PREPARATION AND CHARACTERIZATION OF SULFONATED POLY (ETHER ETHER KETONE)-CHITOSAN (SPEEK-CS) BASED BY MICROWAVE CROSSLINKED TECHNIQUE.

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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 University Technologi MARA

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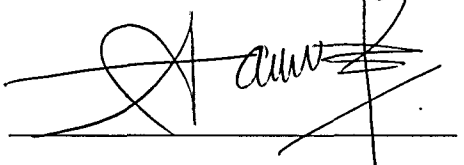

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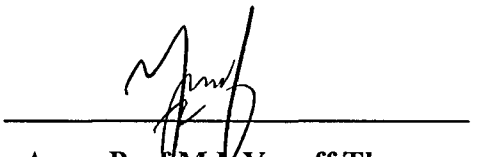

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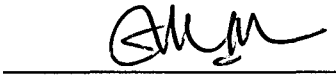

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ABSTRACT

PREPARATION AND CHARACTERIZATIONS OF SULFONATED POLY(ETHER ETHER KETONE)-CHITOSAN (SPEEK-CS) BASED BY MICROWAVE CROSSLINKED TECHNIQUE.

In this study. SPEEK-CS with different composition was prepared. Impedance spectroscopy technique was carried out in frequency range between 100Hz to 1MHz. The optimum properties of the SPEEK-CS membrane is obtained when composition is 80% SPEEK and 20% CS with conductivity 5.09×10^{-04}S/cm at temperature 80^{0}C.This conductivity value was calculated using the bulk resistance value that obtained from the complex impedance plot. The degree of swelling test have been done to obtained the lowest degree of swelling for the samples.The lowest degree of swelling obtained from this study is 10.25%.

CHAPTER1

INTRODUCTION

1.1 Background of study

Fuel cells technology allows the direct conversion of the potential chemical energy to electrical energy through a redox process [1]. It involves the molecular hydrogen as combustible and oxygen as comburent.

The main characteristic of such a fuel cell is to employ as electrolyte known as Proton Exchange Membrane Fuel Cells (PEMFC). The main component of a PEMFC is a dense proton-exchange membrane, which is responsible of proton migration from the anode to the cathode. The membrane is placed between two electrodes and separates the anodic region (where a fuel, such as hydrogen, is catalytically oxidised to produce protons and electrons used as electricity source in an external device) from the cathodic region (where protons react with oxygen and electrons coming from the external device to produce water and heat [2].

A perfluorosulfonic acid (PFSA) membrane, such as Nafion, is widely used as the polymer electrolyte membrane in low-temperature hydrogen/oxygen fuel cells because of its excellent chemical, mechanical, and thermal stability, as well as its relatively high proton conductivity when fully hydrated [3]. However, Nafion has certain disadvantages for PEMFC applications. The main weaknesses of this commercial trademark