Supplementary Information

Viscoelasticity in associating oligomers and polymers: experimental test of the bond lifetime renormalization model

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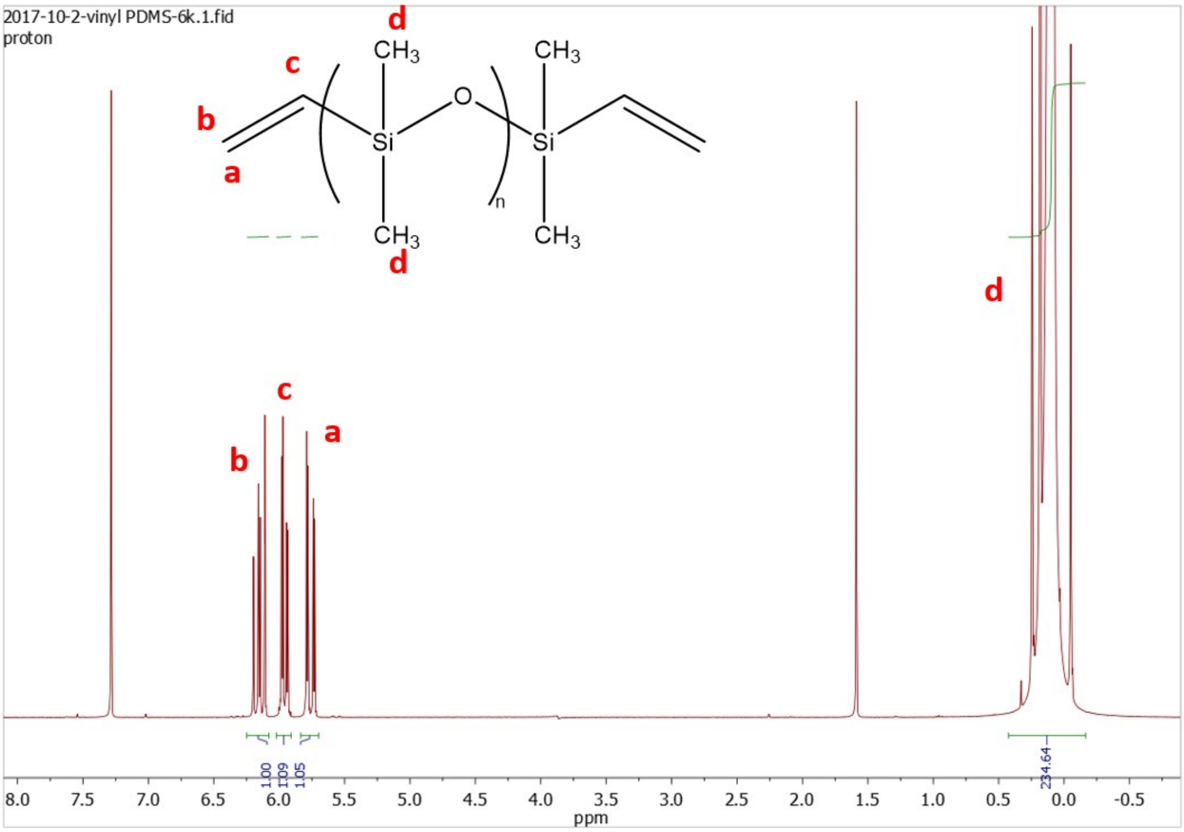

Figure S1: ^{1}H NMR spectra of vinyl-terminated PDMS with *DP* = 83.

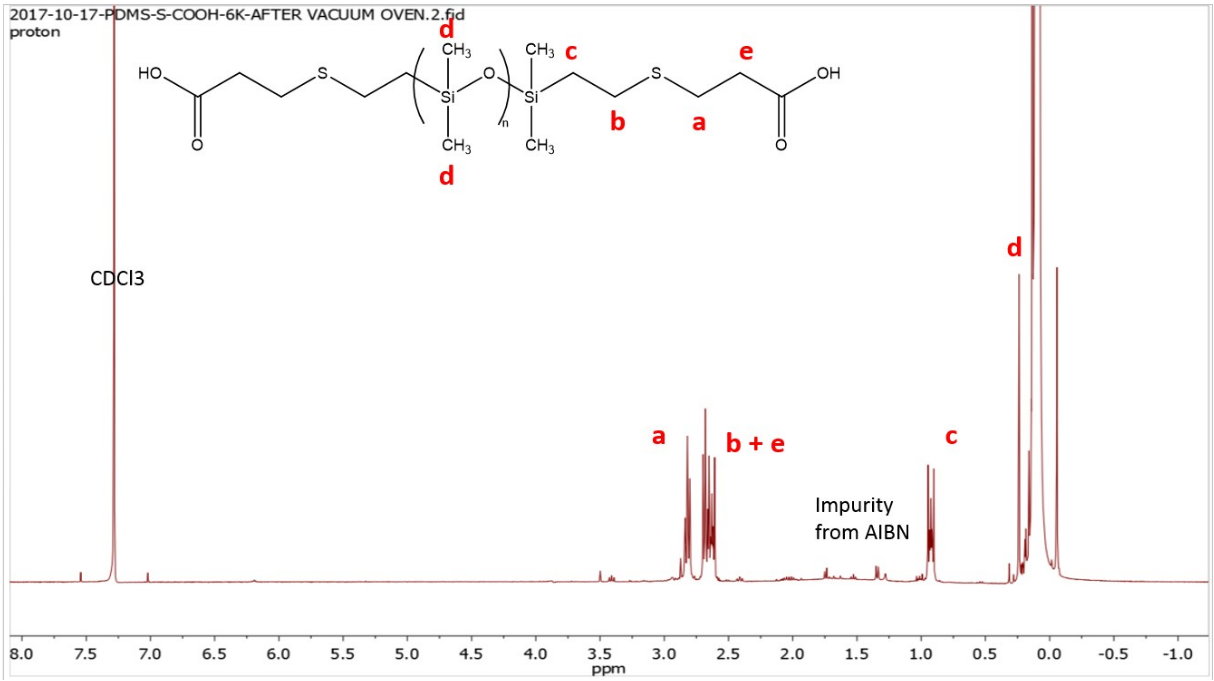

Figure S2: ^{1}H NMR spectra of PDMS-S-COOH-83.

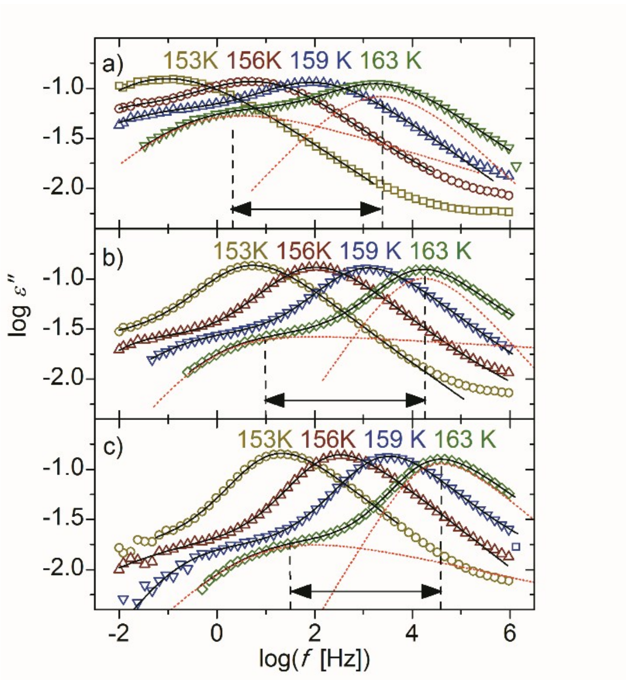

Figure S3: Dielectric loss spectra of PDMS-NH_2 with a *DP* of (a) 22, (b) 50, and (c) 74. Taken from [1].

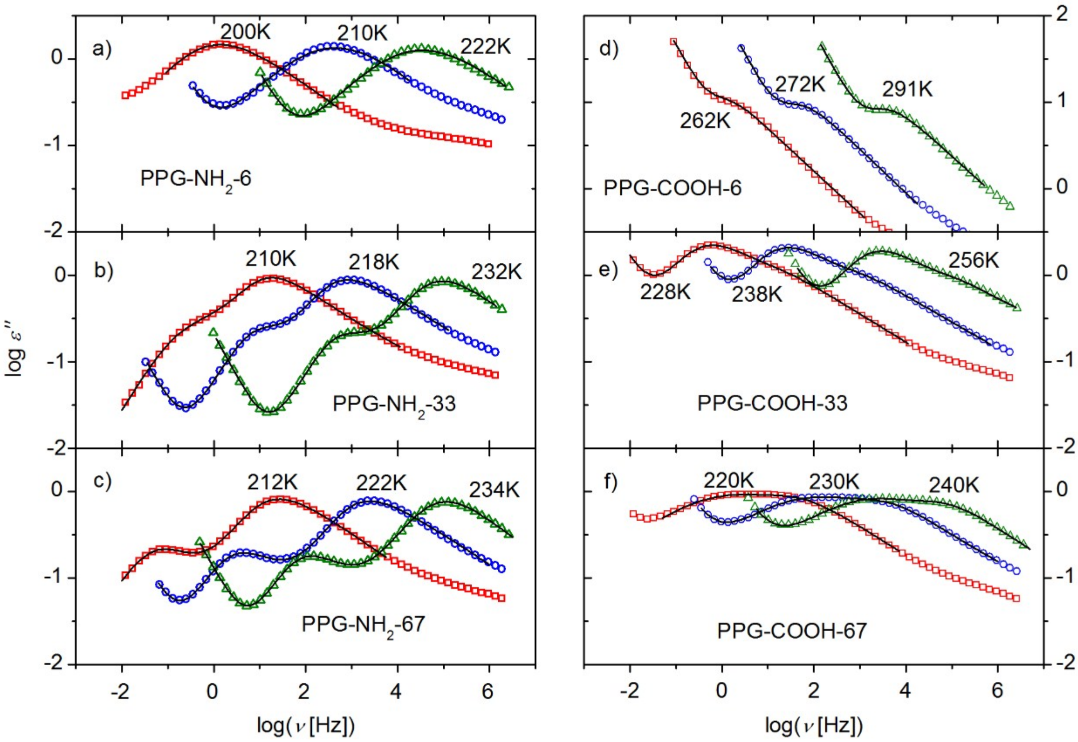

Figure S4: Dielectric loss spectra of PPG-NH_2 with a *DP* of (a) 6, 8b) 33, and (c) 67 as well as of PPG-COOH with a *DP* of (d) 6, (e) 33, and (f) 67. Taken from [2].

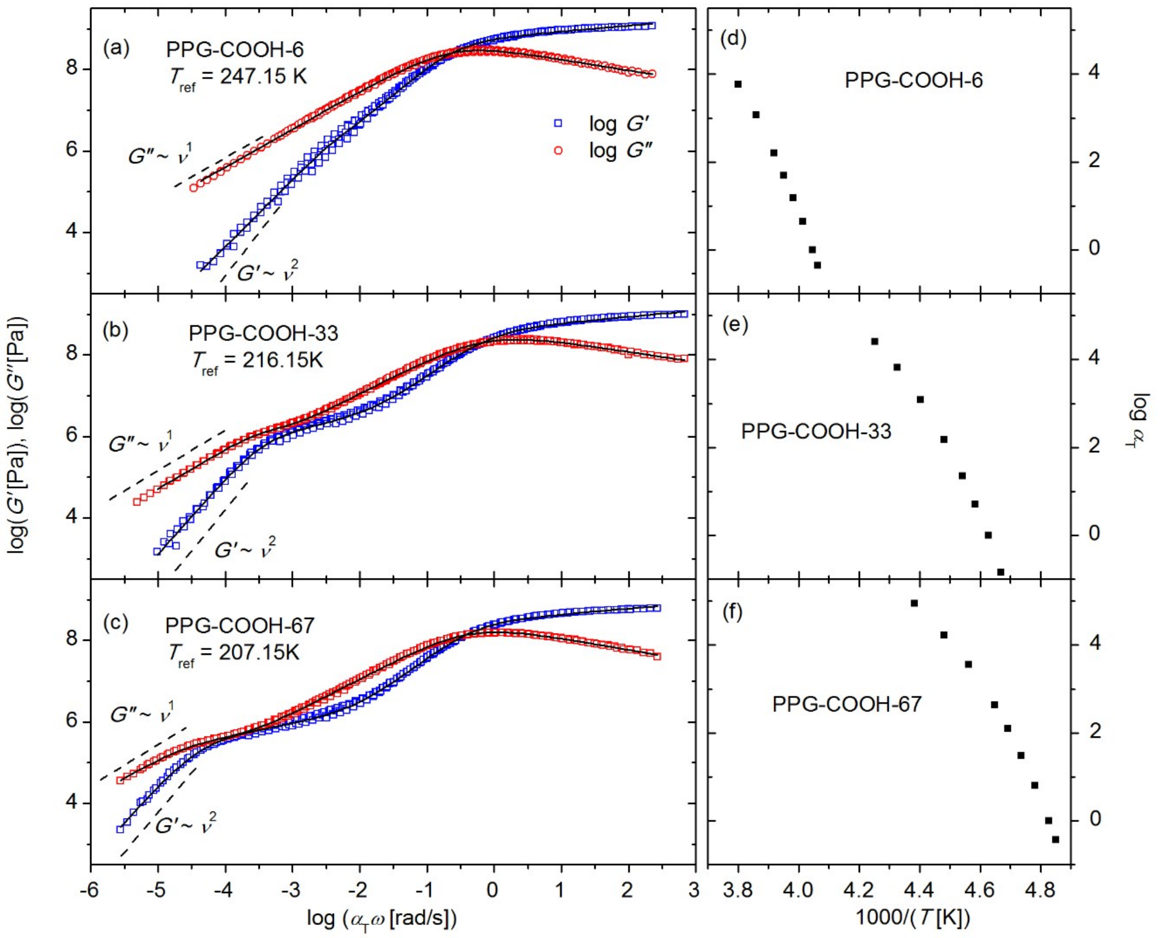

Figure S5: Shear modulus master curves constructed from linear viscoelastic spectra using tTS for PPG-COOH with (a) DP = 6, (b) DP = 33 and (c) DP = 67, and the respective shift parameters (d-f). Modified after [2].

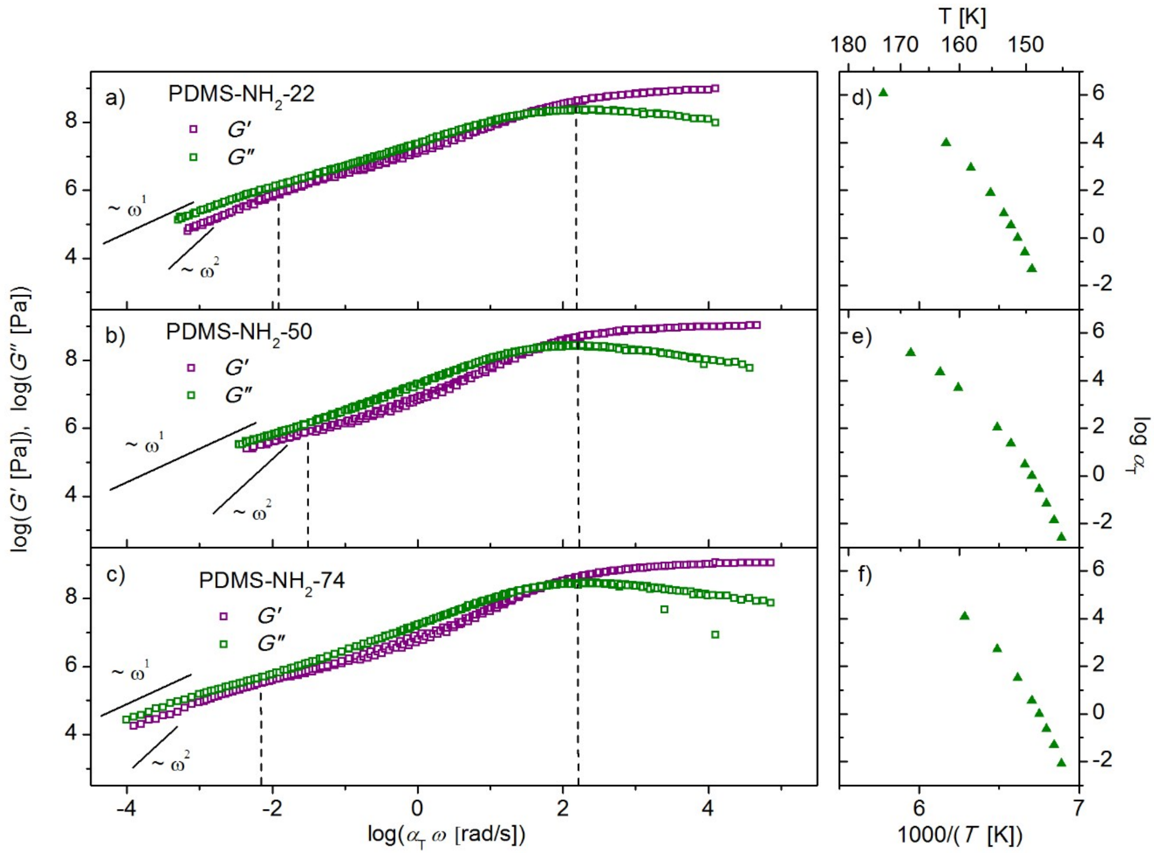

Figure S6: Master curves constructed from linear viscoelastic spectra using TTS for PDMS-NH_2 with (a) DP = 22 (T_{ref} = 151 K), (b) DP = 50 (T_{ref} = 149 K), (c) DP = 74 (T_{ref} = 148). The master curves were shifted horizontally to match their α-relaxation peak positions and cut at low frequencies due to the onset of crystallization. The temperature dependence of the horizontal shift factors α_T employed for the TTS is given for (d) DP = 22, (e) DP = 50 and (f) DP = 74. Modified after [1].

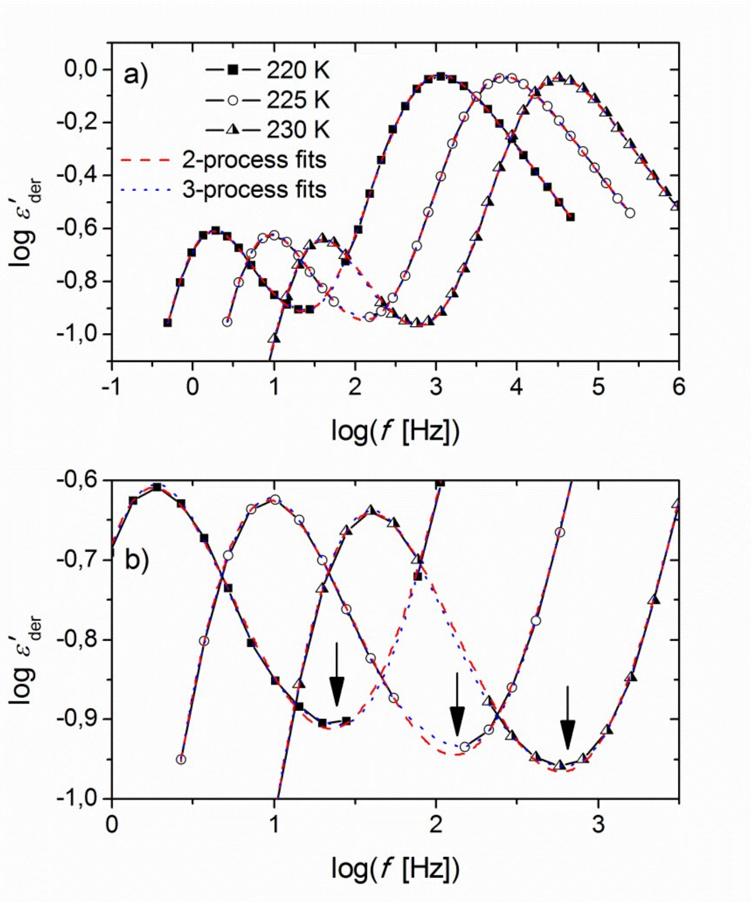

Figure S7: (a) Dielectric permittivity derivative spectra of PPG-NH_2-67 for different temperatures as indicated as well as respective fit functions composed of two (dashed red lines) and three (dotted blue lines) Havriliak-Negami functions. (b) Close-up of the minimum region in-between the two relaxation peaks of the same data sets (identical symbol assignment as in (a)); the arrows indicate the location of the biggest deviation between the data and the best-fit using two Havriliak-Negami functions which suggests the presence of a third process.

References

1. Xing, K.; Tress, M.; Cao, P.; Cheng, S.; Saito, T.; Novikov, V. N.; Sokolov, A. P. Hydrogen-bond strength changes network dynamics in associating telechelic PDMS. *Soft Matter* **2018,** 14, 1235-1246.
2. Xing, K.; Tress, M.; Cao, P.-F.; Fan, F.; Cheng, S.; Saito, T.; Sokolov, A. P. The Role of Chain-End Association Lifetime in Segmental and Chain Dynamics of Telechelic Polymers. *Macromolecules* **2018,** 51 (21), 8561-8573.