Supporting Information for

Fibrous Hybrid of Graphene and Sulfur Nanocrystals for High-Performance Lithium–Sulfur Batteries

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Figure S1. Thermogravimetric curves of the G-S hybrids in Ar with a heating rate of $10\text{ }^{\circ}\text{C min}^{-1}$, indicating the sulfur contents of 55, 63 and 71 wt%.

Figure S2. (a) Photograph of the as-prepared G-S hybrids (powder) using intercalation-exfoliated graphene and thermally exfoliated reduced graphene with sulfur-dissolving CS_2 and alcohol dispersion as precursor, after hydrothermal treatment at $180\text{ }^{\circ}\text{C}$ for 10 h. (b) Thermogravimetric curves of the G-S hybrids (powder) in Ar with a heating rate of $10\text{ }^{\circ}\text{C min}^{-1}$, indicating the sulfur contents of 59 and 60 wt%.

Figure S3. SEM images of the G-S55 and G-S71 hybrids.

Figure S4. SEM image of the G-S_{mix}.

Figure S5. (a) TEM and (b) HRTEM images of the G-S55 hybrid. (c) TEM and (d) HRTEM images of the G-S71 hybrid. (Insets are two enlarged S nanocrystals marked in (b) and (d)).

Figure S6. SEM images of the (a, b) G-S60 hybrid (powder) and (c, d) G-S59 hybrid (powder) using intercalation-exfoliated graphene and thermally exfoliated reduced graphene, respectively.

Figure S7. XRD patterns of the G-S55, G-S63 and G-S71 hybrids.

Figure S8. O 1s XPS spectra of the G-S63 hybrid.

Figure S9. Electrical conductivity of the G-S55, G-S63, and G-S71 hybrids.

Figure S10. (a) Cycling stability of the G-S63 hybrid, G-S59 hybrid (powder) and G-S60 hybrid (powder) cathodes at 300 mA g^{-1} for 50 cycles. (b) Cyclic performance of the G-S59 hybrid (powder) and G-S60 hybrid (powder) cathodes at 0.75 A g^{-1} for 100 cycles after the rate capability test.

Figure S11. (a) Rate capacity of the G-S cathodes at different current densities. (b) Cyclic performance and Coulombic efficiency of the G-S cathodes at 0.75 A g^{-1} for 100 cycles after the high rate ability test. Pink symbol, Coulombic efficiency for the G-S55 cathode; brown symbol, Coulombic efficiency for the G-S71 cathode.

Figure S12. S 2p XPS spectra of the G-S63 hybrid electrode after being discharged to the end of the second plateau.