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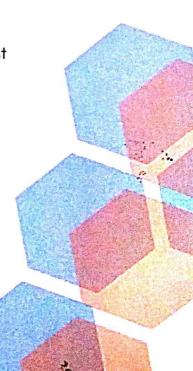
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## For Asian Society for Solid State Ionics

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	Bhuvaneshwari <sup>a</sup> , Paulo Wiff <sup>c</sup> , Hiroshige Matsumoto <sup>a,*</sup>	
C3-OP15	WO <sub>3</sub> Nanostructured Thin Films Prepared by In Situ	
	Hydrothermal Method as a Low-cost, Multifunctional Material	154
	H.N.M Sarangika <sup>a</sup> *, E.G.O.D Egodawaththa <sup>a</sup> , H. M. B. I.	
	Gunathilakab, M.A.K.L. Dissanayakee, G.K.R. Senadeeraed, Sangeeta	
	Goshe, Chinmoy Bhattacharyae	
	POSTER PRESENTATION	
C1-PP01	Fabrication of a Primary Proton Battery with using Cassia	159
	Auriculata based membrane as an Electrolyte	
	A. Arul Shilpa <sup>a,b*</sup> , S. Sukumari <sup>a</sup> , S. Aafrin Hazaana <sup>b,c</sup> , R. Meera	
	Naachiyarbc, N. Muniraj @ Vigneshbd, S. Selvasekarapandianbe	
C1-PP02	Primary Sodium Ion Conducting Battery Fabrication using	160
	Biomaterial (Cassia Ariculata) Based Solid membrane as an	
	Electrolyte	
	S. Udhaya Priya <sup>a,c*</sup> , J. Belinda Asha <sup>a</sup> , S. Aafrin Hazaana <sup>b,c</sup> , R. Meera	
	Naachiyarbc, N. Muniraj@Vigneshcd, S. Selvasekarapandiance	
C1-PP03	Sodium ion conducting biomaterial electrolyte based on Centella	162
	Asiatica incorporated with sodium perchlorate for primary sodium	
	ion battery	
	T. Gowrani*1, T. Sabeetha2, S.Aafrin Hazaana3,	
	S.Selvasekarapandian <sup>4,5</sup>	
	Development of Magnesium Ion Conducting Biomaterial	163
C1-PP04	Electrolyte Based on Centella Asiatica for Electrochemical Devices	
	M. Megaraj Begam <sup>a,b*</sup> , M.V. Leena Chandra <sup>a</sup> , S.Selvasekarapandian <sup>b,c</sup>	
	, R. Meera Naachiyar <sup>a,b</sup> , S. Aafrin Hazaana <sup>a,b</sup> and N. Muniraj @	
	Vignesh <sup>b,d</sup>	
C1-PP05	Proton - Conducting Electrochemical Devices Developed by	164
	Biomaterial, Centella Asiatica Leaf with Ammonium Nitrate	
	T. Sabeetha <sup>a,c,*</sup> , M. V. Leena Chandra <sup>a</sup> , S. Selvasekarapandian <sup>c,d</sup> , S.	
	Aafrin Hazaana <sup>a,c</sup> , R. Meera Naachiyar <sup>a,c</sup> , N. Muniraj @ Vignesh <sup>b,c</sup>	
C1-PP06	Fabrication of Primary Proton-conducting battery using Cassia	166
	Auriculata as biomaterial-based electrolyte	
	A. Arulsneha <sup>a,b*</sup> , A. Rajeswari <sup>a</sup> , R. Meera Naachiyar <sup>b,c</sup> ,S.	
	AafrinHazaana <sup>b,e</sup> , N. Muniraj @ Vignesh <sup>b,d</sup> , S. Selvasekarapandian <sup>b,e</sup>	
C1-PP07	Fabrication of Proton Conducting Primary Battery Using	167
	Biomaterial (Cassia Auriculata) With Ammonium nitrate as	
	Biomaterial Based Solid Electrolyte	
	S. Akila <sup>a,b*</sup> , S. Sukumari <sup>a</sup> , S. Aafrin Hazaana <sup>b,c</sup> , R. Meera	
	Naachiyarbc, N. Muniraj@Vigneshbd, S. Selvasekarapandianbe	

### Fabrication of Proton Conducting Primary Battery Using Biomaterial (Cassia Auriculata) With Ammonium nitrate as Biomaterial Based Solid Electrolyte

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#### Abstract

In the present study, bio degradable solid biomaterial based membranes have been prepared using the flower part of Cassia Auriculata (CA) [1] with different composition of Ammonium Nitrate (NH<sub>4</sub>NO<sub>3</sub>) using simplest solution casting technique. The prepared biomaterial based membranes have been characterized using various techniques such as X-ray diffraction (XRD) analysis, Transference Number Measurement (TNM) and Ac impedance analysis. The amorphous/ crystalline nature of the prepared biomaterial based membranes has been analyzed by X-ray diffraction method. The ionic conductivity of all the membranes has been analyzed using Ac impedance spectroscopy at room temperature. The highest ionic conductivity of  $1.02\times10^{-2}$  S/cm has been obtained for 1g of CA + 0.5 M.wt % of NH<sub>4</sub>NO<sub>3</sub>. Transference number measurement is done to confirm that the majority of charge carriers are ions. Finally, a primary proton conducting battery has been fabricated using the highest ion conducting membrane as an electrolyte with Zinc metal powder + ZnSO<sub>4</sub>.7H<sub>2</sub>O+ Graphite as an anode and PbO<sub>2</sub>+V<sub>2</sub>O<sub>5</sub>+Graphite as cathode [2]. The constructed battery shows an open circuit voltage of 1.70 V and 17  $\mu$ A of current is drawn while connecting a load of 100 k $\Omega$  to the constructed cell.

Keywords: Cassia Auriculata, NH4NO3, AC impedance, XRD, Primary proton battery