

# Supporting Information

## Electrochemical Cross-Talk Leading to Gas Evolution and Capacity

### Fade in $\text{LiNi}_{0.5}\text{Mn}_{1.5}\text{O}_4$ /Graphite Full-Cells

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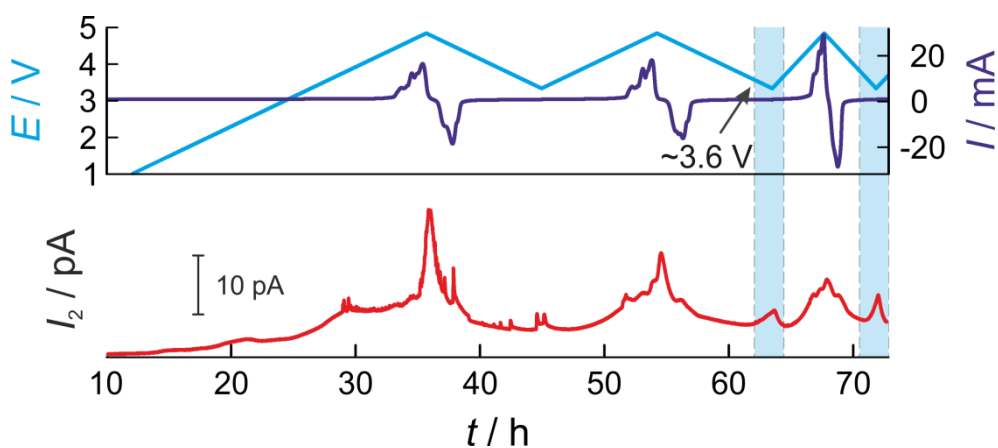
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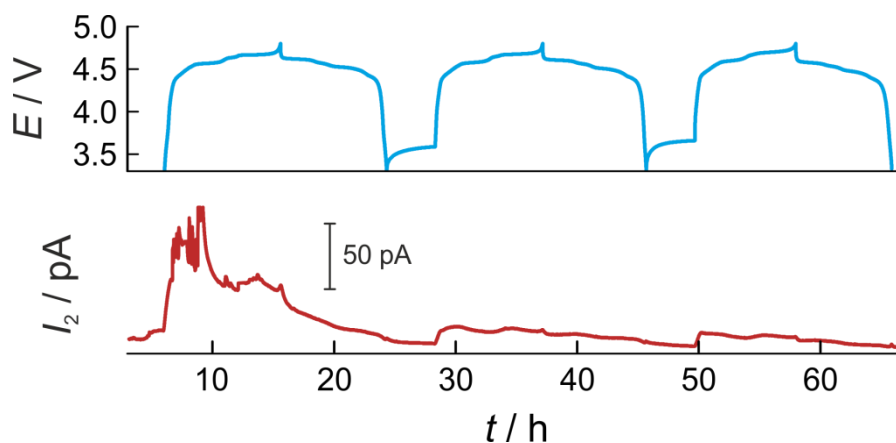
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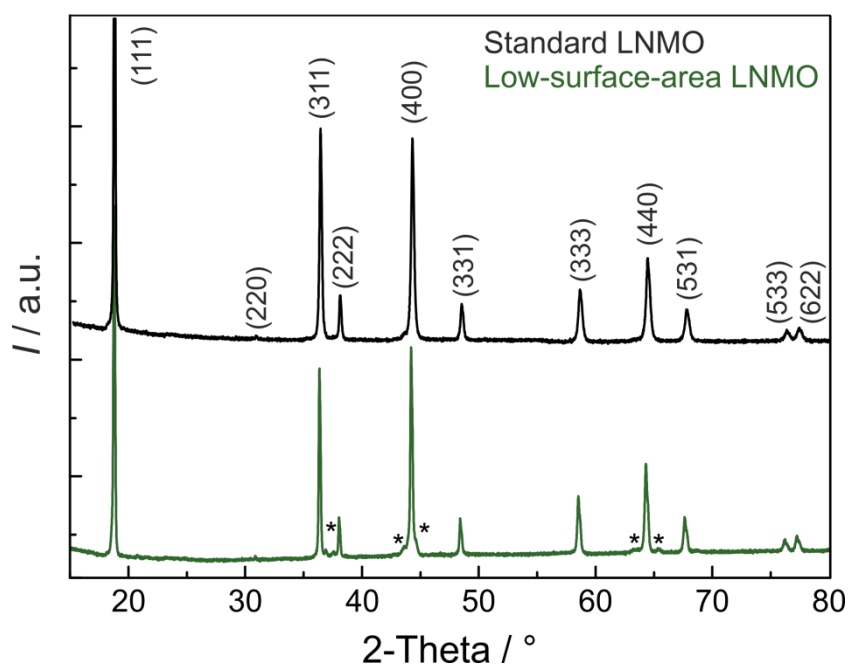
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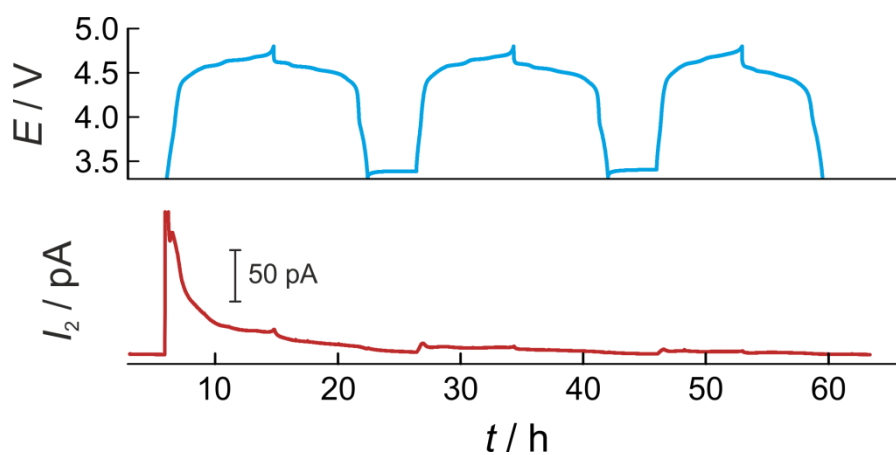
**Figure S1.** Cyclic voltammetric curves and the corresponding  $\text{H}_2$  signal ( $m/z = 2$ ) from DEMS for a standard LNMO/graphite cell. The sweep rate was 0.045 mV/s in the first two cycles, and then it was increased to 0.1 mV/s. As evident, the hydrogen peak at the end of discharge starts to appear at around 3.6 V.



**Figure S2.** Voltage profiles and the corresponding  $\text{H}_2$  signal ( $m/z = 2$ ) from DEMS for a standard LNMO/precycled graphite cell at C/10.



**Figure S3.** XRD patterns of standard LNMO and low-surface-area LNMO. Impurity phases (mainly NiO,  $\text{Li}_x\text{NiO}_2$ , and  $\text{Li}_2\text{MnO}_3$ ) in the latter material are indicated by asterisks.



**Figure S4.** Voltage profiles and the corresponding  $\text{H}_2$  signal ( $m/z = 2$ ) from DEMS for a low-surface-area LNMO/graphite cell at C/10.