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The effect of varying molecular weight on ion-transport properties in polymeric ionic liquids JORDAN KEITH, University of Texas at Austin, FAISAL ALDUKHI, University of Illinois at Urbana-Champaign, SANTOSH MOGURAMPELLY, Temple University, BILL WHEATLE, VENKAT GANESAN, University of Texas at Austin — We performed atomistic molecular dynamics simulations on polymerized 1-butyl-3-vinylimidazolium ionic liquid with a PF_6^- counterions to study the influence of the molecular weight of the polymer on the ion mobilities and mechanisms underlying ion transport. As the molecular weight of the polymer increases, the diffusivity of the counterions decreases, but plateaus around a polymer length of 7-12 monomer units. We rationalize this result by invoking the molecular weight dependence of ion-pair dynamics, ion hopping mechanisms, polymer segmental motion, orientational relaxation, and coordination statistics.

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