Abstract Submitted
for the MAR07 Meeting of
The American Physical Society

Effect of MWNT and Carbon Nanofiber Orientation in Polymer Nanocomposites on Electrical Conductivity KAREN I. WINEY, LAI-CHING CHOU, MINFANG MU, Department of Materials Science and Engineering University of Pennsylvania, Philadelphia, Pennsylvania 19104-6272 — Poly(methyl methacrylate) (PMMA) composites were prepared by a coagulation method containing multi-wall carbon nanotubes (MWNT) or carbon nanofibers (CNF). The critical concentrations for electrical conductivity are 0.25wt% and 4.0wt% for MWNT and CNF composites, respectively. These isotropic composites were melt spun into fibers to align the fillers and the extent of alignment was quantified using x-ray scattering methods to measure the azimuthal full width at half-maximum (FWHM). The electrical conductivity shows a strong dependence on filler alignment and the presence of a critical alignment ($FWHM_c$) indicates a percolation threshold with respect to alignment. The critical alignment shifts to lower FWHM (more aligned) as the MWNT loading increases. We are also exploring the filler alignment and electrical conductivity of nanocomposites with both MWNT and CNF.

Karen I. Winey
Department of Materials Science and Engineering,
University of Pennsylvania, Philadelphia, Pennsylvania 19104-6272

Date submitted: 30 Nov 2006 Electronic form version 1.4