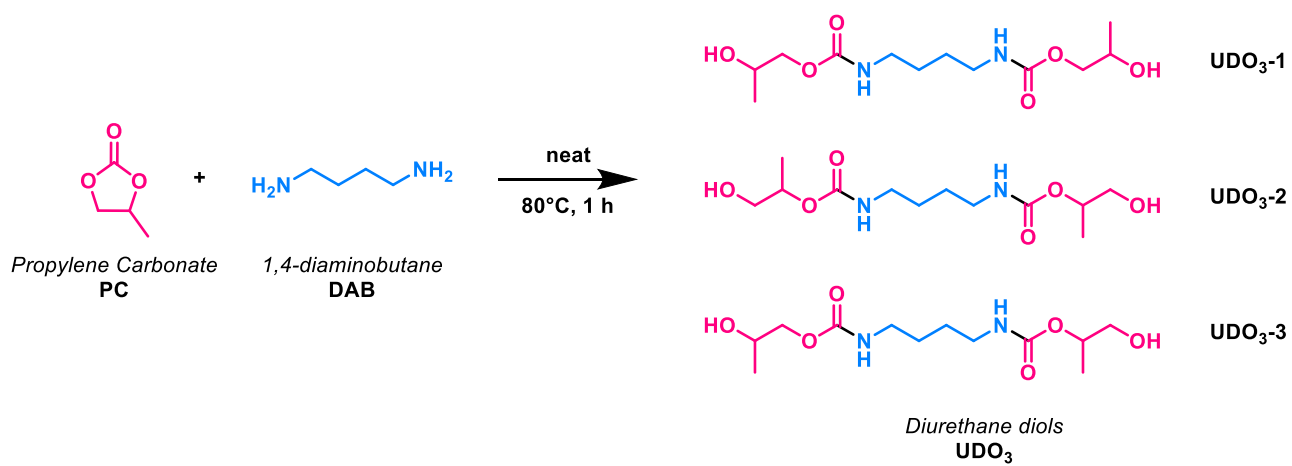


Isocyanate-free urethanediol itaconates as biobased liquid monomers in photopolymerization-based 3D printing

R. Carmenini, C. Spanu, E. Locatelli, L. Sambri, M. Comes Franchini and M. Maturi**

Department of Industrial Chemistry “Toso Montanari”, University of Bologna, Via P. Gobetti 85,
40129 Bologna (Italy)

SUPPORTING INFORMATION



Scheme S1. Chemical structure of the different isomers of UDO₃ formed by aminolysis of propylene carbonate with 1,4-diaminobutane.

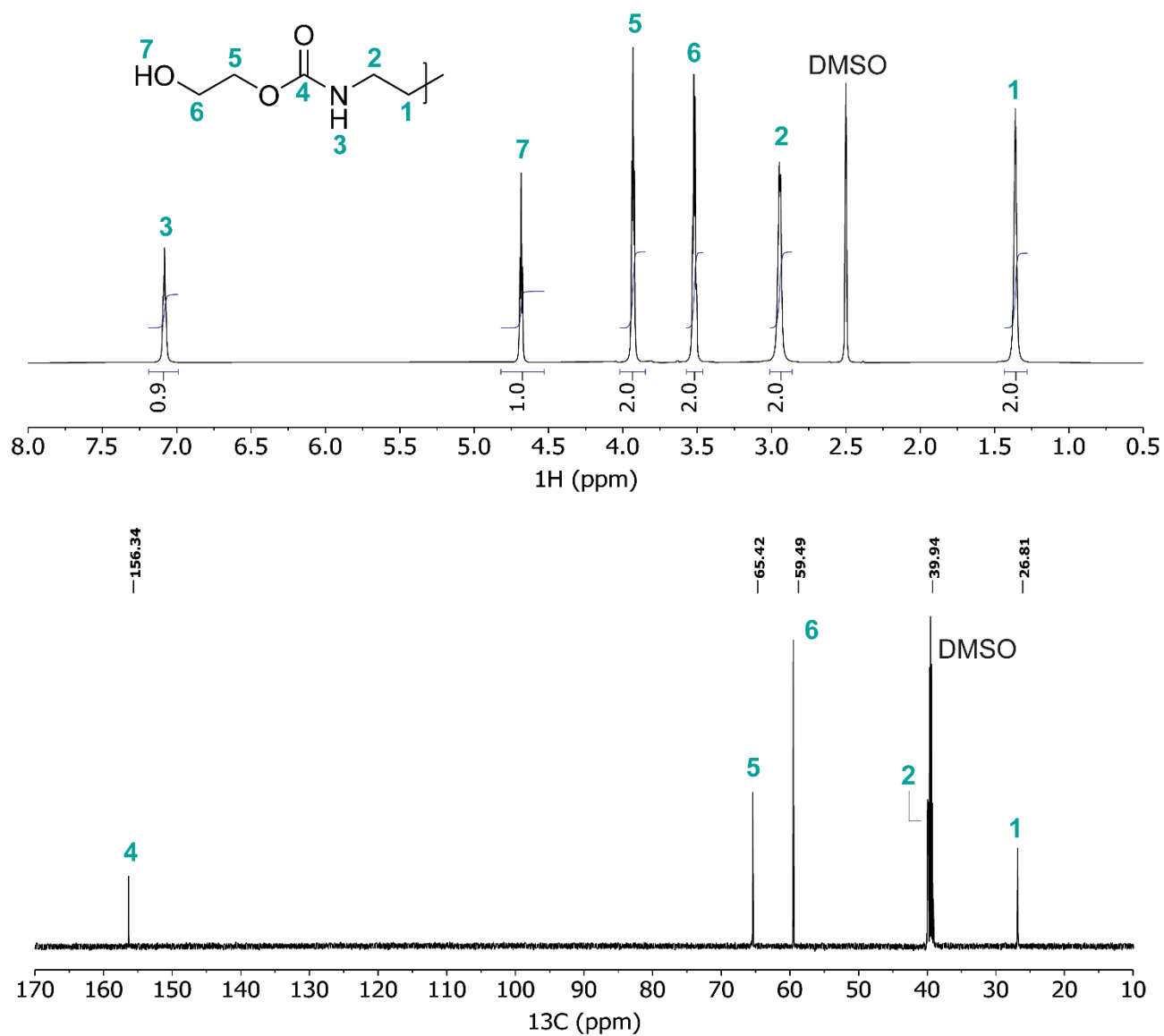


Figure S1. ¹H- (600 MHz, DMSO-*d*₆, top) and ¹³C- (150 MHz DMSO-*d*₆, bottom) NMR spectra of UDO₂. The signal corresponding to carbon 2 is partially overlapped with the septuplet of DMSO, but still distinguishable.

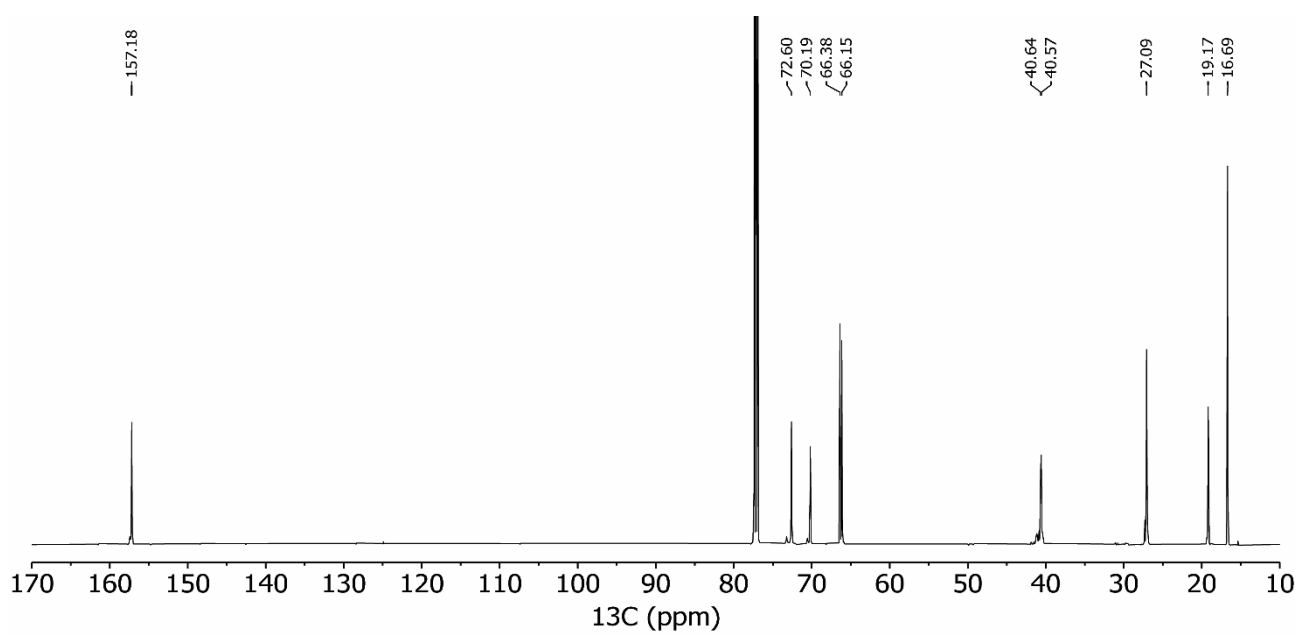


Figure S2. ¹³C-NMR spectrum (150 MHz, CDCl₃) of UDO₃.

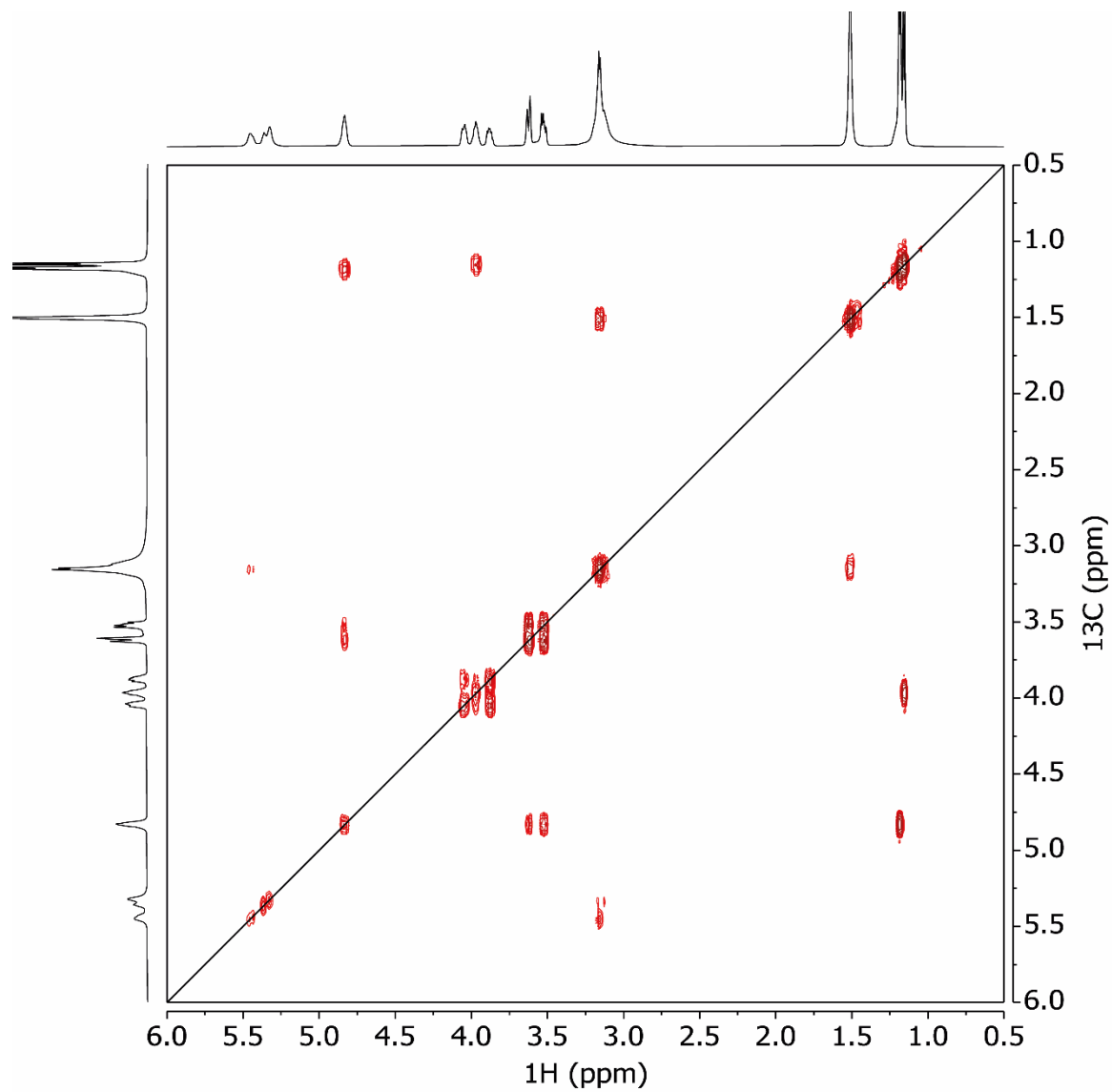


Figure S3. ^1H - ^{13}C COSY (600 MHz, CDCl_3) NMR analysis of the diurethane diols UDOs.

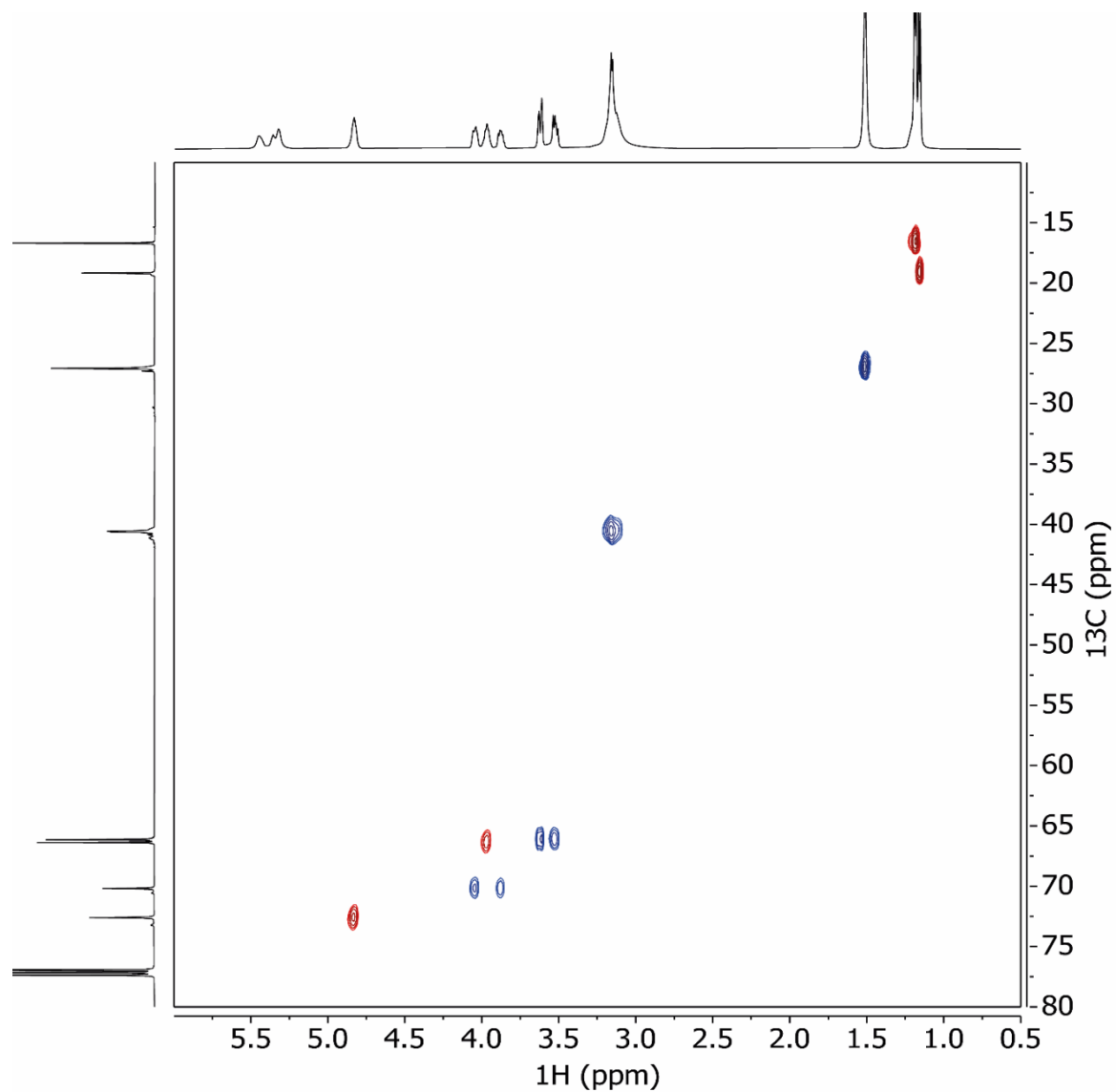
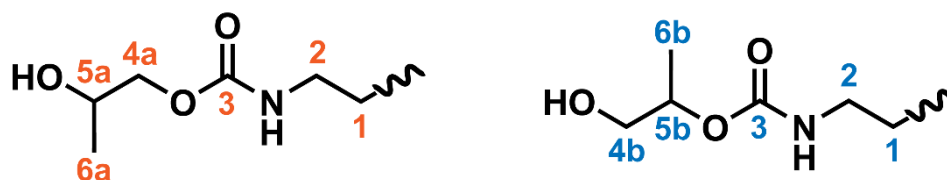


Figure S4. ^1H - ^{13}C HSQC (600 MHz, CDCl_3) NMR analysis of the diurethane diols UDOs. Positive peaks are colored red and are related to CH and CH_3 groups, while negative peaks are colored blue and are related to CH_2 groups.



	^1H (ppm)	^{13}C (ppm)
1	1.50	27.09
2	3.16	40.64 and 40.57
3	-	157.18
4a	3.87 and 4.04	70.19
4b	3.51 and 3.61	66.15
5a	3.97	66.38
5b	4.83	72.60
6a	1.16	19.17
6b	1.18	16.69

Table S1. NMR spectral attributions for UDO_3 .

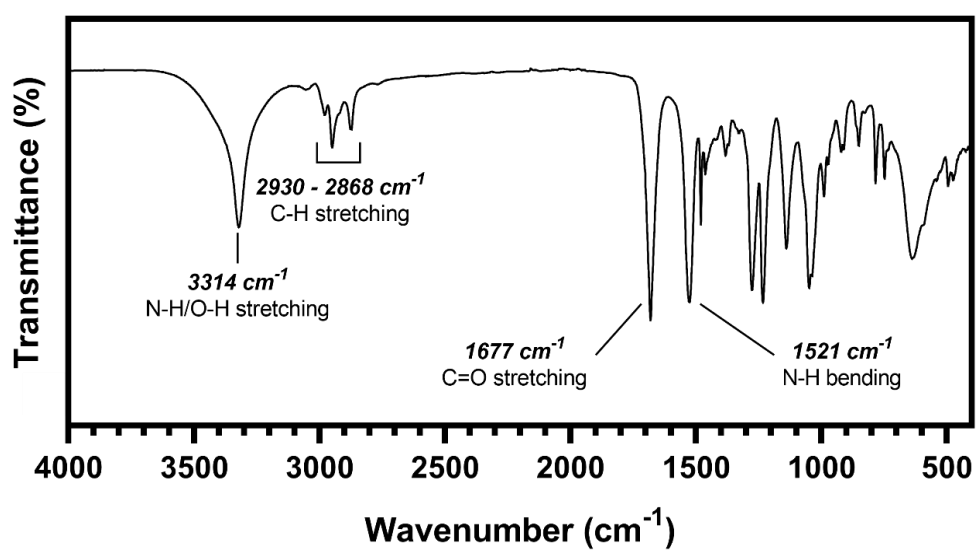


Figure S5. ATR-FTIR spectrum of UDO_3

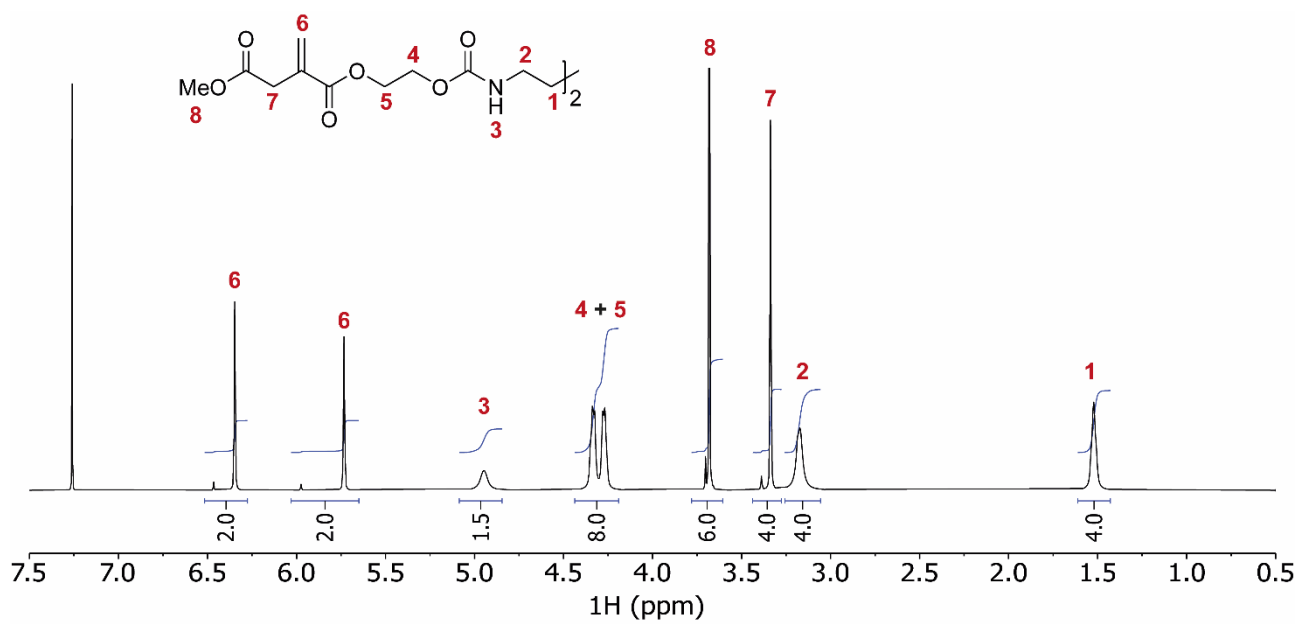


Figure S6. $^1\text{H-NMR}$ (400 MHz, CDCl_3) of $\text{UDO}_2\text{-I}$

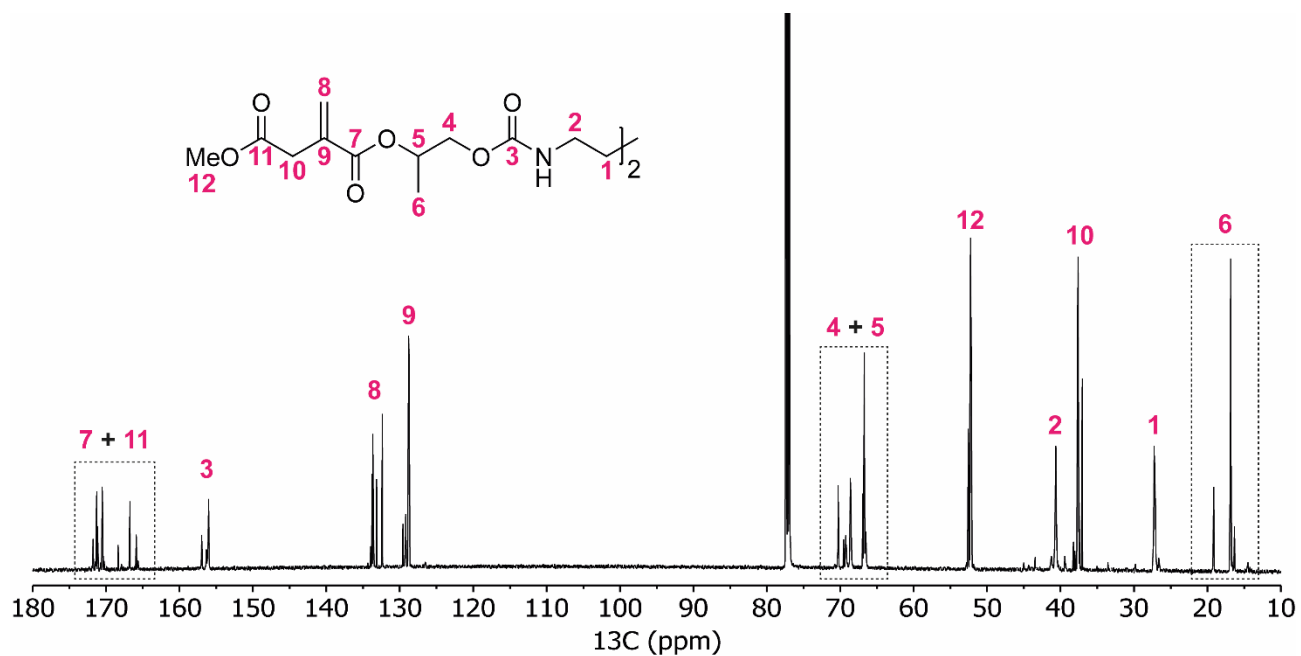


Figure S7. $^{13}\text{C-NMR}$ (150 MHz, CDCl_3) of $\text{UDO}_3\text{-I}$.

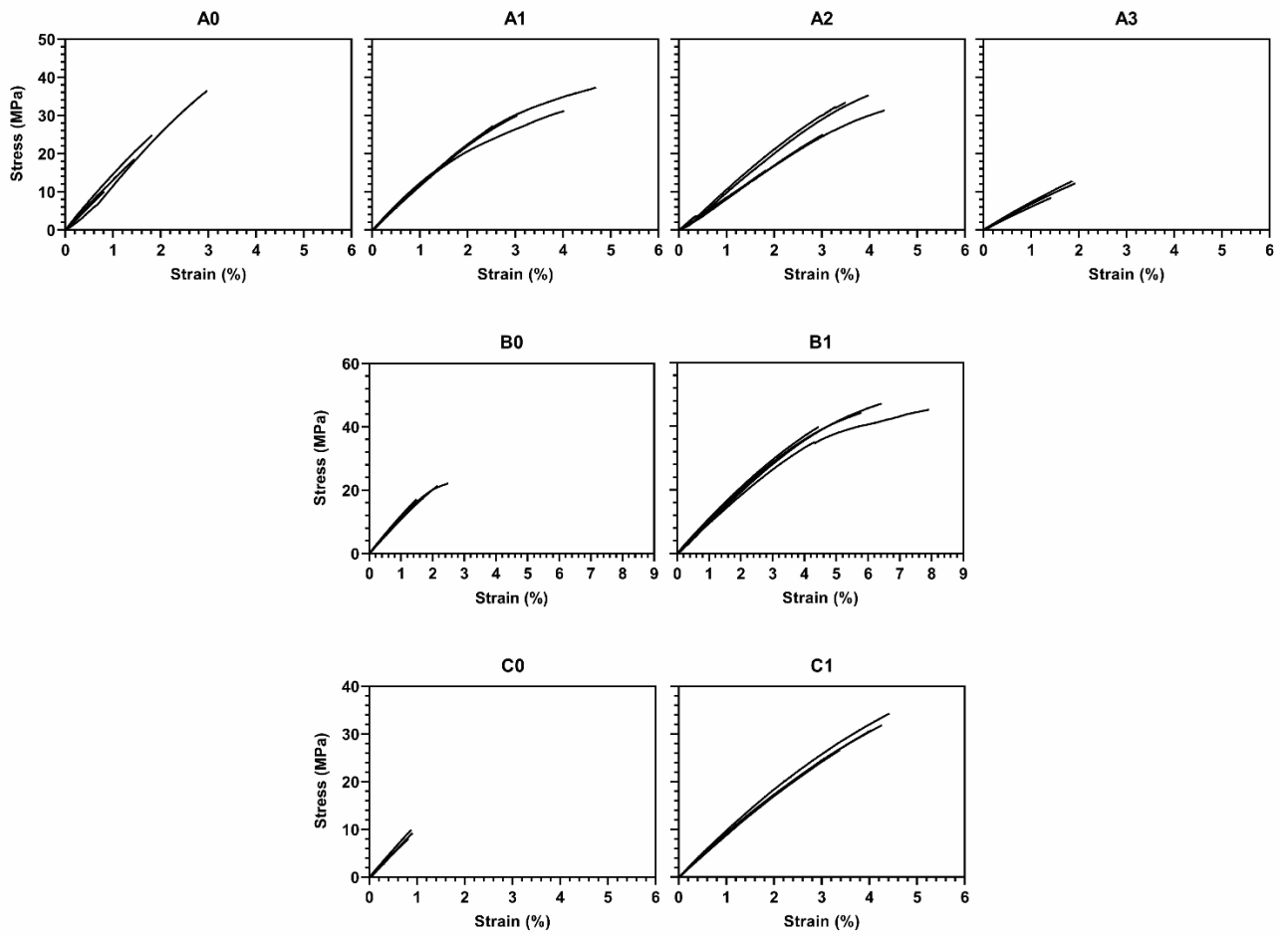


Figure S8. Tensile stress-strain curves.

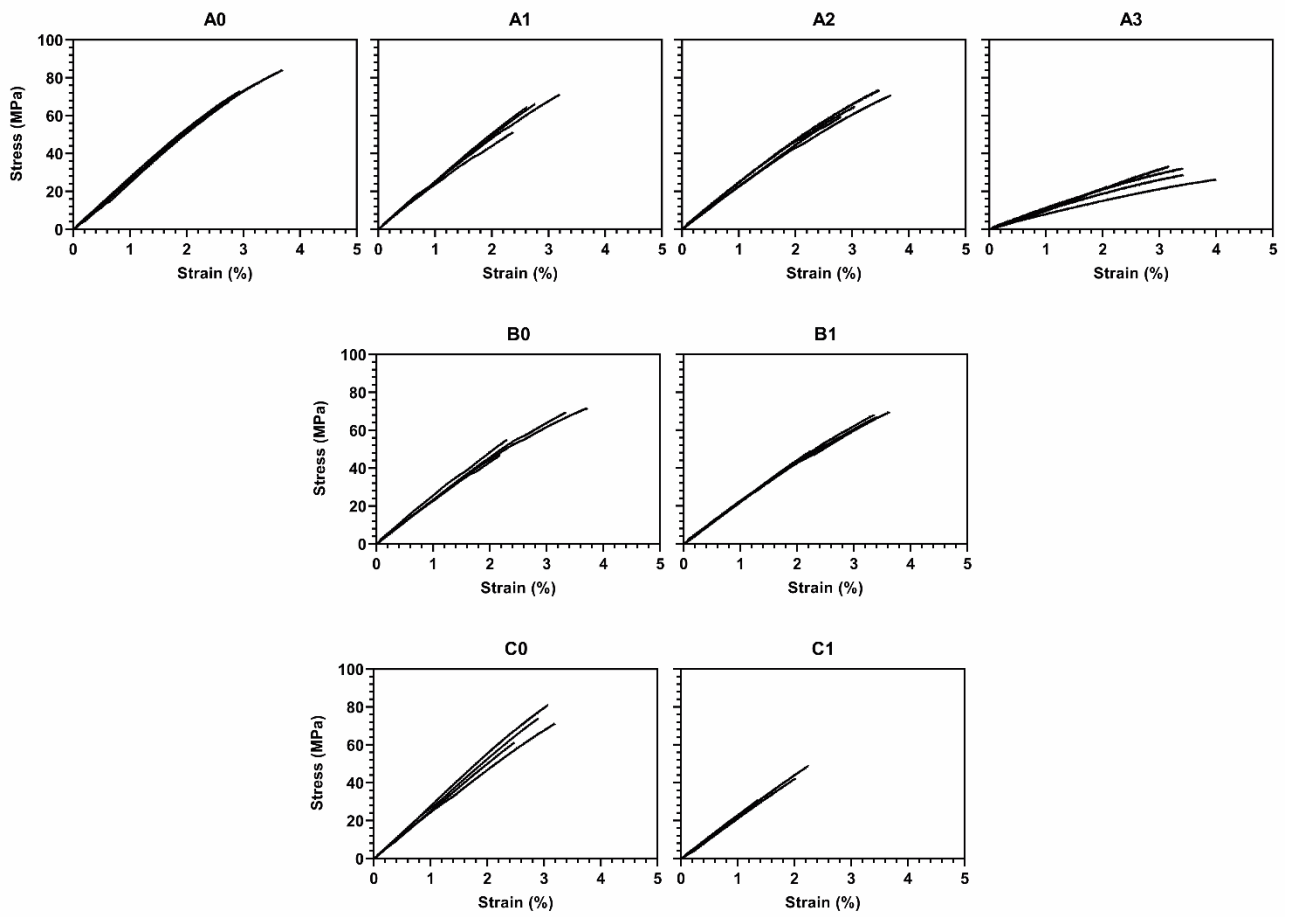


Figure S9. Flexural stress-strain curves