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Supporting information

For

Host–guest interaction-mediated fabrication of hybrid microsphere-structured supramolecular hydrogel showing high mechanical strength

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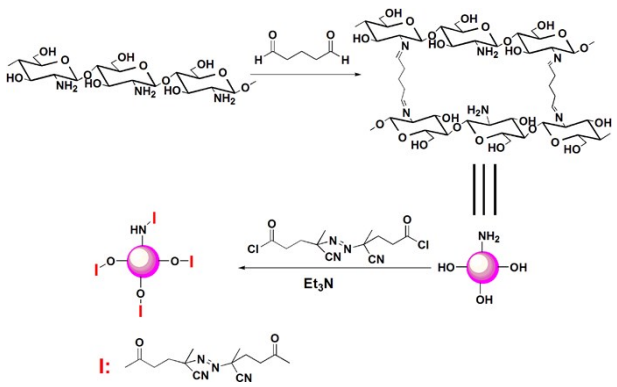

Scheme S1 Construction of the CS-Azo.

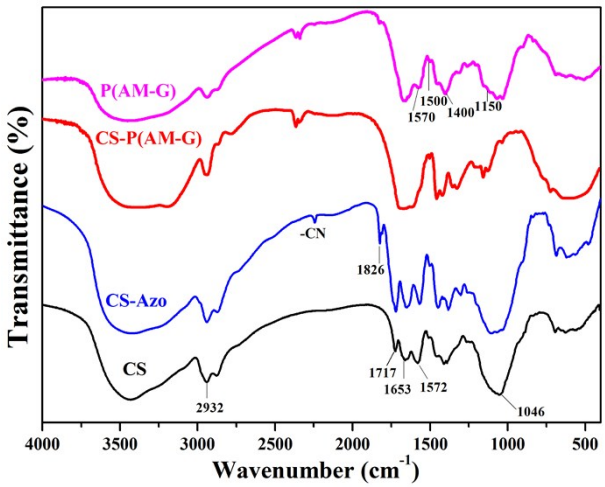

Fig. S 1. FTIR spectra of the samples: CS; CS-Azo; CS- P(AM-G) and P(AM-G).

Fig. S 1 displays the FTIR spectra of CS, CS-Azo, CS- P(AM-G) and P(AM-G) samples. In the FTIR spectra of CS, the band at 3350 cm^{-1} corresponds to the O-H and N-H stretching vibrations, but the peaks appear broad here belongs to O-H stretching and hydrogen bonds. The C-H stretching

vibration of the polymer backbone is manifested through strong peaks at 2932 and 2870 cm^{-1}. The peak at 1717 cm^{-1} corresponds to the C=O stretching band.[1] The peaks at 1653 and 1572 cm^{-1} were attributed to the bending vibrations of NH_2 and the C=O stretching band, indicate the formation of Schiff's base.[2] The peaks in the fingerprint region of the spectrum around 1046 cm^{-1} are the symmetric stretch of C-O-C.[3] For the FTIR of CS-Azo, new bands at 2240 and 1826 cm^{-1} corresponds to the -CN and C=O from Azo initiator, suggesting the occurrence of reaction between CS and initiator.[4]

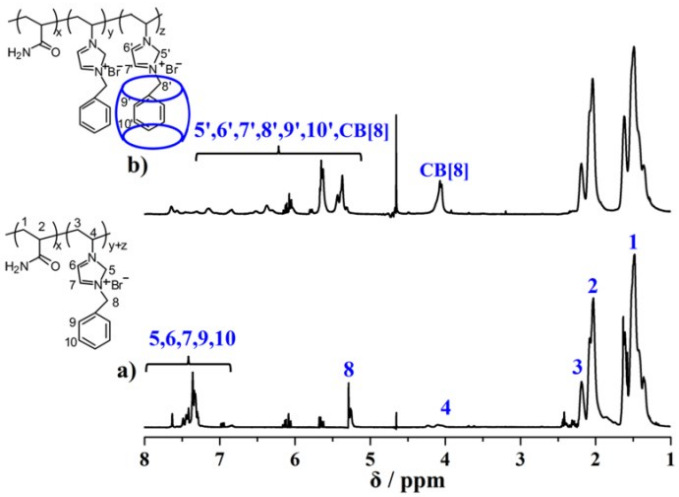

Fig. S 2 ^{1}H NMR spectra (600 MHz, 298 K) of (a) P(AM-G) and (b) P(AM-G) after the addition of CB[8].

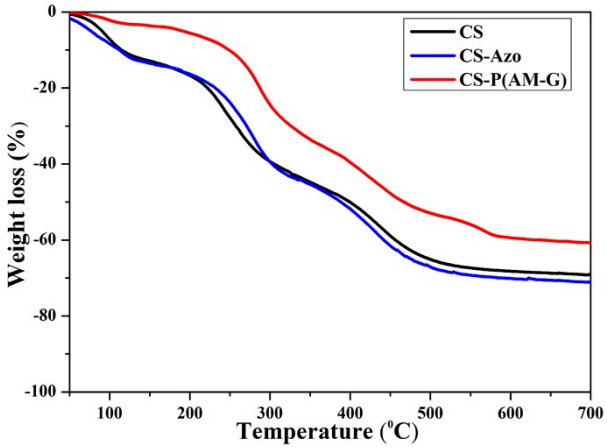

Fig. S3. TGA of the samples: (a) CS; (b) CS-Azo and (c) CS-P(AM-G).

The thermal stability of the as-obtained CS- P(AM-G) was confirmed by TGA in N_2 atmosphere, as presented in Fig. S 3. As could be observed in the figure, the thermal degradation of CMS took place at a maximum rate in the temperature range from 150 °C to 700 °C with a weight loss was 56.4 wt%. Furthermore, the main weight loss above 240 °C, this is assigned to structure collapse and thermal decomposition of the CS. For the CS-Azo, the weight loss is about 58.1%, higher than pure CS, this may due to the thermal degradation of azo initiator. The TGA of P(AM-G) grafted CS indicates that

weight loss between 150 °C and 700 °C is about 60.6%, the weight loss before 150 °C is attributable to the dehydration of the adsorbed water or moisture. The CS- P(AM-G) experiences weight loss at around 283 °C due to the thermal decomposition of CS and P(AM-G) polymer. The sample further degrades gradually over the temperature range above 350 °C may be the thermal decomposition of P(AM-G) polymer.

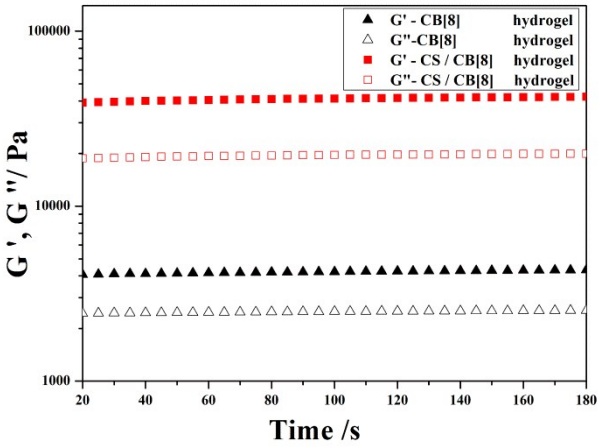

Fig. S 4 Time-scan tests were done at a fixed frequency (1 Hz) and strain 1% for 3 min at 25 ºC.

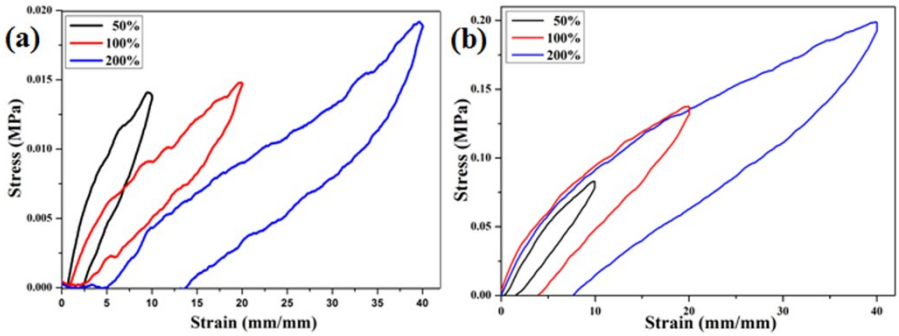

Fig. S 5 Cyclic tensile loading-unloading curves with different strain: (a) pure CB[8] hydrogels and (b） 0.9 CS/ CB[8] micro-composite hydrogels.

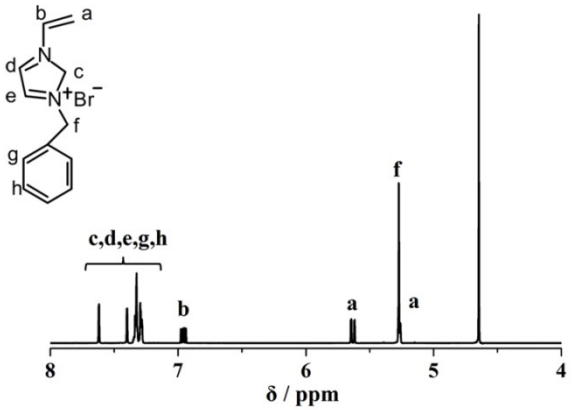

Fig. S 6 ^{1}H NMR spectrum (600 MHz, 298 K) of 1-benzyl-3-vinylimidazolium (G).

References

1. X. Zhang, Y. Huang, X. Huang, C. Huang and H. Li, *Polym. Composite.*, 2016, **37**, 462-467.
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