CHAPTER V
CONCLUSIONS AND RECOMMENDATIONS

5.1 Conclusions

Methane dehydrogenation and coupling to ethylene can be achieved by using 1%Ni/HZSM-5. It exhibits the performance for both dehydrogenation and coupling the CHx fragment to ethylene. Whereas, using only unloaded HZSM-5 or HZSM-5 (HF) are not attainable. To improve methane conversion and ethylene selectivity, both effect of reaction temperature and the effect of methane concentration in feed play an important role for this reaction by improve favorable thermodynamics of reaction and decrease coke formation respectively. In additional, hydrofluorination enhance the stability of the catalyst for longer than using untreated HZSM-5 as a support. It can be concluded that the best condition to produce ethylene under non-oxidative condition using Ni/HZSM-5 catalyst is using 1%Ni/HZSM-5 carried out at 800 °C, 20% methane, GSHV 1500 ml/g/h. This provides the highest 100% ethylene selectivity.

5.2 Recommendations

From all experiments, it can be observed that the major obstacle for this reaction is coke formation which is difficult to avoid from using only Ni as a catalyst. Therefore, it can be suggested that using bimetallic catalyst which is combined between Ni and the others for coke resistance is the alternative way to reduce coke formation and enhance ethylene yield.