

Microstructure and fractography of multiwalled carbon nanotube reinforced unsaturated polyester nanocomposites

A.K.M. Moshiul Alam, M.D.H. Beg, R.M. Yunus

Faculty of Chemical and Natural Resources Engineering, Universiti Malaysia Pahang,
Gambang, Malaysia

ABSTRACT

In this study unsaturated polyester resin (UPR) was reinforced with different concentration of pre-dispersed multiwalled carbon nanotube (MWCNT). The rheology, structural analysis, fracture behavior, morphology, and thermal analysis of nanocomposites were carried out as a function of MWCNT content. Shear thinning behavior exhibited distinguishable dispersion quality of 0.3 wt% MWCNT in UPR matrix. Structural analysis reveals that MWCNT enhanced the nucleation of nanocomposites. The crystallinity of nanocomposites was increased by 71% after incorporation of 0.3 wt% MWCNT. Bending strength (BS) and bending modulus (BM) of nanocomposites were increased as well as 0.3 wt% MWCNT exhibited crack shielding in nanocomposites. The glass transition (T_g) and melting transition (T_m) of nanocomposites was increased by 6°C and 10°C respectively as compare to neat UPR. Additionally thermal stability of 0.3 wt% MWCNT incorporated nanocomposites was significantly improved as compare to UPR and nanocomposites which contained 0.1 and 0.5 wt% MWCNT. POLYM. COMPOS., 38:E462–E471, 2017.

KEYWORDS

Bending moduli; Crystallinities; Dispersion quality; Fracture behavior; Melting transitions; Shear-thinning behaviour; Unsaturated polyester; Unsaturated polyester resin

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