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Surfactant Effects on Thermocapillary Interactions of Deformable Drops MICHAEL ROTHER, University of Minnesota-Duluth — A three-dimensional boundary-integral algorithm is used to study interactions of two deformable drops moving due to an applied vertical temperature gradient in the presence of bulk-insoluble surfactant. At each time-step, the temperature field, surfactant surface concentration and velocity field are calculated. In the simplest case, the interfacial tension depends linearly on both temperature and surfactant concentration. Non-linear models for the surface equation of state are considered, as well. Because the driving force for pure thermocapillary motion is located on the drop interfaces, it is possible for surfactant to completely arrest drop motion. The primary effect of deformation for thermocapillary motion, where there is only small deviation from sphericity, is to slow down film drainage and inhibit coalescence. A second problem considered is the effect of surfactants on droplet interactions under the combined driving forces of gravity and a vertical temperature gradient, where more interesting phenomena, such as breakup and deformation-enhanced coalescence, may occur.

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