

Abstract Submitted
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PB-PEO wormlike micelles under oscillatory shear flow as probed by Time-resolved SANS MINNE PAUL LETTINGA, BARBARA LONETTI, JOERG STELLBRINK, Forschungszentrum Juelich, JOACHIM KOHLBRECHER, Paul Scherrer Institut, Villigen — Polybutadiene-poly(ethylene oxide) (2.5 kd:2.5 kd) diblock copolymers form wormlike micelles, known to undergo an isotropic to nematic phase transition at 5% w/w. The rheological properties of this system display similarities to surfactant wormlike micelles. The theory describing this type of ‘living’ polymers uses the concept of reptation in combination with the kinetics of breaking and re-formation of the micelles to predict the dynamical response of such systems. In practice the dynamical characterization is limited to the determination of the crossover point between the storage and loss moduli and thus to the linear properties of the system. Here we present an *in situ* study of the response of pb-peo in the vicinity of the I-N transition to an oscillatory shear field. We determine the (non-) linear response of the Kuhn-segments applying a novel approach to obtain high time-resolution Small Angle Neutron Scattering ($\Delta t \geq 5$ ms). We interpret our data using the reptation time as determined by high-speed confocal microscopy on labeled pb-peo. Thus we obtain a microscopic understanding of the dynamics of ‘living’ polymers.

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