

Abstract Submitted
for the MAR11 Meeting of
The American Physical Society

Effects of adsorbed gases on the conductance of individual carbon nanotubes¹ DAVID COBDEN, HAO-CHUN LEE, ERIK FREDRICKSON, University of Washington, RICHARD ROY, University of Puget Sound, OSCAR VILCHES, University of Washington — We investigate the effects of adsorbed monolayers of Ar, Kr and other gases on individual suspended single-walled carbon nanotubes. The down-shifts of the vibrational resonances of a nanotube can be used to determine the monolayer density² while the electrical conductance is measured simultaneously, at temperatures as low as 4.3 K. In the case of Ar, by studying density isotherms in the range 38 to 65 K, we see behavior resembling that of the well known two-dimensional vapor, liquid and solid phases on exfoliated graphite, although the correspondence is not exact and is device dependent. In addition, we find that the conductance changes significantly and non-monotonically with the density, and there are indications that it is sensitive to ordering in the monolayer.

¹Work supported by NSF DMR-0907690 and PHY-0754333 (REU)(Roy)

²Z. Wang et al, Science 327, 552 (2010)

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Date submitted: 27 Dec 2010

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