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Resonant Raman Spectroscopy of Chirality-Enriched Semiconducting Single Walled Carbon Nanotubes JUAN G. DUQUE, Los Alamos National Laboratory, HANG CHEN, ANNA SWAN, Boston University, XIAOMIN TU, MING ZHENG, NIST, STEPHEN K. DOORN, Los Alamos National Laboratory — Recent advances in carbon nanotube separations science are providing access to samples highly enriched in single chiralities. We present a Raman spectroscopic investigation of enriched semiconducting samples generated from ion chromatography of DNA-functionalized nanotubes. We will present results on the resonance Raman excitation profile behavior of RBM, G-band, and G' spectra from isolated SWNT samples. RBM profiles show very good separation of single chirality semiconducting fractions with very low cross-contamination from other nanotubes. G-band profiles allow testing of different models for the Raman scattering process and reveal new evidence for the importance of non-Condon effects in the Raman response. Investigations into the G' mode enabled us to map the band structure of the different isolated chiralities and to probe variable coupling in the vicinity of the E22 transition. These results demonstrate the important role that chirality-enriched samples have to play in revealing new SWNT photophysical behaviors.

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