

CHAPTER V

CONCLUSIONS

The addition of tin to the alumina-supported Pt catalyst enhances both dehydrogenation conversion and selectivity of the catalyst and decrease the selectivity for the coking reaction. There are two main effects of tin on *Pt/Al₂O₃*; the first one is Sn reduced to Sn²⁺ ions interacted with the alumina support to form tin-aluminate complex which can modify the properties of Pt directly as result of ensemble or of electronic effect. The second effect is to increase the transportation of coke precursors from the metal to the support, called the drain-off effect.

The addition of lithium to the alumina-supported Pt catalyst also improve the butane dehydrogenation activity and selectivity of the catalyst. Lithium acts as a neutralization species for the acidity of the support. Consequently, coke formation and cracking are suppressed.

For the trimetallic catalyst, *Pt-Sn-Li/Al₂O₃*, the activity and selectivity are better than bimetallics due to the effect of both tin and lithium. However the tin addition has more beneficial effect on the alumina-supported Pt catalyst than lithium addition. Therefore the variation of Sn/Pt ratio in trimetallics is the focus of this work. The results show that adding more tin enhances more activity and selectivity of butane dehydrogenation.

For the repeated cycle runs, the results show the same trend for all catalysts. That is the decomposition of Sn and agglomeration of Pt particles during the third cycle considerably reduces the conversion of the Pt-Sn-Li supported on alumina catalyst and the selectivity of the catalyst is increased.

For the remaining cycles, they show smaller changes in the conversion and selectivity.