Electronic Supplementary Information (ESI)

A potential anode material Pyrrhotite (Fe_7S_8) for lithium storage

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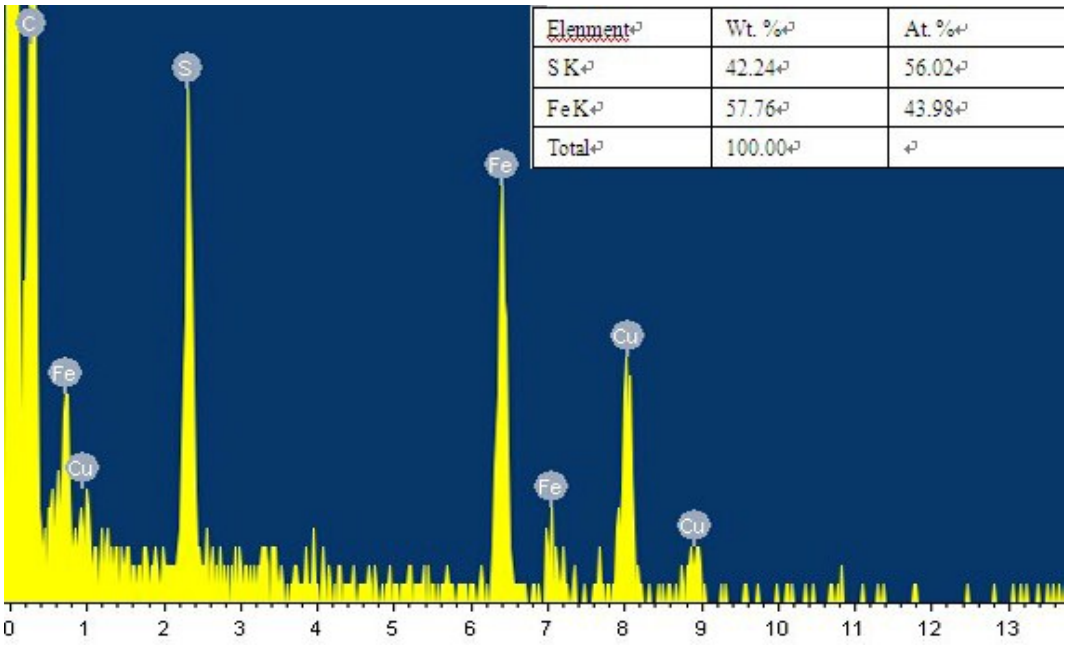

Element	Wt. %	At. %
S K	42.24	56.02
Fe K	57.76	43.98
Total	100.00	

Fig .S1 The X-ray energy-dispersive spectrometer of Fe_7S_8@C

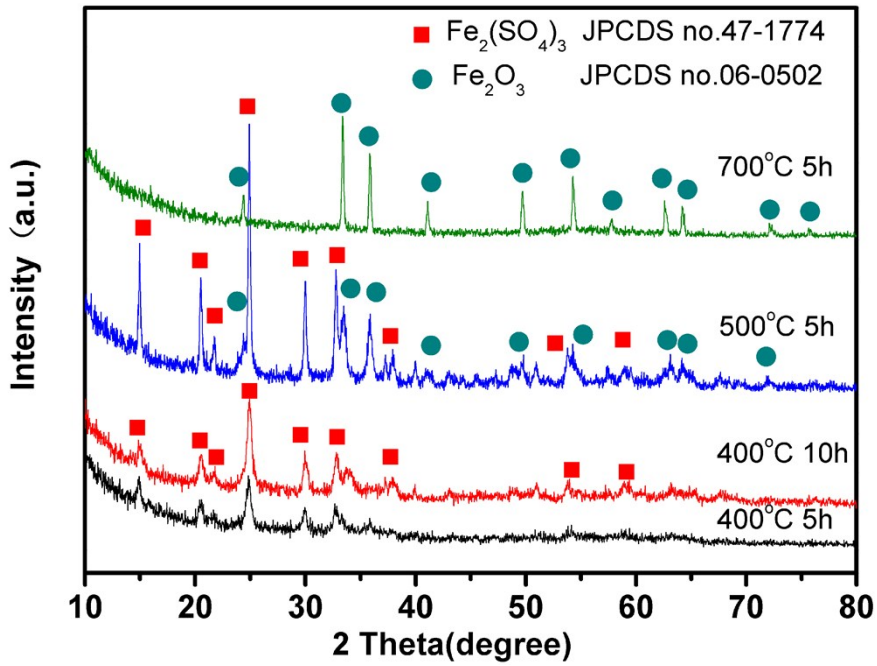

Fig .S2 XRD pattern of the oxidation product of Fe_7S_8@C obtained at different temperature for some hours (heating rate of 10.00 °C min^{-1}).

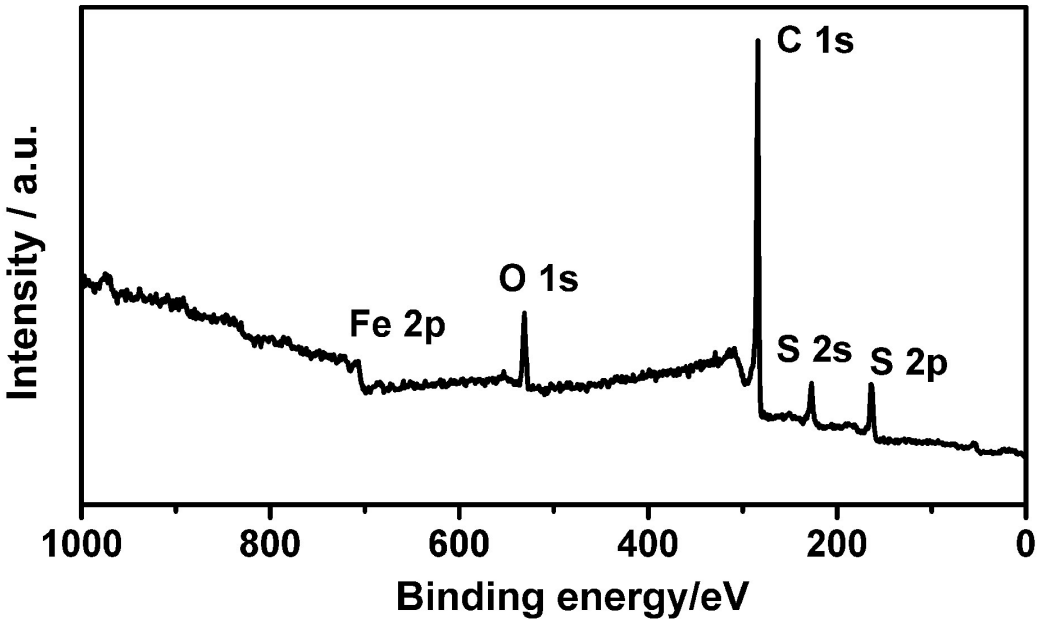

Fig .S3 The XPS of Fe_7S_8@C sample.

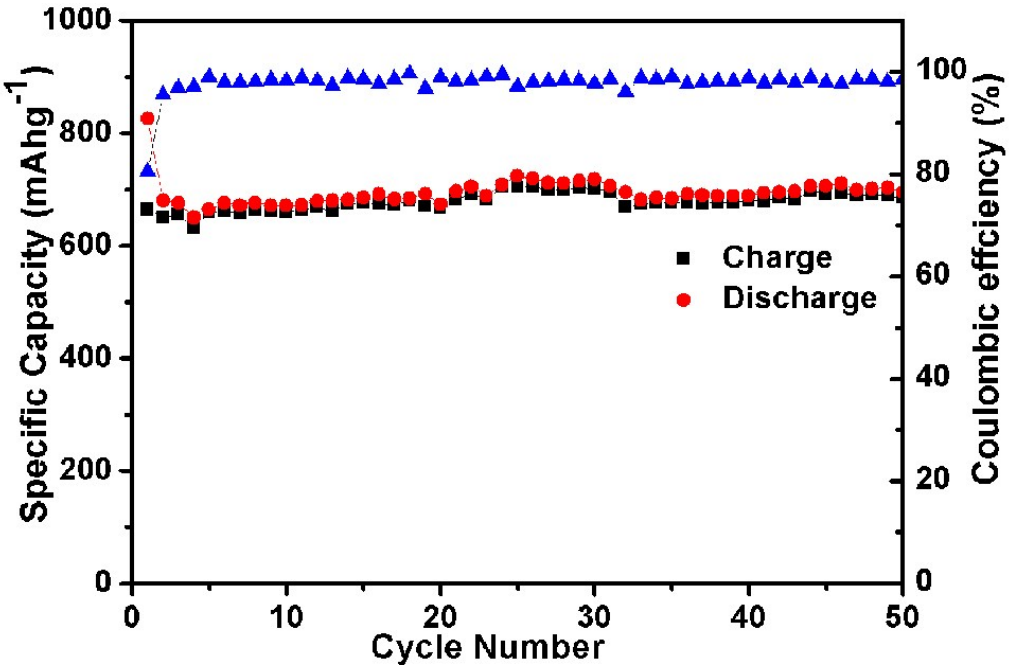

Fig .S4 Cycle performance of the Fe_7S_8@C composites at a current density of 0.1 A g^{-1}between 0.01 and 3.00 V

Experimental Information

Characterizations*:*

Phase characterization was characterized by X-ray powder diffraction (XRD) through a Philips X'pert X-ray diffractometer with Cu Ka radiation (λ = 1.54182 Å) over the range of 10-70º (2θ) at room temperature. The microstructure and morphology were

taken by transmission electron microscope (TEM, H7650), high-resolution transmission electron microscope (HRTEM, JEOL 2010) and scanning electron microscopy (SEM, EOL-JSM-6700F 20KV). The weight percentage of carbon was characterized by elemental analysis (EA, Elemental vario EL cube) at pure oxygen atmosphere. X-Ray photoelectron spectroscopy (XPS) measurements were recorded on a GESCALAB KII -ray photoelectron spectrometer. Raman spectra were recorded with an excitation laser wavelength of 514.5 nm at room temperature. Thermogravimetric analysis (TGA) was performed in air from room temperature to 800^{o}C at a heating rate of 10^{o}C min^{-1} with a TGA-2050 (TA Corp.)

Electrochemical measurements:

The electrochemical measurements were measured with 2016 coin cells. The working electrode was prepared by coating 90 wt % active materials and 10 wt % polyvinylidene fluoride (PVDF) slurry onto a copper foil substrate. The copper foil was dried in a vacuum oven at 110 ^{o}C for 12 h. The loading of the Fe_7S_8@C anode material was about 2.0 mg cm^{-2}. Li metal was used as anode, the electrolyte was 1M LiPF6 with a mixed solution of diethyl carbonate (DC) and ethylene carbonate (EC) (1: 1, in wt. %). Cyclic voltammetry (CV) was carried out at a scanning rate of 0.1 mV s−1 start from 1.00 to 3.00 V (vs. Li^+/Li) at room temperature. The coin-cell was tested with galvanostatic cycling on a battery test system (LAND CT2001) in the voltage window of 0.01-3.00 V and in the voltage window of 1.20-2.50 V versus Li^+/Li.