

9th World Congress on

MATERIALS SCIENCE AND ENGINEERING

June 12-14, 2017 Rome, Italy

Fabrication and characterization of carbon nanotube–recycled polyethylene terephthalate nanocomposites

Ravindra Reddy Chowreddy
Norner AS, Norway

Polymer nanocomposites (PNCs) containing organic and inorganic nano-fillers have attracted great interest from both academia and industry due to their unique characteristics. PNCs exhibit superior mechanical properties, lower permeability for gases, improved flame retardancy, better thermal stability, improved chemical resistance, and enhanced thermal and electrical conductivity. In the present study, recycled poly(ethylene terephthalate) (PET) nanocomposites containing multi-wall carbon nanotubes (CNTs) were prepared through melt compounding via masterbatch dilution method. The masterbatch and the nanocomposites were processed in a twin-screw extruder. The resulting PET-CNT nanocomposites were characterized for rheological, thermal, mechanical and morphological properties. Incorporation of CNTs into recycled PET at reasonably lower concentration significantly increases the viscosity. The storage modulus and loss modulus of nanocomposites was also increased with CNTs loading and which was more pronounced at lower frequencies. The incorporated CNTs in recycled PET increase the degree of crystallinity and crystallization temperature through heterogeneous nucleation. Thermal stability and glass transition temperature of PET-CNT nanocomposites was slightly higher than the reference recycled PET. The tensile properties of PET-CNT nanocomposites increased even at low concentrations of CNTs. Morphological investigation through scanning electron microscopy indicated homogeneous dispersion of CNTs at lower concentrations. At higher concentrations, the CNTs tend to agglomerate due to nanotube-nanotube interactions.

Biography

Ravindra Reddy Chowreddy has received MSc in Chemistry from Bangalore University, Bangalore, India in 1999 and PhD in Applied Sciences from Visvesvaraya Technological University, India in 2006. He has 4 years of Post-doctoral research experience from University of Waterloo, Canada. Currently, he is working as a Senior Researcher at Norner AS, an industrial R&D services provider in the field of plastics in Norway. His research areas of interest include polymer nanocomposites, bioplastics from the renewable sources and food co-streams.

Ravindra.Chowreddy@norner.no

Notes: