# CHAPTER I
# INTRODUCTION

Mixed C4 hydrocarbon is a product from the naphtha cracking process in the petrochemical process and contains mainly 4 carbon atoms in its molecule. For instance, 1,3-butadiene is used for polybutadiene and styrene-butadiene rubber production. 1-Butene is used as a co-monomer to produce linear low density polyethylene (LLDPE). Isobutylene is used for producing methyl *tert*-butyl ether (MTBE) or ethyl *tert*-butyl ether (ETBE) and butane is used as the liquefied petroleum gas (LPG). There are other compounds in the mixed C4 streams, such as vinylacetylene, which can be converted to higher value products. Typically, a high concentrated vinylactylene streams is eliminated by burning away. However, this vinylacetylene can be converted to 1,3-butadierne and 1-butene by using selective catalytic hydrogenation process. The selective catalytic hydrogenation process is a one alternative for mixed C4 hydrocarbons upgrading. The Pd is frequently used as a catalyst for this process because it gives high catalytic performances, however, the use of Pd for hydrogenation still limited to apply with alkynes. For example, Pd-based catalyst can be poisoned by some impurities, such as COS, $H_2S$ and some mercaptans, in the stream and isomerization of 1-butene rapidly takes place in the nonexistence of 1,3-butadiene. Several techniques which are studied by many researchers are employed to enhance the hydrogenation process in order to reduce these limitations and increase the activity, selectivity and stability of the Pd catalyst. A bimetallic catalyst and using of the other supports are the important methods for developing the catalytic performances of the catalyst for this process. (Choochuen, 2012)

In this study, 1-hexyne is selected to be used as a model acetylene compound for liquid phase hydrogenation. This work proposes the use of bimetallic catalyst Pd-Mn/alumina to study for the hydrogenation process of 1-hexyne in order to increase the activity and selectivity of the Pd catalyst.