Abstract Submitted
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Raman Scattering Study of Carbon Nanotube Serpentines[1] BEI WANG, AWNISH GUPTA, Department of Physics, Penn State University, PETER EKLUND, Department of Physics, Department of Materials Science & Engineering and Materials Research Institute, Penn State University, JUN HUANG, WON-BONG CHOI, Department of Mechanical and Materials Engineering, Florida International University, PENN STATE UNIVERSITY COLLABORATION, FLORIDA INTERNATIONAL UNIVERSITY COLLABORATION — Single-walled carbon nanotubes (SWNTs) were grown on step-edge single crystal quartz using CVD. SEM images were taken using FESEM showing serpentines and loops. Raman spectra were taken on SWNTs using excitation lines 514nm and 647nm with laser spot diameter $\sim$0.8μm. By tracing the Raman spectrum along a SWNT, we were able to record the change of Raman features with respect to the bending radius R of tube in the plane of the substrate. We found that there is linear upshift of the G-band and R-band with the curvature (1/R) of the bend. We attribute the shift of these frequencies to strain related change of carbon-carbon bond length. In semiconducting SWNTs changes were also observed in the intensities of these bands which we identify with a curvature induced change in the band-gap. This interpretation is also consistent with the results of electronic measurements.

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