Kinetic modeling of Congo red dye decolorization by US/O$_3$ process: nonlinear regression analysis

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**Abstract**

The decolorization and degradation of Congo red dye in the aqueous solution were studied by a combination of sonication and ozonation. The effect of operational parameters such as initial dye concentration, pH value, sonication density and gas flow rate on the decolorization rate has been investigated. The results showed remarkable decolorization efficiency which can be reached up to 100% in less than 12 min. Also, the decolorization efficiency increased with an increase in pH, ultrasonic density, ozone gas flow rate and decreasing initial dye concentration. The reaction was modeled using a pseudo-first-order kinetic model. The effect of different parameters on the rate constant was evaluated using the nonlinear regression method.

**Keywords:** Decolorization; Sonolysis; Ozonation; Kinetic study; Congo red

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