

## Characterization on conduction properties of carboxymethyl cellulose/kappa carrageenan blend-based polymer electrolyte system

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### ABSTRACT

The present work deals with the development of carboxymethyl cellulose (CMC) blended with kappa carrageenan (KC) as a host-based polymer electrolyte (PE) system. The CMC/KC films were successfully prepared using solution casting method and were characterized through electrical impedance spectroscopy, Fourier transform infrared (FTIR) spectroscopy, and X-ray diffraction (XRD) methods, respectively. The FTIR spectrum revealed that the significant region of interaction transpires at wave number 1,057, 1,326, 1,584, and 3,387  $\text{cm}^{-1}$  which correspond to the bending of C–O–C, bending of –OH, asymmetric of –COO<sup>–</sup> as well as the stretching of –OH, respectively. It has also been demonstrated that the complexation process occurred between CMC and KC. The CMC/KC blend PE system with a ratio of 80:20 achieved an optimum conductivity of  $3.91 \times 10^{-7} \text{ S cm}^{-1}$  and had the lowest crystallinity percentage as suggested by the XRD analysis.

### KEYWORDS:

Blending method; CMC/KC polymer blend; ionic conductivity