

Supporting Information

Effects of Butadiene Sulfone on the Formation of Solid Electrolyte Interphase in Lithium-ion Batteries based on $\text{Li}_4\text{Ti}_5\text{O}_{12}$ Anode Materials

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Table S1 The assignments of the characteristic bands observed in ATR-FTIR spectra

Band-description	Transmittance Peak (cm^{-1})	Possible assignments
P-F	798	Li_xPF_y
C-H	2800-2950	ROCO_2Li
C-O	1039	ROCO_2Li
-C=O	1600	ROCO_2Li
C-F	1310	PVDF
C-H, O-CO ₂ (overlapped)	1405	ROCO_2Li
CO ₃ (asymm. str.)	1476	Li_2CO_3
CO ₃ (out-of plane vib.)	836	Li_2CO_3
CO ₂	1476	ROCO_2Li

Table S2 The assignments of the characteristic bands observed in XPS spectra

Peak Position	Binding energy BE (eV)	Assignment	Reference
C 1s	284.5	sp ² carbon of carbon black (CB)	16, 39, 42
	286.1	sp ³ carbon of carbon black (CB)	
	290.6	PVDF	
	289.7	Li ₂ CO ₃	
	291.6	ROCO ₂ Li	
F 1s	687.8	PVDF	42, 43
	684.2	LiF	
	685.0	Li _x PF _y	
O 1s	530.7	LTO	42, 44
	532.4	LTO	
	529.0	LiSO ₃	
	530.8	Li ₂ CO ₃	
	531.5	Phosphate group	
	532.4	ROCO ₂ Li	
P 2p	132.5	Phosphate group	44
S 2p	168.0	Li ₂ SO ₃	44,45