Supporting Information for

High Specific Capacity and Mechanism of a Metal-organic Framework Based Cathode for Aqueous Zinc-ion Batteries

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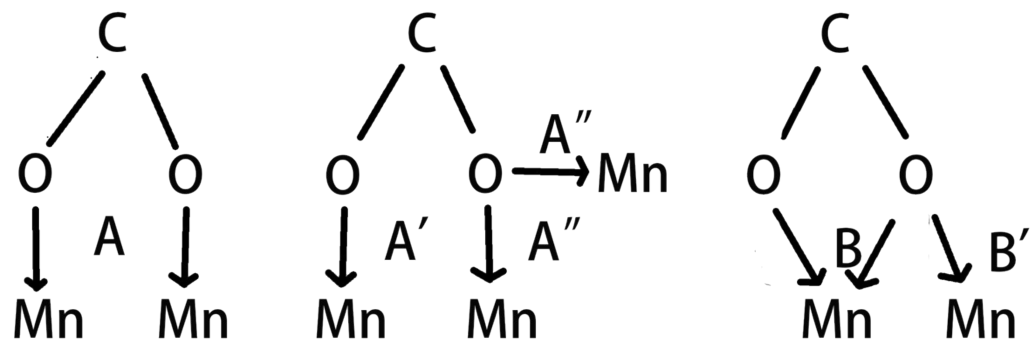

Fig. S1. The different modes of Mn-O-C rods (carboxylate links are coordinated to the metal centers).

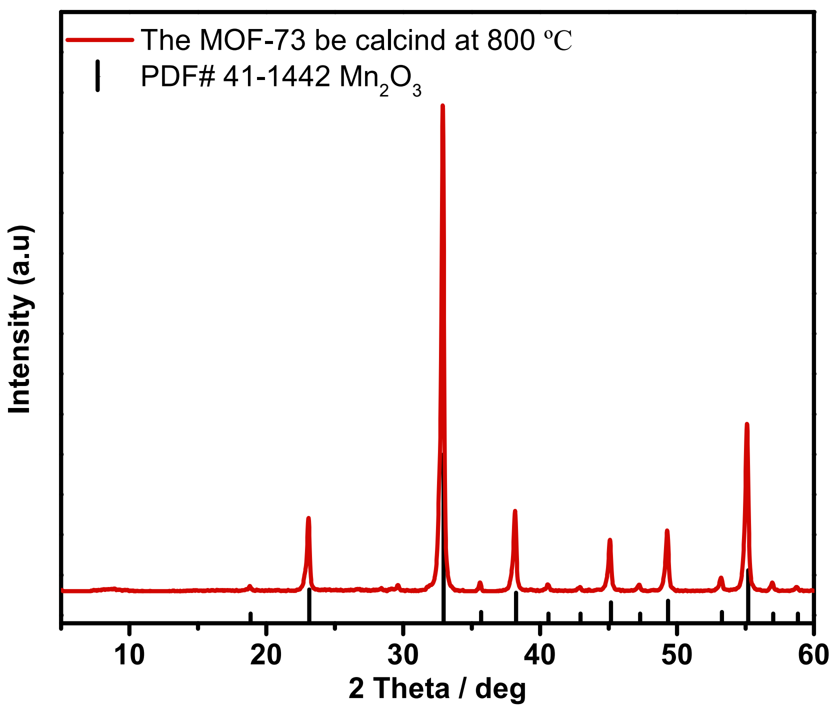

Fig. S2. The XRD pattern of MOF-73 after calcine at 800°C in air.

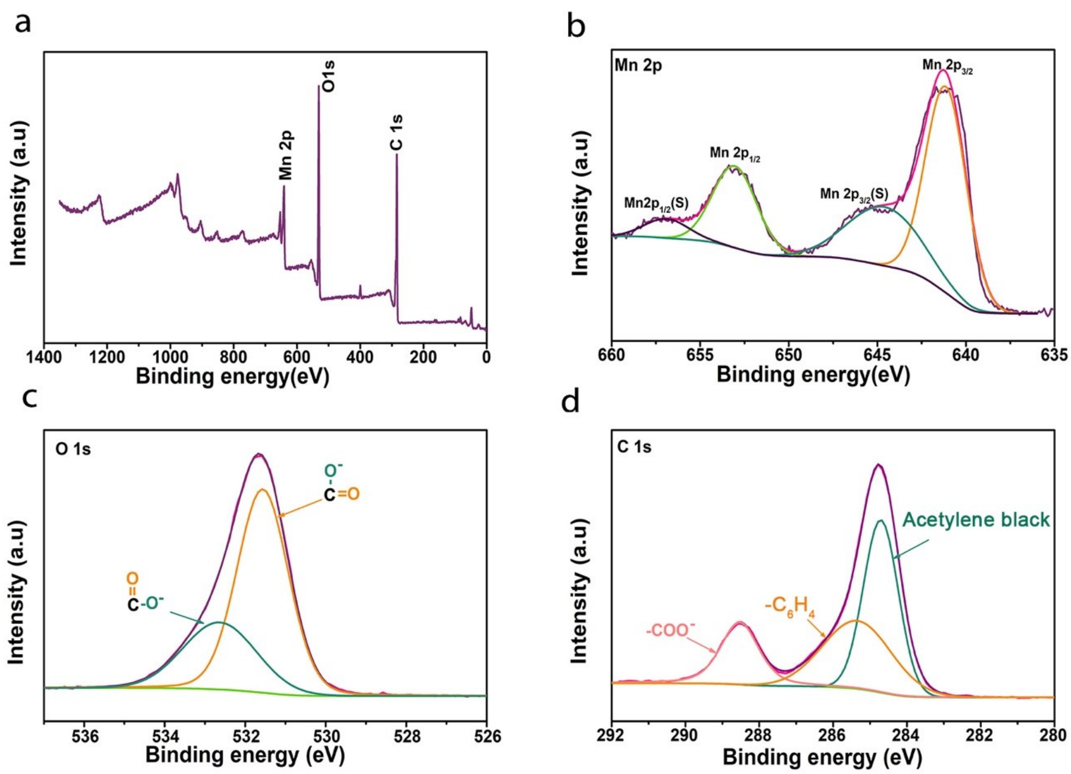

Fig. S3. XPS survey spectra (a) of the as-prepared MOF-73 and narrow spectra for Mn 2p (b) O 1s (c) and C 1s (d).

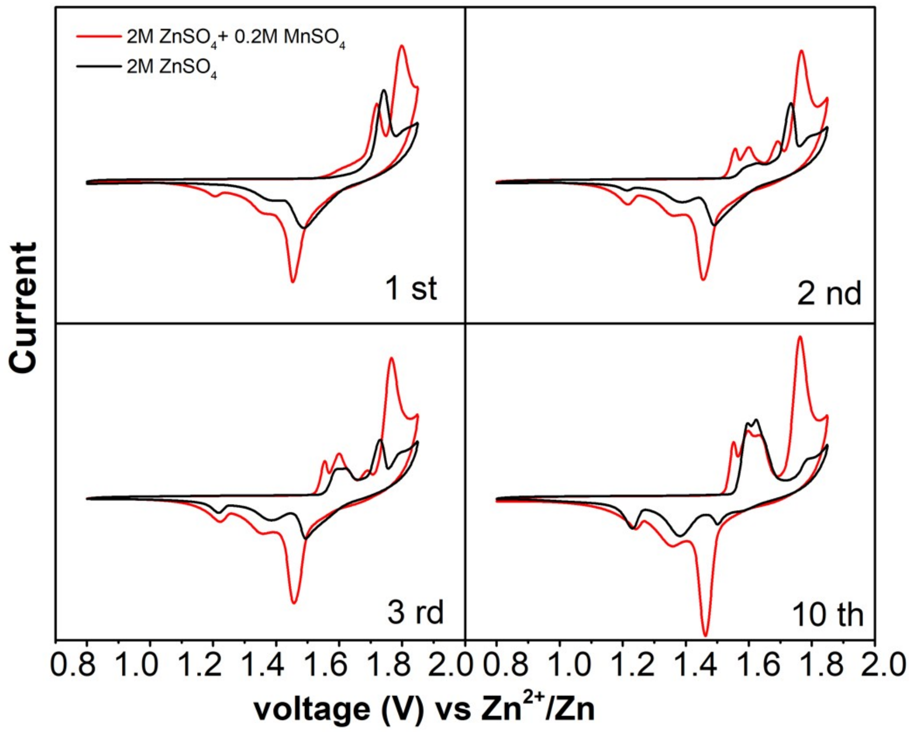

Fig. S4. The CV curves of ZIBs with or without $MnSO_4$ added.

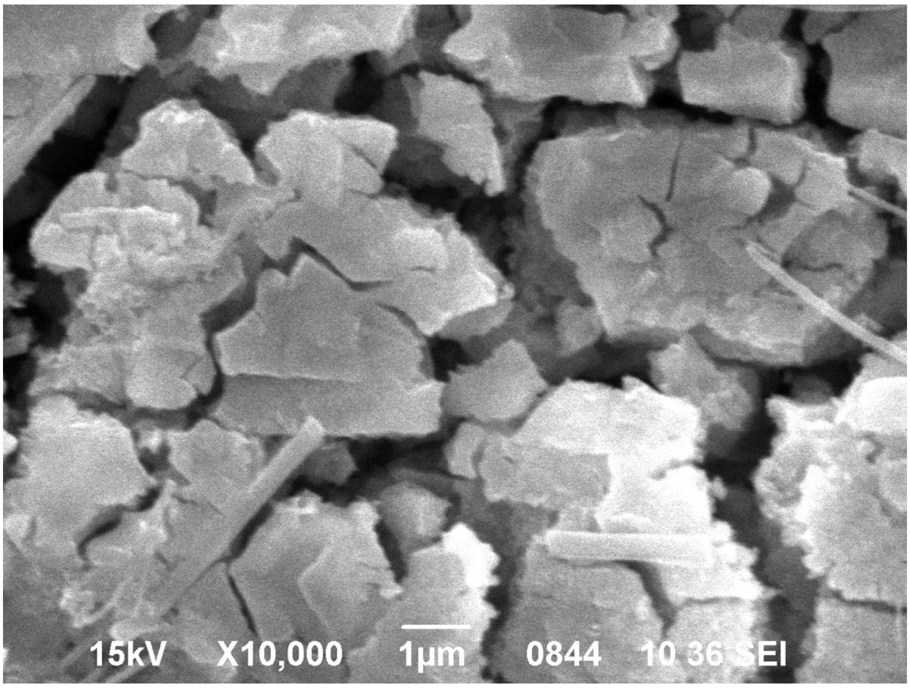

Fig. S5. The SEM of cathode at original state.

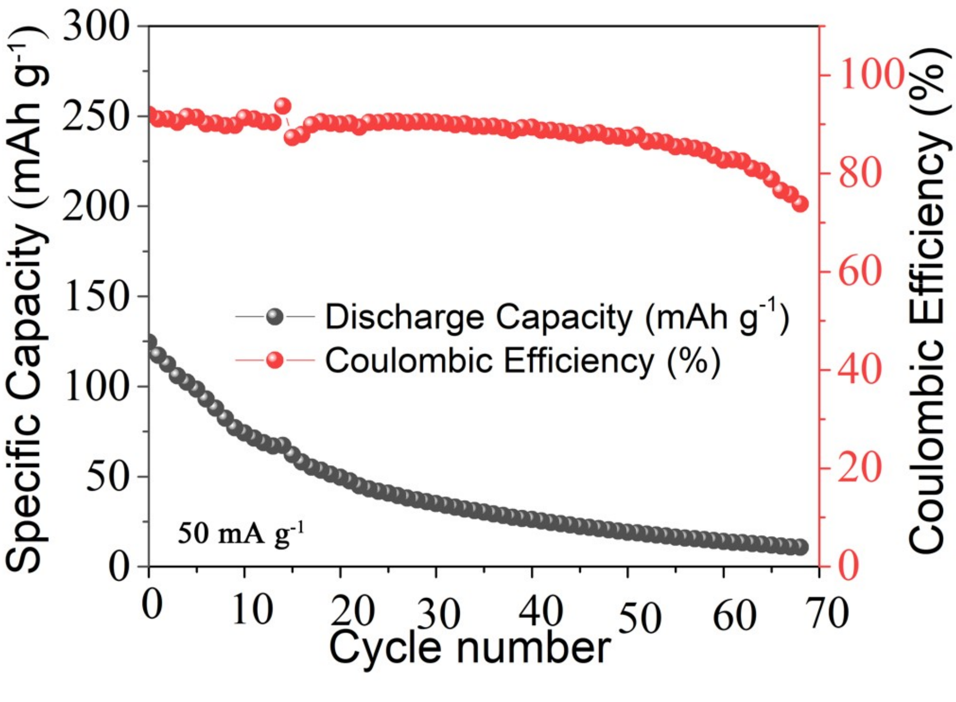

Fig. S6. The cycle performance of other carbon ZIBs with 0.2M $MnSO_4$ added.

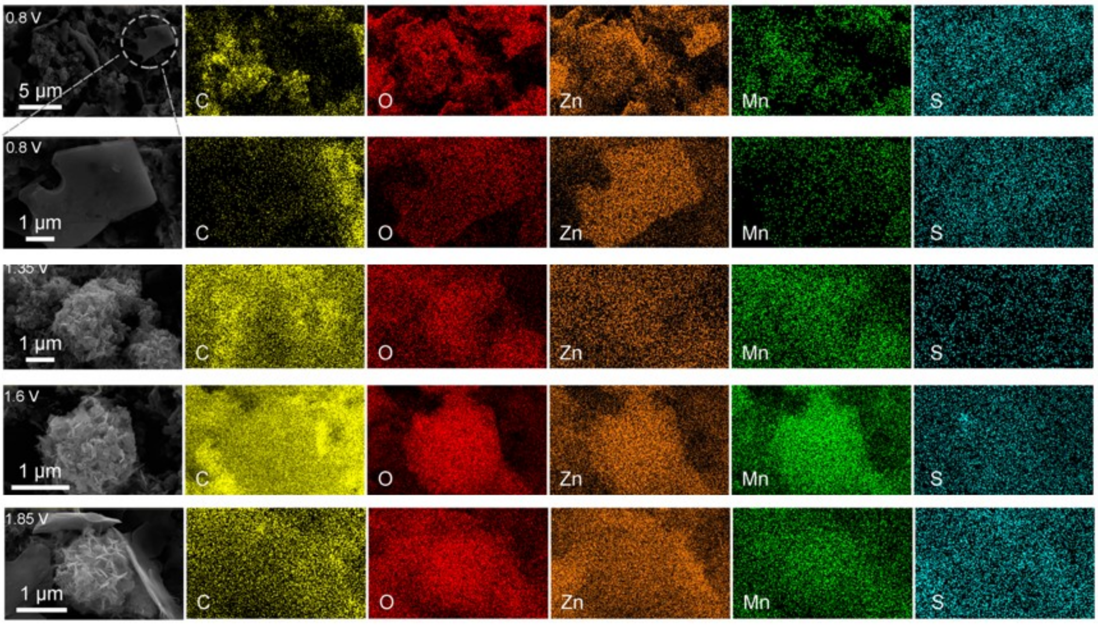

Fig S7. The EDS mapping of cathode at different charge/discharge states.

Electrode materials	Electrolyte	Current density (A g^{-1})	Specific capacity (mA h g^{-1})
MnO_2/PAN [1]	2 M $ZnSO_4$ + 0.1 M $MnSO_4$	0.2 (0.4 mA cm^{-2})	280 (0.56 mA h cm^{-2})
N-CNSs@MnO_2 [2]	2 M $ZnSO_4$ + 0.2 M $MnSO_4$	0.2 (0.46 mA cm^{-2})	303 (0.69 mA h cm^{-2} at)
Mn_3O_4 [3]	2 M $ZnSO_4$ + 0.2 M $MnSO_4$	0.1 (0.2 mA cm^{-2})	221 (0.44 mA h cm^{-2} at)
MnO [4]	1M $ZnSO_4$ + 1 M $MnSO_4$	(0.2 mA cm^{-2})	0.325 mA h cm^{-2}
γ - MnO_2/graphene [5]	2 M $ZnSO_4$ + 0.2 M $MnSO_4$	2 (1 mA cm^{-2})	301 (0.6 mA h cm^{-2})
δ-MnO_2 [6]	2 M $ZnSO_4$ + 0.2 M $MnSO_4$	0.308 (0.62 mA cm^{-2})	278 (0.55 mA h cm^{-2})
MnO_2/Co_3O_4 [7]	2 M $ZnSO_4$ + 0.2 M $MnSO_4$	0.5 (1.25 mA cm^{-2})	250 (0.62 mA h cm^{-2})
β-MnO_2 nanorod [8]	3 M $ZnSO_4$ + 0.2 M $MnSO_4$	0.0308 (0.077 mA cm^{-2})	288 (0.72 mA h cm^{-2})
β-MnO_2 [9]	2 M $ZnSO_4$ + 0.5 M $MnSO_4$	0.1 (0.1 mA cm^{-2})	300 (0.3 mA h cm^{-2})
Polyfurfural/MnO_2 [10]	1 M $Zn(CF_3SO_3)_2$+ 0.1 M $MnSO_4$	0.2 (0.4 mA cm^{-2})	275 (0.55 mA h cm^{-2})
D-β-MnO_2 [11]	2 M $ZnSO_4$	0.05 (0.6 mA cm^{-2})	305 (0.60 mA h cm^{-2})
MnO_2-Ce [12]	2 M $ZnSO_4$ + 0.1 M $MnSO_4$	0.15 (0.3 mA cm^{-2})	255 (0.51 mA h cm^{-2})
This work	2 M $ZnSO_4$ + 0.2 M $MnSO_4$	0.05 (53 mA cm^{-2})	815 (0.84 mA h cm^{-2})

Table S1. the comparison of electrochemical properties between the proposed battery and the recently reported data about aqueous Zn^{2+} battery. (the area-specific capacity is calculated according to the mass loading per unit area provided in the article)

References

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