

Search &gt; Results &gt; Enhancement on protonation...

Full text at publisher



Look Up Full Text at Google Scholar

Export ▾

Add To Marked List

&lt; 1 of 1 &gt;

## Enhancement on protonation (H+) with incorporation of flexible ethylene carbonate in CMC-PVA-30 wt % NH4NO3 film

By: Saadiah, MA (Saadiah, M. A.)<sup>1,3</sup>; Nagao, Y (Nagao, Y.)<sup>2</sup>; Samsudin, AS (Samsudin, A. S.)<sup>3</sup>

INTERNATIONAL JOURNAL OF HYDROGEN ENERGY

Volume: 46 Issue: 33 Page: 17231-17245

DOI: 10.1016/j.ijhydene.2021.02.187

Published: MAY 13 2021

Document Type: Article

### Abstract

In the present work, carboxymethyl cellulose (CMC)epolyvinyl alcohol (PVA)-NH4NO3 with the addition of ethylene carbonate (EC) based polymer blend electrolyte (PBE) was explored. The complexes of PBE with addition of EC revealed that an interaction of the -OH and -COO- of the CMC-PVA blend with the dissociation of H+ from NH4NO3 provides a flexibility pathway for ion hopping. The optimum ionic conductivity at room temperature was found to be 3.92 x 10(-3) S/cm for the sample containing 6 wt.% EC with an increment of amorphous phase and thermal stability. Based on the Impedance-Nyquist theoretical approach, it was shown that the ionic conductivity with cation transference number (t(H+) = 0.48) of the PBE is primarily influenced by the ionic mobility as well as the ions diffusion coefficient. The findings verified that the CMC-PVA-NH4NO3-EC possesses favorable conduction properties upon physical structural modification as a promising polymer electrolyte. (C) 2021 Hydrogen Energy Publications LLC. Published by Elsevier Ltd. All rights reserved.

### Keywords

**Author Keywords:** Polymer blend; Physicochemical properties; Conductivity; H+ transport

**Keywords Plus:** BIO-POLYMER ELECTROLYTES; IONIC TRANSPORT-PROPERTIES; TRANSFERENCE NUMBER; ELECTROCHEMICAL PERFORMANCE; ELECTRICAL-PROPERTIES; AMMONIUM THIOCYANATE; SOLID-ELECTROLYTE; BLEND; CONDUCTIVITY; CHITOSAN

### Author Information

**Corresponding Address:** Samsudin, A. S. (corresponding author)

▼ Univ Malaysia Pahang, Fac Ind Sci & Technol, Ion Mat Team, Pahang 26300, Malaysia

#### Addresses:

▼ <sup>1</sup> Int Islamic Univ Malaysia, Dept Chem, Ctr Fdn Studies, Gambang 26300, Pahang, Malaysia

▲ <sup>2</sup> Japan Adv Inst Sci & Technol, Sch Mat Sci, 1-1 Asahidai, Nomi, Ishikawa 9231292, Japan

**Affiliation**

## Citation Network

In Web of Science Core Collection

0

Citations

Create citation alert

Cited References

79

[View Related Records](#)

You may also like...

Saadiah, MA; Nagao, Y; Samsudin, AS;  
[Proton \(H+\) transport properties of CMC-PVA blended polymer solid electrolyte doped with NH4NO3](#)  
INTERNATIONAL JOURNAL OF HYDROGEN ENERGY

Zainuddin, NK; Rasali, NMJ; Samsudin, AS; et al.

[Investigation on favourable ionic conduction based on CMC-K carrageenan proton conducting hybrid solid bio-polymer electrolytes for applications in EDLC](#)  
INTERNATIONAL JOURNAL OF HYDROGEN ENERGY

Rasali, NMJ; Nagao, Y; Samsudin, AS;  
[Enhancement on amorphous phase in solid biopolymer electrolyte based alginate doped NH4NO3](#)  
IONICS

Ahmad, NHB; Isa, MINB;  
[Proton conducting solid polymer electrolytes based carboxymethyl cellulose doped ammonium chloride: ionic conductivity transport studies](#)



Japan Advanced Institute of Science & Technology (JAIST)

▼ <sup>3</sup> Univ Malaysia Pahang, Fac Ind Sci & Technol, Ion Mat Team, Pahang 26300, Malaysia

**E-mail Addresses:** [ahmadsalihin@ump.edu.my](mailto:ahmadsalihin@ump.edu.my)

### Categories/Classification

**Research Areas:** Chemistry; Electrochemistry; Energy & Fuels

### Funding

Funding agency	Grant number	Hide All Details
Ministry of Education, Malaysia	FRGS/1/2019/STG07/UMP/02/4	Hide details
<b>Appeared in source as:</b> Ministry of Higher Education Malaysia (MOHE)		
Universiti Malaysia Pahang	RDU 190389	
	PGRS 190307	

[View funding text](#)

### Document Information

**Language:** English

**Accession Number:** WOS:000646140200017

**ISSN:** 0360-3199

**eISSN:** 1879-3487

### Other Information

**IDS Number:** RV9IX

— [See fewer data fields](#)

INTERNATIONAL JOURNAL OF PLASTICS TECHNOLOGY

Samsudin, AS; Saadiah, MA;  
[Ionic conduction study of enhanced amorphous solid bio-polymer electrolytes based carboxymethyl cellulose doped NH4Br](#)  
 JOURNAL OF NON-CRYSTALLINE SOLIDS

[See all](#)

### Use in Web of Science

Web of Science Usage Count

2

Last 180 Days

2

Since 2013

[Learn more](#)

### This record is from:

Web of Science Core Collection

- Science Citation Index Expanded (SCI-EXPANDED)

### Suggest a correction

*If you would like to improve the quality of the data in this record, please [Suggest a correction](#)*

### Journal information

INTERNATIONAL JOURNAL OF HYDROGEN ENERGY

**ISSN:** 0360-3199

**eISSN:** 1879-3487

**Current Publisher:** PERGAMON-ELSEVIER SCIENCE LTD, THE BOULEVARD, LANGFORD LANE, KIDLINGTON, OXFORD OX5 1GB, ENGLAND

**Journal Impact Factor:** [Journal Citation Report™](#)

**Research Areas:** Chemistry; Electrochemistry; Energy & Fuels

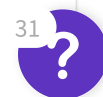
**Web of Science Categories:** Chemistry, Physical; Electrochemistry; Energy & Fuels

5.816

Journal  
Impact  
Factor™  
(2020)

79 Cited References

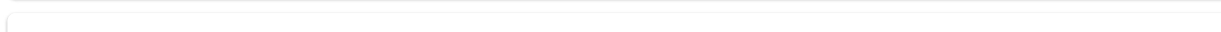
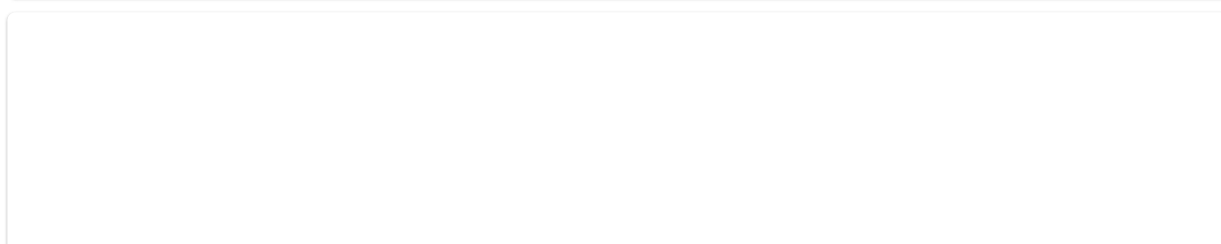
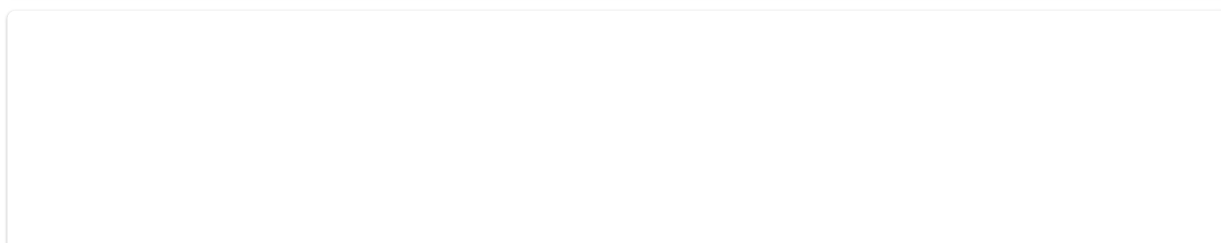
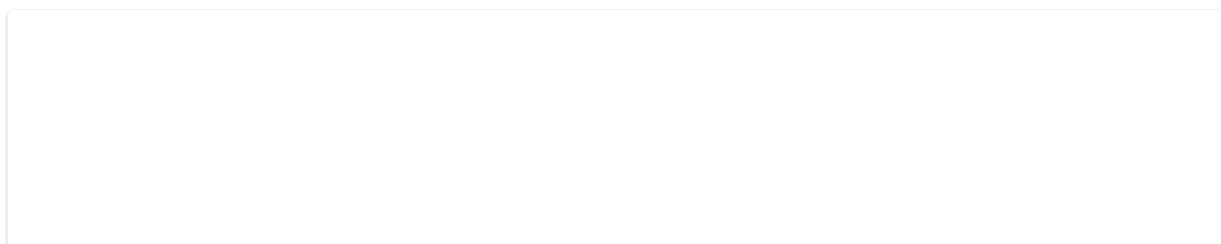
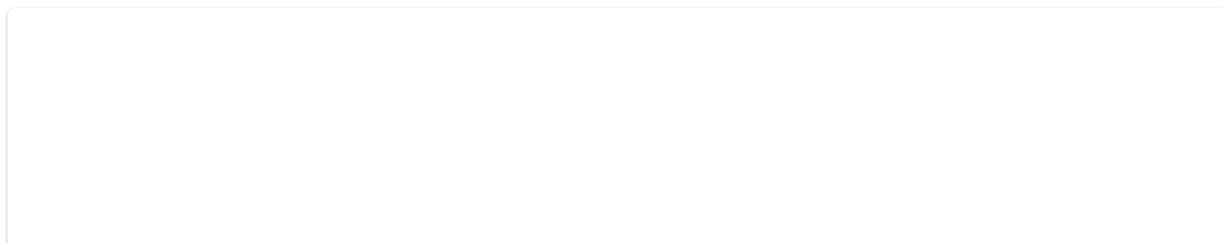
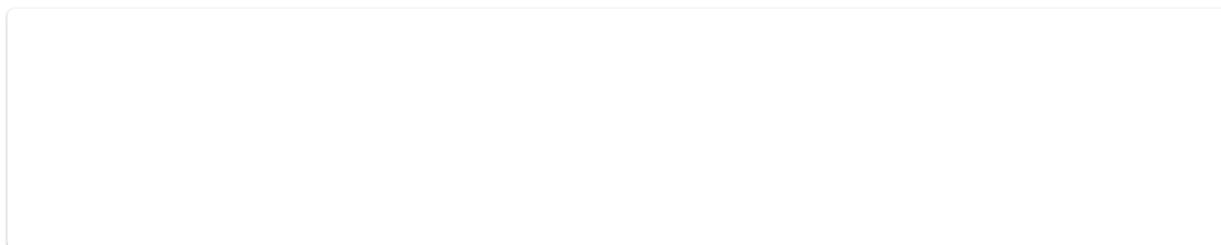
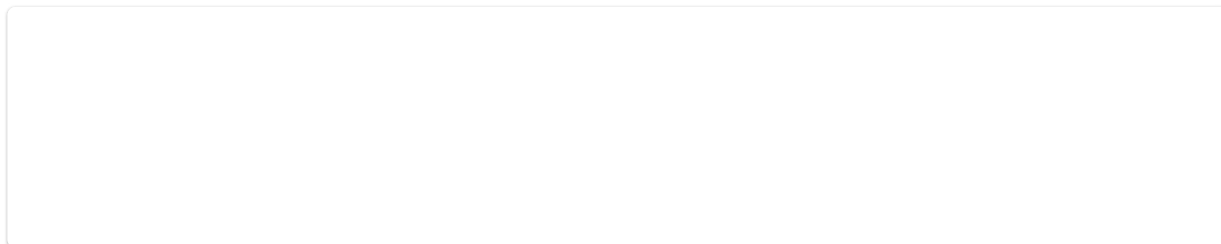
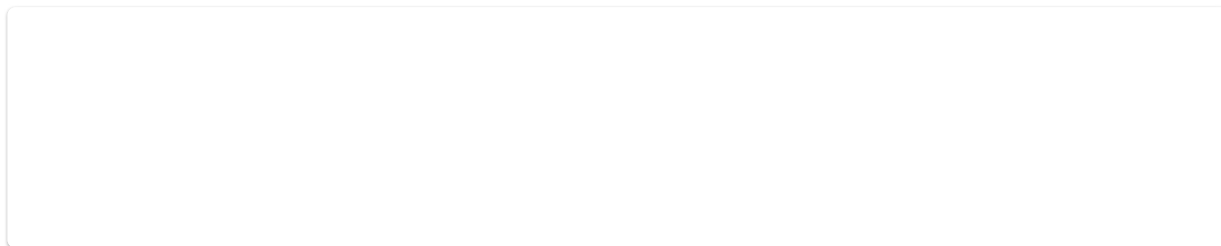
[View as set of results](#)



Showing 30 of 79

[view as set of results](#)

(from Web of Science Core Collection)





Multiple empty rectangular boxes for text input, arranged vertically.


© 2021

Clarivate

Training Portal

Product

Support

Data Correction

Privacy

Statement

Newsletter

Copyright

Notice

Cookie Policy

Terms of Use

Manage cookie preferences

Follow Us

