Supporting Information

Two-Dimensional Molecular Brush-Based Ultrahigh Edge-Nitrogen-Doped Carbon Nanosheets for Ultrafast Potassium-Ion Storage

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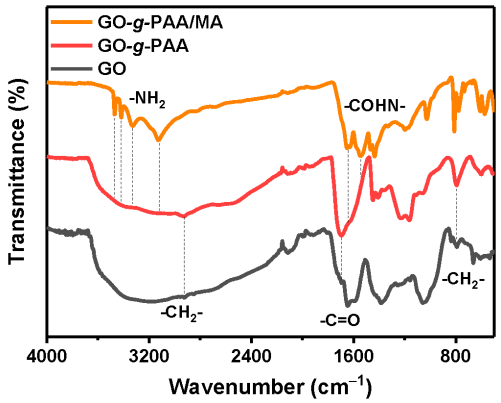

Figure S1. FT-IR spectra of GO, GO-*g*-PAA and GO-*g*-PAA/MA.

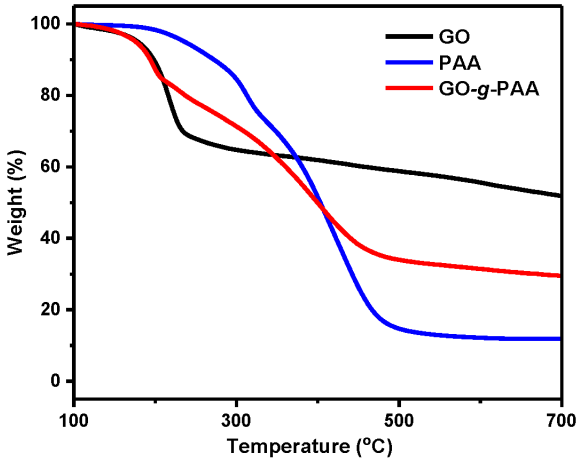

Figure S2. TGA curves of GO, PAA and GO-*g*-PAA.

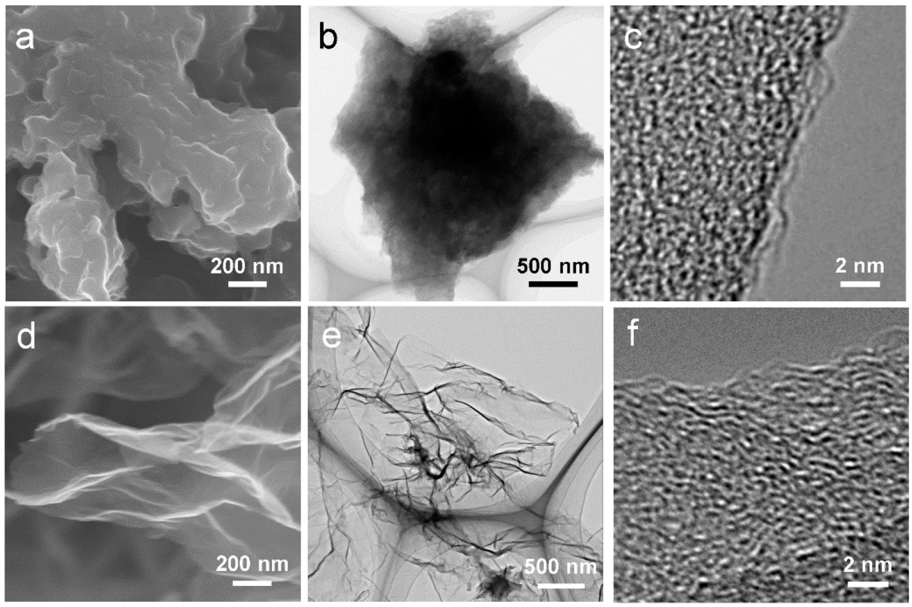

Figure S3. SEM, TEM and HRTEM images of (a-c) ENCNP and (d-f) CNS.

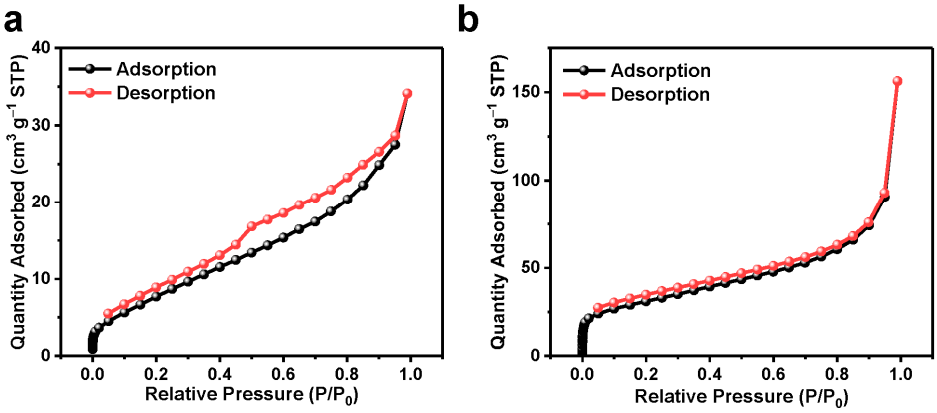

Figure S4. N_2 adsorption-desorption isotherms of (a) ENCNP and (b) CNS.

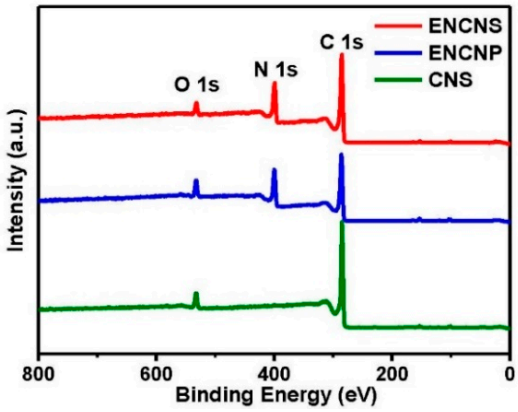

Figure S5. XPS full scans of ENCNS, ENCNP and CNS, revealing the presence of C, N and O elements.

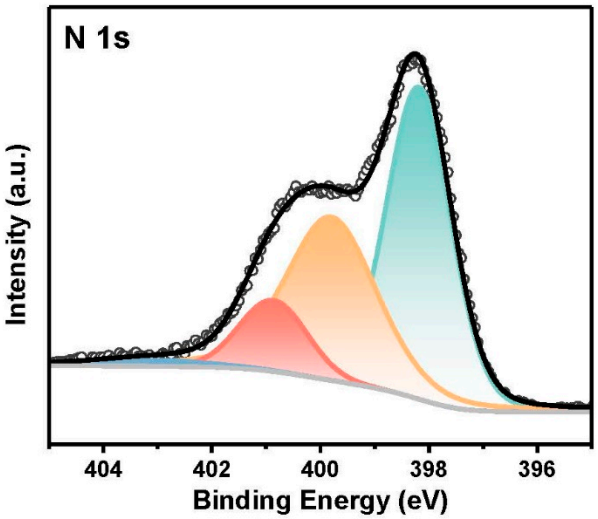

Figure S6. High-resolution N 1s XPS spectrum of ENCNP.

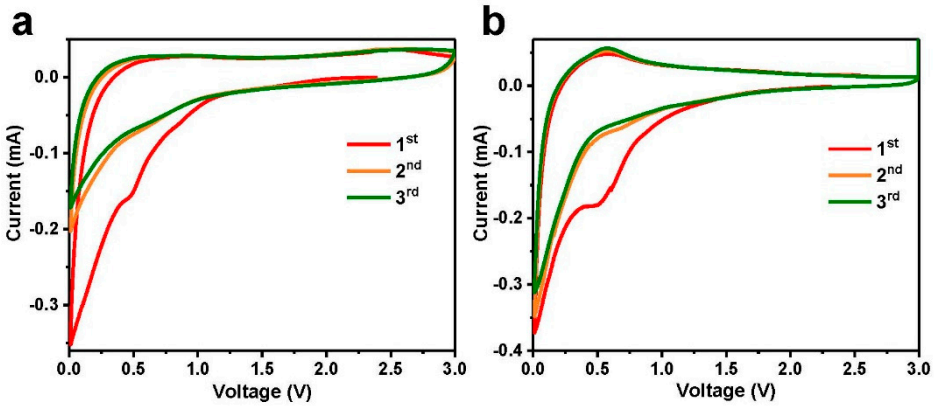

Figure S7. CV curves of (a) ENCNP and (b) CNS anodes at a scan rate of 0.2 mV s^{-1}.

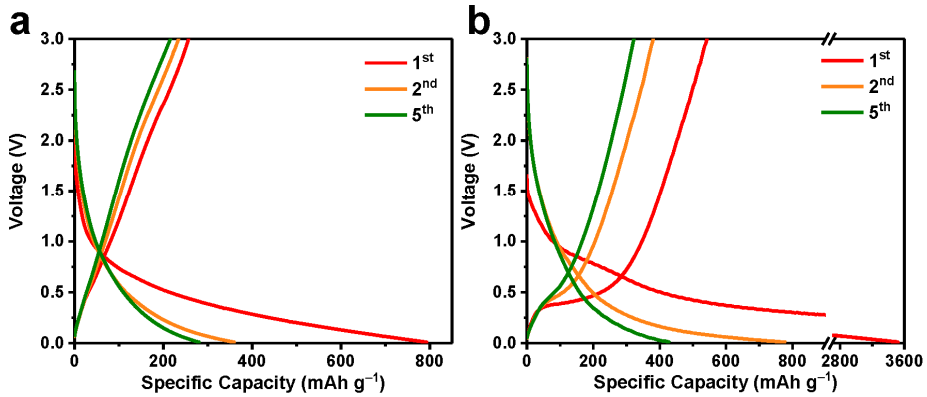

Figure S8. Discharge/charge curves of (a) ENCNP and (b) CNS anodes at a current density of 0.05 A g^{-1}.

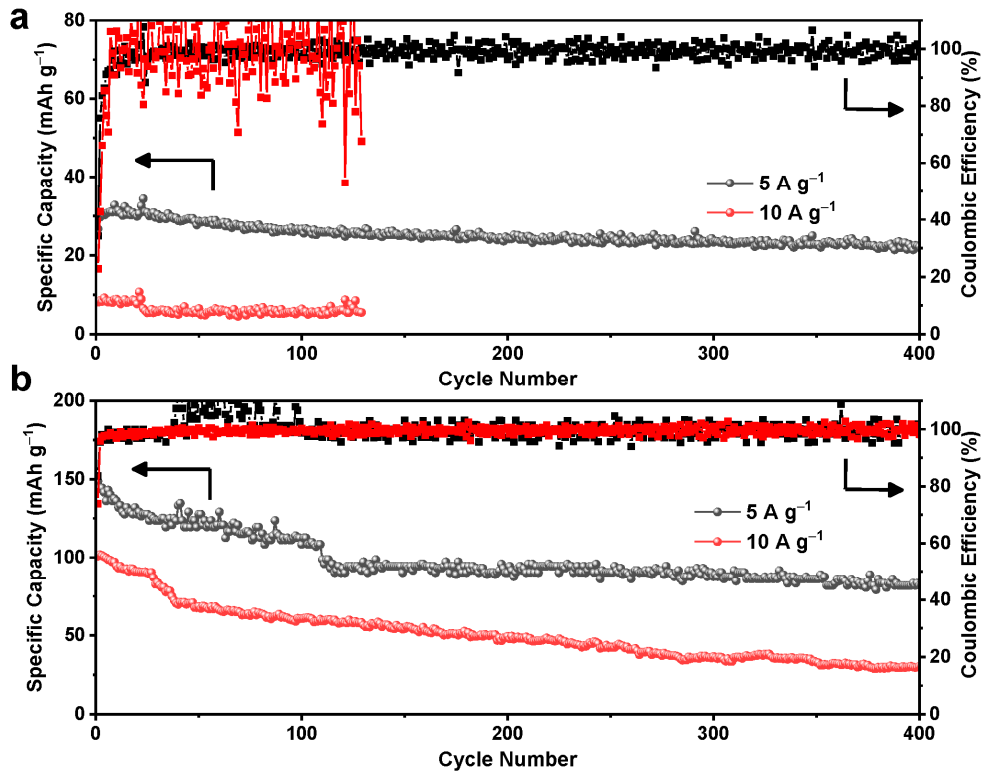

Figure S9. Long-term cycling performances of (a) ENCNP and (b) CNS at 5 and 10 A g^{-1}.

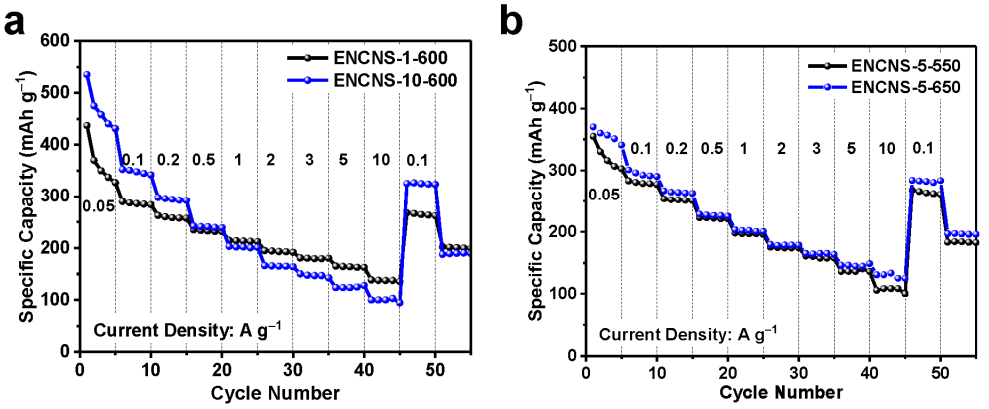

Figure S10. Rate capability of (a) ENCNS-1-600 and ENCNS-10-600 as well as (b) ENCNS-5-550 and ENCNS-5-650 at various current densities between 0.05 and 10.0 A g^{-1}.

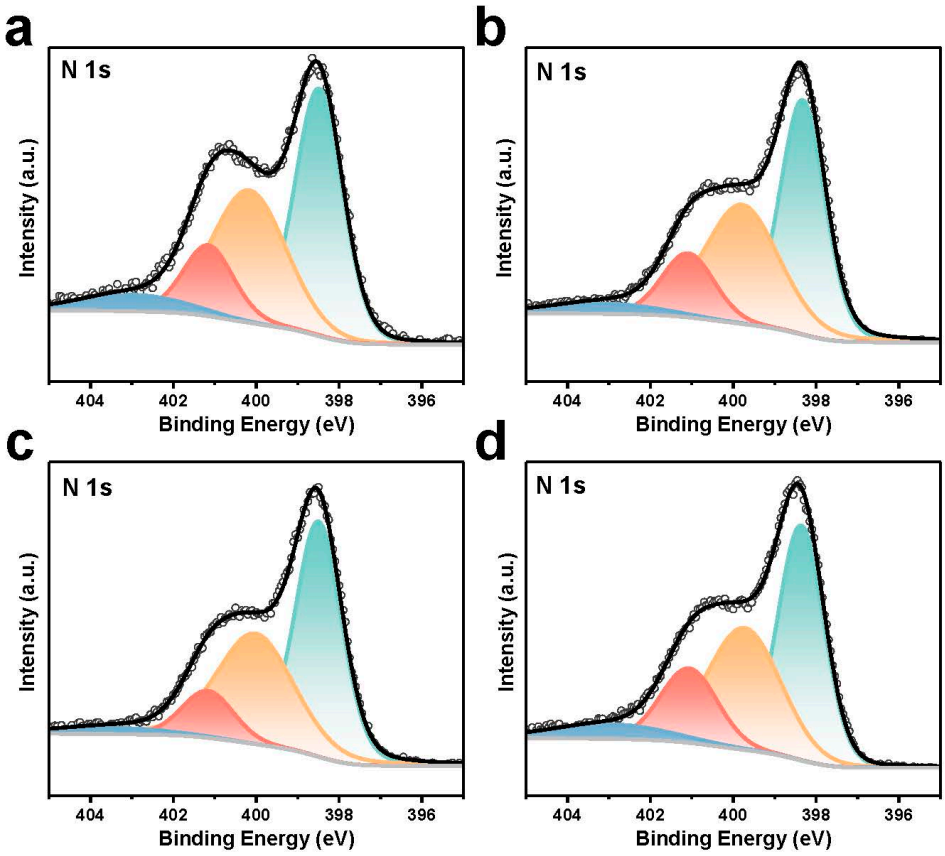

Figure S11. High-resolution N 1s XPS spectra of (a) ENCNS-1-600, (b) ENCNS-10-600, (c) ENCNS-5-550, and (d) ENCNS-5-650.

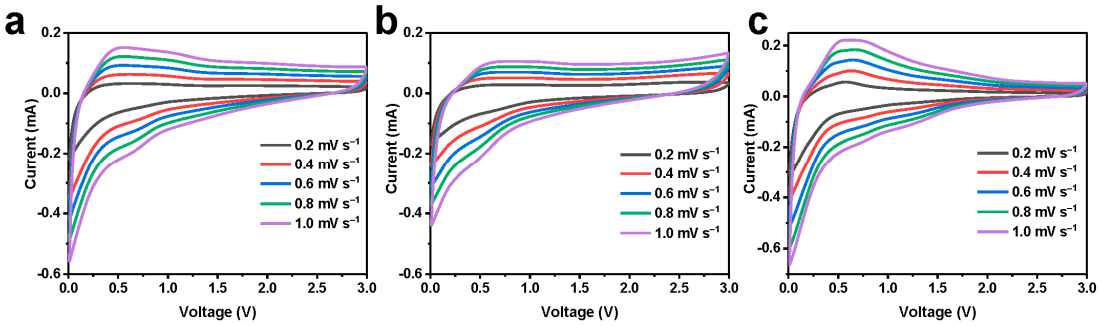

Figure S12. CV curves of (a) ENCNS, (b) ENCNP, and (c) CNS at scan rates of 0.2, 0.4, 0.6, 0.8 and 1.0 mV s^{-1}.

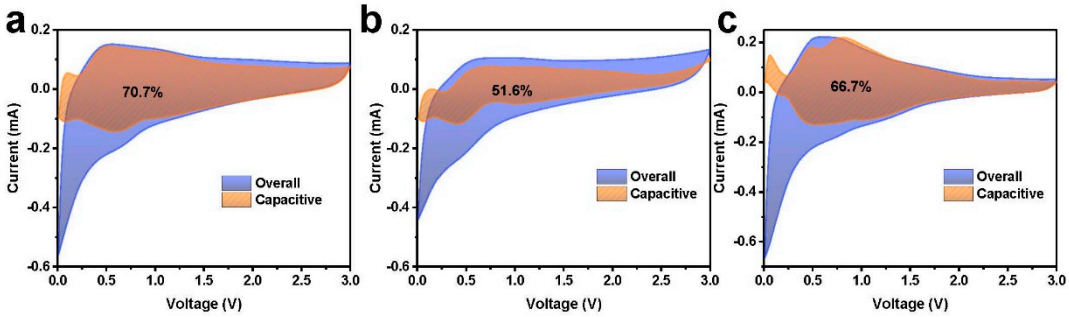

Figure S13. Capacitive contributions of (a) ENCNS, (b) ENCNP, and (c) CNS at a scan rate of 1.0 mV s^{-1}.

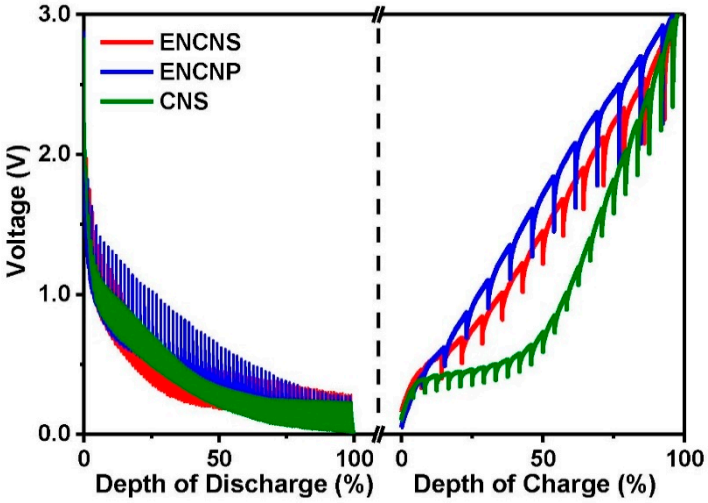

Figure S14. GITT potential profiles of ENCNS, ENCNP, and CNS.

Table S1. Total nitrogen and edge-nitrogen contents of various samples obtained with different molar ratios of -NH_2/-COOH and heat treatment temperatures.

Sample	Total nitrogen content (at%)	N6 content (at%)	N5 content (at%)	NQ content (at%)	NO content (at%)	Edge-nitrogen content (at%)
ENCNS	20.6	8.5	7.7	2.8	1.6	16.2
CNS	0.6	-	-	-	-	-
ENCNP	22.4	10.9	8.7	2.4	0.4	19.6
ENCNS-5-550	24.1	11.6	9.3	2.5	0.7	20.9
ENCNS-5-650	19.3	8.1	6.7	3.2	1.3	14.8
ENCNS-1-600	9.3	4.1	3.4	1.3	0.5	7.5
ENCNS-10-600	21.6	9.4	8.3	3.0	0.9	17.7

Table S2. Total nitrogen content, edge-nitrogen content, and reversible capacity at 5 A g^{-1} of ENCNS and other reported nitrogen-doped carbonaceous anode materials in PIBs.

Sample	Total nitrogen content (at%)	Edge-nitrogen content (at%)	Reversible capacity at 5 A g^{-1} (mAh g^{-1})	Reference
ENCNS	20.6	16.2	168	**This work**
HNC	17.03	15.70	93.0	[1]
N-CNFs	13.1	7.2	144	[2]
NPPC-2-700	3.68	2.82	133	[3]
MCS-7-900	5.27	1.96	107.9	[4]
NCSN	8.10	5.91	149	[5]
ENDC	10.5	9.2	74	[6]
NSC	2.09	1.57	115	[7]
HENC	5.78	4.38	101	[8]
NCTP	11.7	9.0	134.7	[9]
HOCNs	16.54	12.58	136	[10]
N-PCNS	12.1	11.8	127.5	[11]
3DNFC	5.74	5.02	115	[12]
NCNFs	13.8	7.7	126	[13]

Reference

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