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Supplementary Information

Nitrogen-Doped Hollow Carbon Nanosphere Towards Application of Potassium Ion Storage

Jiafeng Ruan,[a,1] *Xi Wu,*[a,1] *Yan Wang,*[a] *Shiyou Zheng,*[b] *Dalin Sun,*[a] *Yun Song,*[a,*] *Min Chen*[a,*]

[a] Department of Materials Science, Fudan University, Shanghai 200433 (P. R. China)

[b] School of Materials Science and Engineering, University of Shanghai for Science and Technology, Shanghai 200093, China

[*]Corresponding author at: Department of Materials Science, Fudan University, Shanghai 200433 (P. R. China)
E-mail addresses: Chenmin@fudan.edu.cn; Songyun@fudan.edu.cn.
[1] These authors contributed equally to this work.

Content:

Figure S1

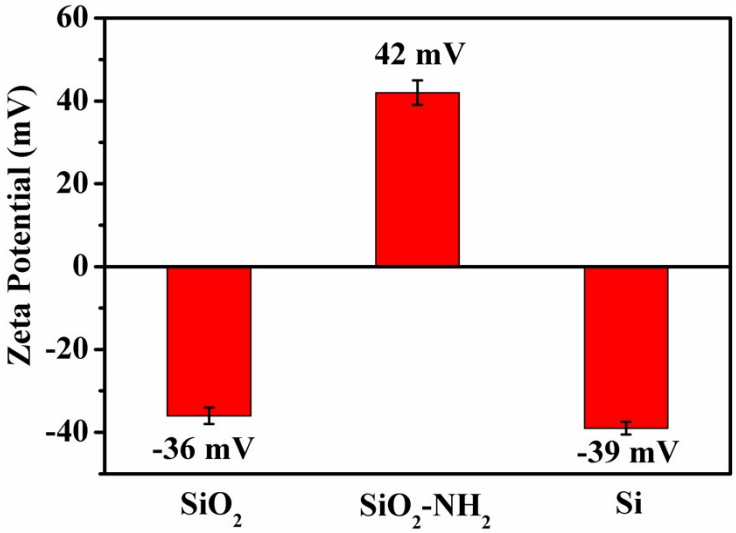

Figure S1. Zeta (ζ) potential of SiO_2-NH_2 and Si.

Figure S2

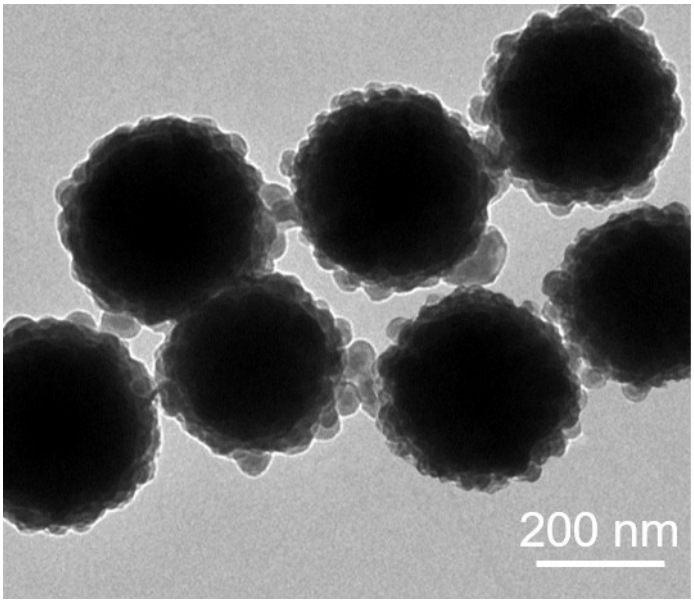

Figure S2. TEM image of the SiO_2-NH_2@DA/Si.

Figure S3

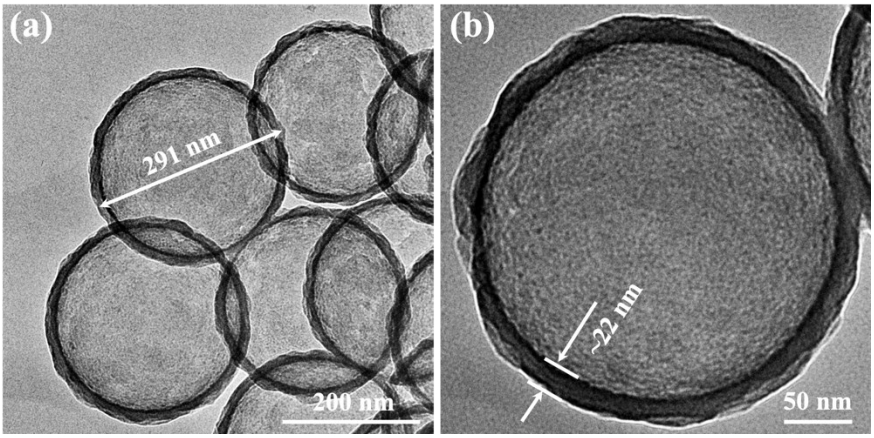

Figure S3. (a, b) TEM images of N-CNs.

Figure S4

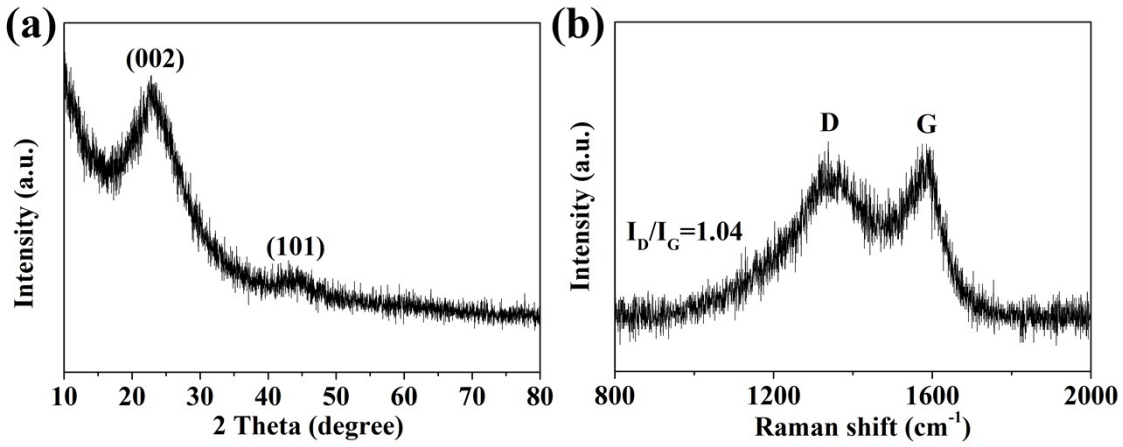

Figure S4. (a) XRD pattern and (b) Raman spectra of N-CNs.

Figure S5

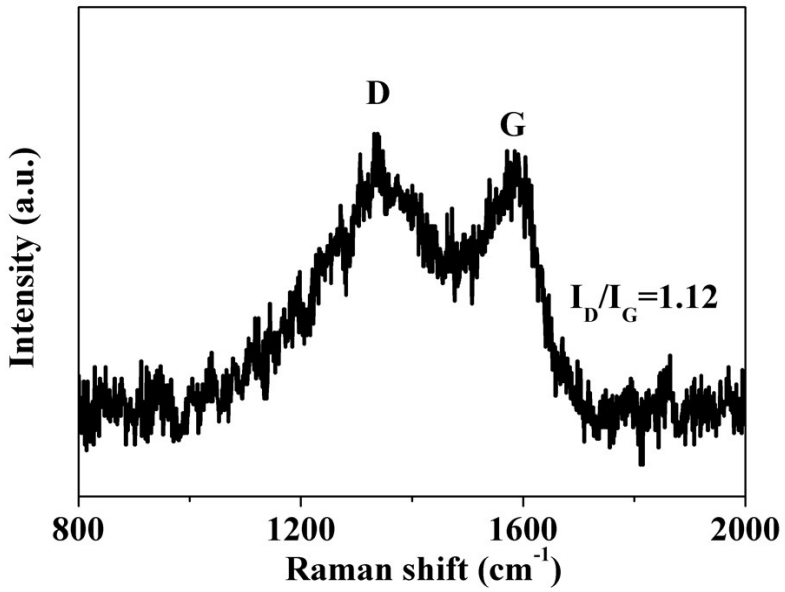

Figure S5. Raman spectra of the N-HCNs

Table S1

Table S1. Assignments and percentage composition in the C1s and N 1s regions of the N-HCNs

	functional group	binding energy (eV)	ratios (%area)
C 1s	C-C sp^2	284.6	69.7
	C=N	286.1	23.6
	C-N/C-O-C	288.2	6.7
N 1s	pyridinic-N	398.6	53.4
	pyrrolic-N	400.0	22.6
	quaternary-N	401.0	24.0

Figure S6

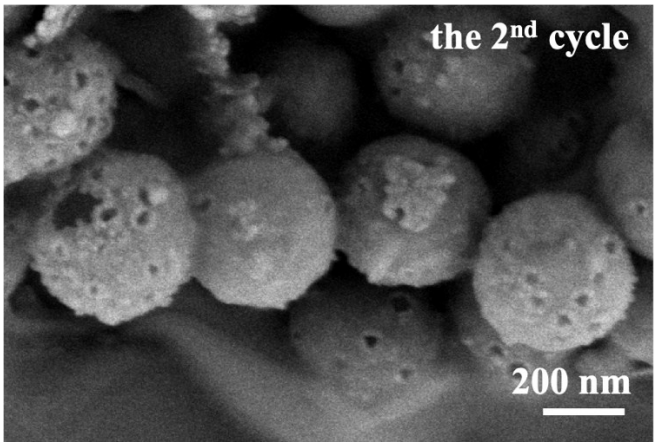

Figure S6. The SEM images of N-HCNs.

Figure S7

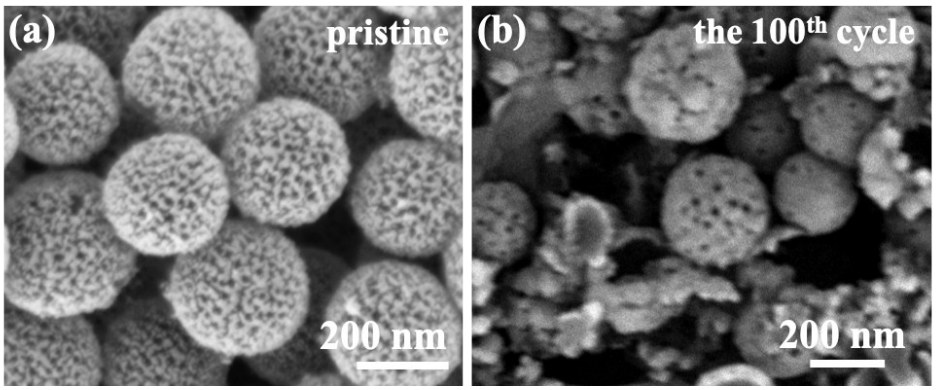

Figure S7. The SEM images of N-HCNs: (a) pristine and (b) after 100 cycles.

The morphology of the pristine and after cycling N-HCNs are carried out, as shown in Figure S7. As compared with the morphology of the pristine N-HCNs, there is no significant difference between before cycling and after cycling, except for the size of the pores. The change can be ascribed to the solid SEI on the surface of the N-HCNs, leading to low initial CE.

Figure S8

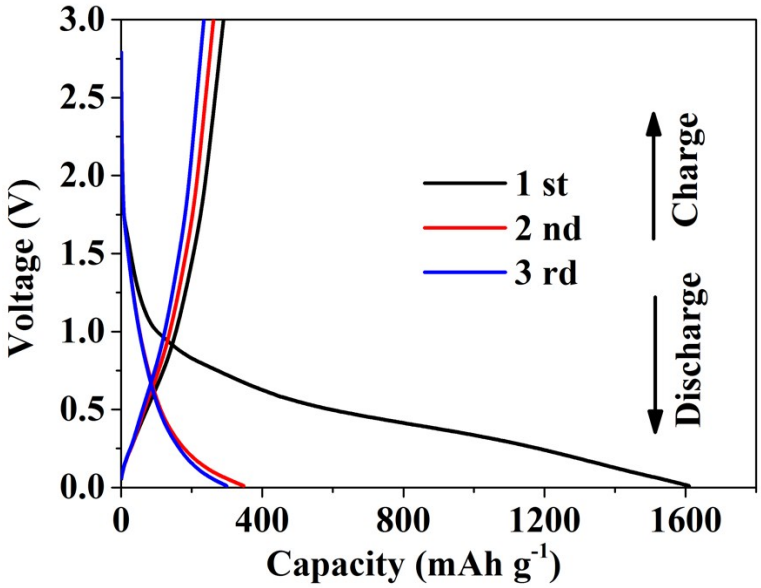

Figure S8. initial three discharge/charge profiles of N-CNs at 0.05 A g^{-1}

Figure S9

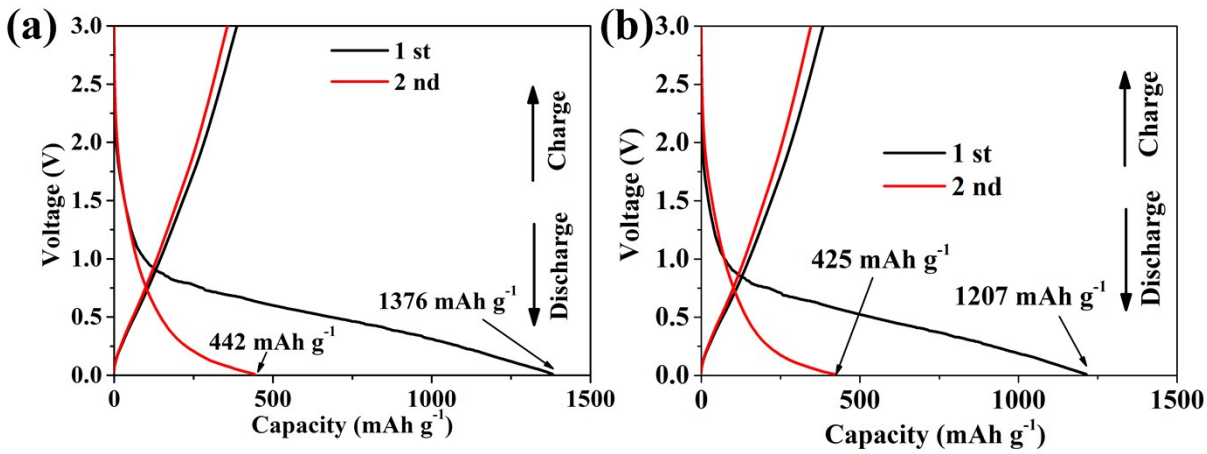

Figure S9. Initial two discharge/charge profiles of the N-HCNs based on the (a) cycle performance at 50 mA g^{-1} and (b) rate performance at 50 mA g^{-1}.

Figure S10

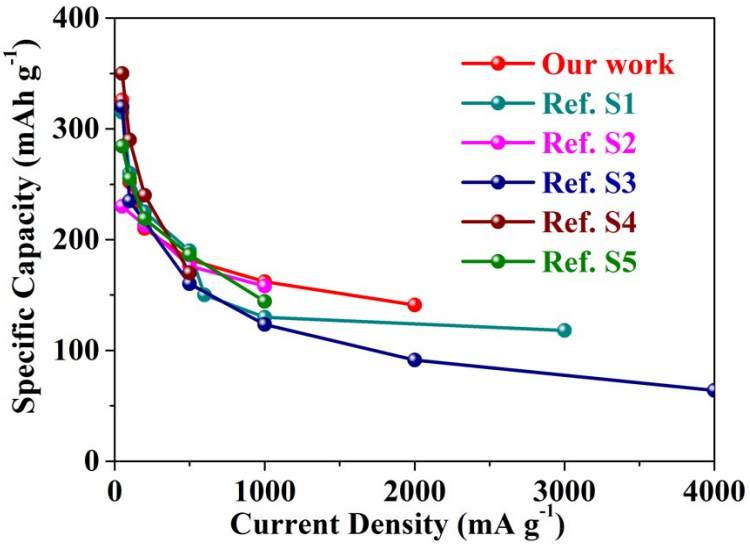

Figure S10. Comparison of rate capability of the N-HCNs and other carbonaceous materials in PIB.

Figure S11

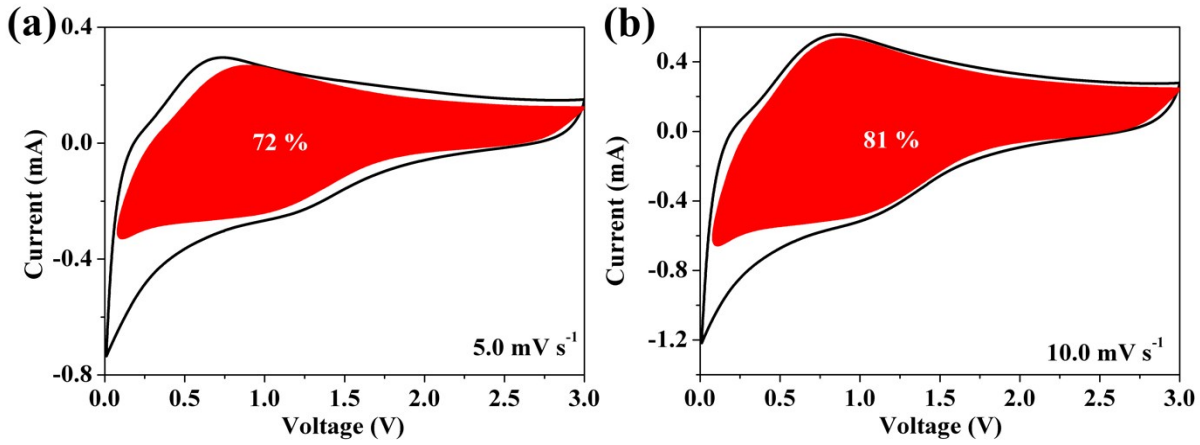

Figure S11. CV curve with the pseudocapacitive fraction shown by the red region at a scan rate of (a) 5.0 mV s^{-1} and (a) 10.0 mV s^{-1}.

Figure S12

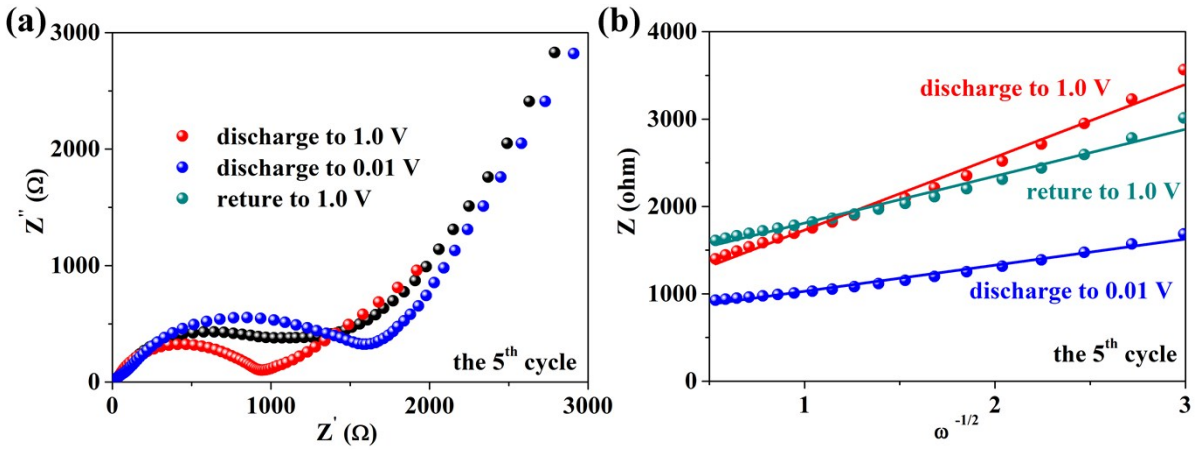

Figure S12. (e) Nyquist plots of N-HCNs at different potentials; (f) the liner relation of $\omega^{1/2}$ vs. -Z″.

Figure S13

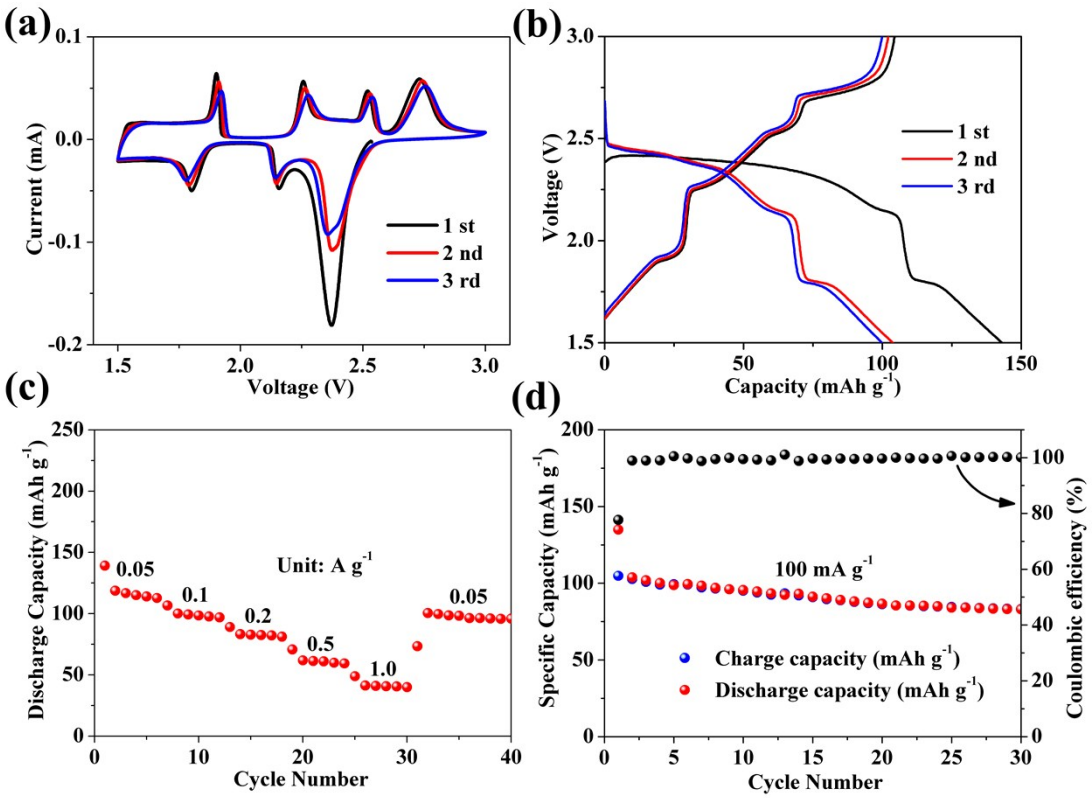

Figure S13. Electrochemical performance of commercial TiS_2 as PIBs cathodes in half cells: (a) CV curves within the voltage window of 1.5-3.0 V at a scan rate of 0.1 mV s^{-1}; (b) initial three discharge/charge profiles at 0.1 A g^{-1}; (c) rate capability of at current rates of 0.05, 0.1, 0.2, 0.5, 1.0 and 2.0 A g^{-1}; (d) cycling property at 0.1 A g^{-1}.

Figure S14

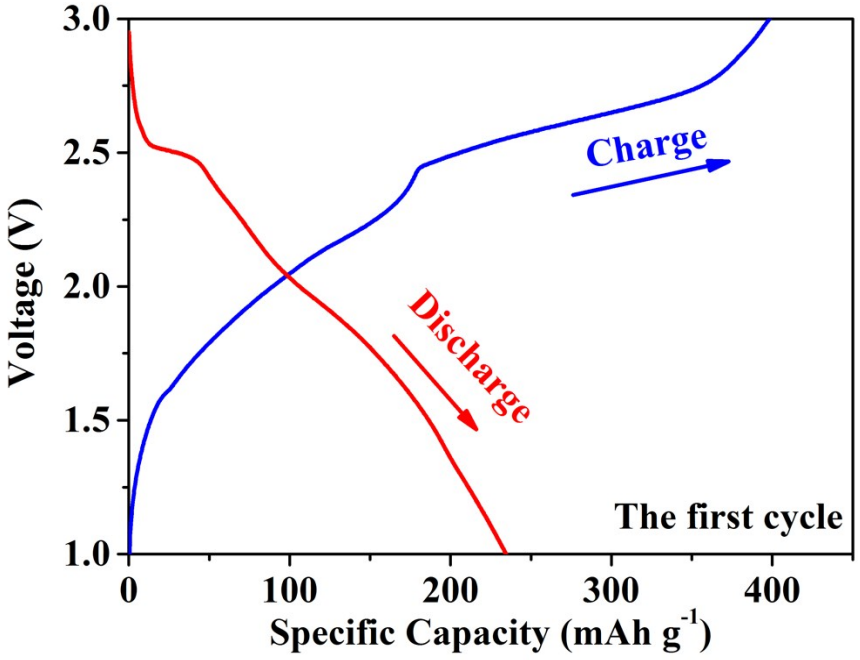

Figure S14. initial GDC profile of full-cell at 0.1 A g^{-1}

Reference:

[S1] J. Yang, Z. Ju, Y. Jiang, Z. Xing, B. Xi, J. Feng, S. Xiong, Enhanced Capacity and Rate Capability of Nitrogen/Oxygen Dual-Doped Hard Carbon in Capacitive Potassium-Ion Storage, Adv. Mater., 30(2017)1700104. https://doi.org/10.1002/adma.201700104.

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