CHAPTER V

CONCLUSIONS AND RECOMMENDATIONS

5.1 Conclusions

XRD patterns and TEM images showed that Pt/HY^{core}-Pd/$TiO_2{}^{shell}$ catalysts were successfully synthesized without losing parent structures. BET pore size distribution showed that the microporous and mesoporous structure of parent catalysts remained in Pt/HY^{core}-Pd/$TiO_2{}^{shell}$ catalysts. TPD of isoproplyamine results showed that Pt/HY^{core}-Pd/$TiO_2{}^{shell}$ catalysts remained Brønsted acid sites for hydrocracking. TPR profiles showed Pt/HY and Pd/TiO_2 reduction peaks. S31, S36, S44, and S57 catalysts exhibited 100% conversion of triglycerides into gasoline, jet, and diesel fuel range products while Pt/HY catalyst exhibited very low conversion of triglycerides with high oxygenate products and Pd/TiO_2 catalyst only converted to diesel range paraffin hydrocarbons. The products obtained over S36 catalyst were shorter chain hydrocarbons compared to those obtained from the S36p catalyst due to its core-shell mechanism that jatropha oil was first deoxygenated in Pd/$TiO_2{}^{shell}$ before further cracked in Pt/HY^{core}. Among all prepared catalysts, S36 catalyst gave the highest biojet fuel yield of 40.2 % at TOS of 2 h. However the light, gasoline, and jet products over Pt/HY^{core}-Pd/$TiO_2{}^{shell}$ catalysts decreased with time on stream.

5.2 Recommendations

The LHSV was optimized in this project, nevertheless other reaction conditions should be further optimized to achieve highest biojet fuel yield. S31, S36, and S44 catalysts exhibited 100 % conversion for 8 h of reaction however diesel yield increase with TOS indicated that Pt/HY is deactivated. Therefore the deactivation of Pt/HY should be further studied.