Supporting Information

Phosphorous-doped graphene nanosheets anchored with cerium oxide nanocrystals as effective sulfur hosts for high performance lithium–sulfur batteries

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**Fig. S1** Low and relatively high magnification SEM images of a,b) CeO$_2$/PG, c,d) CeO$_2$/G, and e,f) G.
**Fig. S2** Low and relatively high magnification SEM images of a,b) S@CeO$_2$/PG, c,d) S@CeO$_2$/G, and e,f) S@G.
**Fig. S3** a,b) TEM images, c) high-resolution TEM (HRTEM) image of CeO$_2$ nanoparticles anchored on graphene. d) Fast Fourier Transform (FFT) pattern of CeO$_2$/G composites, e) EDX maps of Ce, O, and C.

**Fig. S4** X-ray diffraction patterns of S@G and G.
Fig. S5 N$_2$ adsorption-desorption isotherms and pore distribution of a,b) S@CeO$_2$/G and CeO$_2$/G, c,d) S@G and G, respectively.
**Fig. S6** Cyclic voltammograms and charge/discharge profiles of a,b) S@CeO$_2$/G and c,d) S@G electrodes, respectively.
**Table S1** The contents of CeO$_2$/PG composites from XPS analysis.

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<th>Sample</th>
<th>Content</th>
<th>At [%]</th>
<th>Mass [%]</th>
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<td>CeO$_2$/PG</td>
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