CHAPTER V
CONCLUSIONS AND RECOMMENDATIONS

5.1 Conclusions

The catalytic pyrolysis of waste tire using Ru/HMOR-based catalysts has been studied. The optimum composition of a being-developed commercial Ru/HMOR catalyst was determined, and the effect of ratio of D_{pellet} to $D_{reactor}$ on pyrolysis products, and the deactivation of catalyst by coking were also investigated.

The Ru/HMOR-based catalysts can increase light hydrocarbons in the pyrolysis gas, and was selective to produce a large amount of light olefins. The amount of the matrix in the catalyst has an effect on the activity of the active Ru/HMOR zeolite. The matrix surrounding the active Ru/HMOR zeolite dissipates the heat during cracking reaction, resulting in the high production of desirable products (light olefins and naphtha). The optimum composition was found to be 20 wt% of Ru/HMOR, 70 wt% of kaolin, and 10 wt% of α-alumina.

The catalyst with the optimum composition was next selected to study for the effect of ratio of pellet diameter to reactor diameter. The influence of the diameter ratio was examined by varying the pellet diameters. The different ratio exhibited the various products because of transportation limitation (internal limitation). The best of ratio of pellet diameter to reactor diameter was 0.0556 (3.0mm of pellet diameter) for the bench-scale autoclave reactor, since it gave a high light olefins content in the gaseous product and naphtha quantity in the oil product.

The deactivation of the catalyst was mainly caused by the coke formation, the sulfur deposition, and the metal agglomeration.

5.2 Recommendations

A lower content (< 20 wt%) of active Ru/HMOR zeolite should be determined to investigate whether or not it can perform better for the catalytic pyrolysis of waste tire. Moreover, the oil product may be refined and tested for its combustion properties in an engine.