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

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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)
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 delithiation.
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).