A Study on Photochemical Degradation of 2-Chlorophenol in Water

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***Abstract*-2-Chlorophenol is an important organic pollutants and widely used chemical with potential to harm the environment and human health. In this study, successful degradation of 2-Chlorophenol was achieved with photochemical process. The degradation was found to follow a first-order decay model and the effects on kinetics of several factors were studied. Almost 100% of initial 2-Chlorophenol was removed within 10 min in alkaline conditions (pH 9.0, 10.0 and 11.0) while it took 50 min to reach same removal in acidic condition (pH 5.0, 6.0 and 7.0). Increasing the UV light intensity caused the rate increased, but higher initial 2-Chlorophenol concentrations resulted in lower removal rate. We also analyzed the intermediate products by GC-MS and Chloride ion by IC to make clear the mechanism of the reaction. A possible degradation process was been proposed in this study.**

Keywords-2-Chlorophenol; Photochemical Degradation; Effect Factors; Mechanism

REFERENCES

[1] Boule P, et al. Photochemistry and Environment IV-Photochemical behavior of monochlorophenols in dilute aqueous solution. Chemosphere, 1982.

[2] Hwang H M, et al. Photolysis of phenol and chlorophenols in Estuarine water. ACS Symposium. Ser. 327;27, 1987.

[3] Kawaguchi H. et al. Kinetics of ferric ion promoted photodecomposition of 2-chlorophenol. Chemosphere, 1994.

[4] Shen Y-S, et al. Decomposition of chlorophenols in aqueous solution by UV/H_2O_2. Toxicol. Chem, 1996.

[5] Miller R M, et al. Sequential degradation of chlorophenols by photolytic and microbial treatment. Environ. Sci. Technol., 1998.

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