



CHAPTER V

CONCLUSIONS AND RECOMMENDATIONS

5.1 Conclusions

The 2,4-DCP photodegradation under visible light was investigated over Fe-N-TiO₂ catalysts. The synthesis of N-TiO₂ was studied under three different amine templates in sol-gel method. Catalysts were characterized by TG-DTA and XRD. It was found that the calcinations temperature at 400°C provided only anatase phase and having average crystalline size around 8.56 to 9.77 nm. The BET surface areas of the photocatalysts were about 103 to 145 m²/g.

Doping of Fe with 0 to 5 mol% onto N-TiO₂ extended absorption in visible light range and also decreased the band gap energy. However, the catalyst absorption was not change much with prepared by different templates (C6, C12 and C16). The oxidation states of Fe and Ti presented in +3 and +4, respectively. Catalyst p*H*_{zpc} was of 3.

Aqueous 2,4-DCP was degraded under visible light with constant temperature (25°C), and pH 5.5. Based on the statistical technique, the optimal condition for 2,4-DCP degradation was evaluated as 0.0Fe-N-TiO₂-6C with catalyst loading of 1.5 g/L. The reaction kinetics performed zero order.

5.2 Recommendations

In this work, different amine precursor has been used for the catalyst preparation, however, the bonding of N to TiO_2 has not been studied. It is quite interesting to understand the bonding of N with TiO_2 and the electronic properties with different amine-templates. This information can be used to support the effect of amine on the degradation performance.

The performance obtained from Box-Behnken analysis should be verified. For example; a condition which had never been tested before should be set for a degradation test. Results obtaining will be analyzed statistically compared with the model.