

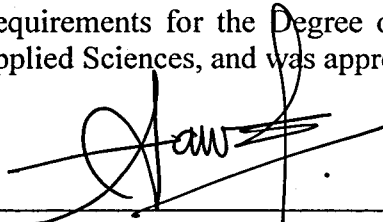
**PREPARATION AND CHARACTERIZATION OF CHITOSAN
BASED POLYMER ELECTROLYTE MEMBRANE FUEL CELL**

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**Final Year Project Report Submitted in
Partial Fulfillment of the Requirements for the
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In the Faculty of Applied Sciences
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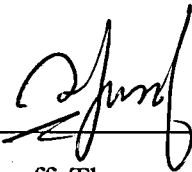
This Final Year Project entitled "preparation and characterization of chitosan based polymer electrolyte membrane fuel cell" was submitted by Mohd Faies Samsudin, in partial fulfillment of the requirements for the Degree of Bachelor of Science (Hons) Physics, in the faculty of Applied Sciences, and was approved by



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Sincerely,

Mohamad Faies Samsudin

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ABSTRACT

PREPARATION AND CHARACTERIZATION OF CHITOSAN BASED POLYMER ELECTROLYTE MEMBRANE FUEL CELL

First of all, sulfonated chitosan acetate-based membranes with sulfuric acid have been prepared and evaluated as proton exchange membrane fuel cell. Before that, the sulfuric acid, (H_2SO_4) solution with different concentration was prepared and uses it as sulfonating agent in sulfonation process. The membranes have been characterized by proton conductivity and water uptake capability. The proton conductivity at different temperature from 30°C until 100°C has been studied on the membranes and the results showed that the proton conductivity was increased with increases of temperature. The highest proton conductivity of $3.1412 \times 10^{-4} \text{Scm}^{-1}$ was obtained from membranes at temperature of 90°C . The introduction of sulfuric acid as sulfonic acid groups in the base polymer was increase the proton conductivity rate flow. The highest percentage of water uptake of 82.41% was obtained. From the characterization of water uptake capability showed that the percentage of water uptake was increased with increases the conductivity.