

Supporting Information for:

Core-shell CeO₂@C Nanospheres as Enhanced Anode Materials for Lithium Ion Batteries

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Structure and morphology characterization of products

Crystallographic phases of all the products were investigated by powder X-ray diffraction (XRD, X'pert PRO SUPER, Cu K α radiation, $\lambda=1.54056$ Å). Morphologies of samples were examined by field-emission scanning electron microscopy (FESEM, FEI Sirion 200) and transmission electron microscopy (TEM; Hitachi H-800). Thermogravimetric analysis and differential scanning calorimetry (TGA–DSC) were used to test the weight loss of the products. TGA–DSC data was recorded with a thermal analysis instrument (WCT-1D BOIF) under an airflow or N₂ atmosphere at the heating rate of 10 °C/ min from the room temperature to 800 °C. Infrared spectra were measured on the Fourier infrared spectrum instrument (Nicolet Magna-IR 870).

Electrochemical measurements

The electrochemical performances of the cerium oxides samples as the electrode materials were evaluated using a coin cells (CR2032) with the structure of the Li | 1M LiPF₆ (EC:DEC=1:1) | CeO₂@C. The CeO₂@C electrodes were prepared as 14 mm diameter pellets by casting a slurry

consisting of 80 wt% active oxide, 10 wt% poly(vinylidene fluoride) (PVDF) binder, and 10wt% acetylene black onto a piece of copper foil. Celgard 2400 microporous polypropylene membrane was used as a separator. These cells were cycled galvanostatically between 0.0 and 3.0 V at room temperature on a multi-channel battery test system (NEWARE BTS-610). The current density was 0.2 C. Cyclic voltammogram (CV) was also performed on a CHI 604a Electrochemical Workstation to identify the electrochemical reactions of CeO₂@C electrodes. The scanning rate was 0.2 mV·s⁻¹.