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Raman Spectroscopy of Heat-Treated Boron Doped Double Wall Carbon Nanotubes[1] F. VILLALPANDO, H.B. SON, G.G. SAMSONIDZE, Massachusetts Institute of Technology, S.G. CHOU, Pfizer Global Research and Development, Y.A. KIM, H. MURAMATSU, T. HAYASHI, M. ENDO, Shinshu University, M. TERRONES, Instituto Potosino de Investigacion Cientifica y Tecnologica, M.S. DRESSELHAUS, Massachusetts Institute of Technology — We performed Raman spectroscopy experiments on undoped and boron-doped double walled carbon nanotubes that exhibit the "coalescence inducing mode" as they are heat treated at temperatures between 1200C and 2000C. From the radial breathing mode spectra we find that the smaller diameter tubes disappear before the larger diameter tubes as the sample is heat treated at higher temperatures. By using different laser excitation energies ranging from 1.57eV to 2.41eV, we observe in agreement with prior work that the outer tubes shield the inner tubes and give the G band its characteristic lineshape. We also find that the G' feature contains contributions from the inner and outer layers of a DWNT and its frequency shifts are related to the change in the diameter distribution of the DWNT sample caused by increasing the heat treatment temperatures. Finally, we report on the observation of a four fold splitting of the G' Raman feature and analyze the similarities with recent studies on 2-layer graphene.

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