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Segmental mobility measured during constant strain rate deformation of poly(methyl methacrylate) glasses[1] KELLY CHRISTISON, BENJAMIN BENDING, JOSH RICCI, MARK EDIGER, University of Wisconsin-Madison — We have measured segmental mobility in poly(methyl methacrylate) glasses during constant strain rate deformation using a dye reorientation method. At 19 K below the glass transition temperature and for strain rates between 5.5x10^{-6} and 1.5x10^{-4} s^{-1}, mobility increases as yield is approached, after which, it remains constant. In the post-yield regime, higher strain rates are found to be correlated with higher values of mobility. These results are consistent with the simulations of Riggleman et al. and the theory of Chen and Schweizer. On a log-log plot of mobility versus strain rate, our data falls on two parallel lines with slopes of -1. Data associated with high strain rates falls on a line consistent with the theory of Chen and Schweizer. Low strain rate data falls on a separate line shifted toward lower mobility. To our knowledge, this behavior is not predicted by existing simulations or modeling approaches.

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