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The Study of the Extraction of Useful Components from Slag by Flotation

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ABSTRACT: This article presents the methods of flotation of slag from the concentrator of the Almalyk Mining Metallurgical Combine to extract useful components. First of all, the sample was isolated by the traditional method, analyzed in the laboratory, and the analysis concluded that the flotation method should be used.

KEY WORDS: solution, gold, silver, flotation, carried, gravity, reagent, hydrocyclone, concentrate, product, component, toxin extraction, solution, tail, regeneration, precious metals analysis, silver, gold, useful components, departure.

I. INTRODUCTION

To conduct laboratory experiments, samples were taken of the tailings of the concentration plants of AMMC, which were subjected to analysis of variance. This presents the methods of flotation of slag from the concentrator of the Almalyk Mining Metallurgical Combine to extract useful components.

The grinding of tailings was carried out in a laboratory ball mill brand 40 ML at T: W: W = 1: 0.75: 8. For the gravitational enrichment of the original tailings, the cheapest methods and equipment for concentrating gold were used - screw separators and gateways (in laboratory form), ZOKS concentration table, felt-coated gateway, laboratory GL hydro cyclone. Studies on the theory of the enrichment process and the processing of various wastes and mineral resources using pyrometallurgical and hydrometallurgical methods were carried out by A.P. Vinogradov, I.V. Petryanov, B.N. Laskorin, N.N. Semenov, E.V. Adamov, I.F. Baryshnikov, A.V. Vanyukov, Yu.P. Kupryakov, I.F. Khudyakov and etc. Scientific research regarding the study of object was carried out in various regions of the world in the field of rational use of mineral resources and improving the technological process of their processing by scientists such as Hector Jordan, Angel Saqhueza, Veronica Ganter, Bevilaqua D., Acciari HA, Benedetti A.V, Fugivara CS, Garciae Jr., O. FremiliosiFilho G, Jacques V., Wiertz, Magda Mateo, Berg H. and others. The scientific research A. P.Vinogradov, B.N. Laskorin, I.V. Petryanov, K. Sanakulov, NN Semenov, A. S. Khasanov, A. A. Yusuphodzhaev, M. M. Yakubov, and others devoted their problems to the processing of waste from mining and metallurgical enterprises. The research of A. A. Andreev, A. N. Dyachenko, A.A. Chizhik, I.P. Markevich, M. Ernazarov, is devoted to the study of halogenammonium technology for processing raw materials and waste and others. In world practice, the improvement of existing technological processes for the processing of mineral raw materials to produce additional metals with the aim of comprehensively extracting valuable components from the waste of mining and metallurgical enterprises is currently becoming very important when creating new highly cost-effective technologies for processing technogenic raw materials.[1]

II. METHODOLOGY

The weight of the sample is standard (1 kg). The distribution of useful components by size classes was studied. The results of the analysis of variance are shown in table 1.

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Table 1.The results of the analysis of variance flotation tailings.

Sizeclass, mkm	Exit, %		Content, %		Extraction	
	г	%	Cu, %	Fe, %	Cu, %	Fe, %
-70 +60	78,1	37,1	0,10	5,1	44.33	45.11
-60 +50	10,1	5,1	0,61	3,74	31,22	4,5
-50 +40	11,0	5,3	0,06	3,4	2.5	4,2
-40 +30	15,0	7,3	0,05	3,6	2,8	5,8
-30 +20	8,4	5,1	0,048	2.9	1,80	2,67
-20 +10	13,8	6,7	0,06	4,7	3,5	7.3
-10 +0	61,4	30,2	0,061	5.0	17.2	33.34
Ref. tails	200	100	0,11	4.6	100	100

From the results of table 1 it follows that the main part of the useful components is contained in the particle size class -70 +60 microns.

The first series of experiments was conducted with reagents BKS, T-92. The subsequent series of experiments were carried out with polyfunctional reagents and reagent T-92.

The technological regime of flotation is as follows. The regrinding of the initial tailings before flotation was carried out for 30 minutes to 98% of the particle size class 0.074 mm. [2] Work was carried out to determine the optimal consumption of a multifunctional reagent according to the flotation scheme shown in Fig.1.

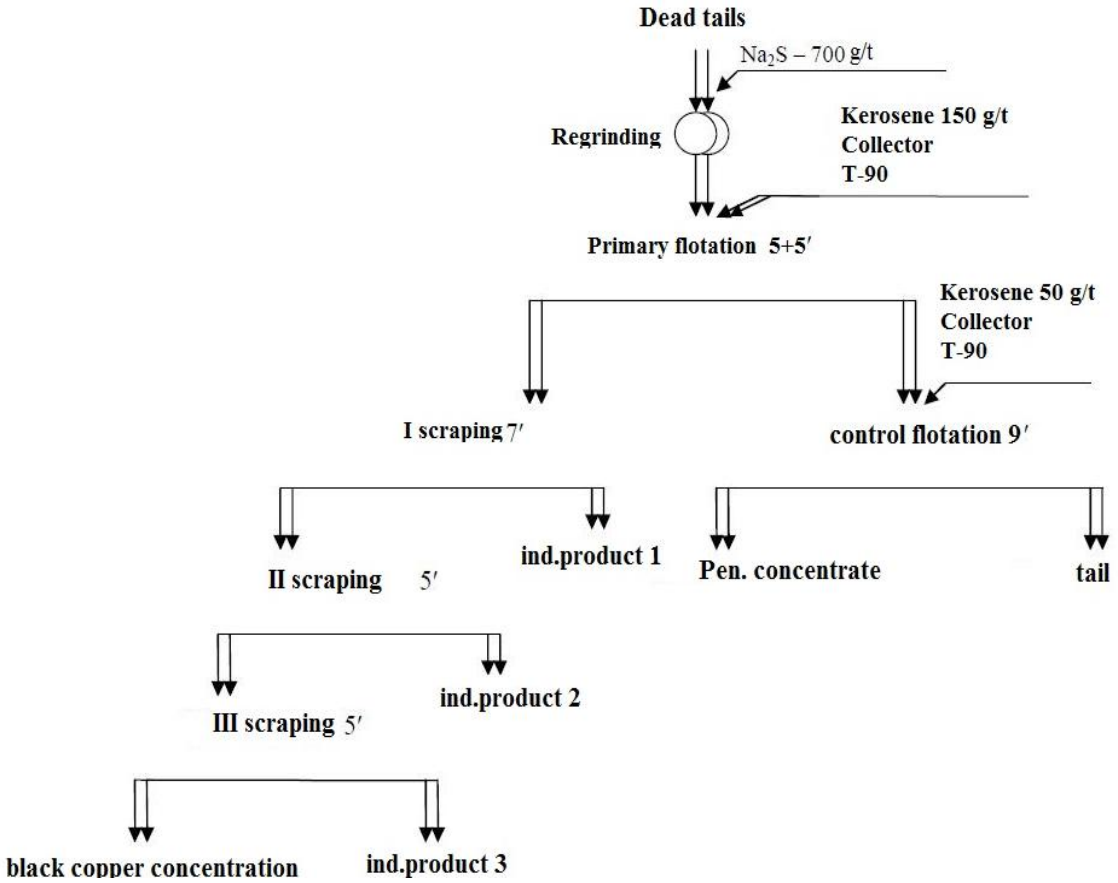

Fig. 1.Technological scheme of flotation tailings enrichment.

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The consumption of a multifunctional reagent ranged from 50 to 100 g / t. Table 2 shows the results of flotation of stale tails at different rates of polyfunctional reagent. It is shown that the optimal consumption of a multifunctional reagent is a flow rate of 75 g / t.

Table 2.Concentration tailings flotation results at various reagent consumption.

Enrichmentproducts	Exit, %	Content		Extraction		Note
		Cu, %	Fe, %	Cu, %	Fe, %	
blackkonstr.	0,9	7,9	10,1	68,7	2,31	BKs-175 g/tT-92-60 g/tRegrinding 30 min
ind. pr 1	15,0	0,03	4,01	3,7	15,26	
ind. pr 2	3,4	0,07	5,41	2,24	5.01	
ind. pr 3	0,98	0,7	7,4	7,1	1,9	
pen. conc.	8.5	0,04	5.01	3,2	11,01	
tail	72,0	0,022	3,4	15,3	65.1	
dead tail	100	0,01	3,8	100	100	
blackkonstr.	0,4	13.2	9.6	54,01	1,1	Multifunctional reagent -50 g/t T-92-60 g/t
ind. pr 1	13	0,03	4,6	3,92	16,94	
ind. pr 2	2.6	0,7	6,8	18,28	5.01	
ind. pr 3	0,65	1	7,9	6,53	1,45	
pen. conc.	7.5	0,03	5,2	2,26	11,05	
tail	75,85	0,021	3	16.00	64,46	
dead tail	100	0.100	3.530	100	100	
blackkonstr.	0,48	13,9	7,5	69,16	1,00	Multifunctional reagent -75 g/t T-92-40 g/t
ind. pr 1	12,6	0,03	3,2	3.92	11,16	
ind. pr 2	2,9	0,08	4,8	2,40	3,85	
ind. pr 3	0,8	0,8	5,9	6,63	1,31	
pen. conc.	6,1	0,03	4,7	1,90	7,94	
tail	77.12	0,02	3.5	15,99	74,74	
dead tail	100	0,096	3,612	100	100	
blackkonstr.	0,8	9,1	9.6	70,21	2,13	Multifunctional reagent -100 g/t T-92-60 g/t
ind. pr 1	15.4	0,02	3,8	2,97	16,20	
ind. pr 2	4,9	0,06	6,4	2,84	8,68	
ind. pr 3	1,2	0,72	6,9	8,33	2,29	
pen. conc.	6.9	0,03	5,2	2,00	9,93	
tail	70.8	0,02	3,1	13,66	60,76	
dead tail	100	0,104	3,612	100	100	

As follows from the results of atomic absorption analysis, maximum content of gold and silver are set in a heavy non-magnetic fraction (table.1.7) due to the presence in it of high amounts of sulfide minerals remaining after pre-analysis selection of gold particles. Study of sulfides in the polished briquettes under the microscope suggests that gold and silver are in fine form, called "invisible", i.e. it is difficult to extract a "hard" gold. In addition, when viewing the material isolated fractions, the polished briquettes was established the presence of "apparent" gold with a size of 0.001 mm. zolotim more "Visible" gold is approximately 70% of the total amount of gold in the samples. Order 45-40% of the gold is free from intergrowths with other minerals. The size of his zolotim ranges from 0.01 to 0.002 mm. Dominated by gold particles size from 0,004 to 0,006 mm. they Often smolder cheshuichatoe, plate, provolochnoe form. [3]

The remaining 35-30% of the gold contained in the intergrowth of goethite, goethite-simontoye beans. The gold forms a single thin inclusions or adheres to their boundary areas, settling in the cracks and pores. The size of these zolotim varies from 0.04 to 0.02 mm. they are characterized amoeboid lumpy shape. Color zolotim in this Association yellow full-bodied.

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III. EXPERIMENTAL RESULTS

A method of refining gold ores, tailings comprising opening at 170-190°C to form ammonium fluoride complexes ftoroammonium silicon and impurity metals separation GFSA sublimation at 350-390 ° C, the adsorption of ammonia from the gas phase by cooling GFSA desublimation process gas , dissolution and processing it with ammonia water to obtain a silicon dioxide filtration silica slurry, drying it and calcination to obtain the finished product in the form of powder, uparkuammoniacal mother liquor, crystallization of ammonium fluoride, which is then recycled to the fluorination step.

Extraction of gold and silver from the residues was performed by cyanidation. The method is characterized in that the ammonium fluoride treatment is carried out in a stoichiometric ratio with respect to silicon oxide and conduct charge separation of silicon oxide in a single step at a relatively low temperature, and translation into a solution of gold by cyanidation is carried out.

A method for producing metallic iron by purifying it from the other components by calcining and melting. Extraction was carried out iron from slag by calcining ammonium fluoride with the addition of salt. Ammonium fluoride, interacting with silicon formed volatile compounds that sublime at temperatures 320-340ºC. The amount of ammonium fluoride was selected stoichiometrically so that there is only sufficient for decomposition of silicon oxide. Equipment for the firing slag was completely sealed. [4]

REFERENCES

[1] A.S. Khasanov, K. S. Sanakulov, A. S. Atakhanov. Technology of complex processing of slags of Almaly MMC.Nonferrous metallurgy, 2003 №2.

[2] S.I. Mitrofanov, L. A. Barsky, V. D. Samygin. The study of minerals for enrichment. M., Nedra, 1974

[3] Samadov A.U. The study of the extraction of iron from copper slags by the halogen-ammonium method // Collection of scientific papers of the XII International scientific-practical conference on the topic: "Modern instrumental systems, information technology and innovation." - T. 4. - Kursk, 2015 .-- S. 34-39.

[4] Samadov A.U. The study of the extraction of valuable components from the waste of metallurgical enterprises // Collection of scientific papers of the XII International scientific-practical conference on the topic: "Modern instrumental systems, information technology and innovation." - T. 4. - Kursk, 2015 .-- S. 212-214.

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