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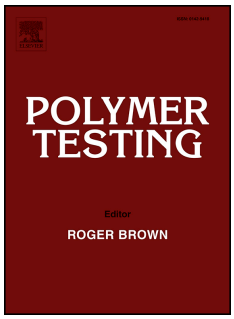

Effects of accelerated weathering on the chemical, mechanical, thermal and morphological properties of an epoxy/multi-walled carbon nanotube composite

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Material Properties

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ABSTRACT

The influence of weathering processes on the properties of a multi-walled carbon nanotube (MWCNT)/epoxy nanocomposite was investigated. All the samples, based on the hydrogenated gylcidyl ether of bisphenol A (HDGEBA) with and without 0.5% MWCNT, were exposed to UV radiation and elevated temperature and humidity for extended periods of time: 1, 2, 3, 4 and 6 months. The investigation included the measurement of the effects of accelerated weathering on the surface of samples for long-term conditions and for different exposure times. Chemical changes that occurred on the surface were determined using FTIR. The carbonyl and hydroxyl indexes of the nanocomposite increased much less over time than the epoxy alone, the nanocomposite also showed less loss in tensile strength and modulus and elongation on accelerated weathering, and there were few morphological changes on the composite surface compared to the unmodified epoxy. Glass transition temperatures and temperature of onset of degradation in thermal analysis decreased after accelerated weathering for all samples, but to a much greater extent for the unmodified epoxy. It appears that the incorporation of functionalized MWCNT as a modified inhibitor against accelerated