Supplementary Information of
High-pressure study of Li[Li\textsubscript{1/3}Ti\textsubscript{5/3}]O\textsubscript{4} spinel

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Fig. S1  Characterization of LTO(raw): (a) result of the Rietveld analysis and (b) electrochemical charge and discharge tests in nonaqueous lithium cell.
Fig. S2 TEM specimen for the HP(200) sample. Depth of the sample is ~100 nm.
HP(1000)

$R_{wp}=15.9\%$ and $S=3.31$

**Fig. S3** Result of the Rietveld analysis for the HP(1000) sample when assuming that the HP(1000) sample is in a single-phase of columbite-type TiO$_2$ with $Pbcn$ space group.
**Fig. S4**  (a) TEM image and (b) SAED pattern of the LTO(raw) sample. The SAED pattern is assigned as the diffraction pattern from the [111] incident with $Fd\bar{3}m$ space group.
Fig. S5  Rescaled charge and discharge curves of the nonaqueous lithium cells of the (a) HP(400), (b) HP(750), and HP(1000) samples.
The derivative of $Q_{\text{dis}}$ (or $Q_{\text{cha}}$) with respect to the cell voltage, i.e., the $dQ_{\text{dis}}/dV$ (or $dQ_{\text{cha}}/dV$) curves for the (a) LTO(raw), (b) HP(RT), (c) HP(400), (d) HP(750), and (e) HP(1000) samples. The $dQ_{\text{dis}}/dV$ (or $dQ_{\text{cha}}/dV$) curves were obtained by the charge and discharge curves at the initial cycle shown in Fig. 8 of the text. The $dQ_{\text{dis}}/dV$ (or $dQ_{\text{cha}}/dV$) curves of the HP(400), HP(750), and HP(1000) samples do not show distinct responses, due to their gradual increases (or decreases) in voltage as a function of discharge (or charge) capacity.