Supporting information outlining the synthesis of azobenzene crosslinkers (Figure 1)

Synthesis of 4,4-dihydroxyazobenzene (2):

A solution of p-aminophenol (10.0 g, 91.64 mmol) in the diluted 1 M HCl solution (200 mL) was cooled to 0°C by immersion in an ice bath. Next, (9.34 g, 109.8 mmol) of $NaNO_2$ was dissolved in 150 ml of H_2O and was added to the p-aminophenol solution. To the diazotized solution, 200ml of CH_3OH (pre-cooled) was added. The resulting mixture was stirred for 1 h. Subsequently, phenol (8.62 g, 91.64 mmol) of dissolved in 65 ml of 3 M aqueous sodium hydroxide was added drop-wise and reaction mixture was stirred at room temperature for 2 h. Methanol was removed by evaporation and concentrated HCl was added to adjust pH< 5. The resulting precipitate was collected and washed with H_2O and recrystallized from ethanol/water synthesize compound **2** (Figure 1) with a yield of (15.42 g, 78.0%.) ^{1}H NMR (400 MHz, $DMSOd_6$, ppm) δ: 10.52 (s, OH) 7.70 (d, 4H, J = 8.8 Hz, ArH), 6.09 (d, 4H, J = 8.8 Hz, ArH). ^{13}C NMR (100 MHz, $DMSOd_6$, ppm) δ: 160.20, 145.72, 124.67, 116.33

Synthesis of 4, 4' (-di (8-(acryloxy)octylloxy)azobenzene) (4) :

To a solution of compound **2** (5 g, 1 equiv), K_2CO_3 (3 equiv), and 8-chloro-1-octonal (2.5 equiv) are dissolved in DMF (60 mL). A trace amount of KI was added, and the reaction mixture was reflux for 12 h. The reaction mixture was poured into a large excess of water (1000 mL) and the layers were separated by adding ethyl acetate. Subsequently, the organic layer was washed, then dried over $MgSO_4$, filtered, and concentrated at reduced pressure. The resulting material was utilized subsequently without further purification. To a solution of compound **3** (3.0 g, 1 equiv), trimethylamine (2.5 equiv) and a trace amount of hydroquinone are dissolved in THF (60 mL) at 0 °C. The acryloyl chloride (3 equiv) is added dropwise and the reaction mixture is stirred for 1 hour at 0 °C and 12 hours at room temperature. The reaction is quenched by adding 20 ml aqueous solution of $NaHCO_3$ and stirred for 30 minutes. The organic phase is separated and washed with water. After evaporation of the solvent the residue was purified using column chromatography using silica gel and chloroform as the effluent. Finally, the resulting solid was recrystallized using ethanol with a yield of (2.51 g, 68%) ^{1}H NMR (400 MHz, $CDCl_3$, ppm) δ: 7.79 (d, 4H, J = 9.2 Hz ArH), 6.91 (d, 4H, J = 9.2 Hz ArH), 6.32 (dd, 2H, J = 17.2 Hz vinylic), 6.05 (dd, 2H, J = 10.4 Hz vinylic), 5.74 (dd, 2H, J = 12.0 Hz vinylic), 4.08 (t, 4H, J = 6.6 Hz, OCH_2), 3.96 (t, 4H, J = 6.6 Hz, OCH_2), 1.78-1.71 (m, 4H), 1.62-1.59 (m, 4H), 1.43-1.41 (m, 4H), 1.39-1.31 (m, 12H). ^{13}C NMR (100 MHz, $CDCl_3$, ppm) δ: 166.36, 161.14, 146.96, 130.48, 128.64, 124.30, 114.66, 68.24, 64.65, 29.25, 29.17, 28.60, 25.96, 25.87.