

Electronic Supplementary Information

Liquid Crystal Janus Emulsion Droplets: Preparation, Tumbling, and Swimming

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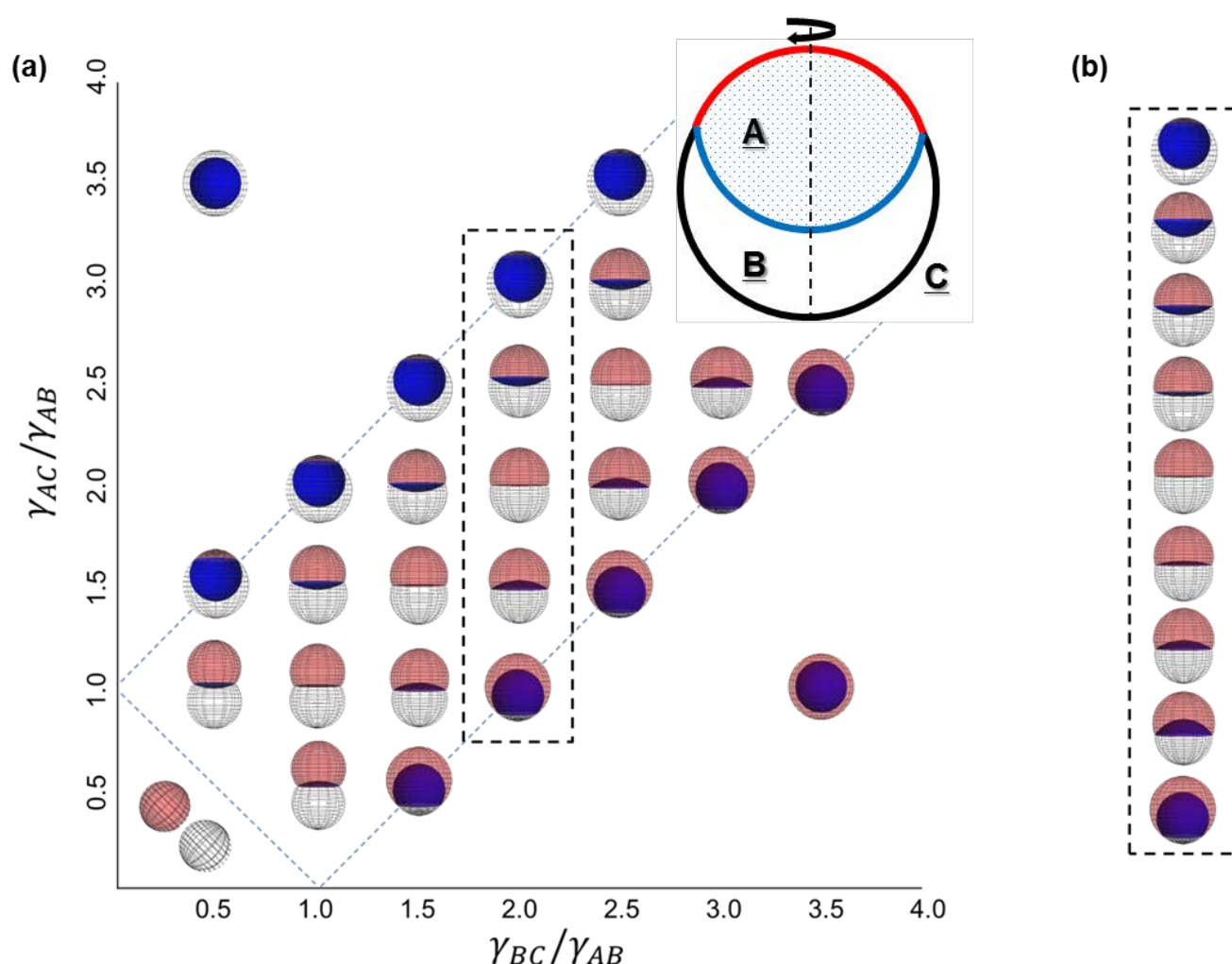


Figure S1. Morphology diagram of the Janus droplets a) Morphologies of the Janus droplet with respect to interfacial tension ratios when the volume ratio between two compartments is 1. The inset (Top Right) depicts each phase, e.g., A (polymer), B (LC), C (water), and γ is defined by the interfacial tension between two phase; in rendered images, transparent, red, and blue interface correspond to LC-water, polymer-water, LC-polymer interfaces, respectively. Blue dashed lines represent the boundaries among an acorn-like (or snowman-like) droplet, a core-shell (Top Left and Bottom Right) droplet, and two separate droplet (Bottom Left). b) Morphologies of the droplet when γ_{BC}/γ_{AB} is fixed to 2.0 and γ_{AC}/γ_{AB} is varied between 1.0 and 3.0.

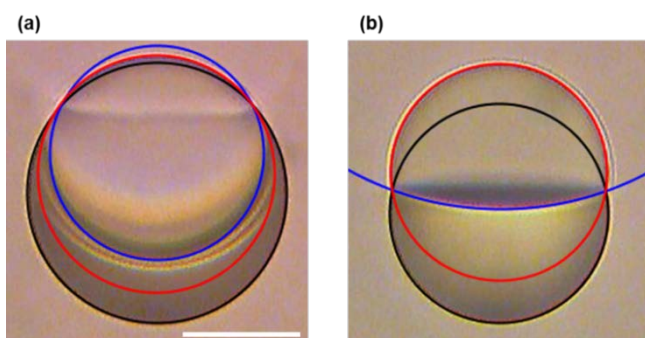


Figure S2. Representative circle fits used to extract the interfacial tension ratios and volume ratios. Each droplet in (a) and (b) corresponds to the droplet in Figures 2(b) and 2(c), respectively. Red, blue, black circles fit polymer-water, polymer-LC, LC-water interfaces, respectively. Scale bars: 20 μm .

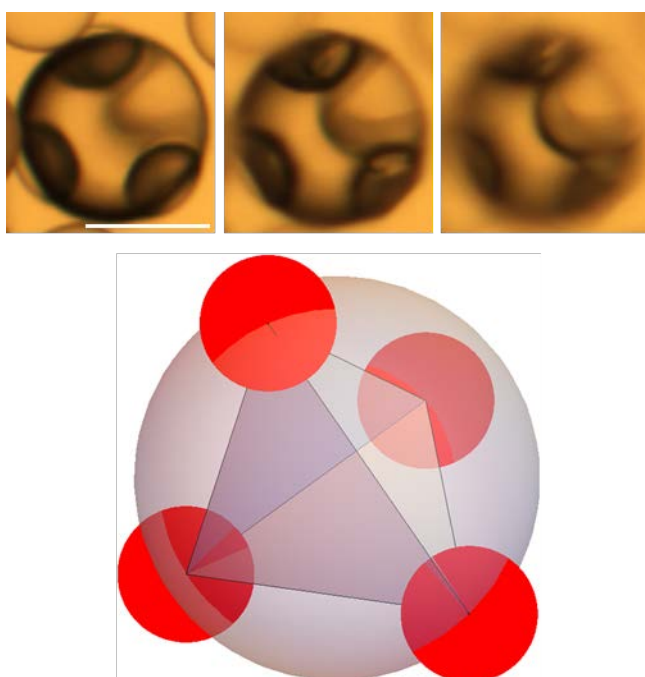


Figure S3. A series of bright-field images at different focal planes showing a LC droplet with four patches (Top) and a corresponding schematic diagram showing three-dimensional coordination of red patches at vertices of a tetrahedron (Bottom).

Movie S1. Both spherical LC droplets and snowman-like LC Janus droplets (with two compartments) show self-propelled motions in $\sim 10\%$ (wt/vol) tetradecyltrimethylammonium bromide (C14TAB) solution. The playback speed is 2 times faster than the real speed.

Movie S2. The shrinkage and disappearance of LC compartment in $\sim 10\%$ (wt/vol) tetradecyltrimethylammonium bromide (C14TAB) solution. The LC compartment becomes too small to propel the attached polymer compartment. The playback speed is 2 times faster than the real speed.