Supporting for

Synthesis and properties of ABA-triblock copolymers from polyester A-blocks and easily degradable polyacetal B-blocks

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Molecular weight calculation

Assay of Sulphur content

0.2 g of copolymers were placed into glass vessels, then 65% nitric acid (3 mL) and 36% hydrochloric acid (1 mL) spectrally pure were added. Samples were pre-mineralized at 25 °C within 25 min. by using an ultrasonic bath. Then, the samples were mineralized in the UltraWave closed microwave system in two steps, as presented in the Table 1.

Table S1. Conditions of mineralization

Step	Time [min.]	T1 [^{0}C]	T2 [^{0}C]	Pressure [Ba]	Power [W]
1	25	240	70	110	1500
2	10	240	70	110	1500

After mineralization, the samples were transferred to 25 mL volumetric flasks and filled with deionized water and characterized. The Sulphur content was determined to be 932 ppm.

Table S2. The diffusion coefficient for signals belonging to the $PDXL_{7000}$ and PLA_{7500}-$PDXL_{7000}$-PLA_{7500} block copolymer

$PDXL_{7000}$	
Signal [ppm]	Difusion coefficiency
4.75	$1.26 \cdot 10^{-6}$
3.70	$1.26 \cdot 10^{-6}$
PLA_{10000}	
5.17	$1.32 \cdot 10^{-6}$
1.60	$1.34 \cdot 10^{-6}$
PLA_{7500}-$PDXL_{7000}$-PLA_{7500}	
5.12	$9.95 \cdot 10^{-7}$
4.75	$1.02 \cdot 10^{-6}$
4.40-4.28	$1.02 \cdot 10^{-6}$
3.70	$9.99 \cdot 10^{-7}$
1.60	$1.01 \cdot 10^{-6}$

Table S3. Thermal properties of selected ABA copolymers (the

second heating cycle at a rate of 10 ˚C/min in a DSC analysis)

Copolymer	Ester content mol %	DSC				TGA	
		T_g [°C]	T_m PDXL [°C]	T_m polyester [°C]	ΔH_m [J/g]	T_1 [°C]	T_2 [°C]
PLA-PDXL$_{7000}$-PLA 1	26	-41	-----	-----	-----	227	308
PLA-PDXL$_{7000}$-PLA 2	35	-26	-----	-----	-----	229	299
PLA-PDXL$_{7000}$-PLA 3	44	-13	-----	123	12.78	239	298
PLA-PDXL$_{7000}$-PLA 4	53	3	-----	145	23.51	239	308
PLA-PDXL$_{7000}$-PLA 5	60	3	-----	150	27.24	243	324
PCL-PDXL$_{7000}$-PCL 1	42	-63	31	53	68.34	305	355
PCL-PDXL$_{7000}$-PCL 2	65	-65	24	51	62.74	302	371

T_g, T_m - temperature of glass transition and melting

ΔH_m - polyester enthalpy of melting

T_1, T_2 - temperature of the maximum decomposition

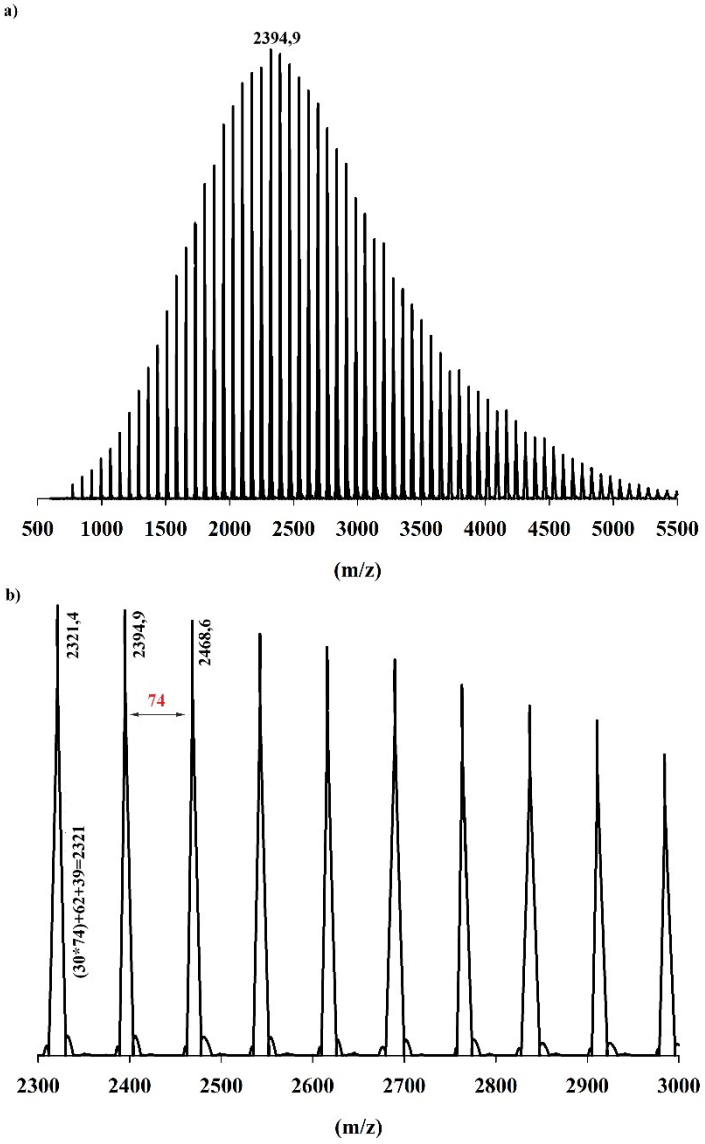

Figure S1. MALDI TOF of purified PDXL (M_{nNMR}= 2400 g/mol)

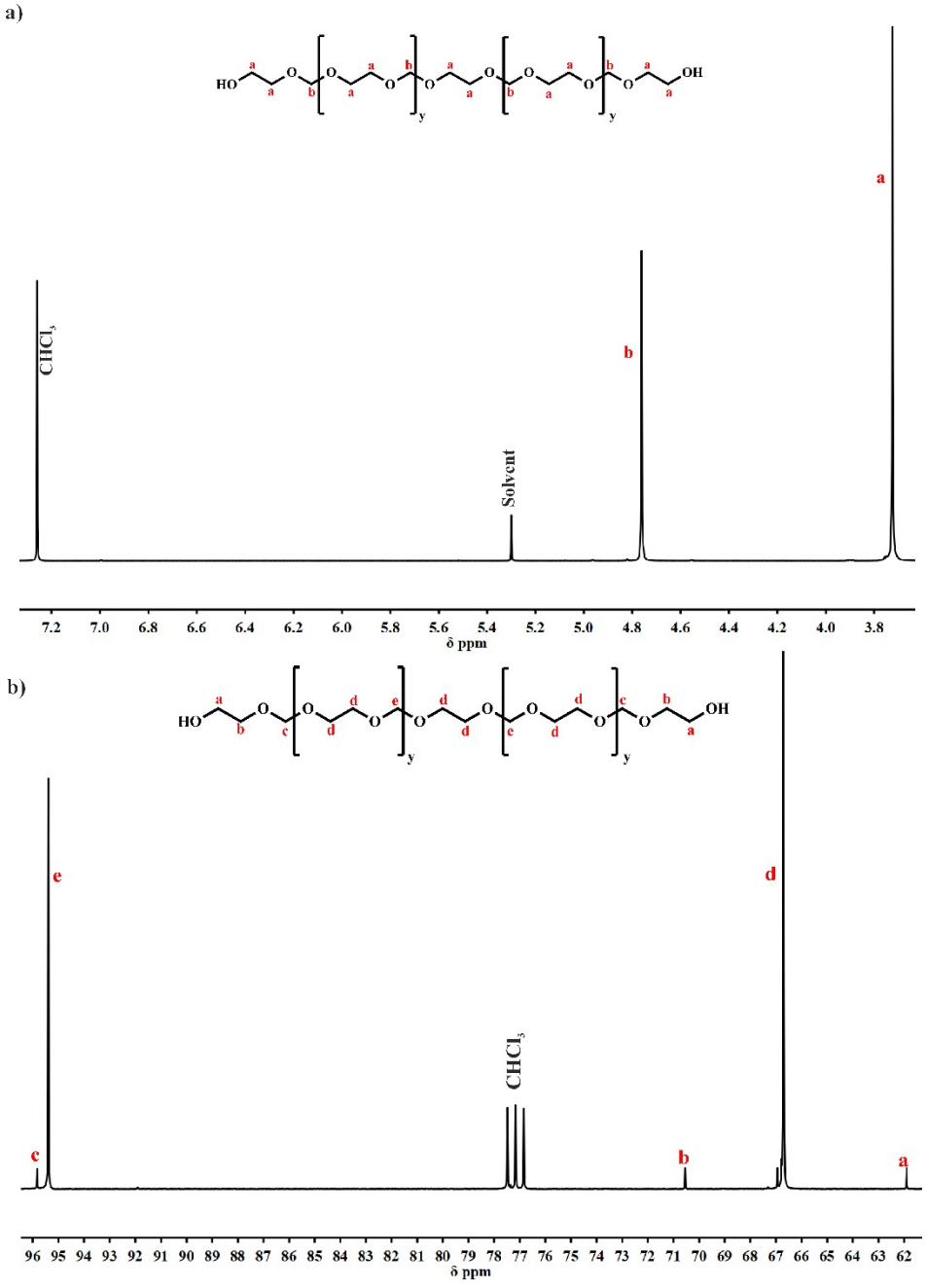

Figure S2. The ^{1}H and ^{13}C NMR spectra (400 MHz, $CDCl_3$) of purified $PDXL_{7000}$

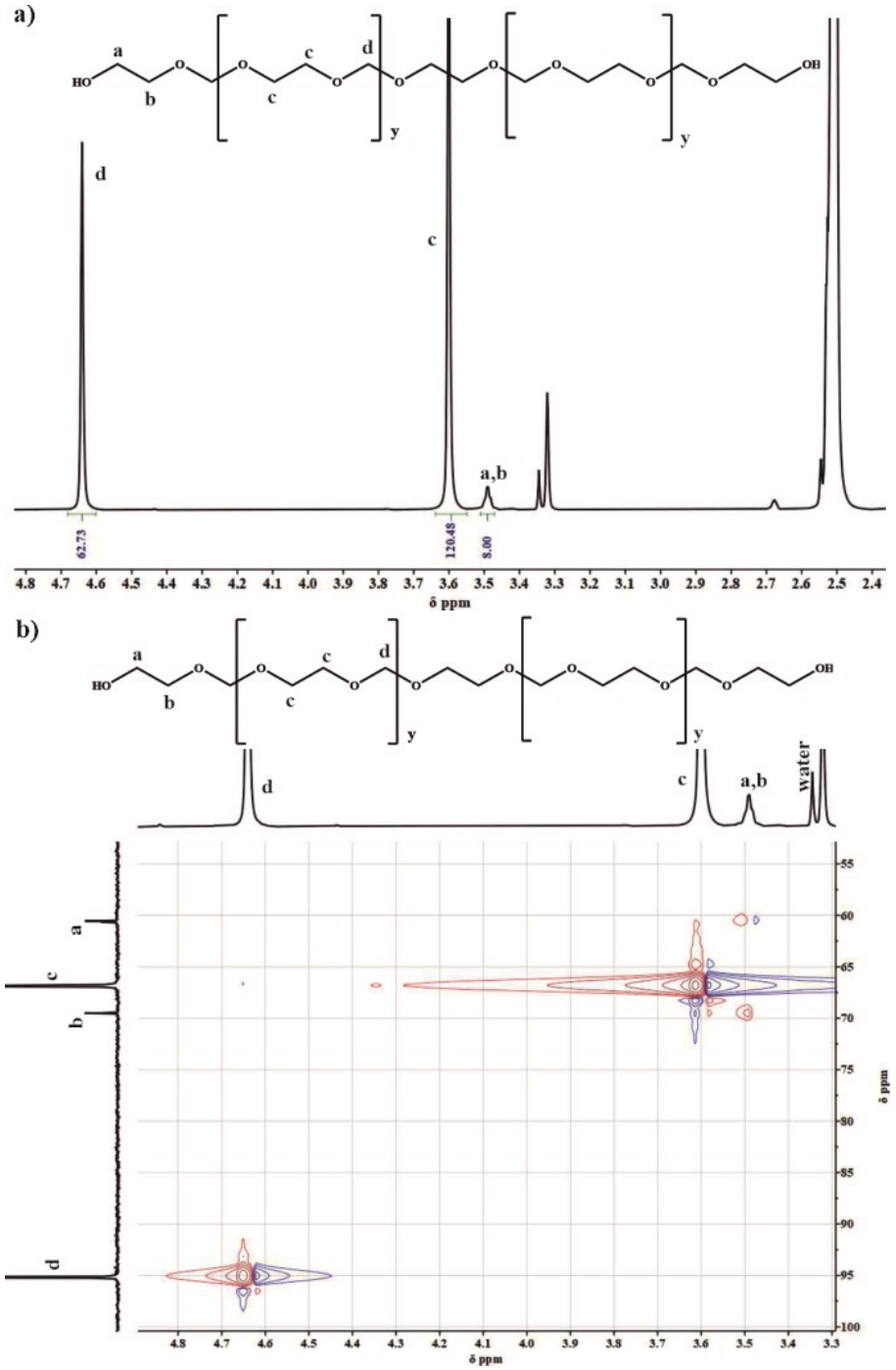

Figure S3. ^{1}H NMR spectrum, and 2D HSQC NMR (400 MHz, DMSO-d_6) of $PDXL_{2400}$ diol

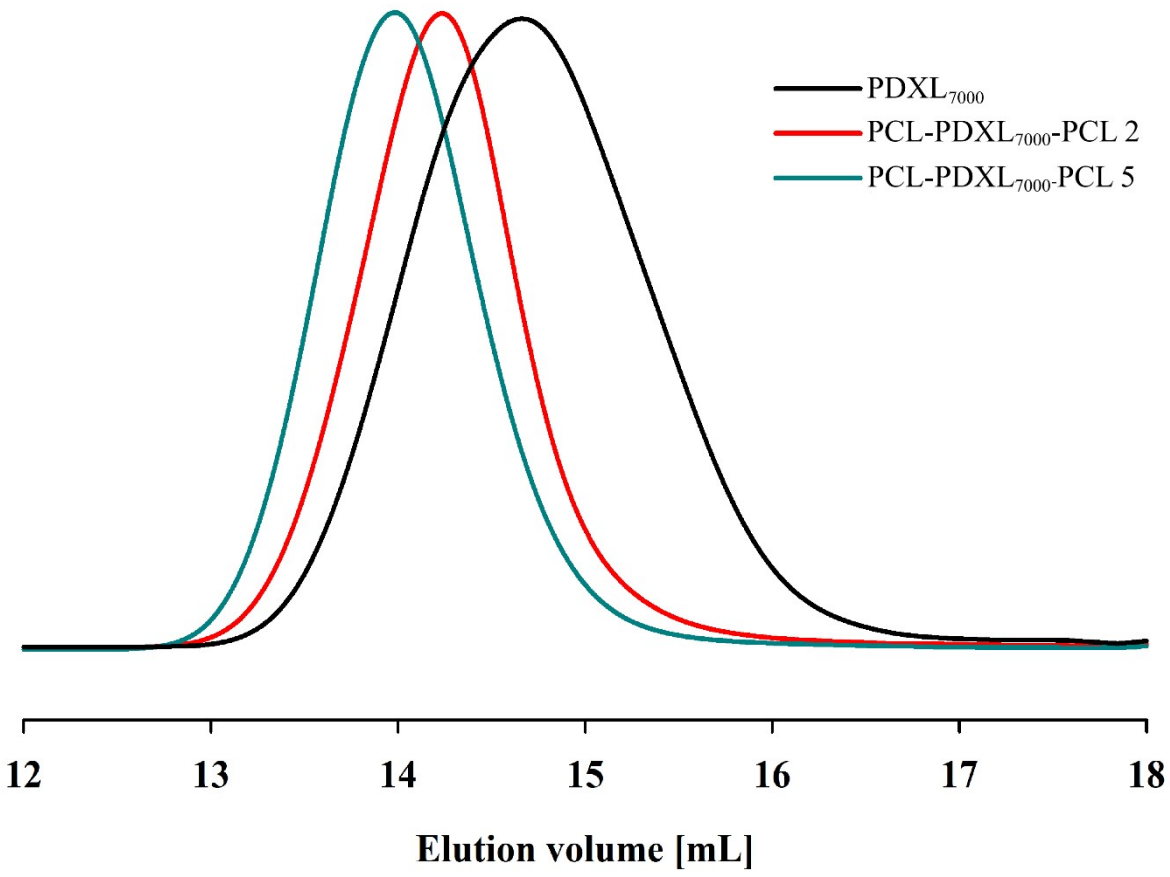

Figure S4. SEC trace of polyacetal macroinitiator HO-PDXL$_{7000}$-OH and prepared purified PCL-PDXL$_{7000}$-PCL copolymers

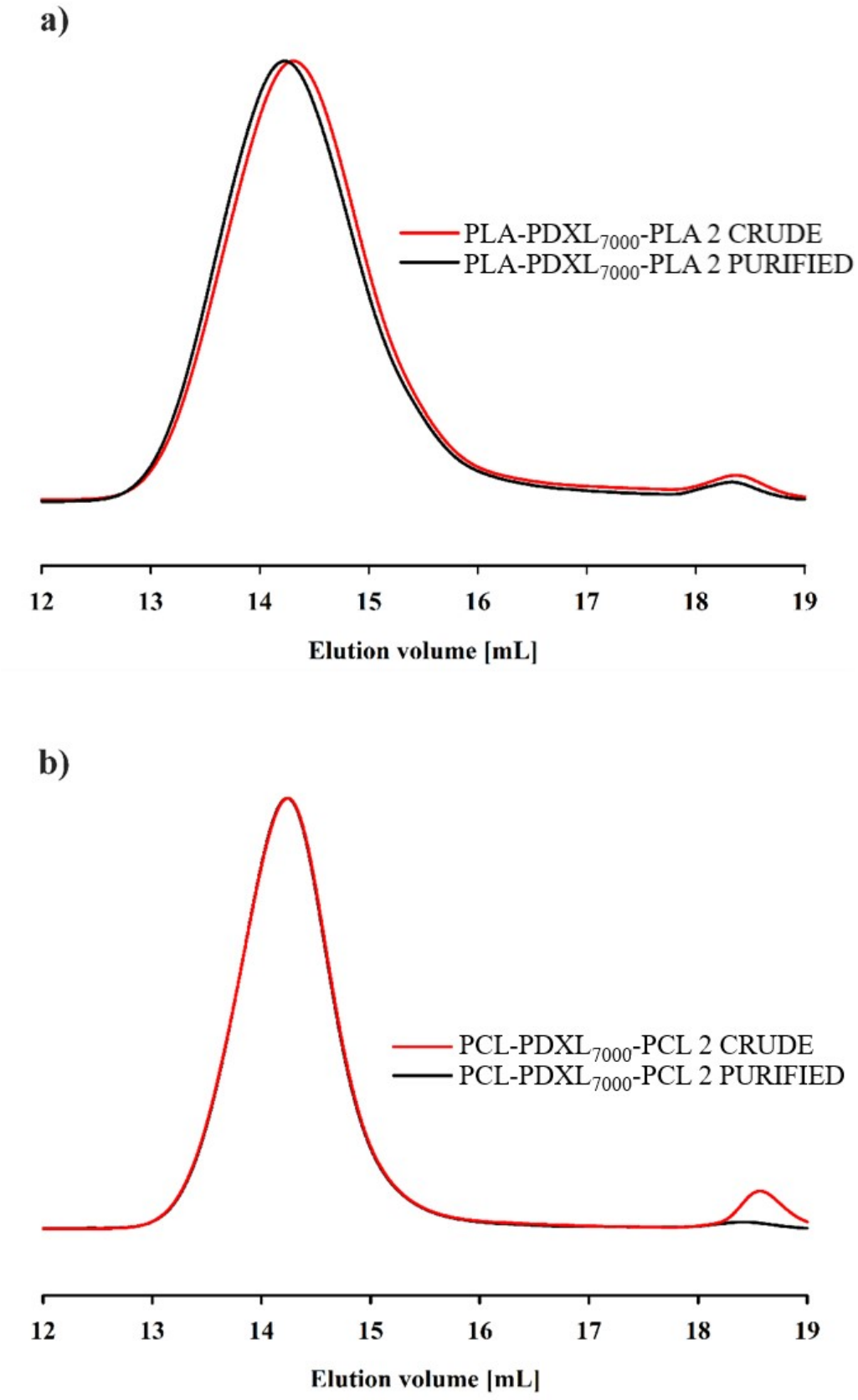

Figure S5. The SEC traces of crude and purified a) PLA-PDXL$_{7000}$-PLA copolymer and b) PCL-PDXL$_{7000}$-PCL copolymer

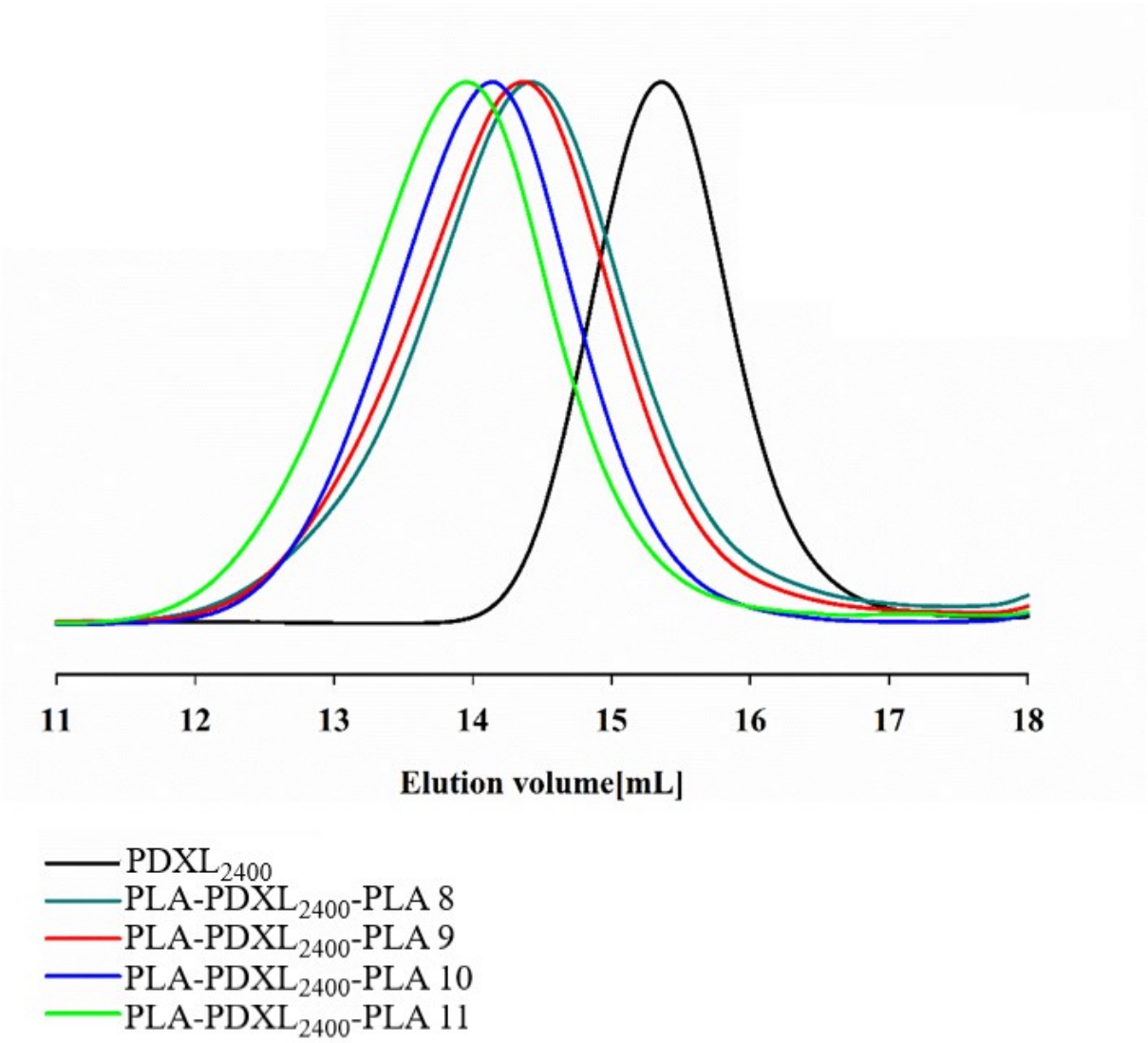

Figure S6. SEC curves of polyacetal macroinitiator HO-PDXL$_{2400}$-OH and resulting purified PLA-PDXL$_{2400}$-PLA copolymers.

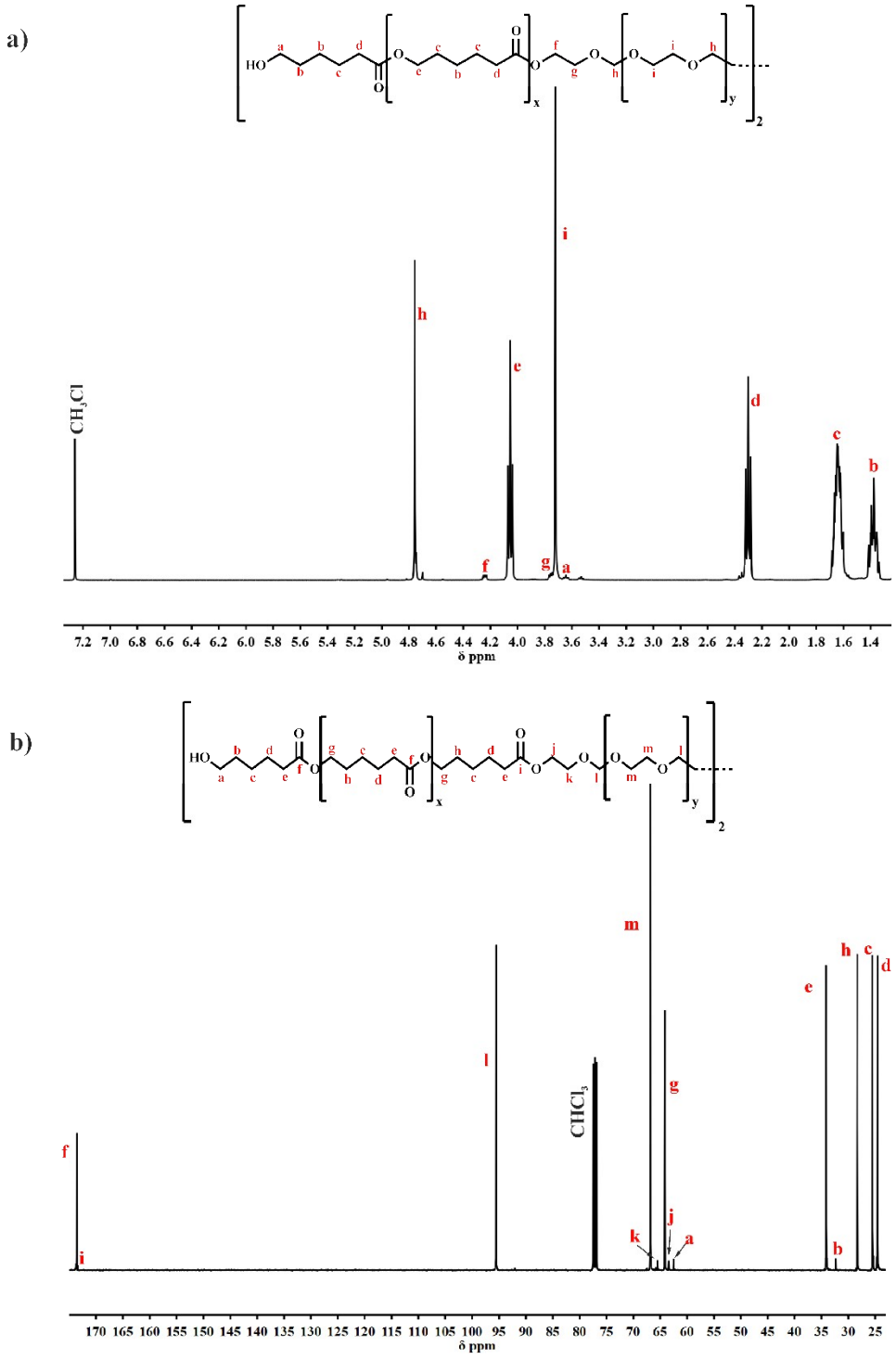

Figure S7. The ^{1}H and ^{13}C NMR spectra (400 MHz, $CDCl_3$) of purified PCL-$PDXL_{7000}$-PCL copolymer.

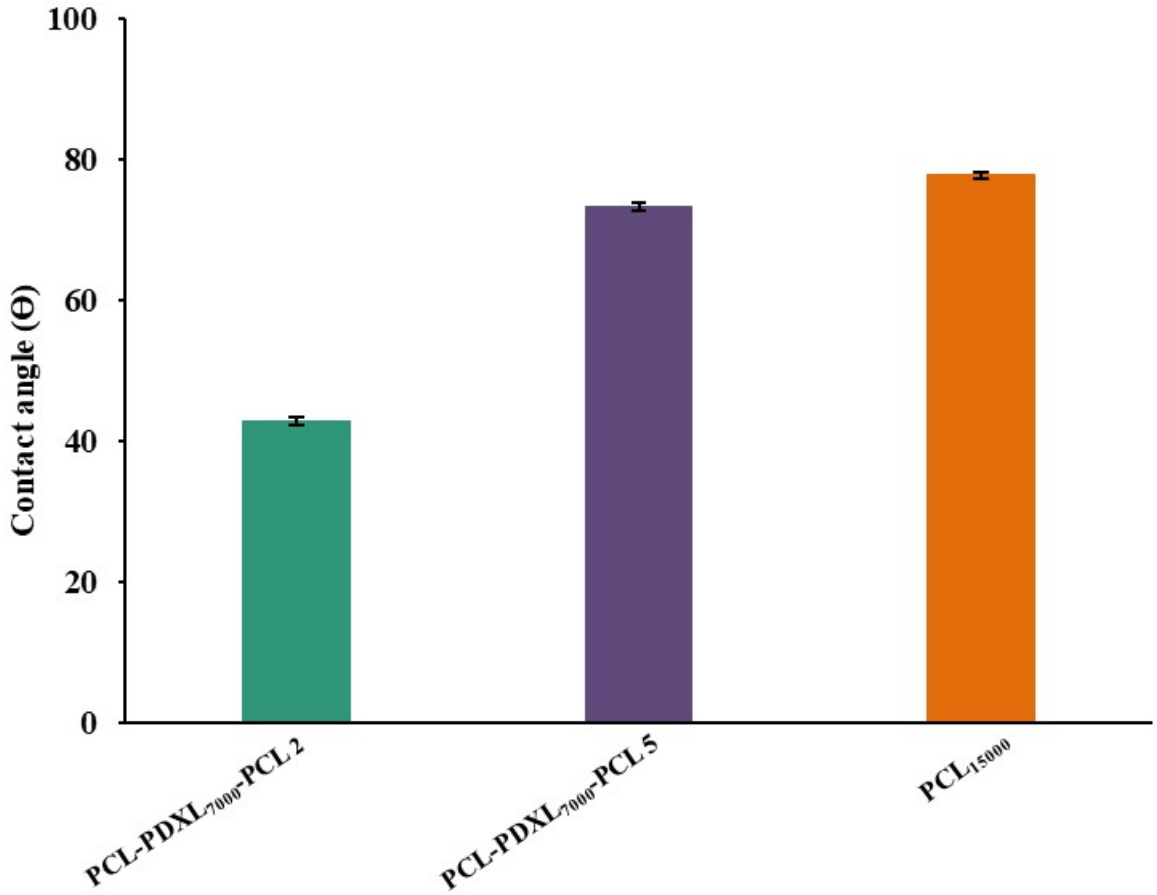

Figure S8. Assessment of mean static contact angles of PCL-PDXL$_{7000}$-PCL block copolymers in comparison to pure PDXL$_{7000}$ and PCL$_{14000}$.

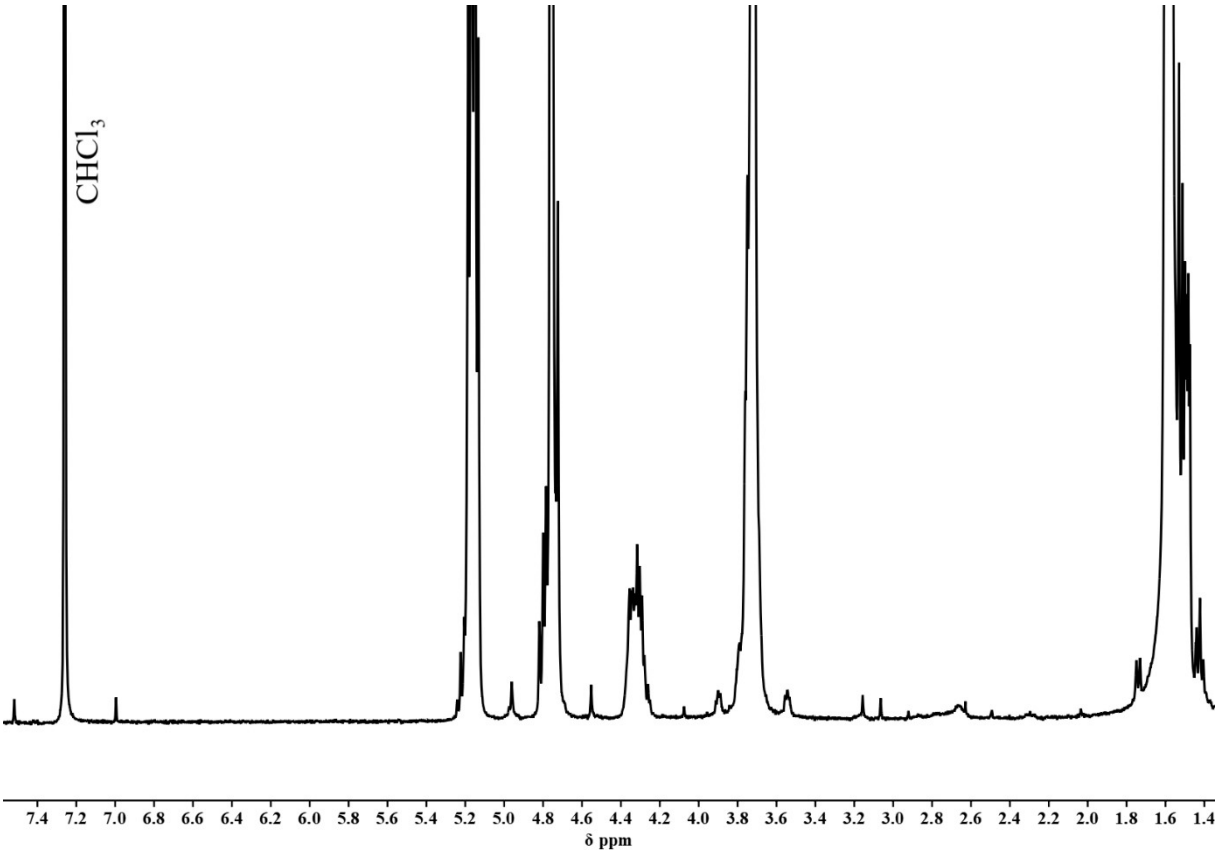

Figure S9. The ^{1}H NMR of the films for the WCA measurements ($CDCl_3$, 400 MHz)

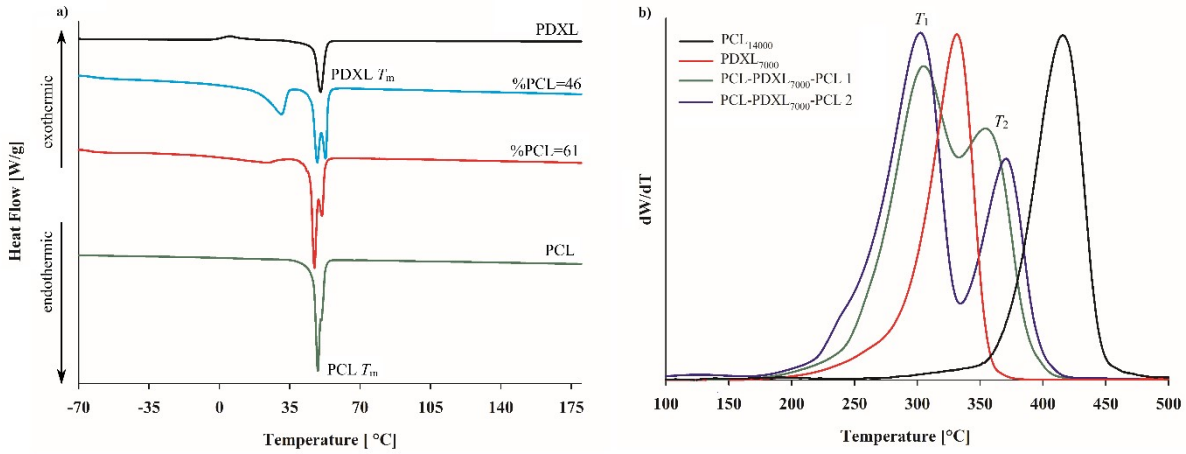

Figure S10. a)The DSC thermograms registered during the second scan and b) TGA curves for starting HO-PDXL$_{7000}$-OH diol, PCL$_{14000}$, and PCL-PDXL$_{7000}$-PCL. For DSC analysis samples were heated at 10 ˚C/min and cooled at 10 ˚C/min, whereas for TGA measurement samples were heated at 20 ˚C/min.

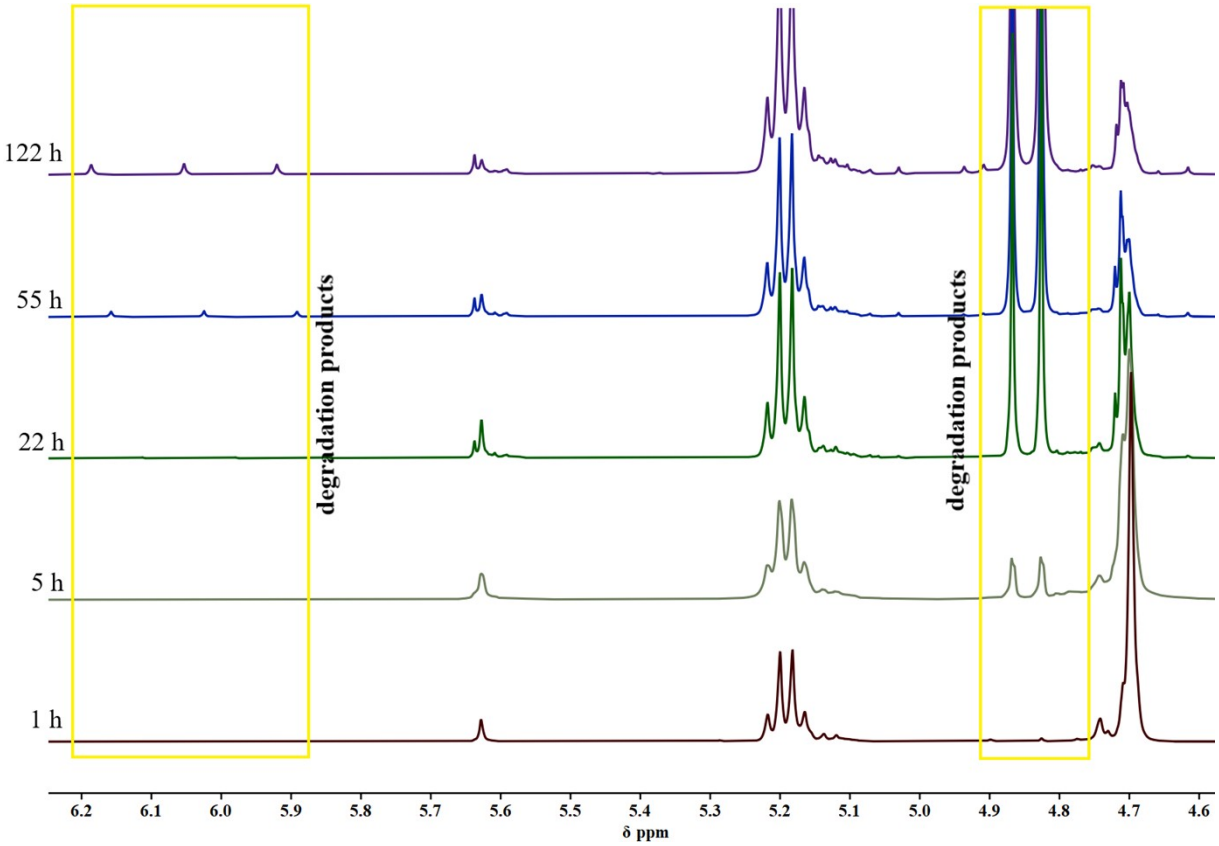

Figure S11. Acid induced degradation of PLA-PDXL$_{7000}$-PLA copolymer followed by ^{1}H NMR spectra([acetal units]:[H^+] = 10:1), (CD_3CN, 400 MHz).

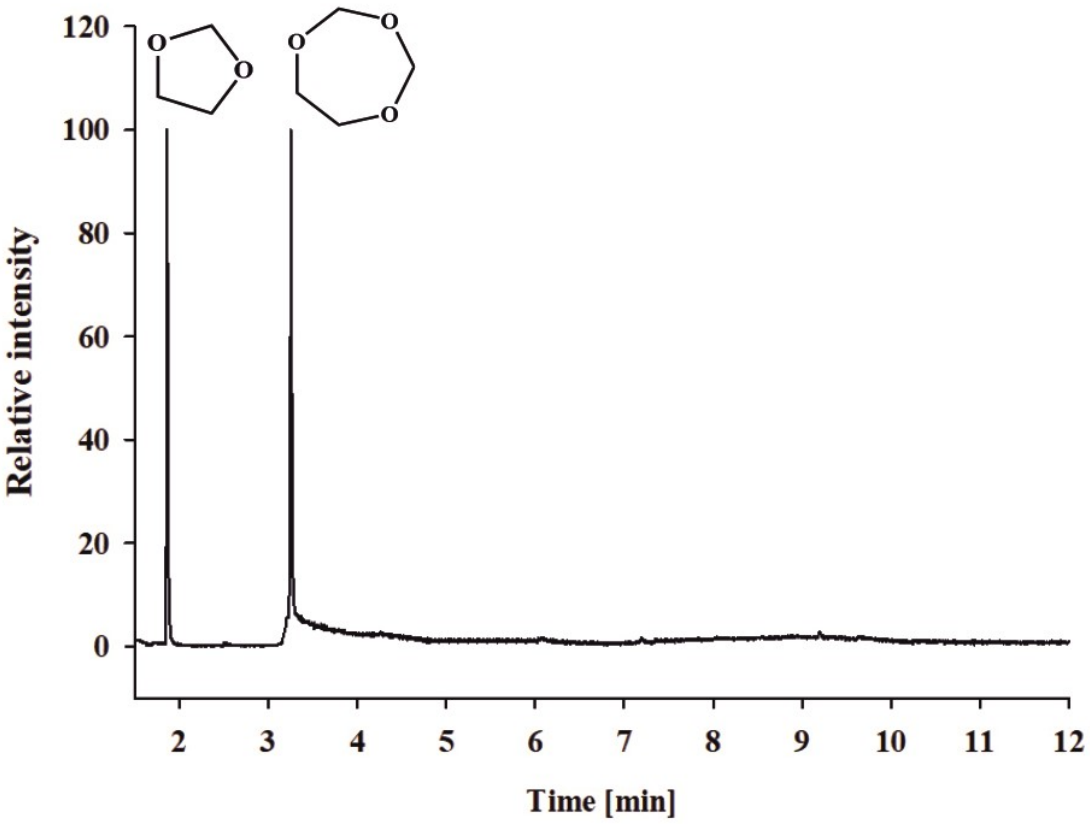

Figure S12. The GC spectra of acid induced degradation of PLA-PDXL$_{7000}$-PLA after 122h