Supporting Information

Highly fluorinated co-solvent enabling ether electrolyte for high-voltage lithium ion batteries with graphite anode

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Scheme S1. Proposed mechanism of H₂ formation.

Figure S1. Nyquist plots of Li||graphite cells after different cycle numbers with (a) fluorinated ether and (b) conventional ether electrolytes.
Figure S2. Cycling performance of NCM811||graphite full cell with fluorinated ether electrolyte for 1,000 cycles.

![Graph showing DCIR vs. cycle for NCM811||graphite full cell with different electrolytes](image)

Figure S3. Discharge direct current internal resistance (DCIR) of NCM811||graphite pouch cells with different electrolytes at 45°C.

Figure S4. SEM images of cycled electrodes after 100 cycles: (a) LCO, (b) NCM811, (c) AG
and (c) graphite using fluorinated ether electrolyte; (d) LCO, (e) NCM811 and (f) graphite using carbonate electrolyte.

Figure S5. N 1s XPS spectrum of graphite electrode after 100 cycles with fluorinated ether electrolyte.

Figure S6. X-ray diffraction (XRD) patterns of (a) LiCoO$_2$ (LCO) and (b) LiNi$_{0.8}$Co$_{0.1}$Mn$_{0.1}$O$_2$ (NCM811).