

## CHAPTER V

### CONCLUSION

In this research, used polystyrene was converted to hydrocarbons in high yield by cracking under hydrogen and nitrogen pressures. To achieve this objective, the reaction conditions were varied in terms of catalyst type, catalyst concentration, reaction time, reaction temperature and pressure. The optimum conditions from this study are indicated below.

Under hydrogen pressure :

catalyst type	Fe(5%)/Sn(5%)/F(2%) on molecular sieve catalyst
catalyst concentration	15%wt
reaction time	1.5 hours
reaction temperature	350°C
hydrogen pressure	400 psig

When the reaction was operated with the optimum conditions shown above, the percentage yield was 85.6 %wt. The composition of product was C8-C11 paraffin, C6-C11 aromatic and polynaphthene. Ethylbenzene was the main component and toluene and iso-propylbenzene were the second and third components. Fe(5%)/Sn(5%)/F(2%) on molecular sieve catalyst could be reused three times on hydrocracking process. The percentage yield of products were 85.6, 83.2 and 81.0 %wt.

The optimum conditions under nitrogen pressure are :

catalyst type	Fe(5%)/Sn(5%)/F(2%) on molecular sieve catalyst
catalyst concentration	10%wt
reaction time	6 hours
reaction temperature	350°C
nitrogen pressure	100 psig

When the reaction was operated at the optimum conditions, the percentage yield was 84.3 %wt. The composition of the products was C8-C11 paraffin, C6-C11 aromatic and polynaphthene. Ethylbenzene was the main component and toluene and iso-propylbenzene were the second and third components.

The products were obtained by a one-step cracking reaction, in contrast to previous work using two-step processes [6]. The product yield and yield of ethylbenzene in this research is higher than in previous work [6-11]. The reaction conditions are less vigorous than the previous reports [6-11].