

21COE Programme: Mechanical Systems Innovation Open Seminar

21COE Programme: Mechanical System Innovation 17th Open Seminar 2006 will be held as follows. Any participants will be welcome.

Invited Speaker: Professor Manfred M. Kappes (Professor, Institut für Physikalische Chemie, Universität Karlsruhe (TH))

Title : Fluorescence of Semiconducting SWNTs under Various Conditions

Date & Time: 24th March 2006 (Friday), 15:00~17:00

Place: The University of Tokyo, Engineering Building No.2, 3rd Floor,
Meeting Room# 31A

Abstract: We have probed the photoluminescence of HiPco-, PLV- and CVD-generated semiconducting SWNTs under a variety of conditions. Measurements on ensembles in aqueous surfactant suspensions at temperatures ranging from 300-16 K are consistent with uniaxial strain build-up in SWNTs due to the differential thermal contraction of ice matrix and nanotube. Pressure dependencies of ensemble photoluminescence and Raman scattering were studied at room temperature using a diamond anvil cell to access hydrostatic pressures up to 11 GPa. Both surfactant suspensions and SWNTs deposited onto glass microfibres were probed. In the latter case, we used methanol/ethanol mixtures as the pressurization medium. There are strong changes to SWNT electronic structure as a result of pressure induced chemical reactions. Additionally, evidence is obtained for a diameter dependent critical pressure (range) within which nanotube collapse occurs. Confocal microscopy was used to study single tube photoluminescence for SWNTs deposited onto or prepared on sapphire and silica surfaces by CVD growth. Measurements at 8K manifest various phenomena including blinking and phonon replicas.

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