Degradation of phenol in water by the combination of sonolysis and photocatalysis

C.D. Wu\textsuperscript{a,b,*}, J.Y. Zhang\textsuperscript{a,b}, Y. Wu\textsuperscript{a,b}, G.Z. Wu\textsuperscript{a}

\textsuperscript{a}School of Environmental Science and Engineering, South China University of Technology, Guangzhou 510641, P.R. China
Tel. +86 20 87110004; email: ppchdwu@scut.edu.cn
\textsuperscript{b}The Key Laboratory of Pollution Control and Ecosystem Restoration in Industry Clusters of Ministry of Education, Guangzhou 510006, P.R. China

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\textbf{ABSTRACT}

The combination of sonolysis and photocatalysis has been used to degrade an aqueous solution of phenol. The synergistic index for sonophotocatalysis was 1.06, indicating that there was a slightly synergistic effect between sonolysis and photocatalysis, and that the degradation by sonolysis, photocatalysis, and sonophotocatalysis presented a good fit to the pseudo-first-order kinetic model. Additionally, the effects of parameters such as the initial pH value of the solution, dissolved gases, salt addition, Fe\textsuperscript{3+} ions, and metal oxide (CuO and MnO\textsubscript{2}) on the sonophotocatalytic degradation were studied. The results shown that acidic/weakly acidic condition is superior to alkaline condition, and higher concentration of dissolved oxygen and the presence of Fe\textsuperscript{3+} favored the phenol degradation, CuO and MnO\textsubscript{2} had no significant effect on the degradation, while NaHCO\textsubscript{3} restrained the degradation rate.

\textit{Keywords:} Sonolysis; Sonophotocatalysis; Photocatalysis; Phenol

\*Corresponding author.