

## CHAPTER V

### CONCLUSIONS AND RECOMMENDATIONS

#### 5.1 Conclusions

Silatrane synthesized via the OOPS process is an excellent precursor for the synthesis of Fe-MCM-41. The optimal condition maintaining the hexagonal array of MCM-41 structure is at 60°C reaction temperature for 7 hrs, 550°C calcinations temperature and 1°C/min calcinations rate. When increasing the amount of Fe loading, the XRD patterns showed lower crystalline material. However, the obtained Fe-MCM-41 keeps the structure of MCM-41 even using 2.5% Fe loaded. The extraframework is observed when the %Fe loading is more than 2.1%. The iron cations could exist either outside the framework or inside the framework of MCM-41, but the irons inside the framework were responsible for the conversion of styrene with H<sub>2</sub>O<sub>2</sub> aqueous solution. The selectivity of styrene oxide reached 65% at styrene conversion of 22% over the 1% catalyst by weight. Moreover, when compared with the impregnated catalyst, the sol-gel synthesis catalyst shows a much better performance for the epoxidation of styrene.

#### 5.2 Recommendations

From this work, it is recommended that the other metals or transition metals should be loaded into MCM-41 support so as to compare the efficiency of the catalysts. Moreover, the synthesized catalysts should be tested the efficiency by using the other reaction study, such as selective catalytic reaction for the benzylation of benzene, oligomerization of olefin, and waste water treatment.