

Modification of structure and properties of well-dispersed dendrimer coated multi-walled carbon nanotube reinforced polyester nanocomposites

A.K.M.Moshiul Alam^{ab}M.D.H.Beg^aR.M.Yunus^aMohdBijarimi^aM.F.Mina^cK.H.Maria^dT.Mieno^d

^a Faculty of Chemical and Natural Resources Engineering, Universiti Malaysia Pahang, Gambang, 26300, Kuantan, Malaysia

^b Institute of Radiation and Polymer Technology, Bangladesh Atomic Energy Commission, Dhaka, Bangladesh

^c Department of Physics, Bangladesh University of Engineering and Technology, Dhaka, 1000, Bangladesh

^d Graduate School of Science and Technology, Shizuoka University, Shizuoka, 422, Japan

ABSTRACT

This work reveals the structure and properties of dendrimer coated multiwall carbon nanotube (DMWCNT) reinforced unsaturated polyester resin (UPR) nanocomposite. Rheology, as well as the shear thinning behavior of nanosuspension exhibits the dispersion of DMWCNT in UPR matrix. The Raman spectra of DMWCNT-UPR nanocomposites along with the Fourier-transform infrared (FTIR) spectra of DMWCNT and DMWCNT-UPR nanocomposites indicate the interaction between DMWCNT and UPR in the nanocomposite system. Additionally, the surface morphology of DMWCNT and DMWCNT-UPR nanocomposites reveals well dispersion of DMWCNT in DMWCNT-UPR nanocomposites. X-ray diffraction (XRD) profile demonstrates structural properties of pristine UPR and nanocomposites. The Transmission Electron micrograph and Field Emission Scanning Electron micrograph show the fractured surface morphologies of DMWCNT-UPR nanocomposites. Comparative stress-strain behavior shows the deformation mechanism of DMWCNT-UPR nanocomposites.

KEYWORDS:

Dendrimer; Nanocomposite; Rheology; Microstructure; Fracture morphology