Supporting Information (SI)

Pentafluorobenzene boronic acid with strong Lewis acidity for the modification of PEO-based polymer electrolytes

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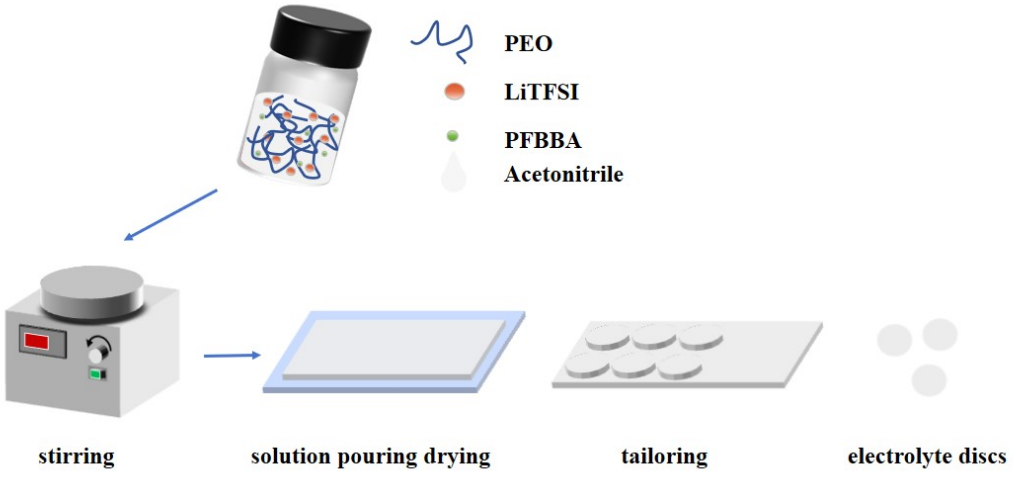

Fig. S1. Diagram of the preparation process of PEO-based SSEs

Table S1. Thermodynamic values and crystallinity of electrolytes

Electrolytes	**T_g (°C)**	**T_m (°C)**	**ΔH_m (J g^{-1})**	**χ_c (%)**
Pristine	-50.44	48.60	46.86	23.08
0.5%PFBBA	-57.41	47.76	44.53	21.93
1.0%PFBBA	-59.76	46.55	39.99	19.70
1.5%PFBBA	-58.90	46.96	33.39	16.45

Table S2. Ionic conductivity (S cm^{-1}) of the four electrolytes at different temperatures

Electrolytes	**30°C**	**40°C**	**50°C**	**60°C**
Pristine	8.01×10^{-6}	1.99×10^{-5}	5.26×10^{-5}	1.92×10^{-4}
0.5%PFBBA	2.03×10^{-5}	4.15×10^{-5}	8.85×10^{-5}	2.37×10^{-4}
1.0%PFBBA	3.09×10^{-5}	6.68×10^{-5}	1.56×10^{-4}	4.58×10^{-4}
1.5%PFBBA	1.20×10^{-5}	2.46×10^{-5}	5.32×10^{-5}	1.28×10^{-4}

Table S3. FT-IR characteristic peaks and the vibration types of functional groups

Wavenumber/cm^{-1}	**Chemical bond**	**Vibration types**
1400-1300	-CH_2	rocking vibration
990-910	-CH_2	stretching vibration
1668, 1671	-OLi	/
1358, 962	B-OH and -O-	hydrogen bond interaction
1348	B-O	/
1096, 1056	C-O-C	symmetric tensile vibration

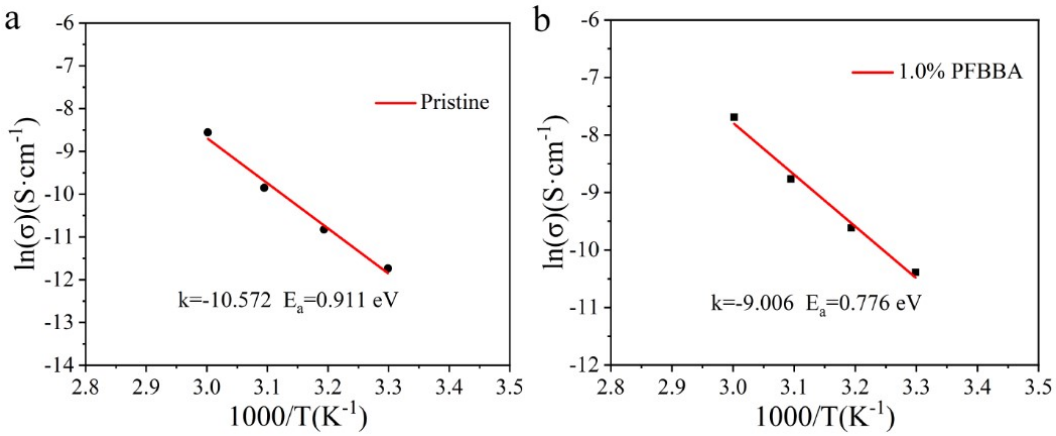

Fig. S2. Arrhenius diagram of electrolytes: (a) Pristine and (b) 1.0% PFBBA

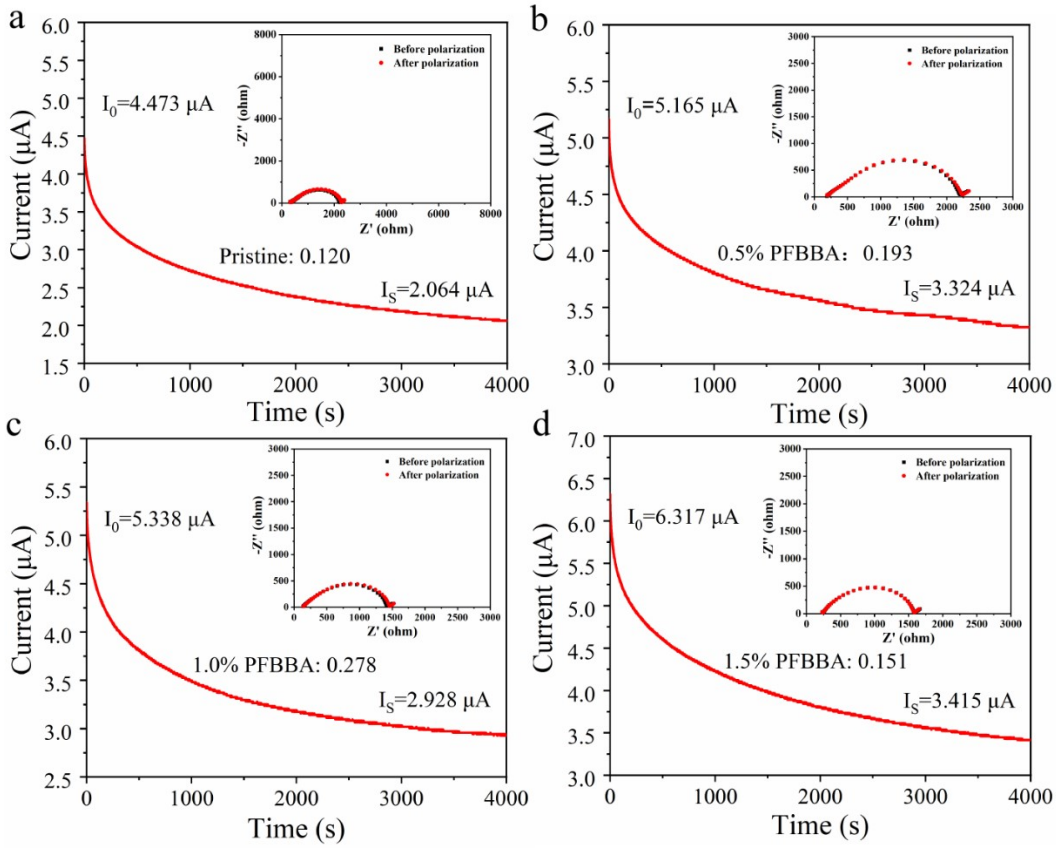

Fig. S3. DC polarization curves and impedance of symmetric Li//Li battery before and after polarization at 30°C: (a) Pristine, (b) 0.5% PFBBA, (c) 1.0% PFBBA, and (d) 1.5% PFBBA

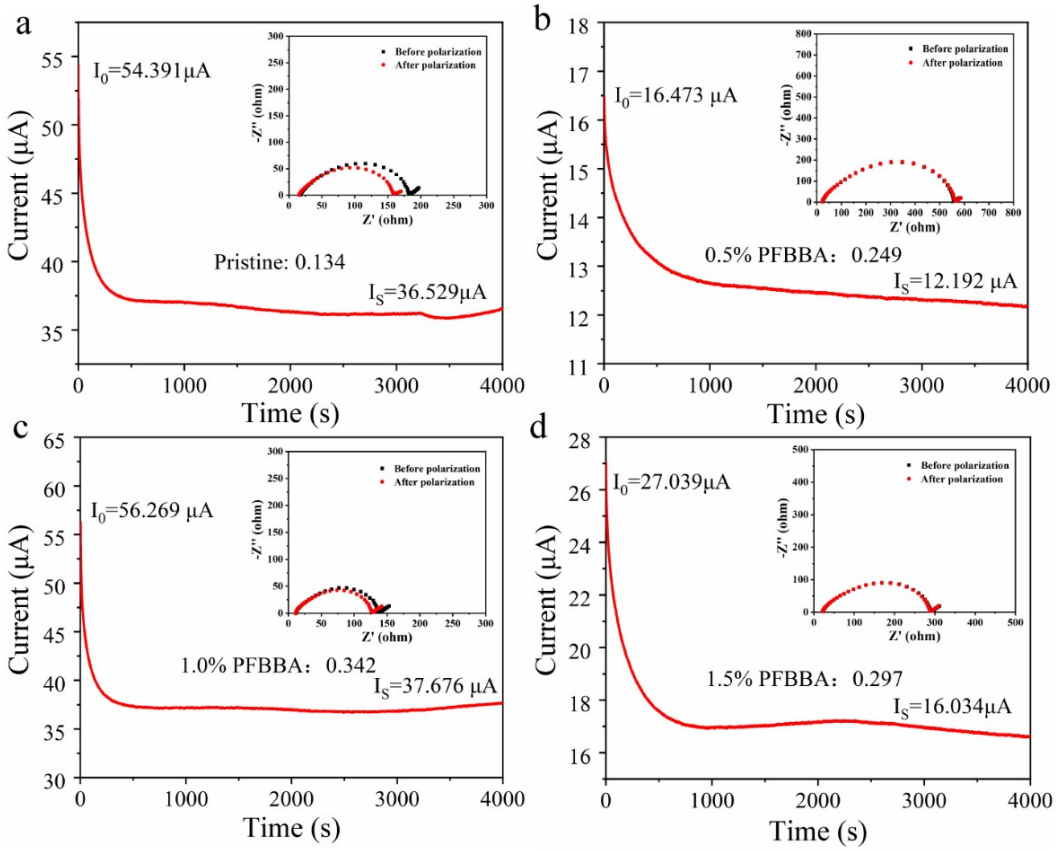

Fig. S4. DC polarization curves and impedance of symmetric Li//Li battery before and after polarization at 60°C: (a) Pristine, (b) 0.5% PFBBA, (c) 1.0% PFBBA, and (d) 1.5% PFBBA

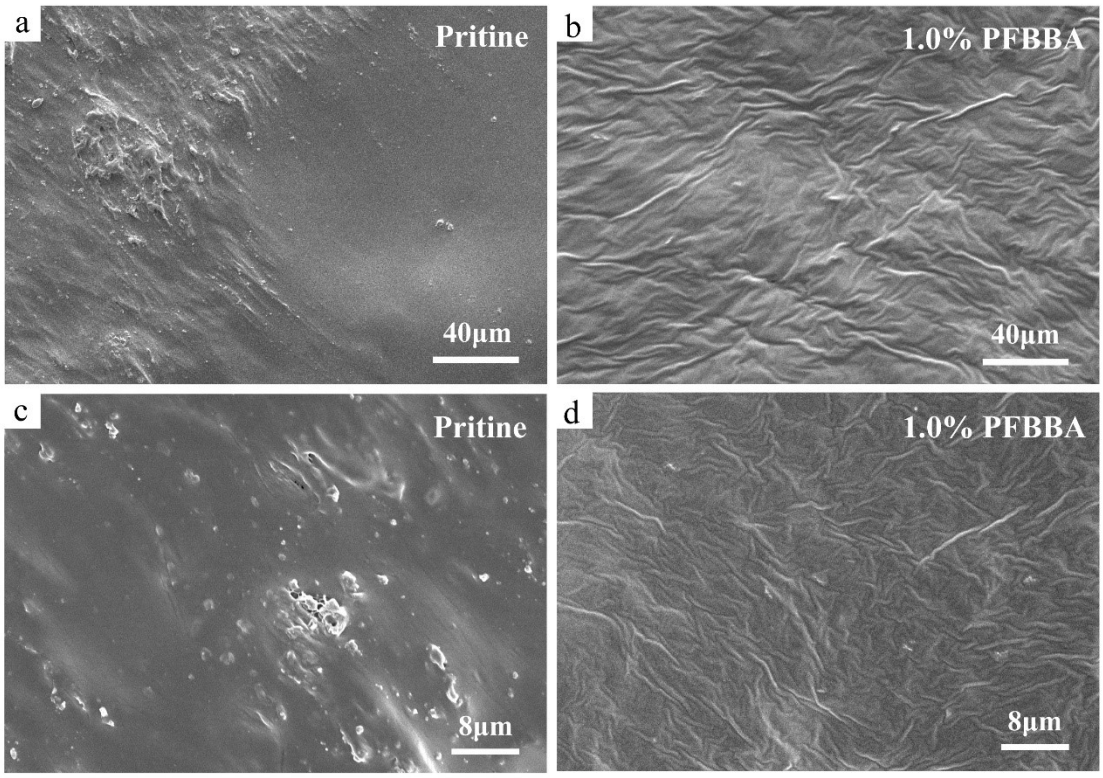

Fig. S5. SEM images of the electrolyte surface exfoliated from the (a, c) Li/Pristine/Li and (b, d) Li/1.0%PFBBA/Li batteries after cycling for 100 h at the current density of 0.05 mA cm^{-2}

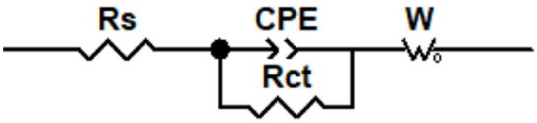

Fig. S6. The equivalent circuit used to fit the EIS plots in Fig. 5, S3, and S4.

Table S4. The interface impedance of Li//Li batteries before and after polarization

Cycles	Pristine R_{int} (Ω)	1.0% PFBBA R_{int} (Ω)
0	1949	1590
1	2821	1712
5	5877	1861
10	3174	1797

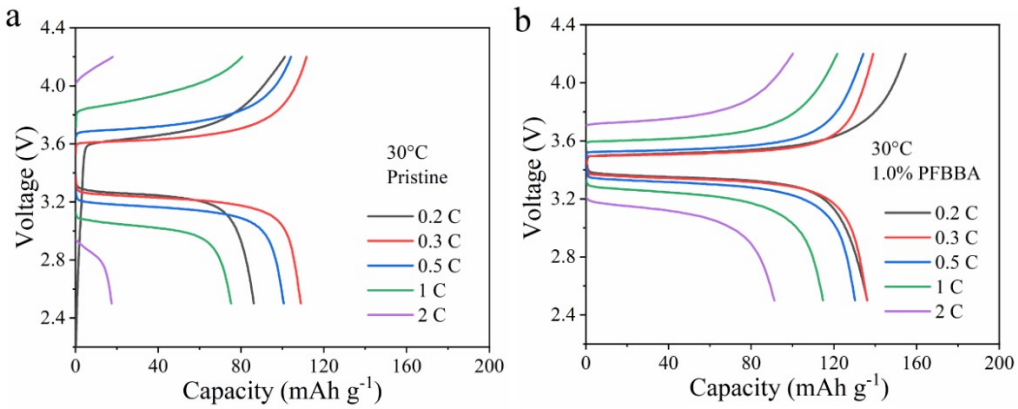

Fig. S7. The charge/discharge curves at different rates of the Li/Pristine/LFP and Li/1.0%PFBBA/LFP full batteries at 30°C

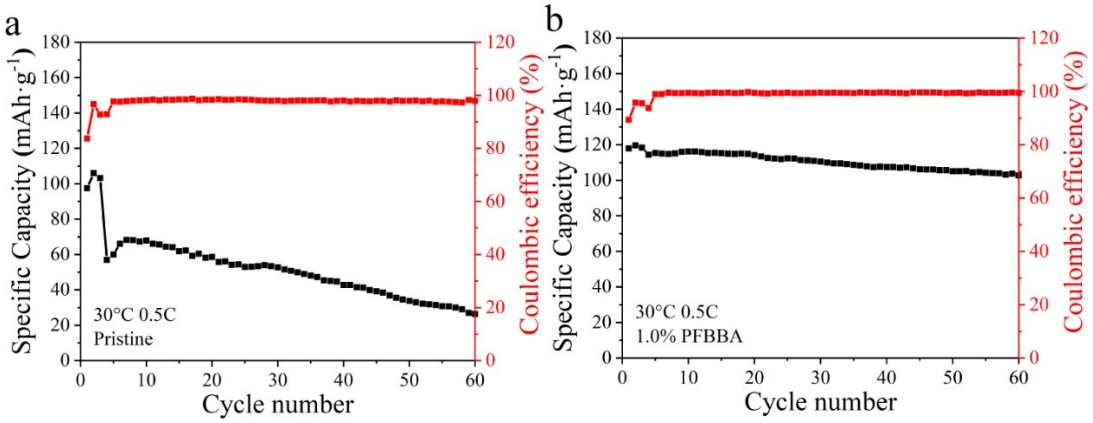

Fig. S8. Cycling performance and Coulombic efficiency of the Li//$LiCoO_2$ batteries: (a) the Pristine electrolyte and (b) the 1.0%PFBBA electrolyte