



## CHAPTER I

### INTRODUCTION

#### **Introduction**

Worldwide interest has emerged in the use of silicon-based chemicals to produce improved, reliable organosilicon compounds. The use of these compounds in the development of new chemical reagents, polymers, glasses and ceramics is limited at present by paucity of simple silicon-containing starting materials. Silicon-based feedstock chemicals are used in a wide variety of applications, such as in biocides, stain- and dirt-resistant polymers for carpets, advanced ceramics for aerospace applications and electronic components. Whereas industrial carbon-based chemistry can draw on the diversity of compounds produced from crude oil, coal or other natural sources, silicon chemistry relies almost exclusively on the carbothermal reduction of  $\text{SiO}_2$  to Silicon. Carbothermal reduction requires high heat and specialized equipment. New methods should also involve an inexpensive and readily available starting material. In view of this, silica is an attractive starting material for producing silicon-containing species.

Silica is by far the major component of the earth's crust. It is the most common material found in nature such as sand, plants etc. For plants, rice husk is an agricultural waste material abundantly available in rice producing countries. During recent decades, many researchers have concentrated on materials science aspects. Several papers were published about rice husk ash as a source of silica, for preparation of new materials [1,2].

## **Objectives**

The objectives of this research are the following:

1. To study the synthesis polysiloxane from rice husk ash and amine as catalyst and reactant in ethylene glycol.
2. To compare the polymer from synthesised from rice husk ash and pure silica which were various particle size with same amine.
3. To characterize products.

## **Expected benefits obtainable for future developments of the research.**

1. Use of waste from rice husk to advantage.
2. Use of rice husk ash as starting material for silicon feed stock chemicals.
3. To decrease the import of silicon in order to save the country's foreign currencies.

## **Scope of The Investigation**

The preparation of polymers from rice husk ash or pure silica is a relatively new idea, the appropriate parameters are theoretically not thoroughly known. The necessary procedures to achieve the product may be as follow:

- Literature survey and in-depth study of this research work.
- Preparation of chemical reagents, equipment and glassware.
- Synthesis of polymer via condensation reactions, varying the following parameters so as to attain appropriate reaction conditions:
  1. Study the effect of reaction temperature
  2. Study the effect of silica : amine mole ratio

### 3. Study the effect of reaction time

And to synthesize the products with different sources of silica and amine

- Characterize the products by
  1. FT-IR Spectroscopy
  2. NMR Spectroscopy
  3. Elemental Analysis
  4. X-ray Fluorescence Spectroscopy
  5. Thermal Analysis
- Summarize the results and prepare the report