

Non-solenoidal Effects During the Drying of Thin films

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Abstract

In this study we consider a binary mixture of incompressible miscible liquids with different densities. The traditional assumption that the mixture is incompressible is incorrect when the densities of the mixing fluids are not the same. We examine the drying/leveling dynamics in the presence of a non-solenoidal velocity field of as one of the components evaporates. Both ideal and non-ideal mixtures are considered.

We show that by studying the leveling dynamics (spectrum of decay rates of the initial interface perturbation), the importance of non-solenoidal effects can be quantified.