CHAPTER V
CONCLUSIONS AND RECOMMENDATIONS

5.1 Conclusions

In the present study, the copper-based catalysts have been developed for dehydroxylation of glycerol to produce propylene glycol. The $CuZnO/Al_2O_3$ catalyst showed the best catalytic activity compared to Cu/ZnO and Cu/Al_2O_3 with and without the addition of other types of promoter (Cr_2O_3, CeO_2, Fe_2O_3). The TPR results revealed that the presence of ZnO facilitates the reduction of Cu to the lower temperature. This behavior was attributed to the highly dispersed CuO species present on the catalyst. The activity of The $CuZnO/Al_2O_3$ catalyst was also dependent on the calcinations temperature. The maximum activity was obtained for the catalyst calcined at 500°C. The BET surface area indicated that the high performance of the catalyst can be ascribed to the higher surface area. When compared with the catalyst prepared by co-precipitation, the stability of the impregnated catalyst was lower than the co-precipitated catalyst. The TPR, XRD, and TEM measurement revealed that a better performance of the co-precipitated catalyst might be attributed the presence of CuO highly dispersed in spinel-like matrix.

5.2 Recommendations

It is known that the method of preparation of the copper-based catalyst is crucial in determining the final properties of the catalysts. Therefore, future work should be focused on other methodologies, for example, sol-gel method, caustic leaching of Cu-Zn-Al alloys, or homogeneous precipitation. Furthermore, the preparation parameters, such as calcination temperature, type of precipitant, pH, stirring rate are also interesting.