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Bubble motion and size variation during thermal migration with phase change ASHA NURSE, GEOFFREY MCFADDEN, SAM CORIELL, NIST, MATHEMATICAL MODELING GROUP TEAM — An analysis of the motion of a spherical bubble in a two-phase, single component system with a vertical linear temperature gradient is presented. The model for the migration of an immiscible bubble considered by Young, Goldstein and Block is modified to allow for phase change at the bubble surface, including the possibility of both bubble translation and the change of bubble radius with time. Depending of the material parameters, the thermocapillary effects that normally lead to migration of an immiscible bubble can be overwhelmed by the effects of latent heat generation, resulting in a change in the mechanism driving the motion. For a water-steam system conditions are determined for a stationary bubble in which the the effects of buoyancy and thermal migration are balanced. The stability of the bubble is also considered.

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