



**“ҚУЙМАКОРЛИК ИШЛАБ ЧИҚАРИШ СОҲАСИДА
РЕСУРС ВА ЭНЕРГИЯТЕЖАМКОР ИННОВАЦИОН
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DETERMINATION OF THE MAIN TECHNOLOGICAL PARAMETERS OF RESTORATION OF THE QUALITY OF COPPER IN WASTE SLAG.

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Eighty-five percent of the world's copper production comes from the pyrometallurgical method. In particular, the pyrometallurgical method is widely used in our country at the copper smelter of the Almalyk Mining and Metallurgical Combine (AGMK). This method, along with its convenience, has a number of disadvantages. One of them is the formation of a very large amount of waste slag in the copper smelter. These slags are formed mainly as a result of the processing of sulfide copper concentrates in metallurgical units such as "Reverse combustion furnace", "Oxygen flare furnace" and "Vanyukov Furnace" and as a result of the process of converting liquid copper matte. Slag processing is the most urgent problem of modern copper metallurgy.

Firstly, for environmental reasons, ie. the daily increase in the amount of slag requires excess storage space. The expansion of the areas of these wastes has a negative impact on the landscape, the air basin, in short, on the environment;

-secondly, the reason is economic, that is, the high content of valuable copper in the slag, for example, the copper content in the converter slag is 2.5 - 3%, in the slag of the anti-inflammatory and Vanyukov processes - 0.4 - 0.6%. The slag content of the oxygen slag smelting process is about 1%. However, if the copper content in the raw material is higher than 0.35%, then this ensures the economic efficiency of production. For example, the content of copper in

primary ore is 0.5 - 2%. It follows that if we compare the initial compositions of ore and slag, we can see that slags from converter and oxygen-torch smelting furnaces are more suitable for processing. Even the amount of copper in converter slag is much higher than in ore. So,

-Thirdly, a lot of energy, reagents and money are spent for technological reasons, i.e. the complexity of preparing solid slags for processing (crushing, grinding, sorting, flotation and enrichment processes) at landfills. In addition, given the possibility of processing them in liquid form, in this case there are not enough reducing agents, such as ordinary coke, which is used in slags under AMMC conditions.

In view of the above, a relatively effective, convenient and inexpensive way to improve the technology of processing copper slags is the method of processing liquid converter slags in the presence of a local cheap and alternative reducing agent. As a result of interdisciplinary studies, studies and studies, an alternative regenerating agent has been found that meets the above requirements. This is waste car tires. They contain a large amount of hydrocarbons and carbon black, these components act as a reducing agent. Tire waste is present on the territory of the AGMK and is even collected in the form of heaps. This indicates that this is a local raw material.

The proposed method differs from other available methods by a number of advantages and disadvantages:

- most importantly, the implementation of this method does not deviate from the technological scheme of the copper smelter;

- The total amount of reducing agents in tire waste used as a local reducing agent is significantly higher than in other reducing agents (its composition is given in Table 1). The amount of carbon in such reducing substances as coal and coke does not exceed 75%;

Table 1

Average chemical composition of the rubber part of car tire waste,
%

FRO M	HOU R	FRO M	ABOU T	Other
83.75	7.58	4.62	2.31	1.74

- sulfur (S) in tire waste is also a useful component that sulfides oxidized copper compounds, which leads to an increase in the volume of slag in the form of matte drops (the main product);

- Another important advantage is the absence of additional equipment and metallurgical units for the process.

The scientific and technical results and achievements of this method are: reduction of copper slag emissions; the release of copper from the slag increases the rate of release of copper into the finished product; due to the reduction in the slag of a harmful mineral - magnetite (Fe_3O_4), the viscosity of the slag decreases and its permeability increases; Due to the reduced viscosity of the slag, the formation of “flooring” layers that damage the furnace unit during its processing in melting furnaces is reduced; due to the fact that car tire waste settles to the bottom of the ladle, a gaseous phase is formed between the liquid slag solution and the ladle wall, which prevents slag from adhering to the ladle wall or lining rupture, which increases the service life of metallurgical ladles; the implementation of the method does not deviate from the technological scheme of copper production; the project is simple and very convenient to use in production, because does not require additional equipment for processes.

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ALYUMINIY VA UNING QOTISHMALARINI ISHLAB CHIQRISH TEXNOLOGIYASI

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Alyuminiy (Al) – kumushsimon oq rangdagi, elektr va issiqlik o‘tkazuvchanligi katta bo‘lgan yengil metallidir; uning zichligi 2700 kg/m^3 , tozaligiga qarab suyuqlanish temperaturasi $660\text{-}667^\circ\text{C}$ chegarada o‘zgaradi. Yumshatilgan aluminiyning mustahkamligi kichik ($\sigma = 80\text{-}100 \text{ MPa}$), qattiqligi past (HB 20-40), lekin plastikligi