

**STUDY ON HEXANAL SELF ALDOL CONDENSATION BY
USING SOLID CLAY AND AMINO FUNCTIONALIZED CALY
CATALYSTS.**

A dissertation submitted to University of Calicut

in partial fulfillment of the requirement for the award of degree of

MASTER OF SCIENCE

in




CHEMISTRY

Submitted by

ALPHY MARTIN

(CRASMCH001)



1. *Dr. V. T. Joy* 
2. *Dr. Tom chinnu* 
3. *Do. Bibitha Joseph* 

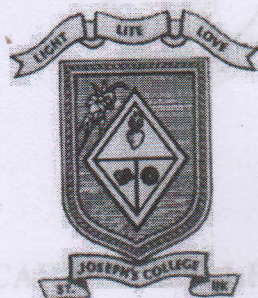
PG DEPARTMENT OF CHEMISTRY

CARMEL COLLEGE,

MALA, THRISSUR

2018-2020

PG DEPARTMENT OF CHEMISTRY
ST. JOSEPH'S COLLEGE, IRINJALAKUDA



CERTIFICATE

This is to certify that the dissertation entitled "STUDY ON HEXANAL SELF ALDOL CONDENSATION BY USING SOLID CLAY AND AMINO FUNCTIONALIZED CLAY CATALYSTS." is a record of original work done by, ALPHY MATIN REG NO CRASMCH001:, in the partial fulfillment of the requirement for the award of degree of MASTER OF CHEMISTRY under the guidance of Dr. MANOJ LAZAR., Assistant professor, Department of Chemistry, ST. Joseph's College, Irinjalakuda. It is further certified that this dissertation or any part of this thesis has not been submitted elsewhere for any other degree.

Prof. Dr. Deena Antony c.

Head of department of chemistry
Irinjalakuda

Place: IJK

Date: 15-07-2020

Deena Antony. c.
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Prof. Dr. Manoj Lazar

Assistant professor St. Joseph's college,
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St. Joseph's college, Irinjalakuda

DECLARATION



Ms. Alphy Martin hereby declare that the project entitled "STUDY ON HEXANAL SELF ALDOL CONDENSATION BY USING SOLID CLAY AND AMINO FUNCTIONALIZED CLAY CATALYSTS" submitted to the University of Calicut is a record of an original work done by me under the guidance of Dr. Manoj Lazar Assistant Professor, Department of chemistry Irinjalakuda and this project work is submitted in partial fulfillment of requirement for the award of degree of Master of Science in Chemistry of University of Calicut. The project has not been submitted to any other university or institute for the award of any degree or diploma.

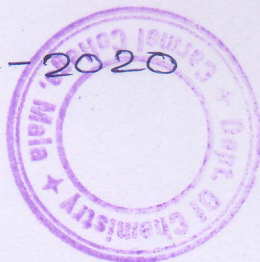
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Affiliated to University of Calicut
Mala – 680733

CERTIFICATE

Certified that the dissertation entitled "STUDY ON HEXANAL SELF ALDOL CONDENSATION BY USING SOLID CLAY AND AMINO FUNCTIONALIZED CLAY CATALYSTS." is an authentic record of work carried out by Ms. Alphy Martin under the guidance of Dr. Manoj Lazar, Assistant professor, department of chemistry, St. Joseph's college, Irinjalakuda in partial fulfillment for the award of the degree of Master of Science in Chemistry during the academic year 2018 – 2020.

Place: MALA

Date: 15-07-2020



Princy K.G.

Dr. Princy K.G

Head, Department of Chemistry,
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**STUDY OF VISIBLE LIGHT PHOTOCATALYTIC ACTIVITY OF
ZINC FERRITE DOPED TITANIA NANOCOMPOSITE ON
METHYLENE BLUE DYE DEGRADATION**

A dissertation submitted to University of Calicut

in partial fulfillment of the requirement for the award of degree of

MASTER OF SCIENCE

in

CHEMISTRY

Submitted by

ANCILYN ANTU K

(CRASMCH002)

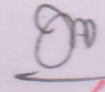



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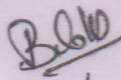
CARMEL COLLEGE,

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2018 - 2020

1. Dr. V. T. Joy 

2. Dr. Tom Cherian 

3. Dr. Bribitha Joseph 

CERTIFICATE



This is to certify that the work entitled, "STUDY OF VISIBLE LIGHT PHOTOCATALYTIC ACTIVITY OF ZINC FERRITE DOPED TITANIA NANOCOMPOSITE ON METHYLENE BLUE DYE DEGRADATION" submitted to faculty of science, University of Calicut in partial fulfillment of the requirement for the award of Master of science in chemistry is authentic record of work carried out at St. Joseph's College, Irinjalakuda by **Ancilyn Antu K** and was supervised and guided by **Dr. Manoj.A.Lazar**, Assistant Professor, Department of Chemistry, St. Joseph's College, Irinjalakuda and **Ms. Tessa Jose**, Assistant Professor on contract, Department of Chemistry, Carmel College, Mala.

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Dr. Deena Antony, C
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Place: **IRINJALAKUDA**

Date: **15-07-2020**

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CERTIFICATE

Certified that the dissertation entitled "STUDY OF VISIBLE LIGHT PHOTOCATALYTIC ACTIVITY OF ZINC FERRITE DOPED TITANIA NANOCOMPOSITE ON METHYLENE BLUE DYE DEGRADATION " is an authentic record of work carried out by Ms. Ancilyn Antu K under the guidance of Dr. Manoj A. Lazar, Assistant Professor, Department of Chemistry, St. Joseph's College, Irinjalakuda and Ms. Tessy Jose, Assistant Professor on contract, Department of Chemistry, Carmel College, Mala in partial fulfillment for the award of the degree of Master of Science in Chemistry during the academic year 2018-2020.

Place: HALA

Date: 15-07-2020



Princy K.G
Dr. Princy K.G,

Head, Department of Chemistry

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DEPARTMENT OF CHEMISTRY

**SCREENING OF AMINO FUNCTIONALIZED LAKE BOTTOM CLAY
CATALYST FOR THE SOLVENT FREE SELF CONDENSATION OF
PENTANAL**

A dissertation submitted to **University of Calicut**
in partial fulfilment of the requirement for the award of the degree of

**MASTER OF SCIENCE IN
CHEMISTRY**

Submitted by

ANILA BASTIAN K

REG.NO. CRASMCH003

1. *D.V.T. Joy Em*

2. *Dr. Tom Chiriac*

3. *Dr. Bibitha Joseph*



**PG DEPARTMENT OF CHEMISTRY
CARMEL COLLEGE , MALA, THRISSUR**

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Date: 15-07-2020

DEPARTMENT OF CHEMISTRY
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IRINJALAKUDA



CERTIFICATE

This is to certify that the dissertation entitled " SCREENING OF AMINO FUNCTIONALIZED LAKE BOTTOM CLAY CATALYST FOR THE SOLVENT FREE SELF CONDENSATION OF PENTANAL" is a record of original work done by ANILA BASTIANK , REG NO:CRASMCH003:, in the partial fulfillment of the requirement for the award of the degree of master of chemistry from Calicut University during the academic year 2018-2020, under the guidance of Dr.MANOJ A. L., Assistant professor, Department of Chemistry, ST JOSEPH'S COLLEGE ,IRINJALAKUDA. This was carried out under my guidance and supervision and that has not been included in any other project submitted for the award of any other degree or diploma .

Dr. DEENA ANTONY C.

Head of Department of Chemistry
St. Joseph's College (autonomous)
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DECLARATION



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Place: MALA

Date: 15-01-2020

CERTIFICATE

This is to certify that the dissertation entitled “ **SCREENING OF AMINO FUNCTIONALIZED LAKE BOTTOM CLAY CATALYST FOR THE SOLVENT FREE SELF CONDENSATION OF PENTANAL**” is an authentic record of work carried out by **Ms. ANILA BASTIAN K** under the guidance of **Dr. MANOJ A.L**, Assistant professor, department of chemistry, St. Joseph’s College(autonomous), Irinjalakuda in partial fulfilment for the award of the degree of Master of Science in Chemistry during the academic year 2018 – 2020.

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Date : 15/01/2020



Princy K-G

Dr. Princy K.G

Head Department of Chemistry,

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“DEVELOPMENT OF ANODE ELECTROCATALYSTS FOR HYDRAZINE FUEL CELL”

CHRIST COLLEGE
TRINJALAKUDA

A Dissertation submitted to University of Calicut
in partial fulfillment of the requirement for the degree of
MASTER OF SCIENCE

IN
CHEMISTRY

Submitted by

ARATHY CHANDRASENAN

(CRASMCH004)

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1. *Dr. V.T. Joy*
2. *Dr. Tom Cheria*
3. *Dr. Bibitba Joseph*

This is to certify that the work entitled, "DEVELOPMENT OF ANODE ELECTROCATALYSTS FOR HYDRAZINE FUEL CELL" submitted to Faculty of Science, University of Calicut in partial fulfillment of the requirements for the award of Master of Science in Chemistry is authentic record of work carried out by Arathy Chandrasenan at Christ College, Irinjalakuda by Arathy Chandrasenan and was supervised and guided by Dr. Joy V.T.



Place: MALA
Date: 15-07-2020

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Department of Chemistry
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CHRIST COLLEGE
IRINJALAKUDA



CERTIFICATE

This is to certify that the work entitled, **“DEVELOPMENT OF ANODE ELECROCATALYSTS FOR HYDRAZINE FUEL CELL”** submitted to Faculty of Science, University of Calicut in partial fulfillment of the requirement for the award of Master of Science in Chemistry is authentic record of work carried out at Christ College, Irinjalakuda by **Arathy chandrasenan** and was supervised and guided by **Dr. Joy V.T**, Head of Department of Chemistry, Christ Irinjalakuda.

Place: MALA

Date: 15-07-2020

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Certified that the dissertation entitled "DEVELOPMENT OF ANODE ELECTROCATALYSTS FOR HYDRAZINE FUEL CELL" is an authentic record of work carried out by ARATHY CHANDRASENAN under the guidance of Dr. JOY V.T, Head of Department of Chemistry, Christ College Irinjalakuda in partial fulfillment for the award of the degree of Master of Science in Chemistry during the academic year 2018-2020.

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Princy K.G.R

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**FAST AMINATION OF AMINOPHENOL AND ITS
DERIVATIVES TO AMIDINE ADDUCTS FOR SUBSTITUTED
BENZOXAZOLE SYNTHESIS.**

A dissertation submitted to the University of Calicut in partial fulfillment of the
requirement for the award of degree of
MASTER OF SCIENCE

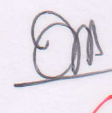
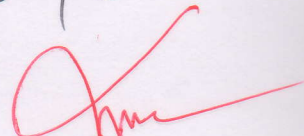

In
CHEMISTRY


Submitted By
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This is to certify that the dissertation entitled "FAST AMINATION OF AMINOPHENOL AND ITS DERIVATIVES TO AMIDINE ADDUCTS FOR SUBSTITUTED BENZOXAZOLE SYNTHESIS" is a record of original work done by Ms. Arya Rajeev (CRASMCH005); in the partial fulfillment of the requirement for the award of degree of Master of Science in Chemistry under the guidance of Dr. Manoj A.L, Department of Chemistry, St. Joseph's college, Irinjalakuda. It is further certified that this dissertation or any part of this thesis has not been submitted elsewhere for any other degree.

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CERTIFICATE

This is to certify that the dissertation entitled "FAST AMINATION OF AMINOPHENOL AND ITS DERIVATIVES TO AMIDINE ADDUCTS FOR SUBSTITUTED BENZOXAZOLE SYNTHESIS" is an authentic record of project work carried out by Ms. Arya Rajeev under the guidance of Dr. Manoj A.L., Assistant professor, Department of Chemistry, St. Joseph's College, Irinjalakuda in partial fulfillment for the award of the degree of Master of Science in Chemistry during the academic year 2018-2020.

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Princy K.G.

DR. PRINCY K.G

HEAD, DEPARTMENT OF CHEMISTRY

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**PhI(OAc)₂ mediated fast cyclisation of amidine
adducts for substituted benzoxazole synthesis**

**A dissertation submitted to university of Calicut
in partial fulfillment of the requirement for the award of degree of
MASTER OF SCIENCE**

**In
CHEMISTRY**

Submitted by

**GEETHUKRISHNAN
(CRASMCH006)**



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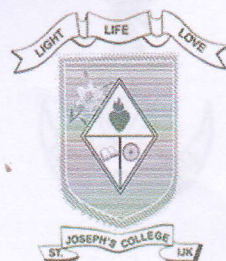
1. Dr. V.T. JOY
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This is to certify that the dissertation entitled "**PhI(OAc)₂ mediated fast cyclisation of amidine adducts for substituted benzoxazole synthesis**" is a record of original work done by, **GEETHUKRISHNAN** REG NO - **CRAMSMCH006**., in the partial fulfillment of the requirement for the award of degree of **MASTER OF CHEMISTRY** under the guidance of **Dr. MANOJ A L**, Assistant professor, Department of Chemistry, St. Joseph's college, Irinjalakuda. It is further certified that this dissertation or any part of this thesis has not been submitted elsewhere for any other degree.

Deena Antony. C

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Dr. Deena Antony. C
Associate Professor & Head
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Certified that the dissertation entitled "**PhI(OAc)₂ mediated fast cyclisation of amidine adducts for substituted benzoxazole synthesis**" is an authentic record of work carried out by Ms. GEETHUKRISHNAN under the guidance of Dr. MANOJ AL, Assistant professor, Department of chemistry, St. Joseph's college, Irinjalakuda in partial fulfillment for the award of the degree of Master Of Science in chemistry during the academic year 2018-2020.

Place: ~~Mala~~ ~~Malappuram~~

Date: 15-07-2020



Princy K.G
Dr. Princy K.G

Head of department of chemistry

Carmel college, Mala

**"ELECTROCHEMICAL PROPERTIES OF COMBUSTION SYNTHESIZED
MgMn₂O₄"**

A dissertation submitted to University of Calicut

In partial fulfillment of the requirement for the award of degree of

MASTER OF SCIENCE

In

CHEMISTRY

Submitted by

JESNA MARY GEORGE

CRAMSCH007



PG DEPARTMENT OF CHEMISTRY

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3. Dr. Bibitba Joseph

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CARMEL COLLEGE, MALA, THRISSUR

Certificate



This is to certify that this thesis entitled ““**ELETROCHEMICAL PROPERTIES OF COMBUSTION SYNTHESIZED $MgMn_2 O_4$** ” submitted towards the partial fulfillment for the award of degree of Master of Science in Chemistry at Carmel College, Mala represents original research carried out by JESNA MARY GEORGE, of under the supervision of Dr. JIBIN A K (Christ College, Irinjalakuda) during the academic year 2018-2020.

Jesna M. G.

Student

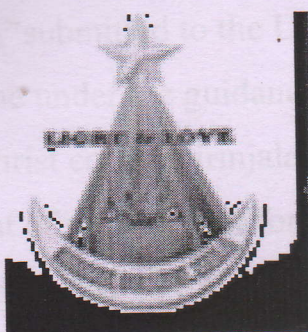
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Jibin A K

Supervisor

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CERTIFICATE



Certified that the dissertation entitled “ELETROCHEMICAL PROPERTIES OF COMBUSTION SYNTHESIZED $MgMn_2O_4$ ” is an authentic record of work carried out by **JESNA MARY GEORGE** under the guidance of Dr. JIBIN A.K (Christ college , irinjalakuda) in partial fulfillment for the award of the degree of Master of Science in Chemistry during the academic year 2018 – 2020.

Place: MALA

Date: 15/7/2020



Princy K. G

Dr. Princy K.G,

Head, Department of Chemistry,

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**“DEVELOPMENT OF ANODE ELECTROCATALYSTS
FOR SODIUM
BOROHYDRIDE FUEL CELL”**

**A Dissertation submitted to University of Calicut
in partial fulfillment of the requirement for the Degree of
MASTER OF SCIENCE**

**IN
CHEMISTRY**

**Submitted by
KRIPA MARIYA JOHNSON
(CRASMCH008)**

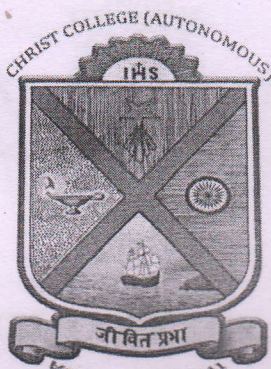
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DEPARTMENT OF CHEMISTRY
CHRIST COLLEGE
IRINJALAKUDA



CERTIFICATE

This is to certify that the work entitled, "DEVELOPMENT OF ANODE ELECTROCATALYSTS FOR SODIUM BOROHYDRIDE FUEL CELL" submitted to Faculty of Science, University of Calicut in partial fulfillment of the requirement for the award of Master of Science in Chemistry is authentic record of work carried out at Christ College, Irinjalakuda by **Kripa Mariya Johnson** and was supervised and guided by **Dr. Joy V.T.**, Head of Department of Chemistry, Christ Irinjalakuda.

Place: *Irinjalakuda*

Date: *15-07-2020*

Dr. V.T. JOY
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Dr. Joy V. T

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Department of Chemistry
Christ College Irinjalakuda



CARMEL COLLEGE, MALA

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Certified that the dissertation entitled "DEVELOPMENT OF ANODE ELECTROCATALYSTS FOR SODIUM BOROHYDRIDE FUEL CELL" is an authentic record of work carried out by **KRIPA MARIYA JOHNSON** under the guidance of **Dr. JOY V.T, Christ College Irinjalakuda** in partial fulfillment for the award of the Degree of Master of Science in Chemistry during the academic year 2018-2020.

Place: MALA

Date: 15-07-2020



Princy K.G.

Dr. Princy K.G,

Head of Department of Chemistry,

Carmel College, Mala.

DEPARTMENT OF CHEMISTRY
**ELECTRO CHEMICAL PROPERTIES OF SOL GEL
SYNTHESIZED LiMn_2O_4**
IRINJALAKUDA

A dissertation submitted to University of Calicut
in partial fulfillment of the requirement for the award of degree of

MASTER OF SCIENCE

in

CHEMISTRY

Submitted by
LISMY LOUIS
(CRASMCH009)

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2. Dr. John Chiriac
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3. Dr. Bibitha Joseph
[Signature]



Forwarded by

Dr. V.T. JOY

Head of department of

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Christ college Irinjalakuda

CARMEL COLLEGE,

Place

MALA, THRISSUR

Date

2018 - 2020

DEPARTMENT OF CHEMISTRY

CHRIST COLLEGE

IRINJALAKUDA



CERTIFICATE

This is to certify that the dissertation entitled **“ELECTRO CHEMICAL PROPERTIES OF SOL GEL SYNTHESIZED LiMn_2O_4 ”** is a record of original work done by **LISMY LOUIS**, Reg no: **CRASMCH009**, in the partial fulfillment of the requirement for the award of degree of **MASTER OF CHEMISTRY** under the guidance of **Dr.JIBIN A.K Assistant Professor, Department of Chemistry, Christ college irinjalakuda**. It is further certified that this dissertation or any part of this thesis has not been submitted elsewhere for any other degree.

Forwarded by

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Head of department of chemistry

Christ college irinjalakuda

Place:

Date:

Project guide

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Assistant professor

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Place: Mala

Date: 15/7/2020

CERTIFICATE

Certified that the dissertation entitled "ELECTRO CHEMICAL PROPERTIES OF SOL GEL SYNTHESIZED LiMn_2O_4 " is an authentic record of work carried out by Ms. LISMY LOUIS under the guidance of Dr. JIBIN A.K, Assistant professor, department of chemistry, Christ College Irinjalakuda in partial fulfillment for the award of the degree of Master of Science in Chemistry during the academic year 2018 – 2020.

Place: Mala

Date : 15/7/2020



Princy K-G
Dr. Princy K.G

Head, Department of Chemistry,
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**CHARACTERIZATION OF $\text{TiO}_2 - \text{ZnFe}_2\text{O}_4$
NANO COMPOSITE**

A dissertation submitted to University of Calicut
in partial fulfillment of the requirement for the award of degree of

MASTER OF SCIENCE

In

CHEMISTRY

Submitted by SIJA P.C

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1. Dr. V. T. Joy
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2. Dr. Tom Chiruvu
3. Dr. Bibitha Joseph
Bibitha

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ST. JOSEPH'S COLLEGE,

IRINJALAKKUDA



CERTIFICATE

This is to certify that the dissertation entitled "**CHARACTERIZATION OF $\text{TiO}_2 - \text{ZnFe}_2\text{O}_4$ NANO COMPOSITE**" is a record of original work done by, **SIJA P.C** REG NO: **CRASMCH010**, in the partial fulfillment of the requirement for the award of degree of **MASTER OF CHEMISTRY** under the guidance of **Dr. MANOJ A LAZAR**, Assistant professor, Department of Chemistry, St. Joseph's College, Irinjakkuda and **Ms. TESSY JOSE** Assistant Professor on contract, department of chemistry Carmel College Mala. It is further certified that this dissertation or any part of this thesis has not been submitted elsewhere for any other degree.

Deena Antony. C

Dr. Deena Antony. C
Associate Professor & Head
Research & PG Dept. of Chemistry
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Manoj A Lazar

Dr. MANOJ A LAZAR
Assistant professor
Department of Chemistry
St. Joseph's College
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Tessy Jose

Ms. TESSY JOSE
Assistant Professor on contract
Department of Chemistry
Carmel College, Mala

Place: IRINJALAKKUDA

Date: 15/7/2020



CARMEL COLLEGE, MALA

(Nationally Re – accredited with A grade)

Affiliated to University of Calicut

Mala – 680732

CERTIFICATE

Certified that the dissertation entitled “**CHARACTERIZATION OF $TiO_2-ZnFe_2O_4$ NANO COMPOSITE**” is an authentic record of work done carried out by **Ms. SIJA P.C** under the guidance of **Dr. MANOJ A LAZAR**, Assistant Professor, department of Chemistry, St. Joseph’s College Irinjalakkuda and **Ms. TESSY JOSE** Assistant Professor on contract, department of chemistry Carmel College Mala in partial fulfillment for the award of the degree of Master of Science in Chemistry during the academic year 2018 – 2020.

Place : **MALA**

Date : **15/7/2020**



Princy K.G

Dr. Princy K.G

Head Department of Chemistry

Carmel College, Mala