Corrosion of aluminum cooling coils in cells for electrodeposition of zinc. A. I. Levin, A. V. Pomosov, and T. N. Rogatkina. *Zhur. Prikl. Khim.* 26, 1245–51(1953).—The corrosion of Al cooling coils was investigated under several conditions which are found in cells for the electrodeposition of Zn. At 32° with a standard Zn electrolyte ($60Zn + 100H_2SO_4$) the presence of 10 mg./l. of Ni^{++}, Fe^{++}, Co^{++}, Bi^{++}, Sb^{++}, As^{++}, Pb^{++}, and Cu^{++} increased the corrosion rate of Al wire from 0.19 to 0.94 g./sq.m./hr.; and the anions NO_3^-, Cl^-, and F^- increased it from 0.32, through 1.55, to 2.05 g./sq.m./hr. At 45° the corrosion rate in H_2SO_4, from 100 to 140 g./l., remained const. at about 0.30 g./sq.m./hr. The presence of silicic acid did not affect the corrosion rate but did retard the corrosion effect of F^-; with 10 mg./l. F^- (in 100 g./l. H_2SO_4) the presence of 10 mg./l. silicic acid decreased the corrosion rate from 2.72 to 0.52 g./sq.m./hr.; with 100 mg./l. F^- the rate decreased from 4.50 to about 0.20 in the presence of 10–50 mg./l. silicic acid and to 0.88 with 100 mg./l. The electrode potential of Al in H_2SO_4 and in the standard Zn electrolyte in the presence of 10–4000 mg./l. F^- attained a const. value after 60 min. at −0.550 and −0.765 v., resp. The protective film obtained by chem. means (in $CaO + CaSO_4$) was found frequently harmful; protective films obtained by anodic oxidation, with a c.d. of 2.4 amp./sq. dm., in 20% H_2SO_4, and for 5 min., were effective. Increasing the c.d. and the temp. or a 10% H_2SO_4 decreased the effectiveness. The effectiveness was further increased by treatment of the film in a soln. of $K_2Cr_2O_7$. It is concluded that Al cooling coils are suitable for Zn electrodeposition cells providing Cl^- and F^- are eliminated and the coil is protected by anodic oxidation. The corrosion rate with a film obtained under the best conditions was 0.001, 0.003, and 0.007 g./sq.m., in 30, 120, and 240 min. I. Bencowitz

LEVIN, A. I.

Chemical Abst.
Vol. 48 No. 6
Mar. 25, 1954
Electrochemistry

(3)

Cathodic processes during electrodeposition of copper from complex electrolytes. E. A. Ukshe and A. I. Levin. (S. M. Kirov [illegible]) [illegible] Zhur. Fiz. Khim. 27, 1[illegible] (1953). The polarization ΔE during electrodeposition of Cu from solns. of $CuSO_4$ + $Na_4P_2O_7$ was large (e.g. 0.5-0.9 v. at [illegible] cm.) and it approx. agreed with Tafel's equation. The ΔE in $CuSO_4$ + $Na_2C_2O_4$ soln. rapidly increased (e.g. from 0.2 to 1.0 v.) when c.d. reached the limiting current v. for (i_0) of about 0.0 ma./sq. cm.; ΔE was const. [illegible] log. (i_0-i)] (I) which was the equation for the combined chem. and concn. polarization. In $CuSO_4$ + Na salicylate, ΔE was 0.3-0.4 v. at i = 1 and had a complicated dependence on i, probably because a salt coating formed on the cathode. In NH_3 solns. ΔE was very small and seemed to be due to diffusion only. In $CuSO_4$ + $Na_2S_2O_3$ equation I was valid. In most cases ΔE was lowered by increasing the concn. of $CuSO_4$ and of the complex-forming salt; thus ΔE was apparently due to the slowness of the transfer of Cu from the complex ions into the metal lattice. The instability consts. of the complexes, calcd. from the equil. potentials and the elec. cond., were for $[Cu(P_2O_7)_2]^{6-}$ 1.3 × 10^{-10}, $[Cu(P_2O_7)]^{--}$ 1.2 × 10^{-6}, $[Cu(C_2O_4)_2]^{2-}$ 1.2 × 10^{-4}, $[Cu(S_2O_3)_2]^{3-}$ 5 × 10^{-11}, Cu salicylate complex 1.5 × 10^{-11}, $[Cu(NH_3)_2]^{++}$ 4.1 × 10^{-10}, and $[Cu(NH_3)_4]^{++}$ 7 × 10^{-13}. J. J. B.

LEVIN, A.I., professor, doktor tekhnicheskikh nauk; POMOSOV, A.V.; KOLEVATOVA, V.S.; GUREVICH, I.Ye.; UKSHE, Ye.A.; ROGATKINA, N.T.; MOKRUSHIN, S.G., professor, doktor tekhnicheskikh nauk, retsenzent.

Corrosion and metal cladding. Sbor.st.Ural. politekh.inst. no.43:3-174 '53. (MIRA 8:1)
(Corrosion and anticorrosives) (Metal cladding)

Levin, A.I.

6

shifted in the pos[illegible] as octanol and camphor while I had [illegible] effects were in agreement with the positions of E with respe[illegible] to the zero charge potentials of these metals [illegible] mater[illegible] [illegible] with further shift in neg. [illegible] polarization curves [illegible] [illegible] the passing of cess [illegible] ceeded. Increase in temp[illegible] creasing adsorption. Analysis [illegible] curves in electrodeposition [illegible] [illegible] 1/4

Lorin, A.I., Pomosov, A.V., Kokovatova, V.S., Gurevich, I.E.

III [illegible]

[illegible]

II Influence of impurities and [illegible] on the electrodeposition of zinc [illegible]

Mn [illegible] slightly retarded [illegible] improvement [illegible]

ful impurities and by better bath circulation. Impurities were improved and the efficiency increased by use of Nibu[illegible] at a concn of 10 mg./l. or by combination of 10 mg glue and 29 mg β-naphthol/l., or by glue, naphthol, and 0.02 mg Sb/l. Formation of waffled surface was promoted by camphor and octanol. Contact-angle measurements indicated that camphor and octanol made the surface of Zn hydrophobic. This caused H bubbles to adhere to Zn several times longer than [illegible] cathodic current [illegible] Zn in the electrolyte [illegible] these substances decreased the [illegible] influence of Ni or Co impurities [illegible] 0.0116 cm./min. The polarization curves indicated that these substances retarded both anodic and cathodic processes. H overvoltage of Sb in the electrolyte was decreased by glue especially strongly (18 mv. at 50 ma. [illegible] [illegible]

[illegible]

[illegible], A.I., [illegible], A.F., [illegible]

66-71 Cu, contg. Sb [illegible], As [illegible], Fe [illegible], Pb 0.015 and Ni [illegible] was electrorefined at [illegible] in H_2SO_4-$CuSO_4$ electrolyte at [illegible] amp/sq m. From anodes Ni was [illegible] resulted in an intercryst. [illegible] of anodes and [illegible] lation of Ni salts in the electrolyte. The [illegible] of $CuSO_4$ was decreased by Ni^{++} but the viscosity of soln. increased. Because of an accumulation of Ni^{++} in the vicinity of the cathode, the efficiency of the electrodeposition of Cu decreased and the deposit became irregular and dendritic. Ni promoted formation of sludge and of passivating scales on the anode. To improve the process, circulation and continuous filtration of the electrolyte was provided. The acidity should be maintained at 170–190 g. H_2SO_4, Ni in the electrolyte <25 g./l., and c.d. <170 amp./sq. m. IV. Sulfite cellulose liquor as an electrolyte additive in electrorefining of copper. *Ibid.* 72–80.—Cu was electrorefined at 55° and 180 amp./sq. m. in soln. of 140 g. $CuSO_4 \cdot 4H_2O$ and 180 g. H_2SO_4/l., with 0–150 g./l. (as dry substance) sulfite-cellulose (IV) liquor. The max. cathodic polarization was at 30–100 g. IV/l. IV improved the deposit and promoted coagulation of the "floating" sludge. Addn. or removal of Ca^{++} from IV had no influence on its action. V. Corrosion of aluminum cooling coils in baths for electrodeposition of zinc. *Ibid.* 81–[illegible]. Corrosion of Al at [illegible] in a soln. contg. 100 g. H_2SO_4 and 60 g. Zn^{++}/l. proceeded at a rate of 0.25 g./sq. m. hr. The corrosion rate was increased by addn. of 10 mg./l. of Cu, Sb, As, Bi, Co, or Pb, by a factor of up to 3, but especially strongly by [illegible] and [illegible]. Silica by itself had little influence [illegible] the influence of [illegible] manage [illegible] and [illegible] g. [illegible] had little influence [illegible] tion of Al at 98° in CaO-$CaSO_4$ with [illegible] corrosion resistance of Al. [illegible] increase the corrosion resistance

3/4

APPROVED FOR RELEASE: 08/23/2000 CIA-RDP86-00513R000929510020-3"

USSR

Mechanism of discharging of copper from electrolytes containing complex pyrophosphates. A. I. Levin, B. A. Ukshe, and N. S. Brylina. *Doklady Akad. Nauk S.S.S.R.* 88, 697-700(1953).—The authors studied the lack of a major difference in electrochem. properties between hydrated and complex ions during electrodeposition of Cu. The expts. were carried out on a water soln. of $CuSO_4$ and $Na_4P_2O_7$ (I) with a Cu cathode. The pyrophosphate complex ions in such solns. are less stable than, e.g., cyanide complex ions. When changing the potential from +0.19 to −0.25 v. it was found that polarization curves show the following behavior: (a) when the potential reaches approx. +0.11 v. ("zero point") there is a decrease in amp. accompanied by an increase in polarization; (b) the max. current, at which the decrease takes place, is greater when the concn. of $CuSO_4$ is greater and when the concn. of I is smaller, i.e. when the ratio $[P_2O_7^{4-}]/[Cu^{++}]$ is smaller; (c) after reaching a min. value the current begins to rise again, the rise being faster when the concn. of $CuSO_4$ is greater and when the concn. of I is smaller. E.g.: for $CuSO_4$ 0.0115 and for I 0.0160 g. mol./l. the amp. change from 0 to 8.5×10^{-4} while the v. change from +0.19 to −0.05; the zero point is at +0.11 v. and 7×10^{-4} amp. It is apparent that the potential at the max. point of the polarization curves is in-

1/2

OVER

A. I. LEVIN

dependent of concn. of $CuSO_4$ or I and is approx. equal to +0.11 v. If the concn. of I is so high that the equil. potential of the Cu electrode is more neg. than +0.11 v. then the polarization curves have neither max. nor min. E.g. for $CuSO_4$ 0.0078 and for I 0.045 g. mol./l. amp. change from 0 to 3.5 × 10^{-4} while the voltage change is from +0.04 to −0.25. In a similar manner in very dild. solns. contg., however, a certain small excess of I there are no max. or min. The current at the zero point should increase when the concn. of Cu increases; on the other hand, a decrease in the concn. of I apparently eases the supply of Cu^{++} to the cathode, thus increasing at the same time the current at the zero point. Neither vigorous agitation nor change of temp. by 8° had any effect on the above results. Substitution of $CuSO_4$ by $Cu(NO_3)_2$ increases only the potential of the zero point to 0.12 v. Expts. with other complex ions $CuSO_4$ + $Na_2H_2(CH_3COO)_4N_2(CH_2)_6$, $CuSO_4$ + $Na_2C_6H_6O_7$, and $CuSO_4$ + $Na_2C_2O_4$ did not give pos. results. Addn. of Na citrate to the soln. of $CuSO_4$ + I flattens the polarization

F. J. Hendel—

LEVIN, A.I.

USSR

Relation between zero point and mechanism of electrodeposition of copper from pyrophosphate solutions. A. I. Levin and E. A. Ukshe (S. M. Kirov Ural Polytech. Inst., Sverdlovsk). *Doklady Akad. Nauk S.S.S.R.* 89, 1045-8 (1953).—Cathodic polarization curves of Cu at c.ds. up to 2 ma./sq. cm. were taken at 25° in a soln. of 0.2*M* $CuSO_4$ and 0.5*M* $Na_4P_2O_7$, in the absence and in the presence of several surface-active or complexing agents. 2-Naphthol, which is adsorbed as an electrically neutral mol., as well as adsorbable anions, such as anthranilic acid and Trilon B, had little influence on polarization. Complexing agents, such as $Na_2C_2O_4$, Na citrate, and $KNaC_4H_4O_6$, also did not influence the polarization. The cationically adsorbed $N\text{-}Bu_4^+$, introduced as iodide, increased the cathodic polarization considerably. At const. c.d. the polarization increased asymptotically with concn. of NBu_4I, indicating that the effect is adsorptive. The free-electrode potential (I) of Cu was 0.0 v. on the H scale, thus neg. to the zero point which is at +0.11 v. in this soln.; this explains why cations, but not anions, influence the polarization. The rate of establishment of I of Cu in solns. of $P_2O_7^{4-}$ of various concns. was influenced by the surface-active agents. In solns. where I was above +0.11 v., that is pos. to the zero point, the anionic Trilon B was most efficient. Below this point, NBu_4I was more efficient, while 2-naphthol took an intermediate position.

Andrew Dravnieks

Levin, A. I.

USSR.

Concentration changes in the pre-electrode layers of a copper pyrophosphate bath. A. I. Levin and E. A. Ukshe. *Doklady Akad. Nauk S.S.S.R.* 91, 779-82(1953).—Electrolysis at high currents of a soln. contg. $CuSO_4$ and $Na_4P_2O_7$ produced crystallites of $Na_4P_2O_7$ on the cathode and insol. $Cu_2P_2O_7$ on the Cu anode. The cathode effect was attributed to the reduction of $Cu(P_2O_7)_2^{6-}$. A soln. contg. 0.2*M* $CuSO_4$ and 0.434*M* $Na_4P_2O_7$ was examd. by the Hittorf method with 6 ma. The passage of 0.015 Faradays yielded: 0.473*M* $P_2O_7^{4-}$ in the catholyte, 0.434*M* $P_2O_7^{4-}$ in the center space, and 0.420*M* $P_2O_7^{4-}$ in the anolyte. These data confirmed an analysis of concn. changes based on transference nos. and conductivities of $CuSO_4$ and $Na_4P_2O_7$ solns. The fraction of current carried by the complex $Na_4[Cu(P_2O_7)_2]$ was approx. 0.41. Passivity on the anode can be eliminated by adding Na K tartrate, Na citrate, or Na tartrate. The complexing agents do not influence the cathode but help to solubilize the anode layer. R. D. Misch

62

Levin, A. I.

USSR.

Influence of adsorption of cations on electrodeposition of copper from pyrophosphate electrolytes. E. A. Ukshe and A. I. Levin (S. M. Kirov Ural Polytech. Inst., Sverdlovsk). *Doklady Akad. Nauk S.S.S.R.* 92, 799-801(1953); cf. *C.A.* 48, 13486g; preceding abstr.—Four different cases can be distinguished in action of surface-active substances during electrochem. reactions of ions at the cathode. The rate of cathodic process is described by: $i = kC \exp(-\alpha Fn(E-\psi_1)/RT) \exp(-nF\psi_2/RT)$ where: i = c.d.; k, α are const. coeffs.; C is vol. concn. of ions to be discharged; E is electrode potential; ψ is the jump of the potential at distance of one ionic radius from the surface of the cathode; n, ion valence with proper sign; F = Faraday; T = abs. temp. In discharge of cations: (1) if $\psi_1 < 0$, that is, neg. to the zero point, cations are adsorbed, ψ_1, moves in pos. direction, and i decreases; (2) at $\psi_1 > 0$, mainly the surface-active anions are adsorbed, and i increases. In discharge of anions: (1) if $\psi_1 > 0$, anions are adsorbed and i decreases; (2) if $\psi_1 < 0$, cations are adsorbed, and ψ_2 shifts in pos. direction. The last case is encountered in electrodeposition of Cu from $Cu(P_2O_7)_3^{4-}$ solns. It was, therefore, expected that NBu_4I should decrease polarization. The opposite was observed. Polarization was increased also by KI but decreased by $(NBu_4)_2SO_4$. Thus, I and not NBu_4^+ was responsible for increase in the polarization by NBu_4I. With the sulfate salt, the polarization increased asymptotically with concn., as expected if it were an adsorption effect. Also, the polarization curves, plotted in ΔE *vs.* log i coordinates for various concns. of the sulfate, were parallel, indicating that the polarization is caused by a change of ψ_2 with concn. Andrew Dravnieks

LEVIN, A. I.

USSR/Chemistry - Physical chemistry

Card 1/1 : Pub. 147 - 10/21

Authors : Ukshe, E. A., and Levin, A. I.

Title : About the effect of admixtures on the electrodeposition of Cu from a pyrophosphate electrolyte

Periodical : Zhur. fiz. khim. 8, 1434-1438, Aug 1954

Abstract : The effect of Pb and Fe admixtures on the cathode process of Cu-deposition with a pyrophosphate electrolyte, was investigated. The effect of J', Cl' and Br'-admixtures on the performance of a copper-pyrophosphate electrolyte, was determined. The quality of the cuprous precipitates was investigated visually, the flux yield by means of Coulomb meter and the electrode potentials by means of a special calibrated cathode voltmeter. Results are given in tables. Eight references: 5-USSR and 3-USA (1944-1953). Tables; graphs.

Institution : The S. M. Kirov-Ural Polytechnicum, Sverdlovsk

Submitted : October 5, 1953

LEVIN, A. I.

USSR/Chemistry

Card 1/1

Authors : Ukshe, E. A.; and Levin, A. I.

Title : The composition and properties of a complex electrolyte of a cupric-pyrophosphate bath.

Periodical : Zhur. Ob. Khim. 24, Ed. 5, 775 - 780, May 1954

Abstract : The problem concerning the composition of complex ions in a real pyrophosphate electrolyte suitable for galvanic copper plating was studied. The instability constants of copper pyrophosphate complexes were measured by the potentiometric method. Values were established for $K_1 = 0.63 \cdot 10^{-9}$ and for $K_2 = 0.5 \cdot 10^{-10}$. The dependence of the electro-conductivity of the $CuSO_4$ - $Na_4P_2O_7$ - H_2O system on the concentration of components was investigated and the bend observed in the electro-conductivity curve indicated a complete transformation of the copper into a complex ion. Ten references. Tables, graphs.

Institution : The S. M. Kirov Polytechnical Institute, Ural

Submitted : October 6, 1953

[illegible], A. I.

*Effect of Surface-Active Substances on the Corrosion of Cathode Zinc. V. S. Kolesnikova and A. I. [illegible] [illegible] Prikl. Khim., 1954, 27, (4), 456-[illegible]. (in Russian).

The experiments were made with Zn deposited from a bath contg. Zn 60, H_2SO_4 100 g./l. for 3 hr. at 30° C. and c.d. 400 amp./m.². Specimens were made the cathode in H_2SO_4 (100 g./l.) at 30° C., c.d. 400 amp./m.² and the corrosion followed by detn. of the vol. of H evolved over and above that due to electrolysis. In the pure electrolyte the corrosion rate (V_c) was 0·01165 c.c./cm.²/min., but it increased as the content of more electropositive impurity (Ni, Sb, Cu, or Co) in the bath increased. Thus, with 100 mg./l. of these impurities, V_c was 1·234, 1·111, 1·092, and 0·2905, resp. At low concentrations, however, their order of decreasing effectiveness is not Ni, Sb, Cu, Co but Ni, Cu, Sb, Co. The addn. of glue (10-100 mg./l.), β-naphthol (10-50 g./l.) or soaproot (10-100 mg./l.) to soln. contg. Ni 50, Co 100, Cu 25, or Sb 25 mg./l. led to a reduction in V_c, this being most effective in the cases of Ni and Co. On electrolysis of soln. contg. (g./l.) Zn 60, H_2SO_4 100, Co 0·0040, at 30° C. with c.d. 400 amp./m.² using sheet Al cathodes, and Pb anodes, the current efficiency was 79·7%, in the absence of addn., 85·75, 85·0, and 79·8% in the presence of 10, 25, and 100 mg./l. glue, 81·6 and 80·0% with 10 and 25 mg./l. β-naphthol. As the content of glue or β-naphthol was increased, the appearance of the deposit improved.

—G. V. E. T.

LEVIN, A. I.

AID P - 916

Subject : USSR/Chemistry

Card 1/1 Pub. 152 - 7/22

Authors : Kolevatova, V. S. and Levin, A. I.

Title : Causes of the inhibition of corrosion of cathodic zinc in the presence of surface-active substances

Periodical : Zhur. prikl. khim., 27, no. 5, 506-513, 1954

Abstract : Study of the effect of surface-active substances on the overvoltage of hydrogen and on the critical current density of metals (nickel, cobalt, copper, and antimony) has shown that with increase in the concentration of the surface-active substances the overvoltage of hydrogen increases to a certain limit and then decreases gradually. The anodic potential of zinc dissolution becomes positive when surface-active substances are introduced into the solution. Two tables, 6 diagrams, 9 references (Russian: 1932-1954).

Institution : None

Submitted : Jl 12, 1952

LEVIN, A.I.

USSR/Chemistry - Electrodeposition

Card 1/1 Pub. 147 - 17/26

Authors : Levin, A. I.; Ukshe, E. A.; and Kolevatova, V. S.

Title : Effect of surface-active substances of the electrodeposition of metals

Periodical : Zhur. fiz.khim. 28/1, 116-126, Jan 1954

Abstract : The effect of surface-active substances on the electrode potentials in the absence of current was investigated. The position of the zero point of the metal and its effect on the change of the equilibrium potentials with time was determined. It was established through study of the effect of surface-active substances on the electrode polarization that such substances have highly inhibiting effect on the cathod process. Ninteen USSR references (1919-1953). Tables; graphs.

Institution : The S. M.Kirov-Ural Polytechnicum, Sverdlovsk

Submitted : March 28, 1953

The effect of additions on the electrodeposition of copper from a pyrophosphate bath. E. A. Ukshe and A. I. Levin (S. M. Kirov Ural Polytech. Inst., Sverdlovsk). *Zhur. Fiz. Khim.* 28, 1134-8(1954); cf. *Doklady Akad. Nauk S.S.S.R.* 89, 1045(1953); Kanevskii C.A. 48, 13459d. — The cathodic polarization ΔE of Cu in 0.2*M* $CuSO_4$ + 0.5*M* $Na_4P_2O_7$ was lowered by 0.05 v. when 0.005-0.02 g.-equiv. $FeSO_4$ or 0.002-0.02 g.-equiv. $Pb(OAc)_2$ was added to a l. soln.; this lowering was almost independent of the concn. of the addn. and slightly dependent on the c.d. The deposit contained Fe or Pb, resp. KCl (10-60 mg./l.) lowered ΔE by 0.1-0.16 v. KBr had no effect on ΔE, and KI raised ΔE by as much as 0.65 v., probably because of the formation of colloidal CuI. All halide ions caused deterioration of the Cu deposit. J. J. Bikerman

LEVIN, A. I.

USSR/Chemistry - Physical chemistry

Card 1/1 Pub. 147 - 15/27

Authors : Levin, A. I., and Falicheva, A. I.

Title : Mechanism of electrodeposition of chromium

Periodical : Zhur. fiz. khim. 28/9, 1652-1661, Sep 1954

Abstract : Various literature data regarding the mechanism of Cr electrodeposition were analyzed. Study of the electrolysis of chromic anhydride solutions showed sharp current drops on Pt-, Ag-, Cu-, Fe-cathodes which, as a rule, are close to the zero-charge potentials for above mentioned metals. No current drops were revealed in the case of Ni-, Cr-, Cd-, Zn-cathodes. This phenomenon is explained by the possibility of direct reduction of chromate ($CrO_4^{=}$) or bichromate ($Cr_2O_7^{=}$) anions on the cathode. The effect of the electrode surface charge on the kinetics of electrode reactions is explained. Thirty-two references: 20-USSR; 7-German; 4-USA and 1-English (1854-1954). Graphs; drawing.

Institution : The S. M. Kirov Ural Polytechnicum, Sverdlovsk

Submitted : January 19, 1954

USSR/ Physics - Complex ions

Card 1/1 Pub. 147 - 22/25

Authors : Levin, A. I., and Ukshe, E. A.

Title : About the nature of complex ions participating in a cathode process

Periodical : Zhur. fiz. khim. 28/10, 1859-1861, Oct 1954

Abstract : Literature and experimental data are presented showing that the electrocrystallization of metals from their own complex salt solutions takes place as result of direct reduction of the complex ions or molecules on the cathode followed by simultaneous separation of the metal. This was found to be perfectly possible in the presence of a cupric pyrophosphate complex $Cu(P_2O_7)_2^{6-} + 2e \rightarrow Cu + 2P_2O_7^{4-}$ or a cyanine complex electrolyte $Ag(CN)_2^- + e \rightarrow Ag + 2CN^-$. Many facts confirming the mechanism of electrode reactions are cited. It is pointed out that a solution containing complex ions of any given metal and a specific surplus of the complex forming agent may have numerous complex ions regardless of the fact that the concentration of one of the ions may be prevalent in the given solution. Nine references: 8-USSR and 1-German (1942-1954).

Institution : The S. M. Kirov-Ural Polytechnicum, Sverdlovsk

Submitted : February 15, 1954

LEVIN, A. I.

Passivity of iron in concentrated nitric acid

LEVIN, A.I., FALICHEVA, A.I., UKSHE, E.A., and BKYLINA, N.S.

"Mechanism of Electrodeposition of Chromium," Dokl. AN SSSR, 95, No.1, pp 105-108, 1954.

Abstract A-44434, 12 Aug 55

LEVIN, A. I.

USSR/Chemistry - Physical chemistry

Card 1/1 : Pub. 22 - 34/47

Authors : Novakovskiy, V. M., and Levin, A. I.

Title : Anodic passivation of iron in concentrated sulfuric acid

Periodical : Dok. AN SSSR 99/1, 129-132, Nov 1, 1954

Abstract : The results obtained by studying the anodic polarization of steel electrodes, in a concentrated sulfuric acid saturated with ferrous sulfate, are presented. The important role of the sulfate layer in the passivation of iron-carbon alloys is explained. The possibility of applying anodic passivation for corrosion-protection of iron-carbon alloys, in concentrated sulfuric acid, was discussed. Nine references: 8-USSR and 1-German (1930-1954). Graphs; diagram.

Institution : The S. M. Kirov Ural Polytechnicum, The Ural Scientific Research Institute of Chemistry

Presented by : Academician S. I. Vol'fkovich, June 8, 1954

LEVIN, A. I.

2493* Connection Between the Potential of Zero Charge and Physical-Chemical Characteristics of Metals. O sviazi mezhdu potentsialom nulevogo zariada i fiziko-khimicheskimi kharakteristikami metallov. (Russian.) V. M. Novakovskii, E. A. Ukshe, and A. I. Levin. *Zhurnal fizicheskoi khimii*, v. 24, no. 10, Oct. 1950, p. 1847-1853.

MG

On the basis of contemporary theory of electrode potential, equations are derived which relate the potential of zero charge with other physical-chemical characteristics. Tables. 13 ref.

(2)

AID P - 2777

Subject : USSR/Chemistry

Card 1/1 Pub. 152 - 5/19

Authors : Ukshe, Ye. A. and A. I. Levin

Title : Characteristics of the cathodic process in a copper pyrophosphate cell

Periodical : Zhur. prikl. khim. 28, 4, 388-393, 1955

Abstract : With an increase in the amount of copper contained in the electrolyte, the current efficiency of copper increases. Four basic types of cathodic deposits are described. One table, 4 diagrams, 13 references (12 Russian: 1939-1953).

Institution : Electrochemical Laboratory of the Ural Polytechnic Institute im. S. M. Kirov.

Submitted : 0 6, 1953

LEVIN, A.I.

USSR/ Chemistry - Galvanization

Card 1/2 Pub. 147 - 12/26

Authors : Levin, A. I. and Falicheva, A. I.

Title : Study of cathode processes during galvanic chrome plating

Periodical : Zhur. fiz. khim. 29/1, 95-104, Jan 1955

Abstract : Investigation was conducted to observe the electrode polarization during chromium electrodeposition and to establish its relationship to various electrolysis factors (temperature, concentration, solution circulation, etc.) The Crpotentials were measured in the absence of the current and it was found that the equilibrium potentials of Cr are highly unstable and depend upon the material, the characteristics of the electro surface and the adsortion processes occurring at the time.

Institution : The S. M. Kirov Ural Polytechnicum, Sverdlovsk

Submitted : April 29, 1954

Periodical : Zhur. fiz. khim. 29/1, 95-104, Jan 1955

Card 2/2 Pub. 147 - 12/26

Abstract : It was established that the polarization during the reduction of chromate ions on the cathode cannot be explained by concentration difficulties but rather by the chemical nature of the substance. Seventeen references: 2 USA; 13 USSR; and 2 German (1920-1954). Diagrams

Levin, A.I

APPROVED FOR RELEASE: 08/23/2000 CIA-RDP86-00513R000929510020-3"

LEVIN, A.I.

USSR/ Physical Chemistry - Electrochemistry B-12

Abs Jour : Referat Zhur - Khimiya, No 4, 1957, 11350

Author : Levin A.I., Pushkareva S.A.
Title : On the Effect of Anions on pH Value in Hydrate-Formation and Electrodeposition of Pulverulent Metal from Solutions of Iron Sulfate

Orig Pub : Zh. prikl. khimii, 1956, 29, No 8, 1223-1229

Abstract : By electrolytic titration with a glass electrode a study has been made of the pH of initial hydrate formation in $FeSO_4$ solutions, depending on the concentration of $FeSO_4$, nature and valency of extraneous anions (A) (Cl^-, NO_3^-, SO_4^{2-}, PO_4^{3-}) and organic substances (gelatin, Trylon B, extract of chlorvinyl fabric). With increase in $FeSO_4$ concentration the pH of initial hydrate formation decreases. Influence of extraneous A on lowering of pH of hydrate formation is the more pronounced the higher the charge of A. Organic substances affect pH of hydrate formation only if they dissociate in solution with formation of surface-active A. It is shown that in order to produce highly dispersed pulverulent Fe the most stable electrolyte is 1.5M $FeSO_4$+ 40 g/l NaCl.

1/1

LEVIN, A.I.

USSR/ Chemistry - Physical chemistry

Card 1/1 Pub. 147 - 12/21

Authors : Novakovskiy, V. M.; Ukshe, Ye. A.; and Levin, A. I.

Title : Relation between zero charge potential and the physico-chemical properties of metals

Periodical : Zhur. fiz. khim. 29/10, 1847-1853, Oct 1955

Abstract : The difference between a normal potential and a zero charge potential which is an intrinsic characteristic of a metal electrode, is described. Employing the modern theory of electrode potentials the authors formulated certain equations which prove a definite relation between the zero charge potential and the physico-chemical properties of metals. The physical sense of the constants included in some of the equations is explained. Thirteen references: 11 USSR, 1 USA and 1 Germ. (1937-1954). Tables.

Institution : Ural Polytechnic Inst. im. S. M. Kirov and the Ural Chem. Inst. Sverdlovsk

Submitted : February 15, 1955

LEVIN, A. I.

USSR/ Chemistry - Physical chemistry

Card 1/1 Pub. 22 - 27/49

Authors : Ukshe, E. A., and Levin, A. I.

Title : Combined deposition of copper and hydrogen during the electrolysis complex solutions

Periodical : Dok. AN SSSR 100/5, 943-946, Feb 11, 1955

Abstract : The results obtained in studying the mechanism of Cu electrodeposition in complex solutions are described. The laws governing the combined metal and hydrogen deposition are explained. The possibility of applying the O. A. Esin method to the study of the kinetics of electrode processes during metal deposition in complex electrolytes is debated. It was found that the characteristics connected with the lamelar growth of crystals and with the change in the actual active surface due to current density are of lesser importance in the case of complex electrolytes than in the case of metal deposition in concentrated simple salt solutions. Eight references: 7 USSR and 1 USA (1929-1953). Graphs.

Institution : The S. M. Kirov Ural Polytechnicum

Presented by: Academician A. N. Frumkin, July 12, 1954

2068

ON ZERO CHARGE POTENTIALS IN COPPER AND CHROMIUM. E. A. Uske and A. I. Levin (Urals S. M. Kirov Polytech. Inst.). Doklady Akad. Nauk S.S.S.R. 106, 119-22 (1955) Nov. 1. (In Russian)

The zero charge potentials in various metals and their dependence on the solution content are not yet sufficiently investigated. Special measurements of zero points in various media are of interest. Some preliminary results of measurements of zero potentials in copper and chromium are given. The method correlating the angles formed by boundaries of the bubbles lying on the surface of the metal in solution and the potential of the electrode is used in the investigation. (R. V. J.)

UKSHE , Ye.A.; LEVIN, A.I.

Composition of the pyrophosphate copper bath; discussion. (MLRA 9:11)
Zhur.ob.khim. 26 no.9:2657-2659 S '56.

1. Ural'skiy politekhnicheskiy institut imeni S.M. Kirova.
(Copper pyrophosphates)

LEVIN, A.I.; KOLEVATOVA, V.S.

Mechanics of the action of antimony on the electrodeposition and stripping of cathodic zinc. TSvet.met.29 no.9:28-34 S '56. (MIRA 9:10)
(Zinc--Electrometallurgy) (Antimony)

A.I

Chromium bath and the mechanism of el[illegible] Zh[illegible] Aronshtam, A. I. Levin and A. I. Fedorova. [illegible] The changes in the [illegible] methods. (a) The pH was measured with a glass electrode during the electrolysis of solns. contg. from 10 to 100 g. CrO_3/l. over a c.d. range of 5-20 amp./sq. dm. in a cell with a porous diaphragm sepg. the catholyte from the [illegible] The dark [illegible] formed at a pH 5.3 co[illegible]

and ionic changes in the pre-

2/2

KM AT

LEVIN, A. I.

"Work in the Tool Factory in Moscow."

Programmed Control of Metal Cutting Machines. report presented at All-Union Conference, Moscow, 13-16 Nov 1957
Vestnik Ak. Nauk SSSR, 1958, No. 2, pp. 113-115, (author Kobrinskiy, A. Ye.)

137-58-6-12949

Translation from: Referativnyy zhurnal, Metallurgiya, 1958, Nr 6, p 252 (USSR)

AUTHORS: Levin, A.I., Falicheva, A.I.

TITLE: Concentration Changes in Applied Layers of Chrome Bath and the Mechanism of Electrolytic Deposition of Chromium (Kontsentratsionnyye izmeneniya v prikladnykh sloyakh khromovoy vanny i mekhanizm elektroosazhdeniya khroma)

PERIODICAL: V sb.: Teoriya i praktika elektrolit. khromirovaniya. Moscow, AN SSSR, 1957, pp 44-60

ABSTRACT: A study was performed of the pH and of the composition of a chrome electrolyte without current and during the process of electrolysis. Measurements were taken by three independent methods: a) electrometrically, by means of a glass electrode; b) by potentiometric titration, for determining the pH of hydrate formation; c) chromatographically, with the use of indicators. It is shown that electrolytic deposition of Cr is in many ways similar to deposition of metal from compound complex electrolytes, where the ion composition of the electrolyte undergoes noticeable variations depending upon the conditions and changes of concentration prevailing in the electrolyte. It is

Card 1/2

137-58-6-12949

Concentration Changes in Applied (cont.)

established that the pH of the space near the cathode in the chromium bath changes from 0.08 to 6 depending upon the initial concentration and the cd. The point of hydration of $Cr(OH)_3$ is near pH 5.3. Admixtures of some metals (Fe, Al) lower the pH of the beginning of formation of the solid phase and form compounds the solubility of which is less than that of $Cr(OH)_3$. Organic impurities lower the pH of formation of $Cr(OH)_3$ while there is an increase of concentration of Cr^{3+}. It is shown that of the three possible ions on the first and second branches of the polarization curve the process of reduction of $Cr_2O_7^{2-}$ predominates. CrO_4^{2-} is directly reduced to metal. A mechanism explaining the effect of SO_4^{2-} on the process of electrolytic deposition of Cr is proposed. Bibliography: 23 references. Ref. also RzhMet, 1957, Nr 6, abstract 10533.

L.A.

1. Chromium--Electrodeposition 2. Electrolytes--Properties 3. Electrolytes --Electrical factors 4. Hydrogen ion concentration analysis

Card 2/2

137-58-6-12948

Translation from: Referativnyy zhurnal, Metallurgiya, 1958, Nr 6, p 252 (USSR)

AUTHORS: Falicheva, A.I., Levin, A.I.

TITLE: Electrolytic Chrome Plating in Cold Baths (Elektroliticheskoye khromirovaniye iz kholodnykh vann)

PERIODICAL: V sb.: Teoriya i praktika elektrolit. khromirovaniya. Moscow, AN SSSR, 1957, pp 194-203

ABSTRACT: Work was carried out with the object of determining optimal conditions for obtaining bright Cr coatings at room temperatures in the usual Cr baths. It is shown that for Cu, Ni, and brass parts high-quality Cr coatings may be produced at room temperatures. For low-profile parts the best results are obtained by using the following electrolyte: CrO_3 100-150 g/liter; H_2SO_4 2-3% (of CrO_3 weight), $Cr^{3+} \leq 3$ g/liter. For Cu and brass, a cathode cd of 6-10 amp/dm^2, and for Ni a cathode cd of between 10 and 15 amp/dm^2 achieves a rate of deposition of 1 μ in 2.5 min. For shaped parts good deposits are obtained in a bath containing 250-300 g/liter of CrO_3, 2-3% (of CrO weight) of H_2SO_4, and $Cr^{3+} \leq 3$ g/liter; the cathode cd should be

Card 1/2

137-58-6-12948

Electrolytic Chrome Plating in Cold Baths

10-15 amp/dm^2 for Cu and 18-20 amp/dm^2 for Ni to achieve a rate of deposition of Cr of 1μ in 3.5 min. Cold chrome-plating baths have many advantages as compared to electrolytes working at an elevated temperature.

L.A.

1. Chromium plating--Processing 2. Electrolytes--Temperature factors 3. Electrolytes --Properties

Card 2/2

LEVIN, A. I.

Mechanism of the electrodeposition of metals from simple and complex salt solutions. Zhur.ob.khim. 27 no.7:1748-1753 Jl '57. (MIRA 10:10)

1.Ural'skiy politekhnicheskiy institut.
(Electroplating)

LEVIN, A.I.

LEVIN, A.I.; PUSHKAREVA, S.A.

Adsorption phenomena and cathodic processes involved in the electrodeposition of iron both in the compact and powdered form [with summary in English]. Zhur.fiz.khim. 31 no.9:1983-1991 S '57. (MIRA 11:1)

1.Ural'skiy politekhnicheskiy institut, Sverdlovsk.
(Iron) (Electroplating) (Adsorption)

137-58-4-6818

Translation from: Referativnyy zhurnal, Metallurgiya, 1958, Nr 4, p 73 (USSR)

AUTHORS: Levin, A.I., Rogatkina, T.N.

TITLE: The Effects of Surface-tension Reducing Substances in the Electrodeposition of Copper (O deystvii poverkhnostnoaktivnykh veshchetsv pri elektroosazhdenii medi)

PERIODICAL: Tr. Ural'skogo politekhn. in-ta, 1957, Nr 69, pp 34-49

ABSTRACT: The speed with which equilibrium is attained in pure and additive-containing systems consisting of Cu and Cu ions is studied. The presence of surface-tension reducing substances has a pronounced effect on the kinetics of the establishment of equilibrium. The dependence of the potential of the Cu electrode on the time elapsed from the moment it is lowered into the solution is expressed by the equation $\sigma_t = \pm 0.013 \log \tanh \Delta\Phi/2b' + \text{const}$. Surface-tension reducing substances exercise a significant influence upon the wettability of cathodic Cu. When combinations of additives are employed, the polarizing effect is promoted. Combinations of molecular organic substances and technical organic substances and technical organic high-molecular intermediates in conjunction with anion-active additives yield the best

Card 1/2

137-58-4-6818

The Effects of Surface-tension (cont.)

results. Additives of this type make for dense, fine crystalline Cu deposits.
G.S.

1. Copper--Plating--Surface tension--Reduction--Effects

Card 2/2

137-58-4-7865

Translation from: Referativnyy zhurnal, Metallurgiya, 1958, Nr 4, p 214

AUTHORS: Falicheva, A.I., Levin, A.I.

TITLE: Chromium Electroplating from Cold Baths (Gal'vanicheskoye khromirovaniye iz kholodnykh vann)

PERIODICAL: Tr. Ural'skogo politekhn. in-ta, 1957, Nr 69, pp 50-64

ABSTRACT: Tests were made of electrolytes (E) containing 75, 100, 150, 200, and 300 g CrO_3 per liter, with H_2SO_4 added in an amount of 1 to 5% of the weight of the CrO_3 and a temperature of 20° ± 2°C, although on occasion, when D_k was high, the temperature was 24-25°. The volumetric D_k was 2-3.5 amp per liter of electrolyte. It was found that good Cr platings are produced on Cu with D_k of 4 to 100 amps/dm^2 at all the CrO_3 strengths indicated above and with an H_2SO_4 content of from 1 to 3%. The brightest coatings were produced in E having the lowest CrO_3 concentrations. Cr current efficiency in cold baths was higher than in hot baths. Current efficiency diminished somewhat as the H_2SO_4 content was raised with constant D_k and CrO_3 content. The Cr brightness diminished when Cr^{3+} >4 g/liter. An increase in H_2SO_4 content (up to 3%) improves the brightness of the deposits

Card 1/2

137-58-4-7865

Chromium Electroplating from Cold Baths

and reduces current efficiency. It was found that the amount of Cr^{3+} in the E is reduced with increase in plate surface. It was established that bright Cr deposits are produced in all the indicated E when chromium-plating is conducted for a long time, 60-90 min, when D_k is 4 to 10 amps/dm^2. When the chromium-plating process continues for a longer time, the deposit at the cathode edges is gray. Precipitation of Cr on Ni required higher D_k than deposition on Cu, and the bond between the Cr and the Ni is weaker. A D_k of 20-25 amps/dm^2 and 48-50° temperature is required to produce bright Cr deposits on steel, while the D_k needed for deposition on Cu, brass, and Ni is 4 to 15 amps/dm^2 at room temperature. The highest quality bright coatings of Cr on Cu, brass, and Ni are produced in E containing 100-150 g CrO_3 per liter, 1 to 3% H_2SO_4, $Cr^{3+} \leq 3$ g/liter, and $Fe^{3+} \leq 2$g/liter at D_k of 4-10 amps/dm^2, 18-22°, and volumetric $D_k \leq 0.5$ amp/liter. Current efficiency 14-24%. Maximum thickness of Cr deposits 20 microns.

R.S.

1. Chromium plating

Card 2/2

A. I. LEVIN, A. V. POMOSOV

"On Hydrometallurgical Treatment"

The Ural'skiy Politekhnicheskiy Institute

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.)

SOV/137-58-9-19455

Translation from: Referativnyy zhurnal, Metallurgiya, 1958, Nr 9, p 187 (USSR)

AUTHORS: Levin, A.I., Falicheva, V.I.

TITLE: Employment of Radioactive Indicators for the Investigation of the Inhibition of Corrosion With Externally Applied Current (Primeneniye radioaktivnykh indikatorov dlya issledovaniya tormozheniya korrozii nalozhennym izvne tokom)

PERIODICAL: Nauchn. dokl. vyssh. shkoly. Khimiya i khim. tekhnol., 1958, Nr 1, pp 32-35

ABSTRACT: The mechanics of the inhibition of corrosion (C) in acid by means of externally applied current were studied. The rate of C and the magnitude of the potential of Zn were measured. The specimens were prepared by the electrolytic deposition of Zn on a Pt plate from a solution containing the Zn^{65} isotope. The rate of C was characterized by the amount of "tagged" Zn which went into solution. The rate of C of Zn proved to be the highest in the absence of current, decreased considerably with an increase of cathode polarization and upon attainment of the value of "protective" potential it was completely inhibited. It is assumed that the mechanics of the protective action of the

Card 1/2

SOV/137-58-9-19455

Employment of Radioactive Indicators for the Investigation (cont.)

current is related first of all to the process of reorganization of the binary electric layer on the metal-solution interface. Passivity of the metal sets in when the number of electrons in the active areas of its surface becomes sufficient for the retention of the Zn cations from their going out of the liquid lining of the binary layer into the electrolyte mass. For metals with a great H overvoltage a lower cathode current density would be needed for the creation of the necessary protective cathode polarization.

V.G.

1. Zinc--Corrosion 2. Electrolytes--Performance 3. Zinc isotopes (Radioactive) --Applications 4. Corrosion--Test results

Card 2/2

SOV/137-58-11-22244

Translation from: Referativnyy zhurnal. Metallurgiya, 1958, Nr 11, p 58 (USSR)

AUTHOR: Levin, A.I.

TITLE: Utilization of Surface-active Substances in the Electrodeposition of Zinc (O primenenii poverkhnostnoaktivnykh veshchestv pri elektroosazhdenii tsinka)

PERIODICAL: Izv. vyssh. uchebn. zavedeniy. Tsvetn. metallurgiya, 1958, Nr 1, pp 82-85

ABSTRACT: Proceeding from the theory and practical results of the utilization of addition agents in the electrolytic deposition of Zn, compound addition agents containing 2 or more substances in various ratios and concentrations have begun to be introduced into industrial electrolytes. Examination is made of the nature of the action of these compound agents, consisting of joiner's glue, β-naphthol and Sb salts in various strengths. The investigation is run under both laboratory and shop conditions. A theoretical rationale for the action of addition agents and combinations thereof is provided. An optimal addition-agent combination is found: 10 mg/liter glue, 20 mg/liter β-naphthol, 0.02 mg/liter Sb (in the form of "tartar

Card 1/2

SOV/137-58-11-22244

Utilization of Surface-active Substances in the Electrodeposition of Zinc

emetic"). Use of this combination improved coating quality and increased the current efficiency for Zn by 1.5-2% as compared to average indices for the department.

B. L.

Card 2/2

POMOSOV, A.V.; LEVIN, A.I.; KRYMAKOVA, Ye.Ye.

Electrodeposition of compact lead from chloride solutions. Trudy Inst. met. UFAN SSSR no.2:243-252 '58. (MIRA 12:4)
(Lead--Electrometallurgy)

POMOSOV, A.V.; KRYMAKOVA, Ye.Ye.; LEVIN, A.I.

Study of zinc corrosion in sulfate electrolytes when admixtures are present. Zhur. prikl. khim. v. 31 no.5:734-742 My '58. (MIRA 11:6)

(Zinc--Corrosion) (Zinc sulfate)

LEVIN, A.I.; PUSHKAREVA, S.A.

Concentration changes in the near electrode layer of an iron bath and peculiarities of cathodic deposition of iron. Zhur. prikl. khim. 31 no.7:1040-1047 Jl '58. (MIRA 11:9)
(Iron) (Electrochemistry)

LEVIN, A.I.

Nature of cathodic processes retardation in complex electrolytes. (MIRA 11:4)
Zhur.fiz.khim. 32 no.2:472-475 F '58.

1.Ural'skiy politekhnicheskiy institut im. S.M. Kirova, Sverdlovsk.
(Electrolytes) (Electroplating)

20-119-1-30/52

AUTHORS: Levin, A. I., Savel'yev, S. S.

TITLE: On the Mechanism of the Formation of Dichromic Acid at the Anode (O mekhanizme anodnogo obrazovaniya bikhromovoy kisloty)

PERIODICAL: Doklady Akademii Nauk SSSR, 1958, Vol. 119, Nr 1, pp. 110-112 (USSR)

ABSTRACT: The direct electrochemical method of producing dichromic acid is based on the application of the equilibrium $2CrO_4^{2-} + 2H^+ \rightleftarrows 2HCrO_4^- \rightleftarrows Cr_2O_7^{2-} + H_2O$, appearing between the chromate anions at no current. With decrease of the pH-value and increasing concentration of the electrolyte containing chromium anhydride this equilibrium is shifted to the side of formation of $Cr_2O_7^{2-}$. For the practical realization of the reaction the processes were investigated at the anode in a trough which has a certain similarity with a mercury electrolysis bath. The investigation of the possible processes at an electrode from lead dioxide shows the following: During the decay of the hydroxyl ions here a high polarization occurs. With sufficiently high current density at the anode after all

Card 1/3

20-119-1-30/52

On the Mechanism of the Formation of Dichromic Acid at the Anode

an amplification of the concentration of the ions $Cr_2O_7^{2-}$ and an increase of the acidity of the electrolyte can be obsered. In this case the activity of the ions OH^- considerably decreases and their decomposition potential becomes very high. Because the anodic oxidation of the hydroxyl ions in highly acid solutions is accompanied by a noticeable retardation, also the occurrence of other processes becomes possible. At the anode one of the following processes can take place:

$$2H_2O - 4e \rightarrow O_2 + 4H^+,\ 2H_2O - 2e \rightarrow H_2O_2 + 2H^+,\ H_2O - 2e \rightarrow O + 2H^+.$$

The equilibrium potential corresponding to these processes amount to 1,229; 1,776 or 2,42 V respectively. The value of the anode potential φ_a of a trough containing sodium dichromate even with remarkable current density does not reach the value of the equilibrium potential φ_3 of the reaction mentioned in the third place. The oxidation of water at the anode obviously takes place under production of molecular, but not of atomic oxygen. The influence of the hydrogen superoxide on the kinetics of production of dichromic acid can be neglected. The water surplus occurring during the electrolysis of the sodium dichromate solutions in the anolyte gives evidence of the decomposition of this compound. This obviously takes

Card 2/3

Nauchno-tekhnicheskoye obshchestvo mashinostroitel'noy promyshlennosti, Kiyevskoye oblastnoye pravleniye

Zashchitno-dekorativnyye i spetsial'nyye pokrytiya metallov (Protective, Decorative, and Special Coatings for Metals) Kiyev, Mashgiz, 1959. 291 p. 4,200 copies printed.

Editorial Board: P. K. Lavrenko, E. I. Litvak, and A. P. Rychis (Resp. Ed.); Ed. of Publishing House: M. S. Sorokin; Chief Ed. (Southern Division, Mashgiz): V. K. Serdyuk, Engineer.

PURPOSE: This book is intended for technical personnel in the field of protective coatings for metals.

COVERAGE: The papers in this collection, presented at a conference of the NTO Mashgoms held in Odessa, deal with the mechanization and acceleration of metal-coating and plating processes performed by spraying, electrolytic, and other methods. Quality control of protective coatings is also discussed. No personalities are mentioned. References follow several of the papers.

Lilnachrom, T. V., Engineer (Khar'kov). Application of High-luster Nickel Plating in Mass Production 37

Shvel'gova, A. I., Candidate of Chemical Sciences, and G. S. Chernobrivenko (Moscow). New Electrolyte for High-luster Nickel Plating 43

Semenyukova, E. A., Candidate of Chemical Sciences (Moscow). Intensification of the Nickel-plating Process Through the Use of a Fluoborate Electrolyte 48

Vasil'yeva, G. S., Engineer (Moscow). Effect of Processing Factors on the Porosity of Electrolytic Deposits of Nickel 55

Gorbunova, K. M., Doctor of Chemical Sciences, and A. A. Nikiforova, Candidate of Chemical Sciences. Nickel Plating by Chemical-reduction Methods 62

Petrova, A. A., Engineer (Moscow). Wear- and Corrosion-resistant Coating by Combination (Two-layer) Chrome Plating 66

Nikitenko, A. I., Candidate of Technical Sciences (Sverdlovsk). Chrome Plating at Room Temperature 75

Bobryantsev, S. T., and L. B. Tukavkova, Candidate of Technical Sciences (Moscow). Electrodeposition of Iron at High Current Densities From Low-temperature Sulfuric Acid Solutions 81

(Moscow), and V. M. Kalb, Engineer (Tula). High-luster Copper Plating From Acid Electrolytes 87

Podlumskaya, R. D., Engineer (Dnepropetrovsk). Pyrophosphate Copper Plating of Aluminum Alloys 92

Shlagur, M. A., Candidate of Technical Sciences, and A. I. Lipin, Engineer (Lyubertsy). Electroplating of Aluminum Alloys 97

Rabalyuk, Ya. Kh., Engineer (Dnepropetrovsk). Deep Anodizing of Aluminum Alloys With Automatic Regulation of the Process 108

Chebotarova, L. I., Engineer (Moscow). A Study of Processes of Depositing Anodized Coatings With High Electrical-insulating Properties on Aluminum and Its Alloys 112

Abramova, E. N., Engineer (Moscow). Deposition of Tinted Anodized Coatings on Aluminum and Some of Its Alloys 123

Bolshchiskiyt'yan, E. G., Candidate of Technical Sciences (Moscow). Electrochemical Passivation of Zinc Coatings 131

Mikel'shaya, M. E., Engineer (Moscow). Electrolytic Polishing of Metal Bands and Wire Products 134

Shlagur, M. A., and A. I. Lipin. Electrolytic Deposition of the Lead-Indium Bearing Alloy 139

Mikhov, E. N., Engineer, and L. K. Gurevich, Engineer (Leningrad). Electroplating With a Lead-Tin Alloy in a Fluorosilicate Solution 146

Levin, A. I., Doctor of Technical Sciences (Sverdlovsk). Mechanism of the Action of Surface-active Substances in Electroplating 156

Levin, A. I. On the Mechanism of Electrodeposition of Metals Contained in Solutions as Simple and Complex Salts 164

Bunisova, T. N., Engineer (Moscow). Palladium Coating of Precision-instrument Parts 172

31733

S/081/61/000/021/043/094
B149/B101

5.1310

AUTHORS: Levin, A. I., Savel'yev, S. S.

TITLE: Preparation of polychromate solutions by electrolysis of sodium bichromate and subsequent electrodeposition of chromium

PERIODICAL: Referativnyy zhurnal. Khimiya, no. 21, 1961, 293, abstract 21K120 (Tr. Konferentsii po usoversh. tekhnol. proiz-va khromovykh i ftoristykh soley, 1957. L., Goskhimizdat, 1959, 31 - 37)

TEXT: The initial experiments were carried out in an electrolyzer with an immobile Hg electrode and a smooth Pb anode. The diaphragm was of porcelain or tuff. The current yield of $H_2Cr_2O_7$ was found to drop to 20% on extending the duration of electrolysis from 5 to 15 hrs and to rise to 82% on increasing $Na_2Cr_2O_7$ concentration from 50 g/liter to saturation at 30°C. The anodes were markedly inactivated. In order to enhance the process, the decomposition of $Na_2Cr_2O_7$ solutions was studied with forced circulation

Card 1/2

31733

S/081/61/000/021/043/094
B149/B101

Preparation of polychromate solutions ...

of liquid Hg cathode and the anolyte. A diaphragm electrolyzer which is easy to dismantle is proposed, in which at D_a 26 a/dm^2 and initial $Na_2Cr_2O_7$ concentration of 500 g/liter the current yield of CrO_3 is 56% and the energy consumption 3.35 kilowatt-hours per kg of CrO_3. Polychromate solutions containing free $H_2Cr_2O_7$ were tested for obtaining metallic chromium by adding 1% H_2SO_4 (in relation to CrO_3) before electrolysis. Deposits of compact Cr were obtained at different D_c (30 - 70 a/dm^2) from solutions containing 480 g/liter CrO_3, 462 g/liter $Na_2Cr_2O_7$, 312 g/liter CrO_3, and 1000 g/liter $Na_2Cr_2O_7$. [Abstracter's note: Complete translation]

X

Card 2/2

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.

Polukarov, Yu. M., and K.M. Gorbunova (Institute of Physical Chemistry, Academy of Sciences, USSR). Some Theoretical Problems on the Electrocrystallization of Alloys 404

Audubert, R. (Deceased) (France). Mechanism of Anode Dissolution 410

Sutyagina, A.A., and K.M. Gorbunova (Institute of Physical Chemistry, Academy of Sciences, USSR). Some Regularities of the Electrocrystallization of Metals Under the Influence of an Alternating Current 414

Kaisnov, R. Kinetics of Nuclei Formation During the Electrodeposition of Metals 421

Bayrakov, Yu. V. Kinetics of the Joint Discharge of Ions During the Electrolytic Deposition of Metals 427

Transactions of the Fourth Conference (Cont.) SOV/2216

Kudryavtsev, N.T., and L.M. Tyutina (Institute of Chemical Technology imeni D.I. Mendeleyev). Cathodic Polarization During the Electrodeposition of a Tin-Nickel Alloy 435

Kheyfets, V.L., and A.L. Rotinyan (Proyektnyy i nauchno-issledovatel'skiy institut nikeleyoy, kobal'tovoy i olovyannoy promyshlennosti-Planning and Scientific Research Institute of the Nickel, Cobalt and Tin Industry) Joint Discharge of Ions and the Problem of Obtaining Metals of High Purity 440

Levin, A.I. Role of a Cathode Surface Discharge and the Formation of Passive Films in the Process of Metal Electrodeposition 447

Izmaylov, A.V. (Institute of Chemical Technology imeni D.I. Mendeleyev). Kinetics of Cathodic Processes During the Electrodeposition of Metals From Aqueous Solutions 453

Card 18/34

S/137/61/000/001/043/043
A006/A001

Translation from: Referativnyy zhurnal, Metallurgiya, 1961, No. 1, p. 60, # 1I525

AUTHOR: Levin, A.I.

TITLE: On the Mechanism of Electrochemical Reduction of Chromate Anions With the Formation of Chromium Hydroxide on the Cathode

PERIODICAL: V sb. "Vopr. teorii khromir", Vil'nyus, Gospolitizdat LitSSR, 1959, pp. 137 - 149, Diskus. pp. 177 - 191

TEXT: The author presents principles of the theory of electrochemical reduction of CrO_4^{2-} ions to $Cr(OH)_3$. Experimental data are given on the reduction of chromate anions with the formation of colloidal Cr hydroxide on the cathode. It is established that electrochemical reduction of chromate anions depends on the magnitude of overvoltage for the discharge of H^+ ions and on the magnitude of deviation of the cathode potential from the potential of zero charge characterizing the electrode metal. There are 14 references.

Ye. L.

Translator's note: This is the full translation of the original Russian abstract.

Card 1/1

SOV/136-59-5-7/21

AUTHORS: Levin, A.I., and Vlasov, V.I.

TITLE: Ways of Further Improving and Intensifying the Electrolytic Refining of Copper (Puti dal'neyshego uluchsheniya i intensifikatsii protsessa elektrorafinirovaniya medi)

PERIODICAL: Tsvetnyye metally, 1959, Nr 5, pp 32-38 (USSR)

ABSTRACT: A.I. Levin, with others (Ref 1) has set down optimal conditions for the electrolytic refining of copper. Experience at the Pyshma medeelektrolitnyy zavod (Pyshma Electrolytic Copper Works) suggests that the practice there (as at other Soviet works) is equal to or better than the best abroad (Ref 2). At Pyshminsk 95% current utilization is obtained with 91-93% machine time of the series. Electrolysis is effected at 54-55 °C and a mean current density of 190 amp/m^2 with electrolyte containing 133 and 185-195 g/litre of copper sulphate and sulphuric acid, respectively. The cells are of identical dimensions facilitating the use of prefabricated linings. Corrosion of starting sheets (most intense at the liquid surface) has been reduced by lead-plating their top parts (suggested by M.I. Nomberg and S.P. Pyunnenen).

Card 1/3

SOV/136-59-5-7/21

Ways of Further Improving and Intensifying the Electrolytic Refining of Copper

Stainless steel (type 1Kh18N9T) starting sheets have given long service, but have not proved easier to strip than copper sheets. This stainless steel has found wide use in the electrolytic plant (e.g. for electrolyte heating tanks, pumps etc.). The author considers the current density used to be insufficient and discounts the view that high current density practice leads to deposit defects due to the deposition of antimony, arsenic, bismuth and other harmful impurities. Such effects can be avoided by proper procedures. Cathode quality can also be improved by additions of surface-active agents and much work in this direction has been done by Gintsvetmet, the Ural'skiy politekhnicheskiy institut (Ural Polytechnical Institute) and the works research laboratory. The effect of mixtures of surface-active agents has been found to be greater than that of individual agents (Ref 5). The author discusses ways of reducing electricity consumption: increasing sulphuric-acid concentration; increasing temperature; reducing inter-electrode distance; improving contact arrangements.

Card 2/3

SOV/136-59-5-7/21

Ways of Further Improving and Intensifying the Electrolytic Refining of Copper

Current leakage can be an important factor (Ref 9), and heat losses should be reduced by covering the electrolyte surface. In view of the 1959-1965 development planned for the Ural non-ferrous metals industry many new features are to be introduced into Pyshma practice and research, e.g. on raising the current density to 250-270 amp/m^2, is to proceed.

Card 3/3

There are 9 references, of which 8 are Soviet and 1 English.

ASSOCIATIONS: Ural'skiy politekhnicheskiy institut (Ural polytechnical Institute) and Pyshminskiy medselektrolitnyy zavod (Pyshma Electrolytic Copper Works)

S/081/61/000/002/003/023
A005/A105

Translation from: Referativnyy zhurnal, Khimiya, 1961, No. 2, p. 283, # 21221

AUTHORS: Prostakov, M.Ye., Kochergin, V.P., Levin, A.I.

TITLE: The Investigation of Corrosion of Passivated Tin Plate

PERIODICAL: "Byul. nauchno-tekhn. inform. Ural'skiy n.-i. in-t chern.metallov", 1959, No. 7, pp. 76 - 82

TEXT: The investigation of the corrosion rate of non-passivated, chemically and electrochemically passivated tin plate showed that the passivation of tin plate increases its resistance to aggressive media: electrochemically passivated tin plate has a higher corrosion resistance than chemically passivated tin plate in 3% CH_3COOH, tomato sauce, NaCl, and animal fat. Chemically passivated tin plate is resistant under the conditions of action of fish preserves. It is established that the corrosion of tin plate in a gas medium totally depends on its coating porosity and is independent on the passivation method.

From authors' summary

Translator's note: This is the full translation of the original Russian abstract.

Card 1/1

POMOSOV, A.V.; LEVIN, A.I.; KRYMAKOVA, Ye.Ye.

Effect of certain surface-active substances on the electrodeposition of compact lead from aqueous chloride solutions. Izv.vys.ucheb.zav.; tsvet.met. 2 no.6:121-125 '59. (MIRA 13:4)

1. Ural'skiy politekhnicheskiy institut. Kafedra tekhnologii elektrokhimicheskikh proizvodstv.
(Lead--Electrometallurgy) (Surface active agents)

LEVIN, A.I.; PROSTAKOV, M.Ye.

Passivation of tin plate as a means for protecting food containers from corrosion. Kons. i ov. prom. 14 no.11:18-22 N '59. (MIRA 13:2)

1.Ural'skiy politekhnicheskiy institut imeni S.M. Kirova (for Levin)
2.Ural'skiy nauchno-issledovatel'skiy institut chernykh metallov (for Prostakov).
(Tin plate--Corrosion) (Tin cans--Corrosion)

SOV/80-32-2-12/56

AUTHORS: Falicheva, A.I., Levin, A.I.

TITLE: On the Influence of Sulfate Ions on the Electric Precipitation of Chromium (O vliyanii sul'fatnykh ionov na elektroosazhdeniye khroma)

PERIODICAL: Zhurnal prikladnoy khimii, 1959, Vol XXXII, Nr 2, pp 308-312 (USSR)

ABSTRACT: Chromium can not be precipitated from solutions of chromium anhydride. Only a black sponge of hydroxides and basic chromium salts forms at the cathode. In the presence of anions, especially sulfate anions, chromium can be precipitated. These anions prevent the formation of a passivating film on the cathode so that the ions $Cr_2O_7^{2-}$ and CrO_4^{2-} can be reduced. The sulfate ions SO_4^{2-} form very stable compounds with trivalent chromium. If the circuit is closed, a darkening of the electrolyte is observed at the cathode which moves gradually to the anode. In this dark part of the electrolyte ions of the type $[Cr_2(H_2O)_4(SO_4)_4]^{2-}$ are probably contained. A small excess of Cr^{3+} is useful for obtaining shining chromium coating, i.e. for the regulation of the crystal growth

Card 1/2

SOV/80-32-2-12/56

On the Influence of Sulfate Ions on the Electric Precipitation of Chromium

[Ref. 15]. The most efficient ratio for the chromium precipitation is $\frac{Cr_2O_3}{SO_4^{2-}} = 1 : 2$ to 2.5

There are 15 references, 9 of which are Soviet, 2 English, 2 American, and 2 German.

SUBMITTED: June 19, 1957

Card 2/2

AUTHORS: Savel'yev, S.S., Levin, A.I. SOV/80-32-2-15/56

TITLE: Cathode Precipitation of Chromium From Polychromate Solutions Produced by the Preliminary Electrolysis of Sodium Bichromate (Katodnoye osazhdeniye khroma iz polikhromatnykh rastvorov, poluchennykh predvaritel'nym elektrolizom bikhromata natriya)

PERIODICAL: Zhurnal prikladnoy khimii, 1959, Vol XXXII, Nr 2, pp 321-326 (USSR)

ABSTRACT: Concentration changes in a sodium bichromate anolyte show that the pH values of the electrolyte vary during electrolysis in the range of +3.9 to 0. The changes in the layers near the anode influence considerably the composition and the ion equilibrium in the sodium bichromate solutions. Sodium bichromate is transformed to dichromic acid on the anode during electrolysis with diaphragm. In the catholyte the concentration of NaOH increases simultaneously. The yield of CrO_3 depends on the concentration of the initial sodium bichromate solution and on the conditions of the electrolysis. Polychromate solutions containing free polychromic acids and

Card 1/2

SOV/80-32-2-15/56

Cathode precipitation of Chromium from Polychromate Solutions Produced by the Preliminary Electrolysis of Sodium Bichromate

sodium bichromate may also be used for the production of metallic chromium by electrolysis.
There are 3 diagrams, 4 tables, and 6 references, 4 of which are Soviet, 1 German, and 1 English.

SUBMITTED: April 3, 1957

Card 2/2

5(4)

SOV/76-33-4-27/32

AUTHORS: Levin, A. I., Falicheva, V. I.

TITLE: On the Mechanism of Retardation of Corrosion by the Application of an External Current and the Simultaneous Discharge of Zinc and Hydrogen Ions (O mekhanizme tormozheniya korrozii nalozhennym izvne tokom i sovmestnom razryade ionov tsinka i vodoroda)

PERIODICAL: Zhurnal fizicheskoy khimii, 1959, Vol 33, Nr 4, pp 930-935(USSR)

ABSTRACT: The corrosion protection of metals by the application of an external current is ever more extending nowadays. It is assumed (Ref 8) that the hydrogen (I) which separates at the cathode simultaneously with zinc (II) does not depend on the external current. As in this case the (I) separation should be the consequence of the already separated (II), which is not very believable, investigations were carried out in this connection. If the application of an external current hinders corrosion, the change of the content of corrosion products must be determinable by the aid of radioactive isotopes, at the same time as the activity of the solution in which the zinc ionizations are observed, is determined. Zn^{65} was used and Zn was solved in 0.5 n H_2SO_4. The activity of the Zn samples and H_2SO_4 solutions was tested with an apparatus of the B type (Ref 10).

Card 1/3

SOV/76-33-4-27/32

On the Mechanism of Retardation of Corrosion by the Application of an External Current and the Simultaneous Discharge of Zinc and Hydrogen Ions

The experiments were made in 2 n H_2SO_4 on a corresponding apparatus (Fig), in which connection the polarization curves were plotted on a lamp potentiometer LLPU-1, following calibration by the aid of a potentiometer PPTV-1. The corrosion rate (CR) was evaluated according to the activity of the 2 n H_2SO_4. The values obtained of the (CR) (Table) show that without external current the electrolytic Zn is corroded quickest. In the case of a cathode polarization with a value being more negative than $\varphi_K = 0.853$ v a standstill of corrosion may be observed. The mechanism of "protective effect" of the current is of a pure electrochemical nature and is brought in connection with a rearrangement process of the binary electric layer at the interface metal-solution. The formation of an excess of electrons in the metallic shell of the binary layer acts as a corrosion-preventing factor and may be regarded as a kind of barrier preventing the passage of Zn-ions into the solution. The (I)-separation is a primary electrode reaction of the H^+-ion discharge and not a secondary process

Card 2/3

SOV/76-33-4-27/32

On the Mechanism of Retardation of Corrosion by the Application of an External Current and the Simultaneous Discharge of Zinc and Hydrogen Ions

in consequence of a zinc dissolution. All experimental data obtained may be explained satisfactorily according to the theory of retarded ion discharge. There are 1 figure, 1 table, and 15 references, 13 of which are Soviet.

ASSOCIATION: Ural'skiy politekhnicheskiy institut im. S. M. Kirova, Sverdlovsk (Ural Polytechnic Institute imeni S. M. Kirov, Sverdlovsk)

SUBMITTED: October 7, 1957

Card 3/3

5 (4) 05827

AUTHORS: Levin, A. I., Savel'yev, S. S. SOV/76-33-10-25/45

TITLE: On the Mechanism Underlying the Formation of Polychromate Solutions in the Electrolysis of Sodium Bichromate in a Diaphragm Bath

PERIODICAL: Zhurnal fizicheskoy khimii, 1959, Vol 33, Nr 10, pp 2264 - 2270 (USSR)

ABSTRACT: The investigations mentioned in the title were made in view of the fact that in recent years electrolytic chromium deposition has found wide application not only in electroplating but also in hydrometallurgy (Ref 1). Experiments were first made by means of an electrolyzer with a stable mercury cathode and a lead anode according to I. G. Shcherbakov (Ref 5), the anode- and cathode space being separated by a diaphragm:

$Hg^- \mid NaOH, Na_2Cr_2O_7, H_2O \parallel H_2O, Na_2Cr_2O_7, H_2Cr_2O_7 \mid {}^+Pb$. The use of a resting cathode, however, gave rise to experimental difficulties; therefore, an electrolyzer was used for further experiments in which the mercury was conveyed from the cathode space to the decomposition space. In this connection, the discharge of Na^+ ions was observed to occur the easier the lower was the

Card 1/3

05827

On the Mechanism Underlying the Formation of Polychromate Solutions in the Electrolysis of Sodium Bichromate in a Diaphragm Bath SOV/76-33-10-25/45

concentration of metallic sodium in the surface layer of the liquid cathode; the decomposition rate of the amalgam was proportional to the root square concentration of metallic sodium in the mercury surface layer. Similar observations were also made by Broensted (Ref 11), Sklyarenko (Ref 12) and Iofa (Ref 13). With sufficiently intense circulation of the mercury, a reduqtion in the number of chromate ions on the cathode can thus be prevented, and the hydrogen separation can be reduced to a minimum. The cathodic processes occurring in the above system have much in common with the reactions on mercury cathodes in baths which are used in the production of chlorine and alkali. Experimental results (Table) indicate that of the three processes possible the following one takes place on the anode: $H_2O - 2e \longrightarrow 2H^+ + O$. Polychromate solutions are formed on the lead anode, which are more abundant in free polychromic acids. This is conspicuously promoted by the formation of PbO_2 on the anode. The diaphragm and quick removal of the products from the

Card 2/3

05827

On the Mechanism Underlying the Formation of Polychromate Solutions in the Electrolysis of Sodium Bichromate in a Diaphragm Bath SOV/76-33-10-25/45

anode- and cathode space favor this process. The formation of isopolychromic acids on the anode is a secondary process taking place in acid medium due to polymerization of the chromate ions. Polychromate electrolytes allow for the production of thick-layered cathodic chromium coatings which are more suitable than those obtained from common baths. There are 2 figures, 1 table, and 20 references, 16 of which are Soviet.

ASSOCIATION: Ural'skiy politekhnicheskiy institut im. S. M. Kirova, Sverdlovsk (Ural Polytechnic Institute imeni S. M. Kirov, Sverdlovsk)

SUBMITTED: March 25, 1958

Card 3/3

S/081/61/000/003/002/019
A166/A129

AUTHOR: Levin, A. I.

TITLE: Adsorption layers and their specific effects on the surface properties of metal and the structure of cathode sediments

PERIODICAL: Referativnyy zhurnal. Khimiya, no. 3, 1961, 87, abstract 3B666. (Tr. Ural'skogo politekhn. in-ta, 1960, Collection 94, 70 - 83)

TEXT: The role of adsorption films in the kinetics of metallic electroplating is discussed from the point of view of changes in the chemical state of the surface and their role in protection against corrosion. The radioactive isotope method was used to confirm that the decrease in adhesion between Zn and Al when Sb is present in the electrode is due to the formation of a film from antimony hydroxide. The formation of cathode films is ascribed to a pH change in the layer next to the cathode, the limit of which is the pH of hydroxide formation by metallic oxides. The author discusses the role of passivation caused by alkalization of the catholyte and the role of the appearance of colloidal suspensions in the formation of a dendritic structure during powdered metal plating at high current densities. The author examines the role of adsorption films in wetting the elec-

Card 1/2

Adsorption layers and their specific effects on... S/081/61/000/003/002/019
A166/A129

trode and the mechanism of passivating film formation in the electrolysis of complex solutions, especially in Cu electroplating from pyrophosphorous electrolytes.

Summary by Z. Solov'yeva

[Abstracter's note: Complete translation]

Card 2/2

SOKOLOV, N.V.; LEVIN, A.I.

Electrolytic treatment of ceramic metal spinnerets. Trudy Ural. politekh.inst. no. 96:42-49 '60. (MIRA 14:3)
(Ceramic metals)

POMOSOV, A.V.; LEVIN, A.I.; KRYMAKOVA, Ye.Ye.

Electrolytic recovery of lead from its aqueous chloride solutions. Trudy Ural.politekh.inst. no.96:50-62 '60. (MIRA 14:3)
(Lead plating)

LEVIN, A.I.; FALICHEVA, V.I.

Investigation of cathodic processes in the electrodeposition of zinc by means of radioactive indicators. Izv. vys. ucheb. zav.; tsvet. met. 3 no.3:62-69 '60. (MIRA 14:3)

1. Ural'skiy politekhnicheskiy institut, Kafedra tekhnologii elektrokhimicheskikh proizvodstv.
(Zinc--Electrometallurgy)
(Radioisotopes--Industrial applications)

LEVIN, A.I.

Means for lowering the consumption of electric power in electrolysis sections of nonferrous metal plants. Prom.energ. 15 no.4:9-11 Ap '60. (MIRA 13:6)

1. Ural'skiy politekhnicheskiy institut.
(Electrometallurgy)

5.2200, 18.3100

78227
SOV/80-33-3-28/47

AUTHORS: Levin, A. I., Chang Kuo-heng

TITLE: Communication I. Electrolytic Refining of Tin Using Sulfamine Electrolytes

PERIODICAL: Zhurnal prikladnoy khimii, 1960, Vol 33, Nr 3, pp 667-674 (USSR)

ABSTRACT: The electrolytic refining of tin from tin sulfaminate $Sn(NH_2SO_3)_2$ was investigated. Compact, dense tin deposits were obtained when the content of Sn in the electrolyte was between 30 and 55 g/liter; below 30 g/liter the deposits were friable, above 55 g/liter they formed dendrites which short-circuited the electrodes. Tin was present in the electrolyte chiefly as Sn^{2+} and the amount of Sn^{4} did not exceed 5-10%. The specific electroconductivity of the electrolyte at a $Sn(NH_2SO_3)_2$ concentration of 40 g/liter was 0.0687 $\Omega^{-1} \cdot cm^{-1}$. The addition

Card 1/3

Communication I. Electrolytic Refining of Tin Using Sulfamine Electrolytes

78227
SOV/80-33-3-28/47

of H_2SO_4 considerably increased the electroconductivity. The current density of 300 amp/m^2 could be increased to 800/m^2 in circulating electrolyte, and to 1000 amp/m^2 in electrolyte mixed by means of agitators. Electrolyte containing total Sn, 40 g; free H_2SO_4, 80 g; glue, 4.0 g; -napthol, 0.7 g, at a rate of circulation equal to 1 bath volume/hr and current density of 500 amp/m^2 gave in 48 hrs a 6 mm-thick tin deposit of a fine crystalline structure with the following impurity content: Cu, 0.008%; Pb, 0.025%; Fe 0.003%; As, 0.002%; Sb, 0.003%; Bi, 002%; Zn, 0.002%. The yield, based on current, was 97.5%; the energy consumption 573 kw/ton. The total voltage drop consisted basically of ohmic losses in the electrolyte (45.1%) and cathodic polarization (52.4%). There are 4 figures; 2 tables; and 12 references, 1 U.S., 1 Italian, 10 Soviet. The U.S. reference is: H. S. Choguill, F. T. Shell, Trans. Kansas Acad. Sci., 57, 386 (1954).

Card 2/3

Communication I. Electrolytic Refining of Tin Using Sulfamine Electrolytes

78227
SOV/80-33-3-28/47

ASSOCIATION: S. M. Kirov Ural Polytechnical Institute (Ural'skiy politekhnicheskiy institut imeni S. M. Kirova)

SUBMITTED: May 20, 1959

Card 3/3

LEVIN, A.I.; CHZHAN GO-KHEN [Chang Kuo-heng]

Effect of the impurities present in a sulfamine electrolyte on the quality of cathodic tin. Zhur.prikl.khim. 33 no.4:854-860 Ap '60. (MIRA 13:9)

1. Ural'skiy politekhnicheskiy institut imeni S.M.Kirova.
(Tin plating) (Sulfamine)

LEVIN, A. I.; PROSTAKOV, M.Ye.; KOCHERGIN, V.P.

Thickness of passive films on tin and their protective action. Zhur. prikl. khim. 33 no.9:2102-2108 S '60. (MIRA 13:10)

1. Ural'skiy politekhnicheskiy institut im. Kirova i Ural'skiy nauchno-issledovatel'skiy institut chernykh metallov.
(Films (Chemistry)) (Tin) (Passivation)

LEVIN, A.I.; CHZHAN GO-KHEN [Chang Kuo-heng]; ALFIMOVA, Ye.A.

Investigating the electrorefining of tin with use of sulfamine electrolytes. Izv. vys. uchebn. zav.; tsvet. met. 4 no. 1:88-95 '61. (MIRA 14:2)

1. Ural'skiy politekhnicheskiy institut, kafedra tekhnologii elektrokhimicheskikh proizvodstv.
(Tin--Electrometallurgy) (Sulfamine)

S/196/61/000/011/002/042
E194/E155

AUTHORS: Levin, A.I., and Lazarev, V.F.

TITLE: The use of alternating current in forming lead accumulator plates

PERIODICAL: Referativnyy zhurnal, Elektrotekhnika i energetika, no.11, 1961, 20, abstract 11A 117. (Vestn. elektrom-sti, no.6, 1961, 60-62)

TEXT: The effects that result from superposing a.c. on d.c. in the process of forming lead accumulator plates were investigated. The a.c. current density was 0.715 A/dm^2, while the d.c. current density ranged from 0.715 to 4.29 A/dm^2. The ratio of direct to alternating current density was maintained constant and greater than 1 during each test. The paste for the positive electrode was made of litharge and red lead and that for the negative of lead powder. It was found possible to increase the direct-current density by a factor of 2 - 3 as compared with the value normally used in production and to cut the forming time from 15-18 to 5-6 hours without appreciably increasing the temperature. If the d.c. is more than 3 times the a.c. component

Card 1/2

The use of alternating current ... S/196/61/000/011/002/042
E194/E155

there is, however, a notable diminution in the effectiveness of the plate-forming conditions with change in the direction of current. With the above mentioned ratio of current densities the a.c. has no appreciable influence on the electro-chemistry, chemical composition or porosity of the active substance of starter accumulator plates but appreciably increases their mechanical strength.
5 literature references.

[Abstractor's note: Complete translation.]

Card 2/2

KOROBOCHKIN, B.L. (Moskva); LEVIN, A.I. (Moskva)

Effect of the dry friction in the guides on the stability of the hydraulic servosystems of copying machine tools. Avtom. i telem. 22 no.9:1253-1256 S '61. (MIRA 14:9)
(Machine tools) (Hydraulic control)

[redacted], A.I.; GURYLEV, V.V.

Using a pyrophosphate electrolyte in the copper plating of a steel wire. Zhur.prikl.khim. 34 no.8:1775-1779 Ag '61. (MIRA 14:8)

1. Ural'skiy politekhnicheskiy institut imeni S.M. Kirova.
(Wire)
(Copper plating)

LEVIN, A.I.; LETSKIKH, Ye.S.

All-Union Conference on Copper Refining. TSvet.met. 34 no.9:86-88 S '61. (MIRA 14:10)

(Copper industry—Congresses)

PROSTAKOV, M.Ye.; LEVIN, A.I.; KOCHERGIN, V.P.

Anodic behavior of zinc and tin in alkaline electrolytes. Zhur. fiz. khim. 35 no.2:420-425 F '61. (MIRA 16:7)

1. Ural'skiy institut chernykh metallov i Ural'skiy politekhnicheskiy institut imeni Kirova, Sverdlovsk.
(Tin) (Zinc) (Electrochemistry)

LEVIN, A.I., prof., doktor tekhn. nauk

Effect of the surface charge of metals and concentration changes near the electrodes on the kinetics of electrode reactions. Sbor. nauch. trud. Ural. politekh. inst. no.122:83-92 '61. (MIRA 17:12)