

Abstract Submitted
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Stability and structure formation in films of binary mixtures¹

SANTIAGO MADRUGA, Universidad Politecnica de Madrid, 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 decomposition within the film and the dewetting of the film. We present a model for films of binary mixtures, 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 analyze the linear stability of vertically stratified base states of free surface films with respect to lateral perturbations [1]. 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]. We study as well the dependence of the instability on parameters such as the Reynolds number, the surface tension number and the ratio of velocities of convective and diffusive transport. [1] U. Thiele, S. Madruga, and L. Frastia. *Phys. of Fluids*. 19, 122106, (2007). [2] S. Madruga and U. Thiele. To appear in *Phys. of Fluids*.

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