

***Dedicated to...***

***My parents and teachers...***

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Sincerely,

*Raktim Abha Saikia*

*13/03/23*

**Date:** 13-03-2023

**Place:** Tezpur University

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(TZ200316 of 2019)



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### CERTIFICATE FROM SUPERVISOR

This is to certify that the thesis entitled "*Exploration of Diaryliodonium Salts for N- and S-Arylations of Biologically Significant Heterocyclic Scaffolds*" 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 **Mr. Raktim Abha Saikia** under my supervision and guidance. He has been duly registered (Registration No. TZ200316 of 2019), and the thesis presented is worthy of being considered for Ph.D. Degree.

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

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**REPORT OF EXAMINERS OF ORAL DEFENCE EVALUATION COMMITTEE**

The examiners of Oral Defense Evaluation Committee (ODEC) certify that the thesis entitled, "Exploration of Diaryliodonium Salts for N- and S- Arylations of Biologically Significant Heterocyclic Scaffolds" submitted by Mr. Raktim Abha Saikia to the Tezpur University in partial fulfillment of requirement of the Ph.D. degree in the discipline of Chemistry under the school of Sciences has been examined on 24-03-2023 and recommend that:

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## **Acknowledgement**

*The journey of PhD is always a difficult one, I am very thankful to all for their help and love during the research work and during the making of this thesis. I would like to express my sincere gratitude to the following people, without their contribution this difficult journey wouldn't be possible:*

*At first, I sincerely acknowledge to my Supervisor; Dr. Ashim Jyoti Thakur for his constant supervision, guidance, and support throughout this research work. His suggestions and inputs during the scientific discussion always help me to improve the quality of my work. I would like to thank him for accepting me as a PhD student in his group.*

*I would like 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 us with easy access to departmental facilities.*

*I would like to deeply acknowledge to Council for Scientific and Industrial Research (CSIR) for the fellowship and Tezpur University (Research & Innovation Grant) for the financial support.*

*I am very thankful to my Doctoral Committee member and sincerely acknowledged; Dr. Utpal Bora, Associated Professor and Dr. Bipul Sarma, Assistant Professor, Department of Chemical Sciences, Tezpur University for their support and valuable suggestions.*

*I would like to acknowledge Dr. Krishna P. Kaliappan, Professor, Department of Chemistry, Indian Institute of Technology, Bombay (IIT-Bombay) and his research group for all support during the early period of my PhD. I am also thankful to Department of Chemistry, IIT-Bombay for allowing me to complete the PhD coursework.*

*Sincere acknowledgment to our Collaborators; Prof. Ramesh Chandra Deka, Professor, Department of Chemical Sciences, Tezpur University and Dr. Bipul Sarma, Assistant Professor, Department of Chemical Sciences, Tezpur University for their valuable contributions in my research work.*

*I am thankful to the non-teaching staff of the Department of Chemical Sciences and staff of SAIC, Tezpur University for their held during these years: Mrs. Babita Das, Mr. Khagen Das, Mrs. Pranati Boro, Dr. Dhruvajyoti Talukdar, Dr. Raju Kr. Borah, Mr. Biplob Ozah, Mr. Sankur Phukan, Dr. Biraj Jyoti Borah, Dr. Nipu Dutta, Mr. Tridip Ranjan Nath and Mr. Manoranjan Sarma. All the cleaning staff of the department is deeply acknowledged for their needful service.*

*My special gratitude to past and present lab-members: Dr. Abhijit Mahanta, Dr. Shivane Borpatra Gohain, Anurag Dutta, Rakhee Saikia and Sudhamoyee Katakya for their help in research work. I am so lucky to have them as labmates and for their love, friendship, and kindness. I am also grateful to the past project students who worked with me: Dhiraj Barman, Snata Deka, Rounak Basu, Nitumoni Hazarika and Khanindra Talukdar for their contribution in my research work.*

*I am thankful to my senior research scholars in the department: Dr. Dhruvajyoti Talukdar, Dr. Kaushik Talukdar, Dr. Rajiv Khatioada, Dr. Basanta Saikia, Dr. Manoj Mondal, Dr. Porag Bora, Dr. Khairujaman Laskar, Dr. Sudarsan Gogoi, Dr. Rajarshi Bayan, Dr. Rituraj Das, Dr. Prasurya Pratim Mudoj, Dr. Kasturi Sarmah, Dr. Manali Dutta, Dr. Aditi Saikia, Dr. Mukesh Sharma, Dr. Plaban Jyoti Sarma, Dr. Chiranjita Goswami, Julie Borah and Bhugendra Chutia for their advice and supervision.*

*Gratitude to my friends and juniors: Dr. Anup Choudhury, Priyankamoni Saikia, Arup Jyoti Das, Sangita Kalita, Debabrat Pathak, Dipika Konwar, Nishant Biswakarma, Debanga Bhusan Bora, Prantika Bhattacharjee, Bijoy Ghosh, Sudakhina Saikia, Asfi Ahmed, Himangshu Sharma, Debasish Sarmah, Manash Jyoti Baruah, Raju Chouhan, Bikash Kumar Kalita, Sameeran Morang, Ashok Bora, Mahendra Tahu, Nobomi Borah, Annesha Kar, Rashmi Chetry, Arzu Almin and Dibyashree Dolakasharia for their help, respect, and love.*

*Special acknowledgement to some people outside the university: Dr. Suresh Rajamanickam, Dr. Hemen Gogoi, Krishna Puri, Nikita Chakraborty, Diraj Barman, Dhruvajyoti Talukdar and Nitumoni Hazarika for their scientific inputs in my research work.*

*Special thanks to Rashmi Ma'am for her motivation and caring during these years.*

*Last but not the least, to my parents and family members for love and caring. Their support is always with me, and I am grateful to them as they allow me to follow my own path.*

**Thank You All**

*Raktim Abha Saikia*

## Abbreviations and Symbols

%	percentage
$\delta$	Chemical shift
$J$	Coupling constant
$\mu\text{w}$	microwave
Å	Angstrom
Ar	Aryl
Ac	Acetyl
ACN	Acetonitrile
An	Anisyl
atm.	Atmosphere (pressure unit)
Aux	Auxiliary
BHT	Butylated hydroxytoluene
BINAP	(2,2'-bis(diphenylphosphino)-1,1'-binaphthyl
bmim	1-Butyl-3-methylimidazolium
br	broad
bs	broad singlet
°C	degree Centigrade
CAN	Ceric Ammonium Nitrate
CCDC	Cambridge Crystallographic Data Centre
calcd	calculated
DPE	1,1-diphenylethylene
DIS	Diaryliodonium salt
DABCO	1,4-Diazabicyclo[2.2.2]octane
DBU	1,8-Diazabicyclo[5.4.0]undec-7-ene
DMAc	<i>N,N'</i> -dimethylacetamide
DIPEA	<i>N,N</i> -diisopropylethylamine
DMAP	<i>N,N'</i> -dimethylpyridin-4-amine
DMSO	Dimethylsulfoxide
DMF	<i>N,N</i> -dimethylformamide
DCE	Dichloroethane
DCM	Dichloromethane
dtbpy	2,6-di- <i>tert</i> -butylpyridine
E	Electrophile

ED	Electron-donating
EW	Electron-withdrawing
EDG	Electron donating group
EWG	Electron withdrawing group
Equiv.	Equivalent(s)
ESI-MS	Electron Spray Ionization-Mass Spectrometry
ESI-TOF	Electron Spray Ionization-Time of Flight
FT-IR	Fourier Transformed Infra-Red
FA	Fenamic acid
g	gram
HRMS	High Resolution Mass Spectrometry
h	hour(s)
$h\nu$	Energy input from light
Hg	Atomic symbol of Mercury
HOMO	Highest Occupied Molecular Orbital
HFIP	Hexafluoro-2-isopropanol
IR	Infra-Red
IM	Intermediate(s)
IA	Isatoic anhydride(s)
K	Kelvin (temperature unit)
LUMO	Lowest Unoccupied Molecular Orbital
Mes	Mesityl
$M^n$	Metal centre with oxidation state of "n"
M	Molarity
mmol	milli mole(s)
MHz	Mega-Hertz
Me	methyl
m	multiplet
mg	milli gram(s)
MS	molecular sieves
mL	milli litre(s)
$m/z$	Atomic mass units per unit charge
2-MP	2-mercaptopyridine
MeCN	Acetonitrile
Nu or Nu-H	Nucleophile(s)
NMR	Nuclear Magnetic Resonance



OTf	Triflate (trifluoromethanesulfonate) anion
OTs	<i>p</i> -Toluenesulfonate anion
ppm	parts per million
rt	Room temperature
THF	Tetrahydrofuran
TCT	2,4,6-trichloro-1,3,5-triazine
Tz	Tetrazole
TS	Transition-state(s)
TEA	triethylamine
TFE	2,2,2-trifluoroethanol
TMG	Tetramethylguanidine
TMB-H	1,3,5-trimethoxybenzene
TMP	2,4,6-trimethoxyphenyl
TBME	Tert-butyl methyl ether
TLC	Thin Layer Chromatography
TFA	Trifluoroacetate anion
TFA-H	Trifluoroacetic acid
TEMPO	(2,2,6,6-tetramethylpiperidin-1-yl)oxyl
TMEDA	Tetramethylethylenediammine
UV-Vis	Ultra violet-visible
w.r.t	with respect to

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