

Mechanical Properties of High Impact Polystyrene/ Styrene-Butadiene-Styrene Blends

Sani Amril Samsudin¹, Azman Hassan¹, Norhayani Othman¹

¹ Department of Polymer Engineering, Faculty of Chemical and Natural Resources Engineering, 81310 UTM Skudai, Johore.

saniamril@fkkksa.utm.my

Abstract: Blends of High Impact Polystyrene (HIPS) with Styrene-Butadiene-Styrene (SBS) have two important applications include restoring the impact resistance, which is lost when flame-retardants are mixed into HIPS, and upgrading HIPS to a super high impact product. The purpose of this research is to study the effect of SBS (TR2000) composition on the mechanical properties of HIPS/SBS blends. The measurement of mechanical properties of HIPS/SBS blends has been made at various compositions. Using a single screw extruder, blends of HIPS/SBS with SBS compositions ranging from 0-12 phr were prepared and the specimens for mechanical evaluations were injection-molded. The mechanical test such as tensile test, flexural test, and impact test were carried out. Incorporation of rubbers in the blends increases Izod impact strength. On the other hand, tensile strength and flexural modulus were decrease with increasing the composition of SBS.

Keywords: HIPS, SBS, blends, tensile strength, flexural strength, flexural modulus, impact strength.

1.0 Introduction

Blending of conventional polymers can be a convenient way of developing materials with novel or selectively enhanced properties, which are possibly superior to those of the component [1]. It has often been assumed that blend development is far less costly and time consuming than the development of new polymers. Nevertheless, blends offer the possibility of tailor-making products to meet specific end needs. Therefore blends are economically attractive and are experiencing significant growth [2].

For many applications polystyrene (PS) might be considered to be too brittle a polymer. Because of this, polystyrene manufacturers have made a number of attempts to modify their products which copolymerisation to produce high-impact polystyrenes (HIPS). Today the common practice is first to dissolve the polybutadiene rubber in the styrene monomer and then to polymerise the styrene in the usual way. By this process the resultant blend will contain not only rubber and PS but also a graft polymer where short styrene side chains have been attached to the rubber molecules. This gives a marked improvement in the impact strength.