

Abstract Submitted
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High yield semiconducting local-gated carbon nanotube field effect transistors¹ KRISTY KORMONDY, ELIOT SILBAR, PAUL STOKES, SAIFUL I. KHONDAKER, Univ. of Central Florida, Nanoscience Technology Center and Dept. of Physics — Carbon nanotube field effect transistors (CNT-FETs) have displayed exceptional electrical properties that are superior to the traditional silicon MOSFET. Directed assembly of individually addressable CNT-FETs at selected positions of the circuit with high throughput needs to be demonstrated for future integrated circuits. Here, we utilize a commercially available semiconducting enriched SWNT solution in combination with ac-dielectrophoresis for the fabrication of CMOS compatible & local gated CNT-FETs with low power consumption and high-speed operation. We assemble the SWNTs between 1 μm spaced Pd source and drain electrodes with a 100 nm wide local Al/Al₂O₃ gate in the middle using DEP. We find that $\sim 80\%$ of the as-assembled device show semiconducting behavior. Measurements on ~ 30 devices show that the majority of them displayed subthreshold slopes less than 300 mV/dec and as low as 120 mV/dec. The threshold voltage for the local gated devices is 0.5 V on average. Directed assembly of local gated CNT-FETs at selected position of the circuit via DEP may pave the way for large scale fabrication of CMOS compatible nanoelectronic devices.

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