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Creasing of soft surfaces under compression RYAN HAYWARD, VERONICA TRUJILLO, GENEVIEVE TUCKER, EMINE MEMIS, University of Massachusetts, Amherst — The surface of a soft material may form sharp creases when placed under compression. Though this mechanical instability was first recognized over 40 years ago, very little is known about the structures that result. In particular, we focus on the creasing of surface-attached hydrogels, materials that provide an excellent means of controlling properties such as biocompatibility, adhesion, and tribology. Large compressive stresses are generated within such gels upon swelling, leading to formation of creases that can dramatically alter surface properties. This instability may be exploited to enable the reversible formation of topographic patterns to actively control surface properties. We will present measurements of the critical compression at which surface creases form and how the soft surfaces deform as they fold, and will describe the preparation of surfaces that reversibly fold and flatten in response to external stimuli.

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