

**PREPARATION AND CHARACTERIZATION OF PMMA-NH<sub>4</sub>BF<sub>4</sub>  
POLYMER ELECTROLYTES FOR  
SUPERCAPACITOR**

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**Final Year Project Report Submitted in  
Partial Fulfillment of The Requirements for the  
Degree of Bachelor of Science (Hon.) Physics  
in the Faculty of Applied Sciences  
University Teknologi MARA**

**JANUARY 2013**

## ACKNOWLEDGEMENTS

Firstly, I would like to express my deepest gratitude to Allah S.W.T for His blessing and guidance that I have a chance to write final year project proposal in this semester.

Secondly, I would like to express my greatest gratitude to my respected supervisor **Prof Madya Dr Ab Malik Marwan Ali** who had been guiding me through all the troubles in finishing this research proposal. I'm really thankful to have him as my supervisor as he motivated me a lot and also provided me with the information and ideas that I'm supposed to know in this project in order to gain better reviews and results.

Siti Masyitah Bt Mohd Razalli

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## ABSTRACT

The present study deals with preparation and characterization plasticized MG30- $\text{NH}_4\text{BF}_4$  polymer electrolytes for supercapacitor. MG30 as a polymer host based solid polymer electrolyte system have been prepared by solution casting technique. THF and  $\text{NH}_4\text{BF}_4$  were used as a solvent and salt respectively.  $\text{NH}_4$  was doped with  $\text{BF}_4$  as a doping salt to form polymer electrolyte in THF solvent. The electrical conductivity was determined by using EIS. The conductivity temperature depends on the studies of the highest conductivity films in PMMA- $\text{NH}_4\text{BF}_4$  electrolytes system obeys the Arrhenius rule. The polymer salt complexes were investigated using FTIR.

## **CHAPTER 1**

### **INTRODUCTION**

#### **1.1 RESEARCH BACKGROUND**

Electrochemical capacitors are called by a number of names : supercapacitors, ultracapacitor or electrochemical double-layer capacitor (ELDCs). The list of different names is almost as large as the number of manufacturers. Since this technology only starts to find itself in the market, a universal term does not seem to have been agreed upon as yet. Electrochemical capacitors can be divided into two types: Electrochemical Double-Layer Capacitors (ELDCs) with large area carbon-like electrodes in which charge storage is electrostatic in nature, and Supercapacitors with faradic electroactive electrodes leading to pseudocapacitance (S.A Hashim & H.M Upadhyaya,2002). The most advantage property is the ability to be charged and discharged continuously without degrading like batteries do. The energy consumption of electronic devices has decreased gradually with progress in integrated circuit technology. The stable working voltage required for power supplies today is considered lower than in the first transistor devices. The demand for miniaturized high energy density and low leakage current capacitors as for examples, a stand-by power source for RAM devices and for actuators or sensors as well as the substitution of batteries by long-life power supplies, offer new opportunities for supercapacitor that uses the electric double layer.