

# Characterization on Ionic Conductivity of Solid Bio-Polymer Electrolytes System Based Alginate Doped Ammonium Nitrate via Impedance Spectroscopy

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## Abstract

This present study aims to investigate the electrical study of a solid biopolymer electrolytes (SBEs) based on alginate doped with ammonium nitrate (NH<sub>4</sub>NO<sub>3</sub>). The SBEs system has been successfully prepared via solution casting method. The electrical properties of SBEs system was characterized using electrical impedance spectroscopy (EIS) under frequency range from 50 Hz to 1 MHz. The optimum ionic conductivity at room temperature (303K) is achieved with  $5.56 \times 10^{-5}$  S cm<sup>-1</sup> for sample containing 25 wt. % NH<sub>4</sub>NO<sub>3</sub>. The SBEs system was found to obey the Arrhenius behavior where all sample is thermally activated and close to unity  $R_2 \sim 1$  with the increasing of temperature. The electrical properties of the alginate-NH<sub>4</sub>NO<sub>3</sub> SBEs system was measured using complex permittivity ( $\epsilon^*$ ) and complex electrical modulus ( $M^*$ ) and the present system shows the non-Debye behavior.