

CHAPTER IV

CONCLUSION AND SUGGESTION FOR FURTHER WORK

Oxidation of alcohol catalysed by iron Schiff base complexes and iron 1,3-dicarbonyl complexes using TBHP as an oxidizing agent in a mixture of pyridine-acetic acid was investigated. Model alcohols: cyclohexanol, benzyl alcohol and 2-octanol were used as substrate. Cyclohexanol was chosen as a model alcohol for studying the optimization conditions. The suitable conditions for cyclohexanol oxidation were disclosed as reaction temperature at 60°C in pyridine 28 mL and acetic acid 2.3 mL. Among iron salts trying to utilize as a catalyst, $\text{FeCl}_3 \cdot 6\text{H}_2\text{O}$ was the good catalyst compared with $\text{FeCl}_2 \cdot 4\text{H}_2\text{O}$, $\text{FeSO}_4 \cdot 7\text{H}_2\text{O}$ and $\text{Fe}(\text{NO}_3)_3 \cdot 9\text{H}_2\text{O}$ under the same reaction conditions. Considering the amount of the obtained product, it was found that cyclohexanol and benzyl alcohol gave better yield than that obtained from 2-octanol oxidation.

For iron Schiff base complexes, the oxidation of cyclohexanol catalysed by Fe sal-*o*-phen could take place faster than those catalysed by other catalysts. The system catalysed by Fe salen gave the highest yield. For iron 1,3-dicarbonyl complexes, it was found that $\text{Fe}(\text{acac})_3$ exhibited better catalytic activity than $\text{Fe}(\text{DMB})_3$ and $\text{Fe}(\text{BZA})_3$. Comparison of iron Schiff base and iron 1,3-dicarbonyl complexes, it could draw a conclusion that the former provided the better yield than the latter group.

For supported catalyst, supported materials used in this research were silica gel and celite, which prepared by impregnation method. Impregnation method was the simple way for synthesizing supported catalysts. It should be noted at this point that $\text{Fe}(\text{acac})_3$ and $\text{Fe}(\text{acac})_3$ on silica gel provided almost the same yield of the desired product, cyclohexanone. Nevertheless, $\text{FeCl}_3 \cdot 6\text{H}_2\text{O}$ on silica gel did not behave as a good catalyst on support compared with $\text{FeCl}_3 \cdot 6\text{H}_2\text{O}$. This may be because it was not well impregnated on the support and thus was soluble in the reaction media.

Suggestion for the Further Work

There are many interesting points derived from this study. Application of supported catalyst particularly $\text{Fe}(\text{acac})_3$ on silica gel and Fe sal-*o*-phen on doped silica gel for the oxidation of various alcohols should be explored in all aspects: regio-, chemo- and stereoselectivity study. Other supported materials, alumina or molecular sieve were cheap, non-toxic and facile material should also be another alternative for further investigation. Good support material should be ease to prepare and gave good stability.



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