Supporting Information

Insight into the effect of cerium dioxide nanoparticle modified cobalt phosphide as an efficient electrocatalyst for high-performance lithium-sulfur battery

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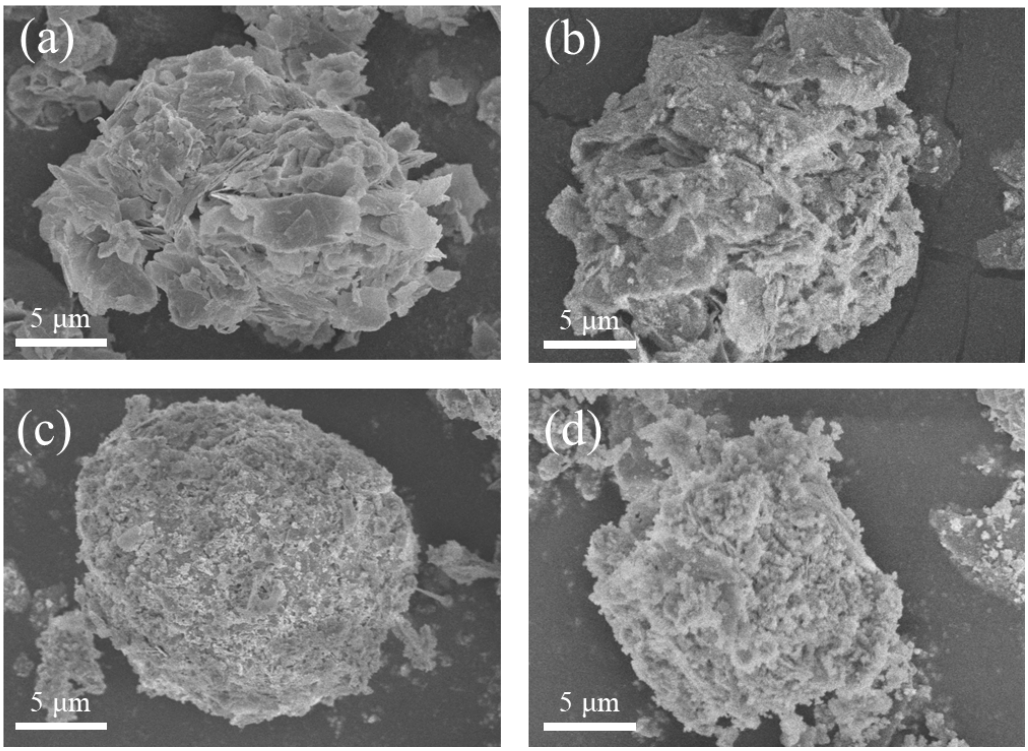

Figure S1 SEM images of the (a) $Co(OH)_2$, (b) $Co(OH)_2/CeO_2$-5, (c) $Co(OH)_2/CeO_2$-10, (d) $Co(OH)_2/CeO_2$-15.

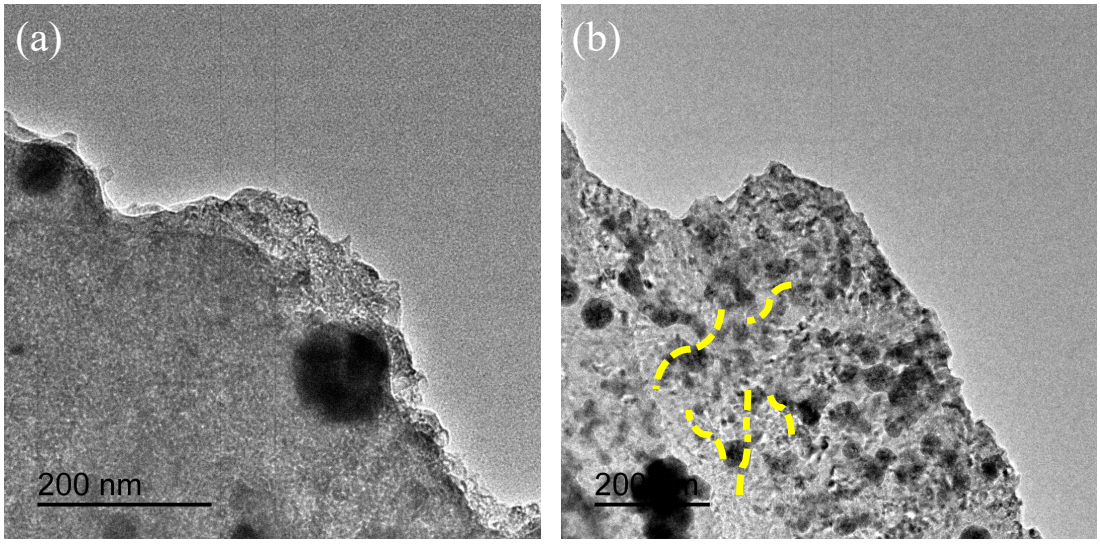

Figure S2 SEM images of the (a) CoP/CeO_2-0, (b) CoP/CeO_2-5.

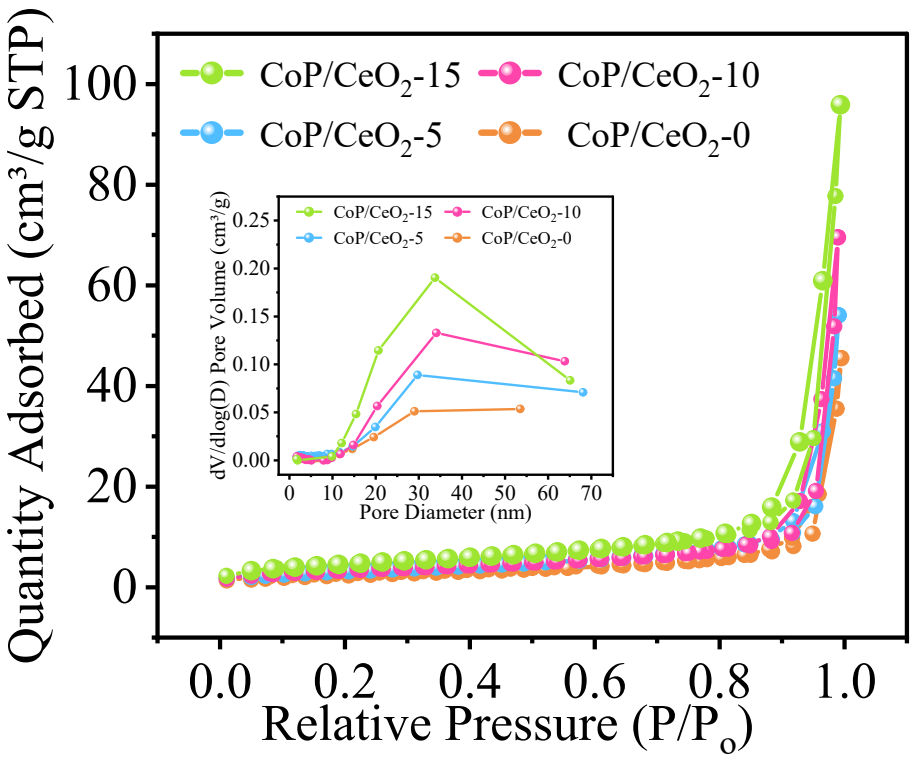

Figure S3 N_2 adsorption/desorption curves and pore size distributi on curves.

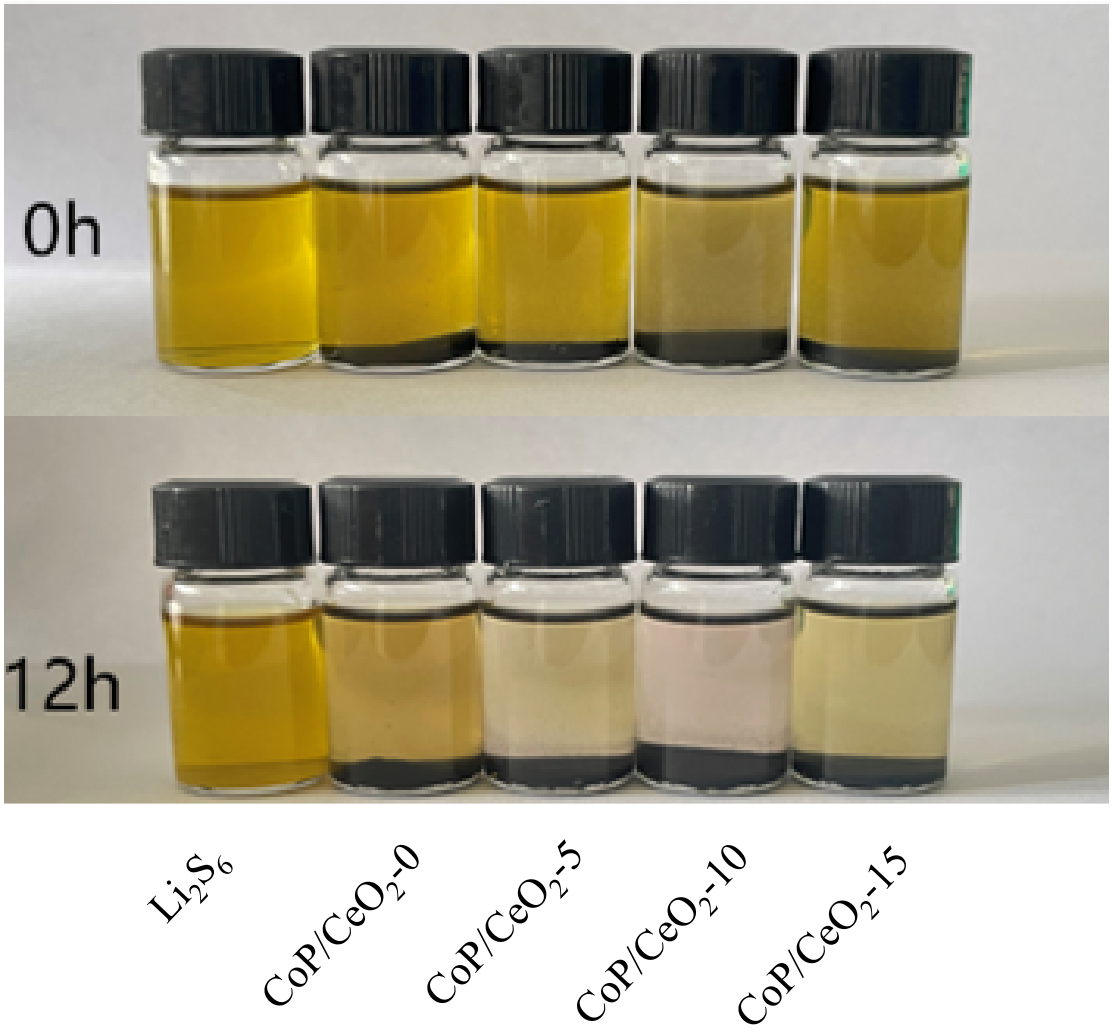

Figure S4 The digital image of Li_2S_6 solutions before and after adding CoP/CeO_2-0, CoP/CeO_2-5, CoP/CeO_2-10 and CoP/CeO_2-15.

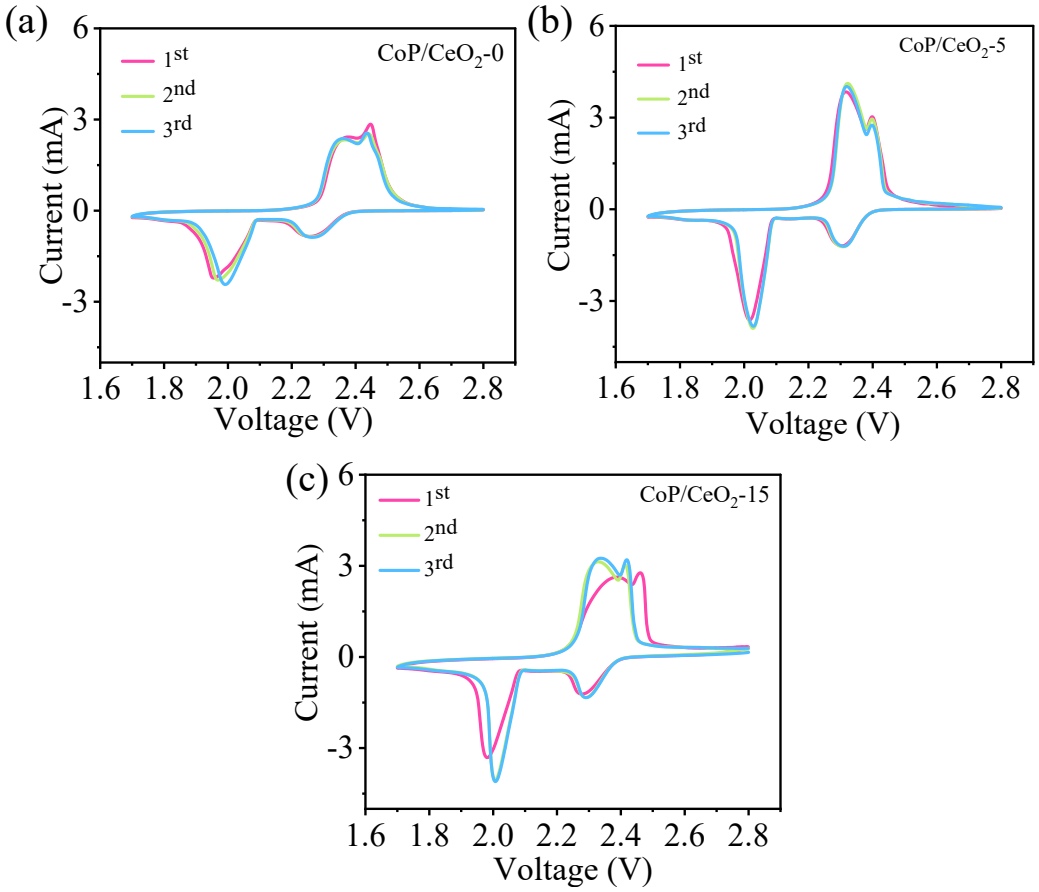

Figure S5 CV curves of Li-S batteries with CoP/CeO_2-0 (a), CoP/CeO_2-5 (b) and CoP/CeO_2-15 (c) modified separators at 0.1 mV s^{-1}.

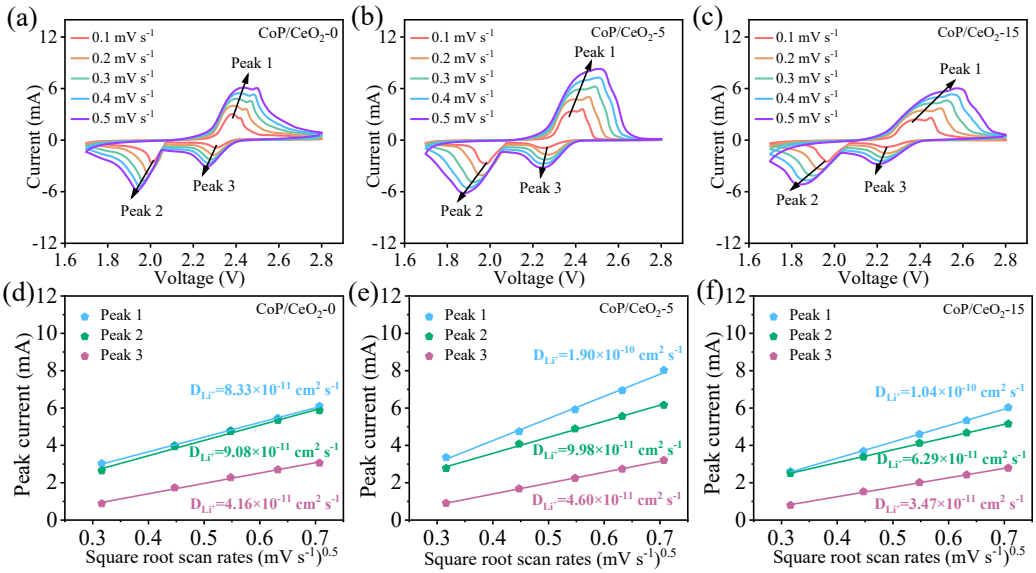

Figure S6 CV curves of Li-S batteries with CoP/CeO_2-0 (a), CoP/CeO_2-5 (b) and CoP/CeO_2-15 (c) modified separators at various scan rates. The corresponding linear fitting of the peak currents with the square root of the scan rate of Li-S batteries with CoP/CeO_2-0 (d), CoP/CeO_2-5 (e) and CoP/CeO_2-15 (f) modified separators.

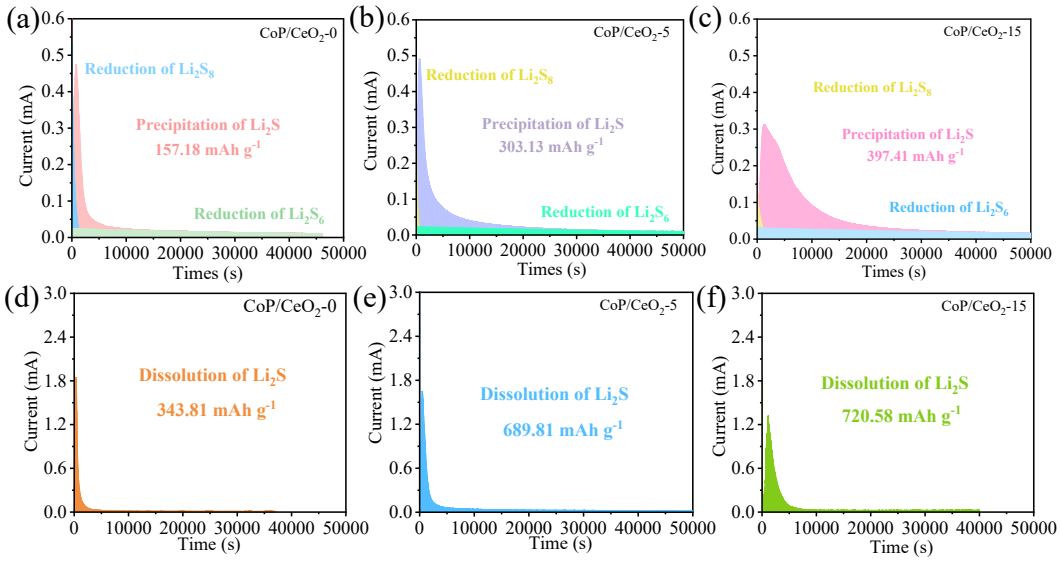

Figure S7 Li_2S nucleation and dissolution curves of the battery using CoP/CeO_2-0 (a, d), CoP/CeO_2-5 (b, e) and CoP/CeO_2-15 (c, f).

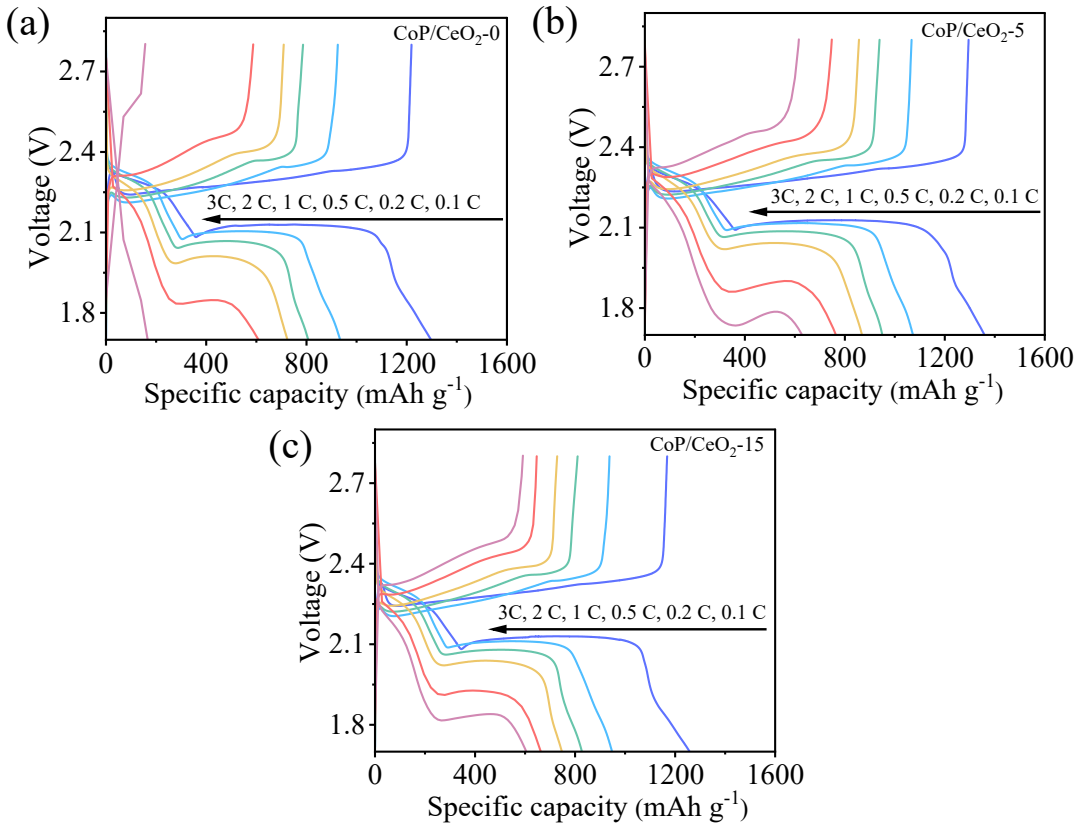

Figure S8 Discharge-charge curves of Li-S batteries with CoP/CeO_2-0 (a), CoP/CeO_2-5 (b) and CoP/CeO_2-15 (c) modified separators at various rates.

Table S1 The electrochemical performance of reported Li-S batteries containing CeO_2 and/or CoP.

Material	Sulfur loading (mg cm^{-2})	Initial capacities (mAh g^{-1}) at various rate (C)	Cycle number	Capacity decay (per cycle)	Ref.
CMK-3@CeO_2	2.8	1248 mAh g^{-1} at 0.5 C 1000 mAh g^{-1} at 1C	200 800	0.106% 0.039%	[1]
P-CeO_2	1.0	620 mAh g^{-1} at 1C	500	0.100%	[2]
CC@CeO_2@Li_2S_6	1.0	1311 mAh g^{-1} at 0.2 C	100	0.050%	[3]
CeO_2@G	1.2	610 mAh g^{-1} at 2 C	1000	0.024%	[4]
CeO_2@CNTs/S	1.0	1437.6 mAh g^{-1} at 0.1 C	300	0.170%	[5]
Li_2S-CGA/CeO_2	2.0	591 mAh g^{-1} at 1 C	200	0.050%	[6]
CeO_{2-x}@CNF	1.0	1017 mAh g^{-1} at 2 C	800	0.046%	[7]
CoP-Co_3S_4	1.1	1516.9 mAh g^{-1} at 0.2 C	100	0.51%	[8]
h-O-CoP-NCG	4.2	834 mAh g^{-1} at 0.5 C	300	0.048%	[9]
CoP/CeO_2	2.0 4.0	1214.5 mAh g^{-1} at 0.2 C 1041.6 mAh g^{-1} at 0.2 C	500 100	0.0972% 0.01%	**This work**

Supplemental References

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