

CHAPTER I

INTRODUCTION

1.1 Statement of problems

Polypropylene is a thermoplastic polymer, which find extensive use in the field of industrial materials, construction, automotive industry electrical industry and household. The excellent moldability in extrusion, injection and various molded articles can produce films, blow molded bottles, articles of other configurations and so on. Although, PP is excellent material when considered generally, their impact strength (NI) and rigidity are relatively poor and this often narrows the range of application (1).

To eliminate this defect, various attempts have been made to improve the impact strength and rigidity of thermoplastic polymers. A usual method for improving the impact strength is to blend thermoplastic polymer with rubber to form polymer-rubber having properties as rubber. The widely interested is polymer blends of polypropylene and ethylene propylene diene monomer rubber, known as PP/EPDM. This is because of many special qualifications such as easy to process, good recyclable, impact resistance and environment. In addition, a typical method for improving the rigidity and flexural strength (FS) is to incorporate various additives such as talc, clay, carbon black, glass fiber and high density polyethylene (HDPE).

However, it is true that if the additives are added in a great amount to the certain point, the rigidity and other properties will be improved gradually, but its impact strength will be reduced (2,3).

Since the composition of this research has remarkably improved FS while maintaining other mechanics properties. Therefore, it would contribute to wider applications, for example automotive parts especially car bumpers.

1.2 Car bumpers

Over the years the growth rate of car industry and automotive parts in Thailand are growing dramatically since Thailand is the big market with low capital and operating cost including high potential to export. The automotive part manufactures have been continually developed in technology for greater efficiency and effectiveness. However, some type of automotive parts such as car bumpers with fine performance and high technology have still been imported either in the form of finished car bumpers or commercial resins.

The main requirements of car bumpers are to protect the body and all the part necessary for safety from the consequences of minor misshape, low cost and long life, lighter weight and recyclable (4).

1.3 Purpose of the research

The purpose of this research is to study physical and mechanical properties of PP/EPDM blends in order to improve the FS while maintaining other mechanical properties such as melt flow index

(MFI), NI and hardness of PP/EPDM blends related to commercial resins.

1.4 Scope of the research

In this research, different level of PP, EPDM and reinforced additives such as talc, clay, carbon black, glass fiber and HDPE effected to mechanical properties were investigated.

Composites were prepared on two-roll mills. X-ray fluorescence, DSC and SEM were used to analyze the blends. Finally, the mechanical properties MFI, NI, FS and hardness were measured compared with commercial resins.