

Effect of intermolecular interaction on ionic conductivity of CMC-DTAB plasticized with Ec based solid biopolymer electrolyte

Nurhasniza Mamajan Khan^a, Noor Saadiah Mohd Ali^{a,b}, Ahmad Salihin Samsudin^{a}*

^a Ionic Materials Team, Faculty of Industrial Sciences & Technology, Universiti Malaysia Pahang, Pahang, Kuantan, 26300, Malaysia

^b Department of Chemistry, Centre for Foundation Studies, International Islamic University Malaysia, Pahang, Gambang, 26300, Malaysia

ABSTRACT

The present work highlights on the structural and conduction properties of the solid biopolymer electrolytes (SBPE) based carboxymethyl cellulose (CMC) doped dodecyltrimethyl ammonium bromide (DTAB) and plasticized with ethylene carbonate (EC). The SBPE exhibits high ionic conductivity at room temperature where the highest value reaching $1.0 \times 10^{-3} \text{ S cm}^{-1}$ for sample containing with 10 wt. % of EC and increases the ionic conductivity when temperature was increased. Complexation within the SBPE has been confirmed by the FTIR analysis where the intermolecular interaction has improvised the coordination between CMC-DTAB and EC resulting in better structural and conductivity ability. The findings suggest that the great potential of CMC and make it promising to serve as an electrolyte for electrochemical devices.

KEYWORDS

Intermolecular interaction; Ionic conductivity; Plasticization

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