Supplementary information

Triazine-based Porous Organic Polymer with Enhanced Electronegativity as Multifunctional Separator Coating in Lithium-Sulfur Batteries

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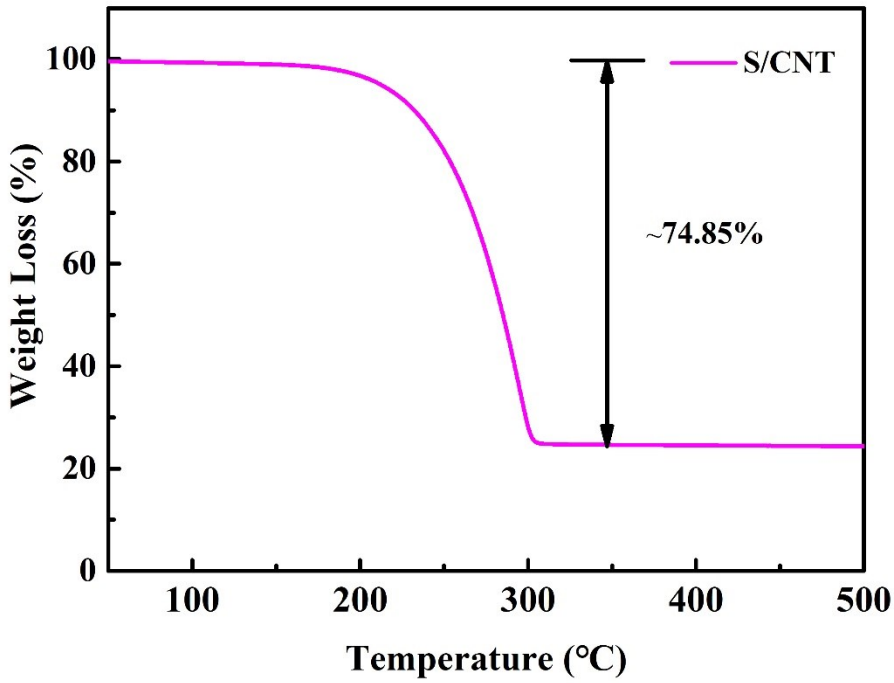

Figure S1. TG curves of S/CNTs.

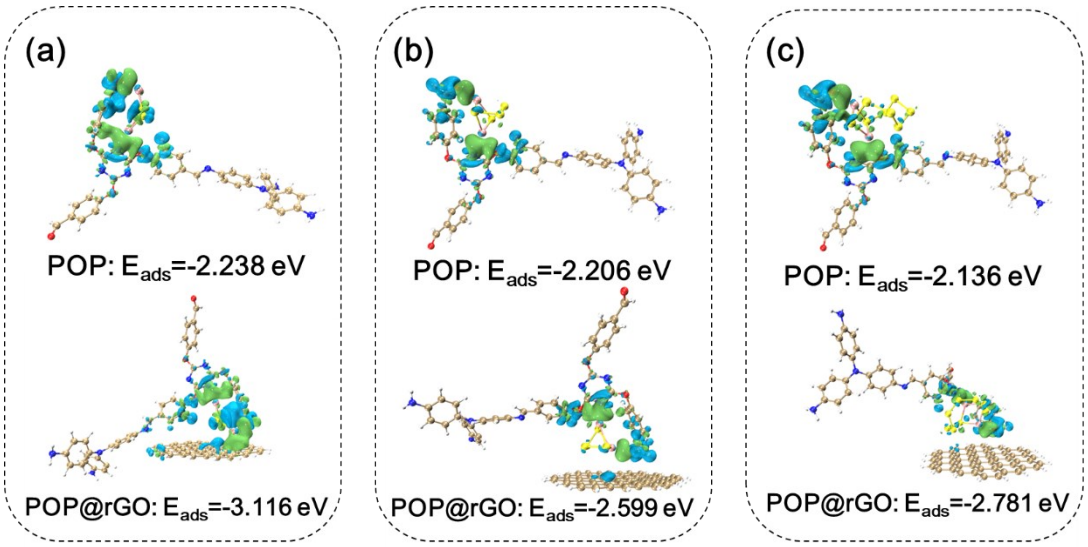

Figure S2. Charge density differences and binding energy of (a) POP-Li_2S_2 and POP@rGO-Li_2S_2, (b) POP-Li_2S_4 and POP@rGO-Li_2S_4, (c) POP-Li_2S_8 and POP@rGO-Li_2S_8.

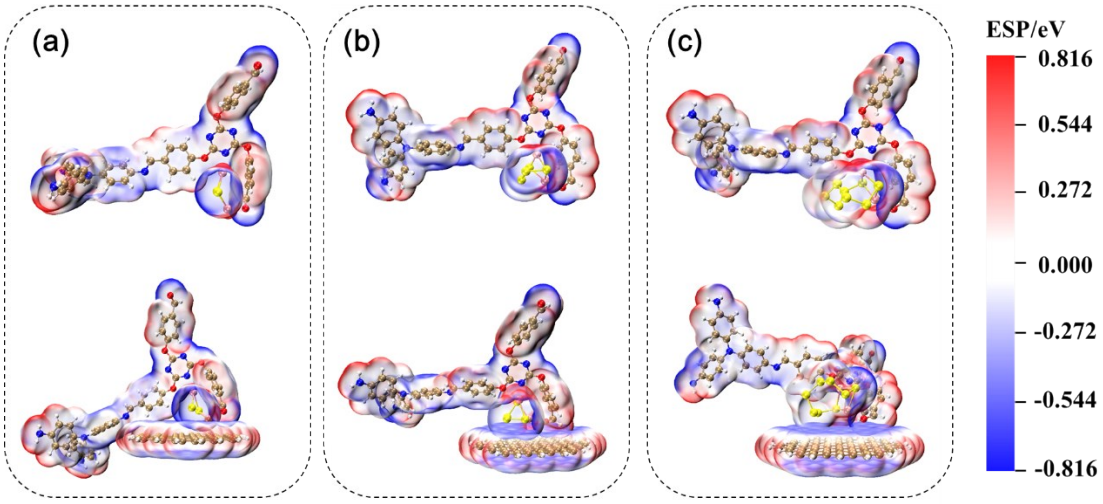

Figure S3. Electrostatic potential of (a) POP-Li_2S_2 and POP@rGO-Li_2S_2, (b) POP-Li_2S_4 and POP@rGO-Li_2S_4, (c) POP-Li_2S_8 and POP@rGO-Li_2S_8.

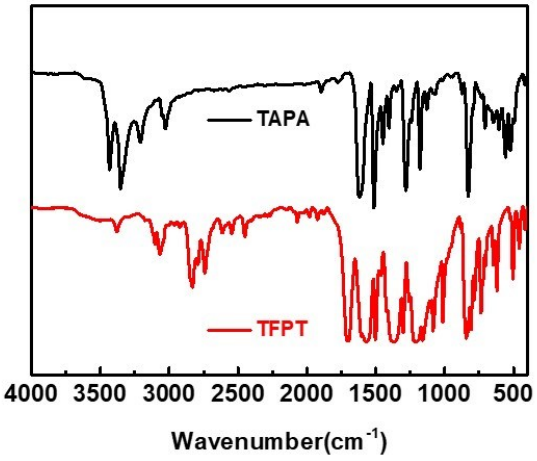

Figure S4. FT-IR spectrum of the TAPA and TFPT.

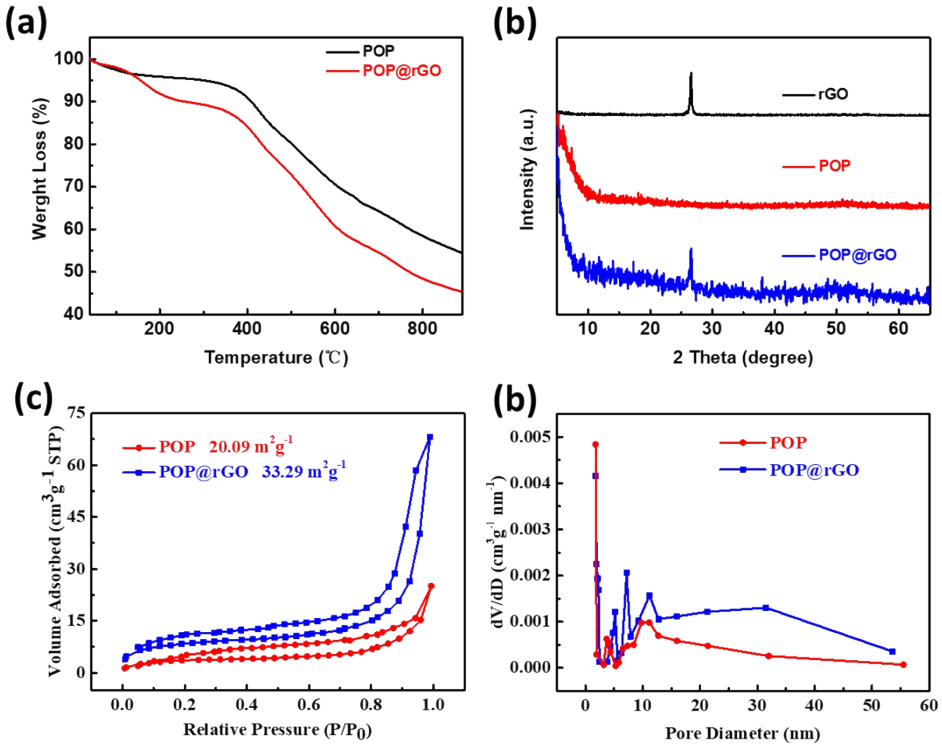

Figure S5. (a) TG curves of POP and POP@rGO. (b) XRD patterns of rGO, POP and POP@rGO. (c) N_2 adsorption-desorption isotherm and (d) pore size distribution of POP and POP@rGO.

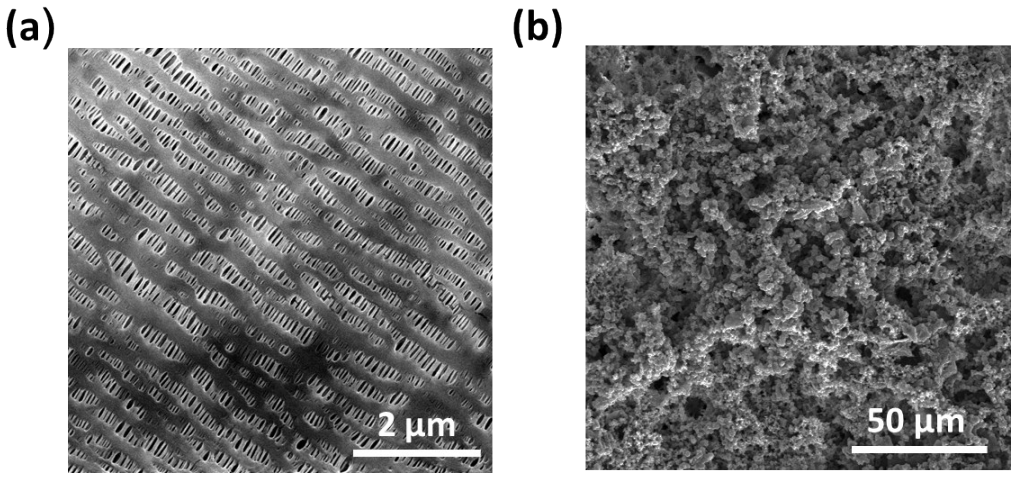

Figure S6. Top surface SEM images of (a) routine PP Celgard, (b) POP-PP.

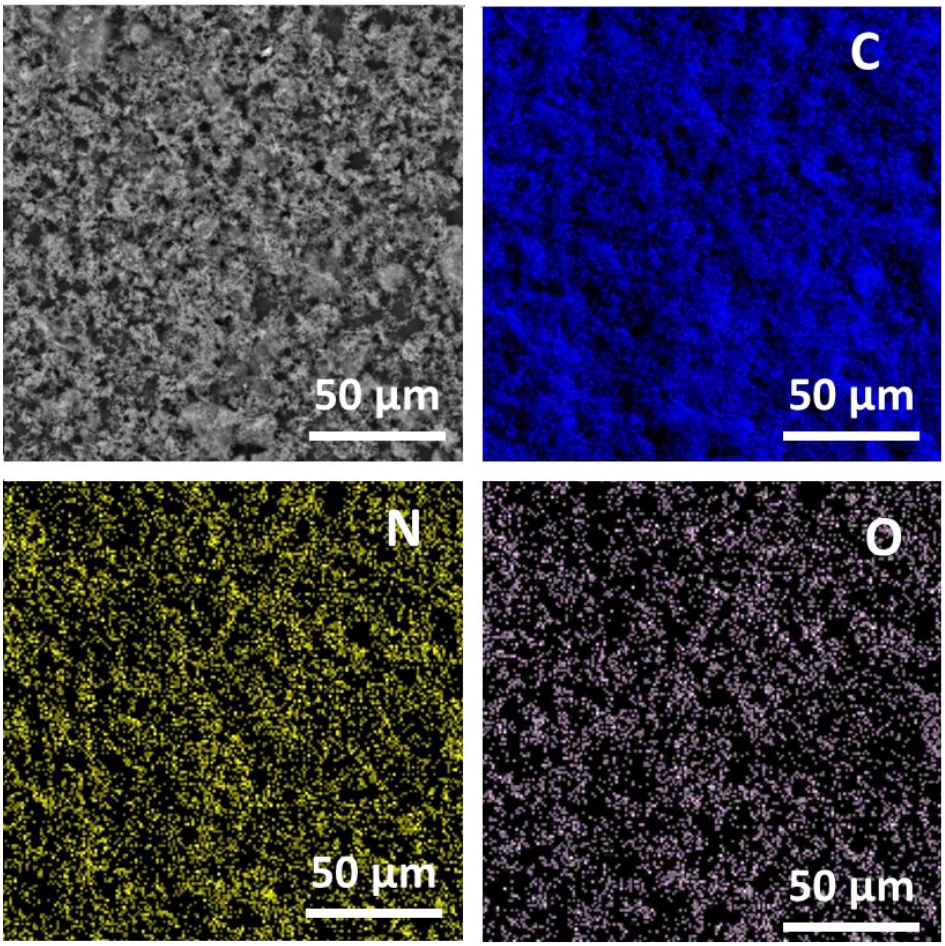

Figure S7. Top surface SEM elemental mapping of POP@rGO-PP.

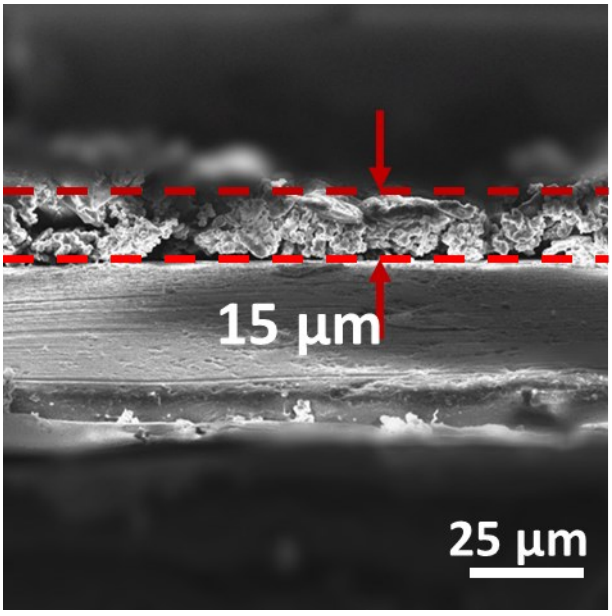

Figure S8. Cross-section SEM image of the POP@rGO-modified separator.

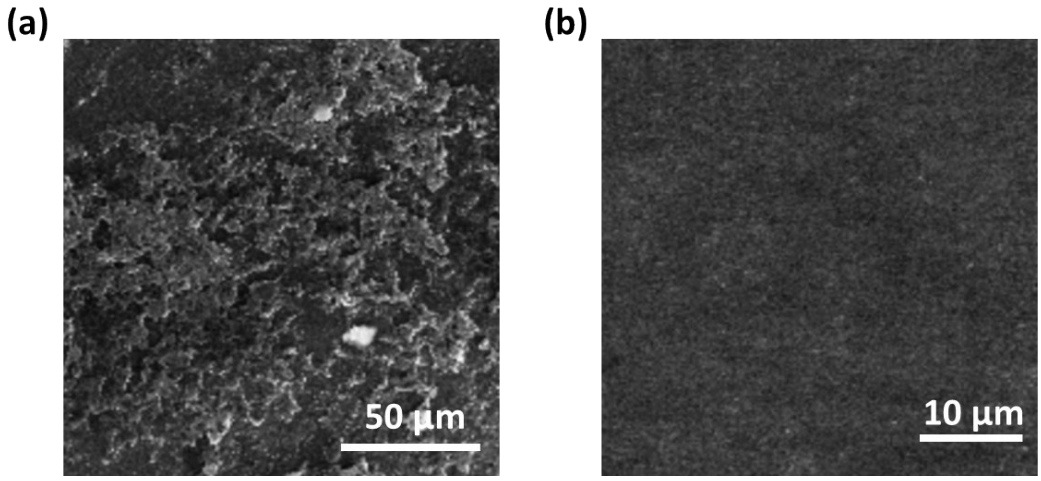

Figure S9. The top surface SEM images of (a) POP@rGO-PP and (b) PP separator facing to Li anode after 100 cycles at 0.2 C.

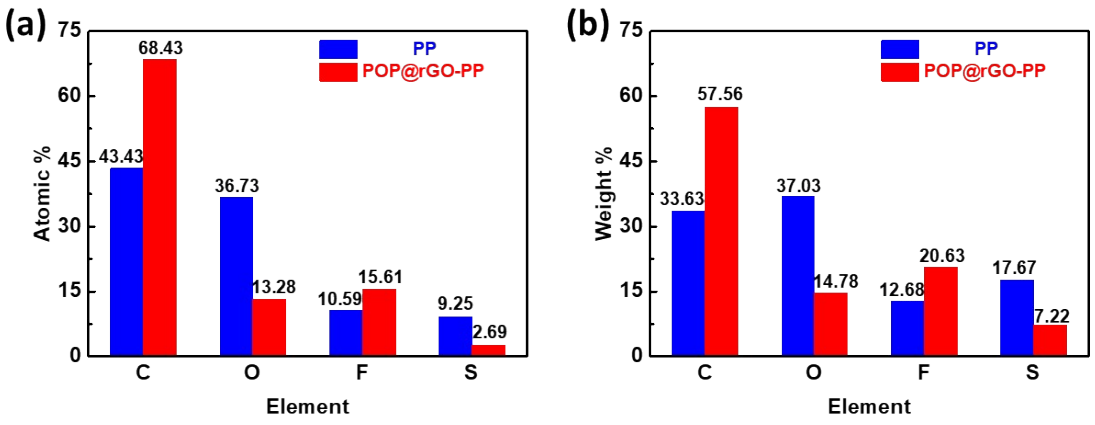

Figure S10. Bar chart of elemental analysis with various separator surfaces facing to Li anode after 100 cycles at 0.2 C.

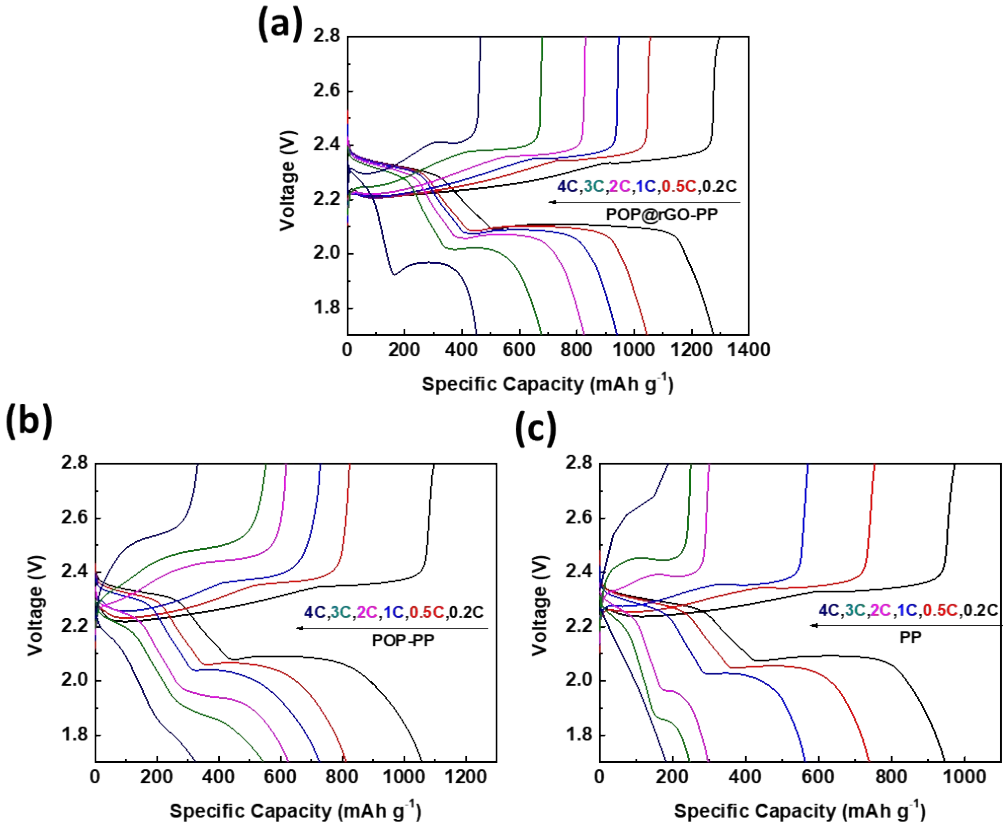

Figure S11. Charge-discharge profiles of Li-S battery with (a) POP@rGO-PP, (b) POP-PP and (c) PP separator at various current densities.

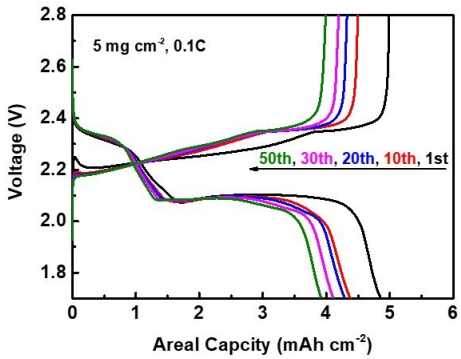

Figure S12. Charge-discharge profiles of cell with the POP@rGO-PP separator at 0.1 C with sulfur loading of 5 mg cm^{-2}.

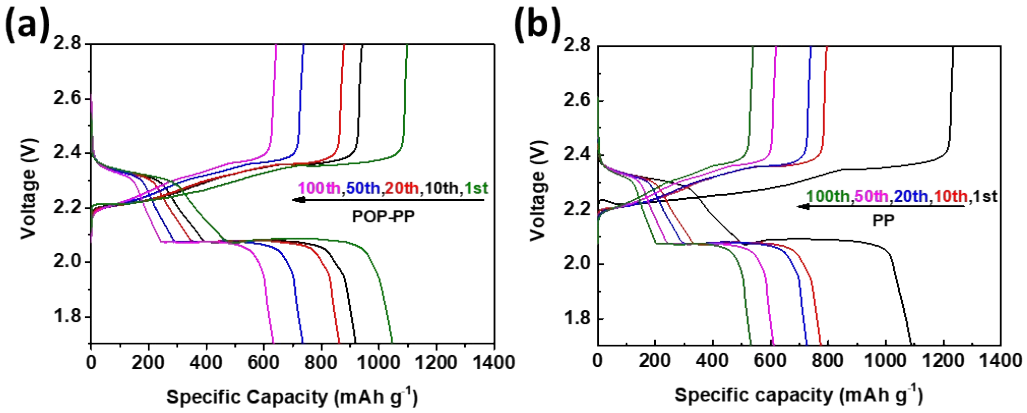

Figure S13. Charge-discharge profiles of cell with the POP-PP and PP separator at 0.2 C.

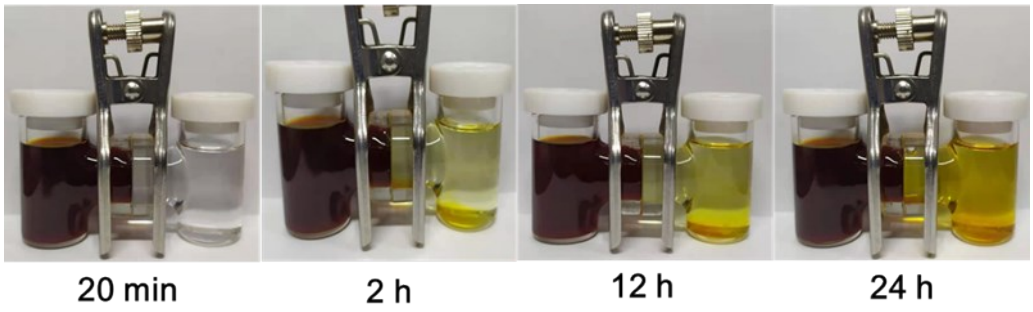

Figure S14. LiPSs diffusion in H-type cells with POP-modified PP separator.

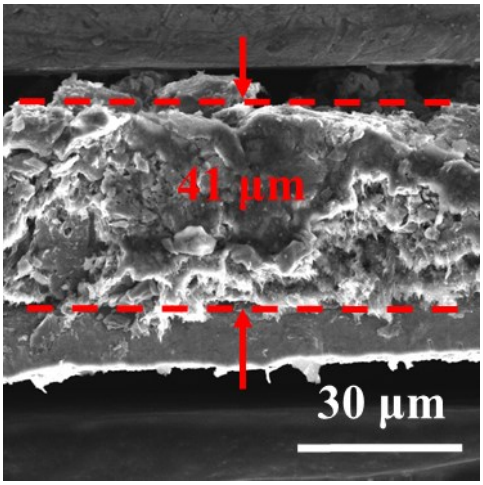

Figure S15. The cross-section SEM image of the S/CNTs cathode at sulfur loading 5 mg cm^{-2}.

Table S1. Performance comparison of the various materials as functional separator coating in Li-S batteries.

Sample	coating Thickness (μm)	S content (wt %)	Cycling Rate (C)	Initial Capacity (mAh/g)	Capacity Decay (%)	Ref.
RGO@MOS_2	8	70	0.2	1122	0.1	S1
HKUST(Zn)@GO	~13	70	1	1100	0.005	S2
MnO_2	0.38	65	0.5	899	0.06	S3
Black P	-	66	0.5	930	0.14	S4
GO	30	70	0.5	1400	0.003	S5
COF-CNT	-	75	0.2	1130	0.13	S6
MoS_2/Polymer	3	60	1	1007	0.029	S7
N-Ti_3C_2/C	6	79	0.5	1107	0.07	S8
SSNS/CNT	10	52	1.675	~780	0.049	S9
Ni_3FeN/G	-	63	1	1047	-	S10
CNF/CoS/KB	~6	70	0.5	1078	0.15	S11
POP@rGO	15	68	0.2	1242.7	0.002	This work
			1	913.7	0.04	

References

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