

Supplementary Materials

Morphology, nucleation, and isothermal crystallization kinetics of poly(ϵ -caprolactone) mixed with a polycarbonate/MWCNTs masterbatch

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Simultaneous SAXS/WAXS experiments

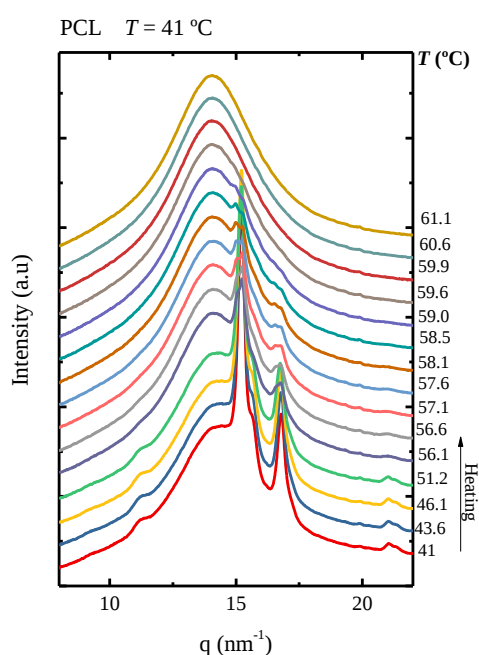


Figure S1. Heating of PCL after isothermal crystallization at 41 °C.

Fitting of DSC isothermal data to the Avrami model

The kinetic parameters for all the investigated samples are shown in Table S1. It is worth noting that a conversion range of approximately 3–20% was used and this corresponds to the primary crystallization range where the Avrami analysis is most adequate. In such a range the correlation coefficients of the fit are mostly in excess of 0.999 (Table S1). For all the samples studied, the half crystallization times for the experimental data ($\tau_{50\% \text{ Exp}}$) and the Avrami fittings ($\tau_{50\% \text{ Theo}}$) are almost the same, which indicates that the Avrami model predicts very well the crystallinity up to 50% relative crystallinity.

Table S1. Kinetic parameters for all the investigated samples during isothermal crystallization.

PCL/(PC/MWCNTs) Sample	T _c [°C]	t ₀ [min]	ΔH [J.g ⁻¹]	V _c range [%]	n	K [min ⁻ⁿ]	R ²	τ _{50%} Theo [min]	τ _{50%} Exp [min]	(τ _{50%} Exp) ⁻¹ [min ⁻¹]	X _c [%]
100/0 w/w	41.0	0.35	52	3-20	2.5	8.21E-01	0.9998	0.93	0.90	1.1111	38
	42.0	0.52	53	3-20	2.5	3.86E-01	0.9999	1.26	1.22	0.8217	39
	43.0	0.50	54	3-20	2.6	1.77E-01	0.9999	1.68	1.63	0.6124	40
	44.0	0.67	55	3-20	2.6	8.13E-02	0.9999	2.25	2.20	0.4545	40
	45.0	1.03	56	3-20	2.7	3.20E-02	1.0000	3.09	3.03	0.3297	41
	46.0	1.13	60	3-20	2.8	1.03E-02	1.0000	4.40	4.37	0.2290	44
	47.0	1.63	59	3-20	2.9	3.64E-03	1.0000	6.16	6.07	0.1648	43
	48.0	1.82	59	3-20	3.0	8.24E-04	0.9999	9.15	9.03	0.1107	43
	49.0	1.02	63	3-20	3.4	8.36E-05	0.9995	14.76	14.43	0.0693	46
	50.0	2.27	51	3-20	3.0	7.94E-05	0.9976	20.21	18.87	0.0530	38
97/(2.5/05) w/w	42.0	0.35	45	3-20	2.6	2.86E+00	1.0000	0.58	0.62	1.6207	34
	43.0	0.47	48	3-20	3.0	1.14E+00	0.9998	0.85	0.90	1.1111	36

	44.0	0.43	52	3-20	3.1	3.95E-01	1.0000	1.20	1.27	0.7893	39
	45.0	0.67	52	3-20	2.8	1.89E-01	1.0000	1.59	1.63	0.6124	39
	46.0	0.67	55	3-20	3.3	3.62E-02	1.0000	2.44	2.53	0.3948	42
	47.0	1.46	51	3-20	2.7	3.79E-02	1.0000	2.97	2.98	0.3352	39
	48.0	2.25	51	3-20	2.7	1.50E-02	0.9999	4.22	4.18	0.2391	39
	49.0	3.10	52	3-20	2.7	5.04E-03	1.0000	6.15	6.10	0.1639	39
	50.0	4.63	56	3-20	2.8	1.39E-03	1.0000	9.35	9.40	0.1064	42
	51.0	5.67	57	3-20	3.1	1.54E-04	1.0000	15.45	15.58	0.0642	43
93/(6/1) w/w	44.0	0.32	50	3-20	3.3	2.07E+00	0.9998	0.72	0.72	1.3947	40
	45.0	0.50	52	3-20	3.5	6.30E-01	0.9998	1.03	1.03	0.9681	41
	46.0	0.53	50	3-20	3.6	2.02E-01	0.9999	1.42	1.42	0.7057	40
	47.0	0.77	50	3-20	3.5	5.81E-02	0.9999	2.01	2.02	0.4958	40
	48.0	0.95	51	3-20	3.8	9.17E-03	0.9999	3.11	3.13	0.3192	40
	49.0	1.48	53	3-20	3.5	3.20E-03	0.9995	4.71	4.65	0.2151	42
	50.0	1.92	55	3-20	4.0	2.19E-04	0.9999	7.65	7.72	0.1296	43

	51.0	3.68	47	3-20	3.8	7.89E-05	1.0000	10.77	10.85	0.0922	37
	52.0	2.53	47	3-20	3.6	1.23E-05	0.9959	21.82	20.35	0.0491	37
	53.0	14.85	30	3-20	3.1	5.35E-05	0.9997	20.34	19.70	0.0508	24
87/(11/2) w/w	45.0	0.33	43	3-20	3.4	2.63E+00	0.9999	0.68	0.68	1.4641	36
	46.0	0.57	43	3-20	3.3	8.52E-01	0.9999	0.94	0.93	1.0718	36
	47.0	0.67	43	3-20	3.2	3.10E-01	0.9998	1.29	1.27	0.7893	36
	48.0	0.90	45	3-20	3.2	8.34E-02	0.9998	1.92	1.90	0.5263	38
	49.0	0.80	47	3-20	4.1	4.93E-03	1.0000	3.30	3.35	0.2985	40
	50.0	1.98	48	3-20	3.3	5.26E-03	0.9999	4.39	4.40	0.2273	41
	51.0	3.75	45	3-20	3.0	2.87E-03	0.9999	6.26	6.20	0.1613	38
	52.0	5.35	49	3-20	3.0	6.52E-04	0.9999	10.34	10.22	0.0979	41
	53.0	11.22	46	3-20	2.7	5.95E-04	1.0000	14.13	14.08	0.0710	39
	54.0	20.92	44	3-20	2.7	1.96E-04	0.9996	20.38	21.63	0.0462	37
73/(23/4) w/w	46.0	0.28	30	3-20%	3.1	5.40E+00	1.0000	0.52	0.53	1.8762	30
	47.0	0.43	31	3-20%	3.5	1.93E+00	1.0000	0.75	0.77	1.3038	31

	48.0	0.47	33	3-20%	3.3	6.03E-01	0.9999	1.04	1.07	0.9372	33
	49.0	0.55	33	3-20%	3.7	1.21E-01	0.9999	1.61	1.63	0.6124	33
	50.0	0.85	35	3-20%	3.5	3.27E-02	0.9996	2.42	2.40	0.4167	35
	51.0	1.52	36	3-20%	3.5	8.79E-03	1.0000	3.54	3.58	0.2791	36
	52.0	2.20	37	3-20%	3.9	7.41E-04	1.0000	5.81	5.97	0.1676	37
	53.0	5.25	29	3-20%	2.9	2.22E-03	0.9996	7.50	7.23	0.1383	29
	54.0	9.62	24	3-20%	3.1	4.73E-04	1.0000	10.86	10.77	0.0929	24