van Megen and Underwood Reply: The central issue of the Comment of Zeng *et al.* [1] concerns the reduction of the scaling time τ_β with increasing ϕ in the glass phase ($\phi > \phi_c$). First, we stress that τ_β, which enters a relaxation function of the form $F(\tau) = f(\tau/\tau_\beta)$ anticipated by Zeng *et al.*, should not be interpreted as a characteristic time associated with a particular physical relaxation process. Indeed such an interpretation is precluded on the basis of the fractal decay indicated by the power law predicted for the early part of the β process [2]. For this stage the intermediate scattering function $f(q,\tau)$ can be written as

$$f(q,\tau) = f_c(q) + h(q)(\tau/t_0)^{-a}, \quad (1)$$

where t_0 specifies the absolute time scale. This ϕ *independent* result follows from Eqs. (19) to (22) of Ref. [3]. In mode coupling theory (MCT), τ_β represents the *crossover* from the β to the α process; the latter describes structural relaxation towards equilibrium, characterized by the time scale τ_α. Below ϕ_c structural relaxation slows with increasing ϕ so that τ_α and also τ_β increase.

In the glass phase ($\phi > \phi_c$) the α process arrests and here τ_β marks the crossover from the above power law to the plateau,

$$f(q,\infty) = f_c(q) + h(q)|\sigma|^{1/2}(1-\lambda)^{-1/2}, \quad (2)$$

where the separation parameter $\sigma = c(\phi - \phi_c)/\phi_c$, $c \simeq 1.2$ and the exponent a is related transcendentally to the exponent parameter λ [see Eq. (2.51a) of Ref. [2]]. It follows that τ_β varies as $|\sigma|^{-1/2a}$. The reduction in τ_β with increasing ϕ (or σ) is a consequence of the concomitant increase in the asymptote $f(q,\infty)$ and occurs irrespective of whether relaxation to the plateau proceeds by the above power law or the illustrative stretched exponential used by Zeng *et al.*

The stretched exponential

$$f(\tau) = A\exp[-(\tau/\tau_k)^\beta] \quad (3)$$

results in a more featureless range of scaling than that seen in the data (Fig. 8 of Ref. [3]). Bartsch *et al.* [4] have already shown that relaxation data similar to ours cannot be satisfactorily explained in terms of stretched exponentials. One reason for this is that our relaxation curves (Figs. 6 and 8 of Ref. [3]) expressed in terms of $\log\tau$ are convex over time windows as large as 3 orders of magnitude. The stretched exponential function [Eq. (3)], on the other hand, is convex for $\tau/\tau_k \gg 1$, where the function is close to zero. Consequently, in the figure of Zeng *et al.*, convex curvature is apparent only over intervals smaller than one decade. Our data, therefore, illustrate that a more complete description of the relaxation to the plateau is given by a power law rather than by a stretched exponential.

Zeng *et al.* state that we should have determined $f_c(q)$ and ϕ_c experimentally. We stress that we have measured both these quantities. ϕ_c has been identified as the concentration where the fluid structure is arrested on the experimental time scale and also as that where homogeneous nucleation is suppressed. The nonergodicity parameter $f_c(q)$ has been determined by three independent methods; first, from the long time value of $f(q,\tau)$ (Fig. 4 of Ref. [5]); second, from the mean-squared amplitude of fluctuations of the intensity of the scattered light (Fig. 5 of Ref. [3]); and third, from the amplitude of the α process for $\phi < \phi_c$ (Fig. 2 of Ref. [6]). Different procedures yield consistent results with accuracy levels of 1% and 5% for ϕ_c and $f_c(q)$, respectively. In seeking optimum MCT fits to our relaxation data ϕ_c (or σ) and $f_c(q)$ are varied only within these tolerances. The only unconstrained parameter is the absolute time scale, which is not specified by the theory. It then becomes a matter of semantics whether or not ϕ_c and $f_c(q)$ are regarded as fit parameters.

Finally, we can summarize our results in terms of MCT as follows: All our measured relaxation functions outside the microscopic transients can be described by the basic version of MCT to an accuracy of (10–15)% using a single fitting parameter t_0. The error margins reflect to some extent our experimental uncertainties but also systematic errors of the theory. This description extends over 4 to 5 decades in time, holds for a significant spread of q values and α relaxation times that vary over 5 decades for the 8 concentrations analyzed. In particular, our estimates of τ_β obtained by fitting the MCT master functions to the scaled data for $\phi > \phi_c$ allow us to confirm the predicted value of the exponent $a = 0.301$ to an accuracy of about ± 0.03. This uncertainty slightly exceeds that obtained for a from the tolerance, determined from our data below the glass transition ($\phi < \phi_c$), in the exponent parameter λ. Our results confirm that τ_β increases as ϕ_c is approached from either side.

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