

【Electronic Supplementary Information】

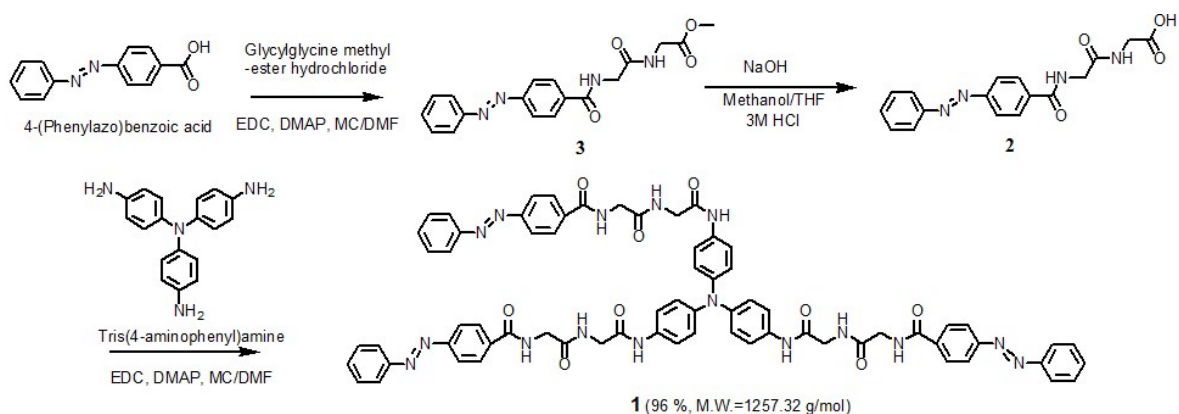
Spatially resolved mechanical properties of photo-responsive azobenzene-based supramolecular gels

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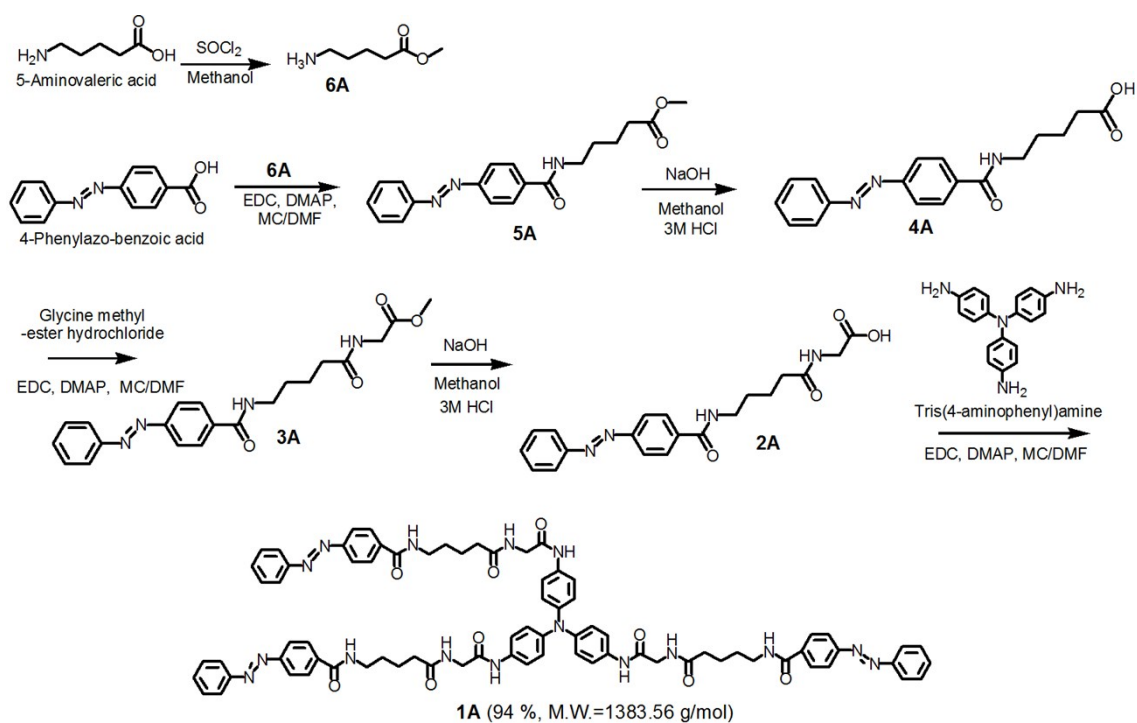
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Scheme S1. Schematic of synthetic methods for compounds **1**.



Scheme S2. Schematic of synthetic methods for compounds **1A**.

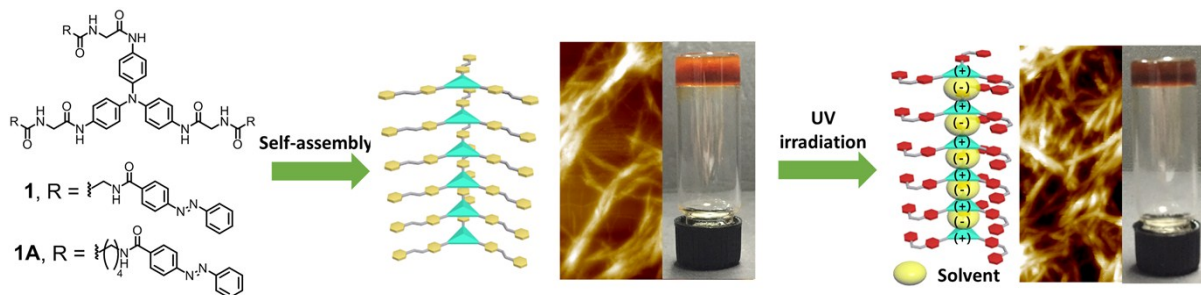


Fig. S1 Illustration showing self-assembly of gelator molecules and its conformational change under UV irradiation.



Fig. S2 The photograph of supramolecular gel (A) **1** and (B) **1A** by aging times.

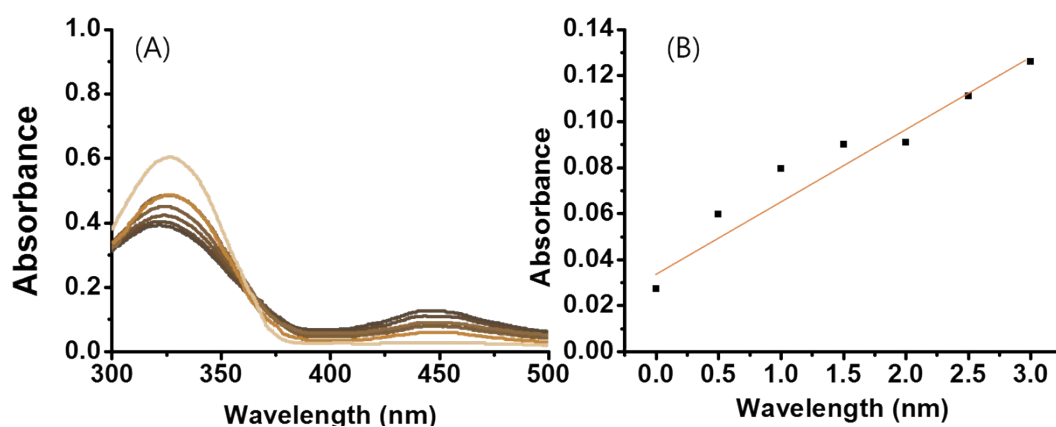


Fig. S3 (A) UV spectra of supramolecular gel **1A** by UV irradiation. (B) Plot of the absorbance bands of gel **1A** at 450 nm.

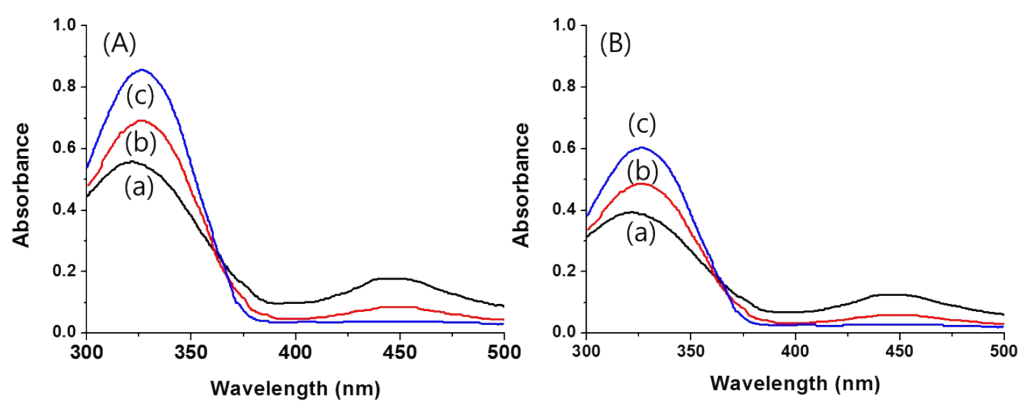


Fig. S4 UV spectra of supramolecular gels (A) **1** and (B) **1A** recovered from *cis* to *trans* state by irradiation with visible light source (450 nm, 10mW/cm²). ((a) before and after irradiation for (b) 1h and (c) 3 h)

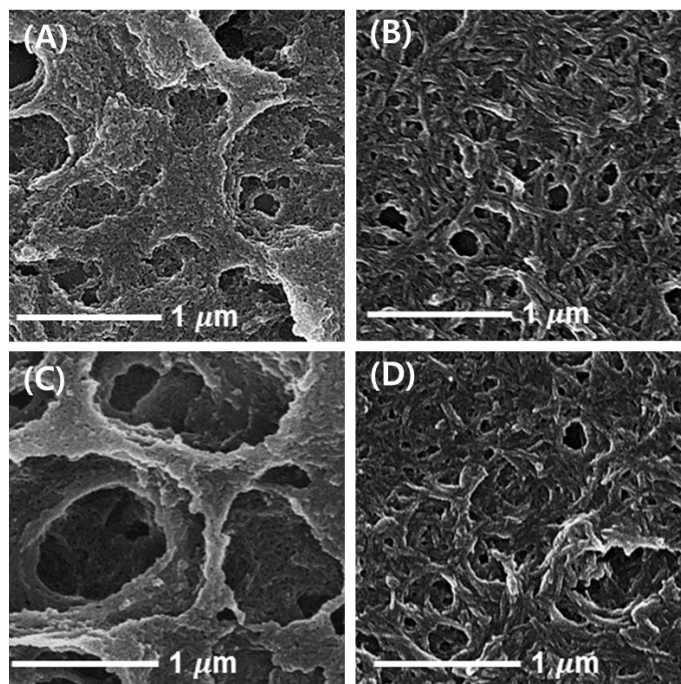


Fig. S5 SEM images of supramolecular gel (A) **1**, (B) **1A**, cis-isomer (C) **1** and (D) **1A** by UV irradiation.

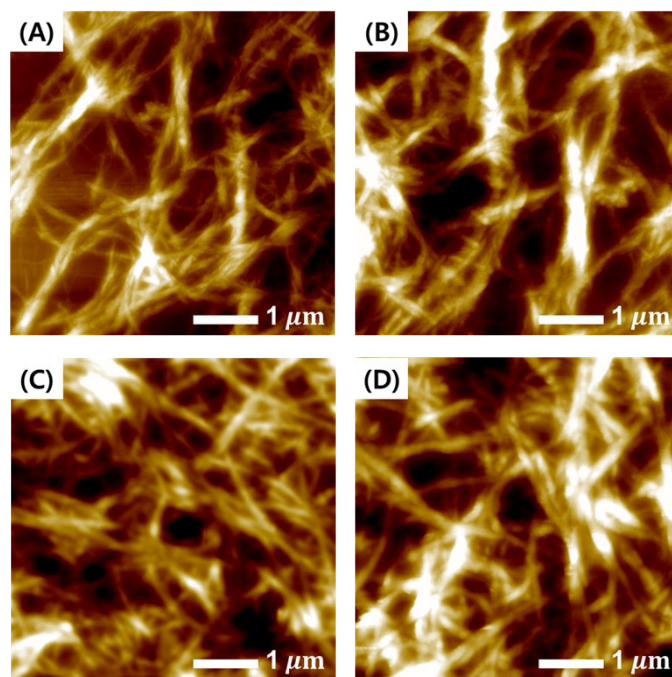


Fig. S6 AFM images of supramolecular gel (A) **1**, (B) **1A**, cis-isomer (C) **1** and (D) **1A** by UV irradiation.

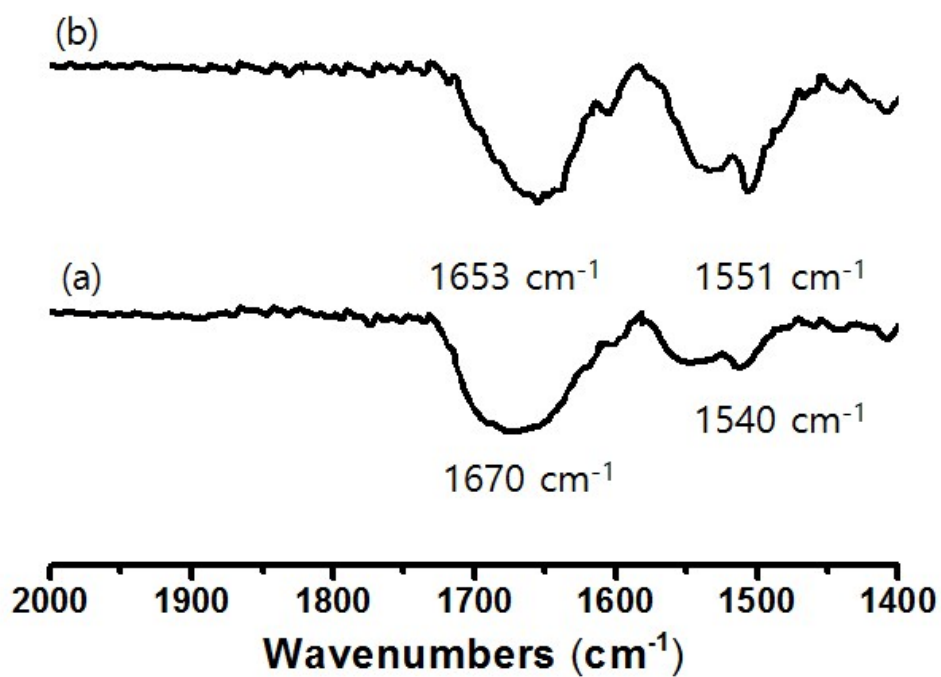


Fig. S7 FTIR spectra of (a) gel-**1** and (b) compound **1** in homogeneous chloroform solution.

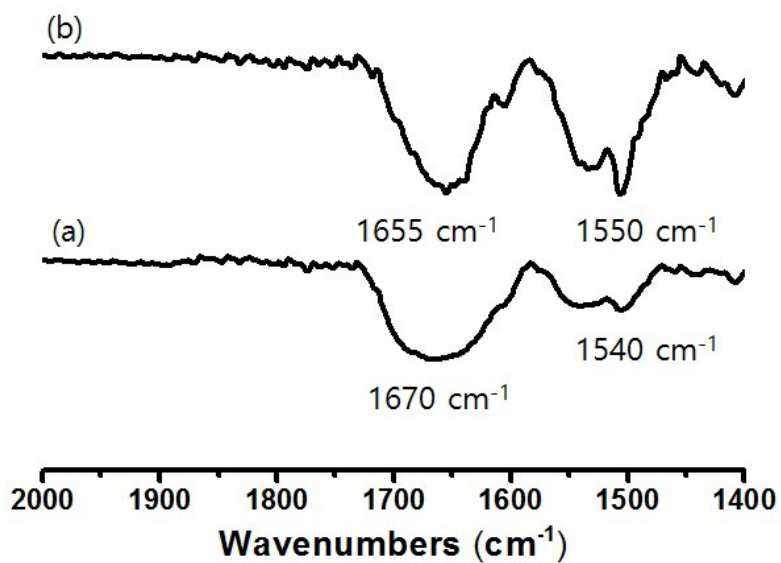


Fig. S8 FTIR spectra of (a) gel-1A and (b) compound 1A in homogeneous chloroform solution.

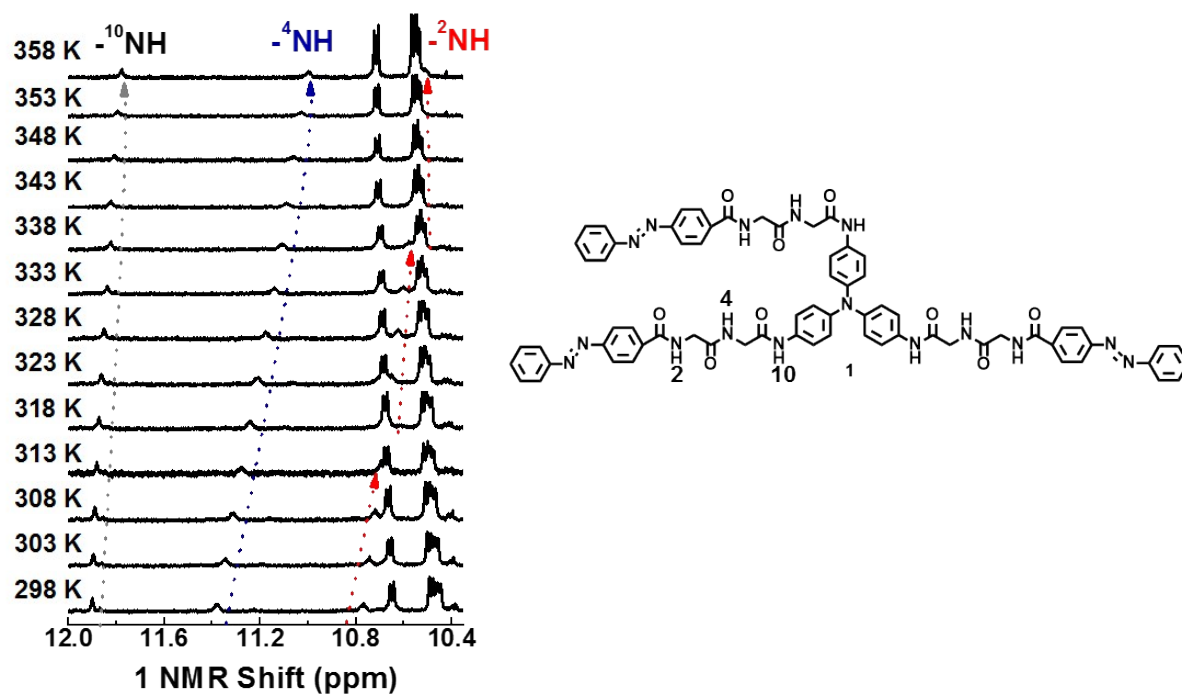


Fig. S9 VT NMR data of supramolecular gel 1 in $\text{DMSO-d}_6/\text{CDCl}_3$ (1:5v/v, 0.5mL) at increasing temperatures.

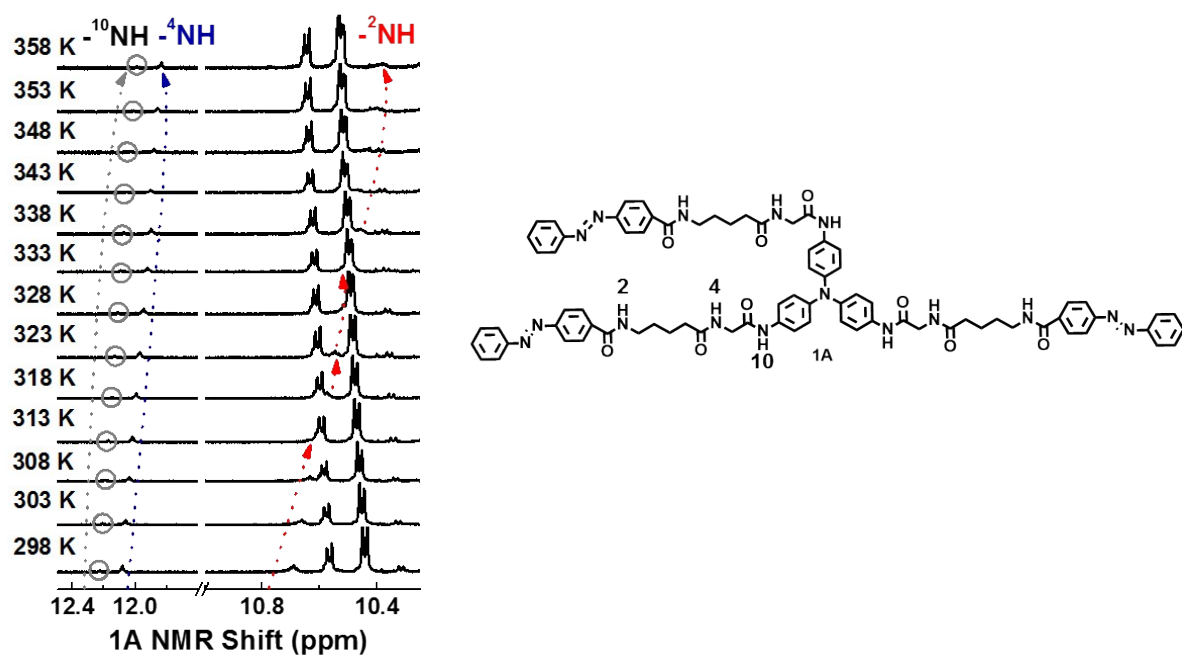


Fig. S10 VT NMR data of supramolecular gel 1A in DMSO-d₆/CDCl₃ (1:5v/v, 0.5mL) at increasing temperatures.

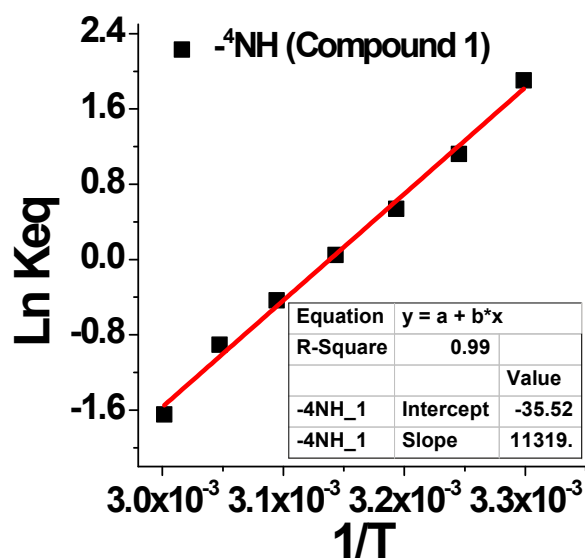


Fig. S11 The thermodynamic parameters for the gel-1 by the van't Hoff equation.

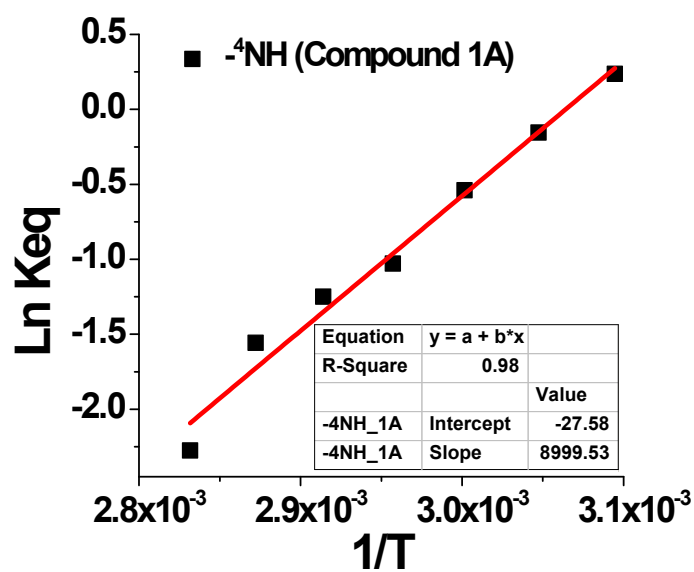


Fig. S12 The thermodynamic parameters for the gel-1A by the van't Hoff equation.

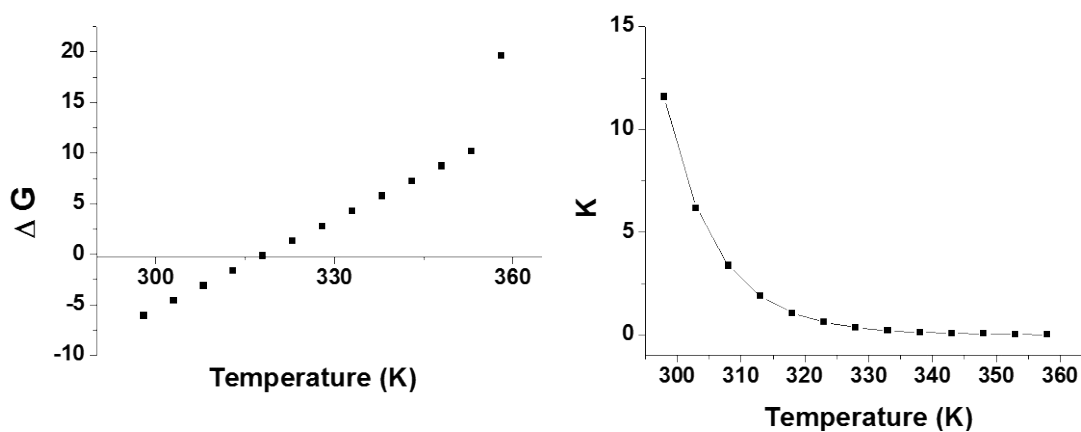


Fig. S13 The plot for association constants of gel 1 via temperatures.

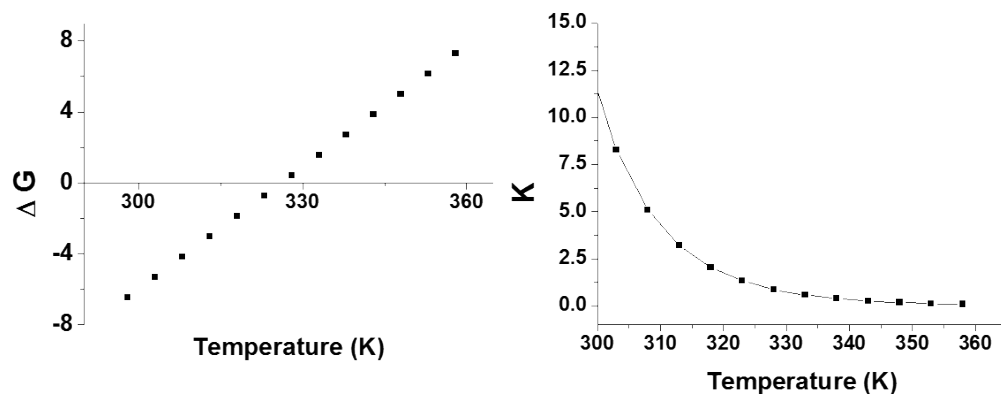


Fig. S14 The plot for association constants of gel 1A via temperatures.

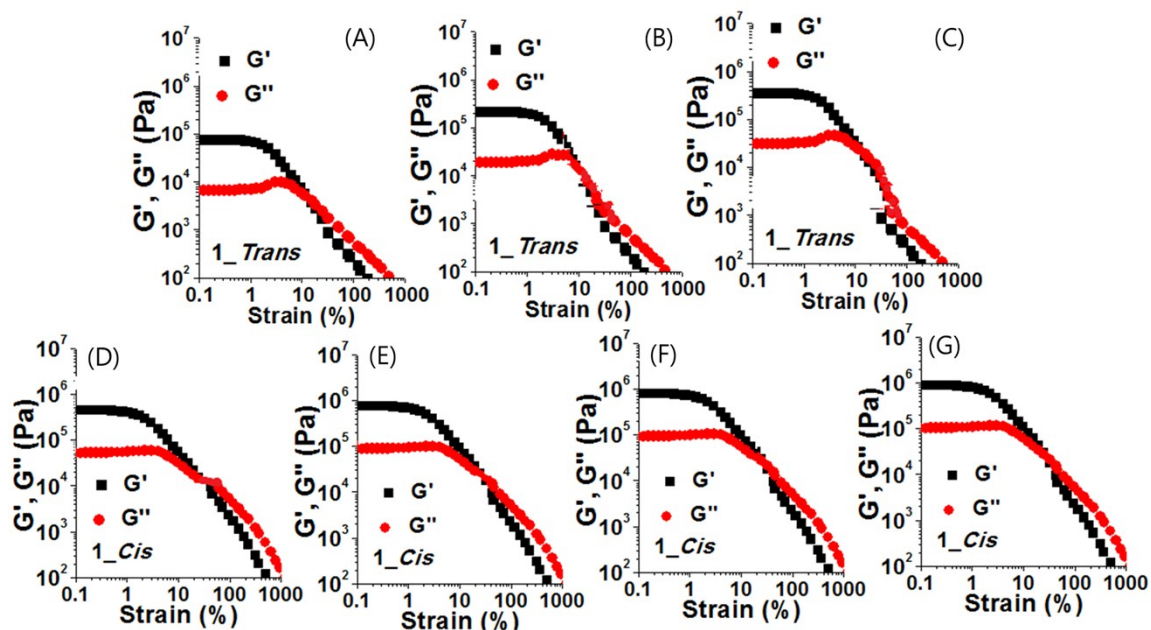


Fig. S15 Strain sweep test results of gel 1 (A) before UV irradiation and after UV irradiation for (B) 0.5 h, (C) 1 h, (D) 1.5 h, (E) 2 h, (F) 2.5 h and (G) 3 h. (strain sweep tests at 0.1-1000, 0.1 Hz frequency).

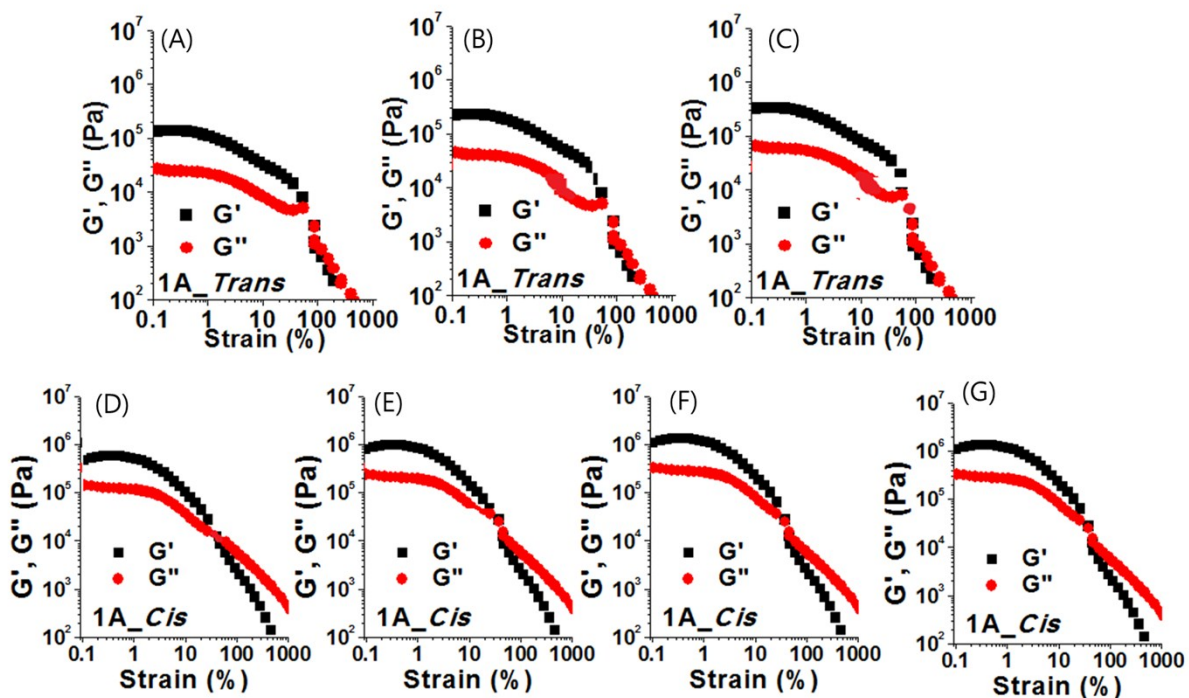


Fig. S16 Strain sweep test results of gel 1A (A) before UV irradiation and after UV irradiation for (B) 0.5 h, (C) 1 h, (D) 1.5 h, (E) 2 h, (F) 2.5 h and (G) 3 h. (strain sweep tests at 0.1-1000, 0.1 Hz frequency).

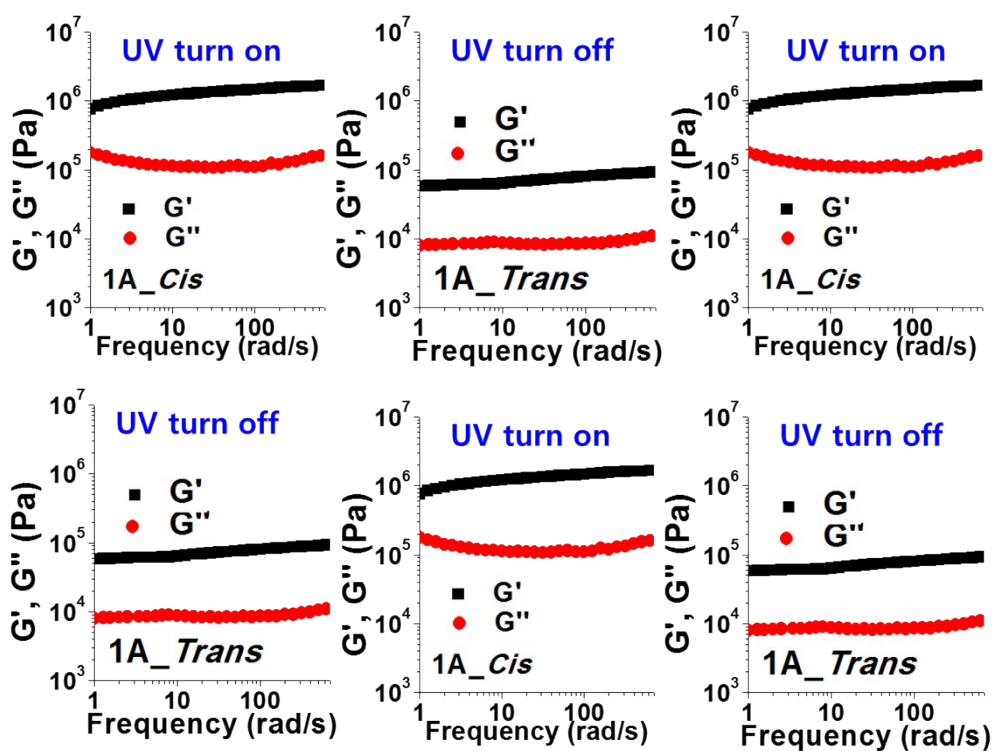


Fig. S17 The recovery test (3 cycles) of gel **1A** by light (400nm, 10mW/cm²).

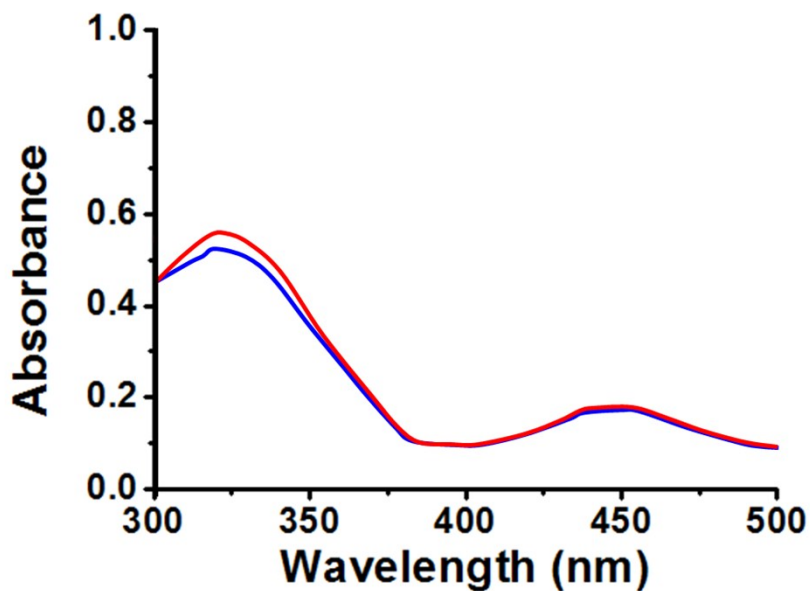


Fig. S18 UV spectra of UV-irradiated gel **1** before (blue) and after (red) standing for 24 h in a darkroom.

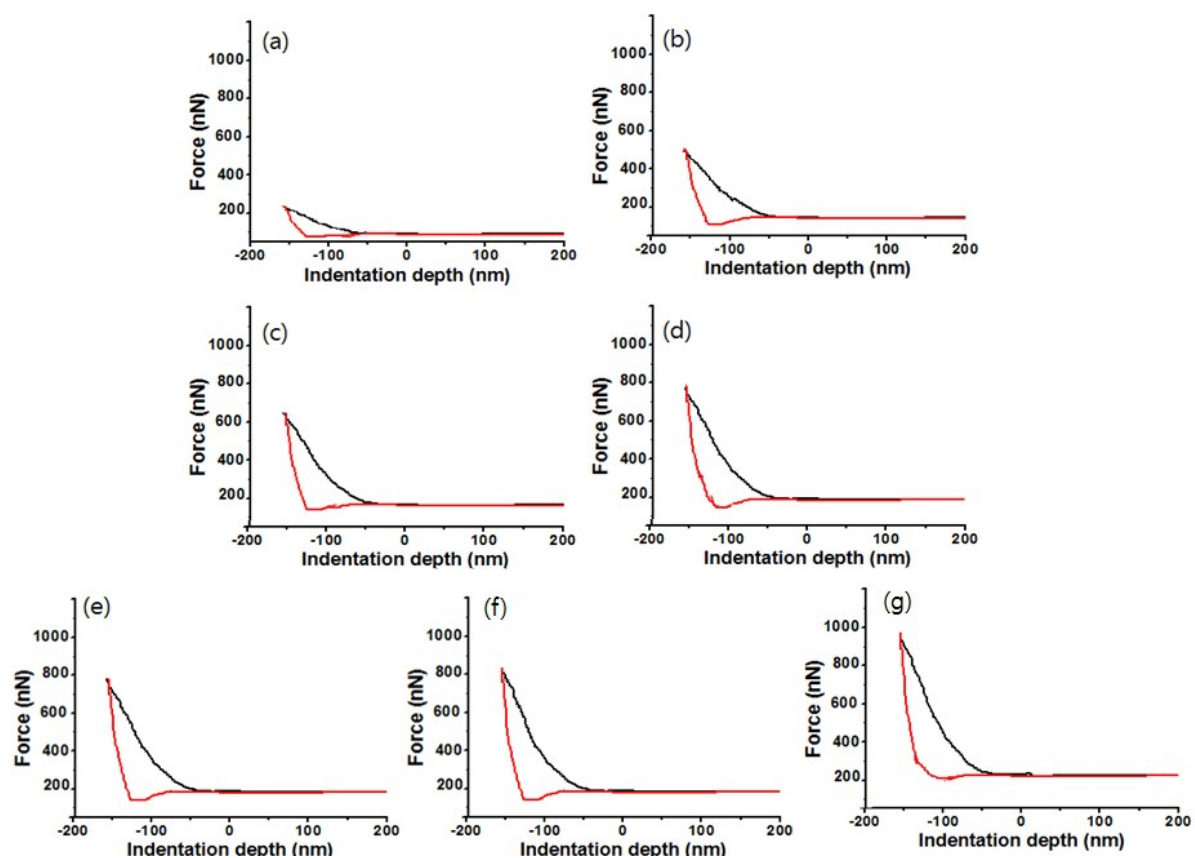


Fig. S19 FD curves of supramolecular gel **1** (a) before UV irradiation and after UV irradiation for (b) 0.5 h, (c) 1 h, (d) 1.5 h, (e) 2 h (f) 2.5 h and (g) 3 h.

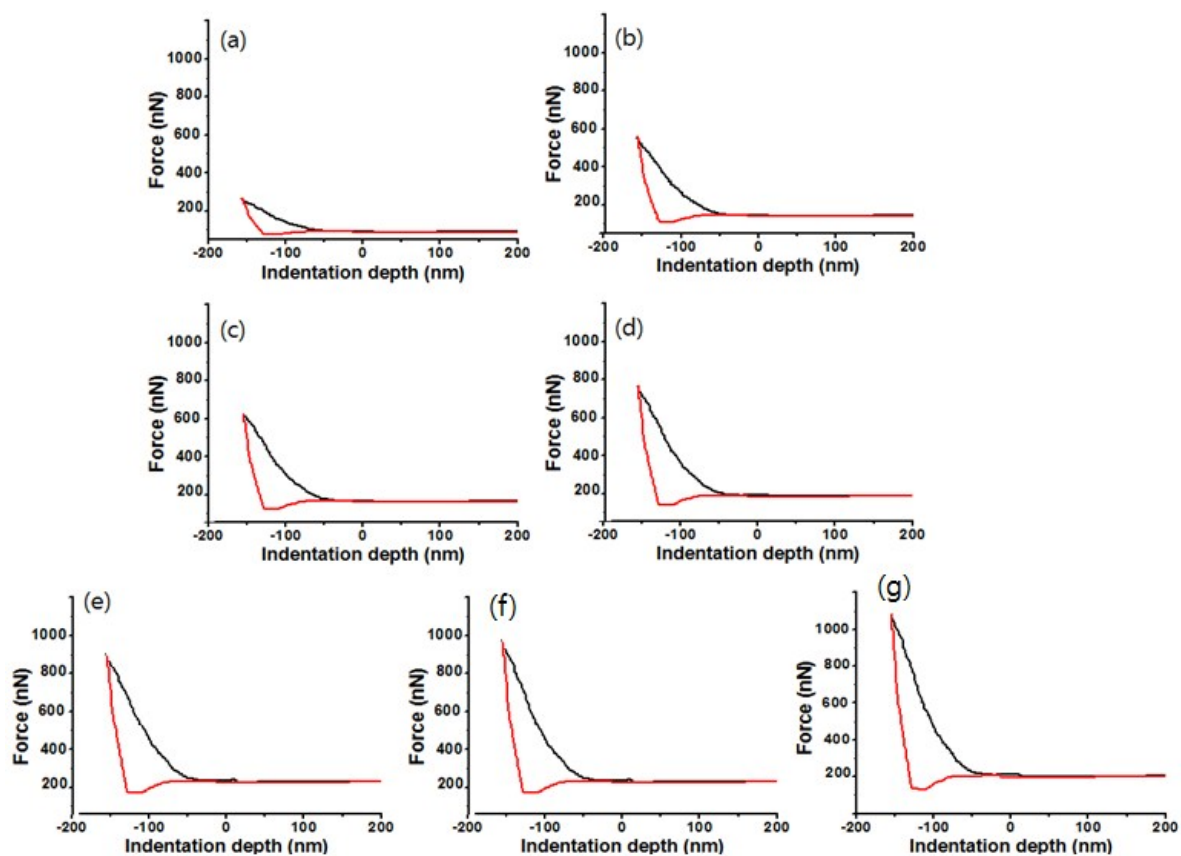


Fig. S20 FD curves of supramolecular gel **1A** (a) before UV irradiation and after UV irradiation for (b) 0.5 h, (c) 1 h, (d) 1.5 h, (e) 2 h, (f) 2.5 h and (g) 3 h.

Table S1. The formation of supramolecular gels in various solvents.

(gelator 25 mg, solvent 1 mL)

Solvent	Gelator 1 and 1A	Solvent	Gelator 1 and 1A
DMSO/chloroform(1:5, v:v)	G	Water	I
DMF	S	DCM	I
DMSO	S	EA	I
THF	LS	Tol	I
MeOH	LS	ACN	I
CHCl ₃	LS	n-Hex	I

G=gelation, I=insoluble, S=solution, LS=light solution

Table S2. The association constants of gel **1** at various temperatures.

1	298K	303K	308K	313K	318K	323K	328K	333K	338K	343K	348K	353K	358K
ΔG	-6.07	-4.59	-3.12	-1.64	-0.16	1.31	2.79	4.27	5.75	7.22	8.70	10.18	19.63
K	11.59	6.18	3.38	1.88	1.06	0.61	0.37	0.21	0.13	0.079	0.049	0.031	0.001

Table S3. The association constants of gel **1A** at various temperatures.

1A	298K	303K	308K	313K	318K	323K	328K	333K	338K	343K	348K	353K	358K
ΔG	-6.47	-5.32	-4.18	-3.03	-1.88	-0.74	0.41	1.55	2.70	3.85	4.99	6.14	7.29
K	13.61	8.27	5.11	3.20	2.01	1.32	0.86	0.57	0.38	0.26	0.18	0.12	0.086