# CHAPTER 1

## INTRODUCTION

Isopropanol has often been called the first modern synthetic petrochemical. Since it was first produced on a large-scale in the U.S. in 1920, it has been used as solvent, dehydrator and defrosting agent, and disinfectant throughout the world. In various industries it is used as extractant. It is also used as a base for the manufacture of acetone and other compounds. In term of production volume, isopropanol is about the fourth largest chemical produced from propylene. Total 1981 U.S. and Western Europe nameplate capacities for isopropanol production are $1.285 \times 10^6$ and $8.52 \times 10^5$ metric tons, respectively. Petroleum refining companies are currently interested in a relatively simple and inexpensive method of converting by-product propylene to isopropanol for use as an anti-icing additive for gasoline. (1)

There are two basic processes for the commercial manufacture of isopropanol, and each involves synthesis from propylene.

In the present work, a catalyst composed of either H type mordenite or HY type zeolite with silica-alumina is to be prepared and used for isopropanol synthesis from one part of $C_3H_6$ and one part of $H_2O$

$$C_3H_6 + H_2O \xrightarrow{\text{catalyst}} (CH_3)_2CHOH \qquad \Delta H = -50 \text{ KJ/mol}$$

## Objectives

1. To investigate the heterogeneous process for direct hydration of propylene to isopropanol.
2. To learn the preparation technique and to prepare a suitable catalyst for the above isopropanol synthesis process.
3. To learn the know-how of carrying out a mixed phase catalytic reaction.
4. To investigate the effects of reaction conditions. (space velocity, pressure, temperature, type of catalyst) for the above reaction process.