

## CHAPTER V

### CONCLUSIONS AND RECOMMENDATIONS

#### 5.1 Conclusions

The following conclusions were drawn from this study;

1) The addition of nitrogen compounds even at low concentration in the feed solution inhibited hydrodesulfurization of thiophene due to competitive adsorption of nitrogen compounds on active sites.

2) Inhibition strength depended upon type and structure of nitrogen compounds as followed;

-Basic nitrogen compound inhibited HDS of thiophene more than non-basic nitrogen compound.

-Saturated nitrogen compound inhibited HDS of thiophene less than the unsaturated nitrogen compound.

-Nitrogen compound, which has steric hindrance in structure, inhibited HDS of thiophene less than nonsteric nitrogen compound.

3) Nitrogen compound adsorbed through nitrogen atom rather than  $\pi$ -bonding of ring.

4) Nitrogen compounds in this study are reversible poisoning agents which have different desorption activity from catalyst surface depend on type, structure and phase of each nitrogen compound in the reactor.

5) Stearic nitrogen compounds increase coke formation while nonstearic nitrogen compounds decrease coke formation.

## 5.2 Recommendations.

1) A similar study should be conducted using another type of catalyst to study the effect of nitrogen compounds on catalysts directly.

2) A similar study should be carried out at a wider range of concentration of nitrogen compounds to study the kinetics to determine the adsorption constant of each nitrogen compound at this condition.

3) The same set of study should be conducted at different operating temperatures and pressures to study the effect of temperature and pressure on catalytic hydrodesulfurization of thiophene.