

### Polymerizable Bicontinuous Ionic Liquid Gels

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The imidazolium-based ionic liquids (ILs) with a long alkyl chains, which have an amphiphilic property, forms a bicontinuous microemulsion system providing molecular level control on the structure. Here, we present polymerizable ionic gels that have potential applications as electrolytes using the self-assemblies of the ILs. Polymerizable ILs have been synthesized and used to polymerize the ionic gels. And acrylate monomers are added for enhancing the stability of the ionic gels. From small-angle X-ray scattering (SAXS), a strong intensity peak was observed near  $0.2 \text{ \AA}^{-1}$  for the polymerized ionic gels. It reveals that the self-assemblies of ILs, a bicontinuous microemulsion system, contributes to the formation of the phase-separated ionic gels, and the structure sustains under polymerization. To confirm the properties of the gels, tensile strength and hydroxide conductivity were measured. These properties are strongly related to the morphology of the ionic gels. Lithium salt was also added for an application of lithium ion conduction.