

## CHAPTER V

### CONCLUSIONS AND RECOMMENDATIONS

#### 5.1 Conclusions

The Low loaded Pd, Pd-Cu and Pd-W supported on alumina catalysts were investigated for the liquid phase hydrogenation of 1-hexyne under 1.5 bar and 40 °C. The Pd-W/Al<sub>2</sub>O<sub>3</sub> catalysts show better catalytic performances than that of low loaded Pd/Al<sub>2</sub>O<sub>3</sub> and Pd-Cu/Al<sub>2</sub>O<sub>3</sub> catalysts. The catalytic activity of Pd-W/Al<sub>2</sub>O<sub>3</sub> catalysts increases when the amount of W loading is increased. For the selectivity, Pd-W/Al<sub>2</sub>O<sub>3</sub> (at Pd to W ratio of 1) shows the highest selectivity among the Pd-W/Al<sub>2</sub>O<sub>3</sub> catalysts. At other Pd-W ratios, increasing or decreasing of the W loading slightly changes the 1-Hexene selectivity. Accordingly, Pd-W/Al<sub>2</sub>O<sub>3</sub> catalyst (at Pd to W ratio of 1) exhibited the optimum activity and selectivity which provided more than 90% selectivity of 1-hexene at the 100% 1-hexyne conversion for selective 1-Hexyne hydrogenation.

#### 5.2 Recommendations

For further studies, the activity and selectivity of 1-Hexyne can be further improved by possible method including the addition of various metals to Pd catalyst such as Re or Bi (Beamson, G. *et al.*, 2011), (Anderson, J.A. *et al.*, 2009) and using other supports such as zeolite or ZnO. Furthermore, improving the operation condition such as H<sub>2</sub> pressure or temperature should be also studied.