

## Electronic Supporting Information

### New Promising Lithium Malonatoborate Salts for Lithium Ion Battery Application

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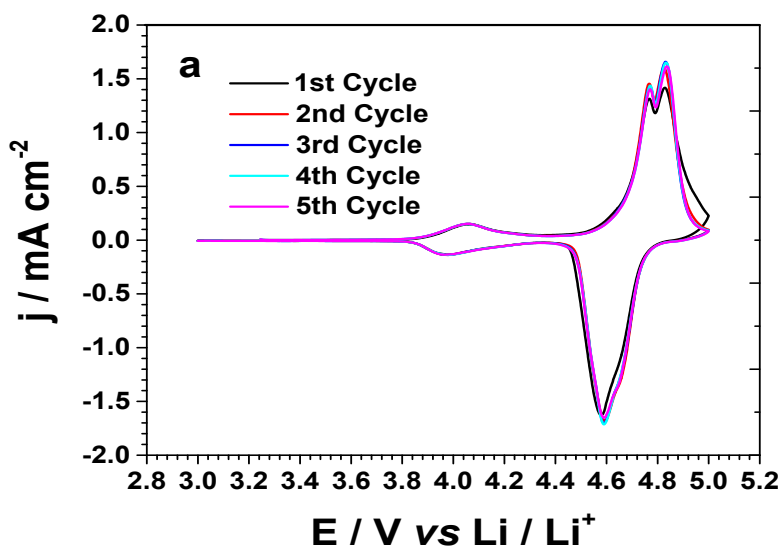
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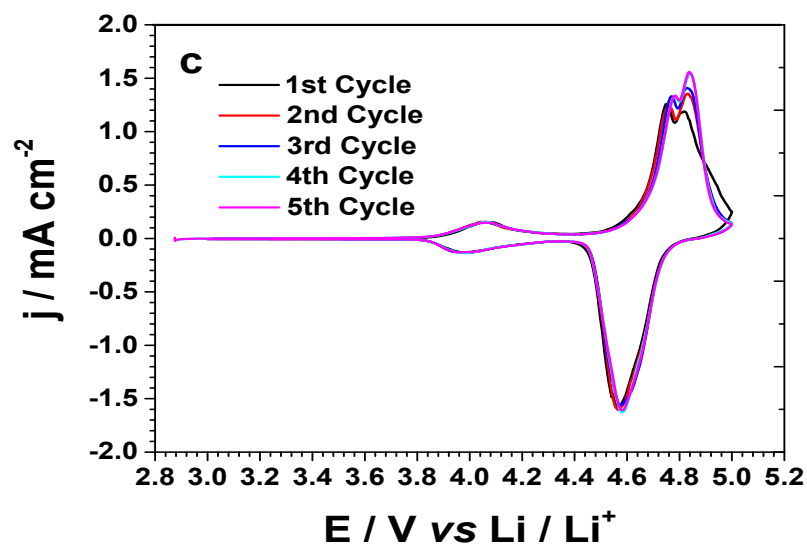
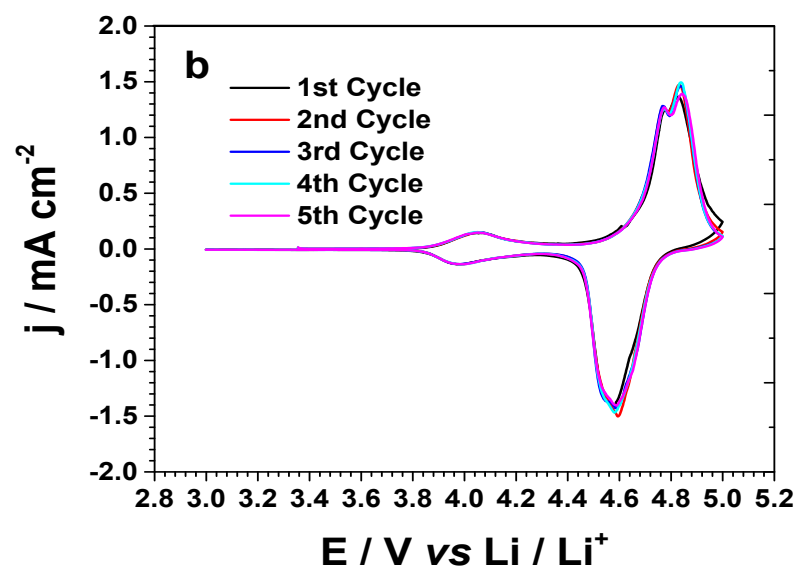


Fig. S1. Cyclic voltammograms (CVs) of  $\text{LiNi}_{0.5}\text{Mn}_{1.5}\text{O}_4$  in (a) 1.0M LiDFMFMB, (b) 1.0M LiDFEFMB, and (c) 1.0 M LiDFPFMB electrolyte at a scan rate of 0.05 mV/s. Lithium is used as both counter and reference electrode.

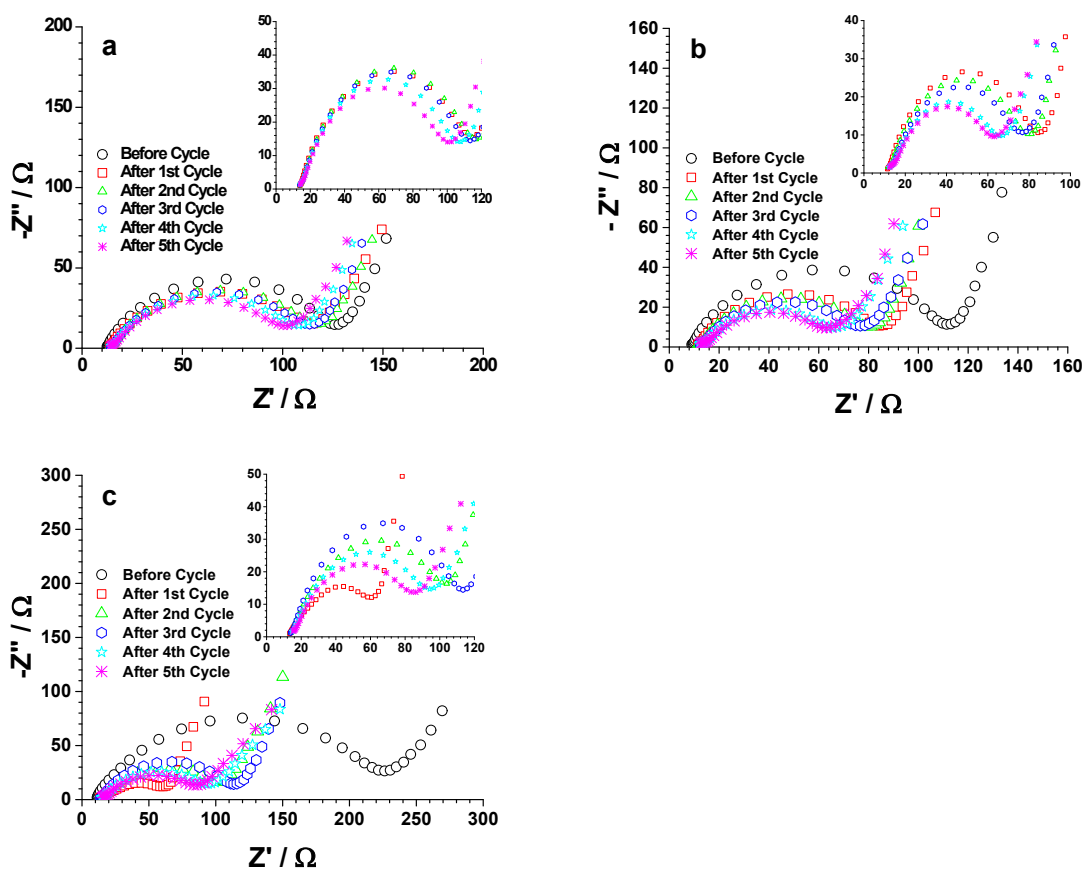


Fig. S2. Electrochemical impedance spectra of  $\text{LiNi}_{0.5}\text{Mn}_{1.5}\text{O}_4$  in (a) 1.0 M LiDFMFMB, (b) 1.0 M LiDFEFMB, and (c) 1.0 M LiDFPFMB electrolyte at different CV cycles at a scan rate of 0.05 mV/s.

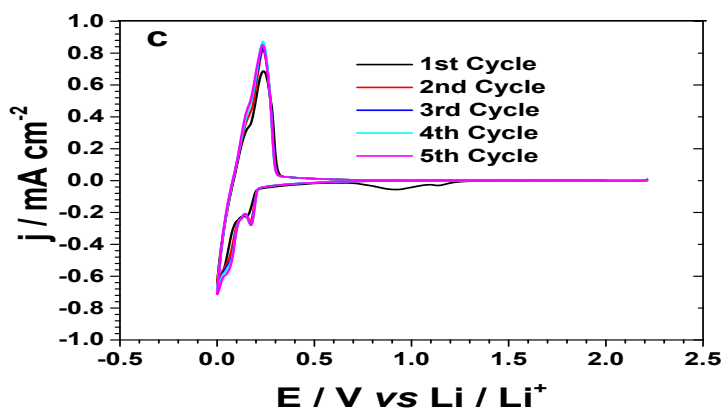
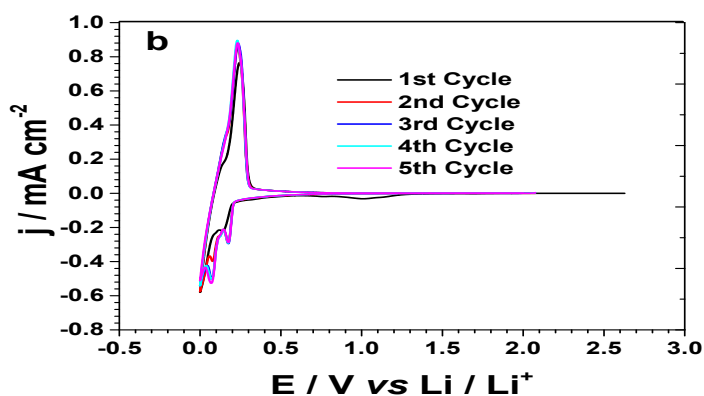
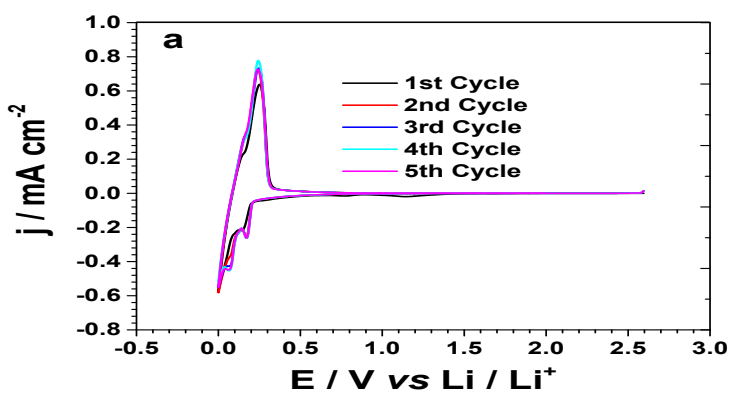


Fig. S3. Cyclic voltammograms (CVs) of graphite in (a) 1.0M LiDFMFMB, (b) 1.0M LiDFEFMB, and (c) 1.0 M LiDFPFMB electrolyte at a scan rate of 0.05 mV/s. Lithium is used as both counter and reference electrode.

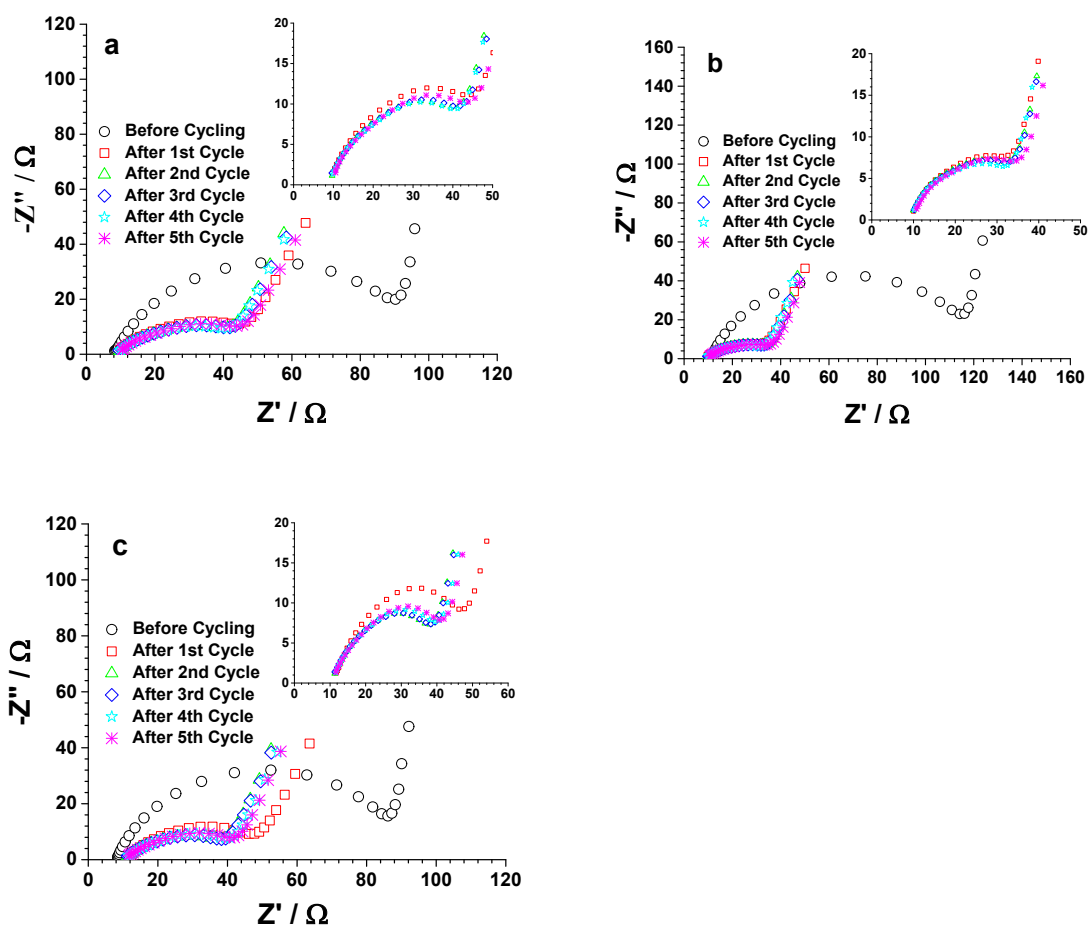


Fig. S4. Electrochemical impedance spectra of graphite in (a) 1.0M LiDFMFMB, (b) 1.0M LiDFEFMB, and (c) 1.0 M LiDFPFMB electrolyte at different CV cycles at a scan rate of 0.05 mV/s.

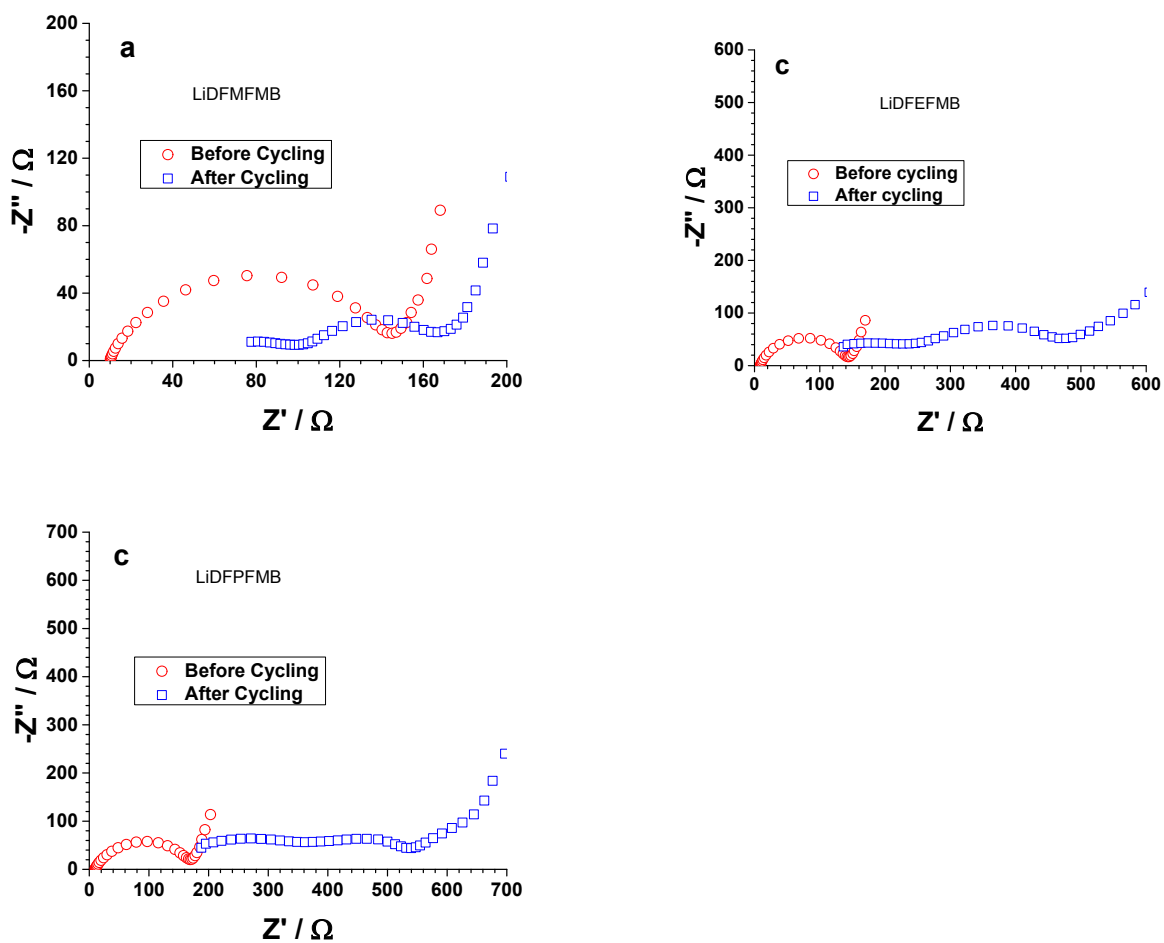


Fig. S5. Electrochemical impedance spectra of the  $\text{LiNi}_{0.5}\text{Mn}_{1.5}\text{O}_4\|\text{Li}$  half-cell before and after cycling at a current rate of  $C/2$  in (a) 1.0 M LiDFMFMB, (b) 1.0 M LiDFEFMB, and (c) 1.0 M LiDFPFMB electrolyte.

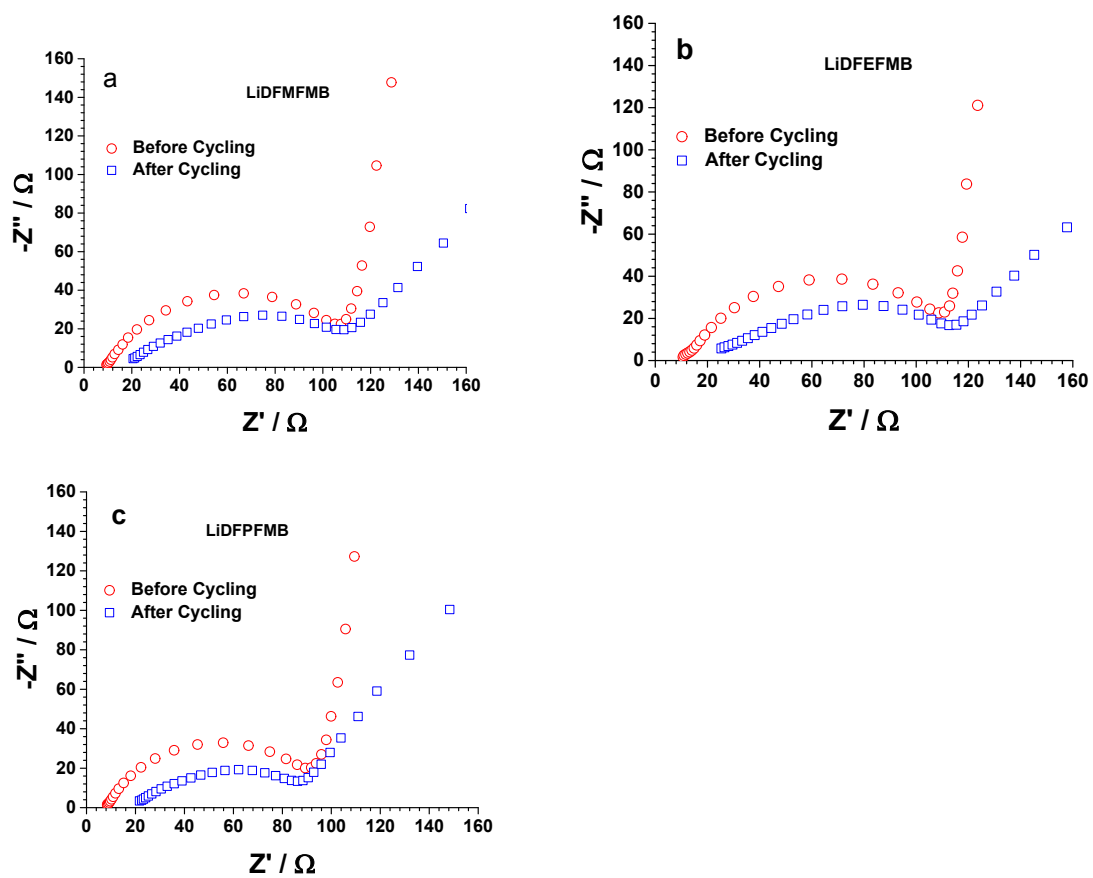
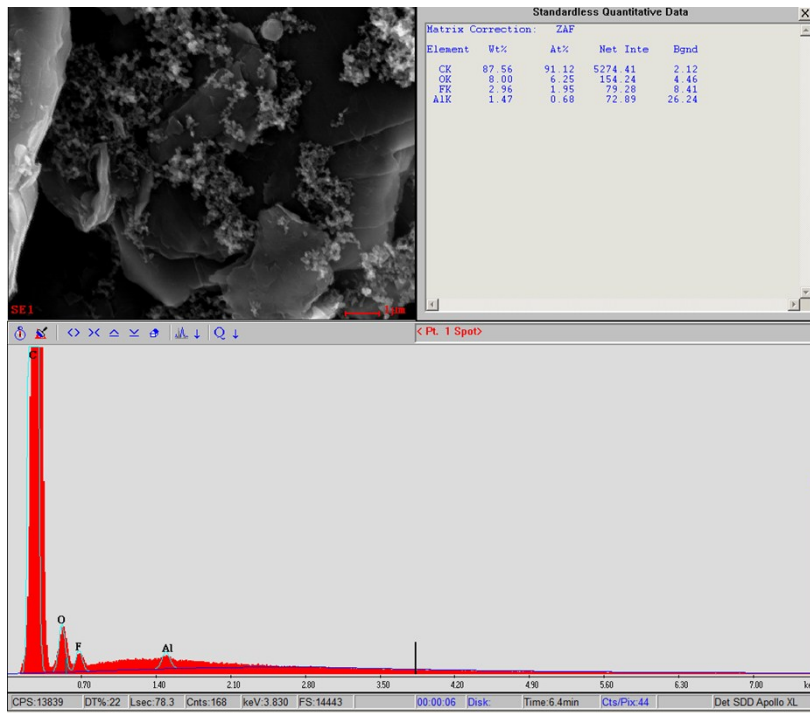
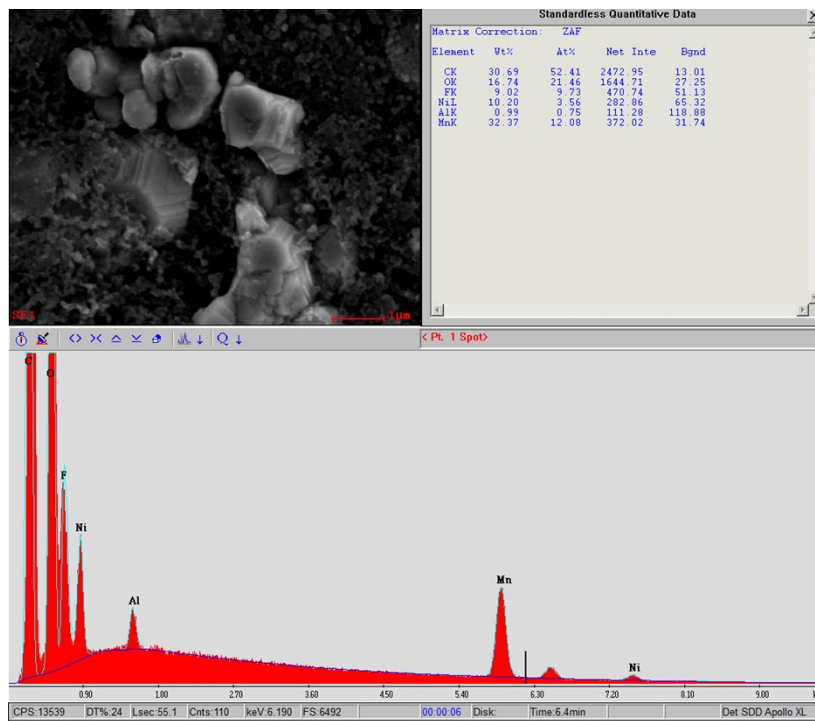


Fig. S6. Electrochemical impedance spectra of the NG||Li half-cell before and after cycling at a current rate of C/5 in (a) 1.0 M LiDFMFMB, (b) 1.0 M LiDFEFMB, and (c) 1.0 M LiDFPFMB electrolyte.

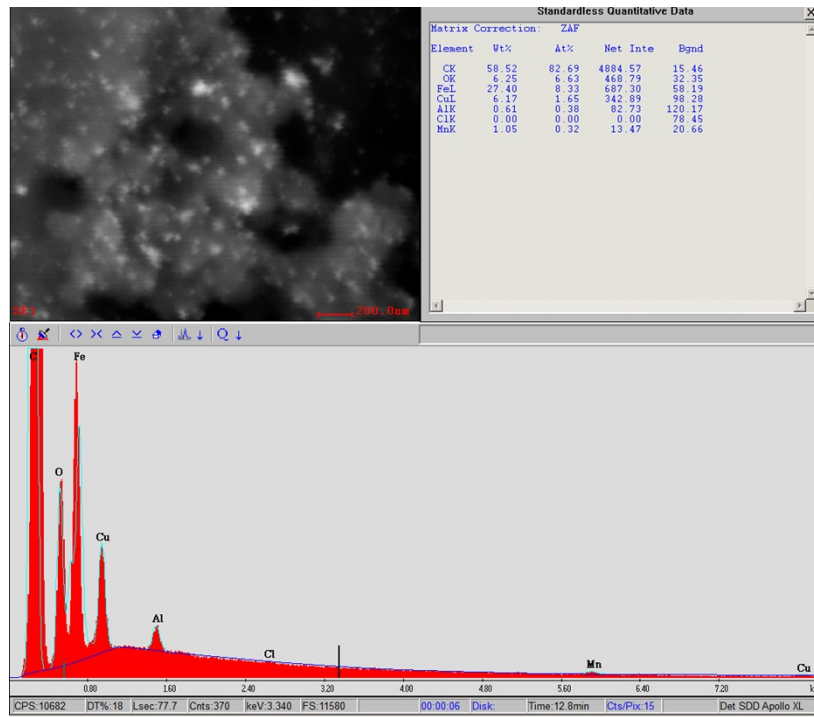


(a) NG-Ref

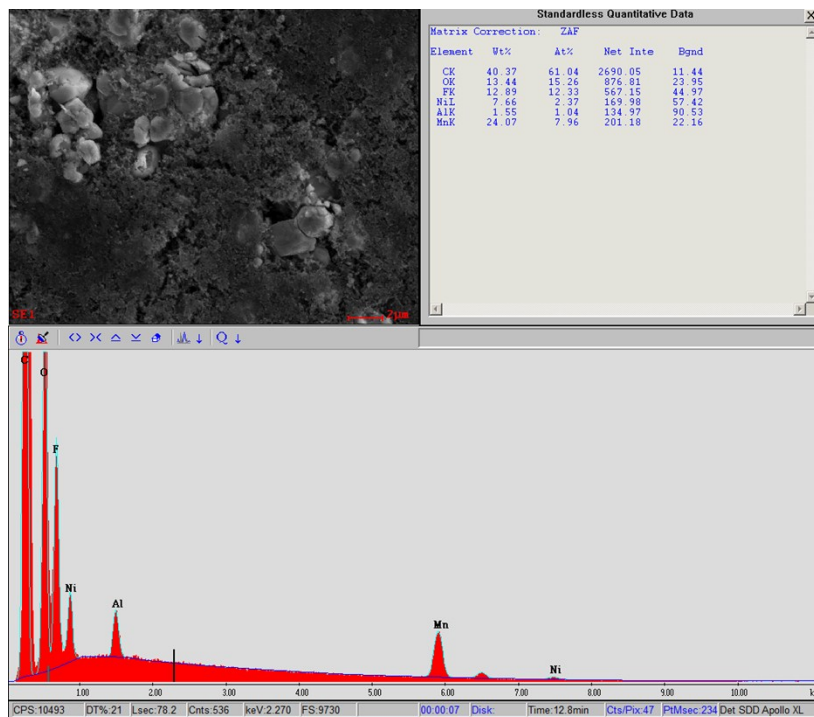


(b) LNMO-Ref

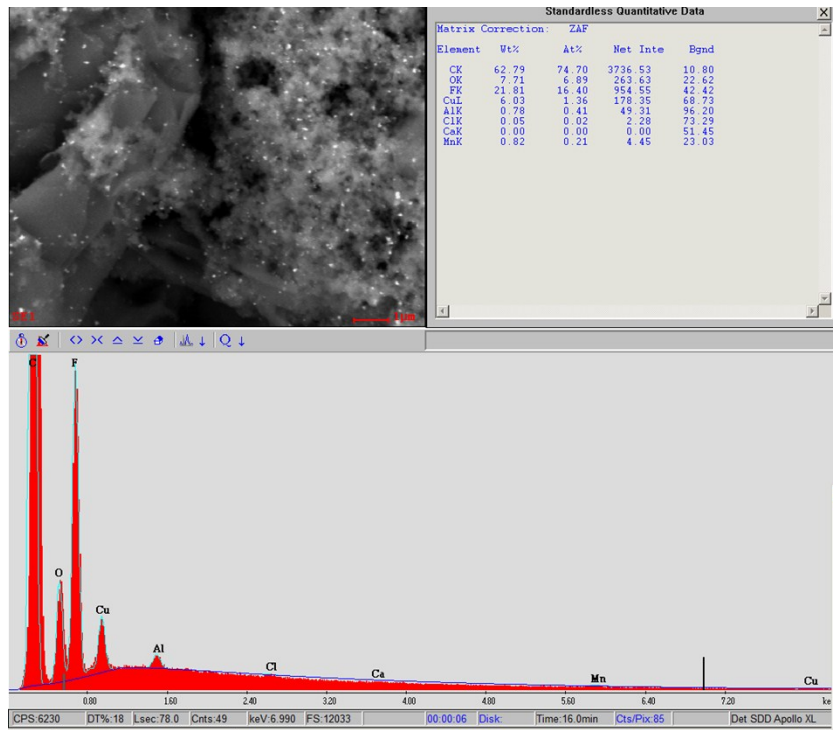




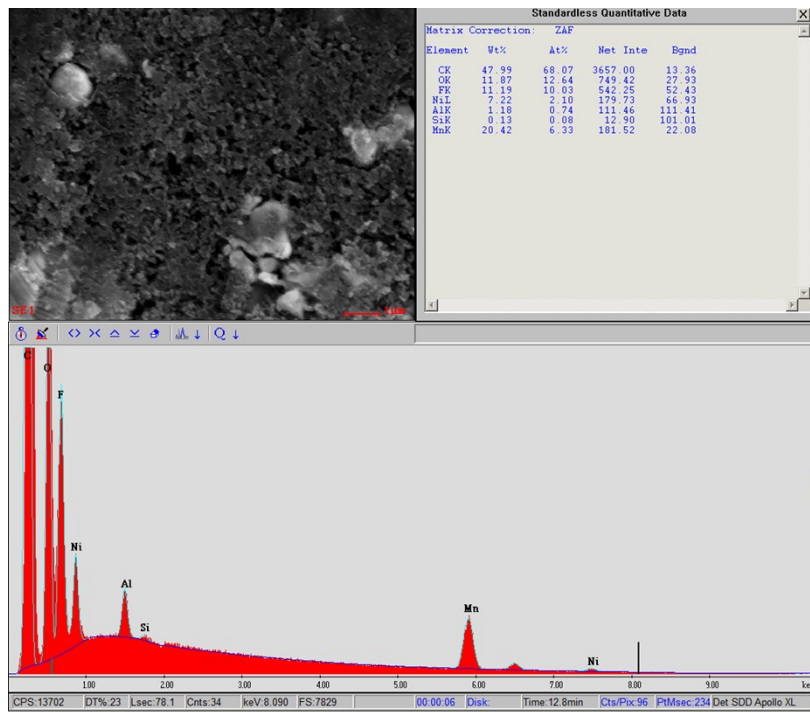
(c) NG-LiDFMFMB



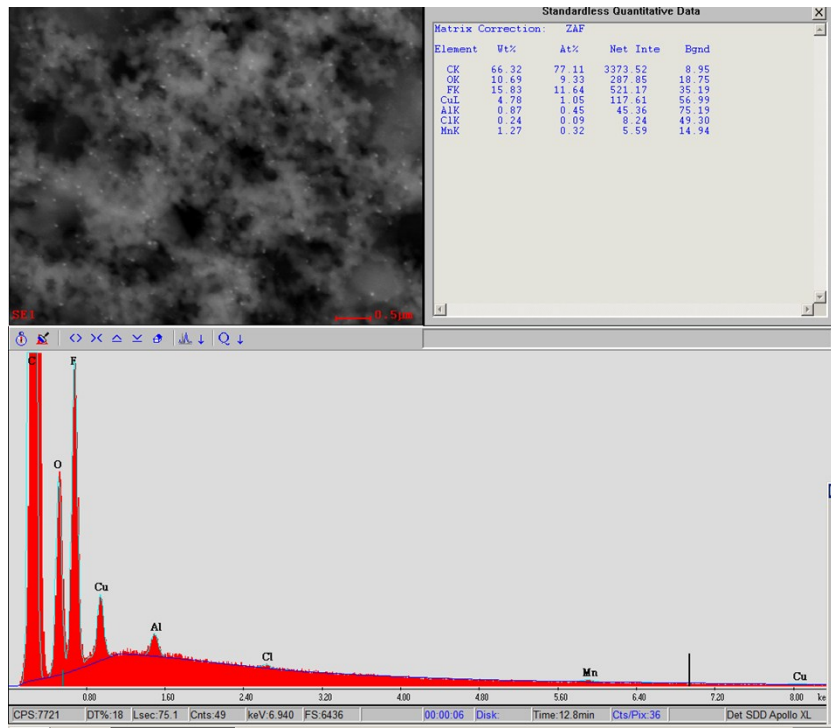
(d) LNMO-LiDFMFMB



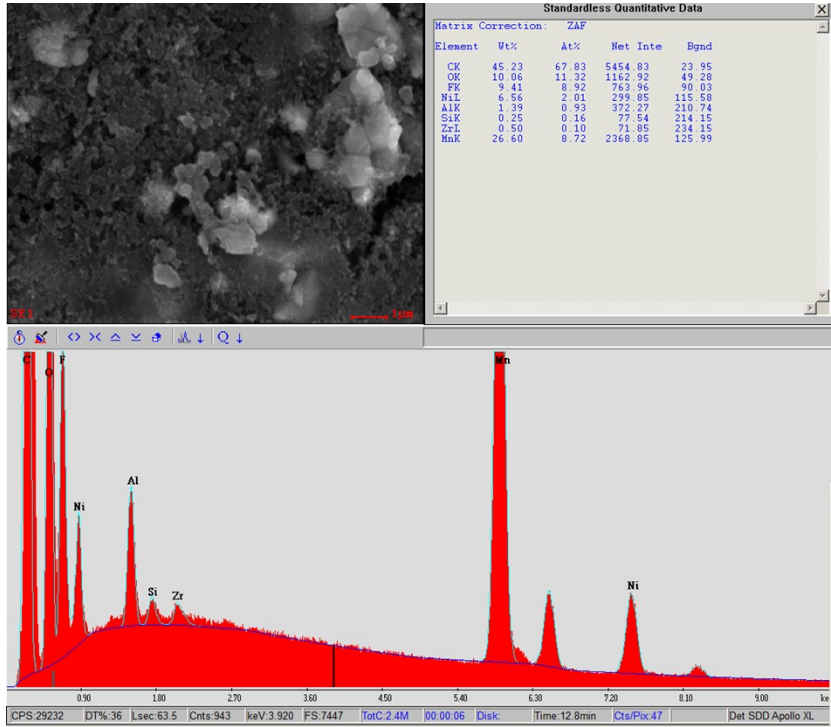
(e) NG-LiDFEFMB



(f) LNMO-LiDFEFMB



(g) NG-LiDFPFMB



(h) LNMO-LiDFPFMB

**Fig. S7.** SEM images with EDX of pristine graphite (a) and LNMO (b) electrode and cycled graphite electrodes (c, e and g) and LNMO (d, f and h) from the LNMO||NG full cells in 1.0 M LiDFMFMB (c and d), LiDFEFMB (e and f), and LiDFPFMB (g and h), respectively.