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Lateral Migration and Equilibrium of Compound Drops in Low Reynolds Number Poiseuille Flow SANGKYU KIM, SADEGH DABIRI, Purdue University — The migration and equilibrium of monodisperse compound drops in a channel with rectangular cross-section are numerically investigated at droplet Reynolds number Re = O(1) and Capillary number Ca = O(0.1) with varying size ratio between the compound drop diameter and the channel size, aspect ratio of the channel, radii ratio between the inner and outer drops, and initial placement. The compound drops' outer diameter is between half the width and half the height of the channel, and three equilibrium configurations without centerline symmetry are found; two with symmetry about the longer direction, and one about the shorter direction. In the former two cases, the point of maximum velocity within the channel lies inside the compound drop, and two counter-rotating circulations are created inside the outer drop. Which circulation the inner drop resides within depends on the radii ratio and the initial placement, and is correlated to the equilibrium configuration. In the latter case, the compound drop reaches a stable equilibrium away from the centerline with a single circulation inside the outer drop. The initial placement of the compound drop is mostly inconsequential, as this configuration is preferred given an initial lack of symmetry about the longer wall direction.

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