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Tunable contact barriers at single wall carbon nanotube/silicon heterojunctions ZHUANGCHUN WU, BO LIU, ANDREW G. RINZLER, University of Florida — Due to their prevalence in modern electronic devices understanding contact barriers at metal-semiconductor junctions remains an important area of research. However, due to the sensitivity of such junctions to surface states modified by parameters like the semiconductor surface preparation, the type of metal used, and its method of deposition, this remains an area rich in complications (viz. Fermi-level pinning). Single wall carbon nanotubes (SWNTs), by virtue of their highly passivated side-walls, provide an opportunity to reduce this complexity by their lack of covalent interaction with the semiconductors on which they can be deposited. The porosity of nanotube film contacts provides further opportunities not available with contiguous metal contacts. We describe experiments in modulating the contact barrier between SWNT/Si heterojunctions using an ionic liquid gate. Modest gate voltages are shown to modify the contact barriers modulating the current across the junction by a factor of 300.

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