Abstract Submitted
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Chain exchange kinetics of block copolymer micelles in ionic liquids YUANCHI MA, TIMOTHY LODGE, University of Minnesota — The chain exchange kinetics of block copolymer micelles has been studied using time-resolved small-angle neutron scattering (TR-SANS), a key tool in determining the average micelle composition in contrast-matched solvents. In this work, PMMA-*block*-PnBMA was selected as the model block copolymer, which has a LCST behavior in the common ionic liquids, [EMIM][TFSI] and [BMIM][TFSI]. We examined the chain exchange kinetics of three PMMA-*block*-PnBMA copolymers, with identical PMMA block length ($M_{\mathrm{PMMA}} = 25000$) and different PnBMA block lengths ($M_{\mathrm{PnBMA}} = 24000$, 35000 and 53000); the Flory-Huggins interaction parameter (χ) between the core (PnBMA) and the solvent were varied by mixing [EMIM][TFSI] and [BMIM][TFSI] in different ratios. We found that the relaxation of the initial segregation of h- and d- micelles followed the same form with the time as previously developed by our group. Assuming that single chain expulsion is the rate limiting step, the thermal barrier was found to depend linearly on the core block length (N_{core}). Furthermore, the effect of χ on the chain exchange kinetics will also be discussed.

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