

CHAPTER I

INTRODUCTION

1.1 General Introduction

The technique of mixing two or more polymers has gained considerable importance in recent years because it may give rise to certain properties that cannot be attained by other means or from individual component. Based on such principle, thermoplastic elastomers can be prepared by mixing a thermoplastic and an elastomer under high shearing action. Other technique of enhancing the properties of polymers involves mixing some additives with the polymer. It is a method that has received much attention because of its economic advantages.

Poly(vinyl Chloride) (PVC) homopolymer is a stiff and brittle plastic. For many applications, therefore, it is useful to mix PVC with other polymers or copolymers in order to improve its properties. One of the many suitable modifying additives for PVC is butadiene-acrylonitrile rubber (NBR). NBR is believed to function as a permanent plasticizer for PVC in applications such as wire and cable insulation, refrigerator gasket, shoe sole and many others.

The property modification by adding NBR to PVC has been pursued by scientists from many disciplines, including Polymer Chemistry, Polymer Physics, Polymer Rheology, Polymer Engineering, and Materials Science. Both science and technology can be applied to create products that will be acceptable to various industrial and consumer groups.

1.2 The Purpose of the Present Study

The present work involves a study on the change of properties when NBR is added to PVC compound. General purpose plasticized PVC is selected for this study. It is used extensively worldwide. The plasticized PVC has some disadvantages such as poor abrasion resistance due to the softness of the plasticized PVC and thus limits its use in footwear application. Other disadvantage is the loss of properties due to the extraction of plasticizer when it is in contact with aggressive material such as motor oil, unleaded gasoline and hexane. Another problem frequently encountered with plasticized PVC is poor dimensional stability.

In the experimental work, various contents of NBR will be mixed with PVC by dry-blending process. The physical and the mechanical properties of the mixtures will be investigated. Environmental test will also be performed in the present study, especially the effects of chemicals such as petrol reagents. Properties before and after an immersion of plasticized PVC with and without NBR in hexane, motor oil and unleaded gasoline will be compared with the original properties. For the

compatibility study, a Differential Scanning Calorimetry (DSC) and a Scanning Electron Microscope (SEM) will be applied as tools for such studies.