Electronic Supplementary Material (ESI) for Journal of Materials Chemistry A.

Supporting Information

Metal-Organic Framework@SiO_2 as permselective separator for lithium-sulfur batteries

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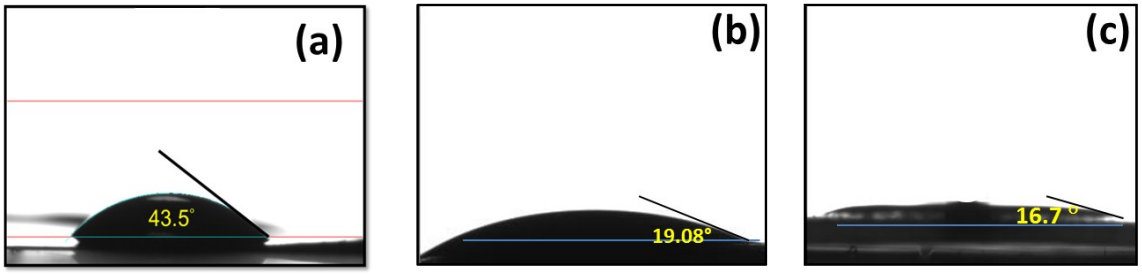


Fig. S1 Contact Angle of (a) uncoated Celgard 2320 separator(b) SiO_2 – coated Celgard 2320 separator (c) UiO-66-NH_2@SiO_2-coated Celgard (2320) separator.

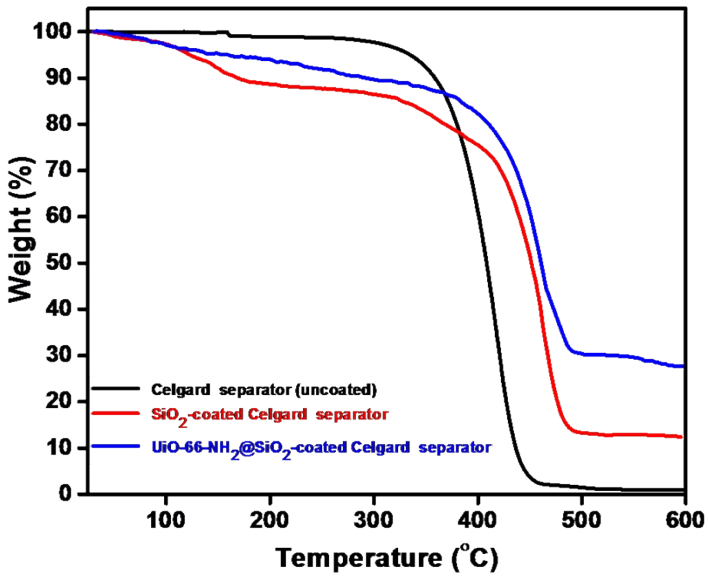


Fig. S2 Thermogravimetric analysis of the uncoated Celgard, SiO2-coated Celgard, and the UiO-66-NH2@SiO2-coated Celgard separator.

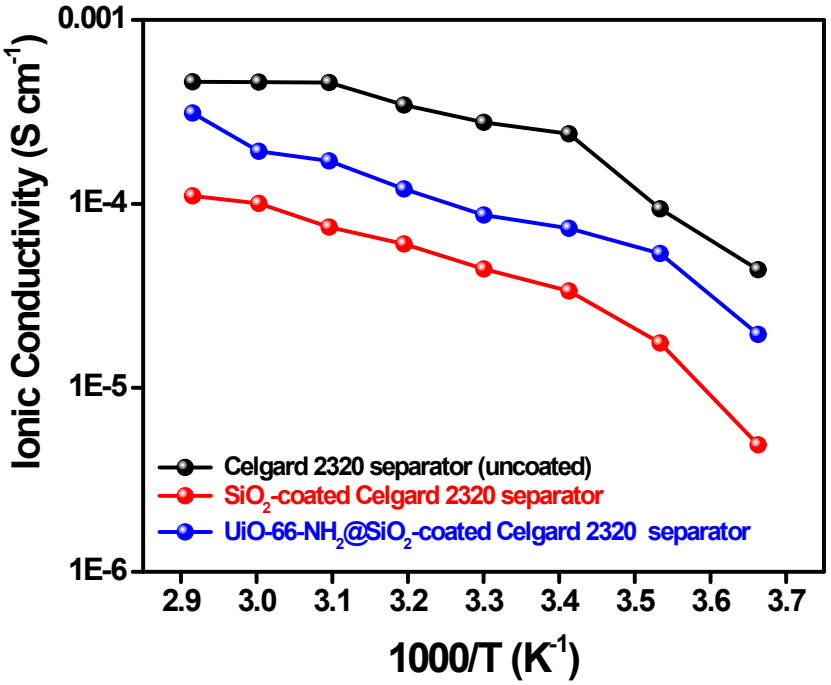


Fig. S3 Ionic Conductivity of (a) uncoated Celgard 2320 (b) SiO_2–coated Celgard 2320 separator (c) UiO-66-NH_2@SiO_2-coated Celgard 2320 separator.

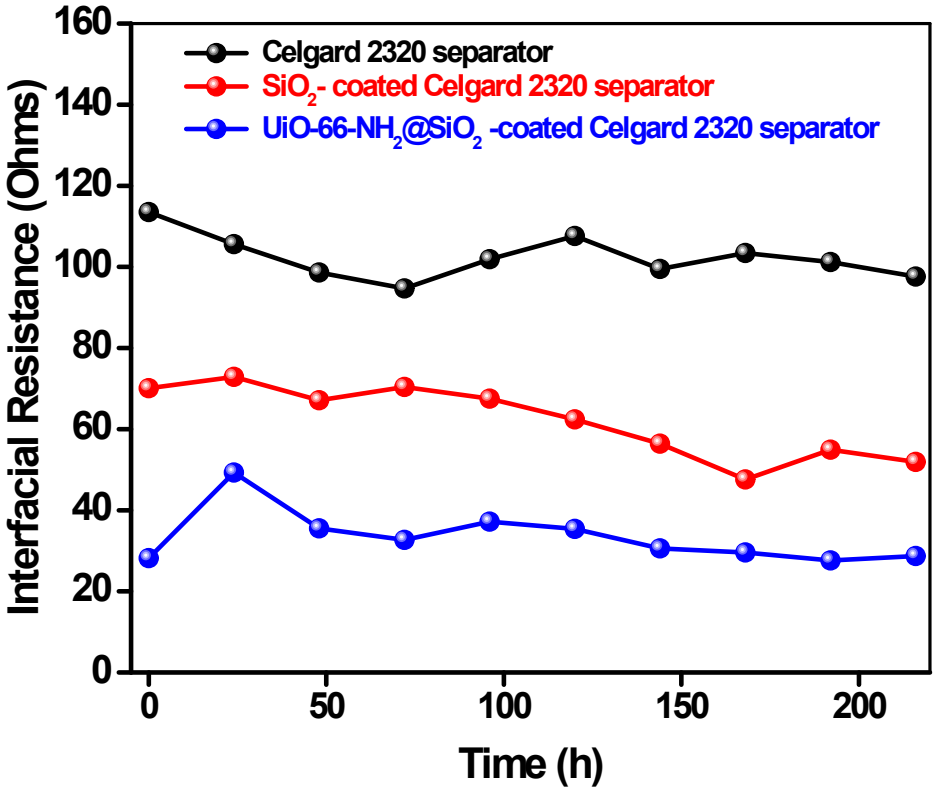


Fig. S4 Interfacial resistance vs Time measurements of (a) uncoated Celgard 2320 (b) SiO_2–coated Celgard 2320 separator (c) UiO-66-NH_2@SiO_2-coated Celgard 2320 separator.

D_{Li+} (cm^2 s^{-1})	UIO-SiO_2	SiO_2	Uncoated
Peak A	1.35E-07	2.15E-08	9.31E-09
Peak B	5.57E-08	5.75E-09	3.23E-09
Peak C	1.05E-07	2.79E-08	1.33E-08

Table S1: Diffusion coefficient for Li+ ions in the three separators utilized, peak A is first anodic peak, B first cathodic peak, C second cathodic peak.

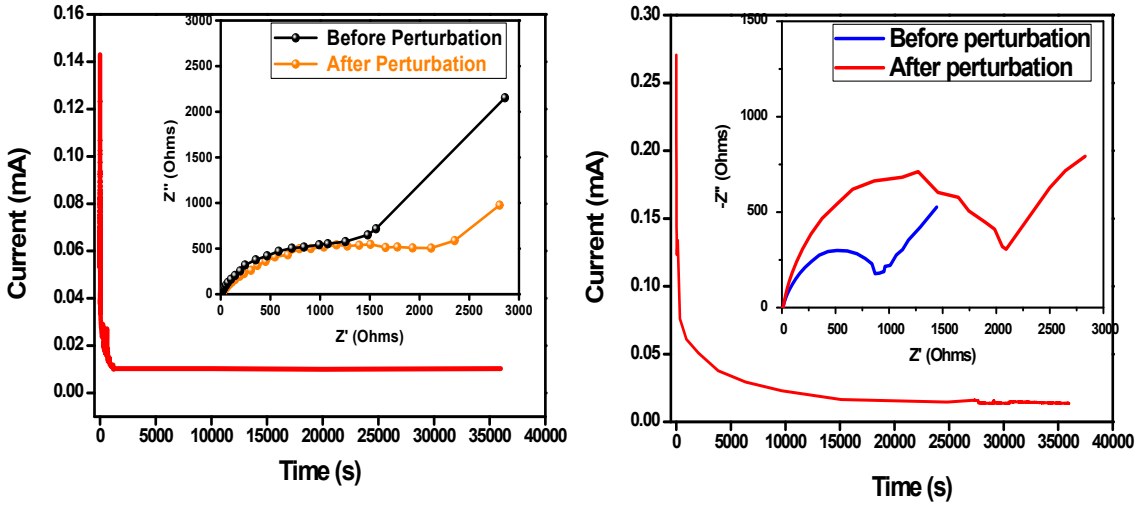


Fig. S5 Chronoamperometric curves of (a) SiO_2-coated and (b) UiO-66-NH_2@SiO_2-coated Celgard 2320. Inset: Nyquist plots of Li/Membrane/Li cells before and after perturbation.

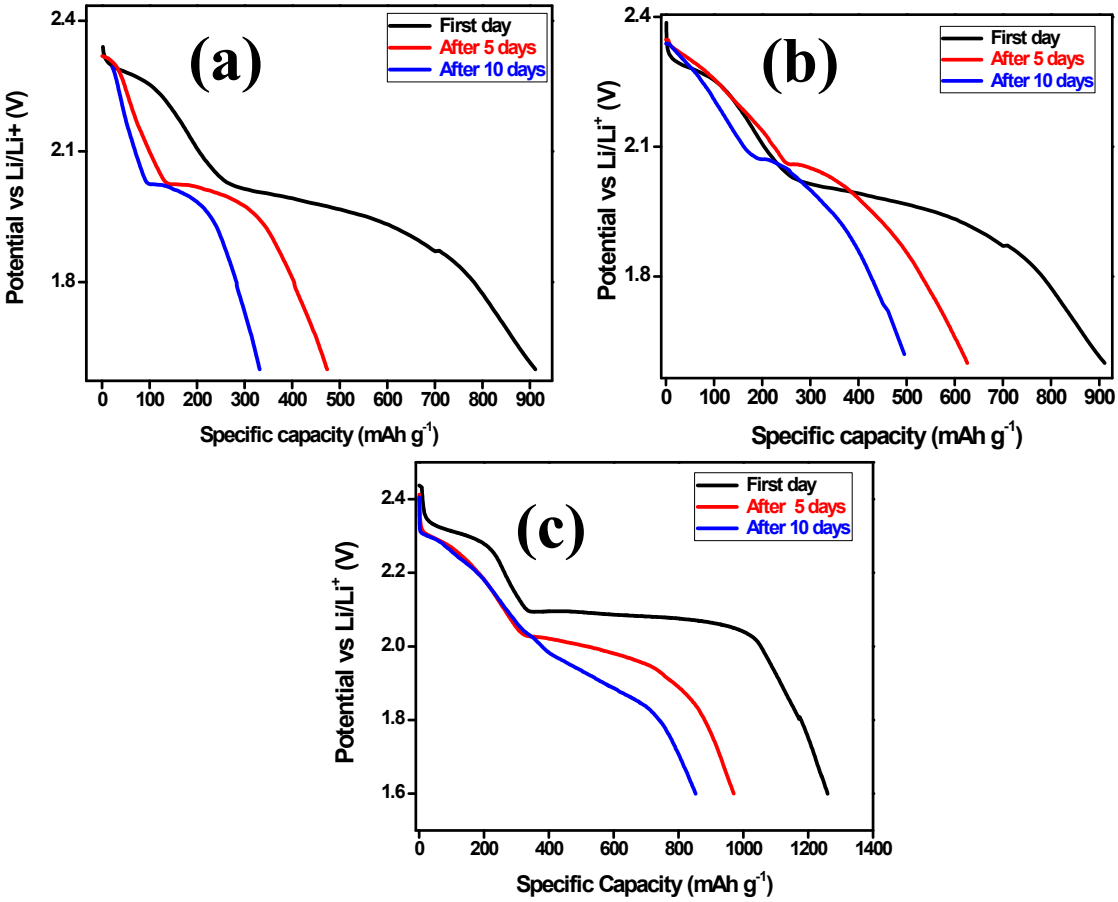


Fig. S6 Discharge curves and self-discharge behaviour of cells with a) uncoated Celgard 2320 separator (b) SiO_2-coated 2320 Celgard and (c) UiO-66-NH_2@SiO_2-coated 2320 Celgard membrane. The cells were tested with a current density of 0.1 C

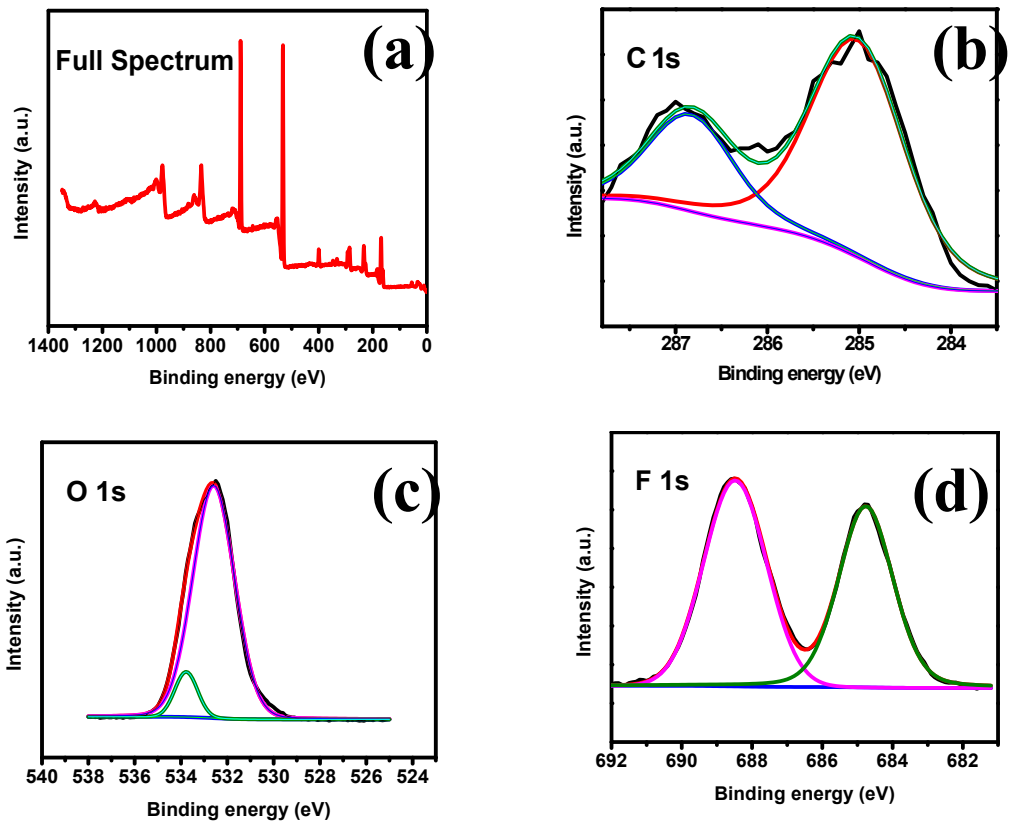


Fig. S7 XPS spectra of sample peeled off from UiO-66-NH2@SiO2-coated membrane after cycling (a) Full spectrum (b) C 1s (c) O 1s (d) F 1s .

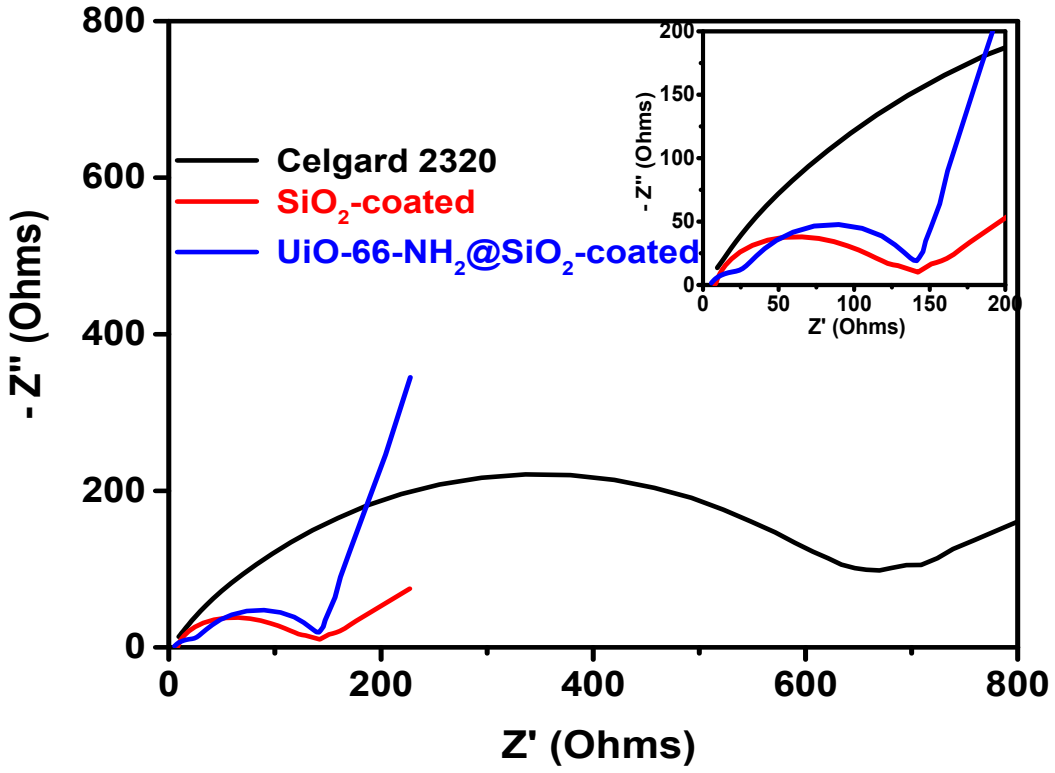
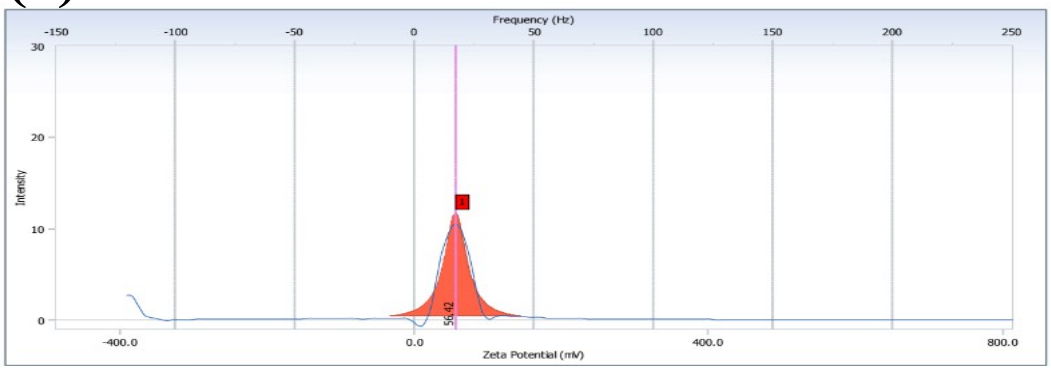


Fig. S8 EIS spectra of Li-S cells with uncoated, SiO_2 and UiO-66-NH_2@SiO_2-coated membranes.

(a)



(b)

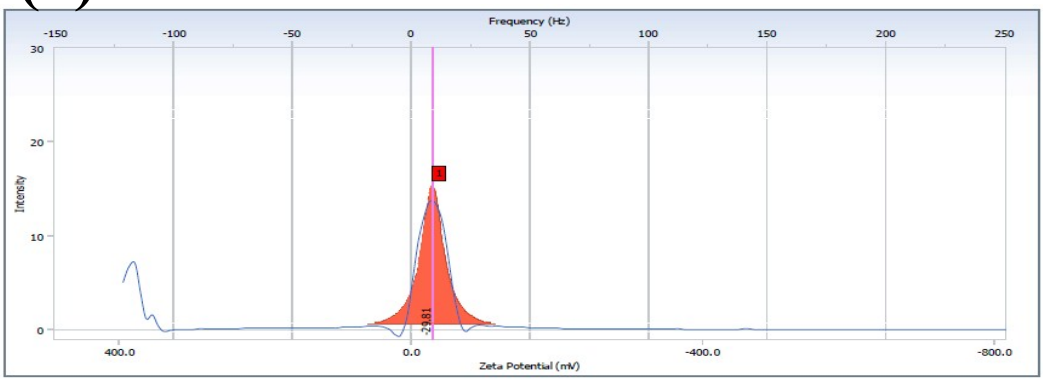


Fig. S9 Zeta potentials of (a) UiO-66-NH_2@SiO_2 and (b) SiO_2 particles.