Abstract Submitted
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Microfluidic emulsification at cross-junction: experimental and numerical study using Blue[1] EVANGELIA ROUMPEA, University College London, NINA M. KOVALCHUK, University of Birmingham, LYES KAHOUADJI, Imperial College London, ZHIHUA XIE, Cardiff University, MAXIME CHINAUD, University College London, MARK J.H SIMMONS, University of Birmingham, OMAR K. MATAR, Imperial College London, PANAGIOTA ANGELI, University College London — Liquid-liquid drop formation in a cross-junction device is investigated both experimentally and numerically. Experiments are performed using 5 cSt silicone oil as the continuous phase and 52% glycerol/ 48% water mixture containing surfactants as the dispersed phase. Both a high-speed camera and a two-colour micro-PIV technique were used to obtain the different flow regimes i.e. squeezing, dripping, jetting and threading and to study the velocity fields of the two phases simultaneously. The dependence of the drop size on flow rate follows a power law with different exponents for small and large drops. Numerical simulations using the code *Blue*, a massive parallel solver for simulations of fully three-dimensional multiphase flows, were also performed taking into account the properties of the liquids used in the experiments and the precise geometry of the microfluidic chips. The simulation results agreed very well with the surfactant-free solution. The numerical simulations taking into account the surfactant are ongoing.

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