# Light-Triggered Core Coalescence of Double-Emulsion Droplets for High-Throughput Microreaction on a $LiNbO_3$ Platform

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**The Supporting Video 1** demonstrates the process in which a photovoltaic field triggers the coalescence of two core droplets, ultimately forming a single-core double emulsion droplet. The experiment is conducted on a high-throughput microfluidic platform with a $LiNbO_3$ substrate, using a laser illumination intensity of $5\times10^7$ W/m². The video, played at 2×speed, shows the high-throughput triggering process of the continuous coalescence of 19 pairs of core droplets.

**The Supporting Video 2** illustrates the light-triggered coalescence process of 470 dual-core double-emulsion droplets. Only one droplet (the 25th in the sequence) did not successfully coalesce, yielding an overall success rate of 99.8%.

**The Supporting Video 3** demonstrates the coalescence process of core droplets within multicore double-emulsion droplets, with the laser illumination intensity corresponding to that shown in Fig. 5.