

## Supplementary Materials

**Synergetic effect of block and catalysis on polysulfides by functionalized bilayer modification on the separator for lithium-sulfur batteries**

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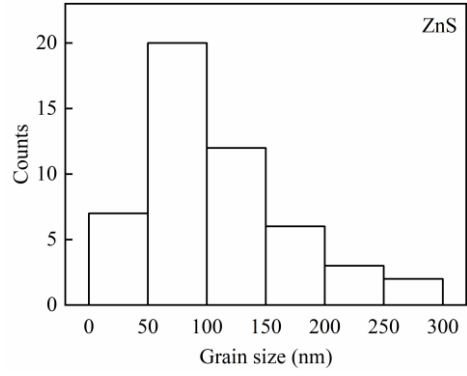


Figure S1. Grain size distribution of the as-prepared ZnS based on the SEM image in Figure 1b.

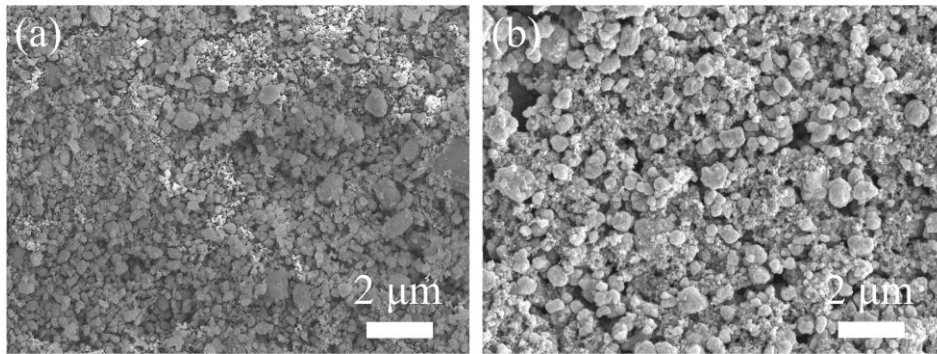


Figure S2. SEM images of (a) SSZ-13@PP and (b) ZnS@PP separator.

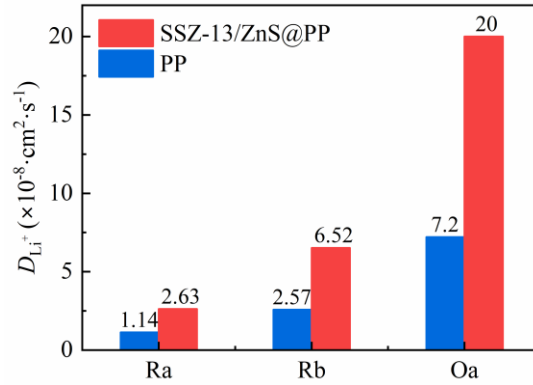


Figure S3. The calculated  $\text{Li}^+$  diffusion coefficients ( $D_{\text{Li}^+}$ ) of SSZ-13/ZnS@PP and PP separators.

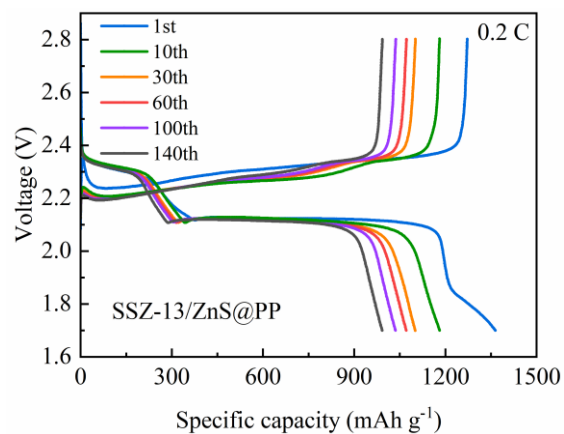


Figure S4. Charge/discharge profiles of the Li-S cells with SSZ-13/ZnS@PP separator during cycling at 0.2C.

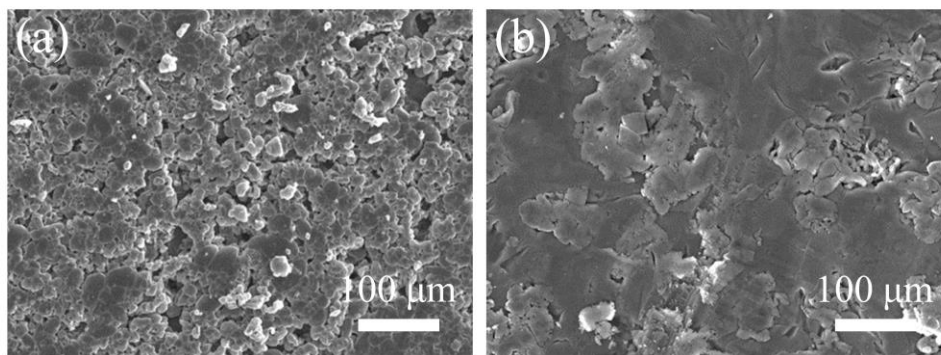


Figure S5. SEM images of the cycled Li anodes in (a) PP and (b) SSZ-13/ZnS@PP separators.

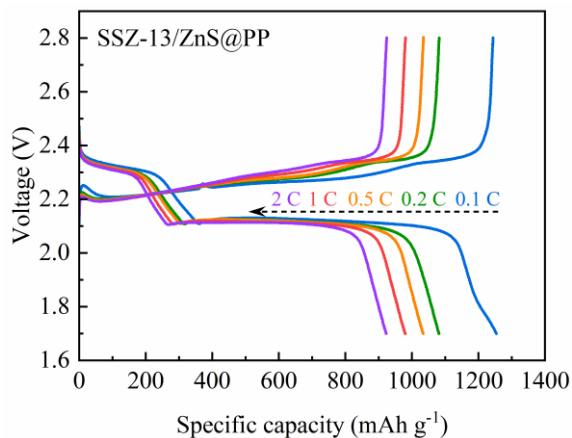


Figure S6. Charge/discharge profiles of the Li-S cells with SSZ-13/ZnS@PP separator at different discharge rates.

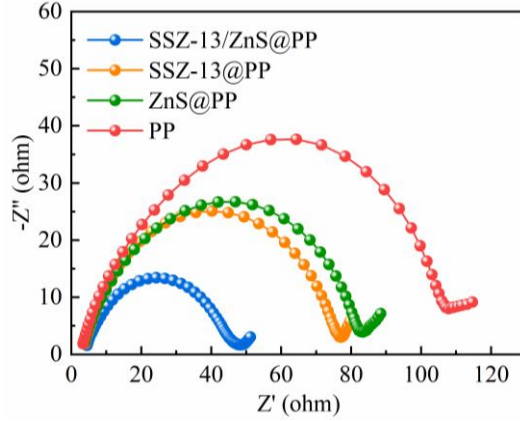


Figure S7. EIS plots of Li-S cells with various separators at open circuit voltage.

Table S1. Comparison of the electrochemical performance of previous reports with this work.

Coating material	Current density	Initial capacity (mAh g <sup>-1</sup> )	Preserved capacity (mAh g <sup>-1</sup> )	Cycle No.	Ref.
Li-AOPIM-1/ SWCNT	0.2 C	1179.7	1027.5	100	Hou et al. <sup>[1]</sup>
	1 C	935.5 (0.1 C)	644.8	500	
Co-NCNTs/SiO <sub>2</sub>	0.2 C	1239.8	759.4	100	Li et al. <sup>[2]</sup>
	1 C	825.1	510.6	200	
PMMALLZO AB	1 C	969	412	500	Xie et al. <sup>[3]</sup>
Fe-N-MCS	0.2 C	1370	892	100	Chen et al. <sup>[4]</sup>
Co-TCN	1 C	1116.8	802.9	300	Fan et al. <sup>[5]</sup>
Cu <sub>2-x</sub> Se@rGO	0.5 C	1485	863	200	Yuan et al. <sup>[6]</sup>
BNNSs/rGO	1 C	915.0	630.6	500	Yang et al. <sup>[7]</sup>
MnO-OVs/ NCNTs	1 C	929	618	500	Yu et al. <sup>[8]</sup>
SSZ-13/ZnS	0.2 C	1364.2	992.3	140	This work
	1 C	885.4	655	500	

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