

Abstract Submitted  
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**Electrical and Structural Properties of Thin Films Fabricated by E-Beam Lithography from Gold Nanoparticle Resists**<sup>1</sup> STEFAN DICKERT, MYOUNG-HWAN PARK, COLIN JERMAIN, VINCENT ROTELLO, MARK TUOMINEN, University of Massachusetts Amherst — Drop- and spin-coated solutions of ligand-coated nanoparticles act as novel “direct write” e-beam resist, which can be prepared with metallic, magnetic and semiconducting nanoparticles. We prepared thin films from gold nanoparticles, in which we varied the film thickness. Small angle X-Ray scattering experiments as well as SEM imaging of the samples were performed to determine structural properties of the nanoparticles films at various stages of the fabrication process, after drop coating, ebeam exposure and annealing. We further performed DC charge transport measurements in the 2-350K temperature range and report different conductivity mechanisms based on the film thickness, ranging from insulating to Mott hopping conduction to metallic.

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