

Irregularities Trend in Electrical Conductivity of CMC/PVA-NH₄Cl Based Solid Biopolymer Electrolytes

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Abstract

In this present work, solid biopolymer electrolytes (SBEs) system consists of the blended polymer namely carboxymethyl cellulose (CMC) and polyvinyl alcohol (PVA) doped ammonium chloride (NH₄Cl) at different composition from 0 to 10 wt. % were successfully prepared by using casting technique. The electrical conductivity of solid biopolymer electrolytes (SBEs) system was investigated by using Electrical Impedance Spectroscopy (EIS). Electrical study shows the highest ionic conductivity in room temperature (303 K) was achieved at $8.86 \times 10^{-5} \text{ Scm}^{-1}$ for sample containing 6 wt. % of NH₄Cl. The present system shown unexpected drop after different amount of NH₄Cl (1-5 wt. %) were added into the CMC/PVA and its might attributed to the factor of composition of dopant. All SBEs systems were found to be obeys Arrhenius behaviour where the plots show close to unity ($R^2 = 1$) and thermally activated.