Lipoic acid-based vitrimer-like elastomer

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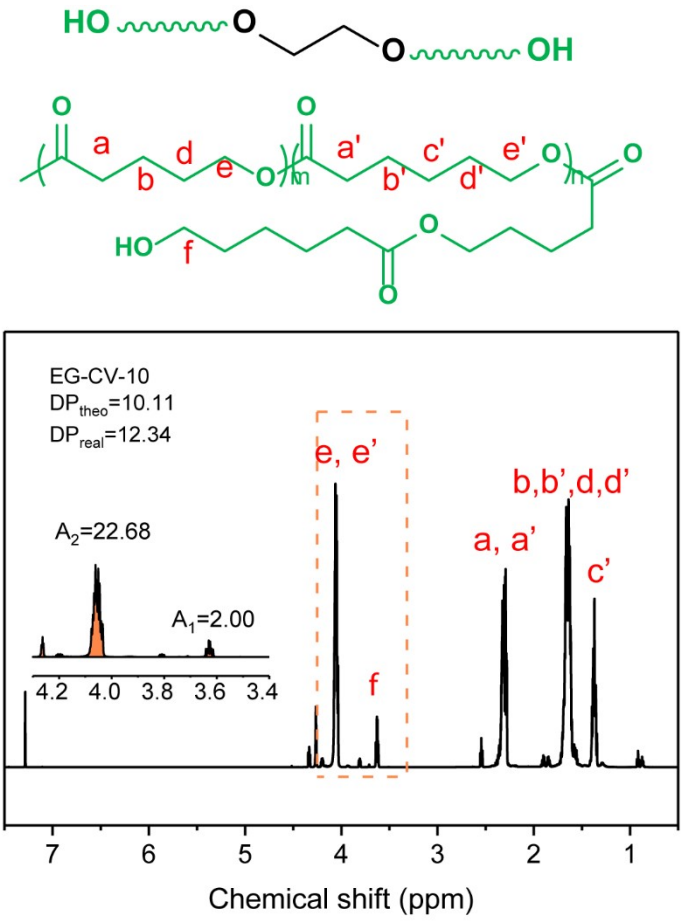

Figure S1-1. ^{1}H-NMR spectra (600 MHz, $CDCl_3$) of EG-CV-10

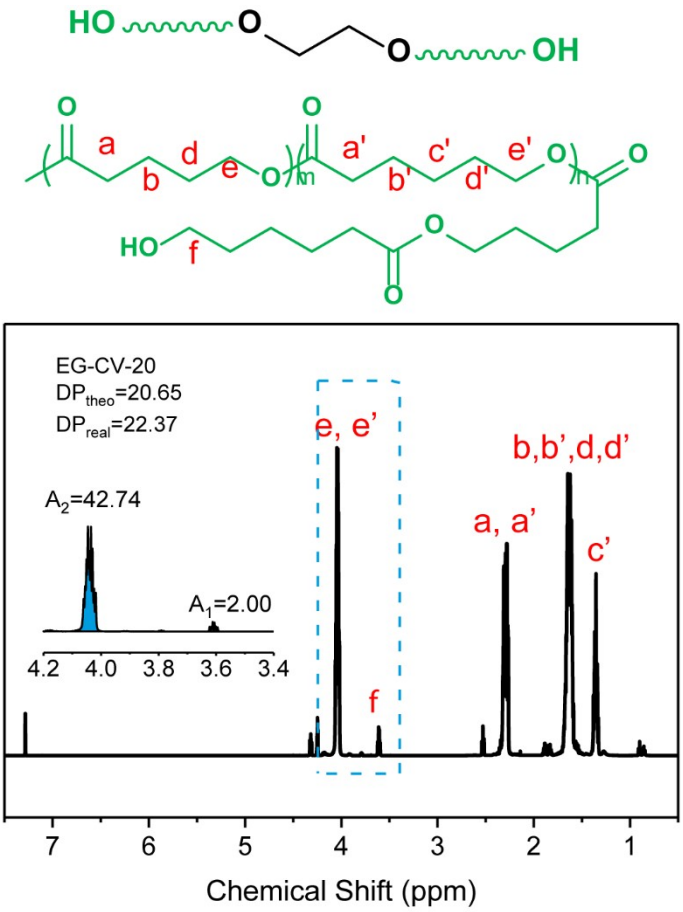

Figure S1-2. ^{1}H-NMR spectra (600 MHz, $CDCl_3$) of EG-CV-20

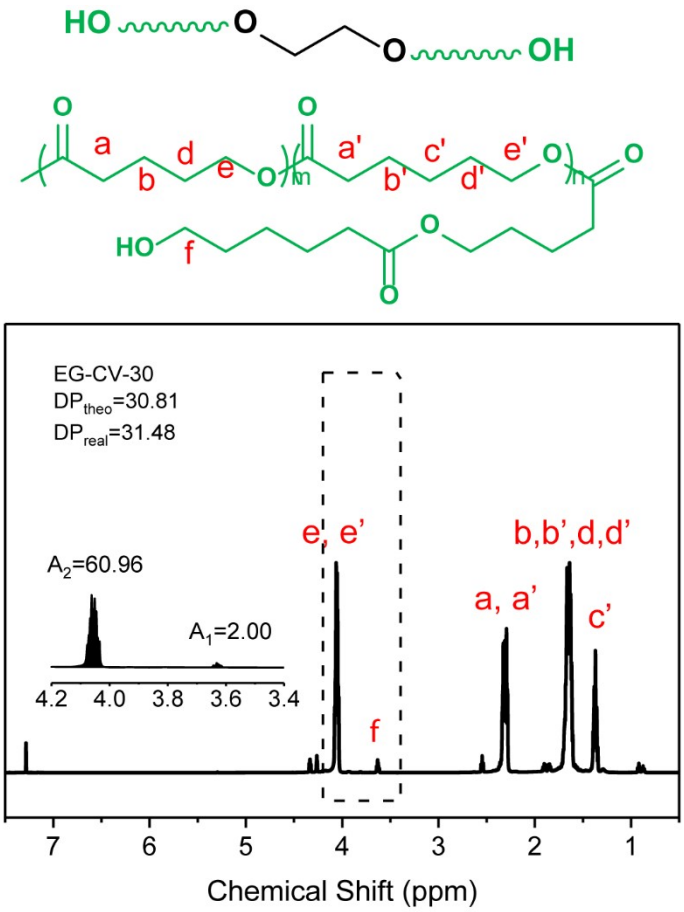

Figure S1-3. ^{1}H-NMR spectra (600 MHz, $CDCl_3$) of EG-CV-30

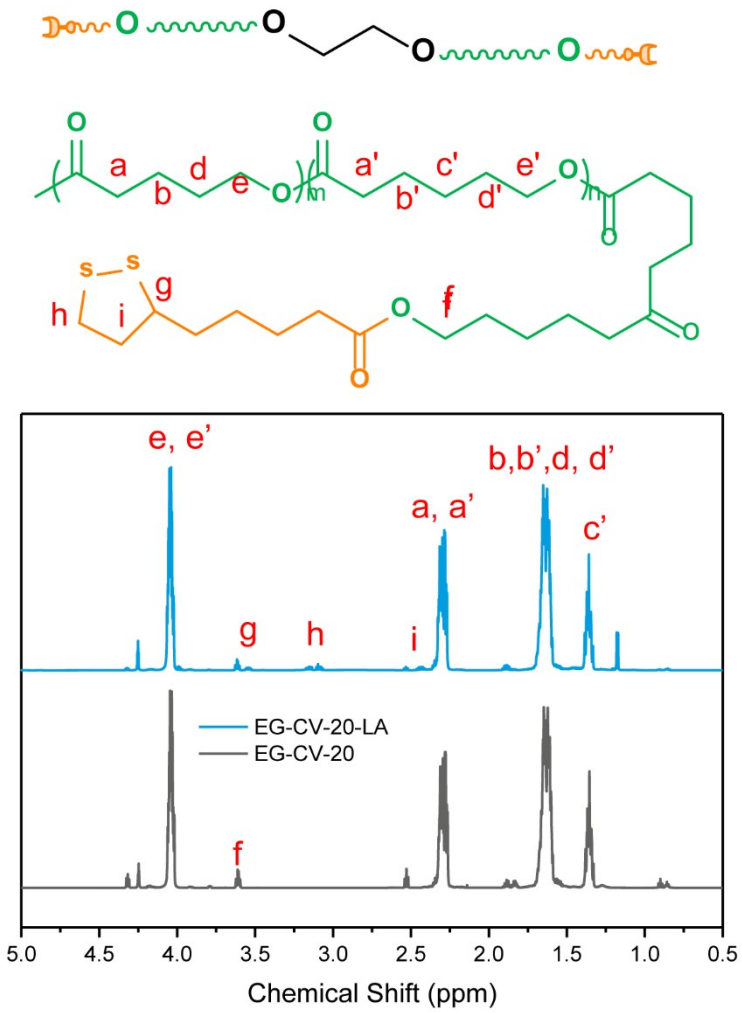

Figure S2-1. ^{1}H-NMR spectra (600 MHz, $CDCl_3$) of EG-CV-20 and EG-CV-20-LA

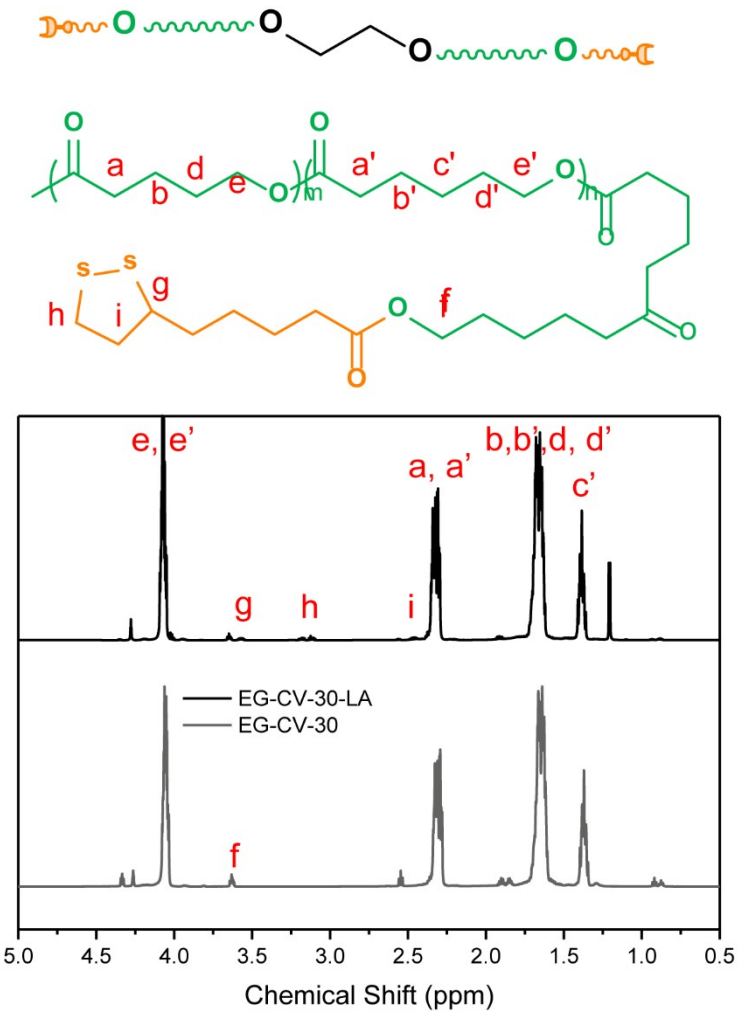

Figure S2-2. ^{1}H-NMR spectra (600 MHz, $CDCl_3$) of EG-CV-30 and EG-CV-30-LA

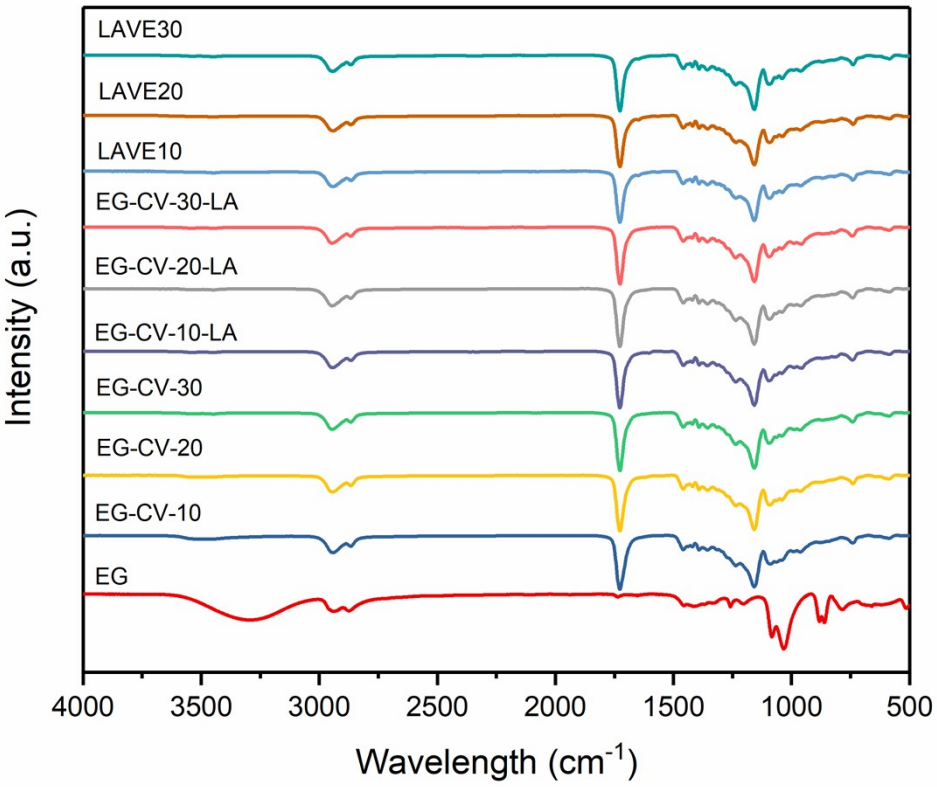

Figure S3. FTIR of EG, EG-CV-X, EG-CV-X-LA, and LAVE

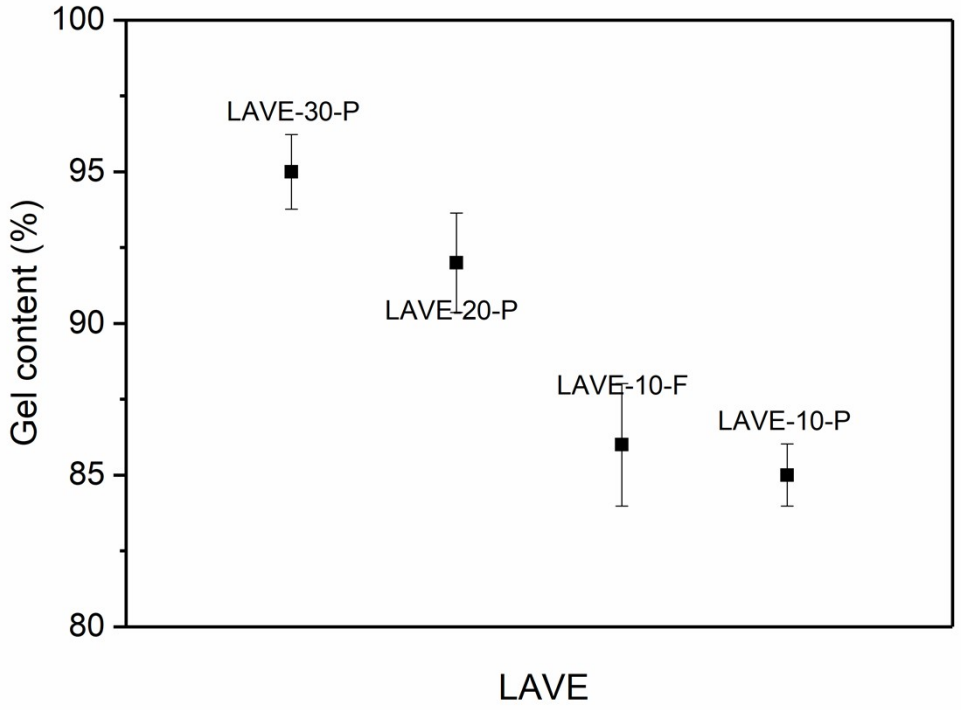

Figure S4. Gel content of LAVE

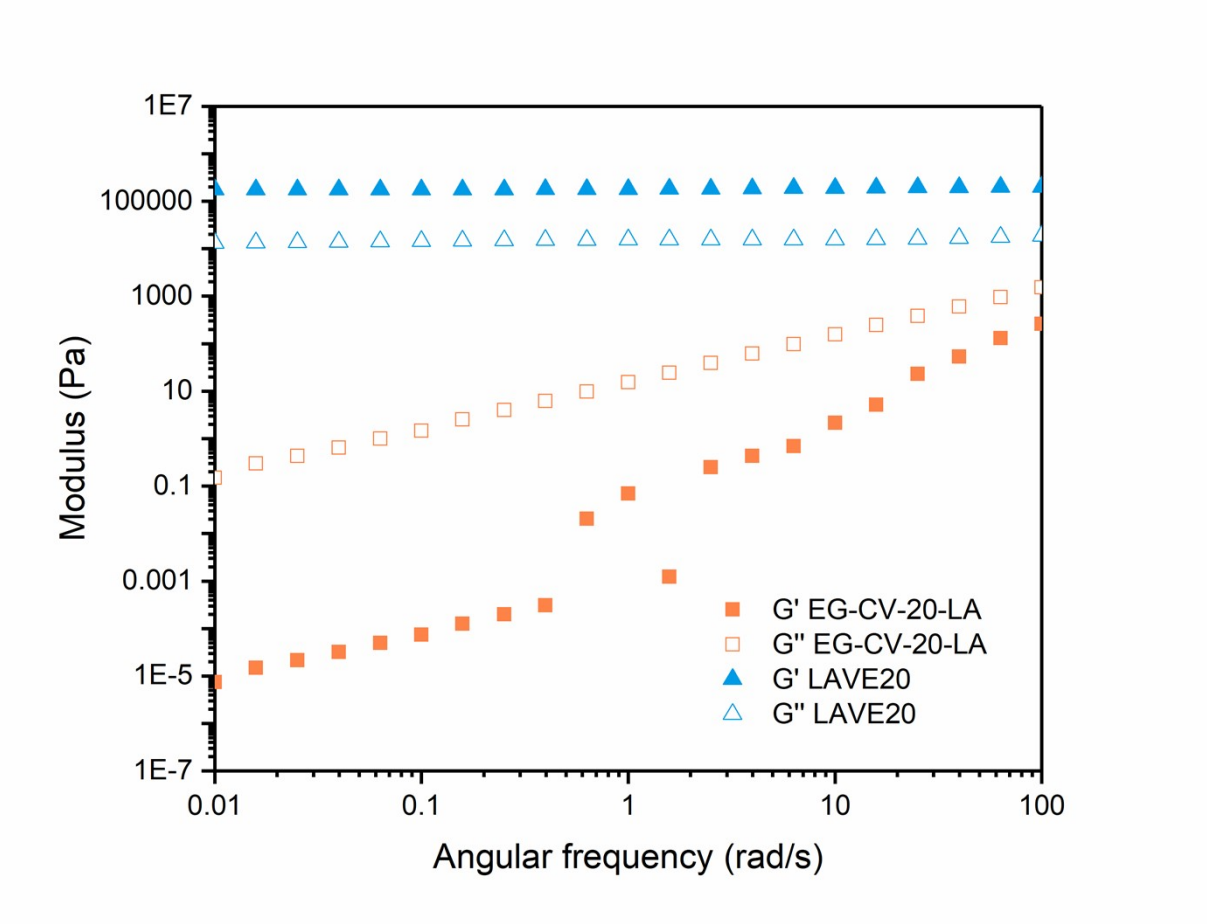

Figure S5-1. Oscillatory rheology measurements of EG-CV-20-LA and LAVE20

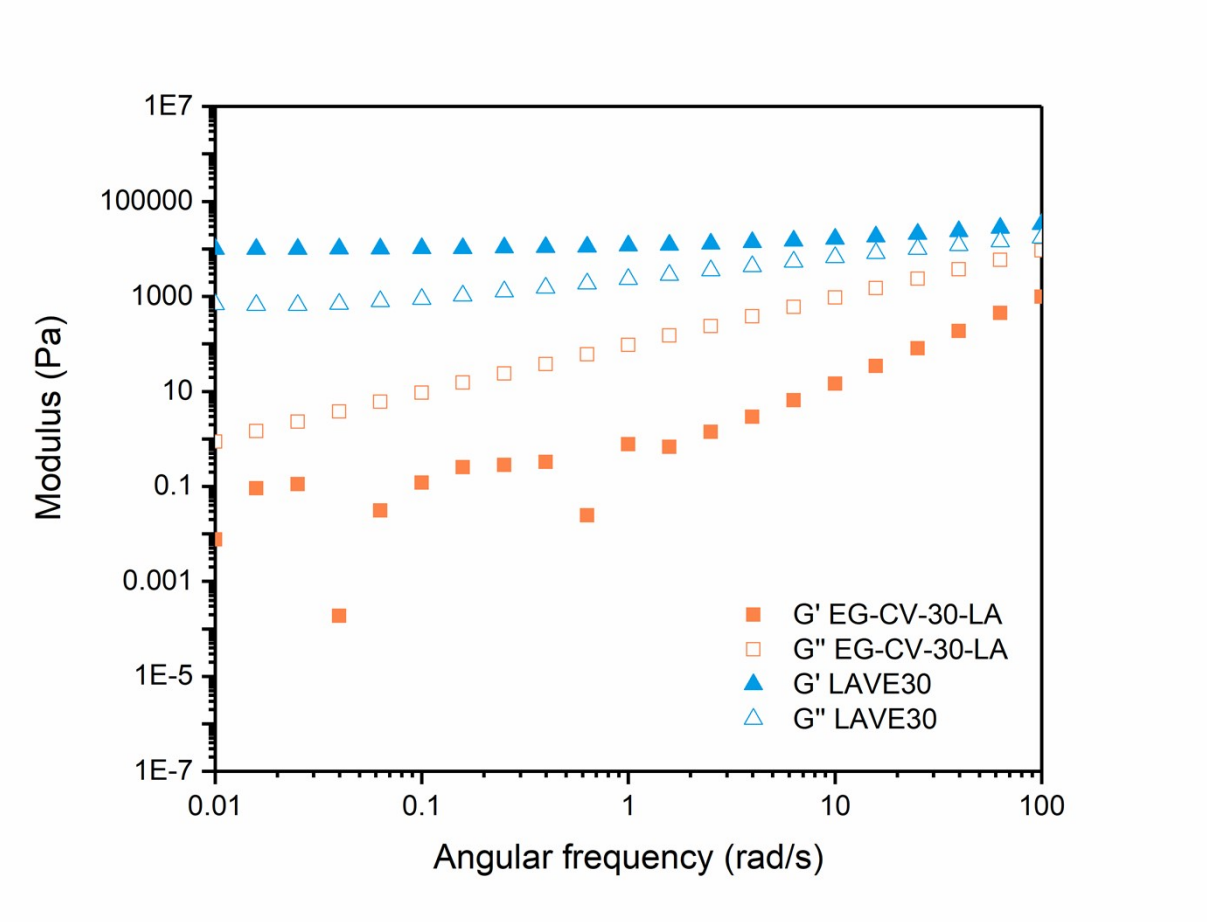

Figure S5-2. Oscillatory rheology measurements of EG-CV-30-LA and LAVE30

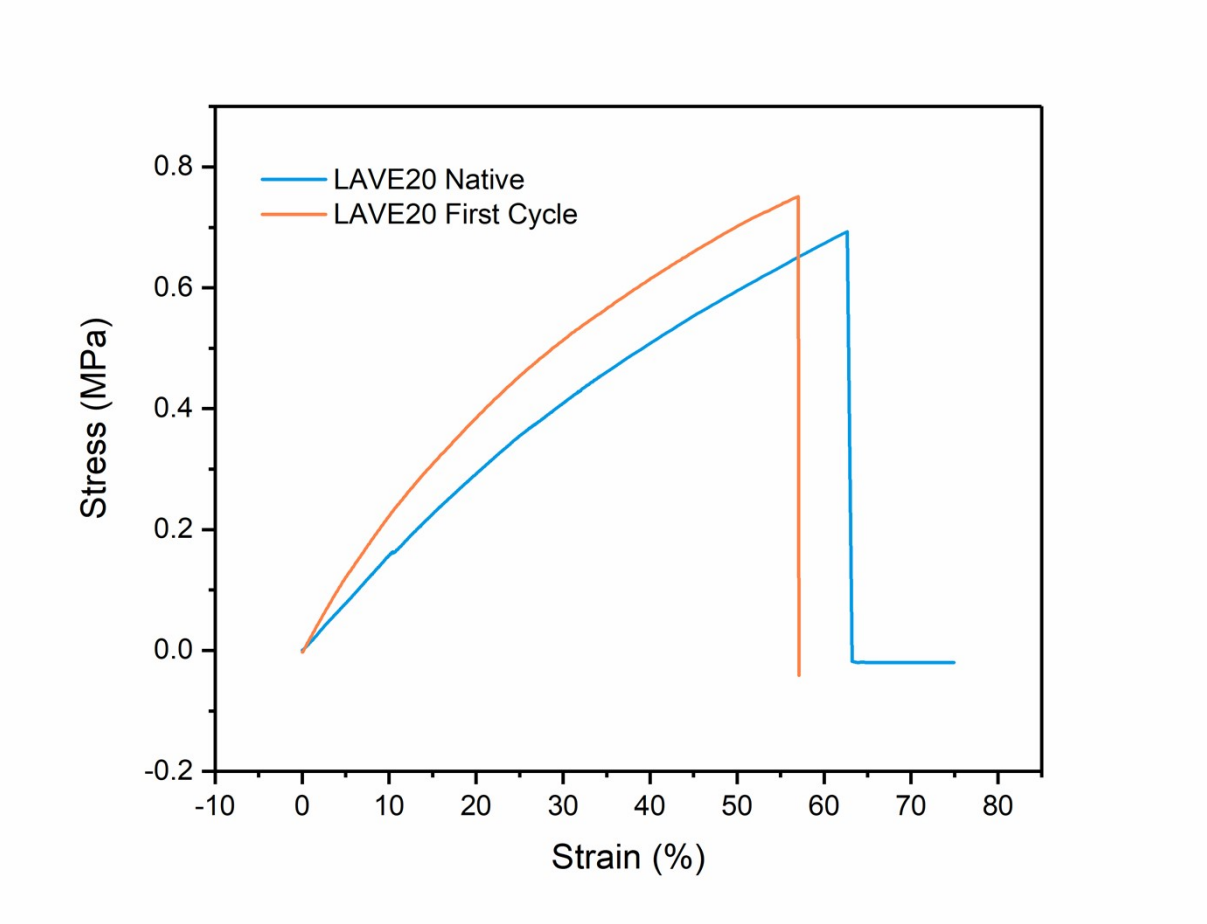

Figure S6-1. Tensile stress–strain curves of the native and healed LAVE20

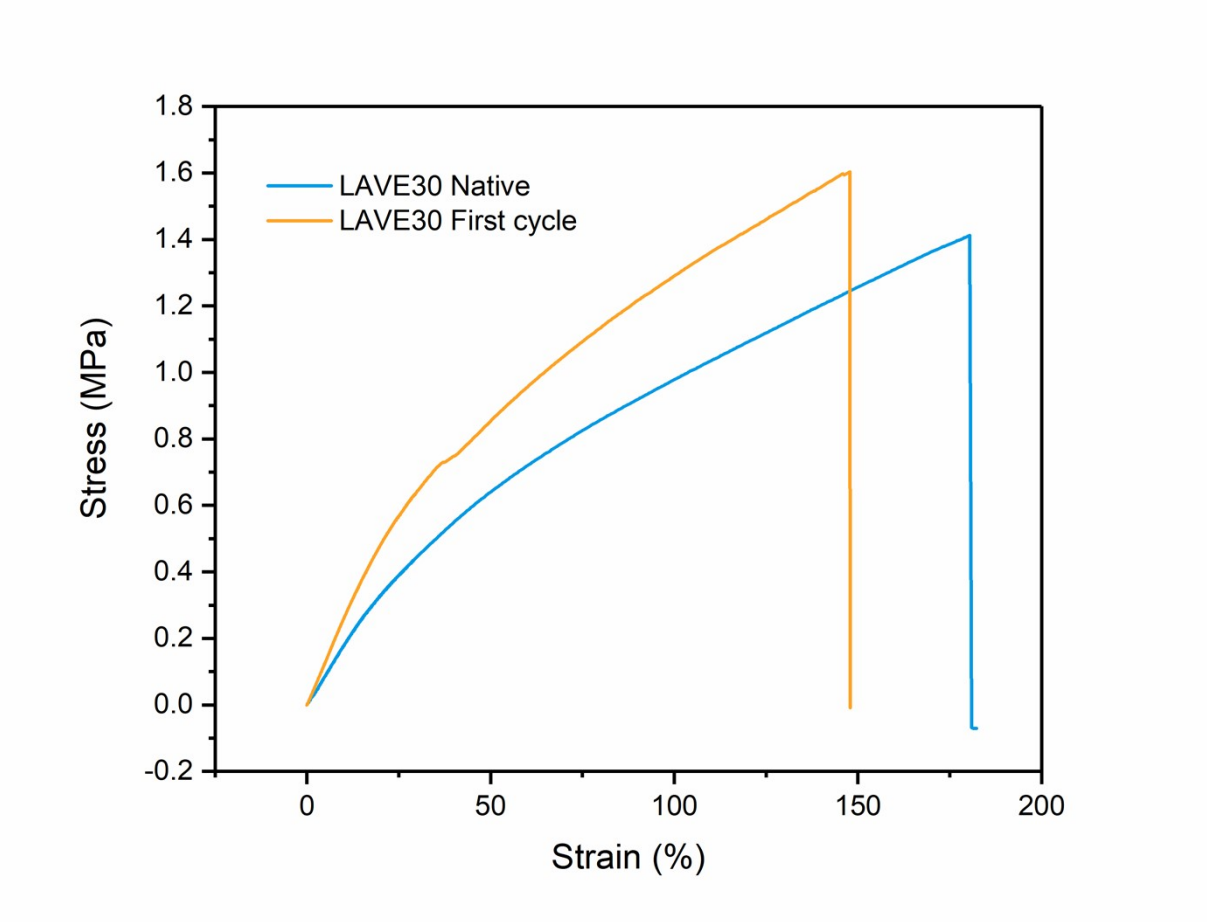

Figure S6-2. Tensile stress–strain curves of the native and healed LAVE30

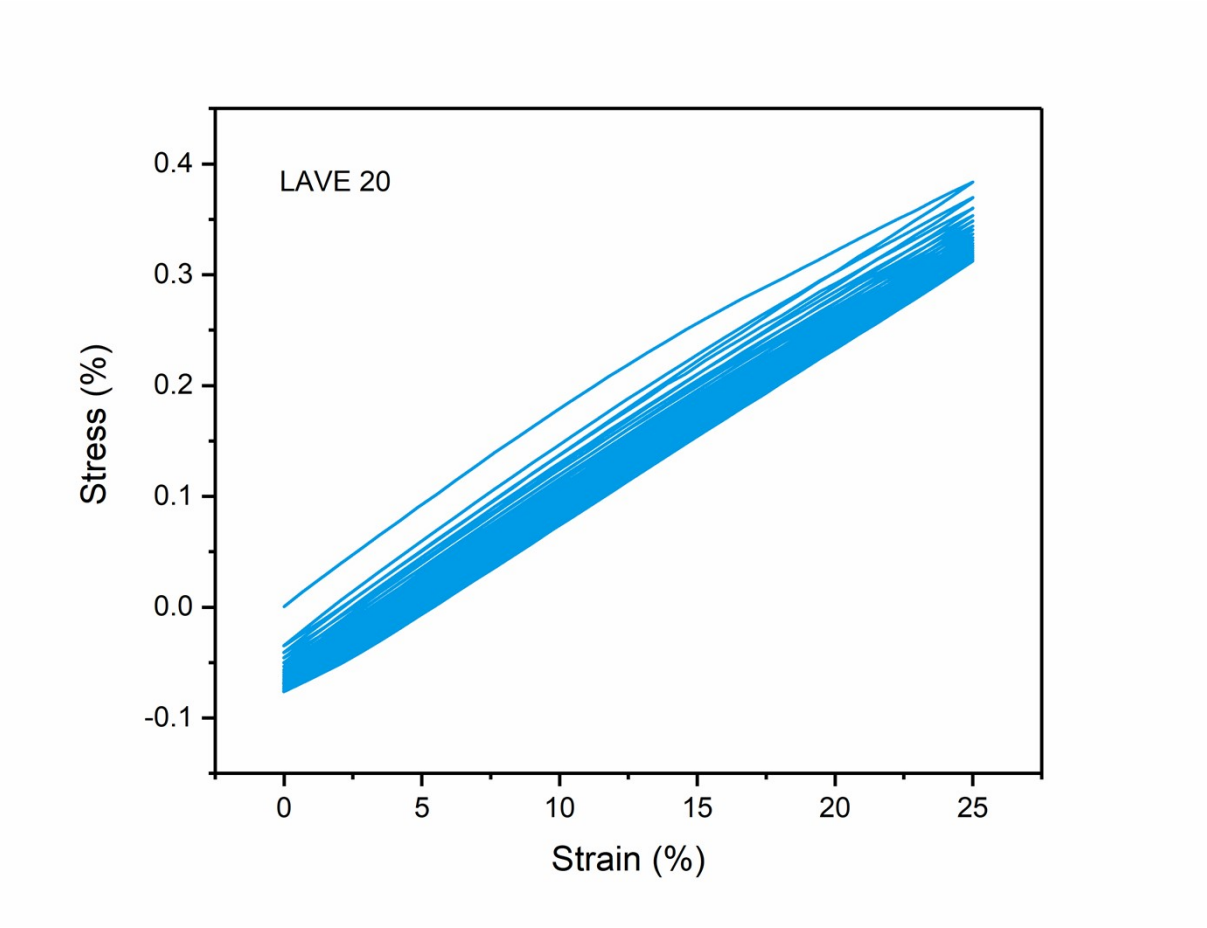

Figure S7-1. Cycling test of LAVE20

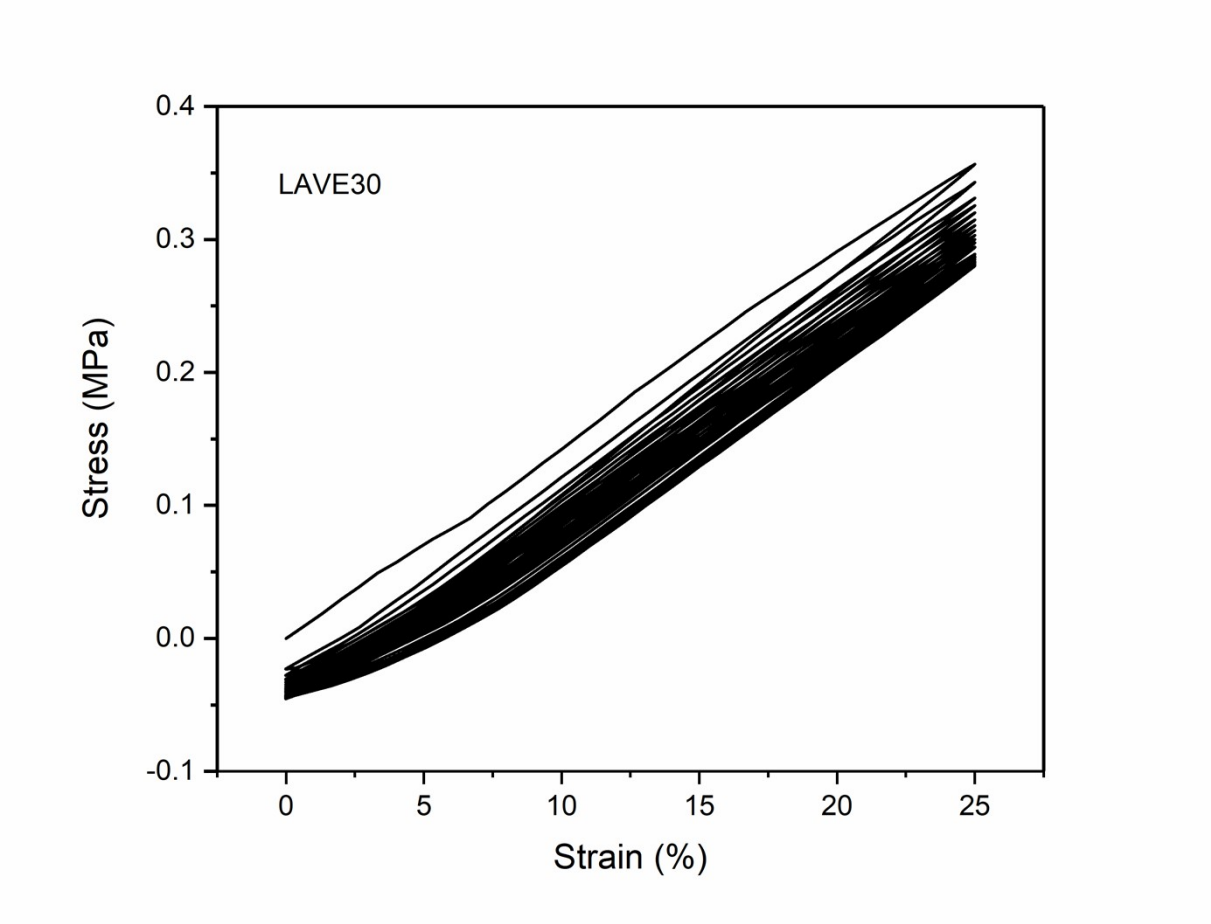

Figure S7-2. Cycling test of LAVE30

Table S1. Composition of the reaction mixtures used for the synthesis of EG-CV-X

Samples	EG (g)	εCL (g)	δVL (g)	$Sn(Oct)_2$ (g)
EG-CV-10	0.233	4.28	3.75	0.015
EG-CV-20	0.233	8.56	7.50	0.015
EG-CV-30	0.233	12.84	11.25	0.015

Table S2 Molecular weights of EG-CV-X and EG-CV-X-LA

Samples	Mn^{*} (g mol^{-1})	Mw^{*} (g mol^{-1})	Đ*	Mw (NMR)$^{+}$ (g mol^{-1})	Mw (theo)$^{\wedge}$ (g mol^{-1})
EG-CV-10	3100	6800	2.22	2702	2226
EG-CV-20	4200	9700	2.31	4849	4482
EG-CV-30	6000	17100	2.83	6798	6656
EG-CV-10-LA	3900	5500	1.42	2889	2514
EG-CV-20-LA	5100	5500	1.06	4530	4770
EG-CV-30-LA	7800	10900	1.40	7731	6944

*determined by GPC in $CHCl_3$ at 35 °C and calibrated against near-monodisperse PS; $^{+}$ determined by ^{1}H-NMR using end-of chain proton signal at 3.6 ppm vs. main chain proton signal at 4.0 ppm; $^{\wedge}$ determined by theoretical calculation based on the ratios of M/I.

Table S3. Thermal characteristics of EG-CV-X, EG-CV-X-LA, and LAVE

Samples	$T_{deg}^{\ddagger}$ (°C)	$T_m^{\pm}$ (°C)	$T_c^{\pm}$ (°C)
EG-CV-10	245	13	-5
EG-CV-20	179	15	-2
EG-CV-30	260	18	-1
EG-CV-10-LA	264	11	-10
EG-CV-20-LA	275	16	-5
EG-CV-30-LA	282	18	-4
LAVE-10	393	13	-13/-9
LAVE-20	399	12	-12
LAVE-30	403	13	-13/-10

‡ The temperature corresponds to the maximal decomposition rate observed in TGA using a rate of 10 °C min^{-1}; $^{\pm}$ determined by differential scanning calorimetry measurements using heating and cooling rates of 10 °C min^{-1}.

Table S4. Mechanical properties of LAVE

Samples	Young's Modulus (MPa)	Stress at Max. Load (MPa)	Strain at Max Load (%)
LAVE-10	1.73	0.34	25
LAVE-20	1.60	0.69	62
LAVE-30	1.82	1.41	180