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Inverse Floatation[1] SAURABH NATH, Virginia Tech, ANISH MUKHERJEE, Georgia Tech, SOUVICK CHATTERJEE, Virginia Tech, RANJAN GANGULY, SWARNENDU SEN, ACHINTYA MUKHOPADHYAY, Jadavpur University, JONATHAN BOREYKO, Virginia Tech — We have observed that capillarity forces may cause floatation in a few non-intuitive configurations. These may be divided into 2 categories: i) floatation of heavier liquid droplets on lighter immiscible ones and ii) fully submerged floatation of lighter liquid droplets in a heavier immiscible medium. We call these counter-intuitive because of the inverse floatation configuration. For case (i) we have identified and studied in detail the several factors affecting the shape and maximum volume of the floating drop. We used water and vegetable oil combinations as test fluids and established the relation between Bond Number and maximum volume contained in a floating drop (in the order of μL). For case (ii), we injected vegetable oil drop-wise into a pool of water. The fully submerged configuration of the drop is not stable and a slight perturbation to the system causes the droplet to burst and float in partially submerged condition. Temporal variation of a characteristic length of the droplet is analyzed using MATLAB image processing. The constraint of small Bond Number establishes the assumption of lubrication regime in the thin gap. A brief theoretical formulation also shows the temporal variation of the gap thickness.

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