

**MATERIALS**  
**ENGINEERING**  
**SEMINAR**

**“Surface Modification Chemistry for Self-assembly of Block Copolymer Materials”**

by

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ABSTRACT

Block copolymer (BCP) lithography has emerged as a promising strategy to create highly regular and dense dot or line arrays at the sub-50 nm length scale. Mainly two pattern geometries have been studied extensively: dense arrays of dots and dense arrays of lines and spaces. The former can be generated from sphere forming BCP or from cylinder-forming BCP with domains oriented perpendicular to the substrate, and the latter from cylinder-forming BCP with domains oriented parallel to the substrate or lamella forming BCP with domains oriented vertically to the substrate. An important aspect of self-assembly of block copolymers in thin-films is controlling the domain orientation. Typically in a diblock copolymer one of the domains prefers the substrate leading to parallel orientation of domains. We have focused on developing chemistry to alter the substrate wetting characteristics to make it non-preferential or neutral towards either block. It is often desirable to modify a wide range of substrates such as gold, III-IV semiconductors, and other oxide surfaces relevant to microelectronics. These periodic arrays based on self-assembly in BCP thin films have been examined for fabrication of magnetic storage media, quantum dot arrays, photonic crystals, and nanowire transistors. I will also describe the synthesis, characterization and assembly of organic-inorganic hybrid block copolymer systems that we are investigating for thin-film assembly.

Short Bio:

**Prof. Gopalan** received her Ph.D from Cornell University in Ithaca, NY, in Chemistry with Prof. Ober. Upon completion she conducted her postdoctoral work in Lucent Technologies, Bell Laboratories, NJ with Dr. Howard Katz. She is currently an Associate Professor in the Department of Materials Science and Eng. at the University of Wisconsin-Madison, and holds an affiliate appointment in the Department of Chemistry. Currently her group consists of 5 graduate students and two postdoctoral fellows. She is a PI in both the NSF-NSEC and NSF-MRSEC centers on campus. Her research is primarily funded by NSF, and DOE. She is the recipient of NSF-CAREER award for 2005 from the polymer program of Division of Materials Research (DMR).

**Date: Friday,**  
**April 15, 2011**  
**Time: 3:30 refreshments**  
**3:45 - Seminar**  
**Place: ARMS 1010**

**Purdue Materials:**

**Infinite**  
**Possibilities**

