Supporting Information

Nitrogen doped carbon composites derived from 7,7,8,8-tetracyanoquinodimethane-based metal-organic frameworks for supercapacitors and lithium-ion batteries

Yongli Tong[a], Dong Ji[a], Ping Wang[b], Hu Zhou[b], Kazim Akhtar[b], Xiaoping Shen[d], Junhao Zhang*[,a,c], Aihua Yuan*[,a,c]

[a]*School of Environmental and Chemical Engineering,* [b]*School of Material Science and Engineering and* [c]*Marine Equipment and Technology Institute, Jiangsu University of Science and Technology, Zhenjiang 212003, P. R. China*

[d]*School of Chemistry and Chemical Engineering, Jiangsu University, Zhenjiang 212013, P. R. China*

Supporting Information Index:

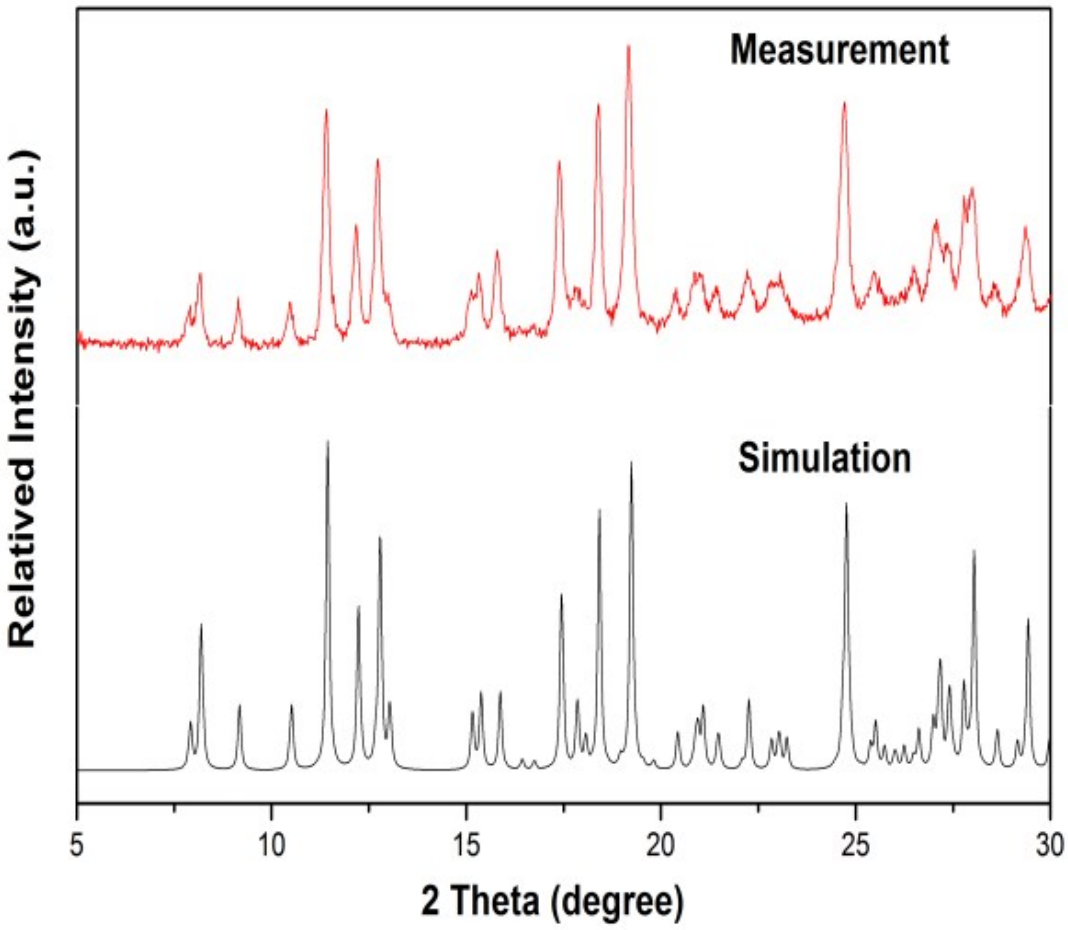

Fig. S1. XRD patterns of the as-synthesized Sr-MOF and simulation

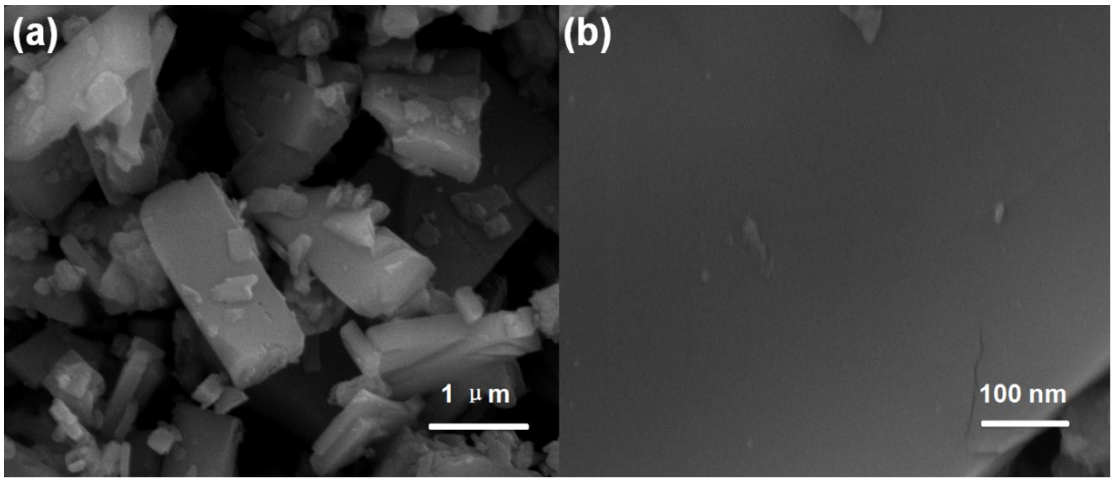

Fig. S2. (a-b) FESEM images of the as-synthesized Sr-MOF with different magnifications.

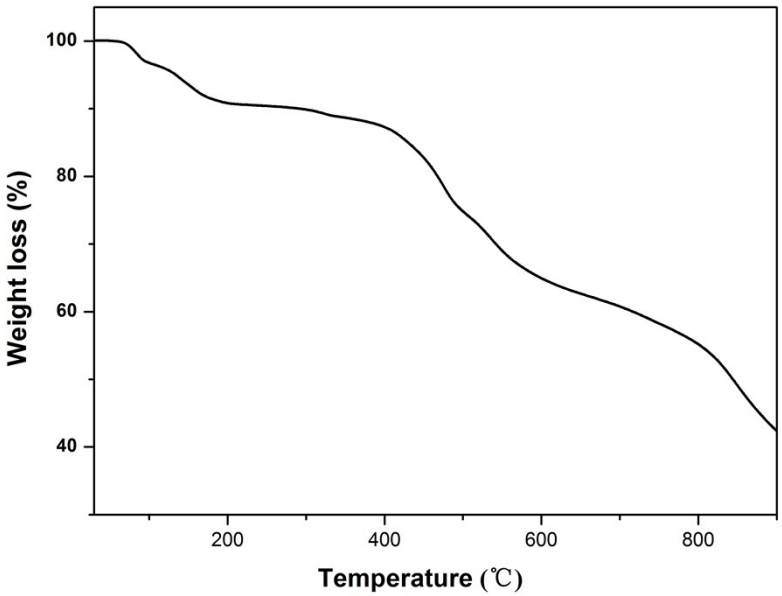

Fig. S3. TG curve of the as-synthesized Sr-MOF.

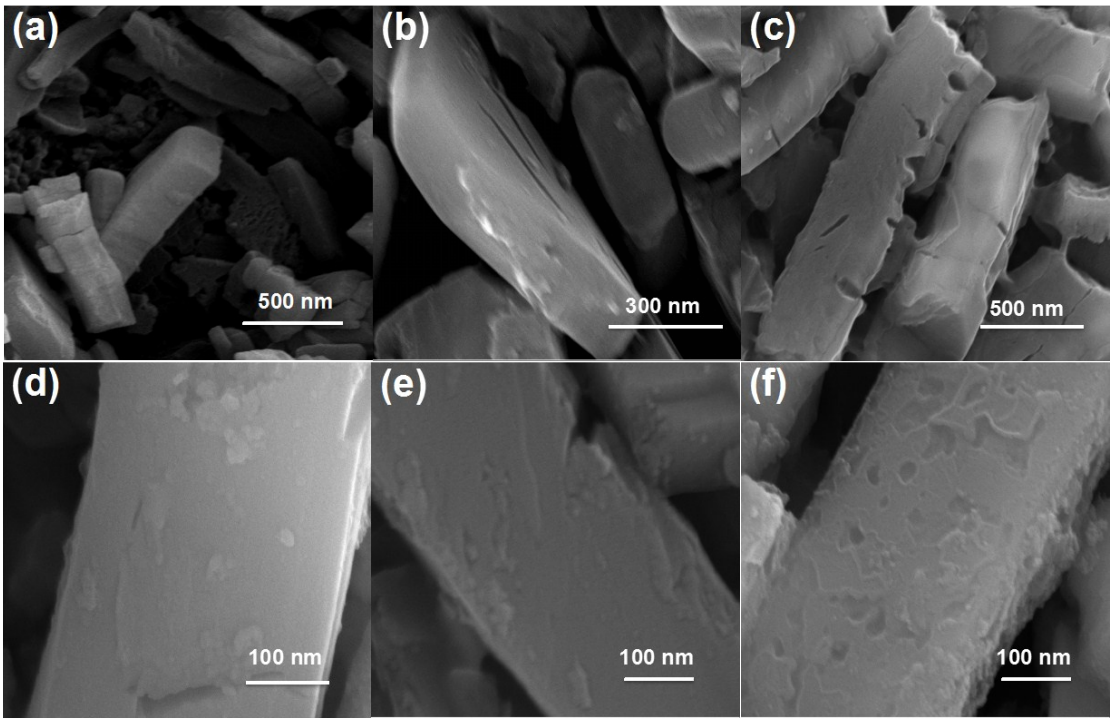

Fig. S4. (a,d) FESEM images of N-C-450 with different magnifications; (b,e) FESEM images of N-C-550 with different magnifications; (c,f) FESEM images of N-C-650 with different magnifications.

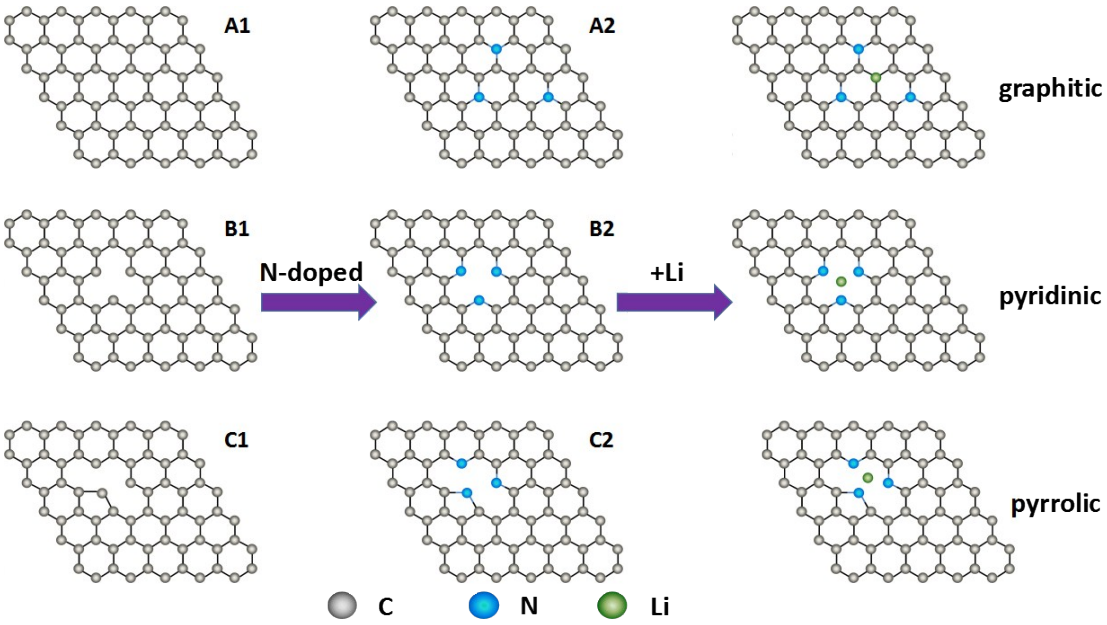

Fig. S5. The no N-doping graphene materials (A1, B1, C1) and corresponding N-doped counterparts (A2, B2, C2).

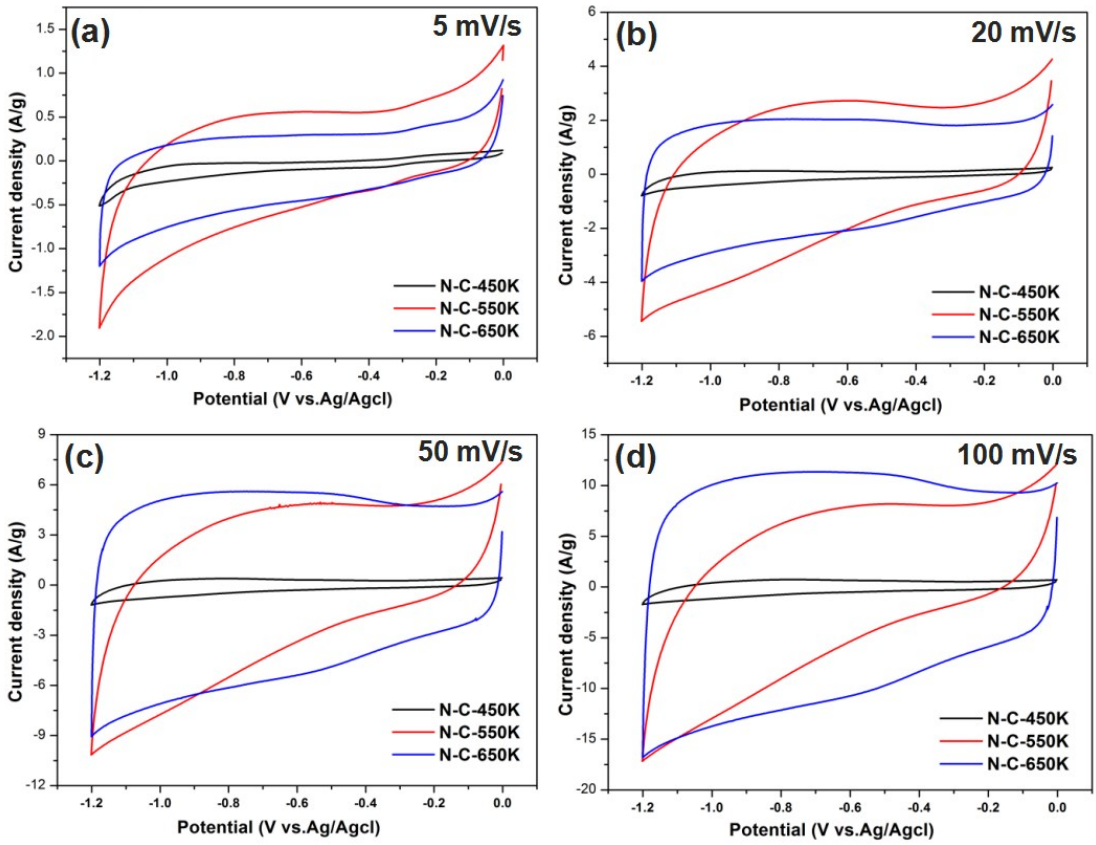

Fig. S6. Cyclic voltammetries of N-C-450, N-C-550 and N-C-650 used as supercapacitor electrodes at different scan rates in the voltage of -1.2 to 0 V: (a) 5 mV s^{-1} ; (b) 20 mV s^{-1} ; (c) 50 mV s^{-1} ; (d) 100 mV s^{-1}.

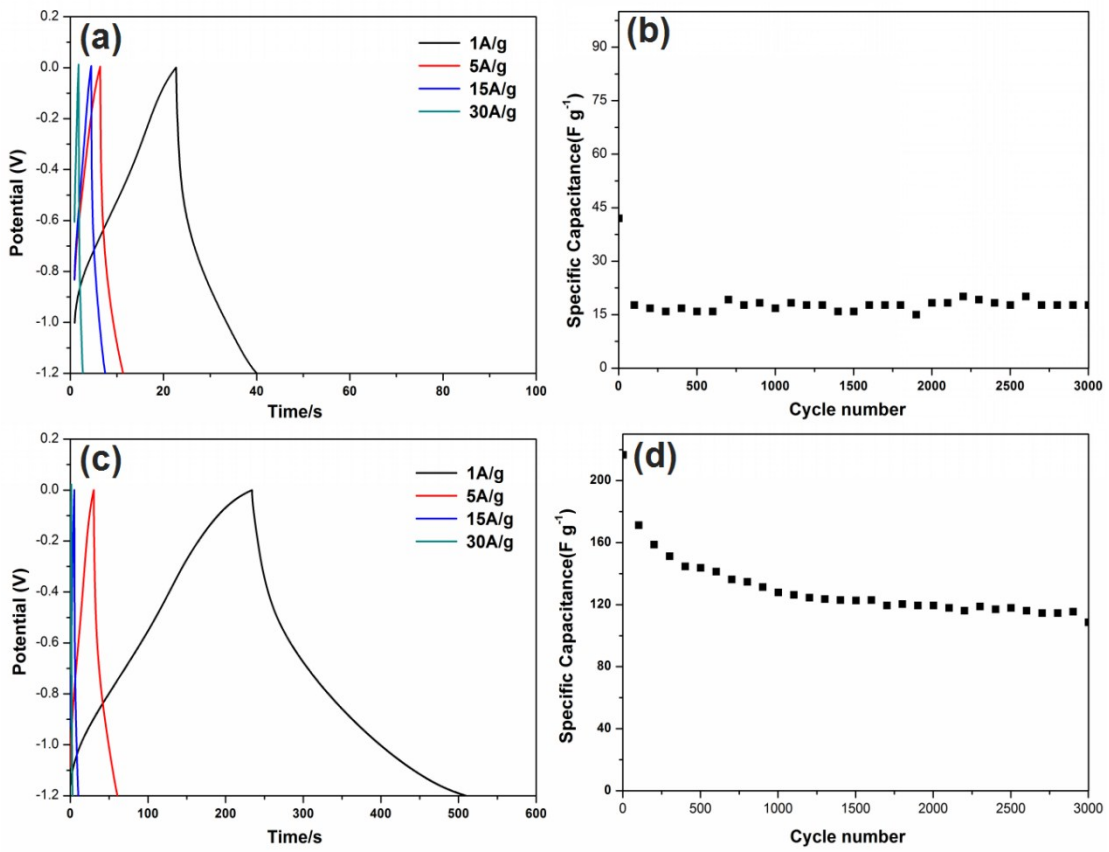

Fig. S7. (a) Galvanostatic charge-discharge curves of the N-C-450 used as supercapacitor electrode at various current densities; (b) Cycling stability of the N-C-450 sample at a current density of 1.0 A g^{-1}; (c) Galvanostatic charge-discharge curves of the N-C-550 used as supercapacitor electrode at various current densities; (d) Cycling stability of the N-C-550 sample at a current density of 1.0 A g^{-1}.

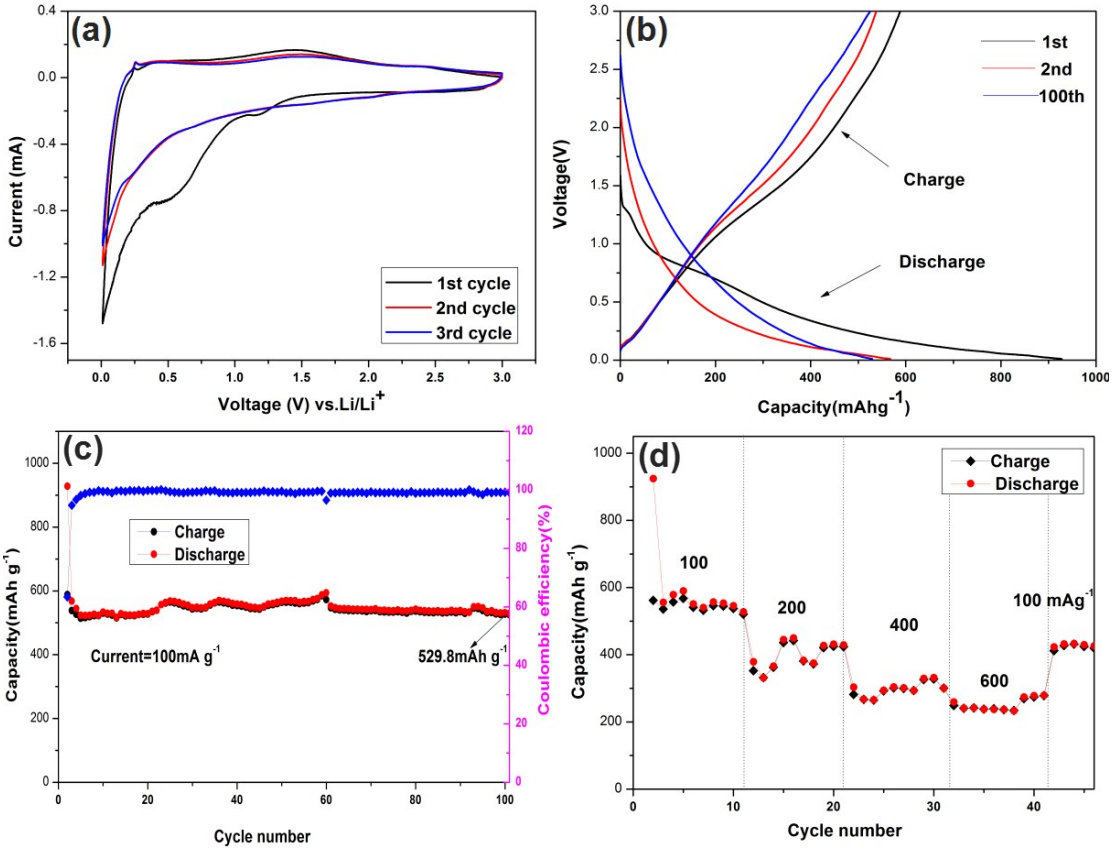

Fig. S8. Electrochemical performance of the N-C-450 anode material for LIBs: (a) Cyclic voltammetry curve at 0.2 mV s^{-1} scan rate in the voltage of 0.1 to 3.0 V; (b) Galvanostatic charge-discharge profiles at a current density of 100 mA g^{-1}; (c) Cycling performance at a current density of 100 mA g^{-1}; (d) Rate performance at different current densities from 100 to 600 mA g^{-1}.

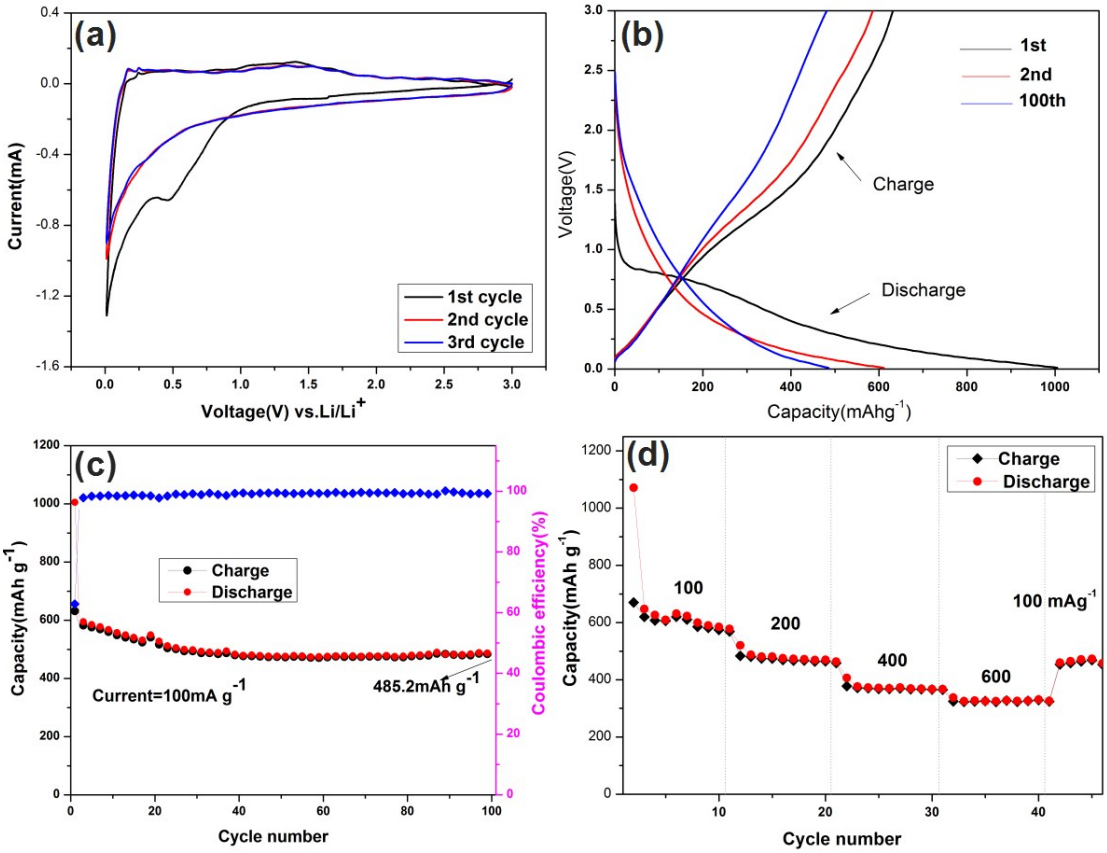

Fig. S9. Electrochemical performance of the N-C-650 anode material for LIBs: (a) Cyclic voltammetry curve at 0.2 mV s^{-1} scan rate in the voltage of 0.1 to 3.0 V; (b) Galvanostatic charge–discharge profiles at a current density of 100 mA g^{-1}; (c) Cycling performance at a current density of 100 mA g^{-1}; (d) Rate performance at different current densities from 100 to 600 mA g^{-1}.

Tab. S1: Capacitances of the representative MOF-derived carbons in aqueous electrolytes

Samples	Electrolyte	Scan rate mV s^{-1}	Specific capacity (F g^{-1})	Ref.
C800	1M H_2SO_4	5	202.0	1
CZIF69a	0.5M H_2SO_4	5	168	2
Z-900	0.5M H_2SO_4	5	214	3
NPC_{650}	1 M H_2SO_4	5	167	4
N-C-650	6 M KOH	5	223.7	Our work

1. H. L. Jiang, B. Liu, Y. Q. Lan, K. Kuratani, T. Akita, H. Shioyama, F. Q. Zong and Q. Xu, J. Am. Chem. Soc., 2011, **133**, 11854-11857.

2. Q. F. Wang, W. Xia, W. H. Guo, L. An, D. G. Xia and R. Q. Zou, Chem. Asian J., 2013, **8**, 1879-1885.
3. W. Chaikittisilp, M. Hu, H. J. Wang, H. S. Huang, T. Fujita, K. C. W. Wu, L. C. Chen, Y. Yamauchi and K. Ariga, Chem. Commun., 2012, **48**, 7259-7261.
4. B. Liu, H. Shioyama, H. L. Jiang, X. B. Zhang and Q. Xu, Carbon, 2010, **48**, 456-463.