

The search for optimal conditions for sulfuric acid leaching to recover copper and zinc from flotation tailings copper slag

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Abstract

The flotation recycling copper slag dump contributes to the accumulation of fine material – flotation tailings. The properties of these tailings are not well understood, so they can be classified as a non-hazardous waste. The tails, according to chemical analysis, contains approximately 0.5% Cu and 4% Zn, which is the basis for the consideration of this waste as technogenic raw materials. The agitation leaching of the flotation tailings copper slag perspective and solves two problems: allows expanding the resource base of non-ferrous metals, particularly copper and zinc, as well as improving the ecological situation in places of storage of copper slag.

The experiments performed with the setup leaching, which consists of a water bath, pH meter and agitator device. Separating the solid from the liquid phase of the pulp was carried out using vacuum filtration. The chemical composition of the solid phase and the aqueous solution was determined by atomic emission induction plasma.

The conditions for the most efficient copper and zinc leaching from the flotation tailings copper slag were studied. Sulfuric acid was used as the leaching agent. The optimal values of the sulfuric acid concentration, temperature, processing time and solid/liquid ratio were found. Were obtained and analyzed dependence the parameters of the extraction of metals leaching. The optimum conditions for recovering copper and zinc from flotation tailings should be taken $T = 90\text{ }^{\circ}\text{C}$, the concentration of aqueous sulfuric acid 300 g/dm^3 , S:L = 1:4. duration of no less than 15 hours.

The utilization of leaching products as micronutrient supplements for growing wood species (pine and birch), as well as building sand is perspective.