

Influence of silicon dioxide nanofiller on flexural strength of carbon fiber epoxy composites

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ABSTRACT

Laminated composites made of continuous fibers generally tend to possess good in-plane properties but the through thickness properties of these composites are often found to be weak. Conditions such as poor roughness of fiber surface, poor wettability, viscosity of the matrix results in poor interfacial interactions between the matrix and the fiber.

In the preset work silicon dioxide nano fillers were incorporated to the epoxy resin and carbon fiber reinforced epoxy composites were fabricated using a simple hand layup technique with vacuum bag setup. Studies on morphology, functional groups present on surfaces were performed with the help of SEM, FTIR and XRD techniques. Flexural strength measurements of prepared composites were obtained from utm machine using a three-point bend fixture as per ASTM standard D7264. Incorporation of silicon dioxide nanoparticle in epoxy matrix showed an enhancement of 34% in flexural properties at 0.3 wt%. Enhancement could be due to formation of bridge between the matrix and reinforcement thus effectively transferring the load.

Keywords: Silicon Dioxide; Carbon fiber reinforced polymer composite (CFRP); Flexural Strength; Scanning electron Microscopy (SEM); Fourier Transform Infrared Spectroscopy (FTIR); X-ray Diffraction (XRD)

