

Immittance responses study of dodecyltrimethylammonium bromide effect on 2-hydroxyethyl cellulose solid biopolymer electrolytes

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In this work, the development of solid biopolymer electrolytes (SBEs) system was done via solution casting technique comprising 2-hydroxyethyl cellulose (2-HEC) doped with 3 to 15 wt% dodecyltrimethylammonium bromide (DTAB). The electrical impedance spectroscopy (EIS) analysis showed that room temperature ionic conductivity for un-dope 2-HEC SBE is 6.42×10^{-7} S/cm and enhanced with the addition of DTAB in the biopolymer system. Sample with 9 wt% of DTAB records the highest ionic conductivity at room temperature of 2.80×10^{-5} S/cm. The 2-HEC-DTAB SBEs confirms Arrhenius behavior where the ionic conductivity increases linearly to temperature with regression value of ~ 1 . The system was observed to satisfy non-Debye type dielectric response through the frequency dependence of dielectric and tangent study at various temperature and frequencies. Consequently, the activation energy of relaxation is lower than the activation energy of conduction which implies that the charge carrier has to overcome higher energy barrier during conducting.

Biography

Mohd Ikmar Nizam Bin Haji Mohamad Isa has completed his PhD from Universiti Malaya in 2006. He is Associate Professor of Physics at the School of Fundamental Science, Universiti Malaysia Terengganu. He has published more than 80 articles in reputable journals (2006-2016) and won numerous awards and medals in International Expos Competition.

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