

Palakorn Boonsai 2014: Oxidation of Phenolic Compounds by H<sub>2</sub>O<sub>2</sub> using Fe/SUZ-4 Zeolite as Catalyst. Doctor of Engineering (Chemical Engineering), Major Field: Chemical Engineering, Department of Chemical Engineering. Thesis Advisor: Associate Professor Paisan Kongkachuichay, Ph.D. 84 pages.

The research has two objectives as 1) the effectiveness of using Fe/SUZ-4 in reducing the phenolic compound concentration in synthetic wastewater treatment and 2) the kinetics of phenolic compounds onto the Fe/SUZ-4 zeolite in the treatment of synthetic wastewater, using batch experiment.

By using synthesized Fe/SUZ-4 zeolite catalysts and H<sub>2</sub>O<sub>2</sub> (0.015 mol/l) oxidation agent, the degradation reactions of Phenol ( $1.06 \times 10^{-3}$  mol/l), 2,4-Dichlorophenol ( $6.13 \times 10^{-4}$  mol/l), and 4-Chlorophenol ( $7.78 \times 10^{-4}$  mol/l) were carried out at 303 K and pH 3.0 for 300 minutes.

The ratio of the rice husk ash to Silica Sol at 50:50 was used for SUZ-4 synthesis. The ion-exchanged SUZ-4 zeolite (Fe/SUZ-4) was used since the degradation rate obtained was actually higher than that of the reaction without ion-exchanged zeolite. Variations of phenolic compounds degradation were investigated and it was found that the degradation rates slightly increase with increasing the phenol concentration. In the same way, the variation of H<sub>2</sub>O<sub>2</sub> was also investigated and the result indicates that the degradation rates also slightly increase as the H<sub>2</sub>O<sub>2</sub> concentration increases. The kinetics of the corresponding reactions was also studied. It was found that the degradation reactions of Phenol, 2,4-Dichlorophenol and 4-Chlorophenol can be classified as a first-order reaction.

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Thesis Advisor's signature

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