Supporting Information

Acrylate copolymer-reinforced hydrogel electrolyte for strain sensors and flexible supercapacitors

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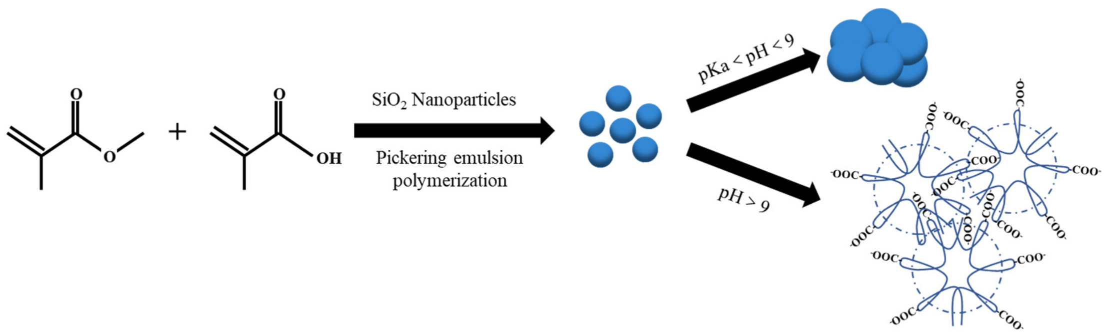

Figure S1. Schematic diagram of the preparation process, swelling, disentanglement, and regrouping of P(MMA-MAA) latex particles under alkaline conditions.

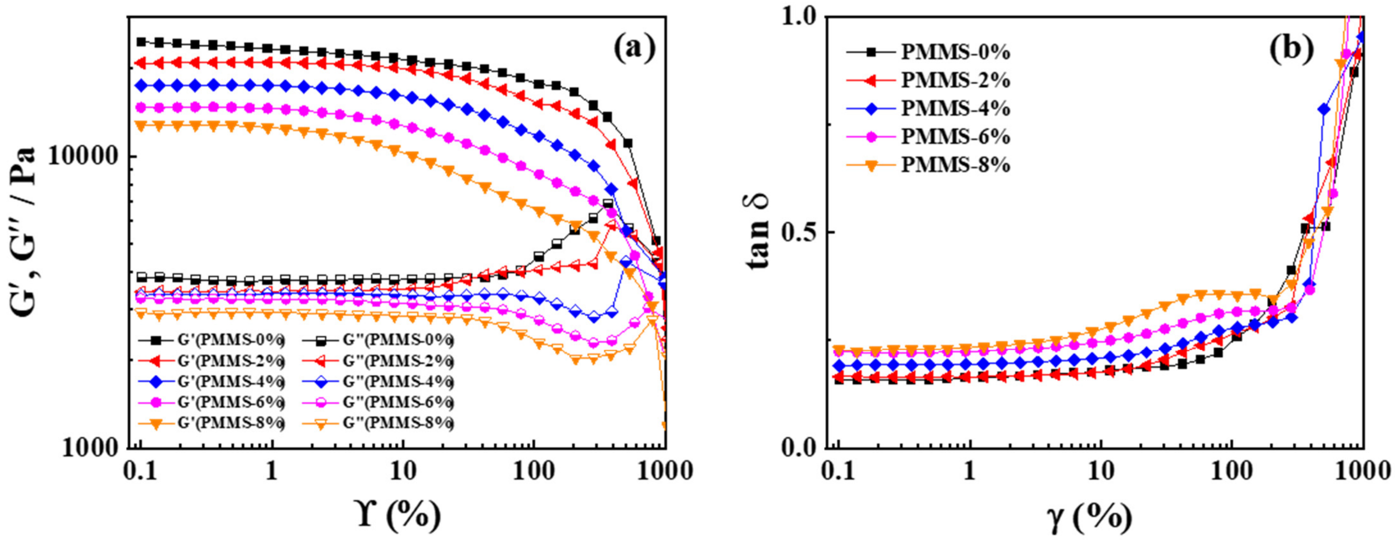

Figure S2. Rheological properties of P(AAS-VPA)/PMMS composite hydrogels: (a–b) curves of rheological properties of the P(AAS-VPA)/PMMS composite hydrogel with different PMMS contents.

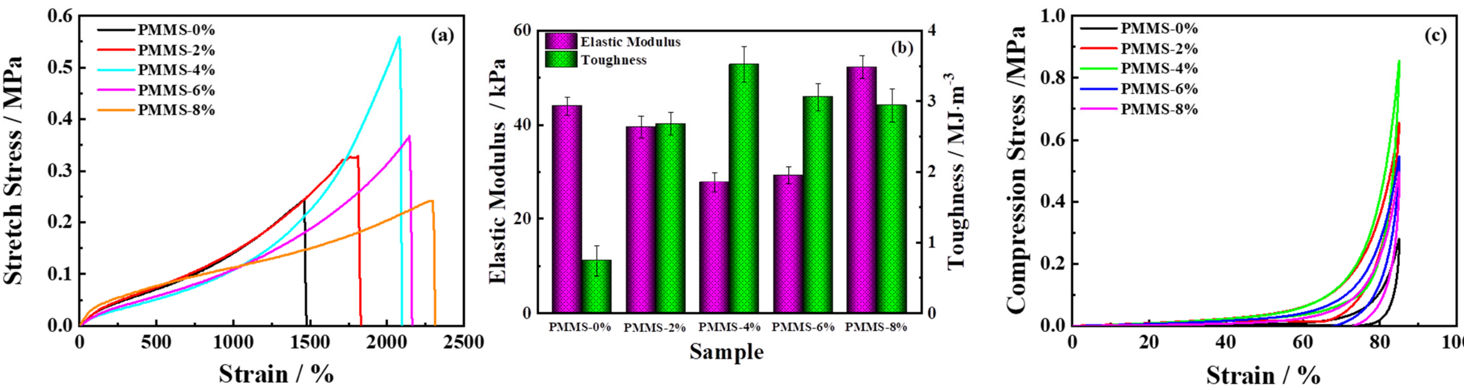

Figure S3. Effect of PMMS and VPA contents on the properties of the P(AAS-VPA)/PMMS composite hydrogels: (a–c) tensile stress–strain curves, corresponding elastic modulus, and toughness and compressive stress–strain curves with PMMS content in hydrogels.

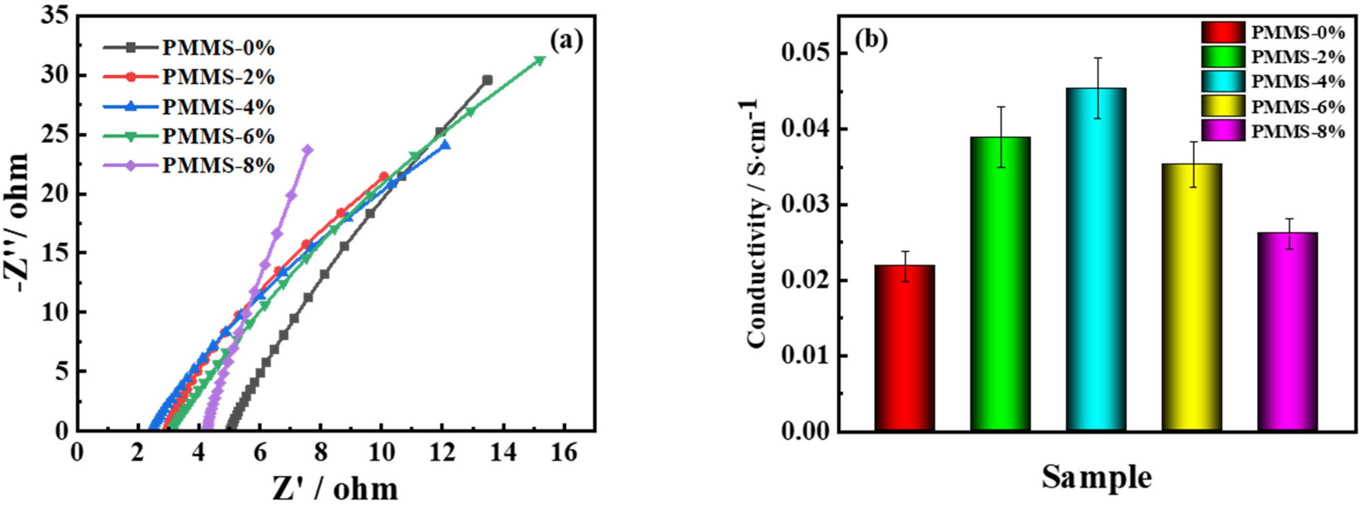

Figure S4. (a) EIS versus frequency for hydrogels with different PMMS contents varying between 10^5 Hz and 10^{-2} Hz and (b) effect of PMMS on the ionic conductivity of composite hydrogels.

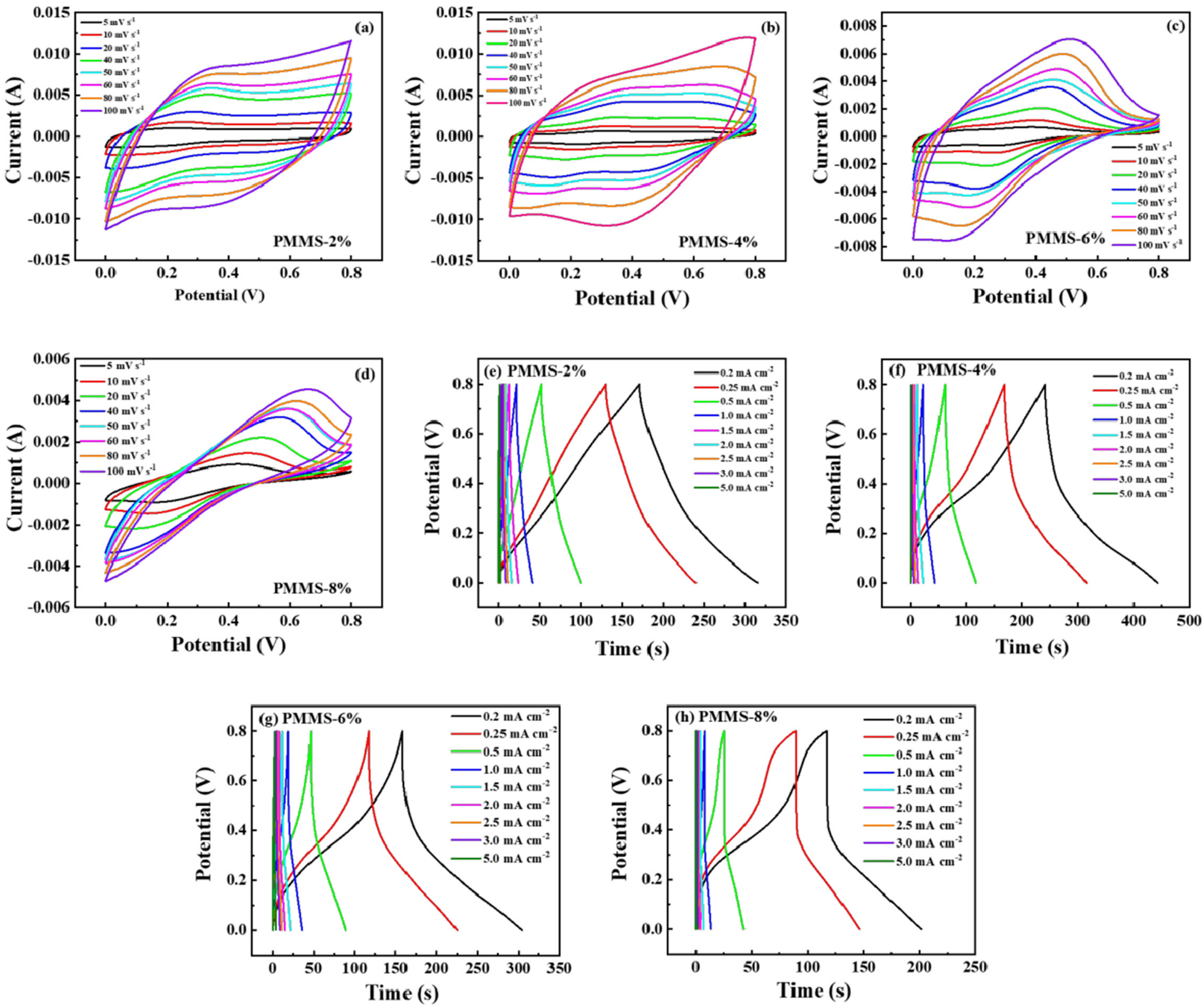

Figure S5. Capacitive performance of the P(AAS-VPA)/PMMS composite hydrogel at different PMMS contents: (a–d) CV curves of hydrogel electrolyte at scanning rates of 5~100 mV/s; (e–h) GCD curves of hydrogel electrolyte at current densities of 0.2~5.0 mA/cm^2.

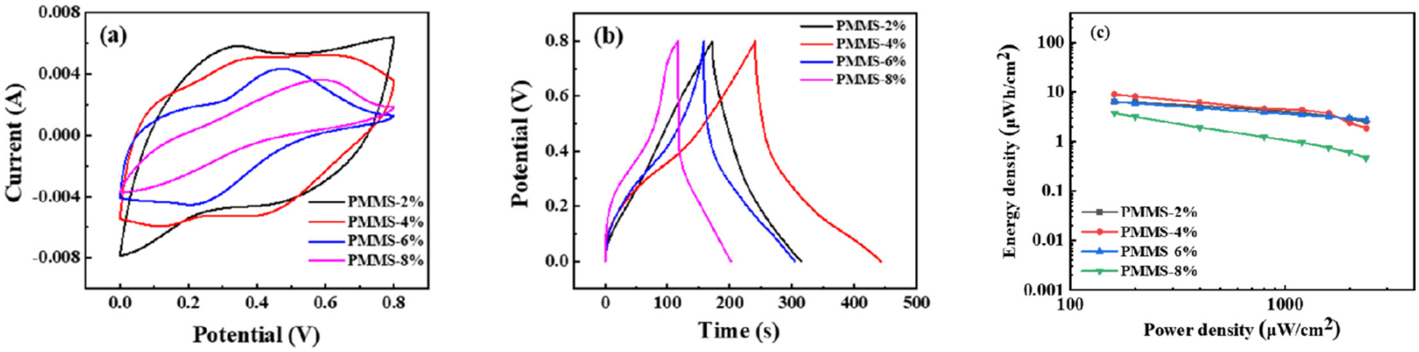

Figure S6. (a, b) CV curves of P(AAS-VPA)/PMMS composite hydrogel electrolyte at 50 mV/s scan rate and GCD curves at a current density of 0.2 mA/cm² for different PMMS mass fractions, respectively; (c) the Ragone diagram of PMMS content in the composite hydrogel with 2%, 4%, 6%, and 8%, respectively.

Table S1. Comparison of the sensing performance of different hydrogels

Hydrogel	Strain	GF	Ref
P(AAS-VPA)/PMMS	300%	4	This work
P (THAM/AM)	200%	3.69	1
PVA/SNF/CN	100%	0.7	2
PVA/CA/AgNPs	200%	1.6	3
SBMA-co-HEMA	100%	1.8	4
AMP-regulated hydrogels	100%	2.37	5
Poly (vinyl alcohol)/glycerol/polyaniline	100%	2.14	6
PAAm/PAA–Fe^{3+}/NaCl	500%	1.96	7
PAA/PVA/EG/PEDOT: PSS/F-MWCNT	100%	1.61	8
PVA/P(SBMA-co-HEMA)	300%	3.356	9
PVA/CNFs/α-ZrP-Na^{+}	350%	2.46	10

References

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