On the Problem of the Mechanism Underlying the Formation of Electrochemical Heterogeneity on the Surface of Sulphide Minerals

influence upon the formation of the electrochemical heterogeneity as well as upon the fixation and distribution of the flotation reagents on the surface. This type of adsorption proceeds much quicker than chemosorption (Ref 9). Still, the quantity of the physically sorbed substance is much larger at the more accessible spots of the mineral than at the less accessible ones. In consequence of the uneven thickness of the adsorption film, the ions are able to pass the boundary solid body - liquid with varying difficulty. A difference of potential is the result A scratch destroys the adsorption film, bringing about the formation of an anodic spot. Here, xanthogenate concentrates with the radioactive isotope S^{35}. Under an air bubble a cathodic spot forms in consequence of the diffusion of the air molecule through the mentioned boundary, and also because the bubble is negatively charged in many solutions of organic substances (Ref 10). There are 3 figures and 10 references, 9 of which are Soviet.

On the Problem of the Mechanism Underlying the Formation of Electrochemical Heterogeneity on the Surface of Sulphide Minerals

of this reagent is determined by the gradient value of the electric field forming between the anodic and cathodic spots of the surface. The stable xanthogenate is irregularly distributed on the surface of various sulphide minerals (Refs 4,5). This was determined by micro-radiographic investigations by using isotope S^{35}. Apart from the heterogeneity discussed, however, there are also spots with various potentials, forming in consequence of the peculiarities of adsorption at sulphide minerals. Some scientific workers (Refs 6,7) observed a concentration increase of the flotation reagent (especially of xanthogenate) by the aid of an air bubble in the 3-phase contact of the mineral particle. Such spots are regularly distributed on the surface of the sulphide minerals, as investigations (Ref 8) have shown. The cathodic spots have the tendency of concentrating in the proximity of the salient parts, whereas the anodic spots gather at the less accessible spots of the sulphide minerals (Fig 1). To investigate this, the authors scratched the surface of the samples (Fig 3). Furthermore, a cathodic spot was found under an air bubble (Fig 2). The physical adsorption exerts a considerable

5(1)

SOV/20-125-3-37/63

AUTHORS: Plaksin, I. N., Corresponding Member, AS USSR, Shafeyev, R. Sh.

TITLE: On the Problem of the Mechanism Underlying the Formation of Electrochemical Heterogeneity on the Surface of Sulphide Minerals (K voprosu o mekhanizme vozniknoveniya elektrokhimicheskoy neodnorodnosti poverkhnosti sul'fidnykh mineralov)

PERIODICAL: Doklady Akademii nauk SSSR, 1959, Vol 125, Nr 3, pp 599-600 (USSR)

ABSTRACT: Electrochemical processes occurring on the surface mentioned in the title greatly influence the interaction mechanism between the flotation reagent and the surface of the said minerals in the flotation pulp. Electrochemical heterogeneity of the surface in question (Refs 1,2), the anodic and cathodic spots on it, as well as high values of the potential differences between these spots (Ref 3) exert a strong influence upon the distribution of the flotation reagents on the surface of the mineral particles. The ions and molecules of the said reagent in the proximity of the mineral surface, are under the influence of electric fields. These fields form on a surface of electrochemical heterogeneity. Consequently, the further distribution

Card 1/4

Infrared Spectra of Some Flotation Reagents SOV/20-124-1-43/69

There are 1 figure and 8 references, 5 of which are Soviet.

ASSOCIATION: Institut gornogo dela Akademii nauk SSSR
(Institute of Mining Industry, Academy of Sciences, USSR)

SUBMITTED: September 6, 1958

Card 3/3

terpene alcohols is up to 47%),(Ref 4). The infraspectrograms taken by the 2-ray spectrophotometer IKS-2 within a range of 3 to 9μ have common absorption bands. They determine the composition of reagents with respect to the content of carbon groups connected with oxygen and hydrogen. The heating of carbon in vacuum up to 550° causes the loss of the bands 3300 and 2920 cm^{-1}, which are characteristic of the hydrogen bond and the CH_2 groups (Ref 8). In the first place this is evidence of the sublimation of the oxidized surface layer of the carbon particles. The occurrence of groups which are capable of forming hydrogen bonds on the surface of carbon as well as in the flotation reagent indicates a physical sorption of the surface active substance on the contact and the formation of a stable monomolecular layer. This is confirmed by strong bands at 3300 cm^{-1} which point to the existence of the hydrogen bond on the surface of the carbon particles as well as in the reagents.

L. A. Ignat'yeva contributed to the work and to the discussion of the results.

5(3)

AUTHORS: Plaksin, I. N., Corresponding Member, SOV/20-124-1-43/69
Academy of Sciences, USSR, Solnyshkin, V. I.

TITLE: Infrared Spectra of Some Flotation Reagents
(Infrakrasnyye spektry nekotorykh flotoreagentov)

PERIODICAL: Doklady Akademii nauk SSSR, 1959, Vol 124, Nr 1, pp 153-154
(USSR)

ABSTRACT: It is difficult to draw a clear conclusion with respect to the character of formation of the monomolecular layer in the case of sorption of the reagents mentioned in the title on the surface of carbon particles. The greatest effect in carbon flotation is exerted by those reagents containing a hydroxyl group and an apolar part of the terpene -, aliphatic and aromatic type. For the purpose of clarifying the structural peculiarities of alcohol-like reagents the following were investigated by infrared spectroscopy:a. IM-68 (mixture of aliphatic alcohols with 6-8 carbon atoms per molecule)(Ref 4), b. Mixture of C_{13-18}-alcohols with a saturated and an unsaturated carbon chain and c. Retort residue (after the distillation of sulfate crude terpentine; the content of

Card 1/3

PLAKSIN, I.N.

Komořany (Czechoslovakia) plant for lignite preparation in heavy suspensions. Ugol' 34 no.3:61-62 Mr '59. (MIRA 12:5)

1. Institut gornogo dela AN SSSR. Chlen-korrespondent AN SSSR.
(Czechoslovakia--Coal preparation)

PLAKSIN, I.N.

Results of research and introduction of achievements in the technology of ore dressing. TSvet.met. 32 no.2:4-9 F '59.
(MIRA 12:2)

1. Chlen-korrespondent AN SSSR.
(Ore dressing)

PLAKSIN, I.N.

Conference on mineral enrichment. Vest.AN SSSR 29 no.2:80-81 F '59. (MIRA 12:4)

1. Chlen-korrespondent AN SSSR.
(Tatranska Lomnica, Czechoslovakia--Ore dressing--Congresses)

PLAKSIN, I.N.; MAZUROVA, A.A.

Studying the process of arsenical pyrite oxidation by oxygen under pressure at high temperatures and in alkaline media. Izv.vys.ucheb.zav.; tsvet.met. 2 no.4:97-105 '59.
(MIRA 13:1)

1. Moskovskiy institut tsvetnykh metallov i zolota. Kafedra metallurgii blagorodnykh metallov.
(Sulfides--Metallurgy) (Arsenic)

PLAKSIN, I.N.

Research on mineral dressing in British and French schools of higher learning and research institutes. Izv.vys.ucheb. zav.; tsvet.met. 2 no.1:136-138 '59. (MIRA 12:5)
(Metallurgical research)
(Ore dressing)

GIRDASOV, M.S.; PLAKSIN, I.N.

Recovering gold from cyanide solutions by ion-exchange resins. Izv.vys.ucheb.zav.; tsvet. met. 2 no.1:74-82 '59. (MIRA 12:5)

1. Moskovskiy institut tsvetnykh metallov i zolota. Kafedra metallurgii blagorodnykh metallov.
(Gold--Metallurgy) (Cyanide process) (Ion exchange)

from the copper [illegible] foil with gradual temperature increase up to [illegible] 800 °C. At this temperature polonium volatilizes from the copper powder and deposits in the form of a thin metallic layer on the cold surface of the platinum foil. The quantity of deposited polonium can be controlled by its γ-irradiation (Ref 3). The device for registration of γ-irradiation consists of the usual γ-counter which is placed in a lead box with a narrow collimating target. Before the beginning of volatilization the slit aperture of the lead box was regulated in such a manner that the γ-irradiation of polonium in the copper powder would be registered. Then the slit was moved (the geometry of count being preserved) so that the γ-irradiation of polonium, sublimated on the platinum foil, could be registered. The γ-irradiation count of the platinum

Card 2/3

[illegible] on the [illegible] from the autoradiograph

[illegible] are 2 figures and 3 references, of which 2 are Soviet and 1 is English.

SUBMITTED: July 3, 1959

21.5100

SOV/180-59-5-18/37

AUTHORS: Plaksin, I.N., Smirnov, V.N., and Starchik, L.P. (Moscow)

TITLE: Preparation of Flat Polonium α-Irradiators of Great Activity

PERIODICAL: Izvestiya Akademii nauk SSSR, Otdeleniye tekhnicheskikh nauk, Metallurgiya i toplivo, 1959, Nr 5, pp 122-123 (USSR)

ABSTRACT: A method was used in which polonium-210 is evaporated in vacuum (Refs 1, 2) from a copper powder serving as the carrier. Polonium in copper powder is transferred to a quartz beaker around which a nichrome spiral is wound (Fig 1). A platinum foil welded to a copper plate, which is attached to a condenser by means of a grip ring, is situated above the quartz beaker. The condenser consists of a cylindrical copper tumbler which is cooled by running water. The quartz beaker with the polonium in the copper powder, the copper rods through which current is supplied and the cooled condenser with the copper tubes through which water is circulated, are placed into a hermetically closed glass cylinder which is connected to a vacuum pipe provided with a diffusion pump. The glass cylinder may get hot due to the radiation from the spiral, and hence its walls are also

Card 1/3

SOV/136-59-5-3/21

Development of Methods for Measuring Pulp Density

There are 6 figures and 24 references, 15 of which are Soviet and 9 English.

ASSOCIATION: IGD AN SSSR, Fiziko-tekhnicheskiy institut (Physical-technical institute) of the AS Ukr SSR, and Khar'kovskiy zavod KIP (KIP works in Khar'kov)

Card 3/3

Development of Methods for Measuring Pulp Density

isotopes and their uses, held in Moscow in April 1957. One of these, (Ref 9) shown in Fig 4, uses two sources, caused to vibrate in opposite phases by electromagnetic vibrators. The other (Ref 10) has one source on a disc rotated by a synchronous motor (Fig 5); it has the advantage of using only one source. Although scintillation counters enable low-activity sources to be used they involve complicated apparatus. Considerable simplification is possible by the use of ionization chambers. A compensating two-chamber method (Ref 11) is shown in Fig 6; this further reduces instrument errors and has the advantage of practically unlimited detector service life. It is the scheme favoured by the authors.

SOV/[illegible]-5-3/21

AUTHORS: Plaksin, I.N., Corresponding Member of the AN SSSR (AS USSR), Val'ter, A.K., Academician AN Ukr SSR (AS Ukr SSR), and Gol'din, M.L., Engineer.

TITLE: Development of Methods for Measuring Pulp Density (Razvitiye metodov izmereniya plotnosti pul'py)

PERIODICAL: Tsvetnyye metally, 1957, Nr 5, pp 19-22 (USSR)

ABSTRACT: Four main methods exist for pulp-density measurement: pyknometric (Fig 1), float, hydrostatic (Fig 2 shows an advantageous piezometric variant), and radioactive. Hydrostatic methods are in wide and successful use, e.g. at the Balkhashskaya (Balkhash) obogatitel'naya fabrika (beneficiation works). The first three methods have a number of disadvantages (including inapplicability to high-density pulps) absent from radioactive methods (based on the relation between gamma radiation absorption and density). An important development in radioactive methods is the use of scintillation counters, and a great improvement for this type of instrument was reported recently by Reiffel and Humphreys (Ref 20) (Fig 3). Two schemes for a radioactive-type density meter were reported at the conference of radioactive and stable

Card 1/3

An Investigation of the Process of Separation of Particles in a Hydrocyclone During Beneficiation of Coal in Heavy Suspensions

separated. In the bottom part of the cyclone, the separation of intermediate fractions is continued and the separation of fine grains of rocks takes place, which moving upwards may enter the circulation. Simultaneously, with the separation of grains according to specific weight, the size segregation also takes place, however, on beneficiating of coal in heavy suspensions, the latter process is insignificant in comparison with the separation in water alone. There are 4 figures and 1 table.

SUBMITTED: January 23, 1959

Card 3/3

An Investigation of the Process of Separation of Particles in a Hydrocyclone During Beneficiation of Coal in Heavy Suspensions

carried out. The experiments were carried out in a hydrocyclone 80 mm in diameter under the following optimum conditions which were previously established: the density of magnetite suspension 1.25 g/cm^3; angle of conicity of the cyclone 20°; the diameters of the top and bottom outlets 35 and 13 mm respectively. Coal size -2 + 0.5 mm with ash content of 22%; the ash content of the concentrates 6.5%; the ash content of the tailings - 70%. Specific weights of separation in various zones and points of the hydrocyclone (r - radius of sampling point; γ - density of suspension; δ - specific weight of separation) are given in the table (p 161) and Figures 3 and 4. It was found that the separation of particles of different specific weight takes place in all zones inside the cyclone. In the upper zone the lightest particles of the concentrate fraction are separated. In the middle zone the separation of particles of intermediate specific gravities (1.5 - 1.7) takes place. Larger coal particles are also

SOV/180-59-3-34/43

AUTHORS: Akopov, M.G., Klassen, V.I. and Plaksin, I.N. (Moscow)

TITLE: An Investigation of the Process of Separation of Particles in a Hydrocyclone During Beneficiation of Coal in Heavy Suspensions

PERIODICAL: Izvestiya Akademii nauk SSSR, Otdeleniye tekhnicheskikh nauk, Metallurgiya i toplivo, 1959, Nr 3, pp 150-163(USSR)

ABSTRACT: The influence of particle size of magnetite used for the production of heavy media and the variation of the density of suspension at various points of hydrocyclone were investigated. The results are shown in Fig 1 and 2 respectively. Some values of specific gravities of separation (γ gr/cm^3) on beneficiation of coal in heavy suspensions of various specific gravities (γ g/cm^3) are given:

γ_o =	1.22	1.25	1.34	1.25	1.27
γ =	1.39	1.42	1.48	1.51	1.03

Using the experimental results obtained, a method of calculating an approximate specific gravity of separation and the limiting size of grains is illustrated. An experimental investigation of the distribution of mineral particles during the beneficiation of a fine coal in heavy suspensions in hydrocyclone was also

Card 1/3

MELIK-STEPANOV, Yu.G.; PLAKSIN, I.N.

Selecting an efficient method for concentrating titanium-zirconium sands of Western Siberia. Izv. Sib. otd. AN SSSR no.3:18-29 '59. (MIRA 12:8)

1. Yakutskiy filial Sibirskogo otdeleniya Akademii nauk SSSR, i Institut gornogo dela Akademii nauk SSSR.
(Titanium ores) (Zirconium ores) (Ore dressing)

News in Brief. Conference on the Dressing of Minerals

plant Kamaržany (Mostecky Basin with a capacity of 1500 t/h in permanent day and night operation and emphasizes the importance of this plant for the Soviet industry. He further emphasizes the high level of technological investigations in the field of dressing of minerals in Czechoslovakia. Further, reports of Czechoslovakian experts in the field of dressing are pointed out: M. Doležil, B. Dobiaš, J. Jančarek, F. Žurek, F. Žusko, J. Kokurek, V. Chumel', M. Čáp and A. Battaglia, Doctor (Poland) reported on hydrocyclones. The fact that representatives of industry and designers took part exercised a considerable influence upon the results of the Conference.

Card 2/2

18(5), 18(0)

SOV/30-59-2-23/60

AUTHOR: Plaksin, I. N., Corresponding Member, Academy of Sciences, USSR

TITLE: News in Brief (Kratkiye soobshcheniya) Conference on the Dressing of Minerals (Konferentsiya po obogashcheniyu poleznykh iskopayemykh)

PERIODICAL: Vestnik Akademii nauk SSSR, 1959, Nr 2, pp 80-81 (USSR)

ABSTRACT: At the suggestion of the Polytechnic Institute at Košice such a Conference is held every year. The last Conference took place at Tatranská Lomnicé (High Tatra, Slovakia) in November 1958. Scientists and engineers from the Socialist countries and some Capitalist states took part. The author of the present paper reported on the use of microradiography and radiometry for the investigation of the flotation theory and the control of production processes in dressing plants. V. A. Glembotskiy (USSR) dealt with the importance of the insoluble xanthates of heavy metals in the flotation of sulfide ores. V. I. Klassen (USSR) reported on the influence of electrolytes upon flotation and "salt flotation" of pit coal and other minerals. I. M. Verkhovskiy (USSR) spoke about several problems of gravitational dressing. The author points out in particular the large dressing

Card 1/2

Conditions for the Separation of Copper From Hydrometallurgical Solutions

SOV/163-59-2-13/48

and mixing rates was investigated and the results are given in figure 4 and tables 3 and 4. There are 4 figures, 4 tables, and 3 Soviet references.

ASSOCIATION: Institut gornogo dela Akademii nauk SSSR (Mining Institute of the Academy of Sciences, USSR)

SUBMITTED: July 17, 1958

Card 2/2

18 (5)

AUTHORS: Plaksin, I. N., Suvorovskaya, N. A., SOV/163-59-2-13/49
Shikhova, V. V.

TITLE: Conditions for the Separation of Copper From Hydrometallurgical Solutions (Usloviya vydeleniya medi iz gidrometallurgicheskikh rastvorov)

PERIODICAL: Nauchnyye doklady vysshey shkoly. Metallurgiya, 1959, Nr 2, pp 69-73 (USSR)

ABSTRACT: Copper was separated from hydrometallurgical flotation solutions by electrolysis. The electrochemcial operation scheme for the determination of the potential and the amperage of the electrolysis process are given in figure 1. The electrolysis container consists of plexiglass (Fig 2). Electrolytic copper was used as cathode and Armco iron as anode. The optimum concentrations of the main components (Cu, H_2SO_4) in the solution were detected. The influence of $CuSO_4$ on the electrolysis process is given in figure 3; the results are summarized in table 1. A considerably acid medium influences the electrolysis process negatively. The separation of copper from solutions with different sulphuric acid concentrations

Card 1/2

Review of Work in the Field of the Science and Application of Achievements in Ore Beneficiation Practice

beneficiation including the separation of lead-copper ores by sulphite or bisulphite and ferrous sulphate (applied at the Kerdzhali Works in Bulgaria) and removal by flotation of iron, copper and lead from zinc concentrates (applied at Belousovka). Mekhanobr and Uralmashzavod have co-operated in producing working drawings of a new mill for testing at the Tyrny-Auzskaya obogatitel'naya fabrika (Tyrny-Auzskaya Beneficiary Works). The laboratoriya metallurgii blagorodnykh metallov (Noble-Metals Metallurgy Laboratory) of Mintsvetmetzoloto have worked on better recovery of valuable metals. The author lists measures for improving beneficiation techniques.

Review of Work in the Field of the Science and Application of Achievements in Ore Beneficiation Practice

points out the special importance for non-ferrous metal ores of new flotation agents and mentions some work in this field by Gintsvetmet, Mekhanobr, the Leningradskiy Nauchno-issledovatel'skiy institut po pererabotke nefti i proizvodstva iskusstvennogo zhidkogo topliva (Leningrad Scientific Research Institute on Oil Refining and the Production of Artificial Liquid Fuel) IGD AN, VIMS, Irgiredmet, Mintsvetmetzoloto and others. Improved methods of xanthate production are to be tested at the Sredduralmed'zavod and the Beresnikovskiy Combine. The author points out the importance of detailed studies of conditions in pulp and the use of various methods for more accurate dispensing of reagents. New flotation methods and equipment have been dealt with by the Belousovskaya obogatitel'naya fabrika (Belousovska Beneficiation Works), Gintsvetmet and the Balkhashskaya Beneficiation Works. The author lists the main work carried out at Mekhanobr on non-ferrous metal ore

Review of Work in the Field of the Science and Application of Achievements in Ore Beneficiation Practice

AS USSR) was reported. At the IGI, Mekhanobr, IGD AN and other centres the theory of centrifugal methods of concentration has been worked out for coal but only partially for ore-concentration. The Mekhanobr institute are studying concentration tables, the Irgiredmet organization spiral separators and the Magadanskiy and other institutes jigging. The author mentions that insufficient attention is being given to heavy-media concentration research, although the IGD AN together with TSNIITMASH is developing a method of producing granulated ferrosilicon. In recent years progess has been made in electric and magnetic methods of separation by the IGD AN, Mekhanobr and Mekhanobr-chermet organizations and full scale tests are shortly to be made of the equipment developed. The last is co-operating with the IGD AN in operating an experimental electric plant for iron ores at the KGOK in Krivbass and the Uralmekhanobr organization have worked on new methods based on the influence of mineral surface-property changes in electric separation. The author

SOV/136-59-2-2/24

AUTHOR: Plaksin, I.N., Corresponding Member of the AS USSR

TITLE: Review of Work in the Field of the Science and Application of Achievements in Ore Beneficiation Practice (Itogi raboty v oblasti nauki i vnedreniya dostizheniy v tekhnike obogashcheniya rud)

PERIODICAL: Tsvetnyye Metally, 1959, Nr 2, pp 4-9 (USSR)

ABSTRACT: The author draws attention to the importance of ore beneficiation in the economic development in the USSR and outlines recent work there in this field. He deals first with work already reported at international conferences in 1955-1958. New material presented at the July 1958 meeting of the Mekhanobr included some dealing with kinetics of flotation-reagent sorption and methods, including those based on the use of radio-active tracers, of studying this. Reviews of research on gravitation-concentration theory and practice were given at the conference (May 1958) at the IGD AN: successful work by the Moskovskiy gornyy institut (Moscow Mining Institute) and the Institut goryuchikh iskopayemykh AN SSSR (Mineral Fuels Institute of the

Card 1/4

LOPATIN, A.G., inzh.; PLAKSIN, I.N., prof.

Effect of alkalies on the flotability of gold. Nauch. dokl. vys. shkoly; gor. delo no.1:209-213 '59. (MIRA 12:5)

1.Chlen-korrespondent AN SSSR (for Plaksin). Predstavlena kafedroy metallurgii blagorodnykh metallov Moskovskogo instituta tsvetnykh metallov i zolota im. M.I. Kalinina.
(Flotation) (Gold)

Influence of Oxygen on the Attachment and Distribution of Tridecylate on the Surface of Fluorite in Flotation

quantity of reagent and its more uniform distribution on particle surfaces, as the oxygen-content rises from 0.1 to 8.3 to 38.8 mg/litre, respectively.

Card 3/3 There are 4 figures, 2 tables and 6 references (5 Soviet, 1 English).

SUBMITTED: January 22, 1958

Influence of Oxygen on the Attachment and Distribution of Tridecylate on the Surface of Fluorite in Flotation

modification of one previously described (Ref 5). Zabaykal'skiy (Zabaykal) fluorite ground to -74 +44 microns was used. 20g samples with a solid/liquid ratio were treated for 2 minutes with the reagent (100 g/tonne of tridecylic acid, 200 of soda) and flotated for 4-10 minutes. An average sample of the washed product was taken and the absorption of reagent was determined radiometrically and by autoradiography. Fig 1 shows the influence of the oxygen content of the pulp on the recovery (curve E) and the absorption of reagent (curve e); both rise with increasing oxygen content; Table 1 gives further details. From the microautoradiograms the non-uniformity of reagent distribution on grain surfaces at various pulp oxygen contents was determined. The results (Table 2) show that this effect too, depends on the oxygen content. Figs 2, 3 and 4 show the increasing

SOV/180-59-1-15/29

AUTHORS: Plaskin, I.N., Tyurnikova, V.I. and Chaplygina, Ye.M. (Moscow)

TITLE: Influence of Oxygen on the Attachment and Distribution of Tridecylate on the Surface of Fluorite in Flotation (Vliyaniye kisloroda na zakrepleniye i raspredeleniye tridetsilata na poverkhnosti flyuorita pri flotatsii)

PERIODICAL: Izvestiya Akademii nauk SSSR, Otdeleniye tekhnicheskikh nauk, Metallurgiya i toplivo, 1959, Nr 1, pp 78-81 (USSR)

ABSTRACT: Two of the authors have experimentally shown the different effects of gases on the flotation of some sulphide and non-sulphide minerals and ores (Ref 1) and established (Ref 2) that oxygen can increase the density of the adsorbed layer and the firmness of its attachment. The investigation now reported had the aim of elucidating the specific influence of oxygen on the reaction of minerals with reagents by studying the adsorption of the collector radiometrically and its distribution by the microauto-radiographic method. The collector was sodium tridecylate (or tridecylic acid) containing radioactive C^{14} as a tracer. Preliminary experiments showed the behaviour of these reagents to be the same as that of sodium oleate (not available with a tracer). The apparatus used was a

Card 1/3

The Measurement of the Pulp Density by Gamma Rays

and in this manner to realize a correct functioning of the latter. This cradle-shaped device serves as well to avoiding the sagging of hard ingredients, thanks to an experimentally fixed, 60° arrangement of its sidewalls. There are 1 set of graphs, 1 diagram and 2 Soviet references.

ASSOCIATION: Institut gornogo dela AS USSR (Institute of Mining Engineering of the AS USSR); Khar'kovskiy zavod KIP (KIP Khar'kov Plant)

Card 2/2

SOV/127-59-1-21/26

AUTHORS: Plaksin, I. N., Corresponding Member of the AS USSR,
Gol'din, M. L., Engineer

TITLE: The Measurement of the Pulp Density by Gamma Rays
(Izmereniye plotnosti pul'py gamma luchami)

PERIODICAL: Gornyy zhurnal 1959, Nr 1, pp 71-74 (USSR)

ABSTRACT: Experiments on determining the pulp density in a concentration plant are described. The contractless method of measuring the pulp density is quoted as most efficient and as corresponding to requirements of the mining industry. Experiments on analysing the technological process of ore dressing were carried out in the concentration plant of the Krivoy Rog South Concentration Combine. As result of these experiments it was found that the spilling threshold of the classifier is one of the most convenient places for measuring pulp density. A collecting device for securing a correct measuring of pulp density was developed during above mentioned experimental work. This collecting device was installed on the spillway threshold of the collector. Its purpose is to secure a complete filling of the pipe duct of the classifier

Card 1/2

SOV/163-59-1-4/50

The Influence of the Principal Factors on the Sorption of a Complex Ion $[PdCl_6]^{11}$ by Some Anionites Under Equilibrium Conditions

to be much smaller than its sorption rate. There are 2 figures, 2 tables, and 2 references, 1 of which is Soviet.

ASSOCIATION: Moskovskiy institut tsvetnykh metallov i zolota (Moscow Institute of Non-ferrous Metals and Gold)

SUBMITTED: June 13, 1958

Card 4/4

The Influence of the Principal Factors on the Sorption of a Complex Ion $[PdCl_6]^{11}$ by Some Anionites Under Equilibrium Conditions

influence of the hydrochloric acid becomes effective primarily just prior to the moment at which the palladium ion is sorbed at the resin. It becomes manifest by an isolation of the sorbed ion from the reaction groups of the resin by the acid ions. This isolation effect is more pronounced at lower metal concentrations, higher acid concentrations and a smaller accessibility of the reaction groups of the resin. The size of the pores and ducts of EDE-10P is more favorable to rapid sorption, and the isolation influence is less effective; thus sorption proceeds normally. The reaction groups in AN-2f are located in less easily accessible ducts. Hence in most cases they cannot participate as easily in the reaction, as the ducts are primarily occupied by the acid ions. In a further diagram it is shown that the rate of sorption is dependent upon the type of resin. The sorption of $[PdCl_6]^{11}$ ions on both resins increases only little with rising temperature. This is closely connected with the kinetic peculiarities of this ion, the diffusion rate of which appears

The Influence of the Principal Factors on the Sorption of a Complex Ion $[PdCl_6]^{11}$ by Some Anionites Under Equilibrium Conditions

ing: 1) The sorption of palladium by the resins EDE-10P and AN-2f increases with increasing palladium concentration in the interval from 0.5 to 4.0 g/l. The sorption practically does not increase further in the interval from 4 - 8 g/l, especially if the acid concentration is below 2.0% of HCl. 2) If the acid concentration is increased, the sorption of the palladium ion by both resins decreases considerably. When the HCl concentration exceeds 4%, the nature of this decrease varies somewhat. On AN-2f the sorption decreases more slowly if the metal concentration is higher, whereas on EDE-10P a diminished concentration has the same effect. Moreover an increase of the metal concentration with EDE-10P and a reduction with AN-2f a tendency is found of the palladium ion sorption to be directly dependent upon the hydrochloric acid concentration. This is for EDE-10P found at a metal concentration of 4.0 and 8.0 g/l in the solution. An explanation is offered for these differences in the dependence of the $[PdCl_6]^{11}$ ion sorption upon the HCl concentration: 1) It is shown that the rate of sorption is higher on the resin EDE-10P than on AN-2f, which can be explained by the different size of the pores and ducts in the grains of these resins. 2) The

18(6)

SOV/163-59-1-4/50

AUTHORS: Korobkin, A. A., Plaksin, I. N.

TITLE: The Influence of the Principal Factors on the Sorption of a Complex Ion $[PdCl_6]^{11}$ by Some Anionites Under Equilibrium Conditions (Vliyaniye osnovnykh faktorov na sorbtsiyu kompleksnogo iona $[PdCl_6]^{11}$ nekotorymi anionitami v ravnovesnykh usloviyakh)

PERIODICAL: Nauchnyye doklady vysshey shkoly. Metallurgiya, 1959, Nr 1, pp 14-18 (USSR)

ABSTRACT: This paper gives an account of the influence of the concentration of palladium and of the free hydrochloric acid, of the contact time and of temperature upon the sorption of the complex ion $[PdCl_6]^{11}$ by the anionites EDE-10P and AN-2f under equilibrium conditions from pure solutions of palladium hydrochloric acid. The experimental procedure is described first. The sorption of palladium in resin samples (100mg) was determined. The volume of the solution was adjusted at a certain concentration of palladium and of the acid so that in each experiment 50 mg of metal and 100 mg of resin were present. The diagrams obtained show the follow-

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PLAKSIN, I.N.

TITLE: Conference on Autoclave Processes

PERIODICAL: Tsvetnyye metally, 1959, Nr 7, pp 84-87 (USSR)

ABSTRACT: On 23-26 February 1959 a conference was held in Moscow for summing-up and coordinating work on autoclave processes in the metallurgy of heavy, non-ferrous, rare and noble [illegible]. The conference heard reports as follows: D.M. Yukhtanov, Gintsvetmet, on progress throughout the world on the use of hydrometallurgical, particularly autoclave, methods for non-ferrous and rare metal production; G. N. Dobrokhotov, Gipronikel', on nickel leaching practice at some Soviet works; N. I. Onuchkina and G. N. Dobrokhotov on the thermodynamics and kinetics of the selective reduction by hydrogen and carbon monoxide under pressure of nickel and cobalt from solution; I. Yu. Leshch and K. M. Shelepova, Gipronikel', on design decisions on the application of the flowsheets dealt with by G. N. Dobrokhotov at the Yuzhuralnikel' and Severonikel Combines and the Ufaleyskiy (Ufa) Nickel Works; I. N. Maslenitskiy, Leningradskiy gornyy institut (Leningrad Mining Institute) on the advantages of a combined flotation-autoclave method for nickel-electrolysis of slimes containing platinum-group metals; V. B. Zhilkin, Severonikel' combine, and S. I. Sobol', Gintsvetmet, on the essentials of the neutral method of oxidizing leaching of nickel concentrate from converter-matte flotation; S. I. Sobol' on preliminary investigations on the development of a sulphurous-sulphuric method for leaching nickel and cobalt from oxidized nickel ores; N. N. Maslenitskiy, Mekhanobr, on the main results of investigations of the autoclave-soda process for treating tungsten-ore beneficiation products; V. I. Poprukaylo, Mekhanobr, and D. A. Malakhov, Skopinskaya (Skopinsk) TsOF, separately, on problems in the application of an autoclave-soda flowsheet to scheelite and wolframite raw material; G. A. Meyerson, K. Ya. Shapiro, N. N. Khavskiy, R. A. Pavlyuk and A. P. Nadol'skiy, Krasnoyarskiy institut tsvetnykh metallov (Krasnoyarsk Non-Ferrous Metals Institute) on the treatment of tungsten concentrate in hermetical, heated ball-mills with acids or caustic [illegible]alies; V. I. Spiridonova, S. I. Sobol', Ye. I. Gulyayeva, S. L. Berlin, I. M. Nelen' and B. I. Rudenko, Gintsvetmet, on the treatment of prepared and unprepared sulphide molybdenum raw material by oxidizing autoclave alkaline leaching; I. M. Nelen' and S. I. Sobol' on the kinetics of oxidizing autoclave leaching; A. N. Zelikman and L. M. Lyapina, Krasnoyarsk Non-Ferrous Metals Institute, on the results of a study of conditions for the selective separation of lower oxides of tungsten and molybdenum from their salt solutions by hydrogen under pressure; M. V. Darbinyan, Gorno-metallurgicheskiy institut (Mining-Metallurgical Institute) of the Sovnarkhoz (economic council) of the Armyanskaya SSR (Armenian SSR), on his investigations of ammoniacal autoclave leaching under oxygen pressure of molybdenum concentrates; S. I. Sobol' on technical-economic factors of ammoniacal leaching; A. I. Sinel'nikova and I. N. Plaksin, Krasnoyarsk Non-Ferrous Metals Institute, on an oxidizing autoclave process for gold-containing raw material; N. G. Tyurin, Ural'skiy politekhnicheskiy institut (Ural Polytechnic Institute) on the behaviour of noble metals in oxidizing autoclave leaching in thiosulphate solutions; A. L. Tseft and D. A. Taraskin and A. Yu. Dadabayev, Institut metallurgii i obogashcheniya AN Kaz SSR (Metallurgy and Beneficiation Institute of the AS Kaz SSR), respectively, on the physicochemical fundamentals and on works' trials of autoclave salt leaching of polymetallic materials; I. Yu. Leshch, Gipronikel', on the unsuitability of autoclave leaching for lime-containing materials; V. A. Bernshteyn, VAMI, on industrial experience of a continuous autoclave leaching process for bauxites; V. V. Tronev, IONKh AN SSSR (IONKh AS USSR), on compounds of some rare elements in various valency states under oxygen and hydrogen pressure in the presence of anhydrous ammonia; S. L. Berlin, Gintsvetmet, on autoclave design and operation; P. G. Yakovlev, Gipronikel', and N. Ye. Vishnevskiy, VNII neftekhim, on model studies on autoclaves and the development of mixers; M. A. Polyanov, K. B. Giredmet, on the design of an experimental high-pressure pulp pump; G. L. Shvarts, NIIKhIMMASh, on the selection of steel for acid leaching of cobalt matte and matte-flotation concentrate; Yu. I. Arkhakov, VNIIneftekhim, on corrosion of types 1Kh18N9T, 12KhN[illegible], 10KhSND and 10GND steels in soda and alkaline solutions in the presence of metal salts and oxygen at [illegible] - 15 kg/mm²; V. I. [illegible] and N. N. Kalyutin, VNIIneftekhim, separately, on mechanical properties of hydrogen-affected steels. The conference made recommendations aimed at the extension and improve-

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SHAPIRO, Izrail' Solomonovich; YANSHIN, A.L., akademik, nauchnyy red.; AGOSHKOV, M.I., nauchnyy red.; PLAKSIN, I.N., nauchnyy red.; BARDIN, I.P., akademik, otv.red.; DOLITSKAYA, S.S., red.; SMIRNOV, Z.K., tekhn.red.

[Iron ores; a bibliography, 1955-1957] Zheleznye rudy; bibliograficheskii spravochnik, 1955-1957. Otvetstv.red. I.P.Bardin. Moskva, Proizvodstvenno-izdatel'skii kombinat VINITI, 1959. 910 p. (MIRA 12:11)

1. Akademiya nauk SSSR. Institut nauchnoy i tekhnicheskoy informatsii. 2. Chleny-korrespondenty AN SSSR (for Agoshkov, Plaksin).

(Bibliography--Iron ores)

PLAKSIN, Igor' Nikolayevich; RAZDELISHIN, Anatoliy Nikolayevich; RUDENKO, Konstantin Gerasimovich; SMIRNOV, Aleksandr Nikolayevich; TROITSKIY, Aleksandr Vasil'yevich; FISHMAN, Mikhail Aleksandrovich; GARBER, T.N., red.izd-va; KOROVENKOVA, Z.A., tekhn.red.

[Atlas of the industrial equipment of ore dressing plants] Atlas tekhnologicheskogo oborudovaniia obogatitel'nykh fabrik. Pod obshchei red. I.N.Plaksina. Moskva, Gos.nauchno-tekhn.izd-vo lit-ry po gornomu delu, 1959. 234 l. (MIRA 13:4)

1. Chlen-korrespondent AN SSSR (for Plaksin).
(Ore dressing--Equipment and supplies)

The Influence of the Electrochemical Heterogeneity of the Sulfide Mineral Surface on the Xanthate Distribution Under Flotation Conditions SOV/20-121-1-41/59

SUBMITTED: April 16, 1958

1. Minerals---Flotation 2. Minerals---Adsorptive properties
3. Sulfides---Electrochemistry 4. Reagents---Performance
5. Xanthate ions---Chemical effects

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also the distribution of the reagent on these facets. When the xanthate ions enter the effective zone of the mentioned electric field they are subjected to the orientated effect of the gradient of these fields and are mainly placed in the zone of the anodic sections. The occurrence of the reducing properties of the xanthates is to be expected, owing to the increased xanthate concentration. The dixanthogen produced in this connection may either screen the anodic section in changing the potential of the latter or shift to the surface sections with an isoelectric state, or leave the mineral surface. In the cathodic sections a stronger bond of xanthate may be assumed, since electric repulsive forces are effective which reduce the formation of the xanthate adsorbed by the surface. Under flotation conditions a re-distribution of xanthate takes place on the surface of a sulfide particle as well as between individual particles under the influence of electrochemical factors. There are 3 figures and 10 references 9 of which are Soviet.

authors investigated the change of the electric potential between two particles of a pyrite crystal. They investigated this change in distilled water as well as in a solution of butyl xanthate (0,001%). Figure 1 gives the measuring results. The maxima of the curves correspond to the greatest difference of the energetic state of the pyrite surface which was placed in a liquid medium in consequence of the adsorption-chemical action of the medium on the mineral surface. The sulfide minerals are in most cases semiconductors with an n-type conductivity. The measurable electro-chemical potential is therefore a sensitive indicator of the physical-chemical processes which take place on the surface of the sulfides. The electro-chemical processes on the surface of the sulfide minerals play an important rôle in the mechanism of the re-distribution of the reagent. The influence of the anodic surface sections on the distribution of the reagent on the surface of the sulfide minerals may be considered fixed. These sections form electric fields which on their part considerably change the qualitative composition of the adsorption diffusion layer, and therefore

AUTHORS: Plaksin, I. N., Corresponding Member, SOV/20-121-1-41/55
Academy of Sciences, USSR, Shafeyev, R. Sh.

TITLE: The Influence of the Electrochemical Heterogeneity of the Sulfide Mineral Surface on the Xanthate Distribution Under Flotation Conditions (Vliyaniye elektrokhimicheskoy neodnorodnosti poverkhnosti sul'fidnykh mineralov na raspredeleniye ksantogenata v usloviyakh flotatsii)

PERIODICAL: Doklady Akademii nauk SSSR, 1958, Vol. 121, Nr 1, pp. 145 - 148 (USSR)

ABSTRACT: The irregular distribution of the reagent on the mineral particles in the flotation pulp may be caused by the different sorption activity of the bare mineral surfaces as well as by numerous secondary actions in the flotation process. The adsorption-chemical effect of the medium which contains the destroyed crystals tends to reduce the energetic irregularity of the surface to a minimum. The velocity of such an action is different even for two particles of one destroyed crystal. This probably leads to the observed irregularity of the sorption properties of the same mineral in the flotation pulp. The

The Nonuniformity of Reagent Distribution in Sulphide Flotation

metal the flotation depends on the nonuniformity of [illegible] as is shown in table 1. This influence of nonuniform distribution may cause a lack of clear relation between reagent adsorption and flotation ability of the reagent if the reagents are sufficiently concentrated. This was ascertained by radiometry (Ref 3). Therefore the increase of concentration of the xanthogenate beyond a certain value is inefficient as far as floatability is concerned. This has the same effect with varying oxide concentration in the liquid phase of the pulp (Table 2). The specific distribution of xanthogenates of various alcohols depends on the length of their hydrocarbon radical. There are 1 table, 2 microautoradiograms (on page 102), and 3 Soviet references.

SUBMITTED: December 24, 1957

1. Minerals--Flotation 2. Reagents--Adsorption
3. Reagents--Effectiveness 4. Radiography--Applications

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The Nonuniformity of Reagent Distribution in Sulphide Flotation

and chemical activity of the xanthogenate, the half life and the coefficient of backscattering. Fig. 1 shows a typical standard and a chalcopyrite particle of the floating agent. The quantitative estimation of the attachment and distribution of the reagent on the mineral surface is carried out according to two indices: a) the calculation of the reagent quantity which has been adsorbed on one facet of the mineral grain and b) the variation coefficient determined by the method of mathematical statistics (Ref 2). By means of this method the interaction of the xanthogenates of various alcohols with chalcopyrite, galenite and sphalerite has been tested. The results are given in table 1. With a sufficient quantity of xanthogenates attached to the surface, the transition of the particle into the floating agent mostly depends on the degree of uniformity of reagent covering. If the reagent is only slightly adsorbed (as for instance with a high pH value) the probability of the grain getting into the floating agent is determined not so much by the distribution character of the reagent on the surface as by the quantity of the reagent attached thereon. Although further xanthogenate layers are formed, they do not add to the flotation. With a constant quantity of reagent adhering to the

SOV/ 20-120-1-42/63

AUTHORS: Plaksin, I. N., Corresponding Member, Academy of Sciences, USSR, Tyurnikova, V. I.

TITLE: The Nonuniformity of Reagent Distribution in Sulphide Flotation (O neravnomernosti raspredeleniya reagenta pri flotatsii sul'fidov)

PERIODICAL: Doklady Akademii Nauk SSSR, 1958, Vol. 120, Nr 1, pp.155-157 (USSR)

ABSTRACT: The investigation of the influence exercised by the degree of nonuniformity in the reagent adsorbed on the surface of very fine particles (44 - 74 μ), on the results of flotation necessitated the elaboration of a special method of quantitative radiography. The method of wet micro-radiography (Ref 1) developed by the authors is based on counting the silver grains developed on samples and standards. The method is again described briefly. By counting these grains under a microscope the quantity of the reagent needed for the reduction of the silver grain on the standard is determined. The standards are prepared in consideration of the specific

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stigation carried out showed the coincidence of the flotation properties with the capability for interaction of the mentioned minerals with the calculated values of energy of the crystal lattice. Thus, for instance, the effectiveness of the action of sodium sulfide on oxide lead minerals decreases in the transition from the minerals of group I to the minerals of groups II and III. Various details concerning the flotation of poorly floatable minerals are given. Phosphotene, petroleum, lubricating oil for automobiles, and polugudron together with xanthogenates served as new effective flotation reagents. Finally the author thanks N.V. Belov, Member, Academy of Sciences, and G. B. Bokiy for valuable advice. There are 1 table and 2 references, 0 of which are Soviet.

SUBMITTED: December 18, 1957

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and composition strongly differentiates from the easily floatable minerals. Therefore the authors tried to explain the unsatisfactory results in the floatation of the above mentioned minerals by the investigation of their crystallo-chemical characteristic features and of their surface properties with regard to water and various flotation reagents. Based on the results of these investigations also the most effective methods for the floatation of the mentioned minerals are to be found. The authors first of all calculated the energies of the crystal lattices of the lead minerals to be investigated by means of the method by Fersman. According to the results given in a table the energies of the crystal lattices of cerussitem anglesite and wulfenite (group I) differ only little from each other. The second group of minerals (mimetisite,pyromorphite and vanadinite) have great values of lattice energies. The greatest energies of the crystal lattice have boudantite, mimesite, plumbo_bojarosite and pyromorphite. Already the given data make possible an orientation in the estimation of the flotation properties with regard to their capability for interaction of all mentioned minerals with the reagents. The inve-

20-119-5-33/59

AUTHORS: Anfimova, Ye. A., Glembotskiy, V. A., Plaksin, I. N., Corresponding Member, AS USSR, Shcheveleva, A.S.

TITLE: The Influence of Structural Features and Surface Properties on the Froth Flotation Extraction of Poorly Floatable Lead Minerals (Vliyaniye strukturnykh osobennostey i poverkhnostnykh svoystv na izvlecheniye pennoy flotatsiyey trudnoflotiruyemykh svintsovykh mineralov)

PERIODICAL: Doklady Akademii Nauk SSSR, 1958, Vol. 119, Nr 5, pp. 961 - 963 (USSR)

ABSTRACT: The present practice of the concentration of useful minerals does not dispose of any methods for a somehow satisfactory production of complicated lead minerals, like pyromorphite $Pb_5(PO_4)_3Cl$, mimetesite $Pb_5(ASO_4)_3Cl$, bedantite $PbFe_3(ASO_4)(SO_4)(OH)_6$ and plumbobcjarosite $PbFe_6(SO_4)_4(OH)_{12}$. The continuous incomplete production of lead minerals brings about important lead losses. The complicated chemical structure and

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The Influence of Oxygen and Nitrogen on the Separation of Titanium and Zirconium Minerals by Flotation

20-119-4-35/60

of their crystalline structure, the stress intensity of the sureface field as well as by an hydration capacity of their surface (reference 3). There are 1 table and 3 Soviet references.

SUBMITTED: December 19, 1957

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with oxygen and nitrogen gas after previously blowing through with air in the study of the gas influence on the flotation properties of the mineral surface of rutile, ilmenite, and zirconium in the laboratory. This was carried out in a soda (200-400 g/T of soda) medium Oleic acid served as collector (1500 g/T). It was found that the air and oxygen activate the titanium and zirconium minerals (table 1). It was found furthermore that oxygen can be removed by blowing through with nitrogen. Thus a selective flotation became possible which led to the precipitation of zirconium into the foamy product. The titanium minerals remained in the non-foamy product. The consumption of reagents is small here. A reagent-depressor can be substituted by blowing through with nitrogen. The isolation of the zirconium concentrate amounted to 68%, with an extraction of 80%. The TiO_2 content in it amounted to approximatively 2%. This method has hitherto been unknown. The different flotability of the zirconium- and titanium minerals in a nitrogen atmosphere is explained by the difference

AUTHORS: Plaksin, I. N., Corresponding Member, 20-119-4-35/60
Academy of Sciences, USSR; Chaplygina, Ye. M.

TITLE: The Influence of Oxygen and Nitrogen on the Separation of Titanium and Zirconium Minerals by Flotation (Vliyaniye kisloroda i azota na flotatsionnoye razdeleniye titanovykh i tsirkoniyevykh mineralov)

PERIODICAL: Doklady Akademii nauk SSSR, 1958, vol 119, Nr 4, pp 756-757 (USSR)

ABSTRACT: The separation of alluvial deposits of the mentioned kind is rather difficult and is carried out at home and abroad according to complicated and slow schemes. These methods are expensive, only to a small extent effective and selective, and demand complicated apparatus. Soviet researchers have succeeded now in solving the problem of how a collective flotation concentrate may be obtained. A scheme of the selective separation of the products of the last mentioned process could, however, not yet be obtained (references 1, 2). The authors began the flotation

Card 1/3

Quantitative Microautoradiography of Xanthates Layers on the Surface of Galenite

20-119-3-44/65

The nonuniformity decreases if 2 different xanthates are combined with each other. Figure 3 shows the blackening curve of the microautoradiograph of the galenite particles which were treated with a mixture (1:1) of ethyl- and butyl xanthate in the case of a total dosage of 100 g/to. The curve characterizes a more uniform blackening of the microautoradiograph and thus a more uniform distribution of the xanthates on the surface. In consequence of the reduction of the sections which were not occupied by the reagent the nonuniformity coefficient here reduces to 73 %. Thus the increased extraction by 2 sulfo-hydryl collectors is explained to a certain extent.
There are 2 figures and 8 references, 7 of which are Soviet.

SUBMITTED: December 18, 1957

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Quantitative Microautoradiography of Xanthates Layers on the Surface of Galenite

for Au 65 %) the measurement of the number of the molecular layers of xanthate on the sections of the particle surface is possible by means of a direct comparison of the blackening density on the radiographs of the galenite particles and the gold plate. Figure 1 shows the distribution curves of the blackening of the microautoradiograph (1) and of the radiographic impression of the gold plate with a monolayer coating (2) and with ethyl-xanthate which contains S35. The dosage for the case (figure 1) amounts to 100 g/to. The analysis of the curve makes possible the determination of the number of molecular layers on the sections of the microautoradiograph and the detection of the coefficients of the nonuniformity of the distribution of ethyl-xanthate on the galenite surface. The nonuniformity variation coefficient of the last mentioned coatings amounts to 168 %. The triple xanthate dose does not lead to a complete coating of the particles with the reagent, increases, however, only the nonuniformity coefficient up to 385 %. Butyl- and isoamyl xanthates are distributed nonuniformly, too, on the galenite surface.

one for the maximum, the other for the minimum densities. The distribution curve was constructed from the results of the photometric evaluation of the microautoradiograph with normal blackening (not more than 2,0). The absolute covering density of single surface sections of the particles was detected according to the blackening density of the microautoradiographs by comparison with the blackening density of the etalon. Radioactive monolayers are the best radioactive sources for the quantitative radiography (ref 6). The authors established conditions (ref 7) under which a monomolecular adsorption layer of xanthate is formed on the surface of a small plate of chemically pure gold. A photometric analysis of the autoradiographic impression showed a complete homogeneity of the mentioned etalon. The coefficients of the backword scattering of the material on which the reagent was adsorbed were taken into account because of an absolute evaluation of the image intensity on the autoradiographs. In consequence of the very approximated values of these coefficients (for PbS 67 %,

20-119-3-44/65

AUTHORS: Plaksin, I. N., Corresponding Member, Academy of Sciences, USSR, Zaytseva, S. P., and Shafeyev, R. Sh.

TITLE: Quantitative Microautoradiography of Xanthates Layers on the Surface of Galenite (Kolichestvennaya mikroavtoradiografiya sloyev ksantogenatov na poverkhnosti galenita)

PERIODICAL: Doklady Akademii Nauk SSSR, 1958, Vol. 119, Nr 3, pp. 551-552 (USSR)

ABSTRACT: A nonuniform distribution of the flotation reagents on the surface of the sulfide minerals (size 43 - 500μ) under formation of poly-layers in single cases was found by means of the mentioned method. In the present paper the degree of nununiformity of the galenite particles which have a size of 200-500μ is evaluated quantitatively by flotation collectors by means of the same method. The layers on the particles were radiographed by means of contrast-micro-autoradiography (ref 1), according to the blackening of single sections of the impressions (determined by micro-photometer). 2 curves of density of blackening were constructed from the results of the photometric evaluation:

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*The Influence of the Electrical Potential on the Distribution of Xanthates on the Surface of Sulfides 20-3-37/39

at the cost of the influence of the gaseous phase of the bubble.
There are 2 figures, and 7 references, 5 of which are Slavic.

SUBMITTED: September 3, 1957

AVAILABLE: Library of Congress

Card 4/4

from one surface place to the other. This occurs especially in the case of shifting of the reagent from the upper layers of a shell of several layers to surface places still free from reagent. The current impulses between sulfide minerals at the moment of collision in a 0,01 n-KCl-solution amounted to 2,0 - 2,5 mA. Such a current related to the point of contact between the mineral particles as well as to the depths of the absorbing layers produces considerable energy gradients which are able to change the original distribution of reagents thoroughly. The authors observed that the the buresting of an air bubble starts at the moment of attachment to any active point. This burst spreads rapidly on the surface of attachment. The potential is probably changed by an air bubble approaching the mineral surface. The change is the greater the more the bubble approached this surface. If the liquid phase is interrupted in an active point at the moment of contact between the air bubble and the mineral surface and then fastening starts, the potential gradiant on the formed 3-phase limit increases with the increasing surface of attachment of the bubble to the mineral

micro- and macro-elements formed. The authors measured potentials of newly stripped sulfide minerals. For this purpose they used an oscillographic apparatus without inertia (Bezynertsionnaya) with an electro-magnetic input scheme guaranteeing a minimum polarization. Measuring results were by 15-50 % higher or lower than those obtained by methods. The forming of a change of the potential on an uneven surface of a sulfide mineral particle is shown schematically in fig. 2. A formed electric field (of forces) affects, the further placing of ions and molecules to be absorbed because of the change of potential e.g. because of oxygen absorption. Due to this fact the reagent is distributed irregularly on the surface. The distribution of ions or molecules reduces the importance of free energy to a minimum. The phenomena occurring on the occasion of flotation are often observed under conditions which are not equilibrium-like. The collisions of mineral particles with different potentials as well as the physical-chemical interaction with the medium influence the potential differences of the micro sections of the surface. Therefore also the distribution of the reagent is influenced as well as the shifting of its layers

PLAKSIN, I. N.

AUTHORS: Plaksin, I. N., Corresponding Member, AN USSR, 20-3-37/59
Shafeyev, R. Sh.

TITLE: The Influence of the Electrical Potential on the Distribution of Xanthates on the Surface of Sulfides (O vliyanii elektricheskogo potentsiala na raspredeleniye ksantogenatov na poverkhnosti sul'fidov).

PERIODICAL: Doklady AN SSSR, 1958, Vol. 118, Nr 3, pp. 546-548 (USSR)

ABSTRACT: The electrical potential of a mineral in water is irregular owing to the irregularity of its structure. The structure, however, is a result of the conditions of formation and further changes of the surface. The difference of the surface potentials influences the oxidation of sulfides. The authors give a survey of technical literature concerning the connection between the properties of flotation of the surface and their potential (ref. 1-6). There exists a relation between the irregularity of the potential, the fastening of a flotation reagent and the process of attachment of a mineralparticle to a small gas bubble. The authors suggest an explanation of the mechanism regulating the irregular distribution of the reagent on the surface of a mineral. It is based on the potential difference of the

Card 1/4

Decomposition of Mercaptan Collectors in Flotation Conditions

stability of dithiophosphate compared with xanthate, whose decomposition is associated with change of its heteropolar part. Quantitatively this process depends on the initial concentrations both of the xanthate itself and hydrogen ion, the chemical nature of the liquid and temperature. There are 5 figures, 4 tables and 10 references of which 6 are Soviet, 2 German and 2 English.

SUBMITTED: 15th January 1958.

Card 3/3

Decomposition of Mercaptan Collectors in Flotation Conditions

composition of the hydrophobic group of the molecule and the length of the hydrocarbon radical in it. Table 1 shows the actual decomposition of potassium ethyl xanthate and the calculated degree of hydrolytic decomposition at 19°C and pH = 6.6 for solutions of various normalities; Table 2 the change in pH and degree of decomposition of butyl xanthate in solutions of various concentrations; Table 3 the decomposition of 2.6×10^{-5} N solutions of ethyl and octyl xanthates at 80°C and Table 4 determinations of potassium butyl xanthate and butyl dithiophosphate in solutions of alkalis (lime, soda and caustic soda) at equal hydroxyl ion concentrations (pH = 8). The figures show the decomposition of the collector: in relation to normality for pH = 6.4 (Fig.1); to time (minutes) for initially 2.9×10^{-5} solutions at 80°C (Fig.2); to pH for solutions of different normalities (Fig.3 for butyl xanthate, Fig.4 for butyl dithiophosphate); to pH for solutions with and without buffering properties.

Card 2/3 The results of this investigation confirm the higher

SOV/24-58-12-18/27

AUTHORS: Plaksin, I.N.
Okolovich, A.M. (Moscow)

TITLE: Decomposition of Mercaptan Collectors in Flotation Conditions (Razlozheniye sul'fgidril'nykh sobirateley v usloviyakh flotatsii)

PERIODICAL: Izvestiya Akademii Nauk, Otdeleniye Tekhnicheskikh Nauk, 1958, Nr 12, pp 115-119 (USSR)

ABSTRACT: The authors point out that although the composition and properties of the liquid part of the flotation pulp are of major importance, insufficient attention has been given to this problem in research. They discuss previous work in this field and describe their own experiments, which were carried out by S.A. Yekhlakova. The application of potentiometric titration with silver nitrate in the presence of an electrochemical pair consisting of a silver electrode and a calomel half-cell (Ref.6) to the analysis of dilute xanthate and dithiophosphate (potassium salts) solutions has enabled studies of the changes in the stability of mercaptan collectors under various conditions in relation to the

SOV/24-58-11-35/42

Study of the Distribution of Ethyl Xanthogenate and Lime on the Surface of Pyrite Particles by the Method of Quantitative Radiography

1.9 to 11.9. The results are also graphed on p.150. There are 1 table, 1 figure and 4 references, all of which are Soviet.

SUBMITTED: January 20, 1958

Card 2/2

SOV/24-58-11-35/42

AUTHORS: Barskiy, L. A., Plaksin, I. N., and Starchik, I. I. (Moscow)

TITLE: Study of the Distribution of Ethyl Xanthogenate and Lime on the Surface of Pyrite Particles by the Method of Quantitative Radiography (Izucheniye raspredeleniya etilovogo ksantogenata i izvesti na poverkhnosti chastits pirita metodom kolichestvennoy radiografii)

PERIODICAL: Izvestiya Akademii Nauk SSSR, Otdeleniye Tekhnicheskikh Nauk, 1958, Nr 11, pp 129-130 (USSR)

ABSTRACT: The aim of the investigation was to study micro-radiographically two cases of distribution of flotation reagents on the surface of particles of sulphide minerals: 1) chemosorption coatings with a sulfhydryl reagent in the layers composed of monomoleculer layers and 2) film formation during depression with lime forming multi-layer coatings. In a table on p.129 the results are given of the dependence of the adsorption of the ethyl xanthogenate, located on the pyrite, on the pH of the medium on the basis of data of quantitative contrast radiography and radiometry for pH values of

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307/127-58-11-7/16

The Flotation of Iron Minerals from Magnetic Separation Tailings of the Concentration Plant of the KMAruda Kombinat

in a proportion of 6 : 1 was used a depressor. The equipment scheme of the mill consisted of: 3 hydrocyclones ICD-300, 1 spiral classificator and 2 flotation machines M-5 with 10 compartments each. There are 2 tables, 4 graphs, 1 flow-chart and 2 Soviet references.

Card 3/3 1. Iron--Recovery

The Flotation of Iron Minerals from Magnetic Separation Tailings of the Concentration Plant of the KMAruda Kombinat

(Chemical Wood Pulp Industry)(TsNIILKhI) tested a new flotation reagent. This reagent is the heavy fraction of the distillation of the gas-generating resin obtained in the process of wood gasification. A similar product, called Vetluga Oil, is being prepared at the Vetluzhskiy lesokhimicheskiy kombinat (Vetluga Chemical Wood Pulp Kombinat). Vetluga oil has the following characteristics: acid number - 26.9, the fraction output at temperatures up to 240°C including water - 13% of volume. It contains about 40% of high molecular phenols and their derivatives. Laboratory tests made with the tailings of ores from the KMAruda Kombinat showed that with the use of water glass as depressor and Vetluga oil as a flotation reagent, a concentrate containing 44-49% of iron was obtained. As a result of these tests, a scheme of tailing flotation was developed (Figure 5) and industrially tested in the flotation mill in Gubkin, which reprocesses the tailing of the magnetic separation. The 3 months of tests showed the possibility to obtain on an industrial scale a flotation concentrate containing 48-52% of iron. Vetluga oil was used as a collector-frother in a proportion of 600 gr/ton and the mixture of water glass and aluminum sulfate

AUTHORS: Bekhtle, G.A. and Silishchenskaya N.V. Candidates of Technical Sciences, Glembotskiy, V.A., Professor, Plaksin, I.N., Member-Correspondent of the AS USSR, Yefimov, V.I. and Shuyantseva, N.M., Engineers, and Korolev, V.A., Research Worker

TITLE: The Flotation of Iron Minerals from Magnetic Separation Tailings of the Concentration Plant of the KMAruda Kombinat (Flotatsiya zheleznykh mineralov iz khvostov magnitnoy separatsii obogatitel'noy fabriki kombinata KMAruda)

PERIODICAL: Gornyy zhurnal, 1958, Nr 11, pp 28 - 31 (USSR)

ABSTRACT: About 800,000 tons of iron are lost each year in tailings of the Krivorozhskiy yuzhnyy gorno-obogatitel'nyy kombinat (Krivoy Rog Southern Concentration Plant) alone when the concentration of iron ore is done by magnetic separation. To reduce these losses, the Mekhanobr Institute long ago proposed the flotation method to extract the iron from the tailings. But the lack of an effective and inexpensive flotation reagent prevented the introduction of this method. Lately, the branch of the Institute of Mining of the AS USSR at the Kursk Magnetic Anomaly, in collaboration with the Tsentral'nyy nauchno-issledovatel'nyy institut (Central Scientific Research Institute) of the Lesokhimicheskaya promyshlennost'

Card 1/3

PLAKSIN, I.N.; OKOLOVICH, A.M.; DMITRIYEVA, G.M.

Flow sheet for flotation of complex ores. Biul. tekh.-ekon.inform. no.9:9-11 '58. (MIRA 11:10)

(Ore dressing)

The Effect of Various Flotation Reagents on the Interaction Between Potassium Xanthogenate and Chalcopyrite, Pyrite and Tetrahedrite

increasing concentration of Na_2S the quantity of desorbed KEKH increased, reaching 80-95% at 0.5% Na_2S.

It was concluded that selective separation of pyrite, chalcopyrite and tetrahedrite by means of adjusting the pH number of the flotation medium is not possible. The fact that adsorption of KEKH is increased by $K_3Fe(CN)_6$ in the case of chalcopyrite and decreased in the case of tetrahedrite could be utilised for developing a selective flotation process for these two minerals. Alternatively, a solution of Na_2S could be used for removing the adsorbed KEKH from all the three minerals which then could be separated by flotation using suitable activating or depressing reagents. There are 6 figures, 1 table and 3 Soviet references.

SUBMITTED: October 17, 1957

Card 5/5

The Effect of Various Flotation Reagents on the Interaction between Potassium Xanthogenate and Chalcopyrite, Pyrite and Tetrahedrite

Pyrite: Adsorption of KEKH decreased by: $K_3Fe(CN)_6$ > > $K_4Fe(CN)_6$ > CaO > $FeSO_4$ > $ZnSO_4$ > Na_2SO_2 > Na_2SO_3 ; adsorption not affected by : Na_2SO_3, NaCl, NH_4CNS , adsorption increased by : $CaCl_2$ < $CuSO_4$

Chalcopyrite: adsorption decreased by: $K_4Fe(CN)_6$ > CaO > > $Na_2S_2O_3$ > NH_4CNS ; adsorption not affected by : NaCl, Na_2SO_3, Na_2SO_4 ; adsorption increased by : $CaCl_2$ < $ZnSO_4$ < $FeSO_4$ < $K_3Fe(CN)_6$ < $CuSO_4$.

Tetrahedrite: adsorption decreased by : $K_3Fe(CN)_6$ > > $K_4Fe(CN)_6$ > CaO > $FeSO_4$ > $ZnSO_4$ > $Na_2S_2O_3$;adsorption not affected by: Na_2SO_3, Na_2SO_4, $CaCl_2$, NaCl, NH_4CNS; Adsorption increased by $CuSO_4$.

Finally, desorption of KEKH from the investigated substances by means of potassium sulphide was studied. The effectiveness of this desorbent was found to be roughly the same for all three minerals (Figure 6). With the

Card4/5

The Effect of Various Flotation Reagents on the Interaction Between Potassium Xanthogenate and Chalcopyrite, Pyrite and Tetrahedrite

the investigated minerals was studied in the following way: 1 g of each mineral with 6 ml of the KEKH solution was stirred mechanically for 15 minutes, filtered, washed with 5 ml of distilled water and dried. The quantity of the adsorbed KEKH was determined from the radioactivity of the powder, and from the difference in the activity of the solution before and after the experiments. The results are reproduced graphically in Figure 1 (for pyrite) and Figure 2 (for tetrahedrite and chalcopyrite). In all cases the relationship between the quantity of adsorbed KEKH and pH number was quite complex with a sharp maximum at pH = 6-6.5 in the case of pyrite and at pH = 5.5-6.5 in the case of the two other minerals. In the next stage, the effect of several reagents on adsorption of KEKH was investigated by measuring the quantity of KEKH adsorbed by powdered minerals that had been previously washed in solutions containing 1×10^{-4} - 3×10^{-4} mol. of the reagents in 6 ml of the solution. The following results were obtained:

The Effect of Various Flotation Reagents on the Interaction Between Potassium Xanthogenate and Chalcopyrite, Pyrite and Tetrahedrite.

makes extraction of these two metals by pyrometallurgical processes more difficult and the object of the present investigation was to explore the possibilities of selective separation of tetrahedrite, chalcopyrite and pyrite by the flotation method. To this end, the effect of various factors on adsorption and desorption of potassium ethylxanthogenate (KEKH) on the investigated minerals was studied by the radioactive tracer technique. The experimental samples (97.9 - 99.36% purity, 0.06 - 0.15 mm particle size) were washed in distilled water, dried in a vacuum desiccator and stored in evacuated ampoules. The KEKH solution was prepared from solid KEKH containing the radioactive isotope S^{35} (specific activity 315 mc/g). Two solutions were used with the concentration of KEKH equal 3.12×10^{-4} and 1.87×10^{-4} mol/l, corresponding to the consumption of KEKH of 300 and 180 g/t, respectively. The pH number of the solutions was adjusted by addition of HCl or NaOH and the effect of pH on the adsorption of KEKH by

AUTHORS: Dolezhil, M., Konopleva, N.K., Pleksin, I.N. and Tsibul'ka, Ya. (Moscow) SOV/24-58-9-1/31

TITLE: The Effect of Various Flotation Reagents on the Interaction Between Potassium Xanthogenate and Chalcopyrite, Pyrite and Tetrahedrite (O vliyanii flotatsionnykh reagentov-regulyatorov na vzaimodeystviye ksantogenata s khal'-piritom, piritom i tetraedritom)

PERIODICAL: Izvestiya Akademii Nauk SSSR, Otdeleniye Tekhnicheskikh Nauk, 1958, Nr 9, pp 3 - 8 (USSR)

ABSTRACT: Almost all the copper-bearing ores from deposits in Western Czechoslovakia contain mainly chalcopyrite and tetrahedrite, with a small proportion of pyrite and (sometimes) pyrrhotite. Of these, tetrahedrite is of particular interest since it contains both copper and antimony, the latter element being sometimes replaced by silver and accompanied by mercury. Flotation is a convenient method for treating these ores but it produces a composite sulphide concentrate in which tetrahedrite and chalco-pyrite are present in approx. equal proportion, with the result that the concentration of antimony and mercury in the concentrate is approx. 50% lower than in tetrahedrite. This comparatively low concentration of Sb and Hg

Card1/5

SOV/24-58-7-32/36

Distribution of Xanthates on the Surface of Sulphide Minerals in Relation to the Length of the Hydrocarbon Radical

on the mineral particles from silver-grain counts. For a quantitative measure of non-uniformity the authors have used the variational coefficient (Ref 5). They outline the determination of its value in the general case and for their experiments with ethyl-, butyl and iso-amyl xanthates on zinc blende. The total adsorption of the reagents for oxygen concentrations in the solution of 0, 16, 20 and 35 mg/litre was also found. The tests covered a pH range of 7.0 - 12.5, the effect of lime being different for the different xanthates. Figures 1, 2, 3 show the values of the coefficient (%) of non-uniformity plotted against lime consumption (K_g/ton) for ethyl, butyl and iso-amyl xanthates on sphalerite for various oxygen contents in the pulp. In all tests, ethyl xanthate was distributed more uniformly than butyl or isoamyl xanthates on the mineral surface. There are 3 figures, 2 tables and 5 Soviet references.

SUBMITTED: January 20, 1958

Card 2/2

SOV/24-58-7-32/36

AUTHORS: Plaksin, I.N., Tyurnikova, V.I. and Trevyakov, O.V.

TITLE: Distribution of Xanthates on the Surface of Sulphide Minerals in Relation to the Length of the Hydrocarbon Radical (Raspredeleniye ksantogenatov na poverkhnosti sul'fidnykh mineralov v zavisimosti ot dliny uglevodorodnogo radikala)

PERIODICAL: Izvestiya Akademii nauk SSSR. Otdeleniye tekhnicheskikh nauk, 1958, Nr 7, pp 146 - 148 (USSR)

ABSTRACT: The authors, in collaboration with L.F. Starchuk have developed a method of quantitative radiography. Using it (Ref 1) they have found that above a certain concentration of reagent on the mineral surface it is the distribution that affects flotation. The method is based on counting the number of developed silver particles on microradiograms of the mineral grains and of a standard. The reagent contains radioactive sulphur as a tracer. The standard is prepared by evaporation of a drop of aqueous xanthate solution, the resulting layer of radioactive reagent being covered with a protective layer. The quantity of reagent required to produce a grain of silver is calculated and used to deduce local reagent concentrations

Card 1/2

Beneficiation of Uranium Ores in England and France (According to Material Gathered in 1955-1957 by the Scientific Missions Abroad)

not yet utilised in industry, was developed in USSR in 1937 by Plaksin and Zefirov for application in cyaniding of gold ores); recovery of metals from solutions (e.g. a solution of phosphoric acid esther in kerosene) or from the pulp with the aid of an insoluble solvent (e.g. a solution of hydrochloric acid); recovery of metals associated with gold, silver and platinum (selenium and tellurium).

Card 3/3

SOV/149-58-6-19/19

Beneficiation of Uranium Ores in England and France (According to Material Gathered in 1955-1957 by the Scientific Missions Abroad)

uranium-bearing, auriferous ores; radiometric sorting of certain Canadian deposits; gravity concentration as practised at Port-Radium (Canada); flotation concentration of uranium ores from deposits at Madagascar and in Central, North and Equatorial Africa; types of uranium ores mined in metropolitan France; flotation concentration of the Australian ores at Radium Hill (with particular reference to the mechanism of the interaction between the uranyl ions and myristic acid); development work on flotation concentration of carbonate uranium ores carried out at the Mindola plant (Africa); recent developments in the application of detergents in the treatment of uranium oxide ores (reference is made to similar developments in USSR, vide "Sbornik Trudov Instituta Gornogo dela Akademii Nauk SSSR, 1956, Nr 3); incorporation of autoclave leaching in the carbonate process (a similar process,

Card2/3

AUTHOR: Plaksin, I.N. SOV/149-58-6-19/19

TITLE: Beneficiation of Uranium Ores in England and France (According to Material Gathered in 1955-1957 by the Scientific Missions Abroad) (Obogashcheniye uranovykh rud v Anglii i Frantsii) (Po materialam zagranichnykh komandirovok 1955 - 1957 gg)

PERIODICAL: Izvestiya Vysshikh Uchebnykh Zavedeniy, Tsvetnaya Metallurgiya, 1958, Nr 6, pp 146 - 148 (USSR)

ABSTRACT: This report is based on two papers ("The Chemical and Physical Concentration of Uranium Ores" by S.W.F. Patching and "Pilot Plant Concentration of Mindola Uranium Ore" by M.L. Fitzgerald and D.F. Kensal) read during the Symposium on the Extraction Metallurgy of Some of the Less Common Metals (Institution of Mining and Metallurgy, London, March 22-23, 1956), on a lecture delivered at the Paris Congress of the Mining Industry (1956) by a representative of the French Atomic Energy Commission and on talks held by the author with a representative of the Mineral Dressing Laboratory of the Atomic Energy Research Establishment at Harwell. A brief account is given of the following: methods used for treatment of the South African,

Card1/3

Action of Oxygen and Nitrogen on the Separation of Titanium and Zirconium Minerals by Selective Flotation and the Role of their Crystal Structure SOV/24-58-6-13/35

selection to be made of the more important factors in the influence of gases on flotation so that a complete theory of the process can be formulated.

There are 3 figures, and 10 Soviet references

SUBMITTED: March 17, 1958

Card 4/4

Action of Oxygen and Nitrogen on the Separation of Titanium and Zirconium Minerals by Selective Flotation and the Role of their Crystal Structure

the most probable cleavage planes. They show the corresponding surfaces for ilmenite (Fig 1), rutile (Fig 2) and zircon (Fig 3) with indications of the ionic distribution and the values of the uncompensated electric charges. The flotation experimental results are explicable on the assumption that the strength of binding of oxygen adsorbed on the mineral surface depends firstly on the oxygen concentration in the pulp and, secondly, on the activity of the adsorbent (particularly the value of the uncompensated charge). The authors examine the factors producing differences between ideal and real crystal surfaces in general and for the three minerals. They admit that because of the complexity of effects involved their views on structural factors are not the only ones possible but claim that they enable a

Action of Oxygen and Nitrogen on the Separation of Titanium and Zirconium Minerals by Selective Flotation and the Role of their Crystal Structure

flotation of rutile and zircon, the relative effects with ilmenite being somewhat less since its flotation was appreciable without gas treatment. Treatment with nitrogen had no effect on zircon flotation but suppressed that of the other two minerals. This depressive effect could not be removed by aeration or oxygenation without the introduction of fresh portions of oleic acid and soda (1.5 kg/tonne and 250 g/tonne, respectively). On the basis of these results it was found possible to achieve a high degree of separation of titanium minerals from zirconium: a saleable zirconium concentrate containing 66% ZrO_2 with a recovery of 80% was obtained cheaply and simply, the titanium losses in it being 2%. The authors have previously (Ref 2,3) attempted to explain differences in flotation behaviour of fluorite and baryte in terms of the fine crystal structure and they now extend their discussion to zircon, rutile and ilmenite. To find the differences in the surface layers of these minerals the authors analysed the crystal structures and determined

Card 2/4

AUTHORS: Bakakin, V.V., Plaksin, I.N. and Chaplygina, Ye.M. SOV/24-58-6-13/35

TITLE: Action of Oxygen and Nitrogen on the Separation of Titanium and Zirconium Minerals by Selective Flotation and the Role of their Crystal Structure (Vozdeystviye kisloroda i azota na razdeleniye selektivnoy flotatsiyey mineralov titana i tsirkona i rol'ikh kristallicheskoy struktury)

PERIODICAL: Izvestiya Akademii Nauk, SSSR, Otdeleniye Tekhnicheskikh Nauk, 1958, Nr 6, pp 84-90 (USSR)

ABSTRACT: It has recently been shown that flotation is the most effective way of beneficiating titanium-zirconium sands but difficulties arise in separating the useful products of the collective flotation. The first part of the work described in this article was carried out under laboratory conditions by Ye.M. Chalpygina supervised by I.N. Plaksin and dealt with the effects of oxygen and nitrogen on flotation in a soda liquid using oleic acid as the collector. Tests were made with the pure minerals, their mixtures, collective gravity concentrate and pulps. Results obtained (Table) showed that treatment with air or oxygen was about equally effective in increasing

Card 1/4

or with a cheaper and safer (although less effective) mixture of methyl alcohol and 18% (by volume) hydrochloric acid; ii) application of a mixture of hydrochloric acid and isobutylmethyl ketone in quantitative analysis of the platinum group metals by paper chromatography; iii) application of isobutylmethyl ketone as a solvent in a two-stage, counter-current, liquid-liquid extraction process suitable for quantitative separation of platinum, palladium, rhodium and iridium chlorides. In the first stage of this process, rhodium and palladium are separated from the other metals after a preliminary oxidising treatment. In the second stage, preceded by a reducing treatment, platinum is separated from iridium. The rest of the article is concerned with the Mond Nickel Co. refining plant at Acton, where platinum, iridium and ruthenium, palladium, rhodium, gold, silver and some other non-ferrous metals are produced. Mention is made of the following items: a) cupellation furnaces with basic lining used for the recovery of precious metals from the low-grade concentrates and from the residues obtained during nickel extraction

AUTHOR: Plaksin, I.N. SOV/149-58-5-18/18

TITLE: Hydrometallurgy and Refining of Precious Metals in Eng...
(From a Report of the Scientific Missions Abroad, 1956)
(Gidrometallurgiya i affinazh blagorodnykh metallov v Anglii (Po materialam zagranichnykh komandirovok 1956 g.))

PERIODICAL: Izvestiya Vysshikh Uchebnykh Zavedeniy, Tsvetnaya Metallurgiya, 1958, Nr 5, pp 148 - 149 (USSR)

ABSTRACT: After a short reference to some of the new processes employed in the British precious metals industry (recovery of precious metals by matte flotation, application of ion exchange resins for extraction of gold from cyanide solutions and for recovery of rhodium during refining of the platinum group metals, complex treatment of the uranium-bearing, South African gold ores), a brief account is given of work done in the chemical department of the National Physical Laboratory at Teddington, where the following problems were being investigated: i) adsorption of gold and associated metals from cyanide solutions by ion exchange resins and elution of the complex gold cyanide compounds with a mixture of acetone and hydrochloric acid.

Card1/3

Investigation of the Effect of the Concentration of Platinum and Free Hydrochloric Acid on Sorption of the Complex $\left[PtCl_6\right]^{2-}$ Ion by Ion-exchangers

capacity and are not suitable media for sorption of platinum from hydrochloric acid solutions.
There are 8 figures, 1 table and 10 references, 2 of which are Soviet, 7 English and 1 German.

ASSOCIATION: Moskovskiy institut tsvetnykh metallov i zolota. Kafedra metallurgii blagorodnykh metallov (Moscow Institute of Non-ferrous Metals and Gold. Chair of Metallurgy of Precious Metals)

SUBMITTED: April 2, 1958

Investigation of the Effect of the Concentration of Platinum and Free Hydrochloric Acid on Sorption of the Complex $[PtCl_6]^{2-}$ Ion by Ion-exchangers

basicity of the resin which cannot but increase the sorption of a weak electrolyte such as platino-hydrochloric acid (Ref 10). If this increase is not observed at all concentrations of HCl of the 4 g/litre Pt solution, it is only because the increase in basicity of the resin is associated with the formation of HCl which weakens the effect of this increase. The following conclusions are drawn.

1) Of the five investigated resins the following are characterised by high sorption capacity (up to 3.8 mg-equiv./g of air-dry resin): EDE-10P, AN-2F, AN-2FG and M-0.

2) The obtained graphs can, in the first approximation, serve as nomographs for calculations both in refining processes and for analytical purposes. By extrapolating these graphs (particularly in the case of resin EDE-10P) the concentration of the HCl eluant can be calculated.

3) Both the AN-1 resin and the MMG-1 and AN-8 resins, which were also studied, are characterised by comparatively low

Investigation of the Effect of the Concentration of Platinum and Free Hydrochloric Acid on Sorption of the Complex $[PtCl_6]^{2-}$ Ion by Ion-exchangers

resin EDE-10P (Figure 7). In this case, sorption of Pt in the 0.5-2.0 g/litre concentration range increases at all concentrations of HCl. However, when the Pt concentration increases to 4 g/litre, sorption of Pt slightly decreases at low HCl concentrations, while at high HCl concentrations it remains constant to increase again in the 4.0-8.0 g/litre Pt concentration range. This phenomenon can be explained in the following manner. Tetravalent platinum is partially reduced by the resin to the bivalent state. As a result two Cl^- ions separated from each molecule of the platino-hydrochloric acid in the absence from the solution of excess ions of the opposite sign, react with the hydrogen of the amine group forming two molecules of HCl, which lowers the pH number of the solution and consequently decreases sorption of platinum. In all probability, the partial reduction of tetravalent Pt and the subsequent reaction of the Cl^- ions with the active groups of the resin is accompanied by an increase of the

Investigation of the Effect of the Concentration of Platinum and Free Hydrochloric Acid on Sorption of the Complex $[PtCl_6]^{2-}$ Ion by Ion-exchangers

dehydrated by filtering, was added and the mixture maintained at 19 - 2 °C was mechanically stirred for 4 hrs. The resin was then separated from the solution with the aid of an ash-free filter, washed thoroughly with distilled water and burnt (together with the filter) in a muffle furnace at 900 - 1 000 °C, after which the obtained sponge was weighed. The results are reproduced graphically in Figures 1-8 which show the sorption of Pt (in mg-equiv./g of air-dry resin) as a function of the concentration of Pt (in g/litre) and HCl (%) in the solution. It appears that the two investigated factors have an opposite effect on sorption of Pt by all the resins used in the present investigation. With the increasing Pt concentration, sorption increases although at high Pt concentrations the rate of increase tends to approach zero. Increasing the HCl concentration results in a decrease of sorption. The sorption/Pt concentration relationship is somewhat different for the

Investigation of the Effect of the Concentration of Platinum and Free Hydrochloric Acid on Sorption of the Complex $[PtCl_6]^{2-}$ Ion by Ion-exchangers

Solutions containing 0.5, 1.0, 2.0, 4.0 and 8% HCl and 0.5, 1.0, 2.0, 4.0 and 8.0 g/litre platinum (in all combinations) were used. All the investigated resins, except AN-1, were used as supplied, i.e. in the chloride form. Resin AN-1 supplied in the sulphate form was converted to chloride form by 24 hour treatment first with a 5% sodium carbonate solution and then with a 3% hydrochloric acid solution. The experiments were carried out in the following manner. The starting solutions were prepared by dissolving refined platinum in aqua regia, transferring the filtered solutions to calibrated flasks, adding a calculated amount of HCl and leaving overnight to ensure the formation of complexes since no reliable results could be obtained with freshly prepared solutions. The quantity of solution used in each experiment was calculated to contain 50 mg Pt. To this quantity of the solution 100 mg of resin (particle size -20 + 35 mesh), previously soaked in distilled water for 48 hours and then

SOV/149-58-5-10/18

AUTHORS: Korobkin, A.A. and Plaksin, I.N.

TITLE: Investigation of the Effect of the Concentration of Platinum and Free Hydrochloric Acid on Sorption of the Complex $\left[PtCl_6\right]^{2-}$ Ion by Ion-exchangers

(Issledovaniye vliyaniya kontsentratsii svobodnoy solyanoy kisloty i platiny na sorbtsiyu kompleksnogo iona $\left[PtCl_6\right]^{2-}$ ionitami)

PERIODICAL: Izvestiya Vysshikh Uchebnykh Zavedeniy, Tsvetnaya Metallurgiya, 1958, Nr 5, pp 90 - 97 (USSR)

ABSTRACT: The five ion-exchange resins used in the present investigation were selected as being representative of those most widely used in industry (resins AN-2F, AN-2FG, EDE-10P, N-O and AN-1) and also because quantitative desorption is more easily obtained in the case of weakly or moderately strong basic exchangers such as AN-2F and EDE-10P. The code numbers, moisture content (%) and the ash content (in mg per 300 mg resin) of the resins are given in a table on p 91 (owing to the low value of the ash content it was neglected in the analytical weight measurements).

Cardl/6

ALEKSEYEV, V.S., inzh.; PLAKSIN, I.N., prof.

Effect of certain reagents on the state of diamond surfaces during their recovery by physicochemical methods of ore dressing. Nauch.dokl.vys.shkoly; gor.delo. no.4:219-222 '58.
(MIRA 12:1)

1. Chlen-korrespondent AN SSSR (for Plaksin). 2. Predstavleno kafedroy metallurgii blagorodnykh metallov Moskovskogo instituta tsvetnykh metallov i zolota imeni M.I. Kalinina.
(Flotation) (Diamonds)

SOV/24-58-4-26/59

On the Theory of Beneficiation of Coal Fines in Hydrocyclones

mechanism of the effects of reagents.
There are 4 figures and 7 Soviet references.

SUBMITTED: January 2, 1958

Card 4/4

carried out experiments to establish experimentally the existence of a separation of gases from the solution in the hydrocyclone. The experiments were carried out inside a perspex hydrocyclone of 60 mm dia., a schematic sketch of which is reproduced in Fig 1. From the sump 1 water, under an excess pressure of 1.2 atm, was fed into the hydrocyclone 3 by means of a centrifugal pump 2. The gas content at various points was determined by measuring the oxygen concentration at the respective points by means of an electro-chemical method described in earlier work of one of the authors (Ref 2). The experimental results relating to the rejection of the dissolved air from the water in various zones of the hydrocyclone prove that gases rejected from the solution play an important rol in the beneficiation of coal in the case of applying reagents. Rejection of dissolved gases occurs almost throughout the entire volume of the liquid and, particularly, in the central zone where the coal beneficiation is mainly concentrated. The results provide an indirect proof of the views of the authors relating to the

On the Theory of Beneficiation of Coal Fines in Hydrocyclones

of the coal particles from the ash particles. The fact that reagents are necessary is attributed to the high content of dissolved gases in the liquid phase of the suspension; in the hydrocyclone the pressure drops sharply and, according to the law of Henry, the pressure drop should result in a rejection from the solution of a large quantity of gases. The rejection of the gases from the solution takes place predominantly at the surface of the solid particles and it is the more intensive the more hydrophobous the surface of the particles. This is particularly noticeable in the flotation of hard coal with addition of large quantities of hydrophobous reagents. In the space subjected to the effects of the centrifugal force in the hydrocyclone, where the influence of differences in the mass of the grains on the separation speed increases very considerably, the presence of gas bubbles of even microscopic dimensions is of great importance from the point of view of separating particles of coal from particles of ash. To verify this idea, the authors

AUTHORS: Akopov, M.G., Venkova, M.D., Klassen, V.I. and Plaksin, I.N. (Moscow) SOV/24-58-4-26/39

TITLE: On the Theory of Beneficiation of Coal Fines in Hydrocyclones (K teorii obogashcheniya melkogo uglya v gidrotsiklonakh)

PERIODICAL: Izvestiya Akademii Nauk SSSR Otdeleniye Tekhnicheskikh Nauk, 1958, Nr 4, pp 129-132 (USSR)

ABSTRACT: One of the problems of coal beneficiation is to find a simple and efficient method of beneficiation of small fractions. At present two processes are applied for this purpose: settling of grains larger than 0.6 mm and flotation of grains smaller than 0.6 mm. Although the settling of such small grains is fully possible, the process is not sufficiently productive. In the Institut Gornogo Dela AN SSSR (Institute of Mining, Ac. Sc., USSR) a method of beneficiation in hydrocyclones was developed. The beneficiation of coal is effected in water to which hydrophobous reagents are added. The presence of reagents brings about an appreciable increase in the effectiveness of the beneficiation process since it results in a more thorough separation

Card1/4