CHAPTER V
CONCLUSIONS AND RECOMMENDATIONS

5.1 Conclusions

The bimetallic Fe,Ti-TUD-1 catalyst was successfully synthesized via sol-gel process using silatrane, titanium(IV) isopropoxide and iron(III) chloride as silica, titanium, and iron sources, respectively. The 0.01Fe,0.01Ti-TUD-1 catalyst for phenol hydroxylation resulted in 93.1% phenol conversion with 53.4% selectivity of hydroquinone at the optimum conditions of 90 °C reaction temperature for 60 min using 1:3 phenol:hydrogen peroxide ratio and 30 mg of the catalyst. The leaching of the metal ion into the reaction mixture was also observed. The 0.01Fe,0.01Ti-TUD-1 catalyst having thinner wall thickness than 0.01Fe-TUD-1 and 0.01Ti-TUD-1 showed the lower hydrothermal stability. The phenol hydroxylation was also performed under UV radiation to compare with the thermal reaction and the results showed much lower phenol conversion (17.4%).

5.2 Recommendations

The synthesized catalysts should be tested for other types of reactions, such as styrene oxidation, benzene oxidation, and waste water treatment.