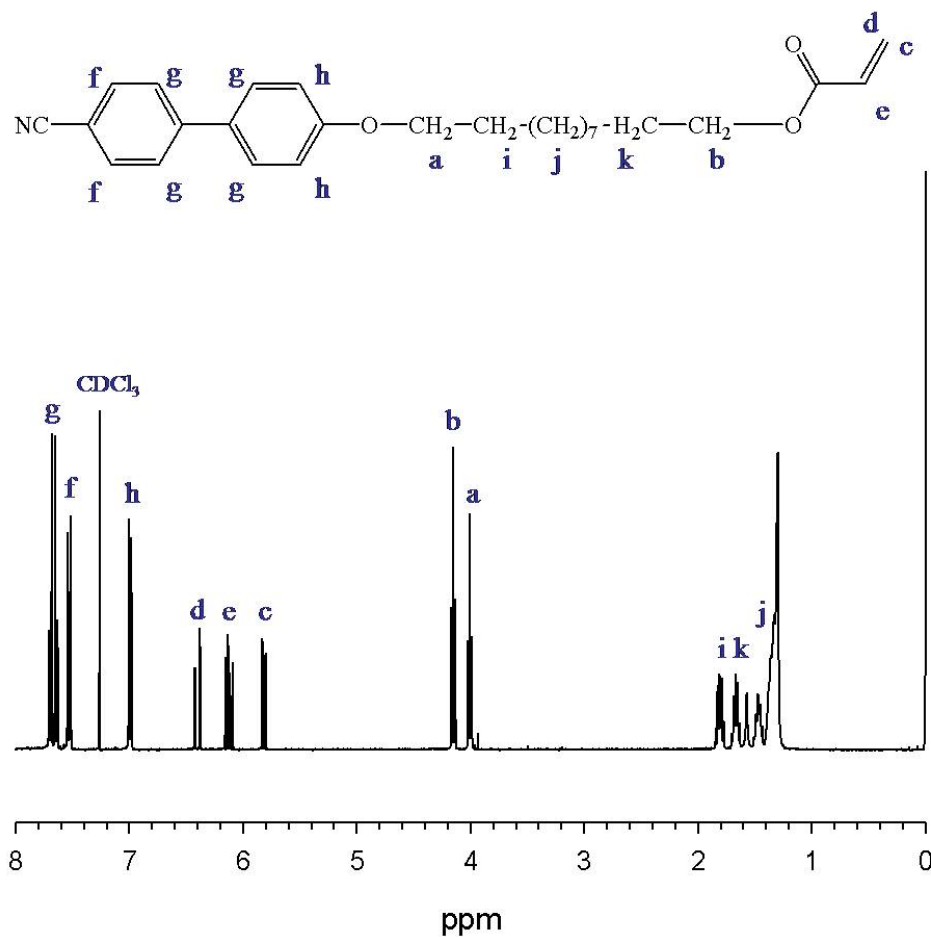
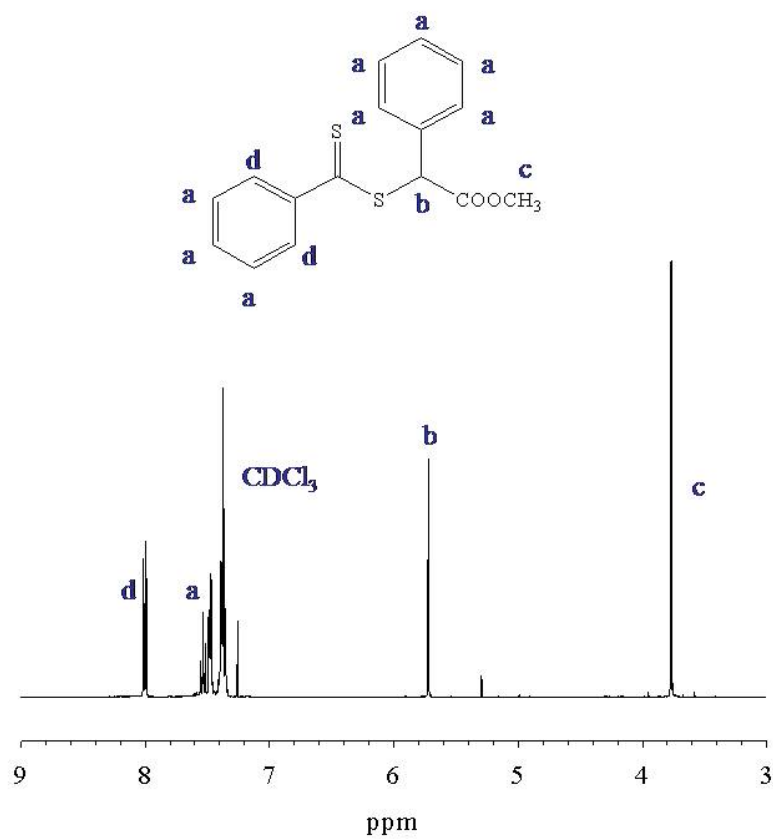


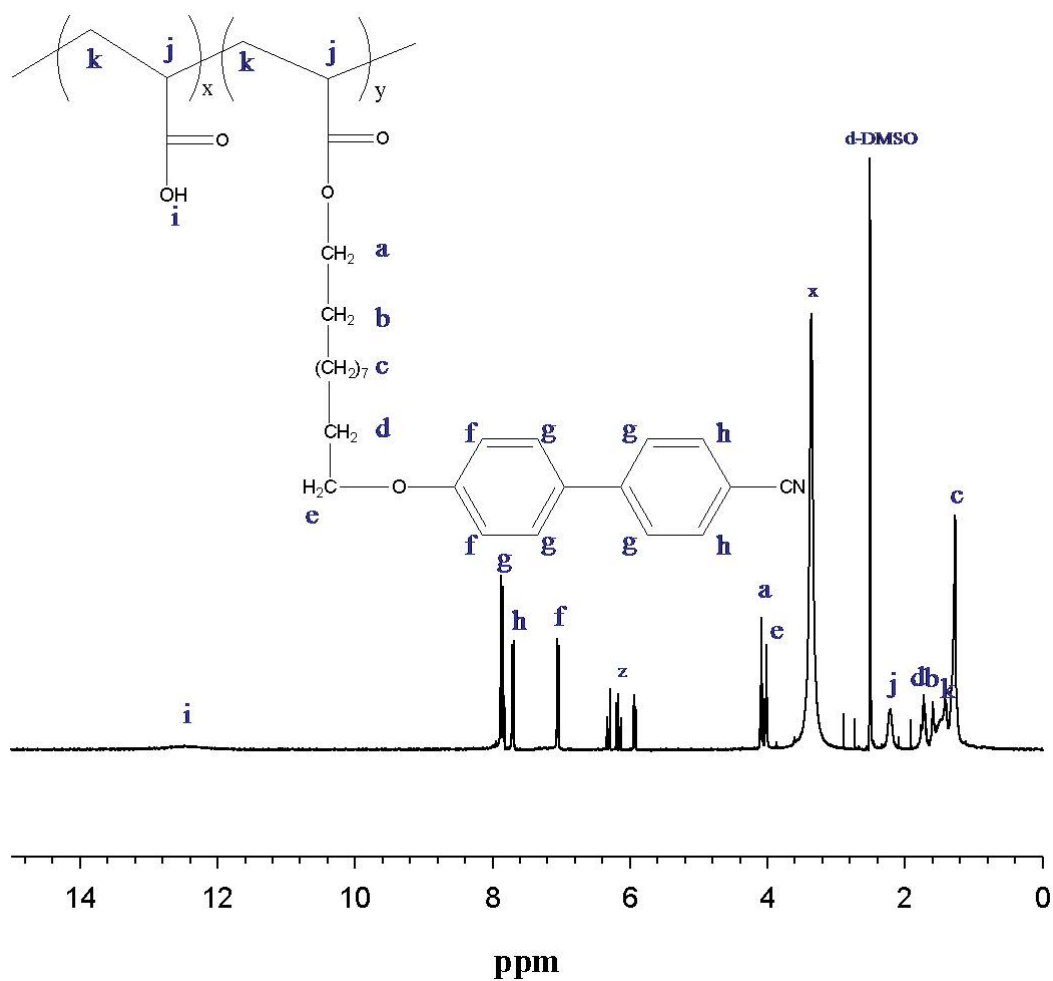
Supplementary Information



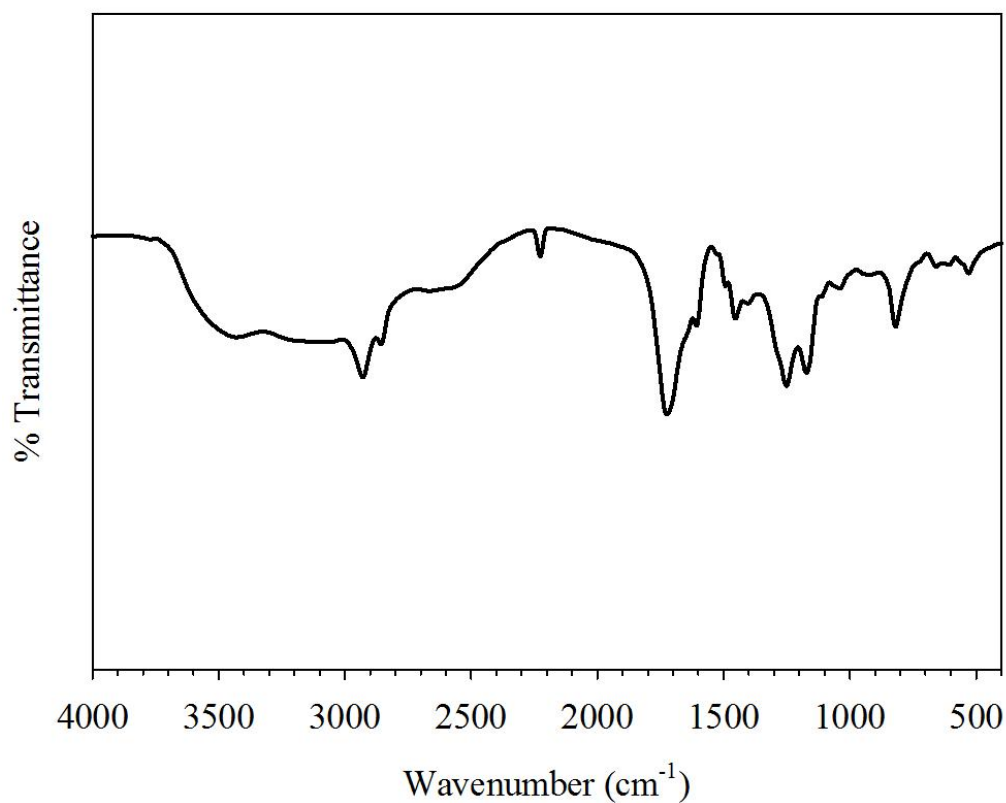
**Fig. S1.** The NMR spectrum of LC11:  $^1\text{H-NMR}$ :  $\delta\text{H}$  (CDCl<sub>3</sub>): 1.2-2.0 (m, 18H,  $-(\text{CH}_2)_9$ ), 3.9-4.0 (t, 2H,  $\text{CH}_2\text{-O-Ar}$ ), 4.1-4.2 (t, 2H,  $\text{O-CH}_2$ ), 5.73-6.35(m, 3H,  $=\text{CH}$ ,  $\text{CH}_2$ ), 6.9-7.0 (m, 2H, aromatic), 7.4-7.5 (m, 4H, aromatic), 7.6-7.7 (m, 2H, aromatic) ppm



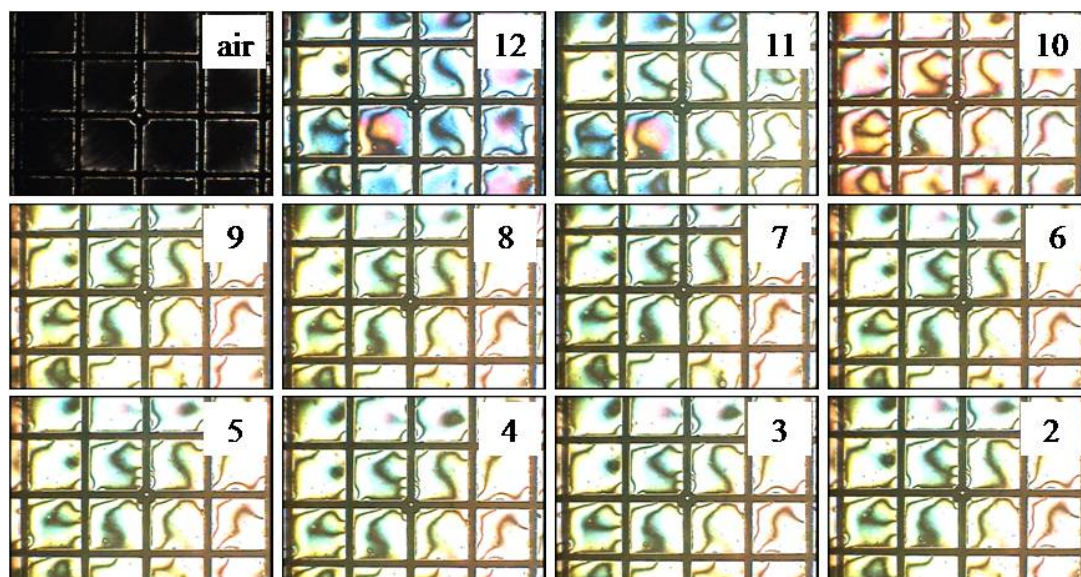
**Fig. S2.** The NMR spectrum of MCPDB: <sup>1</sup>H-NMR: δH (CDCl<sub>3</sub>): 3.70 (s, 3H, -O-CH<sub>3</sub>), 5.65 (s, 1H, -S(Ph)CH-CO<sub>2</sub>Me), 7.20-7.48 (m, 8H, aromatic), 7.91 (m, 2H, aromatic) ppm



**Fig. S3.** The NMR spectrum of PAA-LC11P: <sup>1</sup>H-NMR: δH (d-DMSO): 1.24-1.35 (s, 14H, -(CH<sub>2</sub>)<sub>7</sub>), 1.35-1.58 (m, main chain, -CH<sub>2</sub>), 1.59 (m, 2H, -CH<sub>2</sub>), 1.72 (m, 2H, -CH<sub>2</sub>), 2.11-2.31(s, main chain, -CH), 4.02 (t, 2H, -CH<sub>2</sub>), 4.09 (t, 2H, -CH<sub>2</sub>), 7.05 (d, 2H, aromatic), 7.70 (d, 2H, aromatic), 7.83-7.89 (q, 4H, aromatic), 12.4 (s, 1H, -OH) ppm. z is due to the remaining LC11 monomer. Peak at x represent protons of water.



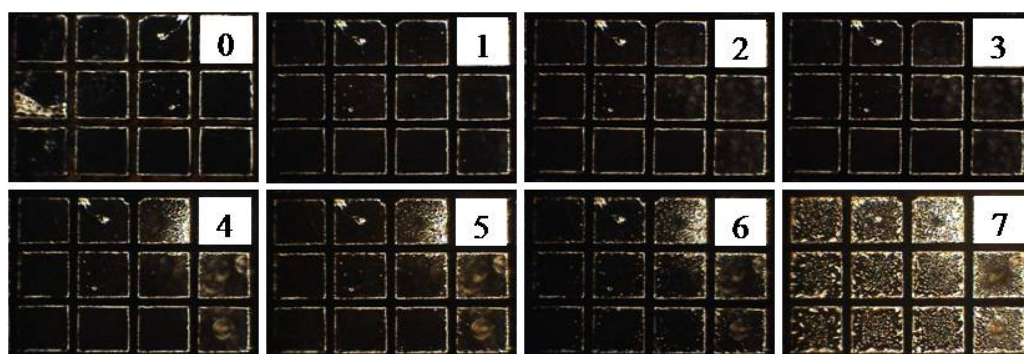
**Fig. S4.** Infrared spectrum of the PAA-b-LCP: The stretching bands of the O-H and C=O groups of PAA appear at 2606 and 1730 cm<sup>-1</sup>, respectively; the peaks at 2225 and 1608 cm<sup>-1</sup> represent the stretching bands of the CN and the aromatic C=C groups of LCP, respectively; the peaks at 2850 to 3000 cm<sup>-1</sup> correspond to the stretching band of the sp<sup>3</sup> hydrocarbons.



**Fig. S5.** The optical micrographs of the TEM grid cells without a PAA-*b*-LCP monolayer on the 5CB observed under a polarized optical microscope with a cross-polar state at the different pHs; the numbers in the figure indicate pH.



**Fig. S7.** The optical micrographs of the TEM grid cells during adjustment of the pH in the buffer solution from 12 to 2, 2 to 12, 12 to 2, and 2 to 12, up to 20 cycles after equilibrium; the numbers in the figure indicate cycle.



**Fig. S8.** The optical micrographs of the TEM grid cells for 7 days at pH=12; the numbers in the figure indicate day.