

Abstract Submitted
for the MAR11 Meeting of
The American Physical Society

Studying of kinetics of rear earth ion (REI) nanoscale complex formation by resonant energy transfer TETYANA IGNATOVA, Department of Physics, Lehigh University, Bethlehem, PA 18015, DENIS PRISTINSKI, Polymers Division of National Institute of Standards and Technology, Gaithersburg, MD 20899, SLAVA V. ROTKIN, (1) Department of Physics and (2) Center for Advanced Materials and Nanotechnologies, Lehigh University, Bethlehem, PA 18015 — We observed formation of nanoscale complexes between multivalent REIs (Tb and Eu) and negatively charged DNA wrapped SWNTs, ionized in the water solution. Foerster Resonance Energy Transfer (FRET) was found to be an ideal method to confirm the complex formation. Because of its high sensitivity and non-destructive characterization approach FRET can be used to trace the kinetics of the complex formation. Strong dependence of SWNT photoluminescence (PL) on the REI concentration was detected and interpreted as a competition between the REI absorption on the SWNTs and subsequent FRET enhanced PL and the SWNT agglomeration followed by PL quenching. We measured the distance between REI and SWNT which appears to be much shorter than the one from their relative concentration in solution. We speculate that Manning condensation of the REIs on the SWNT/DNA surface happens thereby significantly reducing their spacing and making FRET possible.

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Date submitted: 01 Feb 2011

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