Supporting Information

Manipulation of 2D Carbon Nanoplates with Core-Shell Structure for High Performance Potassium-Ion Batteries

Dongjun Li, [1] *Xiaolong Cheng,* [1] *Rui Xu,*[1] *Ying Wu,* [1]*Xuefeng Zhou,*[1] *Cheng Ma* [*, 1] *and Yan Yu*[*, 1, 2, 3]

[1]Hefei National Laboratory for Physical Sciences at the Microscale, Department of Materials Science and Engineering, Key Laboratory of Materials for Energy Conversion, Chinese Academy of Sciences (CAS), University of Science and Technology of China, Hefei, Anhui 230026, China. E-mail: yanyumse@ustc.edu.cn, mach16@ustc.edu.cn.

[2]State Key Laboratory of Fire Science, University of Science and Technology of China, Hefei, Anhui, 230026, China.

[3]Dalian National Laboratory for Clean Energy (DNL), Chinese Academy of Sciences (CAS), Dalian 116023, China

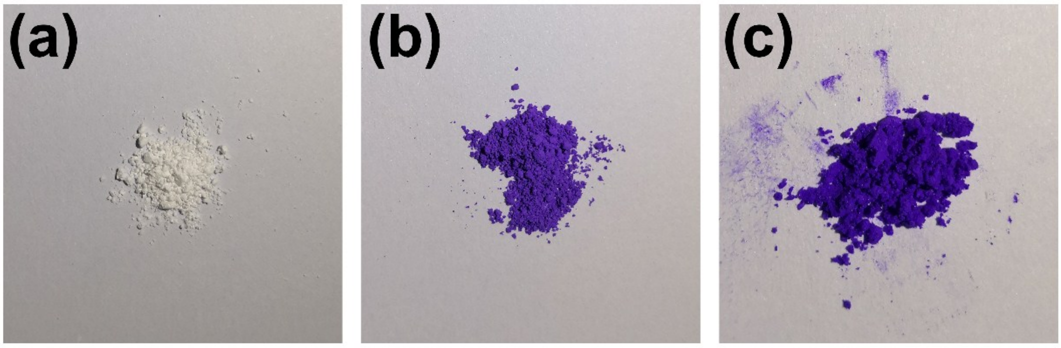

Figure S1. Photograph of (a) Zn-MOF. (b) 2D Zn-MOF@Co-MOF. (c) Co-MOF.

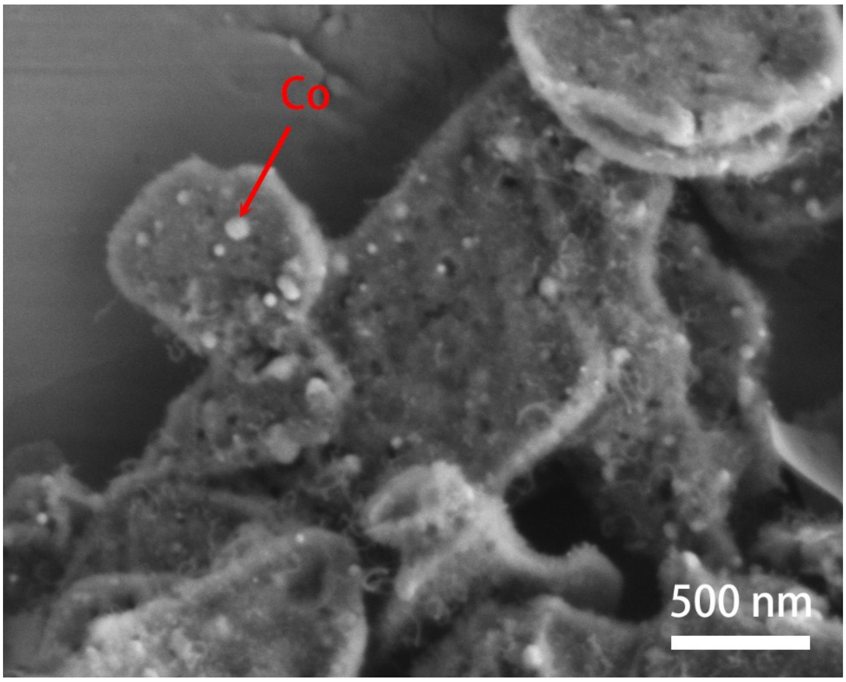

Figure S2. SEM of the AC@GC before etching.

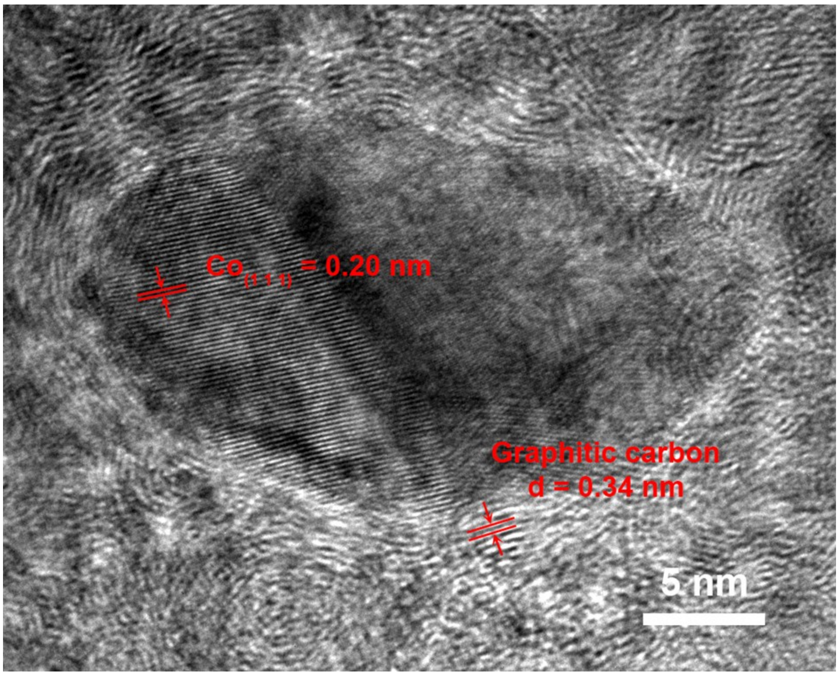

Figure S3. TEM of the AC@GC before etching.

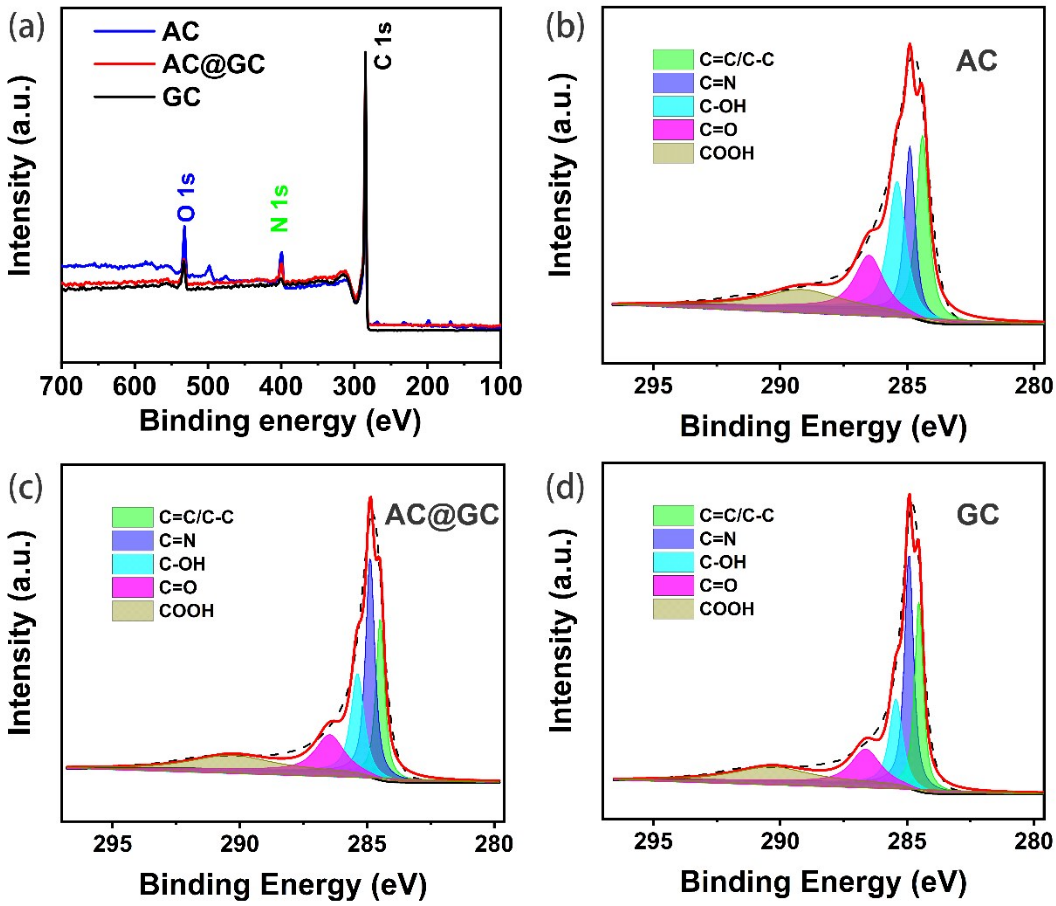

Figure S4. Global XPS profiles for the AC, the AC@GC and the GC (a) and high resolution XPS spectra of C 1s for the AC (b), the AC@GC (c), and the GC (d).

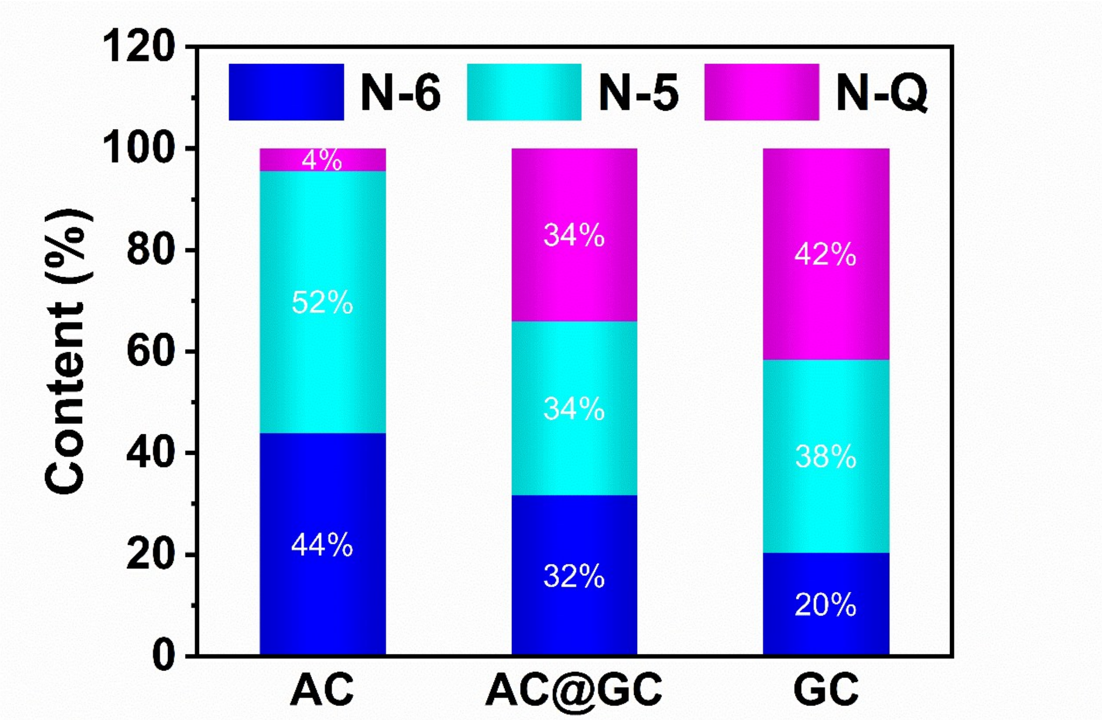

Figure S5. Schematic illustration of different nitrogen contents.

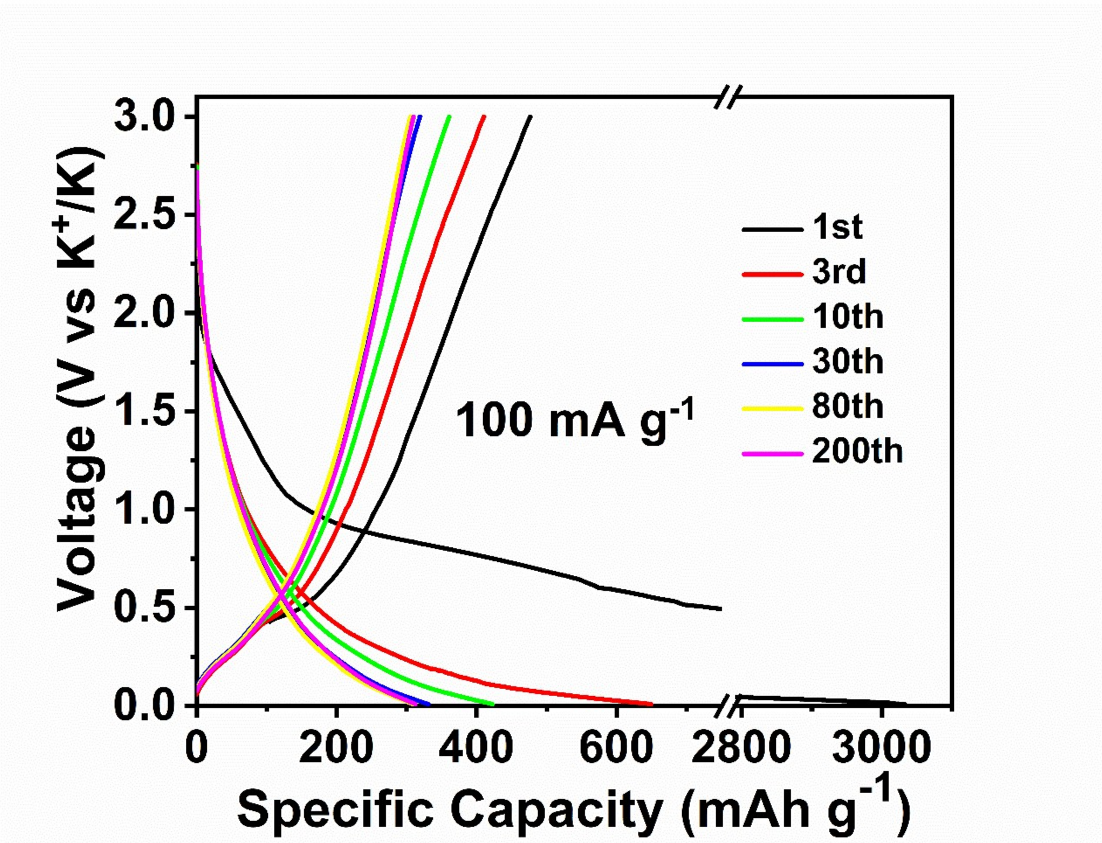

Figure S6. Charge/discharge profiles of the AC@GC at 0.1 A g^{-1}.

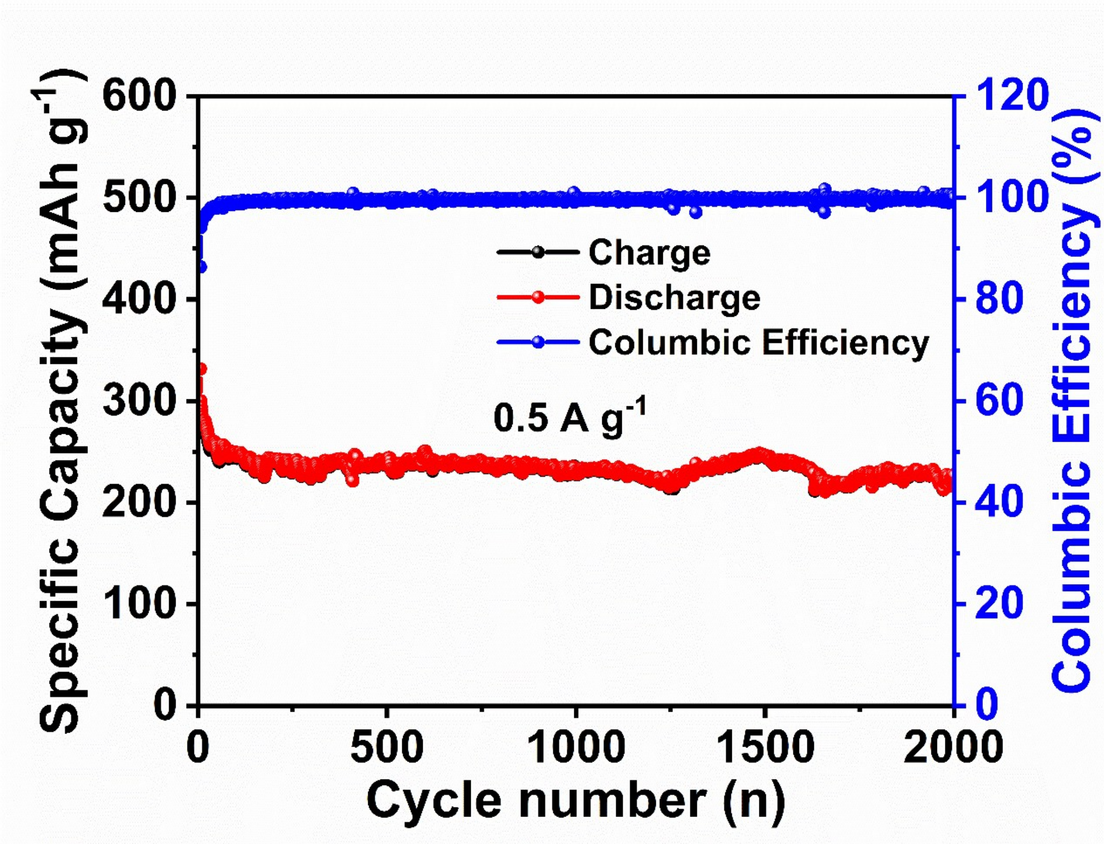

Figure S7. Long cycling performance at 0.5 A g^{-1} of the AC@GC.

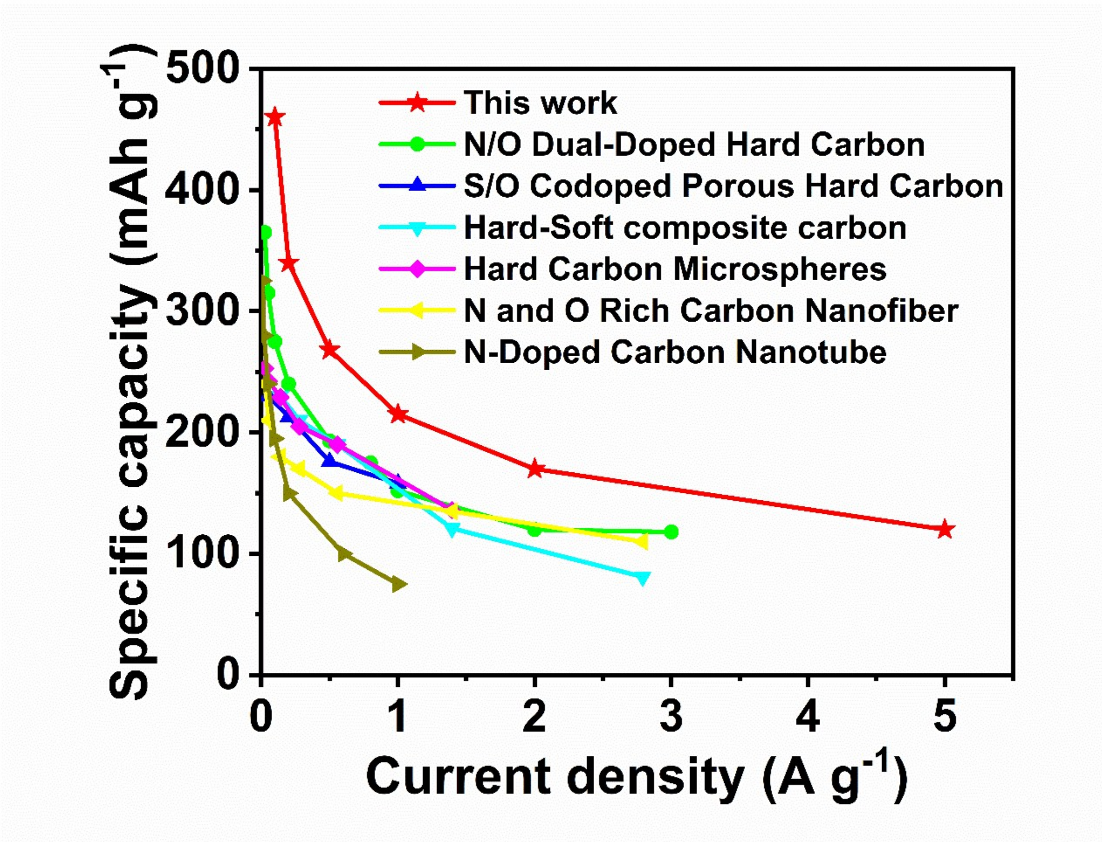

Figure S8. Comparison of rate performance of the AC@GC with other reports.

Table S1 Detailed Comparison of AC@GC with other carbon-based anodes in KIBs.

Types of materials	Rate performance		Reference in supporting information
	Specific Capacity (mAh g^{-1})	Current Density (A g^{-1})	
N/O Dual-Doped Hard Carbon	118	3	**1**
S/O Codoped Porous Hard Carbon	158	1	**2**
Hard-Soft composite carbon	81	2.8	**3**
Hard Carbon Microspheres	136	1.4	**4**
N and O Rich Carbon Nanofiber	110	2.8	**5**
N-Doped Carbon Nanotube	75	1	**6**
AC@GC	**120**	**5**	**This work**

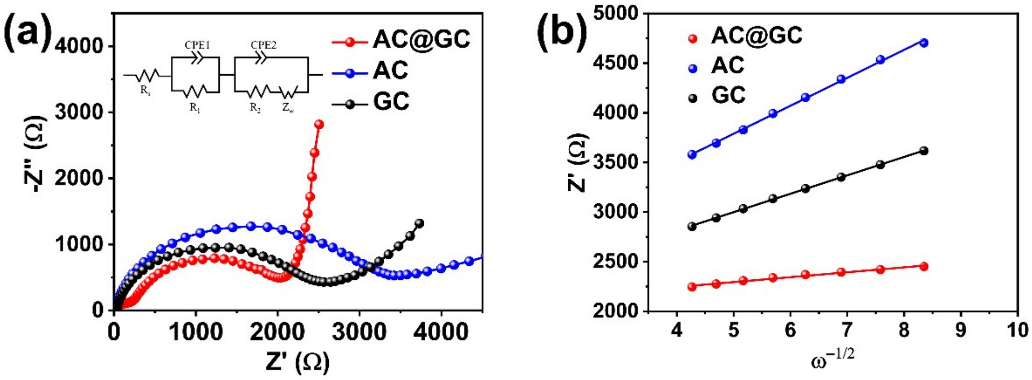

Figure S9. (a) EIS curves and the corresponding equivalent circuit (inset of (a)) and (b) The linear fits of the Z' versus $\omega^{-1/2}$ in the low-frequency region of the AC, the AC@GC and the GC.

Reference:

1. J. Yang, Z. Ju, Y. Jiang, Z. Xing, B. Xi, J. Feng and S. Xiong, *Adv Mater*, 2018, 30, 1700104.

2. M. Chen, W. Wang, X. Liang, S. Gong, J. Liu, Q. Wang, S. Guo and H. Yang,

Advanced Energy Materials, 2018, 8, 1800171.

3. Z. L. Jian, S. Hwang, Z. F. Li, A. S. Hernandez, X. F. Wang, Z. Y. Xing, D. Su and X. L. Ji, *Advanced Functional Materials*, 2017, 27, 1700324.
4. Z. L. Jian, Z. Y. Xing, C. Bommier, Z. F. Li and X. L. Ji, *Advanced Energy Materials*, 2016, 6, 1501874.
5. R. A. Adams, J. M. Syu, Y. Zhao, C. T. Lo, A. Varma and V. G. Pol, *ACS Appl Mater Interfaces*, 2017, 9, 17872-17881.
6. X. Zhao, Y. Tang, C. Ni, J. Wang, A. Star and Y. Xu, *ACS Applied Energy Materials*, 2018, 1, 1703-1707.