

**IMPEDANCE STUDIES OF PLASTICIZED POLYMER
ELECTROLYTES BASED ON POLYETHYLENE OXIDE (PEO)**

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ABSTRACT

Impedance Studies of Plasticized Polymer Electrolytes Based on PEO

In this work, Polyethylene Oxide (PEO) is used as the polymer host with Lithium fluoroborate (LiBF_4) as the doping salt to prepare dry polymer electrolyte systems by solution casting technique. The effect of addition of greater concentration of salt in the ionic conductivity was investigated. Plasticized polymer electrolytes were also prepared using a fixed of PEO - LiBF_4 with different concentration of Propylene Carbonate (PC) added as the plasticizer. The effect of the concentration of PC on the ionic conductivity was investigated. Ionic conductivity values in the order of 10^{-4} Scm^{-1} were obtained from the PEO - LiBF_4 - PC system.

CHAPTER 1

INTRODUCTION

1.1 Background of study

During the 20th century most synthetic polymers have been used as structural materials or as electric insulators. But in the past 20 years, they have been tailored as electron or ion conductors. When combined with appropriate salts their ionic conductivity can be put to use as an electrolyte and hence they are commonly known as polymer electrolyte. These ion conducting polymers have given a big contribution not only in solid state rechargeable lithium or lithium-ion batteries, but also in other electrochemical devices such as super capacitors and sensors.

A polymer is a substance with large molecular mass composed of repeating structural units, or monomers, connected by covalent chemical bonds. The structural properties of a polymer relate to the physical arrangement of monomers along the backbone of the chain. Structure has a strong influence on the other properties of a polymer. For example, a linear chain polymer may be soluble or insoluble in water depending on whether it is composed of polar monomers (such as ethylene oxide) or nonpolar monomers (such as styrene). Polymer electrolytes are composed of alkaline salts dissolved in a high molecular weight polymer host such as poly (ethylene oxide) (PEO) or poly (propylene oxide) (PPO).