Electronic Supplementary Material (ESI) for Polymer Chemistry.

Supporting Information

Thermal, structural and degradation properties of an aromatic-aliphatic polyester built through ring-opening polymerisation

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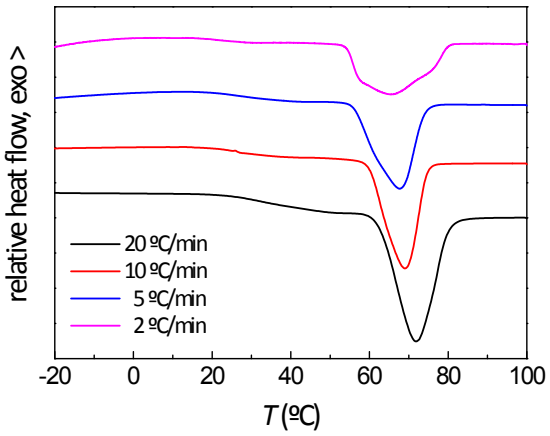

Fig. S1. DSC 1st heating traces of P2HEB obtained at different rates.

Target M_n [b] (gmol^{-1})	Temperature (ºC)	Solvent	Time (hr)	Conversion (%)[a]	M_n [a] (gmol^{-1})	Đ [c]
11,000[1]	60	Toluene	6	99	11,600	1.14
40,000[2]	60	Toluene	6	93	40,300	1.23
80,000[3]	60	Toluene	6	95	78,600	1.2

Table S1. Homopolymerisation of 2,3-DHB with $[2,3\text{-DHB}]_0$:$[Al]_0$:$[BnOH]_0$= [1]70:1:1, [2]500:1:1, [3]1000:1:1 [a]Determined by ^{1}H NMR spectroscopy, [b]Mn,th = ([2,3-DHB/[BnOH]) × % conversion × MW2,3-DHB, [c]Determined by gel permeation chromatography versus polystyrene standards

Heating rate	T_g (ºC)	T_m (ºC)	ΔH_m (J/g)
20 ºC/min	32.2	71.6	31.1
10 ºC/min	26.5	68.8	29.8
5 ºC/min	26.1	67.6	28.6
2 ºC/min	24.3	65.5	29.1

Table S2. Main thermal parameters extracted from 1st DSC heating scans depending on the heating rate.

	M_n (g/mol)	M_w (g/mol)	P.I.
Raw polymer	6915	12119	1,7526
After melting	6873	12484	1,8163

Table S3. Gel permeation chromatography (GPC) results before and after heating.

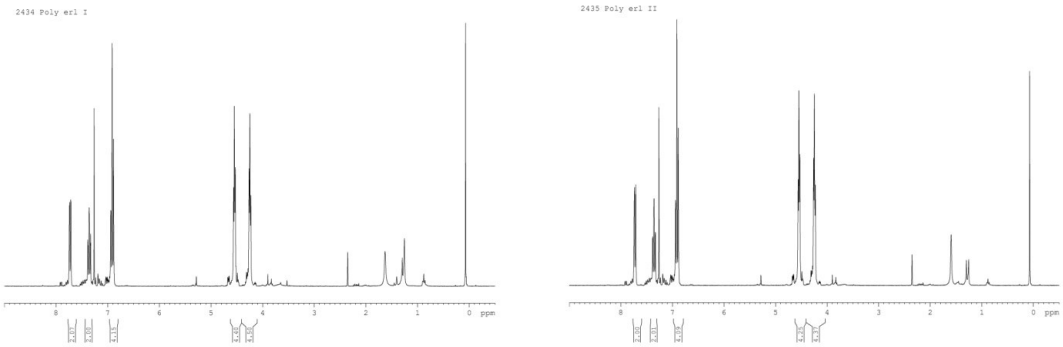

Fig. S2. ^{1}H NMR spectrum of P2HEB before (left) and after (right) melting.

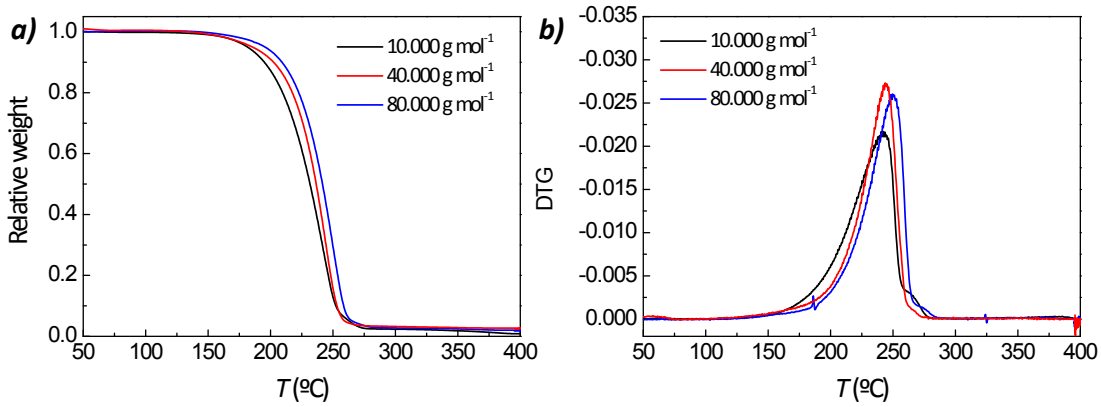

Fig. S3. Thermogravimetric traces (a) and weight lost rates (b) obtained at different heating rates under N_2 atmosphere for P2HEB having three different molecular weights.

Fig. S4. P2HEB solubility in different solvents has been evaluated. For left to right: hexane, toluene, chloroform, tetrahydrofuran (THF), cyclohexane and dimethylformamide (DMF). Best solvents are chloroform and DMF.

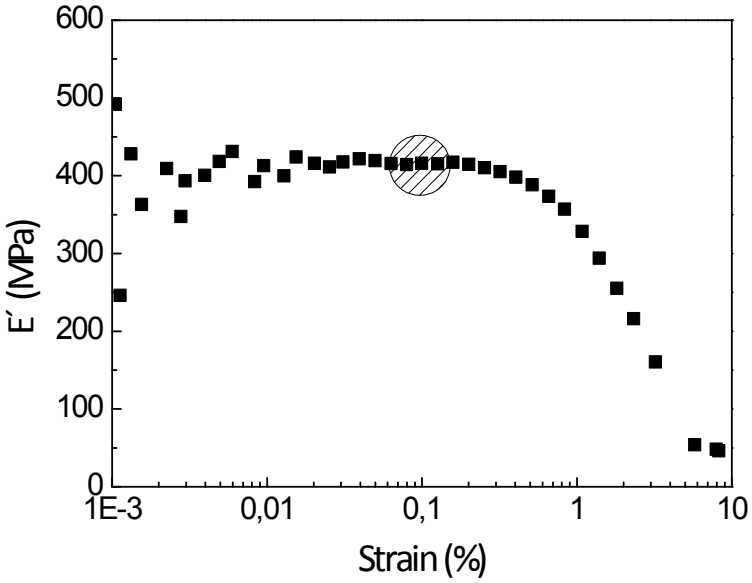

Fig. S5. Dynamic mechanical storage modulus (E´) vs. strain for P2HEB having 80.000 g mol^{-1}. The inset shows the strain range in which DMA experiments have been carried out.

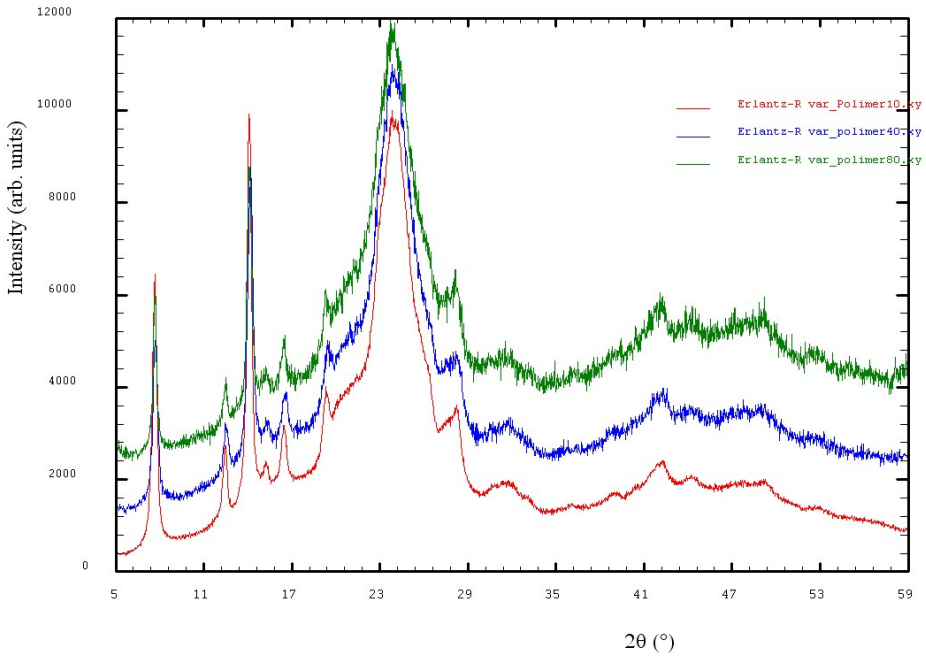

Fig. S6. Wide angle X-ray diffraction patterns of P2HEB having three different molecular weights (10.000, 40.000 and 80.000 g mol^{-1}).

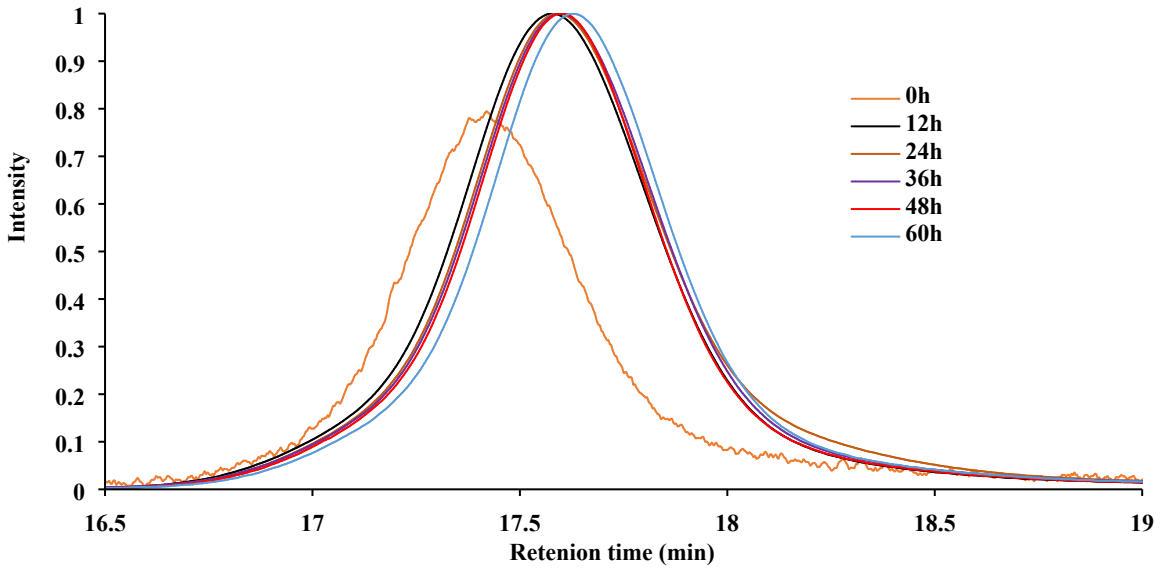

Fig. S7. GPC trace of P2HEB of molecular weight 78,600 $gmol^{-1}$ with their dispersity at 12-hour intervals to show the decrease in molecular weight as the degradation studies proceed.

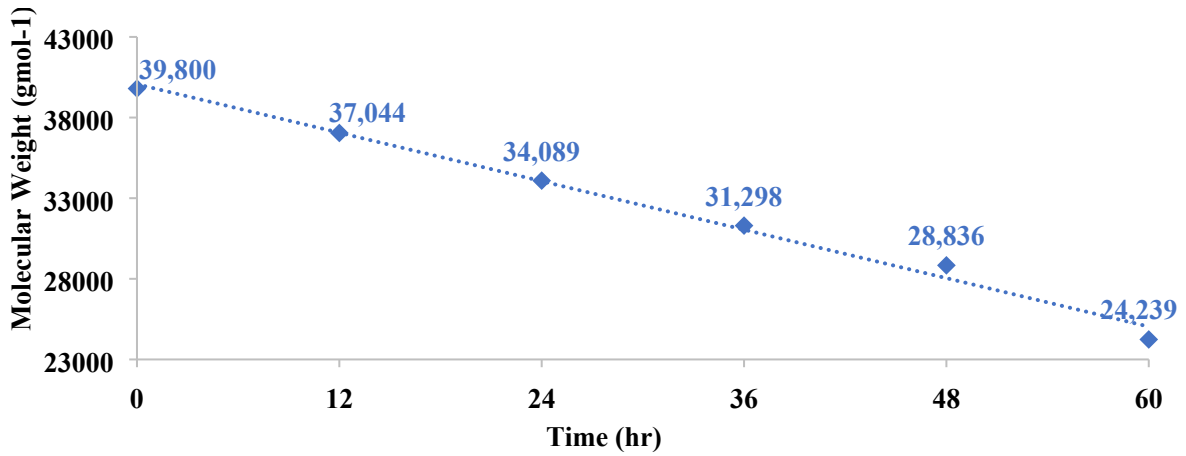

Fig. S8. Molecular weight determined by ^{1}H NMR at 12 hour intervals during enzymatic degradation of P2HEB of molecular weight 40,000 gmol^{-1}

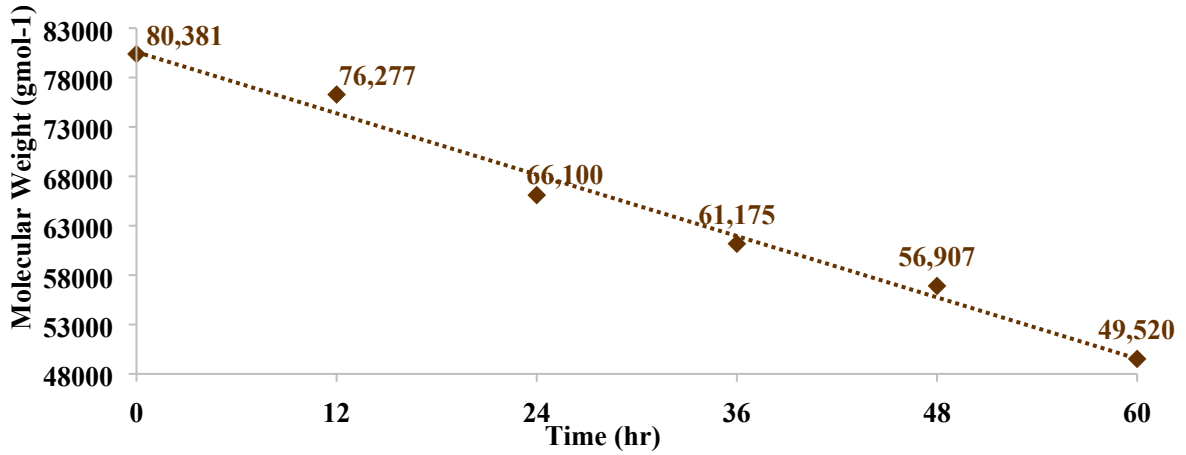

Fig. S9. Molecular weight determined by ^{1}H NMR at 12 hour intervals during enzymatic degradation of P2HEB of molecular weight 80,000 gmol^{-1}

Time (hr)	M_n (gmol^{-1})	Đ
0	40,300	1.23
12	39,400	1.26
24	39,000	1.25
36	38,600	1.23
48	37,500	1.26
60	36,100	1.27

Table. S4. P2HEB of molecular weight 40,300 gmol^{-1} determined by gel permeation chromatography, dn/dc value used to calculate M_n was 0.115, Đ=dispersity=M_w/M_n.

Time (hr)	M_n (gmol^{-1})	Đ
0	78,600	1.22
12	76,800	1.23
24	74,400	1.24
36	73,200	1.23
48	72,500	1.25
60	70,100	1.24

Table. S5. P2HEB of molecular weight 78,600 gmol^{-1} determined by gel permeation chromatography, dn/dc value used to calculate M_n was 0.11, Đ=dispersity=M_w/M_n.