

Abstract Submitted
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Design of responsive polymer surfaces with ultrafast response time JAN GENZER, EVREN OZCAM, JULIE WILLOUGHBY, NC State University — Responsive surfaces with tailorable surface-reconstruction kinetics and switching hysteresis were prepared from poly(vinylmethylsiloxane) (PVMS) networks modified with thiol alkanes to provide hydrophobic or hydrophilic surface properties. The cooperative effects of polymer mobility, arising from the high flexibility of the siloxane backbone, and the enthalpic interactions between the contacting medium and the PVMS functionalized surface control the degree of responsiveness. Exposing the modified-elastomer surfaces to water resulted in rearrangement of the hydrophilic alkanes at the surface. The kinetics of reconstruction and reversibility were established by measuring the surface wettability via dynamic contact angle. By controlling the formation of semi-crystalline regions in our substrates we demonstrate either “sluggish” kinetics and eventual surface “freezing” and stability or stimuli-responsive substrates with a magnitude of change and repeated reversibility unparallel to most polymeric surfaces.

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