Abstract Submitted
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Conductance-Based Temperature Programmed Desorption with Single Defect Resolution DENG PAN, PATRICK C. SIMS, BRAD L. CORSO, PHILIP G. COLLINS, Department of Physics and Astronomy, Univ. of California at Irvine, Irvine, CA 92697-4576 — The controlled functionalization of nanotubes and graphene requires methods of chemically attacking these inert surfaces and of removing unwanted oxidation damage. The appeal of reversible chemistries is rarely achieved: the degraded electrical properties of reduced graphene oxide compared to pristine graphene indicates residual damage that remains poorly understood. Using a high temperature, UHV apparatus to perform electrical measurements in situ, we investigate the thermal desorption of adducts that can restore conductivity in oxidized nanographites. The majority of our measurements are accomplished using SWCNTs, due to their enhanced sensitivity to even single point defects. Discrete conductance jumps accompanying the removal of different types of adducts provide a characterization method that directly distinguishes the relative electronic effects of phenolic, epoxide, and carboxylic defects. The electronic measurements complement more traditional, temperature programmed desorption from bulk material, which is insensitive to electronic disorder.

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