

EFFECT OF IONIC LIQUID ON THE ELECTRICAL PROPERTY OF  
CHITOSAN-BASED POLYMER ELECTROLYTE

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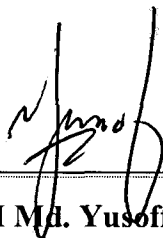
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## ABSTRACT

### THE EFFECT OF IONIC LIQUID ON THE ELECTRICAL PROPERTY OF CHITOSAN – BASED POLYMER ELECTROLYTE

A composition of host electrolyte chitosan and ionic liquid 1-butyl-3-methylimidazolium hexafluorophosphate, BMIM-PF<sub>6</sub> as the doping salt was prepared by solution casting technique. The main objective of this study is to study the effect of ionic liquid on the electrical property of chitosan – based polymer electrolyte and structural property of chitosan-based polymer electrolytes. Six different compositions of the polymer electrolytes were prepared with various salt concentrations, ranging from 0 wt% to 50 wt%. Composition dependence conductivity of all the samples at room temperature were measured using the Electrical Impedance Spectroscopy (EIS) at frequency range from 100 Hz to 1MHz. The highest conductivity recorded was  $1.0 \times 10^{-3} \text{ Scm}^{-1}$  for sample with 40 wt% BMIM-PF<sub>6</sub> composition. The temperature dependence conductivity of the polymer electrolyte system with salt composition of 40 wt% obeys the Arrhenius rule, suggesting that the conductivity is a thermally assisted process. The dielectric study suggests that an increment in salt content from 10 to 40 wt% yields an enhancement in ionic conductivity. Fourier Transform Infrared (FTIR) study suggested the occurrence of complexation between the chitosan – based polymer electrolyte and the ionic liquid of 1-butyl-3-methylimidazolium hexafluorophosphate, BMIM-PF<sub>6</sub>.