Electronic Supplementary Material (ESI) for Journal of Materials Chemistry C.

Supporting information

Bio-inspired Color-changing and Self-healing Hybrid Hydrogel for Wearable Sensors and Adaptive Camouflage

Han Liu, Long Yu, Bingqian Zhao, Yezhou Ni, Peng Gu*, Hua Qiu, Wan Zhang, Kunlin Chen*

Key Laboratory of Eco-Textile, Ministry of Education, School of Textile Science and Engineering,

Jiangnan University, Wuxi 214122, China

E-mail: chenkunlin@jiangnan.edu.cn; Tommy861007@hotmail.com

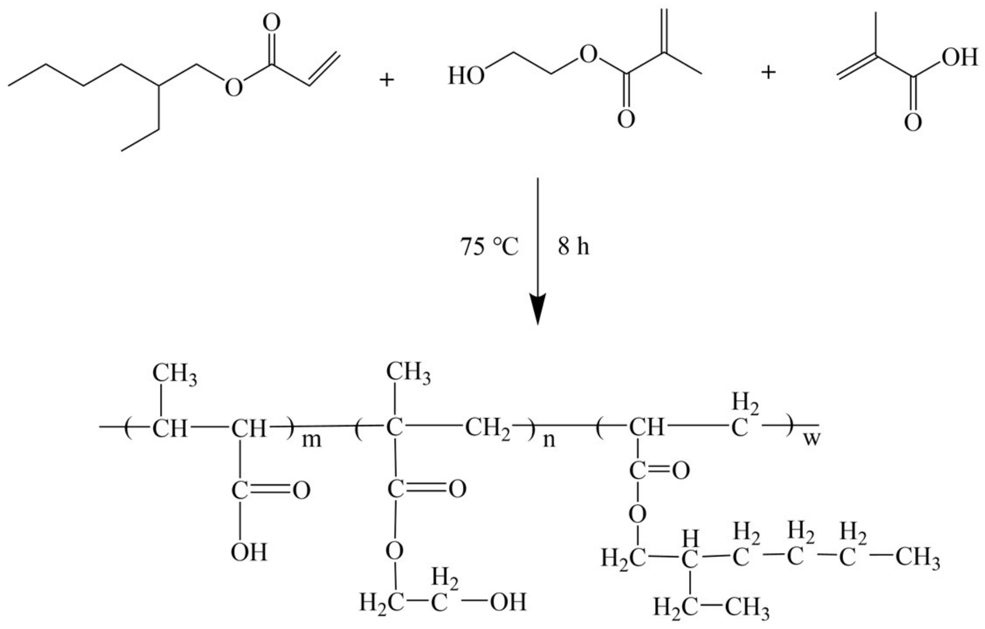

Fig. S1 The synthetic route of polyacrylate

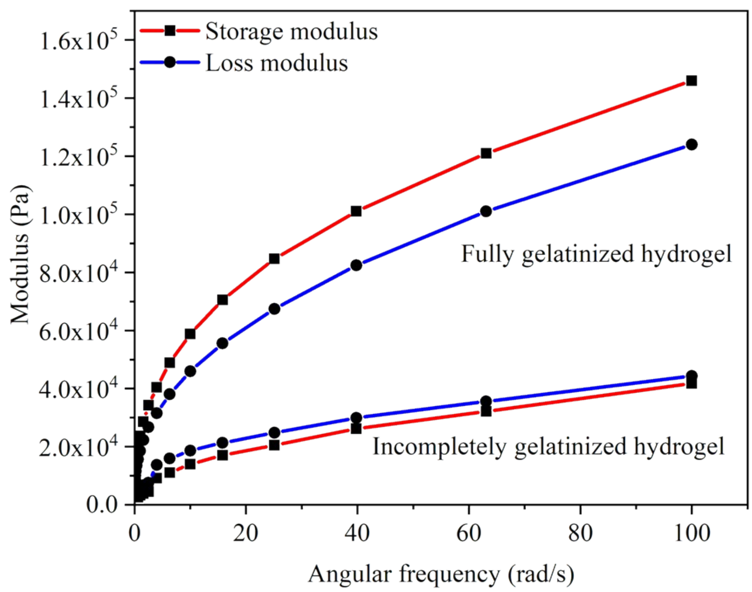

Fig. S2 Rheological testing of fully gelatinized and incompletely gelatinized hydrogels

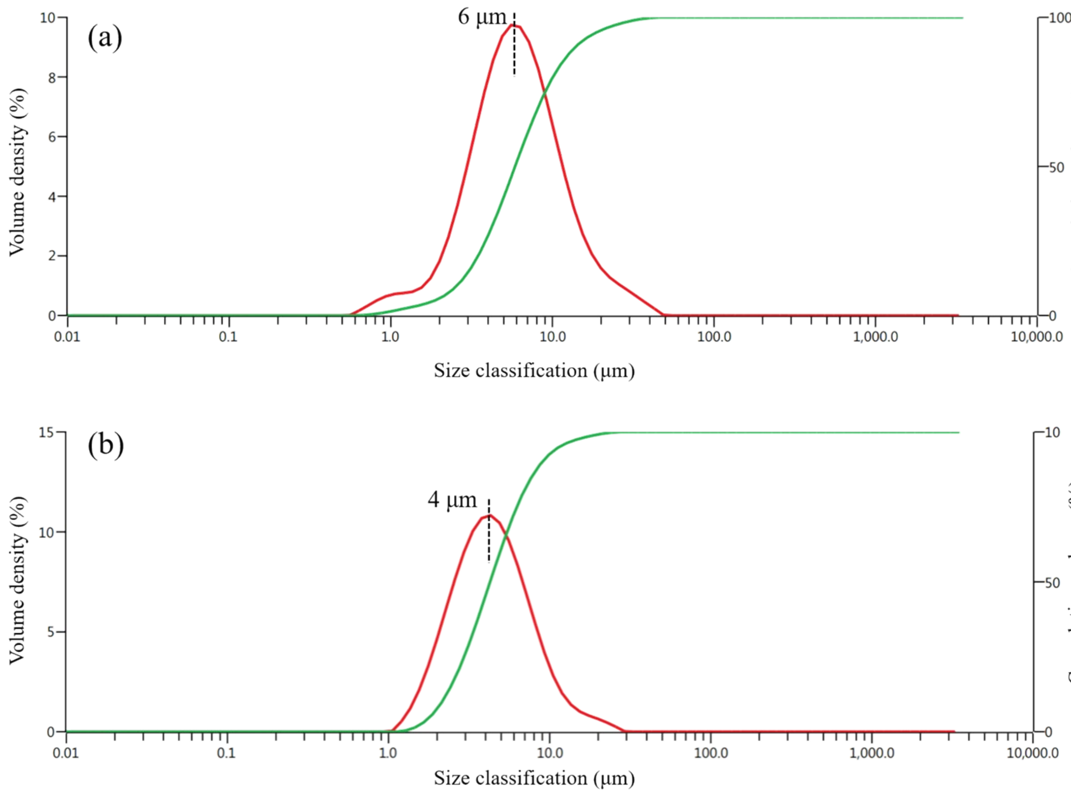

Fig. S3 (a) Particle size distribution of PDM. (b) Particle size distribution of TDM

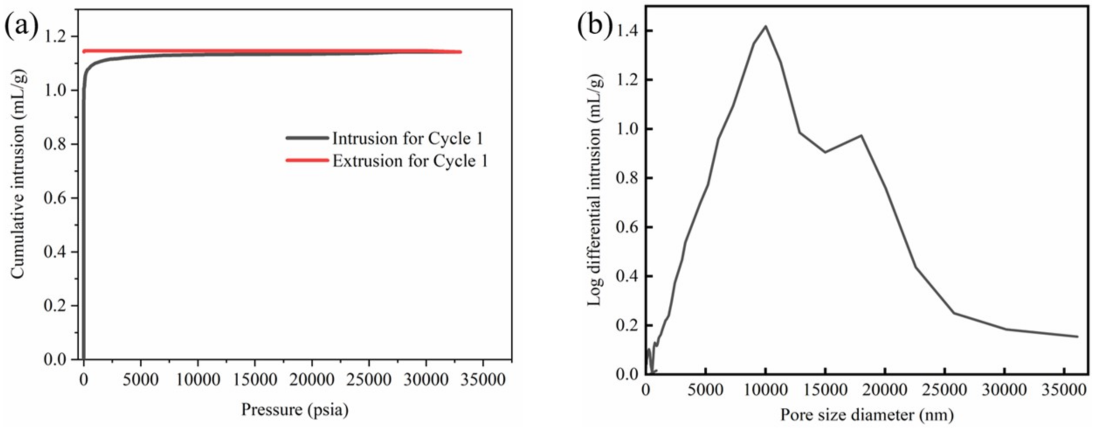

Fig. S4 (a) Curves for mercury injection/withdrawal. (b) Curves of the pore size distribution

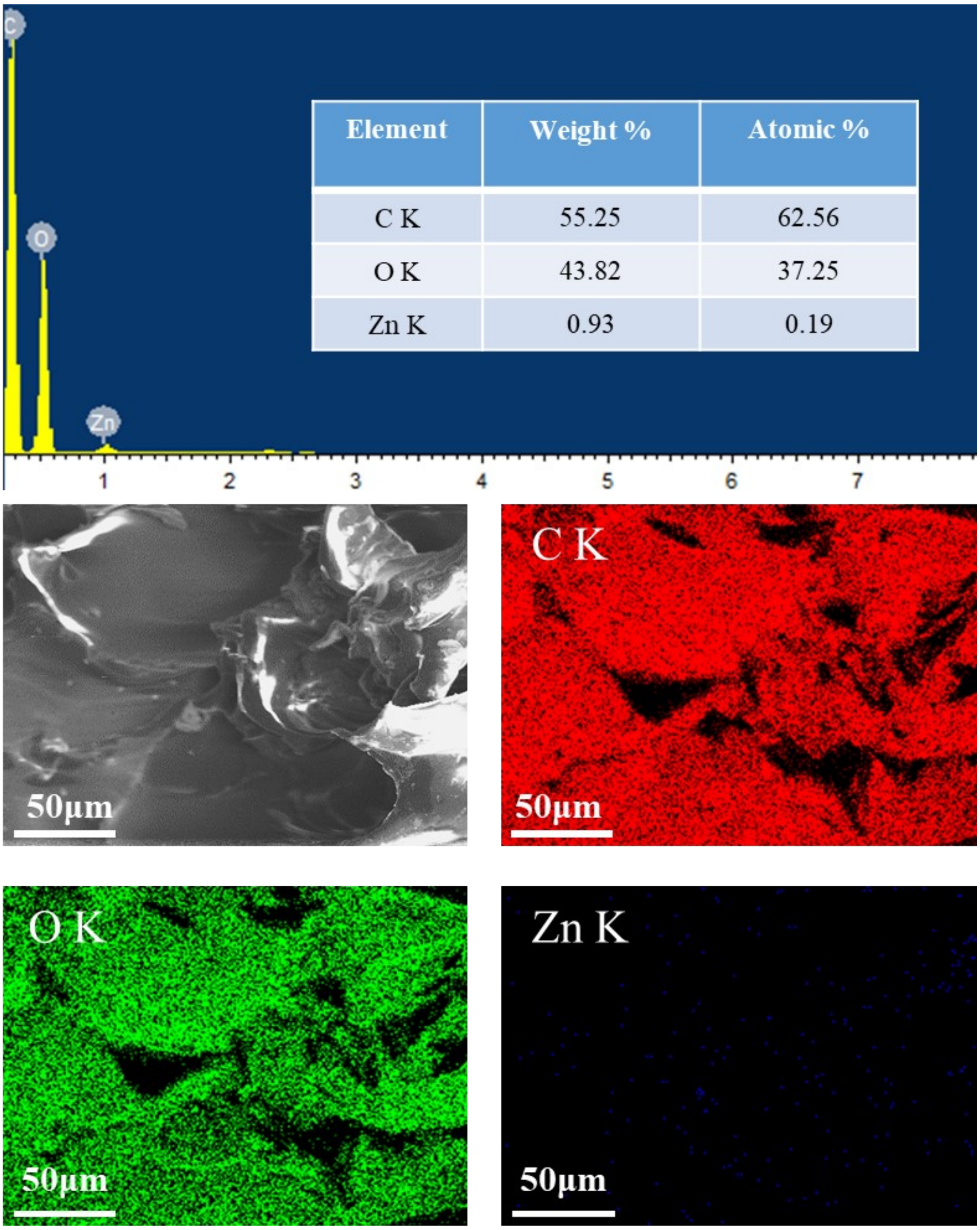

Fig. S5 EDS spectrum and mapping analysis of the TDM/PDM/polyacrylate hybrid hydrogel

Table S1. List of tensile strength of other hydrogels from different reports hydrogels

	Sample size	stress	strain	Ref.
CCAP hydrogel	42 mm×25 mm×2mm	40 KPa	70%	[1]
DN hydrogel	10 mm×4 mm×1mm	1.2 MPa	700%	[2]
Hybrid hydrogel	D=4.2 mm L=30 mm Clavate	11 KPa	112%	[3]
SV3/PVA-1-3 hydrogel	D=0.7 mm L=12 mm Clavate	45 KPa	60%	[4]
RSF/G hydrogel	50 mm×10 mm×1mm	0.21 MPa	80%	[5]
pCBM/pSB hydrogel	30 mm×10 mm×1mm	1.23 MPa	93%	[6]
EO@AMS/polyacrylate hybrid hydrogel	20 mm×5 mm×1.5 mm	0.08 MPa	710%	[7]
This work	30 mm×20 mm×2 mm	0.015 MPa	1180%	

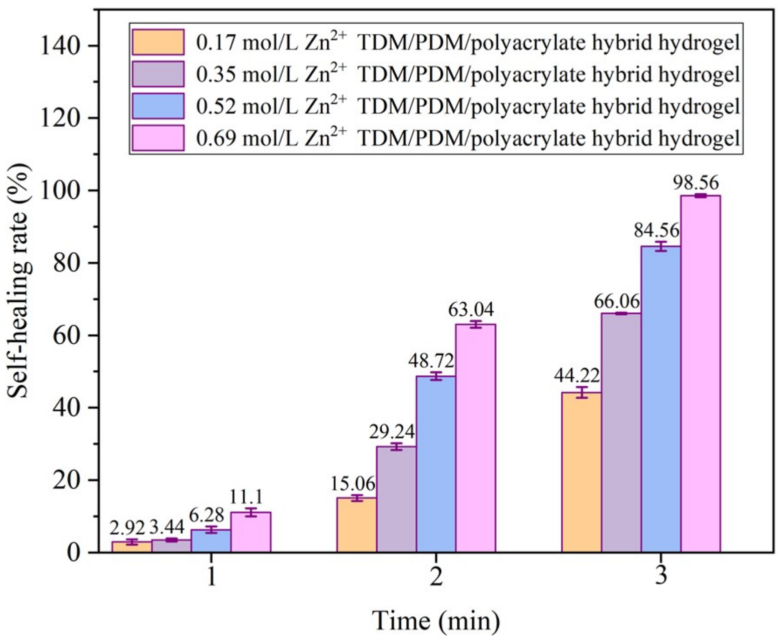

Fig. S6 Effect of different ratios of zinc ions on the self-healing rate of TDM/PDM/polyacrylate hybrid hydrogel

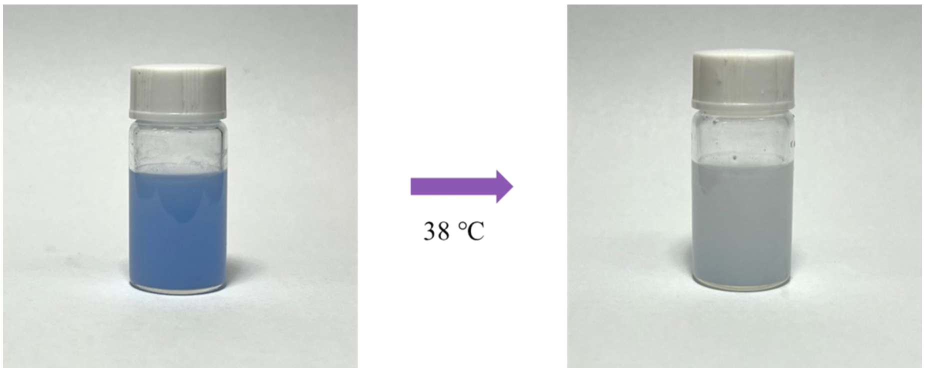

Fig. S7 The thermochromic property of aqueous solution of TDM

.

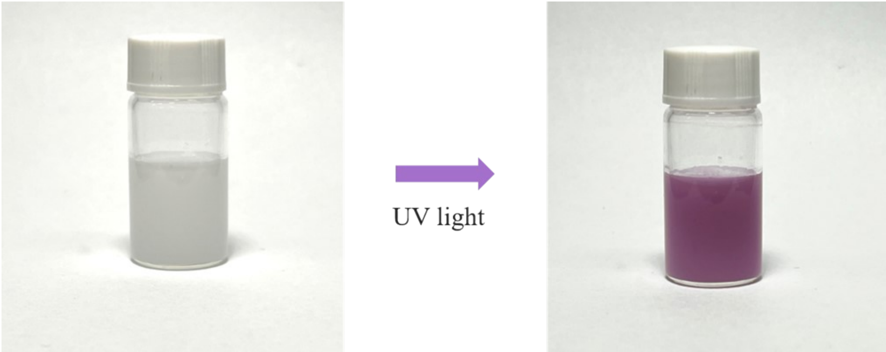

Fig. S8 The photochromic property of aqueous solution of PDM

.

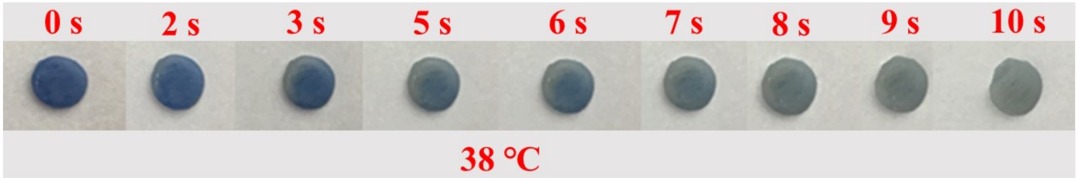

Fig. S9 The thermochromic property of TCM/polyacrylate hybrid hydrogel

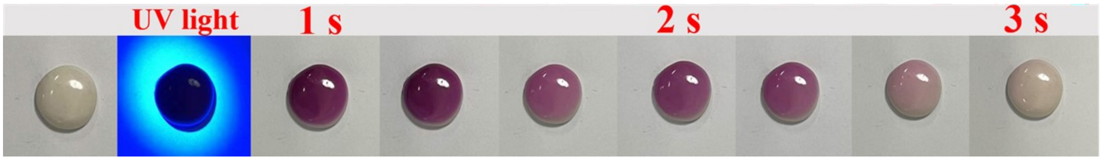

Fig. S10 The photochromic property of PDM/polyacrylate hybrid hydrogel

Reference

1 Y. Wang, H. Qin, Z. Li, J. Dai, H. Cong, S. Yu, Highly compressible and environmentally adaptive conductors with high-tortuosity interconnected cellular architecture, *Nat. Synth.*, 2022.

2 J. Peng, M. Zhou, T. Gao, J. Wang, Y. Cao, W. Wang, D. Wu, Y. Yang, A mechanically robust all-solid-state supercapacitor based on a highly conductive double-network hydrogel electrolyte and $Ti_3C_2T_x$ MXene electrode with anti-freezing property†g, *J. Mater. Chem. A*, 2021, **9**, 25073.

3 G. Zhang, Y. Chen, Y. Deng, C. Wang, A triblock copolymer design leads to robust hybrid hydrogels for high-performance flexible supercapacitors, *ACS Appl. Mater. Interfaces*, 2017, **9**, 36301-36310.

4 X. Zhou, A. Rjeev, A. Subramanian, Y. Li, N. Rossetti, G. Natale, G. Lodygensky, F.Cicoira, Self-healing, stretchable, and highly adhesive hydrogels for epidermal patch electrodes, *Acta Biomater.*, 2022, **139**, 296-306.

5 L. Jiang, D. Su, S. Ding, Q. Zhang, Z. Li, F. Chen, W. Ding, S. Zhang, J. Dong, Salt-assisted toughening of protein hydrogel with controlled degradation for bone regeneration, *Adv. Funct. Mater.*, 2022, **29**, 1901314.

6 M. Yao, Z. Wei, J. Li, Z. Guo, Z. Yan, X. Sun, Q. Yu, X. Wu, C. Yu, F. Yao, S. Feng, H. Zhang, J. Li. Microgel reinforced zwitterionic hydrogel coating for blood-contacting biomedical devices, *Nat. Commun.*, 2022, **13**, 5339.

7 H. Liu, Y. Ni, J. Hu, Y. Jin, P. Gu, H. Qiu, K. Chen, Self-healing and antibacterial essential oil-loaded mesoporous silica/polyacrylate hybrid hydrogel for high-

performance wearable body-strain sensing, *ACS Appl. Mater. Interfaces*, 2022, **14**, 21509-21520.