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Structural and Transport Properties of Dielectrophoretically Assembled Interconnects[1] BIROL OZTURK, Department of Physics, Oklahoma State University, Stillwater, OK 74078, ISHAN TALUKDAR, Department of Physics, Oklahoma State University, Stillwater, OK 74078, PREM THAPA, Department of Physics, Oklahoma State University, Stillwater, OK 74078, CHARLES BLACKLEDGE, Department of Physics, Oklahoma State University, Stillwater, OK 74078, DANIEL GRISCHKOWSKY, School of Electrical and Computer Engineering, Oklahoma State University, Stillwater, OK 74078, BRET FLANDERS, Department of Physics, Oklahoma State University, Stillwater, OK 74078 — Dielectrophoresis was used to form ∼140nm diameter interconnects composed of gold nanorods between targeted points in a circuit. Cleanroom-based lithographic procedures were used to produce identical arrays of electrodes, improving the sample-to-sample reproducibility of the interconnect-conductances to ∼10%. Transmission electron microscopy and low temperature conductivity analyses indicate that the Coulomb Blockade associated with the individual nanorods is the primary conductance-limiting feature. To further improve the reproducibility of the structural and transport properties of dielectrophoretic interconnects, we investigate submicron wire formation in aqueous solutions of indium acetate. Our preliminary data show that single crystal wires with submicron diameters may be fabricated from such solutions.

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