

Abstract Submitted
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When does a molecule become a polymer? YIFU DING, University of Akron, ALEXANDER KISLIUK, VLADIMIR NOVIKOV, ALEXEI SOKOLOV — The molecular weight (MW) dependences of chain, segmental and fast dynamics have been studied for a few polymers. These properties (except chain dynamics) appear to have similar MW dependence that they all saturate when chain approaches Gaussian coil behavior. Chain dynamics in PDMS reaches asymptotic Rouse prediction at the same MW. We demonstrate that the difference in the MW dependence for various polymers does not correlate to either the difference in the Kuhn length or M_e . We introduce an additional parameter, mR (MW for each random step) that might be important for characterizing chain statistics and the MW dependence of many physical properties. The most intriguing result is that the MW dependence of the fast dynamics, elastic property and fragility observed in PS is opposite to the one observed in PIB. We speculate that the difference in symmetry of the structural unit is responsible for the opposite behavior. Based on this idea, predictions for the dependence of the fast dynamics and fragility in polymers on MW and tacticity are formulated.

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