

NASICON-type polymer-in-ceramic composite electrolytes for lithium batteries

Electronic Supplementary Information

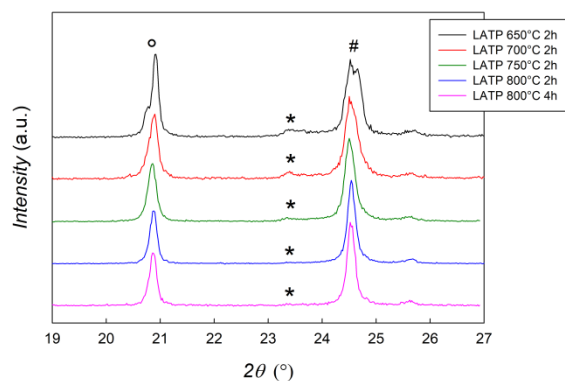


Figure S1 – XRD of the LATP powders treated at increasing temperature, showing the presence of impurity peaks for temperature treatments below 800°C.

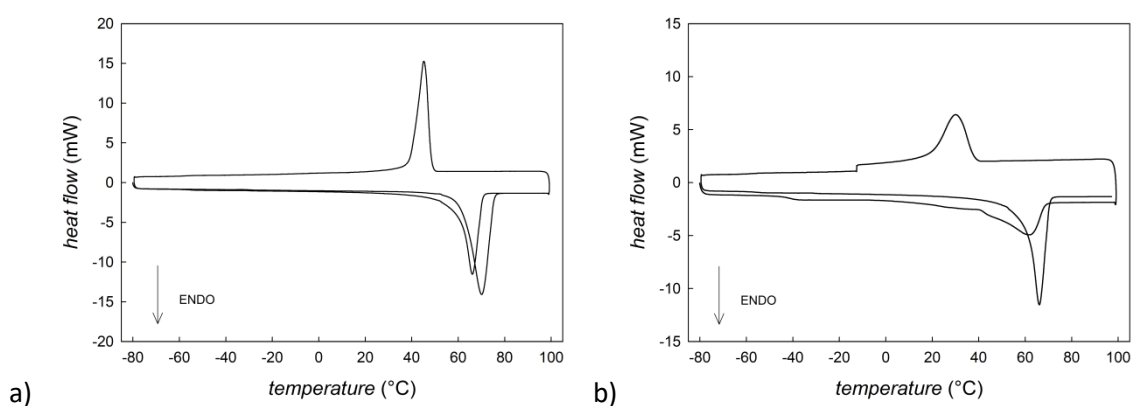


Figure S2 – DSC curves of the PEO (a) and the SPE (b) sample showing the difference between the first and the second heating cycles

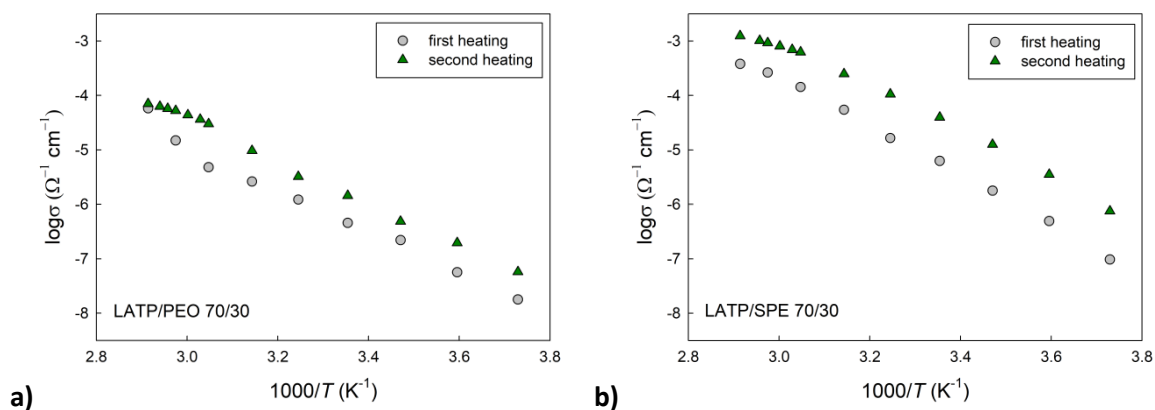


Figure S3 Arrhenius plot of conductivity for two selected samples, LATP/PEO 70/30 (a) and LATP/SPE 70/30 (b), highlighting the differences in the first and second heating cycle.

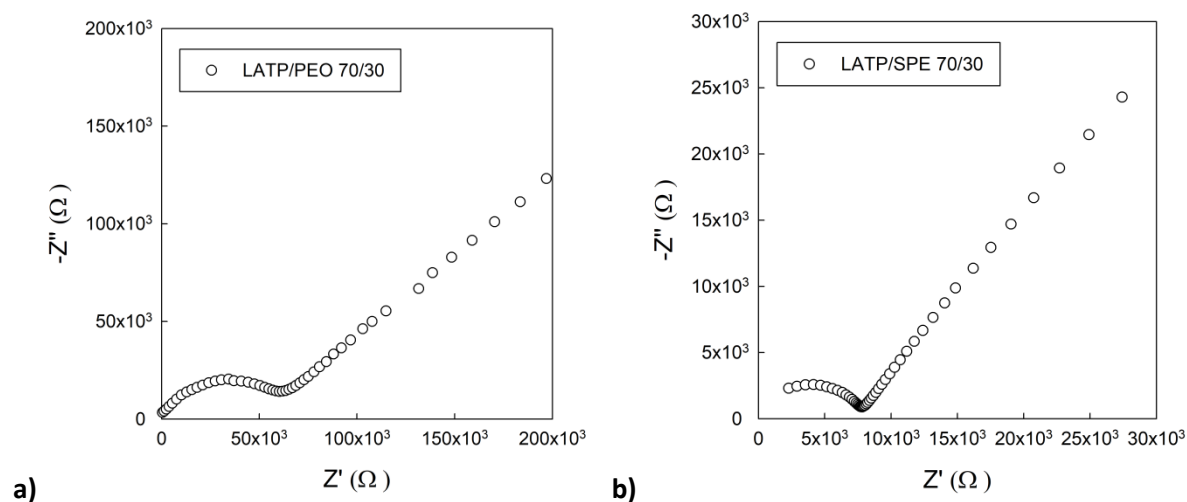


Figure S4 Nyquist plots for two selected samples, LATP/PEO 70/30 (a) and LATP/SPE 70/30 (b), acquired at 45 °C.

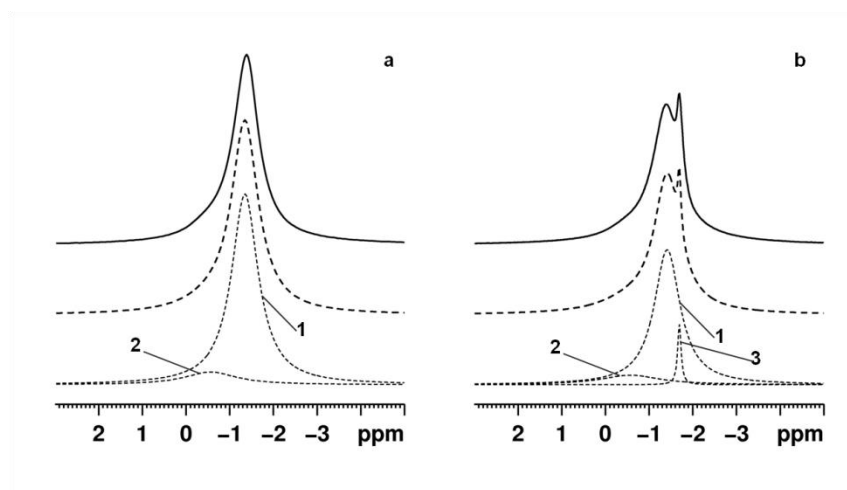


Figure S5 Room temperature MAS-NMR ^7Li spectra for the LATP/PEO 70/30 (a) and LATP/SPE 70/30. Experimental spectrum: black solid line; total fit: large dotted line; single components (named 1,2, 3 as in Table SI-1): small dotted lines.

Table S1 MAS-NMR ^7Li parameters from the fit procedures for the spectra of the LATP/PEO 70/30 and LATP/SPE 70/30 compositions. A Gaussian/Lorentzian lineshape was used for each line shape with 0 gaussian contribution (pure Lorentzian lineshape). δ_{iso} = isotropic chemical shift; FWHH = Full Width at Half Height; Rel. int. = relative intensity.

LATP/PEO 70/30									
T /°C	Peak 1			Peak 2			δ_{iso} / ppm	FWHH / Hz	Rel. int. / %
	δ_{iso} / ppm	FWHH / Hz	Rel. int. / %	δ_{iso} / ppm	FVHH / Hz	Rel. int. / %			
25	-1.35	107	86	-0.61	222	14			
30	-1.29	109	90	-0.50	200	10			
40	-1.26	107	92	-0.53	200	8			
50	-1.22	102	94	-0.58	200	6			
60	-1.21	100	100						
70	-1.18	97	100						
75	-1.18	95	100						

LATP/SPE 70/30									
	Peak 1			Peak 2			Peak 3		
T /°C	δ_{iso} / ppm	FWHH / Hz	Rel. int. / %	δ_{iso} / ppm	FWHH / Hz	Rel. int. / %	δ_{iso} / ppm	FWHH / Hz	Rel. int. / %
25	-1.39	122	80	-0.56	253	13	-1.67	12	7
30	-1.34	112	86	-0.56	235	8	-1.63	12	6
40	-1.35	112	90	-0.62	200	4	-1.65	15	6
50	-1.33	111	93				-1.62	17	7
60	-1.30	105	94				-1.60	17	6
70	-1.26	98	92				-1.57	13	8
75	-1.25	98	93				-1.56	18	7