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# Structural, Thermal and Battery Characteristic Properties of $Nh_4cf_3so_4$ Doped Pan Films for Electrochemical Cell Applications

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**Abstract :** Gel polymer electrolyte films using polyacrylonitrile (PAN) as polymer and Ammonium Trifluoro methane sulfonate ($NH_4CF_3SO_4$) as dopant has been prepared at different wt% ratios by solution cast technique. The gel polymer electrolyte thick films have been characterized using analytical techniques such as X-Ray diffraction (XRD),Differential scanning calorimetery (DSC),Cell parameters like open circuit voltage(OCV),short-circuit current (SCC),energy density and power density has been calculated and compared with the data from the earlier reports. The variation of the conductivity with salt concentration ranging from 10 to 40 wt % studied. The Gel polymer Electrolyte's bulk resistance was measured by using AC conductivity at room temperature (303K).It can be revealed that conduction mechanism to be the Arhenius-type thermally activated process.This mechanism can be calculated by Impedance spectroscopy. The sample containing 30% of $NH_4CF_3SO_4$ exhibits the highest conductivity of 1.68x $10^{-3}$ S $cm^{-1}$ at room temperature (303K) and 3.46x $10^{-3}$ S $cm^{-1}$ at 378K for 70:30 wt% films. The transport numbers both electronic ($t_e$) and ionic ($t_i$) are evaluated using Wagner's polarization technique.

**Keywords :** Gel Polymer Electrolyte; Solution Casting Technique; Discharge Characteristics; Electrochemical Cell Applications.

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