

Abstract Submitted
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Rheology On A Triblock Copolymer: Mechanical Hole Burning Spectroscopy¹ QIAN QIN, GREGORY MCKENNA, Texas Tech University — Mechanical hole burning spectroscopy was developed for probing the dynamic heterogeneity of polymeric materials. In this technique, a mechanical oscillatory perturbation is applied to the sample to excite the dynamic heterogeneities and this is followed by a small linear strain. Comparison between linear response after perturbation and that without any perturbation can result in vertical and horizontal modifications in the response that are referred to as “holes.” The holes are thought to be a signature of the dynamic heterogeneity of polymers. To quantitatively characterize the dynamic heterogeneity, a block copolymer was used and the study was performed in the vicinity of its order-disorder transition temperature. The results indicate that the mechanical holes can be successfully burned in the heterogeneous phase ($T < T_{ODT}$), while in the homogeneous or disordered phase, no apparent holes were observed. More importantly, the hole intensity decreases sharply in the vicinity of the ODT, which provides a correlation between hole intensity and the length scale of the heterogeneity.

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