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**Anisotropic Conductivities of Magnetic Carbon Nanotubes Embedded in Epoxy Matrices** IL TAE KIM, ALLEN TANNENBAUM, RINA TANNENBAUM, Georgia Institute of Technology — Maghemite ($\gamma$-$Fe_2O_3$)/carbon nanotubes (CNTs) hybrid-materials were synthesized and their anisotropic electrical conductivities resulting from their alignment in a polymer matrix under a magnetic field were investigated. The tethering of $\gamma$-$Fe_2O_3$ nanoparticles on the surface of CNT was achieved by a modified sol-gel reaction. These hybrid-materials, specifically, magnetized carbon nanotubes (m-CNTs) were readily aligned parallel to the direction of a magnetic field even when using a relatively weak magnetic field. The conductivity of the epoxy composites formed in this manner increased with increasing m-CNT mass fraction in the polymer matrix. Furthermore, the conductivities parallel to the direction of magnetic field were higher than those in the perpendicular direction, indicating that the alignment of the m-CNT contributed to the enhancement of the anisotropic electrical properties of the composites in the direction of alignment.

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