

Séminaire

Vendredi 11 avril 2025 à 10h30
Amphithéâtre Henri Benoît

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Confined directional drying: free convection, humidity-insensitive evaporation, and the case of nanoparticles

Confined directional drying refers to a model experiment for the study of mass transport phenomena that occur during the drying of a complex fluid. In such experiments, a dilute complex fluid is confined within a capillary with cross-sectional dimensions $< 100 \mu\text{m}$. When the air/liquid meniscus remains trapped at the outlet of the capillary, solvent evaporation induces a flow that continuously accumulates the non-volatile solute at the tip of the cell.

In this presentation, I will focus on three different aspects of such experiments : (i) the role of free convection on the concentration process in the case of a dilute solution/dispersion, (ii) the impact of the solute concentration on the driving force of evaporation which can lead to humidity-insensitive evaporation in the case of polymer solutions, and (iii) the case of a dispersion of nanoparticles. For this last point, we have developed PDMS microfluidic chips for confined directional drying experiments, and we have exploited hydrophilic fillers naturally present in the PDMS matrix to measure the water potential and thus obtain a quantitative description of the process.

Les personnes souhaitant rencontrer JB Salmon sont priées de prendre contact avec Emilie Moulin ou Nicolas Giuseppone.