Supporting Information

Enhanced Properties of Polyurea Elastomeric Nanocomposites with Anisotropic Functionalized Nanofillers

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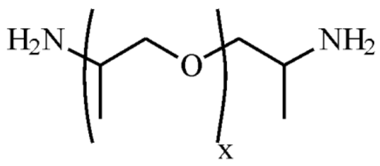

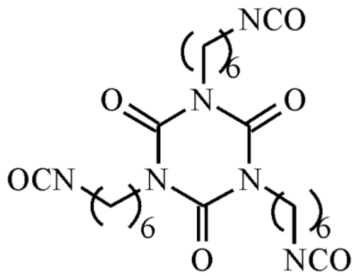

$C_{24}H_{36}N_6O_6$
504.58

Fig. SI-1: Chemical structures for the diamino-terminated poly(propylene oxide), Jeffamine D-2000, M_n = 2000 g·mol^{-1} , x ≈ 33 (Huntsmann Corporation), and the triisocynate crosslinker, Basonat HI-100 (BASF SE), *mw* = 505 g·mol^{-1}.

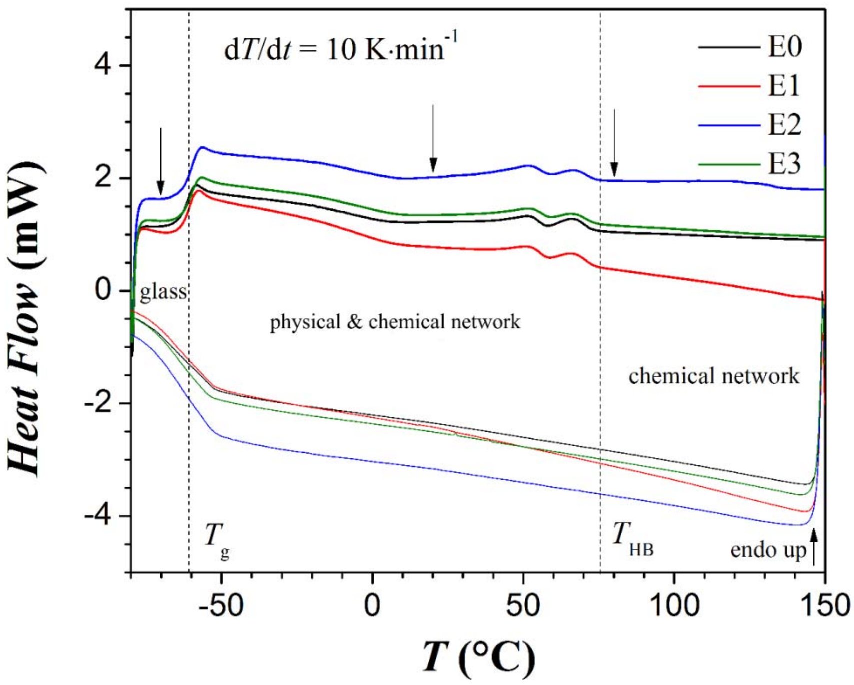

Fig. SI-2: DSC thermograms for the reference elastomer E0 and the three IOENs E1, E2 and E3 at the scanning rate of 10° K min^{-1}. The three arrows indicate the temperatures related to the glassy state, and the two rubbery states (physical and chemical network, and chemical network) where DMA analysis was performed.

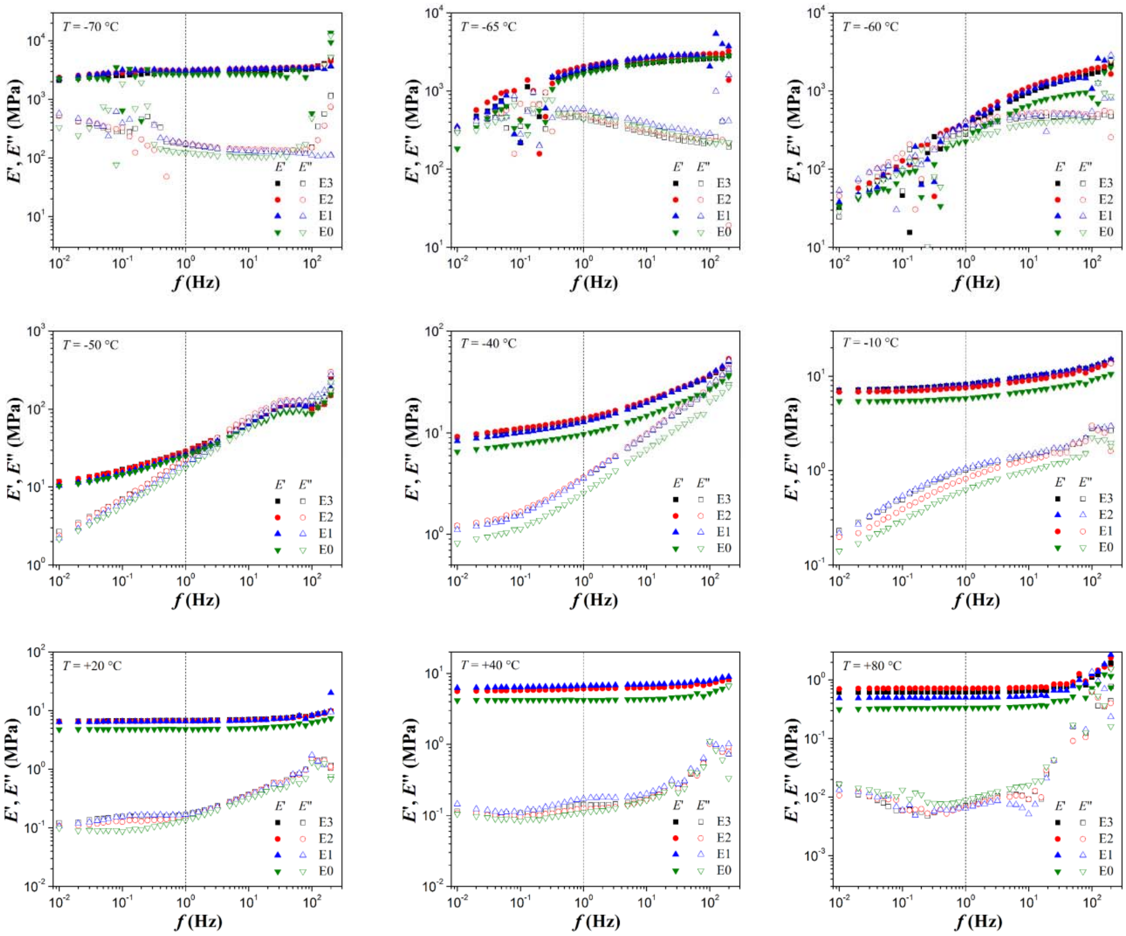

Fig. SI-3: DMA frequency-sweep experiments from $f = 10^{-2}$ to $2 \cdot 10^{2}$ Hz for the reference elastomer E0 and the three IOENs E1, E2 and E3 at different temperatures: -70, -65, -60, -50, -40, -10, +20, +40 and +80 °C.

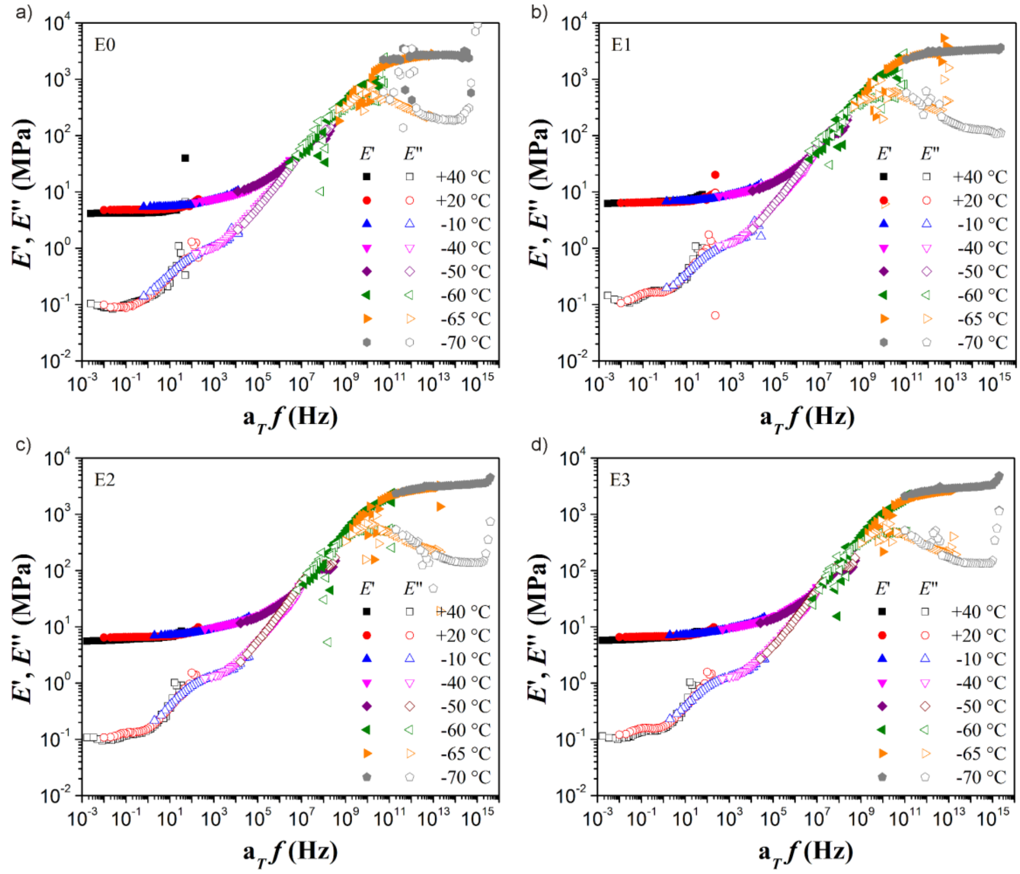

Fig. SI-4: Shifting of the DMA frequency-sweep experiments at different temperatures for the reference elastomer E0 and the three IOENs E1, E2 and E3.

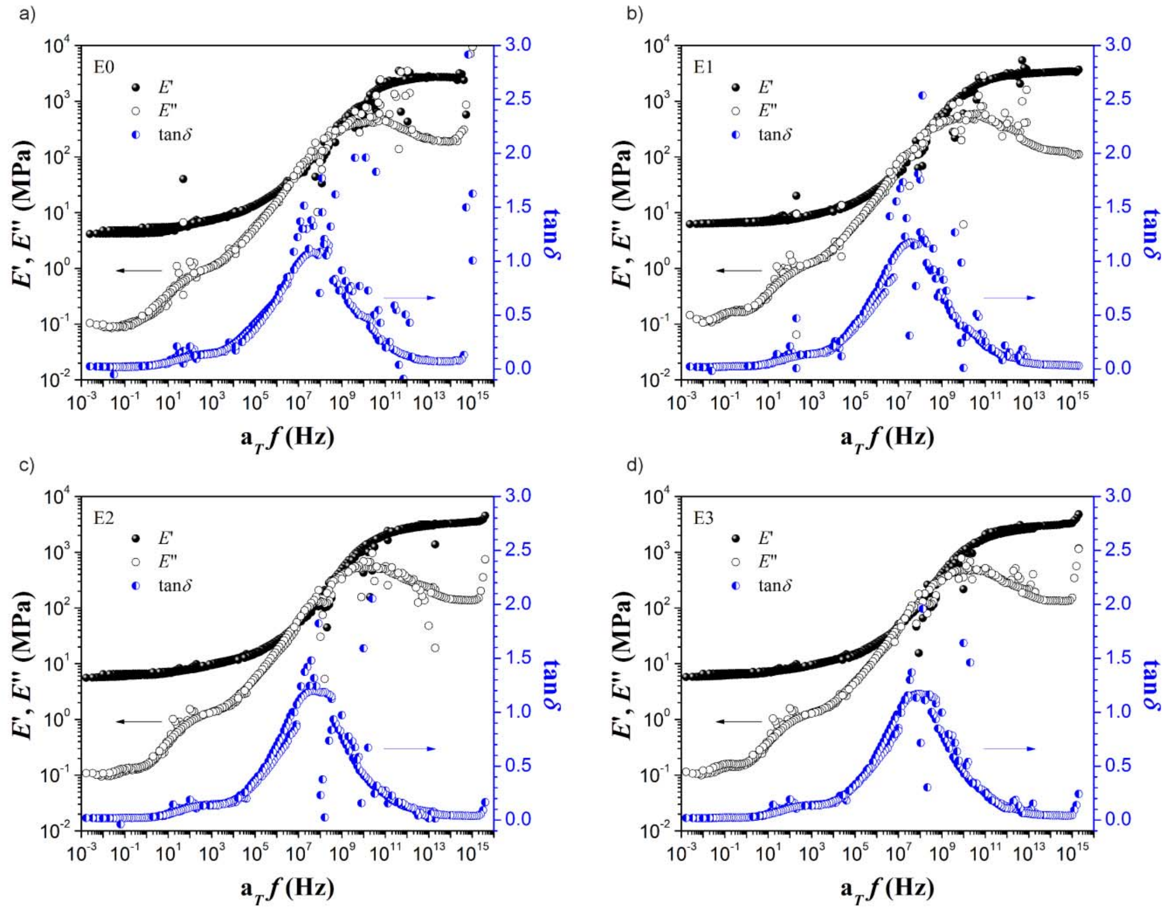

Fig. SI-5: DMA frequency-sweep master curves for the reference elastomer E0 and the three IOENs E1, E2 and E3.

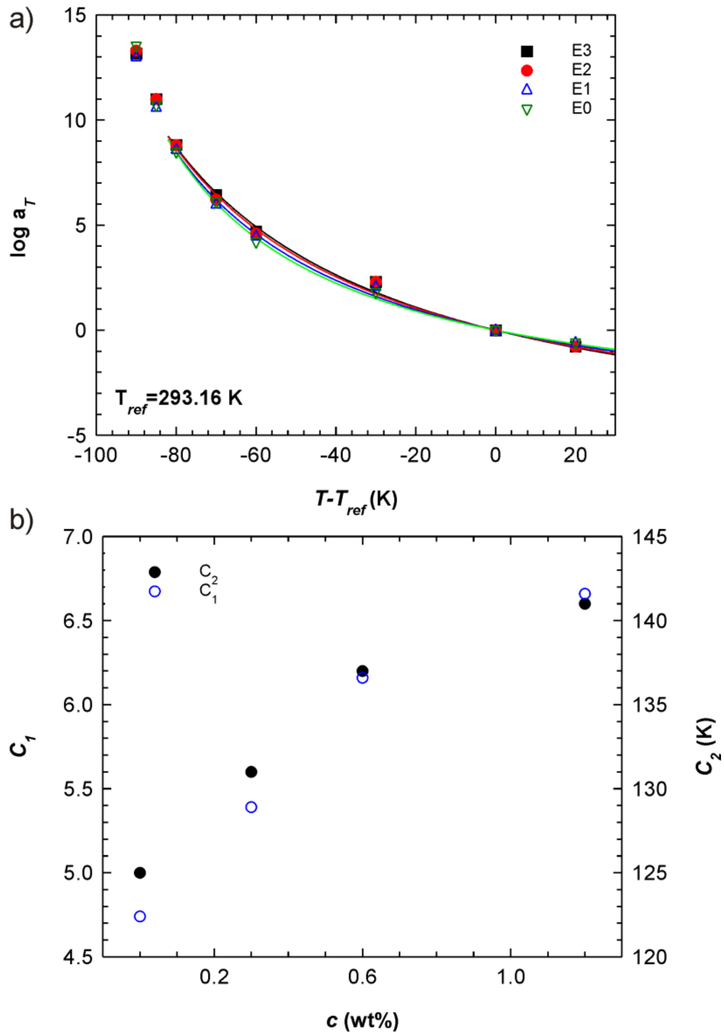

Fig. SI-6: a) Temperature dependence of the shift factor a_T for the reference elastomer E0 and the three IOENs E1, E2 and E3. The solid lines represent the fits according to the WLF equation- (see eq. 8) with a reference temperature of T_{ref} = 293.16 K. b) Material constants C_1 and C_2 as function of the nanoparticle concentration.

Table SI-1: Material constants C_1 and C_2 for the reference elastomer E0 and the three IOENs E1, E2 and E3 obtained from the WLF fitting with a reference temperature of T_{ref} = 293.16 K.

sample	*c* (wt%)	C_1	C_2 (K)
E0	0	4.74	125
E1	0.3	5.39	131
E2	0.6	6.16	137
E3	1.2	6.66	141

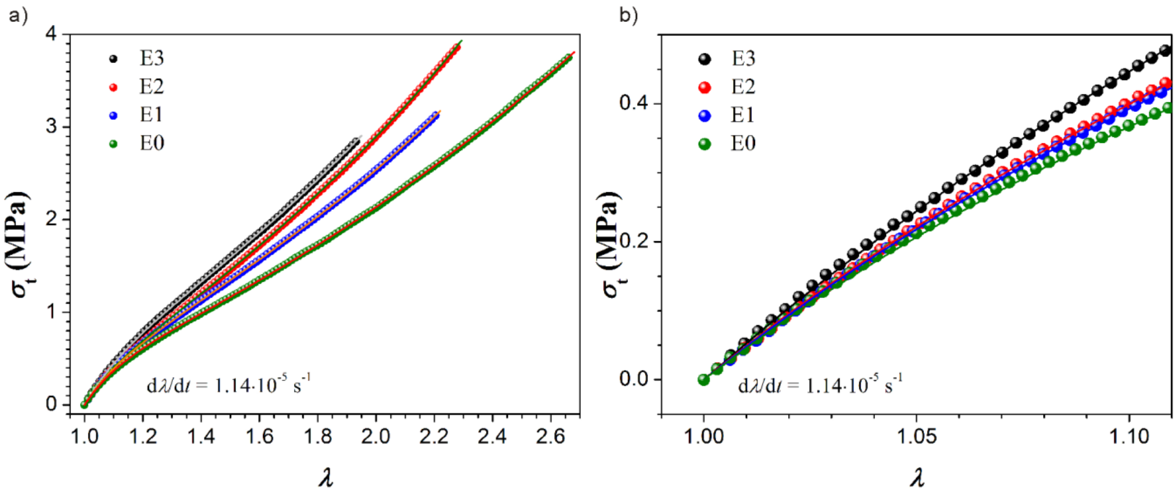

Fig. SI-7: a) Uniaxial stress-strain deformation curves for the reference elastomer E0 and the three IOENs E1, E2 and E3 at 20 °C. b) Zoom-in at the initial strain values.