

Abstract

Nowadays research dealing with thermoplastic/liquid crystalline polymer (LCP) blends is an issue of major interest. However, problem pertaining to incompatibility between thermoplastic and LCP is a subject matter of the present research work. The afore-mentioned problem can be eliminated by using suitable compatibilizer. Compatibilizers may act as a polymeric surfactant and lead to trim down the interfacial tension. Moreover, nowadays, carbon nanotube (CNT)-aided thermoplastic polymer blends have drawn the attention of several researchers owing to some attention-grabbing features of CNT. But homogeneous dispersion of CNTs throughout the matrix is quite difficult. In order to achieve uniform dispersion, modification of CNT is an essential requirement.

In the present research work, polyphosphazene has been used as a compatibilizer and its effect on the properties of thermoplastic/LCP blends have been thoroughly investigated. In presence of polyphosphazene, finer morphology is observed by providing phase stability against gross segregation and also allows better stress transfer. Enhanced thermal stability in presence of polyphosphazene has been explained from Thermogravimetric analysis (TGA). FTIR study reveals the change in chemical atmosphere. Reduction in number average particle size (measured using Scion image analyzer) directs the improved interfacial interaction in presence of compatibilizer.

On the other hand, CNTs have been modified using polycarbosilane derived silicone carbide (SiC) and the resultant SiC-modified CNT on the properties of thermoplastic polymer blends has been investigated. Homogeneous dispersion of modified CNTs throughout the matrix is quite evident from FESEM study. A remarkable improvement in thermal stability is observed in case of polymer blends containing SiC modified CNT. Effect of polyphosphazene on the CNT/polymer composites has also been investigated in the current research work and found to be very much successful in order to develop high performance polymeric nanocomposites.

Key words: Thermoplastics, Liquid Crystalline polymer, Polyphosphazene, Silicone carbide, Carbon nanotubes, Thermal stability.