



Improved Photocatalytic Activity of CeO₂ Coupling Ultrasound for Eosin-Y Degradation

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ABSTRACT

The degradation of Eosin-Y using photolysis, sonolysis, photocatalysis and sonophotocatalysis in aqueous solutions was investigated. Emphasis was given on the effects of different operating conditions like catalyst dose, pH, initial concentration, ultrasonic power and reaction time on Eosin-Y. The extent of photocatalytic and sonophotocatalytic degradation was increased by increasing pH, catalysts loading, ultrasonic power and decrease in initial dye concentration. Ultrasound combined with photocatalysis was found efficient than the respective individual processes due to the enhanced formation of reactive hydroxyl radicals as well as the possible ultrasound-induced increase of the active surface area of the catalyst. It was observed that the percent degradation rate is higher at pH 8 for ultrasound 13.46%, photocatalyst 64.90% and sonophotocatalyst 84.61% at same experimental conditions (80 mg L⁻¹ of dye concentration, 200 mg L⁻¹ of CeO₂, and 150 W ultrasonic powers and at pH 8). The kinetic study of eosin-Y degradation under different experimental conditions apparently followed first order reaction.

Keywords: Eosin-Y, CeO₂, Photolysis, Sonolysis, Photocatalysis, Sonophotocatalysis, Kinetic study.
