CHAPTER V
CLUSIONS AND RECOMMENDATIONS

5.1 Conclusions

Au-CuO/CeO_2 catalyst has been studied to produce hydrogen from the oxidative steam reforming of methanol reaction. Au-CuO/CeO_2 catalysts were chosen to study the performance in this reaction. Several parameters that influence the catalytic activity of the catalyst, pretreatment condition, (Cu/Au) weight ratio, calcinations temperature, and the $O_2/H_2O/CH_3OH$ molar ratio was chosen to study further in the decomposition of methanol and the steam reforming of methanol reaction. In summary, the conditions of the $O_2/H_2O/CH_3OH$ molar ratios at 0.96:1:1 for the existing of OSRM leading to the combination of SRM and POM. The 5:1,(Cu/Au) of Au-CuO/CeO_2 was considered as the optimum condition for effect of metal ratio which consist of high Au^0 and can reduce interaction between Au and CeO_2 support. The catalyst calcined at 200 °C can give the highest methanol conversion at 95 % and 59% hydrogen yield, which was definitely affected by the Au sintering effect, when compared to higher calcinations temperature. The optimum size for Au particle was 5.64 nm which was suitable for OSRM reaction. Doping CuO on Au/CeO_2 catalyst to improve performance on OSRM by characteristic of CuO which active for OSRM reaction and can improve metal-metal interaction of Au and CuO. For the side reaction 5:1,(Cu/Au) of Au-CuO/CeO_2 calcined at 200°C can exhibit the catalytic activity in those side reactions in the whole range of reaction temperature.

5.2 Recommendations

The consistent preparing catalysts seemed to be a significantly factor that will affect the catalytic activity. Thus, the catalyst should be prepared in the same batch.

The oxidation state of Au is very interesting because there are many parameters which affect the oxidation state of Au. X-ray photoelectron spectroscopy (XPS) is recommended to characterize the catalyst, in order to explain the chemical state of gold that presents on the surface of catalyst and determine the relationship between states of gold and catalytic performance.