Absence of Broad G\textsuperscript{−} Feature in Resonant Raman Spectra of
Armchair Carbon Nanotubes E.H. HAROZ, W.D. RICE, J. KONO, Department of Electrical & Computer Engineering, Rice University, J.G. DUQUE, C.G. DENSMORE, S.K. DOORN, Center for Integrated Nanotechnologies, Los Alamos National Laboratory — Unlike the radial breathing mode in carbon nanotubes (CNTs), the G-band Raman feature does not display a strong frequency dependence on nanotube structure. The appearance of a broad G\textsuperscript{−} peak in CNT Raman spectra has been attributed to numerous phenomena including the presence of metallic nanotubes, although a consensus has yet to be achieved amongst researchers. Here, we present resonant Raman measurements on macroscopic ensembles enriched in armchair CNTs produced by density gradient ultracentrifugation. Our G-band data clearly show that the broad, lower-frequency G\textsuperscript{−} mode is absent for armchair structures, in contrast with recent theoretical and experimental results, and only occurs with resonance of non-armchair metals. This forms a generalized correlation between G-band lineshape and nanotube structure due to the sampling of a large number of nanotubes of several armchair species.