

**ADVANCED
MATERIALS**
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Supporting Information

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Ultrathin Surface Coating Enables Stabilized Zinc Metal
Anode

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Qiulong Wei, Pan He, Yifan Dong, Ziyi Zhang, Xudong Wang,
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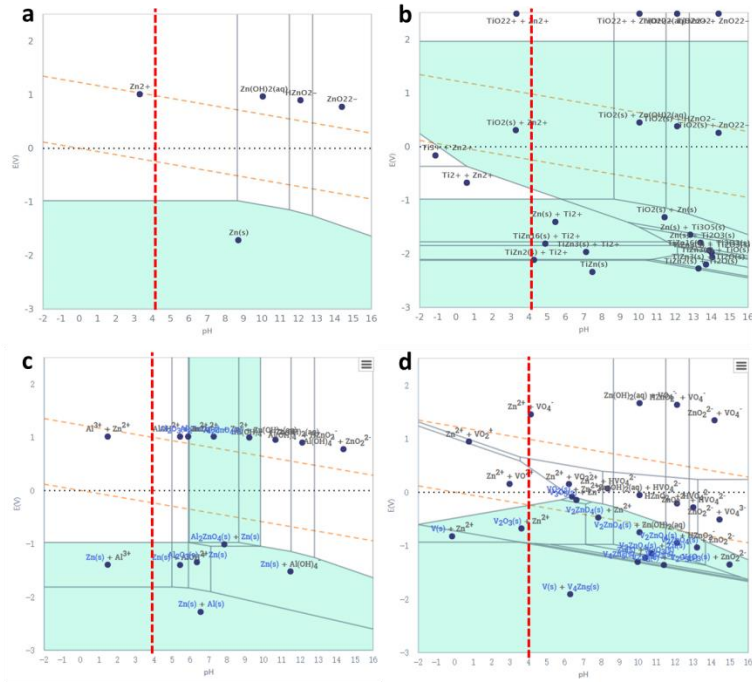


Fig. S1. Pourbaix diagram of the system Zn/H₂O, 10⁻⁴ M Zn²⁺ from Materials Project.

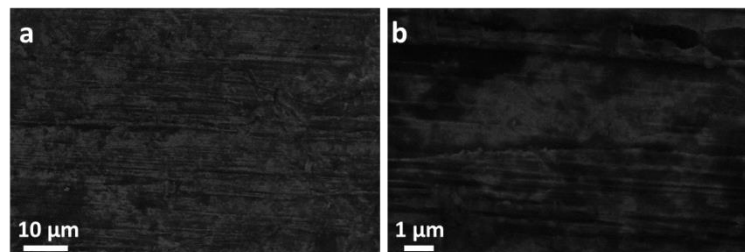


Fig. S2. SEM images of commercial zinc plate.

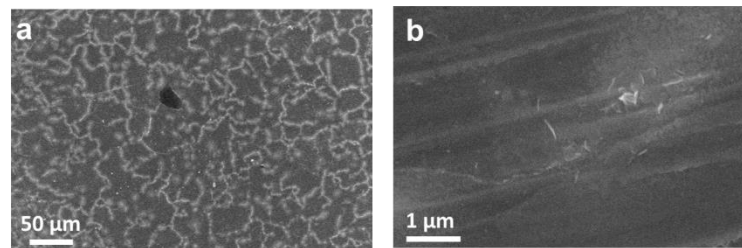


Fig. S3. SEM images of 100TiO₂@Zn-MnO₂.

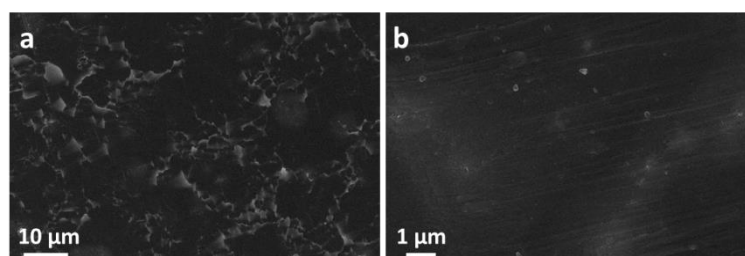


Fig. S4. SEM image of 500TiO₂@Zn-MnO₂.

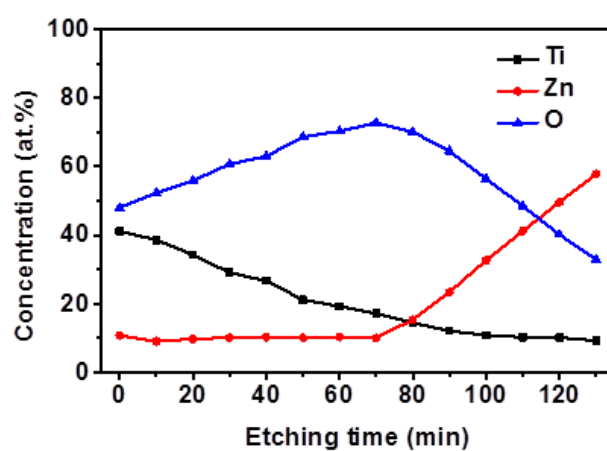


Fig. S5. XPS depth profile of 100TiO₂@Zn.

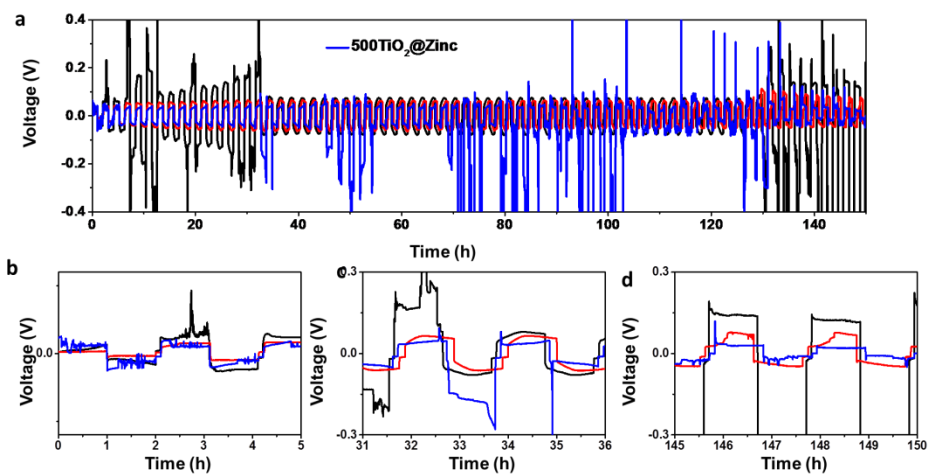


Fig. S6. Cyclic deposition/stripping process of symmetric cells using 500TiO₂@Zn and pristine Zn at a constant current density of 1 mA cm⁻². Each cycle is set to be 1 h.

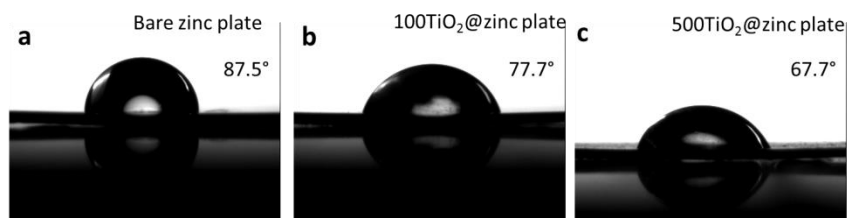


Fig. S7. Experimental images of a droplet of the electrolyte on **a**, pristine zinc plate, **b**, 100TiO₂@Zn, and **c**, 500TiO₂@Zn.

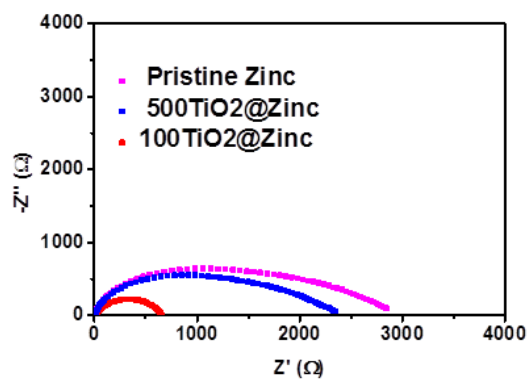


Fig. S8. EIS spectrum of symmetrical Zn/Zn battery implementing different thickness of TiO₂ layer.

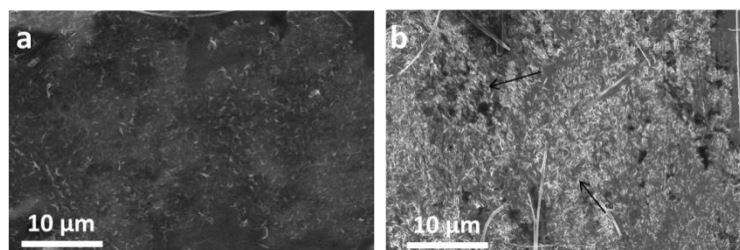


Fig. S9. *Ex-situ* SEM images of **a**, 100TiO₂@Zn and **b**, pristine Zn anode, respectively.

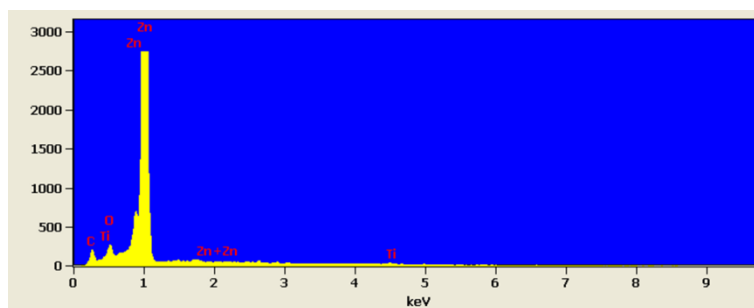


Fig. S10. EDS spectrum of 100TiO₂@Zn after cycling.

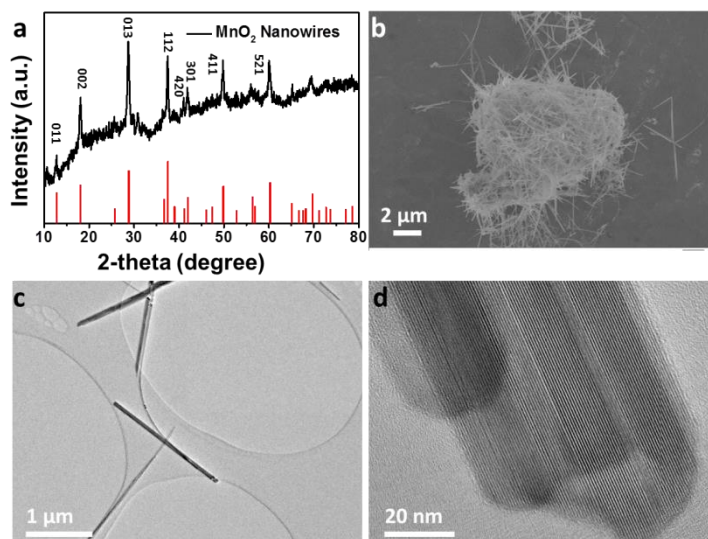


Fig. S11. XRD pattern, SEM image and TEM images of MnO₂ Nanowires.

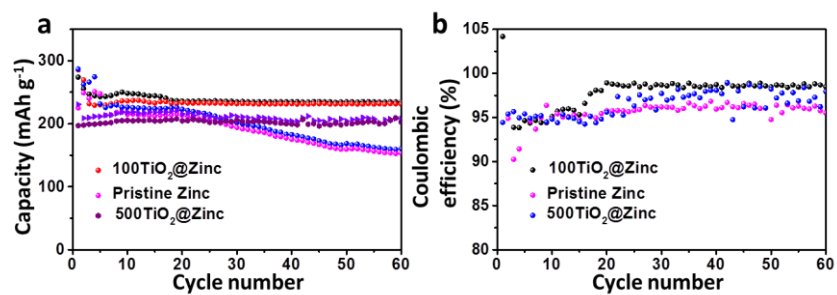


Fig. S12. Cycling performance of 500TiO₂@Zn-MnO₂ cell at 100 mA g⁻¹ and b) the corresponding coulombic efficiencies of 100TiO₂@Zn-MnO₂ cell and Zn-MnO₂ cell at 100 mA g⁻¹.

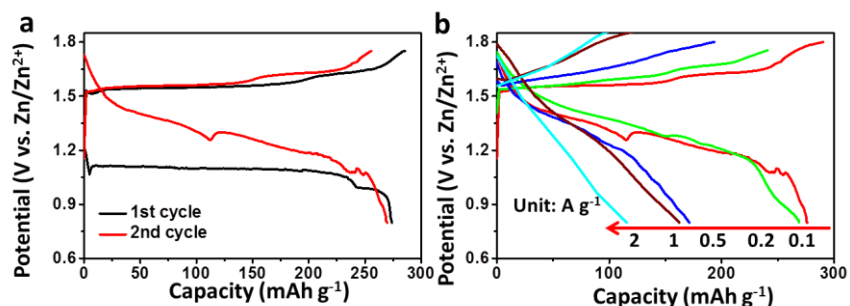


Fig. S13. The charge-discharge curves of Zn-MnO₂ battery of a. the initial two cycles at 100 mA g⁻¹ and b. at different current density.

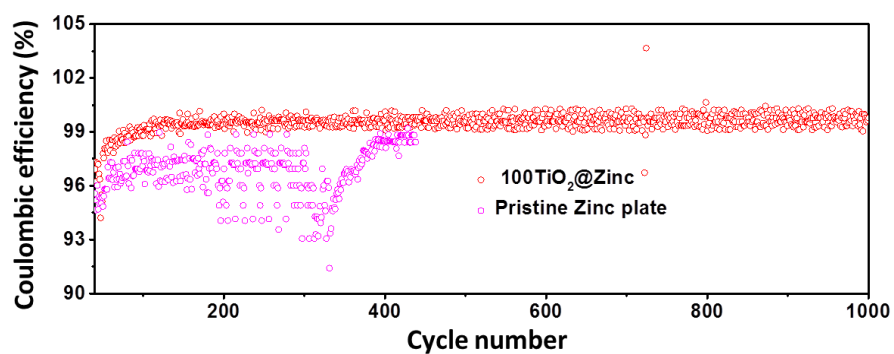


Fig. S14. Coulombic efficiencies of 100TiO₂@Zn-MnO₂ cell and Zn-MnO₂ cell at 1 A g⁻¹.

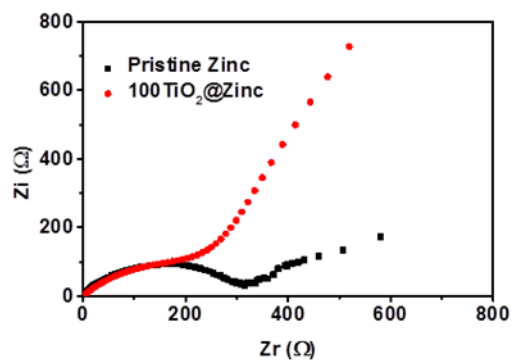


Fig. S15. EIS spectrum of 100TiO₂@Zn-MnO₂ cell and Zn-MnO₂ cell at open circuit voltage.