CHAPTER V

CONCLUSIONS AND RECOMMENDATIONS

The pyrolysis of scrap tire was performed in a bench-scaled autoclave reactor. The effect of Co supported on different zeolites (HY, HBETA, HMOR, HZSM-5 and SAPO-34), the effect of the addition of mesoporous SAPO-34 zeolite as an additive in pyrolysis of waste tire were investigated on the quality of tire pyrolysis products, especially on mono-aromatics production. The parameters namely, particle size of tires, holding time, N_2 flow rate, heating rate, temperature in pyrolysis zone, temperature in catalytic zone and the ratio of tire per catalyst were fixed as 8-18 mesh, 30 min, 30 ml/min, 10 min/°C, 500 °C, 350 °C and 25% (tire: 30 g per catalyst: 7.5 g), respectively.

The use of SAPO-34 significantly increased yields of light olefins and cooking gas than the non-catalytic case, but they were not as much as those of the 5 %Co/SAPO-34 case. Using 5 %Co/SAPO-34, mono-aromatics were increased, whereas di- and poly- aromatics are decreased when compared with those of SAPO-34. It can be suggested that the active sites of Co promote the activity in hydrogenation and ring opening reaction that can reduce concentration of multi-ring aromatic (Pedrosa *et al.*, 2006). The study of Co supported on acid zeolites, namely HY, HBETA, HMOR, and HZSM-5 zeolites was investigated for its influences on the quantity and quality of products. It was found that among the other catalysts 5 %Co/HY gave the highest light olefins yield, and 5 %Co/HZSM-5 gave the highest production of cooking gas. 5 %Co/HZSM-5 gave the highest mono-aromatics production among all supported by the other zeolites due to the pore size of HZSM-5. Among the binary support catalysts, 5 %Co/HMOR/SAPO-34 gave the highest mono-aromatics production among of the other catalysts.

For the further experiment, the other metal supported on the binary supports shall be investigated. Moreover, the concentration of mono-aromatics shall be determined by using other techniques such as GC-MS.