Supporting Information

Particle Separation inside a Sessile Droplet with Variable Contact Angle using Surface Acoustic Waves

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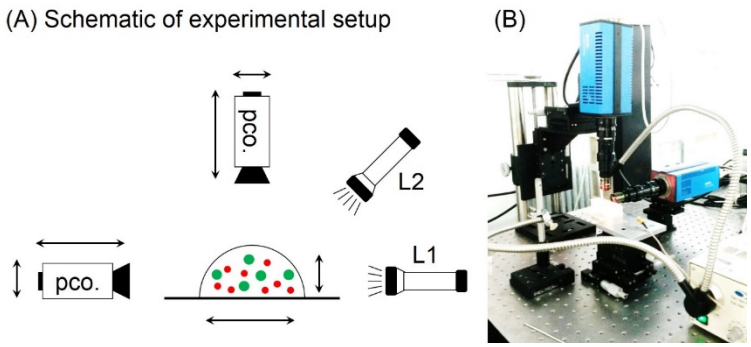

Figure S1. (A) Schematic of the experimental setup (B) used to obtain Figure 6 and Figure S12.

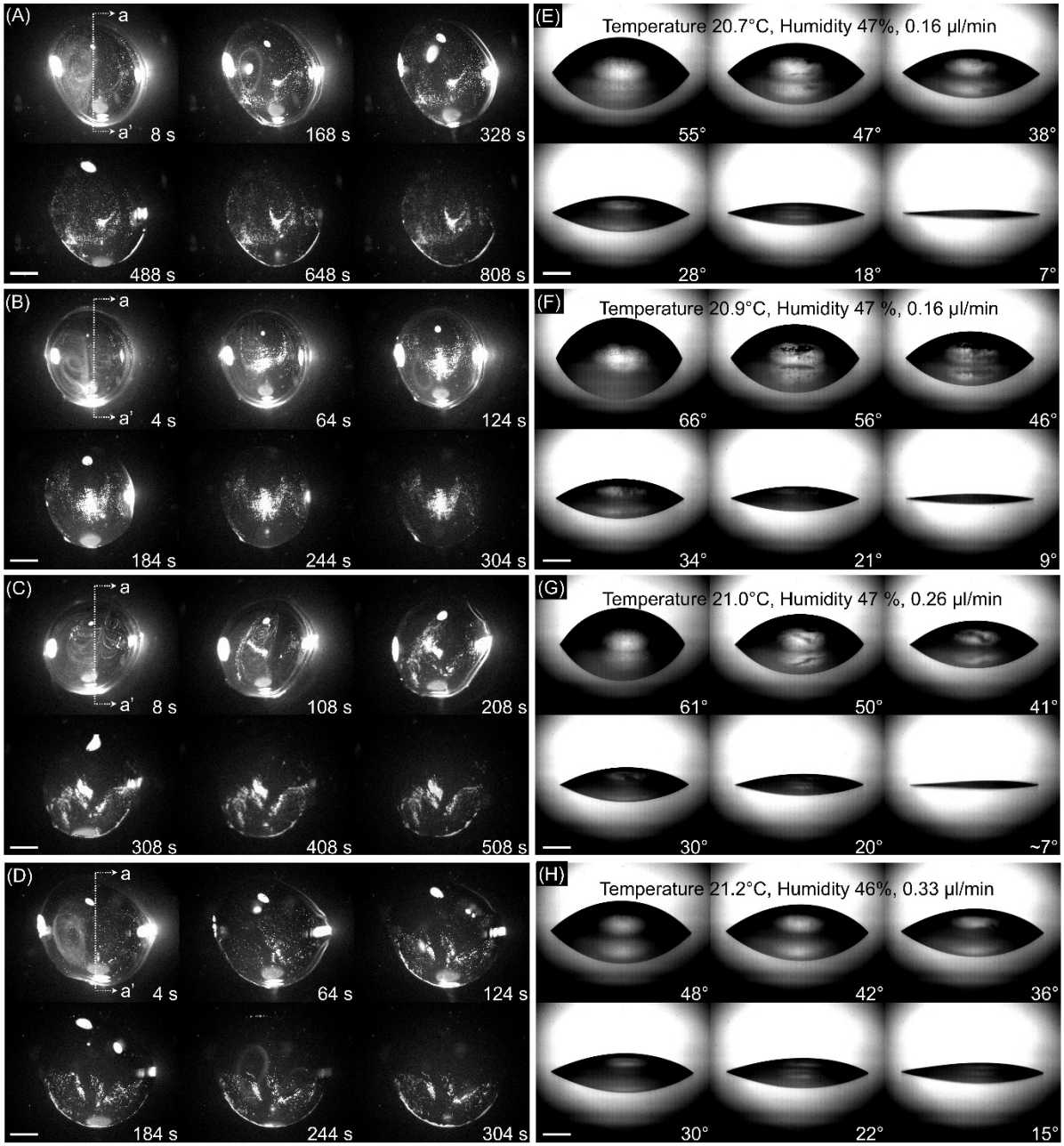

Figure S2. The top (A-D) and side (E-H) views are shown of the 2.5 µl sessile droplets as the manipulation of 6 µm suspended particles was carried out by 130 MHz SAWs with input powers of 479, 479, 851, and 1330 mW, respectively. The scale bars are 500 µm long.

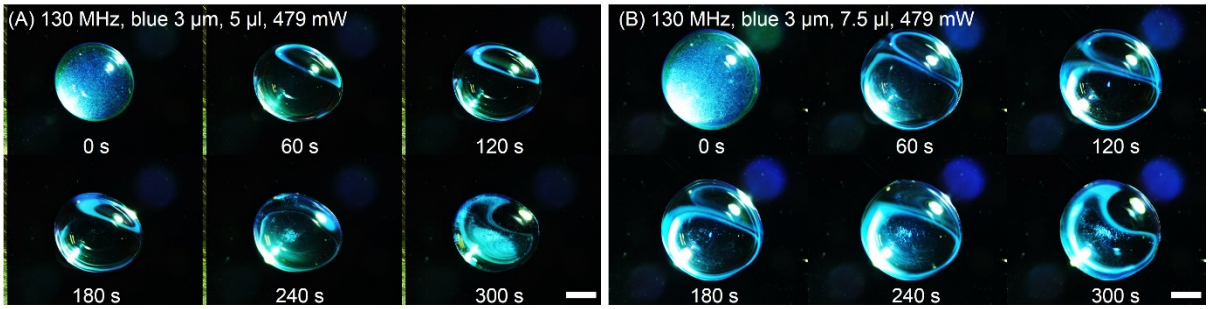

Figure S3. Concentration of 3 μm blue particles is demonstrated as the sessile droplets of 5 μl (A) and 7.5 μl are exposed to 130 MHz SAWs with 479 mW input power for a time period of 300 s while the liquid evaporation rates are ~ 0.6 ul/min and ~ 0.7 ul/min, respectively. The scale bars are 1 mm long.

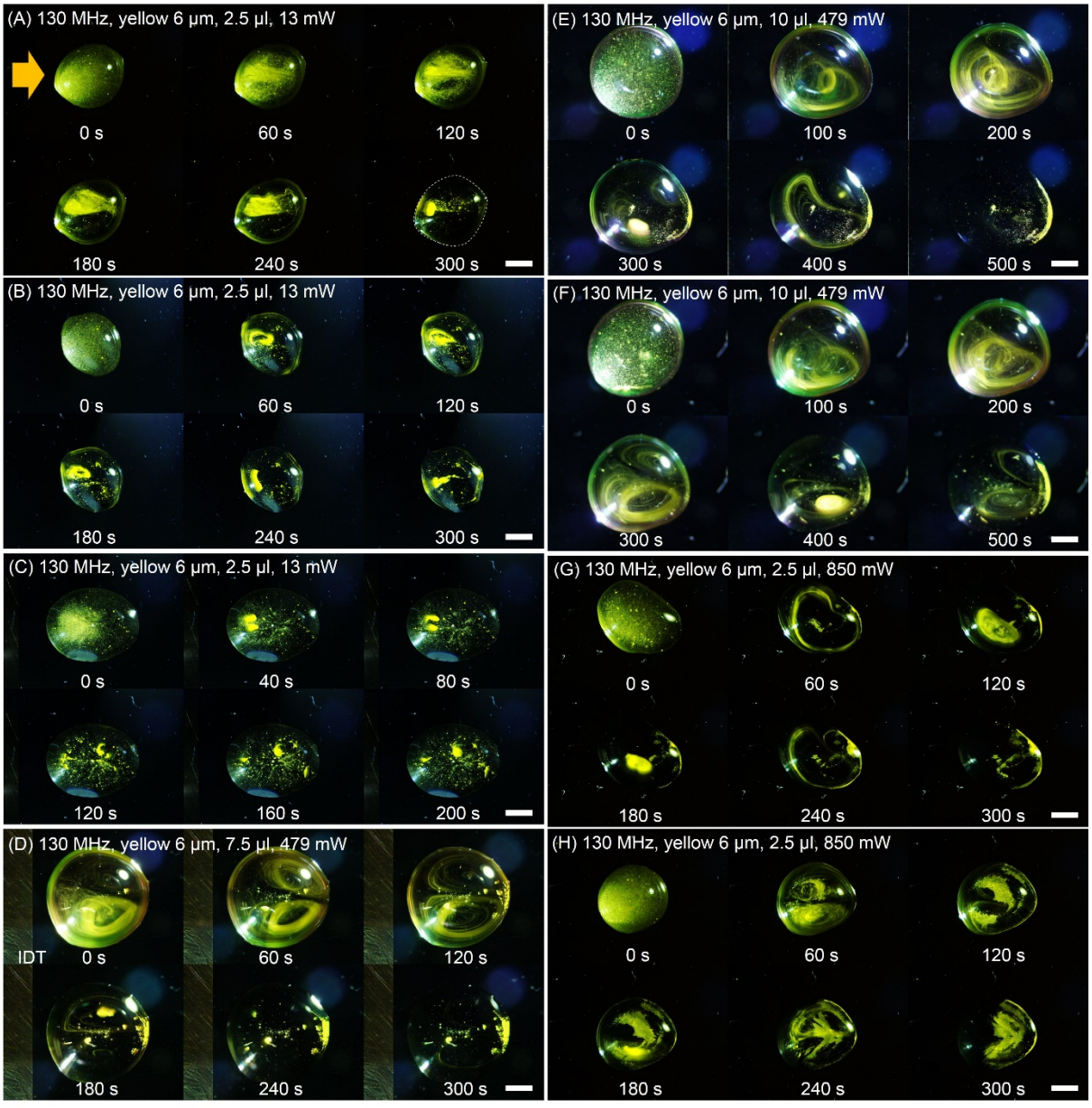

Figure S4. Concentration of 6 μm yellow particles is demonstrated as the sessile droplets are exposed to 130 MHz SAWs with 13 (A-C), 479 (D-F), and 850 (G, H) mW input power for an extended time period and different sample volume. The scale bars are 1 mm long.

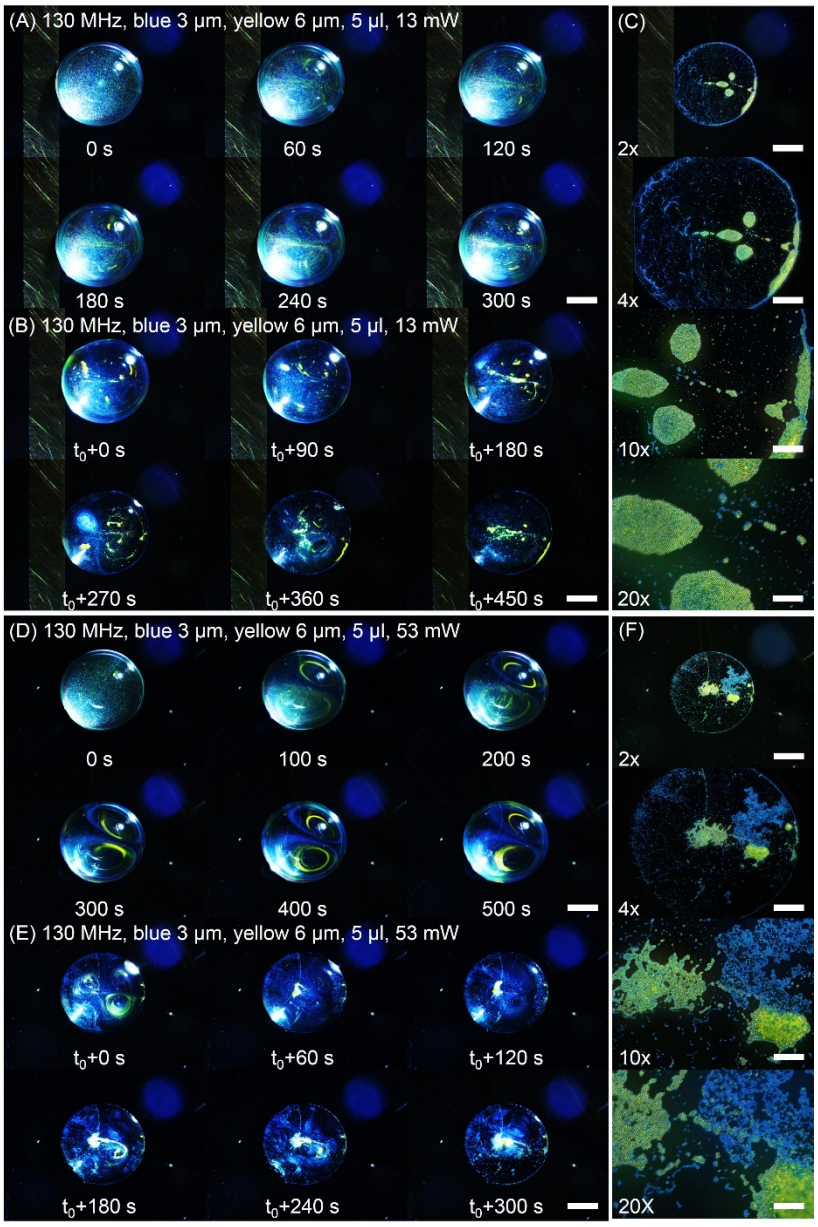

Figure S5. Separation of 3 µm blue and 6 µm yellow particles is demonstrated as the sessile droplets are exposed to 130 MHz SAWs with 13 (A, B) and 53 (D, E) mW input power for an extended time period and 5 µl of sample volume. (C) and (F) show the concentrated particles at different magnifications after the water has completely evaporated, corresponding to (A, B) and (D, E), respectively. The scale bars are 1000, 500, 200, and 100 µm long for a magnification of 2x, 4x, 10x, and 20x, respectively.

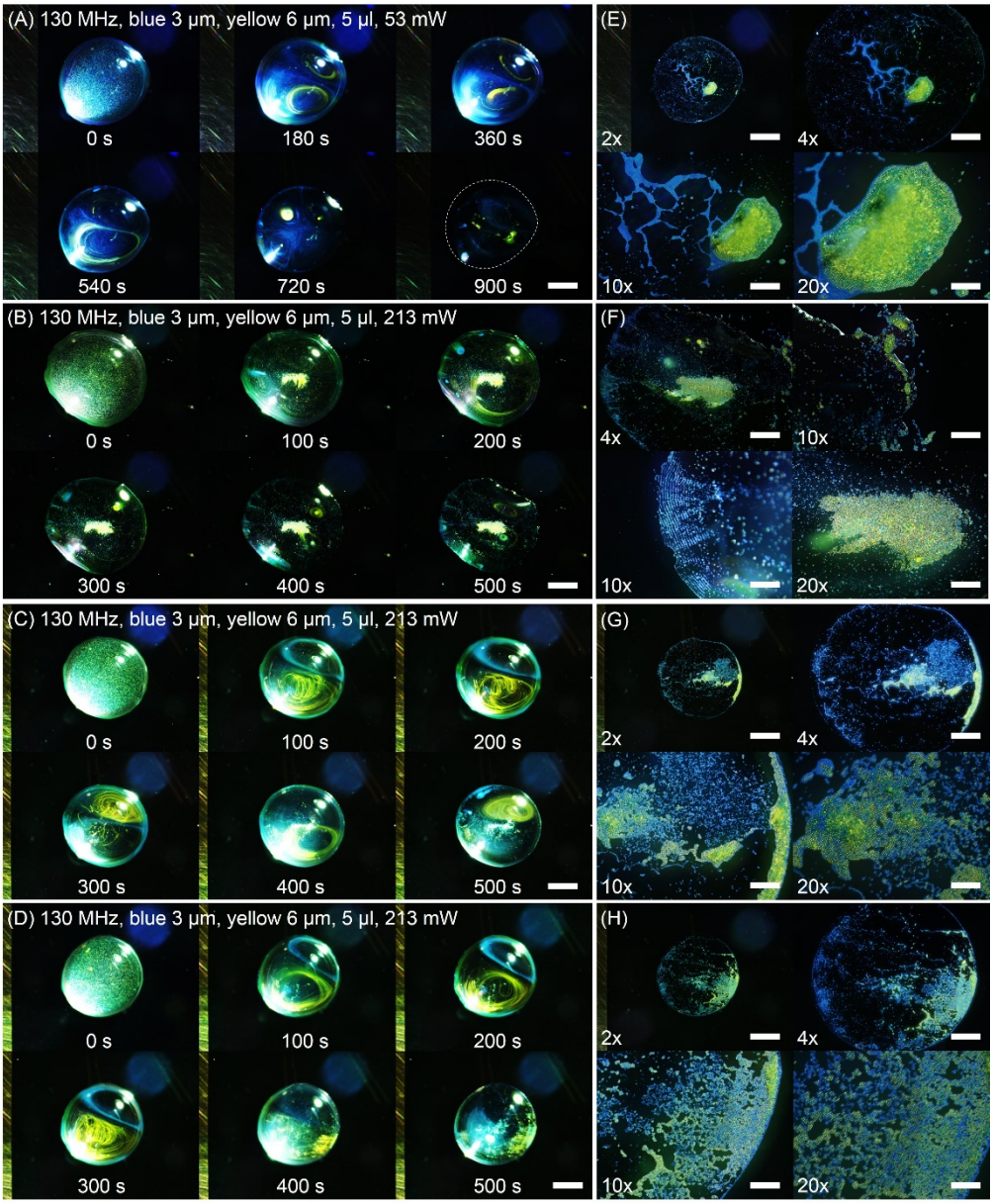

Figure S6. Separation of 3 µm blue and 6 µm yellow particles is demonstrated as the sessile droplets are exposed to 130 MHz SAWs with 53 (A) and 213 (B-D) mW input power for an extended time period and 5 µl of sample volume. (E-H) show the concentrated particles at different magnifications after the water has completely evaporated, corresponding to (A-D), respectively. The scale bars are 1000, 500, 200, and 100 µm long for a magnification of 2x, 4x, 10x, and 20x, respectively.

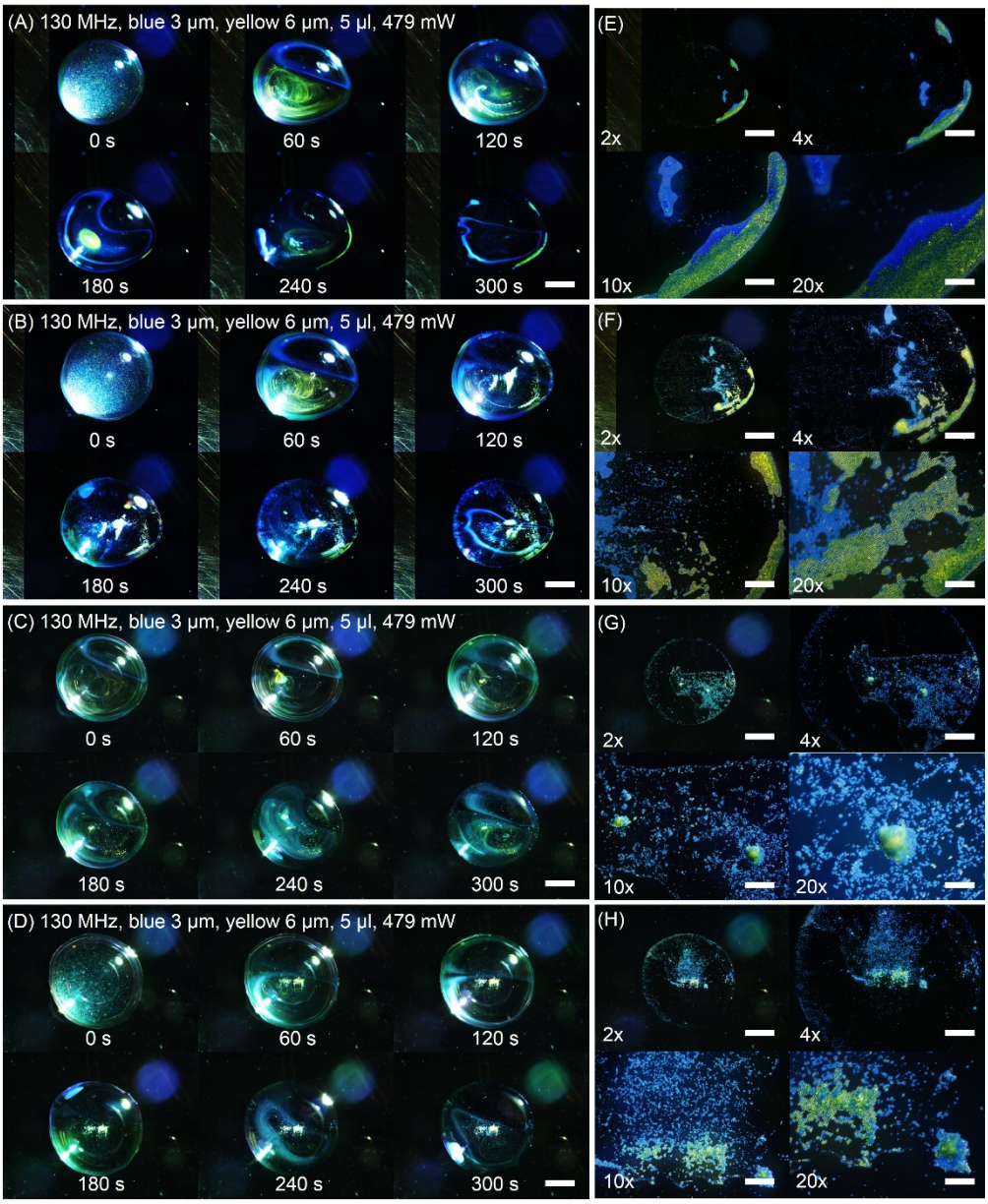

Figure S7. Separation of 3 µm blue and 6 µm yellow particles is demonstrated as the sessile droplets are exposed to 130 MHz SAWs with 479 (A-D) mW input power for a time period of 300 s and 5 µl of sample volume. (E-H) show the concentrated particles at different magnifications after the water has completely evaporated, corresponding to (A-D), respectively. The scale bars are 1000, 500, 200, and 100 µm long for a magnification of 2x, 4x, 10x, and 20x, respectively.

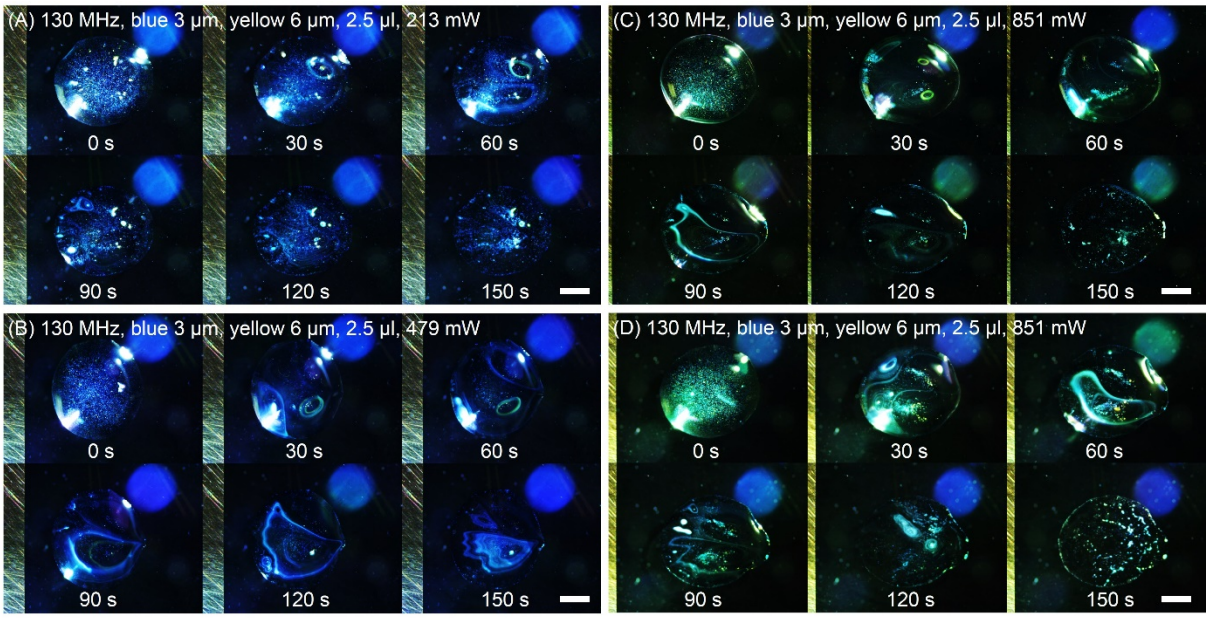

Figure S8. Separation of 3 µm blue and 6 µm yellow particles is demonstrated as the sessile droplets with added surfactant are exposed to 130 MHz SAWs with 213 (A), 479 (B) and 851 (C, D) mW input power for a time period of 150 s and 2.5 µl of sample volume. As the contact angle is low because of the surfactant, the particle concentration and separation reach very fast, while the water quickly evaporates due to bigger surface area. The scale bars are 1 mm long.

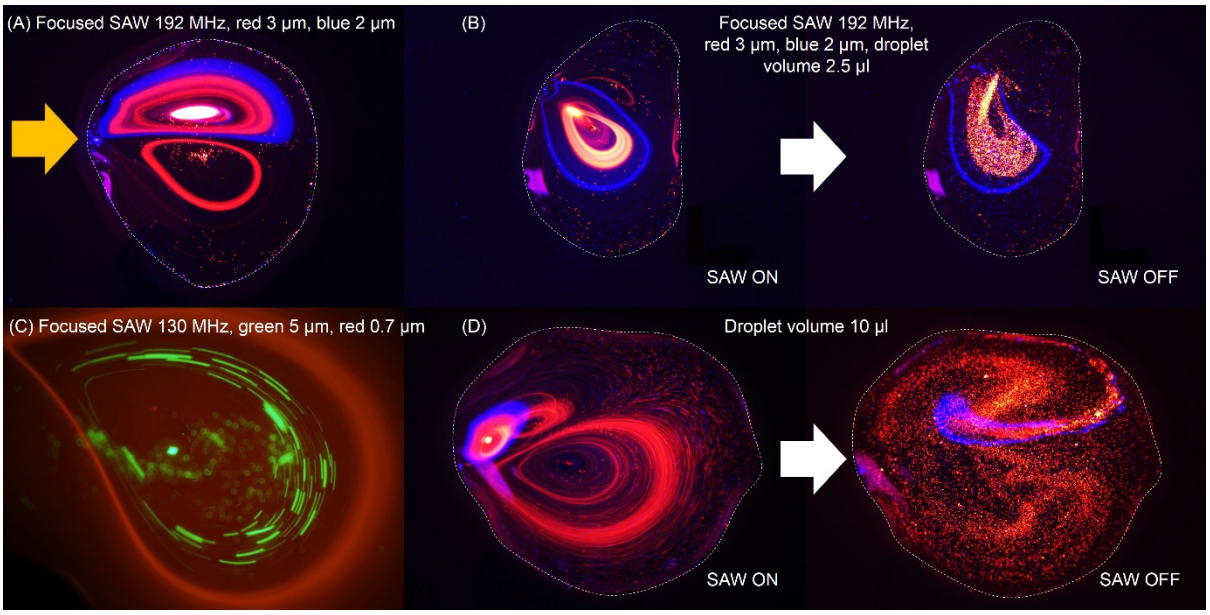

Figure S9. Separation of 3 µm red and 2 µm blue fluorescent particles is demonstrated as the sessile droplet with added surfactant is exposed to 192 MHz focused SAWs (A, B, D). The snapshots of the droplet are shown when the SAW is ON and OFF (B, D). Separation of 5 µm green and 0.7 µm red fluorescent particles is realized using 130 MHz focused SAWs.

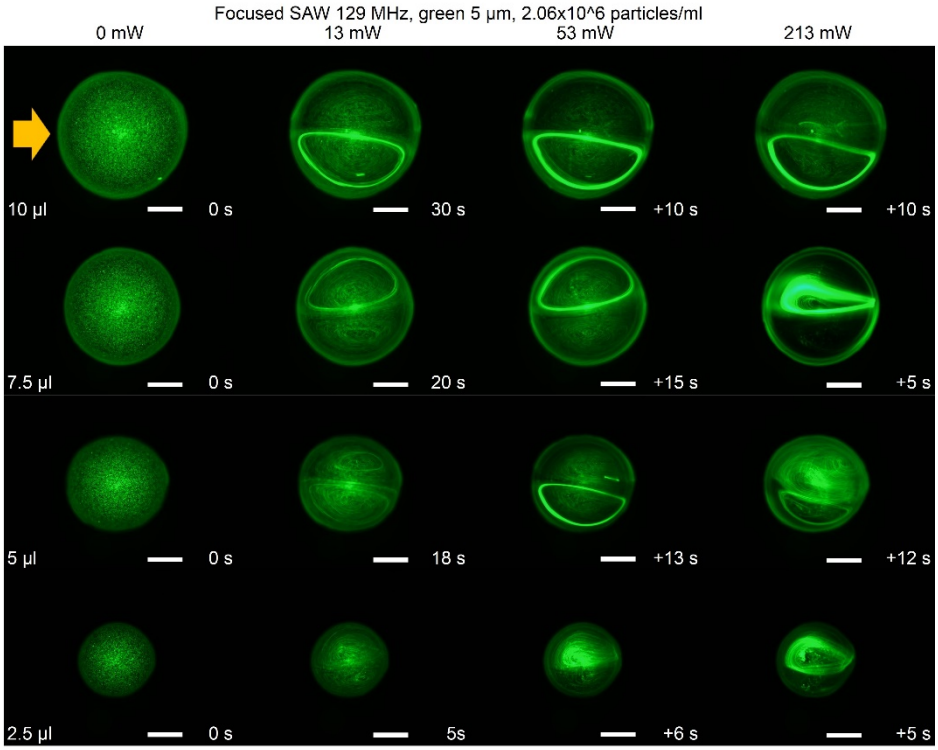

Figure S10. Manipulation of 5 µm green fluorescent particles (with particle concentration of 2.06x10^6 particles/ml) as the sessile droplet (10, 7.5, 5, and 2.5 µl) is exposed to 129 MHz focused SAWs with input power of 13, 53, and 213 mW. The power is increased in steps e.g. the 10 µl droplet is exposed to 13 mW for 30s, and the power is then increased to 53 mW and maintained for another 10 s before switching to 213 mW. The scale bars are 1 mm long.

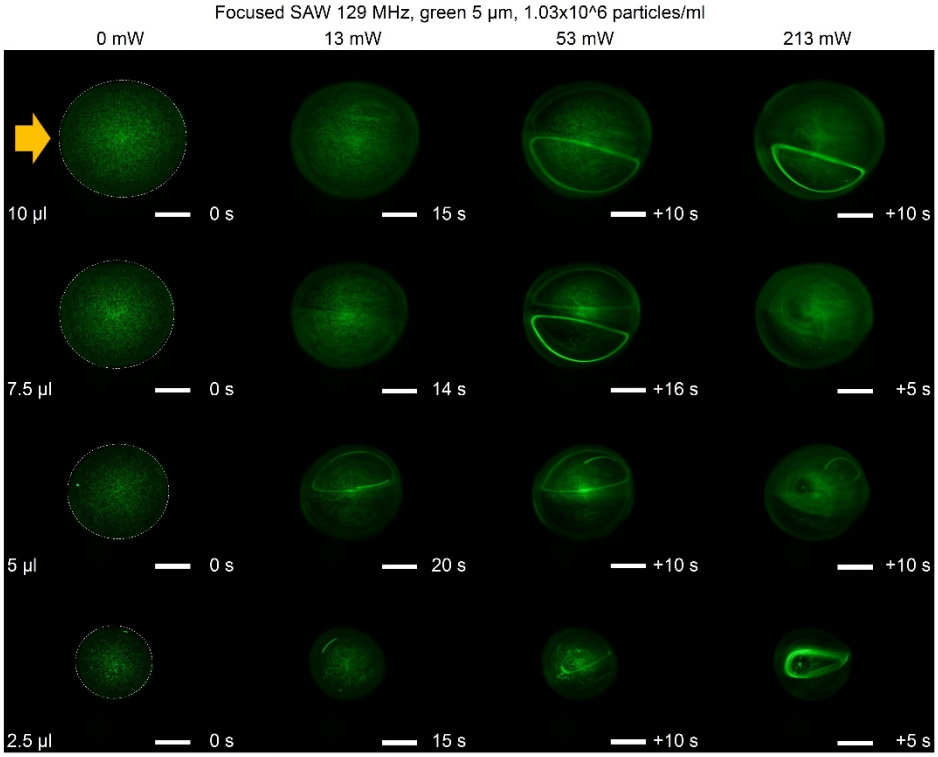

Figure S11. Manipulation of 5 µm green fluorescent particles with particle concentration of 1.06x10^6 particles/ml in a similar manner as shown in Fig. S8. The scale bars are 1 mm long.

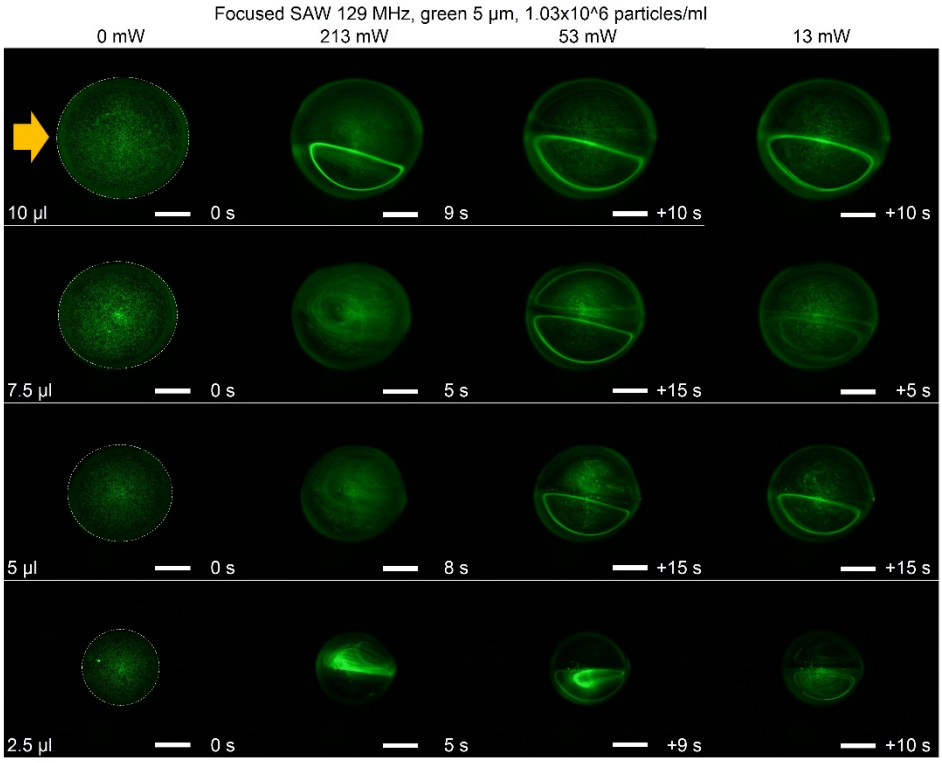

Figure S12. Manipulation of 5 µm green fluorescent particles with particle concentration of 1.06x10^6 particles/ml as the power is gradually decreased from 213 to 13 mW. The scale bars are 1 mm long.

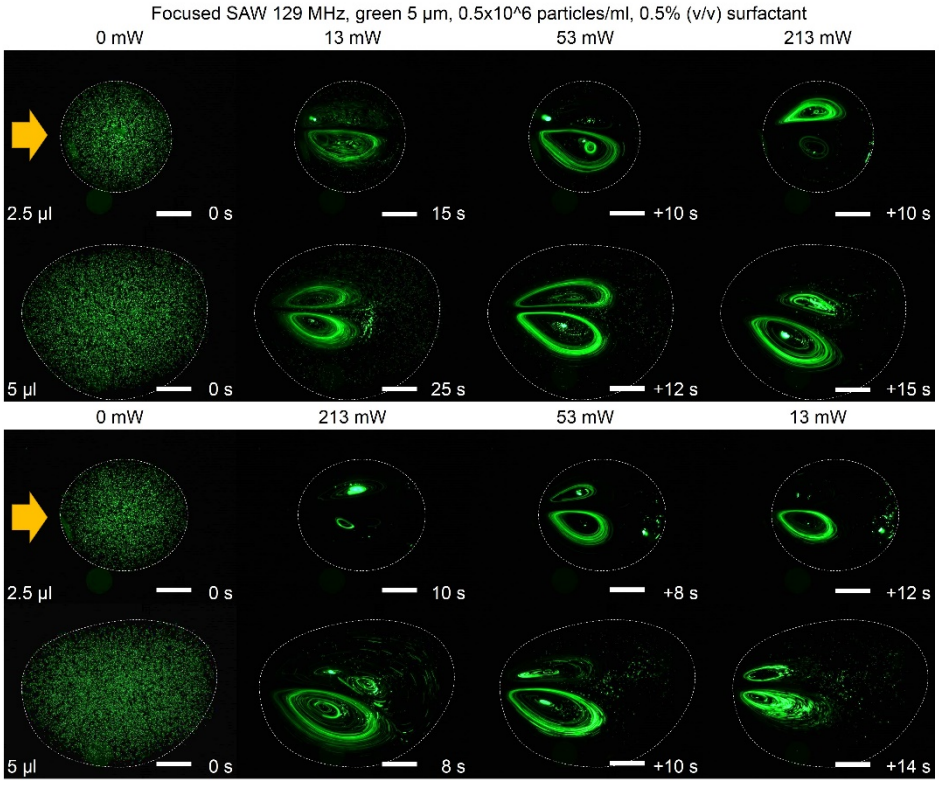

Figure S13. Manipulation of 5 µm green fluorescent particles with particle concentration of 0.5x10^6 particles/ml inside the sessile droplet with 0.5% v/v surfactant as the power is increased and decreased. The scale bars are 1 mm long.