Supplementary Information

Ferrocene Based Carbon-Iron Lithium Fluoride Nanocomposite as Stable Electrode

Material in Lithium Batteries

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Figure S1: HRTEM images of selected as-prepared nanoparticles. Top: Open graphitic structures of the carbon matrix. Center: Inhomogeneous graphitic coating of iron-rich nanoparticles. Bottom: multi-walled tube-like structure with or without metal encapsulation.
Figure S2. HAADF-STEM reference image and EELS spectra of the selected as-prepared carbon Fe-LiF nanocomposite. Two types of characteristic EELS spectra were recorded with a) a strong F signal and small amounts of Fe, b) trace amounts of F and significant amounts of Fe.
**Figure S3.** Specific discharge capacity versus cycle number for carbon-Fe-LiF nanocomposite which was cycled between the voltage ranges of 1.3–4.3 V at room temperature.
Figure S4. HAADF-STEM overview image and local EELS/EDX analysis after the 1st charging, showing FeF$_3$ aggregates (area 1) and iron-rich particles in a carbon matrix (area 2).
Figure S5. XRD patterns of the carbon-confined Fe-LiF nanocomposite before (bottom) and after charging of the composite electrode to 4.3 V at a current density of 20.83 mA/g (top).