

第111回化学コロキウム / (大学院GP・物理-化学合同セミナー)

日時 1月28日(月) 15:00-16:00

教室 11-302号室

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演題 Alcohol CVD Growth and Characterization of Vertically-Aligned Single-Walled Carbon Nanotubes

By using alcohol as a carbon source in a catalytic CVD (ACCVD), high-purity single-walled carbon nanotubes (SWNTs) can be grown at relatively low temperatures. The vertically aligned SWNTs film with thickness up to 30 microns is grown on quartz or silicon substrates by employing the simple dip-coat preparation of catalytic metal particles. Recently developed removal and transfer technique of this film enabled a direct TEM observation of free-standing vertically aligned SWNTs along the alignment direction. It was revealed that the film is comprised primarily of small SWNT bundles, typically containing 3-8 SWNTs. This minimum bundling structure is ideal for various optical characterizations such as resonant Raman and possible production of homogeneous composite materials. Our recent studies of reaction kinetics of nanotube growth and optical characterization using polarized absorption and polarized Raman will be discussed. Laser-excitation of a vertically aligned film from top means that each nanotube is excited perpendicular to its axis. Because of this predominant perpendicular excitation, interesting cross-polarized absorption and interesting and practically important Raman features are observed.