Studies on H+ ions conducting bio-polymer blend electrolyte based on alginate-PVA doped with NH4NO3

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ABSTRACT

This study provides insights into the protonation of bio-polymer blend electrolytes (BBEs) that are based on alginate (Alg)-PVA doped with various NH4NO3 compositions, which was prepared using the solution casting method. The physicochemical of BBEs were studied by using electrical impedance spectroscopy (EIS) analysis, thermogravimetric analysis (TGA), scanning electron microscope (SEM), x-ray diffraction (XRD) and Fourier transform infrared (FTIR) spectroscopy. The complexation had occurred between the Alg-PVA functional groups with the H+–NH3NO3 through the shifting and changes in the intensity of the bands. The BBEs films showed the enhancement of amorphous and the presence of globules when introduced NH4NO3, which enhanced the ionic conductivity. The addition of 35 wt.% of NH4NO3 resulted in the highest ionic conductivity value of 5.20×10–4 S cm-1 and demonstrated excellent thermal property. It was found that the system's ionic conductivity was generally influenced by the charge carriers based on evaluation of the Nyquist fitting approaches.

KEYWORDS: Amorphous conducting polymer, Bio-materials, Ionic conducting mechanism, Nyquist fitting method

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