Electronic Supplementary Information

Transparency and AIE tunable supramolecular polymer hydrogel act as TEA-HCl vapor controlled smart optical material

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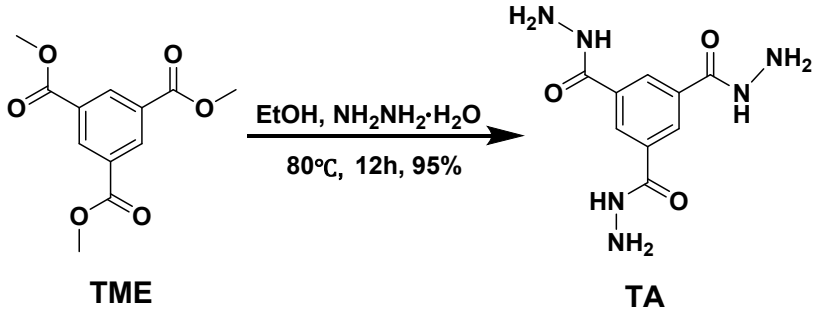
Materials and General Methods:

Materials: All chemical reagents are high purity commercial reagents. Triethylamine (TEA) and hydrochloric acid (12 mol/L) were analytical grade. The water was fresh double-distilled water throughout the experiment. To record the ^{1}H NMR and ^{13}C NMR spectra, we were used Varian Mercury 400 and Varian Inova 600 instruments. To record MS, we were used a Bruker Esquire 3000 high-resolution MS instrument. To use a scanning electron microscopy (SEM) system (JEOL, Model JSM-6701F) characterized the surface morphologies of **TH-GF**. The infrared spectra were characterized on Digilab FTS-3000 FT-IR spectrophotometer. Melting point was measured by using X-4 digital melting-point apparatus. The fluorescence spectra were recorded by Shimadzu RF-5301PC fluorescence spectrophotometer. Ultraviolet-visible (UV-vis) spectra were recorded on a Shimadzu UV-2550 spectrometer.

Synthesis:



Scheme S1. Synthesis route of TA

Synthesis of TA:

Hydrazine hydrate (5ml, 85%) was dropwise added into a solution of the TME (0.5040 g, 2 mmol) in alcohol (30 mL). The mixture was stirred and refluxed at 80 °C for 24 h. The product was filtered and washed twice by water. Finally, the white solid was obtained (compound TA) (0.4808 g, yield: 95%). ESI-MS m/z: $[M+H]^{+}$ Calcd $C_9H_{12}N_6O_3$: 253.1044, found 253.1037.

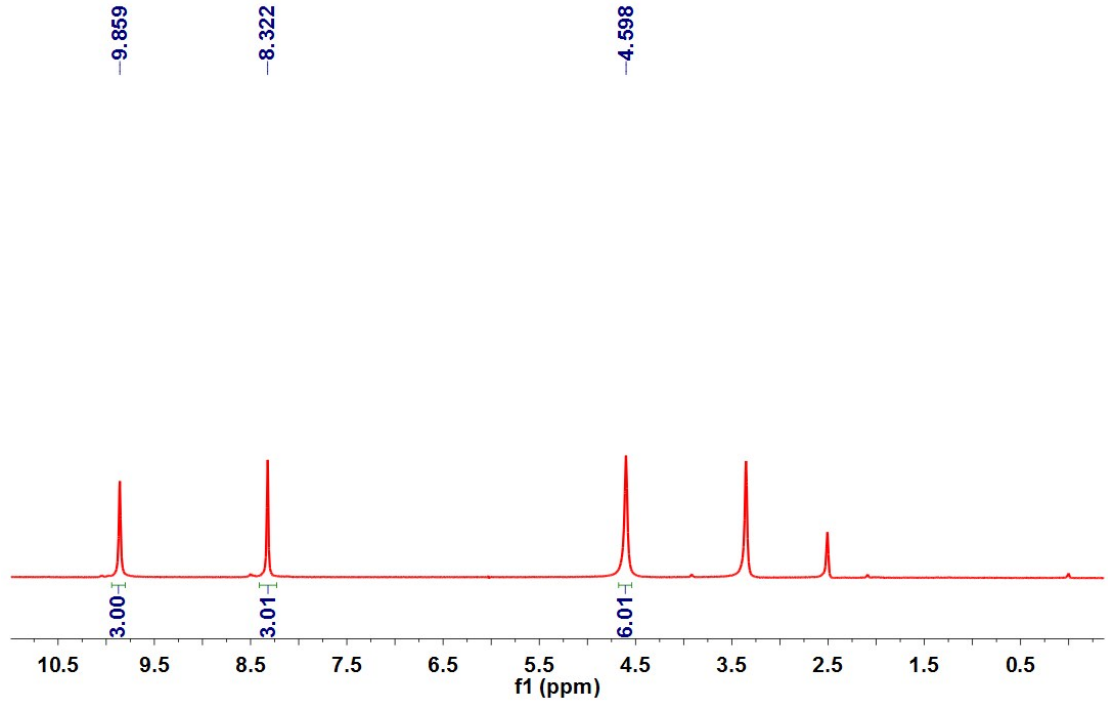


Figure S1. 1H NMR spectrum of **TA**

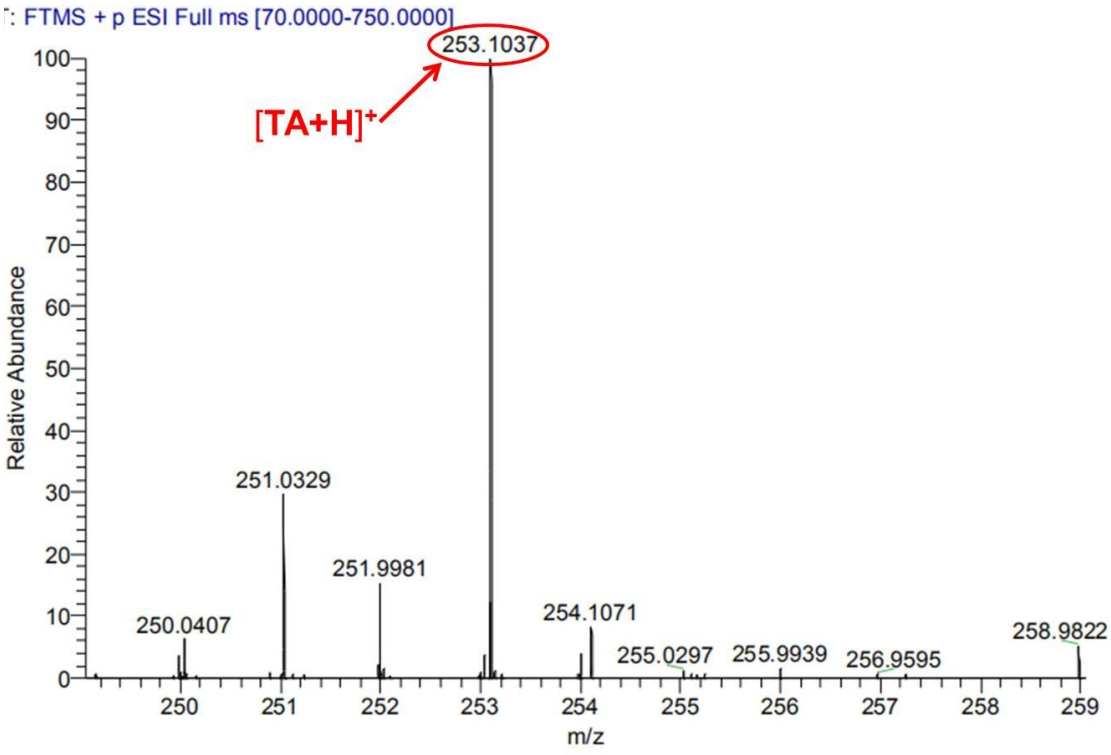


Figure S2. Mass spectrum of **TA**

Synthesis of A:

A mixture of P-hydroxybenzaldehyde (1.22 g, 10mmol), 1, 6-dibromohexane (9.68 g, 40mmol), KI (0.83 g, 5mmol) and K_2CO_3 (1.38 g, 10mmol) was added into acetone

(150 mL). The mixture was heated under nitrogen atmosphere at reflux at 60°C for 72 h. The reaction mixture was concentrated by rotary evaporation, the crude product isolated by flashed column chromatography using petroleum ether/ethyl acetate (20:1). Finally, the white solid was obtained (compound **A**) (2.00 g, yield: 70.4%). The melting point is 49-52 °C.^{1}H NMR (DMSO-d_6, 600 MHz) δ/ppm: 9.88 (s, 1H), 7.84-7.82 (m, 2H), 6.00-6.98 (m, 2H), 4.06-4.04 (m, 2H), 3.44-3.42 (t, J = 6.7Hz, 1H), 3.22-3.20 (t, J = 6.9Hz, 1H), 1.92-1.82 (m, 4H), 1.53-1.50 (m, 4H). ESI-MS m/z: $[M+H]^+$ Calcd $C_{13}H_{17}O_2Br$: 258.0485, found 258.0485.

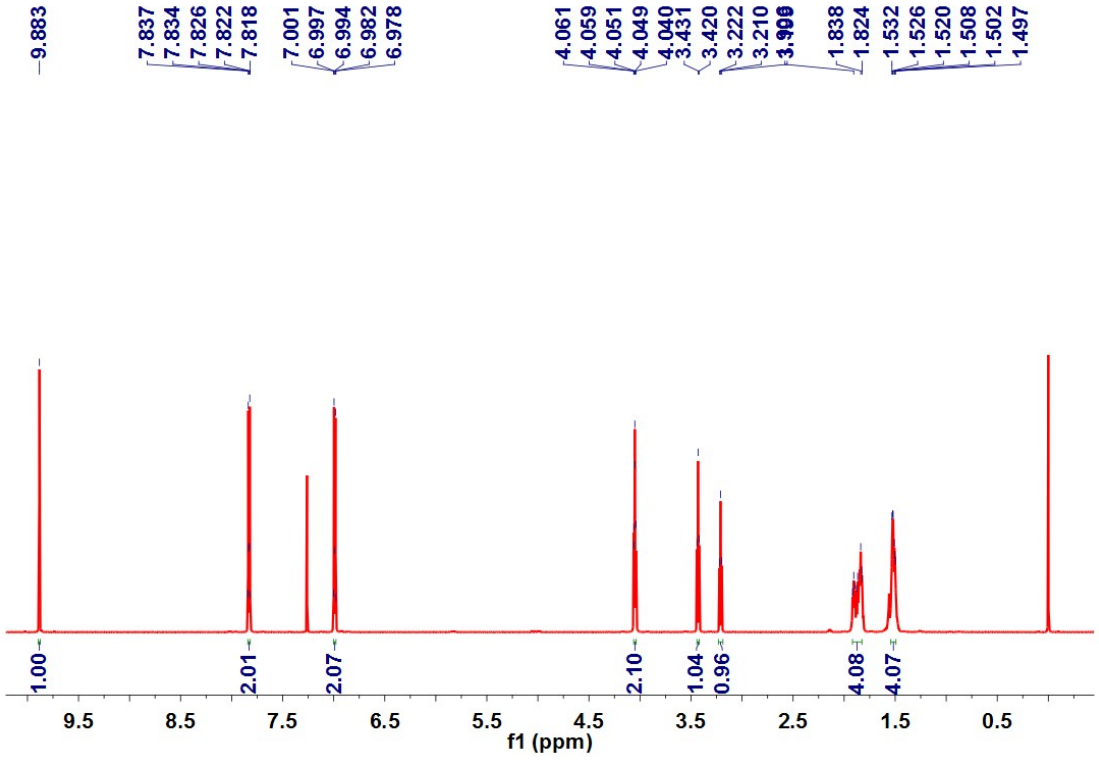


Figure S3. ^{1}H NMR spectrum of **A**

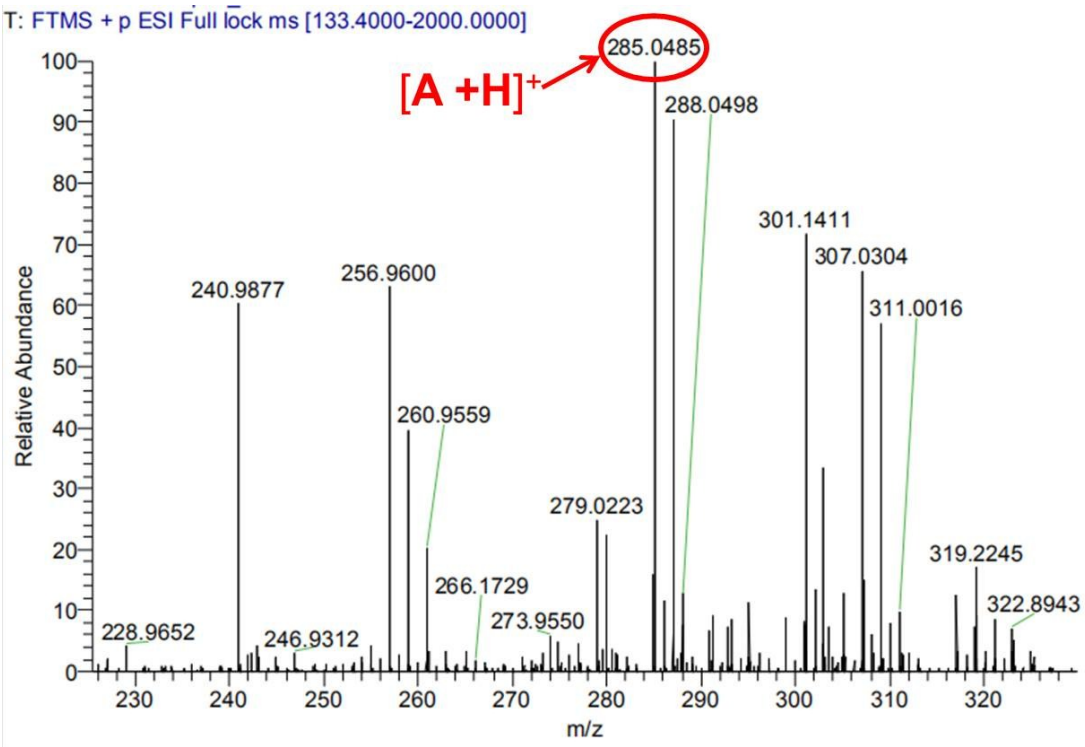


Figure S4. Mass spectrum of **A**

Synthesis of AN:

Compound **A** (0.142 g, 0.5 mmol) was added into ethyl acetate (2ml) and stirring at room temperature for 5 minute. Then, trimethylamine (33 % in ethanol, 1.0 mL, 3.7 mmol) was added into the solution of the compound **A**, and stirring at room temperature for 48 hours. Then the solvent was removed by evaporation, the crude product was washed by diethyl ether to obtain a white solid (compound **AN**) (0.13 g, yield: 76%). The melting point is 89-91 °C.^{1}H NMR (DMSO-d_6, 600 MHz), δ/ppm: 9.86 (s, 1H), 7.82-7.80 (m, 2H), 6.98-9.97 (m, 2H), 4.04-4.02 (t, J = 6.2Hz, 2H), 3.66-3.63 (m, 2H), 3.45 (s, 10H), 1.83-1.80 (m, 4H), 1.59-1.54 (m, 2H), 1.50-1.45 (m, 2H). ESI-MS m/z: $[M+K]^+$ Calcd $C_{16}H_{26}BrNO_2$: 382.0799, found 382.0793.

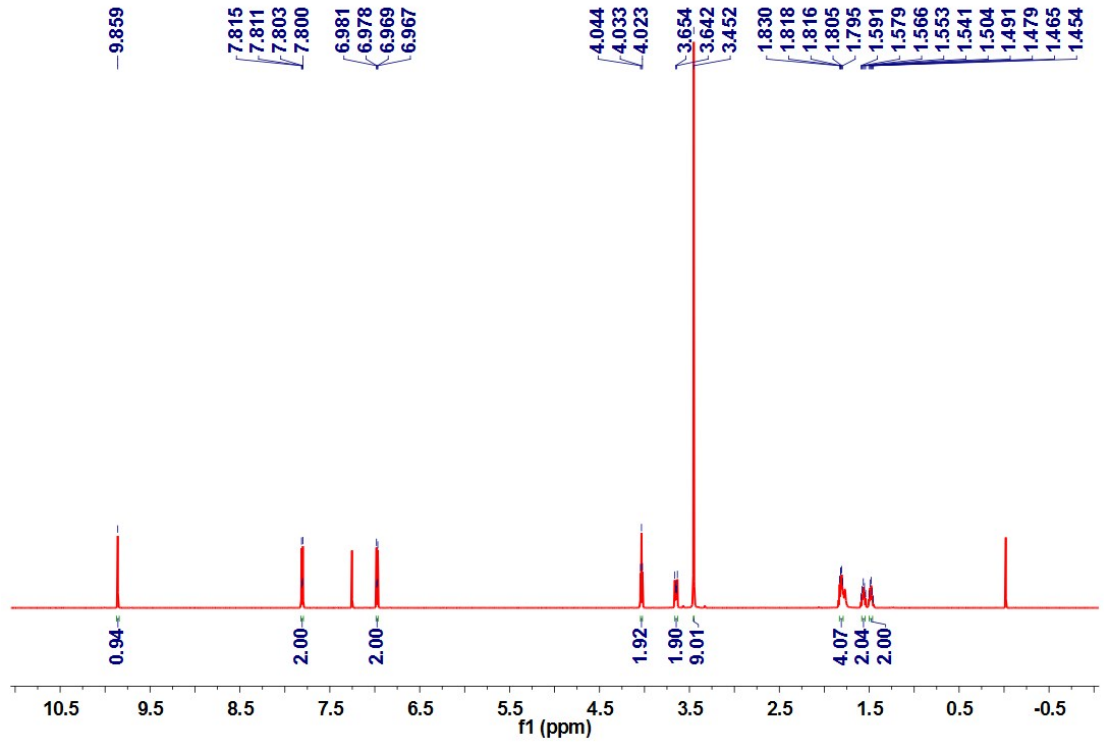


Figure S5. ^{1}H NMR spectrum of **AN**

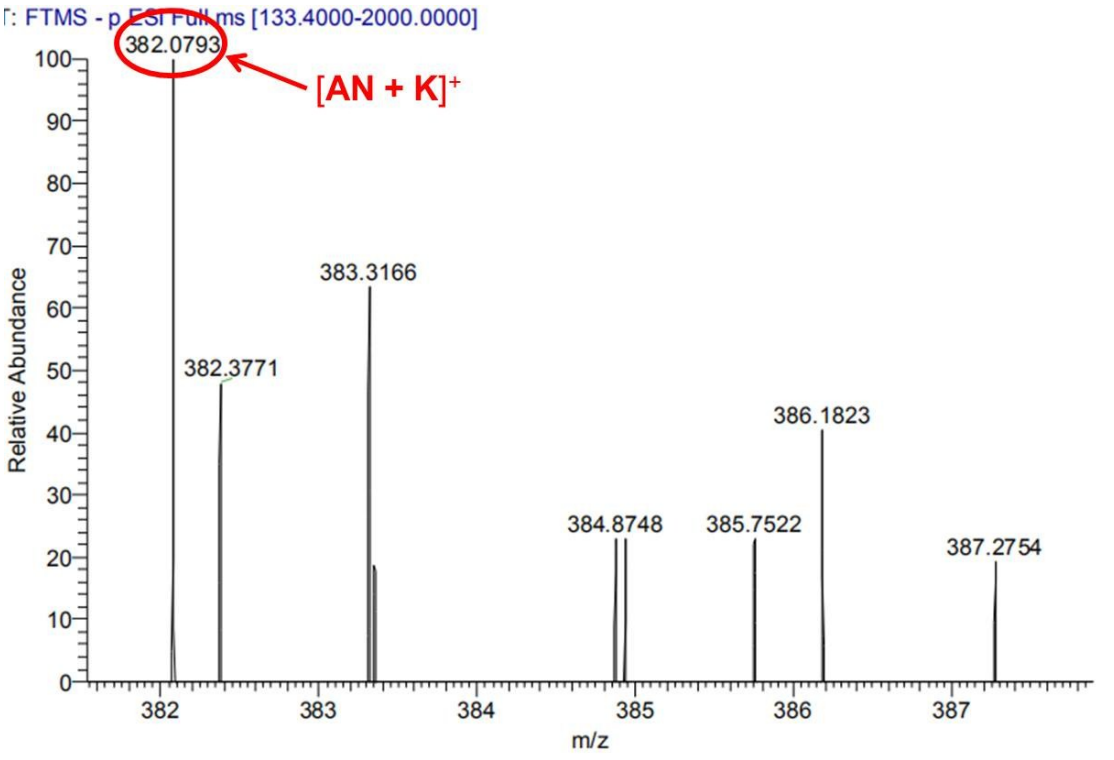


Figure S6. Mass spectrum of **AN**

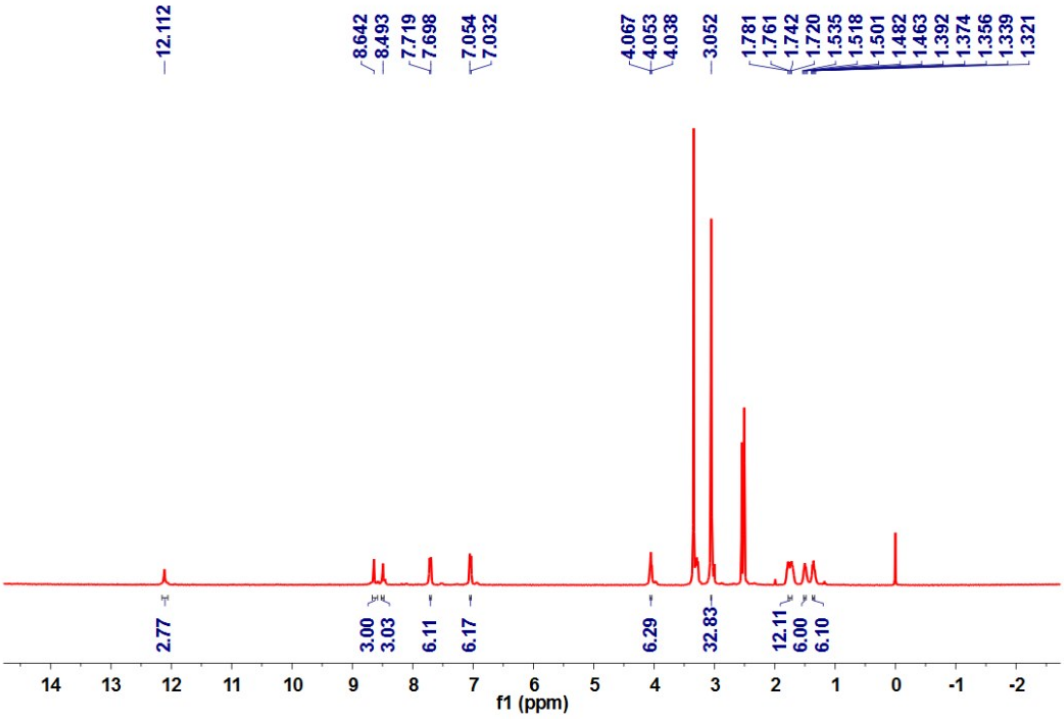


Figure S7. ^{1}H NMR spectrum of **TH**

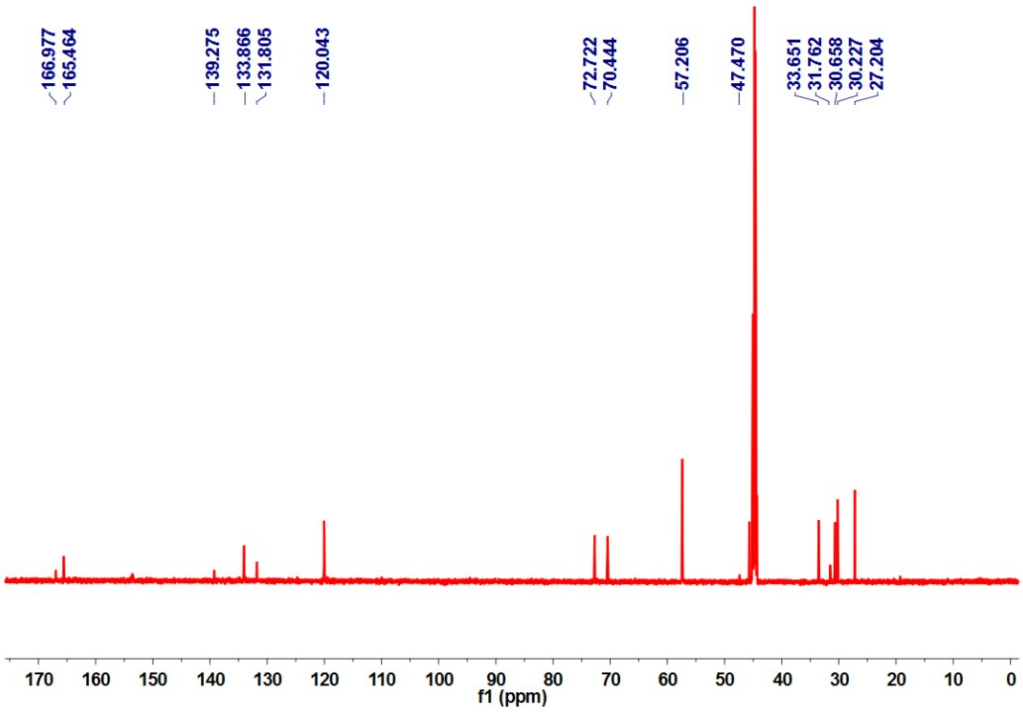


Figure S8. ^{13}C NMR spectrum of **TH**

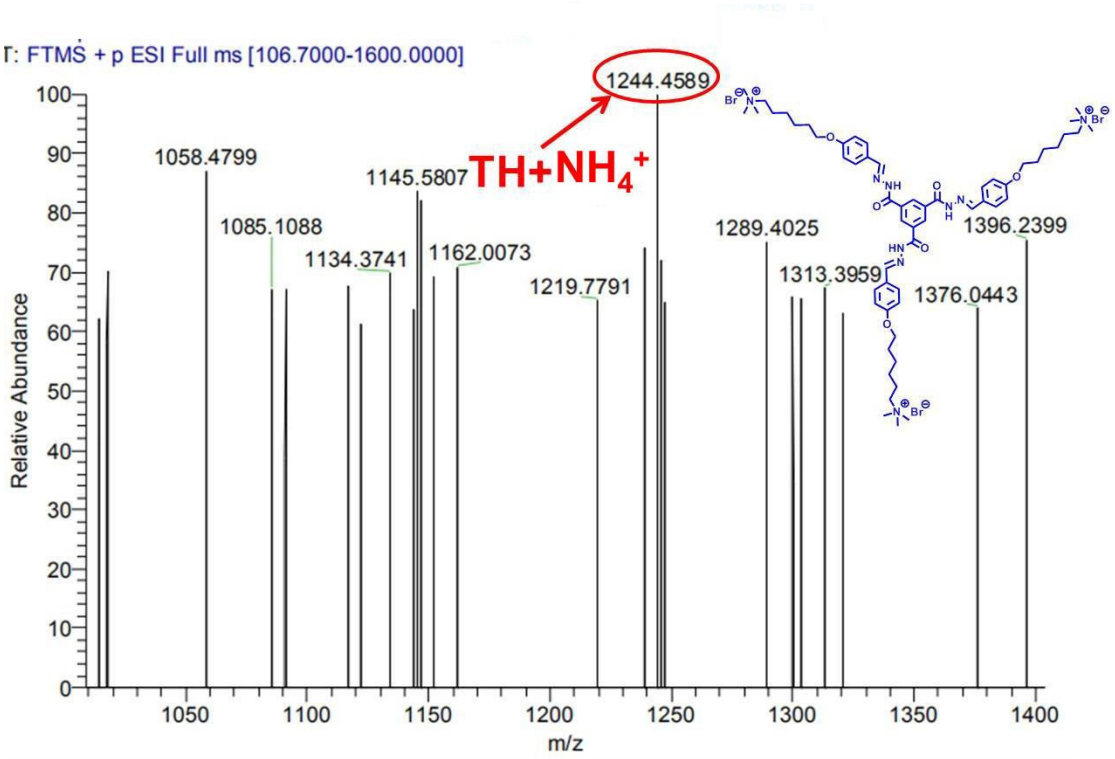


Figure S9. Mass spectrum of **TH**

Table S1. Gelation Properties of **TH-G** in different gelation concentration

Entry	CGC(%)	T_{sol}-T_{gel}(℃)
1	5	37-35
2	10	44-42
3	15	47-43
4	20	44-41
5	25	43-40

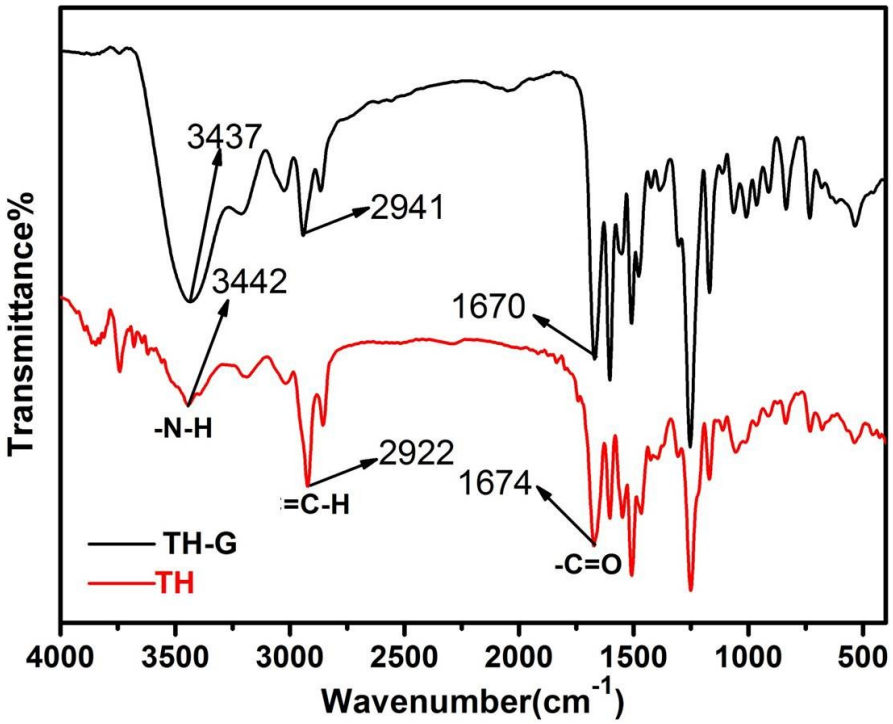


Figure S10. FT-IR spectra of **TH** and **TH-G**