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Graphene/carbon nanotube hybrid as a multi-functional interfacial reinforcement for carbon fiber-reinforced composites

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Abstract

A graphene/carbon nanotube hybrid material stabilized in an aqueous medium, was coated on carbon fibers by anodic electrophoretic deposition. Chemically oxidized graphene, graphene oxide, was used as a stabilizing agent for dispersion of carbon nanotubes and as a transport medium for the graphene oxide/carbon nanotube hybrid during electrophoretic deposition. This hybrid coating increased the wettability and surface roughness of carbon fibers, which led to improved affinity between the carbon fibers and epoxy matrix. The resulting hybrid-coated carbon fiber-reinforced composites showed an enhancement of over 10% in the short beam strength compared to un-coated carbon fiber composites and demonstrated significantly improved through-thickness electrical conductivity (increase of over 1,400 %).

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