

APPENDIX C

Data used to calculate the number densities of PEMA/PVdF-HFP-LiTf-PC system

The density for PEMA, PVdF-HFP, LiTf and PC = 1.11, 1.78, 1.90 and 1.19 g cm⁻³ respectively. The density for PEMA/PVdF-HFP (70:30) is taken to be 1.311 g cm⁻³. The molecular weight of LiTf is 156.01 g mol⁻¹. The number of mole of LiTf in this system is calculated using the fixed amount of salt present in the composition of the optimized 70 wt.% PEMA/PVdF-HFP- 30 wt.% LiTf sample. The number density, n of the total number of free ions is obtained by multiplying the number density calculated for Tf⁻ ions by a factor of two. This is because the amount of Li⁺ ions equal to the amount of Tf⁻ ions present in each sample. Table below lists the parameters used to calculate the number densities of Li⁺ and Tf⁻ ions.

Sample	No. of mole of LiTf	FI (%)	σ (S cm ⁻¹)	$V_{\text{PEMA/PVdF-HFP (70:30)}}$ (cm ³)	V_{LiTf} (cm ³)	V_{PC} (cm ³)	V_{Total} (cm ³)	n of free Tf ⁻ ions (cm ⁻³)	n of free Li ⁺ and Tf ⁻ ions (cm ⁻³)
PC-2	2.75×10^{-3}	9.43	3.43×10^{-7}	1.311	0.814	0.035	2.16	7.22×10^{21}	1.44×10^{22}
PC-4	2.75×10^{-3}	21.22	6.23×10^{-7}	1.311	0.814	0.072	2.20	1.60×10^{22}	3.20×10^{22}
PC-6	2.75×10^{-3}	76.58	1.46×10^{-6}	1.311	0.814	0.110	2.24	5.67×10^{22}	1.13×10^{23}
PC-8	2.75×10^{-3}	30.70	4.70×10^{-7}	1.311	0.814	0.150	2.27	2.23×10^{22}	4.47×10^{22}
PC-10	2.75×10^{-3}	18.91	2.65×10^{-8}	1.311	0.814	0.191	2.32	1.35×10^{22}	2.70×10^{22}