

Supporting Information

Table S1: VFT fitting parameters of SiO₂-PP-TFSI/PC with various particle loadings.

VFT Curve Parameters					
Loading	Chi Square	A	B	C	Tg
11	2.657e-07	0.873	-12.96	5.912	-104
23	1.076e-08	1.858	-15.08	5.877	-103
36	2.518e-08	2.02	-15.39	5.809	-101
38	1.943e-08	1.455	-15.48	5.677	-97
41	6.217e-09	1.96	-16.36	5.709	-98
44	2.359e-09	1.535	-15.66	5.582	-94
48	4.672e-09	1.724	-16.10	5.460	-90
53	1.435e-09	2.315	-18.09	5.551	-93

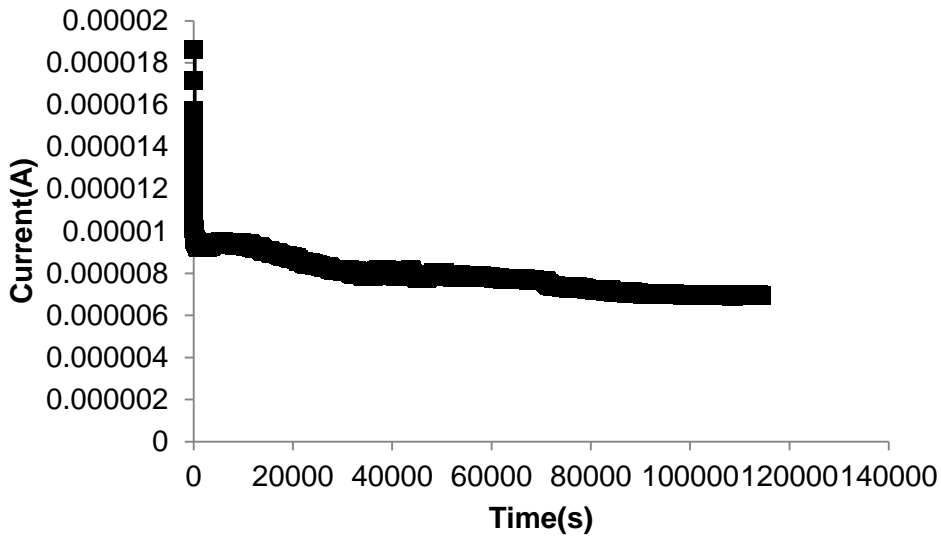
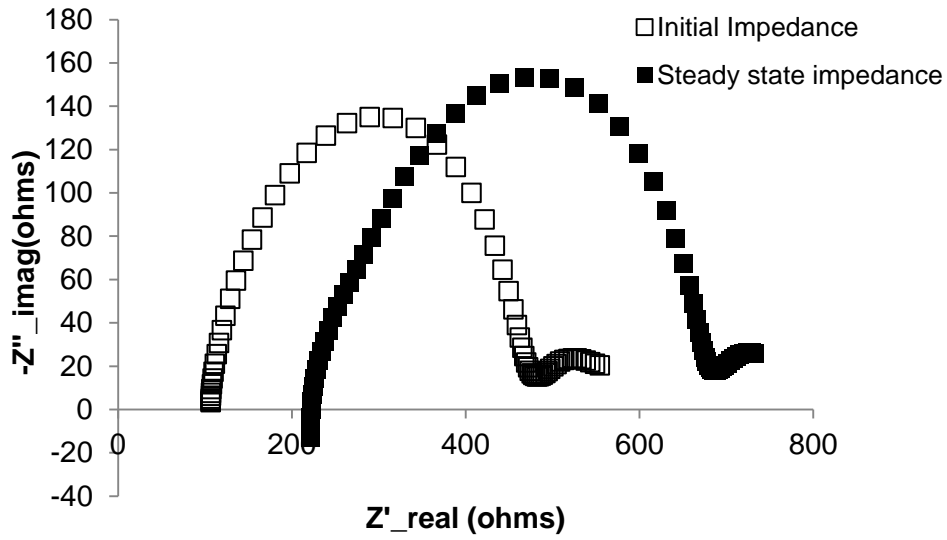


Figure S1: Lithium ion transference number measurement for $\phi=0.23$ SiO_2 -PP-TFSI/PC electrolyte. Applied voltage was 10mV. Parameters obtained for t_{Li^+} calculation $I_0=0.021\text{mA}$, $I_{\text{ss}}=0.0070\text{mA}$, $R_0=363\Omega$, $R_{\text{ss}}=462\Omega$

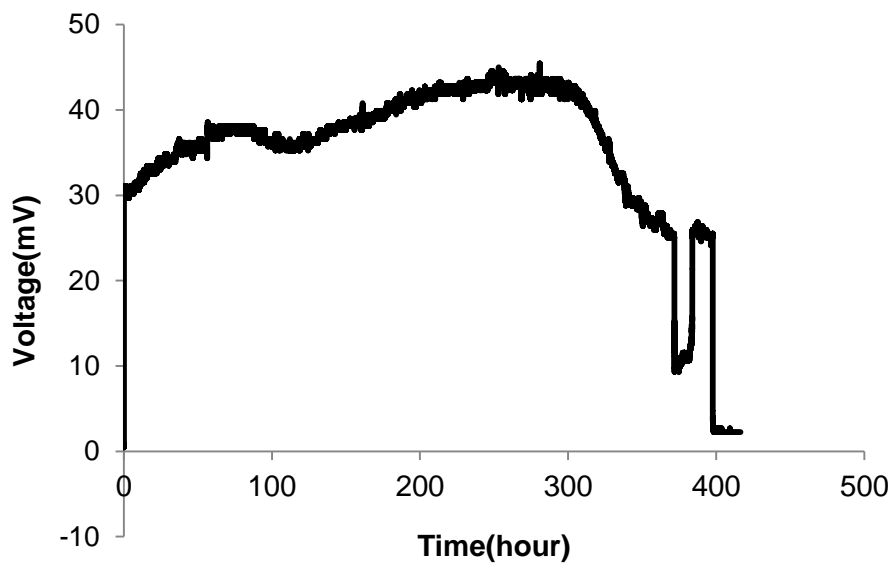


Figure S2: Typical voltage versus time profiles for SiO₂-PP-TFSI/PC electrolyte. Symmetric lithium cells were polarized at fixed current density 0.017 mA cm⁻². First sudden drop indicates the point that short circuit happened. SEM analysis was measured after cell short-circuiting.

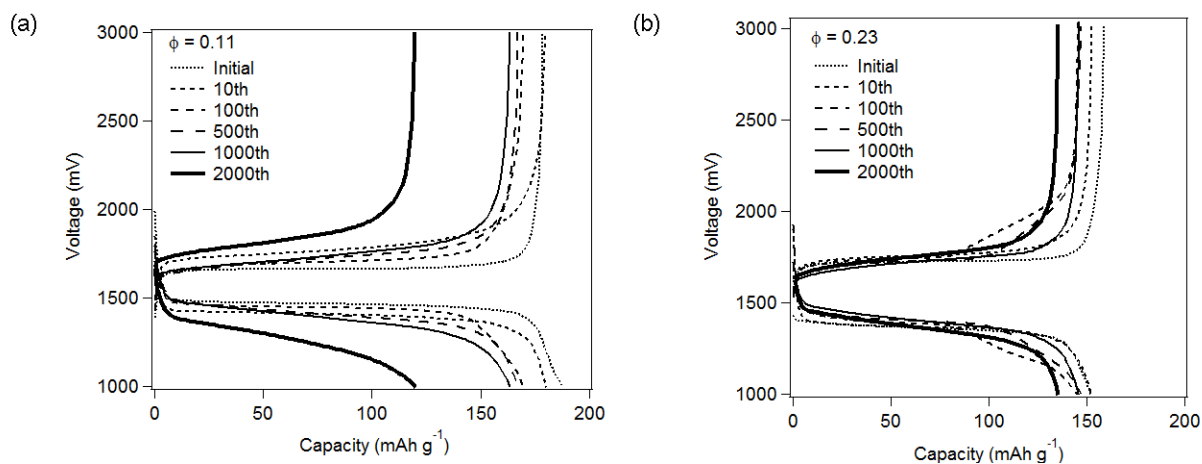


Figure S3: Initial, 10th, 100th, 500th, 1000th, 2000th charge-discharge profiles for $\phi=0.11$, 0.23 SiO₂-PP-TFSI/ PC electrolytes respectively.