PACIFICA, R.

BROJERSKI, R. Developmental trends of production technique and management in the clothing industry. Pt. 3. Or anizational and technical problems. p. 5. Vol. 7, no. 1, Jan. 1956. OBZESZ. Lodz, Poland.

SOURCE: Esst European Accessions List (EE/L) 10 Vol. 5, No. 6 June 1956

BROJEWSKI, Makeymilian Assessment of rates for social insurance and calculation of insurance benefits for workers of private handicraft. Praca zabezp spol 3 no.3/9:93-98 61.

BROJEWSKI, Maksymilian Maternity insurance allowances during maternity vacations.

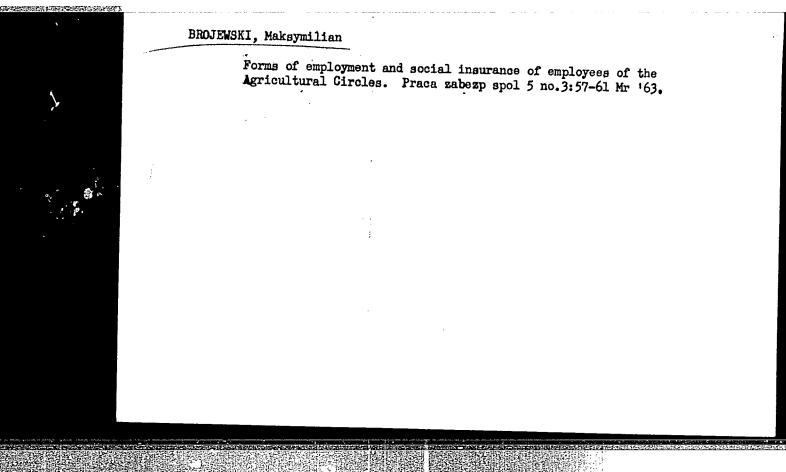
Praca zabezp spol 3 no.12:53-56 '61.

BROJEWSKI, Maksymilian

Compensation and the right to a health-or-maternity insurance allowance. Praca zabezp spol 3 no.11:42-44 '61.

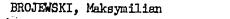
BROJEWSKI, Makaymilian

Pay periods of sickness allowances. Praca i zabezp spol 4 no. 5:52-55. By '62

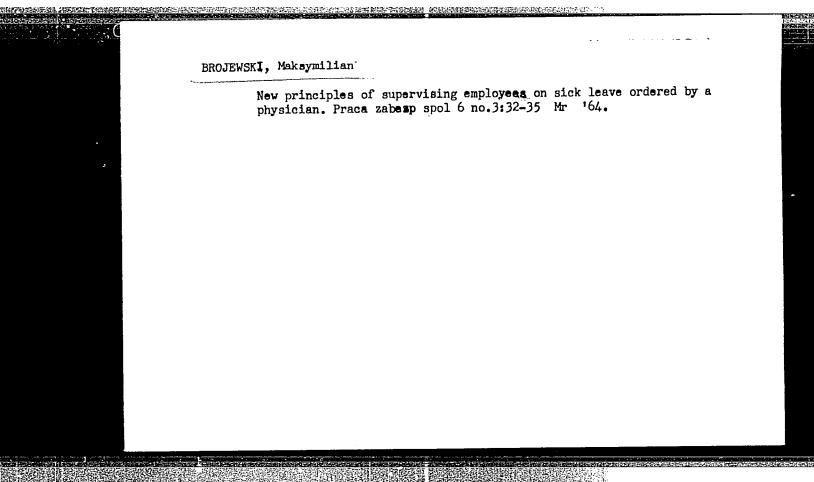


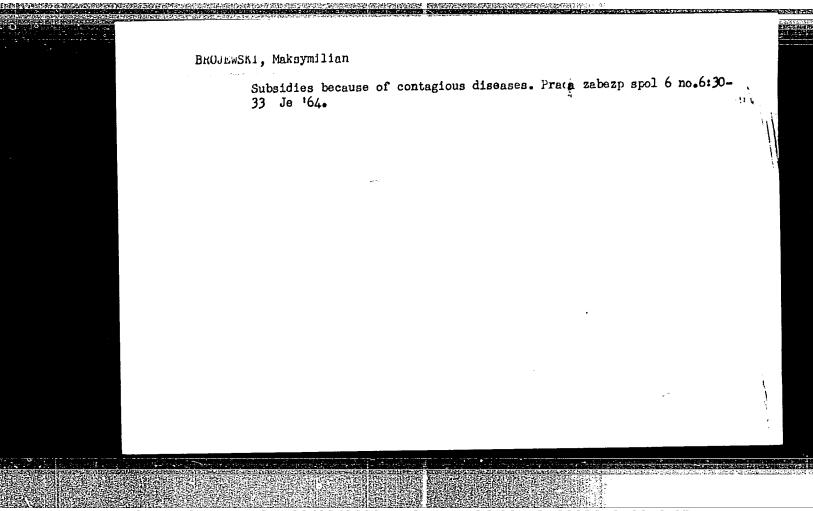
BROJEWSKI, Neksymilian

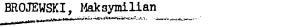
Types of wages constituting the bases for the calculation of benefits in cases of health and maternity insurance. Praca zabesp spol 5 no.8/9:89-92 Ag-S 163.



Method of computing sickness allowances. Praca zabezp spol 5 no.12:40-43 D'63.



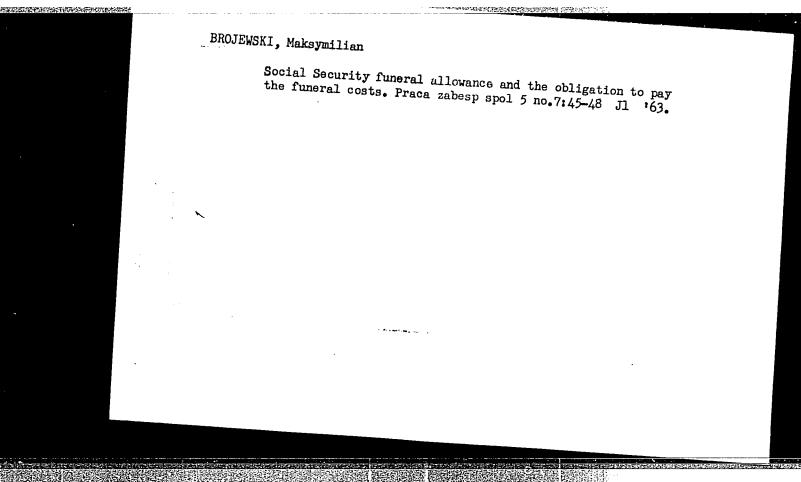




Periods of suspending and reinstating the title to social security pensions. Praca zabezp spol 6 no.12:29-32 D 164.

BROJEWSKI, Maksymilian

Decisions concerning this portry work disability for past periods. Praca zabezp spol 7 no.1:39-42 Ja '65.



HROK, Aleksandr Arturovich; ZAUSAYLOV, Boris Alekseyevich; STEPANOV, Nikolay Grigor'yevich; KOLTUNOVA, M.P., red.; BOBROVA, Ye.N., tekhn.red.

[Fundamentals of safety engineering and fire prevention measures in railroad transportation] Osnovy tekhniki bezopasnosti i protivopozharnoi tekhniki na zheleznodorozhnom transporte. Moskva, Vses.izdatel'sko-poligr.ob"edinenie M-va putei soobshcheniia, 1960. 234 p.

(MIRA 14:4)

(Railroads--Safety measures)
(Railroads--Fires and fire prevention)

BROK, V. A.

"Temperature Anomalies of Spring and the Beginning of Summer in the Southeastern Fart of Western Siberia." Cand Geog Sci, Chair of Climatology and Meteorology, Tomsk State U imeni V. V. Kuybyshev, Tomsk, 1955. (KL, No 15, Apr 55.

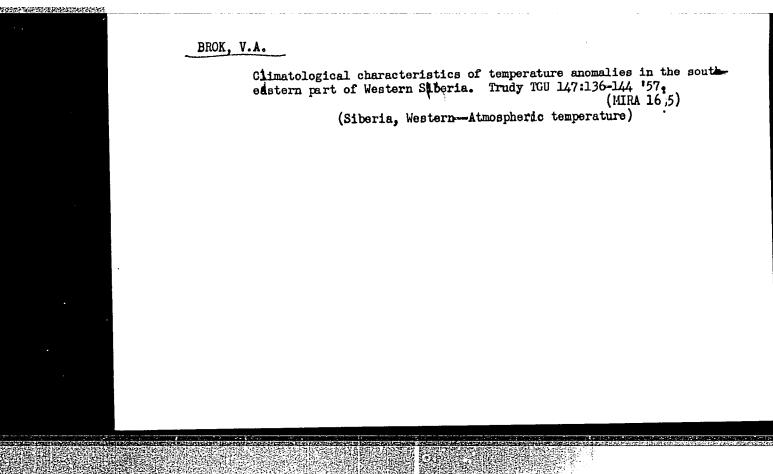
SO: Sum. No. 704, 2 Nov 55 - Survey of Scientific and Technical Dissertations Defended at USSR Higher Educational Institutions (16).

BROK, V.A., kand.geogr.nauk; KOVALEVA, T.Ye., inzh.; KEL'CHEVSKAYA, L.S., starshiy inzhener; IZNAIRSKAYA, I.A., starshiy inzhener; KUKHARSKAYA, V.L.; PAKHNEVICH, K.P., inzh.; DYMOVICH, Yu.L., inzh.; VOROB'YEVA, T.P., inzh.; PAKHNEVICH, S.Ya., otv.red.; LEONTOVICH, B.V., nauchno-tekhn.red.; USHAKOVA, T.V., red.; SERGEYEV, A.N., tekhn.red.

[Agroclimatic reference book on Kemerovo Province] Agroklimaticheskii spravochnik po Kemerovskoi oblasti. Leningrad, Gidrometeor.izd-vo, 1959. 135 p. (MIRA 13:2)

1. Novosibirsk. Gidrometeorologicheskaya observatoriya.
2. Novosibirskaya gidrometeorologicheskaya observatoriya (for Brok, Kovaleva, Kel'chevskaya, Iznairskaya, Kukharskaya, K.P. Pakhnevich, Dymovich, Vorob'yeva). 3. Direktor Novosibirskoy gidrometeorologicheskoy observatorii (for Leontovich).

(Kemerovo Province—Crops and climate)



17 (2) AUTHORS: Bass, I. A., Broker, T. M., Gol'dfarb, D. M., SOV/20-129-6-61/69

Gorlenko, Zh. M., Il'yashenko, B. N.,

Nankina, V. P., Khesin, R. B.

TITLE:

Infectious Properties of Injured Phages

PERIODICAL:

Doklady Akademii nauk SSSR, 1959, Vol 129, Nr 6, pp 1421 - 1423

(USSR)

ABSTRACT:

D. Fraser and co-workers (Ref 12) concluded from their investigations that the infectious activity of the destroyed preparations of phage T2 is related to the desoxyribonucleic acid (DNA) which was liberated from the protein covers of the phage particles by the effect of urea. The results obtained by the authors, however, were rather divergent. Therefore, they thoroughly investigated the preparations formed from bacteriophages by treatment with urea. The following dysentery phages were used: T4r, DN (isolated from the soil by T. N. Broker), and N-2 (obtained by F. I. Yershov, 2-y Moskovskiy gosudarstvennyy meditsinskiy institut, Second Moscow State Medical Institute). The effect of the phages was tested on protoplasts (bacteria without cell walls). The authors obtained them from cells of the following bacterial strains by means of lysozyme according to R. Repaske

Card 1/4

Infectious Properties of Injured Phages

sov/20-129-6-61/69

(Ref 13): E. coli B (sensitive to phage T4r and DM); E. coli 600 (resistant to all three phages mentioned); and Sh. dys. Newcastle (obtained by F. I. Yershov, sensitive to N-2). Suspensions of phages, concentrated to 10 12 particles in 1 ml, were treated with an 8 M urea solution. Thereafter, the action of phages on intact cells was completely eliminated. They showed an activity of 0.00001 to 0.001% on protoplasts. This effect concerns bacteria strains sensitive to phages as well as those resistant to phages. Thus, this remaining activity cannot be due to the preservation of a few phage particles. Further experiments showed that the above residual infectivity is not related to the free DNA which has left the virus particles. Thus, it could be assumed that only the part of the DNA is active which is protected against the used desoxyribonuclease by other components of the phage (probably by proteins). In order to check this assumption, the proteins were separated from the preparations by phenol or chloroform. The preparations were completely inactivated in spite of the proved extensive separation of the proteins from the DNA. This proved again that, after

Card 2/4

Infectious Properties of Injured Phages

sov/20-129-6-61/69

treatment with urea, infectious activity is not due to free DNA. On the other hand, it has been known that the protein component isolated from the phage cannot cause phage reproduction in the bacteria. The only assumption is that one complex of the DNA with the protein has infectious activity. It was serologically proved that the proteins of the active complexes mentioned are similar to the antigenes of normal phage particles. The transition of 80-90% of activity into the precipitate could be achieved by centrifugation of virus preparations treated with urea as well as by suspensions of intact phages. The electron microscope showed that the above complex has corpuscular struc- / ture and that it is of about the same size as the intact phage. Figures 1 and 2 show that, apparently, urea destroys only the distal parts of the processes. Thus, the phage particles become incapable of depositing on normal bacteria. The inner part of the process axis which consists of protein is uncovered by the urea effect. Further experiments with trypsin, which destroyed the uncovered part, brought about complete suppression of activity. Thus, the protein in the axis of the phage particle is necessary for the occurrence of the infectious activity of the preparations mentioned. There are 1 figure and 13 references.

Card 3/4

Infectious Properties of Injured Phages

sov/20-129-6-61/69

ASSOCIATION:

Institut biofiziki Akademii nauk SSSR (Institute of Biophysics of the Academy of Sciences, USSR). Institut epidemiologii i mikrobiologii im. N. F. Gamaleya Akademii meditsinskikh nauk SSSR (Institute of Epidemiology and Microbiology imeni N. F. Gamaley of the Academy of Medical Sciences, USSR)

PRESENTED:

June 10, 1959, by I. L. Knunyants, Academician

SUBMITTED:

May 29, 1959

Card 4/4

VLASOV, V.V., kand, med. nauk (Novosibirsk); BROKHES, L.I. (Novosibirsk); SHTERNSHIS, Yu.S. (Novosibirsk)

Effective anticoagulant treatment in thromboembolism of the pulmonary artery. Khirurgiia 40 no.11:121-122 N '65. (MIRA 18:7)

BROKSH, M.M.; GVOZDEV, B.P.; ZAYTSEV, V.I.; ESTRINA, A.A.; SALTYKOV, A.L.

Investigating a full-scale model of aspherical scrubber, a
ball-shaped dust collector. Trudy VNIIGAZ no.21/29:172-182 (MIRA 17:9)

BROKSH, M.M.; YERMOSHINA, M.S.; SALTYKOV, A.L.; ESTRINA, A.A.

Checking the liquid content in gas flow. Trudy VNIIGAZ (MIRA 17:9)

BROKSH, M.M.; GVOZDEV, B.P.; KVASHUK, V.S.; KOSHELEV, V.A.

Using cermet filters to remove solid impurities from natural gas. Trudy VNIIGAZ no.21/29:205-217 '64. (MIRA 17:9)

BASS, I.A.; BROKER, T.N.; GOL'DFARB, D.M.; GORLENKO, Zh.M.; IL'YASHENKO, B.N.; NANKINA, V.P.; KHESIN, R.B.

Significance of proteins for the infectivity of bacteriophages treated with urea. Biokhimiia 25 no.2:360-367 Mr-Ap '60. (MIRA 14:5)

l, Institut biofiziki Akademii nauk SSSR i Institut epidemiologii i mikrobiologii im. N.F.Gamaleya Akademii meditsinskikh nauk SSSR, Meskva.

(BACTERIOPHAGE)

(UREA)

(PROTEINS)

BROKER, T.N.

Mechanism of antiphage activity of antitumor preparations.

Zhur. mikrobiol. epid. i immun. 31 no.2:84-89 D 160.

(MIRA 14:6)

1. Iz Instituta epidemiologii i mikrobiologii imeni Gamalei

AMN SSSR.

(BACTERIOPHAGE) (TRACIL) (DIETHYLAMINE)

BROKARENKO, Konstantin Kus'mich; IGWATOV, Viktor Nikolayevich; PETROV,
Boris Ivanovich; EPSHTEYN, D.M., red.; KHITROV, P.A., tekhn.red.

[Technological training for students specializing in railroad transportation; organisation and methods] Professional notekhnicheskoe obuchanie na shelesnodoroshnom transporte; organisatsiia i metodika. Moskva, Gos.transp.shel-dor.isd-vo, 1959. 255 p. (MIRA 12:6)

GOL'DFARB, D.M.; BROKER, T.N.

Antiphage properties of certain antibiotics, antiseptics, amino acids and antitumor drugs. Vop. virus. 4 no.1:103-108 Ja-F 159. (MIRA 12:4)

1. Laboratoriya izmen chivosti mikrobov i otdel epidemiologii Instituta epidemiologii i mikrobiologii imeni N.T. Gamalei AMN SSSR, Moskva. (RACTERIOPHAGE, effect of drugs on, repeat title (Rus))

MARDASHEV, S.R.; HARGORINA, L.M.; LESTROVAYA, N.N.; BROKER, T.N.

Amino acid decarboxylases in bacteria of the intestinal group. Zh. mikrobiol. 40 no.7:25-29 Jl*63 (MIRA 17:1)

1. Iz Instituta biologicheskoy i meditsinskoy khimii AMN SSSR i Instituta epidemiologii i mikrobiologii imeni Gamalei AMN SSSR.

PETROV, V.I.; GOELEVSKAYA, M.V.; SYRKASHEVA, A.V.; RAYKHSHTAT, G.N.; SHAPIRO, A.A.; BERLOVICH, E.A.; KARASEVA, M.F.; RYUMINA, M.G. LEYKINA, R.S.; BROKER, T.N.; GITARIN, D.Yu.; MOSKOVENKO, D.F.; STASILEVICH, Z.K.; REUT, A.I., ALIYEVA, S.G.

Annotations. Zhur. mikrobiol., epid. i immun. 40 no.2:109-112 F '63. (MIRA 17:2)

1. Iz Dnepropetrovskoy gorodskoy sanitarno-epidemiologicheskoy stantsii (for Petrov). 2. Iz Saratovskogo meditsinskogo instituta i Saratovskoy gorodskoy sanitarno epidemiologicheskoy stantsii (for Godlevskaya, Syrkasheva). 3. Iz sanitarno-epidemiologicheskoy stantsii Sverdlovskogo rayona Moskovy (for Raykhshtat, Shapiro, Berlovich, Karaseva, Ryumina, Leykina, Broker). 4. Iz Instituta eksperimental'noy patologii i terapii AMN SSSR (for Stasilevich). 5. Iz Belorusskogo sanutarni-gigiyenicheskogo instituta (for Reut). 6. Iz Uzbekskogo nauchno-issledovatel'skogo kozhno-venerologicheskogo instituta (for Aliyeva).

RAYKHSHTAT, G.N.; SHAPIRO, A.A.; LEYKINA, R.F.; KARASEVA, M.F.; BERLOVICH, E.A.; RYUMINA, M.G.; BROKER, T.N.; KUZNETSOVA, N.S.

Epidemiological effectiveness of preventive bacteriophage treatment against dysentery in pediatric institutions. Zhur. mikrobiol., epid. i immun. 42 no.8:139-141 Ag '65. (MIRA 18:9)

1. Sanitarno-epidemiologicheskaya stantsiya Sverdlovskogo rayona Moskvy.

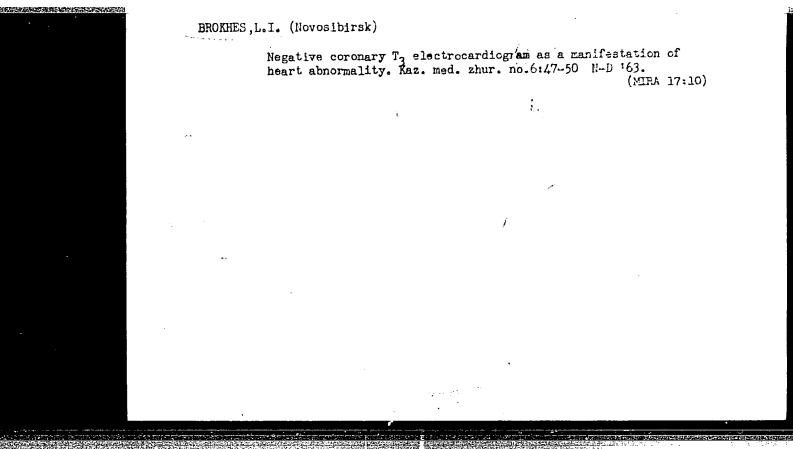
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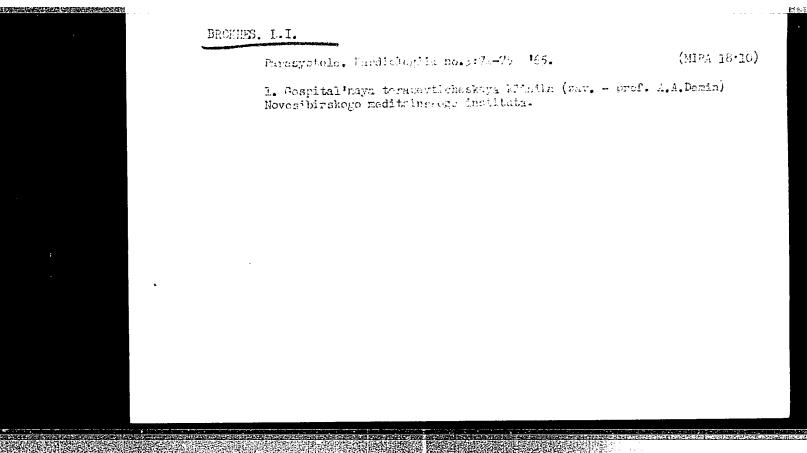
"The Influence of Hardening With High Frequency Heated Currents on the Resilience of Steel," p. 43 of the book "Problems on Strength and Deformation of Metals and Alloys", released by the Moscow Engineer-Physics Inst., Mashgiz, 1954.

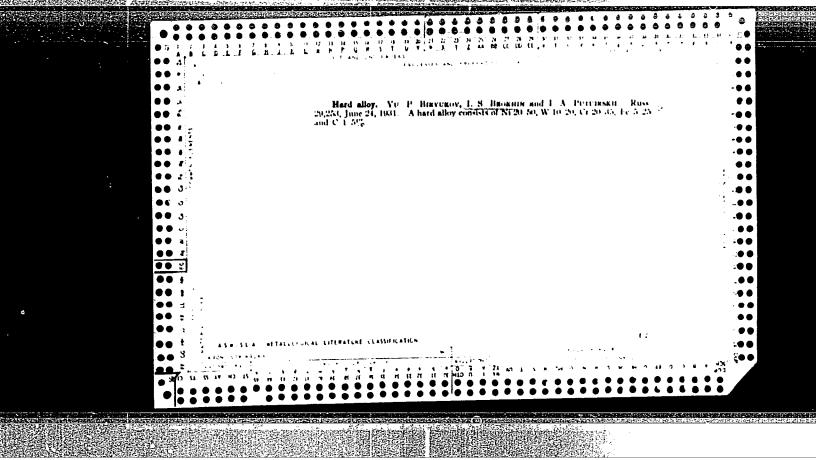
TABCON D-342613, 24 Oct 1955

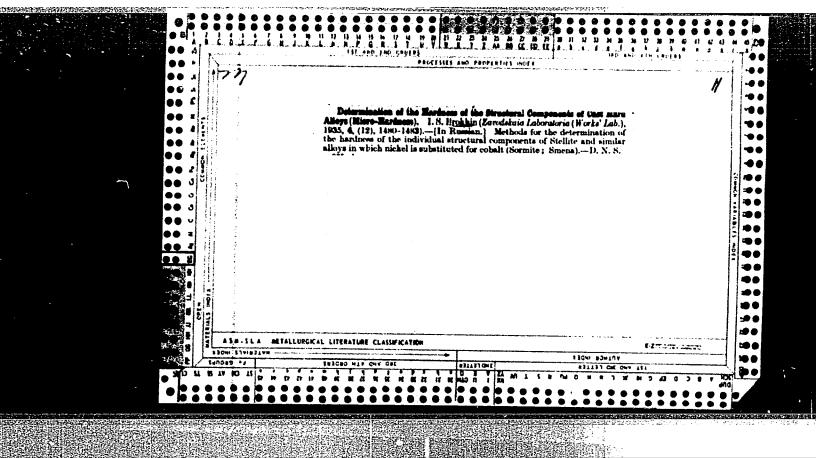
EROKHES, L.I.; NISNEVICH, Ya.G. (Novosibirsk)

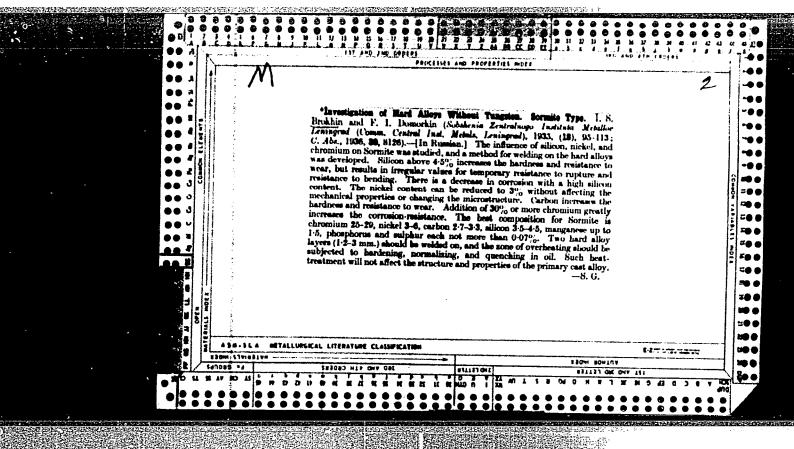
Migrating source of ventricular excitation in Frederica's syndrome. Terap. arkh. 35 no.9:109-114 S'63 (MIRA 17:4)

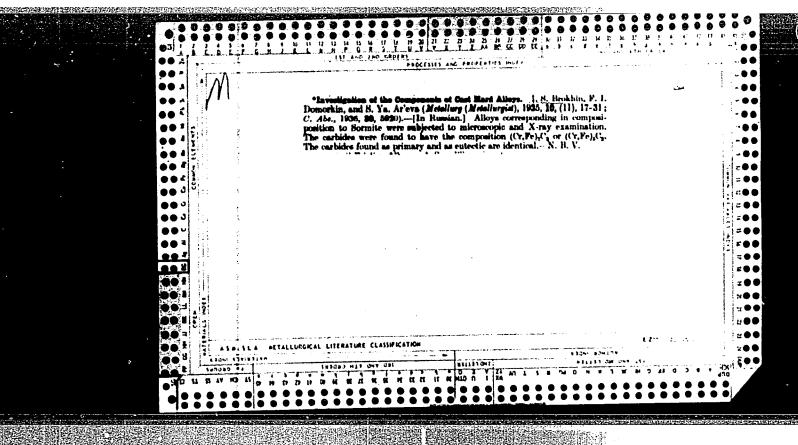


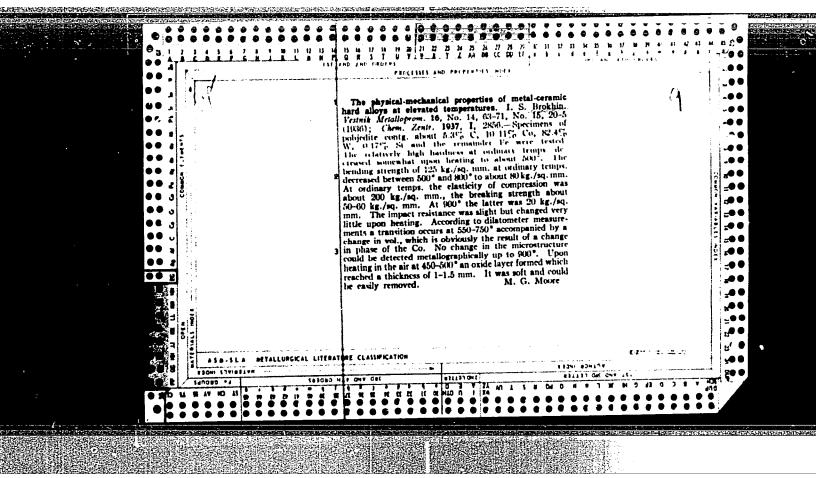


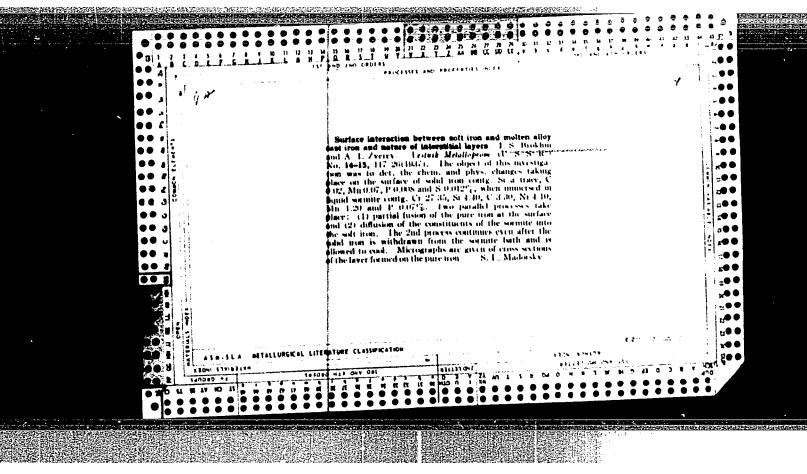


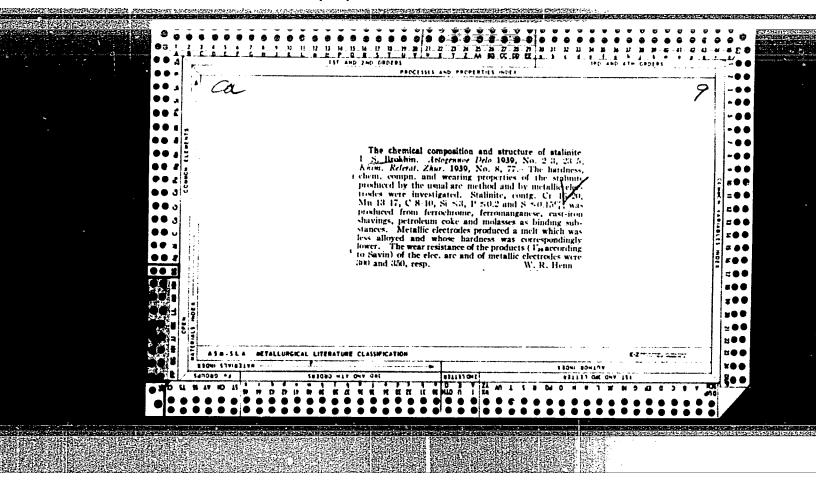


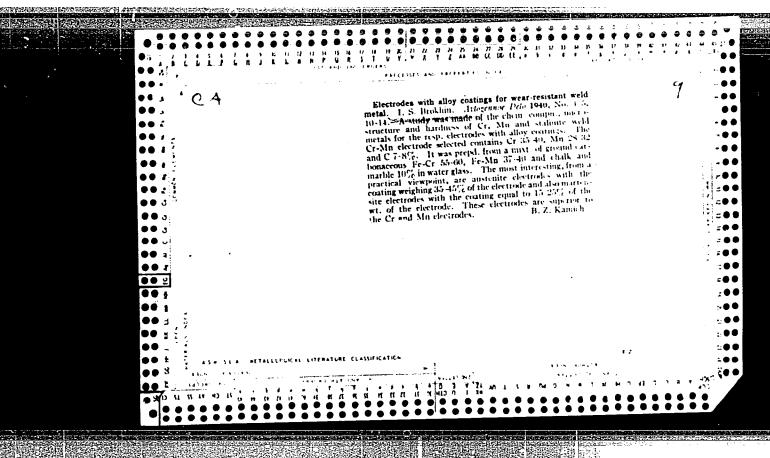


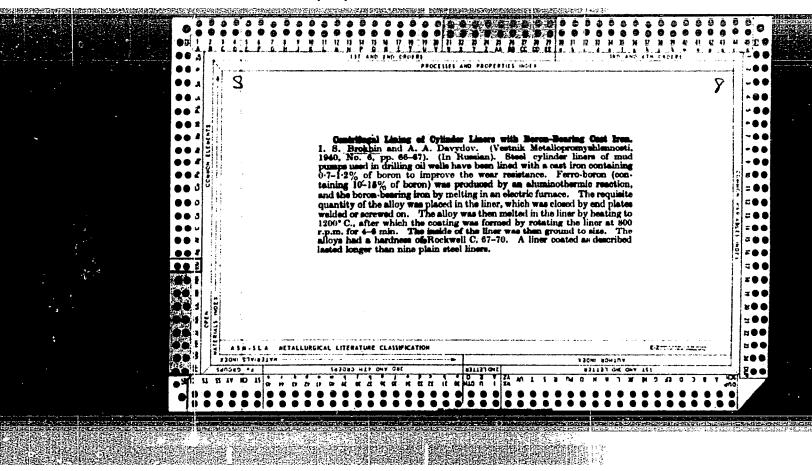


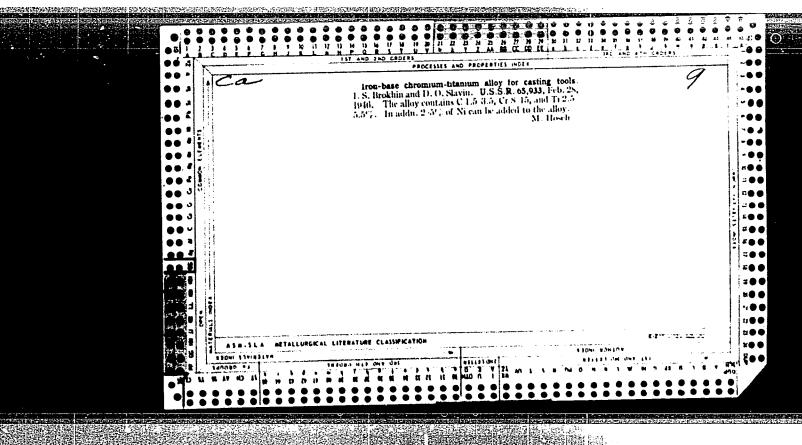












USSR/Metals - Electron Microscopy

Nov 50

"Investigation of Metal Powders With the Aid of Electron Microscope," I. S. Brokhin, L. M. Bursuk, All-Union Sci Res Inst Hard Alloys

"Zavod Lab" No 11, pp 1331-1335

Describes procedure, giving results for examn of various metal powders under electron microscope at 6,000-10,000 X magnification. Studied powders of wolfram and its carbide, nickel, and cobalt. Reproductions of several electron photomicrographs.

180T77

 BROKHIN

AUTHORS:

Brokhin, I.S., Funke, V.F.

131-12-7/9

TITLE:

Certain Properties of Ceramics Obtaining and Investigating From Silicon Nitride (Polucheniye i issledovaniye nekotorykh

svoystv keramiki iz nitrida kremniya)

PERIODICAL:

Ogneupory, 1957, Nr 12, pp. 562-566 (USSR)

ABSTRACT:

According to published data the silicon-nitrogen system has three phases: Si₃ N₄, Si₂N₃ and SiN, where the phase Si₃N₄ with 39.5% nitrogen is chemically the most stable and the most important in practice. Further, the properties of Si N are described in detail as also the method by which it is obtained from silicon powder, the chemical composition of which is shown in table 1. Figure 1 shows the saturation curves of silicon by nitrogen at various temperatures. Figure 2 shows the nitrogen content in silicon in dependence of the duration of nitration at 1600°. Table 2 shows the influence exercised by an addition of silicon upon the sintering of the silicon nitride (hot pressing at 1400° and 800 kg/cm²). In table 3 the properties of test samples of silicon nitride are described (Nitration temperature 1500°). Also bending strength and the resistance against oxidation were tested in dependence on temperature.

Card 1/2

APPROVED FOR RELEASE: 08/22/2000

CIA-RDP86-00513R000307010010-9"

131-12-7/9

The Discovery and Investigation of Certain Properties of Ceramics From Silicon Nitride

(See tables 4 and 5, as well as fig. 4). There are 5 figures, 5 tables, and 8 references, 2 of which are Slavic.

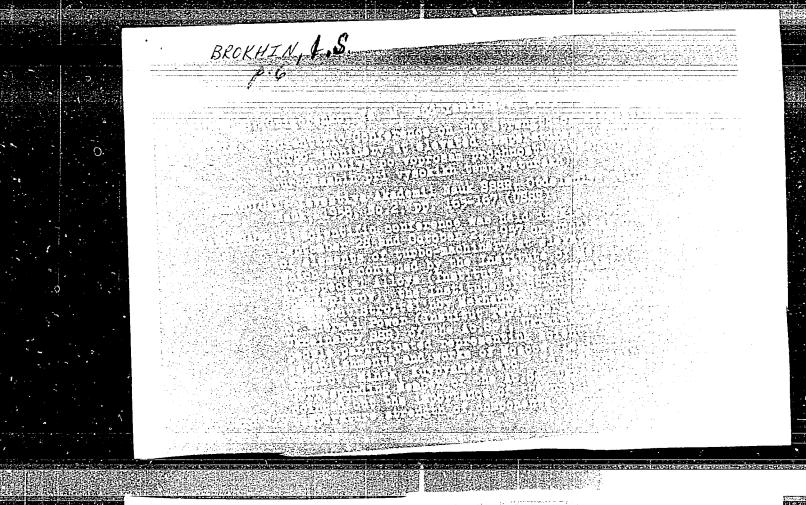
ASSOCIATION: All-Union Scientific Research Institute of Hard Alloys

(Vsesoyuznyy nauchno-issledovatel'skiy institut tverdykh splavov)

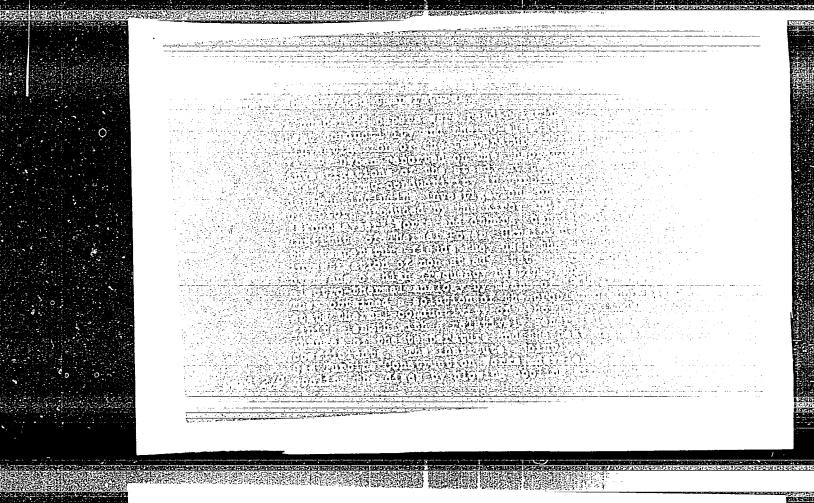
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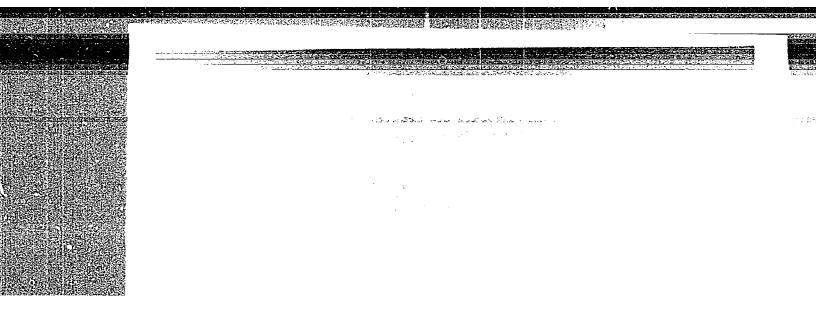
Card 2/2

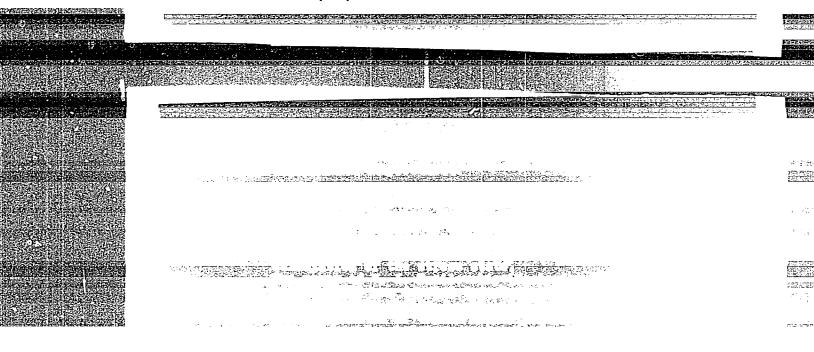
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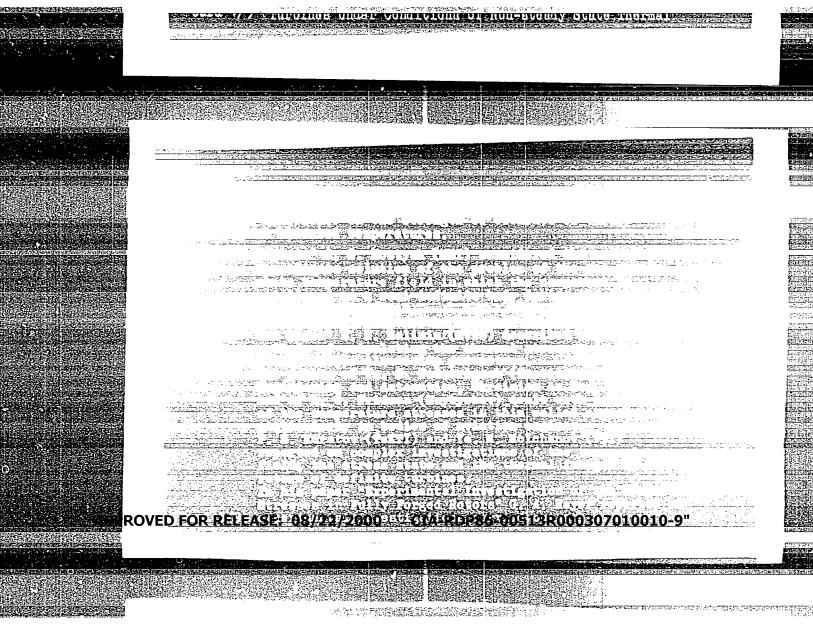


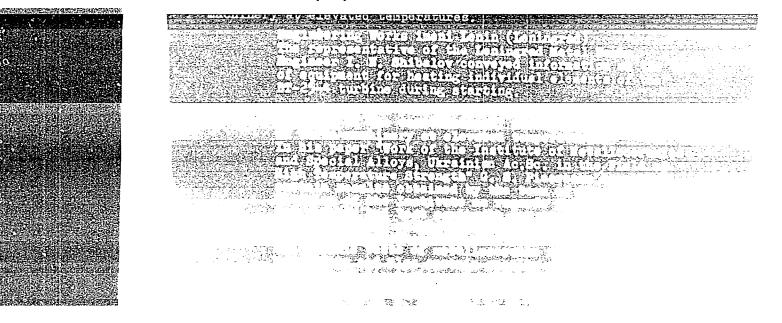
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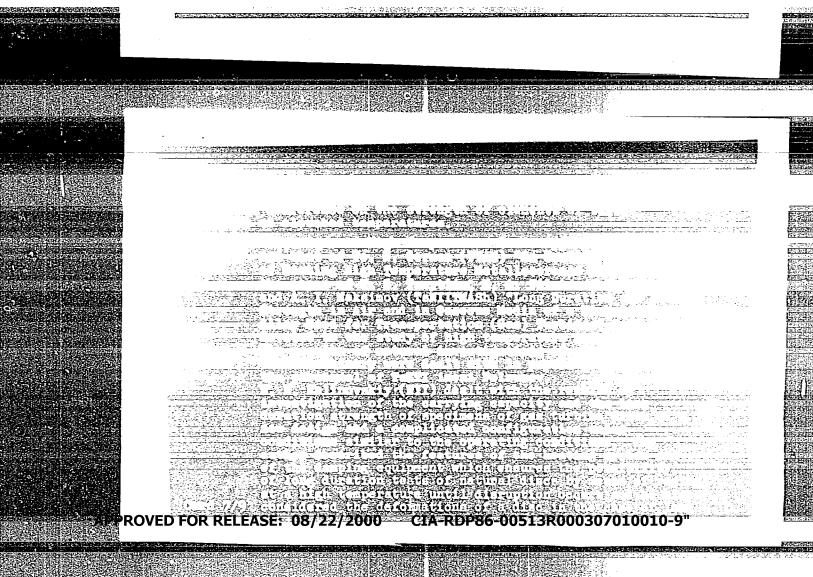


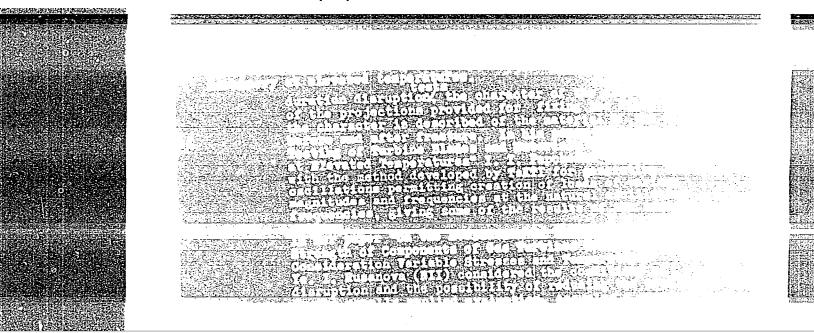












AUTHORS:

Brokhin, I. S., Funke, V. F.

78-3-4-2/38

TITLE:

Investigation of the Solubility and Phase Composition in the System Silicon-Carbon (Issledovaniye rastvorimosti i fazovogo

sostava v sisteme kremniy-uglerod)

PERIODICAL:

Zhurnal Neorganicheskoy Khimii, 1958, Vol. 3, Nr 4, pp. 847-

-853 (USSR)

ABSTRACT:

The solubility of carbon in silicon, the phase composition and the structure of silicon-carbon alloys as well as the problem of the dissociation of silicon carbide in vacuum at

higher temperatures were investigated.

The investigation of the phase diagram in the system Si-C was

carried out in three parts:

1.-Determination of the solubility of carbon in silicon;

2.-Determination of the phase composition in the range Si-SiC;

3.-Explanation of the formation of the SiC phase.

For the investigation of the phase composition and the structure of the alloys metallographic and x-ray structural analyses as well as the determination of microhardness were carried out. The metallographic investigations showed that the alloys

Card 1/2

consist of one phase up to 0,7% C.

Investigation of the Solubility and Phase Composition in the 78-3-4-2/38 System Silicon-Carbon

The alloys containing more than 0,8% C consist of two phases: solid solution C in Si (light field) and silicon carbide (dark field).

In the thermal treatment of silicon carbide in vacuum at 2000--2100°C a complete dissociation of silicon carbide occurs with Si evaporating and C forming a graphite residue.

The graphite lines were proved by the x-ray structure analyses.

No solubility of Si was found in silicon carbide.

There are 14 figures, 3 tables, and 5 references, 2 of which

are Soviet.

ASSOCIATION:

Vsesoyuznvy nauchno-issledovs+el'skiy institut tverdykh splavov, Moskva (Moscow, All-Union Scientific Institute for Hard Alloys)

Card 2/2

AUTHORS:

Smiryagin, A. P., Potemkin, A. Ya.,

78-3-4-3/38

Martynyuk, R. P.

TITLE:

Investigation of the Phase Diagram Nickel-Molybdenum-Chromium (Issledovaniye diagrammy sostoyaniya nikel-molibden-khrom)

PERIODICAL:

Zhurnal Neorganicheskoy Khimii, 1958, Vol. 3, Nr 4,

pp. 853-859 (USSR)

ABSTRACT:

The nickel corner in the phase diagram of the system Ni-Mo-Cr (up to 40% molybdenum and up to 40% chromium) was investigated

using the thermal and microscopic analysis.

Eight polythermal sections of the nickel corner in the phase diagram nickel-molybdenum-chromium were constructed. The phase composition and the hardness of the alloys were investigated at temperatures of 1270°, 1200°, 950°, 800° and 700°C. The saturation limit of the ternary solid solution of the basis of nickel was determined at temperatures of 700°, 800°,

950° and 1000°C.

It was shown that with a drop of temperature the solubility of molybdenum and chromium in nickel decreases markedly. Also

the sectional diagrams with a constant content of

Card 1/2

4%, 8,5%, 3,5% and 20% of chromium were constructed.

SOV/136-58-9-13/21

AUTHORS: Brokhin, I.S., Zolotarev, I.S. and Baranov, A.I. TITLE:

Some Properties of Molybdenum Disilicide (Nekotoryye svoystva distilitsida molibdena)

PERIODICAL: Tsvetnyye Metally, 1958; Nr 9, pp 61-67 (USSR)

ABSTRACT: Molybdenum disilicide has good resistance to scaling at temperatures up to 1700°C combined with other useful properties (e.g. metallic electrical conductivity) and the study of this compound has been proceeding in recent years (Refs 3-7). The authors describe their investigation of the high-temperature mechanical properties of the compound and of a preparation with an excess of silicon. The disilicide was prepared by sintering at 1100-1200°C from hydrogen reduced molybdenum (0.005% Fe, 0.002% Ni, 0.03% O, rest Mo) and grade Kr-O silicon (99% Si) further purified by acid treatment and the blanks obtained (Table 2) were ground and made into 6 x 6 x 60 mm pieces (Table 3) by sintering under pressure at 1500-1550°C. From these the test pieces were prepared. The chemical nature of specimens obtained was confirmed by X-ray and chemical analysis and by determinations of micro-hardness

Card 1/2

Some Properties of Molybdenum Disilicide

SOV/136-58-9-13/21

and resistance to scaling. The hardness has been determined up to 1 000 °C (Figure 2) and the microhardness and scaling resistance (1 200 °C). Tests on specimens with 3, 5 and 10% excess Si showed that 5% excess Si is beneficial. Long-term bending tests were carried out in a special installation (Figure 3) to determine the plastic deformation of MoSi₂ and MoSi₂ x x 5% Si at 1 200 °C with relatively small (up to 20 kg/mm²) stresses. Tensile strengths in bending were also determined at 20, 1 000, 1 100 and 1 200 °C. There are 4 figures, 4 tables and 8 references, 1 of which is Soviet, 3 German, 3 English and 1 Czech.

ASSOCIATION: VNIITS

Card 2/2

Molybdenum silicides—Properties
 Molybdenum silicides
 Molybdenum silicides—Mechanical properties
 Molybdenum silicides—Test results

SOV/136-59-3-14/21

SUTHORS: Brokhin, I.S., Ol'khov, I.I.

TITLE: The Scale-stability of Cermet Alloys Based on Titanium

Carbide (Okalinostoykost' metallokeramicheskikh splavov

na osnove karbida titana)

PERIODICAL: Tsvetnyye Metally, 1959, Nr 3, pp 61 - 66 (USSR)

ABSTRACT: The initial materials were titanium dioxide, niobium

pentoxide, powdered niobium (containing 1-3% tantalum), tungsten carbide, lamp-black and powdered cobalt reduced from its oxalate. Alloys were prepared by mixing for 24 hours and then heating in a hydrogen atmosphere in an

electric furnace. X-ray analysis of the specimens prepared from individual carbides of titanium and niobium

showed the lines corresponding to the two carbides (TiC - 4.32 Å, NbC - 4.46 Å), whereas the alloy containing 87% TiC and 13% NbC showed only one phase with lattice

parameter 4.37 ± 0.03 Å (TiC-NbC solid solution). The microhardness of niobium carbide and of the complex titanium-niobium carbide was shown to be 1 822 and 2 472

kg/mm². All the samples of titanium-tungsten carbide were

single-phased with a crystal lattice of TiC. The Cardl/4 powdered carbides were mixed with cobalt by wet grinding

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for five days, pressed with a stress of 1 000 kg/cm² and sintered at 1 450 - 1 560 °C in hydrogen. Figures 1 and 2 show typical microstructures of TiC-NbC-Co and TiC-WC-Co. The alloys were tested at 900-1 200 °C for 100 hours, the gain in weight and the thickness of oxide layer being noted. Diagram 3 shows that with increase of NbC in TiC-NbC-Co alloys there is a sharp decrease in weight

gain from 5-1 g/m² per hour. With further increase in NbC the weight gain is practically constant. Figure 4 shows the weight gain of alloys containing 25% Co and 3-15% NbC. The scale-stability is a maximum with 15% NbC at all temperatures. Further increase of NbC to 25% has no further effect. Varying the cobalt content showed that the weight gain was a minimum at 25% Co. Specimens prepared from simple carbides gave similar results to those prepared from complex carbides but in all cases the former had a greater weight gain than the latter. At 1 000 °C the surface has/grey colour due to breaking up of the scale and at 1 100 - 1 200 °C there is a thicker layer on the Card2/4 surface. The TiC-WC-Cc alloys were prepared from the

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complex carbides. Figure 5 shows the weight gain of alloys containing 15 and 30% WC both with 18 wt.% ccbalt. At 900°C, the weight gain is practically the same for both alloys but at higher temperatures the 30% WC alloy has a lower weight gain. The effect of Co content is shown in Figure 6 (the ratio TiC:WC is 65:35). With increase from 10 to 20% Co there is an increase in oxidation resistance which is more marked at higher temperatures. With alloys with TiC:WC ratio of 85:15 the effect of Co increase is less marked. At temperatures higher than 1 100°C all the alloys oxidise rapidly. In both TiC-NbC and TiC-WC alloys oxidation spreads in the first instance along the cementing phase. The TiC-NbC-WC-Co alloy containing 10-15% NbC has better scale stability than TiC-WC-Co alloys but not as good as TiC-NbC-Co alloys. The TiC-15NbC-25Co alloy is suitable up to 1 100°C and the TiC-30WC-15-20Co up to 900°C.

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There are 7 figures, 1 table and 13 references, 8 of which are English and 5 German.

ASSOCIATION: VNIITS

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St V/150439-16-15/16

AUTHORS: Brokhin, I.S. Ol'khov, 1.1. and Platov, A.B.

TITLE: Mechanical Properties of Cevamic Tool Entertals and

Hard Alloys at Elevated Temperatorys

PERIODICAL: Tsvetnyye metally, 1959. Nr. 10. pp. 03-62 (ESSR)

ABSTRACT: One of the new materials that have verently found wide application in the manufacture of cutting tools, drawing dies and other wear-resistant components, is a ceramic

material based on sintered alumina and produced at the Moscow Hard Metals Combine under the mane of TsMeSS2 (Ref. 1).

This product, characterized by timely prystalline

structure (average grain size up to 2 %) and low peresity (specific gravity = 3.9 g/cm²). To node of conmercial grade a-alumina with a small tabule 0.5% addition of MgC by sintering at approximately 1700 C. shrinking auring sintering amounts to 18 to 20%. The object of the

investigation described in the present paper was to measure hardness, transverse rupture stress; UTS and compressive strength of TsM-332 and certain other wear-

resistant materials, both at room and ofevated temperatures. Hardness measurements were taken an macuse, using a

Card 1/7 diamond indenter, I kg load and political explinational test

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> pieces 15 mm diameter and 5 mm high. The specimens were held at the test temperature for 20 min before applying the load of 30 sec duration; not less than six measurements were taken at each temperature, each new test temperature being attained by cooling. After cooling to room temperature, the specimens were photographed (x 420), the diagonals of the indentation were measured and the VPN values were found from the tables. The results are reproduced in the form of an $H_V({\rm kg/mm}^2)$ versus t(°C) curve in Fig la (curve 3) where, for comparison, the results obtained by other workers are also shown: curve $l_{\mathfrak{g}}$ based on the measurements of Betaneli (Ref 5), who used a 250 kg load, and curve 2, based on data due to Kazakov (Ref \dot{b}), who used a 1 kg load. It will be seen that hardness of TsM-332 decreases monotonically and linearly with rising temperature from about 1800 VPN at room temperature to about 600 at 1000°C and to 350 at 1100°C. Fig la shows photographs of the diamond pyramid indentations made on TsM-332 specimens under the following conditions of loading and temperature:

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1 to 5 kg, 20°C (H_v equal 1800 kg/mm²); 2 to 1 kg, 700°C (H_v equal 960 kg/mm²); 3 to 1 kg, 1000°C (H_v equal 540 kg/mm²). Hair cracks (originating at the corners of the indentations), visible clearly on these photographs, occurred even when the hardness measurement was taken at the highest test temperature; they were even more pronounced when a Rockwell machine (scale A, load 60 kg) was used (see Fig 3). No cracks were observed on specimens used for microhardness measurements (load 100 g) at room temperature, which gave values of $H_{\mathbf{v}}$ equal 1900 to 2000 kg/mm². In the next stage of the investigation, hardness of the following hard alloys was measured: (a) standard titanium-tungsten alloys T5K10, T14K8, T15K6, T30K4 and T5K6; (b) new types of tungstencobalt alloys (VK6V, VK8V, VK15V) characterized by high strength and coarsely-crystalline structure (average grain size of the WC phase ~ 3 to 5 μ) made by the method developed by VNIITS and based on tungsten obtained by reduction at 1200°C; (c) alloy VK6M, characterized by improved wear resistance and finely crystalline structure

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(average WC grain size of approximately 1 μ) and made by a process involving intensified wet grinding of the powder mixture. The results of these measurements (load 1 kg, loading time - 30 sec) are reproduced in Table 1 (for the titanium-tungsten alloys) and Table 2 (for the tungsten-cobalt alloys) in which the test temperature (°C) is given in the first columns. Curves plotted in Fig 1b show the temperature dependence of H_v for the following alloys: 1 - T30K4; 2 - T15K6; 3 - T14K8; 4 - T5KlO. The same relationship for the tungsten-cobalt alloys is illustrated by curves plotted in Fig 1B: 1 - VK6M; 2 - VK6V; 3 - VK8V; $\hat{4}$ - VK15V; 5 - (for comparison) TsM-332. Photographs of diamond pyramid indentations obtained on T5KlO specimens at (1) - 20, (2) - 600 and (3) - 1000° C (corresponding to H_v values of 1650, 850 and 260 respectively) are reproduced in Fig 2b; finally, similar photographs for VK8V specimens at 200, 600 and 1000°C (the corresponding H_v values being 1500, 650 and 200) are shown in Fig 2B (1, 2 and 3 respectively). In the next series of experiments, the

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transverse rupture stress, our , of the investigated materials was determined at temperatures up to 1200°C, a universal testing machine P5, equipped with a silit heating device, was used for this purpose. The test pieces, measuring 5 x 5 x 40 mm, resting on prismatic supports made of heat-resisting material, were maintained at the test temperature for 5 to 7 min before the load was applied at a strain rate of 11 mm/min. The results for the TsM-332 specimens are given in Table 3 under the following headings: test temperature, °C; ousr, kg/mm²; number of tested specimens; scatter of results, %. data given in Table 3 are also reproduced graphically in Fig 4. The temperature dependence of GN3F of VK and TK alloys, is illustrated in Fig 5a and 5b respectively. Flat, radiused test pieces were used for the determination of the UTS of the investigated materials. (Tested TsM-332 specimens are shown in Fig 6) A standard tensile testing machine, or a specially adapted creep testing apparatus, was employed for this purpose, a gradual application of the "dead weight" load being attained by the use of copper

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granules; particular care was taken to ensure axial loading of the brittle specimens and the results of any test, in which fracture of the test piece occurred at a distance of more than 5 mm from its centre, were ignored. UTS of $T_{\tilde{x}}M-332$ determined in this manner was 15 to 16 kg/mm^2 . In the final series of experiments, the compressive strength of TsM-332 was determined on cylindrical specimens (10 mm diameter and 15 mm thick), tested on a 30 t hydraulic machine equipped with hard alloy supports. 90 Specimens, taken from two batches of TsM-332, were tested; the scatter of the results amounted to 20%. The average values of the compressive strengths equal to 80 to 90 kg/mm², were much lower than those obtained by other workers. In the conclusions, it is claimed that the results of the present investigation are more accurate than those quoted in the literature. Attention is drawn to the fact that hardness of the VK6M alloy decreases with rising temperature at a rate much slower than that of other investigated materials ($H_{\mathbf{V}}$ of this alloy being 1400 kg/mm² at 600°C and that both

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hardness and UTS of the ceramic material based on Al_20_3 at 1200° C are higher than those of other materials. There are 6 figures, 3 tables and 10 references, 8 of which are Soviet and 2 German.

ASSOCIATION: VNIITS

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S/736/60/000/002/002/007

AUTHORS: Brokhin, I.S., Zolotarev, I.S., Baranov, A.I.

TITLE: The making and investigation of the properties of Mo disilicide.

SOURCE: Vsesoyuznyy nauchno-issledovatel skiy institut tverdykh splavov.

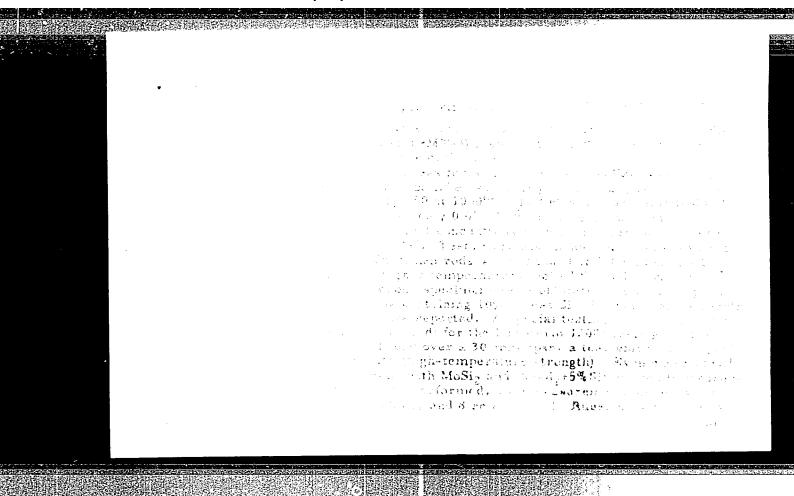
Sbornik trudov. no. 2. Moscow, 1960. Tverdyye splavy. pp. 24-36.

Mo disilicide has recently gained in interest because of its exceptionally TEXT: high scale-resistance up to 1700°C, especially in the making of heating elements for resistance-type electric furnaces. Three Mo-Si compounds are known to exist: Mo3Si, Mo3Si₂, and MoSi₂. R. Kieffer's and E. Cerwenka's phase diagram (Zs. f. Metallkunde, v. 43, no. 4, 1952) is used. Si solubility in Mo at 1200° is 0.15% and at 1400° 0.8% Si. The types of crystalline lattice, densities, m.p.'s, and microhardnesses (100-g load) of the three compounds are tabulated. MoSi, is a metallic conductor of electricity (21 µohm/cm) and is the most highly scale-resistant Mo-Si compound, owing to the formation on it of a dense and strong vitreous SiO, film, 0.03 to 0.1 mm thick. Oxidation at 1350-1400°C is most effective. Above 1700° the SiO2 film melts, coagulates in droplets, and loses its protective properties. The oxidation mechanism of Mo disilicide changes abruptly at 450-6000, at which point a rapid intercrystalline corrosional disintegration takes place. Whereas incandescence at 1200-1500° over thousands of hours does not produce either an increase or a loss in weight, 30-50 hours oxidation at 5000 will reduce the disilicide Card 1/3

The making and investigation of the properties...

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to powder (except under a shielding atmosphere). Mo disilicide is termed brittle and of medium hardness. Compressive strength at room temperature is 70 kg/mm²; bending strength at 1200° is 37 kg/mm²; 100-hour strength at 1100°C is 6.3 kg/mm² (all three values from Western sources). It is high-temperature plastic; creep strength at 1000° is termed unsatisfactory. If Mo disilicide is to be employed, e.g. ingas-turbine parts, cementing substances must be found that will enhance its toughness and strength. Unfortunately, attempts to produce sintered combinations of MoSi2 with various metals have not been successful. The MoSi2 for the subject experiments (work done in 1952-3) was made of powdered Mo (grains up to 3µ) with 0.005% Fe, 0.002% Ni, 0.03% O₂, and of thoroughly ground Si (2μ) with 0.08% Al, 0.03% Ca, 0.015% Mg, 0.015% Fe. The two powders, taken in stoichiometric ratio (63.14% Mo, 36.86% Si), were thoroughly mixed in alcohol for 48 hours. Cylindrical specimens 50x25 mm were sintered from this mixture at 1100-12000 (3-5 min holding). The special graphite pressing dies were compressed at 150 kg/cm². The MoSi2 formation is fast and complete; the fracture of the specimen is steel-gray in color with a metallic gloss. The specimen surface forms a thin carbide crust in contact with the graphite. The results of three chemical analyses are tabulated. The MoSi₂ was once more ground to a fine powder (grain size 2 µ) and subjected to a second sintering at 1500-1550° into 6x0x60-mm rectangular rods. The unit weight increased to 6.11-6.13 g/cm³ owing to reduced porosity. X-ray analysis reveals only a single phase with tetragonal lattice; parameters: a = 3.29 and c = 7.86Card 2/3



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AUTOGRAS Broken . S. Stiller . . . Platon a di

TENTION Some high temperature in temperature properties of more editional enterior components of AlpComment in said a layer.

SOULCE: Vsessyannyy nauchness of dovatel skiy institut (verdych spiavov Sbornik trudov, no. 2 mendow, 1960. Tveedyye spiavy, pp. 143-126

TEXT: This is a laboratory (131 temporation high temperature hardness and bending-strength tests on a large number of specimens of the Soviet IM-332 (TeM-332) oxide ceramic based on sintered Al₂O₃ ("mineraloceramic," "corundum microlith") which were first developed at the Moscow Institute of Chemical Technology intent D.I. Mendeleyev and which are being produced industrially by the Moscow Hard- (Alloy Kombinat (cf. Kitaygorodskiv, I.I., Pavlushkin, N.M., Steslo i keramika, no. 11, 1955; also, "Mineralokeramichaskiy instrumental nyy material TeM-332." The mineraloceramic tool material 1964-332." Metallurgizdat, 1967. TeM-332 is prepared from technically pare including with 0.5% MgO mineralizer additive sintering temperature 1760°. Grain size: 1-3 µ, with little porosity; weight: 3.9 g/cm³. Microphotographs of unetched and clohed sections are shown. The present hardness to be were confacted at temperatures of up to 1100°C and bending

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Some high-temperature mechanical properties... \$/735/60/000/002/004/001

tests up to 1300°C, along with comparison tests on USSR have alloged. The hightemperature Hy hardness was determined on a special vacuum (10" from lig) teas : Buil-1M (VIM-1M) with diamond-pyramid indenters with a 1360 angle between edges. Test load 1 kg: fests were made on a polished specimen 15 min dis and 5 mm high. Three or more specimens were tested at each temperature up to 1100° with 6-7 indentations per specimen. Temperature soaking: 20 min; indentation time under load: 30 sec. Tests were performed during temperature reduction. After cooling to room temperature 420x photographs were made, and the indentation diagonals were measured for the Hy determination. A nearly straight line of Vickers hardness vs. temperature, ranging from H_V =1300 kg/mm² at 20°C to H_V =360 kg/mm⁴ at 1100°C, was found and graphically compared to referenced Soviet data by Betaneli and Kazakov. Indentation photographs reveal thin branching lissures at the corners of the indentations, indicating brittleness up to the highest test temperatures. Rockwell tests (scale A, load 60 kg) on the same specimens resulted in even more pronounced radial cracks. Microhardness tests of the TsM-332 ceramic on the MMT-3 (PMT-3) instrument at room temperature and with a 100-g load yielded a hardness of 1900-2000 kg/mm², i.e., 100-200 kg/mm² higher than the Hy, and without evidence of corner microfissures in the indentations. High-temperature bending tests were performed on 5x5x40-mm specimens on the universal P-5 (R-5) testing machine with a simple testing span of 30 mm. As in all tests of brittle materials, the data

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scatter is appreciable; insemuch as the scatter distribution obeys the law of normal random-error distribution, the data are analyzed by the methods of mathere ica statistics. The bending strength was determined from the weighed mean of the bending batches of specimens. Results are tabulated and graphically portrayed; a nearstraight-line variation goes from 32.7 kg/mm² at 20°C to 28.7 kg/mm² at 800°C, followed by a curve through 23.6 kg/mm² at 1000° and 13.5 kg/mm² at 1200°, with a scatter of ~10% from 20 to 9000, rising to 17.3% at 12000; B.P. Pribylov reports 8 kg/mm² at 1300°. A comparison with Pribylov's data on hard alloys BK (VK) and TK (TK) (4) Makhanicheskiya svoystva tverdykh splavov - The mechanical y properties of hard alloys. Izd. Doma inzhenera i tekhnika imeni Dzerzhinskogo, 1955) show that, while hard alloys are stronger at room temperature, the TsM-332 ceramic loses strength more slowly with rising temperature, especially beyond 700-800°, so that beyond 1200°C the strength of TsM-332 exceeds that of the plastically deformable hard alloys. Tension tests of plane, symmetrically (concavely curvilinearly) tapered, specimens encountered difficulties attributable to irregular shrinkape (18-20%) which rendered the specimen geometry somewhat uncertain; the observed tensile strongth amounted to 15-16 kg/mm2. Compression tests were made on 10-mm dia and 15-mm high cylindrical specimens with hard-alloy support blocks, which minimized apecimen-support-block compenetration and frictional constraint of the ups . . en ends. Data scatter: 20%. Mean compressive strength

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Some night temperature mechanical properties...

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of 80-90 kg/mm² is lower than that reported in the literature. High-temperature hardness tests on the TsM-332 are compared with simultaneously performed tosts of standard FIW alloys T5K10, T14K8, T15K6, T30K4, and T5K6, the new WCo alloys BK6B (VKAV), BK8B (VKSV), and BK15B (VK15V) with large-grain microstructure (mean WC-phase grain size 3-5 μ), and the BK6M (VK6M) extrafine-grain alloy (WG-phase grain size 1 p) prepared by intensified wet grinding. Data on all of the tests are tabulated and graphed. The Hy of all alloys decreases to 250-400 kg/mm2 at 1000°C. TiC and Co alloys have substantially parallel curves; Hv increases with increasing TiC and Co. In the WCo alloys a similar effect of Co is observed, except for one high-Co alloy, BK15 (VK15). The fine-grain alloy BK6M (VK6M) has a more shallow decrease in H_V up to 600 than the analogous coarsegrain alloy BK6B (VK6V), but at higher temperatures the decrease is so steep that, the H_{er} at 1000° is the same for both alloys. Diamond-pyramid indentations in the TK (TK) and BK(VK) alloys are free of fissuration in the corners; their microbrittleness is significantly smaller than that of TsM-332. In summary: At the highest temperatures tested, the strength and hardness of sintered Al-oxide ceramics was found to be greater than that of sintered metallic hard alloys. This advantage, however, is achieved at the cost of an increased microbrittleness. There are 15 figures, 3 tables, and 11 references (7 Russian-language Soviet, 1 Russian-language translation of the German book on hard alloys by R. Kieffer and P. Schwarzkopf, and 3 German). ASSOCIATION: None given. Card 4/4

\$/736/60/000/002/006/007

AUTHORS: Brokhin, I.S., Ol'khov, I.I., Ashmarin, G.M., Baranoy, A.I.,

Platov, A.B., Repkin, V.P.

TITLE: The high-temperature strength of sintered titanium-carbide hard alloys. SOURCE:

Vsesoyuznyy nauchno-issledovatel skiy institut tverdykh splavov. Sbornik trudov. no. 2. Moscow, 1960. Tverdyye splavy. pp. 135-147.

Following a review of recent Western progress in the manufacture of TEXT: heterogeneous carbide alloys sintered with Co, Ni, Ni-Cr, and other cementing binders, and more especially the Austrian WZ and the U.S. "Kanthanium" alloy (cf. Harwood, //no initials //, Materials and Methods, v.36, no.2, 1952), with reference to the manufacture of gas-turbine blades, the brittleness and thermal-shock sensitivity of such alloys is criticized. The authors experimented with sintered TiG-NbC and TiC-WC alloys cemented with pure Co powder from 1950 through 1953. Short-term and 100-hour strength tests were made at room temperature and temperatures up to 1200°C. For details on the source materials, cf. the paper by I.S. Brokhin and I. I. Ol'khov on p. 148 of this compendium (Abstract S/736/60/000/002/ 007/007); the compound carbides were obtained by the calcining of a mixture of finely-ground powders of the simple carbides at 2000-22000. Test specimens comprise (a) TiC-NbC-Co with 3 to 30% NbC and 10 to 40% Co, and (b) TiC-WC-Co with 15 to 35% WC and 10 to 25% Co. Bending-strength test specimens were

The high-temperature strength..

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prismatic, 5x5x40 and 6x6x50 mm. Tests up to 1000°C were made on a special Silit-resistor-heated accessory (cross-section shown) installed on the P-5 (R-5) universal testing machine. The specimen was supported as a simple beam on hardalloy or sintered aluminum-oxide supports with a 30-mm span and was subjected to a ball-centered load advancing at a rate of 11 mm/min. A PtRh-Pt contact thermocouple measured the temperature; mean results were taken from no less than 15 specimens. The tensile-strength test specimens had the shape proposed by Prof. S. V. Sörensen (Russian transliteration "Serensen"); they were 120 mm long, 7 mm thick, 21.2 mm wide at the ends, and had a 200 inward straight taper for 26.2 mm from the ends and a R=194.5 mm circular fairing between the tapers to arrive at a 40 to 45 mm² neck section at the center. Precise dimensions were obtained by boron-carbide rubbing of the sintered specimens. Only the central 20 mm of each specimen were brought to the test temperature (15-20 min heating, 20-min holding), while the asbestos-padded hinge-clamped ends remained outside the furnace. During the 1200° tests, the upper end did not exceed 800-900°, the lower end 700-800°. Tests in which rupture occurred outside of ±5 mm from the midpoint of the specimen were not included in the evaluatio. A structural cross-section and a general-view photograph of the testing machine, the III-1350 (PI-1350) tubular Pt heater (manufactured by the "Platinopribor" factory), and its installation on the ACT-5000 (DST-5000) creep tester are shown. Room-temperature tension-data scatter was 12-15%, as against 10-12% at high temperature. The bending-data scatter was Card 2/3

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10-12% and 7-10%, respectively. TiC-NbC-Co alloys: 10-15% NbC increases the scale resistance of TiC alloys by some 150-2000C, but engenders some loss in strength. In TiC-NbC-Co alloys a Co content from 10-40% was tested (with 10-15% NbC); maximum strength in bending occurred at 25-30% Co. Tests with a 25% Co content and 3 to 30% NbC contents showed a nearly constant bending strength (-90 kg/mm²) up to 12-13% NbC, followed by a significant drop-off at NbC contents up to 20%. The bending strength of an alloy with 15% NbC and 25% Co (optimal scale resistance) increased steadily from 80 to 90 kg/mm² from 20 to 700° (attributed to plasticity), then dropped to 65 kg/mm² at 1000°. The tensile strength of the same alloy decreases in a straight line from 34 kg/mm² at 950° to 13 kg/mm² at 1200°. 100-hour tests indicate that the alloy retains high-temperature strength only up to 1000°. TiC-WC-Co alloys: The scale resistance of the W-containing alloys is lower than that of the Nbcontaining alloys. Variations in WC content from 15 to 30% and in Co from 10 to 23% do not affect the strength of the TiC-based alloys appreciably. The g-vs.-T curves of the 10%Co and the 25%Co alloys cross over at 800° and 80 kg/mm², and at higher T up to 10000 the 10% Co alloy is stronger than the 25% Co alloy. The tensile strength of the 30% WC, 15% Co, 55% TiC alloy descends linearly from 40 kg/mm2 at 9500 to 12 kg/mm² at 12000. 100-hr tensile tests indicate a high-T strength limit of only 900°. Summary: TiC-WC-Co alloys are stronger (E=38-40·103 kg/mm²) but less high-T resistant (Tmax/100 hr=900°C) than TiC-NbC-Co (E=30.5-31.5 · 103 kg/mm²; Tmax=10000). There are 13 figures and 7 refs. (3 English-language and 4 German) Card 3/3 ASSOCIATION: None given.

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AUTHORS:

Brokhin, I. S., Ol'khov, I. I.

TITLE:

Scale stability of metal ceramic solid alloys based on

titanium carbide

PERIODICAL:

Referativnyy zhurnal. Khimiya, no. 1, 1962, 306,

abstract 1I182 (Sb. tr. Vses. n.-i. in-t tverdykh splavov,

no. 2, 1960, 148-157)

TEXT: A study of the scale-stability of 3 series of experimental metal ceramic solid alloys based on TiC at temperatures up to 1200°C has shown that in the TiC-NbC-Co series the optimum effect is given by an alloy containing 15% NbC and 25% Co, the rest of the alloy being TiC. Its scale-stability is considered to be satisfactory at temperatures up to 1100°C. Among the TiC-WC-Co alloys the best is one containing 30% WC; 15 - 20% Co, the rest being TiC. The scale-stability of this alloy is considered to be satisfactory up to 900°C. [Abstracter's note: Complete translation.]

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AUTHORS:

Brokhin, I. S., Ol'khov, I. I., Ashmarin, G. M., Baranov, A. I., Platov, A. B., and Repkin, V. P.

Heat Resistance of Titanium Carbide Base Cermets TITLE: Tsvetnyye metally, 1960, Nr 4, pp 67-70 (USSR) PERIODICAL:

ABSTRACT: In this paper, the results of an investigation of the refractoriness of Ti-Nb/and Ti-WAbase alloys produced by powder metallurgy methods (carbide solid solutions) with Co as binder are reported. The influence of the NbC, WC and the binding metal on the mechanical properties of TiC alloys has been studied at room temperature and at elevated temperatures in short-term and long-term tests. The experimental alloys were made by methods generally used for the manufacture of titanium carbides. The complex carbides TiC-WC, TiC-NbC and pure powdered cobalt were used as the starting materials. The complex carbides were prepared by water quenching a mixture of fine powders of the respective simple carbides from 2000 to 2200°C. In the TiC-Nb-Co alloys, the NbC

content was varied from 0 to 25% and the Co content from 5 to 40% (remainder TiC), and in the TiC-WC-Co alloys, the WC content was varied from 15 to 35% and the Co

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Heat Resistance of Titanium Carbide-Base Cermets

content from 10 to 25%. The elastic limit in bending was determined for prismatic specimens, $5 \times 5 \times 40$ and 6 x 6 x 50 mm. Bend testing at high temperatures was carried out in a specially constructed device with a silicon carbide heater which was attached to an R-5 universal testing machine. The specimen was placed on supports made of a heat resisting carbide and fractured with a concentrated load; the distance between the supports was 30 mm and the speed of loading was 11 mm/minute. The temperature was measured by a Pt/Pt-Rh thermocouple, the junction of which was in direct contact with the specimen. For the determination of the UTS in tension and the long term refractoriness, flat radiused specimens, as proposed by S. V. Serensen, were used. The main feature of the high temperature testing of these specimens (Fig 1) is the fact that up to a given maximum temperature only the central "working" portion of the specimen is heated; the ends of the specimen which are fixed in grips are outside the hot Card 2/5 zone of the furnace. The temperature of the "cold" ends

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of the specimen does not exceed 800 to 900°C in the case of the upper, and 700 to 800°C in the case of the lower The electric furnaces with a single piece tubular platinum heater, type P.I-1350, enable lengthy tests to be carried out at temperatures of up to 1350°C. furnace is attached to the creep testing maching DST-5000, which has been specially reconstructed for testing cermet specimens and has been re-equipped with electrical gear registration and regulation apparatus (potentiometers). Damping asbestos packing was inserted under the supporting surfaces of the side faces of the specimen adjoining the The temperature was measured with the Pt/Pt-Rh thermocouple passing through an orifice in the solid platinum heater; the junction was placed within 0.5 to 1 mm of the central portion of the specimen. Short term tests to fracture at high temperatures were carried out with the same machines and attachments as the long term (100 hours) tests. Fig 2 shows the UTS in bending of TiC-NbC-Co (10 to 15% NbC) alloys in relation to cobalt content (1 - at 20°C; 2 - at 1000°C). Fig 3 shows the Card 3/5 UTS in bending of TiC-NbC-Co (25% Co) alloys in relation

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to NbC content. Fig 4 shows the change in UTS on straining a TiC-NbC-Co alloy in relation to temperature. Fig 5 shows the UTS in bending of TiC-WC-Co alloys containing 30% WC at 10 and 23% Co, in relation to temperature (1 - 10% Co; 2 - 23% Co). Fig 6 shows the change in UTS in tension of a TiC-WC-Co alloy of the basic composition (65: 35) + 15% Co, in relation to temperature; Fig 7 shows the limiting long-term (100 hours) refractoriness of a TiC-WC-Co alloy of the original composition (1 - 950°C; 2 - 1100°C). For the investigated cermets, the relationship $\sigma_b/\sigma_{bending} \approx 1-2$ (approximately 50%) is characteristic. The specific gravity of the TiC-NbC-Co alloys is 5.9 to 6.2 g/cm² and that of the TiC-WC-Co alloys is 6.5 to 7 g/cm². For the determination of the modulus of elasticity of the experimental alloys, the angle of bend under various loads was measured directly and from that, the value of E was calculated by a well known formula. The specimens were plates 0.3 to 0.5 mm thick, made by compressing and sintering plates of 1 mm thickness and subsequently grinding with boron carbide. The tests were carried out at room temperature in a device made

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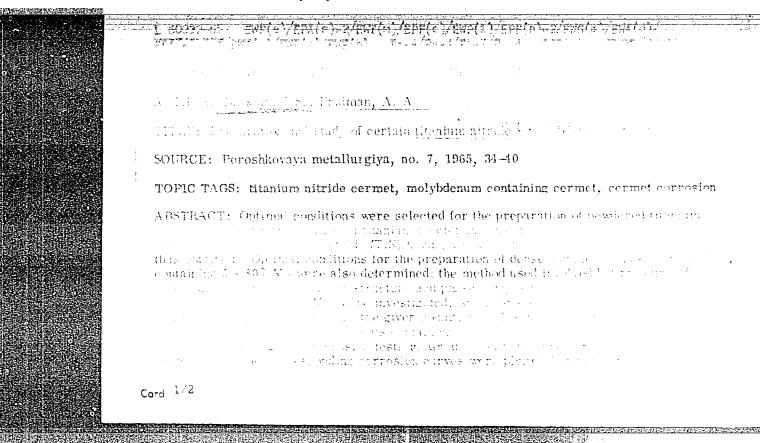
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Heat Resistance of Titanium Carbide-Base Cermets

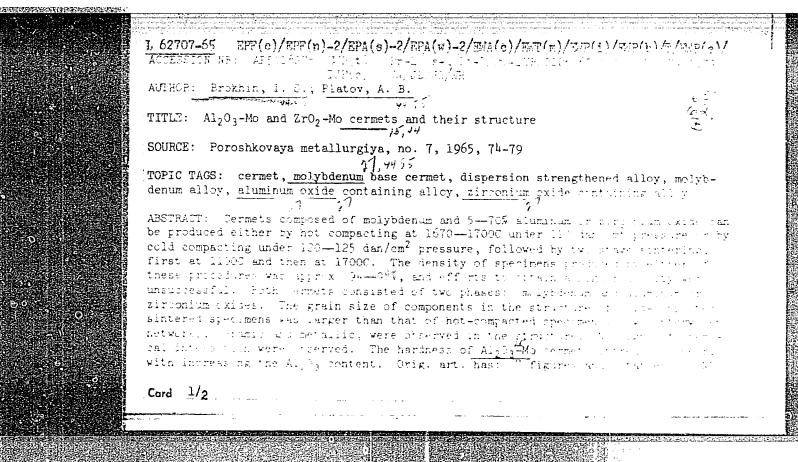
by B. I. Pribilov. The specimens were placed on refractory supports and loaded gradually with loads of 50 to 1000 g. The degree of bending was measured with a micrometer. For TiC-NbC-Co alloys, E was found to be 30 500 to 31 500 kg/mm², and for TiC-WC-Co alloys, 38 000 to 40 000 kg/mm². There are 7 figures and 3 references, 2 of which are Soviet and 1 German.

ASSOCIATION: VNIXTS

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