Electronic Supplementary Material (ESI) for Journal of Materials Chemistry C.

Supporting Information

Liquid-Liquid Extraction: An Universal Method to Synthesize Liquid Colloidal Photonic Crystals

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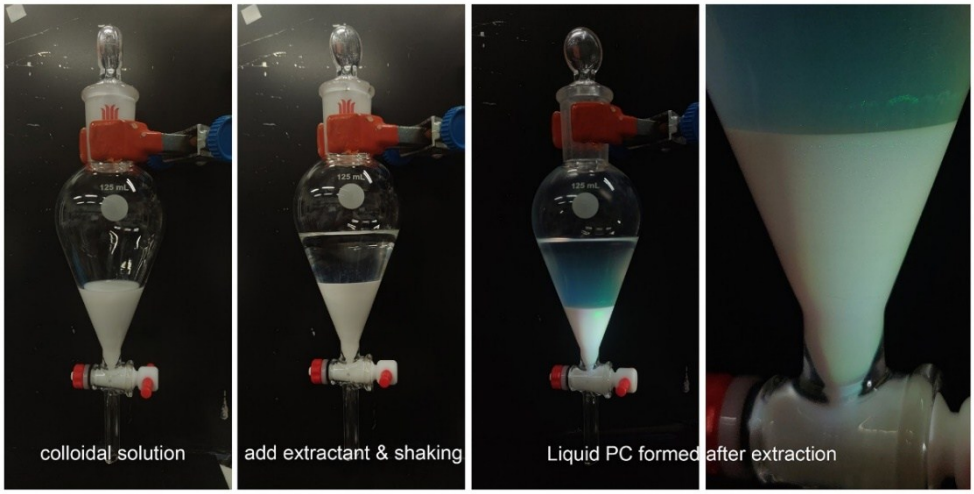

Figure S1. Synthesis of SiO_2/EG liquid photonic crystals by liquid-liquid extraction.

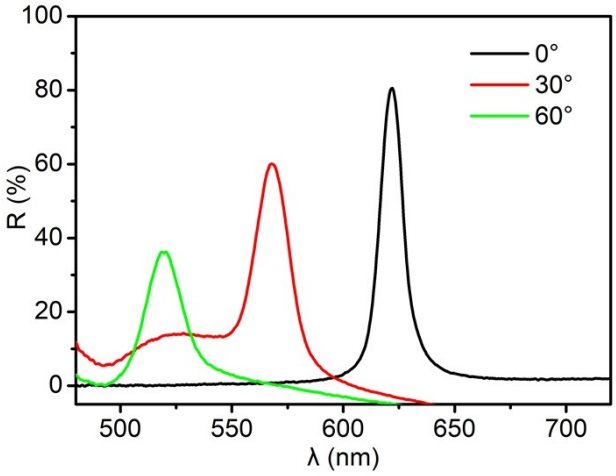

Figure S2. Reflection spectra of SiO_2/EG liquid PC as the incident angle and reflected angle being tuned from 0° to 60°

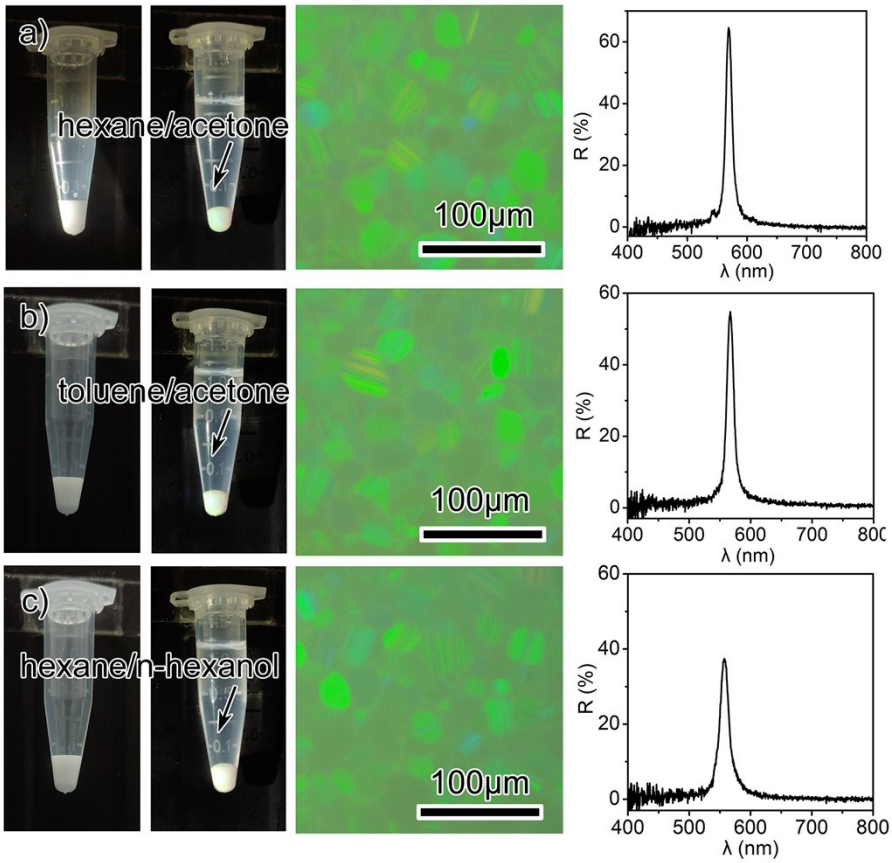

Figure S3. Digital photos, optical microscopic images, and reflection spectra of liquid colloidal photonic crystals prepared by extraction with a) hexane/acetone, b) toluene/acetone, and c) hexane/n-hexanol.

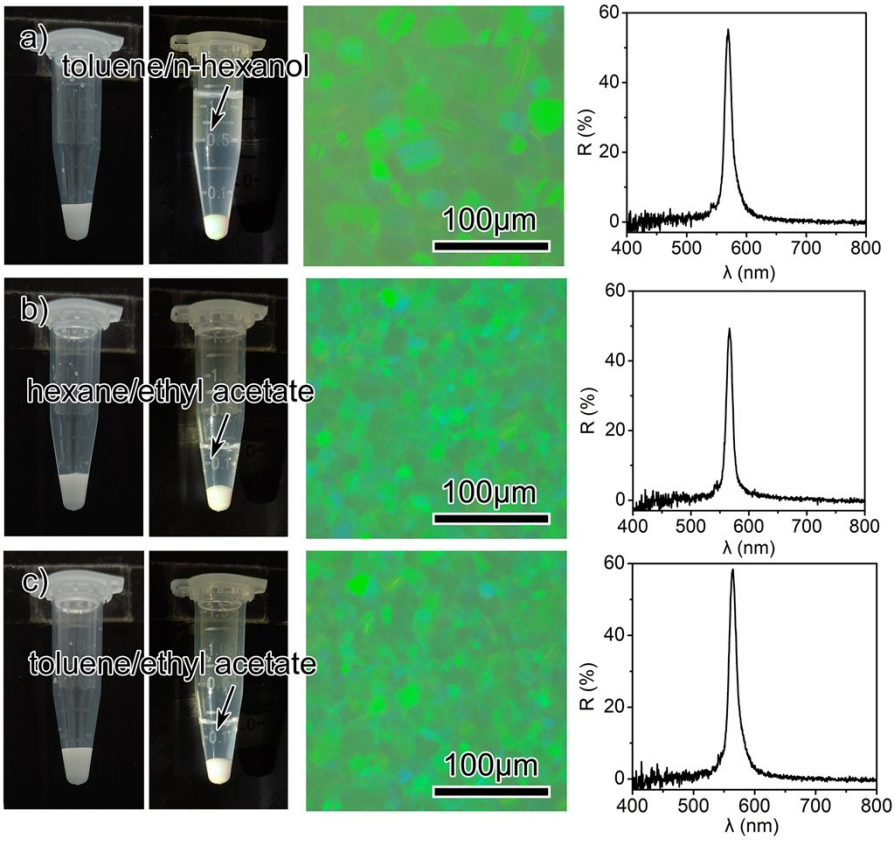

Figure S4. Digital photos, optical microscopic images, and reflection spectra of liquid colloidal photonic crystals prepared by extraction with a) toluene/n-hexanol, b) hexane/ethyl acetate, and c) toluene/ethyl acetate.

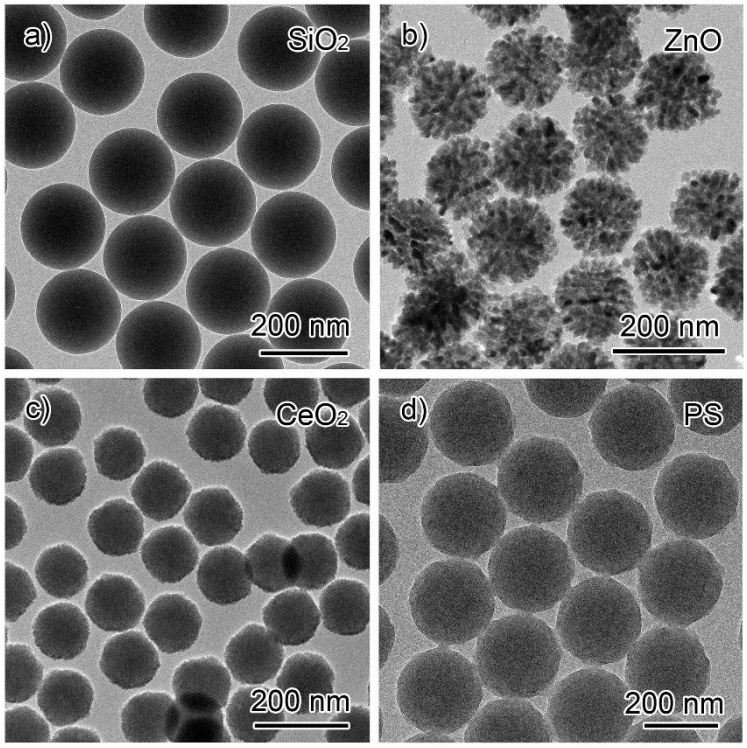

Figure S5. TEM images of a) SiO_2, b) ZnO, c) CeO_2, and d) PS particles

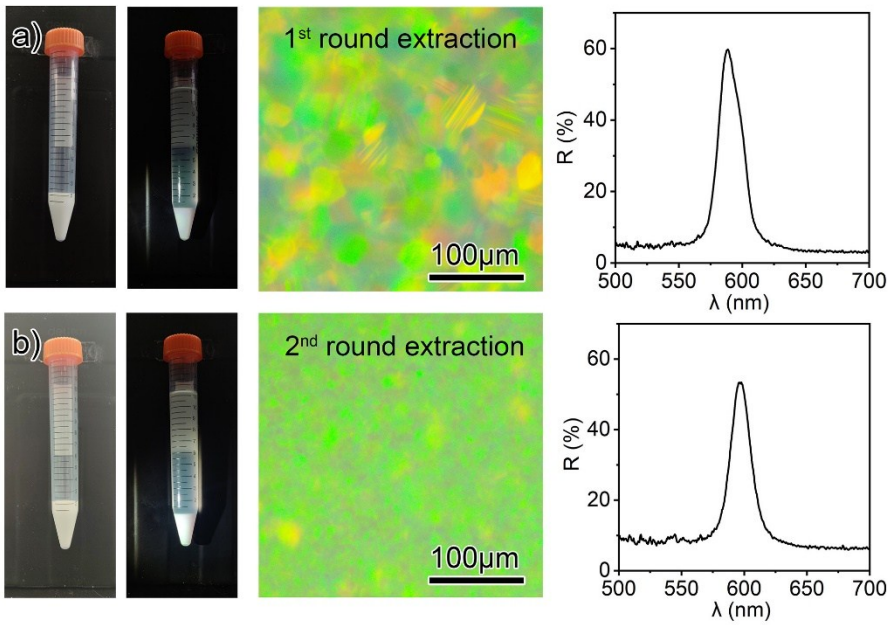

Figure S6. The extractant used in the 1st round synthesis of SiO_2/EG liquid PCs is recycled by distillation and used for the 2nd round synthesis of liquid PCs.

Table S1. Calculation of the extraction efficiencies in Figure 3a when two-component extractants (n-hexanol + cyclohexane) with increasing volume fraction of n-hexanol were used for preparation of liquid PC.

Extractant $V_{n\text{-hexanol}} / V_{ex}$	V_{ex} (μL)	V_{sol} (μL)	V_{ex}/V_{sol}	V_{tr} (μL)	$f_{EG/ex}$	$f_{EG/sol}$	K	$f_{0\ SiO2}$	f_{SiO2}
0.19	1000	100	10	50.96	0.048	0.674	0.072	0.16	0.326
0.20	1000	100	10	53.66	0.051	0.655	0.078	0.16	0.345
0.21	1000	100	10	58.19	0.055	0.617	0.089	0.16	0.383
0.22	1000	100	10	63.10	0.059	0.566	0.105	0.16	0.434
0.23	1000	100	10	66.18	0.062	0.527	0.117	0.16	0.473

Table S2. Calculation of the extraction efficiencies in Figure 3c when different folds of two-component extractant (n-hexanol + cyclohexane) were used for preparation of liquid PC.

Extractant $V_{n\text{-hexanol}} / V_{ex}$	V_{ex} (μL)	V_{sol} (μL)	V_{ex}/V_{sol}	V_{tr} (μL)	$f_{EG/ex}$	$f_{EG/sol}$	K	$f_{0\ SiO2}$	f_{SiO2}
0.22	700	100	7	47.1	0.063	0.697	0.090	0.16	0.302
	800	100	8	52.9	0.062	0.661	0.094	0.16	0.339
	900	100	9	58.1	0.061	0.618	0.098	0.16	0.382
	1000	100	10	62.2	0.059	0.576	0.102	0.16	0.424
	1100	100	11	65.5	0.056	0.536	0.105	0.16	0.464

Table S3. Calculation of interparticle spacing (D) and solvation layer thickness (sl) in the liquid PCs.

Liquid PC	$d_{particle}$	$n_{particle}$	$n_{solvent}$	$f_{particle}$	$f_{solvent}$	n_{total}	λ (nm)	D (nm)	sl (nm)
SiO_2/PTD	200	1.46	1.45	0.57	0.43	1.456	518	217.9	9.0
SiO_2/PC	200	1.46	1.42	0.37	0.63	1.435	594	253.5	26.7
SiO_2/DMF	200	1.46	1.43	0.36	0.64	1.441	601	255.4	27.7
ZnO/DEG	150	2.0	1.432	0.50	0.50	1.741	521	183.3	16.7
CeO_2/DEG	128	2.2	1.432	0.33	0.67	1.721	557	198.2	35.1
PS/EG	230	1.59	1.43	0.32	0.68	1.482	773	319.3	44.7