A supramolecular liquid crystal/photonic crystal composite film with broad diffraction-wavelength shifts/fast response to pH changes

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Table S1 LC-based PC materials developed in the recent decades.

Materials	$\Delta\lambda_{max}$ (nm)	Response time	Stability (Cycles)	Application	Ref.
Azobenzene-containing CLCPs	-	-	5 cycles	Photo/thermal dual-response	[1]
SiO_2 opal PC/LCE	16 nm	-	6 cycles	Thermal response	[2]
SiO_2 inverse opal PC/LCE	50 nm	-	5 cycles	Thermal response	[3]
Janus azobenzene inverse opal actuator	-	-	-	Photo-, solvent-, and thermal-response	[4]
SiO_2 inverse opal PC/LCE	28 nm	-	-	Thermal response	[5]
Azobenzene inverse opals	60 nm	2 s	Repeated more than 100 times	Inkless rewritable paper	[6]
Cholesteric LC network-based PCs	163 nm	Within 5 s	5 cycles	Humidity and SO_2 gas response	[7]
LC-based inverse opal film	16 nm	-	10 cycles	Thermo-, photo-, and mechano-responsive	[8]
Chiral hydrogen-bonded self-assembled complexes	190 nm	70 s	5 cycles	Thermal switching reflective color film	[9]
SLC/PC film	250	< 0.5 s	> 50 cycles	PH/thermal response	This work

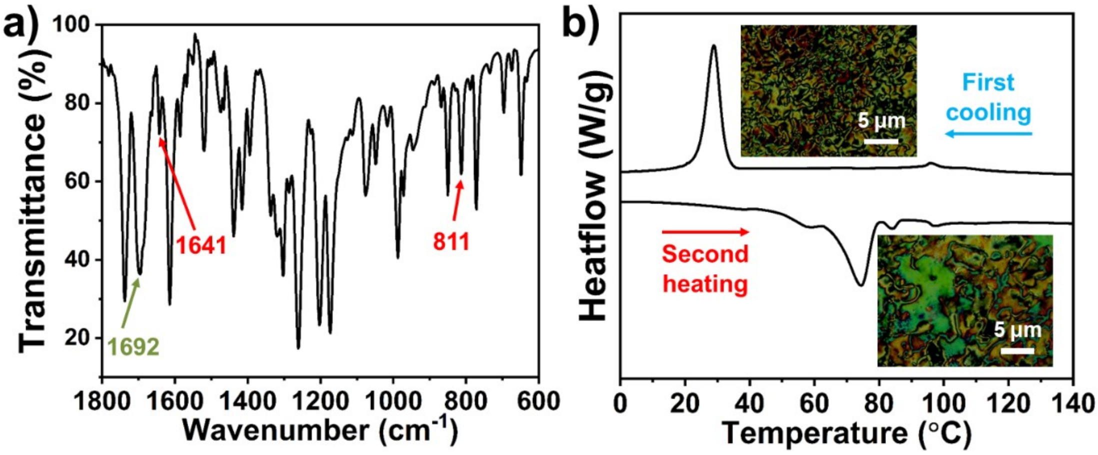

Fig. S1 (a) FT-IR spectrum of the monomer mixture. (b) DSC spectra and POM pictures (*insets*) of the monomer mixture at different temperatures during the first cooling and second heating processes.

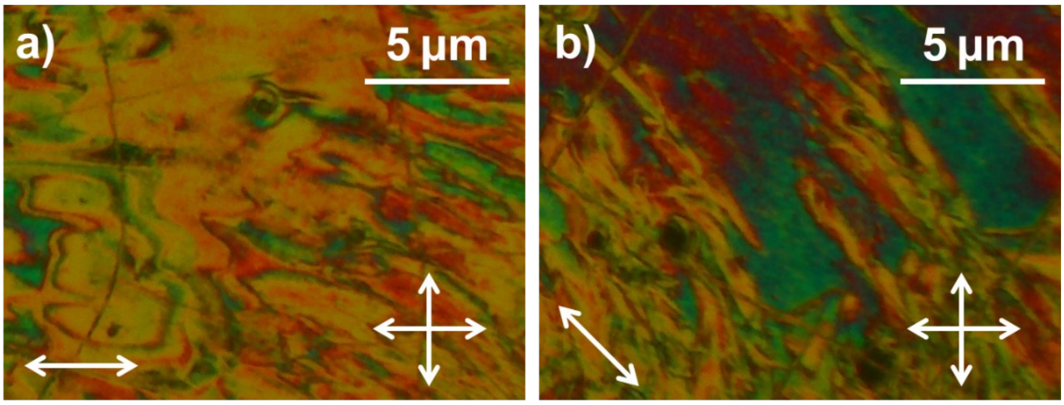

Fig. S2 POM images of the SLC/PC opal composite film. The single arrow shows the alignment direction. The axes of the crossed polarizers are represented by the crossed arrows.

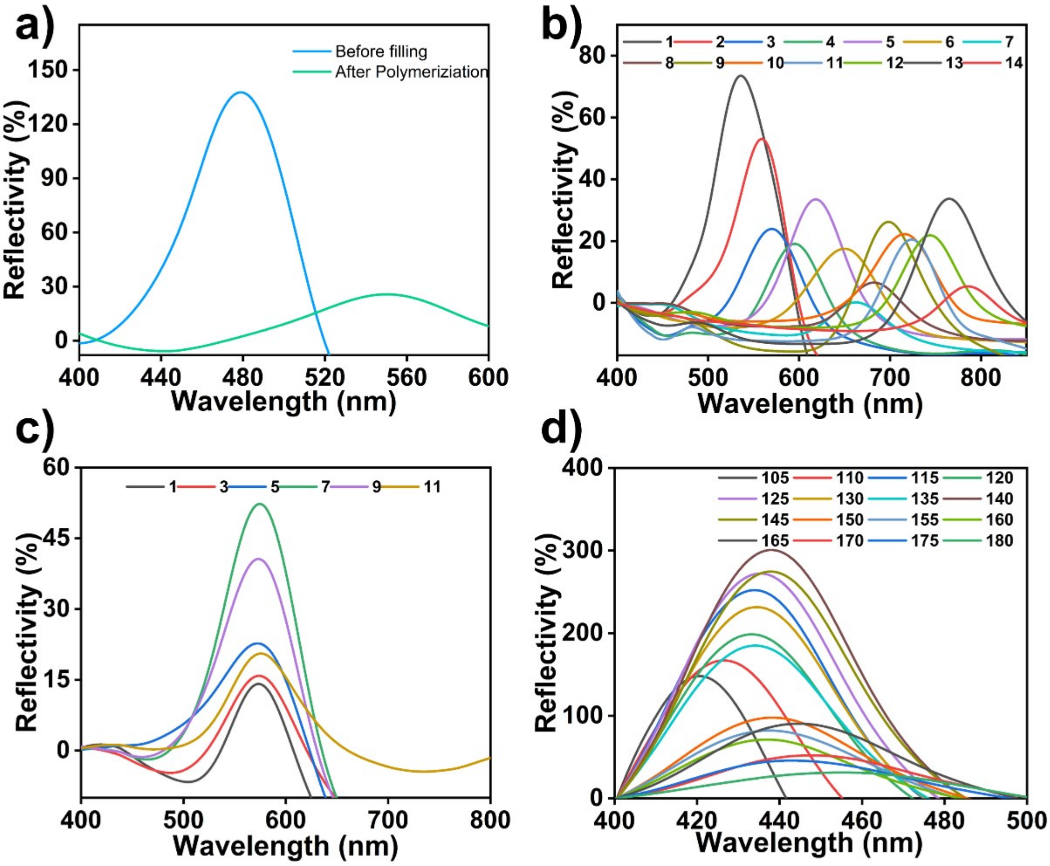

Fig. S3 (a) Reflection spectra of the samples before filling with SLC monomer (*Blue*) and after UV-induced polymerization (*Green*). The diffraction wavelength shifts of the SLC/PC inverse opal composite film (b) as a function of pH value, (c) with no alignment at various pH values, (d) as a function of temperatures of 100–180 ºC. (Not normalized)

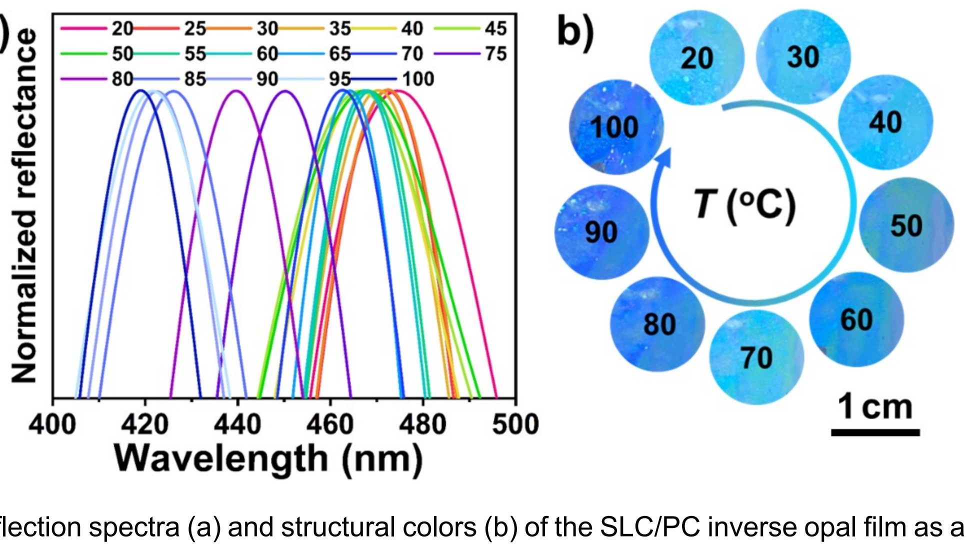

Fig. S4 Reflection spectra (a) and structural colors (b) of the SLC/PC inverse opal film as a function of temperatures from 20 to 100 ºC.

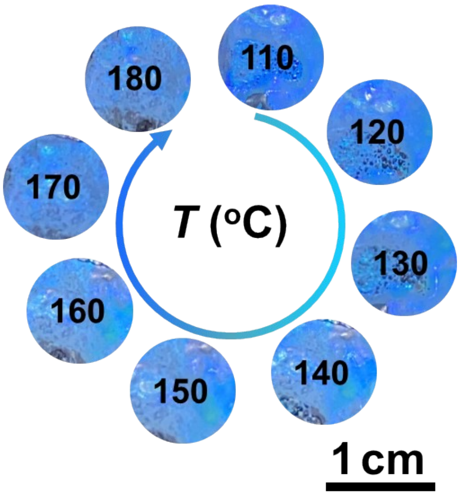

Fig. S5 Structural color changes of the inverse opal composite film as a function of temperatures ranging from 110 to 180 °C.

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