Electronic Supplementary Material (ESI) for Nanoscale.

Supporting Information for

Hollow Carbon Nanofibers as High-Performance Anode Materials for Sodium-Ion Batteries

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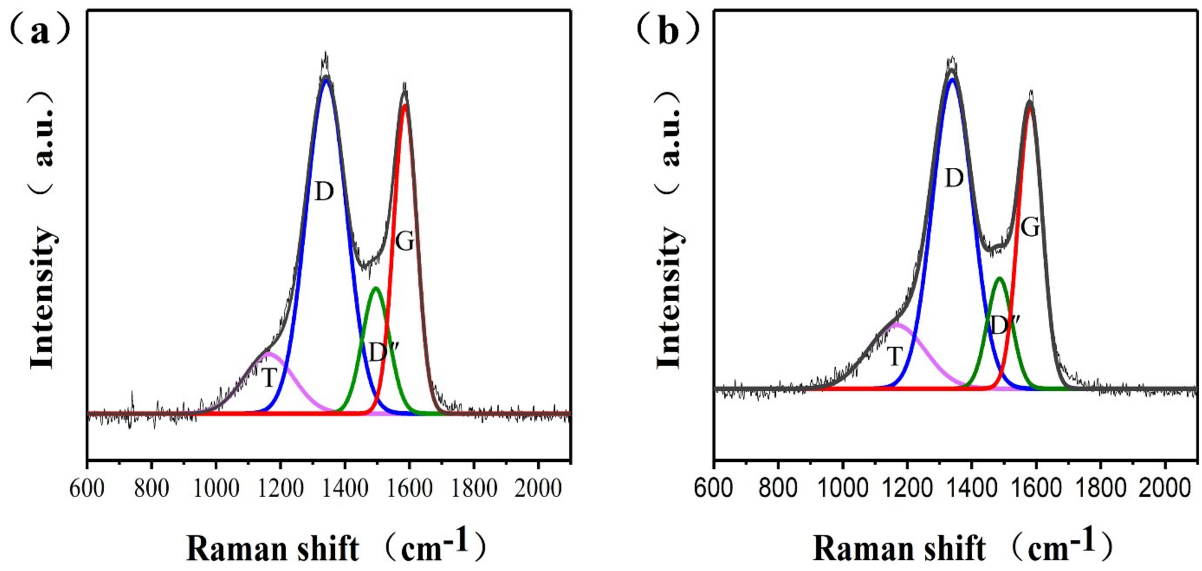

Fig. S1. Fitted of Raman spectra of (a) HCNFs, (b) CNPs.

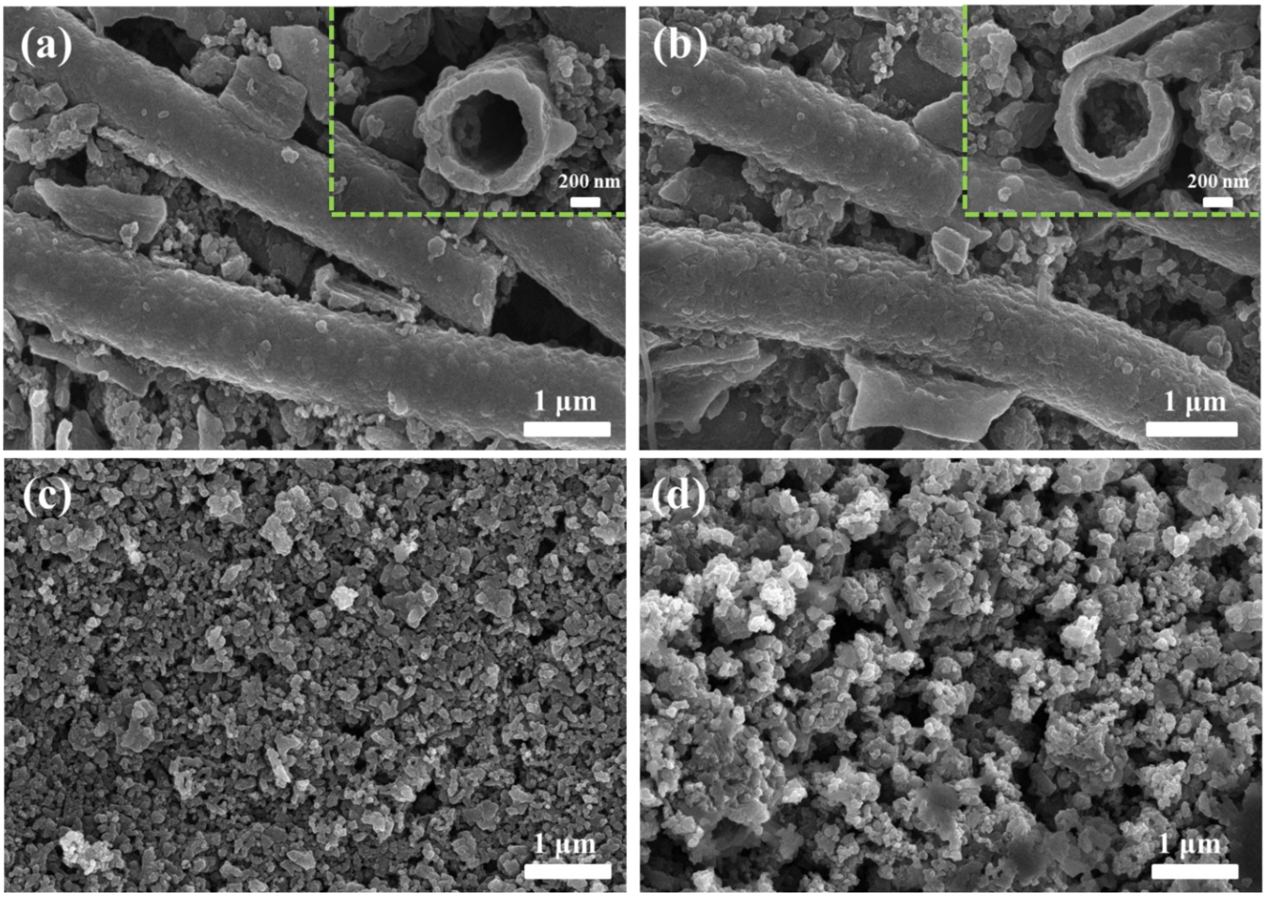

Fig. S2. FESEM images of HCNFs electrode (a) before and (b) after cycles for 450 cycles; FESEM images of CNPs electrode (c) before and (d) after cycles.

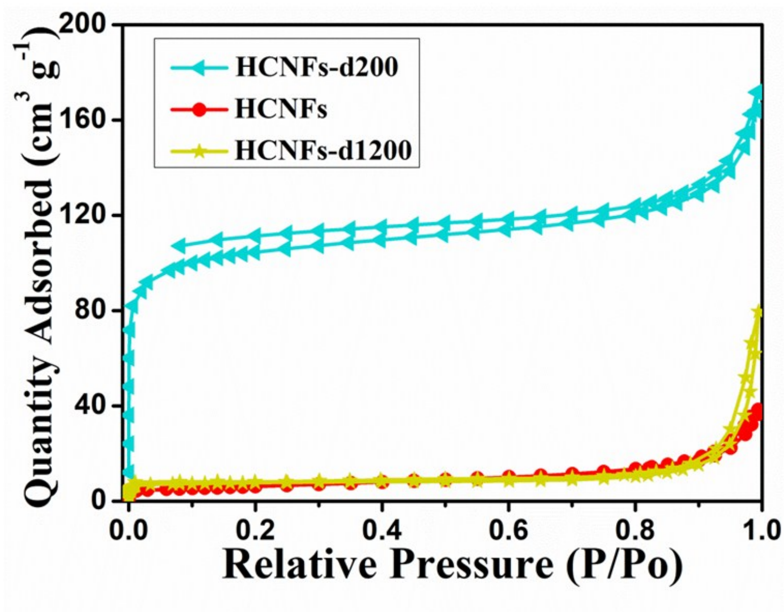

Fig.S3. N_2 adsorption–desorption isotherms of HCNFs-d200, HCNFs and HCNFs-d1200.

Table S1. Comparisons of HCNFs versus other hard carbon anodes for SIBs.

Samples	ICE (%)	Cyclic stability (capacity retention (%))	Ref.
Hard carbon nanoparticles	51.6	207 mA h g^{-1} at 50 mA g^{-1} for 500 cycles (77)	1
HCNWs	50.5	251 mA h g-1 at 50 mA g-1 for 400 cycles (82.2)	2
Nitrogen-rich mesoporous carbon	54.2	252.9 mA h g-1 at 50 mA g-1 for 100 cycles (82.9) 110.7 mA h g-1 at 500 mA g-1 for 800 cycles	3
nitrogen-doped carbon/graphene	50	270 mA h g-1 at 50 mA g-1 for 200 cycles (89)	4
N-doped porous HCNFs	32	160 mA h g-1 at 50 mA g-1 for100 cycles (50.2)	5
N-doped CNTs	61.2	175.5 mA h g-1 at 200 mA g-1 after 300 cycles (76.0)	6
Core-sheath structured porous CNFs	29.4	240 mA h g-1 at 100 mA g-1 after 100 cycles 148.8 mA h g-1 at 500 mA g-1 after 400 cycles (46.7)	7
Porous CNFs	38.8%	254 mA h g-1 at 100 mA g-1 after 100 cycles (86.7)	8
Lotus seedpod-derived HC[9]	50.4	161.5 mA h g-1 at 200 mA g-1 after 500 cycles (80)	9
HCNFs	70.4	266 mA h g-1 at 100 mA g-1 after 450 cycles (96.4) 85 mA h g-1 at 1.6 A g-1 after 5000 cycles (70)	This work

Reference

1 L. Xiao, Y. Cao, W. A. Henderson, M. L. Sushko, Y. Shao, J. Xiao, W. Wang, M. H. Engelhard, Z. Nie and J. Liu, *Nano Energy*, 2016, **19**, 279-288.

2 Y. Cao, L. Xiao, M. L. Sushko, W. Wang, B. Schwenzer, J. Xiao, Z. Nie, L. V. Saraf, Z. Yang and J. Liu, *Nano Lett.*, 2012, **12**, 3783-3787.

3 H. Liu, M. Jia, N. Sun, B. Cao, R. Chen, Q. Zhu, F. Wu, N. Qiao and B. Xu, *ACS Appl. Mater. Interfaces,* 2015, **7**, 27124-27130.

4 H. Liu, M. Jia, B. Cao, R. Chen, X. Lv, R. Tang, F. Wu and B. Xu, *Journal of Power Sources*, 2016, **319**, 195-201.

5 L. Zeng, W. Li, J. Cheng, J. Wang, X. Liu and Y. Yu, *RSC Adv.*, 2014, **4**, 16920-16927.

6 Q. Fan, W. Zhang, J. Duan, K. Hong, L. Xue and Y. Huang, *Electrochimica Acta*, 2015, **174**, 970-977.

7 Z. Zhang, J. Zhang, X. Zhao and F. Yang, *Carbon*, 2015, **95**, 552-559.

8 J. Zhu, C. Chen, Y. Lu, Y. Ge, H. Jiang, K. Fu and X. Zhang, *Carbon*, 2015, **94**, 189-195.

9 F. Wu, M. Zhang, Y. Bai, X. Wang, R. Dong and C. Wu, *ACS Appl. Mater. Interfaces,* 2019, **11**, 12554-12561.