

Siwaporn Choorueang. 2013. **Treatment of wastewater from pulp processing by photo-Fenton reaction over Fe-Ce bimetal catalysts**. Master of Engineering Thesis in Chemical Engineering, Graduate School, Khon Kaen University.

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ABSTRACT

This thesis is an investigation of the effectiveness of chemical oxygen demand (COD) removal from synthesized wastewater using photo-Fenton reaction over Fe-Ce bimetal catalysts. The synthesized wastewater has the same COD concentration as the pulp processing wastewater. The treatment was done using photo-Fenton reaction with metal catalysts (Fe-Ce and Fe-Ce-Zn). They were synthesized by co-precipitation. The samples were characterized by Brunauer-Emmett-Teller Method (BET), X-ray Diffraction Spectroscopy (XRD), UV-Diffuse reflectance (UV-DR) and Thermal gravimetric analysis (TGA) techniques. When the catalysts efficacies in reducing COD were tested, it was found that the Fe-Ce-Zn catalyst was superior to Fe-Ce because the addition of Zinc influenced its reaction to light; this enhanced adsorption. Therefore, Fe-Ce-Zn catalyst was studied to check the optimum conditions for COD reduction. The conditions and parameters investigated were: pH, concentration of Hydrogen peroxide (H_2O_2), and concentration of catalyst. This work used the Box-Behnken statistical experiment design (BBD) and the response Surface analysis (RSM). It has been found that the pH and the concentration of catalyst have significant effects on the reduction of COD. While the concentration of H_2O_2 has no effect. The maximum COD removal (60%) was achieved at: pH 5.2, 4 g/L of catalyst, and 366 mg/L of H_2O_2 .