

Abstract Submitted
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Numerical study of the convection induced by evaporation in cylindrical geometry CLAUDINE DELCARTE, BENOÎT TROUETTE, Univ. Paris-Sud 11, LIMSI-CNRS, ERIC CHÉNIER, Univ. Paris-Est, MSME-CNRS, BÉATRICE GUERRIER, FAST-CNRS — During very short times, at the beginning of the drying of a polymer/solvent solution contained in a cylindrical crucible, experimental results have shown that the origin of convective cells is essentially linked to buoyancy- and/or surface tension-driven instabilities. In order to understand the relative importance of the two mechanisms, a 3D numerical study is performed. Convection is considered as significant when the Peclet number value (Pe) is greater than 1. The evolution of Pe as a function of the initial perturbation is intended to explore the transient character of the problem. The impact of the viscosity and thickness of the fluid on the convective regime and instability thresholds will also be presented and a comparison with experimental data performed. Convective patterns during the quasi-steady regime (slow evolution of the cells) will be shown for various aspect ratios.

Laurette Tuckerman
PMMH-ESPCI-CNRS

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