Supporting Information

In-situ solidified gel polymer electrolytes for stable solid-state lithium batteries at high temperatures

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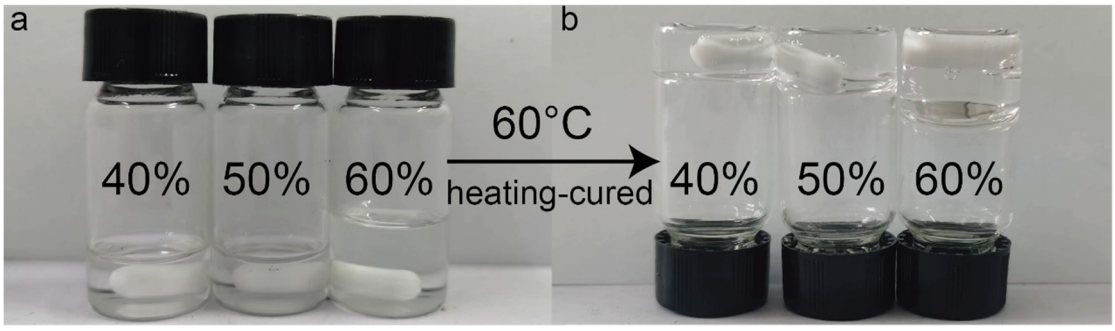

Figure S1. Optical images of PEGMEA, LiTFSI and initiator with varied amounts of LCE before (a) and after (b) the polymerization process.

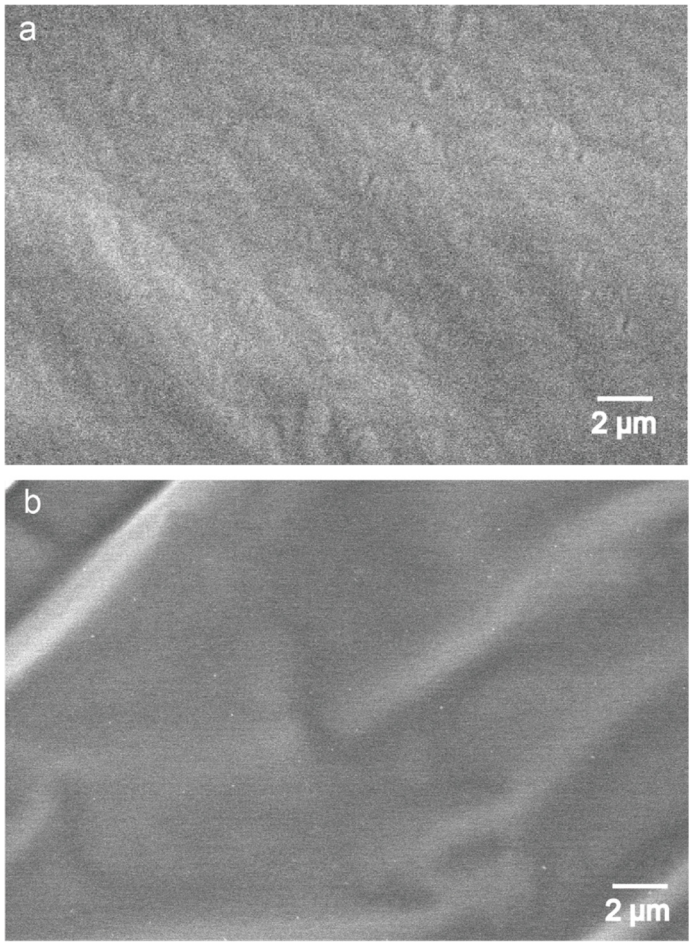

Figure S2. SEM images of (a) PE-40%LCE@PEG and (b) PE-60%LCE@PEG gel polymer electrolytes.

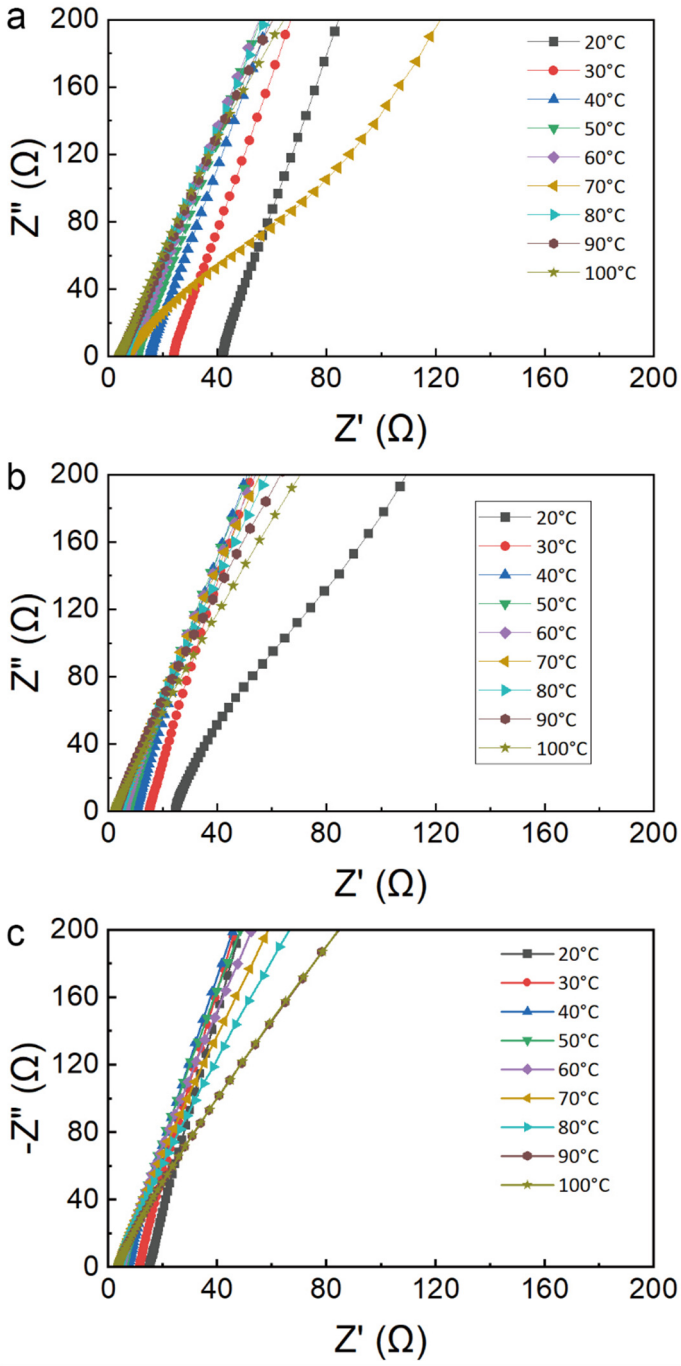

Figure S3. EIS plots of PE-*x*%LCE@PEG (*x* = (a) 40, (b) 50, and (c) 60) gel polymer electrolytes at different temperatures (20 ~ 100 °C).

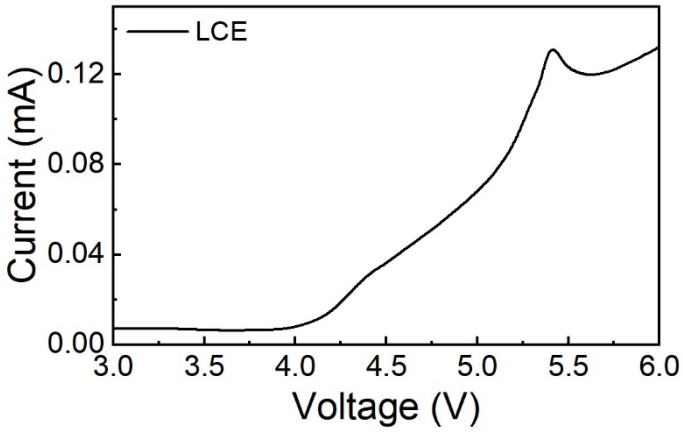

Figure S4. Linear sweep voltammetry of LCE.

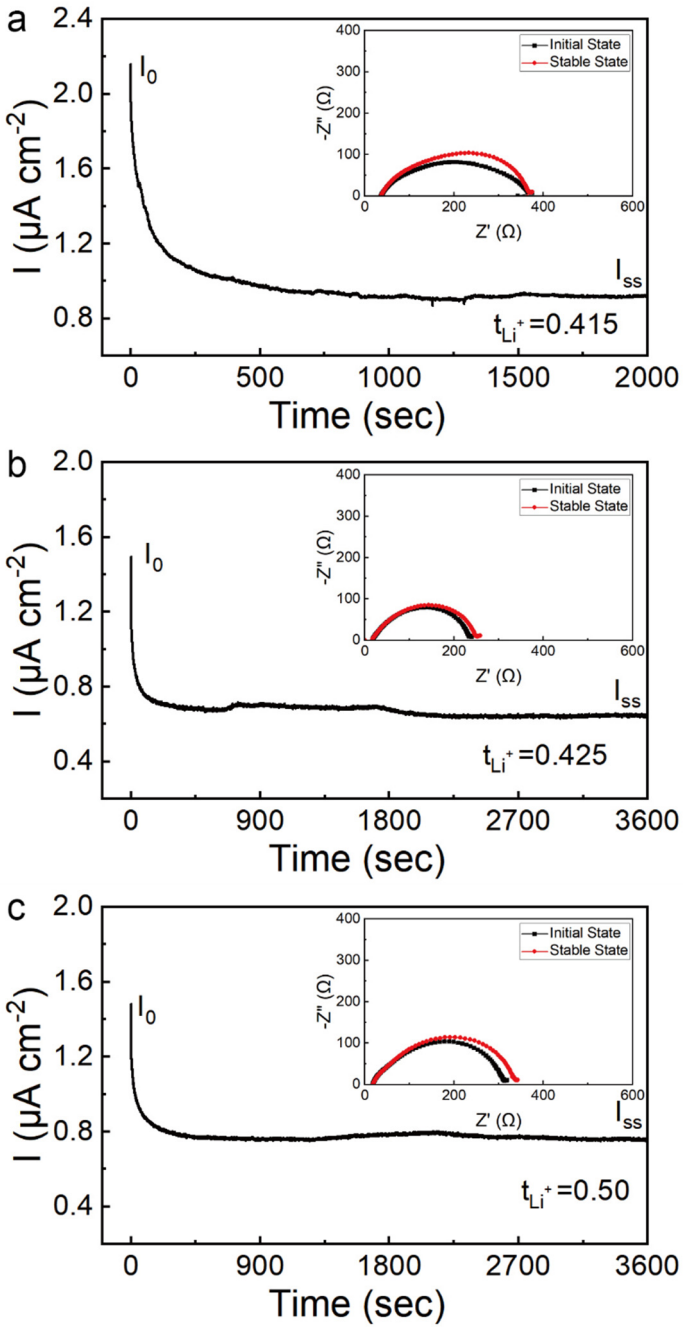

Figure S5 Chronoamperometry of (a) Li/PE-40%LCE@PEG/Li, (b) Li/PE-50%LCE@PEG/Li, (c) Li/PE-60%LCE@PEG/Li symmetric cells at ambient temperature. The insets are the alternate current impedance spectra before and after polarization.

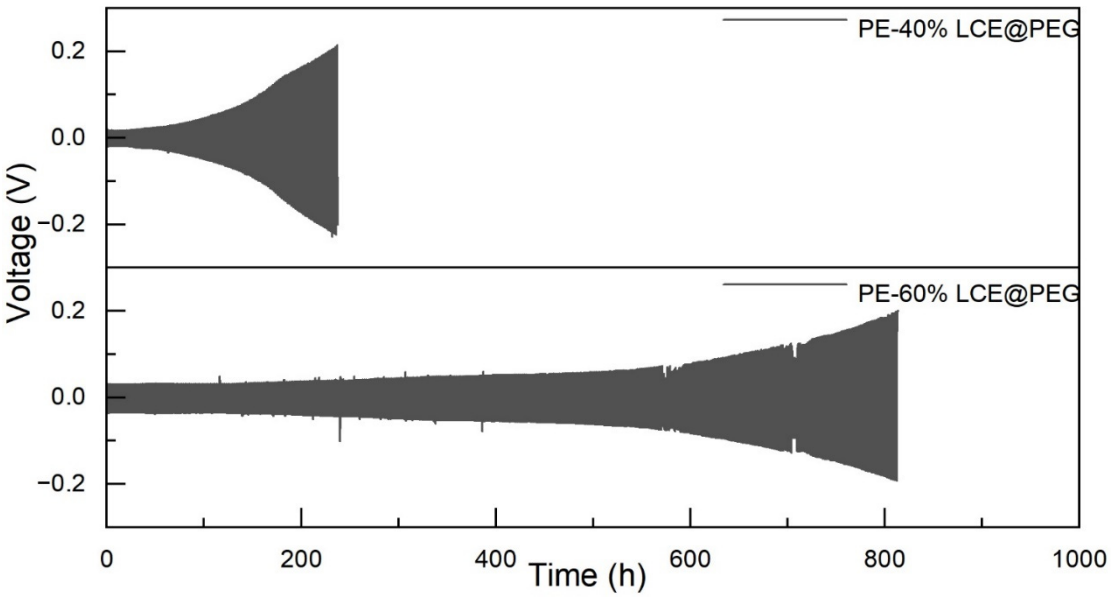

Figure S6. Long-term cycling of symmetrical Li cells using the PE-40%LCE@PEG and PE-60%LCE@PEG electrolytes at 0.1 mA cm^{-2} and 60 °C.

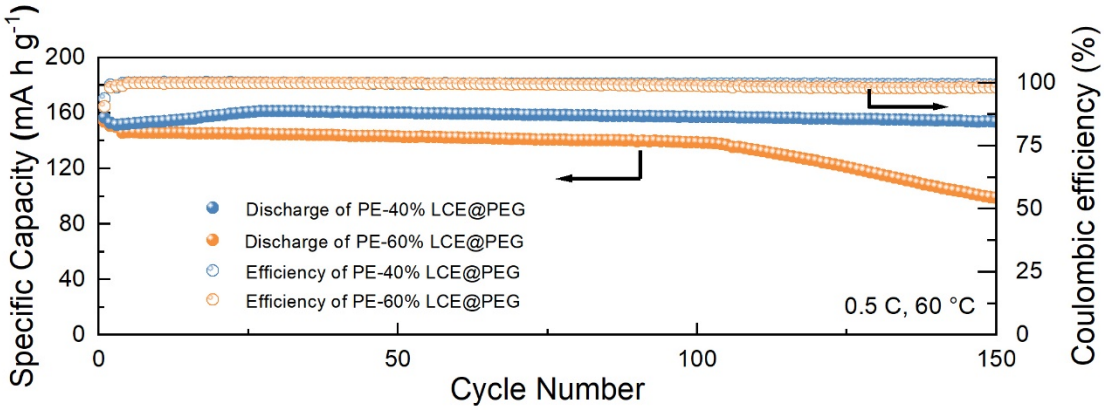

Figure S7. Cyclic performances of the $LiFePO_4$//Li batteries assembled with PE-40%LCE@PEG and PE-60%LCE@PEG under 0.5 C rate and 60 °C.

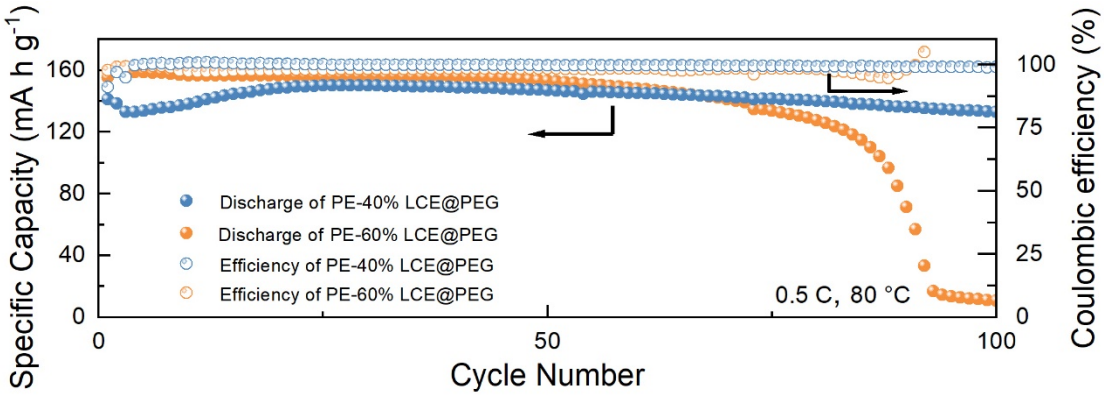

Figure S8. Cyclic performances of the $LiFePO_4$//Li batteries assembled with PE-40%LCE@PEG and PE-60%LCE@PEG under 0.5 C rate and 80 °C.

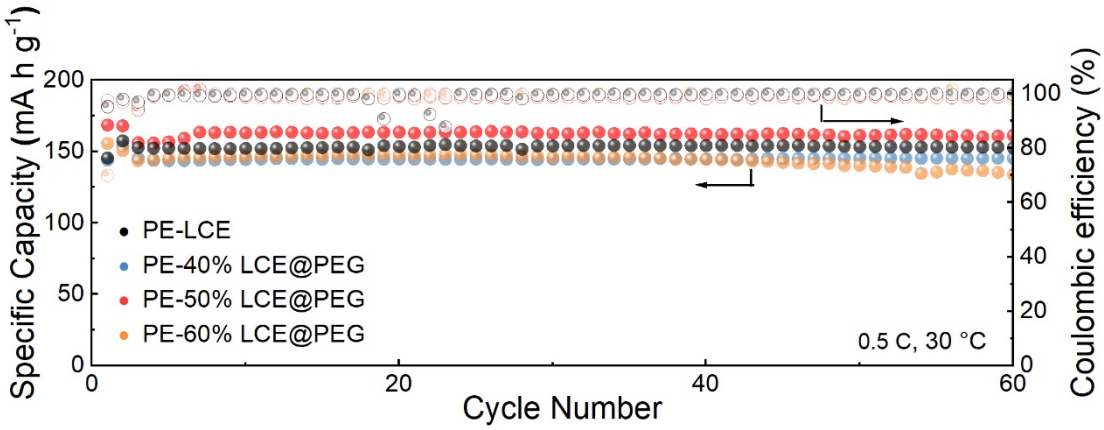

Figure S9. Cyclic performances of the $LiFePO_4$//Li battery with LCE and PE-*x*%LCE@PEG (*x* = 40, 50, and 60) electrolytes under 0.5 C rate and 30 °C.

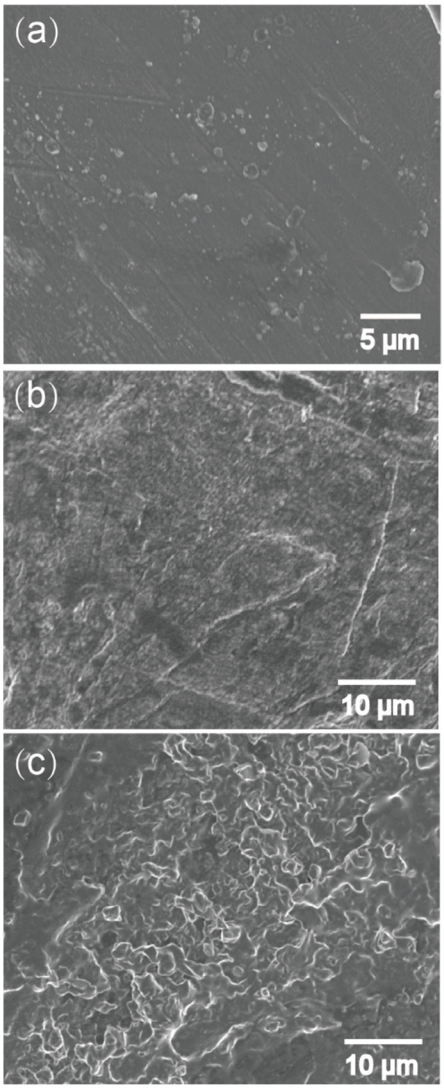

Figure S10. SEM images of the Li metal taken from (a) bare lithium, (b) $LiFePO_4$/PE-50%LCE@PEG/Li cell after 100 cycles under 0.5C at 60 ºC, (c) $LiFePO_4$/LCE /Li cell after 25 cycles under 0.5C at 60 ºC.