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Size distribution and three-phase interactions in thermocapillarity-driven flows BHUSHAN PENDSE, ASGHAR ESMAEELI, Southern Illinois University at Carbondale — The use of thermo-capillarity forces to manipulate drops and bubbles finds relevance in a good number of micro-fluidics applications. For instance, it has been suggested to use these forces to enhance fluid mixing in the drops, or to move them through a network of channels, or to levitate them. While drop sorting and trafficking is considered a major task in many lab-on-chips applications, however, so far the possibility of using thermo-capillarity forces for this purpose has been widely overlooked. The goal of this study is to explore such a possibility by examination of the motion of droplets of different sizes but of the same fluid, and also to consider interactions of droplets of the same size but of different fluids suspended in a host liquid in a uniform temperature gradient. To this end, we use a front tracking finite/difference scheme and solve the Navier-Stokes and energy equations in all the phase involved. It is expected that the imposition of different forces on the surfaces of the drops (due to the differences in their material properties or sizes) lead to segregation of droplets of different types.

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