Electronic Supplementary Material (ESI) for Lab on a Chip.

Supplementary Information to

Microfluidic Confined Acoustic Streaming Vortex for Liposome Synthesis

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1. Experimental setup photography

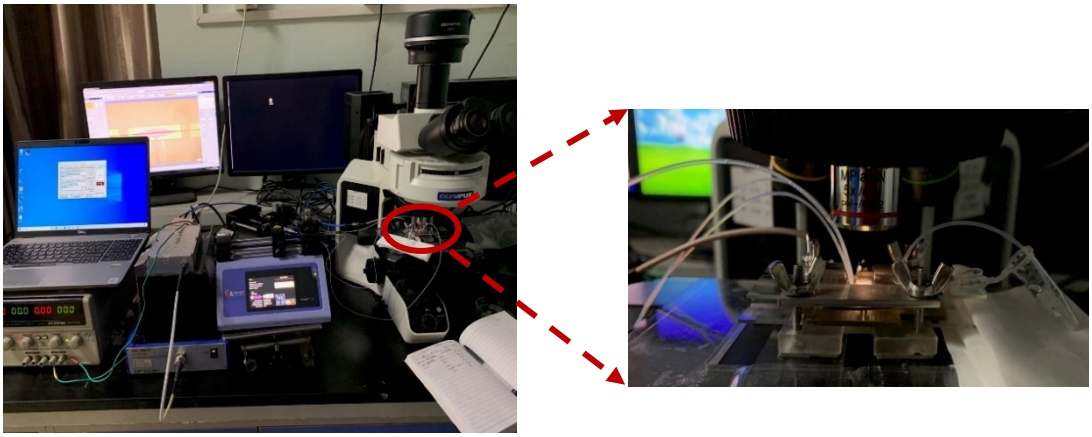

Figure S1. Photography of symmetrical fusiform-like-shaped solid mount resonator (SFLS-SMR) based liposome synthesis platform. The whole platform is mainly composed of signal source, power amplifier, resonator, syringe pumps and microscope observation systems.

2. Liposome synthesis based on pentagonal resonator

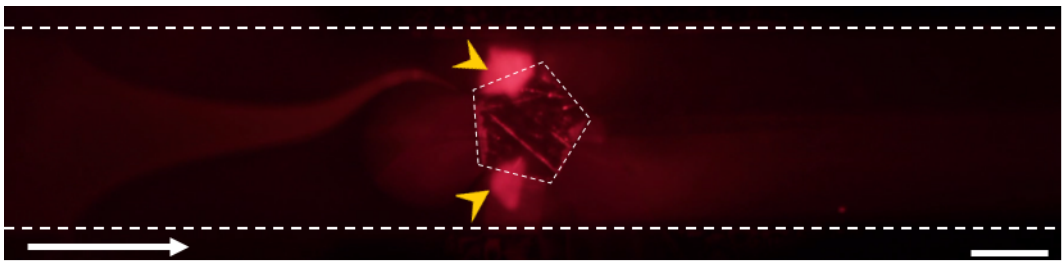

Figure S2. Experimental results with inflow perpendicular to one side of the pentagonal resonator. Fluorescent phospholipids were added into the lipid precursor solution for visualization. The red fluorescence is the aggregation of lipid mixture. The white arrowed line represents the direction of liquid flow. The white dashed line represents the boundary of the microchannel. The orange arrows mark lipid aggregates. Scale bar, 200 μm.

3. Acoustic streaming performance in microchannels of different heights

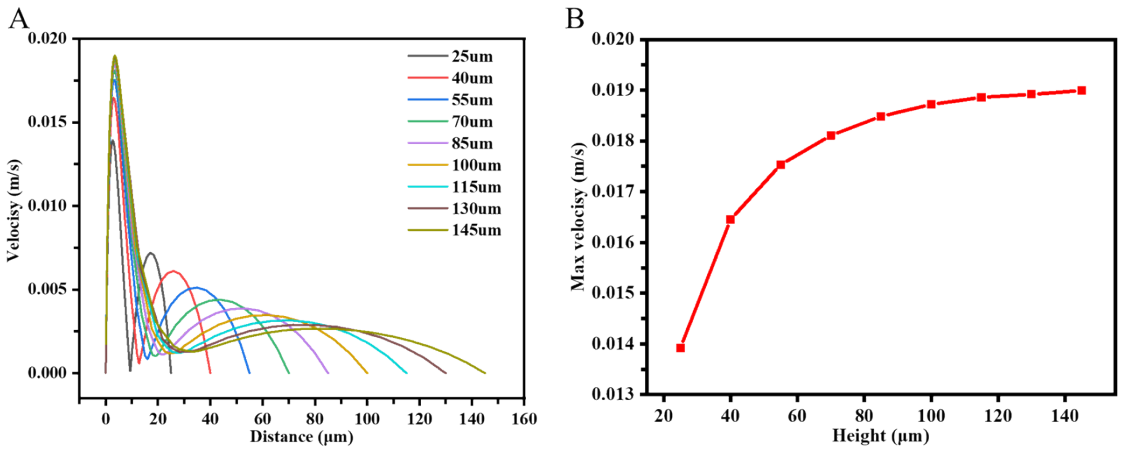

Figure S3. (A) Numerical calculation results of the acoustic streaming velocity distribution along the z-axis at the edge of the device at the cross-section of x=0. (B) The statistics of the maximum velocity in Figure A.

4. Length analysis results of ASHFF and mixing zones

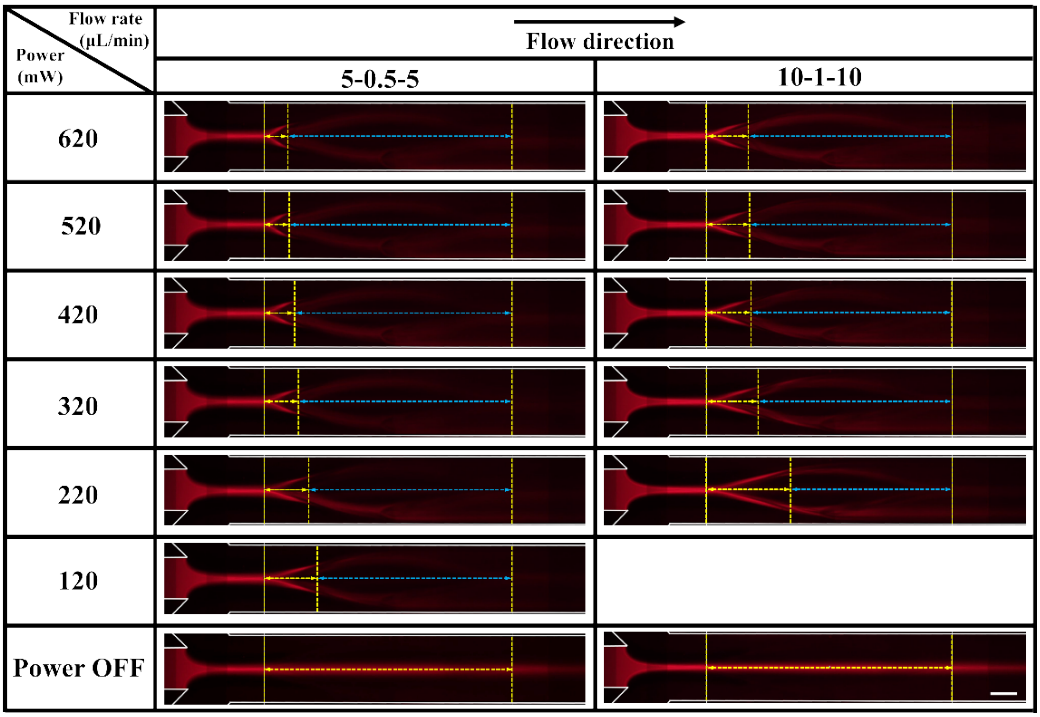

Figure S4. The length distribution of ASHHF zone and mixing zone when the total flow rate of 10.5 μL/min and 21 μL/min. The yellow dot lines with double arrows represent the pre-mixing zone, and the blue ones represent the mixing zone. Scale bar, 200 μm.

5. The fabrication process of SMR

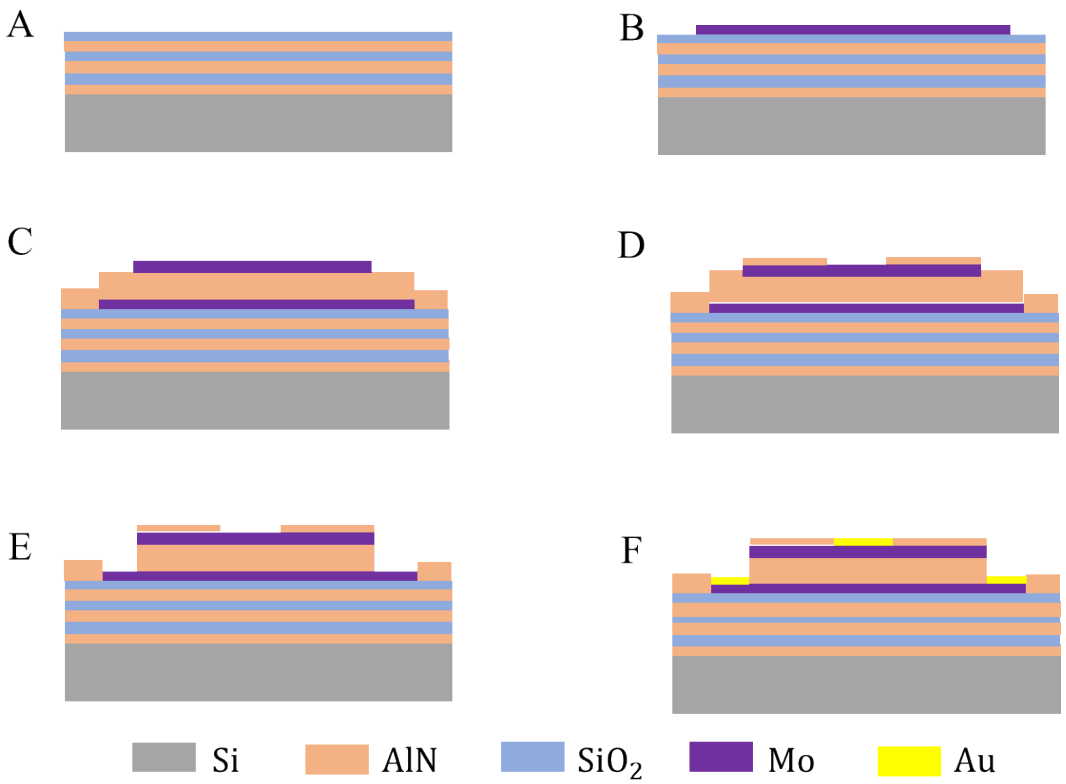

Figure S5. (A) AlN and SiO_2 are alternately deposited in three layers by magnetron sputtering and chemical vapor deposition, respectively. The first layer is 1200 nm and 700 nm, the second layer is 1000 nm and 1300 nm, and the third layer is 1000 nm and 650 nm. (B) Deposition of the bottom electrode Mo (170 nm) followed by patterning using the dry etching method. (C) Deposition of piezoelectric thin film AlN (1100 nm) and top electrode Mo (150 nm), followed by patterning of the top electrode. (D) Deposit AlN (200 nm) as passivation layer to protect the top electrode Mo from oxidation and corrosion. Etch the passivation layer at the end of the pad of the top electrode to expose the segment intended for power connection. (E) Etch the passivation layer and the piezoelectric film AlN to expose the bottom electrode. (F) Deposition Au (200 nm) at the exposed pads using physical vapor deposition (PVD). Subsequently, excess Au on other segments was removed using the lift-off process.