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In-situ Curing of Glass Fiber Reinforced Polymer Composites via Resistive Heating of Carbon Nanotube Films

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ABSTRACT: In this study, we report a time- and energy-saving out-of-oven curing process based on the resistive heating of a macroscale carbon nanotube (CNT) film made using the floating catalyst chemical vapor deposition method. CNT film can be heated up very quickly when connected to an electrical power source. By coating CNT film onto the surface of uncured glass fiber reinforced polymer composites, the composites can be cured by the resistive heating of the CNT film. The degree of cure, loss storage, and tensile properties of the composites made from the new process are almost the same as those made from the traditional oven heating process. However, the new curing process is much faster, and its energy consumption is found to be only one seventh that of the oven curing process. The deicing of glass fiber composites based on the resistive heating of CNT film is also demonstrated.

Keywords: Carbon nanotube, curing, resistive heating, fiber reinforced polymer composites, deicing

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