



CHAPTER I INTRODUCTION

Mixing two or more polymer is an important strategy used in the production of materials with improved mechanical and physical properties. Polymer blend or alloys can combine the merits of each constituent and may be more easily processed. Examples of the improved properties that can be achieved by using this technique are enhancement in the impact strength, processability, tensile strength, chemical resistance and barrier properties. The production of new materials designed through blending implies lower cost together with ease of recycling (Folkes, 1993).

One unique feature of linear low density polyethylene (LLDPE) is superior mechanical and thermal properties comparing with low density polyethylene (LDPE). However, a drawback of LLDPE is process difficulty due to a little or no long chain branching. It has made LLDPE more difficult to withstand drawing process especially in blown film and chill roll cast film extrusion. LLDPE is often used as a blend with LDPE which is a polymer of very good melt strength (Micic *et al.*, 1996). The long chain branching in LDPE is related to its good extensional and melt strength properties. Thus, one issue in this research is to improve processability of LLDPE.

Natural rubber (NR) is a long chain polymer having many excellent properties due to its elasticity caused by some amount of long chain branching and high molecular weight. Its pronounced properties are high resilience, high elongation, high tensile strength, high tear resistance and so on. There are some weak properties; e. g. low modulus, low resistance to oil, O₂ and ozone. Due to its high M_w and long chain branching, it offers a way to enhance processing of

LLDPE; i. e. by blending LLDPE with NR. Since compatibility of LLDPE/NR has to be concerned, then maleic anhydride (MA) as chemical substance to enhance adhesion between two polymers is selected. MA can react with both LLDPE and NR during melt mixing and produce intermediate products to act as a compatibilizer (Werner, 1989).

It has been known that process history affecting to final properties of the product. If NR can alter process ability of LLDPE, the whole properties of blended material may be changed by processing variables as well. It is thus interesting to extend this work to observe those effects to the molecular structure or molecular orientation, morphology and mechanical properties.