

Supporting Information

Pomegranate-Like Microclusters Organized by Ultrafine Co nanoparticles@Nitrogen-Doped Carbon Subunits as Sulfur Host for Long-life Lithium Sulfur Batteries

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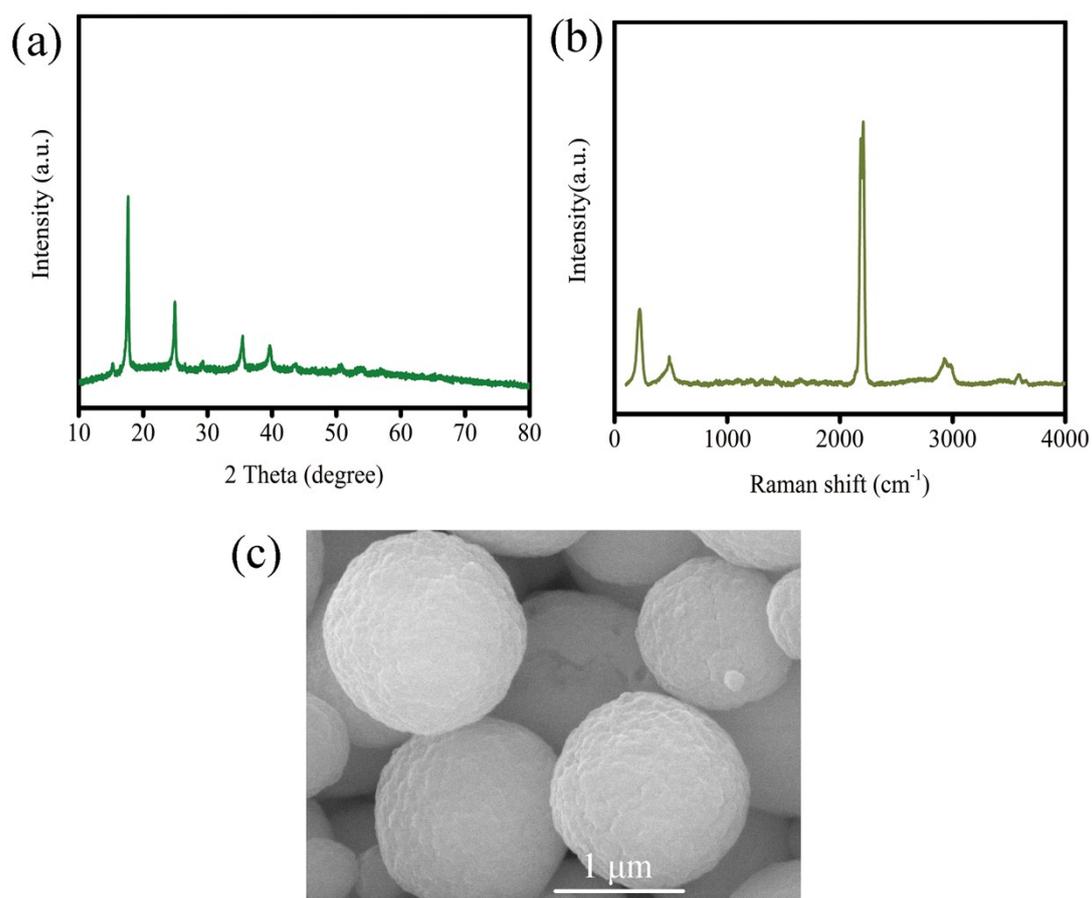


Fig. S1 (a) XRD pattern; (b) Raman spectrum and (c) SEM image of $Zn_3[Co(CN)_6]_2/PVP-F127$

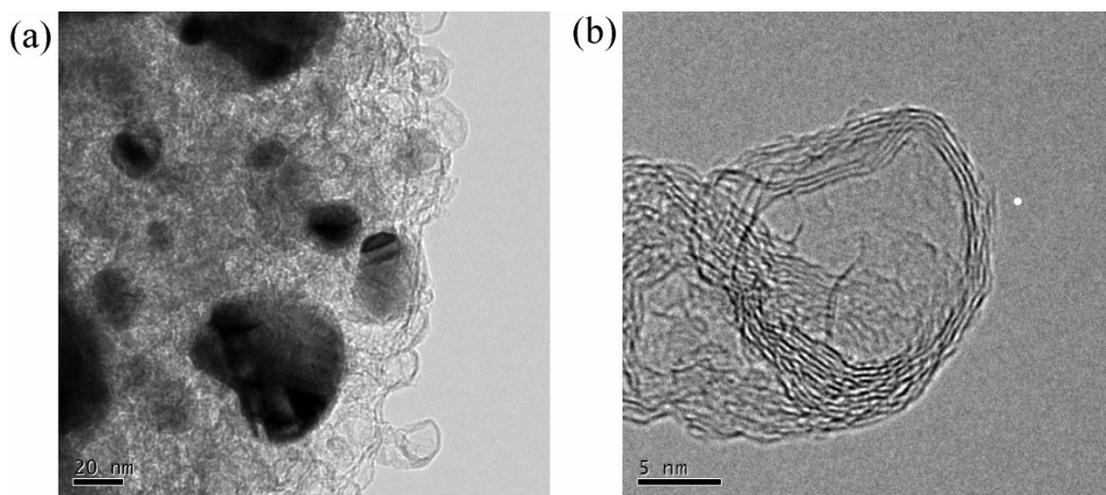


Fig. S2 (a) and (b) high-solution TEM images of Co-NPC

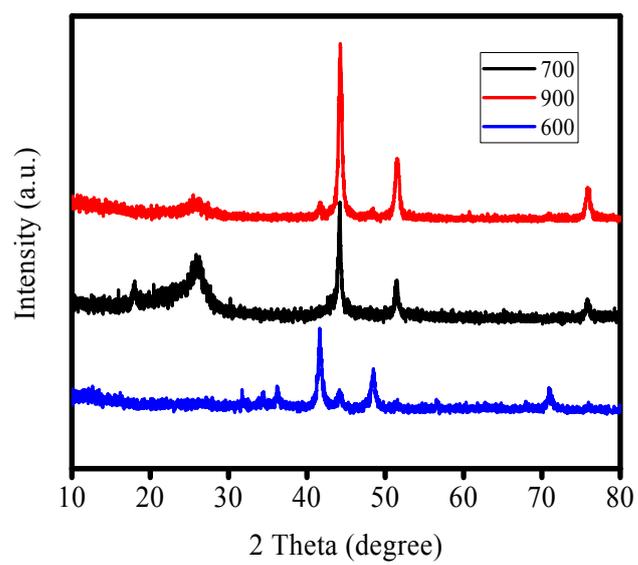


Fig. S3 XRD patterns of different produce at different annealing temperatures

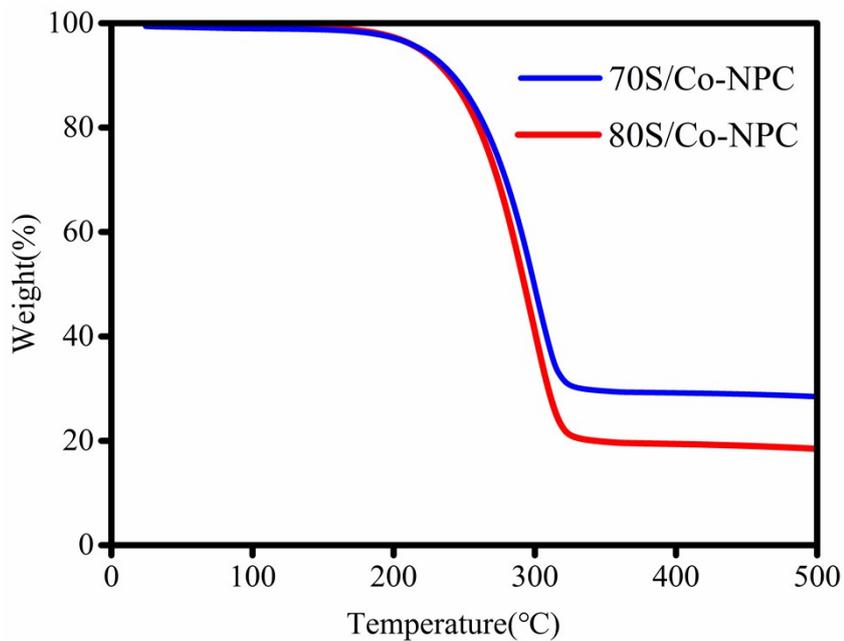


Fig. S4. TG curves of S/Co-NPC-MCs

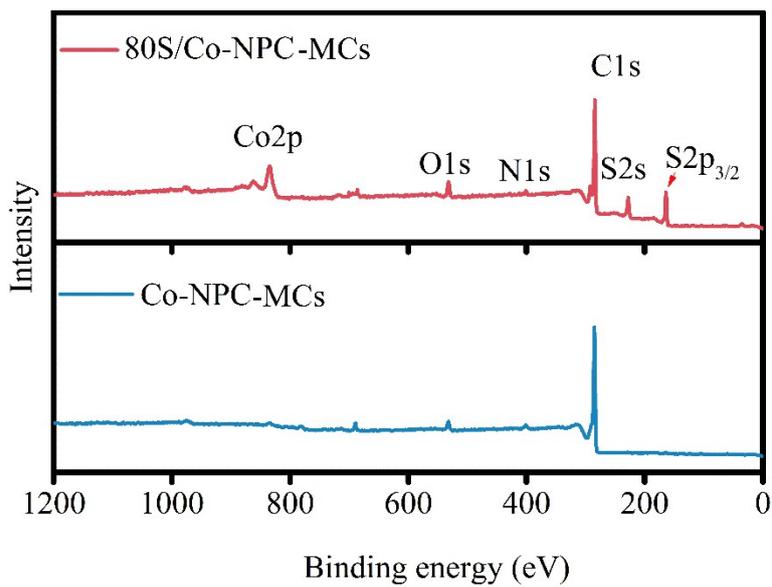


Fig. S5. The overview XPS spectrum of Co-NPC-MCs and 80S/ Co-NPC-MCs

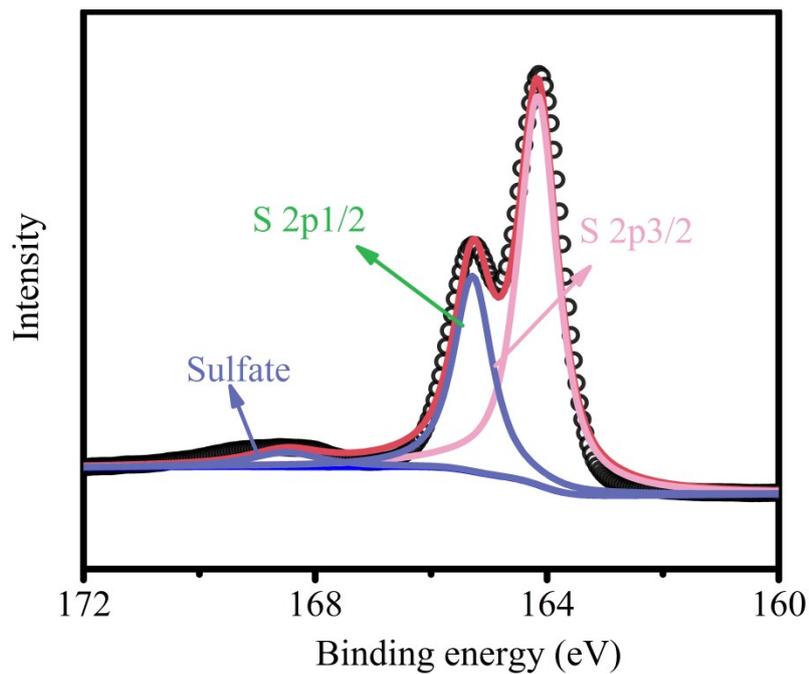


Fig. S6 XPS spectra of S 2p of the 80S/Co-NPC-MCs composites.

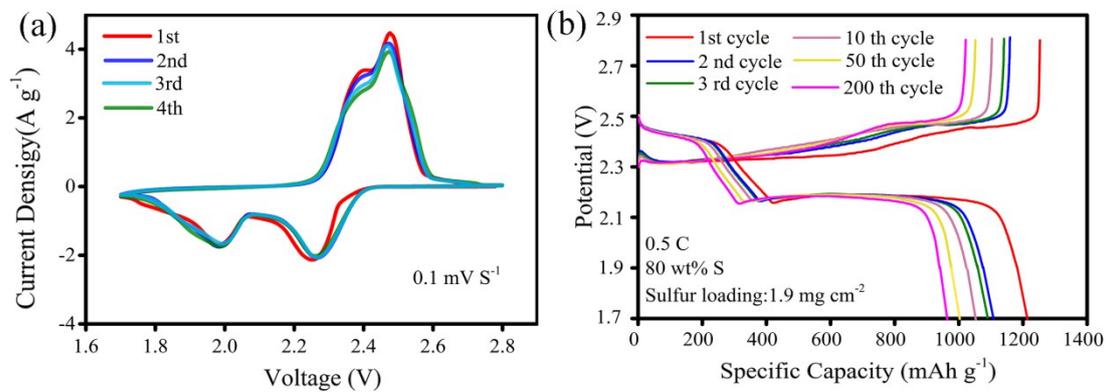


Fig. S7 (a) Initial four CV curves of 80S/Co-NPC-MCs composite; (b) galvanostatic discharge–charge voltage profile at 0.5 C of 80S/Co-NPC-MCs composite;

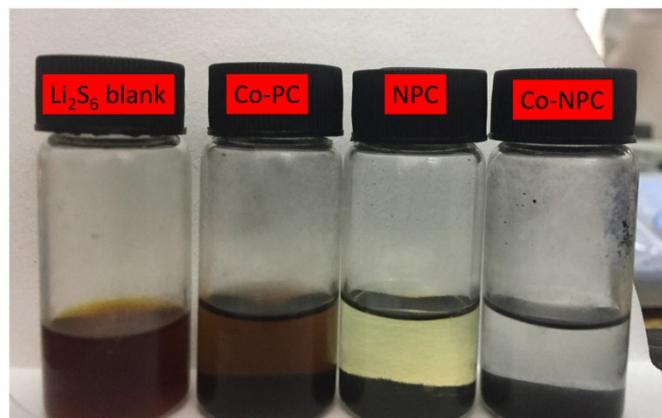


Fig. S8 Sealed vials of Li_2S_6 /DME&DOL solutions, after contact with Co-PC, NPC and Co-NPC composites.

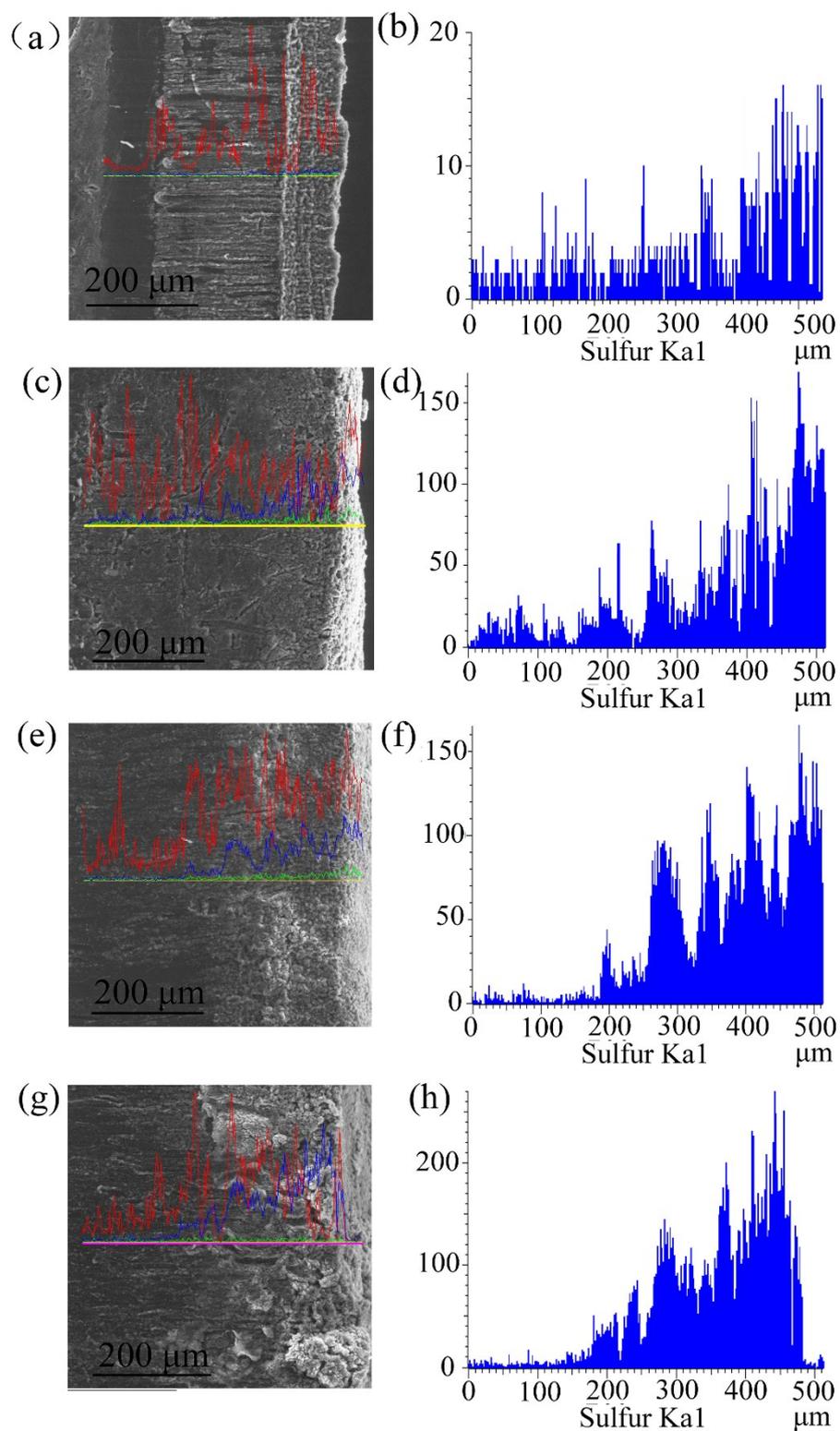


Fig. S9 (a) the cross-section SEM images of fresh lithium anode, combing with the corresponding line-scanning result, (b) line-scanning result of sulfur of (a); (c) the cross-section SEM images of lithium anode after 200 cycles with 80S/Co-NPC-MCs cathode, combing with the corresponding line-scanning result, (d) line-scanning result

of sulfur of (c); (e) the cross-section SEM images of lithium anode after 200 cycles with 80S/Co-PC-MCs cathode, combining with the corresponding line-scanning result, (f) line-scanning result of sulfur of (e); (g) the cross-section SEM images of lithium anode after 200 cycles with 80S/NPC-MCs cathode, combining with the corresponding line-scanning result, (h) line-scanning result of sulfur of (g).

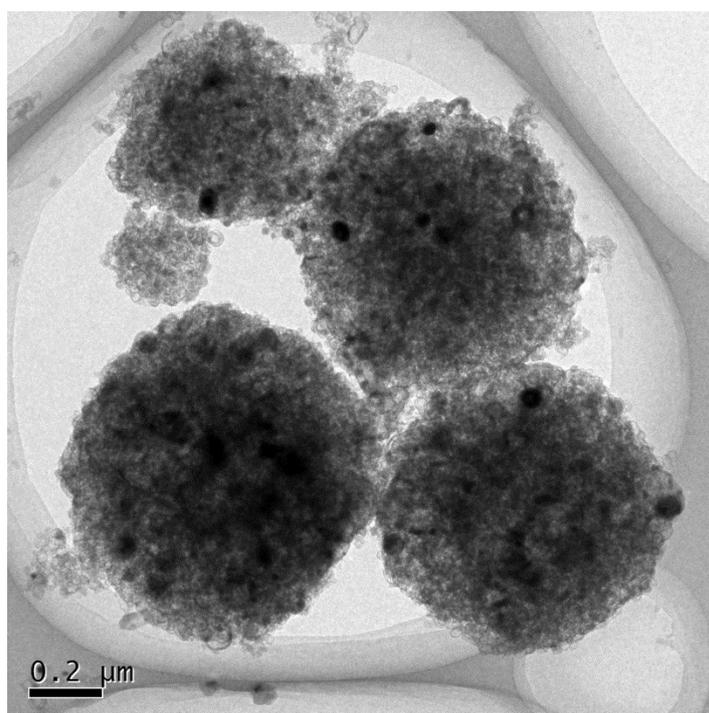


Fig. S10 Ex situ TEM image of 80S/Co-NPC cycles after 400 cycles

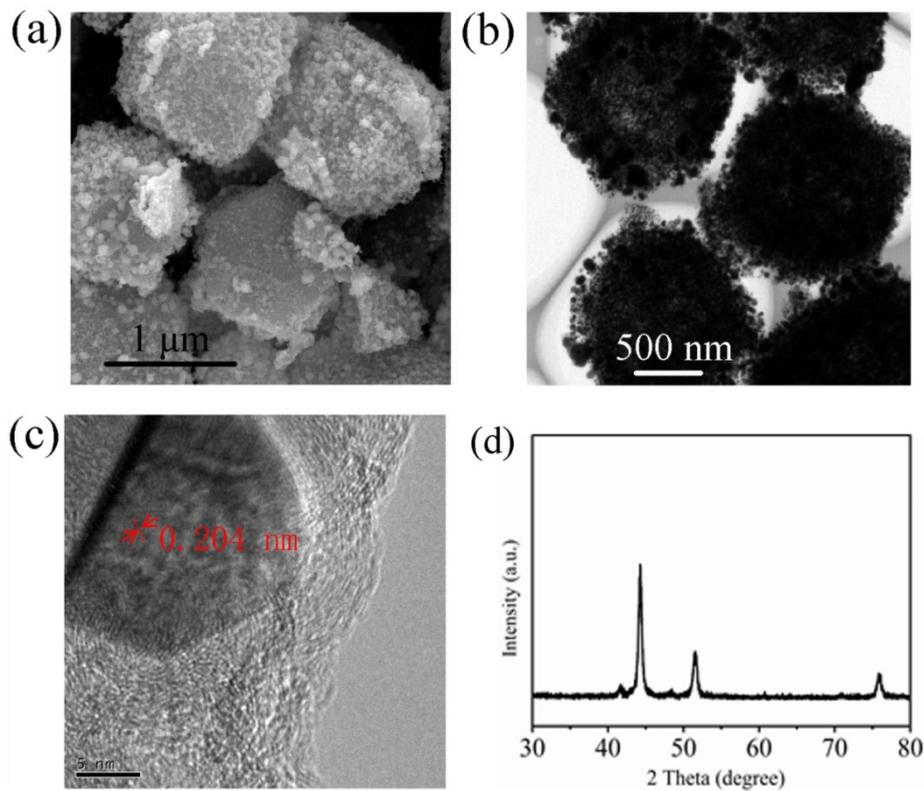


Fig. S11. (a) SEM image, (b) and (c) TEM images, (d) XRD pattern of Co-BZ

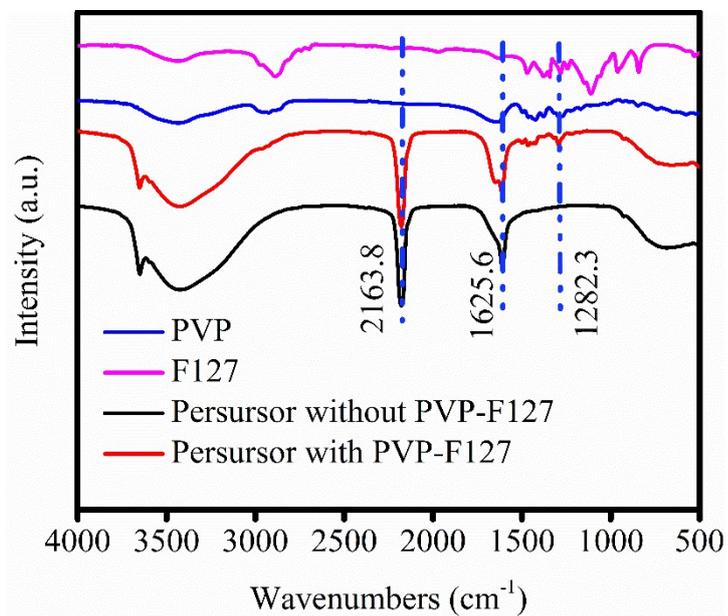


Fig. S12. FT-IR of precursor without and with PVP-F127, PVP and F127

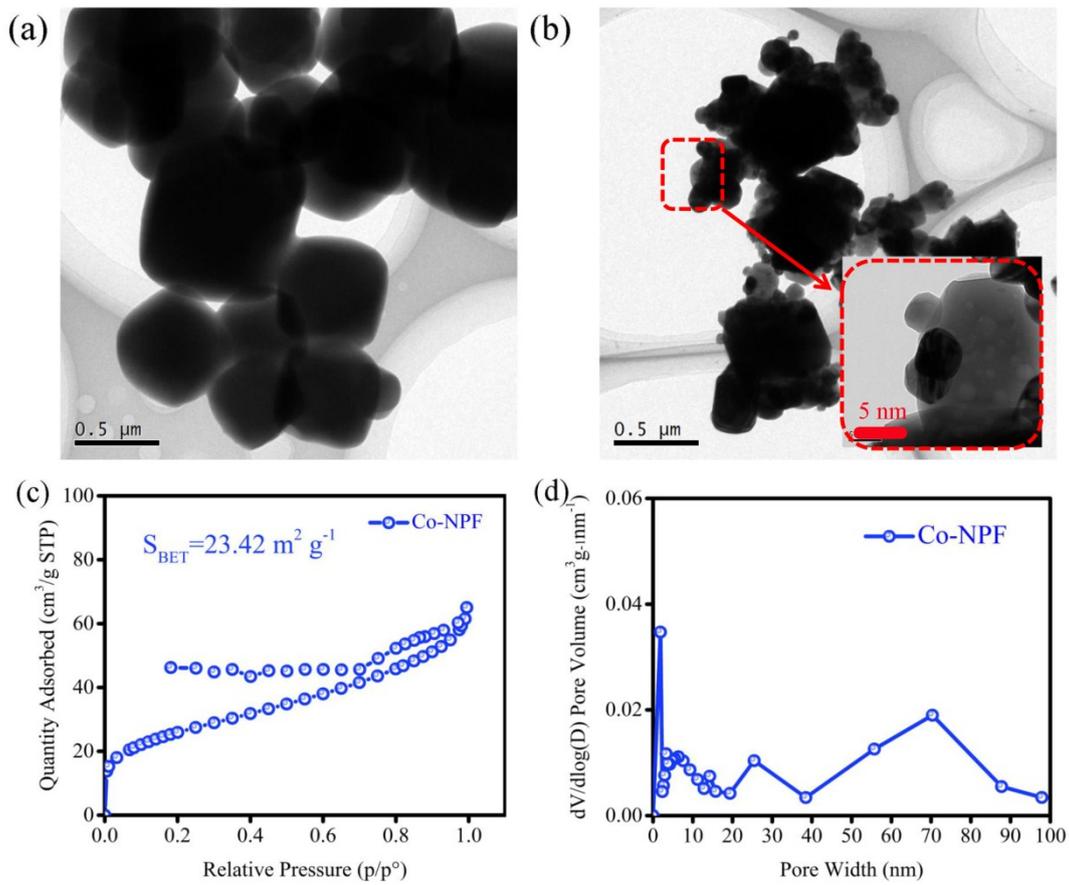


Fig. S13 TEM images of (a) $\text{Zn}_3[\text{Co}(\text{CN})_6]_2$, (b) Co-NPF, (c) N_2 adsorption-desorption isotherms, and (d) pore size distributions of the as-prepared Co-NPF

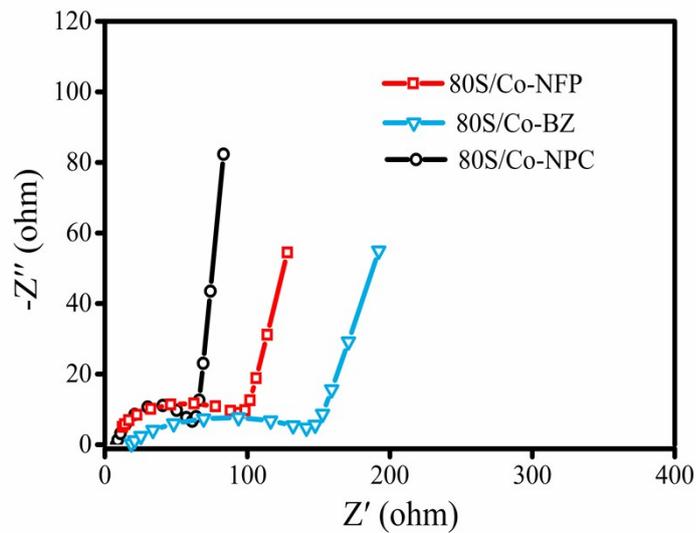


Fig. S14 Nyquist plots of 80S/Co-NPC, 80S/Co-BZ and 80S/Co-NPF

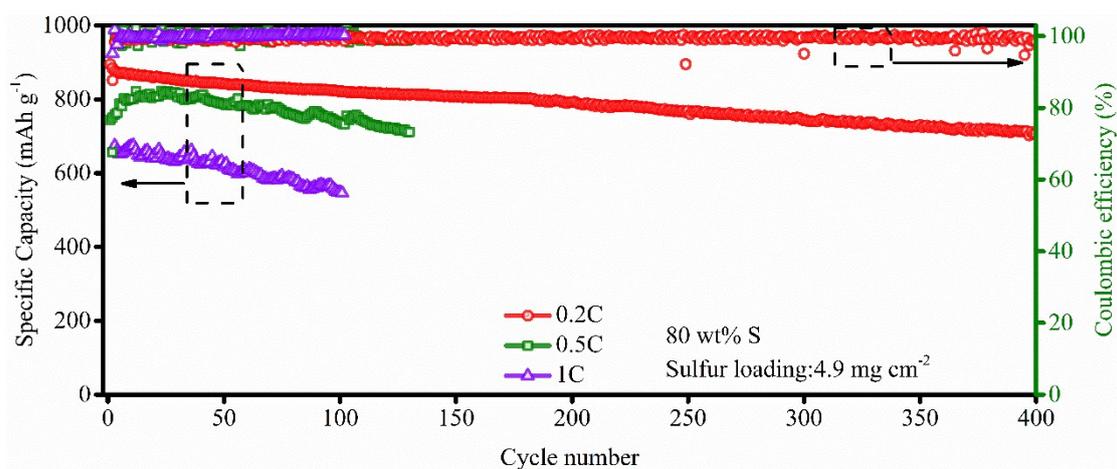


Fig. S15 Cycling performance of 80S/Co-NPC-MCs cathode with 4.9 mg cm^{-2} at 0.2 C, 0.5 C, and 1 C rate.

Tab. S1. XPS and EDX result of Co-NPC

Element	C	N	Co	Zn	O
XPS result (Atomic%)	82.56	9.31	3.23	0.33	4.89
EDX result (Atomic%)	80.82	9.55	3.53	0.12	5.97

Tab. S2. The surface area and pore volume of Co-NPC, Co-PC and NPC.

Materials	Surface Area (m^2g^{-1})	Pore Volume ($\text{cm}^3 \text{g}^{-1}$) (at $P/P^0 = 0.99$)
Co-NPC	470	0.93
Co-PC	489	1.13
NPC	553	1.85