

Mechanical and thermal properties of multiwalled carbon nanotube/polypropylene composites using itaconic acid as compatibilizer and coupling agent

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Multi-walled carbon nanotubes (CNTs) are functionalized with itaconic acid (IA) and its derivative, monomethylitaconate (MMI), to prepare CNT/isotactic polypropylene (PP) composites. To promote dispersion and improved interactions between functionalized CNTs and the PP matrix, PP grafted with IA (PP-g-IA) is employed as a compatibilizer for the preparation of 1% w/w CNT/PP blends by melt compounding. The role of IA as a functionalizing agent for the CNTs and as a compatibilizer for the fabrication of CNT/PP composites is examined. Improved tensile mechanical properties of the composites were obtained when the CNTs were functionalized with IA, although no significant improvement in mechanical properties was observed when PP-g-IA was used as compatibilizer. The use of a compatibilizer, however, retarded the thermal degradation of the composites. Overall, the composites fabricated with IA-functionalized CNTs yielded better mechanical and thermal properties than those composites with CNTs