PREVO, A.A., kand. biolog. nauk; STOLYAROV, K.D.; KAKORIN, I.S.

Let's establish large turkey farms in the Northern Caucasus. Ptitsevodstvo 9 no.6:36-38 Je '59. (MIRA 12:10)

1.TSentral'nyy nauchno-issledovatel'skiy institut ptitsepererabatyvayushchey promyshlennosti (for Prevo). 2.Direktor Krasnodarskogo tresta ovoshchnykh i ptitsevodcheskikh sovkhozov (for Stolyarov). 3.Starshiy zootekhnik Krasnodarskogo tresta ovoshchnykh i ptitsevodcheskikh sovkhozov (for Kakorin).

(Caucasus, Northern--Turkeys)

KAKORINA, A. N.

32777. Ukhod za filatovskim steblem. Med. Sestra, 1949, No. 10, s. 9-12

SO: Letopis' Zhurnal'nykh Statey, Vol. 44, Moskva, 1949

MALININ, V.; BUDANTSEV, A., naladchik; SINEL'NIKOV, V.; KAUSTOV, V.;
KAKORINA, N.; SILIN, A.; SOKOL'SKIY, A.; LOBOV, V.;
KORTADZE, N.; SEMENOV, A.; ADAMOV, B.

Tribune of the "Communist Youth League Searchlight" movement. Tekh.mol. 30 no.9:2,3,14,15,16 '62. (MIRA 15:9)

1. Sekretar' Tul'skogo oblastnogo komiteta Vsesoyuznogo Leninskogo kommunisticheskogo soyuza molodezhi (for Malinin). 2. Mekhanicheskiy tsekh Tul'skogo oruzheynogo zavoda (for Budantsev). 3. Sekretar' Khar'kovskogo oblastnogo komiteta Leninskogo kommunisticheskogo soyuza molodezhi Ukrainy (for Sinel'nikov). 4. Sekretar' komiteta kommunisticheskogo soyuza molodezhi Khar'kovskogo traktornogo zavoda (for Khaustov). 5. Sborochnyy tsekh zavoda priborov imeni Yu.Gagarina g. Orel (for Kakorina). 6. KZTZ (for Silin). 7. Zamestitel' sekretarya komsomol'skoy organizatsii Rostovskogo zavoda sel'skokhozyaystvennogo mashinostroyeniya (for Lobov). 8. Sekretar' komiteta Kommunisticheskogo soyuza molodezhi shokhty No.1 tresta "Tkvarcheliugol'" (for Kortadze). 9. Sekretar' komiteta Kommunisticheskogo soyuza molodezhi sela Kalinovki (for Semenov). 10. 3-iy mekhanicheskiy tsekh Gor'kovskogo zavoda frezernykh stankov (for Adamov).

(Communist Youth League) (Efficiency, Industrial)

KAKOSIMIDI, N.F.

Calculating plastic deformations of the subgrade in designing foundation strips. Osn., fund.i mech.grun. 3 no.2:17-20 '61. (MIRA 14:5)

(Foundations)

KAKOSIMIDI, N.F. (Odessa)

Determining the reactive pressure under a circular plate on a solid creeping foundation bed. Osn., fund. i mekh. grun. 7 no.5:9-12 '65. (MIRA 18:10)

10.7300
11.2313
24.4200

34374
S/207/62/000/001/015/018
B104/B108

AUTHORS: Kakosimidi, N. F., Prokopovich, I. Ye. (Odessa)

TITLE: Solution of the contact problem in creep theory with linear stress-strain dependence

PERIODICAL: Zhurnal prikladnoy mekhaniki i tekhnicheskoy fiziki, no. 1, 1962, 102 - 108

TEXT: The plane contact problem in the theory of creep with linear stress-strain dependence has been solved by I. Ye. Prokopovich (PMM, 1956, v. 20, no. 6). In the present work the solution is extended to the 3-dimensional problem. Formulae are derived which take creep and ageing into account by means of functions which are introduced into the solution of the elastic problem. These functions are not dependent on the geometry of the contact surfaces. In solving the problem it is presumed that the coefficient of lateral dilatation $\nu^*(t,\tau)$ in creep deformation is equal to that coefficient $\nu(t)$ in elastic deformation, not depending on time. Linear stress-strain dependence under such conditions means that the elastic stresses produced by surface forces are equal to the elastic

Card 1/2

S/207/62/000/001/015/018
Solution of the contact problem... B104/B108

stresses which were calculated taking creep into account. Experimental and theoretical investigations show that the assumption $\nu^*(t,\tau) = \nu(t) = \nu =$ const leads in the determination of the stresses, e. g., in concrete construction to errors of not over 5%, which is within the tolerance of engineering. For ordinary concrete $\nu = 1/6$, $0 < \nu^* \ll 1/6$. Mention is made of I. Ya Shtayerman (Kontaktnaya zadacha teorii uprugosti. Gostekhizdat, M.-L., 1949). The authors thank M. G. Kreyn for his advice. There are 4 figures and 8 references: 7 Soviet and 1 non-Soviet. The reference to the English-language publication reads as follows: Lee E. H., Radok J. R. M. Stress analysis in linearly visco-elastic materials. Actes. IX Congr. internat. mecan. appl. T. 5. Bruxelles, Univ. Bruxelles, 1957.

SUBMITTED: April 24, 1961

Card 2/2

KAKOSTIKOV, P.F., (Leningrad, P-22, ul. L.Tolstogo, d.17, komn.141)

Aleksandr Aleksandrovich Kad'ian; 40th anniversary of his death.
Vest.khir. 80 no.5:132-137 My '58 (MIRA 11:7)

1. Iz gospital'noy khirurgicheskoy kliniki (zav. - prof. F.G. Uglov)
1-go Leningradskogo meditsinskogo instituta im. I.P. Pavlova).
(KAD'IAN, ALEKSANDR ALEKSANDEROVICH, 1849-1917)

DOBROVITS, Aladar; KAKOSY, Laszlo

Can Nubia's historical monuments be preserved? Elet tud 16 no.15:464-467 9 Ap '61.

KAKOSY, Laszlo, dr., kandidatus, egyetemi adjunktus

How did Alexander the Great become a god in Egypt?
Elet tud 18 no.7:208-211 17 F '63.

SCHEIBER, Eszter; KAKOSY, Tibor; GLAZ, Ervin

Effect of antigungoid drugs on the yeast cells in the intestines of mice. Biol orv kozl MTA 11 no.4:477-483 '60. (EEAI 10:5)

1. Budapesti Orvostudomanyi Egyetem Gyogyszertani Intezete.
(INTESTINES)
(FUNGI)
(ANTIBIOTICS)

SCHEIBER, Esther; KAKOSY, T.; GLAZ, E.T.

Effect of antifungal agents on the faecal yeast flora of mice.
Acta microb. hung. 8 no.2:173-179 '61.

1. Pharmacological Institute, University Medical School, Budapest.
(YEASTS pharmacology) (FUNGICIDES pharmacology)
(FECES microbiology)

KAKOVANU, A.

Production councils as an important factor in the organization of enterprises. p. 662.
(Tehnika, Vol. 12, no. 4, 1957. Beograd, Yugoslavia)

SO: Monthly List of East European Accessions. (EEAL) LC. Vol. 6, No. 7,
July 1957. Uncl.

KAKOVKIN, A. A.

"Certain Characteristics of Tomato Fruit Bearing Under the Conditions Which Exist in the Low Land Area of Dagestan." Cand Agr Sci, Moscow Order of Lenin Agricultural Inst imeni K. A. Timiryazev, Moscow, 1954. (KL, No 1, Jan 55)

Survey of Scientific and Technical Dissertations Defended at USSR Higher Educational Institutions (13)
SO: Sum. No. 598, 29 Jul 55

ACC NR: AP6030629 (A,N) SOURCE CODE: UR/0413/66/000/016/0125/0125

INVENTOR: Kakovina, V. G.; Gorbacheva, V. V.; Levina, V. K.

32

ORG: none

6

TITLE: A method of removing scale from the surface of titanium or its alloys. Class 48, No. 185163/[announced by the Progress Plant (Zavod "Progress")]

SOURCE: Izobreteniya, promyshlennyye obraztsy, tovarnyye znaki, no. 16, 1966, 125

TOPIC TAGS: titanium, titanium alloy, titanium electrochemical pickling, titanium alloy electrochemical pickling

ABSTRACT: This Author Certificate introduces a method for removing scale from the surface of titanium or its alloys by electrolytic pickling in acid solutions containing sodium fluoride. To improve the surface quality, pickling is done in an electrolyte containing (g/l) 400—500 orthophosphoric acid, 30—40 nitric acid, 40—60 sodium fluoride or 180—200 sulphuric acid, 45—50 sodium fluoride, with an initial anodic current density of 1.0—5 a/dm^2, at a temperature of 40—50C for removing scale which was formed below 700C, or at 70—80C for removing scale which was formed above 700C. [WW]

SUB CODE: 11/ SUBM DATE: 01Mar65/ ATD PRESS: 5075

Card 1/1 mT UDC: 621.357.8.:669.295

MARCHENKO, N.A.; KAKOVKINA, V.G.; LIPKO, S.K.

Removal of chromium coatings from aluminium parts. Izv.vys. ucheb.zav; khim.i khim.tekh. 4 no.5:871-872 '61. (MIRA 14:11)

1. Khar'kovskiy politekhnicheskiy institut imeni V.I. Lenina, kafedra tekhnologii elektrokhimicheskikh proizvodstv.
(Aluminum alloys) (Chromium--Plating)

34973

S/080/62/035/002/013/022
D244/D302

18.1210(2408)

AUTHORS: Marchenko, N. A., Kakovkina, V. G. and Linko, S. K.

TITLE: Anodizing of aluminum alloys as a method of preparation before electro-plating

PERIODICAL: Zhurnal prikladnoy khimii, v. 35, no. 2, 1962, 338-341

TEXT: The authors present results of an investigation into the anodic behavior of complex shaped aluminum castings АЛ2 (AL2), АЛ9 (AL9), АЛ4 (AL4) and large machine component mouldings АЛ5 (AL5) and АЛ10В (AL10V) in standard chromium-plating electrolytes. After the anodizing treatment, the chrome-plating takes place to a thickness of 100 - 150 μ to increase the wear-resistance. Alloy AL10V was studied in greater detail. Its structure is characterized by the presence of cuprous components ($CuAl_2$) and silicon in the general background of solid solution. The kinetics of formation of an oxide film were investigated by weighing the specimens. In the case of alloy AL10V a loss of weight was observed and was explained

Card 1/3 Khar'kovskiy politekhnicheskiy institut im. V. I. Lenina

S/080/62/035/002/013/022
D244/D302

Anodizing of aluminum ...

by the solution of impurities contained in the specimen surface. At the same time the oxide film thickens as could be seen from the increase in the bath-voltage. The anodizing treatment is praceded by digestion in an alkaline solution followed by electro-polishing in the micture of acids (HNO_3 + HF). During the digestion, silicon present on the surface dissolves with the formation of silicic acid. During the electro-polishing cuprous compounds dissolve and silicon shows almost no change. After the anodic polarization the cuprous components ($CuAl_2$) are completely removed. To reveal the active parts of the surface short processes of chrome- and copper-plating were conducted. In the first stage of the process chromium deposit formed in the pores and places from which impurities were removed during the alkaline digestion. When the chromium-plating was carried out on the surfaces not previously anodized then a chromium film was deposited over all the surface. Analogous results were obtained for copper-plating. Good adhesion of the chromium film was obtained for the anodizing treatment with current density of 10 - 15 A/dm^2 and process duration of 1 - 3 minutes. Good adhe-

Card 2/3

L 43037-66 EWT(m)/EWP(t)/ETI IJP(c) JD/HW/WB

ACC NR: AR6014367 SOURCE CODE: UR/0137/65/000/011/G030/G030

AUTHORS: Kuznetsov, V. K.; Mel'nikova, L. P.; Kakovkina, V. G.; Paneva, L. S.

43
B

TITLE: Electrolytic deposition of zinc-nickel alloy

SOURCE: Ref. zh. Metallurgiya, Abs. 11G217

REF SOURCE: Sb. Zashchita met. ot korrozii. Kuybyshev, 1965, 47-52

TOPIC TAGS: zinc containing alloy, nickel containing alloy, electrolytic deposition

ABSTRACT: To obtain clear, bright depositions of Zn-Ni alloy with an Ni content of up to 2% the following electrolyte composition is recommended (in g/liter): Zn 32--42, Ni 0.75--0.196, NaCN 84--94, NaOH 71--82; temperature of electrolyte 18--25C; D = 2--3 amp/dm^2. Data on corrosion experiments have shown that the corrosion stability of Zn-Ni alloy is not lower and, in a number of cases, is higher than the corrosion stability of Zn. G. Svodtseva /Translation of abstract/

SUB CODE: 11

Card 1/1 UDC: 669.5'14.018.9

KAKOVSKAYA, K. V.

AID P - 2287

Subject : USSR/Chemistry

Card 1/1 Pub. 152 - 13/21

Authors : Kuznetsov, S. I., O. V. Serebrennikova, and K. V. Kakovskaya

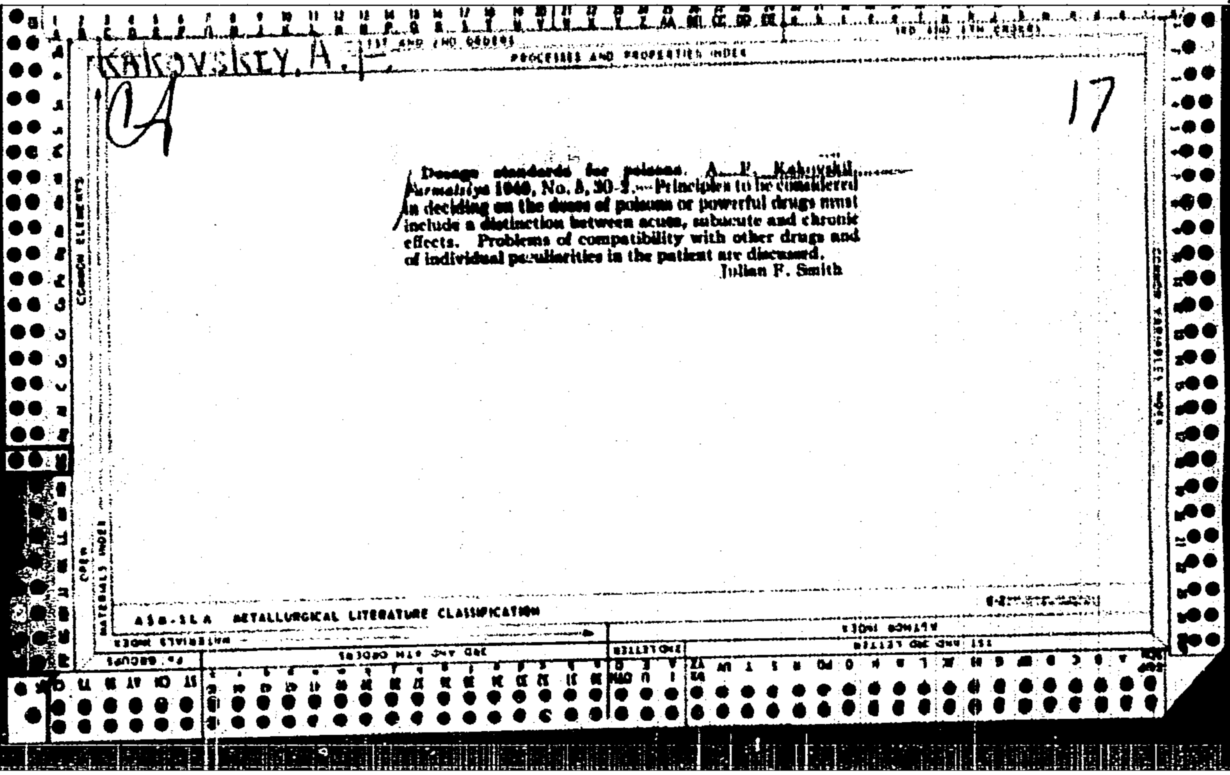
Title : Interaction of bauxite and kaolin with calcium hydroxide

Periodical: Zhur. prikl. khim., 28, no.3, 317-319, 1955

Abstract : Preliminary calcination of bauxite and kaolin increases the yield of alumina. However, calcination and use of large quantities of $Ca(OH)_2$ make the cost prohibitive for industrial use. Five references (1 Russian: 1936)

Institution: Ural Polytechnic Institute (im. S. M. Kirov)

Submitted : 0 12, 1953



KAKOVSKIY, A. P.

CA

17

Dosage standards for poisons. A. P. Kakovskii. armatsiya 1940, No. 5, 30-2.—Principles to be considered in deciding on the doses of poisons or powerful drugs must include a distinction between acute, subacute and chronic effects. Problems of compatibility with other drugs and of individual peculiarities in the patient are discussed.

Julian F. Smith

KAKOVSKIY, A. F.

CA

17

1ST AND 2ND ORDERS

PROCESSES AND PROPERTIES INDEX

3RD AND 4TH ORDERS

Drug nomenclature. A. F. Kakovskii. *Farmatsiya* 8, No. 3, 43-4(1945).—Use of chemically descriptive names for synthetic drugs is urged instead of such names as diuretin, aspirin, urotropin, sulfidine, streptocide, and the like. Names indicating a chem. type, such as alkaloid names ending in *-ine*, are often acceptable substitutes for long chem. names.

Julian F. Smith

COMMON ELEMENTS

MATERIALS INDEX

ASM-SLA METALLURGICAL LITERATURE CLASSIFICATION

KAKOVSKIY, A. F.

Kakovskiy, A. F. "On the history of the pharmacopeia", Vracheb. delo, 1948, No. 12, paragraphs 1109-10.

SO: U-3042, 11 March 1953, (letopis 'nykh Statey, No. 10, 1949).

~~KAZOVKIY, A. F.~~ KAKOVSKIY, A. F.

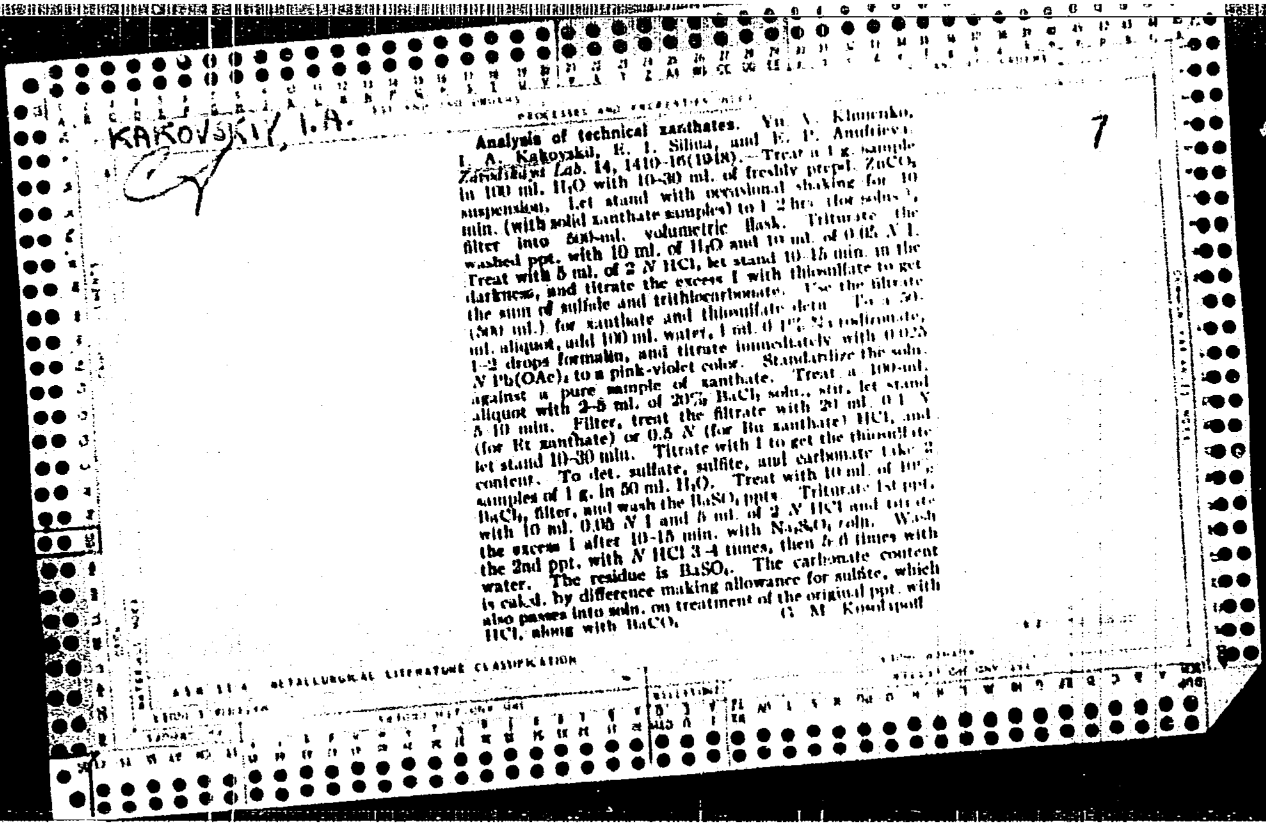
22006 KAKOVSKIY, A. F. Starinnyye nazvaniya lekarstv. Vracheb. delo, 1949, No. 7, stb. 641-42.

SO: Letopis' Zhurnal'nykh Statey, No. 29, Moskva, 1949.

KOLESNIK, R.S.; KHUNDANOV, L.Ye.; KAKOUROV, A.P.

Pathomorphological changes in the organs of horses used to produce anticholera serum which have positive reactions to brucellosis. Izv.Irk.gos.nauch.-issl.protivochum.inst. 14: 154-164 '57. (MIRA 13:7)

(HORSES) (SERUM) (BRUCELLOSIS)



KAKOVSKIY, I.A.

7

PROCESSES AND PROPERTIES INDEX

Analysis of technical xanthates. Yu. A. Klimenko, I. A. Kakovskii, E. I. Silina, and E. P. Andrieva. *Zavodskaya Lab.* 14, 1410-16(1948).—Treat a 1 g. sample in 100 ml. H_2O with 10-30 ml. of freshly prepd. $ZnCO_3$ suspension. Let stand with occasional shaking for 10 min. (with solid xanthate samples) to 1-2 hrs. (for solns.), filter into 500-ml. volumetric flask. Titrate the washed ppt. with 10 ml. of H_2O and 10 ml. of 0.05 *N* I. Treat with 5 ml. of 2 *N* HCl, let stand 10-15 min. in the darkness, and titrate the excess I with thiosulfate to get the sum of sulfide and trithiocarbonate. Use the filtrate (500 ml.) for xanthate and thiosulfate detn. To a 50-ml. aliquot, add 100 ml. water, 1 ml. 0.1% Na rhodizonate, 1-2 drops formalin, and titrate immediately with 0.025 *N* $Pb(OAc)_2$ to a pink-violet color. Standardize the soln. against a pure sample of xanthate. Treat a 100-ml. aliquot with 2-5 ml. of 20% $BaCl_2$ soln., stir, let stand 5-10 min. Filter, treat the filtrate with 20 ml. 0.1 *N* (for Bu xanthate) or 0.5 *N* (for Et xanthate) HCl, and let stand 10-30 min. Titrate with I to get the thiosulfate content. To det. sulfate, sulfite, and carbonate take 2 samples of 1 g. in 50 ml. H_2O. Treat with 10 ml. of 10% $BaCl_2$, filter, and wash the $BaSO_4$ ppts. Triturate 1st ppt. with 10 ml. 0.05 *N* I and 5 ml. of 2 *N* HCl and titrate the excess I after 10-15 min. with $Na_2S_2O_3$ soln. Wash the 2nd ppt. with *N* HCl 3-4 times, then 5-6 times with water. The residue is $BaSO_4$. The carbonate content is calcd. by difference making allowance for sulfite, which also passes into soln. on treatment of the original ppt. with HCl, along with $BaCO_3$. G. M. Kosolapoff

METALLURGICAL LITERATURE CLASSIFICATION

KAKOVSKIY, I.A.

CA

7

Determination of heavy metal sulfates in sulfide ores. I. A. Kakovskii and M. N. Fedorova (Ural Polytech. Inst.). *Zavodskaya Lab.* **16**, 414-17(1950).—Use of diethyl dithiophosphate as the precipitant of Cu eliminates the interference caused by ZnS, metallic Fe, metal oxides, and carbonates in the conventional extn. of $CuSO_4$ with aq. solns. followed by the detn. of Cu and SO_4. The sample is shaken with 100 to 200 ml. H_2O contg. 0.1-0.2 g. sodium diethyl dithiophosphate, the mixt. is extd. with 15-20 ml. C_6H_6, the whole is filtered, and Cu is detd. from the org. layer, Zn from the aq. layer. Detn. of 0.01% Cu is possible. G. M. Kosolapoff

KAKOVSKY, I. A.

Physico-chemical constants characterising the formation and composition of the lowest cuprous cyanide complex. M.G. Vladimirova and I.A. Kakovsky (J.appl: Chem. USSR, 1950, 23, 580-598) - The elucidation of the composition and the conditions of formation of cyanide complexes at concn.similar to those used in the cyanide treatment of the ores of noble metals is attempted. The measurements have therefore been made at concn.of 10-' - 10^{7} g.-ion per l.,i.e. much lower than in experiments described hitherto in the literature. The standard free-energy changes have been calculated for the following reactions:(i) Cu+(CN) = CuCN,(ii) CuCN (CN)$_2'$ = (iii) Cu+(CN)$_2'$ (CN) = Cu(CN)" , (iv) Cu(CN)$_3$+(CN) = Cu(CN)" ΔG val. at 25° for these reactions are -26609,-5769, -2301, and -61 g.-cal.per g.-mol. The equilibrium constant for the reaction:CuCN HCN = Cu(CN)'+ H has been determined by (a) measuring the concn. of H bydirect titration, (b) preliminary titration with introduction of a known quantity of HCl or H_2SO_4 (c) potentiometric measurements All methods giveessentially the same value for K_{298} = (H)(Cu(CN)$_2$ $f_a^{\#}$/(HCN) = 1.22×10^{-5}. The identical results obtained in (a), (b) and (c) provide proof that Cu(CN)$_2$ is the only complex present in analytically measurable quantities. By dissolution of CuCN or CuCNS in HCN at concn. up to 3g.-mol. per l.,no other complex ions are formed except Cu(CN)$_2'$ For the reaction: CuCNS 2HCN = Cu(CN)$_2$ CNS 2H, K_{298} = 1.31×10^{-9}. So by the interaction between the weak acid HCN and sparingly sol. CuCN or CuCNS a strong acid HCu(CN)$_2$ is formed. The conductivity measurements forHCN and HCu(CN)$_2$ are also reported. The value of 389 for the equiv. conductance of HCu(CN)$_2$ at infinite dilution is close to that for HCl. Hence the mobility(l) of the Cu(CN)$_2$ = 39.2 and its transference no, T, = 0.10. The dissociation const. of Cu(CN)$_2'$ was determined

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by potentiometric measurements with (i) a Cu electrode (1.8×10^{-24}) ;(ii) an analgam electrode containing 0.373% of Cu (1.6×10^{-24}); (iii) as (ii) with 0.138% or Cu(2.4×10^{-24}). The mean value of 1.9×10^{-24} is in agreement with that calculated thermodynamically from the reaction between CuCNS and HCN. The order of the solubility product of CuCNS has been determined by potentiometric measurements to be 10^{-15}. and has been calculated from the above dissociation constant to be 4.8×10^{-15}. Similarly the solubility product of CuCN has been calculated to be $L_p = (Cu)(CN) = 3.2 \times 10^{-20}$. Finally, from the known dissociation constants, the free energy of formation of $Cu(CN)_2$ from Cu and 2CN has been calculated to be 58399 g. -cal.per g.-mol. at 298 k.

J. B. J. Zaba

"Card 2 of 2"

KAKOVSKIY, I.A.

1441. The determination of gold in cyanide solutions by precipitation with sodium sulphide and mercaptobenzothiazole. K. A. Karasev, I. A. Kakovskii and M. Golovin. Report of Symposium Sovrem. Metody Anal. Metall., M. Metallurgizdat 1955 214-218 Ref. Zhur. Khim. [illegible]

1 to 2% by wt. Heat the soln. [illegible] and allow to cool slowly. To the cold soln. add slowly and with stirring 0·2 to 0·3 g of the sodium salt of mercaptobenzothiazole as an aq. soln. (to improve the filtration of the ppt.). Filter, and without washing the ppt. dry it on a glazed plate. Mix with 30 g of assay lead, cupel and weigh. The method gives more accurate results than pptn. by zinc dust in the analysis of dirty and weak cyanide soln. (0·04 to 2·1 mg of Au in 600 ml).

C. D. Kopsin

Kakovskiy, I. A.

USSR/Physical Chemistry - Surface Phenomena. Adsorption. Chromatography. Ion Exchange, B-13

Abst Journal: Referat Zhur - Khimiya, No 1, 1957, 581

Author: Kakovskiy, I. A.

Institution: Mining Institute of the Academy of Sciences USSR

Title: Investigation of the Physicochemical Properties of Some Organic Flotation Reagents and Their Salts with the Ions of Heavy Nonferrous Metals

Original Periodical: Tr. In-ta gorn. dela AN SSSR, 1956, Vol 3, 255-289

Abstract: A discussion is given of some of the physicochemical and thermodynamic properties of sulfur-containing flotation reagents and of their salts which are of importance in the flotation process. A considerable part of the material presented in the article has been published earlier (Dissertation, Sverdlovsk, 1949; Symposium on the Action of Gases and Reagents in the Flotation Process, Izd.-vo AN SSSR, 1950, page 113; Transactions of the Second Session on Industrial Chemistry of the "Mekhanobr" Institute, Metallurgizdat, 1952, page 293).

Card 1/1

SOV/137-57-11-20800

An Intensive Stirring Reactor to Produce Dry Xanthates

industrial R for ~ 500 kg of finished product to obtain a more precise design for a large equipment and to shed light upon a number of economic indices.

M.L.

Card 2/2

KAKOVSKIY, I.A.

Speed of flotation. TSvet.met.29 no.12:7-20 D '56. (MLRA 10:2)

1. Ural'skiy politekhnicheskiy institut.
(Flotation)

137-58-6-11322

Translation from: Referativnyy zhurnal, Metallurgiya, 1958, Nr 6, p 9 (USSR)

AUTHORS: Kakovskiy, I.A., Nagirnyak, F.I., Vershinin, Ye.A.

TITLE: A Comparative Technological Evaluation of the Collecting Properties of Dithiophosphates and Xanthogenates on Flotation in Acid Media (Sravnitel'naya tekhnologicheskaya otsenka sobiratel'nykh svoystv ditiofosfatov i ksantogenatov pri flotatsii v kisloy srede)

PERIODICAL: V sb.: Usloviya raskrytiya i razdeleniya mineralov rud tsvetn. met. Sverdlovsk, 1957, pp 68-90

ABSTRACT: Theoretical data descriptive of the technological properties of collectors and the conditions for their use form the basis of a hypothesis to the effect that on flotation in a weakly acid medium a definite possibility exists of obtaining greater efficiency by employing collectors with shorter hydrocarbon chains, and that consumption thereof would be lower than that in basic mediums and also lower than that of collectors with longer hydrocarbon chains. In other words, the weaker the collector, the more efficient will be its action in a weakly acid medium. The object of the given study is to seek experimental confirmation for this

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137-58-6-11322

A Comparative Technological (cont.)

theoretical proposition and to justify the necessity of the practical employment of weak and selective collectors in the flotation of hard-to-concentrate complex pyrite ores in weakly acid mediums. The question of the advantage of flotation of refractory ores in acid mediums is also posed. The following collectors are investigated: ethyl and butyl frothers, ethyl and butyl xanthogenates, the quantities employed being 5-45 g/t ore. The Cu-Zn ore of the Degtyar deposit is investigated. In all experiments, the quality of the concentrates derived was higher when weaker collectors were employed. This is emphasized by their superior selective properties and higher efficiency, which is confirmed by the higher percentage of recovery attainable in weakly-acid medium with small consumptions of the weak collector. Thus, weak collectors with an increased number of radicals in the molecule are recommended. The superiority of dithiophosphates as collectors for flotation in weakly acid mediums is demonstrated.

A.Sh.

1. Ores--Flotation 2. Dithiophosphates--Effectiveness 3. Xanthogenates --Effectiveness

Card 2/2

KAKOVSKIY, I. A.

137-1957-12-23029

Translation from: Referativnyy zhurnal, Metallurgiya, 1957, Nr 12, p 23 (USSR)

AUTHOR: Kakovskiy, I. A.

TITLE: On the Nature of the Interaction Between Disulfides and the Surface of Metals (Preliminary Report) [O kharaktere vzaimodeystviya disul'fidov s poverkhnost'yu metallov (Predvaritel'noye soobshcheniye)]

PERIODICAL: Obogashcheniye rud, 1957, Nr 1, pp 6-9

ABSTRACT: Disulfides (D) that is, the oxidation products of certain anion sulfhydryl collectors, are frequently employed as collectors in the processes of concentration by flotation of ores containing native metals. A study of dithiophosphates and xanthogenates was conducted. In particular, the reversible reaction: $2(RO)_2PSS' + I'_3 = (RO)_2RSSSSP(OR)_2 + 3I'$ was studied. The experiments consisted in the titration of dithiophosphate solutions of various concentrations against a titrated solution of iodine until a permanent coloration appeared of the starch in the presence of a variable concentration of KI in the solution. On the strength of the experimental data the computation of the interactive reactions

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137-1957-12-23029

On the Nature of the Interaction Between Disulfides (cont.)

between D and metals was made, using diethyldithiophosphatedisulfide and Cu as an example. The progress of the reaction of the D with powdered Cu was verified experimentally. Thus it was shown, experimentally and by means of thermodynamic calculations, that during the flotation of metals the D's are fixed on their surface and form xanthogenates of these metals. The excessive D consolidates on the surface making it highly hydrophobic. D does not react with the surroundings, nor with the oxidizers present in the pulp nor with ions of heavy metals which tend to increase the consumption of the anion collectors. The presence of non-oxidized xanthogenate in D is not mandatory.

A. Sh.

1. Metallurgy-USSR 2. Ores-Flotation 3. Dithiophosphates-Applications 4. Xanthogenates-Applications

Card 2/2

Affiliation — Ural'skiy politekhnicheskiy institut.

KAKOVSKIY, I.A., GOLOVIN, A.A., KARASEV, K.A., SOKOLOVA, D.D.

Methods of treating oxidized gold ores containing selenium. Obog. rud 2 no. 6:31-34 '57. (MIRA 11:8)

(Gold ores)
(Ore dressing)
(Selenium)

AUTHOR: Kakovskiy, I.A. (Sverdlovsk). 24-7-5/28

TITLE: On the theory of the hydro-metallurgy of precious metals. (K teorii gidrometallurgii blagorodnykh metallov).

PERIODICAL: "Izvestiya Akademii Nauk, Otdeleniye Tekhnicheskikh Nauk" (Bulletin of the Ac.Sc., Technical Sciences Section), 1957, No.7, pp.29-34 (U.S.S.R.)

ABSTRACT: A characteristic feature is that dissolution of gold is still effected by processes which are 100 to 200 years old and that during the last century no new methods have been proposed for that purpose. In this paper the theoretical fundamentals of dissolution of gold are considered. In 1941 I.N. Plaksin and M.A. Kozhukhova (10) proposed the use of thiourea for dissolving gold. Plaksin (11) also pointed out the possibility of using thiosulphate as a solvent for gold. In 1953 information was published (12) on autoclave ammonia lixivation of sulphide concentrates accompanied by the formation in the solution of considerable quantities of thiosulphate and, as a result of this, the idea cropped up of the possibility of utilisation of the complex forming properties of this reagent for the purpose of extracting gold and silver from these concentrates. Therefore, in the laboratory of the author work was started on

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On the theory of the hydro-metallurgy of precious metals. (Cont.)

24-7-5/28

the thermodynamic investigation of this process. In the meantime Sobol', S.I. et alii (13) published detailed results on the behaviour of gold and silver during the process of autoclave ammonia lixivation. These authors, as well as Sidgwick, N.V. (15), established full passage of the gold into the solution even in concentrates from which gold could not be extracted by cyaniding. These authors mention that data on physico-chemical constants for gold compounds are almost completely absent in literature and, therefore, in this article some thermodynamic calculations are given relating to reactions which take place during autoclave lixivation. On the basis of these it is concluded that gold as well as silver are present in the solutions in the form of anion thiosulphate complexes which can be confirmed spectrometrically and is in agreement with the results of the here given thermodynamic calculations. However, it is necessary to bear in mind that after long duration heating and oxidation of the thiosulphate a decomposition of the complexes may take place and this problem has to be additionally studied.

2/3. The calculations were carried out for the temperature of 25 C but this has almost no bearing at all on the arrived at

Distr: 4E4j/4E2c
27

Reaction between disulfides and the surfaces of metals. I. A. Kakovskii (Polytech. Inst., Ural, U.S.S.R.). *Rev. chim.* (Bucharest) 8, 499-502(1957). — The reactions under consideration are of importance during the flotation of Cu, Ag, Au, and Hg, where dixanthogenates, thiuram disulfides, e.g. $(Et_2NCSS)_2$, are used as flotation agents. It is shown how one may follow the reaction $2RS^- - 2e \rightleftharpoons (RS)_2$ by aid of the potentiometric method and by aid of the iodometric method with starch as indicator. Several numerical examples are given. 19 references. Werner Jacobson

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2

KAKOVSKIY I. A.

24-11-5/31

AUTHORS: Kakovskiy, I. A. and Smirnov, N. S. (Sverdlovsk)

TITLE: On the solubility of iron in molten tin. (O rastvorimosti zheleza v rasplavlennom olove).

PERIODICAL: Izvestiya Akademii Nauk SSSR, Otdeleniye Tekhnicheskikh Nauk, 1957, No.11, pp.44-51 (USSR)

ABSTRACT: The solubility was studied of iron in molten tin in the range of existence of $FeSn_2$, at the temperature range of tinning, which is 250 to 480 °C. Formulae are derived for calculating the solubility of iron in the molten tin at these temperatures and the behaviour is explained of metallides in a molten metal, which is one of the components of metallide. According to available data, it can be assumed that the solubility of iron and tin is very limited and the iron usually detected in tin consists fundamentally of suspended $FeSn_2$ crystals. Experimental results on the solubility of the system iron-tin, as well as of other analogous systems, have so far not been theoretically evaluated. This is due to the fact that the considered system, as well as similar systems, represent a particular case of metallic solutions which cannot be considered as an ideal nor as a regular solution. The authors believe that interpretation of experimental data in such systems

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was unsuccessful mainly due to valency electrons, i.e. due to the formation of a new phase, a metallide and $FeSn_2$ in this particular case. The considerable divergence in the values of the solubility of iron in molten tin, calculated according to various equations, imposes the necessity of obtaining more accurate experimental data in the range for which these equations are not sufficiently reliable. For determining the limit solubility of iron and tin at the range of tinning temperatures, a method was utilised which was applied in the paper by V. I.Danilov for studying the influence of the mechanical admixtures to the tin on the degree of super-cooling, namely, filtering of the molten tin through porous quartz plates. A sketch of the test set-up is shown in Fig.2, p.46. The results of determining the iron contents in the tin specimens before filtering q_1 and after filtering q_2 through a quartz filter at the temperature 480°C and also the iron contents q in the tin after filtering at various temperatures are given. These show that the real solubility of the iron in the tin corresponds more closely to the value calculated according to Eq.(1):

137-1958-3-4530

KAKOVSKIY, I. A.

Translation from: Referativnyy zhurnal, Metallurgiya, 1958, Nr 3, p 8 (USSR)

AUTHORS: Kakovskiy, I. A., Silina, Ye. I.

TITLE: Substitutes for Cresyl Aerofloats (Zameniteli krezilovykh aeroflotov)

PERIODICAL: Byul. tsvetn. metallurgii, 1957, Nr 14, pp 9-15

ABSTRACT: On the basis of a comparative qualitative evaluation of the chemical activity of aromatic (highly poisonous) and aliphatic (considerably less poisonous) dithiophosphates (D), which demonstrated the similarity in the chemical activity of cresyl and of the higher alcoholic D's, the kinetic properties of D's were studied and it was established that cresyl D's may be replaced by higher, alcoholic (butyl or isoamyl) D's. Isoamyl D exhibits somewhat greater collective and frothing properties than cresyl D. The prevalence of frothing or collecting properties is a function of the grade of industrial D present, i.e., of the amount of free isoamyl alcohol. Industrial butyl and isoamyl D's may be employed as frothers in any flotation process at their corresponding grade designations instead of those of the cresyl D's. However, the employment of a frother in the role of a collector

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137-1958-3-4530

Substitutes for Cresyl Aerofloats

may be advised only in those instances when, owing to the technological regimen, small amounts (5-20 g/t) of high grade (25, 31) collectors are required. They are best used in the form of a dry salt in conjunction with alcohol. A. Sh.

Card 2/2

KAKOVSKIY, I. A.

136-7-9/22

AUTHOR: Kakovskiy, I.A.

TITLE: Theoretical foundations of the xanthate method of precipitating cobalt from solutions. (Teoreticheskiye osnovy ksantogenatnogo metoda osazhdeniya kobal'ta iz rastvorov).

PERIODICAL: "Tsvetnyye Metally", 1957,30 No.7, pp.42-51 (USSR).

ABSTRACT: In this article some of the considerable literature bearing on the precipitation of cobalt from solutions by the Xanthate method is critically discussed and some original experimental work is described. The basis of the latter was the construction of "quantity of metal precipitated vs. function of precipitating-agent consumption" curves from successive precipitations. Two series of experiments, one with pure solutions of cobalt, and the other with solutions containing cations of other metals were carried. It was found that in the former 1 g-atom of cobalt uses up 2 g-mols of xanthate; in the latter cobalt is precipitated before zinc, almost simultaneously with nickel and after copper and cadmium; some coprecipitation of cobalt with copper and cadmium and of zinc with cobalt takes place. The thermodynamics of the precipitation of cobalt and of the possibility of the formation of the

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KAKOVSKIY, I. A. Professor (Uralmekhanobr)

"The influence of the surface state on the electrical separation of low-conductivity minerals"

report presented at the 4th Scientific and Technical Session of the Mekhanobr Inst, Leningrad, 15-18 July 1958

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KHOKHLOV, V.R., kand.tekhn.nauk, retsenzent; SKOBEYEV, I.K.,
prof. odktor, retsenzent; VESSONOV, S.V., prof., doktor tekhn.
nauk, retsenzent; MARENKOV, Ye.A., red.; EL'KIND, L.M., red.
izd-va; VAYNSHTEYN, Ye.B., tekhn.red.

[Metallurgy of precious metals] Metallurgiia blagorodnykh metallov.
Moskva, Gos.nauchno-tekhn.izd-vo lit-ry po chernoi i tsvetnoi metal-
lurgii, 1958. 366 p. (MIRA 11:7)

1. Chlen-korrespondent Akademii nauk SSSR (for Plaksin). 2.
Irkutskiy gorno-metallurgicheskiy institut, kafedra metallurgii
blagorodnykh metallov (for Khokhlov, Skobeyev). 3. Irkutskiy
gorno-metallurgicheskiy institut kafedra obogashcheniya poleznykh
iskopayemykh (for Bessonov)
(Precious metals--Metallurgy)

KAKOVSKIY, I.A.; REVNIVTSEVA, V.I.

Use of electric separation in dressing zircon-pyrochlore concentrates. Obog. rud 3 no.1:16-24 '58. (MIRA 11:10)
(Zircon) (Pyrochlore) (Ore dressing)

KAKOVSKIY, I.A.

136-58-3-9/21

AUTHORS: Karasev, K.A. and Kakovskiy, I.A.

TITLE: Some mercapto-compounds of palladium (Nekotoryye sul'fgidril'nyye soyedineniya palladiya)

PERIODICAL: Tsvetnyye Metally, 1958, Nr.3. pp. 47-54 (USSR)

ABSTRACT: Existing methods of isolating palladium from chloride and sulphate solutions are inefficient. The noble-metals metallurgy department of the Ural Polytechnic Institute therefore studied the physical-chemical properties and conditions for the formation of the xanthates, dithiophosphates and mercaptides (aliphatic and aromatic) of palladium with the object of developing methods for the quantitative isolation of this element from chloride and sulphate solutions of various compositions and from very impure industrial solutions. The authors describe experiments which showed that the compounds studied were practically insoluble in water and acid and basic solutions, and direct solubility determinations were impossible. The potentiometric method was used for finding activity products at 25°C and values were checked by equilibrium and dissociation investigations. Calculated values of activity products for a series of palladium mercapto-compounds are tabulated (table.1) as are those for the ethyl xanthates of other heavy metals (table.2). The experiments on fractional precipitation of metals by ethyl sodium xanthate fully confirmed the thermodynamical foundations worked out at the Institute. Experiments using a previously-described technique (ref.5) on the separation of

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Some mercapto-compounds of palladium 136-58-3-9/21

palladium from copper (fig.1), nickel (fig.2) and iron (fig.3), with synthetic neutral or slightly acid chloride solutions, showed that palladium is precipitated first by the xanthate; except for iron in weakly acid solution excess of xanthate causes precipitation of the base metal. A modified experimental method was used with a solution containing equal concentrations of palladium, platinum, rhodium, iridium, copper, nickel and iron (0.730 g/l): equal portions were placed in separate beakers, different quantities of xanthate being added to each, and the precipitates produced being analysed for palladium and impurities. The results (fig.5) show that the xanthate can be used to separate palladium from other platinoids as well as from solutions with a great variety of compositions. The work described is the second communication at the Ural Polytechnic Institute on the use of organic reagents in hydrometallurgy. There are 4 figures, 3 tables and 6 Soviet references.

ASSOCIATION: Ural'skiy Politekhnicheskiy Institut (Ural Politechnical Institute)

AVAILABLE: Library of Congress.

1. Palladium-Purification 2. Palladium-Precipitation
3. Minerals-Separation-Test results

Card 2/2

SOV/149-58-5-8/18

AUTHORS: Tyurin, N.G., Kholmanskikh, Yu.B. and Kakovskiy, I.A.

TITLE: An Automatic Laboratory Instrument for Studying the Kinetics of Hydro-metallurgical Processes at High Temperatures and Pressures (Laboratornyy avtomaticheskiy pribor dlya issledovaniya kinetiki gidrometallurgicheskikh protsessov pri vysokikh temperaturakh i davleniyakh)

PERIODICAL: Izvestiya Vysshikh Uchebnykh Zavedeniy, Tsvetnaya Metallurgiya, 1958, Nr 5, pp 69 - 80 + 1 plate (USSR)

ABSTRACT: The autoclave processes play an increasingly important part in the modern hydrometallurgical practice and the field of their application continues to grow. To determine the optimum operating conditions in any particular case, it is necessary to study the kinetics of the autoclave reactions which is not easy owing to the inaccessibility of the system that has to be maintained at high temperatures and under high pressures. The standard method of chemical analysis of periodically taken samples is not suitable for studying reversible reactions, characterised by fast reaction rates or for determining the quantities of the gaseous phases taking

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part in the reactions. In addition, a reverse reaction may take place in the sample during cooling, or the basic reaction may proceed continuously after removal of the sample from the autoclave, in which case the results of the analysis will not be a true indication of the conditions existing in the autoclave at the moment of sampling.

To overcome these difficulties the present authors developed a laboratory instrument which is, basically, a recording polarograph with solid platinum micro-electrodes and in which the autoclave constitutes the electrolysis cell. A photograph of the complete apparatus is shown in Figure 1, while a diagrammatical sketch of the autoclave and the circuit diagram of the polarising unit and the automatic recorder are reproduced in Figure 3. A detailed description of the apparatus and the method of calibration are also given.

The main shortcoming of all polarographs with solid electrodes is that if reproducible results are to be obtained, means have to be found to "clean" the electrode surfaces which easily undergo chemical and/or physical changes.

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An Automatic Laboratory Instrument for Studying the Kinetics of Hydro-metallurgical Processes at High Temperatures and Pressures

This is best done by the application of alternating polarisation (Ref 15) and this method has been adopted by the present authors, with the modification that polarisation takes place with the potential changing continuously. To ensure reproducibility of the results, the variation of the electrode potential E must follow a pre-determined law, e.g. $E = E_1 - vt$ where E_1 - potential at the beginning of the cycle, v - rate of the variation of the potential, t - time. With the linear character of the E/t relationship a generator of a simple construction can be used. Under the actual conditions the graph of this relationship constitutes a cyclic curve (see Figure 2). Each cycle consists of two periods: preliminary and working period. During the preliminary period the reduction products formed during the preceding working cycle are removed from the electrode surface. This is attained by superimposing on the electrode so-called initial potential of the sign opposite to the potential of the working period. Polarisation takes place during the

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An Automatic Laboratory Instrument for Studying the Kinetics of Hydro-metallurgical Processes at High Temperatures and Pressures

working period with the electrode potential changing from + 0.5 to -3.0 V.
The polarising potential in the form of periodic signals is supplied by a generator. This potential is applied to the cell through a calibrated resistance connected in series. The drop of potential on this resistance which is proportional to the current passing through the cell is fed to the input side of a DC amplifier and the amplified signal actuates the recording mechanism operating on the continuous balancing principle.
In the apparatus described in the present paper, the autoclave itself (250 ml capacity, designed to operate at temperatures up to 300 °C and pressures up to 100 atm and provided with an impeller operating at up to 2 800 rev/min) served as the electrolysis cell. A platinum foil disc 25 mm diameter was used as the anode and a platinum wire 3 mm long, 0.3 mm diameter served as the cathode. This gave the electrode areas ratio of approximately 1/550, which ensured a sufficient degree of stability of the potential of the non-polarisable electrode. The

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preliminary experiments designed to check the proper functioning of the cell were carried out at room temperature at atmospheric pressure. Polarograms were obtained for various solutions and from these calibration curves were constructed which confirmed the linear relationship between the wave-height and the cation concentration in the solution. The polarograms for various solutions of $CdCl_2$ in 0.5 N KCl are shown in Figure 4 (the concentration of $CdCl_2$ varying from 0.4 to 3.6 g/l). The calibration curve for this system (graph 1) and also for the system $CuSO_4$/1.0 N NH_4OH (graph 2) are reproduced in Figure 5. In the next stage dissolution of galenite in NaOH solutions in the presence of oxygen was investigated. The polarising cell was calibrated with the aid of the standard plumbite solutions (solutions of PbO in 0.5 N NaOH) at 105, 110, 115, 120 and 125 °C and under total pressure of 7 atm (Figure 6). The calibration curves constructed on the basis of polarograms shown in Figure 6 are reproduced

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An Automatic Laboratory Instrument for Studying the Kinetics of Hydro-metallurgical Processes at High Temperatures and Pressures

in Figure 7. These data were used to study the kinetics of the reaction:

$$PbS + 2O_{2(gas)} + 3OH^- = SO_4^{2-} + Pb(OH)_3^-$$

at 115 °C and partial oxygen pressure equal to 5.4 atm. The polarograms of this reaction are shown in Figure 8 and the kinetic curve (concentration of the dissolved galenite versus time) is reproduced in Figure 9. The separate oxygen and lead maxima can be easily distinguished on the polarograms, while the kinetic curve shows that after an induction period (Ref 21) a constant rate of solution is attained. The rate of solution (tangent of the slope of the linear portion of the kinetic curve) was 1.14×10^{-7} g - mol/sec, the rate of the solution constant being 1.1×10^{-8} g-molcm^{-2} sec^{-1} atm$^{-1/2}$. This value is in good agreement with the results obtained by Andersen et al (Ref 21).

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The results of the present investigation show that a

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An Automatic Laboratory Instrument for Studying the Kinetics of Hydro-metallurgical Processes at High Temperatures and Pressures

polarograph with platinum electrodes is eminently suitable for analysis of strongly oxidising and reactive media. Application of the initial potential of 0 to +0.5 V ensures the complete regeneration of the surface of the polarisable electrode. The polarograms are characterised by well-defined maxima, and experiments with copper-, cadmium-and lead-bearing solutions have shown that the relationship between the wave-height and the cation concentration is linear, even at elevated temperatures. The temperature coefficient of the wave-height (Figure 7) is 2.4 per 1 °C in the 105 - 125 °C range, i.e. it has diffusion character (Ref 22).
There are 9 figures and 22 references, 10 of which are Soviet and 12 English.

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ASSOCIATION: Ural'skiy politekhnicheskiy institut. Kafedra metallurgii blagorodnykh metallov (Urals Polytechnical Institute. Chair of Metallurgy of Precious Metals)

SOV/149-58-6-4/19

AUTHORS: Kakovskiy, I.A. and Barbin, M.B.

TITLE: Study of the Suppressive Action of the Cyanide Ion (Izucheniye podavlyayushchego deystviya tsianistogo iona)

PERIODICAL: Izvestiya Vysshikh Uchebnykh Zavedeniy, Tsvetnaya Metallurgiya, 1958, Nr 6, pp 31 - 42 (USSR)

ABSTRACT: Kakovskiy has previously examined (Ref 1) the suppressive action of the cyanide ion. Later work showed that the effect is more complicated than supposed and the present work is the first of a series on its detailed investigation. For this, the suppression of artificially prepared silver sulphide and metallic silver was studied, the use of these materials eliminating many complications. The authors give improved values of equilibrium constants for the solution of silver xanthates in cyanide solutions and suggest that there may be little difference between these and values for reactions on the surface (Refs 1, 2,3). They discuss the use of equilibrium constants in estimating flotation characteristics and go on to describe their experiments. In these mechanical mixtures 1 [illegible] part of silver sulphide or metallic silver with 99 parts

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SOV/149-58-6-4/19

Study of the Suppressive Action of the Cyanide Ion

of quartz were used, all components being -105 + 74 µ in size and carefully washed. The flotation of this material was carried out in a 75 ml. Mintsvetmetzoloto machine without metal parts into which a solution containing silver-cyanide complex was introduced. Repeated flotation was carried out with fresh portions of xanthate. Various frothing agents (alcohols) were tested and comparative tests were carried out in laboratory machines of other types. It was found (Figure 1) that the transition from suppression to intensive flotation occurred at the same "critical" concentration of xanthate for all the machines used. For further tests a Gallimond (Hallimond) tube was used, with a volume of 100 ml., a charge weight of 0.25 - 0.5 g (-147 + 105 µ) mineral/reagent contact time of 20 minutes, and the passage of 50 ml. of air during flotation. Two methods of operation were used but they gave similar results. Figures 2-4 show the results of several series of experiments; they give the recovery (%) as a function of the logarithm of $C_4H_9OCSS^-$ concentration.

Card2/4 Figure 5 shows the logarithm of the critical xanthate

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Study of the Suppressive Action of the Cyanide Ion

flotation at a constant concentration of potassium cyanide and silver-cyanide complex decreases but with constant xanthate concentration the critical potassium cyanide concentration rises proportionally to the square root. The authors conclude that this work provides evidence of the chemical nature of collecting-agent attachment on the silver surface and the suppressive effect of cyanide. Cyanide can be successfully used for the comparative evaluation of the chemical activity of strong collecting agents.

There are 8 figures, 1 table and 10 references, 7 of which are Soviet and 3 English.

ASSOCIATION: Ural'skiy politekhnicheskiy institut. Kafedra metallurgii blagorodnykh metallov (Ural Polytechnic Institute. Chair of the Metallurgy of Noble Metals)

SUBMITTED: April 10, 1958

Card 4/4

AUTHOR: Kakovskiy, I.A. SOV/136-58-9-2/21

TITLE: ~~The Nature of the~~ Collecting Action of Disulphides
(O kharaktere sobiratel'nogo deystviya disul'fidov)

PERIODICAL: Tsvetnyye Metally, 1958, Nr 9, pp 7-13 (USSR)

ABSTRACT: The author discusses with the aid of thermodynamics, the action of disulphides in flotation to see how the corresponding reactions can occur, pointing out that this has not been possible before through lack of thermodynamic data. He uses the results of an experimental study of the reversible reaction $2RS' - 2e = (RS)_2$ for alcohol dithiophosphates and xanthates. For this two independent methods were used: potentiometric titration with iodine solution and ordinary iodometric titration using starch as indicator. He uses the results without going into experimental details or showing the methods of calculation since these have already been described (Ref. 18). He considers the diethyldithiophosphates and ethylxanthates of copper, silver and gold. His conclusion is that disulphide can react with metals and sulphides of some heavy metals with the formation of the xanthates or

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The Nature of the Collecting Action of Disulphides

dithiophosphates of these metals, and he points out that this almost certainly holds also for other derivatives as well as the ethyl ones dealt with. The conditions in the monomolecular layer make the kinetics of disulphide action more favourable and the length of contact considered necessary by Taggart (Ref. 1, p 426) superfluous. The presence of a non-oxidized collector is not absolutely necessary but can have a beneficial effect by lowering the length of contact of collector and ore. The author mentions the great theoretical and practical interest of studying the use of disulphide diluted with appropriate solvents, the joint use of disulphides of different structure and of mixtures of disulphides with unoxidized collectors and cites the favourable results reported by Livshits (Ref 4) for flotation of copper from samples of Nr 2 Almalyksk ore to support his view that such joint use is promising, and states that Livshits' is the only work

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The Nature of the Collecting Action of Disulphides SOV/136-58-9-2/21

where a systematic study of the effect of disulphide structure on their flotational properties has been made.

There are 2 tables and 26 references (20 Soviet, 4 English, 1 French and 1 German)

ASSOCIATION: Ural'skiy Politekhnicheskiy Institut
(Urals Polytechnic Institute)

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1. Ores--Processing 2. Flotation--Materials 3. Sulfides--Performance 4. Titration

SOV/24-58-9-2/31

AUTHORS: Kakovskiy, I.A. and Revnivtsev, V.I. (Sverdlovsk)

TITLE: Electrostatic Separation of Zircon and Apatite (Razdeleniye tsirkona i apatita metodom elektricheskoy separatsii)

PERIODICAL: Izvestiya Akademii Nauk SSSR, Otdeleniye Tekhnicheskikh Nauk, 1958, Nr 9, pp 9 - 16 (USSR)

ABSTRACT: The physical properties of zircon and apatite (Table 1) are very similar so that neither the electrostatic nor magnetic or gravitational methods can be used for separation of these minerals. Since flotation (with fatty acids or soaps used as collectors) has also been found to be ineffective, the authors investigated the possibility of solving this problem by changing the surface properties of zircon and apatite. Such a method is used in the case of the quartz-feldspar and quartz-fluorite mixtures which, after a preliminary treatment with HF solution resulting in the change of the surface electrical conductivity of one of the components, can be separated by the electrostatic method (Refs 6, 13). Pure, native minerals from one of the Ural deposits were used in the experiments, their composition being: 62.45% Zr_2O_2 ,

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31.7% SiO_2; apatite - 53.6% CaO, 41.3% P_2O_5, 2.5% F and 0.2% Cl. The minerals were placed in 10% solutions of H_2SO_4, HCl, HNO_3, H_3PO_4 and HF. After agitating the suspension for some time, the acid solution was decanted, the mineral washed thoroughly with water, dried at 110 °C to constant weight and cooled to the room temperature (20 °C) in a dessicator with the relative humidity maintained at 62-65%, after which the surface resistance and surface conductivity of the grains were measured. The results, given in Table 1, show that while the surface conductivity of both minerals was hardly affected by the treatment with H_2SO_4, HCl, HNO_3 or H_3PO_4, it changed after treatment with HF from 2.5×10^{-14} to $3.5 \times 10^{-10} ohm^{-1}$ in the case of apatite, and from 1.2×10^{-13} to $2.5 \times 10^{-14} ohm^{-1}$ in the case of zircon. (Similar results are obtained if instead of HF a solution of sodium fluoride in diluted sulphuric acid is used). It appears that as a result of the chemical reaction between HF and apatite, a thin layer of CaF_2 is formed on the surface of this mineral. This layer has a finely crystalline structure and is characterised by large specific surface and high absorption power in respect of the atmospheric moisture. The marked increase of the surface conductivity of apatite treated with HF is due to the presence of moisture adsorbed by CaF_2 and not due to the intrinsic properties of this compound. This view was confirmed by the results of experiments in which the variation of the surface conductivity of zircon and apatite with the change of the relative humidity was studied before and after treatment with HF (Figures 2a and 6): the surface conductivity of the untreated minerals increased at the same rate with increasing humidity. After treatment with HF the surface conductivity of apatite increased much more rapidly than that of zircon.

In the next stage of the investigation, a series of electrostatic separation tests were carried out using minerals treated with HF of various concentrations (1-10%). A laboratory version of a rotating separator (Figure 3) was used and the results, given in Table 3, show that the

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Electrostatic Separation of Zircon and Apatite

separation was most complete when the mineral mixtures had been pre-treated with 5-10% HF solution: in these cases, the zircon concentrate contained 95% zircon with 91.5% recovery, the corresponding figures for apatite being 90 and 95%. However, when it was attempted to separate mixtures that had not been allowed to cool after drying, the efficiency of separation fell considerably. A series of flotation tests yielded similar results thus confirming the view that the increased surface conductivity of apatite treated with HF is due entirely to moisture adsorbed by the layer of CaF_2 formed on the mineral surface and that any factor affecting the quantity of adsorbed moisture will therefore affect the efficiency of the separation process. There are 3 figures, 4 tables and 16 references, 13 of which are Soviet, 2 English and 1 German.

SUBMITTED: March 17, 1958

Card 4/4

KAKOVSKIY, I.A., doktor tekhn. i khim. nauk, prof.; SILINA, Ye.I., inzh.

Interaction of ion producing collectors with surface minerals. [Trudy] Mekhanobr no.96:53-74 '58. (MIRA 11:9)
(Flotation) (Chemical reactions)

BARBIN, M.B., inzh.; KAKOVSKIY, I.A., prof.

Studying the depressing effect of cyanide ions. Izv.vys.ucheb.
zav.; gor.zhur. no.1:148-156 '59. (MIRA 13:1)

1. Ural'skiy politekhnicheskiy institut. Rekomendovana kafedroy
metallurgii blagorodnykh metallov.
(Flotation--Equipment and supplies)
(X rays--Industrial applications)

5(3), 5(4) SOV/156-59-2-14/43

AUTHORS: Stepanov, B. A., Kakovskiy, I. A., Serebryakova, N. V.

TITLE: The Redox Potentials of Xanthogenates (Okislitel'no-vosstanovitel'nyye potentsialy ksantogenatov)

PERIODICAL: Nauchnyye doklady vysshey shkoly. Khimiya i khimicheskaya tekhnologiya, 1959, Nr 2, pp 277-279 (USSR)

ABSTRACT: In the present investigation the same method was used that the authors employed for determining the redox potentials of dithiophosphates (Ref 1). The calculation of the potentials of the reaction (1) $2\ ROCSS' - 2e = (ROCSS)_2$ was carried out according to the graphical method described in reference 1. The redox potentials of methyl-, ethyl-, n-propyl-, n-butyl-, n-amyl-, n-hexyl-, n-heptyl-, n-octyl-, n-nonyl- and n-decyl xanthogenate are shown by figure 1 and listed in table 1. The potential increases as a result of the decreasing solubility of dixanthogenide with growing carbon chain. The second author found in an earlier investigation (Ref 10) that the solubility of the members of a homologous chain is reduced by 1/4.25 in the case of an elongation of the chain by a CH_2-member. This corresponds to $1/(4.25)^2 = 1/18$ in the case

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The Redox Potentials of Xanthogenates SOV/156-59-2-14/48

of the disulphide with 2 radicals. This is in agreement with the increase of the potentials for the higher xanthogenates (over C_8), while in the case of the low ones the values of measurement are too low by 5 - 15 mv as compared to calculation. This may be explained by the partial irreversibility of the reaction (1) with low xanthogenates on the platinum electrode. The reversibility of reaction (1) is to be investigated in a later paper. There are 1 figure, 1 table, and 10 references, 5 of which are Soviet, and 1 Rumanian.

PRESENTED BY: Kafedra metallurgii blagorodnykh metallov Ural'skogo politekhnicheskogo instituta (Chair of Metallurgy of Precious Metals, Ural Polytechnic Institute)

SUBMITTED: December 15, 1958

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SOV/136-59-3-17/21

AUTHORS: Kakovskiy, I.A., Bessonov, S.V., Professor, Klassen, V.I., Doctor of Technical Sciences and Livshits, A.K.

TITLE: On the Use of Radiography in Work on the Theory of Flotation (O primenenii radiografii v rabote po teorii flotatsii)

PERIODICAL: Tsvetnyye Metally, 1959, Nr 3, pp 72 - 78 (USSR)

ABSTRACT: This collection of letters to the editor were written in connection with the publication by Tsvetnyye Metally, 1958, April, of an article by Professor S.I. Mitrofanov. This criticised the use of radiographic methods of reagent distribution on the surface of the mineral particles.

I.A. Kakovskiy suggests that since radiography and radiometry are the same in principle, Mitrofanov's critical remarks should apply to both. He considers however, that the experiments of that author were entirely unrealistic and unnecessarily complicated. He mentions his experiments which showed that it is impossible to wash xanthate off a polished silver plate. He also

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discounts Mitrofanov's assumption of the existence of the collector in the electrical double layer and gives some other factors which he has found to be contrary to Mitrofanov's views.

S.V. Bessonov of the Irkutskiy gorno-metallurgicheskiy institut (Irkutsk Mining-metallurgical Institute) welcomes contributions on methods applicable to flotation-kinetics research but maintains that Mitrofanov's criticisms of radiographic methods are experimentally unsupported. He mentions work at the Institut gornogo dela AN SSSR (Mining Institute of the Ac.Sc.USSR) which clearly contradicts that author's contention that the results of drying-films experiments represent the distribution of reagent over glass as much as over mineral particles. Bessonov particularly deplores unfounded criticism by Mitrofanov of a technique which has contributed to the progress and international reputation of Soviet science but emphasises that he favours constructive criticism.

V.I. Klassen classifies Mitrofanov's experiments as artificially contrived to support incorrect ideas. The basis of these ideas is that when a mineral particle is

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removed from the pulp it takes with it an envelope of reagent-containing water; when the water evaporates the envelope splits into islands which lead to localised fixing of the tracer-containing reagent. In correctly conducted radiographic experiments the possibility of this happening is carefully avoided, e.g. by repeated washing of the particle. He also points out that if Mitrofanov's views were correct, the amount of collector on particles remaining in the tailings would be much more than on those in the concentrate: the opposite is found experimentally. Mitrofanov's attitude is inconsistent since he accepts radiometry of powders, to which his own objections should apply. The author urges further studies in this field.

A.K. Livshits does not deal specifically with Mitrofanov's article but himself criticises some work in which radiographic methods were used. The author admits that any of the micrcradiograms published give a direct picture of the reagent-distribution in particle surfaces. A general criticism is that the purity of the reagent is never stated; but the presence of impurities could alter the radiographic

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pattern and the presence of radioactive sulphur is likely to lead to their production. It may well be impossible to wash the impurities off the mineral surface. The author complains of the lack of quantitative data and the frequent discrepancies of results, e.g. between those of V.I. Klassen and of I.N. Plaksin and R.Sh.Shafeyev, published in Tsvetnyye Metally, Nr 7 for 1957 and 1958, respectively. He notes that the first attempts at quantitative radiography confirmed the validity of doubts on the usefulness of results based on visual examination of radiographic patterns. The author regards much of the pattern obtained by Plaksin and Shafeyev as being due to liquid droplets. He deals with some other published data and concludes, making specific recommendation, that much remains to be done to establish the radiographic method for flotation-kinetic studies. In the editorial introduction the following are invited to contribute to the discussion: M.A. Eygeles, V.A. Mokrousov, O.S. Bogdanov, G.S. Strel'styn, V.Ya. Khaynman and S.I. Krokhin (workers in flotation-theory research) and N.V. Matveyenko, M.I. Gorodetskiy,

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On the Use of Radiography in Work on the Theory of Flotation

M.M. Polyakov and S.N. Kulinin (works' personnel).

ASSOCIATION : Irkutskiy gorno-metallurgicheskiy institut
(Irkutsk Mining-metallurgical Institute)
(Bessonov, S. V.)

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GREBNEV, A.N., inzh.; KAKOVSKIY, I.A., prof.

Floatability of artificial, heavy metal sulfides and the flotation characteristics of little-studied minerals. Izv. vys.ucheb.zav.; gor.zhur. no.3:140-151 '59.
(MIRA 13:4)

1. Ural'skiy politekhnicheskiy institut imeni S.M.Kirova. Rekomendovana kafedroy metallurgii blagorodnykh metallov.
(Flotation) (Nonferrous metals--Metallurgy)

SOV/136-59-4-4/24

AUTHORS: Kakovskiy, I.A. and Karasev, K.A.

TITLE: Use of Mercaptans for Separating Platinoids from Solutions (Primeneniye merkaptanov dlya vydeleniya platinoidov iz rastvorov)

PERIODICAL: Tsvetnyye metally, 1959, Nr 4, pp 16-22 (USSR)

ABSTRACT: This is the fourth of a series of communications on the use of organic reagents in hydrometallurgy (Ref 1-3) and is closely related to the authors work on palladium recovery with mercapto reagents (Ref 2). The object of the work was to find whether solid mercaptans would be applicable, sufficiently simply, for process as distinct from analytical purposes. Most of the work was carried out with solid mercapto-benzthiozole, which is cheap and plentiful in the USSR; in some, the solid parathiocresol was used. The authors discuss conditions for the formation of platinum-metal mercaptides, their properties and composition. In their experiments in the use of mercaptobenzthiozole for separating platinoid metals, the separation of palladium and platinum from base metals, of palladium and platinum from rhodium and indium, the

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Use of Mercaptans for Separating Platinoids from Solutions

precipitations of all platinum-group metals from synthetic solutions and the separation of these metals from solutions similar to those in industry (on a semi-production scale) were studied. Fig 1 shows the weights (mg) of palladium, platinum and copper precipitated as functions of the mercaptobenzthiozole consumption (mg), Fig 2 and 3 giving the corresponding curves for palladium, platinum and iron and for palladium, platinum and nickel. The curves for all the above metals when present together, are shown in Fig 4. Each solution contained equal quantities (73 mg) of the appropriate metal. The volume of each solution taken was 100 ml and the acidity 1% HCl. The mercaptobenzthiozole was used in the form of its sodium-salt solution. Details of the experimental method have been published (Ref 4). The synthetic solutions contained 100 mg Pd; 100 mg Pt; 84 mg Rh; 106 mg Ir; 100 mg Fe; 100 mg Cu and 100 mg Ni per litre. The work showed that mercaptobenzthiozole in the form of its sodium-salt solution is best used for the combined separation of palladium and platinum from rhodium,

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iridium and base metals or for removing platinum or palladium from rhodium or iridium solutions. In the absence of palladium, mercaptobenzthiozole at room temperature can be used to separate even the smallest quantities of platinum from rhodium, iridium and base metals to give a very high-grade platinum concentrate. With prolonged boiling of solutions the reagent precipitates all the platinum-group metals; the small amounts of rhodium and ruthenium remaining in solution can be precipitated with parathiocresol. There are 4 figures, 4 tables and 15 references, 7 of which are Soviet, 4 German and 4 English.

ASSOCIATION: Ural'skiy politekhnicheskiy institut (Ural Polytechnic Institute)

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BARBIN, M.B., inzh.; KAKOVSKIY, I.A., prof.

Studying the floatability of mercury by measurement of contact angles and radioactive indicators. Izv.vys.ucheb.zav.; gor. zhur. no.4:130-138 '59. (MIRA 13:5)

1. Ural'skiy politekhnicheskiy institut imeni S.M.Kirova. Rekomendovana kafedroy blagorodnykh metallov.
(Mercury) (Flotation)

BARBIN, M.B.; KAKOVSKIY, I.A.

Studying the depressant effect of cyanide ions by the "zero" and radiochemical methods. Izv.vys.ucheb.zav.; tsvet.met. 2 no.4:36-43 '59. (MIRA 13:1)

1. Ural'skiy politekhnicheskiy institut. Kafedra metallurgii blagorodnykh metallov.
(Flotation--Equipment and supplies)
(Radiochemistry--Industrial applications)

KAKOVSKIY, I.A.; GREBNEV, A.N.

Concept of "the critical pH value" in flotation. Obog. rud 4 no.5:6-9 '59. (MIRA 14:8)

1. Ural'skiy nauchno-issledovatel'skiy institut mekhanicheskoy obrabotki poleznykh iskopayemykh.

(Flotation--Equipment and supplies)
(Hydrogen ion concentration)

5(4)

SOV/76-33-8-27/39

AUTHORS: Kakovskiy, I. A., Stepanov, B. A., Ryazantseva, O. F., Serebryakova, N. V. (Sverdlovsk)

TITLE: Redox Potentials of Dithiophosphates

PERIODICAL: Zhurnal fizicheskoy khimii, 1959, Vol 33, Nr 8, pp 1830-1839 (USSR)

ABSTRACT: Organic sulph-hydryl reagents, such as xanthogenates, dithiophosphates, mercaptanes, dithiocarbamates, etc. are used to an ever-increasing extent in industry for flotations, in hydrometallurgy, in analytical chemistry, etc. For thermodynamic balance calculations in connection with the above reagents, it is necessary to know the redox potential (RP) of these compounds, but the publications hardly contain any of the desired data. The present paper is, for this reason, devoted to the study of the (RP) of the ions of dialkyldithiophosphates. The firmness of the chemical bond between the two disulphide molecules is determined by the density of the electron cloud between them, i.e. the character of the central core of the group and the structure of the apolar part. The synthesis of dithiophosphoric acids was carried out by means of the reaction of alcohols with phosphorus

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pentasulphide (Ref 9). For the determination of the (RP) of the dithiophosphates (DP), two methods were used - a determination of the equilibrium constant of the oxidation reaction of the (DP) with iodine, and a measurement of the (RP) by the compensation method. The results furnished by the former method for an initial concentration of the (DP) of $1.85 \cdot 10^{-3}$ g.mol/l are given (Table 1), as well as those obtained by the potentiometrical measurements of various (DP) (Table 2). In order to determine the accuracy of determination, the standard potential was calculated by means of an equation (4) for dihexyldithiophosphate and compared with the experimental data (Table 3). The reversibility of the oxidation process of the (DP) with iodine was found, and the standard-(RP) of alkyldithiophosphates was determined for systems in which liquid disulphide was regarded as standard state. The effect of the length of the hydrocarbon chain of the (DP) radicals upon the magnitude of the (RP) was examined, and an appropriate equation given for calculating the (RP) as a function of the carbon number of the radical. The influence of the isostructure of the apolar group of the (DP) upon the magnitude of the (RP) was also found. Furthermore, the solubility of

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dimethyldithiophosphate disulphide in water was determined at 25°C and a formula for the calculation of the solubility of disulphides and other (DP) was suggested. The standard (RP) of the homologous (DP) series for the standard state (disulphide solution in water) was calculated with an activity = 1. There are 1 figure, 3 tables, and 19 references, 16 of which are Soviet.

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

SUBMITTED: February 11, 1958

KAKOVSKIY, I.A., prof.; GOLOVIN, A.A., dotsent; KARASEV, K.A., dotsent

Role of the water in the flotation process. Izv.vys.ucheb.zav.; gor.zhur. no.1:130-137 '60. (MIRA 13:6)

1. Ural'skiy politekhnicheskiy institut imeni S.M. Kirova. Rekomendovana kafedroy metallurgii blagorodnykh metallov.
(Flotation--Equipment and supplies)

Kakovskiy, I.A.

82110
S/184/60/000/02/02/006

15.2210

AUTHORS: Svetlov, V.A., Engineer, Smirnov, N.S., Candidate of Technical Sciences, Kakovskiy, I.A., Doctor of Technical Sciences, Professor

TITLE: To the Study of Acid Resistance of Enameled Chemical Equipment

PERIODICAL: Khimicheskoye mashinostroyeniye, 1960, No 2, pp 27 - 30

TEXT: The authors describe methods of determining and improving the acid resistance of enamels. In the USSR and abroad (Refs 1 - 7), enamels have been developed which do not lose more than 0.1 - 1.0% of weight when boiled in hydrochloric acid during four hours. Nevertheless, there are failures of equipment due to an insufficient resistance of enamel coatings. The destruction of coatings does not appear over the entire surface, but only in some places. One of the reasons for failures of enameled chemical equipment are pores and microcracks which originate during the manufacturing process and during the operation of the equipment under the influence of an aggressive medium, especially at great temperature differences. The existing method of studying the acid resistance of enamel coatings by determining the amount of enamel components leached out by an aggressive solution from a surface unit

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during a certain time does not take into account the effect of a possible porosity of coatings. The industrial method of determining the porosity by HF currents at 6 - 8 kv does not characterize the resistance of enamel against aggressive media under real operation conditions. An enamel coating with a low conductivity can be considered as an imperfect capacitor. The processes taking place in enamel coatings exposed to an aggressive medium are recorded by changes of electric properties (alternating current is used). In the absence of pores and microcracks the active component of conductivity is considerably smaller than the reactive. With a temperature increase to 100 - 150°C both components increase. The ohmic conductivity increases by the exponential law (Refs 6 and 8). The resistance of a coating is determined for this case by the equation:

$$z_1 = \frac{1}{\sqrt{\frac{1}{r_1^2} + (\omega C_1)^2}} = K \frac{l}{S}, \qquad (1)$$

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where $$K = \frac{1}{\sqrt{\chi^2 + \frac{\omega^2 \varepsilon^2}{1296 \cdot 10^{22} \pi^2}}};$$

l - thickness of enamel layer; S - surface of coating; χ - specific conductivity of enamel; ω - a.c. frequency; ε - dielectric constant of enamel. The resistance changes of an enamel coating due to the solution of enamel components can be represented graphically by a straight line with a gradient $\frac{K}{S}$. For the case of pores and microcracks formed in the enamel coating the resistance of the coating is:

$$z_2 = \frac{l}{\sqrt{\mu^2 \left(\frac{q}{n_u}\right)^2 + 2 \mu \chi S \left(\frac{q}{n_u}\right) + \frac{S^2}{K^2}}} \qquad (2)$$

where q - summary surface of the equivalent section of pores and microcracks; μ - specific conductivity of the aggressive medium; n_u - coefficient of sinuousity of pores, approaching one. The resistance change of an enamel

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coating due to pores and microcracks is represented by an hyperbola equation. The following values determine the accuracy of the method. Enamels have a dielectric constant of about 10. Specific active electric conductivity of enamel can be determined by the tangent of the dielectric loss angle which is 10^{-1} at a temperature of 100 - 150°C. The specific electric conductivity of an aggressive medium (hydrochloric acid) has a value of about 1/ohm·cm. The resistance of 1 cm^2 of a 1 mm enamel coating is about 10^8 ohms. Calculations show that the resistance of an enamel coating is 10^7 ohms, i.e., it decreases by a factor of 10 if the total surface of pores and microcracks is 10^{-8} cm^2, (equivalent diameter of 1 micron). Such a resistance change can be easily recorded by modern instruments. Figures 3 and 4 show the circuit for measuring the resistance of an enamel coating exposed to 20% boiling hydrochloric acid and the measuring cell, respectively. The resistance was measured by comparing the voltage drop in the measuring cell with that in the entire electric circuit consisting of the measuring cell and of a noninductive resistance box. A "ВКС-7Б" (VKS-7B) cathode voltmeter (3 Megohms) was used. The tests were carried out as follows. Drosses of "Э-1" (E-1) and No "2237" and "2235" acidproof enamels (rated composition: SiO_2 - 58.13%; Al_2O_3 - 2.14%; B_2O_3 - 1.94%; Na_2O -

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15.25%; K_2O - 2.42:; CaO - 4.36%; Na_3AlF_6 - 7.14%; TiO_2 - 7.75%; CoO - 0.87%) were applied to specimens of cold rolled "08КП" (08KP) steel. After the drosses had been dried (at 120°C), the specimens were baked in a muffle furnace. Those covered with E-1 enamel at 840 - 860°C and those covered with No 2237 and 2235 enamels at 760°C and 830°C, respectively. The baked specimens were fixed in the measuring cell filled with a boiling 20% hydrochloric acid solution. The specific resistance graphs of enamel coatings plotted against the time of their exposure to an aggressive solution lead to the assumption that the dissolution and the pore formation proceed simultaneously. A period of resistance stability was observed in all cases after an intensive resistance decrease. The microscopic inspection of the surfaces during this period showed a porous silica film on the enamel surface. The electronographic investigation revealed an amorphous structure of the film. It can be assumed that the resistance stabilization is connected with the formation of an amorphous silicic acid film on the enamel surface due to leaching out of enamel borates and silicates by boiling hydrochloric acid. This film delays a further destructive action of the aggressive solution. The acid penetrates gradually through the pores of the film and contacts the metal after a certain time. This causes a sharp resistance decrease.

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An attempt was made to preserve the protective properties of the film by a 3-hour heat-treatment at 200° and 400°C. The film was fused with the adjoining enamel layer at 1,000 - 1,100°C and was treated with molten paraffin at 230°C for 0.5 hours. In all cases a noticeable electric resistance increase was achieved which remained constant for a long time. The methods of increasing the acid resistance of enamel coatings were tested under industrial conditions (distillation of germanium tetrachloride from a boiling hydrochloric acid solution containing aggressive components). As a result the life of the enamel coating increased by a factor of 7, compared with other enameled chemical equipment.

There are: 3 circuit diagrams, 1 diagram, 2 graphs and 13 references: 11 Soviet, 1 American and 1 Czech.

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KAKOVSKIY, I.A. (Prof.) and REVNIVTSEV, V.I.

"Effects of Surface Conditioning on Electrostatic Separation of Minerals of Low Conductivity."

report to be presented at the Intl. Mineral Processing Congress, LOndon, England, 6-9 Apr 60. Ural Polytechnic Institute for Kakovskiy, and Ural Scientific Research Institute for Mechanical Processing of Minerals for Revnivtsev.

S/180/60/000/005/027/033
E193/E183

AUTHORS: Kakovskiy, I.A., and Kholmanskikh, Yu.B., ~~(Sverdlovsk)~~

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TITLE: Study of the Kinetics of the Process of Cyanidation of Copper and Gold

PERIODICAL: Izvestiya Akademii nauk SSSR, Otdeleniye tekhnicheskikh nauk, Metallurgiya i toplivo, 1960, No.5, pp. 207-213

TEXT: The process of dissolution of copper, silver and gold in cyanide solutions was investigated using the method of a rotating disc (Ref. 17). The concentration of cyanide in solution was determined at the beginning and end of the experiment. The quantity of metal dissolving was fould by analysing samples taken from the reaction vessel after different lengths of time. Copper was determined iodometrically after removing the cyanide by evaporation with sulphuric acid; gold by assay analysis after evaporation in a lead dish. Experimental details were given in earlier work of the authors (Ref. 1) of which this is a continuation. Results showed that the rate of dissolution was determined by the rate of diffusion of the cyanide at

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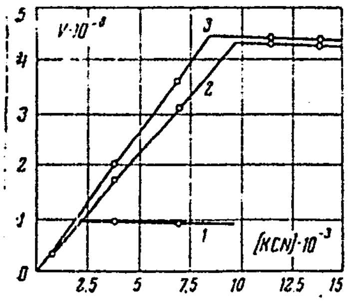
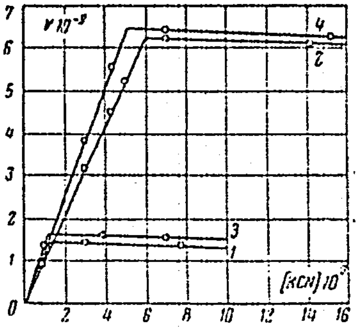
concentrations below a limiting value, and by the rate of diffusion of oxygen at concentrations above this value.

Fig. 1



Фиг. 1.

Fig. 6



Фиг. 6.

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