Metal-Organic Framework-derived Porous Mn$_{1.8}$Fe$_{1.2}$O$_4$ Nanocubes with an interconnected channel structure as High-Performance Anodes for Lithium Ion Batteries

Fangcai Zheng$^a$, Dequan Zhu$^{a#}$, Xiaohui Shi and Qianwang Chen$^{a,b}$

$^a$Hefei National Laboratory for Physical Science at Microscale, Department of Materials Science & Engineering & Collaborative Innovation Center of Suzhou Nano Science and Technology, University of Science and Technology of China, Hefei 230026, China.

$^b$High Magnetic Field Laboratory, Hefei Institutes of Physical Science, Chinese Academy of Sciences, Hefei 230031, China.

E-mail: cqw@ustc.edu.cn. Fax and Tel: +86 551 63603005.
**Figure S1.** TEM image of Mn$_3$[Fe(CN)$_6$]$_2$·nH$_2$O nanocubes.

**Figure S2.** XRD pattern of Mn$_3$[Fe(CN)$_6$]$_2$·nH$_2$O nanocubes.
Figure S3. IR spectrum of $\text{Mn}_3\text{[Fe(CN)]}_6\cdot2n\text{H}_2\text{O}$ nanocubes.

Figure S4. TGA curve of $\text{Mn}_3\text{[Fe(CN)]}_6\cdot2n\text{H}_2\text{O}$ nanocubes under a flow of the mixed carrier gas (80 vol% He and 20 vol% O$_2$), with a heating rate of 20 °C min$^{-1}$. 
Figure S5. IR absorbance variation of (a) H$_2$O, (b) CO$_2$, (c) NO$_2$ and (CN)$_2$ as a function of time.

Figure S6. MS intensity variation of (a) H$_2$O, (b) CO$_2$, (c) NO$_2$ and (CN)$_2$ as a function of time.
Figure S7. The high-magnification FESEM (a) and TEM (b) images of Mn$_{1.8}$Fe$_{1.2}$O$_4$ nanocubes.

Figure S8. The coulombic efficiency of the Mn$_{1.8}$Fe$_{1.2}$O$_4$ nanocubes for lithium storage at a current density of 200 mA g$^{-1}$. 
**Figure S9.** Morphological analysis of the electrode cycled for 20 cycles at a current density of 200 mA g\(^{-1}\).

**Figure S10.** XRD pattern of as-prepared Mn\(_x\)Fe\(_{2-x}\)O\(_3\) obtained at 600 °C.
Figure S11. FESEM images of Mn$_x$Fe$_{2-x}$O$_3$ sample at different magnification (a and b). TEM images of Mn$_x$Fe$_{2-x}$O$_3$ sample at different magnification (c and d).

Figure S12. Discharge-charge curves of Mn$_x$Fe$_{2-x}$O$_3$ sample (600 °C) at a current density of 200 mA g$^{-1}$. 
Figure S13. Rate capability test for the Mn$_x$Fe$_{2-x}$O$_3$ nanocubes at various current densities (100-1600 mA g$^{-1}$).