A self-adhesive, self-healing and antibacterial hydrogel based on PVA/MXene-Ag/sucrose for fast-response, high-sensitive and ultra-durable strain sensor

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Content

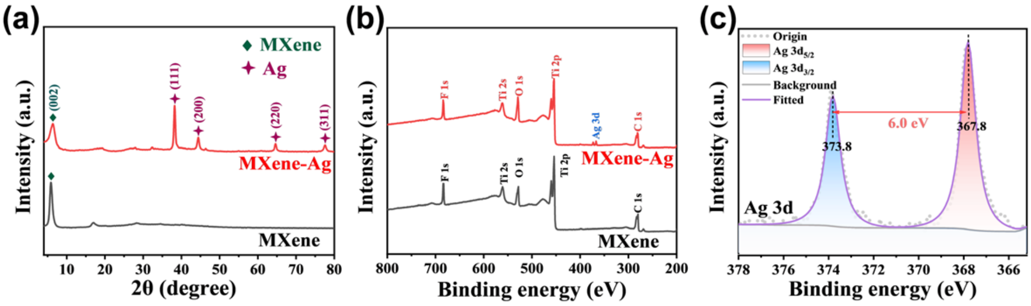

Fig. S1. (a) XRD patterns of MXene and MXene-Ag NPs. (b) XPS profiles of the MXene and MXene-Ag NPs. (b) Ag 3d in the MXene-Ag NPs.

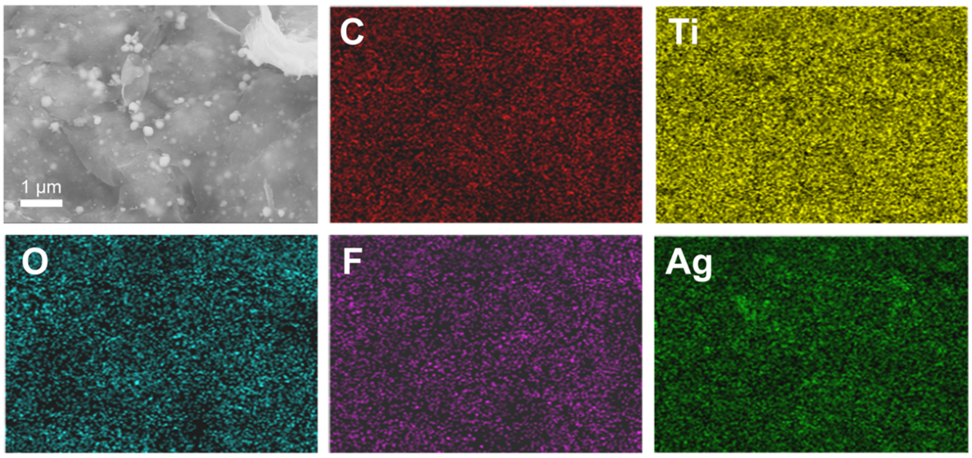

Fig. S2. SEM image of the MXene-AgNPs and corresponding EDS elemental mapping images for C, Ti, O, F, and Ag elements.

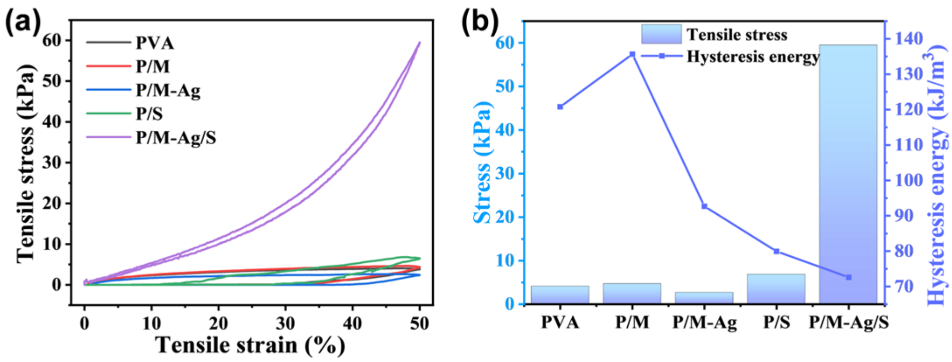

Fig. S3. (a) Cyclic loading-unloading curves and (b) stress and energy dissipation of PVA, P/M, P/M-Ag, P/S, and P/M-Ag/S hydrogels at a tensile strain of 50%.

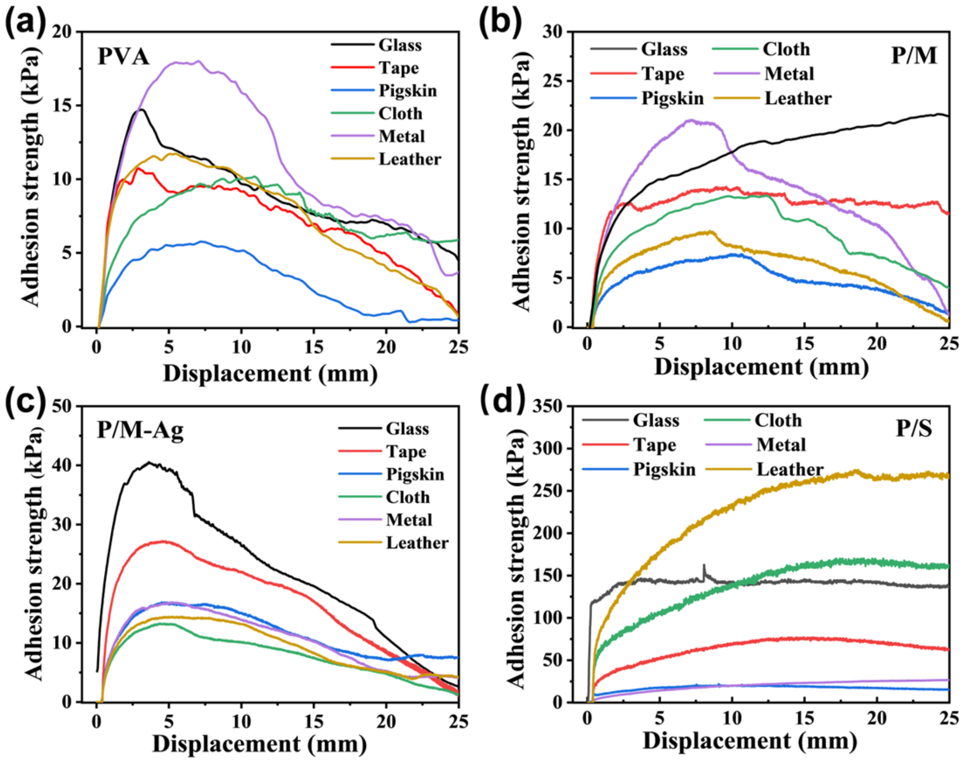

Fig. S4. (a-d) Lap shear curves for PVA, P/M, P/M-Ag, and P/S with different materials (glasses, tapes, pigskins, cloths, metals, and leathers).

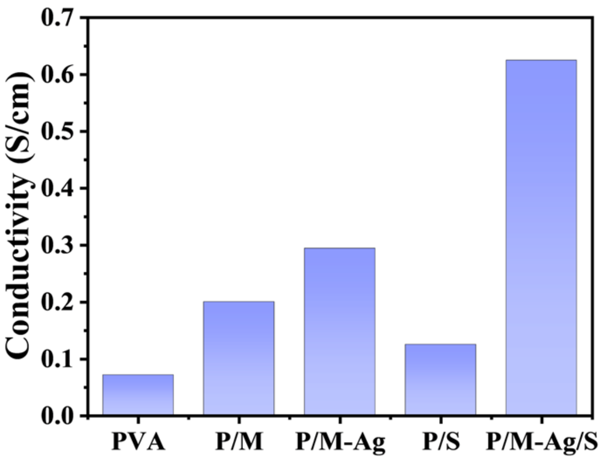

Fig. S5. Conductivity of PVA, P/M, P/M-Ag, P/S and P/M-Ag/S hydrogels.

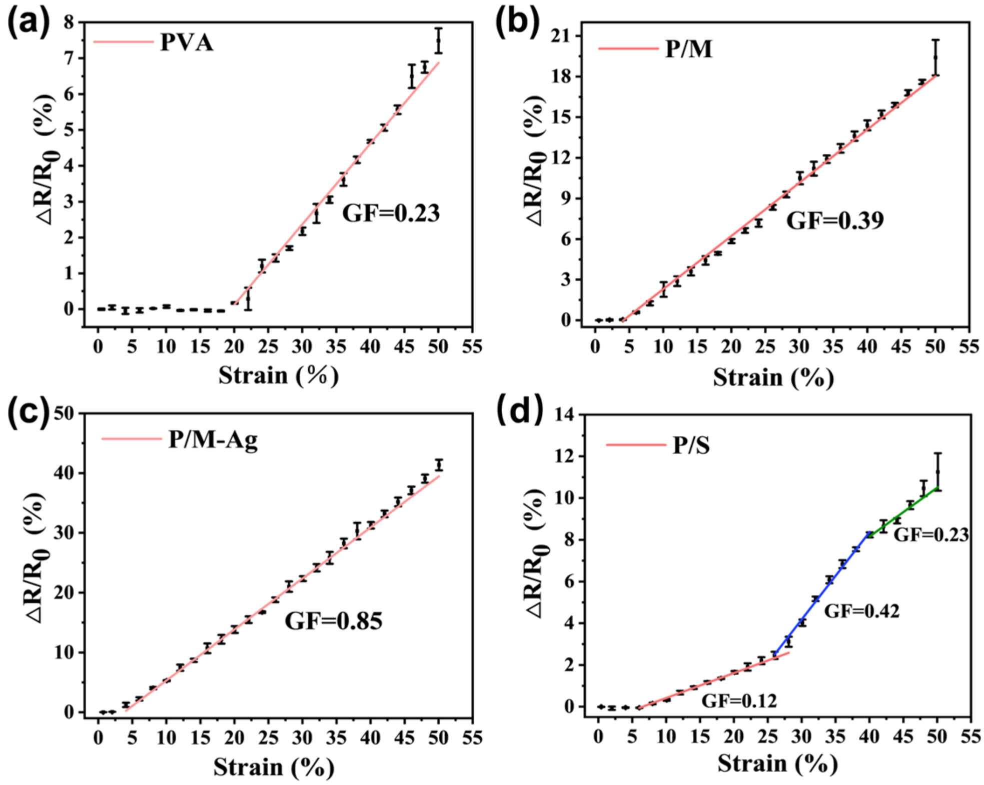

Fig. S6. (a-d) Relative resistance changes and GF values of PVA, P/M, P/M-Ag, and P/S hydrogel sensors of varied tensile strain (0−50%), respectively.

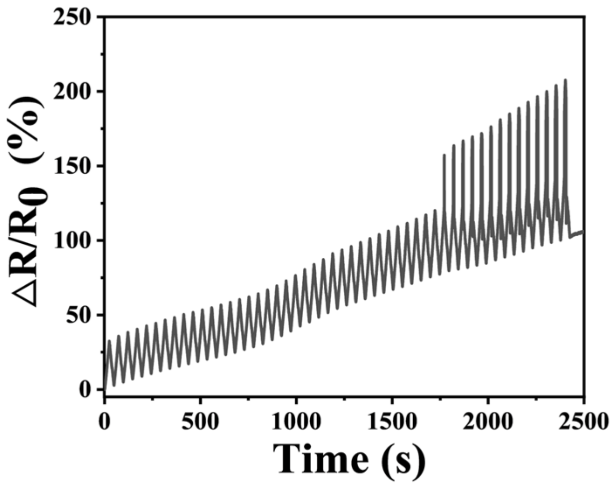

Fig. S7. Cycling stability tests of P/M-Ag hydrogel sensor at strain from 0% to 30% for 50 cycles.

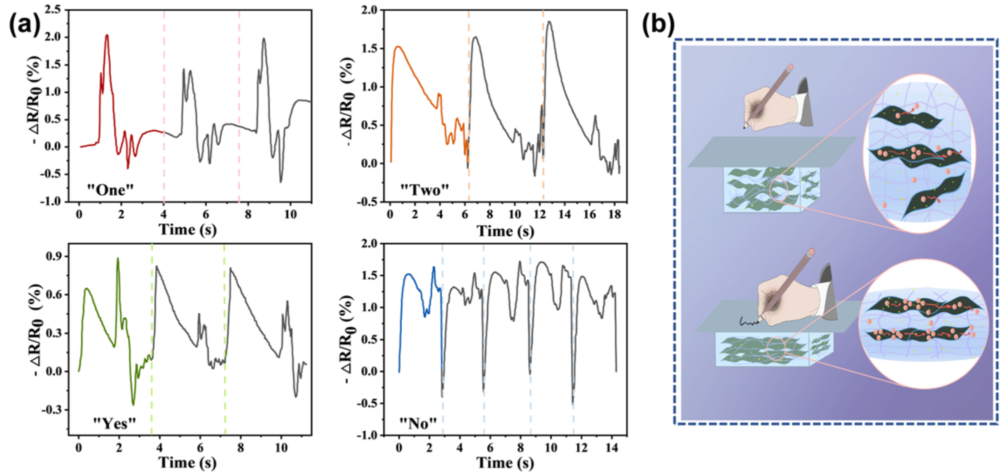

Fig. S8. (a) Relative resistance changes in writing different English words (“One”, “Two”, “Yes”, and “No”). (b) Schematic illustration of mechanism of writing board.

Table S1. Performance comparison of some conductive PVA-based hydrogels.

Materials	Elongation at break (%)	Sensing Stability (T/C) (cycles)	Self-healing	Self-adhesive	Response Time (T/C) (ms)	Recovery Time (T/C) (ms)	GF (T/C)	Anti-bacterial	Ref.
PVA/MXene-Ag/Suc	**194**	**1500 (30%) /6000 (250 kPa)**	**Yes**	**Yes**	**82.8/28.8**	**102.6/153**	**3.92 /-0.81**	**Yes**	**This work**
PVA/SA/MXene	225	1000 (30%) /N-G	N-G	N/G	62.5/ N-G	147.3 / N-G	0.97 /N-G	No	[1]
PVA/MXene	3400	N/G	Yes	Yes	N-G	N-G	25/80	No	[2]
PVA/MXene/CS /Gly	16.37	1000(8%) /N-G	N-G	N-G	120/N-G	90/N-G	N-G	No	[3]
PVA/SBMA /HEMA	337	1000(50 %)/ N-G	N-G	N-G	130/N-G	200/N-G	1.43 /N-G	No	[4]
PVA/AgNWs /OPs	1073	1000(15 %) /N-G	Yes	Yes	20/N-G	N-G	1.34 /N-G	No	[5]
PVA/SNF /CN	585	20(20%)/ N-G	Yes	N-G	276/N-G	N-G	0.74 /N-G	Yes	[6]
PVA/CNF	1919	540(25%) /N-G	Yes	N-G	N-G	N-G	N-G /0.75	No	[7]
PVA/gelatin /PCD–Fc–CHO	1156	12(30%)/ N-G	Yes	Yes	512/N-G	600/N-G	3.42 /N-G	No	[8]
PVA/CA/ AgNPs	600	200(50%) /N-G	N-G	Yes	90/N-G	240/N-G	1.6 /N-G	No	[9]

Note: ‘N-G’ indicates ‘not given’ in the references, ‘T/C’ indicates ‘Tensile/ compressive’ in the Table.

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