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Useful Effects of Silica Nanoparticles in Ionic Liquid Electrolyte for Energy Storage

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Abstract : Improved energy storage is inevitably needed to improve energy efficiency and to be environmentally friendly to chemical processes. Ionic liquids (ILs) can play a crucial role in addressing these needs due to inherent adjustable properties including low volatility, low flammability, inherent conductivity, wide liquid range, broad electrochemical window, high thermal stability, and recyclability. Here, binary mixtures of ILs were prepared with fumed silica nanoparticles and characterized to obtain ILs with conductivity and electrochemical properties optimized for use in energy storage devices. The solutes were prepared by varying the size and the weight percent concentration of the nanoparticles and made up 10 % of the binary mixture by weight. We report on the physical and electrochemical properties of the individual ILs and their binary mixtures.

Keywords : ionic liquid, silica nanoparticle, energy storage, electrochemical properties
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