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Supporting information

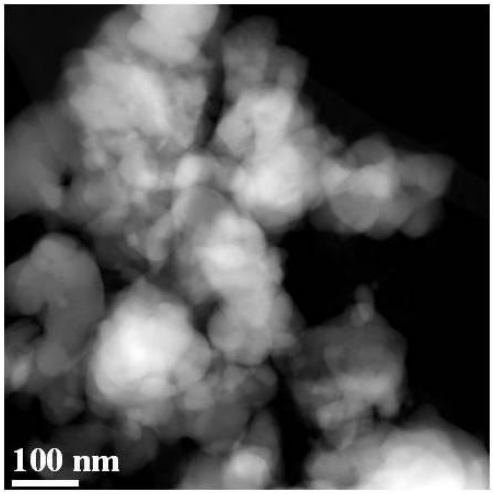

Figure S1. Micrograph of the 100 nm $LiFeBO_3$/C with approximately 20 wt% carbon by an Annular dark-field (ADF) STEM image.

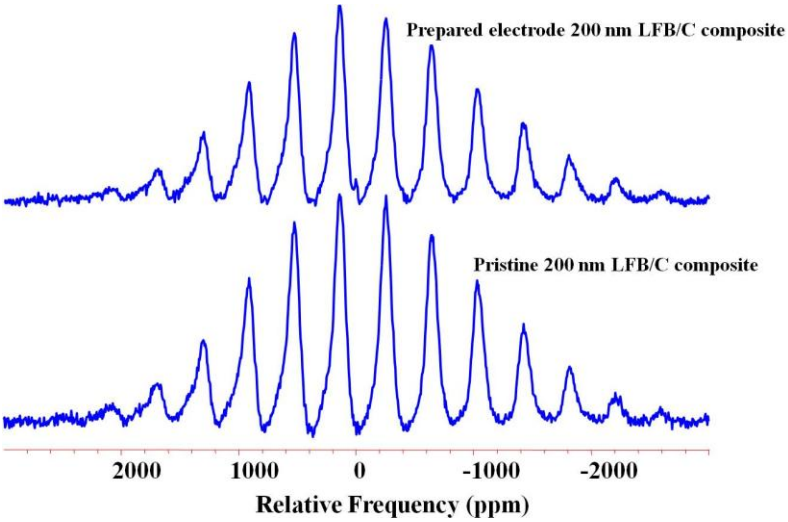

Figure S2. ^{7}Li MAS NMR spectra of the pristine 200 nm $LiFeBO_3$/C composite and the corresponding prepared electrode film. Data were collected at a spinning speed of 35 kHz.

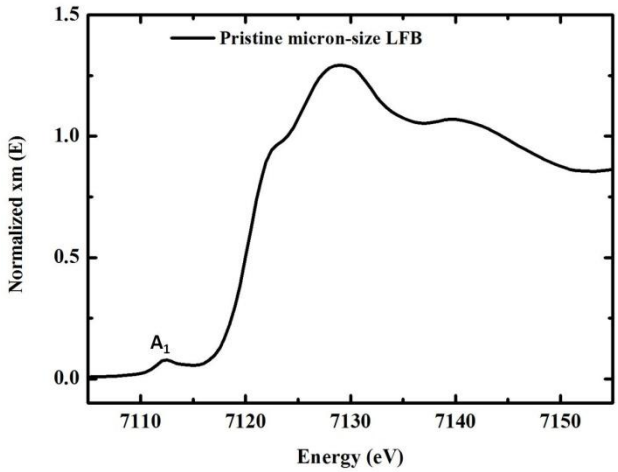

Figure S3. XANES of the highly pure ceramic (carbon-free) $LiFeBO_3$. The presence of $\mathbf{A_1}$ feature is due to the noncentrosymmetric FeO_5 coordination environment in $LiFeBO_3$.

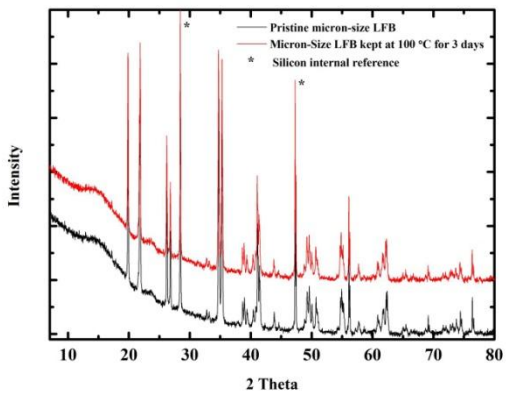

Figure S4. XRD patterns of pristine micron-size $LiFeBO_3$ and the sample after 3-day heat treatment at 100 °C in air.

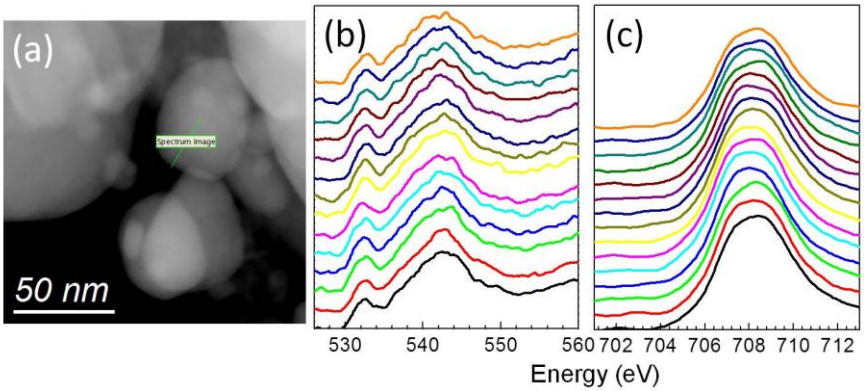

Figure S5. STEM-EELS studies of 200 nm $LiFeBO_3$/C after 70 hours heat treatment in air: (a) DF-STEM image shows the scanning along the green line, from the edge towards the center of a particle (~50 nm); (b) O *K* edge and (c) Fe L_3 edge recorded at different sites along the green line in (a). The big prepeak in the O *K*-edge and high energy position of Fe L_3 (~ 708 eV) peak indicates a higher oxidation state of Fe, as a result of the degradation.