

Supplementary Information of

**Lithium-preserved Sintering Method for  
Perovskite-based Solid Electrolyte Thin Films  
via Flash Light Sintering for All-solid-state  
Lithium-ion Batteries**

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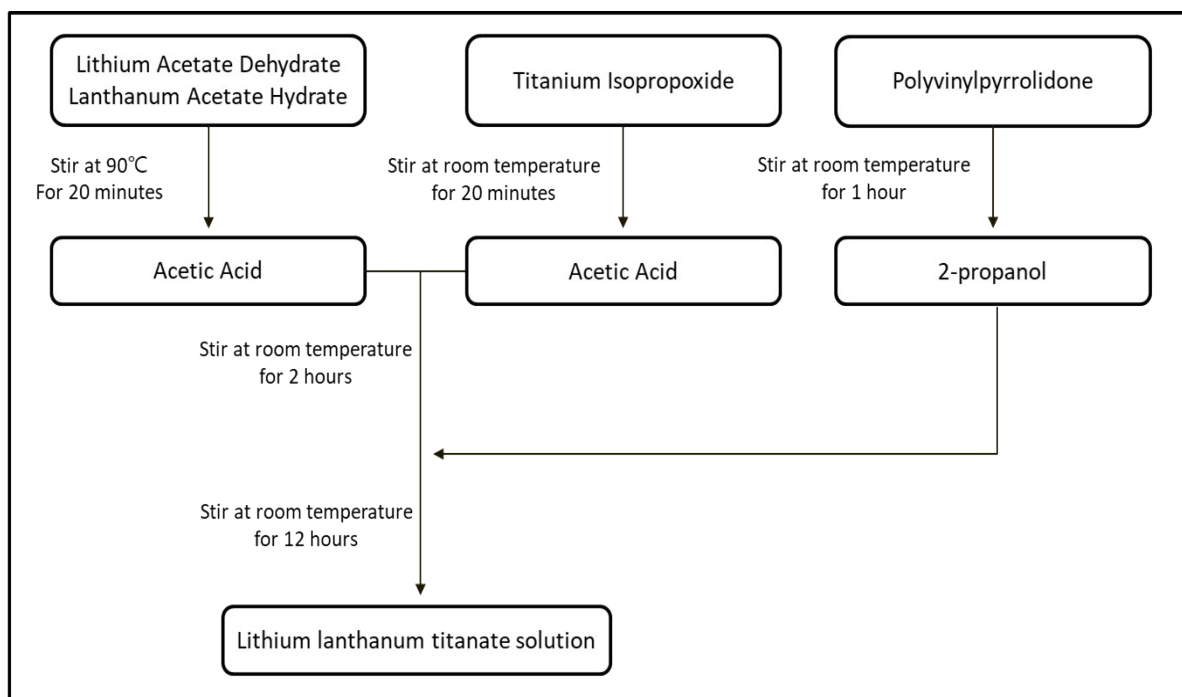
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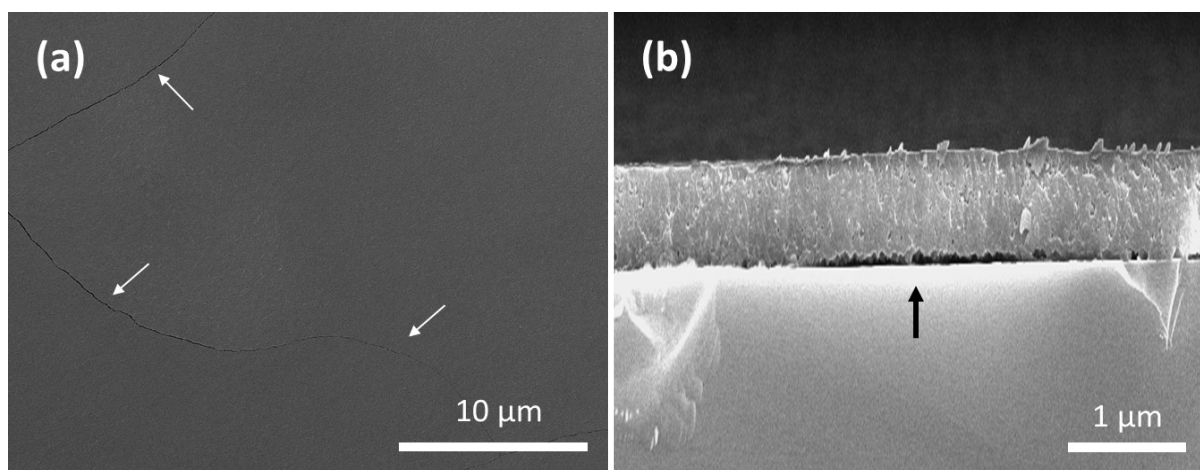
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**Fig. S1** Procedure for the fabrication of lithium lanthanum titanate sol in acetate-alkoxide route.

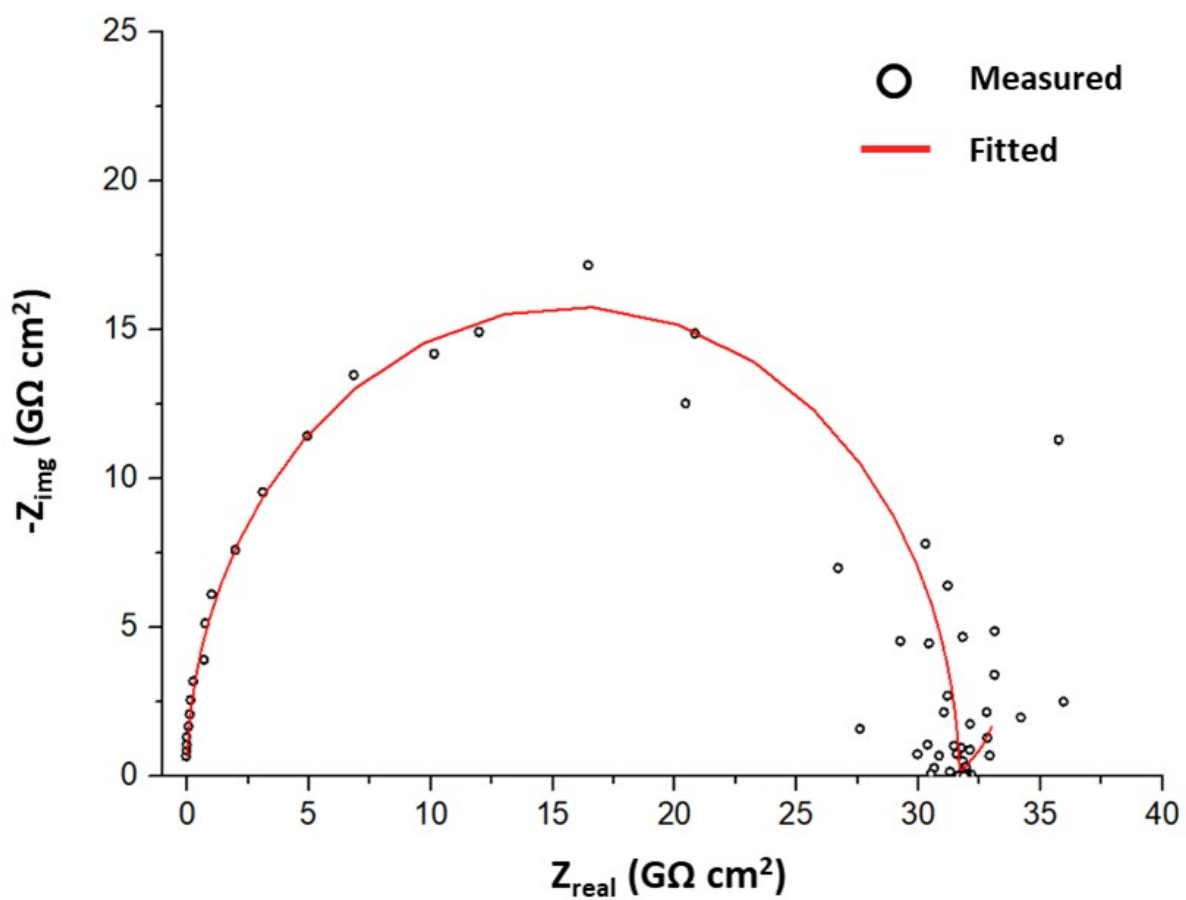


**Fig. S2** (a) Surface morphologies and (b) cross-sections of flash-light sintered LLTO thin film under 650 V without hot plate. The white arrows are pointing at the cracks on the surface of the thin film. The black arrow is pointing at the delamination spot.

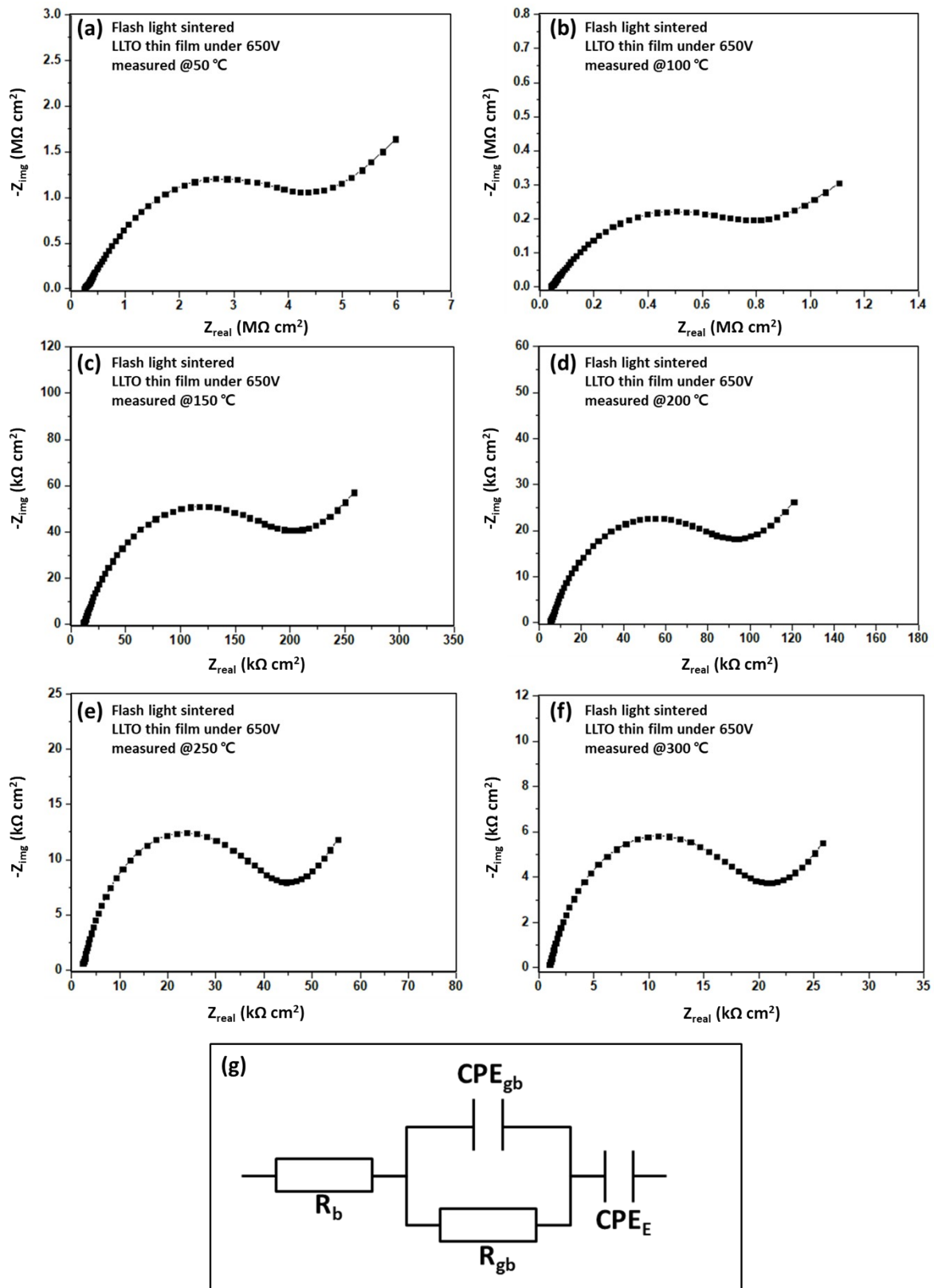
**Table S1** ICP-OES result for molar ratios of lithium, lanthanum, and titanium in thermal sintered thin film at 1100 °C.

Sintering Condition	Molar ratio of Li:La:Ti in starting solution	Molar ratio of Li:La:Ti after sintering
Thermal Sintering at 1100 °C	0.34 : 0.56 : 1	0.20 : 0.55 : 1

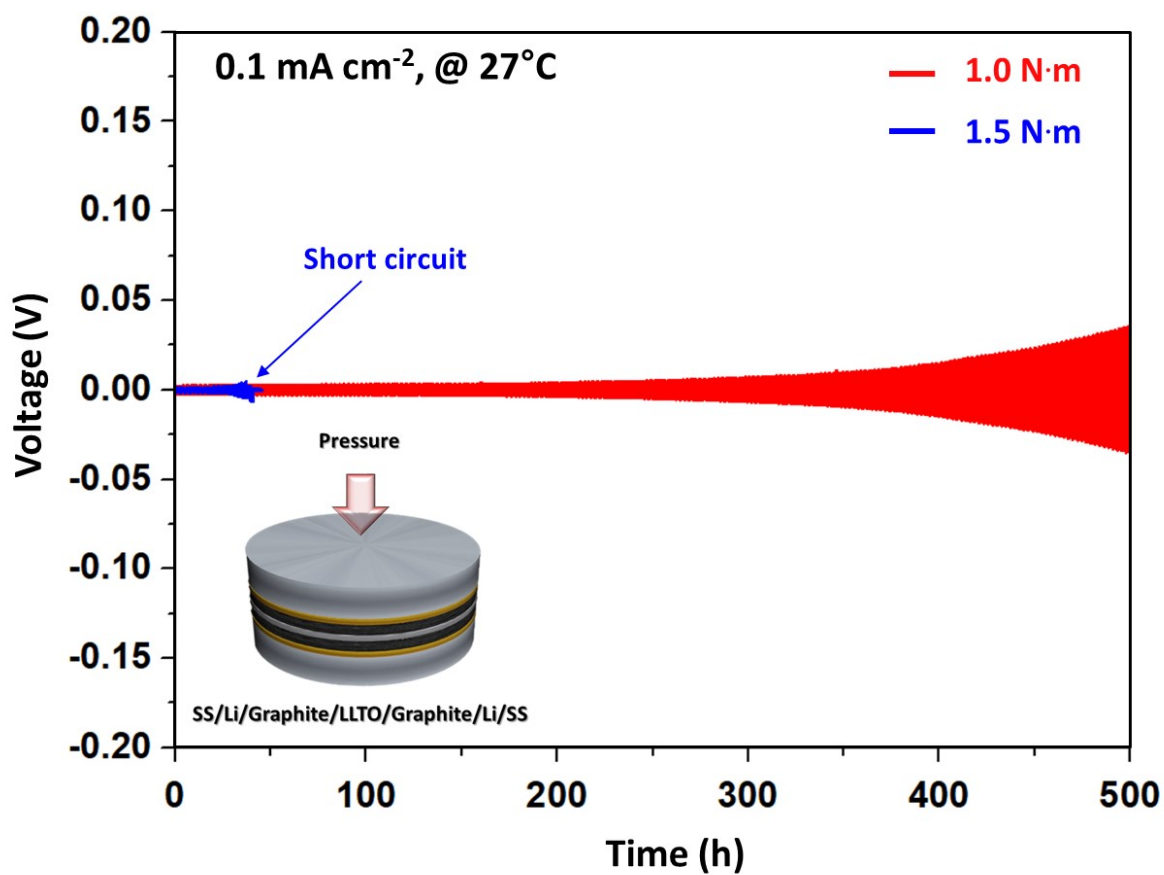
### LLTO thin-film sintered at 1100 °C



**Fig. S3** Nyquist plot of the LLTO thin film thermally sintered at 1100 °C.



**Fig. S4** Nyquist plot of flash light sintered LLTO thin film under 650V measured at (a) 50 °C (b) 100 °C (c) 150 °C (d) 200 °C (e) 250 °C (f) 300 °C and the data is fitted based on the corresponding (g) electrical circuit.



**Fig. S5** Galvanostatic cycle performance of symmetric cell with flash-light sintered LLTO thin film under 650V as solid electrolyte under torques of 1.0 N·m and 1.5 N·m