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Flexible solid polymer electrolyte membran formed by photopolymerization JINWEI CAO, THEIN KYU, Univ of Akron — Binary and ternary phase diagrams of poly(ethylene glycol) dimethacrylate (PEGDMA,succinonitrile(SCN), and bis(trifluoromethane)sulfonimide (LiTFSI) blends have been established to provide guidance to fabricationof polymer electrolyte membrane (PEM). The phase diagram of binary PEGDMA/SCN mixture is of a typical eutectic typ, whereas the binary PEGDMA/LiTFSI mixture reveals a eutectic trend exhibiting a wide single phase region at intermediate composition. Likewise, the ternary phase diagram of PEGDMA/SCN/LiTFSI mixture shows a wide isotropic regio. The PEM network, formed by UV-crosslinking of PEGDMA in the isotropic region, is a solid amorphous network, but flexible and stretchable. Ion conductivity of PEMwas measured as a function of temperature at different ratios of PEGDMA/SCN and SCN/LiTFSI. Of particular importance is that these PEM networks possessvery high roo-temperature ion conductivity on the order of 10_{-3} S cm_{-1}, which reaches the level of 10_{-2} S cm_{-1} at elevated temperatures of 60-70 °C. The electrochemical stability of the solid PEM will be evaluated by cyclic voltammetry and its potential applicabilityinflexible lithium ion battery will be discussed.

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