NANOHOUR

Wednesday, November 9, 2005

3:00 PM

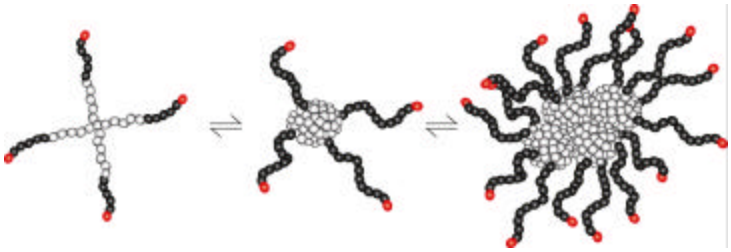
Beckman Institute - Room 3269

Synthesis and Aggregation Behavior of Thermally Responsive Star Polymers: Toward Self Assembling Nanoparticles

Robert Lambeth

(Ph.D. student, Chemistry Dept., Advisor: Jeffrey S. Moore)

The overall goal of this research is to develop synthetic methods for the preparation of well-defined, surface functionalized core-shell nanoparticles capable of self-assembly. As a first step towards this goal, thermoresponsive four arm star block copolymers have been synthesized using reversible-addition fragmentation chain transfer (RAFT) polymerization. The exterior blocks of the star polymer consist of hydrophilic dimethylacrylamide (DMA) while the interior blocks consist of thermoresponisve N-isopropylacrylamide (NIPAM). The polymers aqueous solution behavior was characterized as a function of temperature using static and dynamic light scattering as well as differential scanning calorimetry. The polymers were found to form monodisperse aggregates when the interior NIPAM blocks became hydrophobic.



AND

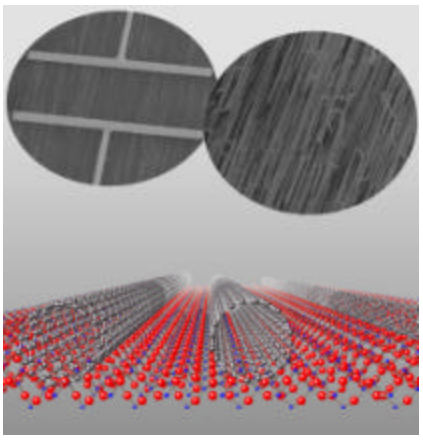
Large Area Guided Growth of SWNT and its Application for TFT

Coskun Kocabas

(Ph.D. student, Dept. of Physics, Advisor: Prof. John Rogers)

This talk will emphasize a convenient process for generating large scale, horizontally aligned arrays of pristine, single walled carbon nanotubes (SWNTs). The approach uses guided growth, by chemical vapor deposition (CVD), of SWNTs on miscut single crystal quartz substrates. Studies of the growth reveal important relationships between the density and alignment of these tubes, the CVD conditions and the morphology of the quartz. Electrodes and dielectrics patterned on top of these arrays yield thin film transistors (TFTs) that use the SWNTs as effective thin film semiconductors. The ability to build high performance devices of this type suggests significant promise for large scale aligned arrays of SWNT in electronics, sensors and other applications.

The picture illustrates a self-aligned array of Single Walled Carbon Nanotubes (SWNTs) formed by chemical vapor deposition on a mis-cut single crystal quartz wafer. The background picture schematically illustrates aligned SWNTs on the quartz crystal surface. The top right image shows a scanning electron microscope image of a dense array of aligned SWNTs. The top left image shows source and drain electrodes of a type of thin film transistor that uses an aligned array of SWNTs as the semiconducting material.



Coffee and cookies will be served