CHAPTER V
CONCLUSIONS AND RECOMMENDATIONS

5.1 Conclusions

Gold-doped on TiO_2 comercial and titania nanotubes (TNT) catalysts catalyze the oxidation of ethylene under various oxygen condition over the temperature range of 200-450°C had been studied in this work. The many effects on the activity are presented; including the effect of catalyst support, the effect of calciantion temperature and oxygen conceatration in oxidation reaction. The important conclusions of this study can be summerized as follws:

Au/TiO_2 catalysts were found to favor in ethylene oxidation and dramatically increased of ethylene conversion. The incipient wetness impregnation method created the large size of gold particles and induced to the total oxidation as a main reaction which was confirmed from many research works. Moreover, ethylene conversion and carbon dioxide selectivity increased with the reaction temperature. The optimum calcination temperature of Au/TiO_2 depened upon the amount of oxygen concentration in oxidation reaction which were 473 K, 573 K and 473 K under deficient, stoichiometry and excess of oxygen, respectively. In addition CO_2 selectivity was increased when increased the amount of oxygen concentration in the reaction. The catalytic activity of Au/TiO_2 catalysts was confirmed by TPD and TPR results which enhanced the oxygen desoption and exhibit the higher reducible property when compared with the pure TiO_2 support. In contrast, Au doped on titania nanotubes (TNT) support obtained from hydrothemal treatment 150°C did not improve the catalytic activity. Although, the BET surface area of synthesized TNT was higher than TiO_2, ethylene conversion of Au/TNT were still extremely lower of than Au/TiO_2. Moreover, there are no different in catalytic activity at different calcination temperatures.

5.2 Recommendations

The metal crystallite sizes strongly affected the catalytic activities so that further study is nccessary in order to improve the catalyst preparation method which provided a small in size of metals and highly dispersion. In addition, try to apply the hydrogen in the reaction to create the ethylene epoxidation for increasing ethylene oxide production yield. Moerover, the promoter type which can create a high activity should be further stuied.