Macromolecular Science and Engineering Seminar Series

Dr. Kathryn L. Beers

VirginiaTech
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"Sensing the Surface/Tracking the Interface: Polymer models for adsorption and dynamic melt interfaces"

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Bio:
Kathryn L. Beers

Kate is Leader of the Polymers and Complex Fluids Group in the Materials Science and Engineering Division of the National Institute of Standards and Technology (NIST). The Group she leads has projects spanning Composites and High Performance Fibers, to Macromolecular Characterization and Polymer Processing. She has recently been recognized with the Arthur S. Flemming Award, the CMU Alumni Achievement Award and as a Fellow of the American Chemical Society.

Kate earned a BS in chemistry with high honors from The College of William and Mary and MS and PhD degrees in polymer science and chemistry, respectively, from Carnegie Mellon University. She conducted her thesis research in controlled radical polymerization under Prof. Krzysztof Matyjaszewski.

Abstract

Whether looking for variations in polymerization behavior near a surface in grafting from reactions or using the long, end-tethered polymer chain as a model for a free chain near a surface, we are using polymer brushes to learn more about the fundamental descriptors that can capture interactions between surfaces, macromolecules and solution. I'll describe two examples: the measurement of reactivity ratios for the same monomer pair at the same temperature using conventional and controlled free radical polymerization, and using neutron and x-ray reflectivity data of brushes in solvents and vapors to elucidate chain dynamics in the transition regime between "brush" and "mushroom" behavior. I'll also describe some new work in our group looking at interfaces in melts and semi-crystalline materials. In particular, the kind of behavior near a bulk/melt interface, such as those created during the process of fused filament additive manufacturing.

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