Investigation of the system...

forms at 1600°C. At 800°C, the solubility of V in $MoSi_2$ is below 1 at%. (4) The phase $(V,Mo)_5Si_3$ melts congruently, the phase $(V,Mo)_3Si$ forms by peritectic reaction. (5) The unlimited solubility of Mo in V is much reduced by introduction of Si. With about 2 at% Si in V-Mo alloys rich in V, a solid solution on the basis of $(V,Mo)_3Si$ is observed as second phase. (6) Alloying with Si improves greatly the stability of V to oxidation, but reduces considerably its plasticity. With 0% Si, the plasticity on compression ε = 30%; with 20 at% Mo + Si, $\varepsilon \sim 6\%$. There are 9 figures and 1 table.

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

SUBMITTED: June 12, 1961

Fig. 9. Isothermal section of the system V-Mo-Si at 800°C.
Legend: Am.% = at%.

Investigation of the system...

S/078/62/007/005/011/014
B101/B110

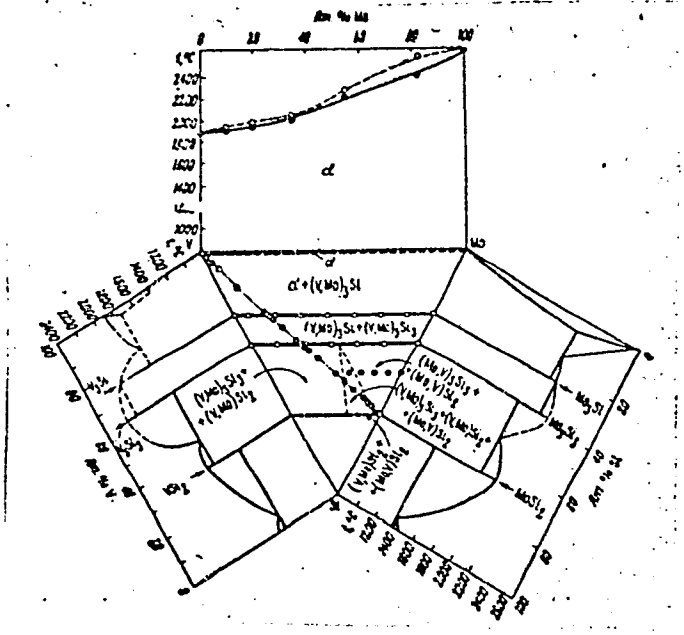

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Fig. 9

ALEKSEYEVSKIY, N.Ye.; SAVITSKIY, Ye.M.; BARON, V.V.; YEFIMOV, Yu.V.

Effect of alloyed elements on the superconducting properties of the compound V_3Si. Dokl.AN SSSR 145 no.1:82-84 Jl '62. (MIRA 15:7)

1. Institut fizicheskikh problem AN SSSR i Institut metallurgii imeni A.A.Baykova. 2. Chlen-korrespondent AN SSSR (for Alekseyevskiy).

(Superconductivity) (Vanadium silicide) (Molybdenum silicide)

SAVITSKIY, Ye.M.; BARON, V.V.; YEFIMOV, Yu.V.

Vanadium recrystallization diagram. Dokl.AN SSSR 145 no.3:612-614 Jl '62. (MIRA 15:7)

1. Institut metallurgii imeni A.A.Baykova. Predstavleno akademikom I.V.Tananayevym.

(Vanadium) (Crystallization)

SAVITSKIY, Ye.M.; BARON, V.V.; KARASIK, V.R.; AKHMEDOV, S.Sh.; PAKHOMOV, V.Ya.; BYCHKOVA, M.I.

Producing a high magnetic field with the aid of a niobium-zirconium alloy. Prib. i tekh. eksp. 8 no.1:182-183 Ja-F '63. (MIRA 16:5)

1. Fizicheskiy institut AN SSSR.
(Magnetic fields) (Niobium-zirconium alloys)

SAVITSKIY, Ye.M. (Moskva); BARON, V.V. (Moskva)

Development of superconducting materials. Izv. AN SSSR. Met. i gor. delo no.5:3-12 S-O '63. (MIRA 16:11)

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

Investigating the structure and properties of some alloys in the system vanadium - niobium - silicon. Trudy Inst. met. no.12:166-178 '63. (MIRA 16:6)

(Vanadium-niobium-silicon alloys--Metallography)
(Phase rule and equilibrium)

SAVITSKIY, Ye.M.; BARON, V.V.; BYCHKOVA, M.I.

Interaction of niobium with molybdenum and silicon. Trudy Inst. met. no.12:179-188 '63. (MIRA 16:6)

(Niobium-molybdenum-silicon alloys—Metallography)
(Phase rule and equilibrium)

ACCESSION NR: AT4009500 S/2509/63/000/014/0139/0146

AUTHOR: Savitskiy, Ye. M.; Baron, V. V.; Yefimov, Yu. V.; Ey*chkova, M. I.

TITLE: Interaction of niobium and vanadium with magnesium

SOURCE: AN SSSR. Institut metallurgii. Trudy*, no. 14, 1963. Metallurgiya, metallovedeniya, fiziko-mekhanicheskiye metody* issledovaniya, 139-146

TOPIC TAGS: niobium, vanadium, magnesium, binary alloy, niobium purification, vanadium purification.

ABSTRACT: Of the three metals in group V of the periodic table, most attention, at present, is being given to niobium and vanadium. These metals are quite pliable in the pure state, but their properties are markedly affected by traces of C, N, O or H. Their purification is therefore unusually important, and one of the most promising techniques for their purification is reduction of their oxides or nitrides with an active element such as Mg. The present investigation concerned the interaction of vanadium and niobium with magnesium. On the basis of studies of the macro- and micro-structure, X-ray and thermal analysis, as well as hardness and micro-hardness determinations, the phase diagrams of the V-Mg and Nb-Mg systems could be plotted. Both systems showed immiscibility in the liquid and solid states, including practically the entire concentration range. Very narrow

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ACCESSION NR: AT4009500

areas of solid solutions are formed on the vanadium and niobium sides. The solubility limit of magnesium in vanadium and niobium at 20C is 0.01 and 0.04%, respectively; at the monotectic temperature (1860C for V-Mg and 2380C for Nb-Mg), the corresponding figures are 0.03-0.04 and 0.05%, respectively. This does not significantly affect the structure of V and Nb. Vanadium and niobium do not dissolve in solid magnesium. In liquid Mg the solubility of vanadium at 660C is 0.06%, increasing to 0.3% at 950C, while the solubility of niobium in magnesium at 1200C is 0.05%. Melting with magnesium leads to reduction of vanadium and niobium, lowering their strength and hardness and increasing their plasticity. However, reduction of vanadium and niobium is hampered by the high vapor pressure of magnesium and the difficulty of removing the slag. Orig. art. has: 3 figures and 3 tables.

ASSOCIATION: Institut metallurgii AN SSSR (Metallurgical Institute, AN SSSR)

SUBMITTED: 00 DATE ACQ: 25Jan64 ENCL: 00

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

Card 2/2

L 25045-65 EWT(m)/EWP(v)/EPF(n)-2/EWA(d)/T/EWP(t)/EWP(b) Pu-4 IJP(c) JD/JG/MLK

ACCESSION NR: AT4048703 S/0000/64/000/000/0138/0140

AUTHOR: Savitskiy, Ye. M. (Professor, Doctor of chemical sciences); Baron, V.V.; Frolov, V.A.

TITLE: The effect of reduction by rare earth metals on molybdenum plasticity

SOURCE: Vsesoyuznoye soveshchaniye po splavam redkikh metallov, 1963. Voprosy* teorii i primeneniya redkozemel'ny*kh metallov (Problems in the theory and use of rare-earth metals); materialy* soveshchaniya. Moscow, Izd-vo Nauka, 1964, 138-140

TOPIC TAGS: molybdenum plasticity, molybdenum reduction, rare earth reducing agent, metal impurity, lanthanum boride, molybdenum alloy plasticity

ABSTRACT: Purification of refractory metals from admixtures such as C,H,N or O, which cause brittleness, would render them more adaptable to structural uses. In continuation of previous work at the Laboratoriya redkikh metallov i splavov (Laboratory of Rare Metals and Alloys), IMET, where La, Nd, and Pr had been found to exert the best effect on molybdenum plasticity, the authors studied the effect of reduction with La and a mixture of rare earth metals on Mo plasticity. Using, e.g., 0.15% La which was melted with Mo in an arc furnace under helium, the authors found that the hardness of cast Mo

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L 25045-65

ACCESSION NR: AT4048703

was decreased sharply by up to 0.2 wt.% rare earth metal. The resulting alloy showed much better plasticity compared to non-reduced Mo; it could be forged and rolled to 90% deformation. The introduction of rare earths encountered difficulties, however, because of the great difference in the melting points of the starter materials and the high vapor pressure of the rare earth admixtures. A number of alloying mixtures of La with B, Ni and Al compounds were developed which have a higher melting point; these were then used successfully. Molybdenum reduced by lanthanum boride could be hammered and rolled at 700C to 98% deformation without breaking. Orig. art. has: 4 figures.

ASSOCIATION: none

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

NO REF SOV: 002 OTHER: 001

Card 2/2

L 11336-65 EWT(m)/EWP(t)/EWP(b) JD/JG

ACCESSION NR: AP4043405 S/0031/64/000/007/0038/0044

AUTHOR: Savitskiy, Ye. M.; Baron, V. V.; Duysemaliyev, U. K.; Yefimov, Yu. V.

TITLE: Phase diagram of the vanadium-copper system

SOURCE: AN KazSSR. Vestnik, no. 7, 1964, 38-44

TOPIC TAGS: vanadium copper system, vanadium copper alloy, vanadium copper alloy composition, vanadium copper alloy structure, vanadium copper alloy property

ABSTRACT: Twenty-five vanadium-copper alloys containing from 0 to 100% Cu were melted from 99.7% pure vanadium and 99.95% pure electrolytic copper. Vanadium-rich alloys were melted in a nonconsumable, tungsten-electrode arc furnace in a helium atmosphere under a 0.5-atm pressure. Copper-rich alloys were melted in the corundum crucible of a high-frequency furnace in an argon atmosphere under a 0.7-atm pressure. Alloys were homonized in vacuum at 900C for 50--100 hr. Fig. 1 of the Enclosure shows the phase diagram of the V-Cu system plotted on the basis of the data obtained. Additions of copper within the

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L 11336-65

ACCESSION NR: AP4043405

limits of solid solution increase the hardness and sharply decrease the ductility of vanadium, e.g., in cold upsetting pure vanadium cracks with a 71% reduction, whereas V-1.2% Cu alloy cracks with a 26.5% reduction. Small additions of vanadium increase the hardness, microhardness, and electrical resistivity of copper alloys. No intermetallic compounds are formed in the V-Cu system. Orig. art. has: 5 figures.

ASSOCIATION: none

SUBMITTED: 00 ATD PRESS: 3100 ENCL: 01

SUB CODE: MM NO REF SOV: 003 OTHER: 005

Card 2/3

L 11336-65

ACCESSION NR: AP4043405

ENCLOSURE: 01

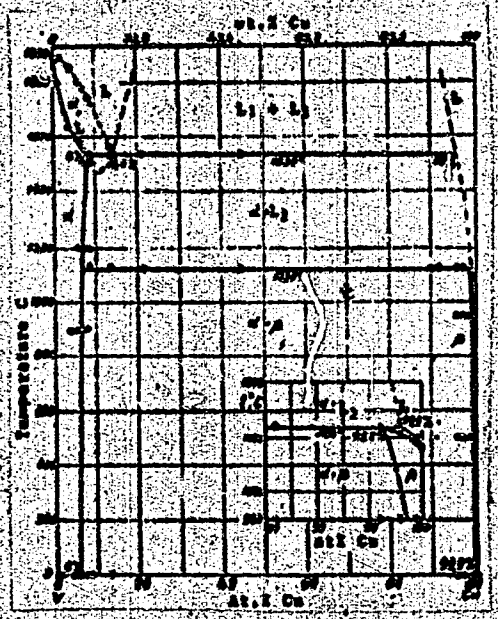

Fig. 1. Phase diagram of V-Cu system

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L 23945-65 EWT(m)/EWP(b)/EWP(t) IJP(c) JD/JG
ACCESSION NR: AP4036965 S/0078/64/009/005/1155/1157

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

TITLE: Phase diagram of the vanadium-gallium system

SOURCE: Zhurnal neorganicheskoy khimii, v. 9, no. 5, 1964, 1155-1157

TOPIC TAGS: vanadium gallium system, vanadium gallium phase diagram, vanadium gallium solubility, vanadium, gallium, vanadium gallium alloy

ABSTRACT: The phase diagram (Fig. 1) of the vanadium-gallium system was constructed based upon studies of microstructure, microhardness, and x-ray and thermal analyses. The studies established the existence of the compound VGa, which had an alpha-Fe type surface structure with a substructure of a = 3.01A, as well as the known compounds V_3Ga and V_2Ga_5. It was also presumed that two additional compounds existed, one rich in Ga and the other closely approaching the composition V_5Ga_3. The compounds were formed by peritectic reaction at the following temperatures: V_3Ga at 1525C; VGa at 1110C, V_2Ga at 1080C; the Ga-rich compound at 485C; and the compound approaching V_5Ga_3 at 1195C. It was particularly found that the compound approaching V_5Ga_3 was stable only at high temperatures and decomposed at about

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L 23945-65
ACCESSION NR: AP4036965

935C. At 800C and below, the solubility of gallium in vanadium is about 10 at.%, whereas at 1525C the solubility is about 20 at.%. The solubility of vanadium in gallium in the solid state is negligibly small. A psuedoeutectic equilibrium was established at 29.8C from the Ga side of the system. Orig. art. has: 3 figures.

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

SUBMITTED: 15Apr63 ENCL: 01 SUB CODE: MM

NO REF SOV: 003 OTHER: 002

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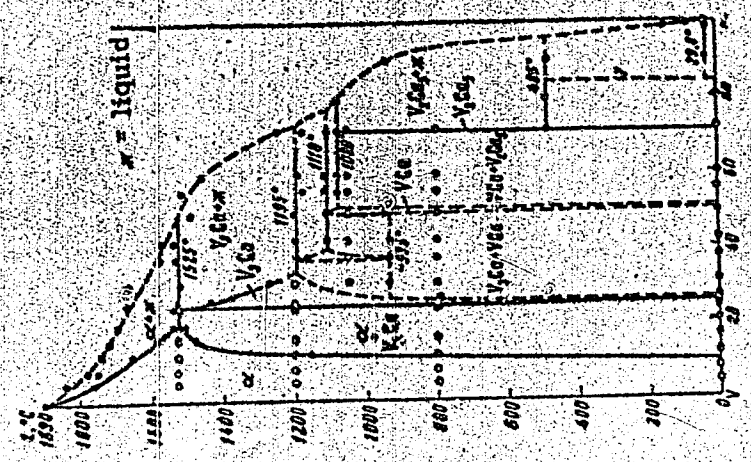
L 23945-65
ACCESSION NR: AP4036965

ENCLOSURE: 01

Fig. 1. Phase diagram of the vanadium-gallium system



Card 3/3

ACCESSION NR: AP4041585 S/0078/64/009/007/1653/1657

AUTHOR: Baron, V. V.; Yefimov, Yu. V.; Savitskiy, Ye. M.; Glady*shevskiy, Ye. I.

TITLE: Vanadium-niobium-silicon system

SOURCE: Zhurnal neorganicheskoy khimii, v. 9, no. 7, 1964, 1653-1657

TOPIC TAGS: vanadium niobium silicon system, vanadium niobium silicon alloy, alloy phase composition, alloy structure

ABSTRACT: Phase equilibrium in alloys of the V-Nb-Si system containing up to 50% Si has been studied. Alloys were melted from 99.9% pure sintered Nb, 99.8% pure Si, and 99.4 or 99.9% pure V in an arc furnace with nonconsumable tungsten electrodes in purified helium under a pressure of 0.7 atm. Alloy ingots weighing 20—50 g were rapidly cooled immediately after solidification; half were then annealed at 800C for 2500 hr and quenched. X-ray diffraction and microstructural analysis and microhardness tests were used in the investigation. On the basis of the results, the equilibrium diagram of the V-Nb-Si system was plotted. The V_5Si_3 and the β-modification of Nb_5Si_3

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ACCESSION NR: AP4041585

compound at high temperatures (close to the melting point) form a continuous series of solid solutions with a W_5Si_3-type structure. The solubility of niobium in the V_5Si_3-base solid solution is 45% at 800C; vanadium solubility in the α-Nb_5Si_3-base solid solution is about 7%; niobium solubility in the V_3Si compound near melting point is about 30% and decreases to 18% at 800C. The silicon content in $(V, Nb)_5Si_3$ and $(V,Nb)_3Si$ solid solution at 800C varied from 1 to 2%. The Nb_4Si compound dissolves little or no vanadium and was not detected in ternary alloys containing more than 5% vanadium. The silicon solubility in (V,Nb) solid solution does not exceed 1 at% at 800C. Orig. art. has: 9 figures.

ASSOCIATION: none

SUBMITTED: 03May63 ATD PRESS: 3064 ENCL: 00

SUB CODE: MM NO REF SOV: 003 OTHER: 007

Card 2/2

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.; Vyleglzhanina, T. V.; Gladyshevskiy, 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-

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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

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L 8772-65
ACCESSION NR: AP4043590

ENCLOSURE: 01

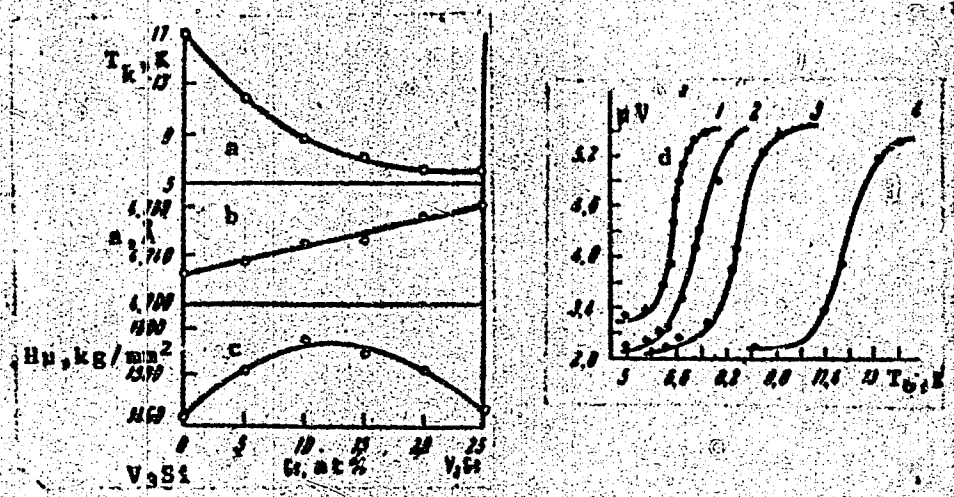

Fig. 1. Composition dependence of critical temperature a, lattice constant b, and microhardness c of V_3Si—V_3Ge alloys and transition curves d of the alloys tested.

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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 - $V_3(Si_{0.8}, Ge_{0.2})$.

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, Re. I.

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, incl). 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;

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L 20683-65

ACCESSION NR: AP4044811

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

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L 20683-65
ACCESSION NR: AP4014811

ENCLOSURE: 01

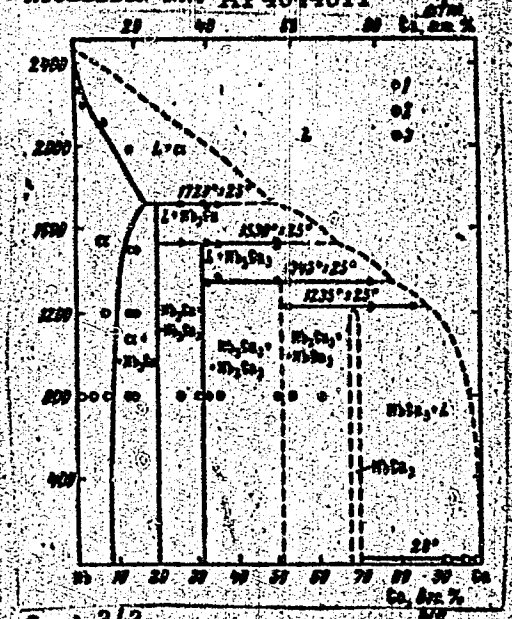

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fig. 1

Phase diagram of the niobium-gallium system

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

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.

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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-

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L 52705-65
ACCESSION NR: AP5013120

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

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

AUTHOR: Savitskiy, Ye. M.; Baron, V. V.; Yefimov, M. 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_3Si 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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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

L 47750-65 EWT(l)/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

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

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

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

ACCESSION NR: AP5011931

2

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. Orig. art. has: 4 figures and 3 tables. [MS]

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

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

ACCESSION NR: AP5022262 UR/0363/65/001/007/1115/1120
546.821+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

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L 1315-66
ACCESSION NR: AP5022262

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

L 8451-66 EWT(m)/EWP(w)/EPF(n)-2/FCC/FCS(f)/T/EWP(t)/EWP(n)/EWP(b)/EWA(c)

ACC NR: AR5024520 IJP(c) JD/JG/WB CH/0080/64/002/001/0020/0021

SOURCE: Science abstracts of china, Technical sciences, v. 2, no. 1, 1964, 20-21

AUTHOR: Wang, Nai-li (3769/0035/4721); Baron, V.V.; Savitskiy, E. M.

TITLE: Structure and properties of the vanadium rich corner of vanadium-niobium-tungsten ternary alloy system

CITED SOURCE: Chin hsu hsueh pao (Acta metallurgica sinica), v. 6, no. 2, 1963, 155-162

TOPIC TAGS: ternary alloy, vanadium, niobium, tungsten, solid mechanical property, metallography, thermal analysis, phase diagram, solid solution

TRANSLATION: The phase equilibrium diagram of the vanadium-rich corner of the vanadium-niobium-tungsten ternary alloy system (up to 25% Nb, 16.6% W) has been established by means of metallographic study, thermal analysis and testing of mechanical properties. An investigation of the vertical sections with a ratio of Nb/W = 2, as well as Nb/W = 1/2, has been made. It is shown that within the range of the alloy compositions under investigation there exists a series of continuous solid solutions. The authors consider that the identical crystal lattice, close atomic radii and similar electron structures of these three metals are a possible explanation for such complete miscibilities. The variation in property of alloys in this system accords

Card 1/2

L 8451-66

ACC NR: AR5024520

with the characteristics of an alloy system having unlimited solid solubility in solid state. By adding niobium and tungsten to "carbon-thermal" vanadium of a certain purity, its hardness is raised appreciably at both room and high tempe atures. At the same time, its placticity and ultimate strength during compression tests are lowered. It is believed that these ternary alloys would have good mechanical properties at high temperatures, should purer vanadium be used as a solvent. It is also found that niobium improves the oxidation resistance of vanadium at 1,000° and 1,200°C, while tungsten makes it deteriorate above 1,000°C. At both temperatures vanadium and its alloys are seriously oxidized.

ASSOCIATION: none

SUBMITTED: 00 ENCL: 00 SUB CODE: MM

NO REF SOV: 000 OTHER: 000

Card 2/2

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

Titanium - vanadium - silicon system. Izv.AN SSSR. Neorg.mat. 1 no.7:1115-1120 Jl '65. (MIRA 18:8)

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

ACC NR: AT6034794 SOURCE CODE: UR/0000/65/000/000/0083/0092

AUTHOR: Talentyan, 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. 1964. Metallovedeniye i metallofizika sverkhprovodnikov (Conference on the physics of metals in superconductors); trudy soveshchaniya. Moscow, Izd-vo Nauka, 1965, 83-92

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.[illegible] % 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.[illegible]% Fe) and O—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 1350° 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

ACC NR: AT6014754

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

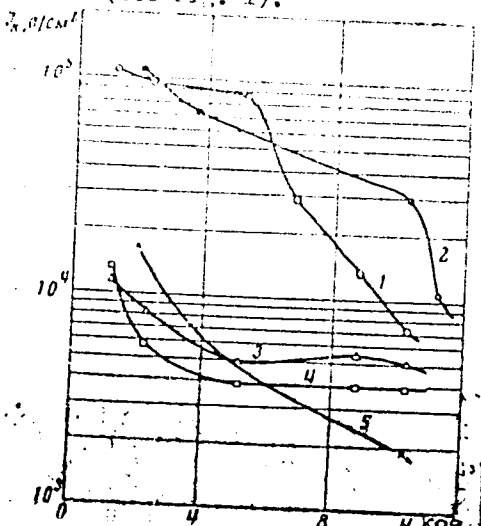

Fig. 1. Critical current density J_k of Nb—Sn alloys as a function of strength of applied transverse magnetic field at 4.2K: 1 - Nb (pure); 2 - Nb + 1.8 wt % Sn; 3 - Nb + 3.11 wt % Sn; 4 - Nb + 4.92 wt % Sn; 5 - Nb + 5.60 wt % Sn.

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.

SUB CODE: 11, 20/ SUBM DATE: 23Dec65/ ORIG REF: 001/ OTH REF: 006

Card 2/2

L 15953-66 EWT(m)/EWP(w)/T/EWP(t) IJP(c) JD/JG
ACC NR: AP6002649 SOURCE CODE: UR/0021/65/000/011/1474/1478

AUTHOR: Savyts'kyy, Ye. M (Savitskiy, Ye. M.); Baron, V. V.; Yefimov, Yu. V.; Hladyshevs'kyy, Ye. I. (Gladyshevskiy, Ye. I.)

ORG: L'vov State University (L'vivs'kyy derzhavnyy universytet)

TITLE: Solid solutions of Ge, Sn, Al, and Be in the compound V_3Si and their superconductivity

SOURCE: AN UkrRSR. Dopovidi, no. 11, 1965, 1474-1478

TOPIC TAGS: germanium, tin, aluminum, beryllium, solid solution, vanadium compound, silicide, superconducting alloy

ABSTRACT: Metallographic and x-ray structural methods were used to study the mutual solubility and properties of alloys of the quaternary systems V_3Si-VX, where X = Ge, Sn, Al, or Be. The microhardness and lattice constants were measured. The existence of continuous solid solutions $V_3(Si, Ge)$ and $V_3(Si, Sn)$ and a limited solubility of Al (about 8 at.%) and Be (less than 0.2 at.%) in the compound V_3Si were established. The critical temperature T_c of transition to the superconducting state is given by

$$T_c = 16.9 \cdot e^{-0.07x} + 0.37e^{0.08x},$$

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L 15953-66

ACC NR: AP6002649

4

for the $V_3(Si, Ge)$ solid solution, x being the Ge content, and by

$$T_c = 17.1 \cdot e^{-0.057x} + 0.069e^{0.13x}$$

for the $V_3(Si, Sn)$ solid solution, x being the Sn content, and a, b, c, and d being constants. Introduction of Al or Be lowers the T_c of the compound V_3Si. The paper was presented by V. M. Svechnikov, Member of AN UkrSSR. Authors thank N. Ye. Aleksyeyevs'kyy, Corresponding Member of AN SSSR and Member of the Institute of Physical Problems, AN SSSR (Institut fizproblem) and V. R. Karasik (of FI AN SSSR) for determining the T_c of the alloys. Orig. art. has: 2 figures and 1 table.

SUB CODE: 11 / SUBM DATE: 22Sep64 / ORIG REF: 003 / OTH REF: 018

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Card 2/2

L 26073-66 EPF(n)-2/EWT(m)/T/EWP(w)/EWP(t) WW/JD/JG/GS

ACC NR: AT6014747 (A) SOURCE CODE: UR/0000/65/000/000/0039/0043

AUTHOR: Myzenkova, L. F.; Baron, V. V. (Candidate of technical sciences); Yefimov, Yu. V.; Savitskiy, Ye. M. (Doctor of chemical sciences)

ORG: none

TITLE: Effect of alloying additions on the superconductivity of niobium-zirconium alloys

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, 1964, 39-43

TOPIC TAGS: superconductivity, alloy superconductivity, niobium alloy, zirconium containing alloy, lanthanum containing alloy, cerium containing alloy, iron containing alloy, titanium containing alloy, superconductive alloy

ABSTRACT: The effect of small additions of cerium, lanthanum, titanium, and iron on the critical current density (I_k) of niobium-zirconium alloys has been investigated. Alloy wires 0.25 mm in diameter, containing 25 and 50 wt% Zr and up to 0.36% La, 0.39% Ce, 5.44% Ti, or 0.5% Fe individually added, were tested at 4.2 K in a magnetic field of 22.4 kGs. Ti, Fe, La, and Ce at contents of up to 0.1% increased considerably the I_k of Nb + 50% Zr alloy. At higher contents, I_k dropped again (see Fig. 1). In the case of Nb + 25% Zr alloy, the maximum on the I_k-composition curves was

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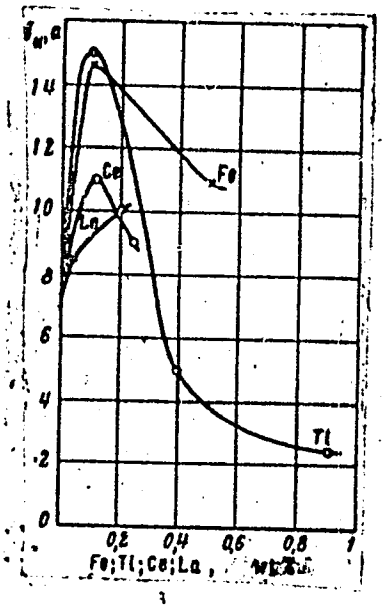

Fig. 1. Critical current of Nb + 50% Zr alloy versus content of alloying addition at an intensity of the magnetic field of 22.2 kGs.

observed at higher contents of alloying elements, for instance, at 1% titanium, but the effect was much weaker than in alloy with 50% Zr. The effect of higher content of alloying elements was studied with alloys containing 5 and 10% Ti and 20—45% Zr.

L 26073-66
ACC NR: AT6014747

At 5% Ti the maximum I_k, $4.45 \cdot 10^4$ a/cm^2, was observed at 28% Zr and in alloys with 10% Ti, at 25% Zr (I_k, $3.65 \cdot 10^4$ a/cm^2). Ti, La, and Ce improved and Fe did not affect the workability of alloys. Annealing at 900 C for 1 hr had a beneficial effect on the I_k of alloys with 25 and 50% Zr containing La and Ce. Orig. art. has: 4 figures.

[WW]

SUB CODE: 11/ SUBM DATE: 23Dec65/ ORIG REF: 003/ OTH REF: 001/ ATD PRESS: 4253

Card 3/3 CC

L 27567-66 EPF(n)-2/EWT(m)/T/EWP(t)/ETI IJP(c) WW/JD/JG/GS

ACC NR: AT6014746 (PR) SOURCE CODE: UR/0000/65/000/000/0029/0038

AUTHOR: Baron, V. V. (Candidate of technical sciences)

58
B+1

ORG: none

TITLE: Superconducting niobium-zirconium alloys and the effect of heat treatment on their properties

27 87 18

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, 29-38

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

ABSTRACT: The relationship between the critical current (I_{cr}) in an external magnetic field at 4.2K and the structure of superconducting Nb-Zr alloys after cold deformation and various thermal treatment has been investigated. Arc-melted Nb-Zr alloys containing up to 65 at% Zr were cold rolled and cold drawn into a wire 0.20—0.25 mm in diameter with a total reduction of 99.75%, and annealed at temperatures up to 1050C for various periods of time. The investigation was conducted at L'vov State University, the Institute of Metallurgy and the Institute of Physics AN SSSR, with the participation of Ye. I. Galdyshevskiy, L. E. Myzenkova, M. S. Model and N. D. Kozlova. All cold-deformed alloys had a b.c.c. lattice of β-solid solution with a

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L 27567-66

ACC NR: AT6014746

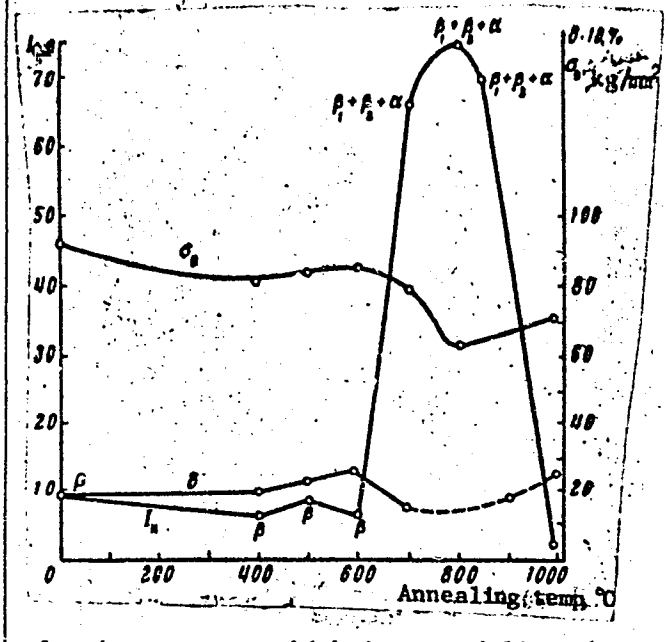

Fig. 1. Dependence of the critical current, structure, and mechanical properties of Nb-50% Zr alloy.

Holding time 1 hr, H = 22 oe, wire diameter-0.25 mm, σ_b-tensile strength, δ-elongation.

lattice constant which increased linearly from 3.31 Å to 3.5 Å with increasing zirconium content from 0 to 65 at% Zr. ... The critical current of cold-deformed...

Card 2/3.

L 27567-66
ACC NR: AT6014746

alloys increased with increasing Zr content. In an external magnetic field of 22 kilo-oersted, the I_{cr} density reached a maximum of 6—8 $\cdot 10^4$ amp/cm^2 in alloys containing 20—25% Zr, and then dropped to 4 and 2 $\cdot 10^4$ amp/cm^2 at Zr contents of 30 and 50%, respectively. The I_{cr} density also increased with an increase in reduction to 99.9%, e.g., to 1.6—2 $\cdot 10^5$ amp/cm^2 in an alloy with 25% Zr. Cold-deformed alloys with 25,30 and 50% Zr had a transition temperature of 11.2, 11, and 10.5K, respectively — the alloys with the highest I_{cr} had a higher transition temperature. Annealing at temperatures up to 600C had little or no effect on structure, strength and I_{cr} (see Fig. 1). A sharp increase in I_{cr} takes place with annealing at 600—800C, which brings about a decomposition of the solid solution. With a further increase of annealing temperature, I_{cr} gradually decreased as the alloy approached the equilibrium state. The sharp increase in I_{cr} after annealing at 600—800C is probably associated with distortions in the crystal lattice of β-solid solution and with the formation of a great number of physical and chemical inhomogeneities. This assumption is well confirmed by a minimum strength and ductility observed at the maximum of I_{cr}. Orig. art. has: 9 figures. [MS]

SUB CODE: 11/ SUBM DATE: 23Dec65/ ORIG REF: 003/ OTH REF: 020/ ATD PRESS: 4260

Card 3/3 CC

L 38550-66 EWT(m)/T/EWP(w)/EWP(t)/ETI IJP(c) JD/JG/GD

ACC NR: AT6014749 SOURCE CODE: UR/0000/65/000/000/0053/0058

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

ORG: none

TITLE: The superconducting properties of niobium-titanium alloys and the effect of alloy additions on the critical current density

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, 53-58

TOPIC TAGS: superconductivity, superconducting alloy, niobium base alloy, titanium containing alloy, tensile strength, critical magnetic field, ~~critical~~ current density

ABSTRACT: The critical current density of niobium alloys with titanium of varying composition (5.5, 14.8, 32.6, 48.8, 55.61, and 68% Ti) is studied as a function of the applied magnetic field strength. The effect of small admixtures (0.2--0.5%) on the critical current density and the mechanical properties of the alloys is also studied. Certain elements of subgroups IIIB, IV, and VIA of the periodic system were used as the alloying admixtures. The ingots were smelted in an electric-arc furnace in a helium atmosphere. The starting materials were niobium with a purity

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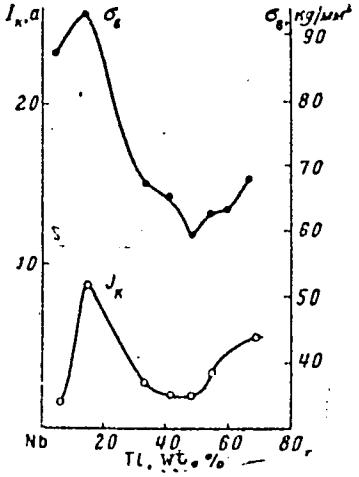
of 99.8% and titanium iodide. The obtained ingots were cut into squares of 1.3 x 1.3 mm and were drawn to a diameter of 0.25 mm. The tensile strength and electric resistance were measured. The superconductivity transition temperature and critical current density were measured in fields of from 0 to 21.2 koe (see Fig. 1).

Fig. 1. Critical current and tensile strength of alloys of Nb—Ti system as functions of composition for maximum field of 21.5 koe.



The maximum superconductivity transition temperature (10.5K) was found in the

L 38550-66

ACC NR: AT6014749

alloys with 32.6% Ti (see Fig. 2).

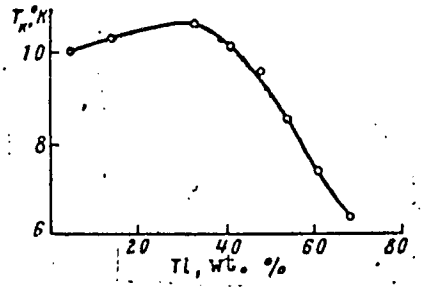


Fig. 2. Superconductivity transition temperature of alloys of Nb--Ti system as function of titanium concentration.

It was determined that the effect of alloy components in concentrations to 0.5% on the transition temperature was negligible. Orig. art. has: 8 graphs and 1 diagram.

SUB CODE: 11, 20/ SUBM DATE: 23Dec65/ ORIG REF: 004/ OTH REF: 007

Card 3/3

L 38549-66 EWT(m)/T/EWP(t)/EWP(w)/ETI IJP(c) JG/JD/GD

ACC NR: AT6014750 SOURCE CODE: UR/0000/65/000/000/0059/0064

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

ORG: none

TITLE: The superconducting properties of alloys of vanadium with titanium

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, 59-64

TOPIC TAGS: superconductivity, superconducting alloy, vanadium base alloy, titanium containing alloy, ~~critical~~ current density, cold drawing, electric wire, critical magnetic field, solid solution, metal heat treatment

ABSTRACT: The critical current density of vanadium-titanium alloys with a body-centered cubic lattice is studied as a function of the applied magnetic field strength and the titanium concentration. The starting materials were titanium iodide (99.9 wt %) and carbothermal vanadium which, after cerium refining, contained (wt %): 99.766 V, 0.11 C, 0.04 O, 0.001 N, and 0.10 Ce. The alloys were smelted in an arc furnace in an atmosphere of purified helium at a pressure of 0.7 atm. After annealing at 800C for 1 hr, one batch of specimens was cold rolled and drawn into wire with a diameter of 0.2 mm. After cold deformation, the second batch was annealed again at 900C for 1 hr.

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ACC NR: AT6014750

The third batch was given intermediate vacuum annealing. In the cold-worked state, the alloy with ~ 50 wt % Ti had the maximum critical current density ($1.4 \cdot 10^4$ a/cm^2) for 99% deformation and a field strength of 22.2 koe (see Fig. 1).

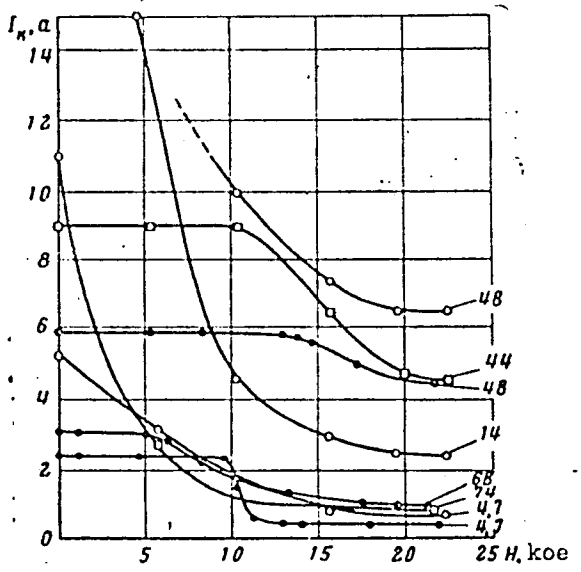

Fig. 1. Critical current of vanadium-titanium wire (0.2 mm in diameter) as a function of applied magnetic field strength. The numbers indicate % Ti.

L 38549-66

ACC NR: AT6014750

A combination of heat treatment and cold deformation was found to be most effective for the vanadium-rich alloys. The authors thank the coworkers of the Department of Inorganic Chemistry, Leningrad State University im. I. Franko (Neorganicheskoy khimii LGU), for performing the x-ray analysis of the alloys, and R. Sh. Akchurin and V. V. Volodin for measuring the critical current. Orig. art. has: 5 graphs and 1 photograph.

SUB CODE: 11, 20/ SUBM DATE: 23Dec65/ ORIG REF: 003/ OTH REF: 021

Card 3/3

L 38535-66 EWT(m)/T/EWP(t)/ETI IJP(c) JD/JG/GD

ACC NR: AT6014755 SOURCE CODE: UR/0000/65/000/000/0086/0088

AUTHORS: Baron, V. V. (Candidate of technical sciences); Myzenkova, L. F.; Savitskiy, Ye. M. (Doctor of chemical sciences)

ORG: none

TITLE: The phase diagram of the niobium-gallium system

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, 86-88

TOPIC TAGS: alloy phase diagram, niobium base alloy, gallium alloy, hardness, solid solution, x ray analysis, thermal analysis

ABSTRACT: A phase diagram is constructed for the niobium-gallium system. The work was done because there are no data on the diagram in the literature. The methods of microstructural, thermal, and x-ray analysis, and also the microhardness method were used. Alloys with up to 40 wt % gallium were prepared in an arc furnace in a helium atmosphere. The starting materials were gallium with a purity of 99.99% and sintered niobium (99.7%). After annealing, individual alloys were hardened from 800C (30 hrs) and 1200C (30 hrs). It was found that, besides the known compound Nb_3Ga, three additional compounds are formed in the system: Nb_5Ga_3 (31.08 wt % Ga), $\sim Nb_2Ga_3$ (~51 wt % Ga), and $NbGa_3$ (69.20 wt % Ga) (see Fig. 1). The microhardness of the compounds

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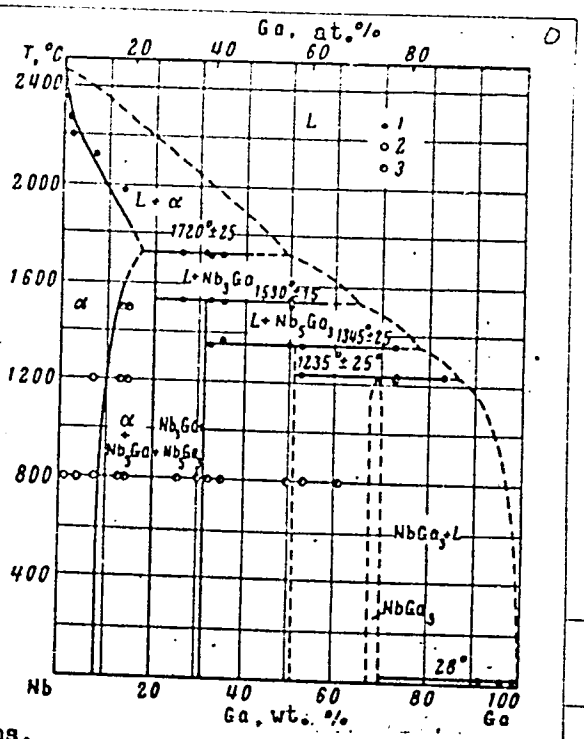
L 38535-66

ACC NR: AT6014755

Fig. 1. Phase diagram of Nb-Ga system:
1 - data of thermal analysis;
2 - single-phase alloys;
3 - two-phase alloys.



was also determined. Orig. art. has: 2 graphs.

Card 2/2 SUB CODE: 11/ SUBM DATE: 23Dec65/ ORIG REF: 002/ OTH REF: 003

L 23366-66 EWP(k)/EWT(d)/EWT(m)/T/EWP(l)/EWP(w)/EWP(w)/EWP(t)/ETI/EWP(k) IJP(c)
ACC NR: AP6019773 (N) SOURCE CODE: UR/0370/66/000/003/0156/0160
WW/JD/HW/JG

AUTHOR: Savitskiy, Ye. M. (Moscow); Baron, V. V. (Moscow); Yefimov, Yu. V. (Moscow)

ORG: none

TITLE: Effect of vanadium on the structure and superconducting properties of niobium-vanadium alloys

SOURCE: AN SSSR. Izvestiya. Metally, no. 3, 1966, 156-160, and insert facing pg. 149

TOPIC TAGS: superconducting alloy, niobium alloy, zirconium containing alloy, vanadium containing alloy, alloy structure, alloy superconducting property

ABSTRACT: The effect of vanadium (up to 15%) on the structure, critical current and the temperature of transition to the superconducting state of binary Nb-Zr alloys has been investigated. The alloys were melted from 99.75—99.95%-pure components in a nonconsumable electrode arc furnace in a helium atmosphere at a pressure of 0.7 atm, homogenized at 1100C for 200 hr, upset at 900—1000C with reductions of up to 20%, annealed at 900C for 100 hr, and furnace cooled. In the as-cast condition the majority of the alloys had a single-phase structure of β-solid solution with a bcc lattice. After annealing, only binary Nb-V alloys and ternary Nb-base alloys had a single-phase structure. The majority of annealed alloys contained two phases: the β-Nb-base solid solutions with a bcc lattice and the α-Zr-base solid solutions with a hexagonal lattice. The investigated Zr-rich region of the Nb-Zr-V system

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L 32368-66
ACC NR: AP6019773

contained a three-phase region where a ZrV_2 compound was present in equilibrium with the two solid solutions. Alloying with V slightly decreased the lattice parameters in binary Nb-Zr alloys. The strength of cold-strained alloys with 5%V and of binary Nb-Zr alloys increased from 134 to 185 kg/mm^2 with increasing Zr content from 0 to 50% and then decreased with a further increase in Zr content. Alloys containing more than 70% Zr and 5%V did not sustain cold deformation without process annealing. The temperature of the transition to the superconducting state was measured with a special unit designed by N. D. Kozlova (IMET im. A. A. Baykov). Alloying with V lowered the superconducting characteristics of the binary Nb-Zr alloys. The decrease in the critical current was particularly sharp with small additions of vanadium, while the temperature of the transition to the superconducting state decreased gradually with increasing Zr content. Annealing (at 900C) increased somewhat the critical current of ternary alloys, but the achieved maximum critical current (18—19 amp) was lower than that of cold-strained binary alloys. It appears that binary Nb-Zr alloys have the most favorable conditions for the presence of superconducting properties, and any departure from the optimal conditions, caused by addition of vanadium, lowers the superconducting properties of binary alloys. The authors thank V. V. Volodin and L. S. Apukhtina (IMET im. A. A. Baykov) for the measurements of the superconducting characteristics of the alloys. Orig. art. has: 5 figures. [MS]

SUB CODE: 11/ SUBM DATE: 17Jun65/ ORIG REF: 004/ OTH REF: 006/ ATD PRESS: 5026

Card 2/2

L 38538-66 EWT(m)/T/EWP(w)/EWP(t)/ETI IJP(c) JG/JD/GD

ACC NR: AT6014757 SOURCE CODE: UR/0000/65/000/000/0091/0100

AUTHORS: Yefimov, Yu. V.; Gladyshevskiy, Ye. I.; Baron, V. V. (Candidate of technical sciences); Savitskiy, Ye. M. (Doctor of chemical sciences)

ORG: none

TITLE: The effect of alloying on the critical temperature of transition to the superconducting state and the crystal-lattice constant of the compound V_3Si

SOURCE: Soveshchaniye po metallovedeniyu i metallofizike sverkhprovodnikov. 1st, 1964. Metallovedeniye i metallofizika sverkhprovodnikov (Metallography and physics of metals in superconductors); trudy soveshchaniye. Moscow, Izd-vo Nauka, 1965, 91-100

TOPIC TAGS: superconductivity, solid solution, vanadium compound, silicon compound, germanium compound, tin compound, crystal lattice parameter, x ray analysis, solubility

ABSTRACT: The solubility of 17 different elements in the compound V_3Si and the effect of the dissolution of these elements on the critical superconductivity transition temperature are studied. Microstructural and x-ray analysis and the microhardness method are used. The starting materials were sintered vanadium and silicon with a purity of 99.8 wt %. The alloys were prepared in an arc furnace in an atmosphere of purified helium at a pressure of 0.7 atm. The alloys were annealed at 800C

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for 2500 hrs. The x-ray phase analysis was performed by the powder method with chromium radiation in a cylindrical chamber. The transition temperature was measured by the magnetic method. It was found that interstitial solid solutions are formed when elements with small atomic radii are dissolved in V_3Si. There is isomorphous replacement of the vanadium atoms in the crystal lattice of V_3Si by atoms

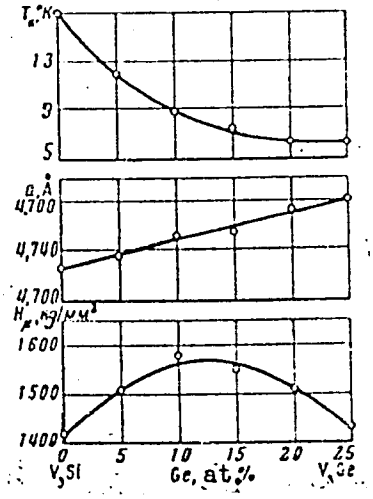

Fig. 1. Change in critical temperature, lattice constant, and microhardness of solid solutions $V_3(Si, Ge)$.

ACC NR: AT6014757

of the transition metals. Atoms of the elements of subgroup B of the periodic system replace Si atoms in the lattice of V_3Si. The pure compound V_3Si has the maximum critical superconductivity transition temperature (see Fig. 1). The authors thank N. Ye. Alekseyevskiy, Institute of Physical Problems AN SSSR (In-t fizproblem AN SSSR) and V. R. Karasik, Physics Institute AN SSSR (Fizicheskiy in-t AN SSSR) for measuring the transition temperatures. Orig. art. has: 4 graphs, 4 tables, 1 diagram, and 2 photographs.

SUB CODE: 11, 20/ SUBM DATE: 23Dec65/ ORIG REF: 008/ OTH REF: 009

ACC NR: AT6034435 (A) SOURCE CODE: UR/0000/66/000/000/0030/0034

AUTHOR: Bychkova, M. I.; Baron, V. V.; Savitskiy, Ye. M.

ORG: none

TITLE: Fusibility diagram of the niobium-tungsten-titanium system and some properties of its alloys

SOURCE: AN SSSR. Institut metallurgii. Svoystva i primeneniye zharoprochnykh splavov (Properties and application of heat resistant alloys). Moscow, Izd-vo Nauka, 1966, 30-34

TOPIC TAGS: heat of fusion, niobium containing alloy, tungsten containing alloy, titanium containing alloy

ABSTRACT: The article reports the results of an investigation of 70 alloys of the given system. Of these, 17 were binary alloys. In the ternary region, the alloys were investigated with respect to six radiation cross sections. Chemical analysis of the alloys showed that in certain cases, due to losses of titanium, the composition of the alloys did not correspond to the cross section. As a result of microstructural, x ray, and thermal analysis, and of measurements of the microhardness, it was established that at 1000°, addition of niobium to alloys of tungsten and titanium contracts the two-phase region, which is a mixture of two solid solutions based on

Card 1/2

ACC NR: AT6034435

tungsten and titanium. The two-phase region extends up to 50 weight percent niobium. The article gives a diagram of an isothermal cross section at 1000°C for alloys of the niobium-tungsten-titanium system. Experimental data on the heat resistance of the various alloys is presented in a series of curves. In general, as a result of the investigation, it was established that in the niobium-tungsten-titanium system above 1000° there are formed a wide region of ternary solid solutions β and a two-phase region ($\beta_{Ti} + \beta_{W}$). Many of the alloys have a melting point above 2200°. With a tungsten content of 30-40%, up to 25% titanium can be introduced into the alloys without lowering the melting point below 2200°. Therefore, some of these alloys have sufficiently good heat resistance for industrial application (30% W and 7-10% Ti). Orig. art. has: 3 figures.

SUB CODE: 11/ SUBM DATE: 10Jun66/ ORIG REF: 005/ OTH REF: 007

Card 2/2

ACC NR: AP6036841 SOURCE CODE: UR/0020/66/171/002/0331/0332

AUTHOR: Savitskiy, Ye. M. (Corresponding member AN SSSR); Baron, V. V.; Yefimov, Yu. V.

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

TITLE: New vanadium compounds with the Cr_3Si-type structure

SOURCE: AN SSSR. Doklady, v. 171, no. 2, 1966, 331-332

TOPIC TAGS: superconductor, superconducting property, vanadium, vanadium indium compound, vanadium cadmium compound, vanadium zinc compound, vanadium bismuth compound, compound superconductivity, vanadium tellurium compound, vanadium lead compound

ABSTRACT: In a search for new superconducting compounds, vanadium wires diffusion coated with An, Cd, In, Tl, Pb or Bi were investigated. It was found that all coatings had a multiphase structure. In addition to vanadium lines, x-ray diffraction patterns showed lines of phases with a cubic structure of the Cr_3Si-type and the following lattice parameters: 4.92—4.95 Å for V_3Cd; 4.87 Å for V_3Pb; 5.28—5.56 Å for V_3In; 5.21—5.25 Å for V_3Tl; and 4.72 Å for V_3Bi. Variations in the lattice parameters of V_3In, V_3Cd and V_3Ti indicate the existence of a homogeneity zone. Diffusion coatings containing V_3In had a temperature of transition to the super-

 UDC: 539.23;537.312.62

APPROVED FOR RELEASE: 06/06/2000 CIA-RDP86-00513R000203710009-9"

ACC NR: AP6036841

conducting state of 13.9°K. Other coatings tested did not show superconductivity at temperatures above 4.2°K. Orig. art. has: 1 figure.

SUB CODE: 11,20/SUBM DATE: 11Aug66/ ORIG REF: 002/ OTH REF: 004/
ATD PRESS: 5108

Card 2/2

L 36960-66 EWP(t)/ETI IJP(c) JD/JG

ACC NR: AP6013371 SOURCE CODE: UR/0370/66/000/002/0163/0165

AUTHOR: Myzenkova, L. F. (Moscow); Baron, V. V. (Moscow); Savitskiy, Ye. M. (Moscow)

ORG: none

TITLE: Phase diagram of the niobium-antimony system

SOURCE: AN SSSR. Izvestiya. Metally, no. 2, 1966, 163-165

TOPIC TAGS: alloy phase diagram, niobium alloy, antimony ~~alloy~~

ABSTRACT: Microstructural, thermal, and x-ray methods as well as microhardness measurements were used to plot the phase diagram of the Nb-Sb system (see Fig. 1). Four compounds were identified in this system: Nb_3Sb (75.00 at.% Nb), NbSb (50 at.% Nb), and apparently also Nb_3Sb_2 (60 at.% Nb) and Nb_4Sb_5 (44.4 at.% Nb). All the compounds are formed by peritectic reactions taking place at 1750, 1140, 1020, and 760°C respectively. The microhardness of alloys based on the compound Nb_3Sb amounts to 668-490 kg/mm2, which indicates the presence of a region of solid solution based on this compound; the microhardness of NbSb is 235, and that of Nb_4Sb_5, 357 kg/mm^2. X-ray structural analysis confirmed that the compound Nb_3Sb has a cubic primitive lattice with constant a=5.26 Å. NbSb has a hexagonal lattice (a=4.270 Å, c=5.447 Å, a/c=1.276) belonging to the NiAs type. Niobium lowers the melting point of antimony, forming with it a eutectic (610°C) whose composition is displaced toward antimony

Card 1/3 UDC: 669.017.12

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ACC NR: AP6013371

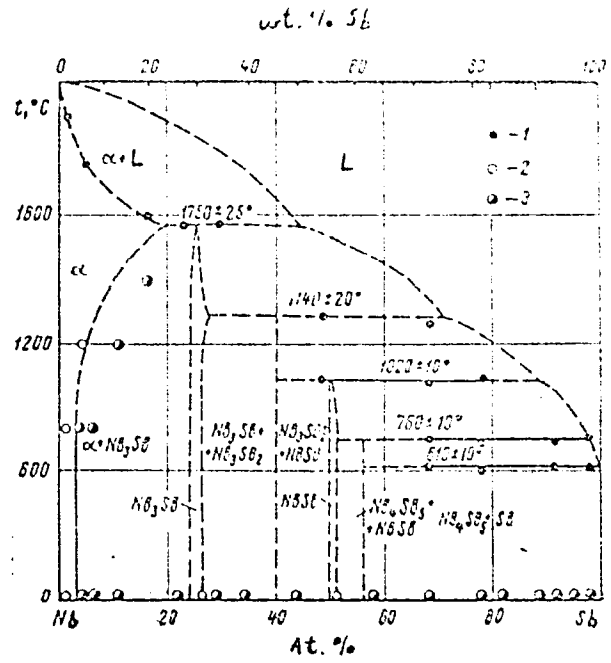

Fig. 1. Phase diagram of the Nb-Sb system: 1 - data of thermal analysis; 2 - single-phase alloys; 3 - two-phase alloys.

Card 2/3

L 38969-66

ACC NR: AP6013371

(pseudoeutectic). The phase diagram of the Nb-Sb systems is in many respects analogous to that of elements of group Va (V, Nb) with elements of group IIIb (Ga). Orig. art. has: 2 figures.

SUB CODE: 11/ SUBM DATE: 16May64/ ORIG REF: 003/ OTH REF: 002

Card 3/3

L 06577-67 EWT(m)/EWP(w)/EWP(t)/ETI IJP(c) JD/JG

ACC NR: AP6029819 SOURCE CODE: UR/0363/66/002/008/1444/1447

42
40
B

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

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

TITLE: The V_3Si-V_3Ga system

SOURCE: AN SSSR. Izvestiya. Neorganicheskiye materialy, v. 2, no. 8, 1966, 1444-1447

TOPIC TAGS: vanadium, gallium, phase diagram, phase composition, phase analysis

ABSTRACT: The V_3Si-V_3Ga system was studied by x ray microstructure and microhardness techniques. The object of the work was to establish the point of transition of the system into a superconductive material and to determine the structures of the alloys of the V_3Si-V_3Ga system. The samples were prepared by fusing mixtures of pure components in an arc furnace in argon atmosphere at 0.9 atm. All samples were homogenized by holding them for 2500 hours at 800°C. The continuous formation of the solid solutions between isomorphic compounds, V_3Si and V_3Ga, at 800°C was established by both x ray and microhardness examinations. The maximum microhardness of 1680 kg/mm^2 was found to correspond to 5-7.5 atom % Ga in the solid solution. At all intercomponent ratios, the solid solutions of V_3Si and V_3Ga were found to have a lattice structure of the Cr_3Si-type. Above 1300°C, the V_3Si-V_3Ga system was found to be composed of two distinct phases: a solid solution based on vanadium and the V_3Si. The transition temperature

Card 1/2 UDC: 546.881'681+546.881'28

of the various compounds of V_3Si-V_3Ga system into the superconducting state can be calculated from the empirical formula

$$T_к = 17{,}1 \cdot e^{-0{,}074x} + 0{,}059 \cdot e^{0{,}216x}$$

where x- is the Ga content in the system in atom %. The authors thank E. I. Gladyshevskiy of L'vov State University for conducting the x ray analysis of the alloys. Orig. art. has: 4 figures and 2 formulas.

SUB CODE: 20/ SUBM DATE: 18Sep65/ ORIG REF: 006/ OTH REF: 006

ANSEROV, M.A., kand. tekhn. nauk; BARON, Yu.M., inzh., red.

[Attachments for machine tools; design and construction] Prisposobleniia dlia metallorezhushchikh stankov; raschety i konstruktsii. Izd.2., perer. i dop. Moskva, Mashinostroenie, 1964. 650 p. (MIRA 17:12)

BARONAS, V. I., Cand of Med Sci — (diss) "On the problem of the development of obstetric aid in Lithuania)" Vil'nyus, 1957, 19 pp (Vil'nyus State University im V. Kapsukas), 100 copies (KL, 29-57, 93)

S/081/62/000/005/041/112
B151/B101

AUTHOR: Báronay, H.

TITLE: New methods used in the chemical industry of Hungary

PERIODICAL: Referativnyy zhurnal. Khimiya, no. 5, 1962, 339, abstract 5I1 (Prakt. Chem., v. 12, no. 8, 1961, 343-344)

TEXT: The following processes are described: The purification (desulfuration) of gases using pyrites cinders (the mass may be regenerated 6-10 times without loss of activity); the production of Co and Ni of high purity from various sources containing their oxides, sulfates, carbonates, hydrocarbonates, sulfides and hydroxides; the production of NH_3 from ammoniacal water without any additional consumption of energy.

Abstracter's note: Complete translation.

Card 1/1

BARONENKO, I.

Increase the material self-interest of pipe rollers to stimulate the improvement of production quality. Sots. trud 6 no.7: 130-131 Jl '61. (MIRA 16:7)

1. Nikopol'skiy trubnyy zavod.
(Nikopol'—Pipe mills) (Bonus system)

BARONENKO, V.A.; TIMOFEYEVA, K.F.

Effect of high-frequency and ultrahigh-frequency fields on conditioned reflex activity and some unconditioned functions in animals and man. Fiziol.zhur. 45 no.2:203-207 F '59. (MIRA 12:3)

1. From the Institute of Occupational Hazards Control, Leningrad.
(ELECTRICITY, effects,
high & ultrahigh frequency fields, on conditioned & unconditioned reflexes (Rus))
(REFLEX, CONDITIONED,
eff. of high & ultrahigh frequency electric fields (Rus))
(REFLEX,
unconditioned, eff. of high & ultrahigh frequency electric fields (Rus))

BARONENKO, V.A.

Effect of exposure of the neck zone to solar radiation on the conditioned reflex activity and dynamics of arterial pressure in animals. Vop. kur., fizioter. i lech. fiz. kul't. 29 no.2: 104-108 Mr-Ap '64 (MIRA 18:2)

1. Nevrologicheskaya klinika (zav. - prof. B.V. Likhterman) i eksperimental'nyy otdel (zav. - dotsent V.A. Zarubin) Instituta meditsinskoy klimatologii i klimatoterapii imeni Sechenova (dir. B.V. Bogutskiy), Yalta.

BALUKHIN, V.L.

Effect of [illegible] of natural and preformed [illegible] course of experimental renal hypertension. Biul. eksp. biol. med. 58 no.8:27-29 Ag '64.

(MIRA 18:1)

1. Institut normal'noy i patologicheskoy fiziologii [illegible] vitel'nyy chlen AMN SSSR prof. V.V. Parin. [illegible] i [illegible] tut meditsinskoy klimatologii i [illegible] Imeni Pavlova. (Str. - B.V. Bogatskiy, Yalta, Submitted Nov. 7, 1963.

PA 33/49T85

BARONENKOV, A. V.

USSR/Mining Methods Jul 48
Bibliography

"Review of P. M. Ipatov and P. D. Lunevskiy's Book, 'Systems for Underground Mining of Deposits of Nonferrous Metals and Gold,'" A. V. Baronenkov, A. V. Kovazhenkov, A. A. Sergeyev, Engineers, 3/4 p

"Gor Zhur" No 7

General description of practical experience intended as manual for engineers, technical workers, mining institutions, etc. It is valuable as it describes means for selecting optimum exploitation methods for various geological and

33/49T85

USSR/Mining Methods (Contd) Jul 48

mining conditions, and aids engineers and technicians in selecting mining systems. It lacks proper evaluation of systems used under certain conditions. Data given is inaccurate.

33/49T85

BARONENKOV, A. V. PA 16/49T105

USSR/Mining Methods Oct 48
Excavating Machinery

"Review of N. G. Trupak's Book, 'Sinking Shafts by the Refrigeration Method,'" Ya. A. Dorman, A. V. Baronenkov, Mining Engineers, 1 p

"Gor Zhur" No 10

Method has been used for 65 years. However, Trupak's book is first to attempt a comprehensive coverage. Unfortunately, it has many defects. Published by Ugletekhizdat, 1947, 246 pp, 163 ill, 4,000 copies, price 23 rubles 50 kopeck.

[redacted] 16/49T105

[illegible], A. . . 41/49T92

USSR/Mining Apr 49
Explosives, Blasting
Bibliography

"Review of G. M. Malakhov's Book, 'Mining Systems with Breaking by Blasting Holes,'" A. V. Baronenkov, A. V. Kovazhenkov, 1 p

"Gor Zhur" No 4

Favorable review of subject book, which describes systems that break down ores by blasting holes, considers methods of drilling deep shafts, and sums up the first experimental work on mining systems with stepped-forced collapsing of the ore in the Krivoy Rog iron ore basin.

LC 41/49T92

BARONENKOV, A. V., SERGEYEV, A. A. and POKROVSKIY, L. A.

"Classification of Losses of Hard Minerals in Exploiting Deposits," Gor. zhur., No.2, 1952

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[Mining] Gornoe delo. Moskva, Gos. nauchno-tekhn. izd-vo lit-ry po chernoi i tsvetnoi metallurgii, 1956. 335 p. (MLRA 10:1)
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BARONENKOV, A.V.

The choice of working system in mining installations at the time of its design. Gor.zhur. no.2:7-12 F '56. (MLRA 9:5)

1. Moskovskiy gornyy institut imeni I.V. Stalina.
(Mining engineering)

SHPITAL'NIKOV, A.G.; BARONENKOV, A.V.

"Economic aspects of mining industries in the U.S.S.R." S.IA. Rachkevskii. Reviewed by A.G.Shpital'nikov, A.V.Baronenkov. Gor.zhur. no.9:60-62 S '56. (MLRA 9:10)
(Mineral industries)

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(continued on next card)

AGAPOV, D.S. --- (continued) Card 2.
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(Kovazhenkov, Aleksandr Vasil'evich, 1906-1957)

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SO: MONTHLY INDEX OF EAST EUROPEAN ACCESSIONS (EEAI) LC, VOL. 7, NO. 1, JAN. 1958

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(Kovazhenkov, Aleksandr Vasil'evich, d. 1957)

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SOV/127-59-1-1/26

AUTHOR: Baronenkov, A. V., Candidate of Technical Sciences

TITLE: Labor Productivity - Up to the Level of Present Requirements (Proizvoditel'nost' truda - na uroven' sovremennykh trebovaniy)

PERIODICAL: Gornyy zhurnal 1959, Nr 1, pp 3-6 (USSR)

ABSTRACT: The article deals with the problem of raising labor productivity up to the level of Seven Year Plan requirements. A production target of 230- 245,000,000 tons of iron ore, or 150- 160,000,000 tons of commercial iron was set for 1965. This represents an increase of 70% in comparison with 1958. The average yearly increase in iron ore production amounted to 6,000,000 tons in the last few years as compared with a yearly production decrease of 3,000,000 tons in the USA. The production of copper and lead-zinc ores also increased. The production of aluminum, nickel, tin, tungsten, molybdenum etc was greatly increased. The open cast mining method was introduced in the Krivoy Rog basin, the Ural, the "Kursk Magnetic Anomaly", the Dzhezkazgan copper ore mine, the Leninogorsk lead-zinc mine, and the Zyryanovsk and Tekeli Combines. Mines and quarries were 98-100%

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mechanized. Labor productivity increased as follows: The average monthly productivity of a mining worker in the Krivoy Rog basin amounted, in 1940, to 101 tons; in 1950, 127.5 tons; in 1957, 186.2 tons. Labor productivity increased in the mining of non-ferrous ore was half as much as that of the Krivoy Rog basin worker. The productivity of a miner from the most successful "Gigant" mine was half as much as that of a miner in the USA. The Seven Year Plan will reduce auxiliary labor and increase the length of stopes assigned to brigades; it will also introduce a wide exchange of experience and improve the technical training of workers. A contract bonus system will be introduced instead of a progressive piece rate system.

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Uncl.

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