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Involvement of ethylene carbonate on the enhancement H^+ carriers in structural and ionic conduction performance on alginate bio-based polymer electrolytes

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Abstract

This study investigates the structural and ionic conduction performance with the involvement of ethylene carbonate (EC) in a bio-based polymer electrolytes (BBPEs) system, based on alginate doped glycolic acid (GA). The solution casting technique was used to successfully prepare the BBPEs which were characterized with various approaches to evaluate their ionic conduction performance . It was revealed that at ambient temperature, an optimum ionic conductivity of 9.06×10^{-4} S cm^{-1} was achieved after the addition of 6 wt% EC, with an observed improvement of the amorphous phase and thermal stability. The enhancement of ionic conduction properties is believed to be due to the protonation (H^+) enhancement , as proven by FTIR and TNM studies. The findings show that the developed alginate-GA-EC is a promising candidate for use as electrolytes in electrochemical devices that are based on H^+ carriers . © 2021 Hydrogen Energy Publications LLC

Author keywords

Biopolymer materials; Ionic conduction performance ; Protonation (H^+); Transference number

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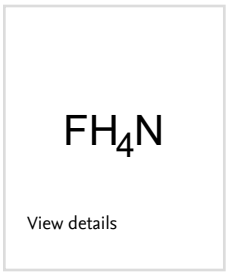

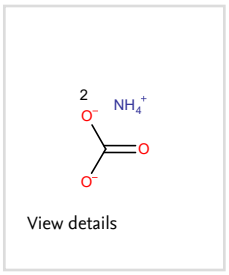

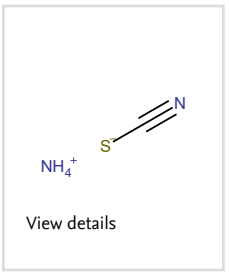

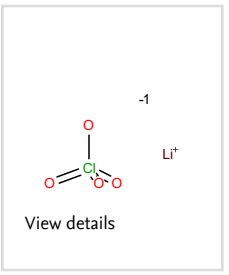

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References (79)

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1 Zhu, M., Wu, J., Wang, Y., Song, M., Long, L., Siyal, S.H., Yang, X., (...), Sui, G.

Recent advances in gel polymer electrolyte for high-performance lithium batteries

(2019) *Journal of Energy Chemistry*, 37, pp. 126-142. Cited 166 times.
elsevier.com/journals/journal-of-energy-chemistry/2095-4956
doi: 10.1016/j.jechem.2018.12.013

View at Publisher

2 Noor, N.A.M., Isa, M.I.N.

Investigation on transport and thermal studies of solid polymer electrolyte based on carboxymethyl cellulose doped ammonium thiocyanate for potential application in electrochemical devices

(2019) *International Journal of Hydrogen Energy*, 44 (16), pp. 8298-8306. Cited 73 times.
http://www.journals.elsevier.com/international-journal-of-hydrogen-energy/
doi: 10.1016/j.ijhydene.2019.02.062

View at Publisher

3 Sohaimy, M.I.H.A., Isa, M.I.N.M.

Natural inspired carboxymethyl cellulose (Cmc) doped with ammonium carbonate (ac) as biopolymer electrolyte (Open Access)

(2020) *Polymers*, 12 (11), art. no. 2487, pp. 1-14. Cited 11 times.
https://www.mdpi.com/2073-4360/12/11/2487/pdf
doi: 10.3390/polym12112487

View at Publisher

4 Vernon-Carter, E.J., Alvarez-Ramirez, J., Bello-Perez, L.A., Roldan-Cruz, C., Garcia-Hernandez, A., Huerta, L.

The order of addition of corn starch/lithium perchlorate/glycerol affects the optical, mechanical, and electrical properties of a solid polymer electrolyte

(2017) *Ionics*, 23 (11), pp. 3111-3123. Cited 13 times.
http://www.springerlink.com/content/120106/
doi: 10.1007/s11581-017-2119-5

View at Publisher

5 Leones, R., Reis, P.M., Sabadini, R.C., Esperança, J.M.S.S., Pawlicka, A., Silva, M.M.

Chitosan polymer electrolytes doped with a dysprosium ionic liquid

(2020) *Journal of Polymer Research*, 27 (3), art. no. 45. Cited 8 times.
www.springer.com/journal/10965
doi: 10.1007/s10965-020-2019-7

View at Publisher

6 Zainuddin, N.K., Samsudin, A.S.

Investigation on the effect of NH4Br at transport properties in k–carrageenan based biopolymer electrolytes via structural and electrical analysis

(2018) *Materials Today Communications*, 14, pp. 199-209. Cited 43 times.
http://www.journals.elsevier.com/materials-today-communications/
doi: 10.1016/j.mtcomm.2018.01.004

View at Publisher

7 Yu, C., Li, X., Liu, Z., Yang, X., Huang, Y., Lin, J., Zhang, J., (...), Tang, C.

Synthesis of hierarchically porous TiO_2 nanomaterials using alginate as soft templates

(2016) *Materials Research Bulletin*, 83, pp. 609-614. Cited 33 times.
http://www.sciencedirect.com/science/journal/00255408
doi: 10.1016/j.materresbull.2016.07.014

View at Publisher

8 Shaari, N., Kamarudin, S.K.

Performance of crosslinked sodium alginate/sulfonated graphene oxide as polymer electrolyte membrane in DMFC application: RSM optimization approach

(2018) *International Journal of Hydrogen Energy*, 43 (51), pp. 22986-23003. Cited 44 times.
http://www.journals.elsevier.com/international-journal-of-hydrogen-energy/
doi: 10.1016/j.ijhydene.2018.10.098

View at Publisher

9 Treenate, P., Monvisade, P., Yamaguchi, M.

Development of hydroxyethylacryl chitosan/alginate hydrogel films for biomedical application

(2014) *Journal of Polymer Research*, 21 (12), art. no. 601. Cited 17 times.
www.springer.com/journal/10965
doi: 10.1007/s10965-014-0601-6

View at Publisher

10 Soeda, K., Yamagata, M., Ishikawa, M.

Outstanding features of alginate-based gel electrolyte with ionic liquid for electric double layer capacitors

(2015) *Journal of Power Sources*, 280, pp. 565-572. Cited 31 times.
https://www.journals.elsevier.com/journal-of-power-sources
doi: 10.1016/j.jpowsour.2015.01.144

View at Publisher

11 Huang, J., Chi, X., Yang, J., Liu, Y.

An Ultrastable Na-Zn Solid-State Hybrid Battery Enabled by a Robust Dual-Cross-linked Polymer Electrolyte

(2020) *ACS Applied Materials and Interfaces*, 12 (15), pp. 17583-17591. Cited 13 times.
http://pubs.acs.org/journal/aamick
doi: 10.1021/acsami.0c01990

View at Publisher

12 Isa, M.I.N., Sohaimy, M.I.H., Ahmad, N.H.

Carboxymethyl cellulose plasticized polymer application as bio-material in solid-state hydrogen ionic cell

(2021) *International Journal of Hydrogen Energy*, 46 (11), pp. 8030-8039. Cited 9 times.
http://www.journals.elsevier.com/international-journal-of-hydrogen-energy/
doi: 10.1016/j.ijhydene.2020.11.274

View at Publisher

13 Perumal, P., Christopher Selvin, P., Selvasekarapandian, S., Sivaraj, P.

Structural and electrical properties of bio-polymer pectin with $LiClO_4$ solid electrolytes for lithium ion polymer batteries

(2019) *Materials Today: Proceedings*, Part 1 8, pp. 196-202. Cited 21 times.
https://www.sciencedirect.com/journal/materials-today-proceedings
doi: 10.1016/j.matpr.2019.02.100

View at Publisher

14 Kiruthika, S., Malathi, M., Selvasekarapandian, S., Tamilarasan, K., Moniha, V., Manjuladevi, R.

Eco-friendly biopolymer electrolyte, pectin with magnesium nitrate salt, for application in electrochemical devices

(2019) *Journal of Solid State Electrochemistry*, 23 (7), pp. 2181-2193. Cited 24 times.
https://rd.springer.com/journal/10008
doi: 10.1007/s10008-019-04313-6

View at Publisher

15 Ramlli, M.A., Bashirah, N.A.A., Isa, M.I.N.

Ionic Conductivity and Structural Analysis of 2-hyroxyethyl Cellulose Doped with Glycolic Acid Solid Biopolymer Electrolytes for Solid Proton Battery (Open Access)

(2018) *IOP Conference Series: Materials Science and Engineering*, 440 (1), art. no. 012038. Cited 9 times.
http://www.iop.org/EJ/journal/mse
doi: 10.1088/1757-899X/440/1/012038

View at Publisher

16 Nofal, M.M., Hadi, J.M., Aziz, S.B., Brza, M.A., Asnawi, A.S.F.M., Dannoun, E.M.A., Abdullah, A.M., (...), Kadir, M.F.Z.

A study of methylcellulose based polymer electrolyte impregnated with potassium ion conducting carrier: Impedance, eec modeling, ftir, dielectric, and device characteristics (Open Access)

(2021) *Materials*, 14 (17), art. no. 4859. Cited 18 times.
https://www.mdpi.com/1996-1944/14/17/4859/pdf
doi: 10.3390/ma14174859

View at Publisher

17 Teo, L.P., Buraidah, M.H., Arof, A.K.

Development on solid polymer electrolytes for electrochemical devices (Open Access)

(2021) *Molecules*, 26 (21), art. no. 6499. Cited 15 times.
https://www.mdpi.com/1420-3049/26/21/6499/pdf
doi: 10.3390/molecules26216499

View at Publisher

18 Chai, M.N., Isa, M.I.N.

Novel Proton Conducting Solid Bio-polymer Electrolytes Based on Carboxymethyl Cellulose Doped with Oleic Acid and Plasticized with Glycerol (Open Access)

(2016) *Scientific Reports*, 6, art. no. 27328. Cited 91 times.
www.nature.com/srep/index.html
doi: 10.1038/srep27328

View at Publisher

19 Karthikeyan, S., Selvasekarapandian, S., Premalatha, M., Monisha, S., Boopathi, G., Aristatil, G., Arun, A., (...), Madeswaran, S.

Proton-conducting I-Carrageenan-based biopolymer electrolyte for fuel cell application

(2017) *Ionics*, 23 (10), pp. 2775-2780. Cited 53 times.
http://www.springerlink.com/content/120106/
doi: 10.1007/s11581-016-1901-0

View at Publisher

20 Hamsan, M.H., Aziz, S.B., Shukur, M.F., Kadir, M.F.Z.

Protonic cell performance employing electrolytes based on plasticized methylcellulose-potato starch-NH_4NO_3

(2019) *Ionics*, 25 (2), pp. 559-572. Cited 31 times.
http://www.springerlink.com/content/120106/
doi: 10.1007/s11581-018-2827-5

View at Publisher

21 Ahmed, H.T., Jalal, V.J., Tahir, D.A., Mohamad, A.H., Abdullah, O.G.

Effect of PEG as a plasticizer on the electrical and optical properties of polymer blend electrolyte MC-CH-$LiBF_4$ based films (Open Access)

(2019) *Results in Physics*, 15, art. no. 102735. Cited 34 times.
http://www.elsevier.com/wps/find/journaldescription.cws_home/725996/description#description
doi: 10.1016/j.rinp.2019.102735

View at Publisher

22 Saadiah, M.A., Tan, H.M., Samsudin, A.S.

Enhancement of proton conduction in carboxymethyl cellulose-polyvinyl alcohol employing polyethylene glycol as a plasticizer

(2020) *Bulletin of Materials Science*, 43 (1), art. no. 203. Cited 4 times.
http://www.ias.ac.in/matersci/
doi: 10.1007/s12034-020-02179-3

View at Publisher

23 Vignarooban, K., Dissanayake, M.A.K.L., Albinsson, I., Mellander, B.-E.

Effect of TiO_2 nano-filler and EC plasticizer on electrical and thermal properties of poly(ethylene oxide) (PEO) based solid polymer electrolytes

(2014) *Solid State Ionics*, 266, pp. 25-28. Cited 159 times.
http://www.journals.elsevier.com/solid-state-ionics/
doi: 10.1016/j.ssi.2014.08.002

View at Publisher

24 Muthukrishnan, M., Shanthi, C., Selvasekarapandian, S., Shanthi, G., Sampathkumar, L., Maheshwari, T.

Impact of ammonium formate (AF) and ethylene carbonate (EC) on the structural, electrical, transport and electrochemical properties of pectin-based biopolymer membranes

(2021) *Ionics*, 27 (8), pp. 3443-3459. Cited 5 times.
http://www.springerlink.com/content/120106/
doi: 10.1007/s11581-021-04106-w

View at Publisher

25 Perumal, P., Christopher Selvin, P., Selvasekarapandian, S., Sivaraj, P., Abhilash, K.P., Moniha, V., Manjula Devi, R.

Plasticizer incorporated, novel eco-friendly bio-polymer based solid bio-membrane for electrochemical clean energy applications

(2019) *Polymer Degradation and Stability*, 159, pp. 43-53. Cited 24 times.
doi: 10.1016/j.polymdegradstab.2018.11.013

View at Publisher

26 Sachdeva, A., Singh, R., Bhattacharya, B., Singh, P.K.

Electrical and structural properties enhancement in plasticized high Tg polymers using metal salts

(2017) *Phase Transitions*, 90 (11), pp. 1143-1153. Cited 6 times.
http://www.tandfonline.com/toc/gpht20/current
doi: 10.1080/01411594.2017.1321762

View at Publisher

27 Saadiah, M.A., Nagao, Y., Samsudin, A.S.

Enhancement on protonation (H^+) with incorporation of flexible ethylene carbonate in CMC–PVA–30 wt % NH_4NO_3 film
(Open Access)

(2021) *International Journal of Hydrogen Energy*, 46 (33), pp. 17231-17245. Cited 6 times.
http://www.journals.elsevier.com/international-journal-of-hydrogen-energy/
doi: 10.1016/j.ijhydene.2021.02.187

View at Publisher

28 Fuzlin, A.F.A., Misnon, I.I., Samsudin, A.S.

Conduction properties study on alginate incorporated with glycolic acid based solid biopolymer electrolytes

(2020) *Materials Science Forum*, 981 MSF, pp. 34-39. Cited 6 times.
http://www.ttp.net/0255-5476.html
ISBN: 978-303571664-1
doi: 10.4028/www.scientific.net/MSF.981.34

View at Publisher

29 Fuzlin, A.F., Saadiah, M.A., Yao, Y., Nagao, Y., Samsudin, A.S.

Enhancing proton conductivity of sodium alginate doped with glycolic acid in bio-based polymer electrolytes system

(2020) *Journal of Polymer Research*, 27 (8), art. no. 207. Cited 17 times.
www.springer.com/journal/10965
doi: 10.1007/s10965-020-02142-0

View at Publisher

30 Samsudin, A.S., Isa, M.I.N.

Structural and electrical properties of carboxy methylcellulose-dodecyltrimethyl ammonium bromide-based biopolymer electrolytes system

(2012) *International Journal of Polymeric Materials and Polymeric Biomaterials*, 61 (1), pp. 30-40. Cited 42 times.
doi: 10.1080/00914037.2011.557810

View at Publisher

31 Woo, H.J., Majid, S.R., Arof, A.K.
Transference number and structural analysis of proton conducting polymer electrolyte based on poly(ε-caprolactone)

(2011) *Materials Research Innovations*, 15 (SUPPL. 2), pp. S49-S54. Cited 34 times.
http://docserver.ingentaconnect.com/deliver/connect/maney/14328917/v15n1x2/s13.pdf?expires=1323884118&id=66265034&titleid=75001644&accname=Elsevier&checksum=4FBED23F180C95F59268D0608AF6AD64
doi: 10.1179/143307511X13031890747697

View at Publisher

32 Premalatha, M., Mathavan, T., Selvasekarapandian, S., Selvalakshmi, S., Monisha, S.
Incorporation of NH_4Br in Tamarind Seed Polysaccharide biopolymer and its potential use in electrochemical energy storage devices

(2017) *Organic Electronics*, 50, pp. 418-425. Cited 30 times.
www.elsevier.com/locate/orgel
doi: 10.1016/j.orgel.2017.08.017

View at Publisher

33 Zainuddin, N.K., Rasali, N.M.J., Mazuki, N.F., Saadiah, M.A., Samsudin, A.S.
Investigation on favourable ionic conduction based on CMC-K carrageenan proton conducting hybrid solid bio-polymer electrolytes for applications in EDLC

(2020) *International Journal of Hydrogen Energy*, 45 (15), pp. 8727-8741. Cited 31 times.
http://www.journals.elsevier.com/international-journal-of-hydrogen-energy/
doi: 10.1016/j.ijhydene.2020.01.038

View at Publisher

34 Rasali, N.M.J., Nagao, Y., Samsudin, A.S.
Enhancement on amorphous phase in solid biopolymer electrolyte based alginate doped NH_4NO_3
(2018) *Ionics*, pp. 1-14. Cited 4 times.

35 Hafiza, M.N., Isa, M.I.N.
Correlation between structural, ion transport and ionic conductivity of plasticized 2-hydroxyethyl cellulose based solid biopolymer electrolyte

(2020) *Journal of Membrane Science*, 597, art. no. 117176. Cited 31 times.
www.elsevier.com/locate/memsci
doi: 10.1016/j.memsci.2019.117176

View at Publisher

36 Lopes, S., Bueno, L., De Aguiar Júnior, F., Finkler, C.L.L.
Preparation and characterization of alginate and gelatin microcapsules containing Lactobacillus Rhamnosus (Open Access)

(2017) *Anais da Academia Brasileira de Ciencias*, 89 (3), pp. 1601-1613. Cited 44 times.
http://www.scielo.br/pdf/aabc/v89n3/0001-3765-aabc-201720170071.pdf
doi: 10.1590/0001-3765201720170071

View at Publisher

37 Ramlli, M.A., Isa, M.I.N.

Structural and ionic transport properties of protonic conducting solid biopolymer electrolytes based on carboxymethyl cellulose doped with ammonium fluoride

(2016) *Journal of Physical Chemistry B*, 120 (44), pp. 11567-11573. Cited 76 times.
http://pubs.acs.org/journal/jpcbfk
doi: 10.1021/acs.jpcb.6b06068

View at Publisher

38 Samsudin, A.S., Saadiah, M.A.

Ionic conduction study of enhanced amorphous solid bio-polymer electrolytes based carboxymethyl cellulose doped NH_4Br

(2018) *Journal of Non-Crystalline Solids*, 497, pp. 19-29. Cited 29 times.
http://www.journals.elsevier.com/journal-of-non-crystalline-solids/
doi: 10.1016/j.jnoncrysol.2018.05.027

View at Publisher

39 Samsudin, A.S., Lai, H.M., Isa, M.I.N.

Biopolymer materials based carboxymethyl cellulose as a proton conducting biopolymer electrolyte for application in rechargeable proton battery

(2014) *Electrochimica Acta*, 129, pp. 1-13. Cited 122 times.
doi: 10.1016/j.electacta.2014.02.074

View at Publisher

40 Bandara, L.R.A.K., Dissanayake, M.A.K.L., Mellander, B.-E.

Ionic conductivity of plasticized (PEO)-$LiCF_3SO_3$ electrolytes

(1998) *Electrochimica Acta*, 43 (10-11), pp. 1447-1451. Cited 150 times.
http://www.journals.elsevier.com/electrochimica-acta/
doi: 10.1016/S0013-4686(97)10082-2

View at Publisher

41 Selvalakshmi, S., Mathavan, T., Selvasekarapandian, S., Premalatha, M.

Effect of ethylene carbonate plasticizer on agar-agar: NH_4Br-based solid polymer electrolytes

(2018) *Ionics*, 24 (8), pp. 2209-2217. Cited 28 times.
http://www.springerlink.com/content/120106/
doi: 10.1007/s11581-017-2417-y

View at Publisher

42 Reddy, S.G., Thakur, A.

Thermal stability and kinetics of sodium alginate and lignosulphonic acid blends

(2018) *Iranian Journal of Materials Science and Engineering*, 15 (3), pp. 53-59. Cited 4 times.
http://ijmse.iust.ac.ir/
doi: 10.22068/ijmse.l5.3.53

View at Publisher

43 Kabir, A., Dunlop, M.J., Acharya, B., Bissessur, R., Ahmed, M.

Water recycling efficacies of extremely hygroscopic, antifouling hydrogels (Open Access)

(2018) *RSC Advances*, 8 (66), pp. 38100-38107. Cited 15 times.
http://pubs.rsc.org/en/journals/journal/ra
doi: 10.1039/C8RA07915C

View at Publisher

44 Larosa, C., Salerno, M., de Lima, J.S., Merijs Meri, R., da Silva, M.F., de Carvalho, L.B., Converti, A.

Characterisation of bare and tannase-loaded calcium alginate beads by microscopic, thermogravimetric, FTIR and XRD analyses (Open Access)

(2018) *International Journal of Biological Macromolecules*, 115, pp. 900-906. Cited 83 times.
www.elsevier.com/locate/ijbiomac
doi: 10.1016/j.ijbiomac.2018.04.138

View at Publisher

45 Plackett, D.

Biopolymers - New Materials for Sustainable Films and Coatings (Open Access)

(2011) *Biopolymers - New Materials for Sustainable Films and Coatings*. Cited 99 times.
http://onlinelibrary.wiley.com/book/10.1002/9781119994312
ISBN: 978-047068341-5
doi: 10.1002/9781119994312

View at Publisher

46 Xiao, C., Liu, H., Lu, Y., Zhang, L.
Blend films from sodium alginate and gelatin solutions
(2001)

47 Kouser, S., Sheik, S., Prabhu, A., Nagaraja, G.K., Prashantha, K., D'souza, J.N., Navada, M.K., (...), Manasa, D.J.

Effects of reinforcement of sodium alginate functionalized halloysite clay nanotubes on thermo-mechanical properties and biocompatibility of poly (vinyl alcohol) nanocomposites

(2021) *Journal of the Mechanical Behavior of Biomedical Materials*, 118, art. no. 104441. Cited 23 times.
http://www.elsevier.com/wps/find/journaldescription.cws_home/711005/description#description
doi: 10.1016/j.jmbbm.2021.104441

View at Publisher

48 Manap, S.M., Ahmad, A., Sarjadi, M.S., Anuar, F.H.

Effect of plasticizers and lithium perchlorate on poly(L-lactic acid)-poly(propylene glycol) solid polymer electrolyte

(2019) *Malaysian Journal of Analytical Sciences*, 23 (4), pp. 703-714. Cited 4 times.
http://www.ukm.my/mjas
doi: 10.17576/mjas-2019-2304-17

View at Publisher

49 Muchakayala, R., Song, S., Gao, S., Wang, X., Fan, Y.
Structure and ion transport in an ethylene carbonate-modified biodegradable gel polymer electrolyte

(2017) *Polymer Testing*, 58, pp. 116-125. Cited 40 times.
doi: 10.1016/j.polymertesting.2016.12.014

View at Publisher

50 Fuzlin, A.F., Nagao, Y., Misnon, I.I., Samsudin, A.S.
Studies on structural and ionic transport in biopolymer electrolytes based on alginate-LiBr
(2019) *Ionics*, pp. 1-16. Cited 4 times.

51 Jiang, H., Zhang, Q., Zhang, Y., Sui, L., Wu, G., Yuan, K., Yang, X.
Li-Ion solvation in propylene carbonate electrolytes determined by molecular rotational measurements

(2019) *Physical Chemistry Chemical Physics*, 21 (20), pp. 10417-10422. Cited 15 times.
http://pubs.rsc.org/en/journals/journal/cp
doi: 10.1039/c8cp07552b

View at Publisher

52 Rani, M.S.A., Rudhziah, S., Ahmad, A., Mohamed, N.S.
Biopolymer electrolyte based on derivatives of cellulose from kenaf bast fiber (Open Access)

(2014) *Polymers*, 6 (9), pp. 2371-2385. Cited 108 times.
http://www.mdpi.com/2073-4360/6/9/2371/pdf
doi: 10.3390/polym6092371

View at Publisher

53 Perumal, P., Christopher Selvin, P., Selvasekarapandian, S.
Characterization of biopolymer pectin with lithium chloride and its applications to electrochemical devices

(2018) *Ionics*, 24 (10), pp. 3259-3270. Cited 44 times.
http://www.springerlink.com/content/120106/
doi: 10.1007/s11581-018-2507-5

View at Publisher

54 Nithya, S., Selvasekarapandian, S., Karthikeyan, S., Pandi, D.V.
Effect of propylene carbonate on the ionic conductivity of polyacrylonitrile-based solid polymer electrolytes

(2015) *Journal of Applied Polymer Science*, 132 (14), art. no. 41743. Cited 20 times.
http://onlinelibrary.wiley.com/journal/10.1002/(ISSN)1097-4628
doi: 10.1002/app.41743

View at Publisher

55 Ma, Y., Liu, Y., Yu, T., Lai, W., Ge, Z., Jiang, Z.
Structure-property relationship of nitramino oxetane polymers: A computational study on the effect of pendant chains (Open Access)

(2019) *RSC Advances*, 9 (6), pp. 3120-3127. Cited 4 times.
http://pubs.rsc.org/en/journals/journal/ra
doi: 10.1039/c8ra08945k

View at Publisher

56 Owusu-Ware, S.K., Boateng, J.S., Chowdhry, B.Z., Antonijevic, M.D.

Glassy state molecular mobility and its relationship to the physico-mechanical properties of plasticized hydroxypropyl methylcellulose (HPMC) films (Open Access)

(2019) *International Journal of Pharmaceutics: X*, 1, art. no. 100033. Cited 10 times.
https://www.journals.elsevier.com/international-journal-of-pharmaceutics-x
doi: 10.1016/j.ijpx.2019.100033

View at Publisher

57 Xie, J., Liang, Z., Lu, Y.-C.

Molecular crowding electrolytes for high-voltage aqueous batteries

(2020) *Nature Materials*, 19 (9), pp. 1006-1011. Cited 249 times.
http://www.nature.com/nmat/
doi: 10.1038/s41563-020-0667-y

View at Publisher

58 Huzaizi, R.M., Tahir, S.M., Mahbor, K.M.

Electrical, thermal and structural properties of plasticized waste cooking oil-based polyurethane solid polymer electrolyte

(2017) *AIP Conference Proceedings*, 1901, art. no. 090002. Cited 6 times.
http://scitation.aip.org/content/aip/proceeding/aipcp
ISBN: 978-073541589-8
doi: 10.1063/1.5010520

View at Publisher

59 Hamsan, M.H., Shukur, M.F., Kadir, M.F.Z.

NH_4NO_3 as charge carrier contributor in glycerolized potato starch-methyl cellulose blend-based polymer electrolyte and the application in electrochemical double-layer capacitor

(2017) *Ionics*, 23 (12), pp. 3429-3453. Cited 83 times.
http://www.springerlink.com/content/120106/
doi: 10.1007/s11581-017-2155-1

View at Publisher

60 Pandi, D.V., Selvasekarapandian, S., Bhuvaneswari, R., Premalatha, M., Monisha, S., Arunkumar, D., Junichi, K.

Development and characterization of proton conducting polymer electrolyte based on PVA, amino acid glycine and NH_4SCN

(2016) *Solid State Ionics*, 298, pp. 15-22. Cited 37 times.
http://www.journals.elsevier.com/solid-state-ionics/
doi: 10.1016/j.ssi.2016.10.016

View at Publisher

61 Brza, M.A., Aziz, S.B., Anuar, H., Ali, F., Hamsan, M.H., Kadir, M.F.Z., Abdulwahid, R.T.

Metal framework as a novel approach for the fabrication of electric double layer capacitor device with high energy density using plasticized Poly(vinyl alcohol): Ammonium thiocyanate based polymer electrolyte (Open Access)

(2020) *Arabian Journal of Chemistry*, 13 (10), pp. 7247-7263. Cited 21 times.
http://colleges.ksu.edu.sa/Arabic%20Colleges/CollegeOfScience/ChemicalDept/AJC/default.aspx (ScienceDirect
http://www.sciencedirect.com/science/journal/18785352)
doi: 10.1016/j.arabjc.2020.08.006

View at Publisher

62 Koduru, H.K., Marino, L., Scarpelli, F., Petrov, A.G., Marinov, Y.G., Hadjichristov, G.B., Iliev, M.T., (...), Scaramuzza, N.

Structural and dielectric properties of $NaIO_4$ – Complexed PEO/PVP blended solid polymer electrolytes

(2017) *Current Applied Physics*, 17 (11), pp. 1518-1531. Cited 59 times.
http://www.elsevier.com/
doi: 10.1016/j.cap.2017.07.012

View at Publisher

63 Rani, M.S.A., Ahmad, A., Mohamed, N.S.

A comprehensive investigation on electrical characterization and ionic transport properties of cellulose derivative from kenaf fibre-based biopolymer electrolytes

(2018) *Polymer Bulletin*, 75 (11), pp. 5061-5074. Cited 22 times.
doi: 10.1007/s00289-018-2320-3

View at Publisher

64 Zainuddin, N.K., Rasali, N.M.J., Samsudin, A.S.

Study on the effect of PEG in ionic transport for CMC-NH_4Br-based solid polymer electrolyte

(2018) *Ionics*, 24 (10), pp. 3039-3052. Cited 20 times.
http://www.springerlink.com/content/120106/
doi: 10.1007/s11581-018-2505-7

View at Publisher

65 Shukur, M.F., Kadir, M.F.Z.

Hydrogen ion conducting starch-chitosan blend based electrolyte for application in electrochemical devices

(2015) *Electrochimica Acta*, 158, pp. 152-165. Cited 121 times.
http://www.journals.elsevier.com/electrochimica-acta/
doi: 10.1016/j.electacta.2015.01.167

View at Publisher

66 Salleh, N.S., Aziz, S.B., Aspanut, Z., Kadir, M.F.Z.

Electrical impedance and conduction mechanism analysis of biopolymer electrolytes based on methyl cellulose doped with ammonium iodide

(2016) *Ionics*, 22 (11), pp. 2157-2167. Cited 108 times.
http://www.springerlink.com/content/120106/
doi: 10.1007/s11581-016-1731-0

View at Publisher

67 Famiza, L., Madzlan, A.
The anti-plasticization effects of dimethyl carbonate plasticizer in poly (methyl methacrylate) electrolyte containing rubber
(2013) *Mater Sci Appl*, 2013.

68 Faizrin Fuzlin, A., Nagao, Y., Samsudin, A.S.

Ionic Conductivity Study of Ethylene Carbonate as A Plasticizer in Alginate Bio-Based Polymer Electrolytes

(2021) *Macromolecular Symposia*, 397 (1), art. no. 2000236. Cited 2 times.
http://onlinelibrary.wiley.com/journal/10.1002/(ISSN)1521-3900
doi: 10.1002/masy.202000236

View at Publisher

69 Sampathkumar, L., Christopher Selvin, P., Selvasekarapandian, S., Perumal, P., Chitra, R., Muthukrishnan, M.

Synthesis and characterization of biopolymer electrolyte based on tamarind seed polysaccharide, lithium perchlorate and ethylene carbonate for electrochemical applications

(2019) *Ionics*, 25 (3), pp. 1067-1082. Cited 65 times.
http://www.springerlink.com/content/120106/
doi: 10.1007/s11581-019-02857-1

View at Publisher

70 Rasali, N.M.J., Samsudin, A.S.
Ionic transport properties of protonic conducting solid biopolymer electrolytes based on enhanced carboxymethyl cellulose-NH_4Br with glycerol
(2017) *Ionics*, pp. 1-12. Cited 5 times.

71 Mohan, V.M., Qiu, W., Shen, J., Chen, W.

Electrical properties of poly(vinyl alcohol) (PVA) based on $LiFePO_4$ complex polymer electrolyte films

(2010) *Journal of Polymer Research*, 17 (1), pp. 143-150. Cited 44 times.
doi: 10.1007/s10965-009-9300-0

View at Publisher

72 Sohaimy, M.I.H., Isa, M.I.N.

Ionic conductivity and conduction mechanism studies on cellulose based solid polymer electrolytes doped with ammonium carbonate

(2017) *Polymer Bulletin*, 74 (4), pp. 1371-1386. Cited 31 times.
doi: 10.1007/s00289-016-1781-5

View at Publisher

73 Monisha, S., Mathavan, T., Selvasekarapandian, S., Milton Franklin Benial, A., Aristatil, G., Mani, N., Premalatha, M., (...), Vinoth pandi, D.

Investigation of bio polymer electrolyte based on cellulose acetate-ammonium nitrate for potential use in electrochemical devices

(2017) *Carbohydrate Polymers*, 157, pp. 38-47. Cited 100 times.
http://www.elsevier.com/wps/find/journaldescription.cws_home/405871/description#description
doi: 10.1016/j.carbpol.2016.09.026

View at Publisher

74 Kopitzke, R.W., Linkous, C.A., Anderson, H.R., Nelson, G.L.
Conductivity and water uptake of aromatic-based proton exchange membrane electrolytes

(2000) *Journal of the Electrochemical Society*, 147 (5), pp. 1677-1681. Cited 217 times.
doi: 10.1149/1.1393417

View at Publisher

75 Shukur, M.F., Ithnin, R., Illias, H.A., Kadir, M.F.Z.
Proton conducting polymer electrolyte based on plasticized chitosan-PEO blend and application in electrochemical devices

(2013) *Optical Materials*, 35 (10), pp. 1834-1841. Cited 106 times.
doi: 10.1016/j.optmat.2013.03.004

View at Publisher

76 Evans, J., Vincent, C.A., Bruce, P.G.
Electrochemical measurement of transference numbers in polymer electrolytes

(1987) *Polymer*, 28 (13), pp. 2324-2328. Cited 1344 times.
doi: 10.1016/0032-3861(87)90394-6

View at Publisher

77 Moniha, V., Alagar, M., Selvasekarapandian, S., Sundaresan, B., Boopathi, G.
Conductive bio-polymer electrolyte iota-carrageenan with ammonium nitrate for application in electrochemical devices

(2018) *Journal of Non-Crystalline Solids*, 481, pp. 424-434. Cited 101 times.
http://www.journals.elsevier.com/journal-of-non-crystalline-solids/
doi: 10.1016/j.jnoncrysol.2017.11.027

View at Publisher

78 Saadiah, M.A., Nagao, Y., Samsudin, A.S.
Proton (H^+) transport properties of CMC–PVA blended polymer solid electrolyte doped with NH_4NO_3

(2020) *International Journal of Hydrogen Energy*, 45 (29), pp. 14880-14896. Cited 24 times.
http://www.journals.elsevier.com/international-journal-of-hydrogen-energy/
doi: 10.1016/j.ijhydene.2020.03.213

View at Publisher

79 Prajapati, G.K., Roshan, R., Gupta, P.N.
Effect of plasticizer on ionic transport and dielectric properties of $PVAH_3PO_4$ proton conducting polymeric electrolytes

(2010) *Journal of Physics and Chemistry of Solids*, 71 (12), pp. 1717-1723. Cited 76 times.
doi: 10.1016/j.jpcs.2010.08.023

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