

Properties of polymeric ionic liquids bearing ether moiety as flexible pendant group

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Polymerized imidazolium ionic liquids incorporated ethyl, mono-, or triethylene oxide pendant group containing a $[\text{Tf}_2\text{N}]^-$ anion as counter ion were synthesized via radical polymerization. The dependence of the length of pendant groups on the ionic conductivity of the polymerized ionic liquids (PILs) was investigated. The experimental results showed that the length of ethylene oxide unit significantly affected the ionic conductivity of PILs implying that the increased number of ethylene oxide unit on the imidazolium cation improved the chain mobility of pendant group on PILs due to the flexibility of ethylene oxide unit. To investigate the interaction between PIL and Li salt, LiTf_2N was mixed with each PIL and the ionic conductivities of the mixtures were higher than that of the pure PILs up to $3 \times 10^{-5} \text{ S cm}^{-1}$ at room temperature.