

Decolorization; mineralization; and toxicity reduction of Acid Orange 6 by iron-sacrificed plates in the electrocoagulation processes

張怡怡

Chang EE; Hsing HJ; Ko CS; Chiang PC

摘要.

Abstract

In this study, electrocoagulation (EC) was used to investigate the decolorization and mineralization of an azo dye solution, as well as biodegradation enhancement and toxicity reduction. Initial pH, flow rate, and acid orange 6 concentration were investigated, and the optimum operational parameters were found to be pH = 4, flow rate (Q) = 0.3 to 0.5 L min⁻¹, and current density = 68.3 A dm⁻². With these optimal parameters, total organic carbon and color removal efficiencies of 40% and 98% were achieved, respectively. Biodegradation was evaluated using the ratio of the 5-day biological oxygen demand (BOD₅) and the chemical oxygen demand (COD), which was 0.19 to 0.25 initially and increased to the range 0.25 to 0.4 after EC treatment, indicating that biodegradability was significantly enhanced. The mean effective concentration (EC₅₀) was measured to represent the toxicity of the solution. Initial EC₅₀ values ranged from 25 to 6.6%, which represent extremely toxic to very toxic solutions. After EC treatment, the toxicity levels were reduced significantly, suggesting that the EC process could be a promising method for reducing the toxicity of textile wastewater. (c) 2007 Society of Chemical Industry.