عنوان مقاله:

On the mechanical behavior of nano-calcium carbonate reinforced epoxy/carbon fiber laminates

محل انتشار:

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خلاصه مقاله:

The effect of silane modified nano-calcium carbonate (nano-CaCO3) on the tensile properties of unidirectional carbonfiber (UCF)/epoxy composites was evaluated. Firstly, the nano-CaCO3 particles were modified with 3-glycidoxypropyltrimethoxysilane (3-GPTMS), which was confirmed by fourier transform infrared (FTIR) spectroscopy. Differentweight percentages of 3-GPTMS/CaCO3 (0, 0.5, 1, 3 and 5 wt.%) were dispersed in the polymer matrix using a combination of highintensityultrasonication and mechanical stirring routes and the resultant mixture was then employed to fabricate the multiscalecomposites via the hand lay-up route. The results revealed that the 3-GPTMS/CaCO3 incorporation offered an increase in the tensilestrengths up to 3 wt.% and afterwards they declined. Microscopic examination identified the possible mechanisms responsible forthe improved tensile properties of the 3-GPTMS/CaCO3 enhanced composites. Totally, the results of the study show that matrixmodification with 3-GPTMS/CaCO3 is an effective strategy to improve the tensile behavior of fibrous composites.

کلمات کلیدی:

Multiscale composites, Nano-calcium carbonate, Surface modification, Mechanical testing