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XSTM Study of SWNTs on GaAs(110) and InAs(110) L.B. RUPPALT, P.M. ALBRECHT, J.W. LYDING, University of Illinois, Urbana Champaign — In an effort to better understand the interactions between single-walled carbon nanotubes (SWNTs) and supporting III/V substrates, we have used ultra high vacuum (UHV) cross-sectional scanning tunneling microscopy (XSTM) and spectroscopy (STS) to examine SWNTs on the (110) surfaces of GaAs and InAs. Clean, atomically flat surfaces were obtained through in situ cleavage, and SWNTs were deposited using an UHV Dry Contact Transfer (DCT) technique previously demonstrated on H-passivated Si(100).¹ The deposition resulted in the intact transfer of primarily isolated SWNTs to the III/V surface, with STM images revealing a preferential alignment of individual tubes in the (110) direction in both cases. STS measurements verify the nanotube/surface band alignments predicted by Kim et. al.²: a Type I alignment in the SWNT/GaAs case, with the SWNT gap contained within the GaAs gap, and a Type II alignment in the SWNT/InAs system, with the SWNT valence band edge within the substrate gap and conduction band edge well within the InAs conduction band.

¹P.M. Albrecht and J.W. Lyding, *APL* **83**, 5029 (2003)

²Y.-H. Kim, et. al., *PRL* **92**, 176102-1 (2004) and *unpublished*

L.B. Ruppalt
University of Illinois, Urbana Champaign

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