

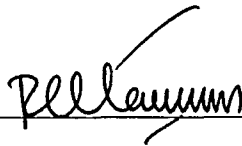
**ELECTRICAL CHARACTERISATION OF PVC-LiTFSI-Al<sub>2</sub>O<sub>3</sub>  
(99% GAMMA 40-80 nm) POLYMER ELECTROLYTES**

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**Final Year Project Report Submitted in  
Partial Fulfilment of the Requirements for the  
Degree of Bachelor of Science (Hons.) Physics  
in the Faculty of Applied Sciences  
Universiti Teknologi MARA**

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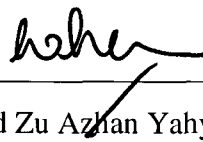
This Final Year Project Report entitled “**Electrical Characterizations of PVC-LiTFSI-Al<sub>2</sub>O<sub>3</sub> (99% Gamma 40-80 nm) Polymer Electrolyte**” was submitted by Muhamad Kamarul Azman b Sulaiman, in partial fulfilment of the requirements for the Degree of Bachelor of Science (Hons.) Physics, in the Faculty of Applied Sciences, and approved by



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## ABSTRACT

In this study of nanocomposite polymer electrolyte, Poly vinyl chloride, (PVC), was used as the host polymer and lithium (bis) trifluoromethanesulfonimide, (LiTFSI), as the doping salt with Aluminium Oxide,  $\text{Al}_2\text{O}_3$  as the filler. PVC and salt in different weight % concentrations dissolved in Tetrahydrofuran, (THF). The influence of different concentration of salt on PVC gave rise to different values of ionic conductivity. The best conductivity concentration of PVC-LiTFSI was mixed with various weight % of Aluminium Oxide in nanosize to form PVC-LiTFSI- $\text{Al}_2\text{O}_3$  nanocomposite polymer electrolytes. The ionic conductivity of nanocomposite polymer electrolyte was determined by impedance spectroscopy. Temperature dependence of conductivity behavior of the best conducting PVC-LiTFSI and PVC-LiTFSI- $\text{Al}_2\text{O}_3$  samples was also investigated to obtain the values of activation energy ( $E_a$ ) of conduction.