Supporting Information

Fast Conversion of Lithium (poly) sulfides in Lithium-Sulfur Batteries Using Three-Dimensional Porous Carbon

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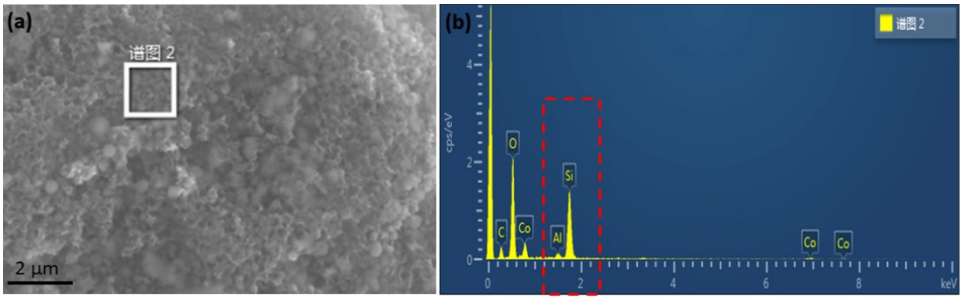

Figure S1. The (a) SEM and (b) EDS diagram of spherical SiO_2 coated with ZIF.

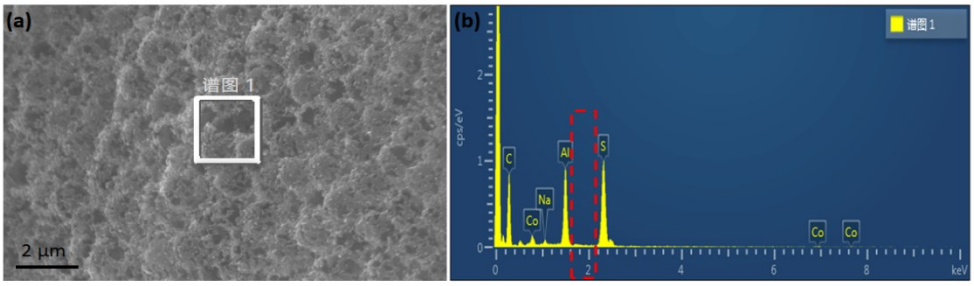

Figure S2. The (a) SEM and (b) EDS diagram of ZIF coating without SiO_2 template.

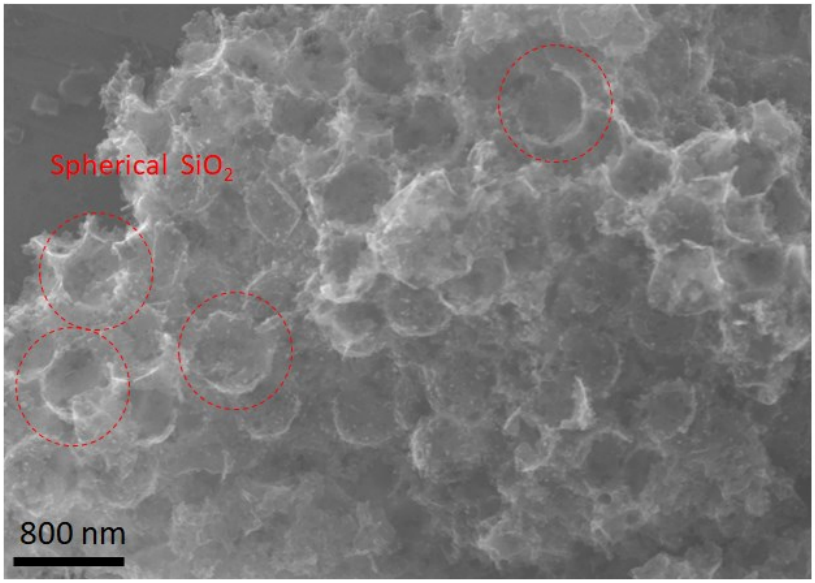

Figure S3. SEM image of ZIF coated spherical SiO_2 material after carbonization.

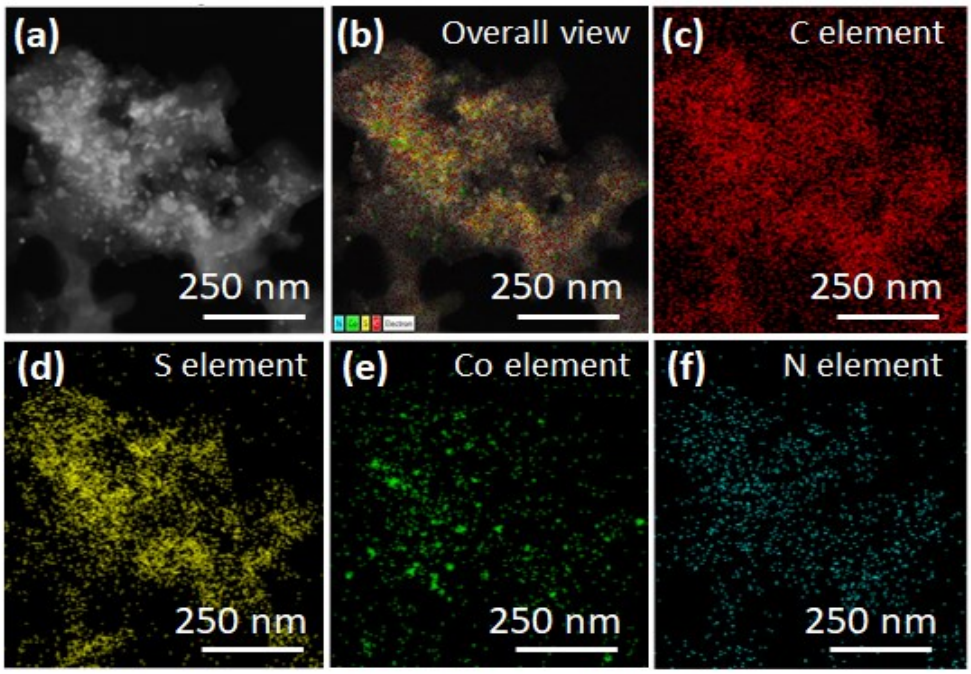

Figure S4. SEM image of (a) TDPC and corresponding elemental maps of (b) overall view map, (c) C element, (d) S element, (e) Co element, and (k) N element.

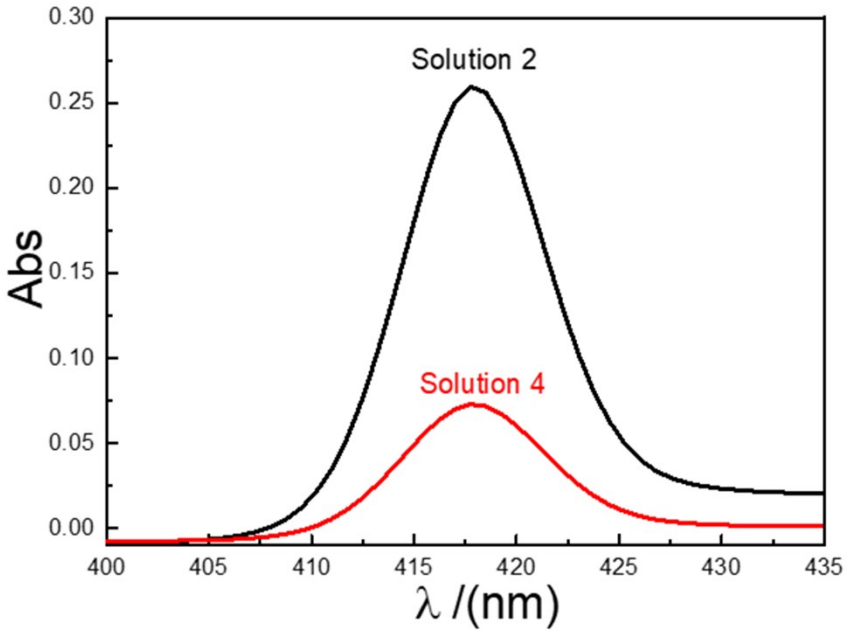

Figure S5. the UV-Vis of solution 2 and solution 4 in Figure 3f.

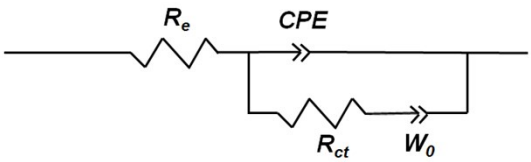

Figure S6. Equivalent circuit. The high-frequency intercept on the real axis represents the ohmic resistance (R_e) of the cell, including the electrolyte and electrode resistances. The semicircles in the high-frequency region along with a radial oblique line in the low-frequency region correspond to the charge-transfer resistance (R_{ct}) and the Warburg impedance (W_0).

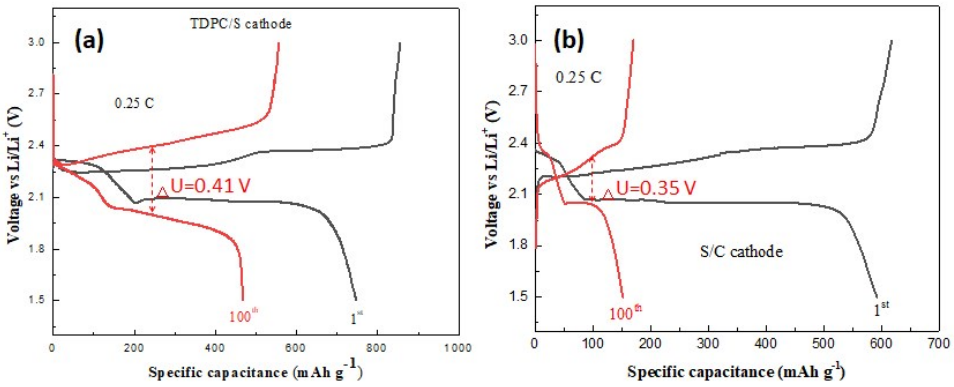

Figure S7. (b) SEM image of the corresponding electrode after washing by THF. charge-discharge curves of a) TDPC/S cathode, and b) S/C cathode at 0.25 C of different cycles.

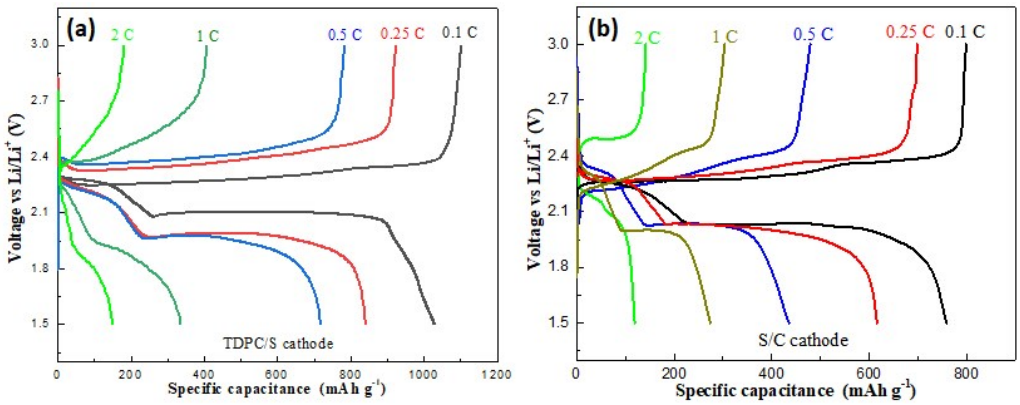

Figure S8. Charge-discharge curves of a) TDPC/S cathode, and b) S/C cathode at different current densities.

Table S1. Summary of the performance of sulfur based cathodes for Li-S batteries in published literatures.

	Synthetic Method	First Discharge Capacity (mAh/g)	C-Rate Capacity (mAh/g)	Total Cycle Number	Sulphur Looading in electrode	Reference
TDPC@S	removable-template approach	1140 (0.1C)	959.9(0.25C); 813.5(0.5C); 519.6 (1C); 349.1 (2C)	500 (1C)	3.8 mg cm^{-2}	This work
HPBC -S	sol–gel route	922(0.5C)	550(2C)	300(1C)	81.29 wt%	J. Mater. Chem. A, 2014, 2, 13916–13922
C/S@PPy	in situ chemical oxidative polymerization	1120(0.2C)	400(1C)	100(1C)	84 wt%	ACS Appl. Mater. Interfaces 2013, 5, 2208−2213
CNT-S	the bottom–up fabrication	995(0.05C)	——	150(0.05C)	6.3 mg cm^{-2}	Adv. Funct. Mater. 2014, 24, 6105–6112
Poly(S-r-DIB) copolymer	Copolymer sulfur electrode	1100(0.1C)	740(1C); 430(2C)	300 (0.25)	0.8 mg cm^{-2} 67.5%	Chem. Commun., 2016, 52, 4525 -4528
SM microgels	Microgels electrode	1118(0.1C)	750(0.5C) 620(1C)	500 (0.5)	1.0 mg cm^{-2}	Chem. Commun., 2016, 52, 4525 -4528