

Supplementary Material Figures and Table

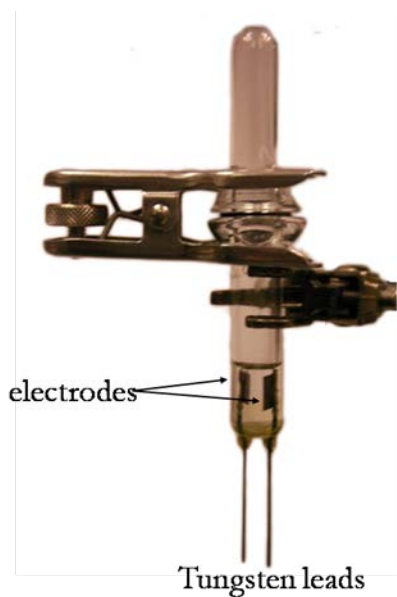


Figure S1. Photo of the electrochemical cell with 1 cm² stainless steel electrodes (area, A) separated by 0.5 cm (length, l); measured $\frac{l}{A} = 0.513 \pm 0.002, 0.542 \pm 0.004, 0.496 \pm 0.004 \text{ cm}^{-1}$

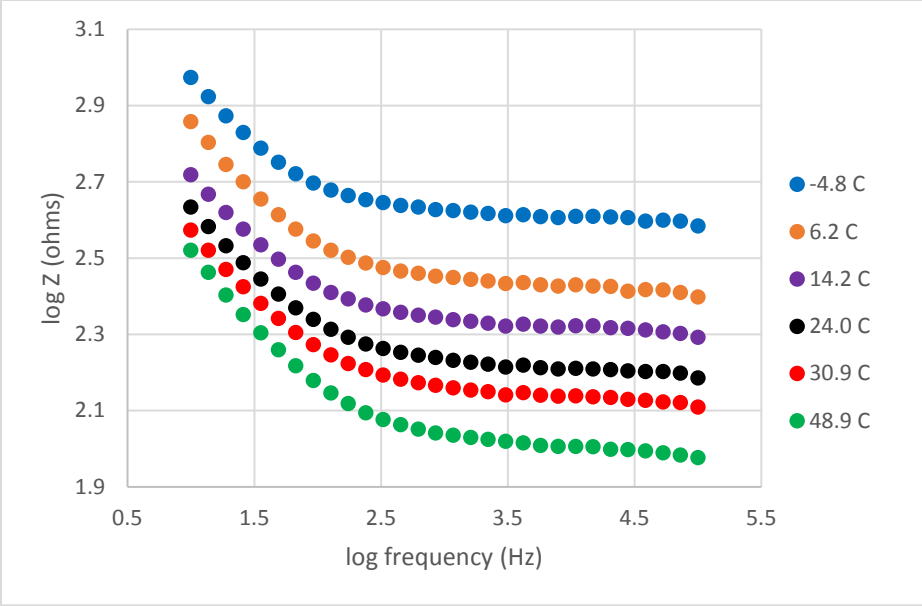


Figure S2. Bode plots (log impedance vs. log frequency) of the impedance measurements for the electrolyte ZP3603 with the difluoro OSN solvent and 0.73 M LiPF₆ as a function of temperature.

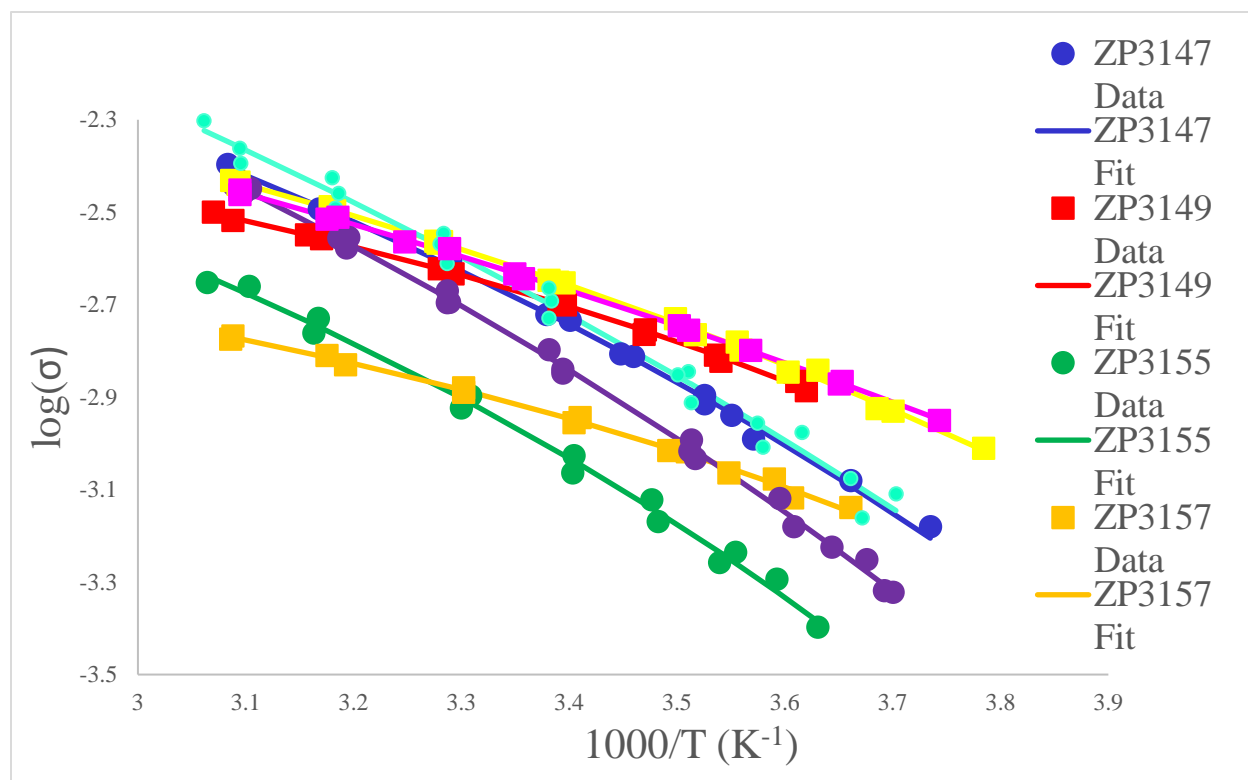


Figure S3. Arrhenius plots of conductivity vs. reciprocal temperature with VTF fits on LiPF_6 containing organosilyl electrolytes at temperatures ranging from -10°C to 50°C . A circle marker indicates a 5 solvent per salt electrolyte while a square marker indicates a 20 solvent per salt electrolyte.

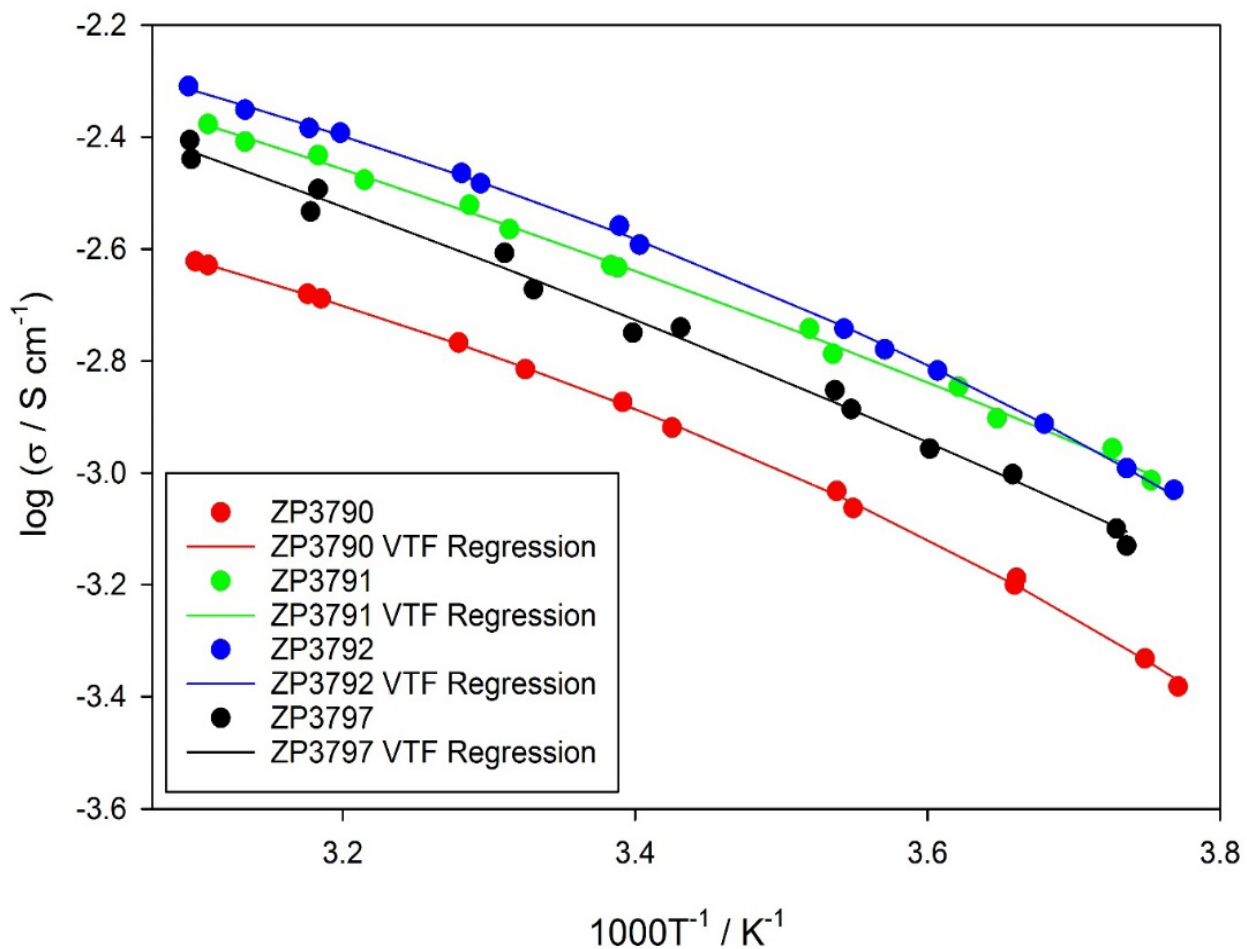


Figure S4. Arrhenius plots of 7 moles solvent per LiPF_6 electrolyte conductivities at 263 K to 323 K for pure organosilyl nitrile solvents of increasing fluorination.

Red has no fluorine; Green monofluoro; Blue difluoro and Black trifluoro

Markers represent the measured data and lines indicate the VTF regression line.

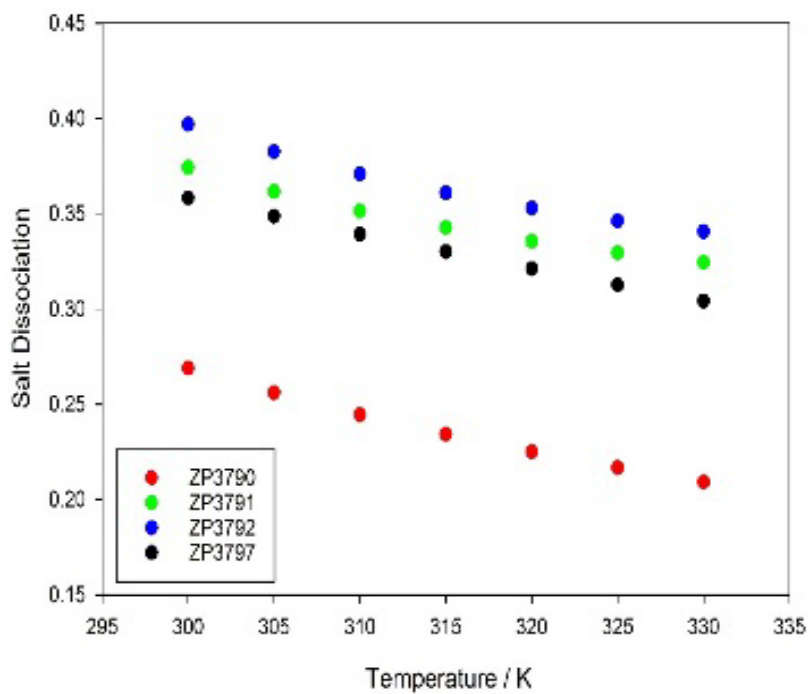


Figure S5. Salt dissociation, α , as a function of temperature from 300 to 330 K for 7 moles solvent per LiPF_6 electrolytes with pure organosilyl nitrile solvents of increasing fluorination.

Red has no fluorine; Green monofluoro; Blue difluoro and Black trifluoro

Electrolyte	σ at 298 K (mScm⁻¹)	σ_0 (mScm⁻¹)	E_a (kJmol⁻¹)	T_0 (K)	α at 300 K
EP3187	6.23±0.02	101±22	3.1±0.5	163±10	0.414
ZP3185	6.3±0.1	48±25	1.7±0.9	195±24	0.453
ZP3200	5.8±0.1	38±10	1.6±0.5	195±14	0.405
ZP3202	5.82±0.09	80±23	2.7±0.6	175±13	0.416
ZP3416	5.47±0.04	115±30	3.4±0.6	164±11	0.416
ZP3	2.446±0.008	54±15	3.2±0.6	174±11	0.332

Table S1. Ionic conductivity, VTF parameters and salt dissociation value for FOS/carbonate blend electrolytes.