

DIELECTRIC BEHAVIOURS OF PLASTICIZED PEO-LiCF₃SO₃ ELECTROLYTES

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ABSTRACT

Films of PEO-based polymer electrolyte were prepared by the technique of solution casting. Ethylene carbonate (EC) was employed as the plasticizer and lithium trifluoromethanesulfonate (LiCF₃SO₃) was used as the doping salt. The highest room temperature conductivity achieved in EC-plasticized system is $2.14 \times 10^{-4} \text{ S cm}^{-1}$. The effects of EC on the frequency-dependent dielectric properties of PEO-based electrolytes were also investigated by impedance spectroscopy, in the temperature range from 300 K to 343 K. The relaxation time for the ionic charge carriers, τ was obtained from the variation of loss tangent, $\tan \delta$ as a function of frequency at various temperatures for sample with highest conductivity value. The linear behaviour of temperature dependence of τ with regression value 0.98 could be described by Arrhenius law. The activation energy for the plasticized PEO-LiCF₃SO₃ sample was found to be 0.39 eV.

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