CHAPTER V
CONCLUSIONS

The deoxygenaiton of oleic acid over $NiMo/Al_2O_3$ produces n-octadecane (C18) and n-heptadecane (C17) as major products from hydrodeoxygenation and hydrodecarbonylation, respectively. In addition, the C18/C17 ratio higher than one indicates that the deoxygenation of oleic acid over $NiMo/Al_2O_3$ prefers to occur via hydrodeoxygenation rather than hydrodecarbonylation. The catalytic activity and hydrocarbon product selectivity can be optimized by varying the reaction condition, for example, temperature, pressure, H_2/oleic acid ratio, and WHSV. That is, the catalytic activity and hydrocarbon products selectivity increases with the reaction temperature and pressure. However, the increase in H_2/oleic acid molar ratio from 70 to 210 did not significantly enhance the selectivity to hydrocarbon. Nevertheless, the increase in space time (1/WHSV) from 4 to 20 hr did not significantly change the selectivity to C17 and C18.

The deoxygenaion of palmitic acid over $NiMo/Al_2O_3$ produces n-hexadecane (C16) and n-pentadecane (C15) as major products from hydrogenation path and hydrodecarbonylation path, respectively. Additionally, the selectivity of C16 is higher than C15. It indicates that the deoxygenation of palmitic acid over $NiMo/Al_2O_3$ prefers to occur via hydrodeoxygenation rather than hydrodecarbonylation path. Moreover, the catalytic activity and hydrocarbon product selectivity can be optimized by varying the reaction condition, temperature, pressure, H_2/palmitic acid ratio, and space time. The catalytic activity and hydrocarbon products selectivity increase with the reaction temperature and pressure. The enhancement in H_2/palmitic acid ratio from 70 to 210 did not have effect to hexdecane selectivity. Nevertheless, the increase in space time (1/WHSV) from 4 to 10 hr did not significantly change in the selectivity of hexadecane.

Moreover, the sulphided $NiMo/Al_2O_3$ catalyst increased the catalytic activity of the doxygenation reaction. And the reaction over the sulphided $NiMo/Al_2O_3$ under hygrogen atmosphere also prefers hydrodeoxygenation to hydrodecarbonylation.

In contrast, the Pd/C catalyst prefers to occur the reaction via hydrodecarbonylation, the product has one carbon atom lower than the original and has CO and H_2O as by-product. Then the major product from the deoxygenation of oleic acid is n-heptadecane and n-pentadecane for palmitic acid.

The optimum condition for the deoxygenation reaction of oleic acid is at 325°C, pressure of 500 psig, H_2/fatty acid ratio of 35, and space time of 4 hr. For the palmitic acid, the optimum condition is at of 325°C, pressure of 500 psig, H_2/fatty acid ratio of 35, and space time of 10 hr.