Electronic Supplementary Material (ESI) for Dalton Transactions.

Supplementary Information for

Realizing a uniform dispersion of MnO_2 with post-synthetic modification of metal-organic frameworks (MOFs) for advanced lithium ion battery anode

Fan Yang, Weiyang Li, Yanfeng Zhang, and Bohejin Tang*

College of Chemistry and Chemical Engineering, Shanghai University of Engineering Science, Shanghai 201620, P. R. China

Corresponding author: tangbohejin@sues.edu.cn

Figure S1. The simulation model of an H-bond (as indicated by the arrow) between two carboxyl groups (-COOH).

Figure S2. The EDX results of (a) MnO_2/ZIF-67-COOH composite and (b) MnO_2/ZIF-8-COOH composite

Figure S3. The rate performance of MnO_2

Figure S4. The CV curves of MnO_2/ZIF-8-COOH composite

Figure S5. Ragone plot of MnO_2/ZIF-67-COOH composite at various charge/discharge rates

Figure S6. The cycle performances of MnO_2/ZIF-67-COOH composite at (a)2000 and (b)5000 mA g^{-1}

Figure S7. The SEM images of MnO_2/ZIF-COOH composites.

Figure S8. The infrared spectra of MnO_2/ZIF-67-COOH composite before and after 10 cycles.

Figure S9. The cross-sectional views of the as-prepared electrodes of MnO_2/ZIF-67-COOH (a) and MnO_2/ZIF-8-COOH (b)

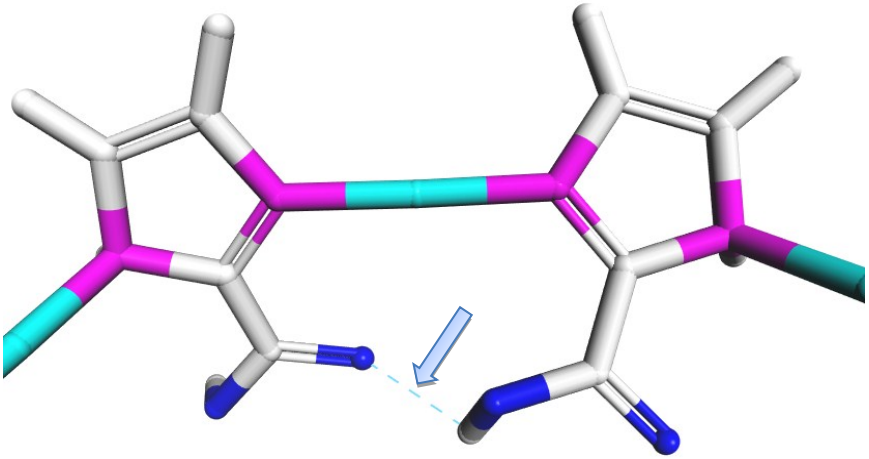

Figure S1. The simulation model of an H-bond (as indicated by the arrow) between two carboxyl

groups (-COOH). Green: Co; pink: N; white: C; blue: O.

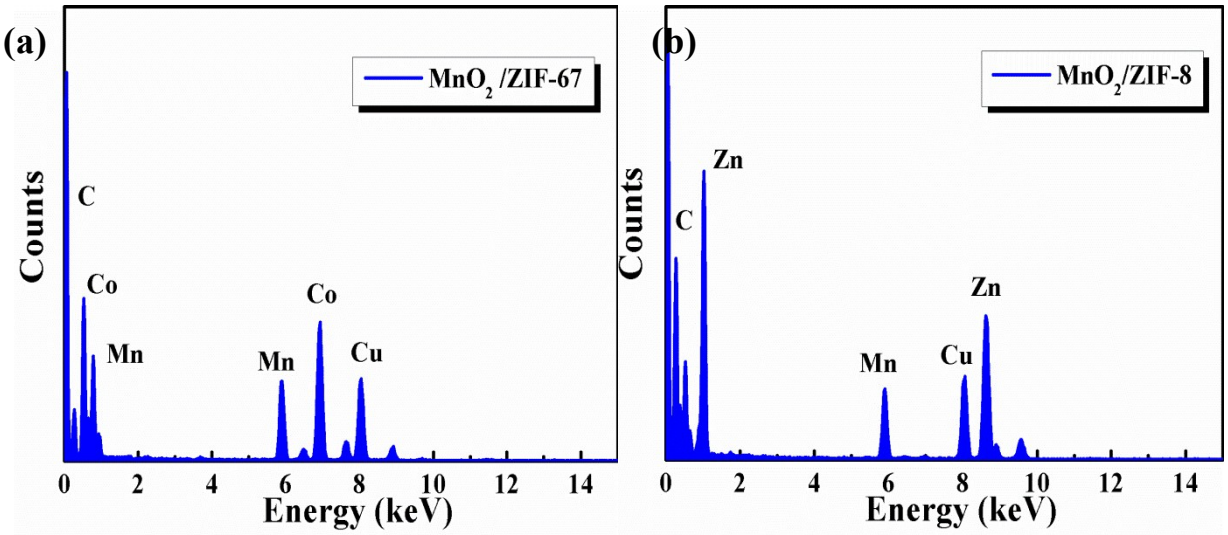

Figure S2. The EDX results of (a) MnO_2/ZIF-67-COOH composite and (b) MnO_2/ZIF-8-COOH composite

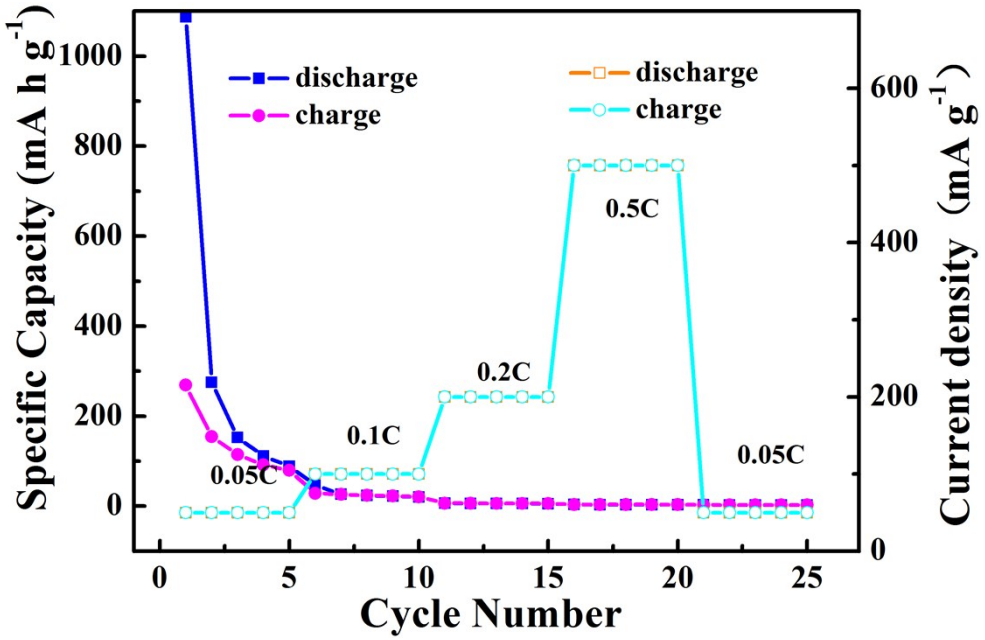

Figure S3. The rate performance of MnO_2

It can be seen that the discharge specific capacity of MnO_2 was only 275 mA h g^{-1} in the second cycle of 50 mA g^{-1}, which was really low compared with its high theoretical capacity.

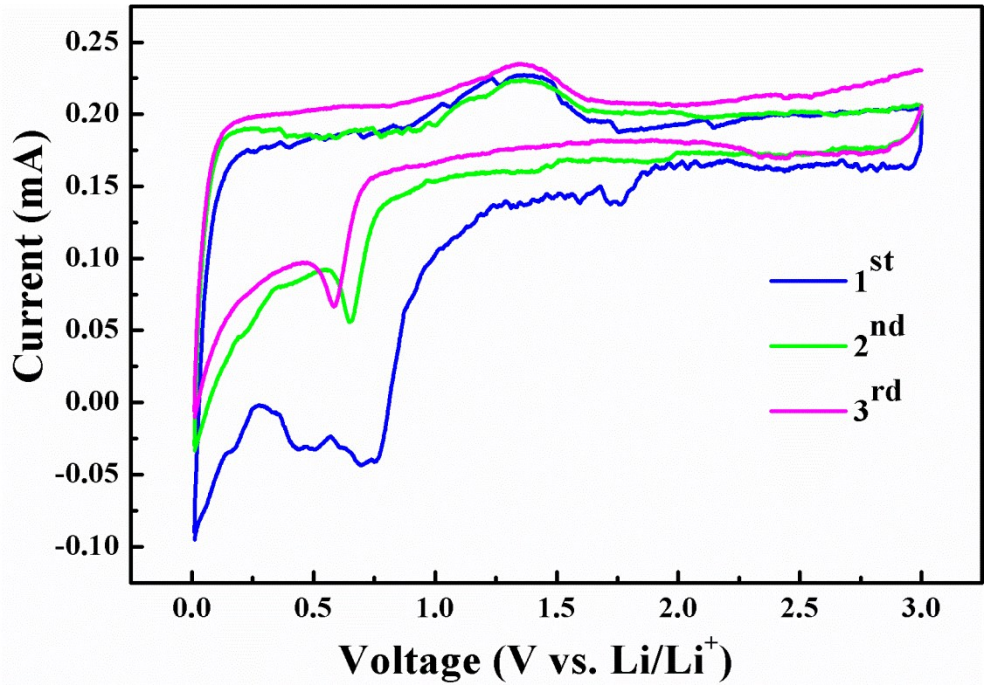

Figure S4. The CV curves of MnO_2/ZIF-8-COOH composite

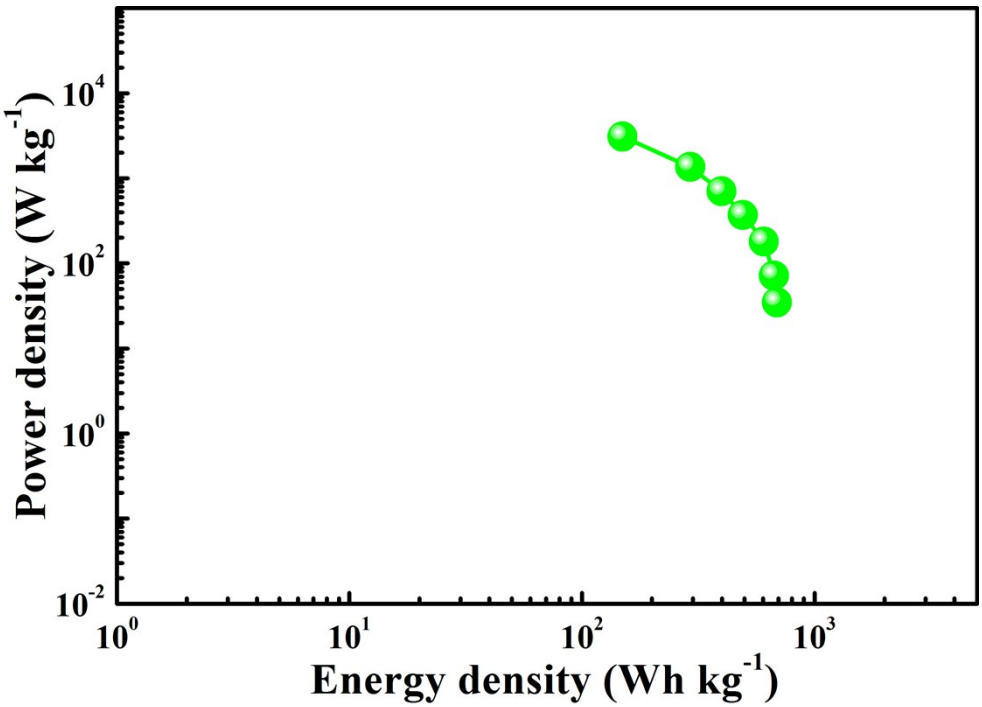

Figure S5. Ragone plot of MnO_2/ZIF-67-COOH composite at various charge/discharge rates

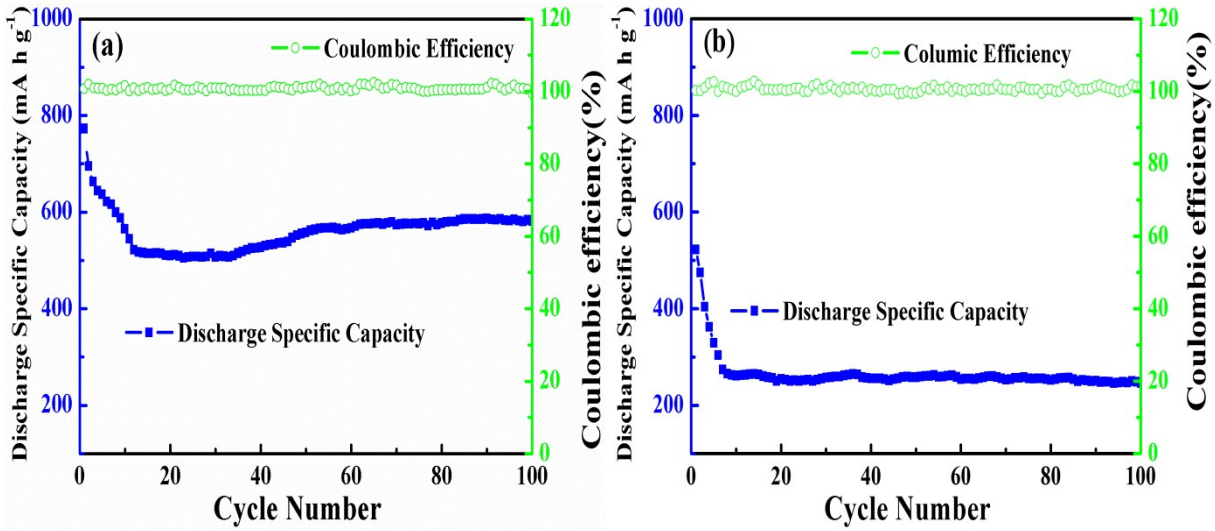

Figure S6.The cycle performances of MnO_2/ZIF-67-COOH composite at (a) 2000 and (b) 5000 mA g^{-1}.

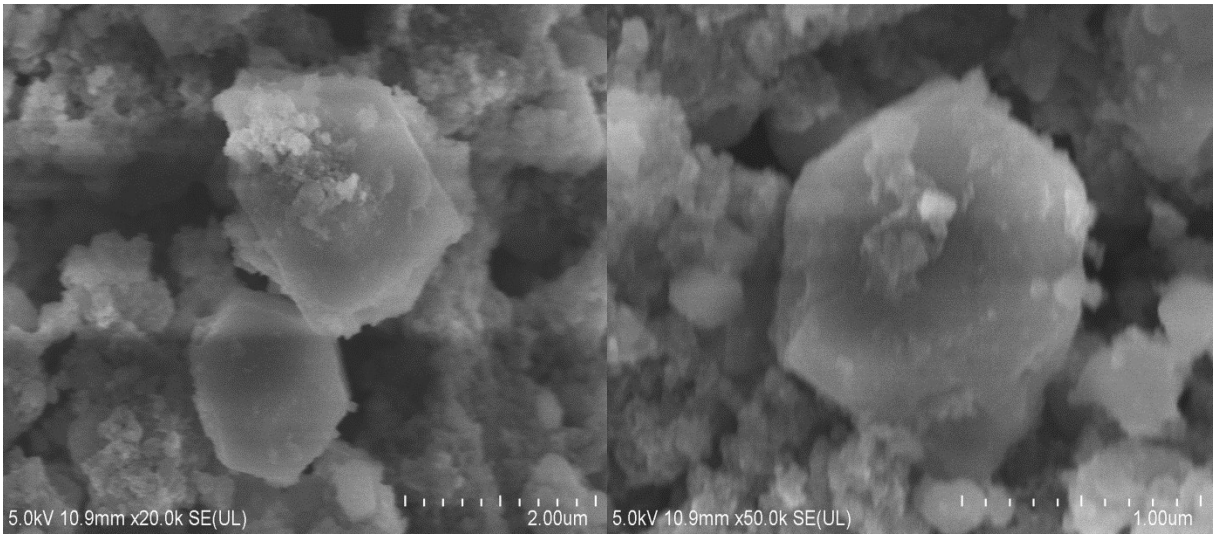

Figure S7.The SEM images of MnO_2/ZIF-COOH composites. (a) MnO_2/ZIF-67-COOH composite and (b) MnO_2/ ZIF-8-COOH composite

As to the reaction mechanism, the SEM images of MnO_2/ZIF-COOH composites were captured, as shown in the figures above. It can be seen that there is no extinct differences before and after discharge and charge, demonstrating that MOFs did not collapse during the lithiation and de-lithiation.

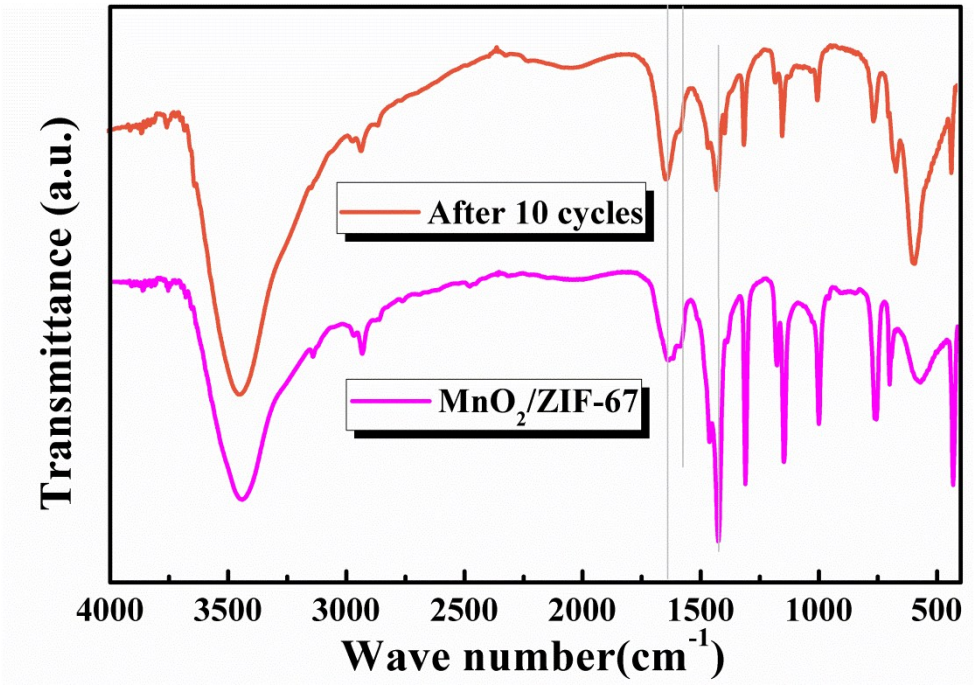

Figure S8. The infrared spectra of MnO_2/ZIF-67-COOH composite before and after 10 cycles

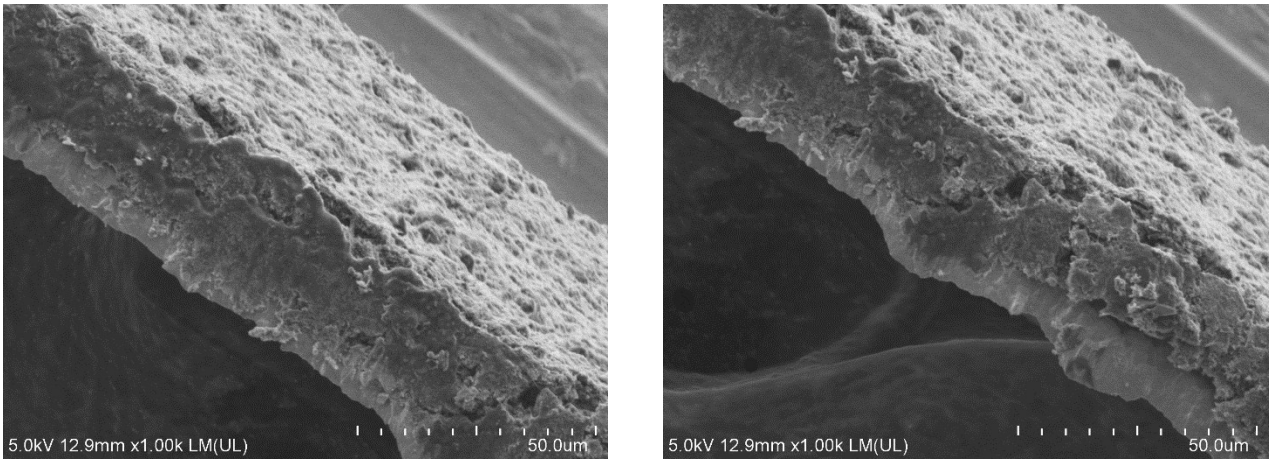

Figure S9. The cross-sectional views of the as-prepared electrodes of MnO_2/ZIF-67-COOH (a) and MnO_2/ZIF-8-COOH (b)