Supporting Information

Mechano- and Photochromic Dual-responsive Properties of an Amino Acid-based Molecule in Polymorphic Phase

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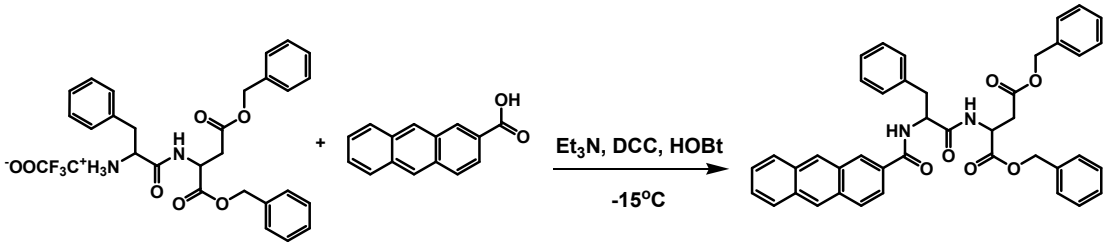
1. Synthesis of the targeted molecule



2 **1**

To a stirring $CHCl_3$ solution of **2**[S1] (0.3 g, 0.5 mmol), 0.5 ml Et_3N and 2-anthracene-carboxylic acid (0.18 g 0.8 mmol) were mixed at -15°C. Then N,N'-dicyclohexylcarbodiimide (0.19 g, 0.9 mmol) and N-Hydroxybenzotriazole (5 mg, 0.03 mmol) were added slowly. After the solution was stirred for 2 days, the mixture was concentrated under vacuum. **1** was purified the silica gel column chromatography using CH_2Cl_2/THF (10:1) as the eluent (yield: 80 %).

^{1}H NMR (500 MHz, $CDCl_3$, δ): 8.43-8.41 (d, 2H), 8.37 (s, 1H), 8.00-7.98 (m, 3H), 7.71-7.70 (d, 1H), 7.52-7.49 (m, 2H), 7.31-7.26 (m, 15H), 7.05-7.00 (dd, 2H), 5.15 (s, 2H), 5.05-5.00 (m, 3H), 4.92 (b, 1H), 3.21-3.21 (m, 2H), 3.09-2.91 (dd, 2H)

^{13}C NMR (125 MHz, $CDCl_3$, δ): 170.75, 170.41, 169.95, 167.16, 136.19, 135.21, 135.03, 132.76, 132.15, 132.04, 130.40, 130.32, 129.43, 128.84, 128.66, 128.58, 128.56, 128.51, 128.49, 128.40, 128.32, 128.14, 128.10, 127.09, 126.33, 126.20,

125.85, 122.67, 67.63, 66.87, 54.54, 48.88, 38.29, 36.23

Element Calcd for $C_{42}H_{36}N_2O_6$: C 75.89; H 5.46, N 4.21. Found. C 75.66; H 5.61, N 4.17.

HR-ESI Calcd. For $C_{42}H_{36}N_2O_6$: 664.2646. Found. $[M+H]^+$: 665.2654, $[M+Na]^+$:687.2471

2. Thermogravimetric analysis (TGA) of original sample of 1.

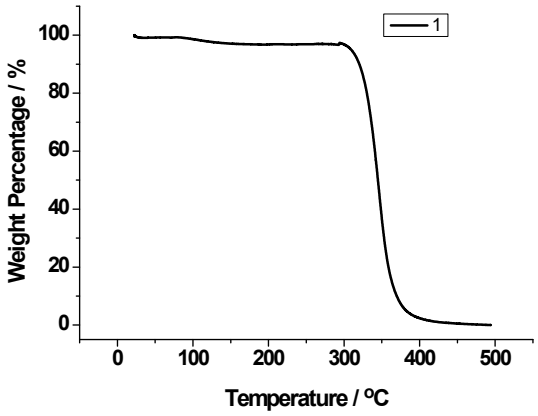


Figure S1. TGA curve of original sample of 1.

3. IR spectra of the sample before and after shearing

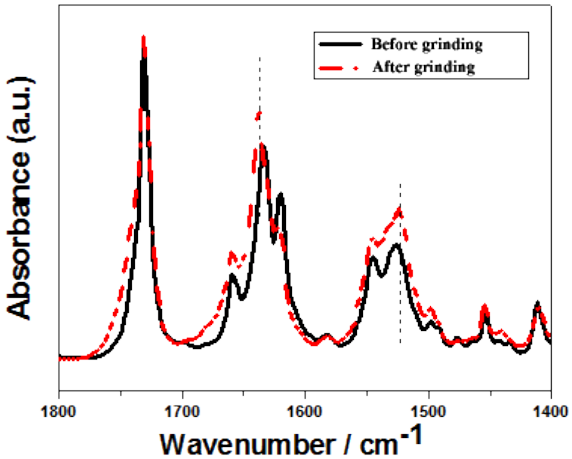


Figure S2. FT-IR spectra of the sample before (black) and after grinding (red).

4. AFM image of O-xerogel

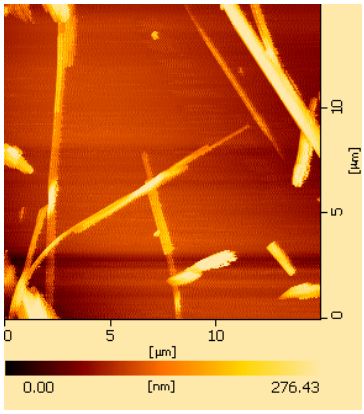


Figure S3. AFM image of O-xerogel sample.

5. Optical property of grinding sample with different radiation time.

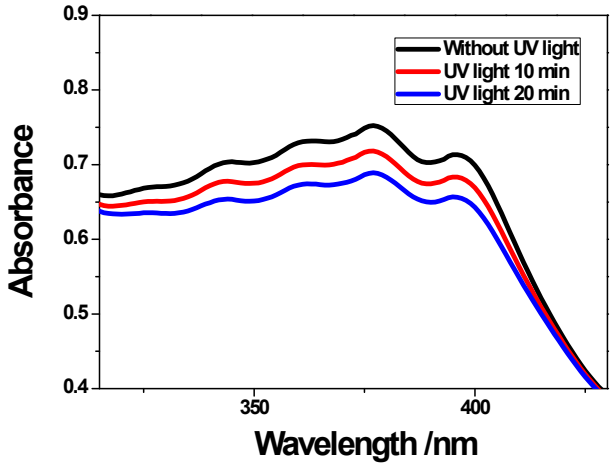


Figure S4. UV-vis absorption spectra of grinding sample irradiated with different time.

6. POM images of O-xerogel before and after grinding.

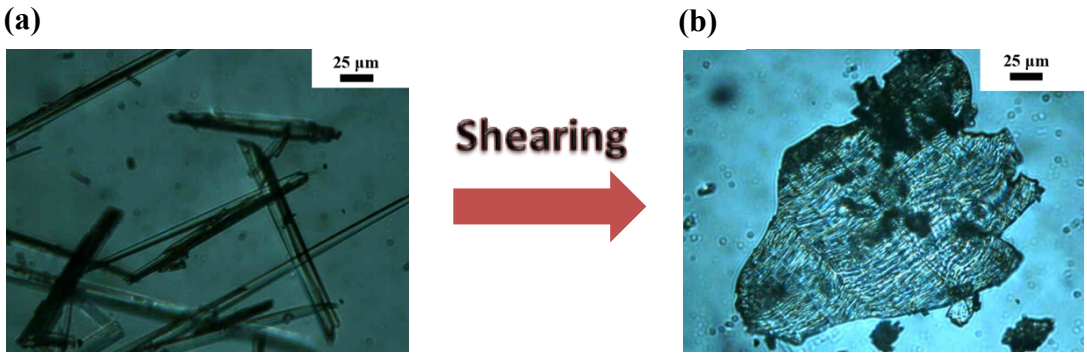
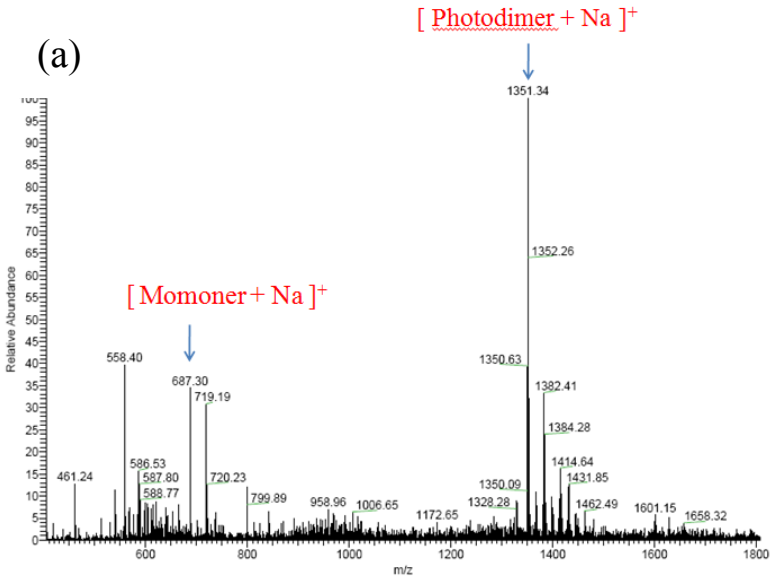


Figure S5. POM images of the tapes (a) before and (b) after grinding.

7. The mass spectra of grinding sample upon UV irradiation



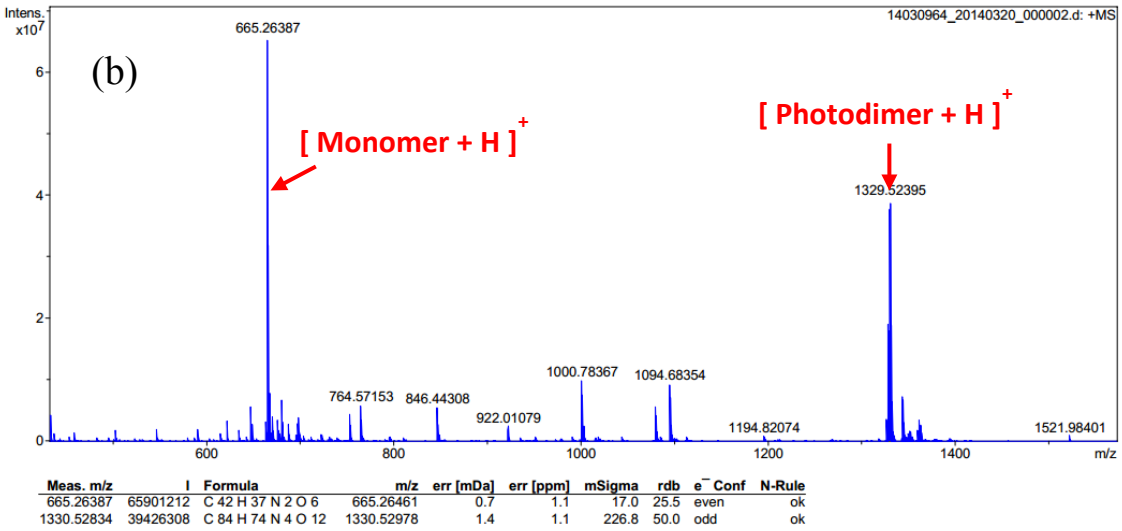


Figure S6. (a) low resolution MS and (b) high resolution MS spectrum of grinding sample upon UV irradiation

8. The switching cycles of the sample by grinding and heating

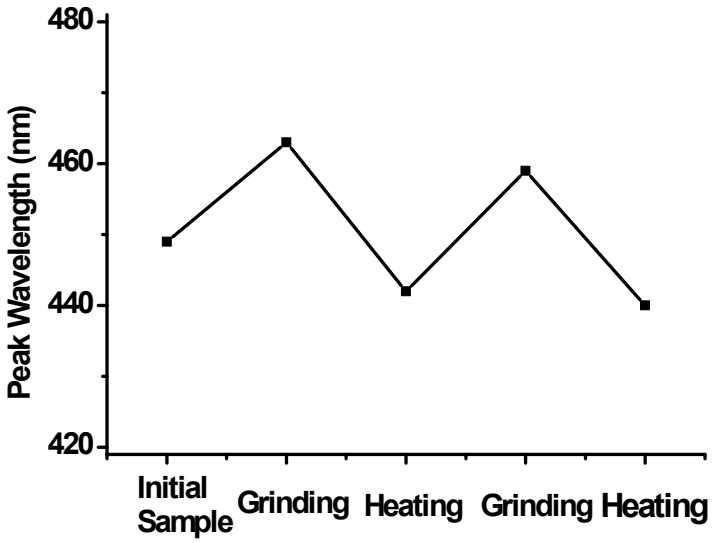


Figure S7. The switching cycles of the sample by grinding and heating.

[S1] Teng, M. J.; Jia, X. R.; Yang, S.; Chen, X. F.; Wei, Y. *Adv. Mater.*, **2012**, *24*, 1255–1261.