CHAPTER V
CONCLUSIONS AND RECOMMENDATIONS

5.1 Conclusions

The catalytic pyrolysis of wasted tires was performed in a bench-scaled autoclave reactor. Y and KL zeolites were packed in three packing styles (Y + KL, Y---> KL, and KL ---> Y). The ratio of the two zeolites was varied from 0.25 to 1.0 with a fixed 1% wt of Pt loaded by using incipient wetness impregnation technique. Other parameter; the amount of used of tire, the amount of catalyst, the particle size of catalyst, the pyrolysis temperature, the holding time, and the heating rate were fixed at 30 g, 7.5 g, 8-18 mesh, 500 °C, 2 hr, 10 °C/min, respectively.

The use of various packing styles of catalyst significantly influenced the quality of pyrolysis products. The physical mixture case (Y + KL) should be the best catalyst for gas production because it can produce the highest amount light olefins and cooking gas production. In addition, the physical mixture case was also the best catalyst for naphtha production because it can produce the highest quantity of naphtha. The higher activity of catalyst mixture as compared to the individual one might be attributed to its cracking activity caused by the simultaneous combination of acid and basic catalysts.

The influence of platinum loaded on catalyst was also investigated with a fixed 1% wt by incipient wetness impregnation technique. Pt/Y slightly showed a higher cooking, light olefin, and naphtha production as compared to the other platinum-loaded packing styles, which was explained by its hydrocracking activity. Pt/KL exhibited higher activity than any other catalyst in producing the total aromatic hydrocarbons. This could be attributed to the high dehydrocyclization activity of platinum that helps converting saturated compound to aromatic hydrocarbons. The case of Pt/KL ---> Pt/Y gave the highest saturated hydrocarbons in maltene fraction. It can be explained that Pt loaded on Y zeolite in the second layer can enhance the hydrogenation and ring opening reaction of aromatic compounds, resulting in the production of saturated hydrocarbons.

5.1 Recommendations

According to the results, further experiments should be conducted to investigate the way to improve the performance of the catalyst under clean and sulfur-poisoned conditions and enhancing the catalyst's resistance to the formation of coke. Furthermore, the amount of sulfur compounds in oil products should be studied in order to improve quality of liquid products.