

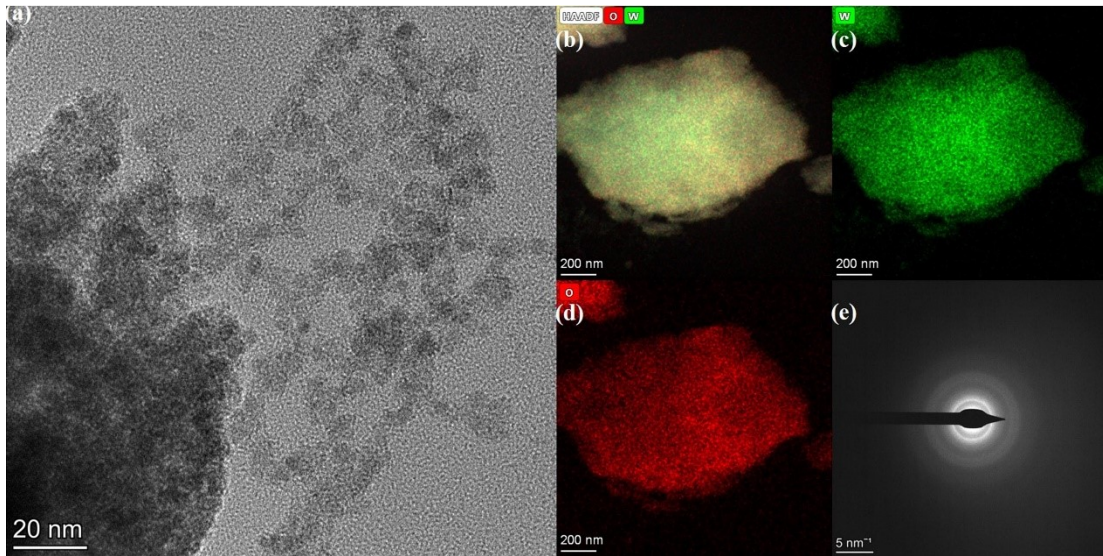
## Supporting Information

# **A bifunctional self-powered electrochromic and thermochromic smart window with enhanced privacy protection ability**

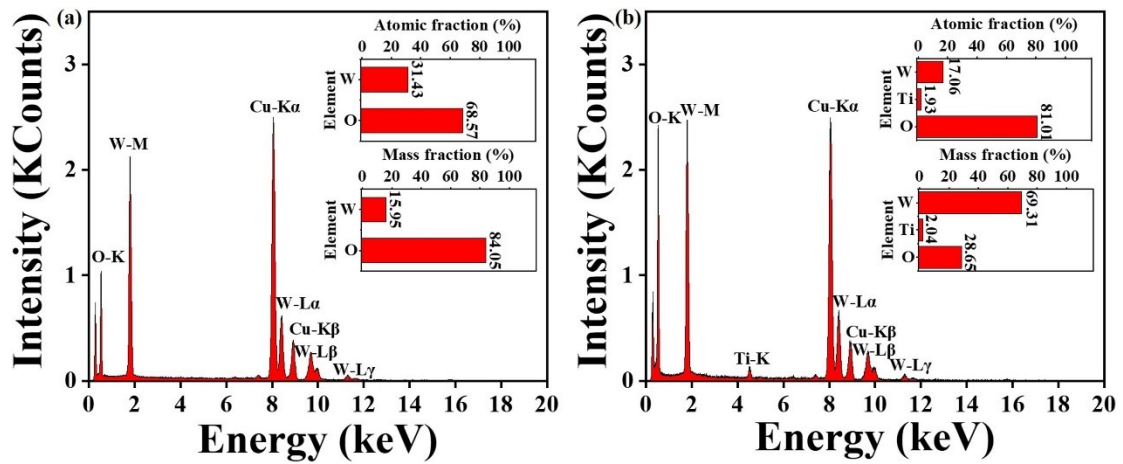
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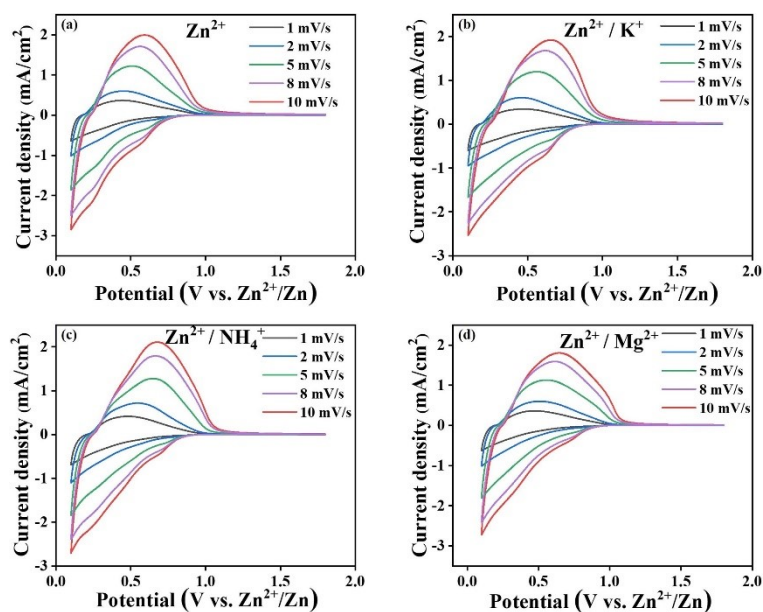
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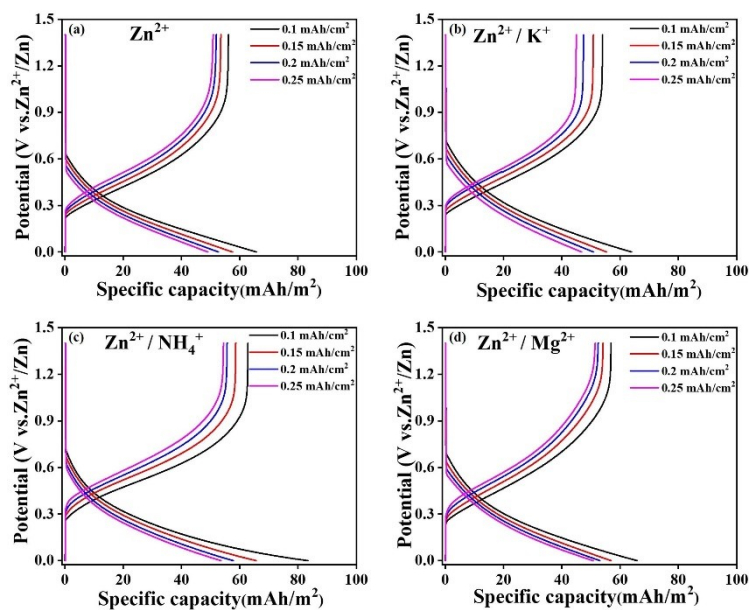
**Fig. S1** (a) The TEM micrographs, (b-d) the EDS mapping images and (e) the Electron diffraction pattern of  $\text{WO}_3$ .



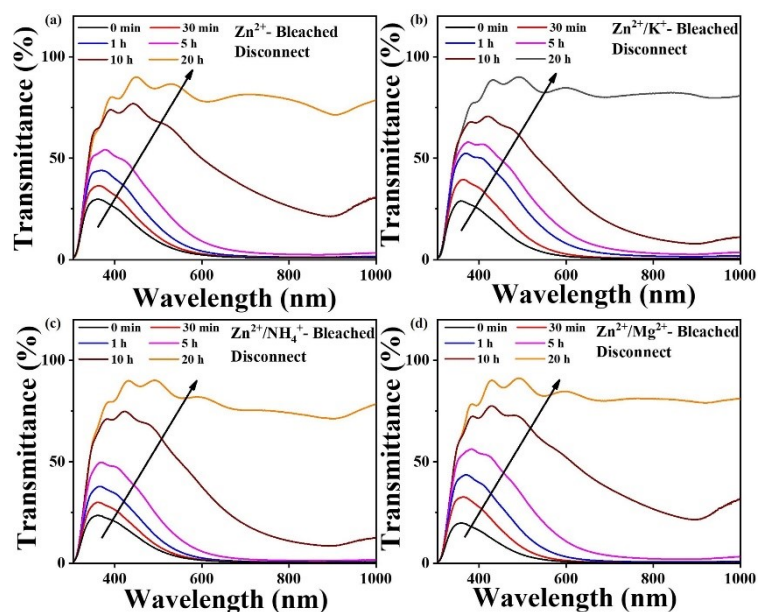
**Fig. S2** (a) the EDS of  $\text{WO}_3$ , (b) the EDS of Ti doped  $\text{WO}_3$ .



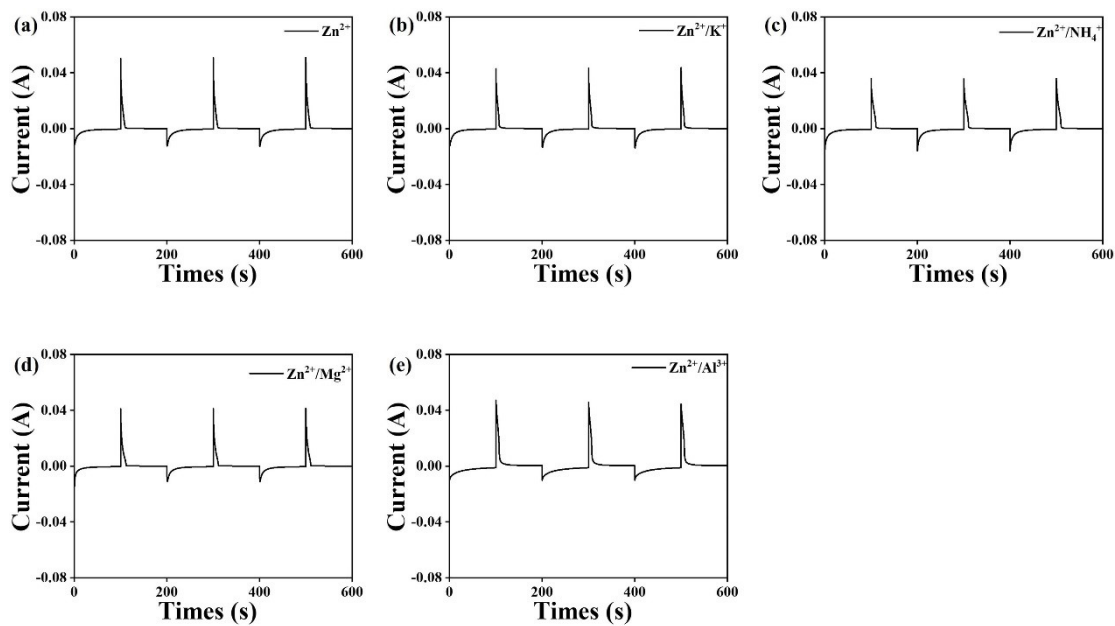
**Fig. S3** CV curves at different scan rates: (a)  $\text{Zn}^{2+}$  electrolyte device; (b) hybrid  $\text{Zn}^{2+}/\text{K}^+$  electrolyte device; (c) hybrid  $\text{Zn}^{2+}/\text{NH}_4^+$  electrolyte device; (d) hybrid  $\text{Zn}^{2+}/\text{Mg}^{2+}$  electrolyte device.



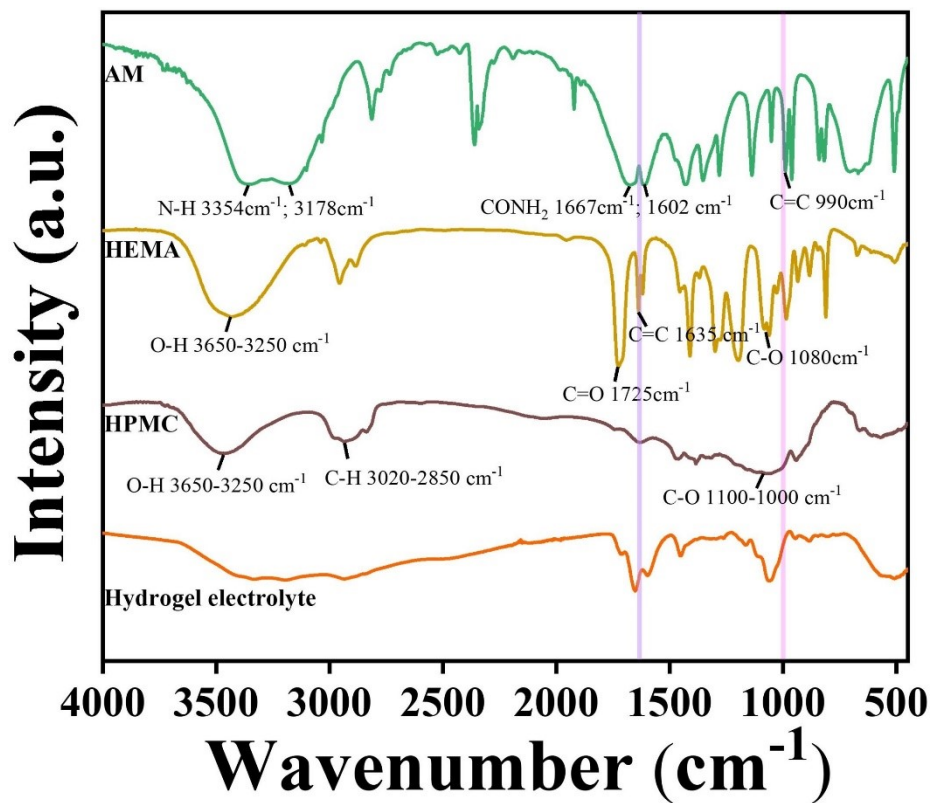
**Fig. S4** GCD curves at various current densities: (a)  $\text{Zn}^{2+}$  electrolyte device; (b) hybrid  $\text{Zn}^{2+}/\text{K}^+$  electrolyte device; (c) hybrid  $\text{Zn}^{2+}/\text{NH}_4^+$  electrolyte device; (d) hybrid  $\text{Zn}^{2+}/\text{Mg}^{2+}$  electrolyte device.



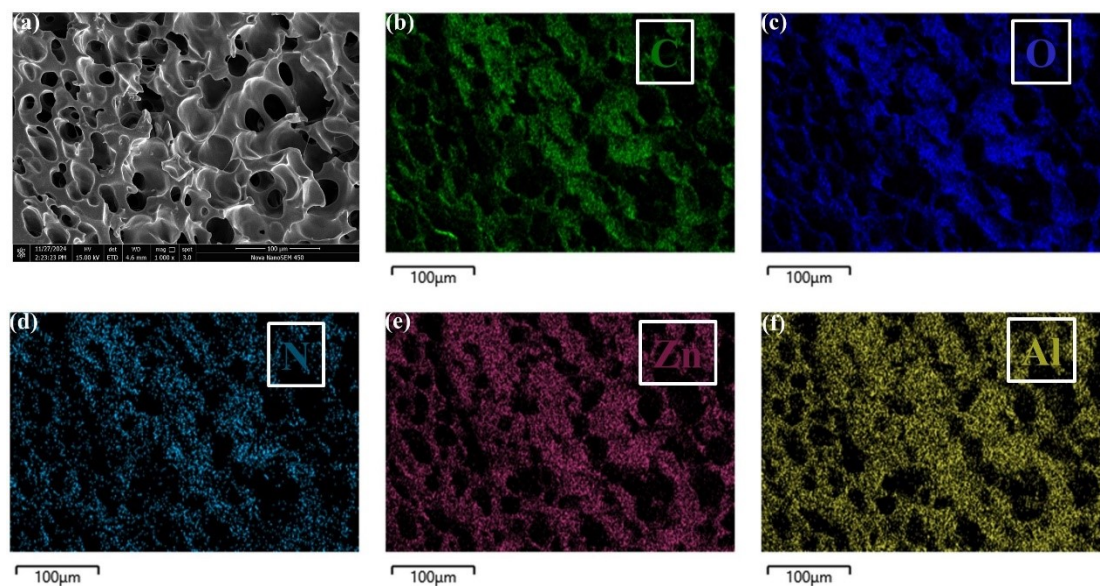
**Fig. S5** The transmittance at different moments in the disconnecting process: (a)  $\text{Zn}^{2+}$  electrolyte device; (b) hybrid  $\text{Zn}^{2+}/\text{K}^+$  electrolyte device; (c) hybrid  $\text{Zn}^{2+}/\text{NH}_4^+$  electrolyte device; (d) hybrid  $\text{Zn}^{2+}/\text{Mg}^{2+}$  electrolyte device.



**Fig. S6** The current-time curves: (a)  $\text{Zn}^{2+}$  electrolyte device; (b) hybrid  $\text{Zn}^{2+}/\text{K}^+$  electrolyte device; (c) hybrid  $\text{Zn}^{2+}/\text{NH}_4^+$  electrolyte device; (d) hybrid  $\text{Zn}^{2+}/\text{Mg}^{2+}$  electrolyte device; (e) hybrid  $\text{Zn}^{2+}/\text{Al}^{3+}$  electrolyte device.

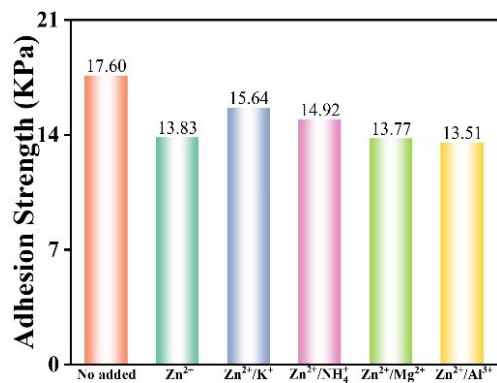


**Fig. S7** FT-IR spectra of AM, HEMA, HPMC and Hydrogel electrolyte.

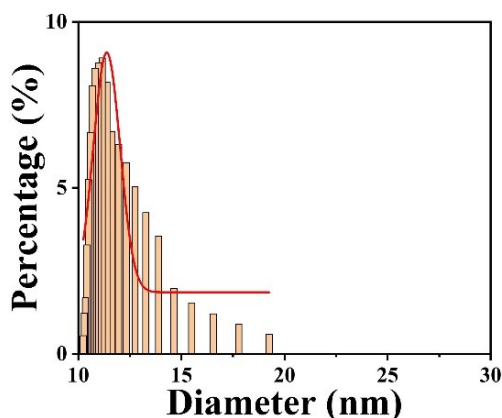


**Fig. S8** (a) the SEM image of hydrogel electrolyte, (b–f) images of element mapping of C, O, N,  $\text{Zn}^{2+}$ ,  $\text{Al}^{3+}$  for hydrogel electrolyte

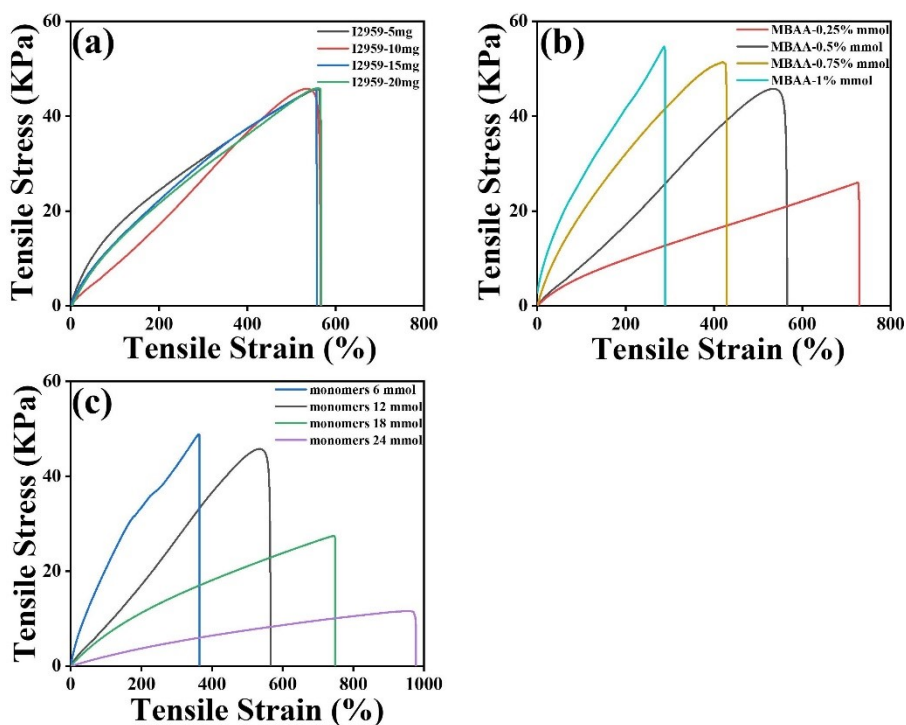




**Fig. S9** The adhesive strength of hydrogels with various cation combinations.



**Fig. S10** The particle size distribution diagrams of 10% Ti doped WO<sub>3</sub> by DLS.



**Fig. S11** The mechanical properties at varying concentrations of (a) the initiator, (b) crosslinker, and (c) monomer.