

Abstract Submitted
for the SES05 Meeting of
The American Physical Society

NEXAFS and UPS studies of aligned single-walled carbon nanotubes on Si(100) substrates JACK ROWE, S.-J. OH, OTTO ZHOU, University of North Carolina, LES FLEMING, NC State University, MARC ULRICH, US Army Research Office — We report near-edge absorption fine structure (NEXAFS) and ultraviolet photoemission spectroscopy (UPS) studies of aligned single-walled carbon nanotube films on Si(100) substrates. Polarization dependent data show very clear anisotropies due to the aligned nature of these films. We find different polarization dependent oscillator strengths for the π^* -core exciton and the σ^* -core exciton. From our data one can thus determine the orientation of the films using the NEXAFS spectra, with the intensity of the π^* -core exciton at 284.4 eV showing a strong dependence on nanotube alignment with respect to the polarization of the incident radiation. At lower angles of incidence, the intensity of the π^* peak was higher for all orientations, which we attribute to the greater accessibility of the π^* orbitals. UPS spectra of the films showed little angular dependence and included features consistent with the total density of states of graphite. As a result of the nanotube curvature and the distribution of nanotube chiralities, the UPS spectra are similar to angle-integrated graphite spectra.

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Date submitted: 09 Aug 2005

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