

Abstract Submitted
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Simulation of evaporation of a sessile drop using a diffuse interface model KHELLIL SEFIANE, University of Edinburgh, HANG DING, KIRTI SAHU, OMAR MATAR, Imperial College London — We consider here the evaporation dynamics of a Newtonian liquid sessile drop using an improved diffuse interface model. The governing equations for the drop and surrounding vapour are both solved, and separated by the order parameter (i.e. volume fraction), based on the previous work of Ding et al. JCP 2007. The diffuse interface model has been shown to be successful in modelling the moving contact line problems (Jacqmin 2000; Ding and Spelt 2007, 2008). Here, a pinned contact line of the drop is assumed. The evaporative mass flux at the liquid-vapour interface is a function of local temperature constitutively and treated as a source term in the interface evolution equation, i.e. Cahn-Hilliard equation. The model is validated by comparing its predictions with data available in the literature. The evaporative dynamics are illustrated in terms of drop snapshots, and a quantitative comparison with the results using a free surface model are made.

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