

**ROLE OF PLASTICIZERS IN ENHANCING THE IONS TRANSPORT
PROPERTIES OF ENR POLYMER ELECTROLYTES FOR
ELECTROCHEMICAL SYSTEMS**

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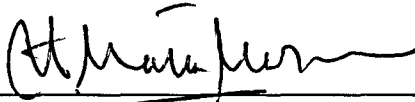
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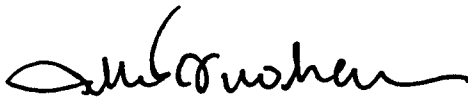
This Final Year Project Report entitled "Role of Plasticizers in Enhancing the Transport Properties of ENR Polymer Electrolytes for Electrochemical Systems" was submitted by Nurmalessa binti Muhammad @ Atan, in partial fulfillment of the requirements for the Degree of Bachelor of Sciences (Hons.) Physics, in the Faculty of Applied Sciences, and was approved by



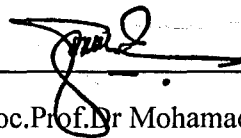
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ABSTRACT

ROLE OF PLASTICIZERS IN ENHANCING THE IONS TRANSPORT PROPERTIES OF ENR POLYMER ELECTROLYTES FOR ELECTROCHEMICAL SYSTEMS

In this study, ENR-50 (epoxidised natural rubber) containing different concentrations of lithium triflate (LiCF_3SO_3) salt concentrations were prepared using a solution cast technique. Impedance spectroscopy (IS) technique was carried out to determine the electrical conductivity value samples. The highest value of electrical conductivity for the optimum percentage salt of the sample was determined. The highest conductivity was $1.98 \times 10^{-5} \text{ S cm}^{-1}$ for 1.0 g ENR-50 + 35 wt% LiCF_3SO_3 . This conductivity was calculated using the bulk resistance value which can be obtained from the complex impedance plot in frequency range between 100 Hz and 1 MHz. Plasticizers such as propylene carbonate (PC) and ethylene carbonate (EC) with different weight percent has been added to ENR-50 + LiCF_3SO_3 film. The role of plasticizer is to increase the rate of ion dissociation, hence the conductivity of the sample increased. The conductivity of the highest conducting sample of plasticized ENR-50 + 35 wt% LiCF_3SO_3 was $2.28 \times 10^{-4} \text{ S cm}^{-1}$. Finally, lithium-air cell using gelled polymer electrolytes was fabricated and characterized. The lithium-air showed a large capacity of 1134 mAhg^{-1} at discharge current of 1.0 mA.