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Understanding Ion Transport in Epoxy-based Polymer Electrolyte. U HYEOK CHOI, Pukyong National University, HYEKYEONG JANG, BYUNG MUN JUNG, SANG-BOK LEE, Korea Institute of Materials Science — We prepare epoxy-based networked polymer electrolytes including Li salts with either ionic liquids or plastic crystals. The epoxy resins are particularly attractive as polymer matrices for solid polymer electrolytes due to their high mechanical performance combined with good adhesive properties. The selected electrolyte components are allowed to boost ionic conductivity owing to solvating the Li cation and plasticizing the epoxy matrix. As a result, the curing of a homogeneous mixture of epoxy and electrolyte can generate a two-phase system in which the epoxy phase is selected to provide mechanical strength and the electrolyte phase is selected to maximize ionic conductivity. Here, we conduct an investigation of the effect of electrolyte types and their concentration on the conductometric, dielectric and rheological properties of epoxy-based networked polymer electrolytes, using dielectric relaxation spectroscopy and oscillatory shear. These results are complemented by morphology studies in order to understand structure-property relations. Our study leads to insight regarding optimal design of multifunctional electrolytes for energy storage devices.

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