

CHAPTER V

CONCLUSIONS AND RECOMMENDATIONS

Conclusions

From the experimental data obtained, the following conclusions are made concerning the effects of temperature on catalytic hydrodesulfurization of thiophene in the presence of quinoline.

1. Thiophene HDS activities of both CoMo/Al₂O₃ and NiMo/Al₂O₃ catalysts strongly depend upon operating temperature in range of 240°C to 260°C. The conversion increases sharply with an increase of temperature on both catalysts.

2. CoMo/Al₂O₃ catalyst shows definitely higher thiophene HDS activity than NiMo/Al₂O₃ catalyst at a temperature less than 250°C, while at a temperature of 260°C HDS activities of both catalysts are identical. NiMo/Al₂O₃ catalyst is more sensitive to temperature than CoMo/Al₂O₃ catalyst for HDS of thiophene.

3. Addition of quinoline even at low concentration to the feedstock results in a substantial decrease in thiophene conversion on both CoMo/Al₂O₃ and NiMo/Al₂O₃ catalysts at all temperatures. Deactivation of both catalysts is due to a competitive adsorption on active sites of catalyst.

4. The quantity of quinoline which is adsorbed on both $\text{CoMo}/\text{Al}_2\text{O}_3$ and $\text{NiMo}/\text{Al}_2\text{O}_3$ catalysts surface is independent of temperature.

5. Rates of catalyst deactivation on HDS of thiophene by quinoline of both $\text{CoMo}/\text{Al}_2\text{O}_3$ and $\text{NiMo}/\text{Al}_2\text{O}_3$ catalysts are independent of operating temperature.

Recommendations

Recommendations for further work are as follows:

1. A similar study should be conducted with varying concentration of nitrogen compounds in order to determine the minimum concentrations at which nitrogen compounds begin to affect the activity of hydrodesulfurization.

2. A same set of study should be done with other nitrogen compounds to study the effect of operating conditions on the activity of hydrodesulfurization.

3. The types of HDS catalyst should be varied with other supports to study the effect of supports on the activity of hydrodesulfurization.