

**EFFECT OF ALUMINA FILLER ON SPHERULITE GROWTH AND  
ON IONIC CONDUCTIVITY OF PEO<sub>9</sub>(LiClO<sub>4</sub>) AND Al<sub>2</sub>O<sub>3</sub>  
COMPOSITE POLYMER ELECTROLYTE**

A PROJECT REPORT PRESENTED BY

F.A.E. NUGERA

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**F.A.E.Nugera**

Postgraduate Institute of Science

University of Peradeniya

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Complex of lithium salts (LiX) with high molecular weight Poly(etheleneoxide), (PEO) are emerging as the best candidate to be used as polymer electrolytes. However, due to their low ionic conductivity at ambient temperature, it is not suitable for most practical applications. Therefore many strategies have been attempted to enhance the ionic conductivity at ambient temperature. Among these, the incorporation of nano-sized ceramic fillers has shown greater results. Greater number of studies has been carried out to find the effect of the addition of fillers on the conductivity. However, a few studies have been carried out to investigate the changes of the structure of the polymer electrolyte with the addition of filler. And also the effect of the grain size of the filler particle also plays an important role.

In the present work, PEO-based polymer electrolytes with different grain sizes of alumina have been synthesized using common solvent casting method and observed the growth pattern of spherulites under the polarization microscopy and characterized by mainly using complex impedance spectroscopy in order to correlate the structural changes to the conductivity measurements. The results show that the size of the PEO spherulite decreases and number of spherulite increases with increasing concentration of the filler. The above has achieved with the system that show the maximum conductivity for each composites with different particle size of alumina.