Electronic Supplementary Material

Effect of polyethylene glycol on the crystallization, rheology and foamability of poly(lactic acid) containing in-situ generated polyamide 6 nanofibrils

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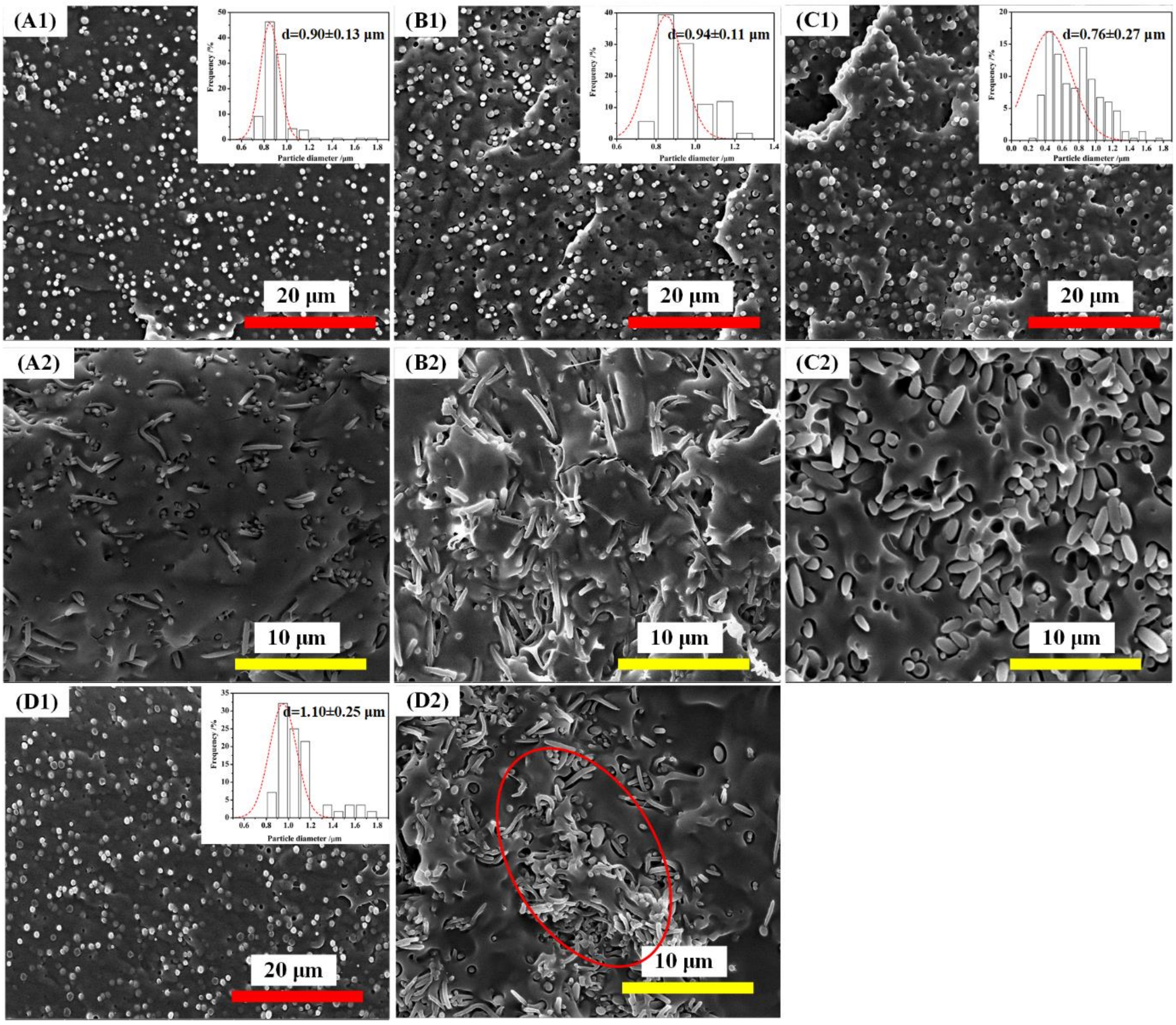

Fig. S1 SEM images of the fractured surface of PLA/PA6/PEG blends before (A1-D1) and after stretching (A2-D2): (A1) (A2) 5% PA6/PEG, (B1) (B2) 10% PA6/PEG，(C1) (C2) 20% PA6/PEG, (D1) (D2) 10% PA6

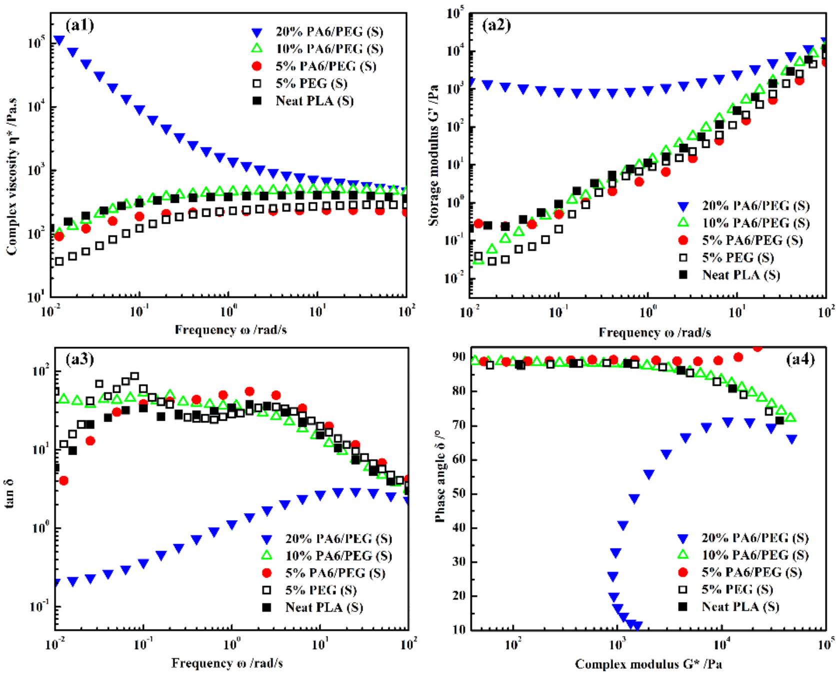

Fig. S2 Viscoelastic behavior of neat PLA and its blends: (a1) complex viscosity *vs* frequency; (a2), storage modulus *vs* frequency; (a3) tan δ *vs* frequency; (a4) phase angle *vs* complex modulus plot. (S) and (F) represent the spherical and nanofibrillar PA6 domains, respectively

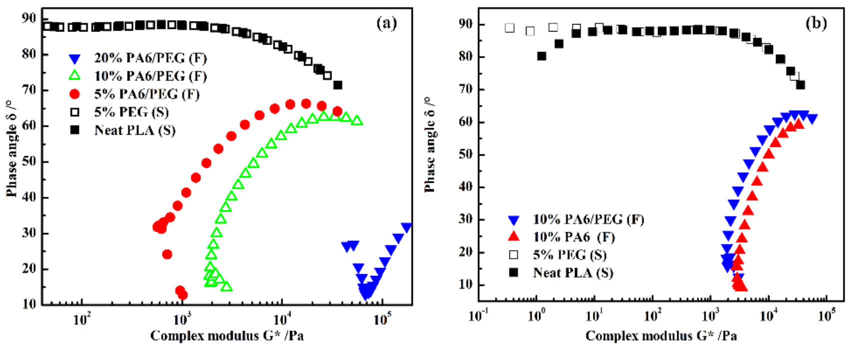

Fig. S3 Phase angle *vs* complex modulus plot of PLA and its blends. (S) and (F) represent the spherical and nanofibrillar PA6 domains, respectively

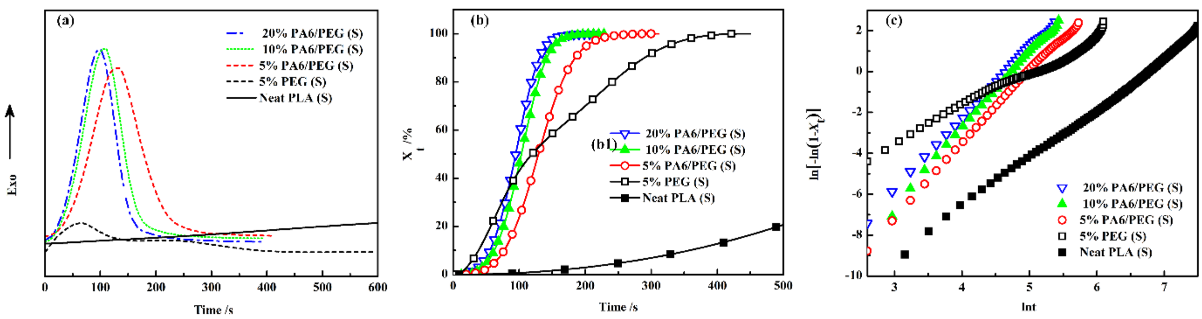

Fig.S4 Isothermal crystallization behavior of neat PLA and PLA/PA6/PEG blends with spherical PA6 domains: (a) heat flow curves; (b) relative crystallinity, X_t *vs* time; (c) fitted plots based on the Avrami equation. (S) and (F) indicate that PA6 exists in the form of spherical particles and nanofibrils, respectively.

$$X_t = \int_0^t \left(\frac{\mathrm{d}H}{\mathrm{d}t}\right) dt / \int_0^\infty \left(\frac{\mathrm{d}H_c}{\mathrm{d}t}\right) \mathrm{d}t \quad \text{(S1)}$$

$$1 - X_t = exp[-kt^n] \quad \text{(S2)}$$

Where n is the Avrami exponents, which is related to type of crystal nucleation. *k* is the crystalization rate constant. Taking double log, equation (2) could be rewritten as:

$$\ln[-\ln(1 - X_t)] = n\ln t + \ln k \quad \text{(S3)}$$

Table S1 Kinetic analysis of isothermal crystallization for neat PLA and PLA/PA6/PEG blends before and after hot stretching

Samples	*n*	k /s^{-n})	$t_{1/2}$ /s
Neat PLA	2.45	1.42×10^{-9}	767.40
5% PEG (S)	1.92	2.15×10^{-8}	119.59
5% PA6/PEG (S)	3.71	1.64×10^{-8}	129.40
10% PA6/PEG (S)	3.65	2.48×10^{-8}	103.60
20% PA6/PEG (S)	3.40	1.23×10^{-7}	94.80
5% PA6/PEG (F)	2.91	2.64×10^{-6}	71.40
10% PA6/PEG (F)	2.75	7.79×10^{-6}	62.20
20% PA6/PEG (F)	2.60	2.61×10^{-5}	50.10

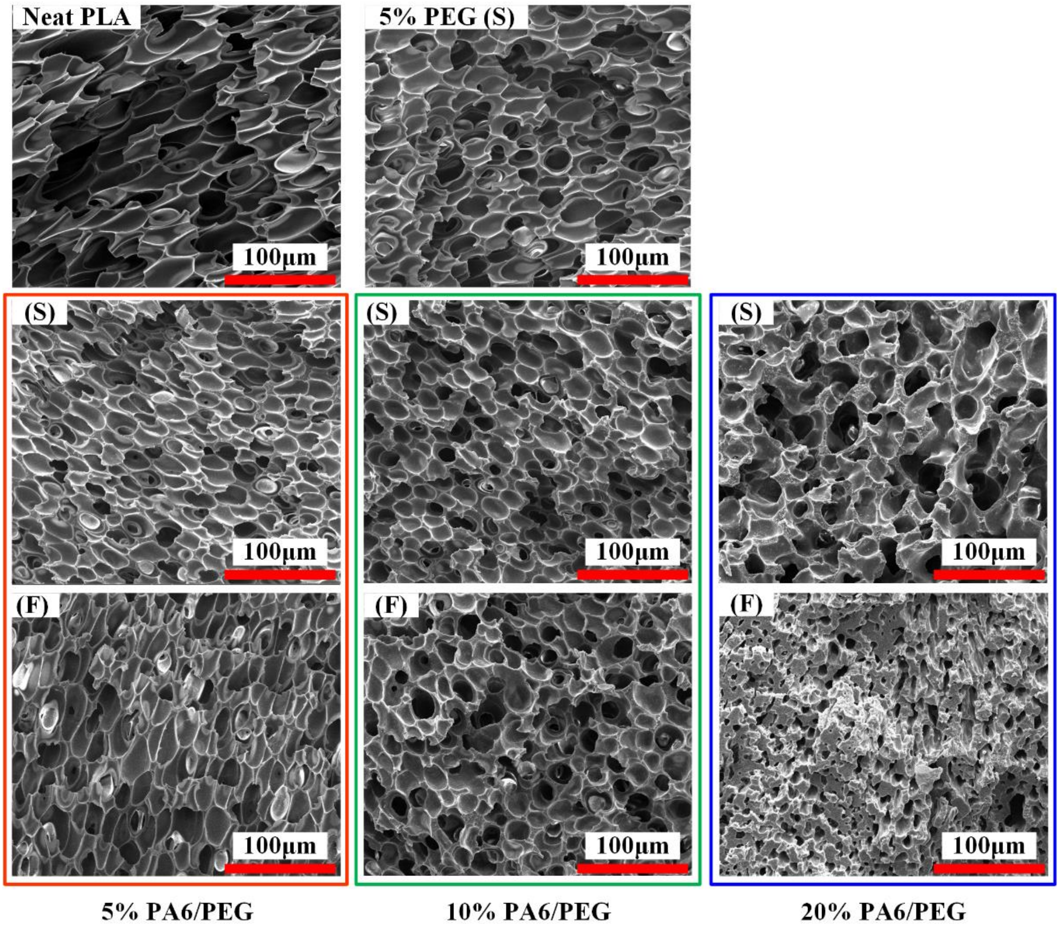

Fig. S5 SEM images of neat PLA foams and PLA/PA6/PEG blends foams before and after drawing. (S) and (F) mean that PA6 exists in the form of spherical particle and nanofibrils, respectively