Abstract Submitted
for the MAR07 Meeting of
The American Physical Society

Sequence Dependent Single Stranded DNA-Single Walled Carbon Nanotube Interactions and Their Applications in Detection of Gaseous Analytes SAMUEL KHAMIS, MICHELLE CHEN, ROBERT JOHNSON, A.T. CHARLIE JOHNSON, University of Pennsylvania — Recently there has been great interest in sensing strategies based on the use of non-covalent means to tune the chemical affinity of single walled carbon nanotube field effect transistors (SWNT FET's). The combination of single-stranded DNA (ssDNA) and SWNT FET's is particularly intriguing because of their chemical compatibility and diverse chemical recognition properties. We have demonstrated the utility of such devices for vapor sensing[1], and report here on results involving more than a dozen different ssDNA sequences. ssDNA/SWNT based sensors are sensitive to ppms of said gases, with response and recovery times on the scale of seconds. In tests involving a gas panel that includes explosives, neuro-toxins, and disease defining compounds, sensor response is specific to particular sequences of ssDNA. Given the extremely large number of different ssDNA sequences available, this observation opens up possibility of creating a large number of sensors with widely varying response characteristics, as required for an "electronic nose" system for the detection and classification of vapor mixtures. [1] C. Staii, M. Chen, A. Gelperin, and A.T. Johnson, Nano Lett. 2005, 5, 1774-1778 This work supported by the JSTO DTRA and the Army Research Office Grant # W911NF-06-1-0462

Samuel Khamis
Univ. of Pennsylvania

Date submitted: 15 Dec 2006 Electronic form version 1.4