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Research Article

STUDY OF THE POSSIBILITIES OF EXTRACTING EXPENSIVE COMPONENTS FROM COPPER INDUSTRY SLAG WASTE

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ABSTRACT

Today, as production improves, the demand for expensive components is growing. In addition to production, productivity in factories has increased and the production of a large number of minerals in industry is increasing. One of the leading areas of non-ferrous metallurgy is the copper industry. As copper production increases, so does the amount of industrial waste. 85% of the copper produced in the world is obtained pyrometallurgically. In the production of pyrometallurgical copper, a large amount of waste in the form of slag from melting furnaces is several times higher than the cost of finished products. Increased requirements for waste to protect the environment are increasing. A number of valuable useful components are required from waste slags that are transported and processed, using innovative technologies. Therefore, the extraction of expensive components from the waste of slag production of copper is one of the main tasks today.

KEYWORDS

Slag, flotation, flotation agent, expensive components, production, productivity, non-ferrous metallurgy, copper industry, copper industry, innovative technologies.

INTRODUCTION

In global practice, the copper production sector has a strong growth trend, and the demand for them is also increasing. There are a lot of waste slag processing technologies and they are paying off. With the

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development of high-efficiency furnaces, the volume of waste slag is increasing.

Currently, a number of scientific and practical results are being carried out on the processing of waste slags in the form of reburner furnaces, oxygen-torch furnaces, Vanyukov furnaces, zinc production cakes and converter slags[1].

The main findings and results

We are using flotation technology to improve copper production technology and extract precious metals such as copper, gold, and silver from waste slag. Today, flotation is a highly effective and inexpensive processing technology for the extraction of precious metals. Based on the flotation technology, experimental and laboratory works are being carried out on converter and waste slag. It was studied that the change of the pH value of the aqueous phase during flotation is of significant importance.

The chemical composition of converter and waste slag is presented in Table 1.1.

Chemical composition of converter and waste slags of Olmaliq MMC JSC

	Type of slag	Composition , %								
		Cu	Mo	Fe	SiO_2	Al_2O_3	S	Zn	Au g/t	Ag g/t
	Converter slag	2,10	0,0068	41,82	26,92	3,97	1,48	1,01	1,0	12,20
	Waste slag	0,96	0,0070	34,55	34,54	5,71	1,38	0,91	0.39	5,75

Grinding waste slag in the converter slag mill was carried out in two stages - stage 1: carried out in a jaw crusher, stage 2: carried out in a shaft crusher. 1000 g of crushed enrichment is taken and the grinding process is carried out in drum mills for 60 minutes.

The converter slag from the mill is enriched by flotation method. Converter slag enrichment was carried out on the basis of the following reagents: Kst - 112 g/t, foaming agent T-92 70 g/t, urea 7.5 g/t.

Converter slag was carried out for 46 minutes according to the technological scheme of flotation, that is, during the flotation time, the degree of separation of the flotation component into enrichment and the quality of enrichment are determined. The converter slag flotation process, which crushed the slag to a size of -0.074 mm, was carried out in the 3l laboratory FM. Kst, urea, T-92 flotation reagents were used for the flotation process. Experiments are carried out according to the scheme, they consist of: basic flotation, control flotation and two cleaning flotation.

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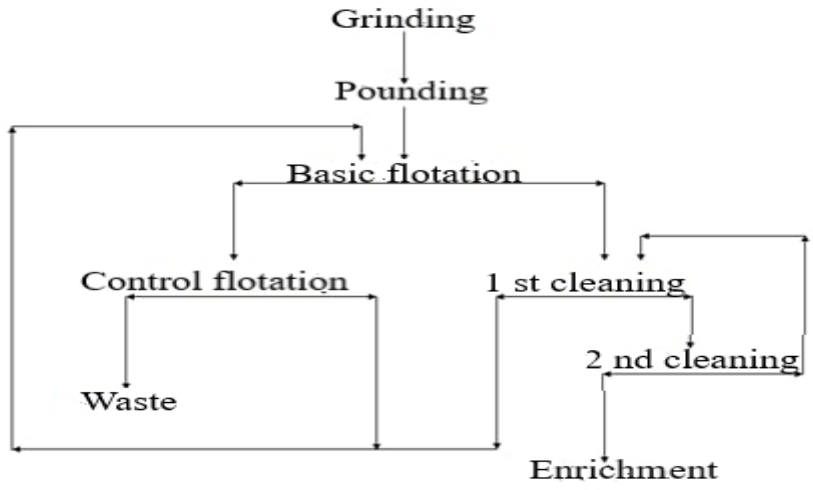
Kst - 78.4 g/t, urea - 5.25 g/t, T-92 - 49 g/t flotation reagents were given to the main flotation and this process was carried out for 15 minutes. Kst - 33.6 g/t, urea - 2.25 g/t, T-92 - 21 g/t flotation reagents are given to the control flotation and this process is carried out for 20 minutes, after which the concentrate from the main flotation is taken to the first cleaning flotation , the process takes 7 minutes. The concentrate obtained from the first treatment goes to the second treatment flotation, where the process is carried out for 4 minutes. During the flotation, the pH value of the aqueous phase showed 11.2. Our finished concentrate is produced in the second cleaning flotation, we dry this enrichment and send it for analysis. According to the analysis of the analysis, we can see a significant increase in precious metals.

The waste from the mill is enriched by flotation method. Enrichment of waste slag was carried out on the basis of the following reagents: Kst - 90 g/t, foaming agent T-92 was given 60 g/t, urea 7.5 g/t.

Flotation in waste slag was carried out for 46 minutes according to the technological scheme. 3L was performed in a laboratory FM using waste slag crushed to a size of -0.074 mm. Kst - 63 g/t, urea - 5.25 g/t, T-92 - 42 g/t flotation reagents were given to the main flotation and this process was carried out for 15 minutes. Kst - 27 g/t, urea - 2.25 g/t, T-92 - 18 g/t flotation reagents are given to the control flotation, and this process is carried out for 20 minutes, after which the concentrate from the main flotation is taken to the first cleaning flotation, the process It is 7 minutes. The concentrate from the first treatment is sent to the second treatment flotation where the process is carried out for 4 minutes. During flotation, the pH value of the aqueous phase was 11. Our finished concentrate is produced in the second cleaning flotation, we dry this enrichment and send it for analysis. According to the analysis of the analysis, we can see that the results obtained from the waste slag in the extraction of precious metals are 5-6% higher than the results obtained from the converter slag.

TECHNOLOGICAL SCHEME



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According to the results obtained from the experiments, we can see that the extraction efficiency of copper and precious metals from the converter slag is high. It is lower in waste slag compared to converter slag, but in flotation technology, waste slag can be enriched. Based on the flotation technology today, extraction of precious metals is highly efficient and relatively low cost.

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