

Supplementary

Highly Flexibility, Powder Self-Healing, and Recyclable Natural Polymer Hydrogels

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Table S1. Different contents of CMA hydrogels.

Sample	CS (g)	MA (g)	APS (g)	Heating Time (h)
CMA-1	4.0	1.0	0.05	6.0
CMA-2	4.0	2.0	0.05	6.0
CMA-3	4.0	3.0	0.05	6.0

Table S2. Mechanical properties of CMA hydrogels.

Sample	Tensile strain	Stress	Young modulus	Toughness
CMA-1	1357%	26 k·Pa	20.3 k·Pa	0.18 MJ/m ³
CMA-2	1718%	62 k·Pa	78.5 k·Pa	0.76 MJ/m ³
CMA-3	3012%	125 k·Pa	129.4 k·Pa	2.14 MJ/m ³

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Table S3. Comparisons of self-healing ability of CMA-3 hydrogel with previous reported self-healing hydrogel in the literature.

Sample	Tensile strain	Self-healing time/rate	Dryness	Partial of hydrogel missing	Recyclability	Ref.
PPBN	991%	6.0 h/90%	x	x	x	[1]
IPN	1400%	24.0 h/80%	√	x	x	[2]
PVA/PEGDA/Agar/H ₂ SO ₄	431%	24.0 h/52.4%	x	x	x	[3]
BH-5.5-1.5-0.4	645%	24.0 h/90%	x	x	x	[4]
JGNs/PAA	508.5%	1.0 h/93.4%	x	x	x	[5]
CNCs@P4VP	921.6%	6.0 h/85.9%	x	x	x	[6]
PAA-CMC-Al ³⁺	2066%	1.0 h/96.3%	x	x	x	[7]
TOCNF-GN/PAA	850%	12.0 h/96.7%	x	x	x	[8]
CMA	3020%	5 min/92.9%	√	√	√	This work

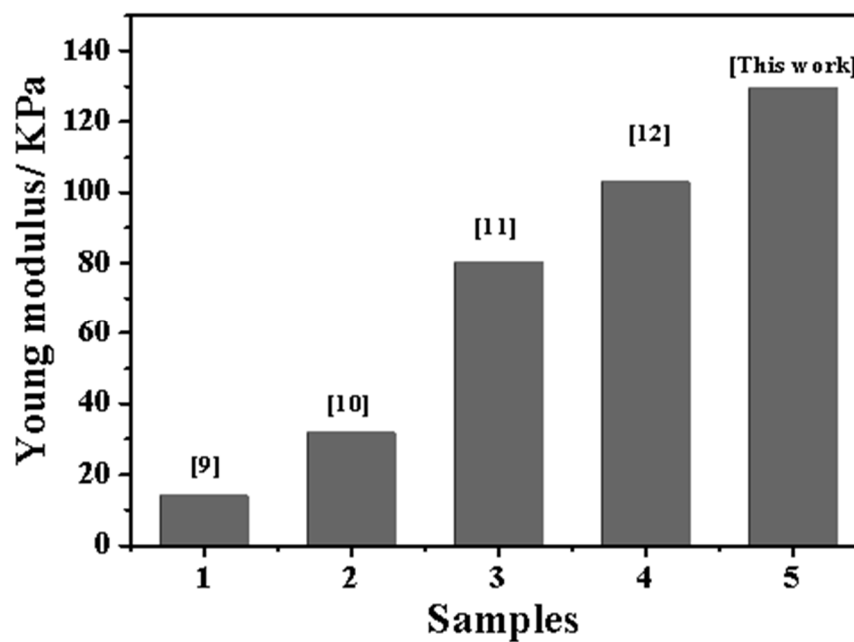
**Figure S1.** Comparisons of Young modulus of CMA-3 hydrogel with previous reported self-healing hydrogel in the literature.



Figure S2. Compressing-recovering process of CMA-3 hydrogel.

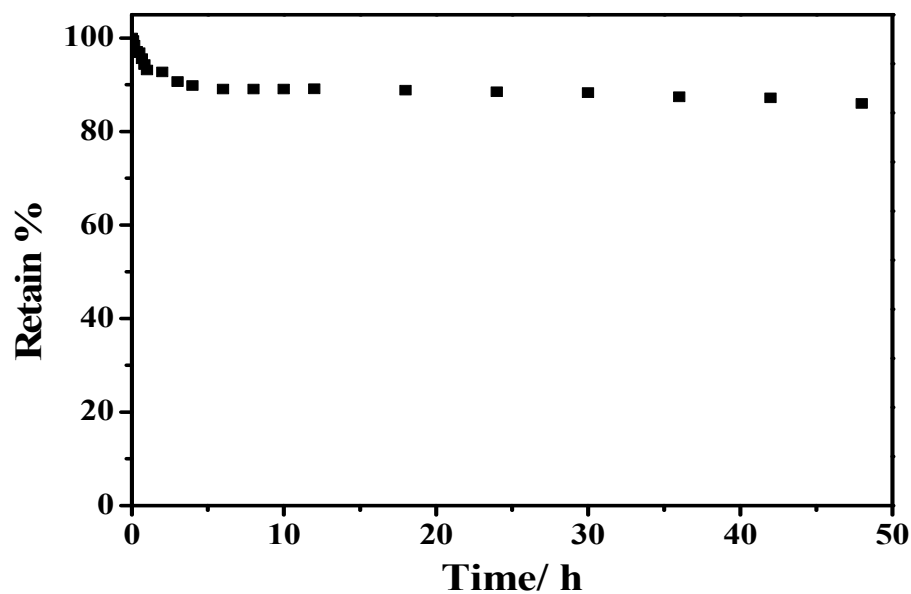


Figure S3. Water retaining ability of CMA-3 hydrogel.

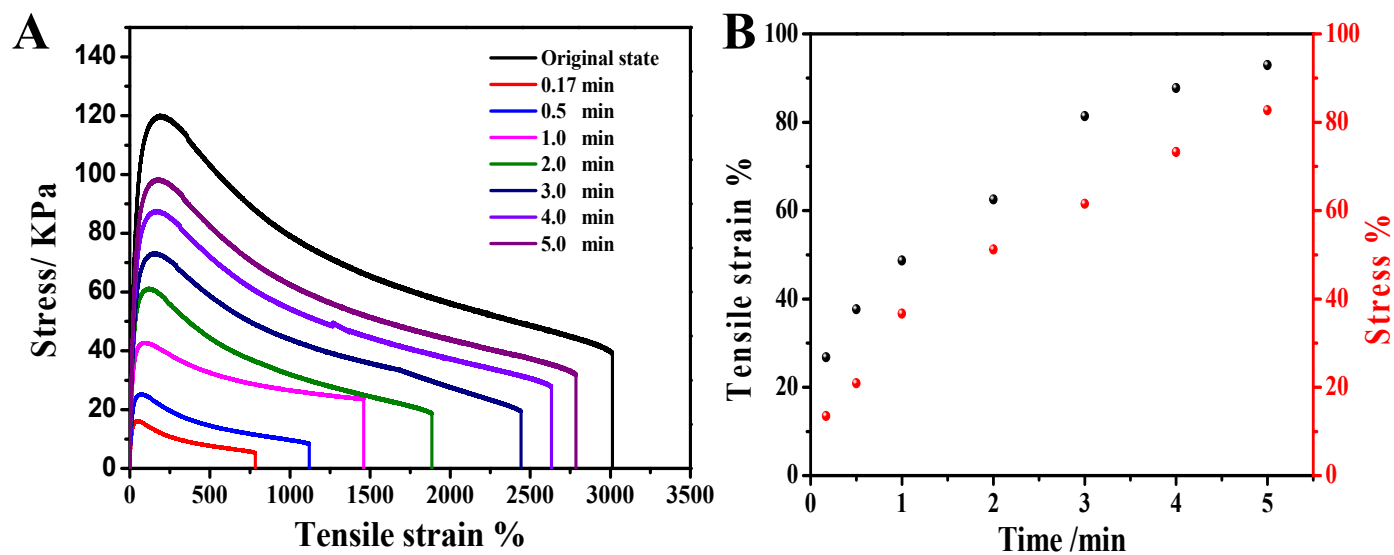


Figure S4. Tensile stress–strain curves of CMA-3 hydrogel during the self-healing process at different healing time (A,B).

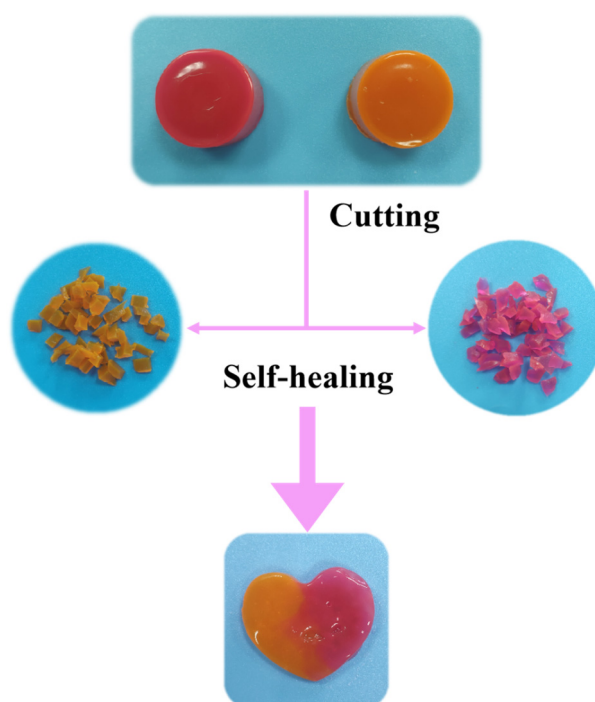


Figure S5. Photographs of self-healing ability of CMA-3 hydrogel.

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