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# An enhancement on electrical properties of carboxymethyl cellulose-$NH_4Br$ based biopolymer electrolytes through impedance characterization

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## ABSTRACT

In this work, the formulation of biopolymer electrolytes (BEs) system has been accomplished by incorporating various plasticizers with carboxymethyl cellulose–$NH_4Br$ through solution casting technique. The ionic conductivity at room temperature of BEs system was achieved at ~$10^{-4}$ S $cm^{-1}$ with addition of 25 wt% $NH_4Br$ and enhanced to ~$10^{-3}$ S $cm^{-1}$ when plasticizers were added. The temperature-dependence of the BEs system exhibits Arrhenius behavior. Jonschers power law was used to study the electrical properties and shows that the highest conducting BEs system can be represented by overlapping overlapping a large polaron tunneling model for poly(ethylene glycol) system a, small polaron hopping model for glycerol system, and a quantum mechanical tunneling model for ethylene carbonate system.

KEYWORDS: CMC, ionic conductivity, plasticizer, polymer electrolytes, universal power law