Supporting Information

Achieving Ultralong Life Sodium Storage in Amorphous Cobalt-tin Binary Sulfide Nanoboxes Sheathed in N-doped Carbon

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Fig. S1. XRD patterns of CoSn(OH)$_6$ nanocubes and nanoboxes.

Fig. S2. Elemental mapping revealing the uniform distribution of Co, Sn, S and C elements in CoSnS$_x$@NC nanoboxes.
Fig. S3. (a) Raman spectrum of CoSnS₆@NC nanoboxes; (b) XPS survey scan of CoSnS₆@NC nanoboxes; (c) S 2p XPS spectrum of CoSnS₆@NC nanoboxes.

Fig. S4. CV curves of CoSnS₆@NC nanoboxes at a scan rate of 0.1 mV s⁻¹ between 0.0-3.0 V.

Fig. S5. (a) CV curves of CoSnS₆@NC nanoboxes at various scan rate of 0.03-0.1 mV s⁻¹ between 0.0-3.0 V; (b) the plot of oxidation/reduction peak current vs. the scan rate.
Fig. S6. Rate capability of CoSnS$_x$@NC nanoboxes in 1 M NaCF$_3$SO$_3$/DGM and 1 M NaPF$_6$/EC:DEC electrolyte at varied current densities of 0.1-5.0 A g$^{-1}$.

Fig. S7. (a) TEM images of CoSnS$_x$@NC nanoboxes after deep cycling for 4000 cycles.

Fig. S8. XRD pattern of CoSnS$_x$@NC nanoboxes after discharging to 0.01 V and charging to 3.0 V.
Fig. S9. (a) SEM image and (b) XRD pattern of Na$_3$V$_2$(PO$_4$)$_3$/C composite.

Fig. S10. (a) Discharge-charge voltage curves of Na$_3$V$_2$(PO$_4$)$_3$/C cathode; (b) cycling stability of Na$_3$V$_2$(PO$_4$)$_3$/C cathode at a current density of 0.1 A g$^{-1}$; (c) rate capability of Na$_3$V$_2$(PO$_4$)$_3$/C composite at various current densities of 0.1-5.0 A g$^{-1}$; (d) CV curve of Na$_3$V$_2$(PO$_4$)$_3$/C cathode between 2.0-3.9 V.