

Experimental

The microfluidic post-array device is fabricated using soft lithography.¹ Briefly, masks are designed using AutoCAD and printed with a resolution of 20 000 dpi. The master consists of two layers of photoresist: the first layer is 40 μm thick and consists of the array of posts as well as the inlet and outlet channels. The second layer, that is aligned with the first one, consists of the inlet and outlet channels only; it is 100 μm thick and reduces the pressure drop across these channels. Replicas are made from these masters using poly(dimethyl siloxane) (PDMS) with a weight ratio of the base to the crosslinker of 10 to 1. The PDMS replica is bonded to glass slides using an O_2 plasma.² To form water in oil emulsions, PDMS devices are treated with Aquapel to make them hydrophobic. To form oil in water emulsions, the PDMS devices are treated with poly(diallyldimethylammonium chloride) ($M_w=400\text{-}500$ kDa) polyelectrolytes to make them hydrophilic.

The aqueous phase of oil-in-water emulsions contains 10 wt% poly(vinyl alcohol) (PVA) as a surfactant. The oil phase of water in oil emulsion contains 1 wt% of a perfluorinated surfactant.³ Crude emulsions are formed by mechanically agitating a mixture of 60 vol% dispersed phase and 40 vol% continuous phase. The resulting crude emulsion is injected into the microfluidic post-array device through polyethylene tubings using volume controlled syringe pumps.

The interface tension of the different types of emulsions is measured using the pendant drop method. The viscosity of the different components of the emulsions is measured on an Anton Paar rheometer (Physica MCR). To acquire SEM images of PDMS based

micro-particles, these particles are dried in air and subsequently coated with a thin layer of Pt/Pd. SEM is performed on a Supra55 (Zeiss) operated at an acceleration voltage of 5 kV. Images are detected using a secondary electron detector.

1. Y. N. Xia and G. M. Whitesides, *Angewandte Chemie-International Edition*, 1998, **37**, 551-575.
2. D. C. Duffy, O. J. A. Schueller, S. T. Brittain and G. M. Whitesides, *Journal of Micromechanics and Microengineering*, 1999, **9**, 211-217.
3. C. Holtze, A. C. Rowat, J. J. Agresti, J. B. Hutchison, F. E. Angile, C. H. J. Schmitz, S. Koster, H. Duan, K. J. Humphry, R. A. Scanga, J. S. Johnson, D. Pisignano and D. A. Weitz, *Lab on a Chip*, 2008, **8**, 1632-1639.