



Sono-photo-Fenton degradation of Reactive Black 5 from aqueous solutions: performance and kinetics

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Received 5 October 2018; Accepted 28 August 2019

ABSTRACT

In this study, degradation of Reactive Black 5 (RB5) as a reactive azo dye from aqueous solutions has been performed by an integrated system namely sono-photo-Fenton ($H_2O_2/Fe^{2+}/UV/US$). The Fenton/UV/US process could show synergistic removal of dye, as compared to Fenton/UV or Fenton process. Batch reactor based on one factorial optimization has been applied for operational parameters: reaction time, pH, H_2O_2 dosage, Fe^{2+} dosage, and initial RB5 concentration. The integrated system significantly removed dye (100%) at the best conditions pH of 3, $50\text{ mg L}^{-1} Fe^{2+}$, $200\text{ mg L}^{-1} H_2O_2$, 100 mg L^{-1} RB5 concentration, and reaction time of 30 min. The present study demonstrated that the sono-photo-Fenton could be used as an efficient, reliable method for the removal of RB5 from water and wastewater.

Keywords: Sono-photo-Fenton; Reactive Black 5; Wastewater; Kinetic; Fenton; Decolorization

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