

Coating of an oil in water emulsion on a glass plate: phase inversion and pattern formation

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Keywords: thin liquid film, coating, patterns, wetting, rheology

Rigid blade coating of glass plates by oil in water emulsions stabilized by surfactants is studied. Complete surface coverage is obtained only for speeds exceeding a threshold velocity dependent on the height between the blade end and the surface. Below this threshold, the emulsion can be inverted in the vicinity of the blade. The phase diagram for film formation is shown to depend on the rheology of the emulsion.

The inversion dynamics of the oil-in-water emulsion and the deposition patterns induced by the phase inversion below threshold are studied using a microscope mounted set up. We show that this dynamics is universal for different volume fractions and deposition velocities. This inversion as well as the destabilization of the emulsion film deposited at high speeds gives rise to different patterns on the glass surface. These patterns are discussed in terms of the emulsion characteristics as well as the deposition velocity.