CHAPTER V
CONCLUSIONS AND RECOMMENDATIONS

The MSP ceria synthesized by nanocasting presents high order structure, high surface area of 293.2 m^2/g, and small crystallite size, giving many oxygen vacancies in the crystal. All Cu doped on MSP ceria catalysts present high dispersion of Cu with slightly different physical properties, still maintaining of the fluorite structure of MSP ceria and long-rage order of three-dimensional pore structure. The suggestion of the penetration of copper precursor into the pore of MSP ceria was confirmed by XPS and AAS analysis. Moreover, the reduction temperature of Cu catalysts was shifted to the lower temperature than pure MSP ceria. $7Cu/CeO_2$ presents 100% conversion at 110 °C and 87% selectivity toward CO_2 in an excess H_2 and a feed free of CO_2 and H_2O. The temperature at 100 % conversion is shifted to the higher temperature in the present of CO_2 and H_2O due to the competitive adsorption of CO and CO_2, and the blocking effect of H_2O. Moreover, $7Cu/CeO_2$ is a highly stable catalyst over 48 h in a feed free of CO_2 and H_2O, the presence of CO_2, or the presence of CO_2 and H_2O due to the maintaing of structure after PROX reaction.

The synthesized catalysts should be evaluated for other redox reactions, such as water-gas shift (WGS), oxidation of methane, oxidative dehydrogenation of propane and methanol synthesis from CO_2. Moreover, The other technique for preparation of Cu doped on MSP ceria and reductive pretreatment (calcination in the H_2 atmosphere) of Copper-ceria catalyst were interesting to study.