Supporting information for

The synergistic effects of Al and Te on the structure and Li^+-mobility of the garnet-type solid electrolytes

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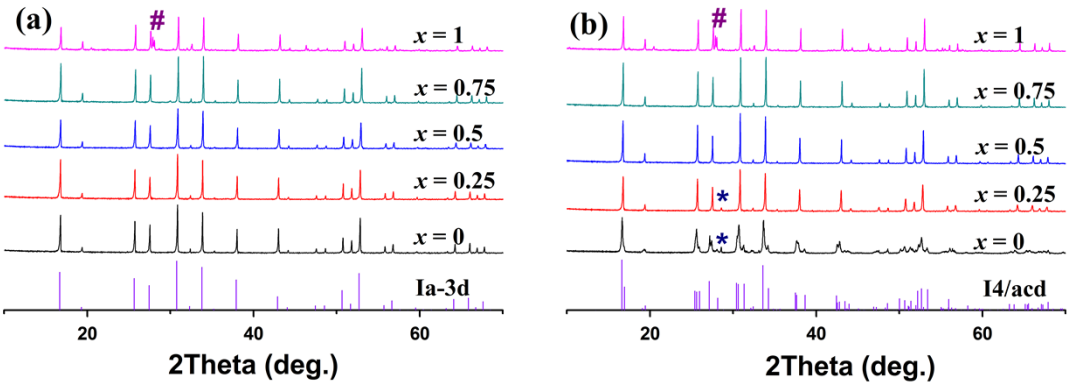

Fig. S1 XRD patterns of $Li_{7-x}La_3Zr_{2-x}Te_xO_{12}$ ($0 \le x \le 1$) samples sintered in (a) Al_2O_3 crucibles, (b) ZrO_2 crucibles. *denotes $La_{0.5}Zr_{0.5}O_{1.75}$ #01-075-0346, and # represents La_2O_3 #01-089-4016.

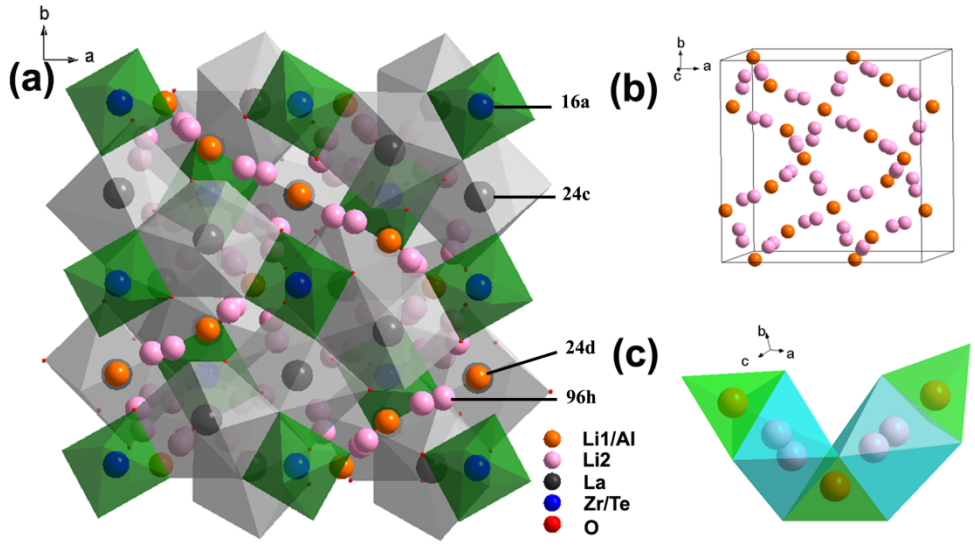

Fig. S2 (a) Crystal structure of the cubic garnet (refined from neutron diffraction data), (b) Lithium jump route proposed by Awaka *el al.*[20], (c) Polyhedral coordination of Li1 and Li2.

Table S1. Fitting results of Nyquist plots for samples with $x = 0.25$ sintered in Al_2O_3 crucibles, with k = A/l = 5.91.

T(°C)	L (H)	R1 (Ω)	CPE1-T (F)	CPE1-P	R2 (Ω)	CPE2-T (F)	CPE2-P
-50	7.8E-7(N/A)	1.62E5(0.39%)	8.8E-11(3.16%)	0.87(0.26%)	1E20(100%)	1.0E-8(3.68%)	0.87(0.56%)
-30	7.8E-7(N/A)	2.65E4(0.48%)	1.9E-10(7.04%)	0.83(0.57%)	1E20(100%)	1.2E-8(5.55%)	0.88(0.69%)
-10	7.8E-7(N/A)	5.4E3(1.06%)	3.9E-10(20.96%)	0.82(1.62%)	1E20(100%)	1.7E-8(13.32%)	0.87(1.42%)
10	7.8E-7(N/A)	1.4E3(0.74%)	2.1E-10(22.61%)	0.87(1.57%)	1E20(100%)	3.1E-8(8.75%)	0.84(0.89%)
25	7.8E-7(N/A)	4.24E2(1.40%)	5.6E-10(59.86%)	0.82(4.19%)	1E20(100%)	4.1E-8(23.75%)	0.84(2.11%)
50	7.8E-7(N/A)	1.74E2(0.72%)	-	-	1E20(100%)	8.2E-8(14.54%)	0.79(1.27%)
70	7.8E-7(N/A)	81(0.96%)	-	-	1E20(100%)	1.6E-7(11.25%)	0.76(1.035)
90	7.8E-7(N/A)	42(0.62%)	-	-	1E20(100%)	2.0E-7(4.99%)	0.76(0.45%)
110	7.8E-7(N/A)	24(5.53%)	-	-	1E20(100%)	2.3E-7(32.04%)	0.76(2.88%)
130	7.8E-7(N/A)	16(1.96%)	-	-	1E20(100%)	1.2E-8(7.09%)	0.78(0.63%)
150	7.8E-7(2.50%)	11(3.42%)	-	-	1E20(100%)	2.4E-7(11.15%)	0.77(1.02%)

L was obtained by fitting Nyquist plot measured at 150 °C, and then fixed at this value while fitting the other data.