

Supplementary Information

Synthesis of Colloidal Microgels using Oxygen-controlled Flow Lithography

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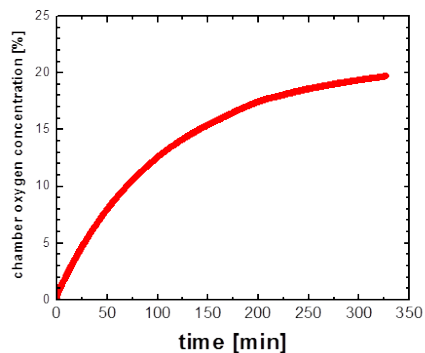


Fig. S1 – Oxygen concentration in the purge chamber slowly approaches atmospheric conditions over time. The measurements were made using the RedEye™ probes starting from an initially argon-filled chamber. The gas inlet apertures were plugged in order to highlight alternative routes in which air can seep in.

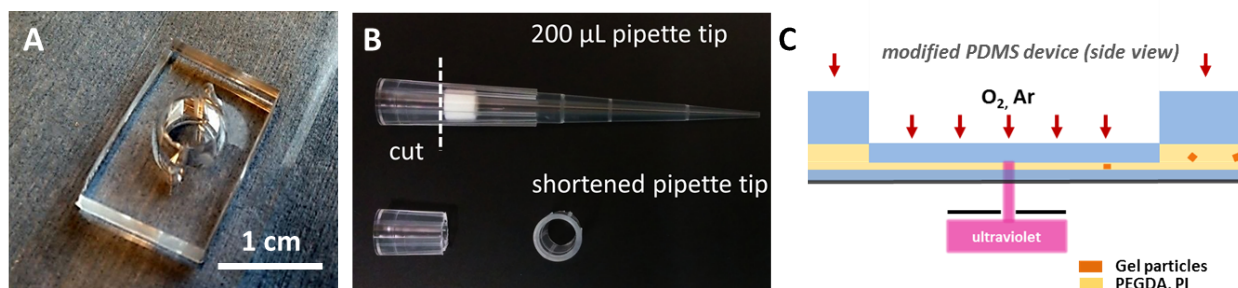


Fig. S2 – (A) Image of a tiered microfluidic device. Scale bar is 1 cm. (B) Shortened pipette tip (bottom, two orthogonal views) made from a 200 µL pipette tip (top) via the cut mark indicated by the dashed line. (C) Schematic of the tiered microfluidic device (not drawn to scale). Particle synthesis takes place in the center, where the PDMS slab is thinnest.

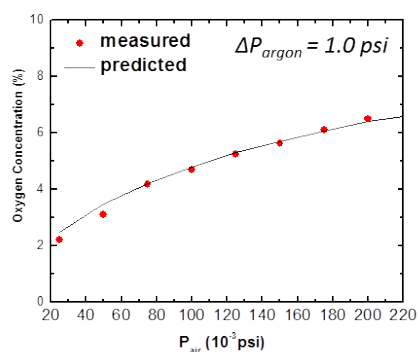


Fig. S3 – Oxygen concentration in the purge chamber measured using the RedEye™ probes for a range of air inlet pressures (red circles). The pressure of argon is maintained at 1 psi. Model predictions (eqn 2 in the main text) are in excellent agreement with experimental data.

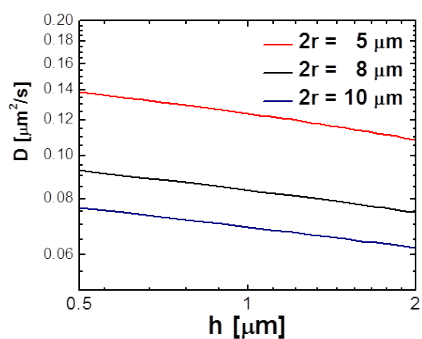


Fig. S4 – Bulk diffusivity as a function of particle height h and radius r , calculated using eqn (11) in the main text.

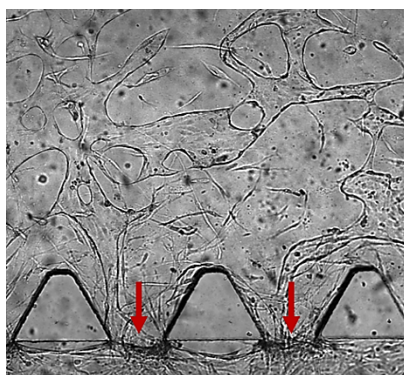


Fig. S5 – A representative bright-field image showing a portion of the central vascularized region of the flow device. Red arrows indicate openings where particles can enter the microvascular network (above) from the adjacent medium channel (below).

Video S1 – Video (1 fps, bright-field/fluorescent overlay) of colloidal discs flowing through the microvascular network in one region of interest under a pressure drop of ~ 5 mmH₂O across the gel region.

Table S1 – Density and viscosity values of air and argon.

Parameter	Value	Units
ρ_{air}	1.20	kg/m ³
ρ_{argon}	1.66	kg/m ³
η_{air}	18.52	10 ⁻⁶ Pa s
η_{argon}	22.61	10 ⁻⁶ Pa s