

Abstract Submitted
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Mechanical Spectral Hole Burning – A Technique to Characterize Dynamic Heterogeneity¹ XIANGFU SHI, QIAN QIN, GREGORY MCKENNA, Texas Tech University — The Mechanical Spectral Hole Burning (MSHB) technique was developed and initially used to qualitatively characterize dynamic heterogeneity of polymer melts and solutions. Here we attempt to develop a quantitative relationship between the heterogeneity and the length scale, by developing a “calibration” for the dynamic heterogeneity, i.e. the frequency and magnitude of the burned hole and the size or length scale. Here we consider the local heterogeneity and well characterized structures of macroscopically homogeneous systems, such as miscible polymer blends and block copolymers in the disordered state, but approaching the phase boundary. We interrogate these materials using the MSHB method at different temperatures going through the phase boundary. Presently and for a styrene-isoprene-styrene triblock copolymer, we find that the hole amplitudes increase as the phase boundary is approached from the one-phase region, i.e., as the order-disorder transition is approached. Further work is ongoing to use miscible blends and other block copolymer systems to determine if the MSHB response can be related quantitatively to the known heterogeneities of the systems.

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