

THE STUDY OF ELECTROCHEMICAL LEACHING OF SULPHIDE AND OXIDIZED COPPER MINERALS FROM DUMPS

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When developing methods for additional extraction of copper from depleted ore deposits and dumps, the methods of transferring copper ions to the solution are of particular interest. In the present study, the possibility of electrochemical stimulation of dissolution of the initial copper minerals was studied.

In the experiments, a ground was used from the Spassk deposit (Abay district, Karaganda region) with a copper content of 0.3-0.4%, represented by sulphide and oxidized minerals. The ground was placed in a column that had an inert anode in the upper third (carbon fiber tape 12 mm wide and 25 cm long), and in the lower third an inert cathode (carbon electrode 6 mm in diameter and 17 cm in length). The column was fed at a rate of 30-50 ml/hr with water with an average salt content of 180 mg/l. The analysis of the copper content in the solution passed through the column was carried out by a photometric method with using of sodium dithiocarbamate (Marczenko, 1968). Variable parameters were current amperage (from 20 to 100 μ A) and voltage (from 0.5 to 2.5 V). The experiments were carried out for several weeks.

In the voltage range from 0.5 to 1.5 V, the concentration of copper ions in the solution remains approximately at the same level of about 2 μ mol/l at different intensities of current. With an increase in voltage up to 2 V, a gradual increase in copper concentration occurred up to 7 μ mol/l for several weeks, while an increase in amperage reduced the yield of copper into the solution. With a further increase in voltage to 2.5 V, the content of copper in the solution dropped sharply to a level of 1-1.5 μ mol/l, while the change in amperage did not significantly affect the concentration, except for single measurements.

Thus, electrochemical leaching shows the highest efficiency at a voltage of 2 V at a current value of not less than 20 μ A, below which the transition of copper ions into the solution decreases noticeably.

References:

1. MARCZENKO, Z. 1968. *Kolorymetryczne oznaczanie pierwiastków*. Warszawa: Wydawnictwa Naukowo-Techniczne