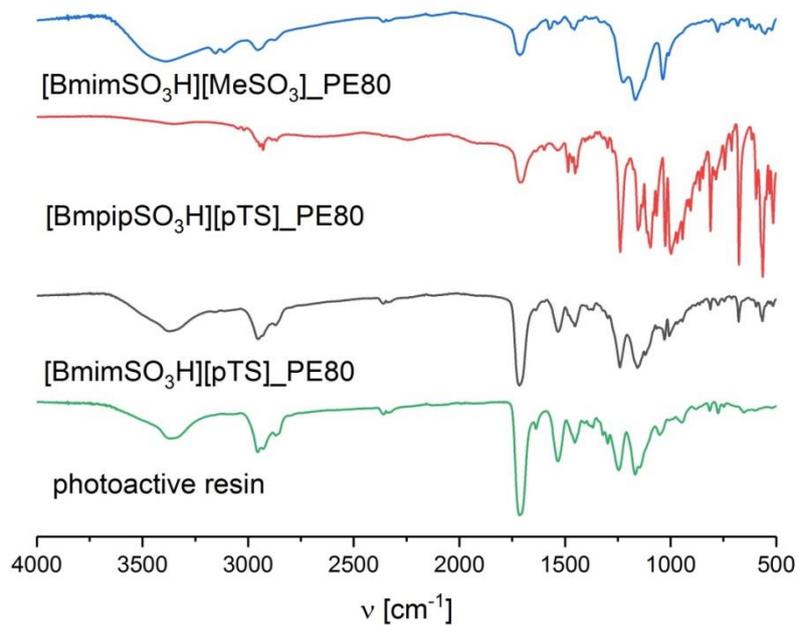
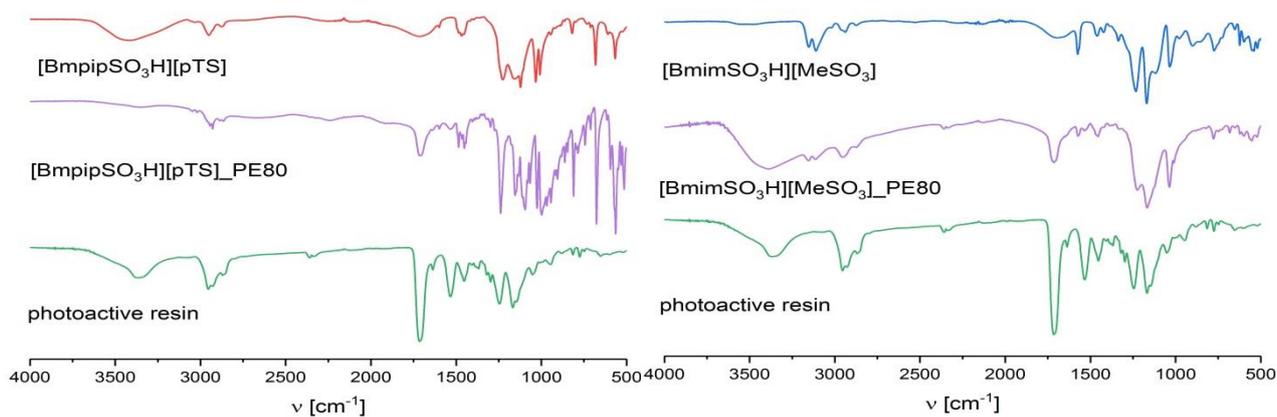


## Supporting Information (SI)

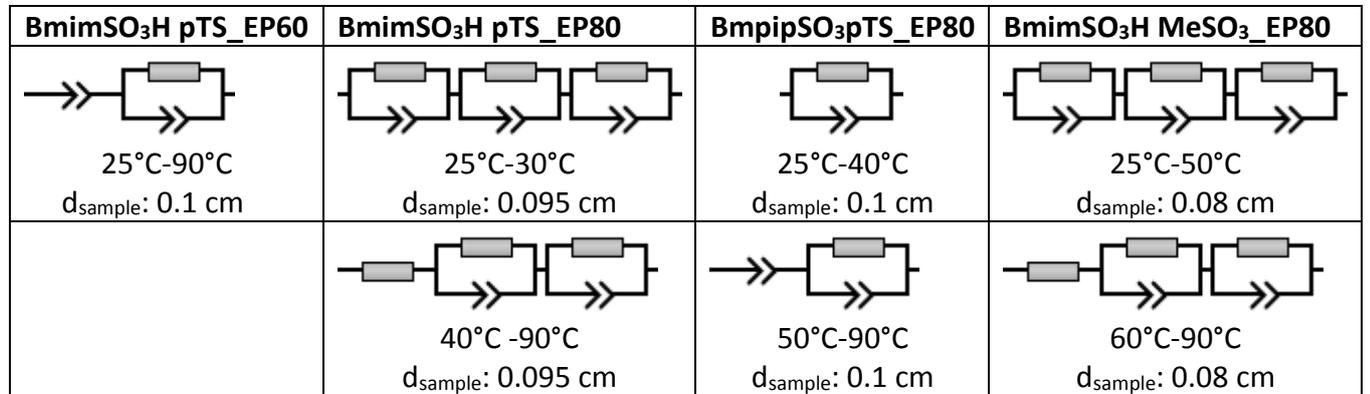
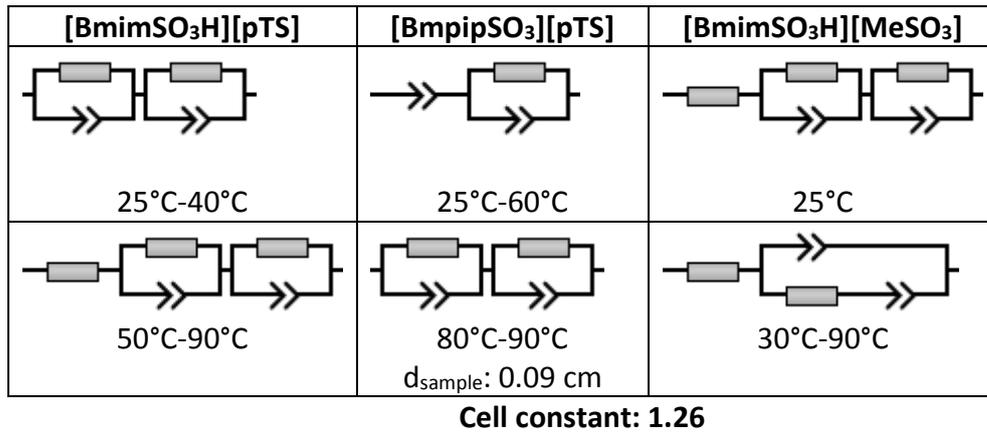


**Figure SI 1:** IR spectra of IGs and polymer resin



**Figure SI 2:** IR spectra of pure ILs, IGs and polymer resin

1. Used Electrochemical Circuit for temperature dependent conductivity measurement



**Table SI 1:** Ohmic resistances and calculated conductivities for the pure ILs from 25°C to 90°C

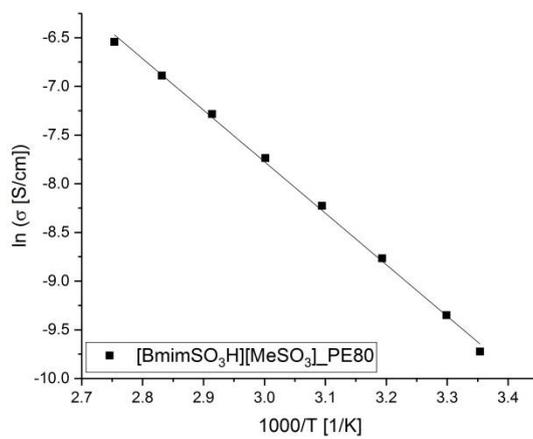
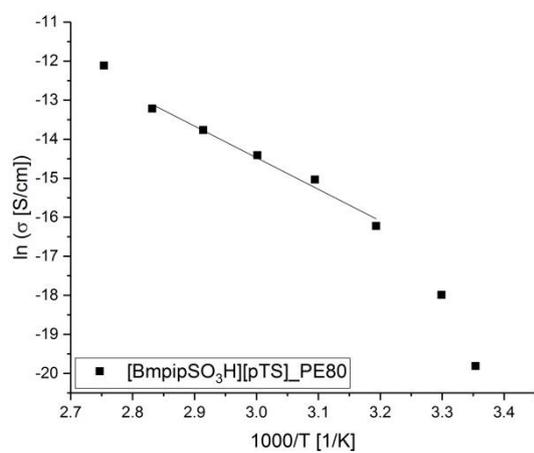
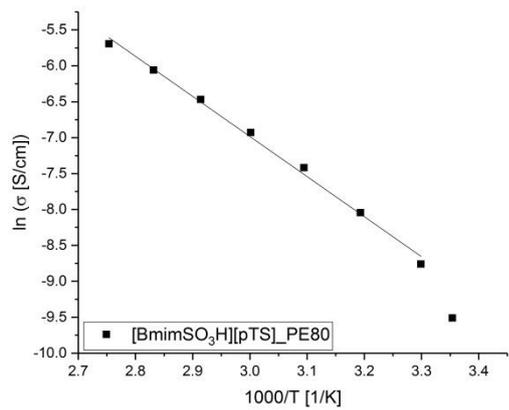
Temperature T [°C]	Resistance R [Ω]			Conductivity σ [S/cm]		
	[BmimSO <sub>3</sub> H] [pTS]	[BmpipSO <sub>3</sub> H] [pTS]	[BmimSO <sub>3</sub> H] [MeSO <sub>3</sub> ]	[BmimSO <sub>3</sub> H] [pTS]	[BmpipSO <sub>3</sub> H] [pTS]	[BmimSO <sub>3</sub> H] [MeSO <sub>3</sub> ]
25	9.92E+4 ± 63.4	1.14E+5 ± 214	3.11E+4 ± 3418	1.27E-5	1.10E-5	4.05E-5
30	6.00E+4 ± 40.6	8.91E+4 ± 152	2.60E+3 ± 3.86	2.10E-5	1.411E-5	4.84E-4
40	2.38E+4 ± 15.1	1.18E+5 ± 310	1.46E+3 ± 1.78	5.29E-5	1.09E-5	8.62E-4
50	1.07E+4 ± 8.98	9.47E+4 ± 147	8.80E+2 ± 1.49	1.18E-4	1.34E-5	1.43E-3
60	5.36E+3 ± 5.94	5.96E+4 ± 29.8	5.64E+2 ± 1.53	2.35E-4	2.11E-5	2.23E-3
70	2.93E+3 ± 2.61	--	3.82E+2 ± 1.75	4.30E-4	--	3.30E-3
80	1.66E+3 ± 1.93	1.26E+4 ± 4.47	2.75E+2 ± 1.87	7.61E-4	1.50E-5	4.58E-3
90	1.09E+3 ± 1.79	6.65E+3 ± 15.1	2.02E+2 ± 1.97	1.16E-3	2.84E-5	6.23E-3

**Table SI 2:** Ohmic resistances and calculated conductivities for the prepared IGs from 25°C to 90°C

Temperature T [°C]	Resistance R [Ω]				Conductivity σ [S/cm]	
	[BmimSO <sub>3</sub> H] [pTS]_PE80	[BmpipSO <sub>3</sub> H] [pTS]_PE80	[BmimSO <sub>3</sub> H] [MeSO <sub>3</sub> ]_PE80	[BmimS O <sub>3</sub> H] [pTS]_P E80	[BmpipSO <sub>3</sub> H] [pTS]_PE80	[BmimSO <sub>3</sub> H] [MeSO <sub>3</sub> ]_PE80
25	2.55E+3 ± 10.5	7.99E+7 ± 4.36E+6	2.66E+3 ± 1.72	7.41E-5	2.49E-9	5.99E-5
30	1.21E+3 ± 1.34	1.29E+7 ± 97695	1.83E+3 ± 0.58	1.57E-4	1.55E-8	8.69E-5
40	5.88E+2 ± 1.2	2.21E+6 ± 19752	1.02E+3 ± 0.50	3.21E-4	9.00E-8	1.56E-4
50	3.15E+2 ± 0.44	6.75E+5 ± 4314	5.95E+2 ± 0.40	6.00E-4	2.95E-7	2.67E-4
60	1.93E+2 ± 0.37	3.61E+5 ± 1429	3.65E+2 ± 0.18	9.79E-4	5.51E-7	4.36E-4
70	1.22E+2 ± 0.71	1.89E+5 ± 574	2.32E+2 ± 0.13	1.55E-3	1.05E-6	6.86E-4
80	8.10E+1 ± 0.39	1.09E+5 ± 281	1.56E+2 ± 0.15	2.33E-3	1.82E-6	1.02E-3
90	5.62E+1 ± 0.42	3.62E+4 ± 45.4	1.11E+2 ± 0.11	3.36E-3	5.49E-6	1.44E-3

**Table SI 3:** Ohmic resistances and calculated conductivities for the prepared IGs from 25°C to 90°C

Temperature T [°C]	Resistance R [Ω]	Conductivity σ [S/cm]
	[BmimSO <sub>3</sub> H] [pTS]_PE60	[BmimSO <sub>3</sub> H] [pTS]_PE60
25	6.76E+5 ± 3546	2.94E-7
30	4.08E+5 ± 1699	4.88E-7
40	1.45E+5 ± 141	1.38E-6
50	9.95E+4 ± 181	2.00E-6
60	3.75E+4 ± 20.4	5.31E-6
70	1.73E+4 ± 5.27	1.15E-5
80	9.07E+3 ± 1.19	2.19E-5
90	4.47E+3 ± 1.04	4.45E-5



**Figure SI 3:** Ionic conductivity vs temperature for  $E_a$  calculation