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Thermocapillary migration of encapsulated bubbles and drops KAUSHIK VONGOLE, ASGHAR ESMAEELI, Southern Illinois University at Carbondale — Motion of bubbles/drops as a result of variation of the surface tension with the temperature is called thermocapillary migration and can be of importance in situations where the usually dominant buoyant forces are weak. While the phenomenon has been relatively well studied for simple systems involving a drop or a bubble, there is scant information about the behavior of drops/bubbles in more realistic (complex) systems; primarily due to the difficulties in experimental measurements. One such system is, for example, boiling at the superheat limit where heterogeneous nucleation can be avoided by suspending the fluids that will be boiled off in the form of a drop in another liquid. Here, the vapor nucleation inside the drop leads to formation of a compound drop. The goal of this study is to shed some light on the role of thermocapillarity forces on the dynamics of the above systems and the similar ones. We, however, ignore the evaporation and buoyant convection to make the problem more tractable. We use a front tracking/finite difference method and solve the governing momentum and energy equations for all the phases that are involved. The goal is to correlate the overall behavior of the system, in terms of the bubble and drop motion and deformation as well as induced flow and temperature fields, with the controlling parameters.

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