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Self Assembled Dipole Monolayers on CNTs: Effect on Transport and Charge Collection ALEXANDER COOK, University of Texas at Dallas Nanotech Institute, BUMSU LEE, Department of Physics, Rutgers University, ALEXANDER KUZNETSOV, University of Texas at Dallas Nanotech Institute, VITALY PODZOROV, Department of Physics, Rutgers University, ANVAR ZAKHIDOV, University of Texas at Dallas Nanotech Institute — We propose a method of quickly and dramatically increasing the conductivity of carbon nanotubes via growth of a self assembled monolayer (SAM) of fluoroalkyl trichlorosilane dipoles following the method demonstrated with organic semiconductors in [1,2]. Growth of a SAM on carbon nanotubes results in a strong p-type doping which improves the conductivity by a factor of two or more. Additionally, this doping is nonvolatile and persists in high vacuum and inert atmospheres. Improvements to conductivity are most dramatic in the case of predominantly semi-conducting, single walled carbon nanotubes (SWCNT) due to the remarkable introduction of about 1.2e14 holes/sq. cm, but this method is also an effective means to improve metallic, multi-walled carbon nanotubes (MWCNT). We will demonstrate improvement of transport and charge collection properties of both SWCNTs and MWCNTs by these SAM coatings in FETs and also in organic photovoltaic solar cells and in OLEDs. [1] M. F. Calhoun et al. Nature Materials 7, 84 - 89 (2008). [2] C. Y. Kao et al. Adv. Func. Mater. 19, 1 (2009).

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