

EINLADUNG

zum Vortrag von

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über

Nano-carbon materials: their fundamentals and various applications including nano-biotechnology

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Dienstag, 20. März 2007, um 17.30 Uhr

Ort: Großer Hörsaal der Experimentalphysik, Universität Wien,
1090 Wien, Strudlhofgasse 4 / Boltzmannngasse 5, 1. Stock

Abstract:

Many unique properties of CNTs depend on their structures and morphologies. When come to detailed comparisons between experiment and theory, well-controlled and characterized specimens (diameter, length, quantity, chirality, structural perfection, impurity, homogeneity) will be eventually needed. This is also true for their industrial applications to match their requirements. Recently two important breakthroughs in single-wall carbon nanotube (SWCNT) growth were made in our laboratories at AIST. One is a floating catalyst-assisted CVD method of growing SWCNTs. The method can provide controlled tube diameters and extremely high purity tubes with high production yield according to optical spectroscopic characterization. The other is the "Super-Growth" of SWCNTs, which grow vertically on various substrates including metal foils as high as one centimeter. Precise control of small amount of water during the CVD reaction is a crucial for such efficient growth. On the basis of the superior properties of the super-growth SWCNTs we started to develop a super-capacitor, which can be used for high power density energy storage.

Secondly, the importance of characterization of nano-structured materials will be discussed by showing the latest observation on individual carbon atoms, local atomic defects and their dynamic behaviors of SWCNTs, which have been carried out by an ultra-high resolution TEM with a spherical aberration corrector. Furthermore, it will be demonstrated that the inside nano-spaces of SWCNT are an ideal support for individual atoms and some organic molecules for atomic resolution TEM microscopy.

The final topic for presentation is a bio-medical application of the carbon nano-horns (CNHs). We utilize the large surface area of CNHs, which is comparable to activated carbon, with emphasis on their chemical and physical stability due to pure graphitic structure. After studying gas adsorption properties of CNHs for some years, we have recently targeted on a drug carrier for the use of CNHs in drug delivery systems. Loading and release of a drug on/from CNHs were studied in a quantitative manner and the loaded drugs were tested on living cells.

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