Supplementary Information

Double-layer carbon protected CoS_2 nanoparticles as an advanced anode for sodium-ion batteries

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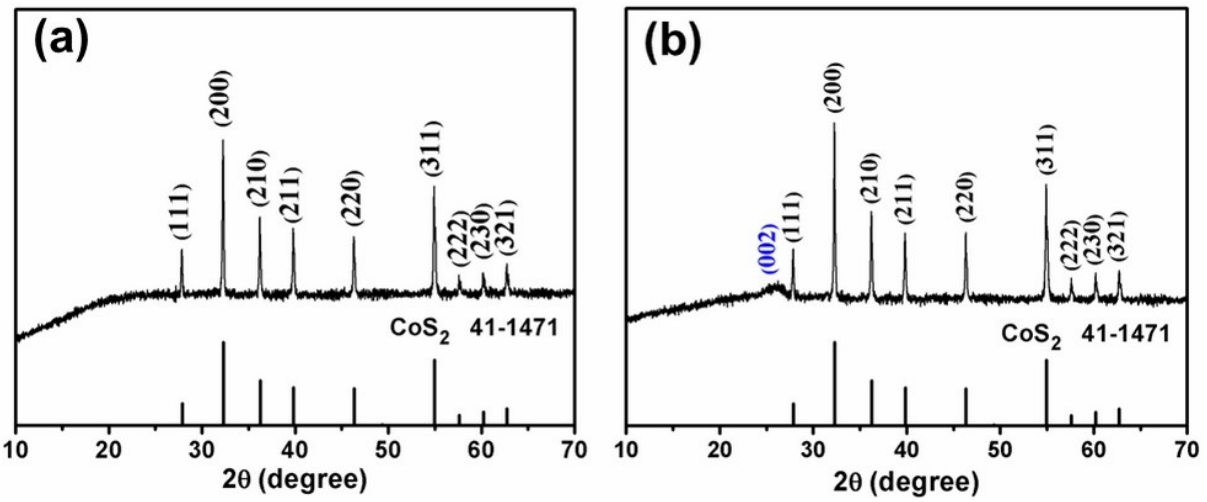

Fig. S1. (a) XRD pattern of the CoS_2; (b) XRD pattern of the CoS_2/CNT composite.

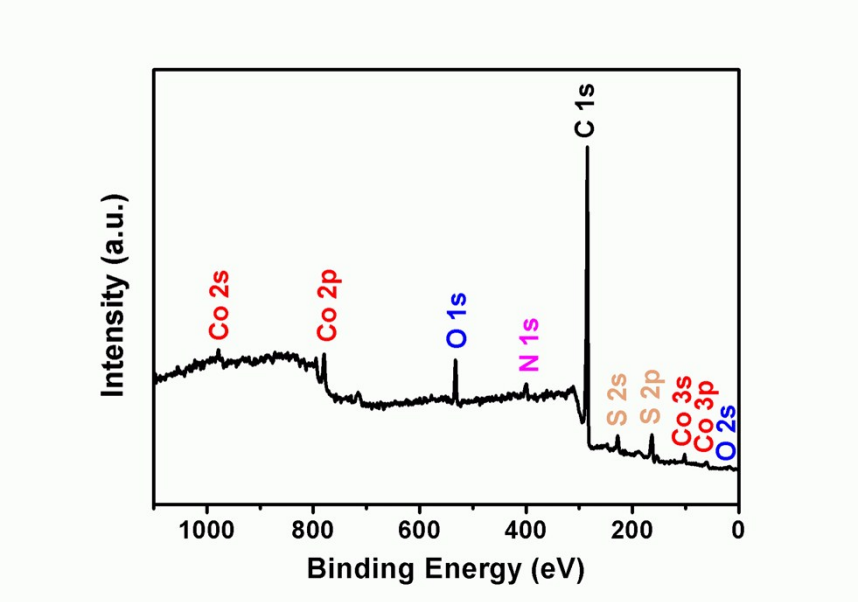

Fig. S2. XPS spectra of the CoS_2@GC@B-CNT.

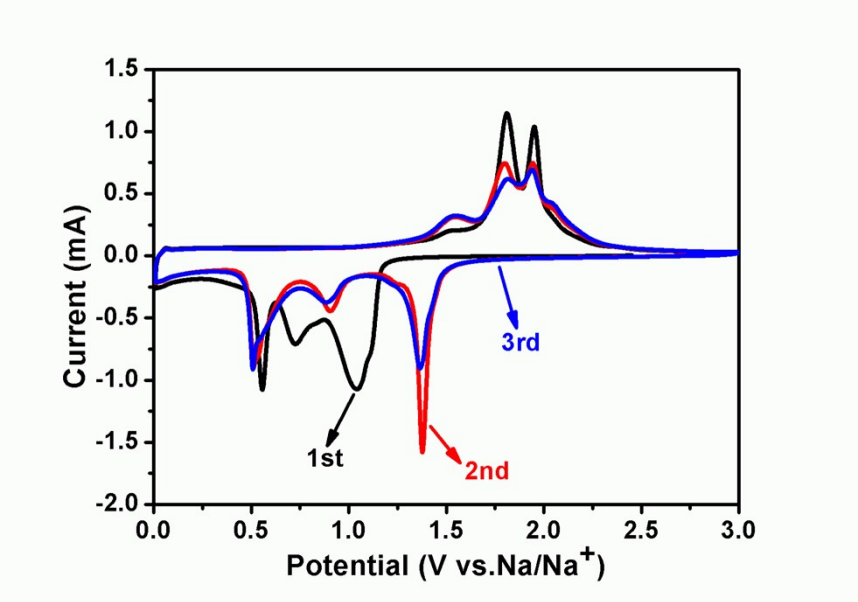

Fig. S3. First three CV curves of the CoS_2@GC@B-CNT electrode at scan rate of 0.2 mV s^{-1}.

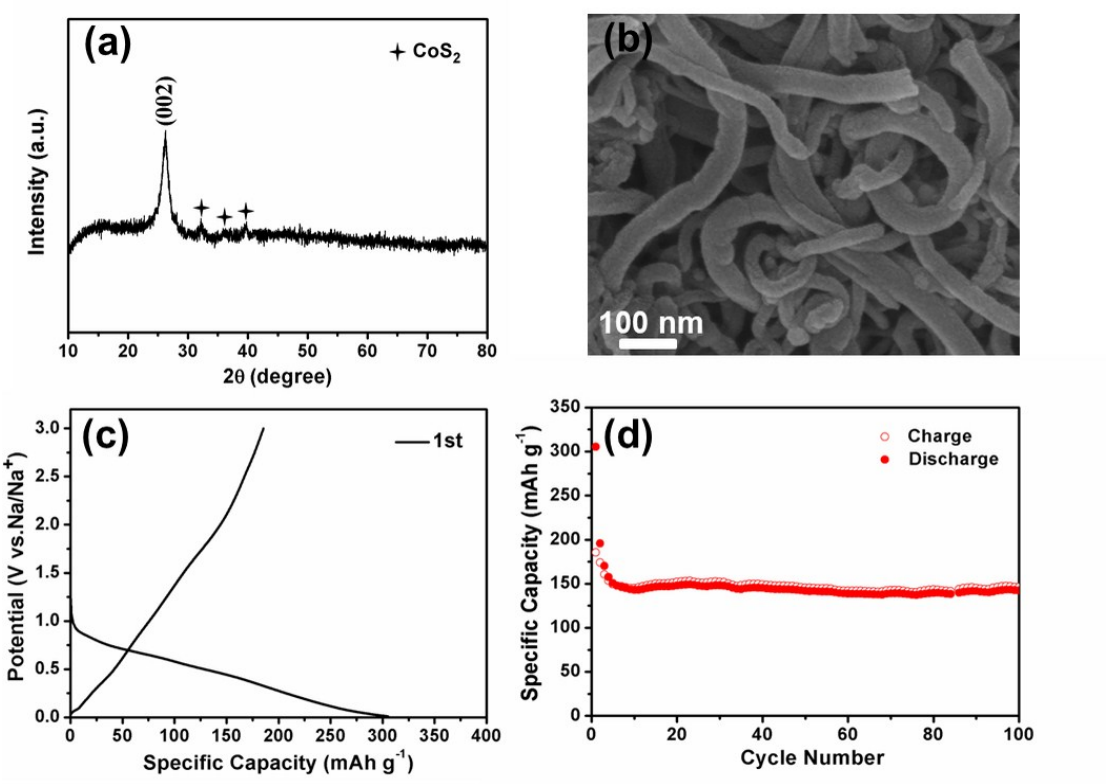

Fig. S4. (a) XRD pattern of the B-CNT; (b) SEM image of the B-CNT; (c) First charge/discharge curves of the B-CNT and (d) Cycle performance of the B-CNT at a current density of 0.1 A g^{-1} during 100 cycles.

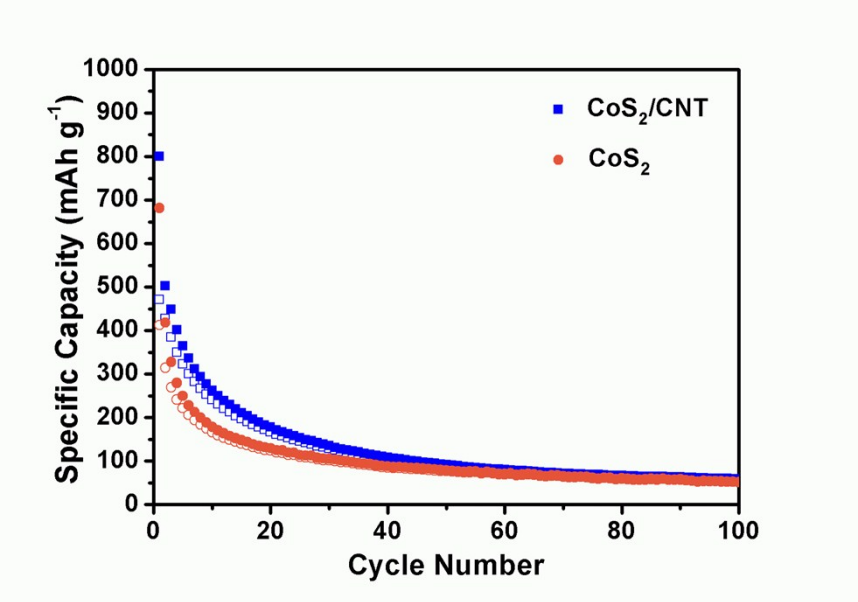

Fig. S5. Cycle performance of the CoS_2 and CoS_2/CNT composite at 0.1 A g^{-1}.

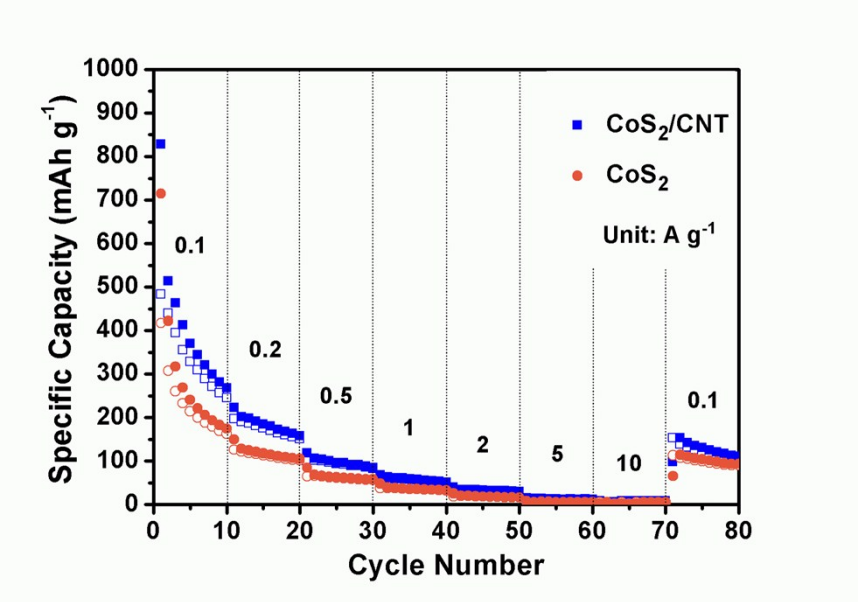

Fig. S6. Rate performance of the CoS_2 and CoS_2/CNT composite under different current densities.

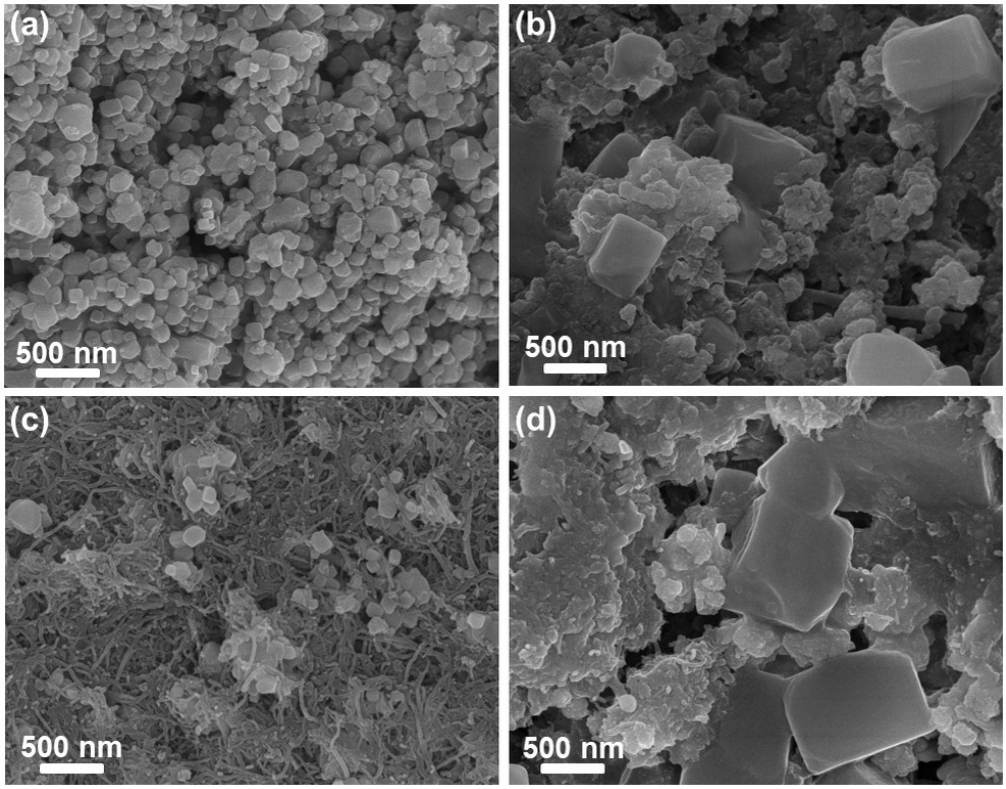

Fig. S7. (a) SEM image of bare CoS_2; (b) SEM image of bare CoS_2 after 100 cycles; (c) SEM image of the CoS_2/CNT ; (d) SEM image of the CoS_2/CNT after 100 cycles.

Table S1. Comparison of sodium storage performance of various cobalt sulfide-based electrodes in the carbonate ester-based electrolyte.

Materials	Current density [A g^{-1}]	Cycle number	Specific capacity [mAh g^{-1}]	Current density [A g^{-1}]	Specific capacity [mAh g^{-1}]	Ref.
CoS_2@GC@B-CNT	0.1 5	100 900	550.0 432.6	1 2 5 10	471.0 455.9 438.0 419.6	This work
CoS_2/multi-walled carbon nanotube	0.1	100	411	0.8	242.3	[S1]
CoS_2 triple-shelled nanoboxes	0.2	100	454	5	346	[S2]

Co_3S_4@polyaniline nanotubes	0.2	100	252.5	4	184.1	[S3]
CoS nanowires@ peapod-like carbon	0.1	100	294	5	235	[S4]
CoS_2-CoS-graphitic carbon microspheres	0.2	100	334	1	411	[S5]
Co_9S_8-carbon	0.5	50	404	1.5	326	[S6]
Co_3S_4@N-rich carbon	0.1	100	420.9	1.4	151.2	[S7]
Carbon nanotube /CoS@carbon	0.1	100	470	5	276	[S8]

References

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