Abstract Submitted
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Micro-evaporators: a powerful tool to control the growth of dense organized colloidal materials[1] CELINE BUREL, CNRS/Solvay/UPenn, JACQUES LENG, LOF, UMR 5258 Solvay-CNRS-Bordeaux 1, BERTRAND DONNIO, REMI DREYFUS, CNRS-Solvay-UPenn, JEAN-BAPTISTE SALMON, LOF, UMR 5258 Solvay-CNRS-Bordeaux 1 — Latex colloids have been concentrated inside a microfluidic channel, referred to as a microevaporator, in a controlled way up to the formation of millimeter-long colloidal materials. The solvent of this colloidal dispersion is transported by pervaporation through a thin PDMS membrane sealing the channel, inducing a flow from the reservoir containing the dispersion, up to the tip of the channel. Thus, as pervaporation occurs, colloids get concentrated at the tip of the channel up to the growth of a packed bed of colloids. The frontier between the dilute dispersion and the concentrated jammed or crystalline phase is clearly delimited by a concentration front. The position of the latter was recorded by using direct videomicroscopy. We investigated the dynamics of growth of such concentrated materials by measuring the position of the concentration front as a function of time. From these data we also estimated the volume fraction of the colloids within the concentrated material using mass conservation. We found that the estimated values are much smaller than the expected volume fractions for a dense colloidal assembly. We finally propose some explanations for such a discrepancy.

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