CHARTER I

INTRODUCTION

Introduction

The field of polymer blends has been developed rapidly, both in terms of scientific understanding and of commercial utilization. The long chain nature of polymers leads to two factors that make the micron scale structure of polymer blends important. Firstly, the entropy of mixing for macromolecules is very small, so that most pairs of polymers are immiscible or insoluble in each other. Secondly, their chain structure also makes the dynamic of these mixture very slow, so that a complete phase separation takes a very long time. Combination of these two factors means that most of the polymer blends have a morphology of phase domain separated on the scale of 0.1-10 μm. The impact property and others physical properties of the polymer blends depend crucially on structures, and the synergistic benefits of blending derive from the blend morphology. One of the ways to obtain such the control is through the use of a compatibilizer, for instance block or graft polymer, which acts as the interfacial agent in the blends found at the interface miscible with the individual phases. Usually, but not always, the blocks of the compatibilizer has identical structure with each of the blend component [1].

In this study focus was made on the improvement of impact property of polypropylene (PP) using ethylene-vinyl acetate (EVA) copolymer having 28% VA content. The amount of EVA used in the blend composition ranging from 0 to 50%. Polypropylene grafted maleic anhydride (PP-g-MA) was explored to use as the compatibilizer. Tensile property and hardness of the resulting polyblend were measured. Its miscibility and morphology were also evaluated.

Objective

To improve impact property of polypropylene using EVA copolymer with and without polypropylene grafted maleic anhydride (PP-g-MA) copolymer as the compatibilizer.

Scope of the Research

1. Literature survey and in-depth study of this research work.

2. Preparation of PP-g-MA using a laboratory counter-rotating twin screw extruder. Factors including the screw speed (vary from 60, 80, 90 to 100 rpm), maleic anhydride and peroxide concentrations (vary respectively from 1, 2, 3 to 4 phr and from 5.0, 5.5, 6.0, 6.5, 7.0 to 8.0 phr) affected on the percentage of maleic anhydride (MA) grafting onto PP. In addition the melt flow index of the resulting grafted copolymer were measured.

3. Preparation of polymer blend of PP with EVA having VA content of 28% with and without PP-g-MA compatibilizer. The amount of EVA in the blend composition as varied from 0 to 50%, and each composition the compatibilizer varied from 0 to 10 phr.

4. Determination of some mechanical properites of the PP/EVA blends as well as to evaluate the blend miscibility and the morphology using the techniques of differential scanning calorimetry (DSC) and scanning electron microscopy (SEM).

5. Summarizing the results.