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Controlling the assembly and electronic properties of solution processed CNT devices: From large area arrays to individual CNT[1]
SAIFUL I. KHONDAKER, PAUL STOKES, YODCHAY JOMPOL, SHASHANK SHEKHAR, Nanoscience Technology Center and Department of Physics University of Central Florida, Orlando, FL 32826 — Single walled carbon nanotubes (SWNTs) are considered to be ideal components for nanoelectronic devices because of their exception electronic properties. Integration of these nanostructures into electronic circuits requires the precise positioning of them in different architectures. Here we will summarize our recent progress on the directed assembly of SWNTs using AC dielectrophoresis (DEP). SWNTs are assembled from a surfactant free commercially available aqueous solution using a non uniform electric field. By controlling the electric field strength, frequency, density of solution and novel fabrication techniques, we are able to control the assembly of SWNT from dense arrays mimicking electric flux to single SWNT devices with high yield. Electronic transport properties of field effect transistors and single electron transistors fabricated from such assembly will be discussed.

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