

Abstract Submitted  
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**Recovery of polymer glasses from mechanical perturbation** ANTON SMESSAERT, JÖRG RÖTTLER, The University of British Columbia — There is a longstanding debate about the nature and extent of mechanical rejuvenation in aging glasses and most related studies have concentrated on the impact of aging during plastic deformation. Here we study the time period after nonlinear creep where the glass recovers, using molecular dynamics simulations of a bead-spring model for a wide range of stress amplitudes and glass ages. We compute  $\alpha$ -relaxation times as well as several quantities that characterize structural changes. From an analysis of the recovery paths we find a transition from memory effects to mechanical rejuvenation that is controlled by the total strain and not the stress amplitude. Although strong mechanical perturbation can make the dynamics appear very similar to that of a freshly quenched glass, various measures of short range order as well as inherent structure energies reveal systematic differences in the underlying thermodynamic state.

Anton Smessaert  
The University of British Columbia

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