

Abstract Submitted
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Self-assembled contacts to nanoparticles using metallic Ga droplets KAN DU, E. GLOGOWSKI, M.T. TUOMINEN, T. EMRICK, T.P. RUSSELL, A.D. DINSMORE, Department of Physics, Department of Polymer Science and Engineering University of Massachusetts Amherst — We demonstrate a pragmatic approach to forming electronic materials and devices, in which metal droplets serve as electrodes and their spacing is controlled spontaneously, *via* self-assembly, to allow tunneling contact with nanoparticles. We have fashioned devices consisting of droplets of molten metal (Ga). Ga is suspended in acidic solution. Ligand-stabilized Au nanoparticles in solution assemble on the metal surface, as shown by electron microscopy. Coated droplets which are then placed on a substrate and the solvent removed. Electron-transport measurements reveal the Coulomb blockade, in which current is suppressed below a tunable threshold voltage by the energy of charging individual nanoparticles. The threshold voltage for two different sizes of nanoparticles agrees with theory. Our approach provides a straightforward approach to creating nanoscale-precision contacts to nanoparticles and might lead to formation of a large number of microscopic devices from suspension.

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