Dedicated to...

My parents and family...

Declaration of Academic Integrity

"I declare that this written submission represents my ideas in my own words and where other's ideas or words have been included, I have adequately cited and referenced the original sources. I also declare that I have adhered to all principles of academic honesty and integrity and have not misrepresented or fabricated or falsified any idea/data/fact/source in my submission. I understand that any violation of the above will be cause for disciplinary action as per the rules and regulations of the Institute."

Sincerely,

Date:

Place: Tezpur University

Priyankamoni Saikia
(TZ203816 of 2021)

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(A Central University established by an Act of Parliament)

CERTIFICATE FROM SUPERVISOR

This is to certify that the thesis entitled "***Study of the Sensing and Photocatalytic Potentials of Some Perovskite-Based Materials***" submitted to the School of Sciences, Tezpur University in partial fulfillment for the award of the degree of Doctor of Philosophy in Chemical Sciences is a record of research work carried out by **Ms. Priyankamoni Saikia** under my supervision and guidance. She has been duly registered (Registration No. TZ203816 of 2021), and the thesis presented is worthy of being considered for Ph.D. Degree.

All help received by her from various sources have been duly acknowledged. No part of this thesis has been submitted elsewhere for award of any other degree.

Date: (**Prof. Swapan Kumar Dolui**)

Place: Tezpur University Supervisor

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CERTIFICATE FROM CO-SUPERVISOR

This is to certify that the thesis entitled "***Study of the Sensing and Photocatalytic Potentials of Some Perovskite-Based Materials***" submitted to the School of Sciences, Tezpur University in partial fulfillment for the award of the degree of Doctor of Philosophy in Chemical Sciences is a record of research work carried out by **Ms. Priyankamoni Saikia** under my supervision and guidance. She has been duly registered (Registration No. TZ203816 of 2021), and the thesis presented is worthy of being considered for Ph.D. Degree.

All help received by her from various sources have been duly acknowledged. No part of this thesis has been submitted elsewhere for award of any other degree.

Date: (**Dr. Sanjeev Pran Mahanta**)

Place: Tezpur University Co-Supervisor

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CERTIFICATE OF THE EXTERNAL EXAMINER AND ODEC

This is to certify that the thesis entitled "***Study of the Sensing and Photocatalytic Potentials of Some Perovskite-Based Materials***" submitted by **Ms. Priyankamoni Saikia** to the School of Sciences, Tezpur University in partial fulfillment of the award of the degree of Doctor of Philosophy in the Department of Chemical Sciences has been examined by us on _____ and found to be satisfactory.

The committee recommends for the award of the degree of Doctor of Philosophy.

Supervisor	**Co-Supervisor**	(**External Examiner**)
Name:	Name:	Name:
Date:	Date:	Date:

Acknowledgement

The PhD journey is a journey of patience, hard-work, consistency, and faith. I am thankful to everyone for their endeavored support and encouragement throughout this voyage. Without their support the journey couldn't be accomplished.

At first, I would like to convey my respect and gratitude to my esteemed Supervisor; Prof. Swapan Kumar Dolui for his constant efforts, supervision, guidance, endless patience, and also his efforts to give me the opportuning to work under his guidance. Thank you, sir, for all you have done for me. I will be ever grateful to you forever in my future life. I will be indebted your all-inspiring guidance.

I will be forever grateful to my Co-supervisor; Dr. Sajeev Pran Mahanta for his constant support, guidance, and encouragement throughout my PhD tenure. I would like to thank for all his supportive efforts in my research problems. Without his support and inspirations my Ph.D journey would not have been possible.

I remain thankful to my doctoral committee members, Dr. Sadhan Mahapatra and Dr. Dambarudhar Mohanta for their support and suggestions.

I take this opportunity to thank the Department of Chemical Sciences and Head of the Department of Chemical Sciences, Prof. Ruli Borah (previous) and Prof. Panchanan Puzari (current) for providing access to all the available departmental facilities in my research work.

My special gratitude towards Dr. Sashi Dhar Baruah, and Dr. Abhijit Dan for their research contributions in my early period of research career, because of which I inspired to take decision for doing research.

I would like to deeply acknowledge to Tezpur University for providing (Research & Innovation Grant) & Institutional fellowship for the financial assistance.

Sincere acknowledgment to our Collaborators; Dr. Neelotpal Sen Sarma (IASST) and Prof. Patit Paban Kundu (IIT-Roorkee) for their valuable helps in my research work.

My sincere thanks to all the non-teaching staff of the Department of Chemical Sciences and staff of SAIC, Tezpur University for their help throughout this journey: Mrs. Babita Das, Mr. Khagen Das, Mrs. Pranati Boro, Dr. Dhrubajyoti Talukdar, Dr. Raju Kr. Borah, Mr. Biplob Ozah, Mr. Sankur Phukan, Dr. Biraj Jyoti Borah, Dr. Nipu Dutta, Mr. Manoranjan Sarma Dr. Ratan Baruah, Mr. Tridip Ranjan Nath, Mr. Prakash Kurmi, and Mr. Palash Dutta. I also want to acknowledge all the cleaning staff of the department for maintaining a healthy environment.

My special acknowledgement to past and present lab-members: Dr. Kiranjyoti Mohan, Dr. Anindita Bora, Dr. Junali Handique, Dr. Jayashree Nath, Dr, Simanta Doley, Shahnaz Ahmed, Suman Lahkar, Asfi Ahmed, Sultana Parveen Ahmed, and Kankana Baruah for their help and support in my research work. My sincere thanks to the labmates from Mahanta Sir's Group Dr. Rituraj Das, Sudhangshu Priya Bharati, Bikash Ch. Mushahary, Debajit Bora, and Chayanika Goswami for their help in my research work. I am also grateful to M.Sc. project student Sika Teronpi who worked with for her MSc. project.

Thankful to my friends and juniors: Dr. Raktim Abha Saikia, Dr. Deepsikha Gogoi, Dr. Silpisikha Goswami, Dr. Gitashree Gogoi, Dr. Geeti Kaberi Dutta, Dr. Rakhee Saikia, Dr. Hemanga Jyoti Sarmah, Priyanka Saikia, Julie Baruah, Dikshita Sharma, Sudhamoyee Kataky, Debabrat Pathak, Dipika Konwar, Raju Chouhan, Nayab Hussain, Mahendra Tahu, Arzu Almin, Dibyashree Dolakasharia, Manash Jyoti Kalita and Ankita Rakshit for their help, affection, and respect towards me.

Special acknowledgement to Bhargav Das for helping me in characterization.

I am grateful to Mrs. Sutapa Dolui for her motivation, caring during those years.

I am also thankful to Mrs. Palakshi Borah for her love and caring.

Hearty thankful to all the members of Pobitora Women's Hostel for providing me a homely environment to stay in the campus.

I want to acknowledge the authorities of Tezpur University for granting me the permission to do my research-work.

Finally thankful, to my parents and family members for their love and caring. I am always grateful to my parents as they always inspire me and allow me to give footsteps towards my own goal.

Thank You Everyone

Priyankamoni Saikia

Abbreviations and Symbols

t	Tolerance factor
LCD	Liquid Crystal Display
K	Kelvin (temperature unit)
PMMA	Poly Methyl Methacrylate
MHP	Metal Halide Perovskite
FWHM	Full width at half maximum
nm	Nanometer
DMF	*N*,*N*–dimethylformamide
DMSO	Dimethyl sulfoxide
%	Percentage
FTO	Fluorine-doped Tin Oxide
ETL	Electron Transport Layer
HTL	Hole Transport Layer
cd A^{-1}	Candela Ampere (Current efficiency unit)
PeLED	Perovskite-based light-emitting diodes
TPBi	2,2',2''-(1,3,5-Benzinetriyl)-tris(1-phenyl-1*H*-benzimidazole)
°C	degree Centigrade
FRET	Forster resonance energy transfer
PET	Photoinduced electron transfer
UV	Ultraviolet
MIP	molecularly imprinted polymer
Å	Angstrom unit
RhB	Rhodamine blue
PL	Photoluminescence
Vis	Visible
ASV	anodic stripping voltammetry
µM	micromolar
cm	centimeter
hv	Energy input from light
e^-	electron
h^+	hole
eV	Electron volt

MBT	mercapto-benzothiazole
g	gram
µmol	micromole
UA	Uric Acid
ppm	parts per million
AA	Ascorbic Acid
MOF	Metal organic framework
mL	millilitre
FT-IR	Fourier Transformed Infra-Red
µL	microliter
XRD	X-ray diffraction
EDX	Energy Dispersive X-ray
h	hour(s)
XPS	X-ray Photoelectron Spectroscopy
FE-SEM	Field emission scanning electron microscopy
TEM	Transmission Electron Microscopy
SAED	selected area diffraction pattern
IR	Infra-Red
PLQY	Photoluminescence quantum yield
K_{sv}	Stern-Volmer constant
ppb	parts per-billion
ICT	Intermolecular Charge Transfer
ns	nanosecond
WHO	World Health Organization
M	Molarilty
mmol	milli mole(s)
MHz	Mega-Hertz
Me	methyl
m	multiplet
mg	milli gram(s)
CTAB	Cetyl Trimethyl Ammonium Bromide
mL	milli litre(s)
SDBS	Sodium Dodecyl Benzene Sulfonate
TX-100	Triton X-100
THF	Tetrahydrofuran
PNCs	perovskite nanocrystals

OA	Oleic Acid
TRPL	Time-resolved Photoluminescence
CCTO	Calcium Copper Titanate
PTC	*p*-thiocresol
λ	wavelength
C	Concentration
A	Absorbance
BQ	Benzoquinone
OH·	hydroxyl radical
$O_2^{\cdot-}$	superoxide
UV-Vis	Ultraviolet-Visible
w.r.t	with respect to

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