CHAPTER I

INTRODUCTION

Nowadays the polymeric material can be considered to be one of the essential components in varieties of products, for example, household appliances, toys, electric and electronic equipment, automobiles. These products require different physical, chemical, electrical, mechanical and other properties from the polymer materials. The ability to improve these properties of the polymeric materials to meet the current and future demand is still the importance reach and development activities in both academic and industrial sectors.

Radical processes are extensively utilized industrially; about 50 % of all polymeric materials are produced by this chain polymerization. Compared to ionic polymerization techniques, free-radical processes offer the advantage of being applicable to a wide variety of vinylic monomers and are easier to handle experimentally. Indeed, free-radical techniques require very standard conditions and are not as demanding as other chain addition machanism regarding the purity of the reagents used. They are therefore applied in emulsion, suspension, solution, or bulk. In addition, radical growing species are highly tolerant of many functional groups, including acid, hydroxyl, amino, and epoxide; hence functional monomers can undergo radical polymerization without the help of protection chemistry. Finally, radical polymerizations can be performed at moderate temperature, typically from room temperature to 140 °C, depending on the monomer and the initiating system utilized.

Propylene polymers containing small amount of ethylene exhibit lower crystallinity and higher impact strength than isotactic homopolypropylene. Copolymerization of propylene with larger amounts of ethylene or their terpolymerization together with 0.1-0.5 wt% of dienes as third monomers results in amorphous rubbery materials, a rapidly growing class of elastomer , refered as EPDM. Copolymers of ethylene and propylene are of great industrial interest especially in the housing industry (roofing). Because there is no double bond in the backbone of

polymer chain, EPDM is not very sensitive to oxygen and ozone, as well as to acids and alkalis. Amorphous ethylene-propylene copolymers are widely used as impact-strength modifiers in blends with isotactic polypropylene.

1.1 Objective of the Thesis

Synthesis graft copolymer from ethylene-propylene-diene terpolymer (EPDM) and polystyrene.

1.2 Scope of the Thesis

1.2.1 Synthesis graft copolymer between ethylene-propylene-diene terpolymer (EPDM) and styrene by change the condition and find suitable condition.

1.2.2 Characterize the graft copolymer properties by ^{13}C-NMR (Nuclear Magnetic Resonance) and DSC (Differential Scanning Calorimetry)

1.2.3 Study the morphology of graft copolymer by SEM (Scanning Electron Microscopy) and TEM (Transmission Electron Microscopy).

1.2.4 Study the tensile strength of the blend of PS and the synthesized graft copolymer compare with others PS blend.

The present study is arranged as follows:

Chapter II explain the basic theory about polymer such as common type of copolymer, techniques of free radical polymerization, type of initiator and polymer blends.

Chapter III present literature reviews of the previous works related to this research.

Chapter IV show the experimental equipment and system, and the preparation method to synthesis graft copolymer between EPDM and styrene monomer.

Chapter V exhibit the experimental results

In the last chapter, the overall conclusions of this research are given.