Electronic Supplementary Material (ESI) for Physical Chemistry Chemical Physics

Supporting Information

Hydrothermal Carbon-based Nanostructured Hollow Spheres for Electrode Materials of High-Power Lithium-Sulphur Batteries

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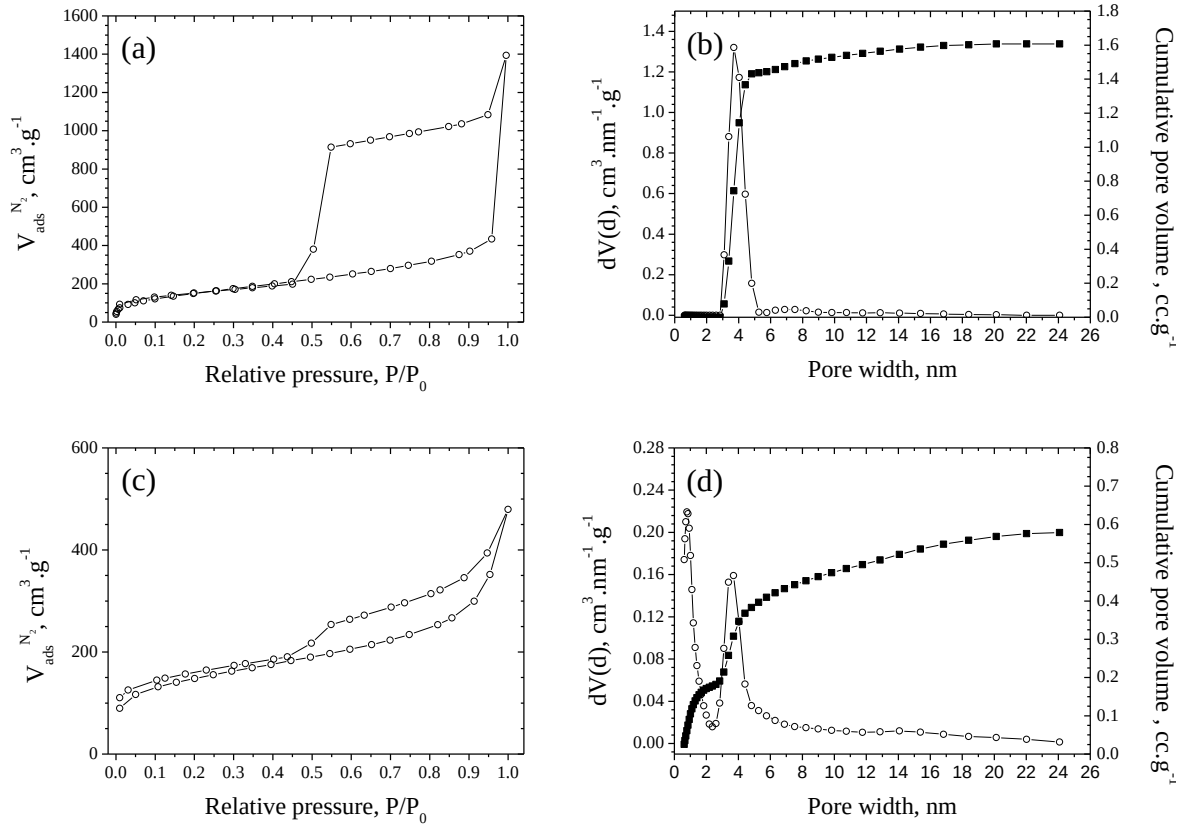

Figure S1. Nitrogen sorption isotherms and DFT pore size distributions of the carbon-based hollow spheres after further thermal treatment at 550 °C and silica removal obtained from xylose, 550-CarbHS-X (a-b) and from glucose, 550-CarbHS-G (c-d).

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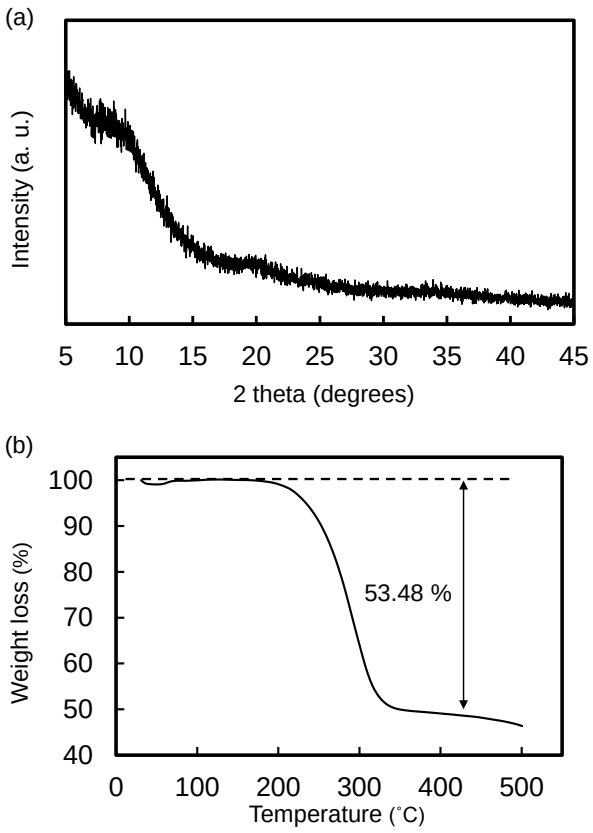

Figure S2. (a) Typical XRD pattern for HCNSs/S composite. XRD patterns were recorded by using PANalytical X'Part PRO with Co Kα radiation. (b) Thermal gravimetric analysis (TGA) for HSs/S composite. TGA was carried out by using NETZSCH STA 409C/CD with heating ratio of 5 K min^{-1}.

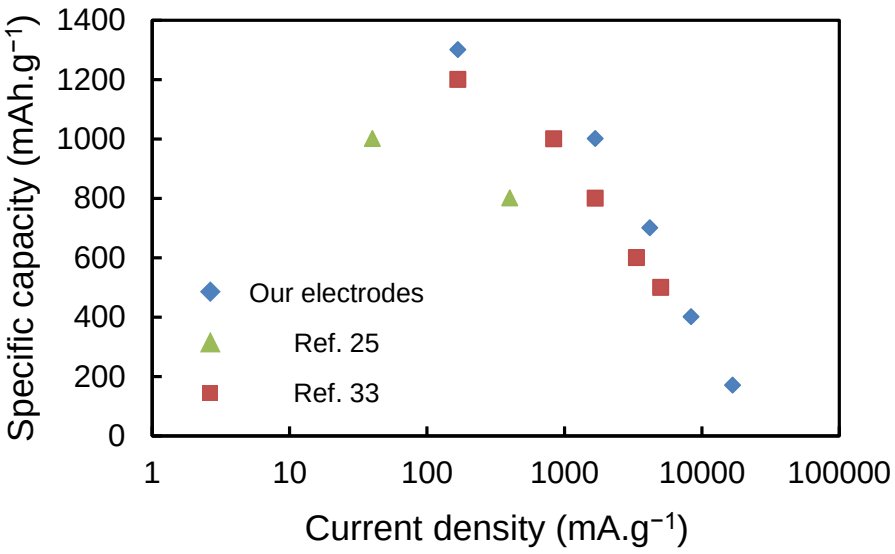

Figure S3. Comparison of the rate capability in current density vs. specific capacity.

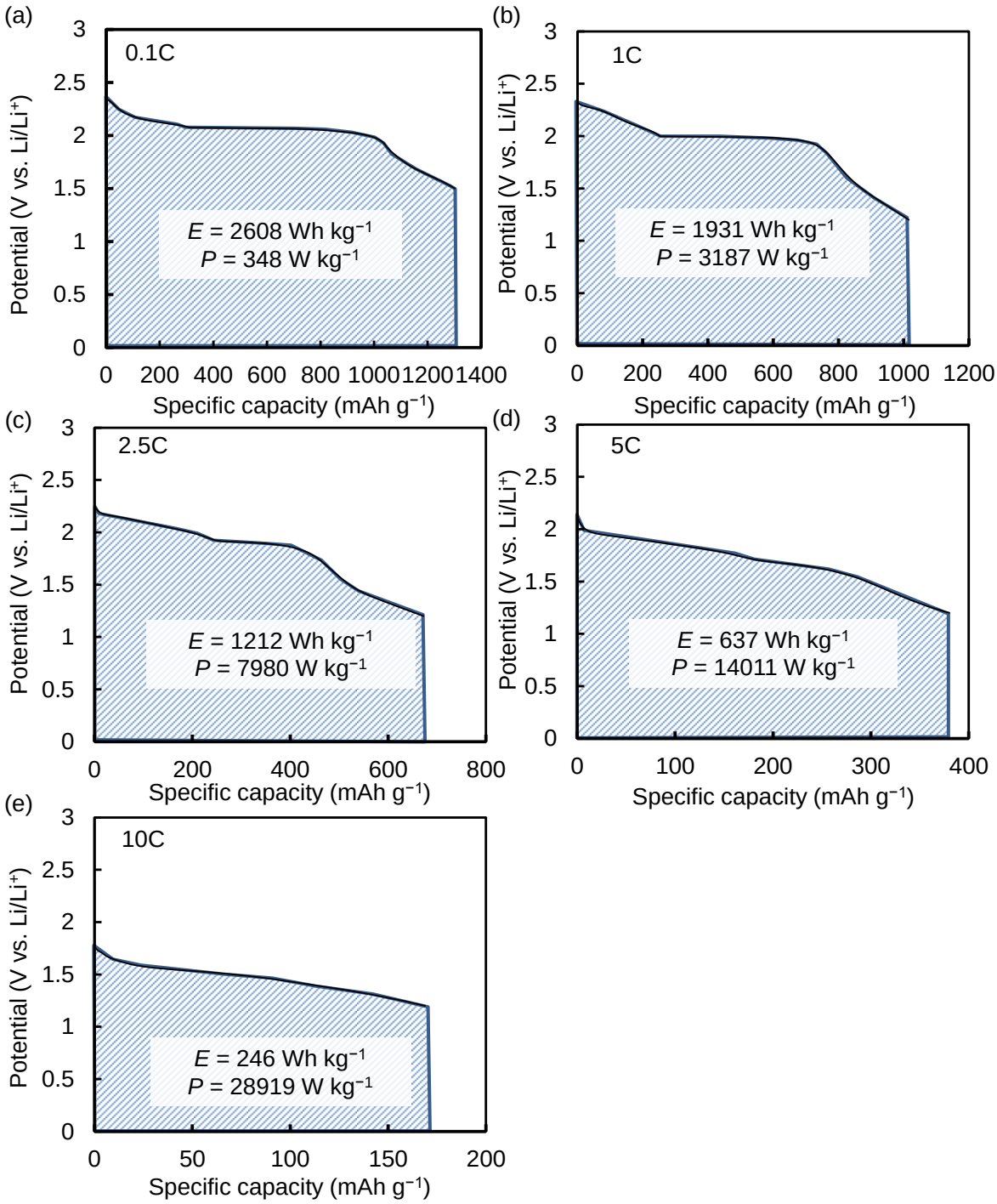

Figure S4. Specific energy and specific power for Li-S cells using HSs in various current densities. (a) Result at a current density of 0.1C (= 167.5 mA g^{-1}). (b) Result at a current density of 1C (= 1675 mA g^{-1}). (c) Result at a current density of 2.5C (= 4187.5 mA g^{-1}). (d) Result at a current density of 5C (= 8375 mA g^{-1}). (e) Result at a current density of 10C (= 16.75 A g^{-1}).

Here, all properties were calculated based on the weight of sulfur. In the Figure 5b, we assumed that mass of Li_2S will comprise 25 % of the total device weight.