



On behalf of the

University of Vienna / Electronic Properties of Materials

we cordially invite you to the following talk

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Dyes encapsulation into single-walled carbon nanotubes: experimental study of the structural, optical and electronic properties of the hybrid systems

Abstract:

Dye encapsulation into host single-walled carbon nanotubes is an elegant way to create hybrid nano-systems with tunable opto-electronic properties. To this aim, different kinds of molecules (either electron donor or acceptor, absorbing either in the blue or the red visible range) are encapsulated into metallic or semiconducting nanotubes displaying different diameters. Up to now, we have mainly studied encapsulated quaterthiophene derivatives (4T), tetracyanoquinodimethane (TCNQ) and phthalocyanine (MPc) molecules. In this work, we discuss the supramolecular organization of dyes inside the nanotube, the optical properties and the charge transfer for some of our hybrid systems. For instance, using Raman spectroscopy, a significant electron transfer is reported with 4T, whose magnitude strongly depends on the nanotube diameter, and on the metallic or semiconducting character. Experiments also suggest a photo-activated electron transfer for small diameter (~ 9 Å) semiconducting and metallic tubes. Confinement of electron donor (4T) (respectively electron acceptor (TCNQ)) into small diameter tubes leads to a red shift (blue shift) of the optical absorption energy and an increase (decrease) of the photoluminescence intensities, evidenced by the photoluminescence excitation maps.

Date: Friday, 20th July 2018, 10 a.m.

Location: Josef-Stefan-Lecture-Hall, 3rd floor, Boltzmannngasse 5, 1090 Vienna

*Prof. Paola Ayala, Prof. Wolfgang Lang
Prof. Thomas Pichler*