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Supporting Information

Thermogalvanic Hydrogels for Self-Powered Temperature Monitoring in Extreme Environments

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Fig. S1 Tensile strain (a) and compressive strain (b) curves of the PVA/GL and PVA gel. Cyclic strain curves of the PVA/GL gel at the elongation of 100% (c) and compression of 50% (d).



Fig. S2 Infrared spectrum of the PVA/GL gel.



Fig. S3 Thermogalvanic performance of the integrated device at varying ΔT . (a) Output voltage and current of an integrated device consisting of different numbers of thermocell units connected in parallel. Inset: A picture of 9 parallel-connected units. Scare bar (5mm). (b) Current of an integrated device composed of 9 parallel units versus ΔT . Inset: Sketch of the integrated device consisting of units in parallel. (c) Output voltage and current of an integrated device consisting of different numbers of cell units connected in series. (d) Voltage of 9 series-connected units versus ΔT . Inset: The diagram of the series-connected units.



Fig. S4 Infrared image of the PVA/GL and PVA gel under heating at 60°C for 15 s (a), 30 s (b), 45 s

(c), and one minute (d). Scare bar (2cm).



Fig. S5 Images of the PVA/GL and PVA gel at different temperatures during different intervals. Scare

bar:2cm



Fig. S6 Images of the PVA/GL and PVA gel at the initial state and at 85 °C after 20 mins. Scare bar (2cm).



Fig. S7 Thermoelectric property of the PVA/GL hydrogel at extreme ΔT . Voltage (a) and current (b) curves of the gel thermocell at ΔT =50°C. Voltage (c) and current (d) curves of the gel thermocell at ΔT =-50°C.



Fig. S8 Schematic illustrations of the fabrication process of the H-window. (a) Creating a square frame in the glass. (b) Embedding the gel in the frame. (c) Implanting electrodes and wires on both sides of the gel. (d) Encapsulating the gel device with two pieces of 1mm glass.



Fig. S9 Schematic diagram of the infrared variation of the house model. Changes in the temperature difference between indoor and outdoor conditions in a refrigeration storage unit (a) and house (b). Scare bar :5cm.