

## Supplementary Materials

### **Boron Additives Passivated Carbonate Electrolytes for the Stable Cycling of 5 V Lithium Metal Batteries**

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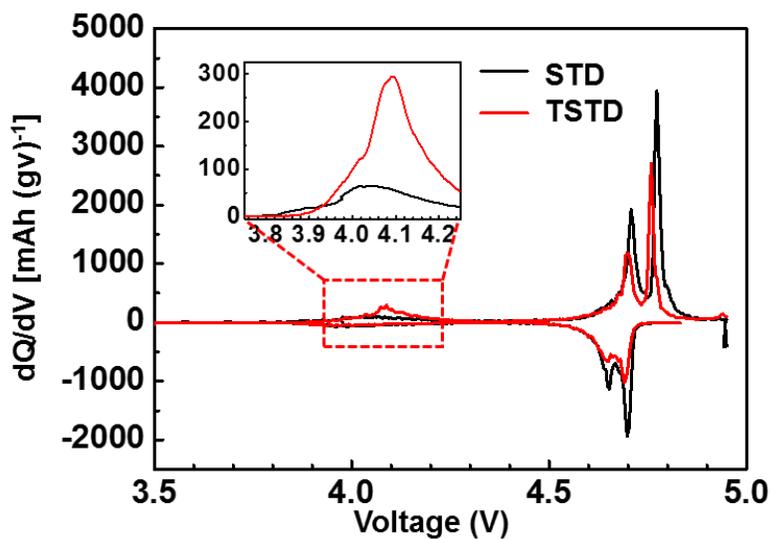
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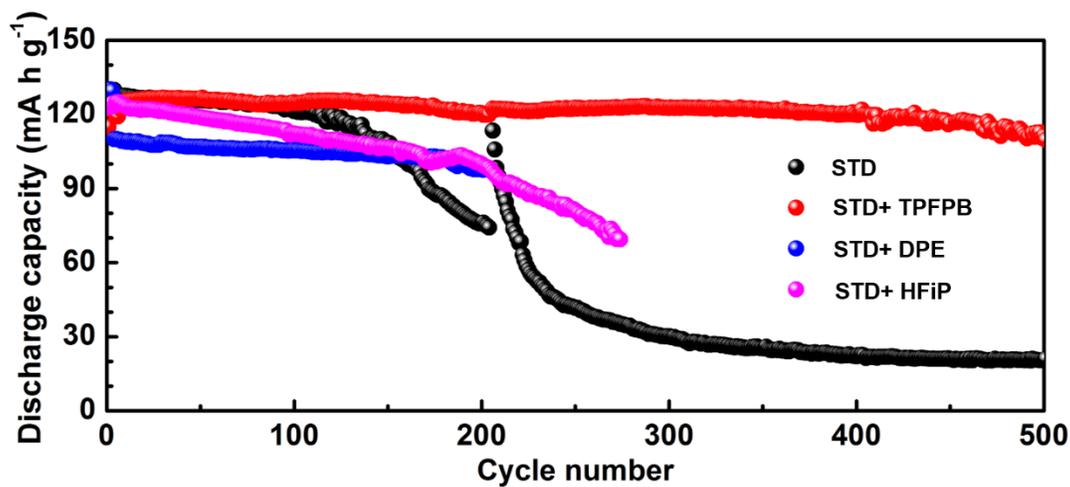
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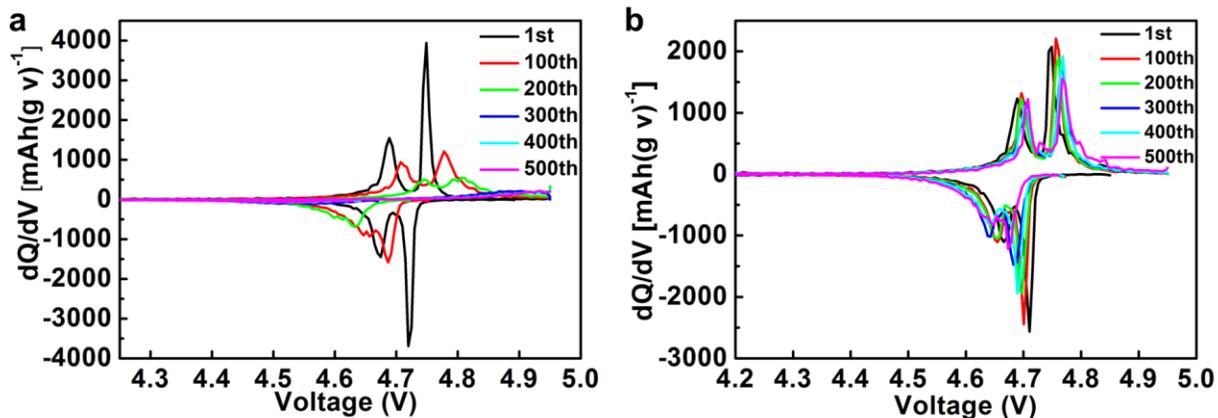
## Supplementary Figures



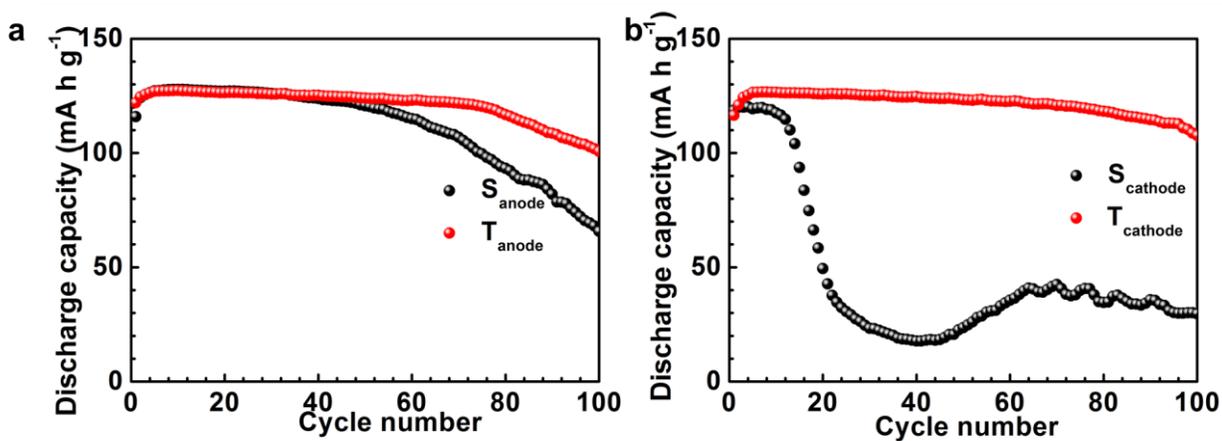
**Figure S1.** Differential capacity vs. voltage curves of LNMO/Li battery with STD and TSTD electrolytes during the first cycle.



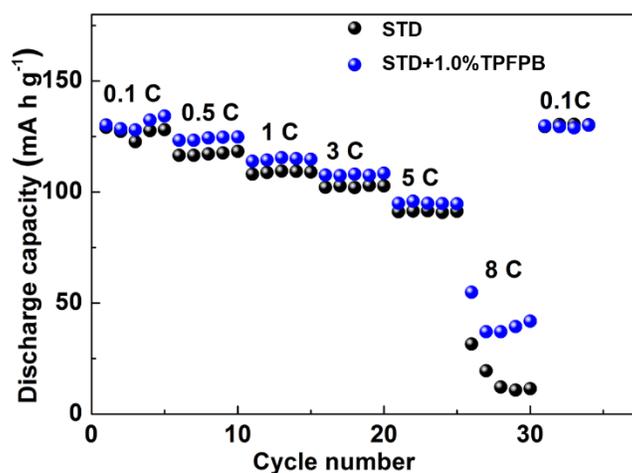
**Figure S2.** The comparison of batteries cycling performance with different kinds of additives.



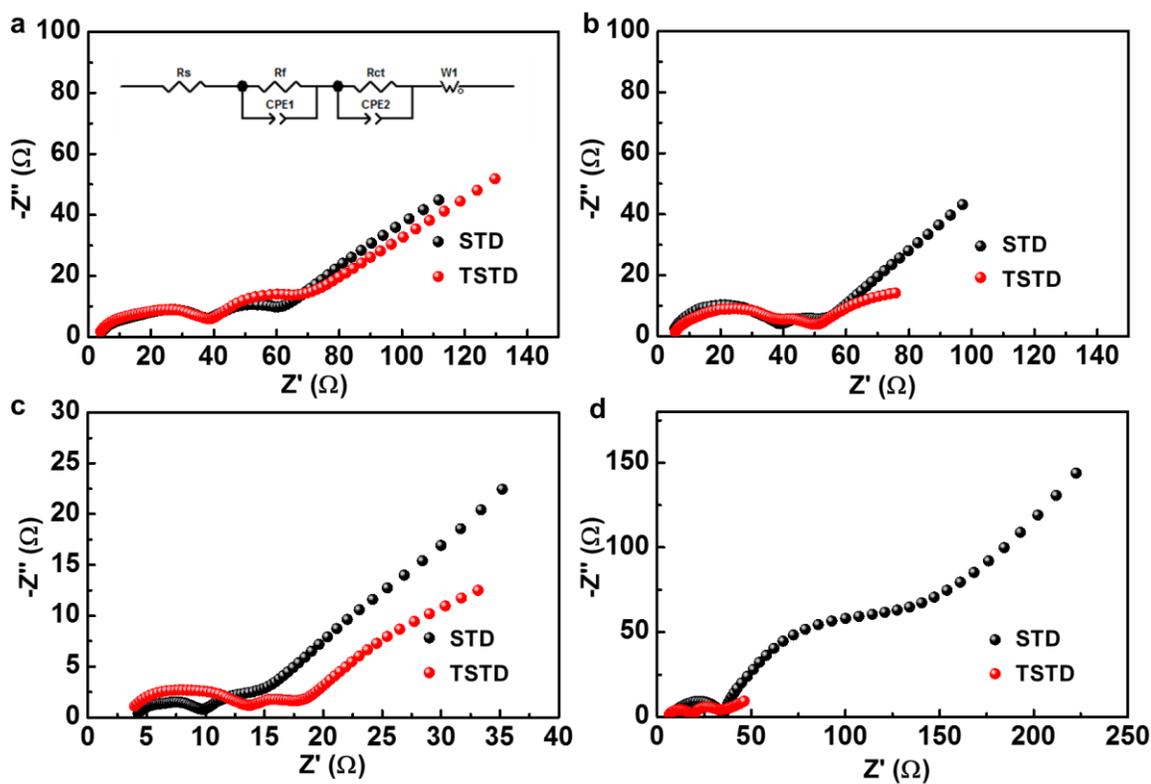
**Figure S3.** Differential capacity vs. voltage curves of cells in electrolyte (a) without (b) and with TPFPB in different cycles.



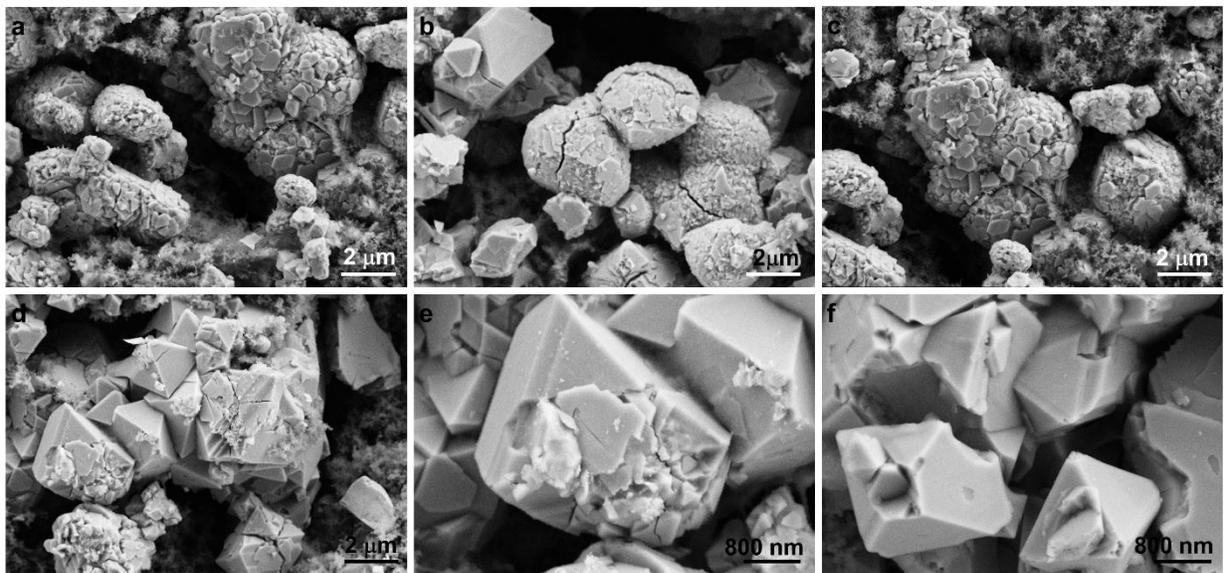
**Figure S4.** The cycling performance of reassembled cells with (a)  $S_{\text{anode}}$ ,  $T_{\text{anode}}$  and (b)  $S_{\text{cathode}}$ ,  $T_{\text{cathode}}$ .



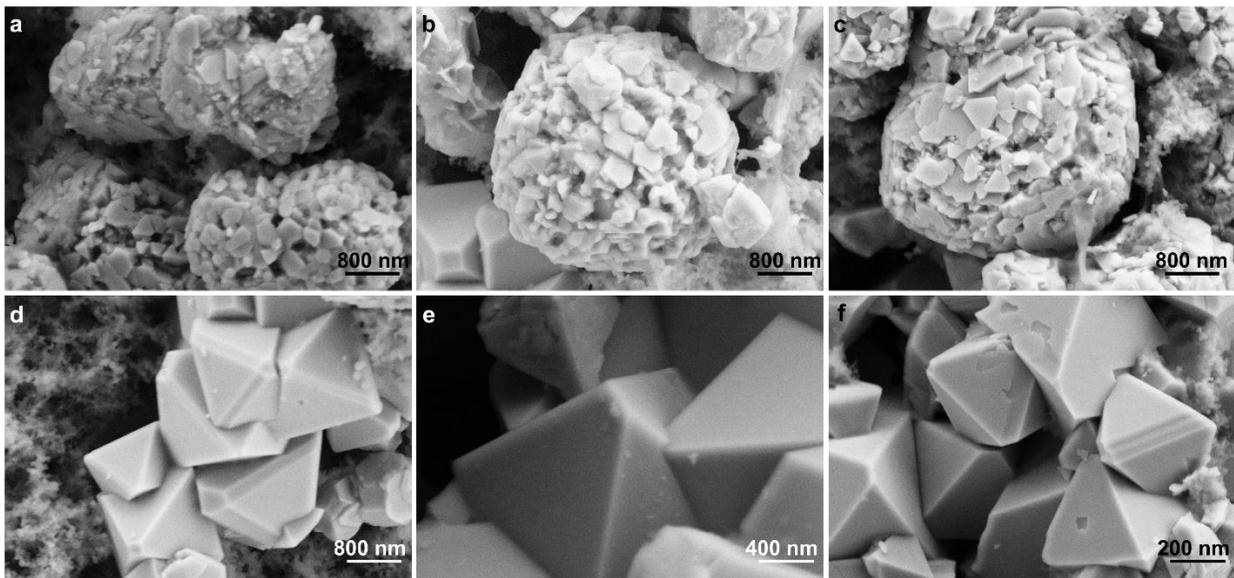
**Figure S5.** Rate performance of Li/LNMO batteries with various electrolytes.



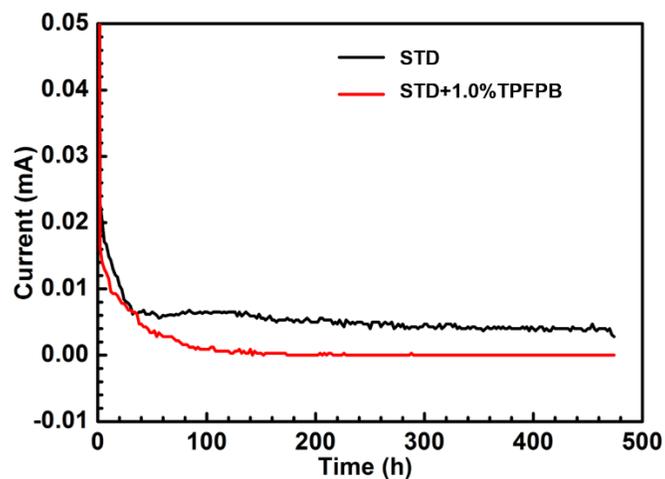
**Figure S6.** Electrochemical impedance spectra of Li/LiNi<sub>0.5</sub>Mn<sub>1.5</sub>O<sub>4</sub> cells STD and TSTD electrolytes (a) after initial 1 cycle, (b) 3 cycles, (c) 5 cycles and (d) 200 cycles.



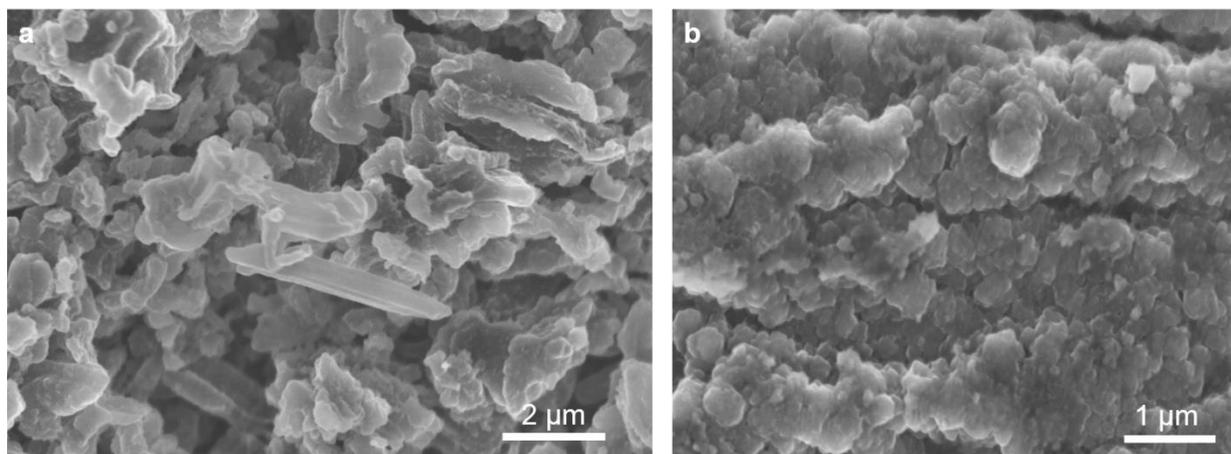
**Figure S7.** Different area data points of LNMO electrode after the 200<sup>th</sup> cycle with STD electrolyte.



**Figure S8.** Different area data points of LNMO electrode after the 200<sup>th</sup> cycle with TSTD electrolyte.



**Figure S9.** Chronoamperometric responses of LNMO/Li batteries in baseline and TSTD electrolytes.



**Figure S10.** SEM images of anode after 200 cycles in (a) STD and (b) TSTD electrolytes.