Supporting Information

MOF-based Ionic Sieve Interphase for Regulated Zn^{2+} Flux Toward Dendrite-Free Aqueous Zinc Ion Battery

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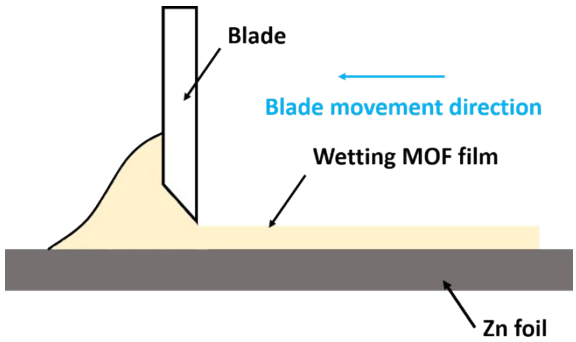


Scheme S1. Schematic diagram of the preparation of Zn-BTC coated Zn anode.

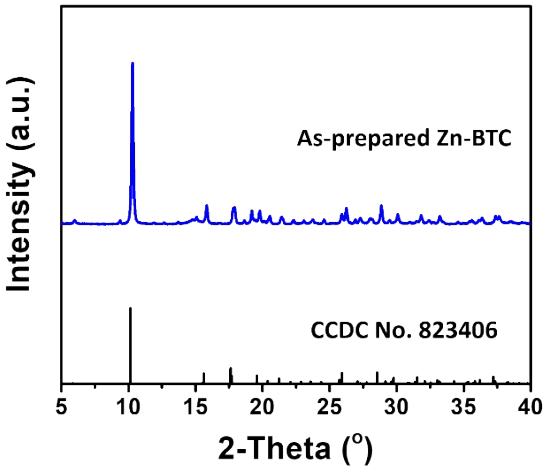


Figure S1. XRD patterns of the as-prepared Zn-BTC (upper curve) and standard sample (lower lines).

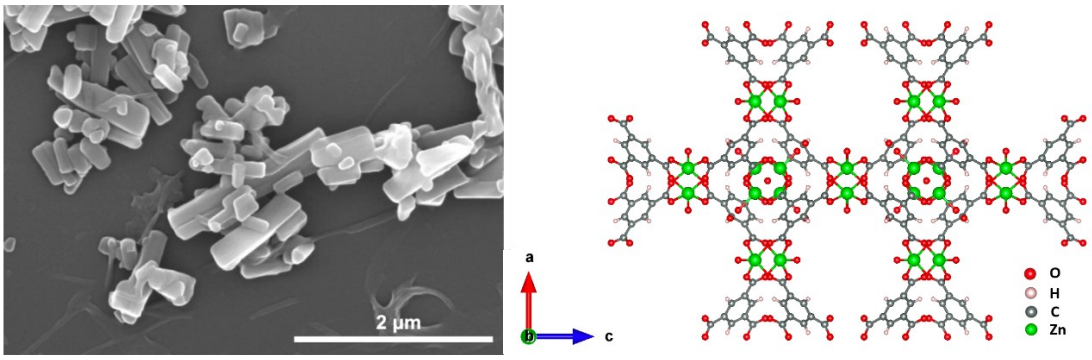


Figure S2. SEM image of as-prepared Zn-BTC (left), where each Zn(II) ion is connected with four carboxylate groups from four BTC^{3-} units to form the highly symmetrical 3D porous structure (right).

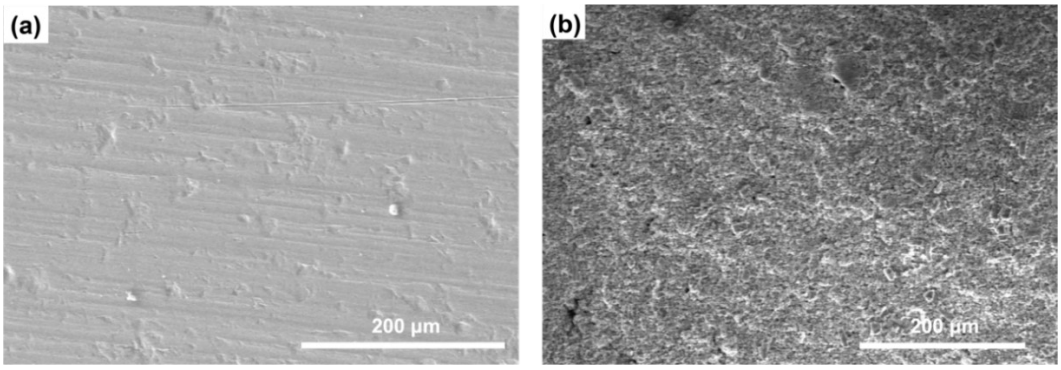


Figure S3. SEM images of (a) bare Zn and (b) coated Zn.

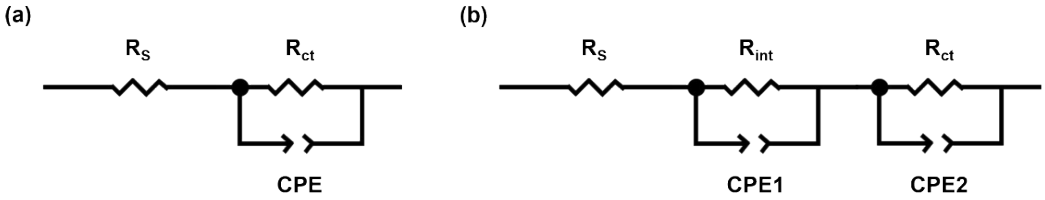


Figure S4. Equivalent circuit diagrams of symmetric cells with (a) bare Zn and (b) coated Zn.

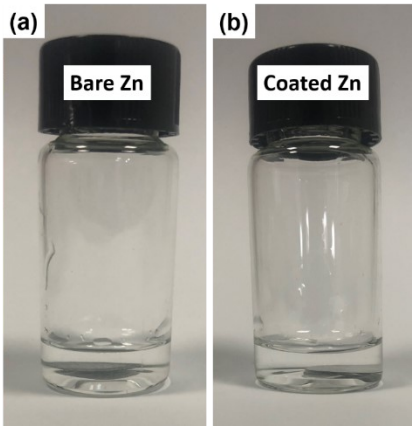


Figure S5. Photographs of (a) bare Zn and (b) coated Zn foil soaked in 2 M $ZnSO_4$ electrolyte.

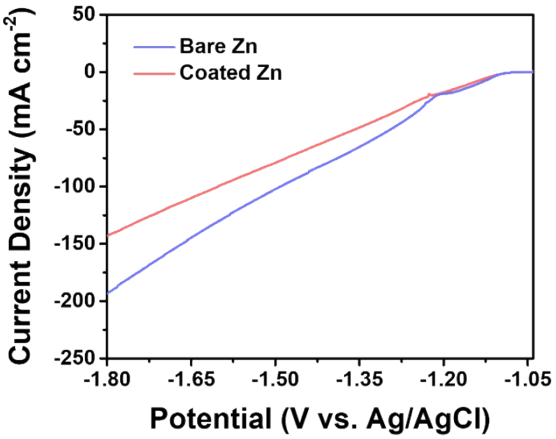
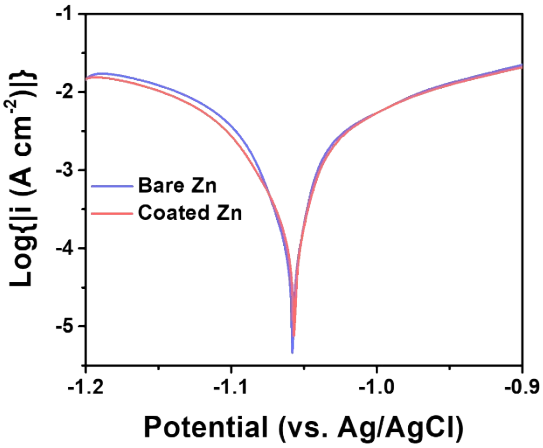


Figure S6. LSV curves presenting hydrogen evolution behaviors at bare and coated Zn in 2 M $ZnSO_4$, respectively. Scan rate: 5 mV s^{-1}.



Samples	Corrosion potential (V)	Corrosion current density (mA cm^{-2})
Bare Zn	-1.058	3.06
Coated Zn	-1.057	2.17

Figure S7. Linear polarization curves and corresponding corrosion potential and corrosion current density of coated Zn and bare Zn in 2 M $ZnSO_4$. Scan rate: 2 mV s^{-1}.

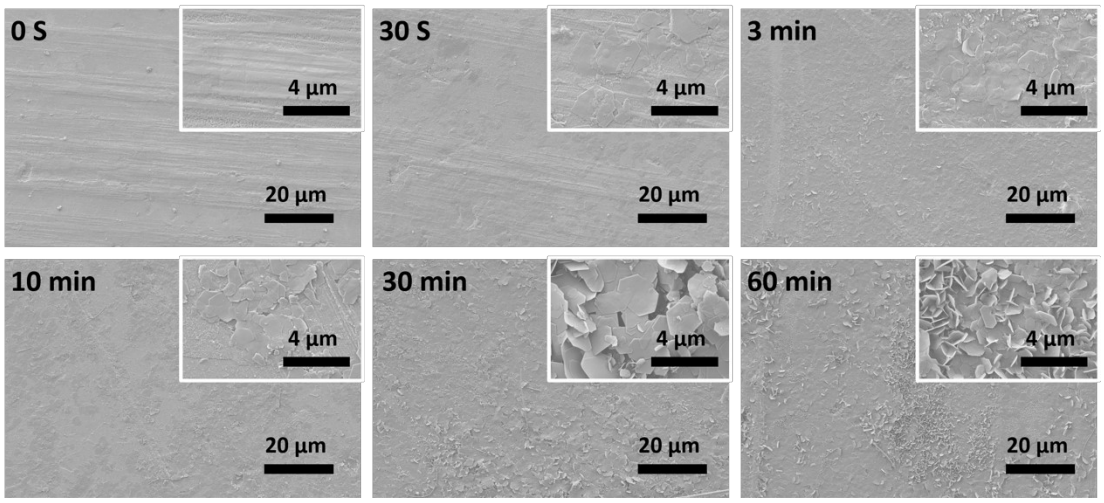


Figure S8. SEM images of morphology evolution on bare Zn. Plating current density: 1 mA cm^{-2}.

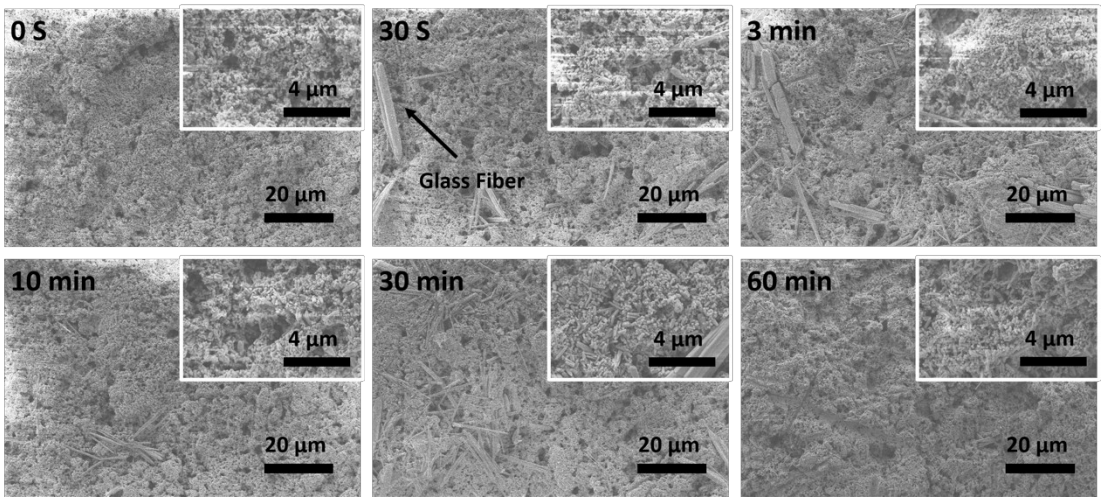


Figure S9. SEM images of morphology evolution on coated Zn. Plating current density: 1 mA cm^{-2}.

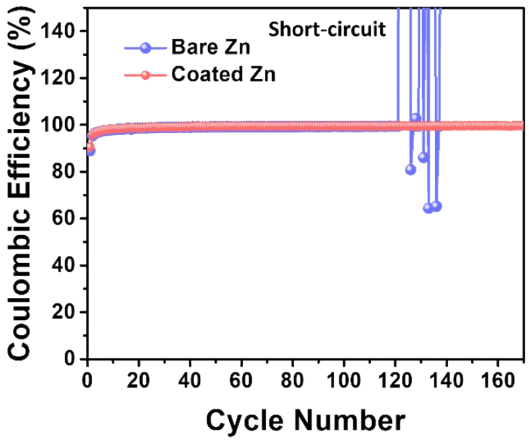


Figure S10. Coulombic efficiencies of the half cells with bare Zn/coated Zn anode at a current density of 1 mA cm^{-2} with a capacity of 1 mA h cm^{-2}.

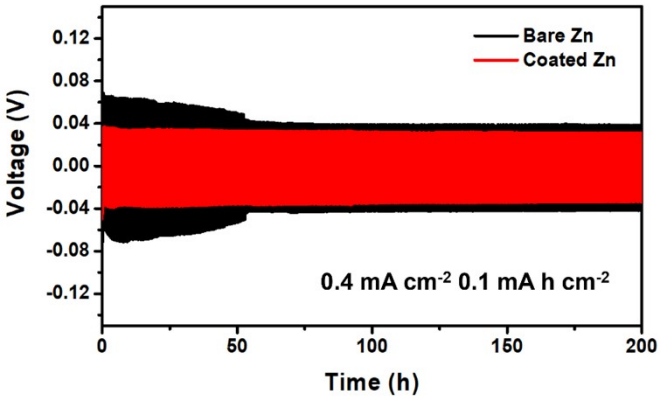


Figure S11. Galvanostatic cycling voltage profiles of symmetric cells with bare Zn and coated Zn at a current density of 0.4 mA cm^{-2} with a capacity of 0.1 mA h cm^{-2}.

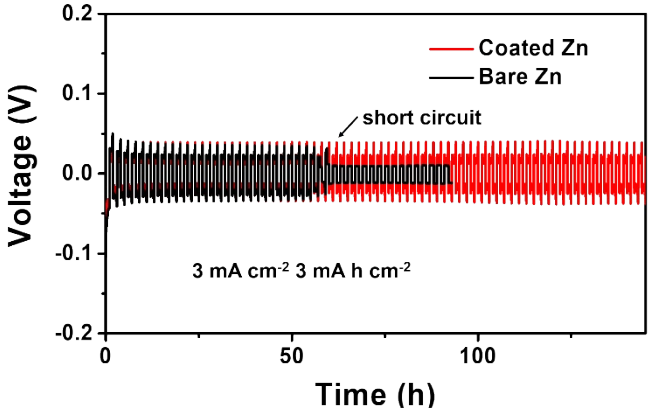


Figure S12. Galvanostatic cycling voltage profiles of symmetric cells with bare Zn and coated Zn at a current density of 3 mA cm^{-2} with a capacity of 3 mA h cm^{-2}.

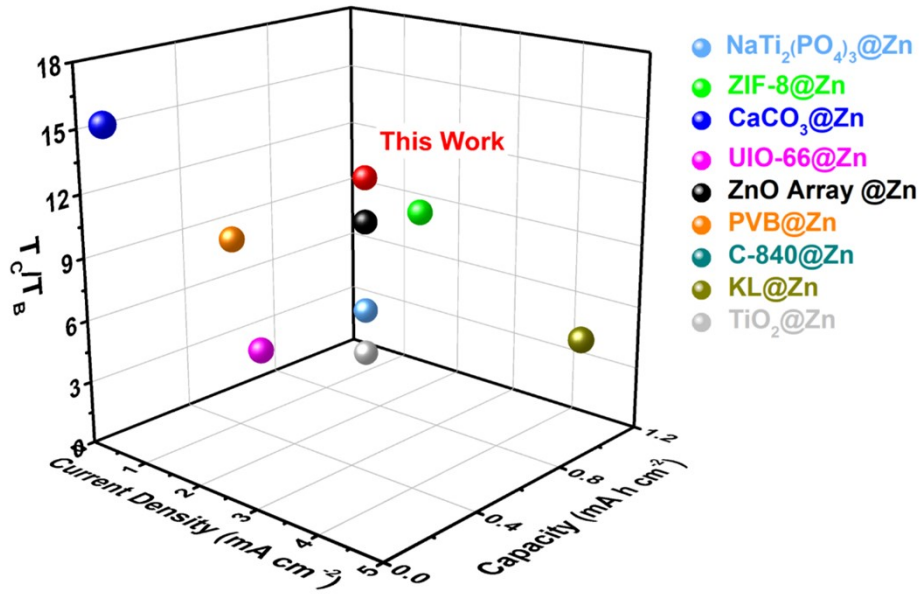


Figure S13. Comparison on the cycle performance of this work and some recently reported works[S1-9]. T_C/T_B is the battery life time ratio of ZIB based on protected Zn anode to that based on bare Zn anode.

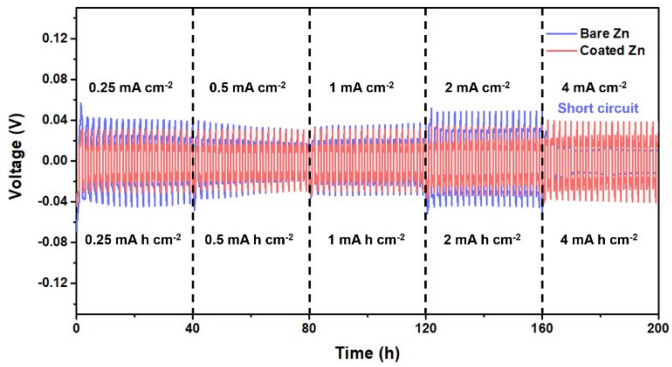


Figure S14. Rate performance of symmetric cells with bare Zn and coated Zn.

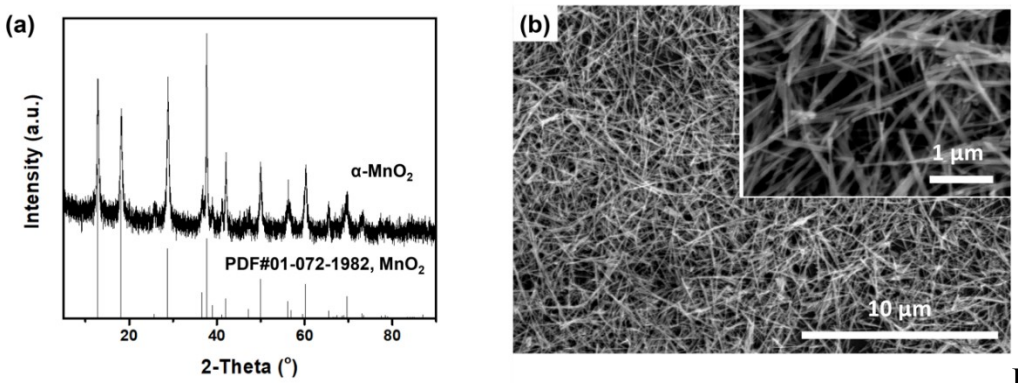


Figure S15. (a) XRD pattern of as-prepared α-MnO_2. (b) SEM images of as-prepared α-MnO_2.

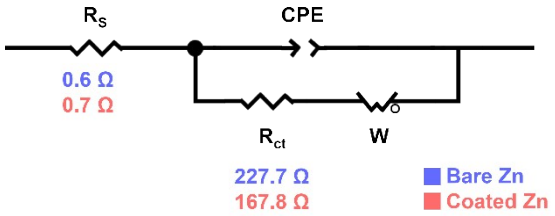


Figure S16. Equivalent circuit diagrams of full cells and the fitting resistance values.

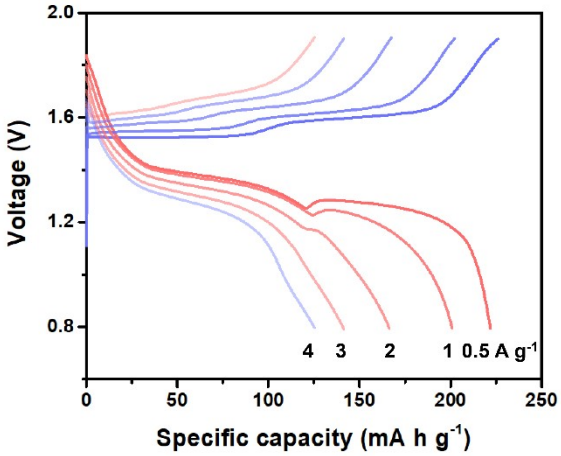


Figure S17. Charge-discharge curves of MnO_2//bare Zn cell at different current densities.

Table S1. Resistance values deduced from the fitting of EIS curves in Figure 2a.

Samples	R_s	R_{int}/Ω	R_{ct}/Ω
Bare Zn	1.1	-	253.1
10 μm $Zn_3(BTC)_2$-PVDF coated Zn	0.9	22.8	157.5
20 μm $Zn_3(BTC)_2$-PVDF coated Zn	0.8	10.6	109.2
30 μm $Zn_3(BTC)_2$-PVDF coated Zn	1.0	9.0	130.8

Table S2. Comparison on the performance of ZIBs with present $Zn_3(BTC)_2$@Zn and other works.

Electrode	Electrolyte	Current density (mA cm^{-2})	Capacity (mA h cm^{-2})	Lifetime (h) T_C	Bare Zn under the same conditions (h) T_B	Ratio (T_C/T_B)	Reference	Method
$NaTi_2(PO_4)_3$@Zn	2 M $ZnSO_4$	1	1	260	80	3.3	S1	Doctor Blade
ZIF-8@Zn	2 M $ZnSO_4$	2	1	1200	130	9.2	S2	Solvothermal
$CaCO_3$@Zn	3 M $ZnSO_4$+0.1 M $MnSO_4$	0.25	0.05	836	55	15.2	S3	Doctor Blade
UIO-66@Zn	3 M $ZnSO_4$+0.1 M $MnSO_4$	1	0.5	500	150	3.3	S4	Doctor Blade
ZnO array @Zn	1 M $Zn(OTf)_2$	1	1	400	<50	>8	S5	Periodic Anodizing
PVB@Zn	1 M $ZnSO_4$	0.5	0.5	2200	260	8.5	S6	Spin Coating
C-840@Zn	2 M $ZnSO_4$	1	1	400	400	1	S7	Immersing Overnight and Pyrolysis
KL@Zn	2 M $ZnSO_4$+0.1 M $MnSO_4$	4.4	1.1	800	184.7	4.3	S8	Doctor Blade
TiO_2@Zn	3 M $Zn(OTf)_2$	1	1	150	150	1	S9	Atomic Layer Deposition
$Zn_3(BTC)_2$@Zn	**2 M $ZnSO_4$**	**1**	**1**	**800**	**78**	**10.3**	**This work**	**Doctor Blade**

References

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