

SOV/78-4-2-36/40

Saturated Vapor Pressures of Solid Lead Fluoride

procal temperature, is more inclined than that found by data of Wartenberg and Bosse. The sublimation and evaporation heat at an absolute temperature was calculated and compared to the values given in the literature. The value $\Delta H_0^\circ = 53.3 \pm 1.0$ kcal/mol

was suggested as being the most plausible. G. V. Khalturin participated in the investigation. There are 1 figure, 2 tables, and 6 references, 3 of which are Soviet.

SUBMITTED: July 2, 1958

Card 2/2

IOFA, B.Z.; BOBROV, L.V.; RATOVA, A.N.

Certain properties of carrier-free radioactive lanthanum
and bismuth in water-dioxane solutions. Radiokhimiya 1
no.6:674-678 '59. (MIRA 13:4)
(Lanthanum--Isotopes) (Bismuth--Isotopes)
(Dioxane)

IOFA, B.Z.

Use of internal electrolysis for separating certain radio-
elements without a carrier. Radiokhimiia 1 no.6:706-708
'59. (MIRA 13:4)
(Electrolysis) (Bismuth--Isotopes) (Lanthanum--Isotopes)

5.4210(A)

68216

~~5(2), 5(4)~~

AUTHORS:

Nesmeyanov, An. N., Iofa, B. Z.,
Polyakov, A. S.S/078/60/005/02/002/045
B004/B016

TITLE:

Pressure of Saturated Vapor of Solid Indium Antimonide

PERIODICAL:

Zhurnal neorganicheskoy khimii, 1960, Vol 5, Nr 2, pp 245-248
(USSR)

ABSTRACT:

The measurement of this pressure was made by a modified method of Knudsen (Refs 7,8) by adding Sb^{124} and In^{114} at temperatures between 636 and 720°K. The two substances with active isotopes added were fused together in quartz capillaries. The radiograms taken by Yu. P. Simanov at the khimicheskii fakul'tet MGU (Chemical Department of Moscow State University) confirm the occurrence of one single phase of InSb. The condensate obtained on determination of the vapor pressure was transformed into sulfides the activity of which was measured. The value of the vapor pressure of InSb determined by evaporation of radioactive In is by far higher than the value resulting from the determination of the evaporated Sb (Tables 1,2, and Fig). The values obtained by measuring the evaporated Sb are practically in agreement with the pressure of the saturated

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68216

Pressure of Saturated Vapor of Solid Indium
Antimonide

S/078/60/005/02/002/045
B004/B016

vapor of pure metallic Sb (Ref 7) whereas the vapor pressure determined by In corresponds with that of solid InSb. Prior to evaporation, a partial dissociation of the compound occurs. The vapor pressure above the solid InSb equals the vapor pressure of the metallic Sb plus the vapor pressure of InSb. The vapor pressure of the metallic In is negligible at the temperatures applied. The authors point out that the determination of the vapor pressure with freshly prepared InSb gives increased values. By pulverization of the substance, a disturbance of the crystal lattice occurs, and a crystal surface with excess energy is formed, as it was likewise observed in As_2O_3 and $ZnAs_2$ (Ref 11). There are 1 figure, 2 tables, and 11 references, 8 of which are Soviet. ✓

SUBMITTED: January 12, 1959

Card 2/2

DAKAR, G.M.; IOFA, B.Z.

Preparation of antimony-125 without carrier by the extraction.
Radiokhimiia 4 no.6:744-746 '62. (MIRA 16:1)
(Antimony--Isotopes) (Extraction (Chemistry))

DAKAR, G.M.; IOFA, B.Z.; NESMEYANOV, An.N.

Extraction of complex acids with oxygen-containing solvents.
Part 1: Extraction of micro- and macroquantities of antimony
(V) with alcohols, ethers, and esters. Radiokhimiia 5 no.4:
428-436 '63. (MIRA 16:10)

(Antimony isotopes) (Extraction (Chemistry))
(Hydrolysis)

IOFA, B.Z.; DAKAR, G.M.

Extraction of complex acids with oxygen-containing solvents.
Part 2: Calculating the equilibrium constants of antimony (V)
hydrolysis in solutions of hydrochloric acid and investigating
the mechanism of its extraction with di-n-butyl ether.
Radiokhimiya 5 no.4:490-496 '63. (MIRA 16:10)

(Antimony) (Hydrolysis) (Butyl ether)

ZABORENKO, Kaleriya Borisovna; IOFA, Boris Zinov'yevich; LUK'YANOV,
Valeriy Borisovich; BOGATYREV, Igor' Olegovich;
KONDRASHKOVA, S.F., red.

[Radioactive-tracer technique in chemistry] Metod radio-
aktivnykh indikatorov v khimii. Moskva, Vysshaya shkola,
1964. 370 p. (MIRA 17:12)

IOFA, B.Z.; DAKAR, G.M.

Extraction of complex acids by oxygen-containing solvents. Part 3:
Mechanism of extraction of trivalent antimony. Radiokhimiya 6 no.4:
411-419 '64. (MIRA 18:4)

DAKAR, G.M.; IOFA, B.Z.

Extraction of complex acids by oxygen containing solvents. Part 5:

Extraction mechanism of pentavalent antimony. Radiokhimiia 7

no.1:25-31 '65.

(MIRA 18:6)

IOFA, B.Z.; MITROPANOV, K.P.; PLOTNIKOVA, M.V.; KOPACH, S.

Extraction of complex acids by oxygen-containing solvents. Radiokhimiia
Part 4: Extraction of tetravalent tin. Radiokhimiia 6 no.4:419-425 '64.
(MIRA 18:4)

IOFA, B.Z.; YUSHCHENKO, A.S.

Hydrolysis equilibrium of zirconium compounds. Zhur. neorg.
khim. 10 no.2:558-560 F '65. (MIRA 18:11)

1. Submitted May 3, 1963.

SEMENENKO, K.N.; KEDROVA, N.S.; IOFA, B.Z.

Radiochemical study of sodium chloroberyllate and chloro-
aluminate. Zhur.neorg.khim. 10 no.12:2833-2834 D '65.

(MIRA 19e1)

ACC NR: AP7010727

SOURCE CODE: UR/0189/66/000/003/0067/0070

AUTHOR: Kolesnikova, N. M.; Iofn, B. Z.

ORG: Department of Radiochemistry, Moscow State University (Kafedra radiokhimii Moskovskogo gosudarstvennogo universiteta)

TITLE: Investigation of the state of selenium (IV) in hydrochloric acid solutions

SOURCE: Moscow. Universitet. Vestnik. Seriya II. Khimiya, no. 3, 1966, 67-70

TOPIC TAGS: spectrophotometric analysis, selenium compound, hydrochloric acid, spectrophotometer /SF-4 quartz spectrophotometer

SUB CODE: 07,14

ABSTRACT: A spectrophotometric investigation is presented on the state of selenium(IV) at a temperature of $18 \pm 3^\circ$ in hydrochloric acid solutions. Absorption spectra were measured on a SF-4 quartz spectrophotometer, where cells with the following thicknesses of absorbing layer were used: 0.1, 0.2 and 10 mm. Selenium (IV) solutions were prepared by dissolving selenium dioxide in 12 N HCl or by chlorination of black metallic selenium in 12 NHCl. In the latter case, SeCl_4 was first obtained, and subsequently dissolved in acid. Both methods of preparing the

Card 1/2

UDC: 546:23:535:313:535.399
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ACC NR: AP7010727

solutions lead to identical results, however the time to reach equilibrium differs. Thus, when SeO_2 was dissolved in 12M HCl, equilibrium was established in seven days, while in the latter case in one day. The absorption maximum at $310 + 3$ microns can relate to the complex ion SeCl_6^{2-} , while absorption maxima of 345 and 385 microns are possibly related to the effect of the glacial solvent on the electronic states of selenium(IV) and not to any chloride complex of selenium(IV).

Orig. art. has: 2 figures and 1 formula. [JPRS: 40,361]

Card 2/2

ACCESSION NR: AP4027981

S/0205/64/004/002/0279/0283

AUTHOR: Sorokina, O. N.; Anikeyeva, I. D.; Iofa, E. I.

TITLE: Protective action of metabolites in radioresistant plants

SOURCE: Radiobiologiya, v. 4, no. 2, 1964, 279-283

TOPIC TAGS: metabolite, radioresistant plant, radiosensitive plant, radioresistant plant extract, barley seed, ionizing radiation, reduced radiosensitivity, Cruciferae

ABSTRACT: The present study investigates the possibility of introducing metabolites of radioresistant plants into radiosensitive plants to reduce the effects of ionizing radiation. The first of three experiments investigates the effects of radioresistant plant extracts acting on barley seeds for 19 hrs before irradiation (4000 r) and for 19 hrs after irradiation, the second investigates the effects of radioresistant plant extracts acting on barley seeds for 24 hrs before irradiation (500 r), and the third investigates the effect of radioresistant plant extracts acting on barley seeds with torn coleorhizas for 1 hr before irradiation. Survivability, growth, and chromosome

Card 1/2

ACCESSION NR: AP4027981

aberrations served as indices. Findings show that a number of radio-resistant plant extracts reduce the radiosensitivity of barley seeds. Various plants of the Cruciferae (mustard family) whose extracts contain mustard oil, rhodamide, thiocarbamide, and glucosides containing sulfur display high radioprotective action. Vitamins and growth promoting substances probably also increase radioresistance. Radio-protection is higher with extracts acting on seeds for a more prolonged period after irradiation. Orig. art. has: 5 tables.

ASSOCIATION: Institut biologicheskoy fiziki AN SSSR, Moscow (Institute of Biological Physics AN SSSR)

SUBMITTED: 18Oct62

ENCL: 00

SUB CODE: 1S

NR REF SOV: 003

OTHER: 003

Card 2/2

SOROKINA, O.N.; ANIKEYEVA, I.D.; IOFA, E.L.

Protective action of metabolites of radioresistant plants.
Radiobiologia 4 no.2:279-283 '64. (MIRA 18:3)

1. Institut biologicheskoy fiziki AN SSSR, Moskva.

ICFA, L.E. Sovremenniki Lomonosova, I.K. Kirilov i V.N. Tatishchev; geografy
pervoi poloviny XVIII v. Moskva, Geografiz, 1949. 91 p. OLC: Unclass.

SO: LC, Soviet Geography, Part I, 1951, uncl.

IOFA, L Ye

111/3
621.01
.16

YEREVAN; STOLITSA ARMYANSKOY SSR (ERIVAN; CAPITAL OF ARMENIAN SSR)
MOSKVA, GERRAFGIZ, 1950. 46 P. ILLUS., MAPS. BIBLIOGRAPHICAL FOOT-
NOTES. PHOTOSTAT COPY.

IOFA, L. Ye.

Geography & Geology

Cities in the Ural province. Moskva. Gos. izd-vo geogr. lit-ry. 1951

Monthly List of Russian Accessions, Library of Congress, June 1952. UNCLASSIFIED.

IOFA, L. YE.

Defended his Candidates dissertation in the Geography Faculty of Moscow State University on 2 June 1952.

Dissertation: "Cities of the Urals."

SO: Vestnik Moskovskogo Universiteta, Seriya Fiziko-Matematicheskikh i Yestestvennykh Nauk, No. 1, Moscow, Feb 1953, pp 151-157; transl. in W-29782, 12 April 54, for Off. use only.

IOFA, L.YE.

Russia - Description and Travel

Forerunner of ideas on the division of Russia from the point of view of economic geography, Geog.v shkole no. 1, 1953.

Monthly List of Russian Accessions, Library of Congress, June 1953. Unclassified.

USSR/ Geography - book review

Card 1/1 Pub. 45 ~ 12/16

Authors : Iofa, L. E.; Ryazantsev, S. N.; and Leont'ev, N. F.

Title : Russian economic maps and atlases

Periodical : Izv. AN SSSR. ser. geog. 1, 86-90, Jan-Feb 1954

Abstract : A review is made of the book, "Russian Economical Maps and Atlases," by A. I. Preobrazhenskiy, published in 1953 by Geographical Publishing Office and containing 329 pages. The book recounts the development of economic maps from their beginning in the 17th century to the present time and finds that their compilation in accordance with scientific principles only began under the Soviet Government. The book does not sufficiently show the connection between the development of statistics and the compilation of economic maps. An outstanding feature of the book is a list of handmade and printed economic maps—1,243 of the latter.

Institution : ...

Submitted : ...

IOFA, L.Ye.

"Life and geographical activity of P.I.Rychkov." F.N.Mil'kov.
Reviewed by L.E.Iefa. Izv.AN SSSR. Ser.geog. no.5:83-84 8-0
'55. (MIRA 9:1)
(Rychkov, Petr Ivanovich, 1712-1777) (Mil'kov, F.N.)

IOFA, L.Ye.

Tver-Kalinin. Vop.geog. no.49:118-133 '60.
(Kalinin--Economic conditions)

(MIRA 13:8)

ANUCHIN, V.; IOFA, L.; RAKITNIKOV, A.; SAUSHKIN, Yu.; SOLOVTSOVA, T.;
TSEDLER, Ye.

Nikolai Vasil'evich Morozov. Vest. Mosk. un. Ser 5:Geog. 18
no.6:77-80 N-D '63. (MIRA 16:11)

SAUSHKIN, Yu.G.; SOLOV'YEV, A.I.; YEFREMOV, Yu.K.; KOTEL'NIKOV, V.L.;
IOFA, L.Ye.; DANTSIG, B.M.; BARKOV, S.A.; GRUZINSKAYA, V.A.;
BARKOVA, G.Ye.

V.A.Kondakov, 1886-1959; obituary. Vop. geog. no.54:174-176
'61. (MIRA 15:3)
(Kondakov, Vadim Aleksandrovich, 1886-1959)

IVANTER, V.S.; MITROFANOV, A.Ye., red.; IOFA, M.A., otv. red.

[What to read about the construction of logging roads;
index of recommended Russian literature for 1958-1960] Chto
chitat' o stroitel'stve lesovoznykh dorog; rekomendatel'nyi
ukazatel' otechestvennoi literatury za 1958-1960 gg. Mo-
skva, 1962. 32 p. (MIRA 16:2)

1. Moscow. Tsentral'naya nauchno-tekhnicheskaya biblioteka
lesnoy i bumazhnoy promyshlennosti.
(Bibliography--Forest roads)

IOFA, M.B.

Thawing frozen ground with an electric needle of simplified design.
Rats. i izobr. predl. v stroi. no.107:20-21 '55. (MIRA 9:7)
(Frozen ground) (Soil heating)

"APPROVED FOR RELEASE: 08/10/2001 CIA-RDP86-00513R000618620010-7

APPROVED FOR RELEASE: 08/10/2001 CIA-RDP86-00513R000618620010-7"

PROCESSES AND PROPERTIES INDEX

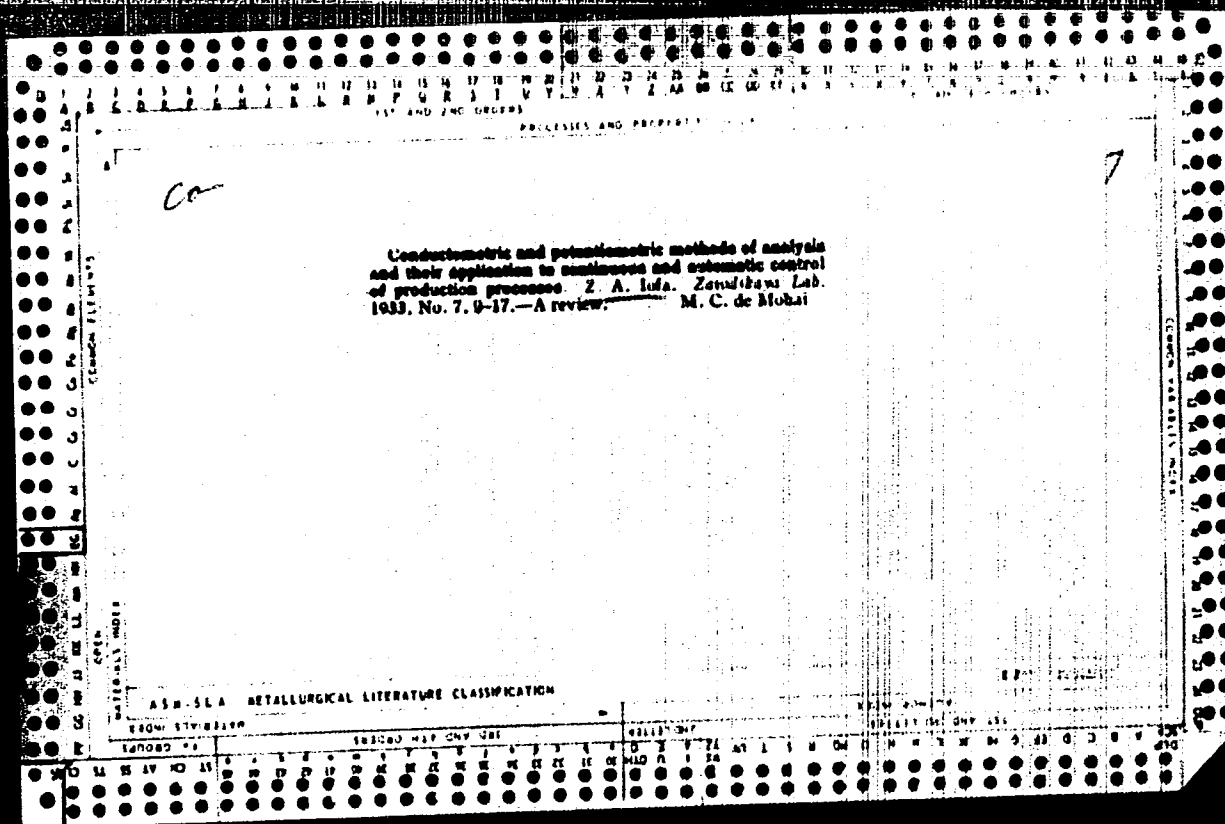
10

ca

Preparation of cupric acetate. Z. A. IOPA AND L. L. KUVACHNO-GURVICH. *Zhur. Prikladn. Khim.* 3, 501-5(1930).—The following method is recommended for prep. cryst. $Cu(AcO)_2$ from CuO and $AcOH$. CuO is agitated with concd. $AcOH$ for 1-2 hrs. $Cu(AcO)_2$ is formed with evolution of heat (the salt contains 1-2% CuO). The soln., which contains a considerable excess of $AcOH$, is sepd. from the ppt. and saved, as it is gradually used up for acidification of the soln., which is obtained at a later stage when the salt is crystd. The ppt. is mixed with the soln., which was obtained from a previous crystn. of $Cu(AcO)_2$ and heated to 80° with const. stirring. The salt, soln. thus obtained is filtered and transferred to a crystg. vessel while hot. It is then dild. with some of the soln., which was saved from the first operation. When the soln. cools to 20° about 40-45% of neutral $Cu(AcO)_2$ ppts. out. If the soln. is stirred the crystals are small and uniform. The cooled soln. is again acid. with $Cu(AcO)_2$ at 80° by repeating the procedure already described, etc. The method was successfully applied on a com. scale at Plant No. 1 of the trust "Lakhrasha" in 1928.

V. KALITSHNIKY

ASB-51A METALLURGICAL LITERATURE CLASSIFICATION



1ST AND 2ND ORDERS PROCESSING AND PROPERTY TAGS

"The Tungsten Electrode and its Temperature Coefficient. Z. A. Ioffe and B. I. Petrov (*Zavod. Lab. (Works' Lab.)*, 1934, 3, 728-731; *Brit. Chem. Abs.*, 1934, [A], 1176).--[In Russian.] The potential of the tungsten electrode over the p_{H_2} range 4-10 is given by $E = A + b p_{H_2}$, where A and b are constants characteristic of the electrode and of the temperature, respectively; the p_{H_2} is given by $p_{H_2} = [E - A + (C - 18)](100.3 + 0.21(t - 18))$.--S. G.

ASB-SLA METALLURGICAL LITERATURE CLASSIFICATION

FROM DIVISION TO DIVISION

SEARCHED INDEXED SERIALIZED FILED

MAY 1964

FBI - NEW YORK

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93 94 95 96 97 98 99 100

1ST AND 2ND ORDERS

PROCESSES AND PROPERTIES INDEX

18

The preparation of copper sulfate from copper ores are by the action of sulfur dioxide and air. Z. A. Jahn and S. M. Kobrin. *J. Chem. Ind. (Moscow)* 1956, No. 7, 41-4.

—When a mixt. of SO₂ and air is passed into a suspension of pure CuO, univalent Cu ions are formed and a complex ppt. of CuSO₄·Cu₂SO₄·2H₂O appears. Salts of Fe mixed with small amounts of other heavy metal ions prevent this pptn. and permit easy formation of CuSO₄. Since natural Cu ores contain these catalysts, such ores give good yields of CuSO₄ by this treatment. H. M. Leicester

COMMON ELEMENTS

COMMON ORGANIC IONS

ASSOCIATED METALLURGICAL LITERATURE CLASSIFICATION

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93 94 95 96 97 98 99 100

CA

PROCESS AND PROPERTIES INDEX

Litharge by electrolytic solution of lead in a double diaphragm cell. Z. A. Lysanskii, *Applied Chem.* (U. S. S. R.) 8, 817-818 (1955) (English 411) (1955). The anodic soln of Pb was carried out in a diaphragm cell in a lab. as well as a test scale. Anodic soln. of Pb in a 20% potassium sulfate soln. of Na₂SO₄ at a c. d. of 0.01 (10.00 amp/cm²) proceeds at almost 100% current efficiency at 2 to 3.2 v. When discharging 0.4 cc. of the anolyte from the cell and 128 cc. of the catholyte per amp. hr., the concn. of the anolyte amounts to 0.5 equiv. with respect to Pb. The equiv. amt. of caustic formed at the cathode is used for the quant. pptn. of Pb as Pb(OH)₂ and for a simultaneous regeneration of the electrolyte. Pb(OH)₂, because of its great reactivity, may be used in the prepn. of various Pb compounds. If the anodic process is carried out in a proper manner contaminated Pb can be used to produce pure products because of the electrolytic anodic refining effect. A high-grade crystal. litharge can be obtained directly from soda. Right references. A. A. B.

ASSOCIATED METALLURGICAL LITERATURE CLASSIFICATION

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APR 1956

CA

PROCESSES AND PROPERTIES INDEX

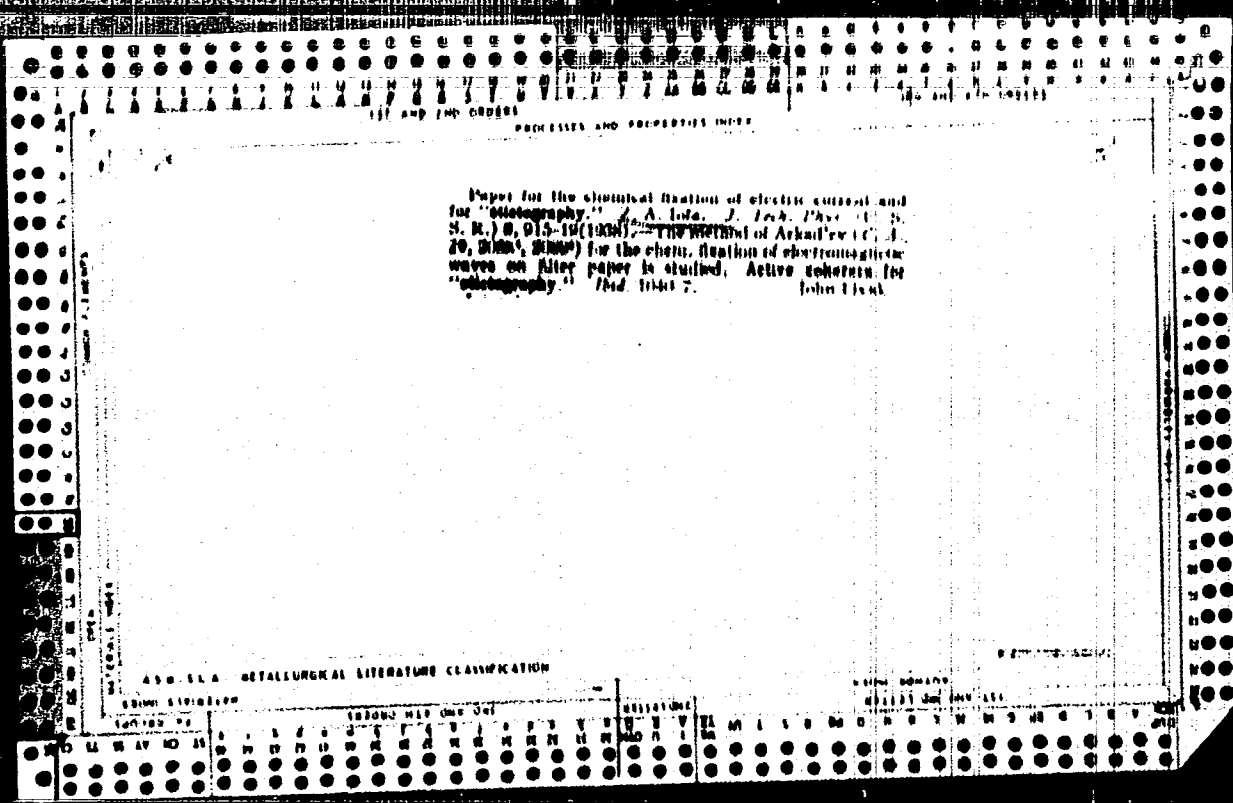
Crystallized litharge in an aqueous medium. Z. A. [ref. *J. Applied Chem. (U. S. S. R.)* 8, 412-23 (in English 1955-4)(1955).]—The main factor in the conversion of Pb(OH)₂ into cryst. PbO is not the high concn. of the alkali or high temp., but the presence in the reaction mixt. of sol. Pb salts or anions of an acid which yields sol. salts with Pb. There is no min. concn. of alkali capable of dehydrating Pb(OH)₂. Pb(OH)₂, obtained by ~~usual~~ washing with weak alkali, can also be rapidly dehydrated with a dil. acid soln., yielding a cryst. PbO. The dehydration velocity depends primarily on the temp., then on the concn. of sol. Pb salts present in the mixt. and finally on the concn. of the alkali. The presence of a few crystals of PbO, or agitation, accelerates dehydration. A cryst. PbO of various particle size, color and structure can be obtained by changing the abs. and relative concns., the temp. and agitation velocity. The d. of the cryst. PbO is increased and its reactivity is lowered in accordance with a change in the shade from yellowish to reddish, but it is always considerably higher than that of PbO prepd. by heating. In all cases, formation of PbO takes place through intermediate formation and decomposition of the basic Pb salts; this is confirmed by the fact that the "balanced acetic hydrate" is dehydrated by a dil. alkali soln. and H₂O, while the "balanced alkaline hydrate" is dehydrated by a dil. acid soln. In the latter case a great amount of PbO is obtained from Pb(OH)₂ by a small amt. of acid (one equiv. of Pb(OH)₂ requires 0.001 equiv. AcOH). This confirmation of the theory on this mechanism is obtained in the formation of cryst. PbO in an aq. soln. by direct addn. of a soln. of alkali heated to 100° to any Pb salt, whereby the intermediate formation of basic Pb salts in the form of a white ppt. may be observed. This electrolytic method permits prepn. of "electrolytic" litharge of high purity and great reactivity. The electrolyte can easily be removed from the crystals by washing.

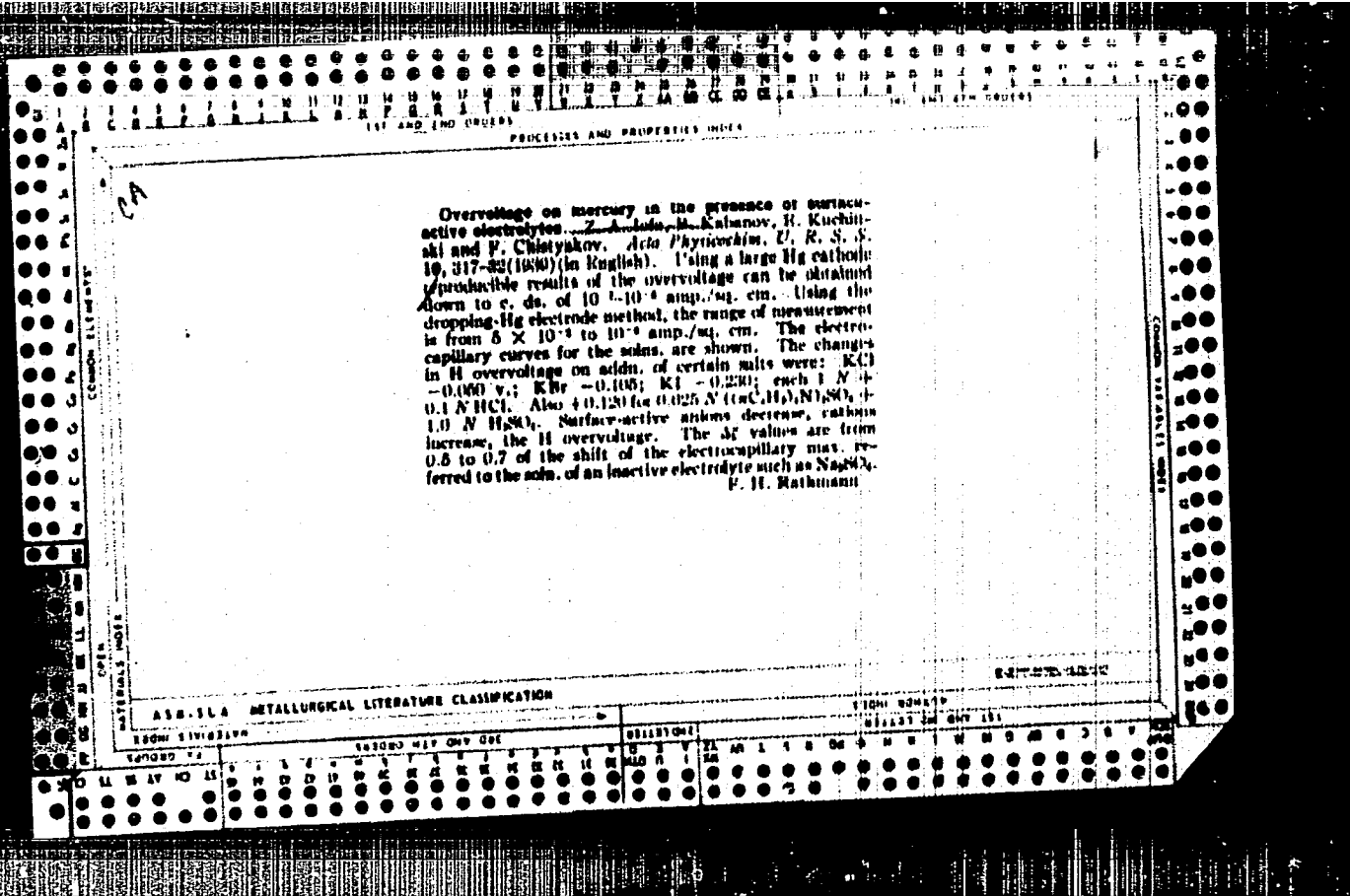
A. A. Bochtinik

ASD-51A METALLURGICAL LITERATURE CLASSIFICATION

1955-4

1955-4





PROCESSES AND PROPERTIES INDEX

1ST AND 2ND ORDERS

2

Electrocapillary curves of concentrated solutions of acids. Z. A. Loh and A. Frumkin. *Acta Physicochim. U. R. S. S.* 16, 473-80(1960)(in English).—Data on HCl in concns. from 0.1 to 10 *N* are given and discussed by means of Lippmann's equation. Cl adsorption is pos. on the anodic branch of the electrocapillary curve; it becomes strongly neg. on the cathodic branch. Adsorption of the H ion is pos. in dil. solns. and neg. in concd. solns. F. H. Rathmann

ASS-SLA METALLURGICAL LITERATURE CLASSIFICATION

E-2774

1ST AND 2ND ORDERS

1ST AND 2ND ORDERS

IOFA4Z8A8

600

1. IOFA, Z. A.
2. USSR (600)

"The Overvoltage on a Mercury Cathode in Concentrated Solutions of Acids" Part I. "Hydrochloric and Hydrobromic Acids," Zhur. Fiz. Khim, 13, No. 10, 1939. MGU, Electro-chemical Laboratory. Received 10 April 1939.

9. [REDACTED] Report U-1615, 3 Jan. 1952.

IOFA428

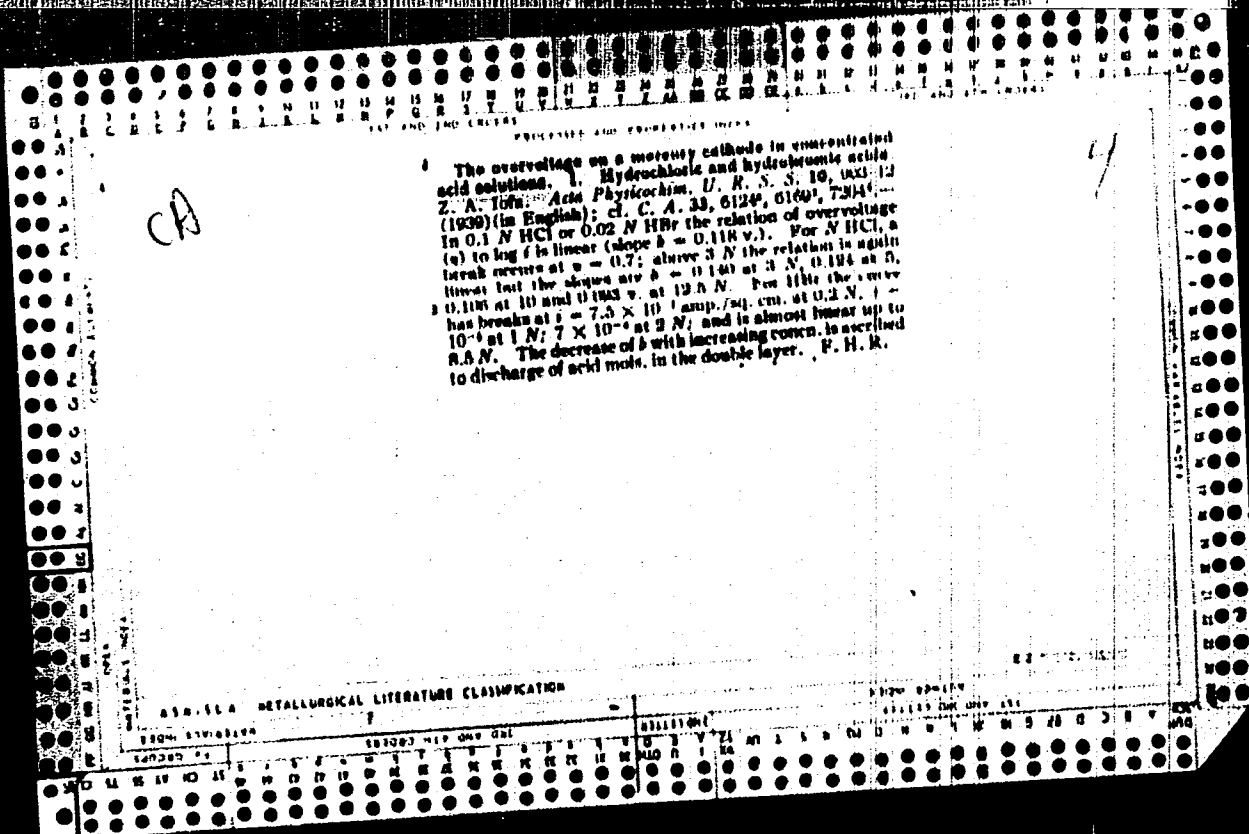
600

1. IOFA, Z.: USTINSKIY, B.; and EYMAN, F.

2. USSR (600)

"The Electrocapillary Curves of Concentrated Solutions of Acids",
Zhur. Fiz Khim, 13. No. 7, 1939. Part II. "The Adsorption of
Ions in Solutions of HCl, HBr and H₂SO₄". MGU, Electrochemical
Laboratory, Received 9 February 1939.


9. [REDACTED] Report U-1615, 3 Jan. 1952.



1. KABANOV, B.; FILIPPOV, S.; VANYUKOVA, L.; IOFA, Z.;
PROKOF'YEVA, A.

2. USSR (600)

"The Supertension of Hydrogen over Lead"; Zhur. Fiz. Khim.; 13, No.
3, 1939; Physico-Chem. Insti. imeni L. Ya. Karpova; recd 21 July
1938.

9.  Report U-1613, 3 Jan. 1952.

POTENTIALS AND PROPERTIES INDEX

147 APR 1964 041133

Electrocapillary curves of concentrated solutions of acids. I. Derivation of an adsorption equation. A. Franklin and Z. A. Iofa. *J. Phys. Chem.* (U. S. S. R.) **64**, 931-3 (1960). The equation $\Delta\sigma_p/(1/P)\Delta\sigma_{\text{max}} = -\Gamma_A' / (\Gamma_A' - \Gamma_A)$ is derived, where σ = potential difference, μ = chem. potential, Γ = adsorption of Hg salt or of acid.

II. Adsorption of ions in solutions of HCl, HBr and HgSO₄. Z. A. Iofa, B. Ustinovskii and P. Elman. *Ibid.*, 934-41. — From 0.1 to 30.0 N the course of the electrocapillary curves and of the adsorption of anions and cations as a function of concn. is given by the equations given in part I. The exptl. data are given in 10 tables and 5 figures. P. W. Rathmann

A 58-55A METALLURGICAL LITERATURE CLASSIFICATION

GROUP 58

58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	00
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PROCESSED AND REPRODUCED FROM
117 AND 120 SERIES

117 AND 120 SERIES

117 AND 120 SERIES

Application of the dropping-mercury electrode to the measurement of overvoltage. *Z. A. A. Kolychev and L. Shtilman. Acta Physicochim. U. R. S. S. 12, 231-42 (1940) (in English).*—For medium c. d. the dropping Hg electrode in HCl and HBr solns. up to 0.1 N yields a linear relation between the overvoltage, η , and log of the c. d., i , and the coeff. is $2.3 \times (RT/F)$ as for the stationary electrode. For high c. d. the overvoltage is less owing to a decrease in the size of the drops with decreasing surface tension; for low c. d. it is greater owing to the nonfaradaic current. After correcting for these factors the overvoltage curve is linear but 35-40 mv. above the values for a stationary electrode and is given by $\eta = 0.116 \log [i/(i_0 - i)] - 0.116 (i_0/i_0)^{1/2} \times \log (i_0/i_0) + 0.034 + b$, where i_0, i_0 are the initial and final areas of the drops, resp., and a_0, a_0 the adherence areas of the drops on the electrode. P. H. R.

117 AND 120 SERIES

117 AND 120 SERIES

Electrochem. Lab., Moscow State U.

ASB-51.8. BIBLIOGRAPHICAL LITERATURE CLASSIFICATION

A-1

BC

Use of dropping mercury electrodes for measuring overvoltage.
 Z. A. Iula and A. N. Kuznetsov (*J. Phys. Chem. Russ.*, 1939, 13, 28-30). For the coeff. b in the equation $b = \log i / i_0$, i being the overvoltage and i_0 the cat. current, different values were obtained when using stationary and dropping electrodes (cf. Heyrovsky, A., 1937, 1, 439). This discrepancy disappears if (a) the variation of the surface tension and, therefore, of the drop vol. with the applied potential is considered; this correction eliminates the apparent rise of b at high vols. of i ; (b) the current used up for charging the growing drop is subtracted from the observed i ; this correction eliminates the abnormally low value of b at low i ; and (c) i is referred to the average surface area of the drop which fluctuates between a very small and a max. val. $b = 4.8 \text{ mV/V}$ for both stationary and dropping electrodes. The experiments were carried out in 0.01-0.25-N HCl and in 1-5.5% H₂O₂.

| 1 11

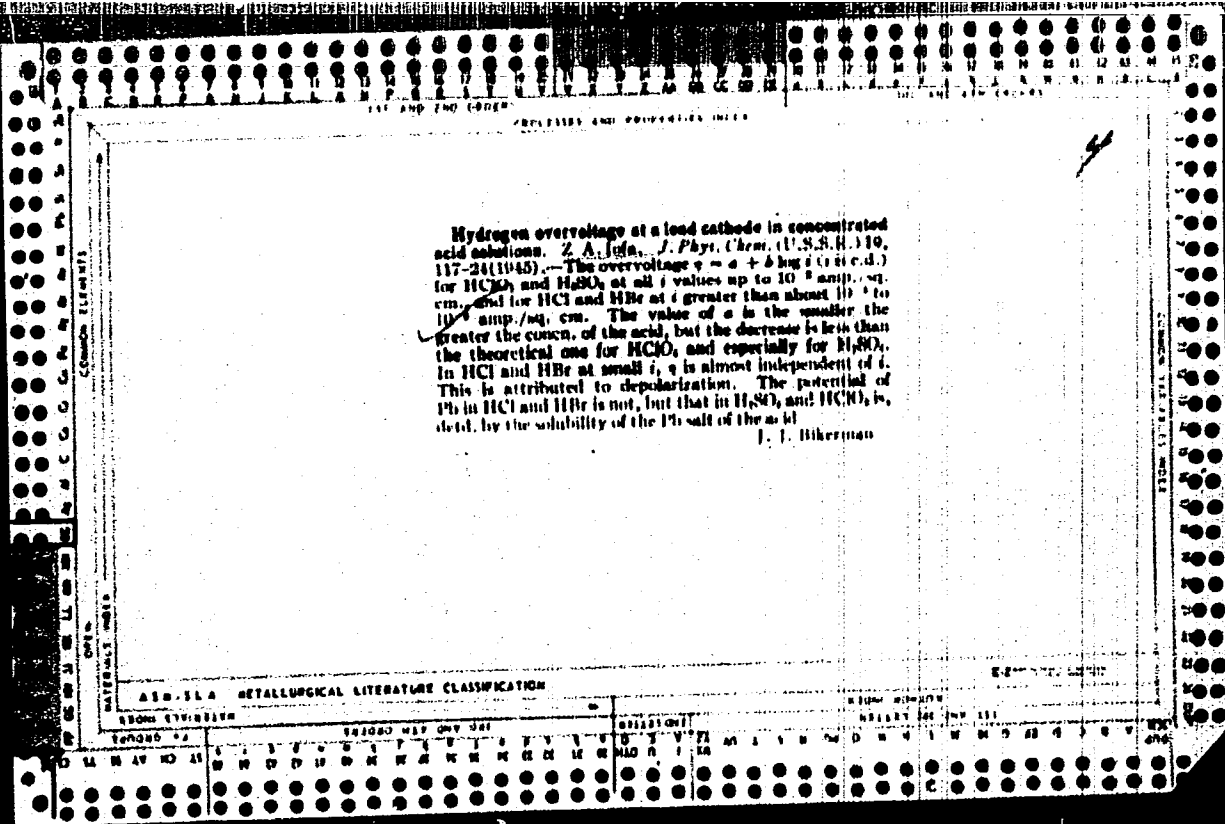
PROCESSES AND PROPERTIES INDEX

AI 8

BC
 Temperature coefficient of hydrogen overvoltage on mercury cathode.
 Z. A. Iofa and K. P. Midulin (J. Phys. Chem. Russ., 1944, 18, 137-142).
 The relation between the overvoltage η_1 and current strength (in 0.25n-H₂SO₄)
 N-H₂SO₄ is given by $\eta_1 = a + b \log i$ (4.68T log i) F, a being a const.
 The temp. variation $d\eta/dT$ is -0.002 v. per degree at $i = 10^{-3}$ amp. and
 0.003 at $i = 10^{-6}$

J. J. B.

METALLURGICAL LITERATURE CLASSIFICATION



REVISED AND REPRINTED 1967

Hydrogen overvoltage on a mercury cathode in concentrated solutions of acids. III. Temperature coefficient of overvoltage. Z. A. Ieda and V. Stapanian, *J. Phys. Chem. (U.S.S.R.)* 10, 125-31 (1948); cf. *C.A.B.* 30, 11304.

The overvoltage η is measured for HCl aq. between 0° and 30°. The value of $d\eta/dT$ (T is temp.) decreases when $\log i$ (i is current) increases for 5, 7, 8, and 10 N, and increases with $\log i$ for 3 N and 4 N HCl; all changes being linear. The value of $d\eta/d \log i$ as a function of T passes through a min. for all runs above 5 N. The results are explained by the effect of temp. and current on the adsorption of anions.

J. J. Bikerman

METALLURGICAL LITERATURE CLASSIFICATION

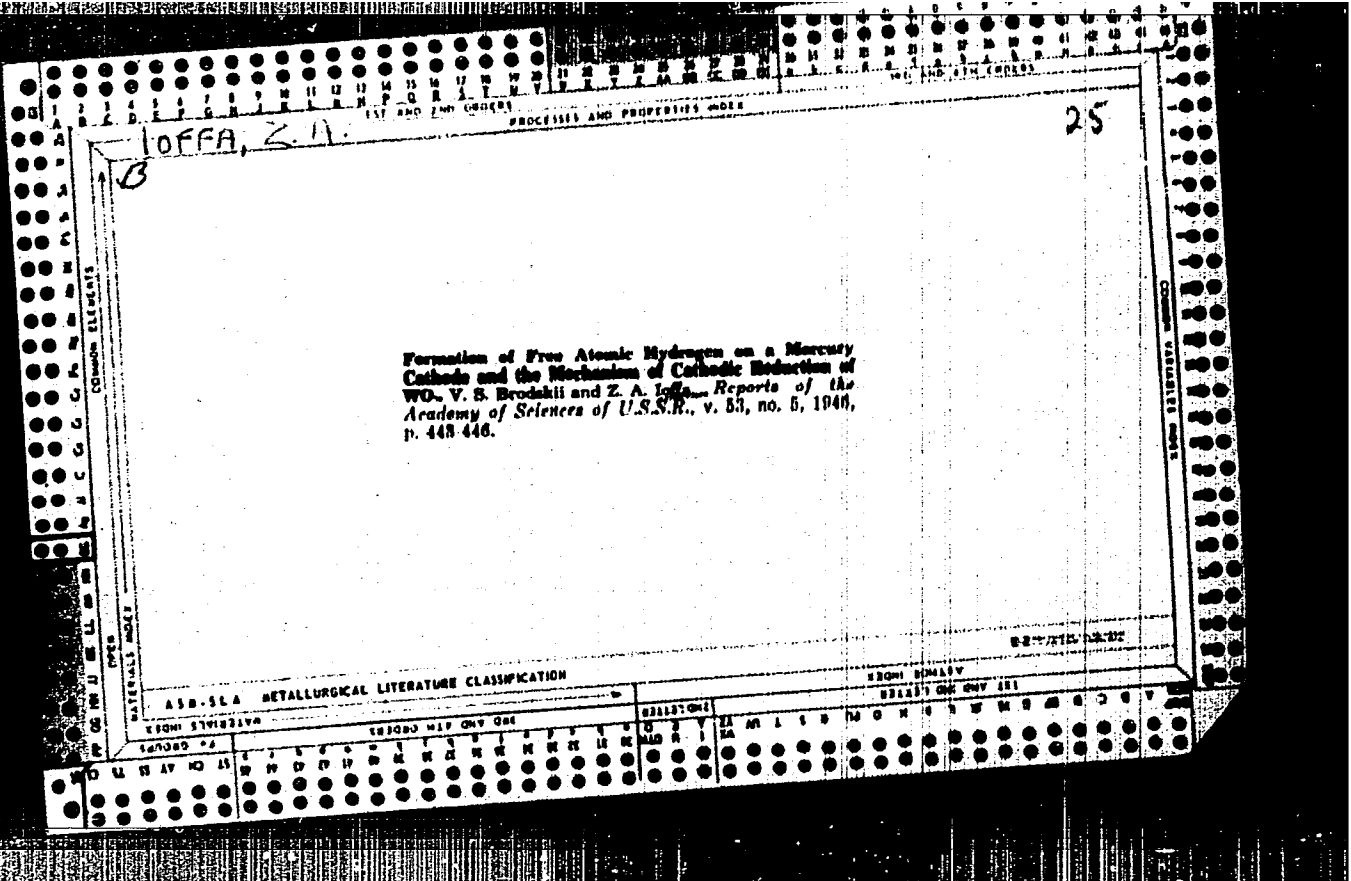
A 5 B 34 3

The appearance and disappearance of surface maxima in polarographic curves. Z. A. Iola, V. V. Lomov, and I. I. Tretyakov (Electrochem. Lab., Univ. Moscow), *J. Phys. Chem. (U.S.S.R.)* 19, 358-64(1945). - A pool of Hg, 0.6 cm. in diam., is made the cathode, and a Hg ring around it the anode. The soln. is 0.02 N Hg(NO₃) + 0.02 N HNO₃. The potential ϕ (referred to N calomel electrode) of various points on the cathode and the total current strength I are measured. In the center of the cathode I first increases with $-\phi$ more rapidly than near the edge, then reaches a max. a little greater than near the edge, and decreases when $-\phi$ further increases. At very great polarizations (at $-\phi = 1.5$ v. or more) there is no p.d. between the center and the edge, and I increases with $-\phi$ rapidly. Along this branch H is evolved. When the applied voltage is again reduced, a hysteresis of polarization is observed. The surface remains polarized at smaller

$-\phi$, and the identity between the ϕ values in the center and near the edge remains also at smaller I . When cathodic polarization is gradually raised, the following movement of the cathode surface is observed. At small $-\phi$ values the movement is moderate and directed from the center towards the edge. When $-\phi$ at the edge reaches the electrocapillary max., a ring forms near the edge; on further increase of $-\phi$ it moves towards the center of the cathode and disappears. As long as the ring is visible, Hg rapidly moves towards it both from inside and outside. The movement is weak or nonexistent after the disappearance of the ring. The current-v. curves and the Hg movements are different in a soln. of 0.05 N ZnSO₄ + 0.02 N HgSO₄, but whatever the soln. the effects are explained by the influence of ϕ on surface tension and the influence of agitation on ϕ . The polarographic max. of Hg in 0.003 N Hg(NO₃) + 0.005 N HNO₃ is suppressed if 120,000 ohms are inserted into the external circuit. This is explained by the hysteresis of polarization. When the external resistance R is small, I increases when the Hg drop grows. When R is big, I does not vary with the drop surface, the e.d. is high when drop formation starts, the polarization created by the high e.d. persists during the whole growth of the drop, the Hg surface is not agitated, and no polarographic max. occurs. J. J. Ilkerman

4

ASD 113 METALLURGICAL LITERATURE CLASSIFICATION



The mechanism of the inhibitor action on solution of iron in acids. V. A. Kuznetsov and G. A. Ieda (State Univ. Moscow). *J. Phys. Chem. (U.S.S.R.)* 21, 291-14 (1947) (in Russian).—The method of polarization curves is used to det. the mechanism of inhibitor action of org. compds. Spectroscopically pure Fe is polarized at 15° for 2-3 min. at a c.d. i amp./sq. cm., and its potential ϕ against a H₂-Pt electrode in N HCl is measured. Curves ϕ against $\log i$ are detd. starting from high cathodic and ending with high anodic polarizations. These curves are parallel to the abscissa at low i values, both in pure N HCl and in the presence of inhibitors. At high i values (e.g., above 10^{-3} amp./cm.²), ϕ increases (for cathodic polarization) or decreases (for anodic polarization) linearly with $\log i$. In the equation $\phi = \phi_0 + k \log i$, k is 0.125 v. along the cathodic and 0.07 v. along the anodic curve in N HCl. Inhibitors (tetraammonylammonium iodide (I), narcotine, two quinoline deriva., tribenzylamine, tetraecyltetrahydropyridinium bromide, etc.) increase k for both anodic and cathodic processes. The increase is greater for the anodic process, showing that the inhibitor affects soln. of Fe even more than liberation of H₂, contrary to Chappel, *et al.* (C.S.I. 22, 2910). In the absence of current, the potential of Fe in N HCl is 0.265 v.; in the presence of 10^{-3} and 5×10^{-3} M I it is -0.221 and -0.181 v., resp. When the concn. C of the inhibitor is high, e.g., over 10^{-3} M narcotine, the anodic polarization and the rate of spontaneous soln. of Fe become almost independent of C although the cathodic overvoltage continues to increase with C . The rate of spontaneous soln. is equivalent to 2.7×10^{-4} amp./cm.² in N HCl and to 0×10^{-4} amp./cm.² in N HCl + 5×10^{-3} M I. Aliphatic alic., hexanoic and octanoic acids, benzenesulfonic and α -naphthalenesulfonic acids have no inhibitor effect;

this shows the importance of a cationic charge. Thiourea accelerates both the soln. of Fe and the liberation of H₂; the effect on the anodic polarization has a max. at $C = 10^{-3}$ M. This max. probably is due to decompn. of thiourea into H₂S, which accelerates the electrode processes, and a N compd. which acts as inhibitor. The stationary potential of Fe is shifted to -0.312 v. by 10^{-3} M and to -0.291 v. by 10^{-2} M thiourea. Unkol P.H. is a polymerization product of butyraldehyde and NH₃. It is used as inhibitor; its 0.5% emulsion lowers the rate of soln. of Fe to 0.01. Unkol very strongly increases cathodic polarization, which also slows hydrogen. It increases also the anodic polarization. Acridine acts similarly. These compds. form protective films. Their lesser effect on anodic polarization presumably is due to reduction of the wettability of the film by anodic polarization and to damaging of the film by the dissolving Fe. The rate of evolution of H₂ by Fe in N HCl without and in the presence of inhibitors without any current increases in time. When extrapolated to zero time, this rate agrees with that detd. from electrochem. measurements. Oxalic acid does not affect, and Li and thiourea lower, the size of H₂ bubbles evolved by Fe in N HCl. This shows that inhibitors are adsorbed on Fe. The adsorption of cations enhances the overvoltage of H and retards the transfer of Fe ions into soln. The effects of inhibitors on the cathodic and the anodic processes are different, presumably because H₂ is evolved on the whole surface, whereas Fe is dissolved only along edges, etc.

J. J. Bikerman

Formation of hydrogen peroxide in air-depolarized
alkali carbon cells. Z. A. Iida, N. H. Muzareva, S. Ya.
Mirlina, and H. F. Krymalkina (Elektrochem. Lab.,
Moscow State Univ.). *Zhur. Priklad. Khim.* (J. Applied
Chem.) 21, 329-40 (1947).—The air O_2 absorbed in the
depolarization process on cold pressed C electrodes of
Zn/C cells is mainly converted into H_2O_2 , part of which is
eliminated after decompn. in the electrolyte or on the elec-
trode. However, a large part of the H_2O_2 is retained in
the cell, and partly accumulates to a stationary concn.
depending on the temp., partly, is consumed in depolariza-
tion of the Zn electrodes, causing corrosion in up to 70%
excess over the amt. of Zn dissolved by the current. For-
mation of H_2O_2 is effectively counteracted by catalysts
which can be either incorporated in advance into the C
electrode or deposited on its surface. By the 1st method,
2.6% of $AgNO_3$ or $KMnO_4$ proved most effective; oxides
and salts of Co and Ni were tested but found without ef-
fect. Better results were obtained by the 2nd method,
with $PtCl_2$ deposited on the surface. Catalyzed electrodes
have a higher potential, raising the e.m.f. of the cell by
10-20%, particularly at lower temps. Absorption of O_2
from the air is reduced approx. by a factor of 2, and the
capacity of the cell is increased by 30-50% owing mainly
to the reduced corrosion of the Zn. The action of the
catalysts consists in an inhibition of the formation of H_2O_2 .
N. Thon

IOFA, Z. A.

USSR/Chemistry - Hydrogen Peroxide, Generation of Electrodes, Carbon, Depolarization of
 Apr 1948

"The Generation of Hydrogen Peroxide in Alkali Carbon Electrodes in Depolarization in Air," Z. A. IOFA, N. B. MOISEYEV, S. Ya. KIRILIN, Ye. Ye. KYZAKOVA, Chair of Electrochemistry, Moscow State U, and Sci Res Elemental and Electrocarbon Inst, 12 pp

"Dokl. Priklad. Khimii" Vol III, No 4

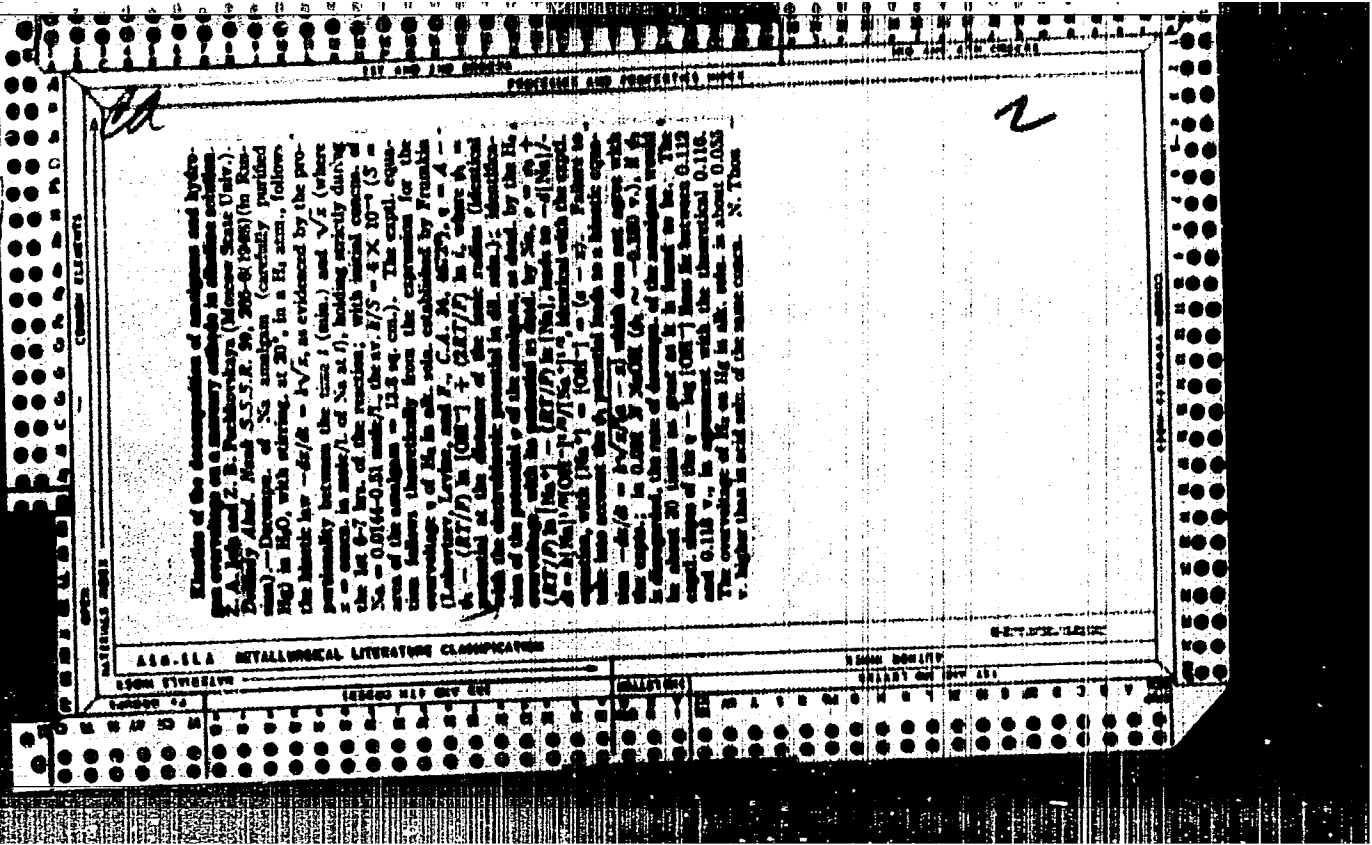
Shows that atmospheric oxygen is absorbed during process of depolarization of carbon electrodes and

43722

USSR/Chemistry - Hydrogen Peroxide, (Contd) Apr 1948
 Generation of

produces peroxides of hydrogen. Catalyst found which will be incorporated into mass of electrode, or used for coating electrode to prevent formation of peroxides in electrolyte, results of experiments permitted conclusions to be drawn regarding reaction mechanism in depolarization in presence of a catalyst
 Submitted 16 Oct 1947.

73722



USSR/chemistry - Electrolysis
Chemistry - Amalgams
13 Jan 1948

"Kinetics of the Decomposition of Amalgams and Over-
voltages of Hydrogen at the Mercury Cathode in Alkaline
Solutions," Z. A. Iofa, Z. B. Fedukovskaya, *Ussr*
Electrochem, Moscow State U issued N. V. Lomacov, 4pp

Yok Akad Nauk SSSR, Nova Ser^a Vol LIX, No 2

various testing theory experimentally, authors inter-
sented in use of results of study of kinetics of de-
composition of amalgams to find and test the equation
for overvoltage of hydrogen at the mercurial cathode
in very diluted alkaline solutions. Experiments con-
firm hypothesis of A. N. Frumkin on electrochemical

USSR/chemistry - Electrolysis (Contd) 11 Jan 1948

mechanism of process of decomposition of the amalgam.
Also prove and confirm dependence of overvoltage upon
the composition of diluted alkaline solutions, follow-
ing directly from Frumkin's theory on influence of the
structure of dual electrical layer on the kinetics of
discharge. Submitted by A. N. Frumkin, 29 Oct 1947.

b7D

IOFA. Z. A.

IOFA, Z.A.

22971 Reaktsiya vosstanovleniya kisloroda na rtutnom elektrode. Zhurnal
fiz. khimii, 1949, Vyp. 7, S. 828-30. Bibliogr: 9 Nazv.

SO: LETOPIS' NO. 31, 1949

IOFA, Z. A.

30165

Mirlina, S. Y. i moisyeyeva, N. B. izucheniye protsessov, protyekayu
shchyennikh na tsinkovom elyektrode elyemyeth so. shchyochnilm
elyek-trolitom. Zhurnal prikl. Khimii, 1949, No. 9 C. 983-94.--Bibliogr:
C.994

SO: LETOPIS' NO. 34

CA

4

Processes taking place on the zinc electrode of an alkaline cell. *Zh. Fiz. Khim.*, N. Ya. Mitina, and N. B. Moliseva (M. V. Lomonosov State Univ., Moscow) *Zhur. Priklad. Khim.* (J. Applied Chem.) 22, 981-99 (1949). (1) The Zn electrode of a Zn-C cell is characterized by pptn. of $Zn(OH)_2$ according to $KH_2ZnO_2 + H_2O \rightarrow Zn(OH)_2 + KOH$. To elucidate the nature of this process, the system ZnO-KOH-H₂O was studied at 0, 15, and 30°. True equil. is not reached even after 3 months, either by shaking ZnO with a KOH soln. or by pptn. from a supersatd. soln. With increasing KOH concn., the Zn content in the soln. increases. At 30°, the curve is limited by the final point of soly. of ZnO and KOH, and no solid zincate is formed; the soln. at that point contains 2.81 equiv./kg. of zincate. At 0°, the zincate content of the soln. is 1.27-1.65 equiv./kg., and the solid phase is a mixt. of ZnO, $KOH \cdot 3H_2O$, and cryst. KH_2ZnO_2 ; the transition of the solid phase from ZnO to KH_2ZnO_2 occurs at 8.1 equiv./kg. of free alkali and 2.81 of Zn in the soln. At 30°, prolonged agitation results in gradual "aging" of the soln., consisting in gradual loss of H₂O, and resulting in gradual decrease of the soly. which draws closer to the equil. curve, as compared to the abnormally high soly. of freshly pptd. $Zn(OH)_2$. In the alk. cell, the zincate soln. formed at the beginning of the 2nd period are distinctly supersatd. even in comparison with the soly. of freshly pptd. $Zn(OH)_2$. Thus, in KOH 5.5 equiv./kg. to fresh orthorhombic $Zn(OH)_2$ dissolves, at 0, 20, and 30°, to the extent of 1.75, 2.0, and 3.0 equiv./kg., resp., whereas in the cell the concns. at 0 and at 30° are 4.4 and 3.8, resp., against an equil. concn. of 1.20 equiv./kg. The supersatd. solns. evidently represent not true mol. but colloidal solns. in which the disperse phase forms aging centers. In the alk. cell, the solid ppt. formed in concn. alkali will, as a rule,

be ZnO; at medium concns., $Zn(OH)_2$. (2) In anodic polarization of Zn in pure KOH and in KOH concn. KH_2ZnO_2 , the crit. c.d. D_c , corresponding to rapid passivation decreases with decreasing concn. of KOH and with increasing concn. of KH_2ZnO_2 ; decrease of the temp. acts in the same direction, much more strongly in the presence of zincate. On depolarization, one observes across of potential, at 1.5 and 0.5 v. in pure KOH, and at 1.0 and 0.5 v. in the presence of

KH_2ZnO_2 . The passivating film formed at D_c is evidently the result of the rate of formation of $Zn(OH)_2$ being greater than the rate of its soly. On intense stirring, the crit. D_c increases, and the potential becomes more pos., but the overvoltage remains unchanged. Passivation of the Zn anode is related directly to the structure of the film formed, and that depends on the temp. and the concn. of KOH. A striking illustration is the fact that in concn. KOH solns. (35-40%), there is no passivation at room temp., but passivation does occur at the beginning of the 2nd period below 0°; in contrast, in less concn. KOH (15-22%), the Zn anode becomes passive at room temp. but never below 0°. The passivation is evidently due to formation of a film of the rhombic $Zn(OH)_2$; there is no passivation under conditions where the solid film is either ZnO or the perismatic and acicular modification of $Zn(OH)_2$ which forms no adherent passivating films.

N. Thom

LA

The passivating effect of halide ions on iron in concentrated acid solutions. Z. A. Iofa and L. A. Melvedeva. (Moskov. Gosudarst. Univ. im. M. V. Lomonosova). - In Doklady Akad. Nauk S.S.S.R. 69, 212-16 (1970). - In view of elucidating the nature of the slowing-down effect of I⁻, Br⁻, and Cl⁻ ions (decreasing in that order) on the rate of dissoln. of Fe in H₂SO₄, curves of the cathodic and anodic polarization potentials ϕ were detd. for Fe in 8 N and 4 N H₂SO₄, without and with 0.2 N and 0.004 N KI, resp., as a function of the log of the c.d. Addn. of 0.2 N KI results in an increase of the overvoltage $\Delta\phi$ both in the anodic ionization of Fe and, particularly, in the cathodic evolution of H₂. The stationary ϕ is shifted to the neg. side by 67 mv. The rate of spontaneous soln. is reduced 43 times. With 0.004 N KI, the cathodic $\Delta\phi$ decreasing or whether the measurements are made along decreasing or increasing c.d. In the 1st case, if the current is shut off for a few sec., with increasing c.d., the film formed is not remains high with increasing c.d.; the film formed is not disrupted as it would be, through desorption of anions at higher c.d. and more neg. ϕ ; if the film were formed by reversible adsorption. In anodic polarization, the film is formed rapidly at lower c.d., but does not grow any further (i.e. $\Delta\phi$ does not increase any further) with the c.d. at high c.d. Without external source of current, the rate of soln. of Fe, in the presence of KI, decreases with time, falling to nearly zero when, apparently, the passivating film is completely formed. This occurs the sooner the greater the

concn. of KI. A surface of Fe, preliminarily passivated in KI + H₂SO₄, is rapidly reactivated upon immersion in I⁻-free H₂SO₄. The same amt. of KI, added to H₂SO₄ of varying concns., has the greater an effect the more highly concd. the H₂SO₄; this follows from the fact that, at the same c.d., the cathodic $\Delta\phi$ in the presence of 0.2 N KI remains unchanged between 0.1 N and 0.8 N H₂SO₄. In 1 N solns. of H₂SO₄, HClO₄, HCl, HBr, and H₂SO₄ (4-2 V KI), at 0.01 amp./sq. cm, the cathodic ϕ = -110, -445, -405, -180, and -540 mv. The variation of the anodic γ is in the reverse direction. The passivating effect of halide ions on Fe in acid soln. is attributed to the formation of a thin, insol. film of an Fe halide. In alk. soln., I⁻ and Br⁻ ions not only do not passivate Fe, but have a strong activating effect, evidently owing to displacement of O from the surface by halogens. The specificity of the passivating effect of halide ions on Fe in acid soln. is further illustrated by their well known activating effect on Cr under the same conditions. N. P. Ponom

7

CA

Polarographic determination of adsorbability of charcoal with methylene blue. Z. A. Isha and G. M. Florinovich (Moscow State Univ.). *Zashchita Lab.* 10, 142-4 (1950).—Agitate 0.2 g. of dried sample for 10 min. with 0.5% methylene blue soln. Treat a 10-ml. aliquot with 0.2 ml. *N H₂SO₄*, and make a polarogram in an open vessel against a calibration curve. Charcoal high in ash should be washed with 6 *N HCl*, followed by *H₂O*. G. M. K.

CA

7

Reply to N. I. Kobayev, A. N. Prumkin, E. A. ...
 and V. S. Baginski. *Zhur. Fiz. Khim.* 23, 1117-31(1951);
 cf. preceding abstr.--Kobayev's theory of H₂ overvoltage
 at Pt on the assumption that the discharge, $H_2O^+ + e \rightarrow H_2 + H_2O$, is rapid and the slow step on cathodes with
 high η is the desorption of at. H: $H_2 \rightarrow H$. The 1st as-
 sumption is known to be incorrect (P., *C.A.* 44, 67(27)).
 The 2nd is discussed. Attempts to detect at. H near the
 cathode by means of WO_3 have failed (B. and I., *C.A.* 41,
 3701A), and although polymerization can be initiated by
 cathodic evolution of H, Parnavane's work (*C.A.* 46,
 2046b) makes it probable that this reaction starts at the sur-
 face and that it is propagated through the vol. of the solu-
 tion by at. H but by an org. radical. From the theoretical
 standpoint, desorption of at. H is ruled out because, at a
 current density of 0.1 amp./sq. cm. with $\eta = 1.3$ v., a calcn. shows
 that the surface coverage θ is $1.8 \cdot 10^{-11}$; then the velocity
 of desorption is $0.8 \cdot 10^{-12}$ mol./sq. cm. sec., which corre-
 sponds to $0.8 \cdot 10^{-12}$ amp./sq. cm. Hence calcn. shows that
 electrochem. desorption, $H_2 + H_2O^+ + e \rightarrow H_2 + H_2O$,
 or recombination, $2H_2 \rightarrow H_4$, are much more rapid processes
 than $H_2 \rightarrow H$. Kobayev's position is definitely corrected.
 Michel Boudart

FRUMKIN, Aleksandr Naumovich, 1895-, redaktor; BAGOTSKIY, V.S.; IOFA, N.A.;
KABANOV, B.N.

[Kinetic energy in electrode processes] Kinetika elektrodnykh protsessov.
[Pod red. A.N.Frumkina. Moskva] Izd-vo Moskovskogo universiteta, 1952.
318 p. (MLHA 6:7)
(Electrochemistry)

IOFA, Z. A.

Chem 2³

Nonmetallic Abs.
V-8 Jan 15, 1954
Mineralogy Metallurgy
and Ceramics

ON THE THEORY OF DECOMPOSITION OF AMALGAMS IN
SOLUTIONS OF ELECTROLYTES. D. L. Kapsant and
Z. A. Iola, Translated from Zhur. Fiz. Khim. 26, 193-200
(1952). 15p. (AEC-tr-1715)

The decomposition of amalgams of alkali and alkaline earth metals by aqueous solutions of electrolytes represents a typical electrochemical process. The process of decomposition of amalgams consists of two interconnected electrochemical reactions. The first reaction is the ionization of the metal dissolved in Hg: $Me \rightleftharpoons Me^+ + e^-$. The second reaction is the discharge of H^+ in acid solutions, $H_3O^+ + e^- \rightarrow H_2O + H$, or in alkaline solution, $H_2O + e^- \rightarrow OH^- + H$. Expressions for the potentials of decomposition and the reaction kinetics of the amalgam in acid and alkaline solutions are derived. (J.S.R.)

MT
4-21-54

IOFA, Z. A.

DECOMPOSITION OF AMALGAMS AND OVERTVOLTAGE OF HYDROGEN ON MERCURY IN ALKALINE SOLUTIONS.
O. I. Koster and Z. A. Iofa. Translated from Zhur. Fiz. Khim. 39, 301-10(1963). 10p. (AEC-tr-1718).

It was proved that the decomposition of amalgams diluted by water mixtures of electrolytes in an electrochemical reaction limited by the speed of the H₂ discharge. Decomposition kinetics for amalgams of K, Li, and Ca were studied in solutions of their hydroxides, and kinetic formulas, deduced theoretically from the electrochemical theory of interlinking electrode processes, are given. The value for H₂ overvoltage on a Hg cathode in alkaline solution was found. The dependence of the amount of overvoltage on the concentration of hydroxyl ions can be expressed as $\eta = 1.507 - 0.105 \log C_{OH^-}$. The influence of surface-active ions on the overvoltage of H₂ is discussed. (J.S.R.)

nuclear Sci. Abs.
K-8 Jan 15, 1954
Mineralogy, Metallurgy
and Ceramics

4-21-54

IOFA, Z. A.

USSR/Chemistry - Overvoltage

Sep 52

"The Effect of Surface-Active Agents on the Kinetics of the Discharge of Hydrogen Ions at the Mercury Electrode," N. V. Nikolayeva, A. N. Frumkin, and Z. A. Iofa, Moscow State U

Zhur Fiz Khim, Vol 26, No 9, pp 1326-1336

Investigated effect of sol surface-active agents (butyl alc, amyl alc, hexyl alc, heptyl alc, caproic acid) and the effect of insol long-chain compds (cetyl alc, palmitic acid, and myristic acid) on the magnitude of the H overvoltage at an Hg cathode in HCl, HBr, and H₂SO₄ of 2 N- 20 N concns. The surface-active

263724

agents increase the H overvoltage at the Hg electrode if the value of the cd and the magnitude of the overvoltage increase do not exceed a certain limit. With an increase in concn of org substances in soln, there is an increase of overvoltage and the range of potentials in which an effect on the H overvoltage is observed. The increase in overvoltage occurred only at these potentials whert the mols of the surface-active agents were adsorbed. The effect of the org substances investigated on the magnitude of overvoltage was detd by the reduction in the rate of H ion discharge.

263724

1. FRUMKIN, A. N., IOFA, Z. A., DAGOTSKAYA, V. S.

2. USSR (600)

4. Adsorption

7. N. I. Kobozev's adsorption theory of overvoltage. Zhur. fiz. khim. 26 no. 12, 1952.

9. Monthly List of Russian Accessions, Library of Congress, May 1953, Uncl.

IOFA, Z.A.; LYAKHOVETSKAYA, Ye.I.; SHARIFOV, K.

Effect of halogen ions on adsorption of organic cations at an iron surface.
C.R. Acad. Sci. U.R.S.S. '52, 84, 543-546. (MLRA 5:6)
(BA -AI Ap '53:337)

PA 247714

USSR/Chemistry - Corrosion

21 Sep 52

"The Mechanism of the Action of Inhibitors on Hydrogen Brittleness of Steel in Sulfuric Acid," Z. A. Iofa and E. I. Lyakhovetskaya, Moscow State U in M. V. Lomonosov

DAN SSSR, Vol 86, No 3, pp 577-580

Surface active agents and negative catalysts of the reaction of recombination of H atoms prevent the diffusion of hydrogen into steel wire and protect it from becoming brittle. Presented by Acad A. N. Frankin 15 Jul 52

247714

B.T.R.

Vol. 3, No. 4

Apr. 54

LOPA, Z. A.

Influence of Surface-Active Substances on the Volts of
Electrochemical Reactions and the Action of Inhibitors on the
Dissolution of Metals in Acids. Z. A. Lopa, E. P. Arshina,
and N. V. Nikolaeva (*Trudy Sverdlovskogo gos. universiteta*
1956, 1963, 294-306).—[in Russian]. A review of published
Russian work. 17 ref.—G. V. E. T.

IOFA, Z. A. Prof.

"Concerning the Mechanism of Action of Inhibitors of the Acid Corrosion of Iron and Concerning the Role of Halogen Ions in This Process," a paper given at the All-University Scientific Conference "Lomonosov Lectures", Vest. Mosk. Un., No.8, 1953.

Translation U-7895, 1 Mar 56

ICFH, Z

USSR .

Measurement of the adsorption of iodide ions on iron.
 Z. A. Iofa and G. B. Rozhdostvenskaya. *Doklady Akad. Nauk S.S.S.R.* 91, 1159-62(1953); cf. *C.A.* 44, 1833d, 9378c.—The adsorption of I⁻ on powdered Fe was detd. by use of a soln. of 1N H₂SO₄ + 0.001N KI that had been freed of O. Both radioactive isotopes and polarographic analysis were used. The adsorption increased with increase in the concn. of H₂SO₄. This explains the effect of KI on the H overvoltage on an Fe electrode reported earlier (loc. cit.). The adsorption varied from 1 to 4 × 10⁻⁴ g. at./sq. cm. which corresponds to a 50% filling of the surface.
 J. Rovtar Leach

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①

IOFA, Z.A.; ROZHDESTVENSKAYA, G.B.; FRUMKIN, A.N., akademik.

Measuring the adsorption of iodine ions on iron. Dokl. AN SSSR 91 no.5:1159-1162 Ag '53. (MLBA 6:8)

1. Akademiya nauk SSSR (for Frumkin).
(Adsorption) (Iodine) (Iron)

Iofa, Z. A.

USSR/Chemistry Physical chemistry

Card : 1/1

Authors : Iofa, Z. A.

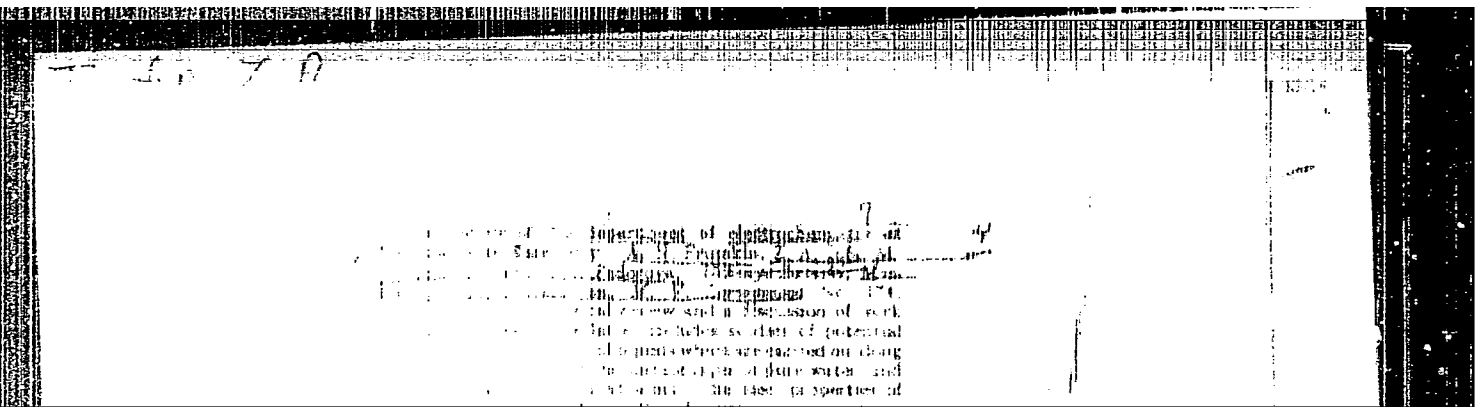
Title : About hydrogen supertension on mercury in alkaline solutions (Letter to editor)

Periodical : Zhur. fiz. khim. 28, Ed. 6, 1163 - 1165, June 1954

Abstract : The factors increasing or reducing the H-supertension on Hg in alkaline media (solutions), are explained. Various mathematical formulas, for the calculation of H-supertension in alkali solutions of different composition, are presented. Eight references: 6 USSR, 1 Czech, and 1 German. Graph.

Institution : The M. V. Lomonosov State University, Moscow

Submitted : November 28, 1953



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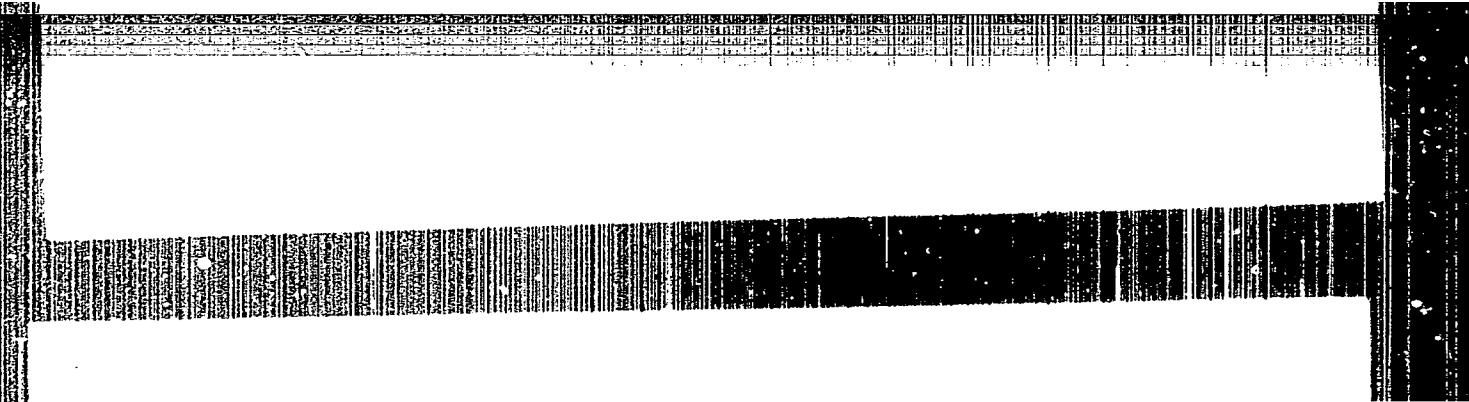
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TOEN, Z. H.

... of the nickel electrode. Equality ...
... of the potential ...

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SOV/137-59-3-7133

Translation from: Referativnyy zhurnal. Metallurgiya, 1959, Nr 3, p 314 (USSR)

AUTHOR: Iofa, Z. A.

TITLE: On the Mechanism of the Action of Surface-active Substances in Electrochemical Reactions and Corrosion Processes (O mekhanizme deystviya poverkhnostno-aktivnykh veshchestv na elektrokhimicheskiye reaktsii i korrozionnyye protsessy)

PERIODICAL: Sb. Kom-t po korrozii i zashchite metallov Vses. sov. nauchno-tekhn. o-v, 1957, Nr 2, pp 26-35

ABSTRACT: Adsorption of surface-active substances on a metal surface (S) with potentials differing from those of the zero charge depends on the sign and the magnitude of its charge. Organic cations are adsorbed on a positively charged S and cause the appearance of the positive ψ_1 potential. Electrochemical reactions are slowed down either by rendering the metal S "water repellent" or by introduction of large molecules and organic ions into the duplex layer, thus decreasing its field strength. The specific action of haloid ions is associated with their chemical sorption on the metal S and a consequent change in the sign of the charge. HS^- and SO_3^{2+} ions intensify the corrosion of Fe

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On the Mechanism of the Action of Surface-active Substances

and increase the protective action of cation inhibitors in acid solutions. The action of thiourea is also based on the formation of HS^- during the decomposition of the former in the solution. Bibliography: 19 references.

S. G.

Card 2/2

IOFA, Z.A., professor.

The fourth conference on electrochemistry. Vest.Mosk.un. 12 no.1:
202-205 '57. (MLRA 10:8)
(Moscow--Electrochemistry--Congresses)

IOFA, Z.A.

IOFA, Z.A.; FRUMKIN, A.N.; MAZNICHENKO, E.A.

Effect of the nature of cations on the rate of hydrogen
separation from alkaline solutions [with summary in English].
Zhur.fiz.khim. 31 no.9:2042-2051 S '57. (MIRA 11:1)

1. Moskovskiy gosudarstvennyy universitet im. M.V. Lomonosova.
(Cations) (Hydrogen) (Solution (Chemistry))

Iofa, Z.A.

76-10-10/34

AUTHORS: Iofa, Z.A., Besproskurnov, G.G.

TITLE: A Study of the Mechanism of the Atmospheric Corrosion of Iron in the Presence of Sulphur Dioxide as Aggressive Agent (Issledovaniye mekhanizma atmosferno korrozii zheleza v prisutstvii sernistogo gaza kak agressora)

PERIODICAL: Zhurnal Fizicheskoy Khimii, 1957, Vol. 31, Nr 10, pp. 2236-2244 (USSR)

ABSTRACT: The corrosion of iron in an atmosphere containing sulphur dioxide is investigated. It is shown that the initial velocity of the corrosion increases with the increase of concentration of sulphur dioxide in air. A decrease of humidity reduces the corrosion velocity and the corrosion stops practically at a relative humidity of less than 65 - 70 %. It is shown that after 25 - 30 hours the corrosion forms a rust layer in humid air which retards this process: the greater the concentration of the sulphur dioxide in air is, the thicker is the rust layer which is formed during this time. It is shown that the corrosion which began in a completely pure humid air is continued, however, with lower velocity. The rust analysis carried out by means

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A Study of the Mechanism of the Atmospheric Corrosion of Iron in the Presence of Sulphur Dioxide as Aggressive Agent

of the radioactive sulphur isotope showed that in an atmosphere without oxygen (hydrogen and nitrogen) the ratio of the equivalent of sulphur to iron in the rust approaches to 0,33 and almost does not change with the corrosion time. The ratio is reduced with the time in the presence of oxygen. Conclusions are drawn on the process in the case of a corrosion in the atmosphere in the presence of sulphur dioxide. The corrosion takes place according to the electrochemical process under the humidity layer at the surface of the iron. The sulphuric acid produced in the case of a dissolution of SO_2 in this layer (cover) is the oxidizing agent which depolarizes the cathode reaction and is restored up to the sulphide ions. Through the occurring negative ψ_1 -potential the sulphide ions also stimulate the anode reaction. The depolarization takes place in air by the oxygen of the cathode process and the oxidation of the bivalent iron to a trivalent one. Apparently the sulphide ions catalyze the last reaction. There are 7 figures, 4 tables, 16 Slavic references.

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I OFH, Z. H.

AUTHORS: Nikiforova, M. M., and Iofa, Z. A. 20-6-22/48

TITLE: Passivation and De-Passivation of a Lead Anode in Concentrated Perchloric-, Fluoboric- and Fluor-Silicic Acids (Passivatsiya i depassivatsiya svintsovogo anoda v kontsentrirrovannykh kremneftoristovodorodnoy, khlornoy i boreftoristovodorodnoy kislotakh).

PERIODICAL: Doklady AN SSSR, 1957, Vol. 115, Nr 6, pp. 1131-1134 (USSR.).

ABSTRACT: Investigations of the electrochemical system PbO_2 /acid/Pb with electrolytes from the acids described in the title and from silicon-fluor-hydracic were recently described in publications. Such elements act at low temperatures and in high discharge currents. The behavior of the lead anode and the conditions leading to its passivation in the mentioned acids were never thoroughly studied. In an acid of a given concentration and at constant temperature the lead anode remains active and little polarizes, provided that the anodic current density (i_a) does not exceed a certain critical value (i_{kr}) which is independent of a number of factors. Experiments showed that the period of time after whose expiration the anode is passivated (t_p) depends on the current-density chosen. This period of time is (in a t_p varying from some seconds to 1,5 hours) with a good approx-

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Passivation and De-Passivation of a Lead Anode in Concentrated Perchloric-, Fluoboric- and Fluor-Silicic Acids.

Passivation determined by the equation: $\lg t_p = A - B \lg i_a$ where A and B are constants. The decrease in temperature in all cases reduces the i_a - value at which the anode is within the same period of time passivated. In strong reductions of concentration of the acid this current density markedly increases. In H_2SiF_6 lead is most easily passivated. In $HClO_4$ and in HF lead is passivated at $t > -20^\circ C$ and at $i_a < 40 \text{ ma / cm}^2$. Figure 1 shows a typical variation curve of the potential in the course of time in anode-lead-passivations in 7,9 N H_2SiF_6 at $i_a = 40 \text{ ma / cm}^2$ and at $t = -10^\circ C$ without stirring. At first the potential suddenly increases due to the resistance of the salt-layer from PbO_2 , whereas the current decreases from 40 to 5 ma / cm^2 . Then the passage of current is made possible due to the PbO_2 -formation in the pores, since this salt possesses a good electric conductivity. Therefore the potential decreases and the current again increases to its initial value. The passivating PbO_2 -layer, however, soon spreads over the entire surface of the

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