



PhotSonochemical degradation of phenol in water

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ABSTRACT

The aim of this work is to evaluate the efficiency of the sonochemical effect in conjunction with a photochemical irradiation and the effects of parameters such as pH, ultrasound frequency (35 and 130 kHz), and initial concentration on the degradation processes. The oxidation of a model pollutant, phenol, has been carried out in photosonochemical reactor. It was considerably more effective than ultrasound wave or ultraviolet light alone. It may be the result of three different oxidative processes: direct photochemical action, high frequency sonochemistry and reaction with ozone (produced by ultraviolet irradiation of air). Identification of the first intermediates of the reaction (hydroquinone, catechol, benzoquinone and resorcinol) indicates that hydroxyl radicals are involved in the photosonochemical degradation mechanisms. The disappearance of phenol in each case approximately obeyed first-order kinetics with the apparent first-order decay constant increasing with decreasing solute concentration.

Keywords: Photosonochemistry; Ultrasound; Ultraviolet; Phenol

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