

Electrochemical preparation of iron nanoparticles and their catalytic properties for Azo dye reduction from polluted waters

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Abstract

Zero-valent iron nanoparticle technology is becoming an increasingly popular choice for treatment of hazardous and toxic wastes, and for remediation of contaminated sites. In this project, zero iron nanoparticles were prepared electrochemically using cyclic voltammetry. Characteristics of synthesized nanoparticles were studied through TEM and XRD analysis. Mean crystallite size of nanoparticles which synthesized by electrochemical deposition method, calculated using Debye-Scherrer formula and were approximately equal to 23 nm. To study water pollutants decolorization efficiency of zero valent iron nanoparticles, Reactive Navy Blue SP-BR was used as a model pollutant. Decolorization efficiency for the parameters such as initial dye concentration, NZVI dosage, pH and reaction time were 10 mg L⁻¹, 260 mg L⁻¹, 6 and 75 min, respectively was 89.5 %.

Keywords: NZVI; cyclic voltammetry; TEM; XRD; Azo dye