CHAPTER IV
CONCLUSIONS AND RECOMMENDATIONS

5.1 Conclusions

Ce75Zr25Ox supported Ni catalysts prepared by polyol mediated method exhibited superior catalytic performance on CPOM to those prepared by impregnation method at a given Ni loading. The synthesized polyol catalysts possessed a higher surface area and metal dispersion degree, and yet required higher reduction temperatures. They were more active for catalytic combustion at lower temperature compared to the synthesized impregnated catalysts. Based on the H_2 production (H_2 yield), it was observed that the appropriate loading amount of Ni would be 15 wt% regardless of catalyst preparation methods. However, the 15Ni/CZOp catalyst provided a better stability and less coke formation for all the reaction conditions studied.

5.2 Recommendations

Catalytic partial oxidation of methane (CPOM) is an attractive process for H_2 production. The challenge of this process is how to maximize H_2 production, and minimize the coke formation on the catalysts. For this present work, the objective to suppress the coke formation by improving Ni dispersion and reducing Ni particle size are satisfied. However, the preparation of Ni/CZO catalysts with optimal Ni particle size might be improved. It is true that polyol mediated method provided the smaller NiO crystallite size and better Ni dispersion but this technique required long time to obtain desired catalysts. Therefore, observation of other techniques which can provide smaller NiO crystallite size, better Ni dispersion, and prevention of aggregation of metal during the reaction should be considered.