

UNIVERSITY OF CONNECTICUT



INSTITUTE OF MATERIALS SCIENCE

POLYMER PROGRAM SEMINAR

“Shedding Light on Material Surfaces”

**Prof. Jeffrey T. Koberstein
Columbia University, New York**

**Friday, October 16, 2009
11 AM, IMS Room 20**

Abstract

There are a number of challenges associated with the general implementation of soft material nanotechnology and these challenges are especially important in the field of surface modification. First, one requires a set of rules for the molecular design of surfaces at the nanoscale, second, one needs a method to fabricate the surface that is designed, and third, if the surface is to be responsive in any way, some latent energy source must be incorporated into the material design. This presentation will describe a practically feasible framework we have developed for the molecular design and fabrication of polymer/material surfaces that enable nanoscale manipulation of the chemical groups that reside there. The methods are based upon three-component heterobifunctional molecules designed to self-assemble at the surfaces of both hard and soft substrates. The molecules either present a controlled areal density of reactive functional groups, in our case, alkyne or azide groups capable of Sharpless “click” chemistry, or are preprogrammed with photoactive functionalities that can be activated using only light as a reagent. In some cases, monomolecular surface layers are fabricated by adsorption from supercritical fluids, a process that is applicable to substrates of arbitrary shape. Because light is used to effect surface functionalization, surface patterns of reactive chemical groups can be made directly by illumination through a mask, without the necessity of indirect techniques like stamping. The surface modification strategies developed are extremely versatile for the general modification of surfaces as well as for spatial patterning of a variety of synthetic and biological molecules. Examples presented include using light to spatially control polymer dewetting and to construct the first covalently immobilized carbohydrate microarrays, and using “click” chemistry and spin coating to immobilize DNA with controlled areal density.

**Coffee will be served at 10:45AM outside the seminar room.*

**For further information, please contact YH Chudy at 860.486.3582 or yhchudy@ims.uconn.edu*

Polymer Program, Institute of Materials Science, University of Connecticut, Storrs, CT 06269-3136 www.ims.uconn.edu/polymer

