Supplementary Information

CoS_2 nanodots trapped within the graphitic structured N-doped carbon spheres with efficient performances for lithium storage

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Figures

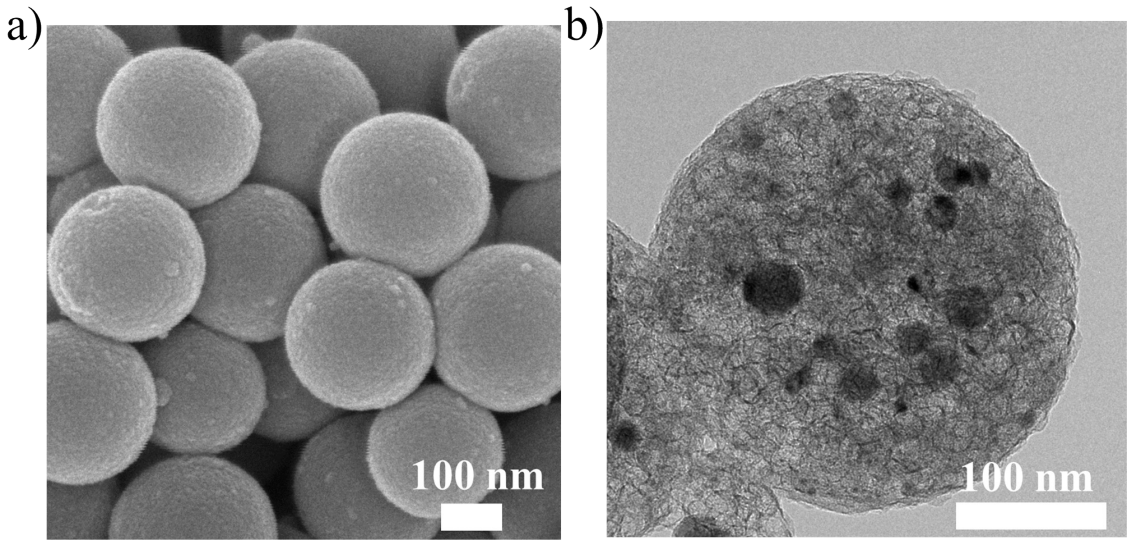

Figure S1. a) SEM and b) TEM images of the Co/NCSs.

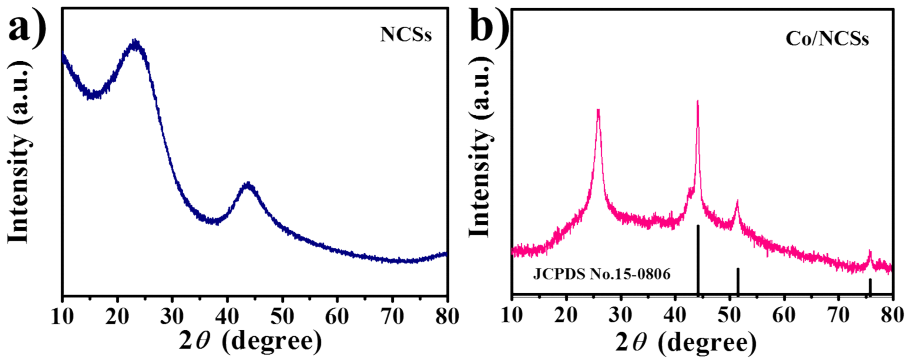

Figure S2. XRD patterns of a) NCSs, b) Co/NCSs.

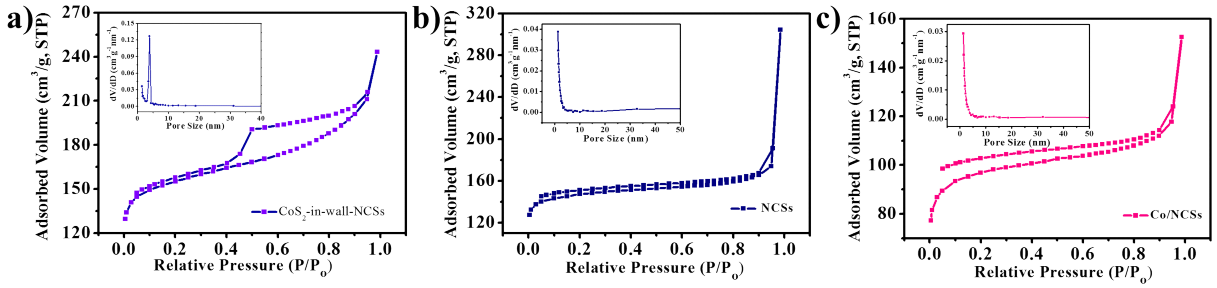

Figure S3. Nitrogen adsorption-desorption isotherms and insert: pore size distribution; a) CoS_2-in-wall-NCSs, b) NCSs, and c) Co/NCSs.

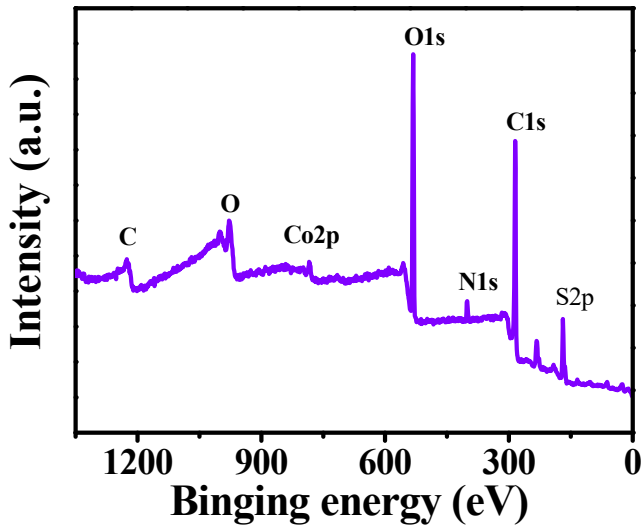

Figure S4. Survey XPS spectrum of CoS_2-in-wall-NCSs.

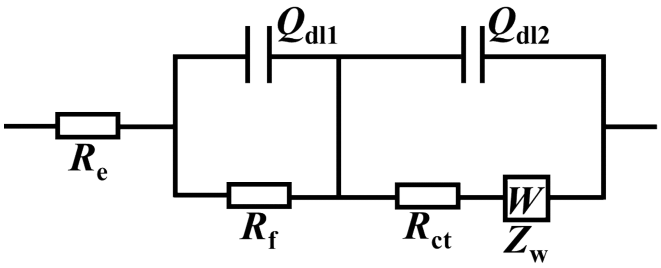

Figure S5. Equivalent series circuit for CoS_2-in-wall-NCSs samples as electrode materials for LIBs. Re: Electrolyte resistance, Rf: Resistance of surface film on the electrodes, Rct: Charge transfer impedance, Zw: Warburg impedance, Qdl1/Qdl2: Constant phase element.

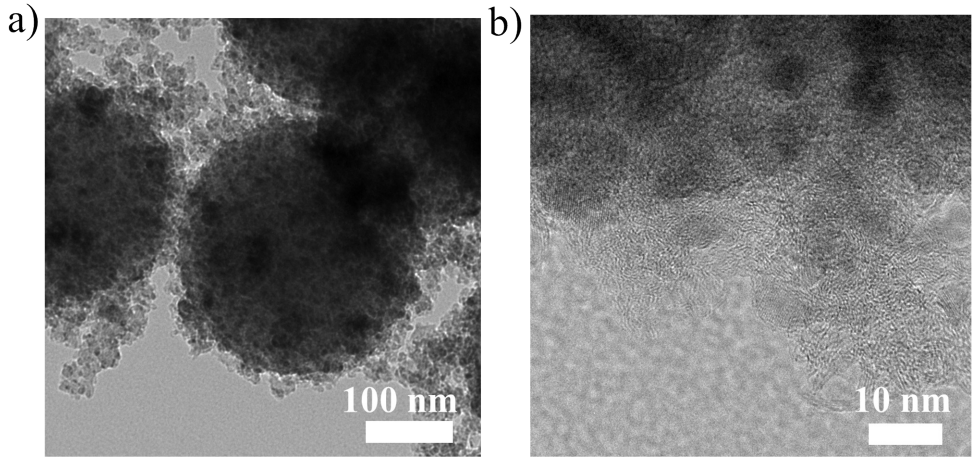

Figure S6. TEM images of the CoS_2-in-pore-NCSs.

Table S1. BET Specific Surface Area of the samples.

Samples	S_{BET}(m^2 g^{-1})	Pore Diameter (nm)	Pore Volume (cc g^{-1})
CoS_2-in-wall-NCSs	480.590	3.835	0.268
Co/NCSs	449.960	1.345	0.193
NCSs	299.021	1.347	0.100

Table S2. Electrochemical performances of the previous reported CoS_2-based nanocomposites anodes.

	CoS_2-based	discharge capacity	voltage range	Capacity Retention	Reference
1	**CoS_2-in-wall-NCSs**	**1415.4 mAh g^{-1} at 200 mA g^{-1}**	**0.01-3.0 V**	**1080.6 mAh g^{-1} (200 mA g^{-1}, 500 cycles)**	***This work***
2	CoS_2/NCNTFs	1191 mAh g^{-1} at 200 mA g^{-1}	0.05-3.0V	1040 mAh g^{-1} (200 mA g^{-1}, 200 cycles)	Nano Res. doi: 10.1007/s12274-016-1394-1
3	CoS_2 NP/Al_2O_3 NSs	1150 mAh g^{-1} at 100 mA g^{-1}	0.01-3.0 V	626 mAh g^{-1} (100 mA g^{-1}, 150 cycles)	J. Mater. Chem. A, 2017, 5, 2861
4	CoS_2 nanobubble hollow prisms	910 mAh g^{-1} at 200 mA g^{-1}	0.01-3.0 V	864 mA h g^{-1} (200 mA g^{-1}, 50 cycles)	Angew. Chem. Int. Ed. 2016, 55,13422.
5	rGO/CoSx	1248 mA h g^{-1} at 100 mA g^{-1}	0.01-3.0V	670 mA h g^{-1} (100 mA g^{-1}, 100 cycles)	Chem. Eur. J. 2016, 22,1467.
6	Co_9S_8 nanorods-coated carbon fiber	632 mA h g^{-1}at 100 mA g^{-1}	0.01-3.0V	515 mA h g^{-1} (100 mA g^{-1}, 60 cycles)	Chem. Mater. 2016, 28, 3897.
7	NC/CoS_2	710 mAh g^{-1} at 100 mA g^{-1}	0.01-3.0V	560 mAhg^{-1} (100 mA g^{-1}, 50 cycles)	small 2015, 11, 2511.
8	the yolk–shell CoS_2@NG	995 mA h g^{-1} at 0.2C	0.01-3.0V	1099 mA h g^{-1} (100 mA g^{-1}, 150 cycles)	Chem. Eur. J. 2015, 21, 4359.
9	worm-like CoS_2	1416 mA h g^{-1} at 100 mA g^{-1}	0.05-3.0V	883 mA h g^{-1} (100 mA g^{-1}, 100 cycles)	J. Mater. Chem. A, 2015, 3,10677.
10	hollow CoS_2@C	800 mA h g^{-1} at 500 mA g^{-1}	0.01-3.0V	730 mA h g^{-1} (500 mA g^{-1}, 200 cycles)	J. Power Sources, 2015, 286, 159.