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Forced drainage in a 2D foam in a microfluidic system using thermocapillary stress MARIE-CAROLINE JULLIEN, VINCENT MIRALLES, Gulliver, CNRS, ESPCI Paris-Tech, 10 rue Vauquelin, F-75005 Paris, France, BERTRAND SELVA, LOF, unité mixte Rhodia–CNRS–Bordeaux 1, 178 avenue du Docteur Schweitzer, F–33608 Pessac cedex, France., JULIEN MARCHALOT, Institut des Nanotechnologies de Lyon, INL, CNRS UMR5270, France, ISABELLE CANTAT, IPR, (UMR CNRS 6251), Université de Rennes 1, 35000 Rennes, France, MMN-ESPCI/CNRS TEAM, LOF COLLABORATION, INL COLLABORATION, IPR COLLABORATION — We present an experimental configuration allowing the possibility to control the liquid fraction in a 2D microfoam located in a Hele-Shaw cell. A Marangoni stress at the air-water interface is generated by applying a constant temperature gradient in situ, and leads to the drainage of the liquid phase. First, in order to avoid gravity drainage, the cell is placed horizontally and we are able to drain up to 70% of the liquid phase, for foams of initial liquid fraction $\phi_0 \sim 15\%$. Next, the cell is placed vertically and the Marangoni stress for temperature gradients above 3.1K.mm^{-1} is strong enough to counterbalance gravity drainage. Finally, a mass conservation approach based on scaling arguments and numerical simulations giving access to the velocity profile in a pseudo-Plateau border happen to be in very good agreement with the experimental results, showing that we can accurately control the liquid fraction in a 2D microfoam.

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