

Caption for Supplementary Movies:

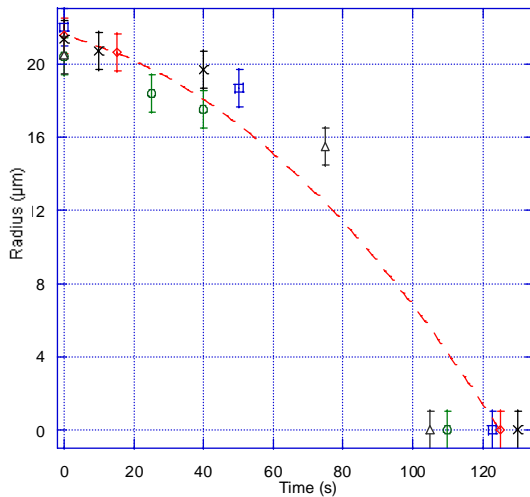
Supplementary Movie 1: Video of the unjammed thermally equilibrated shell after exposure to Triton X-100 at a concentration of 0.66 mM, $c > c_{critical}^{(2)}$. The bubble is covered with 4.0 μm charge stabilized polystyrene beads.

Supplementary Movie 2: Time lapse video of an armored bubble dissolving after exposure to Triton X-100 at a concentration of 0.66 mM, $c > c_{critical}^{(2)}$. Note the spherical shape of the dissolving bubble, and the mobility of the particles on the interface. The bubble is covered with 4.0 μm charge stabilized polystyrene beads.

Supplementary Movie 3: Time lapse video of an armored bubble dissolving after exposure to Triton X-100 at a concentration of 0.066 mM $c_{critical}^{(1)} < c < c_{critical}^{(2)}$. Note the non-spherical shape, and the absence of mobility of the particles on the interface, a signature of a jammed shell.

Supplementary Information:

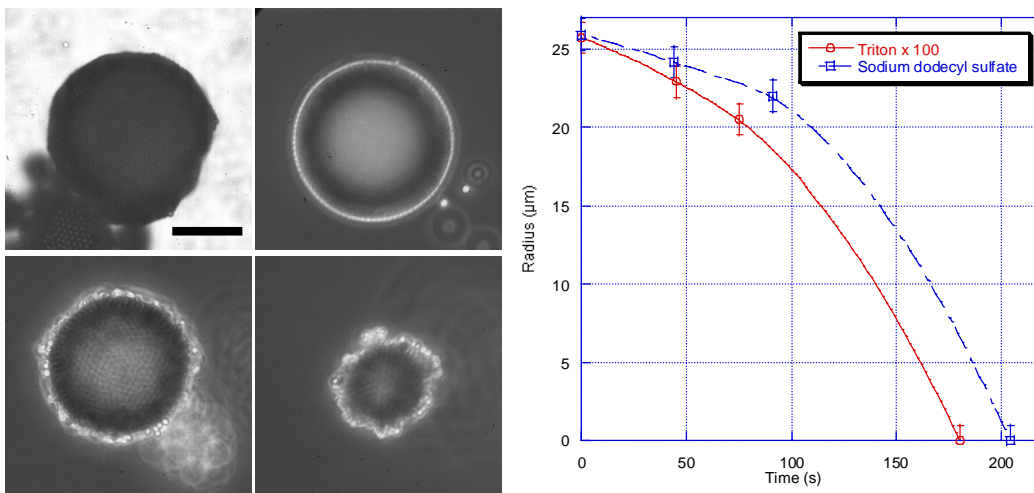
Reproducibility data for armored bubbles exposed to Triton X-100 at a concentration of 0.66 mM:



Supplementary Figure 1: Radius versus time plots of four bubbles exposed to 0.66 mM Triton X-100 showing the distribution of the time of dissolution of the bubbles.

Exposure of the armored bubbles to different surfactant species:

The armored bubbles were exposed to an anionic surfactant, sodium dodecyl sulfate, to determine the effect of surfactant type on the destabilization process. The process of destabilization is very similar to the one described for Triton X-100 (Figure 2e in the main paper).



Supplementary Figure 2: Exposure of armored bubbles to the anionic surfactant sodium dodecyl sulphate (SDS) at 3 times its critical micellar concentration (CMC). Scale bar 40 μm **a,b**) Note that the initially non-spherical bubble quickly returns to sphericity by losing particles and the proceeds to shrink continuously while ejecting particles, a behavior reminiscent of the non-ionic surfactants. **c,d**) However, unlike exposure to non-ionic surfactants, the particles ejected from the bubble are not colloidally stable, i.e. they are aggregated to each other and often remain associated with the armour shell. The aggregation is simply due to the ions screening the charges on the particles. **e**) Despite the difference in appearance there is no appreciable variation in the bubble lifetime when compared to that obtained after exposure to Triton X-100 at a concentration above its CMC.