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The Anisotropic Physical Properties of Polyethylene Oxide/Magnetic Carbon Nanotubes Composite Films IL TAE KIM, ALLEN TANNENBAUM, RINA TANNENBAUM, Georgia Institute of Technology — Magnetic carbon nanotubes (m-CNTs) were synthesized by the tethering of γ-Fe_2O_3 nanoparticles. Subsequently, the m-CNTs were dispersed and aligned in a PEO matrix under a low externally-applied magnetic field (<0.3 T). The degree of crystallinity, crystal size, and crystal structure of the composite films were investigated using DSC and XRD. The electrical conductivity of the composite films showed anisotropic characteristics that were correlated to the parallel and perpendicular direction of the applied magnetic field. Young's modulus and tensile strength of the composite films increased with the increasing weight fraction of m-CNT up to 170 % and 157 %, respectively. The elongation at break of the composites improved as well compared to that of the pure-PEO film, due to the lowering of the glass transition temperature (T_g) and was also correlated to m-CNT content and the alignment directions.

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