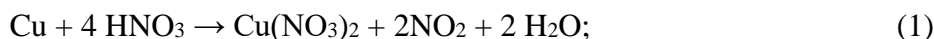


DR-77**CONTINUOUS COPPER LEACHING TECHNOLOGY****L.I. Mukhortova, O.E. Nasakin, A.V. Eremkin, I. V. Glushkov**

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Known that copper dissolves only in the presence of substances with oxidizing properties. These substances include nitric acid.

High values of the redox potentials of nitric acid solutions allow copper to be dissolved, but the reaction mechanism depends on the concentration of nitric acid¹. With concentrated nitric acid (mass fraction of acid more than 45%), the reaction proceeds according to equation (1), and with dilute acid (mass fraction of acid less than 40 %) – according to equation (2):



In this paper, the possibility of conducting a continuous process of copper dissolution with nitric acid while excluding the formation of toxic nitrogen dioxide is studied.

Copper leaching was carried out in a vertical flow reactor with a diameter of 50 mm and a height of 250 mm with a false bottom located at a height of 20 mm, a jacket heated by water vapor obtained in a laboratory steam generator, copper chips with a particle size of about 2×2×2 mm were loaded into the reactor until a column of copper 200 mm high was obtained. Leaching was carried out with a working solution with an initial nitric acid content of 10, 15, 20, 25, 30, 40 and 45 % (wt.). before each experiment, working solutions with a volume of 500 cm³ were prepared, heated to a temperature of 20, 30, 40, 50 or 60 °C and thermostated. To stabilize the temperature in the reactor, the reactor was initially filled with water, the water was heated to a set temperature by applying steam to the jacket, then the water was drained and the working solution was immediately supplied. The working solution was fed to the upper part of the reactor through a sprinkler. The contact time was regulated by the flow rate of the working solution. The first 50 cm³ of the outgoing working solution was discarded. The content of copper ions in the solution was controlled by the iodometric method². Waste gases from the reactor were displaced by a nitrogen current into an absorption flask filled with 50 cm³ of a 10 % solution of potassium iodide. At the end of the experiment, a high-quality sample was made for the content of nitrogen dioxide in the absorption solution for the formation of pink staining with the Griss–Ilosvay reagent³.

The results obtained showed that the maximum concentration of copper ions in a solution of more than 25 g/dm³ without the formation of nitrogen dioxide is achieved when using working solutions with a mass fraction of nitric acid of 30-35% with a temperature of 60 °C and a flow rate of the working solution of 60 cm³/s. Therefore, when leaching copper with nitric acid, it is possible to organize a continuous process.

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