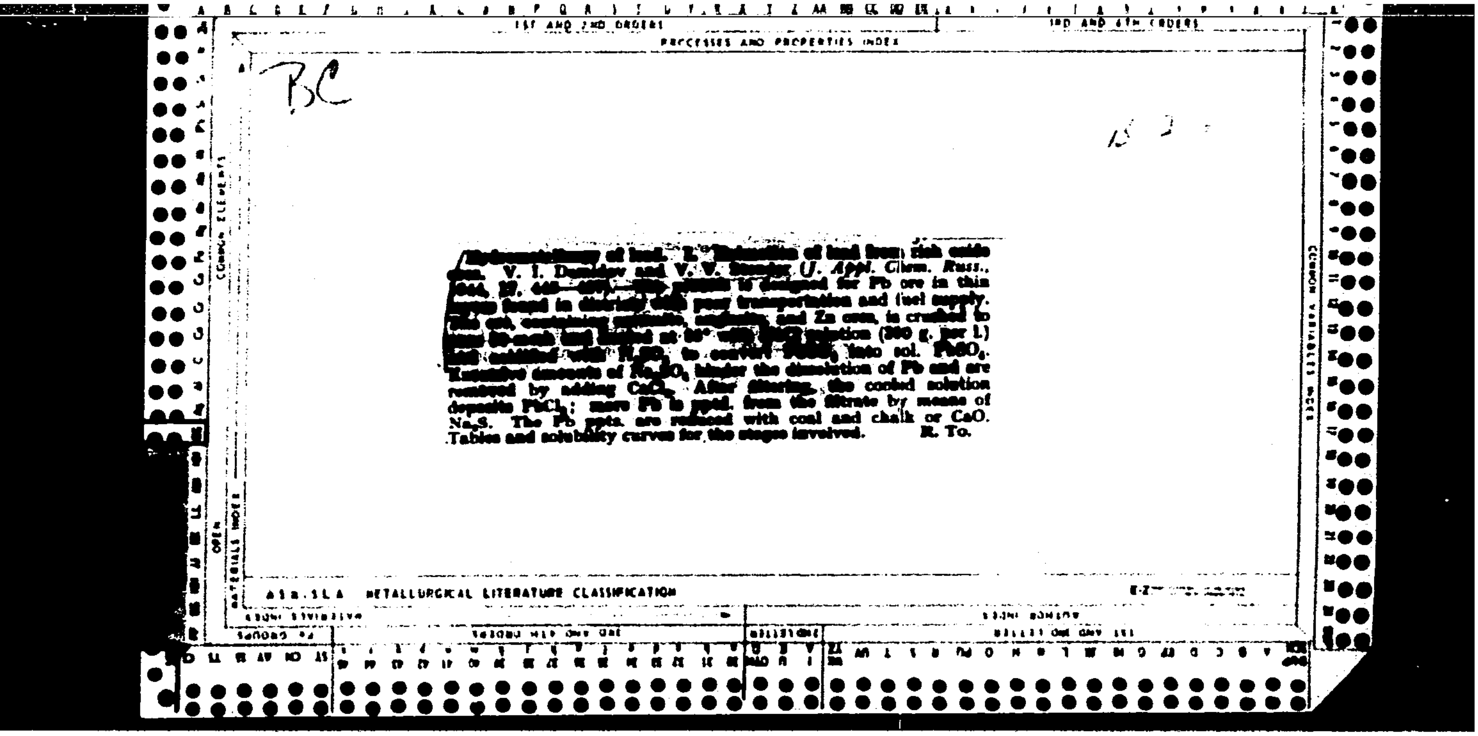


1ST AND 2ND ORDERS

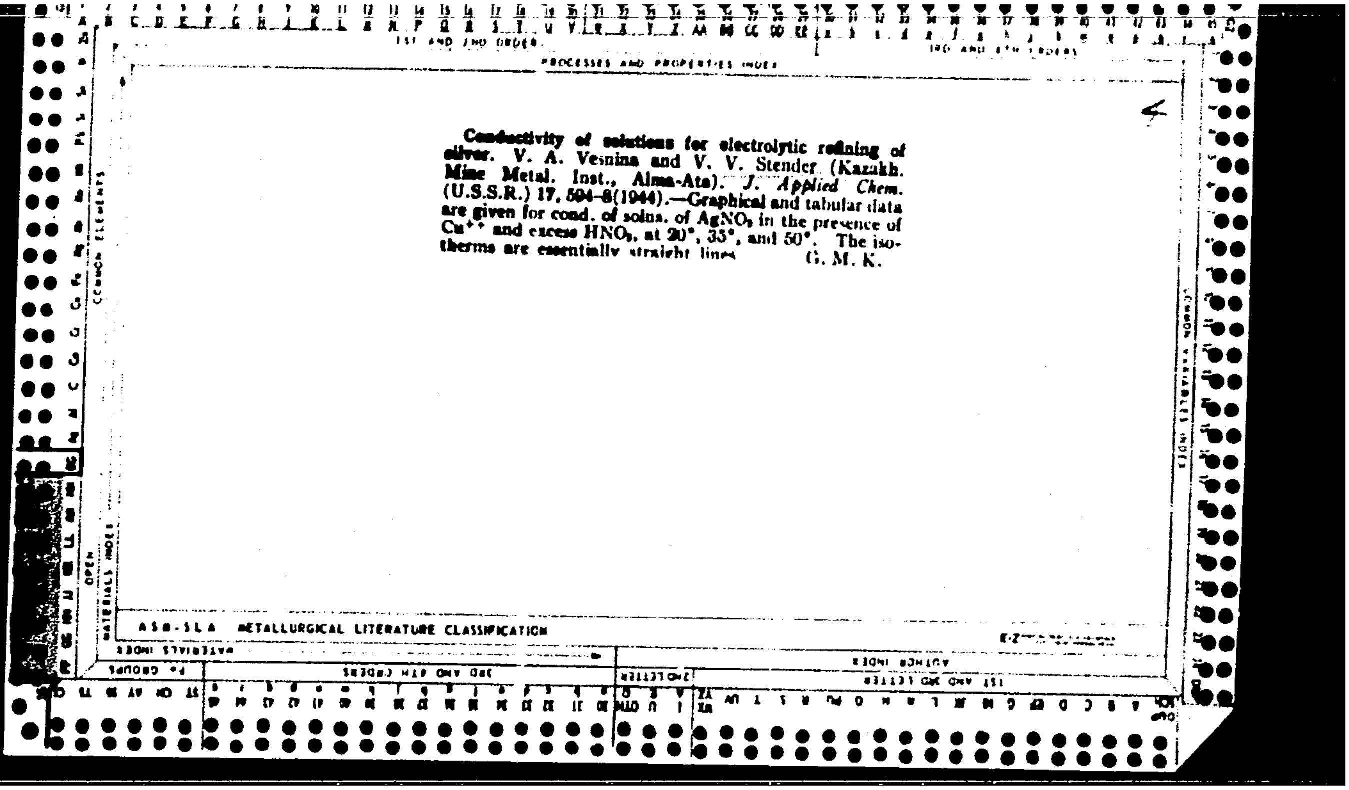
PROCESSES AND PROPERTIES INDEX

3RD AND 4TH ORDERS

BC

Hydrometallurgy of lead. I. Extraction of lead from rich oxide ores. V. I. Davidov and V. V. Stender. (J. Appl. Chem. Russ., 1944, 17, [illegible]).—The process is designed for Pb ore in this region found in districts with poor transportation and fuel supply. The ore, containing cerussite, anglesite, and Zn ores, is crushed to pass [illegible]-mesh and leached at [illegible]° with NaCl solution (300 g. per l.) and acidified with H_2SO_4 to convert $PbCO_3$ into sol. $PbSO_4$. Excessive amounts of Na_2SO_4 hinder the dissolution of Pb and are removed by adding $CaCl_2$. After filtering, the cooled solution deposits $PbCl_2$; more Pb is pptd. from the filtrate by means of Na_2S. The Pb ppts. are reduced with coal and chalk or CaO. Tables and solubility curves for the stages involved. R. To.

ASM-SLA METALLURGICAL LITERATURE CLASSIFICATION



4

Conductivity of solutions for electrolytic refining of silver. V. A. Vesnina and V. V. Stender (Kazakh. Mine Metal. Inst., Alma-Ata). *J. Applied Chem.* (U.S.S.R.) 17, 504-8(1944).—Graphical and tabular data are given for cond. of solns. of $AgNO_3$ in the presence of Cu^{++} and excess HNO_3, at 20°, 35°, and 50°. The isotherms are essentially straight lines. G. M. K.

PONOMAREV, V.D.; SALTOVSKAYA, L.A.; STENDER, V.V.

Utilization of converter gas in copper hydrometallurgy. Izv.AN Kazakh.SSR Ser.khim. no.1:63-73 '46. (MLRA 9:8)
(Copper--Metallurgy) (Sulfuric acid industry)

Bu. abs.

B1-6, Non-Ferrous Metallurgy.

Chemical and [illegible] methods in the metallurgy of non-ferrous metals. V. V. Stender (*J. appl. Chem., USSR*, 1946, **19**, 291—302).—A review is given of work on 6 projects during 1941—44. These were: the use of waste H_2S in Cu refining, making use of the catalytic oxidation of dil. H_2S to H_2SO_4; metallurgy of Sn and Sb; metallurgy of Co and V; extraction of clay by the use of Na_2SO_4; electrolytic refining of non-ferrous metals using salts of NH_2SO_3H; and investigation of the conductivities of mixed aq. solutions used in industrial electrochemistry. (30 references.)

E. B. Uvarov.

1ST AND 2ND ORDERS

PROCESSES AND PROPERTIES INDEX

C 4

4

Depolarization of hydrogen by oxygen at highly porous graphite cathodes. R. K. Drachevskaya and V. V. Stender. *J. Applied Chem.* (U.S.S.R.) 19, 1041-4(1946) (in Russian).—In NaCl solns., 300 g./l., depolarizations by about 0.7-0.8 v., at c.d. 100 amp./sq. dm., were obtained with an air stream flowing through the inner channel of hollow cylindrical graphite cathodes; the effect of the degree of porosity, 42.6-64.0%, is very slight, 0.1 v. or less. With increasing c.d., the depolarizing action decreases; it disappears at a higher c.d. the greater the porosity of the graphite: 400 amp./sq. m. for 42.6%, 800-1000 for 64.0. Pure O instead of air does not increase the effect to any appreciable extent (mostly by about 0.1 v., in exceptional cases, at c.d. 200-600 amp./sq.m., by 0.2-0.3 v.). N. Thon

ASM-SLA METALLURGICAL LITERATURE CLASSIFICATION

1ST AND 2ND ORDERS

PROCESSES AND PROPERTIES INDEX

3RD AND 4TH ORDERS

MATERIALS INDEX

COMMON ELEMENTS

11d

Electrolytic oxidation and chlorination of ethylene. M. A. Kalinin and V. V. Stender. *J. Applied Chem.* (U.S.S.R.) 19, 1045-58(1946)(in Russian).—(1) On Pb anodes, in Na_2SO_4-H_2SO_4 electrolytes, with and without $Ce(SO_4)_2$ as catalyst, no oxidation of C_2H_4 was observed at c.d. 50-500 amp./sq.m. up to 10 amp.-hrs. (2) A 23.8% yield in $(CH_2OH)_2$ was obtained with a Pt anode, in a H_2SO_4 (sp. gr. 1.2) anolyte, c.d. 7000 amp./sq.dm., 30 amp.-hrs., at 7°; higher temp. and lower c.d. give inferior yields. (3) In 4% KOH + 4% $KMnO_4$, 500 amp./sq.m., C_2H_4 was oxidized only at the expense of $KMnO_4$, not electrolytically; in mixed acetone (30%)-water-KOH solns., 100-700 amp./sq.m., both C_2H_4 and acetone were oxidized to $(CH_2OH)_2$, HCHO, AcOH, and other products; in a pyridine (30%)-water medium, C_5H_5N is easily oxidized to resinous products. (4) In 1.22 *N* HCl, at 25° with a Pt anode, 5.5 amp.-hrs., the yield of $CH_2(OH)$-CH_2Cl was about 3.5% with c.d. 700-3500 amp./sq.m., with a slight max. (3.8%) at c.d. 1400; increasing concn. of HCl, from 1.22 to 4.62 *N*, lowers the yield with respect both to C_2H_4, from 90.5 to 67.0%, and to O, from 2.9 to 0.4% (at 1400 amp./sq.dm., 5.5 amp.-hrs.); the yield of $CH_2(OH)CH_2Cl$ changes little, with a flat max. at 2.0-2.2 *N*. (5) In terms of temp., at const. c.d. and HCl concn., the yield first increases to a max. at about 30-40°, passes through a min. at about 75°, and increases again up to 100°; above 40°, further oxidation of CH_2-$(OH)CH_2Cl$ to CH_2ClCO_2H becomes significant but is slowed down again at still higher temp. due to marked azeotropic removal of $CH_2(OH)CH_2Cl$ with the evapg. water. The current efficiency drops sharply (from 73.5 to 0.2%), when the concn. of $CH_2(OH)CH_2Cl$ rises from 0.5 to 11.2% which, on account of the much slower fall of the yield with respect to C_2H_4, is evidence of enhanced further oxidation. (6) In NaCl (*N*) + HCl solns., with acid catholyte, yields are lower than in HCl, due to decreased soly. of C_2H_4 and increased oxidation of $CH_2(OH)$-CH_2Cl; they are the lower the higher the NaCl content: 3.4 and 2.0% $CH_2(OH)CH_2Cl$ in *N* and 5.1 *N*, resp.; in terms of temp., in *N* NaCl, only one max. (at about 40°) is found, followed by a steady decline of the yield up to 100° (no 2nd max.). (7) On graphite anodes, in HCl, current efficiencies vary only slightly, from 85 to 80%, with $CH_2(OH)CH_2Cl$ increasing from 4 to 15%, and are practically identical with the yields with respect to C_2H_4, indicating absence of oxidation; optimum c.d. is 1500-2250 amp./sq.m.; with rising c.d. and temp., the amt. of $(CH_2Cl)_2$ formed increases. In NaCl solns., the optimum c.d. is only 750-1000 amp./sq.m.; with rising NaCl concn., the amt. of $(CH_2Cl)_2$ formed increases rapidly, reaching 44% (of the amp.-hrs. passed) in a 5 *N* soln.; at the optimum concn. (*N*), variation of the $CH_2(OH)$-CH_2Cl content from 4 to 15% is without significant effect on the current efficiency. (8) Catalysts ($CuCl_2$, $FeCl_3$, $CoCl_2$) are without effect. A rate of circulation of C_2H_4 corresponding to an amt. of the latter equal to 10 times the amt. of Cl_2 formed at the anode, and fine division of the C_2H_4 gas are essential.

N. Thon

10

METALLURGICAL LITERATURE CLASSIFICATION

AUTHOR INDEX

COMMON VARIABLES INDEX

1ST AND 2ND ORDERS

3RD AND 4TH ORDERS

PROCESSES AND PROPERTIES INDEX

4

Overvoltage with hydrogen evolution at high current densities. A. G. Pecherskaya and V. V. Stender. *J. Applied Chem.* (U.S.S.R.) **19**, 1303-12(1946)(in Russian).—Measurements were made by the direct method, from 0.001 to 0.2 amp./sq. cm., in 2 *N* H_2SO_4 and in 1 *N* HCl, at 25 ± 0.5° with Pt anodes, active cathode area 1 sq. cm., electrode distance 70 mm. Const. potentials *E* (±0.005 v.) were reached, at lower c.d., within 20-30 min. with Ag, Sb, Ni, W; in 30-60 min. with Sn, Cd; 1-2 hrs. with smooth Pt, Fe, Pb, Al; 4-5 hrs. with Ta; with Mo, no constancy better than ±0.01 v. was reached even after 48 hrs.; at higher c.d., establishment of a const. *E* was faster, except with Ta where it was slower. Cathode metals were: Ni, electrolytic (55°, 150 amp./sq. m.); Sn, electrolytic (from acid sulfate, 35°, 100 amp./sq.m.); Pb, electrolytic, recast; Sb, electrolytic (from Na_2S + NaOH, 40°, 60 amp./sq.m.) recast; Cd, electrolytic, recast; Al, electrolytic, rolled; Fe, Pt, W, Mo, Ta, sheet; WNi (on Fe), electrolytic, from a sulfate ammoniacal bath. In all cases, the overvoltage η obeys Tafel's law $\eta = a + b \log i$, in contrast to Hickling and Salt's (*C.A.* **35**, 2797⁴) measurements showing max. for Pt, Cd, Sn, Sb; this is due no doubt to the error involved in the indirect commutator method and results in too low values of η at higher c.d. with rapid fall of *E* during the interruption (5 × 10^{-4} sec.). The data of Knobel, Caplan, and Eisemann (*C.A.* 17, 1757) are too high. From the measurements, the following values of the *b* coeff. in Tafel's equation are calcd.: Pt(bright) −0.125; W −0.10; Ni −0.09; Ag −0.075; Mo −0.105; Fe −0.115; Ta −0.075; Sn −0.13; Al −0.09; Sb −0.10; Pb −0.095; WNi −0.085. The fact that *b* is generally less than the theoretical 0.116 indicates that the recombination reaction H + H → H_2 is at least one of the rate-detg. slow processes. H overvoltage is remarkably low on electrolytic WNi deposits. N. Thon

ASM-SLA METALLURGICAL LITERATURE CLASSIFICATION

STENDER, V.V.

Utilization of waste sulfur dioxide in copper hydroelectrometallurgy; introduction. Izv.AN Kazakh.SSR Ser.khim. no.1:5-7 '47.
(MLRA 9:8)

(Copper--Metallurgy) (Sulfur dioxide)

SERGEYEVA, V.F.; STENDER, V.V.; YAKUNINA, M.N.

Extraction of copper from ores oxidized with sulfur dioxide in sodium chloride solutions ("Sulfite-chloride process"). Izv.AN Kazakh.SSR Ser.khim. no.1:7-21 '47. (MLRA 9:8)
(Copper--Metallurgy) (Sulfur dioxide)

BAUSLIT, I.E.; KIR'YAKOV, G.Z.; STENDER, V.V.

Copper hydroelectrometallurgy with the use of anodic depolarization. Characteristics of highly porous carbon anodes and depolarization by sulfur dioxide. Izv.AN Kazakh.SSR Ser.khim. no.1: 21-30 '47. (MLRA 9:8)

(Electrometallurgy) (Sulfur dioxide)

YEREMENKO, M.F.; PONOMAREV, V.D.; STENDER, V.V.

Catalytic oxidation of sulfuric anhydride by manganese salt solutions: a) Adsorption and oxidation of sulfur dioxide by manganese compounds. Izv.AN Kazakh.SSR Ser.khim. no.1:38-46 '47. (MLRA 9:8)

(Sulfur dioxide) (Manganese)

PONOMAREV, V.D.; YEREMENKO, M.F.; STENDER, V.V.

Catalytic oxidation of sulfuric anhydride by manganese salt solutions: b) Pilot-plant experiments in catalytic preparation of sulfuric acid. Izv.AN Kazakh.SSR Ser.khim. no.1:46-59 '47.

(MLRA 9:8)

(Sulfuric acid industry)

PECHERSKAYA, A.G.; STENDER, V.V.; YASHKINA, O.P.

Electrolytic extraction of copper from solutions after lixiviation. Izv.AN Kazakh.SSR Ser.khim. no.1:62-63 '47. (MIRA 9:8)
(Copper--Electrometallurgy)

GARKAVI, I.Ya.; STENDER, V.V.

Lixiviation of manganese ores from the Dzhezdinski Basin. Izv. AN Kazakh.SSR Ser.khim. no.1:74-102 '47. (MLRA 9:8)
(Dzhezdinskii Basin--Manganese ores)

STENDER, V.V. (Others not listed)

Electrolytic refining of nonferrous metals in sulfamic-acid salt solutions. Izv.AN Kazakh.SSR Ser.khim. no.1:103-104 '47. (MLRA 9:8)

(Metallography) (Sulfamic acid)

PAVLOV, Ye.A.; STENDER, V.V.

Preparation and properties of sulfamic acid. Izv.AN Kazakh.SSR ser.khim. no.1:104-108 '47. (MLRA 9:8)
(Sulfamic acid)

BUDON, V.D.; PAVLOV, Ye.A.; STENDER, V.V.

Electrolytic refining of lead from sulfamic acid solutions. Izv. AN Kazakh.SSR Ser.khim. no.1:108-112 '47. (MLRA 9:8)
(Lead-electrometallurgy) (Sulfamic acid)

LIOZNER, N.D.; STENDER, V.V.

Electrolytic refining of copper from sulfamic acid solutions. Izv. AN Kazakh.SSR Ser.khim. no.1:112-117 '47. (MLRA 9:8)
(Copper--Electrometallurgy) (Sulfamic acid)

SALTOVSKAYA, L.A.; STENDER, V.V.

Electrolytic refining of silver from sulfamic acid solutions.
Izv.AN Kazakh.SSR Ser.khim. no.1:117-121 '47. (MLRA 9:8)
(Silver--Electrometallurgy) (Sulfamic acid)

1ST AND 2ND ORDERS

PROCESSES AND PROPERTIES INDEX

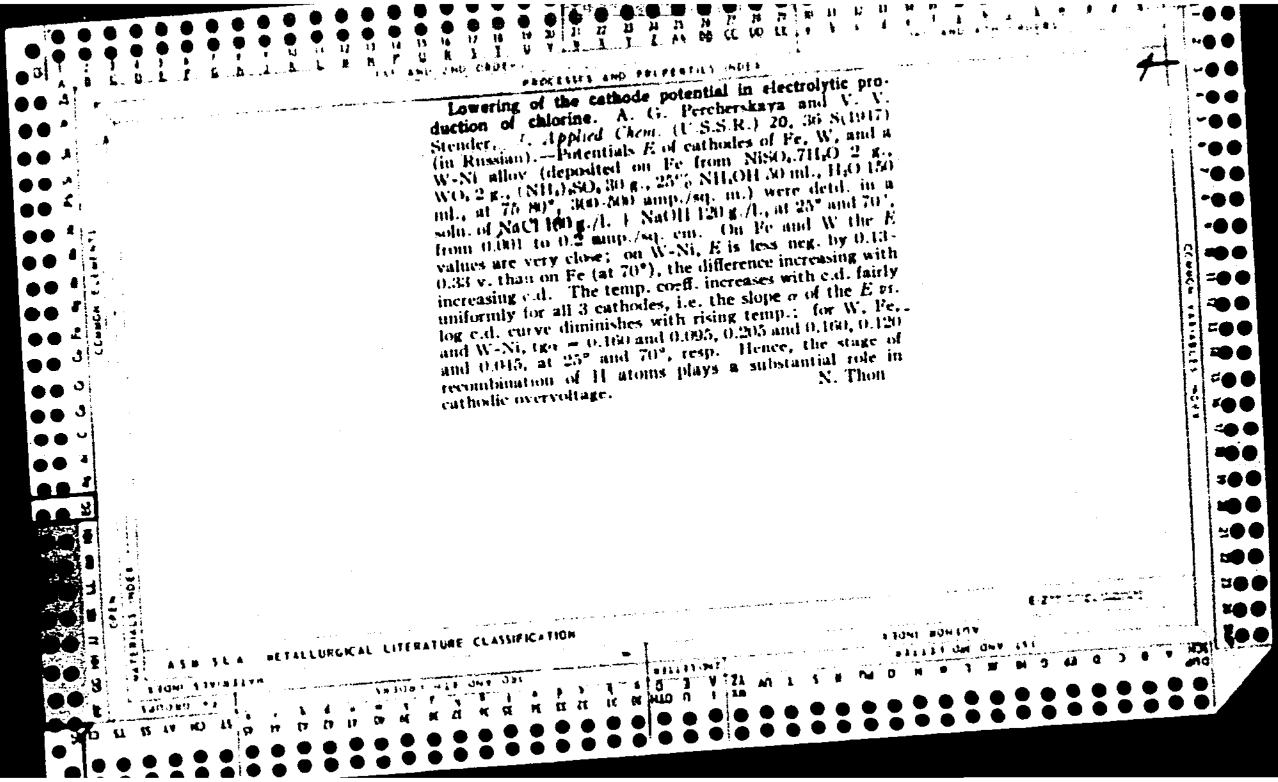
3RD AND 4TH ORDERS

Ca

9

Utilization of sulfur dioxide in the Dzhezkazgan [Kazakh S.S.R.] system. V. V. Stender (Kazakh Mining Met. Inst.). *Tsvetnye Metal.* 20, No. 2, 31-2(1947); cf. *C.A.* **41,** 64e.—It is suggested to utilize the SO_2 in the converter exhaust gases to produce cheaply dil. H_2SO_4. The acid is to be used for leaching the sulfide tailings from the concg. plant, thereby recovering addnl. Cu, and for leaching local poor Mn ore in order to produce C-free Mn. The sulfide tailings contain 0.3% of Cu. By using a liquid:solid ratio of 3:1 and a soln. contg. H_2SO_4 10 and Fe_2SO_4 10 g. per l., 60-70% of this Cu was recovered. Thus, approx. 4 tons of the cheap acid will be needed for 1 ton of recovered Cu. The poor ore (9.6% of Mn) is treated in a closed circuit to produce C-free Mn. One ton of Mn required ore 12, lime 0.4, NH_4OH 0.03, SO_2 0.6 ton, H_2O 34 cu. m., and 9940 kw.-hrs. M. Hosch

ASM-SLA METALLURGICAL LITERATURE CLASSIFICATION



Lowering of the cathode potential in electrolytic production of chlorine. A. G. Percherskaya and V. V. Stender. *J. Applied Chem.* (U.S.S.R.) 20, 365(1947) (in Russian).—Potentials *E* of cathodes of Fe, W, and a W-Ni alloy (deposited on Fe from $NiSO_4.7H_2O$ 2 g., WO_3 2 g., $(NH_4)_2SO_4$ 30 g., 25% NH_4OH 50 ml., H_2O 150 ml., at 75-80°, 300-500 amp./sq. m.) were detd. in a soln. of NaCl 160 g./l. + NaOH 120 g./l., at 25° and 70°, from 0.001 to 0.2 amp./sq. cm. On Fe and W the *E* values are very close; on W-Ni, *E* is less neg. by 0.13-0.33 v. than on Fe (at 70°), the difference increasing with increasing c.d. The temp. coeff. increases with c.d. fairly uniformly for all 3 cathodes, i.e. the slope α of the *E* vs. log c.d. curve diminishes with rising temp.: for W, Fe, and W-Ni, tg α = 0.160 and 0.095, 0.205 and 0.160, 0.120 and 0.045, at 25° and 70°, resp. Hence, the stage of recombination of H atoms plays a substantial role in cathodic overvoltage. N. Thon

4

Depolarization by sulfur dioxide in the electrolytic extraction of copper from sulfate solutions. V. V. Stender and I. E. Banslit. *J. Applied Chem.* (U.S.S.R.) 20, 155-62(1947)(in Russian).—Introduction of a stream of SO_2-contg. gas (4-33% SO_2) through a channel bored in the porous C anode brought about depolarization of the anode up to 1.0-1.1 v., in the electrolysis of $CuSO_4$ solns. (33 g. Cu/l.) with anodic c.d. 100, 200, and 300 amp./sq. m., cathodic c.d. 120, 240, and 360 amp./sq.m. This resulted in energy savings up to 1.8-fold. Roughly half of the SO_2 introduced is oxidized to H_2SO_4; the av. consumption is 2.5 kg./kg. Cu. The consumption of the C anode material, through mech. crumbling, is 6-12 kg./kg. Cu. Industrial-scale application presents the problem of enrichment of the initial gas to 6-12% SO_2, removal of suspended matter likely to plug up the pores, and disposal of the unchanged SO_2. N. Thon

ASM-SLA METALLURGICAL LITERATURE CLASSIFICATION

4

— **Stender, Vladimir V.:** Diafragmy dlya elektroliza vodnykh rastvorov. Moscow: Sci. Tech. Pub. House and Chem Literature. 1948. 143 pp.

ASM-SLA METALLURGICAL LITERATURE CLASSIFICATION

DRACHEVSKAYA, R.K.; STENDER, V.V.

Depolarization of chlorine by ethylene. Izv.AN Kazakh.SSR. Ser.
khim.no.2:20-22 '48. (MIRA 9:7)
(Chlorine) (Ethylene) (Depolarization)

PECHERSKAYA, A.G.; STENDER, V.V.

Cathode potentials in the preparation of hydrogen. Izv.AN Kazakh.SSR Ser.khim.no.2:23-31 '48. (MIRA 9:7)
(Hydrogen) (Electroplating)

KORCHMAREK, I.A.; STENDER, V.V.

Preparation of copper from residues of ore-dressing plants. Izv. AN Kazakh.SSR Ser.khim. no.2:32-42 '48. (MIRA 9:7)
(Korchmarek, I.A.) (Stender, V.V.)

GARKAVI, I.Ya.; STENDER, V.V.

[redacted]

Components of the voltage balance in the electrolysis of manganous sulfate. Izv.AN Kazakh.SSR Ser.khim. no.3:44-54 '49. (MLRA 9:8)
(Manganese--Electrometallurgy)

PECHERSKAYA, A.G.; DURNOVO, I.G.; STENDER [redacted]

Potentials of lead and lead-silver anodes during electrolysis of aqueous solut9ons of zinc sulfate. Izv.AN Kazakh.SSR Ser.khim. no.3: 55-61 '49. (MLRA 9:8)

(Electrodes, Lead) (Zinc sulfate)

4

Electrode potentials and electric conductivity of the solutions in the electrodeposition of manganese. I. Ya. Garkavi and V. V. Stender (Acad. Sci. Kazakh S.S.R.). *Zhur. Priklad. Khim.* (J. Applied Chem.) **23**, 598-606 (1950).—The electrolyte, 40-50 g./l. Mn in the form of $MnSO_4$, $(NH_4)_2SO_4$ 100-150 g./l., SO_2 0.2 g./l., pH 2.8, flows into the cathode space, and from there, through a diaphragm, into the anode compartment; the outgoing anolyte has the compn. Mn 10-20, $(NH_4)_2SO_4$ 100-150, H_2SO_4 20-50 g./l. On an Al foil cathode, the crit. c.d. i_c necessary for the deposition of Mn to begin increases with the acidity (pH 8.5-2.4); the slope of the i_c isotherms is the greater the higher the temp. No smooth Mn deposits were obtained at high pH. Below i_c the cathode potentials fluctuate; the jumps and breaks are possibly due to evolution of H_2 partly on Al, partly on Mn which in this region may be deposited transitorily, only to be dissolved very rapidly. Cathode potentials η are a linear function of the log of the c.d., $\eta = a + b \log i$, with Tafel's coeff. $b = 0.20$-0.24, i.e. about twice as high as normal. Anode potentials on pure Pb anodes are also represented by Tafel's equation, with $b = 0.22$ as against $b = 0.17$ in the absence of Mn^{++} ions; on Pb-Ag (1%) anodes, the corresponding values of b are 0.08 and 0.10, resp. On that alloy anode, the anode potentials are by 0.05-0.15 v. less pos. than on pure Pb; consequently, there is advantage in the use of Pb-Ag (1%) anodes rather than pure Pb on which MnO_2 is formed more readily. The elec. cond. of aq. solns. of $(NH_4)_2SO_4$ decreases with increasing amt. of $MnSO_4$, owing to a viscosity effect; the elec. cond. corrected for viscosity increases with increasing amt. of $MnSO_4$.

N. Thon

CA

Influence of impurities in the electrodeposition of zinc from sulfate solutions. A. G. Pechretskaya and V. A. Stender (Kazakh. Gorno-Metallurg. Inst.). *Zhur. Priklad. Khim.* (J. Applied Chem.) **23**, 925-35(1950).—In an acid soln., 60 g. Zn as $ZnSO_4$ and 100 g. free H_2SO_4/l., ions of metals more pos. than Zn, such as Na, Mg, or Al, increase the voltage *V*; e.g. 10 g./l. of Mg^{++} increase *V* by 0.06 v., i.e. increase the energy consumption by 1.75%. The current efficiency is lowered through accumulation of the foreign ions at the cathode. Mn^{++} ions, in the amts. 3, 6, and 15 g./l., lower the current efficiency from 91.00 to, resp., 89.80, 87.50, and 83.21% (at 25°), doubtlessly through depolarization of H discharge at the cathode by higher Mn oxides formed at the anode. The effects of ions of metals more electroneg. than Zn on the cathode potentials of Zn were investigated in pure 2 *N* H_2SO_4 (100 g./l.), in the above acid $ZnSO_4$, and in a near-neutral soln. of $ZnSO_4$ contg. Zn 60 g./l., pH 5.3-5.5. Without impurities, the potentials *E* in the acid $ZnSO_4$ soln. lie between those in pure H_2SO_4 and in neutral $ZnSO_4$; the current efficiencies calcd. from the *E* curves agree well with the observed yields. On addn. of the foreign ions Ni^{++}, Co^{++}, Cu^{++}, and Sb^{++}, in amts. from 1 to 110 mg./l., to the pure H_2SO_4 soln., the values of *E* rise (become less neg.) as the amt. of the impurity increases; e.g., at the c.d. $i = 400$ amps./sq.m., at 25°, with Ni^{++} 0, 1, 6, 16, 116 mg./l., $-E = 1.06$, 1.02, 0.76, 0.74, 0.72 v. (on the H scale), and with the same amts. of Sb^{++}, $-E = 1.06$, 1.08, 0.97, 0.81, 0.79 v. The proportionality of *E* and log *i* is preserved. This fall of *E* indicates the presence, besides the discharge of H ions, of a 2nd process, namely, soln. of Zn which increases with the amt. of the impurity. This is confirmed by the fact that the current efficiency in H_2 increases above 100%, up to 1500%, with 100 mg./l. of the impurity. This current efficiency decreases with increasing c.d. This leads to the conclusion that the soln. of Zn is due to short-circuited local elements in which Zn is the sol. anode. Superposition of a cathodic polarization on such a local cell represses the anodic soln. On the basis of overvoltage data, the activity of the impurity ions with respect to soln. of Zn should increase in the order Sb, Cu, Co, Ni. Actually, with small amts., the order is Cu, Sb, Co, Ni, and with large amts., Co, Cu, Sb, Ni. This inconsistency is partially explained by inspection of the surface of the Zn after electrolysis of H_2SO_4 in the presence of the impurities: Co is distributed on the surface in discrete clumps, Ni somewhat more uniformly, Cu very uniformly, whereas with Sb hardly any change in the appearance of the original Zn surface is visible. Nor is there complete agreement between the overvoltages and the "crit. c.d." of deposition of Zn, i.e. the c.d. at which electrodeposition of Zn begins to be noticeable on a smooth surface of a foreign metal. The exptl. values of this crit. c.d., in the acid $ZnSO_4$ electrolyte, at 25°, have been detd. to: on Cu 30-45, Sb 50, Co 50-90, Ni 100-300, Fe 220-250, Al 80 amp./sq.m. These detns. are considered to be more reliable than the data of Tainton (*C.A.* **16**, 2269; **25**, 1442). In the acid $ZnSO_4$ soln., as in H_2SO_4, *E* of the Zn becomes decreasingly neg. and decreasingly dependent on the c.d., as the amt. of the impurity ion increases. Examples, with 0, 1, 5, 10, 100 mg./l. of the foreign ion, are, at 400 amps./sq.m., with Ni, 0.89, 0.89, 0.85, 0.81, 0.73 v.; Co, 0.89, 0.88, 0.86, 0.82, —; Cu, 0.89, —, 0.86, 0.84, 0.81; Sb, 0.89, 0.83, 0.78, 0.70, 0.78 v. The current efficiencies for H_2 again fall with increasing c.d. and can be greater than 100%. The harmful effect of the impurities on the yield of Zn can be combatted by the use of high c.ds. Another way of raising the yield of Zn is the use of poisons such as Hg or gelatin which increase the overvoltage of H. Most active with respect to soln. of Zn, and, consequently, most detrimental for the deposition of Zn, is Ni, on account of its low H overvoltage. Co is less active both on account of its somewhat higher H overvoltage and of the high polarization of its deposition on Zn. Cu has a high H overvoltage, but is deposited on Zn without significant polarization, and uniformly. Sb, despite its much higher H overvoltage, is much more active than Cu, because of the ease and very high uniformity of its deposition on Zn with which it reacts chemically. N. Thon

C. 4.

a **Potentials of the evolution of hydrogen in acid solutions.** A. G. Pecherskaya and V. V. Stender (Kazakhskii Mining-Met. Inst., Alma-Ata). *Zhur. Fiz. Khim.* 24, 880-9 (1950).—The potentials of the evolution of H from a 2 N soln. of H_2SO_4 at 25° at c. ds. of 10-2000 amp./sq. m. for the metals Pb, Zn, Sb, Al, Sn, Cd, Cu, Ta, Ge, Fe, Mo, Ag, Co, Ni, W, and Re were detd. Paul W. Howerton

CA

4

Catalytic properties of electrode surfaces. A. G. Pecherskaya and V. V. Stender (Acad. Sci. Kazakh S.S.R.). *Doklady Akad. Nauk S.S.S.R.* **75**, 811-3(1950).—Fe cathode potentials for evolution of H_2 in solns. of NaOH 100 + NaCl 100 g./l., at 70°, at 650 amp./sq. m., were shifted by 0.2-0.4 v. to more pos. values by coating with W-Ni. As the coating did not change the surface area of the cathode, the effect is attributed to its greater catalytic action as compared with Fe. Typical catalyst poisons, such as Hg salts or surface-active substances, counteract the lowering of the potential, more so on W-Ni than on Fe. The effect is not observable under industrial conditions owing to the presence of catalyst-poisoning impurities in the bath or in the anodes.

N. Thon

1751

SALTOVSKAYA, L.A.; STENDER, V.V.

Rate of lixiviating copper from copper minerals. Izv.AN Kazakh.
SSR.Ser.khim. no.4:90-96 '51. (MLRA 9:5)
(Copper ores)

ASM

T

310-T. Stability of Lead and Lead-Alloy Anodes During Electrolysis of Sulfate Solutions. (In Russian.) G. Z. Kir'iakov and V. V. Stender. *Zhurnal Prikladnoi Khimii*, v. 24, Dec. 1951, p. 1263-1273.

Numerous Pb alloys were evaluated as anodes. An alloy containing 98.68% Pb, 1.0% Ag, 0.3% Sn, and 0.02% Co showed the smallest weight loss. Effects of current density, temperature, and other factors were also investigated. Tables and graphs. 20 ref. (T29, P15, Pb)

STENDER, V. V.

USSR/Chemistry - Electrolysis Dec 51

"Stability of Anodes of Lead and Its Alloys Under Electrolysis of Sulfuric Acid Solutions," G. S. Kir'yakov, V. V. Stender

"Zhur Prik Khim" Vol XXV, No 12, pp 1263-1273

In search for most stable Pb alloy anodes for electrolysis of H_2SO_4 solns, studied performance of Pb anodes contg admixts of Ag, Tl, Te, Se, Bi, Ca, Au, Hg, As, Ba, Sr, Sn, and Co. Most stable was Pb-Ag-Sn-Co alloy. Discusses effects of different admixts on performance of anodes.

206T31

STENDER, V. V.

3

met

②

Chemical Abst.
Vol. 48 No. 5
Mar. 10, 1954
Metallurgy and Metallography

The rate of leaching out of copper from copper minerals. L. A. Saltovskaya and V. V. Stender. *Izvest. Akad. Nauk Kazakh. S.S.R.* No. 101, ~~*Ser. Khim.*~~ No. 4, 90–6(1951).—The rate of leaching of 3 sulfide and 4 oxide Cu minerals with agitation at room temp. was detd. The carbonate, sulfate, and silicate minerals show rapid leaching, while the phosphate material is slowest. The process gives a logarithmic time curve. Extn. of sulfide minerals with acid soln. of $Fe_2(SO_4)_3$ is much slower than the aq. H_2SO_4 extn. of the oxide minerals. G. M. Kosolapoff

STENDER, V. V.

Metallurgical·Abst.
Vol. 21 May 1954
Electrometallurgy and Electrochemistry

(II.) *Anodic Potentials of Lead and Its Alloys. G. Z. Kir'yakov and V. V. Stender (Zhur. Priklad. Khim., 1952, **25**, (1), 23–29 ~~(in Russian); J.~~ Appl. Chem. U.S.S.R., 1952, **25**, (1), 25–31 (in English)).—To investigate the relation between the stability of the anode (cf. (I.); preceding abstract) and its potential ϕ, K. and S. measured ϕ (by comparison with Hg_2O half cells) in 2*N*-H_2SO_4 for pure Pb, Ag, Tl, smooth Pt, and the following alloys (compn. in %): Pb–1·0 Ag; Pb–1·0 Au; Pb–1·0 Hg; Pb–0·5 Ag contg. As 0·1, Ba 1·0, Sn 1·0, or Sr 1·0; Pb–1·0 Ag–1·0 Ca; Pb–1·0 Ag–2·0 Tl; Pb–1·0 Ag–0·1 As–0·1 Ba; and Pb–1·0 Ag–0·3 Sn–0·02 Co. To avoid boundary effects, the anodes were framed in synthetic resin, the working surface being 2·135 cm.². ϕ was measured at 25°, 50°, and 75° C., c.d. (D_a) 50–5000 amp./m.². All the Pb anodes were given a preliminary polarization in 2*N*-H_2SO_4 at 400 amp./m.², some for a week. Some tests were made with addn. of Cl^- (100 mg./l.), Mn^{2+} (4000 mg./l.), and Co^{2+} (15 and 100 mg./l.) to the electrolyte. The values of ϕ obtained are tabulated and shown graphically. Tl showed passivity only at high c.d. (the higher the temp., the greater the c.d. at which this happens). With Ag, Pt, Pb, and its alloys, $\phi \propto \log D_a$. For Pb alloys which are more (less) stable than pure Pb, ϕ is more negative (positive) than ϕ_{Pb}: thus, $\phi_{Pb-Ag-Sn-Co}$ is very negative, ϕ_{Pb-Au} and ϕ_{Pb-Hg} very positive. The abs. values of the temp. coeff. of ϕ are lower for the more stable anode alloys. Thick protective films on anodes contg. Ba, Sr, As, and Sn had practically no effect on ϕ. The presence of Cl^- or Co^{2+} ions in the electrolyte lowers ϕ at all anodes, but Mn^{2+} has little effect. Cl^- ions have a strong depassivating effect on Pb–Au alloys. The action of Co in lowering ϕ and raising the stability of anodes is attributed to the oxidation of Co^{2+} ions (derived from the soln. or the anode) to higher-valency compounds, which are then decomposed catalytically at other points on the inhomogeneous surface, which is considered to act as a catalyst.
—G. V. E. T.

②

MF
9-9-54

STENDER, V. V.

USSR/Chemistry - Electrolysis Jan 52

"Binary Electrochemical Systems Composed of Lead and an Alloying Admixture to It," G. Z. Kir'yakov, V. V. Stender, Inst of Chem Sci, Acad Sci Kazakh SSR

"Zhur Prik Khim" Vol XXVI, No 1, pp 30-38

Examd electrochem mechanism by which certain alloying admixts in binary alloys with Pb protect Pb from corrosion under anodic polarization in H_2SO_4 solns. Found that Ag, Tl, and Co protect Pb from corrosion, Ca and other electroneg admixts have only temporary effect, while Au and Hg even promote corrosion. Explains mechanisms in cases of different alloys.

206T39 39

STENDER, V.V.

4

Alkali-Metal Separation Potentials and Current Yield in Electrolysis at a Mercury Cathode. L. N. Sheludyakov, L. A. Saltovskaya, and V. V. Stender (*Zhur. Priklad. Khim.*, 1953, 26, (2), 160–169 (in Russian); *J. Appl. Chem. U.S.S.R.*, 1953, 26, (2), 137–144 (in English)).—The potential of the Hg cathode in electrolysis of aq. soln. of LiCl and NaCl was determined within the following ranges: c.d. 500–4000 amp./m.², temp. 30°–65° C., amalgam concentrations up to 0·33% for Na and up to 0·05% for Li. The main reason for cathodic polarization was found to be slow diffusion of the alkali metal from the surface into the amalgam. The cathode potential was not linearly dependent on log (c.d.), and a rotating vertical Hg cathode gave almost the same values as a horizontal cathode. The current efficiencies over the above ranges of conditions (temp. up to 75° C.) were also determined. High c.d. suppressed the dissolution of alkali metal from the amalgam.—G. V. E. T.

Stender, V.V.

USSR.

62
1

√Electrolysis of zinc sulfate in acid solutions. U. P. Turomshina and V. V. Stender. *Zhur. Priklad. Khim.* 27, 1082-9(1954).—The effect of the concn. of Zn (20-90 g./l.) and H_2SO_4 (100-200 g./l.) and the temp. (30-70°) on the cathodic potential φ and the current efficiency ϵ of Zn deposition at different c.ds. i (up to 10,000 amp./sq. m.) was detd. ϵ was detd. by the evolution of H. ϵ increased (current efficiencies for H decreased) with i in solns. contg. 60 g./l. Zn and with Zn^{++} in solns. contg. 100 and 200 g./l. H_2SO_4 and i values from 100 to 3000 amp./sq.m. The effect of Zn^{++} concns. was more pronounced up to 100 amp./sq.m. and became negligible as i increased. Higher concns. of H_2SO_4 and temps. decreased ϵ; the effect of the latter reversed itself with i above ~2000 amp./sq.m., more so with 200 than with 100 g./l. H_2SO_4. φ varied linearly with i up to 10,000 amp./sq.m. and became more electropos. with higher concns. of H_2SO_4 and Zn^{++} and temps. The effect of the temp. was more pronounced at high i and that of Zn at low i.

I. Bencowitz

STENDER, V.V.

AID P - 2261

Subject : USSR/Chemistry

Card 1/1 Pub. 152 - 6/19

Authors : Turomshina, U. F. and V. V. Stender

Title : Current efficiency and cathodic potentials in the electrolysis of zinc sulfate solutions in the presence of ions of metals more electronegative than zinc. Part II.

Periodical: Zhur. prikl. khim., 28, no.2, 166-174, 1955

Abstract : Addition of sodium, calcium, magnesium, and manganese ions resulted in decreasing the current efficiency (determined by evolution of hydrogen). Nine diagrams, 22 references (21 Russian: 1933-54)

Institution: Institute of Chemical Sciences of the Academy of Sciences of the Kazakhskaya SSR

Submitted : Jl 18, 1953

STENDER, V. V.

AID P - 2268

Subject : USSR/Chemistry

Card 1/1 Pub. 152 - 13/19

Authors : Stender, V. V.

Title : The anode problem in electrolysis

Periodical: Zhur. prikl. khim., 28, no.2, 212-123, 1955

Abstract : Suggestions are made for cutting the loss of electric energy by changing the material of the anode or its construction.

Institution: Dnepropetrovsk Institute of Chemical Technology

Submitted : Jl 6, 1953

Stender, V.V.

AID P - 2776

Subject	:	USSR/Chemistry
Card 1/2		Pub. 152 - 4/19
Authors	:	Turomshina, U. F. and V. V. Stender
Title	:	Current efficiency and cathodic potentials during the electrolysis of zinc sulfate solutions in the presence of ions of metals more electropositive than zinc. Part III.
Periodical	:	Zhur. prikl. khim. 28, 4, 372-387, 1955
Abstract	:	The effect of the ions of mercury, lead, cadmium, copper, arsenic, antimony, germanium, iron, cobalt, and nickel on the current efficiency was studied. The electrolysis was carried out at 30, 50 and 70°C. The experiments are described in detail. Fourteen diagrams, 41 references (27 Russian: 1933-1955).

Zhur. prikl. khim. 28, 4, 372-387, 1955 AID P - 2776

Card 2/2 Pub. 152 - 4/19

Institution : Institute of Chemical Sciences of the Academy of Sciences of the Kazakh SSR.

Submitted : F 23, 1954

STENDER, V.V.

3

CH

Electrolysis of zinc sulfate in acid solutions. IV. The combined effect of mixts. of additives during the electrolysis of $ZnSO_4$ solns. U. F. Turomshina and V. V. Stender. *J. Appl. Chem. U.S.S.R.* 28, 447-52(1955)(Engl. translation). See *C.A.* 49, 15500*e*. H. M. R.

①

STENDER, V.V

AID P - 3418

Subject : USSR/Chemistry

Card 1/2 Pub. 152 - 3/18

Authors : Turomshina, U. F. and V. V. Stender

Title : The combined effect of additives during the electrolysis of zinc sulfate solutions

Periodical : Zhur. prikl. khim., 28, 5, 467-474, 1955

Abstract : Various additives were added to the standard electrolyte containing 60 g Zn and 100 g H_2SO_4 per liter. The effect of a single additive and the combined effect of two additives on the current efficiency of hydrogen were studied and the data compiled in tables. The sum of the added effects of two additives may be higher or lower than the combined effect of the mixture. The positive difference was compared with promoter action, and the negative difference with catalytic poisoning. Three tables, 9 references, all Russian (1945-1955).

STENDER, V.V.

[redacted]

Ways to develop electrolysis in industry. Vest.AN Kazakh.SSR 12
no.3:11-17 Mr '56. (MIRA 9:7)

1.Chlen-korrespondent Akademii nauk KazSSR.
(Electrolysis)

STENDER, V.V.

2

Current distribution on porous electrodes. O. S. Ksenzhek and V. V. Stender (Chem. Tech. Inst., Dnepropetrovsk). *Doklady Akad. Nauk S.S.S.R.* 107, 280-3(1956). —The inner surface of porous electrodes participates nonuniformly in the electrode processes, which extend inward into the electrodes, and gradually fade out at some depth because of the electrolyte resistance effects inside the pores. Some new considerations of the current distribution were discussed. An equation was derived for the current distribution, and curves were calcd. for the potential distribution in depth. The nonuniformity of potential distribution increased with larger outside polarization, and the discharge proceeded principally in the surface layer, the thickness of which was smaller at lower c.d. The thickness of that layer in which some c.d. was still observed and was defined as the "penetration depth" of the process, which

RAZINA, N.F.; KOZLOVSKIY, M.T.; STENDER, V.V.

Lead anode destruction in the electrolysis of sulfate solutions. Dokl. AN SSSR 111 no.2:404-406 N '56. (MIRA 10:1)

1. Dnepropetrovskiy khimiko-tekhnologicheskiy institut imeni F.E. Dzerzhinskogo. Predstavleno akademikom S.I. Vol fkovichem.
(Electrodes) (Lead--Electrometallurgy)

STENDER, V. V.

4 4E2c

4E3d

18 27

Electrolytic deposition of zinc by the alkali method. M. D. Zholudev and V. V. Stender. *Vestnik Akad. Nauk Kazakh. S.S.R.* 13, No. 7, 30-6(1957).—The inhibition period of Zn-sponge formation on a revolving cylindrical steel cathode (Ni anode) is reduced as the c.d., r.p.m., concn. of zincate in the electrolyte, and temp. are decreased and as the concn. of free alkali is increased. The c.d. of the limiting current (H evolution) with revolving cylinders or disks is close to the calcd. values, but initial sponge formation, a few min. after electrolysis is started, is at $^1/_5$-$^1/_4$ of the c.d. of the limiting current. The current efficiency of Zn-sponge formation on a revolving Mg cylinder (Zn does not adhere to Mg and the overvoltage of H in alk. solns. is higher) increases with the r.p.m. and the temp. and decreases as the concn. of Zn and free alkali in the electrolyte increases. I. B.

N3

STENDER, V. V.

73-2-9/22

AUTHORS: Zholudev M.D. and Stender V.V.

TITLE: Properties of sodium zincate solutions: coefficients of diffusion, viscosity and density. (Svoystva rastvorov tsinkata natriya: koeffitsiyenty diffuzii, vyazkost' i plotnost').

PERIODICAL: "Ukrainskiy Khimicheskiy Zhurnal" (Ukrainian Journal of Chemistry), Vol.23, No.2, March-April, 1957, pp.200-207 (USSR).

ABSTRACT: Various methods have been described in literature for the determination of the above coefficients. The optical method devised by K.V.Chmutov and I.Ya.Slonim (Ref.6: K.V.Chmutov and I.Ya.Slonim, Usp.Khim., 1950, 22, 142), the diffraction method described by Ya.P.Gokhshtein (Ref.7: Ya.P.Gokhshtein, Zh.Fiz.Khim., 1948, Vol.22, 871 and 1952, Vol.26, 224, 336) and other methods are critically examined. The authors determined the coefficients of diffusion on a rotating disc electrode which had porous diaphragms with straight channels. They used an equation expressing the limit current on the rotating disc electrode and discuss the particular case of electroplating of metals. The apparatus for this purpose is described in detail and illustrated in Fig.1. The dependence of the electrode

Card 1/3

73-2-9/22

Properties of sodium zincate solutions: coefficients of diffusion, viscosity and density. (Cont.)

potential of 0.05 mol.sodium zincate and the log of the current density at various speeds of rotation of the electrode is given in Diagram 2. The diffusion coefficients of zincate ions calculated by the above mentioned formula are tabulated (Table 1). The obtained experimental values for the diffusion coefficients for various concentrations of zinc and free alkali in the solution are indicated in Diagrams 4 and 5. It can be seen (Diagram 5) that the coefficients decrease with increasing alkali concentration. This is demonstrated by the increasing viscosity. During the electrolysis of zincate containing 30 g/l zinc and free alkali (in one case 120 g/l, in the second case 480 g/l) the limit current should decrease in the same proportion as the diffusion coefficient, i.e. 4.8 fold. This was proved by carrying out practical experiments. The viscosity of the solution was determined with an Ostwald viscosimeter and values obtained are shown in Diagrams 6 and 7. The density of the sodium zincate solution is determined in relation to the density

Card 2/3

73-2-9/22

Properties of sodium zincate solutions: coefficients of diffusion, viscosity and density. (Cont.)

of water. (Diagrams 8 and 9).

There are 2 drawings, 7 diagrams, 1 table, and 16 references, 12 of which are Slavic.

ASSOCIATION: Dnepropetrovsk Chemical Technology Institute.
(Dnepropetrovskiy Khimiko-tekhnologicheskiy Institut).

SUBMITTED: September 15, 1956.

AVAILABLE: Library of Congress

Card 3/3

73-3-6/24

Stender, V. V.

AUTHOR: Zholudev, M. D. and Stender, V. V.

TITLE: Potentials of Hydrogen Evolution from Alkalis with Increased Current Density. (Potentsialy Vydeleniya Vodoroda iz Rastvorov Shchelochey Pri Povyshennykh Plotnostyakh Toka)

PERIODICAL: Ukrainskiy Khimicheskiy Zhurnal, 1957, Vol. 23., No. 3, pp. 322-324 (USSR).

ABSTRACT: The potentials of hydrogen evolution of 9 metals (Mg, Zn, Pb, Sn, Cd, Cr, Sb, Cu and Al) were measured by the direct compensation method at 25°C ± 0.2°C at a current density interval of 10^{-3} to 4.10^{-1} a/cm^2. These data are required for the calculation of the intensity in the bath, for the investigation of conditions of the discharge of metal ions together with the H-ions, etc. when calculating the electrolysis of alkaline solutions. 6 N and 0.6 N NaOH solutions (chemically pure) were used as electrolytes. All metals were used in the shape of discs as cathodes which were previously polarised in the investigated solution for 1 hour at a current density of 400 a/m^2. Measurements were carried out in an open vessel, the electrodes being at a distance of 60 mm. Results are tabulated in Table 1.

Card 1/2

STENDER, V.V.

AUTHOR: Kalinovskiy, Ye. A. and Stender, V. V.

TITLE: Electrolysis of Zinc Chloride Solutions. (Elektroliz Rastvorov Khloristogo Tsinka)

PERIODICAL: Ukrainskiy Khimicheskiy Zhurnal, 1957, Vol. 23, No.3, pp. 384-390 (USSR).

ABSTRACT: Contemporary commercial methods of preparing zinc by electrolysis have several drawbacks: the anode is made of lead and of its alloys which are not of suitable quality and are expensive; the anode product (oxygen) is not utilised; the cathodic zinc is peeled off by hand from the aluminium cathodes. The authors investigated the influence of various factors on the current efficiency and the quality of the cathode deposit during the electrolysis of zinc chloride solutions. A diagram of the apparatus used in the experiment is shown in figure 1. The volume of hydrogen liberated on the cathode during a given time is measured and the current efficiency is calculated. The difference between 100% and the yield of hydrogen in % gives the yield of zinc (in %). It is shown that the corrosion of the cathode progresses at a greater rate than the separation of the zinc on the cathode. The effect of the concentration of HCl was investigated in the electrolyte

Card 1/3

ities.
-ion additives are
was taken as the characteristic
. The properties of the zinc deposit on

0

70-2-27/43

STENDER, V. V

AUTHORS: Selivanov, V. G., Stender, V. V.

TITLE: The Thermal Analysis of the Systems KF-KBF$_4$ and NaF-NaBF$_4$ (Termicheskiy analiz sistem KF-KBF$_4$ i NaF-NaBF$_4$)

PERIODICAL: Zhurnal Neorganicheskoy Khimii, 1958, Vol.3, Nr 2, pp.447-449 (USSR)

ABSTRACT: The ternary systems of KF-KBF$_4$ and NaF-NaBF$_4$ were investigated by thermal analysis. The investigations of the cooling curves were performed by automatic galvanometers of the type SG. The system KF-KBF$_4$ has a simple eutectic, and the eutectic melting point with a composition of KF - 80,5 % and KBF$_4$ - 19,5 % lies near 410°C. The system NaF-NaBF$_4$ also has a simple eutectic and the eutectic melt of NaF - 26,5 % and NaBF$_4$ - 37,4 % lies at 304°C. The nature of the liquidus curve in the systems KF-KBF$_4$ and NaF-NaBF$_4$ does not indicate that a thermal dissociation of KBF$_4$ and NaBF$_4$ occurs. NaBF$_4$ is less stable. It was experimentally determined that the thermal and chemical stability of a fluorborate melt increases with increasing content of KF and NaF. The melts with

Card 1/2

78-2-27/43

The Thermal Analysis of the Systems KF-KBF_4 and NaF-$NaBF_4$

eutectic composition were also subjected to an electrolysis, where elementary boron is precipitated at the cathode, but where with a prolongation of the electrolytic process anodic effects occur. There are 2 figures, 2 tables, and 8 references, 5 ofwhich are Slavic.

ASSOCIATION: **Dnepropetrovsk Chemical-technological Institute** (Dnepropetrovskiy khimiko-tekhnologicheskiy institut)

SUBMITTED: April 24, 1957

AVAILABLE: Library of Congress

Card 2/2

STENDER, V.V., prof.

Industrial electrolysis of aqueous solutions. Khim. nauka i prom. 3 no.4:418-423 '58. (MIRA 11:10)
(Electrolysis)

STENDER, V.V.; VARIVODA, Ye.A.

Electric conductivity of zinc chloride solutions. Trudy IKHTI no.6:208-215 '58. (MIRA 13:11)
(Zinc chloride--Electric properties)

NIKIFOROV, A.F.; STENDER, V.V.

Obtaining zinc by the electrolysis of its chloride. Vest.AN Kazakh.SSR
14 no.10:42-48 O '58. (MIRA 11:12)
(Zinc--Electrometallurgy)

ZHOLUDEV, M.D.; STENDER, V.V.

Cathodic polarization during electrolysis of zincate solutions. Ukr. khim.zhur. 24 no.5:570-574 '58. (MIRA 12:1)

1. Dnepropetrovskiy khimiko-tekhnologicheskiy institut.
(Zincates) (Polarization (Electricity))

ZHOLUDEV, M.D.; STENDER, V.V.

Effect of impurities and admixtures on electrolysis of sodium zincate solutions. Zhur. prikl. khim. 31 no.7:1036-1039 Jl '58. (MIRA 11:9)

1. Dnepropetrovskiy khimiko-tekhnologicheskiy institut.
(Electrolysis) (Sodium zincates)

ZHOLUDEV, M.D.; STENDER, V.V.

Overvoltage in the liberation of hydrogen from alkaline solutions.
Zhur. prikl. khim. v. 31 no.5:719-723 My '58. (MIRA 11:6)

1. Dnepropetrovskiy khimiko-tekhnologicheskiy institut.
(Hydrogen) (Overvoltage)

SALIN, A.A., kand.tekhn.nauk; SYROYESHKIN, M.Ye., inzh.; STENDER, V.V.,
prof., doktor, nauchnyy red.; ARKHANGEL'SKAYA, M.S., red.izd-va;
PETKER, S.Ya., red.; MIKHAYLOVA, V.V., tekhn.red.

[Electrolysis of zinc sulfate] Elektroliz sernokislogo
tsinka. Pod red. V.V.Stendera. Moskva, Gos.nauchno-tekhn.
izd-vo lit-ry po chernoi i tsvetnoi metallurgii, 1959. 184 p.
(MIRA 12:6)

1. Chlen-korrespondent AN KazSSR (for Stender).
(Electrolysis) (Zinc--Metallurgy)

STENDER, V.V.

[redacted]

5(4)

PHASE I BOOK EXPLOITATION SOV/2216

Soveshchaniye po elektrokhimii. 4th, Moscow, 1956.

Trudy...; [sbornik] (Transactions of the Fourth Conference on Electrochemistry; Collection of Articles) Moscow, Izd-vo AN SSSR, 1959. 868 p. Errata slip inserted. 2,500 copies printed.

Sponsoring Agency: Akademiya nauk SSSR. Otdeleniye khimicheskikh nauk.

Editorial Board: A.N. Frumkin (Resp. Ed.) Academician, O.A. Yesin, Professor; S.I. Zhdanov (Resp. Secretary), B.N. Kabanov, Professor, S.I. Zhdanov (Resp. Secretary); B.N. Kabanov, Professor; Ya. M. Kolotyrkin, Doctor of Chemical Sciences; V.V. Losev, P.D. Lukovtsev, Professor; Z.A. Solov'yeva; V.V. Stender, Professor; and G.M. Florianovich; Ed. of Publishing House: N.G. Yegorov; Tech. Ed.: T.A. Prusakova.

PURPOSE: This book is intended for chemical and electrical engineers, physicists, metallurgists and researchers interested in various aspects of electrochemistry.

COVERAGE: The book contains 127 of the 138 reports presented at the Fourth Conference on Electrochemistry sponsored by the Department of Chemical Sciences and the Institute of Physical Chemistry, Academy of Sciences, USSR. The collection pertains to different branches of electrochemical kinetics, double layer theories and galvanic processes in metal electrodepositon and industrial electrolysis. Abridged discussions are given at the end of each division. The majority of reports not included here have been published in periodical literature. No personalities are mentioned. References are given at the end of most of the articles.

(Cont.) SOV/2216

Stender, V.V., G.Z. Kir'yakov, G.N. Znamenskiy, S.A. Alekseyev, ~~[illegible]~~ and A.P. Solyarskiy. High Current Densities During the Electrolytic Preparation of Zinc 461

Loshkarev, M.A., and Ye. I. Dubyago (Dnepropetrovskiy khimiko-tekhnologicheskiy institut imeni F.E. Dzerzhinskogo-Dnepropetrovsk Institute of Chemical Technology imeni F.E. Dzerzhinskiy). Electrocrystallization of Bismuth From an Oxychloride Electrolyte 467

Bodnevas, A.I., and Yu. Yu. Matulis (Institute of Chemistry and Chemical Technology, Academy of Sciences, Lithuanian SSR). New Electrolyte for Bright Tinplating 477

Morkhov, M.I., and K.N. Kharlamova. Adhesion of Nickel Plating to Steel 2, Nickel, Chromium, Steel 1Kh19N9T and a Chrome-Nickel Alloy 482

Lipin, A.I. Contact Separation of Some Metals at the Surface of Aluminium Alloys 486

Card 19/34

Stender, V.V. (Dnepropetrovsk Institute of Chemical Technology ~~imeni F.E.~~ Dzerzhinskiy; Institute of Chemistry, Academy of Sciences, KazSSR). Electrolysis as a Means of Combining Several Metallurgical and Chemical Production Processes (Some New Processes of Hydroelectric Metallurgy) 697

Ksenzhek, O.S., and V.V. Stender (Dnepropetrovsk Institute of Chemical Technology ~~imeni F.E.~~ Dzerzhinskiy). Polarization of Graphite Electrodes During the Anodic Separation of Chlorine 823

AUTHORS: Stender, V.V. and Ksenzhek, O.S. SOV/80-59-1-18/44

TITLE: Graphitized Anodes in Electrolysis of Aqueous Solutions of Chlorous Salts (Grafitirovannyye anody pri elektrolize vodnykh rastvorov khloristykh soley)

PERIODICAL: Zhurnal prikladnoy khimii, 1959, Nr 1, pp 110-121 (USSR)

ABSTRACT: The authors studied the functioning of graphite anodes in the electrolysis of chlorous solutions on 17 kinds of artificial graphites of various origin and structure. The methods employed in this investigation were based on the non-stationary polarization. As a result the data were obtained which characterize the kinetics of the process of chlorine separation on graphite, and information was secured on the magnitude of the specific surface of different kinds of graphites. In spite of the difference of the graphite kinds, the magnitude of exchange current during the chlorine separation is practically the same and equals to $5 \cdot 10^{-6}$ amp/cm^2 at 20°C. The specific surface amounts to 0.8 to 1.5 m^2/g for the well-graphitized samples and 2.5 to 6 m^2/g for the less graphitized samples. The magnitudes of the actual density of current, effective electrode thickness and polarization under various conditions were calculated. It was established that the differences in the electrochemical behavior of various graphite samples were determined mainly by their structural properties.

Card 1/2

SOV/80-59-1-18/44

Graphitized Anodes in Electrolysis of Equeous Solutions of Chlorous Salts

There are 3 graphs, 1 diagram, 3 tables and 22 references, 14 of which are Soviet, 4 English, 1 American and 3 German.

ASSOCIATION: Dnepropetrovskiy khimiko-tekhnologicheskiy institut (Dnepropetrovsk Chemico-Technological Institute)

SUBMITTED: June 13, 1957

Card 2/2

5(4) SOV/156-59-1-49/54

AUTHORS: Stender, V. V., Znamenskiy, G. N.

TITLE: The Determination of the Active Current Density in the Case of the Electro-precipitation of Zinc at High Current Densities (Opredeleniye deystvuyushchey plotnosti toka na primere elektroosazhdeniya tsinka pri vysokikh plotnostyakh toka)

PERIODICAL: Nauchnyye doklady vysshey shkoly. Khimiya i khimicheskaya tekhnologiya, 1959, Nr 1, pp 189 - 192 (USSR)

ABSTRACT: In the electro-crystallization of metals various factors (current density, temperature, time, ion concentration, etc) cause a continuous change in the electrolytic precipitation, and the determination of the actual current density is thus rendered difficult. The paper under consideration studies the changes in the active surface on the basis of the electrolytic precipitation of zinc at high current densities (6000 a/m^2), the above-mentioned changes being particularly well noticeable in this process. The active surfaces of the zinc precipitations obtained under different conditions were judged on the basis of hydrogen hypertension. Zinc was used that had been distilled in a nitrogen atmosphere. In the

Card 1/3

The Determination of the Active Current Density in the Case of the Electro-precipitation of Zinc at High Current Densities SOV/156-59-1-49/54

same way water and sulfuric acid were purified to a high degree by means of distillation. A platinum plate was used as an anode, zinc monocrystals and various zinc precipitations served as a cathode. The potential-measuring was effected directly with respect to a saturated calomel electrode. Diagrams show the shifting in a positive direction of the hydrogen hypertension, as a function of time and temperature. Tables present the calculated enlargement of the active zinc surface as compared with the visible surface. According to these data the actual current density decreases rapidly, which explains the slowing-down of precipitation formation. With a precipitation of 2 mm thickness, the critical current density at which a re-dissolution of zinc may occur is almost reached. The method described can also be employed for the investigation of the surfaces of other pure metals (Cu,Cd, etc). There are 2 figures, 1 table, and 6 references, 4 of which are Soviet.

Card 2/3

The Determination of the Active Current Density in the Case of the Electro-precipitation of Zinc at High Current Densities SOV/156-59-1-49/54

ASSOCIATION: Kafedra tekhnologii elektrokhimicheskikh proizvodstv Dnepropetrovskogo khimiko-tekhnologicheskogo instituta (Chair of the Technology of Electrochemical Products of the Dnepropetrovsk Institute of Chemical Technology)

SUBMITTED: July 15, 1958

Card 3/3

SOV/31-59-3-5/14

5(2)

AUTHOR: Stender, V.V., Corresponding Member of the AS of the Kazakh SSR

TITLE: Chlorine and Carbon-Free Manganese (Khlor i bezuglerodistyy marganets)

PERIODICAL: Vestnik Akademii nauk Kazakhskoy SSR, 1959, Nr 3, pp 48-50 (USSR)

ABSTRACT: The author and his collaborator S.A. Zaretskiy recommend a new method of producing chlorine and pure manganese by the mutual reaction of pyrolusite (manganese dioxide) and hydrogen chloride, and a subsequent electrolysis of manganese dichloride. The reaction is carried out according to the formula: $4\ HCl + MnO_2 = Cl_2 + MnCl_2 + 2H_2O$. As to the electrolysis of the manganese dichloride solutions, see /Ref 8,11,12/ The shortcomings of this method, as compared with the sulphate method, are the particular control conditions of the anode process of chlorine production, and the as-yet-undeveloped

Card 1/2

design of the electrolyzer. The advantage of this method is the use of graphitized instead of lead anodes, the more negative anode potential, the comparatively pure state of the metallic manganese obtained. The chief advantage lies in the fact, that the chlorine electrolyte is prepared by the extraction of half of the chlorine amount from the hydrogen chloride of the above formula. According to the author there are favorable conditions in Central Kazakhstan for the development of an industry of organic synthesis on the basis of electrolytic chlorine production, from NaCl and also for the utilization of hydrogen chloride (by-product of NaCl electrolysis), and the production of manganese according to the above-outlined scheme. The author maintains, that the realization of his method under industrial conditions would be very profitable. There are 14 references, 11 of which are Soviet and 3 English.

ASSOCIATION: AN KazSSR

Card 2/2

5(2)

AUTHORS: Selivanov, V. G., Stender, V. V. SOV/78-4-9-21/44

TITLE: The Electrical Conductivity of Fluoroborate Melts in the Systems NaF - $NaBF_4$, and KF - KBF_4

PERIODICAL: Zhurnal neorganicheskoy khimii, 1959, Vol 4, Nr 9, pp 2058-2061 (USSR)

ABSTRACT: The conductivity was determined by generally accepted methods. On the basis of the experimental data (Tables 1, 2) the isothermal lines of the specific conductance were drawn and brought into connection with the melting point diagram (Fig 1) previously determined. The isothermal lines of the specific electrical conductivity of both the systems investigated belong to the third kind of electrical conductivity according to the classification by M. A. Klochko (Ref 6). Both components of the two systems are good conductors, but the specific conductivity decreases with rising content of weaker conducting fluorides. It reaches a maximum at the eutectic point of the melt. The values of the specific conductivity are higher in the sodium than in the potassium system (Fig 2), which is explained by the larger dimensions of the potassium ion, and the lower mobility

Card 1/2

connected therewith. The linearity of the curve over a wide range indicates the ionic character of these systems. The eutectic melts of both systems may be regarded as optimum electrolytes for the production of elementary boron, as they combine lowest melting points with highest electrical conductivity. There are 2 figures, 2 tables, and 7 Soviet references.

ASSOCIATION: Dnepropetrovskiy khimiko-tekhnologicheskiy institut (Dnepropetrovsk Institute of Chemical Technology)

SUBMITTED: June 14, 1958

NIKIFOROV, A.F.; STENDER, V.V.

Liberation of hydrogen during the electrolysis of acid solutions of zinc salts. Ukr.khim.zhur. 25 no.1:18-24 '59. (MIRA 12:4)

1. Dnepropetrovskiy khimiko-tekhnologicheskiy institut im. F.E. Dzerzhinskogo.

(Hydrogen) (Zinc) (Electrolysis)

STENDER, V.V.; KSENZHEK, O.S.

Graphitized anodes in the electrolysis of aqueous solutions of chlorides. Zhur.prikl.khim. 32 no.1:110-121 Ja '59.
(MIRA 12:4)

1. Dnepropetrovskiy khimiko-tekhnologicheskiy institut.
(Graphite) (Electrolysis)

NIKIFOROV, A.F.; STENDER, V.V.

Causes of the pitting corrosion of zinc deposits in the presence of cobalt admixtures. Izv.vys.ucheb.zav.; khim.i khim tekh. 3 no.1:162-165 '60. (MIRA 13:6)

1. Kafedra tekhnologii elektrokhimicheskikh proizvodstv Dnepropetrovskogo khimiko-tekhnologicheskogo instituta imeni F.E. Dzerzhinskogo.
(Zinc plating) (Electrolytic corrosion)

STENDER, V.V.

S/031/60/000/006/001/004

AUTHOR: Stender, V.V., Corresponding Member

TITLE: On the Automation of Electrochemical Production Processes

PERIODICAL: Vestnik akademii nauk Kazakhskoy SSR, 1960, No. 6, pp. 3 - 7

TEXT: The author discusses the possibilities of increasing speed and degree of automation of electrochemical production processes. Electrochemical production of gaseous and liquid products, in which both the solutions being processed and the products of electrolysis are conveyed through pipes, has already been highly perfected; it could be fully automated if the present graphitized anodes could be replaced by more stable ones, e.g., made of metal. Automation of electrolysis on metallurgy is considerably more complicated, as the metals are obtained in solid phase below their melting point, and a constant feed of the metal anodes is required in electrolytic refining. Automatic feed of the anodes has not yet been achieved; automatic discharge of the cathode metal is subject of extensive research, chiefly in zinc production. One method of automatic zinc discharge consists in obtaining the zinc in powdered form not connected with the cathode metal, con-

Card 1/5

S/031/60/000/006/001/004

On the Automation of Electrochemical Production Processes

tinuously stirring up the electrolyte and draining the latter out of the bath at intervals together with the zinc powder. In the electrolysis of acid solutions of zinc sulfate the discharge of cathode zinc can be done automatically by taking it off from a drum, disc or slotted cathode as an endless metal strip. Such devices are now being tested in Soviet zinc plants, and results show that an increased productivity and improvement of working conditions can be achieved. One of the difficulties in this method is that the zinc output for a given current expenditure decreases with the growing thickness of the strip. G.N. Znamenskiy (Ref. 6), a co-worker of the author, developed a method for determining the effective surface of metal; the relationship between the values of the cathode zinc surface and the yield at a given current on one hand, and the time of electrolysis (i.e., thickness of deposit), current density etc. on the other hand, have also been studied in the author's laboratory. It was shown, for example, that at 6,000 a/m^2 the surface of the cathode zinc increases in 30 - 40 min by 20 - 30 times compared with the original surface, and in the usual industrial electrolysis the combined discharge of hydrogen ions increases. The

Card 2/5

S/031/60/000/006/001/004

On the Automation of Electrochemical Production Processes

obtaining of smoother deposits should lead to the formation of thicker deposits, thus enabling the continuous electrolysis equipment to be simplified. It was also shown that in pure solutions the combined discharge of hydrogen ions was so impeded that the zinc could be separated at very low current densities, e.g., 5 - 10 a/m^2, the relative yield being considerable. Step-by-step electrolysis is suggested as a possible means of obtaining higher zinc yields at high current densities with the solutions passing through normal electrolyzers working at small current densities and the most important admixtures separated and the purified solution fed to continuously operating electrolyzers working at high current densities. In the electrometallurgy of cadmium the addition of surface-active substances should be studied. Good results are to be expected in the use of high current densities and of automatic cathode metal discharge in the production of manganese and iron. Tests with automatic discharge of cathode nickel from the electrolyte baths are beginning on the basis of suggestions by A. A. Bulakh (Ref. 12). In the electrolytic refining of copper the use of vibrating electrodes showed that it was possible to extend the electrolysis

Card 3/5

S/031/60/000/006/001/004

On the Automation of Electrochemical Production Processes

over prolonged periods at a current density of 1,000 a/m^2; it is possible to achieve an analogous effect by eliminating the concentration polarization effect by other means. The galvanizing process is considerably automated, all the operations being carried out in one unit, and so is the electroplating of tin coming off rolling mills and welding machines in an endless strip and passing through a large tinplating unit at 30 - 50 km/h. These and similar devices may serve as a basis for the planning of automation in hydroelectrometallurgical processes. When extracting rare metals from a poor natural source (e.g., natural water) by electrolysis continuous operation with a mercury cathode at current densities close to the maximum is suggested. Reduction of manpower should be aimed at in the electrolysis of smelted media. In the electrolytic production of aluminum the carbon anode should be replaced by a metal or metal-oxide one being stable during the electrolysis of fluoride electrolyte: this would permit the process to be fully automated. Electrolytic production of refractory metals should be effected with the use of liquid cathodes dissolving the metal, after which industrial alloys are obtained or the components of the alloy are electrolytically

Card 4/5

S/031/60/000/010/002/005
A161/A026

AUTHOR: Stender, V.V., Corresponding Member

TITLE: Electrolysis in Iron Metallurgy

PERIODICAL: Vestnik Akademii nauk Kazakhskoy SSR, 1960, No. 10, pp. 66 - 70

TEXT: The existing Soviet and foreign technologies of manganese, chrome and iron electrolysis are briefly reviewed with references to 24 works, and practical recommendations are given. Carbon-free electrolytic manganese is obtained from its sulfate in solution, and in the USSR such production method exists in one plant in the Gruzinskaya SSR. The process technology has been devised by Academician R.I. Agladze of the AS GruzSSR (Ref. 4). Pyrolusite ore is reduced, then leached in spent electrolyte containing sulfuric acid and ammonium sulfate; then, after careful purification, the solution is used for electrolysis, and metal is separated on stainless-steel cathodes with about 400 amp/m^2 current; the anodes are sheets of lead alloyed with 1% silver; about 8,000 kwh of direct current are spent for 1 ton of metal. This process may be improved by: 1) Using sub-standard manganese ores, or their concentration tailings; 2) Using very high current densities and very pure solutions; 3) Using electrolyte with hydrochloric

Card 1/4

S/031/60/000/010/002/005
A161/A026

Electrolysis in Iron Metallurgy

acid instead of sulfuric acid (Refs. 5,8), although it became obvious in latest experiments (by A.F. Nikiforov at the author's laboratory) that two diaphragms must be used to prevent catholyte from reaching the anode. The production of electrolytic manganese doubtlessly must be developed in manganese ore regions (Transcaucasus, Nikopol', Central Kazakhstan), and this industry can be combined with that utilizing chlorine for synthetic products (Ref. 8). The old chrome electrolysis method used since the twenties is not suitable for large-scale production. Electrolysis of trivalent chrome salt solutions in the presence of ammonium salts gives very pure metal with not more than 0.14% iron and 0.01% carbon, and with much lower electric power consumption than in the old method (Refs. 11, 12, 13, 14, 15, 16). Anodes of lead alloyed with 1% silver are used in sulfate solutions, and those of graphite in chloride solutions. Sulfate electrolyte is prepared either from ore (Ref. 13), or by dissolving carbonic ferrochrome preliminarily melted from ore in electric furnace. Ferrochrome may be dissolved by sulfuric acid with heating and subsequent separation of chrome into binary sulfate with ammonium (Ref. 17, Engl.), or anode dissolution of ferrochrome may be used and $Cr_2O_7^{2-}$ and Cr^{3+} iones obtained at a current density up to 1,500 amp/m^2. Such current expenditure is worth while in the opinion of the author (Ref. 16), because of much simpler separation of chrome from iron. In view of the high consumption

Card 2/4

of sulfuric acid and ammonia the production of electrolytic chrome ought to be located in regions rich in sulfides and needing nitrous fertilizers, for the most part of the reagents will be turned into ammonium sulfate. Such regions are, e.g. the South Ural and West Kazakhstan. Electrolytic iron is not yet being produced in large quantities despite existing need. The reasons of this are the raw materIal problem, the still insufficient processing speed, and the insufficiently developed equipment. Kangro and Fluegge (Ref. 21, German) suggested a method (in 1929) of chloridizing iron ores at 1,000°C, trap chlorous iron separately from other chlorides, dissolve it and electrolytically reduce it to iron chloride; move it into special electrolyzers with graphite anodes and a steel cathode in the form of an endless band on which iron powder would be deposited and moved out. The author thinks that this method might considerably be improved and chlorine, separated on the anode,,be utilized in chemical industry. Hydrochloric acid could then be used for dissolving iron ore, for this acid will be soon available in large quantities from plants chlorinating natural gas, coke gas and other matters. The problem of utilizing hydrochloric acid is being discussed in countries having developed a chemical industry (Ref. 22), and the application for electrolysis of iron and chrome might be one of possible solutions. Brown iron clay ores could be used for raw material. It would be expedient to utilize ore

Electrolysis in Iron Metallurgy

S/031/60/000/010/002/005
A161/A026

and waste containing manganese (Ref. 23, Engl.), for manganese in electrolyte improves the quality of deposited metal. There are 24 references: 18 Soviet, 3 English and 3 German.

ASSOCIATION: AN KazSSR (AS KazSSR)

Card 4/4

S/080/60/033/010/010/029
D216/D306

AUTHORS: Stender, V.V., Kir'yakov, G.Z., and Vakhidov, R.S.

TITLE: The effect of manganese on the electrodeposition of zinc

PERIODICAL: Zhurnal prikladnoy khimii, v. 33. no. 10. 1960, 2238 - 2245

TEXT: In existing processes for producing zinc electrolytically where the c.d. does exceed 600 A/M^2, compounds of the higher oxides of manganese have little effect on the cathode. Much work is being done on electrolysis of $ZnSO_4$ solutions at very high c.d.s.

This demands a high solution feed rate, and causes increased gassing at the cathode with consequent agitation of the electrolyte. It had already been found that Mn causes lower cathode current efficiencies, while the presence of permanganates causes depolarization at the cathode. The limiting concentration of Mn is 3 gr./l;

Card 1/4

The effect of manganese on ...

S/080/60/033/010/010/029
D216/D306

if it is higher, it produces a considerable reduction in current efficiency. The following processes are shown graphically in the article: The corrosion rate in gr./M^2·hr. plotted against the MnO_2 content of the electrolyte (gr./l) at 3 given temperatures; The corrosion rate of Zn in gr./M^2 · hr. plotted against $KMnO_4$ concentration at various temperatures: It is pointed out that the action of Mn compounds on the corrosion of Zn is determined by their surface activity and oxidizing properties. MnO_2 particles are absorbed on the surface of the zinc and react with Zn atoms to form unphased layers of the type ZnO_{ads}. The complex sorption layer both protects the Zn from solution in the acid and slows down the reaction of Zn with MnO_4' ions. Further shown are the relation of the current efficiency of Zn cathodes, and the cathode potential to $Mn^{\cdot\cdot}$ concentration in the electrolyte; the relation of current efficiency of Zn to MnO_2 content of the electrolyte; the current efficiency with MnO_2 present in the electrolyte together with Sb

Card 2/4

The effect of manganese on ... S/080/60/033/010/010/029
D216/D306

[illegible] mg/l.), Cu(0.5 mg/l), iron oxide (10 mg/l), Co(9 mg/l), MnO ([illegible] gm/l), Na(2 gm/l), Cl (50 mg/l), Pb (bivalent saturated). On adding MnO to the electrolyte the reduction of cathode efficiency [illegible] up to 10 mg/l, then changes very little. This is connected with absorption of MnO_2 on the zinc. The complex layer protects the Zn cathode from other impurities. It is concluded that the corrosion rate of zinc in standard zinc electrolyte is slowed down by the presence of 0.1 gm/l MnO_2; the presence of potassium permanganate encourages the corrosion of zinc in the standard electrolyte; manganous salts up to 20 gm/l have practically no effect on the electrodeposition of zinc; manganese dioxide in small amounts (less than 5 gm/l) has a beneficial effect when other impurities are present (Sb, Cu, Ni, Pb, etc.). MnO_2 in larger amounts lowers the current efficiency (by 4 - 5 %), but as a surface-active agent improves the quality of the zinc deposit; MnO_4' ions are the most harmful in zinc electrodeposition. At high temperatures

Card 3/4

The effect of manganese on ... S/080/60/033/010/010/029
D216/D306

and low c.d. the current efficiency falls considerably in the pre-
sence of $KMnO_4$, but $KMnO_4$ in small amounts (0.3 - 0.5 gm/l) lowers
the negative effect of impurity metal ions; it is hardly possible
to exclude manganese compounds from hydrometallurgical processes.
In the electrolytic bath Mn compounds do not occur in critical
quantities to cause harmful effects in the electrodeposition; the
the product is manganese dioxide which settles to the bottom of
the bath as slimes. There are 8 figures and 48 references: 42 Sov-
iet-bloc and 6 non-Soviet-bloc. The 4 most recent references to
the English-language publications read as follows: A.L. Marshall,
Trans. Faraday Soc., 21, 297, 1925-26; D.M. Liddell, Handbook of
Non-ferrous metallurgy, N.Y. Sec. Ed., 1945; V.C. King and N.E.
McKinney. Canad. J. Chem., 37, 205, 1959; R.C. Rooney, Analyst.,
82, 619, 1957.

SUBMITTED: March 24, 1960

Card 4/4

ZNAMENSKIY, G.N.; STENDER, V.V.

Electrolysis of acid solutions of zinc sulfate at very low current densities. Zhur. prikl. khim. 33 no.12:2728-2730 D '60. (MIRA 14:1)

1. Dnepropetrovskiy khimiko-tekhnologicheskiy institut.
(Zinc sulfate)

STENDER, Vladimir Vil'gel'movich, prof., doktor tekhn. nauk. Prinimali uchastiye: KSENZHEK, Oktavian Stanislavovich, dots., kand. tekhn. nauk; RAZINA, Ninel' Fedorovna, dots., kand. tekhn. nauk; SAGOYAN, Leonid Nikolayevich, dots., kand. tekhn. nauk; SLUTSKIY, Iosif Zinov'yevich, dots., kand. tekhn.nauk; GALINKER, I.S., prof., otv. red.; TRET'YAKOVA, A.N., red.; TROFIMENKO, A.S., tekhn. red.

[Applied electrochemistry] Prikladnaia elektrokhimiia. Khar'kov, Izd-vo Khar'kovskogo gos.univ. im. A.M.Gor'kogo, 1961. 538 p. (MIRA 15:6)

(Electrochemistry)

24008
S/080/61/034/006/010/020
D247/D305

5 1310

AUTHORS: Znamenskiy, G.N., Mazanko, A.F., and Stender, V.V.

TITLE: Characteristics of codeposition of zinc and cobalt from sulfate solutions

PERIODICAL: Zhurnal prikladnoy khimii, v. 34, no. 6, 1961, 1305 - 1311

TEXT: The present paper reports a study of phase structures and the nature of their distribution during codeposition of Zn and Co. Attention is mainly directed to the distribution of H overpotential in Zn-Co alloys which has a considerable influence on the process of electrolytic Zn separation. Alloys were thermally prepared from 99.999 % pure Zn and 99.98 % electrolytic Co which were dissolved in chemically pure H_2SO_4 and diluted 3-fold with distilled water. Zn-Co alloys were prepared from an electrolyte of composition 30-90 g/l Zn and 10-100 g/l Co, or pH 2-3, temperature 20°C, with current density of 250-300 A/dm². The alloys, before measuring H

Card 1/4

overpotential, were polished and ground with subsequent cathode degreasing and rinsing. Polarization curves were obtained with a 1N H_2SO_4 solution at 20°C. Fig. 1 shows the effect of Co content in the alloy on overpotential of H liberated in both thermal and electrolytic alloys, a marked reduction of overpotential of H separation being observed on increasing Co content to 5 % though lower by 80-100 mv in electrolytic than in thermal alloys (for the same Co content). Microstructures of the two types of alloy are also compared. The thermal alloy containing 4.6 % Co is a 2-phase system of Zn and Co_5Zn_{21} which is in accordance with the equilibrium graph. The structure of the electrolytic alloy with almost the same Co content is also 2-phase, but the amount of the more positive phase is much less and approximately corresponds to the Co content. These differences were verified by heat treatment of the electrolytic alloy at 350°C for 6 hours, followed by again measuring H overpotential and studying the microstructure. The magnetic properties of the two alloy types were examined. Co_5Zn_{21} is not ferromagnetic and the thermal alloys with 0 - 20 % Co were also

24008

Characteristics of codeposition ... S/080/61/034/006/010/020
D247/D305

found to be not ferromagnetic. Electrolytic alloys with more than % Co were found to have clearly defined ferromagnetic properties which disappeared after heat treatment. The marked displacement of potentials shown on curves 5 and 6 (Fig. 8) indicates that the inception of intensive Zn dissolution is due to reduction of active current density below the critical vale. To determine inception of an auto-solution of cathode Zn in relation to current density maintaining Co constant in the electrolyte, the potential variation of Zn residue with time for varying current densities was measured, using a solution of 35 g/l Zn 150 g/l H_2SO_4 and 20 mg/l of Co at 50°C, with current densities from 1000 to 6000 A/dm². With current densities of 3000 and 6000 A/m², the potential evenly changes to positive values; for 6000 A/m², the gradient of the curve is steeper and therefore the active current density falls more rapidly (Ref. 15: G.N. Znamenskiy, Byull. tsvetn. met., 1959, vol. 11, no. 136, p. 24). The auto-dissolution of the Zn deposit begins at 6000 A/m² after electrolysis for 100 minutes, at 3000 A/m² after 80 minutes, and at 1000 A/m² after 10 minutes. There

Card 3/4

24008
S/080/61/034/006/010/020
D247/D305

Chracteristics of codeposition ...

are 9 figures and 16 references: 12 Soviet-bloc and 4 non-Soviet-bloc. The references to the English-language publications read as follows: U. Tainton, Trans. Am. Electrochem. Soc., 1922, vol. 41, p. 392; G.M. Westrip, J. Chem. Soc., 1924, vol. 125, p. 1122; W. Harkins and H. Adams, J. phys. Chem., 1926, vol. 26, p. 205.

ASSOCIATION: Dnepropetrovskiy tekhnologicheskiy institut (Dnepropetrovsk Technological Institute)

SUBMITTED: September 12, 1960

Card 4/4

STENDER, V.V.

"Theoretical principles of electrochemistry" by A.I.Levin. Reviewed by V.V.Stender. Zhur.prikl.khim. 34 no.7:1650 Jl '61. (MIRA 14:7)

(Electrochemistry) (Levin, A.I.)

S/020/61/137/002/011/020
B103/B215

AUTHORS: Znamenskiy, G. N., Gamali, I. V., and Stender, V. V.

TITLE: Peculiarities of electrodeposition of metals from extremely pure solutions

PERIODICAL: Doklady Akademii nauk SSSR, v. 137, no. 2, 1961, 335-337

TEXT: The authors describe experiments on the electrodeposition of the electronegative metals zinc and manganese from extremely pure solutions. They found that the chemically pure salts usually used for studying the kinetics of such processes, do not guarantee the required experimental purity, not even when they have been recrystallized. Small amounts of organic impurities in the solution hamper the determination of the influence of surface-active admixtures on the structure of the cathodic deposit, and on the value of cathodic polarization. Therefore, the authors used extremely pure $ZnSO_4$ solutions produced as follows: metallic zinc contained 10^{-5}% of admixtures and was produced by sublimation in a nitrogen atmosphere,

✓

Card 1/5

Peculiarities of electrodeposition... S/020/61/137/002/011/020
B103/B215

following the method of the Gipronikel' Institute. Chemically pure sulfuric acid was distilled. Water was boiled in potassium permanganate, and then distilled three times, but 1/3 (first portions) of the distillate was not used. The solution thus obtained was boiled again, and then for a long while exposed to current from platinum electrodes. By using standard concentrations (Zn 60 g/l, H_2SO_4 100 g/l) at 20°C, the authors obtained from this solution a current output of zinc up to 60% at low current density (1 a/m^2), and up to 99% at 5 a/m^2. Zinc, however, was intensively dissolved already at 30 a/m^2 in an electrolyte of chemically pure $ZnSO_4$ which had been recrystallized three times. The electrode potential of high-purity zinc without current or with weak current is shifted by 25-30 mv toward negative values (as compared to the potential of the conventional ЦО (TsO) electrolytic zinc). Only glass parts can be used in the electrolytic cell when using high-purity solutions. Plastics (viniplast, organic glass, polyethylene) change the structure of deposited zinc. Crystals become irregular and small. On the basis of these results, the authors worked out a method of

Card 2/5

measuring the active surface of zinc, which gives well reproducible results, and is also applicable to other metals (Ref. 5, V. V. Stender, G. N. Znamenskiy, Nauchn. dokl. vyssh. shkoly, ser. khim., 1, 189 (1959)). For similar experiments with manganese, the authors used an electrolyte of 50 g/l of manganese (as chloride), and 110 g/l of ammonium chloride. Manganese was dissolved at pH >1. The solution was purified with manganese sulfide which was obtained from a previously purified manganese chloride solution and ammonium sulfide. Ammonium sulfide was obtained by absorption of hydrogen sulfide by an ammonia solution in water distilled twice. H_2S was obtained from chemically pure sodium sulfide previously purified from arsenic. After purification of sulfide, the manganese electrolyte was electrolytically treated in a glass vessel at a current density of 20-50 a/m^2. In the vessel, there was an anodic glass cell with a glass diaphragm, a platinum anode, and a cathode of pure aluminum. The catholyte was constantly stirred. Anodic gases were sucked off. Manganese hydroxide which was deposited in the catholyte and oxidized to dioxide by atmospheric oxygen, adsorbed all sorts of admixtures from the electrolyte. After filtration, the solution was subjected to another electrolytic treatment. This process was repeated