CHAPTER I
INTRODUCTION

C4 hydrocarbons are important chemicals and widely used in both the petrochemicals and fuel applications. For example, 1,3-butadiene can be used as a precursor for producing polybutadiene and styrene-butadiene rubber, 1-butene can be used as a co-monomer with ethylene to produce linearly low density polyethylene (LLDPE), isobutylene can be used as a feedstock for producing methyl-*tert*-butyl ether (MTBE) and butane can be used as the liquefied petroleum gas (LPG).

The C4 hydrocarbons are generally produced by the catalytic cracking unit. The C4 product stream from the catalytic cracking unit is mixture of C4 hydrocarbons containing 1,3-butadiene, 1,2-butadiene, 1-butene, 2-butene, butane, isobutylene and C4-acetylene. In the commercial plants, the mixed C4 stream will be separated and purified to produce higher value chemicals such as 1,3-butadiene, 1-butene and isobutene. Selective catalytic hydrogenation process is an important process for C4 stream purification by using hydrogen. In this process, the Pd catalyst is often used as a catalyst because of their high activity at low temperature for hydrogenation of acetylenes and diolefins. However, there are many limitations such as isomerization of 1-butene rapidly occurs in the absence of 1,3-butadiene, Pd catalyst can be fouled by oligomerization of C4 and Pd-based catalyst can be poisoned by COS, H_2S and some mercaptanes. Many researchers have tried to study and improve this hydrogenation process in order to decrease the limitations of Pd catalyst and increase an activity, selectivity and stability of Pd catalyst. An addition of second metal to Pd catalyst and using of other supports are two methods which are currently chosen for improving the catalytic performance of acetylenic compound hydrogenation catalyst.

The aim of this work was to study the hydrogenation of highly concentrated vinylacetylene mixed C4 over Pd-Cu/Al_2O_3 catalyst.