Dedicated To My Loving Parents...

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It is certified that the work contained in the thesis titled **"Development of new synthetic routes for the preparation of *N*-aryl, acyl and phosphoryl sulfoximines"** by **Mr. Siddharth Baranwal** has been carried out under my supervision and this work has not been submitted elsewhere for a degree.

It is further certified that the student has fulfilled all the requirements of Comprehensive Examination, Candidacy and SOTA for the award of Ph.D. Degree.

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(*Dr. Jeyakumar Kandasamy*)
(Department of Chemistry)

DECLARATION BY THE CANDIDATE

I, ***Mr. Siddharth Baranwal***, certify that the work embodied in this thesis is my own bonafide work and carried out by me under the supervision of "***Dr. Jeyakumar Kandasamy"*** from "***July-2017*** to ***August-2021***," at the ***Department of Chemistry***, ***Indian Institute of Technology (BHU), Varanasi***. The matter embodied in this thesis has not been submitted for the award of any other degree/diploma. I declare that I have faithfully acknowledged and given credits to the research workers wherever their works have been cited in my work in this thesis. I further declare that I have not willfully copied any other's work, paragraphs, text, data, results, etc., reported in journals, books, magazines, reports dissertations, theses, etc., or available at websites and have not included them in this thesis and have not cited as my own work.

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Department of Chemistry,

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Date:

(*Mr. Siddharth Baranwal*)

LIST OF CONTENTS

LIST OF SCHEMES

LIST OF TABLES

LIST OF FIGURES

LIST OF NOTATION, SYMBOLS AND ABBREVIATIONS

Notations	Abbreviations
%	Percentage
<	Less than
>	More than
°	Degree
°C	Degree Celsius
©	Copyright
Å	Angstrom
1,10-Phen.	1, 10-phenanthroline
2,2-Bipy	2, 2-Bipyridine
Ac	Acetyl group
Ac_2O	Acetic anhydride
ACN	Acetonitrile
AIBN	Azobisisobutyronitrile
AcOH	Acetic acid
Aq.	Aqueous
atm.	Atmosphere
brs	Broad Singlet
Bn	Benzyl
Bz	Benzoyl group
Calc.	Calculated
calcd	Calculated
$CHCl_3$	Chloroform
cm	Centimeter
$CDCl_3$	Deuterated Chloroform
CD_3OD	Methanol-d_4
c	Concentration
cc	Column chromatography
CSA	Camphorsulfonic acid
D_2O	Deuterated water
DCE	1,2-Dichloroethane
DMAP	4-Dimethylaminopyridine
DMF	Dimethylformamide
DCM	Dichloromethane
d	Doublet
dd	Doublet of doublet

ddd	Doublet of doublet of doublet
ddt	Doublet of doublet of triplet
dq	dq
dt	Doublet of triplet
DNA	Deoxyribonucleic acid
DABCO	1,4-Diazabicyclo[2.2.2]octane
Dppe	1,2-Bis(diphenylphosphino)ethane
EDG	Electron donating group
EWG	Electron withdrawing group
equiv.	Equivalent
EtOH	Ethanol
EtOAc	Ethyl acetate
Et_3N	Triethylamine
ESI	Electrospray ionization
g	Gram; Gravitational force
GC-MS	Gas Chromatography Mass Spectrometry
h	Hour
HRMS	High Resolution Mass Spectrometry
HPLC	High-performance liquid chromatography
Hz	Hertz
HSQC	Heteronuclear single quantum coherence spectroscopy
i-Pr	*Iso*-propyl
IR	Infra Red
J	Coupling constant
KI	Potassium iodide
KOH	Potassium hydroxide
LG	Leaving group
lit.	Literature
m	Multiplet
m/z	Mass to charge ratio
MeOH	Methanol
mg	Milligram
MHz	Megahertz
min	Minute
mL	Milliliter
mm	Millimeter
mmol	Milli Mole
µm	Micrometer
m.p.	Melting Point
MOM	Methoxymethyl

MS	Molecular sieve
MeOD	Dutereted methanol
nm	Nanometer
NaCl	Sodium chloride
NMR	Nuclear Magnetic Resonance
n-BuLi	*n*-Butyllithium
NMP	N-Methyl-2-pyrrolidone
nr	Not reported
nd	Not determined
NBS	N-Bromosuccinimide
NIS	N-Iodosuccinimide
NCS	N-Chlorosuccinimide
NOESY	Nuclear Overhauser Effect Spectroscopy
Obser.	Observed
PDC	Pyridinium dichromate
PG	Protectin group
pH	Potential of hydrogen
ppm	Parts per million
Py	Pyridine
PTSA	*p*-Toluenesulfonic acid
Pd-C	Palladiun on carbon
Quant.	Quantitative
RT	Room Temperature
RNA	Ribonucleic acid
R*f*	Retardation Factor
s	Singlet
t-Bu	Tertiary butyl
TBN	*tert*-Butyl nitrite
THF	Tetrahydrofuran
TLC	Thin-Layer Chromatography
TMS	Tetramethylsilane
TMEDA	Tetramethylethylenediamine
TBAI	Tetran-n-Butyl Ammonium Iodide
TBAF	Tetran-n-Butyl Ammonium Fluoride
TBAB	Tetran-n-Butyl Ammonium Bromide
TBS	*tert*-Butyldimethylsilyl
TBDMS	*tert*-Butyldimethylsilyl
TBDPS	*tert*-Butyldiphenylsilyl
TEMPO	(2,2,6,6-Tetramethylpiperidin-1-yl)oxyl
TFA	Trifluoroacetic acid

TfOH	Trifluoromethanesulfonic acid
t	Triplet
TMSOTf	Trimethylsilyl trifluoromethanesulfonate
TsCl	4-Toluenesulfonyl chloride
UV	Ultraviolet
XRD	X-ray diffraction
α	Alpha
β	Beta
δ	Chemical shift
δ	Delta
[ox]	Oxidation
[α]	Specific rotation
i.e.	that is
o	Ortho
m	Meta
p	Para