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Thermocapillary interactions of spherical drops covered with incompressible surfactant MICHAEL ROTHER, University of Minnesota-Duluth — An incompressible surfactant film occurs when very small changes in surfactant concentration correspond to finite changes in interfacial tension in a way analogous to the density-pressure relationship in incompressible fluids. In work on linear flows and Brownian motion, it has been shown[1] that in most cases incompressible surfactant holds for spherical drops. Surfactant coverage is thus nearly uniform, and the Marangoni number Ma and surface Péclet number Pe_s are combined into a single retardation parameter $A = Ma\ Pe_s$. Previously, we have presented results for arbitrary surfactant surface coverage in thermocapillary interactions of deformable drops. Herein, we use bispherical coordinates and multipole techniques to determine thermocapillary trajectories for two spherical drops covered with bulk-insoluble, non-ionic surfactant in the limit of small deviation in surfactant coverage, i.e., incompressible surfactant. The range of validity for incompressible surfactant theory is probed by comparison with our previous work. In addition, collision efficiencies are determined, and population dynamics are used to analyze the behavior of dilute dispersions of spherical drops in thermocapillary motion.

[1]Blawzdziewicz, J., Wajnryb, E., and Loewenberg, *J. Fluid Mech.* **395** 29-59 (1999).

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