[Supporting Information]

Factors Influencing Fast Ion Transport in Glyme-based Electrolytes for Lithium–Air Batteries

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Table S1. Self-diffusion coefficients D of ions and G4 solvent and transference number of cations t_{Li+} at each measured temperature

Electrolyte		Self-diffusion coefficient / 10^{-10} m^2 s^{-1}			Transference number of cation
		D_{G4}	D_{Li+}	D_{anion}	t_{Li+}
1.0 M LiOTf/G4	333 K	3.4	2.1	2.2	0.49
	323 K	2.6	1.5	1.6	0.48
	313 K	1.9	1.1	1.2	0.48
	303 K	1.4	8.0	0.84	0.49
1.0 M LiTFSI/G4	333 K	2.5	1.9	2.0	0.49
	323 K	2.0	1.4	1.6	0.47
	313 K	1.5	1.0	1.2	0.46
	303 K	1.1	0.70	0.88	0.44
1.0 M LiFSI/G4	333 K	2.7	1.8	2.6	0.41
	323 K	2.2	1.4	1.8	0.44
	313 K	1.6	1.0	1.3	0.44
	303 K	1.2	0.73	0.97	0.43
0.50 M LiTFSI/G4	333 K	4.3	3.1	3.1	0.50
	323 K	3.4	2.2	2.6	0.46
	313 K	2.7	1.6	1.9	0.46
	303 K	1.9	1.1	1.3	0.46
2.0 M LiTFSI/G4	333 K	0.83	0.79	0.81	0.49
	323 K	0.59	0.53	0.59	0.47
	313 K	0.40	0.35	0.40	0.47
	303 K	0.26	0.22	0.25	0.47
2.7 M LiTFSI/G4	333 K	0.42	0.43	0.43	0.50
	323 K	0.30	0.30	0.30	0.50
	313 K	0.19	0.20	0.19	0.51
	303 K	0.12	0.12	0.12	0.50

Table S2. Viscosity η of G4-based electrolytes at each measured temperature

Electrolyte		Viscosity η / mPas	Inverse of viscosity η^{-1} / $mPas^{-1}$
	333 K	3.6	0.28
1.0 M	323 K	4.5	0.22
LiOTf/G4	313 K	5.7	0.18
	303 K	7.4_5	0.13
	333 K	4.6	0.22
1.0 M	323 K	5.7	0.17
LiTFSI/G4	313 K	7.5	0.13
	303 K	10	0.10
	333 K	4.4	0.23
1.0 M	323 K	5.5_5	0.18
LiFSI/G4	313 K	7.2	0.14
	303 K	9.6	0.10
	333 K	2.7	0.37
0.50 M	323 K	3.3	0.30
LiTFSI/G4	313 K	4.1	0.24
	303 K	5.2	0.19
	333 K	13	0.075
2.0 M	323 K	$18._5$	0.054
LiTFSI/G4	313 K	$26._5$	0.038
	303 K	41	0.025
	333 K	25	0.039_5
2.7 M	323 K	35	0.028
LiTFSI/G4	313 K	53	0.019
	303 K	85	0.012

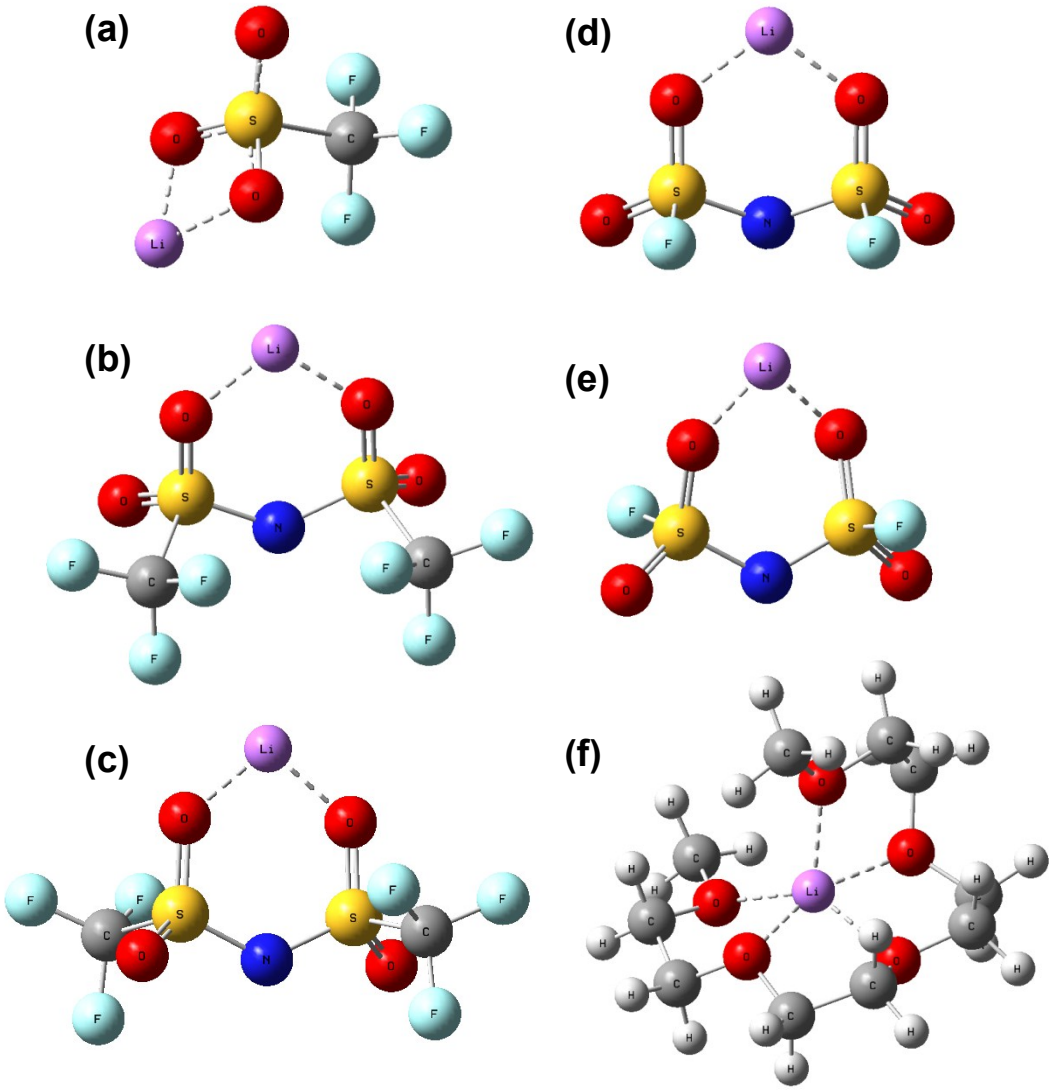

Fig. S1. Optimized geometries of the Li^+-anion and G4-Li^+ complexes. (a) Li^+-OTf^-, (b) cis-type Li^+-$TFSI^-$, (c) trans-type Li^+-$TFSI^-$, (d) cis-type Li^+-FSI^-, (e) trans-type Li^+-FSI^-, and (f) G4-Li^+ (5 coordination). B3LYP/6-311+G**.