

Physical properties of epoxy nanocomposites comprising amine-functionalized carbon nanofillers

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To develop mechanically efficient polymer nanocomposites reinforced by carbon nanofillers, adequate dispersion of the fillers and strong interfacial bonding between the fillers and the polymer matrix are essential. The purpose of this study is to examine the influence of introducing amine groups on the surfaces of carbon nanofillers (carbon nanofibers(CNFs), multi-wall carbon nanotubes(MWNTs)). An amine functionalization of carbon nanofillers was carried out via treating pristine carbon nanofillers with 4-aminobenzoic acid in polyphosphoric acid. FT-IR spectroscopy, XPS, TGA and FE-SEM were used to confirm the functionalization. Epoxy nanocomposites comprising the pristine or functionalized carbon nanofillers were prepared and their curing behavior and thermo-physical properties were compared to each other. Fracture surfaces of the nanocomposites were investigated by FE-SEM. The functionalized MWNTs induced strong interfacial bonding than the functionalized CNFs and resulted in considerable improvements in the properties of the nanocomposites.