

E1-01: Ionic conductivity of the solid polymer electrolyte (PEO)₉LiCF₃SO₃

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Complexes of a number of Lithium salts with Polyethylene oxide (PEO) are reported to exhibit high ionic conductivities. These materials are considered as potential candidates for the electrolyte in solid state rechargeable batteries, smart windows and other devices, because of their favourable mechanical properties, such as low weight, good flexibility and easy processing.

In the preliminary stages of a research project on solid polymer electrolytes, (PEO)₉LiCF₃SO₃ polymer-salt complex was successfully synthesized and its conductivity measured. Required amounts of pre-vacuum dried Polyethylene oxide (PEO) of average molecular weight 4,000,000 and Lithium trifluoromethane sulfonate (LiCF₃SO₃) were dissolved in anhydrous acetonitrile and films of (PEO)₉LiCF₃SO₃ were obtained by solvent casting on insert teflon support. After solvent evaporation and vacuum drying, the discs of films of thickness of about 2 mm were sandwiched between two stainless steel electrodes and the conductivity was measured from 25-125°C using complex impedance technique.

Typical conductivity values were $3.89 \times 10^{-4} \text{Scm}^{-1}$ at 100°C and $1.74 \times 10^{-4} \text{Scm}^{-1}$ at 65°C.

The possibility of using water as a solvent for obtaining solvent cast polymer electrolyte films was also investigated.