"APPROVED FOR RELEASE: 08/10/2001 CIA-RDP86-00513R000619210007-5

Ivanov V. Ye.

AUTHORS: Sinel'nikov, K. D., Ivanov, V. Ye., Safronov, B. G., Azovskiy, Yu. S., Aseyev, G. G. 56-2-9/51

TITLE: The Separation of Isotopes in a Non-Steady Molecular Flow (Razdeleniye izotopov pri nestatsionarnom molekulyarnom techenii)

PERIODICAL: Zhurnal Eksperimental'noy i Teoreticheskoy Fiziki, 1958, Vol 34, Nr 2, pp 327-330 (USSR)

ABSTRACT: In the non-steady molecular flow of mercury vapor a change of the content of isotopes in the flow is observed. The scheme of the measuring arrangement is shown by a diagram. As material served mercury which was in a steel ampoule and could be separated from the system by means of a valve. The content of mercury isotopes was measured by means of the one-jet method for the lightest and for the heaviest isotope, and from these measurements $\beta = I_{198}/I_{204}$ was calculated. The standard ratio β_0 does not change within 2 days. The just discussed measurements were carried out by means of an iron tube and analogous measurements were then carried out by means of a glass tube and a copper tube. The results

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obtained by the glass-and the iron tube are shown in a diagram. The mercury flow is enriched with the lighter isotope immediately after its appearance and it takes about 8 hours to return again to the standard composition. The desorbed mercury is enriched with the heavy isotope. The time necessary for the formation of the steady flow as well as for the standard-like isotope composition decreases at T = 290°C. For a glass tube at T = 20°C this time is one tenth of that of an iron tube. Another diagram shows the results of measurements of the flow as well as of the isotope composition in a copper tube at T = 20°C. The course of the curves coincides qualitatively for copper and iron. The solution of the absorption problem found by P. Clausing (reference 1) coincides well with the experimental curve, which speaks in favor of the applicability of such calculations for the flow of mercury vapors through a glass tube. The analogous calculations for a copper tube proved the impossibility of the description of the change of flow and of the composition of isotopes by means of Clausing's equation. The difference of curves for the flows through an iron and through a copper tube are probably based on the solution of the diffusion of mercury into the depth of the

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walls of the copper tube. Thus it was shown that the different sorption times lead to a separation of isotopes. This phenomenon must be considered a source of error in exact mass-spectroscopic measurements. There are 3 figures and 2 references, 1 of which is Slavic.

SUBMITTED: August 30, 1957

AVAILABLE: Library of Congress

1. Isotopes-Separation 2. Mercury vapor-Molecular flow-Applications 3. Mercury isotopes-Measurement

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Ivanov, V.Ye.

21(4) PHASE I BOOK EXPLOITATION SOV/2714

International Conference on the Peaceful Uses of Atomic Energy. 2nd, Geneva, 1958

Doklady sovetskikh uchenykh; yadernoye goryucheye i reaktornyye metally. (Reports of Soviet Scientists; Nuclear Fuel and Reactor Metals) Moscow, Atomizdat, 1959. 670 p. (Series: Its: Trudy, vol. 3) 8,000 copies printed.

Ed. (Title page): A.A. Bochvar, Academician, A.P. Vinogradov, Academician, V.S. Yemel'yanov, Corresponding Member, USSR Academy of Sciences, and A.P. Zefirov, Doctor of Technical Sciences; Ed. (Inside book): V.V. Paravarzev and G.N. Pobelintseva; Tech. Ed.: E.I. Mazel'.

PURPOSE: This volume is intended for scientists, engineers, physicians, and biologists working in the production and peaceful application of atomic energy; for professors and students of schools of higher technical education where the subject is taught; and for people interested in atomic science and technology.

COVERAGE: This is volume 3 of a 6-volume set of reports on atomic energy, presented by Soviet scientists at the Second International Conference on the Peaceful Uses of Atomic Energy, held in Geneva from September 1 to 13, 1958. Volume 3 consists of two parts. The first part, edited by A.I. Zubov, is devoted to geology, prospecting, concentration and processing of nuclear source material. The second part, edited by G.L. Zverev, includes 27 reports on metallurgy, metallography, processing technology of nuclear fuels and reactor metals, and neutron irradiation effects on metals. The titles of the individual papers in most cases correspond word for word with those in the official English language edition on the Conference proceedings. See SOV/2081 for the titles of the other volumes of the set.

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IVANOV, V. YE.

21(4) PHASE I BOOK EXPLOITATION SOV/2714

International Conference on the Peaceful Uses of Atomic Energy. 2nd, Geneva, 1958

Doklady sovetskikh uchenykh; yadernoye goryucheye i reaktornyye metally. (Reports of Soviet Scientists; Nuclear Fuel and Reactor Metals) Moscow, Atomizdat, 1959. 670 p. (Series: Its: Trudy, vol. 3, 8,000 copies printed.

Ed. (Title page): A.A. Bochvar, Academician, A.P. Vinogradov, Academician, V.S. Yemel'yanov, Corresponding Member, USSR Academy of Sciences, and A.P. Zefirov, Doctor of Technical Sciences; Ed. (Inside book): V.V. Pereverzev and G.M. Pchelintseva; Tech. Ed.: E.I. Mazel'.

PURPOSE: This volume is intended for scientists, engineers, physicians, and biologists working in the production and peaceful application of atomic energy; for professors and students of schools of higher technical education where the subject is taught; and for people interested in atomic science and technology.

COVERAGE: This is volume 3 of a 6-volume set of reports on atomic energy, presented by Soviet scientists at the Second International Conference on the Peaceful Uses of Atomic Energy, held in Geneva from September 1 to 13, 1958. Volume 3 consists of two parts. The first part, edited by A.I. Zubov, is devoted to geology, prospecting, concentration and processing of nuclear source material. The second part, edited by G.L. Zverev, includes 27 reports on metallurgy, metallography, processing technology of nuclear fuels and reactor metals, and neutron irradiation effects on metals. The titles of the individual papers in most cases correspond word for word with those in the official English language edition on the Conference proceedings. See SOV/2081 for the titles of the other volumes of the set.

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"APPROVED FOR RELEASE: 08/10/2001 CIA-RDP86-00513R000619210007-5

S/120/60/000/01/038/051
E192/E382

AUTHORS: Ivanov, V.Ye., Vereshchagin, L.F. and Demyashkevich, B.P.

TITLE: High-pressure Hydraulic Compressor Employing Oil and Water

PERIODICAL: Pribory i tekhnika eksperimenta, 1960, Nr 1, pp 126 - 128 (USSR)

ABSTRACT: The compressor described is illustrated in Figure 1. It is designed for compressing large volumes of liquids to the pressures of 8 to 10 katm. It is a periodically operating machine in that one cycle is completed during each revolution of a crankshaft. The operating cycle is as follows. From a container, the "operating" liquid is admitted through the gland 9 into the annular space between the cylinder 8 and the throttle 7. The liquid has the input pressure of about 30 atm and through three apertures in the throttle is admitted into the annular space formed by the rod 10 and the internal surface of the piston. When the piston is lowered, the liquid is admitted into the channel 6 through the apertures in the rod and results in the lifting of the

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High-pressure Hydraulic Compressor Employing Oil and Water

valve 13 . The compression channel is filled thereby. As soon as the rod passes the lower dead point, the compression cycle is commenced. At the instant when the pressure in the compression chamber is several times higher than that behind the valve 12 the latter is opened and the compressed liquid is expelled. If the compressor operates with water it is necessary to lubricate the piston and the rod. This is done by employing a hypoid grease to the piston 6 and rod 10 and the tightening cylinders 14 . The performance of the compressor is illustrated in Figures 1 and 2. Curve 1 of Figure 2 shows the change of the compressor performance (in litres/min) as a function of the force applied, the input pressure being constant. Figure 3 illustrates the losses due to piston friction as a function of the pressure applied. Curve 1 of Figure 3 represents the hydrostatic pressure, while Curve 2 shows the force received by the rod 10 . The overall dimensions of the compressor (including the mounting frame and the electric motor) are:

Card2/3 length 1.5 m; width 0.8 m and height 1.5 m.

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E192/E382

High-pressure Hydraulic Compressor Employing Oil and Water

There are 3 Soviet references and 3 figures.

ASSOCIATION: Institut fiziki vysokikh davleniy AN SSSR
(Institute of Physics of High Pressures of the Ac.Sc.,USSR)

SUBMITTED: October 15, 1958

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E021/E406

AUTHORS: Ivanov, V.Ye., Amonenko, V.M., Tikhinskiy, G.F. and Kruglykh, A.A.

TITLE: Refining Beryllium by Vacuum Distillation

PERIODICAL: Fizika metallov i metallovedeniye, 1960, Vol.10, No.4, pp.581-585

TEXT: Previous work (Refs.11 to 14) had shown the possibility of purifying beryllium from certain elements despite similar volatilities of these elements and beryllium. The present work was carried out using a diffusion pump giving residual pressures of 10^{-5} to 10^{-6} mm Hg. A beryllium oxide crucible was used for evaporating the beryllium, heated by molybdenum spirals. The condensing column, placed over the crucible, is shown in Fig.1. Condensation took place on the molybdenum plate on the inside of the column. The condensation surface was heated to 900 to 1100°C (measured by a pyrometer and by thermocouples) and the optimum temperature was determined. Fig.2 shows the ratio of the impurity content in the original material (q_2) to the impurity in the condensate (q_1) plotted against the temperature of evaporation (1 - iron, 2 - nickel, 3 - copper, 4 - silicon). Fig.3 shows

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Refining Beryllium by Vacuum Distillation

the change in manganese content with increasing column temperature. A similar change occurs with aluminium. Fig.4 shows that 85 to 90% of the original material can be distilled before the impurity concentrations increase to any extent. Fig.5 shows a column with baffles which has been used very successfully. The table gives the chemical composition of the initial beryllium (second column) and the beryllium after distillation (third column using a simple condensing column, and the fourth column using baffles). The purest beryllium is obtained in the middle zone and is 99.99% apart from oxygen (0.04%) and carbon (0.02%). The carbon originates from oil vapours from the diffusion pump, and the oxygen from sublimation of the crucible material (BeO) and reactions between beryllium and the crucible material to form Be_2O. The microhardness of the distilled beryllium (99.98%) decreased to 130 kg/mm^2 for monocrystals and the hardness of the cast metal was 100 H_b - a decrease by a factor of 1.5 to 2. The low plasticity of the beryllium is explained by the considerable quantities of carbon and oxygen still present. There are 5 figures, 1 table and 16 references: 8 Soviet and 8 English.

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"APPROVED FOR RELEASE: 08/10/2001 CIA-RDP86-00513R000619210007-5

IVANOV, V. Ye, SHELNIKOV, K. D., AMONENKO, V. M., and Tikhinskiy, G. F.

"Some Properties of Pure Beryllium."

report presented (by V. Ye. Ivanov) at the Atomic Energy Research Establishment Harwell UK August 1961

Physical-Technical Inst. , Acad. Sci. Ukr SSR

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S/126/61/011/001/006/019
E021/E406

AUTHORS: Ivanov, V.Ye., Shapoval, B.I. and Amonenko, V.M.

TITLE: Study of Phase Transformations in Zirconium and Beryllium by an Internal Friction Method

PERIODICAL: Fizika metallov i metallovedeniye, 1961, Vol.11, No.1, pp.52-58

TEXT: The phase transformations were studied by following the changes in internal friction during heating. The method of measuring the internal friction used force oscillations during resonance, when changes in internal friction can be followed by changes in the resonance amplitude. The method consisted in clamping one end of a specimen and applying torsional vibrations to the free end by the use of solenoids, measuring the amplitude produced. The working part of the sample was placed in a tube furnace. Measurements were carried out in a vacuum of 10^{-4} to 10^{-5} mm Hg. Samples of zirconium were prepared by the iodide method, preliminarily rolled in a vacuum mill at 900°C with 65% reduction. Samples for testing were cut from the strip and annealed in vacuo for two hours at 800°C. Samples of beryllium were cut from the cylindrical specimens made by powder metallurgical

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Study of Phase Transformations in Zirconium and Beryllium by an Internal Friction Method

methods, and annealed at 1000°C for one hour in high vacuum. Three peaks were observed in the temperature vs internal friction ($Q^{-1}.10^4$) curve of zirconium, i.e. at 260, 645 and 875°C (Fig.3). The peak at 645°C was caused by viscous flow in the grain boundaries. The peaks at 260 and 875°C were of more interest. These peaks did not change with change in frequency (from 56 cps to 29 and 72 cps) of the applied oscillations. This confirmed that the maximum at 260°C was caused by a transformation in the metal structure. The height of the peak at 260°C depended on the rate of heating of the sample. At rates of 2°C/minute and less the maximum did not appear and at higher rates the value of the maximum increased. It was proposed that this was caused by the formation of hydride. Additional experiments showed that the peak disappeared after treatment in vacuum at 700°C for seven hours which removed the hydrogen. The peak at 875°C was present even at the low rate of heating and corresponded to a polymorphic transformation. A peak was observed in the internal friction vs temperature curve of beryllium between 600 and 700°C. This peak also appeared after

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E021/E406

Study of Phase Transformations in Zirconium and Beryllium by an Internal Friction Method

high rates of heating and was not present at low rates. After heating in hydrogen, both the internal friction of zirconium in the region of 260°C and that of beryllium at 600 to 700°C showed a hysteresis effect. Acknowledgments are expressed to I.A.Gindin for discussion of the work. There are 6 figures, 2 tables and 5 references: 4 Soviet and 1 non-Soviet.

ASSOCIATION: Fiziko-tekhnicheskiy institut AN UkrSSR
(Physicotechnical Institute AS UkrSSR)

SUBMITTED: July 2, 1960

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S/126/61/012/006/010/023
E021/E435

AUTHORS: Amonenko, V.M., Ivanov, V.Ye., Tikhinskiy, G.F., Finkel', V.A., Shpagin, I.V.

TITLE: The high temperature polymorphism of beryllium

PERIODICAL: Fizika metallov i metallovedeniye, v.12, no.6, 1961, 865-872

TEXT: Measurements of the electrical conductivity of beryllium were carried out on specimens in the form of plates about 0.3 mm thick, prepared by condensing beryllium vapour on molybdenum sheet at 300°C and 2 x 10^{-6} mm Hg pressure. The beryllium was of purity 99.96 to 99.97% (total metallic impurities 0.01%, oxygen content 0.01% and carbon content less than 0.02%). The density of the beryllium was 1833 g/cm^3. The plates had axial symmetry with the [001] axis perpendicular to the surface. Electric resistance measurements were carried out in the range 18 to 1280°C, in an atmosphere of purified helium above 900°C. Fig.1 shows the relation between temperature and relative electrical resistance of beryllium. Curve 1 is for 99.97% beryllium and shows a continuous smooth increase with increase in

Card 1/3

Ref.6: Sidchu S.S., Henry C.O. J. Appl. Phys., v.21, (10), 1950,

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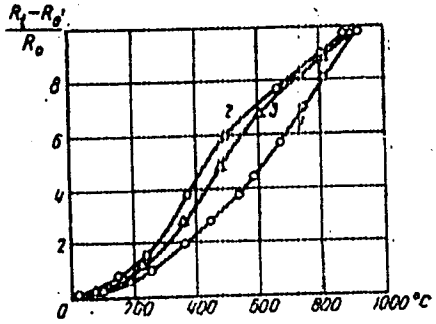
The high temperature ...

1036; Ref.7: Seybolt A., Lukesh I., White D. J. Appl. Phys., v.22, 1951, 986; Ref.11: Martin A.J., Moore A.J. Less-Common Met., v.1, (2), 1959, 85.

ASSOCIATION: Fiziko-tekhnicheskiy institut AN UkrSSR
(Physicotechnical Institute AS UkrSSR)

SUBMITTED: April 19, 1961

Fig.1.



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"APPROVED FOR RELEASE: 08/10/2001 CIA-RDP86-00513R000619210007-5

IVANOV, V. Ye.; SHAPOVAL, B. I.

"Vnutrenneye Treniye V Uranye"
Report presented at the Symposium on Radiation Damage
in Solids and Reactor Materials (IAEA) Venice, 7-11 May 1962

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"APPROVED FOR RELEASE: 08/10/2001 CIA-RDP86-00513R000619210007-5

IVANOV, V.YE., KRUGLYKH, A.A., PAVLOV, V.S., KOVTUN, G.P. AND ARNONENKO, V.M.

"Measurment of the vapor pressure of uranium containing compounds."

Report presented at the IAEA Symposium on the Thermodynamics of Nuclear Materials.
Vienna, Austria 21-26 May 1962

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"APPROVED FOR RELEASE: 08/10/2001 CIA-RDP86-00513R000619210007-5

ZELENSKIY, V. F. and IVANOV, V. Ye.

"Corrosion of Magnesium-Beryllium Cladding Alloys"

report presented at the IAEA Symposium on Corrosion of Reactor Materials, Salzburg, Austria, 4-9 June 1962.

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"APPROVED FOR RELEASE: 08/10/2001 CIA-RDP86-00513R000619210007-5

S/862/62/001/000/005/012
E202/E492

AUTHORS: Gumenyuk, V.S., Ivanov, V.Ye., Lebedev, V.V.

TITLE: Determination of the thermal conductivity of metals at temperatures in excess of 1000°C

SOURCE: Teplo- i massoperenos. t.1: Teplofizicheskiye kharakteristiki materialov i metody ikh opredeleniya. Ed. by A.V.Lykov and B.M.Smol'skiy. Minsk, Izd-vo AN BSSR, 1962, 94-101

TEXT: A method and apparatus developed in the Fiziko-tekhnicheskiy institut AS USSR (Physico-Technical Institute AS UkrSSR) for measurement of the thermal conductivity of metals and alloys up to their melting point are described. Calculation of the thermal conductivity requires determination of the specific electrical resistance, the amount of current and the distribution of temperature along the samples, which are in the form of right circular cylinders (e.g. wires). The apparatus comprises a vacuum chamber with the sample placed between two water-cooled clamps and connected to the electrical supply. Surface temperature measurements are carried out by means of a micro-

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pyrometer of the disappearing filament type, mounted on a cathetometer so tha' the measurements may be taken along the whole length of the sample. The samples used were within 0.5 to 5 mm in diameter and the distance between the clamps could be varied up to 250 mm. As an example, the authors carried out measurement of electrical resistivity and conductivity of Mo, Ta and W wires and developed from first principles the heat balance equations, considering the loss due to radiation and conductivity only. The method is recommended on account of the relatively simple apparatus and relatively high accuracy, and was tried within the range from 0 to 1200°C. It was found that within the above range the thermal conductivities of all the metals studied decrease with temperature. There are 7 figures.

ASSOCIATION: Fiziko-tekhnicheskiy institut AN UkrSSR
(Physico-Technical Institute AS UkrSSR)

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"APPROVED FOR RELEASE: 08/10/2001 CIA-RDP86-00513R000619210007-5

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E039/E485

18.7100

AUTHORS: Gumenyuk, V.S., Ivanov, V.Ye., Lebedev, V.V.

TITLE: The determination of the thermal and electrical conductivity of metals at temperatures higher than 1000°C

PERIODICAL: Pribory i tekhnika eksperimenta, no.1, 1962, 185-189

TEXT: The investigation of the thermal properties of metals and alloys at high temperatures is of considerable interest in the theory of metals and for practical applications. There is no published data in the Soviet literature on the thermal conductivity of refractory materials and only a limited number of non-Soviet papers. In the method described the sample in rod form is heated by an electric current in a vacuum. Differential equations are set up, taking into account the Stefan-Boltzman radiation law, and formulae are derived for determining the coefficient of thermal conductivity and electrical conductivity of the sample material. In order to obtain the required data it is necessary to measure the potential difference on the working length of the sample and also the temperature distribution over the

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same length. This must be done for two samples differing either in length or diameter. The samples are held in water cooled clamps in the vacuum chamber and the potential difference along them is measured by means of two tungsten or molybdenum probes and a potentiometer. The temperature is measured by means of a micro-optical pyrometer ОМП-019 (OMP-019), fastened to the moving carriage of a cathetometer, which enables an accurate temperature distribution to be obtained. The thermal conductivity λ and specific resistance ρ for tantalum is shown to vary from λ = 0.1129 cal/cm sec °C and ρ = 50.50 micro ohms cm at 900°C to λ = 0.0904 cal/cm sec °C and ρ = 108.42 micro ohms cm at 2500°C. There are 4 figures and 1 table.

ASSOCIATION: Fiziko-tekhnicheskiy institut AN UkrSSR
(Physicotechnical Institute AS USSR)

SUBMITTED: May 11, 1961

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APPROVED FOR RELEASE: 08/10/2001 CIA-RDP86-00513R000619210007-5"

"APPROVED FOR RELEASE: 08/10/2001 CIA-RDP86-00513R000619210007-5

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E021/E580

AUTHORS: Verkhorobin, L.F., Ivanov, V.Ye., Matyushenko, N.N., Nechiporenko, Ye.P., Pugachev, N.S. and Somov, A.I.

TITLE: Diffusion reactions in the Mo-Si, W-Si and Ta-Si systems

PERIODICAL: Fizika metallov i metallovedeniye, v.13, no.1, 1962, 77-81

TEXT: The processes occurring during the saturation of molybdenum, tungsten and tantalum by silicon on thermal diffusion were studied. Metallic samples were heated in silicon powder in a vacuum of 10^{-5} mm mercury in the range 1150-1350°C. The silicide layer, formed on the surface of the metals, was examined by metallographic and X-ray analysis. The results showed that the saturated layer was produced, in the main, through the vapour phase. The first stage was the formation of lower silicides. Afterwards, higher silicides are formed. At 1240°C, the disilicide appears after 0.5, 1 and 3 hours on W, Ta and Mo, respectively. Once the disilicide has appeared, further growth occurs largely by this phase, and only after a definite thickness has been attained is there a retardation in growth of disilicide

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and increased growth in the layers of lower silicide. It was shown from X-ray analysis and from the change in form of the samples during diffusion that preferential diffusion of silicon through the silicide layer occurred, and the reaction leading to the formation of the phase takes place mainly at the internal boundary of the layer. There are 5 figures and 2 tables.

ASSOCIATION: Fiziko-tekhnicheskiy institut AN UkrSSR
(Physico-technical Institute AS UkrSSR)

SUBMITTED: April 25, 1961

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"APPROVED FOR RELEASE: 08/10/2001 CIA-RDP86-00513R000619210007-5

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E039/E435

18.8100

AUTHORS: Ivanov, V.Ye., Lebedev, V.V.

TITLE: On the relation between the lattice and electron components of thermal conductivity in metals

PERIODICAL: Fizika metallov i metallovedeniye, v.13, no.4, 1962, 632-635

TEXT: Assuming that the experimental values of thermal conductivity are equal to the sum of one component due to the motion of electrons and another due to the vibration of the lattice the following expression is obtained from the Wiedemann-Franz relation

$$\frac{\lambda_{obs}}{\sigma T} = \frac{\lambda_e}{\sigma T} + \frac{\lambda_\phi}{\sigma T} = L_o + \frac{\lambda_\phi}{\sigma T} \qquad (3)$$

where λ_{obs} is the experimental value of thermal conductivity; λ_e the component due to electrons; λ_ϕ that due to the lattice; σ the electrical conductivity; T the absolute temperature and L_o the Lorentz number. In this work is considered the

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On the relation between ...

possibility of making a more rigid division of the experimental values of thermal conductivity into the electron and lattice components at high temperatures. The electron component is independent of temperature while the lattice component decreases with increasing temperature. The thermal conductivity of Mo and W is measured at temperatures up to about 2200°C and shown to approach a constant value asymptotically. This value must equal λ_e. Values of λ_ϕ are given for Pt, Pb and Cd for temperatures up to 500, 282 and 252°C respectively. Values of λ_e and λ_ϕ are given for Cu, Au, Ag and Al up to 700°C. In the case of W, λ_e is equal to 0.204 cal/cm.°C.sec while λ_ϕ varies from 0.071 at 900°C to 0.012 cal/cm.°C.sec at 2200°C. The dependence of the Lorentz number on temperature is also obtained. In the case of Cu it varies from $\sim 2.3 \times 10^{-8}$ at 100°C to $\sim 2.46 \times 10^{-8}$ at 500°C. It is concluded that: 1) The division of the coefficient of thermal conductivity of metals into electron and lattice components with the aid of Eq.(3) appears to be incorrect. 2) At temperatures near to the Debye temperature it is impossible to neglect the lattice component of the thermal

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conductivity, even for good thermal conductors. 5) The Wiedemann-Franz law is not fulfilled near the characteristic temperature for metals. It is suggested that a more rigorous experimental investigation is required for a wider range of materials. There are 2 figures and 3 tables.

ASSOCIATION: Fiziko-tekhnicheskiy institut AN UkrSSR
(Physicotechnical Institute AS UkrSSR)

SUBMITTED: May 22, 1961

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APPROVED FOR RELEASE: 08/10/2001 CIA-RDP86-00513R000619210007-5"

"APPROVED FOR RELEASE: 08/10/2001 CIA-RDP86-00513R000619210007-5

39756
S/126/62/014/001/012/018
E193/E383

5.4300

AUTHORS: Amonenko, V.M., Ivanov, V.Ye., Tikhinskiy, G.F. and Finkel', V.A.

TITLE: On the problem of the solubility of impurities in beryllium

PERIODICAL: Fizika metallov i metallovedeniye, v. 14, no. 1, 1962, 128 - 130

TEXT: Data on the solid solubility of nonmetallic impurities (carbon, nitrogen, oxygen) in beryllium are scarce and sometimes contradictory. This prompted the present authors to study this problem by comparing the temperature-dependence of the lattice parameters of high-purity beryllium with that of beryllium containing nonmetallic impurities in quantities sufficient to ensure the formation of saturated solid solutions. These relationships are demonstrated in Fig. 1, where the magnitude (kX) of a (lefthand scale) and c (righthand scale) is plotted against the temperature (^{o}C), the broken and continuous curves relating, respectively, to specimens containing 0.4% impurities (mainly C and O) and 99.98% pure beryllium.

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"APPROVED FOR RELEASE: 08/10/2001 CIA-RDP86-00513R000619210007-5

On the problem of ....

the dotted lines representing data obtained by Martin and Moore (Less-Com. Metals, 1959, 1, no. 2, 85) for commercial-grade metal. The solubility limit at 1 200 °C was evaluated in the following manner: experimental data on the degree of lattice distortion (Δc, kX/1 at.%) of Ti and Zr due to dissolution of oxygen (C.F. Domogola, D.J. McPherson - J. Metals, 1954, 6, 2, 238; E.S. Bumps, H.D. Kessler, H. Hunsen - Trans. ASM, 1953, 45, 1008) were plotted against the reciprocal of the volume of the elementary cells of these metals (i.e. against the value characterizing the size of the interstitial pores); on linear extrapolation of this graph to the reciprocal of the volume and elementary cell of Be, the magnitude of Δc = 0.02 kX/1 at.%, was obtained, which corresponded to the total solubility of interstitial impurities equalling 1 to 1.5%. This value, although evidently too high owing to inaccuracy of extrapolation and inability to take into account the increase in the thermal-expansion coefficient due to distortion of the vibration spectrum of the lattice by the impurity atoms, is not in contradiction to the value of 0.3% obtained by metallographic analysis (J. Greenspan. TID - 7526 (part 1), 1957 (quoted

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S/126/62/014/001/012/018
E193/E383

On the problem of ....

according to G.E. Darvin, I.H. Budery - "Beryllium", London, 1960, p. 291)). There are 2 figures.

ASSOCIATION: Fiziko-tekhnicheskiy institut AN UkrSSR (Physicotechnical Institute of the AS UkrSSR)

SUBMITTED: December 2, 1961

Card 3/3

APPROVED FOR RELEASE: 08/10/2001 CIA-RDP86-00513R000619210007-5"

"APPROVED FOR RELEASE: 08/10/2001 CIA-RDP86-00513R000619210007-5

IVANOV, V. Ye.; NECHIPORENKO, Ye. P.; OSIPOV, A. D.; ZMIY, V. I.

Effect of stresses on defects in silicide layers on molybdenum.
Fiz. met. i metalloved. 14 no.4:574-577 O '62.
(MIRA 15:10)

(Metallic films—Defects)
(Thermal stresses)

APPROVED FOR RELEASE: 08/10/2001 CIA-RDP86-00513R000619210007-5"

"APPROVED FOR RELEASE: 08/10/2001 CIA-RDP86-00513R000619210007-5

AMONENKO, V.M.; IVANOV, V.Ye.; TIKHINSKIY, G.F.; FINKEL', V.A.

X-ray study of the solubility of impurities in beryllim. Fiz. met.i metalloved. 14 no.6:852-856 D '62. (MIRA 16:2)

1. Fiziko-tekhnicheskiy institut AN UkrSSR.
(Beryllium--Inclusions)
(X rays--Industrial applications)

APPROVED FOR RELEASE: 08/10/2001 CIA-RDP86-00513R000619210007-5"

"APPROVED FOR RELEASE: 08/10/2001 CIA-RDP86-00513R000619210007-5

S/080/62/035/009/006/014
D204/D307

AUTHORS: Ivanov, V.Ye., Somov, A.I., and Yarovoy, V.G.

TITLE: The kinetics of vacuum siliciding

PERIODICAL: Zhurnal prikladnoy khimii, v. 35, no. 9, 1962, 1960 - 1964

TEXT: The above problem was studied theoretically and experimentally in view of the advantages of this process and high quality of the resultant coatings. By considering a vapor interacting with a solid to form a layer of product upon the latter, which is of thickness l after a time t, and assuming that the vapor is supplied into the reaction zone at a rate much lower than the rate of mutual diffusion of reactants through the layer formed, it is shown on general grounds that l should vary linearly with t. The relation between l and t becomes parabolic if the rate of chemisorption of the vapor upon the solid surface is higher than the rate of diffusion through the layer. To confirm these results 10 x 10 x 1.5 mm specimens of Ta and Mo were silicided by a method similar to that described by Gorbunov, using Si powder (0.5 - 1.0 mm), at 1200, 1250, 1300 and

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"APPROVED FOR RELEASE: 08/10/2001 CIA-RDP86-00513R000619210007-5

IVANOV, V.Ye.; KOVTUN, S.F.; TARASOV, N.D.; UL'YANOV, R.A.

Vacuum rolling of chemically active metals. TSvet. met. 35 no.11:85-88 N '62. (MIRA 15:11)
(Vacuum metallurgy) (Rolling (Metalwork))

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(3)

IVANOV, V. Ye., ZELENSKIY, V. F., VOLOSHCHUK, A. I., GRINYUK, V. N.,

"Uranium-based Cermet Alloys"

Report submitted for the Conference on New Nuclear Materials Technology including Non-Metallic Fuel Elements (IAEA), Prague, 1-5 July 1963

APPROVED FOR RELEASE: 08/10/2001 CIA-RDP86-00513R000619210007-5"

"APPROVED FOR RELEASE: 08/10/2001 CIA-RDP86-00513R000619210007-5

(5)

IVANOV, V. Ye., ZELENSKIY, V. F., FAYFER, S. I., ZHDANOV, S. M.,
MAKSIMENKO V. I., SAVCHENKO V. I.,

"Magnesium Cermets and Magnesium-Beryllium Alloys

Report submitted for the Conference on New Nuclear Materials Technology including Non-Metallic Fuel Elements (IAEA), Prague, 1-5 July 1963

APPROVED FOR RELEASE: 08/10/2001 CIA-RDP86-00513R000619210007-5"

"APPROVED FOR RELEASE: 08/10/2001 CIA-RDP86-00513R000619210007-5

IVANOV, V.YE., ZELENSKIY, V.F., KOLENDOVSKIY, M.G., KOLOMIYETS, L.D.

Impregnation of Graphite with Liquid Silicon in a vacuu,.

Report submitted for the Conference on New Nuclear Materials Technology including Non-Metallic Fuel Elements (IAEA), Prague, 1-5 July 63

APPROVED FOR RELEASE: 08/10/2001 CIA-RDP86-00513R000619210007-5"

"APPROVED FOR RELEASE: 08/10/2001 CIA-RDP86-00513R000619210007-5

IVANOV, V. Ye.; ZELENSKIY, V. F.

"Development of heat-resistant fuel elements with magnesium-beryllium cannings."

report submitted for 3rd Intl Conf, Peaceful Uses of Atomic Energy, Geneva, 31 Aug-9 Sep 64.

APPROVED FOR RELEASE: 08/10/2001 CIA-RDP86-00513R000619210007-5"

"APPROVED FOR RELEASE: 08/10/2001 CIA-RDP86-00513R000619210007-5

ACCESSION NR: AP4029694 S/0089/64/016/004/0325/0332

AUTHORS: Ivanov, V.Ye.; Zelenskiy, V.F.; Stukalov, A.I.; Azarenko, A.V.; Ty*rina, L.V.; Gordiyenko, Ya.I.; Kunchenko, V.V.

TITLE: The relationship between the texture of hardened uranium and the type of heating and other aspects of heat treatment.

SOURCE: Atomnaya energiya, v.16, no.4, 1964, 325-332

TOPIC TAGS: phase recrystallization, heat treatment, uranium treatment, polymorphic transformation, multiple hardening, beta phase, alpha phase, phase transformation, annealed uranium, linear expansion, slow cooling, diffusion conversion.

ABSTRACT: It has now been established that the radiative growth of uranium is largely determined by the nature and prominent features of its texture. An attempt has been made to destroy the uranium texture resulting from a single hardening process by subjecting it to several such processes (up to 4 times). The result was a pulverization of the grain and disappearance of the texture, although the authors claim that the latter requires additional verification. Opinions vary as to

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ACCESSION NR: AP4029694

the best method of hardening uranium with a view to limiting its increasing radiation. The tests made in this connection included hardening the uranium samples in the beta- and gamma-phases, followed by the slow-cooling and water-cooling methods. The test results indicate that the texture of hardened uranium is determined primarily by the parametersof the heat treatment of the metal, and the following conclusions are therefore justified: 1) the texture of hardened uranium depends on the nature of the heat treatment but primarily on the duration of exposure to high-temperature phases; 2) the greatest destruction of the texture was noted in the samples that had been heat-treated under the effect of tensions produced by thermic gradients or external efforts, and 3) in the case of low and moderate heating speeds, the texture of hardened uranium is determined to a large extent by the technology of the uranium production and the duration of its exposure in the beta-phase before the hardening. Orig. art. has: 9 figures.

ASSOCIATION: None

SUBMITTED: 30May63 DATE ACQ: 01May64 ENCL: 00

SUB CODE: PH, NS NR REF SOV: 015 OTHER: 005

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APPROVED FOR RELEASE: 08/10/2001 CIA-RDP86-00513R000619210007-5"

"APPROVED FOR RELEASE: 08/10/2001 CIA-RDP86-00513R000619210007-5

ACCESSION NR: AP4013097 S/0126/64/017/001/0094/0099

AUTHOR: Ivanov, V. Ye.; Nechiporenko, Ye. P.; Zmiy, V. I.

TITLE: Study of reaction diffusion in the Mo - Si system

SOURCE: Fizika metallov i metalloved., v. 17, no. 1, 1964, 94-99

TOPIC TAGS: metal diffusion, reaction diffusion, silicon diffusion, molybdenum silicide, molybdenum silicon system, silicide phase formation, vacuum silication

ABSTRACT: Previously published papers of the first two authors and others on various aspects of the reaction diffusion of silicon-saturated molybdenum, tungsten, and tantalum in vacuum have led to the conclusion that in the Mo - Si system the predominant role is played by diffusion of the silicon through the silicide layer; that is, the phase formation reaction takes place primarily on the internal boundary of the layer. The present article confirms this conclusion. The kinetic aspects of the vacuum silication of the molybdenum were also studied. The authors found that the growth of diffusion layers of Mo_5Si_3 and $MoSi_2$, as a function of time, obeys a parabolic law. From the parabolic growth of the silicide layers the authors computed the silicon diffusion factors in Mo_5Si_3 and $MoSi_2$ at 1250C. Used in the diffusion study were flat molybdenum samples 4OX1OX1 millimeter in size. The

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silicon employed in the tests was in the form of powder with a grain size of 5-7 microns (purity factor: 99.99%). The samples were located in a molybdenum bath and thoroughly sprinkled with the powder. The bath with the samples was inserted, through a precombustion chamber, into a furnace with a molybdenum heater set at the proper temperature. Orig. art. has: 6 figures, 2 formulas, and 1 table.

ASSOCIATION: Fiziko-tekhnicheskiy institut AN USSR (Physicotechnical Institute, AN UkrSSR)

SUBMITTED: 03Mar63 DATE ACQ: 26Feb64 ENCL: 00

SUBCODE: ML; PH NO REF SOV: 009 OTHER: 000

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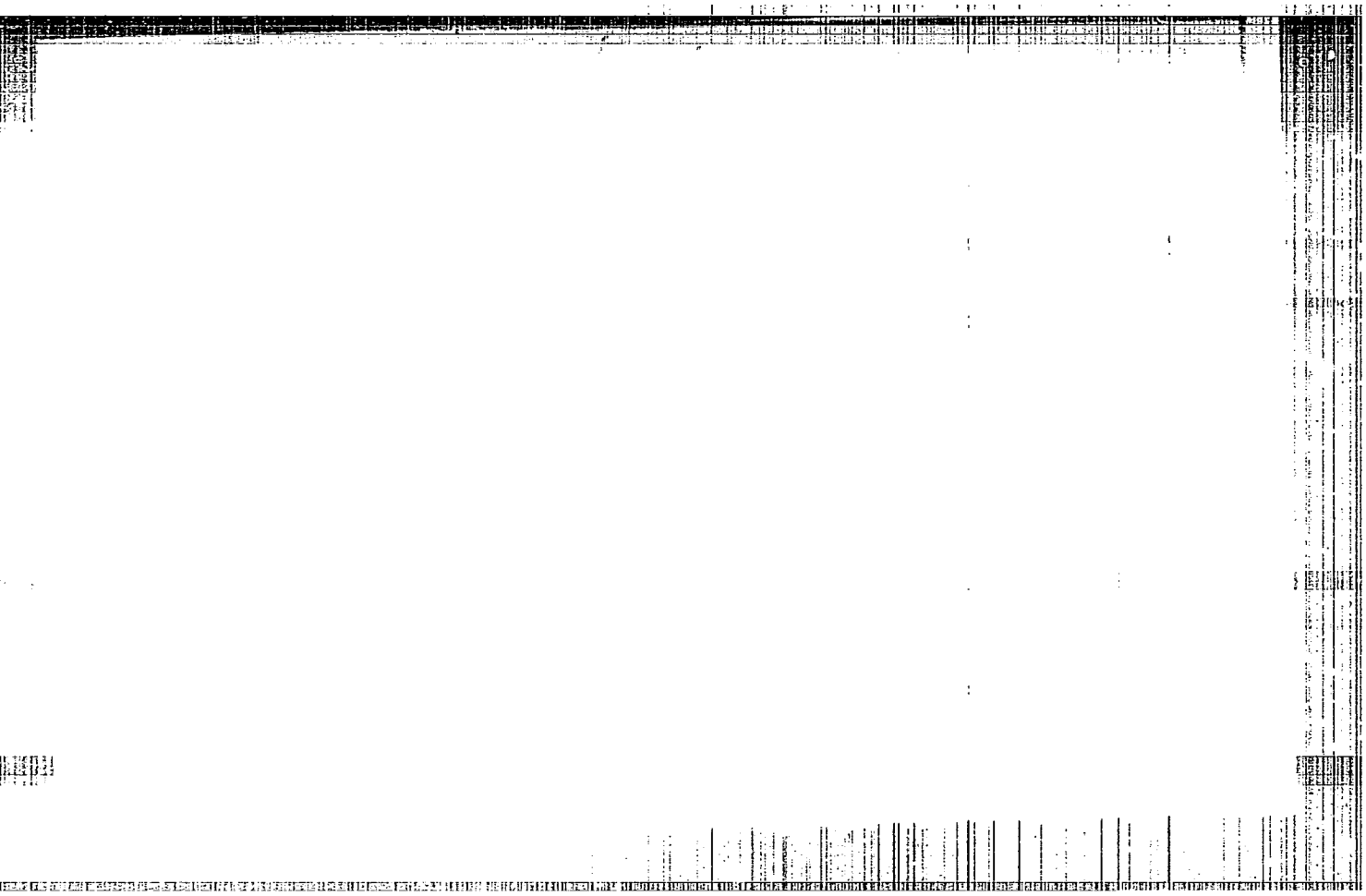

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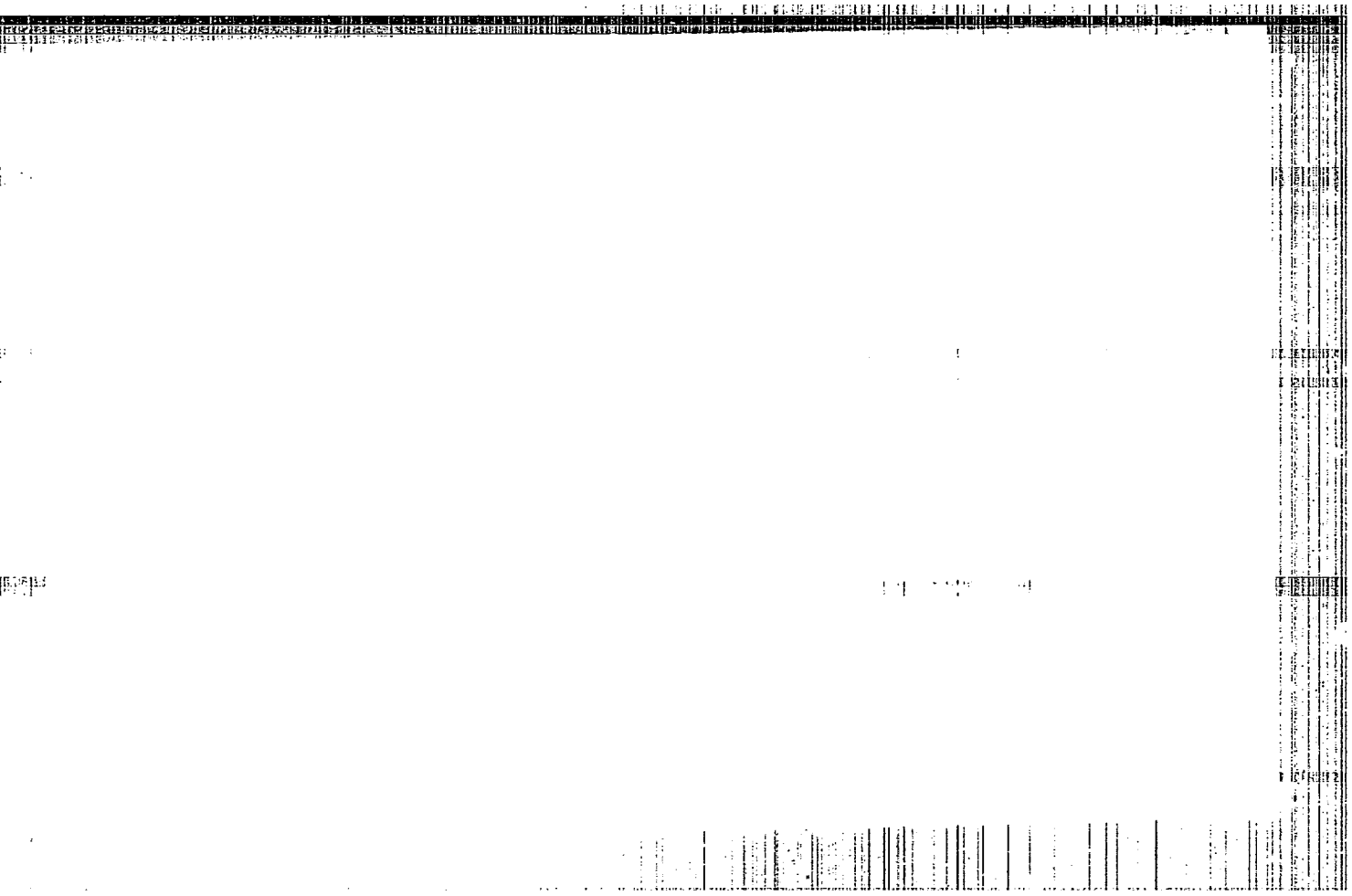

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"APPROVED FOR RELEASE: 08/10/2001 CIA-RDP86-00513R000619210007-5

ACCESSION NR: AP4013101 S/0126/64/017/001/0142/0144

AUTHOR: Ivanov, V. Ye.; Nochiporenko, Ye. P.; Zmiy, V. I.; Glushko, P. I.; Aleksandrov, G. M.; Dorokhov, V. I.

TITLE: High-temperature oxidation of molybdenum disilicide

SOURCE: Fizika metallov i metalloved., v. 17, no. 1, 1964, 142-144

TOPIC TAGS: molybdenum, silicon, molybdenum disilicide, molybdenum disilicide oxidation, molybdenum disilicide microhardness

ABSTRACT: Molybdenum disilicide is a metal with great promise for use in structures designed to withstand high temperatures. In the technical literature there are data on the oxidation of $MoSi_2$ achieved by various methods: hot pressing, sintering, etc. The authors of this short article conducted a study of the kinetics of $MoSi_2$ oxidation in a temperature interval of 1400-1700C using a high-temperature resistance furnace. The heater was a spiral 5mm in diameter made from a molybdenum rod. For oxidation, samples of molybdenum disilicide 25X10X0.15 mm in size were used; these samples were obtained by the vacuum method. The temperature was controlled by a thermocouple (Pt - Rh 7% center: Pt-Rh 20%) and an optical pyrometer, the latter placed directly on the heater. The temperature gradient between the heater

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ACCESSION NR: AP4013101

and the sample was not more than 30C. A metallographic analysis of the sample was carried out with an MIM-7 microscope, with microhardness tested on a PMT-3 instrument. Oxidation time was 10 hours. It was found that with increasing time and temperature the oxidizability of $MoSi_2$ increases, the rate of oxidation obeying a parabolic law. No transition from a parabolic law of oxidation to a logarithmic one was detected in the tests. X-ray analysis in the temperature range indicated (1400-1700C) revealed an amorphous oxide film on the surface of the oxidized samples. Preliminary analysis showed that this film, in addition to SiO_2, contains unknown components. These are, apparently, lower molybdic oxides, the vapor tension of which is lower than that of MoO_3. The microhardness of the molybdenum disilicide, which did not change during the oxidation process, was 1200 kg/mm^2. Orig. art. has: 3 figures.

ASSOCIATION: Fiziko-tekhnicheskiy institut AN USSR (Physicotechnical Institute, AN UkrSSR)

SUBMITTED: 03Mar63 DATE ACQ: 26Feb64 ENCL: 00

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

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21C

L 18316-65 EWG(j)/EWT(l)/EWP(e)/EWG(k)/EWT(m)/EPF(c)/EPF(n)-2/EPR/EEC(b)-2/EWP(b) Pz-6/Pr-4/Ps-4/Pu-4 IJP(c)/AFWL/SSD WW/AT/WH

ACCESSION NR: AP4049532 S/0089/64/017/005/0329/0335

AUTHOR: Millionshchikov, M. D.; Gverdtsiteli, I. G.; Abramov, A. S.; Gorlov, L. V.; Gubanov, Yu. D.; Yefremov, A. A.; Zhukov, V. F.; Ivanov, V. Ye.; Kovy*rzin, V. K.; Koptelov, Ye. A.; Kosovskiy, V. G.; Kukharkin, N. Ye.; Kucherov, R. Ya.; Laly*kin, S. P.; Merkin, V. I.; Nechayev, Yu. A.; Pozdnyakov, B. S.; Ponomarev-Stepnoy, N. N.; Samarin, Ye. N.; Serov, V. Ya.; Usov, V. A.; Fedin, V. G.; Yakovlev, V. V.; Yakutovich, M. V.; Khodakov, V. A.; Kompaniyets, G. V.

TITLE: The "Romashka" high-temperature reactor-converter 19

SOURCE: Atomnaya energiya, v. 17, no. 5, 1964, 329-335

TOPIC TAGS: nuclear power reactor, reactor feasibility study, research reactor, thermoelectric converter/Romashka

ABSTRACT: The authors briefly describe the construction, parameters, test results, and operating experience of the "Romashka" reactor-

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converter unit, which has been in operation at the Kurchatov Atomic Energy Institute since August 1964. The fuel used is uranium dicarbide enriched to 90% U^{235}. Graphite and beryllium are used as reflectors. Electricity is generated by silicon-germanium semiconductor thermocouples distributed on the outer surface of the reflector and connected in four groups which can be connected in series or in parallel. The temperatures of the active zone and outer surface are 1770 and 1000C, respectively. The power ratings are 0.50—0.80 kW electric and 40 kW thermal, the maximum current (parallel connection) is 88 A, the neutron flux is 10^{13} neut/cm^2 sec in the center of the active zone and 7×10^{12} on its boundary. The reactor has a negative temperature reactivity coefficient. The equipment has high inherent stability and requires no external regulator, and little change was observed in the thermocouple properties after 2500 hours of operation. Tests on the equipment parameters are continuing, and the results are being analyzed for use in future designs. Orig. art. has: 8 figures and 1 formula.

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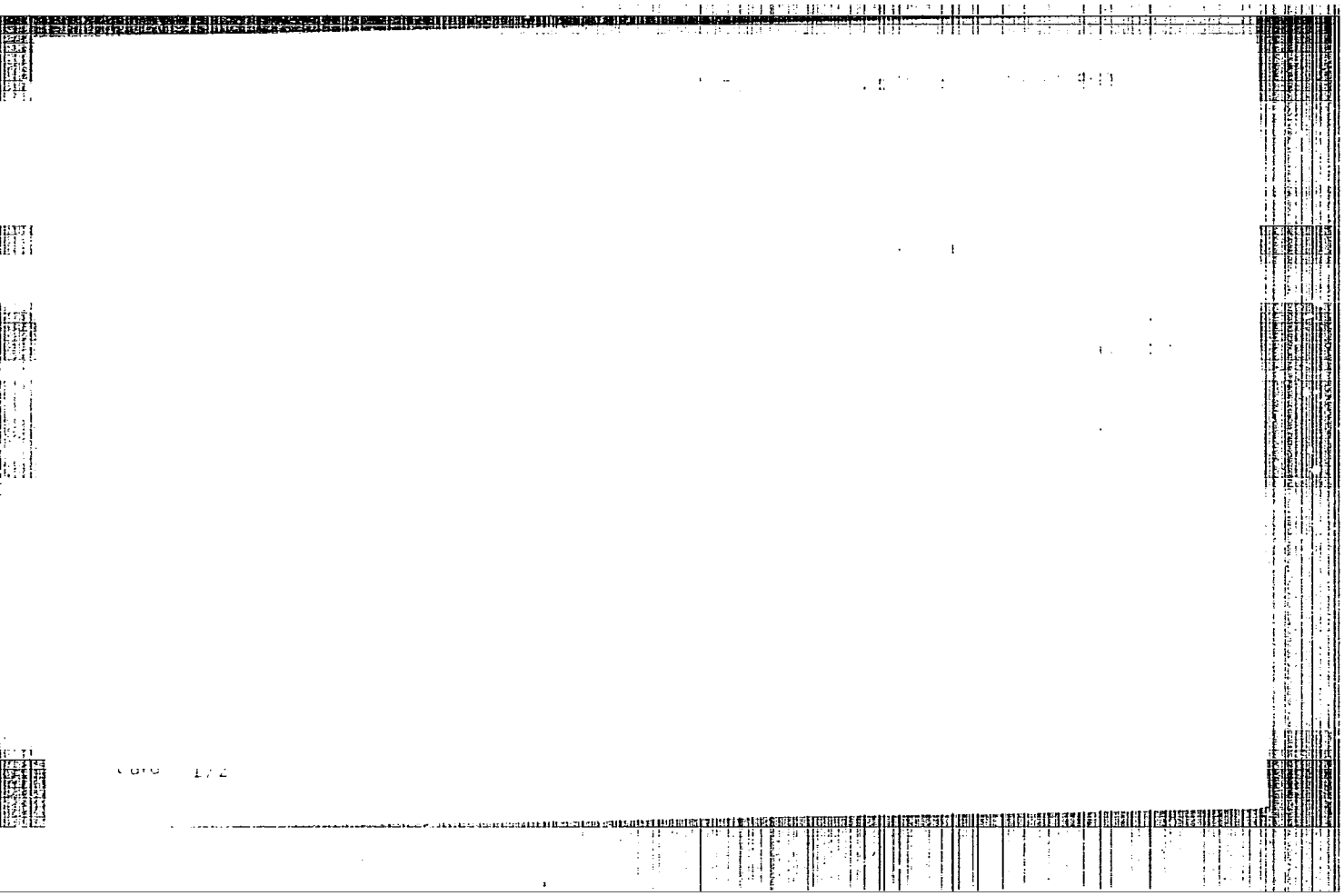

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corrosion of siliconized tantalum. Siliconizing in a cell with a temperature grad-

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BURLAKOV, V.D.; IVANOV, V.Ye.; KURILO, Yu.P.; SOKOV, A.I.

Aluminum recovery from fused aluminosilicates by vaporization in vacuum. TSvet. met. 37 no.6:71-73 Je '64. (MIRA 17:9)

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BORISENKO, A.I., doktor tekhn. nauk, otv. red.; TOROPOV, N.A., red.; IVANOV, V.Ye., red.; APPEN, A.A., doktor khim. nauk, red.; GORBUNOV, N.S., doktor khim. nauk, red.; KLEVTSUR, S.A., doktor tekhn. nauk, red.; NECHIPORENKO, Ye.P., doktor tekhn. nauk, red.

[Heat-resistant coatings; transactions] Zharostoikie pokrytiia; trudy. Leningrad, Nauka, 1965. 233 p. (MIRA 18:9)

1. Seminar po zharostoykim pokrytiyam, Leningrad, 1964.
2. Chlen-korrespondent AN SSSR (for Toropov, Ivanov).

APPROVED FOR RELEASE: 08/10/2001 CIA-RDP86-00513R000619210007-5"

"APPROVED FOR RELEASE: 08/10/2001 CIA-RDP86-00513R000619210007-5

L 25363-66 EWT(m)/EWP(t) IJP(c) JD/JW

ACC NR: AM6004741 Monograph UR/ 32 B71

Ivanov, Viktor YEvgen'yevich; Papirov, Igor' Isaakovich; Tikhinskiy, Gennadiy Filippovich; Amonenko, Vasiliy Maksimovich

Pure and superpure metals; production by the method of distillation in a vacuum (Chistyye i sverkhchistyye metally; polucheniye metodom distillyatskii v vakuume) [Moscow], Izd-vo "Metallurgiya", 1965. 263 p. illus., biblio. 3,100 copies printed

TOPIC TAGS: vacuum distillation, metal vapor deposition, metallurgic process

PURPOSE AND COVERAGE: The book presents the theoretical principles of the separation of metals by evaporation, calculations of different binary metallic systems, and a discussion of the advantages and shortcomings of the method of obtaining pure metals by distillation in vacuum. The apparatus used to distill metals and the technology of its construction are described. The results of laboratory tests on purification of various metals by distillation, the parameters of the apparatus, the operating conditions for the processes, and also commercial installations for vacuum distillations are considered in detail. The book is designed for engineering metallurgists and scientific workers in metal physics and physical chemistry; in addition, it can be used as a text by senior students in metallurgical high institutions of learning.

TABLE OF CONTENTS [abridged]:

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APPROVED FOR RELEASE: 08/10/2001 CIA-RDP86-00513R000619210007-5"

"APPROVED FOR RELEASE: 08/10/2001 CIA-RDP86-00513R000619210007-5

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ACC NR: AM6004741

SUB CODE: 11, 14/ SUBM DATE: 12Jul65/ ORIG REF: 168/ OTH REF: 251

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APPROVED FOR RELEASE: 08/10/2001 CIA-RDP86-00513R000619210007-5"

"APPROVED FOR RELEASE: 08/10/2001 CIA-RDP86-00513R000619210007-5

L 3434-66 EWT(m)/ETC/EPF(n)-2/EWG(m)/EWP(t)/EWP(b) IP(c) JD/JG/GS

ACCESSION NR: AT5024871 UR/0000/65/000/000/0045/0055

AUTHOR: Ivanov, V. Ye.; Nechiporenko, Ye. P.; Zmiy, V. I.; Krivoruchko, V. M.

TITLE: On the vacuum siliconizing of refractory metals

SOURCE: AN UkrSSR. Institut problem materialovedeniya. Diffusionnyye pokrytiya na metallakh (Diffusion coatings on metals). Kiev, Naukova dumka, 1965, 45-55

TOPIC TAGS: metal diffusion plating, silicon, refractory metal, silicide, activation energy

ABSTRACT: The kinetics and mechanism of case-formation were investigated for Mo specimens measuring 40x10x1 mm vacuum-siliconized at $1 \cdot 10^{-5}$ mm Hg by being covered with Si powder and heated at 1200-1350°C. Metallographic and radiographic examination established that the formation of molybdenum silicides occurs in the following sequence:

$$Mo + Si \rightarrow Mo_3Si + Si \rightarrow Mo_5Si_3 + Si \rightarrow MoSi_2$$

at the corresponding phase interfaces, i.e. the formation of $MoSi_2$ is due to the

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lower silicides. Plotting of the curves of isothermal growth of the layers of Mo_5Si_3 and $MoSi_2$ at 1250°C revealed that the increase in their thickness with time follows a parabolic law. This was verified by vacuum-siliconizing specimens of Mo, W, and Ta in saturated Si vapors. The resulting curves also proved to follow a parabolic law of growth in layer thickness as a function of time, thus confirming that the diffusion of Si is the determining factor in the rate of siliconizing. On this basis, the activation energies for the diffusion of Si in Mo_5Si_3 and $MoSi_2$ were calculated to be Q_{Mo_5Si} = (126,000 ± 12,000) cal/mole and Q_{MoSi_2} = (57,600 ± 6,000) cal/mole, respectively. Experiments to determine the effect of the presence of a temperature gradient between the box (1250°C) and the specimen (1200°C) on the growth rate of the $MoSi_2$ layer (see Fig. 1 of the Enclosure) revealed that, if the metals are siliconized in a box with a temperature gradient, the siliconizing rate decreases with increase in temperature of the specimen and increases with decrease in this temperature as compared with the temperature of the box, while the growth in case-thickness follows a parabolic curve. Orig. art. has: 10 figures.

ASSOCIATION: none

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L 3434-66

ACCESSION NR: AT5024871

SUBMITTED: 00 ENCL: 01 SUB CODE: MM, IE

NR REF SOV: 006 OTHER: 003

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L 3434-66

ACCESSION NR: AT5024871 ENCLOSURE: 01

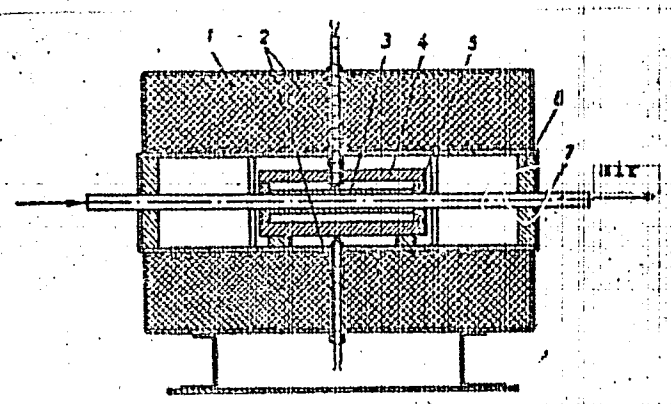

Fig. 1. Diagram of setup

1 - furnace; 2 - thermocouple; 3 - specimen; 4 - box; 5 - Al_2O_3 ring; 6 - furnace lid; 7 - stainless-steel cooling pipe

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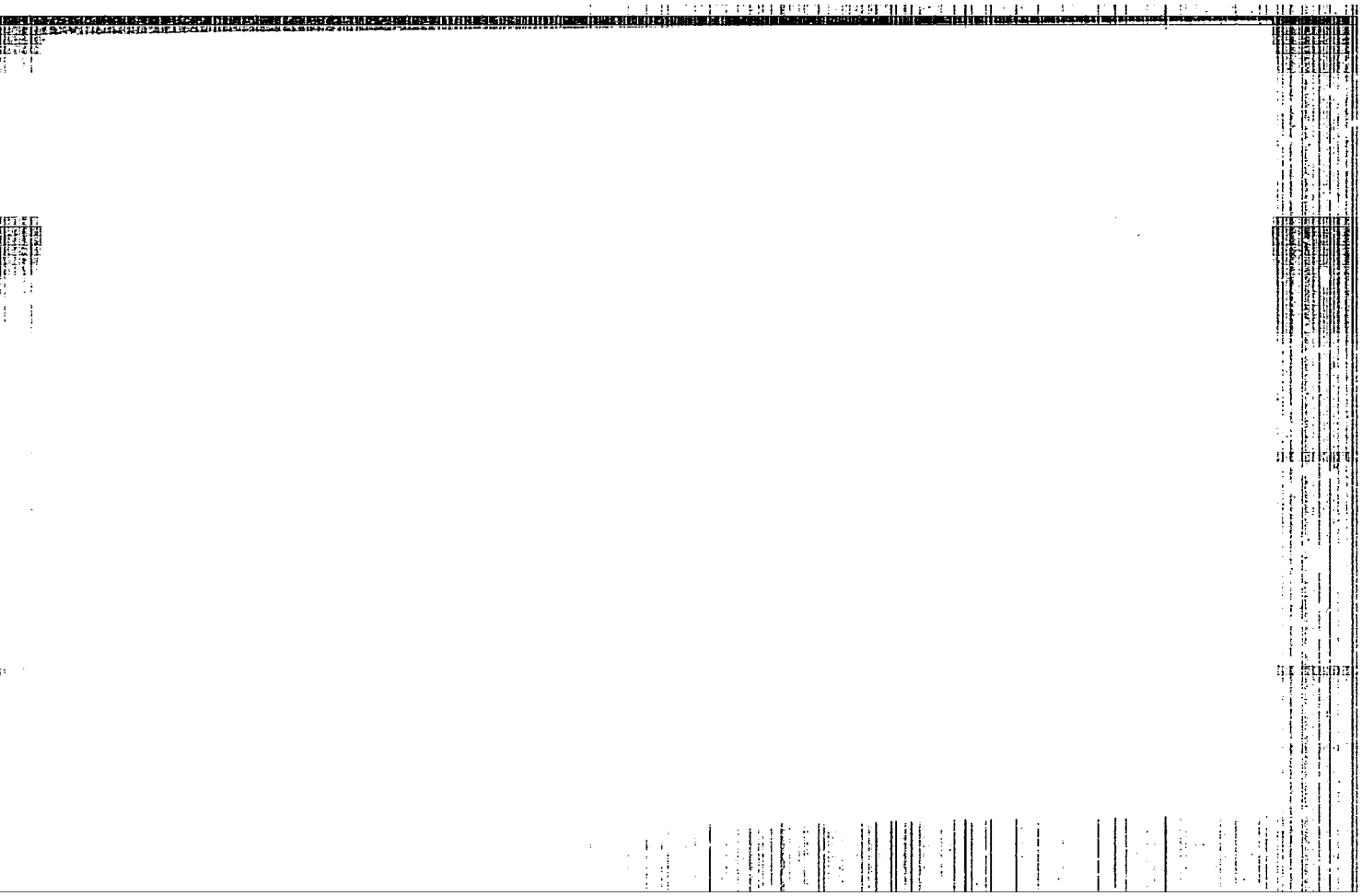

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L 12058-66 EWT(m)/EWP(t)/EWP(b) IJP(c) JD/JG/WB
ACC NR: AP6001302 SOURCE CODE: UR/0363/65/001/008/1354/1359

AUTHOR: Ivanov, V. Ye.; Nechiporenko, Ye. P.; Zmiy, V. I.; Krivoruchko, V. M.; Verkhorobin, L. F.; Aleksandrov, O. M.; Mitrofanov, A. S.; Poltavtsev, N. S.

ORG: Physicotechnical Institute, Academy of Sciences UkrSSR (Fiziko-tekhnicheskiy institut Akademii nauk UkrSSR)

TITLE: Study of the oxidation kinetics of molybdenum disilicide at 1500 — 1800C

SOURCE: AN SSSR. Izvestiya. Neorganicheskiye materialy, v. 1, no. 8, 1965, 1354-1359

TOPIC TAGS: molybdenum compound, silicide, oxidation kinetics, silicon dioxide

ABSTRACT: Molybdenum disilicide samples (prepared by siliciding molybdenum at 1250, 1300, and 1350C) were oxidized for 10 hr at 1500 and 1600C and for 1 hr at 1700 — 1800C. The oxidation is represented as follows: (1) $5MoSi_2 + 7O_2 \rightarrow Mo_5Si_3 + 7SiO_2$, (2) $2MoSi_2 + 7O_2 \rightarrow 2MoO_3 + 4SiO_2$. X-ray analysis shows that reaction (1) predominates over (2); the latter is of decisive importance at the start, when the SiO_2 film is formed. The increase in the oxidation rate is related to the orientation of the crystals. The structure of $MoSi_2$ may be considered to consist of layers of silicon and molybdenum atoms alternating in the direction of axis c; if it is kept in mind that the bonding forces between like atoms in a layer are weaker than the forces between the layers, the layer orientation parallel to the surface ($MoSi_2$

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L 12058-66

ACC NR: AP6001302

samples obtained at 1250 and 1300C) will cause a lower oxidation rate than in samples where the layer orientation is perpendicular to the surface (silicides obtained at 1350C). It is concluded that the oxidation rate of $MoSi_2$ is affected by many factors, but it has not been possible to determine which is the most important one. Orig. art. has: 2 figures.

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Card 2/2

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"APPROVED FOR RELEASE: 08/10/2001 CIA-RDP86-00513R000619210007-5

L 9447-66 EWP(e)/EWT(m)/ETC/EPF(n)-2/EWG(m)/EWP(t)/EWP(k)/EWP(z)/EWP(b) IJP(c)
ACC NR: AP6001239 JD/JG/WB SOURCE CODE: UR/0363/65/001/012/2212/2218

AUTHOR: Ivanov, V. Ye.; Nechiporenko, Ye. P.; Krivoruchko, V. M.; Verkhorobin, L. P.; Mitrofanov, A. S.; Poltavtsev, N. S.

ORG: Physicotechnical Institute, Academy of Sciences UkrSSR, Kharkov (Fiziko-tekhnicheskiy institut Akademii nauk UkrSSR)

TITLE: Effect of additives on the kinetics of the siliciding of molybdenum in vacuum

SOURCE: AN SSSR. Izvestiya. Neorganicheskiye materialy, v. 1, no. 12, 1965, 2212-2218

TOPIC TAGS: refractory metal, refractory coating, molybdenum, silicon, molybdenum disilicide, oxidation resistance

ABSTRACT: Inasmuch as the coating of refractory metals with molybdenum disilicide is known as a prospective method for preventing high-temperature oxidation, the effect of some additives on the growth rate and the structure of the silicide layer on molybdenum was studied. It was noted that properties of the disilicide coating (including brittleness and an inadequate thermal stability) may depend on the preparative method and on the purity of the initial materials. In this study the silicide layer was produced on molybdenum sheet and wire 0.1 and 0.5 mm thick, respectively, in vacuum by heating at 1250C. Molybdenum of 99.95% purity, 99.999%-pure silicon and commer-

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L 9447-66

ACC NR: AP6001239

cial silicons KR-0 and KR-1, 99.0 and 98.0% pure, respectively, were used as initial materials for siliciding cells. The growth rate, structure and phase composition of the coatings obtained were studied by gravimetric, metallographic and x-ray methods. The effect of Al, Fe, Cu, Ti, and B used as additives, and of the residual gas pressure was studied. It was found that the presence of small amounts of Al(1—3%) in powdered silicon causes the formation of a ternary compound $Mo(Si, Al)_2$ with a hexagonal structure, the growth of which is expressed as a linear dependence on time. The presence of the other additives studied, with the exception of Ti, results in a decrease in the growth rate of the $MoSi_2$ layer and does not affect its structure. The residual gas pressure does not affect the silicide layer growth, if it is within 1.10^{-6}—1.10^{-4} mm Hg; at 1.10^{-3} mm Hg, the rate slows down 3—4 times; at 1.10^{-2} mm Hg, disilicide is not formed at all, and only the Mo_3Si phase is formed. Transition of the dark and opaque hexagonal disilicide into the silvery tetragonal form on prolonged heating was observed. Orig. art. has: 4 figures and 3 tables. [BN]

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IVANOV, V.Ye.; ZELENSKIY, V.F.; FAYFER, S.I.; ZHDANOV, S.M.; MAKSIMENKO, V.I.; SAVCHENKO, V.I.

Ceramic metal magnesium and magnesium beryllium alloys. Poroshk. met. 5 no.5:46-53 My '65. (MIRA 18:5)

1. Fiziko-tekhnicheskiy institut AN UkrSSR, Khar'kov.

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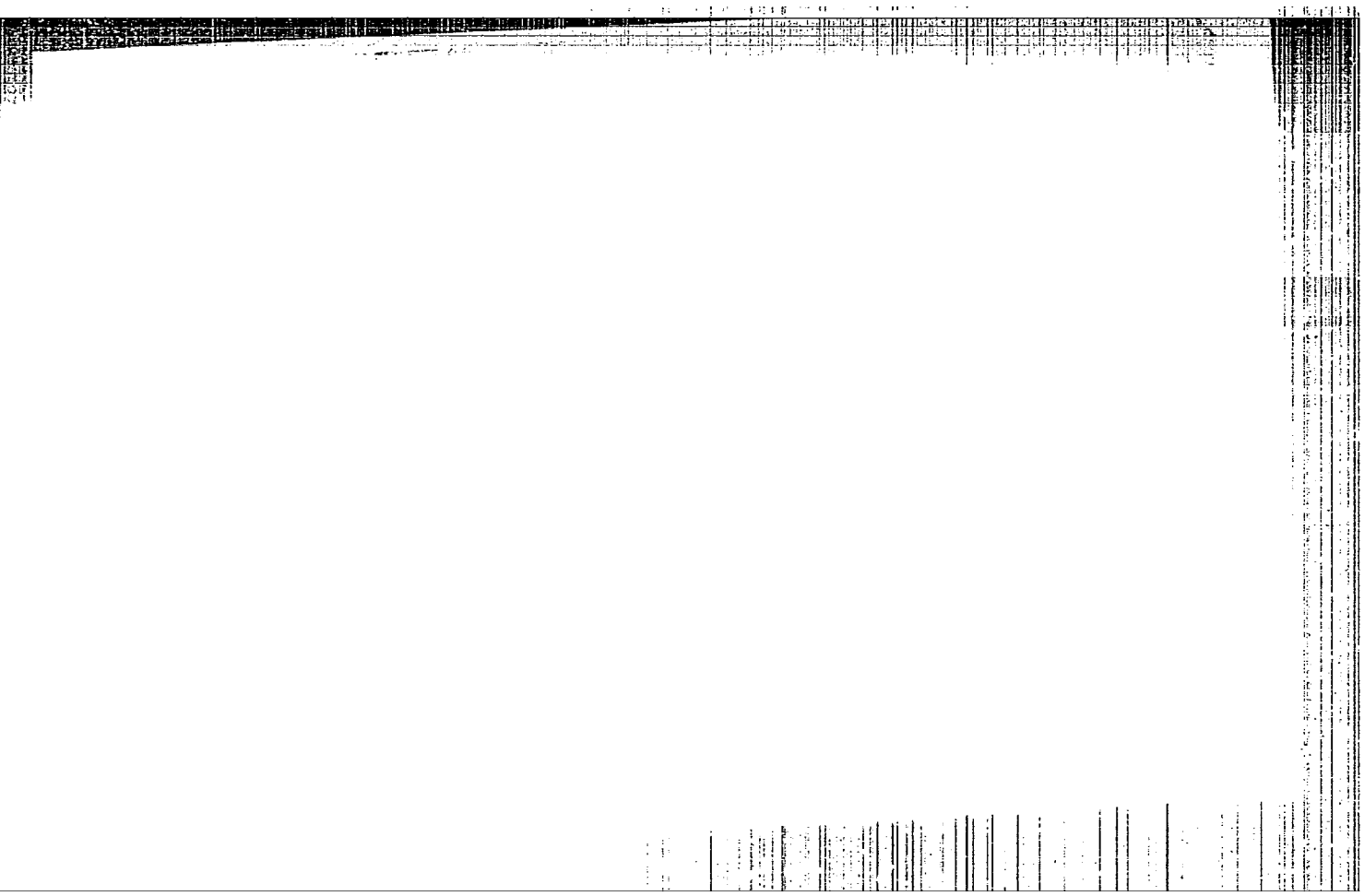

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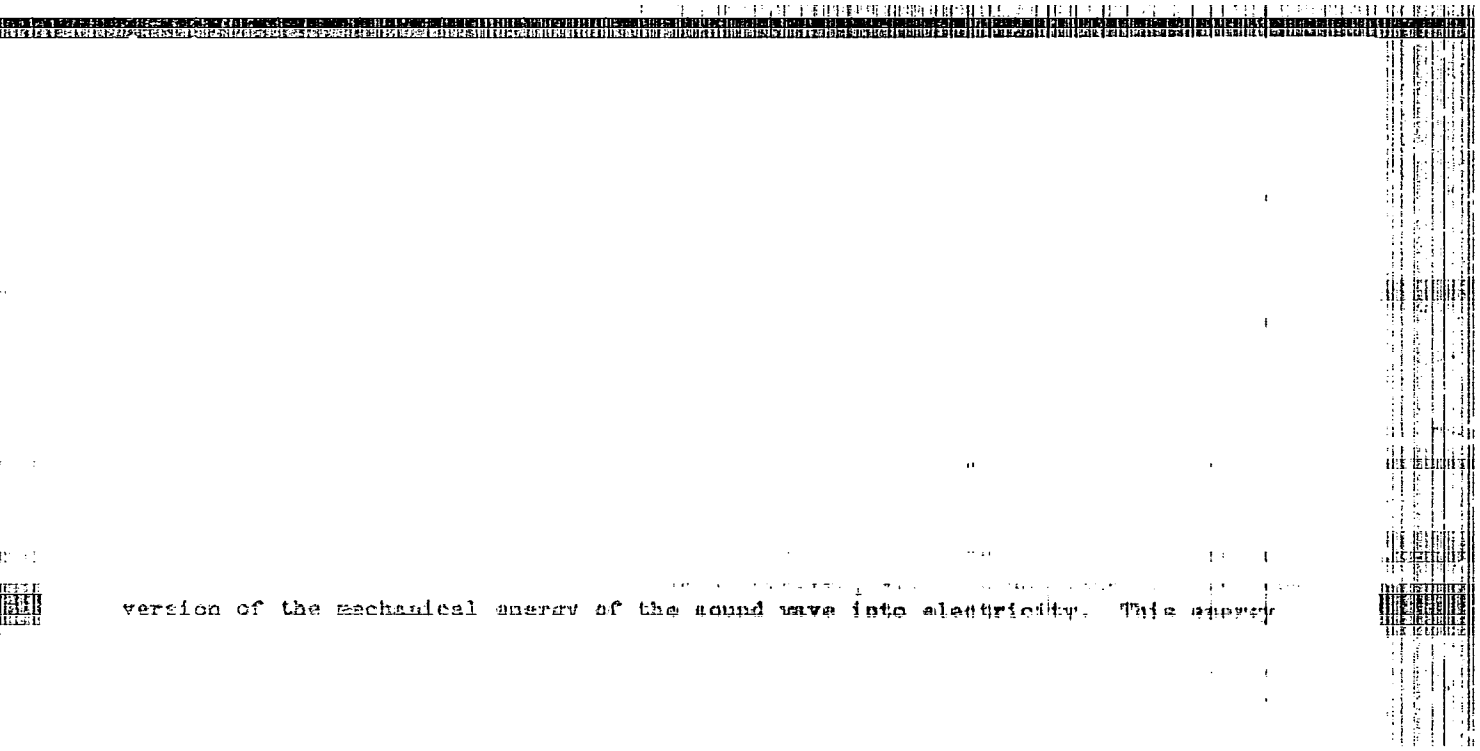

version of the mechanical energy of the sound wave into electricity. This energy

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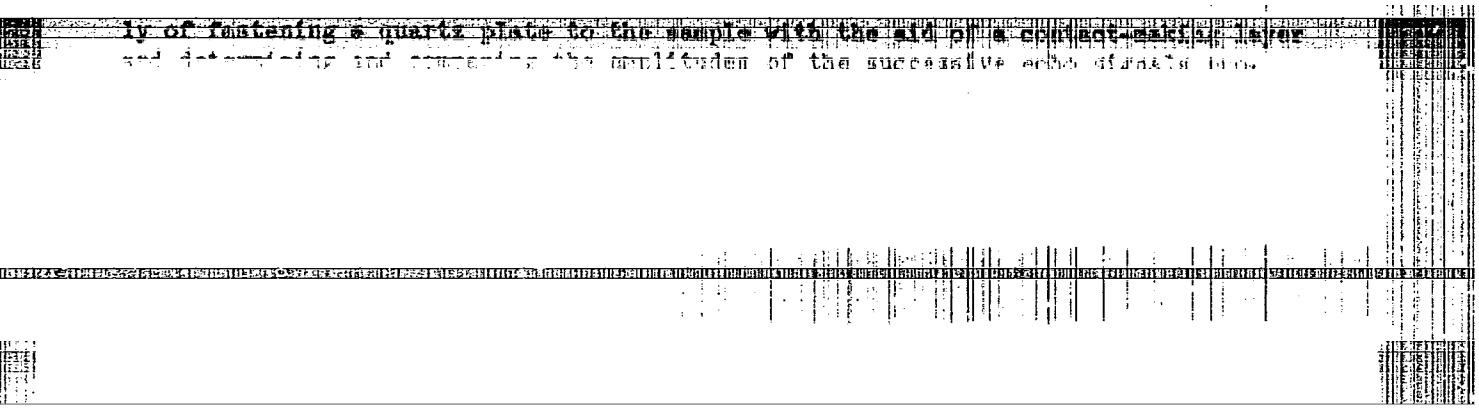

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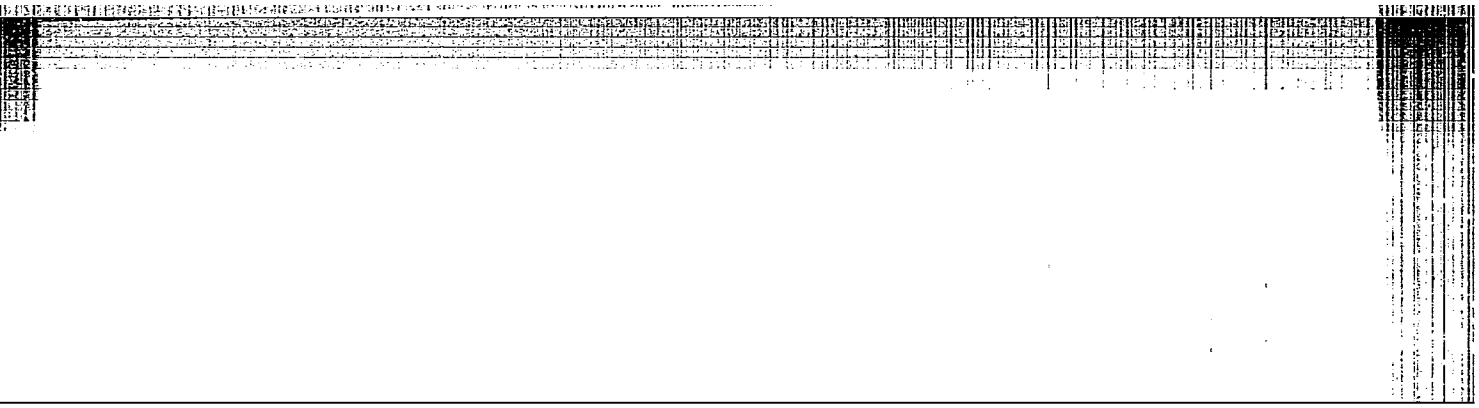

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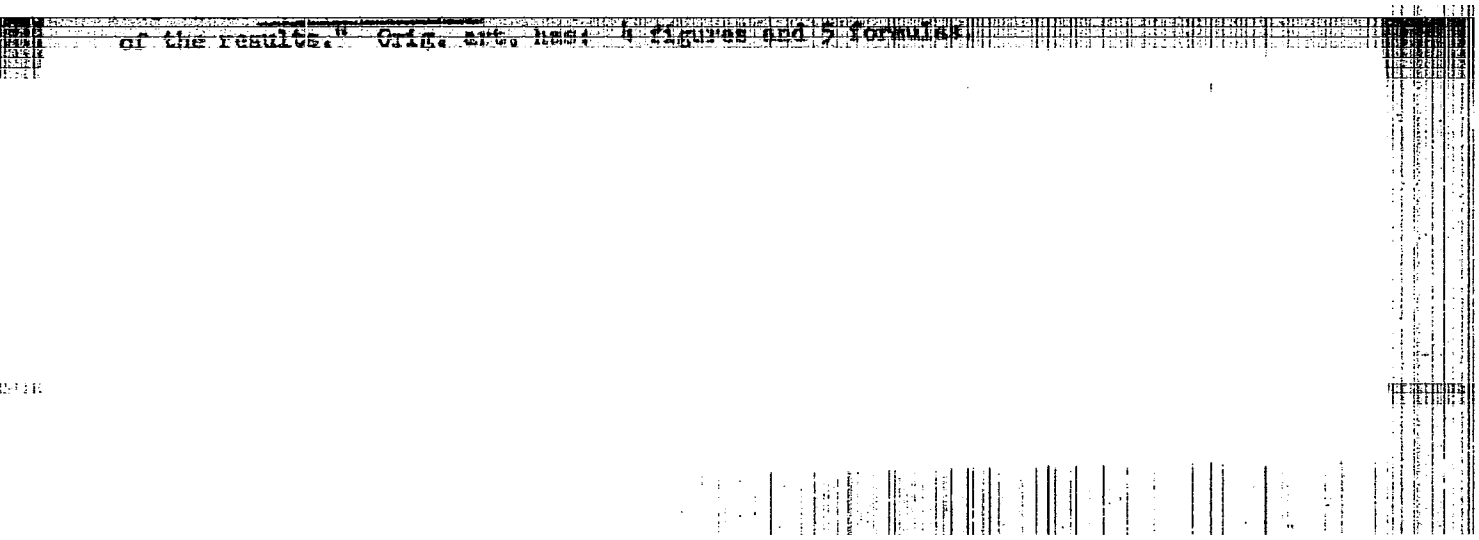

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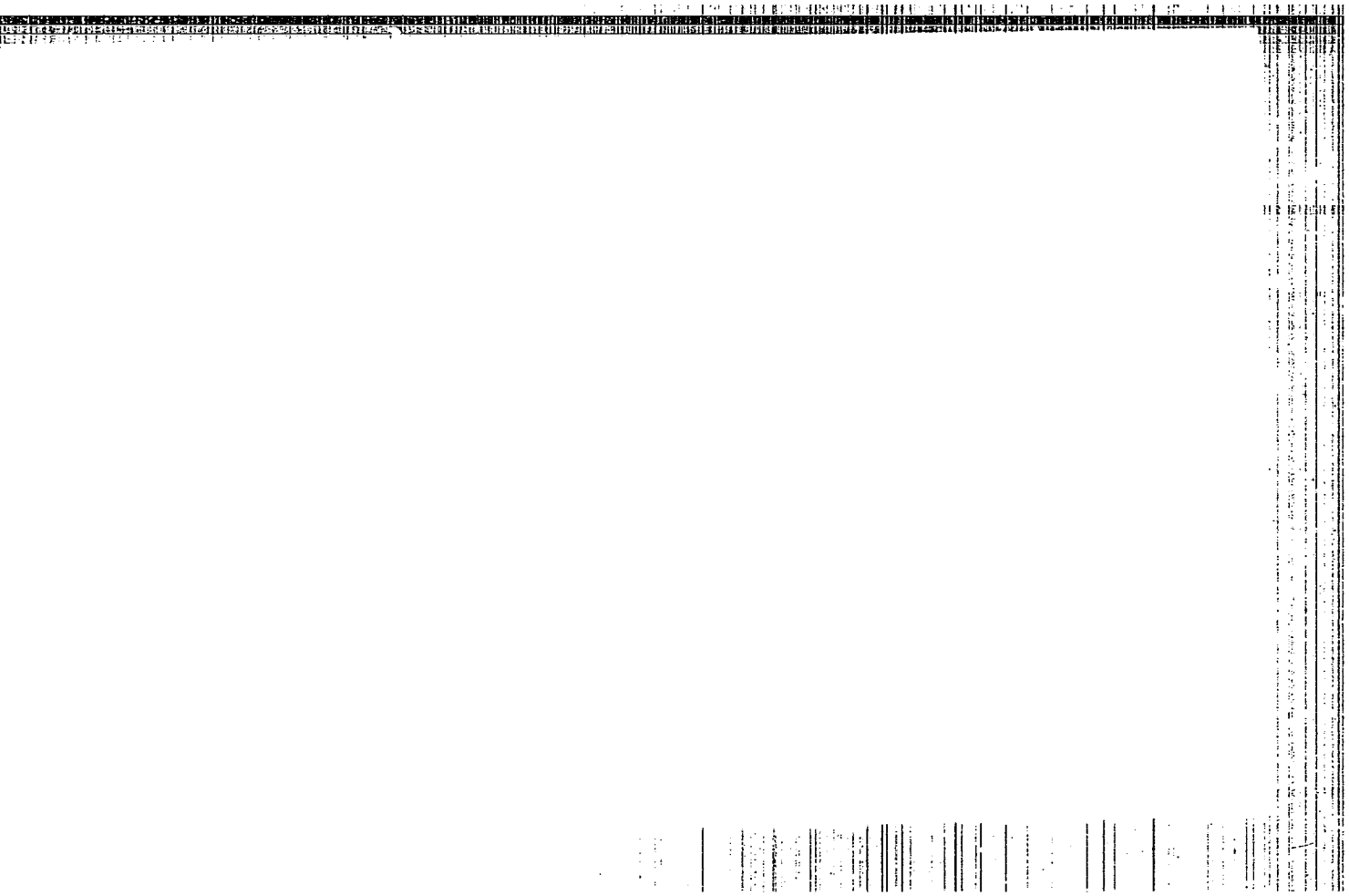

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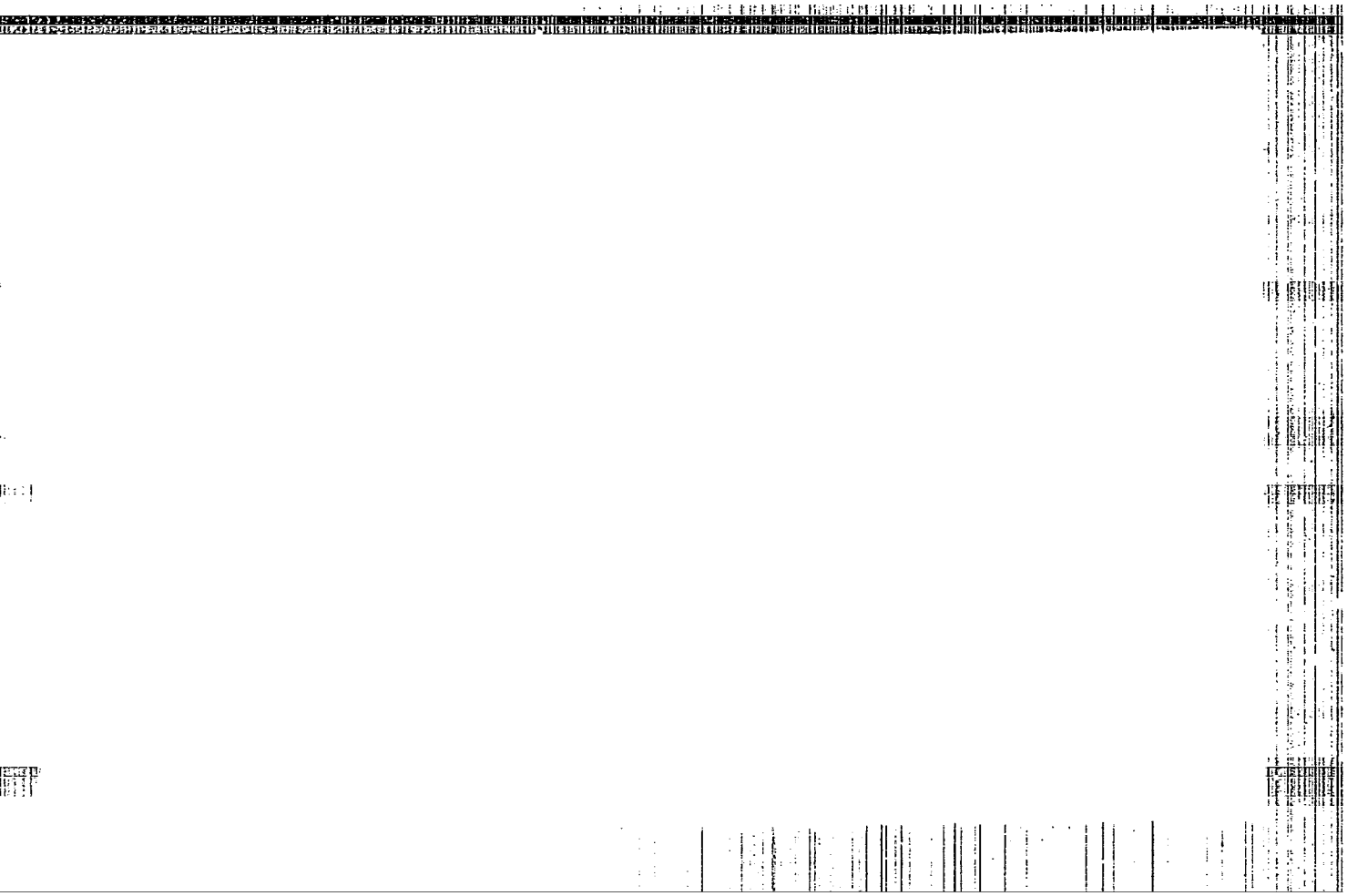

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L 28408-66 EWT(m)/EPF(n)-2/EWP(t)/ETI IJP(c) JD/HW/JG/GD

ACC NR: AT5027942 SOURCE CODE: UR/0000/65/000/000/0077/0082

AUTHOR: Ivanov, V. Ye.; Nechiporenko, Ye. P. (Dr. of Technical Sciences); Osipov, A. D.; Vasyutinskiy, B. M.; Kartmazov, G. N.

ORG: none

TITLE: Thermal stresses in chromium coatings on molybdenum

SOURCE: Seminar po zharostoykim pokrytiyam. Leningrad, 1964. Zharostoykiye pokrytiya (Heat-resistant coatings); trudy seminara. Leningrad, Izd-vo Nauka, 1965, 77-82

TOPIC TAGS: chromium plating, vapor plating, molybdenum, heat effect, internal stress, adhesion, thermal stress

ABSTRACT: Previous studies (FMM, IX, 4, 558, 1960) showed that coatings obtained by the condensation in vacuum of Cr vapors on the surface of Mo samples had good protective properties, but that their service life decreased considerably when they were subjected to temperature fluctuations. A study was made on the effect of temperature on internal stresses in chromium coatings on molybdenum produced

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in various vacuum conditions and having various strengths of adhesion of the coating to the substrate. The value of stress (σ) was determined from changes in the deflection (d) of the plated samples (100 x 5 x 2mm) by using the formula $\sigma = 4 E h_2^2 d / 3l^2 h_1 (h_1 + h_2)$, where E is the Young modulus, l is the length of the coated part of the sample, and h_1 and h_2 are the thicknesses of the coating and the base metal, respectively. The curves of deflection (in mm) vs temperature were plotted during the experiments. The changes in the slope of the curves (inflections), corresponding to the conversion of elastic into nonelastic deformations, were observed during heating and cooling of the samples. Nonelastic deformations in the low-temperature range ($\leq$ 400C) were formed at the critical stress σ=8 kg / mm^2. The value of the critical stress could be controlled either by the deformation of the coating itself or by the strength of adhesion of the coating to the substrate. Experiments with the coatings of various degrees of adhesion strength (strength of adhesion was changed by applying the coatings to the surface of Mo oxidized to various degrees, or by increasing the roughness of the Mo surface) proved that the value of the critical stress did not depend on the adhesion strength and was controlled by the deformation of the coating itself. The adhesion strength of coatings applied to the surfaces of oxidized

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and nonoxidized Mo were about the same and were similar to the strength of the coating. The curves plotted for the temperature range of 100 - 1000C for the coatings applied under various values of vacuum (10^{-3} - 10^{-5} mm Hg) showed that the samples produced in 10^{-3} vacuum failed at smaller σ than the samples coated in the higher vacuum. Orig. art. has: 4 fig.

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L 28409-66 EWT(m)/T/EWP(t)/ETI IJP(c) JD/JG/GD

ACC NR: AT5027943 SOURCE CODE: UR/0000/65/000/000/0083/0086

AUTHOR: Ivanov, V. Ye. (Corresponding member AN SSSR); Kochiporenko, Ye. P. (Dr. of Technical Sciences); Osipov, A. D.; Matyushenko, N. N.

ORG: none

TITLE: Siliconising of molybdenum in vacuum with a controlled rate of silica delivery

SOURCE: Seminar po zharostoykim pokrytiyam. Leningrad, 1964. Zharostoykiye pokrytiya (Heat-resistant coatings); trudy seminara. Leningrad, Izd-vo Nauka, 1965, 83-86

TOPIC TAGS: vapor plating, silica, molybdenum, crystal structure

ABSTRACT: An experiment was conducted to siliconize Mo under a controlled delivery rate so that the amount of SiO_2 deposited on the sample surface was nearly similar to the amount necessary for the formation of a diffusion layer at a given temperature. This resulted in the formation of the silicide layers at temperatures above the eutectic, with the rate controlled only by diffusion. Siliconising was done

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in a special apparatus (see Fig.) where sample 1 was set into container 2 having in its lower part the crucible 3 containing SiO_2. The container was closed by lead 4, charged into vacuum chamber and exposed to a vacuum of 10^{-5} mm Hg. The container was then closed by rod 8 and heated to the required temperature by resistance heaters 5 and 6 controlled by Pt-PtRh thermocouple 7. The rate of silica delivery, commensurable with the diffusion at a given temperature, was regulated by the selection of openings in the crucible and the container and by changing the temperature in the SiO_2. The microphotograph of the layer produced at 1500C showed that it consisted of a single phase which was determined by X-ray diffraction analysis as $MoSi_2$. Therefore, the use of a controlled rate of delivery of SiO_2 during siliconizing from the vapor phase permitted the authors to increase the temperature of siliconizing above the eutectic and to increase the rate of growth and the thickness of the layer. The changes in temperature of the production of the silicide layer insignificantly affected the temperature of the beginning of cracking in the coating. Orig. art. has: 3 fig. and 1 table.

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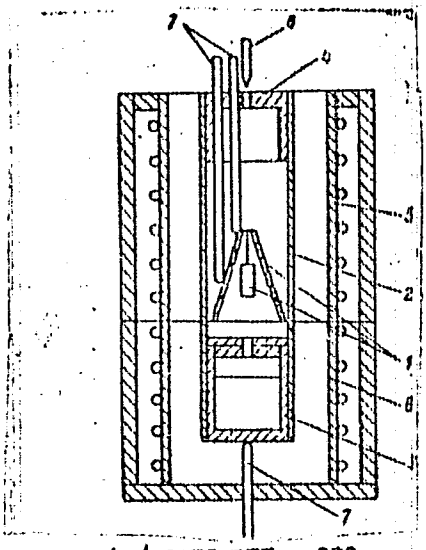

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"APPROVED FOR RELEASE: 08/10/2001 CIA-RDP86-00513R000619210007-5

L 27562-66 EWT(m)/EWP(t) IJP(c) JD/JG/WB

ACC NR: AP6017688 SOURCE CODE: UR/0363/65/001/008/1360/1363

AUTHOR: Ivanov, V. Ye.; Nechiporenko, Ye. P.; Krivoruchko, V. M.; Zmiy, V. I.; Mitrofanov, A. S.; Aleksandrov, O. M. 41 B

ORG: Physicotechnical Institute AN UkrSSR (Fiziko-tekhnicheskiy institut AN UkrSSR)

TITLE: Oxidation of tungsten disilicide at 1500-1800°C temperatures

SOURCE: AN SSSR. Izvestiya. Neorganicheskiye materialy, v. 1, no. 8, 1965, 1360-1363

TOPIC TAGS: tungsten compound, silicide, oxidation kinetics, silicon, molybdenum compound

ABSTRACT: The authors carried out an investigation of the oxidation kinetics of tungsten disilicide over the temperature range 1500-1800°C. Tungsten of 99.95% purity and 99.999% pure silicon were used for the investigation. The oxidation kinetics curves are parabolas. The effects of preparation temperature and homogenization time of tungsten disilicide specimens on their oxidation rate was studied. It was shown that the oxidation rate of WSi_2 at 1500-1700°C is approximately the same as that for $MoSi_2$. It is even somewhat lower than that for $MoSi_2$ at 1800°C. Orig. art. has: 2 figures and 2 formulas. [JPRS]

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L 27458-66 EWT(m)/EWP(t) IJP(c) JD/JG/WB

ACC NR: AP6017689 SOURCE CODE: UR/0363/65/001/008/1364/1367

AUTHOR: Ivanov, V. Ye.; Nechiporenko, Ye. P.; Krivoruchko, V. M.; Zmiy, V. I.; Mitrofanov, A. S.; Aleksandrov, O. M.

ORG: Physicotechnical Institute AN UkrSSR (Fiziko-tekhnicheskiy institut AN UkrSSR)

TITLE: Oxidation of tantalum disilicide at 1400-1600°C temperatures

SOURCE: AN SSSR. Izvestiya. Neorganicheskiye materialy, v. 1, no. 8, 1965, 1364-1367

TOPIC TAGS: tantalum compound, silicide, oxidation kinetics, silicon

ABSTRACT: Up to the present day there are no systematic investigations on the oxidation kinetics of tantalum disilicide at high temperatures. The purpose of the present study was an examination of the oxidation kinetics of tantalum disilicide at 1400-1600°C temperatures. Tantalum of 99.95% purity and 99.99% pure silicon were used for the investigation. The effects of specimen preparation temperature and extent of their homogenization on the oxidation rate were established. The oxidation of $TaSi_2$ specimens in the initial stage conforms to a straight-line relationship. After some specific period of time a sharp rise in the specimen oxidation rate sets in, which leads to their failure. The fundamental feasibility of raising the tantalum disilicide's heat resistance up to 1600°C was demonstrated. Orig. art. has: 3 figures. [JPRS]

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"APPROVED FOR RELEASE: 08/10/2001 CIA-RDP86-00513R000619210007-5

L 31869-66 EWP(k)/EWT(d)/EWT(m)/EWP(h)/T/EWP(l)/EWP(e)/EWP(w)/EWP(v)/EWP(t)

ACC NR: AT6013552 ETI IJP(c)(N) JD/HW/GD SOURCE CODE: UR/0000/65/000/000/0063/0068

AUTHOR: Amonenko, V. M.; Azhazha, V. M.; Bolgov, I. S.; Zeydlits, M. P.; Ivanov, V. Ye.; Shapoval, B. I.

ORG: Physico-Technical Institute, AN UkrSSR (Fiziko-tekhnicheskiy institut AN UkrSSR)

TITLE: Influence of boron on the properties of nickel

SOURCE: AN UkrSSR. Institut problem materialovedeniya. Vysokotemperaturnyye neorganicheskiye soyedineniya (High temperature inorganic compounds). Kiev, Naukova dumka, 1965, 63-68

TOPIC TAGS: boron, nickel, alloy, boron alloy, internal friction

ABSTRACT: The effect of boron concentration (0-0.1 wt %) on mechanical strength limit, relative elongation, and relative plasticity of nickel was examined at 25° and 600°C and also the temperature dependence of internal friction (Q^{-1}) for nickel containing 0.005-0.1% B was examined in the 20°-600°C range. Samples of nickel-boron alloys were prepared by fusing mixtures of N-O-grade nickel and NiB standard material in an electrical furnace. After 70-80% deformation for 4 hour at 400°C, the samples were held for 2 hours at 800°C. In general, boron had a beneficial effect on the mechanical properties of nickel. Specifically, boron was found to strengthen the alloy crystals and the intergrain boundaries within the alloy, to improve the internal grain structure and

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to retard harmful recrystallization processes. The effect of boron on strength limit, relative elongation, and relative plasticity of nickel is shown in figure 1.

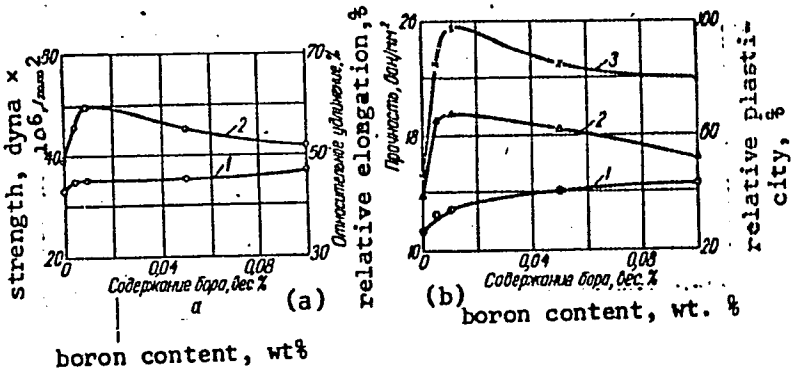

Fig. 1. The effect of boron on strength limit (1), relative elongation (2), and relative plasticity (3) of nickel at 25°C (a) and 600°C (b).

The temperature dependence of internal friction (Q^{-1}) of Ni-B alloys is given in figure 2. Orig. art. has: 5 figures.

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L 31869-66

ACC NR: AT6013552

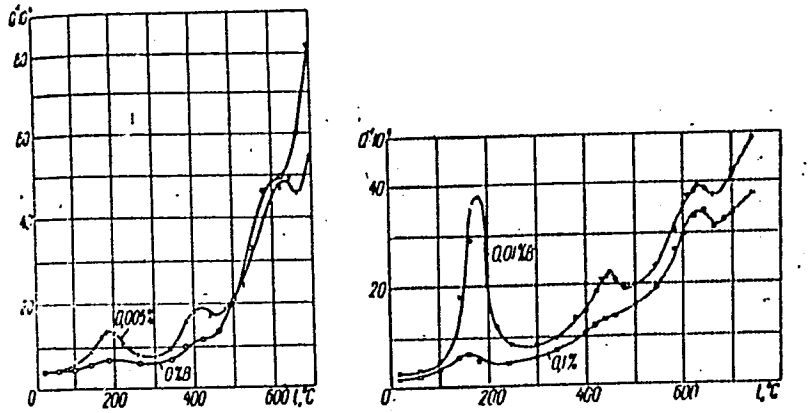

Fig. 2.

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L 31370-66

ACC NR: AT6013553 (N) SOURCE CODE: UR/0000/65/000/000/0069/0075

AUTHOR: Azhazha, V. M.; Amonenko, V. M.; Bolgov, I. S.; Zeydlits, M. P.; Ivanov, V. Ye.

ORG: Physico-Technical Institute AN UkrSSR (Fiziko-tekhnicheskiy institut AN UkrSSR)

TITLE: Smelting in vacuo as a means of improving the mechanical properties of boron steels

SOURCE: AN UkrSSR. Institut problem materialovedeniya. Vysokotemperaturnyye neorganicheskiye soyedineniya (High temperature inorganic compounds). Kiev, Naukova dumka, 1965, 69-75

TOPIC TAGS: boron steel, mechanical property, steel, ferrous metal, steel microstructure, chromium steel, nickel steel / EI437A steel, EI437B steel, EI403 steel

ABSTRACT: The effect of smelting (250°-1000°C) in vacuo and in air for 137-1300 hrs on relative elongation, impact, strength, and hardness of chromium-nickel steels containing from 0.4 to 3.0 wt % boron was investigated. EI437A (boron-free), EI437B (0.015 wt % B), EI403 (0.1-1.0 wt % B), and some specially prepared steels containing 2-3 wt % B were used as representative steel samples. It was found that the smelting of steels containing 2-3 wt % B results in a 1.5-2 fold increase in their plasticity. A 15-20% improvement in relative elongation characteristic and two-fold increase in impact strength result when high purity steel grades are smelted in vacuo. Greater improve-

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ACC NR: AT6013553

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ments in mechanical properties of boron-containing steels were achieved by smelting in vacuo rather than in air. The effect of smelting in vacuo on strength and plasticity of EI437B steel on rapid breaking strength and relative elongation of EI437B is graphed. The effect of boron content on mechanical properties of EI403 steel is also graphed. Orig. art. has: 6 figures, 4 tables.

SUB CODE 11,13 SUBM DATE: 03Jul65/ ORIG REF: 006/ OTH REF: 004

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"APPROVED FOR RELEASE: 08/10/2001 CIA-RDP86-00513R000619210007-5

L 09378-67 EWT(m)/EWP(w)/EWP(t)/ETI LIP(c) JH/JW/JD

ACC NR: AT6026916 (A) SOURCE CODE: UR/0000/66/000/000/0163/0166

AUTHOR: Ivanov, V. Ye.; Zelenskiy, V. F.; Savchenko, V. I.; Fayfer, S. I.; Zhdanov, S. M.

ORG: None

TITLE: Internal friction in powder metal magnesium

SOURCE: AN SSSR. Institut metallurgii. Vnutrennoye treniye v metallakh i splavakh (Internal friction in metals and alloys). Moscow, Izd-vo Nauka, 1966, 163-166

TOPIC TAGS: internal friction, powder metal, shear modulus, magnesium, vibration measurement

ABSTRACT: Powdered magnesium was oxidized to obtain samples with differing amounts of MgO (0.3, 2.3 and 5% by weight), annealed at 500°C for one hour, and subjected to measurement of change in vibration amplitude in order to determine internal friction (Q^{-1}), as well as shear modulus with respect to temperature. There are fairly consistent data on the curves for the three alloys with respect to strength (mechanical) properties, increasing or decreasing, as the case may be, with respect to MgO content. The path of curves for the temperature relationship of internal friction and shear modulus can be explained by dispersion hardening effect found in MgO. Grain boundaries, type of impurities and distribution of impurities in the

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L 09378-67

ACC NR: AT6026916

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alloy also influences the internal friction. For purposes of comparison the relationship of $Q^{-1}(T)$ is presented for technical magnesium MG-1, which had been hot pressed, where it is evident that the height of the peak for $Q^{-1}(T)$ differs little from the peak for MG-1, increasing but slightly for increased MgO content. This may be caused by a structural refinement in alloys containing a large amount of the finely dispersed oxide phase, plus high degrees of distortions and increased numbers of defects in the polycrystalline structure. Orig. art. has: 6 figures.

SUB CODE: 11 / SUBM DATE: 02 Apr 66/ ORIG REF: 007/OTH REF: 001

Card 2/2 mla

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"APPROVED FOR RELEASE: 08/10/2001 CIA-RDP86-00513R000619210007-5

L 09377-67 EWP(k)/EWT(m)/EWP(e)/EWP(t)/ETI IJP(c) AT/WH/JW/JD/JG/GD
ACC NR: AT6026917 (N) SOURCE CODE: UR/0000/66/000/000/0166/0169

61
60

AUTHOR: Ivanov, V. Ye.; Zelenskiy, V. F.; Fayfer, S. I.; Savchenko, V. I.; Maksimenko, V. I.

ORG: None

TITLE: Internal friction in powder metal beryllium

SOURCE: AN SSSR. Institut metallurgii. Vnutrenneye treniye v metallakh i splavakh (Internal friction in metals and alloys). Moscow, Izd-vo Nauka, 1966, 166-169

TOPIC TAGS: internal friction, powder metal, shear modulus, elastic modulus, beryllium

ABSTRACT: Previous studies of internal friction for such powder metal systems as Cu-Fe-Ni, Cu-Mo, Cu-W, Ni + Al_2O_3, SAP and beryllium have shown that the temperature relationship of internal friction Q^{-1} (T) affects the nature of the initial components the method of producing a compact material and its structure. This paper discusses the same property, plus shear modulus and modulus of elasticity, for hot-pressed powder metal alloys of Be-BeO containing 0.3, 1.5 and 7% by weight BeO. Testing was conducted in a vacuum relaxation tester at forced torsion oscillations in resonance. Internal friction was determined according to change of oscillation amplitude along with measurement of frequency for constructing the temperature relationship of shear modulus and modulus of elasticity. Samples were vacuum annealed one

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hour at 1,000°C prior to testing to remove stresses and adsorbed gases and to put the alloy in a more equilibrium state. Test results show maximums for all curves, and according to the authors, the behavior of these maximums depends on solubility of the components, their concentration, distribution and other factors. From a comparison of the high-temperature "background" of $Q^{-1}(T)$ it is clear that temperature of abrupt growth of the curve increases with oxide content while slope of curve becomes less. This "background" can serve as a criterion of increasing heat resistance with increased oxide content. Orig. art. has: 3 figures.

SUB CODE: 11 / SUBM DATE: 02 Apr 66/ORIG REF: 008

APPROVED FOR RELEASE: 08/10/2001 CIA-RDP86-00513R000619210007-5"

"APPROVED FOR RELEASE: 08/10/2001 CIA-RDP86-00513R000619210007-5

IVANOV, V. Z.

Electric Cutouts

Comments of the "Uralelektroapparat" factory on Eng. Lytkin's suggestion about improving the insulation on VM-34 cutouts. Elek. sta. 23 no. 8, 1952.

9. Monthly List of Russian Accessions, Library of Congress, ~~November~~ 1952, Uncl.

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Ivanov, Y. A.

21(4) PHASE I BOOK EXPLOITATION SOV/2714

International Conference on the Peaceful Uses of Atomic Energy. 2nd, Geneva, 1958

Doklady sovetskikh uchenykh; yadernoye goryucheye i reaktornyye metally. (Reports of Soviet Scientists; Nuclear Fuel and Reactor Metals) Moscow, Atomizdat, 1959. 670 p. (Series: Its: Trudy, vol. 3. 8,000 copies printed.

Ed. (Title page): A.A. Bochvar, Academician, A.P. Vinogradov, Academician, V.S. Yemel'yanov, Corresponding Member, USSR Academy of Sciences, and A.P. Zefirov, Doctor of Technical Sciences; Ed. (Inside book): V.V. Pereverzev and G.M. Pchelintseva; Tech. Ed.: E.I. Mazel'.

PURPOSE: This volume is intended for scientists, engineers, physicians, and biologists working in the production and peaceful application of atomic energy; for professors and students of schools of higher technical education where the subject is taught; and for people interested in atomic science and technology.

COVERAGE: This is volume 3 of a 6-volume set of reports on atomic energy, presented by Soviet scientists at the Second International Conference on the Peaceful Uses of Atomic Energy, held in Geneva from September 1 to 13, 1958. Volume 3 consists of two parts. The first part, edited by A.I. Zubov, is devoted to geology, prospecting, concentration and processing of nuclear source material. The second part, edited by G.L. Zverev, includes 27 reports on metallurgy, metallography, processing technology of nuclear fuels and reactor metals, and neutron irradiation effects on metals. The titles of the individual papers in most cases correspond word for word with those in the official English language edition on the Conference proceedings. See SOV/2081 for the titles of the other volumes of the set.

Konobeyevskiy, S.T., K.P. Dubrovin, B.M. Levitskiy, L.D. Panteleyev, and N.F. Pravdyuk. Some Physico-chemical Processes occuring in Fissionable Materials Under Irradiation (Report No. 2192)

Pravdyuk, N.F., S.T. Konobeyevskiy, A.D. Amayev, and Yu.I. Pokrovskiy. The Effect of Neutron Irradiation on the Mechanical Properties of Structural Materials (Report No. 2052) 610

Sinel'nikov, K.D., V.Ye. Ivanov, and V.F. Zelenskiy. Magnesium-Beryllium Alloy as Structural Materials for Nuclear Reactors (Report No. 2153) 625

[illegible], and V.A. Nikitina. Corrosion Behavior of Structural Metals in Ionized Air (Report No. 2042) 636

Lyashenko, V.S., V.V. Zotov, V.Ye. Andreyev, M.D. Abramovich, and Y.A. Ivanov. Inquiry into the Corrosion Resistance of Certain Materials in Sodium and Lithium (Report No. 2194) 642

Card 10/11

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"APPROVED FOR RELEASE: 08/10/2001 CIA-RDP86-00513R000619210007-5

IVANOV, YA. A.

Ivanov, Ya. A.: "Pests and diseases of the grapevine in Tadzhikistan", Byulleten' po plodovodstvu, ovoshchevodstvu i vinogradarstvu, No. 9, 1948, p. 97-105.

SO: U-3042, 11 March 53, (Letopis 'nykh Statey, No. 10, 1949).

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B6

SOV/124-58-5-5388

Translation from: Referativnyy zhurnal, Mekhanika, 1958, Nr 5, p 62 (USSR)

AUTHOR: Ivanov, Ya. A.

TITLE: Some Aspects of the Theory of Gyroscopic Devices Used to Produce Forced Angular Motions on Ship Models (Nekotoryye voprosy teorii giroskopicheskikh ustroystv dlya sozdaniya vynuzhdennoy kachki modeley sudov)

PERIODICAL: Tr. Leningr. korablestroit. in-ta, 1956, Nr 18, pp 125-139

ABSTRACT: A theoretical investigation is made of several types of gyroscopic rocker devices used in the study of angular motions on ship models in model-test basins in place of artificial surface-wave exciters. An analysis of the standard equations of gyroscope theory leads to the following conclusions: 1. Single-rotor devices are capable of producing combined rolling and pitching or rolling and yawing motion. 2. In the single-rotor devices the amplitude of the perturbation moment varies as a function of the pitch and yaw and of the frequency of the roll. 3. Two-rotor devices with swiveling rotor-axes are not subject to these limitations and can be recommended unqualifiedly for test-basin studies of the angular motions of ships. S.V. Zhak

Card 1/1

1. Gyroscopes--Applications 2. Gyroscopes--Performance
3. Ship models--Test methods

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"APPROVED FOR RELEASE: 08/10/2001 CIA-RDP86-00513R000619210007-5

IVANOV, Ya.A.

Foreign gas analyzers. Avtom.i prib. no.1:77-85 Ja-Mr '62. (MIRA 15:3)

(Gases--Analysis)

APPROVED FOR RELEASE: 08/10/2001 CIA-RDP86-00513R000619210007-5"

"APPROVED FOR RELEASE: 08/10/2001 CIA-RDP86-00513R000619210007-5

IVANOV, Ya.A., aspirant

Alloplasty using gypsum for large bone defects of the hip under experimental conditions. Sbor. nauch. trud. GIDUV no. 14:67-76 '58. (MIRA 13:10)

1. Iz kafedry operativnoy khirurgii gosudarstvennogo instituta dlya usovershenstvovaniya vrachey (zav. kafedroy prof. A.P. Nadein).
(HIP JOINT—SURGERY) (GYPSUM—THERAPEUTIC USE)

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"APPROVED FOR RELEASE: 08/10/2001 CIA-RDP86-00513R000619210007-5

IVANOV, Ya.A., aspirant

Experimental bone homotransplants for large circular defects of the hip. Sbor. nauch. trud. GIDUV no. 14:77-83 '58. (MIRA 13:10)

1. Iz kafedry operativnoy khirurgii Gosudarstvennogo instituta dlya usovershenstvovaniya vrachey (zav. kafedroy - prof. A.P. Nadein).

(BONE GRAFTING)

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"APPROVED FOR RELEASE: 08/10/2001 CIA-RDP86-00513R000619210007-5

IVANOV, Ya. A., Cand Med Sci -- (diss) "Experimental osseous homoplasty and alloplasty with plaster-of-paris for thigh bone defects." Perm', 1960. 20 pp; (Ministry of Public Health, RSFSR, Perm' State Medical Inst); 150 copies; price not given; (KL, 31-60, 143)

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"APPROVED FOR RELEASE: 08/10/2001 CIA-RDP86-00513R000619210007-5

IVANOV, Ya. A.

IVANOV, Ya. A.: "Biological and economic properties of alfalfa and rye on the piedmont hill of the Chuya valley." Kirgiz Agricultural Inst imeni K. I. Skryabin. Frunze, 1956. (DISSERTATION FOR THE DEGREE OF CANDIDATE IN BIOLOGICAL SCIENCE)

So.: Knizhnaya letopis' No 15, 1956, Moscow

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