Supplementary Information

Hierarchical porosity in silica thin films by a one-step templating strategy using a stimuli-responsive bioderived glycolipid

Authors

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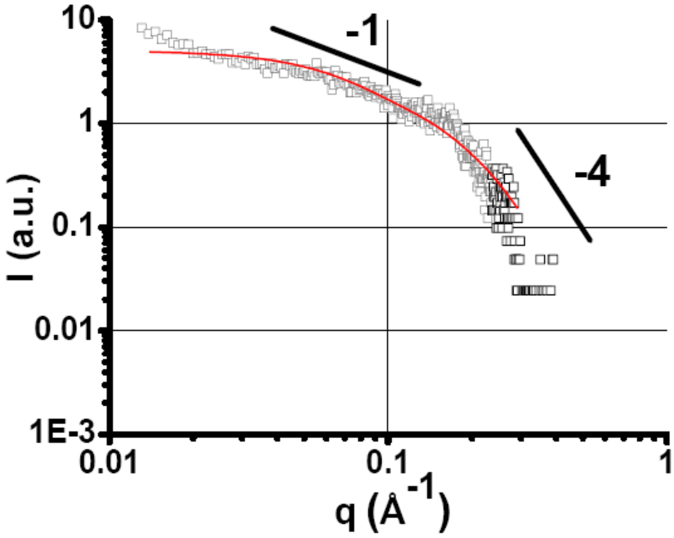

Figure S1 – Log-log plot of the SAXS spectrum recorded for sample S7 fitted using a cylinder form factor. Fit has been done using the "Scatter" software package[1]

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[1] a/ S. Förster, C. Burger, Macromolecules, 1998, 31, 879; b/ S. Förster, A. Timmann, M. Konrad, C. Schellbach, A. Meyer, S.S. Funari, P. Mulvaney, R. Knott, J. Phys. Chem. B, 2005, 109, 1347. The software is available at the website: **http://www.pci.uni-bayreuth.de/rg_foerster/en/Software/index.html**

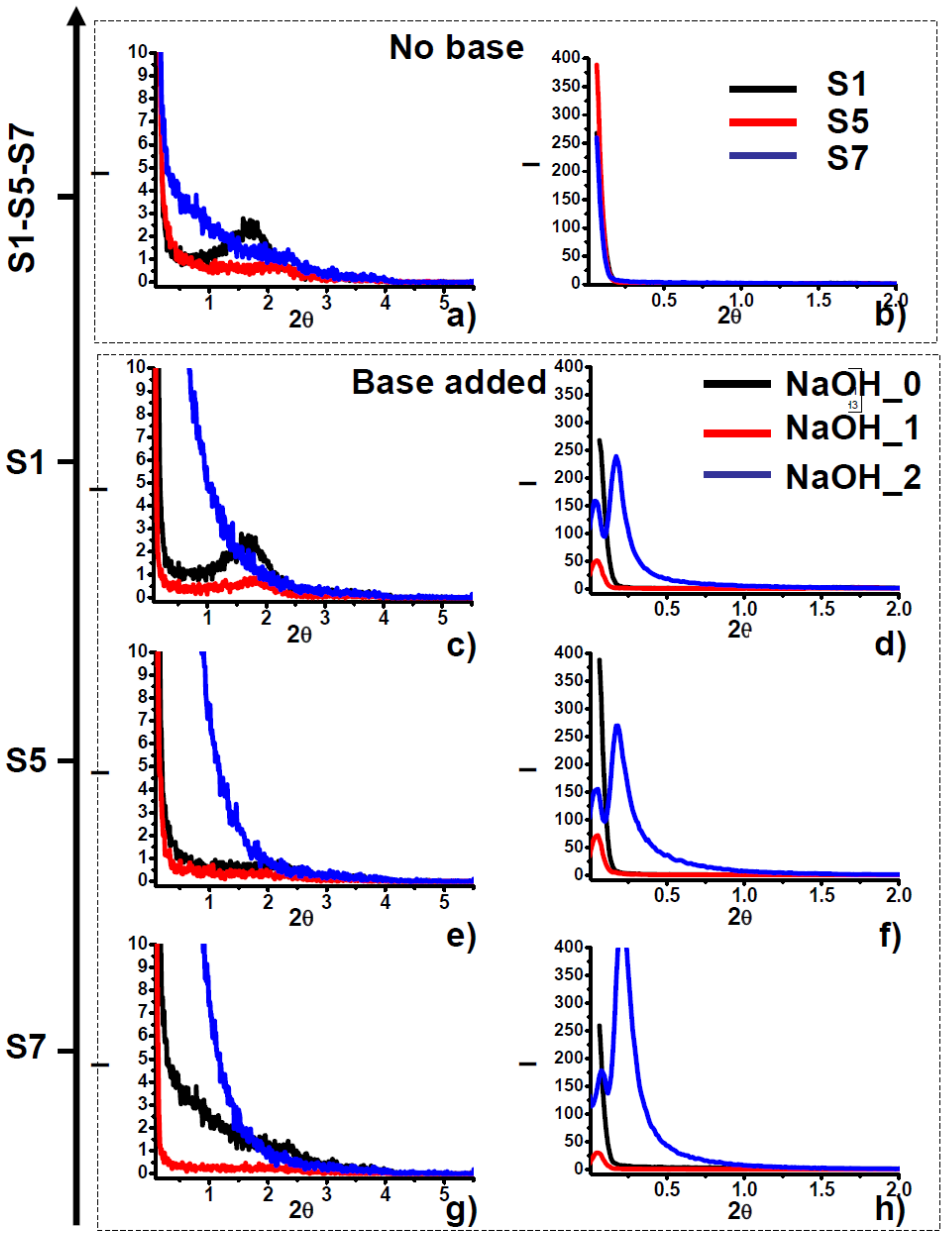
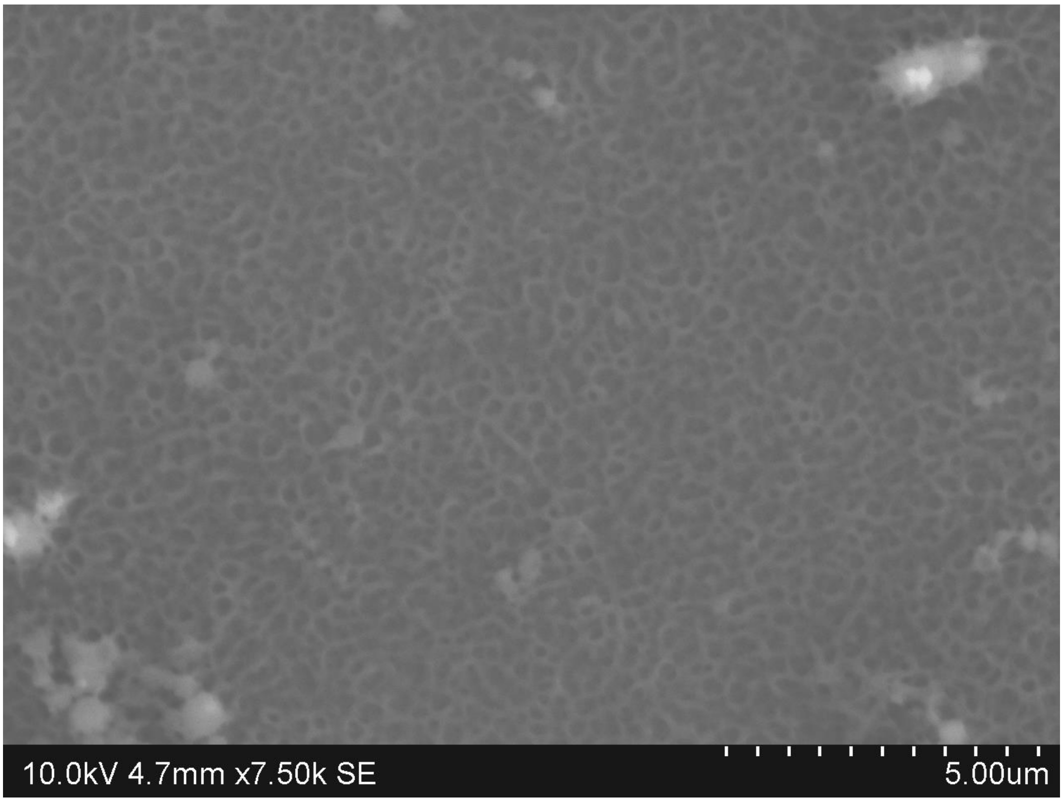
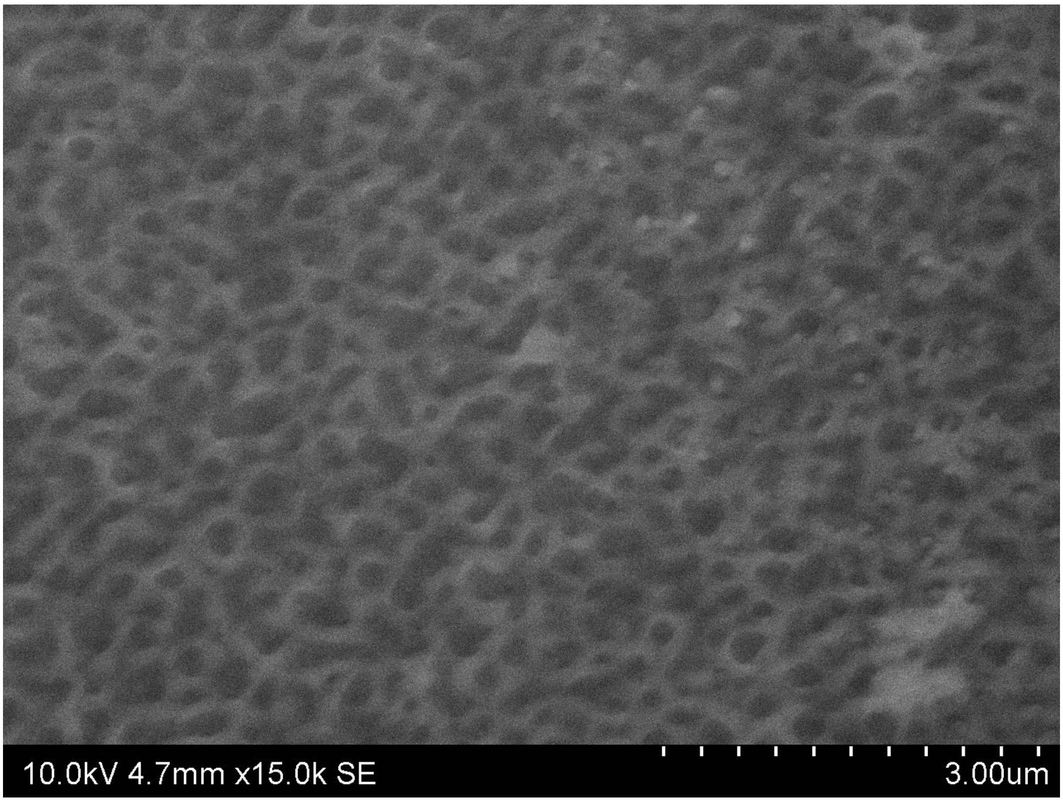


Figure S2 – Integrated SAXS patterns corresponding to samples S1, S5 and S7. For the meaning of NaOH_0, NaOH_1 and NaOH_2 refer to Table 2 in the main manuscript. Spectra on the left and right column are the same but scaled differently both in X and Y directions in order to highlight the mesostructuration at different scales.

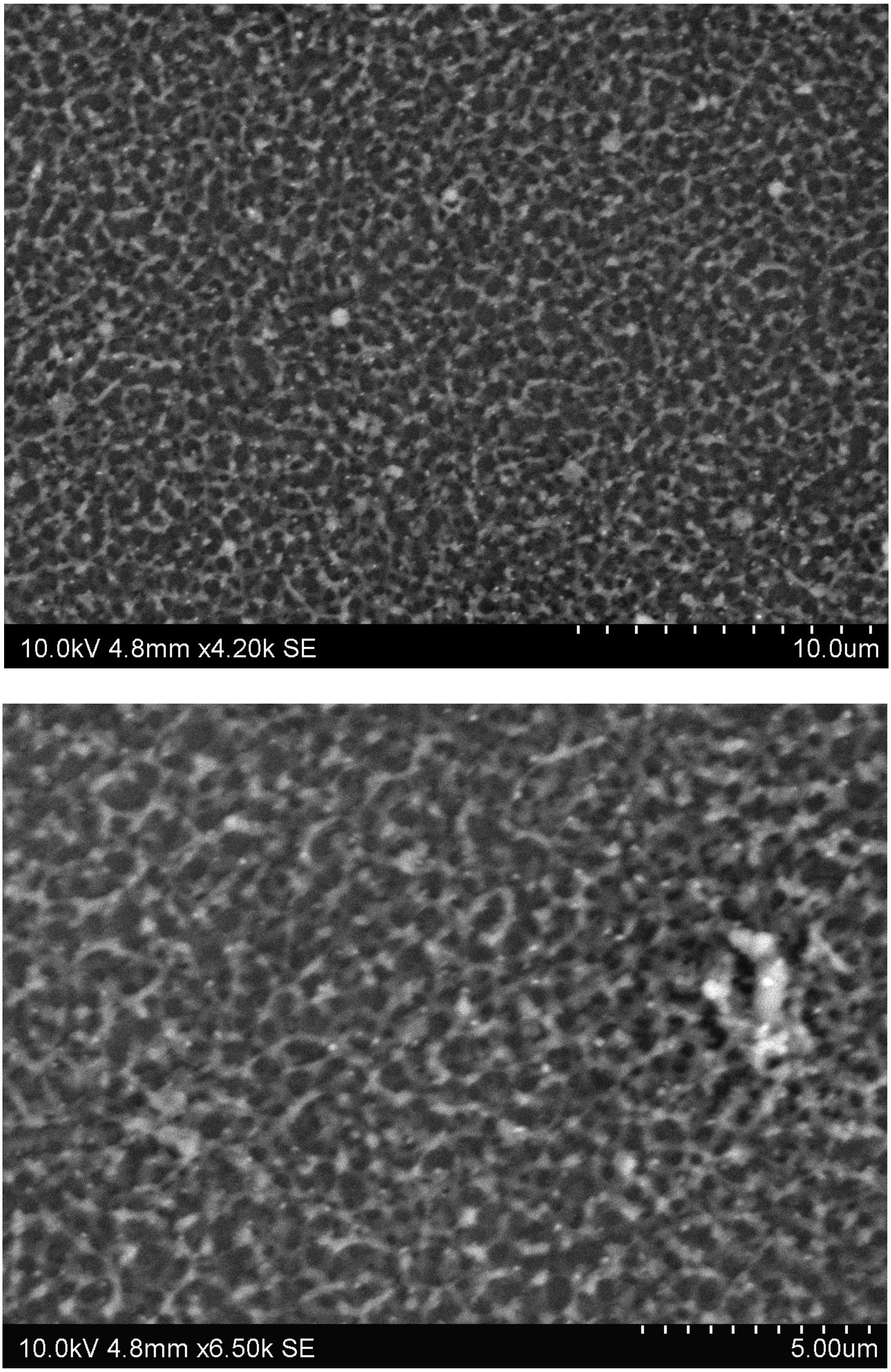


a)



b)

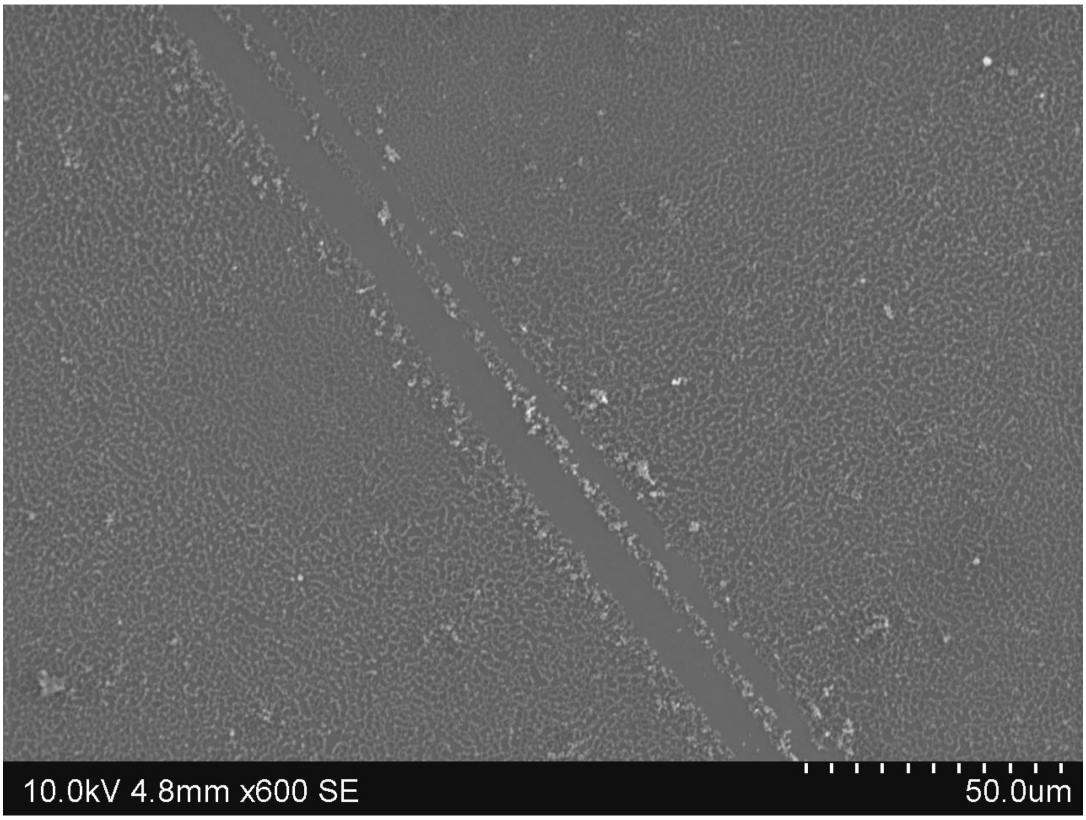
Figure S3



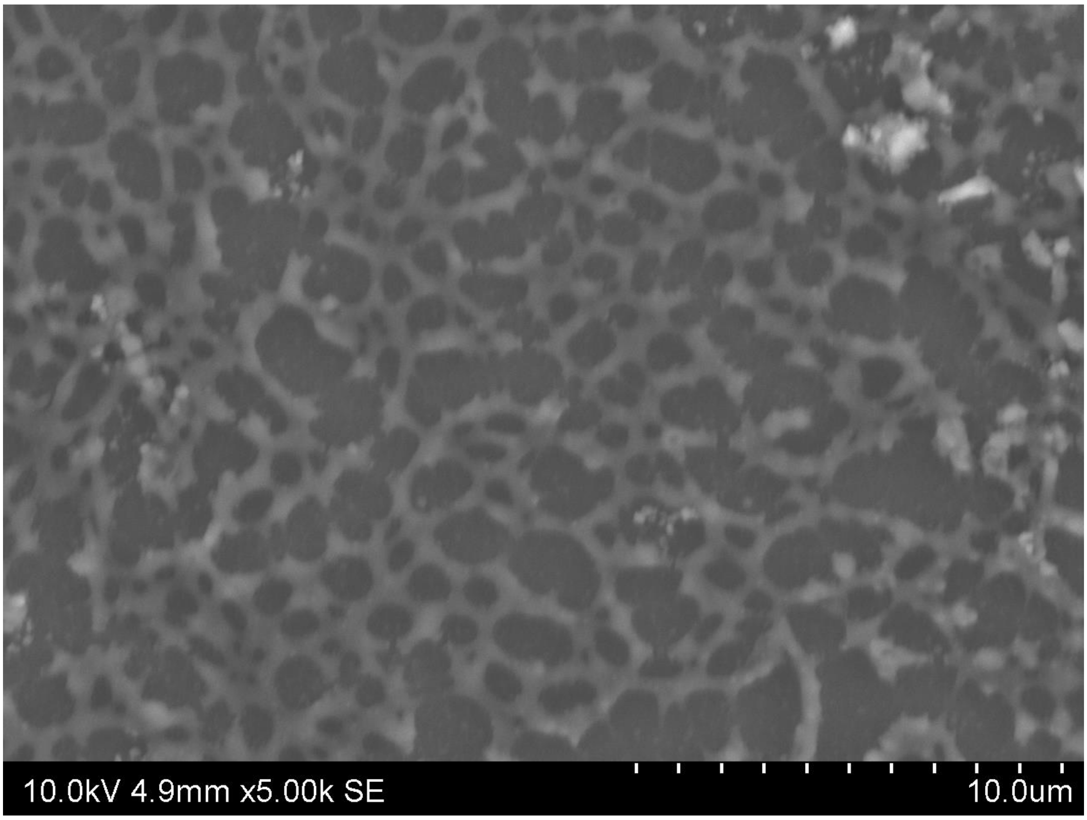
c)

d)

Figure S3 (continued)

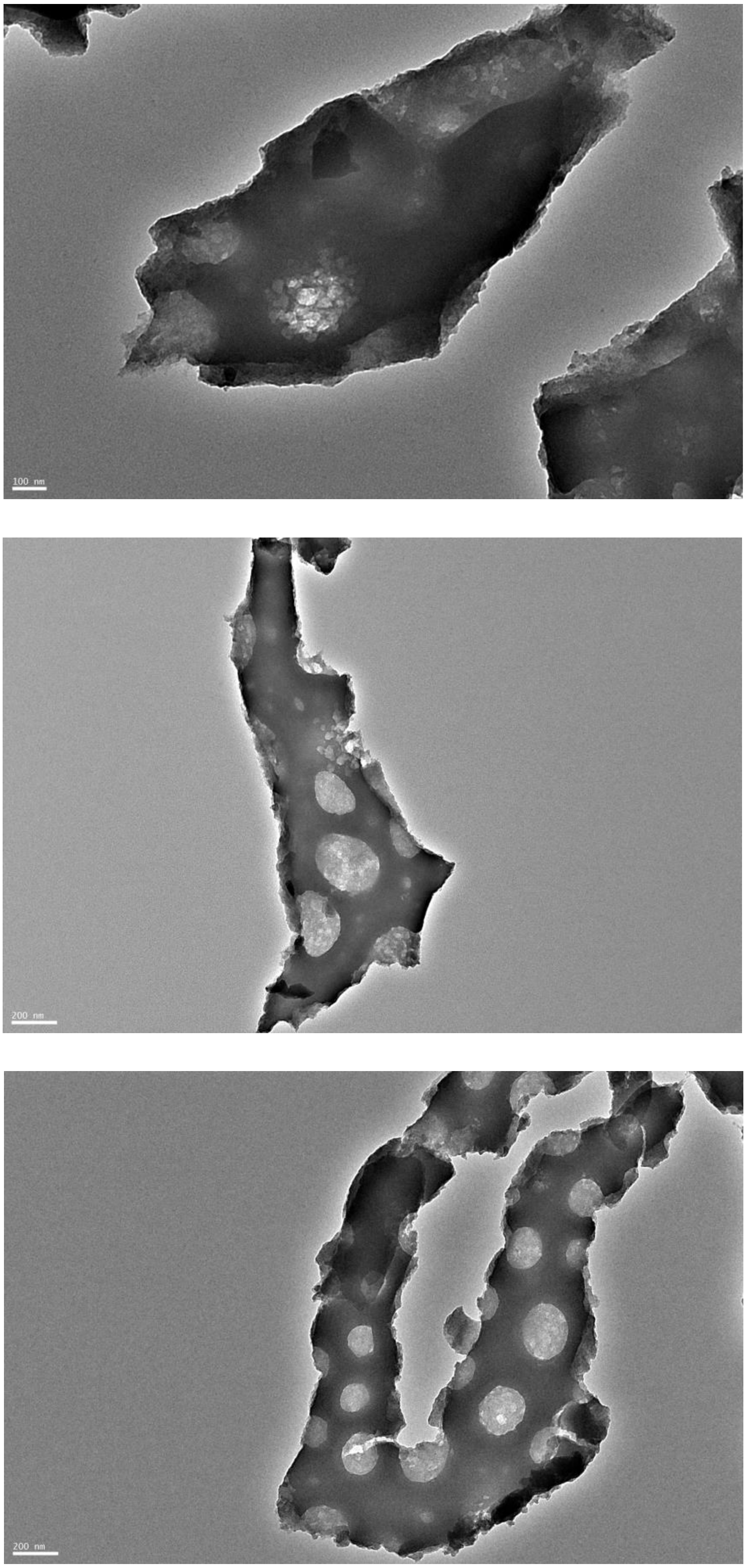


e)



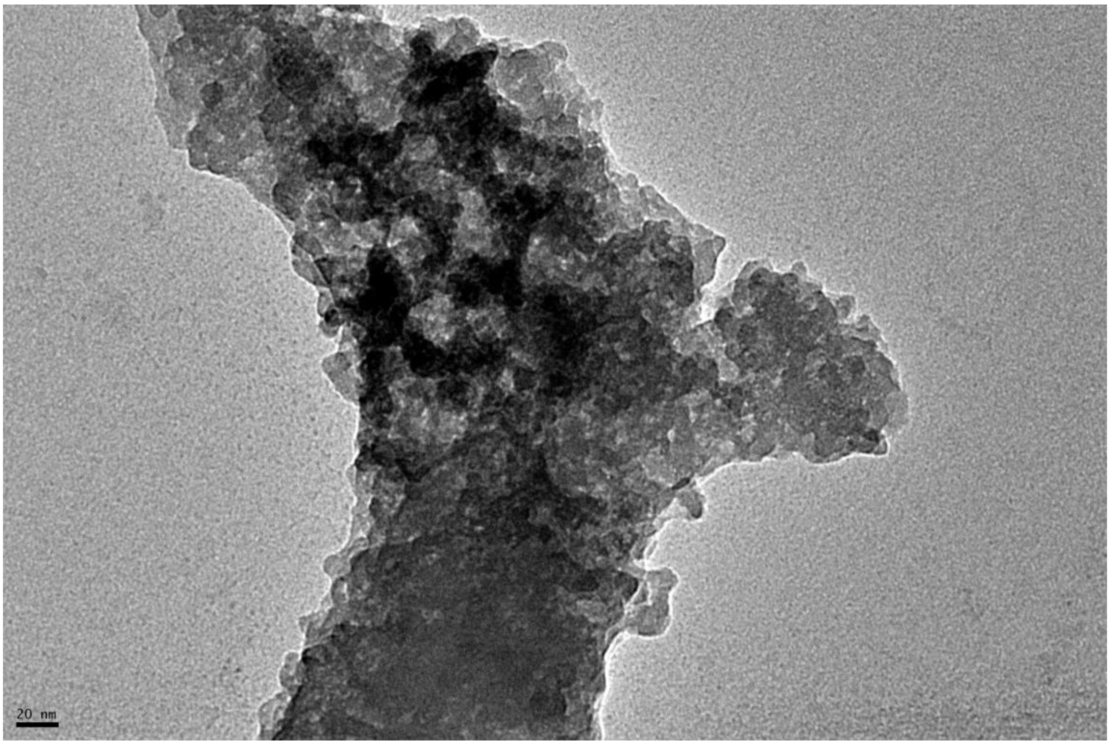
f)

Figure S3 – SEM images of sample (a, b) S1, (c, d) S5 and (e, f) S7 in the NaOH_2 conditions (largest amount of base. See main text for details)

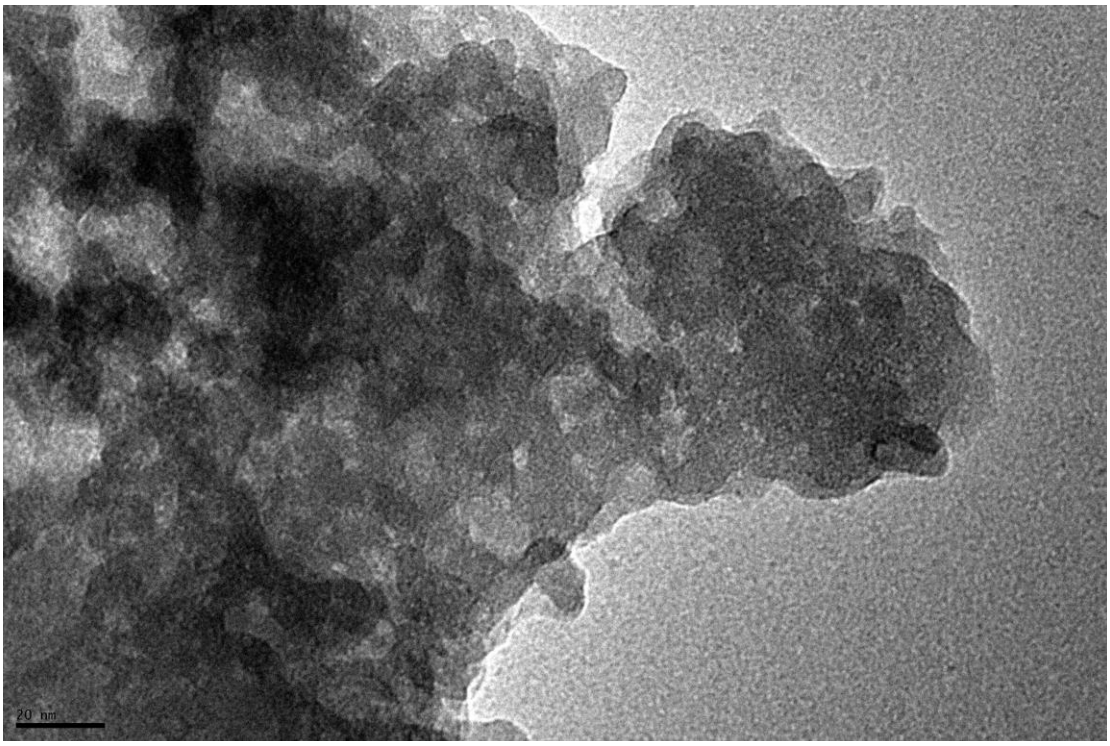


a) b) c)

Figure S4

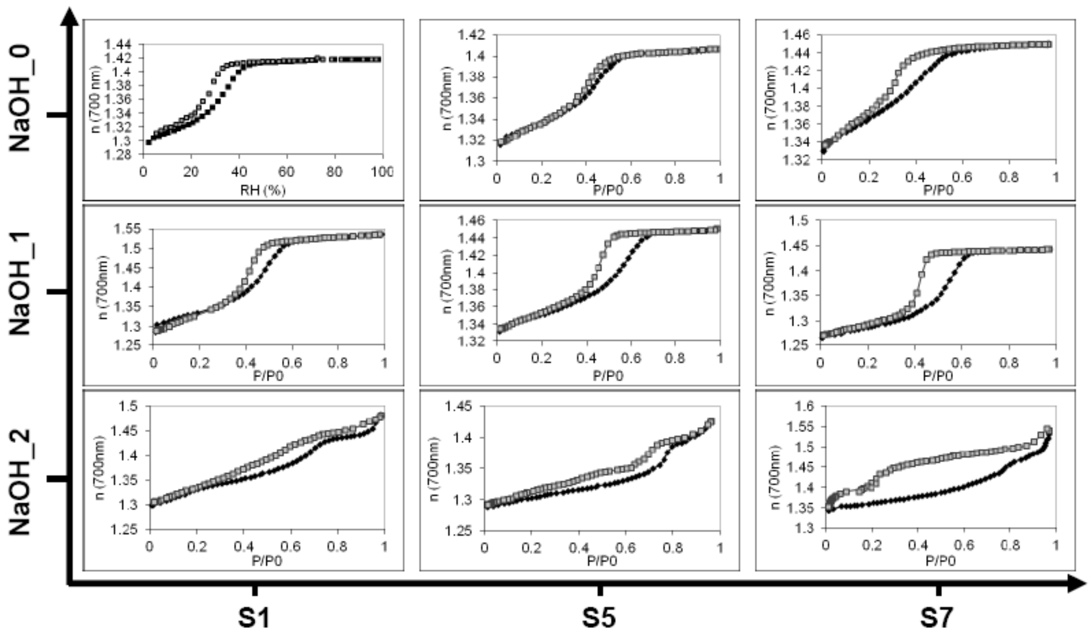


d)

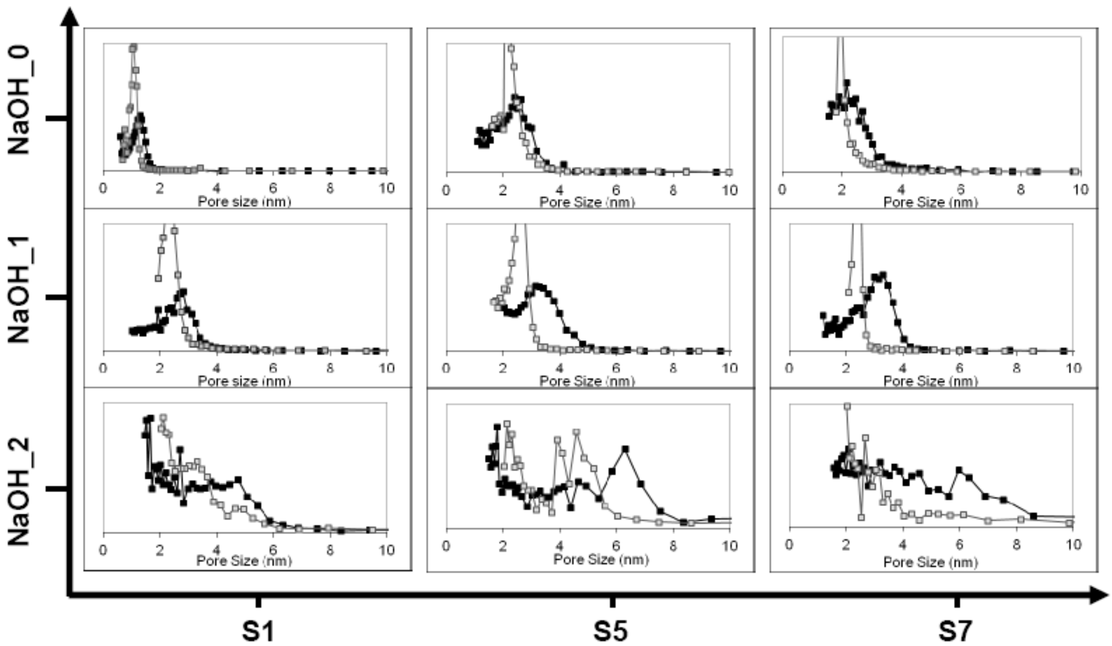


e)

Figure S4 - TEM images of sample (a, b) S1 and (c, d) S5 in the NaOH_2 conditions (largest amount of base. See main text for details)



a)



b)

Figure S5 – (a) Water adsorption-desorption isotherms measured using ellipsoporosimetry for samples S1, S5, S7 in the NaOH_0 (base-free), NaOH_1 and NaOH_2 conditions. (b) Pore size distribution derived from the isotherms for the same set of samples.

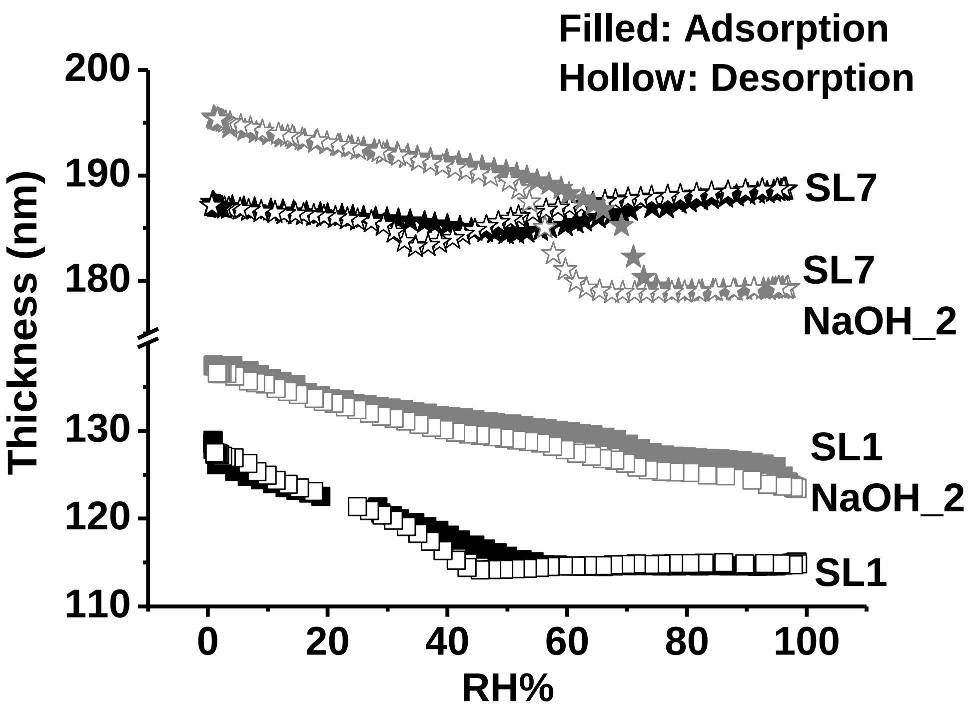


Figure S6 – Evolution of the silica film thickness with relative humidity RH% for selected samples. Filled and hollow symbols indicate, respectively, water adsorption and desorption

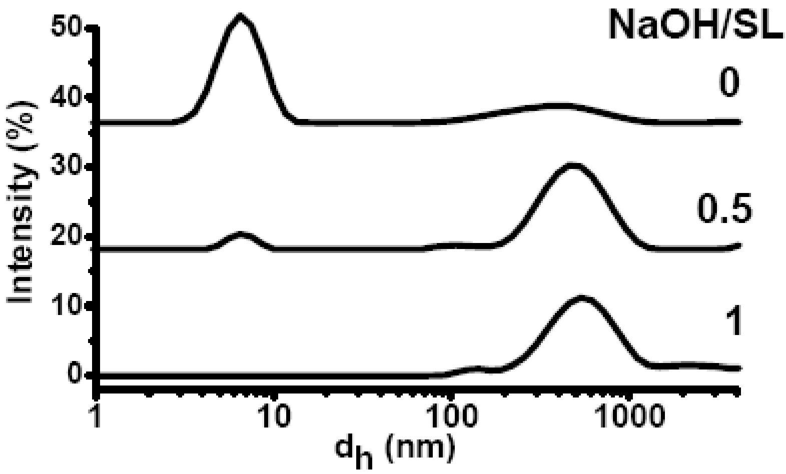


Figure S7 – Intensity-processed Dynamic Light Scattering data recorded on water solutions of acidic sophorolipids at increasing NaOH/SL molar ratio for a 5 mg/mL solution

Figure S6 shows DLS analysis of water-based silica-free solution at various NaOH/SL molar ratio: 0, 0.5 and 1. Typical Intensity-filtered size distributions show the evolution of the hydrodynamic diameter (d_h) as a function of NaOH/SL

When no base is added (NaOH/SL= 0) the pH is generally slightly acidic (pH < 5.5) and the solution is mainly composed of micellar objects where d_h< 10 nm. At NaOH/SL= 0.5 and 1, signals intensities are inversed: small micelles (signal at d_h< 10 nm) disappear in favor of polydisperse, large (d_h> 100 nm) aggregates. At NaOH/SL= 1, the system is exclusively composed of large assemblies, as suggested by the missing signal at d_h< 10 nm and the intense polydisperse signals at d_h> 100.