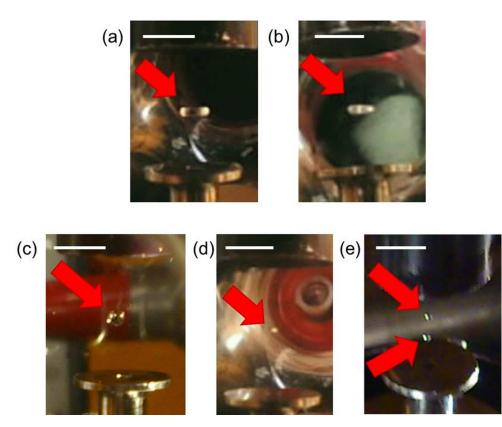
## Supporting Information - Control of Nanomaterial Self-Assembly in Ultrasonically Levitated Droplets

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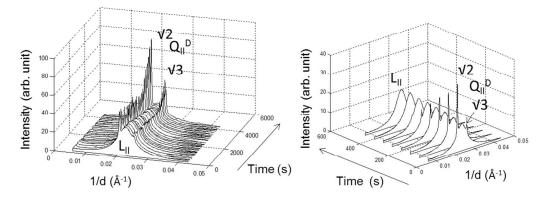
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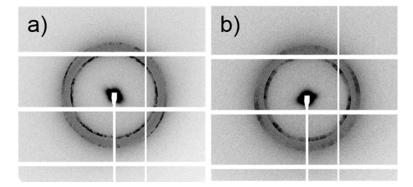
**Figure S1:** Representative images of levitated droplets: ellipsoidal (most common) (a),(b); spherical (c); small non-transparent (d); two droplets trapped in different nodes (e). Arrows indicate droplet locations and white scale bars correspond to 5 mm.

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**Figure S2:** Phase changes between  $L_{II}$  and  $Q_{II}^{D}$  phases of phyantriol / 10% glycerol on increasing (left) and decreasing (right) relative humidity.



**Figure S3:** 2D SAXS patterns from the edges of an acoustically levitated droplet formed from Phytantriol in 20% glycerol at a relative humidity of 75%; a) left; b) right.