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Creasing instability of elastomers under uniaxial compression DAYONG CHEN, RYAN HAYWARD, Polymer Science and Engineering Department at UMass-Amherst — Soft polymers placed under compressive stress can undergo an elastic creasing instability in which sharp folds spontaneously form on the free surfaces. This process may play an important role in contexts as diverse as brain morphogenesis, failure of tires, and electrical breakdown of soft polymer actuators, but our understanding of this instability is still quite limited. We describe a simple experimental system to study creasing of thin elastomer films under uniaxial compression. The equilibrium depths, spacings and shapes of creases are characterized and found to show excellent agreements with numerical results. Further, we use this system to explore the important roles played by surface energy and adhesion in the onset and hysteretic behavior of creases.

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