Supporting information

Sustainable biobased blends of poly (lactic acid) (PLA) and poly (glycerol succinate-co-maleate) (PGSMA) with balanced performance prepared by dynamic vulcanization

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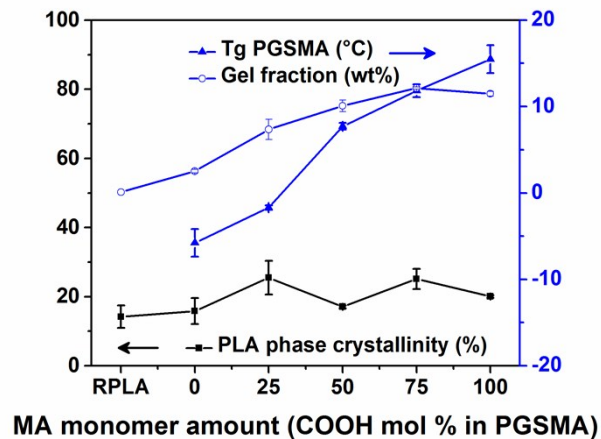Total number of figures: 7

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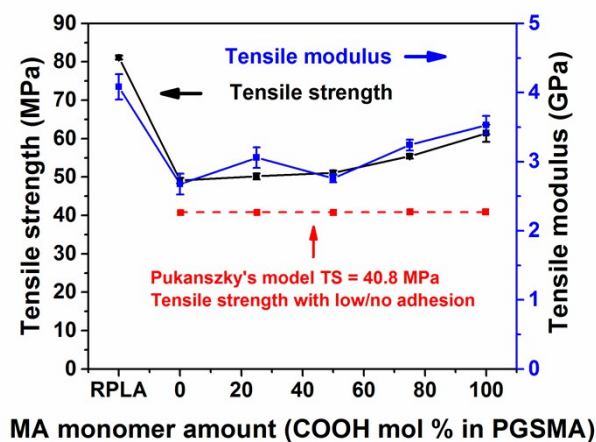

Fig. S2 Tensile strength and modulus of dynamically vulcanized 80/20 wt% PLA/PGSMA blends. Dashed line represents a low interfacial adhesion model (B=0) for 80/20 wt% PLA/PGSMA blends.
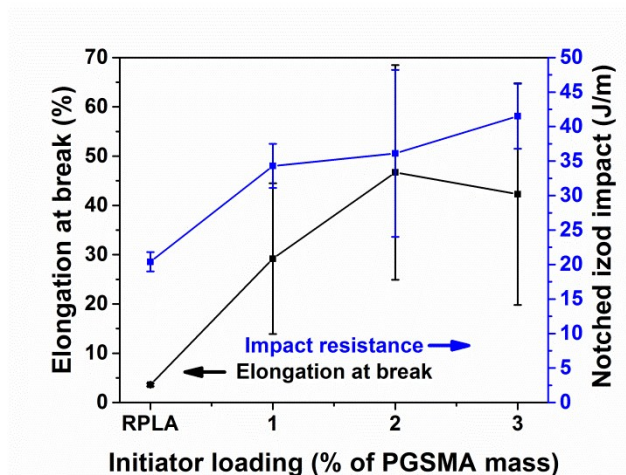
Fig. S3 Elongation at break and notched Izod impact of dynamically vulcanized 80/20 wt% PLA/PGSMA blends at different free radical initiator loadings.
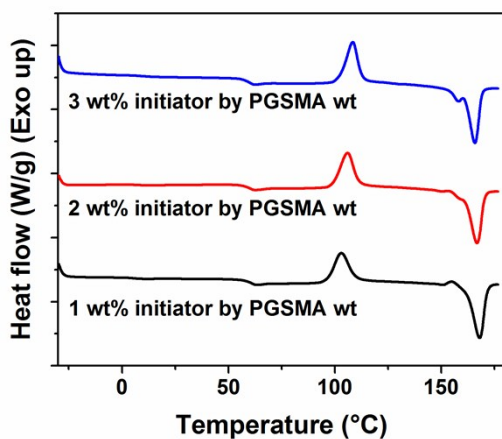

Fig. S4 Differential scanning calorimetry analysis of dynamically vulcanized 80/20 wt% PLA/PGSMA blends using different free radical initiator loadings. Second heating cycle data is shown.
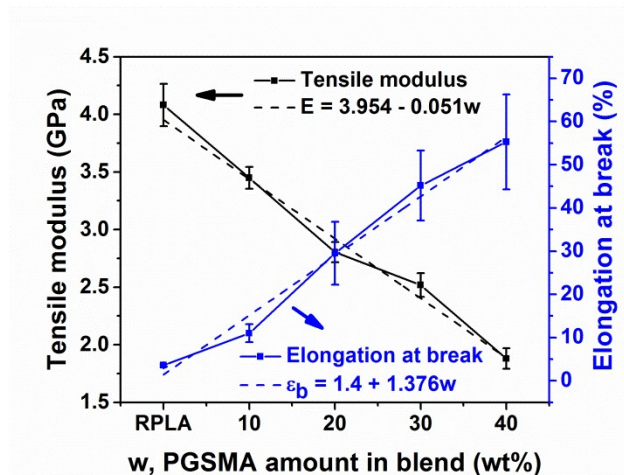
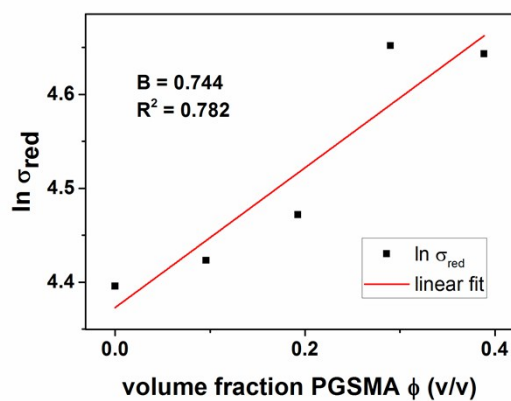Fig. S5 Tensile modulus and elongation at break of dynamically vulcanized PLA/PGSMA blends.

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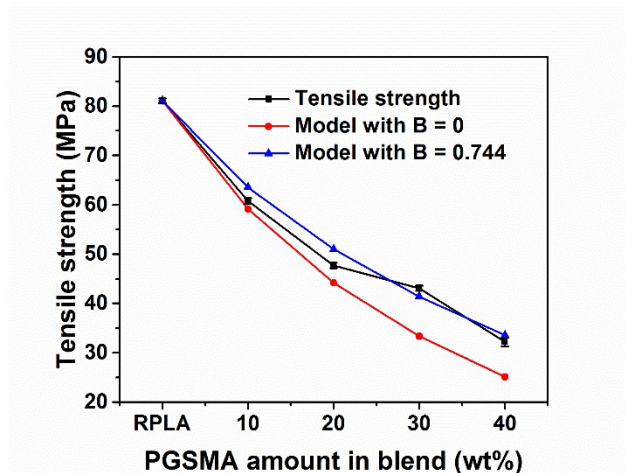
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Table S1 Glass transition temperature of PLA phase and melt flow index of dynamically vulcanized 80/20 wt% PLA/PGSMA blends in the presence of different free radical initiator loadings

Initiator content in blend (wt% with respect to PGSMA)	T_g PLA (°C)	Melt flow index (g/10 min) (190°C, 2.16 kg)
1	60.6 ± 0.1	23.7 ± 0.8
2	59.5 ± 0.5	38.6 ± 0.8
3	58.2 ± 0.8	36.1 ± 1.3

Table S2 Morphological parameters of PGSMA phase on dynamically vulcanized PLA/PGSMA blends

Blend	d (µm)	σ	Φ_d (v/v)	T (µm)
60/40 PLA/PGSMA	0.649	0.49	0.43	0.651
70/30 PLA/PGSMA	0.532	0.51	0.33	0.563
80/20 PLA/PGSMA	0.467	0.49	0.22	0.736
90/10 PLA/PGSMA	0.469	0.58	0.11	0.682

Table S3 Normalized ligament thickness (T) and gel fraction (W_{gel}) and experimental data of notched Izod impact (IS) on dynamically vulcanized PLA/PGSMA blends.

Blend	T (µm)	W_{gel} (wt%)	T'	W'	IS (J/m)
60/40 RPLA/PGSMA	0.651	16.6	0.51	1	55.4
70/30 RPLA/PGSMA	0.563	12.5	0	0.67	37.3
80/20 RPLA/PGSMA	0.736	7.5	1	0.28	40.5
90/10 RPLA/PGSMA	0.682	4	0.69	0	27.6