Studies on structural and ionic transport in biopolymer electrolytes based on alginate-LiBr

A. F. Fuzlin[1] & Y. Nagao[2] & I. I. Misnon[1,3] & A. S. Samsudin[1]

[1]Ionic Materials Team, Faculty of Industrial Sciences & Technology, Universiti Malaysia Pahang, 26300 Kuantan, Pahang, Malaysia

[2] School of Materials Science, Japan Advanced Institute of Science and Technology, 1-1 Asahidai, Nomi, Ishikawa 923-1292, Japan

[3] Nanostructured Renewable Energy Materials Laboratory, Faculty of Industrial Sciences & Technology, Universiti Malaysia Pahang, 26300 Kuantan, Pahang, Malaysia

ABSTRACT

The development of solid biopolymer electrolytes (SBEs) system based on alginate doped with LiBr was successfully prepared via solution casting. The structural and ionic conduction of SBEs were conducted to correlate the effect of LiBr in alginate by means of Fourier transform infrared (FTIR) spectroscopy, X-ray diffraction (XRD), scanning electron microscope (SEM), thermogravimetric analysis (TGA), differential scanning calorimetry (DSC), and impedance spectroscopy. From the infrared study, SBEs exhibited the occurrence of complexation between lithium-ion and carboxylate ion (COO^-) of alginate through the peak intensity and wavenumber shift. The alginate doped with 15 wt.% LiBr achieved the highest ionic conductivity of 7.46×10^{-5} S/cm at ambient temperature, suggesting its good conduction stability as well as amorphous phase. The IR-deconvolution approach revealed that the ionic conductivity of SBEs system is influenced by both the ionic mobility and diffusion coefficient of transport properties. Based on LSV analysis, it's implies that the present SBEs have the potentiality to be applied in electrochemical devices.

KEYWORDS

Biopolymer material . Ionic conductivity . Thermal stability . Ionic transports

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