Abstract Submitted
for the MAR13 Meeting of
The American Physical Society

Tailoring of optoelectronic properties in nanotube-chromophore energy transfer complexes FRIEDERIKE ERNST, Free University of Berlin, Department of Physics, TIMM HEEK, Free University of Berlin, Department of Chemistry, ANTONIO SETARO, Free University of Berlin, Department of Physics, RAINER HAAG, Free University of Berlin, Department of Chemistry, STEPHANIE REICH, Free University of Berlin, Department of Physics — The formation of nanotube-chromophore energy transfer complexes is of great interest for a number of applications, in particular for energy conversion. Certain chromophores can π - π stack on the nanotube wall: when they are radiatively excited an exciton is formed, which subsequently passes into the carbon nanotube. In the carbon nanotube it can radiatively recombine, emitting a photon characteristic for that nanotube's chirality, or, by applying a voltage, the exciton can be split into an electron and a hole, generating a photocurrent. We demonstrate that the chromophore may be incorporated directly into a surfactant molecule, which then serves two distinct purposes: constituting the photon collecting half of the energy transfer complex, and solubilizing said complexes (Ernst et al., Adv. Funct. Mat 2012). This approach results in temporally stable, biologically compatible solutions which are functional in a wide range of pHs. Alternatively, nanotubes suspended in surfactant micelles can be functionalized with dyes in organic media through micelle swelling. Both processes yield functional nanotube-chromophore complexes with tunable optoelectronic properties, paving the way for scalable optoelectronic devices.

Friederike Ernst
Free University of Berlin

Date submitted: 17 Oct 2012 Electronic form version 1.4