CHAPTER V

CONCLUSIONS

The addition of Li to the Pt/Al_2O_3 decreases the activity of dehydrogenation reaction but increases the selectivity to propylene. This indicated that the selectivity shift from coking and acid cracking reaction to dehydrogenation because Li can neutralize the acidity of the alumina.

For Sn addition to the Pt/Al_2O_3, Sn can promote both dehydrogenation activity and selectivity, prolonging the lifetime and decreasing the amount of carbon deposition. There are two main effects of Sn on Pt/Al_2O_3; the first one is an ensemble effect. Sn can block the large ensembles that required for cracking and coking reaction which causes the selectivity shift towards the dehydrogenation reaction. The second effect is enhancing the transportation of coke precursors from metal to support. The coke precursors become more mobile and are drained off from metal to the alumina on the Sn containing catalyst.

For trimetallic catalysts, $Pt-Sn-Li/Al_2O_3$, The catalytic effects of Sn and Li exhibit a surprising uniformity; negative under low reaction temperature (500 °C), positive under high reaction temperature (600 °C). As mentioned above, the Sn addition has more beneficial effect on Pt/Al_2O_3 than Li addition. Therefore the variation of Sn/Pt ratio in the $Pt-Sn-Li/Al_2O_3$ is focused. The activity of dehydrogenation reaction and the rate of coke formation depend on the amount of Sn. Catalyst D4 (Sn/Pt = 2.0) exhibits a maximum conversion and gives the lowest rate of coke formation. An excess amount of Sn (Sn/Pt = 2.5) may reduce the active sites by alloy formation so it suppresses the activity of catalyst.

In the repeated reaction-regeneration cycles it can confirm that at Sn/Pt of 2 still gives the high conversion after long time operation and it shows the highest conversion in the 2nd cycle. This can be noted that the redispersion of Pt in oxygen is possible in the presence of chlorine. In addition, the activity of catalyst can be improved by burning carbon deposited on the catalyst in an oxygen atmosphere.