

Abstract Submitted
for the DFD19 Meeting of
The American Physical Society

Liquid-liquid phase separation in sessile drops induced by evaporation.¹ HOSEIN SADAFI, Universit Libre de Bruxelles, RAMIN RAB-BANI, University of Lige, SAM DEHAECK, Universit Libre de Bruxelles, HATIM MACHRAFI, University of Lige, BENOIT HAUT, Universit Libre de Bruxelles, PIERRE DAUBY, University of Lige, PIERRE COLINET, Universit Libre de Bruxelles, TIPS LABORATORY TEAM, THERMODYNAMICS OF IRREVERSIBLE PHENOMENA TEAM — The interplay between two phase change mechanisms of evaporation and liquid-liquid phase separation (demixing) in binary sessile drops of partially miscible liquids is investigated. To determine the onset of the demixing phenomenon, a simple model is developed, which predicts a considerable temperature reduction in the mixture due to evaporative cooling. Temperature reduction alongside with the change of composition lead to demixing in the mixtures. Five stages of the process are identified and explained. For the cases studied here, once the demixing begins through nucleation, a growing fingering pattern is formed at the contact line. The length of the fingers is a function of the initial concentration of the low volatile component. Moreover, the final area of deposition increases with the initial concentration. Experimental tests were performed using a double telecentric setup.

¹The authors gratefully thank financial support from European Space Agency (ESA) and the Belgian Federal Science Policy Office (BELSPO) through PRODEX and IAP 7/38 MAST contracts and Fonds de la Recherche Scientifique F.N.R.S. (PDR - DITRASOL contract T.0123.16 and Research Director position of PC).

Hosein Sadafi
Universit Libre de Bruxelles

Date submitted: 01 Aug 2019

Electronic form version 1.4