"APPROVED FOR RELEASE: 08/26/2000 CIA-RDP86-00513R001653610003-6

STROGBENG, A. G.

Chem. Inst., Sverdlovsk, Ural Branch, Acad. Sci., (-1946-).

"A Contribution to the Theory of the Catalytic Waves of Hydrogen in Polarography."

Zhur. Fiz. Khim., No. 4, 1946.

APPROVED FOR RELEASE: 08/26/2000 CIA-RDP86-00513R001653610003-6"

"APPROVED FOR RELEASE: 08/26/2000 CIA-RDP86-00513R001653610003-6

SHCHUROV, A. V.

Chem. Inst. Sverdlovsk, Ural Branch of Acad. Sci., (-1946).

"Polarographic Studies of Nitric Acid Solutions of Niobium."

Zhur. Fiz. Khim., No. 7, 1946.

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"APPROVED FOR RELEASE: 08/26/2000 CIA-RDP86-00513R001653610003-6

STROMBERG, A. G.

A. G. Stromberg and L. M. REINUS

"A Polarographic Study of Half-Wave Potentials of Substituents of quinones, phenones and Fuchsones" from Zhurnal obshtchei Khimii, No. 9, 1946

The object of this article is to make a polarographic study of quinones, phenones, and fuchsones in order to explain the influence of substitutents on the potential of the half-waves of these three groups of organic compounds. The work was begun at the suggestion of Prof. Dr. I. Y. Postovsky in order to explain the connection between the antibacterial properties of certain quinones and their physico-chemical properties.

Translation available

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C1

1ST AND 2ND ORDERS

PROCESSES AND PROPERTIES INDEX

3RD AND 4TH ORDERS

10

Polarographic study of the half-wave potentials of substituted quinones, phenones, and fuchsones. A. G. Stromberg and L. M. Reinus (All-Union Chem. Pharm. Research Inst., Sverdlovsk). *J. Gen. Chem.* (U.S.S.R.) **10**, 1431-42(1940)(in Russian). In phenones and fuchsones, Me, OMe, and two MeO groups (in 2,6 situations) give almost no potential variations; in the quinone series, the potentials are progressively shifted to more neg. values in the order H < Me < OMe < 2,6-$(MeO)_2$, the values being (1st figure, at 25°, in absence of EtOH; 2nd, at 60°, after addn of 30 vol.-% EtOH): *p*-quinone +0.15, 0.04, *o*-methyl-*p*-quinone −0.05, 0.13; *o*-methoxy-*p*-quinone −0.085, −0.17; 2,6-dimethoxy-*p*-quinone −0.17, −0.26 v. For phenones, at 60°, in nonalc. medium: benzophenone −1.24; 4,4'-dihydroxybenzophenone −1.47; 3,3'-dimethyl-4,4'-dihydroxybenzophenone −1.48, 3,3'-dimethoxy-4,4'-dihydroxybenzophenone −1.46. Fuchsones produced 2 waves, with the following values at 60° and in the presence of 30 vol.-% EtOH: aurin −0.8 and −1.24; *o*-cresaurin −0.82 and −1.26; rubrophen −0.82 and −1.24; aurintricarboxylic acid −0.81 and −1.27; triiodoaurin −0.81 and −1.49; *o*-hexamethoxyaurin −0.82 and −1.26. The existence of 2 waves in fuchsones is attributed to the formation of an intermediate semifuchsone. The possibility of a connection between the reduction-oxidation potential and biol. activity is corroborated by the finding that the fuchsones studied have the same ability to promote *hemoglobin production* in guinea pigs.

G. M. Kosolapoff

ASM-SLA METALLURGICAL LITERATURE CLASSIFICATION

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CA

2

A theory of the catalytic waves in polarography. A. G. Stromberg (Ural Branch of the Acad. Sci. U.S.S.R., Sverdlovsk). *J. Phys. Chem.* (U.S.S.R.) 20, 400-10 (1946).—The additional polarographic wave observed by Brdička (*C.A.* 27, 3872) in solns. of $CoCl_2$, cysteine, NH_4OH, and NH_4Cl, is due to liberation of H from cysteine. Co atoms deposited on the Hg surface attract S of cysteine and reduce the attraction between H and S in the HS group so much that H is evolved at a potential below that of the discharge of H ions. The free valence of S attaches a H^+ from the soln., and the process starts anew. It is assumed that the formation of HS group from S and H^+ is the slowest process which dets. the rate of the catalytic liberation of H. This assumption and Langmuir's adsorption isotherm lead to an equation between the height h of the catalytic wave and the concns. of H^+, Co^{++}, cysteine (c_1), NH_4Cl (c_2), and gelatin in the soln. In agreement with Brdička's expts., h is proportional to the concn. of Co^{++}, and $1/h$ is a linear function of $1/c_1$ and $1/c_2$.

J. J. Bikerman

ASM-SLA METALLURGICAL LITERATURE CLASSIFICATION

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Polarographic study of columbium solutions in nitric acid. A. G. Stromberg and L. M. Reiman (Ural Branch of the Acad. Sci. U.S.S.R., Sverdlovsk). *J. Phys. Chem.* (U.S.S.R.) 20, 693-705(1946).—No polarographic wave is obtained for Cb solns. in HCl, H_2SO_4, tartaric acid, salicylic acid, KNO_3 + pyrogallol, and NH_4 oxalate. If CbO_2 is fused with K_2CO_3 and then dissolved in HNO_3, the soln. gives a wave the height of which is proportional to the concn. x of Cb between 0.10 and 2.12 millimol./L., independent of the concn. y of KNO_3 between 0.2 and 2 N, and increases with the concn. z of HNO_3 between 0.05 and 0.9 N. The half-wave potential referred to a N calomel electrode is independent of y and x, and decreases when z increases; it is, e.g., −0.88 at z = 0.026 N and −0.80 v. at z = 0.89 N. Addn. of 0.001% of gelatin increases, and 0.01% of gelatin reduces the height of the wave. The diffusion coeff. of Cb, calcd. from the Ilkovic equation, is improbably great. Presumably, the wave is due to the catalytic liberation of H, at the cathode. First the quinquevalent Cb ion is reduced to Cb^{+++}, and then Cb^{+++} reacts with 2 H^+ to give quinquevalent Cb and H_2. This assumption explains the above exptl. results. Probably the soln. contains complex ions of CbO^{+++} and HNO_3. Cb solns. in other acids do not show polarographic waves, presumably because their reduction potentials are more neg. than that of H. I. I. Bikerman

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Polarographic determination of copper and nickel in steel. A. G. Stromberg, R. V. Dityatkovskaya, and N. V. Milovanova. *Zavodskaya Lab.* 14, 919-25(1948). The adsorption of Cu^{++} and Ni^{++} by $Fe(OH)_3$ was studied by a polarographic method with respect to the effect of NH_3, NH_4 salts, and amts. of Fe, Cu, and Ni. A ppt. of $Fe(OH)_3$ adsorbs 2-2.5 times more Ni^{++} than Cu^{++}, and the adsorption is increased by lowering the concn. of NH_3 or NH_4Cl. The reverse is also true; when NH_4Cl reaches 0.3 *N* and NH_3 4.0 *N*, the adsorption of Cu is almost nil. In a soln. which is 0.7 *N* in NH_4Cl this happens when the NH_3 concn. reaches 2.5 *N*. The amt. of adsorbed Cu is proportional to the amt. of Fe ppt., while that of Ni rises somewhat slower; the amt. of adsorption is directly proportional to the concn. of Cu or Ni, resp. (this is contrary to Thanheiser and Maassen (C.A. 31, 4615[8]). To det. Cu and Ni in steel, dissolve 0.5 g. of sample in 25 ml. of 6 *N* HCl and oxidize with HNO_3. Evap. to dryness and digest the residue with 9 ml. of 2.7 *N* HCl. Transfer to a 50-ml. volumetric flask, add 15 ml. of concd. NH_4OH and dil. to the mark. After 15 min. place a suitable aliquot in the polarograph together with 4 ml. of satd. Na_2SO_3 soln. and 1 ml. of 0.25% gelatin soln. With the instrument measure the Cu at −0.4 and 0.8 v. and the Ni at −0.8 and −1.2 v. Calibrate the instrument with standard samples of steel. G. M. K.

ASM-SLA METALLURGICAL LITERATURE CLASSIFICATION

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STROMBERG, A. G. PA 64/49T9

USSR/Chemistry - Test Equipment Nov 48
Chemistry - Polarographs

"Visual Polarograph Developed by the Ural Affiliate of the Academy of Sciences USSR," A. G. Stromberg, I. Ye. Bykov, Ural Affilliate, Acad Sci USSR, 3 pp

"Zavod Lab" Vol XIV, No 11

This development project has been going on for several years. Present model operates off a 4-volt battery and has some 25 coils with a total resistance of 10 ohms and fine tuning coils with a total resistance of one ohm. Describes circuit and some performance characteristics. No evaluation given.

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PROCESSES AND PROPERTIES INDEX

5

21

THE ELECTRICAL SYSTEM OF THE VISUAL POLAROGRAPH. A.G. Stromberg. (Zavodskaya Laboratoriya, 1948, vol 14, Nov., pp 1382-1387). (in Russian). Two conditions are given which should be satisfied by any arrangement of the rheostat in the circuit of the visual polarograph: (1) The total resistance of the shunts is equal to the critical resistance of the mirror-galvanometer within ± 5% for any setting; and (2) the ratio of sensitivities for two given settings of the sensitivity-regulator does not vary for different settings of the rheostat. A number of different circuits are critically examined on the basis of the above criteria, equations being derived to show the influence of resistances on the working of the polarograph. Various parameters of the circuits and individual resistances for optimum results are calculated.—S.K.

ASM-SLA METALLURGICAL LITERATURE CLASSIFICATION

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STROMBERG, A. G.

Discussion

1. A. G. Stromberg, A question on the theory of viscosity of liquids. P. 1146.
This is criticism of a monograph by I. M. Panchenkov in which Mr. Stromberg's work is criticized.

Acad. of Sciences U.S.S.R. Ural Branch,
Sverdlovsk
July 21, 1947

SO: Journal of Physical Chemistry (USSR) 22, No. 9, 1948

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"APPROVED FOR RELEASE: 08/26/2000 CIA-RDP86-00513R001653610003-6

Polarographic investigation of columbium. A. G. Stromberg and L. M. Rehms. *Trudy Komissii Anal. Khim., Otdel. Khim. Nauk, Akad. Nauk S.S.S.R.* 2, 5[illegible], 31-53(1940). Extensive expts. showed that Cb could be detd. only in acid nitrate soln. In solns. of HCl, H_2SO_4, HF, as well as in acid and ammoniacal solns. of oxalic acid, tartaric acid, salicylic acid, and pyrogallol Cb gave no wave. The wave appeared clearest in the presence of 0.5-1.0 mol./l. of KNO_3 and approx. 0.2 mol./l. of HNO_3. The effect of gelatin on the height of the Cb wave was to cause it first to increase, reach a max. at a gelatin concn. of 0.001%, and then to diminish as the concn. of gelatin increased. The diffusion coeff. (D) of Cb calcd. from the exptl. data is considerably larger (D_{Cb} = 8.3.10^{-6} sq. cm./sec.) than is usually encountered for other ions; e.g., it is 250 times D_{Cb} in the presence of 0.05% of gelatin and 400 times without gelatin. This abnormal behavior is attributed to the catalytic action of Cb^{++} reduced on the Hg electrode from Cb^{++}. Trivalent Cb then reacts with at. H reducing the latter. A formula is derived relating the polarographic wave of Cb to its concn. in soln. and to the concn. of HNO_3. M. Hosch

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Polarograph with a visual scale (polarometer) used in the Ural Branch of the U S S R Academy of Sciences for rapid analyses in industrial control. A. G. Stromberg. *Trudy Komisii Anal. Khim., Otdel. Khim. Nauk, Akad. Nauk S.S.S.R.* 2 (5), 112-20(1949).—Structural details are given. M. Hosch

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STROMBERG, A.G.

4

USSR

Investigation of the solubility of dimethylglyoxime in ammoniacal and alcoholic solutions with the aid of amperometric titration. A. G. Stromberg and A. L. Zelvanskaya (Acad. Sci. U.S.S.R.). *Zhur. Anal. Khim.* 4, 286-91 (1949).—Satd. solns. of dimethylglyoxime were titrated amperometrically with standard Ni solns. using a dropping-Hg electrode. The solns. were satd. in the presence of solid dimethylglyoxime. Satn. took 4-6 days, except for H_2O 10 days at 25 ± 0.1°. In NH_4OH the soly. was detd. at concns. of 0.01-1.0 and 2.0-10 *M*. Up to 1.0 *M* NH_4OH the soly. of dimethylglyoxime increased rapidly with NH_4OH concn. Then, the increase in soly. with concn. of NH_4OH slowed down until at 8.0 *M* NH_4OH and above the increase with concn. was again rapid. By plotting the soly. of dimethylglyoxime (in millimol. per l.) (c_D) vs. concn. of NH_4OH (c_a) in *M*/l. the soly. of dimethylglyoxime in the range of 0.4-8.0 *M* NH_4OH is given by $c_D = 10 + 6.7\ c_a$. In the range of 0.1-2 *M* NH_4OH the relation is given by $\log c_D = 1.26 + 0.35 \log c_a$, and for the range 3.0-10 *M* NH_4OH $\log c_D = 1.28 + 0.066\ c_a$. c_D was next studied in a mixt. of NH_4OH and NH_4Cl. The NH_4OH was kept const. at 1 *M*, the concn. of NH_4Cl (c_s) was varied from 0.1 to 1.0 *M*. The results are given by $\log c_D = 0.73 - 0.23 \log c_s$. In alc. the soly. of dimethylglyoxime was studied at alc. concns. of 0-96% by vol. or 0-16.4 *M*. The soly. in 5-16 *M* alc. is given by $\log c_D = 0.66 + 0.10\ c_{alc.}$ where $c_{alc.}$ is the concn. of alc. in *M*. In H_2O the soly. of dimethylglyoxime was detd. to be 2.6 millimol./l. M. Hosch

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STRONBERG, A. G.

Feb 49

USSR/Chemistry- Cadmium
Chemistry- Polarography

"Polarographic Study of Cadmium Complexes," A. G. Stromberg, I. Ye. Bykov, Inst of Chem and Metll, Ural Affiliate, Acad Sci USSR, 13 pp

"Zhur Obshch Khim" Vol XIX, No 2

Measured polarographic half-wave potentials of cadmium in solutions of various complex-forming agents. Determined coordination numbers and constants of dissociation by polarographic method for cadmium complexes with potassium iodide, ammonium, and sodium ~~thi~~ thiosulfate. Submitted 29 Oct 47.

PA 46/49T24

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STROMBERG, A. G.

PA 67/49T10

USSR/Chemistry - Solubility Aug 49
Glyoxime, Dimethyl-

"The Effect of the Nature of Combined Solvents on Solubility. The Solubility of Dimethylglyoxime in Water-Alcohol Solutions," A. G. Stromberg, Lab of Anal Chem, Sverdlovsk, Ural Affiliate, Acad Sci USSR, 7 pp

"Zhur Fiz Khim" Vol XXIII, No 8 - pp 962-68

Expands A. Zhukhovitskiy's statistical theory of regular solutions for the case of the solubility of slightly soluble nonelectrolytes in mixed binary solvents. Develops a formula expressing the

[redacted] 67/49T10

USSR/Chemistry - Solubility (Contd) Aug 49

relationship between the solubility of substances and the composition of mixed binary solvents, and applies to solutions of dimethylglyoxime in water-alcohol mixtures. Submitted 13 May 48.

[redacted] 67/49T10

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STROMBERG, A. G.

USSR/Chemistry - Glyoxime, Dimethyl-
Solubility

Aug 49

PA 67/49T9

"The Solubility of Dimethylglyoxime in Water-Ammonium and Ammonium Solutions," A. G. Stromberg, Lab of Anal Chem, Inst of Chem and Metal, Sverdlovsk, Ural Affiliate, Acad Sci USSR, 11 ½ pp

"Zhur Fiz Khim" Vol XXIII, No 8 - pp 969-80

Dimethylglyoxime in water-ammonium solutions partially reacts to form an ammonium salt of the dimethyglyoxime whose ions are completely dissociated. Calculates total solubility of this compound from its concentration of molecules and its concentration

[redacted]

67/49T9

USSR/Chemistry - Glyoxime, Dimethyl-
(Contd)

Aug 49

of arions. Determines approximate mathematical relation between the solubility and the composition of the solvent in water-ammonium mixtures, and applies satisfactorily to the solubility of dimethylglyoxime with a concentration of ammonium chloride in water-ammonium solutions of invariable composition. Measures specific electroconductivity of solutions of dimethylglyoxime in water-alcohol and water-ammonium solutions. Submitted 24 May 48.

[redacted]

67/49T9

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CA

1

Polarographic method for determining styrene in the styrene fraction of crude benzene. A. G. Pozdeeva and A. G. Stromberg (Acad. Sci., U.S.S.R., Sverdlovsk). *Zhur. Anal. Khim.* 5, 101-9(1950).—To det. styrene in a styrene fraction, b. 136-150°, 3 solns. are needed: (1) the unknown soln., prepd. by dissolving 2 drops (wt. = p_1) of the sample in 1 ml. of H_2O-EtOH mixt. contg. 75% by vol. of EtOH; (2) standard soln., prepd. by dissolving 1 drop (wt. = p_0) of pure styrene in 1 ml. of the H_2O-alc. mixt.; (3) supporting electrolyte, prepd. by dissolving 7.40 g. of Bu_4NI in 100 ml. of 75% EtOH. Cover the Pt lead in the electrolyzer with 0.5 ml. of Hg, add 1 ml. of soln. (3) and 2 drops (wt. = p_1') of soln. (1), mix, and take a reading at −1.7 v., another at −2.1 v., and note the difference (m_1) in scale reading. Repeat with 2 drops (wt. = p_0') of soln. (2), and again note the difference (m_0) in scale reading. Repeat with soln. (3) only, and note the difference (n'). The styrene content (x) in wt. % is calcd. from $k(m_1 - n')/(m_0 - n')$. The factor k is calcd. from $k = P_0P_0'/P_1P_1'$. This method is essentially a micromethod. If Bu_4NI is available, it is preferable to work with 5-10 ml. of the solns.; thus the necessity of weighing drops is avoided. M. Hosch

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C1

Polarographic study of styrene in an alcoholic solution of tetrabutylammonium iodide. A. G. Stromberg and A. [illegible] Pozdeeva (Eastern Coal Chem. Research Inst., Sverdlovsk). *Zhur. Obshchei Khim.* **20**, 54-62(1950); *J. Gen. Chem. U.S.S.R.* **20**, 57-63(1950)(Engl. translation). A 0.2 *M* soln. of Bu_4NI in 75% alc. is a convenient solvent owing to the smallness of its diffusion current in the potential range of reduction of $PhCH:CH_2$. In this solvent, the half-wave potential of $PhCH:CH_2$ (in about 0.25 *M* soln.) is −2.58 v. relative to satd. calomel, and is independent of the conc. between 0.25 *M* and 0.7 *M*. From the current-voltage curve, the no. of electrons, *n*, involved in the reduction of 1 mol. $PhCH:CH_2$ is found to be ≈ 0.67; consequently, the reduction is irreversible. From Ilkovich' formula, with the diffusion coeff. *D* tentatively estd. to 0.68 × 10^{-5} cm.^{2} sec.$^{-1}$, the true no. *n* is found = 1.86, i.e. close to the required 2. With *n* = 2, Ilkovich's formula gives *D* = 0.60 × 10^{-5} cm.^{2} sec.$^{-1}$. The wave height is strictly proportional to the conc. of $PhCH:CH_2$ in the range 0.001–0.030 *M*. In order to maintain a const. diffusion current, it is advisable to work with long dropping periods, 10–20 sec. without polarization, 3–5 sec. under −2.4 v. The high half-wave potential of $PhCH:CH_2$, expressing its difficult reducibility, is detd. by the resonance stabilization of the mol. Substituted derivs. are reduced at even more strongly neg. potentials, thus, *p*-methylstyrene at −2.54 v. The reduction reaction is evidently $PhCH:CH_2 + 2H^+ + 2e \rightarrow PhCH_2Me$. With polystyrene the wave disappears almost completely. N. Thon

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Stromberg, A.G.

Advances in Soviet polarography. A. G. Stromberg. CH *Trudy Inst. Khim. i Fiz., Akad. Nauk U.S.S.R., Ural Filial* 1951, No. 4, 30-41.—A 5-year review.

Gary Gerard

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STROMBERG, A.G.

STROMBERG, A.G.; ZELYANSKAYA, A.I.

Amalgam polarography. Trudy Komissii Anal. Khim., Akad. Nauk S.S.S.R., Otdel Khim. Nauk 4, 5-28 '52.
(CA 47 no.21:11032 '53)

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"APPROVED FOR RELEASE: 08/26/2000 CIA-RDP86-00513R001653610003-6

STROMBERG, A.G

BYKOV, I.Ye.; STROMBERG, A.G.

Polarographic determination of cadmium in presence of a large amount of copper. Trudy Komissii Anal. Khim., Akad. Nauk S.S.S.R., Otdel Khim. Nauk 4, 63-74 '52.
(CA 47 no.22:12105 '53)

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CH

Electrochemistry -4

Determination of diffusion coefficients of metals in mercury by amalgam polarography. A. G. Stromberg (Ural State Univ., Sverdlovsk). *Doklady Akad. Nauk S.S.S.R* 85, 831-4(1952). Polarography with a dil. amalgam, contg a dissolved metal at a concn. of the order of 10^{-4}%, gives an anodic wave due to concn. polarization in the amalgam as a result of slow diffusion of the dissolved metal. This anodic wave is entirely analogous with the cathodic wave obtained with pure Hg in a soln. contg. the ions of the metal, and should be governed by the same Ilkovich equation. Tests with amalgams of Cd, Pb, Zn, Tl, and Bi, in various indifferent electrolytes, have demonstrated that the height of the anodic wave is actually independent of the nature of the electrolyte. This is in accord with the requirements of the Ilkovich formula and clearly contradicts the contrary reports of Furman and Cooper (*C.A.* 45, 3735g). Application of the Ilkovich formula permits detn. of the diffusion coeff. D of metals dissolved in Hg from the height of the anodic wave in amalgam polarograms. Values of 10^4D detd. in this way are: Cd 2.07, Pb 1.39, Zn 1.57, Tl 1.60, Bi 1.62 sq. cm./sec. N. Thon

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Rational calculation of an electrical scheme of compensation of the condenser current in polarography. A. G. Stromberg (A. M. Gorkii Ural State Univ., Sverdlovsk). Zhur. Prikkl. Khim. 26, 1029-32(1953).—The electrolytic cell forms one arm (labeled 4) of a bridge circuit with resistance R_4, current i_4, and cell e.m.f., E_4. The ratio arms are designated 1 and 2; the balance points are between 1 and 4 and between 2 and 3. Polarography requires unbalance with current, i_5, through the internal galvanometer resistance, R_5. From Kirchhoff's laws, expressions are derived for i_4 and i_5 in terms of E_4, E (applied e.m.f. across the bridge), and resistances, R_1, R_2, R_3, R_4, R_5. Simplification is achieved by neglecting terms such that $R_4/R_1 = R_3/R_2 \gg 100$, $R_1/R_2 \gg 100$, $R_1/R_4 \gg 100$. R_4 is an apparent resistance of the order 10^7 ohms for the condenser current in 1.0M KCl. One then obtains: $i_4 = (E - E_4)/R_4$, $i_5 = -E_4/R_4$, from which $i_4 = E/R_4 + i_5$. As a consequence, the presence of a diffusion current (reducible substance) corresponds to a change of effective counter-e.m.f. to another fixed value E_4' for R_4 const. The relation for balance $R_4 = R_1R_3/R_2$ then applies, and the galvanometer indication i_5 will not change with E as it does when condenser current is present. As a result, $i_4' - i_4^0 = i_5' - i_5^0$, where i_4' and i_4^0 are diffusion plus condenser currents with and without reducible substance; i_5' and i_5^0 are the respective diffusion currents. Therefore, the change of current through the galvanometer is equal to the change of current through the cell. For a typical case, $R_1 = 10^5$ ohms, $R_2 = 10$ ohms, $R_3 = 1000$ ohms, $R_5 = 1000$ ohms. The galvanometer produces an apparent displacement of the half-wave potential unless the potentiometer resistance is 0.01 ($R_2 + R_3$) or less. Polarograms are given for an NH_4 electrolyte with and without $1.6 \times 10^{-3}M$ Cd at max. galvanometer sensitivity (0.05 μ amp./cm. of scale) for different values of R_2. Optimum compensation produces a flat curve before and after the half wave. The method is recommended for trace analysis.

R. D. Misch

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Jan 10, 1954
Electrochemistry

STROMBERG, A. G.

Amalgam polarography. Study of the influence of gelatin and camphor on the anodic waves of amalgams. A. G. Stromberg and M. S. Guferman (A. M. Gor'kii Ural State Univ., Sverdlovsk). *Zhur. Fiz. Khim.* 27, 993-1001(1953); cf. *C.A.* 47, 11032b.—In amalgam polarography, the dropping liquid was a dil. amalgam of metal, M, and the aq. soln. in which the drops formed usually contained no ions of M. The potentials (E_a and E_c) of the half waves and the coeffs. k_a and k_c of the equation $\log [i/(I - i)] = \text{const.} - kE$ (i = current strength, I = limiting current strength, E = drop potential referred to satd. Hg-HgCl electrode) were compared for the anodic polarization of amalgam drops (subscript a) and the cathodic polarization of Hg drops in a soln. of M (subscript c). The amalgam (in expts. a) and the soln. (in expts. c) usually were 0.0005-0.002N. For Zn amalgam in 0.1N KOH or zincate soln. in 0.1N KOH the difference between E_a and E_c was 0.32 v. Addn. of 0.1% gelatin (I) raised it to 0.58 v. and gave k_a = 0.15 and k_c = 0.29 instead of the theoretical value 0.030. For Cd in 0.1N KCl there was almost no difference between E_a and E_c and between k_a and k_c (0.033 – 0.040), and I had almost no effect. Apparently the I film adsorbed on the drop surface was permeable for small Cd^{2+} but impermeable for large ZnO_2^{2-}. In 0.1N KCl the difference between E_a and E_c was negligible also in the instances of Pb and Zn. Satn. of the soln. with camphor (II) produced $E_a - E_c$ of 0.82, 0.89, and 0.61 v. for Zn, Cd, and Pb, resp., and increased k_a and k_c to 0.06-0.18. II had no effect on the potential of non-polarized drops, but made E_a less and E_c more neg.; in both instances the half-wave potential was shifted toward the (pos. and neg., resp.) potential of desorption of II. The effect of II on the polarization of Sn amalgam in 4N HCl and that of Hg in 4N HCl + $SnCl_4$ was complicated. The wave corresponding to $SnCl_6^{2-} \rightarrow Sn$ was suppressed by II. Surface-active addns. also affected polarographic results by slowing down the movements of the drop surface.

J. J. Bikerman

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Chemical Abst.
Vol. 48 No. 6
Mar. 25, 1954
[illegible] chemistry

(3)

Electrode processes on dropping amalgam electrodes. Retarded dissociation of complexes. A. G. Stromberg (A. M. Gor'kii Ural State Univ., Sverdlovsk). *Zhur. Fiz. Khim.* 27, 1287-97(1953); cf. *C.A.* 43, 53f.—Math. Whether the polarization of a dropping electrode is due to (*a*) slow diffusion only or (*b*) slow diffusion and slow dissocn. of metal complexes (yielding metal ions M), the half-wave potential of the anodic wave (φ_a) should be equal to that of the cathodic wave (φ_c) and $d\varphi/d \ln i$ (φ = potential, i = c.d.) should be = $0.059/r$ (r = valency of M). However, in case *b*, φ_a and φ_c are by $(0.059/r)\ln(1 + \alpha)$ more cathodic than in case *a*, and the limiting c.d. for the cathodic polarization is $(1 + \alpha)$ times as small as in case *a*, while the limiting c.d. for the anodic polarization is identical for *a* and *b*. α is the ratio of the rate constants for dissocn. of metal complexes and for diffusion of complex ions. Experimentally, it should be possible to det. whether *a* or *b* is present from the numerical value of the overall diffusion rate (which is small when the dissocn. of metal complexes is slow) and from the temp. coeff. (which in case *b* is greater than in case *a*). The above theory assumes that the diffusion of M ions is negligible compared with that of complex ions. If the latter diffusion also is considered, less simple results are found.

I. I. Bk. [illegible]

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Stromberg, A. G.

MG

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Influence of Camphor on the Electrode Potential of the Dropping Amalgam Electrode. A. G. Stromberg and R. A. Fitateleva (*Doklady Akad. Nauk S.S.S.R.*, 1953, 89, (6), 1071–1074; errata, 1954, 97, (5), 866).—(In Russian). The potentials of dropping electrodes of Pb, Sn, Cd, and Zn amalgams in 0·005*M* soln. of ions of the metals in various indifferent electrolytes (0·1*N*-KNO_3 or 0·1*N*-HNO_3; 6·2*N*-HCl or 0·1*N*-KOH; 0·1*N*-KCl; 0·1*N*-KCl or 0·5*N*-KOH, resp.) shifted in the positive direction on saturating the soln. with camphor; there was no change with Bi amalgam and 0·6*N*-HCl, whilst with Cu amalgam and 0·1*N*-H_2SO_4 there was a slight shift in the negative direction. Reducing the drop period from 2 to 1 sec. (thus increasing the rate of formation of a new electrode surface from 0·013 to 0·026 cm.²/sec.) in experiments with Cu, Bi, and Pb amalgams led to shifts of −0·005, 0, and +0·010 V., resp. In the case of Cd amalgam, shifts of +0·120, +0·041, and +0·003 V. were produced when the soln. was saturated, ½-saturated, and $\frac{1}{10}$-saturated, resp., with camphor. Increasing the Cd content in the amalgam (0·0013*M*) by 10× and 100× reduced the shift from 0·112 V. to 0·043 and 0·005 V., resp. Camphor did not affect the equilibrium potentials of stationary amalgam electrodes. If camphor is absent, the potentials of dropping and stationary electrodes are identical. All these observations can be explained in terms of the theory that the electrode processes are governed by exchange currents.—G. V. E. T.

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STROMBERG, A. G.

USSR/Chemistry

Card 1/1

Authors : Stromberg, A. G., and Markacheva, T. K.

Title : Polarographic Coulometry. Estimation of the Number of Electrons in the Process of Reduction of Quinoline, Isoquinoline and Quinaldine, on a Mercury Drop Electrode.

Periodical : Zhur. Fiz. Khim. Vol. 28, Ed. 4, 671-682, Apr 1954

Abstract : The author presents the methods for determination of the number of z-electrons present in the process of reduction of a molecule of quinoline, isoquinoline, and quinaldine in the three buffer solutions of pH compounds (4,7; 7,4; and 9,9). The estimates are performed with the aid of a polarographic coulometer. Eleven references; tables; graphs.

Institution : A. M. Gor'ki's Ural State Institute.

Submitted : June 28, 1953

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"APPROVED FOR RELEASE: 08/26/2000 CIA-RDP86-00513R001653610003-6

STROMBERG, A. G.

USSR/Chemistry Physical Chemistry

Card : 1/1

Authors : Stromberg, A. G. and Zagaynova, L. S.

Title : Effect of camphor on the electrode processes on a cadmium amalgam drop electrode

Periodical : Dokl. AN SSSR, 97, Ed. 1, 107 - 110, July 1954

Abstract : The effect of camphor on the electrode processes occurring on a cadmium amalgam drop electrode was investigated in various indifferent electrolytes, and the mechanism of the effect of surface-active substances on the electrode processes in this concrete case, was determined. The experimental results are given in graph and table. The separation of the anode and cathode waves on the amalgam drop electrode is explained on the basis of the theory of the retarded ionization discharge. Eight USSR references.

Institution : The A. M. Gorkiy State University, Ural

Presented by : Academician, A. N. Frumkin, April 21, 1954

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STROMBERG, A. G.

USSR/ Chemistry - Physical chemistry

Card 1/1 : Pub. 22 - 28/48

Authors : Stromberg, A. G., and Braynina, A. Z.

Title : Stationary potential, exchange and charge currents of an amalgam drop-electrode

Periodical : Dok. AN SSSR 97/5, 863-866, August 11, 1954

Abstract : A quantitative theory of the amalgam drop-electrode, its stationary potential and exchange and charge currents, is presented. The stationary potential of an amalgam drop-electrode is determined by a different physical principle than the stationary potential during self-solution of metals. The displacements of the stationary potential toward negative and positive sides in the case of Cu, Sn, Cd, Zn and Bi and their reasons are explained. The effect of ion-atom concentration of the displacement of the stationary potential, is discussed. Five USSR references (1951-1953). Table; graphs.

Institution : The A. M. Gorkiy-Ural State University

Presented by : Academician L. A. Orbeli, April 30, 1954

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STROMBERG, A.G.

The potentiometric study of the precipitation of Ce(IV) (H and Ce(III) with respect to the effect of pH of the solution on the oxidation-reduction potential of the system Ce^{4+}/Ce^{3+}. T. N. Bondareva and A. G. Stromberg. *J. Gen. Chem. U.S.S.R.* 25, 630-42(1955)(Engl. translation).—See *C.A.* 49, 11360*h*. H. L. H.

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STROMBERG A.G. 3

USSR.

The potentiometric study of the precipitation of Ce(IV) and Ce(III) with respect to the effect of the pH of the solution on the oxidation-reduction potential of the system Ce^{4+}/Ce^{3+}. T. N. Bondareva and A. G. Stromberg. *Zhur. Obshchei Khim.* 25, 660-71(1955). The effect of pH on the oxidation-reduction potential of the Ce^{4+}/Ce^{3+} system was studied in weakly acid and alk. solns. (pH 1-9.5). The relation obtained is explained theoretically and certain segments of the curve are correlated with the pptn. of the hydrated oxide of Ce(IV) ($CeO(OH)_2$ and then $Ce(OH)_4$) and with the simultaneous pptn. of $Ce(OH)_3$ and $Ce(OH)_4$.

J. Rovtar Leach

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Stromberg, A. G.

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1

The Theory of Electrode Processes at Dropping Amalgam Electrodes. II.—Retarded Discharge-Ionization. A. G. Stromberg (*Zhur. Fiz. Khim.*, 1955, 29, (3), 409–420). [In Russian]. Cf. *ibid.*, 1953, 27, 1287. Having made 10 fundamental assumptions, and defined "exchange current" as the average (over a period) quantity of electricity taking part in unit time in the reaction on the electrode between metal ions in soln. and atoms of metal on the electrode at equilibrium potential, S. derives an equation of the potential for the irreversible, retarded discharge-ionization at a dropping amalgam electrode: $\frac{i}{i_0} = \frac{I_k - i}{I_k} \exp\left(\frac{\alpha}{b}\eta\right) - \frac{I_a + i}{I_a} \exp\left(-\frac{\beta}{b}\eta\right)$, where i_0 = exchange currents, I_a, I_k = anodic and cathodic limiting currents, and η = cathodic polarization. This equation is based on the general theory of retarded discharge-ionization. Irreversibility of the process is characterized by three quantities: exchange current, coeff. of discharge (α), and ionization (β). If current of exchange is increased indefinitely, this equation changes into an equation of reversible anodic–cathodic wave: $\phi = \phi_{i\,(\text{reversible})} - b \log \frac{I_a + i}{I_k - i}$; where ϕ = potential. From the theory of retarded discharge-ionization, cathodic and anodic potentials of the half-wave differ between themselves and show displacement of the half-wave (in the positive direction for the anodic part, and the negative direction for the cathodic part, referred to the reversible anodic–cathodic wave as the zero position). The displacement depends on the exchange current and resp. magnitudes of α and β; the smaller the magnitude of the exchange current at given concentration of ions and atoms of the metal, the larger the differences in the anodic

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Stromberg, A.G.

and cathodic potentials of the half-waves. Resp. displacements of the cathodic and anodic potentials of the half-waves are inversely proportional to coeff. α and β of the theory of retarded discharge-ionization, and directly proportional to resp. angular coeff. of the wave. S. investigated the methods of calculating α, β, and exchange current, from the measurements of polarization on the dropping amalgam electrode. The connection between exchange current and factors taking part in the reaction (characteristics of the electrode, concentration of ions of metals in sol'n., temp., and concentration of complexing agents) is also investigated, and relationship between them expressed by formulæ. A relation is derived for the anodic–cathodic curve for dropping-amalgam electrodes (taking into account ψ_1 potential): $\frac{i}{i_0}\exp\left(\frac{-\beta}{b^{1/2}}\right)(\psi_{1p}-\psi_1) = \frac{I_a - i}{I_a}\exp\left(\frac{\alpha}{b^{1/2}}\right) - \frac{I_c + i}{I_c}\exp\left(-\frac{\beta}{b^{1/2}}\right)$. 31 ref.—A. W.

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STROMBERG A.G.

Theory of electrode processes at a dropping amalgam electrode. III. The reduced exchange current and the equation for the anodic-cathodic wave. A. G. Stromberg (A. M. Gor'kii Ural State Univ., Sverdlovsk). Zhur. Fiz. Khim. 29, 2152-62(1955); cf. C.A. 49, 10091i.—The reduced exchange current i_0^* is the amt. of electricity taking part in the electrode reaction in unit time when the electrode is at the equil. potential and the concns. of the metal ions (other than Hg) in the amalgam and the soln. are such that the limiting diffusion currents I_a and I_c have unit intensity each. If $\Delta\eta$ is the deviation from the reversible polarization due to the retardation of ionization of complex ions (which retardation is characterized by no. β), and $x = zF\Delta\eta/RT$ (z = valency, F = faraday), then $i_0^* = B/(e^{\alpha x} - e^{-\beta x})$; $B = i(I_a + i)^{\beta-1}/(I_c - i)^{\beta}$, $\alpha = 1 - \beta$, and i is the polarizing current; for cathodic (anodic) polarization B and x are pos. (neg.). When $\Delta\eta \neq 0$, the anodic wave is not a continuation of the cathodic wave. Graphs of these waves for various values of i_0^* are given. The value of i_0^* at which the irreversibility of polarization starts to be noticeable is different for anodic and cathodic polarizations if I_a and I_c are different. J. J. Bikerman

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STROMBERG, A.G.

USSR/Physics - Physical chemistry

Card 1/2 Pub. 22 - 28/52

Authors : Stromberg, A. G., and Ivantsova, M. K.

Title : Interchange current on an amalgam drop electrode and the composition of discharging complexes.

Periodical : Dok. AN SSSR 100/2, 303-306, Jan 11, 1955

Abstract : The definition of "interchange current" is given as the amount of electricity which participates in the electrode reaction per unit of time at an equilibrium potential. The interchange current on an amalgam drop electrode was computed by means of a certain equation by substituting in it the experimental data obtained during polarization measurements.

Institution : The A. M. Gorkiy Ural State University

Presented by : Academician A. N. Frumkin, July 15, 1954

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Periodical : Dok. AN SSSR 100/2, 303-306, Jan 11, 1955

Card 2/2 Pub. 22 - 28/52

Abstract : If the discharge-ionization process is sufficiently slow the amalgam drop electrode shows a split anode-cathode wave which with a certain simplifying assumption can be satisfactorly described by an equation formulated on the basis of the retarded discharge-ionization the ory. Six references: 4 USSR, 1 USA and 1 German (1940-1953). Graphs.

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STROMBERG, A. G.

The influence of surfactant mixtures (camphor and gelatin) upon electrode processes on the cadmium-amalgam electrodes. L. S. Zagainova and A. G. Stromberg. *Doklady Akad. Nauk S.S.S.R.* 105, 71[illegible]. The effects of the gelatin concn., alone and when mixed with camphor, upon the electrode processes on the Cd-amalgam electrode and upon the capillary curves of the Hg-drop electrode were measured, and the results given graphically. The results were discussed in terms of the reduced-velocity discharge-ionization theory of Stromberg (*C.A.* 49, 10991f).

W. M. Sternberg

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STROMBERG, A.G.; PYSHKINA, A.A.

Determination of admixtures in alloys and amalgans by means of amalgam polarography. Trudy Kom.anal.khim. 7:136-141 '56. (MLRA 9:9)

1.Ural'skiy gosudarstvennyy universitet imeni A.M.Gor'koge, Kafedra fizicheskoy khimii, Sverdlovsk.
(Alloys) (Amalgams) (Polarography)

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STROMBERG, A. G.

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Distr: 4E4j/4E3d

Polarographic study of 2,3-derivatives of 1,4-naphthoquinone. I. F. Vladimirtsev and A. G. Stromberg. Zhur. Obshchei Khim. 27, 1029-41(1957).—Polarographic data are reported for 49 2,3-substituted-1,4-naphthoquinones, the detns. being made in buffers of 0.1*N* AcOH-0.1*N* AcONa and 0.1*N* NH_4OH-0.1*N* NH_4Cl. The following values for half-wave potentials (in milliv.) in these buffers are given for *1,4-naphthoquinones* having the indicated substituents in the 2- and 3-positions, resp.: *H, H*, −124, −278; *Cl, OH*, −342, −574; *HO, HO*, −332, −542; *HO, H*, −294, −523; *MeO, H*, −249, −398; *Me, H*, −205, −346; *Cl, OAc*, −167, −320; *Cl, Cl*, −120, —; *Cl, H*, −112, —; *NH_2, H*, −345, −493; *PhNH, H*, −323, −475; *2-$C_{10}H_7$-NH, H*, −307, —; *4-$HO_2CC_6H_4NH$, H*, −290, −461; *2,4-$Cl_2C_6H_3NH$, H*, −277, —; *4-$H_2NSO_2C_6H_4NH$, H*, −273, −423; *$COC(NH_2):CHC(:NPh)$*, −237, −399; *$COCH:CHC(:NPh)$*, −85, −236; *NH_2, Cl*, −350, −505; *p-$MeOC_6H_4NH$, Cl*, −267, —; *PhNH, Cl*, −245, −395; *2-$C_{10}H_7NH$, Cl*, −243, −392; *p-$HO_2CC_6H_4NH$, Cl*, −217, −398; *p-$O_2NC_6H_4NH$, Cl*, −174 and −670, −325 and −695; *EtPhN, Cl*, −152, −305; *AcNH, Cl*, −135, −284; *PhAcN, Cl*, −108, −265; *NH_2, OH*, −383, −557; *p-$MeOC_6H_4NH$, OH*, −341, —; *o-$MeOC_6H_4NH$, OH*, −327, —; *PhNH, HO*, −324, −585; *p-$O_2NC_6H_4NH$, OH*, −325 and −680, —; *m-$O_2NC_6H_4NH$, OH*, −325, —; *p-ClC_6H_4NH, HO*, −324, —; *o-ClC_6H_4NH, OH*, −325, —; *2,4-$Cl_2C_6H_3NH$, HO*, −323, −548; *p-$HO_2CC_6H_4NH$, HO*, −315, −532; *p-$H_2NSO_2C_6H_4NH$, HO*, −315, −540; *PhEtN, HO*, −298, −517. Substituent effects are discussed.

G. M. Kosolapoff

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STROMBERG, A.G.

5

Effect of camphor concentration on the electrocapillary curves of mercury and the electrode processes at a cadmium amalgam dropping electrode. A. G. Stromberg and L. S. Zagainova (A. M. Gorkii Ural State Univ., Sverdlovsk). Zhur. Fiz. Khim. 31, 1042-55(1957); cf. C.A. 50, 9177e.—Camphor (I) lowered the electrocapillary curve (e.c.c.) of Hg in M NH_4OH + M Na_2SO_4 + 0.01% gelatin and shifted the electrocapillary max. φ_m toward smaller polarizations; when the soln. was satd. with I, φ_m was −0.20 instead of −0.48 v. (referred to satd. HgCl electrode) in the absence of I. The adsorbed amt. Γ of I, calcd. from the e.c.c., had a max. Γ_m at −0.48 v. at all concns. of I; in the satd. soln. this max. was 8 × 10^{-12} mole/sq.cm. The difference ψ_1 between the φ_m values with and without I was proportional to Γ_m^2. It was assumed that also at other potentials, ψ_1 was proportional to Γ^2. These calcd. ψ_1 values were used to explain the polarization curves at a dropping Cd amalgam electrode in 0.005M $CdSO_4$ + M Na_2SO_4 + M NH_4OH + 0.01% gelatin + I. The potentials of the anodic and the cathodic half-waves at different I concns. were linear functions of ψ_1 and the slopes of these lines were in accord with the theory of the delayed discharge. J. J. Bikerman

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STROMBERG, A.G.

Distr: 4E4j

Determination of the composition of ammonia and oxalate complexes of zinc discharged at a zinc-amalgam drop electrode by the difference of the anode and cathode potentials of the half-wave. A. G. Stromberg (Polytech. Inst., Tomsk). *Zhur. Fiz. Khim.* 31, 1704-11(1957).—The Tockstein (*C.A.* 46, 4923*f*) method for the continuous prepn. of Zn amalgam of the required compn. by electrolysis with a dropping Hg electrode was improved. The relation of the anode and cathode half-wave potentials at an amalgam dropping electrode to the concn. of the complex-formers was calcd. from the theory of retarded discharge and Gerischer's theoretical considerations (*C.A.* 48, 3765*h*). The compns. of the discharged Zn-ammonia and Zn-oxalate complexes differed from those of the complexes in soln. This agrees with Gerischer's results obtained by the a.c. method.

W. M. Sternberg

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STROMBERG, A.G.

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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.

Usachev, D.N., and A.T. Bagramyan (Institute of Physical Chemistry, Academy of Sciences, USSR). Mechanism of the Electrolytic Reduction of Chromic Acid 197

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"APPROVED FOR RELEASE: 08/26/2000 CIA-RDP86-00513R001653610003-6

SOV/79-29-9-66/76

5(3)

AUTHORS: Voronova, K. R., Stromberg, A. G.

TITLE: Polarographic Investigation of the Azo Derivatives of Barbituric and Thiobarbituric Acid

PERIODICAL: Zhurnal obshchey khimii, 1959, Vol 29, Nr 9, pp 3117-3124 (USSR)

ABSTRACT: Among the soporifics and antispasmodics the derivatives of barbituric acid such as Veronal, Luminal etc have been already used since long. K. R. Voronova (Ref 1) synthesized a series of azo derivatives of barbituric and thiobarbituric acid. Pharmacological investigations showed that many of these azo derivatives are soporifics and antispasmodics. The dependence of the physiological activity on their structure was observed. In the present paper the azo derivatives of barbituric and thiobarbituric acid were polarographically investigated in order to determine the relation between their structure and their reducibility, which is characterized by their semiwave potential at the dropping-mercury cathode. From publications (Refs 2-4) it is known that azo compounds are easily reduced at the dropping-mercury cathode and that their reducibility depends on the molecular structure. Concern-

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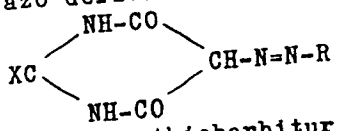
Polarographic Investigation of the Azo Derivatives of Barbituric and Thiobarbituric Acid

ing azo benzene and its derivatives it was proved (Ref 5) that two electrons participate in the reduction, and that hydrazo compounds result as reduction products:

$R\text{-}N{=}N\text{-}R_1 + 2H^+ + 2e^- \longrightarrow RNH\text{-}NHR_1$. On the basis of a series of investigations it was found that the system of the "azo compound - hydrazo compound" is reversible (Refs 3, 7, 8). 14 Azo derivatives of barbituric acid and 13 corresponding azo derivatives of thiobarbituric acid of the general formula:



were investigated, where X=O in barbituric acid and X = S in thiobarbituric acid; R = phenyl, naphthyl, phenyl with substituents, naphthyl with substituents. It was found that the reduction of the azo derivatives of thiobarbituric acid is more reversible than that of the corresponding azo derivatives of barbituric acid. In the series of the azo derivatives with the naphthalene cycle the introduction of

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SOV/79-29-9-66/76

Polarographic Investigation of the Azo Derivatives of Barbituric and Thiobarbituric Acid

the sulfo group facilitates reduction. In the series of azo derivatives with a benzene cycle the introduction of the sulfo- and also of the carboxyl group inhibits reduction. A theoretical explanation of the experimental results obtained is suggested as being provided by the influence of the sulfo group on the semiwave potential of the compounds according to the theory of retarded discharge and ionization. In the polarographic investigation of the above azo derivatives the visual polarograph of the system UFAN was used. All determinations were made in a thermostat with a toluene thermoregulator at 25°. All potentials in the text, in the tables, and in the figures are given with respect to the saturated calomel electrode. The azo derivatives were produced by K. R. Voronova under the supervision of L. P. Kulev to whom the authors express their thanks. There are 2 figures, 4 tables, and 9 references, 4 of which are Soviet.

ASSOCIATION: Tomskiy politekhnicheskiy institut (Tomsk Polytechnic Institute)

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Polarographic Investigation of the Azo Derivatives of Barbituric and Thiobarbituric Acid

SUBMITTED: July 16, 1958

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SOV/76-33-2-12/45

5(4)

AUTHORS: Stromberg, A. G., Voronova, K. R.

TITLE: The Effect of the Dropping Period on the Half-Wave Potential of Manganese and Calculation of the Density of the Manganese Exchange Current (Vliyaniye perioda kapaniya na potentsial poluvolny marganitsa i vychisleniye plotnosti toka obmena marganitsa)

PERIODICAL: Zhurnal fizicheskoy khimii, 1959, Vol 33, Nr 2, pp 319 - 322 (USSR)

ABSTRACT: A series of observations (Refs 4-10) could be explained by the theory of the delayed ionization discharge (Ref 1) which was used by A. G. Stromberg for the amalgam dropping electrode (Refs 2,3). The theory was further developed by studying metals which do or do not form amalgams with mercury, and the theoretical relationships were tested using the example indicated in the title. The theoretical section of the paper explains the two principal cases involved. A new polarographic method for calculating the density of the exchange current of pure metals is suggested, and the density of the exchange current between Mn ions in solution and metallic

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manganese (on a 1 cm^2 true surface) is calculated. For an amalgamation it is assumed that the potential of the half-wave varies linearly with the logarithm of the dropping period, so that with an increase in the dropping period the potential of the half-wave becomes more positive. Corresponding to the derived equations the half-wave potential is independent of the velocity of discharge of the mercury. In the case that no amalgam is formed the concentration of the metal atoms separated on the mercury drops must be considered as constant in the equations. To test the theoretically derived equations of the potential of the half-wave as a function of the dropping period (15) the irreversible polarographic waves of manganese were studied at various dropping periods and compared with the reversible polarographic waves of cadmium. The current strength was measured with a M 21/2 mirror galvanometer while the potential of the dropping electrode was measured with a PFTV-1 potentiometer. Solutions of 10^{-3}m $MnCl_2$, 1.0 m KCl + 0.005% gelatin (or 10^{-3} m $CdCl_2$, 1.0 m KCl + 0.005% gelatin) were investigated at dropping

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The Effect of the Dropping Period on the Half-Wave Potential SOV/76-33-2-12/45
of Manganese and Calculation of the Density of the Manganese Exchange Current

periods of 1.2 to 13 seconds using 3 different capillaries and at 19-20°C. The experimental results show that the manganese wave is irreversible, i.e., not only the diffusion process is determining but another delaying stage of the electrode process is also. The experimental data (Figs 1-4) agree well with the theoretical line for the coordinates of the half-wave potential and the logarithm of the dropping period. The line possesses a theoretical angular coefficient of 0.020. There are 4 figures and 16 references, 12 of which are Soviet.

ASSOCIATION: Tomskiy politekhnicheskiy institut im. S. M. Kirova (Tomsk Polytechnical Institute imeni S. M. Kirov)

SUBMITTED: July 4, 1957

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STROMBERG, A.G.; GORODOVYKH, V. Ye.

Polarographic determination of 10^{-7} m. of lead. Zav.lab. 26 no.1:46-48 '60. (MIRA 13:5)

1. Tomskiy politekhnicheskiy institut.
(Lead--Analysis)
(Polarography)

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S/032/60/026/02/011/057
B010/B009

5 (2)

AUTHORS: Zakharov, M. S., Stromberg, A. G., Rodnova, G. G.

TITLE: Polarographical Determination of Manganese in Glasses

PERIODICAL: Zavodskaya laboratoriya, 1960, Vol 26, Nr 2, pp 153 - 154 (USSR)

ABSTRACT: A new method for the determination of manganese in special glass types containing considerable amounts of manganese was developed. Experiments showed that Mn^{2+} may be best determined polarographically in an ammonia - ammonium chloride solution. M. A. Shcherbachev (Ref 1) recommends that the latter solution be first added to the solution under investigation and the sodium sulfite added subsequently. The present authors, however, noted that in this case a partial precipitation of $MnO(OH)_2$ takes place. It was found that the sodium sulfite amount added affects the polarographic wave of Mn^{2+} (Figure), since Mn^{2+} forms a stabler complex with sodium sulfite than it does with ammonia. The working method given provides for the glass to be dissolved with NH_4F. In order to prevent precipitation of manganic acid

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Polarographical Determination of Manganese in Glasses

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B010/B009

at the addition of ammonia, 1m Na_2SO_3 solution is added to the hydrochloric acid solution of the oxides. Subsequently, the mixture of 0.1 m NH_4OH, 0.25 m NH_4Cl, 0.25 m Na_2SO_3, and 0.025% of gelatine is added. The determination results obtained polarographically are in agreement with those obtained gravimetrically (Table). There are 1 figure, 1 table, and 1 Soviet reference.

ASSOCIATION: Tomskiy politekhnicheskiy institut (Tomsk Polytechnic Institute). Tomskiy elektrolampovyy zavod (Tomsk Electric Bulb Plant)

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"APPROVED FOR RELEASE: 08/26/2000 CIA-RDP86-00513R001653610003-6

ZAKHAROV, M.S., STROMBERG, A.G.

Use of the EO-7 oscillograph for the polarographic determination of micro concentrations. Zav.lab. 26 no.5:632-633 '60. (MIRA 13:7)

(Oscillograph) (Microchemistry)

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86153

S/076/60/034/008/016/039/XX
B015/B063

26.1610

AUTHORS: Stromberg, A. G., Kartushinskaya, A. I.

TITLE: Polarographic Study of Inorganic Redox Systems. I. Influence of the Parameters of the Capillary Tube on the Anode and Cathode Waves in the Ti^{4+} - Ti^{3+} System

PERIODICAL: Zhurnal fizicheskoy khimii, 1960, Vol. 34, No. 8, pp. 1684 - 1690

TEXT: The appearance of a separate anode and cathode wave at a dropping amalgam electrode has been explained by A. G. Stromberg (Refs.1,2) on the strength of the theory of delayed discharge ionization, and (Ref.3) by equations regarding the dependence of the half-wave potential of an irreversible cathode wave on the dropping time, for the case of a discharge of metal ions on a dropping mercury electrode under the formation of metal atoms. These equations are valid also for redox systems and show that the difference between the half-wave potentials of the anode and cathode waves is bound to diminish with an increase of the dropping time.

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Polarographic Study of Inorganic Redox Systems. I. Influence of the Parameters of the Capillary Tube on the Anode and Cathode Waves in the Ti^{4+} - Ti^{3+} System

For checking this assumption which corresponds to the theory of delayed discharge ionization, the authors studied the influence of the capillary parameters, i.e., the dropping time in the interval from 1.2 to 20 sec on the half-wave potential of the cathode and a .ode waves of the redox system Ti^{4+} - Ti^{3+} at 16°-17°C in solutions having the following composition: $5 \cdot 10^{-3}$ M Ti^{4+} + Ti^{3+}, 0.23 M HCl, and 0.005% gelatin. A visual polarograph and an M-21/2 (M-21/2) mirror galvanometer (sensitivity, 10^{-9} a/mm/m) were used for the purpose. The polarograms obtained with three different dropping periods show the cathode and anode waves to be separate, i.e., the electrodic process is irreversible and can be schematically represented by $Ti^{4+} + e = Ti^{3+}$. When the dropping time changes from 1 to 4 sec (log τ from 0 to 0.6), the cathode and anode potentials become similar. Quite surprisingly, the function $\varphi_{1/2} = f(\log\tau)$ changes in the opposite direction in the dropping time interval from

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Polarographic Study of Inorganic Redox Systems. I. Influence of the Parameters of the Capillary Tube on the Anode and Cathode Waves in the Ti^{4+} - Ti^{3+} System

4 to 20 sec (log τ from 0.6 to 1.3), i.e., the difference between anode and cathode potentials increases with n increase of the dropping time. The question was examined as to whether the potential depends on the outflow rate of mercury, and the half-wave potential was found to be independent on the amount of mercury flown out. This is in accordance with the above-mentioned theory. It is assumed that a more exact formulation of the equations applied will make it possible to clarify the dependence of the potential $\varphi_{1/2}$ on the dropping time in the 4 - 20 sec interval. The sum of discharge and ionization coefficients was calculated from the inclination of the cathode and anode waves, and was found to be close to 1. The normal current density for the exchange Ti^{4+} - Ti^{3+} in 0.23 M HCl solution was found to be $j_o^o = 0.78$ ma·cm^{-1}millimole^{-1} for pH = 0. The instability constant of the complex ion $TiCl_6^{2-}$ is given as $2 \cdot 10^{-11}$. Thus, the results of the present work prove the irreversible course of the process concerned, considering the existence of a slow

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Polarographic Study of Inorganic Redox Systems. I. Influence of the Parameters of the Capillary Tube on the Anode and Cathode Waves in the Ti^{4+} - Ti^{3+} System

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B015/B063

discharge ionization. There are 2 figures and 9 references: 5 Soviet, 1 US, and 1 German.

ASSOCIATION: Tomskiy politekhnicheskiy institut Kafedra fizicheskoy i kolloidnoy khimii (Tomsk Polytechnic Institute, Chair of Physical and Colloid Chemistry)

SUBMITTED: July 16, 1958

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"APPROVED FOR RELEASE: 08/26/2000 CIA-RDP86-00513R001653610003-6

S/076/60/034/009/007/022
B015/B056

AUTHORS: Stromberg, A. G. and Bogoslovskiy, V. D.

TITLE: Polarographic Study of Organic Redox Systems. The System Altax - Captax

PERIODICAL: Zhurnal fizicheskoy khimii, 1960, Vol. 34, No. 9, pp. 1947-1951

TEXT: The irreversible anode-cathode wave in the organic redox system Altax - Captax was experimentally investigated, and a theoretical clarification of the mechanism of the electrode process is given. The experiments were carried out on a polarograph of the UFAN (Ref. 4), the current being measured with an M 25/2 (M25/2) mirror galvanometer. The polarogram of the solution of $1 \cdot 10^{-3}$ M Altax [+], $2 \cdot 10^{-3}$ M Captax [++], 0.26 M $NaC_2H_3O_2$, and 0.25 M $HC_2H_3O_2$ in a 75% ethanol - water mixture has an anode-cathode wave, which indicates the irreversibility of the process. It is assumed that the Captax molecules are associated in the form of double molecules in the solution, the Captax dimer being formed by a hydrogen bond between the hydrogen and sulfur atoms. The electrode reaction

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"APPROVED FOR RELEASE: 08/26/2000 CIA-RDP86-00513R001653610003-6

Polarographic Study of Organic Redox Systems. The System Altax - Captax

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B015/B056

$RSSR + 2H^+ + 2e \rightleftharpoons (RSH)_2$ (1) ($R = C_7H_5NS$) is regarded as a limiting stage. A new method of determining the equilibrium redox potential in highly irreversible organic redox systems is suggested by using the equation: $\varphi_{1/2\ rev.} = \alpha\varphi_{1/2,k} + \beta\varphi_{1/2,a}$ (5) (α and β = discharge- and ionization coefficients, $\varphi_{1/2,k}$ and $\varphi_{1/2,a}$ = cathode and anode potentials of the semiwave). The exchange current of the investigated system was calculated and is given. As the theoretical statements agree well with the experimental data if reaction (1) is assumed, the major part of the Captax molecules in the solution probably exists as the afore-mentioned double molecules. However, the formation of RS^* radicals as intermediate products ($RSSR \rightleftharpoons 2RS^*$) is not impossible if $RS^* + H^+ + e \rightleftharpoons RSH$ associate to $RSH + RSH \rightleftharpoons (RSH)_2$. There are 1 figure and 6 Soviet references.

ASSOCIATION: Tomskiy politekhnicheskiy institut (Tomsk Polytechnic Institute)

SUBMITTED: December 3, 1958

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"APPROVED FOR RELEASE: 08/26/2000 CIA-RDP86-00513R001653610003-6

S/200/61/000/011/002/005
D202/D304

AUTHORS: Stromberg, A.G. and Kartushinskaya, A.I.

TITLE: A polarographic study of the composition of complexes taking part in the electrode reaction in the system Ti (IV) - Ti (III) in hydrochloric acid solutions

PERIODICAL: Akademiya nauk SSSR. Sibirskoye otdeleniye. Izvestiya, no. 11, 1961, 88-97

TEXT: The aim of this work was to determine the composition of complex ions taking part in the electrode reaction of the system Ti (IV) - Ti (III) in HCl solutions of different H^+ and Cl^- concentrations and to elucidate the mechanism of the process: Ti(IV + [illegible] Ti (III), as well as determine the equilibrium potential and the exchange current for this system. The mercury dropping cathode and other equipment, as well as the polarographic method used in these experiments have been described by the authors in a previous publication and the theoretical part of their work in another one. 59 Experiments were carrie' out in 5 series

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of tests, using HCl, HCl + KCl, and HCl + $HClO_4$ as the electrolytes, on the assumption that neither K^+ nor ClO_4^- ions participated in the complex-formation by Ti(IV) and Ti(III). The results are tabulated. The consecutive steps of the electrode process may be represented by the following reactions

в сериях 1 и 2 (in series 1 → 2

$$Ti(OH)_2Cl_2 + H^+ \rightleftharpoons (Ti(OH)Cl)^{++} + H_2O + Cl^-,$$
$$(Ti(OH)Cl)^{++} + e \rightleftharpoons (Ti(OH)Cl)^{+}, \qquad (12)$$
$$(Ti(OH)Cl)^{+} + H^+ \rightleftharpoons Ti^{+++} + H_2O + Cl^-;$$

в сериях 3 и 4
in series 3 & 4

$$(TiOHCl)^{++} + e \rightleftharpoons (TiOHCl)^{+}, \qquad (13)$$
$$(TiOHCl)^{+} + H^+ \rightleftharpoons Ti^{+++} + H_2O + Cl^-.$$

The authors calculated the composition of Ti(IV) and Ti(III) complexes which are preponderant in the solution in the equilibrium state and of

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A polarographic study ...

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D202/D304

those taking part in the electrode reaction, the first having the composition $Ti(OH)_2Cl_2$ or $(TiOHCl)^{++}$ and $Ti^{(III)}$ and those taking part in the electrode process: $(TiOHCl)^{++}$ and $(TiOHCl)^{+}$. The standard electrode potential and the standard exchange current density were calculated for the electrode reaction of Ti(IV) and Ti(III) ions recharging in HCl solutions. There are 5 tables and 10 references: 5 Soviet-bloc and 5 non-Soviet-bloc.

ASSOCIATION: Tomskiy politekhnicheskiy institut (Tomsk Polytechnic Institute)

SUBMITTED: December 26, 1960

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"APPROVED FOR RELEASE: 08/26/2000 CIA-RDP86-00513R001653610003-6

STROMBERG, A.G.

"Polarographic analysis" by T.A. Kriukova, S.I. Siniakova, T.V. Aref'eva. Reviewed by A.G. Stromberg. Zhur. anal. khim. 16 no. 1:115-117 Ja-F '61. (MIRA 14:2)
(Polarography) (Kriukova, S.I.) (Siniakova, S.I.)
(Aref'eva, T.V.)

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"APPROVED FOR RELEASE: 08/26/2000 CIA-RDP86-00513R001653610003-6

S/032/61/027/001/001/037
B017/B054

AUTHORS: Stromberg, A. G. and Stromberg, E. A.

TITLE: Determination of Ultramicroconcentrations in Solutions by the Method of Amalgam Polarography on a Stationary Mercury Drop (Survey)

PERIODICAL: Zavodskaya laboratoriya, 1961, Vol. 27, No. 1, pp. 3-10

TEXT: The authors thoroughly discuss the method of amalgam polarography with a stationary mercury drop at a continuously changing potential for the determination of ultramicroconcentrations. The principle of the method is as follows: The sample of 10^{-7} - 10^{-9} g is electrolyzed for a certain time on a stationary Hg drop at a controlled potential. The element to be investigated is enriched as amalgam on the surface layer of the drop. Then follows anodic dissolution at a continuous potential increase from the value at which the element was separated on the Hg cathode to more positive values. The current forming in the oxidation of the amalgam is recorded. Various types of stationary mercury electrodes are discussed on the basis of published data. The authors also discuss the effect of

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Determination of Ultramicroconcentrations in Solutions by the Method of Amalgam Polarography on a Stationary Mercury Drop (Survey)

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B017/B054

working conditions of the preliminary electrolysis on the height of the anodic peak, e.g. time of electrolysis, mixing of the sample, change in concentration of metals in the solution, surface area of the mercury electrode. They give Ševčik's equation (Ref. 32) for the height of peak:

$$I_{max} = 217\ S\ z^{3/2}\ v^{1/2}\ D^{1/2}\ C,$$

where I = height of peak in amperes, S = electrode area in cm^2, z = number of electrons participating in the electrode process, v = rate of potential change (v/sec), C = molar concentration (moles/l), D = diffusion coefficient (cm^2/sec), 217 = coefficient. The equation shows that the height of peak changes proportionally to the square root of the rate of potential change. Amalgam polarography with a stationary mercury drop at a continuously changing potential permits a 100-1,000 fold increase in sensitivity when determining microamounts, and will be widely used in chemical laboratories and scientific research institutes. The method is particularly convenient to determine ultramicroimpurities (10^{-6} - 10^{-7}%) in high-purity materials. The authors do not refer to their own papers in this survey. There are 2

Card 2/3

APPROVED FOR RELEASE: 08/26/2000 CIA-RDP86-00513R001653610003-6"

"APPROVED FOR RELEASE: 08/26/2000 CIA-RDP86-00513R001653610003-6

Determination of Ultramicroconcentrations in Solutions by the Method of Amalgam Polarography on a Stationary Mercury Drop (Survey)

S/032/61/027/001/001/037
B017/B054

figures, 1 table, and 51 references: 18 Soviet, 25 US, 2 British, 2 Czechoslovakian, and 3 Polish.

Card 3/3

APPROVED FOR RELEASE: 08/26/2000 CIA-RDP86-00513R001653610003-6"

"APPROVED FOR RELEASE: 08/26/2000 CIA-RDP86-00513R001653610003-6

STROMBERG, A.G.; ZAKHAROV, M.S.; GORODOVYKH, V. Ye.; ZAICHKO, L.F.

Determination of the ultramicroimpurities of zinc, lead, and copper in high purity tin by amalgam polarography. Zav.lab. 27 no.5:517-521 '61. (MIRA 14:5)

1. Tomskiy politekhnicheskiy institut.
(Zinc--Analysis) (Lead--Aralysis) (Copper--Analysis)

APPROVED FOR RELEASE: 08/26/2000 CIA-RDP86-00513R001653610003-6"

"APPROVED FOR RELEASE: 08/26/2000 CIA-RDP86-00513R001653610003-6

VORONOVA, K.R.; STROMBERG, A.G.

Polarographic and adsorptive properties of benzoyl derivatives of some barbiturates. Zhur.ob.khim. 31 no.8:2786-2792 Ag '61. (MIRA 14:8)

1. Tomskiy politekhnicheskiy institut.
(Barbituric acid)

APPROVED FOR RELEASE: 08/26/2000 CIA-RDP86-00513R001653610003-6"

"APPROVED FOR RELEASE: 08/26/2000 CIA-RDP86-00513R001653610003-6

STROMBERG, A.G.; KARTUSHINSKAYA, A.I.

Polarographic determination of the composition of complexes directly participating in the electrode process and predominant in the solution, and calculation of the exchange current and equilibrium potential in inorganic oxidation-reduction systems. Zhur. fiz. khim. 35 no.5:1058-1063 My '61. (MIRA 16:7)

1. Tomskiy politekhnicheskiy institut.
(Oxidation-reduction reaction)
(Titanium compounds) (Electromotive force)

APPROVED FOR RELEASE: 08/26/2000 CIA-RDP86-00513R001653610003-6"

"APPROVED FOR RELEASE: 08/26/2000 CIA-RDP86-00513R001653610003-6

STROMBERG, A.G.; BRAYNINA, Kh.Z.

Theory of the current decay at the zero charge potential. Zhur. fiz.khim. 35 no.9:2016-2024 '61. (MIRA 14:10)

1. Tomskiy politekhnicheskiy institut i Ural'skiy gosudarstvennyy universitet.

(Polarography)

APPROVED FOR RELEASE: 08/26/2000 CIA-RDP86-00513R001653610003-6"

"APPROVED FOR RELEASE: 08/26/2000 CIA-RDP86-00513R001653610003-6

KARTUSHINSKAYA, A.I.; STROMBERG, A.G.

Polarographic study of the Ti^{IV} - Ti^{III} system in solutions of hydrobromic acid. Zhur.neorg.khim. 7 no.2:291-297 F '62. (MIRA 15:3)

1. Tomskiy politekhnicheskiy institut.
(Titanium compounds) (Hydrobromic acid) (Polarography)

APPROVED FOR RELEASE: 08/26/2000 CIA-RDP86-00513R001653610003-6"

"APPROVED FOR RELEASE: 08/26/2000 CIA-RDP86-00513R001653610003-6

ZAKHAROV, M. S.; STROMBERG, A. G.; STROMBERG, A. G.

Possibility of a repeated determination on a stationary mercury drop in determining ultramicroimpurities. Zav.lab. 28 no.1:13-15 '62. (MIRA 15:2)

1. Tomskiy politekhnicheskiy institut.
(Metals--Analysis) (Electrodes, Dropping mercury)

APPROVED FOR RELEASE: 08/26/2000 CIA-RDP86-00513R001653610003-6"

"APPROVED FOR RELEASE: 08/26/2000 CIA-RDP86-00513R001653610003-6

STROMBERG, A. G.; IGOLINSKIY, V. A.

Comparative accuracy of exchange current calculation according to various theories for irreversible polarographic waves. Zhur. fiz. khim. 36 no.12:2714-2720 D '62. (MIRA 16:1)

1. Tomskiy politekhnicheskiy institut.

(Polarography)

APPROVED FOR RELEASE: 08/26/2000 CIA-RDP86-00513R001653610003-6"

"APPROVED FOR RELEASE: 08/26/2000 CIA-RDP86-00513R001653610003-6

STROMBERG, A.G.

"Theory of Irreversible Anodic-Cathodic Polarographic Waves and Its Application to the Solution of Some Problems of Electrochemical Kinetics."

Report presented at the 14th meeting CITCE, Intl. Comm. of Electrochemical Thermodynamics and Kinetics, Moscow, 19-25 Aug 63.

The University, Tomsk, U.S.S.R.

APPROVED FOR RELEASE: 08/26/2000 CIA-RDP86-00513R001653610003-6"

"APPROVED FOR RELEASE: 08/26/2000 CIA-RDP86-00513R001653610003-6

L 25649-65 EPF(c)/EWP(j)/EWT(m) Pc-4/Pr-4 RM

ACCESSION NR: AR5000707 S/0081/64/000/017/B072/B073

27
18
B

SOURCE: Ref. zh. Khimiya, Abs. 17B458

AUTHOR: Karbainov, Yu. A.; Stromberg, A. G.

7

TITLE: A study of the electrical conductivity of binary mixtures of silicon tetrachloride and aliphatic oxygen-containing compounds for the purpose of determining trace impurities in highly purified silicon tetrachloride

CITED SOURCE: Dokl. 2-y Mezhvuz. konferentsii po khimii organ. kompleksn. soyedineniy, 1963. Tomsk, Tomskiy un-t, 1963, 20-22

TOPIC TAGS: silicon tetrachloride, silicon tetrachloride conductivity, silico-organic complex, silicon tetrachloride, purity, complex formation, acetic acid, chloroacetic acid, propyl alcohol, electrical conductivity, anisol

TRANSLATION: The authors studied the electrical conductivity χ of binary mixtures of $SiCl_4$ and aliphatic oxygen-containing compounds (acetic acid, chloroacetic acid, ethyl chloroacetate, anisol, propyl alcohol and isopropyl alcohol) at 18C in the concentration range of 0-30 mol.% $SiCl_4$. In addition, they studied the conductivity of the system $SiCl_4$ - acetic acid - sodium acetate at various

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"APPROVED FOR RELEASE: 08/26/2000 CIA-RDP86-00513R001653610003-6

L 25649-65
ACCESSION NR: AR5000707

concentrations of sodium acetate. The results showed that maximal χ is obtained in all binary systems at an $SiCl_4$ content of 6-8 mol.%. Among the systems studied, the largest maximal conductivity was observed for the binary systems containing propyl and isopropyl alcohol (0.013 and 0.01 mho/cm). Addition of sodium acetate to the binary system of $SiCl_4$ (8 mol.%) and acetic acid (92 mol.%) increases the value of χ 5 fold compared to the binary system. The question of the role of complex formation in the increased conductivity of the systems studied is discussed. In the case of acetic acid, it is suggested that a complex compound of the type $SiCl_4 \cdot 2\ CH_3COOH$ forms initially, but that since this is a strong complex acid, it then enters into an acid-base reaction with acetic acid to form $SiCl_4 \cdot 3\ CH_3COOH$, which decomposes into the ions: $[SiCl_3 \cdot 3\ CH_3COOH]^+$ and Cl^-. From the authors' summary

SUB CODE: OC ENCL: 00

Card 2/2

APPROVED FOR RELEASE: 08/26/2000 CIA-RDP86-00513R001653610003-6"

"APPROVED FOR RELEASE: 08/26/2000 CIA-RDP86-00513R001653610003-6

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"APPROVED FOR RELEASE: 08/26/2000 CIA-RDP86-00513R001653610003-6

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APPROVED FOR RELEASE: 08/26/2000 CIA-RDP86-00513R001653610003-6"

"APPROVED FOR RELEASE: 08/26/2000 CIA-RDP86-00513R001653610003-6

KULESHOV, V.I.; STROMBERG, A.G.

New designs of electrolysers and electrodes. Metod. zam. khim. reak. i propar. no.5/6:37-41 '63. (MIRA 17:9)

1. Tomskiy politekhnicheskiy institut.

APPROVED FOR RELEASE: 08/26/2000 CIA-RDP86-00513R001653610003-6"

"APPROVED FOR RELEASE: 08/26/2000 CIA-RDP86-00513R001653610003-6

STROMINSKI, A.W.; [illegible]; [illegible]; [illegible]

Determination of bismuth, copper, lead, indium, and zinc in tin. Metod. anal. khim. reak. i prepar. no.[illegible]:72-79 '63. (MIRA 17:9)

1. Tomskiy politekhnicheskiy institut.

APPROVED FOR RELEASE: 08/26/2000 CIA-RDP86-00513R001653610003-6"

"APPROVED FOR RELEASE: 08/26/2000 CIA-RDP86-00513R001653610003-6

L 38711-65 EWT(m)/EWG(m)/T/EWP(t)/EWP(b) IJP(c) JD/EWH

ACCESSION NR: AT5004077 S/3127/63/000/05-/0090/0092

23
20
B+1

AUTHOR: Stromberg, A. G.; Zakharov, M. S.; Kaplin, A. A.; Tyutyun'kova, R. S.

TITLE: Rapid determination of microconcentrations of copper in indium without separation of the bulk of the indium

SOURCE: USSR. Gosudarstvennyy komitet po khimii. Metody analiza khimicheskikh reaktivov i preparatov, no. 5/6, 1963. Polyarograficheskoye opredeleniye ul'tramikro-primesey s nakopleniyem ikh na statsionarnykh rtutnykh ili tverdykh elektrodakh s posleduyushchim rastvoreniyem (Polarographic determination of ultramicroimpurities with their accumulation on stationary mercury or solid electrodes and subsequent dissolution), 90-92

TOPIC TAGS: copper determination, indium analysis, dropping mercury electrode, polarography

ABSTRACT: Investigations were carried out in order to select a supporting electrolyte solution in which indium would either not be reduced, or be reduced at potentials much more negative than the copper reduction potential. The best supporting electrolyte was found to be 1 M H_3PO_4, and the best solvent for dissolving indium was 10-11 N HNO_3. Several factors causing the formation of insoluble precipitates were elucidated. A

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"APPROVED FOR RELEASE: 08/26/2000 CIA-RDP86-00513R001653610003-6

L 28711-65

ACCESSION NR: AT5004077

3

comparative study was made of the copper troughs obtained in an analysis of indium samples on mercury drops obtained on platinum and silver contacts. More distinct and reproducible copper troughs are obtained by using a silver contact. The error of the copper determination was 15-20%. The copper content of the analyzed indium samples was 1×10^{-5} to 4×10^{-5}%. Orig. art. has: 1 figures.

ASSOCIATION: TPI

SUBMITTED: 00Jul62 ENCL: 00 SUB CODE: IC

NO REF SOV: 000 OTHER: 001

Card 2/2

APPROVED FOR RELEASE: 08/26/2000 CIA-RDP86-00513R001653610003-6"

"APPROVED FOR RELEASE: 08/26/2000 CIA-RDP86-00513R001653610003-6

L 28710-65 EWT(m)/EWG(m)/T/EWP(t)/EWP(b) IJP(c) JD /RWH

ACCESSION NR: AT5004078 S/3127/63/000/05-/0092/0095

AUTHOR: Kaplin, A.A.; Zakharov, M.S.; Stromberg, A.G.

TITLE: Rapid determination of microconcentrations of copper and lead in indium by amalgam polarography involving transfer

SOURCE: USSR. Gosudarstvennyy komitet po khimii. Metody analiza khimicheskikh reaktivov i preparatov, no. 5/6, 1963. Polyarograficheskoye opredeleniye ul'tramikro-primesey s nakopleniyem ikh na statsionarnykh rtutnykh ili tverdykh elektrodakh s posleduyushchim rastvoreniyem (Polarographic determination of ultramicro-impurities with their accumulation on stationary mercury or solid electrodes and subsequent dissolution), 92-95

TOPIC TAGS: copper determination, lead determination, indium analysis, amalgam polarography, quantitative transfer, electrolyzer design

ABSTRACT: The essence of the method proposed for the determination of copper and lead in the presence of excess indium consists in carrying out a preliminary electrolysis (accumulation) in one supporting electrolyte solution and an anodic dissolution from the amalgam in another, this technique having certain definite advantages. Experiments were carried out in order to determine the possibility of a quantitative transfer of

Card 1/2

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"APPROVED FOR RELEASE: 08/26/2000 CIA-RDP86-00513R001653610003-6

L 23710-65

ACCESSION NR: AT5004078

bismuth, copper, lead, cadmium, indium, and zinc from one solution of alkaline ethylenediamine into another. A new design of an electrolyzer was proposed which makes it possible to transfer the electrodes (and mercury drop) from one electrolyte into the other without breaking the circuit and in an inert medium. Experiments were performed on the quantitative transfer of copper and lead from 1 M H_3PO_4 into an alkaline solution of ethelenediamine. The transfer losses did not exceed 10-15%, which was satisfactory. The determination procedure is described. The copper and lead content of the samples was 1×10^{-5} to 5×10^{-5}%. The method is also applicable to the determination of copper and lead microconcentrations in indium salts. Orig. art. has: 1 figure and 1 table.

ASSOCIATION: TPI

SUBMITTED: 00Jul62 ENCL: 00 SUB CODE: IC

NO REF SOV: 000 OTHER: 000

Card 2/2

APPROVED FOR RELEASE: 08/26/2000 CIA-RDP86-00513R001653610003-6"

"APPROVED FOR RELEASE: 08/26/2000 CIA-RDP86-00513R001653610003-6

ZAKHAROV, M.S.; STROMBERG, A.G.; STEPANOVA, O.S.; GUESKAYA, S.F.

Determination of the microconcentrations of germanium, barium, potassium, nickel. Metod. anal. khim. reak. i prepar. no.5/6: 95-101 '63. (MIRA 17:9)

1. Tomskiy politekhnicheskiy institut.

APPROVED FOR RELEASE: 08/26/2000 CIA-RDP86-00513R001653610003-6"

"APPROVED FOR RELEASE: 08/26/2000 CIA-RDP86-00513R001653610003-6

STROMBERG, A.G.

Method of amalgam polarography and D.I. Mendeleev's periodic law. Zhur. VKHO 8 no.5:575-576. '63. (MIRA 17:1)

1. Tomskiy politekhnicheskiy institut.

APPROVED FOR RELEASE: 08/26/2000 CIA-RDP86-00513R001653610003-6"

"APPROVED FOR RELEASE: 08/26/2000 CIA-RDP86-00513R001653610003-6

STROMBERG, A.G.; GORODOVYKH, V.Ye.

Intermetallic compound of zinc with copper. Zhur. neorg. khim. 8 no.10:2355-2359 O '63. (MIRA 16:10)

1. Tomskiy politekhnicheskiy institut.
(Intermetallic compounds) (Zinc) (Copper)

APPROVED FOR RELEASE: 08/26/2000 CIA-RDP86-00513R001653610003-6"

"APPROVED FOR RELEASE: 08/26/2000 CIA-RDP86-00513R001653610003-6

STROMBERG, A.G.

Increasing the sensitivity of the amalgam polarographic method with accumulation on a stationary mercury drop. Zav.lab. 29 no.4:387-390 '63. (MIRA 16:5)

1. Tomskiy politekhnicheskiy institut im. S.M.Kirova.
(Polarography) (Electrodes, Dropping mercury)

APPROVED FOR RELEASE: 08/26/2000 CIA-RDP86-00513R001653610003-6"

"APPROVED FOR RELEASE: 08/26/2000 CIA-RDP86-00513R001653610003-6

VORONOVA, K.R.; STROMBERG, A.G.

Polarographic stud/ of azo derivatives of salicylic and α-hydroxynaphthoic acids. Zhur.ob.khim. 33 no.7:2098-2102 Jl '63. (MIRA 16:8)

1. Tomskiy politekhnicheskiy institut.
(Salicyclic acid) (Naphthoic acid) (Azo compounds)

APPROVED FOR RELEASE: 08/26/2000 CIA-RDP86-00513R001653610003-6"

"APPROVED FOR RELEASE: 08/26/2000 CIA-RDP86-00513R001653610003-6

L 18311-63 EWP(q)/EWT(m)/BDS AFFTC/ASD/ESD-3 RM/JD/RH

ACCESSION NR: AP3004976 S/0076/63/037/008/1793/1799

62

AUTHORS: Stromberg, A. G.; Kartushinskaya, A. I.

TITLE: Polarographic study of the composition of complexes in the system titanium (4)-titanium (3) in sulfuric acid solution, with respect to their concentration and participation in the electrode reaction

SOURCE: Zhurnal fiz. khimii, v. 37, no. 8, 1963, 1793-1799

TOPIC TAGS: titanium (4), titanium (3), sulfuric acid, TiHSO sup 3 plus sub 3, TiHSO sup 2 plus sub 4, Ti(OH)(HSO sub 4) sup 2 plus, Ti sup 3 plus.

ABSTRACT: The polarographic method of determining the composition of participating complexes in electrode reaction was applied to the oxidizing reduction system titanium (4)-titanium (3) to explain the mechanism of the electrode process in sulfuric acid solution. Four series of runs were conducted to investigate the effect of the change in concentration of H^+, HSO_4^- and SO_4^{2-} ions upon the anodic and cathodic potential of the irreversible polarographic wave in the system Ti (4)-Ti (3) in sulfuric acid solutions. The composition of the complexes has been calculated and a mechanism for the electrodic process has been proposed based on experimental data for the slope of the curve depicting the half

Card 1/2

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L 18311-63

ACCESSION NR: AP3004976

wave potential (cathodic or anodic) as a function of the logarithm of the corresponding ion concentration and on some additional evidence. It has been shown that complexes $TiHSO_3^{2+}$ and $TiHSO_4^{2+}$ participate directly in the electrodic process, although complexes $Ti(OH)(HSO_4)^{+}$ sup 2+ and Ti^{3+} predominate in the solution. The standard exchange current density and standard electrode potential of the system Ti (4)-Ti (3) in sulfuric acid solutions have been calculated. Orig. art. has: 3 tables, 17 equations, 5 figures.

ASSOCIATION: Tomskiy politekhnicheskiy institut (Tomsk polytechnical institute)

SUBMITTED: 25Nov61 DATE ACQ: 06Sep63 ENCL: 00

SUB CODE: CH NO REF SOV: 007 OTHER: 003

Card 2/2

APPROVED FOR RELEASE: 08/26/2000 CIA-RDP86-00513R001653610003-6"

"APPROVED FOR RELEASE: 08/26/2000 CIA-RDP86-00513R001653610003-6

KOZIN, Leonid Fomich; STROMBERG, A.G., prof., red.; ZHUKOVA, N.D., red.

[Physicochemical principles of amalgam metallurgy] Fiziko-khimicheskie osnovy amal'gamnoi metallurgii. Alma-Ata, Izd-vo "Nauka," 1964. 360 p. (MIRA 18:2)

APPROVED FOR RELEASE: 08/26/2000 CIA-RDP86-00513R001653610003-6"

"APPROVED FOR RELEASE: 08/26/2000 CIA-RDP86-00513R001653610003-6

L 14973-65 EWT(m)/EWP(t)/EWP(b) IJP(c)/AFWL JD/MLK

ACCESSION NR: AT4048098 S/0000/64/000/000/0115/0118

AUTHOR: Kaplin, A.A., Zakharov, M.S., Stromberg, A.G., Tyutyun'kova, R.S.

TITLE: Polarographic determination of trace amounts of copper in indium

SOURCE: Spektral'ny*ye i khimicheskiye metody* analiza materialov (Spectral and chemical methods of materials analysis); sbornik metodik. Moscow, Izd-vo Metallurgiya, 1964, 115-118

TOPIC TAGS: polarography, dropping mercry electrode, copper determination, indium analysis

ABSTRACT: An amalgam polarographic method was developed for the determination of 10^{-5} -10^{-6}% copper in high purity indium without the separation of the base metal. The indium samples were first dissolved in nitric acid and the solution evaporated to dryness. Tests with a variety of acids, such as HCl, HBr, HNO_3, H_2SO_4, and H_3PO_4 in which indium is readily soluble showed that the best results are obtained with 1 M H_3PO_4 which binds a large part of the indium to form irreducible complexes under the analytical conditions. The potential of the anode peak of copper in this base electrolyte is +0.05 and of indium is -0.42 v. It was found that the use of solvents containing Cl- and Br- ions

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ACCESSION NR: AT4048098

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permits the dissolution time of the indium samples (0.2 g) to be reduced to 15-20 min., but the formation of an insoluble film renders the determination of copper difficult. The samples must be dissolved at 120-150C; during removal of the excess nitric acid and drying of the precipitated indium nitrate, the temperature must be below 80-90C. The polarographic investigation is described in detail. The optimum potential was -1.0 v. Typical polarograms of the base electrolyte on 2 types of electrodes are given. Analysis of 15 samples for copper showed a maximum sensitivity with a 0.2 g sample of $2 \times 10^{-6}\%$ after 10 min. of accumulation at 0.14 microamp./cm. The time required for analysis of a blank and two parallel samples with $10^{-5}\%$ impurity was 2-2.5 hours. "The colorimetric and part of the polarographic analyses were carried out in the factory laboratory by Engineer R. D. Tresnitskaya." Orig. art. has: 2 figures.

ASSOCIATION: Tomskiy politekhnicheskiy institut (Tomsk Polytechnical Institute)

SUBMITTED: 12Feb64 ENCL: 00 SUB CODE: MM, IC

NO REF SOV: 001 OTHER: 001

Card 2/2

APPROVED FOR RELEASE: 08/26/2000 CIA-RDP86-00513R001653610003-6"

"APPROVED FOR RELEASE: 08/26/2000 CIA-RDP86-00513R001653610003-6

ZAKHAROV, M.S.; STROMBERG, A.G.

Polarographic characteristics of anodic peaks of elements in the method of amalgam polarography with storage. Report No.1. Zhur. anal. khim. [illegible] (MIRA 17:11)

1. Tomskiy politekhnicheskiy institut imeni Kirova.

APPROVED FOR RELEASE: 08/26/2000 CIA-RDP86-00513R001653610003-6"

"APPROVED FOR RELEASE: 08/26/2000 CIA-RDP86-00513R001653610003-6

ACCESSION NR: AP4043461 S/0075/64/019/008/0959/ 063

AUTHORS: Mesyats, N.A.; Nazarov, B.F.; Zakharov, M.S.; Stromberg, A.G.

TITLE: Determination of microamounts of thallium in high purity indium by means of preconcentration amalgam polarography

SOURCE: Zhurnal analiticheskoy khimii, v. 19, no. 8, 1964, 959-963

TOPIC TAGS: thallium polarography, thallium analysis, indium analysis, amalgam polarography, stripping analysis, extraction, preconcentration

ABSTRACT: Because high purity metallic indium and indium alloys find various applications in electronic engineering, semiconductor technology and since thallium is the usual impurity, it was the purpose of this work to develop a method for the determination of thallium. The method was amalgam polarographic. The effect of the electrolysis potential on the height of the anodic peak of thallium is shown in Figure 1, and the maximum height of the thallium peak is achieved from -0.9 to -1.0 volt vs S.C.E. Thallium was extracted with diethyl ether. Since thallium and indium peak potentials coincide in a majority of supporting electrolytes, the indium peak was

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ACCESSION NR: AP4043461

suppressed by complexan III. Since simple extraction is not sufficient to remove interfering amounts of indium, extraction was carried out twice. Recovery of thallium by extraction and the determination accuracy comprises 85-100%, as found on synthetic solutions. The method is very precise. Orig. art. has: 4 tables and 2 figures.

ASSOCIATION: Tomskiy politekhnicheskiy institut im. S. M. Kirova (Tomsk Polytechnic Institute)

SUBMITTED: 29Jul63 ENCL: 01

SUB CODE: IC, GC. NR REF SOV: 001 OTHER: 002

Card 2/3

APPROVED FOR RELEASE: 08/26/2000 CIA-RDP86-00513R001653610003-6"

"APPROVED FOR RELEASE: 08/26/2000 CIA-RDP86-00513R001653610003-6

ACCESSION NR: AP4043461 ENCLOSURE: 01

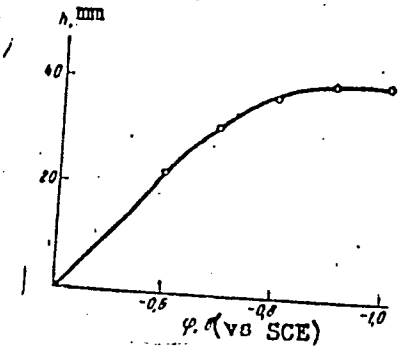

Figure 1
The anodic peak height of thallium as a function of electrolysis potential

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"APPROVED FOR RELEASE: 08/26/2000 CIA-RDP86-00513R001653610003-6

L 14010-65 EWT(m)/EWP(t)/EWP(b) IJP(c)/SSD/AFETR/AFWL JD
ACCESSION NR: AP4049098 S/0075/64/019/011/1341/1345

AUTHOR: Karbainov, Yu. A.; Stromberg, A. G.

TITLE: Investigation of ultramicroconcentrations of antimony, bismuth, and tin in a nonaqueous mixture of $SiCl_4$ (6.3 mol %) and $n\text{-}C_3H_7OH$ by the method of amalgam polarography with accumulation

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TOPIC TAGS: polarographic analysis, amalgam polarography, high purity silicon tetrachloride, trace analysis, antimony trace determination, bismuth trace determination, tin trace determination

ABSTRACT: Amalgam polarography with accumulation was used to study antimony, bismuth, and tin ultratrace impurities in silicon tetrachloride, in an n-propyl alcohol solution. The purpose of the study was to develop a direct method for determining microimpurities (in the 10^{-6}—10^{-7}% range) in high-purity silicon tetrachloride, since the existing methods are either not sensitive enough or too cumbersome and time consuming. The importance of $SiCl_4$ as a starting material for the preparation of silicon single crystals for semiconductor devices is

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