Supporting Information Available

Physical Data on Calcium Chloride Solution

Table 1: Physical data on used aqueous calcium chloride solution, all parameters measured at 20 °C.

property	value
$CaCl_2$ concentration	3.36 mol/l
density	1.25 g/cm^3
dynamic viscosity	2.85 mPa*s
surface tension	75.97 mJ/m^3

Picture of the used Squeegee

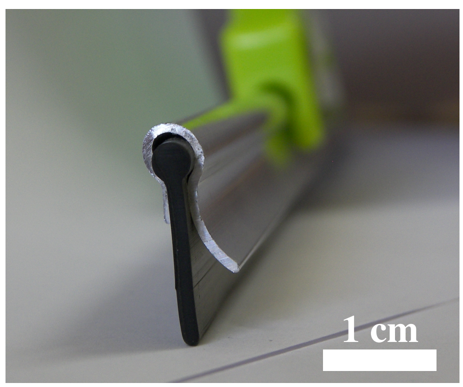

Figure 1: Profile of the squeegee (Rival, Gerhard Haas KG, Stockach, Germany) used to remove an excess of aqueous calcium chloride solution.

Used Mask Patterns

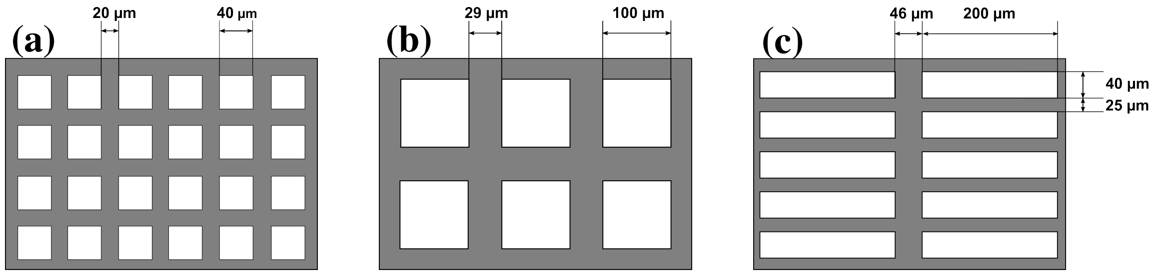

Figure 2: Draft of used mask patterns: (a) lithography mask with 40 µm square hols, (b) 200 mesh TEM-grid with 100 µm square holes, (c) 400 x 100 mesh TEM-grid with rectangular holes 40 µm x 200 µm.

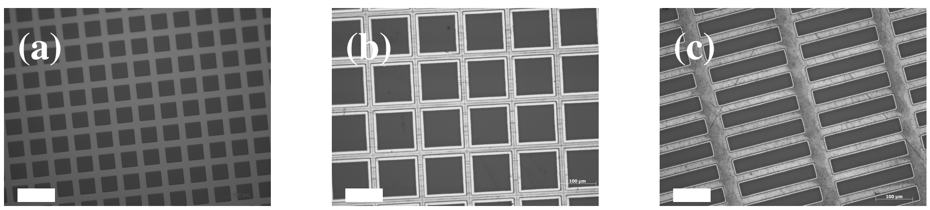

Figure 3: Optical microscopy images of used mask patterns: (a) lithography mask with 40 µm square holes, (b) 200 mesh TEM-grid with 100 µm square holes, (c) 400 x 100 mesh TEM-grid with rectangular 40 µm x 200 µm. Scale bars are 100 µm.

EDX Measurement

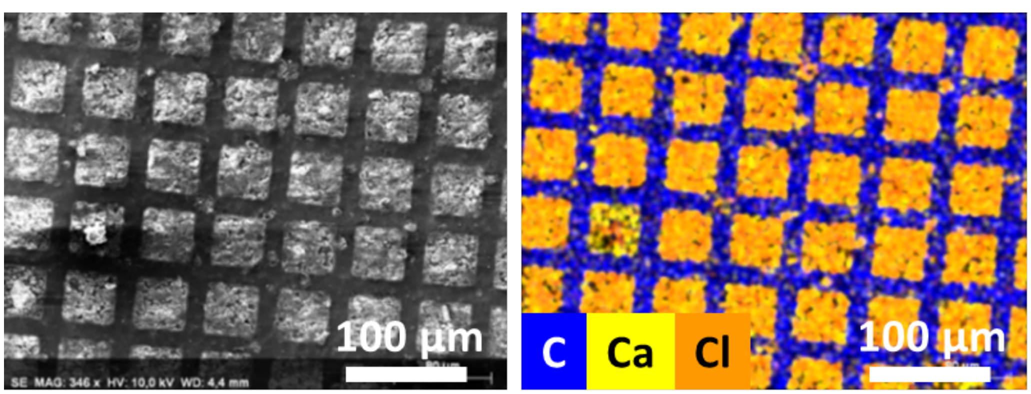

Figure 4: SEM picture and EDX element mapping of a structured substrate after application of aqueous calcium chloride solution and drying in vacuum.

Derivation of the Polymer Height H

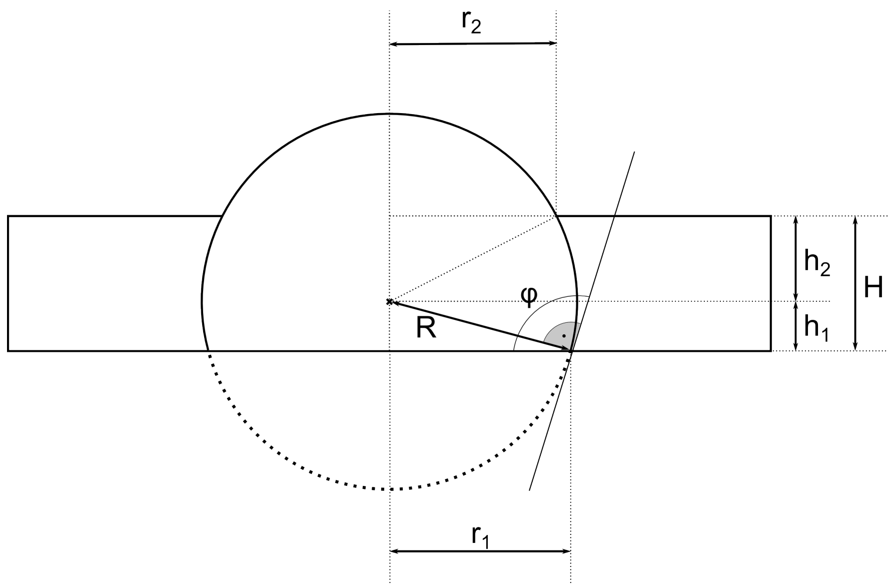

Figure 5

The height of the polymer film H equals the sum of h_1 and h_2 assuming that the given template droplet forms a perfect spherical cap as shown in Figure 5.

$$H = h_1 + h_2 \tag{1}$$

The first height h_1 can be calculated with the help of the contact angle φ and the radius r_1 of the droplet base.

$$h_1 = r_1 \cdot tan(\varphi - 90^\circ) \tag{2}$$

The second height h_2 is given through the radius R of the theoretical sphere that the droplet is part of and the radius r_2 of the opening in the polymer film (the pore radius).

$$h_2 = \sqrt{R^2 - {r_2}^2} \tag{3}$$

The radius R of the full sphere is to be calculated with the help of r_1 and the contact angle φ.

$$R = \frac{r_1}{cos(\varphi - 90^\circ)} \tag{4}$$

If h_1 and h_2 in Eq. (1) are replaced by Eq. (2) and Eq. (3) Eq. (5) is the result.

$$H = r_1 \cdot tan(\varphi - 90^\circ) + \sqrt{R^2 - {r_2}^2} \tag{5}$$

Using Eq. (4) for R Eq. (5) becomes Eq. (6).

$$H = r_1 \cdot tan(\varphi - 90^\circ) + \sqrt{\frac{{r_1}^2}{[cos(\varphi - 90^\circ)]^2} - {r_2}^2} \tag{6}$$

Eq. (6) becomes Eq. (7) after simplification.

$$H = r_1 \left(tan(\varphi - 90^\circ) + \sqrt{\frac{1}{[cos(\varphi - 90^\circ)]^2} - \left(\frac{r_2}{r_1}\right)^2} \right) \tag{7}$$

AFM Measurement to obtain the Membrane Thickness

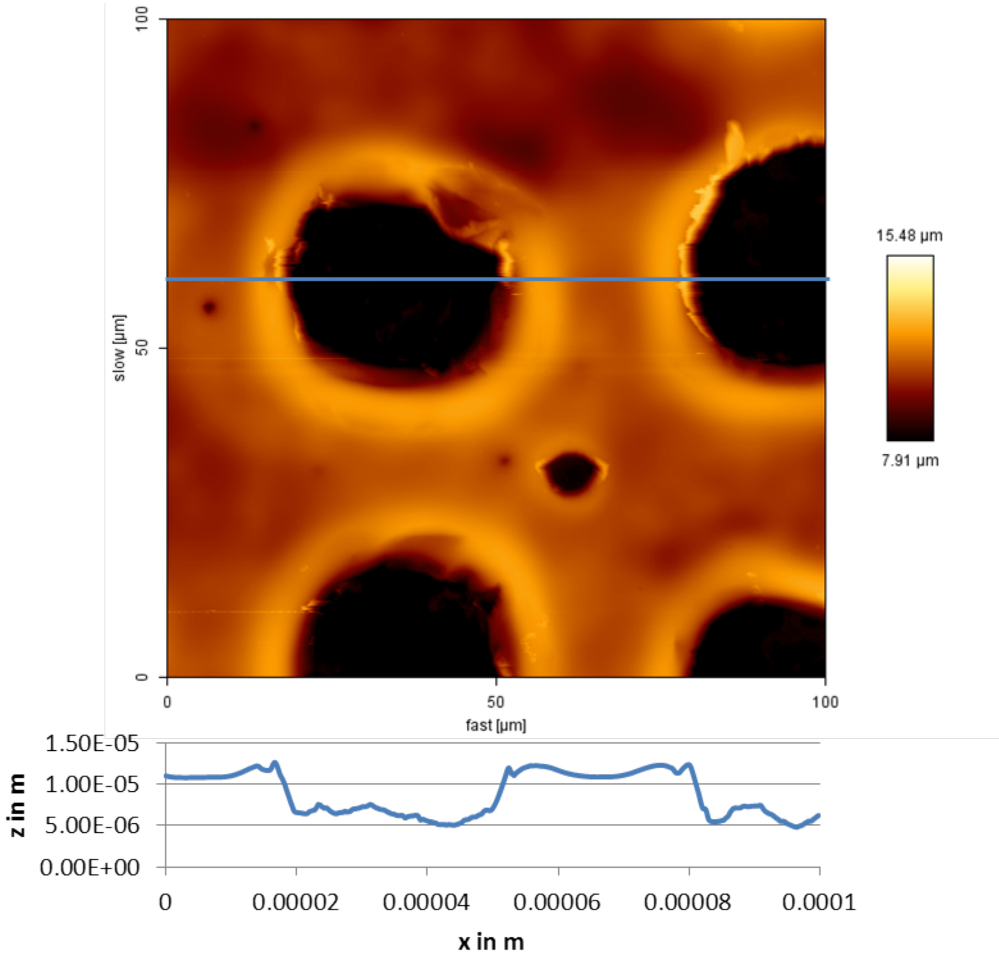

Figure 6: One of the AFM height pictures and cross sections of porous membranes that were used to obtain the membrane thickness. (The membrane thickness given in the text of 4.6 µm ± 0.78 µm is the average of 13 independent measurements on various membranes.)

Model Suspension and Membrane after Filtration

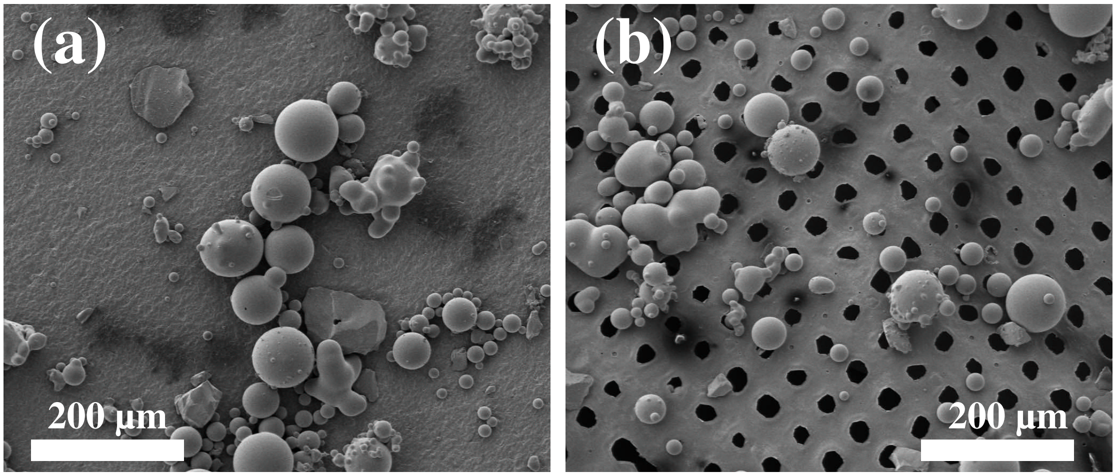

Figure 7: (a) particle mixture before filtration, (b) membrane after filtration with retained particles.

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