CHAPTER V
CONCLUSIONS AND RECOMMENDATIONS

5.1 Conclusions

It can be concluded that the addition of Mg promoter resulted in shifting the light-off temperature to higher temperatures resulting in less active of the catalyst. However, the addition of Mg could prevent the agglomeration of NiO particles on CPOM at high temperatures resulting in higher stability of the catalyst. Moreover, the impregnation sequence of Mg and Ni has a significant effect on reducibility, reactivity, the amount of carbon deposition and stability of the catalysts. When Mg is impregnated first, higher catalytic activity and reducibility for CPOM were found when compared with the one where Ni is impregnated first. But the amount of carbon deposition of Ni-Mg/CZO was higher than that of Mg-Ni/CZO resulting in lower stability of the catalyst. Among the catalysts investigated, the Ni-3%Mg/CZO catalyst exhibited the highest catalytic activity and stability with the lowest amount of carbon deposition for CPOM with a prolong time on stream of 6 hours at 750°C.

5.2 Recommendations

Methane partial oxidation is an attractive process for H_2 production. The challenge of this process is how to maximize H_2 production, and minimize the carbon deposition on the catalysts. For this present work, the objective to improve catalytic activity and suppress the carbon deposition by adding low content of Mg over NiO-MgO/CZO catalyst is satisfied. However, the preparation of NiO-MgO/CZO catalyst might be improved by using non-thermal incipient wetness impregnation method because, in this work, thermal impregnation cause lower catalytic activity and higher amount of carbon deposition when compared with non-thermal method. Therefore, development of new preparing method of Mg promoter into Ni/CZO catalysts should be studied.