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Temperature dependence of Raman scattering from Single-Walled Carbon Nanotubes

Shohei Chiashi, Yoichi Murakami, Yuhei Miyauchi and Shigeo Maruyama

The University of Tokyo
Contact e-mail: chiashi@photon.t.u-tokyo.ac.jp

Raman scatterings from various single-walled carbon nanotube (SWNT) samples were measured over a wide temperatures range (from 4 to 1000 K). The G-band and D-band peaks showed clear temperature dependences; the downshift of Raman shift and the broadening of peak width. The G-band main peak (G+ peak) showed the universal temperature dependence in Raman shift for the various SWNTs samples and for the three excitation laser energies (488.0, 514.5 and 632.8 nm). The downshift of D-band peak was considerably less than that of G-band with increasing temperature. Raman shift, peak width and intensity of most of radial breathing mode (RBM) peaks also have the qualitatively similar temperature dependence as G-band peak. However, some of RBM peaks show the increase in intensity with increase in temperature. Furthermore, these peculiar RBM peaks disappear when SWNTs were isolated, suggesting the unique resonance due to bundling.

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