# CHAPTER V
# CONCLUSIONS AND RECOMMENDATIONS

## 5.1 Conclusions

The Pd and Pd-Cu catalysts supported on alumina were investigated in the liquid phase hydrogenation of vinylacetylene in mixed C4. The Pd loading of Pd monometallic catalyst varied from 0.1 to 1.0 wt% affected the activity, 1,3-butadiene selectivity and 1-butene selectivity. The activity in vinylacetylene hydrogenation increase with increasing amount of Pd. The Pd monometallic catalyst containing 0.3 wt% Pd gave the best 1,3-butadiene selectivity within the range of Pd loadings investigated. For Pd-Cu catalysts, Adding Cu on the Pd catalyst was to improve activity in vinyacetylene hydrogenation and Pd-Cu catalyst with Pd/Cu ratio of 1.5 gave the optimum catalytic activity and selectivity. Pd-Cu catalyst with Pd/Cu ratio of 1.5 was chosen to study the effect of reaction temperature and $H_2$ pressure. Temperature varied from 27 to 43 $^{o}$C affected the activity in vinylacetylene hydrogenation and had no effect to the 1,3-butadiene and 1-butene selectivity. $H_2$ pressure varied from 3.5 to 5.5 bar affected both activity and selectivity. The activity and 1-butene selectivity increased with $H_2$ pressure. 1,3-butadiene selectivity decreased with increasing $H_2$ pressure.

## 5.2 Recommendations

For further studies, since using Pd-Cu catalyst in vinylacetylene hydrogenation could not improve 1,3-butadiene selectivity from Pd catalyst. The possible method for improving 1,3-butadiene selectivity including the addition of various metal to Pd catalyst such as Zn and W and using various support such as zeolite and ZnO should be studied.