Tough, ultrastretchable and tear-resistant hydrogels enabled by linear macro-crosslinker

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Supporting Tables ＆ Figures

Table S1. Different yield values of CA macro-crosslinker.

Yield of CA	**20.32%**
Yield of AGE	**13.99%**

Table S2. The swelling properties of the MC hydrogels and the calculation of crosslinking density.

Sample	**Hydrogel Weight (g)**	**Polymer Weight (g)**	**Swollen weight (g)**	**Swelling ratio (Q)**	**Crosslinking density (mol•m^{-3})**
$MC_{0.5\text{-}30}$	1.81	0.44	62.46	139.97	0.48
$MC_{1.0\text{-}30}$	2.28	0.56	53.31	94.35	0.93
$MC_{2.0\text{-}30}$	1.84	0.45	23.70	51.67	2.63
$MC_{3.0\text{-}30}$	1.83	0.45	20.69	45.18	3.32

Table S3. The swelling properties of the H-MC, M-MC and L-MC.

Sample	**Hydrogel Weight (g)**	**Polymer Weight (g)**	**Swollen weight (g)**	**Swelling ratio (Q)**	**Crosslinking density (mol•m^{-3})**
H-MC	2.11	0.53	67.98	128.14	0.57
M-MC	1.95	0.49	61.12	124.53	0.58
L-MC	2.13	0.53	67.50	125.48	0.58

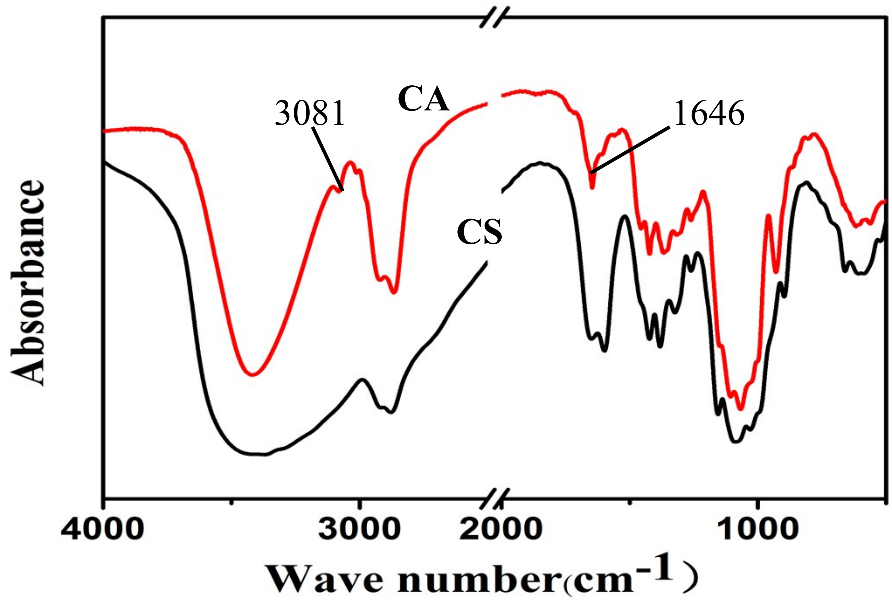

Fig. S1. FT-IR spectra of CS powder and CA macro-crosslinker.

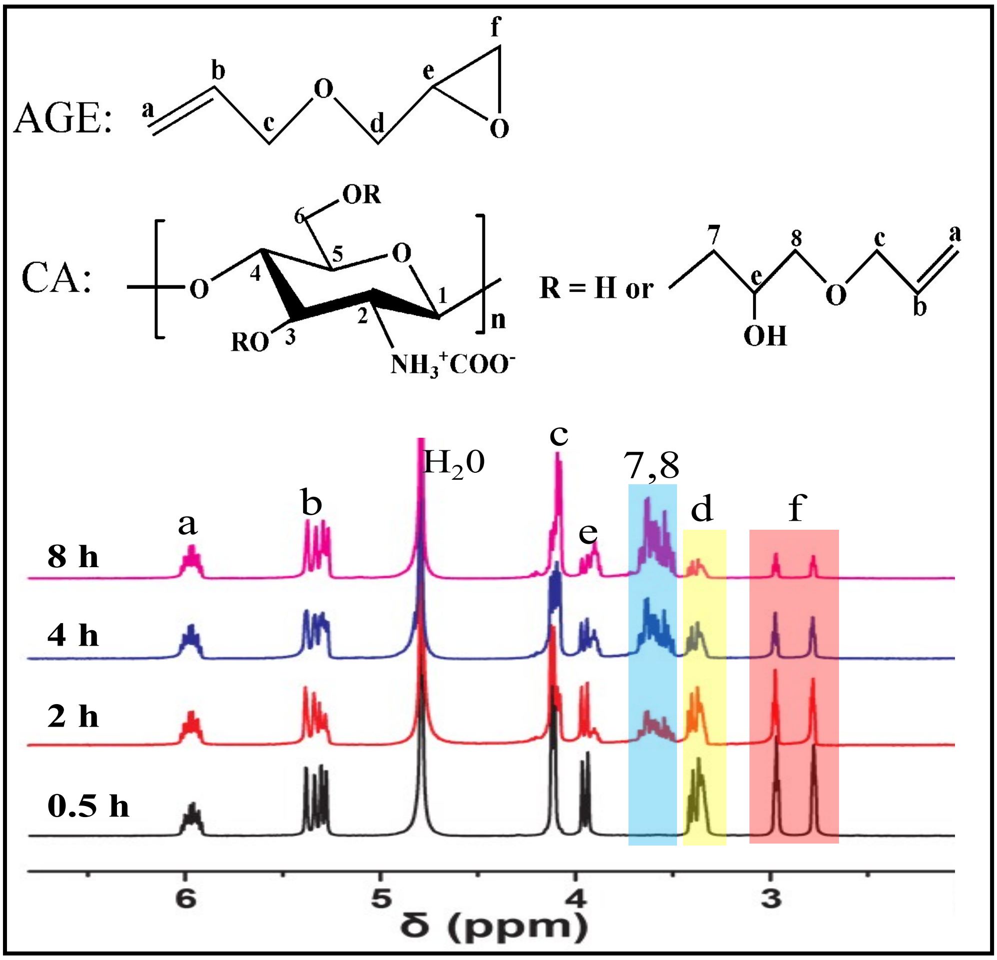

Fig. S2. [1]H NMR spectra for CA macro-crosslinker reaction solution during different reaction stages. CS and AGE were dissolved in CD_3COOD/D_2O and then reacted, we took samples at different reaction time and cooled them rapidly to stop the reaction. Because the addition of AGE is much larger than that of CS, the peak of H on CS is not obvious, and it is covered by AGE.

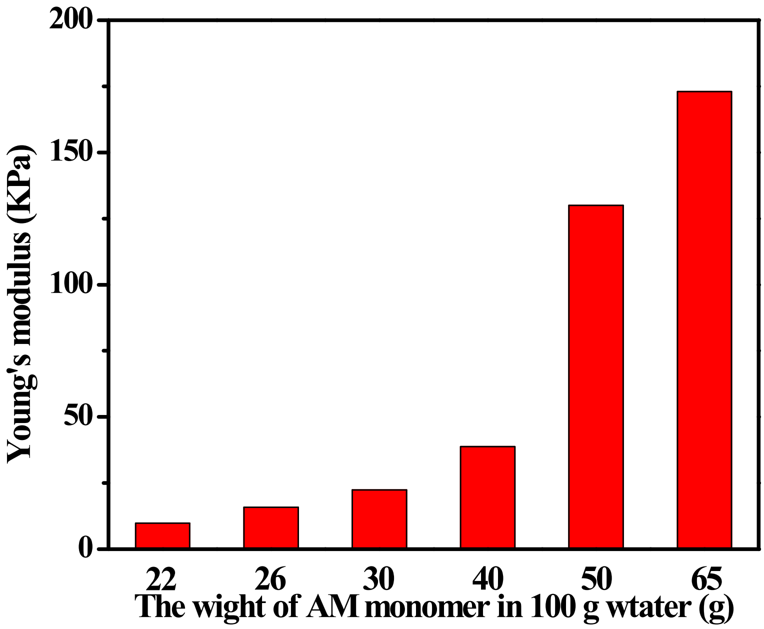

Fig. S3. Young's modulus of $MC_{2.0\text{-}y}$ hydrogels.

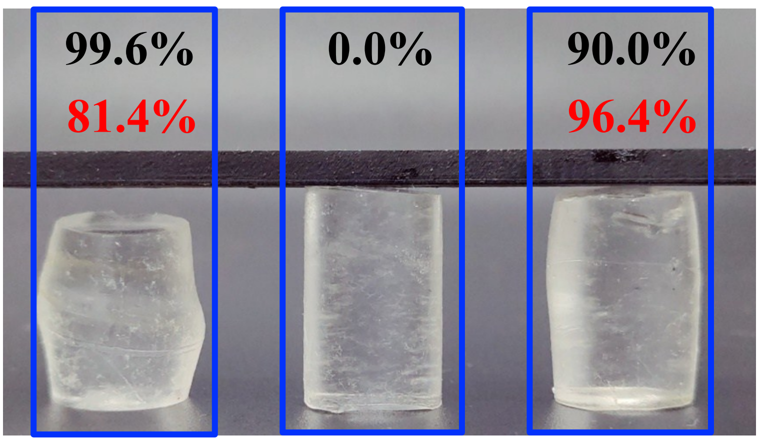

Fig. S4. Photos of the MC hydrogel before and after compression, respectively. The black fonts represent the compressive strain, and the red fonts represent the strain recovery ratio.

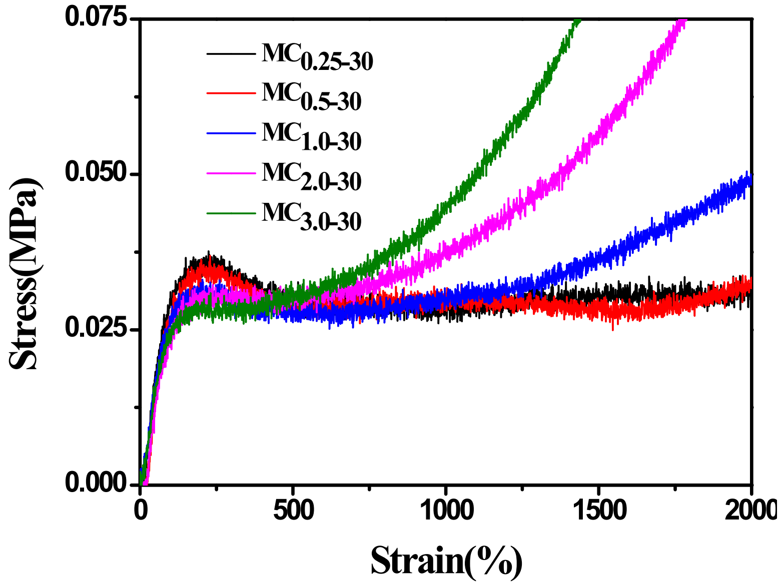

Fig. S5. Locally enlarged stress–strain curves of $MC_{x\text{-}30}$ hydrogels.

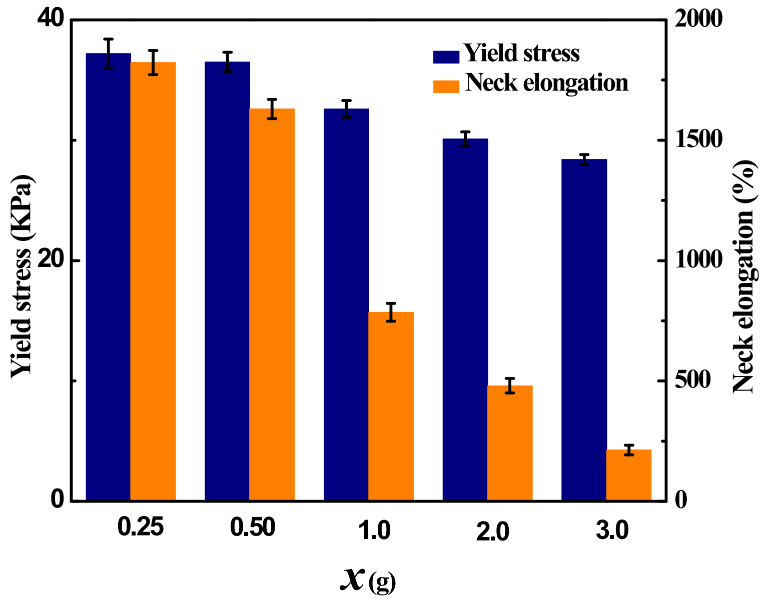

Fig. S6. Yield stress and neck elongation of $MC_{x\text{-}30}$ hydrogels.

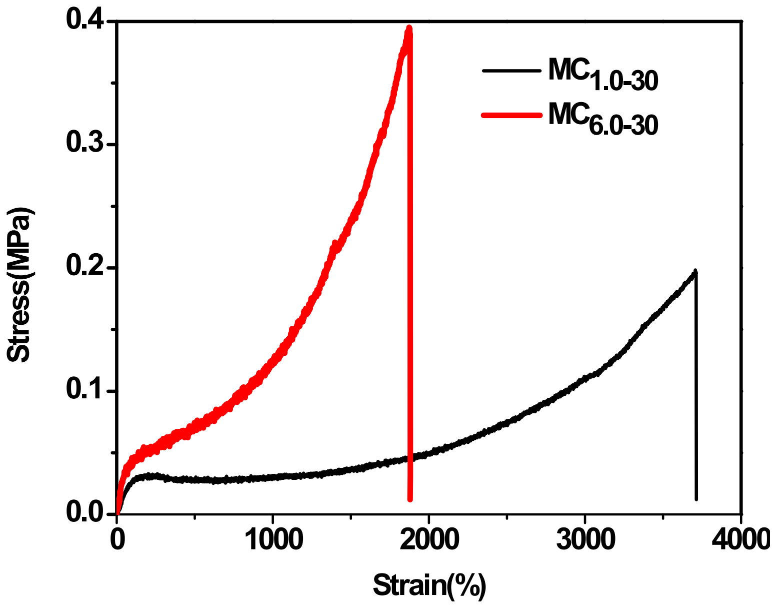

Fig. S7. Typical stress–strain curves of $MC_{1.0\text{-}30}$ and $MC_{6.0\text{-}30}$ hydrogels.

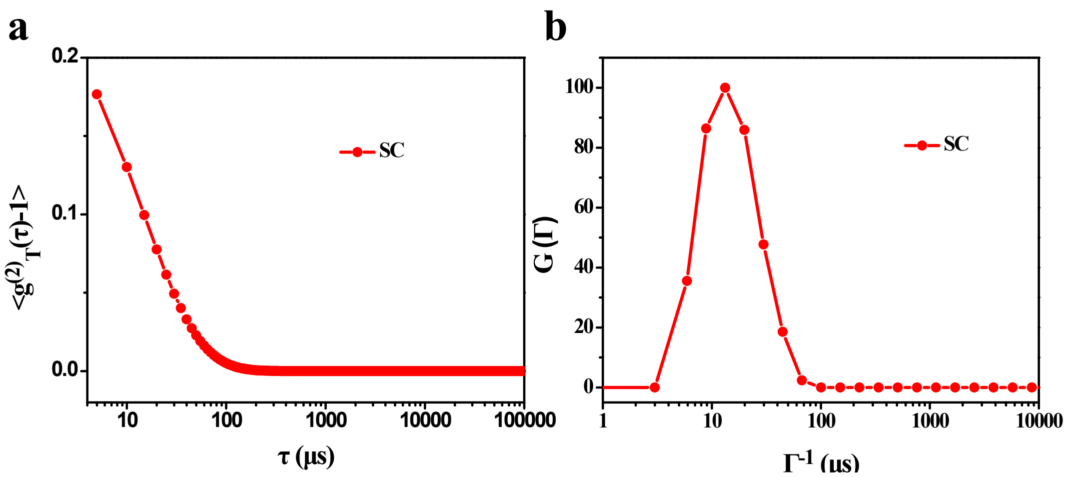

Fig. S8. (a) Ensemble-averaged correlation function $<g_T^{(2)}(\tau)-1>$ and (b) relaxation-time distribution function G(Γ) for the SC hydrogel.