Electronic Supplementary Material (ESI) for RSC Advances.

Supporting Information for:

Bio-based Unsaturated Polyester Resin from Post-Consumer PET.

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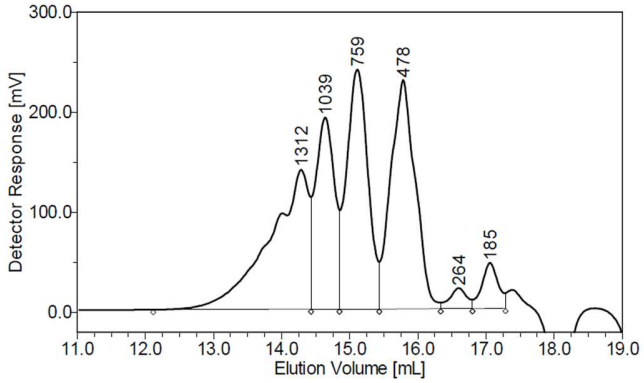
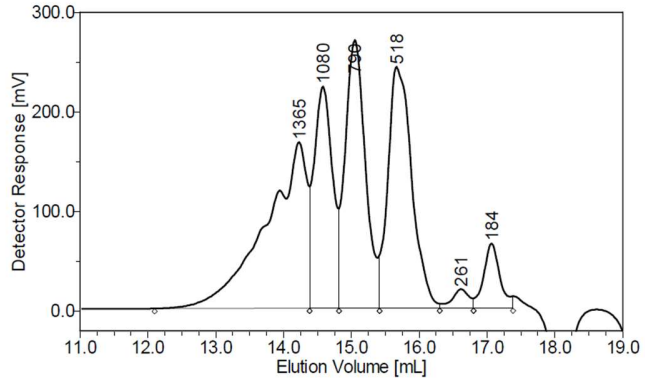


	MP (Daltons)	Area	% Area	Height	Retention Time (min)
1	1312	5610094	26.2	139409	14.286
2	1039	3715384	17.3	191476	14.639
3	759	5250889	24.5	239247	15.111
4	478	5739812	26.8	228687	15.783
5	264	360054	1.7	20673	16.599
6	185	757020	3.5	45675	17.057

Figure S1. SEC chromatogram of GL1.



	MP (Daltons)	Area	% Area	Height	Retention Time (min)
1	1365	7023270	28.9	166813	14.227
2	1080	4268843	17.6	222684	14.580
3	790	5651402	23.3	269390	15.050
4	518	5911522	24.4	242389	15.667
5	261	330711	1.4	19174	16.615
6	184	1076396	4.4	64821	17.065

Figure S2. SEC chromatogram of GL2.

GPC Results

	Mn	Mw	Mz	Polydispersity	Area (µV*sec)	End Time (min)
1	1349	2333	3542	1.73	2.37e+007	16.95

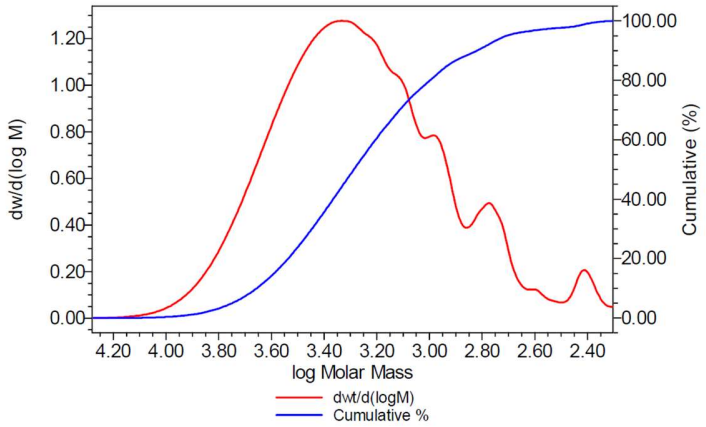


Figure S3. SEC chromatogram of GL3.

GPC Results

	Mn	Mw	MP	Mz	Mz+1	Polydispersity	Area (µV*sec)	End Time (min)
1	2153	4762	3866	8668	13727	2.21	2.42e+007	18.28

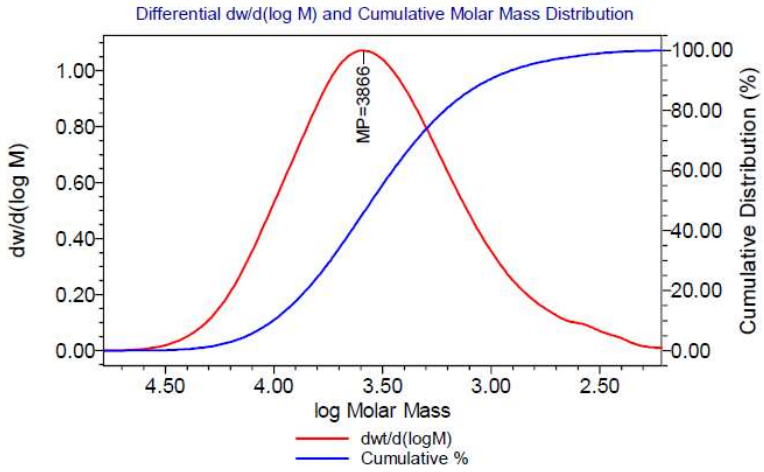


Figure S4. SEC chromatogram of UPET1.

GPC Results

	Mn	Mw	MP	Mz	Mz+1	Polydispersity	Area (µV*sec)	End Time (min)
1	2134	4332	3541	8021	14435	2.03	2.25e+007	18.07

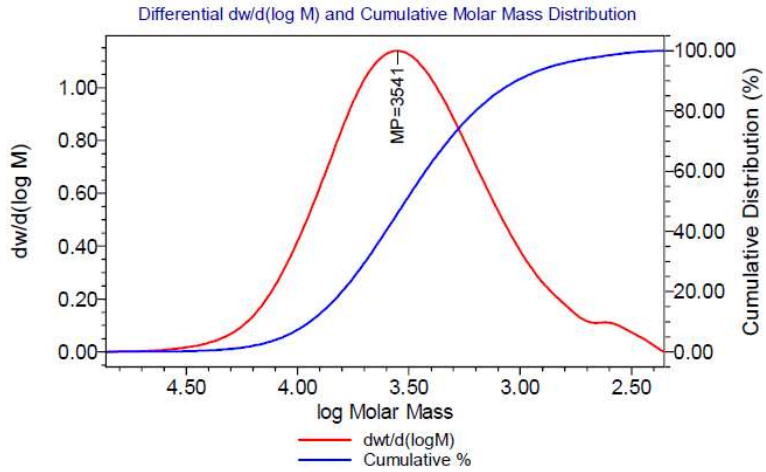


Figure S5. SEC chromatogram of UPET2.

GPC Results

	Mn	Mw	MP	Mz	Mz+1	Polydispersity	Area (µV*sec)	End Time (min)
1	2805	6794	5162	13367	22926	2.42	2.34e+007	18.08

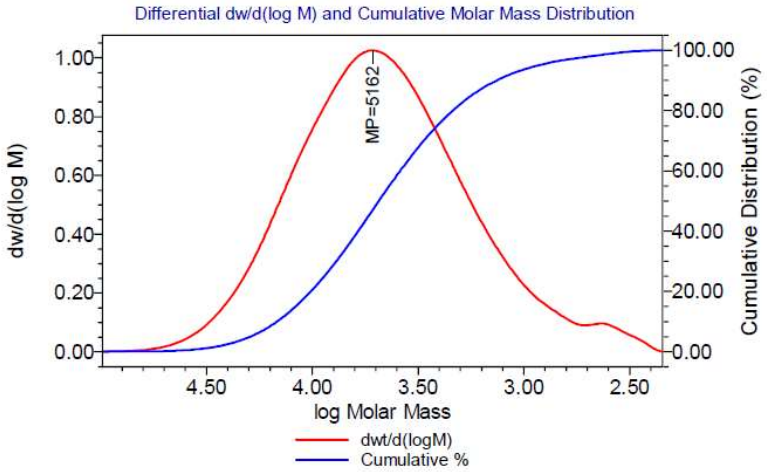


Figure S6. SEC chromatogram of UPET3.

Table S1. Composition of PET glycolysis products.

Glycolysate	Feed composition [a]	Theoretical segment distribution [b,c]	Experimental segment distribution [b,d]
GL1	1/1/1	1/1/2/2/1/1	0.77/1.12/2.13/2.08/0.95/0.94
GL2	1/0.5/1.5	0.33/1/0.66/2/0.33/1	0.33/0.92/0.85/1.88/0.44/0.90
GL3	1/0/2	0/1/0/2/0/1	0.06/0.67/0.13/2.73/0.00/0.42

[a] Molar ratio of the building blocks TPA/EG/DEG. [b] Molar ratio of TPA-EG-TPA/TPA-DEG-TPA/TPA-EG-OH/TPA-DEG-OH/EG/DEG segments given in Scheme 1. [c] Based on the statistical distribution of equally reactive hydroxyl groups. [d] Determined by ^{1}H NMR spectroscopy.

Table S2. Composition of synthesized UPs.

Polyester	Feed composition (molar ratio) [a]	Polyester composition (molar ratio) [b]
UPET1	1/1/1/1	0.99/1.00/0.80/1.24/0.04/0.06
UPET2	1/1/0.5/1.5	0.99/1.00/0.42/1.57/0.04/0.05
UPET3	1/1/0/2	0.71/1.00/0.14/1.45[c]/0.04/0.05

[a] Feed composition IA/TPA/EG/DEG. [b] Molar ratio of the IA/TPA/EG/DEG/MES/OA segments determined by ^{1}H NMR spectroscopy. [c] Covers higher oligomers of EG.

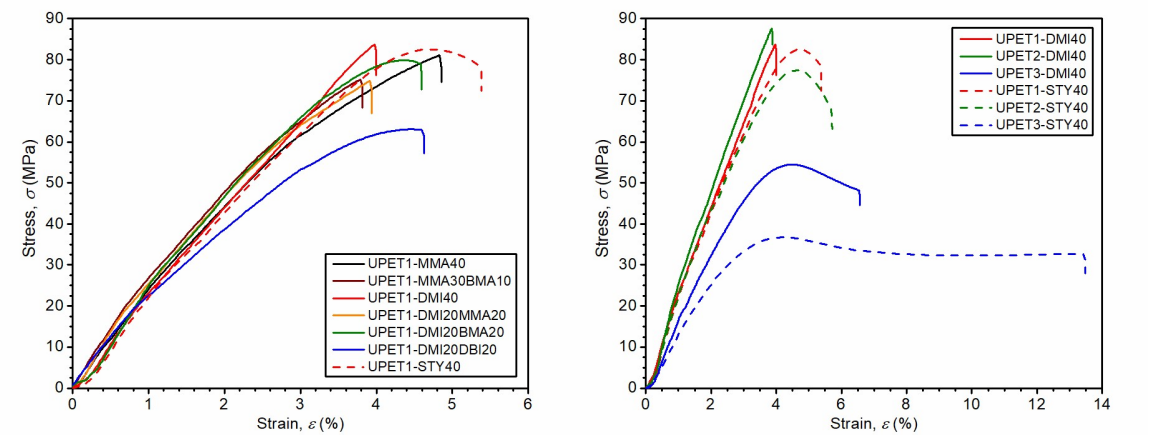


Figure S7. Tensile properties of cured polyester formulations.

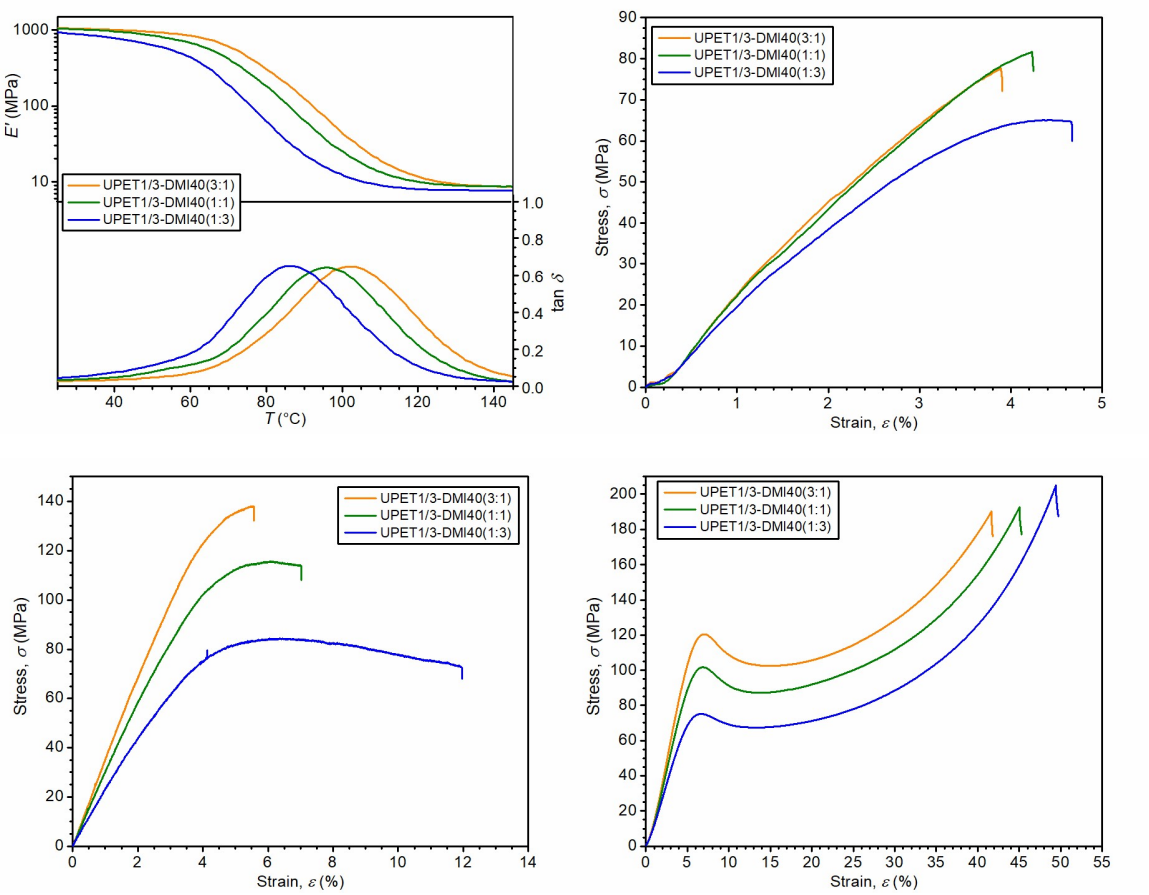


Figure S8. Properties of UPET1/3-DMI40 blends: DMA analysis (top left), tensile (top right), flexure (bottom left) and compression measurements (bottom right).

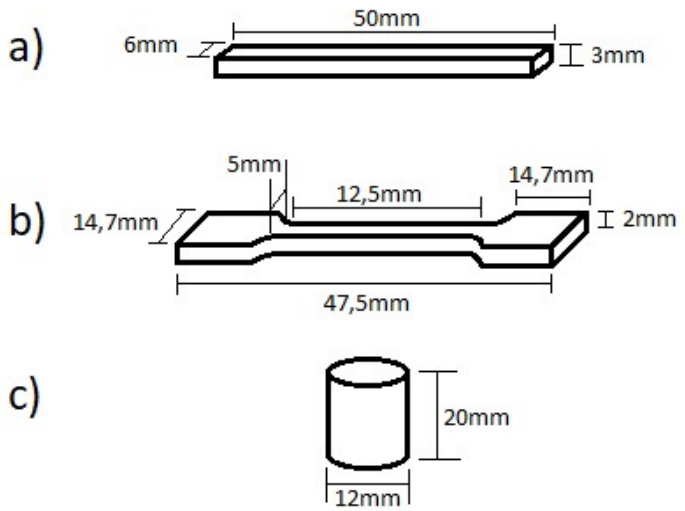


Table S3. Bio-based and recycled contents in UP prepolymer and formulations of UP resins.[a]

	UP		UP resin	
	Biobased	Recycled	Biobased	Recycled
UPET1-MMA40	51.0	49.0	43.0	29.4
UPET1-MMA30BMA10	51.0	49.0	45.1	29.4
UPET1-DMI40	51.0	49.0	70.6	29.4
UPET1-DMI20MMA20	51.0	49.0	56.8	29.4
UPET1-DMI20BMA20	51.0	49.0	60.9	29.4
UPET1-DMI20DBI20	51.0	49.0	70.6	29.4
UPET1-STY40	51.0	49.0	30.6	29.4
UPET2-DMI40	60.9	39.1	76.5	23.5
UPET2-STY40	60.9	39.1	36.5	23.5
UPET3-DMI40	69.7	30.3	81.8	18.2
UPET3-STY40	69.7	30.3	41.8	18.2
UPET1/3-DMI40(3:1)	55.7	44.3	73.4	26.6
UPET1/3-DMI40(1:1)	60.4	39.6	76.2	23.8
UPET1/3-DMI40(1:3)	65.1	34.9	79.0	21.0

[a] Given in wt.%.