Supporting information for

Co-doped g-C_3N_4 nanotubes decorated separators mediate polysulfide redox for high performance lithium sulfur batteries

Zunhao Fan,[a] Mengting Zhu,[a, b] Shungui Deng,[b] Yanhua Chen,[c] Yue Zhao,[b,e] Mengyuan Qin, [a] Guiyuan Ma, [a] Jinghua Wu,[b, d *] Xing Xin[a*]

a School of Material Science and Chemical Engineering, Ningbo University, Ningbo 315211, P. R. China

b Ningbo Institute of Materials Technology and Engineering, Chinese Academy of Sciences, Ningbo 315201, P. R. China

c Zhejiang Fashion Institute of Technology, Ningbo 315211, Zhejiang, P. R. China

d Center of Materials Science and Optoelectronics Engineering, University of Chinese Academy of Sciences, Beijing 100049, P. R. China

e Key Laboratory of Material Physics, Ministry of Education, School of Physics and Microelectronics, Zhengzhou University, Zhengzhou 450001, China

*Corresponding authors: xinxing@nbu.edu.cn, wujh@nimte.ac.cn

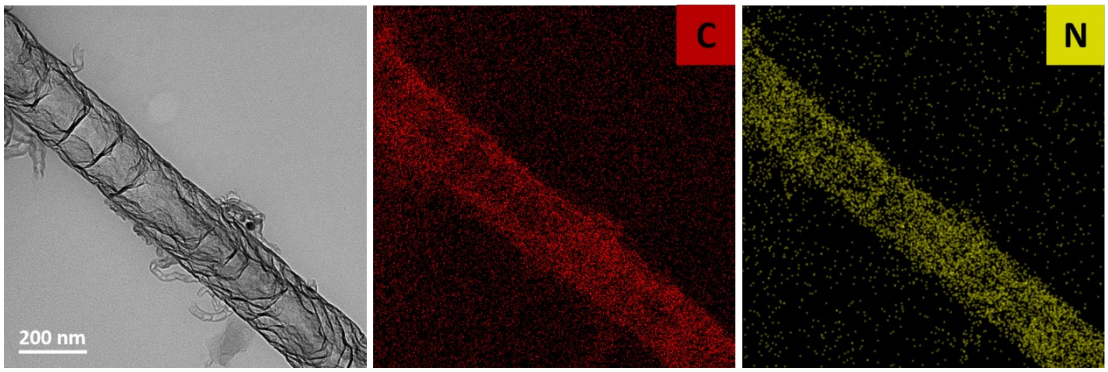

Fig. S1. STEM-EDX mapping of Co-TCN

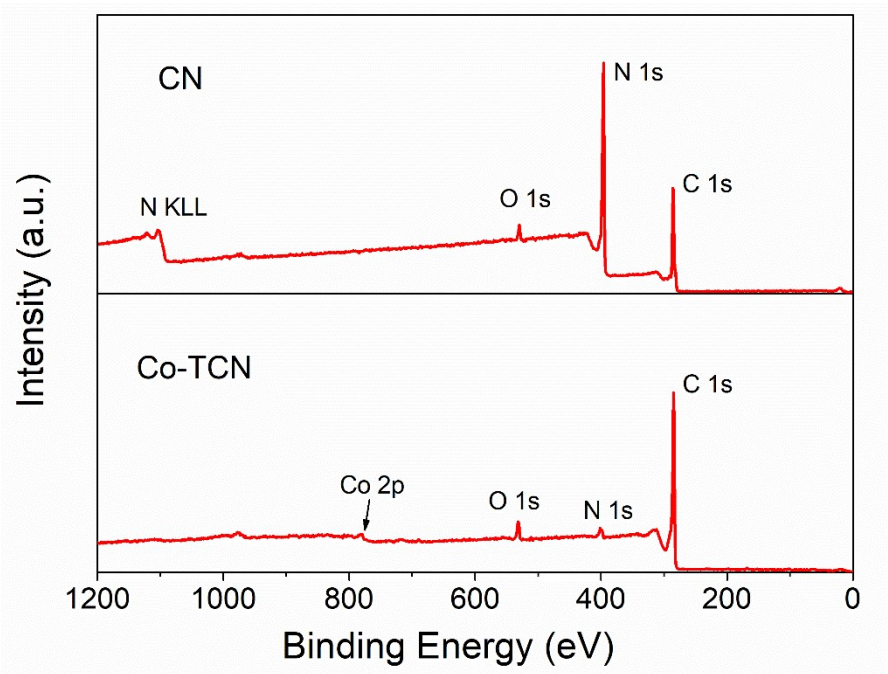

Fig. S2. XPS spectra of full spectrum for Co-TCN sample.

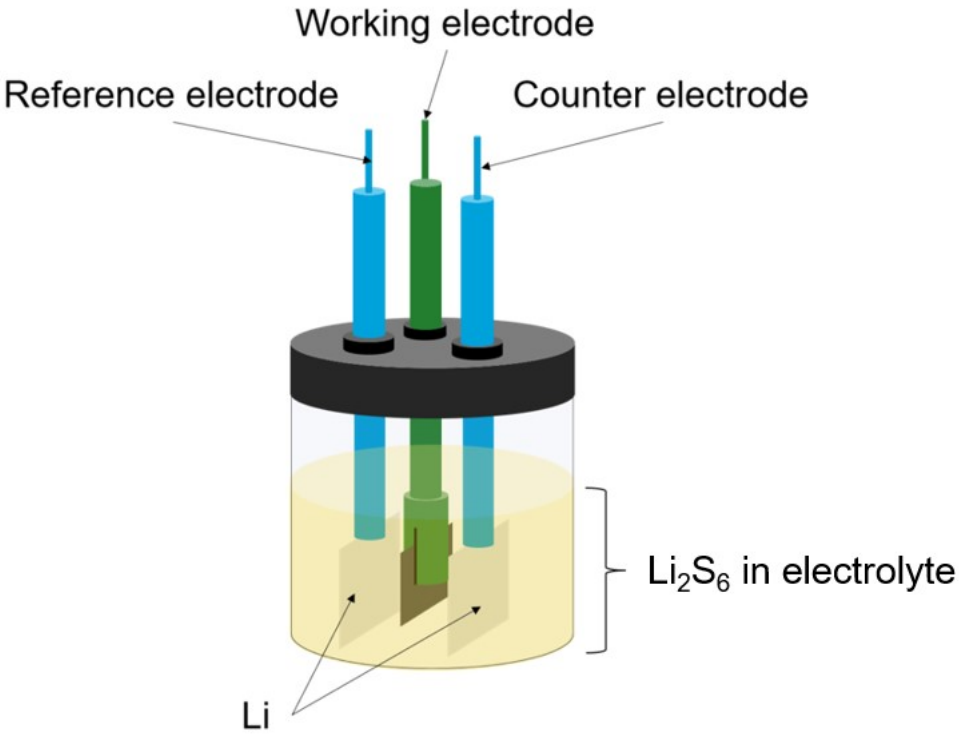

Fig. S3. Diagram of elucidated by exchange current measurements using linear scanning voltammetry (LSV) with a Li_2S_6 solution in a three-electrode cell.

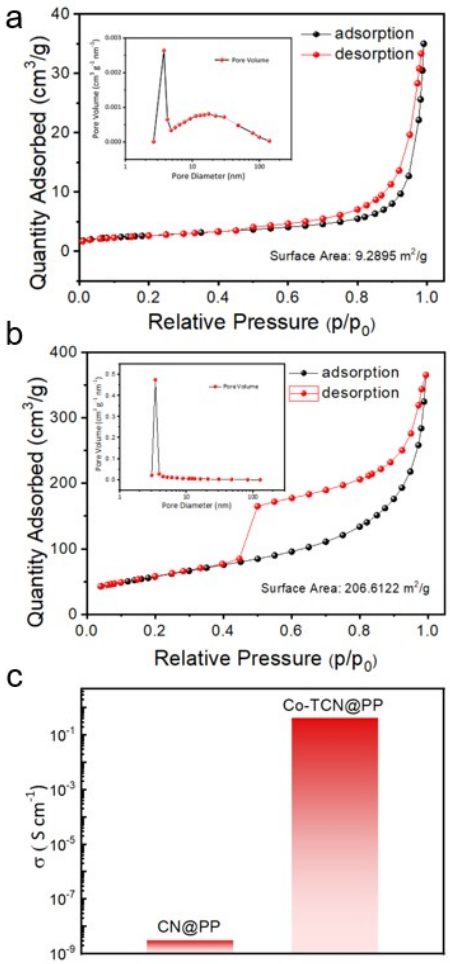

Fig. S4. N_2 adsorption/desorption isotherms of g) CN and h) Co-TCN. i) Conductivity of CN and Co-TCN.

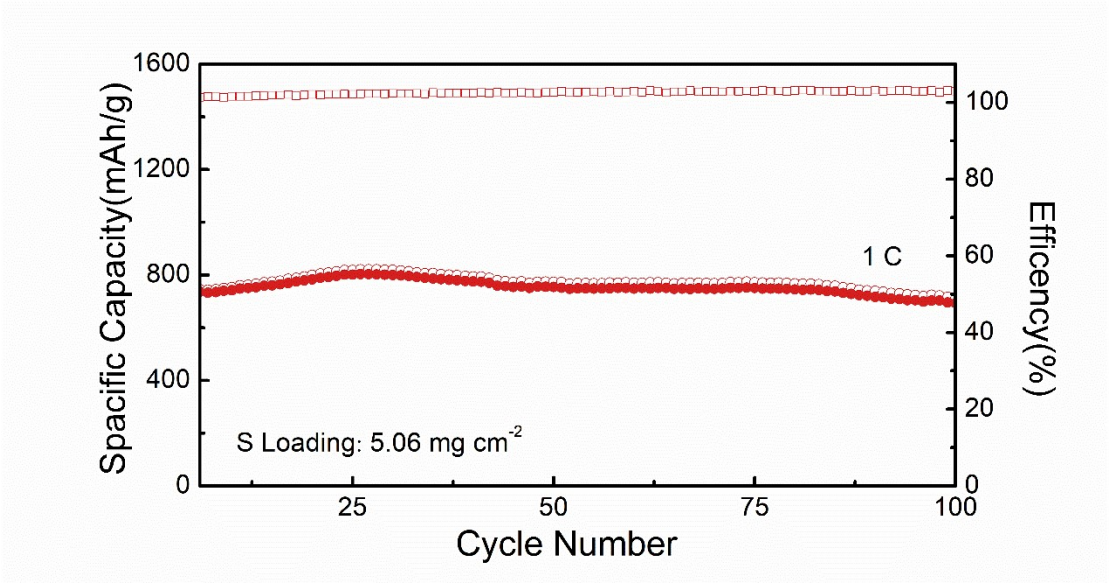

Fig. S5. Cycling performances of Co-TCN with high loading at current density of 1 C.

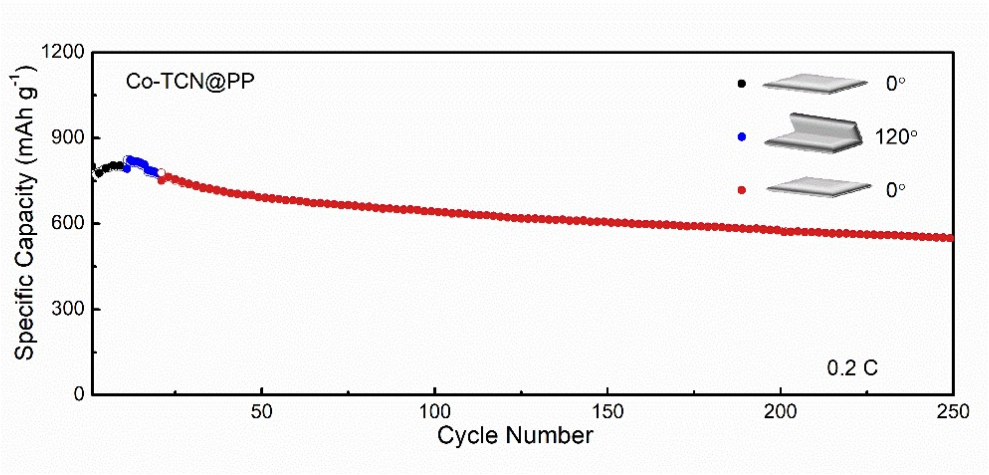

Fig. S6. Cycling performances of Co-TCN assembled Li-S pouch cell at 0.2 C.

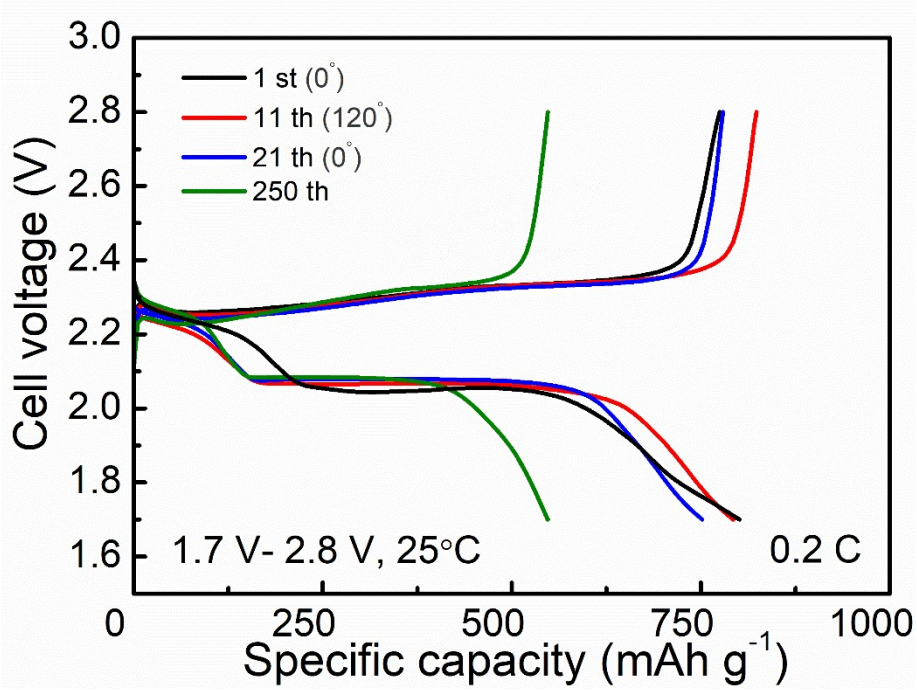

Fig. S7. Discharge-charge profiles of Co-TCN assembled Li-S pouch cell at 0.2 C.

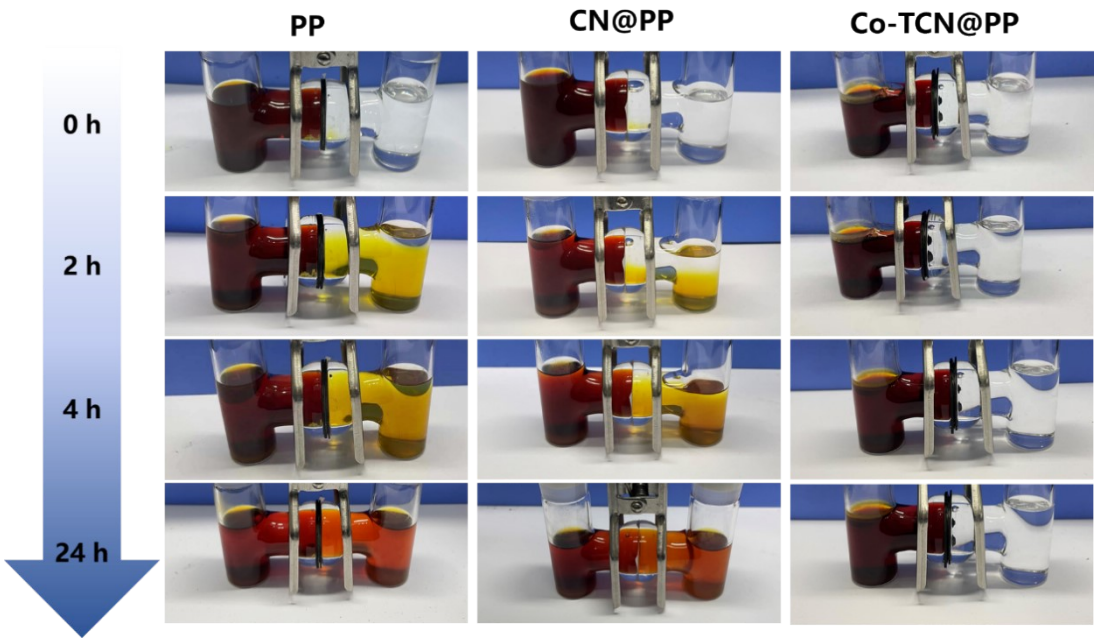

Fig.S8. Photographs of the glass cells with Li_2S_6 in DOL/DME solution and pure DOL/DME solvent in the left and right chambers, respectively, separated by pp, CN@PP or Co-TCN@PP.

Table S1. The setup parameter of coin cells and pouch cells.

Coin cell test information		
Active material	Cathode: Sulful (1675 mAh/g)	
Additive	Ketjenblack	
Binder	PVDF	
Electrolyte	1M LiTFSi and 1wt% $LiNO_3$ in DOL and DME (v:v,1:1)	
Current collector	Al	
Separator	Co-TCN@PP	
Pouch cell test information		
	Anode: Li	
	Cathode: S/KB	
Comments	We tested both pouch cells and coin cells. The S loading was controlled to 1 mg/cm^2.The highest can reach to 5.6 mg/cm^2. The area of the electrode was 1.3 cm^2 for coin cell and 4 cm^2 for pouch cell.	
Measurements and Calculations		
1C = 1675 mA/g Capacity = current density*time (h)		
Initial capacity (mAh/g)	863	
Capacity achieved (mAh/g)	621	
@rate	2C	
Number of cycles tested	400	
Capacity retention	71%	
Testing temperature	30℃	