

Abstract Submitted
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Process development for perfectly concentric droplets-within-droplets and uniform-walled shells GREG RANDALL, BRENT BLUE, General Atomics — Compound droplets, or droplets-within-droplets, are currently precursors for shell targets used in inertial fusion experiments. To implode properly, each shell requires a uniform wall thickness, which in turn requires a centered core droplet in the compound droplet precursor. Previously, Bei et al. (2009, 2010) have shown that stationary compound droplets could be centered in a static fluid using an electric field of 0.7 kV/cm at 20 MHz. We present our recent results in developing a continuous microfluidic process to mass fabricate these uniform-walled shells. This includes: using electric fields to center the core of moving compound droplets, inhibiting droplet stretching by using protein emulsifiers, and maintaining a centered core during polymerization. We apply a physical scaling analysis from a fluid mechanics perspective to aid process design.

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