

Abstract

Index No: 45/21/Chem./27

Title: "Fabrication of new organic probes for chromo-fluorogenic detection of environmentally hazardous ions and molecules"

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Chapter 1 describes a compendious and fundamental overview of fluorescent sensing probes along with various sensing mechanisms and its wide application with a concise literature survey of various published chemosensors elaborately.

Chapter 2 deals with the thorough instrumentation procedures like ^1H , ^{13}C NMR, HRMS, IR, UV-Vis, fluorescence detection, crystallography, lifetime decay measurement etc. which are essential in order to study more about the organic probes. In this chapter, some other methods such as detection limit determination, quantum yield calculation along with association constant derivation were also discussed which are needed in further study of a chemosensor.

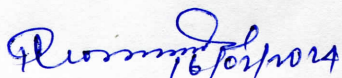
Chapter 3 represents the fabrication of a new coumarin based fluorescent "turn-on" probe (PCEH) for distinct and sequential recognition of Al^{3+} and F^- in methanol-water mixture (4:1, v/v) along with its practical application through cellular bioimaging experiment at physiological pH.

Chapter 4 introduces the modulation in the binding sites for adaptable DNA interactive probe efficient at chromo-fluorogenic meticulous reversible recognition of Al^{3+} in methanol at pH 7.2, using HEPES buffer. DNA binding study is also executed to elucidate possible bioactivity and compared potentiality among analogues.

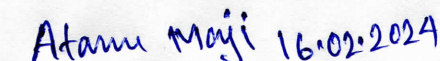
Chapter 5 reports a novel AIE active carbazole-benzothiazole based chemodosimeter (CBTA) for chromogenic and fluorogenic recognition of CN^- in 60 % mixed aqueous DMSO solution. The practical application of the chemodosimeter is executed through the 'dip-stick method' as well as waste water treatment.

Chapter 6 describes the efficient solid and solution state emissive reusable solvatochromic fluorophore (CPI) for colorimetric and fluorometric detection of CN^- in DMSO. Significantly, the sensor can detect low-level water in organic solvents and successfully employed for real samples analysis.

Lastly, **Chapter 7** deals with the rapid and swift recognition of lethal nerve agent simulant, diethyl chlorophosphate (DCP) through a new chemodosimetric approach.


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