

Abstract

Name of Research Scholar: **Mr. Arunava Misra**

Index no: **101/19/Chem./26**

Degree for which submitted: **Ph.D.**

Department: **Chemistry**

Name of the Research Guide: **Dr. Mohabul Alam Mondal**

Thesis Title: Synthesis of Aza heterocycles from various substituted aromatic amines and dialdehyde.

Objectives:

- Design and synthesis of *N*-heteroatom-based fluorophores for various applications in the field of optoelectronics and bio imaging.
- Explore the reactivity of 1,5-bisnucleophile (2-aminoacetophenone, *anthranilamide*) with *o*-Phthalaldehyde to construct biologically important aza-heterocycles.
- Investigate the scope of hydride transfer from 2,3-dihydroquinazolin-4(1*H*)-one to an electrophilic centre placed at the distal position within the same molecule.
- Explore the Lewis acidic property of Yttrium Nitrate to synthesize various functionalized aromatic aniline-based cyanoethylated products.

The thesis entitled above has been divided into three chapters as under:

Chapter 1: Transition Metal Catalyzed Annulative Coupling: Synthesis and Photophysical Properties of Isoindoloindolones

The first chapter describes a novel synthetic routes to access an array of 6*H*-isoindolo[2,1-*a*]indol-6-ones via one pot tandem cyclization of activated *o*-phthalaldehyde with 2-amino acetophenone involving well-documented Lewis acidic behaviour of FeCl₃ and their photophysical behaviour.

Chapter 2: Studies towards the Synthesis of 11*H*-benzo[*b*]fluoren-11-one from *o*-Phthalaldehyde

In the second chapter, we described a simple, economically viable method for synthesizing 11*H*-benzo[*b*]fluoren-11-one, a dual-state organic fluorophore, starting from *ortho*-phthalaldehyde (OPA) in different methyl transferring solvents (acetone, DMF, DMSO).

Chapter 3: Design, Synthesis, and Calf-Thymus DNA binding Studies of Highly Functionalized Quinazolinones

The third chapter of the thesis describes the one pot protocol for the synthesis of wide range of substituted quinazolinones via a three component coupling reactions 4-bromoanthranilimide, glutaraldehyde and various substituted aromatic primary amines in presence of Yttrium nitrate as a catalyst and we also examined the binding ability of one of the synthesized compound with ctDNA.

Chapter 4: Yttrium Nitrate Promoted Synthesis of Cyanoethyl Amines

The fourth chapter of this thesis describes the Lewis acidic behaviour of Yttrium nitrate in aza-Michael addition reaction of various aliphatic and aromatic amines with acrylonitrile in excellent yields.

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