Electronic Supplementary Material (ESI) for Polymer Chemistry.


# Supporting Information

# Photo-adaptable shape memory hydrogel based on orthogonal supramolecular interactions

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**Table S1.** Characterization of host-guest cross-linked hydrogel.

| | [Acrylamide] (mol/L) | Alginate (g/mL) | [Azobenzene] (mmol/L) | [α-cyclodextrin] (mmol/L) | [Cross-linker]/ [Monomer] | $M_c$ [b] (kg/mol) |
|---|---|---|---|---|---|---|
| 1# | 3.9 | 0.013 | 7.1 | 7.1 | 0.18 % | ~20 |
| 2# | 3.9 | 0.013 | 3.6 | 3.6 | 0.09 % | ~39 |
| 3# | 3.9 | 0.013 | 19.8 | 19.8 | 0.50 % | ~7.1 |
| 4# | 3.9 | 0.0064 | 7.1 | 7.1 | 0.18 % | ~20 |
| 5# | 3.9 | 0.017 | 7.1 | 7.1 | 0.18 % | ~20 |

[a] Measured with UV-VIS absorbance spectra.

[b] Number-averaged molecular weight between cross-linking points, calculated by $M_c = M_{monomer}$ *[Monomer]/[Crosslinker]/2.

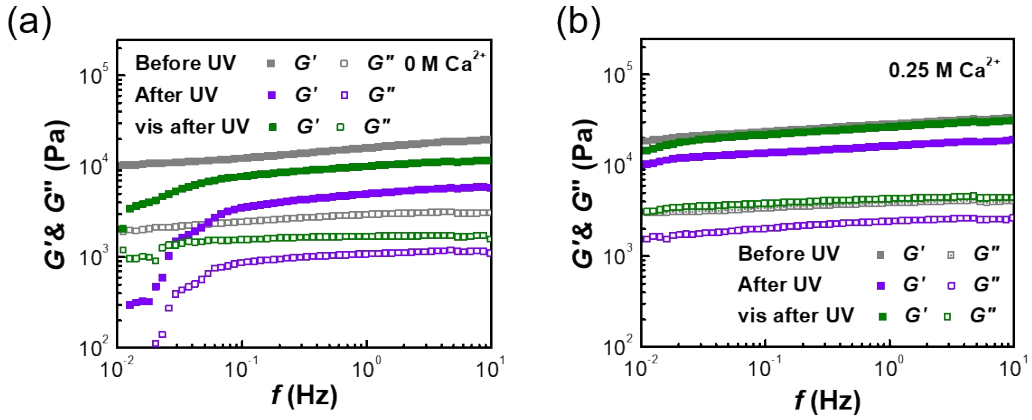


**Figure S1.** Rheological properties of host-guest cross-linked PAAm/alginate hydrogel in different cross-linking states: (a) in the absence $Ca^{2+}$ and (b) in the presence of 0.25 M $Ca^{2+}$. All the data were measured at a shearing strain amplitude of 1.0 % and at 25 °C.

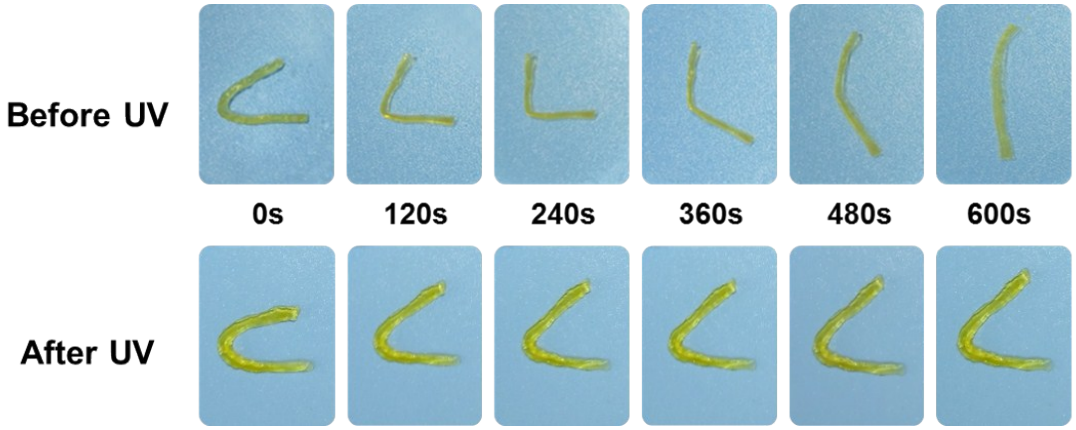


**Figure S2.** Shape recovery in 0.25 M EDTA solution before and after UV irradiation, where temporary shape was fixed with 0.25 M $Ca^{2+}$.

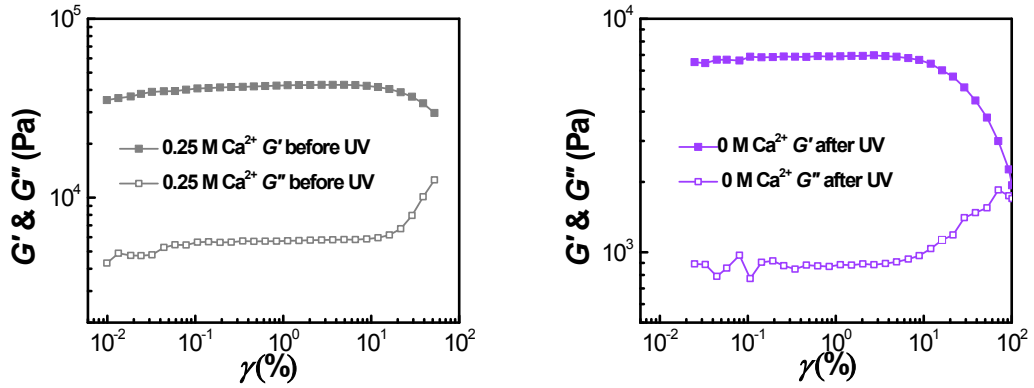


**Figure S3** Storage and loss shearing moduli as functions of shear strain amplitude of the host-guest cross-linked hydrogel, measured with a frequency of 1 Hz. The linear viscoelastic region is within $\gamma \leq 10.0\%$.

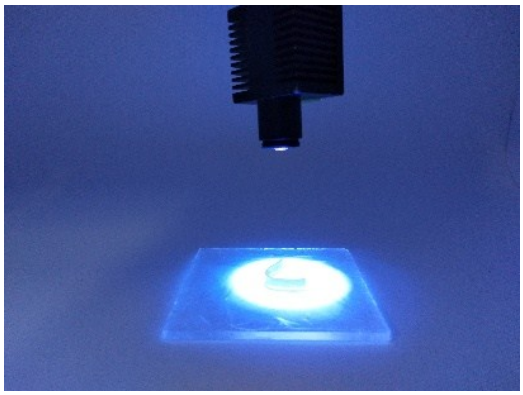

**Figure S4.** A graph of the apparatus for the light-treatment.