KSCST

Karnataka State Council for Science and Technology

Indian Institute of Science Campus, Bengaluru - 560 012

Telephone: 080-23341652, 23348848, 23348849 ♦ Telefax: 080-23348840

Email: office@kscst.iisc.ernet.in, office@kscst.org.in ♦ Website: www.kscst.iisc.ernet.in, www.kscst.org.in

Mr. H. Hemanth Kumar
Executive Secretary

27th March, 2019

Ref: 7.1.01/SPP/1333

The Principal,
Alva's Institute of Engineering and Technology,
Shobavana Campus,
Mijar,
Moodbidri - 574 225.

Dear Sir/Madam,

Sub : Sanction of Student Project - 42nd Series: Year 2018-2019
Your Project Proposal Reference No. : 42S_BE_0693

Ref : Your Project Proposal entitled " **PERFORMANCE IMPROVEMENT OF DIRECT METHANOL FUEL CELL USING NAFION MEMBRANE**

I am happy to inform that your student project proposal referred above, has been approved by the Council for "Student Project Programme - 42nd Series" and has been sanctioned with a budgetary break-up as detailed below:

Students	Ms. Challa Meghana and others	**Budget**	**Amount (Rs)**
		Materials/Consumables	3,500.00
Guide/s	Dr. D V Manjunatha	Labor	-
		Travel	500.00
Department	Electronics And Communication Engineering	Miscellaneous	500.00
		Report	500.00
		TOTAL	5,000.00
	FIVE THOUSAND RUPEES ONLY		

The following are the guidelines to carryout the project work :

a) The project should be performed based on the objectives of the proposal sent by you.

b) The project should be completed in all respects and one copy of the hardbound report along with softcopy of the full report in a CD (.pdf format) should be submitted to KSCST.

c) Any change in the project title and objectives, etc., or students is liable to rejection of the project and the amount sanctioned needs to be returned to KSCST.

d) Please quote your **project reference number printed above** in all your future correspondences.

e) Important: After completing the project, 2 to 3 page write-up (synopsis) needs to be sent by e-mail [spp@kscst.iisc.ernet.in] and should include following points:

1) Title of the project
2) Name of the College & Department
3) Name of the students & Guide(s)
4) Keywords

PRINCIPAL
Alva's Institute of Engg. & Technology
Mijar, MOODBIDRI - 574 225, D.K

VISVESVARAYA TECHNOLOGICAL UNIVERSITY

"Jnana Sangama" Belagavi – 590 010

PROJECT REPORT ON

"PERFORMANCE IMPROVEMENT OF DIRECT MENTHANOL FUEL CELLS USING MODIFIED NAFION MEMBRANE"

Submitted in partial fulfillment of the requirements for the award of degree

BACHELOR OF ENGINEERING
IN
ELECTRONICS & COMMUNICATION ENGINEERING

Submitted By

Name	USN
ANANYA M	4AL15EC008
ARPANA	4AL15EC011
CHALLA MEGHANA	4AL15EC016
ABHISHEK S	4AL15EC104

Under the Guidance of
Dr. D V Manjunatha
Sr. Professor & Head
Department of E&C Engineering

ALVA'S
Education Foundation

DEPARTMENT OF ELECTRONICS & COMMUNICATION ENGINEERING

ALVA'S INSTITUTE OF ENGINEERING & TECHNOLOGY

MOODBIDRI – 574 225.

2018-2019

ALVA'S INSTITUTE OF ENGINEERING & TECHNOLOGY

MOODBIDRI – 574 225

(Affiliated to VTU, BELAGAVI)

DEPARTMENT OF ELECTRONICS & COMMUNICATION ENGINEERING

CERTIFICATE

Certified that the project work entitled "PERFORMANCE IMPROVEMENT OF DIRECT MENTHANOL FUEL CELLS USING MODIFIED NAFION MEMBRANE" *is a bona fide work carried out by*

ANANYA M	**4AL15EC008**
ARPANA	**4AL15EC011**
CHALLA MEGHANA	**4AL15EC016**
ABHISHEK S	**4AL15EC104**

in partial fulfillment for the award of BACHELOR OF ENGINEERING in **ELECTRONICS & COMMUNICATION ENGINEERING** of the **VISVESVARAYA TECHNOLOGICAL UNIVERSITY, BELAGAVI** during the year 2018–2019. It is certified that all corrections/suggestions indicated for Internal Assessment have been incorporated in the report deposited in the departmental library. The project report has been approved as it satisfies the academic requirements in respect of Project work prescribed for the Bachelor of Engineering Degree.

D.V. M 06/05/19 D.V. M 06/05/19

Signature of the Guide	Signature of the H.O.D	Signature of the Principal
Dr. D V Manjunatha	Dr. D V Manjunatha H.O.D Dept. Of Electronics & Communication Alva's Institute of Engg. & Technology Mijar, MOODBIDRI - 574 225	Dr. Peter Fernandes PRINCIPAL Alva's Institute of Engg. & Technology, Mijar, MOODBIDRI - 574 225, D.K

EXTERNAL VIVA

Name of the Examiners

1. Dr. Dattathreya

2. ASHOKA-A

Signature with date

Dattath 11/6/19

11/6/19

ALVA'S INSTITUTE OF ENGINEERING & TECHNOLOGY

MOODBIDRI – 574 225

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Dr. D V Manjunatha	**Dr. D V Manjunatha**	**Dr. Peter Fernandes**
	H.O.D Dept. Of Electronics & Communication Alva's Institute of Engg. & Technology Mijar, MOODBIDRI - 574 225	PRINCIPAL Alva's Institute of Engg. & Technology Mijar, MOODBIDRI - 574 225, D.K

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ABSTRACT

The Direct Methanol Fuel Cells (DMFC) is a subcategory of Proton Exchange Membrane Fuel Cells (PEMFCs) in which methanol is used as a fuel. PEMs are important components of fuel cells which conduct protons. In this paper the proposed work provides to use methanol as fuel to realize DMFC. The Membrane Electrode Assembly (MEA) of DMFC is sandwiched between two silicon chips with micro channels consists of a micro-porous Gas Diffusion Layer (GDL) layer which regulates the flow of methanol to the catalyst at the anode, a high efficiency catalyst layer for the generation of protons (H+) and electrons (e^-) from methanol, a high proton conductance membrane layer for the transfer of protons and a high efficiency catalyst at the cathode for the conversion of oxygen and H+ into water. In modern cells, electrolytes based on proton conducting polymers i.e., electrolyte membranes (e.g., Nafion) are often used, since these cells can be operated under high temperature and pressure.

A 3D DMFC model has been used to analyze the effect of nafion membrane thickness and GDL thickness on the performance in a single fuel cell. At 25°C, the fuel cell has the optimal relative humidity in the PEM, which allows proton to travel from anode to cathode of DMFC. Nafion 117 was coated with various thicknesses of Poly Vinylidene Fluoride (PVDF) polymer and its effect on fuel cell performance was studied. The power density of DMFC PVDF coated Nafion 117 higher than that of native Nafion 117 because, the coating, introduces hydrophobic surface on Nafion 117 and hence, methanol is repelled from nafion surface thereby causing reduction in methanol crossover, which gives better performance when compared to uncoated Nafion 117.The DMFC has lot of advantages, such as low energy consumption, high energy density, simple system, which is easy to carry, storage and supply. The improvement of comprehensive characteristics of proton exchange membrane represents one of the most critical challenges for the large scale commercialization of PEM fuel cells.