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**Stress-induced Mobility in Polymer Glasses During Multi-step Creep Deformation** HAU-NAN LEE, KEEWOOK PAENG, STEPHEN SWALLEN, MARK EDIGER, Department of Chemistry, University of Wisconsin-Madison, ROBERT RIGGLEMAN, JUAN DE PABLO, Department of Chemical and Biological Engineering, University of Wisconsin-Madison — An optical photobleaching experiment and molecular dynamics simulations have been used to study the changes in segmental dynamics of a polymer glass during uniaxial creep deformation. Both experiment and simulation observe that segmental mobility increases more than a factor of 100 during deformation. Both show a strong correlation between strain rate and mobility in single step creep. However, in multistep creep and recovery, the correlation between strain rate and mobility is broken in both experiment and simulation; this emphasizes that no simple mechanical variable universally exhibits a simple relationship with molecular mobility. Interestingly, in contradiction to the Eyring model, both experiments and simulations show an increase in segmental mobility immediately follows a significant drop in stress.

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