Electrochemical removal of copper from synthetic wastewater using rotating cylinder electrode

Qasim J. M. Slaiman, *Cecilia K. Haweel and Suha A. Mohammed

Abstract

The performance of a batch undivided electrochemical reactor with a rotating cylinder electrode of woven-wire (60 mesh size), stainless steel 316, is examined for the removal of copper from synthetic solution of o.5 M sodium chloride containing 125 ppm at pH ≈ 3.5. The effect of total applied current, rotation speed on the figures of merit of the reactor is analyzed. For an applied current of 300 mA at 100 rpm, the copper concentration decreased from 125 to mg l-1 after 60 min of electrolysis with a specific energy consumption of 1.75 kWh kg-1 and a normalized space velocity of 1.62 h-1. The change in concentration was higher when the total applied currents were increased because of the turbulence-promoting action of the hydrogen evolution. The results suggest that the applied current must represent a compromise between the increase in space time yield or normalized space velocity and the increase in the specific energy consumption.