



Effects of operating parameters and additives on degradation of phenol in water by the combination of H₂O₂ and hydrodynamic cavitation

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Received 28 April 2013; Accepted 14 September 2013

ABSTRACT

The combination of H₂O₂ and hydrodynamic cavitation has been used to degrade phenol in water. The effects of parameters including inlet pressure (P1), orifice geometries of hydrodynamic reactor, initial concentration of H₂O₂, the presence of dissolved gases and catalysts (CuO, Fe, and TiO₂) have been discussed. It revealed that increased P1, more number of holes on plates, optimum initial H₂O₂ concentration, the higher flow rate of oxygen, and the presence of Fe or CuO are more favorable in phenol degradation. Nitrogen has different effect on cavitation from oxygen. Furthermore, the identification of primary intermediates of the reaction (hydroquinone, catechol, benzoquinone, and resorcin) indicated that hydroxyl radicals are involved in phenol degradation mechanisms.

Keywords: Hydrodynamic cavitation; H₂O₂; Phenol; Water treatment; Mechanism

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