Electronic Supplementary Material (ESI) for Materials Chemistry Frontiers.

Accommodating sodium into three-dimensional hosts with a nanoscale sodiophilic layer towards stable pre-stored Na metal anodes

Juli Liang, Wenwei Wu, Yang Chao, Yilong Li, Junfei Wu, Yulu Xie, Xuehang Wu*

Guangxi Key Laboratory of Processing for Non-ferrous Metals and Featured Materials, School of Chemistry and Chemical Engineering, Guangxi University, Nanning 530004, PR China

Corresponding author. E-mail: xhwu@gxu.edu.cn (X. Wu)

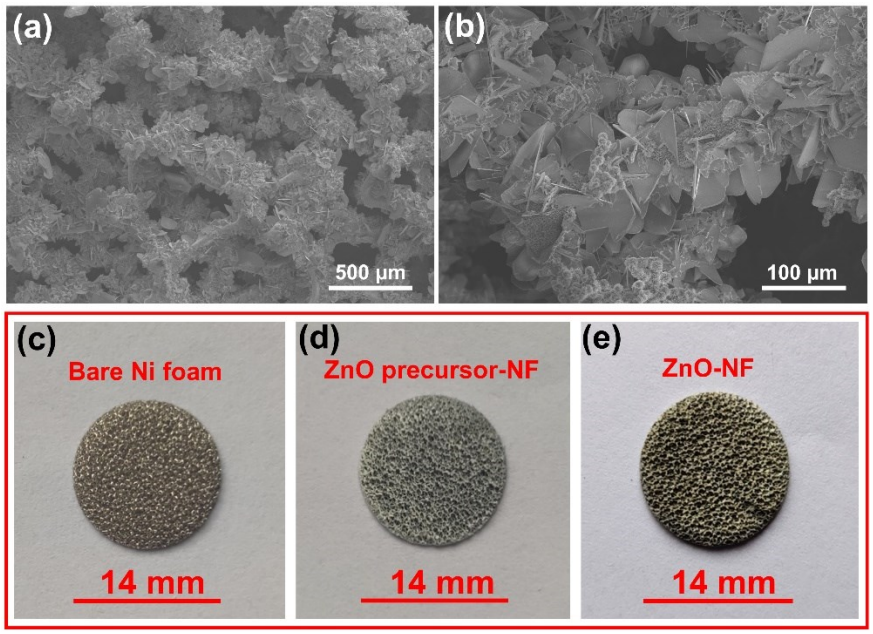

Fig. S1. (a,b) SEM images of ZnO precursor-NF. Digital images of (c) bare Ni foam, (d) ZnO precursor-NF, and (e) ZnO-NF.

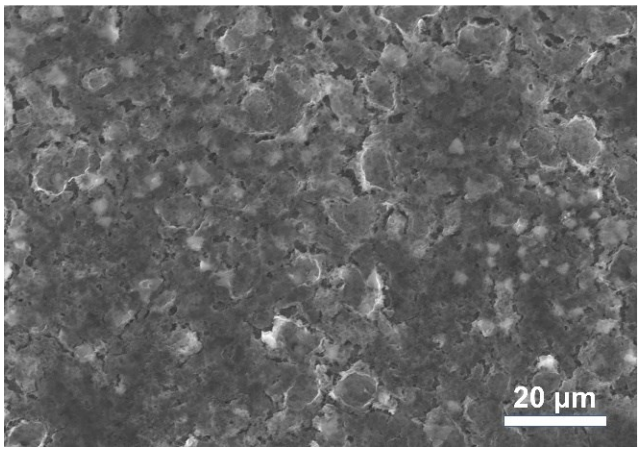

Fig. S2. SEM image of Na-NF.

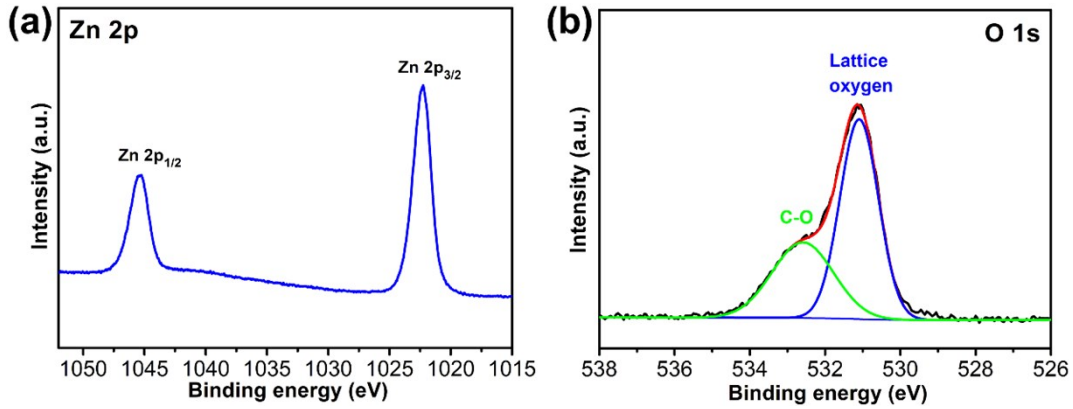

Fig. S3. High-resolution (a) Zn 2p and (b) O 1s XPS spectra of ZnO-NF.

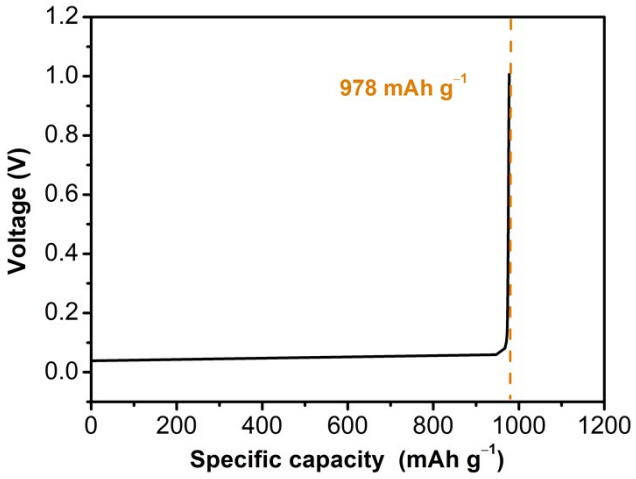

Fig. S4. Galvanostatic stripping voltage profile of Na-Zn-NF. The current density was 1 mA cm^{-2} and the cut-off voltage was 1.0 V.

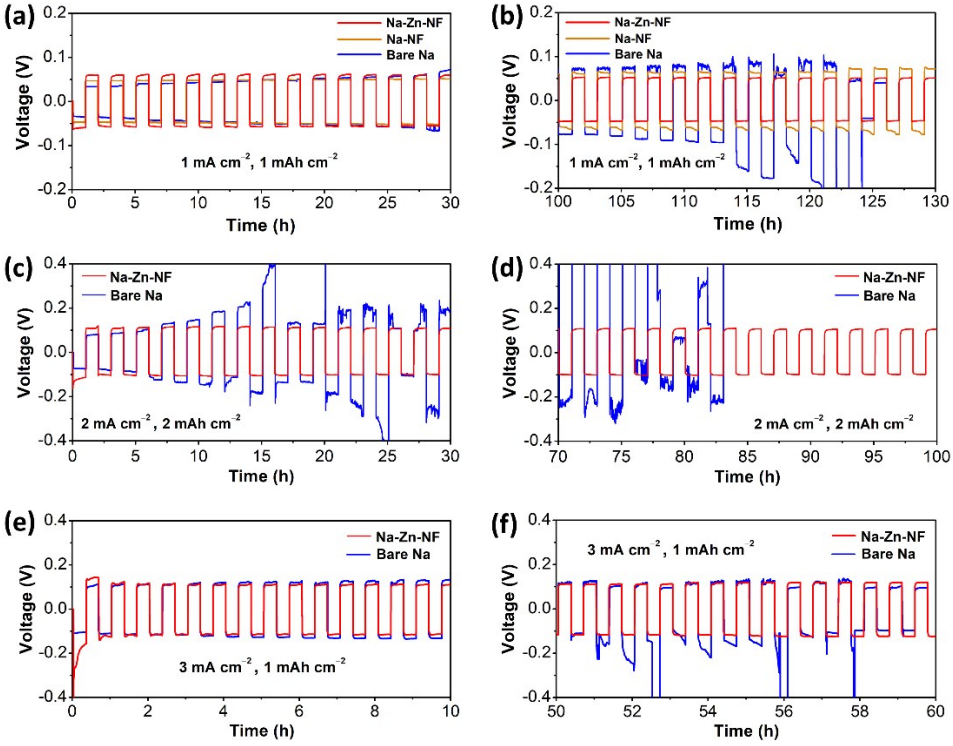

Fig. S5. (a,b) Enlarged voltage profiles of the Na-Zn-NF, Na-NF, and bare Na symmetric cells at a current density of 1 mA cm^{-2} with a capacity of 1 mAh cm^{-2}. Enlarged voltage profiles of the Na-Zn-NF and bare Na symmetric cells (c,d) at a current density of 2 mA cm^{-2} with a capacity of 2 mAh cm^{-2} and (e,f) at a current density of 3 mA cm^{-2} with a capacity of 1 mAh cm^{-2}.

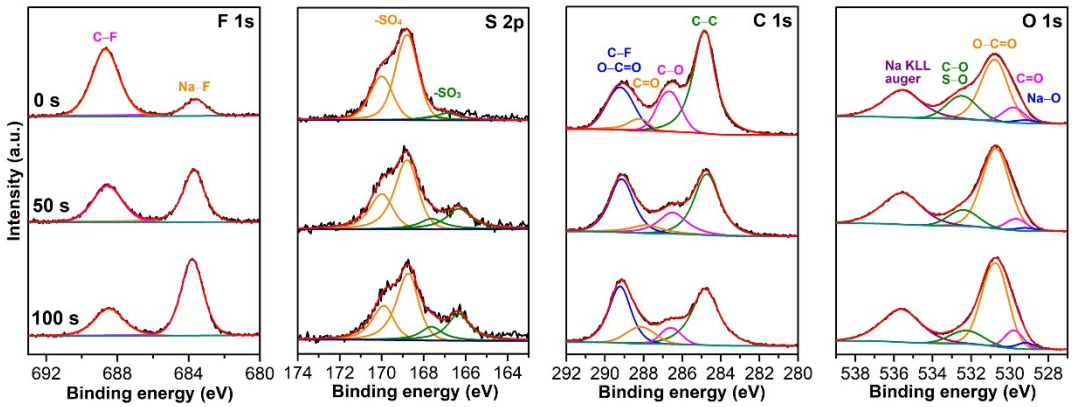

Fig. S6. F 1s, S 2p, C 1s, and O 1s XPS spectra of the cycled Na-NF before (0 s) and after etching for 50 s and 100 s.

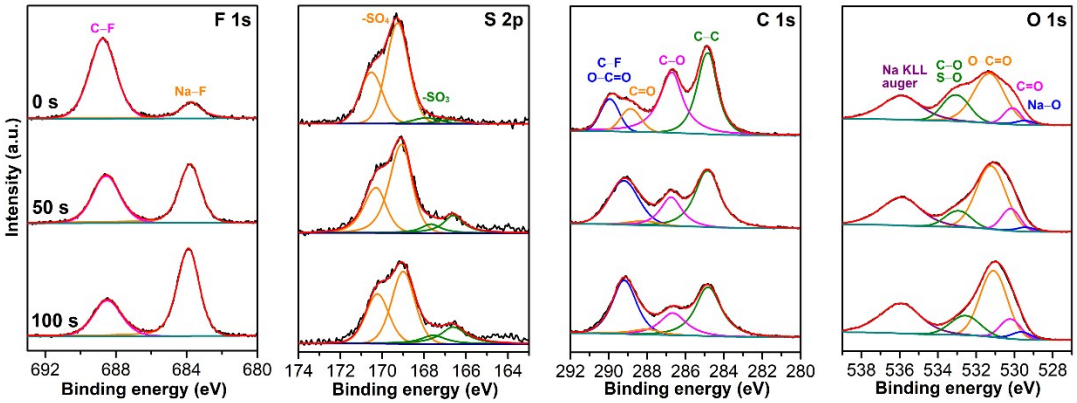

Fig. S7. F 1s, S 2p, C 1s, and O 1s XPS spectra of the cycled bare Na before (0 s) and after etching for 50 s and 100 s.

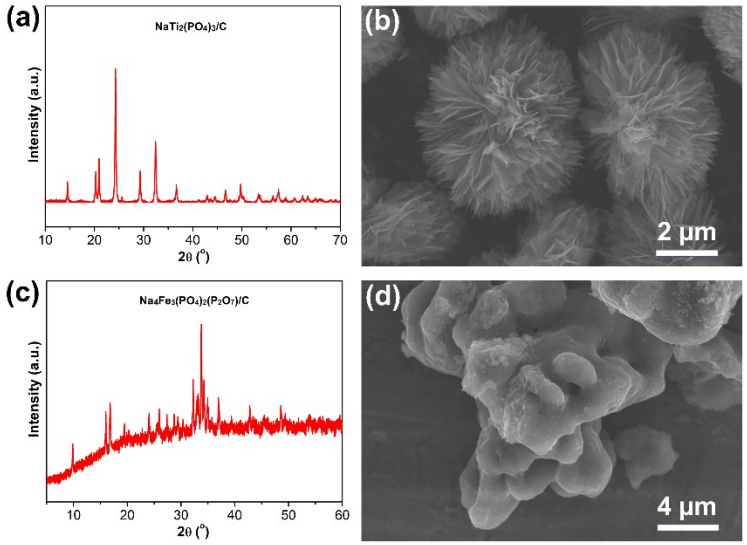

Fig. S8. (a) XRD pattern and (b) SEM image of $NaTi_2(PO_4)_3$/C. (c) XRD pattern and (d) SEM image of $Na_4Fe_3(PO_4)_2(P_2O_7)$/C.

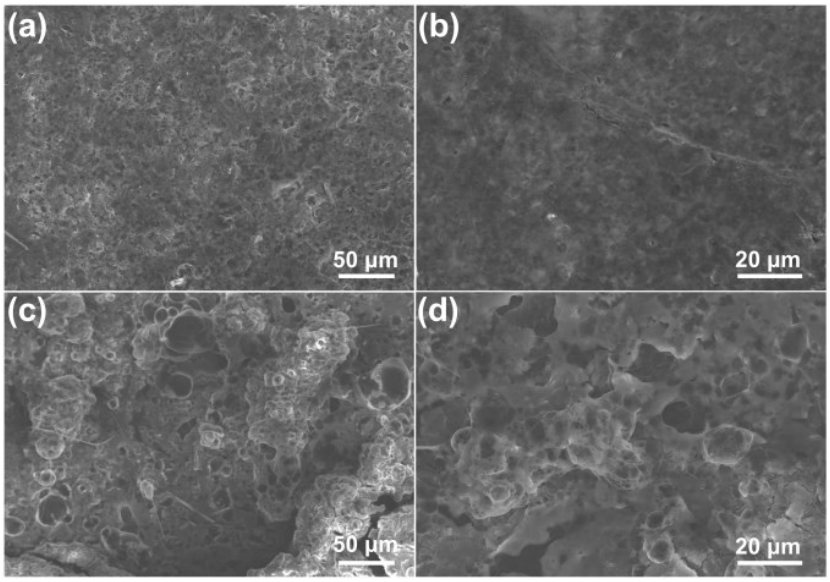

Fig. S9. SEM images of the Na-Zn-NF after 1000 cycles and the bare Na after 600 cycles in full cells.

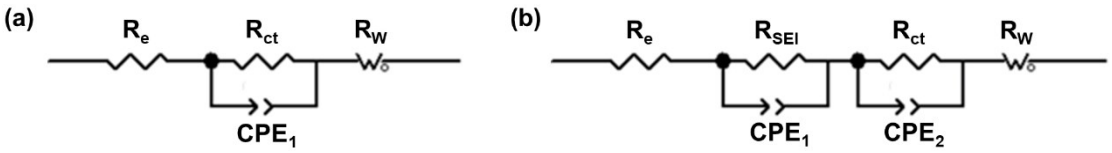

Fig. S10. Equivalent circuits used to fit the Nyquist plots of the Na-Zn-NF, Na-NF, and bare Na symmetric cells (a) before and (b) after 50 cycles.

Table S1. Masses of ZnO-NF, Na-Zn-NF, and Na in Na-Zn-NF. Three representative groups of samples are selected.

	ZnO-NF	Na-Zn-NF	Na in Na-Zn-NF
Sample 1	53.1 mg	102.4 mg	49.3 mg
Sample 2	53.4 mg	103.1 mg	49.7 mg
Sample 3	53.3 mg	102.7 mg	49.4 mg
Average	53.3 mg	102.7 mg	49.5 mg

Table S2. Comparison of cycling performance between Na-Zn-NF and other state-of-the-art Na metal anodes.

Materials	Capacity (mAh cm^{-2})	Current density (mA cm^{-2})	Cycles	Time (h)	Electrolyte	Ref.
Na-Zn-NF	**1** **2**	**1** **2**	**> 1000** **> 550**	**> 2000** **> 1100**	**1 M $NaCF_3SO_3$ in diglyme**	**This work**
Na carbonized wood	1	1	> 250	> 500	1 M $NaClO_4$ in EC/DEC	1
Na/Ni foam	1	1	> 300	> 600	1 M $NaPF_6$ in DEGDME	2
Na@oxygen-treated Cu foam	1 1	0.5 1	> 100 > 100	> 400 > 200	1 M $NaClO_4$ in EC/DEC	3
Na/3D flexible carbon Felt	2	1	> 120	> 480	1 M $NaClO_4$ in EC/PC	4
Na@CP-NCNTs	1 1	1 3	> 175 > 270	> 350 > 180	1 M $NaPF_6$ in EC/PC	5
Na-carbon cloth composite	1	1	> 100	> 200	1 M $NaCF_3SO_3$ in DME	6
Na-carbon fiber	1	0.5	> 150	> 300	1 M $NaClO_4$ in EC/DMC/EMC with 5% FEC	7
Na-Sn alloy/Na_2O	1 1	1 2	> 350 > 500	> 700 > 500	1 M $NaCF_3SO_3$ in diglyme	8
Na-Na_2S-carbonized tissue paper	0.5	1	> 300	> 300	$NaClO_4$ in EC/DEC with 10% FEC	9

Table S3. Percentages of F, S, C, and O elements detected at different depths of SEI films on the cycled Na-Zn-NF, Na-NF, and bare Na.

Electrodes	Etching time (s)	Percentages (%)			
		F	S	C	O
Na-Zn-NF	0	11.82	3.30	16.70	68.18
	50	9.49	3.22	13.20	74.09
	100	9.82	3.11	12.31	74.76
Na-NF	0	11.98	2.77	19.28	65.97
	50	11.47	2.65	15.21	70.67
	100	12.48	2.74	13.92	70.86
Bare Na	0	13.93	2.87	18.84	64.36
	50	14.14	3.04	14.57	68.25
	100	15.45	2.92	13.13	68.50

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