

## Supporting information

# Influence of poly(lactide) stereocomplexes as nucleating agents on the crystallization behaviors of poly(lactide)s

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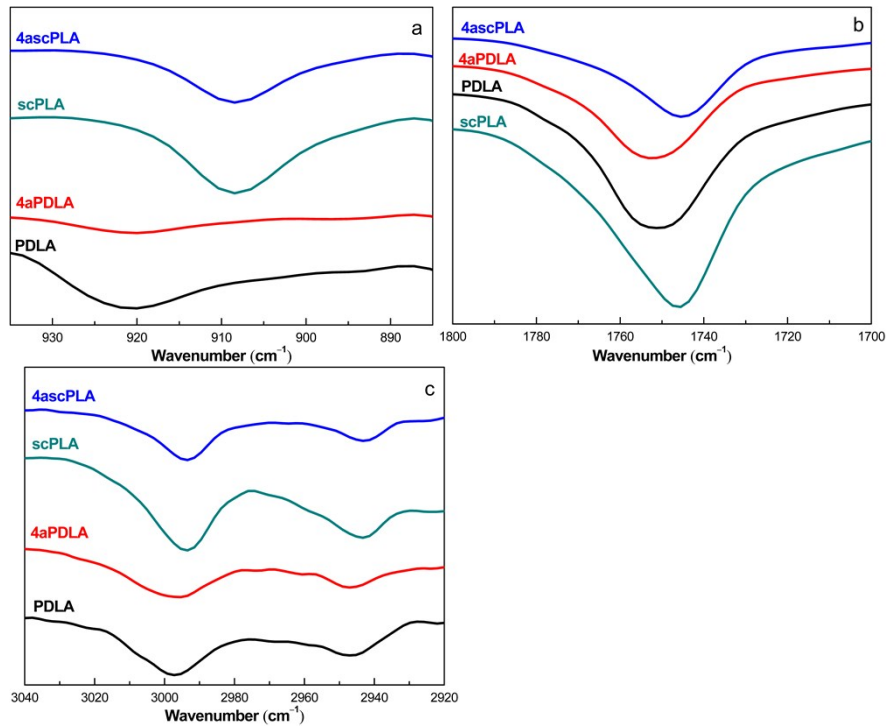
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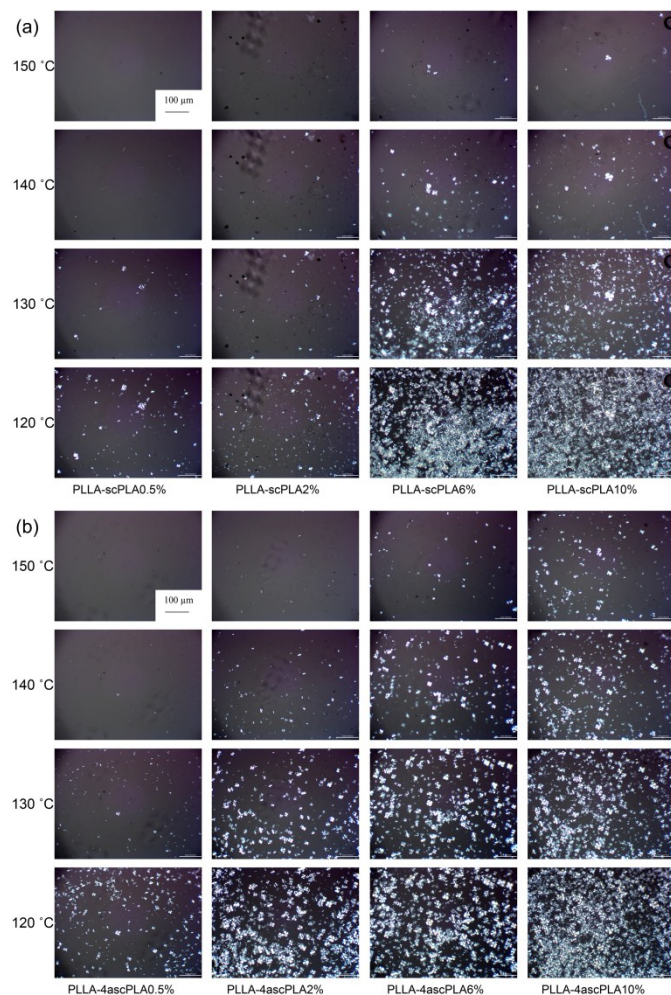
1. FTIR/ATR spectra of PDLA, 4aPDLA, scPLA and 4ascPLA.



**Figure S1.** FTIR spectra of the homocrystal and stereocomplex specimens in the range of (a)  $935\text{--}885\text{ cm}^{-1}$ , (b)  $1800\text{--}1700\text{ cm}^{-1}$ , and (c)  $3040\text{--}2920\text{ cm}^{-1}$ .

2. POM images during non-isothermal crystallization.

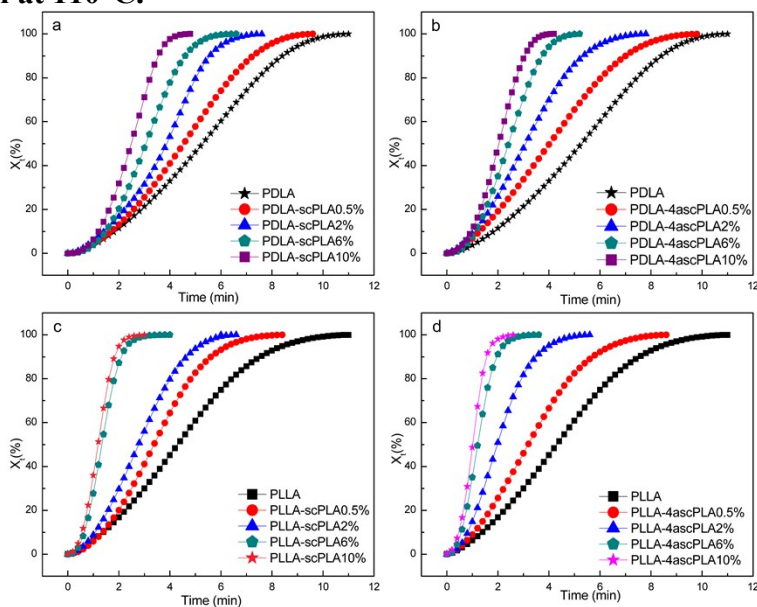
Samples compressed between two slides were heated at 200°C for 5 min to remove the thermal history. Photomicrographs were then obtained while cooling to room temperature at a rate of 20°C·min<sup>-1</sup>. Photomicrographs obtained at various temperatures (150°C, 140°C, 130°C, and 120°C) are presented in Fig. 5. The results revealed the formation of small spherulitic crystallites in the PLLA-NA specimens at 150°C.



**Figure S2.** POM images during the non-isothermal crystallization of (a) PLLA-scPLA<sub>x</sub> and (b) PLLA-4ascPLA<sub>x</sub>.

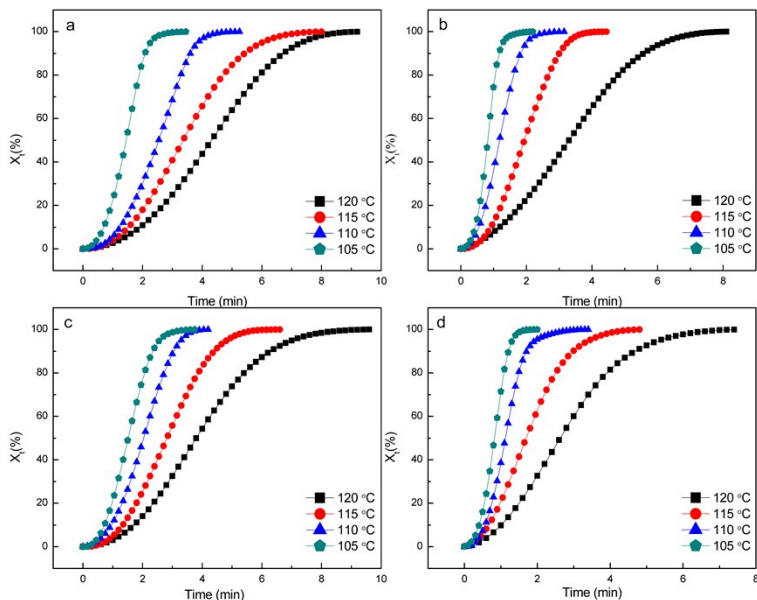
**3. Relative crystallinity as a function of time for the (a) PDLA-scPLA<sub>x</sub>, (b) PDLA-4ascPLA<sub>x</sub>, (c) PLLA-scPLA<sub>x</sub>, and (d) PLLA-4ascPLA<sub>x</sub> samples during isothermal**

crystallization at 110°C.



**Figure S3.** Relative crystallinity as a function of time for the (a) PDLA-scPLA<sub>x</sub>, (b) PDLA-4ascPLA<sub>x</sub>, (c) PLLA-scPLA<sub>x</sub>, and (d) PLLA-4ascPLA<sub>x</sub> samples during isothermal crystallization at 110°C.

**4. Relative crystallinity as a function of time for the (a) PDLA-scPLA10%, (b) PLLA-scPLA10%, (c) PDLA-4ascPLA10%, and (d) PLLA-4ascPLA10% samples during isothermal crystallization at various temperatures.**



**Figure S4.** Relative crystallinity as a function of time for the (a) PDLA-scPLA10%,

(b) PLLA-scPLA10%, (c) PDLA-4ascPLA10%, and (d) PLLA-4ascPLA10% samples during isothermal crystallization at various temperatures.

### 5. Values of $t_{1/2}$ and crystallization kinetic parameters for PLA/NA samples with various nucleating agent contents at $T_{iso} = 110^{\circ}\text{C}$ .

**Table S1** Values of  $t_{1/2}$  and crystallization kinetic parameters for PLA/NA samples with various nucleating agent contents at a  $T_{iso} = 110^{\circ}\text{C}$ .

Sample	$x = 0\%$			$x = 0.5\%$			$x = 2\%$			$x = 6\%$			$x = 10\%$		
	$t_{1/2}/$ min	$n$	$k$	$t_{1/2}/$ min	$n$	$k$	$t_{1/2}/$ min	$n$	$k$	$t_{1/2}/$ min	$n$	$k$	$t_{1/2}/$ min	$n$	$k$
PDLA-scPLA $x$	5.27	2.05	0.024	4.47	2.18	0.027	3.76	2.43	0.028	3.04	2.72	0.033	2.29	2.83	0.055
PDLA-4ascPLA $x$	5.27	2.05	0.024	3.97	1.84	0.055	3.21	2.02	0.073	2.42	2.53	0.075	2.07	2.74	0.101
PLLA-scPLA $x$	4.32	2.09	0.033	3.35	2.25	0.046	2.66	2.13	0.081	1.38	2.65	0.326	1.18	2.66	0.450
PLLA-4ascPLA $x$	4.32	2.09	0.033	3.15	1.92	0.077	2.12	2.16	0.160	1.21	2.53	0.432	1.01	2.66	0.690

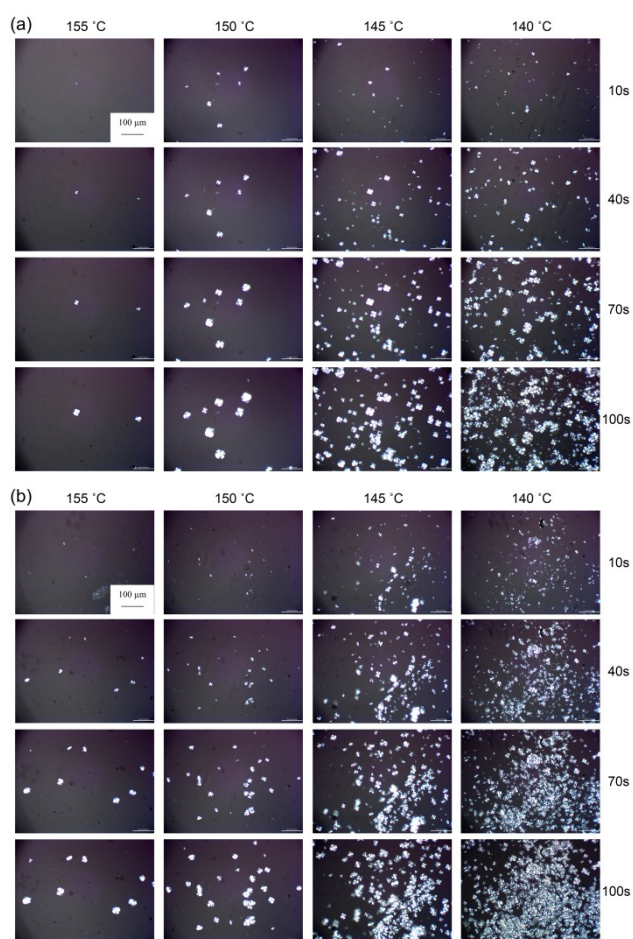
### 6. Values of $t_{1/2}$ and crystallization kinetic parameters for PLA-NA10% samples at various $T_{iso}$ values.

**Table S2** Values of  $t_{1/2}$  and crystallization kinetic parameters for PLA-NA10% samples at various  $T_{iso}$  values.

Sample	120°C			115°C			110°C			105°C		
	$t_{1/2}/$ min	$n$	$k$	$t_{1/2}/$ min	$n$	$k$	$t_{1/2}/$ min	$n$	$k$	$t_{1/2}/$ min	$n$	$k$
PDLA-scPLA10%	4.28	2.50	0.018	3.36	2.45	0.036	2.29	2.83	0.055	1.43	2.90	0.247
PDLA-4ascPLA10%	3.80	2.39	0.028	2.82	2.57	0.049	2.07	2.74	0.101	1.50	2.64	0.233
PLLA-scPLA10%	3.26	2.06	0.061	1.93	2.54	0.130	1.18	2.66	0.450	0.82	3.35	1.353
PLLA-4ascPLA10%	2.83	2.08	0.094	1.69	2.11	0.230	1.01	2.66	0.690	0.83	2.98	1.252

**7. POM images obtained during the isothermal crystallization of (a) PLLA-scPLA6% and (b) PLLA-4ascPLA6% at various temperatures.**

Similar to the previous measurements, the PLLA-NA6% samples were first melted at 200°C for 5 min to remove the thermal history and then rapidly cooled to the desired temperature ( $T_{iso} = 155^\circ\text{C}$ , 150°C, 145°C, or 140°C) for isothermal crystallization.



**Figure S5.** POM images obtained during the isothermal crystallization of (a) PLLA-scPLA6% and (b) PLLA-4ascPLA6% at various temperatures.