

18th ASIAN CONFERENCE ON SOLID STATE IONICS ACSSI - 2024

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MEENAKSHI COLLEGE FOR WOMEN
(Autonomous)

Kodambakkam, Chennai - 600024, India

BOOK OF ABSTRACTS

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For

Asian Society for Solid State Ionics

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Fabrication of a Primary Proton Battery with using Cassia Auriculata based membrane as an Electrolyte

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Abstract

In present study, the proton conducting membrane using Cassia Auriculata (CA) (Aavaram poo) and Ammonium formate (NH_4HCO_2) has been prepared by the Solution Casting Method. The X-Ray Diffraction (XRD) method is used to analyze the crystalline/amorphous nature of the prepared biomaterial membranes. The ionic conductivity of the prepared biomaterial membranes is studied by the AC Impedance spectroscopy. And the membrane with the composition of 1g CA + 1.3 M. wt % of NH_4HCO_2 exhibits an enhanced ionic conductivity of $2.206 \times 10^{-3} \text{ S/cm}$. Transference Number Measurement (TNM) is studied to confirm that the majority of charge carriers are ions. Using the highest ion conducting membrane (1g CA + 1.3 M. wt % of NH_4HCO_2), primary proton conducting battery [1] is fabricated and shows an open circuit voltage of 1.88 V. Then, by connecting a load of 100 k Ω , the voltage drops to 1.78 V and 20 μA of current has been drawn from the cell.

Keywords Cassia Auriculata, NH_4HCO_2 , AC impedance analysis, XRD, Primary proton battery

Reference

- [1] Hazaana, S. A., Joseph, A., Selvasekarapandian, S., Naachiyar, R. M., & Vignesh, N. M. (2023). Performance of solid-state Li-ion conducting battery using biopolymer electrolyte based on near-near/lithium chloride. *Journal of Solid State Electrochemistry* 27(7) 539-557