

SUPPORTING INFORMATION

High-Performance Li-Se Batteries Enabled by Selenium Storage in Bottom-Up Synthesized Nitrogen-Doped Carbon Scaffolds

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Table S1. Comparison of lithium storage performances of Se-NCSs cathode with other Se-C composite cathodes in the literatures.^{28,30-44}

Ref.	Samples	Selenium content	Electrolyte	Current density	Cycle number	Specific capacity after cycling (mAh g ⁻¹)
This work	Se encasupalted in bottom-up synthesized nitrogen-doped carbon scaffolds	56 wt%	Ether-based electrolyte	0.1 C	100	480
				1 C	500	301
28	Se@mesoporous carbon	30 wt%	Carbonate-based electrolyte	0.25 C	1000	480
30	Se@3D interconnected hierarchical porous carbon aerogels	56 wt%	Ether-based electrolyte	0.5 C	50	367
31	Carbon microsphere-Se composites	50 wt%	Ether-based electrolyte	0.5 C	100	300
32	Meso-C@Se	48 wt%	Ether-based electrolyte	337.5 mA g ⁻¹	100	306.9
33	Interconnected porous carbon nanofiber webs/Se	33.2 wt%	Ether-based electrolyte	1 C	300	323.7
34	Se@microporous carbon polyhedra	51 wt. %	Carbonate-based electrolyte	1 C	3000	249
35	Se/micro-mesoporous carbon spheres	59.7 wt%	Carbonate-based electrolyte	0.25 C	500	320
36	Se/nitrogen-containing hierarchical porous	56.2 wt%	Ether-based electrolyte	1 C	60	267

	carbon					
37	Se/carbonized polypyrrole	60 wt%	Ether-based electrolyte	1 C	50	413
			Carbonate-based electrolyte	1 C	150	506
38	Se/interconnected porous hollow carbon	50 wt%	Carbonate-based electrolyte	0.1 C	120	606.3
39	Carbonized polyacrylonitrile/Se	36 wt%	Carbonate-based electrolyte	0.3 C	500	600
40	Porous carbon nanofibers/Se	52.3 wt%	Carbonate-based electrolyte	500 mA g ⁻¹	900	516
41	Carbon bonded and encapsulated Se	54 wt%	Carbonate-based electrolyte	100 mA g ⁻¹	250	430
42	Se/carbon-rich core-shell composites	43.2 wt%	Ether-based electrolyte	0.5 C	80	181
43	Graphene/Se@CNTs	30 wt%	Carbonate-based electrolyte	0.1 C	100	315
44	Graphene/CNTs@Se	51 wt%	Ether-based electrolyte	0.2 C	150	504

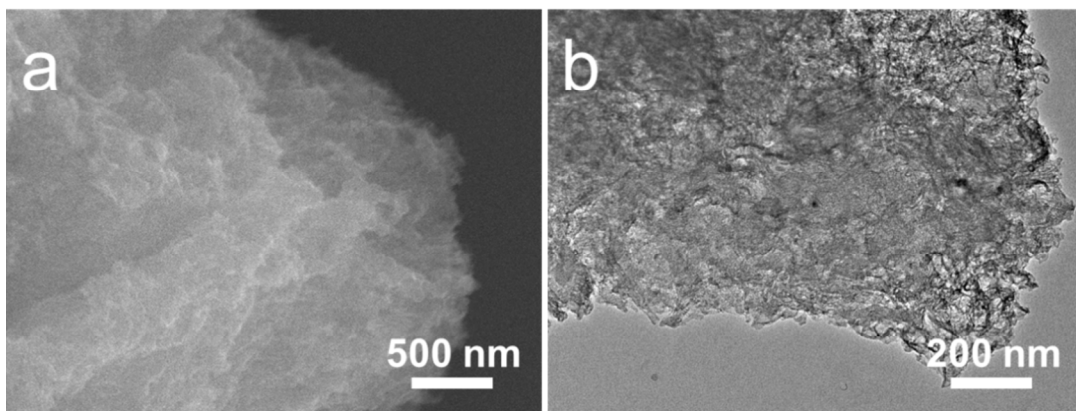


Figure S1. (a) SEM and (b) TEM images of PCSs.

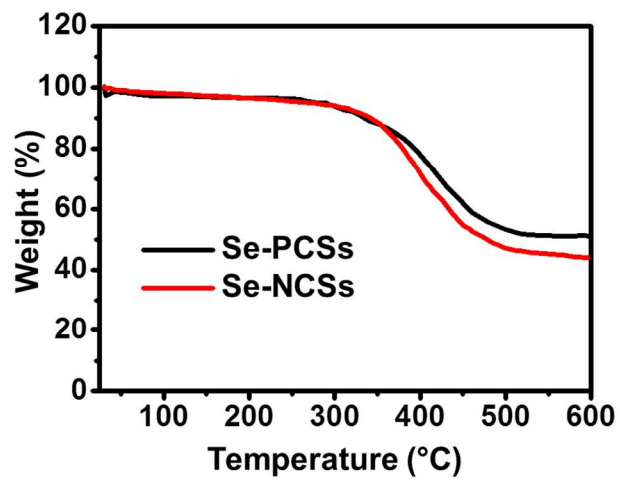


Figure S2. Thermal analysis curves of Se-NCSs and Se-PCSs. The Se contents are 56 wt.% and 50 wt.% for Se-NCSs and Se-PNCSs, respectively.

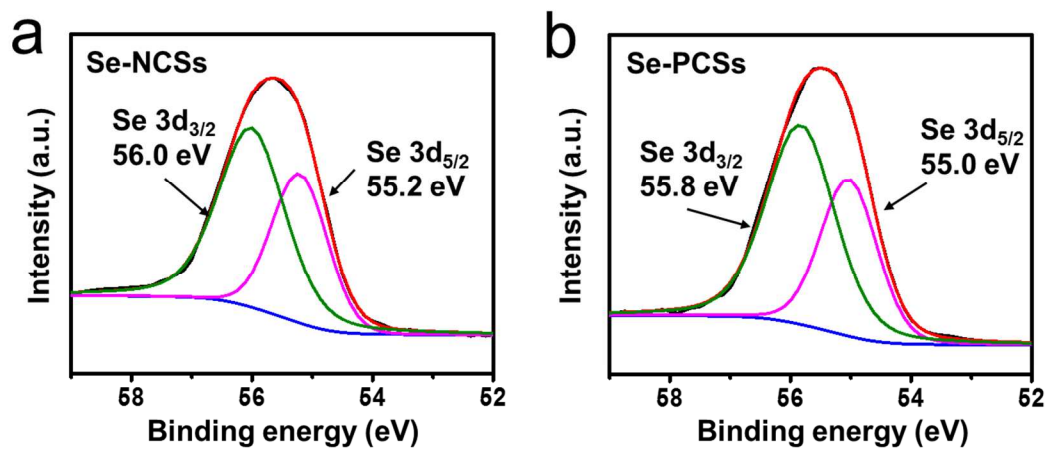


Figure S3. High-resolution XPS spectra at Se 3d region of (a) Se-NCSs and (b) Se-PCSs.

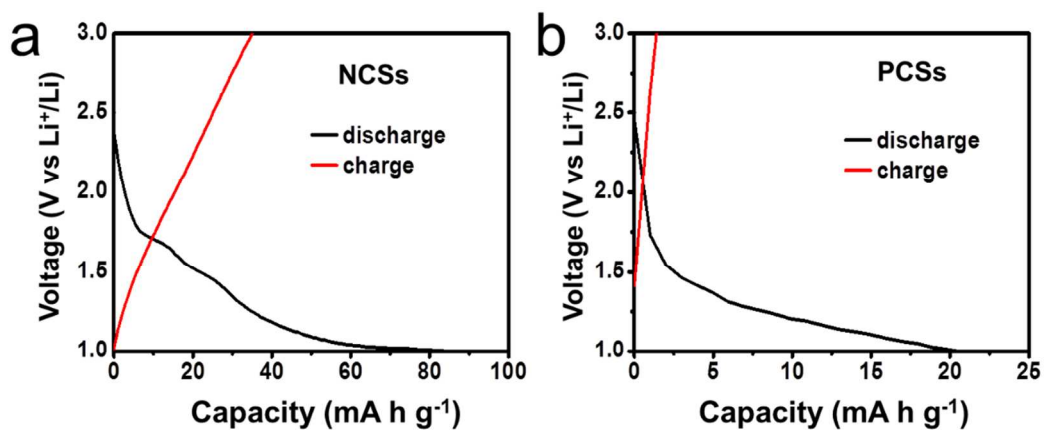


Figure S4. Charge/discharge profiles of (a) NCSs and (b) PCSs without the loading of selenium at a current density of 60 mA g^{-1} .

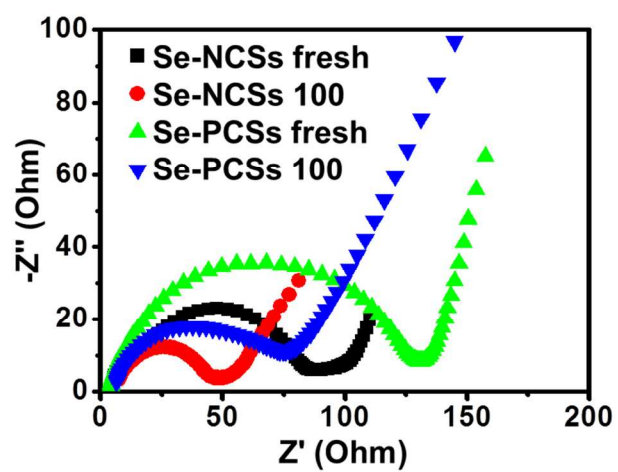


Figure S5. Nyquist plots of the Li-Se cells with different Se composite cathodes after 100 cycles at 0.1 C.

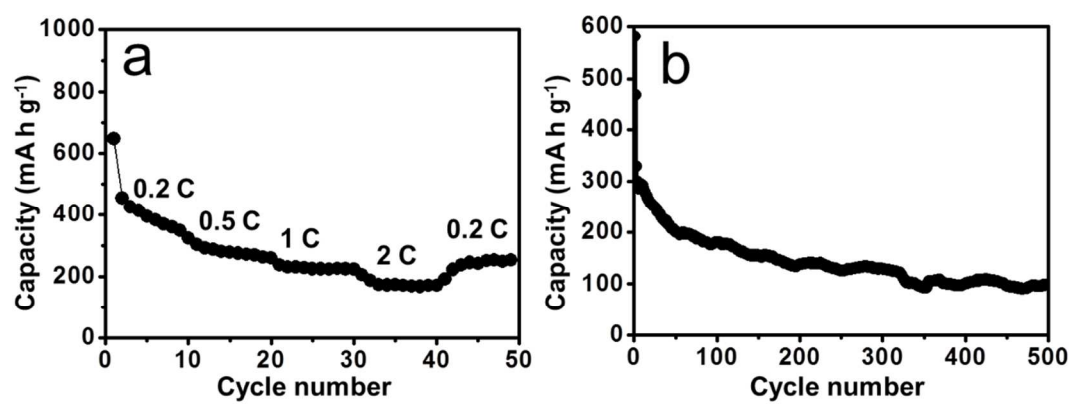


Figure S6. (a) Rate capability of Se-PCSs based cathode at 0.2–2 C. (b) Long-term cycling performance of Se-PCSs based cathode at 1 C.

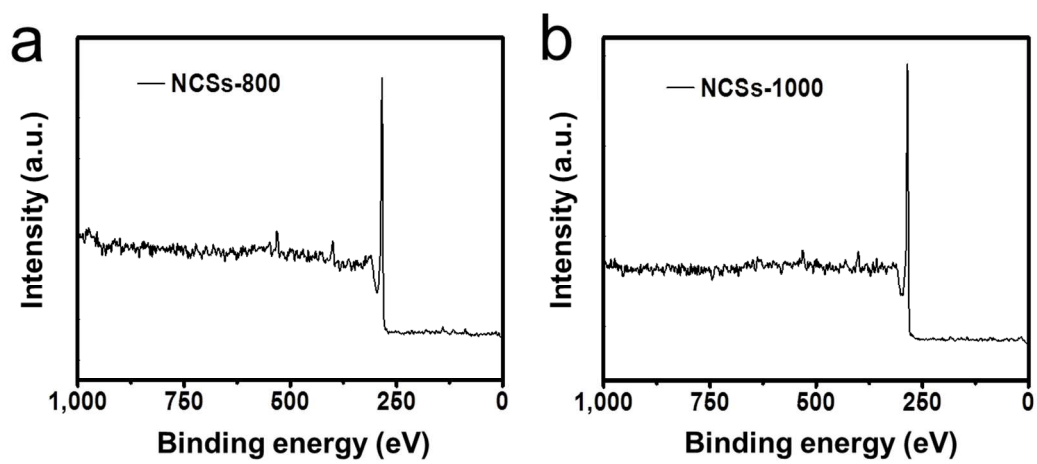


Figure S7. XPS spectra of (a) NCSs-800 and (b) PCSs-1000.

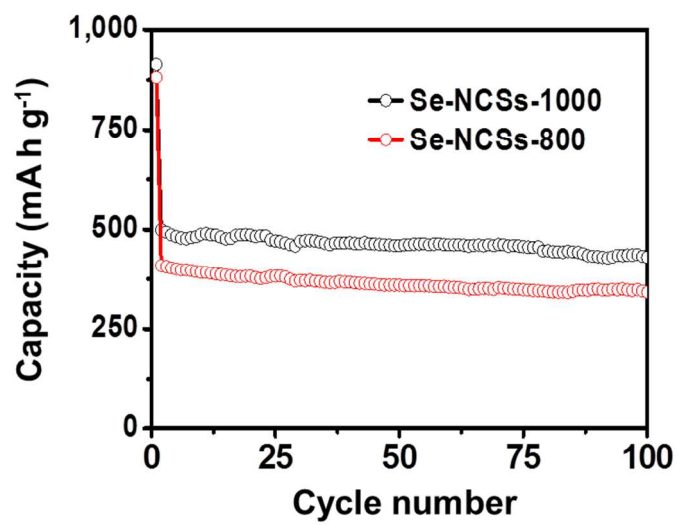


Figure S8. Cycling performance of Se-NCSs-800 and Se-NCSs-1000 based cathodes at 0.1 C.