Supporting Information to

Nitrogen-doped Porous Carbon Networks with Active Fe-N_x Sites to Enhance Catalytic Conversion of Polysulfides in Lithium-Sulfur Batteries

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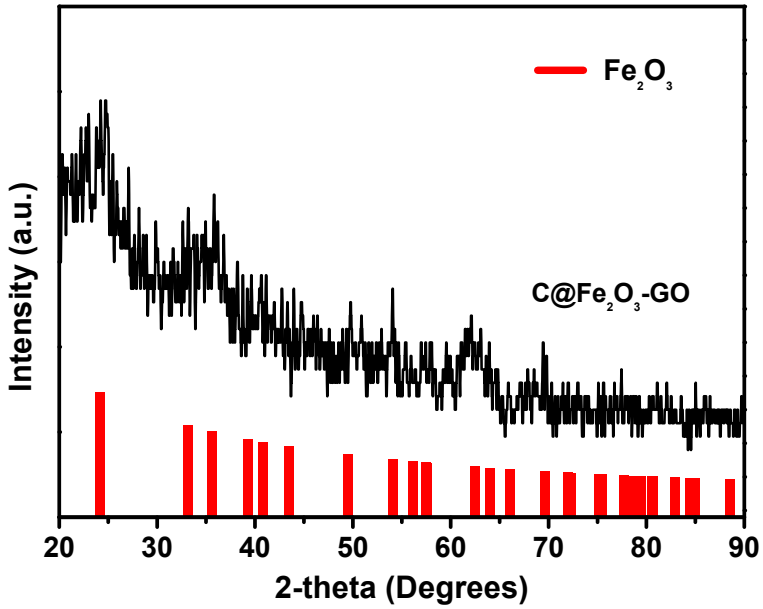

Figure S1. XRD patterns of C@Fe_2O_3-GO.

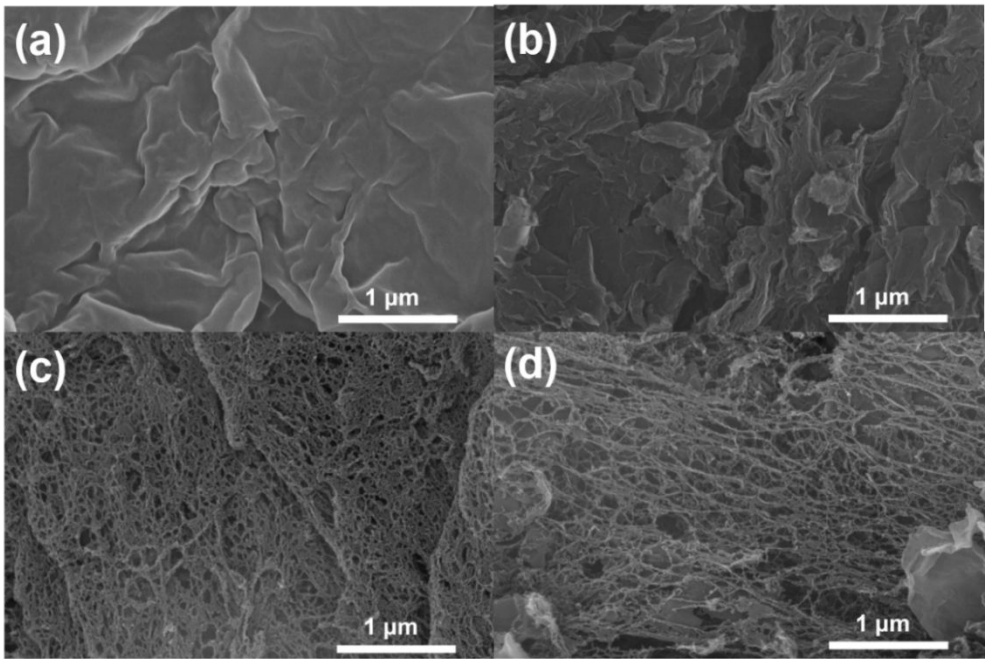

Figure S2. SEM images of (a) C@Fe_2O_3-GO, (b) Fe_3C@C, (c) Fe_3C/Fe-N_x@NPCN, and (d) NPC.

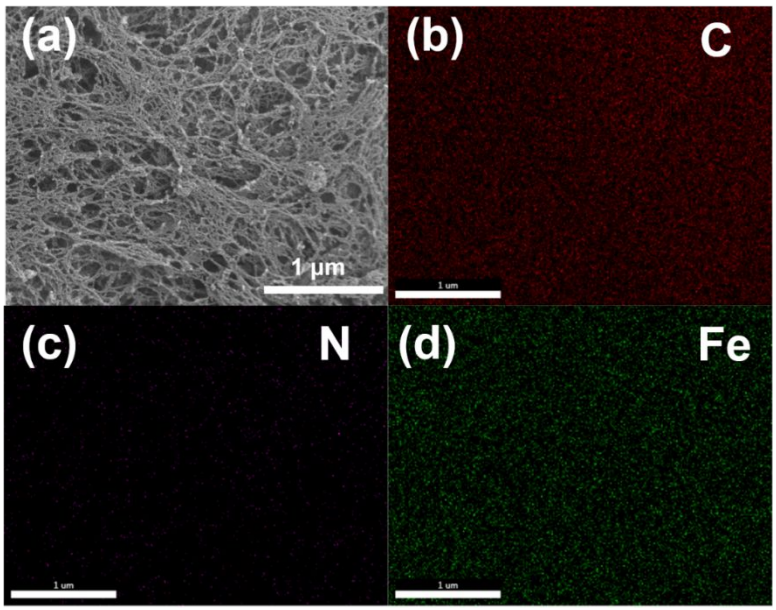

Figure S3. (a) SEM image of $Fe_3C/Fe\text{-}N_x@NPCN$, and the corresponding elemental mapping of (b) C; (c) N; (d) Fe.

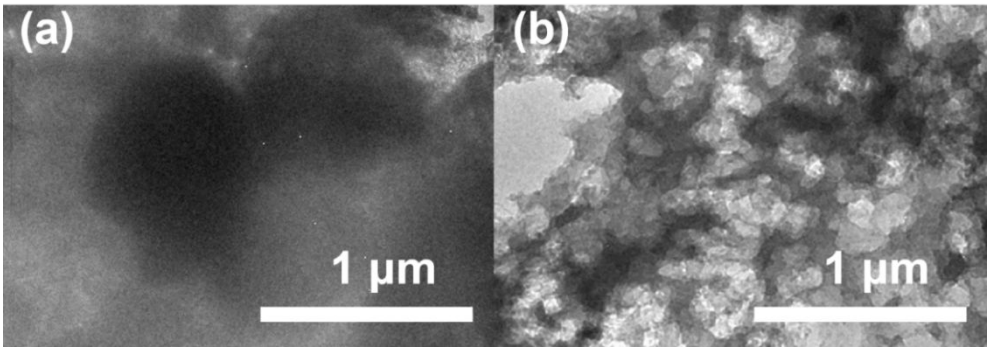

Figure S4. TEM images of (a) $Fe_3C@C$; (b) NPC.

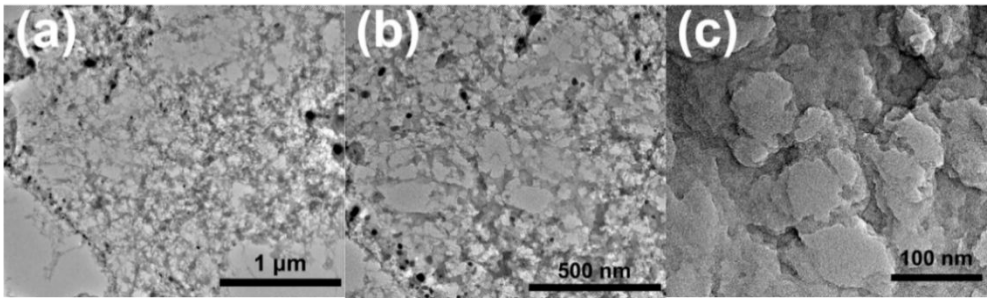

Figure S5. TEM images of $Fe_3C/Fe\text{-}N_x@NPCN$.

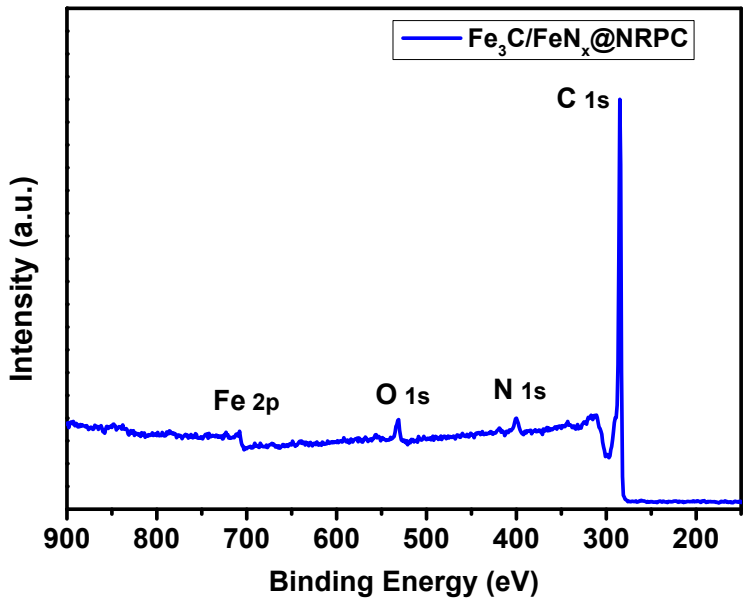

Figure S6. Wide scan XPS spectrum of Fe_3C/Fe-N_x@NPCN.

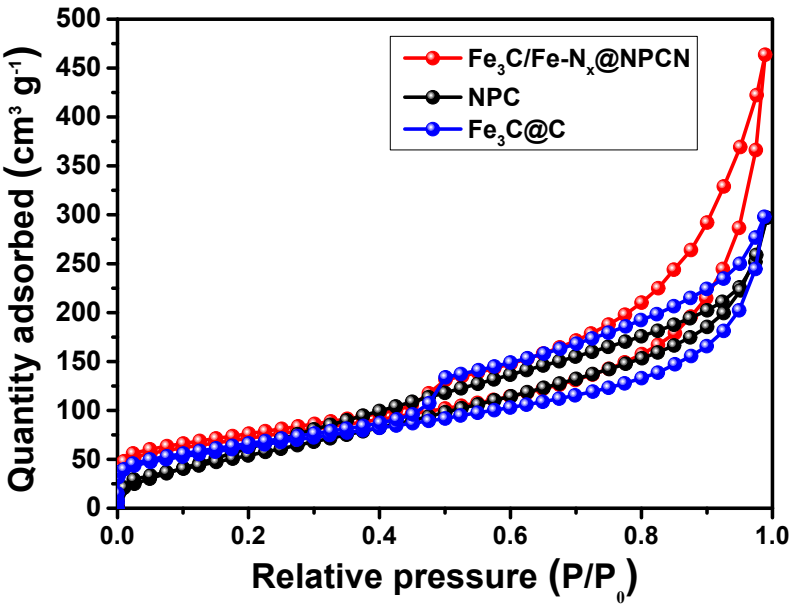

Figure S7. N_2 adsorption-desorption isotherms of Fe_3C/Fe-N_x@NPCN, Fe_3C@C and NPC composites.

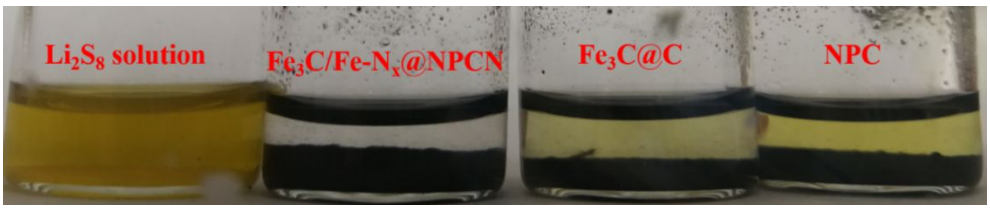

Figure S8. Digital image of the Li_2S_8 (0.05 M) solution after soaking Fe_3C/Fe-N_x@NPCN, Fe_3C@C and NPC for 30 min.

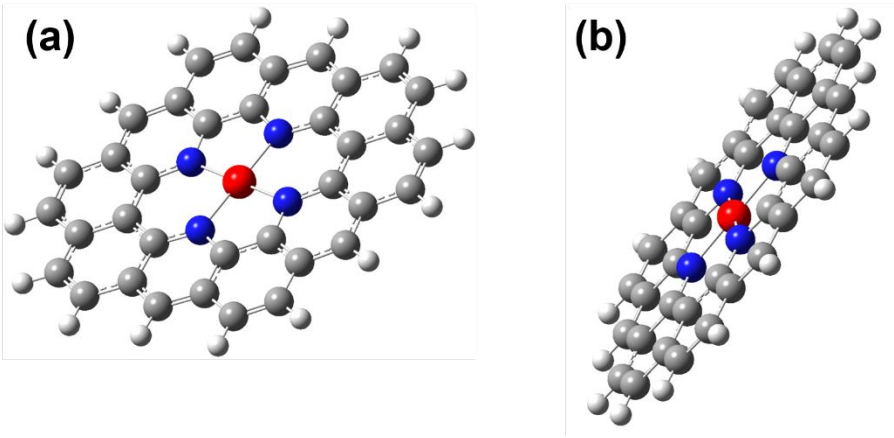

Figure S9. Structures of Fe-N_4 moieties on N-doped porous carbon networks used in first-principles calculations.

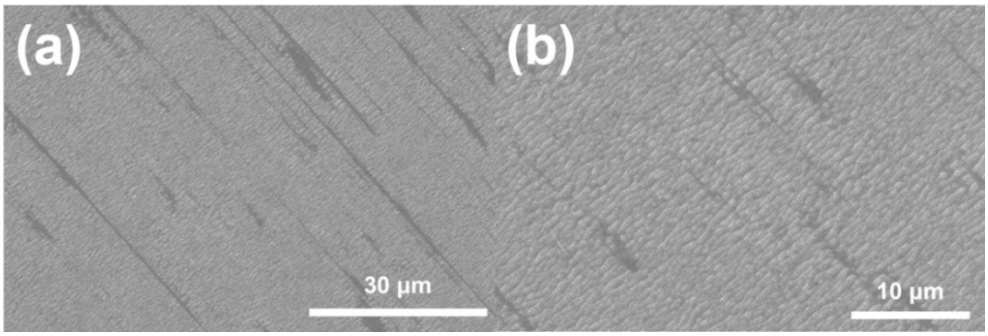

Figure S10. SEM images of pure PP membrane under different magnifications.

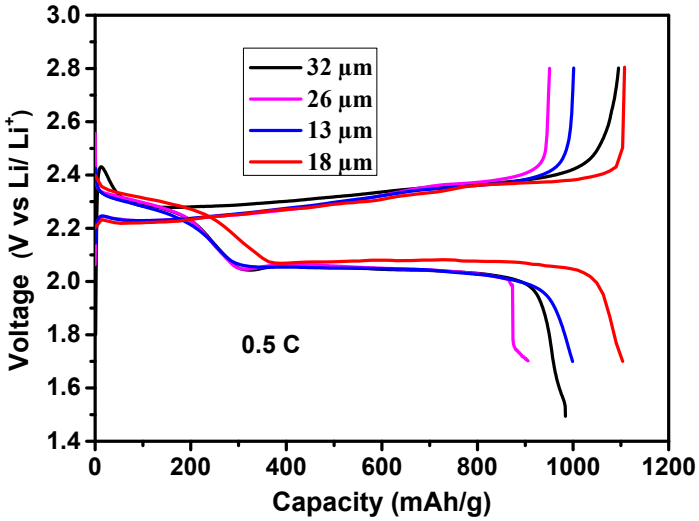

Figure S11. Discharge curves of the Li-S batteries assembled with modified PP separators of different Fe_3C / Fe-N_x@NPCN coating thickness values.

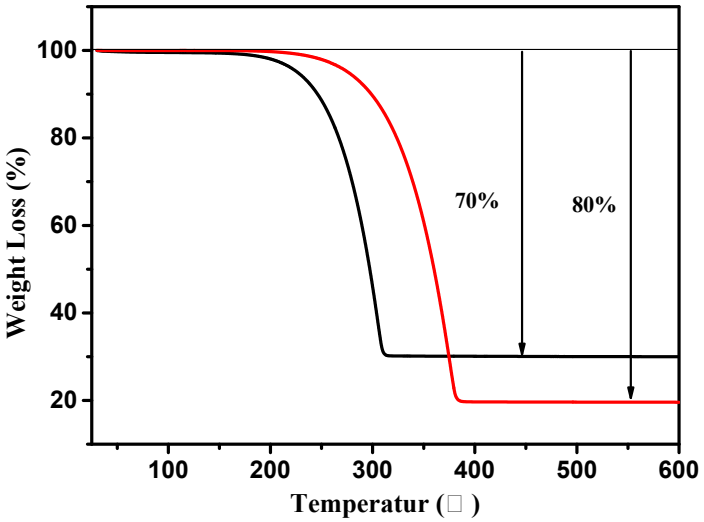

Figure S12. TGA of super-P/S under N_2 atmosphere.

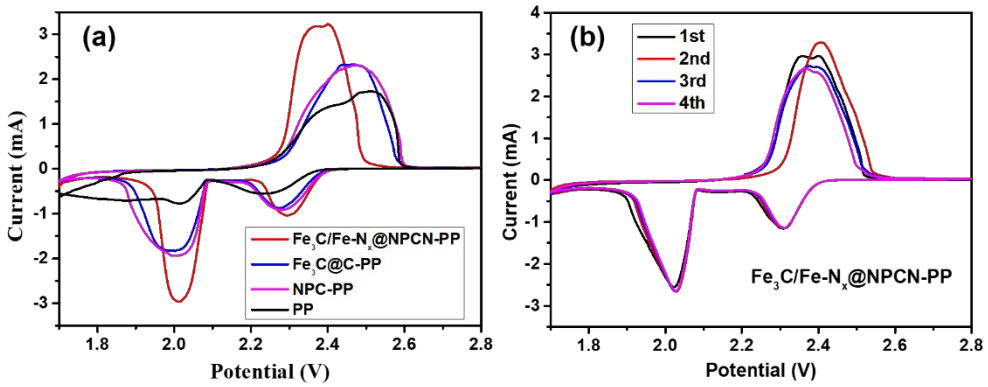

Figure S13. CV profiles of (a) Fe_3C/Fe-N_x@NPCN-PP, Fe_3C@C-PP, NPC-PP, and PP batteries. (b) CV profiles of Fe_3C/Fe-N_x@NPCN-PP at different cycles.

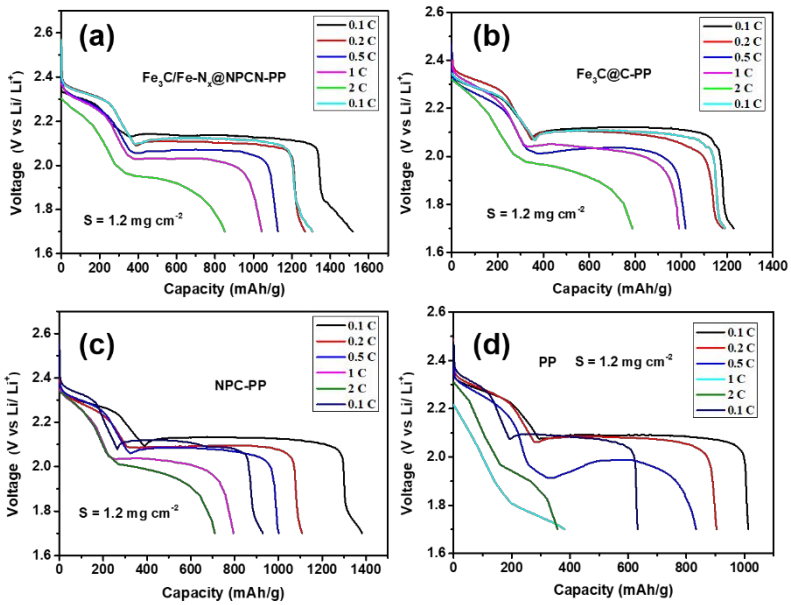

Figure S14. (a-d) Fe_3C/Fe-N_x@NPCN-PP, Fe_3C@C-PP, NPC-PP and PP batteries galvanostatic discharge-charge profiles at 0.1 to 2 C.

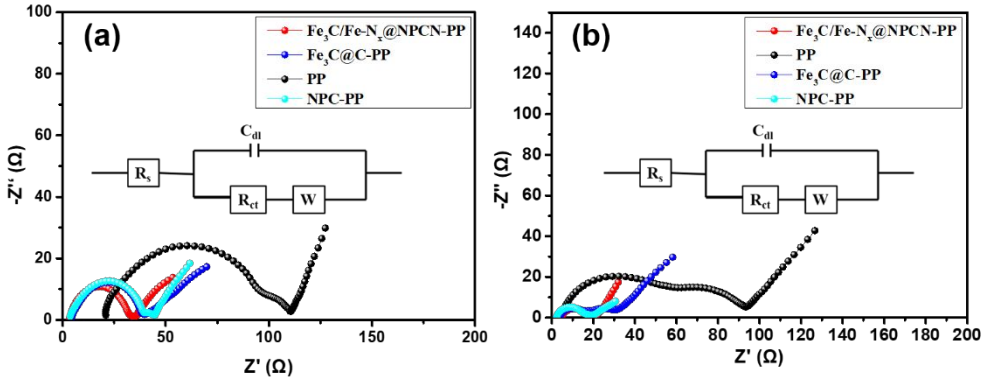

Figure S15. Nyquist plots of the Fe_3C/Fe-N_x@NPCN-PP, Fe_3C@C-PP, NPC-PP and PP batteries (a) before cycling and (b) after 50 cycles at 0.5 C.

Table S1. Physical properties of PP separator.

Thickness	JIS Gurley	TD Shrinkage	Pore size
25 μm	620 seconds	0%	0.028 μm