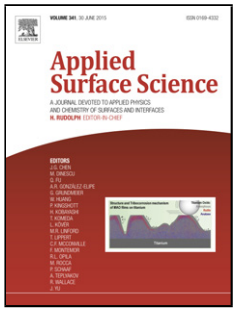

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Optimization of interfacial microstructure and mechanical properties of carbon fiber/epoxy composites via carbon nanotube sizing

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Highlights:

- Multiple sizing treatments were used to modify the surface of carbon fiber with carbon nanotubes.
- The distribution state of carbon nanotubes in interface had a great effect on the performance of carbon fiber composites
- Microstructure changes in interface of carbon fiber composites after sizing treatment were detected using energy dispersive X-ray spectroscopy and force modulation atomic force microscope.
- Gradient interphase composed of carbon nanotubes and epoxy was favorable to improve the mechanical properties of carbon composites.

Abstract

Repetitious sizing treatment was used to modify the carbon fiber (CF) surface with carbon nanotubes (CNTs) for improving interfacial properties of CF/epoxy composites. Interlaminar shear and flexural results showed that mechanical properties of composites were significantly depended on the dispersion state and contents of CNTs in interfacial regions. Increases of 13.45% in interlaminar shear strength and 20.31% in flexural strength were achieved in quintuple sized-CF/epoxy composites, whereas excessive CNTs led to decrease of interfacial performance due to defects induced by agglomerated

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