

CHAPTER I

INTRODUCTION

The combination in blend with appropriate polymer component is the one way to improve the mechanical properties and processability of polymer according to gain the industrial importance. However, most polymer pairs are thermodynamically incompatible, which might give rises in poor component interaction and mechanical properties. The blends of natural rubber (NR) and polystyrene (PS) are a new class of thermoplastic elastomers (TPEs), which combine the processability of PS and elasticity of NR. However, the blend is an incompatible without the addition of suitable compatibilizers such NR-g-PS (Asaletha, 1998).

Therefore, to overcome that limitation and invent the new method to avoid the addition of chemical such compatibilizer, the convenience procedure to improve the interfacial interaction between the two components is needed. In recently, there is the new method concerning thin-flim coating by technique called "admicellar polymerization" has been invented. The admicellar polymerization is a fine-coating technique that leads to the formation of ultrathin polymer films on charged surface by using surfactant bilayers as a reaction template. The four main steps of this process are consisted of surfactant adsorption onto the surface of solid particles, adsolubilization of monomers into admicelles, polymerization, and washing of the outside layer of surfactant.

Since the rheological studies gain the valuable viscosity that will be helpful to optimize the processing conditions. In this work, we focus on the result of the rheological studies of admicelled PS-NR by capillary rheometer. With round die used, the effects of die dimension, temperature and concentration of styrene monomer in admicelled PS-NR on shear stress, viscosity and die swell have been investigated. The NR blended and silica filled admicelled PS-NR were investigated by using the silt die as well. The changing in cure characteristic of admicelled PS-NR has been observed on addition of chemicals with conventional curing system. In addition, the physical properties of admicelled PS-NR products have also been examined to understand the influence of their components on strength, hardness, ozone resistance, torque, vulcanization and thermal aging. The challenge in this

work is that one is necessarily to understand how are the rheological property, i.e. flow behavior, and physical property of admicelled PS-NR. Therefore, we can predict the obtained products in the conventional processing machinery under the desired conditions of temperatures and shear rates used.