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

Supplementary Information

Synthesis and characterization of the bent-shaped material

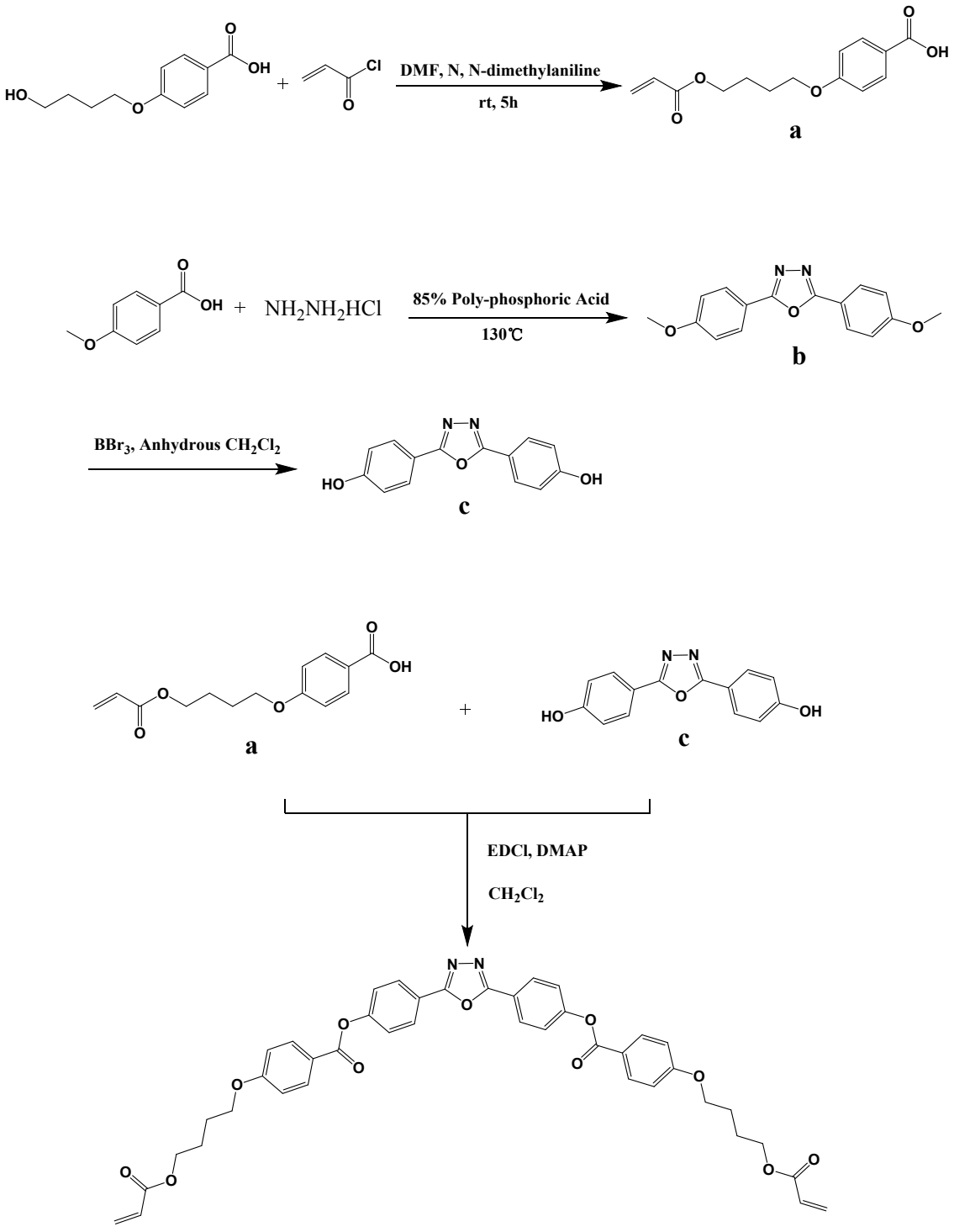

Fig. S1 Synthetic route of the bent-shaped material.

^{1}H NMR (400 MHz, $CDCl_3$) δ =8.23 (d, J = 8.5 Hz, 4H), 8.17 (d, J = 8.7 Hz, 4H), 7.42 (d, J = 8.5 Hz, 4H), 7.00 (d, J = 8.7 Hz, 4H), 6.43 (d, J = 17.3 Hz, 2H), 6.14 (dd, J = 17.3, 10.4 Hz, 2H), 5.85 (d, J = 10.4 Hz, 2H), 4.27 (t, J = 5.8 Hz, 4H), 4.11 (t, J = 5.6 Hz, 4H), 2.02 – 1.86 (m, 8H).^{13}C NMR (101 MHz, $CDCl_3$) δ =166.36, 164.11, 163.65, 153.91, 132.57, 130.95, 128.50, 122.86, 121.37, 114.51, 77.49, 77.17, 76.86, 67.74, 64.16, 31.56, 30.30, 29.82, 25.87, 25.48. HRMS (ESI): Calcd for $C_{42}H_{39}N_2O_{11}H^+$: 747.2554; found: 747.2560.

Herein, the coupling constants (*J*) were reported in hertz (Hz); and the splitting pattern is designated as s, singlet; d, doublet; t, triplet; and m, multiple.

Phase transition behaviour of the bent-shaped material

Figure S2a demonstrates the polarizing optical microscopy (POM) texture of the synthesized bent-shaped material during heating process. The material shows a crystalline phase in the room temperature—25 °C, and transits to liquid crystalline phase at 166 °C. The material transforms into optical isotropy as the temperature reaches about 380 °C. Results detected through differential scanning calorimetry (DSC) (Fig. S2b) confirm the observations of POM, which indicate two exothermic peaks at 165.24 °C and 381.69 °C, corresponding to transition temperature from crystal to liquid crystal and from liquid crystal to isotropy, respectively. No liquid crystal phase was detected during cooling process according to the results of DSC.

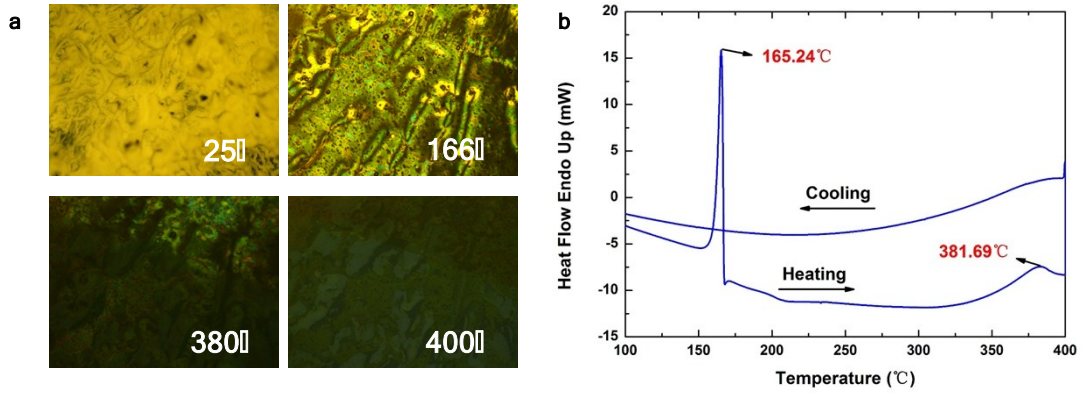

Fig. S2 (a) POM textures at the crystalline (25 °C), crystalline—liquid crystal (166 °C), liquid crystal—isotropy (380 °C), and isotropic phase (400 °C). (b) Phase transition behaviour of bent-shaped material detected by DSC during both heating and cooling processes.

Electro-optical property of the BP before UV irradiation

Before UV induced photo-crosslinking, a typical BP optical texture with blue-and-green platelets was presented at the initiate (Fig. S3a). A bright state generated after the BP sample was driven by a 110-V_{rms} voltage applied on the IPS cell (Fig. S3b). However, the sample did not recover to the original BP state, but was replaced by the N* phase (Fig. S3c) after such voltage was removed,

which confirms the BP instability under the applied electric-field.

Fig. S3 POM textures of BP sample (12 wt% bent-shaped material) before light irradiation. (a) The initial BP state; (b) by applying a 110-V_{rms} voltage, *i.e.*, ON state; (c) as the voltage was removed, *i.e.*, OFF state.