CHAPTER 1

INTRODUCTION

Since the oil crisis in 1974, scientists worldwide have realized that some kinds of renewable energy resources will be necessary in the near future. Many researches now focus on synthesis of petrochemical from synthesis gas ($CO + H_2$) which comes from various sources, eg. from natural gas reformation, coal gasification, biomass gasification, etc. These sources of synthesis gas should lost for many decades and some are also renewable. Since the mid 1980's, the oil prices have dropped and stabilized, and researches on crude oil substitution consequently have slowed down or been given up. However another serious problem that all the industrial countries are facing and which shall grow in urgency and important as time goes by is environmental pollution. Pollutants from the combustion of fossil fuel, especially from automotive engines, have been increasing at an alarming rate. Nowadays lead compounds eg. tetraethyl lead are used as octane booster, and they become heavy metal pollutant after combustion. The use of gasohol gasoline blended with alcohols will provide clean exhaust gas and costs comparable with other octane boosters. Hence it has been decide to investigate the synthesis of mix alcohols from synthesis gas ($CO + H_2$).

In Thailand all of the ethanol is obtained from fermentation, because economically it is advantageous to synthesize ethanol from fermentation. Since natural gas was discovered, it has been reallized that this valuable resource must be effectively utilized. Since petrochemical technology generally requires synthesis at elevated pressure, the objectives of this study are as follows:

1. Design and construct a through-flow high-pressure reactor that can withstand up to 100 atg at 400°C.

2. Prepare catalysts for alcohol synthesis from synthesis gas

3. Carry out experiments on alcohol synthesis from synthesis gas and observe the effects of temperature, pressure and gaseous hourly space velocity.