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Resonance Raman Excitation of Double-Walled Carbon Nanotubes JEFFREY SIMPSON, Towson University, JI YEON HUH, JEFFREY FAGAN, ANGELA HIGHT WALKER, National Institute of Standards and Technology — The opto-electronic properties of carbon nanotubes depend sensitively on their environment. Double-walled carbon nanotubes (DWCNTs) offer an ideal configuration in which to study interlayer electron-phonon coupling effects. Dispersed sub-populations (MM, MS, SM, SS where M is metal and S is semiconducting) of individualized DWCNTs were prepared in a three part process consisting of purification to remove catalysts, density gradient ultracentrifugation to remove dispersed SWCNT and MWNT nanotubes, followed by additional ultracentrifugation of purified DWCNT dispersions to separate the sub-species by buoyancy. Extracted fractions were concentrated and dialyzed for measurement. We perform resonance Raman spectroscopy (RRS) of DWCNTs using a wide range of laser excitation wavelengths, from NIR through UV, for vibrational modes including the radialbreathing mode (RBM) and higher order graphite modes. In order to measure the effects of electron-phonon coupling, we will compare the Raman spectra for specific chirality nanotubes in a double-walled complex with the behavior of individual SWCNTs of the same chirality.

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