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Signatures of Chemical Defects in Carbon Nanotube Electronic Devices BRETT R. GOLDSMITH, A. KANE, PHILIP G. COLLINS, Department of Physics and Astronomy, University of California Irvine, Irvine, CA 92697-4576 — The study of chemical defects in carbon nanotubes has important implications for their operation as electronic devices, and many synthesis and fabrication techniques for such devices result in non-zero defect densities. Scanned probe microscopy techniques are particularly useful for identifying these sites and then examining their electronic properties. We have examined a number of electronic devices in which single defects play important roles in determining the two- and three-terminal device behavior. Using conducting-tip atomic force microscopy to measure local electronic properties, we distinguish one type of defect from another and correlate this with the device characteristics. Furthermore, we can chemically modify and reinvestigate the same defect site. Ultimately, the goal is to use the device characteristics as a kind of signature to reliably infer the presence of particular chemical defects. This work is partly supported by NSF grant DMR-0239842.

Brett R. Goldsmith
Department of Physics and Astronomy, University of California Irvine, Irvine, CA 92697-4576

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