

Supplementary information

Table S1: Overview of all product and semi-products mentioned in the manuscript

Number	Chemical structure
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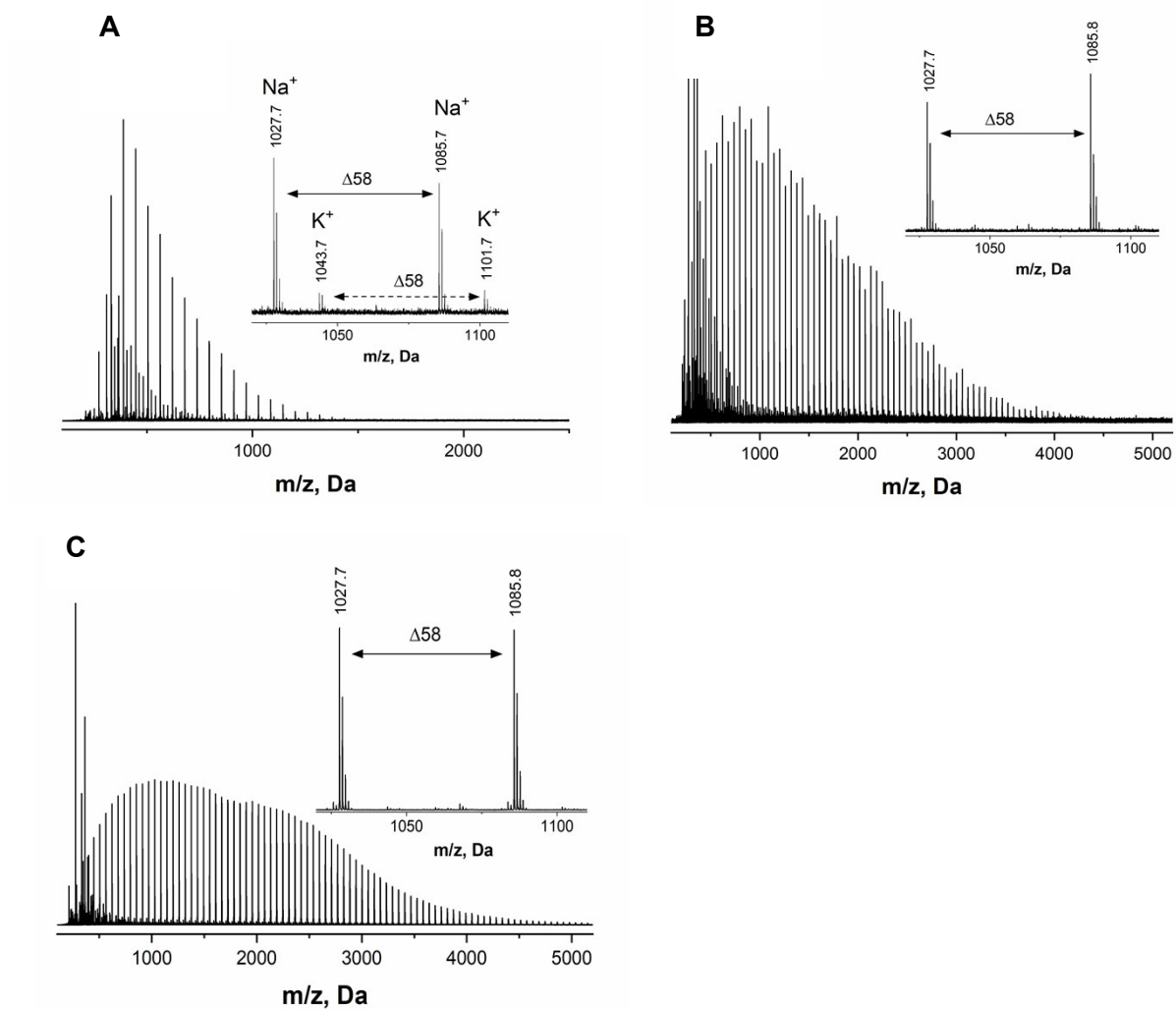


Figure S1: MALDI TOF mass spectra of the initial bio-based poly(trimethylene glycol) PO3G250 (A), PO3G650 (B) and PO3G1000 (C), and assigned structure (D). The peaks correspond to sodium adducts of molecular ions $[M+Na]^+$ (unless otherwise marked).

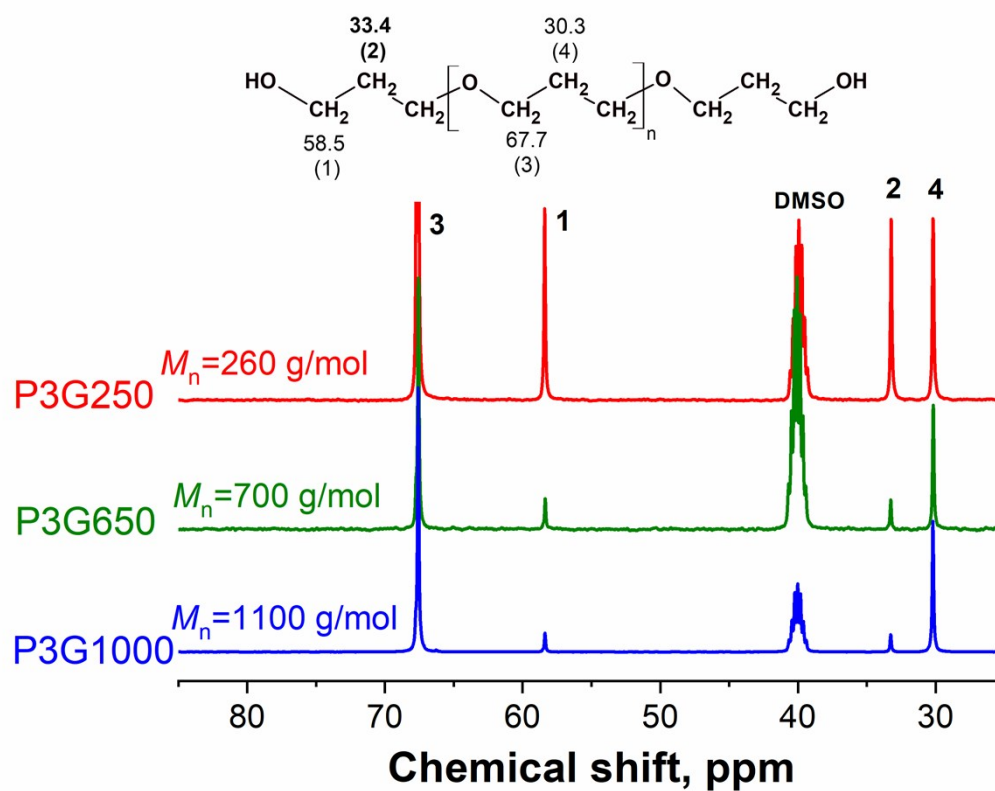


Figure S2: ^{13}C NMR spectra of the original PO3G polyols (PO3G250, PO3G650 and PO3G1000). The number-average molecular weights (M_n) of the PO3G polyols were calculated using integral values of end-groups (signal 2 at 33.4 ppm) and repeating units (signal 4 at 30.3 ppm).

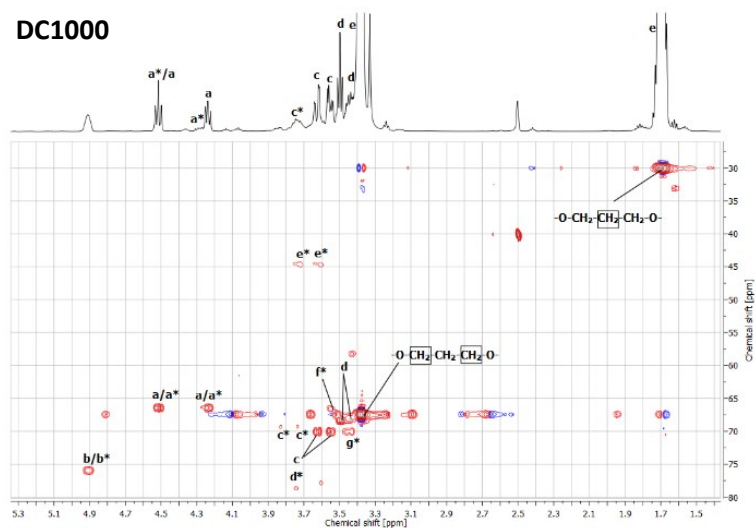
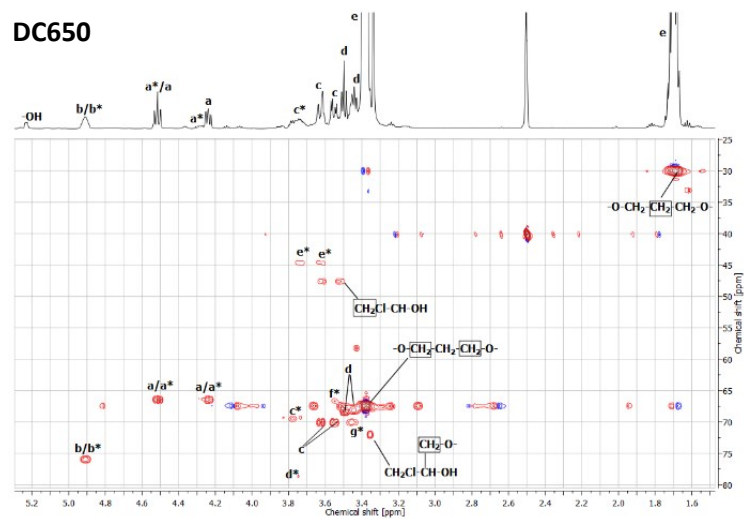
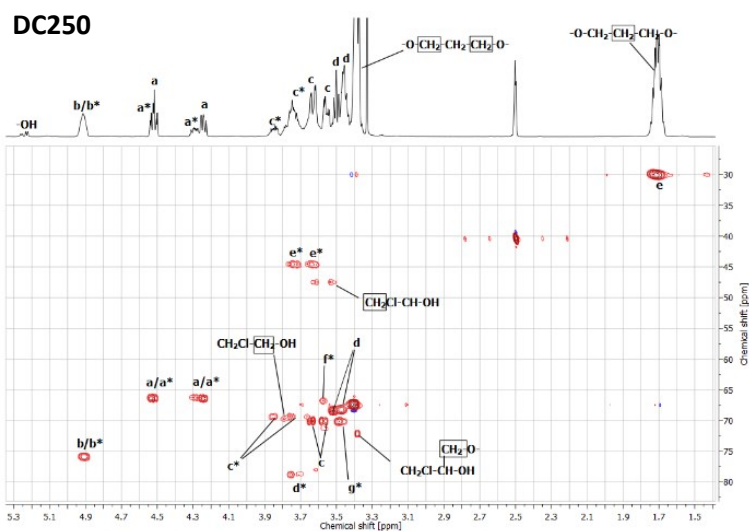


Figure S3: ^1H - ^{13}C HSQC spectra of the synthesized bis(cyclic carbonate)s showing proton signals of cyclic carbonate ring in the α -C (a) and β -C (b) positions at 4.25 ppm (a), 4.50 ppm (a), 4.90 ppm (b), respectively.

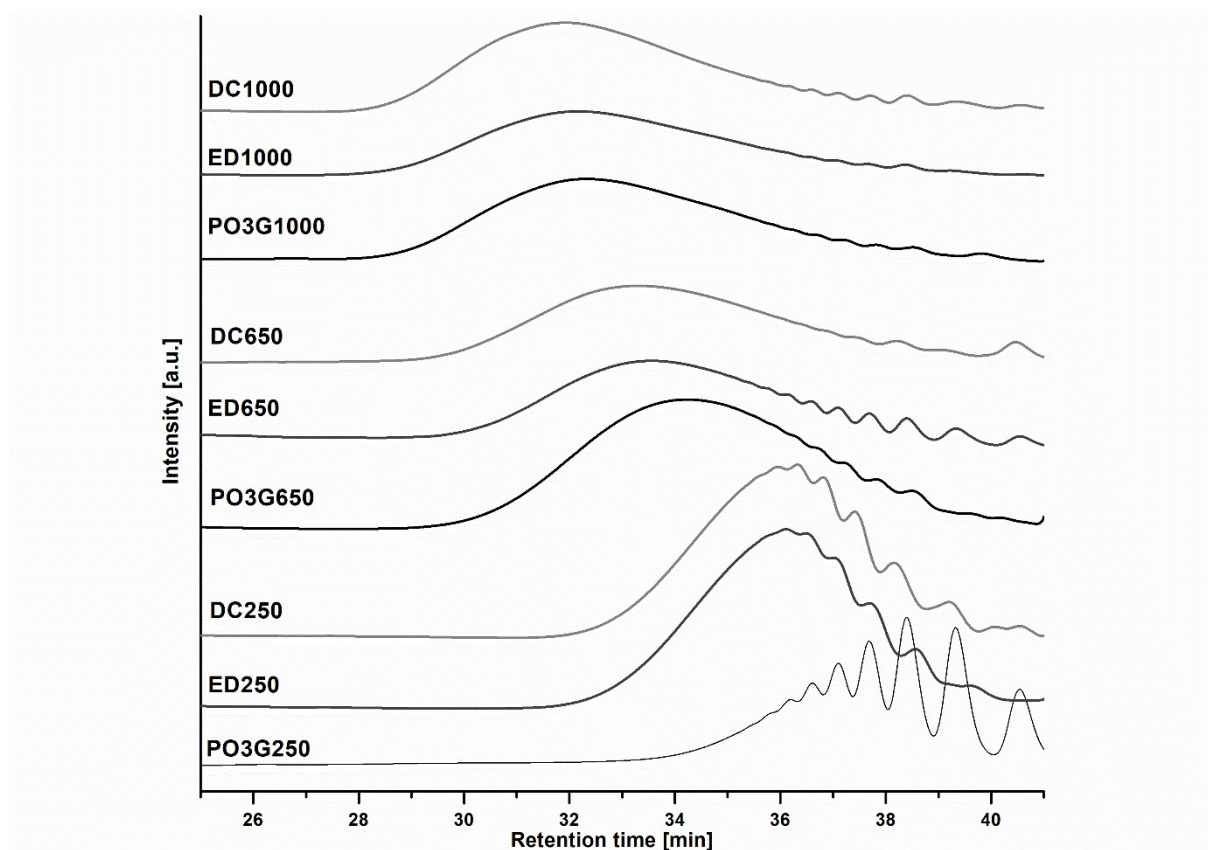


Figure S4: SEC records of the initial bio-based poly(trimethylene glycol)s (PO3G250, PO3G650 and PO3G1000), the synthesized diglycidyl ethers (ED250, ED650 and ED1000) and the synthesized bis(cyclic carbonate)s (DC250, DC650 and DC1000).

Table S2 SEC results: number average molar mass(M_n) and dispersity (\mathcal{D}) of original polyols (PO3G250, PO3G650 and PO3G1000), epoxidized polyols (ED250, ED650 and ED1000) and bis(cyclic carbonate)s (DC250, DC650 and DC1000). PS calibration was applied.

Sample	M_n (SEC)	\mathcal{D} (SEC)
	[g mol ⁻¹]	
PO3G250	260	1.6
ED250	520	1.4
DC250	540	1.4
PO3G650	700	2.5
ED650	790	1.8
DC650	800	2.0
PO3G1000	1100	2.2
ED1000	1100	2.5
DC1000	1200	2.2

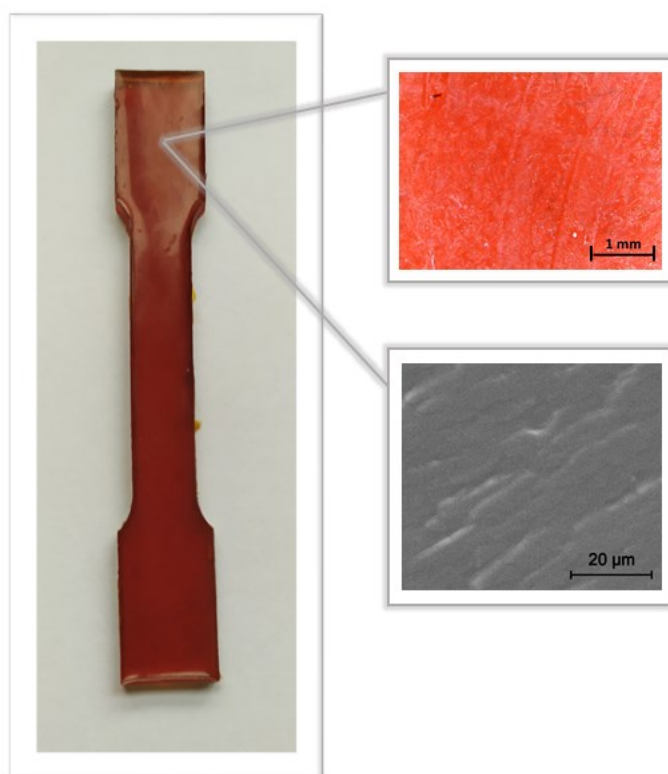


Figure S5: Photograph of NIPU650, optical microscope and scanning electron microscope images

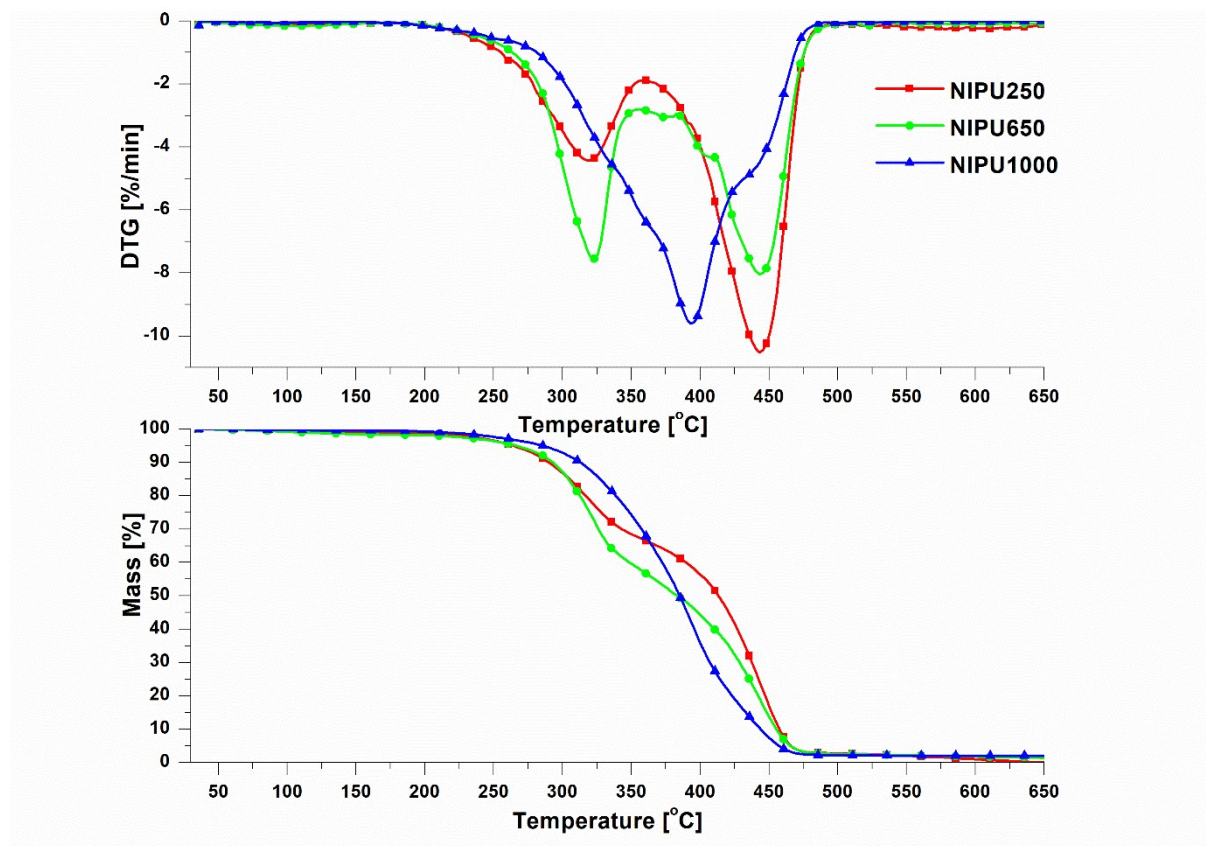


Figure S6: TGA and DTG curves of prepared non-isocyanate polyurethanes

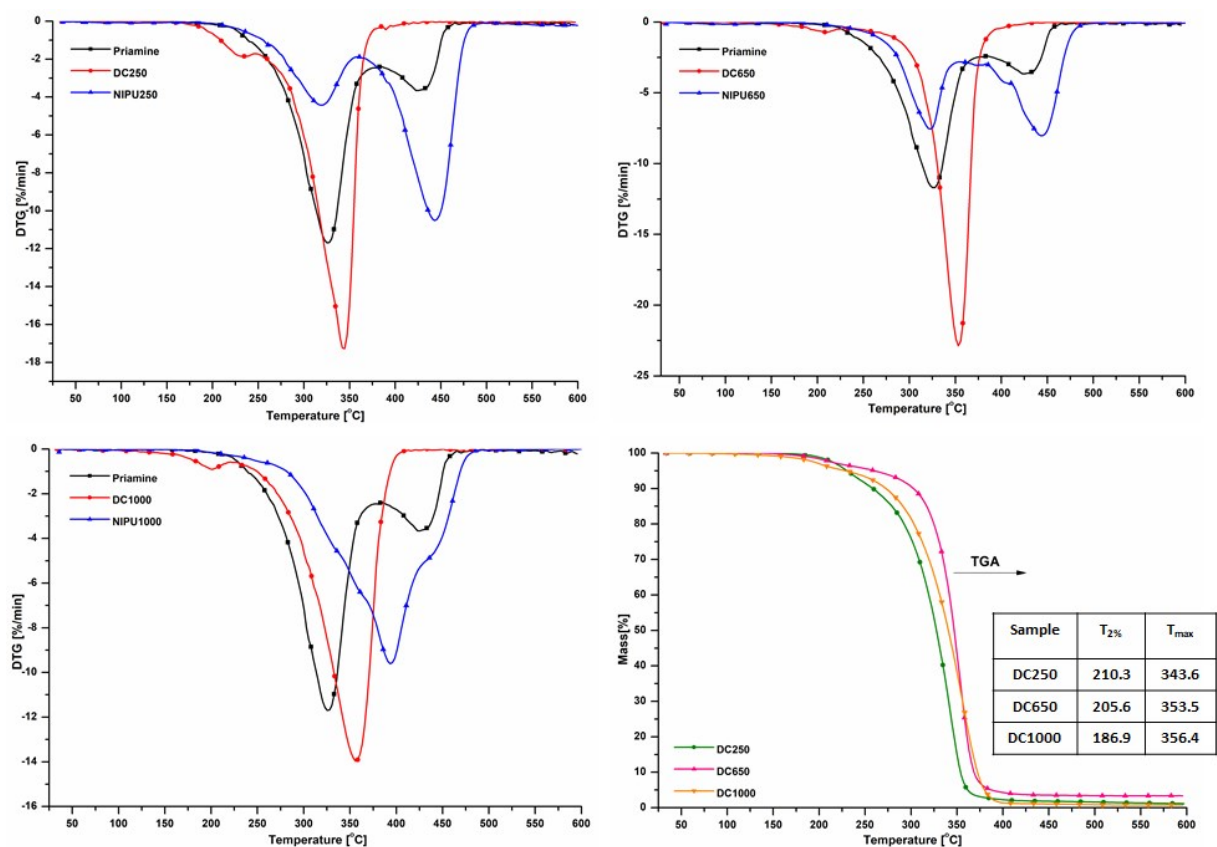


Figure S7: Thermal stability of pure bis(cyclic carbonate)s (DC250, DC650, and DC1000) and amine hardener (Priamine 1071) in conjunction with NIPUs synthesized on their basis