Abstract Submitted
for the MAR09 Meeting of
The American Physical Society

Unusual behaviors of heat-treated nanotube devices with platinum contact metal[1] ALEXANDER A. KANE, TATYANA SHEPS, PHILIP G. COLLINS, Department of Physics and Astronomy, Univ. of California Irvine, Irvine CA 92697-4576 — Modest heat treatments typically lead to performance improvements in devices made from single-walled carbon nanotubes (SWCNTs) [1]. We report highly unusual behavior, however, in the response SWCNTs contacted with Pt electrodes. Instead of monotonically improving, the contact resistance can either increase or decrease by one order of magnitude depending on the processing temperature. Furthermore, we observe anomalous changes in the device transconductance, such that SWCNTs previously identified as metallic acquire gate-dependent characteristics. The results appear intrinsic to the Pt-SWCNT interface and are not due to contamination or environmental effects, because measurements are performed *in situ* during heating in ultra-high vacuum. Complimentary electrochemical and spectroscopic testing reveals the influences of Pt-SWCNT interface chemistry. These results have particular importance for high power applications requiring refractory metal contact electrodes. [1] A. Kane et al. *App. Phys. Lett.* **92** 038506 (2008).

[1]This research has been partly supported by the NSF DMR-0801271.

Alexander A. Kane

Date submitted: 21 Nov 2008 Electronic form version 1.4