

A promising recycling strategy via processing polypropylene/recycled poly (ethylene terephthalate): reactive extrusion using dual compatibilizers

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- Morphological analysis: Average size of rPET particles**

Table S1. Average size of rPET in the binary PP/rPET blend, the blend containing single and dual compatibilizers.

sample	$\bar{d}_w(\mu\text{m})$
PT	2.01
PT/MA6	1.00
PT/MA3/EBA(H)3	0.89
PT/MA3/EBA(L)3	0.94
PT/MA3/E3	0.99
PT/MA3/EMA3	0.87

- Rheological properties: Determination of linear viscoelastic region in binary PP/rPET blend as a reference sample.**

Figure S1 illustrates the results of a strain sweep test conducted on a PP/rPET blend, used as a reference sample to determine the linear viscoelastic region. This test was carried out over a strain amplitude range of 0.01 to 1000% at 265 °C and an angular frequency of 1 rad/s. It can be observed that the sample remains within the linear viscoelastic region across the entire strain range. Therefore, a strain amplitude of 1% was selected to avoid the nonlinear response when adding other components.

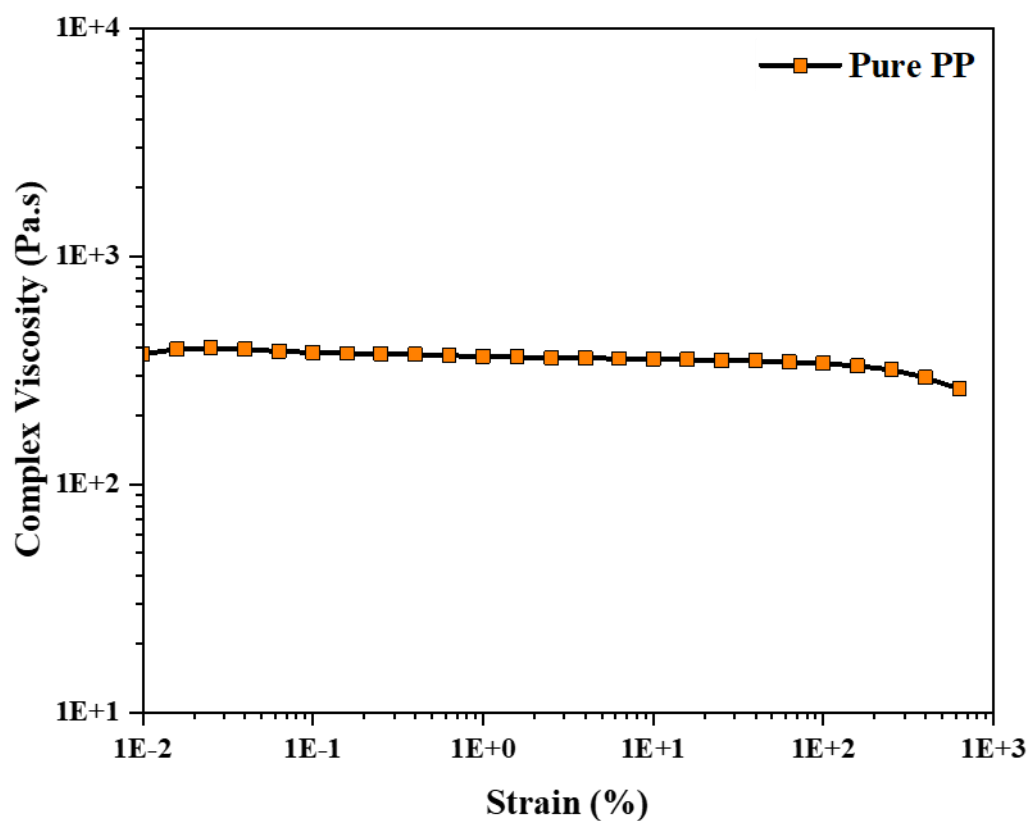


Figure S1. Dynamic strain sweep test for PP/rPET blend at frequency 1 rad/s.

- **Mechanical properties: investigation the synergistic effect of dual compatibilizers**

Figure S2 presents the stress-strain curves for the uncompatibilized PP/rPET blend, the PP/rPET blend was modified using two different compatibilizers: one with PP-g-MA (referred to as PT/MA6) and the other with EMA-GMA (referred to as PT/EMA6), and the PP/rPET blend with dual compatibilizers. As can be seen, the PP/rPET blend sample containing dual compatibilizers exhibits a synergistic effect in tensile properties, including elongation at break and tensile strength.

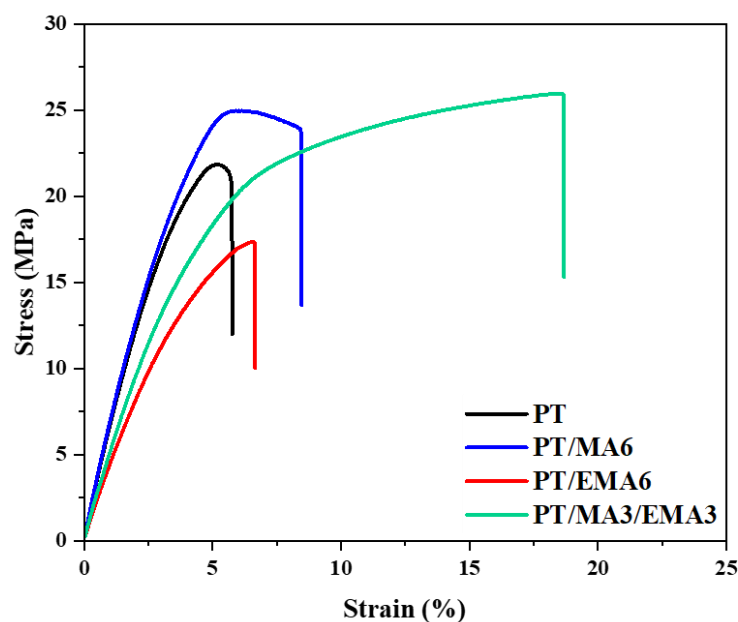


Figure S2. Tensile stress-strain curves for the uncompatibilized PP/rPET blend, the PP/rPET blend containing single compatibilizer (PT/MA6 and PT/EMA6), and the PP/rPET blend with dual compatibilizers.

- *Comparison of present study with the literature*

Table S2. Comparison of the results of current study with available literature data.

sample	Compatibilizer content	Elongation increase	Tensile strength increase	Ref.
PP80/rPET20/PP-g-MA	4	38.5	17.4	[1]
PP70/rPET30/PP-g-MA	10	27.1	26.4	[2]
PP80/rPET20/(PP-g-MA/DAP)	5	171.0	12.0	[3]
PP80/PET20/PP-g-GMA	10	33.3	45.0	[4]
PP90/PET10/PP-g-MA	12	300.0	25.0	[5]
PP75/PET25/SEBS-g-MA	5	53.8	-7.0	[6]
PT/MA3/EMA3	6	217.0	17.7	This work
vPT/MA3/EMA3	6	103.0	11.6	This work

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