CHAPTER I
INTRODUCTION

There are many reasons to utilize renewable feedstocks as alternative fuels for example, the limitation of petroleum supply to support the increasing energy demand, the pollution caused by petroleum fuels combustion, and the uncertainty of petroleum-based fuels prices. Therefore, awareness of energy sustainable development is important to reduce the unwanted situations.

There are a number of sustainable alternative energy sources that can replace the petroleum-based energy, especially energy from biomass which provides the advantages over petroleum-based fuels such as a relative clean-burning, theoretically inexhaustible fuel source, zero net greenhouse gases emission.

In 2008, twenty-five airlines stopped their operations because of the unusual rapid increase in petroleum prices. The unstable and unpredictable price of petroleum-based fuels has an effect on jet fuel prices. In order to solve this problem, bio-jet fuel seems to be an interesting way. Therefore, a stable and predictable price of bio-jet fuel is preferable for airlines to have a better plan for long term profitability.

There have been many researches on biodiesel and hydrogenated biodiesel production from vegetable oil but the study on bio-jet fuel production is limited. Since vegetable oil is the molecule of triglyceride which composed mainly of 14 to 18 carbon atoms, it is proper for biodiesel and hydrogenated biodiesel production. However, vegetable oils can be also used to produce bio-jet fuel by using catalysts that have hydrocracking and hydroisomerization activity. Moreover, hydrodeoxygenation is desirable to improve the quality of bio-jet fuel. The typical catalysts used for these processes are bifunctional catalysts which provide the isomerization/cracking and hydrogenation functions.

The main aim of this work is to study the bio-jet fuel production from jatropha oils by using bifunctional catalysts including, Pt-Al_2O_3, Pt/F-Al_2O_3, Pt/H-Y, Ir/H-Y, and Ru/H-Y. The experiment will focus on comparison activity and selectivity of these bifuctional catalysts for hydrocracking, hydroisomerization and hydrodeoxygenation. These bifuctional catalysts will be prepared by incipient

wetness impregnation method, and tested for their catalytic activity and selectivity. In addition, the catalyst with the highest performance will be selected for further study on optimum condition.