Tensile Properties of Glass Fiber Reinforced Polyamide 6-Polypropylene Composites

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In this research study, glass fiber (GF) reinforced polyamide 6 (PA6)-polypropylene blends were prepared using injection molding machine. Test specimens of five different compositions such as, 70%PA6+30%PP, 65%PA6+30%PP+5%GF, 60%PA6+30%PP+10%GF, 55%PA6+30%PP+15%GF and 50%PA6+30%PP+20%GF were prepared successfully. The effects of glass fiber content on the tensile properties of the composites were investigated. Test results reveal that yield strength, elastic modulus, tensile strength and tensile elongation are influenced by glass fiber content. Results show that yield strength is low for 70%PA6+30%PP pure polymer blend whereas 50%PA6+30%PP+20%GF composite shows high yield strength. Test results also show that elastic modulus is low for 70%PA6+30%PP, it increases with the increase in fiber content and elastic modulus is remarkably high for 50%PA6+30%PP+20%GF composite. On the other hand, tensile strength is low for 70%PA6+30%PP blend and tensile strength of GF reinforced composite increases steadily with the increase in glass fiber content. In addition, the tensile elongation of 70%PA6+30%PP pure blend is very high, whereas the composite shows reduced tensile elongation with the increase in fiber content and particularly, 50%PA6+30%PP+20%GF composite shows notably low tensile elongation.

Keywords: Tensile Properties, Glass Fiber, Polyamide 6, Polypropylene, Composites.

1. INTRODUCTION

In recent years, fiber reinforced polymer blends are gaining popularity and these types of polymer composites can play an important role for improved mechanical properties according to industrial requirements. Polymer blends are combinations of different polymers that are mixed in the molten state. Polymer blends of different thermoplastic materials (amorphous or semicrystalline) can be joined together and these polymer blends can be reinforced by a suitable fiber material in order to improve the mechanical properties for different engineering applications. In the past decade, numerous research works were carried out for the mechanical and tribological properties of fiber reinforced polymer composites and the properties of these polymer composites can be influenced by several operating parameters and type of fiber material.[1-8]

The effect of hybrid glass fiber (GF)/carbon nanotube (CNT) reinforcement on the mechanical properties of polypropylene composites was investigated and the obtained results showed that GF and CNT reinforced hybrid composites can provide improved tensile strength and tensile modulus than only GF or CNT reinforced composites.[9] Flow analysis of pure nylon polymer for injection molding process was theoretically investigated and different flow parameters such as fill time, pressure

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