



CHAPTER V

CONCLUSIONS AND RECOMMENDATIONS

GDC10 and metal (Ni and Cu) loaded GDC10 were successfully prepared by sol-gel process, using cerium glycolate as precursor. The suitable condition for the gel formation was hydrolysis molar ratio (h) and acid molar ratio (A) in the range of 20-70 and 0-0.5, respectively. The acidity of metal affected to the gelation time. This synthesis route provided homogeneous particles in the nano-scale. The activity of GDC10 on the methanol steam reforming was very low, as compared to copper loaded GDC10, demonstrating good activity at moderate temperature (250–350 °C) while nickel loaded GDC10 showed good performance at higher temperature (400 °C). All metal loaded catalysts showed the hydrogen selectivity over 70%. The highest methanol conversion and hydrogen yield were achieved by 20%Ni/GDC10. All spent catalysts had small amount of coke deposition in which 20%Cu/GDC10 was found the lowest coke deposition.

The variation of water to methanol ratio is recommended for further study to optimize the water to methanol ratio on this system. A mixture of nickel and copper metals should be studied to observe a synergy on methanol steam reforming.