

Title: Imidazolium Ionic Liquid based Lithium Conducting Polymer Electrolytes

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In the present work, numerous solid polymer electrolyte membranes (SPEM) of varying ionic liquid compositions were fabricated and their properties studied in order to develop electrolytes for use as an electrolyte for application in lithium batteries. The SPEM consisted of a novel ionic liquid namely 1-propyl-3-methylimidazole tetrafluoroborate (1P-3-MIm TFB) and the copolymer poly (vinylidene fluoride-co-hexafluoropropylene) [PVDF-HFP] and a plasticizer. The ionic liquid that made up part of the SPEM was prepared by an alkylation reaction with a bromoalkyl compound and sodium hydride followed by an anion exchange reaction with Lithium Tetrafluoroborate (LiTfB). Electrical property have been studied in terms of the ionic conductivity for pure ionic liquid, polymer electrolytes and plasticized polymer electrolytes using impedance spectroscopy. RT conductivity of 8.24 S/cm has been observed for pure ionic liquid. PC has been used in order to synthesize the plasticized polymer electrolytes. The effect of plasticizer and polymer concentration on various properties of the electrolytes has been studied.