

## Support Information

### Photo Actuation Performance of Nanotube Sheet Incorporated Azobenzene Crosslinked Liquid Crystalline Polymer Nanocomposite

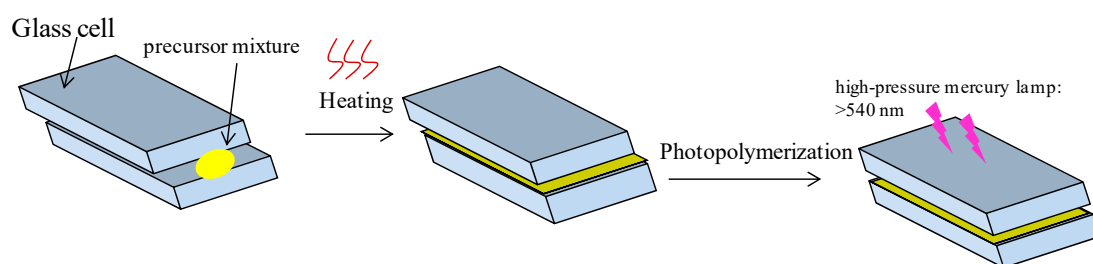
Movie S1: The microvalve membrane actuator performs opening or closing the valve outlet under switching on/off of UV-light.

$^1\text{H}$  NMR measurement data:

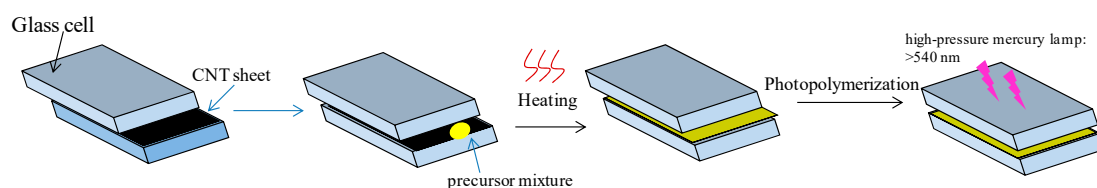
The  $^1\text{H}$  NMR measurement of DA11AB:  $\delta$  1.4-1.9(m, 36H), 3.9(t, 4H), 4.1(t, 4H), 5.8(dd, 2H), 6.1(dd, 2H), 6.4(dd, 2H), 6.9(m, 4H), 7.8(m, 4H). The  $^1\text{H}$  NMR measurement of C9A:  $\delta$  1.35-1.85(m, 28H), 2.24(s, 3H), 4.05(t,  $J=6.5$  Hz, 4H), 4.18(t,  $J=6.5$  Hz, 4H), 5.74(dd,  $J=2$ , 10 Hz, 2H), 6.07(dd,  $J=10$ , 7 Hz, 2H), 6.33(dd,  $J=2$ , 17 Hz, 2H), 6.95-6.99(m, 4H), 7.12-7.36(m, 3H), 8.12-8.17(m, 4H).

Mass spectra (MS) data:

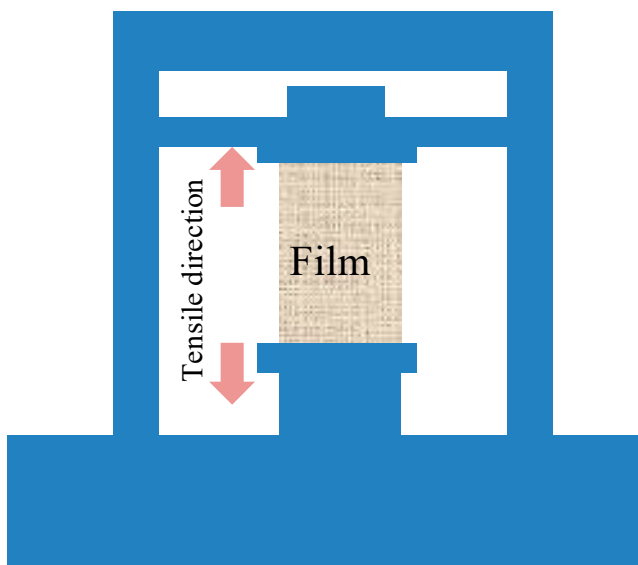
The mass fraction of the element “C”, “H” and “N” obtained from MS measurement of DA11AB was 72.29%, 8.80% and 4.48% respective, which are closed to the theoretical value of 72.47%, 8.82% and 4.23% respective. In addition, the mass fraction of the element “C” and “H” obtained from MS measurement of C9A was 71.68% and 7.48% respective, which are closed to the theoretical value of 71.43% and 7.41% respective.



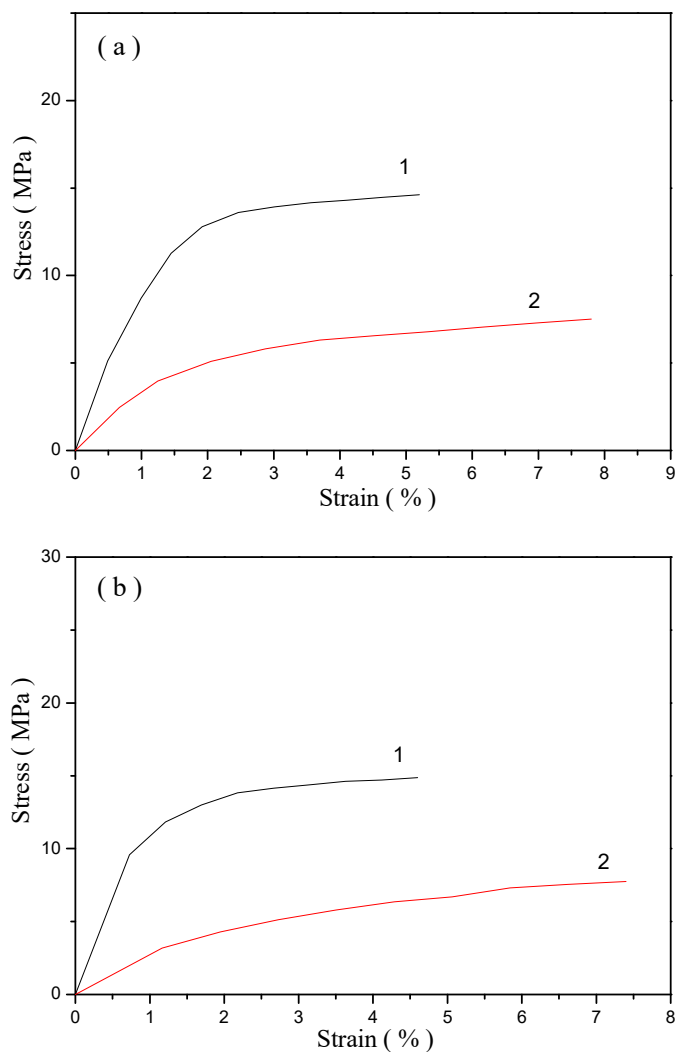
**Figure S1.** A schematic illustration of the preparation process of AZO-CLCP film.

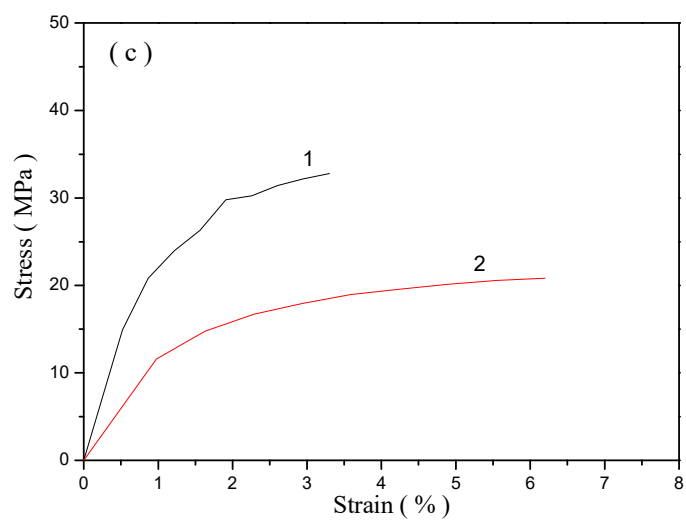


**Figure S2.** A schematic illustration of the preparation process of AZO-CLCP/CNT film.



**Figure S3.** Schematic illustration of the experimental setup for measuring the tensile strengths of AZO-CLCP films or AZO-CLCP/CNT nanocomposite films by using the universal material mechanical analyzer. The tensile rate was  $1 \text{ mm min}^{-1}$ .





**Figure S4.** Stress-strain curves of F10(a), F60(b) and CF60(c) measured with the tensile direction of being parallel (1) and perpendicular (2) to the alignment direction.