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Conductivity and Structural Properties of Nanostructures Fabricated by E-Beam Exposure of Nanoparticle Resists[1] STEFAN DICKERT, MYOUNG-HWAN PARK, UMass Amherst, YUVAL OFIR, Israel Institute of Technology, QIJUN XIAO, UC San Diego, TIANYU YANG, BAPPADITYA SAMANTA, VINCENT ROTELLO, MARK TUOMINEN, UMass Amherst — Spin or drop coated solutions of ligand-coated nanoparticles act as a novel type of ebeam resist into which functional nanostructures can be produced in a direct-write process (Y. Ofir et al, Adv. Mater. 20, 2561-2566 (2008)). Thin films were produced by this method from a set of resists in which the size of the Au nanoparticles and ligand length were varied systematically. Small angle x-ray scattering (SAXS) experiments were used to characterize film structure and the role played by ligand length and particle size. Films were characterized at different stages in processing: directly after drop coating, after ebeam exposure and after annealing. Further, 4-point resistance measurements were performed on thin Au nanoparticle films to ascertain the resistance-temperature behavior in the 2-350K range. These results suggest a Mott-type hopping conduction behavior that can be manipulated by fabrication conditions.

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