Evolution of the dynamic susceptibility in molecular glass formers: from boiling point down to T_g

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Although broadly studied, molecular glass formers are not well investigated above the melting point. Correlation times (τ_α) down to 10^{-12}s are easily accessible when studying low-T_g systems by depolarized light scattering employing a tandem-Fabry-Perot interferometer and a double monochromator. When combining these techniques with state-of-the-art photon correlation spectroscopy (PCS), broad band susceptibility spectra become accessible which can compete with those of dielectric spectroscopy (DS). Concerning $\tau_\alpha(T)$ a three-parameter function is suggested which yields a high-temperature Arrhenius law – as experimentally observed. Comparing the light scattering spectra with those from DS, optical Kerr effect and NMR we describe the evolution of the susceptibilities starting from boiling point T_b down to T_g, *i.e.*, from simple liquid to glassy dynamics. Special attention is given to the emergence of the excess wing contribution which is also probed by PCS and which signals a crossover of the spectral evolution; it is attributed to a small-angle precursor of the α-process. The apparent probe dependent stretching of the α–process may be explained by a probe dependent amplitude of the excess wing. Many glass formers show in addition a slow β-process which manifests itself rather universally in NMR and DS, but not at all in PCS experiments.