

Influence of lithium bromide on electrical properties in bio-based polymer electrolytes

A.F. Fuzlin ¹, B. Sahraoui ² and A. S. Samsudin ^{1*}

¹ Ionic Materials Team, Faculty of Industrial Sciences & Technology,
Universiti Malaysia Pahang 26300, Kuantan, Pahang, Malaysia
² Université d'Angers, CNRS UMR 6200, Laboratoire MOLTECH-Anjou,
2 bd Lavoisier, 49045 ANGERS cedex, France

*E-mail: ahmadsalihin@ump.edu.my

Abstract:

The present work reports on the influence of lithium bromide (LiBr) in electrical properties of alginate, as bio-based polymer electrolytes (BBPEs) system. Alginate bio-based were prepared with various composition of LiBr via solution casting technique. The ionic conductivity and electrical properties of the prepared BBPEs samples were investigated using electrical impedance spectroscopy over a frequency range from 50 Hz to 1 MHz. The maximum ionic conductivity of $7.46 \times 10^{-5} \text{ S cm}^{-1}$ was obtained at ambient temperature (303 K) for sample containing with 15 wt. % lithium bromide-doped alginate bio-based polymer electrolytes. The electrical analysis revealed the highest ionic conductivity sample based alginate-LiBr BBPEs has the optimum dielectric constant and loss and increases significantly when temperature increased. The dielectric properties show that the entire alginate-LiBr BBPEs are in non-Debye behavior condition where there is no single relaxation occurred in the present system.

Keywords: Bio-Based Polymer; Ionic Conductivity; Electrical Analysis; Dielectric Properties.

References

- [1] L. Sampathkumar, P. C. Selvin, S. Selvasekarapandian, P. Perumal, R. Chitra, M. Muthukrishnan, *Ionics* 25/3 (2019) 1067.
- [2] H. Tan, S. Ramesh, C.-W. Liew, *Ionics* (2019) 1.
- [3] N. M. J. Rasali, Y. Nagao, A. S. Samsudin, *Ionics* (2018) 1.
- [4] M. Fertah, A. Belfkira, M. Taourirte, F. Brouillette, *Arab. J. Chem.* 10 (2017) S3707.
- [5] S. Monisha, T. Mathavan, S. Selvasekarapandian, A. M. F. Benial, *Ionics* 23/10 (2017) 2697.