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Interplay between phase separation and surface deformations in thin films of binary mixtures SANTIAGO MADRUGA, Universidad Politecnica de Madrid, FATHI BRIBESH, UWE THIELE, Loughborough University — Films of polymer blends are used in technological applications such as coatings or structured functional layers. The evolution of those films is involved by the coupling of phase separation within the film and surface deformations. We developed a model for films of binary mixtures [1], such as polymer blends, with free evolving surfaces. The model is based on model-H describing the coupled transport of concentration and momentum fields supplemented by boundary conditions at the substrate and free surface. We use the model to analyze the stability of vertically stratified base states of free surface films and the influence of composition in the shape of the films. For purely diffusive transport, an increase in film thickness either exponentially decreases the lateral instability or entirely stabilizes the film. The inclusion of convective transport leads to further destabilization as compared to the purely diffusive case [2]. In addition, we discuss the role of composition for off-critical mixtures on surface deflections.

[1] U. Thiele, S. Madruga, and L. Frastia. Phys. of Fluids. 19, 122106, (2007).

[2] S. Madruga and U. Thiele. Phys. of Fluids. 21, 062104, (2009).

Santiago Madruga
Universidad Politecnica de Madrid

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