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Electrical conductivity of carbon nanofiber reinforced resins: potentiality of Tunneling Atomic Force Microscopy (TUNA) technique

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ABSTRACT

Epoxy nanocomposites able to meet pressing industrial requirements in the field of structural material have been developed and characterized. Tunneling Atomic Force Microscopy (TUNA), which is able to detect ultra-low currents ranging from 80 fA to 120 pA, was used to correlate the local topography with electrical properties of tetraglycidyl methylene dianiline (TGMDA) epoxy nanocomposites at low concentration of carbon nanofibers (CNFs) ranging from 0.05% up to 2% by wt. The results show the unique capability of TUNA technique in identifying conductive pathways in CNF/resins even without modifying the morphology with usual treatments employed to create electrical contacts to the ground.

Keywords: A. Carbon-carbon composites (CCCs); A. Thermosetting resins; B. Electrical properties; D. Surface Analysis; Tunneling Atomic Force Microscopy (TUNA); Conductive pathways.

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