

Supporting Information

Assembling Sulfur Spheres on Carbon Fiber with Graphene Coated Hybrid Bulk Electrodes for Lithium Sulfur Batteries

Zhi-Zheng Yang, Hui-Yuan Wang, Xiao-Bin Zhong, Wen Qi, Bang-Yong Wang and
Qi-Chuan Jiang*

Synthesis of Graphene Oxide

Graphite flakes (Alfa, cat #43209, 325 mesh flakes) were oxidized using the improved method.¹ In a typical procedure to synthesize GO, 360 mL H₂SO₄ and 40 mL H₃PO₄ were added to the mixture of 2.0 g graphite flakes and 18.0 g KMnO₄. After stirred for 30 min at room temperature, the reactant was then heated in an oil bath at 50 °C for 12 h. After cooled to room temperature, the gray mixture was added with 400 mL ice and 5 mL 30% H₂O₂. After the supernatant was decanted away by centrifuging, the yellow precipitation was washed with 400 mL 15% HCl to dissolve the residual MnO₂. After centrifuged and washed with deionized water for several times, the pH of the supernatant was neutral. During the centrifugation process, the low-speed centrifugation was conducted to purify the GO nanosheets. The precipitation was dispersed with 1000 mL deionized water, and then dried in a vacuum freeze-dryer. A yellow flocculent GO aerogel was achieved after dried for 12 h under a vacuum degree of 10 Pa at 35 °C below the ice point.

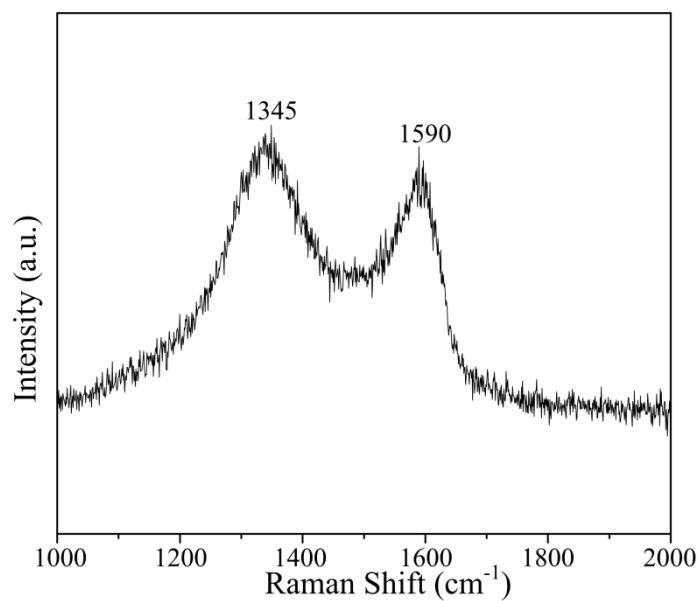


Figure 1s Raman spectrum of the CFS@G bulk electrode. The Raman spectroscopy shows that the two remarkable peaks around 1345 and 1590 cm^{-1} can be attributed to D band arising from the defects and disorders in carbonaceous material and G band associated with the E_{2g} mode of graphite. The intensity ratio (I_D/I_G) of the two bands is about 1.07.

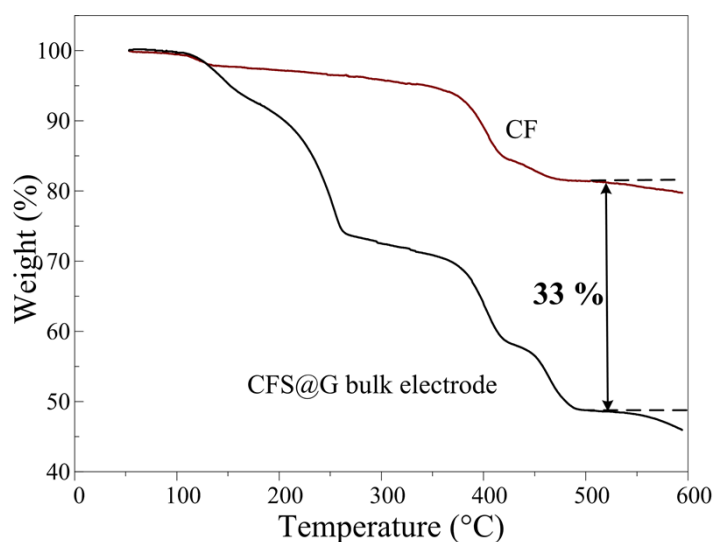


Figure 2s TGA curves of the CF and CFS@G bulk electrode.

[1] D. C. Marcano, D. V. Kosynkin, J. M. Berlin, A. Sinitskii, Z. Sun, A. Slesarev, L.

B. Alemany, W. Lu and J. M. Tour, ACS Nano 2010, 4, 4806-4814.