

CHAPTER I

INTRODUCTION



1.1 The Purpose of the Investigation

In recent years, rubber-plastic blends have become technologically interesting for their use as Thermoplastic Elastomers (TPEs). These materials present the excellent processing characteristics of the thermoplastics and the elastic characteristics of the rubbers [1,2,3]. TPEs can be also developed by blending natural rubber and poly(methyl methacrylate), these materials combine the excellent processability characteristics of poly(methyl methacrylate) and the elastic properties of natural rubber. In addition, They can be successfully used for the fabrication of automobile components [4].

Even though blending looks very attractive for the preparation of TPEs, but the blends of natural rubber and poly(methyl methacrylate) are highly incompatible and hence exhibit poor mechanical properties [3,5]. The technological compatibilization of the immiscible pairs is necessary in order to improve the mechanical properties of the blends for commercial uses. The properties of natural rubber and poly(methyl methacrylate) blends can be improved by the addition of the compatibilizer which can interact with both blend components. Therefore, the compatibilizer can be a graft copolymer with segments that are chemically identical to natural rubber and poly(methyl methacrylate). In this research, an attempt was made to prepare graft copolymer of methyl methacrylate onto natural rubber. A graft copolymer was used for compatibilizing rubber and poly(methyl methacrylate). Besides TPEs can also be prepared from natural rubber-g-methyl methacrylate and poly(methyl methacrylate). TPEs are generally used for making automobile parts.

Since these materials find uses in a variety of applications, therefore, investigations of mechanical properties of TPEs from natural rubber-g-methyl methacrylate and poly(methyl methacrylate) is important in predicting their service life.

1.2 Objectives

The objectives of this research are following:

1. To determine a suitable condition for the synthesis of natural rubber grafted methyl methacrylate (NR-g-MMA) by emulsion polymerization.
2. To study the mechanical properties of NR-g-MMA/poly(methyl methacrylate) blends.

1.3 Scope of the Investigation

In this research, the necessary procedures to carry out the successful research are as follows:

1. Literature survey and in-depth study of this research work.
2. Preparing the graft copolymer of methyl methacrylate onto natural rubber via emulsion polymerization, as to select the suitable and appropriate reaction condition.
3. Characterizing the grafted natural rubber.
4. To produce many formulations of the polymer blends of NR-g-MMA/poly(methyl methacrylate) by a two roll-mill machine and sheet make with a compression molding machine.
5. Mechanical properties testings.
6. Summerizing the results.