

BRONCOVA, O.; BYDZOVSKY, V.

The disinfective effect of quaternary ammonium compounds on viruses in vitro. II. Comparison of the disinfective effect of Ajatin, Septonex, substance VUFB - 3555 and Bradosol on vaccinia and WEE viruses. Cesk. epidem. 14 no.2:106-116
Mr '65

1. Vyzkumny ustav pro farmacii a biochemii, Praha.

BRONDER, Mieczyslaw, technik

The GHOP type orthogonal lining of headings. Wiadom gorn 14
no.5:142-143 My '63.

BRONDZ, B.D. (Moskva, Baltiyskaya ul., 10, kv.59)

In vitro and in vivo study of the cytotoxic effect of cellular and humoral isoantibodies. Report No.1: Cytotoxic effect of humoral isoantibodies from cells resistant to sarcoma in mice. Vop. onk. 10 no.3:9-16 '64. (MIRA 17:8)

1. Iz otdela immunologii i onkologii (zav. - prof. L.A. Zil'ber) Instituta epidemiologii i mikrobiologii imeni N.F. Gamalei (dir. - prof. P.A. Vershilova).

BRONDZ, B.D.; YEGOROV, I.K.

Antigenic structure of locus H-a of the mouse strains CC57Br and CC57W. Folia biol. (Praha) 10 no.2:90-93 '64

1. Department of Immunology and Oncology, Gamaleya Institute of Epidemiology and Microbiology, Moscow.

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BRONDZ, B.D.

Some problems in the study of the inhibition and stimulation mechanisms of homotransplant growths. Analele biol 17 no.3:32-55 My-Je '63.

BRONDZ, B.D.

Interaction of immune lymphocytes in vitro with normal and neoplastic tissue cells. Folia biol. (Praha) 10 no.3:164-176 '64

1. Immunology and Oncology Department, Gamaleya Institute of Epidemiology and Microbiology, Academy of Medical Sciences of the U.S.S.R., Moscow.

BRONDZ, B.D. (Moskva, Baltiyakaya, d.10, kv.59)

Antibodies against the specific antigen of the membrane of tumor cells. Vop. onk. 10 no.2:81-88 '64. (MIRA 17:7)

1. Iz otdela immunologii i onkologii (zav. - prof. L.A. Zil'ber) Instituta epidemiologii i mikrobiologii imeni N.F. Gamalei (dir. - prof. P.A. Vershilova) AMN SSSR.

BRONDZ, B.D.

Relationship between haemagglutinating and cytotoxic properties of humoral isoantibodies. Folia biol. (Praha) 10 no.4:251-260 '64.

1. Gamaleya Institute of Epidemiology and Microbiology, Academy of Medical Sciences of the U.S.S.R., Immunology and Oncology Department, Moscow.

BRONDZ, B.D. (Moskva, Baltiyskaya ul., d.10, kv.69)

Studies in vivo and in vitro on the cytotoxic effect of cellular and humoral antibodies. Report No.2: Interrelation of immune lymphocytes and homologous normal and tumor tissues. Vop onk. 10 no.8:64-71 '64. (MIRA 18:3)

1. Iz otdela immunologii i onkologii (zav. - deystvitel'nyy chlen AMN SSSR prof. L.A.Zil'ber) Instituta eksperimental'noy meditsiny imeni Gamalei (dir. - prof. P.A.Vershilova), Moskva.

BRONDZ, B.D.

Methodology for cell agglutination reactions of normal and tumor tissues and of cytotoxic reactions in vitro. Biul. eksp. biol. i med. 57 no. 5: 64-69 My '64. (MIRA 18:2)

1. Otdel immunologii i onkologii (zav. - prof. L.A. Zil'ber) Instituta epidemiologii i mikrobiologii imeni Gamalei (dir. - prof. P.A. Vershilova), Moskva. Submitted December 27, 1962.

BRONDZ, B.D.; YEGOROV, I.K.

Antigenic structure of the H-2 locus of CC57BR and CC57W mice.
Biol. eksp. biol. i med. 58 no.7:90-93 J1 '64.

(MIRA 18:2)

? Otdel immunologii i onkologii (zav. - prof. L.A. Zil'ber)
Instituta epidemiologii i mikrobiologii imeni Gamalei (dir. -
prof. P.A. Vershilova), Moskva. Submitted July 8, 1963.

ACC NR: AP6017418

SOURCE CODE: UR/0221/65/059/002/0257/0283

AUTHOR: Brondz, B. D. (Moscow)

ORG: none

19
B

TITLE: Various aspects of investigation of the nature of hypersensitivity of the delayed type and of phenomena related to it

SOURCE: Uspekhi sovremennoy biologii, v. 59, no. 2, 1965, 257-283

TOPIC TAGS: immunity, antibody, antigen, enzyme, immunization

ABSTRACT: The phenomenon of hypersensitivity of the delayed type (HDT) and its significance in the formation of immunity are discussed on the basis of extensive published data on the subject and of the author's own work. It is brought out that the process of formation of immunity consists of two stages, development of cell antibodies, i.e., of a specific complementary configuration on the surface of mature small lymphocytes, and development of humoral antibodies. Some immune lymphocytes deteriorate upon reacting with the antigen, with the result that intracellular proteolytic enzymes are released which are responsible for HDT, reactions against transplantates, and other phenomena of tissue immunity. The second stage of immunization develops as a result of a transformation by interaction with the antigen of other immune lymphocytes into cells capable of developing humoral antibodies (possibly plasma cells). By administering only a small amount of antigen, irradiating experimental animals with X-rays, and applying some other methods, the second

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ACC NR: AP6017418

stage of immunization, that of formation of humoral antibodies, can be delayed and the first stage (as indicated by formation of HDT) produced in its pure form. On administration of a large amount of antigen, the second stage develops rapidly and the first stage can usually not be differentiated from it. The first stage (that of formation of immune lymphocytes) presumably forms the basis for lasting immunological tolerance by ensuring persistence of the antigen in an organism that is tolerant to it. Although it is generally assumed that cell antibodies cannot be separated from the cells, the arguments advanced to this effect are not entirely valid. [JPRS]

SUB CODE: 06 / SUBM DATE: none / ORIG REF: 011 / OTH REF: 228

Card 2/2 *W*

Boots and Shoes - Trade and Manufacture

Apparatus for determining the activity of a
solvent for granitol. Leg. prom. 12 no. 4:33-34 Ap '52

Monthly List of Russian Accessions, Library of
Congress, July 1952. Unclassified

FREIWILLIG, Rudolf; CADEK, Josef; BRONEC, Josef

Kinetics of decarburization of cold rolled silicon steel transformer sheets in the $H_2-H_2-H_2O$ and $CO-CO_2-H_2-H_2-H_2O$ atmospheres. Hut listy 16 no.9:645-651 S '61.

1. Vyzkumny ustav hutnictvi zeleza, Praha.

CHURY, J.; BRONEC, J.; KANINSKY, J.

Catalase activity of hepatic tissue, preserved at a temperature of 4°
[in Russian with summary in German]. Chekh.biol. 3 no.1:49-53 P '54.
(MIRA 7:6)

1. Institut biologii veterinarnogo fakul'teta Vysshey zemledel'cheskoy
shkoly, Brno. (Liver) (Catalase)

BRONER, A.

Prospects of the increase of labor productivity. p. 15.

PRZEGLĄD TECHNICZNY. Naczelna Organizacja Techniczna. Warszawa, Poland, Vol. 7, no. 29, July, 1959.

Monthly List of East European Accessions (EEAI), LC, Vol. 8, No. 9, September, 1959. Uncl.

МОСКВА, П. 1.

Kvartirnaia plata v RSFSR [Rent in the U.S.S.R.] 5-e izd. Moskva, Izd-vo Minist. kommunal. khoziaistva RSFSR, 1953. 62 p.

SO: Monthly List of Russian Accessions, Vol. 6 No. 11 February 1954.

BRONER, D.L.

Kvartirnaya Plata V RSFSR (Apartment Rend In The RSFSR, By)
K. L. Broner, Izd, Dop, 1 ISFR. Moskva, Izd-Vo Ministerstva
Kommunal'nogo Khozyaystva RSFSR, 1954.

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63 p. Tables.

Bibliographical Footnotes.

BRONER, D. I.

1/5
855.2
.38

Organizatsiya i ekonomika zhilishchnogo khozyaystva (Organization and economics of housing) Moskva, 1955.
351 p.

ERON, V.A., kand.tekhn.nauk

Sintering and mineralogical structure of the system $MgO-CaO-Fe_2O_3$.
Trudy Inst. ognep. no.29:90-106 '60. (MIRA 14:12)
(Refractory materials)

BRONER, D.L., kandidat ekonomicheskikh nauk, dotsent.

Computing the cost of housing maintenance in planning houses. Uch.
Zap. Mosk. ekon.-stat. inst. 6:70-86 '55. (MIRA 10:4)
(Dwellings)

BRONER, D.L., kandidat ekonomicheskikh nauk, dotsent.

Bourgeois apologetics in housing statistics. Uch. Zap. Mosk. ekon.-stat.
inst. 6:133-139 '55. (MIRA 10:4)

(Housing--Statistics)

BROMER, D.L.; ROZANTSSEV, S.N.; KHRISTENKO, V.P.; VOLKOV, S.V., tekhn.red.

[Housing management; reference manual for workers in housing management and in offices administering apartment houses]
Upravlenie zhilishchnym khoziaistvom; spravochnoe posobie dlia rabotnikov domoupravlenii i zhilishchno-ekspluatatsionnykh kontor. Izd.2., perer. Moskva, Izd-vo M-va kommun.khoz. RSFSR, 1959. 302 p. (MIRA 12:5)

(Housing management)

(Dwellings—Maintenance and repair)

BRONER, D.L.; GEL'BERG, L.A., kand. tekhn. nauk; KATS, Ye.A.; PEKLER, A.N.; FILATOV, N.L.; MORSKOY, K.L., red. izd-va; OSENKO, L.M., tekhn. red.

[Ways to lower apartment house operating expenses; on the basis of choosing efficient plans] Puti snizhenia raskhodov po ekspluatatsii zhilykh domov; na osnove vybora ratsional'nykh proektrykh reshenii. Moskva, Gos. izd-vo lit-ry po stroit., arkhitekt. i stroit. materialam, 1960. 109 p. (MIRA 14:9)

1. Akademiya stroitel'stva i arkhitektury SSSR. Institut zhilishcha. (Apartment houses--Accounting)

BRONER, David L'vovich; RYABUSHKIN, T.V., red.; YEZHOVA, L.L., tekhn.
red.

[Modern problems in housing; economic and statistical analysis]
Sovremennye problemy zhilishchnogo khoziaistva opyt ekonomicheskogo
statisticheskogo analiza. Moskva, Gos. izd-vo "Vysshaya shkola,"
1961. 263 p. (MIRA 14:10)

(Housing)

KAPUSTIN, Ye.I., kand.ekon.nauk; LAVROV, V.V.; RYUMIN, S.M.; KONSTANTINOV, Yu.A.; PRAVDIN, D.T., kand.ekon.nauk; KIRILLOVA, N.I.; RIMASHEVSKAYA, N.M.; ANTROPOV, B.F.; RYABKOV, F.S.; POPOV, G.A.; DEM'YANOVA, V.A.; SMOIYAR, I.M.; ACHARKAN, V.A., kand. yurid.nauk; BRONER, D.L.; SHEPTUN, Ye.V.; KRYAZHEV, V.G.; ALESHINA, F.Yu., kand. ekon. nauk; KUZNETSOVA, N.P.; MARKOVICH, M.B.; BIBIK, L.F.; BUDARINA, V., red.; GRIGOR'YEVA, I., mladshiy red.; CHEPELEVA, O., tekhn. red.

[Public consumption funds and improving the welfare of the people in the U.S.S.R.] Obshchestvennye fondy i rost blagosostoiania naroda v SSSR. Moskva, Sotsekgiz, 1962. 222 p. (MIRA 15:6)
(Cost and standard of living)

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SOV/117-59-8-33/44

AUTHOR: Broner, L.

TITLE: The Creators of Hydrocopying Semi-Automatic Machines

PERIODICAL: Mashinostroitel', 1959, Nr 8, pp 38-40 (USSR)

ABSTRACT: The designers of the Moskovskiy stankostroitel'nyy zavod imeni Ordzhonikidze (Moscow Machine Tool Plant imeni Ordzhonikidze), Ya.P. Mezivetskiy, B.L. Korobochkin, I.A. Rostovtsev, Ye.F. Sokolov and the former Chief Engineer of the plant M.M. Berman, were awarded the 1959 Lenin prize for the creation of hydrocopying semi-automatic machine tools. The new hydraulic co-ordinate follow-up system (Figure 1) permits the copying of parts of any configuration within 180° limits. The plant is producing a series of hydrocopying semi-automatic machines. The three main models are: "1732" (Figure 2), "1722" (Figure 3) and "1712" (Figure 4), designed mainly for the machining of multistage parts with conical, cylindrical

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SOV/117-59-8-33/44

The Creators of Hydrocopying Semi-Automatic Machines

and shaped journals of 15 to 320 mm in diameter and 150-1,600 mm long. At the zavod imeni Likhacheva (Plant imeni Likhachev) it takes only 15-20 minutes to reset such a machine for installation in automatic lines. The automatic line containing two hydrocopying machines, which received the Grand Prix at Brussels, will soon be available to the machine building industry. At present, the designers are completing a hydrocopying machine with program control. Ivan Alexandrovich Rostovtsev, Chief Designer of the plant, has received many letters of praise from the Nizhnetagil'skiy "Uralvagonzavod" (Nizhniy Tagil "Uralvagonzavod"), Gor'kovskiy Avtozavod (Gor'kiy Automobile Plant), Chelyabinskiy traktornyy zavod (Chelyabinsk Tractor Plant), Gorlovskiy mashinostroitel'nyy zavod (Gorlovka Machine Building Plant). There are 4 photos and 1 diagram.

Card 2/2

BRONER, L.

New designs of industrial buildings. Mashinostroitel' no.10:38-40
'60. (MIRA 13:10)

(Industrial buildings)

RUDAKOV, A.; VASIL'YEV, G.; BRONER, R.; MOLCHANOV, V.

Proposals made by engineers. Pozh.delo 8 no.12125 D '62.
(MIRA 16:1)

(Fire prevention--Technological innovations)

DMITRIYEV, A.Ye.; BRONEVICH, B.A.

Parents' role in preparing students for socially useful work.
Politekh.obuch. no.12:44-47 D '59. (MIRA 13:5)

1. Srednaya shkola No.21, Taganrog.
(Home and school)

BRONEVICH, G.A., inzh.

Device for removing, storing, and replacing balls in ball mills.
Elek.sta. 29 no.11:77-78 N '58. (MIRA 11:12)
(Milling machinery--Equipment and supplies)

(A) 8585-66

ACC NR: AP5021521

SOURCE CODE: UR/0113/65/000/008/0034/0035

AUTHOR: Abramson, Yu. M.; Genina, F. Kh.; Bronevitskaya, N. V.

ORG: None

TITLE: A simplified approach to automobile radio interference level testing

SOURCE: Avtomobil'naya promyshlennost', no. 8, 1965, 34-35

TOPIC TAGS: radio transmission, automobile, interference measurement 9M

ABSTRACT: The All-Union standards for tolerable industrially-produced radio interference levels also apply to automobiles. The present article describes a small-scale test stand to measure radio interference levels of automobiles simply and inexpensively. The stand is made of two mutually insulated plates the size and location of which are selected so as to achieve a sufficiently large capacitance between the upper plate and the car body (reasonable coupling) while maintaining a low capacitance between the two plates. This capacitance determines the magnitude of the HF resistance which is used to measure the voltage generated by the interference current between the automobile and the lower plate (ground). The article also gives all the pertinent formulas for the calculation of the interference level and gives some results obtained with GAZ-63 and ZIL-130 automobiles. Orig. art. has: 8 formulas, 2 figures, and 2 tables.

SUB CODE: EC, EE / SUBM DATE: none / ORIG REF: 001

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UDC: 629.113:621.391.823

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B

BRONEVITSKIY, V.P.; VISLENEV, M.V.; ZINOV'YEVA, U.Z.; MILYUGIN, A.M.;
RASIN, B.I.; FEDOROV, A.A.; FEDOROV, A.D.; FEDOTOVA, A.Ye.;
VOLKHOVER, R.S., tekhn. red.

[Central Museum of Communications named after A.S.Popov]
TSentral'nyy muzei sviazi imeni A.S.Popova. Leningrad,
1962. 234 p. (MIRA 15:11)

1. Russia (1923- U.S.S.R.) Ministerstvo sviazi.
(Leningrad--Communications museums)

FEDOROV, A.D.; VISLENEV, M.V.; BRONEVITSKIY, V.P.

"Studies of the history of radio engineering" by B.S. Sotin and V.M. Rodionov and V.M. Titova. Reviewed by A.D. Fedorov, M.V. Vislener, V.P. Bronevitskii. Vest. svyazi 21 no.7:30-31 (MIRA 16:7) J1 '61.

1. Nachal'nik TSentral'nogo muzeya svyazi imeni A.S. Popova (for Fedorov). 2. Uchenyy sekretar' TSentral'nogo muzeya svyazi imeni Popova (for Vislener). 3. Zaveduyushchiy radiotdelom TSentral'nogo muzeya svyazi imeni Popova (for Bronevitskiy).
(Radio) (Sotin, B.S.) (Rodionov, V.M.)
(Titova, V.M.)

BRONEVOY, V.A.; ZHEZHEL', O.N.; ZHILIN, S.G.

New data on the stratigraphy of Paleogene sediments in the northern part of the Aral Sea region. Dokl. AN SSSR 152 no.6: 1412-1415 0 '63. (MIRA 16:11)

1. Vsesoyuznyy nauchno-issledovatel'skiy geologicheskiiy institut. Predstavleno akademikom V.N. Sukachevym.

BRONEVOY, V.A.; KIRYUKHIN, L.G.; MERELIN, P.I.; PLEKHICHYEV, I.S.

Stratigraphy of Oligocene sediments in the southwestern part of
the Chagrayskoye Plateau. *Blul. MOIP. Old.geol.* 39 no.5:96-100
S-0 '64.

(MIRA 18:2)

BRONEVSKIY, F.I., inzh.

RNV-L type minimum voltage relay with time delay. Energetik 13
no.1:24-25 Ja '65. (MIRA 18:3)

LAGOVSKIY, Andrey Nikolayevich, polkovnik; BRONEVSKIY, S.S., general-mayor,
red.; GOLUNOV, A.V., polkovnik, red.; MEDVIKOVA, A.N., tekhn.red.

[Strategy and economics; a brief study of their interrelation]
Strategiya i ekonomika; kratkii ocherk ikh vzaimnoi svyazi i
vzaimnogo vliianiia. Moskva, Voen.izd-vo M-va obor.SSSR, 1957.
199 p. (MIRA 11:1)

(War--Economic aspects)

KAYZER, A.O.; BRONEVSKIY, V.A.

New equipment for multihole drilling. Razved. i okh. nedr 27
no.8:17-23 Ag '61. (MIRA 16:7)

1. Kazakhskiy nauchno-issledovatel'skiy institut mineral'nogo
syr'ya Ministerstva geologii i okhrany nedr KazSSR.
(Boring machinery)

DUM, E.V.; FAYERMAK, B.G.; BRONFEN, P.M.

The SBC-1m boring machine for boring gas drainage holes in coal mines. Ugol' 40 no.12:60-61 D '65. (MIRA 18:12)

1. Giprouglegormash, Karaganda (for Dum). 2. Mashinostroitel'nyy zavod Karagandinskogo soveta narodnogo khozyaystva (for Fayermak, Bronfen).

BRONFENBRENER, P., gvardii inzhener-podpolkovnik

Training of tank drivers. Voen. vest. 42 no.10:52 0 '62.

(Tanks (Military science))

(MIRA 15:10)

CHUDNOVSKIY, A.R. [Chudnovs'kyi, A.R.]; BRONFENBRENER, Z.V.

Factors affecting the shrinkage of plastics. Khim. prom.
[Ukr.] no.3:9-13 J1-S '63. (MIRA 17:8)

1. Chernomorskiy sovet narodnogo khozyaystva.

SHKOL'NIKOV, V.M.; BRONFIN, I.B.

Double-stage deasphalting of crude residues from the Tuymazy
petroleum. Nefteper. i neftekhim. no.6:9-13 '63 (MIRA 17:7)

1. Omskiy neftepererabatyvayushchiy zavod.

I 22479-66 EWT(m)/T DJ
 ACC NR: AP6007939 (A) SOURCE CODE: UR/0318/66/000/001/0020/0022

AUTHOR: Bronfin, I. B.; Sidorskaya, L. F.; Slepchenko, L. G.; Vinnikova, R. A.; Kurach, L. S.

ORG: Omsk Oil Refinery (Omskiy neftepererabatyvayushchiy zavod) 38
 B

TITLE: Synthesis of alkylphenols for oil additive manufacturing using silica-alumina catalysts

SOURCE: Neftepererabotka i neftekhimiya, no. 1, 1966, 20-22

TOPIC TAGS: alkylphenol, petroleum product, lubrication oil, lubricant, lubricant property, lubricant additive

ABSTRACT: Catalytic synthesis of alkylphenols based on technical grade phenol fraction and olefin fraction boiled below 80°C was investigated. The synthesis was conducted by passing a mixture of 27-28 wt % phenol fraction and 72-73 wt % olefin fraction through a tubular reactor packed with silica-alumina cracking catalyst. At an optimum reaction temperature equal to 150°C, the yield of alkylphenols was 25-30 wt % per pass. The lubricating oil additive based on the product alkylphenol was found to conform to the GOST standard for quality. Alkylphenol characteristics reaction temperature is graphed. Orig. art. has: 4 figures.

SUB CODE: 07, 11 SUBM DATE: 00/ ORIG REF: 008/ OTH REF: 002
 Card 1/1 BK UDC: 665.652.4-4 : 665.4-4 : 66.022.313

BROFEN, M.B.; MARICHEV, V.A.

High-vacuum unit for testing sublimation by the continuous
weighing method. Zav. lab. 31 no. 12:1522-1524 '65
(MIRA 19:1)

18(7)

AUTHORS:

Krasil'shechik, V. Z., Svetlov, I. L., Bronfin, M. B.

SOV/32-25-9-15/53

TITLE:

Determination of the Diffusion Coefficient According to the Method of Residual Gamma Activity

PERIODICAL:

Zavodskaya laboratoriya, 1959, Vol 25, Nr 9, pp 1072-1074 (USSR)

ABSTRACT:

The simplified method (Ref 3) of the removal of thin layers for the determination of diffusion in solid bodies based upon a measurement of the difference of radioactivity in a certain layer depth, contain a large determination error. It was found that, if the diffusion coefficient (D) is not determined according to the gamma activity, but according to the absolute values, the determination accuracy may be increased. For this purpose the relationship between the value of the integral gamma activity of the sample, from which a layer of the thickness h was taken, and the value (D) must be determined. A diagram of

the function $\phi^{-1} \left(\frac{I_o - I_h}{I_o} \right)$ (I_o = initial activity (pulses/min)

proportional to the quantity of the radioactive element placed upon the sample surface, I_h = integral activity of the sample

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Determination of the Diffusion Coefficient
According to the Method of Residual Gamma Activity

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after the removal of a layer of the thickness h) versus the thickness h of the removed layer, is obtained; it is a straight line from whose tangent of the inclination angle the value (D) may be directly determined. The autodiffusion of zinc was investigated to test the method. 99.9%-Zn and the radio isotope Zn^{65} were used. The intensity of the radioactive radiation was measured on the apparatus B-2 with a gamma counter MS-4, and the autodiffusion of Zn at 325, 350, 375, and 400° was investigated after 40, 34, and 22 hours. The maximum determination error of (D) amounts to 10% (Table). There are 1 figure, 1 table, and 5 references, 3 of which are Soviet.

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BRONFIN, M.B., BOKSHEYN, S.Z., ZHUKHOVITSKIY, A.A.

Determination of the diffusion coefficient from the
displacement of the activity curve. Zav.lab. 26 no.7:
828-830 '60. (MIRA 13:7)

(Diffusion) (Radioisotopes)

S/806/62/000/003/002/018

AUTHORS: Bronfin, M. B., Bokshteyn, S. Z., Kishkin, S. T.

TITLE: The self-diffusion of molybdenum in molybdenum-zirconium alloys.

SOURCE: Akademiya nauk SSSR. Institut metallurgii. Issledovaniye splavov tsvetnykh metallov. no. 3. 1962, 12-18.

TEXT: The paper describes experimental work done to clarify the dependence of the volumetric self-diffusion (SD) parameters of Mo on two factors: (1) the amount of alloying Zr present; (2) the antecedent cold-working of Mo alloys. The work is intended as a contribution to correlations between the rate of self-diffusion and creep, such as those which O. D. Sherby, R. L. Orr, et al. have tried to establish causally (J. of Metals, v. 6, no. 1, Sect. I, 1954, 71-79; Trans. ASM, v. 46, 1954, 113-128). Test material and methodology: Large-grain specimens were used to reduce the share of boundary diffusion in the total diffusional flux. The Mo and its Zr alloys were vacuum arc-smelted, rolled into an 18-mm diam rod, and high-T annealed at above 1700°C; the alloys ranged from 0.005% Zr to 0.54% Zr. Right-cylindrical plane-parallel specimens 14-mm diam, 4-mm high, were cut out of the rods and were subjected to a 10-15-hr stabilizing anneal at 1,950-2,000°C in a 10^{-3} - 10^{-4} torr vacuum, whereupon the grain size in all specimens attained 1-2 mm.

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The self-diffusion of molybdenum ...

S/806/62/000/003/002/018

Part of the specimens were upset on a press at 20° (height reduction 25%) to investigate the effect of cold working on the SD of the Mo. The specimens were electrically polished, whereupon one of their faces was activated with radioactive Mo⁹⁹ in a galvanic bath. Diffusion anneal was then performed in a special vacuum furnace (exploded view shown) at 10⁻³-10⁻⁴ torr and 1,720-2,000°C. The SD coefficient was measured by the two senior authors' method (Zavodskaya laboratoriya, no.7, 1960, 828-830) based on the shift in the activity curve (summarized). Test results: The self-diffusion parameters measured (and tabulated) indicate an appreciable augmentation effect of even small additions of Zr on both the self-diffusion activation energy of the Mo and the factor before the exponential term. Thus, at T above 2,000°C the SD coefficient of Mo does not depend on the alloying, but at T below 1,700°, in which the value of the activation energy is decisive, the SD rate decreases with increasing Zr content (numerical values tabulated). Even though antecedent cold-working depresses the SD activation energy of the Mo in Mo-Zr alloys, the activation energy of upset specimen increases with increasing Zr content. Inasmuch as the diffusion anneal of the deformed alloys was performed at a T substantially above their recrystallization T, the latter was completed in but a fraction of the anneal time, and the diffusion in the grain volume continued through an extended time in the absence of any structural transformation, so that any observed lowering of the SD activation energy of the Mo is regarded as a result of irreversible structural changes attribu-

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The self-diffusion of molybdenum ...

S/806/62/000/003/002/018

table to the cold-working of the alloy. The increase in activation energy during the anneal is attributed to a healing of crystalline-lattice defects which previously had served as "short-cut paths" for the diffusion; cold-working appears to firm up the defects, thereby inhibiting the healing effect of the anneal. The relationship between the SD coefficient and the activation energy is further examined and, in agreement with G. J. Dienes (J. Appl. Phys., v.21, no.11, 1950, 1189) and 3 Soviet authors, is found to be exponential. The results of this investigation agree with existing knowledge on the favorable effect of relatively small additions to Mo on its recrystallization T, its hardness (ref. Pipitz, E., Kieffer, R., Zs. f. Metallkunde, v. 46, no. 3, 1955, 187-194), and its high-T stress-rupture strength (Northcott, L. Molybdenum. Russian translation, Moscow. Foreign Lit. Publ. House, 1959, 107-108). There are 2 figures, 4 tables, and 16 references (11 Russian-language Soviet, 1 German cited above, 4 English-language of which 1 is a Russian translation).

ASSOCIATION: None given.

Card 3/3

S/129/62/000/009/001/006
E071/E492

AUTHORS: Bokshteyn, S.Z., Doctor of Technical Sciences, Professor,
Bronfin, M.B., Engineer, Kishkin, S.T., Doctor of
Technical Sciences, Professor, Moroz, L.M., Candidate
of Technical Sciences

TITLE: Grain boundaries on recrystallization

PERIODICAL: Metallovedeniye i termicheskaya obrabotka metallov,
no.9, 1962, 6-8

TEXT: This is a continuation of earlier work ("Zavodskaya laboratoriya", no.10, 1960). The behaviour of W, Ni, Sn and C admixtures present at the grain boundaries during recrystallization of iron (0.021% C, 0.014% P, 0.011% S, 0.67% Si, 0.07% Al, 0.08% Mn, 0.06% Ni, 0.033% Cu) was studied by autoradiographic investigation and microstructural analysis. The admixtures, forming with iron substitutional solid solutions in the case of W, Ni, Sn and interstitial solid solutions in the case of C, were introduced by diffusion saturation at 600 to 700°C. The recrystallization was carried out after preliminary deformations of 10 to 15 and 50 to 70%. The Ni, W and Sn were completely
Card 1/3

Grain boundaries ...

S/129/62/000/009/001/006
E071/E492

soluble in iron at all recrystallization temperatures investigated and remained in their original lattice positions, despite substantial changes in the structure of the metal. The behaviour of carbon atoms was substantially different: above 750°C carbon passed from the boundaries of deformed grains to the boundaries of new recrystallized grains. However, in the initial stages of recrystallization (after 30 to 45 min at 650 to 750°C) carbon atoms remain at the boundaries of the initial grains and boundaries of the new grains remain free from carbon. The possibility of "heredity", i.e. preservation of the initial structural and concentration non-uniformities in recrystallized metal was demonstrated on a molybdenum alloy (0.54% Zr, 0.005% Cr, 0.0008% Ti and 0.011% C). A thin layer of tungsten 185 was electrodeposited on the surface of a flat specimen of the deformed alloy, submitted to a preliminary annealing at 1700°C. The activated specimen was then annealed in vacuo at 1750°C for 100 hours. Autoradiographs of an oblique section showed the presence of an accelerated diffusion not only along the boundaries of the newly formed grains but also a preferential penetration of

Card 2/3

Grain boundaries ...

S/129/62/000/009/001/006
E071/E492

the w185 along those sections where old grain boundaries were passing before recrystallization. The velocity of diffusion along the old boundaries was lower than along the new boundaries, nevertheless it was noticeably faster than volume diffusion. The results confirmed that within the grains the process of grain boundary migration does not produce as high concentration of defects as is produced at the beginning and at the end of the boundary migration. There are 6 figures.

Card 3/3

S/032/62/028/012/015/023
B108/B186

AUTHORS: Bronfin, M. B., and Shabanov, N. N.

TITLE: A portable apparatus for stripping parallel microlayers from metal samples

PERIODICAL: Zavodskaya laboratoriya, v. 28, no. 12, 1962, 1508 - 1510

TEXT: A combined electrolytic and mechanical method is used. The specimen is rotated at high speed in contact with a simultaneously reciprocating ground cast iron disk. This disk is coated with abrasive micropowder with a few drops of electrolyte added. A small recess in the center of the iron disk prevents continuous contact over the entire sample surface, which guarantees uniform abrasion. When direct current is passed through the specimen for electrolytic dissolution of the sample surface the recess in the disk will compensate the higher current density at the edge of the cylindrical specimen. For a current density of 2 - 2.5 a/cm², with micro-powder, type M20 (M20) and 10% NaCl solution a layer of 15μ is removed from a molybdenum sample in 30 sec. The size of the apparatus is 360·220·440 mm. It weighs 12 kg. There is 1 figure. ✓

Card 1/1

L 13985-65 EMT(1)/GPT(m)/EAP(e)/EAP(o)/EPT(n)-2/EVA(d)/T/EAP(k)/EAP(w)/EAP(t)
SSD/AFWL/ASD(f)-2/ARD(m)-3 JD/JG/MLK

ACCESSION NR: AT4048127

S/0000/63/000/000/0123/0127

AUTHOR: Bokshteyr, S. Z., Bronfin, M. B., Marichev, V. A.

TITLE: Effect of preliminary plastic deformation on the internal friction of molybdenum and molybdenum alloys

SOURCE: Vsesoyuznaya konferentsiya po relaksatsionny^m yavleniyam v metallakh i splavakh. 3d, Voronezh, 1962. Relaksatsionny^e yavleniya v metallakh i splavakh (Relaxation phenomena in metals and alloys); trudy* konferentsii. Moscow, Metalurgizdat, 1963, 123-127

TOPIC TAGS: molybdenum, molybdenum alloy, internal friction, molybdenum plastic deformation.

ABSTRACT: The authors investigated the relationship between the temperature of maximum internal friction connected with plastic deformation and the grain size, in an attempt to explain the shift of the deformation maximum toward high temperatures when the grain size increases. Molybdenum powder and cast binary alloys of molybdenum with zirconium (0.13% Zr) and rhenium (50% by weight of Re) were tested; the 110-120 mm wire samples were tested on a torque pendulum in a vacuum.

Card 1/3

L 13985-65
ACCESSION NR: AT4048127

of 10^{-5} mm Hg. The heating rate was 2 deg/min. in the 20-1000C range. Maximum deformation was below 10^{-5} . The torque oscillation frequency for measuring internal friction was 0.35-0.40 cycles/sec. Hydrochloric acid in an all-cadmium solution was used for electrolysis of the sample to increase the internal friction. All alloys passed through recrystallization at three different temperatures. The maximum of internal friction after preliminary plastic deformation was on the high temperature side, but the internal friction constantly decreased as the temperature increased, especially between 200 and 600C. In the discussion, it is pointed out that modern theory considers the crystal structure to be a three-dimensional lattice, segments of which may bend under low stress. The equation derived in the paper shows that the modulus of elasticity of material with dislocation locations is lower than for materials without dislocations. Plastic deformation thus increases the dislocation density in the metal grains, lowering the effective modulus of elasticity and increasing internal friction. The maximum of internal friction connected with plastic deformation is reached only for a certain relationship of degrees of freedom of oscillating dislocations and introduced atoms or admixtures. The irreversible lowering of internal friction at temperatures exceeding the maximum temperature is caused in the opinion of the authors, not only by an increase in the diffusion mobility of the introduced atoms, but also

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ACCESSION NR: AT4048127

4

by the lowering of relatively free dislocations due to polygonization. The lack of a maximum connected with plastic deformation for the molybdenum-rhenium alloy indicates that there is a great difference between the deformation of this alloy and that of the molybdenum-zirconium alloy or pure molybdenum. For the molybdenum-rhenium plastic deformation is not accompanied by the quantity of relatively free dislocations, with the appearance of the deformation maximum. The deformation of the molybdenum-rhenium alloy is characterized by a high degree of plasticity.

ASSOCIATION: Vsesoyuznyy institut aviatsionnykh materialov (All-Union Institute of Aviation Materials)

SUBMITTED: 10Nov63

ENCL: 00

SUB CODE: MM

NO REF SOV: 001

OTHER: 001

Card 3/3

BOKSHTEYN, S.Z.; BRONFIN, M.B.; KISHKIN, S.T.; MARICHEV, V.A.

Internal friction of deformed molybdenum and its alloys with
zirconium and rhenium. Fiz. tver. tela 5 no.11:3075-3080 N
'63. (MIRA 16:12)

ACCESSION NR: AT4040405

S/0000/64/000/000/0025/0035

AUTHOR: Bokshcheyn, S. Z.; Bronfin, M. B.; Kishkin, S. T.

TITLE: Surface and bulk diffusion of tungsten in molybdenum

SOURCE: *Protsessy* diffuzii, struktura i svoystva metallov* (Diffusion processes, structure and properties of metals); *sbornik statey*. Moscow, Izd-vo Mashinostroyeniye, 1964, 25-35

TOPIC TAGS: tungsten, molybdenum, surface diffusion analysis, bulk diffusion analysis, autoradiographic analysis method, activity curve analysis method, diffusion coefficient, diffusion equation, diffusion activation entropy, vacancy formation energy

ABSTRACT: The radioactive isotope W^{185} was electroplated on fine-grained flat plates of Mo for autoradiographic analyses of bulk diffusion and surface diffusion, as well as on coarse-grained cylindrical samples for bulk diffusion analyses based on displacements of activity curves. Diffusion coefficients were determined for all samples (see Table 1 in the Enclosure) and further processing yielded the equations

$$D = 3.18 \exp [-(112900 \pm 1000)/RT] \text{ cm}^2/\text{sec}$$

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ACCESSION NR: AT4040405

for bulk diffusion and

$$D_{\text{surf}} = 1.1 \exp(-77000/RT) \text{cm}^2/\text{sec}$$

for surface diffusion. It is concluded that the entropy of activation of Mo self-diffusion is greater than zero, in agreement with Zener's theory of D_0 for atomic diffusion, and approximate values for the entropy of activation of W diffusion in Mo. Energy of vacancy formation $Q_0 = 36$ kcal/g-atom, ratio $Q_0/Q_{\text{diff}} = 0.3$ to 0.4 (0.32 for Mo, 0.39 for Cr). Orig. art. has: 8 formulas, 4 figures and 4 tables.

ASSOCIATION: none /

SUBMITTED: 09Dec63

DATE ACQ: 28May64

ENCL: 02

SUB CODE: MM

NO REF SOV: 011

OTHER: 012

Card 2/4

ACCESSION NR: AT4040405

ENCLOSURE: 01

Table 1. Diffusion coefficient in $\text{cm}^2/\text{sec.}$ for diffusion of W in No.

Temp. of diffusion annealing in °C	1700	1750	1830	1850	1880	1900
Bulk diffusion, activity curve displacement analysis (hrs.)	—	—	5.8×10^{-12} (47.5)	—	1.1×10^{-11} (109.5)	—
Bulk diffusion, autoradiographic analysis (hrs.)	9.9×10^{-12} (112)	2.0×10^{-12} (108)	—	8.9×10^{-12} (103)	—	1.2×10^{-11} (99)
Intercrystalline diffusion	—	5.4×10^{-9}	—	1.3×10^{-8}	—	2.0×10^{-8}

Card 3/4

ACCESSION NR: AT4040405

ENCLOSURE: 02

1950	2100
3.1×10^{-11}	1.25×10^{-11}
(59)	(24)
—	—

Card

4/4

ACCESSION NR: AT4040406

S/0000/64/000/000/0036/0039

AUTHOR: Bronfin, M. B.

TITLE: Diffusion of rhenium in molybdenum

SOURCE: Protsessy* diffuzii, struktura i svoystva metallov (Diffusion processes, structure and properties of metals); sbornik statey. Moscow, Izd-vo Mashinostroeniye, 1964, 36-39

TOPIC TAGS: molybdenum, molybdenum alloy, molybdenum self diffusion, rhenium, rhenium diffusion

ABSTRACT: Alloys representing solid solutions of rhenium in molybdenum are characterized by unusual plasticity at low temperatures and by a high recrystallization threshold. However, an Re content of 50% represents the limit of solubility, above which precipitation of the sigma phase begins, accompanied by considerable embrittlement. The processes of solution and precipitation of a phase in a solid solution are to a great extent determined by the diffusional mobility of the atoms of the alloy components. For this reason, measurement of diffusion constants is useful for estimation of the temperature- and time-dependent stability of the plastic properties of Mo-Re alloys. In the present study, the diffusion coefficient of

ACCESSION NR: AT4040406

rhenium was determined in cylindrical specimens of Mo prepared in a vacuum arc furnace and subjected to preliminary annealing at 2000C. Radioactive Re^{186} was used as a tracer, and the coefficients of diffusion were determined by the method of activity curve shifting, following diffusion annealing at temperatures of 1700-2100C. Analysis of the results (diffusion coefficient rising from 0.28 to $17.0 \times 10^{-11} \text{cm}^2/\text{sec.}$ with increasing temperature) revealed the following empirical relationship between the diffusion coefficient of rhenium in molybdenum and temperature:

$$D = 9.7 \times 10^{-2} \exp\left(-\frac{94700}{RT}\right) \text{ cm}^2/\text{sec.}$$

Since the self diffusion of molybdenum is given by:

$$D = 4.5 \exp\left(-\frac{113000}{RT}\right) \text{ cm}^2/\text{sec.},$$

the activation energy of self diffusion of molybdenum is considerably greater than that of rhenium diffusion in molybdenum. This difference, about 19 kcal/g-atom, is apparently caused by the different polarity and dimensions of the ions of the solvent and the solute, as a result of which the Re atoms diffuse 1.7-2.5 times

the solvent and the solute, as a result of which the Re atoms diffuse 1.7-2.5 times
Card 2/3

ACCESSION NR: AT4040406

as rapidly. "N. N. Shabanov took part in the experimental work." Orig. art. has:
1 table, 1 figure and 2 formulas.

ASSOCIATION: none

SUBMITTED: 09Dec63

DATE ACQ: 28May64

ENCL: 00

SUB CODE: MM

NO REF SOV: 003

OTHER: 001

Card 3/3

ACCESSION NR: AT4040407

S/0000/64/000/000/0040/0051

AUTHOR: Bokshteyn, S. Z.; Bronfin, M. B.; Kishkin, S. T.; Marichev, V. A.

TITLE: Investigation of conditions at the grain boundaries in molybdenum and its alloys with zirconium and rhenium by the method of internal friction

SOURCE: Protsessy* diffuzii, struktura i svoystva metallov (Diffusion processes, structure and properties of metals); sbornik statey. Moscow, Izd-vo Mashinostroyeniya, 1964, 40-51

TOPIC TAGS: molybdenum, molybdenum alloy, molybdenum grain boundary, molybdenum rhenium alloy, molybdenum zirconium alloy, rhenium, zirconium, internal friction, stress relaxation, alloy diffusion.

ABSTRACT: The mechanism of stress relaxation at the grain boundaries in pure metals is known to be affected by the presence of alloying elements, but precisely how is still unclear. The study of internal friction, based on measurement of the forced oscillation dampening of a polycrystalline specimen is a sensitive method for investigation of the structural conditions of a metal generally, and particularly at the grain boundaries. The present authors experimented with specimens of 99.98% pure sintered molybdenum; a Mo - Zr alloy containing 0.13% Zr,

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ACCESSION NR: AT4040407

0.008% C, 0.006% O₂, and 0.0007% H₂; and Mo+50% Re. The specimens were subjected to torsional oscillations (0.3-0.4 cycles/sec.) at various temperatures in a range of about 20 - 1000C, after annealing at temperatures up to 2000C. The test installation was originally developed by V. B. Osvenskiy and is shown schematically in modified form, in Fig. 1 of the Enclosure. The activation energy H of internal friction was determined from the expression

$$\log Q^{-1} = \log \frac{\Delta M}{\omega T_0} - 0.4346 \frac{H}{RT}$$

under the assumption that $\log \frac{\Delta M}{\omega T_0} = \text{const.}$ Fig. 2 of the Enclosure shows the temperature dependence of Q^{-1} for the 3 materials compared. The results showed that the boundary relaxation begins to grow at different temperatures in different alloys. Thus, this temperature is 700C for the Mo-Re alloy and about 600C for pure molybdenum or Mo+0.13% Zr. Beginning at 700C, the highest level of internal friction is shown by unalloyed molybdenum; the lowest - by its alloy with 50% rhenium. If the internal friction along the grain boundaries depended only on the activation energy, it should be maximal in the Mo-Zr alloy, and not in

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ACCESSION NR: AT4040407

pure molybdenum. A mechanism of boundary relaxation is therefore suggested which is connected with a migration of interstitial solutes such as oxygen, carbon and nitrogen. This migration requires less energy than the displacement of the diffusionally more inert atoms normally occupying the nodal points in the lattice. This could explain the relatively low activation energy of internal friction found at the grain boundaries. Qualitatively, the influence of diffusional replacement components can be explained by the mutual interaction between these components and the migrating atoms of penetrating components, as well as the ability of the replacement components to alter the structural imperfections in intergranular zones. "The authors express thanks to Ye. M. Savitskiy and M. A. Tytkina for supplying the Mo-Re alloy." Orig. art. has: 5 figures and 4 formulas.

ASSOCIATION: None

SUBMITTED: 09Dec63

SUB CODE: MM

NO REF SOV: 003

ENCL: 02

OTHER: 005

Card: 3/5

ACCESSION NR: AT4040408

S/0000/64/000/000/0052/0058

AUTHOR: Bronfin, M. B.; Marichev, V. A.

TITLE: Internal friction in stressed molybdenum alloys

SOURCE: Protsessy* diffuzii, struktura i svoystva metallov (Diffusion processes, structure and properties of metals); sbornik statey. Moscow, Izd-vo Mashinostroyeniye, 1964, 52-58

TOPIC TAGS: internal friction, molybdenum, molybdenum alloy, stressed molybdenum alloy, plastic deformation, sintered molybdenum, molybdenum zirconium alloy, molybdenum rhenium alloy, rhenium, zirconium

ABSTRACT: Curves characterizing the temperature dependence of internal friction in cold-worked metals sometimes show a peak which is reduced after low-temperature annealing and which disappears after recrystallization. Previous studies with iron have shown that a significant increase in internal friction can be produced only by relatively free dislocations existing within the sub-grains, and only in the presence of dissolved nitrogen and oxygen. In the present study, wire made of sintered molybdenum and binary alloys of molybdenum with zirconium (0.13%) and

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ACCESSION NR: AT4040408

rhenium (50%) was investigated for internal friction after plastic deformation, and an attempt was made to correlate the temperature dependence of the maximal internal friction with the grain size. The wire was subjected to torsional oscillations (0.35-0.4 cycles/sec.) in a vacuum at 20-1000C, and the total deformation in the elastic range was considered to be the sum of the deformations arising from displacement of atoms and the bending of dislocation loops in a three-dimensional lattice. The results are shown in the Enclosure. It can be shown theoretically that a material containing dislocations has a lower shear modulus than a material without dislocations, and that plastic deformation increases the density of dislocations inside the metal grains. In freshly deformed metals, there are considerable distortions inside the subgrains. Annealing below the recrystallization temperature reduces the inner distortions because of polygonization, and decreases the deficiency of the shear modulus. The present results indicate that the intensive fixation of dislocations by polygonization, interactions with point defects and other processes occurs in a temperature range of 250-600C. The maximal internal friction shifts toward lower temperatures with increasing plastic deformation, and toward higher temperatures with coarser grain structure. The irreversible decrease in internal friction at temperatures

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ACCESSION NR: AT4040408

higher than that corresponding to the maximal internal friction can be explained not only by an increase in the diffusional mobility of the atoms, but also by a decrease in the number of relatively free dislocations caused by polygonization processes. The absence of an internal friction peak after plastic deformation of the Mo+50%Re alloy leads the authors to the conclusion that, in this alloy, plastic deformation is not accompanied by creation of a sufficient number of relatively free dislocations. Orig. art. has: 3 figures and 3 formulas.

ASSOCIATION: None

SUBMITTED: 09Dec63

DATE ACQ: 28May64

ENCL: 01

SUB CODE: MM

NO REF SOV: 005

OTHER: 003

Card 3/4

ACCESSION NR: AT4040414

S/0000/64/000/000/0110/0112

AUTHOR: Bokshteyn, S. Z.; Bronfin, M. B.

TITLE: Effect of hereditary structure in molybdenum and its alloys

SOURCE: Protsessy* diffuzii, struktura i svoystva metallov (Diffusion processes, structure and properties of metals); sbornik statey. Moscow, Izd-vo Mashinostroyeniye, 1964, 110-112

TOPIC TAGS: molybdenum, molybdenum zirconium alloy, alloy structure, hereditary structure, structure effect

ABSTRACT: The effect of hereditary structure (residual structure defects in regions corresponding to the original grain boundaries) in molybdenum and molybdenum-zirconium alloys was investigated by the method of tagged atoms. A layer of W^{185} was electrically deposited on the surface of specimens vacuum annealed (10^{-3} — 10^{-4} mm Hg) at 1700C for 14 hr. The specimens were then held at 1750C for 108 hr. The growth of the molybdenum grains at 1750C was completed in 100 min and no further change in grain size occurred in the succeeding 10,000 min. The autoradiograms of the diffusion zone showed that W^{185} penetrates not only along the grain boundaries formed at 1750C but also along the

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ACCESSION NR: ^TAP4040414

initial grain boundaries, i.e., those which existed prior to diffusion annealing. This indicates that even prolonged diffusion annealing does not eliminate structural defects in places where the initial grain boundaries were located. In the molybdenum-zirconium alloy (0.54% zirconium) the phenomenon was expressed much more sharply than in unalloyed molybdenum, owing probably to the presence of very stable zirconium compounds (either oxide or carbide type). The diffusion along the new grain boundaries was more intensive, which indicates a higher density of defects than is found along the old boundaries. It is suggested that the phenomenon observed can be utilized for improving the ductility of molybdenum at room temperature. Under certain conditions at recrystallization it could be expected that the old boundaries would serve as a kind of trap for the atoms of harmful interstitials such as carbon, oxygen, and nitrogen, and would thus reduce the content of these interstitials in the new grain boundaries. Orig. art. has: 2 figures.

ASSOCIATION: none

Card 2/32

L 56052-65 EWT(m)/EWA(d)/ PR/T/EWP(l)/EWP(z)/EWP(b)/EWA(c) Pa-4 IJP(c)
ACCESSION NR: APS010555 MJW/JD/JW UR/0129/65/000/004/0036/0018
532.72:669.71'72

AUTHOR: Bokshteyn, S. Z.; Bronfin, M. B.; Kishkin, S. T.; Marichev, V. A.

TITLE: Study of the diffusion of magnesium in aluminum by means of evaporation in a vacuum

SOURCE: Metallovedeniye i termicheskaya obrabotka metallov, no. 4, 1965, 36-38

TOPIC TAGS: magnesium diffusion, aluminum alloy, vacuum evaporation, magnesium containing alloy

ABSTRACT: The diffusion of magnesium in aluminum was studied at 278-425C by evaporation from an open surface. Samples of the Al-Mg alloy AMg6 containing 6.35% Mg were used. As time elapses, the surface layers of the sample become depleted of Mg; a concentration gradient is thus created which causes the migration of magnesium by diffusion from the middle layers to the surface. Subsequently, Mg evaporates at the rate at which it is supplied by this diffusion. The evaporation was determined from the weight loss of the sample, and kinetic curves of the specific weight loss under isothermal conditions were plotted for several temperatures. From these curves, the coefficients of diffusion of magnesium in

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L 56052-65

ACCESSION NR: AP5010555

aluminum were calculated for 275, 300, 350, 375, 400, and 425C by assuming that the diffusion coefficient is independent of the Mg concentration, which is zero at the surface of the sample in the course of the isothermal process. The activation energy of the diffusion of Mg in Al was obtained graphically, and found to be 28.50 kcal/g-at. Orig. art. has: 2 figures, 1 table, and 2 formulas.

ASSOCIATION: None

SUBMITTED: 00

ENCL: 00

SUB CODE: MM, SS

NO REF SOV: 001

OTHER: 003

Card

MR
2/2

L 00737-66 EWP(e)/EPA(s)-2/EWT(m)/EPF(c)/EWP(i)/EPA(w)-2/EWP(t)/EWP(b)/ETC(m)
IJP(c) JD/WJ/WH

ACCESSION NR: AP5022693

UR/0181/65/007/009/2603/2606

AUTHOR: Bronfin, M. B.; Zhukhovitskiy, A. A.; Marichev, V. A.

56
B

TITLE: Effect of oxide films on sublimation kinetics

SOURCE: Fizika tverdogo tela, v. 7, no. 9, 2603-2606

TOPIC TAGS: sublimation, aluminum oxide, magnesium oxide

ABSTRACT: One of the methods for studying rate of vaporization is continuous weighing of specimens during isothermal holding in a vacuum. When the specimens are metals which have a strong affinity for oxygen, two characteristic periods may be distinguished on kinetic curves for weight loss. In the first period, the loss in weight increases with time, then after reaching a maximum value the loss remains constant in the second period (see fig. 1 of the Enclosure). This increase in the rate of sublimation at the beginning of isothermal annealing is due to gradual destruction of the oxide film on the surface of the specimen. Kinetic curves for weight loss in some alloys show a similar shape. If the alloy base has a considerably lower vapor pressure than the dissolved material, there is a third period on the curve where the rate of sublimation decreases due to a reduction in the concentration of the volatile component on the surface of the sample. Aluminum-zinc and

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L 00737-66

ACCESSION NR: AP5022693

aluminum-magnesium alloys are examples of such systems. The authors study the first stage of the sublimation process. Thermal dissolution of magnesium and aluminum oxides is practically impossible at experimental temperatures because of their thermal stability. Therefore there should be another mechanism responsible for the destruction of these films. Nearly all surface films on metals except for aluminum have various types of microscopic discontinuities. During isothermal annealing in a vacuum, atoms of the volatile component pass through these defects and leave the surface of the metal, thus increasing the concentration of vacancies in the defect zone. Vacancy coagulation takes place due to the interface between the oxide film and the metal. With the formation of microscopic pores close to this interface, the bond between substrate and oxide film is broken and the film is destroyed, increasing the defect area. Thus the minority atoms are more rapidly evaporated, microscopic pores are formed and the autocatalytic process of film removal is accelerated. A kinetic equation is proposed for the process of sublimation when there is an oxide film on the surface of the metal. Theoretical calculations show excellent agreement with experimental results. Orig. art. has: 3 figures, 14 formulas.

ASSOCIATION: none

SUBMITTED: 06Feb65

NO REF SOV: 000

Card 2/3

ENCL: 01
OTHER: 001

SUB CODE: IC, GC

L 00737-66

ACCESSION NR: AP5022693

ENCLOSURE: 01

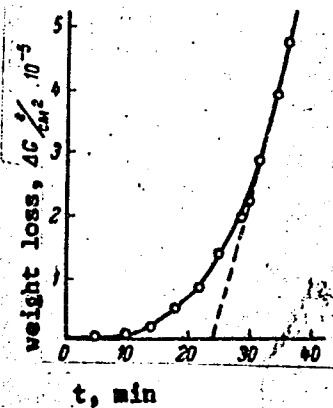


Fig. 1. Specific loss of weight for magnesium as a function of isothermal holding time at 350°C.

sp
Card 3/3

L 23718-66 EWT(m)/EWA(d)/EWP(t) IJP(c) JD/WB

ACC NR: AP6013374

SOURCE CODE: UR/0370/66/000/002/0177/0187

AUTHOR: Bokshteyn, S. Z. (Moscow); Bronfin, M. B. (Moscow); Zhukhovitskiy, A. A. (Moscow); Kishkin, S. T. (Moscow); Marichev, V. A. (Moscow)

ORG: none

TITLE: Characteristics of metal sublimation in the presence of an oxidized surface layer

SOURCE: AN SSSR. Izvestiya. Metally, no. 2, 1966, 177-187

TOPIC TAGS: sublimation, vacuum sublimation, magnesium alloy, aluminum alloy, alloy sublimation/VM65-1 alloy, V95 alloy

ABSTRACT: Theoretical and experimental studies have been made of the sublimation and mechanism of the breakdown in the presence of an oxidized surface layer of VM65-1 magnesium-base alloy (5-6% Zn, 0.3-0.9% Zr) and V95 aluminum-base alloy (2.5% Mg and 6% Zn) in a vacuum of 10^{-8} torr at a temperature of 200-380C. It was found that magnesium alloy with a surface oxide film sublimated slowly at 200 or 250C for the first 12-15 hr; then the sublimation rate increased sharply. Specimens which were vacuum annealed at 300C for 4 hr prior to testing sublimated at a high rate from the very beginning of the test (see Fig. 1). The weight of surface-oxidized V95 alloy specimens does not change at 300C for 4 hr. However, at 350C rapid sublimation begins after 10-15 min. Annealing at 340C removes the oxide film, eliminates the inoculation period, and induces rapid sublimation (as in the

Card 1/2

UDC: 669.049.6

L 23718-66
ACC NR: AP6013374

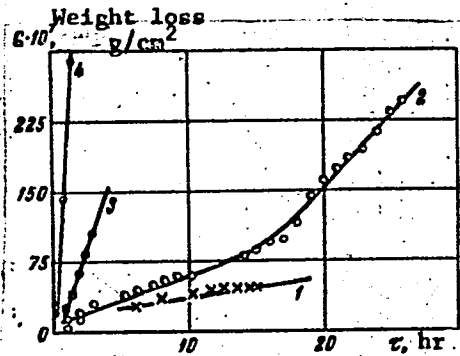


Fig. 1. Sublimation curves of VM65 alloy in vacuum

1 - 200C; 2 - 250C; 3 - 200C;
4 - 250C (3 and 4 after annealing at 300C for 4 hr).

case of VM65 alloy) at the very beginning of the test. The experimental values of the sublimation rate agree well with values obtained from kinetic equations for the sublimation process of tested alloys. Orig. art. has: 7 figures and 26 formulas.

[AZ]

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retsenzent; KLOCHKOV, V.I., inzh., retsenzent; KOROTKOV,
V.N., inzh., red.; KHITROVA, N.A., tekhn. red.

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avtopogruzchikov. Moskva, Vses. izdatel'sko-poligr. ob"edi-
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PA 45/49T45

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E073/E535

AUTHOR: Bronfman, A.I., Engineer

TITLE: Movement of a Short Electric Arc in a Magnetic Field

PERIODICAL: Vestnik elektropromyshlennosti, 1960, No.7, pp.52-56

TEXT: A number of arrester designs have been published in which the arc quenching is by means of the magnetic field. The arc quenching ability of spark gaps, which are similar to arrestors, is determined in the first instance by the behaviour of a short electric arc in a magnetic field. This behaviour is also important in various other electrical apparatus. On the basis of published data, the author reviews the behaviour of an electric arc between electrodes of non-magnetic materials generally, mentioning briefly the results of G. A. Kukekov (Ref.1), N. A. Babakov (Ref.2), O. B. Bron (Ref.3), V. V. Shmatovich (Ref.4) as well as American and British results (Refs.5-16). Furthermore, he analyses published results on the speed of movement of the arc in the various zones of the gap as functions of the field strength and the current intensity and also the behaviour of the arc at reduced atmospheric pressure and in various gases, including the anomalous "reverse" movement of the arc. In the latter part of the article
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E073/E535

Movement of a Short Electric Arc in a Magnetic Field

a similar analysis is given of published results on short electric arcs between electrodes made of ferromagnetic material, paying particular attention to d.c. arcs. The following conclusions are arrived at:

- 1) The movement of a short electric arc in a magnetic field depends on the current intensity, the field potential, the inter-electrode gap, the material and the state of the surface of the electrodes. With increasing current intensity and magnetic field potential, the speed of arc movement increases in all cases.
- 2) In the case of gaps between non-magnetic electrodes in excess of 1.3 to 3 mm, the speed of movement of arcs depends little on the material of the electrodes or the state of their surfaces. With decreasing distance between the electrodes the speed increases, reaching tens of metres per second. The speed drops by a factor of 2 to 3 in the case of field potentials below the critical one, which is estimated at tens of oersted.
- 3) In the case of smaller gaps between non-magnetic electrodes, the speed of movement of the arc depends to a considerable extent on the state of the electrode surfaces. It reaches tens of metres per

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