Supporting Information

Highly-effective nitrogen-doped porous carbon sponge electrode for advanced K-Se batteries

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Supporting Information

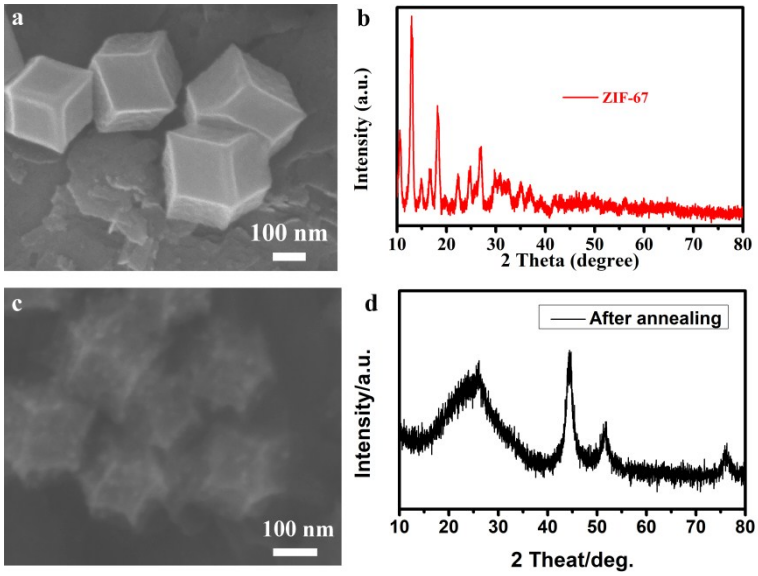

Figure S1. (a) and (c) FESEM image of ZIF-67 before and after the annealing; (b) and (d) XRD patterns of ZIF-67 before and after the annealing.

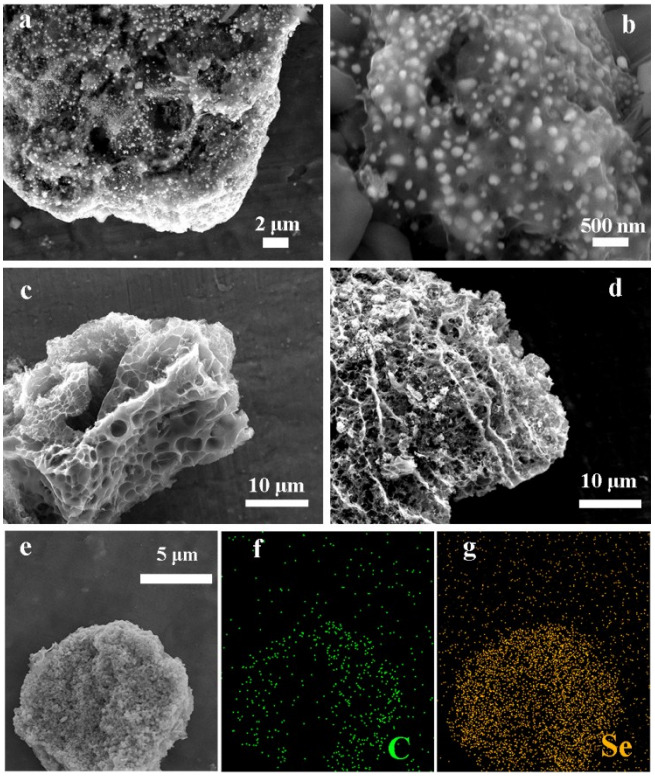

Figure S2. (a-b) FESEM images of the precursor; (c) FESEM image of NPCS; (d-e) FESEM image of the Se@NPCS composite; (f-g) The element mappings.

Supporting Information

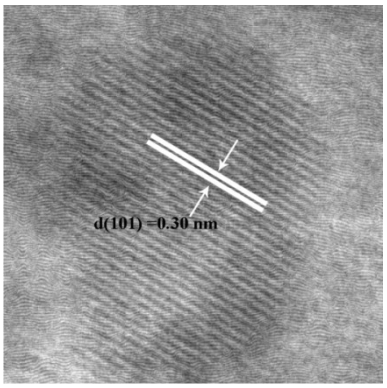

Figure S3. HRREM image of the Se@NPCS composite.

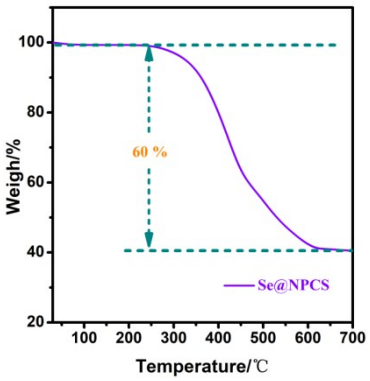

Figure S4. TGA curve of the Se@NPCS composite at N_2 atmosphere.

Material	Specific surface area	Pore volume	Pore diameter contribution
NPCS	737 m^2 g^{-1}	0.8733 cm^3 g^{-1}	2-8 nm
Se@NPCS	12 m^2 g^{-1}	0.1023 cm^3 g^{-1}	4 nm

Table S1. Porosity comparison of NPCS and the Se@NPCS composite.

Supporting Information

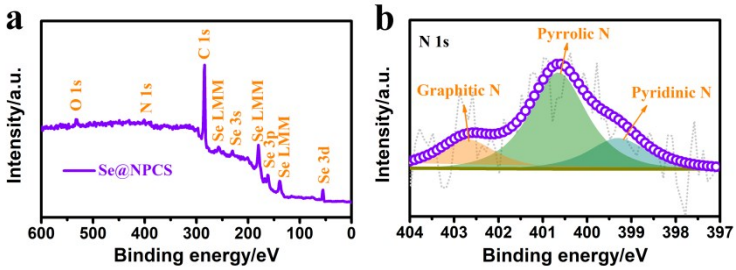

Figure S5. (a) XPS spectra of the Se@NPCS composite; (b) XPS spectra of N 1s.

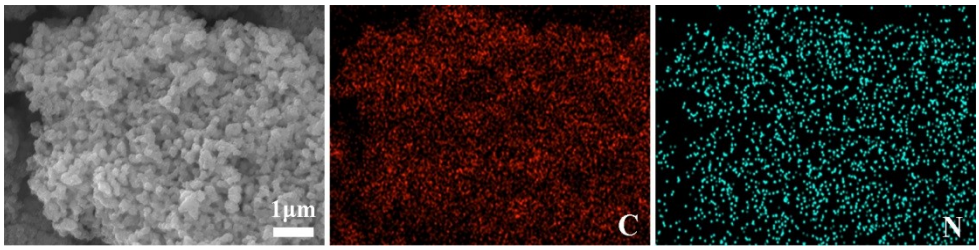

Figure S6. Nitrogen elemental mapping of the carbonized ZIF-67.

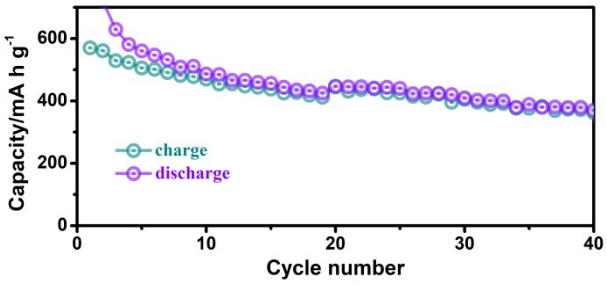

Figure S7. Cycling performance of the Se@NPCS composite at 0.1 C.

Supporting Information

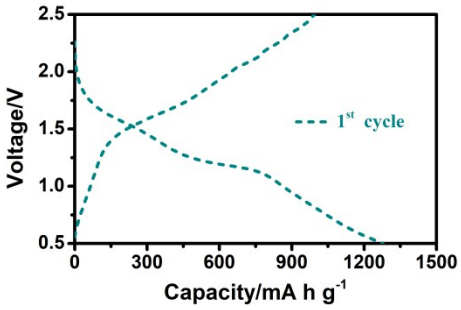

Figure S8. Discarge-charge profiles of the first cycle at 0.5 C.

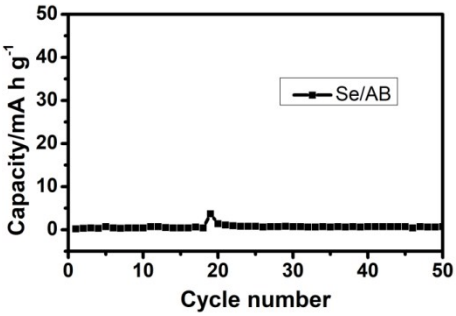

Figure S9. Cyling performance of the Se/AB mixture at 0.5 C.

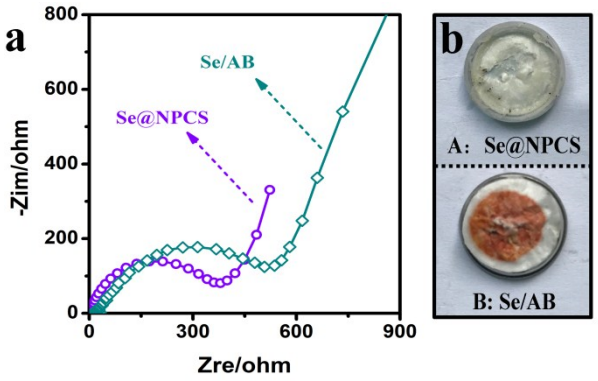

Figure S10. (a) Nyquist plots of the batteries with the fresh Se/AB electrode and Se@NPCS electrode before cycling; (b) Glass fibers of the half-cells with the Se/AB and Se@NPCS electrode after cycling.