

## **Electronic Supplementary Information**

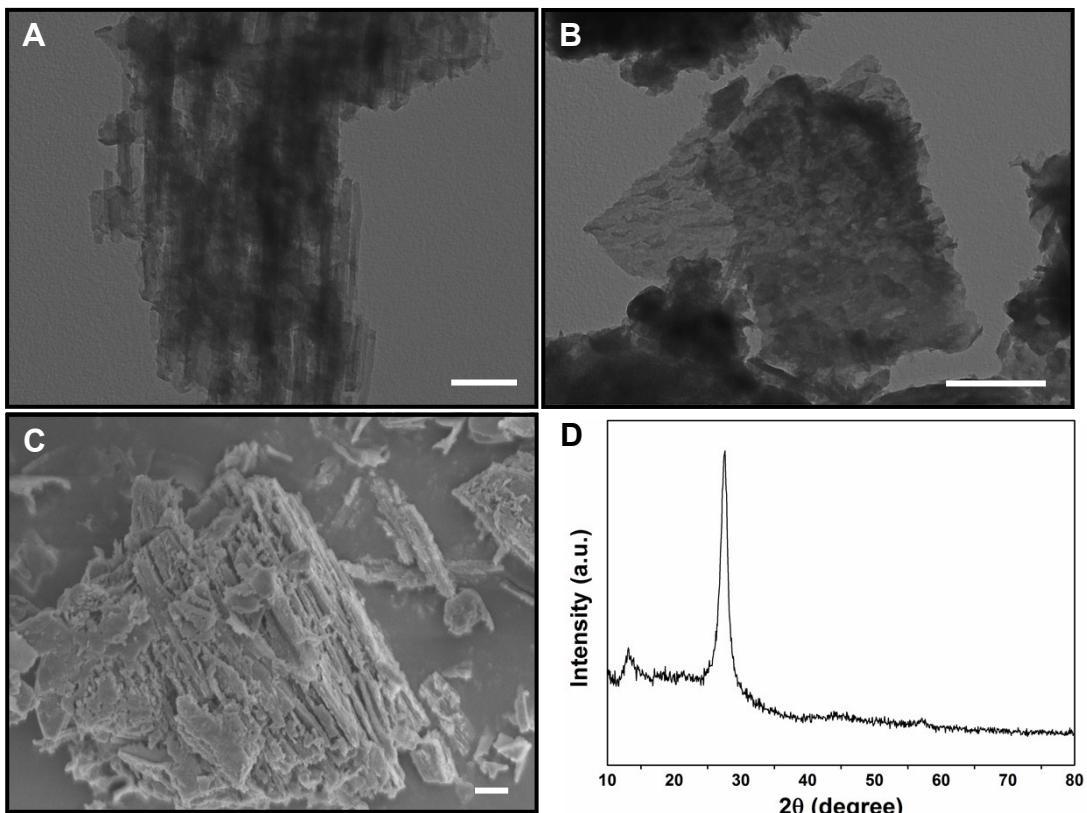
### **Heteroatom Dopings and Hierarchical Pores of Graphene for Synergistic Improvement of Lithium-Sulfur Battery Performance**

Jiahui Li,<sup>a</sup> Caining Xue,<sup>a</sup> Baojuan Xi<sup>\*,a</sup> Hongzhi Mao,<sup>a</sup> Yitai Qian,<sup>\*a,b</sup> and Shenglin Xiong,<sup>a</sup>

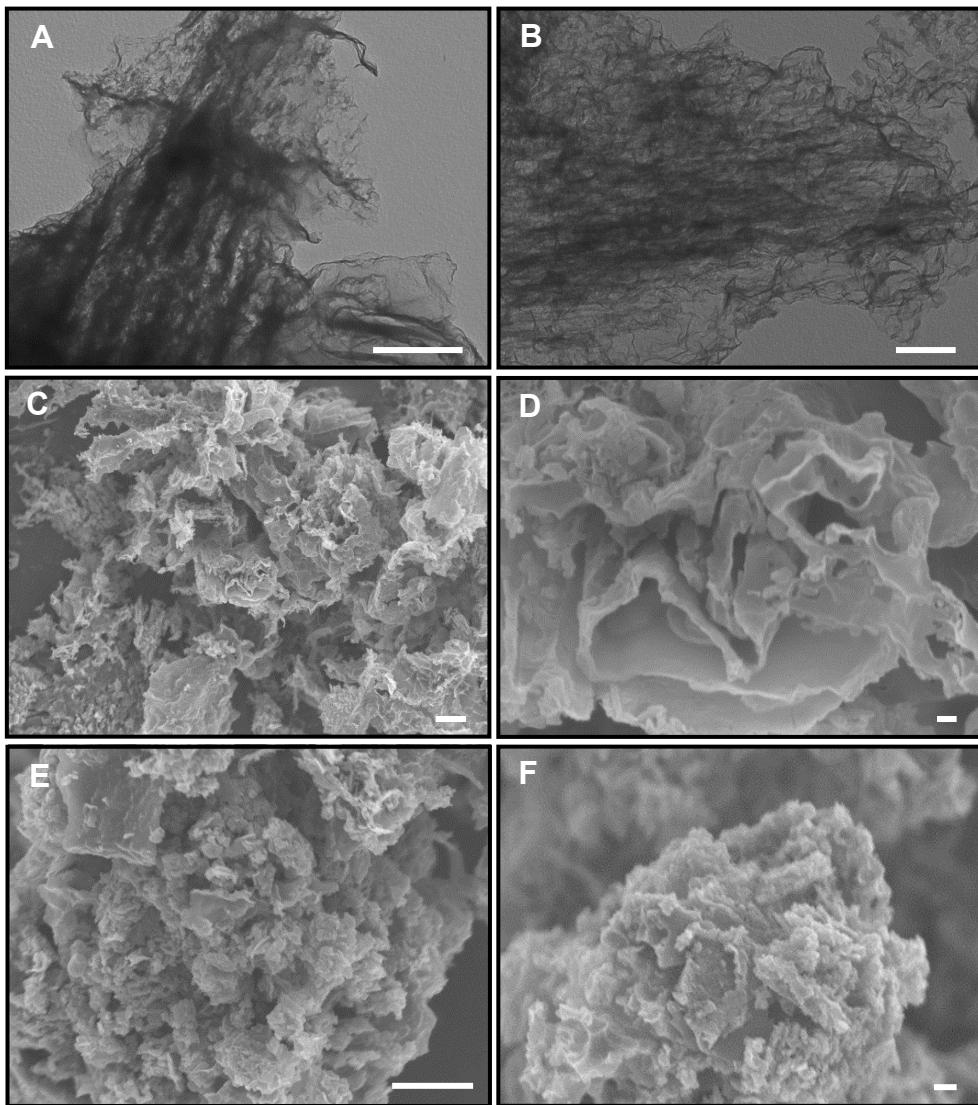
<sup>a</sup>Key Laboratory of the Colloid and Interface Chemistry, Ministry of Education, and School of Chemistry and Chemical Engineering, Shandong University, Jinan, 250100, PR China

Correspondence and requests for materials should be addressed to B.J.X. (Email: baojuanxi@sdu.edu.cn) or S.L.X. (Email: qianyt@sdu.edu.cn)

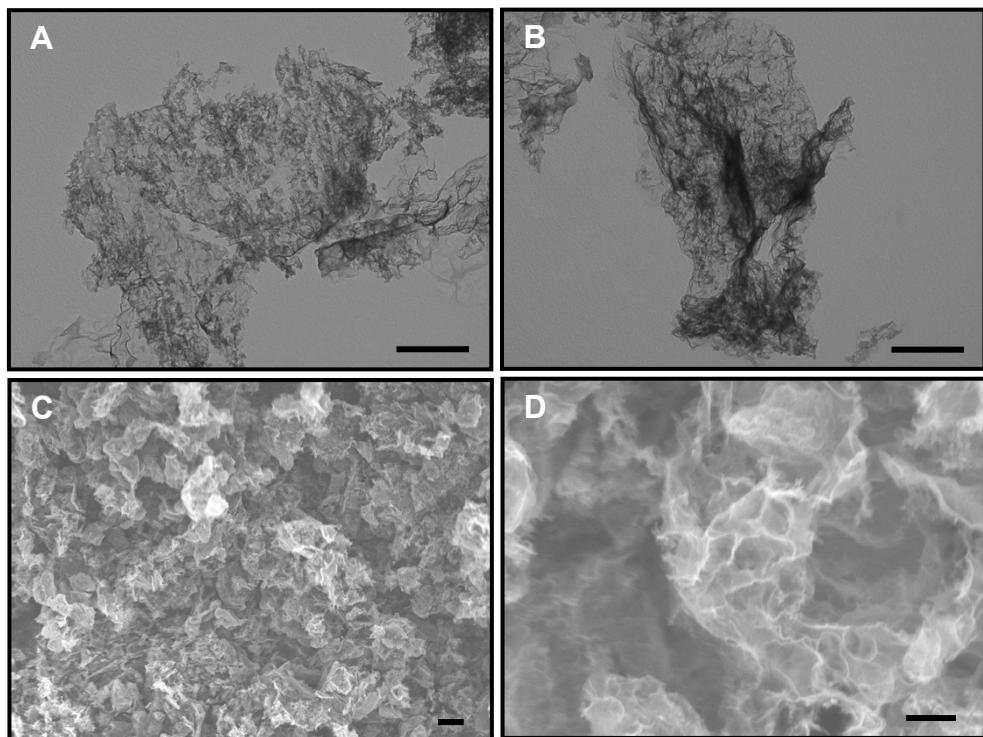
<sup>b</sup>Hefei National Laboratory for Physical Sciences at the Microscale, University of Science and Technology of China, Hefei, 230026, PR China



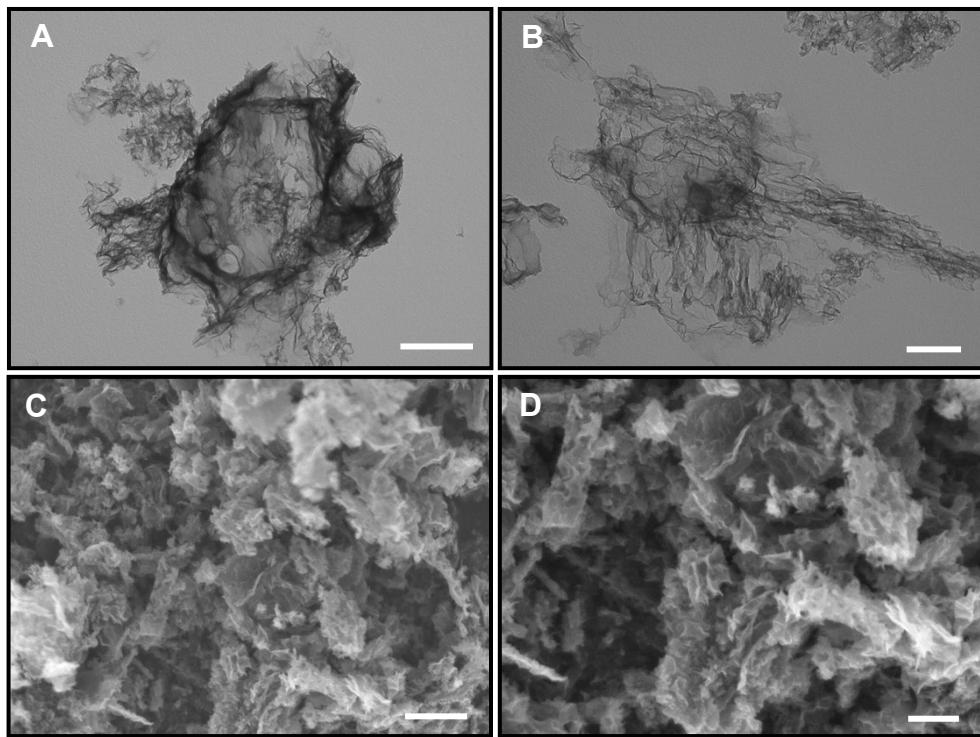
**Fig. S1** Morphology and microstructure of g-C<sub>3</sub>N<sub>4</sub>: (A,B) Different-magnification TEM images, (C) SEM image, (D) XRD pattern. Scale bar: (A) 200 nm, (B) 500 nm, (C) 1 μm.



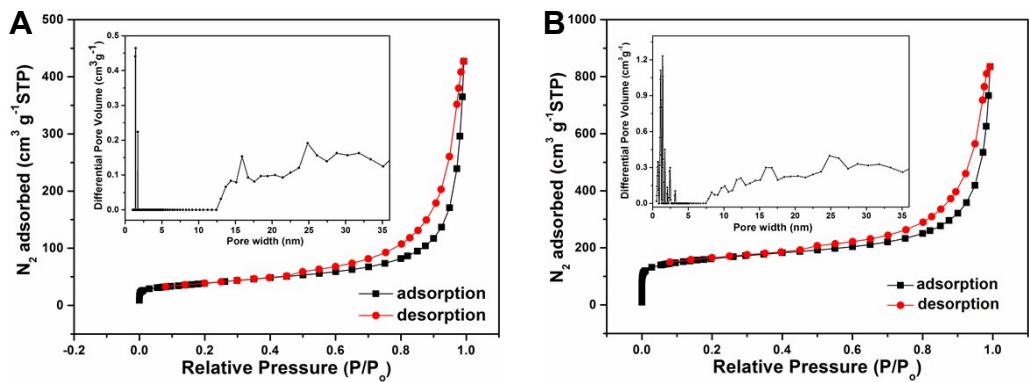
**Fig. S2** (A,B) TEM and (C,D) FESEM image of N,S-FLG<sub>800</sub> and (E,F) N,S-FLG<sub>800</sub>/S .  
Scale bars: (A) 500 nm, (B,F) 200 nm, (C,E) 1  $\mu$ m, (D) 100 nm.



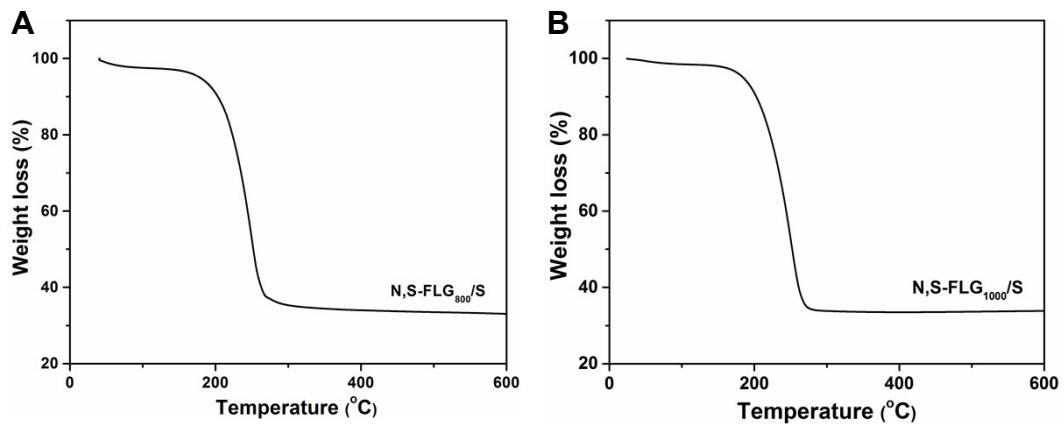
**Fig. S3** (A,B) TEM and (C,D) FESEM image of N,S-FLG<sub>1000</sub>. Scale bars: (A,B,D) 500 nm, (C) 2 μm.



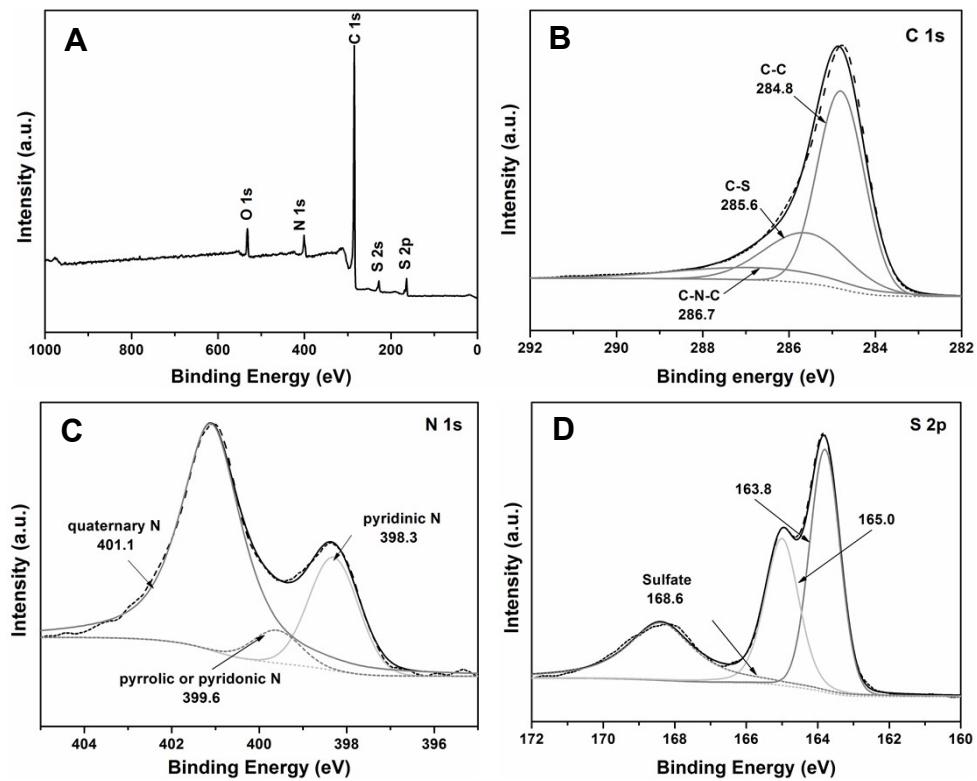
**Fig. S4** (A,B) TEM and (C,D) FESEM image of N,S-FLG<sub>1000</sub>/S. Scale bars: (A,D) 500 nm, (B) 250 nm, (C) 1 μm, (D) 500 nm.



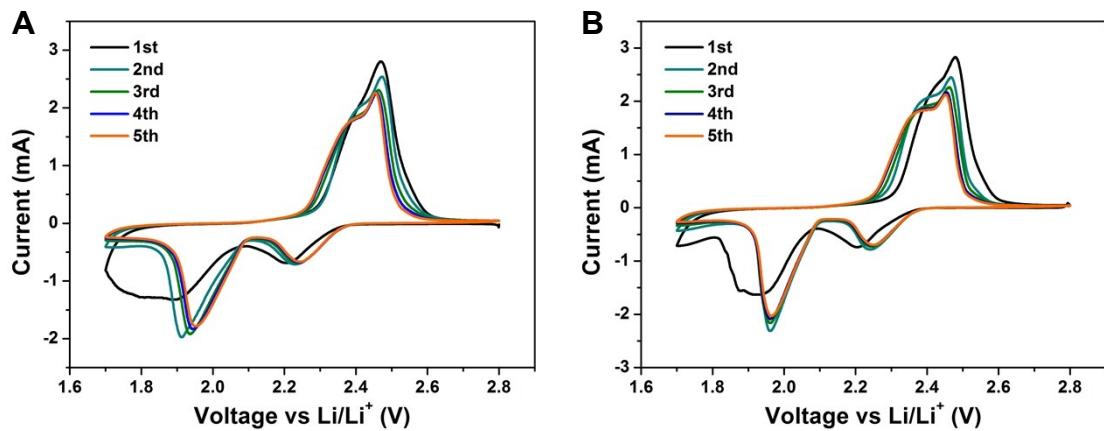
**Fig. S5** N<sub>2</sub> adsorption–desorption isotherms and the corresponding pore-size distribution of N,S-FLG<sub>800</sub> (A) and N,S-FLG<sub>1000</sub> (B).



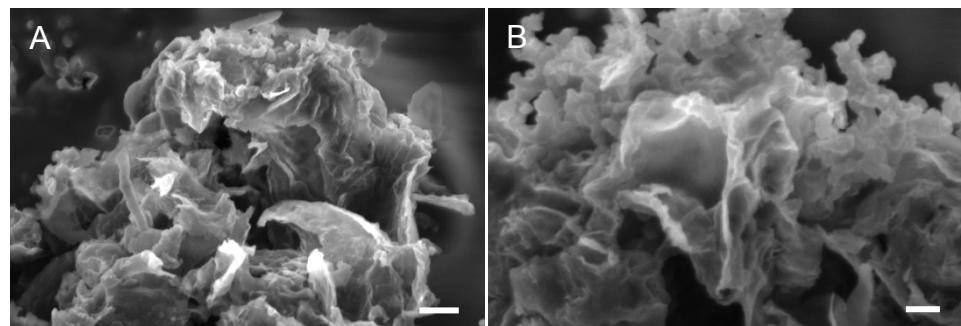
**Fig. S6** TGA curves of N,S-FLG<sub>800</sub>/S (A) and N,S-FLG<sub>1000</sub>/S (B) composites.



**Fig. S7** XPS spectra of N,S-FLG<sub>900</sub>/S composite: (A) survey spectrum, (B) C 1s, (C) N 1s, (D) S 2p.



**Fig. S8** CV curves of N,S-FLG<sub>800</sub>/S (A) and N,S-FLG<sub>1000</sub>/S (B) measured between 1.7-2.8 V at a sweep rate of 0.1 mV s<sup>-1</sup>.



**Fig. S9** FESEM images of N,S-FLG<sub>900</sub>/S after 50 cycles at the current density of 0.8 A g<sup>-1</sup>. (Scale bar: 200 nm for A and 100 nm for B)