Supporting Information for

Investigation of the dynamics of growth of polymer materials obtained by combined pervaporation and micro-moulding

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I. NUMERICAL RESOLUTION

The velocity profile is directly related to the concentration field through:

$$v(x) = -\int_0^x \mathrm{d}u a(\phi(u)) \,, \tag{1}$$

we assumed above $h_e = 0$. The evolution of the concentration field $\phi(x,t)$ is thus given by the following equation:

$$\partial_t \phi = \partial_x (\phi \int_0^x \mathrm{d}u a(\phi(u)) + \frac{1}{\mathrm{Pe}} \partial_x \phi) = 0 \,.$$

This equation is discretized along the x axis with n points according to $x_i = i\mathrm{d}x$ with $\mathrm{d}x = 1/(n-1)$ (n ranges typically from 200 to 500). We then applied the classical no-flux boundary condition at $i = 0$ and we set the flux at the point $i = n-1$ to be $-\phi_0 v(1)$. These n coupled ordinary differential equations were solved using the *ode15s* Matlab solver with the initial condition $\phi(x, t = 0) = \phi_0$. The computing time ranges between a few seconds to a few minutes depending on the temporal and spatial resolutions.

II. FABRICATION PROTOCOLS

We used standard photolithography to make network of channels with a fixed height h on a silicon wafer (photoresist SU8). The template master with two levels, see figure 2 in the main text, is obtained using classical alignment processes. The SU8 template is then moulded in PDMS and cured at 60°C. A thin PDMS layer (thickness $e = 25$ μm) is then spin-coated on another silicon wafer and also cured at 60°C. The PDMS mould is then detached from the template and punched to create an opening for the reservoir using a polyethylene tubing.

This PDMS mould is then bonded on the PDMS membrane using either the gradient technique or plasma activation. The whole elastomeric device is then detached carefully from the silicon wafer. Glass slides are finally placed on top of the PDMS membrane to define the length L_0, see figure 1 in the main text.

III. CLOSER VIEW OF THE SOLIDIFICATION FRONT

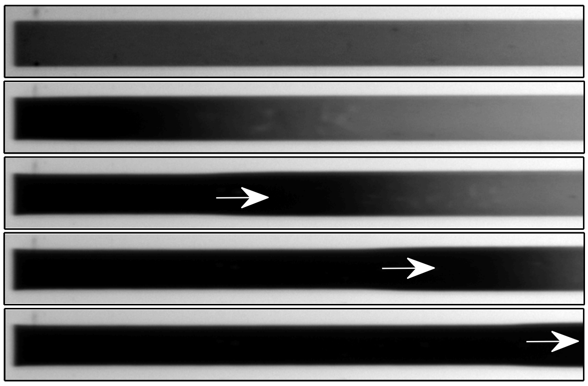

FIG. S1: From top to bottom: zooms on the solidification front at different time scales, channel width $w = 150\ \mu$m. The snapshots 3, 4 and 5 show the progression of the polymeric solid along the channel (see the white arrows). The channel width is significantly smaller within the dry solid.