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"Gheorghe Asachi" Technical University of Iasi, Romania

ELECTROCOAGULATION TREATMENT OF SULFIDE WASTEWATER IN A BATCH REACTOR: EFFECT OF ELECTRODE MATERIAL ON ELECTRICAL OPERATING COSTS

Marius Sebastian Secula*, Igor Creţescu*, Stelian Petrescu

"Gheorghe Asachi" Technical University of Iasi, Faculty of Chemical Engineering and Environmental Protection, 73 Prof. Dr. Docent Dimitrie Mangeron, 700050 Iasi, Romania

Abstract

An experimental study on the separation of sulfides from aqueous solution by electrocoagulation is described in this work. Two types of anode materials, aluminum and mild steel, were investigated in relation to anodic dissolution, removal efficiency and energy consumption. Experiments were carried out under galvanostatic regime at different values of current density. During the experiments, the pH was monitored and adjusted in order to maintain near neutral pH values. By weighing the anodes before and after electrocoagulation and based on Faraday's law, electrochemical and chemical dissolved weights were determined. Specific energetic consumptions related to sulfide ions and electrical operating costs were calculated. In comparison with aluminum, iron-based anode provides higher removal efficiencies, lower energy requirements and electrical operating costs. The complete removal of sulfide ions from the treated solution was achieved after 45 min of electrocoagulation at a current density of 65.79 $A \cdot m^{-2}$ using mild steel as anode.

Key words: anodic dissolution, batch reactor, electrical operating cost, electrocoagulation, sulfide wastewater

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* Authors to whom all correspondence should be addressed: E-mail: mariussecula@ch.tuiasi.ro; icre@ch.tuiasi.ro; Phone: +40 - 232 278683; Fax: +40 - 232 271311