

Electronic Supplementary Information

Defective MnO₂ nanosheets based free-standing and high mass loading electrodes for high energy density aqueous zinc ion batteries

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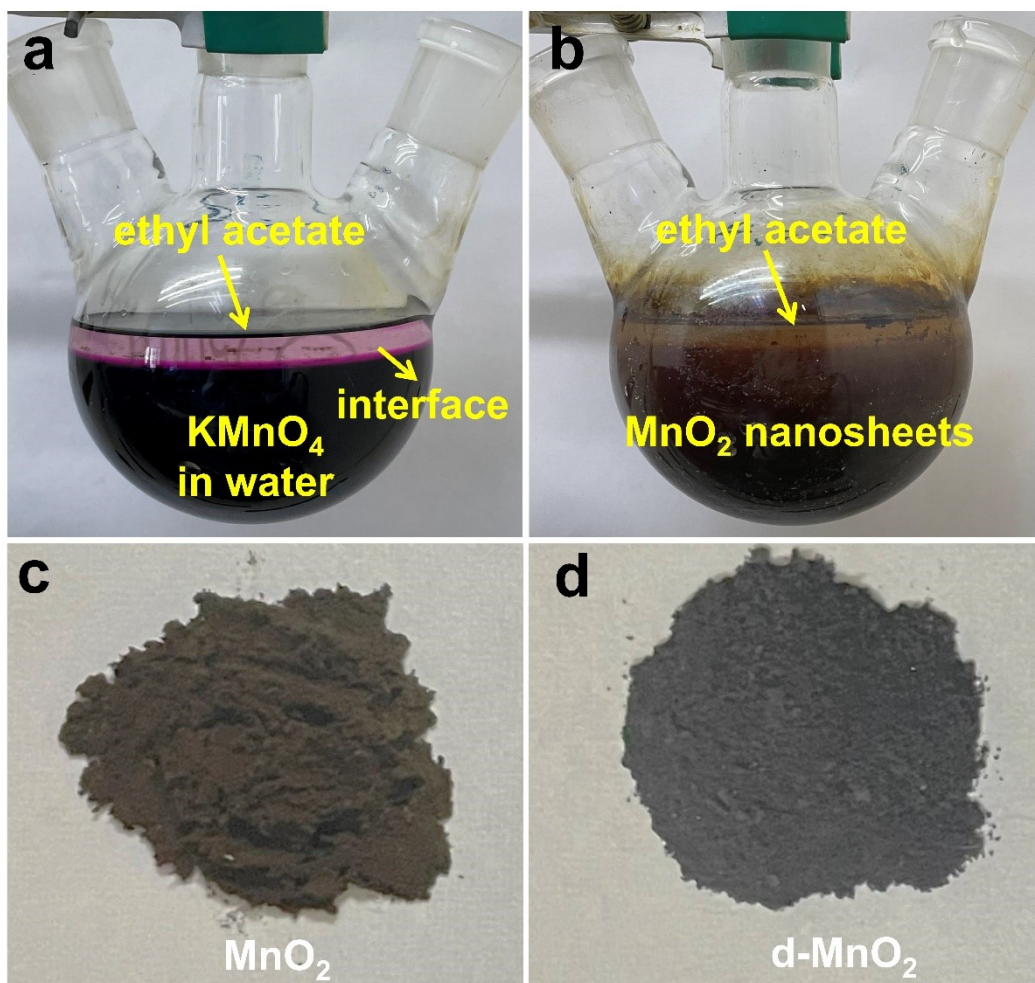


Fig. S1. Digital photos of the round-bottom flask (a) before and (b) after interfacial reaction between KMnO₄ and ethyl acetate. Digital photos of (c) the as-prepared MnO₂ and (d) d-MnO₂ products.

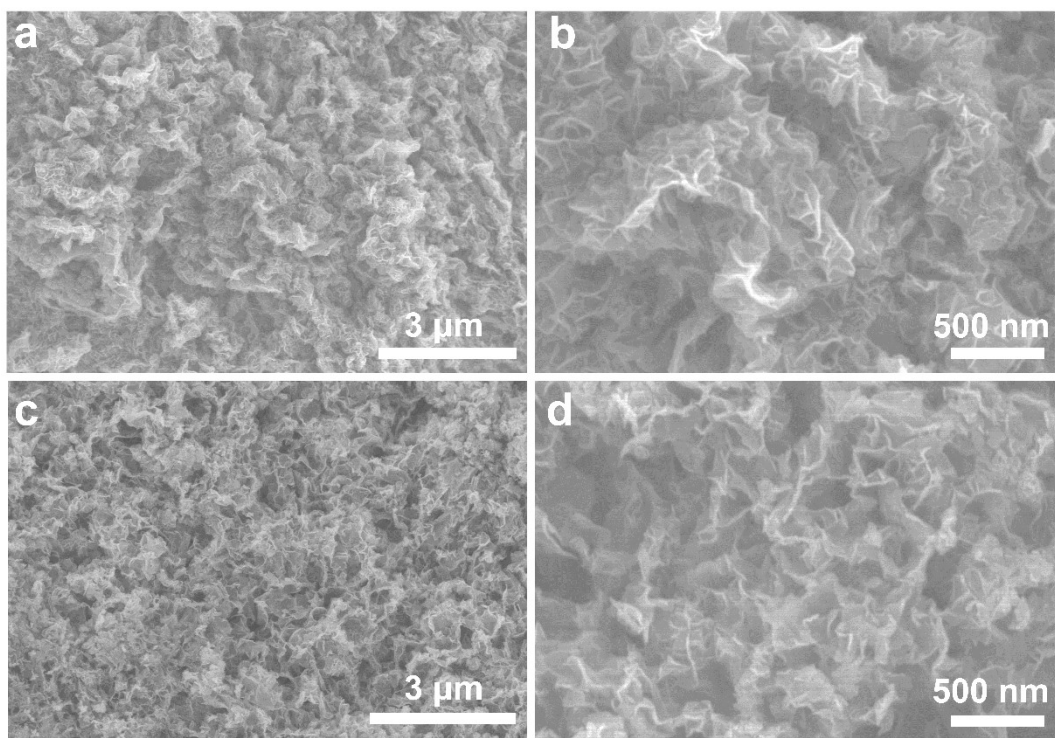


Fig. S2. (a, c) Low-magnification and (b, d) high-magnification SEM images of (a, b) MnO₂ nanosheets and (c, d) d-MnO₂ nanosheets.

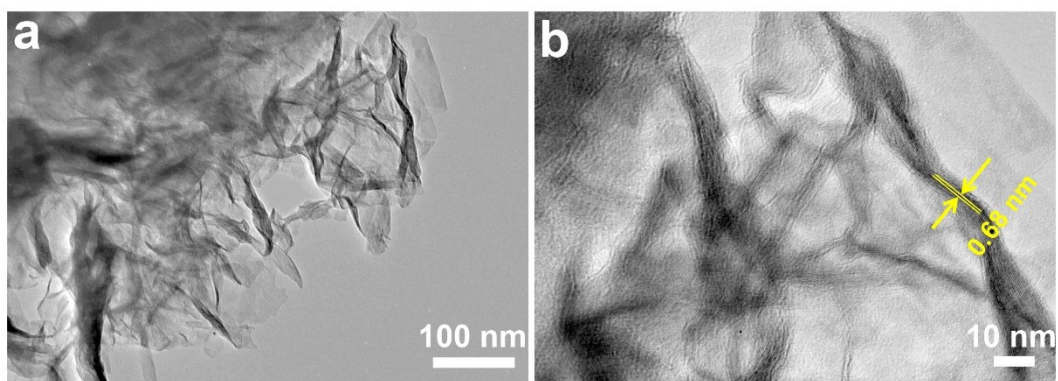


Fig. S3. (a) TEM and (b) HRTEM images of MnO₂ nanosheets.

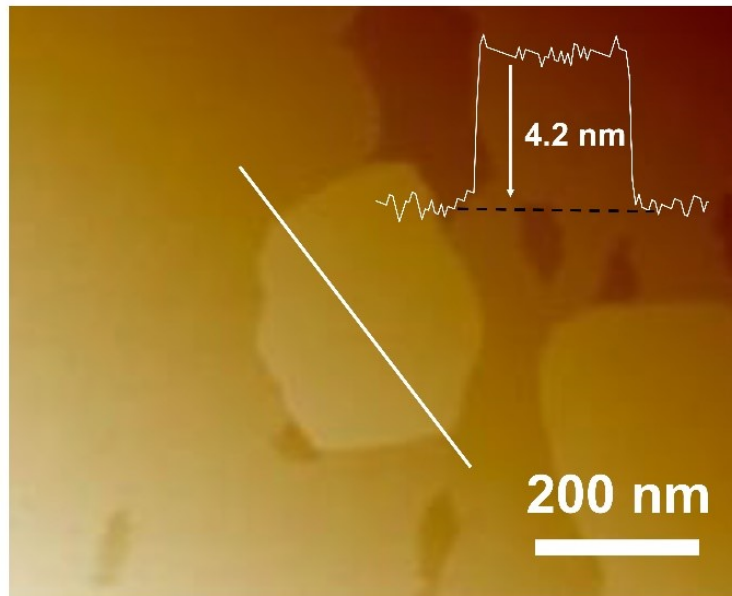


Fig. S4. AFM analysis of d-MnO₂ nanosheets.

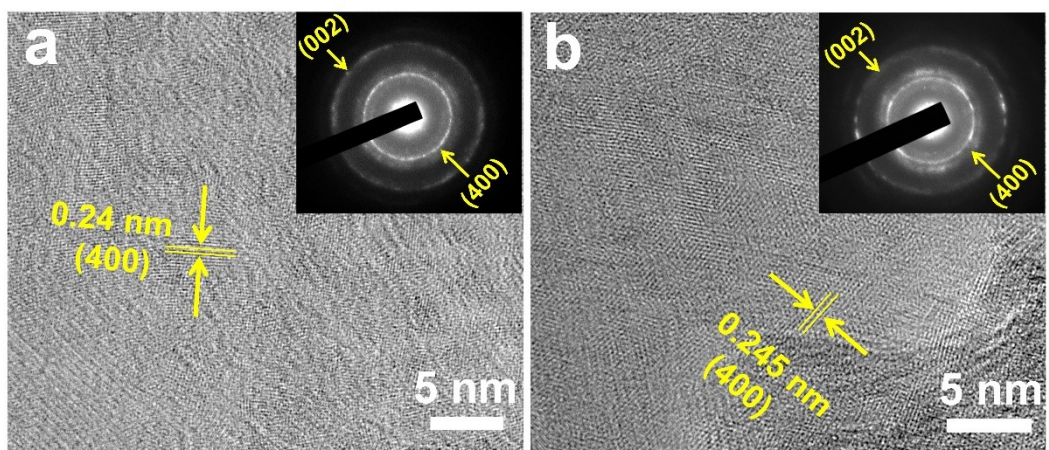


Fig. S5. HRTEM images of (a) MnO₂ and (b) d-MnO₂ with SAED analysis (inset).

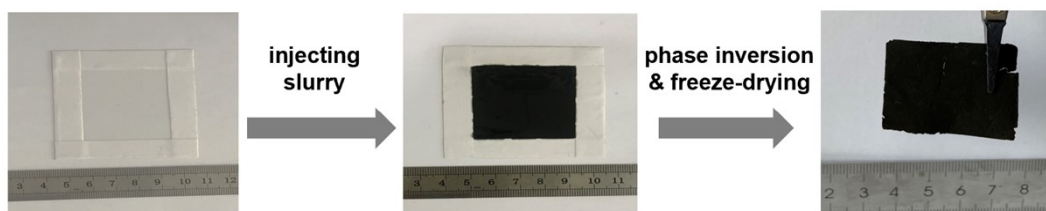


Fig. S6. A illustration to show the fabrication process of a H-d-MnO₂ film.

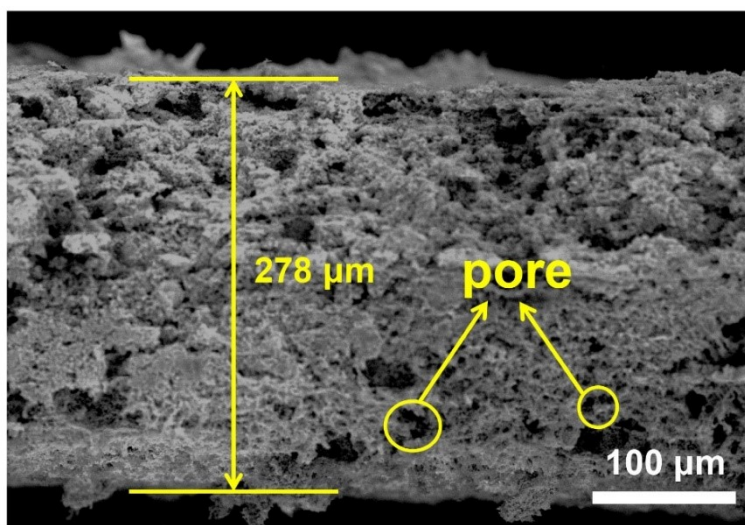


Fig. S7. Cross-section SEM image of a H-d-MnO₂ film electrode with a d-MnO₂ loading of 10 mg cm⁻².

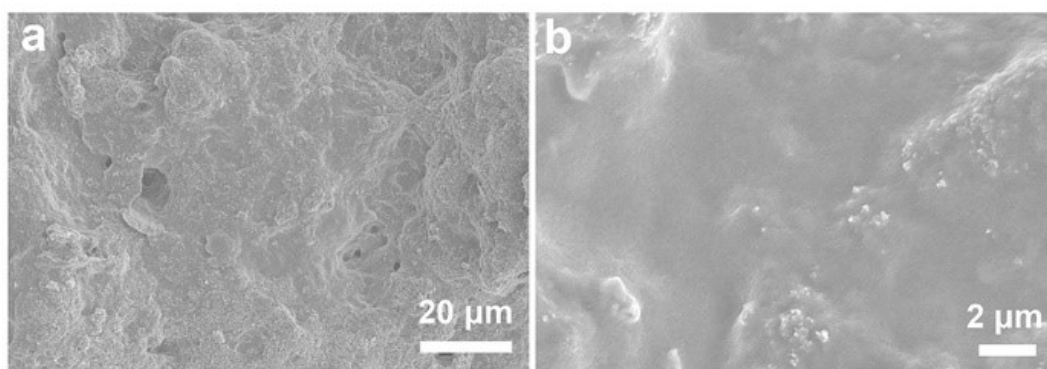


Fig. S8. (a) Low-magnificent and (b) high-magnificent SEM images of d-MnO₂@Ti electrodes.

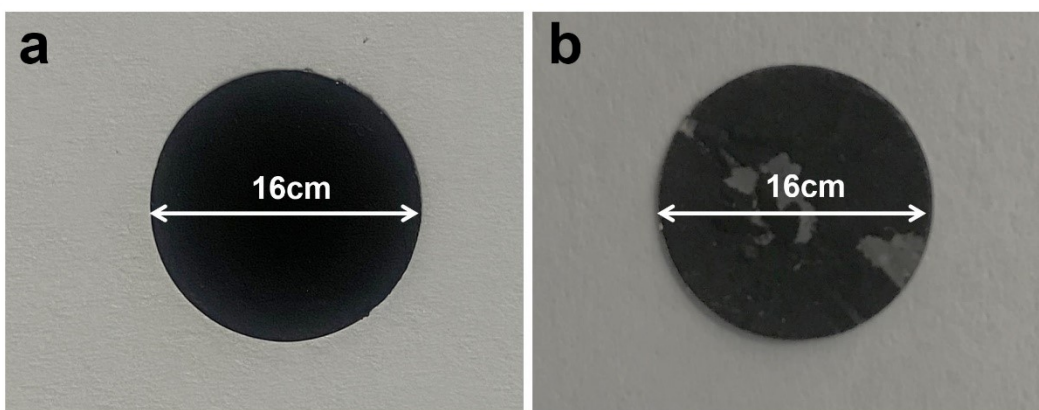


Fig. S9. Digital photos of d-MnO₂@Ti with d-MnO₂ loading of (a) 3.4 mg cm⁻² and (b) 5 mg cm⁻².

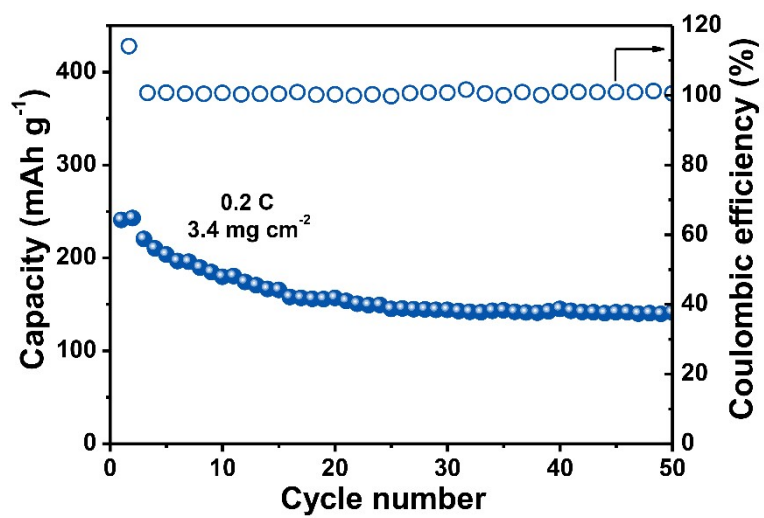


Fig. S10. Cycling performance of the d-MnO₂@CC electrode with a mass loading of ~3.4 mg cm⁻² at 0.2 C.

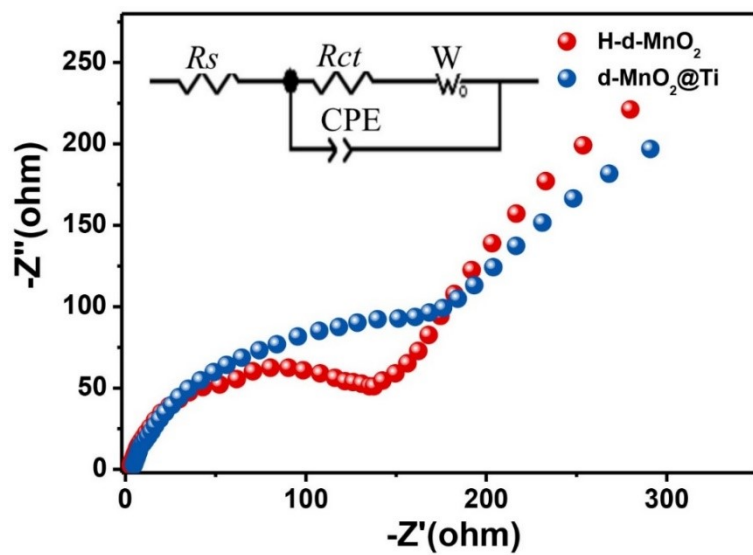


Fig. S11. Nyquist plots of H-d-MnO₂ and d-MnO₂@Ti electrodes.

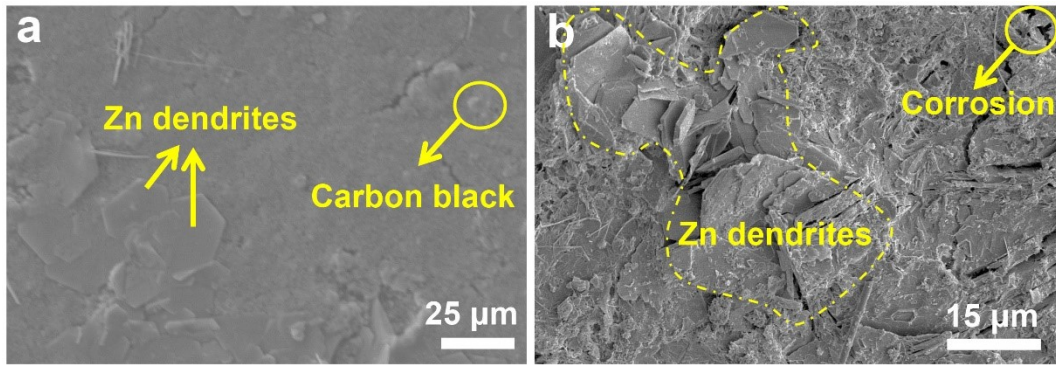


Fig. S12. SEM images of (a) a carbon coated Zn foil and (b) bare Zn foil.

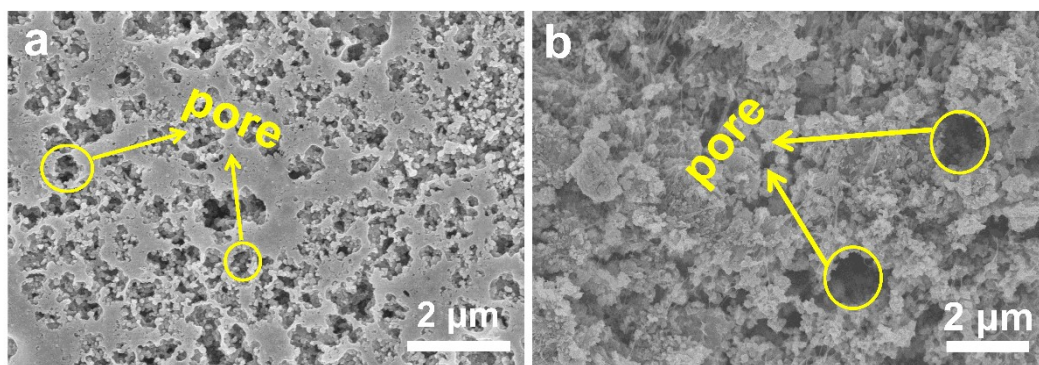


Fig. S13. SEM images of H-d-MnO₂ cathode with (a) a low mass loading of 3.4 mg cm⁻² after 100 cycles at 0.2 C and (b) a high mass loading of 10 mg cm⁻² after 50 cycles at 0.1 C.

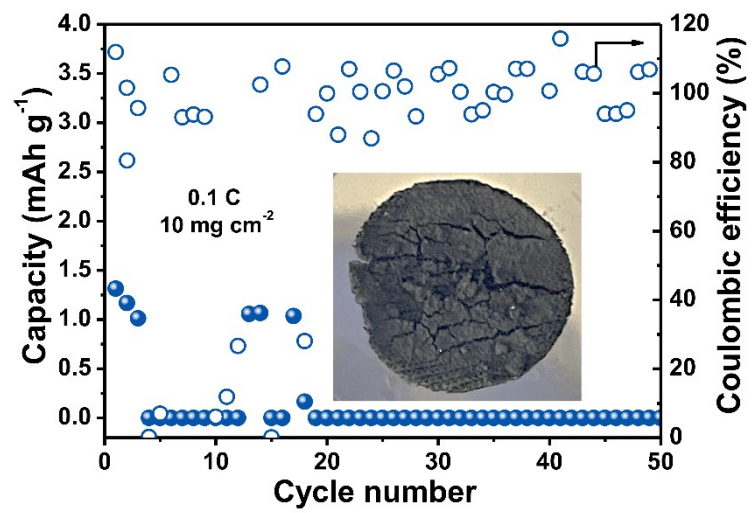


Fig. S14. Cycling performance of the d-MnO₂@carbon cloth electrodes at 0.1 C with a mass loading of ~10 mg cm⁻².