

Supplementary Materials

Simple and efficient synthesis of oligoetherdiamines: hardeners of epoxyurethane oligomers for obtaining coatings with shape memory effect

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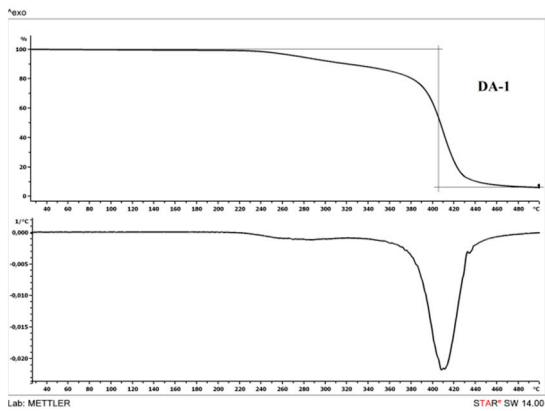


Figure S1. DTG curves D-1

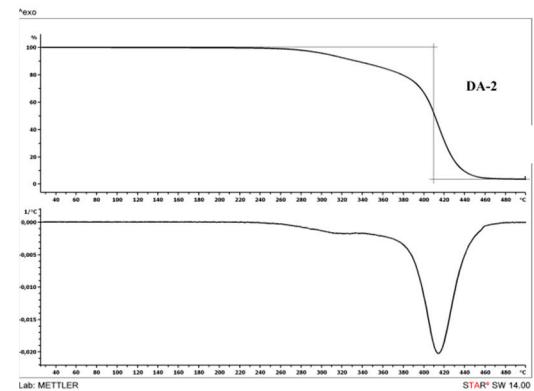


Figure S2. DTG curves D-2

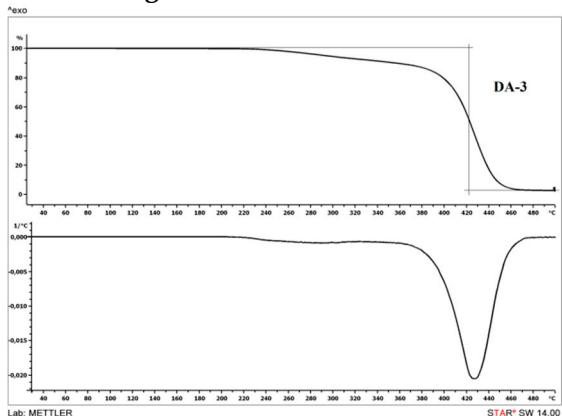


Figure S3. DTG curves D-3

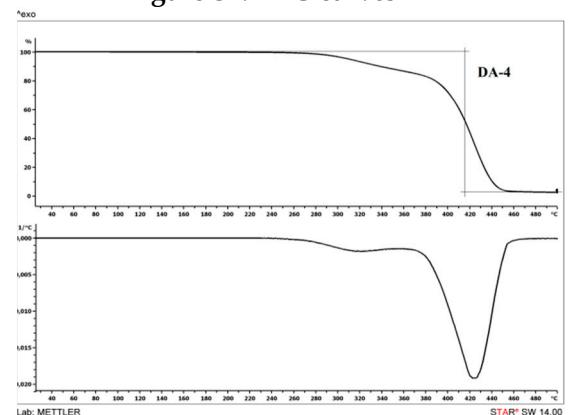


Figure S4. DTG curves D-4

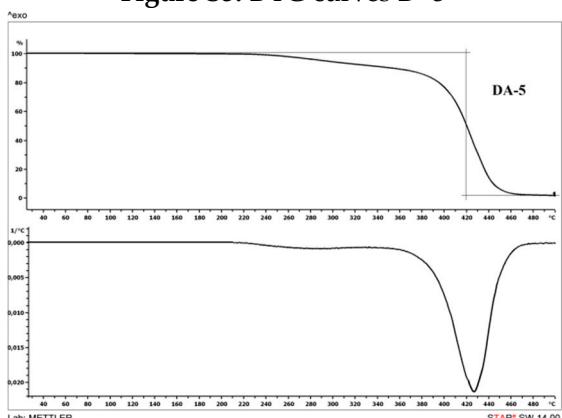


Figure S5. DTG curves D-5

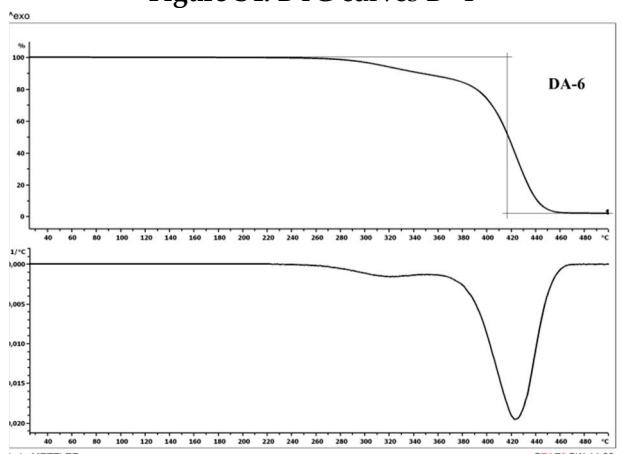


Figure S6. DTG curves D-6

Table S1. ^1H -NMR and ^{13}C -NMR data in CDCl_3 for OTMO-diAc and OTMO-diAEP.

Compound	$^1\text{H-NMR}$ (CDCl_3 , 400 MHz)	$^{13}\text{C-NMR}$ (CDCl_3 , 75 MHz)
OTMO-diAc-1000	1.44 (m; -O-CH ₂ -CH ₂ -CH ₂ -CH ₂ -O-, -O-CH ₂ -CH ₂ -CH ₂ -CH ₂ -O-C(O)-CH=CH ₂ ; 56H), 1.57 (t; J 6.8 Hz; -O-CH ₂ -CH ₂ -CH ₂ -CH ₂ -O-C(O)-CH=CH ₂ ; 4H), 3.23 (m; -O-CH ₂ -CH ₂ -CH ₂ -CH ₂ -O-, -O-CH ₂ -CH ₂ -CH ₂ -CH ₂ -O-C(O)-CH=CH ₂ ; 56H), 3.99 (t; J 8.0 Hz; -O-CH ₂ -CH ₂ -CH ₂ -CH ₂ -O-C(O)-CH=CH ₂ ; 4H), 5.62 (d; J 10.4 Hz; -O-C(O)-CH=CH ₂ ; 2H), 5.90-5.97 (m; -O-C(O)-CH=CH ₂ ; 2H), 6.19 (d; J 17.2 Hz; -O-C(O)-CH=CH ₂ ; 2H)	25.2 (-O-CH ₂ -CH ₂ -CH ₂ -CH ₂ -O-C(O)-CH=CH ₂), 25.8 (-O-CH ₂ -CH ₂ -CH ₂ -CH ₂ -O-C(O)-CH=CH ₂), 26.1 (-O-CH ₂ -CH ₂ -CH ₂ -CH ₂ -O-), 63.8 (-O-CH ₂ -CH ₂ -CH ₂ -CH ₂ -O-C(O)-CH=CH ₂), 69.6 (-O-CH ₂ -CH ₂ -CH ₂ -CH ₂ -O-C(O)-CH=CH ₂), 70.1 (-O-CH ₂ -CH ₂ -CH ₂ -CH ₂ -O-), 128.2 (-O-C(O)-CH=CH ₂), 129.8 (-O-C(O)-CH=CH ₂), 165.5 (C=O)
OTMO-diAc-1400	1.55 (m; -O-CH ₂ -CH ₂ -CH ₂ -CH ₂ -O-, -O-CH ₂ -CH ₂ -CH ₂ -CH ₂ -O-C(O)-CH=CH ₂ ; 80H), 1.69 (t; J 7.2 Hz; -O-CH ₂ -CH ₂ -CH ₂ -CH ₂ -O-C(O)-CH=CH ₂ ; 4H), 3.35 (m; -O-CH ₂ -CH ₂ -CH ₂ -CH ₂ -O-; 76H), 3.56 (t; J 6.0 Hz, -O-CH ₂ -CH ₂ -CH ₂ -O-C(O)-CH=CH ₂ ; 4H), 4.11 (t; J 6.8 Hz, -O-CH ₂ -CH ₂ -CH ₂ -CH ₂ -O-C(O)-CH=CH ₂ ; 4H), 5.73 (d; J 11.6 Hz, -O-C(O)-CH=CH ₂ ; 2H), 6.01-6.08 (m; -O-C(O)-CH=CH ₂ ; 2H), 6.32 (d; J 18.8 Hz, -O-C(O)-CH=CH ₂ ; 2H)	25.4 (-O-CH ₂ -CH ₂ -CH ₂ -CH ₂ -O-C(O)-CH=CH ₂), 26.1 (-O-CH ₂ -CH ₂ -CH ₂ -CH ₂ -O-C(O)-CH=CH ₂), 26.3 (-O-CH ₂ -CH ₂ -CH ₂ -CH ₂ -O-), 64.1 (-O-CH ₂ -CH ₂ -CH ₂ -O-C(O)-CH=CH ₂), 69.9 (-O-CH ₂ -CH ₂ -CH ₂ -CH ₂ -O-C(O)-CH=CH ₂), 70.3 (-O-CH ₂ -CH ₂ -CH ₂ -CH ₂ -O-), 128.4 (-O-C(O)-CH=CH ₂), 130.1 (-O-C(O)-CH=CH ₂), 165.9 (C=O)
OTMO-diAc-2000	1.55 (m; -O-CH ₂ -CH ₂ -CH ₂ -CH ₂ -O-, -O-CH ₂ -CH ₂ -CH ₂ -CH ₂ -O-C(O)-CH=CH ₂ ; 112H), 1.69 (t; J 8.0 Hz; -O-CH ₂ -CH ₂ -CH ₂ -CH ₂ -O-C(O)-CH=CH ₂ ; 4H), 3.34 (m; -O-CH ₂ -CH ₂ -CH ₂ -CH ₂ -O-; 108H), 3.53 (t; J 6.0 Hz; -O-CH ₂ -CH ₂ -CH ₂ -O-C(O)-CH=CH ₂ ; 4H), 4.11 (t; J 6.8 Hz; -O-CH ₂ -CH ₂ -CH ₂ -CH ₂ -O-C(O)-CH=CH ₂ ; 4H), 5.73 (d; J 10.4 Hz; -O-C(O)-CH=CH ₂ ; 2H), 6.01-6.08 (m; -O-C(O)-CH=CH ₂ ; 2H), 6.31 (d; J 17.2 Hz; -O-C(O)-CH=CH ₂ ; 2H)	25.3 (-O-CH ₂ -CH ₂ -CH ₂ -CH ₂ -O-C(O)-CH=CH ₂), 26.0 (-O-CH ₂ -CH ₂ -CH ₂ -CH ₂ -O-C(O)-CH=CH ₂), 26.2 (-O-CH ₂ -CH ₂ -CH ₂ -CH ₂ -O-), 64.0 (-O-CH ₂ -CH ₂ -CH ₂ -O-C(O)-CH=CH ₂), 69.8 (-O-CH ₂ -CH ₂ -CH ₂ -CH ₂ -O-C(O)-CH=CH ₂), 70.2 (-O-CH ₂ -CH ₂ -CH ₂ -CH ₂ -O-), 128.3 (-O-C(O)-CH=CH ₂), 130.0 (-O-C(O)-CH=CH ₂), 165.7 (C=O)
OTMO-diAEP-1000	1.55 (m; -O-CH ₂ -CH ₂ -CH ₂ -CH ₂ -O-, -O-CH ₂ -CH ₂ -CH ₂ -CH ₂ -O-C(O)-CH ₂ -CH ₂ -AEP; 56H), 1.62 (t; J 6.8 Hz; -O-CH ₂ -CH ₂ -CH ₂ -CH ₂ -O-C(O)-CH ₂ -CH ₂ -AEP; 4H), 2.16 (s; -NH ₂ ; 4H), 2.33-2.43 (m; -N-(CH ₂ -CH ₂) ₂ -N-, -N-(CH ₂ -CH ₂) ₂ -N-CH ₂ -CH ₂ -NH ₂ ; 20H), 2.61 (t; J 7.6 Hz; -N-(CH ₂ -CH ₂) ₂ -N-CH ₂ -CH ₂ -NH ₂ ; 4H), 2.71 (t; J 6.0 Hz; -O-C(O)-CH ₂ -CH ₂ -AEP; 4H), 2.82 (t; J 6.0 Hz, -O-C(O)CH ₂ -CH ₂ -AEP; 4H), 3.34 (m; -O-CH ₂ -CH ₂ -CH ₂ -CH ₂ -O-, -O-CH ₂ -CH ₂ -CH ₂ -CH ₂ -O-C(O)-CH ₂ -CH ₂ -AEP; 56H), 4.03 (t; J 6.4 Hz, -O-CH ₂ -CH ₂ -CH ₂ -CH ₂ -O-C(O)-CH ₂ -CH ₂ -AEP; 4H)	25.2 (-O-CH ₂ -CH ₂ -CH ₂ -CH ₂ -O-C(O)-CH ₂ -CH ₂ -AEP), 25.9 (-O-CH ₂ -CH ₂ -CH ₂ -CH ₂ -O-C(O)-CH ₂ -CH ₂ -AEP), 26.2 (-O-CH ₂ -CH ₂ -CH ₂ -CH ₂ -O-), 32.0 (-O-C(O)-CH ₂ -CH ₂ -AEP), 38.3 (-N-(CH ₂ -CH ₂) ₂ -N-CH ₂ -CH ₂ -NH ₂), 52.6 (-N-(CH ₂ -CH ₂) ₂ -N-CH ₂ -CH ₂ -NH ₂), 52.8 (-N-(CH ₂ -CH ₂) ₂ -N-CH ₂ -CH ₂ -NH ₂), 53.2 (-O-C(O)-CH ₂ -CH ₂ -AEP), 60.4 (-N-(CH ₂ -CH ₂) ₂ -N-CH ₂ -CH ₂ -NH ₂), 63.8 (-O-CH ₂ -CH ₂ -CH ₂ -O-C(O)-CH ₂ -CH ₂ -AEP), 69.8 (-O-CH ₂ -CH ₂ -CH ₂ -O-C(O)-CH ₂ -CH ₂ -AEP), 70.2 (-O-CH ₂ -CH ₂ -CH ₂ -CH ₂ -O-), 172.0 (C=O).
OTMO-diAEP-1400	1.45 (m; -O-CH ₂ -CH ₂ -CH ₂ -CH ₂ -O-, -O-CH ₂ -CH ₂ -CH ₂ -CH ₂ -O-C(O)-CH ₂ -CH ₂ -AEP; 84H), 1.94 (s; -NH ₂ ; 4H), 2.23-2.30 (m; -N-(CH ₂ -	25.3 (-O-CH ₂ -CH ₂ -CH ₂ -CH ₂ -O-C(O)-CH ₂ -CH ₂ -AEP), 25.9 (-O-CH ₂ -CH ₂ -CH ₂ -CH ₂ -O-C(O)-CH ₂ -CH ₂ -AEP),

	$CH_2)_2-N-, -N-(CH_2-CH_2)_2-N-CH_2-CH_2-NH_2;$ 20H), 2.50 (t; J 7.2 Hz; -N-(CH ₂ -CH ₂) ₂ -N-CH ₂ -CH ₂ -NH ₂ ; 4H), 2.59 (t; J 6.0 Hz; -O-C(O)-CH ₂ -CH ₂ -AEP; 4H), 2.70 (t; J 6.0 Hz; -O-C(O)CH ₂ -CH ₂ -AEP; 4H), 3.24 (m; -O-CH ₂ -CH ₂ -CH ₂ -CH ₂ -O-; 76H), 3.41 (t; J 6.0 Hz; -O-CH ₂ -CH ₂ -CH ₂ -CH ₂ -O-C(O)-CH ₂ -CH ₂ -AEP; 4H), 3.93 (t; J 6.0 Hz; -O-CH ₂ -CH ₂ -CH ₂ -O-C(O)-CH ₂ -CH ₂ -AEP; 4H)	26.2 (-O-CH ₂ -CH ₂ -CH ₂ -CH ₂ -O-), 32.1 (-O-C(O)-CH ₂ -CH ₂ -AEP), 38.4 (-N-(CH ₂ -CH ₂) ₂ -N-CH ₂ -CH ₂ -NH ₂), 52.6 (-N-(CH ₂ -CH ₂) ₂ -N-CH ₂ -CH ₂ -NH ₂), 52.8 (-N-(CH ₂ -CH ₂) ₂ -N-CH ₂ -CH ₂ -NH ₂), 53.2 (-O-C(O)-CH ₂ -CH ₂ -AEP), 60.6 (-N-(CH ₂ -CH ₂) ₂ -N-CH ₂ -CH ₂ -NH ₂), 63.8 (-O-CH ₂ -CH ₂ -CH ₂ -CH ₂ -O-C(O)-CH ₂ -CH ₂ -AEP), 69.7 (-O-CH ₂ -CH ₂ -CH ₂ -O-C(O)-CH ₂ -CH ₂ -AEP), 70.2 (-O-CH ₂ -CH ₂ -CH ₂ -CH ₂ -O-), 171.8 (C=O)
OTMO-diAEP-2000	1.55 (m; -O-CH ₂ -CH ₂ -CH ₂ -CH ₂ -O-, -O-CH ₂ -CH ₂ -CH ₂ -CH ₂ -O-C(O)-CH ₂ -CH ₂ -AEP; 116H), 1.92 (s; -NH ₂ ; 4H), 2.34-2.43 (m; -N-(CH ₂ -CH ₂) ₂ -N-, -N-(CH ₂ -CH ₂) ₂ -N-CH ₂ -CH ₂ -NH ₂ ; 20H), 2.61 (t; J 7.2 Hz; -N-(CH ₂ -CH ₂) ₂ -N-CH ₂ -CH ₂ -NH ₂ ; 4H), 2.71 (t; J 6.0 Hz; -O-C(O)CH ₂ -CH ₂ -AEP; 4H), 2.82 (t; J 6.0 Hz; -O-C(O)-CH ₂ -CH ₂ -AEP; 4H), 3.34 (m; -O-CH ₂ -CH ₂ -CH ₂ -CH ₂ -O-; 108H), 3.52 (t; J 6.0 Hz; -O-CH ₂ -CH ₂ -CH ₂ -CH ₂ -O-C(O)-CH ₂ -CH ₂ -AEP; 4H), 4.03 (t; J 6.4 Hz; -O-CH ₂ -CH ₂ -CH ₂ -O-C(O)-CH ₂ -CH ₂ -AEP; 4H)	25.3 (-O-CH ₂ -CH ₂ -CH ₂ -CH ₂ -O-C(O)-CH ₂ -CH ₂ -AEP), 25.9 (-O-CH ₂ -CH ₂ -CH ₂ -O-C(O)-CH ₂ -CH ₂ -AEP), 26.2 (-O-CH ₂ -CH ₂ -CH ₂ -CH ₂ -O-), 32.1 (-O-C(O)-CH ₂ -CH ₂ -AEP), 38.5 (-N-(CH ₂ -CH ₂) ₂ -N-CH ₂ -CH ₂ -NH ₂), 52.6 (-N-(CH ₂ -CH ₂) ₂ -N-CH ₂ -CH ₂ -NH ₂), 52.9 (-N-(CH ₂ -CH ₂) ₂ -N-CH ₂ -CH ₂ -NH ₂), 53.2 (-O-C(O)-CH ₂ -CH ₂ -AEP), 60.7 (-N-(CH ₂ -CH ₂) ₂ -N-CH ₂ -CH ₂ -NH ₂), 63.9 (-O-CH ₂ -CH ₂ -CH ₂ -CH ₂ -O-C(O)-CH ₂ -CH ₂ -AEP), 69.8 (-O-CH ₂ -CH ₂ -CH ₂ -CH ₂ -O-C(O)-CH ₂ -CH ₂ -AEP), 70.2 (-O-CH ₂ -CH ₂ -CH ₂ -CH ₂ -O-), 172.0 (C=O)



D-3 **D-4** **D-5** **D-6**
Figure S7. Shape Memory Properties of the elastomers D-3, D-4, D-5, D-6