



Degradation of dyes using combined photo-Fenton/activated carbon: synergistic effect

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ABSTRACT

In this paper, the effect of activated carbon (AC) on the photocatalytic degradation of dyes using photo-Fenton process was investigated. Reactive Red 198 (RR198) and Reactive Red 120 (RR120) were used as model dyes. The surface characteristics of AC were investigated using Fourier transform infrared. Photocatalytic dye degradation was studied using UV–Vis spectrophotometer and ion chromatography. The effects of AC dosage, initial dye concentration, pH, and salt on dye degradation were investigated. Formate, acetate, and oxalate anions were detected as dominant aliphatic intermediates, where they were further oxidized slowly to CO₂. Nitrate, chloride, and sulfate anions were detected as the photocatalytic mineralization products of dyes. The results indicated that the AC/Fe could be used as an eco-friendly material to remove dyes. In addition, AC has synergistic effect when degrading dyes from colored wastewater using photo-Fenton process.

Keywords: Synergistic effect; Photo-Fenton process; Activated carbon; Dye degradation; Colored wastewater

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