Supporting Information for *Dynamics of unidirectional drying of colloidal dispersions*

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A-Validity of $Jy_f \approx J_0 y_0$

In the regime of the drying interface, we consider the following picture displayed Fig. 1, where we take into account the

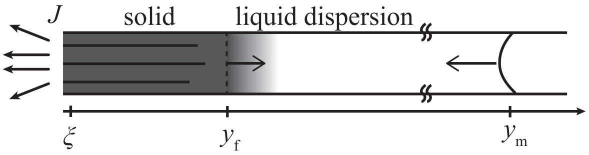

Fig. 1 Regime of the drying interface. ξ is the position of the air/water interface in the bulk of the solid region.

minute recession of the air/water interface inside the bulk of the solid region, at the position ξ. We define r_0 as the resistance to the mass transfer of vapor from the open end of the capillary in the air, and $r(\xi)$ the resistance of the mass transfer in the dry porous solid. Following the arguments given in the text, one has strictly:

$$r_0 J_0 = (r_0 + r(\xi))J\,, \tag{1}$$

$$J_0 y_0 = J(y_f - \xi) = k p_m/\eta\,. \tag{2}$$

It follows simply from these two equations the relation:

$$\dot{\xi}\left(1 + \frac{\mathrm{d}r}{\mathrm{d}\xi}\frac{y_0}{r_0}\right) = \dot{y}_f\,. \tag{3}$$

We now assume:

$$\frac{\mathrm{d}r}{\mathrm{d}\xi} \gg \frac{r_0}{y_0}\,. \tag{4}$$

This means that the resistance of the mass transfer in the dry porous media increases more rapidely with ξ, as compared to r_0/y_0. With this assumption, one has $\dot{\xi} \ll \dot{y}_f$, and therefore $\xi \ll y_f$, and finally:

$$J_0 y_0 \approx J y_f\,. \tag{5}$$

Note that we assume implicitely in the previous arguments that vapor concentration profiles in the gas phase quickly reach a steady state (quasi-stationary approximation).

B-Movies and figures

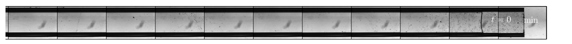

Fig. 2 M1.avi: Movie corresponding to the figure 3 showing the growth dynamics (extended images). Note the change in temporal resolution at $t = 120$ min.

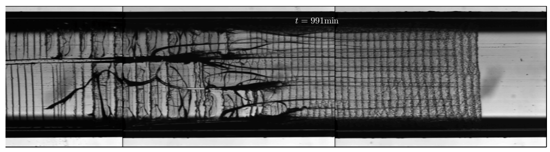

Fig. 3 M2.avi: Same as above, but zooming on the tip of the capillary. Note again the change in temporal resolution at $t = 120$ min.

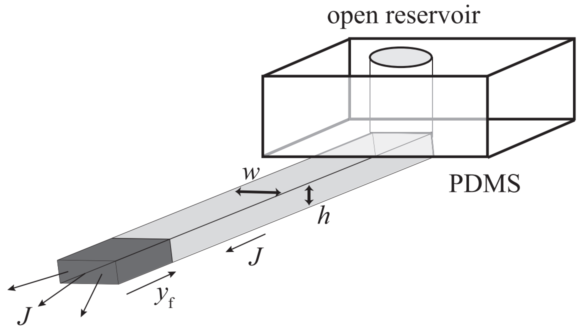

Fig. 4 Shematic view of the setup used for the infiltration experiments. The capillary is inserted in a PDMS slab, and its opening is connected to a reservoir, a simple hole punched in the PDMS matrix.

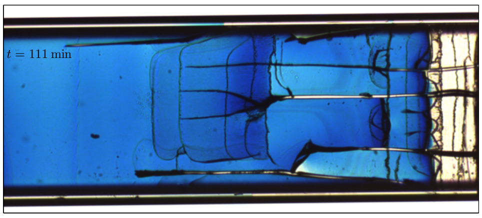

Fig. 5 M3.avi: Movie corresponding to Fig. 7 and showing the infiltration of the fracturated solid by the colored dye.

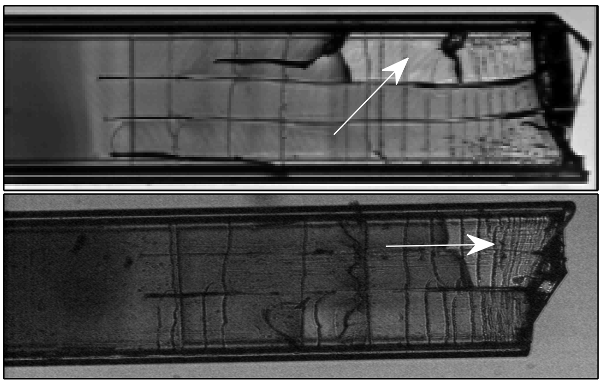

Fig. 6 Two images of different infiltration experiments. In all cases, the front of infiltration is not homogeneous, and some pieces are even not infiltrated (see the white arrows).