

Abstract Submitted
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Polymer Conformation near the Critical Demixing Point of a Binary Solution LILIN HE, Oak Ridge National Laboratory, GANG CHENG, Sandia National Laboratory, YURI MELNICHENKO, Oak Ridge National Laboratory — We have used Contrast Matching Small Angle Neutron Scattering (CMSANS) to probe directly the conformation change of polyethylene glycerol (PEO) chains in the critical demixing region of Acetonitrile-d₃ in (D₂O + H₂O) at concentration of the components corresponding to zero-average contrast condition. The d-PEO and h-PEO were mixed to match the scattering length density (SLD) of the critical liquid solution, which allowed us to extract single-chain dimension of polymer molecules in the aggregates near the critical point of the solvent. A non-monotonic variation of R_g was detected as temperature approached the critical temperature of phase demixing of acetonitrile- water solution, which was attributed to the interaction asymmetry of the solvent molecules with polymers predicted by Brochard and de Gennes two decades ago. To our best knowledge, this is the first direct experimental evidence supporting this prediction.

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