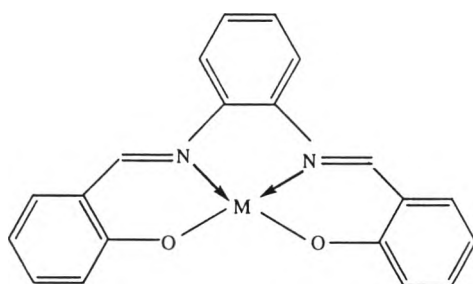


CHAPTER IV

CONCLUSION AND SUGGESTION FOR FURTHER WORK

The relationship between electrochemical and the catalytic properties of various metal Schiff base catalysts responsible for the oxidation of cyclohexane to cyclohexanone and cyclohexanol was thoroughly investigated during the course of this research. The reaction was carried out using pyridine and acetonitrile (1:1 v/v) and hydrogen peroxide at room temperature or *tert*-butylhydroperoxide at 50 °C. Cyclic voltammetry was employed for examination redox property of metal Schiff base complexes using glassy carbon and boron-doped diamond electrodes as working electrode, silver wire as reference electrode and platinum wire as auxillary electrode. Almost metal Schiff base complexes could selectively oxidize cyclohexane to cyclohexanone as a major product and cyclohexanol being a minor. Among them, metal Schiff base complexes **9**, **10** and **12** as shown below provided a better yield than other metal salophen.



M = Fe(II), Mn(II) and VO(IV)

In addition, it was disclosed that iron and oxovanadium complexes of ligands: **1**, **2**, **4** and **5** also gave good results. This result was in good agreement with that obtained from the studying for redox properties. The metal Schiff base complexes **9**, **12**, **13**, **15** and **16** displayed reversible reactions while **6**, **10** and **17** displayed quasi-

reversible reactions and **8**, **11** and **14** displayed irreversible reactions. In addition, the results of redox property obtained from using glassy carbon and boron-doped diamond electrodes as working electrode were different. This was because the electrode-reaction kinetics of boron-doped diamond electrode were slow. Furthermore, the use of *tert*-butylhydroperoxide (at 50 °C) as an oxidizing agent in cyclohexane oxidation gave better yield than hydrogen peroxide.

In term of kinetic study, metal Schiff base complexes **9** and **10** consume lesser time for complete cyclohexane oxidation than **12**. Considering the kinetically redox property of cyclohexane oxidation, metal Schiff base complexes **9** and **10** displayed irreversible reaction at 6 h and 8 h while **12** did not show any redox reaction. This finding supported the result of former kinetic analysis. In addition, the relationship between the amount of hydrogen peroxide left in the reaction and the amount of cyclohexanone produced in cyclohexane oxidation was investigated.

Suggestion for further work

Other catalysts used in oxidation of organic compounds: metalloporphyrins could be examined the redox property to investigate the relationship between electrochemical and catalytic properties. The outcome from this study would be a benefit for the selection of appropriate catalysts.