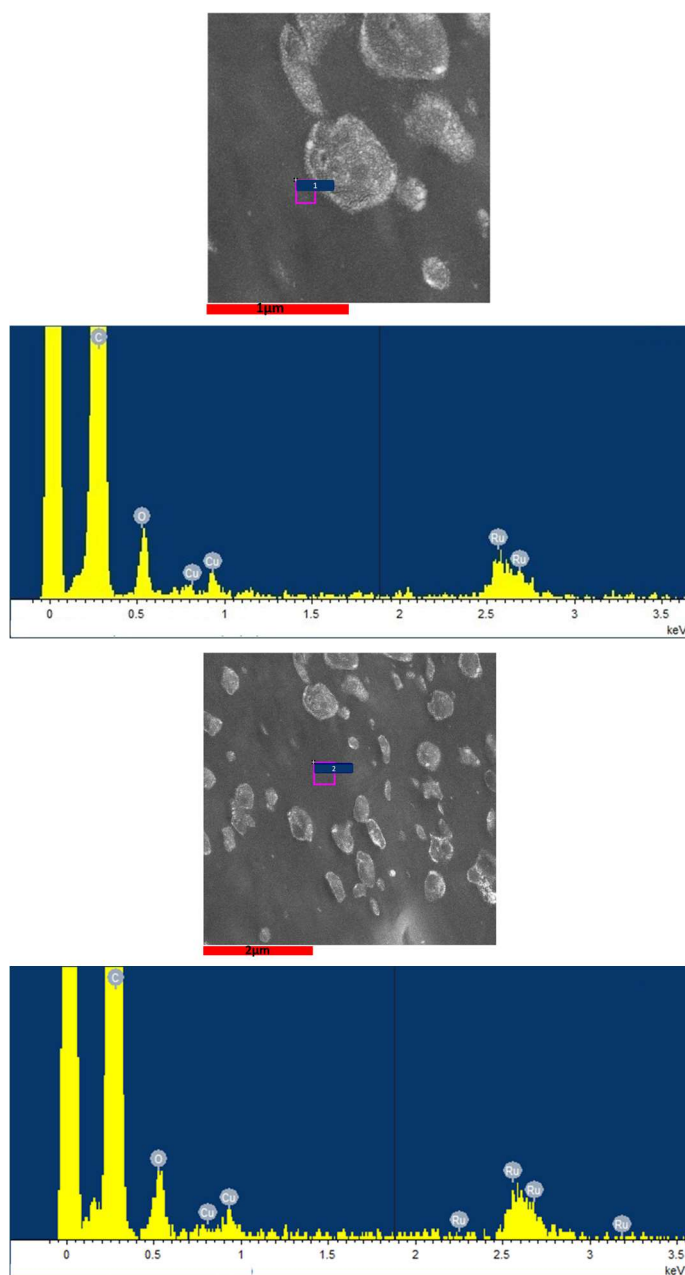
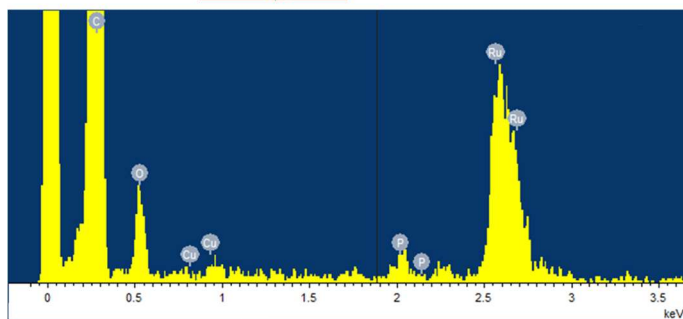
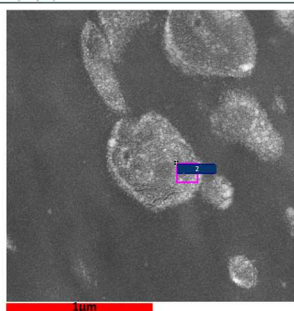
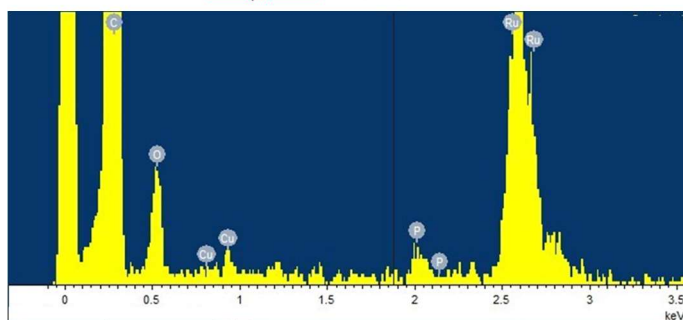
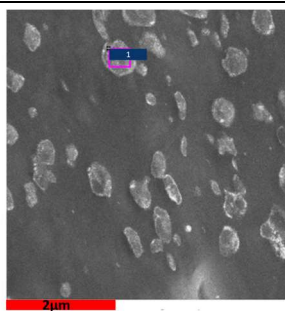


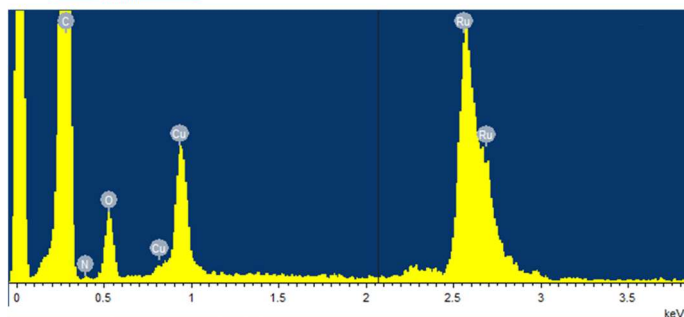
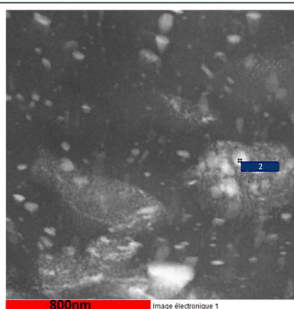
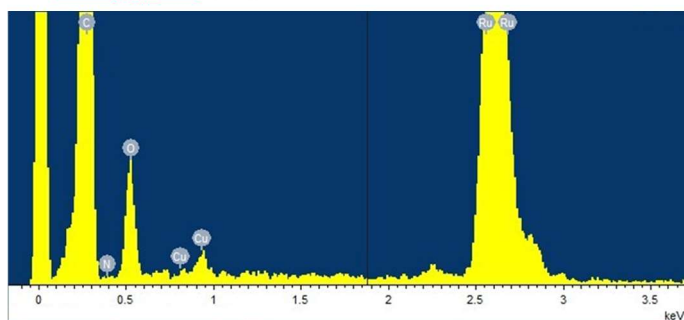
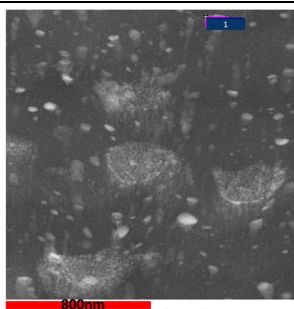
1. Elemental Analysis Spectra (EDX-TEM)



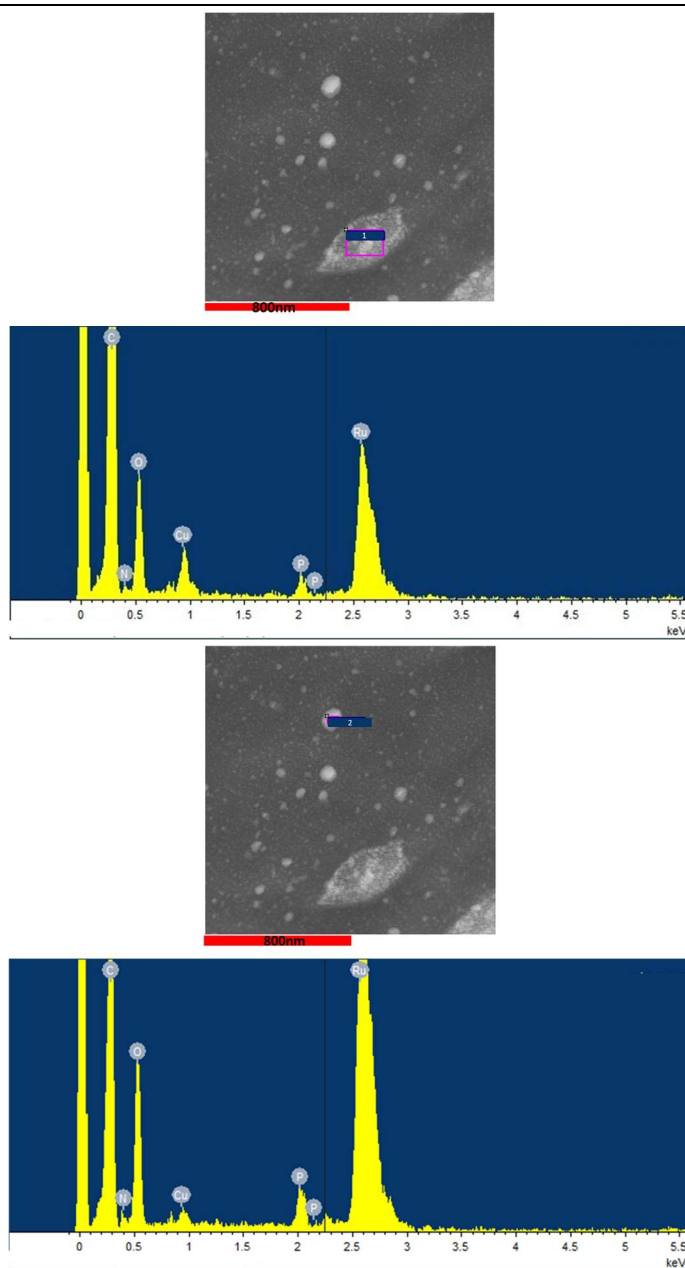
Polymer
matrix within
L-P*DEP-10



L-P*DEP-10



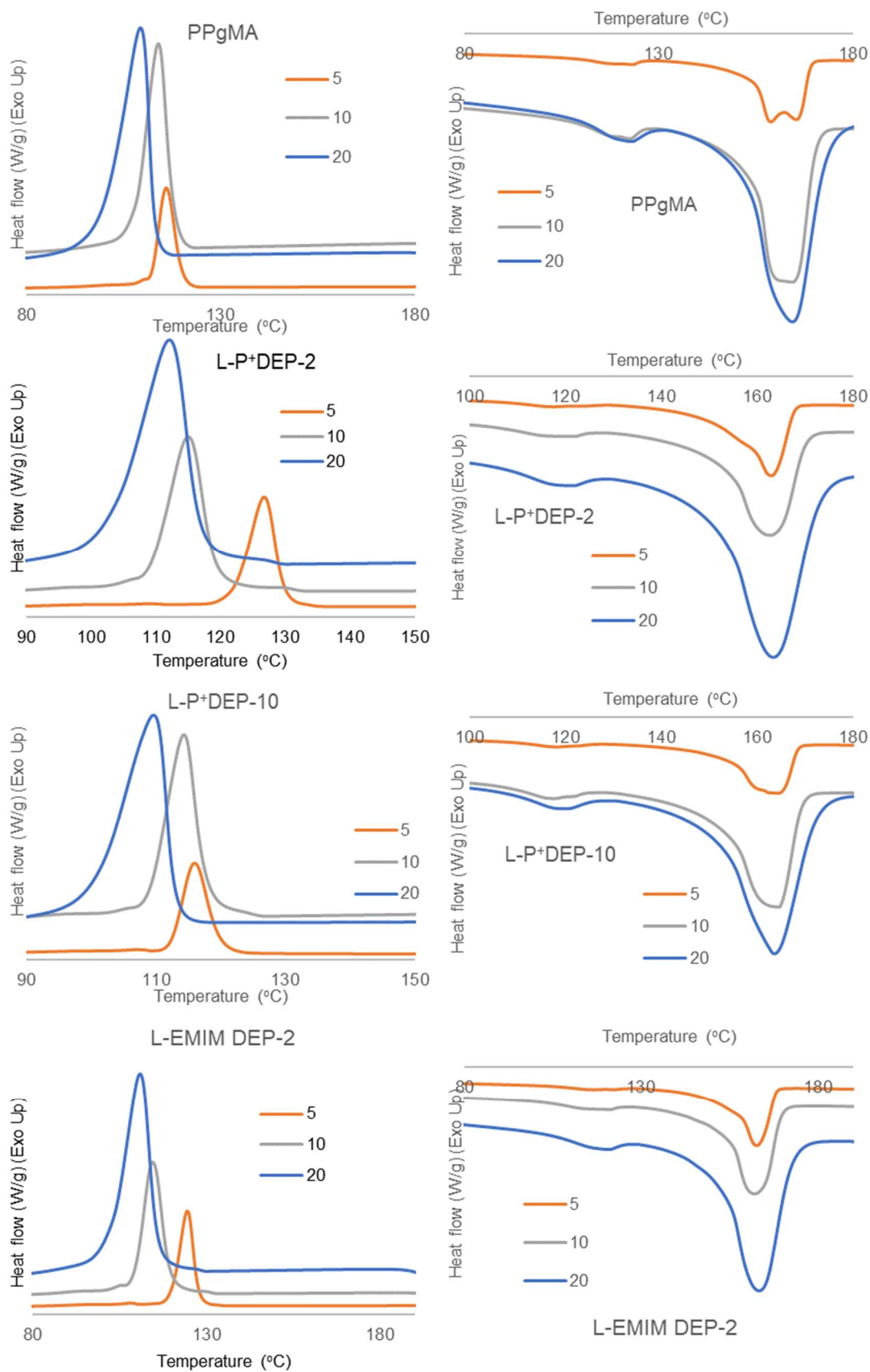
L-EMIM Ac-10



L-EMIM DEP-
10

Figure S1. Elemental analysis spectra (EDX) of Llonomers performed on fractured surfaces observed by TEM.

2. DSC thermograms of PPgMA and related Llonomers



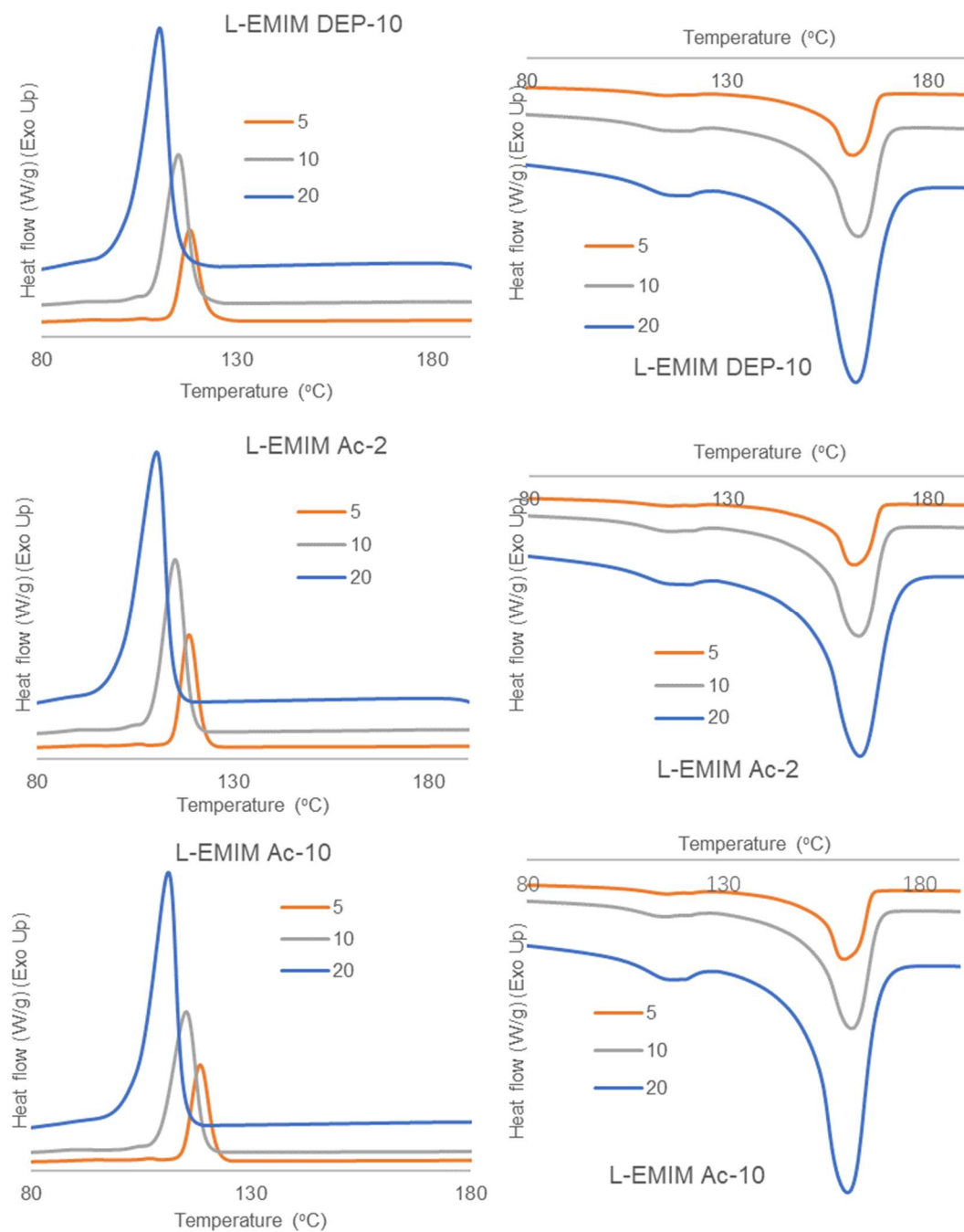


Figure S2. DSC traces of PPgMA and related Llonomers prepared with various ionic liquids (2 and 10 wt.%). Melting and crystallization phenomenon was observed for different heating and cooling rates (5, 10, and 20 K·min⁻¹) under nitrogen atmosphere.

3. $\ln[-\ln(1-X_t)]$ vs. $\ln t$ plots according to Jeziorny's non-isothermal crystallization model

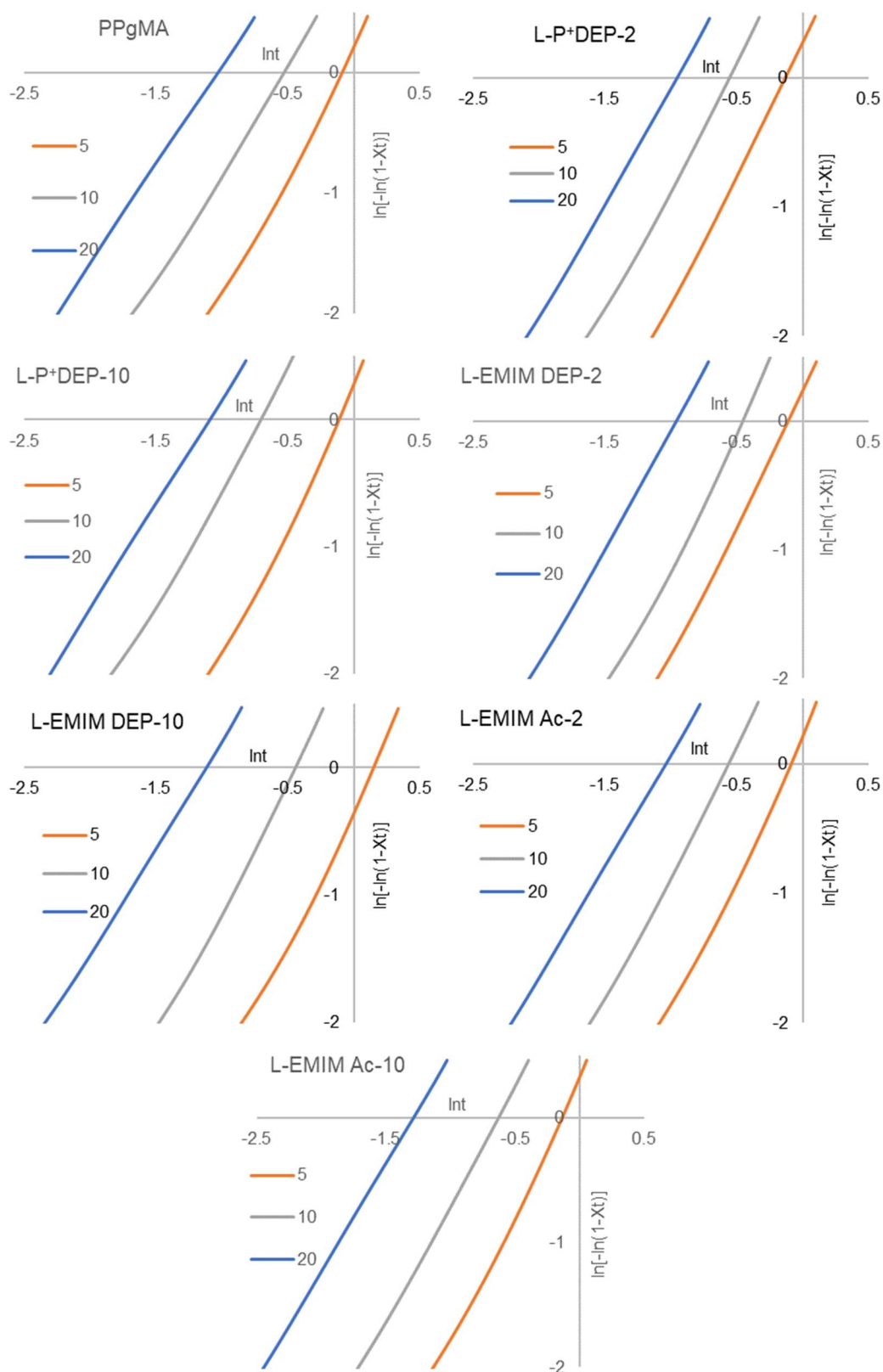


Figure S3. $\ln[-\ln(1-X_t)]$ vs. $\ln t$ plots according to Jeziorny's crystallization model for neat PPgMA and related L-ionomers based on various ionic liquids (2 and 10 wt.%) for different cooling rates (5, 10, and 20 K·min⁻¹)

4. Detailed parameters of non-isothermal crystallization process in accordance with Jeziorny's model

Table S1. Parameters of non-isothermal crystallization process based on Jeziorny's model.

Samples	Φ (K/min)	$t_{1/2}$ (min)	n	Z_t	T_m (°C)	T_c (°C)	X_c (%)
PPgMA	5	0.77	2.01	1.17	159.0/165.6	116.1	34.1
	10	0.47	1.78	2.68	164.2	114.1	35.5
	20	0.28	1.65	5.55	164.5	109.5	31.6
L-P+DEP-2	5	0.74	2.01	1.28	163.0	126.8	37.6
	10	0.48	1.88	2.81	162.8	115.0	34.7
	20	0.32	1.76	5.29	163.4	112.2	33.6
L-P+DEP-10	5	0.76	2.06	1.22	164.5	116.0	35.1
	10	0.41	1.81	3.54	164.7	114.3	34.0
	20	0.27	1.65	6.16	163.7	109.6	32.1
L-EMIM DEP-2	5	0.72	1.98	1.33	162.9	124.6	36.8
	10	0.50	1.94	2.65	162.3	114.6	34.3
	20	0.31	1.81	5.66	163.4	111.0	33.2
L-EMIM DEP-10	5	0.87	2.04	0.92	161.6	118.0	35.3
	10	0.49	1.85	2.56	162.9	115.1	34.0
	20	0.28	1.69	5.98	162.2	110.2	33.4
L-EMIM Ac-2	5	0.77	2.03	1.16	161.9	118.8	34.2
	10	0.47	1.92	2.92	162.9	115.2	33.7
	20	0.29	1.71	5.90	163.2	110.5	34.6
L-EMIM Ac-10	5	0.72	2.30	0.84	161.0	118.5	36.9
	10	0.44	1.86	3.20	162.8	115.3	35.8
	20	0.22	1.73	9.35	161.7	111.2	35.0

Note: Φ : cooling rate (K.min⁻¹), T_m : melting temperature (°C), T_c : crystallization temperature (°C) and X_c : crystallinity (%).