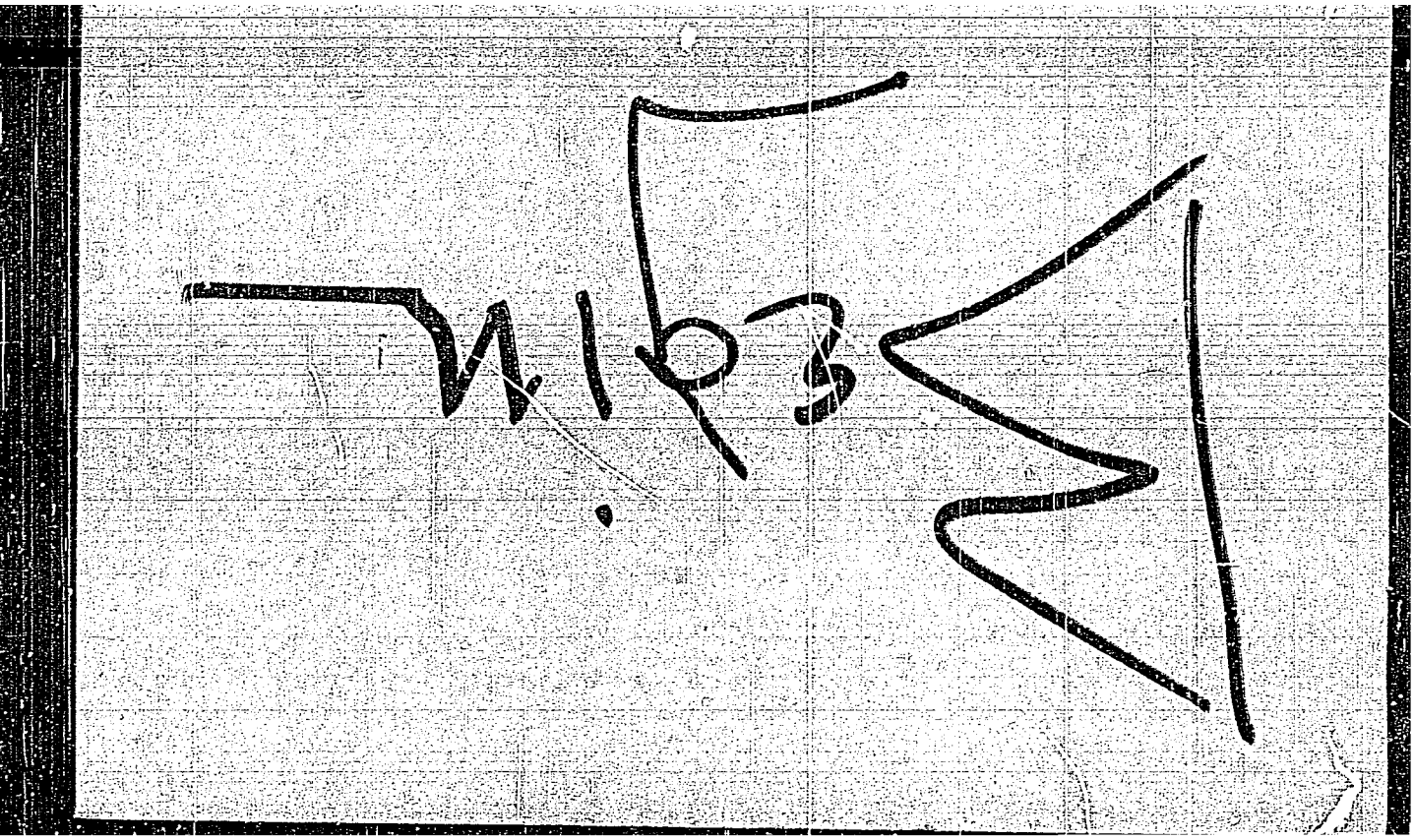

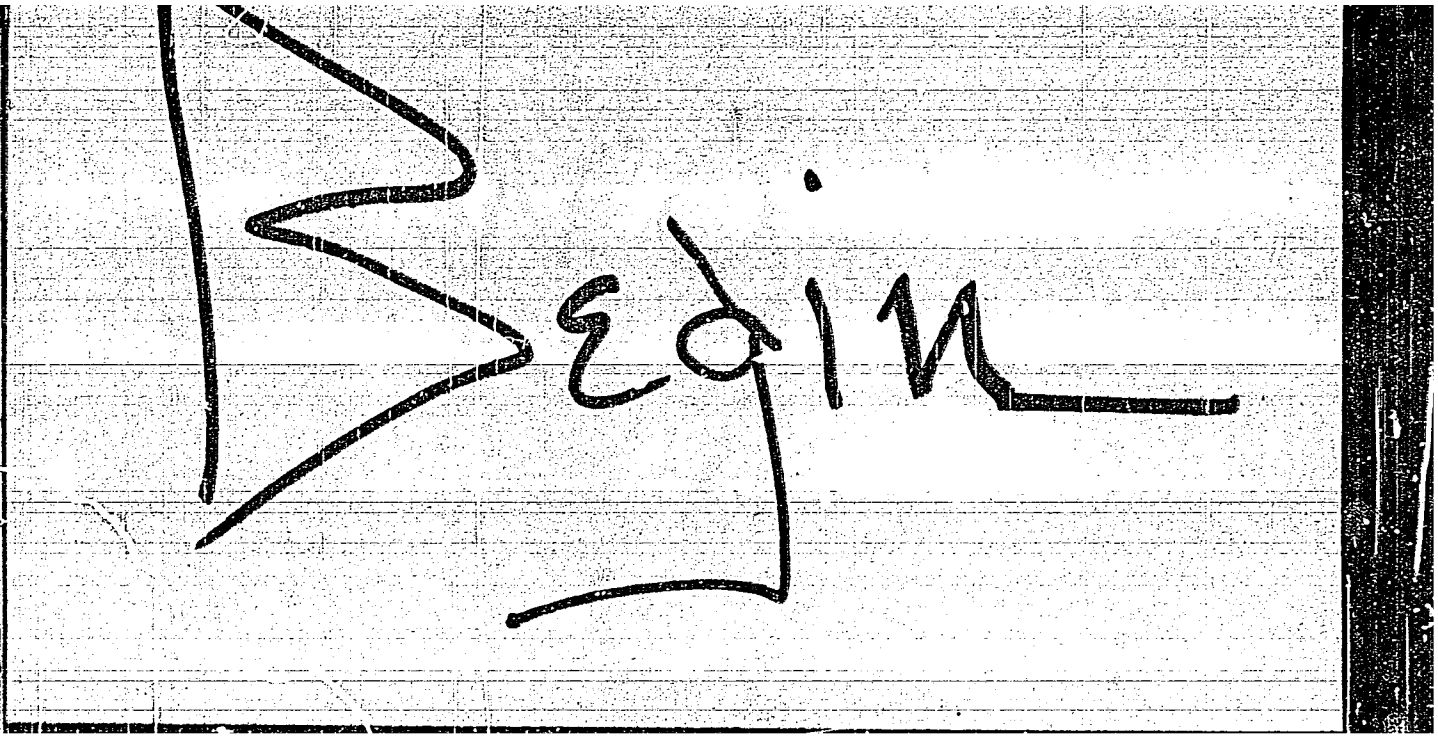

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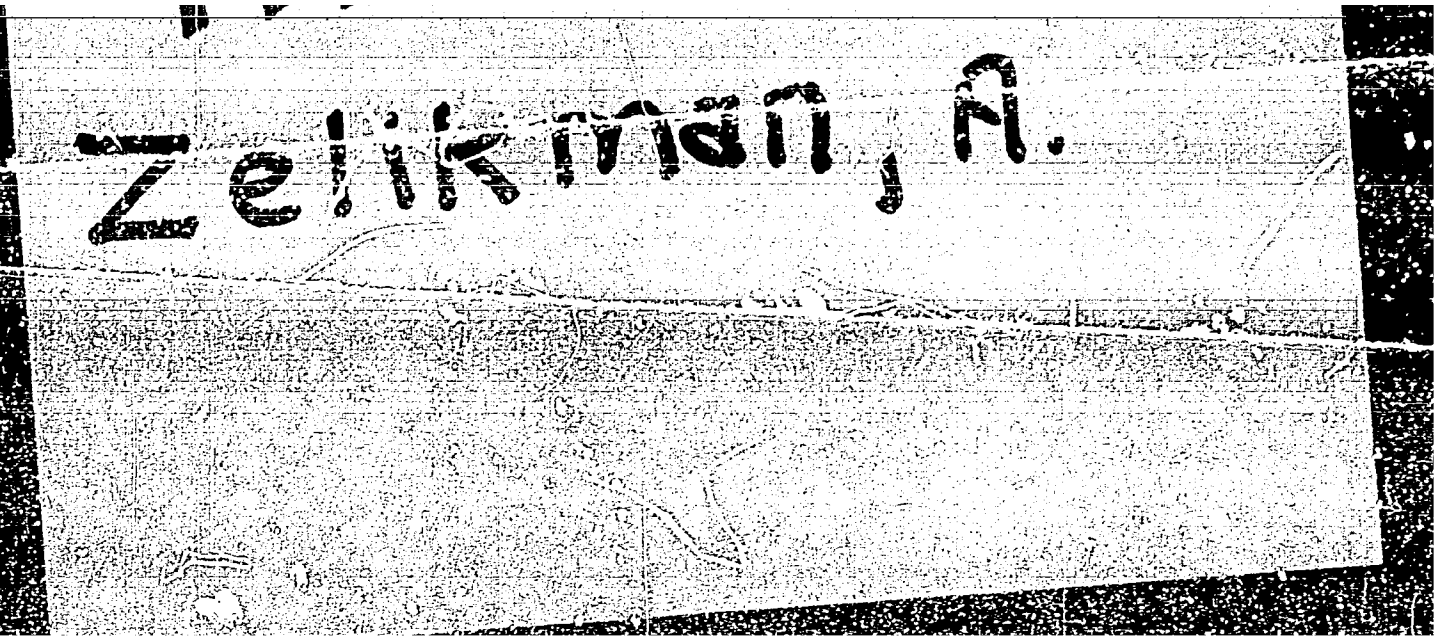


S/149/61/000/002/017/017
A006/A001

AUTHOR: Zelikman, A.

TITLE: Inter-VUZ Conference on Methods of Separating Rare Metals of Similar Properties

PERIODICAL: Izvestiya vysshikh uchebnykh zavedeniy, Tsvetnaya metallurgiya, 1961, No. 2, pp. 166 - 167

TEXT: A Conference on methods of separating rare metals with similar properties was convened from November 15 to 18, 1960 at the Institute of Non-Ferrous Metals imeni M.I. Kalinin. Over 250 delegates from 10 VUZes, 13 institutes of the Academy of Sciences of the USSR and the Union Republics, 20 scientific research institutes, and a number of plants attended the Conference. The Conference heard 56 reports: 14 on separating zirconium and hafnium; tantalum and niobium; 13 reports on their separation from titanium; and 15 on their separation from rare-earth elements. The other reports dealt with methods of separating tungsten and molybdenum; indium and tin; gallium and aluminum; selenium and tellurium; the separation of alkali rare metals, and deep cleaning of germanium. The following papers were delivered on ion-exchange methods: M.M. Senyavin on

Card 1/4

S/149/61/000/002/017/017
A006/A001

Inter-VUZ Conference on Methods of Separating Rare Metals of Similar Properties

"Chromatographic Preparation of Pure Rare Metal Materials"; B.N. Laskorin on "Ion-Exchange and Chemo-Sorbtion Processes in the Hydrometallurgy of Non-Ferrous Metals"; L.I. Martynenko, on the mechanism of separating macro-quantities of rare-earth elements; N.P. Kalonina and N.P. Magda, on results of semi-industrial checking of a method using sorbtion from hydrofluoric acid solutions; Ye.A. Subbotina, D.M. Chizhikov and others on the possibility of sorbtion from hydrochloric acid solutions; B.N. Laskorin, G.Ye. Kaplan and A.M. Arzhatkin on continuous chromatographical method of separating zirconium and hafnium; D.M. Ryabchikov and his collaborators on separating selenium and tellurium by the ion-exchange method using sorbtion on cationites and anionites. Extraction methods were treated in the following papers: G.V. Karpusov on extraction methods of separating rare-earth elements; V.I. Mikhaylov and V.G. Torgov on the use of complexing agents during extraction of rare-earth elements; Z.A. Sneka and Ye.Ye. Kriss on the use of di-butyl phosphate as complexing agent; N.I. Gel'perin and V.L. Pebalk on continuous extraction separation of elements of the cerium group; A.I. Vaysenberg, T.P. Zhitkova and L.A. Kolchina on conditions of extracting tantalum and niobium from hydrofluoric acid solutions with cyclohexane and tributyl phosphate; G.Ye. Kaplan, B.N. Laskorin and others on the use of trioctyl amine for extracting tantalum and nio-

Card 3/4

S/136/61/000/002/017/017
A006/A001

Inter-VUZ conference on Methods of Separati a Rare Metals or Similar Properties

Biur, V.K. Kulifeya, and V.Z. Kapranyashchiy on extraction of tantalum, niobium and titanium from hydrochloric acid solutions by commercial alcohol; G.Yu. Kaplan, O.A. Yegodina and others on results of investigating extraction separation of zirconium and hafnium using amines, phosphorous organic compounds and other extracting agents; D.L. Motov and T.G. Loshkayev on extraction of zirconium and hafnium from sulfuric acid solutions with cyclohexane; L.V. Vinarov and others on preparing pure hafnium dioxide by rhodanide extraction. The methods of fractional precipitation and crystallization were treated in the following papers: D.M. Chizhikov, B.Ya. Tretdevitskaya and others on results of investigating separation of titanium, niobium and tantalum on the basis of the solubility of their complex chlorine salts; phosphoric acid compounds (A.P. Sntin, A.K. Sharova) and sulfuric acid complex compounds (Ya.G. Gorshchenko); B.D. Stepin and V.Ye. Plyushcheva on separating rubidium and potassium, based on the different stability of their bromochlorides. The following reports treated the methods of distillation and rectification: L.A. Hisel'son, on methods of separating and refining zirconium and hafnium, tantalum and niobium on the basis of different volatility of their halides; A.N. Zelikman, O.Ye. Kreyn and others, on results of studying the se-

Card 3/4

Zelikman, A

MEYERSON, Grigoriy Abramovich; ZELIKMAN, Abram Naumovich; BOL'SHAKOV, K.A., prof.dokt., retsenzent; ABRIKOSOV, N.Kh., doktor.khim.nauk, retsenzent; MASLYANITSKIY, I.N., prof.dokt., retsenzent; GREYVER, M.S., prof., dokt., retsenzent; VYSOTSKAYA, V.N., red.; KAMAYEVA, O.M., red. izd-va; ATTOPOVICH, M.K., tekhn.red.

[Metallurgy of rare metals] Metallurgiia redkikh metallov. Moskva, Gos. nauchno-tekhn.izd-vo lit-ry po chernoi i tsvetnoi metallurgii, 1995. 608 p. (MIRA 11:4)

1. Kafedra metallurgii tsvetnykh i redkikh metallov Leningradskogo gornogo instituta (for Maslyanitskiy, Greyver)
(Metallurgy)

ZELIKMAN, A. L.

A. L. Zelikman: "Experience of the experimental examination of the effect of stabilizing selection on the fertility of Cyclops cerrutatus." (p. 239)

SO: Journal of General Biology Vol. 7, No. 4, 1944

ZELIKMAN, A. L. DOCENT

USSR/Medicine - Biology Jan 48
Medicine - Evolution

"Moscow Conference on Problems of Darwinism," Prof V. I. Polyanskiy, Docent A. L. Zelikman, 3 pp

"Priroda" No 6

Conference which convened in Moscow 3-8 Feb 48 was of interest not only to biologists, but also to large number of Soviet intelligentsia. This was first such conference in Soviet Union. Lists people who contributed to proceedings, and some of the problems discussed.

2/49184

ZELIKMAN, A. L. PA 68T83

USSR/Medicine - Zoology May 1948
Medicine - Fecundity

"Fertility of Cyclops in Cultures of Various Densities," A. L. Zelikman, A. K. Geynrikh, Inst Zool, Moscow State U imeni M. V. Lomonosov, 3 pp

"Dok Ak Nauk SSSR" Vol LX, No 5

Studies conducted to determine effect of numbers on quality of factors in process of evolution of a type. Devotes special attention to relation of fertility of cyclops to densities of their populations. Submitted by Academician I. I. Shmal'gauzen 15 Mar 1948.

68T83

USSR/General Biology. General Hydrobiology. B-6

Abs Jour : Ref. Zhur-Biol., No 16, 1958, 71676

Author : Zelikman, A. L.
Inst : Kostroma Pedagogical Institute.
Title : Feeding Base for Young Fish in the Reservoirs of the Volga-Kostroma Bottom Lands.

Orig Pub : Uch. zap. Kostromsk. ped. in-ta, 1957, vyp. 2, 129-191

Abstract : The physical and geographical characteristics of the reservoirs of the Volga-Kostroma bottom lands are given. The zooplankton of the lakes of this bottom land are studied, such as the Sloinskoye and the Velikoye, as well as the five small rivers which later connect with the lakes or with the Kostroma river.

Card : 1/2

ZELIKMAN, A.L.

Ch.Darwin's views of the role of "saltations" in the historical development of organisms [with summary in English]. Biul.MOIP. Otd.biol. 62 no.1:89-95 Ja-F '57. (MLRA 10:6)
(EVOLUTION)

ZELIKMAN, A.L.; GEYNRIKH, A.K.

Effect of the density of the population on the development of its components and the mortality rate in Cyclops (Copepoda, Cyclopidae). Biul.MOIP.Otd.biol. 64 no.4:125-139 Jl-Ag '59. (MIRA 13:4)

(Animal populations) (Copepoda)

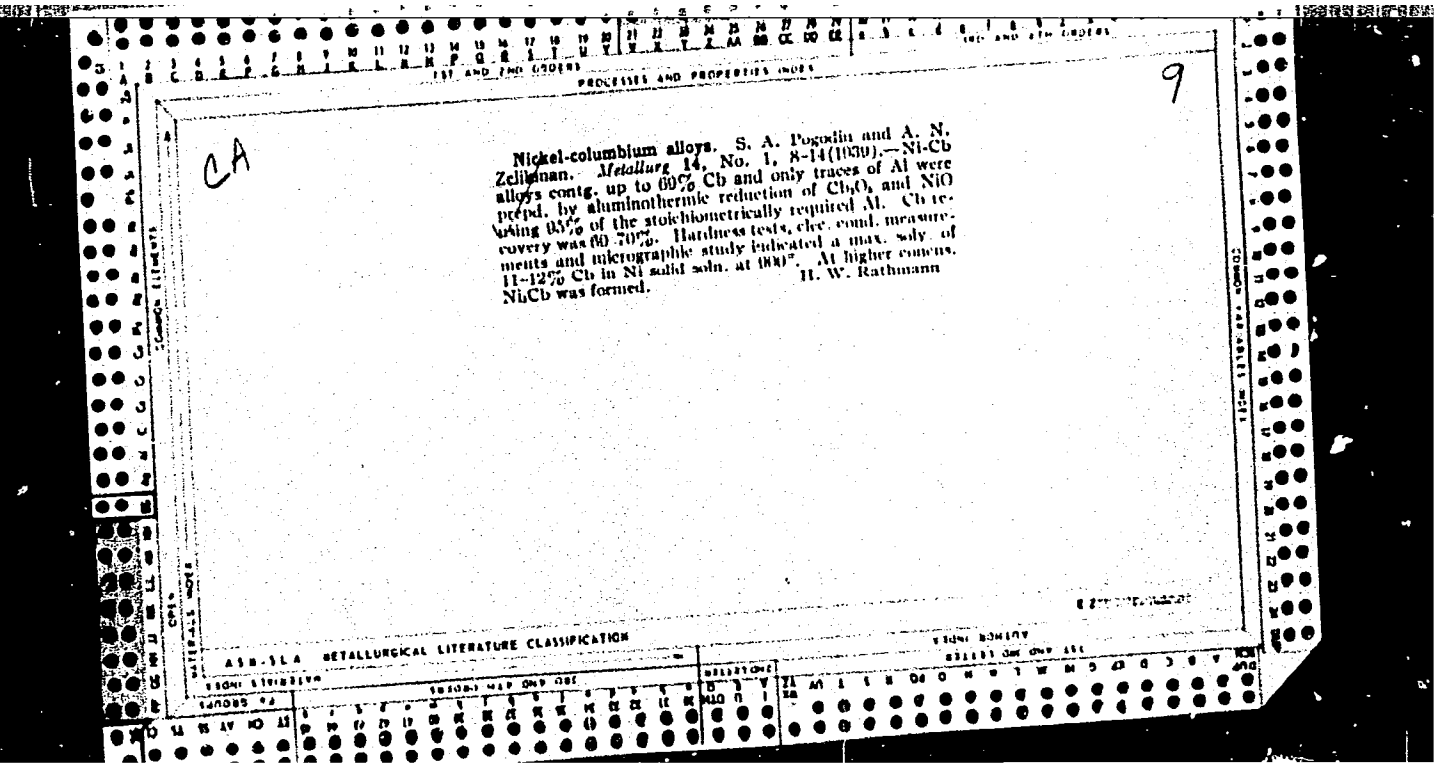
ZELIKMAN, A.L.

Quantitative characteristics of zooplankton in waters of the Volga-Kostroma flood plain. Trudy Gidrobiol. ob-va 10:86-101 '60. (MIRA 13:9)

(Kostroma Valley—Zooplankton)
(Volga Valley--Zooplankton)

ZELIKMAN, A.I.; PROZOROV, A.A.

Reviews and bibliography. Genetika no.2:170-178 Ag '65.
(MIRA 18:10)



CA

9

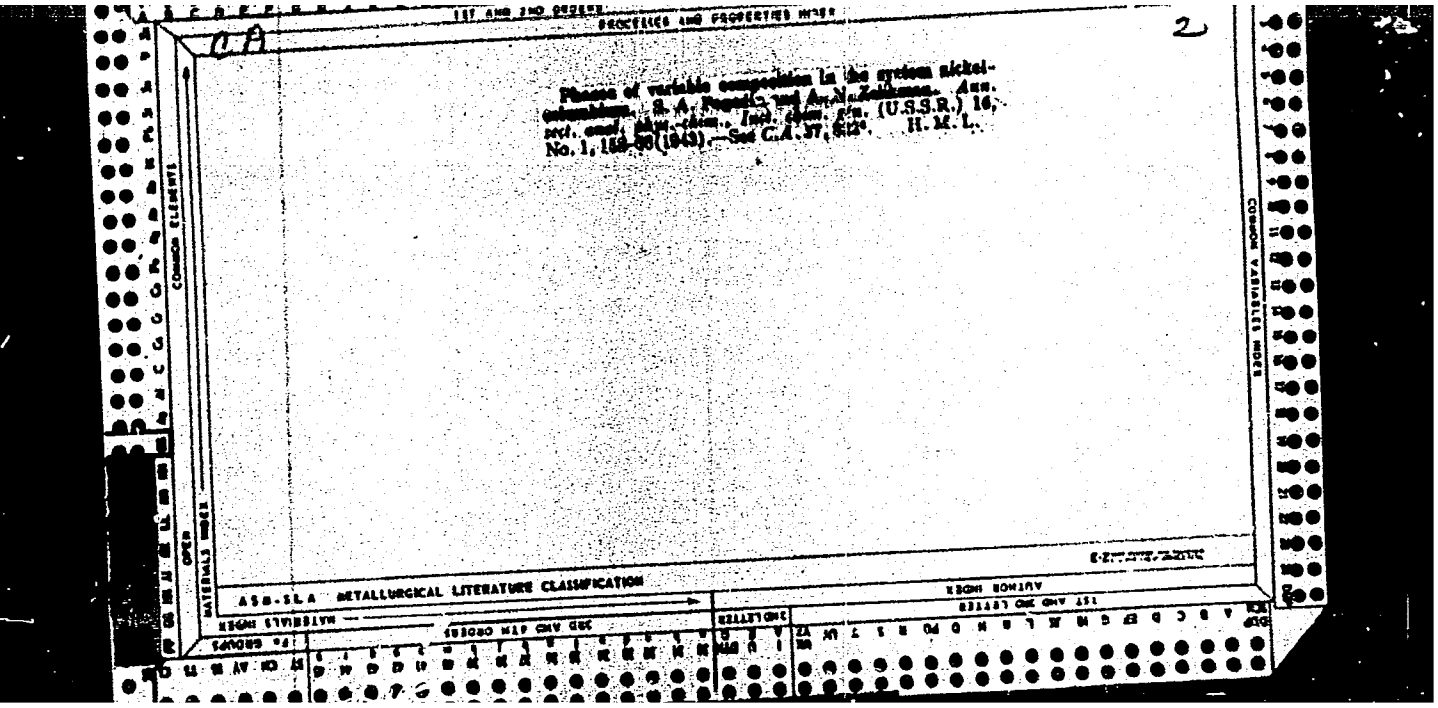
Nickel-columbium alloys. S. A. Pogodin and A. N. Zelikman. *Metallurg* 14, No. 1, 8-14(1939).—Ni-Cb alloys contg. up to 69% Cb and only traces of Al were prepd. by aluminothermic reduction of Cb_2O_5 and NiO using 85% of the stoichiometrically required Al. Cb recovery was 60-70%. Hardness tests, elec. cond. measurements and micrographic study indicated a max. soly. of 11–12% Cb in Ni solid soln. at 980°. At higher concns. $NiCb$ was formed. H. W. Rathmann

MH

2

Magnesium and Its Alloys. (Hall.) See p 191.

***On the Equilibrium Diagram of the System Nickel-Niobium.** S. A. Pogodin and A. N. Zelikman (*Compt. Rend. (Doklady) Acad. Sci. U.R.S.S.*, 1941, [N.S.], 31, (9), 895–897).—[In German.] The nickel-niobium system was examined in the range 0–65% niobium by the methods of thermal analysis, annealing and quenching, hardness, and electrical conductivity. Alloys were prepared directly from nickel [illegible] 0·2, silicon 0·2, copper 0·1 [illegible] and tantalum [illegible] titanium 0·3%). The diagram shows a eutectic at [illegible] C. and [illegible] niobium between Ni_3Nb and the primary solid solution of niobium in [illegible] niobium between Ni_3Nb and a [illegible], and a eutectic at 1175° C. and 51·6% niobium between Ni_3Nb and a further compound ($NiNb_2$?), which undergoes a peritectic reaction at 1250° C. Hardness-composition curves showed that at 900° C. ([illegible] hrs. anneal) the Ni_3Nb phase has a homogeneous range from 32·5 to 36% niobium, while the solubility of niobium in nickel is 10·7%. The Ni_3Nb phase melts at a maximum on the liquidus of 1403° C. Solubility values for niobium in nickel, as deduced from annealing experiments at 900° (48 hrs.), 1100° ([illegible] hrs.), and 1200° C. (5 hrs.), are, respectively, 10·7, 15, and 18% niobium. At 1275° C. the solubility was deduced from a cooling curve to be 20% niobium. These solubility values follow the usual logarithmic relation. —G. V. R.



ZELIKMAN, A. N.

The cementation phase in hard alloys with a tungsten-carbide base, Metallurgy of Non-Ferrous Metals, Moscow, 1946. Collection of Scientific Works No. 14, Moscow Inst. of Non-Ferrous Metallurgy. Report U-3391, 22 April 1953.

ZELIKMAN, A. N.

USSR/Metals Jul/Aug 1947
Titanium Compounds
Nitrogen

"Nitrogen in Titanium Carbide and Titanium Tungsten Hard Alloys," A. N. Zelikman, Candidate in Technical Sciences, S. S. Loseva, Tsvetyne, Engrs, Ministry of Nonferrous Metallurgy and Gold, and the Institute of Hard Alloys, 8 pp

"Tsvetnyye Metally" No 4

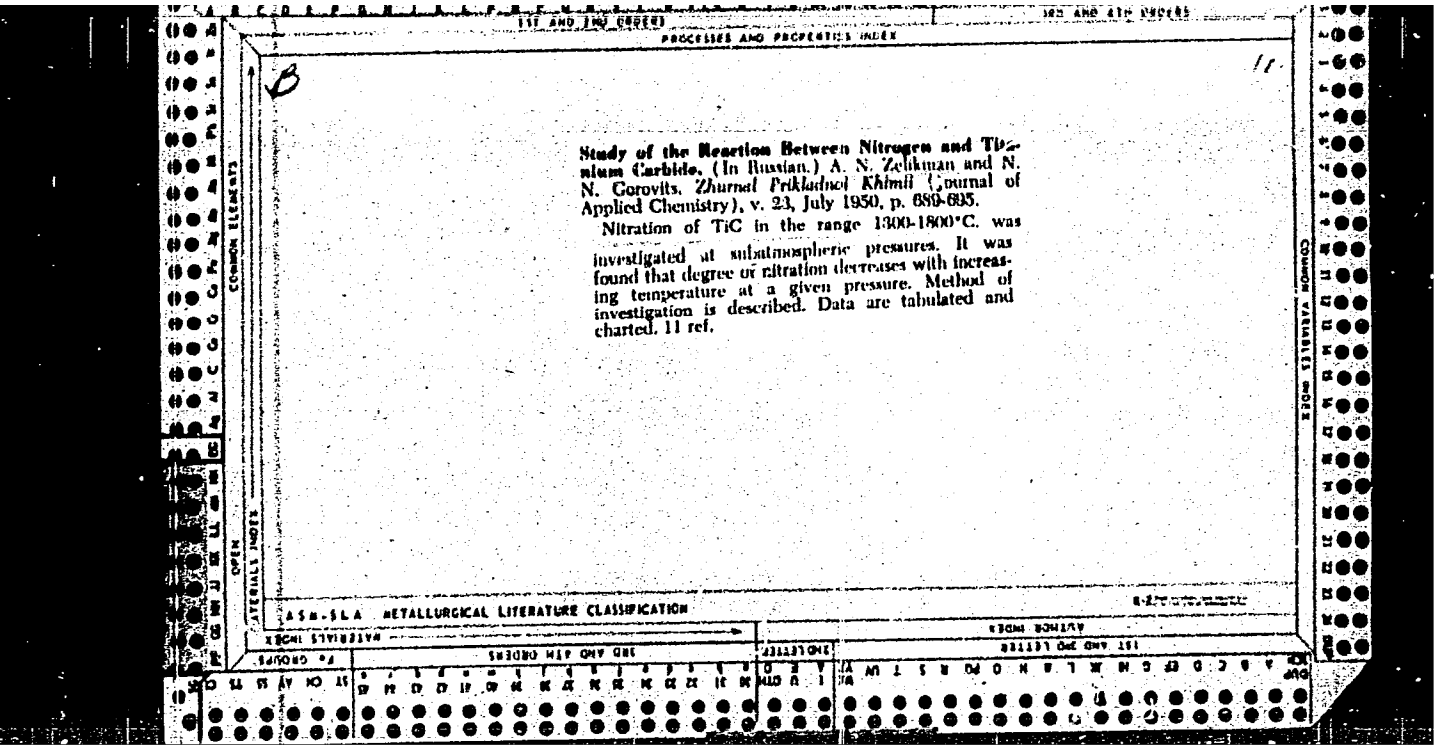
Titanium tungsten is the hard alloy used to coat the cutting edges of steel-working tools. The productivity of these hard alloys has therefore considerably increased. Tables of the percentage composition of

24T74

USSR/Metals (Contd) Jul/Aug 1947

various types of hard alloys and four photographic plates showing the microstructure of four samples of this alloy. Decarbonization of titanium carbide is conducted in furnaces at temperatures of 1200 - 1800 degrees. Nitrogen appears to be the only effective decarbonization agent at temperatures of 1800 - 2000 degrees. Nitrogen does not decrease the cutting efficiency of hard alloy tools.

24T74



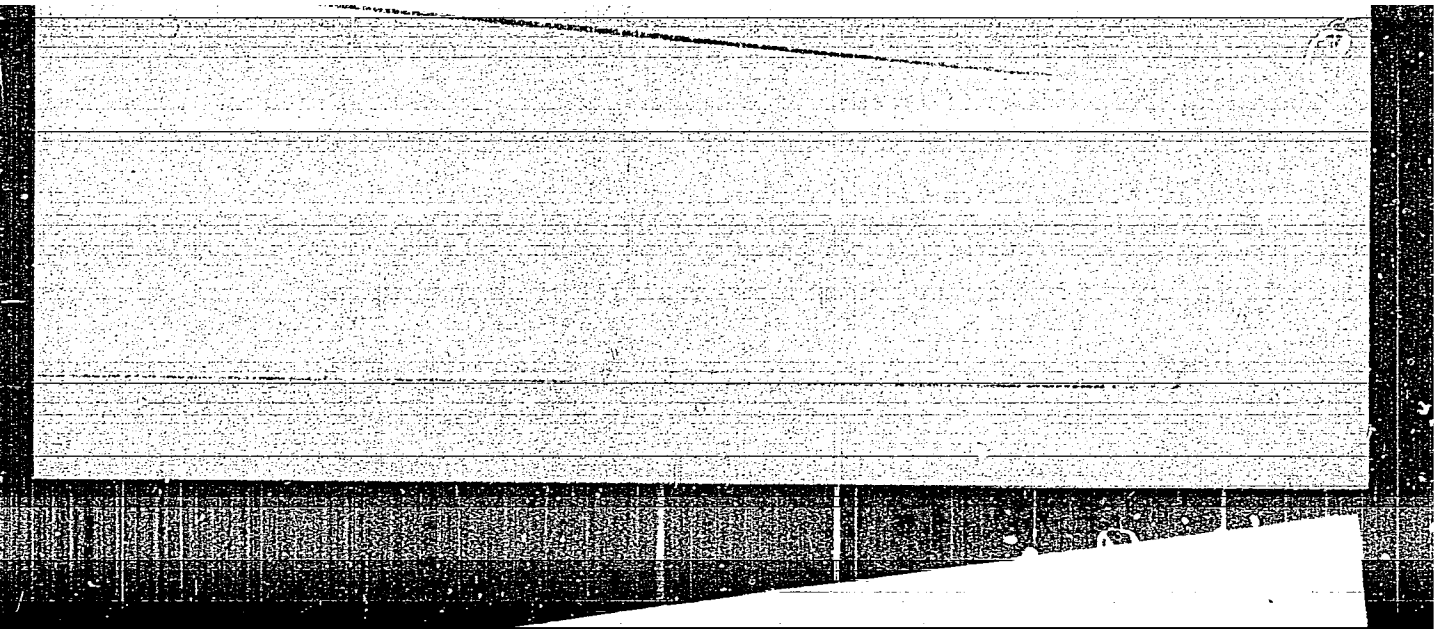
Study of the Reaction Between Nitrogen and Titanium Carbide. (In Russian.) A. S. Zelikman and N. N. Gorovits. *Zhurnal Prikladnoi Khimii* (Journal of Applied Chemistry), v. 23, July 1950, p. 689-695.

Nitration of TiC in the range 1300-1800°C. was investigated at subatmospheric pressures. It was found that degree of nitration decreases with increasing temperature at a given pressure. Method of investigation is described. Data are tabulated and charted. 11 ref.

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

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

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



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were written by G.A. Meyerson,; Chapters I-III, V, VI, VIII-XII, XVII-XXII, by A.N. Zelikman. The authors express their thanks for suggestions received from the reviewers and from scientific workers in the Department of Metallurgy of Light Metals of the Moskovskiy institut tsvetnykh metallov i zolota (Moscow Institute of Nonferrous Metals and Gold), at the Gosudarstvennyy nauchno-issledovatel'skiy institut po redkim metallam (State Scientific Research Institute for Rare Metals), and at the Vsesoyuznyy nauchno-issledovatel'skiy institut po tverdym splavam (All-Union Scientific Research Institute for Hard Alloys). There are 375 references, of which 205 are Soviet, 126 English, 40 German, 3 French, and 1 Italian.

TABLE OF CONTENTS:

Card 1/1 Pub. 147 - 15/22

Authors : Zelikman, A. N., and Kreyn, O. Ye.

Title : Thermal dissociation of MoS_2

Periodical : Zhur. fiz. khim. 29/11, 2081-2085, Nov 1955

Abstract : The elasticity of MoS_2 (molybdenum disulfide) was investigated at temperatures ranging from 800 to 1,100° by means of a static method on the basis of the equilibrium composition of the gaseous phase during the reduction of MoS_2 with hydrogen. The results obtained were compared with those of N. Parravano (Italy) and K. K. Kelley (USA) and found to correspond perfectly with each other. Ten references: 4 USSR, 3 French, 2 Ital. and 1 USA (1900-1950). Tables; graph; drawing.

Institution : Moscow Inst. of Non-Ferrous Metals and Gold

Submitted : May 24, 1955

USSR/ Chemistry - Metallurgy

Card 1/1 Pub. 22 - 14/47

Authors : Zelikman, A. N.

Title : The reaction of the molybdenite mineral with MoO_3

Periodical : Dok. AN SSSR 100/6, 1083-1085, Feb 21, 1955

Abstract : The equilibrium and kinetics of the reaction between a pure molybdenite mineral (MoS_2) and MoO_3 were investigated. The reaction products were analyzed for their S content and then subjected to phase x-ray analysis. The effect of the gaseous MoO_3 on the rate of reaction is explained. It was found that the formation of MoO_2 during the calcination of molybdenite concentrates is possible only when the material clinkers during the calcination. Five references: 3 USA and 2 USSR (1937-1952). Tables; graphs.

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

Presented by: Academician G. G. Urazov, August 24, 1954

ZELIKMAN, A.N.

137-58-5-8788

Translation from: Referativnyy zhurnal, Metallurgiya, 1958, Nr 5, p 8 (USSR)

AUTHORS: Zelikman, A. N., Belyayevskaya, I [illegible], Kreyn, O. Ye.

TITLE: A Study of FluoSolids Roasting of Molybdenite Concentrates (Izucheniye protsessov obzhiga molibdenitovykh kontsentratov v kipyashchem sloye)

PERIODICAL: Tr. Tekhn. soveshchaniya po obzhigu materialov v kipyashchem sloye. Moscow, Metallurgizdat, 1956, pp 75-96

ABSTRACT: A presentation of results of studies of oxidation rates of molybdenite and of its interaction with MoO_3, as well as of the interaction of MoO_3 with CuO, CaO, FeO, and ZnO and of the solubility in ammonia of molybdates formed in the process. The process of FluoSolids roasting was studied in a laboratory furnace with a cross section of 400x150 mm. The following was established: optimal temperature: 585°-595°C; specific output of the hearth: 1.5-1.6 t/m^2; extent of dust removal: 38-42 percent; it was also established that the roasting process may be carried out without fuel by means of utilizing the heat from the reactions. Chemical composition and results of leaching of cinder (which results from the FluoSolids roasting process)

Card 1/2

137-58-5-8788

A Study of FluoSolids Roasting of Molybdenite Concentrates

are shown, together with analogous information for an industrial roasting process carried out in a rotary furnace. Extraction of Mo from cinder, produced in the course of a process of FluoSolids roasting, is 92.0-93.5 percent as compared to the 79.0-79.5 percent achieved in the industrial process. The amounts of tailings from the two processes constitute 20-22 percent and 36-38 percent, respectively.

A. P.

1. Molybdenum ores--Processing 2. Molybdenum ores--Properties

Card 2/2

ZELIKMAN, A.N.

Category : USSR/Atomic and Molecular Physics - Statistical Physics Thermodynamics D-3

Abs Jour : Ref Zhur - Fizika, No 2, 1957 No 3480

Author : Zelikman, A.N., Gorovits, N.N., Prosenkova, T.Ye.
Title : Vapor Pressure of Molybdenum Trioxide at High Temperatures

Orig Pub : Zh. neorgan. khimii, 1956, 1, No 4, 632-637

Abstract : The vapor pressure of molybdenum trioxide was determined at temperatures above the melting point from the boiling temperatures at constant pressure. The following equation was derived for the vapor pressure of MoO_3: $\log P = -7685/T + 8.26$. The latent heat of boiling of MoO_3 is 35.1 kcal. Comparison of the vapor pressure determined by the jet method with the true vapor pressure confirm the assumption that the molybdenum trioxide molecules become polymerized in the gas phase. The probable composition of the gas molecules at temperatures of 950 -- 1000° corresponds to Mo_3O_9.

Card : 1/1

ZELIKMAN, A.N.

Category: USSR / Physical Chemistry - Kinetics. Combustion. Explosives. Topochemistry. Catalysis. B-9

Abs Jour: Referat Zhur-Khimiya, No 9, 1957, 30040

Author : Zelikman A. N., Belyayevskaya L. V.
Inst : not given
Title : Study of the Reaction of Oxidation of Molybdenite

Orig Pub: Zh. neorgan. khimii, 1956, 1, No 10, 2245-2256

Abstract: It is shown that at 400, 500 and 600° molybdenite (I) is oxidized by oxygen of the air, directly to MoO_3 (II). Intermediate interlayer of MoO_2, which is observed only at 600°, is formed as a result of secondary interaction between I and II. Rate and regularities of the oxidation of I, at different temperatures, depend on structure of oxidic envelope. At 600° this envelope is friable, velocity of the process is determined by velocity of the chemical reaction, extent of oxidation depends linearly upon duration, velocity constant K = 0.0085 mm/minute. At 500°, as oxidation proceeds, there is observed a transition from kinetic conditions, over intermiate, to diffusion conditions, which are attained with a thickness

Card : 1/2 -15-

Category: USSR / Physical Chemistry - Kinetics. Combustion. Explosives. Topochemistry. Catalysis. B-9

Abs Jour: Referat Zhur-Khimiya, No 9, 1957, 30040

of the oxidic envelope of above 0.8 mm. The reaction is defined by the equation $x^n = kt$ (x is extent of oxidation, n varies from 1 to 2). At 400° a dense oxidic envelope is formed, the nature of the process is one of pure diffusion. A probable mechanism of oxidation of I is proposed, which is based on formation of intermediate compounds of the type of oxysulfides MoS_2O or $MoSO_2$.

Card : 2/2 -16-

ZELIKMAN, A.N.

Reactions in the solid phase with participation of molybdenum trioxide. Zhur. neorg. khim. 1 no.12:2778-2791 D '56. (MLRA 10:6)
(Molybdenum oxides) (Chemical reactions)

Investigation of reciprocal reactions of molybdates of calcium, copper, and iron with solutions of sodium carbonate. A. N. Zelikman and L. V. Belyayevskaya. *Zhur. Prikladn. Khimii* 23, 1307(1950); cf. C.A. 49, 7952f, 10783d.—Molybdates of Ca, Cu, and Fe were prepd. by sintering at 600–650° for 8–12 hrs. stoichiometric mixts. of the respective oxides; $CaMoO_4$ was also prepd., as a check, by pptn. from aq. solns. Equil. of $CaMoO_4$ with Na_2CO_3 was reached slowly: 80–120, 24–48, and 10 hrs. at 25, 50, and 75°, resp. With 0.7% Na_2CO_3 some of the carbonate remained as $NaHCO_3$, whereas with an initial concn. of 5% Na_2CO_3 such hydrolysis was not noted. The equil. consts., obtained graphically, were expressed by $\log K = -874.1/T + 3.124$ for pptd. $CaMoO_4$ and $-839.1/T + 2.875$ for that prepd. from the oxides. The corresponding free energies were $\Delta F^\circ = -3999.9 + 15.20T$ and $-3839.7 + 13.18T$. With $CuMoO_4$ two reactions took place: $(x+y)CuMoO_4 + (x+2y)Na_2CO_3 + 2H_2O = xCuCO_3.yCu(OH)_2 + (x+y)Na_2MoO_4 + 2yNaHCO_3$, x and y varied, in part, as a function of the Na_2CO_3 concn., equil. was reached within 20–40 hrs., and at 60 and 75° all of the $CuMoO_4$ dissolved at the expense of 1.12 moles of Na_2CO_3 per mole of $CuMoO_4$; the solid phase approximated 1.5-$CuCO_3.Cu(OH)_2$. At the expense of 0.5 mole of Na_2CO_3 per mole of molybdate the reaction was $CuMoO_4 + Na_2CO_3 = CuCO_3 + Na_2MoO_4$. The equil. consts. of the 1st reaction are $K_{60} = 33$ and $K_{75} = 53$. Equil. with $BaMoO_4$

ZELIKMAN, Abram Naumovich -- awarded sci degree of Doc Technical Sci for the 20 May 57 defense of dissertation: "Oxidization firing of molybdenite concentrates (theory and practice of the process)" at the Council, Mos Inst of Non-Ferrous Metals and Gold imeni Kalinin; Prot No 2, 18 Jan 58.

(BMVO, 6-58, 12)

SOV/136-58-10-20/27

AUTHOR: Zelikman, A.N., Doctor of Technical Sciences, Professor

TITLE: Letters to the Editor (Pis'ma v redaktsiyu)

PERIODICAL: Tsvetnyye Metally, 1958, Nr 10, p 82 (USSR)

ABSTRACT: The author complains that he has been incorrectly named as the editor of the book "Rare Metals of the Capitalist Countries" by G.D. Kochergin. This book was reviewed by I.S. Stepanov in Tsvetnyye Metally, 1958, Nr 8.

Card 1/1

SOV/136-58-11-9/21

AUTHORS: Zelikman, A.N., Bibikova, V.I., Petrov, V.M., Postnikova, S.V., Abashin, G.I., Pritula, V.F. and Nikitina, L.N.

TITLE: Study of the Behaviour and Recovery of Rhenium in the Roasting of Molybdenite Concentrates in a Fluidized-Red Roaster (Izucheniye povedeniya i ulavlivaniya reniya pri obzhige molibdenitovykh kontsentratov v pechi kipyashchego sloya)

PERIODICAL: Tsvetnyye Metally, 1958, Nr 11, pp 47-52 (USSR)

ABSTRACT: The rhenium concentration in some molybdenite concentrates from ores of mainly copper-molybdenum deposits reaches 0.02 - 0.10% and these are one of the principle sources of the element. In 1956 a rare-metals works adopted fluidised roasting, the composition of a batch of concentrate being 49.35% Mo, 35.42% S (total), 0.73% Cu, 2.98% Fe, 6.95% SiO_2, 0.88% Cu, 0.12% W, 0.025% Re, 0.033% Se, trace of Te, 4.0% H_2O, 2.2% flotation reagents. The plant has a rotary kiln and a fluidised roaster discharging into a common electrostatic precipitator. Analysis of samples (table 1) shows a 94.8-% distillation of rhenium in

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Study of the Behaviour and Recovery of Rhenium in the Roasting of Molybdenite Concentrates in a Fluidized-Bed Roaster

the fluidized roaster, compared with 50% for the rotary kiln but the existing dust-catching system involved 79.5% loss of rhenium in the waste gases. A bubbler (fig.1) installation type VSPU designed by Gintsvetmet which could deal with part of the gas was tested and found to be 89-96% efficient with respect to rhenium, most (75-92%) of the quantity trapped being in the form of soluble compounds; the losses of liquid from the bubbler were shown to be due to evaporation rather than mechanical entrainment. Removal of pulp from the bubbler is recommended when pulp acidity becomes 30-60 g/litre and rhenium concentration 0.15 - 0.30 g/litre. The installation is recommended by the authors. The Mintsvetmetzoloto large laboratory fluidized roaster (fig.2) was used to study the behaviour of rhenium and its recovery in the roasting of low-grade molybdenite concentrates (20.5% Mo, 17.5% S (total), 18.31% SiO_2, 4.06% Cu,

Study of the Behaviour and Recovery of Rhenium in the Roasting of Molybdenite Concentrates in a Fluidized-Red Roaster

1,60% CaO, 7.16% Fe, 0.21% W, 0.04% Re) at 590-630°C and an air velocity in the stac' of 8-9 cm/sec (giving an hourly productivity of 75-80 kg/m^2 of hearth area). A materials balance (table 3) for a 12 hour run shows that the method is successful with such concentrates; the distillation of rhenium being 93.2% of the quantity in the concentrate. There are 2 figures and 3 tables.

SOV/32-24-8-9/43

AUTHORS: Zelikman, A. N., Gorovits, N. N.

TITLE: The Precipitation of Tungsten in the Determination of this Element in Molybdenum Products (O soosazhdenii vol'frama pri opredelenii yego v molibdenovykh produktakh)

PERIODICAL: Zavodskaya Laboratoriya, 1958, Vol. 24, № 8, pp. 94o - 941 (USSR)

ABSTRACT: The methods for separating out tungsten from different molybdenum products are not yet sufficiently worked out. Usually a colorimetric method is used in which the pentavalent tungsten forms a yellow complex with a thiocyanogen salt. When the molybdenum concentration is preponderant a separation must first be carried out. This is accomplished by precipitating the tungsten with iron oxide, according to a report from the Institut tverdykh splavov MTsM SSSR (Institute for Hard Alloys MTsM USSR). The precipitated tungsten is then removed, dissolved in hydrochloric acid, and determined colorimetrically after the iron is first precipitated with lye. The completeness of the tungsten precipitation was investigated using the radioactive isotope tungsten-185 as an indicator.

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The Precipitation of Tungsten in the Determination of this Element in Molybdenum Products SOV/32-24-8-9/43

These investigations showed that 70-79% of the tungsten is precipitated, so this method is not suitable for an exact determination of tungsten in molybdenum products. There are 1 table and 2 references which are Soviet.

ASSOCIATION: Moskovskiy institut tsvetnykh metallov i zolota im.M.I.Kalinina (Moscow Institute for Nonferrous Metals and Gold imeni M.I.Kalinin)

Card 2/2

ZELIKMAN, A. N.

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75404
SOV/149-2-5-30/32

AUTHOR: Zelikman, A. N.

TITLE: Rare Metals of Chinese People's Republic

PERIODICAL: Izvestiya vysshikh uchebnykh zavedeniy. Tsvetnaya metallurgiya, 1959, Vol 2, Nr 5, pp 186-187 (USSR)

ABSTRACT: Until 1949 there was no production of rare metals in China; this also refers to tungsten, the reserves of which are very considerable; China's export of tungsten concentrates constituted about one half of world's output. The Soviet Union helped China develop its production by sending specialists and by permitting Chinese specialists to study in the Soviet Union. China now produces gallium, indium, thallium, selenium, and tellurium, which are prepared from byproducts of nonferrous metallurgy. Conventional methods of their preparation are described by the author but no names of plants or production figures are given. Ferrous alloys, ferromolybdenum, ferrotungsten, and carbides, and metallic tungsten and molybdenum are now produced in China, and there is no

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Rare Metals of Chinese People's Republic

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SOV/149-2-5-30/32

doubt that the Chinese People's Republic will become one of the most advanced producers of rare metals. There are 7 references, 3 Soviet, 1 Hungarian, 1 German, 2 U.S. The U.S. references are: Kleinert, The Mining Magazine, 85, 5, 146(1950) and Mills, Hunt, Terner, J. Electrochem. Soc., 100, 3, 126 (1953).

Card 2/2

ZELIKMAN, A.N.

TITLE: Conference on Autoclave Processes

PERIODICAL: Tsvetnyye metally, 1959, Nr 7, pp 84-87 (USSR)

ABSTRACT: On 23-26 February 1959 a conference was held in Moscow for summing-up and coordinating work on autoclave processes in the metallurgy of heavy, non-ferrous, rare and noble metals. The conference heard reports as follows: D.M. Yukhtanov, Gintsvetmet, on progress throughout the world on the use of hydrometallurgical, particularly autoclave, methods for non-ferrous and rare metal production; O. N. Dobrokhotov, Gipronikel', on nickel leaching practice at some Soviet works: N. I. Onuchkina and G. N. Dobrokhotov on the thermodynamics and kinetics of the selective reduction by hydrogen and carbon monoxide under pressure of nickel and cobalt from solution; I. Yu. Leshch and K. K. Shelepova, Gipronikel', on design decisions on the application of the flowsheets dealt with [illegible] N. Dobrokhotov at the Yuzhuralnikel' and Severonikel' combines and the Ufaleyskiy (Ufa) Nickel Works; I. N. Maslenitskiy, Leningradskiy gornyy institut (Leningrad Mining Institute) on the advantages of a combined flotation-autoclave method for nickel-electrolysis of slimes containing platinum-group metals; V. B. Zhilkin, Severonikel' combine, and S. I. Sobol', Gintsvetmet, on the essentials of the neutral method of oxidizing leaching of nickel concentrate from converter-matte flotation; S. I. Sobol' on preliminary investigations on the development of a sulphurous-sulphuric method for leaching nickel and cobalt from oxidized nickel ores; N. N. Maslenitskiy, Mekhanobr, on

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the main results of investigations of the autoclave-soda process for treating tungsten-ore beneficiation products: V. I. Poprukaylo, Mekhanobr, and D. A. Malakhov, Skopinskaya (Skopinsk) TsOF, separately, on problems in the application of an autoclave-soda flowsheet to scheelite and wolframite raw material; G. A. Meyerson, K. Ya. Shapiro, N. N. Khavskiy, R. A. Pavlyuk and A. P. Nadol'skiy, Krasnoyarskiy institut tsvetnykh metallov (Krasnoyarsk Non-Ferrous Metals Institute) on the treatment of tungsten concentrates in hermetical, [illegible] ball-mills with acids or caustic alkalies; V. I. Spiridonova, S. I. Sobol', Ye. I. Gulyayeva, Z. L. Berlin, I. N. Nelen' and B. I. Rudenko, Gintsvetmet, on the treatment of prepared and unprepared sulphide molybdenum raw material by oxidizing autoclave alkaline leaching; I. N. Nelen' and S. I. Sobol' on the kinetics of oxidizing autoclave leaching; A. N. Zelikman and Z. M. Lyapina, Krasnoyarsk Non-Ferrous Metals Institute, on the results of a study of conditions for the selective separation of lower oxides of tungsten and molybdenum from their salt solutions by hydrogen under pressure; M. V. Darbinyan, Gorno-

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metallurgicheskiy institut (Mining-Metallurgical Institute) of the Sovnarkhoz (economic council) of the Armyanskaya SSR (Armenian SSR), on his investigations of ammoniacal autoclave leaching under oxygen pressure of molybdenum concentrates; S. I. Sobol' on technical-economic factors of ammoniacal leaching; A. I. Sinel'nikova and I. N. Plaksin, Krasnoyarsk Non-Ferrous Metals Institute, on an oxidizing autoclave process for gold-containing raw material; N. G. Tyurin, Ural'skiy politekhnicheskiy institut (Ural Polytechnic Institute) on the behaviour of noble metals in oxidizing autoclave leaching in thiosulphate solutions; A. L. Tseft and D. A. Taraskin and A. Yu. Dadabayev, Institut metallurgii i obogashcheniya AN Kaz SSR (Metallurgy and Beneficiation Institute of the AS Kaz SSR), respectively, on the physicochemical fundamentals and on works' trials of autoclave salt leaching of polymetallic materials; I. Yu. Leshch, Gipronikel', on the unsuitability of autoclave

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leaching for lime-containing materials; V. A. Bernshteyn, VAMI, on industrial experience of a continuous autoclave leaching process for bauxites; V. G. Tronev, IONKh AN SSSR (IONKh AS USSR), on compounds of some rare elements in various valency states under oxygen and hydrogen pressure in the presence of anhydrous ammonia; Z. L. Berlin, Gintsvetmet, on autoclave design and operation; P. G. Yakovlev, Gipronikel', and N. Ye. Vishnevskiy, VNII neftekhim, on model studies on autoclaves and the development of mixers; M. A. Polyanov, K. B. Giredmet, on the design of an experimental high-pressure pulp pump. G. L. Shvarts, NIIKhIMMASh, on the selection of steel for acid leaching of cobalt matte and matte-flotation concentrate; Yu. I. Archakov, VNIIneftekhim, on corrosion of types 1Kh18N9T, 12Kh3N, 10KhSND and 10GND steels in soda and alkaline solutions in the presence of metal salts and oxygen at 5 - 15 kg/mm²; V. I. Deryabina and N. N. Kalgatin, VNIIneftekhim, separately, on mechanical properties of hydrogen-affected steels. The conference made recommendations aimed at the extension and improve-

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PHASE I BOOK EXPLOITATION SOV/4686

Zelikman, Abram Naumovich

Metallurgiya redkozemel'nykh metal'ov toriya i urana (Metallurgy of Rare-Earth Metals of Thorium and Uranium) Moscow, Metallurgizdat , 1960. 380 p. 3,650 copies printed.

Ed.: O.M. Kamayeva; Tech. Ed.: M.K. Attopovich.

PURPOSE: This textbook is intended for students of metallurgical and technological schools of higher education. It may also be useful to technical and scientific personnel.

COVERAGE: The author discusses processes for extracting the rare-earth elements thorium and uranium from various ores and concentrates, and describes methods for producing thorium and uranium metals and chemical compounds. Particular attention is given to methods of fractionating rare-earth elements. The principal physicochemical properties of these elements are discussed, and the area of their utilization is considered. Also included is information on pertinent minerals, ores, and concentrates. The

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author thanks K.A. Bol'shakov, Professor G.Ye. Kaplan, Professor N.S. Greyver, and Professor N.N. Murach, Corresponding Members of the Academy of Sciences USSR, and their coworkers for their valuable comments, and A.I. Ginzburg, Doctor of Geological and Mineralogical Sciences, for reviewing paragraphs containing characteristics of various ores. There are 354 references: 194 Soviet, 138 English, 16 German, and 6 French.

TABLE OF CONTENTS:

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S/149/60/000/03/04/009

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AUTHORS: Kirillova, G.F., Meyerson, G.A., Zelikman, A.N.

TITLE: Kinetics of the Chlorination of Titanium and Niobium Carbides

PERIODICAL: Izvestiya vysshikh uchebnykh zavedeniy, Tsvetnaya metallurgiya, 1960, No 3, pp 90 - 96

TEXT: The method of preparing niobium and titanium chlorides from TiC and NbC, which may be obtained from oxides or directly from Ti and Nb concentrates, is of considerable interest. Information is given on results of investigations into kinetics of chlorinating pure Ti and Nb carbides. Carbide powders were used as initial material, obtained by the reduction of TiO_2 and Nb_2O_5 oxides with lamp black in a coal-tubular furnace in hydrogen atmosphere at 1,900° - 2,000°C and 1,700° - 1,800°C respectively. The chemical composition of the carbides is given in Table 1. The experiments were performed on compact cylindrical specimens contained in a tube; chlorine flow was passed through the tube at a certain speed and temperature; the loss in weight of the specimen was recorded as well as the amount of chloride developed during a given time interval. The experimental installation is shown

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Kinetics of the Chlorination of Titanium and Niobium Carbides

in Figure 1. The weight loss of the specimens was the basic and most accurate indicator of the chlorination rate. The experimental results were expressed in the weight rate ($g/cm^2 \cdot min$) or linear rate (mm/min) characterizing the extension of the process into the depth of the specimen. Computational data were checked by direct measurements with the aid of a binocular microscope (x 28). Table 2 shows that the computational and measured values are in a satisfactory agreement. The following conclusions are drawn: The chlorination process was accompanied by the development of an external graphite layer whose effect on the rate of the process was not noticed at 400°C; at 600° and 800°C a certain diffusional inhibition of the reaction was observed; chlorination acquired the characteristic of an intermediate process between the kinetic and diffusion processes, the first one being prevalent. It was established that the compact Nb carbide was chlorinated slower at 800° than at 600°C. This is apparently due to a higher adhesion strength of the graphite layer to the Nb carbide. The chlorination rate of Ti carbide increased rapidly at higher temperatures. The revealed dependence of the chlorination depth on the duration of the process was used to calculate the optimum time of chlorination of Ti and Nb carbide

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Kinetics of the Chlorination of Titanium and Niobium Carbides

particles of different sizes at 400°, 600° and 800°C. This may play a part in the evaluation of the chlorination rates of powder-like carbides in a fluidized bed. There are 2 tables, 1 diagram, 3 sets of graphs and 6 references: 3 Soviet, 2 English and 1 German.

ASSOCIATION: Krasnoyarskiy institut tsvetnykh metallov (Krasnoyarsk Institute of Non-Ferrous Metals), Kafedra metallurgii redkikh metallov (The Chair of Metallurgy of Rare Metals)

SUBMITTED: December 10, 1959

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PETROV, V.M.; ZELIKMAN, A.N.

Study of roasting in a fluidized bed of unconditioned molybdenite concentrates. Izv.vys.ucheb.zav.; tsvet.met. 3 no.2:126-131 '60. (MIRA 15:4)

1. Krasnoyarskiy institut tsvetnykh metallov, kafedra metallurgii redkikh metallov.

(Ore dressing) (Fluidization)

85457

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152200 2808, 1142, 1411, 1439

S/149/60/000/005/009/015
A006/A001

AUTHORS: Meyerson, G.A., Zelikman, A.N., Belyavskaya, L.V., Tseytina, N.Ya., Kirilleva, G.F.

TITLE: Investigation Into Conditions of Titanium-Niobium Carbide Chlorination

PERIODICAL: Izvestiya vysshikh uchebnykh zavedeniy, Tsvetnaya metallurgiya, 1960, No. 5, pp. 108-115

TEXT: The authors investigated kinetics of complex titanium-niobium carbide chlorination and studied the process of chlorination in a fluidized bed on a large-scale laboratory furnace. The former investigation was made with hot pressed cylindrical specimens of titanium-niobium carbide, containing in %: 46.88 Ti; 13.91 Nb; 2.62 Si; 8.79 C_{bound}; 12.32 C_{free}; 3.76 N; 11.72 O etc. Complex carbide was obtained from titanium-niobium concentrate and represented an oxycarbonitride. Chlorination kinetics of complex carbide was investigated using a horizontal quartz tube at 800, 600 and 400°C and 9 l/min chlorine feed. It was found that chlorination of compact carbide specimens was accompanied by the formation of an external graphite layer. At 400°C the effect of this layer on the

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A006/A001

Investigation Into Conditions of Titanium-Niobium Carbide Chlorination

chlorination rate was not noticeable (the process having a kinetic nature). At 600° and, in particular, at 800°C, some diffusion inhibition of the reaction was observed due to the graphite layer formed. The nature of the chlorination process becomes intermediate between kinetic and diffusion one, the former being prevalent. The dependence of the chlorination depth on the duration of the process was revealed and used to calculate the maximum possible duration of chlorination of various-size carbide particles at 400, 600 and 800°C (Table 1)

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A006/A001

Investigation Into Conditions of Titanium-Niobium Carbide Chlorination

Table 1
Maximum possible duration of carbide particle chlorination

Temperature °C	Particle size mm	Duration of chlorination, min	
		in the presence of a graphite layer	without a graphite layer
800	0,250	8,0	5,58
800	0,075	2,8	1,68
800	0,042	1,2	0,94
600	0,250	17	13,6
600	0,075	5	4,1
600	0,042	3	2,3

Chlorination in a fluidized bed was studied on a furnace shown in Figure 4.

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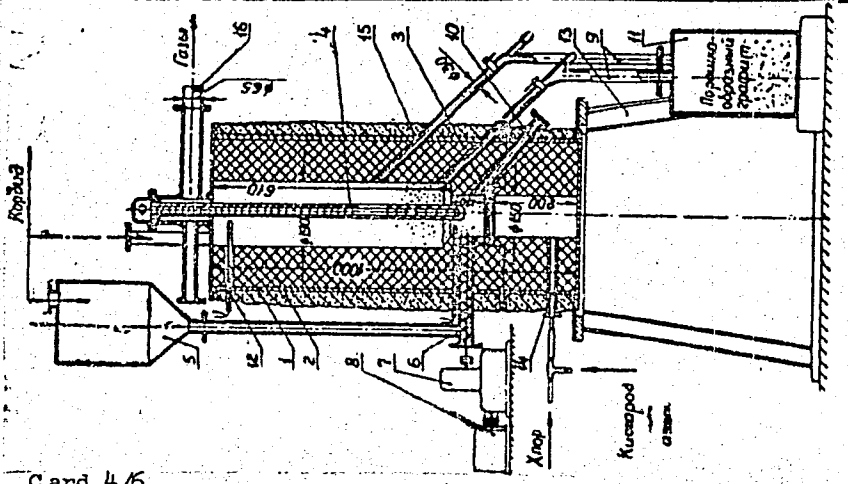
A006/A001

Investigation Into Conditions of Titanium-Niobium Carbide Chlorination

Figure 4

Furnace for the chlorination of complex carbide in a fluidized bed



1 - body; 2 -graphite lining; 3 - graphite grid; 4 - nichrome heater; 5 carbide bin; 6 - screw; 7 - reductor; 8-dac motor; 9-fine graphite discharge pipes; 10-furnace discharge pipes; 11-powder graphite container; 12-thermocouple; 13-frame; 14-tuyere; 15-heat insulation; 16-gas exhaust pipe.

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S/149/60/000/005/011/015
A006/A001

Radiographic Investigation of Recrystallization Processes and Release of a Carbide Phase of Hard Alloys Containing Tungsten, Titanium and Tantalum Carbides

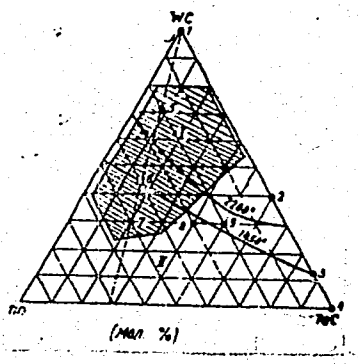

Figure 1

Phase diagram of the WC-TiC-TaC system; solubility of WC at 1,450 and 2,200°C are shown; the biphase range I contains a solid solution of TiC-TaC-WC and WC carbide; the mono-phase range II contains the TiC-TaC-WC phase; points 1 - 9 are the carbide components of the alloys investigated.

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S/149/60/000/005/011/015
A006/A001

Radiographic Investigation of Recrystallization Processes and Release of a Carbide Phase of Hard Alloys Containing Tungsten, Titanium and Tantalum Carbides

There are 3 figures and 4 Soviet references.

ASSOCIATION: Moskovskiy institut stali (Moscow Steel Institute) Kafedra fiziki metallov i rentgenografii (Department of Physics of Metals and of Radiography)

SUBMITTED: October 27, 1959

Card 6/6

S/137/62/000/005/026/150
A006/A101

AUTHORS: Meyerson, G. A., Zelikman, A. N., Belyayevskaya, L. V., Tseytina, N. Ya., Kirillova, G. F.

TITLE: Processing of titanium-niobium rare-earth complex raw material by carbidization and chlorination

PERIODICAL: Referativnyy zhurnal, Metallurgiya, no. 5, 1962, 13, abstract 5G80 ("Sb. nauchn. tr. In-t tsvetn. met. im. M. I. Kalinina", 1960, v. 33, 175-185)

TEXT: The processing of Ti-Nb raw material by the method of carbidization and chlorination was conducted on a laboratory and enlarged scale. The method consists in heating a mixture of the concentrate with coal in an electric furnace at 1,800 - 1,900°C. The complex raw material elements are then transformed into carbides and divided into the following two groups according to their properties: 1) TiC, NbC, TaC, SiC - strong refractory compounds, and 2) carbides of rare earth elements Ca, Na, Al and Fe, dissolving in diluted acids. Processing of a carbidization product with 10% HCl makes it possible to separate all soluble elements from refractory carbides. The washed and dried residue (solid solution

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Processing of titanium-niobium ... S/137/62/000/005/026/150
A006/A101.

of Ti, Ni, Ta carbides) is chlorinated at 800°C with subsequent separation of chlorides in condensers and cleaning by rectification. Results of investigations are presented.

G. Svodtseva

[Abstracter's note: Complete translation]

Card 2/2

S/081/62/000/010/056/085
B168/B180

AUTHORS: Zelikman, A. N., Gorovits, N. N.

TITLE: Extraction of molybdenum from oxidized ores and lean concentrates from sor formations

PERIODICAL: Referativnyy zhurnal. Khimiya, no. 10, 1962, 397, abstract 10K61 (Sb. nauchn. tr. In-t tsvetn. met. im. M. I. Kalinina, v. 33, 1960, 186-201)

TEXT: A table is given showing the chemical make-up of oxidized ores and lean concentrates from sor formations. The following hydrometallurgical method of extracting Mo is examined: leaching with sulfuric acid and diluting with solutions of NaOH or soda (leaching conditions: soda concentration 2%; solid : liquid = 1 : 3; temperature 120°C, time 6 hr). A scheme is given for an autoclave-soda process for extracting Mo. Combined methods of extracting Mo, namely calcining with NaCl and soda and the 'chloride sublimation' method, were investigated. The technological characteristics of various schemes of Mo extraction are

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compared. From the point of view of outlay on reagents and equipment the 'chloride sublimation' method, in which $\leq 2\%$ by weight of the material being processed goes into the hydrometallurgical operation (absorption of molybdenum oxychloride by ammonia solution), is the most economical. With the remaining schemes the entire mass of lean concentrates is used in leaching, which means that a large amount of apparatus must be installed for the leaching, concentration and filtration of pulps, with occupation of a correspondingly large amount of floor space.
[Abstracter's note: Complete translation.]

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SOV/80-33-1-8/49

AUTHORS: Zelikman, A. N., Kreyn, O. Ye.

TITLE: Preparation of Molybdenum Disulfide for Lubrication Purposes

PERIODICAL: Zhurnal prikladnoy khimii, 1960, Vol 33, Nr 1, pp 49-55 (USSR)

ABSTRACT: The lubricating properties of natural MoS_2 (molybdenite), supplied by the Sobin Refining Plant, and of synthetic MoS_2, were compared by testing both materials in oil suspension in TsNIIMASH and VIAM friction testing machines. The lubricating properties of both additives were practically equal. Synthetic MoS_2 was obtained: (1) on fusing MoO_3 with sulfur and sodium carbonate; optimum conditions: sulfur in 15% excess, temperature 700° C, time of reaction 1 hr; (2) on fusing $CaMoO_4$ with sulfur and sodium carbonate; optimum conditions:

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Preparation of Molybdenum Disulfide for Lubrication Purposes

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SOV/80-33-1-8/49

sulfur in 60% excess, temperature 600-700° C, time of reaction 1 hr. There are 5 figures; 5 tables; and 7 references, 2 U.S., 1 French, 3 German, 1 Soviet. The U.S. references are: R. E. Bell, R. E. Herfert, J. Am. Chem. Soc., 79, 13, 3351 (1957); R. L. Graham, L. G. Hepfer, ibid., 78, X, 19, 4846 (1956).

SUBMITTED: January 19, 1959

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S/697/61/000/000/004/018
D228/D303

AUTHORS: Zelikman, A. N., Bibikova, V. I., Petrov, V. M., Postnikova, S. V., Abashin, G. I., Pritulo, V. F. and Nikitina, L. N.

TITLE: Study of the behavior and recovery of rhenium during the roasting of Kadzhara and Koundrad molybdenite concentrates in a boiling layer

SOURCE: Akademiya nauk SSSR. Institut metallurgii im. A. A. B[illegible]kova. Institut mineralogii, geokhimii i kristallokhimii redkikh elementov. Mezhduvedomstvennaye komissiya po redkim metallam. Vsesoyuznoye soveshchaniye po probleme reniya. Moscow, 1958. Reniy; trudy soveshchaniya. Moscow, Izd-vo AN SSSR, 1961, 42-50

TEXT: The authors present the results of their study of: (a) the distribution of Re in the products obtained from roasting Kadzhara molybdenite concentrates in a boiling-layer furnace, (b) the recovery of Re from waste gases of a boiling-layer furnace by means

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of a bubbling unit, and (c) the behavior of Re during the calcining of Koundrad concentrates in the same type of furnace and the extraction of Re with a similar bubbling unit. A tentative scheme is also suggested for reprocessing bubbler pulp to obtain metallic Re. It is noted that recent research at the Institut tsvetnykh metallov im. M. I. Kalinina (Institute of Non-Ferrous Metals im. M. I. Kalinin) has indicated the advantages of the boiling-layer furnace as compared with tubular, muffle, and reverberatory types. Diagrams illustrate the dust-collection system of the boiling-layer furnace, the bubbling unit designed by the Gintsvetmet (State Institute of Non-Ferrous Metallurgy) for the recovery of furnace gases, and the laboratory model of the boiling-layer furnace employed by the authors in their tests. The Re distribution in the roasting products of Kadzhara concentrates, the Re content of bubbler pulp, and the Re balance for both the bubbler and the furnace as a whole are given in tables. Conclusions: 1) The roasting of Kadzhara concentrates in a boiling-layer furnace ensures the fullest sublimation of Re; 92 - 96% of the Re is sublimated in this type of furnace

as compared with only 50 - 67% in muffle and rotary tubular furnaces. 2) The existing dust-collection system of the boiling-layer furnace does not guarantee a satisfactory degree of Re extraction, since the loss of metal in waste gases amounts to about 80%. The lowering of the temperature of the Cottrell filter to 55 - 80° does not reduce this loss on account of the condensation of H_2SO_4. 3) Much better results can be obtained with the bubbling unit, and the bubbler's efficiency with respect to Re is stated to equal 89 - 96%. 75 - 92% of the metal in the bubbler pulp is in solution, and the concentration of dissolved Re rises as the duration of the bubbling lengthens. It is recommended that the pulp be removed from the bubbler when the Re concn. and acidity of the solution is 0.15 - 0.3 and 30 - 50 g/l respectively. 4) The high degree of Re sublimation (92-93.2%) from the ash of Koundrad concentrate shows that the same technique can also be applied to this material; there is no difference in the behavior of Re during the roasting of both concentrates and the processing of their gaseous products in the bubbling unit. There are 3 figures and 4 tables. [Abstracter's note: p.48 of the photostat copy is illegible.]

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BAL'SHIN, M.Yu., kand.tekhn.nauk; VINOGRADOV, S.V., inzh.; GLAZUNOV, S.G., kand.tekhn.nauk; ZELIKMAN, A.N., kand.khim.nauk; KISLYAKOV, I.P., kand.tekhn.nauk; KURITSYNA, A.D., kand.tekhn.nauk; LEBEDEV, A.A., A.A., inzh.; LUZHNIKOV, L.P., kand.tekhn.nauk; POMERANTSEV, S.N., inzh.; RUDNITSKIY, A.A., doktor khim.nauk; SMIRYAGIN, A.P., kand. tekhn.nauk; TRET'YAKOV, V.I., kand.tekhn.nauk; CHURSIN, V.M., kand.tekhn.nauk; CHUKHROV, M.V., kand.tekhn.nauk; SHAROV, M.V., kand.tekhn.nauk, SHPAGIN, A.I., kand.tekhn.nauk; SHPICHINETSKIY, Ye.S., kand.tekhn.nauk; POGODIN-ALEKSEYEV, prof., doktor tekhn. nauk, red.; BOCHVAR, M.A., inzh., red.toma; RYBAKOVA, V.I., inzh., red.izd-va; SOKOLOVA, T.F., tekhn.red.; MODEL', B.I., tekhn.red.

[Handbook of materials used in the machinery industry; in four volumes] Spravochnik po mashinostroitel'nym materialam; v chetyrekh tomakh. Pod red. G.I.Pogodina-Alekseeva. Moskva, Gos.nauchno-tekhn.izd-vo mashinostroit.lit-ry. Vol.2. [Nonferrous metals and alloys] TSvetnye metally i ikh splavy. Red.toma M.A.Bochvar. 1959. 639 p. (MIRA 13:1)

(Nonferrous metals) (Nonferrous alloys)
(Machinery industry)

MEYERSON, G.A.; ZELIKMAN, A.N.; BELYAYEVSKAYA, L.V.; TSEYTINA, N.Ya.; KIRILLOVA, G.F.

Processing of complex titanium-niobium bearing rare earth minerals by the carbidizing and chlorination method. Sbor. nauch. trud. GINTSVETMET no.33:175-185 '60. (MIRA 15:3)
(Titanium ores) (Rare earths)

ZELIKMAN, A.N.; GOROVITS, N.N.

Molybdenum recovery from "Sorskoye" deposit oxidized ores and low-grade concentrates. Sbor. nauch. trud. GINTSVETMET no.33: 186-201 '60. (MIRA 15:3)

(Molybdenum ores) (Ore dressing)

ZELIKMAN, A.N.; LYAPINA, Z.M.

Separating tungsten and molybdenum from solutions of sodium tungstate and molybdate by hydrogen reduction under pressure. Izv.vys.ucheb.zav.; tsvet.met. 3 no.2:119-125 '60. (MIRA 15:4)

1. Krasnoyarskiy institut tsvetnykh metallov, kafedra metallurgii redkikh metallov.
(Tungsten--Metallurgy) (Molybdenum--Metallurgy)

S/149/61/000/004/005/008
A006/A101

18.3100 25548

AUTHORS: Zelikman, A. N.; Pritulo, V. F.

TITLE: Investigating the autoclave method of rhenium production from potassium perrhenate

PERIODICAL: Izvestiya vysshikh uchebnykh zavedeniy, Tsvetnaya metallurgiya, no. 4, 1961, 111-120

TEXT: Information is given on the autoclave method of rhenium precipitation from potassium perrhenate solutions at elevated temperatures and high hydrogen pressure. The authors studied the effect of the medium (initial acidity of the solution), partial hydrogen pressure, temperature, time and potassium perrhenate concentration, on the rate and degree of rhenium deposition and on the composition of the deposits and the metallic powder obtained. The investigation was made with the participation of graduate A. Peredereyev, on a stainless steel 1-liter autoclave with a magnetic mixer designed by Vishnevskiy. The section of the mixer that is located in the reaction zone and the impeller, are made of titanium. The autoclave was heated by a dismountable electric furnace whose temperature was regulated by an electronic potentiometer ЭПД-12 (EPD-12). The

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batch of potassium perrhenate was placed into a quartz glass container, filled with 200 ml distilled water and the rated amount of sulfuric acid. After heating the autoclave to a given temperature, the mixer was switched on and the hydrogen was added until the required partial pressure was attained. The pressure was maintained constant. The results of each experiment were evaluated from the rhenium content in the solution and in the washed and dried precipitate, and from changes in pH of the solution. Rhenium content in the solutions was determined by the photocalorimetrical method and in the precipitates by the weight method. The precipitates were reduced with hydrogen to metal and the rhenium metal was analyzed as to its content of potassium sodium and calcium. It was found that 98 - 99% Re were precipitated into a deposit which contained rhenium particles and lower Re oxides under the following conditions: potassium perrhenate concentration 25 - 150 g/l; hydrogen pressure 10-60 atm.; temperature 200°C. It is shown that under optimum conditions of autoclave reduction ($KReO_4$ = concentration = 100 g/l; P_{H_2} = 60 atm.; t = 200°C; initial acidity 1.0 g-equ/l.; reduction time = 1 hour) rhenium powders do not contain over 0.002 - 0.003% admixtures of potassium, sodium and calcium. These values which are permissible in respect to the sintering properties of powder-pressed rhenium, correspond to the purity of rhenium obtained from ammonium perrhenate by the conventional

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Investigating the autoclave method ... 25548

S/149/61/000/004/005/008
A006/A101

method. Preliminary tests performed by engineer Ye. I. Pavlova, showed the possibility of using rhenium powders obtained by the autoclave method for sintering producing compact malleable metal. There are 7 figures, 6 tables and 10 references: 4 Soviet-bloc and 6 non-Soviet-bloc.

ASSOCIATIONS: Krasnoyarskiy institut tsvetnykh metallov (Krasnoyarsk Institute of Non-Ferrous Metals); Kafedra metallurgii redkikh metallov (Department of Metallurgy of Rare Metals)

SUBMITTED: April 12, 1961

X

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S/598/61/000/005/007/010
D040/D113

AUTHORS: Meyerson, G.A., Zelikman, A.N., Belyayevskaya, L.V., Tseytina, N.Ya., and Kirillova, G.F.

TITLE: Investigation of the chlorination processes of titanium and niobium carbides, complex titanium-niobium carbide, and some other compounds

SOURCE: Akademiya nauk SSSR. Institut metallurgii. Titan i yego splavy, no. 5, Moscow, 1961. Metallurgiya i khimiya titana, 167-180

TEXT: The authors studied the reactions of titanium carbides and nitrides, niobium, complex Ti-Nb carbide, TiO and silicon carbide with chlorine in chlorination for obtaining $TiCl_4$. The experiments were conducted in view of the advantageous technological properties of titanium carbide and titanium carbonitride, the possible future use of the boiling layer for chlorinating them, and because precarbonization of rutile and ilmenite is used in foreign titanium production practice. Generalized results of the studies are given and a detailed illustrated description of the experimental equipment pre-

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sented. Titanium carbide, and titanium and niobium nitrides chlorinated fastest of all compounds, starting to chlorinate at 200°C. Active reaction of Nb carbide with chlorine was observed at 400°C, and of silicon carbide from above 600°C. Chlorination of TiO at a perceptible rate started from 300°C. In the range 400-700°C, the TiO chlorination degree was 50%, which is explained by the reaction

$$2TiO+2Cl_2 \rightarrow TiCl_4+TiO_2.$$

In the presence of carbon, TiO chlorinated much faster than a mixture of TiO_2 with carbon. Titanium carbide was prepared with lamp soot in a hydrogen atmosphere in a carbon-tube furnace at 2000°C, and niobium carbide in the same way at 1700-1800°C, and pressed into cakes with 110 kg/cm^2 and 325 kg/cm^2 pressure at 2150-2200°C and 2700-2750°C respectively. The chlorination of these carbides was accompanied by the formation of a graphite layer which did not affect the chlorination rate at 400°C but caused some inhibition at 600° and 800°C. Ti-Nb carbide was produced by carbidization of loparite concentrate with subsequent washing in hydrochloric acid

for separating the carbides of other elements, and its composition (in %) was 46.88 Ti, 13.91 Nb, 0.70 Ta, 2.62 Si, 8.84 C_{fixed}, 12.32 C_{free}, 3.76 N, 3.56 O, and 7.41 other elements. The constants of TiC chlorination rate were higher than of NbC, particularly at 800°C, and the chlorination rate of Ti-Nb carbide from loparite was close to the chlorination rate of pure TiC. The maximum necessary time for chlorination of carbide particles of different size at different temperatures has been determined. Chlorination of Ti-Nb carbide in the boiling layer was studied in a small laboratory furnace and in one of larger size, and proved feasible with the use of chlorine as well as chlorine with air. The $TiCl_4$ output rate from powder carbide in the boiling layer proved to be more than 10 times higher than in direct chlorination of oxides or concentrated ore in mixture with carbon. The chlorination degree of Ti-Nb carbide in the boiling layer amounted to 97-99%. There are 10 figures.

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ZELIKMAN, A.N.

Intercollegiate Conference on Methods of Seperating Rare Metals Having Similar Properties. Izv. vys. ucheb. zav.; tsvet. met. 4 no.2:166-167 '61. (MIRA 14:6)
(Ore dressing—Congresses)
(Metals, Rare and minor)

ZELIKMAN, A.N.; PROSENKOVA, T.Ye.

Solubility of calcium, copper, zinc, iron and lead molybdates in water and in dilute ammonia solutions. Zhur. neorg. khim. 6 no.1: 212-215 '61. (MIRA 14:2)

(Molybdates)

also 1583

22792
S/070/61/006/003/003/009
E021/E435

24,7100 (1160, 1136, 1142)

AUTHORS: Zelikman, A.N., Chistyakov, Yu.D., Indenbaum, G.V. and Kreyn, O.Ye.

TITLE: Study of the crystal structure of molybdenum disulphide prepared by different methods

PERIODICAL: Kristallografiya, 1961, Vol.6, No.3, pp.389-394

TEXT: The crystal structure of powdered MoS_2 prepared by five different methods has been investigated by X-ray analysis. Sample one was formed by the interaction of molybdenum trioxide with sulphur in fused soda; sample two by the interaction of calcium molybdenate with sulphur in fused soda; sample three by the interaction of molybdenum pentachloride with hydrogen sulphide; sample four by the interaction of molybdenum trioxide with sulphur vapour and sample five by the interaction of molybdenum with sulphur vapour. Further samples were also tested - sample six obtained by the thermal dissociation of molybdenum trisulphide and sample seven obtained by the interaction of molybdenum and sulphur and hot-pressed at 1200 to 1300°C. The X-ray photographs of these samples show that the structure of all the synthetic samples is a

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Study of the crystal ...

new type different from both hexagonal α-MoS_2 and rhombohedral β-MoS_2. Fig.3 is a comparison of the results of X-ray studies for the three types of structure (a - α-MoS_2, б - β-MoS_2, в and г new structural type). Since the interplanar distance is the same in going from one form to another, it can be assumed that the layered lattice and the disposition of the sulphur atoms around the molybdenum is retained. It is proposed that the new form is hexagonal with c greater than in the lattice of β-MoS_2. Changes can be seen in the new structure depending on its method of preparation. This is explained by statistical interchanging of hexagonal and rhombohedral packing. The lubricating properties of the artificial MoS_2 are not different from those of natural MoS_2. There are 3 figures, 1 table and 11 references: 2 Soviet-bloc and 9 non-Soviet-bloc. The two references to English language publications read as follows: S.S.Berzelius. Pogg. Ann., 7, 261, 1826; R.E.Bell, R.Herfert, J.Amer.Chem.Soc., 19, 13, 3351, 1957.

ASSOCIATION: Krasnoyarskiy institut tsvetnykh metallov im.M.I.Kalinina (Krasnoyarsk Institute of Non-Ferrous Metals imeni M.I.Kalinina)

SUBMITTED: September 5, 1960

Card 2/4

22621

S/089/61/010/004/024/027
B102/B205

5,2300 1087, 1228, 1485

AUTHOR: Zelikman, A. N.

TITLE: Intercollegiate Conference on Methods of Separating Rare Metals Having Similar Properties

PERIODICAL: Atomnaya energiya, v. 10, no. 4, 1961, 405-406

TEXT: In the past few years, several Soviet institutes have studied and elaborated numerous methods for the separation of elements having similar properties. The mezhvuzovskaya konferentsiya po metodam razdeleniya blizkikh po svoystvam redkikh metallov (Intercollegiate Conference on Methods of Separating Rare Metals Having Similar Properties) took place at the Institut tsvetnykh metallov im. M. I. Kalinina (Institute of Non-ferrous Metals im. M. I. Kalinin) in November, 1960. It was attended by 250 delegates from 10 schools of higher education, 13 institutes of the Academies of Sciences of the USSR and of the Republics of the Union, and 20 scientific research institutes and plants. 56 reports were made within four days. Most of them (19) dealt with extraction by organic solvents, 13 with ion-exchange chromatography, and 9 with fractional crystallization and preci-

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Intercollegiate Conference on...

pitation. Some of these reports are discussed in the following. Ion-exchange methods: Among others, M. M. Senyavin spoke about "chromatographic synthesis of pure rare-metal preparations" and B. N. Laskorin about "ion-exchange and chemosorption processes in non-ferrous hydrometallurgy". L. I. Martynenko and others spoke about ion-exchange separation of macroscopic quantities of rare earths; N. P. Kalonina, N. P. Magd, Ye. A. Subbotina, D. M. Chizhikov, and others about sorption methods of separating tantalum, niobium, and titanium; B. N. Laskorin, G. Ye. Kaplan, and A. M. Arzhatkin about chromatographic separation of zirconium and hafnium; D. I. Ryabchikov and others about the separation of selenium and tellurium by ion exchangers. Extraction methods. G. V. Korpusov held a synoptic report; V. A. Mikhaylov and V. G. Torgov spoke about the use of complexing agents in separating rare earths; Z. A. Sheka and Ye. Ye. Kriss about the use of organic extracting agents; N. I. Gel'perin, V. L. Pebalk, and others about the separation of the elements of the cerium group; A. I. Vaysenberg, T. F. Zhitkova, L. A. Kolchina, G. Ye. Kaplan, B. N. Laskorin, V. K. Kulifeyev, and V.Z. Nepomnyashchiy about the separation of tantalum, niobium, and titanium by cyclohexanone, tributyl phosphate, trioctyl amine, and other compounds; G. Ye. Kaplan and

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Intercollegiate Conference on...

S/089/61/010/004/024/027
B102/B205

G. A. Yagodin about the separation of zirconium and hafnium; L. D. Motov and T. G. Loshtayeva about the extraction of zirconium and hafnium by cyclohexanone; M. V. Vinarov and others about the synthesis of hafnium by rhodanide extraction. Fractional precipitation and crystallization. Reports were made on the separation of titanium, niobium, and tantalum on the basis of their varying solubility in chlorine complex salts and sulfuric acid complex salts (D. M. Chizhikov, B. Ya. Tratsevitskaya, A. P. Shtin, A. K. Sharova, Ya. G. Goroshchenko, and others), and also on the separation of Rb and K (B. D. Stenin and V. Ye. Plyushchev). Distillation and rectification methods. L. A. Nisel'son held a synoptic report on separation and purification of zirconium, hafnium, niobium, and tantalum; A. N. Zelikman, O. Ye. Kreyn, V. N. Chernyayev, and V. V. Kranukhin spoke about the separation of tungsten and molybdenum. Other separation methods. Reports were made on the separation of zirconium and hafnium by selective reduction of their chlorides (V. A. Kozhelyakin, V. S. Yemel'yanov, A. I. Yevstyukhin, and others); electrolytic separation of zirconium and hafnium (V. M. Smirnov and others); electrolytic separation of rare earths (L. Ye. Ivanovskiy and others); and separation of tungsten and molybdenum by zone melting (P. I. Fedorov and N. V. Mokhosev). The proceedings of the Conference will be published this year by the publishing house Metallurgizdat.

Card 3/3

IORDANOV, Khr. V.; ZELIKMAN, A. N.

Kinetics of molybdenum oxidation in the solution of sodium hypochlorite. Khim i industriia 23 no.6:171-175 '61.

S/080/61/034/003
A057/A129

15.2130
5.2200

AUTHORS: Zelikman, A. N., Kreyn, O. Ye., Gorovits, N. N.

TITLE: Purification of molybdenum trioxide from tungsten and admixtures of some other elements

PERIODICAL: Zhurnal prikladnoy khimii, v. 34, no. 3, 1961, 679 - 682

TEXT: A preparative purification method for molybdenum trioxide from tungsten and other impurities is described. The method is based on distillation of molybdenum oxychloride by heating a mixture of molybdenum trioxide and sodium chloride. Thus the tungsten content can be decreased from an initial content of 0.01 to 1% W down to 10^{-4} - 10^{-3}% W. The present method was already published by A. N. Zelikman [Soviet patent no. 1131145 (1957)] and developed as a result of prior investigations [Ref. 1: ZhOKh, 24, 1916 (1954)]. Previous experiments demonstrated the reaction of MoO_3 with NaCl at 500° - 700°C resulting in formation of sodium molybdate and dioxychloride. The latter evaporates at this temperature. On the other hand it was observed that at 500° - 650°C tungsten trioxide does not react with sodium chloride forming volatile compounds. Tests for the present method were carried out with MoO_3 + WO_3 mixtures varying the ratio of W/(Mo + W) from 1 to 29%.

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Purification of molybdenum trioxide from...

The mixtures were obtained by mixing an ammonium molybdate solution with ammonium tungstate solution with subsequent evaporation of the liquid and calcination (550° - 600°C) of the residue. The latter was then thoroughly mixed with finely ground sodium chloride, placed in a horizontal tubular oven and heated by passing air (about 10 l/hr). Molybdenum oxychloride sublimated, was dissolved and molybdenum and tungsten were determined. The latter was first determined colorimetrically by the method of the Vsesoyuznyy institut tverdykh splavov (All-Union Institute of Solid Alloys), but since this method was insufficient in further experiments a spectral method, developed in the MGU (Moscow State University) by N. I. Tarasevich et al. [Ref. 4: ZL, 8 (1959)] was applied. The obtained results (Table 1) demonstrate that the sublimates contain a maximum of about 0.001% W/(Mo + W), and independently of the composition of the mixture about 20% of molybdenum sublimates. Further tests were made with a quartz tubular oven (length 1 m, diameter 45 mm), using 200 g samples, passing air at a 20 l/hr rate, and heating to 650° - 700°C for 30 minutes. Thus a 20 - 22% extraction of molybdenum was effected. For tungsten contents of 0.004, 0.01, 0.03 and 1.035% in the initial material (MoO_3 from ammonium paramolybdate, molybdenic acid, or contaminated with WO_3) final products containing $8 \cdot 10^{-4}$, $8 \cdot 10^{-4}$, $6 \cdot 10^{-4}$, and $1.5 \cdot 10^{-3}$ % respectively of tungsten were obtained.

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Purification of molybdenum trioxide from...

The purification degree in relation to other impurities is shown in Table 3. There are 3 tables, 1 figure and 4 Soviet-bloc references.

SUBMITTED: May 27, 1960

Table 1. Purification degree of molybdenum trioxide from tungsten impurities in experiments with 2 - 3 g batches. Temperature 600°C, duration of the experiments 1 hr.

Состав смеси (1)	Отношение $\frac{W}{Mo+W}$ (2) (% в исходной смеси)	Время хлорирования (мин.) (3)	Отношение $\frac{W}{Mo+W}$ в оксихлориде (%) (4)	Извлечение молибдена в оксихлорид (%) (5)
$MoO_3 + 1\%WO_3 + NaCl$	1.19	30	$1.70 \cdot 10^{-3}$	21.54
	1.19	45	$0.86 \cdot 10^{-3}$	21.98
	1.19	60	$1.00 \cdot 10^{-3}$	19.92
$MoO_3 + 5\%WO_3 + NaCl$	5.90	30	$0.93 \cdot 10^{-3}$	21.38
	5.90	45	$0.91 \cdot 10^{-3}$	21.83
	5.90	60	$0.91 \cdot 10^{-3}$	21.73
$MoO_3 + 25\%WO_3 + NaCl$	28.80	30	Следы (6)	20.04
	28.80	45	$1.01 \cdot 10^{-3}$	19.75
	28.80	60	$1.01 \cdot 10^{-3}$	18.91

Legend: (1) composition of the mixture, (2) ratio W/(Mo + W) (% in the initial mixture), (3) time of chlorination (min), (4) ratio W/(Mo + W) in the oxychloride (%), (5) extraction of molybdenum in the oxychloride (%), (6) traces.

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ZELIKMAN, A.N., prof, doktor tekhn. nauk, red.; KOMISSAROVA, L.N., dots., kand. khim.nauk, red.; KRAPUKHIN, V.V., dots., kand. tekhn. nauk, red.; SEVRYUKOV, N.N., prof., doktor tekhn. nauk, red.; KAMAYEVA, O.M., red. izd-va; MIKHAYLOVA, V., tekhn. red.

[Separation of rare metals having similar properties]Razdelenie blizkikh po svoistvam redkikh metallov. Moskva, Metallurgizdat, 1962. 264 p. (MIRA 15:8)
(Nonferrous metals--Metallurgy)

S/149/62/000/001/006/009
A006/A101

AUTHORS: Zelikman, A. N., Lyapina, Z. M.

TITLE: Separation of cerium from other rare-earth elements using the method of oxidation with oxygen under pressure

PERIODICAL: Izvestiya vysshikh uchebnykh zavedeniy, Tsvetnaya metallurgiya, no. 1, 1962, 115 - 120

TEXT: The authors studied the possibility of accelerating oxidation of Ce^{3+} in aqueous pulp of rare earth element hydroxides by pressure as developed in Oranienbaum (Germany). The acceleration can be achieved by the use of oxygen, and by raising the temperature and pressure. Experimental investigations were made on a 1-liter-autoclave with a Vishnevskiy electromagnetic mixer at 2,600 rpm. The solid-liquid ratio in the pulp was 1 : 5. The necessary alkalinity of the pulp was obtained by the addition of a 40% NaOH solution. To produce a neutral or weakly acid medium the pulp was neutralized with nitric acid. The pH value was determined with a ЛП-5 (LP-5) potentiometer with a glass electrode. The effect of the oxidation medium, the temperature and the method of preparing the hydroxide, on cerium oxidation in the pulp was investigated. Studying

S/149/62/000/001/006/009
A006/A101

the effect of alkalinity, partial oxygen pressure and temperature on the rate and completeness of cerium oxidation, the following optimum conditions were found: pH = 10, oxygen pressure 5 - 10 atm; temperature 130°C. Under these conditions full Ce oxidation is obtained within 30 minutes. The rate of Ce^{3+} oxidation depends on the method of preparing the hydroxides; oxidation in a mixture of hydroxides precipitated from chloride solutions with ammonia, proceeds incompletely. In a mixture of hydroxides, obtained by the decomposition of bisulfates, or precipitated with caustic soda, cerium oxidation proceeds rapidly. Cerium concentrates with up to 95% CeO_2 content can be obtained. This article was recommended by the Kafedra metallurgii redkikh metallov (Department of Metallurgy of Rare Metals) at the Krasnoyarskiy institut tsvetnykh metallov (Krasnoyarsk Institute of Non-Ferrous Metals). There are 6 figures and 11 references, 9 Soviet-bloc and 2 non-Soviet-bloc.

ASSOCIATIONS: Krasnoyarsk Institute of Non-Ferrous Metals. Gosudarstvennyy nauchno-issledovatel'skiy i proyektnyy institut redkometallicheskoy promyshlennosti (State Scientific Research and Planning Institute of Rare-Metal Industry)

SUBMITTED: December 29, 1960

S/080/62/035/007/004/013
D267/D307

AUTHORS: Zelikman, A.N., Kreyn. O.Ye., Nisel'son, L.A. and Ivanova, Z.I.

TITLE: Separation of tungsten from molybdenum by the rectification of their chlorides

PERIODICAL: Zhurnal prikladnoy khimii, v. 35, no. 7, 1962, 1467-1472

TEXT: WCl_6 and $MoCl_5$ were obtained from pure metals by chlorination at 600-750°C, distilled in an argon atmosphere to separate the oxychlorides, after which WCl_6 with about 5% $MoCl_5$ or vice versa were rectified on a plate column. It was found that the impurity content of the purified chloride is less than 0.015%, and that the yield of the rectified chloride is 70-80% of theoretical. There are 5 figures and 3 tables.

SUBMITTED: June 22, 1961

Card 1/1

ZELIKMAN, A.N.

(29)

The Second All-Union Conference on Rhenium, sponsored by the Institute of Metallurgy imeni A. A. Baykov, Academy of Sciences USSR, and the State Institute of Rare Metals, was held in Moscow 19-21 November 1962. A total of 335 representatives from 83 scientific institutions and industrial establishments participated. Among the reports presented were the following: autoclave extraction of Re from Cu concentrates (A. P. Zelikman and A. A. Peredereyev); Re extraction from the gaseous phase (V. P. Savrayev and N. L. Peysakhov); recovery of Re by sorption and ion interchange (V. I. Bibikova, V. V. Il'ichenko, K. B. Lebedev, G. Sh. Tyurekhodzhayeva, V. V. Yermilov, Ye. S. Raimbekov, and M. I. Filimonov); production of carbonyl Re (A. A. Ginzburg); electrolytic production of high-purity Re and electroplating with Re (Z. M. Sominskaya and A. A. Nikitina); Re coatings on refractory metals produced by thermal dissociation of Re chlorides (A. N. Zelikman and N. V. Baryshnikov); plastic deformation and thermomechanical treatment of Re (V. I. Karavaytsev and Yu. A. Sokolov); growth of Re single crystals and effect of O_2 on their properties (Ye. M. Savitskiy and G. Ye. Chuprikov); Re-Mo, Re-W, and Re-precious-metal alloys (Ye. M. Savitskiy, M. A. Tylkina, and K. B. Povarova); synthesis of Re nitrides, silicides, phosphides, and selenides (G. V. Samsonov, V. A. Obolonchik, and V. S. Neshpor); weldability of Re-Mo and Re-W alloys (V. V. D'yachenko, B. P. Morozov, and G. N. Klebanov); new fields of application for Re and Re alloys (M. A. Tylkina and Ye. M. Savitskiy); and Re-Mo alloy for thermocouples (S. K. Danishevskiy, Yu. A. Kocherzhinskiy, and G. B. Lapp). [WW]

Tsvetnyye metally, no. 4, Apr 1963, pp 92-93

S/078/62/007/011/004/005
B101/B186

AUTHORS: Baryshnikov, N. V., Zelikman, A. N., Teslitskaya, M. V.

TITLE: Vapor pressure and composition of rhenium monoxytetrachloride vapor

PERIODICAL: Zhurnal neorganicheskoy khimii, v. 7, no. 11, 1962, 2634-2635

TEXT: Failing any data for the vapor pressure and composition of $ReOCl_4$ vapor, attempts were made to measure its vapor pressure with a Swietoslawski ebulliometer and the resulting values were compared with those from the jet method. It was found that oxydizing $ReCl_5$ with oxygen at relatively low temperatures (150-180°C) produces only $ReOCl_4$, which can easily be purified by rectification. The pressure of the $ReOCl_4$ vapor above the liquid $ReOCl_4$ phase follows the equation $\log p = -2380/T+7.63$ mm Hg; the latent heat of evaporation of liquid $ReOCl_4$ is 10.9 ± 0.2 kcal/mole, and the boiling point calculated by extrapolation to 760 mm Hg is

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VOL'DMAN, G.M.; ZELIKMAN, A.N.

Equation for calculating the efficiency of a continuous action fluidized bed. Izv. vys. ucheb. zav.; tsvet. met. 5 no.4:73-79 '62. (MIRA 16:5)

1. Moskovskiy institut stali, kafedra metallurgii redkikh metallov.
(Fluidization)

BARYSHNIKOV, N.V.; ZELIKMAN, A.N.

Thermodynamic properties of rhenium chlorides and oxychlorides. Izv. vys. ucheb. zav.; tsvet. met. 5 no.6:98-110 '62. (MIRA 16:6)

1. Moskovskiy institut stali i splavov, kafedra metallurgii redkikh metallov.

(Rhenium chlorides—Thermodynamic properties)

S/828/62/000/000/013/017
E071/E135

AUTHORS: Zelikman, A.N., and Lyapina, Z.M.

TITLE: The separation of cerium from other rare earth elements using the method of oxidation with oxygen under pressure

SOURCE: Razdeleniye blizkikh po svoystvam redkikh metallov. Mezhvuz. konfer. po metodam razdel. blizkikh po svoyst. red. metallov. Moscow, Metallurgizdat, 1962, 148-154.

TEXT: The authors investigated the possibility of accelerating the process by the use of oxygen at increased temperatures (25-200 °C) and partial pressures (3-15 atm), using in the experiments a mixture of alkali earth hydroxides obtained from a melt of chlorides containing, %: 29.55 rare earth elements (of which 50% was CeO_2); 7.61 CaO; 2.37 SrO; 0.51 MnO; 0.23 Fe_2O_3; 0.43 ThO_2. After solution of the chlorides in a 2% hydrochloric acid and purification from thorium and partially from iron and manganese, the rare earth elements were precipitated as acid sulphates and the latter decomposed with sodium hydroxide (in some cases directly precipitated with sodium hydroxide or with

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The separation of cerium from other ... S/828/62/000/000/013/017
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ammonia). Oxidation was carried out in an autoclave fitted with an electromagnetic stirrer. The solid to liquid ratio in the pulp was 1:5. Results: it is possible to accelerate the oxidation of hydroxides of rare earth elements in an aqueous pulp with oxygen under pressure. Optimum conditions: pH = 10, oxygen pressure 10 atm, temperature 130 °C. Under these conditions complete oxidation of cerium is achieved in 30 minutes. The velocity of oxidation of Ce^{3+} depends on the method of preparation of the hydroxides. Oxidation in the mixture of hydroxides, precipitated from a solution of chlorides with ammonia, is incomplete; Ce oxidises rapidly in a mixture of hydroxides produced by decomposition of acid sulphates, or precipitated with sodium hydroxide. After the oxidation, cerium was separated from other rare earth elements by treatment with a 10% nitric acid. Concentrates containing up to 95% of CeO_2 can be obtained.

There are 6 figures.

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S/828/62/000/000/016/017
E071/E135

AUTHORS: Zelikman, A.N., Kreyn, O.Ye., Nisel'son, L.A., Gorovits, N.N., and Ivanova, Z.I.

TITLE: Separation of tungsten and molybdenum by utilising the difference in volatility of their chlorides and oxychlorides

SOURCE: Razdeleniye blizkikh po svoystvan redkikh metallov. Mezhvuz. konfer. po metodam razdel. blizkikh po svoyst. red. metallov. Moscow, Metallurgizdat, 1962, 186-197.

TEXT: A method of separating tungsten from molybdenum, based on evaporation of MoO_2Cl_2 on heating of molybdenum trichloride with sodium chloride to a temperature of 600-700 °C, was studied. With contents of 0.01 to 0.16 and 1.035% W in the starting molybdenum trioxide the purified product contained less than $(6 \text{ to } 9) \times 10^{-4}$ and 1.5×10^{-3}% W respectively. It was established that it is possible to separate tungsten and molybdenum by rectification of their higher chlorides, WCl_6 and $MoCl_5$ (rectification column data: diameter 30 mm, height 600 mm, 15 sieve plates, with 45 holes of 1 mm diameter).

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