Supporting Information

Solid-Electrolyte Interphase Formation during Li Metal Deposition in $LiN(SO_2F)_2$-based Solvate Ionic Liquids

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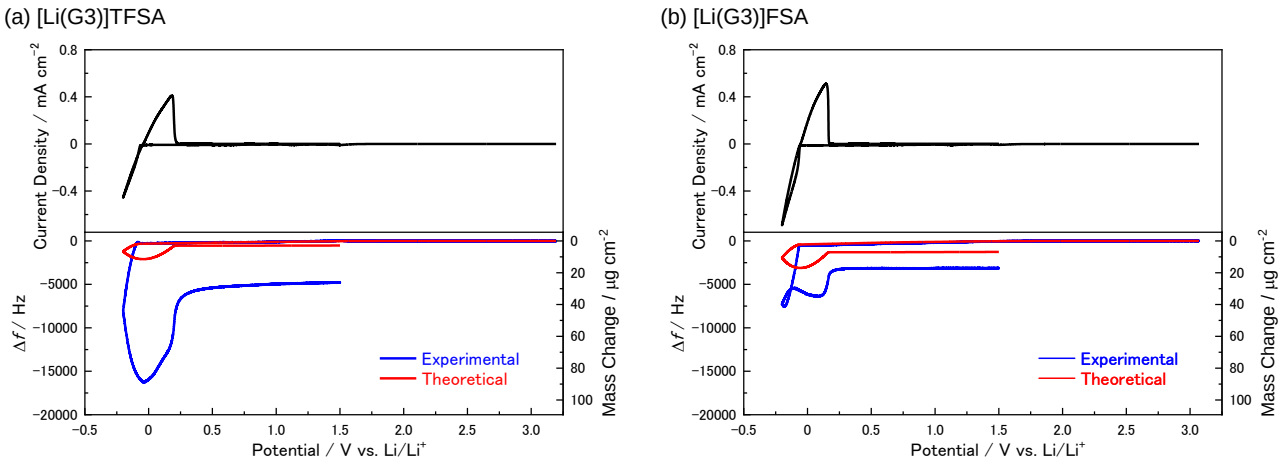

Fig. S1 Initial CVs (black line) and the resonance frequency change (Δf) (blue line) recorded using QCM with a Cu-coated quartz crystal electrode in (a) [Li(G3)]TFSA and (b) [Li(G3)]FSA, measured at a scan rate of 0.5 mV s^{-1} at 30 °C.

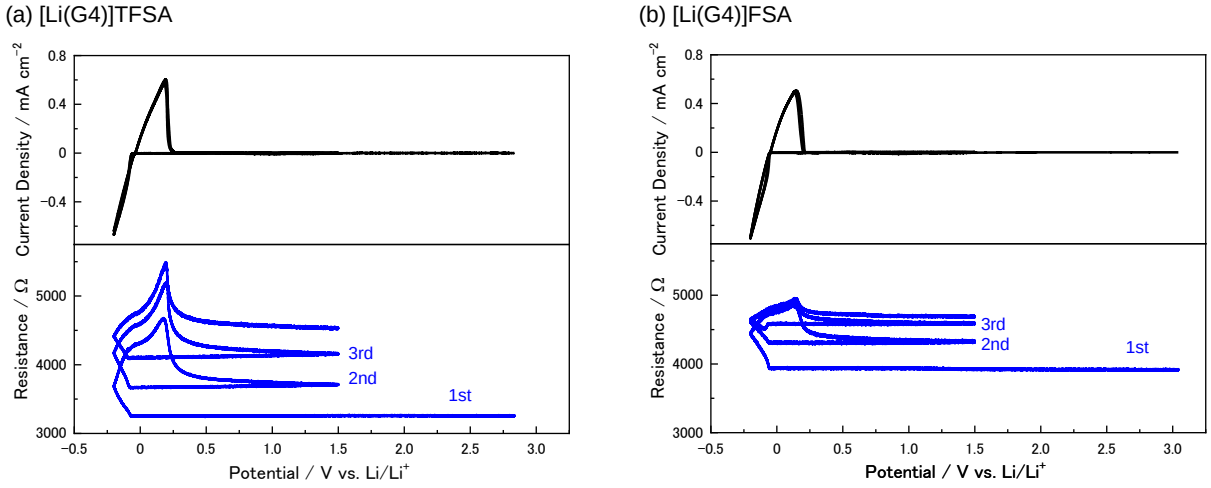

Fig. S2 Resonance resistance change obtained from EQCM measurements during CV scans with a Ni-coated quartz crystal electrode in (a) [Li(G4)]TFSA and (b) [Li(G4)]FSA at 30 ºC. Scan rate: 0.5 mV s^{-1}.

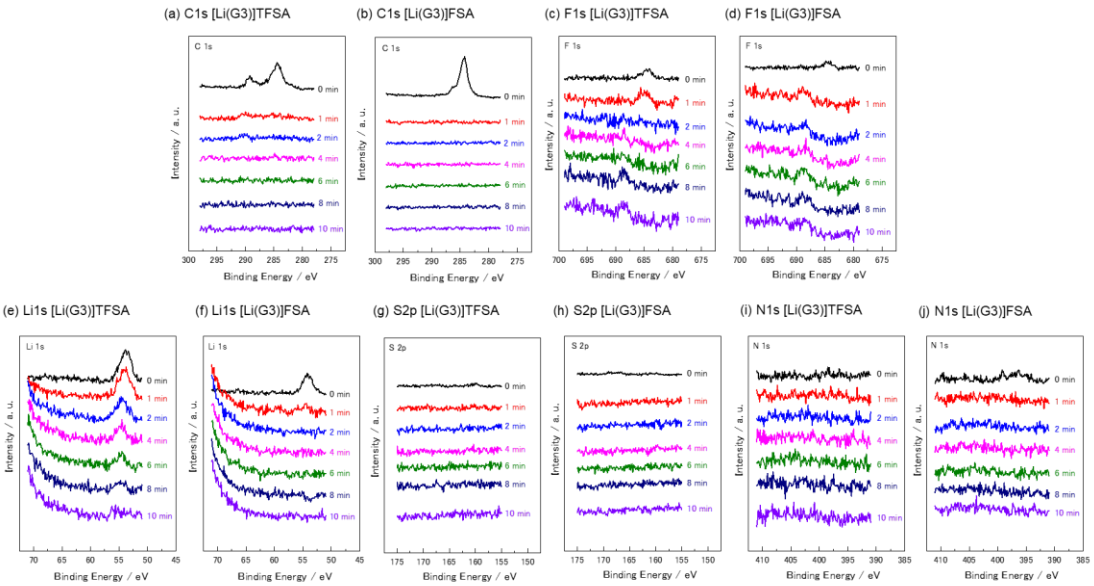

Fig. S3 XPS spectra of the (a,b) C1s, (c,d) F1s, (e,f) Li1s, (g,h) S2p, and (i,j) N1s collected from Cu foil after Li-deposition at 0.1 mA cm^{-2} for 5 h in [Li(G3)]TFSA and [Li(G3)]FSA electrolytes. Ar-ion etching was performed to conduct depth profiling, under the etching rate of 23 nm min^{-1} based on SiO_2 surface. The binding energy was not calibrated because adventitious carbon was not observed after Ar-ion etching; however, charge neutralizer was utilized throughout the experiments.