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1.	Prof. Hitesh Patel	Recent trends in chemical sciences and environmental science	Chapter: 2 The medicinal importance of luminescent and fluorescent analogues	Mahesh Vasava, Shital Thacker, Normal Madzivir, Hitesh D. Patel	978-8195252992	Thanuj International Publishers		Nov-21	Book Chapter
2.	Prof. Hitesh Patel	Synthesis and Biological Activity of Quinoline-4-carboxylic acid		Dhaval B. Patel Siddharth S. Patel Hitesh D. Patel	978-6206149040	Lembert Academic Publishing		Mar-23	Book
3.	Prof. Hitesh Patel	Computational study of Quinoline-4-carboxylic acid and application		Dhaval B. Patel, Siddharth S Patel, Hitesh D. Patel	978- 6206149057	Lembert Academic Publishing		Mar-23	Book
4.	Prof. Hitesh Patel	Medicinal application of spiro-oxindole based analogues		Mayuri A. Borad Manoj N. Bhoi Hitesh D. Patel	978-3659717260	Lembert Academic Publishing		Jun-15	Book
5.	Prof. Hitesh Patel	A water-mediated synthesis of isatin-based aromatic compounds		Mayuri A. Borad Manoj N. Bhoi Hitesh D. Patel	978-3659758171	Lembert Academic Publishing		Jul-15	Book
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17.	Prof. Hitesh Patel	KAL(SO <sub>4</sub> ) <sub>2</sub> .12H <sub>2</sub> O (Alum) Catalyzed organic synthesis	Kinjal Patel, Rajesh Vekariya, Hitesh D. Patel	978-3-659939518	Lembert Academic Publishing	Aug-16	Book

# RECENT TRENDS IN CHEMICAL SCIENCES AND ENVIRONMENTAL SCIENCE

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**CHAPTER: 2**  
**THE MEDICINAL IMPORTANCE OF LUMINESCENT AND FLUORESCENT**  
**ANALOGUES**

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**Abstract**

The significant optical features of luminescent materials have drawn immense appreciation in all walks of life including organic dyes, metal-organic frameworks, lanthanide compounds, semiconductor-based quantum dots, and carbon-based nanodots, which attribute numerous applications to these Luminescent materials. Moreover, they have been proven important in various applications, including gas storage and separation, heterogeneous catalysis, light-harvesting, chemical sensing, bio-imaging, and drug delivery. In recent times, biologically important luminescent metal contain drugs have attracted great interest in bioinorganic chemistry.

There is great potential in the application of these materials to cell bio-imaging. The most effective and useful tool for tracking the bio-distribution of luminescent compounds into the cell and cellular uptake of the species is cell bioimaging. A researcher has recently studied the cellular uptake which is monitored by CFM (Confocal Fluorescence Spectroscopy) of bioactive luminescent silver(I) diethylbarbiturate complexes, and these studies have demonstrated that this luminescent compound may develop potent anticancer agents in the future by suggesting that mitochondria and DNA are the potent biological targets for new drug discovery. This review will focus on a brief discussion on the various biological applications of luminescent and fluorescent metal-organic complexes, fluorescent heterocyclic compounds, nanomaterials, and luminescent inorganic molecules. This effort will help new researchers working in the field of luminescent and fluorescent-based medicinal chemistry development.

**Keywords:** Metal-organic frameworks; Luminescence; Biosensors; Fluorescence; Biological activity.

**1.0 INTRODUCTION**

Bioactive luminescent metallodrugs have attracted great interest in bioinorganic chemistry in the last few years, owing to the potential application of the luminescent compounds to cell bio-imaging, which is a useful tool for tracking the biodistribution of luminescent species into the cell, as well as the cellular uptake of these species. The cellular uptake studies monitored by confocal fluorescence spectroscopy (CFM) of bioactive luminescent silver(I) diethylbarbiturate complexes, recently tested as anticancer agents, have demonstrated that these complexes can access the cytosol and nucleus of A549 and MCF-7 tumor cells. These findings are suggesting that mitochondria and DNA are potent biological targets [1]. Moreover, LMOFs (Luminescent metal-organic frameworks) key structural and chemical features make them appealing candidates for measuring levels of biochemical compounds or for imaging contrast agents. Numerous different LMOFs display low cytotoxicity, which is important for eventual *in vivo* screening[2]. Furthermore, to design specific affinity, the wide range of metal and organic building blocks that can be incorporated into their structures allows for judicious tuning of the material's light absorption and emission properties to avoid interference with those of the desired analyte. LMOFs can also be modified post-synthesis, enabling specific molecular recognition [3]. Additionally, this versatility of LMOFs opens up possibilities for cell or tissue-specific targeting in bio-sensing applications [4]. The LMOF can be re-used multiple times, as the binding and fluorescence events are typically reversible.



**Graphical Abstract**



Dhaval B. Patel  
Siddharth S. Patel  
Hitesh D. Patel

## Synthesis and Biological Activity of Quinoline-4- Carboxylic Acid

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Dhaval B. Patel  
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# Computational Study of Quinoline-4-carboxylic acid and application

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# Medicinal application of spirooxindole based analogues

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Manoj N. Bhoi  
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# A water-mediated synthesis of isatin-based aromatic compounds

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Isatins and its C-3 functionalized derivatives occupy a conspicuous place in organic synthesis and medicinal chemistry. N-substituted isatins, and isatins with different substituents on a phenyl ring have been employed in two, three or four-component reactions leading to the formation of five and six membered spiro-heterocyclic frameworks bearing a 2-oxindole moiety. The development of diastereo and enantioselective methodologies containing two to four stereocenters for the synthesis of spiro-fused cyclic frameworks is the area of current interest. In this review, we presented several recent syntheses of isatin-based spiroheterocycles in different media indicator of significant interest in the area and a lot more interesting chemistry is anticipated. In the mentioned reactions, some cases need heat to accelerate them and some others are microwave assisted reactions. In some cases biological evaluation also has been mentioned. We hope this review will lead the researchers or organic chemists to a strong interest for the isatin based organic synthesis of biologically active compounds.



Mayuri A. Borad was born in Junagadh (Gujarat) India in 1990. She obtained her M.Phil. degree in organic chemistry in 2013 from the Gujarat University, Ahmedabad (India). She is pursuing her Ph.D. under Dr. Hitesh D. Patel at Gujarat University, Ahmedabad. Her research work focuses on spiro heterocyclic compound and multicomponent reactions.

Mayuri A. Borad  
Manoj N. Bhoi  
Hitesh D. Patel

## Mono, di, tri and tetra spiro heterocyclic compounds: Recent advances

Mono, di, tri and tetra spiro heterocyclic compounds



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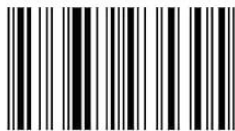
Chiral drugs are currently 50% used and near 90% of the last ones are marketed as racemates consisting of an equimolar mixture of two enantiomers. While they have the same scaffold, but they shows different biological activities such as pharmacology, toxicology, pharmacokinetics, metabolism etc. Therefore, it is significant to endorse the chiral separation and analysis of racemic drugs either in industry or in the clinic so as to eliminate the unwanted isomer from the groundwork and to find an optimal treatment and a right therapeutic control for the patient. In this article, we have briefly discussed the history of chirality, importance, and some basic concept of them. We have also included the importance of separation and various resolution methods.



Manoj N. Bhoi  
Mayuri A. Borad  
Hitesh D. Patel

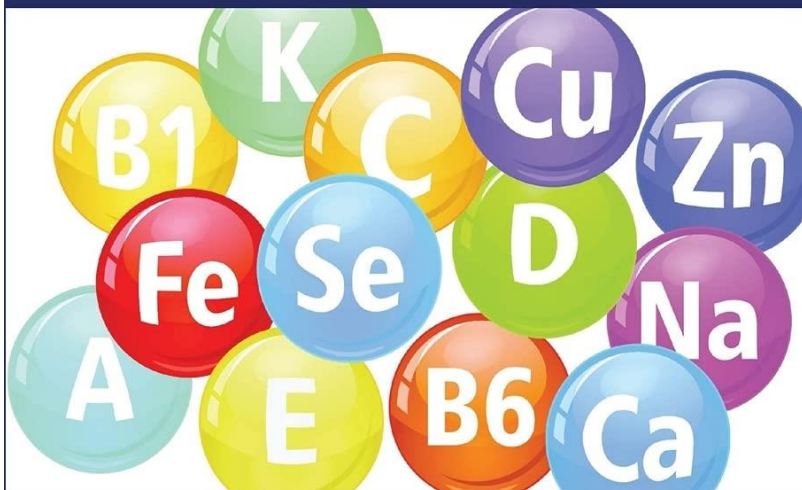
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## History, importance, and some basic concept of chirality



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## Application of heterogeneous catalyst for Organic synthesis

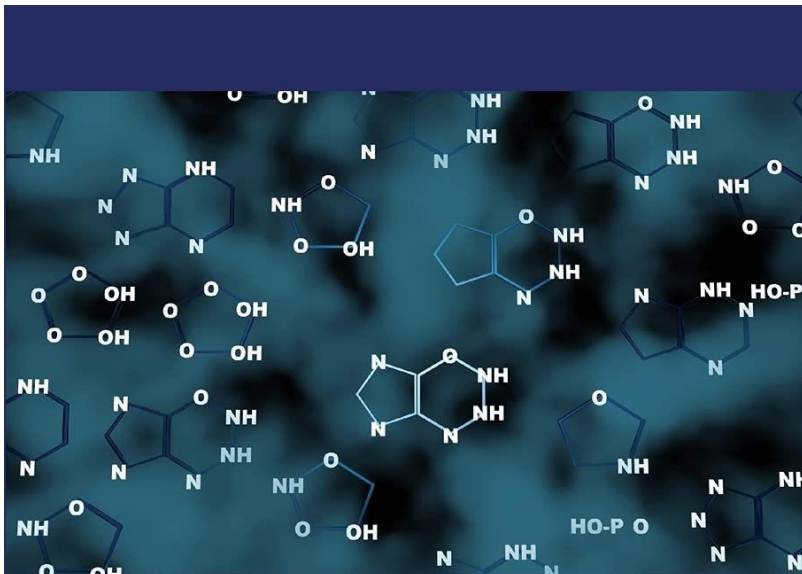
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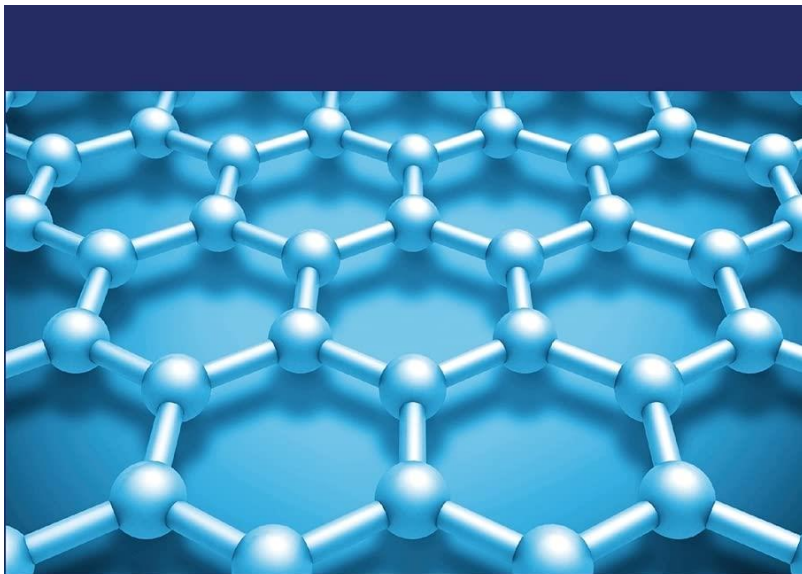
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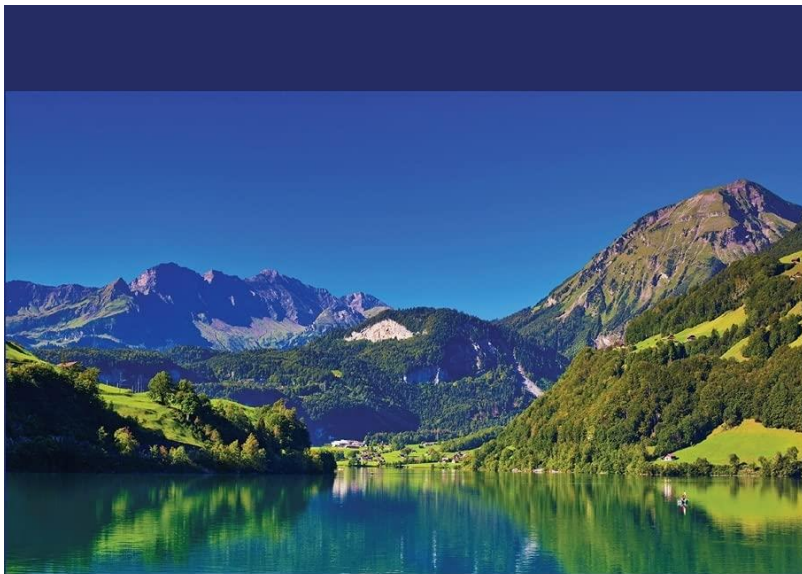
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# Synthesis and Utility of Acid hydrazides

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Catalysis has played a significant role in reducing pollution from chemical processes in our environment. By utilizing catalysts, organic reactions can be more efficient and selective thereby eliminating large amounts of by-products and other waste compounds. This book provides a broad overview of the  $KAl(SO_4)_2 \cdot 12H_2O$  (Alum) as an eco-friendly, inexpensive, readily available and reusable catalyst in green synthesis of organic compounds.



Kinjal Patel  
Rajesh Vekariya  
Hitesh Patel

Kinjal D. Patel is a research scholar at Department of Chemistry, Gujarat University. She is currently working on synthesis of heterocyclic chemistry.

## $KAl(SO_4)_2 \cdot 12H_2O$ (Alum) Catalyzed Organic Synthesis



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