CHAPTER V
CONCLUSIONS

5.1 Conclusions

The catalysts were prepared by co-precipitation method, and their catalytic performances for the partial oxidation of methane to synthesis gas were evaluated. It can be concluded that BET surface area and metal dispersion were affected significantly by the calcination temperature. The XRD results showed that separate phases of CeO_2 and NiO were detected but none existed as a perovskite structure. For a given catalyst, the CH_4 conversion was declined with increasing calcination temperature while the H_2 and CO selectivities were slightly increased as a calcination temperature was increased. Under the reaction conditions, both $(Ce_{0.75}Zr_{0.25})_{2.14}Ni_{0.86}O_3$ and $Ce_{2.14}Ni_{0.86}O_3$ catalysts were active at temperatures above 650°C. Among the catalysts tested, the $(Ce_{0.75}Zr_{0.25})_{2.14}Ni_{0.86}O_3$ catalyst calcined at 700°C exhibited the highest catalytic activity and stability and less amount of carbon deposition within time on stream of 24 hr.

5.2 Recommendations

To further apply the H_2 production via methane partial oxidation over ceria-nickel and ceria-zirconia-nickel mixed-oxide catalysts. The challenge of this process is how to minimize carbon deposition. For this present work, aimed to reduce of carbon deposition over perovskite structure under the reaction conditions. The regeneration of catalysts are also promising.