Supporting Information

Green and Facile Fabrication of Hierarchical N-doped Porous Carbon from Water Hyacinths for High Performance Lithium/Sodium Ion Batteries

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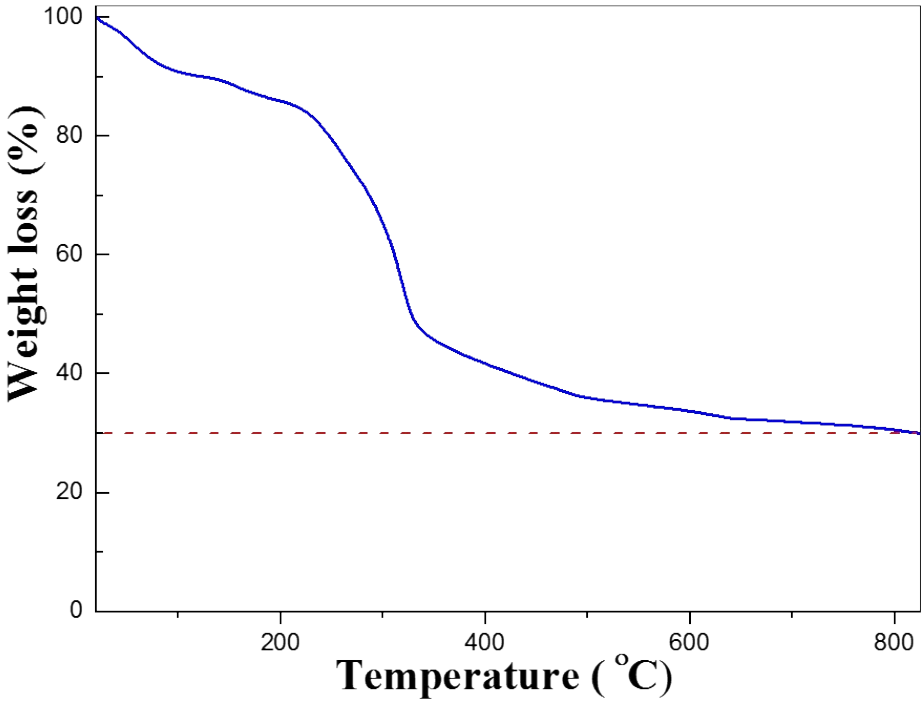

Figure S1. TG curve of the dried stem medulla of water hyacinth under argon atmosphere.

Table S1 Comparison of the yields of the carbon materials in this work and some other typically biomass derived carbon materials.

Materials	Yield (%)	Ref.
Water hyacinth	30	This work
Lotus stem	30.8	[1]
Asparagus lettuce stem	18	[1]
Celery	10	[1]
Bean shell	25	[2]
Seaweed	35	[3]
Pokeweed stem	25	[4]

Table S2 Content of the selected nine ions in the carbonized carbon materials before and after rinsing with hydrochloric acid by ICP (g/100 g).

Samples	K	Ca	Na	Mg	Al	Fe	Zn	Cu	Mn	Total
NPC-700 before rinsing	15.440	1.580	1.650	0.490	0.003	0.019	0.003	0.003	0.170	19.358
NPC-900 before rinsing	14.960	2.060	1.460	0.630	0.006	0.015	0.001	0.002	0.220	19.354
NPC-1100 before rinsing	4.200	2.120	0.130	0.910	0.011	0.007	0.001	0.001	0.300	7.680
NPC-700	0.043	0.210	0.023	0.076	0.001	0.018	0.005	0.005	0.013	0.394
NPC-900	0.041	0.350	0.019	0.055	0.001	0.021	0.002	0.008	0.017	0.514
NPC-1100	0.068	0.390	0.015	0.046	0.004	0.012	0.002	0.008	0.020	0.565

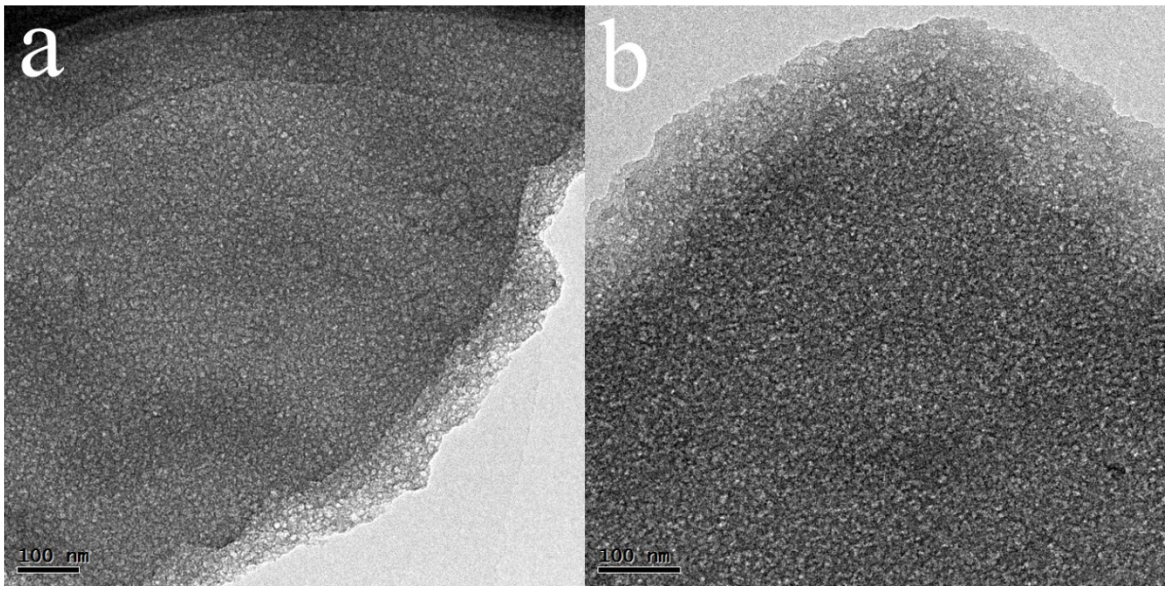

Figure S2. TEM images of (a) NPC-900 and (b) NPC-1100.

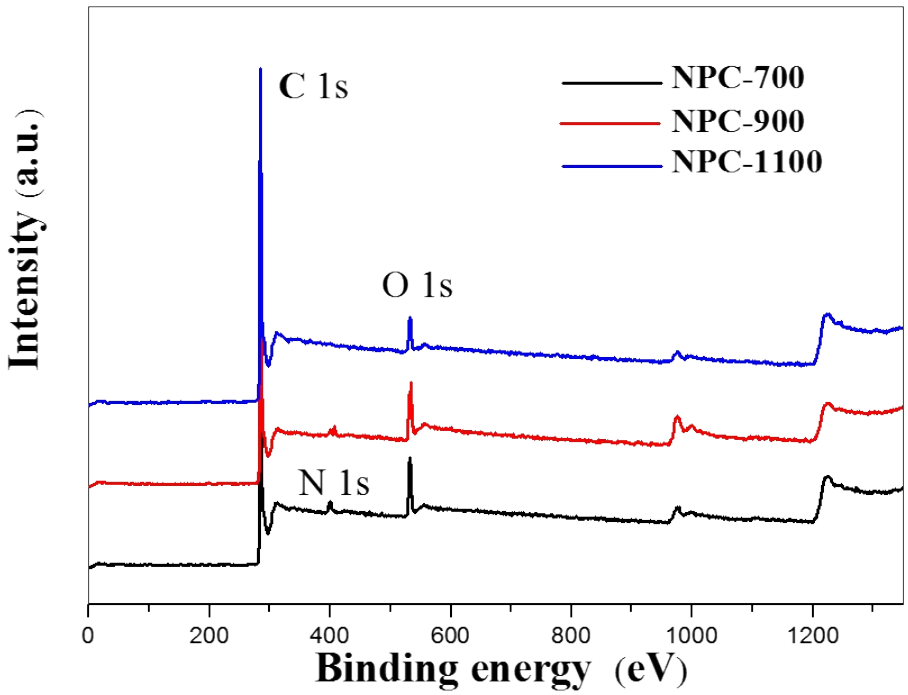

Figure S3. XPS survey spectra of NPC-700, NPC-900, and NPC-1100.

Table S3 Comparison of the electrochemical performances of NPC-700 and some other typically biomass derived carbon anode for LIBs.

Materials	Activating agent	BET surface area ($m^2 g^{-1}$)	Initial coulombic efficiency (%)	Current density ($mA g^{-1}$) / Cycle number	Specific capacity ($mAh g^{-1}$)	Ref.
Water hyacinth	Self-activation	1005.4	65.9	50 / 100 400 /450	740 552	This work
Mushroom	Self-activation	19.6	Not reported	100 / 700	234	5
Rice husk	CHOOH	243	50.2	75 / 100	403	6
Banana peel	Dry air	217	55.0	100 / 300	800	7
Constalk	KOH	847	76.0	100 / 200 2000 / 400	592 481	8
Bean shell	KOH	655	<40	372 / 100 186 / 100	262 300	2
Waste tea	HCl	338	57.0	75 / 200	479	9
Prawn shell	NaOH	336	64.0	100 / 150 750 / 150	730 470	10
Garlic peel	KOH	1710	41.0	100 / 100	540	11
Wheat stalk	KOH	36	62.9	372 / 183 1860 / 2000	475 215	12
Peanut shell	KOH	706	40.0	1000 / 400	474	13
Spongy pomelo peel	No activation	114	59.5	90 / 200	450	14
Microalgae	No activation	29	Not reported	38 / 100	433	15
Coconut oil	No activation	Not reported	55.0	100 / 90	300	16

The self-activation by K^+ has been reported in Ref. 5. However, the effect of the self-activation by K^+ in the water hyacinth in this work has been significantly different from that in the mushroom. As shown in **Table S3**, the BET surface area of the water hyacinth-derived carbon material (NPC-700) in this work is 50 times more than that of the mushroom-derived carbon material in Ref. 5. Furthermore, the NPC-700 delivered much higher reversible capacities than that of the mushroom-derived carbon material

in Ref. 5 not only at low current density (50 mA g^{-1}) but also at high current density (400 mA g^{-1}) (**Table S3**).

Table S4 Comparison of the electrochemical performances of NPC-700 and some other typically biomass derived carbon anode for SIBs.

Materials	Activating agent	BET surface area (m^2 g^{-1})	Initial coulombic efficiency (%)	Current density (mA g^{-1}) / Cycle number	Specific capacity (mAh g^{-1})	Ref.
Water hyacinth	Self-activation	1005.4	47.8	50 / 100 400 /1000	293 140	This work
Peat moss	Dry air	197	43.9	100 / 200	255	17
Pomelo peel	H_3PO_4	1272		200 / 220	181	18
Banana peel	Dry air	217	67.8	100 / 300	298	7
Lotus petiole	Dry air	Not reported	27.0	200 / 200	228	19
Bean shell	KOH	655	36.5	200 / 100	140	2
Prawn shell	NaOH	336	56.0	100 / 200 400 / 150	325 234	10
Garlic peel	KOH	1710	41.0	100 / 100	190	11
Peanut shell	KOH	706	40.7	250 / 400	190	13
Peanut skin	KOH	2500	<34.0	500 / 200	140	20
Apple	H_3PO_4	196	61.0	20 / 80 1000 / 1000	230 85	21
Coconut oil	No activation	Not reported	34.0	100 / 200	180	16
Algal bloom	No activation	Not reported	53.3	20 / 60	230	22

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