

CHAPTER V

CONCLUSION

In this research, used polyethylene was converted to hydrocarbon oil in high yield by hydrocracking. To achieve this objective, the reaction conditions were varied in terms of catalyst type, catalyst concentration, reaction time, reaction temperature and hydrogen pressure. The optimum condition from this study were indicated below.

catalyst type	Pt(0.6%)/Sn(0.15%)/Cl(1.21%)/F(0.5%) on Al ₂ O ₃ catalyst
catalyst concentration	40%wt
reaction time	12 hours
reaction temperature	400°C
hydrogen pressure	600 psig

The reaction was operated at the optimum condition shown above. The percentage yield was 94.8 %wt. The composition of product from the optimum condition was C₁₀-C₁₆ hydrocarbon. Pt(0.6%)/Sn(0.15%)/Cl(1.21%)/ F(0.5%) catalyst could reused three times on hydrocracking process. The percentage yield of products were 94.8, 92.3 and 89.1 %wt. The hydrocracking reaction could not occur at the fourth times because the supports were broken.

These results were shown that the products were prepared by one-step hydrocracking reaction, in contrast to the previous works using two-step process: thermal cracking and catalytic cracking reaction [34,38]. Product yield of this research is higher than the previous works[34, 36-42]. The reaction condition of this research is milder than the previous reports [36, 40-42].

The property of the product showed that it was suitable for use as gasoline.

API Gravity @ 60°F	51.3
Specific Gravity @ 60/60°F	0.7741
Color	1.0
Pour Point, °C	-24
Distillation, °C	172
Lead Content, g/l	0.00
Sulfur Content, %wt	0.00

It has the advantages of the absence of sulfur and lead comparing to commercial gasoline. This study related to a process for converting the used polyethylene into hydrocarbon oil. This process can be used as waste management because used polyethylene is the one of plastic waste. So this research can be solved the waste disposal problem.

Suggestion for future work

Questions arising from this study are suggested and shown below.

1. The cylindrical catalyst pellets were easily broken in the reaction mixture. Spherical catalyst particles should be studied. From this problem, the reaction time of this experimental was long time and catalyst concentration was high. This may be decrease reaction time and catalyst concentration.

2. The effect of pore volume of supports and support types on hydrocracking reaction should be studied because they have the more important effect on catalyst activity and on product composition.