March Meeting of the APS in Montreal, March 22-24, 2004
MAR04 -7.9.5 Carbon Nanotubes and Related Materials (DMP)

Electron Microscopy Imaging of Single-Wall Carbon Nanotube Networks in Polymers

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Scanning electron microscopy (SEM) imaging techniques have been applied to study the electrical transport properties of conducting networks of single-walled carbon nanotubes (SWNTs) in insulating polymers. Two SEM techniques were used. One approach uses specimen current (SC) measurements to visualize current flow within the SWNT network. Another and novel approach is highly sensitive to electrical potential within the networks and occurs as a result of the large electric fields generated in the vicinity of the nanotube bundles. High-resolution transmission electron microscopy was used to characterize the SWNT bundles in the PMMA. These techniques permit a direct experimental approach to characterize and understand potential distribution and current flow through percolation networks formed by nanotube bundles in polymers, or more generally, nanorods or nanowires in various matrices.

This research was sponsored by NASA-Langley Research Center and the Laboratory-Directed Research and Development Program at ORNL, and the U.S. Department of Energy under contract DE-AC05-00OR22725 with the Oak Ridge National Laboratory, managed by UT-Battelle, LLC.

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