

Effects of amine-functionalization on the physical properties of epoxy/carbon nanofillers nanocomposites

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(dskim@cbnu.ac.kr*)

The incorporation of carbon nanofillers into a polymer can remarkably enhance the mechanical and thermal properties of the polymer. In this study, to not only uniformly disperse carbon nanofillers in an epoxy matrix but also strongly bond them to the polymer matrix, two types of carbon nanofillers, graphene nanoplatelets(GNPs) and multi-walled carbon nanotubes (MWCNTs), were functionalized by coupling 4,4'-methylene dianiline onto their surfaces. The influence of introducing amine groups onto the carbon nanofillers' surfaces was examined. FTIR spectroscopy and TGA were used to confirm the amine-functionalization. Epoxy/carbon nanofillers nanocomposites were prepared and their physical properties and morphology were investigated by DSC, DMA, TMA and FESEM. The amine-functionalization of the carbon nanofillers improved dispersibility of them in the epoxy matrix, resulting in improvements in the physical properties of the composites.