DELIMARSKIY, Yu. K

Electrical conductivity in the beryllium chloride–sodium chloride system. Yu. K. Delimarskii, I. N. Sheiko and V. G. Feshchenko (Inst. Gen. and Inorg. Chem., Acad. Sci. Ukr. S.S.R., Kiev). Zhur. Fiz. Khim. 29, 1499-1507 (1955).—The elec. cond. of pure $BeCl_2$ and NaCl was detd. between 445° and 458°. The data were used to calc. the activation energy of $BeCl_2$ and the electrolytic dissocn. of fused $BeCl_2$. The elec. cond. of $BeCl_2$-NaCl with 10-78.5 mol. % $BeCl_2$ was detd. between 350 and 600°. The isotherms and the polytherms of the specific cond. in the $BeCl_2$-NaCl system were constructed from the exptl. data; also the temp. coeff.-compn. curves. Two max. and two min. were found on the elec. cond. isotherms and on the temp. coeff.-compn. curve. The log κ and 1/T are in almost linear relation in the system. The largest deviations from the linear relation is found in compns. close to the eutectic. The elec. cond. data indicate the existence of the Na_2BeCl_4 compd., and of the eutectics formed with it.

W. M. Sternberg

Chem

LFH

DELIMARSKIY, YU.K.

A glass tin-sodium standard electrode for fused salts. Yu. K. Delimarskii and A. A. Kolotii. *Zavodskaya Lab.* 22, [illegible] ([illegible]).—The Na-Sn standard electrode to be used as a null electrode in fused salts contg. Na^+ (concn. 10^{-4} mole and higher) can be made from a 0.5-cm Pyrex tube with a thick-walled bulb blown at the bottom (diam. ~1 cm.), contg. the alloy, and a 1-mm. W wire to serve as a lead sealed at the top. The thick glass protects the alloy, and its life is long. Precautions in its construction are given. The electrode is fully reversible, no solvation of Na or complex ion-formation takes place, and it can be used up to the temp. of Pyrex-glass softening or up to about 600°.

W. M. Sternberg

DELiMARSKiY, Yu. K.

B-12

Category: USSR / Physical Chemistry - Electrochemistry

Abs Jour: Referat Zhur-Khimiya, No 9, 1957, 30142

Author : Kolotiy A.A., Delimarskiy Yu. K.
Inst : not given
Title : Electrochemical Separation of Binary Lead-Copper and Lead-Silver Alloys in Fused Electrolyte

Orig Pub: Ukr. khim. zh., 1956, 22, No 4, 466

Abstract: In continuation of previously published work (RZhKhim, 1956, 42832) a study was made, for the purpose of refining Pb from Cu and Ag, of the electro lysis of fused eutectic mixture $PbCl_2$-KCl-NaCl at different current density i, As anode were utilized the binary alloys Pb-Ag (0.05 - 10 at .% Ag) and Pb-Cu (0.05 - 5 at.% Cu). Cathode and anode metals were held in refractory test tubes with lateral openings. The electrolyte was contained in a porcelain crucible. It was found that with increase of Cu and Ag content of the anode metal by 10 times the amount of admixtures in the cathode metal increases, respectively, by 10 and 4 times. On increase of i at the

Card : 1/2

DELMARSKII, YU. K.

Determination of the decomposition potentials of fluorides in sodium fluoride solution. Yu. K. Delimarskii and V. F. Grigorenko (T. G. Shevchenko State Univ., Kiev). *Ukrain. Khim. Zhur.* 22, 167-73 1956 (in Russian); cf. *C.A.* 50, 11704.—The following decompn. potentials (I) of 5 mole % soln. of various fluorides in NaF at 1000° and single-electrode potentials (II) of the metals calcd. with 0 assigned to that of Na^+ and assuming that the F^- single-electrode potential does not change are reported (metal, I, and II, given): Al, 2.25, +0.51; Mn, 2.24, +0.52; Zn, 2.10, +0.66; Cd, 1.98, +0.78; Pb, 1.74, +1.02; Co, 1.72, +1.04; Ni, 1.58, +1.18; Bi, 1.36, +1.40; Fe^{3+}, 1.00, +1.76, Cr^{3+}, 0.80, +1.96. II for heavy metal halides becomes less pos. in the order Cl, Br, I, F. The abnormal placement of the fluorides is due to the strong one-sided polarizing action of the fluoride ion. John Hart Scott

DELIMARSKIY, YU. K.

Electrolysis of the system lead chloride–lead oxide. [illegible] K. Delimarskii, B. D. [illegible], and B. F. Markov. Ukrain. Khim. Zhur. 21, 574-7 (1955)(in Russian).—In the electrolysis of the PbO-PbCl₂ eutectic, the decompn. potential (E in v.) changes with the temp. (t) in accordance with E = 0.55-0.0022(t − 500). This is a feasible process for reclaiming storage-battery compns. John H. Scott

1. Inst. obshchey i neorganicheskoy Khimii Akad. nauk USSR

DELIMARSKIY, Y. K.

4

4E3d

Polarization electromotive force on electrolysis of molten fluorides. Yu. K. Delimarskii and E. P. Grigorenko (T. G. Shevchenko State Univ., Kiev). *Ukrain. Khim. Zhur.* 22, 726-30(1956)(in Russian).—Potentials are reported for molten fluorides (substance, temp., decompn. potential (I) (cf. *C.A.* 51, 4173a), and polarization potential (II) at this temp., which is well above the m.p.; and II at a given temp. which is closer to the m.p.). Pure salts: LiF, 1000°, 3.20, 2.43; 3.36, 840°; NaF, 1000°, 2.78, 2.23; 3.05, 990°; KF, 1000°, 2.54, 2.12; —, —. MgF_2, 1400°, 2.35, 1.35; 2.20, 1200°; CaF_2, 1400°, 2.40, 0.81; 2.40, 1280°; SrF_2, 1440°, 2.43, 1.84; 2.50, 1300°; BaF_2, 1400°, 2.58, 1.27; 2.60, 1260°. Five mole % solns. in NaF: BiF_3, 1000°, 1.36, 0.079; 1.92, 930°; MnF_2, 1000°, 2.24, 2.51; 2.20, 921°; CoF_2, 1000°, 1.75, 1.61; 1.84, 930°. The following I and II, resp., at 1000° for 5 mole % solns. in NaF are reported: ZnF_2, 2.16, 1.17; CdF_2, 1.98, 1.04; AlF_3, 1.28, 1.88; PbF_2, 1.74, 0.93; CuF_2, 0.80, 1.31; FeF_3, 1.00, 1.16; NiF_2, 1.58, 1.00. II for NaF is steady as the temp. drops from 1040° to 1000°, then rises to a max. at 990° and drops again. As seen from the results, a rise in II near the m.p. is not unusual. For the alk. earths, it is interesting that the value of II close to the m.p. is so near I in value. The wide variations between I and II for the fluorides of Mg, Ca, Ba, Zn, Cd, and Pb are attributed to irreversible processes which occur when the current is interrupted.

John Howe Scott

DELIMARSKIY, Yu. K.

3/4E2c

Electrochemical separation of lead-gold alloys. E. I. [illegible]. Ukrain. Khim. Zhur. 21, 731-8(1955)(in Russian).—At 700-850°, the potential of the cell Pb,PbCl$_2$/NaCl-KCl equimol. mixt./AuCl,Au is 1.00 ± 0.02 v. A 0.1% Au-Pb alloy (labeled with Au^{198}) does not lose Au to a PbCl$_2$.KCl.NaCl eutectic (I) at 500°. When such an alloy is electrolyzed in a I bath the Au does not leave the anode compartment. John Howe Scott

Yu.K

Electrochemical separation of binary alloys of lead with tin and zinc in fused electrolytes. [illegible] and K. A. Kolotii. *Ukrain. Khim. Zhur.* [illegible] (in Russian).—Binary alloys of Pb with Sn and Zn were used as anodes in fused $PbCl_2$-NaCl-KCl eutectic. At a cathodic c. d. (I) of 2.80 amp./sq. cm. the atom % of Sn in the cathode deposit equals the mole % of $SnCl_2$ in the electrolyte. At I = 0.16 amp./sq. cm. the concns. of Sn and $SnCl_2$ approach those present at equil. On slow electrolysis the anode is depleted of Sn which is divided between the cathode and the electrolyte. Zn on slow electrolysis is almost completely removed from the electrodes by reaction with the electrolyte, no Zn impurities can be removed from Pb. On increasing I, the amt. of Zn deposited decreases owing to concn. polarization. John Howe Scott

DELIMARSKIY, YU K.

Chem

Periodic variation of the electrode potentials of metals in fused salts. Yu. K. Delimarskii (Inst. Gen. and Inorg. Chem., Acad. Sci. Ukr. S.S.R.). Zhur. Obshchei Khim. 21, 2951-72(1951).—The electrode potentials of the metals, in different fused electrolytes, were plotted against the at. no. The values of the electrode potentials were taken with Na as a standard (potential of O). The periodic nature of the variation in the electrode potential was apparent in each case. J. Rovtar Leach

DELIMARSKIY, YU. K.

Chemical problems connected with the use of nuclear energy for peaceful purposes. Yu. K. Delimarskii. *Visnik Akad. Nauk Ukr. R.S.R.* 27, No. 7, 18-21 (1956).—A discussion of the chemistry and technology of materials for nuclear reactors, the analytical detn. of microscopic amts. of chem. elements, the regeneration of nuclear fuel and the disposal of radioactive refuse, the chemistry of the transuranium elements, radiation chemistry, and the application of radioactive tracers for the solution of chem. problems.

Werner Jacobson

1

Chem

DELIMARSKIY, Y. K., MARKOV, B. F., and PANCHENKO, I. D., Institute of General
and Inorganic Chemistry, AS USSR, Kiev

"Thermodynamic Properties of Certain Chlorides in Melts," a paper submitted at the International Symposium on Macromolecular Chemistry, 9-15 Sep 1957, Prague.

DELIMARSKIY, Yuriy Konstantinovich [Delimars'kyi, IU.K.]; ZAYATS, Anastasiya Ignat'yevna [Zaiets', A.I.]; SHEKA, I.A., doktor khim.nauk., otv.red.; POKROVSKAYA, Z.S. [Pokrovs'ka, Z.S.], red.izd-va; KUZ', V.P., tekhred.

[Development of electrochemistry in the Ukraine] Rozvytok elektrokhimii na Ukraini. Kyiv, Vyd-vo Akad.nauk URSR, 1957. 46 p. (MIRA 12:5)

(Ukraine--Electrochemistry)

ДЕЛИМАРСКИЙ, Ю.К.

PALLADIN, O.V., red.; SEMENENKO, M.P., akademik, red.; SHCHERBAN'. O.N., akademik, red.; GNEDENKO. B.V. [Hniedenko, B.V.], akademik, red.; DELIMARSKIY, Yu.K. [Delimars'kyi, IU.K.], akademik, red.; KAVETSKIY, R.Ye. [Kavets'kyi, R.IE.], akademik, red.; KHRENOV, K.K. [Khrienov, K.K.], akademik, red.; KOROID, O.S., kand.ekon.nauk, red.; GUDZENKO, P.P. [Hudzenko, P.P.], kand.ist.nauk, red.; SHIKAN, V.L., red. izd-va; RAKHLINA, N.P., tekhn.red.

[Development of science in the Ukraine during the past 40 years] Rozvytok nauky v Ukrains'kii RSR za 40 rokiv. Kyiv, 1957. 529 p.
(MIRA 11:3)

1. Akademiya nauk URSR, Kiyev.(for Semenenko, Shcherban', Gnedenko, Delimarskiy, Kavetskiy, Khrenov)
(Ukraine--Science)

Decomposition potentials for metallic oxides dissolved in fused borax. Yu. K. Delimarskii and G. D. Nazarenko. *Zhur. Neorg. Khim.* 2, 580-6 (1957).—The decompn. potentials of metallic oxides (CuO, Ag_2O, MgO, ZnO, CdO, Tl_2O, SnO_2, PbO, Sb_2O_3, Bi_2O_3, MoO_3, WO_3, Mn_2O_3, Fe_2O_3, CoO, NiO) dissolved in borax were detd. and an electrochem. series was set up that at 840° has the form Na, Cr, Mo, Fe, Mn, W, Zn, Sb, Ni, Sn, Cd, Bi, Tl, Co, Pb, Cu, Ag. Comparison of the heats of formation of the pure oxides with the heats of formation of these oxides dissolved in fused borax showed that a chem. reaction takes place accompanied by the evolution of energy.

J. Rovtar Leach

2-1

4

4E4c

4E2d

MT

DELIMARSKIY, YU. K.

21-6-7/22

AUTHORS: Kalabalina, K.M., and Delimarskiy (Delimars'kyy), Yu.K., Member of the AN Ukrainian SSR

TITLE: Polarographic Investigation of Tin, Antimony and Bismuth Oxides Dissolved in Fused Borax (Polyarograficheskoye issledovaniye okislov olova, sur'my i vismuta, rastvorennykh v rasplavlennoy bure)

PERIODICAL: Dopovidi Akademii Nauk, Ukrains'koi RSR, 1957, No 6, pp 562-565 (USSR)

ABSTRACT: A direct proportionality between the intensity of the diffusion current and the molar fraction of the oxide dissolved is shown for the investigated melts. The polarographic waves obtained on solid platinum electrodes are satisfactorily described by the Geyrovskiy-Il'kovich equation. They do not obey the Kolthoff-Lingeyn equation; in particular, the dependence of the half-wave potential on the logarithm of the molar fraction is not linear. The values of the prelogarithmic coefficients in the Geyrovskiy-Il'kovich equation do not correspond to the valencies of the simple ions of tin, antimony and bismuth, which is apparently explained by the presence of more com-

Card 1/2

21-6-7/22

Polarographic Investigation of Tin, Antimony and Bismuth Oxides Dissolved in Fused Borax

plicated complex ions taking part in the electrode processes in the melts.

The article contains 3 graphs and 5 references, of which 3 are Slavic.

ASSOCIATION: Institute of General and Inorganic Chemistry of the AN Ukrainian SSR (Instytut zahal'noi ta neorhanichnoi khimii AN URSR)

SUBMITTED: 6 March 1957

AVAILABLE: Library of Congress

Card 2/2

DELIMARSKIY, Yu.K.; KALABALINA, K.M.

Polarographic investigation on the background of molten borax. Part 1: Polarography of copper and cadmium. Ukr. khim. zhur. 23 no.5:584-592 '57. (MIRA 10:11)

1. Kiyevskiy gosudarstvennyy universitet im. T.G. Shevchenko.
(Polarography) (Copper oxides) (Cadmium oxide)

DELIMARSKIY, Yu.K.

SHEYKO, I.N.; DELIMARSKIY, Yu.K.

Investigating the decomposition potentials of the system $BeCl_2$ -- NaCl with regard to the correlation of components in the fusion. Ukr.khim.zhur. 23 no.6:713-720 '57. (MIRA 11:1)

1.Institut obshchey i neorganicheskoy khimii AN USSR.
(Beryllium chloride) (Salt)

DELIMARSKIY, YU. K

DELIMARSKIY, Yu.K.; TUROV, P.P.; GITMAN, Ye.B.

Recovering the lead of worn-out storage batteries. Ukr.khim.zhur. 23 no.6:817-822 '57. (MIRA 11:1)

1. Institut obshchey i neorganicheskoy khimii AN USSR.
(Lead) (Storage batteries)

Met

Elec

13076* (Russian.) Electrode Potentials of Metals in Melted Salts. Electrodnye potentsialy metallov v rasplavlennykh solakh. Iu. K. Delimarskii. Uspekhi Khimii, v. 26, Apr. 1957, p. 494-515.

Survey of the literature. Difficulties in establishing electrode potentials without having a universally adapted neutral electrode as a comparison standard.

MT

DELIMARSKIY, Yu.K. (Kiyev)

On the 50th anniversary of D.I. Mendeleev's death. Usp.khim.
26 no.4:516 Ap '57. (MLRA 10:5)
(Mendeleev, Dmitrii Ivanovich, 1834-1907)

DELIMARSKIY, Yu.K. [Delimars'kyi, IU.K.].

Achievements in the field of chemistry in the Soviet Ukraine. Visnyk
AN URSR 28 no.12:32-37 D '57. (MIRA 11:3)
(Ukraine--Biological research)

8011

RECOVERY POTENTIALS FOR MOLTEN SYSTEMS OF LiCl–KCl AND LiCl–BaCl$_2$. A. A. Kolotii and Yu. K. Delimarskii. Zhur. Priklad. Khim. 30, 106-11(1957) Mar. (In Russian)

Recovery potentials from eutectic and equimolar compositions of LiCl–KCl and LiCl–BaCl$_2$ at various temperatures were studied. It was found that eutectic compounds are more amenable to electrolytic recoveries of Li. The difference of LiCl–BaCl$_2$ recovery potentials at temperature intervals of 550 to 700° was about 0.31 to 0.37 v, while the difference for LiCl and KCl in the same temperature interval was only 0.11 to 0.37 v. The disadvantage of the LiCl–BaCl$_2$ system is its high melting point. Experiments showed that metallic Li recoveries from chlorides should be carried out at the lowest possible temperatures. (L.V.J.)

DELIMARSKIY, Yu. K.

76-11-34/35

AUTHORS: Markov, B.F., Delimarskiy, Yu.K.

TITLE: The Thermodynamic Properties of $BeCl_2$ in the $BeCl_2$-NaCl Molten System (Termodinamicheskiye svoystva $BeCl_2$ v rasplavlennoy sisteme $BeCl_2$-NaCl)

PERIODICAL: Zhurnal Fizicheskoy Khimii, 1957, Vol. 31, Nr 11, pp. 2589-2590 (USSR)

ABSTRACT: One of the methods of investigating salt solutions in a molten state consists in measuring the electromotoric force (EMF) of galvanic elements with mixed electrolytes. This method was employed in this case. The EMF of the chemical chains $Be\,|BeCl_2 x_1 + NaCl(1-x_1)|\,Cl_2$ were measured in dependence on the mol part of the $BeCl_2$. The EMF of the chemical chain with the individual $BeCl_2$ was found by means of the experimental amounts and was determined as being equal to 1.986 V at 500°. The partial thermodynamic properties of $BeCl_2$ are computed. The energy on the occasion of the formation $BeCl_2 \cdot 2NaCl$ in the melt at 500° amounted to 7.5 kcal. There are 1 figure, 2 tables, and 4 references, 3 of which are Slavic.

Card 1/2

76-11-34/35

The Thermodynamic Properties of $BeCl_2$ in the $BeCl_2$-NaCl Molten System

ASSOCIATION: AN Ukrainian SSR, Institute for General and Inorganic Chemistry
(Akademiya nauk USSR. Institut obshchey i neorganicheskoy khimii)

SUBMITTED: December 10, 1956

AVAILABLE: Library of Congress

Card 2/2

20-114-6-34/54

AUTHORS: Gorodyskiy, A. V. and Delimarskiy, Yu. K., Member of the AN Ukrainian SSR

TITLE: The Equation of an Unsteady Diffusion Toward a Stationary Electrode (Uravneniye nestatsionarnoy diffuzii k nepodvizhnomu elektrodu)

PERIODICAL: Doklady AN SSSR, 1957, Vol. 114, Nr 6, pp. 1261-1264 (USSR)

ABSTRACT: It is considered an established fact that the diffusion of a reacting substance in the direction to a stationary electrode is determined by 2 conditions: 1) the concentration of this substance c_0 until switching in the current is the same in the entire mass of the electrolyte; 2) the ionic concentration at the surface of the electrode at a certain moment t after switching in the current is equal to zero (references 1-5). In other words, the following conditions apply to the linear diffusion: $c(x,0) = c_0$ (1) and $c(t,0 = = 0$; (2), whereas $c(r,0) = c_0$ (3) and $c(r_0,t) = 0$ (4) apply to the spherical diffusion: (x and r are coordinates, r_0 - the radius of a sparking ball). Based on this, general equations (5) for both kinds of diffusion are solved [(6),(7)]. As the conditions (1) - (4) do not take into account the convection of the electrolyte, equations (6)

Card 1/4

The Equation of an Unsteady Diffusion Toward a Stationary Electrode 20-114-6-34/54

and (7) are only correct for stationary (gelatinized) solutions (reference 2). Under ordinary conditions of electrolysis the amperage after closing the circuit drops to an attained value (references 2,3,6,7) and further remains constant in contrast to equations (6) and (7). From this follows that the diffusion process of the reacting substance in the course of time attains a certain stationary state to which a constant concentration-gradient of the diffusing substance at the surface of the electrode corresponds. On this occasion a constant thickness of the diffusion layers is apparently attained at the outer boundary of which a practically constant concentration c_0 is maintained (in accordance with references 8,9). From this follows an additional boundary condition of the diffusion of the reacting substance in the direction to the stationary electrode: in some distance ℓ or $p - r_0$ from the electrode the concentration of this substance is maintained constant and equal to c_0. Thus $c(1,t) = c_0$ (8) applies to the linear diffusion and $c(p,t) = c_0$ (9) to the spherical. According to conditions (1),(2),(8) and (3),(4),(9) the solution of equation $\frac{\partial c}{\partial t} = a\Delta c$ (5) by means of the integral

Card 2/4

by Laplace for the linear diffusion yields:

$$\left(\frac{\partial c}{\partial x}\right)_{x=0} = \frac{c_0}{\ell}\left[1 + 2\sum_{k=1}^{\infty} \exp\left(-\pi^2 k^2 \frac{at}{\ell^2}\right)\right] \quad (10)$$

and for the spherical diffusion:

$$\left(\frac{\partial c}{\partial r}\right)_{r=r_0} = \frac{c_0}{r_0} + \frac{c_0}{\rho - r_0}\left[1 + 2\sum_{k=1}^{\infty} \exp\left(-\pi^2 k^2 \frac{at}{(\rho - r_0)^2}\right)\right] \quad (11)$$

The derived rules were checked by the authors on the current-time curves in the case of mercury-separation at a stationary spherical mercury cathode as well as in the case of silver-separation at a stationary flat silver cathode, furthermore by means of the data of other authors (references 2,3,7). The electrolyte was not stirred. The curves $i = f(t)$ obtained by the authors and other researchers, where i is density of the diffusion current, were investigated in coordinates t, $\lg(i - i_\infty)$, where i_∞ is the density of the current that became constant, i.e. at $t = \infty$. Figure 1 gives examples of such curves. In all cases a linear dependence of t on $\lg(i - i_\infty)$ was observed. This

DELIMARSKIY, Yu. K.

20-3-23/46

AUTHORS: Delimarskiy, Yu. K., Member of the AN Ukrainian SSR, Kalabalina, K. M.

TITLE: Polarographic Investigations With Molten Boron Used as a Background (Polyarograficheskoye issledovaniye na fone rasplavlennoy bury) Copper and Cadmium Polarography (Polyarografiya medi i kadmiya)

PERIODICAL: Doklady AN SSSR, 1957, Vol. 116, Nr 3, pp. 433 - 435 (USSR)

ABSTRACT: The present report brings the results of the polarographic investigation of the oxides of copper and cadmium dissolved in molten boron. For these investigations served a polarograph with automatic recording and a mirror galvanometer. As electrolyser served a crucible out of "farfor". As cathode served a platinum wire with a diameter of 0,25 mm and as anode a plate with a surface of 2,5 cm^2. The experiments were carried out at 820°. A diagram illustrates the polarogram of the CuO and CdO and in addition the polarogram of the background. The authors identified with both oxides a direct proportionality between the power of the diffusion flow and the molar concentration of the dissolved oxide. There it is pointed to the results of other preliminary works dealing with the subject. According to these results the potential of

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20-3-23/46

Polarographic Investigations With Molten Boron Used as a Background -
Copper and Cadmium Polarography

the half wave depends necessarily on the concentration . The potentials of the half wave were also computed from the experimental results of the authors and were compared with the corresponding concentrations. At a given equal sensitivness the values of $i_d = kN$ remain sufficiently constant. (i_d - power of the diffusion flow, N - molar concentration of the dissolved oxide.). This verifies the accuracy of the equation $i_d = kN$ and holds good for the exact computability of the concentration of the oxides in solutions by means of diffusion flows. For the smeltings which contain CdO the temperature dependence of the diffusion flows in the temperature interval 760 - 875 ° has been computed and the results of these experiments are set up on a table. In this case the equations $\ln i_d = A - (B/T)$ and $i_d = ke^{-U/RT}$ with $A = \ln k$ and $B = U/R$ are valid. The activation energy amounts to 31,27 kcal/mol. There are 3 figures, 2 tables, and 8 references, 6 of which are Slavic.

SUBMITTED: March 5, 1957

AVAILABLE: Library of Congress

Card 2/2

Yu. K. DELIMARSKIY, I. D. PANCHENKO, Ye. B. GITMAN and A. A. KOLOTIY

"Electrolytic Production of Lead by Electrolytes of Fused Salts"

IONKh Ac. Sc. Ukr SSR.

report submitted at a conference on new methods of lead production from concentrates, Gintsvetmet (State Inst. Non-Ferrous Metallurgy), Moscow 22-25 June 1958.

(for entire conf. see card for LIDOV, V. P.)

MARKOV, E. B. G., DELIMARSKIY, YU. K., and PANCHENKO, I. D.

(Institute of General andz Inorganic Chemistry, Acad. Sci. Ukr., SSR, Kiev, USSR)

"Thermodynamic Properties of Some Fused Chlorides," paper submitted at Soviet High-Polymers, Intl. Conference, Nottingham, 21-24 July 1958.

E-3,109,661

21-58-7-14/27

AUTHORS: Delimarskiy, Yu.K., Member of the AS UkrSSR, and Andreyeva, V.N.

TITLE: Galvanic Concentration Cells in Fused Phosphates (Gal'vanicheskiye kontsentratsionnyye elementy v rasplavlennykh fosfatakh)

PERIODICAL: Dopovidi Akademii nauk Ukrains'koi RSR, 1958, Nr 7, pp 743-746 (USSR)

ABSTRACT: The authors investigated concentration cells composed of a solution of Sb_2O_3 in the fused sodium metaphosphate. One of the semi-elements was pure antimony oxide and the other was the fused sodium metaphosphate in which the Sb_2O_3-concentration was variable. The electromotive forces of these cells were measured, the activity and activity coefficients of Sb_2O_3 were calculated, and their dependence on the concentration was established. The results are presented in a table and in graphs. In one of the graphs, Fig. 1, electromotive force E is plotted versus $\lg \frac{1}{N}$ where N means concentration, and in the other two concentrations, N is plotted versus activity and activity coefficient re- tively. On the basis of the E, $\lg \frac{1}{N}$ - curve the authors

21-58-7-14/27

Galvanic Concentration Cells in Fused Phosphates

come to the conclusion that compounds of the antimony oxy-polyphosphate type are formed in the investigated system, thereby confirming an inference drawn by Bues and Gehrke (Ref. 12) on the basis of optical studies with respect to sodium polyphasphate. There is 1 table, 3 graphs, and 12 references, 4 of which are Soviet, 4 German, 1 French and 3 American.

ASSOCIATION: Institut obshchey i neorganicheskoy khimii AN UkrSSR (Institute of General and Inorganic Chemistry of the AS UkrSSR)

SUBMITTED: February 4, 1958

NOTE: Russian title and Russian names of individuals and institutions appearing in this article have been used in the transliteration.

1. Phosphates--Electrical properties 2. Antimony oxides--Electrochemistry 3. Electrolytic cells--Theory

Card 2/2

DELIMARSKIY, Yu. K.

78-3-5-3/39

AUTHORS: Delimarskiy, Yu. K., Velikanov, A. A.

TITLE: I. The Electric Conductivity of the Molten Sulfides of Tin, Antimony, Bismuth, and Nickel (I. Elektroprovodnost' rasplavlennykh sul'fidov olova, sur'my, vismuta i nikelya)

PERIODICAL: Zhurnal Neorganicheskoy Khimii, 1958, Vol 3, Nr 5, pp 1075-1078 (USSR)

ABSTRACT: In the present paper, the specific conductivity of the melts of SnS, SbS_3, Bi_2S_3, and NiS is investigated. The sulfides are produced by precipitation from an aqueous solution of the purest chlorides of these metals by H_2S. The results show that the molten sulfides exhibit a high electric conductivity, similar to the electric conductivity of some metals. The electric conductivity of Bi_2S_3 and NiS is much higher than that of the other melts. Positive temperature coefficients have been found for the electric conductivity of Sb_2S_3 and SnS, and negative temperature coefficients for the electric conductivity of Bi_2S_3 and NiS. The dependence of the specific conductivity on temperature in the molten sulfides is given by Frankel's equation

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I. The Electric Conductivity of the Molten Sulfides of Tin, 78-3-5-3/39
Antimony, Bismuth, and Nickel

$x = A.e^{-U/kT}$. It is supposed here, that in the melts of SnS and Sb_2S_3 electric conductivity is predominant, while in Bi_2S_3 and NiS prevails electronic conductivity. The character of the electric conductivity of the examined molten sulfides changes in the same way as the chemical properties of the corresponding oxides. The electric conductivity increases in the following succession: Sb_2S_3-SnS-Bi_2S_3-NiS. In the same succession the value of the corresponding temperature coefficients decreases. There are 2 figures, 3 tables, and 10 references. 3 of which are Soviet.

SUBMITTED: May 16, 1957

AVAILABLE: Library of Congress

1. Liquid metal sulfides--Conductivity--Test results

Card 2/2

SOV/78-3-12-23/36

AUTHORS: Delimarskiy, Yu. K., Kaptsova, T. N.

TITLE: Polarographic Investigation of a Solution of Titanium Dioxide in Molten Sodium Metaphosphate (Polyarograficheskoye issledovaniye rastvora dvuokisi titana v rasplavlennom metafosfate natriya)

PERIODICAL: Zhurnal neorganicheskoy khimii, 1958, Vol 3, Nr 12, pp 2751-2756 (USSR)

ABSTRACT:

In the present paper a solution of titanium dioxide in molten sodium metaphosphate was investigated polarographically using solid stationary electrodes. The linear dependence between N and i_d was expressed by means of the following equation: $i_d = kN$ (1). In the polarogram two waves appear, which indicate the step-wise reduction of the titanium (IV) ion. The reduction apparently occurs in the following steps:

$$Ti^{4+} + e \rightarrow Ti^{3+},$$

$$Ti^{3+} + 3e \rightarrow Ti.$$

The polarographic waves plotted for the system under investigation correspond to the equation of Geyrovskiy-Il'kovich. The half-wave potential $E_{1/2}$ is independent of the concentration.

SOV/78-3-12-23/36

Polarographic Investigation of a Solution of Titanium Dioxide in Molten Sodium Metaphosphate

A linear dependence exists between E and $\lg \frac{i}{i_d - i}$. The energy of activation of the diffusion current for the first and second wave were determined. The activation energy of the first wave **varies** from 8.6 to 19.2 kcal/mol and the second from 20.5 to 21.4 kcal/mol. There are 5 figures, 3 tables, and 19 references, 10 of which are Soviet.

SUBMITTED: September 30, 1957

Card 2/2

DELIMARSKIY, Yu,K.; KOLOTIY, A.A.

Quartz reference electrode for fused salts. Ukr. khim. zhur. 24 no. 2:146-151 '58. (MIRA 11:6)

1. Institut obshchey i neorganicheskoy khimii AN USSR.
(Electrodes)
(Quartz)
(Salts)

KALABALINA, K.M.; DELIMARSKIY, Yu.K.

Polarography using a fused borax background. Part 2: Polarography of tin, antimony and bismuth. Ukr. khim. zhur. 24 no. 2:152-157 '58. (MIRA 11:6)

1. Institut obshchey i neorganicheskoy khimii AN USSR.
(Tin oxides)
(Antimony oxides)
(Bismuth oxides)

DELIMARSKII, Yu.K.; KALABALINA, K.M.

Polarographic investigation on a fused borax background. Report No.3: Polarography of iron, cobalt and nickel. Ukr. khim. zhur. 24 no.4:435-439 '58. (MIRA 11:10)
(Polarography) (Metals) (Borax)

79-28-4-58/60

AUTHOR: Delimarskiy, Yu. K.

TITLE: On Reasons for the Displacement of Metals in the Electrochemical Series in Melted Electrolytes (O prichinakh peremeshcheniya metallov v ryadu napryazheniy v rasplavlennykh elektrolitakh)

PERIODICAL: Zhurnal Obshchey Khimii, 1958, Vol. 28, Nr 4, pp. 1112-1117 (USSR)

ABSTRACT: In recent time the question for the reasons of the displacement of metals in the electrochemical series was treated by Ye. Ya. Gorenbeyn (Refs 1, 2). In the present paper is explained to which extent the opinion of this author can be regarded as founded from the scientific point of view and which connection they have to the displacement of metals in the electrochemical series. Gorenbeyn reduces many properties of solutions and melts to the formation of "structural groups" which are said to determine the electric conductivity and the osmotic pressure of solutions, but also the equilibrium at the metal - solution limit. These "structural groups" have according to Gorenbeyn following properties:

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79-28-4-58/60

On Reasons for the Displacement of Metals in the Electrochemical Series in Molted Electrolytes

1) They have a special internal electric conductivity which is greater than the conductivity which is caused by the same ions if they do not form "structural groups".
2) In the cryoscopic investigation the "structural groups" behave like single kinetic particles.
3) Ions which entered into "structural groups" do not influence the potential.
4) The forces which cause the formation of the "structural forces" are of the same kind as the forces which cause the formation of an ionic crystal lattice.

As is known, the conception of a quasi-crystalline structure of liquids comes from Steward (Refs 6, 7), who proved by radiographic investigations that liquids often conserve the crystalline structure of the solid substance in the vicinity of their melting point. This quasi-crystalline order of liquids was confirmed also by other authors (Res 8, 9). According to modern conceptions this order in liquids is explained by the existence of regions in which the molecules occur in a state similar to that in the crystal, however, not identical with it (Refs 10-12). At

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79-28-4-58/60

On Reasons for the Displacement of Metals in the Electrochemical Series in Melted Electrolytes

present was shown that this quasi-crystalline structure can also occur in solutions (Refs 10, 13 - 18). The principles of this theory are the following:
1) In solutions an approximated arrangement and quasi-crystalline distribution of the molecules can occur.
2) Concentration currents can occur in solutions in contrast to pure liquids (Ref 14).
3) The number of the neighbors of a molecule is determined by the coordination number which characterizes the structure of the solution.
4) Interactions between molecules of which the solution consists are characterized by their general moments and by the distance between them. (Ref 10).

On the strenght of this theory which is based upon a great number of experimental results the conceptions of Ye. Ya. Gorenbeyn are refuted point by point in the present paper. Gorenbeyn's attempt to explain the reasons for the displacement of metals in the electrochemical series with the aid of "structural groups" is inadequate and leads to

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79-28-4-58/60

On Reasons for the Displacement of Metals in the Electrochemical Series in Melted Electrolytes

contradictions with a great number of experimental results. There are 1 table and 30 references, 22 of which are Soviet.

ASSOCIATION: Institut obshchey i neorganicheskoy khimii Akademii nauk Ukrainskoy SSR
(Institute for General and Inorganic Chemistry, AS Ukrainian SSR)

SUBMITTED: March 5, 1957

Card 4/4

DELIMARSKIY, Yu. K.

"Physical chemistry of melted salts" A.I. Beliaev, E.A. Zhemchuzhina, L.A. Firsanova. Reviewed by IU. K. Delimarskii. TSvet. met. 31 no.9:79-80 S '58. (MIRA 11:9)
(Chemistry, Physical and theoretical) (Salts)

AUTHORS: Delimarskiy, Yu. K., Gorodyskiy, A.V. SOV/76-32-6-24/46

TITLE: The Equation for the Polarographic Curves of the Electrodeposition of Metals on Solid Electrodes (Uravneniye polyarograficheskikh krivykh elektroosazhdeniya metallov na tverdykh elektrodakh)

PERIODICAL: Zhurnal fizicheskoy khimii, 1958, Vol. 32, Nr 6, pp. 1348-1353 (USSR)

ABSTRACT: Heyrovsky and Ilkovich (Ref 2) advocated an equation for the description of polarographic curves of dropping mercury electrodes, while Ye. M. Skobets (Ref 3) showed that it can also be used in the case of solid amalgamated electrodes. Yu. K. Delimarskiy and I.D.Panchenko (Ref 4) proved that it may also be used for solid electrodes at high temperatures. Since at usual temperatures no particular diffusion is to be assumed within the solid not amalgamated electrodes the equation by Kol'tgof and Lingeyn (Ref 5) took into account only the concentration polarization, while Le Blanc (Ref 6) found also in this case the existence of an electrochemical polarization. Proceeding from the theory of A. N. Frumkin

Card 1/3

The Equation for the Polarographic Curves of the Electrodeposition of Metals on Solid Electrodes SOV/76-32-6-24/46

and his school (Ref 7) an equation is elaborated which takes into account both kinds of polarization, and which is analogous to that by Frumkin concerning the polarograms of hydrogen cleavage. The correctness of the equation is proved by experiments of the electric deposition of copper, cadmium, zinc and nickel on platinum electrodes; the small deviations noticed at lower voltages are explained by the influence of the reversible ionization process. Besides, data obtained by Ye. M. Skobets and S. A. Kacherova (Ref 9), Ye. M. Skobets, P. P. Turov and V. D. Ryabokon' (Ref 10), I. D. Panchenko (Ref 11), I.L. Abarbatchuk and L. I. Koval'skiy (Ref 12) and S. K. Chirkov (Ref 13) are investigated and thus the correctness of the equation is proved. There are 10 figures and 13 references, 11 of which are Soviet.

ASSOCIATION: Institut obshchey i neorganicheskoy khimii, Kiyev (Kiyev, Institute of General and Inorganic Chemistry)

SUBMITTED: February 16, 1957

Card 2/3

5(2) SOV/21-59-1-15/26

AUTHORS: ~~Delimarskiy, Yu. K.~~, Member of the AS UkrSSR, and Kuz'movich, V.V.

TITLE : A Polarographic Investigation of Chlorides of Heavy Metals Dissolved in a Molten NaCl-KCl Mixture (Polyarograficheskoye issledovaniye khloridov tyazhëlykh metallov, rastvorennykh v rasplavlennoy smesi NaCl-KCl)

PERIODICAL: Dopovidi Akademii nauk Ukrains'koi RSR, 1959, Nr 1, pp 55-59 (USSR)

ABSTRACT: The subject polarographic investigation was conducted on molten solutions of CuCl, $CuCl_2$, AgCl, $ZnCl_2$, $CdCl_2$, TlCl, $PbCl_2$, $CoCl_2$ and $NiCl_2$ in a NaCl-KCl mixture. A direct proportionality between the diffusion current intensity and the molar fraction of the dissolved chloride was shown. The polarographic waves obtained on solid Pt-electrodes were found to be satisfactorily determined by the Heyrovsky-Ilkovic

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SOV/21-59-1-15/26

A Polarographic Investigation of Chlorides of Heavy Metals Dissolved in a Molten NaCl-KCL Mixture.

equation, and not by the Kolthoff-Lingane equation of concentration polarization. In particular, the dependence of the half-wave potential on the logarithm of the molar fraction was not expressed by a straight line. The half-wave potential values were found to remain nearly constant, and the prelogarithmic coefficient values of the Heyrovsky-Ilkovic equation did not always correspond to the valency of simple ions of the respective salts. The determined dependence of the diffusion currents on the temperature made possible the calculation of the corresponding activation energies, and these energies demonstrated that the increase of diffusion currents with the temperature, is not caused by the decrease of viscosity alone. There are 3 graphs, 2 tables and 3 references, 2 of which are Soviet and 1 English.

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SOV/21-59-1-15/26

A Polarographic Investigation of Chlorides of Heavy Metals Dissolved in a Molten NaCl-KCL Mixture.

ASSOCIATION: Institut obshchey i neorganicheskoy khimii AN UkrSSR (Institute of General and Inorganic Chemistry of AS UkrSSR)

PRESENTED: October 27, 1958.

Card 3/3

SOV/21-59-6-14/27

AUTHORS: Delimarskiy, Yu. K., Academician of the AS UkrSSR, and Andreyeva, V. N.

TITLE: Potentiometric Determination of the Solubility of Metal Oxides in Fused Sodium Metaphosphate

PERIODICAL: Dopovidi Akademii Nauk Ukrains'koi RSR, 1959, Nr 6, pp 633 - 635 (USSR)

ABSTRACT: Having rejected the determination of the solubility of metal oxides in fused salts by the method of isothermic saturation as ill-fitted to deal with colorated fused solvents, the author studied this matter applying the potentiometric method described by H. Lux [Ref. 4]. At the same time, the author had an objective to disprove the Lux's statement, that CaO can be dissolved in a fused eutectic $Na_2SO_4 - K_2SO_4$ only when the electrolytic dissociation is complete. The author constructed a galvanic cell of Pt (O_2) / $NaPO_3$-PbC|| $NaPO_3$/ (O_2) Pt type, and applied the indicator platinum-oxygen

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SOV/21-59-6-14/27

Potentiometric Determination of the Solubility of Metal Oxides in Fused Sodium Metaphosphate

electrode consisting of 0.5 mm platinum wire encased in a porcelain cover. In the galvanic cell, the author used two crucibles of different dimensions, made of porcellain. The larger crucible contained $NaPO_3$, the smaller (put into the larger one) —$NaPO_3$-PbO, with different concentrations of PbO.

Electromotive force was measured by a PPTV potentiometer. The element was heated in an electric furnace, at an even temperature of 720°C. Results of examinations are compiled in tables 1 and 2. It has been found that the electromotive force grew with the growth of oxide concentration. This confirmed the correctness of the author's assumption, and proved the reversibility of platinum electrode with respect to oxygen iones. The saturated solution obtained by this method contained 31.6% PbO, which agreed satisfactorily with the value of 31.0% obtained by the method of isothermal saturation. The proposed method can also be applied to other oxides.

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SOV/21-59-6-14/27

Potentiometric Determination of the Solubility of Metal Oxides in Fused Sodium Metaphosphate

There are 2 tables, 1 graph and 9 references, 4 of which are Soviet, 2 German and 3 English

ASSOCIATION: Institut obshchey i neorganicheskoy khimii AN UkrSSR (Institute of General and Inorganic Chemistry of the AS UkrSSR)

SUBMITTED: Januar 14, 1959

Card 3/3

SOV/21-59-7-15/25

5(2)

AUTHOR: Delimars'kyy, Yu.K., Member of the AS UkrSSR and Andryeyeva, V.M. (Delimarskiy, Yu. K. and Andreyeva, V. N.)

TITLE: Chemical Galvanic Cells in Fused Phosphate Systems

PERIODICAL: Dopovidi Akademii Nauk Ukrains'koi RSR, 1959, Nr 7, pp 760-765 (UkrSSR)

ABSTRACT: The authors investigated and demonstrated the reproducibility and reversibility of a platinum-oxygen electrode in fused sodium metaphosphate. The presence of such an electrode permits measuring the e.m.f. of chemical cells for metal oxide solutions in fused metaphosphate. The chemical cell e.m.f.'s were measured with a mixed electrolyte, PbO - $NaPO_3$, in dependence on the temperature and composition. On the basis of these values, the partial excessive thermodynamic functions (isobaric potential, entropy, enthalpy) were calculated for various concentrations of PbO. The thermodynamic properties of lead oxide dissolved in sodium metaphosphate indicate that there

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SOV/21-59-7-15/25

Chemical Galvanic Cells in Fused Phosphate Systems

is a strong chemical interaction among the melt components. Evidence of this is found in the magnitudes of the partial entropy values, as well as in the considerable negative deviations of the isobaric potential. There are 3 tables, 3 diagrams and 6 references, 2 of which are Soviet and 4 American

ASSOCIATION: Instytut zahal'noyi ta neorhanichnoyi khimiyi AN URSR (Institute of General and Inorganic Chemistry AS UkrSSR)

SUBMITTED: February 16, 1959

Card 2/2

DELIMARSKIY, Yu.K.; ANDREYEVA, V.N.

Galvanic concentration of elements in fused phosphates. Part 1: Antimony oxide in sodium metaphosphate. Ukr.khim.zhur. 25 no.1: 8-13 '59. (MIRA 12:4)

1. Kiyevskiy politekhnicheskiy institut.
(Antimony oxides) (Sodium phosphates)
(Electrochemistry)

5(2)

SOV/80-32-3-19/43

AUTHORS: Gitman, Ye.B., Delimarskiy, Yu.K.

TITLE: Electrolytic Separation of Binary Alloys of Lead With Silver and Arsenic (Elektroliticheskoye razdeleniye binarnykh splavov svintsa s serebrom i mysh'yakom)

PERIODICAL: Zhurnal prikladnoy khimii, 1959, Vol XXXII, Nr 3, pp 578-582 (USSR)

ABSTRACT: The treatment of crude lead by pyrometallurgical methods does not separate silver and arsenic which are contained in it. In electrolysis silver remains in the anode alloy. At a content of 0.25% silver in the initial alloy the cathode metal contains only some thousandth parts of a percent. The electrolyzer should be designed to reduce stirring of the electrolyte in order to obtain the best separation results. At a silver content of 0.25 - 2.5% in the initial metal only 0.00016% of silver is found in the cathode metal. The elimination of arsenic was studied in an alloy containing 2% of arsenic. The radioactive As-76 was used as a tracer. The arsenic remains almost completely in the anode alloy. At a content of 1.3% arsenic in the initial anode alloy, a current density of 0.2 a/cm^2 and a

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SOV/80-32-3-19/43

Electrolytic Separation of Binary Alloys of Lead With Silver and Arsenic

50%-extraction of lead, arsenic cannot be detected in the cathode metal. Only at a 96%-extraction of lead some hundredth parts of a percent of arsenic are present in the cathode metal. There are 3 tables and 5 references, 4 of which are Soviet and 1 German.

SUBMITTED: May 27, 1957

Card 2/2

5(4)

SOV/76-33-1-22/45

AUTHORS: Delimarskiy, Yu. K., Gorodyskiy, A. V.

TITLE: On the Question of Decomposition Potentials of Electrolytes (K voprosu o napryazhenii razlozheniya elektrolitov)

PERIODICAL: Zhurnal fizicheskoy khimii, 1959, Vol 33, Nr 1, pp 137 - 140 (USSR)

ABSTRACT: Investigations of the question mentioned in the title were first carried out by Helmholtz (Gel'mgol'ts)(Ref 1) and commented by Le Blanc (Leblan)(Refs 2,3). Le Blanc's assumption, however, that under a decomposition potential of a given electrolyte no electrolysis can take place, contradicts modern ideas on the nature of electrode processes (e.g. excess-potential). Since the decomposition point assumed by Le Blanc is not related to any certain potential any point of the diagram current-potential may be used. Thus there is no basic difference between ordinary and residual current. The fundamental mistake in Le Blanc's ideas is the assumption that ions of a certain type are completely equal with respect to energy. The Boltzmann

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On the Question of Decomposition Potentials of Electrolytes SOV/76-33-1-22/45

(Bol'tsman) statistics, however, can be applied to the ions (and gas molecules). The electrolyte cell Pt/KCl/Pt is considered from this point of view and the statements are confirmed in contradiction to Le Blanc's assumptions, that no definite value exists up to which the electrolysis cannot be carried out. There are 2 figures and 12 references, 9 of which are Soviet.

ASSOCIATION: Akademiya nauk USSR, Institut obshchey i neorganicheskoy khimii, Kiyev (Academy of Sciences, UkrSSR; Institute of General and Inorganic Chemistry, Kiyev)

SUBMITTED: July 1, 1957

Card 2/2

PHASE I BOOK EXPLOITATION SOV/4888

Delimarskiy, Yuriy Konstantinovich, and Aleksandr Vladimirovich Gorodyskiy

Elektrodnyye protsessy i metody issledovaniya v polyarografii (Electrode Processes and Methods of Analysis in Polarography) Kiyev, Izd-vo AN Ukr. SSR, 1960. 293 p. 3,000 copies printed.

Sponsoring Agency: Akademiya nauk Ukrainskoy SSR. Institut obshchey i neorganicheskoy khimii.

Resp. Ed.: E. M. Natanson, Doctor of Chemical Sciences; Ed. of Publishing House: V. N. Zaviryukhina; Tech. Ed.: I. D. Milekhin.

PURPOSE: This book is intended for students, aspirants and teachers in the chemical divisions of schools of higher education, and for scientists and skilled workers at plant laboratories.

COVERAGE: The authors review the present state of polaro- and discuss techniques for the polarography of

PHASE I BOOK EXPLOITATION SOV/5047

Delimarskiy, Yuriy Konstantinovich, and Boris Fedorovich Markov

Elektrokhimiya rasplavlennykh soley (Electrochemistry of Fused Salts) Moscow, Metallurgizdat, 1960. 325 p. Errata slip inserted. 3,700 copies printed

Ed.: A.I. Belyayev; Ed. of Publishing House: L.M. El'kind; Tech. Ed.: V.V. Mikhaylova.

PURPOSE: This book is intended for aspirants, scientists, and technical personnel in the field of electrochemistry, and for students in schools of higher education.

COVERAGE: The book discusses the following fundamentals of the electrochemistry of fused salts: conductance and ion migration, galvanic cells, decomposition and electrode potentials, the solubility of metals and metal - fused salt equilibrium, electrolysis and polarization, electrode reactions, and the polarography of fused salts. Recent experimental and theoretical investigations of the electrochemistry of fused salts are reviewed. The modern concepts of the liquid state as an ordered system and of the close structural correspondence of the liquid to the solid

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SOV/5047

Electrochemistry of Fused Salts

phase are extensively used. The introduction and Chs. III, IV, V, and VIII were written by Yu.K. Delinarskiy and Chs. I, II, VI, and VII by B.F. Markov. The authors thank V.P. Mashovets, Professor, Doctor, and A.I. Belyayev, Professor, Doctor, for their advice. References accompany each chapter.

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A153/A029

26.1610

AUTHORS: Delimarskiy, Yu.K., Corresponding Member AS UkrSSR; Chernov, R.V.

TITLE: Specific Conductivity of Molten Titanium Trichloride - Alkali Chloride Metals

PERIODICAL: Dopovidi Akademiyi nauk Ukrayins'koyi RSR, 1960, Nr. 6, pp. 795 - 797

TEXT: The authors report the results of the study specified in the title, conducted on molten systems containing three-valent compounds of titanium, viz., $NaCl-TiCl_3$ and $KCl-TiCl_3$. Titanium trichloride was of 98% purity. The method of the preparation of the alloys is described by B.F. Markov and R.V. Chernov (Ref. 2). The specific conductivity of the above systems was measured by the polythermal method within the range of temperatures from 770 - 820°C. The electric conductivity was measured in an atmosphere of dry argon with the help of an ordinary bridge circuit [frequency 1,400 c/s, clear minimum, 6E5 (6Ye5) tube used for zero]. Figure 1 shows the isotherms obtained at 800°C by the authors compared with those obtained by Bil'ts and Klemm. The $NaCl-TiCl_3$ system was studied up to 45.4% molar, the $KCl-TiCl_3$ system to 57.4% molar. The specified electric

Card 1/2

DELIMARSKIY, Yu.K.; ANDREYEVA, V.N.

Potentiometric determination of the solubility of metal oxides in fused sodium metaphosphate. Zhur.neorg.khim. 5 no.5:1123-1125 My '60. (MIRA 13:7)
(Metallic oxides) (Sodium metaphosphate)

(6)

DeLimARSKiy, Yu.K.

S/078/60/005/05/36/037
B004/B016

AUTHORS: Tananayev, I. V., Lushnaya, N. P.

TITLE: The XVII Congress on Pure and Applied Chemistry

PERIODICAL: Zhurnal neorganicheskoy khimii, 1960, Vol. 5, Nr. 5, pp. 1178 - 1185

TEXT: The XVII Congress of the IUPAC (International Union of Pure and Applied
Chemistry) took place in Munich from July 30 to September 6, 1959. It was pre-
ceded by the XX Conference of the IUPAC (August 26-27, 1959) which was attended
by a Soviet delegation consisting of B. A. Kazanskiy (re-elected as representative
of the USSR at the Bureau of the IUPAC), M. M. Shemyakin (elected as a member of
the Section of Organic Chemistry), A. P. Vinogradov (elected as Deputy Chairman
of the Section of Geochemistry), I. V. Tananayev (elected as a member of the
Section of Inorganic Chemistry), Ya. I. Gerasimov, O. A. Reutov, and
O. I. Rakhmaninov. Further, I. P. Alimarin was appointed Second Secretary of the
Section of Analytical Chemistry. About 2200 delegates attended the Congress. In
a plenary session O. A. Reutov delivered a lecture: "The Mechanism of the Form-
ation of Metal-Carbon Bond and Some Considerations on the Reactivity of Organo-
metallic Compounds of Heavy Metals". Concerning the work of the sections the

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following is reported: Section I (Organometallic Compounds): 66 lectures. A re-
port on the work of this section will be given later on. Section II (Chemistry of
Hydrides): 36 lectures. Section III (Chemistry of Actinides and Lanthanides):
51 lectures, among them D. I. Ryabchikov: "Complex Formation of Rare Earths",
and I. V. Tananayev: "On the Composition of Ferrous Cyanides of the Rare Earths
Scandium and Yttrium". Section IV (Fluorine Chemistry): 21 lectures. Section V
(Preparation of Pure Metals): 16 lectures. Section VI (Non-aqueous Solvents):
16 lectures. Section VII (Homogeneous and Heterogeneous Gas Equilibria):
9 lectures. Section VIII (Semiconductors and Non-metallic Compounds):
24 lectures. Section IX (Ternary Oxides and Sulfides): 35 lectures, among them
N. P. Lushnaya: "The Phase Diagram of the Ternary System CaO - P_2O_5 - SiO_2".
Section X (Various Communications): 101 lectures, among them Yu. K. Delimarskiy
(Kiyev): "Polarography of Melted Salts", L. K. Lepin' (Riga): "On the Kinetics
of Exchange Reactions Between Metals and Water", and Ya. I. Gerasimov: "Thermo-
dynamic Properties of Iron- and Cobalt Antimonides". Reactions at ultrahigh
pressures were dealt with at a symposium. I. R. Krichevskiy reported on:
"Thermodynamics of Systems at High and Superhigh Pressures".

Card 2/2

DELIMARSKIY, Yu.K.; ANDREYEVA, V.N.

Thermodynamic properties of lead oxide dissolved in fused sodium metaphosphate. Zhur. neorg. khim. 5 no.8:1800-1805 Ag '60. (MIRA 13:9)

(Lead oxide) (Sodium metaphosphate)

85600

S/078/60/005/009/034/040/XX
B017/B058

5.4700 2205,1018,1273

AUTHORS: Andreyeva, V. N., Delimarskiy, Yu. K.

TITLE: The Thermodynamic Properties of Some Metal Oxides Dissolved in Molten Sodium Metaphosphate

PERIODICAL: Zhurnal neorganicheskoy khimii, 1960, Vol. 5, No. 9, pp. 2076 - 2083

TEXT: The oxides of bismuth, nickel, molybdenum, and antimony were dissolved in molten $NaPO_3$. Chemical electrolyte chains were formed from these solutions and their emf was determined in dependence on temperature and composition of the electrolyte. The thermodynamic functions (isobaric potential, entropy and enthalpy) as well as the activities and the coefficients of activity were calculated for Bi_2O_3 and NiO on the basis of the results obtained. The emf of the chemical chain $Bi|Bi_2O_3|O_2(Pt)$ and the emf of the chemical chain $Bi|NaPO_3.Bi_2O_3(N)|O_2(Pt)$ are given in Tables 1 and 2. Fig. 1 shows the dependence of the emf in the system

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85600

The Thermodynamic Properties of Some Metal Oxides Dissolved in Molten Sodium Metaphosphate

S/078/60/005/009/034/040/XX
B017/B058

Bi_2O_3 - $NaPO_3$ on the molar ratio of both components. The dependence $\Delta Z_{excess} \cdot N$ on the molar ratio can be seen in Fig. 2. The thermodynamic characteristics of the Bi_2O_3 - $NaPO_3$ system in dependence on the molar ratio are summarized in Table 3. Table 4 shows the activity of Bi_2O_3 in the Bi_2O_3 - $NaPO_3$ system at 860°C. The experimental and calculated emf values given in Table 5 differ only slightly. The same studies were also made for the NiO - $NaPO_3$ system, and the results are given in Tables 7 and 8 and in Figs. 3 to 5. The thermodynamic data and the activity coefficients point towards an intensive chemical interaction of the bismuth and nickel oxides with $NaPO_3$. The emf determination of the chemical chains $Mo|MoO_3|O_2(Pt)$ and $Mo|NaPO_3 - MoO_3(N)|O_2(Pt)$ shows that a reduction of hexavalent molybdenum sets in in this system, and compounds of lower valency form. The emf values of the chain $Mo|NaPO_3 - MoO_3(N)|O_2(Pt)$ at temperatures of from 720 to 900°C are given

DELIMARSKIY, Yu. K.; GORODYSKIY, A. V.; KUZIMOVICH, V. V.

Chronopotentiometric determination of diffusion coefficients in melts. Coll Cz Chem 25 no.12:3056-3060 D '60. (EEAI 10:9)

1. Institut obschey i neorganicheskoy khimii, Akademiya nauk Ukrainskoy SSR, Kiev.

(Chronopotetiometry) (Diffusion)

DELIMARSKIY, Yu.; DANCHENKO, I. D.; SHILINA, G. Ya.

Rotating disk electrode in the polarography of molten salts. Coll Cs Chem 25 no.12:3061-3064 D '60. (EEAI 10:9)

1. Institut obschey i neorganicheskoy khimii, Akademiya nauk Ukrainskoy SSR, Kiev.

(Electrodes) (Polarograph and polarography) (Salts)

S/073/60/026/001/003/021
B004/B054

AUTHORS: Delimarskiy, Yu. K. and Kolotiy, A. A.

TITLE: Anodic Dissolution of Lead Alloys With Antimony, Bismuth, and Silver in Fused Alkali

PERIODICAL: Ukrainskiy khimicheskiy zhurnal, 1960, Vol. 26, No. 1, pp. 16-24

TEXT: The authors studied the electrolytic separation of the anode residue which is formed in the electrolytic refining of lead, and contains, besides lead, 1-13% of Bi, 0.6-35% of Sb, and about 0.05% of Ag. The electrolytic experiments were made in molten NaOH. Pure Pb, Bi, Pb-Sb alloy, Pb-Bi alloy, or a quaternary Pb-Sb-Bi-Ag alloy served as anodes. The interaction of Pb, Sb, and Pb-Sb alloy (with 1% and 35% of Sb) with the molten NaOH was studied. The authors found a poor solubility of Pb and, in the alloy with 1% of Sb, an extraction of Sb from the alloy. The 35% Sb alloy, however, was stable to NaOH. Electrolysis of the two Pb-Sb alloys was conducted in the electrolyzer shown by the figure. The Pb-Bi and Pb-Ag alloys were stable to NaOH. These alloys were also dissolved anodically. To dissolve

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Anodic Dissolution of Lead Alloys With Antimony, Bismuth, and Silver in Fused Alkali

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the lead completely from alloys rich in bismuth, the authors finally studied the interaction between Pb-Bi alloys and a Bi_2O_3 - NaOH melt, and determined the solubility of Bi_2O_3 in NaOH. The following was found: 1.4% by weight of Bi_2O_3 dissolved at 315°C; 6.4% by weight at 483°C; and 10.1% by weight at 740°C. A Pb-Bi alloy with 4% of Bi can be concentrated to 50% of Bi by means of the Bi_2O_3-NaOH melt. On the basis of experimental data, the authors concluded: Sb must be removed from alloys poor in Sb at low anodic amperage, since otherwise Pb and Bi are also dissolved. In alloys rich in antimony, a high current density must be applied at the beginning to intensify the process. After a decrease of the Sb content in the alloy, low current density is applied. Antimony can be fully removed from lead alloys by anodic dissolution. After removal of Sb, the alloy can be enriched in silver by anodic dissolution of Pb and Bi. By complete removal of Pb, possibly with the use of a Bi_2O_3-NaOH melt, the alloy can be enriched to 40% of Ag. The complete separation of silver from bismuth must be conducted by known oxidation methods. The cathodic process during the

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Anodic Dissolution of Lead Alloys With Antimony, Bismuth, and Silver in Fused Alkali

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anodic separation of the Pb-Sb-Bi-Ag alloy was not investigated in detail. It was observed that only hydrogen was separated by low current densities. At high current densities, Pb, Bi, and also Na can be precipitated as Na_3Bi. The formation of H_2 and Na_3Bi reduces the current yield of Pb and Bi on the cathode. A complete separation of lead from bismuth in an alkaline melt could not be attained. There are 1 figure, 6 tables, and 12 references: 5 Soviet, 3 US, and 4 German.

ASSOCIATION: Institut obshchey i neorganicheskoy khimii AN USSR (Institute of General and Inorganic Chemistry of the AS UkrSSR)

SUBMITTED: June 19, 1958

Legend to the figure: 1: metallic anode, 2: NaOH melt, 3,4: corundum beaker, 5: current supply to the anode, iron bar in corundum casing, 6: cathode, iron bar in corundum casing with shovel-shaped end.

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S/073/60/026/002/003/015
B023/B067

AUTHORS: Delimarskiy, Yu. K. and Velikanov, A. A.

TITLE: Electrolytic Separation of Antimony From Fused Sulfide

PERIODICAL: Ukrainskiy khimicheskiy zhurnal, 1960, Vol. 26, No. 2. pp. 168-173

TEXT: The authors determined the voltages of the decomposition of fused antimony trisulfide and the melt (15% Na_2S - 85% Sb_2S_3). The experimental data were compared with the thermodynamically calculated values. The decomposition potential of Sb_2S_3 was calculated at 800°C by using the known thermodynamical interrelations. It amounted to 0.42V which is in satisfactory agreement with the experimental data. The authors found that the current yield is temperature-dependent. The highest current yield (63.5%) was obtained at a temperature of 800-860°C. The authors also studied the dependence of the current yield on the cathodic current density. The following are the optimum conditions of electrolysis in nitrogen atmosphere:

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Electrolytic Separation of Antimony From Fused Sulfide

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temperature 800-860°C, current density 0.5-2.0 a/cm^2. Fig. 3 shows an electrolytic tank for the electrolysis of the sulfide melt. 1 - Cathode, 2 - anode, 3 - quartz cover for the insulation of the electrodes, 4 - tungsten conductors in porcelain insulation, 5 and 6 - contact terminals at the electrodes, 7 - quartz electrolyzer, 8 - stopper, 9 - melt. The paper by V. I. Lapshin (Ref. 1) is mentioned. There are 3 figures, 3 tables, and 8 references: 4 Soviet, 1 French, 1 US, 1 British, and 1 Japanese.

ASSOCIATION: Kiyevskiy gosudarstvennyy universitet im. T. G. Shevchenko (Kiyev State University imeni T. G. Shevchenko)

SUBMITTED: July 8, 1959

Card 2/3

5.1310

77517
SOV/80-33-1-26/49

AUTHORS: Panchenko, I. D., Delimarskiy, Yu. K.

TITLE: Electrolytic Recovery of Lead From the Factory Crude Lead and Bismuth Dross Using Melted Electrolytes

PERIODICAL: Zhurnal prikladnoy khimii, 1960, Vol 33, Nr 1, pp 153-156 (USSR)

ABSTRACT: Large-scale laboratory experiments of electrolytic lead refining were conducted in order to find the best conditions and materials for removing impurities from lead and for producing different grades of lead. Crude factory lead and bismuth dross were used. The following conclusions were made from the data obtained. These eutectic electrolytes may be used in electrolytic lead refining: $PbCl_2$-KCl-NaCl, $PbCl_2$-NaCl, and $PbCl_2$-PbO. It was found that by refining the crude lead with 25% recovery of the cathode lead, grade C_1 lead is obtained; with 50% recovery, grade C_2 lead is obtained; with 75% recovery in a triple and double eutectic mixture of lead,

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Electrolytic Recovery of Lead From the Factory Crude Lead and Bismuth Dross Using Melted Electrolytes

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potassium, and sodium chlorides, grade C_3 lead is obtained. It was found that by the electrolytic refining of bismuth dross containing 5% of Bi, Grade C_1 lead can be obtained (one thousandth of a percent of Bi); dross containing 13% of Bi yields grade C_2 cathode lead (containing one hundredth of a percent of Bi). It was found that the following electrolysis conditions are optimal: temperature, 500° C; anode current density (D_a), 0.4 amp/cm^2; cathode current density (D_c), 1 amp/cm^2. Yield based on current, 97-98%. Electric energy consumption, 1.6 kw hours/kg. There are 4 tables; and 6 Soviet references.

SUBMITTED: November 15, 1958

Card 2/2

DELIMARSKIY, Yu.K.; PAVLENKO, I.G.; KOSMATYY, Yu.Ye.

Electrolytic refining of zinc in fused silicate electrolytes. Zhur. prikl. khim. 33 no.8:1840-1843 Ag '60. (MIRA 13:9)
(Zinc) (Silicates) (Electrolysis)

DELIMARSKIY, Yu. K.

report to be submitted for the IUPAC 21st Conference and 18th Intl. Congress of Pure and Applied Chemistry, Montreal, Canada, 2-12 August 1961

ALIMARIN, I. P., and ZOLOTOV, Yu. A., Institute of Geochemistry and Analytical Chemistry imeni V. I. Vernadskiy, Academy of Sciences USSR - "Extraction of metal chelate compounds as affected by the nature of the solvent" (To be presented in Russian) (Section C.2 - 11 Aug 61, morning)

BAGDASAR'YAN, Kh. S., and KRONGAUZ, V. A., Scientific Research Physico-Chemical Institute imeni L. Ya. Karpov, Moscow - "Some aspects of energy transfer in radiation chemistry" (Section A.1, Session II - 7 Aug 61, morning)

DELIMARSKIY, Yu. K., Institute of General and Inorganic Chemistry, Academy of Sciences UkSSR, Kiev - "The kinetics of the electrode processes in the electrolysis of melted salts" (Section B.3 - 10 Aug 61, morning)

DELIMARSKIY, Yu. K., ANDREYEVA, V. N., BOYKA, K. M. (Possibly VOYKA, K. M.), [illegible], G. D., and KAPTSOVA, T. I., Institute of General and Inorganic Chemistry, Academy of Sciences UkSSR, Kiev - "Electrochemical experiment with melted borate and phosphate" (Section A.3, c, (2), Session I - 11 Aug 61, morning)

DELIMARSKIY, Yu. K., PANCHENKO, I. D., and SHILINA, G. V., Institute of General and Inorganic Chemistry, Academy of Sciences UkSSR, Kiev - "On the convection diffusion in melted salts" (Section B.3 - 9 Aug 61, afternoon)

GERASIMOV, Ya I., Moscow State University imeni M. V. Lomonosov, (Co-Chairman, Section A.3,c,(2), Session I(B), 11 Aug 61, afternoon)

GERASIMOV, Y. I. LAVRENT'YEV, V. I., [illegible], F. A., and [illegible], [illegible], Moscow State University imeni M. V. Lomonosov - "The thermodynamic properties of columbium and cerium oxides" (Section A.3,c,(3), Session II(A), 11 Aug 61, morning)

GOL'DANSKIY, V. I., Institute of Chemical Physics, Academy of Sciences USSR - "Two-proton radioactivity - a new kind of radioactive decay of nuclei" (Section A.4 - 7 Aug 61, morning)

DELIMARSKIY, YU.K

S/021/61/000/002/011/013
D210/D303

AUTHORS: Delimars'kyyi, Yu.K., Member of AS UkrSSR, Panchenko, I.D., and Shylina, H.V.

TITLE: Rotating disc electrode in the polarography of fused salts

PERIODICAL: Akademiya nauk Ukrayins'koyi RSR. Dopovidi, no. 2, 1961, 205 - 208

TEXT: The authors state that the question of theoretically interpreting polarographical curves obtained for fused electrolytes with the use of stationary or revolving cylindrical electrodes cannot be regarded as solved, because different investigators propose different equations for their interpretation. Only V.G. Levich (Ref. 3: Fiziko-khimicheskaya gidrodinamika, Fizmatgiz, M., 1959 (Physico-Chemical Hydrodynamics)) worked out a theory of connective diffusion of a rotating disc electrode, its equity having been proved for aqueous electrolyte solutions. The thickness of the

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Rotating disc electrode in ...

diffusion layer is given by the equation

$$\delta = 1.6 \cdot D^{1/3} \cdot \gamma^{1/6} \cdot \omega^{-1/2} \qquad (4)$$

where δ is the layer thickness; D - coefficient of diffusion; γ - kinematic viscosity; ω - angular velocity of the rotating disc electrode. The ultimate current value is given by the equation

$$i_d = \frac{nFDC}{\delta} \qquad (5)$$

which, taking into account Eq. (4), may be expressed as

$$i_d = 0.62\ nFD^{2/3} \cdot \gamma^{-1/6} \cdot \omega^{1/2}. \qquad (6)$$

The authors decided to apply Levich's theory to fused salts. They obtained polarograms of a series of electrolytes, using a rotating disc electrode. They investigated AgCl, $PbCl_2$, $CdCl_2$ and TlCl on the background of a fused mixture of Cl - KCl. Polarograms were

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obtained by means of a check polarograph LP55A. Experiments were carried out at 420°C in a china crucible, cap. 100 ml, the anode was a platinum plate of 4 cm^2, the cathode a platinum microdisc set in a molybdenum tube, disc's angular velocity 100, 500 and 750 rev/min. Apart from normal polarograms they obtained derivative ones, by using an electrolytic condenser, consecutively connected with the galvanometer. The depolarizer concentrations were in the range of 0.0005 to 0.003 mol fractions. Their first object was to investigate the dependence of the limit-current on the rate of electrode revolutions. Polarograms obtained with different electrode angular velocities are shown in Fig. 1. On the basis of these, the authors found that the above dependence can be expressed by the equation:

$$i_d = K \cdot \omega^{0.58}.$$

This is in agreement with Eq. (6), which follows from Levich's connective diffusion theory. They thus proved the adequacy of this theory for fused electrolytes, in which it is possible to use a ro-

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tating disc electrode. Their experimental results are given in tabulated form. Two waves were observed for cadmium and lead chlorides which is obviously due to the formation of univalent chlorides. The authors express the opinion that the use of the rotating disc electrode allows polarographic curves to be obtained with lower concentrations than with the stationary ones which is a proof of its higher susceptibility and permits a more precise polarogram interpretation. Kinematic viscosity values being known, it is possible to calculate from Eq. (6) the diffusion coefficients in fused electrolytes; the authors found that this coefficient for silver ions equals $0.9 \cdot 10^{-5}$cm^2/sec, which is in good agreement with data obtained for determining it by different methods. [Abstractor's note: Methods not given]. There are 3 figures, 1 table, and 8 references: 6 Soviet-bloc and 2 non-Soviet-bloc. The references to the English-language publications read as follows: E.D. Black, T. De-Vries, Analyt. Chem., 27, 906, 1955; J. Corbert, S. Winbush, F. Alberts, J. Am. Chem. Soc., 79, 3020, 1957.

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Rotating disc electrode in ... S/021/61/000/002/011/013
D210/D303

ASSOCIATION: Institut zagal'noyi ta neorganichnoyi khimiyi AN URSR (Institute of General and Anorganic Chemistry, AS UkrSSR)

SUBMITTED: September 3, 1960

Card 5/6

DELIMARSKIY, Yu.K. [Delimars'kyi, IU.K.], akademik; VLASYUK, N.V. [Vlasiuk,M.V.]

Relations between electrode polarization and the heat of fusion of metals [with summary in English]. Dop.AN URSR no.3:340-343 '61.
(MIRA 14:3)

1. Institut obshchey i neorganicheskoy khimii AN USSR. 2. AN USSR (for Delimarskiy).
(Electrolysis) (Melting points)

DELIMARSKIY, Yu.K. [Delimars'kyi, IU.K.], akademik; CHERNOV, R.V.

Transference numbers in binary salt systems $TiCl_3$ - MeCl. Dop. AN URSR no.11:1508-1509 '61. (MIRA 16:7)

1. Institut obshchey i neorganicheskoy khimii AN UkrSSR.
2. AN UkrSSR (for Delimarskiy).
(Systems (Chemistry)) (Ions--Migration and velocity)

30180

5.4700

S/078/61/006/012/006/011
B145/B147

AUTHORS: Chernov, R. V., and Delimarskiy, Yu. K.

TITLE: Some rules governing the specific conductivity of melts of the systems alkali metal chloride - titanium trichloride

PERIODICAL: Zhurnal neorganicheskoy khimii, v. 6, no. 12, 1961, 2749-2752

TEXT: The authors had shown in a previous paper (Ref. 1: Yu. K. Delimarskiy, R. V. Chernov. Dokl. AN USSR, 6, 795, 1960) that the isotherms of the specific conductivities of the NaCl - $TiCl_3$ and KCl - $TiCl_3$ systems confirm the existence of chemical interactions in these mixtures, and that characteristic sections of the isotherms are indicative of combinations of the type M_3TiCl_6 and $MTiCl_4$ existing in the melts. In the present paper, these rules are investigated for the RbCl - $TiCl_3$ and CsCl - $TiCl_3$ systems that had been studied before by the thermal analysis method (Ref. 2: B. F. Markov, R. V. Chernov. Ukr. khim. zhurn., 25, 279, 1959). Methods of determination, preparation of reagents, and construction of cells were adopted from the previous paper (Ref. 1). The specific conductivities

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of the RbCl - $TiCl_3$ and CsCl - $TiCl_3$ systems were measured in the range of 0 - 51.8 mole% of $TiCl_3$, and 0 - 52.9% of $TiCl_3$, respectively. In conformity with the results obtained by thermal analysis, the isotherms exhibit characteristic salient points at 25 and 50 mole% of $TiCl_3$. In the case of a melt with RbCl, the specific conductivity at 800°C at these points is 1.08 ohm^{-1} cm^{-1} and 0.93 $ohm^{-1}cm^{-1}$, respectively, and in the case of a melt with CsCl, it is 0.86 $ohm^{-1}cm^{-1}$ and 0.69 $ohm^{-1}cm^{-1}$, respectively. In the melts of the MCl - $TiCl_3$ systems (M = alkali metal), the salient point in the conductivity isotherms for M = Rb, Cs is less distinct than it is for M = Na,K, since the stability of the compounds $MTiCl_4$ and M_3TiCl_6 (M = Rb,Cs) in the melt is approximately equal, and the two types of ions $TiCl_4^-$ and $TiCl_6^{3-}$ may in this case simultaneously be present in the melt. According to Semenchenko, the compounds $MTiCl_4$ and M_3TiCl_6 (M = Na,K,Rb, Cs) obey a linear dependence of μ, the reduced

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moment of the cation, in the same way as do the values of the specific conductivity of pure alkali metal chlorides. The values of specific conductivity at 800°C of the compound M_3TiCl_6 satisfy the equation $\varkappa_{800}=3.22\ (\mu-0.34)$. Owing to lower electrolytic dissociation of $MTiCl_4$ and M_3TiCl_6 as compared with that of pure chlorides, for which complete dissociation is assumed, the diagram $\varkappa,\mu$ shows that the angle of inclination of the straight lines for these compounds is smaller than the corresponding angle of the straight lines for pure chlorides. The electrolytic dissociation of M_3TiCl_6 depends on the following reaction: $M_3TiCl_6 \rightleftharpoons M^+ + M_2TiCl_6^-$. Thermal dissociation is decisive for the total equilibrium. The relative degree of dissociation of the compound M_3TiCl_6 (M = Na,K,Rb) is calculated from the difference of the angles of inclination of the straight lines in the $\varkappa,\mu$ diagram with respect to the degree of dissociation of Cs_3TiCl_6. It is 73.6, 84.6, and 91.4% for M = Na,K,Rb and, analogously, 63.7, 75.7, and 86.0% of the dissociation of $CsTiCl_4$

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for the compound $MTiCl_4$. Comparing the values of the specific conductivity for melts of the composition 25 mole% of $TiCl_3$ at different temperatures shows that the increase in conductivity as a result of a change in temperature is about equal for NaCl and KCl, and then steadily decreases for RbCl and CsCl. There are 2 figures and 5 references: 4 Soviet and 1 non-Soviet. The reference to the English-language publication reads as follows: M. Mulcahy, E. Heymann, J. Phys. Chem. 47, 485 (1943).

SUBMITTED: November 29, 1960

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/ 5 1310 1067, 1273, 2210 also 2808, 1521

26277
S/073/61/027/004/001/004
B127/B203

AUTHORS: Shen Ch'in-nang and Delimarskiy, Yu. K.

TITLE: Solubility of titanium, molybdenum, and tungsten oxides in borax melt

PERIODICAL: Ukrainskiy khimicheskiy zhurnal, v. 27, no. 4, 1961, 454-457

TEXT: The electrolytic deposition of heavy metals is of great interest. In this connection, the solubility of oxides in the borax melt is important but still unknown, and has, therefore, been studied by the authors. Special objects were: TiO_2, MoO_3, and WO_3. The borax, chemically pure for analytical purposes, was carefully prepared, dried, and molten. TiO_2 was produced from $TiCl_4$ according to G. Brauer (Ref. 4: Rukovodstvo po preparativnoy neorganicheskoy khimii, 1956). It was dried in an electric furnace at 1000°C. MoO_3 was prepared from chemically pure ammonium molybdate, WO_3 from tungstic acid according to Yu. V. Karyakin, I. Angelov (Ref. 5: Chistyye khimicheskiye reaktivy, 1955, str. 248, 262). X

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Solubility of titanium, molybdenum, and... B127/B203

The solubility was determined by the method of isothermal saturation. 20 g of borax was put in a platinum crucible, and the latter in a porcelain pot filled with roasted aluminum. The porcelain pot was placed in an electric furnace whose temperature was measured with a Pt-Pt-Rh thermocouple. An electrically driven platinum stirrer was used for mixing. The corresponding oxide was admixed when the required temperature was attained. The quantity introduced surpassed the saturation limit considerably. The melt was soaked at constant temperature and under permanent mixing for 1.5-7 hr. The unsoluble part of the oxide was clearly visibly deposited on the bottom of the platinum crucible, a small portion of the liquid melt was removed with a platinum ladle for chemical analysis. The gravimetric method was used for determining titanium, the tenino-β-naphthol-quinoline method for tungsten. Results show the solubility of TiO_2 in borax melt to rise linearly with temperature. Molybdenum and tungsten oxide were found to be easily soluble in borax. The closer the oxide melting point to that of borax, the higher is the solubility. The same applies to the solubility of oxides in molten sodium metaphosphate according to V. N. Andreyeva (Ref. 8: Ukr. khim zh., 24, 23 (1958)); the Schroeder equation may be used:

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$\ln N = \frac{L(T-T')}{RTT'}$, where L is the molar melting heat of the oxide, T' its melting temperature, T the temperature of the solubility determination, and N the solubility expressed in molar fractions. It was shown, however, that test results did not quite agree to the Schroeder (Shreder) equation due to a strong interaction between oxides and borax.

Table 2

Oxide	Solubility		Melting point of the oxide, °C
	% by weight	mole%	
MoO_3	60.8	66.1	795
WO_3	68.8	63.2	1473
TiO_2	10.86	21.2	2130

There are 3 figures, 2 tables, and 9 references: 6 Soviet-bloc and 3 non-Soviet-bloc.

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Solubility of titanium, molybdenum, and... S/073/61/027/004/001/004
B127/B203

ASSOCIATION: Institut obshchey i neorganicheskoy khimii AN USSR (Institute of General and Inorganic Chemistry AS UkrSSR)

SUBMITTED: January 20, 1960

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