

**Electrical and Dielectric Behaviors of Dry-Mixed CNT/UHMWPE Nanocomposites**

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**Abstract:** Carbon nanotube (CNT)/ultrahigh molecular weight polyethylene (UHMWPE) nanocomposite with an electrical percolation threshold of only 0.1 wt% was prepared by simple dry mixing followed by compression molding. The nanocomposite microstructure, DC and AC electrical conductivities, conduction mechanisms, and dielectric properties in the  $10^1$ - $10^5$  Hz frequency range have been investigated. Due to the localization of the nanofiller at the surface of UHMWPE powder particles, a segregated microstructure within the polymer matrix was created. Nanocomposites filled with 0.125 - 0.5 wt% CNT were found to follow the typical universal dynamic response (UDR) behavior and the characteristic frequency was found to increase with the increase in CNT concentration. At CNT concentration > 0.5 wt%, the AC conductivity was found to be frequency independent over the entire frequency range studied.