

Supplementary Information

Improving the high initial Coulombic efficiency of manganese oxide anodes: A strategy for in-situ construction of an interface of metal-organic framework-derived oxide nanoparticles

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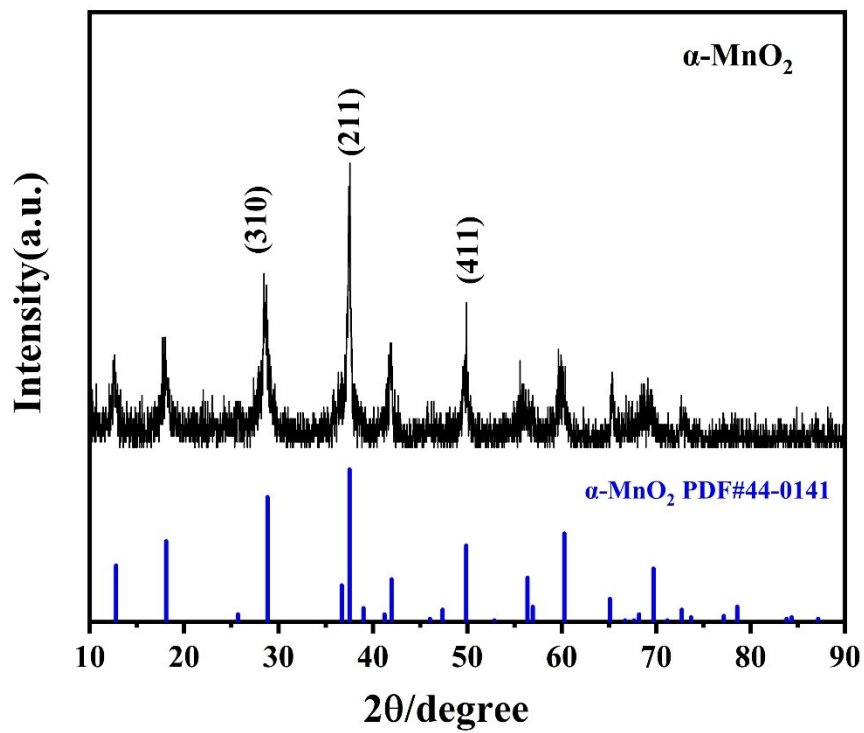


Fig. S1. XRD patterns of α - MnO_2 .

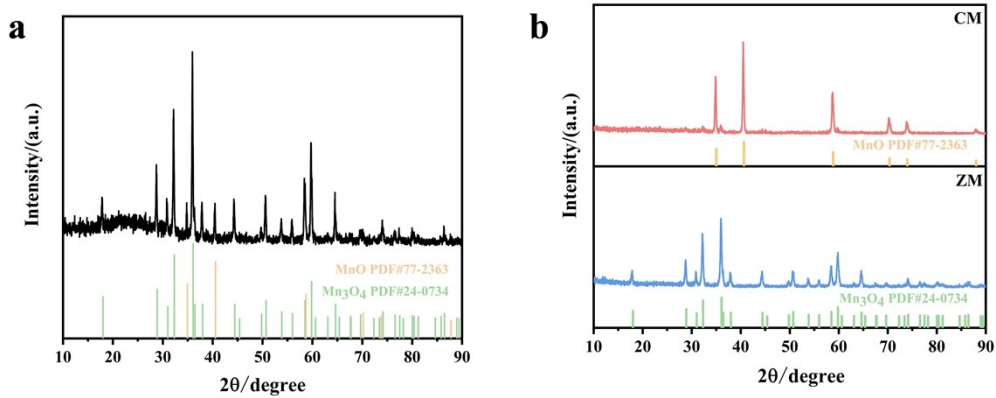


Fig. S2. XRD patterns of the calcined MnO_2 (a), CM and ZM(b).

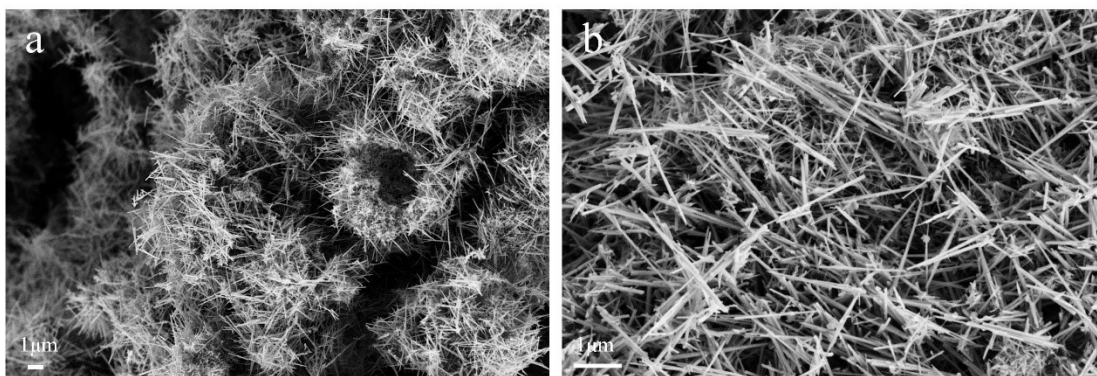


Fig. S3. SEM images of α -MnO₂.

Element	Sample element content W (%)
Co	3.757%
Zn	5.507%
Mn	47.645%

Table S1. ICP test of Co, Zn and Mn.

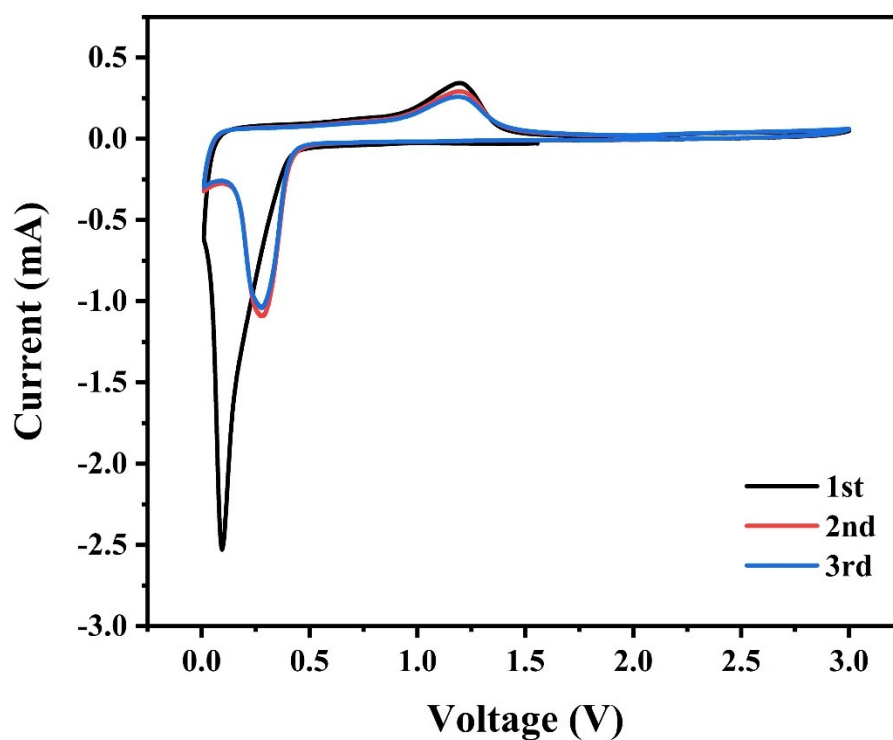


Fig. S4. CV curves between 0.01 and 3 V at a potential sweep rate of 0.1 mV s⁻¹ for the α -MnO₂ electrodes.

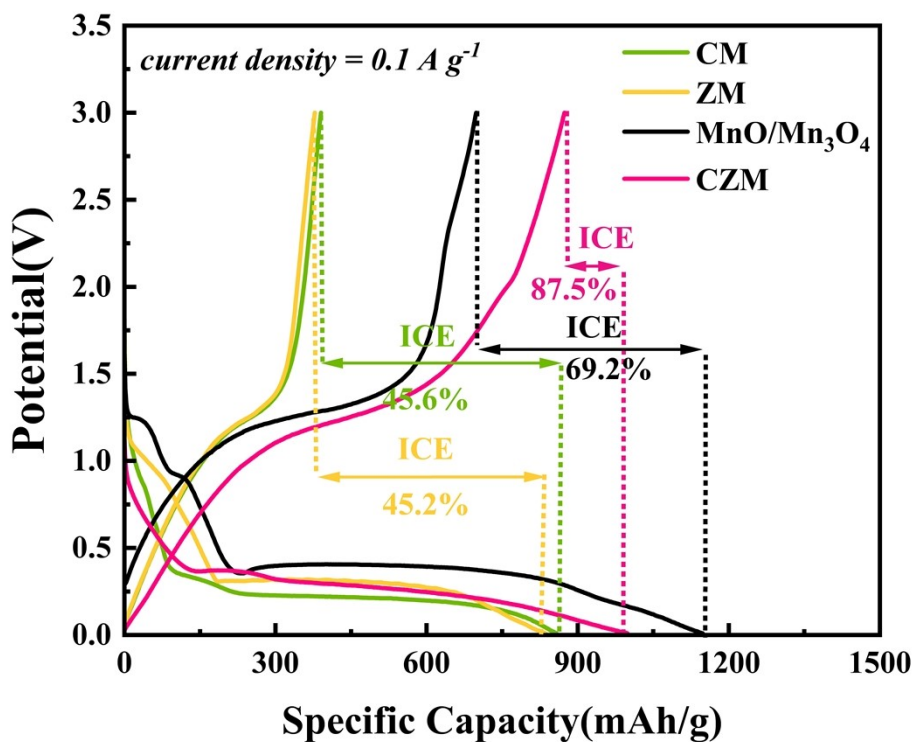


Fig. S5. Voltage profiles for the MnO/Mn₃O₄, CM and ZM electrodes during the initial charge-discharge cycle at 0.1 A g^{-1} .

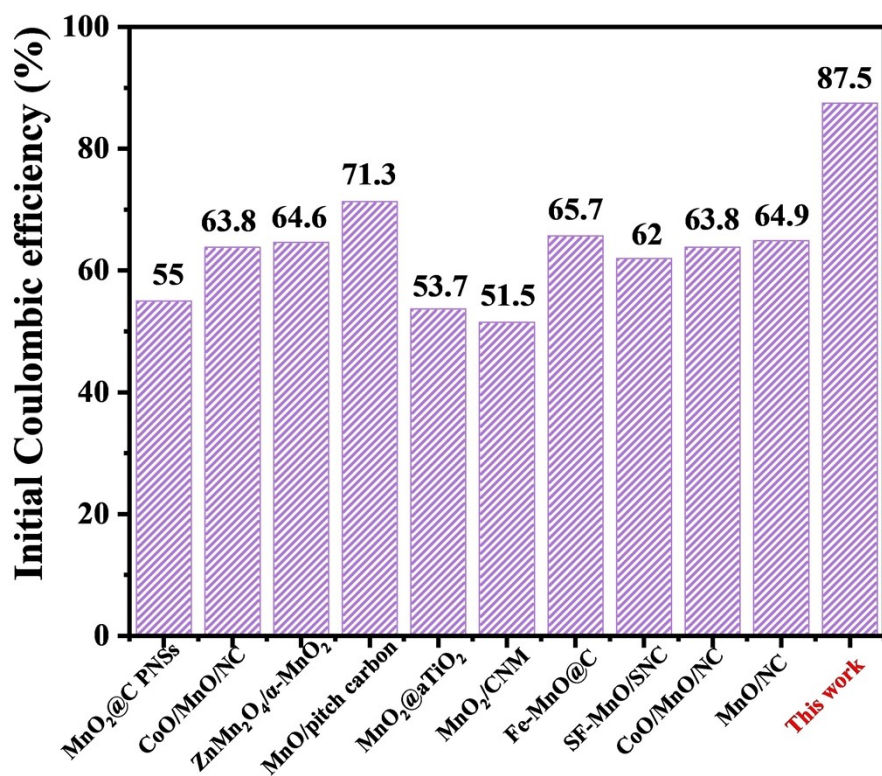


Fig. S6. Comparison of the initial Coulombic efficiency between this work and previously reported manganese-based anodes.

Sample	$R_s(\Omega)$	$R_{ct}(\Omega)$
MnO ₂	15.76	220.7
CZM	3.428	148.3

Table S2. The R_s and R_{ct} of MnO₂ and CZM sample.

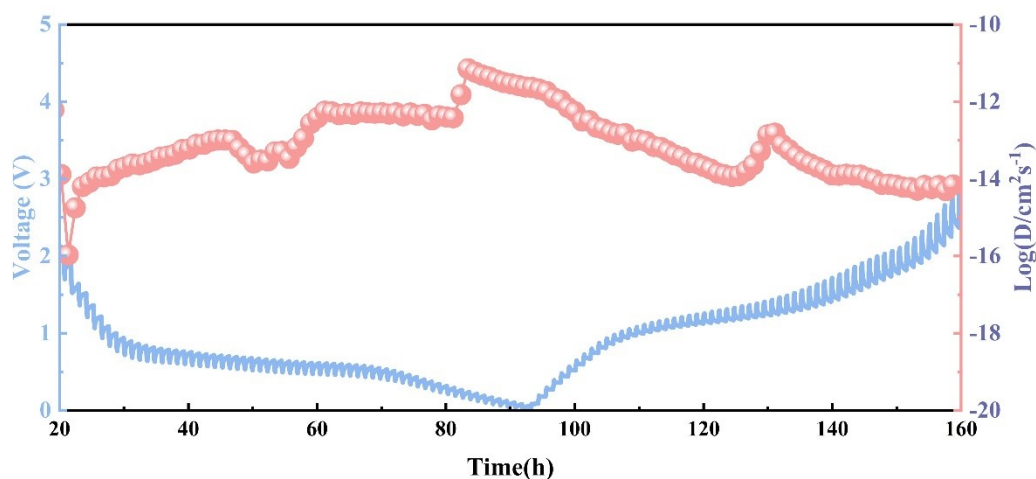


Fig. S7. GITT curves and corresponding D_{Li^+} of MnO₂ electrode.

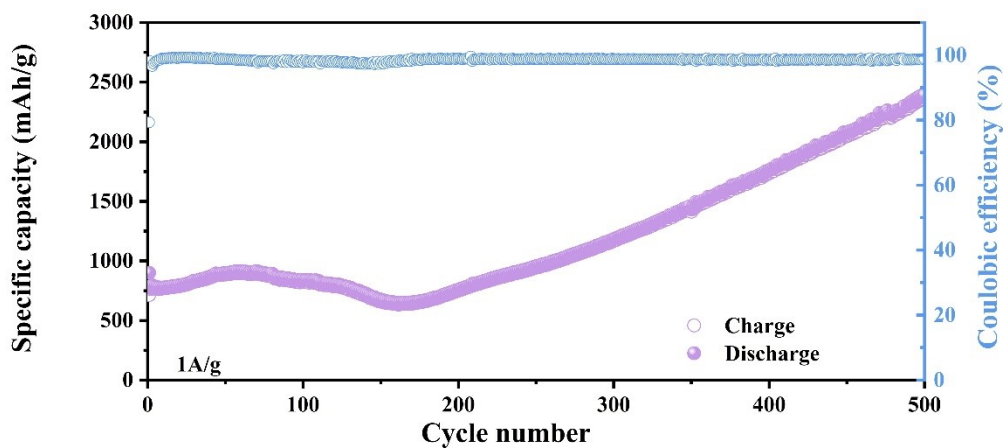


Fig. S8. Long-term cycle performance in the voltage range of 0.01 – 3.0 V at 1 A g⁻¹ of the CZM electrodes.

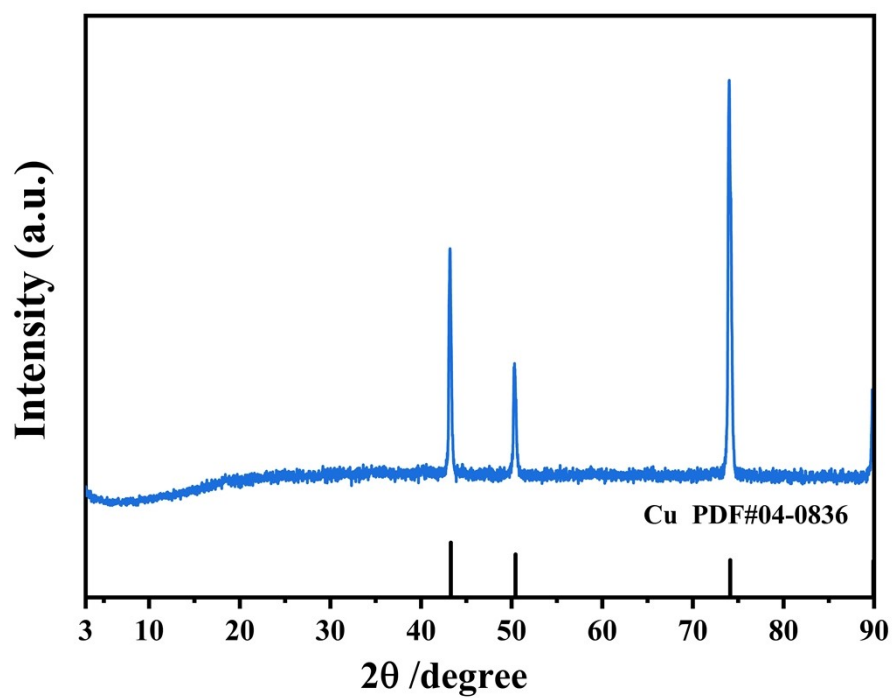


Fig. S9. XRD patterns of the CZM electrode after 30th cycle.

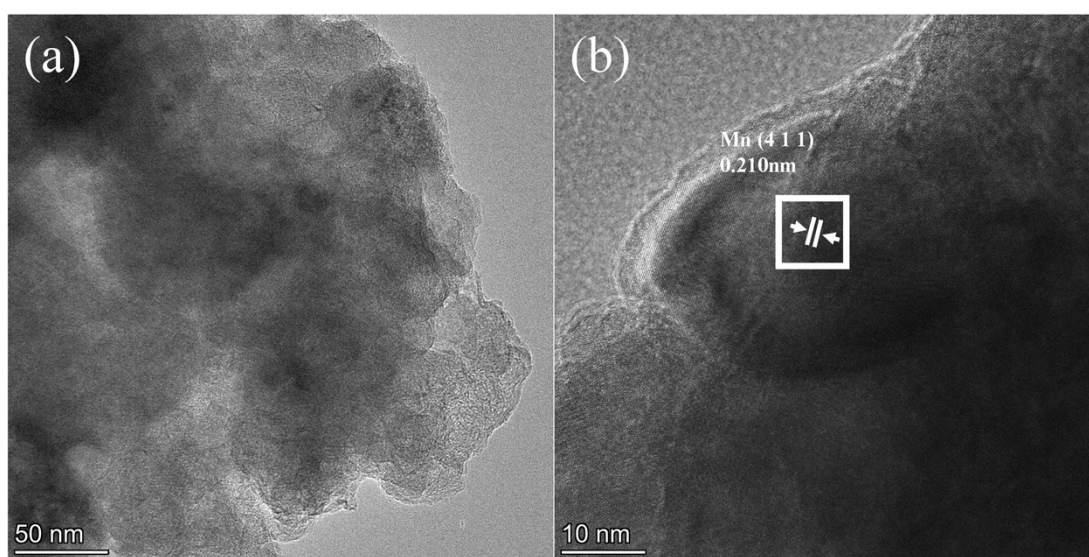


Fig. S10. (a)The TEM images of CZM electrode after 30th cycle. (b) HRTEM images of CZM electrode after 30th cycle.