Supporting Information

Porous Carbon Paper As Interlayer To Stabilize the Lithium Anode For Lithium–Sulfur Battery

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1. Figures

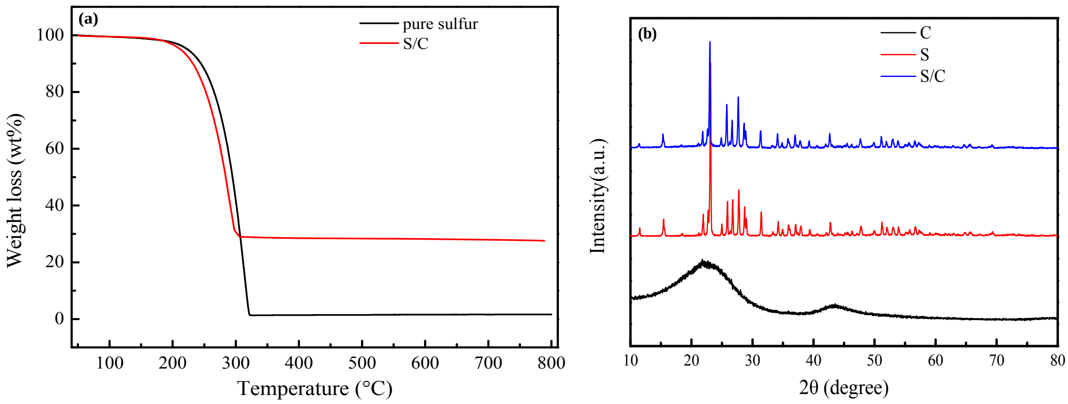

Figure S1 (a) TG curves of pure sulfur, and the S/C composite, which has the same heat treatment, recorded under an argon atmosphere with the heating rate of 10 °C min^{-1}. (b) XRD patterns for Ni modified bamboo carbon, pure sulfur and the S/C composite.

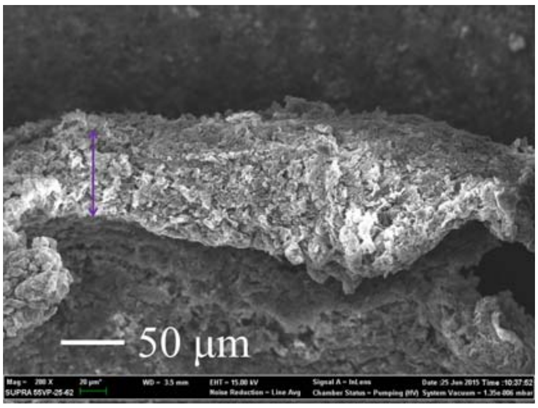

Figure S2 The cross section image of the pristine APC paper.

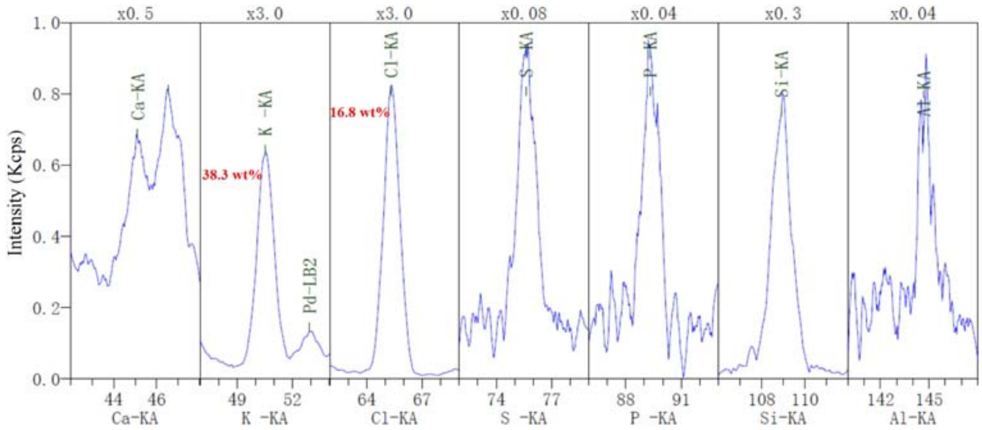

Figure S3 XRF results of the GC powders. According to the intensities of the different elements, elemental K and Cl are the major elements in the GC powders.

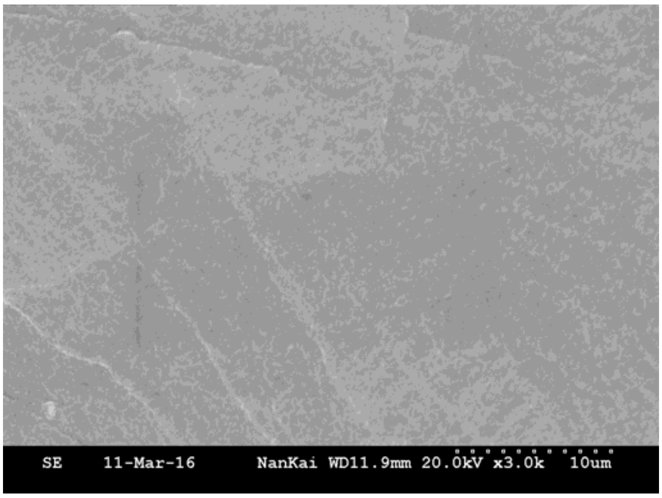

Figure S4 SEM image of the pristine lithium surface.

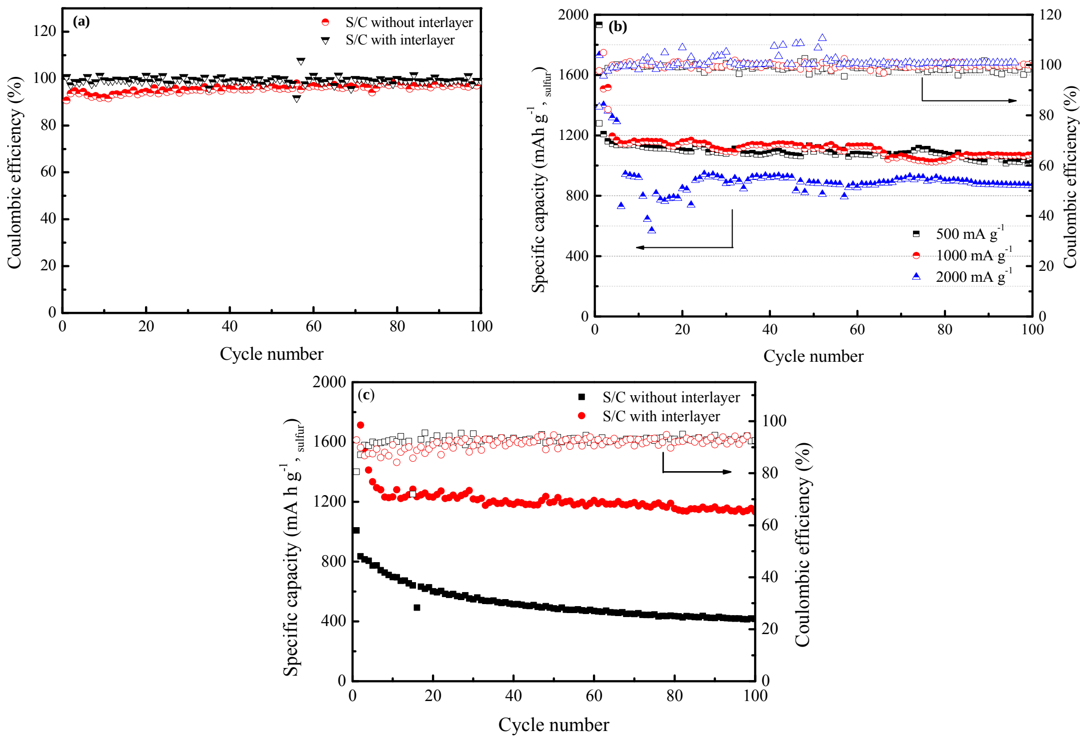

Figure S5 (a) The coulombic efficiency of Li−S cells with and without interlayer at 100 mA g^{-1} and (b) cycling performance of Li−S cells with interlayer at the current densities of 500, 1000, and 2000 mA g^{-1}, respectively. (c) The effect of the interlayer on the cycle performance of Li−S cells in the electrolyte without $LiNO_3$ additive at 100 mA g^{-1}.

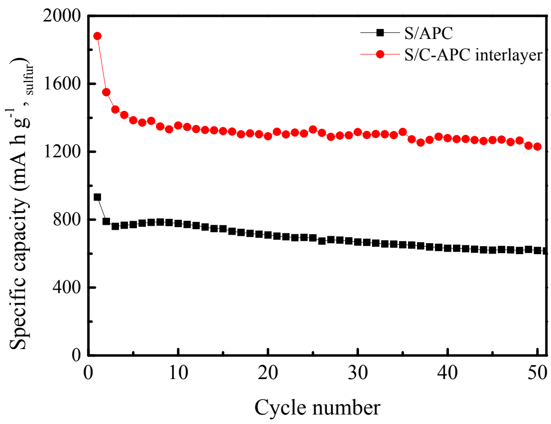

Figure S6 The discharge capacity curves of the Li−S cells with S/APC and S/C-APC interlayer, respectively, at the current density of 100 mA g^{-1}.

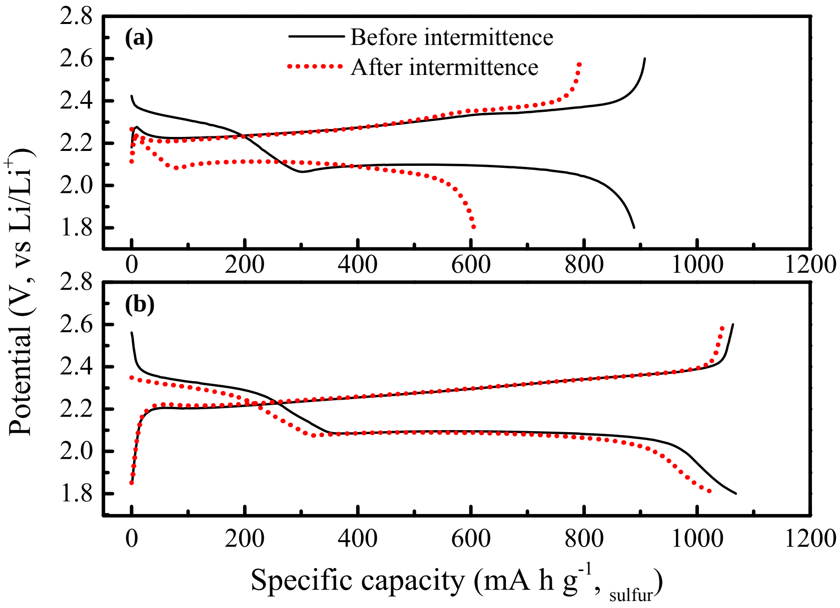

Figure S7 The typical discharge/charge curves (solid lines, 9th cycle) and the discharge/charge curves (dotted lines) after intermittence for 120 hours of the cells (a) without and (b) with interlayer.

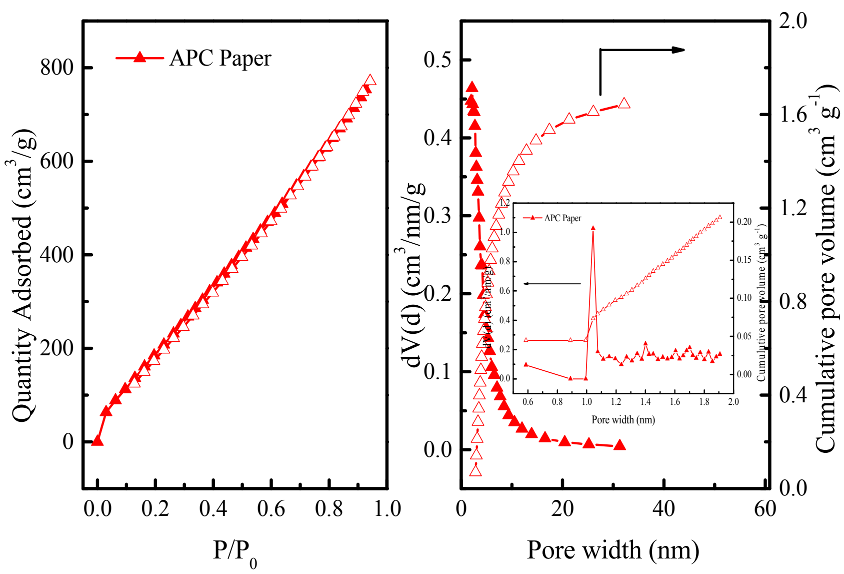

Figure S8 Nitrogen adsorption and desorption isotherms of APC paper after cycle with relevant pore size distribution.

2. Tables

Table S1. Specific surface area and corresponding pore volumes of different carbon powders and paper.

Sample	Specific surface area ($m^2\ g^{-1}$)	pore volume ($cm^3\ g^{-1}$)	Average pore size (nm)	Micropore volume ($cm^3\ g^{-1}$)	Micropore size (nm)
GC powders	645.0	1.0	4.2	0.1	1.1
APC powders	2543.9	1.6	3.7	1.3	0.6
APC Paper	1263.9	1.4	3.9	0.4	1.1
APC Paper (after cycle)	1040.9	1.6	4.0	0.2	1.1

Table S2. The corresponding electrochemical parameters simulated from EIS spectra in **Figure 10**.

Sample	Cycle	Rs (Ω)	R_1 (Ω)	Rct (Ω)	Wo-R (Ω)
No interlayer					
	0	0.6	—	251.4	58.2
	1st	5.2	25.2	4.3	56.3
	10th	6.9	17.9	1.6	86.9
	50th	2.5	28.9	4.5	115.7
	100th	0.8	34.9	5.1	100.6
APC paper					
	0	1.9	—	44.2	218.3
	1st	1.1	—	76.6	178.4
	10th	1.4	—	12.8	23.9
	50th	1.4	—	8.9	15.3
	100th	1.6	—	8.0	15.0