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Resonance Raman Spectroscopy of Separated Single-Wall Carbon Nanotube[1] J.R. SIMPSON[2], Towson University, J.A. FAGAN, X. TU, M. ZHENG, A.R. HIGHT WALKER, National Institute of Standards and Technology, J.G. DUQUE, J. CROCHET, S.K. DOORN, Los Alamos National Laboratory —
The heterogeneity of single-wall carbon nanotubes (SWCNTs) produced by typical techniques complicates characterization and presents a barrier for technological applications. Improvements in separation and purification techniques enable detailed studies of specific nanotube properties by providing samples of unique chirality, length, metallicity, bundling, and interior filling. We report resonant Raman spectroscopy (RRS) measurements on these samples over a wide range of excitation wavelengths using a series of discrete and continuously tunable laser sources coupled to a triple-grating spectrometer. RRS of these homogeneous samples reveals unique spectral features and affords interpretation of intrinsic nanotube optical properties. Of particular interest are the G-band of chirally-pure armchair metallic SWCNTS and shifts of the radial breathing mode and excitation energy with water filling. Additionally, we will compare Raman results with other optical characterization techniques.

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