Electronic Supplementary Material (ESI) for RSC Advances.

Synergistic effect of PLA-PBAT-PLA tri-block copolymers with two molecular weights as compatibilizers on mechanical and rheological properties of PLA/PBAT blends

Zhiqiang Sun, Bao Zhang, Xinchao Bian, Lidong Feng, Han Zhang, Ranlong Duan, Jingru Sun, Xuan Pang,Wenqi Chen and Xuesi Chen*

Key Laboratory of Polymer Ecomaterials, Changchun Institute of Applied Chemistry, Chinese Academy of Sciences, Changchun 130022, China

*Corresponding author. E-mail: xpang@ciac.ac.cn

Tel: +86-431-85262197 Fax: +86-431-85262933

Supporting information

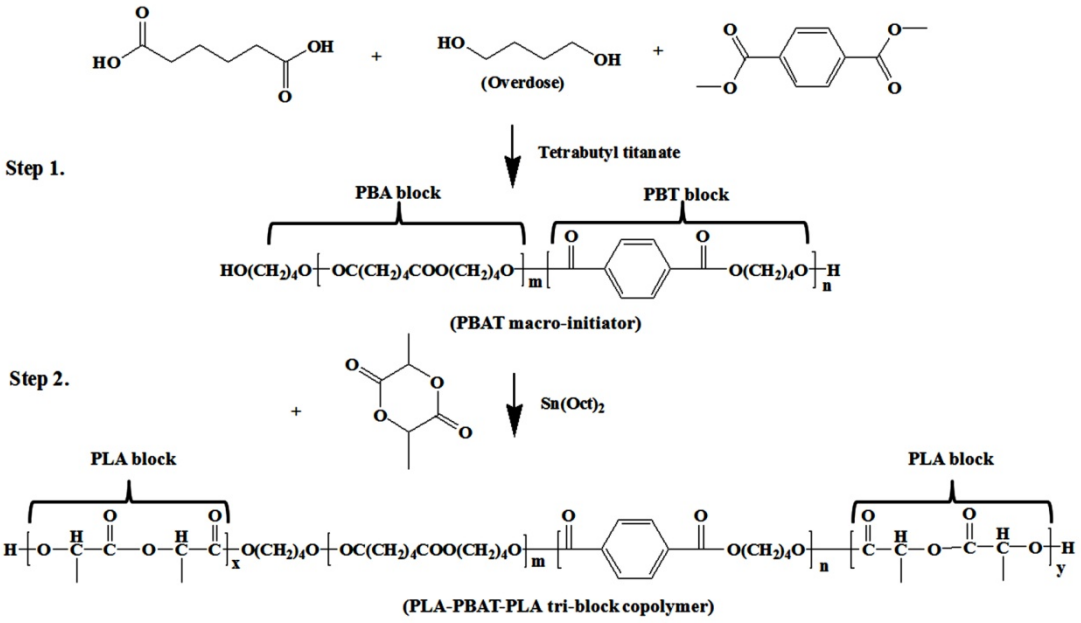

Figure S1. Synthetic process of PBAT macro-initiators and PLA-PBAT-PLA tri-block copolymers.

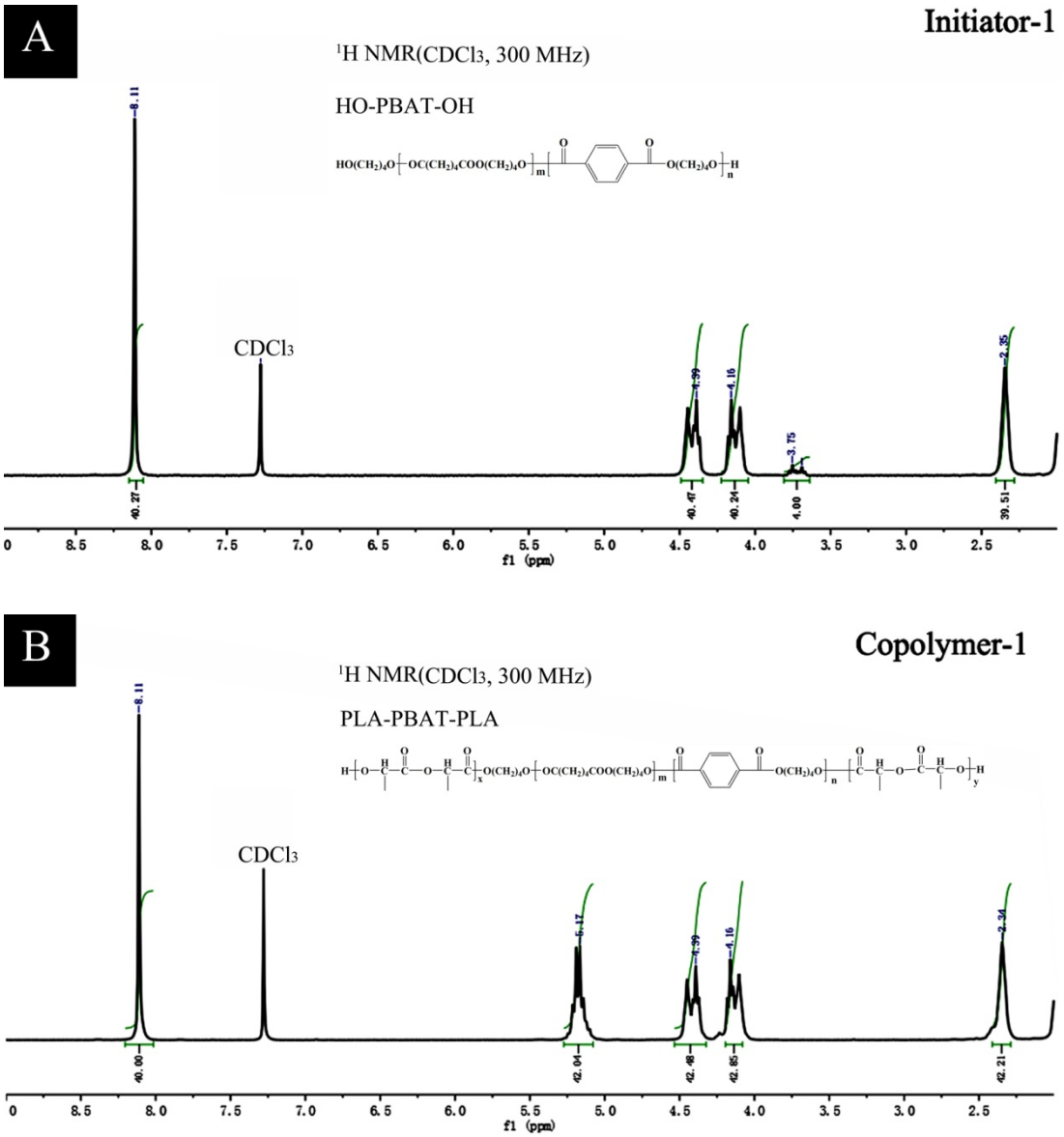

Figure S2. ^{1}H NMR Spectra of initiator-1 and tri-block **CP1**.

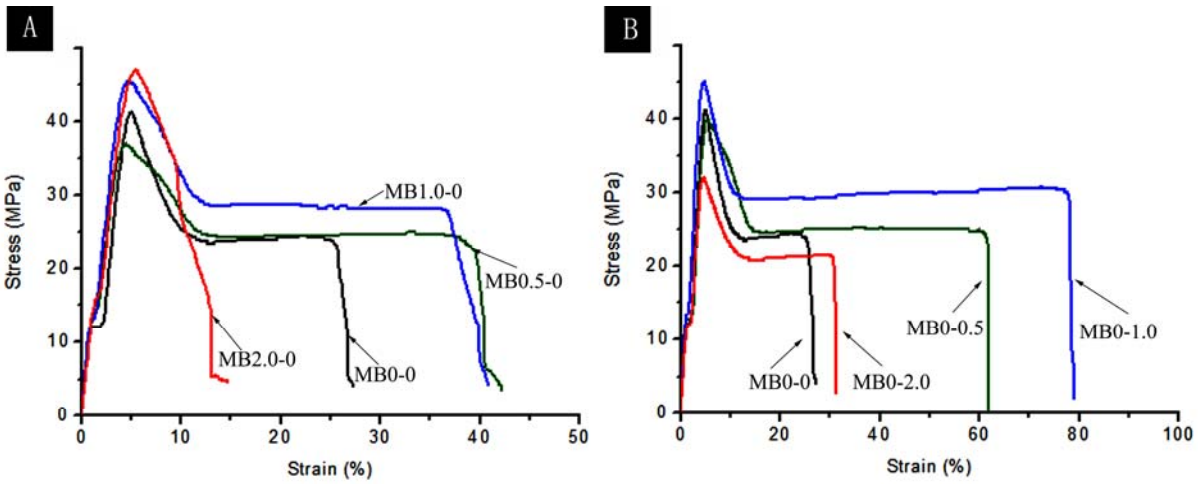

Figure S3. Typical stress–strain curves of melt-blended specimens with different amounts of **CP1** A) and **CP2** B)

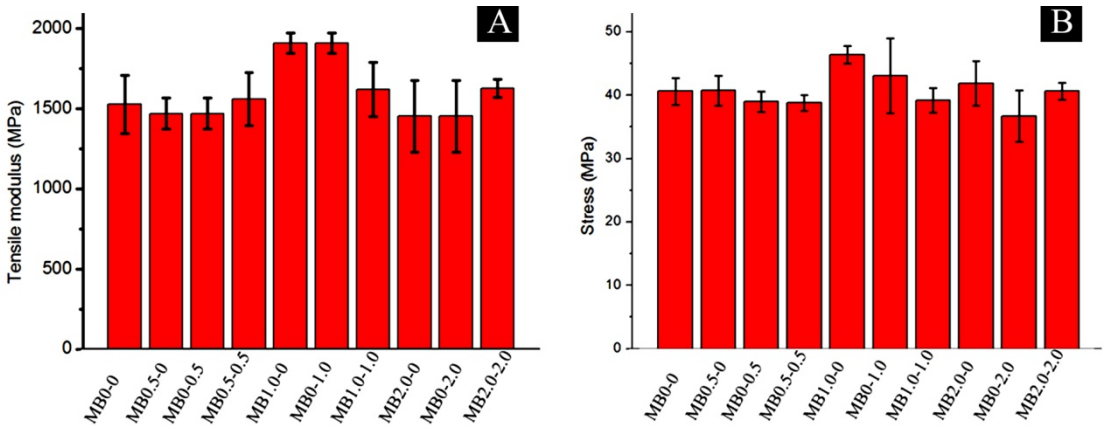

Figure S4. Average values of tensile modulus A) and strength B) of different melt-blended specimens, each sample was tested with a sample size (n) = 5.

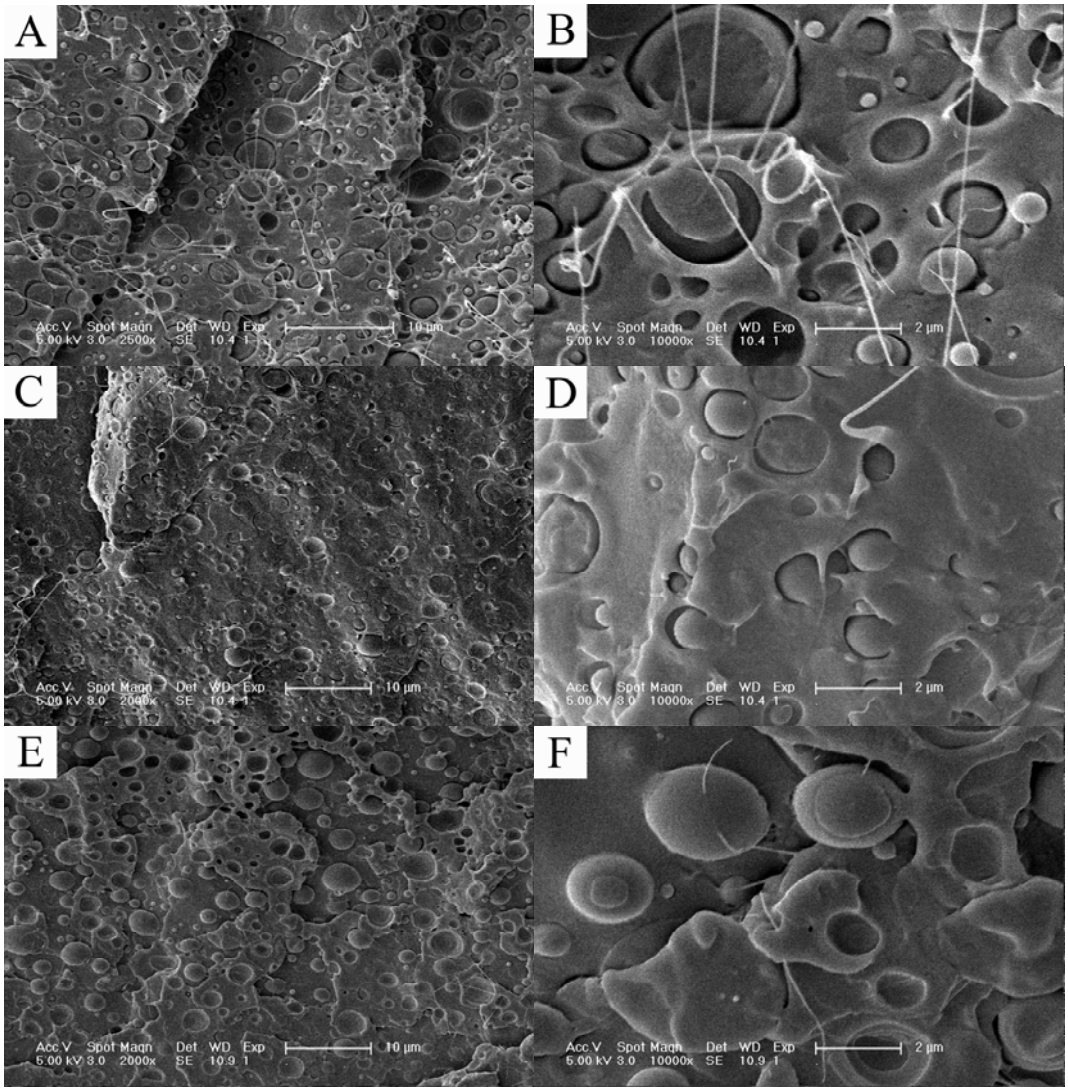

Figure S5. SEM micrographs of cryogenically fractured surfaces of PLA/PBAT (80/20, w/w) blends with different amounts of copolymer compatibilizers. A)&B), MB1.0-0, C)&D), MB0-1.0, E)&F), MB1.0-1.0, respectively

Table S1. The compositions of the melt-blended specimens. * Sample codes (MB**x**-**y**), where **x** and **y** are the approximate percentage of **CP1** and **CP2** in the blends, respectively.

Sample code *	PLA (g)	PBAT (g)	CP1 (g)	CP2 (g)
MB0-0	48	12	0	0
MB0.5-0	48	12	0.3	0
MB1.0-0	48	12	0.6	0
MB2.0-0	48	12	1.2	0
MB0-0.5	48	12	0	0.3
MB0-1.0	48	12	0	0.6
MB0-2.0	48	12	0	1.2
MB0.5-0.5	48	12	0.3	0.3
MB1.0-1.0	48	12	0.6	0.6
MB2.0-2.0	48	12	1.2	1.2

Table S2. GPC analysis of the synthesized macro-initiators and tri-block copolymers.

Sample Code	GPC		
	M_n [c] (kg/mol)	M_w [c] (kg/mol)	PDI [c]
Initiator-1	8.2	13.6	1.66
Initiator-2	11.9	21.2	1.79
Copolymer-1(**CP1**)	12.1	17.0	1.40
Copolymer-2(**CP2**)	18.1	29.0	1.60

Table S3. Thermal properties of different melt-blended specimens.

Sample code	ΔT_g (°C)	T_{onset} (°C)	T_c (°C)	ΔH_c (J/g)	T_m (°C)	ΔH_m (J/g)
MB0-0	90.2	106.4	116.7	17.7	153.3	20.0
MB0.5-0	88.2	106.0	114.9	19.2	153.1	21.7
MB0-0.5	87.9	106.0	115.9	20.54	153.2	22.1
MB0.5-0.5	87.5	104.4	113.9	21.3	152.6	23.3
MB1.0-0	88.1	107.4	117.4	17.3	153.7	22.0
MB0-1.0	88.4	107.5	117.8	19.9	153.6	22.8