

Micro Structure and Fractography of Multiwalled Carbon Nanotube Reinforced Unsaturated Polyester Nanocomposites

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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.

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