Supplementary material (ESI) for Journal of Materials Chemistry

Supplementary Information

Ferrocene Based Carbon-Iron Lithium Fluoride Nanocomposite as Stable Electrode Material in Lithium Batteries

Raju Prakash,* Ajay Kumar Mishra, Arne Roth, Christian Kübel, Torsten Scherer, Mohammad Ghafari, Horst Hahn and Maximilian Fichtner*

Karlsruhe Institute of Technology (KIT), Institute of Nanotechnology, Postbox 3640, 76021 Karlsruhe, Germany. E-mail: raju.prakash@kit.edu; maximilian.fichtner@kit.edu

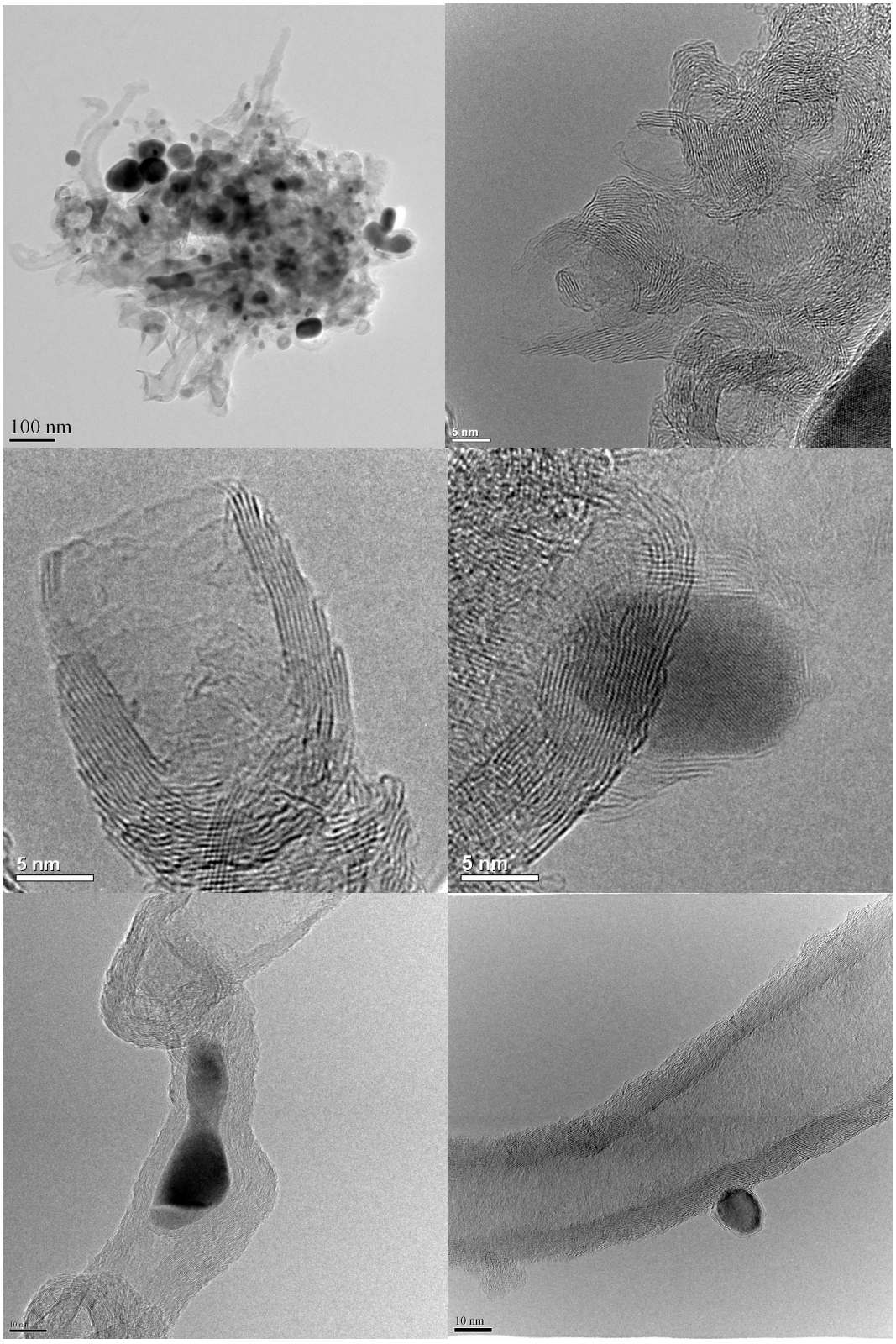

Figure S1: HRTEM images of selected as-prepared nanoparticles. Top: Open graphitic structures of the carbon matrix. Center: Inhomogeneous graphitic coating of iron-.rich nanoparticles. Bottom: multi-walled tube-like structure with or without metal encapsulation

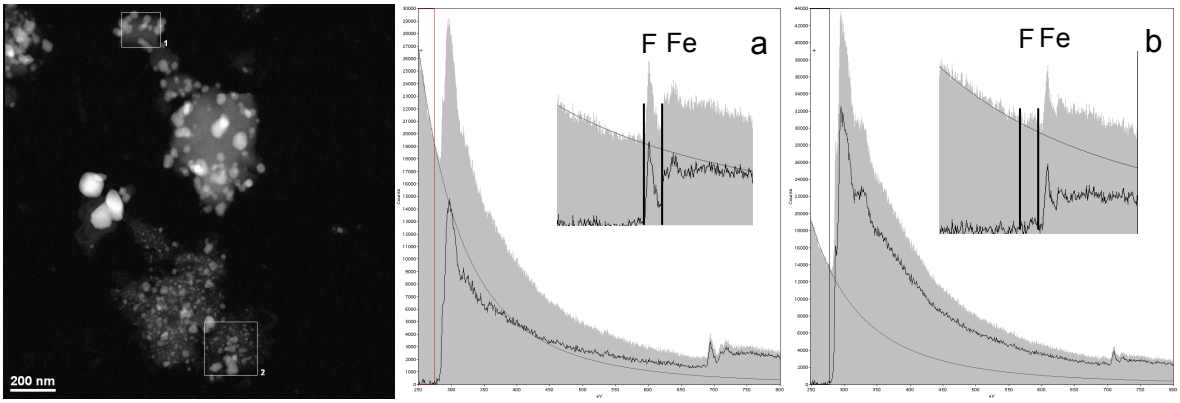

Figure S2. HAADF-STEM reference image and EELS spectra of the selected as-prepared carbon Fe-LiF nanocomposite. Two types of characteristic EELS spectra were recorded with a) a strong F signal and small amounts of Fe, b) trace amounts of F and significant amounts of Fe.

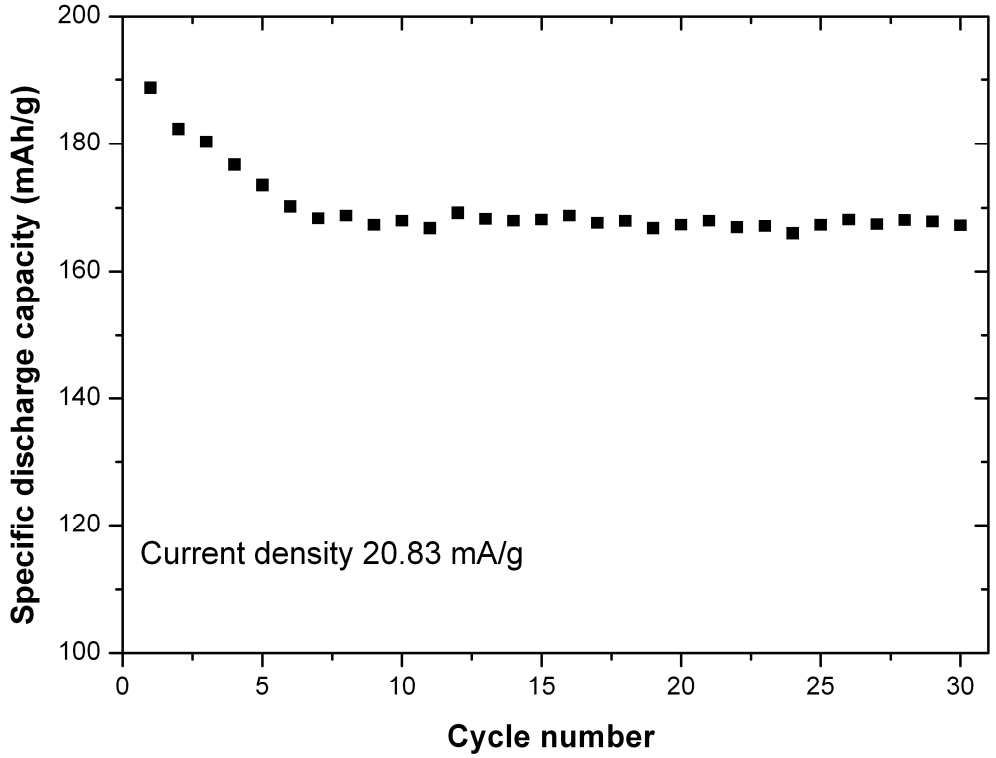

Figure S3. Specific discharge capacity versus cycle number for carbon-Fe-LiF nanocomposite which was cycled between the voltage ranges of 1.3–4.3 V at room temperature.

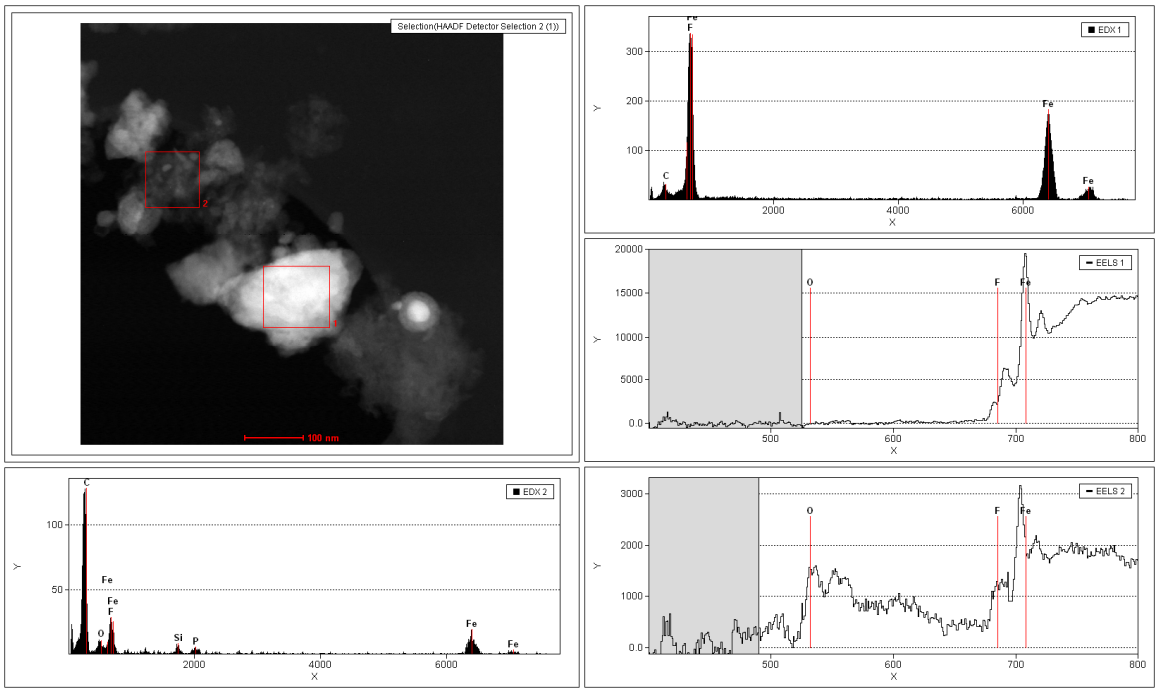

Figure S4. HAADF-STEM overview image and local EELS/EDX analysis after the 1st charging, showing FeF_3 aggregates (area 1) and iron-rich particles in a carbon matrix (area 2).

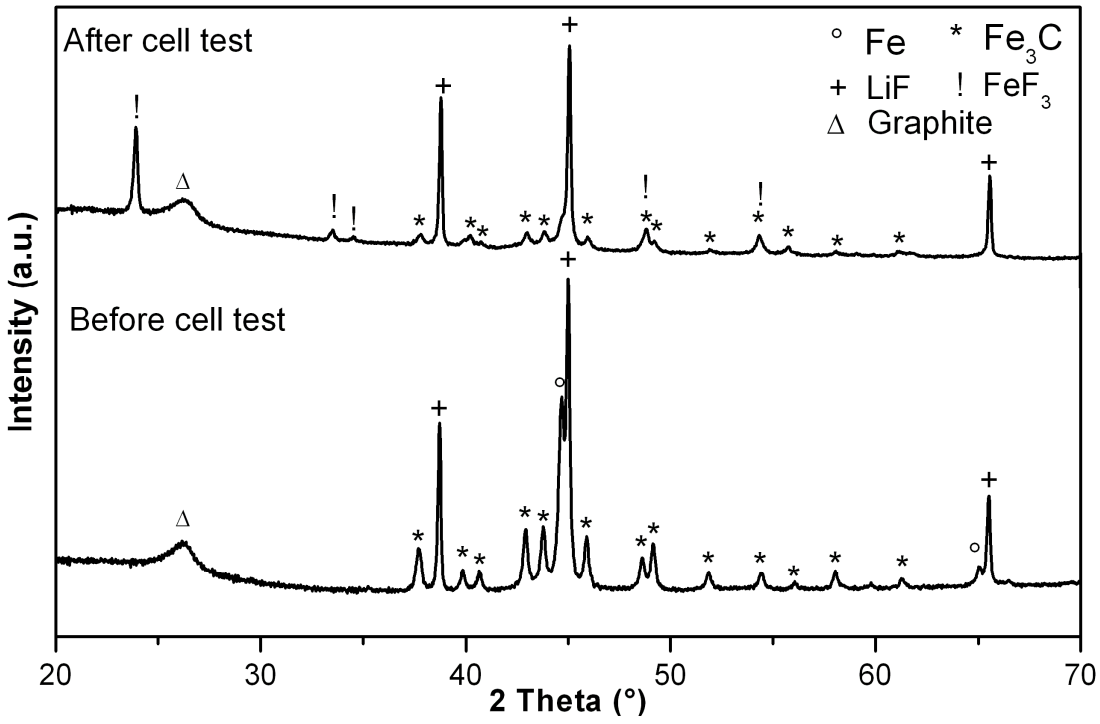

Figure S5. XRD patterns of the carbon-confined Fe-LiF nanocomposite before (bottom) and after charging of the composite electrode to 4.3 V at a current density of 20.83 mA/g (top).