

RECENT ADVANCES IN THE SCIENCE AND TECHNOLOGY OF CARBON NANOTUBE-BASED COMPOSITES

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Abstract

This lecture reports a review of the recent advancements in the science and technology of carbon nanotube (CNT)-based fibers and composites. The assessment is made according to the hierarchical structural levels of CNTs used in composites, ranging from 1-D to 2-D to 3-D. At the 1-D level, fibers composed of pure CNTs or CNTs embedded in a polymeric matrix produced by various techniques are reviewed. Developments in pure CNT fibers will be emphasized. At the 2-D level, the focuses are on CNT-modified advanced fibers, CNT-modified interlaminar surfaces and highly oriented CNTs in planar form. At the 3-D level, the mechanical and physical properties of CNT/ polymer composites and textile assemblies of CNTs are examined. CNT-based damage sensing of composites under cyclic and impact loading will be reviewed. The opportunities and challenges in basic research at these hierarchical levels will be discussed.

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