Supplementary Information

Scalable microfluidic droplet on-demand generator for non-steady operation of droplet based assays

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Supplementary files:

1. AutoCAD drawing of the devices used in the paper.
2. MATLAB script for running a DoD experiment with MFCS Fluigent pump

Supplementary movies:

S1. Droplet on demand generation for variation of pulse strength reported in Fig. 2a.
S2. Droplet on demand generation for variation of pulse duration reported in Fig. 2c.
S3. Droplet on demand generation for partial wetting system reported in Fig. 4c.
S4. Scale out to 64 parallel DoD generators reported in Fig. 6.

Pressure profiles for the viscosity variation experiments reported in Fig. 4a:

Glycerol (w/w%)	**Viscosity @ 20^{0}C (mPa.s) [1]**	**Pressure profile**
0	1	p_d = 22 mbar; p_c= 30 mbar; $\Delta p_{d,form}$ = 15 mbar; $\Delta p_{c,form}$ = 3 mbar; Δt_{form} = 0.2 s; Δt_{pause} = 15 s; $\Delta p_{d,release}$ = 5 mbar; $\Delta p_{c,release}$ = 12 mbar; $\Delta t_{release}$ = 5 s; Δt_{cycle} = 8 s.
50	6	p_d = 47 mbar; p_c= 37 mbar; $\Delta p_{d,form}$ = 35 mbar; $\Delta p_{c,form}$ = 2.3 mbar; Δt_{form} = 0.3 s; Δt_{pause} = 15 s; $\Delta p_{d,release}$ = 5 mbar; $\Delta p_{c,release}$ = 12 mbar; $\Delta t_{release}$ = 5 s; Δt_{cycle} = 8 s.
80	60.1	p_d = 39 mbar; P_c= 38 mbar; $\Delta p_{d,form}$ = 110 mbar; $\Delta p_{c,form}$ = 3.7 mbar; Δt_{form} = 1 s; Δt_{pause} = 15 s; $\Delta p_{d,release}$ = 5 mbar; $\Delta p_{c,release}$ = 18 mbar; $\Delta t_{release}$ = 10 s; Δt_{cycle} = 8 s.
85	109	p_d = 54 mbar; P_c= 37 mbar; $\Delta p_{d,form}$ = 55 mbar; $\Delta p_{c,form}$ = 3 mbar; Δt_{form} = 5 s; Δt_{pause} = 15 s; $\Delta p_{d,release}$ = 5 mbar; $\Delta p_{c,release}$ = 18 mbar; $\Delta t_{release}$ = 10 s; Δt_{cycle} = 8 s.
90	219	p_d = 48 mbar; P_c= 37 mbar; $\Delta p_{d,form}$ = 60 mbar; $\Delta p_{c,form}$ = 1.8 mbar; Δt_{form} = 10 s; Δt_{pause} = 10 s; $\Delta p_{d,release}$ = 5 mbar; $\Delta p_{c,release}$ = 18 mbar; $\Delta t_{release}$ = 10 s; Δt_{cycle} = 8 s.

References:

[1] Segur, John Bartlett and Oberstar, Helen E, Viscosity of glycerol and its aqueous solutions, Industrial & Engineering Chemistry, 1951, 43, 9, 2117—2120.