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Elastic and capillary failure of particle stabilized droplets NIVEDITHA SAMUDRALA, RAPHAEL SARFATI, JIN NAM, ERIC DUFRESNE, None — Colloidal surfactants robustly stabilize fluid interfaces against spontaneous phase separation. Like molecular surfactants, they improve the thermodynamic and kinetic stability of the interface. However, particle stabilized interfaces are also thought to exhibit enhanced mechanical stability. Here, we investigate the mechanics of colloid-stabilized droplets using micro-pipette aspiration. We observe two distinct modes of failure: a classic buckling of the particle-laden interface similar to the buckling of a thin elastic shell, and a capillary failure where the encapsulated fluid is sucked out through the porous shell. To elucidate the underlying physics, we quantify the critical tension to drive each of these phenomena as a function of the size of the droplets, particles, and micro-pipette.

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None

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