

Supporting Information

Flexible composite solid electrolyte with high stable interphase for dendrite-free and durable all-solid-state lithium metal batteries

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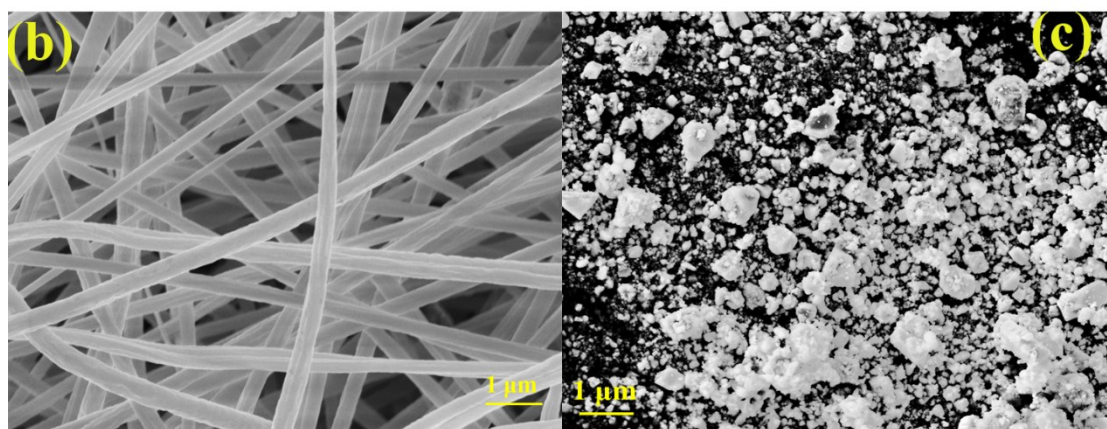
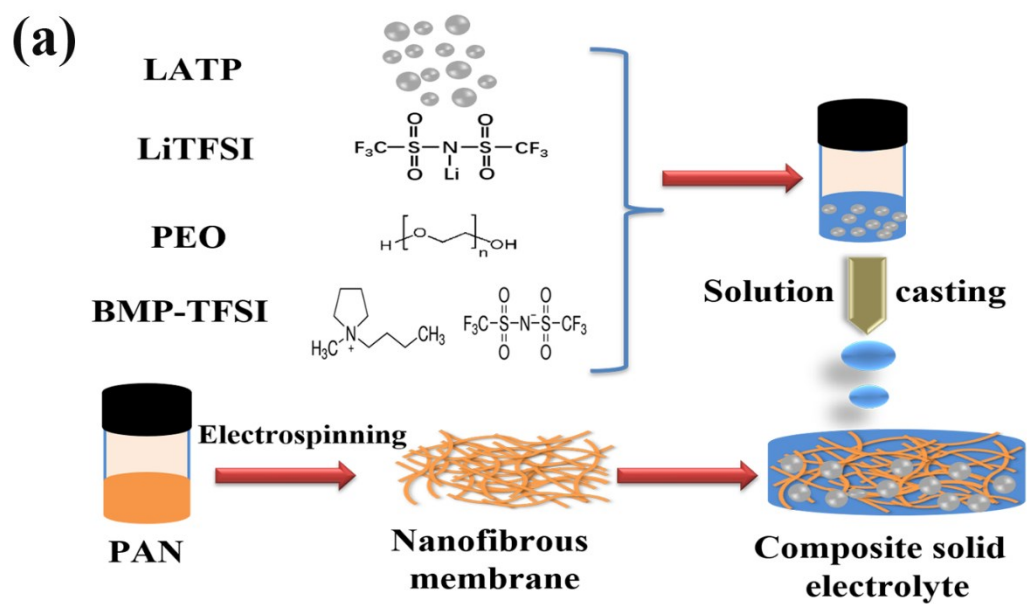


Figure S1. (a) Schematic illustration for the schematic illustration of the composite solid electrolyte. Typical SEM images of the electrospun PAN-fibers (b), and LATP powders.

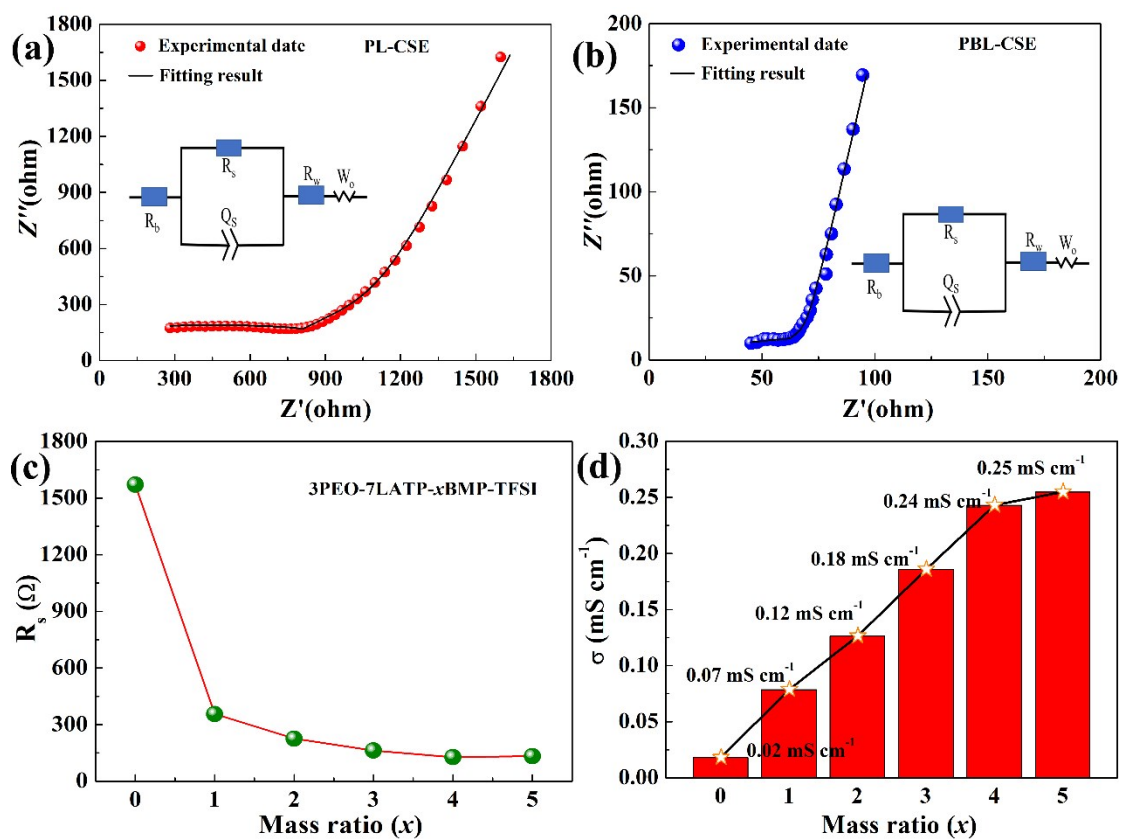


Figure S2. (a,b) Selected Nyquist plots of 3PEO-7LATP-xBMP-TFSI composite solid electrolyte: (a) PL-CSE and (b) PBL-CSE, the solid line represents the fitting curve with the equivalent circuit shown in the inset. (c) Interfacial resistance and (d) ionic conductivity for 3PEO-7LATP-xBMP-TFSI composite solid electrolyte incorporated with different concentrations of BMP-TFSI (IL).

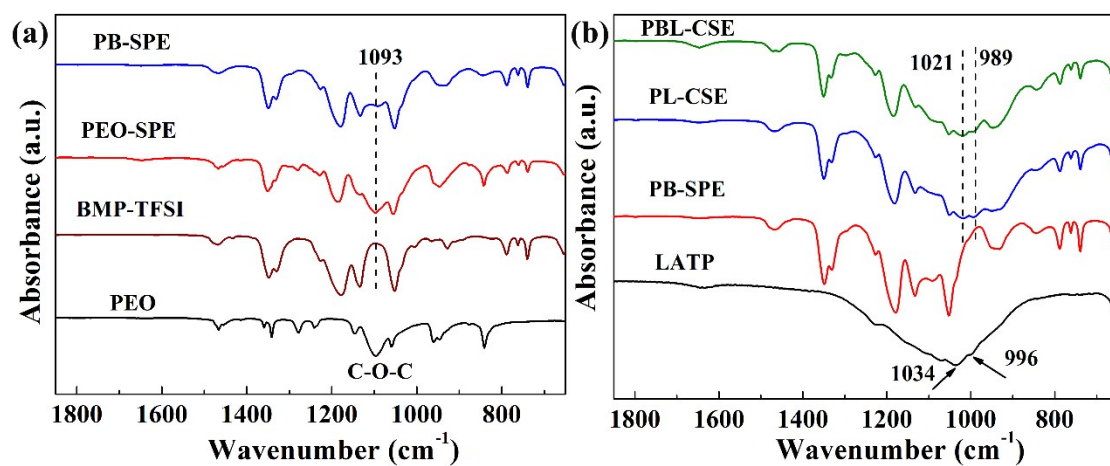


Figure S3. FTIR spectra of pure PEO, BMP-TFSI, PEO-SPE and PB-SPE (a) and LATP, PB-SPE, PL-CSE, PBL-CSE (b).

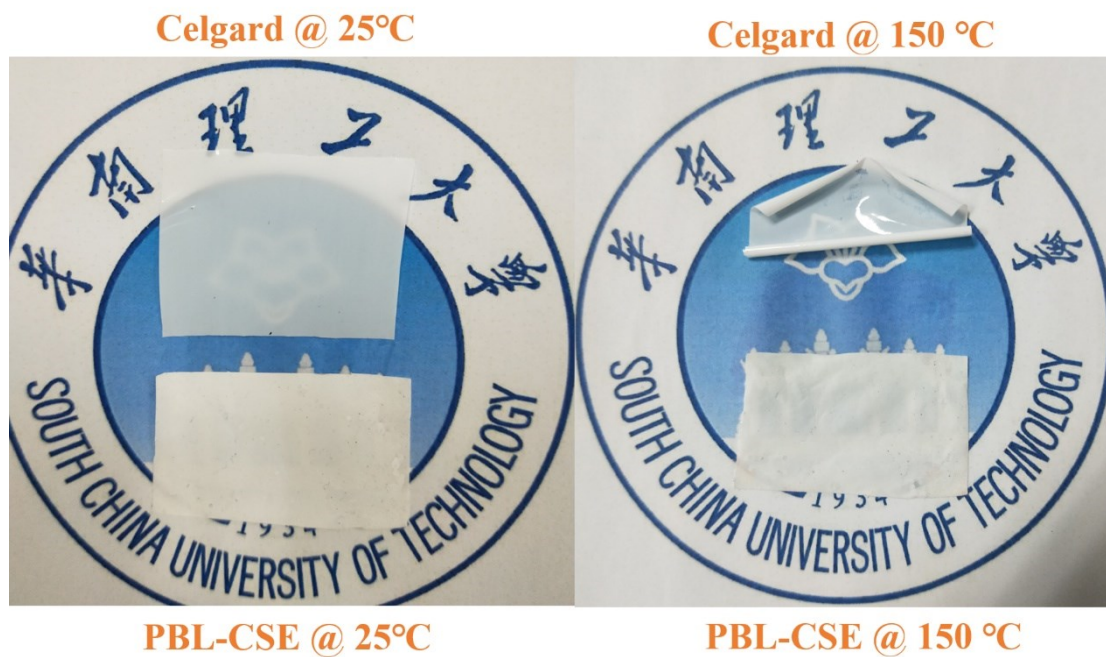


Figure S4. Optical photos of Celgard separator and PBL-CSE before and after heating at 150 °C.

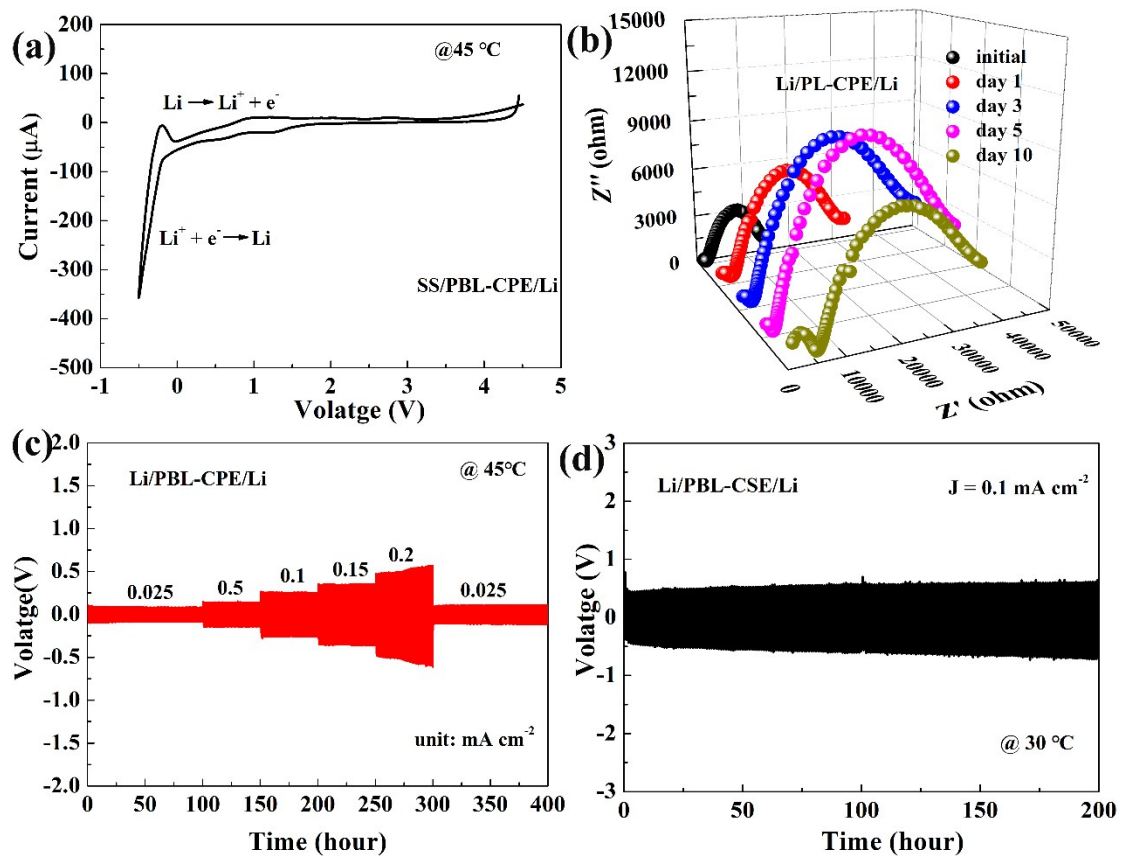


Figure S5. (a) CV curves of PBL-CSE at a scan rate of 1 mV s^{-1} at $45 \text{ }^\circ\text{C}$. (b) The AC impedance spectrum of the Li/PL-CSE/Li cell after different aging time. Galvanostatic cycling of Li/PBL-CSE/Li cell with different current density at $45 \text{ }^\circ\text{C}$ (c), and with a current density of 0.1 mA cm^{-2} at $30 \text{ }^\circ\text{C}$.

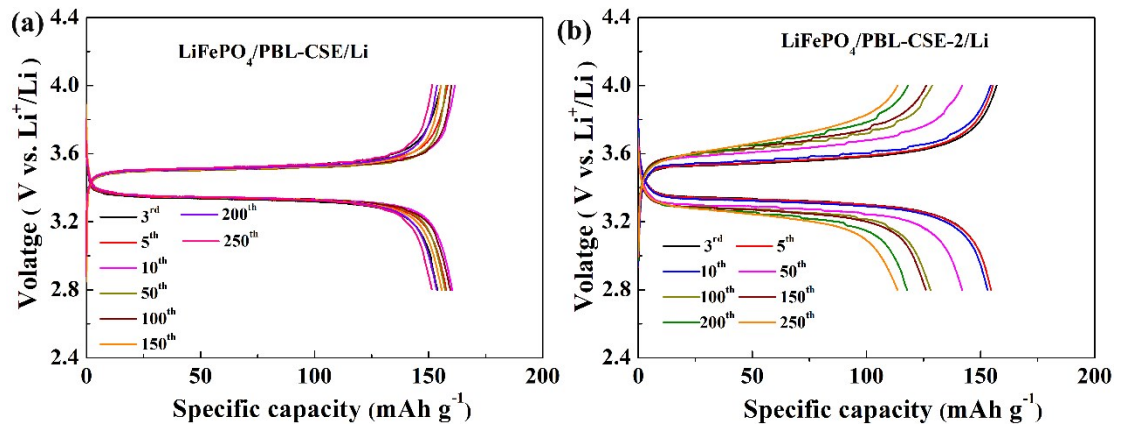


Figure S6. Typical charge and discharge voltage profiles of $\text{LiFePO}_4/\text{PBL-CSE}/\text{Li}$ (a) and $\text{LiFePO}_4/3\text{PEO-7LATP-2BMP-TFSI}/\text{Li}$ (b) solid-state cells at 0.1C current density and 30 °C.

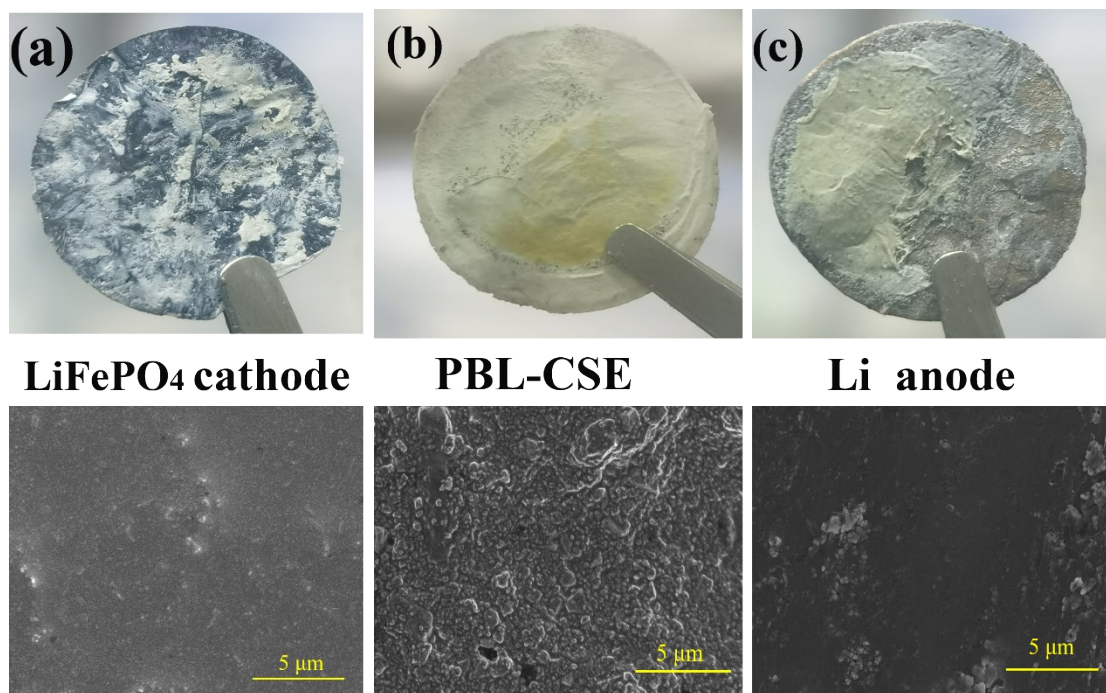


Figure S7. Optical photograph and SEM images of LiFePO₄ cathode (a), PBL-CSE composite electrolyte membrane (b) and Li metal anode (c) after 1200 cycles at 45 °C.

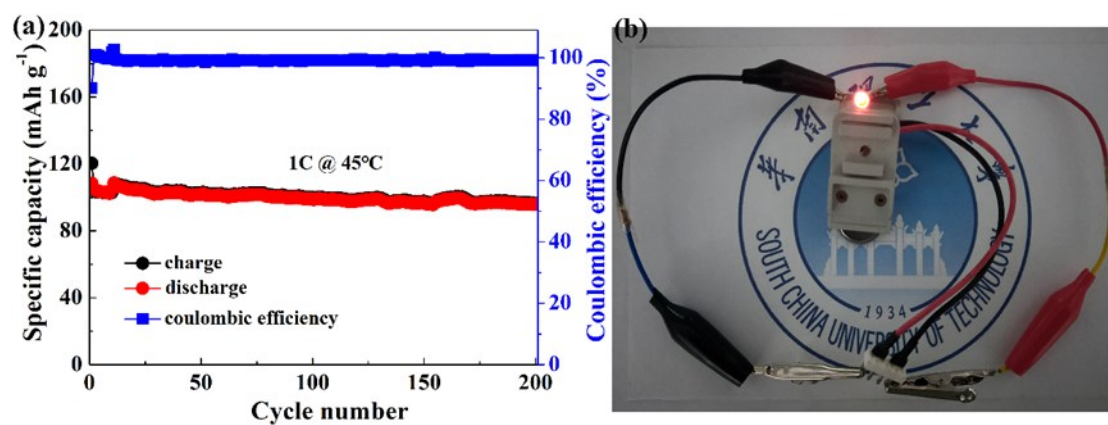


Figure S8. (a) Cycling performances of LiFePO₄/PBL-CSE/Li cell at 1C current density. (b) Illustration of the solid cell light up a LED lamp at room temperature.