

CHAPTER V

CONCLUSIONS AND RECOMMENDATIONS

5.1 Conclusions

The Pd and Pd-Mn supported on alumina catalysts are studied for the liquid-phase hydrogenation of 1-hexyne under 1.5 bar and 40 °C. The Pd-Mn/Al₂O₃ catalysts (Pd/Mn ≤ 1) show better catalytic activity than 0.3 wt% Pd/Al₂O₃ catalyst. In contrast, the activity of Pd-Mn/Al₂O₃ (Pd/Mn ≥ 1.0) catalysts are less active than Pd/Al₂O₃ catalyst. The Pd-Mn/Al₂O₃ catalyst (Pd/Mn = 1) provides the highest activity among the tested Pd-Mn catalysts. The conversion of 1-hexyne of Pd-Mn/Al₂O₃ (Pd/Mn = 0.5, 0.75, 1.0) catalysts are all over 98 % at 2 h reaction time. Moreover, Pd-Mn/Al₂O₃ catalyst are more selective than 0.3 wt% Pd/Al₂O₃ catalyst which provides more than 95 % of 1-hexene selectivity at 1 h reaction time. The Pd-Mn/Al₂O₃ (Pd/Mn = 5) catalyst is slightly more selective than other Pd-Mn/Al₂O₃ catalysts. As expected, selectivity of *n*-hexane is also increased.

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 the second metals to Pd-based catalyst, such as Re (Beamson *et al.*, 2011), Bi (Anderson *et al.*, 2009), Rh (Liprandi *et al.*, 2012), W (Lederhos *et al.*, 2011), Ni (Maccarone *et al.*, 2012) and Au (Kittisakmontree *et al.*, 2013) or using other supports, such as zeolite. Moreover, improvement of the operating condition, such as H₂ partial pressure or temperature should be also studied.