

CPP 63: Keynote Lecture IV

Time: Friday 9:30–10:00

Location: ZEU 222

Invited Talk

CPP 63.1 Fri 9:30 ZEU 222

Stimuli-Responsive and Switchable Polymer Brushes: Theoretical Concepts and Computer Simulations — •JENS-UWE SOMMER — Leibniz-Institut für Polymerforschung Dresden, Hohe Strasse 6, 01069 Dresden — Technische Universität Dresden, Institut für Theoretische Physik, Zellescher Weg 17, 01069 Dresden

Polymers densely anchored onto surfaces display properties which combine liquid and solid state behavior. While such polymer brushes resist dissolution, friction and solvent flow they are able to change their properties over some range by changing the conformational statistics of the polymers collectively. This makes it possible to synthesize polymer surfaces which react on environmental stimuli in various ways

and even suddenly switch their physico-chemical properties. In this talk I will discuss several aspects of how to influence the properties of polymer brushes by the environmental conditions using simple theoretical concepts and coarse-grained simulation studies. Starting from one-component neutral and charged brushes in simple solvents, I will show how various conformational transitions can be induced in two-component brushes. Another possibility to obtain switchable polymer surfaces is to consider multi-component solvents. In particular the case of co-nonsolvency seems to be a possible route to induce discontinuous phase transitions in polymer brushes via a small change of environmental variables. This presentation highlights the unique potential of polymer systems to display a variety of phase transitions even on finite scales.