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I, **Mrs. Sadaf Azeez**, 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-2016** to **Feb-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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LIST OF ABBREVIATIONS

Notations	Abbreviations
%	Percentage
<	Less than
>	More than
°	Degree
Å	Angstrom
Ac	Acetyl
Ac ₂ O	Acetic anhydride
AcOH	Acetic acid
Bn	Benzyl
Bz	Benzoyl group
Boc	Di- <i>tert</i> -butyl dicarbonate
brs	Broad singlet
Obser.	Observed
Calc.	Calculated
©	Copyright
CHCl ₃	Chloroform
CD ₃ OD	Methanol-d ₄
CDCl ₃	Deuterated chloroform
cm	Centimeter
<i>J</i>	Coupling constant
DMF	Dimethylformamide
DMSO-d ₆	Deuterated dimethyl sulfoxide
D ₂ O	Deuterated water
°C	Degree celsius
d	Doublet
DMAP	4-Dimethylaminopyridine
DCE	Dichloroethane
DCM	Dichloromethane
dd	Doublet of doublet
ddd	Doublet of doublet of doublet
ddt	Doublet of doublet of triplet
DMSO	Dimethyl sulfoxide
dq	Doublet of quartet

dt	Doublet of triplet
DBU	1,8-Diazabicyclo[5.4.0]undec-7-ene
DABCO	1,4-Diazabicyclo[2.2.2]octane
equiv.	Equivalent
EtOH	Ethanol
EtOAc	Ethyl acetate
Et ₃ N	Triethylamine
EDG	Electron donating group
EWG	Electron withdrawing group
equiv.	Equivalent
g	Gram; Gravitational force
GC-MS	Gas Chromatography Mass Spectrometry
h	Hour
HRMS	High Resolution Mass Spectrometry
HPLC	High-performance liquid chromatography
Hz	Hertz
IR	Infra Red
LDA	Lithium diisopropylamide
m	Multiplet
m/z	Mass to charge ratio
MeOH	Methanol
mg	Milligram
MHz	Megahertz
min	Minute
mL	Milliliter
mm	Millimeter
mmol	Millimole
μm	Micrometer
M.p.	Melting point
nm	Nanometer
NMR	Nuclear Magnetic Resonance
<i>n</i> -BuLi	<i>n</i> -Butyllithium
KOH	Potassium hydroxide
pH	Potential of hydrogen
ppm	Parts per million
RT	Room temperature
NaCl	Sodium chloride
s	Singlet
NMP	N-Methyl-2-pyrrolidone
<i>t</i> -Bu	Tertiary butyl

THF	Tetrahydrofuran
TLC	Thin-Layer Chromatography
TMS	Tetramethylsilane
CF ₃ COOH	Trifluoroacetic acid
UV	Ultraviolet
XRD	X-ray Diffraction
α	Alpha
β	Beta
γ	Gamma
δ	Chemical shift
[ox]	Oxidation
R _f	Refractive Index
i.e.	that is
<i>o</i>	Ortho
<i>m</i>	Meta
<i>p</i>	Para

GENERAL EXPERIMENTAL CONSIDERATIONS

All the reactions were carried out in oven dried glassware. Starting materials were prepared using modified literature procedures and modified procedures as described in the experimental sections. Solvents, Chemicals were purchased from commercial sources (Aldrich, Alfa Aesar, SD fine and Avra) and used without further purifications, unless otherwise stated. **Melting points** of products were measured Staurt SMP10 melting point apparatus using in open capillary tubes. **FT-IR** for the products were recorded on ALPHA BRUKER Eco-ATR fitted out on ZnSe ATR crystal in the range of 500-3000 cm^{-1} . **^1H NMR and ^{13}C NMR** spectra were recorded on Bruker Avance 500 MHz NMR spectrometer using deuterated solvents. Chemical shifts are given in ppm, using tetramethylsilane (TMS) as an internal standard. **Mass spectra (HRMS)** were measured on water's Quattro Micro V 4.1. Electronic absorption spectra were recorded on Shimadzu UV-2450 spectrophotometer. The **X-Ray crystallographic studies** were carried out on a Bruker Kappa APEXII diffractometer with $\text{Mo-K}\alpha$ radiation ($\lambda = 0.71073 \text{ \AA}$). Structure solution and refinement were performed with SHELX-97.

Thin layer chromatography (TLC) was performed using pre-coated plates obtained from E. Merck (TLC silica gel 60 F254). The TLC's were visualized in UV Chamber with 254 nm wavelength lamp and also in iodine chamber. **Column chromatography** was performed on silica gel (60-120 or 100-200 mesh) using different eluents. The details of other fine chemicals, reaction conditions, substrate preparation etc. are given in respective chapters.