Supporting Information

A sprayable H-bonding coumarin-containing compound for photoalignment of liquid crystals on curved surface

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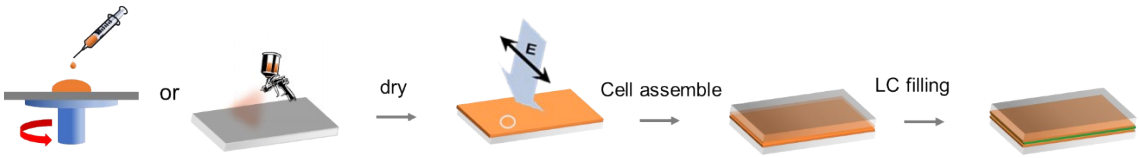

Figure S1. Schematic illustration of the typical preparation process of the photoalignment layers using spin-coating or spray-coating, and the cells fabrication using the photoalignment layers.

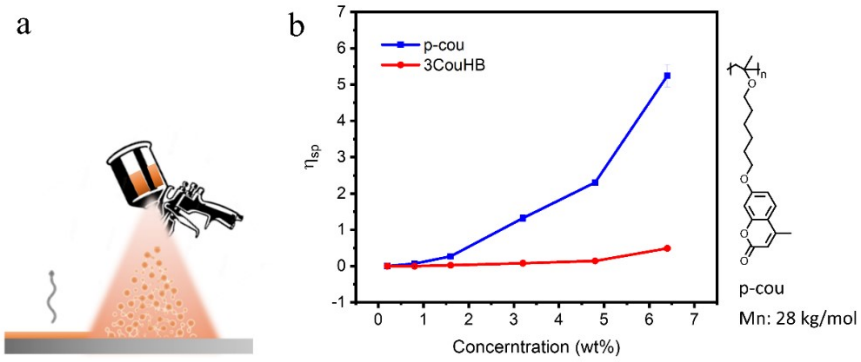

Figure S2. (a) Schematic diagram of the spray-coating method. (b) The specific viscosity of the coumarin-containing compound and a commonly used coumarin-containing polymer as a function of their concentration (wt%) in chloroform. The specific viscosity (η_{sp}) was measured using a NO1 B97-type Ostwald viscometer and calculated using the equation: $\eta_{sp} = (\eta - \eta_0)/\eta_0$, where η_0 is the viscosity of solvent (chloroform in this case) and η is the viscosity of the sample solution.

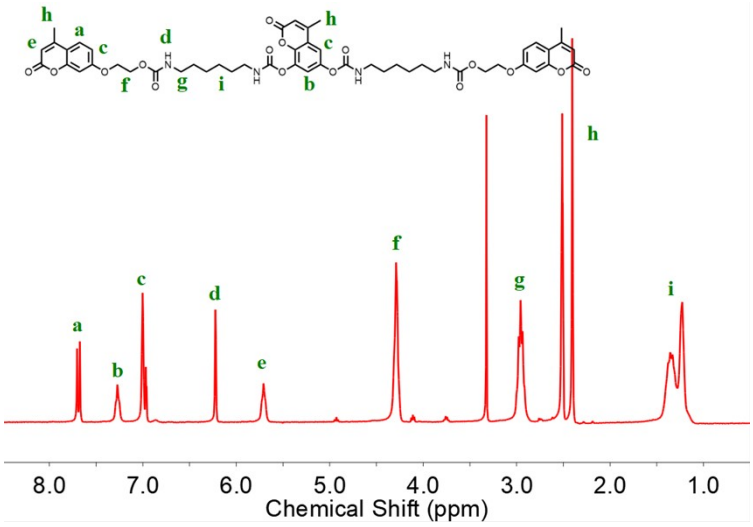

Figure S3. ^{1}H NMR spectrum of the synthesized coumarin-containing compound in DMSO-d_6.

Table S1. Infrared absorption peak assignment of 3CouHB

Wavenumber (cm^{-1})	Functional Group	Vibration Mode
~3300	-NH (Amide)	N-H Stretching
~2950, ~2850	-CH (Aliphatic)	C-H Stretching
~1700	C=O (Amide, Ester)	C=O Stretching
~1600	C=C (Aromatic)	C=C Stretching
~1500-1400	C=C (Coumarin)	C=C Stretching

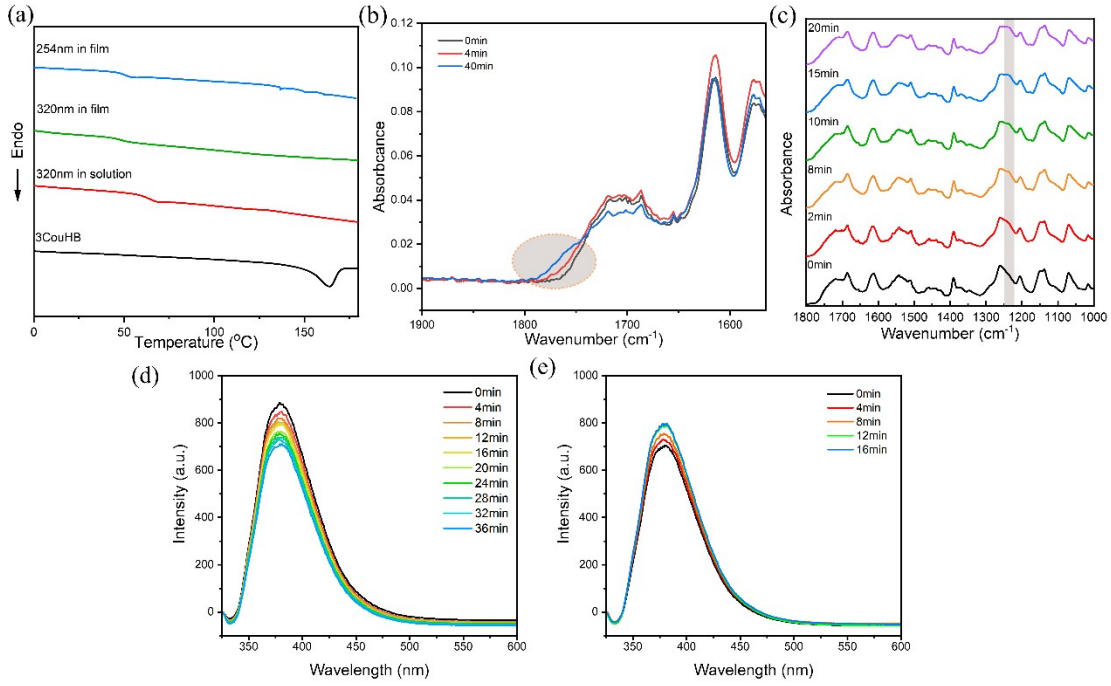

Figure S4. (a) DSC heating curves of 3CouHB, its crosslinked polymer (dimerized 3CouHB) after LPUV irradiation (8 mW/cm², 20 min) either in solution or in solid state, and the dimerized 3CouHB film after unpolarized 254 nm UV irradiation (30 mW/cm², 8 min) for de-dimerization. (b) Infrared spectra of 3CouHB under LPUV irradiation for different times (8 mW/cm²). (c) Infrared spectra of dimerized 3CouHB under unpolarized UV 254 nm irradiation (30 mW/cm²) for de-dimerization. The new absorption peak appearing at 1240 cm^{-1} (C-O stretching) implies some kind of side reaction, but the spectral change becomes significant with prolonged 254 nm UV light irradiation time (over 8 min). (d) and (e) Fluorescence emission spectra (325 nm excitation) of 3CouHB upon the photo-dimerization under the LPUV irradiation (8 mW/cm²) and the subsequent de-dimerization under unpolarized UV 254 nm irradiation (30 mW/cm²) for different times, respectively. The fluorescence intensity decreases upon the photo-dimerization and increases upon the subsequent photo de-dimerization, being consistent with the reversible photodimerization of coumarin.

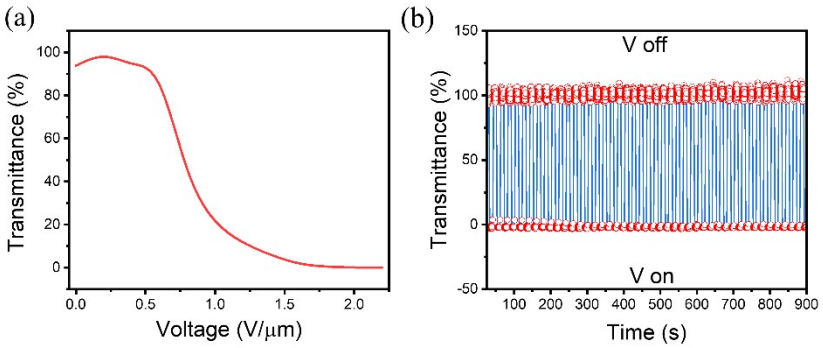

Figure S5. (a) Change in transmittance as a function of applied voltage for a 5CB cell assembled with 3CouHB photoalignment layers prepared using 8 mW/cm² LPUV for 20 min. (b) Transmittance switching cycles at voltage on (1.8 V μm^{-1}, 10 s duration) and voltage off (10 s) for the 5CB cell with 3CouHB photoalignment layers.

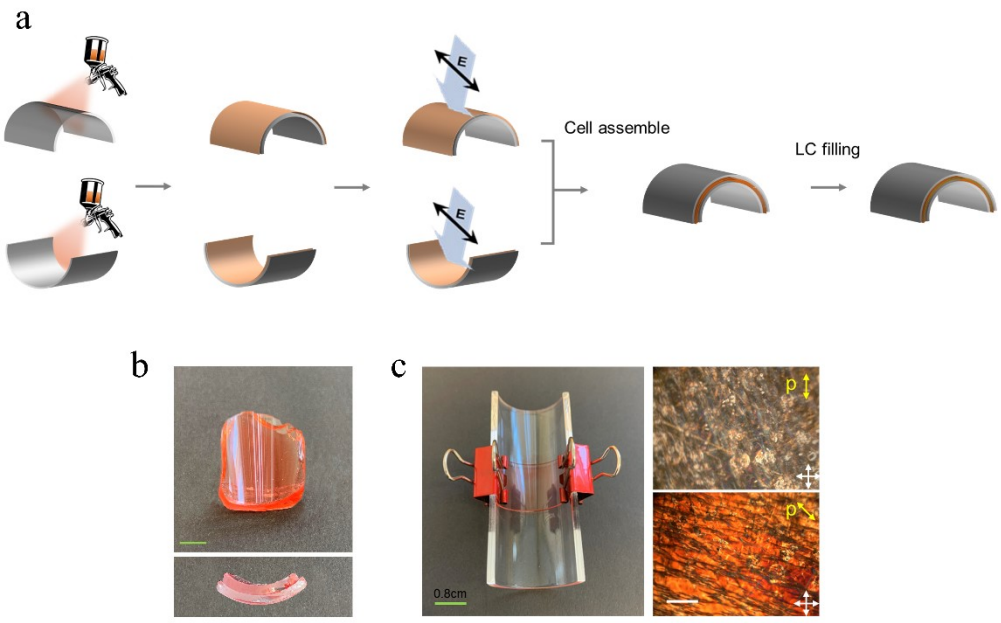

Figure S6. (a) Schematic illustration of a curved cell fabricated using the spray-coating method. (b) Photographs of a curved cell prepared using spray-coated photoalignment surface layers on a pair of curved quartz plates (scale bar is 0.5 cm) (c) Photograph of a curved cell prepared with a bottom quartz plate spray-coated with a photoalignment layer and an upper flexible plastic film containing no photoalignment layer (scale bar is 0.8 cm); and POM images of this cell under different alignments LPUV polarization and crossed polars (scale bar is 200 μm).