



STUDY OF WET HYDROGEN PEROXIDE OXIDATION PROCESS APPLIED FOR ADVANCED TREATMENT OF WASTEWATERS CONTAINING HIGH PHENOL CONCENTRATIONS

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Abstract

In this paper a study of wet hydrogen peroxide oxidation (WHPO) applied for organic pollutants removal from synthetic aqueous solutions containing high phenol concentration is presented. The study was performed in order to establish the influence of different factors (stirring rate, pH, H₂O₂ concentration, catalyst type and concentration) involved into the wet oxidation (Fenton process) on the phenol degradation efficiency. The treatment efficiency was determined for phenol and organic matters expressed as Chemical Oxygen Demand (COD).

An empirical model for the phenol treatment efficiency using the Fenton process was developed, applying a second order central rotatable design 2² type.

The mathematical model was elaborated considering operation time and H₂O₂ concentration as independent variables, while the phenol treatment efficiency and COD were chosen as dependent variables. The mathematical model was verified and found adequate for the oxidative process applied for aqueous solutions containing 100 mg/L phenol.

Also, an analysis of the mathematical model of the WHPO process was performed to find the optimal operating conditions, in order to apply this process for efficient treatment of wastewater containing phenol.

Keywords: phenol, wet hydrogen peroxide oxidation, Fenton process, mathematical model, operating conditions

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