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ABSTRACT:

The Impact of Carbon Nanotube on the Thermal Properties of Polypropylene

Maziyar Sabet

University Technology Brunei,
Brunei

In this study, carbon nanotube (CNT) filled polypropylene (PP) nanocomposites prepared by melt processing methods by employing extruder technique was investigated with different characterization methods. The aim and novelty of the study were to investigate the effects of amount and dispersion of CNTs on thermal properties of PP including no compatibilizer and thus chemical interaction and/or interfacial adhesion effect. Thermal analysis data revealed that the CNT addition slightly increased the crystallization peak onset and peak maximum temperatures of PP. The improved thermal stability can be attributed to the much higher heat capacity of the CNTs than that of the polypropylene matrix. Because the nanotubes are good thermal conductors, they easily take up the heat that is applied to the system. The formation of a relatively uniform network structure inside the matrix allows the spread of heat, which enhances thermal stability. This work provides an easy way to produce high-performance composites which would lay a foundation to optimize the macroscopic performance of polymer-based composites.