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**Experiments and theory on binary mixture evaporation in Hele-Shaw cells**[1] JUTHAMAS KAMRAK, SAM DEHAECK, ALEXEY REDNIKOV, Service TIPs - Fluid Physics, ULB, B-1050 Brussels, Belgium, HSUEH CHING, FRÉDÉRIC DOUMENC, BÉATRICE GUERRIER, Laboratoire FAST, UPMC, UPSUD, CNRS, Orsay F 91405, France, PIERRE COLINET, Service TIPs - Fluid Physics, ULB, B-1050 Brussels, Belgium — Evaporation of binary mixtures is studied using a Hele-Shaw cell. Refractive index variations during the evaporation are followed using a Mach-Zehnder interferometer. A Rayleigh-Taylor instability, due to the evaporation-induced density stratification, is observed during the process, both for simple and more complex mixtures. A theoretical model is developed for 1D concentration profiles before instability, in order to facilitate the interpretation of the experimental results. In the case of the aqueous solutions of ethanol, it takes into account evaporation of both the solute and the solvent. However, in the case of polymer solutions, only the solvent evaporates, and the properties of the solution (viscosity, diffusion coefficient, saturated vapor pressure, etc.) strongly depend on the time-dependent polymer concentration. The concentration profiles obtained from the theoretical model are compared to the experiments, for both systems.

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