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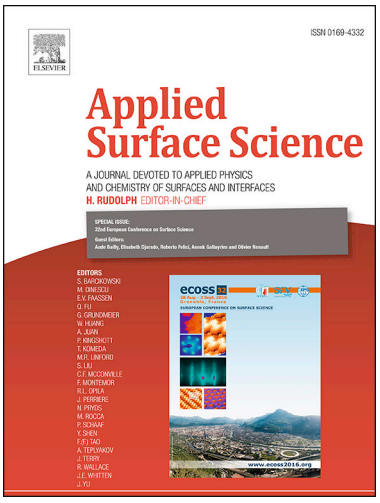

Full Length Article

Effect of carbon nanotubes and octa-aminopropyl polyhedral oligomeric silsesquioxaneon the surface behaviors of carbon fibers and mechanical performance of composites

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Effect of carbon nanotubes and octa-aminopropyl polyhedral oligomeric silsesquioxaneon on the surface behaviors of carbon fibers and mechanical performance of composites

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ABSTRACT: A kind of carbon fiber/carbon nanotubes/octa-aminopropyl polyhedral oligomeric silsesquioxane (CF/CNTs/POSS for short) reinforcement was prepared by grafting CNTs and OA-POSS to CFs surfaces in order to improve the mechanical properties and interfacial performance. Scanning electron microscopy (SEM), X-ray photoelectron spectroscopy (XPS), and contact angle testing and analysis were applied to characterize the carbon fibers surface. Tensile testing, bending testing and interlayer shear strength (ILSS) testing were employed to analyze the mechanical properties of composites. The experimental results of SEM and XPS indicate that CNTs and OA-POSS are grafted uniformly on fibers surface with chemical bonding of -NH in CNTs and POSS and -COOH on CFs surface. The contact angle test and analysis results show that the surface energy of modified CFs decrease compared with that of the unmodified. Furthermore, the mechanical properties of composites after