SKROBOV, S.A., glav. red.; TYZHNOV, A.V., zam. glav. red.; SHABAROV, N.V., zam. glav. red.; AMMOSOV, I.I., redaktor; red.; BURTSEV, D.N., red.; IVANOV, G.A., red.; KOROTKOV, G.V., red.; KOTLUKOV, V.A., red.; KUZNETSOV, I.A., red.; MIRONOV, K.V., redaktor; MOLCHANOV, I.I., redaktor; NEKIPELOV, V.Ye., red.; PONOMAREV, T.N., red.; POPOV, V.S., red.; PROKHOROV, S.P., red.; YAVORSKIY, V.I., red.; LAGUTINA, V.V., red. toma; LEVENSHTEYN, M.L., red. toma; SHIROKOV, A.Z., red. toma; IZRAILEVA, G.A., red.izd-va; KROTOVA, I.Ye., red. izd-va; IVANOVA, A.G., tekhn. red.

[Geology of coal and combustible shale in the U.S.S.R.]Geologiia mestorozhdenii uglia i goriuchikh slantsev SSSR. Glav. red. I.I. Ammosov i dr. Moskva, Gosgeoltekhizdat. Vol.1.[Coal basins and deposits in the south of the European part of the U.S.S.S;;Donets Basin, Dnieper Basin, Lvov-Volyn' Basin, deposits of the western provinces of Moldavia and the Ukraine, White Russia, Transcaucasia and the Northern Caucasus] Ugol'nye basseiny i mestorozhdeniia iuga Evropeiskoi chasti SSSR; Donetskii bassein, Dneprovskii bassein, L'vovsko-Volynskii bassein, mestorozhdeniia zapadnykh oblastei Ukrainy i Moldavii, Belorussii, Severnogo Kavkaza i Zakavkaz'ia. 1963. 1210 p. (MIRA 17:3)

1. Russia (1923- U.S.S.R.) Gosudarstvennyy geologicheskiy komitet.

GRECHISHNIKOV, Nikolay Pavlovich; BURTSEV, D.N., retsenzent; AMMOSOV, I.I., doktor geol.-miner. nauk, prof., otv. red.

[Methods of studying the material composition of solid fuel minerals] Metody issledovaniia veshchestvennogo sostava tverdykh goriuchikh iskopaemykh. Moskva, Izd-vo "Nedra," 1964. 214 p. (MIRA 17:5)

AFANAS'YEV, B.L., red.; YAROSLAVTSEV, G.M., red.; YATSUK, V.I., red.; AMMOSOV, I.I., red.

[Geology of coal and oil shale deposits of the U.S.S.R.] Geologiia mestorozhdenii uglia i goriuchikh slantsev SSSR. Moskva, Nedra. Vol.3. 1965. 488 p. (MIRA 18:5)

1. Russia (1923- U.S.S.R.) Gosudarstvennyy geologicheskiy komitet.

AMMOSOV, Innokentiy Ivanovich; VASIL'YEV, B.K., red.

[Coal oxidation zone; methods of determining the depth of the oxidation zone] Zona okisleniia uglei; metodika opredeleniia glubiny zony okisleniia. Moskva, Nauka, 1965. 90 p. (MIRA 18:7)

GOLANT, Shaya Nakhimovich, kand. tekhn. nauk; L'VOVA, Yevgeniya Dmitriyevna, inzh.; AMMOSOV, N.G., red.; FREGER, D.P., red.izd-va; [illegible]IRTS, V.L., tekhn. red.

[Increasing the durability of the finish (plastering and painting) of interior rooms by means of waterproofing] Povyshenie dolgovechnosti otdelki (shtukaturki i okraski) vnutrennikh pomeshchenii sposobom gidrofobizatsii. Leningrad, 1963. 20 p. (Leningradskii dom nauchno-tekhnicheskoi propagandy. Obmen peredovym opytom. Seriia: Stroitel'nye materialy i konstruktsii, no.5) (MIRA 17:1)

SMIRNOV, N.A., prof.; DAVIDSON, M.G.; PORADNYA, A.I.; STABNIKOV, V.N.; VEBER, M.A.; ZHADOVICH, V.K.; KRUPSKIY, A.S.[deceased]; MELAMEDOV, N.K.; SERGEYEV, V.V.: Prinimali uchastiye: AMMOSOV, N.G., inzh.; AKIMOVA, L.D., kand. tekhn. nauk, dots.; FILIPPOV, N.A., inzh., nauchn. red.; SMIRNOV, N.A., prof., red.; DNEPROVA, N.N., red.izd-va; PUL'KINA, Ye.A., tekhn. red.

[Technology of building] Tekhnologiia stroitel'nogo proizvodstva. [By] N.A.Smirnov i dr. Leningrad, Gosstroiizdat, 1963. 435 p. (MIRA 17:2)

L 22624-66 EWT(d)/T/EWP(1) IJP(c) GG/BB
ACC NR: AP6006600 SOURCE CODE: UR/0259/65/000/010/0002/0004

AUTHOR: Amosov, N. M. (Lenin prize winner, Doctor of medical sciences)

ORG: none

TITLE: Medicine in formulas. [The use of computers and mathematical models in medicine]

SOURCE: Nauka i tekhnika, no. 10, 1965, 2-4

TOPIC TAGS: mathematic model, cybernetics, diagnostic instrument, computer application

ABSTRACT: In Kiev an information retrieval system is used in the diagnosis of heart diaseses. Soon the system will be expanded to include other diseases as well. The Biocybernetics Department of the Institute of Cybernetics of the Ukrainian SSR in Kiev has developed an electronic model of the heart from a mathematical model in order to study the dynamic function of the heart. In the retrieval system, individual case histories of almost 50 different types of heart diseases are punched on perforated cards and fed into the memory bank of the computer which is programmed to compare a current set of symptoms fed into the computer with past sets, print out the most probable diagnosis, forecast the further course of the disease, and suggest the best methods of treatment. In a sample disease program, the human organism is mathematical-

Card 1/2

L 22624-66
ACC NR: AP6006600

ly depicted as a set of organs (A, B, C,...N), the impairment of whose functions may follow paths (1,2,3,...n). Then a branch diagram may be constructed out of circles numbered by Roman numerals (I,II,III,...) to show various ways in which the disease can progress from one state to another and to assign probabilities to possible series such as: "I-III-IV-*Death*" or "I-II-VI-*Cure type 1*". In regard to the new mode 1, attempts to develop mathematical analogs of an organ's complex functions lead to sets of differential equations. These may be solved by computer and used as the basis for an electronic model of the input-output or stimulus-response type. Indicators included in the Cybernetics Institute's model of the heart which was developed by a team headed by V. O. Leshchuk, include blood flow, back pressure of the arterial system, etc. There also arises the possibility of interconnecting electronic models of various organs to study the development of various types of diseases. Orig. art. has: 3 photographs, 2 figures.

SUB CODE: 06/ SUBM DATE: 00/ ORIG REF: 000/ OTH REF: 000

Cord 2/2 dw

ANDREYEV, Ye.N., kand.med.nauk; MAZINA, Ye.G., kand.med.nauk; AMMOSOV, N.P.; KORYAKINA, T.I.

Changes in tuberculosis epidemiology in Yakutsk during the period 1948-1955 [with summary in French]. Probl.tub. 35 no.8:3-7 '57. (MIRA 11:4)

1. Iz Yakutskogo filiala (dir. Ye.N.Andreyev) Instituta tuberkuleza AMN SSSR.

(TUBERCULOSIS, epidemiol.
in Russia 1948-1955 (Rus))

AMOSOV, S.A., veterinarnyy vrach (g. Kashin, Kalininskaya oblasti').

Hydrotherapy in atony and tympanites of the paunch in ruminants. Veterinariia 30 no.2:42-43 Ja '53. (MLRA 6:2)

AMMOSOV, S.A., veterinarnyy vrach.

New model tongs for castration. Veterinariia 32 no.7:71 Jl '55.
(MLRA 8:9)

1.Kashinskiy zoovettekhnikum Kalininskoy oblasti.
(CASTRATION) (VETERINARY INSTRUMENTS AND APPARATUS)

AMMOSOV, S.A., veterinarnyy vrach.

Blocking the brachial plexus in dogs. Veterinariia 33 no.1: 61-63 Ja '56. (MLRA 9:4)

1.Kashinskiy zooveterinarnyy tekhnikum.
(LOCAL ANESTHESIA)

AMMOSOV, V. (Leningrad)

Handle for the "Zenit" camera. Sov.foto 20 no.8:34-35 Ag '60.
(MIRA 13:8)
(Cameras--Equipment and supplies)

ARKOSOV, V. ..

3[illegible]089. Shirokiye vozmozhnosti razvitiya zverovodstva v kolkhozakh severnykh oblastey. (Kratkoye Izlozheniye kand. dissertatsii). Karakulevodstvo i zverovodstvo, 1949, No. 5, c. 38-41

SO: Knizhnaya Letopis', Vol. 7, 1955

AMMOSOV, V.A.

USSR / Farm Animals. Wild Animals. Q-4

Abs Jour : Ref Zhur - Biol., No 10, 1958, No 45264

Author : ~~Ammosov, V.~~
Inst : Not given
Title : The Raising of Fur-Bearing Animals in the Khanty-Mansiyskiy Okrug.

Orig Pub : S. kh. Sibiri, 1957, No. 2, 64-67

Abstract : During the last 5 years the breeding of fur animals was intensively developing in the Khanty-Mansiyskiy Okrug. On January 1, 1956, the Okrug had 134 kolkhozes, cooperatives and other fur farms numbering 9,757 heads of silver-black foxes. The income from breeding fur animals in 1955 amounted to 20% of the total income of the kolkhozes engaged in fur farming. The shortcomings in the development of fur farming in the Okrug are pointed out.

Card 1/1

AMMOSOV, V.I.; MATYUSHENKOV, V.G.

Machine for pinning together basic holders in the slubbing frame. Biul.tekh.-ekon.inform.Gos.nauch.-issl.inst.nauch.i tekh.inform. 17 no.7:57-59 Jl '64. (MIRA 17:10)

AMOSOVA, M. M.

36848. Svoyeob raznyye proyavleniya emfizemy legkikh. Trudy Med. in-ta (Izhev. gos. med. in-t), t. IX, 1949, c. 264-66

SO: Letopis' Zhurnal'nykh Statey, Vol. 50, Moskva, 1949

AMMOSOVA, M.M., dotsent

Effect on kidney function of water from the Novo-Izhevsk chloride-sulphate-calcium spring. Trudy Izhev.gos.med.inst. 13:402-405 '51. (MIRA 13:2)

1. Klinika fakul'tetskoy terapii Izhevskogo meditsinskogo instituta. Zaveduyushchiy klinikoy - dotsent D.M. Rappoport.
(NOVO-IZHEVSK (UDMURT A.S.S.R.)--MINERAL WATERS)
(KIDNEYS)

AMMOSOVA, N.A.

Materials on the hydrochemistry of floodland lakes of the Volga River near Saratov. Uch.zap.Len.un.no.126:199-211 '49.(MLRA 9:6)

1.Kafedra gidrobiologii.
(Volga Valley--Hydrology)

AUTHORS: Ammosov, I.I. and Ammosova, Ya.M. 68-5-2/14

TITLE: An investigation of changes in the microstructure of coals during thermal treatment. (Issledovaniye izmeneniya mikrostruktury ugley pri termicheskom vozdeystvii).

PERIODICAL: "Koks i Khimiya" (Coke and Chemistry), 1957, No.5, pp.9-17 (U.S.S.R.)

ABSTRACT: The character of structural changes and transformations of the components of the vitrinite group during thermal treatment was investigated. Semi-dull and semi-bright petrographic types from Kuznetsk coals of various rank (I_2, II_2; III_2 IV_2; V_2; VI_2 and VII_2) and for comparison some coals from the Donets basin were studied. Coal specimens were heated to various temperatures from 250 to 900 - 1100 C. Sections prepared from specimens so obtained were microscopically studied under reflected ordinary and polarised light. In addition, the yield of volatiles at various temperatures and plastic ranges of the coals examined were determined. It was found that on heating, vitrinites of coals from long flame to coking (metamorphic stages I_2 to IV_2) change their microstructure with the formation of pores. The beginning of changes in the microstructure of coal during heating can be used as an indication of the

Card 1/2

An investigation of changes in the microstructure of coals during thermal treatment. (Cont.) 68-5-2/14

appearance of the plastic state. Three distinct stages in the development of porous structures were observed. It was established that the beginning of changes in the microstructure of vitrinite, changes in the plastic state as well as the period of an intensive evolution of volatiles are different for coals of different rank. Changes in the microstructure taking place on the heating of coals of various rank are illustrated in 19 microphotographs.

There are 5 tables, 19 figures and 16 references, including 12 Slavic.

ASSOCIATION: IGI AN SSSR).

AVAILABLE:

Card 2/2

AMMOSOV, I.I.; AMMOSOVA, Ya.M.

Changes in the microstructure of coals due to the effect of heat.
Trudy IGI 8:66-68 '59. (MIRA 13:1)
(Coal)

LOSEV, B.I.; AMMOSOV, I.I.; MEL'NIKOVA, A.N.; AMMOSOVA, Ya.M.; CHIBISOVA, K.I.; CHERNYKH, V.I.

Use of ultrasonic waves in coal bromination. Trudy IGI 8:131-141 '59. (MIRA 13:1)
(Ultrasonic waves--Industrial application)
(Coal--Analysis)

AMMOSOV, I.I.; YEREMIN, I.V.; BABINKOVA, N.I.; GRECHISHNIKOV, N.P.; PRYANISHNIKOV, V.K.; MUSYAL, S.A.; AMMOSOVA, Ya.M.; BORODAVKIN, M.G., red. izd-va; YEPIFANOVA, L.V., tekhn.red.

[Petrographic characteristics and properties of coals]Petrograficheskie osobennosti i svoistva uglei. Moskva, Izd-vo Akad. nauk SSSR, 1963. 379 p. (MIRA 16:1)
(Coal)

KAMNEVA, A.I.; AMMOSOVA, Ya.M.; DAY I VEN' [Tai I-wen]

Changes in the microstructure of some ranks of coals of the Donets Basin after their extraction. Zhur. prikl. khim. 36 no.9:2047-2055 D '63. (MIRA 17:1)

1. Moskovskiy khimiko-tekhnologicheskiy institut imeni Mendeleyeva.

KAMNEVA, A.I.; AMMOSOVA, Ya.M.; MESSERLE, P.Ye.

Using the S-100 super centrifuge for fractionating coal.
Ugol' 39 no.5:62-63 My '64. (MIRA 17:8)

1. Khimiko-tekhnologicheskiy institut im. D.I. Mendeleyeva.

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

conductivity depending on the number of vacant places on the axis c. A trial was made to construct a hypothetical diagram of the state of alloys in the system of B and C.

Country : USSR J
Category: Soil Science. Tillage. Reclamation. Erosion.

Abs Jour: RZhBiol., No 18, 1958, No 82150

Author : Pechkurov, A.F.; Ammuil, Kh. I.
Inst : Sc. Res. Inst. of Melioration and Water Economy.
Title : Capillary Water Permeability of Peat Soils.

Orig Pub: V.sb.: Osnovnyye rezul'taty nauchno-issled. raboty Belorussk. n.-i. in-ta melior. i vodn. kh.-va za 1956 g Minsk, AN BSSR, 1957, 71-92.

Abstract: Investigations were conducted on monolithic sections 26 x 50 x 70 cm, taken on the Drichinskiy marshland tract (sedge peat), and sections 27 x 50 x 100 from the bottomland of the Zakovanka River (woody-scirpus peat). The method of investigation is described.

Card : 1/3

Country : USSR J
Category: Soil Science. Tillage. Reclamation. Erosion.

Abs Jour: RZhBiol., No 18, 1958, No 82150

It was established that the water permeability of the Drichinskiy peat consisted of 0.4 mm in a day, the Zakovanka bottomland peat 0.15 mm. Under field conditions of the Experimental Agricultural Institute for the study of qualitative characteristics of water permeability of peat soils, the following radioactive isotopes were applied; P^{32} in the compound Na_2HPO_4, S^{35} in Na_2SO_4, Rb^{86} in RbCl, and I^{131} in NaJ. Rb^{86} showed the least reaction with the peat and S^{35} the most. The movement of capillary waters was determined under rye and wheat in deep drained sections, under perennial grasses in normally drained areas, and in peats with a capacity of 0.8 - 1.0 m. Under wheat there was a shift of P^{32} with water at a depth of 80 cm upward to 30 cm,

Card : 2/3

L 07116-67 EWT(m)/EWP(w)/EWP(t)/ETI IJP(c) JD/JG

ACC NR: AP6029115 SOURCE CODE: UR/0048/66/030/006/0984/0989

AUTHOR: Smokhvalov, A.A.; Ivakin, A.A.; Morozov,Yu.N.; Simonova, M.I.; Bamburov,V.G.; Volkenshteyn,N.V.; Zotov,T.D.

ORG: none

74
73

TITLE: Magnetic, high frequency, and electric properties of some oxide compounds of divalent europium (Report, All-Union Conference on the Physics of Ferro- and Antiferromagnetism held 2-7 July 1965 in Sverdlovsk)

SOURCE: AN SSSR. Izvestiya. Seriya fizicheskaya, v. 30, no. 6, 1966, 984-989

TOPIC TAGS: ferromagnetism, dielectric constant, dielectric loss, magnetization, temperature dependence, europium compound, oxide, aluminate, silicate, ELECTRIC PROPERTY, MAGNETIC PROPERTY

ABSTRACT: The authors have synthesized EuO, Eu_3O_4, $Eu_3Al_2O_6$, $EuAl_2O_4$, Eu_2SiO_4, and two series of solid solutions containing EuO and CaO, or EuO, CaO, and Eu_2O_3, and have investigated their magnetic and electric properties. The investigation was undertaken because the high magnetization of divalent europium compounds make them of interest in connection with technical applications and the simple crystal structure of EuO makes it a suitable material with which to compare the predictions of theories of ferromagnetism. The magnetization measurements were made with a Domenikali type pendulum magnetometer in fields up to 19 kOe and at temperatures down to 1.6° K. The ferro- and paramagnetic resonance of EuO was investigated at 9 and 35.7 kMHz down to 4.2°K,

Card 1/2

BAHTAMOV, W. [Bakhtamov, V.]; AMON, Agnes [translator]

In the tail of a comet; a fantastic story of space flight.
Repules 16 no.1:9 Ja '63.

AMON, Ivan

An interesting case of thoracoplasty. Tuberkuloza no.1:48 '62.

1. Zdravstveni dom Ljutomer (upravnik: dr L. Kaukler), Antituberkulozni dispanzer (sef: dr I. Amon).
(THORACOPLASTY)

AMON, Ivan

An informative case of pulmonary cancer. Tuberkuloza no.2/4:183-185 '62.

1. Grudno odeljenje Opce bolnice i ATD Murska Sobota (sef: dr I. Amon) Bolnica za tuberkulozu Topolsica (ravnatelj: prim. dr I. Cestnik). (LUNG NEOPLASMS)

5

AMON, K.

"Equalizing moments in calculations for openwork beams." Technicka Praca, Bratislava, Vol. 6, No. 1, Jan. 1954, p. 44.

SO: Eastern European Accessions List, Vol. 3, No. 11, Nov. 1954, L.C.

AMON, K.

A contribution to calculation of keyed beams.

p. 125
Vol. 3, no. 2, 1955
STAVEBNICKY CASOPIS
Bratislava

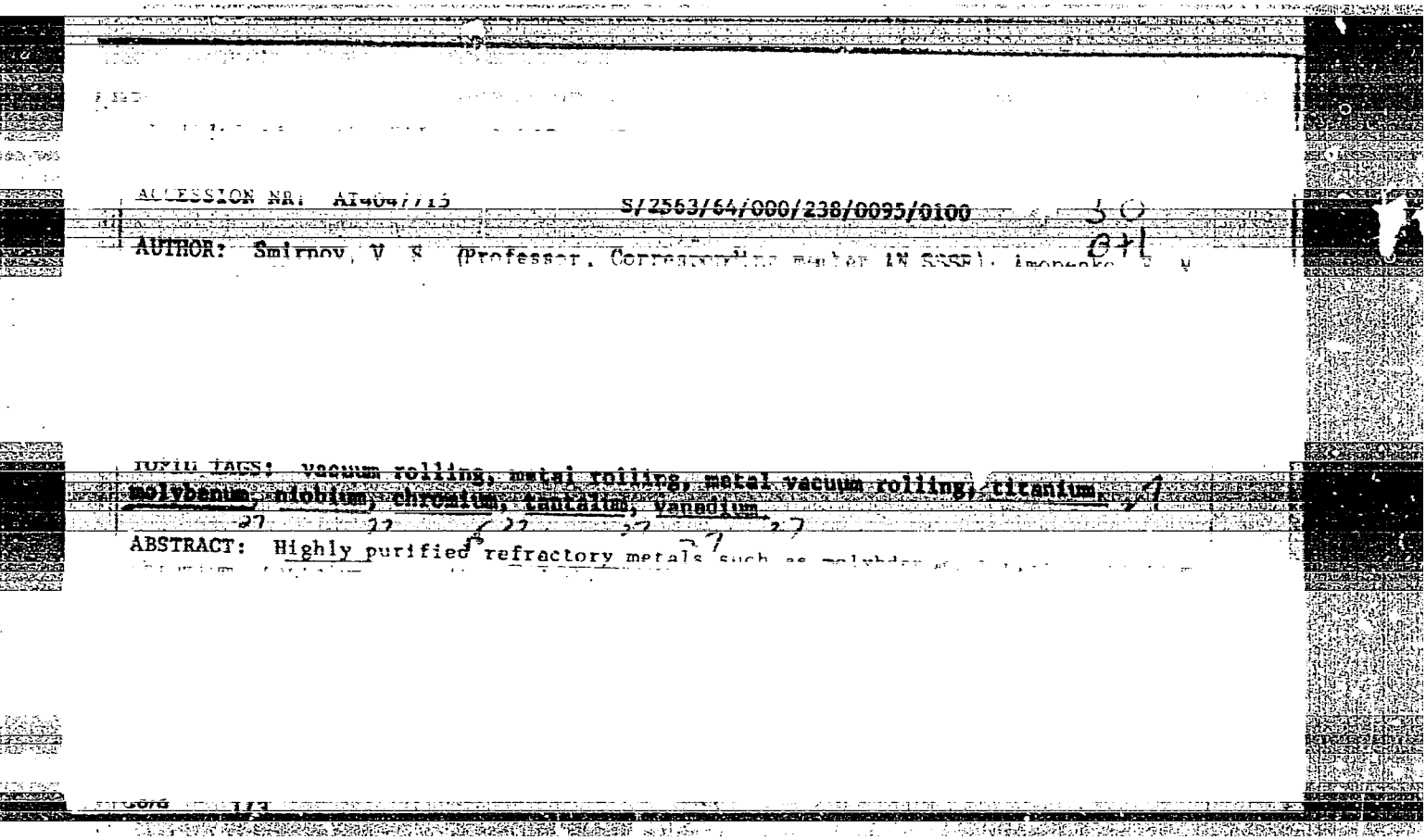
SO: Monthly List of East European Accessions (EEAL), LC, Vol.5 , no. 3
March 1956

AMOSENKOVA, N.I.; DAYTER, A.B.; KLENOV, K.N.

Study of small mammalia in the Luga Q fever focus; preliminary report. Trudy Len.inst.epid.i mikrobiol. 20:71-79 '59.
(MIRA 16:1)
(LUGA DISTRICT (LENINGRAD PROVINCE)--Q FEVER)

AMOSENKOVA, N.I.; DAYTER, A.B.

Survival of Rickettsia burneti in the organism of a bedbug; experimental materials. Trudy Len.inst.epid.i mikrobiol.i mikrobiol. 20:80-88 '59. (MIRA 16:1)
(RICKETTSIA) (BEDBUGS)

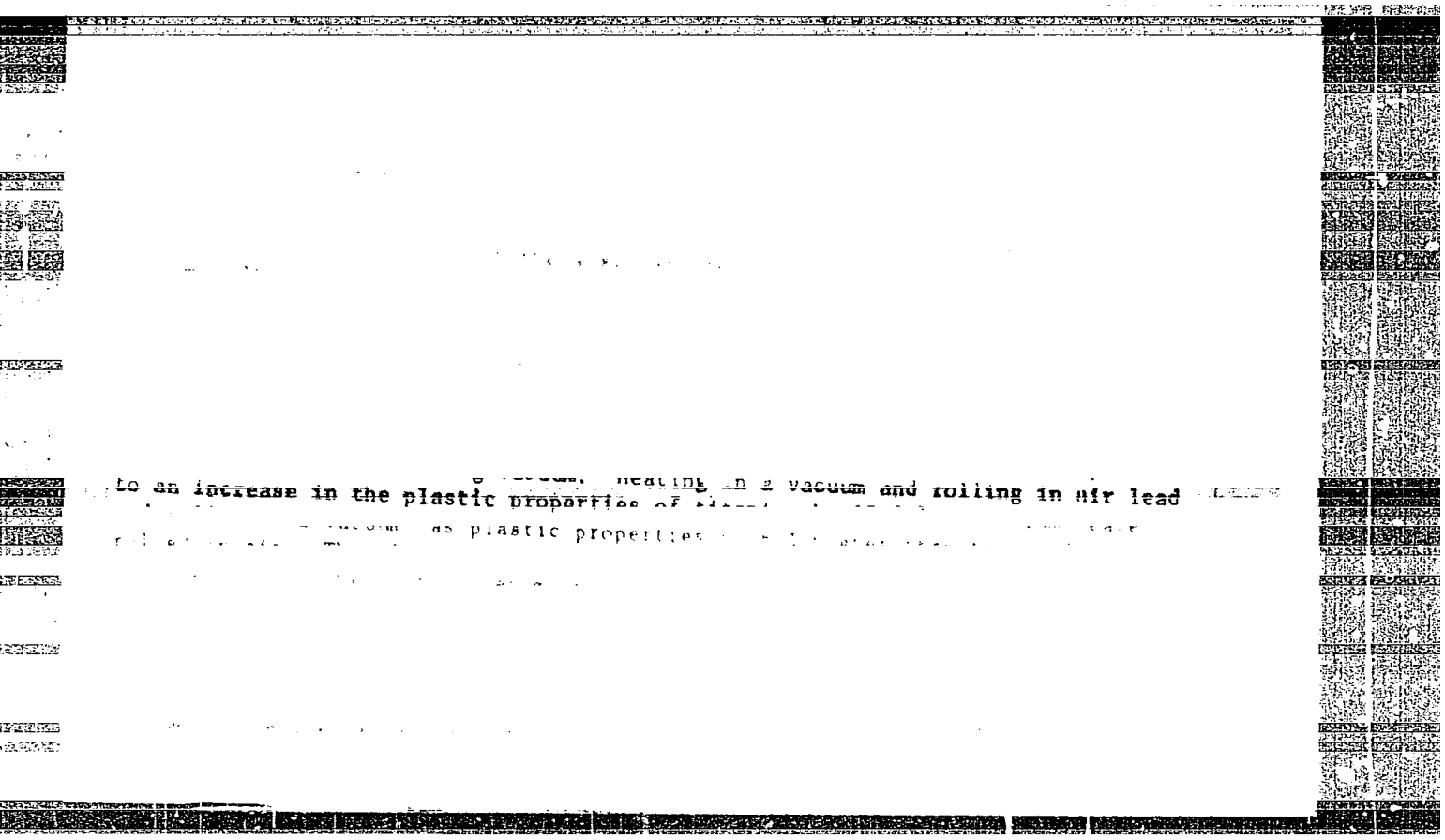


ACCESSION NR: AT4047715 S/2563/64/000/238/0095/0100

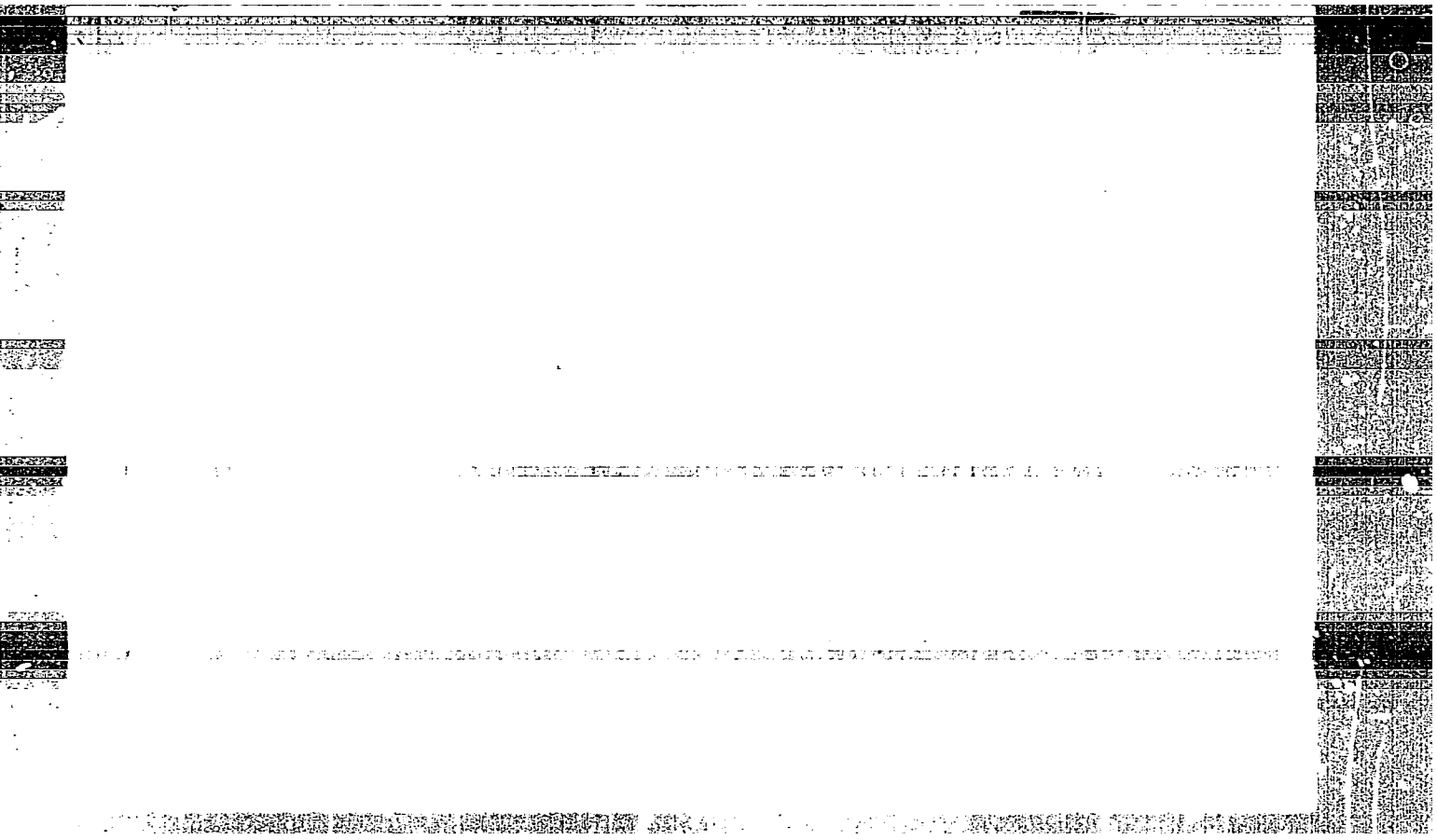
AUTHOR: Smirnov, V. S. (Professor, Corresponding member AN SSSR); Smorenko, [illegible]

TOPIC TAGS: vacuum rolling, metal rolling, metal vacuum rolling, titanium, molybdenum, niobium, chromium, tantalum, vanadium

ABSTRACT: Highly purified refractory metals such as molybden[illegible]



to an increase in the plastic properties of [illegible] heating in a vacuum and rolling in air lead [illegible] as plastic properties [illegible]



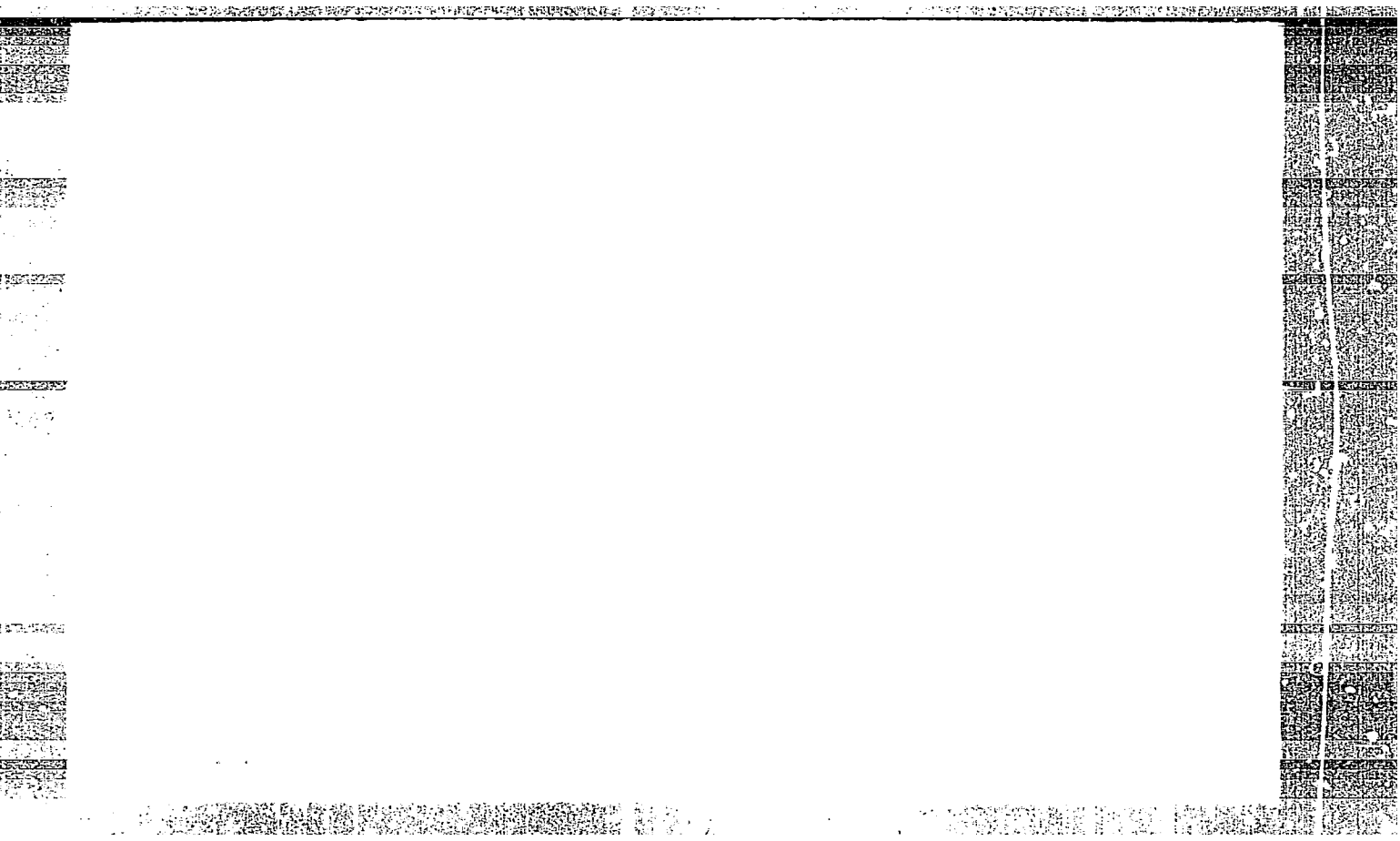
APPROVED FOR RELEASE: 03/20/2001 CIA-RDP86-00513R000101310006-9"

TITLE: Development of etching patterns in nickel by thermal etching in vacuum

SOURCE: [illegible] metallovedenie [illegible]

ABSTRACT: A thermal etching method in vacuum was developed for nickel and [illegible]. It was found that [illegible] of etching patterns, increased their density, and reduced the grain size. The temperature range between 700 and 1200 C was investigated, and the optimal temperatures were found to be at about 1000. The electropolished samples show-

Card 1/2



APPROVED FOR RELEASE: 03/20/2001 CIA-RDP86-00513R000101310006-9"

SINELNIKOV, K. D., IVANOV, V. E., AMONENKO, V. M., and BURLAKOV, V. D.

"Refining Beryllium and Other Metals by lCondensation on Heated Surfaces."

paper to be presented at the 2nd UN Intl. Conf. on the peaceful uses of Atomic Energy, Geneva, 1 - 13a Sep 58.

21(4) PHASE I BOOK EXPLOITATION SOV/2714

AMONENKO, V.M.

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

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

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

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

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

Card 9/11

SOV/126-7-6-10/24

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

TITLE: Vacuum Distillation of Chromium

PERIODICAL: Fizika metallov i metallovedeniye, 1959, Nr 6, pp 868-874 (USSR)

ABSTRACT: Impurities in chromium make it brittle and difficult to deform at high temperatures and decrease its usefulness as a heat-resisting alloy base. Much work (Refs 1-10) has been done on its purification. This included vacuum distillation (Ref 1) at 10^{-4} mm Hg and 1400°C with condensation on a surface at unspecified temperature, which, as shown in Table 1, failed to effect any improvement. The authors describe their own work at a laboratory of the FTI of the Ac.Sc., UkrSSR on chromium distillation in a high vacuum onto a heated surface. The method has been reported (Ref 11). The temperatures of distillation and condensation can, assuming the applicability of Raoult's law, be calculated for the particular purification required. Fig 1 shows a general view of the installation, provided with a high-vacuum and backing pumps. Evaporation was effected from alumina or beryllium-oxide crucibles heated by tungsten

or molybdenum wire spirals, and condensation in a ceramic column internally coated with tantalum sheet (Fig 2). Temperatures were measured with a type OPPIR-09 optical pyrometer and all experiments were at 10^{-5} mm Hg. Chromium samples produced by the alumino-thermic and the electrolytic methods were distilled: the initial and final compositions are shown in Tables 2 and 3 respectively. Distillation was effected at 1250-1500°C, the condensing-column temperature being 950-1200°C. The chromium was deposited (Fig 3) in the lower and middle zones. No purification from iron or aluminium resulted for the alumino-thermic material and these elements, together with carbon and silicon, were also the most difficult to eliminate from electrolytic chromium. It was found, however, that by passing the chromium vapour through a filter of chromium-oxide powder, the aluminium present in the chromium is oxidized and its content in the refined metal falls to 0.001-0.003 but that of oxygen rises to 0.03%. By passing the vapour through zirconium turnings, the silicon content could be reduced to 0.001%.

Simultaneous purification to 0.003, 0.001 and 0.005% Al, Si and C, respectively, was obtained by fusion in air of either form of chromium with 5% tungsten before distillation. The micro-hardness of chromium distilled at 10^{-4} to 10^{-7} mm Hg was determined with a type PMT-3 machine, the results (Table 4) showing that the softest material is that distilled at the lowest pressure. Freshly-distilled chromium had considerable plasticity, but on storage in air this decreased due to the absorption of nitrogen, oxygen and hydrogen (Table 5).
There are 4 figures, 5 tables and 13 references, 2 of which are Soviet, 10 English and 1 German.

ASSOCIATION: Fiziko-tekhnicheskiy institut AN UkrSSR (Physico-technical Institute, Ac.Sc., Ukrainian SSR)

SUBMITTED: February 25, 1958

SOV/126-7-6-9/24

AUTHORS: Amonenko, V.M., Vasyutinskiy, B.M., Lebedev, V.V. and Shapoval, B. I.

TITLE: Vacuum Distillation of Metals with Condensation on a Heated Surface

PERIODICAL: Fizika metallov i metallovedeniye, 1959, Vol 7, Nr 6, pp 862-867 (USSR)

ABSTRACT: The properties of heat-resisting alloys are influenced to a considerable extent by the purity of the starting materials. Vacuum distillation is a promising way of purifying such materials. The authors describe their use for purifying iron of the method developed in 1952 at the Fiziko-tekhnicheskiy institut AN UkrSSR (Physico-technical Institute, Ac.Sc. Ukrainian SSR) for vacuum distillation with condensation of the metal on a surface at a high temperature. The authors consider this more efficient than published methods and they have used it successfully for purifying beryllium (Ref 5). The distillation of the iron was effected in a working vessel (Fig 1) with evacuation by an oil diffusion pump (2500 litres/sec) and a type VN-2 backing pump.

Card 1/4 0.5-3 litre alundum or beryllium-oxide crucibles wound

Vacuum Distillation of Metals with Condensation on a Heated Surface

with molybdenum or tungsten heating coils, contained the metal. The heated column directly over the crucible was generally lined with thin iron sheet, on which condensation occurred. The temperature of the column surface was chosen such that iron condensed while the impurities remained vaporized: the lower part up to 1300°C, the upper to about 1100°C. Assuming as a first approximation that the condensing metal and impurities form an ideal solid solution, the authors apply the Knudsen-Langmuir equation to calculate rates of evaporation. From a crucible at about 1580°C evaporation of metal occurred at 1 g/cm^2 hr., 75-80% of which was recovered at a column temperature of 1250-1300°C. Tables 1-3 show compositions before and after distillation (single and double) of armco, electrolytic (single only) and carbonyl irons, respectively. Purification from Mn, Mg, Cu, S, P, N_2 and O_2 was good and somewhat less so from aluminium. Considerable contamination from evaporation of crucible material was possible, but with double distillation the impurities could be reduced to

Vacuum Distillation of Metals with Condensation on a Heated Surface

0.01%. The resistances of some long-needle single crystals of iron in the condensate were compared at 0°C and at low temperatures in the laboratory of B.G.Lazarev, acting member of the Ac.Sc. UkrSSR: the ratio values agree fairly closely (Table 4) with those of Meysner (Ref 6) for the purest iron and indicate that the needles were 99.996% Fe. The authors have also studied the purification of high-carbon (7% C, 73% Mn) and medium-carbon ferromanganese. The same apparatus was used, evaporation temperatures being 1100-1400°C. Rates of evaporation tended to fall through impoverishment of surface layers with manganese and formation of a graphite layer. Lower iron contents were obtained when baffles (Fig 2) were fitted in the column. On the lower baffles, kept at about 1000°C, almost all iron condensed, the manganese condensing mainly on the middle baffles (750-800°C). Table 6 shows the composition of the condensate from the third and fourth baffles. A carbon content of under 5×10^{-3}% is inferred. The purity of the manganese after a single distillation is over 99.96%.

SOV/126-7-6-9/24

Vacuum Distillation of Metals with Condensation on a Heated Surface

There are 2 figures, 6 tables and 6 references, 3 of which are Soviet, 1 English and 1 French and 1 German.

ASSOCIATION: Fiziko-tekhnicheskiy institut AN UkrSSR (Physico-Technical Institute, Ac.Sc. UkrSSR)

SUBMITTED: July 22, 1957

Card 4/4

SOV/126-8-2-14/26

AUTHORS: Amonenko, V.M., Shapoval, B.I. and Lebedev, V.V.

TITLE: Temperature Dependence of Internal Friction and Elastic Constants of Pure Iron

PERIODICAL: Fizika metallov i metallovedeniye, 1959, Vol 8, Nr 2, pp 249 - 254 (USSR)

ABSTRACT: The authors point out that in investigations of the internal friction of iron (Refs 1, 2), the purity of the metal has been insufficient for studying the nature of the internal-friction peaks. For the present investigation the authors used iron vacuum-distilled by the vacuum-distillation method developed at the Fiziko-tekhnicheskiy institut AN UkrSSR (Physico-technical Institute of the Ac.Sc. Ukrainian SSR), in which iron vapour condenses on a surface heated to 1 200 - 1 300 °C and covered with pure-iron foil. Evaporation was effected at 1 600 °C from alundum crucibles. The distilled iron, remelted in a high vacuum, was poured into 5-kg ingots (cast-iron moulds) from which 120 x 15 x 15 mm pieces were cut for shaping into test

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Temperature Dependence of Internal Friction and Elastic Constants of Pure Iron

pieces - 10 mm in diameter and 100 mm long. Their 20-mm long working length was turned down to a diameter of 3 mm. Before tests, the specimens were vacuum annealed at 900 °C for two hours and cooled in the furnace. The composition of the metal was: 0.003% each C, O_2; 0.001% each S, P, Al; 0.0001% each N_2, Mg; 0.0007% Mn; 0.008% Ni; 0.0006% Cu. The tests were carried out in vacuum in a resistance furnace (Figure 1); for the measuring circuit the system proposed by Tsobkallo and Chelnokov (Ref 5) was used and test-piece oscillation was produced by a self-oscillating system (V.A. Zhuravlev - Ref 4). The relative deformation on the test-piece surface did not exceed 5×10^{-5}. Figures 2 and 3 show internal friction as functions of temperature. Figure 2 refers to pure iron without (Curve 1) and with (Curve 2) a magnetic field of 100 oE. Curve 1 in Figure 3 refers to armco iron and Curve 2 to vacuum-distilled armco iron. The internal-friction dependence on the temperature was

Temperature Dependence of Internal Friction and Elastic Constants of Pure Iron

found to be similar for 99.99% iron as for other metals; but the absolute value over the whole temperature range is several times that for armco iron and other metals. The high value for pure iron is due to losses in magneto-mechanical hysteresis arising in periodic deformation in the range of very small strains. The application of a magnetic field reduces the value greatly. The results showed that not all the carbon in the iron is in the form of solid solution. From the internal-friction measuring technique the dependence of the elastic constants on temperature were obtained (Figure 4); for the moduli of normal elasticity and shear the relations are almost linear in character.
There are 4 figures, 1 table and 8 Soviet references.

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SOV/20-128-5-32/67

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AUTHORS: Amonenko, V. M., Ryabchikov, L. N., Tikhinskiy, G. F., Finkel', V. A.

TITLE: On the Mechanism Underlying the Evaporation of Beryllium in High Vacuum

PERIODICAL: Doklady Akademii nauk SSSR, 1959, Vol 128, Nr 5, pp 977-978 (USSR)

ABSTRACT: Wide application of beryllium in engineering is presently being restricted by the low degree of plasticity of this metal which results from impurities, especially from oxygen that attains a content of 0.1% approximately. The authors investigated the evaporation of Be to detect the origin of this oxygen content. They used an MS-1 mass spectrometer at a vacuum of 10^{-6} mm torr and various temperatures. Figure 1 shows that at 1,265 C mass 18 is predominant which corresponds to the dimer B_2. At higher temperatures, the peak of mass 9 begins to predominate in the spectrogram. At temperatures of above 1,300 C, a peak of mass 34 occurs in addition to the ions Be^+, Be_2^+ and BeO^+, which was radiographically identified to be Be_2O (Table 2). It is of some importance that Be_2O is formed only in the presence of metallic Be, and not by the heating of pure BeO, for example. This suboxide

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66178

On the Mechanism Underlying the Evaporation of Beryllium in High Vacuum SOV/20-128-5-32/67

is more volatile than BeO, and effects the addition of oxygen to Be when the metal is distilled in BeO pots. The authors thank B. G. Lazarev for valuable advice. There are 1 figure, 1 table, and 6 references, 3 of which are Soviet.

ASSOCIATION: Fiziko-tekhnicheskiy institut Akademii nauk USSR, g. Khar'kov (Institute of Physics and Technology of the Academy of Sciences of the Ukr SSR, Khar'kov Town)

PRESENTED: June 6, 1959 by G. V. Kurdyumov, Academician

SUBMITTED: June 3, 1959

Card 2/2

PHASE I BOOK EXPLOITATION SOV/4548

Akademiya nauk SSSR. Komissiya po fiziko-khimicheskim osnovam proizvodstva stali

Primeneniye vakuuma v metallurgii (Use of Vacuum in Metallurgy) Moscow, Izd-vo AN SSSR, 1960. 334 p. Errata slip inserted. 4,500 copies printed.

Sponsoring Agency: Akademiya nauk SSSR. Institut metallurgii imeni A.A. Baykova. Komissiya po fiziko-khimicheskim osnovam proizvodstva stali.

Resp. Ed.: A.M. Samarin, Corresponding Member, Academy of Sciences USSR; Ed. of Publishing House: G.M. Makovskiy; Tech. Ed.: S.G. Markovich.

PURPOSE: This collection of articles is intended for technical personnel interested in recent studies and developments of vacuum steelmaking practice and equipment.

COVERAGE: The book contains information on steel melting in vacuum induction furnaces, and vacuum arc furnaces, reduction processes in vacuum, and degassing of steel and alloys. The functioning of apparatus and equipment, especially vacuum furnaces and vacuum booster pumps is also analyzed. Personalities are mentioned in connection with some of the articles and will appear in the Table of Contents. Three articles have been translated from English. Some of the

Card 1/9

Amonenko, V.M.

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S/126/60/010/004/012/023
E021/E406

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

TITLE: Refining Beryllium by Vacuum Distillation

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

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

Refining Beryllium by Vacuum Distillation

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

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E021/E406

Refining Beryllium by Vacuum Distillation

ASSOCIATION: Fiziko-tekhnicheskiy institut AN USSR
(Physics and Engineering Institute, AS UkrSSR)

SUBMITTED: April 12, 1960

Card 3/3

S/126/60/010/005/023/030
E111/E452

AUTHORS: Ivantsov, I.G., Finkel', V.A. and Amonenko, V.M.

TITLE: Influence of Carbon on the Phase Composition of an Austenitic Fe-Cr-Ni Base Alloy

PERIODICAL: Fizika metallov i metallovedeniye, 1960, Vol.10, No.5, pp.780-782

TEXT: The object of the present work was to elucidate the influence of carbon on the phase composition of austenitic steels as exemplified by high-vacuum melted alloys after different heat treatments in air. The range of composition covered (%) was: 0.02 to 0.2 C, 22.0 Cr, 25.0 Ni, 7.0 W, 2.0 Mo, 2.0 Co, 2.6 Ti, 0.05 B, 0.15 Al, remainder Fe. The phase composition of electrolytically obtained residues was determined by the X-ray method (Ref.5 to 9), solution being effected over several hours at 0.05 to 0.06 A/cm^2 and 12 to 15 V in a solution of 10 g each of ammonium sulphate and citric acid in 1200 ml water. The results (Tables 1 and 2) for alloys hardened from 1200 with and without subsequent ageing at 800°C show a substantial effect of carbon on phase transformations. During ageing, the chromium carbide found after hardening changes into a form which is more stable at heat-

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E111/E452

Influence of Carbon on the Phase Composition of an Austenitic Fe-Cr-Ni Base Alloy

treatment temperatures. There were no TiC lines in X-ray diffraction patterns from aged specimens, probably because of excess of other secondary phases in the residue. The temperature threshold for the sigma-phase is below 950°C and the concentration "Threshold" is about 0.035%. If alloying elements enter appreciably into the intermetallic compounds, they leave the solid solution and the solubility of carbon rises. The mechanism of sigma-phase formation during ageing at 800°C is more likely to be directly from austenite and not in association with chromium-carbide formation. V.S.Kogan made valuable comments on this work.
There are 2 tables and 13 references: 7 Soviet and 6 Non-Soviet.

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

SUBMITTED: February 27, 1960

Card 2/2

S/126/60/010/006/009/022
E193/E483

26.2240 also 2308

AUTHORS: Popov, B.Ye., Kovtun, S.F. and Amonenko, V.M.

TITLE: Refining the Structure of Beryllium and Chromium by the Application of Ultrasonics During Arc-Melting

PERIODICAL: Fizika metallov i metallovedeniye, 1960, Vol.10, No.6, pp.853-856

TEXT: Owing to its coarsely-crystalline, dendritic structure, cast beryllium has low mechanical properties and it is for this reason that beryllium components are usually made by the powder metallurgy techniques. The disadvantage of this method consists in increased risk of contamination with beryllium oxides and other impurities which may considerably reduce the ductility of the metal. The object of the present investigation was to explore the possibility of producing pure (i.e. made by fusion) beryllium and chromium with a structure consisting of small, equiaxial grains. The experiments were carried out in an argon-arc furnace, the refining of the structure being obtained by subjecting the molten metal to ultrasonic vibration. A magnetostrictive converter, fed by a high-frequency generator operating in the 10 to 30 kilocycle

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E193/E483

Refining the Structure of Beryllium and Chromium by the Application of Ultrasonics During Arc-Melting

range, served as the source of ultrasonic waves. The sound energy was transmitted to the metal by means of a half-wave exponential concentrator and a water-cooled copper sound-conductor, led into the furnace through its bottom flange and attached to the crucible. The metal was subjected to the ultra-sonic vibration for about 1 to 2 min, while still molten, and throughout the solidification stage. The degree of grain-refining achieved by these means was such that, in the case of beryllium, grain-size comparable to that in sintered specimens was obtained. The effect of the ultrasonic treatment was most pronounced in the central region of the ingot, the grains near its surface being somewhat larger and reaching the average size of 100 to 120 microns. This variation of the grain-size was attributed to non-uniformity of the acoustic field in the crucible of semi-spherical shape and to the variation in the rate of heat transferred from the crucible walls, the grain-size being smallest in the regions corresponding to the maximum cooling rate. The structure of chromium subjected

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E193/E483

Refining the Structure of Beryllium and Chromium by the Application of Ultrasonics During Arc-Melting

to the same treatment was more uniform, the difference between the largest and smallest grains not exceeding 100%. The grains in ultrasonically treated chromium were 40 to 50 times smaller than those in argon-arc melted specimens not subjected to the ultrasonic vibration and comparable in size to grains found in metal molten by conventional methods and allowed to solidify in the crucible. The density of the argon-arc melted beryllium and chromium specimens could be increased by increasing the duration of the ultrasonic treatment while the metal was still molten; when the duration of the ultrasonic treatment prior to solidification was not sufficiently long, pores, visible under microscope, were formed in the metal. There are 4 figures and 9 references: 5 Soviet and 4 non-Soviet (1 of which is translated into Russian).

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

SUBMITTED: June 6, 1960

Card 3/3

1,1300 also 2108,1944,1496

85490
S/133/60/000/010/007/013
A054/A029

AUTHORS: Amonenko, V.M.; Tron', A.S.; Mukhin, V.V.; Tarasov, V.A.

TITLE: Vacuum Rolling Mill

PERIODICAL: Stal', 1960, No. 10, pp. 920 - 922

TEXT: Some metals, such as W, Mo, V [Abstracter's note: U in the original text is probably a mistake and should be read V], Zr, Nb, Ta and their alloys, which are only deformable with difficulty at high temperatures when applying the conventional methods, can be heated and rolled more easily in vacuum or in an inert atmosphere. In 1953 in the FTI AN UkrSSR an experimental vacuum rolling mill was developed, which, however, had a number of drawbacks. For instance, the complete mill with the exception of the reductor and the motor was mounted in the vacuum chamber. Consequently its size and its output were considerably limited, moreover, the ball bearings and other parts were not easily accessible for lubrication, etc. In order to eliminate these drawbacks, the authors designed a new type of vacuum rolling mill, where the stand forms an inherent part of the vacuum system, into which only the rollers are placed, while secondary mechanisms were designed outside the vacuum system. In this way a mill was designed, which

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Vacuum Rolling Mill

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A054/A029

in spite of smaller external dimensions had a greater capacity and could be more easily maintained than the old one. The stand (Ст. 3 - St. 3 type steel, with walls 45 mm thick) has two openings arranged on either side, to which the vacuum chambers (320 mm in diameter and 1,000 mm long) are connected. The dimensions of the new and the old-type vacuum mils are as follows: the length of the operating part of the roll in the new type is 300 mm (in the old type 150 mm); the diameter of the roll neck is 85 mm (30 mm), the distance between the rollers is adjustable up to 20 mm (up to 12 mm); in the new-type mill specimens 450 mm long can be rolled, whereas in the old type the maximum was 200 mm. The new mill also features resistance furnaces placed into the vacuum chambers, with molybdenum wires (2.2 mm in diameter), in which the specimens can be heated up to 1,500 - 1,600°C, the rollers are driven by asynchronous motors (18 kw, 1,450 rpm), the rolling velocity can be regulated between 0.1 and 1.0 m/sec; in the chambers a vacuum of 2 - 5.10-5 mm Hg can be obtained by ММ-500 (MM-500) and РВН-20 (RVN-20) type pumps. Facilities are provided for an extension of the vacuum and the furnace when longer workpieces have to be rolled, moreover, preheating and cooling of the rollers is also possible. The new-type vacuum mill, on which heat resistant alloys, molybdenum and other metals are rolled in sheets that have a minimum thickness of 0.3 mm, is described in detail. There are 2 figures, 1 set of figures and 3 Soviet references.

ASSOCIATION: Fiziko-tekhnicheskiy institut AN UkrSSR (Physical-Technical Institute of the AN UkrSSR)

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S/133/60/000/011/009/023
A054/A029

AUTHORS: Amonenko, V.M., Romanchenko, K.G., Tron', A.S.

TITLE: Reaction Between Heat-Resisting Alloys and Refractory Oxides at High Temperatures in Vacuum

PERIODICAL: Stal', 1960, No. 11, pp. 1002-1004

TEXT: Many heat-resisting alloys contain elements which enter easily into reaction with the oxides of the refractory crucible during vacuum casting at high temperatures. Consequently, the alloys are contaminated with oxygen and with the material of the crucible which affects their mechanical properties. In order to investigate this phenomenon and to establish such a composition of the crucible that has least effect on the alloys, tests were undertaken with crucibles containing ZrO_2, BeO, MgO, Al_2O_3 and (Al_2O_3 + 1% TiO_2) and nickel-base heat-resisting alloys of the ЭИ 617 (EI 617)-type at various temperatures and with various holding times in vacuum. The tests were carried out in resistance furnaces having molybdenum heaters, the crucibles were made from chemically pure oxides, having a porosity between 0-2% and which were stabilzed with 5% MgO or CaO. In the tests the effect of casting temperatures, of the duration of the vacuum treatment and of the crucible material on the

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A054/A029

Reaction Between Heat-Resisting Alloys and Refractory Oxides at High Temperatures in Vacuum

gas content of the alloy were investigated while the quantity of non-metallic inclusions in the alloy was examined by petrographic analysis. It was found that the refractory materials of crucibles made from Al_2O_3, ZrO_2, MgO and BeO entered into reaction with the C of the casting. Al, Zr and Be reduced from the oxides was dissolved in the metal while carbon oxide and magnesium were eliminated in the gas-phase. The reduction process was accelerated by the rising temperature. The minimum reduction rate was observed at 1,450-1,500°C and the minimum amount of reduction products were found in the alloy when the vacuum process did not last longer than 20-30 minutes. The lowest oxygen content was found in alloys cast in ZrO_2 and BeO crucibles while the reduction process was the most intensive in MgO crucibles. When casting in Al_2O_3-containing crucibles, an exchange reaction took place between metal and refractory material, during which chrome and titanium were oxidized and Al_2O_3 was reduced to Al_2O, followed by its decomposition into Al_2O_3 and Al. Petrographically it was established that Cr_2O_3 was present in the refractory substance, indicating a reaction between the crucible and the chrome of the alloy. The

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A054/A029

Reaction Between Heat-Resisting Alloys and Refractory Oxides at High Temperatures in Vacuum

Tests on inclusions and the microscopic investigations showed spinelides of $Mg(Cr,Al)_2O_4$ in MgO crucibles, which were formed as a result of the reaction between the alloying elements and magnesium oxide. The higher the casting temperature, the longer the holding time of the metal and the lower the remaining pressure in the chamber, the more complete was the elimination of N and H from the alloy. The refractory materials were arranged according to their degree of resistance against reaction with the alloy in the following series: $MgO < Al_2O_3$; $(Al_2O_3 + 1\%TiO_2) < BeO < ZrO_2$. There are 5 figures and 8 references: 4 Soviet, 2 English, 1 German, 1 French.

ASSOCIATION: Fiziko-tekhnicheskiy institut AN UkrSSR (Physical-Technical Institute AS UkrSSR), Ukrainskiy nauchno-issledovatel'skiy institut ogneuporov (Ukrainian Scientific-Research Institute of Refractory Materials)

Card 3/3

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S/032/60/026/05/47/063
B010/B008

AUTHORS: Amonenko, V. M., Kruglykh, A. A., Pavlov, V. S., Tikhinskiy, G. F.

TITLE: Manufacture of a Beryllium Foil

PERIODICAL: Zavodskaya laboratoriya, 1960, Vol. 26, No. 5, pp. 625-626

TEXT: Beryllium foils of a thickness of 20-300 μ are used for the manufacture of X-ray counter tube windows. With the existing methods for the manufacture of such foils there is the difficulty of obtaining foils which are sufficiently plastic at room temperature. A method according to which beryllium is deposited by vaporization on a polished molybdenum lamella in vacuum (approx. 10^{-6} mm Hg) is described. The beryllium is deposited by vaporization on the preheated molybdenum lamella from a BeO-crucible at 1300-1550°C in vacuum and then treated thermally (in vacuum). The dependence of the plasticity of the finished beryllium foil on its thickness (Fig. 1), on the temperature of condensation (Fig. 2) and the length of the thermal aftertreatment (Fig. 3) was investigated. Vacuum tight and plastic foils are obtained

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Manufacture of a Beryllium Foil

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B010/B008

if the molybdenum underlayer has 50-100°C at the beginning of the deposition by vaporization, and the temperature is thereafter quickly increased. It was determined that the grain of the foil gets coarser with the increase of the temperature and prolongation of the duration of the beryllium condensation. A corresponding duration is to be applied for each temperature of the thermal aftertreatment. It is recommended to aftertreat thermally for 6 and 3 hours at 700 and 800°C. Foils of a thickness of 40-70 μ are vacuum tight, if the underlayer was not heated above 300°C. There are 3 figures and 2 references, 1 of which is Soviet.

Card 2/2

AMONENKO, V. M., TIKHINSKIY, G. F., IVANOV, V. YE., SINELNIKOV, K. D.

"Some Properties of Pure Beryllium."

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

Physical-Technical Institute, Academy of Sciences, Ukrainian SSR

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S/181/61/003/003/017/030
B102/B205

AUTHORS: Amonenko, V. M., Tikhinskiy, G. F., Finkel', V. A., Azhazha, V. N., Shpagin, I. V.

TITLE: Plastic deformation of textured beryllium

PERIODICAL: Fizika tverdogo tela, v. 3, no. 3, 1961, 796-802

TEXT: Single crystals of beryllium show highly anisotropic mechanical properties on account of their hexagonal crystal structure. A study has now been made of the mechanical properties of high-purity beryllium foils. For this purpose, thin textured Be foils of high purity (99.987% without taking hydrogen into account) were prepared by condensation of beryllium vapor on molybdenum sheet in a vacuum of $1 \cdot 10^{-6}$ mm Hg. The rate of evaporation was 0.2 g/cm^2·hr, the condensation temperature was 300-320°C, and the temperature of heat treatment was 700°C for one hr. These conditions were the same for all specimens. The purity was checked by a determination of the resistivity ratio: $R_{4.20K}/R_{293°K} = 9 \cdot 10^{-3} - 1.5 \cdot 10^{-2}$. The grain size varied from 8 to 15 μ, the foils had a thickness of 170-300 μ, and the density was

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Plastic deformation ...

1.831 g/cm^3. The texture was studied by X-ray analysis using a tube designed by B. Ya. Pines and V. S. Kogan. Two different textures (I and II) were studied. Texture I of the Be foil showed no relationship with that of the molybdenum backing which had been carbidized. The X-ray diagrams showed no (002) line, i.e., an axisymmetric texture with the axis [001] (perpendicular to the surface of the foil) could be assumed. Texture II showed "interaction" of the condensate of hexagonal beryllium with the backing (body-centered cubic Mo) with the texture (100) [011]. On account of this "interaction", the basal plane (002) was orientated at an angle of 45° toward the surface of the foil, which resulted in a shift of the interference points. The plastic deformation (rate: 1% per min) was studied at 20-800°C. The temperature was measured by means of a Pt-PtRh thermocouple (accuracy: $\pm 2°$). The specimens had a size of 50 x 4 x (0.17-0.3) mm. Three kinds of specimens with different directions of the texture relative to the direction of expansion were studied. Type I: The basal plane coincided with the plane of the specimen. The temperature dependence of the breaking point σ_b of the longitudinal expansion δ and of the lateral contraction Ψ was measured (Fig. 4). The maximum value of σ_b at room tem-

Plastic deformation ...

perature was 43 kg/mm^2. δ increased monotonically from 14% at room temperature to 77% at 600°C. These specimens showed a three-dimensional plasticity. X-ray analysis disclosed effects of prismatic sliding in the entire range of temperatures (20-800°C). Type II: The basal plane formed an angle of 45° with the plane of the specimen. It showed practically the same temperature dependence of σ_b; at room temperature σ_b = 44 kg/mm^2 and δ = 18.5% (somewhat higher than in the case of I). These specimens exhibited a two-dimensional plasticity. The temperature-dependent variations in width and thickness are illustrated in Fig. 5. The two types show different rupture. Type III: The same texture as II but expansion in the direction [010]. These specimens showed a particularly low strength; at room temperature, there is practically no longitudinal expansion. X-ray diagrams showed no variations. Only at 200°C they showed an insignificant shift of the intensity maxima. Maximum δ appeared at 550°C (26.5%). The behavior of these specimens on expansion in one direction perpendicular to the plane of a prism of type II is similar to Be single crystals. I. A. Gindin and V. S. Kogan are thanked for a discussion. There are 6 figures and 16 references: 11 Soviet-bloc and 5 non-Soviet-bloc.

Card 3/6

Plastic deformation ...

20791
S/181/61/003/003/017/030
B102/B205

ASSOCIATION: Fiziko-tekhnicheskiy institut AN USSR Khar'kov (Institute of Physics and Technology, AS UkrSSR, Khar'kov)

SUBMITTED: July 15, 1960

Legend to Figs: 1 - I, 2 - II, 3 - III (type of texture);
a) change in width, b) change in thickness.

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28441

17.4430

S/185/61/006/002/016/020
D210/D304

AUTHORS: Amonenko, V.M., and Vasyutyns'kyy, B.M.

TITLE: The existence of a permeability minimum in the flow of gases through porous films

PERIODICAL: Ukrayins'kyy fizychnyy zhurnal, v. 6, no. 2, 1961, 263 - 266

TEXT: Beryllium films were obtained with the aid of precipitation of Be vapor on a molybdenum surface at 10^{-5} mm Hg. The temperature of the condensation surface was varied between 400 and 750°C in different experiments. Degassing of molybdenum before condensation affects essentially the character of distribution of the pores in the film. The permeability is defined by the authors as the ratio of flow through a plate to the flow through the same area in absence of the plate. Experimental determination of permeability was made according to the formula

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The existence of a permeability ...

$$\gamma = \frac{\ln \frac{\Delta P_1}{\Delta P_2} \cdot V_1 \cdot V_2}{s \sqrt{\frac{RT}{2\pi\mu}(V_1 + V_2)\Delta t}}, \qquad (3)$$

ΔP_1 being the decrease of pressure through the film at the beginning of the experiment, ΔP_2 the decrease at the end of the experiment, Δt the time of variation of the decrease from ΔP_1 to ΔP_2, V_1 and V_2 the volumes separated by the film. Measurements were made on a device not essentially different from M. Knudsen's (Ref. 1: Ann. d. Physik, 28, 75, 1909), and graphs of the dependence of γ on P were traced. Only one graph is given by the authors (thickness of the film approx. 100 μ). From the relation $L \gg \lambda \gg r$ for the transition interval (λ - mean free path of the molecules, r - radius of capillaries, L not defined) it is estima-

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ted that the mean radius of the capillaries is $r < 0.5$ μ. From the existence of a minimum it is concluded that the pores are mostly direct canals. The permeability of films which had a minimum was always found to be small (10^{-4} - 10^{-5}). There are 2 figures and 6 references: 1 Soviet-bloc and 5 non-Soviet-bloc. The references to the English-language publications read as follows: W. Pollard, Phys. Rev., 69, 53, 1946; W. Pollard, W. Present, Phys. Rev., 73, 7, 762, 1948; Kormann, Proc. Roy. Soc., 203, 51, 1950.

ASSOCIATION: Fizyko-tekhnichnyy instytut AN URSR, m. Kharkiv (Institute of Technical Physics, AS UkrSSR, Kharkov)

SUBMITTED: July 8, 1960

Card 3/3

S/185/61/006/003/004/010
D208/D302

AUTHORS: Amonenko, V.M., Kruglykh, A.A. and Tykhins'kyy, G.P.

TITLE: On the vacuum refining of chromium

PERIODICAL: Ukrayins'kyy fizychnyy zhurnal, v. 6, no. 3, 1961, 390-393

TEXT: An attempt was made to refine chromium from an aluminum admixture by the distillation method. The results were not satisfactory. The admixture contained 0.6% Al. The distillation took place in a vacuum of 10^{-6}mm Hg and at a temperature of 1400°C. It could be assumed that if the vapors precipitate on a surface which is heated to a temperature at which the difference between the vapor pressure of chromium and of aluminum is considerable, the two metals could be separated. At a condensation temperature of 900 - 1100°C there was such a difference between vapor pressures (2 orders of magnitude). Yet no appreciable refining was observed. In order to ascertain the reasons for this, alumino-thermic chromium, containing 0.6% Al and 0.2% aluminum-oxide was used, as well as melts of pure

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On the vacuum refining...

electrolythic chromium with 0.5% to 5.4% Al. The obtained specimens were distilled and condensed. In order to exclude impurities due to the oxide, the vaporization took place in crucibles made of tantalum wool. The change in aluminum contents of the precipitate as a function of temperature of the condensation surface is shown graphically. Two reasons were suggested for the inadequate results: The formation of a solid solution on condensation, and the formation of suboxides at the high vacuum-temperatures. X-ray investigations supported the first explanation. To verify the second reason, a melt Cr-Al-Al_2O_3 with 5.4% Al and 5.7% Al_2O_3 was refined. A volatile suboxide was formed which decomposed on condensation into Al and Al_2O_3. The authors conclude that the vaporization of the aluminum admixture takes place in the atomic state. On condensation upon a hot surface (above 700°C), a solid solution is formed. During the vaporization of chromium, reactions take place in the crucible which lead to the formation of aluminum suboxides. The free Al which results from the decomposition of the suboxide forms a solid solution with the chromium. The formation of a solid solution at

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On the vacuum refining...

condensation temperature and the transfer of Al and Al_2O_3 as suboxides does not permit refining chromium from aluminum by the method of vacuum distillation. There are 2 figures and 7 references: 1 Soviet-bloc and 6 non-Soviet-bloc. The references to the English language publications read as follows: L. Limsden, Disc. of Far. Soc. 4, 60, 1949; A.I. Bradley, J. Inst. of Metals, 40, 319, 1937; M. Hoch, H.L. Jonston, J. Amer. Chem. Soc., 76, 2560, 1954; C. Norman Cochram, J. Amer. Chem. Soc., 77, 2190, 1955.

ASSOCIATION: Fizyko-tekhnichnyy instytut AN UkrSSR (Physico-technical Institute AS UkrSSR), Khar'kov

SUBMITTED: July 1, 1960

Card 3/3

89940

18.8200 1413, 1418, 1454

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

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

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

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

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

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

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

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

89940

S/126/61/011/001/005/019
E021/E496

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

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

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

SUBMITTED: July 2, 1960

Card 3/4

89940

S/126/61/011/001/006/019
E021/E496

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

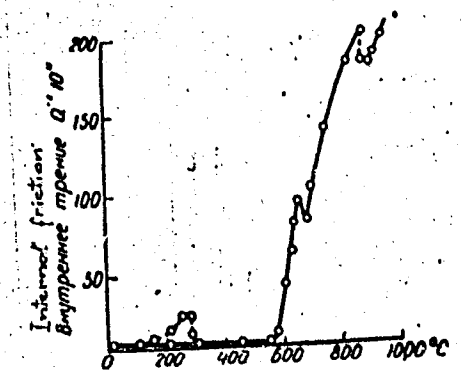


Рис. 3. Зависимость внутреннего трения циркония от температуры.

Fig.3.

Card 4/4

5.2200 1043, 1087, 1273

S/126/61/011/004/021/023
E021/E435

AUTHORS: Amonenko, V.M., Kruglykh, A.A. and Papirov, I.I.

TITLE: Preparation of Zinc of High Purity and a Method of its Control

PERIODICAL: Fizika metallov i metallovedeniye, 1961, Vol.11, No.4, pp.633-635

TEXT: The method of purification used was vacuum distillation and condensation of the vapours on a surface with a temperature gradient (Ref.6). The apparatus is shown in the figure: 1 coupling, 2 quartz tube, 3 condenser, 4 heating sections, 5 baffles, 6 crucible and 7 thermocouple. Zinc of 99.98% purity was used as the initial material. One kg was placed in a crucible and 70 to 95% of it vapourized. The purest zinc was always obtained in the middle zone of the condenser. When a shorter condenser was used, the degree of purification decreased. The purest zinc was obtained by vapourizing at 460°C when a purity of 99.99997% was obtained. 40% of the original charge could be obtained with this purity. Repeated distillation did not give a further improvement in purity. The control of the purity was carried out by the method of measuring the residual resistance,

Preparation of Zinc ...

using a low-ohmic condenser and a high-sensitivity galvanometer (B.N.Aleksandrov, I.G.D'yakov and one of the authors, I.I.Papirov, carried out these measurements in the Kriogennaya laboratoriya (Cryogenic Laboratory) of the Institute . The ratio of the resistance at 4.2°K to the resistance at room temperature of the obtained sample was compared with the same ratio for zinc of known purity. Thus an estimate of the total impurity in the zinc was obtained. Acknowledgments are expressed to B.G.Lazarev for his advice. There are 1 figure and 11 references: 7 Soviet and 4 non-Soviet.

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

Preparation of Zinc ...

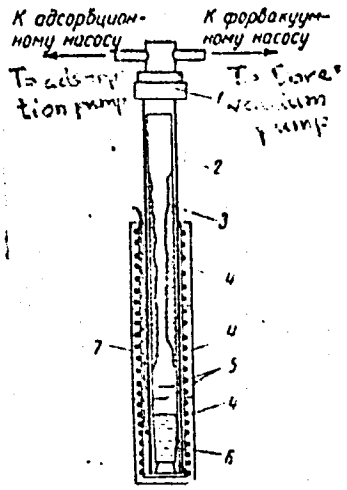


Figure.

Card 3/3

AMONENKO, V.M.; PAPIROV, I.I.; TIKHINSKIY, G.F.; FINKEL', V.A.

Oriented growth of beryllium precipitates on textured [redacted] isotropic base layers. Fiz. met. i metalloved. 12 no.1:73-77 Jl '61. (MIRA 14:8)

1. Fiziko-tekhnicheskiy institut AN USSR.
(Beryllium crystals--Growth)

18.1215 2808, 1555, 1418 25917

S/126/61/012/001/009/020
E021/E406

AUTHORS: Amonenko, V.M., Papirov, I.I., Tikhinskiy, G.F. and Finkel', V.A.

TITLE: Orientated growth of beryllium precipitates on oriented and on isotropic bases

PERIODICAL: Fizika metallov i metallovedeniye, 1961, Vol.12, No.1, pp.73-77

TEXT: The plasticity of beryllium can be increased by preparing it with a preferred orientation. A preferred orientation can sometimes be obtained by condensing the metal onto a base with a preferred orientation or by changing the angle between the direction of the molecular stream and the normal to the base. In the present work, the structure of beryllium precipitates prepared by the condensation of vapour in vacuo on a textured base of various metals, and also the variation of structure with the angle of inclination of the molecular stream to the base, were investigated. The method of precipitation used was described earlier (Ref.10: FMM, 1960, 10, 4, 581). Beryllium of 99.987% purity (discounting oxygen) was vaporized in a resistance furnace with a BeO crucible. The rate of evaporation was about 0.2 g/cm^2 hr, the condensation

surface temperature 300 to 350°C. The precipitate was annealed for 1 hour at 700 to 750°C. Precipitation was carried out in a vacuum of (1 - 5) x 10^{-6} mm Hg. Rolled sheets of Mo, Ta, Ni, Cu, Ti and armco Fe were used as a base. The texture of the condensed beryllium was investigated by X-ray methods. Some of the photographs obtained are shown in the paper (of a layer condensed on a molybdenum base, on nickel, and on an amorphous base). Fig.2 shows the orientation of the crystals on the same bases. The results are given in the table. Epitaxial growth was observed in several cases with precipitates up to 500 μ thick. The best plastic properties of beryllium were obtained by condensation in the [2$\bar{1}\bar{1}$] direction on a molybdenum base, and on a neutral base. The orientation of beryllium condensed on a nickel base is unfavourable for plastic deformation. There are 2 figures, 1 table and 16 references: 9 Soviet and 7 non-Soviet. The four most recent references to English language publications read as follows: Newman R.C. Proc.Phys.Soc., 1956, B69, (4), 432;
James J.A. Trans. Faraday Soc., 1955, 51, 833;
Finch G.I., Sun C.H. Trans. Faraday Soc., 1936, 32, 852;
Burgers W.G., Dippel C. J.Physica, 1934, 1, 549.

25917 S/126/61/012/001/009/020
Orientated growth of beryllium ... E021/E406

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

SUBMITTED: November 9, 1960 (initially)
January 11, 1961 (after revision)

Card 3/5

33453
S/126/61/012/006/010/023
E021/E435

187500 1418
21, 2100

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

TITLE: The high temperature polymorphism of beryllium

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

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

Card 1/3

The high temperature ...

temperature. Curve 2 is for 98% beryllium. This shows the effect of impurities in the region 200 to 800°C. Curve 3 is for 99.97% beryllium after 10% deformation and annealing at 900°C for 1.5 h, and shows the effect of residual stresses which are difficult to eliminate. At 1254 ± 5°C the electrical resistance increases rapidly, due to a polymorphic transformation. Samples similar to those used for electrical resistance measurements but no less than 0.5 mm thick were investigated by X-ray analysis. The results showed that there was a transformation at 1254 ± 5°C from the hexagonal α-Be lattice to the body-centred cubic β-Be lattice with the parameter a = 2.5464 kX. The transformation was accompanied by a decrease in specific volume.

Acknowledgments are expressed to M.I.Kaganov and V.S.Kogan for discussions and to S.F.Kovtun for supplying the vanadium used in the anodes. There are 7 figures and 18 references: 8 Soviet-bloc and 10 non-Soviet-bloc. The four most recent references to English language publications read as follows: Ref.4: Kaufmann A.R., Gordon P., Lillie D.W. Trans. ASM, v.42, 1950, 785. Ref.6: Sidchu S.S., Henry C.O. J. Appl. Phys., v.21, (10), 1950,

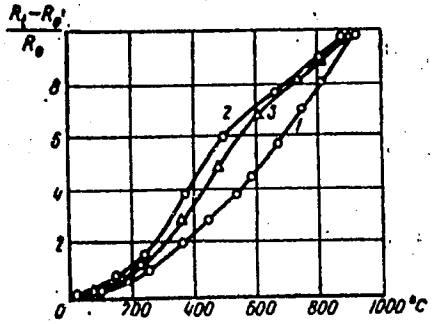
The high temperature ...

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

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

SUBMITTED: April 19, 1961

Fig.1.



Card 3/3

IVANTSOV, I.G., inzh.; AZHAZHA, V.M., inzh.; ANONENKO, V.M., kand.tekhn.nauk

Vacuum-smelted, heat-resistant, iron-base alloy castings.
Metalloved. i term. obr. met. no.7:43-45 Jl '62. (MIRA 15:6)

1. Fiziko-tekhnicheskiy institut AN USSR.
(Iron alloys--Thermal properties)
(Vacuum metallurgy)

S/126/62/013/006/013/018
E021/E192

AUTHORS: Amonenko, V.M., Papirov, I.I., Tikhinskiy, G.F., and Finkel', V.A.

TITLE: Investigation of whisker crystals of beryllium. I. Preparation of whisker crystals and determination of their orientation.

PERIODICAL: Fizika metallov i metallovedeniye, v.13, no.6, 1962, 928-930

TEXT: Single crystal beryllium whiskers were prepared by evaporation in vacuo and condensation of the vapour on a cylindrical column of molybdenum sheet. Distilled beryllium of purity 99.99% (neglecting oxygen and carbon) was used. The vaporising temperatures were 1365-1600 °C and the condensing temperatures 770-950 °C. The rate of evaporation varied from 0.4 to 0.9 g/cm^2.hour, and the rate of growth of the whiskers from 0.01 to 0.07 g/cm^2.hour. The majority of the crystals had a diameter of several tenths of a micron and a length of several millimetres. X-ray investigations (by rotating the sample in the D-S camera) showed that the whiskers were single crystals.
Card 1/2

Investigation of whisker crystals ...

There was some splitting of reflections indicating plastic deformation in the process of removal from the condensate. The directions of growth of the crystals investigated were [221], [331], and [111]. Thus the growth does not occur in the direction of closest packing.
There are 2 figures and 1 table.

ASSOCIATION: Fiziko-tekhnicheskiy institut AN USSR
(Physicotechnical Institute, AS Ukr.SSR)

SUBMITTED: December 2, 1961

Card 2/2

5.4300

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

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

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

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

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

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