

Title: Novel Ionic liquid based lithium ion conducting gel electrolytes for lithium batteries

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Demand for portable electronic devices has reached an unprecedented level in the last two decades and this has catapulted technological improvements in rechargeable batteries. Lithium-ion batteries are the preferred systems due to the exceptional properties lithium offers like its light weight and its high electrochemical potential. Lithium-ion batteries offer a more flexible and lightweight design, higher energy density and longer lifespan than their battery counterparts. Since the electrolyte is the means of transportation of ions in an electrochemical cell, its role is critical. In the present work, lithium ion gel electrolytes has been synthesized using imidazolium based room temperature ionic liquid, 1-propyl-3-methylimidazolium tetrafluoroborate [PmImBF₄], poly(vinylidene fluoride)-co-hexafluoropropylene [PVdF(HFP)] copolymer and ethylene carbonate (EC)/propylene carbonate (PC) as the solvent. Different gel electrolytes have been synthesized using different ratios of RTIL and solvent and also of polymer. High ionic conductivity of the order of 10^{-3} - 10^{-2} S/cm at RT has been observed along with good thermal stability. The observed results suggest their potential use as electrolytes in lithium batteries.