pure erbium, and 99.5%-pure cerium. Phase diagrams of both systems were plotted from the results of physicochemical analysis (see Figs. 1 and 2 of the Enclosure). The erbium-scandium alloys maintain a hexagonal close-packed structure in the whole composition range studied. In the cerium-scandium system, the high-temperature modifications, δ-Ce and

Card 1/3

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L 12450-65
ACCESSION NR: AP4046458

β-Sc, form continuous series of solid solutions. It appears, therefore, that the crystal lattice of β-Sc is the same as that of δ-Ce (body-centered cubic). At room temperature the solubility of scandium in cerium is approximately 17 at%, and that of cerium in scandium, approximately 12 at%. Cerium-scandium alloys were found to have a good formability at room temperature. Scandium improves the atmospheric corrosion resistance of cerium, and alloys containing over 17 at% Sc do not need any special protection against oxidation in air. Orig. art. has: 1 table and 2 figures.

ASSOCIATION: none

SUBMITTED: 13Mar64 ENCL: SUB CODE: MM

NO REF SOV: 002 OTHER: 000 ATD PRESS: 3125

Card 2/3

APPROVED FOR RELEASE: 03/14/2001 CIA-RDP86-00513R001447420003-6"

"APPROVED FOR RELEASE: 03/14/2001 CIA-RDP86-00513R001447420003-6

L 12450-65

ACCESSION NR: AP4046458

ENCLOSURE: 01

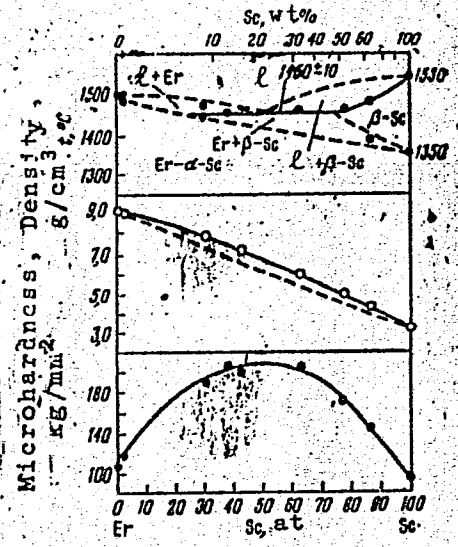

Fig. 1. Er-Sc phase diagram (Dots indicate thermal-analysis data.)

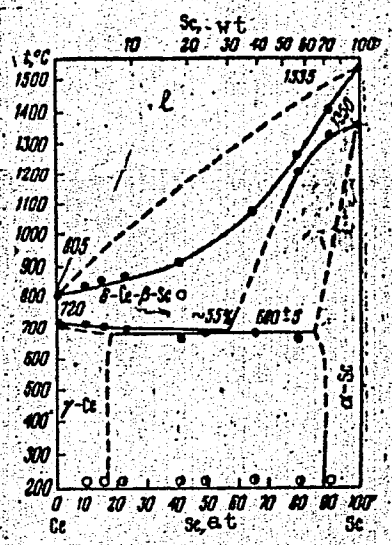

Fig. 2. Ce-Sc phase diagram (Dots indicate thermal-analysis data.)

Card 3/3

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"APPROVED FOR RELEASE: 03/14/2001 CIA-RDP86-00513R001447420003-6

L 15295-65 EWT(m)/EWP(b) AS(mp)-2/ESD(gs)/ESD(t) JD/JG
ACCESSION NR: AP4048304 S/0078/64/009/011/2594/2598

AUTHOR: Burov, I. V.; Chechernikov, V. I.; Savitskiy, Ye. M.; Pop Iuliu

TITLE: The cerium-gadolinium system

SOURCE: Zhurnal neorganicheskoy khimii, v. 9, no. 11, 1964, 2594-2598

TOPIC TAGS: cerium, gadolinium, cerium gadolinium alloy, paramagnetic susceptibility, alloy susceptibility temperature dependence, alloy phase diagram

ABSTRACT: To determine the suitability of the thermomagnetic method for purposes of physiochemical analysis of substances, the paramagnetic susceptibility (χ) of Ce-Gd alloys containing from 5 to 95 wt % Gd was investigated. The experimental data on the temperature dependence of $1/\chi$ showed that the properties of the investigated alloys do not follow the Curie-Weiss rule. The thermomagnetic data agreed well with the data obtained from differential thermal analysis of the alloys, and were found to be very useful in plotting the phase diagram of the Ce-Gd system. Thermomagnetic data were particularly useful for exact delineation of the boundaries of solid solutions on an α-Gd base. This is because the thermal analysis data are not stable in this region of the phase diagram, whereas the paramagnetic

Card 1/2

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"APPROVED FOR RELEASE: 03/14/2001 CIA-RDP86-00513R001447420003-6

L 15295-65
ACCESSION NR: AP4048304

susceptibility of α-Gd is appreciably higher than that of γ-Ce. Orig. art. has: 3 figures and 3 tables.

ASSOCIATION: none

SUBMITTED: 28Mar63 ENCL: 00 SUB CODE: MM, IC

NO REF SOV: 002 OTHER: 001 ATD PRESS: 3138

Card 2/2

APPROVED FOR RELEASE: 03/14/2001 CIA-RDP86-00513R001447420003-6"

"APPROVED FOR RELEASE: 03/14/2001 CIA-RDP86-00513R001447420003-6

L 25268-65 EWT(m)/EWP(t)/EWP(b) Pu-4 IJP(c) JD/JG

ACCESSION NR: AP5000497 S/0078/64/009/012/2738/2742

21
18
B

AUTHOR: Savitskiy, Ye. M.; Ty*lkina, M. A.; Khamidov, O. Kh.

TITLE: The palladium-molybdenum system

SOURCE: Zhurnal neorganicheskoy khimii, v. 9, no. 12, 1964, 2738-2742

TOPIC TAGS: palladium molybdenum system, phase diagram, palladium molybdenum system deformability, palladium molybdenum system conductance, palladium molybdenum compound

ABSTRACT: The phase diagram for this system, determined by the usual physicochemical analytic methods, is presented and discussed. A 50:50% alloy was prepared in an arc furnace under helium at 200-250 mm/Hg pressure. X-ray and microstructural studies of the phases were conducted on cast and annealed specimens (1400 C for 20 hours under vacuum); these were also studied after quenching at 1680 and 1450 C. The test equipment is described and the results figured. The phase diagram represents the peritectic type with 2 bounded solid solutions

Card 1/3

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"APPROVED FOR RELEASE: 03/14/2001 CIA-RDP86-00513R001447420003-6

L 25268-65

ACCESSION NR: AP5000497

and one metallic compound. The range of the α-solid solution at a temperature close to the m. p. included up to 33% molybdenum; the solubility did not change significantly upon lowering the temperature. All alloys in the cast and annealed state with a content of up to 30% molybdenum were single-phased and devoid of dendrite structure in the cast, polyhedral structure in the annealed state. All melts showed this range of one-phase solid solution with face-centered cubic lattice. The α-solid solution formed at 1700 ± 10 C. These alloys showed good deformability. Conductance increased with increasing content of molybdenum (from 18 for pure palladium to 130 microhm for 30% molybdenum) while the thermal coefficient of electrical resistance decreased from 2.5×10^{-3} to 1×10^{-4}. Both strength and deformability increased with the molybdenum content. The beta range was considerably narrower, from 17% Pd, close to the melting temperature, to 12% at 1400 C. Microstructural examinations showed that its content with dendrite structure increased with increase in molybdenum. One metal compound, with a 44 weight % of molybdenum, was detected; it was stable at high temperatures and had a hexagonal densely packed crystalline structure of the ε-phase. The compound formed upon peritectic reaction at 1750 ± 25 C and dissociated at

Card 2/3

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L 25268-65

ACCESSION NR: AP5000497

3

1425 ± 25 C into solid α and β solutions. "I. M. Lobyntseva, N. L. Pravoverov and V. P. Polyakova took part in this study." Orig. art. has: 1 table and 4 figures

ASSOCIATION: None

SUBMITTED: 24Jul64 ENCL: 00 SUB CODE: MM, GC

NR REF SOV: 003 OTHER: 003

Card 3/3

APPROVED FOR RELEASE: 03/14/2001 CIA-RDP86-00513R001447420003-6"

"APPROVED FOR RELEASE: 03/14/2001 CIA-RDP86-00513R001447420003-6

L 17089-65 EWT(m)/EPF(n)-2/EWP(b) Pu-4 ASD(m)-3/SSD/AFWL/ASD(f)-2/AFETR
WW/JD/JG

ACCESSION NR: AP5000163 S/0032/64/030/012/1501/1504

AUTHOR: Savitskiy, Ye. M.; Zakharov, A. M.

TITLE: Relationship between tensile strength and hardness of niobium alloys

SOURCE: Zavodskaya laboratoriya, v. 30, no. 12, 1964, 1501-1504

TOPIC TAGS: niobium, niobium alloy, tungsten containing alloy, molybdenum containing alloy, zirconium containing alloy, tensile strength, hardness, relationship

ABSTRACT: Niobium binary alloys containing 4.6% W or 5% Mo, ternary alloys containing 4.4% W and 4.2% Mo, 4.3% W and 1.24% Zr, or 4.6% Mo and 1.37% Zr, and quaternay alloys containing 2.56—14.8% W, 2.6—10.4% Mo, and 0.76—3.46% Zr were vacuum-arc melted, heat treated, and then tested for tensile strength and hardness at 20, 1300, 1400, and 1500C. The data obtained were used to determine the relationship between the tensile strength (σ_B) and hot hardness (H_K) of the alloys, to be used for preliminary evaluation of the tensile strength of alloys at high temperatures. Most of the alloys had a single-phase structure; some quaternary alloys contained 8—10% finely dispersed secondary phase $(W, Mo)_2Zr$. The value of the coefficient $K = \sigma_B/H_K$ was found to vary from 0.31 to 0.36 (0.34 av) at 20C and from 0.29 to 0.39 (0.36 av) at 1300—1500C. The results show that there is a

Card 1/2

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"APPROVED FOR RELEASE: 03/14/2001 CIA-RDP86-00513R001447420003-6

L 17089-65

ACCESSION NR: AP5000163

definite dependence in niobium and its alloys between tensile strength and hardness, which is characteristic for all ductile materials necking under tension. In graphs, this dependence represents a straight line whose maximum deviation does not exceed 8—10%. Hence, hot hardness measurements can be used to determine tentatively the tensile strength of refractory metals and alloys at high temperatures, provided that alloys have a single phase structure or contain small amounts of a secondary phase. Orig. art. has: 2 figures and 3 tables.

ASSOCIATION: Institut metallurgii im. A. A. Baykova (Institute of Metallurgy)

SUBMITTED: 00 ENCL: 00 SUB CODE: MM

NO REF SOV: 009 OTHER: 004 ATD PRESS: 3149

Card 2/2

APPROVED FOR RELEASE: 03/14/2001 CIA-RDP86-00513R001447420003-6"

"APPROVED FOR RELEASE: 03/14/2001 CIA-RDP86-00513R001447420003-6

L 11953-65 EWT(m)/EWP(b) ESD(t) JD/JG

ACCESSION NR: AP4046399 S/0056/64/047/003/0860/0864

AUTHORS: Belov, K. P.; Burov, I. V.; Yergin, Yu. V.; Ped'ko, A. V.; Savitskiy, Ye. M.

TITLE: Anomalies of Galvanomagnetic phenomena in gadolinium 27 B

SOURCE: Zhurnal eksperimental'noy i teoreticheskoy fiziki, v. 47, no. 3, 1964, 860-864

TOPIC TAGS: gadolinium, galvanomagnetic effect, magnetoresistance

ABSTRACT: To obtain more detailed data on the magnetic properties of gadolinium, the authors undertook measurements of the effect of a magnetic field on the electric resistance (even galvanomagnetic effect), as a function of field and temperature, for several polycrystalline samples and one single crystal of gadolinium. The measurements were made on cast, rolled, and drawn gadolinium 99.0--99.5% pure and annealed at 1200C. The transverse and longitudinal galvano-

Card 1/3

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L 11953-65
ACCESSION NR: AP4046399

magnetic effects were found to have a complex temperature dependence, much more complicated than observed by some of the authors (K. P. Belov and S. A. Nikitin, FMM v. 13, 43, 1962) in dysprosium or terbium. Two maxima of the negative galvanomagnetic effect were observed in the region of the Curie point, one corresponding to the Curie point itself (~290K) and due to intrinsic magnetization, and the other, higher and broader, located somewhat below the Curie point (~230--250K). A minimum of the negative galvanomagnetic effect is observed near 140--180K. At still lower temperatures, an additional maximum is observed below this temperature. In the single-crystal gadolinium a sharp difference was observed in the character of the galvanomagnetic effect curves parallel and perpendicular to the hexagonal axis, and this is interpreted as being due to a helicoidal ferromagnetic structure. Orig. art. has: 5 figures.

ASSOCIATION: Moskovskiy gosudarstvenny*y universitet (Moscow State University)

Card 2/3

APPROVED FOR RELEASE: 03/14/2001 CIA-RDP86-00513R001447420003-6"

"APPROVED FOR RELEASE: 03/14/2001 CIA-RDP86-00513R001447420003-6

L 11953-65

ACCESSION NR: AP4046399

SUBMITTED: 04Apr64 ENCL: 00

SUB CODE: SS, MM NR REF SOV: 005 OTHER: 006

Card 3/3

APPROVED FOR RELEASE: 03/14/2001 CIA-RDP86-00513R001447420003-6"

"APPROVED FOR RELEASE: 03/14/2001 CIA-RDP86-00513R001447420003-6

L 20368-65 EWT(m)/EPF(n)-2/T/EWP(t)/EWP(b) Pu-4 AFWL/IJP(c)/
ASD(f)-3/ASD(m)-3/AFTC(p)/ESD(t) JD/JG
ACCESSION NR: AP5001522 S/0020/64/159/005/1137/1139

AUTHOR: Savitskiy, Ye. M.; Bokareva, N. N.

TITLE: Effect of plastic deformation on the fine structure of molybdenum single crystals

SOURCE: AN SSSR. Doklady, v. 159, no. 5, 1964, 1137-1139, and insert facing p. 1119

TOPIC TAGS: molybdenum, single crystal, single crystal structure, zone refining, plastic deformation, cold rolling, microstructure

ABSTRACT: Molybdenum single crystals, 99.77%-pure, obtained by electron-beam zone refining from twice vacuum-arc-melted molybdenum, were cold rolled with a 2% max reduction per pass. The single crystals were highly ductile and at room temperature sustained a total reduction of more than 90% without failure. A study of deformation-induced changes in the single-crystal substructure revealed fragmentation and disorientation of the blocks whose boundaries were in the

Card 1/2

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"APPROVED FOR RELEASE: 03/14/2001 CIA-RDP86-00513R001447420003-6

L20368-65
ACCESSION NR: AP5001522

active slip planes. With increasing degree of deformation, the blocks turn in the direction of the force and the disorientation increases. A fibrous structure begins to form with a deformation greater than 80%. No hardness anisotropy was observed in as-cast single crystals. The microhardness along the (100), (110), and (111) planes was 156—157 kg/mm^2. The density of the etch pits was on the order of $10^3/cm^2$ in both the (100) and (111) planes. Orig. art. has: 1 figure.

ASSOCIATION: Institut metallurgii im. A. A. Baykova (Institute of Metallurgy)

SUBMITTED: 23Jun64 ENCL: 00 SUB CODE: SS, MM

NO REF SOV: 002 OTHER: 000 ATD PRESS: 3163

Card 2/2

APPROVED FOR RELEASE: 03/14/2001 CIA-RDP86-00513R001447420003-6"

"APPROVED FOR RELEASE: 03/14/2001 CIA-RDP86-00513R001447420003-6

L 34115-65 EWT(m)/EWP(w)/EPF(n)-2/EWG(m)/EWA(d)/EWA(d)/EPR/T/EWP(t)/EWP(k)/EWP(b)/EWA(c) IJP(c) JD/HW/JG/GS

ACCESSION NR: AT4048691 S/0000/64/000/000/0007/0014

38
B+1

AUTHOR: Savitskiy, Ye. M. (Professor, Doctor of chemical sciences)

TITLE: The status and problems of research on the alloys of the rare earth metals

SOURCE: Vsesoyuznoye soveshchaniye po splavam redkikh metallov, 1963. Voprosy teorii i primeneniya redkozemel'nykh metallov (Problems in the theory and use of rare-earth metals); materialy soveshchaniya. Moscow, Izd-vo Nauka, 1964, 7-14

TOPIC TAGS: rare earth, rare earth alloy, yttrium, scandium, rare earth crystal structure, phase diagram, alloy mechanical property

ABSTRACT: In a very general review of the theoretical work carried outsince 1957 in both the Soviet Union and the West on the properties and uses of the rare earth metals, the author emphasizes the work of the Metallurgicheskiy institut im. A. A. Baykova (Metallurgical institute), the Otdel tsvetnoy metallurgii Komiteta po koordinatsii nauchnykh rabot RSFSR (Nonferrous metallurgy department, Committee on the coordination of scientific work, RSFSR), the Komitet po chernoy i tsvetnoy metallurgii pri Gosplane SSSR (Committee on ferrous and nonferrous metallurgy, State planning commission, SSSR), and the Gosudarstvennyy institut redkikh metallov (State rare metals institute) on the physical properties of the rare earths

Card 1/2

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"APPROVED FOR RELEASE: 03/14/2001 CIA-RDP86-00513R001447420003-6

L 34115-65
ACCESSION NR: AT4048691

and their alloys. Among the fields in which considerable work has been done and in which further study is proposed are: 1) the properties of pure rare-earth metals as well as of scandium and yttrium at low and high temperatures and at ordinary and high pressures to determine their applicability in new technological areas; 2) the crystal structure and structural diagrams of the rare-earth metals in order to find metal compounds with special physical-chemical properties; 3) the structure and physical-chemical properties of rare-earth metal alloys with each other and with other metals, and the mechanism of the distinct effect of alloying additions of rare-earth metals and their mixtures on the structure and properties of alloys made of magnesium aluminum, copper, iron, nickel, manganese, titanium, chromium, molybdenum, vanadium niobium, and tungsten. Special attention should be paid to studies of the deoxidation of rare-earth refractory metals of the VA and VIA groups in order to reduce the temperature of transition into the brittle state; 4) finally, the economic effects of the application of rare-earth metals in industry.

ASSOCIATION: None

SUBMITTED: 13Jun64 ENCL: 00 SUB CODE: MM, IC

NO REF SOV: 002 OTHER: 000

Card 2/2

APPROVED FOR RELEASE: 03/14/2001 CIA-RDP86-00513R001447420003-6"

"APPROVED FOR RELEASE: 03/14/2001 CIA-RDP86-00513R001447420003-6

SAVITSKIY, Ye.M.; BARON, V.V.; DUYSEMALIYEV, U.K.; YEFIMOV, Yu.V.

Phase diagram of the system vanadium - copper. Vest. AN Kazakh. SSR 20 no.7:38-44 Jl '64. (MIRA 17:11)

APPROVED FOR RELEASE: 03/14/2001 CIA-RDP86-00513R001447420003-6"

"APPROVED FOR RELEASE: 03/14/2001 CIA-RDP86-00513R001447420003-6

L 25326-65 EWT(m)/EWP(w)/EPF(n)-2/EWA(d)/T/EWP(t)/EWP(b) Pu-4 IJP(c)
JD/WW/JG

ACCESSION NR: AP5003501 S/0148/65/000/001/0104/0109

36
35
B

AUTHOR: Savitskiy, Ye. M.; Zakharov, A. M.

TITLE: Mechanical properties of quaternary alloys of the Nb-W-Mo-Zr system at 1000—1600C

SOURCE: IVUZ. Chernaya metallurgiya, no. 1, 1965, 104-109

TOPIC TAGS: niobium, niobium alloy, tungsten containing alloy, molybdenum containing alloy, zirconium containing alloy, quaternary niobium alloy, hardness, mechanical property, alloy structure

ABSTRACT: A series of Nb alloys containing W, Mo, and Zr have been investigated. On the basis of preliminary experiments several alloys (see Fig. 1 of the Enclosure) were selected for further examination. The quaternary alloys of the Nb-W-Mo-Zr system had the highest mechanical properties due to a more complex composition of solid solution and the presence of $(W, Mo)_2Zr$ strengthening phase in their structure. An analysis of the test data showed a correlation between the tensile strength, σ_B, and hardness of alloys, expecially at 1300—1500C. For Vickers hardness, $\sigma_B = 0.34$ HV. Orig. art. has: 3 figures and 2 tables. [MS]

Card 1/3

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"APPROVED FOR RELEASE: 03/14/2001 CIA-RDP86-00513R001447420003-6

L 25326-65

ACCESSION NR: AP5003501

ENCLOSURE: 01

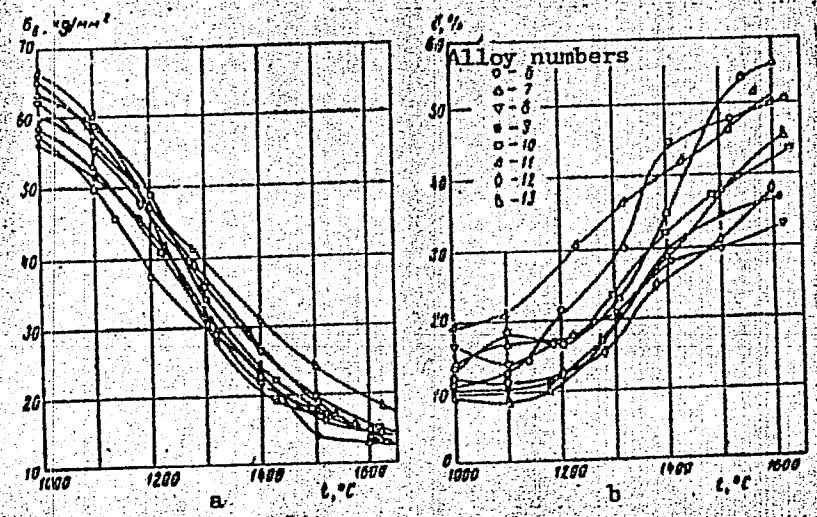

Fig. 1. Temperature dependence of the mechanical properties of quaternary alloys of the Nb-W-Mo-Zr system at 1000—1600C

a - Tensile strength; b - elongation.

Card 3/3

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"APPROVED FOR RELEASE: 03/14/2001 CIA-RDP86-00513R001447420003-6

L 44143-65 EPF(c)/EPF(n)-2/EWA(c)/EWT(m)/EWP(b)/T/EWP(t) Pr-4/Pu-4 IJP(c)
WW/JD/JG

ACCESSION NR: AP5009272 S/0370/65/000/001/0151/0159

32
B

AUTHOR: Zakharov, A. M.; (Moscow); Savitskiy, Ye. M. (Moscow)

TITLE: Investigation of the ternary W-Mo-Zr phase diagram

SOURCE: AN SSSR. Izvestiya. Metally, no. 1, 1965, 151-159

TOPIC TAGS: tungsten base alloy, molybdenum containing alloy, zirconium containing alloy, molybdenum base alloy, tungsten containing alloy, zirconium containing alloy, zirconium base alloy

ABSTRACT: A series of the W-Mo-Zr alloys were melted from 99.95%-pure W, 99.95%-pure Mo, and 99.7%-pure iodide Zr in an arc furnace with a nonconsumable tungsten electrode, in a helium atmosphere, at a pressure of 200 mm Hg. The investigated binary W-Zr alloys contained from 3.36 to 18.40 wt% Zr, binary Mo-W alloys contained from 18.62 to 80.78 wt% Mo, and binary Mo-Zr alloys contained from 2.52 to 31.1 wt% Zr; the ternary W-Mo-Zr alloys contained W and Zr in the 4:1, 1:1, and 1:4 ratios. The investigation results showed that the mutual solubility of W, Mo, and Zr in the solid state appreciably decreased with decreasing temperature. For example, the total solu-

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L 44143-65

ACCESSION NR: AP5009272

bility of W and Mo (1:1 ratio) in Zr was 7.5 and 5.0 wt% at 1500 and 1000C, respectively; the solubility of Zr in W and Mo (in the alloys along the same section) was 3.5—4.0 and 2.5 wt% at 1800 and 1000C, respectively. The alloys tested had a single- or two-phase structure. The single-phase alloys were ternary α- or β-solid solutions of Zr in W and Mo, or W and Mo in Zr, respectively. The two-phase alloys, in addition to the α- or β-solid solutions, contained solid solutions of the W_2Zr and Mo_2Zr compounds. The ternary peritectic and eutectic transformations, which occur in the ternary alloys at 2260—1890 and 1640—1570C, respectively, can be described as $L + \alpha \rightarrow (W, Mo)_2Zr$ and $L \rightarrow \beta + (W, Mo)_2Zr$. Orig. art. has: 5 figures and 1 table. [MS]

ASSOCIATION: none

SUBMITTED: 15Sep64 ENCL: 00 SUB CODE: MM

NO REF SOV: 008 OTHER: 007 ATD PRESS: 3247

Card 2/2

APPROVED FOR RELEASE: 03/14/2001 CIA-RDP86-00513R001447420003-6"

"APPROVED FOR RELEASE: 03/14/2001 CIA-RDP86-00513R001447420003-6

L 52705-65 EWT(m)/EWP(w)/EPF(c)/EPF(n)-2/EWA(d)/T/EWP(t)/EWP(b)/EWA(c) Pu-4
IJP(c) JD/JG/WB
ACCESSION NR: AP5013120 UR/0370/65/000/002/0159/0166
669.017.13

AUTHOR: Savitskiy, Ye. M. (Moscow, L'vov); Baron, V. V. (Moscow, L'vov); Bychkova, M. I. (Moscow, L'vov); Bakuta, S. A. (Moscow, L'vov); Gladyshevskiy, Ye. I. (Moscow, L'vov)

TITLE: Phase diagram and certain properties of alloys of the Nb-Mo-Si system

SOURCE: AN SSSR. Izvestiya. Metally, no. 2, 1965, 159-166

TOPIC TAGS: niobium alloy, molybdenum containing alloy, silicon containing alloy, alloy phase composition, alloy structure, alloy hardness, alloy oxidation resistance, alloy oxidation, alloy property

ABSTRACT: The phase composition and oxidation resistance of 117 alloys of the Nb-Mo-Si system have been investigated. The composition of the alloys tested corresponded to the $NbSi_2$-$MoSi_2$, NbSi-MoSi, Nb_5Si_3-Mo_5Si_3, Nb_3Si-Mo_3Si, Nb-$MoSi_2$, Mo-$NbSi_2$, and (Nb, Mo)-Si sections of the ternary diagram. No ternary compounds were found in the system.

Card 1/3

APPROVED FOR RELEASE: 03/14/2001 CIA-RDP86-00513R001447420003-6"

"APPROVED FOR RELEASE: 03/14/2001 CIA-RDP86-00513R001447420003-6

L 52705-65

ACCESSION NR: AP5013120

The $NbSi_2$ and $MoSi_2$ disilicides form a quasi-binary eutectic-type system with a limited solubility of the components; $NbSi_2$ dissolved 24 at% Mo (72 mol% $MoSi_2$) and $MoSi_2$ dissolved 3 at% Nb (about 9 mol% $NbSi_2$). Between the high-temperature modification β-Nb_5Si and the Mo_5Si_3 occurs a mutual isomorphous substitution of Nb and Mo atoms in the lattice of the compounds in the entire concentration range. In annealed alloys the Nb_5Si_3 compound was in the form of a low-temperature modification α-Nb_5Si_3. At 800C, there are limited solid solutions: α-Nb_5Si_3 containing about 2 mol% Mo_5Si_3, and Mo_5Si_3 containing 60 at% Nb (96 mol% Nb_5Si_3). The Mo_3Si compound dissolves up to 20 at% Nb. The Nb_4Si compound was found to exist in pure form and also in equilibrium with a Nb-base solid solution in the cast and annealed alloys. The Nb_4Si compound dissolved little or no Mo, and does not form at an Mo-content higher than 4 at%. In $NbSi_2$-$MoSi_2$ alloys the hardness of the $NbSi_2$ compound varied from 460 to 800 kg/mm^2. The high-temperature modification of the Nb_5Si_3 compound had a hardness of 840 kg/mm^2; the low-temperature modification had the highest hardness — 1100 kg/mm^2. The oxidation resist-

Card 2/3

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L 52705-65

ACCESSION NR: AP5013120 0

ance of the $NbSi_2$ compound increased with additions of up to 5 at% Mo. The $MoSi_2$ compound alloyed with 0.5 wt% Nb had the highest oxidation resistance; in air at 1200C its weight gain was 0.05 $mg/cm^2 \cdot hr$. Orig. art. has: 6 figures and 2 tables. [MS]

ASSOCIATION: none

SUBMITTED: 16Sep64 ENCL: 00 SUB CODE: MM

NO REF SOV: 007 OTHER: 012 ATD PRESS: 4012

Card 3/3

APPROVED FOR RELEASE: 03/14/2001 CIA-RDP86-00513R001447420003-6"

"APPROVED FOR RELEASE: 03/14/2001 CIA-RDP86-00513R001447420003-6

L 34904-65 EWT(m)/EWP(w)/EPF(n)-2/EWA(d)/T/EWP(t)/EWP(b) Pu-4 IJP(c) WW/JD/JG

ACCESSION NR: AP5007000 S/0129/65/000/003/0008/0016

33
31
10

AUTHOR: Savitskiy, Ye. M.; Zakharov, A. M.

TITLE: Investigation of the mechanical properties of alloys of the Nb-W-Mo-Zr system

SOURCE: Metallovedeniye i termicheskaya obrabotka metallov, no. 3, 1965, 8-16

TOPIC TAGS: ternary niobium alloy, quaternary niobium alloy, niobium alloy, tungsten containing alloy, molybdenum containing alloy, zirconium containing alloy, alloy hardness, alloy mechanical property, alloy hot hardness, alloy strength

ABSTRACT: Small ingots (60—70g) of binary, ternary, and quaternary niobium-base alloys, containing a total of up to 30 wt% W, Mo, and Zr, were melted from sintered 99.42%-pure Nb, 99.95%-pure W, 99.95%-pure Mo, and 99.7%-pure iodide zirconium. Ternary Nb-W-Zr alloys contained tungsten and zirconium in 4:1, 1:1, and 1:3 ratios; in ternary Nb-Mo-Zr alloys, the molybdenum-zirconium ratios were 2.1:1, 1:1, and 1:3. The investigated quaternary alloys were located along four primary sections of the Nb-W-Mo-Zr concentration tetrahedron parallel to the face of the W-Mo-Zr system, and contained a total of 10, 15, 20, and 30% W, Mo, and Zr. Suitably heat-treated alloys were tested for hardness at 1500C, and the alloys with the highest

Card 1/3

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L 34904-65

ACCESSTION NR: AP5007000

hot hardness were subjected to tension tests at 1000—1600C. The room temperature hardness increased most with additions of Zr, and to a smaller extent with additions of W or Mo. The hot hardness (at 1500C), however, increased most with the addition of W, less with the addition of Mo, and least of all with the addition of Zr. Binary Nb-W and Nb-Mo alloys containing more than 30% W or Mo, and Nb-Zr alloys with 30% Zr had the highest hot hardness. The addition of Zr to Nb-W alloys noticeably lowered the solidus temperature and hot hardness. In the Nb-Mo-Zr system, alloys located along the $Nb-Mo_2Zr$ section had the highest hot hardness. The composition dependence of the hot hardness of quaternary Nb-W-Mo-Zr alloys follows generally the same pattern as that of ternary Nb-W-Zr and Nb-Mo-Zr alloys. The maximum hot hardness was shown by alloys containing Mo and Zr in the 2.1:1 ratio and 5—10 wt% W, and by alloys containing 2.5—7.5% Mo and up to 2.5% Zr at a variable W content. Of the investigated binary and ternary alloys, a ternary alloy containing 4.4% W and 4.2% Mo had the highest tensile strength: 32, 21, and 11 kg/mm² at 1150, 1300, and 1500C, respectively. The elongation of binary and ternary alloys increased from 12—17% at 1000C to 40—50% at 1500C. The investigated quaternary alloys had a tensile strength of 30—60 and 7—19 kg/mm² at 1000—1200 and 1500—1600C, and an elongation of 10—20% at 1000C and 30—50% at 1500—1600C. The alloy containing 14.8% W, 3.4% Mo, and 1.8% Zr had the highest strength at 1200 to

Card 2/3

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"APPROVED FOR RELEASE: 03/14/2001 CIA-RDP86-00513R001447420003-6

L 34904-65

ACCESSION NR: AP5007000

1600C: 40 kg/mm² at 1300C and 19 kg/mm² at 1600C at an elongation of 38—45% at 1500—1600C. For niobium and its alloys, the relation between tensile strength and hardness is linear. Orig. art. has: 4 figures and 3 tables. [MS]

ASSOCIATION: Institut metallurgii im. A. A. Baykova (Institute of Metallurgy)

SUBMITTED: 00 ENCL: 00 SUB CODE: MM

NO REF SOV: 006 OTHER: 007 ATD PRESS: 3212

Card 3/3

APPROVED FOR RELEASE: 03/14/2001 CIA-RDP86-00513R001447420003-6"

"APPROVED FOR RELEASE: 03/14/2001 CIA-RDP86-00513R001447420003-6

L 58944-65 EWT(m)/EWP(w)/EWA(d)/T/EWP(t)/EWP(b)/EWA(c) IJP(c) JD/JG

ACCESSION NR: AP5017473

UR/0370/65/000/003/0128/0130

669.017.12

AUTHOR: Terekhova, V. F. (Moscow); Maslova, E. V. (Moscow); Savitskiy, Ye. M. (Moscow)

TITLE: Phase diagram of the iron-neodymium system

SOURCE: AN SSSR. Izvestiya. Metally, no. 3, 1965, 128-130

TOPIC TAGS: iron, neodymium, iron neodymium system, iron neodymium alloy, alloy phase diagram, alloy structure, alloy hardness

ABSTRACT: Iron-neodymium alloys containing 0—100 wt% Nd were vacuum melted from 99.9%-pure Fe and 99.0%-pure Nd in a nonconsumable tungsten electrode arc furnace in an atmosphere of helium, under a pressure of 300—400 mm Hg. Depending on the composition, the alloys were vacuum annealed at temperatures ranging from 900 to 600C for 130 hr and subjected to various methods of physicochemical analysis. On the basis of the results obtained, a phase diagram of the Fe-Nd system (see Fig. 1 of the Enclosure) was plotted. The alloy containing 24 wt% Nd was found to be a single-phase chemical compound corresponding to the stoichiometric Nd_2Fe_{17} composition. A second chemical compound was found in alloys containing more than 50 wt% Nd. The

Card 1/3

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"APPROVED FOR RELEASE: 03/14/2001 CIA-RDP86-00513R001447420003-6

L 53944-65

ACCESSION NR: AP5017473

largest amount of this compound was in alloys similar in composition to $NdFe_2$ compound. A fine-grain eutectic was observed in the system at 88.5% Nd. The Nd_2Fe_{17} and $NdFe_2$ compounds are formed with peritectic reactions at 1185 and 1130 ± 10C, respectively. Nd_2Fe_{17} has a Th_2Zn_{17}-type structure with the lattice parameters a = 8.59 Å, c = 12.47 Å, and c/a = 1.451. The structure of the second metallic compound has not yet been identified, but preliminary data show it is not a Laves phase. Additions of Nd increase the hardness of α-iron solid solutions. With increasing content of the second phase, the hardness of the alloy increased. In the concentration range of 15—60 wt% Nd, the alloys became very brittle. The microhardness of Nd_2Fe_{17} was 730 kg/mm^2 and that of $NdFe_2$, 560 kg/mm^2. Orig. art. has: 2 figures. [WW]

ASSOCIATION: none

SUBMITTED: 06Jul64 ENCL: 01 SUB CODE: MM, SS

NO REF SOV: 002 OTHER: 003 ATD PRESS: 4051

Card 2/3

APPROVED FOR RELEASE: 03/14/2001 CIA-RDP86-00513R001447420003-6"

"APPROVED FOR RELEASE: 03/14/2001 CIA-RDP86-00513R001447420003-6

L 41417-65 EWT(m)/EWP(w)/EWA(d)/T/EWP(t)/EWP(z)/EWP(b) IJP(c) JD/JG

ACCESSION NR: AP5009370 S/0363/65/001/002/0208/0210

26
24
B

AUTHOR: Savitskiy, Ye. M.; Baron, V. V.; Yefimov, Yu. V.; Gladyshevskiy, Ye. I.

TITLE: Investigation of the structure and properties of alloys of the V_3Si-V_3Sn system

SOURCE: AN SSSR. Izvestiya. Neorganicheskiye materialy, v. 1, no. 2, 1965, 208-210

TOPIC TAGS: vanadium, silicon, tin, vanadium alloy, silicon containing alloy, tin containing alloy, alloy property, superconducting alloy

ABSTRACT: The V_3Si-V_3Sn alloys containing 75 at% V, 5—25 at% Si, and 5—25 at% Sn (99.8%-pure vanadium and silicon, and 99.9%-pure tin) have been investigated. It was found that continuous series of solid solutions are formed between superconductors V_2Si and V_3Sn. Microstructure and x-ray analyses showed that Si atoms are substituted by Sn atoms. The temperature of transition into the superconducting state drops from 12.85 to 6.4K with increasing Sn content. There is a correlation between temperature of transition into the super-

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L 41417-65

ACCESSION NR: AP5009370

conducting state, the crystal-lattice parameter, and the content of tin (see Fig. 1 of the Enclosure). All investigated alloys are superconductors and have the same electron concentration. Orig. art. has: 1 figure and 1 table. [ND]

ASSOCIATION: Institut metallurgii im. A. A. Baykova (Institute of Metallurgy); L'vovskiy gosudarstvenyy universitet im. Franko (L'vov State University)

SUBMITTED: 24Aug64 ENCL: 01 SUB CODE: MM

NO REF SOV: 004 OTHER: 004 ATD PRESS: 3234

Card 2/3

APPROVED FOR RELEASE: 03/14/2001 CIA-RDP86-00513R001447420003-6"

"APPROVED FOR RELEASE: 03/14/2001 CIA-RDP86-00513R001447420003-6

L 47750-65 EWT(1)/EWT(m)/EPF(n)-2/T/EWP(t)/EWP(b)/EWA(c) Pu-4 IJP(c)
JD/JG/GG

ACCESSION NR: AP5011931 UR/0363/65/001/003/0354/0361

53

AUTHOR: Savitskiy, Ye. M.; Baron, V. V.; Yefimov, Yu. V.; Gladyshevskiy, Ye. I. 51 B

TITLE: Solubility of certain transition metals in V_3Si compound and their effect on the temperature of transition of the compound into superconducting state 21

SOURCE: AN SSSR. Izvestiya. Neorganicheskiye materialy, v. 1, no. 3, 1965, 354-361

TOPIC TAGS: vanadium silicide compound, transition metal containing compound, transition metal solubility, vanadium silicide superconductivity, superconductivity transition temperature

ABSTRACT: The solubility of Mo, Cr, Nb, Mn, Ti, Zr, Re, Pd, Ce, and La in V_3Si-base alloys arc melted in a helium atmosphere or synthesized by the powder metallurgy method has been investigated, and the critical temperature of transition into the superconducting state (T_c) of several of the alloys has been measured. An investigation of the solubility of the additives in V_3Si along the V_3Si—Me_3Si sections of the ternary V-Me-Si systems revealed the formation of substitutional solid solutions in which the transition-metal atoms occupy the sites of vanadium atoms in the V_3Si crystal lattice. Continuous series of V_3Si—Mo_3Si and V_3Si—Cr_3Si solid solutions are formed in the presence of isostructural compounds and favorable dimensional and

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L 47750-65 2

ACCESSION NR: AP5011931

electrochemical factors. The limit solubility of other transition metals directly depended on the dimensional and electrochemical factors. Mn, Nb, and Ti, the nearest to V in the periodic table, had the highest solubility in V_3Si. Re, Pd, and Fe, whose atomic radii differ least from that of V, had a substantial solubility in V_3Si. In general, at dissolving transition metals, the relationships in forming ternary solid solutions on a V_3Si base are identical with those for binary solid solutions. The binary V_3Si compound had the highest T_c. Partial substitution of vanadium atoms in the V_3Si lattice for atoms of any transition metal decreased the T_c, but the cause of this phenomenon has not yet been determined. For the V_3Si-base ternary solid solutions no correlation was established between the T_c changes and the change in the dimension of the solute atom or the mean electron concentration. [MS]
Orig. art. has: 4 figures and 3 tables.

ASSOCIATION: Institut metallurgii im. A. A. Baykova (Institute of Metallurgy); L'vovskiy gosudarstvennyy universitet im. I. Franko (L'vov State University)

SUBMITTED: 06Oct64 ENCL: 00 SUB CODE: MM

NO REF SOV: 011 OTHER: 010 ATD PRESS: 4004

Card 2/2

APPROVED FOR RELEASE: 03/14/2001 CIA-RDP86-00513R001447420003-6"

"APPROVED FOR RELEASE: 03/14/2001 CIA-RDP86-00513R001447420003-6

SAVITSKIY, Ye.M.; ZAKHAROV, A.M.

Mechanical properties of alloys in the quaternary system Nb - W - Mo - Zr at temperatures of 1000 - 1600° C. Izv. vys. ucheb. zav.; chern. met. 8 no.1:104-109 '65 (MIRA 18:1)

1. Institut metallurgii im. Baykova, Moskva.

APPROVED FOR RELEASE: 03/14/2001 CIA-RDP86-00513R001447420003-6"

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L 57813-65 EWT(m)/EWP(b)/T/EWA(d)/EWP(w)/EWP(t) IJP(c) JD/JG

ACCESSION NR: AP5008796

S/0126/65/019/003/0466/0468
539.292; 548.0:538

34
33
B

AUTHOR: Pop, I.; Chechernikov, V. I.; Naumkin, O. P.; Savitskiy, Ye. M.

TITLE: Magnetic properties of Er-Sc alloys

SOURCE: Fizika metallov i metallovedeniye, v. 19, no. 3, 1965, 466-468

TOPIC TAGS: nonferrous metal alloy, antiferromagnetic material, metal magnetic property

ABSTRACT: Procedures employed in the preparation of test specimens of Er-Sc alloys are described. An investigation of the temperature dependence of the magnetic permeability indicated it is possible that an antiferromagnetic exchange reaction occurs in these alloys as in alloys of Er-Yt. In alloys with a high content of erbium, antiferromagnetism is basically conditioned by the properties of erbium among which there is a complex spin-spiral structure in which antiferromagnetic reactions occur in addition to the positive reactions. The paramagnetic properties of these alloys are basically conditioned by the localized f-electrons whereby the change of permeability follows the Curie-Weiss law, with a term independent of temperature. This

Card 1/2

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ACCESSION NR: AP5008796

causes a sharp reduction in the slope of $1/\chi$-to-T curves. Any conclusions concerning the existence of antiferromagnetism in alloys with high contents of scandium would be premature even though the Curie paramagnetic point is less than zero. Orig. art. has: 2 figures, 1 table.

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

SUBMITTED: 20Apr64 ENCL: 00 SUB CODE: MM, EM

NO REF SOV: 003 OTHER: 002

Card 2/2

APPROVED FOR RELEASE: 03/14/2001 CIA-RDP86-00513R001447420003-6"

"APPROVED FOR RELEASE: 03/14/2001 CIA-RDP86-00513R001447420003-6

L 62958-65 EWT(1)/EWT(m)/T/EWP(t)/EEC(b)-2/EWP(z)/EWP(b) IJP(c) JD/HW/GG

ACCESSION NR: AP5013442 UR/0020/65/162/001/0064/0066

46
42
B

AUTHOR: Popov, N. M.; Savitskiy, Ye. M.; Tsarev, G. L.
44,55 44,55 44,55

TITLE: Observation of fine structure of single crystals of tungsten by microdiffraction of ultrafast electrons
55 18 44,27

SOURCE: AN SSSR. Doklady, v. 162, no. 1, 1965, 64-66

TOPIC TAGS: tungsten, single crystal, fine structure, electron diffraction analysis, fast particle, particle diffraction

ABSTRACT: Single crystals of tungsten 99.97% pure (estimated impurity content is ~0.001% oxygen and nitrogen) were grown by electron beam zone melting. Samples 0.3μ thick, parallel and perpendicular to the <100> axis were prepared by electrolytic polishing in 2% NaOH. The specimens were studied with an electron microscope diffraction camera using 557 kev electrons (wavelength 0.016 Å), capable of recording on the same photograph both a picture and a diffraction spectrum of a portion of the specimen. The use of high energy electrons makes it possible to study thicker specimens so that dislocations and inclusions of foreign phases may be more easily observed. Ultrafast electrons also give better contrast in the photographs. The specimens were found to have inclusions varying in size from 0.5μ to 2.5μ. Diffrac-

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L 62958-65

ACCESSION NR: AP5013442

tion spectra of these inclusions showed, in addition to tungsten, reflections characteristic of the compound W_2C. Also in specimens cut perpendicular to the growth axis <100>, a cellular growth structure with a cell size of 0.2 to 0.4μ was observed. The formation of this structure is caused by reduction of the freezing point by impurities. Diffraction spectra showed that the cell boundaries were rich in impurities, particularly in the W_2C phase. To introduce dislocations some samples were subjected to slight bending. Both screw and edge dislocations were observed. Dislocations whose ends lay along lines in the <110> direction were identified as screw type. The edge dislocations appeared to form at impurity regions. Orig. art. has: 4 figures.

ASSOCIATION: Institut metallurgii im. A. A. Baykova (Institute of Metallurgy)

SUBMITTED: 16Nov64 ENCL: 00 SUB CODE: SS

NO REF SOV: 008 OTHER: 001

Card 2/2

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"APPROVED FOR RELEASE: 03/14/2001 CIA-RDP86-00513R001447420003-6

L 3417-66 EWT(m)/EWP(w)/T/EWP(t)/EWP(b)/EWA(c) IJP(c) JD/JG/GS

ACCESSION NR: AT5023099 UR/0000/65/000/000/0250/0254

70
60
B+1

AUTHOR: Savitskiy, Ye. M.; Babareko, A. A.; T'ao, Tsu-ts'ung

TITLE: Crystal-structure defects and density of dislocations in molybdenum of different degrees of purity following its filing

SOURCE: Problemy bol'shoy metallurgii i fizicheskoy khimii novykh splavov (Problems of large-scale metallurgy and physical chemistry of new alloys) k 100-letiyu so dnya rozhdeniya akademika M. A. Pavlova, Moscow, Izd-vo Nauka, 1965, 250-254

TOPIC TAGS: crystal structure, molybdenum, coherent scattering, crystal defect

ABSTRACT: The clarification of the physical nature of the effect of interstitial impurities on the plasticity of Mo is of major interest. In this connection, the authors present the results of an experimental investigation of the structural defects caused by deformation and the distribution of dislocation in Mo containing different amounts of impurities (0.023, 0.002, 10^{-4}% oxygen and, in one case, 0.1% La). Specimens for X-ray examination were obtained by filing the ingots, with screening of powder through a 300-mesh sieve. On the basis of an examination of

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L 3417-66

ACCESSION NR: AT5023099

the interference maxima of the metal during deformation, obtained through monochromatic copper K_α-emission by means of automatic recording with an URS-501 spectrometer, the crystal-structure defects were evaluated. It was established that the dimensions of the regions D of coherent scattering for commercial molybdenum (0.023% O) are roughly 3 times as large as for ultra-pure molybdenum (10^{-4}% O) and the microdeformation is 1.5 times as high. According to the theory of dislocations, the crystal-structure defects detected by this method are conditioned by the increase in the density of dislocations on deformation. Dislocations form the boundaries of the regions of coherent scattering and cause internal stresses in the lattice. Hence, the density of dislocations in deformed molybdenum may be determined according to the dimensions of the regions D and the magnitude of microdeformation. Approximate formulas of the elastic deformation of lattice as a function of density of dislocations are presented. It is shown that for ultra-pure Mo the density of dislocations ρ_D, calculated according to the dimensions of D, coincides with the calculated extent of microdeformation $\Delta a/a$. On the basis of these findings, it turns out that the distribution of dislocations in ultra-pure molybdenum is random so far as the nature of their interactions is concerned, whereas in commercial Mo and in the alloy Mo + 0.1% La the dislocations are arrayed in pile-ups whose formation is associated with the growth of the fields.

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L 3417-66

ACCESSION NR: AT5023099

of elastic stresses. These pile-ups are due to the presence of impurities, and they lead to stress concentrations which is the reason why commercial Mo is so brittle. By contrast, ultra-pure Mo, which lacks such pile-ups, is more plastic and its D regions are smaller. "The authors are indebted to L. N. Guseva for her active assistance, as well as to V. P. Fedotov for handling the gas analysis of Mo specimens." Orig. art. has: 3 tables, 4 formulas.

ASSOCIATION: none

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NR REF SOV: 005

ENCL: 00

OTHER: 002

SUB CODE: SS, MM

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"APPROVED FOR RELEASE: 03/14/2001 CIA-RDP86-00513R001447420003-6

L 4440-66 EPA(s)-2/EWT(m)/EWP(w)/EPF(n)-2/T/EWP(t)/EWP(b) - IJP(c) JD/WW/JG/GS

ACC NR: AT5023100 SOURCE CODE: UR/0000/65/000/000/0255/0260

AUTHOR: Savitskiy, Ye. M.; Kim, T. A.

44,55 44,55

ORG: none

54
B+1

TITLE: Investigation of the changes in the microstructure and mechanical and electrical properties of copper-aluminum and magnesium-silicon alloy with substitution of the eutectic

18 27 44,55,27 44,55 27 27

SOURCE: Problemy bol'shoy metallurgii i fizicheskoy khimii novykh splavov (Problems of large-scale metallurgy and physical chemistry of new alloys); k 100-letiyu so dnya rozhdeniya akademika M. A. Pavlova. Moscow, Izd-vo Nauka, 1965, 255-260

TOPIC TAGS: copper alloy, aluminum containing alloy, magnesium alloy, silicon containing alloy, alloy eutectic, eutectic substitution, substituted eutectic alloy, alloy structure, alloy mechanical property

ABSTRACT: The effect of substitution of low-melting eutectic 16 on the structure and mechanical properties of copper-aluminum and magnesium-silicon alloys has been investigated. In binary Cu-Al alloys containing 40—50 wt% Cu, the eutectic which contained 33% Cu and 67% Al was substituted by alloys containing 75—80% Zn and 20—25% Al. In binary Mg-Si alloys containing 77—83 wt% Mg, the eutectic consisting of 98.6% Mg and 1.4% Si was substituted by 99.99% pure Al. Cu-Al and Mg-Si alloys with the substituted eutectics were solution heat treated at 375—400 and 400C and tempered at 250

Card 1/2

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L 4440-66

ACC NR: AT5023100

and 190C, respectively, and then extruded at 350—450C with a reduction of 80%. In all investigated alloys, substitution of the eutectics resulted in sharp changes in the microstructure and properties. The Mg_2Si and $CuAl_2$ crystals of Mg-Si and Cu-Al alloys, respectively, were surrounded by a solid solution of Mg_2Si in Al in the first case, and by a 75 Zn + 25 Al alloy in the second. Substitution of the eutectic decreased the hardness 10—25% in Cu-Al and up to 25% in Mg-Si alloys. The corresponding increases in the elongation were 2.5 and 1.5 times those of the initial alloys. In all alloys, the electric resistivity increased, but its temperature coefficient decreased 50% in the 20—100C range. The mutual solubility of the liquid alloy and solid crystals of the base alloy had a significant effect on the mechanical properties of alloys with substituted eutectics. The experimental results showed that the method of substitution of alloy components opens wide possibilities for controlling the structure and the mechanical and electrical properties of alloys. Orig: art. has: 5 figures and 2 tables. [MS]

SUB CODE: MM/ SUBM DATE: 19May65/ ORIG REF: 004/ OTH REF: 000/ ATD PRESS: 4126

Card 2/2

APPROVED FOR RELEASE: 03/14/2001 CIA-RDP86-00513R001447420003-6"

"APPROVED FOR RELEASE: 03/14/2001 CIA-RDP86-00513R001447420003-6

L 27228-66 EWT(m)/T/EWP(w)/EWP(t) IJP(c) JD/JG

ACC NR: AM6003227 Monograph 28 UR/ B+1

Savitskiy, Yevgeniy Mikhailovich; Tylkina, Mariya Aronovna; Povarova, Kira Borisovna

Alloys of rhenium (Splavy reniya) Moscow, Izd-vo "Nauka," 1965. 334 p. illus., biblio. (At head of title: Akademiya nauk SSSR. Gosudarstvennyy komitet po chernoy i tsvetnoy metallurgii pri gosplane SSSR. Institut metallurgii im. A. A. Baykova) 2500 copies printed.

TOPIC TAGS: rhenium, rhenium alloy, alloy containing rhenium, rhenium production, rhenium property, rhenium alloy property, rhenium phase diagram

PURPOSE AND COVERAGE: This monograph is published as an encyclopedic summary of modern knowledge on rhenium, its alloys and compounds. An attempt was made to generalize the data gathered by authors about the structure and physicochemical properties of rhenium, its alloys and compounds, and to determine the application of rhenium in industry.

TABLE OF CONTENTS:

Foreword -- 3

Card 1/5 UDC: 669.84+669.845

APPROVED FOR RELEASE: 03/14/2001 CIA-RDP86-00513R001447420003-6"

"APPROVED FOR RELEASE: 03/14/2001 CIA-RDP86-00513R001447420003-6

L 27228-66

ACC NR: AM6003227

0

Introduction -- 5

References -- 8

Section 1. Rhenium Raw Material Sources and the Technology of Rhenium Production.

Ch. I. Rhenium raw material sources -- 9

Ch. II. Industrial sources of rhenium production -- 11

Ch. III. Rhenium extraction from rhenium containing products -- 13
References -- 17-18

Section 2. Production and Properties of Metallic Rhenium.

Ch. IV. Production of metallic rhenium -- 19

Ch. V. Obtaining compact rhenium -- 26

Card 2/5

APPROVED FOR RELEASE: 03/14/2001 CIA-RDP86-00513R001447420003-6"

"APPROVED FOR RELEASE: 03/14/2001 CIA-RDP86-00513R001447420003-6

L 27228-66

ACC NR: AM6003227

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Ch. VI. Rhenium plastic deformation -- 32
References -- 47-49

Ch. VII. Rhenium chemical properties -- 50
References -- 72-75

Ch. VIII. Rhenium physical properties -- 76

Ch. IX. Rhenium mechanical properties -- 94
References -- 102-103

Section 3. Rhenium Phase Diagrams

Ch. X. Binary phase diagrams -- 104

Ch. XI. Ternary phase diagrams -- 147

Ch. XII. Some properties of the interaction of rhenium with elements of the periodic system -- 158
References -- 164-167

Card 3/5

APPROVED FOR RELEASE: 03/14/2001 CIA-RDP86-00513R001447420003-6"

"APPROVED FOR RELEASE: 03/14/2001 CIA-RDP86-00513R001447420003-6

L 27228-66

ACC NR: AM6003227

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Section 4. Properties and Use of Rhenium Alloys

Ch. XIII. Production and working of rhenium alloys -- 168

Ch. XIV. Mechanical properties of rhenium alloys -- 188

Ch. XV. Weldability of rhenium and its alloys -- 219

Ch. XVI. Elastic properties and thermal expansion of rhenium alloys -- 227
References -- 234-235

Ch. XVII. Physical properties of rhenium alloys -- 236
References -- 253-254

Ch. XVIII. Use of rhenium and rhenium alloys in electronics and electrical engineering -- 255
References -- 275-276

Ch. XIX. Use of rhenium and its alloys for thermocouples -- 277

Card 4/5

APPROVED FOR RELEASE: 03/14/2001 CIA-RDP86-00513R001447420003-6"

"APPROVED FOR RELEASE: 03/14/2001 CIA-RDP86-00513R001447420003-6

L 27228-66

ACC NR: AM6003227

Ch. XX. Uses of rhenium and its alloys for electric contacts -- 288
References -- 301-302

Ch. XXI. Chemical heat treatment: coating with rhenium and its alloys -- 303
References -- 317-318

Ch. XXII. Corrosion stability of rhenium and its alloys -- 319
References -- 326-327

Ch. XXIII. Rhenium catalytic properties -- 328
References -- 330-331

SUB CODE: 11/ SUBM DATE: 12Aug65/ ORIG REF: 381/ OTH REF: 360

Card 5/5

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"APPROVED FOR RELEASE: 03/14/2001 CIA-RDP86-00513R001447420003-6

L 29792-66 EWT(m)/EWP(w)/T/EWP(t)/ETI IJP(c) JD/WH/JG/GD/RM/JH

ACC NR: AT6016411 (A) SOURCE CODE: UR/0000/65/000/000/0065/0069

AUTHORS: Savitskiy, Ye. M.; Kim, T. A.

ORG: none

56
B+1

TITLE: Investigation of the structure and properties of alloys of the system magnesium--tin derived by the eutectic exchange method

SOURCE: AN SSSR. Institut metallurgii. Metallovedeniye legkikh splavov (Metallography of light alloys). Moscow, Izd-vo Nauka, 1965, 65-69

TOPIC TAGS: alloy phase diagram, magnesium ~~containing~~ alloy, tin ~~containing~~ alloy, plexiglass, tin base alloy, metal property, electric resistance

ABSTRACT: The effect of exchanging the liquid eutectic composition in the system Mg--Sn by Sn and plexiglass on the properties of the resulting alloys was investigated. The investigation supplements earlier results of Ye. M. Savitskiy and T. A. Kim (Izv. AN SSSR, OTN, Metallurgiya i gornoye delo. M., 1963, str. 89). A schematic of the experimental installation is presented (see Fig. 1). The microstructure, electrical resistance, density, microhardness, strength limit during compression, and the relative contraction during compression of the exchanged alloys were determined. The experimental results are presented in graphs and tables. The best eutectic exchangers in the system Mg--Sn are an alloy containing 84--90% Sn, and the optimum exchange temperature interval is 250--280C. By exchanging the

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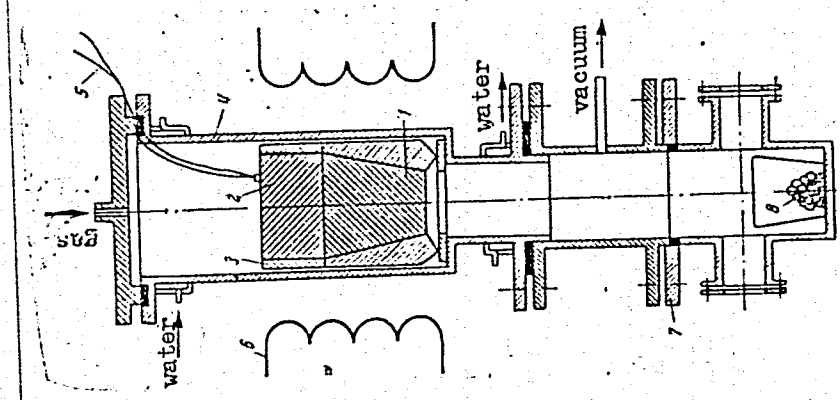

Fig. 1. Schematic of the vacuum installation for the exchange of the eutectic in alloys. 1 - initial alloy; 2 - replacing alloy; 3 - separable container; 4 - stainless steel pipe; 5 - thermocouple; 6 - electric furnace; 7 - eutectic collector; 8 - displaced eutectic.

eutectic with plexiglass, alloys are obtained which possess very high specific electrical resistance. Orig. art. has: 5 tables and 4 figures.

SUB CODE: 11/ SUBM DATE: 16Sep65/ ORIG REF: 005

Card 2/2

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"APPROVED FOR RELEASE: 03/14/2001 CIA-RDP86-00513R001447420003-6

L 32667-66 EWT(m)/EWP(w)/T/EWP(t)/ETI IJP(c) JD/JG/GD

ACC NR: AT6016409 (A) SOURCE CODE: UR/0000/65/000/000/0051/0053

AUTHORS: Naumkin, O. P.; Terekhova, V. F.; Chistyakov, O. D.; Savitskiy, Ye. M.

ORG: none

43
B+1

TITLE: Purification of metallic scandium by distillation 18

SOURCE: AN SSSR. Institut metallurgii. Metallovedeniye legkikh splavov (Metallography of light alloys). Moscow, Izd-vo Nauka, 1965, 51-53

TOPIC TAGS: scandium, metal purification, high purity metal

ABSTRACT: Preparation of metallic scandium of 99.4--99.6% purity by distillation of the technical 96--97% material is described as a continuation of the study of the physical and chemical properties of this metal by Ye. M. Savitskiy, V. F. Terekhova, O. P. Naumkin, and I. V. Burov (Tsvetnyye metally, 1963, No. 5, 51). The distillation was performed at 1650C and 10^{-4} mm Hg in an apparatus presented schematically in Fig. 1. Microscopic study of the obtained product shows improvement in its structure. The hardness and electrical resistance are lowered while ductility of the purer material is increased. Detailed chemical analysis of the product is reported. The authors express their gratitude to A. N. Shteynberg (IMYeT im. A. A. Baykov) for spectral analysis and to R. M. Liberman (Giredmet) for collaboration.

Card 1/2

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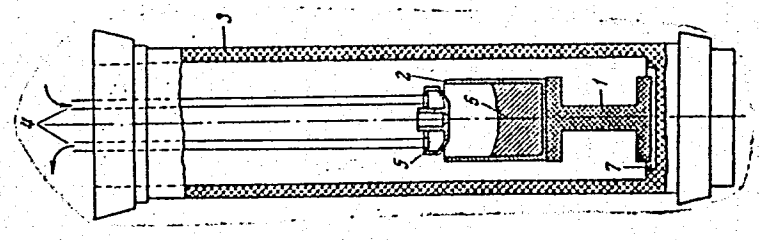

Fig. 1. Diagram of the equipment for distillation of metallic scandium: 1 - graphite base; 2 - tantalum crucible; 3 - graphite heater; 4 - water; 5 - copper condenser; 6 - metallic scandium; 7 - beryllium oxide packing.

Orig. art. has: 2 figures and 1 table.

SUB CODE: 11,07/ SUBM DATE: 16Sep65/ ORIG REF: 005/ OTH REF: 002

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APPROVED FOR RELEASE: 03/14/2001 CIA-RDP86-00513R001447420003-6"

"APPROVED FOR RELEASE: 03/14/2001 CIA-RDP86-00513R001447420003-6

L 1315-66 EWT(m)/EWP(w)/T/EWP(t)/EWP(b)/EWA(c) IJP(c) JD/JG

ACCESSION NR: AP5022262 UR/0363/65/001/007/1115/1120
546.621+546.881+546.28

46
43
B

AUTHOR: Gladyshevskiy, Ye. I.; Markiv, V. Ya.; Yefimov, Yu. V.; Savitskiy, Ye. M.; Baron, V. V.

TITLE: The titanium-vanadium-silicon system

SOURCE: AN SSSR. Izvestiya. Neorganicheskiye materialy, v. 1, no. 7, 1965, 1115-1120

TOPIC TAGS: titanium compound, silicon compound, vanadium compound, titanium alloy, silicon alloy, vanadium alloy

ABSTRACT: The object of the work was to investigate the equilibria and phase regions in the Ti-V-Si system in alloys containing up to 50 at.% Si. X-ray structural and microstructural studies as well as microhardness measurements provided data from which a diagram of the phase equilibria was plotted. The isothermal section at 800C showed the presence of a new ternary compound (Ti, V)Si and wide regions of solid solutions based on the binary compounds Ti_5Si_3, V_5Si_3, and V_3Si. The compound (Ti, V)Si has a variable content of the transition metal, and its region of homogeneity includes the composition $TiVSi_2$, which was shown to crystallize in the rhombic system. The change of the lattice constants and

Card 1/2

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L 1315-66

ACCESSION NR: AP5022262

3

microhardness of the solid solutions based on Ti_5Si_3, V_5Si_3, and V_3Si was studied as a function of composition of the alloys. The solubility of vanadium in Ti_5Si_3 is approximately 30 at.%, and that of titanium in V_5Si_3 and V_3Si, 12 and 18 at.%, respectively. Orig. art. has: 5 figures.

ASSOCIATION: L'vovskiy gosudarstvennyy universitet im. I. Franko (Lvov State University); Institut metallurgii im. A. A. Baykova (Institute of Metallurgy)

SUBMITTED: 07Apr65 ENCL: 00 SUB CODE: MM, IC

NO REF SOV: 002 OTHER: 013

Card 2/2

APPROVED FOR RELEASE: 03/14/2001 CIA-RDP86-00513R001447420003-6"

"APPROVED FOR RELEASE: 03/14/2001 CIA-RDP86-00513R001447420003-6

L 2098-66 EWT(m)/EWP(w)/T/EWP(t)/EWP(b)/EWA(c) IJP(c) JD/JG

ACCESSION NR: AP5021505

UR/0370/65/000/004/0176/0182
669.017.12

AUTHOR: Naumkin, O. P. (Moscow); Terekhova, V. T. (Moscow); Savitskiy, Ye. M. (Moscow)

TITLE: Phase diagram and the properties of alloys of the aluminum-scandium system

SOURCE: AN SSSR. Izvestiya. Metally, no. 4, 1965, 176-182

TOPIC TAGS: aluminum, scandium, aluminum scandium alloy, aluminum scandium system

ABSTRACT: A large series of aluminum-scandium alloys melted from 98.16- or 99.5%-pure Sc and 99.99%-pure Al has been studied. On the basis of the results obtained, a phase diagram of the Al-Sc system (see Fig. 1 of the Enclosure) was plotted. The investigations showed that Al and Sc have unlimited solubility in the liquid state. The room-temperature solubility of Sc in Al is approximately 0.5 at% and that of Al in Sc approximately 4 at%. Four compounds: $ScAl_3$, $ScAl_2$, ScAl, and Sc_2Al were identified. All the compounds are brittle and crack during solidification. The microhardness is 255, 530, 370, and 460 kg/mm for $ScAl_3$, $ScAl_2$,

Card 1/4

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"APPROVED FOR RELEASE: 03/14/2001 CIA-RDP86-00513R001447420003-6

L 2098-66

ACCESSION NR: AP5021505

ScAl, and Sc_2Al, respectively. Alloying with Sc increases the tensile strength at room and elevated temperatures without a noticeable decrease in ductility (see Fig. 2 of the Enclosure). The strengthening effect of Sc is much stronger than that of rare-earth metals. Orig. art. has: 6 figures and 1 table. [WW]

ASSOCIATION: none

SUBMITTED: 29May64 ENCL: 02 SUB CODE: MM, SS

NO REF SOV: 009 OTHER: 004 ATD PRESS: 4113

Card 2/4

APPROVED FOR RELEASE: 03/14/2001 CIA-RDP86-00513R001447420003-6"

"APPROVED FOR RELEASE: 03/14/2001 CIA-RDP86-00513R001447420003-6

L 2098-66

ACCESSION NR: AP5021505

ENCLOSURE: 01

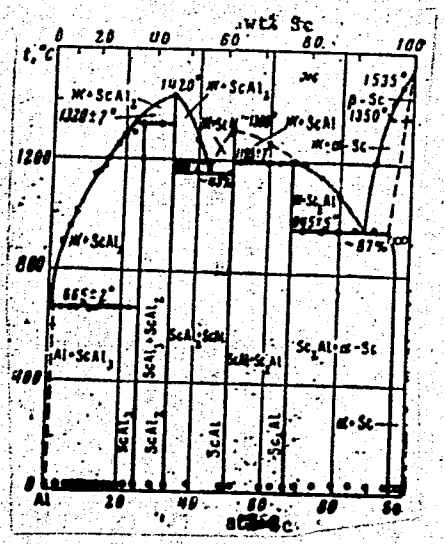

Fig. 1. Phase diagram of the Al-Sc system

Card 3/4

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ACCESSION NR: AP5021505

ENCLOSURE: 02

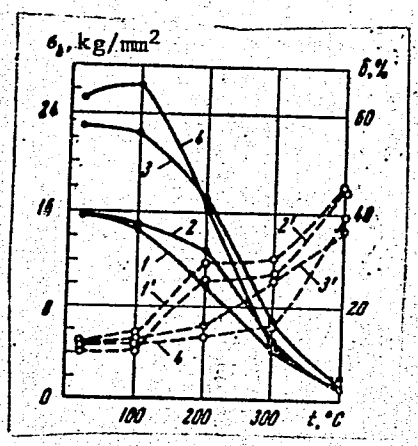

Fig. 2. Effect of Sc on tensile strength (σ_b - continuous lines) and elongation (δ - dash lines) of Al at various temperatures (1,1-pure Al; 2,2' - addition of 0.1 at% Sc; 3,3' - 0.3 at% Sc; 4,4' - 0.7 at% Sc)

Card 4/4

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"APPROVED FOR RELEASE: 03/14/2001 CIA-RDP86-00513R001447420003-6

SAVITSKIY, Ye.M.

Problem of polymorphic metals. Metalloved. i term. obr. met. no.7:3-7 Jl '65. (MIRA 18:8)

1. Institut metallurgical imeni A.A.Baykova.

APPROVED FOR RELEASE: 03/14/2001 CIA-RDP86-00513R001447420003-6"

"APPROVED FOR RELEASE: 03/14/2001 CIA-RDP86-00513R001447420003-6

L 2793-66 EWT(1)/EWT(m)/ETC/EPF(n)-2/EWG(m)/T/EWP(t)/EWP(b)/EWA(c)
ACCESSION NR: AP5021377 LJP(c) JD/JG/GG UR/0120/65/000/004/0248/0250
621.365.91:669—172

AUTHOR: Savitskiy, Ye. M.; Burkhanov, G. S.; Tsarev, G. L.; Bokareva, N. N.

TITLE: Growing of single crystals of refractory metals and alloys with desired crystallographic orientation by electron-beam zone melting

SOURCE: Pribory i tekhnika eksperimenta, no. 4, 1965, 248-250

TOPIC TAGS: crystal, single crystal, crystal growing, metal crystal, alloy crystal, refractory metal

ABSTRACT: A method for growing single crystals of pure refractory metals and alloys with desired orientation by electron-beam zone melting is described. The only thing necessary is to have a seed with the desired orientation. The seed is mounted vertically and the bar of metal or alloy is placed 1 mm above the seed (see Fig. 1 of Enclosure). The electron beam melts both the seed and the bar and, as it rises, the metal crystallizes with the same orientation as that of the seed. For growing alloy single crystals, the seed of one of the metals can be used. The initial portion of the single crystal will have a lower

Card 1/3

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L 2793-66

ACCESSION NR: AP5021377

9

content of the other component, but after a distance of 20 mm, a balanced composition is obtained. Single crystals of Mo, W, Ta, Nb, Zr, Re, and their alloys were grown by this method. The orientation of the single crystal differs from that of the seed by 2° max. Orig. art. has: 4 figures. [AZ]

ASSOCIATION: Institut metallurgii, Moscow (Institute of Metallurgy)

SUBMITTED: 27Nov64 ENCL: 01 SUB CODE: MM

NO REF SOV: 003 OTHER: 000 ATD PRESS: 4103

Card 2/3

APPROVED FOR RELEASE: 03/14/2001 CIA-RDP86-00513R001447420003-6"

"APPROVED FOR RELEASE: 03/14/2001 CIA-RDP86-00513R001447420003-6

L 2793-66

ACCESSION NR: AP5021377

ENCLOSURE: 01

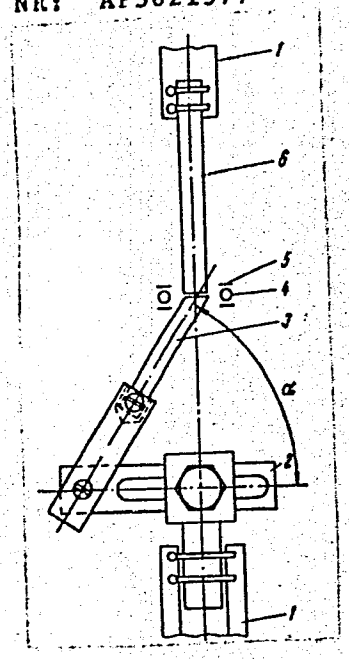

Fig. 1. Layout of the crystal-growing unit

1 - Top and bottom clamps; 2 - seed holder; 3 - seed electron gun; 4 - cathode; 5 - focusing system; 6 - metal or alloy bar.

BVK

Card 3/3

APPROVED FOR RELEASE: 03/14/2001 CIA-RDP86-00513R001447420003-6"

"APPROVED FOR RELEASE: 03/14/2001 CIA-RDP86-00513R001447420003-6

SAVITSKIY, Ye.M. (Moskva)

The problem of metal single crystals. Izv. AN SSSR. Met. no.5:83-105 S-O '65. (MIRA 18:10)

APPROVED FOR RELEASE: 03/14/2001 CIA-RDP86-00513R001447420003-6"

"APPROVED FOR RELEASE: 03/14/2001 CIA-RDP86-00513R001447420003-6

L 9440-66 EPF(n-2/EWT(m)/EWP(t)/EWP(b) IJP(c) JD/WW/JG

ACC NR: AP5027098 SOURCE CODE: UR/0149/65/000/005/0117/0121

AUTHOR: Savitskiy, Ye. M.; Zakharov, A. M.

ORG: Institute of Metallurgy im. A. A. Baykov (Institut metallurgii)

63
B

TITLE: Hardness of alloys of the Nb-W-Zr and Nb-Mo-Zr systems at 1500C

SOURCE: IVUZ. Tsvetnaya metallurgiya, no. 5, 1965, 117-121

TOPIC TAGS: niobium, niobium alloy, binary alloy, ternary alloy, tungsten containing alloy, molybdenum containing alloy, zirconium containing alloy, hardness, metal hardening

ABSTRACT: To determine the individual and combined effect of tungsten, molybdenum, and zirconium additions of up to 30 wt% on the hardness of niobium, binary Nb-W, Nb-Mo and Nb-Zr and ternary Nb-W-Zr and Nb-Mo-Zr alloys were arc-melted from 99.9%-pure sintered Nb, 99.95%-pure W, 99.95%-pure Mo, and 99.97%-pure Zr, homogenized in a vacuum, cold upset with a 50% reduction, vacuum annealed at 1500C for 2 hr, and tested for hardness at 20 and 1500C. The W-Zr ratio in the Nb-W-Zr alloys was 4:1, 1.1, and 1:3, and the Mo-Zr ratio in Nb-Mo-Zr alloys was 2.1:1, 1:1, and 1:3. After final annealing, all alloys had a recrystallized structure. Unalloyed Nb had a hardness (HB) of 105—110 and 14—15 kg/mm^2 at 20 and 1500C, respectively. Figure 1 shows the effect of W, Mo, and Zr on the hardness of binary alloys at 20C and 1500C. In the

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L 9440-66

ACC NR: AP5027098

0

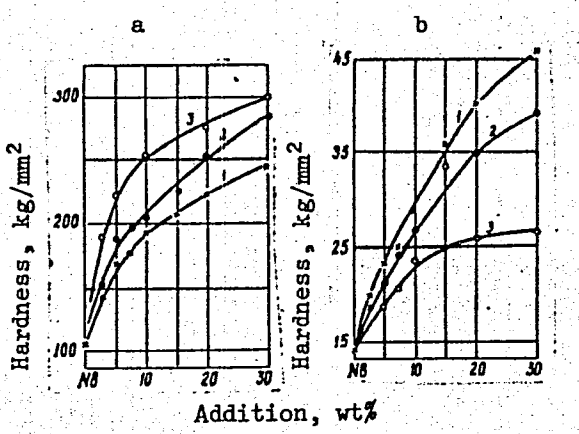

Fig. 1. The effect of W (1), Mo (2), and Zr (3) on the hardness of Nb at 20C (a) and 1500C (b)

Nb-W-Zr system, additions of Zr lower the melting temperature and hardness. In the Nb-Mo-Zr system at 1500C, alloys of the $Nb-Mo_2Zr$ section have the maximum hardness (H_c = about 44 kg/mm^2). Orig. art. has: 5 figures. [MS]

SUB CODE: 11/ SUBM DATE: 08Jun64/ ORIG REF: 010/ OTH REF: 008/ ATD PRESS: 4154

jw

Card 2/2

APPROVED FOR RELEASE: 03/14/2001 CIA-RDP86-00513R001447420003-6"

"APPROVED FOR RELEASE: 03/14/2001 CIA-RDP86-00513R001447420003-6

GLADYSHEVSKIY, Ye.I.; MARKIV, V.Ya.; YEFIMOV, Yu.V.; SAVITSKIY, E.M.; BARON, V.V.

Titanium - vanadium - silicon system. Izv.AN SSSR. Neorg.mat. 1 no.7:1115-1120 Jl '65. (MIRA 18:9)

1. L'vovskiy gosudarstvennyy universitet imeni I.Franko i Institut metallurgii imeni A.A.Baykova, Moskva.

APPROVED FOR RELEASE: 03/14/2001 CIA-RDP86-00513R001447420003-6"

"APPROVED FOR RELEASE: 03/14/2001 CIA-RDP86-00513R001447420003-6

L 13111-66 EWT(1)/EWT(m)/T/EWP(t)/EWP(b) IJP(c) JD/JG/GG

ACC NR: AP5025805 SOURCE CODE: UR/0363/65/001/009/1621/1622

AUTHOR: Savitskiy, Ye. M.; Khamidov, O. Kh.

27 B

ORG: Institute of Metallurgy im. A. A. Baykov (Institut metallurgii)

TITLE: Crystal structure of a compound of rhenium with praseodymium

21, 44, 55 27 27

SOURCE: AN SSSR. Izvestiya. Neorganicheskiye materialy, v. 1, no. 9, 1965, 1621-1622

TOPIC TAGS: rhenium compound, praseodymium compound, rhenium containing alloy, praseodymium containing alloy

ABSTRACT: To study the physicochemical interaction between rhenium and praseodymium, alloys of the two metals were prepared and subjected to x ray and microstructural analyses in the cast form and after vacuum annealing at 1200°C for 200 hr. $PrRe_2$ metallic compounds containing approximately 66.67 at % Re were formed. Powder diagrams of cast samples quenched at a temperature close to the melting point showed a system of lines characteristic of $MgCu_2$-type Laves phases with a cubic crystal lattice. The lattice parameter of the high temperature modification of $PrRe_2$ is a = 7.57±0.01 Å. Powder diagrams of alloys annealed at 1200°C

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"APPROVED FOR RELEASE: 03/14/2001 CIA-RDP86-00513R001447420003-6

L 13111-66

ACC NR: AP5025805

had a system of lines characteristic of $MgZn_2$-type Laves phases with a hexagonal crystal lattice. The low temperature modification of $PrRe_2$ has parameters a = 5.34 ± 0.01 Å, c = 8.81 ± 0.01 Å, c/a = 1.65. The microhardness of this modification is equal to 590 kg/mm^2. Orig. art. has: 1 figure.

SUB CODE: 11/ SUBM DATE: 28Apr65/ ORIG REF: 000/ OTH REF: 000

Card 2/2 HW

APPROVED FOR RELEASE: 03/14/2001 CIA-RDP86-00513R001447420003-6"

"APPROVED FOR RELEASE: 03/14/2001 CIA-RDP86-00513R001447420003-6

L 10854-66 EWT(m)/EWP(t)/EWP(b) IJP(c) JD/JG

ACC NR: AP5028714 SOURCE CODE: UR/0363/65/001/011/1873/1877

AUTHOR: Savitskiy, Ye. M.; Khamidov, O. Kh.

ORG: Institute of Metallurgy im. A. A. Baykov (Institut metallurgii)

31
B

TITLE: Metal compounds in alloys of rhenium with rare earth metals

SOURCE: AN SSSR. Izvestiya. Neorganicheskiye materialy, v. 1, no. 11, 1965, 1873-1877

TOPIC TAGS: rhenium alloy, praseodymium alloy, gadolinium alloy, terbium alloy, dysprosium alloy, holmium alloy, erbium alloy, transition element

ABSTRACT: The physicochemical interaction of rhenium with praseodymium, gadolinium, terbium, dysprosium, holmium, and erbium was studied. Phase analysis was carried out by x-ray structural and microstructural methods on alloys in the cast state and after vacuum annealing at 1200°C for 200 hr. The formation of metallic compounds of the Laves phases type (AB_2) was established in all cases. A polymorphous transformation of the compound $PrRe_2$, whose high-temperature modification has an $MgCu_2$-type cubic structure and the low-temperature modification has an $MgZn_2$-type hexagonal structure, was identified. The formation of Laves phases of various structures (cubic or hexagonal) should apparently be attributed both to the change in the valence of the B element in AB_2-type compounds and to the change in the valence of the A ele-

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"APPROVED FOR RELEASE: 03/14/2001 CIA-RDP86-00513R001447420003-6

L 10854-66

ACC NR: AP5028714

ment. The formation of Laves phases in the interaction of rhenium with transition elements of the periodic system is observed in the range of ratios of atomic radii r_A/r_B equal to 1.10-1.40. Orig. art. has: 2 figures, 1 table.

SUB CODE: 11/ 07/ SUBM DATE: 03Jun65/ ORIG REF: 014/ OTH REF: 009

HW

Card 2/2

APPROVED FOR RELEASE: 03/14/2001 CIA-RDP86-00513R001447420003-6"

"APPROVED FOR RELEASE: 03/14/2001 CIA-RDP86-00513R001447420003-6

SONGINA, O.A.; SAVITSKIY, Ye.M.; KLUBNICHKIN, K.F.; SHAPIRO, I.S.

Rare metals and technological progress. Review of the book by I.S. Stepanov. Tsvet. met. 38 no.6:95 Je '65. (MIRA 18:10)

APPROVED FOR RELEASE: 03/14/2001 CIA-RDP86-00513R001447420003-6"

"APPROVED FOR RELEASE: 03/14/2001 CIA-RDP86-00513R001447420003-6

L 11825-66 EWT(m)/EWP(w)/EPF(n)-2/T/EWP(t)/EWP(b)/EWA(c) IJP(c) JD/JG

ACC NR: AT6002266 SOURCE CODE: UR/2564/65/006/000/0308/0318

AUTHOR: Savitskiy, Ye. M.; Burkhanov, G. S.; Kopetskiy, Ch. V.; Chuprikov, G. Ye.

ORG: none

TITLE: Growing and plastic deformation of the single crystals of refractory metals and alloys

SOURCE: AN SSSR. Institut kristallografii. Rost kristallov, v. 6, 1965, 308-318

TOPIC TAGS: refractory metal, refractory alloy, metal refining, alloy refining, tungsten, molybdenum, rhenium, tantalum, niobium, vanadium, zone refining, refractory metal single crystal, refractory alloy single crystal, single crystal growing, single crystal property

ABSTRACT: The physical and mechanical properties of single crystals of tungsten, molybdenum, rhenium, tantalum, niobium, vanadium, and their alloys grown from melts of vacuum-arc melted or sintered metals have been investigated. Crystals up to 12—14 mm in diameter and 150—250 mm long were grown in an electron-beam furnace developed at the Refractory and Rare Metals Laboratory of the Institute of Metallurgy im. A. A. Baykov in 1960-1961 for vacuum zone melting of refractory metals. The crystal purity was found to be two orders higher than that of the initial metals and alloys. For instance, the oxygen content dropped from 0.05 and 0.012% in the sintered and in vacuum-arc melted rhenium, respectively, to 0.001% in single crystals. The removal of interstitial impurities decreased the

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ACC NR: AT6002266

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tensile strength and appreciably increased the ductility of all investigated metals. For example, the tensile strength of sintered and arc-melted rhenium, 115 and 65.8 kg/mm^2, respectively, decreased to 42.5 kg/mm^2 for rhenium single crystals. At the same time, elongation increased from 12.1 and 16.1% to 41%. Molybdenum single crystals sustained a bend angle of 180 deg at room temperature and a 60 deg bend angle at -196C. At room temperature, tungsten and niobium single crystals sustained a bend angle of 90 and 180 deg, respectively, and rhenium sustained a bend angle of 90 at -196C. Molybdenum single crystals 13 mm in diameter and 250 mm long were drawn into wire 50 μm in diameter or rolled into 50 μm-thick foil without process annealing. Single crystals of some alloys in the region of solid solutions of the Mo-Nb, Mo-W, Mo-Ti, and W-Nb systems were also grown from electron beam-melted single crystals of the respective metals. The obtained single crystals had essentially the same substructures as the initial components; they also had good ductility and a tensile strength higher than that of the initial metals. Orig. art. has: 10 figures and 4 tables. [MS]

SUB CODE: 11, 13/ SUBM DATE: none/ ORIG REF: 012/ OTH REF: 002/ ATD PRESS: 4178

HW

Card 2/2

APPROVED FOR RELEASE: 03/14/2001 CIA-RDP86-00513R001447420003-6"

"APPROVED FOR RELEASE: 03/14/2001 CIA-RDP86-00513R001447420003-6

SAVITSKIY, Ye.M.; TEREKHOVA, V.F.; BUROV, I.V.; NAUMKIN, O.P.; MARKOVA, I.A.

Alloys and compounds of rare-earth metals. Izv.AN SSSR.Neorg.mat. 1 no.10:1648-1659 O '65. (MIRA 18:12)

1. Institut metallurgii imeni A.A.Baykova, Moskva. Submitted July 5, 1965.

APPROVED FOR RELEASE: 03/14/2001 CIA-RDP86-00513R001447420003-6"

"APPROVED FOR RELEASE: 03/14/2001 CIA-RDP86-00513R001447420003-6

L 14617-66 EWT(1)/EWT(m)/T/EWP(t)/EWP(b) IJP(c) GG/JD/JG

ACC NR: AT6002265 (A) SOURCE CODE: UR/2564/65/006/000/0301/0307 40

AUTHOR: Savitskiy, Ye. M.; Terekhova, V. F.; Naumkin, O. P.; Burov, I. V. 37

ORG: none

B+1

TITLE: Preparation and properties of rare earth single crystals [Paper presented at the Third Conference on Crystal Growing held in Moscow from 18 to 25 November, 1963]

SOURCE: AN SSSR. Institut kristallografii. Rost kristallov, v. 6, 1965, 301-307

TOPIC TAGS: single crystal growing, rare earth metal, crystallization

ABSTRACT: A technique and apparatus were developed for purifying and growing single crystals of rare earth metals. The growing technique consisted of (1) purifying technical-grade metals by vacuum distillation; (2) vacuum remelting of the distillate with directional crystallization; and (3) recrystallization annealing in a high vacuum. Single crystals of scandium, yttrium, gadolinium, and neodymium 8 x 10 x 12 mm were thus grown, and some physical constants and anisotropy of the mechanical, electrical, and magnetic properties were determined along various crystallographic directions. The data obtained showed that

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L 14617-66

ACC NR: AT6002265

3

a complex electron spin configuration exists in gadolinium at temperatures below 75C. V. Ye. Kolesnichenko participated in the work of growing yttrium and neodymium single crystals. Orig. art. has: 8 figures.

SUB CODE: 20 / SUBM DATE: none / ORIG REF: 004 / OTH REF: 001

Card 2/2

APPROVED FOR RELEASE: 03/14/2001 CIA-RDP86-00513R001447420003-6"

"APPROVED FOR RELEASE: 03/14/2001 CIA-RDP86-00513R001447420003-6

SAVITSKIY, Ye.M. [Savyts'kyi, IE.M.]; BARON, V.V.; YEFIMOV, Yu.V. [IEfimov, IU.V.]; GLADYSHEVSKIY, Ye.I. [Hladyshevs'kyi, IE.I.]

Solid solutions of Ge, Sn, Al, and Be in the V_3Si compound and their superconductivity. Dop. AN URSR no.11:1474-1478 '65. (MIRA 18:12)

APPROVED FOR RELEASE: 03/14/2001 CIA-RDP86-00513R001447420003-6"

"APPROVED FOR RELEASE: 03/14/2001 CIA-RDP86-00513R001447420003-6

L 22056-66 EWP(e)/EWT(m)/T/EWP(t)/EWP(k) IJP(c)

ACC NR: AP6007907 SOURCE CODE: UR/0149/66/000/001/0112/0115

AUTHOR: Savitskiy, Ye. M.; Chuprikov, G. Ye.

ORG: Institute of Metallurgy im. Baykov (Institut metallurgii)

TITLE: Recrystallization diagram of high-purity rhenium

SOURCE: IVUZ. Tsvetnaya metallurgiya, no. 1, 1966, 112-115

TOPIC TAGS: recrystallization ~~diagram~~, rhenium, high purity metal, metal purification, plastic deformation, recrystallization temperature, electron beam melting, crystal growth, refractory metal

ABSTRACT: The use of electron-beam heating to obtain highly pure Rh by means of zone vacuum melting and growth of Rh monocrystals opens broad new vistas for the utilization of this promising refractory metal. In this connection it is important to know the recrystallization diagram of high-purity Rh, since this makes it possible to select the optimal conditions for the deformation and annealing of Rh in order to obtain semifinished products with the desired mechanical properties. Diagrams of this kind have already been constructed for cast and powdered-metal technical-purity Rh (Ye. M. Savitskiy et al. DAN SSSR, vol. 119, no. 2, 1958). To construct the recrys-

Card 1/2 UDC: 669:849.548.53

APPROVED FOR RELEASE: 03/14/2001 CIA-RDP86-00513R001447420003-6"

"APPROVED FOR RELEASE: 03/14/2001 CIA-RDP86-00513R001447420003-6

L 22056-66

ACC NR: AP6007907

tallization diagram of high-purity Rh(obtained by eightfold electron-beam vacuum zone refining), the monocrystalline structure of the specimens was destroyed by cold rolling with 0, 5, 10, 20, 40, 60, and 70% reduction in area and with intermediate vacuum annealing; the resulting specimens were deformed at room temperature by rolling through smooth rolls with subsequent vacuum annealing at 900-2400°C for one hour. Thereupon the recrystallization diagram was plotted according to the findings of radiographic and microstructural examination and measurements of hardness. On this basis basis it is found that the initial recrystallization temperature of high-purity Rh ranges from 1000 to 1500°C depending on the extent of previous reduction in area by rolling (0 to 70%), whereas for technical-purity cast Rh this temperature ranges from 1200 to 1700°C. The critical degree of deformation is 5%, when the hardness of the Rh monocrystals jumps from 100 kg/mm^2 to 155 kg/mm^2; a further increase in degree of reduction in area no longer causes such a sharp increase in hardness. Orig. art. has: 4 figures.

SUB CODE: 11, 13, 20/ SUBM DATE: 08Oct64/ ORIG REF: 006/

Card 2/2

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ACC NR: AT6014754 SOURCE CODE: UR/0000/65/000/000/0083/0085

AUTHORS: Telentyuk, G. Ye.; Baron, V. V. (Candidate of technical sciences); Savitskiy, Ye. M. (Doctor of chemical sciences)

ORG: none

TITLE: A study of the critical current density of a solid solution of tin in niobium

SOURCE: Soveshchaniye po metallovedeniyu i metallofizike sverkhprovodnikov. 1st, 1964. Metallovedeniye i metallofizika sverkhprovodnikov (Metallography and physics of metals in superconductors); trudy soveshchaniya. Moscow, Izd-vo Nauka, 1965, 83-85

TOPIC TAGS: superconductivity, superconducting alloy, transverse magnetic field, niobium base alloy, tin containing alloy, ~~critical~~ current density, cold drawing, cold rolling, electric wire

ABSTRACT: The results are given of a study of the effect of alloying niobium with tin (up to 5.6 wt % Sn) on the critical current density as a function of the transverse magnetic field. The starting materials were sintered niobium with a purity of 99.1 wt % (with 0.4% Ta, 0.06% Ti, 0.05% Si, 0.03% Fe) and 0--1 grade tin (99.9 wt % Sn). The alloys were prepared in an arc furnace in an atmosphere of purified helium at 0.6 atm. After cleaning and annealing in a vacuum at 1350C for 1.5 hrs, 2.5 x 2.5-mm blanks were cut, from which wire with a diameter of 0.20 mm was made by cold rolling and drawing. The critical current density as a function of the magnetic

Card 1/2

APPROVED FOR RELEASE: 03/14/2001 CIA-RDP86-00513R001447420003-6"

"APPROVED FOR RELEASE: 03/14/2001 CIA-RDP86-00513R001447420003-6

ACC NR: AT6014754

field was measured for specimens with a length of 100 mm (see Fig. 1).

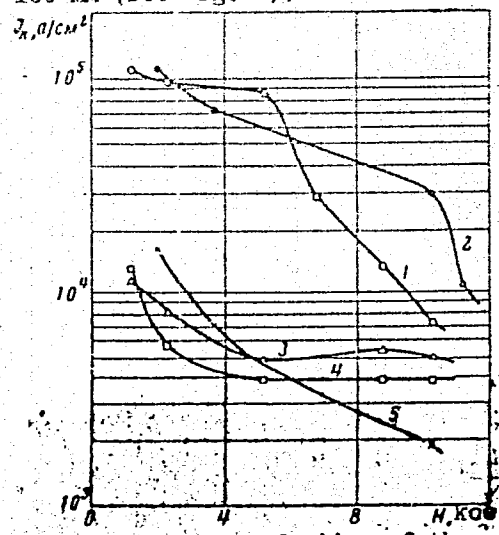

Fig. 1. Critical current density J_k of Nb--Sn alloys as a function of strength of applied transverse magnetic field at 4.2K: 1 - Nb (pure); 2 - Nb + 1.8 wt % Sn; 3 - Nb + 3.11 wt % Sn; 4 - Nb + 4.92 wt % Sn; 5 - Nb + 5.60 wt % Sn.

It was found that alloying niobium with tin causes a simultaneous reduction of the critical current density and of the superconductivity transition temperature. Orig. art. has: 2 graphs.

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Card 2/2

APPROVED FOR RELEASE: 03/14/2001 CIA-RDP86-00513R001447420003-6"

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L 38544-66 EWT(d)/EWP(e)/EWT(m)/EWP(w)/EWP(v)/T/EWP(t)/ETI/EWP(k)/EWE(h)/EWP(1)

ACC NR: AT6014744 IJP(c) JD/WW/HW/JG/AT/GD/WH/RH SOURCE CODE: UR/0000/65/000/000/003/0016

102
71
B+1

AUTHOR: Savitskiy, Ye. M. (Doctor of chemical sciences)

ORG: none

TITLE: The state and problems of scientific research work in superconducting materials

SOURCE: Soveshchaniye po metallovedeniyu i metallofizike sverkhprovodnikov, 1st, 1964. Metallovedeniye i metallofizika sverkhprovodnikov (Metallography and physics of metals in superconductors); trudy soveshchaniya. Moscow, Izd-vo Nauka, 1965, 3-16

TOPIC TAGS: superconductivity, superconducting alloy, solenoid, niobium base alloy, zirconium alloy, titanium alloy, tin alloy, fine structure, electric wire, arsenide, magnetic field

ABSTRACT: Both the present state and future problems of superconducting materials are surveyed. Record solenoids with a magnetic-field strength of 100 koe with alloys of niobium with zirconium, niobium with titanium and niobium with tin have been created. A compact superconducting solenoid with a magnetic-field strength of 51 koe has been created in the SSSR. The composition, internal structure, purity, macrostructure, microstructure, fine structure, flaws, stresses, and cold working of superconductors determine the characteristics of superconducting materials, magnets, and their operating stability and economic advisability. The need for planning and for coordination

Card 1/2

APPROVED FOR RELEASE: 03/14/2001 CIA-RDP86-00513R001447420003-6"

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of work on the problem of superconductivity is pointed out. The cost of high-melting metals such as niobium, vanadium, rhenium, zirconium, gallium, etc, is also discussed. The inefficiency of the production of superconducting wire and the cost of research work with liquid helium are also indicated. The main directions for future research work are indicated: 1) to establish the laws of change of fine structure, macrostructure, microstructure, and the properties of superconductors, alloys and compounds at ordinary helium temperatures; 2) to study superconducting systems and develop compositions of superconducting alloys and compounds based on high-melting metals; 3) to develop methods of producing extra-pure materials; 4) to develop optimal industrial technologies for producing wire and other semifinished products; 5) to develop standard methods of evaluating the superconducting characteristics of materials; 6) to study the critical characteristics of superconducting magnets, cryostats, and other devices. The study of the interrelationship between the structure and properties of superconducting materials and the search for new superconductors is discussed. It is pointed out that there are about 500 superconducting metallic compounds with structures of the Cr_3Si, σ-phase, α-Mn, and nickel-arsenide types. The study of superconducting systems and superconducting solenoids is discussed. Orig. art. has: 7 graphs, 1 photograph, and 2 diagrams.

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Card 2/2

APPROVED FOR RELEASE: 03/14/2001 CIA-RDP86-00513R001447420003-6"