Abstract Submitted
for the MAR10 Meeting of
The American Physical Society

Evaluating defects in solution processed carbon nanotube devices by low temperature transport spectroscopy[1] PAUL STOKES, SAIFUL I. KHONDAKER, University of Central Florida Nanoscience Technology Center and Dept. of Physics — We evaluate defects in solution processed dielectrophoreticly assembled single-walled carbon nanotube (SWNT) devices via low temperature electron transport spectroscopy. In contrast to the general belief that solution processing introduces many defects in SWNTs, we show that devices assembled from stable solutions can give rise to relatively clean quantum dot behavior. This is a strong indication that there are no or few intrinsic defects in the SWNTs. The individual, 1 um long SWNT devices were fabricated by dielectrophoresis from a surfactant free commercially available SWNT solution. Measurements on a number of semi-metallic SWNT devices at low temperature show periodic Coulomb Blockade oscillations as a function of gate voltage along with well defined Coulomb diamonds. The Coulomb diamonds were further modeled to elucidate number of quantum dots in the transport channel. Our observation is a significant step forward for the use of solution processed SWNTs for high yield and high quality devices in nanoelectronics.

[1]This work is partially supported by NSF-CARRER award ECS-0748091.

Saiful I. Khondaker
University of Central Florida
Nanoscience Technology Center and Dept. of Physics

Date submitted: 08 Dec 2009 Electronic form version 1.4