Abstract Submitted
for the MAR11 Meeting of
The American Physical Society

Effect of Nanowire Size Dispersity on the Electrical Conductivity in Polymer Nanocomposites ROSE MUTISO, MICHELLE SHERROTT, JU LI, KAREN WINEY, University of Pennsylvania — In this simulation study, we model the percolation threshold and electrical conductivity of three-dimensional networks containing finite, conductive cylinders with experimentally typical (Gaussian) and engineered (Bidisperse) distributions in their length and/or diameter. We have previously used this approach to explore the effects of cylinder orientation and aspect ratio. Preliminary results suggest that narrow Gaussian distributions do not affect the threshold concentration or electrical conductivity significantly in both isotropic and oriented networks, while the addition of a small fraction of longer rods in a bidisperse system can improve the electrical properties considerably. Additionally, polydispersity in the filler length has a more pronounced effect on the electrical percolation behavior than that in filler diameter. This implies that the separate effects of length and diameter should be decoupled from the overall filler aspect ratio when probing the effects of size dispersity in conducting polymer nanocomposites with elongated fillers.

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Date submitted: 19 Nov 2010 Electronic form version 1.4