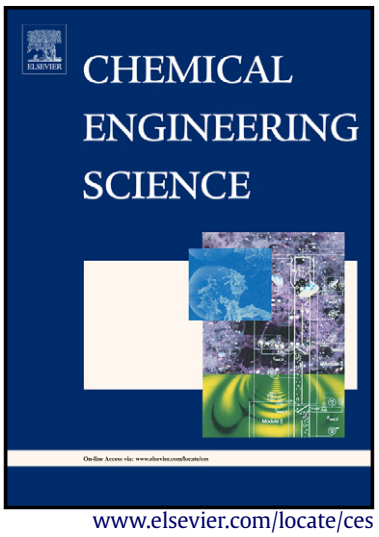


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# Double emulsion production in glass capillary microfluidic device: Parametric investigation of droplet generation behaviour

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## Abstract

A three-phase axisymmetric numerical model based on Volume of Fluid–Continuum Surface Force (VOF–CSF) model was developed to perform parametric analysis of compound droplet production in three-phase glass capillary devices that combine co-flow and countercurrent flow focusing. The model predicted successfully generation of core-shell and multi-cored double emulsion droplets in dripping and jetting (narrowing and widening) regime and was used to investigate the effects of phase flow rates, fluid properties, and geometry on the size, morphology, and production rate of droplets. As the outer fluid flow rate increased, the size of compound droplets was reduced until a dripping-to-jetting transition occurred. By increasing the