

Flexible and antibacterial conductive hydrogel based on silk fibroin/polyaniline/AgNPs for motion sensing and wound healing promotion under electrical stimulation

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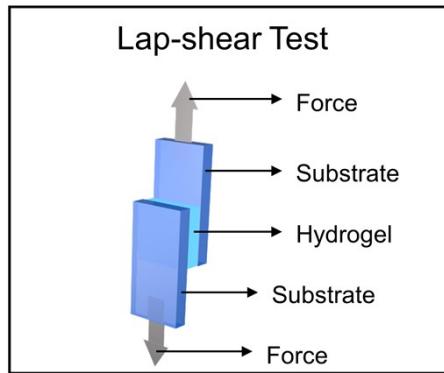


Fig. S1 Diagrammatic sketch of the lap shear experiments.

Table S1. Performance summary of representative hydrogels.

Reference	Materials	Sensitivity	Response Time (ms)	Mechanical strength (KPa)	Elongation at break (%)
PNIPAM/CMCS					
1	/MWCNT/PANI hydrogels	3.6	/	47	225
PSA/LiCl/PANI hydrogels					
2		1.74	223	470	600
PEDOT:PSS-PVA hydrogels					
3		3.18	/	186	270
PL (PEDOT:LS) -Fe ³⁺ -PAA/PVA hydrogels					
4		1.64	253	98.2	460
CNC-PEDOT : PSS/PVA hydrogels					
5		7.97	/	989. 6	989.6
CMC/PTh/AHC hydrogels					
6		/	/	758	107.4
SDS/PPy/LMPAm hydrogel					
7		/	300	345	1021
PVA-EGaIn-x@PAAm/PAA @FeCl ₃ @PPy hydrogel					
8		0.28	/	344.7	700
PVA@MXene@PPy hydrogel					
9		1	100	26.78	4351
PAM/PDA@PE DOT hydrogel					
10		2.82	140	187	3383
PAM-co-SBMA/SF-PANI-Ag hydrogel					
This work		12.17	210	239	2858

References:

- 1.T. Zhan, H. Xie, J. Mao, S. Wang, Y. Hu and Z. Guo, *ChemistrySelect*, 2021, **6**, 4229-4237.

- 2.Z. Zhang and P. Raffa, *European Polymer Journal*, 2023, **199**.
- 3.J. Cao, Z. Zhang, K. Li, C. Ma, W. Zhou, T. Lin, J. Xu and X. Liu, *Nanomaterials (Basel)*, 2023, **13**.
- 4.X. Su, S. Zhai, K. Jin, C. Li, A. Chen, Z. Cai, C. Xian and Y. Zhao, *ACS Appl Mater Interfaces*, 2023, **15**, 45526-45535.
- 5.X. Chai, J. Tang, Y. Li, Y. Cao, X. Chen, T. Chen and Z. Zhang, *ACS Appl Mater Interfaces*, 2023, **15**, 18262-18271.
- 6.N. Danmatam, J. T. H. Pearce and D. Pattavarakorn, *Journal of Applied Polymer Science*, 2023, **141**.
- 7.X. Cao, Q. Cao, T. Zhang, W. Ji, U. Muhammad, J. Chen and Y. Wei, *Biomacromolecules*, 2024, **25**, 143-154.
- 8.Y. Li, Y. Peng, J.-Y. Tian, S. Duan, Y. Fu, S. Zhang and M. Du, *Colloids and Surfaces A: Physicochemical and Engineering Aspects*, 2023, **670**.
- 9.Z. Qin, G. Zhao, Y. Zhang, Z. Gu, Y. Tang, J. T. Aladejana, J. Ren, Y. Jiang, Z. Guo, X. Peng, X. Zhang, B. B. Xu and T. Chen, *Small*, 2023, **19**, e2303038.
10. X. Li, X. Zhao, R. Liu, H. Wang, S. Wang, B. Fan, C. Hu and H. Wang. *J. Mater. Chem. B*, 2024, **12**, 3092-3102.