CHAPTER V
CONCLUSIONS AND RECOMMENDATIONS

5.1 Conclusions

In the present study, the catalytic dehydroxylation of glycerol to propylene glycol over $CuZnO/MgO-Al_2O_3$ catalysts has been investigated. From the experiment, CuZnO/MgO exhibited the highest performance in terms of stability, while $CuZnO/Al_2O_3$ gave the highest catalytic activity. However, the glycerol conversion over $CuZnO/Al_2O_3$ was continuously dropped with longer reaction time. Interestingly, $CuZnO/MgO(15)-Al_2O_3(85)$ provided both high catalytic activity and stability. This could be due to the loaded MgO in mixed oxide supports enhanced the metal support interaction, resulting in well dispersed of CuO grains and high coke resistance. Compared to $CuZnO/Al_2O_3$, $CuZnO/MgO(15)-Al_2O_3(85)$ showed higher catalytic activity and stability when yellow grade glycerol was used as feed. In addition, the reaction stability of $CuZnO/MgO(15)-Al_2O_3(85)$ was not affected by the mixed NaOH in feedstock and also increased the propylene glycol selectivity due to the less NaOH impurity effect on the hydrogenation active surface.

5.2 Recommendations

In this work, $CuZnO/MgO(15)-Al_2O_3(85)$ exhibited the highest catalytic activity and stability compared to other catalysts. This might due to high support interaction when higher MgO content was loaded into mixed oxide support. However, surface area of catalysts decreased with increasing of loaded MgO, resulting lower catalytic activity. Therefore, modification of MgO with high surface area should be investigated. It is possible that $CuZnO/MgO-Al_2O_3$ with higher surface area may demonstrate the greater catalytic activity. On the other hand, the incorporation of both alkali purification and catalytic reaction units for the conversion of crude glycerol might provide the higher cost effective than one unit, catalytic conversion of refine glycerol.