

Curing behavior and properties of epoxy nanocomposites with different amine-functionalized carbon nanofillers

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Homogeneous dispersion and strong interfacial bonding have been found to be necessary conditions to take full advantage of the remarkable properties of nanofillers for reinforcement of composites. Therefore, in this study, amine groups were introduced on the surfaces of carbon nanofillers (carbon nanofiber, multi-wall carbon nanotubes) via treating them with 4-aminobenzoic acid in polyphosphoric acid. FT-IR spectroscopy and TGA were used to confirm the functionalization. Epoxy nanocomposites comprising different carbon nanofillers were prepared and their characteristics were compared to each other by DSC, DMA and TMA. According to the SEM images of the fractured-surfaces of the nanocomposites, the functionalization induced strong interfacial bonding resulting in considerable improvements in the performance of the nanocomposites.