

PROJECT WORK/FIELD  
WORK/INTERNSHIP  
OF  
STUDENTS OF  
MSc. CHEMISTRY  
GOVERNMENT COLLEGE FOR WOMEN,  
THIRUVANANTHAPURAM



# STUDIES ON DEVELOPMENT OF FLEXIBLE POLYURETHANE FOAM AS CREW SEAT

*Project report*

*In partial fulfillment of the award of the degree of*

***Master of Science in Chemistry***

*Submitted by*

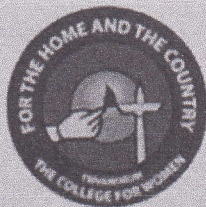
**APARNA.S**

Candidate code: 63518107001

Under the guidance of

**Ms. REMYA BALAKRISHNAN**

Scientist/Engineer-SE  
Application Development Division  
Vikram Sarabhai Space Centre  
Thiruvananthapuram




**DEPARTMENT OF CHEMISTRY**

**GOVT. COLLEGE FOR WOMEN**

**VAZHUTHACAUD, THIRUVANANTHAPURAM, KERALA**

**UNIVERSITY OF KERALA**

**SEPTEMBER 2020**

  
PRINCIPAL  
GOVT. COLLEGE FOR WOMEN  
THIRUVANANTHAPURAM, K.







## CERTIFICATE

This is to certify that **Ms APARNA S**, Master of Science in Chemistry, Govt College for Women, Thiruvananthapuram, worked on the topic, entitled as '**STUDIES ON DEVELOPMENT OF FLEXIBLE POLYURETHANE FOAM AS CREW SEAT**' under my supervision at Vikram Sarabhai Space Centre, Thiruvananthapuram, in partial fulfillment of the requirements for the award of Master of Science in Chemistry, University of Kerala, Thiruvananthapuram. The present work or any part thereof has not been submitted elsewhere for any degree.

Project Guide

**REMYA BALAKRISHNAN**

Scientist/Engineer-SE

Application Development Division

Division Head

**NALLAPERUMAL A.M**

Scientist/Engineer-SG

Application Development division

PRINCIPAL  
GOVT. COLLEGE FOR WOMEN  
THIRUVANANTHAPURAM

नल्लपेरुमल ए.एम./NALLAPERUMAL A.M.  
प्रधान, एपीसी / सीएसजी / पीसीएम  
Head APD/CSG/PCM  
विक्रम साराभाई अंतरिक्ष केंद्र  
Vikram Sarabhai Space Centre  
भारत सरकार / Government of India  
तिरुवनंतपुरम / Thiruvananthapuram





**MODULATING LOWER CRITICAL SOLUTION TEMPERATURE OF  
SUPRAMOLECULAR POLYMER BY ADDING WATER SOLUBLE DYES**

**A Project Report Submitted for the Partial Fulfillment**

**of the Requirements for the Degree of**

**MASTER OF SCIENCE**

**IN**

**CHEMISTRY**

**BY**

**ATHIRA GOPAN**



**Register No: 63518107002**

**DEPARTMENT OF CHEMISTRY**

**GOVT.COLLEGE FOR WOMEN, THIRUVANANTHAPURAM**

*Under the Supervision of*



**Dr.A.Ajayaghosh**

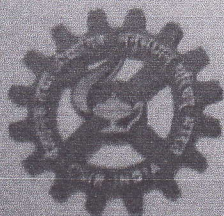
**At**

**CHEMICAL SCIENCES AND TECHNOLOGY DIVISION, CSIR-NATIONAL INSTITUTE FOR  
INTERDISCIPLINARY SCIENCE AND TECHNOLOGY, THIRUVANANTHAPURAM-**

**695019**

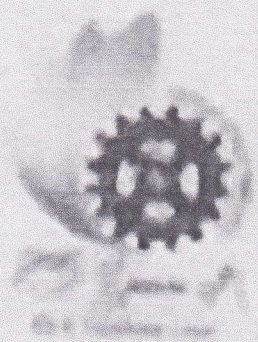


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THIRUVANANTHAPURAM.**





# National Institute for Interd



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Council of Scie

Industrial Estat  
E

Dr. A. Ajayaghosh ., FASc., FNASc., I  
Director



*[Signature]*  
PRINCIPAL  
GOVT. COLLEGE FOR WOMEN  
TIRUVANANTHAPURAM-14

July 14, 2020



# SYNTHESIS OF VARIOUS N-SUBSTITUTED ISATINS

*In partial fulfilment for the award of the degree of*

**Master of Science in Chemistry**

*By*

**Deepanjana Mohan**

**Register Number: 63518107003**

**Govt. College For Women**

**Vazhuthacaud, Thiruvananthapuram**



*Under the guidance of*

**Dr. Sasidhar B. S.**

**Senior Scientist**

**CSIR-National Institute for Interdisciplinary Science and Technology (CSIR-NIIST)**

**Thiruvananthapuram, Kerala-695019**



*Shirish*

**PRINCIPAL  
GOVT. COLLEGE FOR WOMEN  
THIRUVANANTHAPURAM-14**

**April 2020**







**CSIR-NATIONAL INSTITUTE FOR INTERDISCIPLINARY SCIENCE AND TECHNOLOGY (NIIST)**

*Council of Scientific & Industrial Research (CSIR), Govt. of India*

**Dr. Sasidhar B. S.**

Senior Scientist, Organic Chemistry Section  
Chemical Sciences and Technology Division

E mail: drsasidharbs@gmail.com

drsasidharbs@niist.res.in

Telephone: 09497260897(Mob)

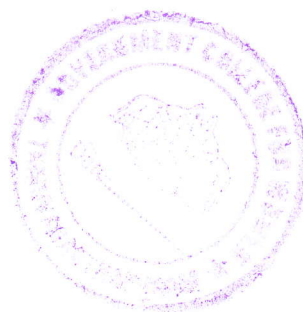
0471 2515416 (Off); Fax: +91 2491712

**CERTIFICATE**

This is to certify that the project report entitled "**Synthesis of various N-substituted isatins**" submitted by **Deepanjana Mohan** for the partial fulfillment of the degree of master of science (M.Sc.) in chemistry of Govt.college for women, Vazhuthacaud Thiruvananthapuram is a bona fide work carried out by her under my guidance at the Chemical Sciences and Technology Division, **CSIR-National Institute for Interdisciplinary Science and Technology (NIIST)**, Trivandrum. This report in my opinion is worthy of consideration for the award of certificate.

**Dr. Sasidhar B. S.**

PRINCIPAL  
GOVT. COLLEGE FOR WOMEN  
THIRUVANANTHAPURAM 14





**STUDY ON EFFECT OF SULPHURICACID IN THE LEACHIN  
PROCESS DURING THE MANUFACTURE  
OF TITANIUM DIOXIDE**

*Dissertation submitted  
in partial fulfilment of the requirements for the  
award of degree of*

**MASTER OF SCIENCE**

**IN**

**CHEMISTRY**

**BY**

**DHANYA KRISHNAN U R**

**Register No: 63518107004**

  
**PRINCIPAL  
GOVT. COLLEGE FOR WOMEN  
THIRUVANANTHAPURAM-14**



**DEPARTMENT OF CHEMISTRY  
GOVT.COLLEGE FOR WOMEN,  
THIRUVANANTHAPURAM  
KERALA, INDIA  
JULY 2020**





# TRAVANCORE TITANIUM PRODUCTS LIMITED

(A Government of Kerala Undertaking)

THIRUVANANTHAPURAM

27<sup>th</sup> July 2020

## CERTIFICATE

This is to certify that Ms. Dhanya Krishnan U R, Msc Chemistry Student of Govt. College for Women, Thiruvananthapuram, has carried out her Project work on "STUDY ON EFFECT OF SULPHURIC ACID IN THE LEACHING PROCESS DURING THE MANUFACTURE OF TITANIUM DIOXIDE" in Travancore Titanium Products Limited with effect from 13<sup>th</sup> January 2020 to 24<sup>th</sup> January 2020.



*[Signature]*  
PRINCIPAL  
GOVT. COLLEGE FOR WOMEN  
THIRUVANANTHAPURAM-14



*[Signature]*  
Manager (P & A)



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CIN : U13209KL1946SGC001214, GST No: 32AAACT8543J1Z9  
E-mail : [mkting@travancoretitanium.com](mailto:mkting@travancoretitanium.com), [md@ttpltd.in](mailto:md@ttpltd.in), [purchase@ttpltd.in](mailto:purchase@ttpltd.in)  
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Adding Life to Colours



# **DFT STUDY ON THE INTERACTION OF CO<sub>2</sub> WITH LONE PAIR BEARING MOLECULES**

**A Project Report Submitted for the Partial Fulfillment  
of the Requirements for the Degree of  
MASTER OF SCIENCE**

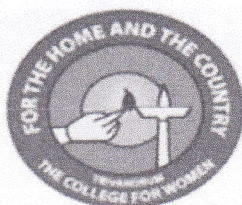
**In**

**CHEMISTRY**

**By**

**FASNI S**

**Register No: 63518107005**

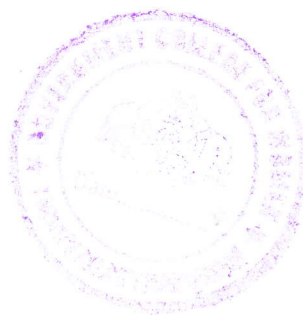


**DEPARTMENT OF CHEMISTRY  
GOVT. COLLEGE FOR WOMEN, THIRUVANANTHAPURAM**

**Under the Supervision of**

**Dr. C H SURESH**

*Principal's*  
**PRINCIPAL  
GOVT. COLLEGE FOR WOMEN  
THIRUVANANTHAPURAM-14**



**At**

**CHEMICAL SCIENCES AND TECHNOLOGY DIVISION  
CSIR-NATIONAL INSTITUTE FOR INTERDISCIPLINARY  
SCIENCE AND TECHNOLOGY,  
THIRUVANANTHAPURAM-695019**

**JUNE 2020**





**COUNCIL OF SCIENTIFIC & INDUSTRIAL RESEARCH**  
**NATIONAL INSTITUTE FOR INTERDISCIPLINARY SCIENCE AND**  
**TECHNOLOGY (CSIR – NIIST),**

**GOVT. OF INDIA**

**CHEMICAL SCIENCES AND TECHNOLOGY DIVISION (CSTD)**

**Industrial Estate P.O. Thiruvananthapuram, KERALA, INDIA, 695019**

---

## **CERTIFICATE**

This is to certify that **Ms. FASNI S**, Master of Science in Department of Chemistry, Govt. College for Women, Thiruvananthapuram, worked on the topic, entitled as **“DFT STUDY ON THE INTERACTION OF CO<sub>2</sub> WITH LONE PAIR BEARING MOLECULES ”** under my supervision in Chemical Sciences and Technology Division, CSIR-National Institute for Interdisciplinary Science and Technology, Thiruvananthapuram, in a partial fulfillment of the requirements for the Degree of Master of Science in Chemistry, University of Kerala, Thiruvananthapuram. The present work or any part of there has not been submitted elsewhere for a degree.

PRINCIPAL  
GOVT. COLLEGE FOR WOMEN  
THIRUVANANTHAPURAM-1A

**Dr. C H SURESH**

Senior Principal Scientist

CSIR-NIIST, Thiruvananthapuram





# **Copper Modified Polycarbosilane: A Preliminary Study On Its Structure And Catalysis**

## **A PROJECT REPORT**

Submitted by

**Lavanya B. Sajeev**

Register No: 63518107006

*To*

**University of Kerala**

*In partial fulfilment of the award of the degree of*

MASTER OF SCIENCE

IN

CHEMISTRY

DEPARTMENT OF CHEMISTRY

**GOVERNMENT COLLEGE FOR WOMEN, VAZHUTHACADU**

**THIRUVANANTHAPURAM**

**KERALA, INDIA**

  
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GOVT. COLLEGE FOR WOMEN  
THIRUVANANTHAPURAM-14

JULY 2020





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अंतरिक्ष विभाग  
विक्रम साराभाई अंतरिक्ष केन्द्र  
तिरुवनन्तपुरम-695 022  
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फैक्स : (0471) 2564096



Government of India  
Department of Space  
**Vikram Sarabhai Space Centre**  
Thiruvananthapuram-695 022  
Kerala, INDIA  
Telephone : (0471) 2563843  
Fax : (0471) 2564096

Propellants, Polymers, Chemicals & Materials Entity  
Analytical, Spectroscopy and Ceramics Group  
**Ceramic Matrix Products Division**

### CERTIFICATE

July 27, 2020

This is to certify that the work embodied in the project report titled "**Copper Modified Polycarbosilane: A preliminary study on its structure and catalysis**" has been carried out by Kum. **Lavanya B. Sajeev** under our supervision and guidance during the period January 2020 – March 2020. The present work or any part of the report has not been submitted to any other university or institution for the award of any degree or diploma.

*Vipin Vijay V.*  
27.07.2020

**Dr. Vipin Vijay V.**  
Scientist SD  
Ceramic Matrix Composites Section  
(Co-guide)

*Dr. Sreejith K. J.*  
20.08.20

**Dr. Sreejith K. J.**  
Scientist SE  
Ceramic Matrix Composites Section  
(Guide)

*[Signature]*  
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THIRUVANANTHAPURAM-1A

*[Signature]*  
28/08/2020  
**Dr. Renjith Devasia**  
Scientist SG & Division Head  
Ceramic Matrix Products Division





# DEVELOPMENT OF POLYIMIDE FOAM FROM DIANHYDRIDE AND ISOCYANATE

*Dissertation Submitted to the University of Kerala*

*In the partial fulfillment of the Degree of*

*Master of Science in Chemistry*

BY

Lekshmi.A

Reg.No: 63518107007



DEPARTMENT OF CHEMISTRY

GOVT. COLLEGE FOR WOMEN, THIRUVANANTHAPURAM

*Under the Supervision of*

Smt. Ani K John, SCIENTIST SE

&

Shri.Satish Mahto, SCIENTIST SC

PROJECT ENGINEERING AND PRODUCTIONIZATION

FACILITY (PEPF) DIVISION

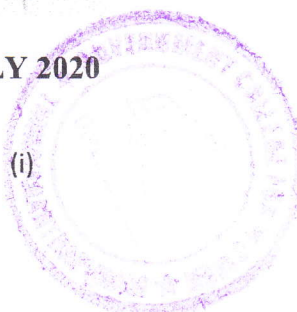
VIKRAM SARABHAI SPACE CENTRE

THIRUVANANTHAPURAM

  
PRINCIPAL  
GOVT. COLLEGE FOR WOMEN  
THIRUVANANTHAPURAM-14



JULY 2020





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अंतरिक्षविभाग

विक्रम साराभाई अंतरिक्षकेन्द्र

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केरल, भारत

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Government of India  
Department of Space

**Vikram Sarabhai Space Centre**

Thiruvananthapuram-695 022

Kerala, INDIA

Telephone : (0471) 2563658

Fax : (0471) 2563013

## CERTIFICATE

DATE: 27.07.2020

This is to certify that the project report titled "**DEVELOPMENT OF POLYIMIDE FOAM FROM DIANHYDRIDE AND ISOCYANATE**" submitted by **Ms. Lekshmi A**, final year MSc. Chemistry student of Govt. College for Women, Thiruvananthapuram, in partial fulfilment of the requirement for award of Degree of **Master of Science in Chemistry** of University of Kerala, is bonafide record of the work carried out by them at PEPF/CSG, Vikram Sarabhai Space Centre, Trivandrum under our guidance.

Project Guide

(Ani K John)  
Scientist/Engineer-SE,  
PEPF/CSG/PCM

Co-Guide

(Satish Mahto)  
Scientist/Engineer-SC  
PEPF/CSG/PCM

Division Head

(N Saravanan)  
Manager, PEPF  
PEPF/CSG/PCM

भारतीय अंतरिक्ष अनुसंधान संगठन Indian Space Research Organisation



PRINCIPAL  
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THIRUVANANTHAPURAM-695 022



# **STUDIES ON EFFECT OF CATALYST ON THE KINETICS OF POLYOL-ISOCYANATE REACTION**

A project report submitted for the Partial Fulfillment  
of the Requirements for the Degree of  
**MASTER OF SCIENCE in CHEMISTRY**

By

**MALAVIKA K. G.**

Candidate code: 635 18 107 008



**DEPARTMENT OF CHEMISTRY  
GOVT. COLLEGE FOR WOMEN,  
THIRUVANANTHAPURAM**

Under the guidance of

**Dr. Suresh Kumar A.**

Scientist/Engineer-SE

Application Development Division

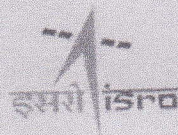


**Vikram Sarabhai Space Centre  
Thiruvananthapuram**

**AUGUST 2020**

**PRINCIPAL  
GOVT. COLLEGE FOR WOMEN  
THIRUVANANTHAPURAM, TA**





**Vikram Sarabhai Space Centre  
Thiruvananthapuram**

**CERTIFICATE**

This is to certify that **Ms. MALAVIKA K. G.**, Master of Science in Chemistry, Govt. College for Women, Thiruvananthapuram, worked on the topic, entitled as **"STUDIES ON EFFECT OF CATALYST ON THE KINETICS OF POLYOL-ISOCYANATE REACTION"** under our supervision and guidance at Vikram Sarabhai Space Centre, Thiruvananthapuram, in partial fulfillment of the requirements for the Degree of Master of Science in Chemistry, University of Kerala, Thiruvananthapuram. This work has not been submitted elsewhere for any degree.

*Suresh Kumar*  
Project Guide  
**Dr. SURESH KUMAR A.**  
Scientist/Engineer-SE  
Application Development Division

*Nallaperumal A.M.*  
Division Head  
**NALLAPERUMAL A. M.**  
Scientist/Engineer-SG  
Application Development Division

കേ. എസ്. കെ. വി. സാബു കുമാർ  
പ്രോജക്ട് ഗൈഡ്  
ഡോ. സുരേഷ് കുമാർ എ. സി.  
വി. സാബു കുമാർ എ. സി.  
വി. സാബു കുമാർ എ. സി.  
വി. സാബു കുമാർ എ. സി.

*[Signature]*  
**PRINCIPAL**  
GOVT. COLLEGE FOR WOMEN  
THIRUVANANTHAPURAM-12

ഡോ. എസ്. എസ്. നാലാപറുമാൾ എം.എം.  
ഡയറക്ടർ  
വി. സാബു കുമാർ എ. സി.  
വി. സാബു കുമാർ എ. സി.  
വി. സാബു കുമാർ എ. സി.



# Phenothiazine Based Organic D-D Dye-Sensitized Solar Co

*In partial fulfillment for the award of the de*

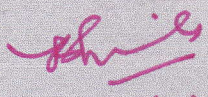
**Master of Science in Chemistry**

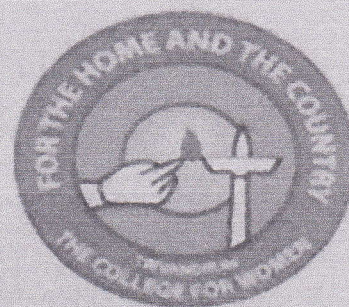
*By*

**Meenakshy C.B**

**Register Number: 63518107009**

**Govt. College For Women, Vazhuthacaud, Thiruv**

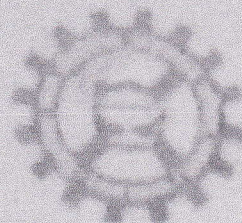
  
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THIRUVANANTHAPURAM



*Under the guidance of*  
*Under the guidance of*

**Dr. Suraj Soman**  
Scientist





राष्ट्रीय अंतर्विषयी विज्ञान तथा प्रौद्योगिकी  
NATIONAL INSTITUTE FOR INTERDISCIPLINARY SCIENCE

वैज्ञानिक तथा औद्योगिक अनुसंधान परिषद् | Council of Scientific & Industrial Research  
इंडस्ट्रियल इस्टेट पी. ओ. पप्पनकोट, तिरुवनंतपुरम, भारत - 695 019 | Industrial Estate P.O. Pappan

**CERTIFICATE**

This is to certify that the project entitled "Phenothiazine-Based Mo for Dye-Sensitized Solar Cells" is a bonafide report of the w Meenakshy C.B at the Photosciences and Photonics Section, Technology Division (CSTD), CSIR-NIIST, Thiruvananthapura during the period of 13<sup>th</sup> January 2020 to 16<sup>th</sup> March 2020 for the degree of Master of Science in Chemistry (Pure Chemistry) t Women, Vazhuthacaud, University of Kerala, Thiruvananthapu

**Place:** Thiruvananthapuram

**Date:** 26-06-2020

*Shinde*  
PRINCIPAL  
GOVT. COLLEGE FOR WOMEN  
THIRUVANANTHAPURAM-14



**SUPERVISOR**

*[Signature]*



# Studies on Dopamine and Glycidyl Methacrylate Modified Epoxy Adhesive for Metals

By  
**MEEVAL STISHI GEORGE**  
(Registration. No. 63518107010)

*A Dissertation Submitted*

Submitted to

**UNIVERSITY OF KERALA**

*In Partial fulfilment of the requirements*

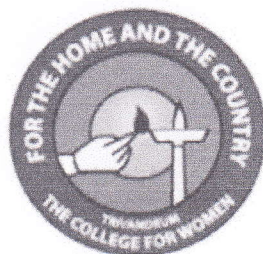
*For the award of the degree*


*Of*

**MASTER OF SCIENCE**

**IN**

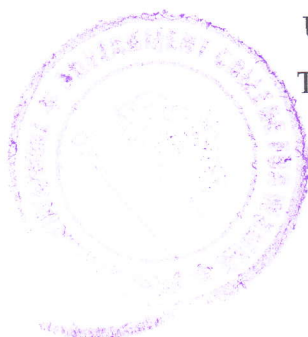
**CHEMISTRY**



  
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GOVT. COLLEGE FOR WOMEN  
THIRUVANANTHAPURAM-24

DEPARTMENT OF CHEMISTRY  
GOVT. COLLEGE FOR WOMEN, VAZHUTHACAUD  
UNIVERSITY OF KERALA  
THIRUVANANTHAPURAM

JULY-2020





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विक्रम साराभाई अन्तरिक्ष केन्द्र  
तिरुवनन्तपुरम - 695 022, भारत



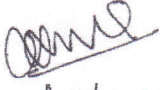
Government of India  
Department of Space  
**Vikram Sarabhai Space Centre**  
Thiruvananthapuram-695022, India

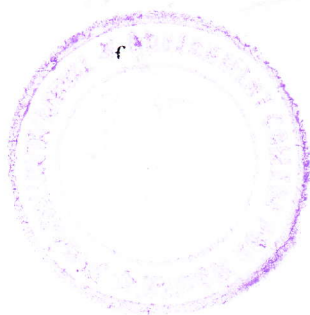
## *Certificate*


This is to certify that the project report entitled “**Studies on Dopamine and Glycidyl Methacrylate Modified Epoxy Adhesive for Metals**” is an authentic record of project work done by Ms. MEEVAL STISHI GEORGE from Department of Chemistry, Govt. College for Women, Vazhuthacaud, Thiruvananthapuram, Kerala, under the supervision and guidance of Shri. Ranajit Pal, Sci./Engr. SE, and Smt. Monisha Baby, Sr. Sci. Asst. A of Polymers and Special Chemicals Division, Vikram Sarabhai Space Centre, Thiruvananthapuram, Kerala, during the period from January 2020 to March 2020 for the award of M.Sc. Degree in Chemistry.

  
25/07/2020  
RANAJIT PAL

Sci./Engr. SE  
PSCD

  
25/07/2020  
MONISHA BABY  
Sr. Sci. Asst. A  
PSCD



  
PRINCIPAL  
GOVT. COLLEGE FOR WOMEN  
THIRUVANANTHAPURAM-695022



# **New Pyridinium Fluorophore for Multichannel pH Sensing of Endoplasmic Reticulum in Live Cells**

A project report submitted to  
**UNIVERSITY OF KERALA**

In partial fulfilment for the award of the degree of

**Master of Science in  
CHEMISTRY**

By

**SREELEKSHMI.S.R**

REGISTER NUMBER: 63518107011

**Department of Chemistry  
GOVT. COLLEGE FOR WOMEN, THIRUVANANTHAPURAM**



Under the Supervision of

**Dr. A. AJAYAGHOSH**

At

**Photosciences and Photonics Section  
Chemical Sciences and Technology Division (CSTD)  
CSIR-National Institute for Interdisciplinary Science and Technology (CSIR-NIIST)  
Thiruvananthapuram 695019**



**PRINCIPAL  
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THIRUVANANTHAPURAM-14**



# National Institute for Interdisciplinary Science and Technology (NIIST)



(Formerly Regional Research Laboratory)

Council of Scientific & Industrial Research  
(CSIR)

Industrial Estate P.O., Trivandrum - 695 019  
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July 14, 2020

## CERTIFICATE

This is to certify that the project report entitled "A New Pyridinium Fluorophore for Multichannel pH Sensing of Endoplasmic Reticulum in Live Cells" submitted by Sreelekshmi S. R. for the partial fulfillment of the degree of master of science (M.Sc.) in chemistry of Govt.college for women, Vazhuthacaud, Thiruvananthapuram is a bona-fide work carried out by her under my guidance in the photosciences and photonics section, NIIST, Trivandrum. This report in my opinion is worthy of consideration for the award of certificate.

Dr. A. Ajayaghosh

Dr. A. AJAYAGHOSH, FASc, FNASc, FNA



निदेशक / Director

सी एस आई आर- राष्ट्रीय अंतरविषयी विज्ञान तथा प्रौद्योगिकी संस्थान  
CSIR-National Institute for Interdisciplinary  
Science and Technology

Thiruvananthapuram - 695 019  
Photosciences and Photonics section  
CSIR-NIIST, Trivandrum



*Signature*

GOVT. COLLEGE FOR WOMEN  
THIRUVANANTHAPURAM-14



# PREPARATION OF RUTILE TITANIUM BY USING TITANIUM OXYCHLORIDE AS NUCLEATING AGENT

*Dissertation Submitted  
in partial fulfillment of the requirements  
award of the degree of*


**MASTER OF SCIENCE**

**IN**

**CHEMISTRY**

*By*

**VISHNUPRIYA U**

  
PRINCIPAL  
GOVT. COLLEGE FOR WOMEN  
TIRUVARUR



**Register No : 6351810701**

**Exam Code : 6351640**

**Subject Code : CH2430**





# TRAVANCORE TITANIUM PRODUCTS LIMITED

(A Government of Kerala Undertaking)

THIRUVANANTHAPURAM

27<sup>th</sup> July 2020

## CERTIFICATE

This is to certify that Ms. Vishnupriya. U, Msc Chemistry Student of Govt. College for Women, Thiruvananthapuram, has carried out her Project work on "RUTILE TITANIUM DIOXIDE PREPARATION BY USING TITANIUM OXYCHLORIDE AS NUCLEATING AGENT" in Travancore Titanium Products Limited with effect from 13<sup>th</sup> January 2020 to 24<sup>th</sup> January 2020.



*[Handwritten signature]*  
PRINCIPAL  
GOVT. COLLEGE FOR WOMEN  
THIRUVANANTHAPURAM-14

*[Handwritten signature]*  
Manager (P & A)



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**Adding Life to Colours**