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Directed Assembly and Electrical Characterization of Carbon Nanotube-Molecule-Metal Junctions KANSHENG CHEN, P. XIONG, Florida State University, S.A. MCGILL, National High Magnetic Field Laboratory — Molecular-template directed assembly has been shown to be an effective method for bottom-up assembly of high-performance single-walled carbon nanotube field-effect transistors (SWNT-FETs) [1]. Here, we utilize this platform to carry out a systematic study of the electron transport behavior through SWNT-molecule-metal junctions. The devices were fabricated on doped- Si/SiO_2 substrates: Au source/drain electrodes were first defined by electron beam lithography. Self-assembled monolayers (SAMs) of thiol molecules with polar ends were then created on both electrodes by immersing the sample in molecule solution or on one of the electrodes by dip-pen nanolithography. Finally, SWNTs were selectively self-assembled onto the electrodes by putting a drop of SWNT solution on the template. The electron transport through the molecular SAM between the SWNT(s) and the Au electrodes were characterized through gated I-V measurements. The same devices were measured before after the desorption of the molecular SAM(by baking) to directly elucidate the role of the molecules on the electron transport. The results will be presented and discussed.

[1]S.A. McGill et al., Appl. Phys. Lett. **89**, 163123 (2006).

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