

Supporting Information

Readily Producing the High Self-Healing, Conductive and Photothermal Conversion Silly Putty-like Hydrogel Based on Dynamic Coordinate Bonds and Hydrogen Bonds

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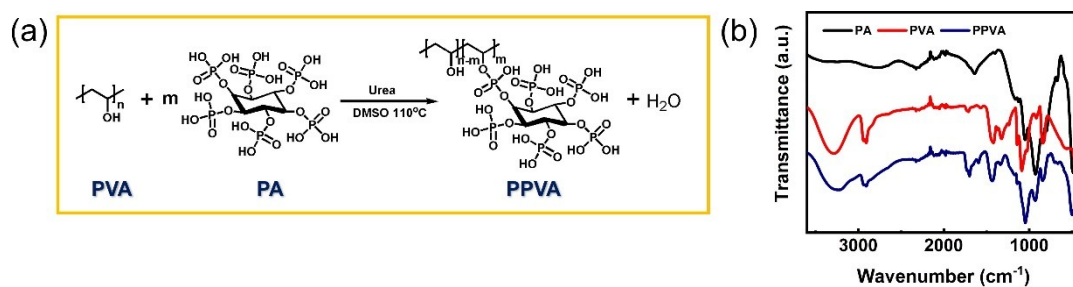


Figure S1. Synthetic route of PPVA (a), ATR-FTIR spectra of PA, PVA and PPVA.

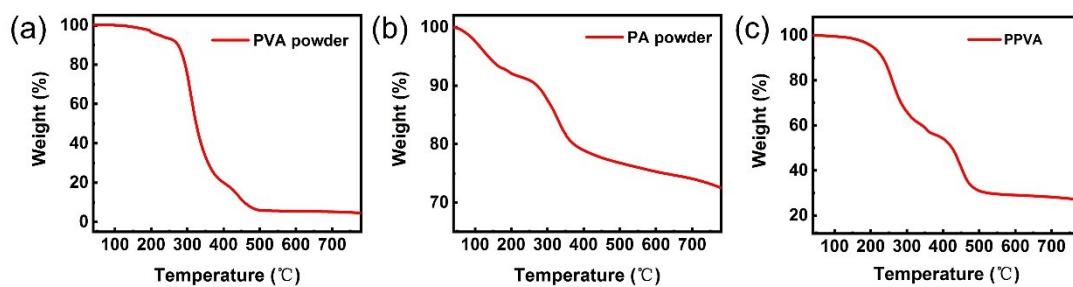
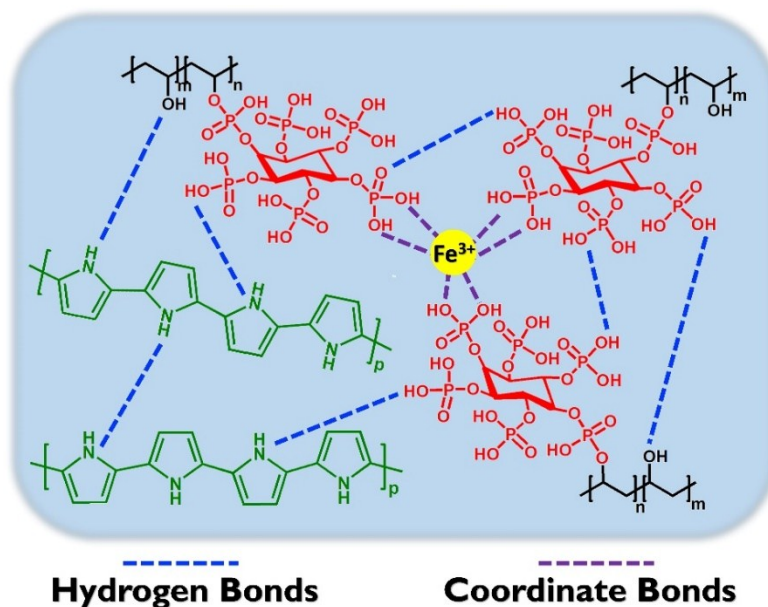


Figure S2. TG analysis of PVA (a), PA (b) and PPVA (c), respectively.



Scheme S1. The complex interactions between each composition inside the PPFc gel.

Table S1 The samples of with different Fe^{3+} contents

Samples	10 wt.% PPVA (mL)	Fe^{3+} (0.4 mL)	Py (μL)
PPFe _{0.5}	1.0	0.5 mol/L	20.0
PPFe ₁	1.0	1.0 mol/L	20.0
PPFe ₂	1.0	2.0 mol/L	20.0
PPFe ₄	1.0	4.0 mol/L	20.0

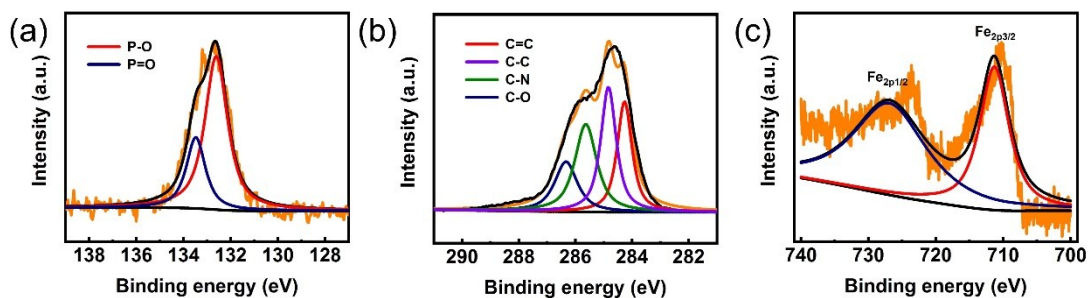


Figure S3. The high-resolution XPS spectra of P 2p (a), C 1s (b) and Fe 2p (c), respectively.

Table S2 The content of elements by the XPS survey spectrum

Elements	C	O	N	P	Fe	others
mol (%)	64.8	25.7	3.7	1.7	1.2	2.9

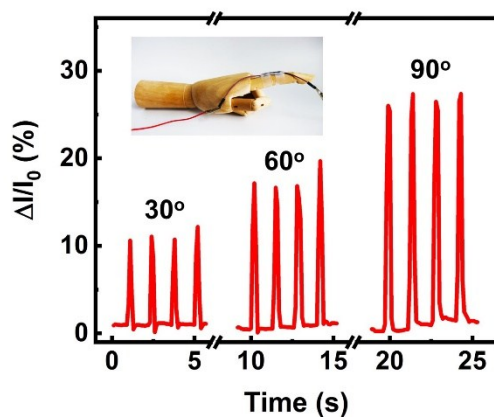


Figure S4. The strain response curves of the PPF_{e4} gel attached on a toy index finger at different bending angles of 30°, 60° and 90°, respectively.

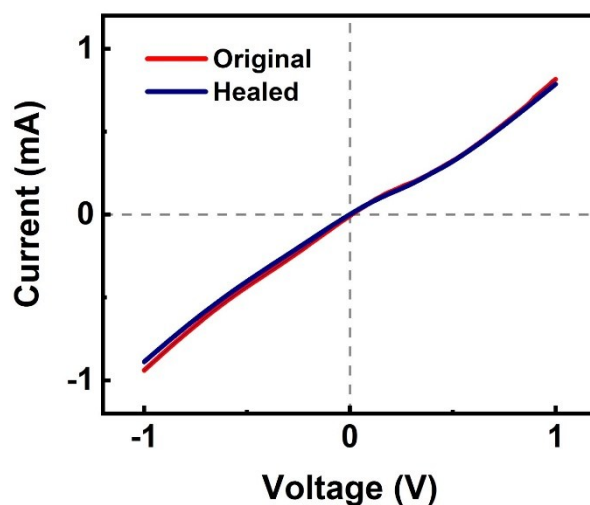
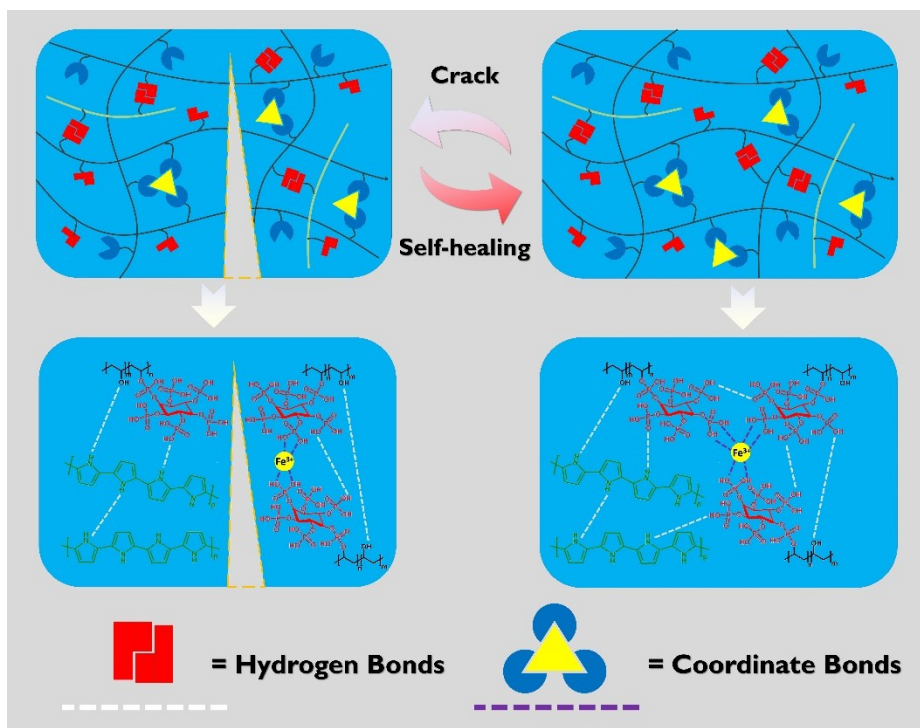


Figure S5. The linear $I-V$ curves before and after self-healing of the PPF_{e4} hydrogel.



Scheme S2. The function of hydrogen bonds and coordinate bonds during the self-healing process.

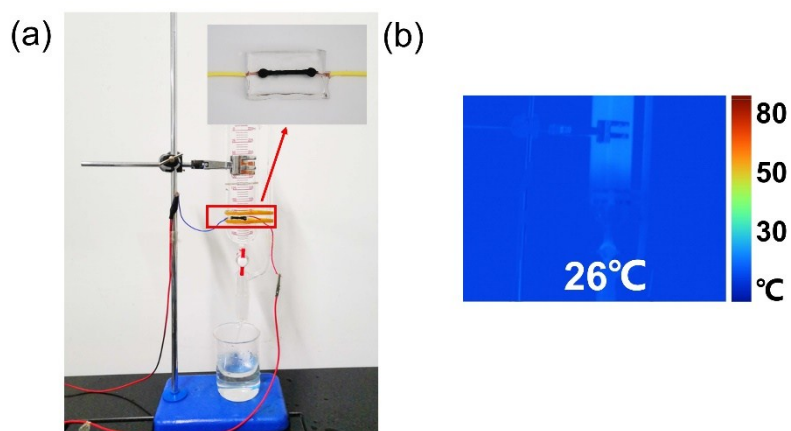


Figure S6. The optical images of temperature sensing device for hot water, inset as the PPF₄ gel-based chip (a). (b) The infrared thermal image of the water at room temperature.