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Self-Assembled Gold Nanowires from Nanoparticles LIFENG ZHENG, U.C. Irvine, SHENGDONG LI, U.C. Irvine, J. BRODY, U.C. Irvine, PETER BURKE, U.C. Irvine — We present a new technique for fabricating gold nanowires using carbon nanotubes as the template. By applying an ac voltage to an electrically contacted single walled carbon nanotube, we generate highly non-uniform ac electric fields in the vicinity of the nanotubes. These ac electric fields serve to polarize 2 nm gold nanoparticles dispersed in solution. The induced dipole moment in the nanoparticles is attracted to the high-intensity field regions at the surface of the nanotube, thus causing a gold nanowire to grow on the surface of the nanotube[1]. Interestingly, we find gold nanowires grow even on nanotubes that are not electrically contacted but in close proximity to the electrodes. This process is also visualized using fluorescently labeled nanoparticles. Future applications of this work include DNA sensors based on functionalized Au nanoparticles. Additional work on the electronic trapping of proteins and DNA[2] using AC electric fields will also be presented. [1] L. Zheng, S. Li, J. Brody, and P. J. Burke, "Manipulating nanoparticles in solution with electrically contacted nanotubes using dielectrophoresis", Langmuir, 20, 8612-8619, 2004; [2] Zheng, L.; Brody, J. P.; Burke, P. J. "Electronic Manipulation of DNA, Proteins, and Nanoparticles for Potential Circuit Assembly", Biosens. Bioelectron., 20, 606-619 (2004).

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