

Influence of Cure Degree in GO and CNT-Epoxy Nanocomposites

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Abstract : In recent years, carbon nanotubes (CNT) and graphene oxide (GO), especially the functionalized ones, have been added to epoxy resin in order to increase the mechanical, electrical and thermal properties of nanocomposites. However, it's still unknown how the presence of these nanoparticles influences the curing process and the final mechanical properties as well. In this work, kinetic and mechanical properties of the nanocomposites were analyzed, where the kinetic process was followed by DSC and the mechanical properties by DMA. Initially, CNT was annealed at high temperature (1800 °C) under vacuum atmosphere, followed by a chemical treatment using acids and ethylenediamine. GO was synthesized through chemical route, washed clean, dried and ground to #200. The presence of functional groups on CNT and GO surface was confirmed by XPS spectra and FT-IR. Then, epoxy resin, nanoparticles and acetone were mixed by sonication in order to obtain the composites. DSC analyses were performed on samples with different curing cycles (1h 80°C + 2h 120°C; 3h 80°C + 2h 120°C; 5h 80°C) and samples with different times at constant temperature (120°C). Results showed that the kinetic process and the mechanical strength are very dependent on the presence of graphene and functionalized-CNT in the nanocomposites.

Keywords : carbon nanotube, epoxy resin, Graphene oxide, nanocomposite

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