

# Chapter I

## Introduction

It has been known that natural rubber (NR) has some privilege properties such as elasticity, good adherence to metal substrate, *etc* but large-scale application for the organic-organic mixture separation in the chemical industry has been applied due to the lack of good membranes for specific application. Therefore developments and modifications of NR have been interested for various applications by macromolecular scientists [1]. Among these, epoxidized natural rubber (ENR) is one of which is widely studied. ENR is a low molecular weight polyisoprenic molecule containing epoxide rings along its chain. Epoxide ring is generally one of the most active and unstable functional groups among organic molecules. Thus, modification of the epoxidized natural rubber (ENR) by various reagents expected to be easily occurred by the reaction with other small molecules at the epoxide functional group. In recent years, there has been increased interest in the use of the membrane separation process for separation of organic liquid mixtures. This technique can be used to separate any liquid mixture in all concentration ranges, due to simplicity, low costs and high selectivity in separation. Many researches were found that selectivity of membrane related to solvent swelling, size and chemical nature of permeating species on separation and relation of selective permeation to the polarities of the organic solvent and the polymer. Thus, many new membranes were synthesized from polymer [2] and these polymers generally showed an improved permselectivity due to they contained specific group that could preferentially interact with one component of liquid mixture [3] and membranes obtained from crosslinked polymer increased separation efficiency by reduction of permeability. Therefore ENR was chosen for our purpose to prepare crosslinked ENR membranes using amines as crosslinking agent. Conditions of reaction, various solvents, type of amines and concentrations of amines were investigated in this research.

## **Objectives and scope of the research**

### **1. Objectives**

- 1.1 To prepare membranes from ENR.
- 1.2 To study the properties of membranes.
- 1.3 To study the effective parameter on separation process.

### **2. Scope of the research**

- 2.1 To prepare crosslinked membranes from ENR.
- 2.2 To study the effect of amine crosslinking agent on the crosslinked membrane.
- 2.3 To characterize mechanical properties of membranes.
- 2.4 To investigate permeability of the membrane.
- 2.5 To investigate separation of mixed solvent using the crosslinked membrane.