

21COE 物質階層融合科学セミナー 物性コロキウム

日時：12月24日(金) 15:30 - 17:00

場所：理学部 総合研究棟745号室(大学院講義室)

講師：R.B. Weisman (Department of Chemistry,
Rice University, USA)

題目：Optical Spectroscopy of Single-Walled Carbon Nanotubes

Abstract: Recent major advances have made optical spectroscopy a powerful tool for basic and applied research on single-walled carbon nanotubes (SWNT). Theory suggested that the diversity of nanotube diameters and chiral angles in SWNT samples should give a complex superposition of optical transitions extending from the near-infrared through the near-ultraviolet. However, experimental spectra remained disappointingly diffuse until samples were physically processed to give individual nanotubes in aqueous surfactant suspensions. Such samples showed structured absorption spectra and, most importantly, near-infrared photoluminescence emission. Spectrofluorimetric studies revealed resolved electronic absorption and emission transitions for more than thirty different structural species of semiconducting nanotubes. Careful data analysis then allowed each optical transition to be assigned to a specific SWNT structure. The results form a precise experimental foundation for expanding theoretical understanding of nanotube electronic structure and excitations. In addition, photoluminescence provides a valuable new analytical method for determining the compositions and environments of mixed SWNT samples. Optical spectroscopy also allows the efficient investigation of physical and chemical processes that depend on nanotube structure.

Bruce Weisman 氏は、ナノチューブをSDS(硫化ドデシルナトリウム)という界面活性剤で水に溶かし、初めて半導体ナノチューブからの発光(PL)の観測に成功しました [Science 297 (2002) 593-596]。この研究でナノチューブの光学的研究が一気に展開しました。年の押しつまった時ですが、少し早めに始めますのでぜひ、このホットな話にご来聴ください。

連絡先：齋藤 理一郎 (217-7754)

15:15 よりコーヒー、紅茶、お菓子を用意します。カップを持ってお集まり下さい。

世話人

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