

EFFECTS OF ENR ON MORPHOLOGY, CHEMICAL INTERACTION AND CONDUCTIVITY OF PEO-LiCF₃SO₃ SOLID POLYMER ELECTROLYTE

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ABSTRACT

The effects of Epoxidized Natural Rubber (ENR) in the PEO doped LiCF₃SO₃ solid polymer electrolyte (SPE) were investigated. These films were prepared by a solution casting technique and characterized by Field Emission Scanning Electron Microscopy (FESEM) to determine the surface morphology, while the presence of the complexes was investigated by Attenuated Total Reflection Fourier Transform Infrared (ATR-FTIR) spectroscopy. Electrochemical Impedance Spectroscopy (EIS) was conducted to obtain ionic conductivity. SEM analysis showed that, the rough surface morphology of SPE became smoother with addition of ENR and salt while ATR-FTIR spectroscopy analysis confirmed the polymer salt complex formation. The interaction occurred between the salt and ether group of polymer host where the triple peaks of ether group in PEO merged and formed one strong peak at 1096 cm⁻¹. The incorporation of ENR is found to increase the conductivity of the system. The highest conductivity achieved was 4.67 x 10⁻⁵ S/cm at room temperature when 25 wt. % of LiCF₃SO₃ was added into the PEO blend containing 10% ENR. The ionic conduction mechanism for both with and without ENR electrolytes comply with the Arrhenius rule which the ion transport in these materials is thermally assisted.

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