

Supporting Information

Relationships between solution and solid-state properties of solution-cast low- k silica thin films

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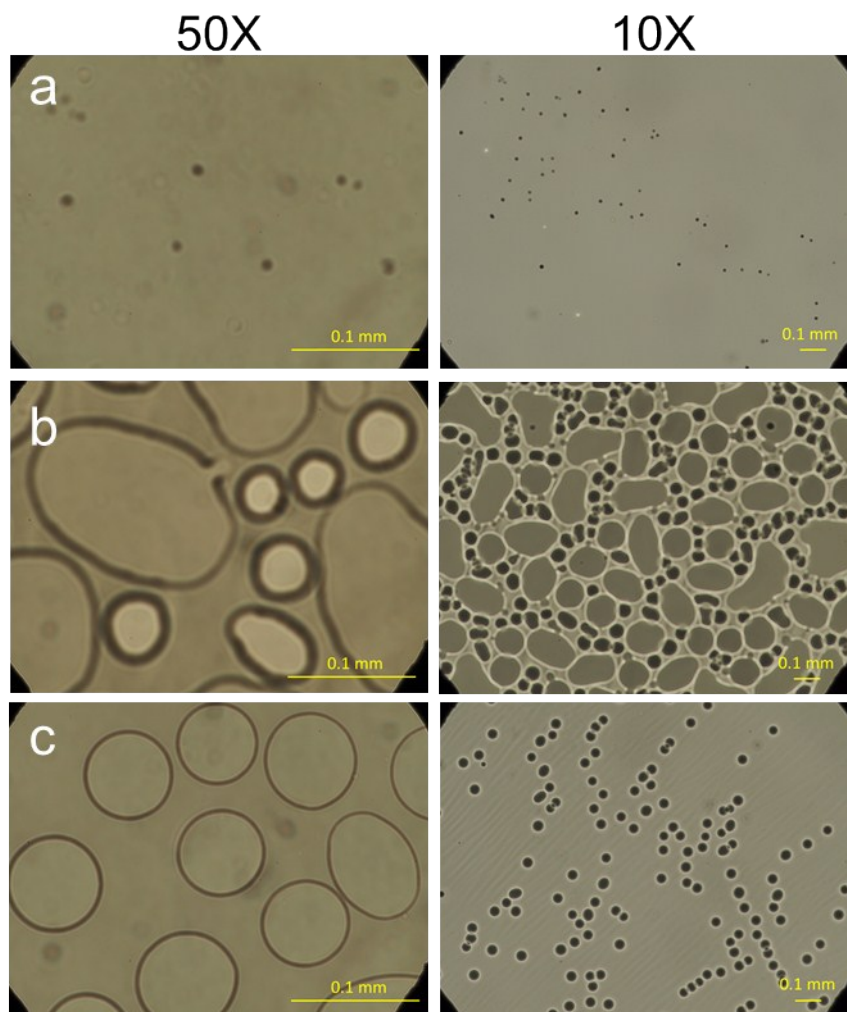


Fig. S1. OM images of natural drying, drop-casting thin films produced from the solutions with (a) no surfactant, (b) TWEEN[®] 80, or (c) Triton[™] X-100 as the surfactant.

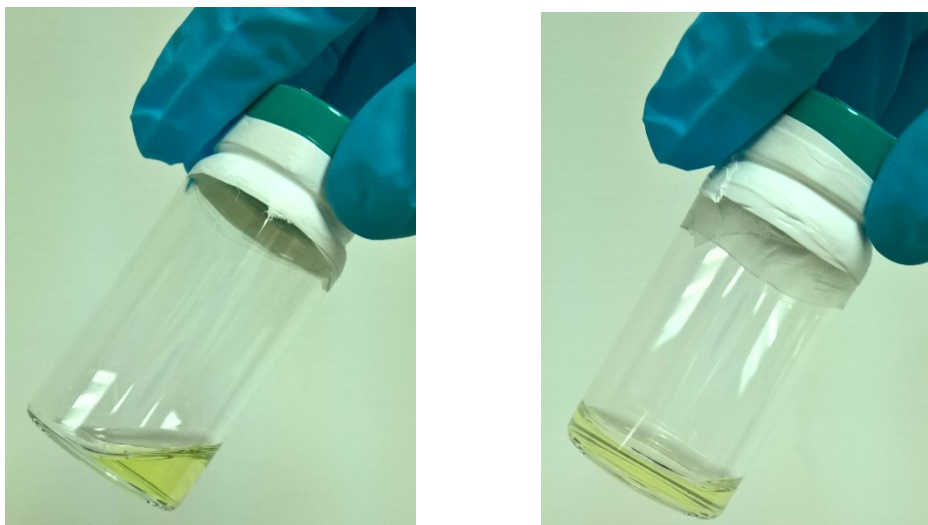
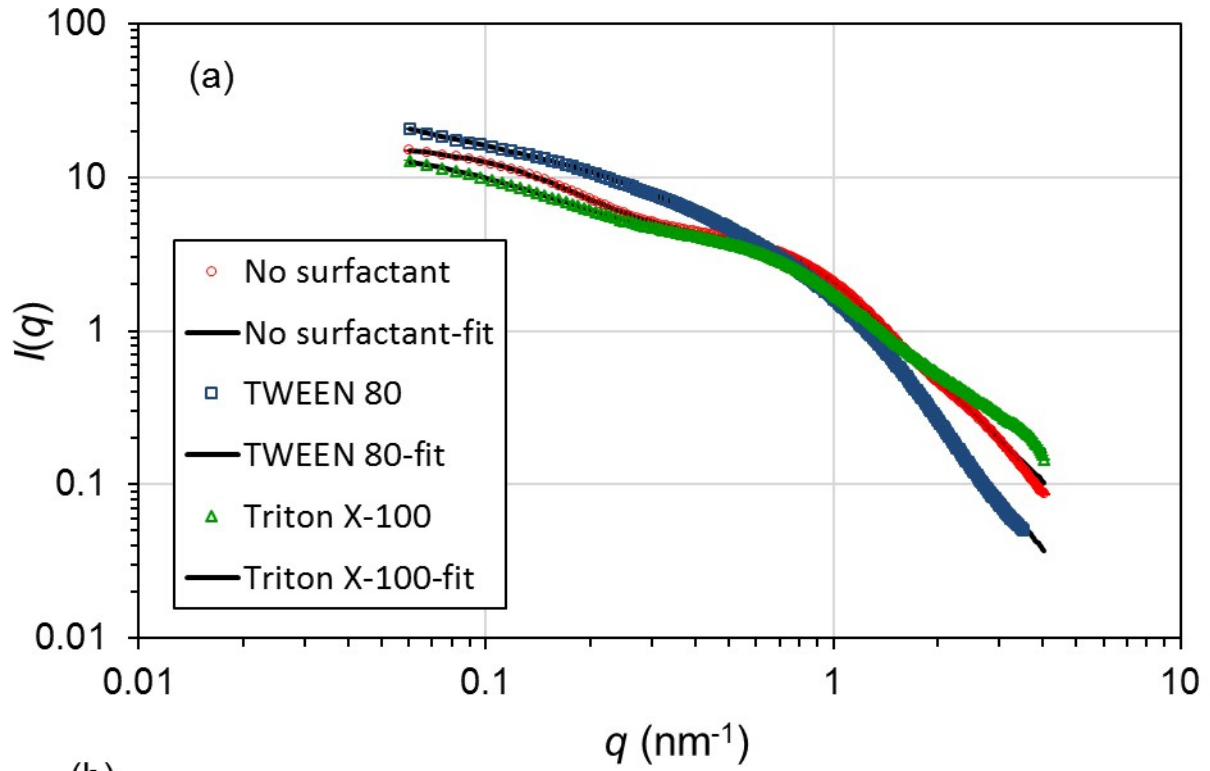


Fig. S2. Solution (left) versus gel (right) state produced from silica casting solutions with TWEEN[®] 80 at a surfactant concentration of (a) 20 wt% (the same as used in this work) and (b) 32 wt% after aging for 22 hr at room temperature.



(b)

Fitted parameters	G	R_g (nm)	B	R_{sub} (nm)	P	G_s	R_s (nm)	B_s	P_s
No surfactant	8.68	14.2	0.21	13.0	1.8	8.12	4.6	2.17	2.2
TWEEN [®] 80	18.34	39.8	0.57	11.8	1.0	13.42	4.4	1.78	2.8
Triton [™] X-100	7.62	20.0	0.32	9.2	1.0	7.47	5.5	1.75	1.7

(c)

$$I(q) \approx G \exp\left(\frac{-q^2 R_g^2}{3}\right) + B \exp\left(\frac{-q^2 R_{sub}^2}{3}\right) \left[\frac{\left(\text{erf}(qR_g/\sqrt{6})\right)^3}{q} \right]^P$$

$$+ G_s \exp\left(\frac{-q^2 R_s^2}{3}\right) + B_s \left[\frac{\left(\text{erf}(qR_s/\sqrt{6})\right)^3}{q} \right]^{P_s}$$

Fig. S3. (a) Detailed fitting of full SAXS profiles as shown in **Fig. 5** for three casting solutions, (b)

gathering of the fitted parameters, and (c) the expression utilized for the theoretical fit (G. Beaucage,

in *Polymer Science: A Comprehensive Reference*, ed. M. Möller, Elsevier, Amsterdam, 2012, DOI:

<http://dx.doi.org/10.1016/B978-0-444-53349-4.00032-7>, pp. 399-409).

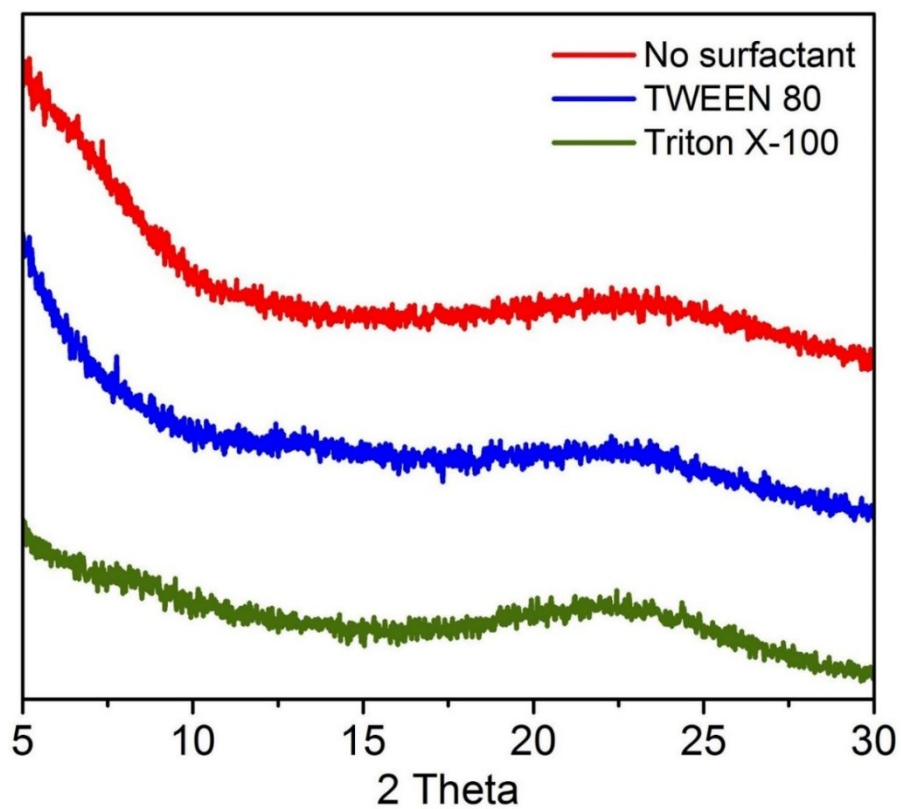


Fig. S4. XRD patterns of powder samples derived from colloidal silica solutions without surfactant and with TWEEN[®] 80 or Triton[™] X-100 as the surfactant, respectively.

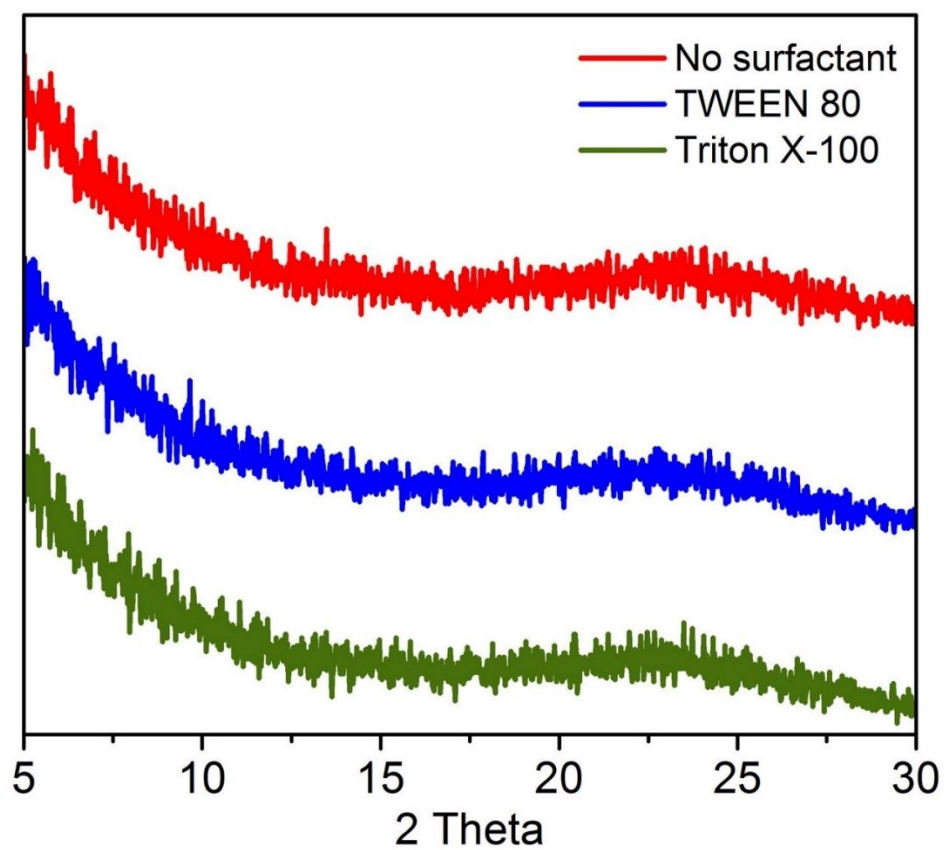


Fig. S5. GIXRD patterns of thin films cast from the solutions without surfactant and with TWEEN[®] 80 or Triton[™] X-100 as the surfactant, respectively.