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ABSTRACT:

A New Perspective on the Thermal Glass Transition Based on Hypersonic, Thermomechanical, and Caloric Investigations of a Model Oligomer

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For the fragile, low-molecular-weight liquid diglycidyl ether of bisphenol A (DGEBA), we report on the dynamic glass transition and a further acoustic anomaly in the vicinity of the thermal glass transition based on hypersonic investigations of the longitudinal and transversal elastic moduli using Brillouin spectroscopy. This additional acoustic anomaly of the longitudinally polarized phonon is confirmed by the occurrence of an anomaly of the shear phonon at the same temperature. Analysis of the generalized Cauchy relation suggests that both anomalies are coupled to a glass transition phenomenon independent of the so-called α-relaxation process. These results are compared with thermo-mechanical and caloric investigations.