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Intensity Ratio of Resonant Raman Modes for (n, m) Enriched Semiconducting Carbon Nanotubes YANMEI PIAO, National Institute of Standards and Technology, JEFFREY SIMPSON, Towson University, JASON STREIT, GEYOU AO, JEFFREY FAGAN, ANGELA HIGHT WALKER, National Institute of Standards and Technology — Relative intensities of resonant Raman spectral features, specifically the radial breathing mode (RBM) and G modes, of eleven, chirality-enriched, single-wall carbon nanotube (SWCNT) species were established under second-order optical transition excitation. The results demonstrate a significantly under-recognized complexity in the evaluation of Raman spectra for the assignment of (n, m) population distributions. Strong chiral angle and mod dependencies affect the intensity ratio of the RBM to G modes and can result in misleading interpretations. Furthermore, we report five additional values for chirality dependent G^+ and G^- Raman peak positions and intensities, supporting accuracy in literature values, and extending the available data to cover more of the small diameter regime by including the first (5,4) second-order, resonance Raman spectra. Together, the Raman spectral library is demonstrated to be sufficient for decoupling multiple species via a spectral fitting process, and enable fundamental characterization even in mixed chiral population samples.

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