Chemical Engineering Graduate Seminar

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"Application of Neutrons and X-rays to Fundamental Problems in Electronics Materials"

As feature sizes in microelectronic devices continue to decrease to sub-100 nm dimensions, new measurement methods are needed to characterize the device structure and to understand the physical phenomena that may limit their fabrication. Neutron (and x-ray) beams have emerged as powerful probes of structures having characteristic length scales ranging from (1 to 1000) nm in thin films and in the bulk. In particular, X-ray reflectivity (XR), neutron reflectivity (NR), small angle neutron scattering (SANS), and near edge X-ray absorption fine structure (NEXAFS) spectroscopy can be applied in novel ways to help understand fundamental issues important to the microelectronics industry. In this talk, we demonstrate the application of these measurement methods to investigate important problems in the development of photoresist materials used in photolithography and of nanoporous low-dielectric-constant materials needed for next generation integrated circuits.