BELOV, P.N.

Considering climatic data on pressure variations in numerical forecasts. Meteor. i gidrol. no.12:25-27 D '61. (MIRA 14:11)
(Numerical weather forecasting)

BELOV, P.N.

Numerical forecasting of the pressure at different levels considering the variability of the Coriolis parameter and the scale of a weather map. Izv. AN SSSR. Ser.geofiz. no.5:700-708 My '62. (MIRA 15:8)

1. TSentral'nyy institut prognozov.
(Numerical weather forecasting)

BELOV, P.N.

Results of testing numerical weather forecasting maps of absolute topography of the 850, 500, and 200 millibar isobaric surface. Meteor. i gidrol. no.10:12-21 O '62. (MIRA 15:9)

1. TSentral'nyy institut prognozov.
(Numerical weather forecasting)

BELOV, P.N.

Using empirical influence functions in forecasting weather in one place. Trudy TSIP no.102:60-63 '62. (MIRA 15:9)
(Moscow--Statistical weather forecasting)

BELOV, P.N.

Means of calculating the scale of a map and the change with latitude of the Coriolis parameter in a numerical forecast. Trudy TSIP no.102:71-79 '62. (MIRA 15:9)
(Meteorology—Charts, diagrams, etc.)

AM4016850 BOOK EXPLOITATION 8/

Belov, Pavel Nikolayevich

Practical methods of numerical weather prediction (Prakticheskiye metody* chislennogo prognoza pogody*) Leningrad, Gidrometeoizdat, 1963. 0257 p. illus., biblio. Errata slip inserted. 3100 copies printed.

TOPIC TAGS: hydrodynamic weather forecasting, statistical weather forecasting, synoptic service, analysis of meteorological data, numerical meteorological analysis, statistical forecasting methods, computer forecasting methods

PURPOSE AND COVERAGE: The monograph considers modern hydrodynamic and statistical methods used for numerical forecasting in the operating weather service, and methods of numerical (objective) analysis of meteorological data. The principles of programming for electronic computers and the solution of forecasting problems of such

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AM4016850

computers are developed. Some data for higher mathematics and dynamic meteorology are given for the reader's convenience. The book is designed for a large group of meteorologists and practicing synopticians in the operating subdivisions of the forecasting service, and for students. Sec. 6 of Ch. III was written in conjunction with N. N. Bel'skaya, and Sec. 5 of Ch. II and Sec. 7 of Ch. III -- with I. P. Vetlov and A. I. Burtsev. The author expresses his gratitude to the latter, and also to V. P. Sadkov for much advice during the preparation of the book.

TABLE OF CONTENTS [abridged]:

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AM4016850

SUB CODE: CP, AS SUBMITTED: 31Aug63 NR REF SOV: 094

OTHER: 020 DATE ACQ: 25Jan64

Card 3/3

L 14975-63 EWT(1)/BDS AFFTC/ASD/ESD-3 RB

ACCESSION NR: AP3003801 S/0050/63/000/007/0040/0042

AUTHOR: Belov, P. N. 55 54

TITLE: Comparison of the precision of numerical forecasting computed by baroclinic and barotropic models

SOURCE: Meteorologiya i gidrologiya, no. 7, 1963, 40-42

TOPIC TAGS: numerical forecasting, barotropic model, baroclinic model, isobaric surface

ABSTRACT: The author has drawn up parallel predictions for 24-hour periods from baroclinic and barotropic models. The steps followed in the computations were otherwise the same. The scheme for the baroclinic model was taken from the author's previous work (Rezul'taty* ispy*taniya chislennogo metoda prognoza kart AT_{850}, AT_{500} i AT_{200}. Meteorologiya i gidrologiya, No. 10, 1962). The baroclinic model was obtained as a special case of the baroclinic. Computations were made for isobaric surfaces of 850, 500, and 200 mb, and these were then compared with actual measurements. The prediction by the barotropic model proved to be much poorer than that by the baroclinic model, the average relative error for the 850-, 500-, and 200-mb surfaces being 0.58, 0.57, and 0.68, respectively, for the baroclinic scheme. The average error was 0.93, 0.68, and 0.97 for the barotropic. The author

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ACCESSION NR: AP3003801

concludes that for practical purposes it is necessary to use baroclinic models. In exceptional cases, when it is necessary to have operational forecasting of maps on an isobaric surface of 500 mb as soon as possible (even if the precision is somewhat less) a barotropic model may be used because of its greater simplicity and easier computation. Orig. art. has: 1 table and 2 formulas.

ASSOCIATION: Vy*chislitel'ny*y meteorologicheskiy tsentr (Meteorological Computing Center)

SUBMITTED: 00 DATE ACQ: 12Aug63 ENCL: 00

SUB CODE: PH NO REF SOV: 001 OTHER: 000

Card 2/2

ACCESSION NR: AT4017169 S/2546/63/000/128/0004/0019

AUTHOR: Belov, P. N.

TITLE: Short-range forecasting of the pressure fields and vertical movements by numerical integration of the equations of hydrothermodynamics in a quasi-geostrophic approximation

SOURCE: Moscow. Tsentral'ny*y institut prognozov. Trudy*, no. 128, 1963. Voprosy* kratkosrochny*kh prognozov pogody* (Problems of short-range weather forecasting), 4-19

TOPIC TAGS: meteorology, weather forecasting, short-range weather forecasting, numerical weather forecasting, atmospheric pressure, atmospheric vertical velocity, hydrothermodynamics, Coriolis force, turbulent friction, quasi-geostrophic approximation

ABSTRACT: The author presents several variants of a numerical method for the forecasting of the pressure fields and vertical movements for 24 hours in advance by use of an electronic computer; the principal equations are presented, followed by a description of the computation method. Numerical experiments were made to evaluate the influence of a number of physical factors on the accuracy of the forecasts. These experiments were to determine the importance of surface friction, smoothing,

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ACCESSION NR: AT4017169

variability of map scale and the Coriolis force, the stability parameter and other factors. The importance of proper choice of the turbulent friction parameter is emphasized. It is shown that computations without smoothing yielded a poorer forecast than when smoothing was introduced. There was a significant improvement in forecasts at all levels when variability of map scale and Coliolis force were taken into account. It appears that the forecast is not greatly influenced by variations in the stability parameter, although the results are not conclusive. All the investigations of the mentioned factors made it possible to select an optimal variant of forecasting. A comparison is made of the final variant, other variants, forecasts by two standard methods and actually observed situations. An example of a specific forecast is given. The described procedures can also be applied to forecasts of vertical movements. Formulas are given for determination of vertical velocitites at the 1000, 675 and 350 mb levels; working formulas then are presented for use at the standard 100, 200, 300, 500, 700 and 850 mb levels. Several examples of 24-hour forecasts of vertical movements are discussed. The article concludes by emphasizing the necessity of automation of processing of initial data for use in numerical forecasting, especially machine analysis of weather maps. However, direct feeding of raw meteorological data into a computer can provide needed forecast data with a saving of 2 or 3 hours. Orig. art. has: 20 formulas, 5 figures and 3 tables.

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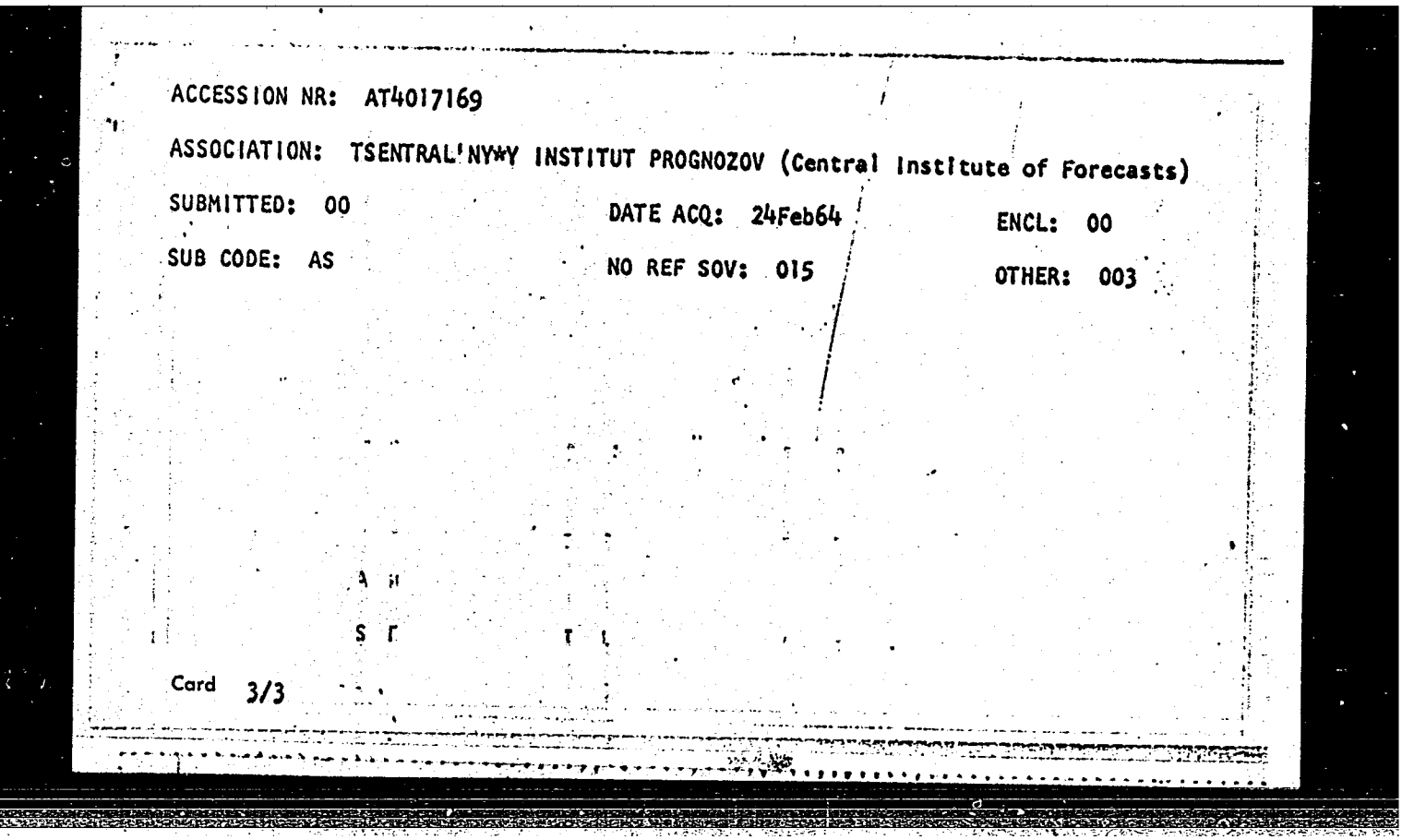

ACCESSION NR: AT4017169

ASSOCIATION: TSENTRAL'NYY INSTITUT PROGNOZOV (Central Institute of Forecasts)

SUBMITTED: 00 DATE ACQ: 24Feb64 ENCL: 00

SUB CODE: AS NO REF SOV: 015 OTHER: 003

Card 3/3

USPENSKIY, B.D., doktor fiz.-mat. nauk, prof.; BELOUSOV, S.L., kand. fiz.-mat. nauk; PYATYGINA, K.V.; YUDIN, M.I.; MERTSALOV, A.N., kand. fiz.-mat. nauk; DAVYDOVA, O.A.; KUPYANSKAYA, A.P.; PETRICHENKO, I.A.; MORSKOY, G.I.; TOMASHEVICH, L.V.; SAMOYLOV, A.I.; ORLOVA, Ye.I.; DZHORDZHIO, V.A.; PETRENKO, N.V.; DUBOVYY, A.S.; ROMOV, A.I.; PETROSYANTS, M.A.; GLAZOVAYA, E.P.; BATYAYEVA, T.F.; BEL'SKAYA, N.N.; CHISTYAKOV, A.D.; GANDIN, L.S.; BURTSEV, A.I.; MERTSALOV, A.N.; BAGROVYY, N.A.; BELOV, P.N.; ZVEREV, A.S., retsenzent; SIDENKO, G.V., red.; red.; DUBENTSOV, V.R., kand. fiz.-mat. nauk, nauchn. red.; SAGATOVSKIY, N.V., red.; BUGAYEV, V.A., doktor geogr. nauk, prof., red.; ROGOVSKAYA, Ye.G., red.

[Manual on short-range weather forecasts] Rukovodstvo po kratkosrochnym prognozam pogody. Leningrad, Gidrometeoizdat. Pt.1. Izd.2., perer. i dop. 1964. 519 p. (MIRA 18:1)

1. Moscow. TSentral'nyy institut prognozov.

L 34479-65 EWT(1)/EWG(v)/EWG(m) Pa-5/Pae-2 GW

ACCESSION NR: AP5008768 S/0050/65/000/004/0012/0017

AUTHOR: Belov, P. N. (Candidate of physicomathematical sciences); Kiygancv, A. F.

TITLE: The role of radiation processes in atmospheric thermodynamics

SOURCE: Meteorologiya i gidrologiya, [illegible], 12-17

TOPIC TAGS: radiation flux, dew point, effective mass, gravity acceleration, specific humidity, geopotential, effective flux, direct solar radiation, isobaric level

ABSTRACT: The integral fluxes of longwave and shortwave radiation have been computed by specially developed formulas for the upwelling and downwelling. The atmosphere was divided into twenty layers according to the pressure and temperature of the dew point. Instead of the mass of water vapor in the air, the so-called effective mass was taken and determined by a special integral formula where the pressure, the gravity acceleration, and the specific humidity were the variables. For the change of geopotential, was based on the hydrostatic equation and the atmosphere used for the forecasts. The effective fluxes for longwave and shortwave radiation and temperature and pressure changes on corresponding levels were computed from the authors' model. Data from Soviet stations were used, and the results were represented in tabular form. The effective flux increases with height. The difference between

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L 3417-65

ACCESSION NR: AP5008768

the flux intensities on the ground and at the upper limit of the atmosphere is 0.244 cal/cm^{2}min ; this quantity is consumed by radiative cooling of the whole atmosphere. The maximum of the geopotential change takes place at the 850-mb level. The direct solar radiation at the upper limit of the atmosphere is 1.368 cal/cm^{2}min. At the ground, 1.33 cal/cm^{2}min. A small quantity of shortwave radiation is absorbed by water vapor. The change in the heights of the isobaric levels occurs [illegible] of the absorbed longwave and shortwave radiation. Orig. art. has: 2 figures, 1 formulas, and 2 tables. [30]

ASSOCIATION: Mirovoy meteorologicheskiy tsentr (World Meteorological Center)

SUBMITTED: 03Feb64 ENCL: 00 SUB CODE: ES

NO REF SOV: 007 OTHER: 000 ATD PRESS: 3213

Card 2/2

L 00913-66 EWT(1)/EWG(v)/FCC GW

ACCESSION NR: AT5017523 UR/3118/65/000/008/0055/0067

AUTHORS: Belov, P. N.; Kivganov, A. F. 55 55

TITLE: Changes in temperature and geopotential due to radiation of heat

SOURCE: Mirovoy meteorologicheskiy tsentr. Trudy, no. 8, 1965. Voprosy sputnikovoy meteorologii (Problems in satellite meteorology), 55-67

TOPIC TAGS: heat radiation, temperature, isobaric potential

55, 12 55, 12

ABSTRACT: Computation of streams of long-wave and short-wave radiation and determination of changes in temperature and geopotential due to this radiation are discussed. Equations are set up for expressing the rising and descending currents of heat radiation in the atmosphere. Pertinent data for computation were obtained for the 1000, 850, 700, 500, 300, and 200 mb surfaces at a network of stations throughout Europe. Radiation flow was then computed for three actual synoptic situations, and radiation changes in temperature and geopotential were determined. It is concluded that the joint effect of long-wave and short-wave radiation causes an average rise of the 850-mb surface amounting to 0.51 m/hr and a decline of the 200 mb-surface amounting to 0.47 m/hr. The height of the 500-mb surface remains practically constant. The contributions of the radiation factor in changing the

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L 00913-66

ACCESSION NR: AT5017523

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geopotential relative to the actual variability for the 850, 500, and 200 mb surfaces are 24, 2, and 12%, respectively. The appreciable role of radiation in geopotential change must be compensated to a considerable extent by turbulent and phase flow of heat. Orig. art. has: 5 figures, 5 tables, and 29 formulas.

ASSOCIATION: Mirovoy meteorologicheskiy tsentr (World Meteorological Center)

SUBMITTED: 00 ENCL: 00 SUB CODE: ES,TD

NO REF SOV: 012 OTHER: 002

Card 2/2 DP

BELOV, P. O.

Obobshchenie i vnedrenie stakhanovskogo opyta na leningradskom Kirovskom zavode. (Metalloobrabotka) [Generalization and introduction of Stakhanovite experience at the Leningrad Kirov plant (Metalworking)]. Pod obshch. red. L. M. Reznitskogo, Moskva, Mashgiz, 1952. 168 p.

SO: Monthly List of Russian Accessions. Vol. 6 No. 7 October 1953

BELOV, P. O.

BELOV, P. O.

6640 BELOV, P. O. TOKAR' NALADCHIK V. YA. KARASEV (LENINGR. KIROVSKIY ZAVOD). M., 1954 13 S S ILL. 20 SM.(M-VO TRANSP. MASHINOSTROYENIYA SSR. VSESOYUZ. PROTEKINO-TEKHNOL. IN-T VPTI. OBMEN TEKHN. OPYTOM. VYP. no. 129) 2000 EKZ. B. ts.- Avt. Ukazan na 3-y s. (55-144zh) 621.941.7 st.

SO: LETOPIS' ZHURNAL'NYKH STATEY, NO. 6, 1955

BELOV, P. O.

USSR/Miscellaneous-Metallurgy

Card 1/1

Authors : Belov, P. O., and Shul'man, L. E.

Title : Mechanization of industrial processes in a profiling steel melting plant

Periodical : Lit. Proizv. 1, 24 - 27, Jan-Feb 1954

Abstract : The workers of the steel melting plant of the Kirov steel mill developed a complex plan for the mechanization of industrial processes in various departments of the mill for the purpose of better and more economical distribution of labor forces. The details of the proposed mechanization plan are described. The planning, preparation and assembly of equipment were carried out within the plant, without outside help, by a specially organized group of engineers, mechanics and workers. Table, drawings.

Institution: ....

Submitted : ....

BELOV, P.O., inzhener.

Lengthening the life of cyclone ventilators. Vest.mash.34 no.4:78 Ap '54.
(MLRA 7:5)

(Ventilation)

BELOV, P.S.

AID P - 578

Subject : USSR/Engineering

Card 1/1 Pub. 78 - 15/22

Authors : Isogulyants, V. I. and Belov, P. S.

Title : Conversion of propylene in the presence of the catalyst $AlCl_3 \cdot NaCl$

Periodical : Neft. Khoz., v. 32, #8, 64-67, Ag 1954

Abstract : The conversion of propylene under pressure in the presence of the catalyst $AlCl_3 \cdot NaCl$ has been studied. The reaction results in a mixture of hydrocarbons consisting of olefins, isoparaffins and aromatics. The preparation of the catalyst is given. Two tables and 2 Russian references (1946-1949).

Institution : None

Submitted : No date

BELOV, P.S.; ISAGULYANTS, V.I.

Study of the synthesis and conversions of β-chloroethers based on styrene. Izv.vys.ucheb.zav.; neft' i gaz 1 no.12:93-99 '58.
(MIRA 12:4)
1. Moskovskiy institut neftekhimicheskoy i gazovoy promyshlennosti im. akad.I.M.Gubkina.
(Styrene)

AUTHORS: Isagulyants, V.I., Belov, P.S. (Moscow) 74-27-4-6/8

TITLE: Halogen Ester. Methods of Synthetization and Properties (Galoidoefiry. Sposoby polucheniya i svoystva)

PERIODICAL: Uspekhi Khimii, 1958, Vol. 27, Nr 4, pp. 488-516 (USSR)

ABSTRACT: In the present paper research work carried out in the field of the synthesis and transformations of β-halogen esters is described in detail. As the properties of these esters differ considerably from one another, the properties of γ- and δ-halogen esters are compared with one another. Also methods of synthetization are described (which were worked out by Shostakovskiy and Bogdanova) (Ref 7). Wislicenus (Ref 8) synthetized α- and β-dichloroesters by combining chloron with vinyl esters. Lieben, Houben and Führer (Ref 5,10) used α-, β-dichloroethyl ester for the synthesis of esters with ramified alkyl radicals by the interaction with zinc-magnesium-organic compounds at the expense of the mobility of the α-halide. Close attention was paid by Shostakovskiy and his collaborators to the reaction of the chlorination of vinyl ester (Ref 13) as well as by Boord (Ref 14). The latter obtained α-, β-dibromoalkyl ester by the

Card 1/3

action of bromine upon α-chloroester. This method makes it possible to synthetize a homologous series of such compounds. α-halogen esters incline towards chemical reactions which are characteristic of only halogen esters. Tsukervanik and Simkhayev (Ref 22) condensed α-ethyl chloride butyl ester with benzene under the action of aluminum chloride. There exist also reports having the character of patents on the condensation of α-, and α'-dichlorodimethyl esters with various amides (stearic amides, stearic anylides). Compounds of chlorine esters with acetylene hydrocarbons were dealt with by Pishnamaz-Zade (Ref 25,26); Pudovik, Nikitina and Aygistova (Ref 27) carried out a thorough investigation of the compound with halogen ester and butadiene. Numerous authors pointed out the ability of α-halogen esters to separate halide hydrogen under the effect of tertiary amine. Shostakovskiy explained the high degree of reactivity of α-halogen esters under the influence of ether-oxygen to the mobility of the α-halide. There follows a discussion of the properties of γ-halogen esters, δ-halogen esters, β-iodine esters, β-bromine esters as well as of β-chlorine esters. In conclusion the properties of β-chlorine esters are discussed in a separate chapter

Halogen Ester. Method of Synthetization and Properties 74-27-4-6/8

There are 1 table, and 137 references, 58 of which are Soviet.

1. Esters--Synthesis

Card 3/3

BELOV, P.S.; ISAGULYANTS, V.I.

Synthesis and study of the conversions of β-chloroacetic esters based on cyclohexene. Izv.vys.ucheb.zav.; neft' i gaz 2 no.11:75-81 '59. (MIRA 13:4)

1. Moskovskiy institut neftekhimicheskoy i gazovoy promyshlennosti imeni akademika I.M.Gubkina.
(Acetic acid) (Cyclohexene)

BELOV, P.S.; LYUY CHAO-TSI [Lü Ch'ao-ch'i]; ISAGULYANTS, V.I.

Alkylation of phenol with isobutyl alcohol in the presence of the cation exchange KU-2. Khim.prom. no.7:480-483 Jl '62. (MIRA 15:9)

(Phenol) (Isobutyl alcohol) (Ion exchange resins)

L 10591-63 EWP(j)/EPF(c)/EWT(m)/BDS Pc-4/Pr-4 RM/WW

ACCESSION NR: AP3000941 S/0064/63/000/003/0001/0006

AUTHOR: Belov, P. S.; Isagulyantz, V. I.

TITLE: Alkylating phenol with isobutylene in fluidized bed of cationite

SOURCE: Khimicheskaya promyshlennost', no. 3, 1963, 1-6

TOPIC TAGS: alkylating phenol, fluidized bed alkylation, commercial production n-tertiary butylphenol

ABSTRACT: Fluidized bed alkylation of phenol with isobutylene with cation exchange resin was investigated in laboratory apparatus; flow rates, reactant ratios, temperature, cationite regeneration, product purification were studied. For the equipment used, at 80 degrees, reactant ratio of 1:1 and a phenol flow rate of 2.01 moles/hour were optimum. Vacuum distillation suffices for purification. It is believed feasible to adapt this simple process to automated commercial production of n-tertiary butylphenol. Orig. art. has: 5 tables, 8 figures.

ASSOCIATION: none

SUBMITTED: 00 DATE ACQD: 31May63 ENCL: 00

SUB CODE: 00 NO REF SOV: 003 OTHER: 000

Card 1/1

BELOV, P.S.; ISAGULYANTS, V.I.; KLYUKINA, Z.P.

Alkylation of phenol with tert-butyl alcohol in the presence of the cation exchanger KU-2. Zhur.prikl.khim. 37 no.1:162-165 Ja '64. (MIRA 17:2)

BELOV, P. S.; ISAGULYANTS, V. I.

Alkylation of phenol by isobutylene in a fluid bed of a cation exchanger. Khim. prom. no.3:161-166 Mr '63.
(MIRA 16:4)

(Phenol) (Propene)

BELOV, P.S.; ISAGULYANTS, V.I.

Alkylation of phenol by a butane-butylene fraction in a flow in the presence of the KU-2 cation exchanger. Khim. i tekh. topl. i masel 8 no.9:28-31 S '63. (MIRA 16:11)

1. Moskovskiy institut neftekhimicheskoy i gazovoy promyshlennosti im. akad. Gubkina.

ACCESSION NR: AT4008701 S/2982/63/000/044/0101/0104

AUTHOR: Belov, P.S.; Isagulyants, V. I.

TITLE: Phenol-promoted polymerization if isobutylene on a cation exchanger

SOURCE: Moscow. Institut neftekhimicheskoy i gazovoy promy*shlennosti. Trudy*, no. 44, 1963. Neftekhimiya, pererabotka nefti i gaza, 101-104

TOPIC TAGS: isobutylene, propene.2-methyl-, isobutylene oligomers, isobutylene polymerization, phenol initiated isobutylene polymerization, motor fuel, fuel components, polymerization catalyst, KU-2 cation exchanger, phenol, polymerization initiator, initiator, propene.2-methyl-.polymer

ABSTRACT: The authors investigated isobutylene polymerization reactions using a KU-2 cation exchanger in the presence of the promoter phenol (5-12% of the isobutylene) at atmospheric pressure and 120-140C. Without phenol, autoclave pressure was required. The resulting polymers contained much dissolved gas and required stabilization. They were purified by means of aqueous alkali and water, dried over sodium sulfate and distilled. The molecular weight (established by the cryoscopic method and bromine numbers) ranged widely from ordinary dimers (16-43%) to fractions boiling at 2800C. The bromine numbers indicated that the products were olefins. Polymerization of the butane-butylene

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ACCESSION NR: AT4008701

fractions produced polymers boiling at higher temperatures than those derived from pure butylene. The mechanism of polymerization is discussed. These polymers can be used as motor fuel compoents, in the alkylation of phenol and benzene, and in special syntheses. Orig. art. has: 4 tables, 1 figure, and 3 chemical formulas.

ASSOCIATION: Institut neftekhimicheskoy i gazovoy promy*shlennosti, Moscow (Institute of Petroleum Chemistry and the Gas Industry)

SUBMITTED: 00 DATE ACQ: 16Jan64 ENCL: 00

SUB CODE: FP, OC NO REF SOV: 001 OTHER:000

2/2

Card

BELOV, P.S.; ISAGULYANTS, V.I.

Alkylation of phenol with isobutylene in a flow in the presence of the KU-2 cation exchanger. Zhur. prikl. khim. 36 no.12: 2706-2711 D'63. (MIRA 17:2)

1. Moskovskiy institut neftekhimicheskoy i gazovoy promyshlennosti imeni I.M. Gubkina.

ACCESSION NR: AP4017573

S/0065/64/000/003/0027/0031

AUTHOR: Bernadyuk, Z. A.; Belov, P. S.; Yegorov, N. M.; Korsakov, N. M.; Libinshteyn, I. Ye.; Luppov, L. V.; Sarkisyants, R. A.

TITLE: Industrial production of alkylphenol additives utilizing the KU-2 cation exchange resin

SOURCE: Khimiya i tekhnol. topliv i masel, no. 3, 1964, 27-31

TOPIC TAGS: alkylphenol, oil additive, cationate, benzene sulfonic acid, alkylphenol additive, oil, petroleum, lubricant, engine oil, motor oil

ABSTRACT: The purpose of this work is to find a better substitute for benzene sulfonic acid as a catalyst for the alkylation of phenol. This work was done at the Moskovskiy institut neftekhimicheskogo (Moscow Institute of Petro-chemical and Gas Industry) under the direction of Prof. V. I. Isagulyants. Phenol was alkylated by olefins in the presence of KU-2 cation exchange resin which is a sulfonated copolymer of styrene and divinylbenzene having a functional SO_3H group. This is a heterogeneous catalyst which, unlike benzene sulfonic acid (BSA), does not require washing of the product, there being no phenol contamination of wash water; the

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ACCESSION NR: AP4017573

alkylate is neutral with practically no dialkylphenols formed. The operation can be fully automated. KU-2 operates for a long time without losing activity and is regenerated by washing in polymerized olefins. The preparation of KU-2 for processing, as well as the manufacturing of phenol alkylate, its sulfonation (S_2Cl_2) and saponification with $Ba(OH)_2$, are described. The oil additive product using KU-2 is considerably superior to that prepared with the aid of BSA as catalyst because of the absence of dialkyl phenols, easier sulfonation and saponification, and no sulfur residues. Orig. art. has: 3 figures and 1 table.

ASSOCIATION: None

SUBMITTED: 00 DATE ACQ: 23Mar64 ENCL: 00

SUB CODE: GC, FP NO REF SOV: 005 OTHER: 000

Card 2/2

BERNADYUK, Z.A.; BELOV, P.S.; YEGOROV, N.M.; KORSAKOV, M.M.; LIBINSHTEYN, I. Ye.; LUPPOV, L.V.; SARKISYANTS, R.A.

Industrial production of alkyl phenol additives with the use of the KU-2 cation exchanger. Khim. i tekh. topl. i masel 9 no.3: 27-31 Mr '64 (MIRA 17:7)

1. Novo-Gor'kovskiy neftepererabatyvayushchiy zavod, Moskovskiy ordena Trudovogo Krasnogo Znameni institut neftekhimicheskoy i gazovoy promyshlennosti imeni akademika Gubkina i S/K "Orgneftezavody".

ISAGULYANTS, V.I.; BELOV, P.S.

Alkylation of p-cresol by isobutylene and isobutanol in the presence of cation exchanger KU-2. Zhur. prikl. khim. 37 no.8: 1797-1802 Ag '64. (MIRA 17:11)

BELOV, P.S.; ISAGULYANTS, V.I.

Condensation of 2-tert-butyl-4-methylphenol with formaldehyde.
Zhur. prikl. khim. 37 no.8:1860-1862 Ag '64.
(MIRA 17:11)

BELOV, Petr Stepanovich; ERIKH, V.N., retsenzent; RAPOPORT, I B., , doktor khim. nauk, prof., retsenzent; BABUSHKINA, S.I., red.

[Fundamentals of the technology of petrochemical synthesis] Osnovy tekhnologii neftekhimicheskogo sinteza. Moskva, Khimiia, 1965. 377 p. (MIRA 18:2)

BELOV, P.S.; ISAGULYANTS, V.I.

Phenol alkylation with cyclic alcohols in the presence of cation exchanger KU-2. Zhur. prikl. khim. 37 no.11:2505-2508 N '64 (MIRA 18:2)

BELOV, P.S.; ISAGULYANTS, V.I.

Alkylation of phenol with isobutyl alcohol on a KU-2 cation exchanger. Trudy MINKHiGP no.44:92-95 '63.

Phenol alkylation with isobutylene in flow on a KU-2 cation exchanger deposited on betonite. Ibid.:96-100

Polymerizatior of isobutylene activated by phenol on a cation exchanger. Ibid.:101-104 (MIRA 18:5)

L 45713-66 EWT(d)/EWT(m)/T/EWP(t)/ETI/EWP(h)/ EWP(l) IJP(c) JD/WB/DJ
ACC NR: AP6026500 (A) SOURCE CODE: UR/0318/66/000/005/0022/0024

AUTHOR: Belov, P. S.; Krasil'nikov, V. P. 47

ORG: Moscow Institute of Petrochemical and Gas Industry im. I. M. Gubkin (Moskovskiy institut neftekhimicheskoy i gazovoy promyshlennosti); Yaroslavl Petroleum Oil Plant im. D. I. Mendeleyev (Yaroslavskiy neftemaslozavod)

TITLE: Technology of industrial production of MNI-IP-22k additive

SOURCE: Neftepererabotka i neftekhimiya, no. 5, 1966, 22-24

TOPIC TAGS: fuel and lubricant additive, alkylphenol

ABSTRACT: The MNI-IP-22k additive improves the anticorrosion, antiwear, antioxidation and wetting properties of oils. An attempt is made to indicate the causes of various difficulties in the industrial synthesis of this additive and to give certain recommendations aimed at facilitating its production. It is pointed out that the production of MNI-IP-22k (as well as additives in general) requires an autonomy excluding the mixing of the intermediate products of synthesis and finished additives. The MNI-IP-22k additive obtained corresponds to the technical specifications if the requirements of the process (raw material of good quality, adequate stirring, adherence to batching norms) are met. The process of production of alkyl phenol additives is considerably simplified if the synthesis of alkyl phenols is carried out on ion-

Card 1/2 UDC: 665.637.6.022.31/.39.002.2

L 45713-66
ACC NR: AP6026500

exchange resins.

SUB CODE: 11/ SUBM DATE: none/ ORIG REF: 002

Card 2/2 ULR

BELOV, P.T.

Practice of using cable drilling in searching for tin and complex ore deposits. Razved. i okh. nedr 26 no.7:54-55 Jl '60. (MIRA 15:7)

1. Sherlovogorskiy kombinat.
(Sherlovaya Gora region--Ore deposits)
(Boring)

ARISTOV, V.V.; PETROVA, M.G.; BELOV, P.T.; GUSHCHIN, V.A.

Structure, mineralization and formation of the granite intrusive in Sherlovaya Gora. Geol.rud.mestorozh. no.6:41-53 N-D '61. (MIRA 14:12)

1. Moskovskiy geologorazvedochnyy institut imeni S.Ordzhonikidze, Moskva i Sherlovogorskiy gornoobogatitel'nyy kombinat, pos. Sherlovaya gora.

(Sherlovaya Gora Region--Ore deposits)

ALBOROV, Z.B.; BELOV, P.V.

Reliability of the detonation of consecutive electric detonating networks with a paired, parallel detonator switch. Sbor. trud. VNIITSVETMET no.4:108-113 '59. (MIRA 16:8)

(Detonators)

BELOV, P.V.

Automatic control of the operation of the "Volga" type grate cooler. TSement 28 no.3:8-9 My-Je '62. (MIRA 15:7)
(Automatic control)
(Cement plants--Equipment and supplies)

BELOV, P.V., inzh.; KALASHNIKOV, A.P., inzh.; KUTUZOV, D.S., inzh.

Efficient diagrams of electric blasting circuits. Bezop.truda v prom. 7 no.3:26-27 Mr '63. (MIRA 16:3)

1. Vsesoyuznyy nauchno-issledovatel'skiy institut tsvetnykh metallov (for Belov, Kalashnikov). 2. Leninogorskiy polimetallicheskiy kombinat (for Kutuzov).

(Electric circuits) (Blasting)

L 46056-66 EEC(k)-2/EWT(d)/FSS-2 WS-2/GD

ACC NR: AT6022341 SOURCE CODE: UR/0000/66/000/000/0032/0036

AUTHOR: Kamnev, Ye. F.; Belov, P. V.

66
B+1

ORG: None

TITLE: A device for automatically choosing the selection angle in a short-wave communications system with spatial beam selection and relative phase keying

SOURCE: Vsesoyuznaya nauchnaya sessiya, posvyaschennaya Dnyu radio. 22d, 1966. Sektsiya teorii i tekhniki peredachi diskretnykh signalov. Doklady. Moscow, 1966, 32-36

TOPIC TAGS: phase coding, antenna radiation pattern, short wave propagation

ABSTRACT: The authors discuss the SW spatial selection system for separating reception signal beams with respect to angle of arrival by using an antenna with a controllable narrow radiation pattern in the vertical plane. Effective operation of a communications system with this type of selection requires a device which automatically selects the principal lobe of the radiation pattern in the position corresponding to the selection angle. A device of this type is proposed which is designed for operation of a radio channel in the relative phase keying system (any multiplicity). A block diagram of the device is given for the case where the antenna (cophased array) has two independent controllable lobes in the vertical plane, the working lobe and

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ACC NR: AT6022341

an auxiliary lobe which continuously scans the range of possible angles for signal arrival. It is assumed that the scanning process is discrete, usually consisting of no more than ten steps. The operating principle of the automatic selection device is based on the fact that during operating on a single beam (when the ratio of the power of the selected beam to that of the remaining beams is high) with frequency doubling, keying modulation stops and the signal component corresponding to the doubled carrier frequency remains. During operation on two (or more) beams with a delay time greater than the length of the elementary pulse group, keying continues with frequency doubling and there are other signal components corresponding to the spectrum of phase-keyed oscillation in addition to that for the doubled carrier frequency. Consequently if there are facsimiles of the phase-keyed signal of identical amplitude for the cases of single- and multiple-beam radio channels, they may be differentiated by measuring the spectral density on the doubled carrier frequency (after the doubler). The higher spectral density corresponds to the single-beam radio channel. The device contains a limiter designed for balancing the amplitudes of oscillations received by the auxiliary lobe of the antenna in each of its positions and for eliminating spurious amplitude keying. A high-Q resonator tuned to the doubled frequency is used for accumulating the energy of the signal on this frequency during the period when the auxiliary lobe is in one of its positions. After passing through the detector, the rectified voltage is fed through a switch corresponding to the position of the auxiliary lobe for a given time interval to a memory unit (capacitor) which stores the magnitude of this voltage. After the voltage corresponding to the last position has

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ACC NR: AT6022341 O

been stored, all voltages are compared. A control pulse is then sent from the capacitor with the maximum voltage to the control unit for the working lobe, and this lobe is set at the position corresponding to that of the auxiliary lobe where the maximum voltage was recorded. Calculations show that the time for filter integration should be at least 100 times greater than the duration of an elementary pulse group. For instance at an operating speed of 2,000 bauds, the band of the integrator filter should be 20 cps giving a scanning time of 0.5 sec for ten steps. The multibeam pattern remains constant through this time interval. The accuracy of adjustment of the system to the optimum beam may be increased by sending the command for fixing the working lobe of the radiation pattern after several scanning cycles. Orig. art. has: 1 figure.

SUB CODE: 20,17/ SUBM DATE: 09Apr66

Card 3/3 gd

Belov, P.Ye.

PAUTOV, A.V.; BELOV, P.Ye.; CHEBUREYEV, G.M.

Regenerating silica gels for drying apparatus of turbocompressors without electric air heating. Prom.energ. 12 no.8:18 Ag '57. (MIRA 10:10)

(Drying apparatus)

BULGARIA

Maj (Maior) Iordan MILKOV and Maj Stefan BELOV, MC

"Three Cases of Invagination"

Sofia, Voenno Meditsinsko Delo, Vol 18, No 2, 1963; pp 54-57..

Abstract: Case reports of an infant aged 7 months with ileus, and of 2 soldiers with unspecific "acute abdomen" found to be due to intestinal invagination and treated surgically with success.

1/1

BELOV, S., kand.med.nauk

Some comments on the second edition of the Large Medical Encyclopedia. Sov.zdrav. 19 no.12:82-83 '60. (MIRA 14:3)
(MEDICINE--DICTIONARIES)

ACC NR: AP7002984 (/1) SOURCE CODE: UR/0413/66/000/024/0082/0082

INVENTOR: Kislitsyn, N. M.; Belov, S. A.

ORG: None

TITLE: A device for inspecting shock absorbers. Class 42, No. 189610

SOURCE: Izobreteniya, promyshlennyye obraztsy, tovarnyye znaki, no. 24, 1966, 82

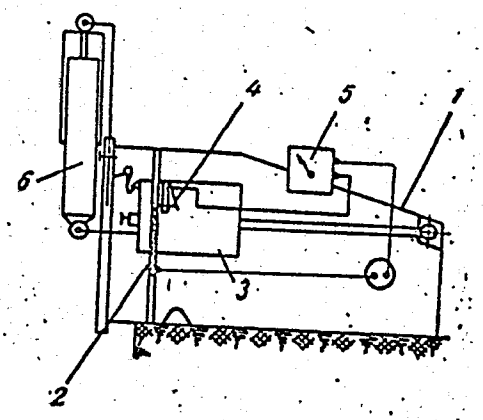
TOPIC TAGS: shock absorber, test equipment, quality control

ABSTRACT: This Author's Certificate introduces a device for checking shock absorbers. A lever which carries a weight is fastened to the frame of the unit. The device also incorporates brackets for mounting the shock absorber, one of them fastened to the frame and the other fastened to the weight. Shock absorber quality control is improved by using a contact plate mounted on the frame which interacts with a sliding contact on the weight as it falls. The electric circuit which is closed during this action contains a registration instrument for determining the length of time required for the weight to fall as a criterion for judging the operating condition of the shock absorber.

Card 1/2

UDC: 620.169.1

ACC NR: AP7002984



1--frame; 2--contact plate; 3--weight; 4--sliding contact; 5--instrument; 6--shock absorber

SUB CODE: 13, 14/ SUBM DATE: 27Aug65

Card 2/2

BELOV, V.I., prof., doktor tekhn. nauk; BELOV, S.A., gornyy inzhener

Electric modeling of mine ventilation. Ugol' Ukr. 3 no.7:20-21 Jl '59. (MIRA 12:11)
(Mine ventilation--Electromechanical analogies)

BELOV, S.A., inzh.

Certain type of multirope hoists. Ugol' 34 no.4:35-37 Ap '59.
(MIRA 12:7)
(Mine hoisting) (Hoisting machinery)

BELOV, S.A., inzh.; KONYUKHOV, V.G., inzh.

Apparatus for measuring the concentration of antiseptics.
Der.prom. 11 no.6:24 Je '62. (MIRA 15:6)
(Wood preservations—Testing)

BELOV, S. D.

USSR/Electricity - Furnaces, Electric   Apr 51

"Electric Furnace Unit for Light Alloys," P. I. Tevis, S. D. Belov, Engineers

"Elektrichestvo" No 4, pp 65, 67

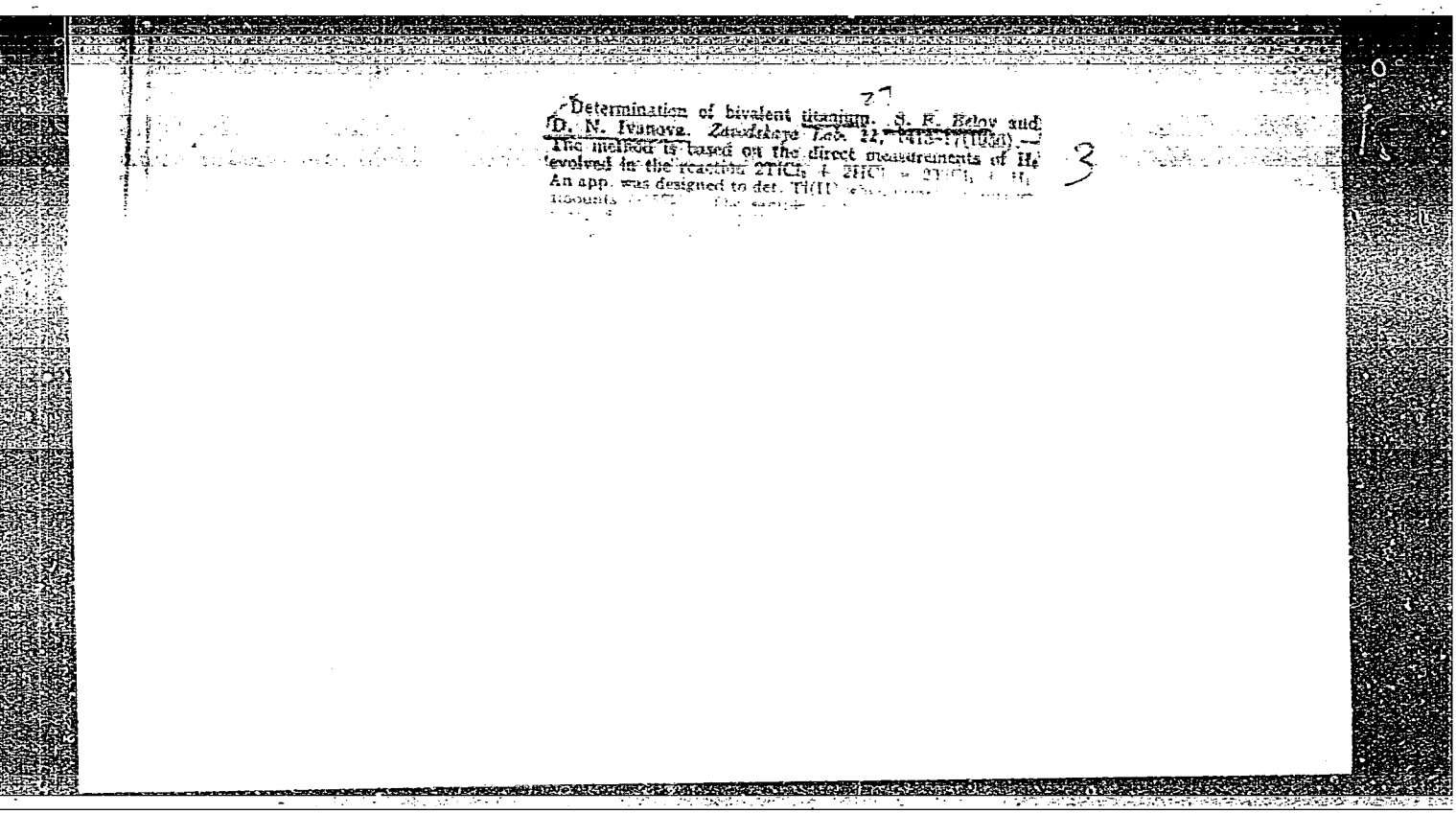
Authors propose method for treating light alloys in elevated elec furnace units which would do away with saltpeter baths now used. Latter are very dangerous from fire standpoint and also very expensive. Hardening, annealing, and aging are all carried out in the unit. One such unit for hardening, annealing and aging of alloy V-95 with inside dimensions 6,400 x 1,200 x 1,000 has been operating at mach-bldg plant

178T59

USSR/Electricity - Furnaces, Electric (Contd)   Apr 51

since Jun 49. Authors were awarded 2d prize in All-Union Sci and Tech Soc of Power Engineers' 1949 competition for elec power econ. Submitted 29 Dec 50.

178T59



Determination of bivalent titanium. S. E. Belov and D. N. Ivanova. *Zavodskaya Lab.* 22, [illegible] (1956). The method is based on the direct measurements of H_2 evolved in the reaction $2TiCl_3 + 2HCl = 2TiCl_4 + H_2$. An app. was designed to det. Ti(II) [illegible]

PISAREV, V.S., gornyy inzh; BELOV, S.F., gornyy inzh.

Economic reasons for the industrial use of "tobacco" ores from Kamysh Burun deposits. Gor.zhur. no.11:57-59 N '48.
(MIRA 11:11)

1. Leningradskiy gornyy institut.
(Kerch Peninsula--Iron ores)

NEDOLUZHENKO, I.A., doktor ekonomicheskikh nauk; ANDREYEV, A., kandidat ekonomicheskikh nauk; BELOV, S.F., kandidat tekhnicheskikh nauk; BOROMINSKIY, B.A., assistent; LITVIN, I.B., assistent.

"Economics of the coal industry in the U.S.S.R." A.A. Zvorykin, D.M. Kirzhner, M.B. Kundin, Reviewed by I.A. Nedoluzhenko and others. Ugol' 31 no.2:46-48 F '56. (MLRA 9:5)

1. Kafedra ekonomiki gornoy promyshlennosti Leningradskogo gornogo instituta.
(Mining industry and finance)(Zvorykin, A.A.)(Kirzhner, D.M.) (Kindin, M.B.)

AUTHORS: Pisarev, V.S. and Belov, S.F., Engineers SOV/127-58-11-11/16

TITLE: The Economic Basis for Industrial Utilization of Tobacco-Colored Ores of the Kamyshburun Deposit (Ekonomicheskiye predposylki promyshlennogo ispol'zovaniya tabachnykh rud Kamyshburunskogo mestorozhdeniya)

PERIODICAL: Gornyy zhurnal, 1958, Nr 11, pp 57 - 59 (USSR)

ABSTRACT: The total annual production of tobacco-colored iron ores of the Kamyshburun, Kyz-Aul' and Katerlez deposits will reach 20,000,000 tons, and the selection of the most efficient method of concentration becomes a very important problem. The Mekhanobr Institute proposed a technological process for the magnetic roasting method of concentration. As the cost of construction of a magnetic-roasting plant involves large capital investments, the authors propose different measures which will cut down the capital expenditure. There is 1 table.

ASSOCIATION: Leningradskiy gornyy institut (The Leningrad Mining Institute)

Card 1/1 1. Iron ores--Processing

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21 3000 (1496, 1515, 4016)

S/149/60/000/006/009/018
A006/A001

AUTHORS: Ruzinov, L.P., Belov, S.F.

TITLE: Thermodynamics of Zirconium and Hafnium Chlorides

PERIODICAL: Izvestiya vysshikh uchebnykh zavedeniy, Tsvetnaya metallurgiya, 1960, No. 6, pp. 104-113

TEXT: Thermodynamical constants (heat content, entropy, heat capacity) required for thermodynamical calculations of many zirconium and hafnium compounds are not available in literature. Therefore the authors investigated the calculational determination of technologically important thermochemical constants of some zirconium and hafnium chlorides. The graphical determination of heat content in lower hafnium chlorides was made using methods developed by V.P. Shishokin (Ref.9), O. Kubashevskiy and E. Evans (Ref. 6); M.Kh. Karapet'yants (Ref. 13) and A.F. Kapustinskiy's rule of thermochemical logarithmics (Ref. 10), employing the modified formula

$$\frac{\Delta H}{W N} = A \lg Z + B$$

where W is the valence, N is the number of the group or series; Z is the number of element, A and B are constants. The solution of the equation is given in

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Thermodynamics of Zirconium and Hafnium Chlorides

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Figure 2. The following data are considered to be reliable values for the heat content of hafnium chlorides: 150 kcal/mole for $HfCl_2$; 220 kcal/mole for $HfCl_3$ and 225 kcal/mole for $HfCl_4$. Since only the entropy of hafnium tetrachloride is available in literature, lacking entropies were calculated and entropies available were made more precise using the following methods: a) V.A. Kireyev's method (Ref. 14) based on the summarizing of atomic entropies by taking into account changes in the entropies during the reaction of the formation of a substance from atoms; b) a method developed by the same author (Ref. 15) using for calculation the entropies in hypothetical state of an ideal gas with subsequent transition to a natural state; c) V.Lattimer's method (Ref. 16) determining the entropy of compounds by summing up the conditional entropy of atoms, taking into account their valence; d) K.B. Yatsimirskiy's method (Ref. 17) connecting entropy with the charge and radius of ions; e) P. Drossbakh's method (Ref. 18) showing the dependence of entropy of chlorides on the molecular weight. The results are given in Table 2. Heat capacity of lower zirconium and hafnium chlorides was calculated using N.A. Landiya's method (Ref. 20) based on the connection of heat capacity with entropy. According to Reference 4, the following melting points were considered: 1,000°K for $ZrCl_2$ and 900°K for $ZrCl_3$ and analogously 1,100°K for $HfCl_2$ and 1,000°K for $HfCl_3$. The calculations for 500, 700 and 900°K and the solution of equations

yielded the following relations for heat capacities (cal/mole . degree):

$$C_{p_{ZrCl_2}} = 15.52 + 7.8 \cdot 10^{-3} T - 0.25 \cdot 10^{-6} T^2;$$

$$C_{p_{ZrCl_3}} = 21.04 + 9.5 \cdot 10^{-3} T + 0.625 \cdot 10^{-6} T^2;$$

$$C_{p_{HfCl_2}} = 16.62 + 5.1 \cdot 10^{-3} T + 1.25 \cdot 10^{-6} T^2;$$

$$C_{p_{HfCl_3}} = 20.8 + 10.1 \cdot 10^{-3} T$$

For the purpose of investigating the possibility of separating hafnium from zirconium, by the interaction of metals and chlorides (Ref. 21, 22), the changes in the isobaric-isothermal potential (ΔZ) of various possible reactions were calculated by a method suggested by M.I. Temkin and L.A. Shvartsman (Ref. 23) using the formula:

$$\Delta Z^* = \Delta Z - RT \ln C^n_{HfCl_4} \cdot C^m_{Hf}$$

where n and m are the stoichiometric coefficients. It was found that the process of separation will sucessfully proceed at a temperature above 900°K (627°K). The

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Thermodynamics of Zirconium and Hafnium Chlorides

calculations show that reactions can proceed which promote the separation of zirconium and hafnium (20 reactions out of 23) but that reactions are also possible preventing the separation, i.e. reactions causing the reverse effect. Therefore the possibility of single-stage separation of zirconium and hafnium is not very probable and the process of separation must consist of several stages or a combination of several known methods. The conclusions drawn are in a sufficient agreement with experimental data.

Table 1: Heat content of hafnium chlorides

Calculation method	Heat content ($-\Delta H_{298}$), kcal/mole		
	$HfCl_2$	$HfCl_3$	$HfCl_4$
Shishikin	164	242	-
Kapustinskiy	148	220	252
Kubashevskiy and Evans	156	220	-
Karapet'yants	-	-	256,5
Literature values	-	-	320; 250; 255
Probabel extremal values	145-150	208-228	235-293

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Thermodynamics of Zirconium and Hafnium Chlorides

Table 2: Entropy of Zirconium and Hafnium Chlorides

Method	Entropy, cal/mole . degree				
	$ZrCl_2$	$ZrCl_3$	$HfCl_2$	$HfCl_3$	$HfCl_4$
a	25,9	32,7	30,2	36,3	48,3
b	29,4*	32,4	31,0	34,0*	-
c	28,3*	32,8	31,0	35,5	47,2
d	26,5	-	30,24	-	-
e	[illegible]	32,1	31,7	36,0	-
Literature values	[illegible]	40,0	-	-	45,6; 48,0
Probable values	26,4	32,5	31,0	36,1	48,0

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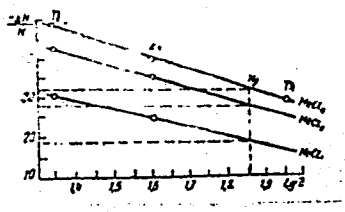
Thermodynamics of Zirconium and Hafnium Chlorides

Figure 2:



Graphical determination of the heat content of Hafnium chlorides by the modified equation of thermochemical logarithmics

There are 4 figures, 4 tables and 25 references: 15 Soviet, 9 English and 1 German.

ASSOCIATIONS: Moskovskiy institut tonkoy khimicheskoy tekhnologii (Moscow Institute of Fine Chemical Technology); Kafedra khimii i tekhnologii redkikh i rasseyannykh elementov (Department of Chemistry and Technology of Rare and Dispersed Elements)

SUBMITTED: November 27, 1959

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88503

S/149/61/000/001/007/013
A006/A001

21.3000 (1565, 1138, 1496)

AUTHORS: Ruzinov, L.P., Belov, S.F.

TITLE: Thermodynamical Calculation of Electrochemical Characteristics of Zirconium and Hafnium Chlorides

PERIODICAL: Izvestiya vysshikh uchebnykh zavedeniy, Tsvetnaya metallurgiya, 1961, No. 1, pp. 106 - 111

TEXT: Data (Ref. 1) on the electro-refining of zirconium from gases do not mention the behavior of other impurities, such as hafnium, iron, aluminum etc. However, their joint elimination by a single process would simplify zirconium production and make it cheaper. The authors investigated some important factors in the evaluation of electrolytical refining of zirconium and calculated the dissociation voltages of zirconium and hafnium chlorides, their oxidation-reduction characterisites and the dissociation voltages of chlorides of some metals which might be present in the initial zirconium and the electrolyte. The investigation was based on American experimental data (Ref. 1, 2, 3). The dissociation voltage of chlorides was calculated with the aid of data given in Reference 4. The Temkin-Shvartsman method (Ref. 5) was used to determine changes in the isobaric-iso-

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Thermodynamical Calculation of Electrochemical Characteristics of Zirconium and Hafnium Chlorides

thermal potential within a range of 700 - 1,400°K for the following processes: $MeCl_2 = Me + Cl_2$; $MeCl_3 = Me + 1.5\ Cl_2$; $Me\ Cl_4 = Me + 2\ Cl_2$, from which temperature dependences of dissociation voltages were obtained (Table 1). The dissociation voltage of compounds which might be present in the electrolytic bath when refining zirconium, was calculated using literature data given in Reference 6 (Table 2). The dissociation voltages of hafnium chlorides at a concentration of 2 mol.% in commercial zirconium chloride were determined (Table 3). The oxidation-reduction processes of salt dissociation are characterized by "incomplete" dissociation voltage, i.e. the voltage, at which an element is deposited on one electrode and an oxidation-reduction process takes place on the other electrode. "Incomplete" dissociation was calculated using the law of Luter: an element K in a combination with A can show two valences n and m, whereby $m > n$. Then the oxidation-reduction process will be characterized by the reaction $KA_m = KA_n + (m-n)A$ (1), and the dissociation voltages will be calculated from the reaction $KA_m = K + mA$ (2) and $KA_n = K + nA$ (3). Changes in the isobaric-isothermal potential of the process (1) can be determined with the aid of (2) and (3) as follows:

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Thermodynamical Calculation of Electrochemical Characteristics of Zirconium and Hafnium Chlorides

$\Delta Z_{m-n} = \Delta Z_{m-o} - Z_{n-o}$. The transition to dissociation voltages will produce $F(m-n) \cdot E_{m-n} = FmE_{m-o} - FnE_{n-o}$, and $E_{m-n} = \frac{mE_{m-o} - nE_{n-o}}{m-n}$ (4). (Tables 4 and 5).

The investigation shows that successful electrolytic refining of zirconium depends on the difference in the dissociation voltages of chlorides. It can be expected that electropositive elements will mainly remain in the anode slurry and electronegative impurities in the electrolyte. Due to the closeness of dissociation voltages of zirconium chlorides and hafnium chlorides, zirconium refining from hafnium will be difficult. The greatest difference of dissociation voltages is observed between zirconium and hafnium tetrachlorides (0.20 at 900°K), however, due to high volatility the separation is difficult. The difference of dissociation voltages of trichlorides (0.160 at 900°K) and dichlorides (0.10 at 900°K) permits the assumption that hafnium separation in electrolytic refining may be successful, although full separation will hardly be achieved. The following recommendations are given: high concentration of zirconium chlorides, ensuring extended accumulation of hafnium on the electrolyte without its noticeable precipitation on the cathode, to maintain a higher difference of dissociation voltages; sufficiently

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Thermodynamical Calculation of Electrochemical Characteristics of Zirconium and Hafnium Chlorides

high current efficiency, since oxidation-reduction processes will not occur on the anode but mainly take place on the cathode; lower chlorides can be obtained by using the interaction reaction of zirconium tetrachloride with zirconium metal directly in the bath. The initial tetrachloride should therefore be purified from Te, Fe, Al and other electropositive elements. It is concluded that zirconium metal is rather difficult to obtain from a chloride bath by electrolysis with tetrachloride, since zirconium reduction to the trivalent state will mainly occur on the cathode and oxidation to the tetravalent state will take place on the anode. This explains the failure of some authors (Ref. 8).

Table 1:

Changes in the isobaric-isothermal potential of zirconium and hafnium chloride formation, and dissociation voltages of chlorides.

Хлорид Chloride	$-\Delta Z$, ккал/моль kcal/mole	E, в oersted/v
$ZrCl_2$	$129{,}1-18{,}8\cdot10^{-3}T$	$2{,}79-0{,}406\cdot10^{-3}T$
$ZrCl_3$	$189{,}1-33{,}5\cdot10^{-3}T$	$2{,}72-0{,}483\cdot10^{-3}T$
$ZrCl_4$	$211{,}4-41{,}5\cdot10^{-3}T$	$2{,}32-0{,}448\cdot10^{-3}T$
$HfCl_2$	$131{,}4-16{,}0\cdot10^{-3}T$	$2{,}84-0{,}345\cdot10^{-3}T$
$HfCl_3$	$198{,}0-31{,}0\cdot10^{-3}T$	$2{,}85-0{,}447\cdot10^{-3}T$
$HfCl_4$	$246{,}0-55{,}75\cdot10^{-3}T$	$2{,}66-0{,}66\cdot10^{-3}T$

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Thermodynamical Calculation of Electrochemical Characteristics of Zirconium and Hafnium Chlorides

Table 2

Dissociation voltage of chlorides

Хлорид Chloride	Decomposition Напряжение разложения, в voltage, v				
	900°K	1000°K	1100°K	1200°K	1300°K
KCl	3,60	3,50	3,39	3,25	3,18
NaCl	—	3,25	3,15	3,05	2,96
$MgCl_2$	2,57	2,52	2,46	2,41	2,35
$HfCl_2$	2,53	2,50	2,46	2,43	2,39
$HfCl_3$	2,45	2,40	2,36	2,31	2,27
$HfCl_4$	2,12	2,06	2,00	1,94	1,88
$ZrCl_2$	2,43	2,38	2,34	2,30	2,26
$ZrCl_3$	2,29	2,24	2,19	2,14	2,09
$ZrCl_4$	1,92	1,87	1,83	1,78	1,74
$TiCl_2$	1,91	1,87	1,84	1,76	1,72
$TiCl_3$	1,76	1,70	1,64	1,58	1,63
$TiCl_4$	1,65	1,57	1,53	1,49	1,45
$AlCl_3$	1,83	1,78	1,73	1,68	1,64
$MnCl_2$	1,80	1,76	1,71	1,67	1,63
$FeCl_2$	1,18	1,15	1,12	1,08	1,05
$FeCl_3$	1,00	1,02	1,03	1,05	1,06

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A006/A001

Thermodynamical Calculation of Electrochemical Characteristics of Zirconium and Hafnium Chlorides

Table 3

Dissociation voltages of hafnium chlorides at a concentration of 2mol%

Хлорид Chloride	Decomposition Напряжение разложения, в voltage, v				
	900° K	1000° K	1100° K	1200° K	1300° K
$HfCl_2$	2,68	2,67	2,65	2,63	2,61
$HfCl_3$	2,60	2,57	2,55	2,51	2,49
$HfCl_4$	2,27	2,23	2,19	2,14	2,10

Table 4

"Incomplete" dissociation voltage of zirconium chlorides

T, °K	Напряжение, в Voltage, v		
	$ZrCl_3 \rightarrow ZrCl_2$	$ZrCl_4 \rightarrow ZrCl_2$	$ZrCl_4 \rightarrow ZrCl_3$
900	2,01	1,41	0,81
1000	1,96	1,36	0,76
1100	1,89	1,32	0,75
1200	1,82	1,26	0,70
1300	1,75	1,22	0,69

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Thermodynamical Calculation of Electrochemical Characteristics of Zirconium and Hafnium Chlorides

Table 5:

"Incomplete" dissociation voltage of hafnium chlorides

T, °K	Напряжение, в Voltage, v		
	$HfCl_3 \rightarrow HfCl_2$	$HfCl_4 \rightarrow HfCl_3$	$HfCl_4 \rightarrow HfCl_2$
900	2,29	1,71	1,13
1000	2,20	1,62	1,04
1100	2,16	1,54	0,92
1200	2,07	1,45	0,83
1300	2,03	1,37	0,71

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A006/A001

Thermodynamical Calculation of Electrochemical Characteristics of Zirconium and Hafnium Chlorides

There are 5 tables and 8 references: 4 Soviet and 4 English.

ASSOCIATIONS: Moskovskiy institut tonkoy khimicheskoy tekhnologii (Moscow Institute of Fine Chemical Technology); Kafedra khimii i tekhnologii redkikh i rasseyannykh elementov (Department of Chemistry and Technology of Rare and Dispersed Elements)

SUBMITTED: November 27, 1959

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SOV/136-58-11-7/21

AUTHORS: Belov, S.F.
Sklyarenko, S.I.

TITLE: Behaviour of Titanium Chlorides in Fused Salts (Povedeniye khloridov titana v rasplavlennykh solyakh)

PERIODICAL: Tsvetnyye Metally, 1958, Nr 11, pp 37-42 (USSR)

ABSTRACT: The authors have previously made an attempt to calculate thermodynamically some "disproportioning" processes (ref.1), such as those of mutual oxidation-reduction of titanium in fused-salt systems. They now expand their treatment and present some experimental results. They give specific-heat (constant pressure) versus temperature equations for $TiCl_2$ and $TiCl_3$ and the most probable values of the heat-contents of these compounds at 298°K, -123 and -170 k.cal/mol, respectively. For the entropies at 298°K of $TiCl_2$ and $TiCl_3$ they consider 23.8 and 30.6 cal/mol. degree, respectively, the most reliable values. They have calculated the changes in the isobaric-isothermal potential for 700-1000°C (table 4 - Fig.1) for 10 possible processes involving only titanium and its compounds in fused salts containing titanium chlorides but have not allowed

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Behaviour of Titanium Chlorides in Fused Salts

for reactions with other possible melt components. All experiments were carried out in a quartz vessel in fused potassium chloride under argon. They confirmed that metallic titanium hardly changes in melts free from titanium compounds; when $TiCl_3$ was present the concentration of Ti^{3+} decreased through the formation of Ti^{2+} (Fig.2). $TiCl_3$- containing potassium-chloride melts were found to form metallic titanium and some $TiCl_2$ (fig 3) at 800°C. By bubbling $TiCl_4$ through fused potassium-chloride at 800-950°C and sampling the resulting melt after standing, it was found that small quantities of the tetrachloride could be claimed for considerable periods. The authors conclude from a discussion of their results that of the reactions considered the one proceeding at an appreciable rate and giving finely-dispersed metal is $2TiCl_3$ (liq) and Ti (solid) = $3TiCl_2$ (liq); though the others can

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proceed in melts their rates are considerably less. There are 4 figures, 5 tables and 14 references of which 5 are Soviet, 7 English, 1 German and 1 Japanese.

BELOV, S. F.

Cand Chem Sci - (diss) "Study of several properties of titanium chlorides and their interactions in smelting." Moscow, 1961. 24 pp with diagrams; (State Scientific Research and Design Inst of the Rare Metal Industry "Giredmet"); 150 copies; free; (KL, 10-61 sup, 206)

S/598/60/000/004/012/020
D217/D302

AUTHORS: Belov, S.F. and Sklyarenko, S.I.

TITLE: On the thermodynamics of titanium chlorides and their behavior in a melt

SOURCE: Akademiya nauk SSSR. Institut metallurgii. Titan i yego splavy. No. 4. Moscow, 1960. Metallurgiya titana, 115-121

TEXT: The purpose of this work was to establish the thermodynamic characteristics, interdependence and significance of the reactions taking place in molten systems containing $TiCl_3$, $TiCl_2$, $TiCl_4$ and Ti. The temperature change of the thermal capacity for $TiCl_2$ and $TiCl_3$ was determined by calculation. The heat content, entropy and decomposition voltages of titanium chlorides were calculated. The change of the isobaric-isothermal potential of the disproportionation reaction was calculated. In a KCl melt containing titanium chlorides and metallic Ti, the only reaction taking place at a considerable rate and leading to

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the formation of finely dispersed Ti, is the disproportionation of $TiCl_3$ to $TiCl_2$ in the presence of Ti. The other reactions occur to an insignificant degree. There are 6 figures, 1 table and 10 references: 3 Soviet-bloc and 7 non-Soviet-bloc. The references to the English-language publications read as follows: F. Clifton, G. Macwood and B. Sanderson. J. Phys. Chem., 3, 309, 311, 316, (1956); Oltman, Farber et al., J. Chem. Phys., 3, 531, (1956); C.B. Gill et al. J. Electro. Chem., 1, 42, (1955).

S/078/61/006/003/021/022
B121/B208

AUTHORS: Belov, S. F., Sklyarenko, S. I.

TITLE: Kinetics of the reaction of titanium tetrachloride with metallic titanium in a potassium chloride melt

PERIODICAL: Zhurnal neorganicheskoy khimii, v. 6, no. 3, 1961, 754-756

TEXT: In the reduction of $TiCl_3$, disperse titanium metal is formed according to the equation $2\ TiCl_3 + Ti \rightleftharpoons 3\ TiCl_2$ (1); the rate of this reaction in the potassium chloride melt depends on the quantity of disperse metallic titanium. The kinetics of this reaction is governed by topochemical rules and may be expressed by the equation of Kolmogorov - Yerofeyev:

$L = 1 - \exp(-k\tau^n)$, where L = reacting portion per time τ; k = constant; n = integral index. The index n determines the nature of the reaction centers being formed and the number of intermediate stages during their formation. At n = 1, the formation centers are planes, and the reaction starts from those centers which existed already at the beginning of the reaction.

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At n = 2, the centers of the formation reaction are linear (microcracks, crystal edges). The kinetic curves of the formation of titanium tetrachloride according to reaction (1) are S-shaped. The equation by Kolmogorov-Yerofeyev in the logarithmic form $\log[-\log(1-L)] = \log k' + n \log \tau$ is used for a quantitative determination of the reaction kinetics. The topochemical character of the heterogeneous reaction (1) indicates that the factors determining the reaction rate are the formation and growth of the reaction centers, and not the diffusion process. Temperature affects the reaction rate only slightly. There are 2 figures and 5 Soviet-bloc references.

SUBMITTED: October 17, 1960

S/136/62/000/009/001/002
E193/E383

AUTHORS: Ruzinov, L.P. and Belov, S.F.

TITLE: Enthalpy and dissociation pressure of the lower chlorides of hafnium

PERIODICAL: Tsvetnyye metally, no. 9, 1962, 85

TEXT: Following the publication (H. Schäfer, K. Kahlenberg, Zs. anorg. allg. Chemie, 291, no. 5-6, 1960 p. 305) of more accurate data on thermodynamical properties of the lower chlorides of several metals, the present authors revised their earlier calculations (Tsvetnyy metally, no. 12, 1959; Izv. vuzov, - Tsvetnaya metallurgiya, no. 6, 1960, 104; no. 1, 1961, 106) and obtained the following values for the enthalpy and dissociation pressures of chlorides of hafnium and zirconium:

$$\triangle H_{298} = -131 \pm 8 \text{ kcal/mole for } HfCl_2;$$

$$\triangle H_{298} = -195 \pm 8 \text{ kcal/mole for } HfCl_3;$$

$$E_{ZrCl_2} = 2.535 - 0.525 \cdot 10^{-3}T ;$$

$$E_{ZrCl_2} = 2.390 - 0.500 \cdot 10^{-3}T ;$$

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Enthalpy and ....

$$E_{HfCl_2} = 2.530 - 0.400 \cdot 10^{-3}T ;$$
$$E_{HfCl_3} = 2.950 - 0.866 \cdot 10^{-3}T .$$

(The expressions for the dissociation pressures relate to the 900 - 1 400 °K temperature range.)

[Abstracter's note: Abridged translation]

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SKLYARENKO, S.I.; BELOV, S.F.

Equilibirum of titanium di- and trichloride in a potassium chloride melt. Izv.vys.ucheb.zav.;khim.i khim.tekh. 5 no.3:383-386 '62. (MIRA 15:7)

1. Moskovskiy institut tonkoy khimicheskoy tekhnologii imeni Lomonosova, kafedra khimii i tekhnologii redkikh i rasseyannykh elementov.
(Titanium chlorides) (Potassium chloride)

S/078/62/007/007/006/013
B117/B101

AUTHORS: Sklyarenko, S. I. (Deceased), Belov, S. F.

TITLE: Effect of the composition of melts on the equilibrium concentration of titanium dichloride and titanium trichloride

PERIODICAL: Zhurnal neorganicheskoy khimii, v. 7, no. 7, 1962, 1636 - 1639

TEXT: The equilibrium of the reaction $2TiCl_3 + Ti \rightleftarrows 3TiCl_2$ was studied in melts for which no uniform numerical values of the equilibrium constants have yet been published. The equilibrium of this reaction was found to be hardly affected by temperature (750 - 1000°C). Experiments with metallic titanium in KCl melt showed that Ti virtually does not react with the melt in an inert gas at 800 - 1000°C. It follows that alkali metals cannot be removed from their chlorides by titanium and do not affect the equilibrium. Analytical errors and consequent great differences in the values of the equilibrium constant are due to the formation, in varying amounts, of finely dispersed active titanium which liberates hydrogen from weak acids and even from water. Titanium chloride was found to react differently with the individual components of the melt, according to its

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Effect of the composition of melts...

composition and concentration. A change in composition changes the equilibrium constant K_N. The ratio of equilibrium concentrations of $TiCl_2/TiCl_3$ in melts was found to increase in the following sequence: KCl, KCl + NaCl, NaCl, NaCl + $SrCl_2$, NaCl + $MgCl_2$, $MgCl_2$. There is 1 figure.

SUBMITTED: July 21, 1961

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BELOV, S.F.; TSYRKIN, S.P.

Recording irrevocable metal losses in enterprises of the nickel and cobalt industries. Izv. vys. ucheb. zav.; tsvet. met. 8 no.3:179-183 '65. (MIRA 18:9)

1. Leningradskiy gornyy institut, kafedra ekonomiki i organizatsii gornoy promyshlennosti.

EBLOV, S.I., podpolkovnik med. sluzhby

Simplified dressing. Voen.med.zhur. no.3:81 Mr '57. (MIRA 11:3)
(BANDAGES AND BANDAGING)

BELOV, S.I., polkovnik meditsinskoy sluzhby

Administration of first aid and extraction of wounded members of self-propelled artillery equipment. Voen.-med.zhur. no.8:16-22 Ag '59. (MIRA 12:12)

(WOUNDED AND SICK)

BELOV, S.I., polkovnik meditsinskoy sluzhby

Evacuation of wounded from the battlefield in individual facilities with antichemical protection. Voen.-med. zhur. no.3:21-23 Mr '60. (MIRA 14:1)

(TRANSPORT OF SICK AND WOUNDED)

BELOV, S.M., inzh.

Formation of the axial force on the straight-tooth transmission gear. Trakt. i sel'khozmash. 31 no.11:5-9 N '61.
(MIRA 14:12)

1. Minskiy traktornyy zavod.
(Tractors—Transmission devices)

DRONG, I.I., prof.; BELOV, S.M., inzh.

Self-releasing clutch couplings of tractor gearboxes. Trakt. i sel'khozmash. 32 no.12:9-14 D '62. (MIRA 16:3)

1. Glavnyy konstruktor Minskoto traktornogo zavoda (for Drong).
2. Belorusskiy politekhnicheskiy institut im. Stalina (for Belov).
(Tractors--Transmission devices)