Amorphous Sn modified nitrogen-doped porous carbon nanosheets with rapid capacitive mechanism for high-capacity and fast-charging lithium-ion batteries

Chong Xu*, Guang Ma*, Wang Yang (✉), Sai Che, Neng Chen, Ni Wu, Bo Jiang, Ye Wang, Yankun Sun, Sijia Liao, Jiahao Yang, Xiang Li, Guoyong Huang, and Yongfeng Li (✉)

State Key Laboratory of Heavy Oil Processing, China University of Petroleum, Beijing 102249, China

E-mails: yfli@cup.edu.cn (Y.L.), wyang@cup.edu.cn (W.Y.)

* C.X. and G.M. contributed equally to this work and should be considered as co-first authors.

Supplementary material

Figures and Tables

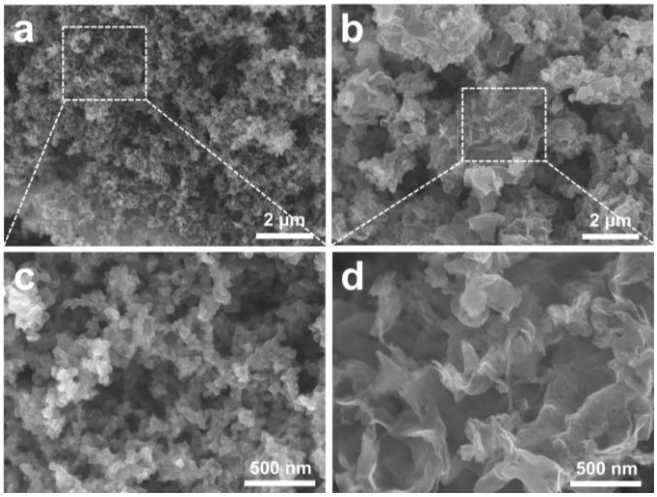

Fig. S1 SEM images of **(a)(c)** ASn-PC-750 and **(b)(d)** NPCNs-750.

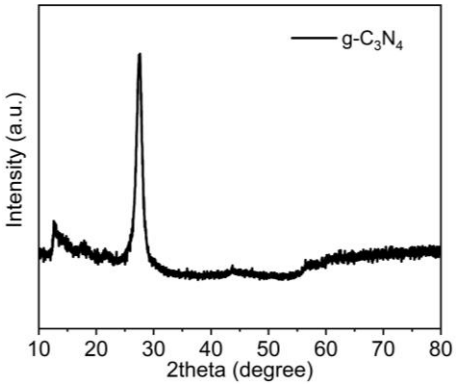

Fig. S2 XRD pattern of g-C_3N_4.

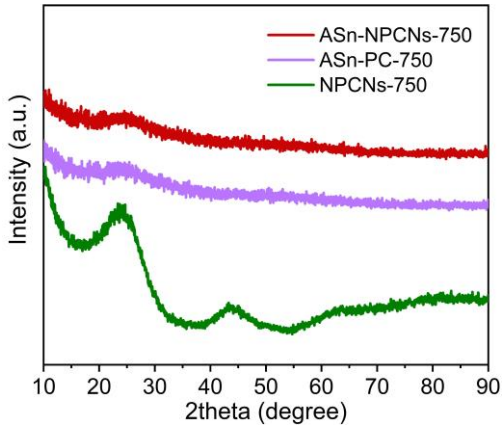

Fig. S3 XRD patterns of ASn-NPCNs-750, ASn-PC-750, and NPCNs-750.

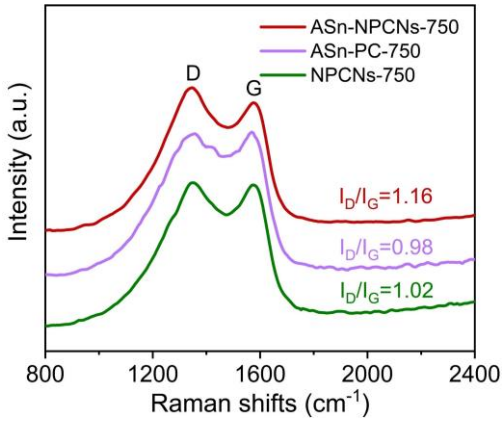

Fig. S4 Raman spectra of ASn-NPCNs-750, ASn-PC-750, and NPCNs-750.

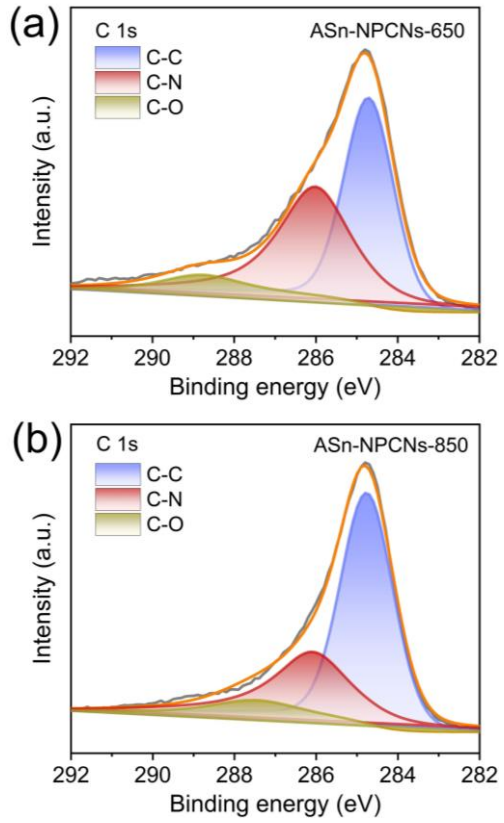

Fig. S5 C 1s spectra of **(a)** ASn-NPCNs-650 and **(b)** ASn-NPCNs-850.

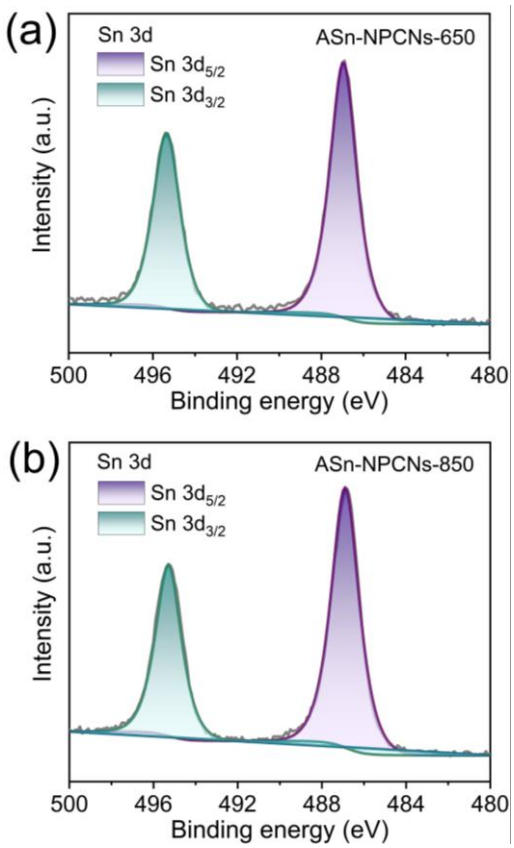

Fig. S6 The Sn 3d spectra of **(a)** ASn-NPCNs-650 and **(b)** ASn-NPCNs-850.

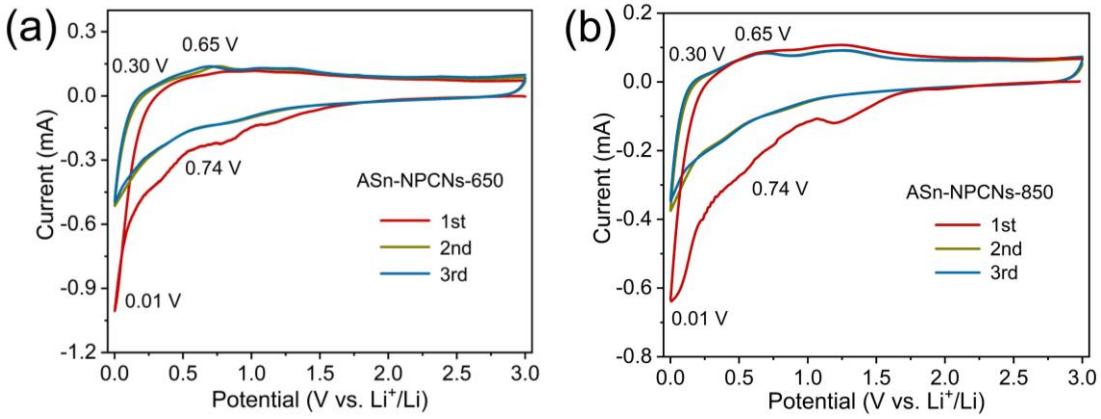

Fig. S7 CV curves at 0.1 $mV \cdot s^{-1}$ of **(a)** ASn-NPCNs-650 and **(b)** ASn-NPCNs-850.

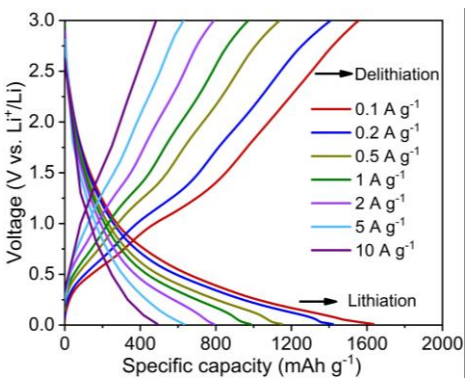

Fig. S8 Discharge/charge curves of ASn-NPCNs-750 at different current densities from 0.1 to 10 $A \cdot g^{-1}$.

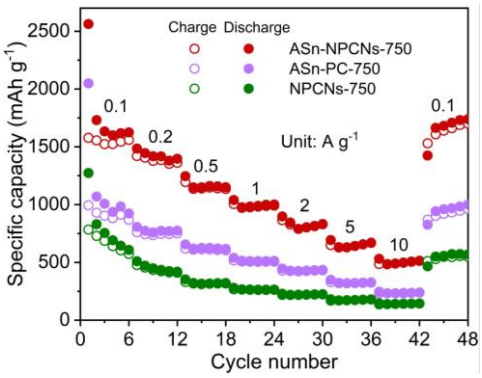

Fig. S9 Rate performance of ASn-NPCNs-750, ASn-PC-750, and NPCNs-750.

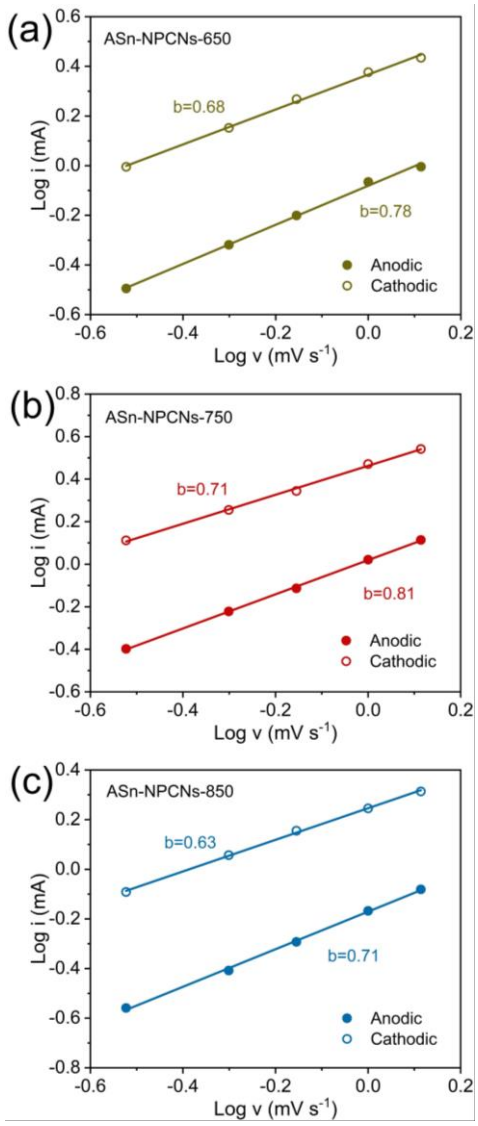

Fig. S10 *b*-values of **(a)** ASn-NPCNs-650, **(b)** ASn-NPCNs-750, and **(c)** ASn-NPCNs-850.

Table S1 Nitrogen contents and percentages of different configurations for ASn-NPCNs-*T*

Sample	c_{tn}/at.%	η_{pdn}/%	η_{prn}/%	η_{gpn}/%	c_{pdn}/at.%	c_{prn}/at.%	c_{gpn}/at.%
ASn-NPCNs-650	17.49	42.7	31.7	25.6	7.47	5.54	4.48
ASn-NPCNs-750	16.35	43.9	41.8	14.3	7.18	6.83	2.34
ASn-NPCNs-850	15.17	48.9	37.7	13.4	7.42	5.72	2.03

Notes: tn, total N; pdn, pyridinic N; prn, pyrrolic N; gpn, graphitic N.

Table S2 Comparisons of electrochemical performance of different Sn/C materials as LIB anodes

Sn/C material	Current density/(mA·g^{-1})	Cycle number	Capacity/(mAh·g^{-1})	Ref.
Sn/NC (R2)	200	200	660	[S1]
C/Sn10	100	500	501	[S2]
Sn/NMC	1000	1600	437	[S3]
Sn/C-PANI	500	1000	522	[S4]
Sn/NCNs	500	1000	717	[S5]
Sn/DGT	500	300	769	[S6]
am-Sn@C	1000	500	510	[S7]
Sn@C/EG-S	2000	400	584	[S8]
ASn-NPCNs-750	1000	2000	988	this work

Table S3 Kinetic parameters of ASn-NPCNs-*T* electrodes

Sample	R_s/Ω	R_{ct}/Ω	σ/(Ω·s$^{-1/2}$)	D_{Li^+}/(cm^2·s^{-1})
ASn-NPCNs-650	1.2	112.3	8.27	7.64×10^{-13}
ASn-NPCNs-750	0.8	93.4	5.41	2.42×10^{-12}
ASn-NPCNs-850	2.4	177.8	13.31	6.41×10^{-14}

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