

Inorganic–organic hybrid electrolytes based on Al-doped $\text{Li}_7\text{La}_3\text{Zr}_2\text{O}_{12}$ and ionic liquids

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Table S1. Thickness of the pellets of (a) LLZO–15wt% FSI IL and (b) LLZO–15wt% DFOB IL

pressed at different pressure.

Pressure	Thickness / cm	
	(a) FSI IL	(b) DFOB IL
hand	0.0530	0.0510
1ton	0.0505	0.0453
2ton	0.0420	0.0362
3ton	0.0347	0.0337
4ton	0.0265	0.0310

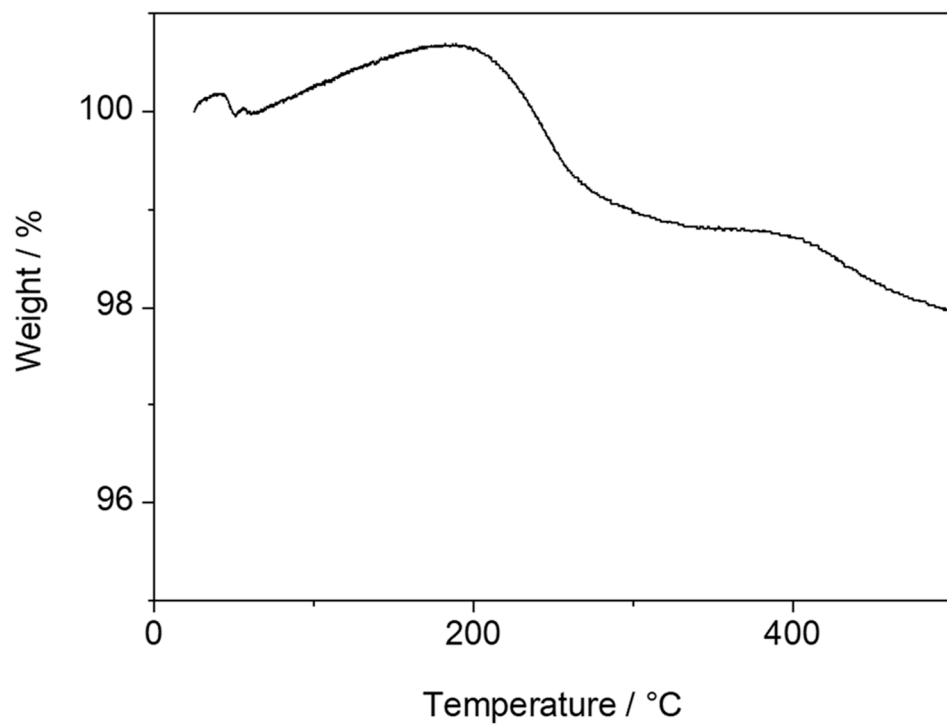
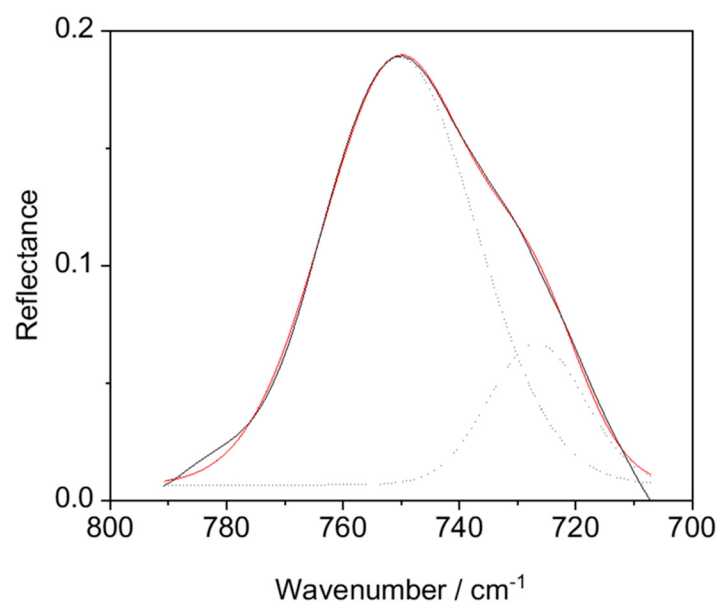
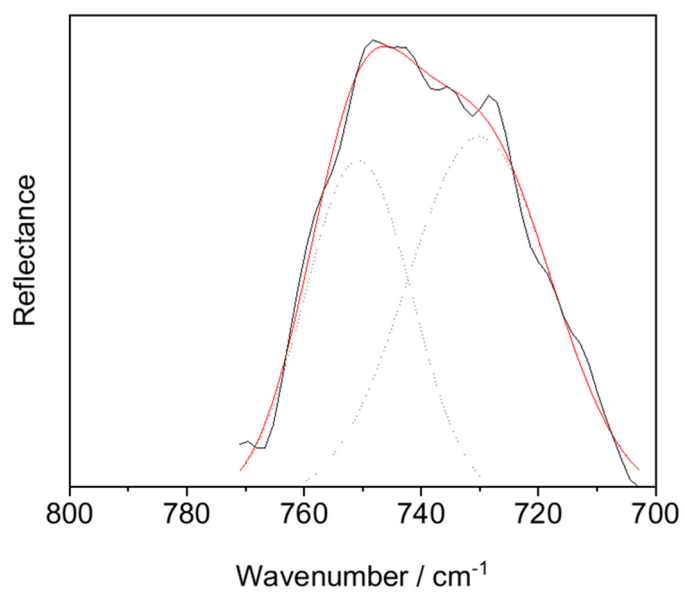


Figure S1. Enlarged TGA curve of pristine LLZO.



(a)



(b)

Figure S2. Gauss curve fitting of ATR-FTIR spectra of (a) pure FSI IL and (b) LLZO-15wt% FSI IL composite. The black curves are experimental data, while red lines are sum of fitting curves centered at 730 and 750 cm^{-1} which are shown in broken black curves.

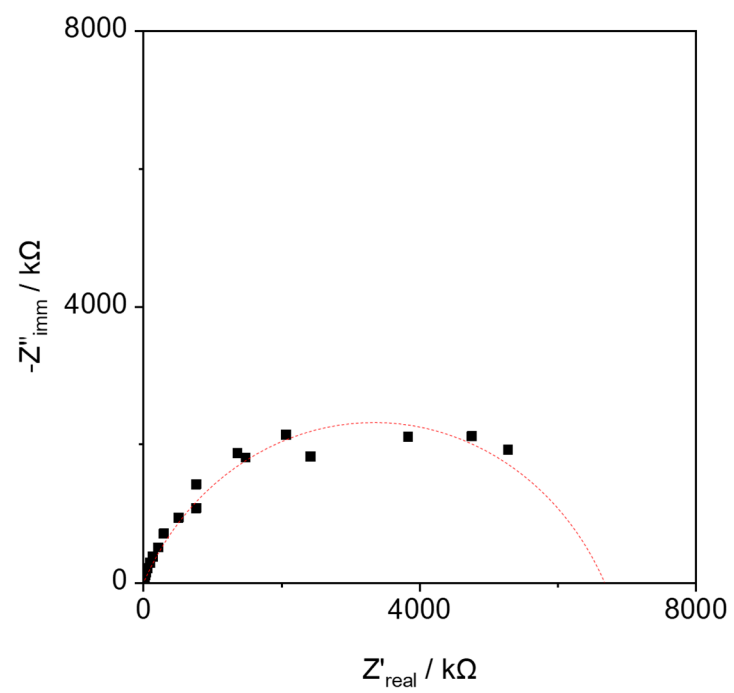


Figure S3. Impedance spectrum of pure LLZO pressed with 1 ton.

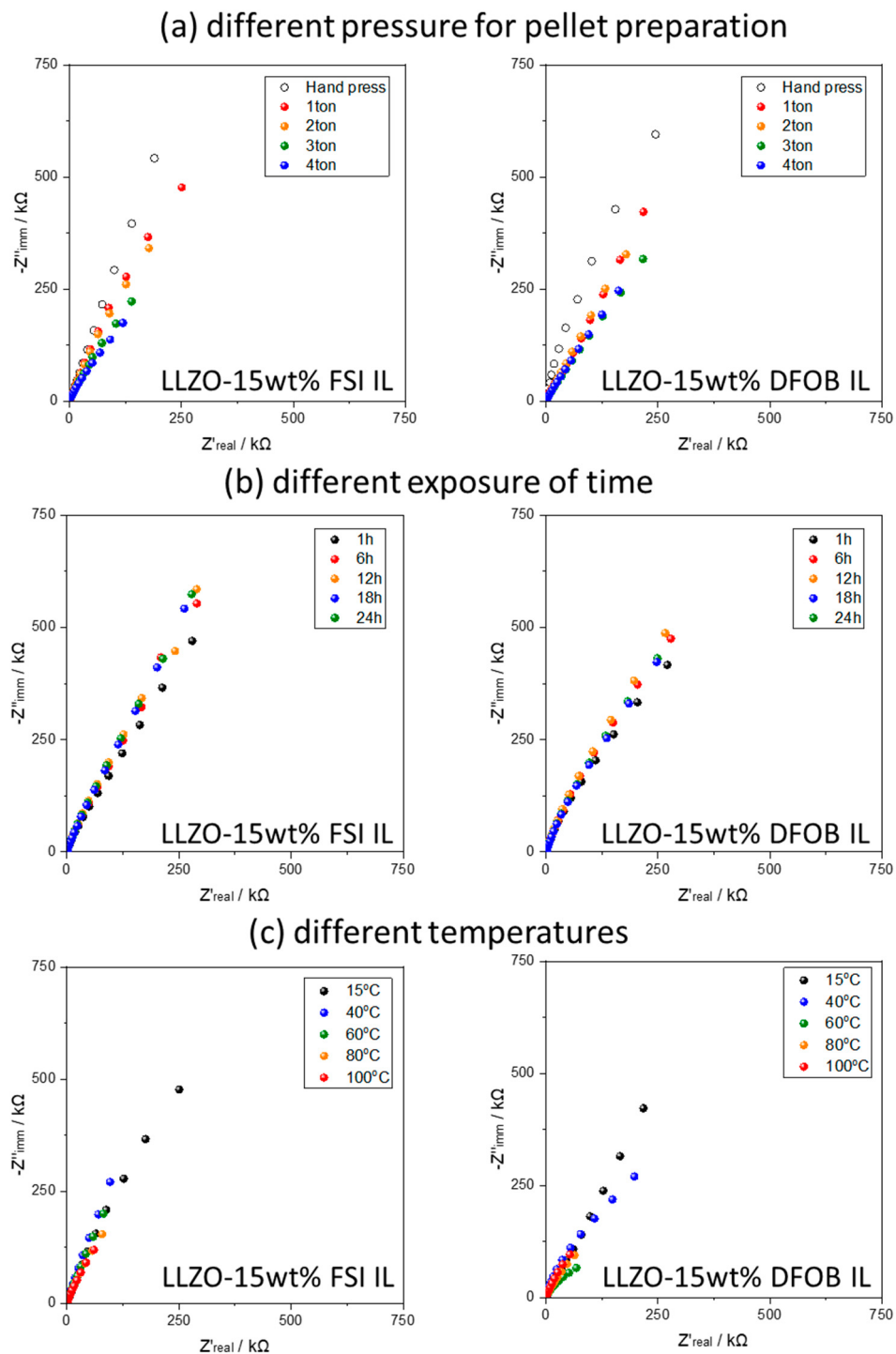


Figure S4. Nyquist plot of impedance spectra measured by changing three different factors: (a) pressure for the pellet preparation, (b) exposure of time, and (c) temperatures. Results are corresponding to Figure 5, Figure S5, and Figure 6, respectively.

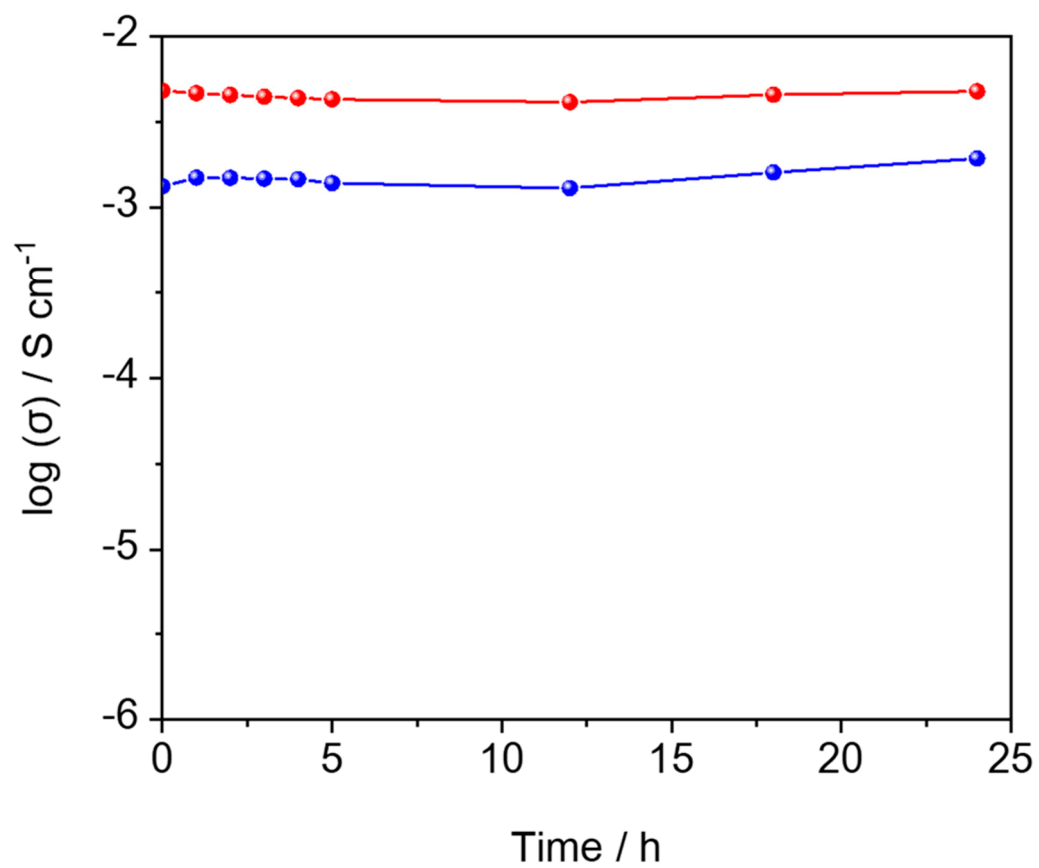
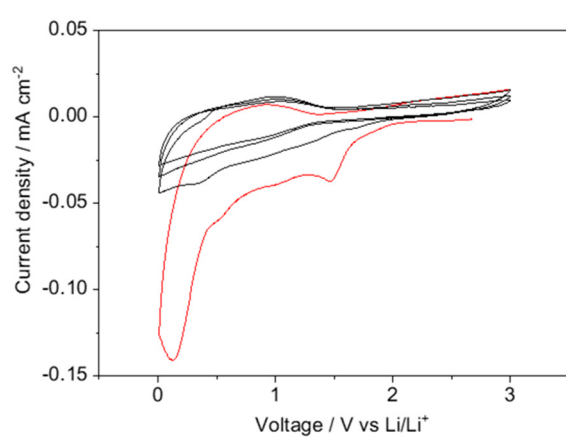
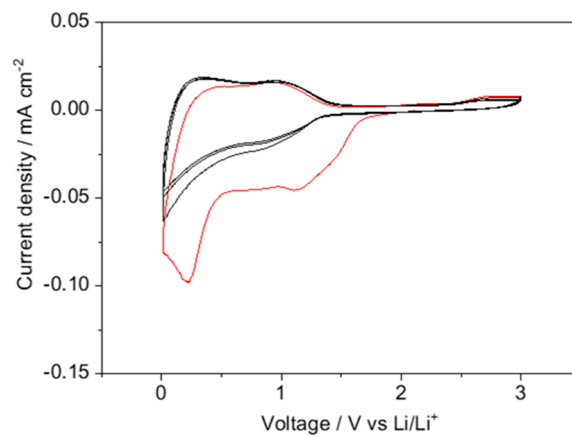


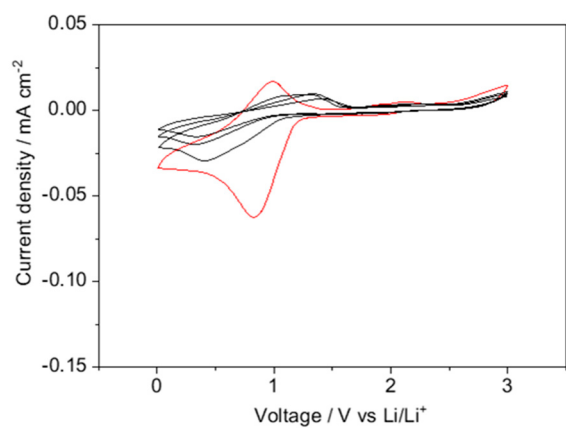
Figure S5. Change in the ionic conductivity of LLZO-FSI IL (red) and LLZO-DFOB IL (blue) composites versus time.



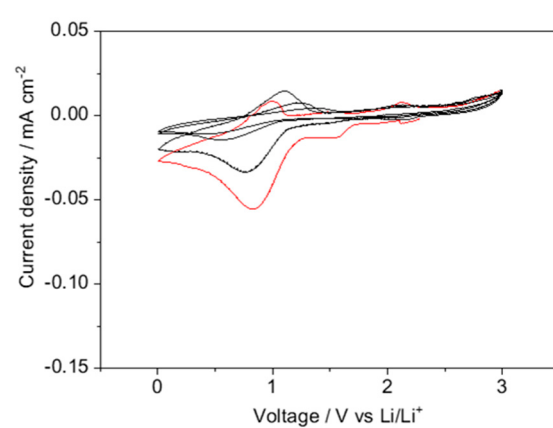
(a)



(b)



(c)



(d)

Figure S6. CV of (a,b) LLZO-FSI IL and (c,d) LLZO-DFOB IL composites, (b,d) with and (a,c) without corresponding lithium salt. Red curve designates the first cycle and black curves denote successive cycles.