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Investigation of operational parameters influencing in treatment of dye from water by electro-Fenton process

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ABSTRACT

In this paper, the degradation of Acid Black 1 (AB1) and Acid Blue 113 (AB113) of azo dyes was studied by electro-Fenton process using an iron electrode to generate Fe^{2+} ions in a batch reactor. In order to reach the maximum efficiency of the process, effective parameters such as: solution pH, operating time, current density, H_2O_2, and dye concentration were investigated. The experimental data indicated that pH, H_2O_2 and dye concentration played an important role in the process. The results showed that decolorization decreased with increasing pH; for instance, the maximum decolorization efficiencies 27 and 47% were obtained, respectively, for AB113 and AB1 at pH 11 and reaction time = 10 min. The best conditions for both dyes were obtained at reaction time of 10 min, pH 3.0, H_2O_2 concentration of 100 mg/L and current density of 5 mA/cm^2. In this case, COD removal rates were, respectively, 83.5 and 92.3% for AB113 and AB1 after 30 min.

Keywords: electro-Fenton; Degradation; Azo dye

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