CHAPTER V
CONCLUSIONS AND RECOMMENDATIONS

5.1 Conclusions

The bimetallic Ni-Mo/HZSM-5 catalysts were successfully synthesized by polyol mediated process for methane dehydrogenation and coupling to ethylene. The monometallic 3%Ni/HZSM-5 catalyst provided the highest selectivity of 100 %. To improve low methane conversion that processed from the monometallic and to study the ethylene selectivity, the bimetallic Ni-Mo was proposed. The results showed that the increased Ni loading could enhance the ethylene selectivity and suppress the aromatics selectivity with the decay of catalytic activity in the course of reaction. For bimetallic catalyst, the 3%Ni-3%Mo/HZSM-5 provided the highest methane conversion of ca. 15 % with the highest ethylene selectivity of ca. 96 %. It was postulated that the primary reaction for producing ethylene took place on the metal sites whereas the secondary reaction for generating aromatics took place on the Brönsted acid sites. The incorporation of Ni can cause the Brönsted acid sites to decline due to the partial pore blockage resulting ethylene converted into aromatics in low amounts.

5.2 Recommendations

This work used the polyol mediated process that is the simple method to synthesize the bimetallic Ni-Mo/HZSM-5 catalyst. Another method should be carried out to compare the catalytic performance with polyol method such as incipient wetness impregnation or ion exchange.