

## Supplemental information

### **Facile preparation of flexible porous carbon fibers as self-supporting sulfur cathode host for high performance Li-S batteries**

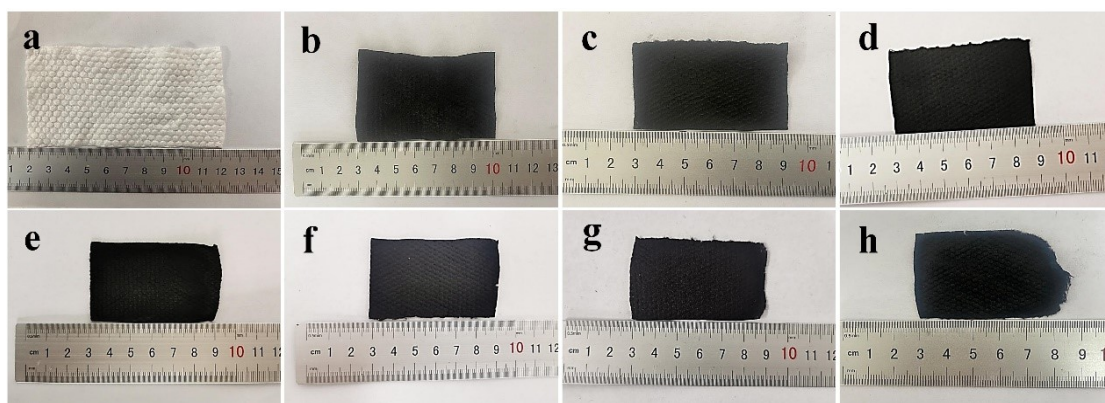
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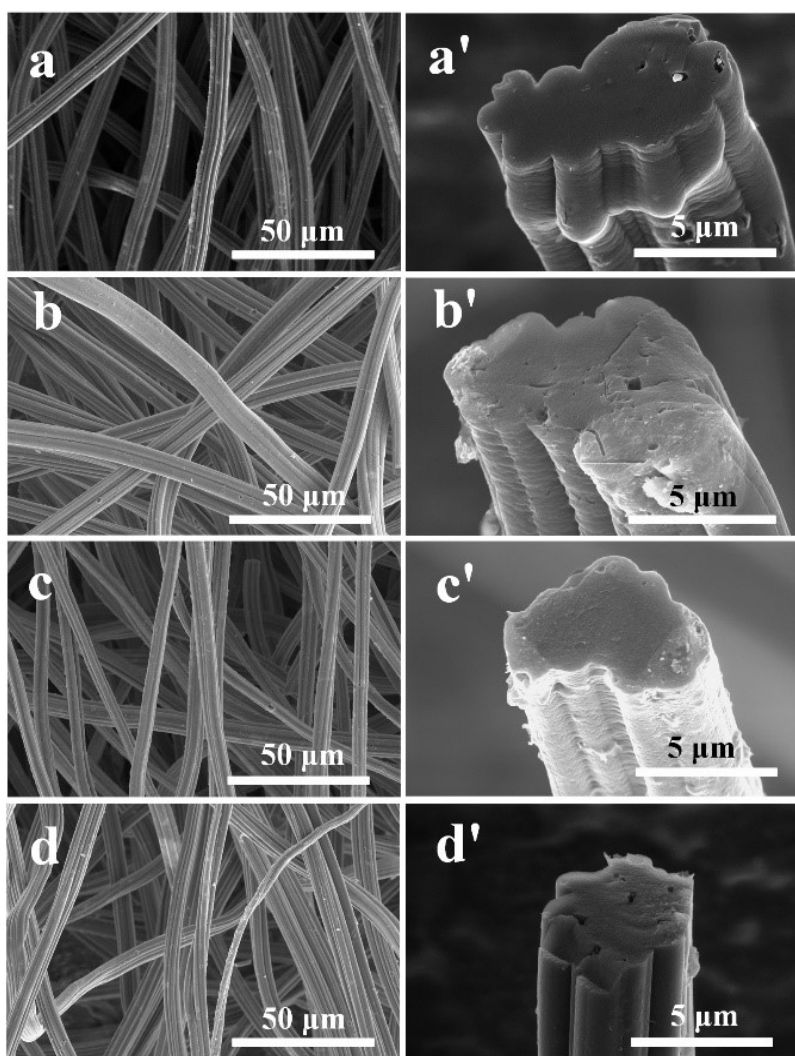
<sup>b</sup> Key Laboratory of Green-chemistry Materials in University of Yunnan Province, Yunnan Minzu University, Kunming, 650500, China;

<sup>c</sup> Yunnan Tianhong Chemical Engineering Co., Ltd., Kunming, 650106, China.

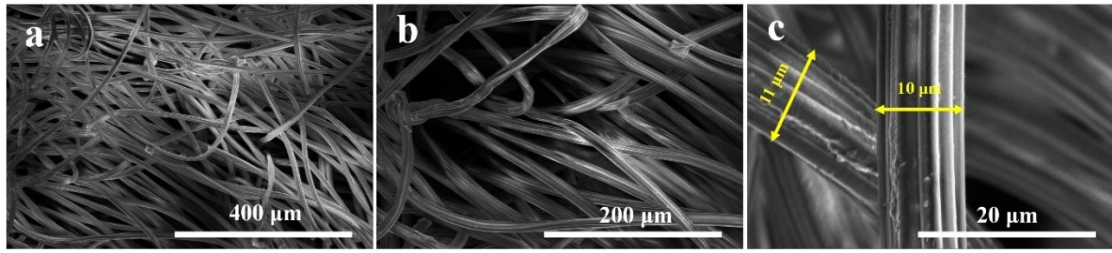
*corresponding author E-mail:* xmwbbboy@163.com (M. W. Xiang)



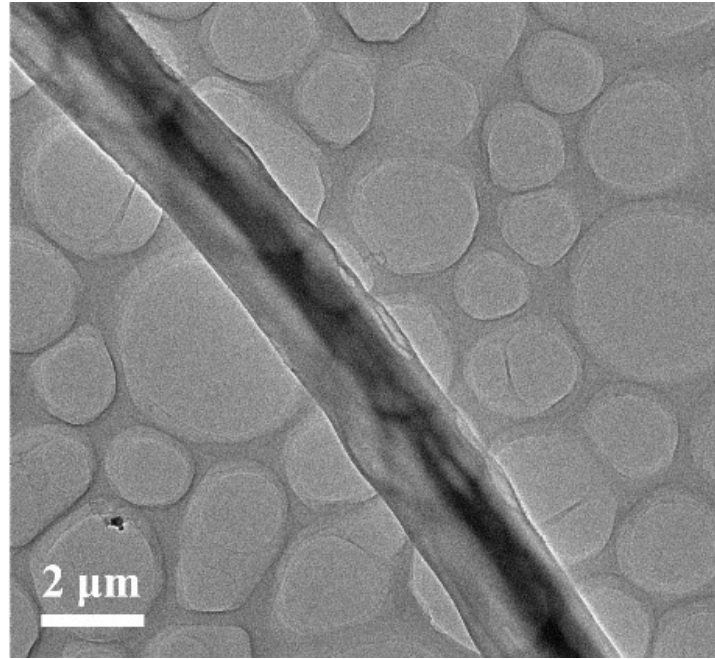
**Fig.S1** Digital photographs of (a) MC, (b) PCF, (c) CF, (d) SPCF1, (e) SPCF2, (f) SPCF3, (g) SPCF4 and (h) SPCF5 samples.



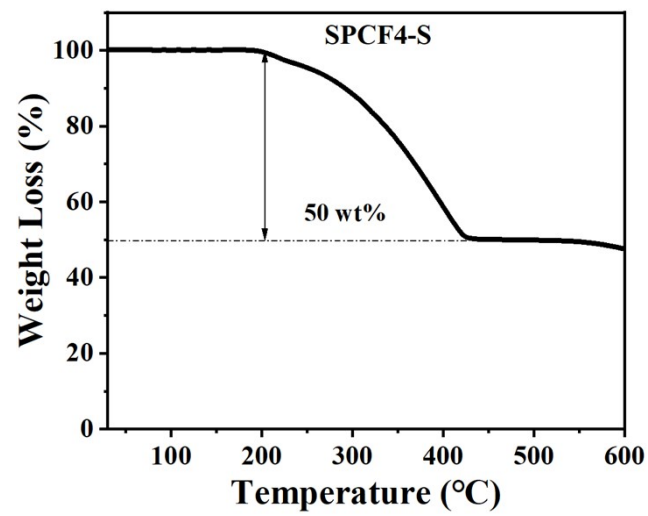
**Fig.S2** SEM images of (a, a') SPCF1, (b, b') SPCF2, (c, c') SPCF3, (d, d') SPCF5 samples.



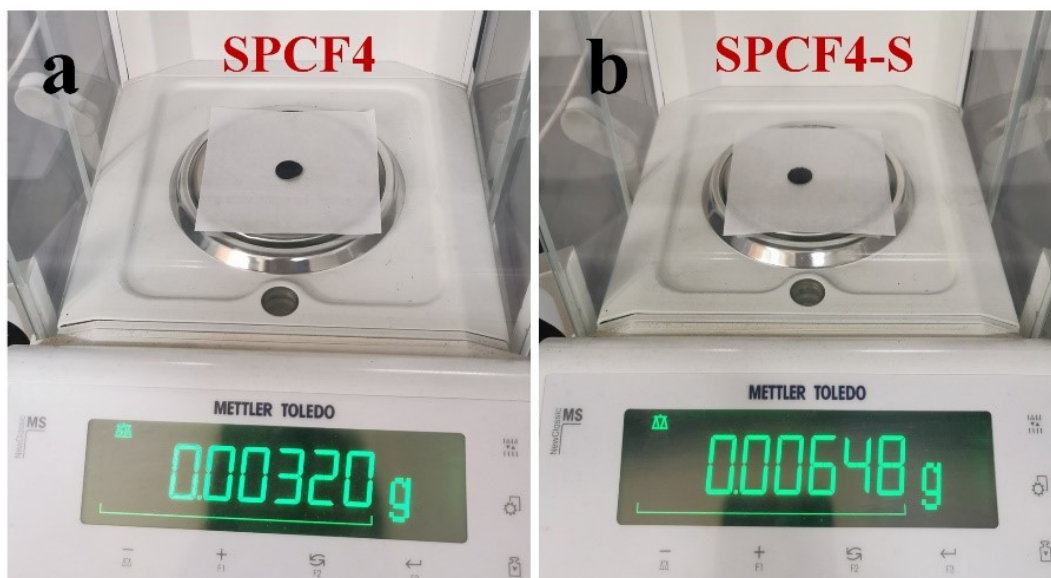
**Fig.S3** SEM images of pristine MC sample with various magnifications.



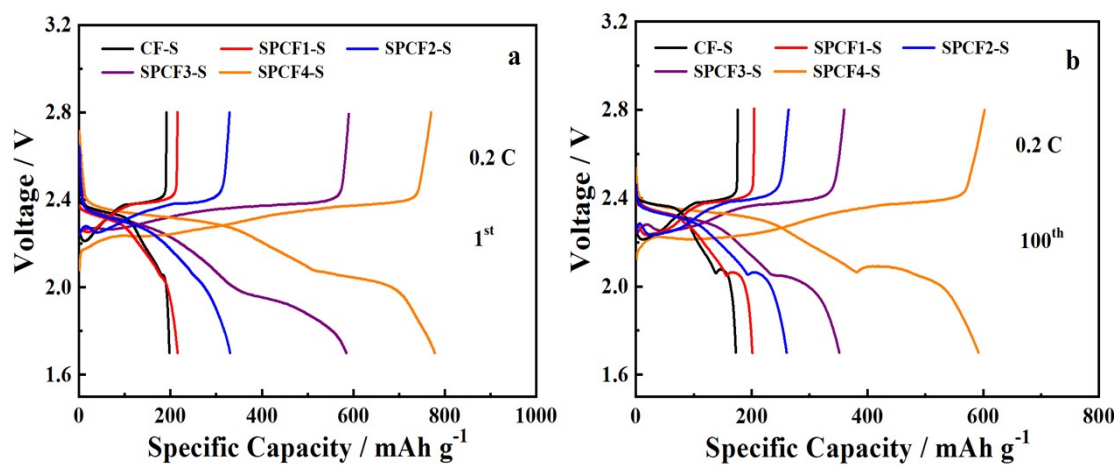
**Fig.S4** TEM image of SPCF4 sample.



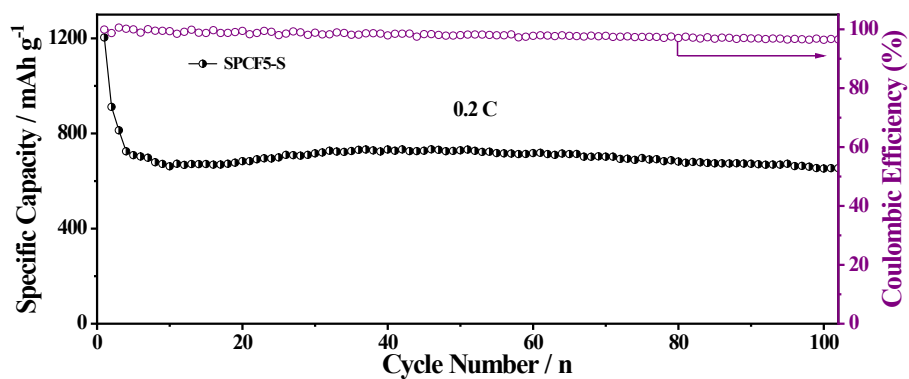
**Fig.S5** TGA curves of the SPCF-S composite.



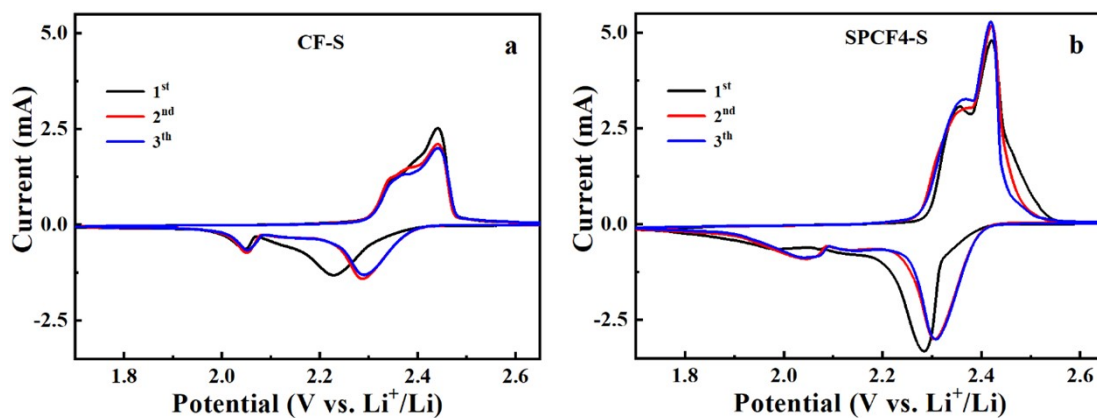
**Fig.S6** The weight changes of (a) SPCF4 and (b) SPCF4-S samples before and after loading active sulfur.



**Fig.S7** (a) The first and (b) 100<sup>th</sup> charge/discharge curves of CF-S, SPCF1-S, SPCF2-S, SPCF3-S and SPCF4-S electrodes at 0.2 C.



**Fig.S8** Cycling performances of SPCF5-S cathodes at 0.2 C after two cycles activation at 0.05 C.



**Fig.S9** CV curves of (a) CF-S and (b) SPCF4-S electrodes with the first third cycles.



**Fig.S10** Equivalent circuit model.

**Table S1.** Electrochemical performance comparison of Li-S batteries employing CF host cathode in this work and those reported in the literatures.

Cathode	Sulfur loading (mg cm <sup>-2</sup> )	Current density (C*)	Initial discharge capacity (mAh g <sup>-1</sup> )	Cycling number	Capacity retention (%)	Ref.
MoS <sub>2</sub> @G-PCNFs	1.0	0.1	1385	100	61.8	[S1]
CFC-S	1.2	0.2	893	30	60.9	[S2]
PCC-S	1.4	0.1	915	100	62.3	[S3]
TiO <sub>2</sub> -ACF/S	3.2	0.2	915	100	77.0	[S4]
CoO/Co@PCF-S	3.0	0.1	945.8	100	75.9	[S5]
<b>SPCF4-S</b>	<b>3.0</b>	<b>0.2</b>	<b>778</b>	<b>100</b>	<b>76.0</b>	<b>This work</b>

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[S2] W. Xiao, L. Mi, S. Cui, H. Hou and W. Chen, *New J. Chem.*, 2016, **40**, 93-96.

[S3] Y. Fu, J. Hu, Q. Wang, D. Lin, K. Li and L. Zhou, *Carbon*, 2019, **150**, 76-84.

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[S5] W. Ren, W. Ma, M. M. Umair, S. Zhang and B. Tang, *ChemSusChem*, 2018, **11**, 2695-2702.