Electronic Supplementary Material (ESI) for Inorganic Chemistry Frontiers.

Supporting information

Mesoporous SiO_2/Carbon Hollow Spheres Applied towards High Rate-Performance Li-Battery Anode

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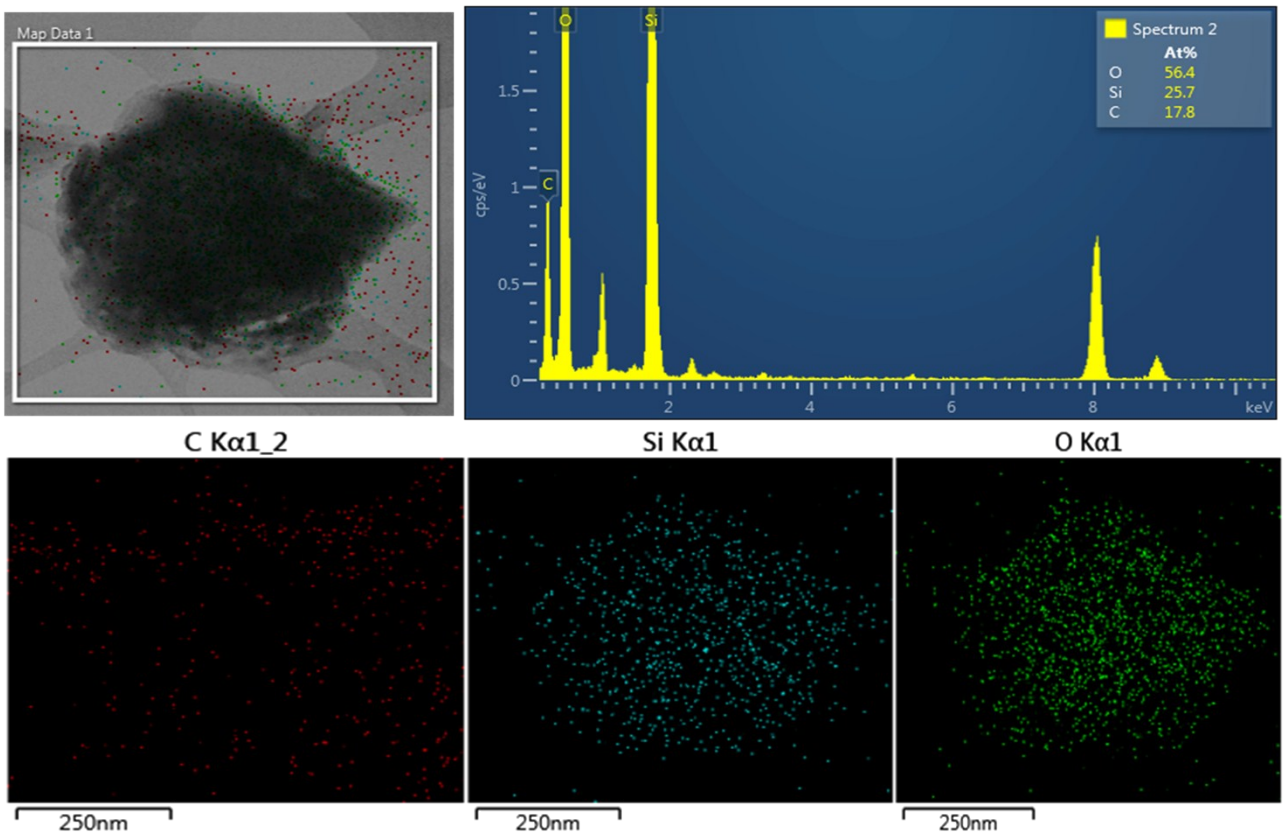

Figure S1. The TEM image corresponding C, O, and Si EDX elemental mappings of the single SiO_2/C sphere.

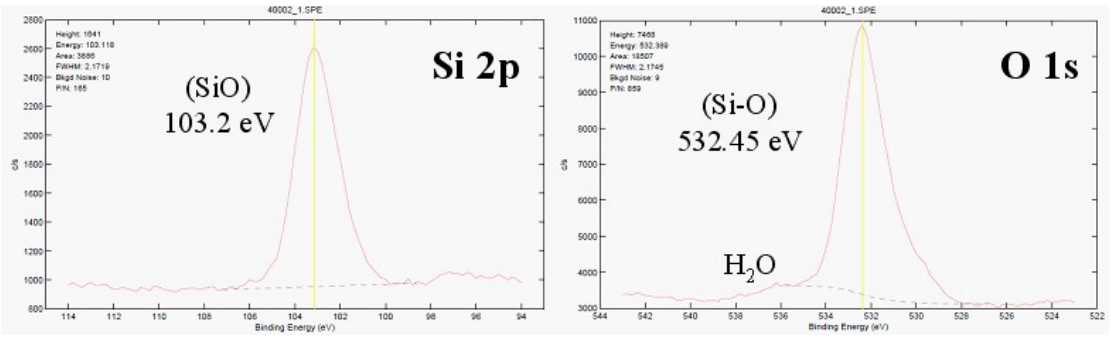

Figure S2. Si 2p and O 1s XPS spectra for as-prepared SiO_2/C hollow sphere.

Preparation of mesoporous SiO_2/Carbon hollow nanocomposites

According to Lin [20-24], the typical synthesis of SiO_2/Carbon composites: poly(ethylene oxide) (PEO, Acrös, MW 20000) (1.0 g) and PF (1.0 g; PF2180, phenol/aldehyde, 0.8–0.9; MW ca. 96000; Chung-Chun Plastic, Taiwan) polymers were dissolved in a mixture of ethanol (20.0 g) and water (10.0 g) to form a clear solution. Then, the PF–PEO blended solution was quickly poured into an acidified sodium silicate aqueous solution (pH = 2.0) at 40 °C, which was prepared by adjusting the pH value of a mixture of sodium silicate (27 wt.-% SiO_2 , 4.0 g, Sigma-Aldrich) and water (150.0 g) to 6.0 and aging for 3 min. A light-yellow precipitate formed within a few seconds. Filtration, washing, and drying at 100 °C yield the PEO–PF/silica hollow spheres. The SiO_2/C hollow spheres were formed after pyrolysis at 800 °C under a N_2 atmosphere for 2 h; in contrast, the SiO_2 hollow spheres are produced after calcination at 600 °C under an O_2 atmosphere for 12 h. **For comparison, the carbon hollow spheres were prepared by removing the SiO_2 from SiO_2/C hollow spheres under 5.0 M NaOH treatments. The TGA curve, the N_2 adsorption and desorption curves and the rate-performance test for carbon hollow spheres were show in Figure S3.**

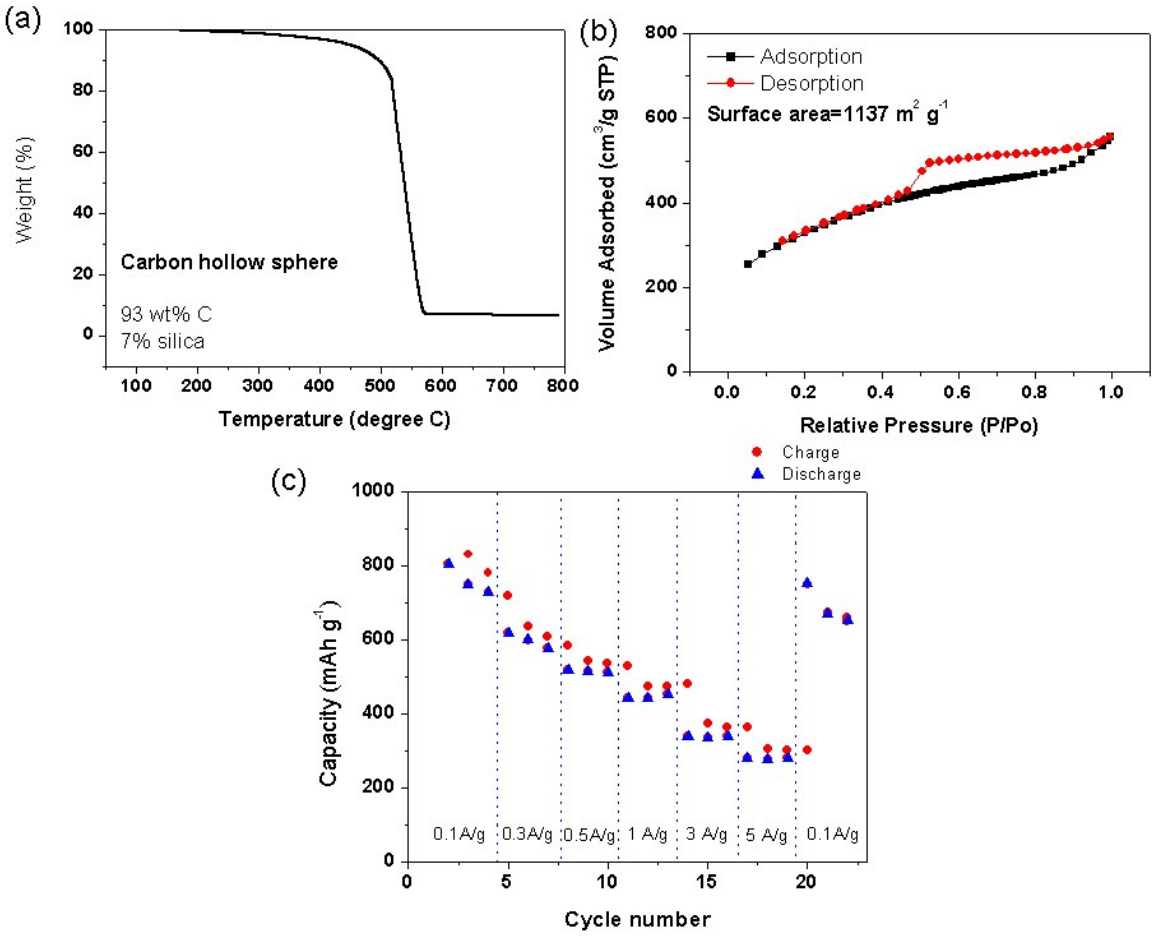

Figure S3. (a) The TGA curve, (b) the N_2 adsorption/desorption isotherms and (c) the rate-performance test for carbon hollow spheres

Table S1. Impedance parameters of the SiO_2/C and SiO_2 cells.

Sample	SiO_2/C-fresh	SiO_2/C-after 3rd cycling	SiO_2-fresh	SiO_2-after 3rd cycling
Rb (Ω)	3.3	2.6	5.1	3.3
Rct (Ω)	60.4	54.9	48.5	102.9