Electronic Supplementary Material (ESI) for Journal of Materials Chemistry A.

Electronic Supplementary Information

A Liquid Metal Assisted Dendrite-Free Anode for High-Performance Zn-Ion Batteries

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Table S1. Electrochemical performance of LM@Zn and other surface coated Zn electrodes in literatures

Coating materials	Overpotential/Current density/ cycling time (mV/ mA·cm^{-2}/ h)	Reference
Liquid metal	18/ 1/ 500	Our work
Carbon	40/ 1/ 200	1
Ag	(≈20)/ 1/ 25	2
TiO_2	72.5/ 1/ 150	3
Nanoporous $CaCO_3$	140/ 1/ 80	4
MOF−PVDF	29/ 1/ 500	5
Water@ZnMOF-808	100/ 0.1/ 200	6

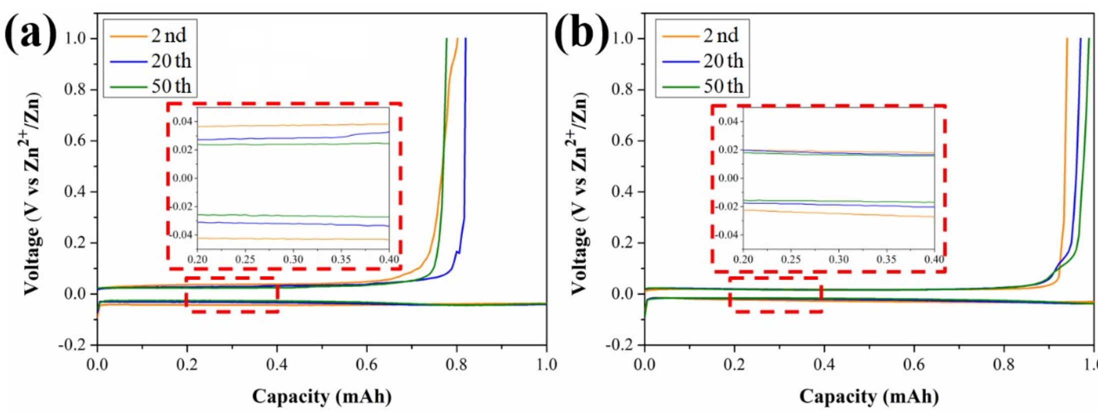

Figure S1. (a) The charge/discharge curves for Zn//Ti, and (b) Zn//LM@Ti cells at different cycles.

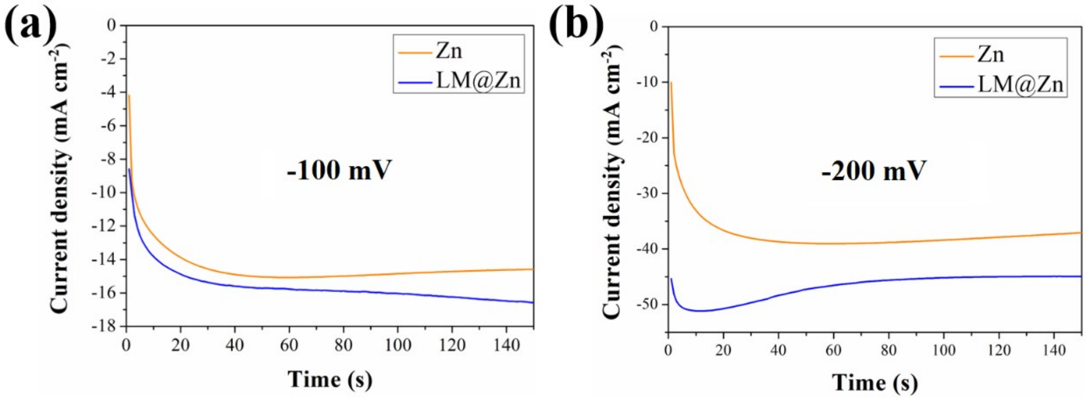

Figure S2. Chronoamperograms (CAs) of bare Zn and LM@Zn electrode against Zn metal reference electrode at (a) -100 mV and (b) -200 mV overpotential.

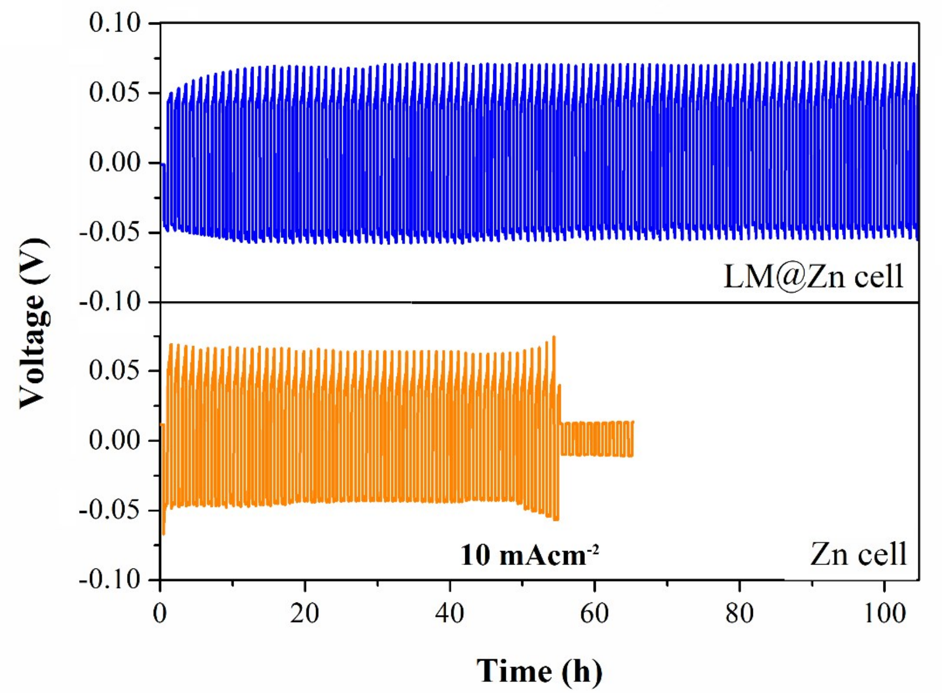

Figure S3. Long-term cycling performance of symmetric Zn and LM@Zn cells.at a current density of 10 mA·cm^{-2}.

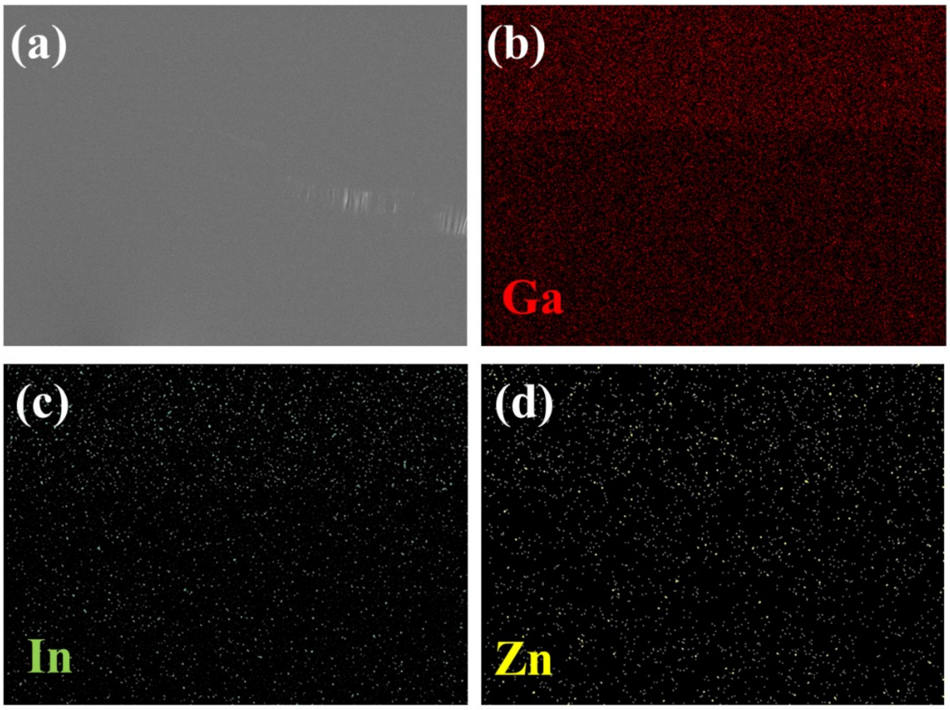

Figure S4. The EDX elemental maps of (a) cycled LM@Zn anode in (b) Ga, (c) In and (d) Zn.

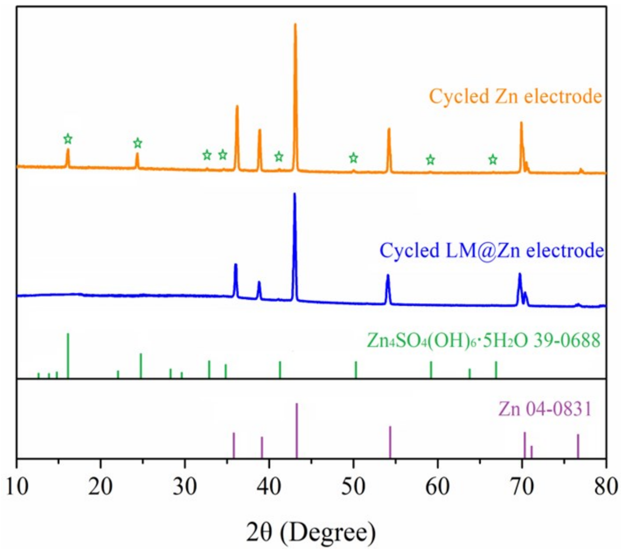

Figure S5. XRD patterns of Zn and LM@Zn electrodes after zinc plating/stripping cycles.

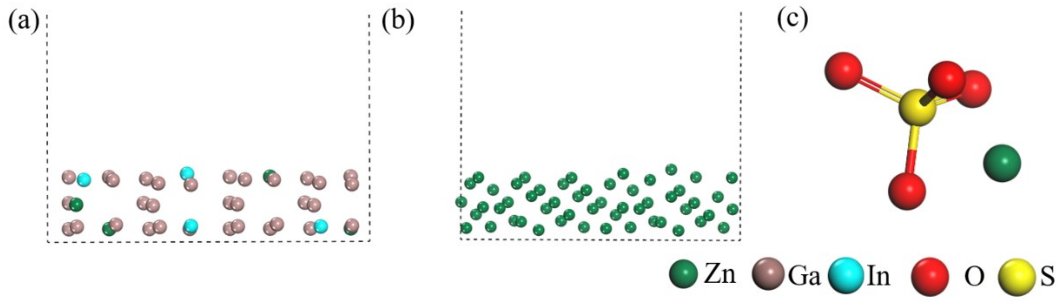

Figure S6. DFT model of liquid Ga-In-Zn alloy (a), Zn (b) and $ZnSO_4$ (c).

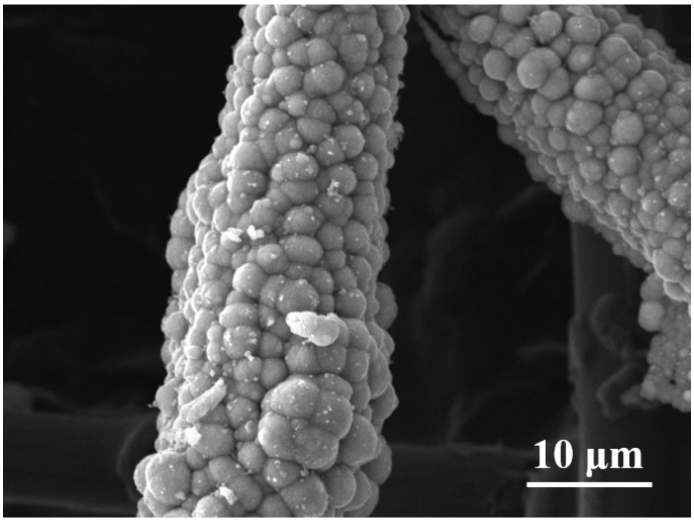

Figure S7. SEM image of δ-MnO_2@CC.

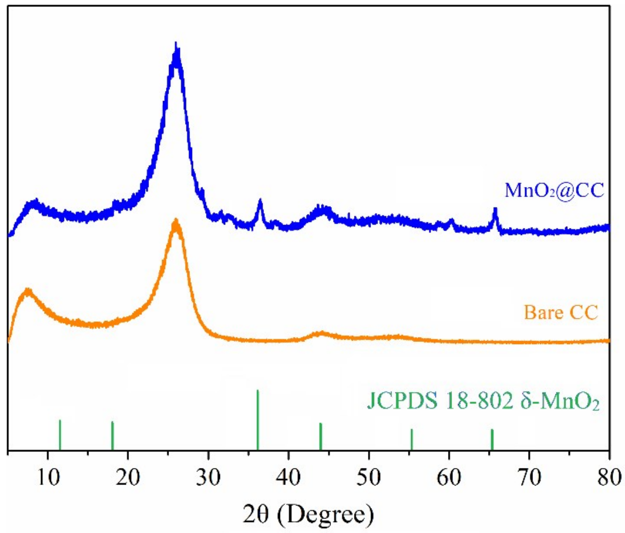

Figure S8. XRD patterns of δ-MnO_2@CC and bare CC.

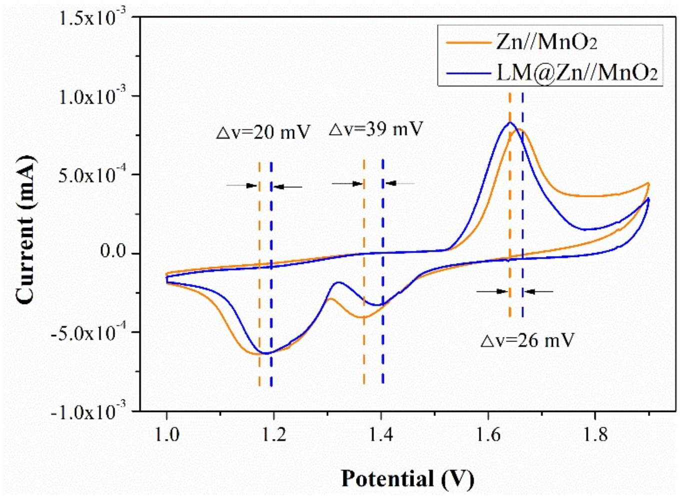

Figure S9. CV curves of the LM@Zn//MnO_2 and Zn//MnO_2 batteries at 0.1 mV·s^{-1}.

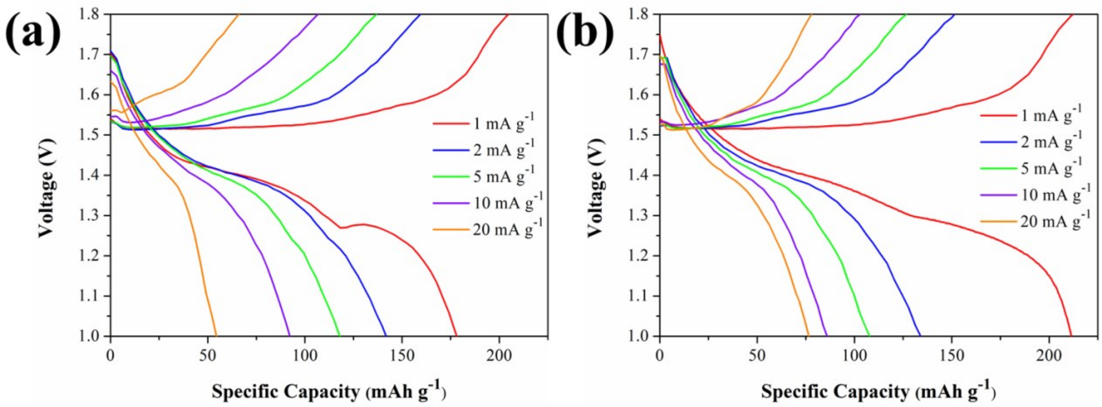

Figure S10. Charge/discharge profiles of the Zn//MnO_2 (a) and LM@Zn//MnO_2 batteries (b) under different rates.

The cost of liquid Ga-Sn-Zn alloy was around 0.99 USD/g, and 0.01 USD/cm^2 for coating application. Hence, we believe the as-prepared LM possesses the cost advantage over other previously reported surface coating materials, such as Au particles,[2] Mxenes,[7] HKUST-1,[8] ZIF,[9] and so on.

References

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