ALEKSANDROV, P.A., kand.arkhitektury; GROMOVA, N.M., kand.farmatsevticheskikh nauk; KAPITSA, N.K., arkhitektor; SAMSONOV, G.A., arkhitektor; DANOVSKIY, V.F., arkhitektor, nauchnyy red.; OSKLEDETS, Z.M., red. izd-va; GILENSON, P.G., tekhn.red.

[Auxiliary therapeutic departments of general hospitals; manual on the planning of pharmacies, laboratories, and physical therapy departments] Lechebno-vspomogatel'nye otdeleniia bol'nits obshchego tipa; posobie dlia proektirovaniia aptek, laboratorii, fizioterapevticheskikh otdelenii. Moskva, Gos.izd-vo lit-ry po stroit., arkhit. i stroit.materialam, 1960. 122 p. (MIRA 14:2)

(HOSPITALS--CONSTRUCTION)

SAMSONOV, G.A., arkhitektor

In a new hospital. Zdorov'e 6 no.4:22-23 Ap '60. (MIRA 13:8)
(HOSPITALS--FURNITURE, EQUIPMENT, ETC.)

APPROVED FOR RELEASE: 08/22/2000 CIA-RDP86-00513R001447010019-4"

SAMSONOV, G.A., arkhitektor (Moskva)

On types of rural hospitals. Sov. zdrav. 19 no. 8:35-47 '60.
(MIRA 13:10)

(HOSPITALS, RURAL)

SAMSONOV, G.I.

"Stamping parts from sheet metal without and with small waste." V.A.Volosatov. Reviewed by G.I.Samsonov. Avt.trakt.prom. no.9:32-33 S '54. (MLRA 7:10)

1. Moskovskiy avtozavod imeni Stalina.
(Volosatov, V.A.) (Sheet-metal work)

ZVYAGINTSEV, Yu.Ye.; SAMSONOV, G.I., inzh., retsenzent; LIBERMAN, Ye.G., doktor ekon. nauk, red.; SALYANSKIY, A.A., red. izd-va; DEMKINA, N.F., tekhn.red.

[Operational planning in pressworking shops] Operativnoe planirovanie v pressovykh tsekhakh. Moskva, Mashgiz, 1963. 136 p. (MIRA 16:7)

(Machinery industry--Management)
(Sheet-metal work)

BRUK, Ya.S.; SAMSONOV, G.N.; SOKOLOV, A.I.

Sets of equipment with the K-52M narrow-range cutter-loaders. Biul. tekh.-ekon. inform. Gos. nauch.-issl. inst. nauch. i tekh. inform. 17 no.3:13-15 '64. (MIRA 17:9)

SAMSONOV, Georgiy Nikiforovich; EL'KIN, Iosif Lazarevich; MERKULOV, Nikolay Yakovlevich; BOGUTSKIY, Nikolay Vasil'yevich; KAZAKOV, Stanislav Semenovich; IVANOV, Ivan Konstantinovich; ABRAMOV, V.I., inzh., otv. red.

[The K-52M (1K-52M) narrow-cut cutter-loader] Uzkozakhvatnyi kompleks K-52M (1K - 52M). Moskva, Nedra, 1964. 207 p. (MIRA 18:4)

MANZHULA, N.G.; SAVEL'YEV, I.P.; GUDYRIN, Yu.N.; SAMSONOV, G.N.

Testing the IK-52sh cutter-loader with the M-87 support. Ugol' 40 no.2:39-43 F '65. (MIRA 18:4)

1. Shakhtoupravleniye No.1 "Znamya kommunizma" tresta Krasnoluchugol' kombinata Donbassantratsit (for Manzhula). 2. Luganskiy sektor Gosudarstvennogo proyektno-konstruktorskogo i eksperimental'nogo instituta ugol'nogo mashinostroyeniya (for Savel'yev, Gudyrin). 3. Gosudarstvennyy proyektno-konstruktorskiy i eksperimental'nyy institut ugol'nogo mashinostroyeniya (for Samsonov).

CA

Determination of free carbon in boron carbide. V. A. Meerson and G. V. Samsonov (M. I. Kalinin. Inst. Non Ferrous Metals and Gold, Moscow). *Zavodskaya Lab.* 16, 1423-8(1950).—The rate of oxidation of B carbide is const. at const. temp. independently of the grain size, when O or chromate soln. were used. The rate is less than that of graphite oxidation. A soln. of CrO_3 in H_2O is added at 100° to the sample, followed by H_2SO_4, and the resulting gases are swept by a current of dried air through the CuO absorber, followed by the drying train of P_2O_5, followed by NaOH absorbers, $CaCl_2$ tube, and a safety vessel. The absorbers are periodically weighed. The results are plotted and the value of free C is detd. as the difference between the total C oxidized up to the given instant and the product of the time (min.) and the rate of oxidation of C (per min.). Oxidation can be done with O at 900-1000° provided that the sample is well powd. (325 mesh or better). Accuracy of 0.5% is claimed. G. M. Kosolapoff

Preparation of single crystals of boron carbide. I. L.
Zagyanskii, G. V. Samsonov, and N. V. Popova. *Doklady*
Akad. Nauk S.S.S.R. 74, 723-4(1950).—Single crystals of
B_4C, up to 10 mm. long, 0.25-0.5 mm. thick, are obtained
in an elec. furnace from a mixt. of B_2O_3 and lampblack,
under conditions of slow cooling, if B is allowed to diffuse
slowly into the C-rich liquid around the electrode. X-ray
patterns of some of the samples lacked the line with d =
3.30 A., usually attributed to B_4C, but evidently due to an
impurity, probably graphite. Absence of that line can,
consequently, serve as an indication of the purity of B_4C.

N. Thon

SLAVINSKIY, M.P., professor, doktor [deceased]; FILIN, N.A., professor, doktor, retsenzent; SHPICHINETSKIY, kandidat tekhnicheskikh nauk, retsenzent; ROGEL'BERG, I.L., inzhener, retsenzent; SAMSONOV, G.V., tekhnicheskiy redaktor; KAMAYEVA, O.M., redaktor; MIKHAYLOVA, V.V., tekhnicheskiy redaktor

[Physical and chemical properties of elements] Fiziko-khimicheskie svoistva elementov. Moskva, Gos. nauchno-tekhn. izd-vo lit-ry po chernoi i tsvetnoi metallurgii, 1952. 763 p. (MLRA 9:12)
(Chemistry, Metallurgic) (Chemical elements)

SAMSONOV, G. V.

(0) 3

The oxidizability of boron nitride. I. L. Zagyanskii and G. V. Samsonov. J. Appl. Chem. U.S.S.R. 25, 629-30(1952)(Engl. translation); Zhur. Priklad. Khim. 25, 557-8(1952).—BN is actively oxidized in air 800-900°; after 2 hrs. at 1000-1100°, the degree of oxidation to B_2O_3 is 96-97%.

Bernard Rubin

SAMSONOV, G.V.

Grigoriy Valentinovich

USSR/Chemistry - Zirconium Jul 52

"Obtaining Zirconium Carbide in a Vacuum," G. A. Meyerson, G. B. Samsonov, Moscow Inst of Nonferrous Metals and Gold im M. I. Kalinin

Zhur Prik Khim, Vol 25, No 7, pp 744-748

By observing the rate of increase of CO given off in calcining of a mixture of $ZrO2$ and carbon black, it was found that the reaction $ZrO_2 + 3C = ZrC + 2CO$ is additive and is composed of successive reactions in which $Zr2O3$ and ZrO are formed. The practical temp range in which the reaction with formation of ZrC will proceed in a vacuum was established and the

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intermediate reactions were discovered. It is possible to obtain by the vacuum process ZrC which contains no N or O admixtures. A fundamental error was found in the work of Prescott and Hincke (J. Chem. Soc., Vol 49) who suggest equil coexistence of ZrO_2 and ZrC in the same reaction.

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SAMSONOV, G. V.

235T62

USSR/Metallurgy - High-Melting Metals 11 Sep 52

"Microhardness of the Borides and Nitrides of High-Melting Metals," G. V. Samsonov, Moscow Inst of Nonferrous Metals and Gold imeni M. I. Kalinin

"Dok Ak Nauk SSSR" Vol 86, No 2, pp 329-332

Measures microhardness of TiB_2, ZrB_2, VB_2, CbB_2, TaB_2, CrB, WB_2, TiN, ZrN and TaN. Microscopic examn and X-ray analysis showed single-phase structure of all specimens. Tabulates physicochem properties of borides and nitrides. States conclusion that borides are formed by intrusion

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of B atoms into lattices of high-melting metals and by wedging slip planes of these metals. This contradicts assumption accepted in tech literature that borides do not belong to intrusive phases. Includes several micrographs. Submitted by Acad G. G. Uragov 18 Jul 52.

235T62

FILYAND, M.A.; SEMENOVA, Ye.I.; POGODIN, S.A., zasluzhennyy deyatel' nauki i tekhniki, professor, doktor, retsenzent; MEYERSON, G.A., professor, doktor, laureat Stalinskoy premii; SAMSONOV, G.V., redaktor; KAMAYEVA, O.M., redaktor; MIKHAYLOVA, V.V., tekhnicheskiy redaktor.

[Properties of rare elements; handbook] Svoistva redkikh elementov; spravochnik. Moskva, Gos. nauchno-tekhn. izd-vo lit-ry po chernoi i tsvetnoi metallurgii, 1953. 414 p. (MLRA 7:11)
(Chemical elements)

SAMSONOV, G. V.

Physical Chemistry, Physicochemical Analysis (12493)

Izv. Sektora Fiz.-Khim. Analiza Inst. Obshch. i Neorgan. Khimii AN SSSR, Vol. 22, 1953, pp 92-103

Meyerson, G. A.; Samsonov, G. V.

Investigation of Fusibility Diagrams of the System Boron-Carbon and the Nature of the Phases in This System

Studied the above system and determined its physical constants.

SO: Referativnyy Zhurnal -- Khimiya, No. 2, 1954 (W-30907)

SAMSONOV, G. V.

Battelle Technical Review
July 1954
Metals-Metallography,
Transformations, and Structures

16200* Heats of Activation During the Diffusion of Boron Into Tungsten and Molybdenum. (Russian.) G. V. Samsonov, *Doklady Akademii Nauk SSSR*, v. 93, no. 5, Dec. 11, 1953, p. 859-861 + 1 plate.

Specimens were heated in a B bath from 900 to 1300 C. Results reveal some regularity as observed for variation of other physical properties with change in completeness of the electron d-level of a transition metal and strength of retention of electrons by a metalloid. Graph, table, micrograph. 3 ref.

The physical properties of some intrusion phases. G. V. Samsonov (M. I. Kalinin Inst. Nonferrous Metals and Gold, Moscow). *Doklady Akad. Nauk S.S.S.R.* 93, 689-92 (1953).—The phys. properties of intrusion phases, i.e. those formed from the reaction of metalloids, with small at. radii, with metals of the transition series, are related to the ratio $1/Nn$, where N is the principal quantum no. for the unfilled d-shell and n is the no. of electrons in the d shell of the metal atom. The following properties are included: microhardness, sp. resistance, thermal coeff. of resistance, Wiedemann-Frantz ratio, critical temp. (for appearance of superconducting state), m.p., and the $\Delta H_{formation}$ at 0°K.

J. Rovtar Leach

SAMSONOV, G. V.

ZELIKMAN, A.N.; SAMSONOV, G.V.; KREYN, O.Ye.; STEPANOV, I.S., inzhener, retsenzent; TANANAYEV, I.V., retsenzent; POGODIN, S.A., professor, doktor, zasluzhennyy deyatel' nauki i tekhniki, retsenzent; RODE, Ye.Ye., professor, doktor, retsenzent; ABRIKOSOV, N.Kh, doktor khimicheskikh nauk, retsenzent; SHAMRAY, F.I., doktor khimicheskikh nauk, retsenzent; MOROZOV, I.S., kandidat khimicheskikh nauk, retsenzent; BOOM, Ye.A., kandidat khimicheskikh nauk, retsenzent; NIKOLAYEV, N.S., kandidat khimicheskikh nauk, retsenzent; ZVORYKIN, A.Ya, kandidat khimicheskikh nauk, retsenzent; BASHILOVA, N.I., kandidat khimicheskikh nauk, retsenzent; VYSOTSKAYA, V.N., redaktor; KAMAYEVA, O.M., redaktor; ATTOPOVICH, M.K., tekhnicheskiy redaktor

[Metallurgy of rare metals] Metallurgiia redkikh metallov. Moskva, Gos. nauchno-tekhn. izd-vo lit-ry po chernoi i tsvetnoi metallurgii, 1954. 414 p. (MLRA 7:9)

1. Chlen-korrespondent Akademii nauk SSSR (for Tananayev)
(Metals, Rare--Metallurgy)

SAMSONOV, G. V.

7

Properties of the system of borides of titanium and zirconium. G. A. Meerson, G. V. Samsonov, and R. B. Kotel'nikov (M. I. Kalinin Inst. Non-Ferrous Metals and Gold, Moscow). *Izvest. Sektora Fiz.-Khim. Anal., Inst. Obshchei i Neorg. Khim., Akad. Nauk S.S.S.R.* 25, 80-93(1954).—The relation of corrosion, microhardness, and elec. resistance to compn. of the system of borides of Ti and Zr shows that this system is a continuous series of solid solns. Microstructure and x-ray data also show this. B. Mayerle

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SAMSONOV, G.V.

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Vacuum-Thermal Production of Borides of Refractory Metals. G. A. Meerson and G. V. Samsonov (*Zhur. Priklad. Khim.*, 1954, **27**, (10), 1115–1120). [In Russian]. The borides of Ti, Zr, V, Nb, and Ta were prepared by vacuum reduction of the corresponding oxides with B_4C (78·2% B) + soot (99·9% C) in a graphite resistor furnace. The oxides had the following compn. (in %): (1) TiO_2 98·25, Fe_2O_3 0·75, CaO trace; (2) ZrO_2 97·9, CaO 0·43, TiO_2 0·35, Fe_2O_3 0·14, SiO_2 trace; (3) V_2O_5 99·15, Fe_2O_3 0·25, TiO_2 0·03, CaO trace; (4) Nb_2O_5 98·90, Ta_2O_5 0·65, TiO_2, 0·27, Fe_2O_3 0·10; (5) Ta_2O_5 97·35, Nb_2O_5 2·23, SnO_2 0·91, SiO_2 0·73, TiO_2 0·68, Fe_2O_3 0·10. The course of the reaction was followed by measuring the pressure of the CO produced; results are given for TiB_2. At 1400° C. and above, 1 hr. heating was sufficient for the formation of TiB_2, the product contg. 30·5–31·5% B, ~0·02% C. Similar results were obtained for ZrB_2. X-ray analysis gave the following values for the lattice const. (hexagonal structure): TiB_2 $a = 3{\cdot}020$, $c = 3{\cdot}217$ kX, $c/a = 1{\cdot}065$; ZrB_2 $a = 3{\cdot}172$, $c = 3{\cdot}538$ kX, $c/a = 1{\cdot}115$. The mean particle size was 2·2–2·3 μ, with 70–80% between 1·5 and 3 μ; $d = 4{\cdot}44$ and 6·24 for TiB_2 and ZrB_2, resp. The data obtained for the VB_2, NbB_2, and TaB_2 produced were, resp., as follows: B contents, 29·83, 18·95, 10·51%; C contents, 0·09, 0·17, 0·16%; $a =$ 3·000, 3·080, 3·092 kX; $c = 3{\cdot}050$, 3·304, 3·239 kX; $c/a =$ 1·027, 1·073, 1·075; mean particle size 1·86, 1·90, 2·41; $d = 4{\cdot}66$, 6·80, 11·85. Because of the high volatility of WO_3, it was first reduced to WO_2; the boride obtained had a compn. near to W_2B_5, mean particle size 2·4, $d = 11{\cdot}96$, and lattice const. $a = 3{\cdot}00$, $c = 13{\cdot}80$ kX.—G. V. E. T.

USSR/ Chemistry Solubility

Card : 1/1

Authors : Zhdanov, G. S., Meerson, G. A., Zhuravlev, N. N., and Samsonov, G. V.

Title : Solubility of boron and carbon in boron carbide $B_{12}C_3$ (B_4C)

Periodical : Zhur. fiz. khim. 28, Ed. 6, 1076 - 1082, June 1954

Abstract : X-ray investigations were conducted to determine the possibility and solubility limits for B and C in B_4C and to explain the mechanism of the latter with respect to the solubility of components in a covalent chemical compound. The fact that the solution takes place by displacement of C-atoms in 1b positions by B-atoms and consequent formation of B_4C of the $B_{13}C_2$ composition, was established on the basis of roentgenograms. More detailed results are given in graphs. Eleven references: 7 USSR, 2 USA and 2 German. Table, drawing, illustrations.

Institution : The M. I. Kalinin Institute of Non-Ferrous Metals and Gold and the Mechanical Institute, Moscow

Submitted : September 19, 1953

SAMSONOV, G.V.

Category : USSR/Solid State Physics - Phase transformations in solid bodies E-5

Abs Jour : Ref Zhur - Fizika, No 1, 1957, No 1186

Author : Samsonov, G.V., Tseytina, N.Ya.

Title : Concerning the Mechanism of Surface Saturation of Iron and Steel by Boron

Orig Pub : Fiz. metallov i metallovedenie, 1955, 1, No 2, 303-306

Abstract : Based on the investigations of the microstructure and the microhardness of specimens of Armco-iron and of steel No .3, subjected to saturation by Boron from the solid phase at various temperatures (700 -- 1200°) and at various soakings (1 -- 17 hours), the authors believe that in pure iron there is a diffusion reaction of boron with formation of iron boride FeB, causing relatively high micro-hardness of the saturated layer (on the order of 730 -- 790 kg/mm^2), and that in the presence of carbon the reaction consists mostly of diffusion on the boundaries of the grain of the solid solution of complicated carbo borides, causing the high hardness of the saturated layer (on the order of 1400 -- 2100 kg/mm^2).

Card : 1/1

SAMSONOV, G. V.

USSR/Solid State Physics - Structural Crystallography, E-3

Abst Journal: Referat Zhur - Fizika, No 12, 1956, 34654

Author: Samsonov, G. V., Zhuravlev, N. N.

Institution: None

Title: On Aluminum Boride AlB_{12}

Original Periodical: Fiz. metallov i metallovedeniye, 1955, 1, No 3, 564-566

Abstract: AlB_{12} crystals were obtained by aluminum-thermal reduction of boric anhydride in crucibles. The contents of boron in the beads obtained during the melting amounted to 82.5 - 82.8%. Almost all the AlB_{12} crystals were double growths. X-ray structural investigation has shown that AlB_{12} belongs to the tetragonal syngony and has the following periods: a 10.1 ± 0.1; c 14.3 ± 0.4 A and c/a = 1.41, ρ 2.79 ± 0.02, number of atoms per elementary cell approximately 200. The electric resistivity of the pressed powder of AlB_{12} is related to the density as follows: ln ρ = 7.588 γ - 15.03, where ρ is the resistivity (ohms/cm), and γ the density of the pressed briquette. The electric resistivity of the specimens of AlB_{12} in compact state, prepared by hot pressing, amounts to approximately 10^3 ohms/cm, the thermal coefficient of electric resistivity is 0.4%/deg. The micro-hardness of AlB_{12} is close to the micro-hardness of B.

Various physicochemical properties of alloys of titanium boride and nitride. G. V. Samsonov and R. V. Petrash. *Metalloved. i Obrabotka Metal.* 1955, No. 4, 19-24(1955) [Brutcner Translation No. 3375] —The TiB_2 was produced by the vacuum-thermal method, and TiN by nitriding Ti ... in a charge of TiO_2 + 2C ... Powd. TiB_2 and TiN were mixed ... [illegible] sintered. The porosity was only 1 to 2%. The melting temp., detd. by optical pyrometer, fell from 2930° at 0 mole % TiN to 2870° at 40, rose to 3100° at 80, and dropped off to 2980° at pure TiN. These variations may have been within the exptl. error. Microexamn. showed that the alloys were 2-phase before annealing, but those contg. 3 to 8 mole % TiB_2 became single phase after annealing. The microhardness of each of the 2 phases was almost independent of compn. X-ray data showed little variation of lattice parameter with compn. but indicated mutual terminal soly. The coeff. of linear expansion was almost const. Elec. resistivity increased to a max. at 90 mole % TiN, supporting the idea of limited soly. of TiB_2 in TiN. Tests of oxidation resistance at 700 to 1000° showed that the 40 mole % TiN compn. was most resistant. The soly. of TiB_2 in TiN was judged to be 8 mole %; that of TiN in TiB_2 was slight.

A. G. Guy

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SAMSONOV, G. V.

USSR

2337. A method of producing boron nitride.—G. A. Meerson, G. V. Samsonov, and N. Ya. Tselпina (*Ogneupory*, 20, 72, 1955). Methods of producing BN are summarized; the best method is considered to be treatment of a batch of B_2O_3+CaO+NH_4Cl with NH_3 at 1,100°–1,200° C. The batch is made by sintering together B_2O_3 and CaO obtained by heating H_3BO_3 with chalk, the decomposition of the hydrate and the carbonate resulting in a fine distribution of B_2O_3 between the CaO particles and partial formation of Ca borate. It is claimed that this method results in a 92–93% yield of BN. It is stated that BN cannot be sintered into dense specimens by hot-pressing under normal conditions, since at high temperatures BN dissociates and takes up carbon. (2 figs., 7 tables.)

SAMSONOV, G. V.

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Vacuum-thermal production of borides of refractory metals, and investigation of several boride systems. G. A. Meerson, G. V. Samsonov, R. B. Kotel'nikov, and N. Ya. Tseitlin. *Sbornik Nauch. Trudov Moskov. Inst. Tsvetnykh Metal. i Zolota* 1955, No. 25, 210-25; *Referat. Zhur., Met.* 1956, Abstr. No. 9158.—The conditions of production of borides of Ti, Zr, V, Nb, Ta, and W, and the binary systems of certain borides were studied. Briquets of metal oxide, B_4C, and C black were charged into a vacuum elec.-resisting furnace. The optimal conditions of boride production were found from tensiometric data. X-ray analysis of the powders of borides Ti, Zr, V, Nb, and Ta showed lattice consts. agreeing with those in the literature. The ds. of the borides detd. by micropycnometer agreed with the calcd. ds. W boride, on account of volatility of W oxides, was obtained at much lower temp. with the excess of WO_3: it has the approx. compn. W_2B_5 with the lattice consts. $a = 3.00$ A. and $c = 13.80$ A. and d. 12.96. Alloys of systems TiB_2-ZrB_2, TaB_2-ZrB_2, and TiB_2-NbB_2 were prepd. by hot-pressing with subsequent annealing; all were monophasic, and their lattice consts. were linearly proportional to their compns. The alloys were comparatively corrosion-resistant, this resistance changing gradually with the compn. The microhardness graph of the system changes continuously. The diagram of compn. vs. elec. cond. is a continuous curve, with convex upward. This indicates that the borides B form a continuous series of solid solns. A. N. Pestoff

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Samsonov G.V.

Reduction of titanium dioxide with carbon through the intermediate steps of lower oxide formation. G. V. Samsonov (M. I. Kalinin Inst. Non-Ferrous Metals, Gold, Moscow). *Zhur. Priklad. Khim.* 28, 1018-21(1955); cf. Meerson, *et al.*, *C.A.* 40, 3575[8].—The heat content ΔH of Ti oxides formed in the reduction of TiO_2 by the reaction $M_xO_y + zC = M_xO_{y-z} + zCO$ was calcd. by $\log K_p = \log P_{CO} = (T\Delta S - \Delta H)/4.574T$. It is assumed that the equil. temp. of each step of the reaction is that which corresponds to the break in the curve P_{CO} *vs.* time. The calcd. ΔH of Ti_3O_5 and TiO (−35).16 and 139.37 kcal./mol, at 880-1153 and 900-1233°, resp.) are so close to the known exptl. values that it is plausible to assume that these oxides are intermediate steps in the reduction of TiO_2. On the other hand, the calcd. values of ΔH of TiC (−27.63 kcal./mol. at 1150-1423°) is low; this is attributed to the formation of solid solns. of TiC in TiO during the initial stages of the 3rd step of the reaction. Similar calcns. can be made for the reduction of ZrO_2 (*C.A.* 48, 9854*g*). From the reaction $2TiO_2 + B_4C + 3C = 2TiB_2 + 4CO$ (*C.A.* 49, 6757*c*) ΔH of TiB_2 ~70 kcal./mole at 1120-1393°. Apparently B of B_4C enters the reaction only after all of the C is exhausted. J. Bencowitz

Samsonov, G. V.

Investigation of the laws of formation of isomorphous boride alloys. G. V. Samsonov and V. S. Neshpor (M. I. Kalinin Inst. Non-Ferrous Metals and Gold, Moscow). *Zhur. Fiz. Khim.* 29, 839-45(1955).—The time required for the homogenization of alloys of the Ti and Nb borides was investigated by keeping their powd. mixts. at 1400-1800° for 30 min. to 32 hrs., followed by an x-ray examn. of the samples. The activation energy was found by calcn. to equal 20,800 cal./mole, or almost 1/2 as much as was previously found in the mutual diffusion in the TiB_2-ZrB_2 system (42,000 cal./mole), indicating that the principal role in the diffusion processes of isomorphous boride solid solns. is due to the metal atoms. The B atoms are concluded also to migrate during the mutual borides diffusion, contrary to the conclusions of Glaser and Ivanik (*Powder Met. Bull.* 6, 126(1953)). A uniform solid soln. and a continuous change in hardness in the TiB_2-NbB_2 system was found in metallographic and microhardness analysis, and the crystal growth during the sintering of the alloys was found to be a function of the bond strength in the cryst. alloy lattice, the cryst. [illegible] and the crystal size [illegible] of the TiB_2-[illegible] system forms a [illegible] curve with a min. as usual [illegible] dispersing [illegible]

A. M. [illegible]

IFH

SAMSONOV, G.V.

USSR/Chemistry - Metallurgy

Card 1/1 Pub. 22 - 30/51

Authors : Samsonov, G. V., and Neshpor, V. S.

Title : Mutual diffusion of titanium and niobium borides

Periodical : Dok. AN SSSR 101/5, 899-900, Apr 11, 1955

Abstract : Investigation was conducted to determine the diffusion process in a TiB_2-NbB_2 system. Results showed that the reaction of the titanium and niobium borides at high temperatures leads to the formation of a monophase solid solution of both components. NbB_2 was found to be the solvent and this is explained by the greater bond energy existing between the metallic atoms and the metal atoms and the B in the lattice of TiB_2 than in the NbB_2 lattice. The Ti atom was considered to possess a greater electron d-level defect than the Nb atom. Six references: 4 USSR, 1 German and 1 USA (1949-1954). Graph.

Institution : The M. I. Kalinin Inst. of Non-Ferrous Metals and Gold, Moscow

Presented by: Academician A. N. Frumkin, October 22, 1954

SAMSANOV, G. V.

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The compressibility of powdered borides, carbides, and nitrides of refractory metals. G. V. Samsonov and V. S. Neshpor (M. I. Kalinin Inst. Non-Ferrous Metals and Gold, Moscow). *Doklady Akad. Nauk S.S.S.R.* 104, 405-8(1955).—WC, TiC, ZrC, TiB_2, ZrB_2, TiN, and ZrN were pulverized to a particle size of 2.0-2.5μ av., with a high degree of particle-size uniformity. Compression did not appreciably reduce the particle size. Compression was varied between 100 and 1700 kg./sq.cm. The apparent cond. of the compressed samples can be satisfactorily expressed by $x = k \exp(-A/\theta)$, where A and k are consts. and $\theta = \gamma/d$, where γ is the apparent sp. gr. of the briquet and d is the sp.gr. of the powd. material. A is called the brittleness factor of the material and is unrelated to the material hardness (e.g., TiB_2 is less brittle than WC, although harder than the latter). W. M. Sternberg

Samsonov, G.V.

Chemical compounds of boron with silicon. G. V. Samsonov and V. P. Latysheva (M. I. Kalinin Non-ferrous Metal and Gold Inst., Moscow). *Doklady Akad. Nauk S.S.S.R.* 105, 499(1955).—Hot pressing of mixed powd. Si and B at 1650–1800° and thermite reduction with Mg of mixts. of quartz with B_2O_3 gave the same product, B_4Si regardless of initial proportion. The product has d 2.41–2.49, hardness 5350 kg./sq. mm. X-ray analysis gave tetragonal lattice with $Z = 1$, a 2.829, c 4.765 A.

G. M. Kosolapoff

PAZUKHIN, Vasiliy Aleksandrovich; FISHER, Aleksandr Yakovlevich; KRESTOVNIKOV, A.N., professor, doktor, retsenzent; MEYERSON, G.A., professor, doktor, retsenzent; ZHUKOVSKIY, Ye.I., professor, doktor, retsenzent; MEN'SHIKOV, M.I., kandidat tekhnicheskikh nauk, retsenzent; SAMSONOV, G.V., kandidat tekhnicheskikh nauk, retsenzent; MESHCHERYAKOV, S.I., kandidat tekhnicheskikh nauk, retsenzent; SAMSONOV, G.V., redaktor; ARKHANGEL'SKAYA, M.S., redaktor izdatel'stva; BERLOV, A.P., tekhnicheskiy redaktor

[Vacuum in metallurgy] Vakuum v metallurgii. Moskva, Gos. nauchno-tekhn. izd-vo lit-ry po chernoi i tsvetnoi metallurgii, 1956. 520 p.
(Vacuum) (Metallurgy) (MLRA 9:12)

SAMSONOV, G. V.

Samsonov, G. V.

"Some physicochemical propertied of compounds of the transition metals with boron, carbon, nitrogen and silicon." Min Higher Education USSR. Moscow Inst of Nonferrous Metals and Gold imeni M. I. Kalinin. Chair of Metallurgy of Rare Metals. Moscow, 1956. (Dissertation for the Degree of Doctor in Technical Sciences).

So: Knizhnaya letopis'
No. 25, 1956. Moscow

SAMSONOV, G. V.

Category : USSR/Solid State Physics - Systems E-4

Abs Jour : Ref Zhur - Fizika, No 1, 1957, No 1158

Author : Samsonov, G.V., Neshpor, V.S., Lange, L.V.
Inst : Moscow Institute for Nonferrous Metals and Gold
Title : Laws of Formation of Binary Alloys of Titanium

Orig Pub : Metallovedeniye i obrabotka metallov, 1956, No 1, 30-39

Abstract : When Ti interacts with metals that have a similar electron shell structure and a small difference in atomic diameters (not more than 18%), the additive (Zr) may have an unlimited solubility in the α and β modification of Ti, or else continuous series of solid solutions are formed with β titanium with a limited solubility in α Ti (Mo, V, Nb, Ta). Elements having a different electron-shell character and a different atomic diameter interact with titanium to form solid solutions with a limited solubility in the β and α titanium and with diagrams of state with eutectic or eutectoid transformations (Mn, Fe, Cr, Si, Ni, Cu) or with peritectic or peritectoid transformations (C, N, Al). When Ti is smelted with elements of the transition groups, one observes an expansion in the region of the solid solutions with α-Ti.

Card : 1/1

SAMSONOV, G. V.

5

Review of the Binary Systems of Titanium and Suggestions for Their Classification. G. V. Samsonov, V. S. Neshpor, and L. V. Lange (*Metallovedenie i Obrabotka Metallov*, 1956, (1), 51–59).—[In Russian]. Reviews the equilibrium diagrams published for binary systems of Ti with Cu, Ag, Au, Be, Mg, B, Al, C, Si, Ge, Sn, Pb, Zr, N, P, V, Nb, Ta, O, S, Se, Te, Cr, Mo, W, U, H, Mn, Fe, Co, and Ni, and the suggestions that have been made for classifying them. 32 ref.

—G. V. E. T.

3

SAMSONOV, G. V.

Tantalum and niobium in chemical industry. G. V. Samsonov and V. I. Konstantinov. *Khim. Nauka i Prom.*

2

SAMSONOV, G.V.

USSR/Inorganic Chemistry - Complex Compounds. C.

Abs Jour : Ref Zhur - Khimiya, No 9, 1957, 30277

Author : Samsonov, G.V., Zorina, O.N.

Inst :

Title : Preparation and Some Properties of Thorium Hexaboride

Orig Pub : Zh. neorgan. khimii, 1956, 1, No 10, 2260-2263

Abst : Borides of Th were obtained by the method of vacuum-thermal reduction of Th oxide with carbon of boron carbide and carbon black, according to the reaction $2ThO_2 + 3B_4C + C \rightarrow 2ThB_6(I) + 4CO$. At 1300-1400° the process takes place very slowly while at 1800° it comes to completion within 35-45 minutes. If the reaction is conducted in such a manner as to obtain ThB_4, that is according to the scheme $ThO_2 + B_4C + C \rightarrow ThB_4 + 2CO$, there is formed at 1250-1300° a product of composition $Th_xB_yC_z$ (II). Density of II is 7.552. II has a teragonal

Card 1/2

USSR/Inorganic Chemistry - Complex Compounds. C.

Abs Jour : Ref Zhur - Khimiya, No 9, 1957, 30277

lattice, a 5.80, c 3.80 A. Powdered II sinters at 2230° to a compact state; melting point of II is about 2400° while the melting point of ThB_6 is about 2150°. Microhardness of I is 1740 ± 123 kg/mm², electric resistance 37 . 10^{-6} ohm cm, coefficient of thermal e.m.f., when coupled with Cu, is 2.5 mv/degree in the interval 20 - 60°, work function on thermoemission 2.86 eV, coefficient of radiation 0.69 - 0.70.

Card 2/2

SAMSONOV, G.V.

USSR/Crystals. B-5

Abs Jour : Referat Zhur - Khimiya, No 6, 1957, 18248

Author : G.V. Samsonov, N.N. Zuravlev, I.G. Amnuel'.

Title : Concerning the Question of Physico-Chemical Properties of Boron-Carbon Alloys.

Orig Pub : Fiz. metallov i metallovedeniya, 1956, 3, No 2, 309-313

Abstract : An x-ray and microscopical study, as well as the measurement of the electrical specific resistance and of the density of B and C alloys within the limits of C content from 5 to 72.5% by weight were carried out. It was found that at $\geqslant$ 5% of C, an imperfect structure of the carbide $B_{13}C_2$ developed, which structure was characterized by vacant places on the c axis in the $B_{13}C_2$ lattice. The vacant places were occupied by C atoms at 14 to 16% of C making the line -C-B-C-, which transformed later into the line -C-C-C- of boron carbide $B_{12}C_3$ ($= B_4C$). Alloys with the imperfect $B_{13}C_2$ lattice possess the electron

Card 1/2

Card 2/2

SAMSONOV, G. V.

5

1-4E2c

4

*Powder-Metallurgical Hard Met[als] with a Non-Uniform Distribution of the Carbide Phase for the Manufacture of Abrasive Materials. G. A. Meerson and G. V. Samsonov. Izvest. Akad. Nauk S.S.S.R., 1956, [Tekhn.] (4), 121–125.—[In Russian]. The conditions of prepn. of these materials [illegible]. In grinding the abrasive material, projections [illegible] wear resistance are formed on the surface of the [illegible] back in the matrix the [illegible] wear resistant, [illegible] brittle, parts richer in Co. This type of structure is [illegible] much higher abrasion-resistance than homogenous hard metals.—N. E. B.

PM RG
MT
JHP

SAMSANOV, G. V.

10459* New Refractory Materials for Smelting and Casting of High-Melting Metals. Novye ogneupornye materialy dlia plavki i lit'ia tugoplavkikh metallov. (Russian.) G. V. Samsonov. *Ogneupory*, v. 21, no. 3, 1956, p. 122-135.

A survey of various refractory materials for prospective use in smelting of high-melting metals. Quotes a large bibliography of mostly foreign sources on the subject. Tables. 53 ref

SAMSONOV, G. V.

Chemistry of borides. G. V. Samsonov and L. Ya. Markovskii. *Uspekhi Khim.* 25, 190-241(1956).—A review with 233 references through 1954. G. M. K.

CH

(2)

SAMSONOV, G. V., and CHISTYAKOV, Yu. D.

"Metal-Reduction ('Metallothermic') Methods in Chemistry and Technology," by G. V. Samsonov and Yu. D. Chistyakov, Uspekhi Khimii, Vol 25, No 10, Oct 56, pp 1223-1248

Work on the reduction of metals and some nonmetals (Si) with metals is reviewed. Reference is made to the use of metal hydrides as reducing agents in processes of this type. The physicochemical aspects of the processes involved are discussed in detail. The heats of formation of some oxides and halides (including $CdCl_2$, $ZrCl_4$, UCL_4, $RaCl_2$, LiCl, CeF_3, LaF_3, and LiF) are listed. The free energies of formation of halides including CeF_3, ThF_4, Zr F_4, Ce Cl_3, Th Cl_4, and Zr Cl_4 are given. Practically applied reduction processes are listed under the subdivisions of processes conducted in vacuum, processes carried out under atmospheric pressure, and processes conducted in an atmosphere of inert gases or reducing gases. The authors say that methods of this type are extensively used at present for the production of pure metals, primarily Ba, Cr, Mn, and some light and rare metals (e.g.. Li, Be, Ti, Zr, and Va).

"While in the metal-reduction processes described above the oxide of the metal being reduced functions as the oxidant, oxidants in pyrotechnics are selected on the following basis: (a) the oxidant must contain the maximum quantity of oxygen and furnish it readily during the combustion of the mixture, and (b) the oxidant must represent a relatively stable, nonhygroscopic compound, at least in the temperature range minus 60° — plus 60°."

The subject matter of the article is based to a considerable extent on data taken from USSR publications: out of 45 references in the bibliography, 26 are USSR.

[Comment: Some of the information given in this article has a bearing on the production of materials that are of importance in nuclear technology (e.g., U, Th, Li, Cd, Be, Zr). The discussion of the properties of metal fuels used in pyrotechnics is of importance from the standpoint of the potential use of such fuels as propellants in reaction motors.]

Sum 1274

The following processes are described, among others: production of lithium by the reduction of lithium oxide or of spodumene in vacuum with Al, Si, or Mg; production of Be by reduction of BeF_2 in vacuum with Ca or Mg; production of Ti, Zr, Ta, and other metals by the reduction of their halides with Mg or Na; and production of Zr, Ti, and Ta by the reduction of their complex fluorides. The use of oxidizing agents to raise the temperature during the process is mentioned and the properties of some oxidizing agents including $Ba(NO_3)_2$, $Sr(NO_3)_2$, KNO_3, $NaNo_3$, $KClO_3$, $Ba(ClO_3)_2$, $KClO_4$, BaO_2, Na_2O_2, $CaSO_4$, and Na_2SO_4 are discussed from this standpoint. In conclusion the application of metal-reduction processes in pyrotechnics, specifically in military pyrotechnics, is discussed on the basis of information given in two USSR handbooks on the subject.

The section on pyrotechnics includes the following passage:

"Among metals which can be potentially applied as metal fuels one may mention Be, Al, B, Li, Mg, Ca, Si, Ti, V, Zr, and their alloys. The highest temperatures during combustion must be developed by Zr, Al, Ca, and Mg. At present, no metals except Mg, Al, and their alloys are applied for this purpose, although some metals which are extensively used in contemporary metallurgy would be suitable for this application either in the pure state or in the form of their alloys.

"To obtain the maximum effect from a metal entering into the composition of a pyrotechnic mixture, the oxidant must be appropriately selected.

SAMSONOV, G.V.

USSR/ Physical Chemistry - Thermodynamics. Thermochemistry. Equilibrium. Physicochemical analysis. Phase transitions B-8

Abs Jour : Referat Zhur - Khimiya, No 4, 1957, 11177

Author : Samsonov G.V.
Inst : Institute of General and Inorganic Chemistry, Academy of Sciences USSR
Title : Some Physicochemical Properties of Compounds of High-Melting Transition Metals with Boron, Carbon and Nitrogen and Particularly of Their Binary Alloys

Orig Pub : Izv. sektora fiz. -khim. analiza IONKh AN SSSR, 1956, 27, 97-125

Abstract : Review of work concerned with interaction of high-melting transition metals of groups Iv, V and Vi of the Periodic System, with boron, carbon and nitrogen. An attempt is made to interprete some properties of the compounds thus formed in the light of modern concepts of the theory of structure and chemical bonds. Biblography 47 references.

Card 1/1

SAMSONOV, G. V.

Category: USSR / Physical Chemistry - Crystals B-5

Abs Jour: Referat Zhur-Khimiya, No 9, 1957, 29770

Author : Samsonov G. V.
Inst : not given
Title : Electric Conductivity of Some Compounds of Transition Metals with Boron, Carbon and Nitrogen, and Their Alloys

Orig Pub: Zh. tekhn. fiziki, 1956, 26, No 4, 716-722

Abstract: Determination of electric resistance (ρ) of carbides, borides and nitrides of a number of transition metals (Ti, Zr, Nb, Ta, V, Hf, Mo, W, La, Ce) -- compounds of the type of implantation phases saturated with metalloid. The ρ of carbides is higher than ρ of the corresponding metals. This is an indication of the fact that formation of carbides results in an increase of the unfilled state of d-band and, correspondingly, of probability of scattering of carriers. In borides of Ti, V, Zr, Hf, Ce, La, ρ is lower than, and in borides of Cr, Nb, Mo, Ta, W, it is higher than the ρ of the corresponding metal. Borides of 2-nd group are, apparently, similar to carbides

Card : 1/2 -48-

S[redacted]msonov G.V.

USSR/Thermodynamics - Thermochemistry. Equilibria. Physical-Chemical Analysis. Phase Transitions. B-8

Abs Jour : Referat Zhur - Khimiya, No 6, 1957, 18498

Author : G.V. Samsonov, N.S. Rozinova.

Inst : Institute of Organic and Inorganic Chemistry of Academy of Sciences of USSR.

Title : Some Physical-Chemical Properties of Zirconium and Carbon Alloys.

Orig Pub : Izv. Sektora fiz.-khim. analiza IONKh AN SSSR, 1956, 27, 126-132

Abstract : It was established on the basis of roentgenographic and metallographic research and the study of the microhardness and electric conductivity of Zr and C alloys that the alloys containing 0.64 to 3.12% of C by weight were two-phase alloys. The basic (hexagonal) phase is a solid solution of C in Zr, and the second (cubic) phase is a Zr carbide. Alloys containing 3.50 to 11.62% of C by

Card 1/2

loys decreases from 3.16 A of pure Zr to 3.06 A at 0.88% of C by weight, after which it rises from 4.582 A at 3.50% of C by weight to 4.683 A at 11.62% of C by weight.

Card 2/2

Some of the properties of the hexaborides of the alkaline earth and of the rare-earth metals. G. V. Samsonov and A. E. Grodshtein (M. I. Kalinin Inst. Non-Ferrous Metals and Gold, Moscow). *Zhur. Fiz. Khim.* 30, 379-81(1956).— The hexaborides of Ca, Ba, La, and Ce were prepd. by the thermal-vacuum method (*C.A.* 47, 6757c) and the following properties were detd.: Lattice period (4.148 ± 0.002, 4.28 ± 0.01, 4.15 ± 0.01, 4.14 ± 0.01 A.); d. (2.49 ± 0.02, 4.25 ± 0.02, 4.72 ± 0.02, 4.81 ± 0.02 g./cc.); microhardness (2740 ± 220, 3000 ± 290, 2770 ± 160, 3140 ± 190 kg./sq. mm.); coeff. of linear expansion (5.2 × 10^{-6} ± 6%, 6.1 × 10^{-6} ± 6%, 4.9 × 10^{-6} ± 6%, 6.2 × 10^{-6} ± 6% %/degree); specific elec. resistance (123.5, 306, 17.4, 60.5 microhm cm.). The heat of formation of CeB_6 was found to be 81 ± 16 kcal./mole. The properties are related to the electron structure of the hexaborides.

J. Rovtar Leach

Some rules and the mechanism for the oxidation of high-melting titanium compounds. G. V. Samsonov and N. [illegible] Golubeva. (M. I. Kalinin Inst. Non-ferrous Metals and Gold, Moscow). Zhur. Fiz. Khim. 30, 1258-60(1956).

The oxidation isotherms were obtained for TiB_2, TiC, and TiN. The isotherms for densely packed samples of TiC and TiN are characterized by 2 segments; the 1st is curved and the 2nd is a straight line. The isotherm for TiB_2 obeys the parabolic rule. The oxide films that were formed were studied chemically, by x-ray analysis, and by electron diffraction. Their elec. resistivity was also measured. These data indicate that the mechanism of the oxidation for TiN and TiC (for the curved portion of the isotherm) is the formation of a solid soln. of TiN-TiO or TiC-TiO followed by (straight-line portion) sepn. into a loose layer of the higher oxides of Ti. For TiB_2 the oxidation is brought about by diffusion of O through a layer of borates that is formed on the surface of the sample. — I. Rovtar Leach

Samsonov, G. V.

Heats of formation of borides of some transition metals. G. V. Samsonov, M. L. Kalinin (Inst. Non-Ferrous Metals and Gold, Moscow). *Zhur. Fiz. Khim.* 30 [illegible]

[illegible] an investigation of the interaction [illegible] borides with N and C. The heats of formation of the metal-like borides, carbides, and nitrides are [illegible] by the electron concn. [illegible]

APPROVED FOR RELEASE: 08/22/2000 CIA-RDP86-00513R001447010019-4"

SAMSONOV, G. V.

Category: USSR / Physical Chemistry - Crystals B-5

Abs Jour: Referat Zhur-Khimiya, No 9, 1957, 29711

Author : Samsonov G. V., Latysheva V. P.
Inst : Academy of Sciences USSR
Title : Diffusion of Boron, Carbon and Nitrogen Into Transition Metals of Groups IV, V AND VI of the Periodic System

Orig Pub: Dokl. AN SSSR, 1956, 109, No 3, 582-585

Abstract: Reaction diffusion of B and C into Ti, Zr, Nb, Ta, Mo and W is utilized to elucidate the effect of vacant d-electron sites of metals and of ionization potential of B and C on the diffusion constants D and Q. Reaction diffusion results in the formation of the compounds TiC, ZrC, Ta_2C, Nb C, W_2C, Mo C, TiB_2, TaB_2, NbB_2, Mo_2B and W_2B. Values of Q on diffusion of B, C and N (from another paper) into transition metals of groups IV, V AND VI, reveal the following regularities: 1) in the same group of the periodic system Q increases with atomic number of the metal; for the given metal, Q increases in the series B, C, N. Low values of Q in the case of B are attributed to the low ioni-

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B-5

Category: USSR / Physical Chemistry - Crystals

Abs Jour: Referat Zhur-Khimiya, No 9, 1957, 29711

zation potential of B; 3) on transition from metals of groups IV and V to those of group VI, Q increases slightly in the case of B and sharply in the case of C. This is interpreted on the basis of the theory of Pauling (Pauling L., Phys. Rev., 1938, 54, 899). Differences in values of Q on diffusion of B into metals of groups IV, V AND VI, level off in comparison with C; the authors attribute this to decreasing effect ofdeficiency of d-sublevel as a result of the formation of structure elements from atoms of B (chains, layers and framework, connected by covalent bonds).

Card : 2/2

4/2

Distr: 4E4j/4E2d

SAMSONOV, Georgiy Valentinovich; PLOTKIN, Semen Yakovlevich; OL'KHOV, I.I., redaktor; GOLYATKINA, A.G., redaktor izdatel'stva; EVENSON, I.M., tekhnicheskiy redaktor

[Production of iron powder] Proizvodstvo zheleznogo poroshka. Moskva, Gos.nauchno-tekhn.izd-vo lit-ry po chernoi i tsvetnoi metallurgii, 1957. 348 p. (MLRA 10:7)
(Powder metallurgy)

(Probably Grigoriy Valentinovich, although Library of Congress has confirmed the author's name as above.)

x

SAMSONOV, Grigoriy Valentinovich; UMANSKIY, Yakov Semenovich; RASTORGUYEV, L.N., redaktor; KAMAYEVA, O.M., redaktor izdatel'stva; ORMONT, B.F., professor-doktor, retsenzent; TRET'YAKOV, V.I., kandidat tekhnicheskikh nauk, retsenzent; MIKHAYLOVA, V.V., tekhnicheskiy redaktor.

[Hard compounds of metals with high melting-point] Tverdye soedineniia tugoplavkikh metallov. Moskva, Gos. nauchno-tekhn. izd-vo lit-ry po chernoi i tsvetnoi metallurgii, 1957. 388 p.
(MIRA 10:6)

(Heat-resistant alloys)

Samsonov G.V.

LAKERNIK, Mark Moiseyevich; SEVRYUKOV, Nikolay Nikolayevich; BELYAYEV, A.I., prof., dokt.; retsenzent; VELLER, R.L., kand.tekhn.nauk; retsenzent; VANYUKOV, A.V., retsenzent; KROL', L.Ya., retsenzent; SAMSONOV, G.V., retsenzent; LEONIDOV, N.K., inzh., retsenzent; ZHEMCHUZHINA, Ye.A., red.; EL'KINA, L.M., red.izdatel'stva; MIKHAYLOVA, V.V., tekhn.red.

[Metallurgy of nonferrous metals] Metallurgiia tsvetnykh metallov. Moskva, Gos.nauchno-tekhn.izd-vo lit-ry po chernoi i tsvetnoi metallurgii, 1957. 535 p. (MIRA 11:1)

(Nonferrous metals--Metallurgy)

SAMSONOV, G.V.

5

Electric conductivity of some compounds of the transition metals with boron, carbon and nitrogen and their melts. 4E4j-1
V. Samsonov. Soviet Phys. Tech. Phys. 1 695-701
1957. English translation ... 50 ... B. M. R. 4E3d-1

MT

Author :

Inst : Institute of Metal Ceramic and Special Alloys, Academy of Sciences, Ukrainian, SSR.

Title : Microhardness and Tantanlum Carbide in the Region Where they are Homogeneous

Orig Pub : Dopovidi AN URSR, 1957, No 3, 247-250

Abstract : Experimental data are given on the measurement of the microhardness and the electric resistivity of alloys in the system Ta-C in the region where the carbides Ta_2C and TaC are homogeneous. It is porposed to treat the results on the basis of the electron structure of the atoms Ta and C.

Card 1/1

SAMSONOV, G.V.

... [illegible] of borides, carbides, nitrides and silicides of transition metals ... [illegible] 2

Seshpur ... [illegible] ... 51, 158.

translation ... See ... [illegible]

SAMSONOV, G.V.

122-3-6/30

AUTHOR: Samsonov, G.V., Candidate of Technical Sciences, Dotsent.

TITLE: Components made of Boron Carbide (Izdeliya iz karbida bora)

PERIODICAL: Vestnik Mashinostroyeniya, 1957, No.3, pp. 24 - 28 (USSR)

ABSTRACT: The properties of born carbide compared with other hard materials are stated in a numerical table. The preparation of components of boron carbide by hot sintering under pressure is discussed and described with the help of drawings and numerical data, taken mainly from foreign periodicals and patent literature. Some applications are discussed; original applications are mainly those for diamondless dressing of grinding wheels. Tests carried out at the First National Ball Bearing Factory (1GPZ imeni L.M. Kaganovicha) with the internal grinding of holes showed that a dressing pencil of boron carbide of 18 mm diameter and a height 23 mm stood up under shop conditions to 168 hours of service, and so ensured hole tolerances of between 8 and 10 microns. The ratio of volumes removed from the grinding wheel and the dressing pencil varies between 800 and 8 000 for boron carbide whilst for carborundum it varies between 200 and 60. There are 4 figures, including 1 photograph, 4 tables and 32 references, of which 9 are Slavic.

Card1/1

AVAILABLE: Library of Congress.

SAMSONOV, G. V.

21-5-13/26

AUTHORS: Neshpor, V.S. and Samsonov, G.V. (H.V.)

TITLE: New Borides of Rare-Earth Elements (Novyye boridy redkozemel'nykh elementov)

PERIODICAL: Dopovidi Akademii Nauk Ukrains'koi RSR, 1957, Nr 5, pp. 478-479 (USSR)

ABSTRACT: The authors obtained the borides of dysprosium, holmium and lutecium by means of the vacuum-thermal method. They were subjected to X-ray and chemical analyses. Roentgenograms of all these compounds are completely similar and indicate the presence in each of them of two phases: cubic and tetragonal so that the composition of these borides is as follows: DyB_6, DyB_4, HoB_6, HoB_4, LuB_6 and LuB_4. The constants of their lattices are cited in Table 1 of the article. The intensities of the lines of the two phases in the roentgenograms are approximately equal; most of the lines are ascribed to the phase of MeB_4. The article contains 1 roentgenogram, 1 table and 6 references, 2 of which are Slavic.

Card 1/2

21-5-13/26

New Borides of Rare-Earth Elements

ASSOCIATION: Institute of Metalloceramics and Special Alloys of the AN Ukrainian SSR (Instytut metalokeramiky i spetssplaviv AN URSR)

PRESENTED: By V.N. Svechnikov (V.M. Svyechnikov), Member of the AN Ukrainian SSR

SUBMITTED: 4 March 1957

AVAILABLE: Library of Congress

Card 2/2

SAMSONOV, G. V.

109-5-14/22

AUTHOR SAMSONOV G.V., NESHPOR V.S., KUDINTSEVA G.A.

TITLE On the Relationship Between Thermoemission Constants of Transitive Metals (and Their Compounds with Several Metalloids) and Electronic Structure.
(O svyazi termoemissionnykh postoyannykh perekhodnykh metallov (i ikh soyedineniy s nekotorymi metalloidami) s elektronnoy strukturoy - Russian)

PERIODICAL Radiotekhnika i Elektronika, 1957, Vol 2, Nr 5, pp 631-636 (U.S.S.R.)

ABSTRACT An attempt is made here to determine the relation between the electronic work function in thermoemission and the electronic structure of transitive metals (and their compounds with boron ,carbon and nitrogen). It is shown that the work function depends on the atomic structure of the metal and decreases with decreasing degree of screening of the electrons of incompletely occupied d-atom shells of transitive metals. The work function can be brought into connection with the quantity of dispersive power of the atoms of transitive metals which are characterized by the criterion 1/Nn. N - chief quantum figure; n - the number of electrons in the incompletely occupied d-shell, it decreases with increasing 1/Nn. In metalloid compounds of transitive metals with boron , carbon and nitrogen the work function should increase with increasing 1/Nn for the corresponding transitive metals.This is confirmed in the case of borides,but in the case of carbides and nitrides it can not yet be considered to be an established fact. The ionizing potential of the metalloid atom

Card 1/2

On the Relationship Between Thermoemission Constants of Transitive Metals (and Their Compounds with Several Metalloids) and Electronic Structure. 109-5-14/22

exerts considerable influence on the amount of the work function of metalloid compounds. A reduction of the work function is to be expected in the MeB_2-MeC-MeN series, where Me is a transitive metal of groups IVa, Va, or VIa. The work function is in most cases smaller in the case of metalloid compounds than in that of the corresponding metals.
(1 table, 4 illustrations, 6 Slavic references).

ASSOCIATION Not Given.
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SUBMITTED 25.6.1956
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Card 2/2

SAMSONOV, G.V.

AUTHOR: Neshpor, V.S. and Samsonov, G.V. 126

TITLE: On the problem of brittleness of metalloids compounds. (K voprosu o khrupkosti metallopodobnykh soyedineniy.)

PERIODICAL: "Fizika Metallov i Metallovedenie" (Physics of Metals and Metallurgy), 1957, Vol.IV, No.1 (10), pp.181-183 (U.S.S.R.)

ABSTRACT: The coefficients of linear expansion of a number of metalloids were determined and their modulus of elasticity was estimated on the basis of a formula proposed by Ya. I. Frenkel' (3). In a table, p.181, the coefficients of linear expansion, the elasticity moduli, the mean square displacements of the molecules in the crystals and the brittleness of these compounds are given, some of the data being based on information published in literature. The following compounds were investigated by the authors: Mo_2C WC, TiC, ZrB_2, TiB_2, ZrC, TiN, CrB_2. The values given in the table for W_2C, NbC, TaC and VC are those given by Koster (Zs. f. Metallkunde, 1948, 39, 111).
1 table, 1 graph, 7 references, 3 of which are Russian.

Institute of Metal Ceramics of Special Alloys, Ac.Sc. Ukraine: Moscow Institute of non-ferrous metals and gold imeni M.I. Kalinin. Recd. Mar.22, 1956.

AUTHORS: Samsonov, G. V. and Solonnikova, L. A. 126-5-3-30/31

TITLE: Diffusion of Silicon in Transition Metals (Diffuziya kremniya v perekhodnyye metally)

PERIODICAL: Fizika Metallov i Metallovedeniye, 1957, Vol 5, Nr 3, pp 565-566 (USSR)

ABSTRACT: Transition metals form compounds of high electrical conductivity with silicon (Ref.1), which can become superconducting (Ref.2), which have a metallic lustre, etc. Crystallographically, silicides are substitutional phases (Ref.3), unlike carbides and nitrides, which are interstitial, or borides, which show some signs of being insterstitial, as well as some layered features typical of silicides. The metals used were Ti, Nb, Ta, Cr, Mo, W, Fe, Co and Ni; the diffusion data were worked up to give the activation energies of diffusion. The cylindrical specimens were saturated with silicon in an oven while immersed in silicon powder containing activating additives. The thicknesses of the silicided layers were determined from etched cross-cut sections. Wafers less thick than the silicide layer were examined with X-rays and by chemical analysis; in all cases the layers were found

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to consist of disilicides. The results were worked up in the normal way for reactive diffusion (Ref.4). The activation energies (in cal/mole) given in the Table were derived, and compared with those for B, C and N in the same metals (Refs. 4, 5, 7). The silicon was found to give the lowest activation energy, although, formally speaking, one would have expected it to give the largest, since silicon has the largest atomic radius (1.18 Å), while B, C and N have 0.9, 0.77 and 0.71 Å respectively. The figure shows that the activation energy is inversely proportional to the ionization potential of the metalloid. The electronic properties, rather than the radius, are therefore here decisive. Although silicon gives low activation energies, the silicides have comparatively low values of the physical parameters, relative to borides, carbides and nitrides. This occurs because the high-melting carbides and nitrides (Ref.8), and partially the borides, are interstitial in type, while the silicides are substitutional. In the first three the shear deformation in hardness testing, and the general deformation in melting, are resisted by the cross-linking action of the metals, while the silicides, having graphite-like layers weakly bonded together (Ref.10), deform comparatively readily. The silicides therefore often melt even below the melting point of metals and silicon, and the hardnesses do not exceed 1000-1500 kg/mm^2, while the borides, nitrides and carbides give values of 2000-3000 kg/mm^2 (Refs. 11, 12). In Fig.1 relations are graphed of the activation energies for metal-like phases to atomic radii and ionization potentials of the metalloids. E, kcal/mole vs. r_x, Å ; I_x, eV.

Note: This is a complete translation without including the information contained in the table, p.565.

There is 1 figure, 1 table and 12 references, 11 Soviet, 1 English.

ASSOCIATION: Institut metallokeramiki i spetsial'nykh splavov AN Ukr.SSR (Institute of Cermets and Special Alloys, Ac.Sc., Ukr. SSR)

SUBMITTED: January 22, 1957

1. Silicon--Diffusion 2. Metal silicides--Preparation 3. Metal silicides--Properties

Samsonov, G. V.

129-12-2/11

AUTHORS: Bal'shin, M. Yu. and Samsonov, G.V., Candidates of Technical Sciences.

TITLE: Forty years of powder metallurgy in the Soviet Union. (40 let Sovetskoy poroshkovoy metallurgii).

PERIODICAL: Metallovedeniye i Obrabotka Metallov, 1957, No.12, pp. 15-25 (U.S.S.R.)

ABSTRACT: The first part of the paper deals with prewar and pre-1917 developments, mentioning that in 1932 fifty tons of "pobedite", thirty tons of "vokar" and sixty-nine tons of "stalinite" were produced and during that year these cemented carbides were used in 1400 Soviet plants. An All Union Scientific Research Institute for Cemented Carbides (Vsesoyuzniy Nauchno-Issledovatel'skiy Institut Tverdykh Splavov) was organised, the work of which determined to a certain extent the development of the Soviet cemented carbide producing industry during the post war years. This Institute contributed a great deal to the development of the process of manufacture of shaped cemented carbide components. It is claimed that the Soviet Union is in the forefront as regards production of cemented carbides and this resulted in considerable successes in the fields of machining of metals, mining, oil and geological drilling. Between 1949 and 1951 a highly efficient method of

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APPROVED FOR RELEASE: 08/22/2000 CIA-RDP86-00513R001447010019-4"

Forty years of powder metallurgy in the Soviet Union. 129-12-2/11

producing pure borides of high melting point elements was developed (Ref.8) and also methods of producing silicides and a number of diagrams of state of carbides, borides, silicides and nitrides were investigated (Refs.9-11). Cemented carbides were used as substitutes for diamonds in trueing grinding wheels and for machining hard watch and instrument jewels of the type of rubies and leucosapphires. New thermo-emitters for electronic devices (lanthanum boride) were developed and also high resistance resistors. At the Institute of Metalloceramics of Special Alloys, Ac.Sc. Ukraine (Institut Metallokeramiki Spetssplavov AN Ukr.SSR) intensive investigations are proceeding relating to cermets which consist of composition of oxides with carbides and of metals with oxides; a considerable part of this work was carried out by Ya. S. Umanskiy, G. A. Meyerson, B. F. Ormont and V.V. Grigor'yev (Ref.12). An important contribution to the theory of alloys of hard, high melting point compounds was made by I. I. Kornilov (Ref.13). The Soviet chemical industry developed methods of production of boron-silicate powders. F. I. Shamra and V. N. Yeremenko investigated

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Forty years of powder metallurgy in the Soviet Union. 129-12-2/11

alloys. P. I. Rebinder, V. I. Likhtman and I.N.Smirnova, Institute of Physical Chemistry, Ac.Sc. (Institut Fizicheskoy Khimii AN SSSR) contributed a great deal to the study of the relations governing the structural transformations in iron-graphite materials (Ref.16); their results enable evolving a rational technology for producing materials with an iron structure. Bimetallic lead bronze liners on a steel strip base and also trimetallic liners (steel base, powdered copper-nickel layer, tin babbite) were developed by V. V. Saklinskiy, A. A. Kokorev, V. A. Khazov and G. S. Konstantinov. Of great importance are welding electrodes, the coatings of which contain waste steel powders; their use simplifies welding and increases the productivity by over 30%. A. S. Zaymovskiy and others have developed sintered magnetic materials, particularly the alloy alsifer (7.5% Al, 10% Si, 82.5% Fe). The technology of producing permanent magnets and pressed magnets from alni and alnico alloys was developed by Zaymovskiy, A. B. Al'tman and others. Work on developing magnetically soft cermet materials was carried out by N. I. Frantsevich and his team in the Institute of

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Samsonov, G. V.

73-3-1/24

AUTHOR: Samsonov, G. V.

TITLE: Intermediate Stages in the Formation of Carbides of Titanium, Zirconium, Vanadium, Niobium and Tantalum. (Promezhutochnyye Stadii Reaktsiy Obrazovaniya Karbidov Titana, Tsirkoniya, Vanadiya, Niobiya i Tantala.)

PERIODICAL: Ukrainskiy Khimicheskiy Zhurnal, 1957, Vol.23, No.3, pp. 287-296 (USSR).

ABSTRACT: Tensiometric measurements were carried out on carbides of the above listed metals in vacuum according to the reaction:

$$Me_xO_y + zC = Me_xC_{z-y} + yCO.$$

X-Ray and chemical methods of analysis of the intermediate and final products and the calculation of the approximate values of their heat of formation verified the formation of TiC and ZrC via the intermediate oxides Ti_2O_3, Ti_3O_5, TiO and Zr_2O_3, ZrO and also the formation of vanadium carbides (from the V_2O_3 + 5C layer), of niobium and tantalum carbides (from the Nb_2O_5 + 7C and Ta_2O_5 + 7C layers) via the intermediate oxides VO, V_4O and TaO_2,

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Intermediate Stages in the Formation of Carbides of Titanium, Zirconium, Vanadium, Niobium and Tantalum.

Ta_4O. The values of ΔH(= change in heat content, cal/mole) of Ti_2O_3 and TiO obtained from tensiometric data are given in Table 1. The tensiometric curve of the reaction $TiO_2 + 3C = TiC + 2CO$ (diagram, Fig. 1) shows not 3 but 4 pressure jumps. The first occurs at 1.100 - 1.150°C, the second at approximately the same temperature, the third between 1250 and 1300°C and the last at 1280 - 1320°C. X-Ray analysis of samples, given in Table 2 confirm the data obtained by chemical analysis. Diagram, Fig. 2 shows the tensiometric curve of $ZrO_2 + 3C = ZrC = 2CO$, with 3 pressure jumps. The chemical composition of the lower Zr oxides is given in Table 3. and line diagrams obtained by X-ray analysis shown in diagram, Fig. 3. It is shown that ZrO has a cubical grid with an interval of 4.63 Å (viz. Table 4). Tensiometric investigations on the conditions of formation of vanadium carbide were carried out together with G. V. Moskalik (diagram, Fig. 4). The heat of formation of vanadium carbides was calculated from the co-ordinates of points on the tensiometric curve (immediately preceding the pressure jumps) and are listed

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73-3-1/24

Intermediate Stages in the Formation of Carbides of Titanium, Zirconium, Vanadium, Niobium and Tantalum.

in Table 5. Further the formation of Niobium carbide was investigated and the relevant data are given in graph 5 and Table 6. Conditions for the formation of carbides of niobium and tantalum in vacuum are nearest in those having the composition NbC and TaC. Approximate values for ΔH of the metal oxides are given. There are 6 diagrams, 8 tables and 24 references, 12 of which are Slavic.

SUBMITTED: November, 23, 1956.

ASSOCIATION: Institut Metallo-Ceramic and Special Alloys. (Institut Metallokeramiki i Spetssplavov AN USSR)

AVAILABLE: Library of Congress.

Card 3/3

SAMSONOV, G.V. 439

AUTHORS: Samsonov, G. V., and Popova, N. M.

TITLE: Preparation and Certain Properties of Thorium Sulfides (Prigotovleniye i nekotoryye osobennosti sul'fidov toriya)

PERIODICAL: Zhurnal Obshchey Khimii, 1957, Vol. 27, No. 1, pp. 3-10 (U.S.S.R.)

ABSTRACT: Efforts were made to improve the method of preparing thorium sulfides by direct combination of the thorium with the sulfur. A thorium powder containing 99.8% of Th and thoroughly purified sublimed sulfur were used as basic material for the experiments. The first series of tests was conducted at temperatures ranging from 400 to 850° with intervals of 50 to 100° with a running period of about 30 min. Parts of the products obtained were chilled in the open air and parts in an H_2S stream. During the chilling of reaction products in a hydrogen sulfide stream the sulfur content increased sharply and the total of Th + S reached 100%, especially in experiments at 600°. The composition of products obtained with consideration of the absence of free Th is Th_2S_3. ThS and Th_2S_3 were observed to be the most stable sulfide phases in the Th-S system. Results obtained by extending the reaction period from

Card 1/3

Preparation and Certain Properties of Thorium Sulfides

30 to 240 min. are given in Fig. 2. Results obtained at 800° with a change in sulfur content in the initial batch and 30 min. reaction time are presented in Fig. 3. Certain physical properties of thorium sulfides were determined including their melting point which was studied by direct melting of samples.

The melting of the sulfides at 2400 - 2450° and 2300° took place without any noticeable decomposition. Special samples prepared by calcination of the powder through hot molding were used for studying the microstructure and microhardness of the thorium sulfides. The sulfides were seen to react with the graphite of the molding forms at temperatures much lower than those necessary for the conversion of the sample into solid state. Th_2S_3 samples baked at 1960 - 2000° showed a diphase structure. The Th_2S_3 compound was also found to be a variable composition phase, extremely homogeneous and ranging from $ThS_{1.22}$ to $ThS_{1.59}$. The relation between the properties of thorium sulfides and other analogous compounds of intermediate metals with metalloids was established. Attention is called to

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Preparation and Certain Properties of Thorium Sulfides

considerable stresses originating during the calcinating by hot molding which are slowly eliminated during and following annealing of samples.

Three tables, four graphs and one illustration. There are 20 references, of which 6 are Slavic.

ASSOCIATION: Moscow Institute of Non-Ferrous Metals and Gold (Moskovskiy Institut Tsvetnykh Metallov i Zolota)

PRESENTED BY:

SUBMITTED: February 16, 1956

AVAILABLE:

Card 3/3

SOV/137-58-11-23268

Translation from: Referativnyy zhurnal. Metallurgiya, 1958, Nr 11, p 203 (USSR)

AUTHOR: Samsonov, G. V.

TITLE: Activation Energy During the Diffusion of Boron, Carbon, Nitrogen, and Silicon Into Highmelting Transition Metals (Energii aktivatsii pri diffuzii bora, ugleroda, azota i kremniya v tugoplavkiye perekhodnyye metally)

PERIODICAL: Sb. nauchn. tr. Mosk. in-t tsvetn. met. i zolota, Nauchno-tekhn. o-vo tsvetn. metallurgii, 1957, Nr 30, pp 192-222

ABSTRACT: The process of diffusion of B in Ti, Nb, Ta, Cr, Mo, W, Fe, Co, and grade-3 steel, of C in Ti, Zr, Nb, Ta, Cr, Mo, W, and Co, and of Si in ('and' in the original. Transl. Note) Ti was investigated. Saturation of specimens of the above metals with B and Si was achieved in a stream of purified H at various temperatures (from 1000 to 2000°C for 2 hours). It was established that the corresponding carbide, boride, and silicide phases are formed in the course of the diffusion. The calculation of the coefficient of diffusion D was accomplished according to the following formula: $D(C_1-C_2) = C_oK$ where C_{o3} is the amount of B, Si, or C necessary for the transformation of 1 cm^3 of the metal

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SOV/137-58-11-23268

Activation Energy During the Diffusion of Boron, Carbon, (cont.)

into the boride, silicide, or carbide phase, (C_1-C_2) is the difference of the concentrations of the metalloid on the borders of the layers, and K is a quantity dependent on the radius of the specimen, the thickness of the diffusion layer, and the saturation time. It was found that the activation energy of the diffusion of the metalloid into the transition metals of a given group increases with increasing atomic number of the metal. The activation energy increases during the transition from the borides to the carbides and nitrides. These regularities are related to the magnitude of the ionization potential of the metalloid and the degree of incompleteness of the α-electron sublevels of the transition metals. The activation energies of the reactive diffusion were compared with the crystalline lattice energy of the corresponding carbide and boride phases determined through calculations. The activation energy decreases with the increase of the energy of the lattices which are formed upon the diffusion of the phase.

I. D.

Card 2/2

SOV/137-58-10-20802

Translation from: Referativnyy zhurnal, Metallurgiya, 1958, Nr 10, p 65 (USSR)

AUTHORS: Sirota, N.N., Samsonov, G.V., Strel'nikova, N.S.

TITLE: Electrical Properties of Some Metalloid Compounds and Solid Solutions Thereof (Elektricheskiye svoystva nekotorykh metallopodobnykh soyedineniy i ikh tverdykh rastvorov)

PERIODICAL: Sb. nauchn. tr. Mosk. in-t tsvetn. met. i zolota, nauchno-tekhn. o-vo tsvetn. metallurgii, 1957, Nr 30, pp 368-374

ABSTRACT: The results of measurement of the electrical resistivity and thermoelectromotive force of a number of carbides, silicides, borides, nitrides, and certain binary alloys thereof, all in a Cu-containing vapor, and of preliminary determination of the magnetic susceptibility of a number of two-component alloys of these compounds are presented. The specimens for investigation are made by hot extrusion. The electronic structure of the objects of investigation is used as the basis for discussion of certain results of the work. R.A.

1. Intermetallic compounds--Electrical properties 2. Alloys--Electrical properties

Card 1/1

SAMSONOV, G.V.

Distr: 4E2c/4E4j

Resistance to oxidation of alloys of borides of titanium and niobium. V. S. Neshpor and G. V. Samsonov. *Zhur. Priklad. Khim.* 30, 1584-8(1957); cf. *C.A.* 50, 1400*d*, 9259*a*.—The resistance to oxidation (air) of TiB_2, NbB_2, and their alloys was detd. by the increase in wt. Δp, g./sq. cm., of specimens made of powders, sintered and hot-pressed, annealed in H, and slowly cooled in the furnace. It was recognized that the change-in-wt. method was not accurate but sufficient for precise, relative values. The röntgenographic d. of NbB_2 and TiB_2 used were 7.08 and 4.53 g./cc., resp. The plots of Δp *vs.* temp. were exponential functions: on semilog coördinates they consisted of 2 linear branches intersecting at 650°. The rate of oxidation above 650° was more rapid. This was attributed to a change in structure and a weakening of the forces between the atoms of the body and the film. The plots of film thickness *vs.* compn. were continuous curves passing through wide min. at 50 mol. % NbB_2 and TiB_2. The plots Δp *vs.* time t were parabolic, expressed by $(\Delta p)^2 = Kt$. The calcd. values of K of NbB_2, TiB_2, and the 50% alloy were 12.9×10^{-6}, 2×10^{-6}, and 0.5×10^{-6} g./sq. cm. min. These results indicate that the principles of oxidation of solid solns. of borides are the same as those of carbides, nitrides, and metallic alloys. I. Bencowitz

SAMSONOV, G.V., kandidat tekhnicheskikh nauk, dotsent.

Boron carbide products. Vest.mash.37 no. 3:24-28 Mr '57.
(MIRA 10:4)

(Boron carbide)

SAMSONOV, G. V.

20-6-32/59

AUTHOR SAMSONOV, G.V.

TITLE The Phases of the Tungsten-Boron System.
(Fazy sistemy vol'fram - bor.- Russian)

PERIODICAL Doklady Akademii Nauk SSSR 1957, Vol 113, Nr 6, pp 1299-1301 (U.S.S.R.)

ABSTRACT On the occasion of the radiographical investigation of the tungsten-boron system 3 borides were found in the beginning: the tetragonal W_2B and WB as well as the hexagonal W_2B_5. Later the existence of a high-temperature modification of tungsten monoboride β-WB was determined. According to published data W_2B (γ -Phase) has very close homogeneity limits, whereas (δ-phase), has wider ones. The previously determined phase WB_2 is probably identical with W_2B_5 if there is a deficiency of boron-atoms. For the purpose of a pricise determination of the phase range of the tungsten-boron diagram the author investigated alloys of this system by the methods of micro-hardness as well as by methods of radiography and metallography. The results obtained make it possible to suggest the following phase ranges of the tungsten-boron system:

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The Phases of the Tungsten-Boron System. 20-6-32/59

1) α-range of a very restricted solid boron solution in α-W.
2) two-phase range α plus γ, with the γ -range having a very restricted homogeneity range.
3) two-phase range γ + δ (W_2B + WB)
4) Homogeneity range of WB (δ-phase)
5) two-phase range δ + ε (WB + W_2B_5)
6) homogeneity range of W_2B_5 which is probably very wide - which does not coincide with KIESSLING'S data.

(1 table, 5 Slavic references)

ASSOCIATION: Moscow Institute for Non-Ferrous Metals and Gold "M.I.KALININ"
PRESENTED BY: A.N. FRUMKIN, Member of the Academy.
SUBMITTED: 29.10. 1955
AVAILABLE: Library of Congress.

CARD 2/2

SAMSONOV, G.V.

20-6-23/42

AUTHORS: Portnoy, K. I., and Samsonov, G. V.

TITLE: Properties of Threefold Alloys TiB_2 - CrB_2 - ZrB_2 (Svoystva troynykh splavov diboridov titana, khroma i tsirkoniya)

PERIODICAL: Doklady AN SSSR, 1957, Vol. 116, Nr 6, pp. 976 - 978 (USSR)

ABSTRACT: For the modern technical engineering of high mechanical stress at high temperatures borides of viscous rare metals are of interest, because they show a strong hardness and resistance to abrasion as well as stability toward acids. They shall be studied from systems in which extreme values of these properties are to be expected. In literature data on the systems mentioned in the title are almost entirely missed. Therefore the work under consideration has been attempted on diboride alloys lying at a " beam cross section" ("luchevoy razrez") TiB_2-CrB_2(50 : 50 mol.%) ZrB_2. Since it was known that borides of Ti and Cr, as well as of Ti and Zr form uninterrupted series of solid solutions, meanwhile borides of Cr and Zr are into one another soluble in a limited sense, it was interesting to follow, how the solubility of CrB_2 (?) in a solid solution TiB_2-CrB_2, compared to its limited solubility in CrB_2(?) and its uninterrupted solubility in TiB_2, and in reverse, vary itself.

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Properties of Threefold Alloys TiB_2 - CrB_2 - ZrB_2

Conclusions: It has been stated that the solubility of ZrB_2 in $(Ti, Cr)B_2$ amounts to about 40 mol.%, whilst that one of $(Ti, Cr)B_2$ in ZrB_2 is below 10 mol%. The range of solubility of ZrB_2 in CrB_2 raises at the decomposition of ZrB_2 in a twofold boride $(Ti, Cr)B_2$. Zirconiumboride forms together with a component of the latter (TiB_2) an uninterrupted series of solid solutions. In the range of the monophase of the solid solutions of ZrB_2 in $(Ti, Cr)B_2$ in a sample quenched of from 1900^0, there is a maximum of micro-hardness: 3900 kG/mm^2 (at 20 mol.% ZrB_2) and a maximum of electric resistance (216 $\mu\Omega$ /cm at 10 mol.% ZrB_2). There are 3 figures, and 6 references, 5 of which are Slavic.

ASSOCIATION: **All-Union** Scientific Research Institute for Aircraft Materials (Vsesoyuznyy nauchno-issledovatel'skiy institut aviatsionnykh materialov)

PRESENTED: June 18, 1957, by A. A. Bochvar, Academician

SUBMITTED: June 7, 1957

AVAILABLE: Library of Congress

Card 2/2

SAMSONOV, G.V.

18(0,7) PHASE I BOOK EXPLOITATION SOV/2170

Akademiya nauk Ukrainskoy SSR. Institut metallokermiki i spetsial'nykh splavov

Voprosy poroshkovoy metallurgii i prochnosti materialov, vyp. 5 (Problems in Powder Metallurgy and Strength of Materials, Nr 5) Kiyev, Izd-vo AN USSR, 1958. 172p. 2,000 copies printed.

Ed. of Publishing House: Ya. A. Samokhvalov; Tech. Ed.: V.Ye. Sklyarova; Editorial Board: I.N. Frantsevich (Resp. Ed.), I.M. Fedorchenko, G.S. Pisarenko, G.V.Samsonov, and V.V. Grigor'yeva.

PURPOSE: This collection of articles is intended for a wide circle of scientists and engineers in the research and production of powder metallurgy. It may also be useful to advanced students of metallurgical institutes.

COVERAGE: This collection of articles describes the results of investigations made at the Institut metallo keramikii spetsial'nykh splavov, AN USSR (Institute of Powder Metallurgy and Special Alloys, Academy of Sciences, Ukrainian SSR). The physical and chem-

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ical properties of materials used in powder metallurgy are discussed. Materials described as new, production processes, and methods and results of mechanical testing are described. No personalities are mentioned. References follow each article.

TABLE OF CONTENTS:

The authors describe results of investigations of microhardness, coefficient of thermal expansion, calculation of the inter-atomic bond between the metal and the metalloid, and factors affecting this bond. They conclude that the hardness of the metal-like compounds is determined chiefly by the bonding forces between the atoms of the metal and the metalloid.

The authors describe the results of an investigation of the chromium-niobium system by thermal, metallographic, and radiographic methods.

S/137/60/000/02/03/010

Translation from: Referativnyy zhurnal, Metallurgiya, 1960, No 2, p 92, # 2779

AUTHORS: Meyerson, G.A., Samsonov, G.V.

TITLE: On the Conditions of Obtaining Boron Carbide

PERIODICAL: V sb.: Bor. Tr. Konferentsii po khimii bora i yego soyedineniy, Moscow, Goskhimizdat, 1958, pp 52 - 57

TEXT: The main condition for the preparation of high-quality B_4C powder is the limitation of the temperature of the preparation process by the temperature of peritectic decomposition (2,200°C) entailing an increased amount of C_{free} in the B_4C powder and reducing its polishing capacity. The best industrial method of B_4C production is the reduction of B_2O_3 with carbon in electric resistance furnaces where the temperature of the process may be regulated. It is shown that fine-grained powder of the theoretical composition may be obtained by magnesium-thermal reduction of B_2O_3 at temperatures of 1,000 - 1,400°C.

A.P.

Card 1/1

S/137/60/000/02/04/010

Translation from: Referativnyy zhurnal, Metallurgiya, 1960, No 2, p 92, # 2781

AUTHORS: Meyerson, G.A., Samsonov, G.V., Kotel'nikov, R.B., Voynova, M.S., Yevteyeva, I.P., Krasnenkova, S.D.

TITLE: Some Properties of Alloys of High-Melting Transition Metal Borides

PERIODICAL: V sb.: Bor. Tr. Konferentsii po khimii bora i yego soyedineniy, Moscow, Goskhimizdat, 1958, pp 58 - 73

TEXT: Information is given on the production technology and results of investigations into the phase composition and the structure of products of diffusional interaction between initial borides of the TiB_2-CrB_2, TiB_2-W_2B_5 and ZrB_2-CrB_2 systems. The authors studied also microhardness of phases, heat-resistance of alloys and the structure of cinder of various composition.

A.P.

Card 1/1

SOV/81-59-23-81116

Translation from: Referativnyy ahurnal. Khimiya, 1959, Nr 23, p 35 (USSR)

AUTHOR: Samsonov, G.V.

TITLE: The Activation Energies of the Diffusion of Boron, Carbon, Nitrogen and Silicon Into High-Melting Transition Metals

PERIODICAL: V sb.: Bor. Tr. Konferentsii po khimii bora i yego soyedineniy. Moscow, Goskhimizdat, 1958, pp 74 - 89

ABSTRACT: Based on the roentgen- and chemical analyses as well as the measurements of microhardness and weight change of the samples, it has been established that the diffusion of B into Ti, Nb, Ta, Cr, Mo, W, Fe and Co, of carbon into Ti, Zr, Nb, Ta, Cr, Mo, W and Co and of Silicon into Ti is an active diffusion, i.e., it is accompanied by the formation of the pertaining boride, carbide and silicide phases. Based on the microscopic investigation of the thicknesses of the diffusion layers as well as on the data of the regions of homogeneity of the pertaining phases and the results of the chemical and roentgen-analyses, the activation energies have been calculated and equations of the temperature dependence of the coefficients of diffusion of B, C and Si into some of the metals indicated were derived. It has been

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SOV/81-59-23-81116

The Activation Energies of the Diffusion of Boron, Carbon, Nitrogen and Silicon Into High-Melting Transition Metals

shown that the values of the activation energies of the diffusion of B, C and Si into transition metals are connected with the value of ionization potential of the diffusing metalloid and the degree of incomplete filling of the d-electronic sublevels of the transition metals, and agree well with the physical constants of the transition metals and the pertaining boride, carbide and silicide phases.

Author's summary

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131-1-7/14

AUTHORS: Samsonov, G. V., Neshpor, V. S.

TITLE: Production, Properties and Technical Use of Molybdenum-Disilicide (Polucheniye, svoystva i tekhnicheskoye primeneniye disilitsida molibdena)

PERIODICAL: Ogneupory, 1958, Nr 1, pp. 28 - 35 (USSR)

ABSTRACT: This is one of the most important difficultly fusible compounds ($Mo Si_2$) which in recent years are used at high temperatures. The extremely high resistance to the influence of atmospheric oxygen at a temperature of up to $1700^{\circ}C$ and other agressive gases, as well as to acids and molten metals is to be considered its basic property. Its properties and behavior at different temperatures are described in detail; K. I. Portnyy also participated in these tests. The behavior of $Mo Si_2$ in the atmosphere of various gases and in the air is represented by the curves of figures 1 and 2 and then explained. Molybdenum-disilicide is resistant to the action of the following molten metals: sodium, lead, bismuth, tin, mercury and other metals which do not form disilicides. Table 1 shows the resistance of $MoSi_2$ to the oxidation in an oxygen flow at $1200^{\circ}C$ after previous heating in metal melts. $MoSi_2$ is inclined to creeping and is not sufficiently resistant to heat shocks (see

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table 2). The other mechanical and physical properties of $MoSi_2$ are enumerated in detail and explained and its use at high temperature is described in detail. Figure 3 shows a molybdenum heater with and without a $MoSi_2$-covering. There are many possibilities of the preparation of $MoSi_2$-powder , the simplest one consists of a direct combination of molybdenum with silicon: $Mo + 2Si = MoSi_2$. The tests of a direct synthesis were performed together with N. M. Popova. Up to a temperature of 1100°C the tests were performed in a laboratory furnace TK 30/200 in an argon atmosphere (figure 4), at higher temperatures in a vacuum resistance furnace. In the Laboratory of the Institute for Powder Metallurgy and Special Alloys AN Ukrainian SSR $MoSi_2$ was produced at a temperature of 1000°C and one hour halt. I. D. Radomysel'skiy also participated in the experiments. Figure 5 records the porosity dependence of the test samples on the sintering temperature and figure 6 that on the time of sintering. Figure 7 shows products of molybdenum-disilicide of the firm Plansee in Austria. Conclusions:
a) $MoSi_2$ is one of the compounds most resistant to scale and chemical influences, which property is connected with its high thermal conductivity, hardness and stability. It is used for the production of refractory products, heatproof alloys and covers for molybdenum products and for the soldering of ceramics with metals;

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b) the most suitable method of the production of $MoSi_2$-powder consists in the heating of briquettes of a mixture of molybdenum- and silicon-powder in the course of 1 hour at a temperature of 1000°C and the manufacture of products by hot pressing of $MoSi_2$-powder at a temperature of 1900°C. There are 9 figures, 2 tables, and 27 references, 9 of which are Slavic, 7 German and 10 English.

ASSOCIATION: Institute for Powder Metallurgy and Special Alloys AN Ukrainian SSR
(Institut metallokeramiki i spetsial'nykh splavov AN USSR)

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1. Compounds-Properties 2. Compounds-Production
3. Compounds-Application

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SAMSONOV, G. V.

129-1-8/14

AUTHOR: Samsonov, G.V., Candidate of Technical Sciences.

TITLE: Character of the Interaction of Titanium Boride with Metals of the Ferrous Group (Kharakter vzaimodeystviya borida titana s metallami gruppy zheleza)

PERIODICAL: Metallovedeniye i Obrabotka Metallov, 1958, No.1, pp. 35 - 38 (USSR).

ABSTRACT: Chromium carbides, although having a relatively high chemical resistance, interact with titanium carbide forming ternary phases [Ref.2] and, for instance, for such systems as TiC-Si a eutectic type of diagram has been observed which is obviously linked with the low loss of free energy during SiC formation. The author considered it of interest to investigate the relation of other Ti compounds (borides, silicides, nitrides) with metals of the ferrous group. In this paper, the interaction was investigated of titanium boride with Fe, Co and Ni. Since the work was not aimed at detailed investigation of these systems, a technique was applied which is described in a paper by A.N. Zelikman and D.S. Bernshteyn [Ref.4], utilising titanium boride powder produced by the vacuum thermal method [Ref.5] and containing 68.90% Ti, 31.02% B and 0.02% C_{free} and powders of Fe, Co and Ni which have been reduced by hydrogen

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titanium boride as compared to systems containing titanium carbide. This is attributed to the presence of strong, covalent bonds in titanium boride which levels out the difference in the behaviour of boride in its interaction with metals of the ferrous group. It is possible, in principle, to utilise titanium boride as the hard component of metallo-ceramic sintered carbides. There are 5 figures, 2 tables and 5 references, 3 of which are Slavic.

ASSOCIATION: Institute of Metallo-Ceramics and Special Alloys, Ac.Sc. Ukrainian SSR (Institut Metallokeramiki i Spetsplavov AN USSR)

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64-58-2-8/16

AUTHORS: Samsonov, G. V., Candidate of Technical Sciences, Plotkin, S. Ya., Candidate of Technical Sciences

TITLE: Powder Metallurgical Materials for Chemical Industry (Metallokeramicheskiye materialy dlya khimicheskoy promyshlennosti)

PERIODICAL: Khimicheskaya Promyshlennost', 1958, Nr 2, pp. 42-46 (USSR)

ABSTRACT: The present paper gives a survey on the kinds of production as well as on the various types of finished products of pow= der metallurgy. It is mainly foreign processes and finished products which are mentioned. In the production of powder the authors point out the importance of structural charac= teristics as well as of the size of particles, with physi= co-chemical and mechanical methods of production being men= tioned. A table of the characteristic features of metal powders obtained by different methods is given. The pres= sing and sintering of metal powder or powder mixtures re= spectively are carried out either simultaneously or by soaking the porous pressed article in liquid metal, or also by means of a pressing into bands and other forms

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