

Supporting Information

Stretchable, sensitive, flexible strain sensor incorporated with patterned liquid metal on hydrogel for human motion monitoring and human-machine interaction

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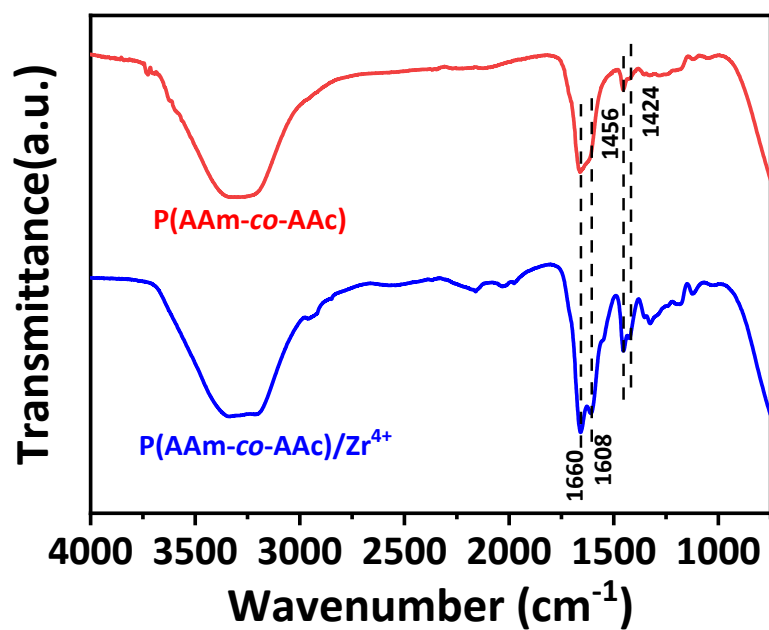


Figure S1. FTIR spectra of equilibrated P(AAm-co-AAc) ($C_m = 5$ M, $f_{AAc} = 30$ mol%) and P(AAm-co-AAc)/Zr⁴⁺ ($C_m = 5$ M, $f_{AAc} = 30$ mol%, $C_{Zr^{4+}} = 0.5$ M) hydrogel films.

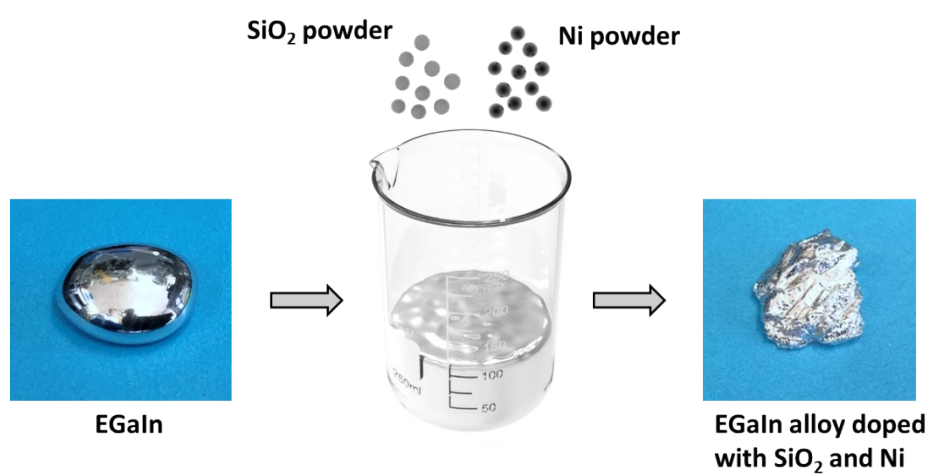


Figure S2. Schematic diagram of the preparation of EGaIn alloy doped with SiO₂ and Ni.

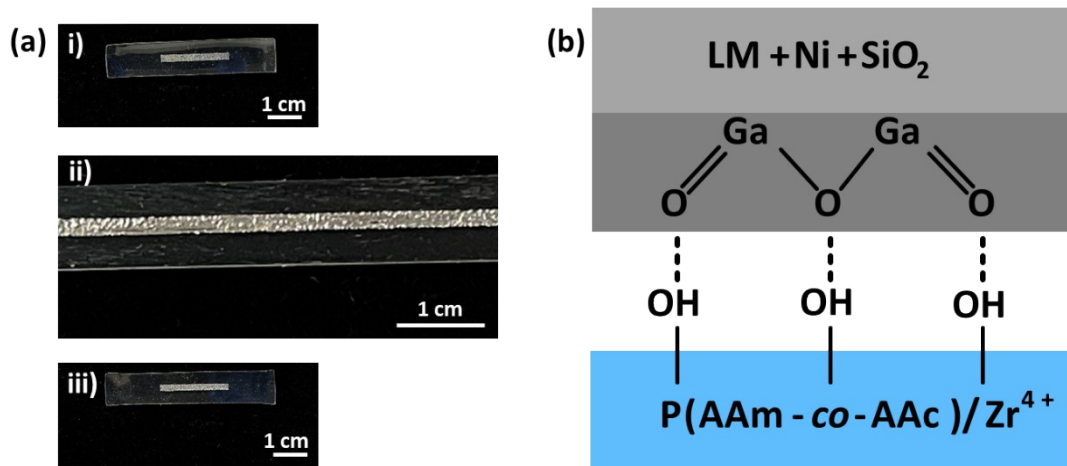


Figure S3. (a) Photographs of linear LM strip shadow printed on the hydrogel surface (i) before, (ii) after applying a tensile strain of 300% and (iii) after recovery from stretching for 300 times. (b) Schematic diagram of interfacial adhesion between the LM and hydrogel layers.

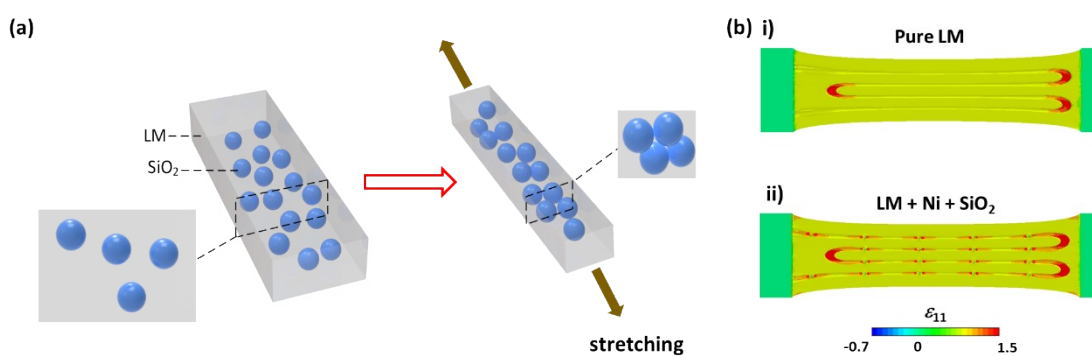


Figure S4. (a) Diagram of LM doped with SiO₂ particles before and after stretching. (b) Finite element analysis of tensile strain of the strain sensor patterned with (i) pure LM and (ii) LM doped with Ni and SiO₂ particles.

Table S1. Comparison of the maximum gauge factor and strain of flexible strain sensors.

Materials	Strain (%)	Gauge factor	Reference ^a
LM/P(AAm- <i>co</i> -MAAc)	630	1.42	S1
LM/Ecoflex	396	2.20	S2
LM/PVA	375	0.73	S3
oxCNTs/PAAm	700	3.39	S4
PANI/P(AAm- <i>co</i> -HEMA)	300	1.48	S5
AgNPs/PDMS	70	10.80	S6
CB/PDMS	30	0.20	S7
MWCNTs/PDMS	40	7.22	S8
CB/CNT/TPU	50	4.10	S9
PEDOT:SL/PAAc	100	7.00	S10

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Table S2. Comparison of the detection limit and sensing range of flexible strain sensors.

Materials	Sensing range (%)	Detection limit (%)	Reference^b
Ag/rGO/PDMS	200	0.20	S11
MXene/PANIF/VHB	80	0.15	S12
CS/MWCNT/PDMS	80	0.40	S13
LM/Ecoflex	310	0.09	S14
PANI/P(AAm-co-HEMA)	300	0.30	S15
CB/TPU/Ecoflex	225	0.50	S16
Ag/MWCNT/G/PDMS	170	0.10	S17
PAAm/Carrageenan	400	0.50	S18
CNT/TPU	600	0.05	S19
CNT/PDMS	100	0.01	S20

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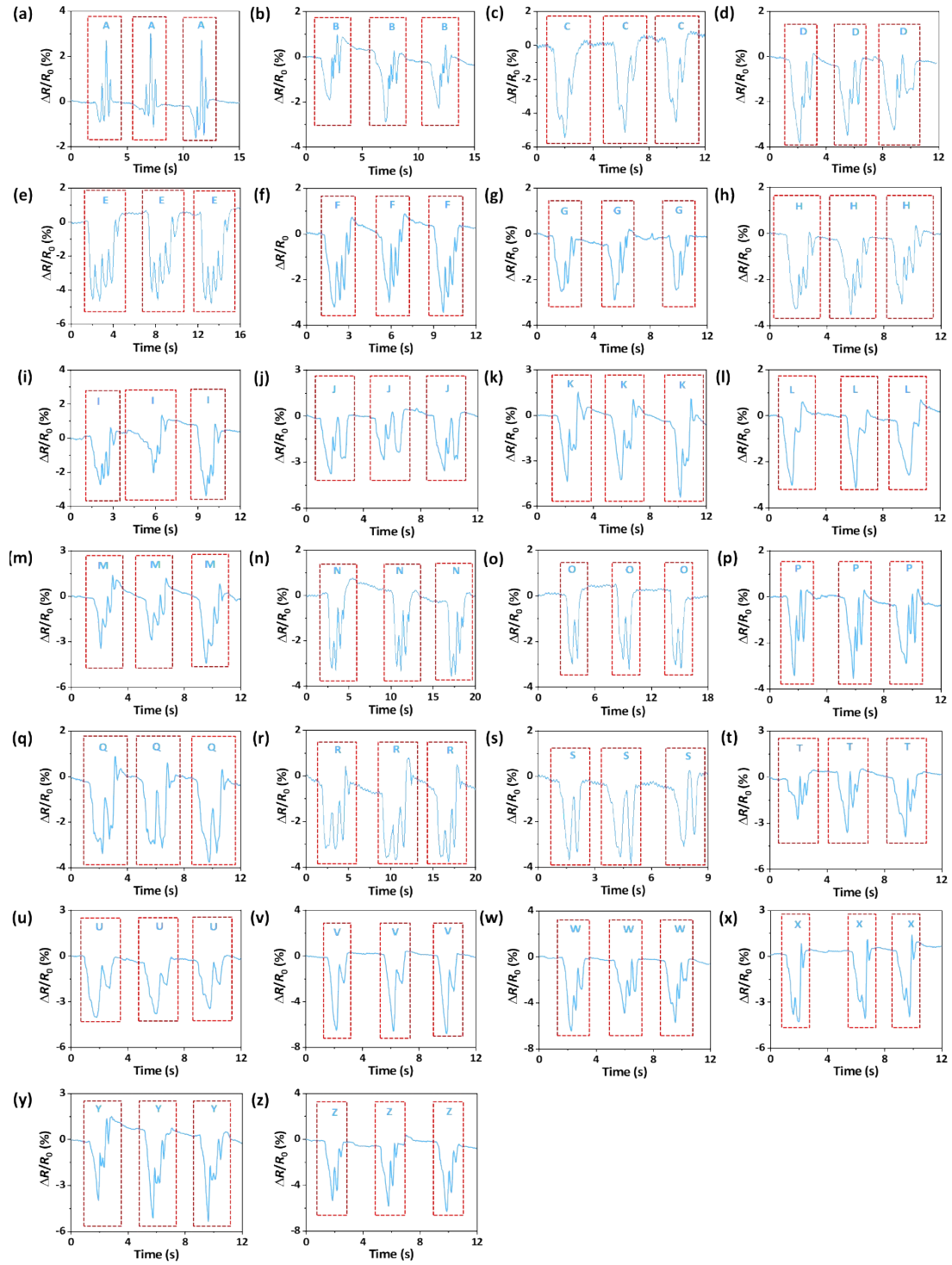


Figure S5. The relative resistance change curves for detection of handwriting different letters.

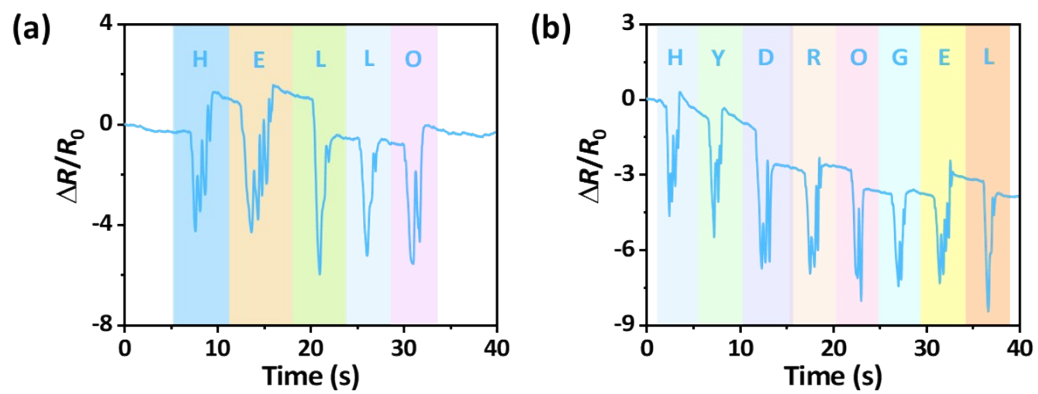


Figure S6. The relative resistance change curves for detection of handwriting different words, (a) "HELLO", and (b) "HYDROGEL".