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MEENAKSHI COLLEGE FOR WOMEN  
(Autonomous)

Kodambakkam, Chennai - 600024, India

## BOOK OF ABSTRACTS

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**For**

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# Primary Sodium Ion Conducting Battery Fabrication using Biomaterial (*Cassia Ariculata*) Based Solid membrane as an Electrolyte

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## Abstract

The ever-growing energy demand and the alarming decrease of fossil fuels leave us with an urgent need of an eco-friendly alternative material for electrochemical devices [1]. In this study, *Cassia Ariculata* (Avarampoo) flower (AP) is used as a host material and sodium perchlorate ( $\text{NaClO}_4$ ) as an additive to prepare bio-material based sodium ion conducting solid membrane using solution casting technique. The biomaterial is dried under shade and made into powder, and then it is made into a solution using distilled water as solvent. The solution is then incorporated with different concentrations of  $\text{NaClO}_4$  (0.4 M.wt%, 0.5 M.wt% and 0.6 M.wt% of  $\text{NaClO}_4$ ) and made into a free-standing membrane. X-Ray Diffraction method is done to analyze the crystalline/amorphous nature of the membrane. The Ionic conductivity of the prepared membranes are measured using AC Impedance analysis and the membrane with the concentration of 1g of AP + 0.5 M.Wt % of  $\text{NaClO}_4$  exhibits high ionic conductivity of  $2.08 \times 10^{-2} \text{ S/cm}$  at room temperature. Transference number measurement is done to confirm that the majority of charge carriers are ions. At last, a primary sodium ion battery [2] has been fabricated using the highest ion conducting membrane (1 of AP + 0.5 M.wt % of  $\text{NaClO}_4$ ) as an electrolyte with sodium metal as anode and  $\text{MnO}_2 + \text{G}$  as cathode. The constructed primary battery exhibits an open circuit voltage of 2.47 V and 19  $\mu\text{A}$  of current is drawn while connecting a load of 100  $\text{K}\Omega$  to the constructed cell.

**Keywords:** *Cassia Ariculata*, XRD, AC impedance analysis.