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Supporting information



Fig. S1 DLS measurements of silica particle dispersions in ethanol after different growing steps (step 1-10) of the stepwise Stöber synthesis.



Fig. S2 TEM images of silica particles after different growing steps (step 1-10) of the stepwise Stöber synthesis.



Fig. S3 DLS measurements after each step of the stepwise emulsion polymerization of the silica@PEA@P(DEGMEMA-co-EA) particles starting from 230 nm silica cores.



hydrodynamic diameter (d_h) / nm





Fig. S5 DLS measurements after each step of the stepwise emulsion polymerization of the silica@PEA@P(DEGMEMA-co-EA) particles starting from 172 nm silica cores.



Fig. S6 TEM images after each step of the stepwise emulsion polymerization of the silica@PEA@P(DEGMEMA-*co*-EA) particles starting from 199nm silica cores. (a) Silica core particles, (b) functionalized silica_{MEMO} particles, (c) silica@PEA core-interlayer particles and (d) silica@PEA@P(DEGMEMA-*co*-EA) CIS particles.



Fig. S7 TEM images after each step of the stepwise emulsion polymerization of the silica@PEA@P(DEGMEMA-*co*-EA) particles starting from 172 nm silica cores. (a) Silica core particles, (b) functionalized silica_{MEMO} particles, (c) silica@PEA core-interlayer particles and (d) silica@PEA@P(DEGMEMA-*co*-EA) CIS particles.

Tab. S8 Comparison of average particle diameters determined b	y TEM and DLS measurements of all prepared CIS particles.
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Sample	Composition	dtem	dors
1	1	[nm] ^{a)}	[nm] ^{b)}
1	silica	233 ± 7	230 ± 26
	silica _{MEMO}	233 ± 6	230 ± 29
	silica@PEA	235 ± 6	247 ± 23
	silica@PEA@P(DEGMEMA-co-EA)	250 ± 7	307 ± 40
2	silica	190 ± 6	199 ± 26
	silica _{MEMO}	198 ± 4	199 ± 28
	silica@PEA	200 ± 5	214 ± 28
	silica@PEA@P(DEGMEMA-co-EA)	215 ± 9	248 ± 48
3	silica	173 ± 5	172 ± 18
	silica _{MEMO}	182 ± 4	173 ± 23
	silica@PEA	185 ± 6	185 ± 20
	silica@PEA@P(DEGMEMA-co-EA)	190 ± 6	199 ± 21
4	silica	154 ± 3	160 ± 25
	silica _{MEMO}	161 ± 5	172 ± 22
	silica@PMMA	170 ± 7	185 ± 20
	silica@PMMA@P(NIPAM-co-MMA)	188 ± 8	248 ± 23

^a)Average sphere diameter and standard deviation determined by counting at least 100 particles out of the TEM images; ^b)Average sphere diameter and standard deviation determined at the maximum of the linear probability density of the particle size distribution;



Fig. S9 DSC curve of silica@PEA@P(DEGMEMA-co-EA) particles with 230 nm silica cores.



Fig. S10 DSC curve of silica@PMMA@P(NIPAM-co-MMA) particles with 160 nm silica cores.



Fig. S11 Comparison of UV-Vis reflection spectra of IOPC hydrogel film prepared from silica@PEA@P(DEGMEMA-*co*-EA) CIS particles with 230 nm silica cores before (original, top) and after (relaxed, bottom) strain-induced colour tuning (stretching from ε = 0% to ε = 20% and subsequent release to ε = 0%).



Fig. S12 Comparison of UV-Vis reflection spectra of IOPC hydrogel film prepared from silica@PEA@P(DEGMEMA-co-EA) CIS particles with 230 nm silica cores before (original, top) and after (relaxed, bottom) temperature-induced colour tuning (cooling from T = 15.0 °C to T = 0.0 °C and subsequent heating to T = 15.0 °C).



Fig. S13 Comparison of UV-Vis reflection spectra of IOPC hydrogel film prepared from silica@PEA@P(DEGMEMA-co-EA) CIS particles with 230 nm silica cores before (original, top) and after (relaxed, bottom) solvent-induced colour tuning (immersion from pure water into pure DEG and subsequent immersion into pure water).