

**DEPARTMENT OF MECHANICAL ENGINEERING**  
**Purdue School of Engineering and Technology**

**FALL 2008 SEMINAR SERIES**

---

**Date: Thursday, October 2, 2008**

**Time: 11:00 am – 12:00 pm**

**Room: SL 165**

**Everyone is invited**

---

**Molecular Self-assembly: From Unitary to Binary System**

**Bo Xu, Professor, State Key Laboratory of Metastable Materials Science  
and Technology, Yanshan University, China**

**Abstract.**

The 'bottom-up' strategy based on non-covalent interactions is an attractive and promising approach for the construction of nanoarchitectures. Here I will demonstrate how the supramolecular structures change with fractional molecular coverage for acridine-9-carboxylic acid (ACA) unitary as well as the C<sub>60</sub>:ACA binary molecular systems. ACA can be presented in gas phase, chain phase, and dimer phase as the coverage increases. Structures of the C<sub>60</sub>:ACA binary system depend on the coverage of pre-deposited ACA. At intermediate (0.4 ML to 0.8 ML) ACA coverages, C<sub>60</sub> deposition results in a hexagonal cooperative structure with the C<sub>60</sub> periodicity nearly 3 times that of the normal C<sub>60</sub> 2-D packing of 1 nm and exists in enantiopure domains. At higher ACA coverages, a C<sub>60</sub> quasi-chain structure is formed in which parallel C<sub>60</sub> chains are spaced by ACA dimer domains. The mechanistic role of the initial ACA phase in the formation of C<sub>60</sub>:ACA supramolecular structures is described. In the end, other research works undertaking now are introduced.

**About the Speaker.**

Bo Xu is a professor in State Key Laboratory of Metastable Materials Science and Technology, Yanshan University, China. He got his physics degree from University of Science and Technology of China in 1994, his Ph.D. in physics at University of Nebraska-Lincoln in 2002. After that, he worked as a postdoc in Materials Research Science and Engineering Center at University of Maryland before he took his position now in Aug. 2006. His research includes the physical and chemical properties of surface under controlled ultra-high vacuum conditions. Recently, he mainly studies molecular self assembly on metal surface: investigate the effects of the surface morphology, reconstruction, as well as the evaporation parameters, on supramolecular structures trying to find the new routes to control this process.