Supporting Information

Gel Electrolyte Interdigitation Enables Stable High Areal Capacity Cycling of 3D Zn Electrode

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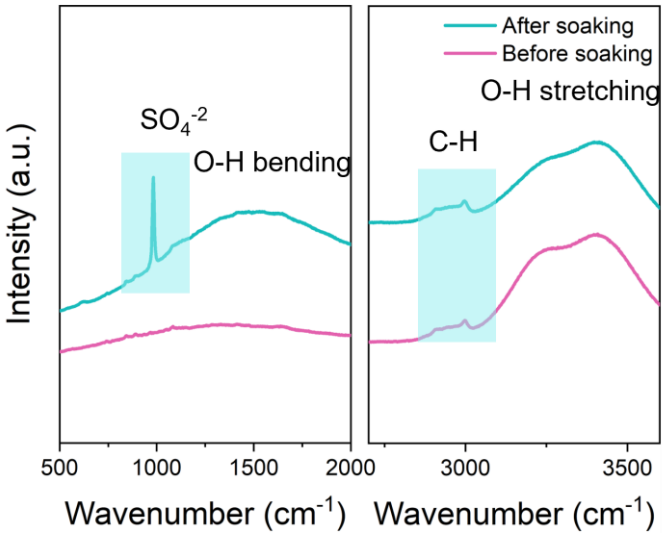

Figure S1. The Raman spectra of agarose hydrogel before and after soaking in 3M $ZnSO_4$ electrolyte.

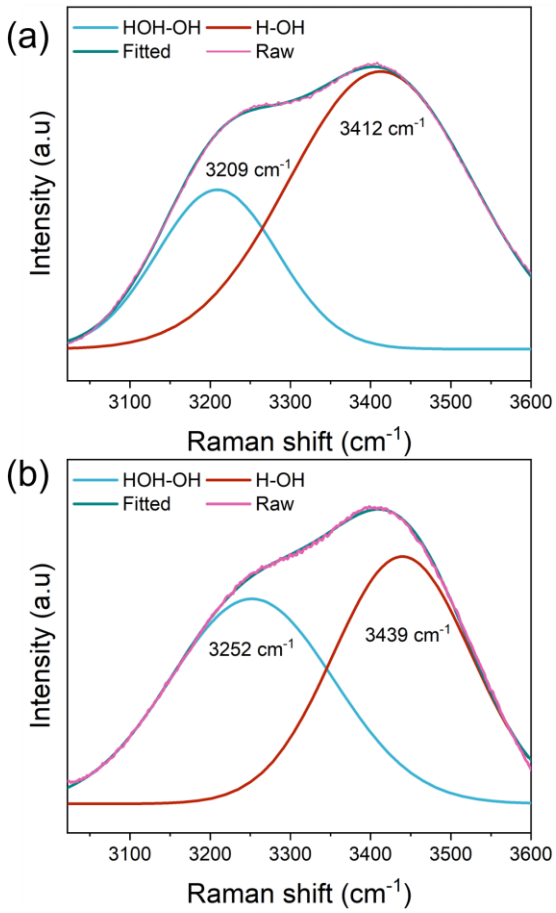

Figure S2. The enlarged Raman spectra of O-H stretch vibration for agarose hydrogel (a) before and (b) after soaking in 3M $ZnSO_4$ electrolyte.

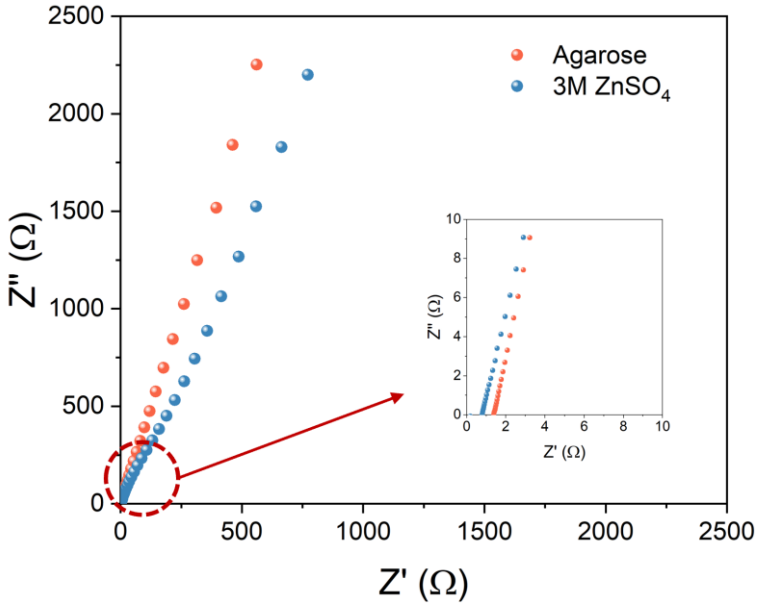

Figure S3. The Nyquist plot of agarose hydrogel electrolyte and 3M $ZnSO_4$ electrolyte obtained by Ti-Ti symmetric configuration.

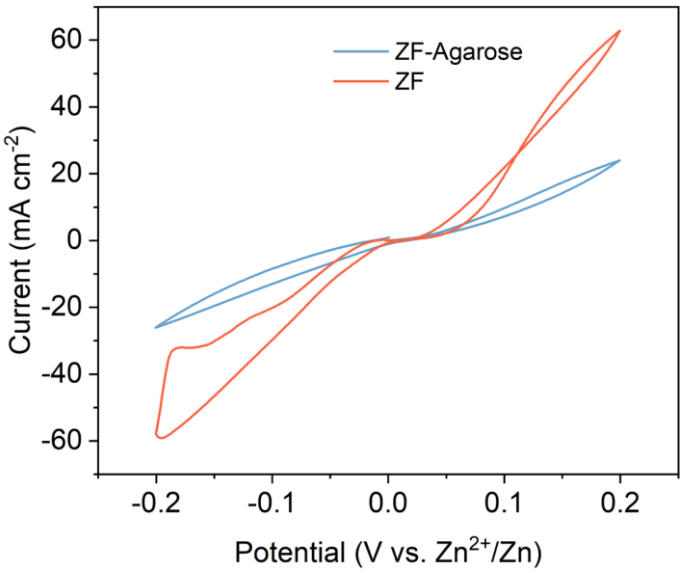

Figure S4. The CV profiles for ZF-Agarose and ZF electrode.

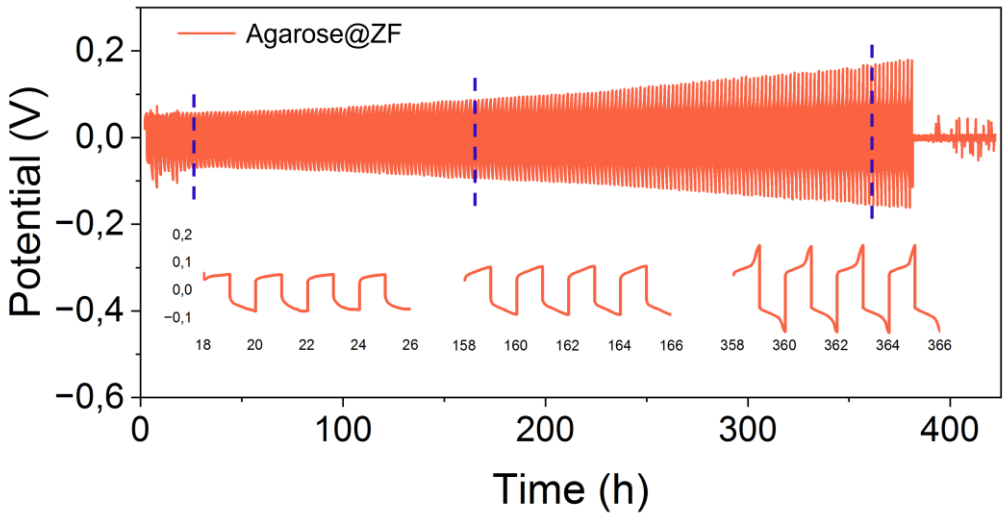

Figure S5. The long-term performance evaluation for Agarose@ZF electrode in symmetric configuration at 5 mA- 5 mAh cm^{-2}.

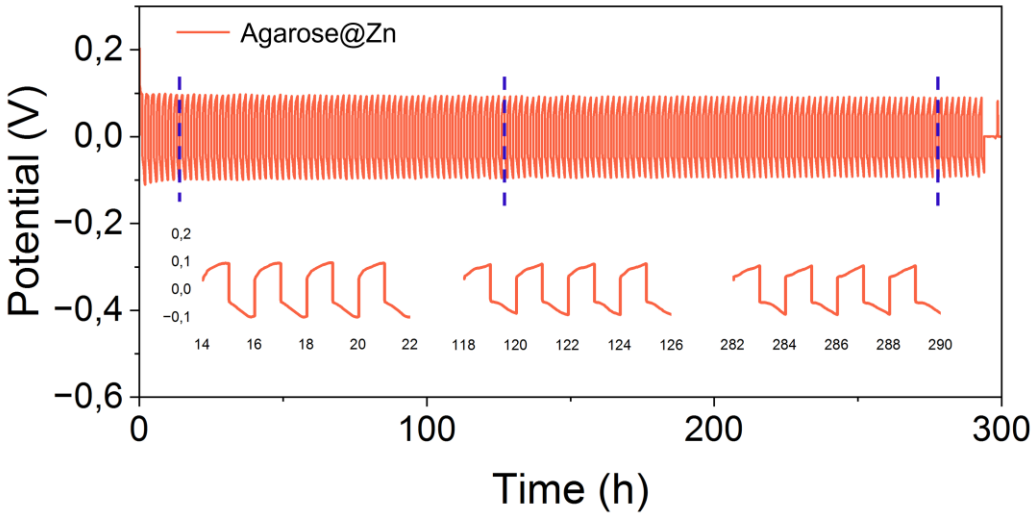

Figure S6. The long-term performance evaluation for Agarose@Zn electrode in symmetric configuration at 5 mA- 5 mAh cm^{-2}.

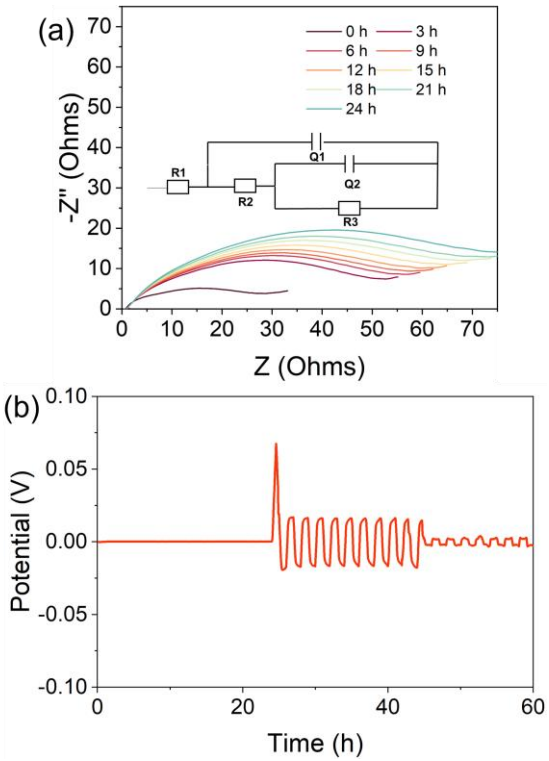

Figure S7. (a) The impedance evolution of ZF electrode during resting and (b) subsequent voltage profile when cycling at 2 mA- 2 mAh cm^{-2}.

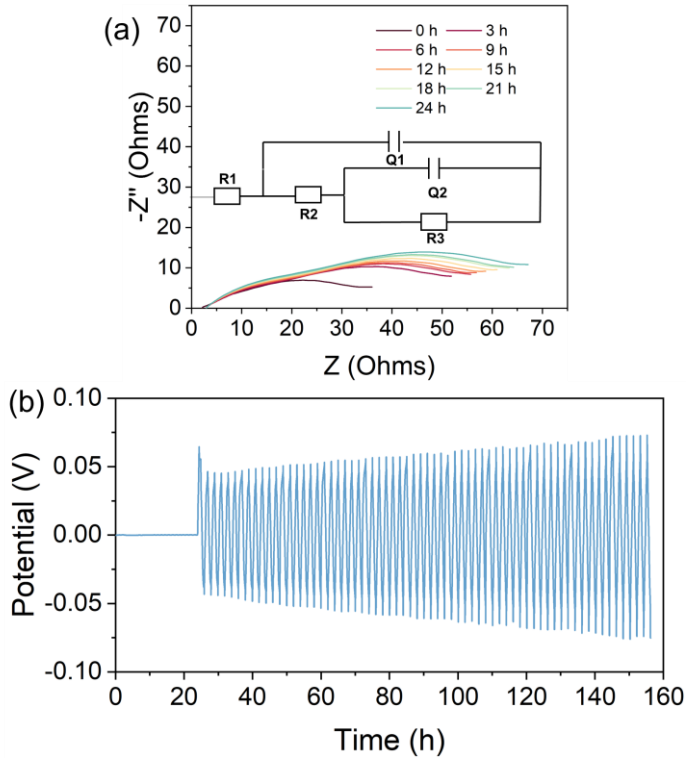

Figure S8. (a) The impedance evolution of ZF-Agarose electrode during resting and (b) subsequent voltage profile when cycling at 2 mA- 2 mAh cm^{-2}. The inset in (a) shows the equivalent circuit model used to fit the impedance data. Further information is provided in the experimental details.

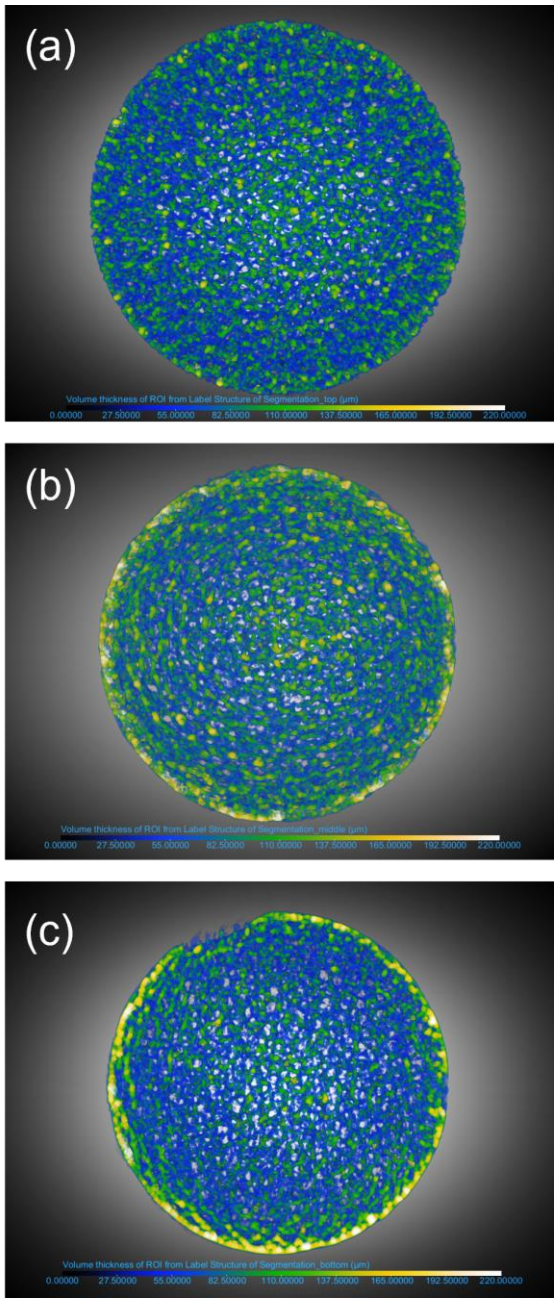

Figure S9. The volume thickness distribution for (a) pristine ZF, (b) cycled ZF-Agarose and (c) cycled ZF electrode.

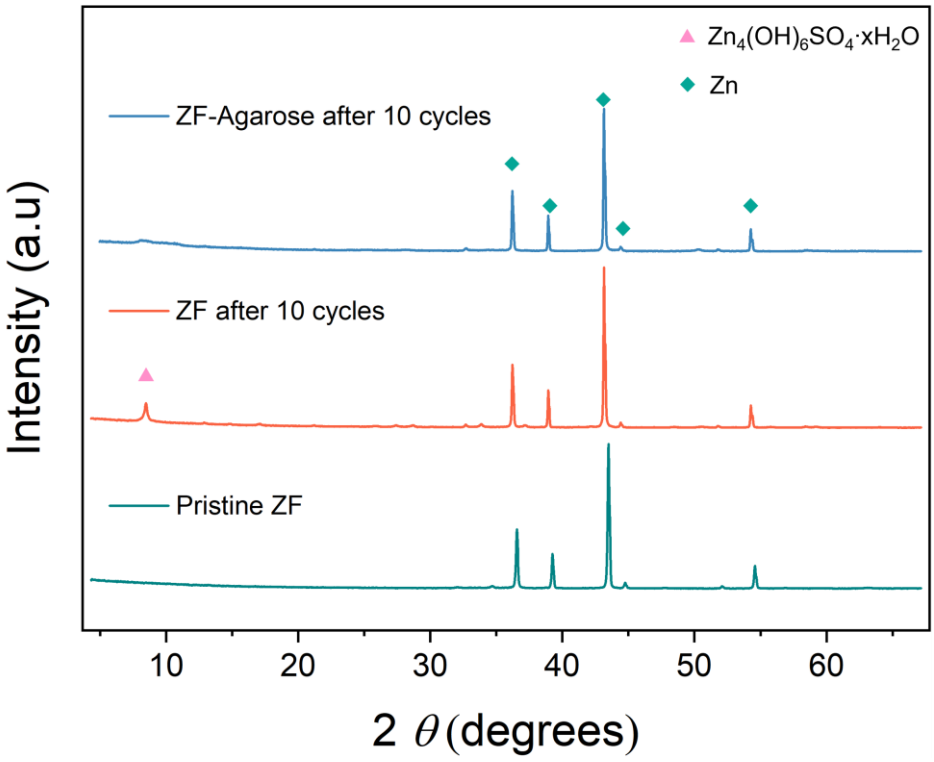

Figure S10. The XRD pattern of ZF and ZF-Agarose electrode after 10 cycles at 2 mA- 2 mAh cm^{-2}

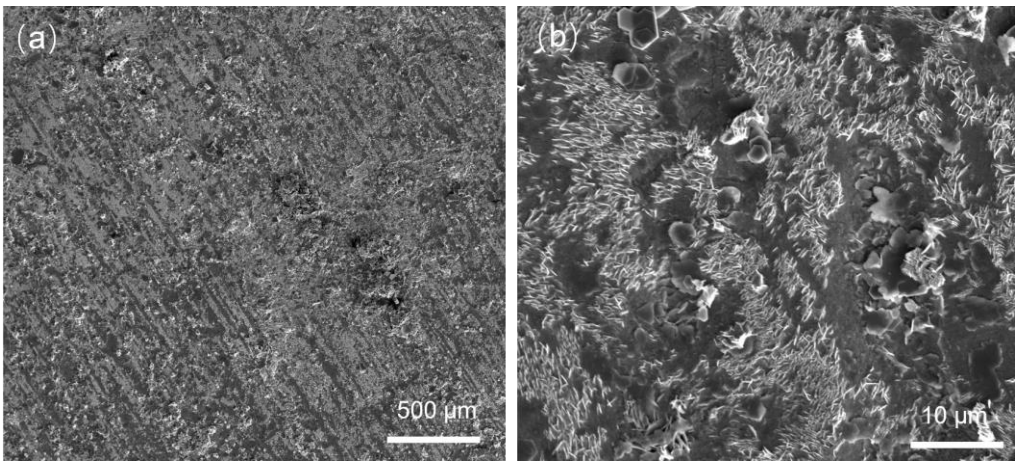

Figure S11. (a) The morphology of Agarose@Zn electrode with (b) higher magnification image after 10 cycles at 2 mA- 2 mAh cm^{-2}

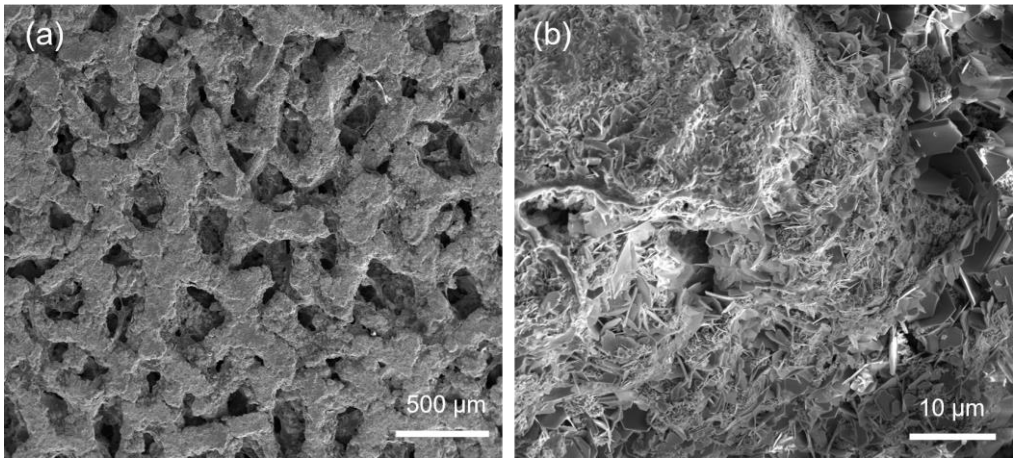

Figure S12. (a) The morphology of Agarose@ZF electrode with (b) higher magnification image after 10 cycles at 2 mA- 2 mAh cm^{-2}

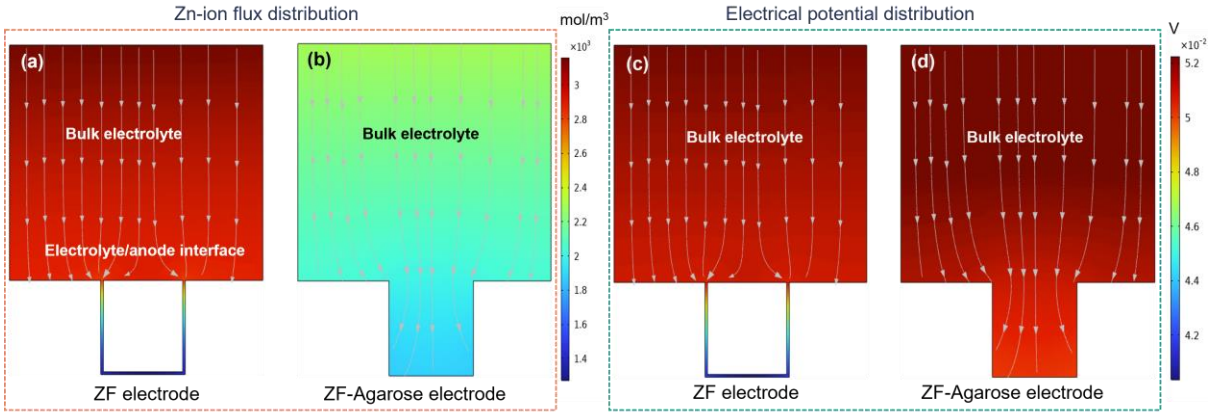

Figure S13. The 2D simulation model for Zn-ion flux distribution of (a) ZF and (b) ZF-Agarose electrode. The electrical potential distribution of (e) ZF and (d) ZF-Agarose electrodes.

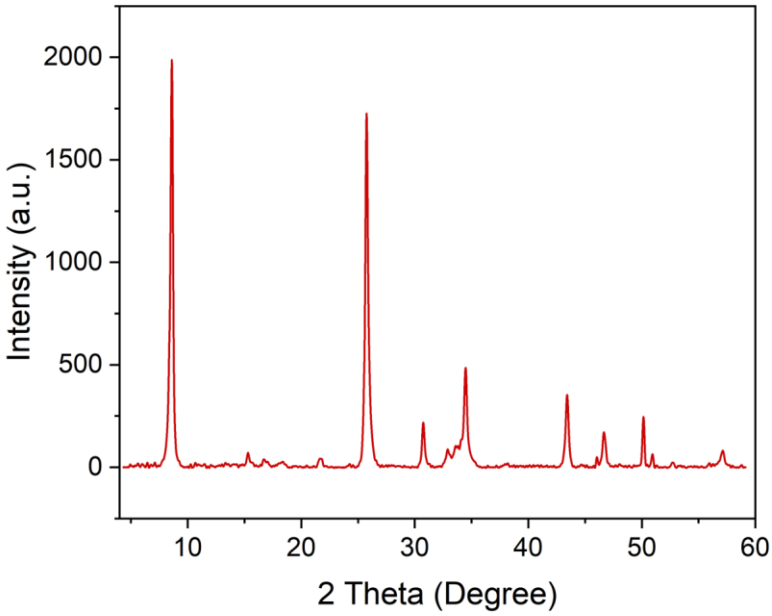

Figure S14. The XRD pattern of the ZVO cathode.

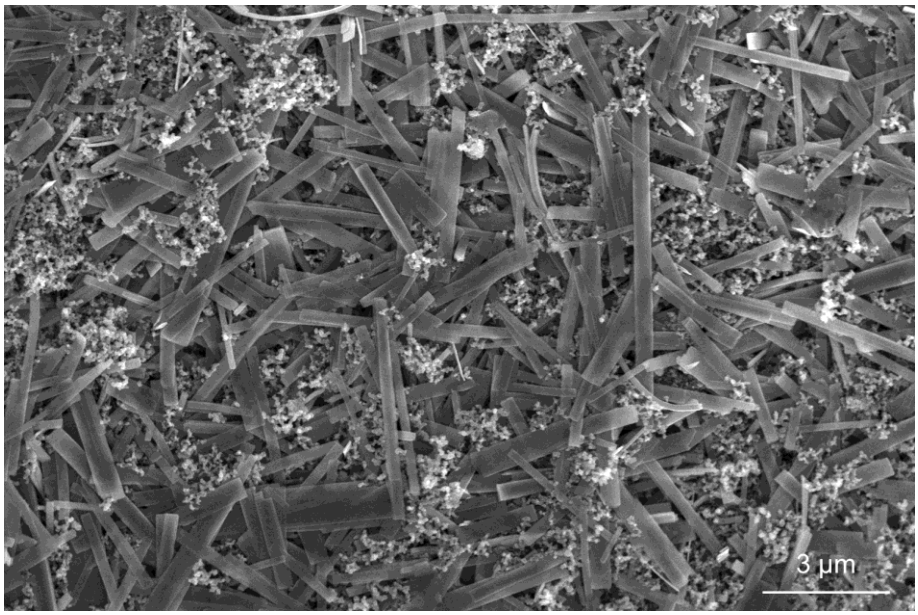

Figure S15. The SEM image of the ZVO cathode.

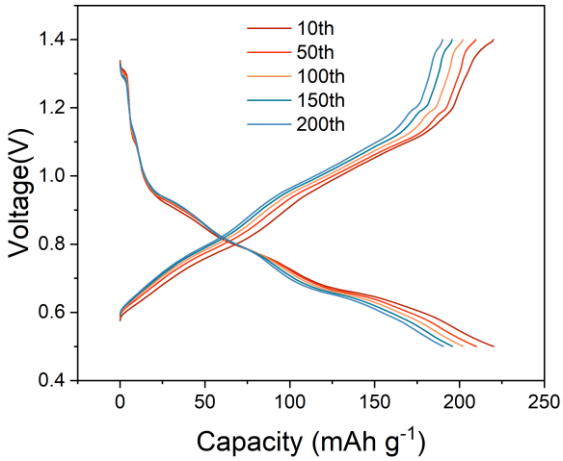

Figure S16. The corresponding voltage profile for ZVO//ZF-Agarose cell at 250 mA g^{-1}.

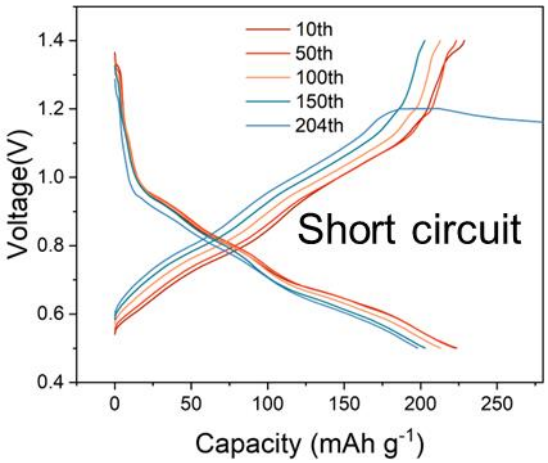

Figure S17. The corresponding voltage profile for ZVO//ZF cell at 250 mA g^{-1}.