Abstract Submitted
for the MAR12 Meeting of
The American Physical Society

Electrical Conductivity in Transparent Silver Nanowire Networks: Simulations and Experiments MICHELLE SHERROTT, ROSE MUTISO, University of Pennsylvania, AARON RATHMELL, BENJAMIN WILEY, Duke University, KAREN WINEY, University of Pennsylvania — We model and experimentally measure the electrical conductivity of two-dimensional networks containing finite, conductive cylinders with aspect ratio ranging from 33 to 333. We have previously used our simulations to explore the effects of cylinder orientation and aspect ratio in three-dimensional composites, and now extend the simulation to consider two-dimensional silver nanowire networks. Preliminary results suggest that increasing the aspect ratio and area fraction of these rods significantly decreases the sheet resistance of the film. For all simulated aspect ratios, this sheet resistance approaches a constant value for high area fractions of rods. This implies that regardless of aspect ratio, there is a limiting minimum sheet resistance that is characteristic of the properties of the nanowires. Experimental data from silver nanowire networks will be incorporated into the simulations to define the contact resistance and corroborate experimentally measured sheet resistances of transparent thin films.

Michelle Sherrott
University of Pennsylvania

Date submitted: 11 Nov 2011 Electronic form version 1.4