CHAPTER V
CONCLUSIONS AND RECOMMENDATION

5.1 Conclusions

The investigated catalysts (Na_2CO_3, MgO, CaO, BaO, SrO, and ZrO_2) show different activity for the condensation of glycerol. Based on the preliminary experiments, the most efficient catalyst for glycerol dimerization were CaO and BaO. They provided diglycerol selectivity and diglycerol yield higher than homogeneous catalyst (Na_2CO_3) and the other catalysts. Thus, CaO and BaO were selected for studying the effect of amount of catalyst and reaction temperature at reaction time 1 hour. At the same amount of catalysts loading, CaO exhibited glycerol conversion and diglycerol yield higher than BaO while BaO exhibited diglycerol selectivity higher than CaO. In the case of reaction temperature, in order to get the same glycerol conversion and diglycerol yield, BaO required higher temperature than CaO, but CaO required higher temperature than BaO in order to get the same diglycerol selectivity. However, the optimum temperature for CaO and BaO catalysts for glycerol dimerization was at approximately 240°C for 1 hr reaction time. From these results, CaO was more active and yield than BaO for glycerol dimerization, but BaO had better diglycerol selectivity than CaO.

5.2 Recommendation

For further development of this research, I recommend that the synthesis of diglycerol can be done by using the shape selectivity catalyst which can select the linear diglycerol from the other isomers. Moreover, this research could analyze the diglycerol oligomers e.g. linear, cyclic and branch diglycerol. And, the recover and reuse of the catalysts should be further studied.