Electronic Supplementary Material (ESI) for Journal of Materials Chemistry A.

Supporting Information

N-doped carbon encapsulating Bi nanoparticles derived from metal-organic framework for high-performance sodium-ion batteries

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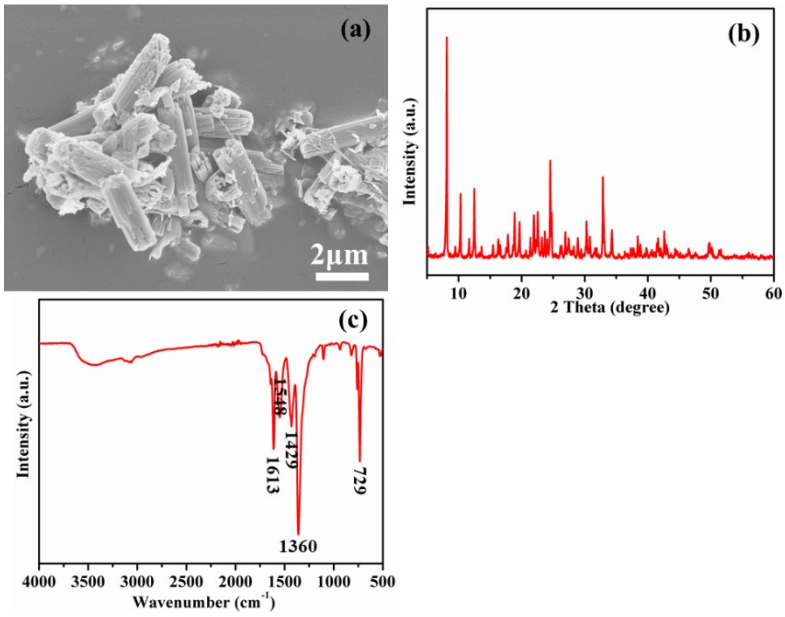

Fig. S1 (a) SEM image, (b) XRD pattern, and (c) IR spectrum of Bi-MOF.

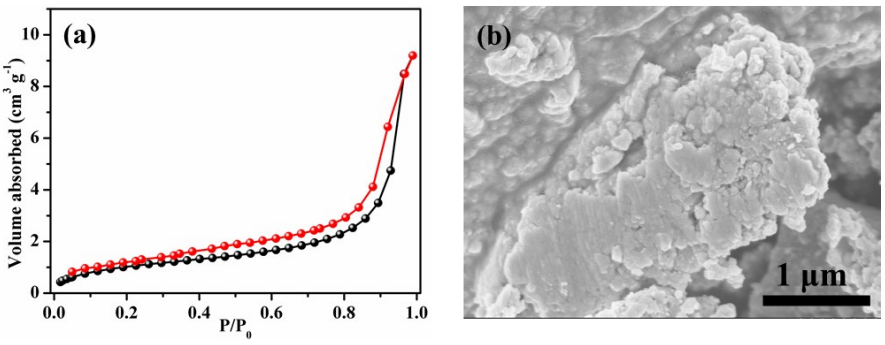

Fig. S2 (a) The N_2 adsorption-desorption isotherms and (b) SEM image of pure Bi.

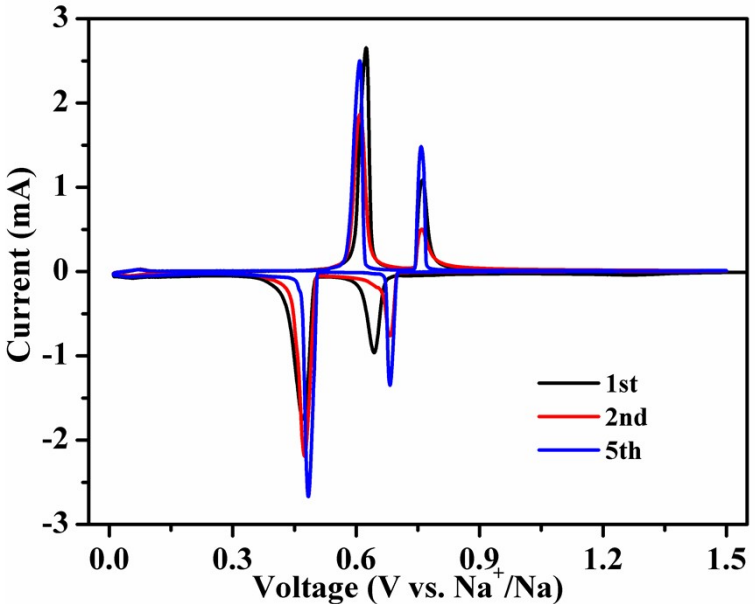

Fig. S3 CV curves at 0.2 A g^{-1} of pure Bi.

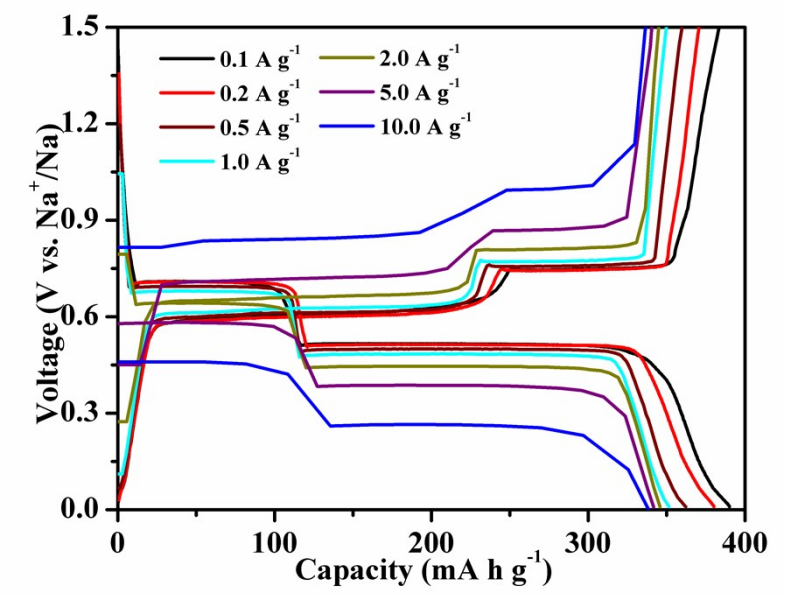

Fig. S4 Charge-discharge curves of the Bi@NC at different current densities.

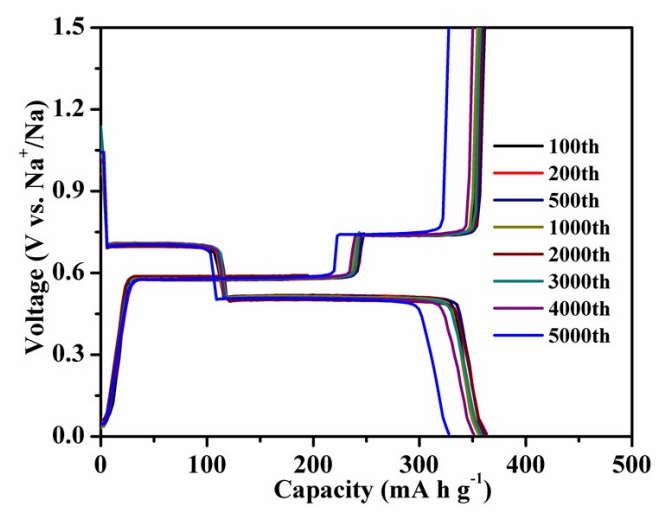

Fig. S5 Selected charge/discharge curves of Bi@NC at 2.0 A g^{-1}.

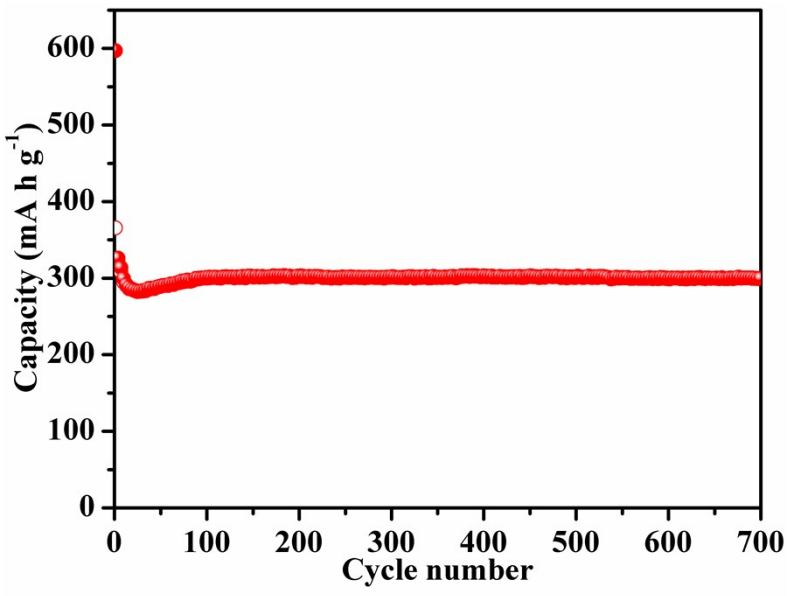

Fig. S6 The long-term cycling performance of Bi@NC with a high mass loading of 3.5 mg cm^{-2} at 2.0 A g^{-1}.

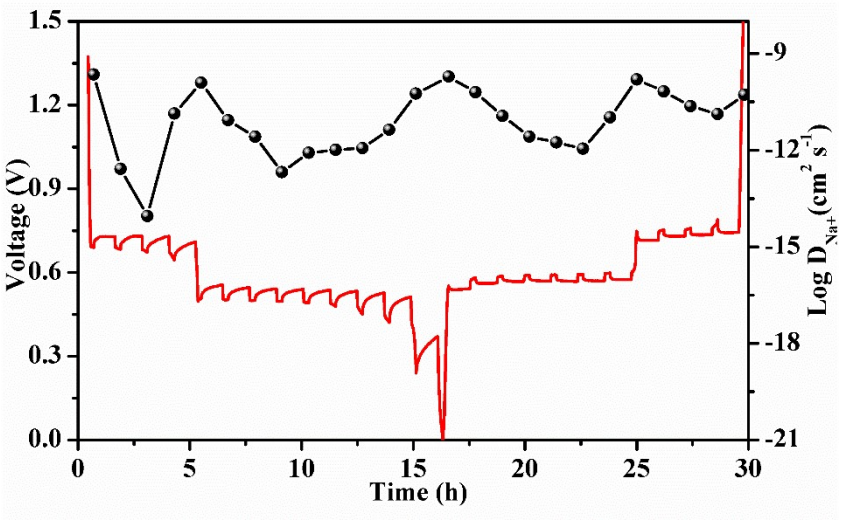

Fig. S7 GITT curves during the second discharge and charge process of Bi@NC electrode at 0.2 A g^{-1}.

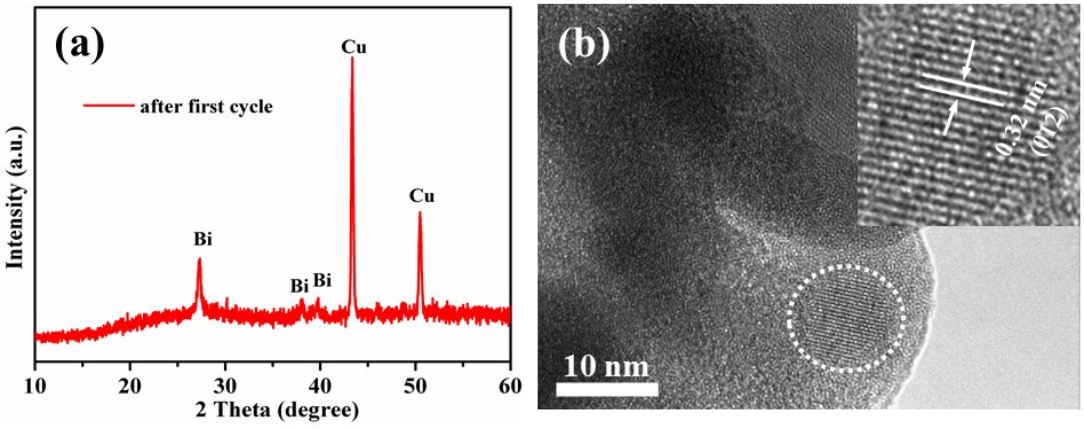

Fig. S8 XRD pattern and TEM image of Bi/NC after first cycle.

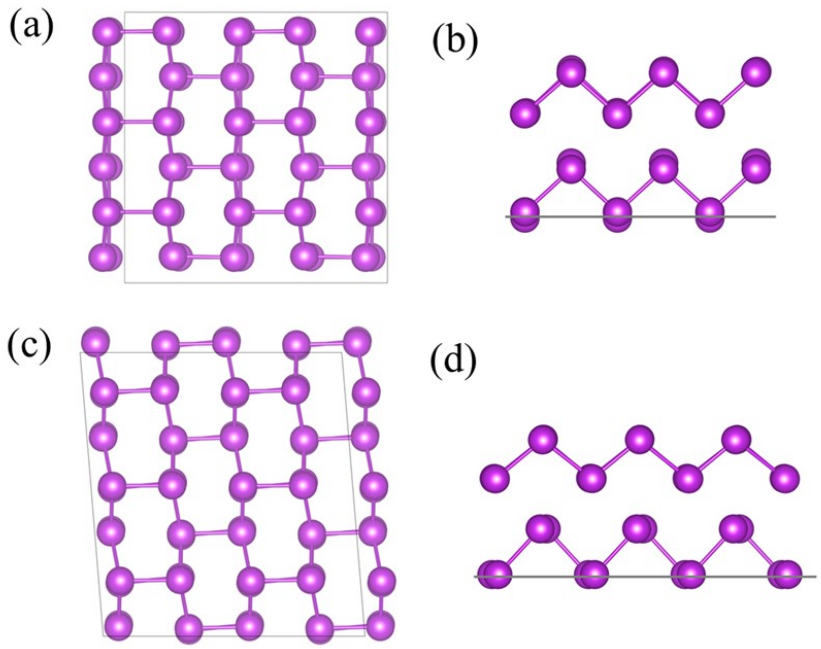

Fig. S9 (a) Top view and (b) side view of Bi (104) surface; (c) top view, and (d) side view of Bi (110) surface.

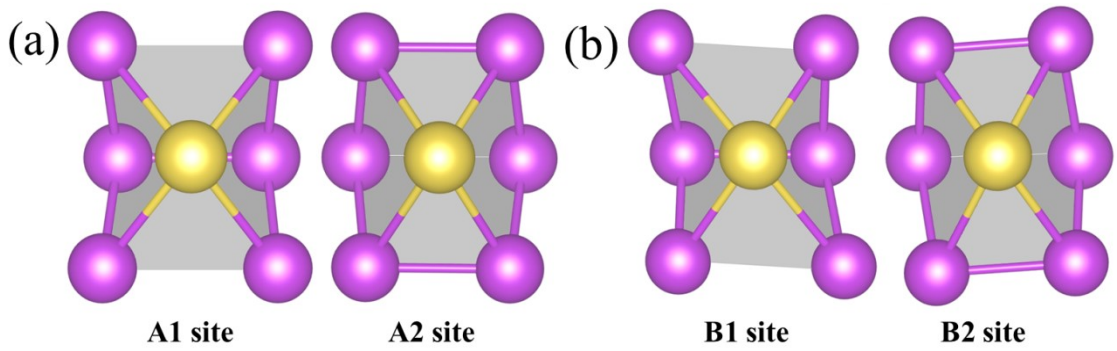

Fig. S10 Possible Na locations (in yellow) on bismuth (a) (104) surface and (b) (110) surface.

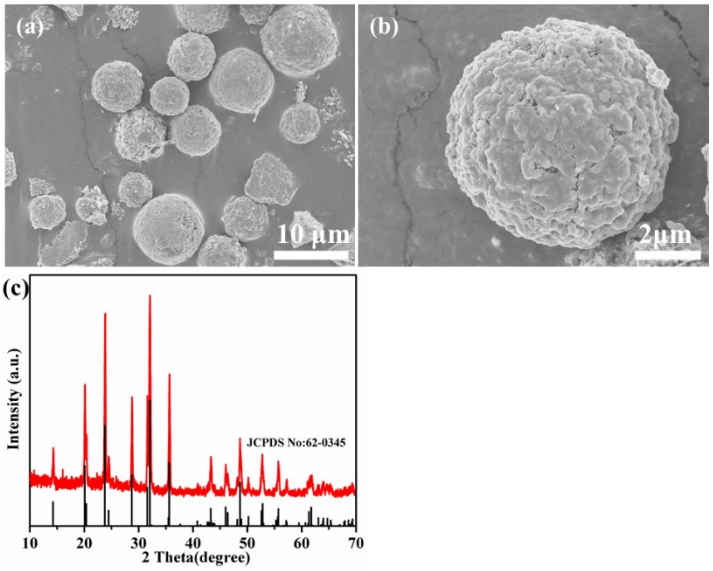

Fig. S11 SEM images and XRD pattern of $Na_3V_2(PO_4)_3$(NVP).

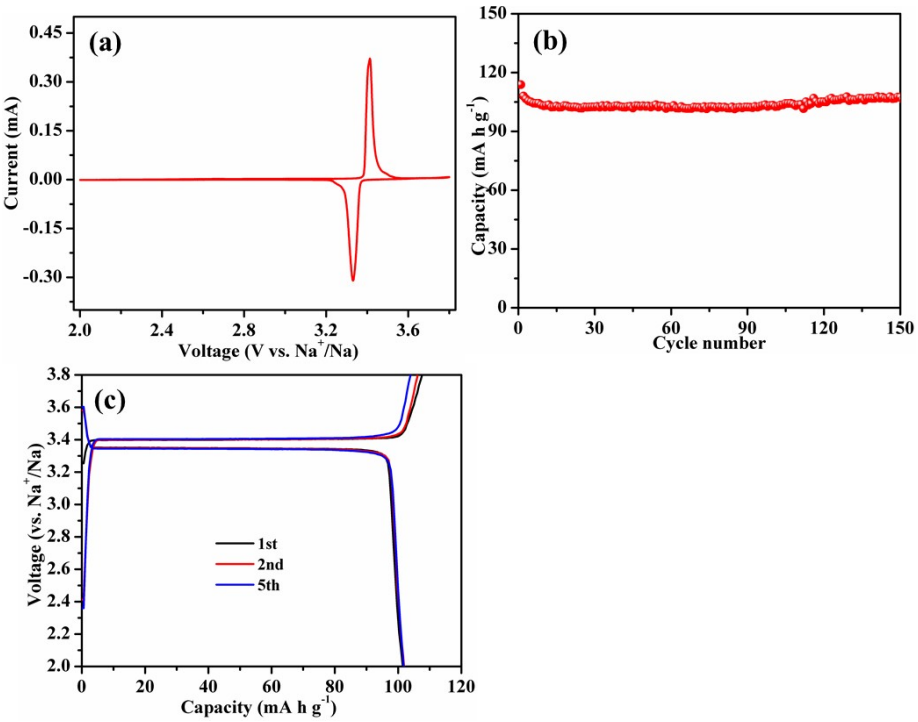

Fig. S12 Electrochemical performance of NVP: (a) CV curves at 0.2 mV s^{-1}, (b) cycling performance, and (c) galvanostatic charge/discharge curves at 1.0 A g^{-1}.

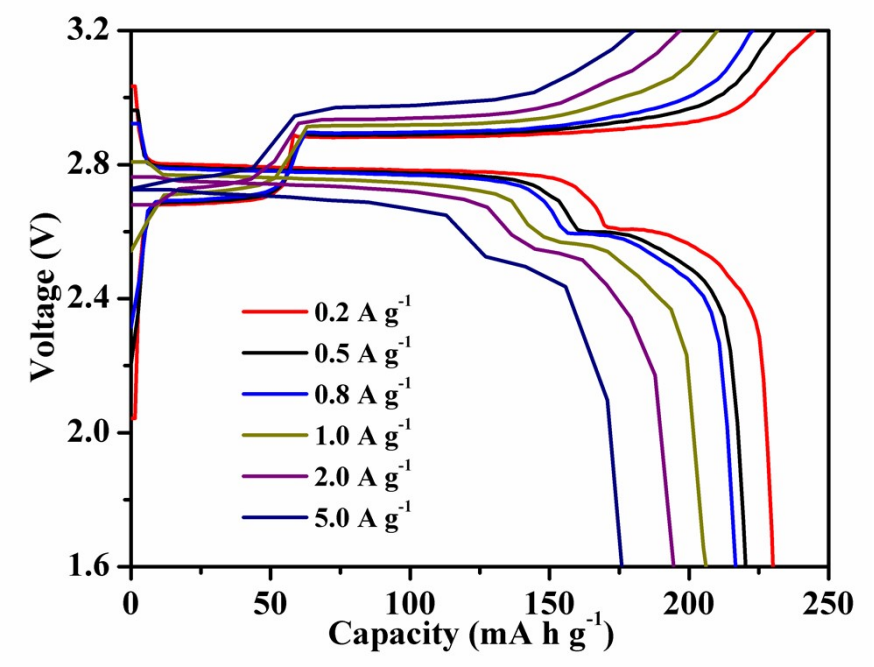

Fig. S13 Charge/discharge curves of NVP // Bi@NC full cell at different current densities.

Table S1. Comparison of the electrochemical properties of Bi based anode materials for SIBs

Materials	Voltage window	Current rate (mA g^{-1})	Capacity retention (mA h g^{-1})	Cycle number	References
Bi@NC	**0.01-1.5**	**200** **2000**	**384.8** **326.9**	**400** **5000**	**Our work**
Bi@N-C	0.01-1.5	1000 10000	300 235	400 2000	*Adv. Funct. Mater.,* 2019, **29**, 1809195
Bi/C	0.1-1.8	100 5000	310 270	100 1000	*Adv. Energy Mater.,* 2020, 2001418
Bi@3DGFs	0.01-1.8	10000	185.2	2000	*J. Mater. Chem. A,* 2019, **7**, 4913
Bi@C	0.01-1.5	8000	265	30000	*Adv. Mater.,* 2019, **31**, 1904771
Bi@Void@C-2	0.01-1.5	1000 20000	253 198	500 10000	*Nano Lett.,* 2020, **20,** 758
$Bi_{0.75}Sb_{0.25}$	0.01-1.5	250 500	334 284	200 2000	*ACS Nano,* 2020, **14**, 9117
$C_{PVP+C2H2}$/Bi/rGO	0.01-2.0	2000 5000	382.6 327.6	250 1200	*Electrochim. Acta,* 2021, **365**, 137379
Bi@N−C	0.1-2.1	50 1000	400 302	100 1000	*Nano Lett.,* 2019, **19**, 1998
Bi@ Graphite	0.01-1.8	160 3200	160 /	/ 10000	*Energy Environ. Sci.,* 2018, **11**, 1218
Bi	0.01-2.2	400	389	2000	*Adv. Mater.,* 2017, 1702212
Bi–C/CF	0.1-2.0	100 500	550 /	/ 500	*Adv. Sci.,* 2019, **6**, 1900162