19:00
Cross-polarized optical excitation of single-walled carbon nanotubes
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Because of the depolarization effect, or so-called antenna effect, cross-polarized optical absorption of single-walled carbon nanotubes (SWNTs) is believed to be quite weak. However, in photoluminescence (PL) excitation spectra of micelle wrapped SWNTs, clearly identified PL peaks due to cross-polarized excitation gives an important measure of optical transition energy of E12 or E21 [1]. The cross-polarized absorption must be dominant in the absorption of vertically aligned film of SWNTs [2] when excited from the top of a film. In our previous study of polarized UV/Vis absorption, pi-plasmon absorption at 5.25 eV was revealed in contrast to 4.5 eV for parallel excitation [3]. The consistent physical view of electron energy loss spectroscopy (EELS) is now being explored [4] with the understanding that the bundle side of such a vertically aligned SWNT film is as small as 5-8 nanotubes [5]. Detailed polarized Raman study is performed to further study the anisotropic optical properties of SWNTs.

1 Y. Miyauchi, M. Oba, S. Maruyama, Phys. Rev. B 74 (2006) 205440.

2 Y. Murakami et al., S. Chiashi, Y. Miyauchi, M. Hu, M. Ogura, T. Okubo, S. Maruyama, Chem. Phys. Lett. 385 (2004) 298.

3 Y. Murakami, E. Einarsson, T. Edamura, S. Maruyama, Phys. Rev. Lett., 94 (2005) 087402.

4 C. Kramberger, R. Hambach, C. Giorgetti, M. H. RAummeli, M. Knupfer, J. Fink, B. BAuchner, L. Reining, E. Einarsson, S. Maruyama, F. Sottile, K. Hannewald, V. Olevano, A. Marinopoulos, T. Pichler, submitted to Phys. Rev. Lett.

5 E. Einarsson, H. Shiozawa, C. Kramberger, M. H. Ruemmeli, A. Grüneis, T. Pichler, S. Maruyama, J. Phys. Chem. C, 111 (2007) 17861.

19:30
Optical modulation of single walled carbon nanotubes for chemical and biological detection
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Nanoscale sensing elements offer promise for single molecule analyte detection in physically or biologically constrained environments. Molecular adsorption can be amplified via modulation of sharp singularities in the electronic density of states