Gel polymer electrolyte for Room temperature Sodium Sulfur batteries

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Associated Content

Supporting Information

Table S1: FTIR spectroscopy absorption bands of pure PVDF-HFP, ClO_4^-, PC and EC

	IR bands (cm^{-1})	Assignment
PVDF-HFP	1397	C-H_2 stretching
	1280	Beta phase
	1187	C-F_3 stretching
	1067	C-C skeleton vibration
	878	Beta & gamma phase of vinylidene group
	845	C-F_2 (rk)
ClO_4^-	1000-1100 (strong)	Asymmetric stretching vibration
	~930 (weak)	Symmetric stretching vibration
PC, EC	1784 (strong)	C=O (sy)
	1558 weak	CH_2 (sc)
	1485 weak	CH_3 (tw)
	1450 weak	CH_3 (sc)
	1389	CH_3 (sc), O-CH_2 (wa)
	1354	vRing, CH_3 (sy)
	1176	CO_2 (as)
	1119	CO_2 (as)
	1070	Ring, C-Me (sy)
	1038	C-O (sy)
	977	Ring breathing mode
	772	Ring breathing mode
	712	Symmetric ring deformation

*sy: symmetry stretching, as: asymmetry stretching, sc: scissoring, tw: twisting, wa: wagging, ro: rocking.

Table S2: GPEs conductivity measurement with temperature dependence

Temperature (^{O}C)	GPEPC	GPE11	GPE 41
	mS cm^{-1}		
23	0.705	1.17	1.365
30	0.839	1.419	1.675
37	0.957	1.603	1.89
44	1.070	1.783	2.07
51	1.226	1.985	2.279
58	1.365	2.179	2.505
65	1.443	2.382	2.692
72	1.550	2.626	2.860
79	1.619	2.802	3.065
86	1.76	3.004	3.225

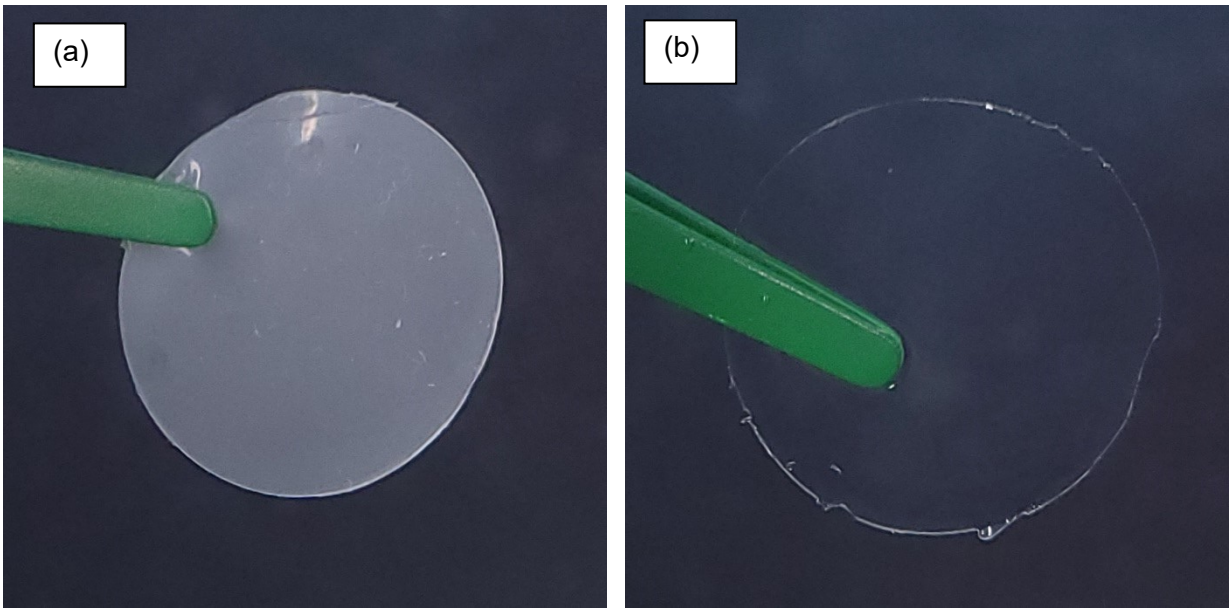

Figure S1: Photo of ¾ inch diameter GPE a) before and b) after absorbing LE.

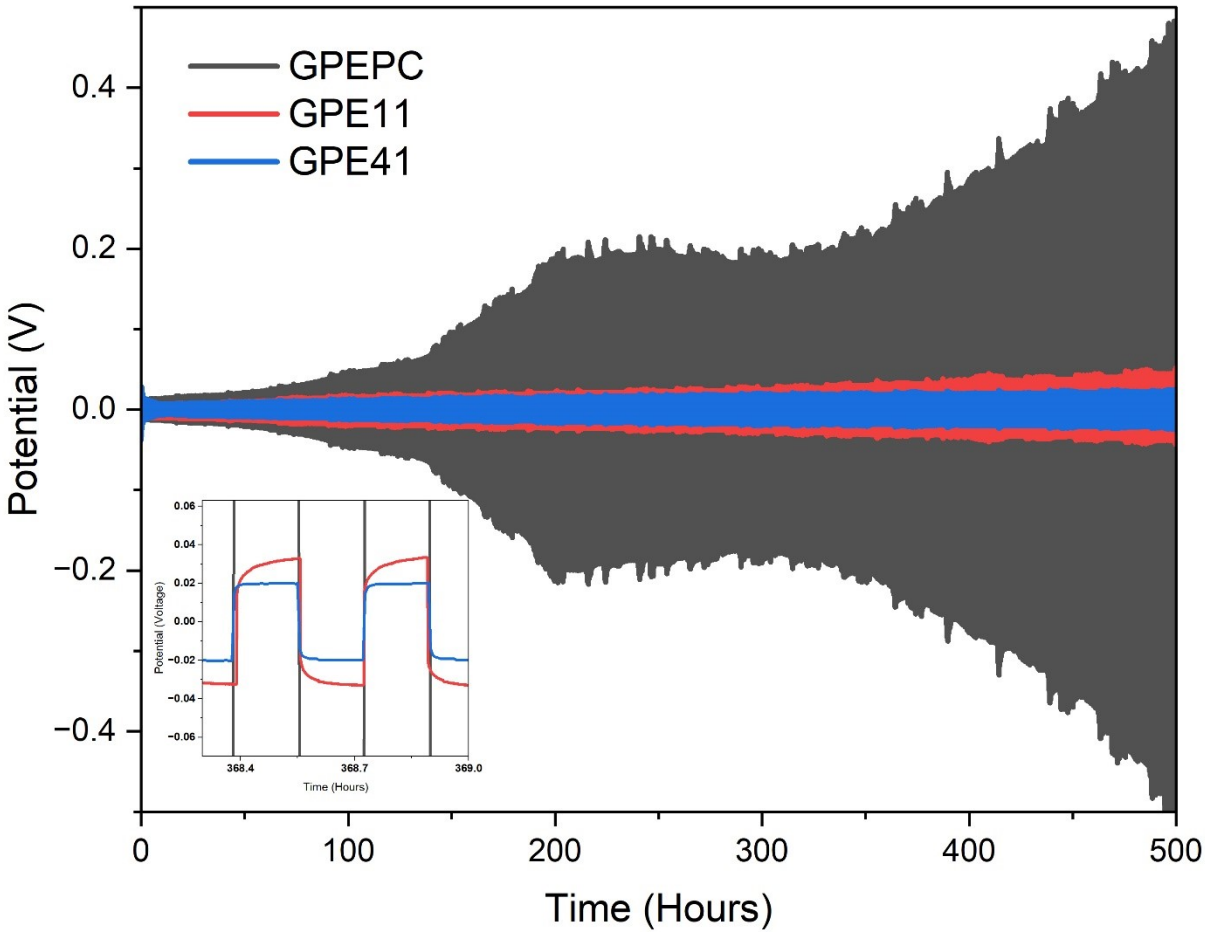

Figure S2: Comparison of striping/plating of sodium symmetric cell with difference GPE at 0.1mA cm^{-2}.

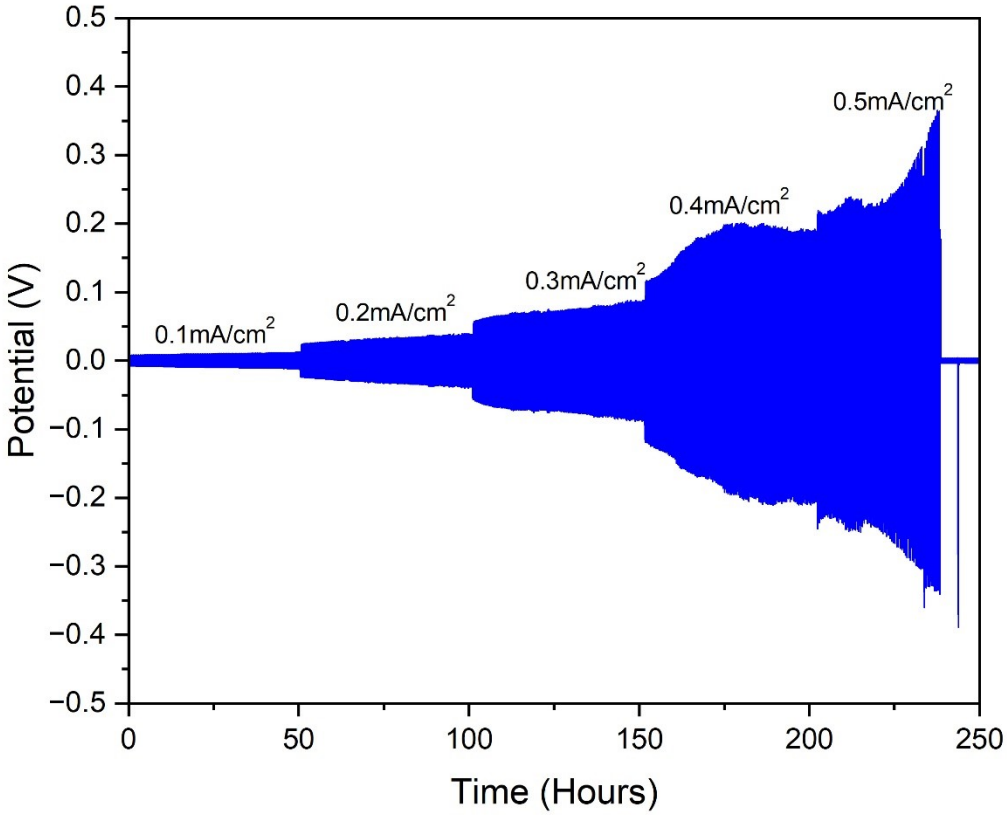

Figure S3: Striping/plating of GPE41 with different current density.

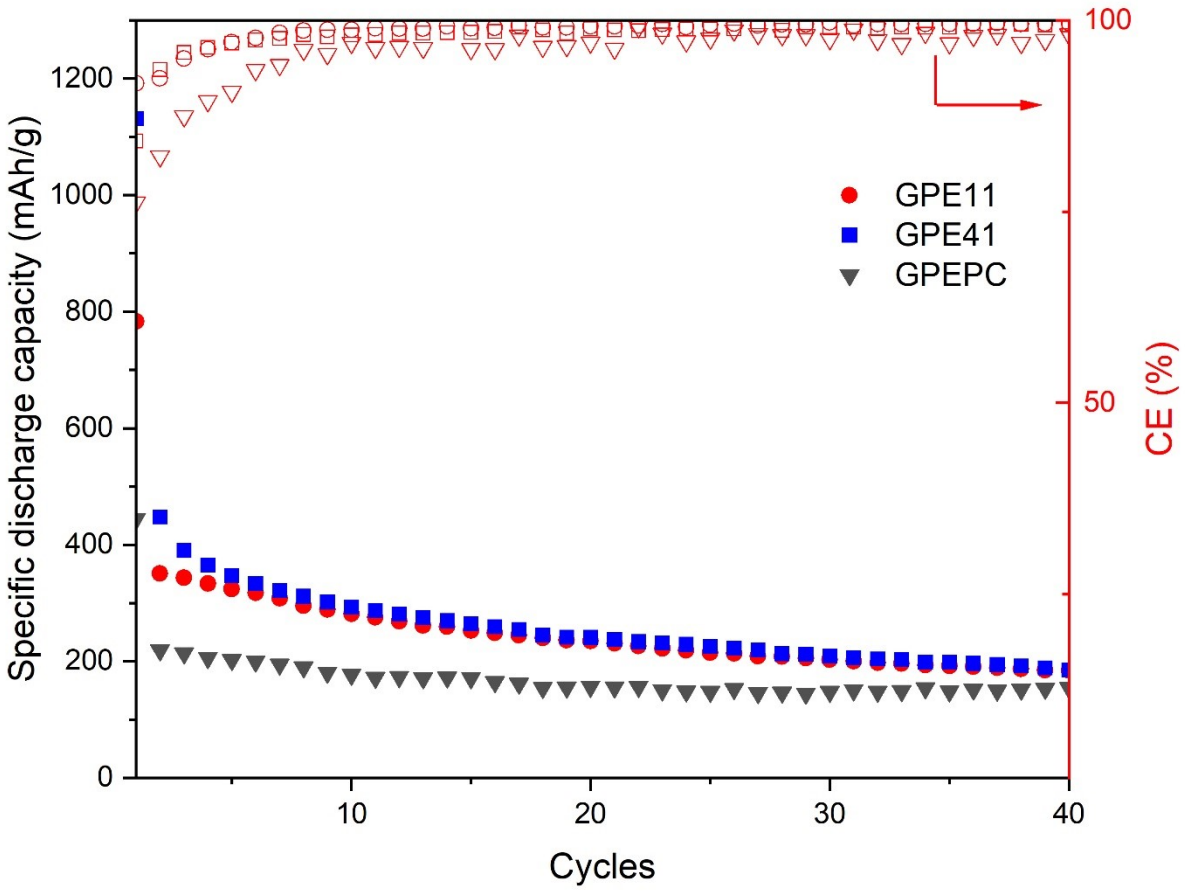

Figure S4: Galvanostatic charge and discharge comparison at 0.1C for Na|SPAN cells with GPEPC, GPE11 and GPE41

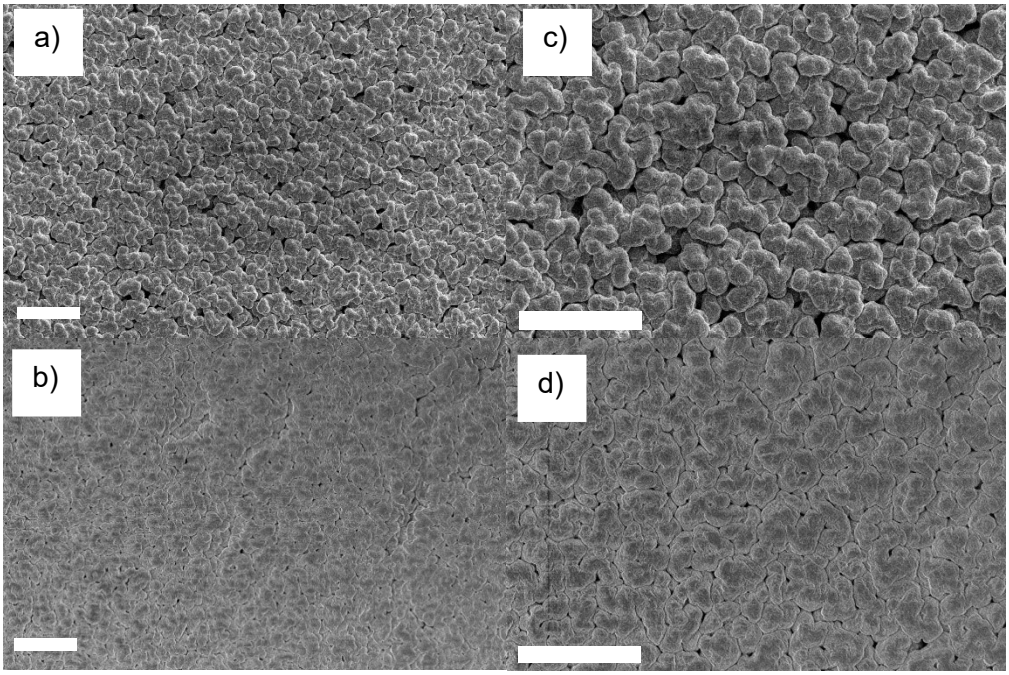

Figure S5: SEM of (a, c) dried GPE41 and (b, d) soaked GPE41 with 10 μm scale bar.

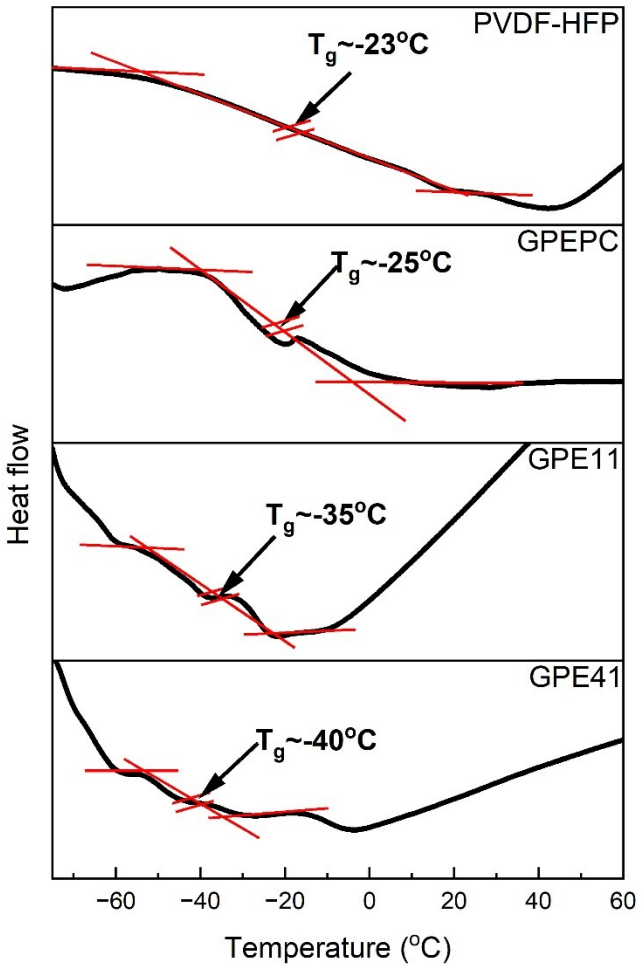

Figure S6: DSC of pristine PVDF-HFP, GPEPC, GPE11 and GPE41