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## 3.3.1.1 Number of research papers in the Journals notified on UGC CARE list year wise during last five years

HEI Input:

2023-24	2022-23	2021-22	2020-21	2019-20
22	27	15	24	12

DVV Suggested Input:

2023-24	2022-23	2021-22	2020-21	2019-20
11	08	07	12	09

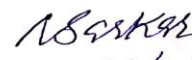
Change Input:

2023-24	2022-23	2021-22	2020-21	2019-20
11	10	08	12	07

  
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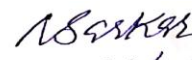
2023-24

Sl. Number	Title of Paper	Author	Department	Journal Name	ISSN Number	Year of Publ.
1	Impact of Electron-Withdrawing Effect on Sigma Hole Via Bromine-Based Interactions in Zn-5, 10, 15, 20-tetra (4-bromo-2, 6-difluoro Phenyl) Porphyrin	Dr. Goutam Nandi	Chemistry	Crystal Growth & Design	1528-7505	2023
2	Luminescent Ruthenium-Terpyridine Complexes Coupled with Stilbene-Appended Naphthalene, Anthracene, and Pyrene Motifs Demonstrate Fluoride Ion Sensing and Reversible Trans-Cis Photoisomerization	Dr. Dinesh Maity	Chemistry	Inorganic Chemistry	0020-1669	2024
3	Chemically Bonded Pepsin via Its Inert Center to Diazo Functionalized Silica Gel through Multipoint Attachment Mode: A Way of Restoring Biocatalytic Sustainability over "Wider pH" Range	Biswajit Hansda	Chemistry	Langmuir	0743-7463	2024
4	A Study on Avian Species Diversity in Purbasthali Oxbow Lake and Adjacent Areas, West Bengal, India	Subhasis Mandal	Botany	International Journal of Research and Analytical Reviews (IJRAR)	2348-1269	2023
5	Analysis of the Post-Cyclonic Physical Flood Susceptibility and Changes of Mangrove Forest Area Using Multi-Criteria Decision-Making Process and Geospatial Analysis in Indian Sundarbans	Tanmoy Basu	Geography	Atmosphere	2073-4433	2024
6	Analysis of the Shoreline Changes using Geoinformatics in Ghoramara Island of Hugli Estuary, West Bengal in India	Tanmoy Basu	Geography	Journal of King Saud University - Science	1018-3647	2024
7	Assessment of diversity of Odonata fauna in selected sites of Purba Bardhaman district, West Bengal, India	Sulagna Mukherjee	Zoology	Journal of Threatened Taxa	0974-7907	2024
8	Long-run and Short-run Dynamic Linkages Among Capacity Utilization, Inflation and Per Capita Income: Theoretical and Empirical	Kinkini Bhattacharjee	Commerce	Global Business Review	0972-1509	2024

  
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	Enquiries for Panel of Countries					
9	Three-dimensional nonlinear ion acoustic waves near critical density in magnetized negative ion plasmas	Akash Biswas	Mathematics	Waves in Random and Complex Media	1745-5049	2024
10	Sri Aurobindo's Principles, Philosophy, Nationalism and Education: A Critique	Siuli Mandi	B.Ed	Journal of Namibian Studies	2197-5523	2023
11	Structures, electrical properties and catecholase-like activity of a series of new copper (II) coordination polymers supported by azido bridges	Dr. Abhijit Banerjee	Electronics	Journal of Molecular Structure	0022-2860	2024

## 2023-24

Title of the paper: Impact of Electron-Withdrawing Effect on Sigma Hole Via Bromine-Based Interactions in Zn-5, 10, 15, 20-tetra (4-bromo-2, 6-difluoro Phenyl) Porphyrin

Author: Dr. Goutam Nandi

Journal: Crystal Growth and Design (SCOPUS Indexed)

Link to the journal: <https://pubs.acs.org/journal/cgdefu>


Link to the article: <https://pubs.acs.org/doi/abs/10.1021/acs.cgd.3c00543>

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## Crystal Growth and Design

Years currently covered by Scopus: from 2001 to 2024

Publisher: American Chemical Society

ISSN: 1528-7483 E-ISSN: 1528-7505

Subject area: [Physics and Astronomy: Condensed Matter Physics](#) [Chemistry: General Chemistry](#) [Materials Science: General Materials Science](#)

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SJR 2023

0.649



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## CRYSTAL GROWTH & DESIGN

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Article

### Impact of Electron-Withdrawing Effect on Sigma Hole Via Bromine-Based Interactions in Zn-5,10,15,20-tetra(4-bromo-2,6-difluoro Phenyl) Porphyrin

Goutam Nand,<sup>\*,†</sup> Rohith Phaneendra Bandaru, Ranjan Patra, Ananda Kumar Jami, and Bharat Kumar Tripuramallu<sup>‡</sup>

Cite This: *Cryst. Growth Des.* 2023, 23, 5975–5985

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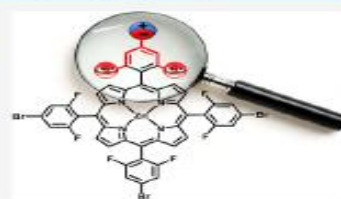
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**ABSTRACT:** This study presents the development of novel supramolecular structures based on custom-designed porphyrin linker Zn(II)-5,10,15,20-tetra(4-bromo-2,6-difluoro phenyl) porphyrin (Zn-BFP). The porphyrin skeleton was specifically designed to introduce electron-withdrawing fluorine atoms near bromine atoms. The inclusion of fluorine atoms at 2,6-positions increases the polarizability of bromine atoms to participate more actively in halogen bonding interactions. The porphyrin Zn-BFP was synthesized by Adler's method and fully characterized by <sup>1</sup>H NMR. The absorbance, emission, and electrochemical studies of Zn-BFP were conducted to reveal the influence of fluorine substituents on the optical and electrochemical properties. Three new supramolecular solids [Zn(BFP)(H<sub>2</sub>O)]·acetone (1), [Zn(BFP)(NA)]·2DCM (2), and [Zn(BFP)(S-Br-NA)]<sub>2</sub> (3) in crystalline forms were synthesized by employing Zn-BFP with axial linkers nicotinic acid and 5-bromonicotinic acid. The axial linkers provided additional interaction sites in the form of COOH groups to involve in hydrogen bonding. Detailed single-crystal X-ray diffraction analysis revealed the existence of diverse halogen bonding contacts Br···Br, Br···O, and Br···π and hydrogen bonding motifs O–H···O between the metalloporphyrin units leading to 1D chains and 2D supramolecular sheets. The findings of particular interest are the existence of relatively shortest Br···Br interactions in compound 2. Hirshfeld surface analyses revealed the contributions of various interactions toward the stability of the extended architectures. Morphological studies supported distinct supramolecular features exhibited by the fluorine-appended porphyrins. Electrostatic potential isosurfaces with the aid of density functional theory indicated that fluorine atom substitution at the 2,6-positions of the bromo phenyl moiety enhances the σ-hole potential by 5.2 kcal/mol, clearly suggesting the expansion of the σ-hole.



#### INTRODUCTION

The porphyrin core is a major component in several enzymatic and biochemical processes owing to its unique photo and electrochemical catalytic properties.<sup>1–4</sup> In several natural systems, the porphyrin moieties are arranged together in a highly well-defined manner; hence it is imperative to construct multi-porphyrin assemblies to mimic nature-derived assemblies.<sup>5–7</sup> Metalloporphyrin architectures are remarkable because they leverage the distinctive geometric and photophysical characteristics of porphyrin molecules for potential applications in light harvesting, oxygen transport, catalysis, and other fields.<sup>8–13</sup> Additionally, the inclusion of coordinating groups at the β-pyrrolic or meso positions often leads to a variety of coordination networks in the crystalline phase.<sup>14,15</sup> The formation of porphyrin architectures through self-assembly in either liquid or solid form has been utilized to produce molecular and supramolecular systems with adjustable physical and chemical characteristics, including the ability to harvest light and exhibit microporosity.<sup>16,17</sup> Significantly, the use of aryl porphyrins and their metalated derivatives in crystal

engineering has resulted in numerous appealing crystalline structures, which can be attributed to the limited flexibility of their molecular backbone and the availability of multiple sites for potential functionalization.<sup>18–20</sup>

In the past few years, halogen bonds have been identified as important contributors toward the stability of diverse supramolecular architectures.<sup>21</sup> Halogen bonds are one of the most important contributors to design stable protein-ligand complexes.<sup>22–24</sup> These noncovalent interactions possess characteristics comparable to hydrogen bonds, particularly their robust directional nature and electrostatic nature.<sup>25</sup> A halogen bond can be best described as the electrostatic

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Title of the paper: Luminescent Ruthenium-Terpyridine Complexes Coupled with Stilbene-Appended Naphthalene, Anthracene, and Pyrene Motifs Demonstrate Fluoride Ion Sensing and Reversible Trans-Cis Photoisomerization

Author: Dr. Dinesh Maity

Journal: Inorganic Chemistry (SCOPUS Indexed)

Link to the journal: <https://pubs.acs.org/journal/inocaj>

Link to the article: <https://pubs.acs.org/doi/abs/10.1021/acs.inorgchem.4c00339>

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## Inorganic Chemistry

Years currently covered by Scopus: from 1962 to 2024

Publisher: American Chemical Society

ISSN: 0020-1669 E-ISSN: 1520-510X

Subject area: [Chemistry: Inorganic Chemistry](#) [Chemistry: Physical and Theoretical Chemistry](#)

Source type: Journal

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CiteScore 2023  
7.6

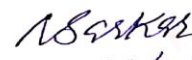
SJR 2023  
0.928

SNIP 2023  
0.894

  
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## Inorganic Chemistry

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### Luminescent Ruthenium–Terpyridine Complexes Coupled with Stilbene-Appended Naphthalene, Anthracene, and Pyrene Motifs Demonstrate Fluoride Ion Sensing and Reversible Trans–Cis Photoisomerization

Tanusree Ganguly, Soumi Das, Dinesh Maity, and Sujoy Baitalik\*

Cite This: *Inorg. Chem.* 2024, 63, 6883–6897

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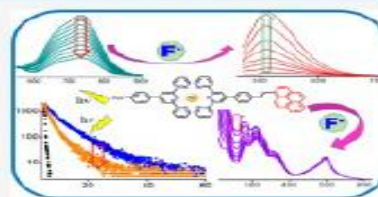
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**ABSTRACT:** A new family of luminescent heteroleptic Ru(II)-terpyridine complexes coupled with stilbene-appended naphthalene, anthracene, and pyrene motifs is reported. Each of the complexes features moderately intense emission at room temperature having a lifetime of 16.7 ns for naphthalene and 11.4 ns for anthracene, while a substantially elevated lifetime of 8.3  $\mu$ s was observed for the pyrene derivative. All the three complexes display a reversible couple in the positive potential window due to Ru<sup>2+</sup>/Ru<sup>3+</sup> oxidation but multiple reversible and/or quasi-reversible peaks in the negative potential domain because of the reduction of the terpyridine moieties. All the complexes selectively sense F<sup>−</sup> among the studied anions via the intermediary of different noncovalent interactions. The interaction event is monitored through absorption, emission, and <sup>1</sup>H and <sup>19</sup>F NMR spectroscopy. Additionally, upon utilizing the stilbene motif, reversible trans–cis isomerization of the complexes has been undertaken upon alternate treatment of visible and UV light so that the complexes can act as potential photomolecular switches. We also carried out the anion sensing characterization of the cis form of the complexes. Theoretical calculation employing density functional theory is also executed for a selective complex (naphthalene derivative) to elucidate different noncovalent interactions that are operative during the complex–fluoride interplay.



#### INTRODUCTION

Noncovalent interactions comprising hydrogen bonding,  $\pi$ – $\pi$  stacking, CH– $\pi$ , cation– $\pi$ , and anion– $\pi$  interactions have orchestrated immense attention in diverse fields of supramolecular chemistry and structural biology.<sup>1–10</sup> Although these forces are weak, their appearances are manifested in manifold interdisciplinary areas that encompass material science, catalysis, crystal engineering, and biology.<sup>11–19</sup> This sort of interaction is responsible for maintaining the basic structures of vital living organisms such as DNA, RNA, and protein.<sup>20–23</sup> The occurrence of this type of weak interactions also introduces a new horizon in the field of supramolecular chemistry of anions such as anion recognition and sensing, anion transport, and many more.<sup>24–32</sup>

In this work, our aim is to recognize specific anions through the intermediary of various noncovalent interactions, viz., hydrogen bonding, CH– $\pi$ , anion– $\pi$ , and  $\pi$ – $\pi$  stacking.<sup>29–31</sup> In order to achieve our objective, we employed herein Ru(II) complexes of polyheterocyclic ligands as they offer multiple optical channels to visualize the receptor–anion interplay.<sup>32–41</sup> Polypyridine-based Ru(II) complexes have been employed as the potential building blocks in numerous applications such as dye-sensitized solar cells, multichannel sensors, and switches as

well as the active components in photochemical heteroleptic Ru(II)-terpyridine complexes coupled with stilbene-appended naphthalene, anthracene, and pyrene motifs is reported. Each of the complexes features moderately intense emission at room temperature having a lifetime of 16.7 ns for naphthalene and 11.4 ns for anthracene, while a substantially elevated lifetime of 8.3  $\mu$ s was observed for the pyrene derivative. All the three complexes display a reversible couple in the positive potential window due to Ru<sup>2+</sup>/Ru<sup>3+</sup> oxidation but multiple reversible and/or quasi-reversible peaks in the negative potential domain because of the reduction of the terpyridine moieties. All the complexes selectively sense F<sup>−</sup> among the studied anions via the intermediary of different noncovalent interactions. The interaction event is monitored through absorption, emission, and <sup>1</sup>H and <sup>19</sup>F NMR spectroscopy. Additionally, upon utilizing the stilbene motif, reversible trans–cis isomerization of the complexes has been undertaken upon alternate treatment of visible and UV light so that the complexes can act as potential photomolecular switches. We also carried out the anion sensing characterization of the cis form of the complexes. Theoretical calculation employing density functional theory is also executed for a selective complex (naphthalene derivative) to elucidate different noncovalent interactions that are operative during the complex–fluoride interplay.

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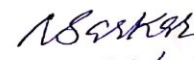
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Title of the paper: Chemically Bonded Pepsin via Its Inert Center to Diazo Functionalized Silica Gel through Multipoint Attachment Mode: A Way of Restoring Biocatalytic Sustainability over "Wider pH" Range

Author: Biswajit Hansda

Journal: Langmuir (SCOPUS Indexed)

Link to the journal: <https://pubs.acs.org/journal/langd5>

Link to the article: <https://pubs.acs.org/doi/10.1021/acs.langmuir.3c03113>

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ISSN: 0743-7463 E-ISSN: 1520-5827

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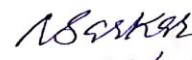
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## LANGMUIR

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Article

### Chemically Bonded Pepsin via Its Inert Center to Diazo Functionalized Silica Gel through Multipoint Attachment Mode: A Way of Restoring Biocatalytic Sustainability over "Wider pH" Range

Biswajit Hansda,<sup>1</sup> Shailja Mishra,<sup>1</sup> Ankit Ghosh,<sup>1</sup> Basudev Das, Tirtha Biswas, Tanay K. Mondal, Bhavya Srivastava, Sneha Mondal,<sup>2</sup> Dipika Roy,<sup>2</sup> and Bhabatosh Mandal<sup>2\*</sup>

Cite This: *Langmuir* 2024, 40, 2146–2164

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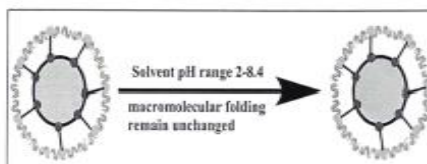
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**ABSTRACT:** Proteolytic enzymes play a pivotal role in the industry. Still, because of denaturation, the extensive applicability at their level of best catalytic efficiency over a more comprehensive pH range, particularly in alkaline conditions over pH 8, has not been fully developed. On the other hand, enzyme immobilization following a suitable protocol is a long pending issue that determines the conformational stability, specificity, selectivity, enantioselectivity, and activity of the native enzymes at long-range pH. As a bridge between these two findings, in an attempt at a freezing temperature 273–278 K at an alkaline pH, the diazo-functionalized silica gel (SG) surface has been used to rapidly diazo couple pepsin through its inert center, the O-carbon of the phenolic –OH of surface-occupied Tyr residues in a multipoint mode: when all the various protein groups, viz., amino, thiol, phenol, imidazole, carboxy, etc., in the molecular sequence including those belonging to the active sites, remain intact, the inherent inbuilt interactions among themselves remain. Thereby, the macromolecule's global conformation and helicity preserve the status quo. The dimension of the SG-enzyme conjugate confirms as  $(\text{Si}(\text{OSi})_4 (\text{H}_2\text{O})_{1.69})_n [-\text{O}-\text{Si}(\text{CH}_3)_2-\text{O}-\text{C}_6\text{H}_4-\text{N}=\text{N}^+]_x$ -[pepsin]- $\gamma\text{H}_2\text{O}$ , where the values of  $n$  and  $y$  have been determined respectively as 347 and 188. The material performs the catalytic activity much better at 7–8.5 than at pH 2–3.5 and continues for up to six months without any appreciable change.



#### INTRODUCTION

Pepsin is an endopeptidase that is obtained in an inactive form in the stomach lining. Hydrochloric acid, which produced in gastric mucosa, converts pepsin into its active conformation at an optimum acidity (pH 1–3) for proper functioning. Pepsin works with two other proteolytic enzymes, chymotrypsin and trypsin, to degrade proteins in the digestive system. The three enzyme candidates were the first to be isolated in crystalline form.<sup>1</sup> In addition to their crucial role in gastric digestive action, they exhibit efficient virus-controlling activities that seriously affect humans' health, such as HIV,<sup>2</sup> and Alzheimer's disease.<sup>3</sup> Pepsin is essential in reducing the risk of allergenic sequences of proteins reaching the intestinal lumen.<sup>4</sup> In the *in vivo* analysis, pepsin is most efficient in cleaving bonds involving aromatic amino acids, phenylalanine, tryptophan, and tyrosine. Of the many proteases investigated in commercial cheese making, pepsin becomes the most promising for continuous milk coagulation.<sup>5</sup> The promising application of pepsin is in producing protein hydrolysates and releasing peptides,<sup>6</sup> particularly the low allergenic foods.

The interest in biocatalysis for chemical production is continuously growing for their high stereo-, chemo-, and

regioselectivity. They work efficiently and are environmentally friendly without harsh external influences, viz., high pressures, temperatures, and stringent chemical environments. Despite these kinds of advantages, the practical use of enzymes is limited. While enzymes exhibit efficient catalytic activity under mild conditions, their stability and activity are questionable *in vitro*. Enzyme immobilization surmounts the resilience, recovery, and recyclability disadvantages of using enzymes in solution, making them industrially and commercially viable as heterogeneous catalysts.<sup>6,9</sup> Immobilization has become essential and technically beneficial in food processing, where a protease-free product formulation needs to be urgently ensured; it demands specialized proteolytic enzyme reactors obtained through their immobilization.<sup>10</sup> The immobilization

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Title of the paper: Three-dimensional nonlinear ion acoustic waves near critical density in magnetized negative ion plasmas

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Author: Akash Biswas

Journal: Waves in Random and Complex Media (SCOPUS Indexed)

Link to the journal: <https://www.tandfonline.com/journals/twrm20>

Link to the article: <https://www.tandfonline.com/doi/full/10.1080/17455030.2024.2314138>

Proof of presence in UGC care list:

## Waves in Random and Complex Media

Formerly known as: [Waves in Random Media](#)

Years currently covered by Scopus: from 2005 to 2023

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Publisher: Taylor & Francis

ISSN: 1745-5030 E-ISSN: 1745-5049

Subject area: [Engineering: General Engineering](#) [Physics and Astronomy: General Physics and Astronomy](#)

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WAVES IN RANDOM AND COMPLEX MEDIA  
https://doi.org/10.1080/17455030.2024.2314138



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## Three-dimensional nonlinear ion acoustic waves near critical density in magnetized negative ion plasmas

Akash Biswas<sup>†</sup>, Debkumar Chakraborty<sup>‡</sup> and Samiran Ghosh

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### ABSTRACT

The nonlinear dynamics of three-dimensional ion acoustic waves near critical density in plasmas consisting of electrons, positive and negative ions in the presence of a uniform external magnetic field are investigated. In the weak nonlinear and dispersive limit, the nonlinear wave is shown to be governed by a Gardner–Zakharov–Kuznetsov (GZK) equation, which is also shown to be integrable in the sense of Painlevé only on the traveling wave frame. The invariant Painlevé analysis provides the analytical solutions in the closed form of solitary, cnoidal, double layer and bipolar structures. The Lyapunov stability analysis shows that the stationary solitary structure is always unstable due to the three-dimensional effect. Finally, the stability of one-dimensional solitary wave has been checked in the transverse direction and the regions of stability (and instability) have been separated in terms of parameters. The results are in qualitative agreement with the observations in magnetized plasmas with negative ions.

### ARTICLE HISTORY

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### KEYWORDS

Negative ion plasma;  
Invariant Painlevé method;  
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### 1. Introduction

Plasma consisting of electrons, positive and negative ions is called negative ion plasma. This kind of plasma can be found in astrophysical [1–3] and experimental setup [4–8]. Negative ions can be produced in various experimental setups such as microwave driven multi-dipolar electron cyclotron resonance plasma sources or intense laser fields and its existence can be observed in earth's magnetosphere, Titan's ionosphere as well as outer solar system plasmas. The response of the plasma disturbances is modified when heavy negative ions are introduced. As a result, two different ion modes namely high-frequency Langmuir type and low-frequency acoustic type occur [8]. The presence of negative ions enhances the phase velocity of ion acoustic wave (IAW) by reducing electron shielding and thereby reduces the effects of Landau damping [8, 9].

Plasma is a nonlinear dynamical system with many degrees of freedom and stable nonlinear coherent structures can be generated when the wave nonlinear wave steepening is

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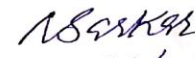
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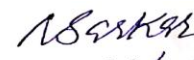
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## Sri Aurobindo's Principles, Philosophy, Nationalism And Education: A Critique

Siuli Mandi

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### ABSTRACT:

Sri Aurobindo is a great educationist, philosopher and nationalist. He has made an extremely special contribution to the subject of education. In real-world applications, he combines Western and Indian philosophy. We move from materialism to spiritualism with his life philosophy. In the sphere of Indian education, Sri Aurobindo's philosophical ideas are unique. By fostering individual virtue through education, he hopes to make Indian society just and content. In this article, Sri Aurobindo's principles, philosophy, nationalism and education has been discussed.

Keywords: Principles, Philosophy, Nationalism, Education.

### INTRODUCTION:

On August 15, 1872, Aurobindo Ghosh was born in Konnagar, Calcutta, in the Indian region of Bengal. His mother was Swarnalata Devi, and his father was Krishnadhan Ghosh. Dr. Ghosh, his father, wished to instill in him the values of western society. As a result, he received his elementary education at the Irish Christian School in Darjeeling. In order to protect Aurobindo from any Indian influence, his father took him to England when he was seven years old. He spent fourteen years in England, attending Cambridge, Manchester, and London for his education, until 1893. He became a member of the student organisation Indian Majlis while attending Cambridge. To support the advancement of his homeland, he founded a covert organisation known as "Lotus and Dagger." Aurobindo participated in the I.C.S. competition in 1890, placing first but losing the riding festival. He returned to India in 1893 and began working for the state of Baroda as an English professor at Baroda College. He began serving as the principal of


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COMMUNICATION

## Assessment of diversity of Odonata fauna in selected sites of Purba Bardhaman district, West Bengal, India

Sulagna Mukherjee<sup>1</sup> & Rabindranath Mandal<sup>2</sup>

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<sup>1</sup>sulagna211@gmail.com (corresponding author), <sup>2</sup>rabindranathmandal869@gmail.com

**Abstract:** Purba-Bardhaman, a newly emerged district of West Bengal was surveyed for listing its odonate diversity. The district is located in southern West Bengal, and two major rivers, Damodar and Ajay, run through it. It also has a lot of small rivers, perennial and seasonal water bodies, grasslands, marshes, and agricultural fields, making it a great place for odonates. Five different sites of the district were surveyed by direct search and opportunistic sighting methods for a period of two years (March 2021 to February 2023) and odonate diversity was listed. We have found a total of 47 species belonging to 35 genera and six families from this district. The most diverse family was Libellulidae, with 24 species. A few major findings from this study were *Mesogonophus montanus*, *Platygonophus dolobrotus*, *Lothracista asiatica*, *Libellago indicus*, and *Agriocnemis julinga*. This is the first systematic study of odonates from this district, and it illustrates the value of this densely populated district for further exploration due to its high agricultural fertility.

**Keywords:** Agricultural land, Ajay River, Anisoptera, Damodar River, Gangetic plain, riverbed, seasonal pool, Zygoptera.

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**Funding:** We would like to thank the University of Burdwan and Hooghly Mohsin College for basic infrastructure and funding of the study.

**Competing interests:** The authors declare no competing interests.

**Author details:** SULAGNA MUKHERJEE did her bachelors from Burdwan Raj College and MSc in zoology from the Department of Zoology, the University of Burdwan with molecular biology and genetics as special paper. She always had an interest studying the animal world from ecological and behavioural perspective which led her to pursue her PhD in the ecology and behaviour of odonates. DR. RABINDRANATH MANDAL is a senior professor in the Department of Zoology, Hooghly Mohsin College. Previously, he worked in the Department of Biological Sciences in Presidency University. He did his PhD from the University of Calcutta and he was the first recipient of D. N. Roychowdhury memorial medal in Entomology.

**Author contributions:** SM did the field work, data collection, preservation of samples, analysis, and manuscript writing. RM helped in manuscript preparation and supervised the work.


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Author: Tanmoy Basu

Journal: Atmosphere (SCOPUS Indexed)

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First Page of the paper:

**Article**

## Analysis of the Post-Cyclonic Physical Flood Susceptibility and Changes of Mangrove Forest Area Using Multi-Criteria Decision-Making Process and Geospatial Analysis in Indian Sundarbans

Binaj Kanti Mondal <sup>1\*</sup>, Sanjib Mahata <sup>2</sup>, Tanmay Basu <sup>3</sup>, Rima Das <sup>4</sup>, Rajib Patra <sup>5</sup>, Kamal Abdelrahman <sup>6</sup>, Mohammed S. Fhais <sup>7</sup> and Sarbeswar Praharaj <sup>8</sup>

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**Abstract:** Tropical cyclones, one of the most extreme and destructive meteorological incidents, cause extensive damage to lives and livelihoods worldwide. This study utilized remotely sensed data along with multi-criteria decision-making, geospatial techniques, and major cyclonic events Aila, Amphan, and Yaas to identify the changes in the vulnerability of cyclone-induced floods in the 19 community development blocks of Indian Sundarbans in the years 2009–2010, 2009–2021, and 2021–2022 (the post-cyclonic timespan). The Sundarbans are a distinctive biotropical region located in a characteristic geographical setting along the West Bengal and Bangladesh coasts. In this area, several cyclonic storms had an impact between 2009 and 2022. Using the variables NDVI, MNDWI, NDMI, NDBI, BSI, and NDTI, Landsat 5 Operational Land Imager, Thermal Infrared Sensor, Resourcesat LISS-III, and AWIFS data were primarily utilized to map the cyclonic flood-effective zones in the research area. The findings indicated that the coastline, which was most impacted by tropical storms, has significant physical susceptibility to floods, as determined by the AHP-weighted overlay analysis. Significant positive relationships ( $p < 0.05$ ,  $n = 19$  administrative units) were observed between mangrove damage, NDBI, and physical flood susceptibility indicators. Mangrove damage increased with an increase in the flood index, and vice versa. To mitigate the consequences and impacts of the vulnerability of cyclonic events, subsequent flood occurrences, and mangrove damage in the Sundarbans, a ground-level implementation of disaster management plans proposed by the associated state government, integrated measures of cyclone forecasting, mangrove plantation, coastal conservation, flood preparedness, mitigation, and management by the Sundarban Development Board are appreciably recommended.

**Keywords:** tropical cyclones; flood susceptibility; AHP; weighted overlay; NDFI; Sundarbans

**1. Introduction**

Mangrove forests act as shock absorbers in the Sundarbans region; they protect against tides and waves [1] and persist with ecological revitalization [2]. In this region, climatic hazard affects riverbank erosion, and it has a wide impact on the loss of the

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Title of the paper: Analysis of the Shoreline Changes using Geoinformatics in Ghoramara Island of Hugli Estuary, West Bengal in India

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Biraj Kanti Mondal<sup>a,\*</sup>, Sanjib Mahata<sup>b</sup>, Rima Das<sup>b</sup>, Rajib Patra<sup>c</sup>, Tanmoy Basu<sup>d</sup>, Kamal Abdelrahman<sup>e</sup>, Mohammed S. Fnais<sup>e</sup>, Sarbeswar Praharaj<sup>f</sup>

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**ARTICLE INFO**

**Keywords:**  
 Coastal degradation  
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**ABSTRACT**

**Conceptual Framework:** Coastal decapitulation is the loss of topographical resources along the coast as a result of silt, temperature fluctuations, tidal shifts, and wave breaking. Hydraulic activity, scraping, abrasion, and erosion are the major causes of erosion; other factors that affect it include the condition of the shore, rocks, joints, fissures, marine chemical reactions, and wave force.

**Objective:** The primary objectives of this study are to analyze the coastline changes between 1972 and 2022 utilizing remote sensing and GIS data and forecast the changes in the shoreline in 2032.

**Method:** The study examined coastal areas from 1972 to 2022 using multi-temporal satellite data from Landsat TM and Landsat OLI/TIRS. Shoreline change and the calculations related to it were examined using the Digital Shoreline Analysis System using near-infrared bands and tasseled cap transformation, to determine the rate of change in the shoreline, the study also employed Shoreline Change Envelope and End Point Rate techniques.

**Results:** Coastal erosion caused substantial damage to the island between 1972 and 2022. The northern, south-eastern, and western regions of the coast are seeing the highest levels of coastal erosion. The south coast experiences considerable erosion, whereas the west and southeast coasts experience the least. The EPR of Ghoramara Island has mean, minimum, and maximum changes of -10.59, -4.13, and -35.95, respectively. A notable inshore shift has occurred in the northern portion of Ghoramara, extending from 676 m to 855 m. The study also uses tidal gauge records and Revised Local Reference data from the Malda Gauge Station to track long-term sea level variations. According to the study, Ghoramara Island's shoreline will change by 2032, with the greatest negative changes expected to occur around the island's western and southern borders.

**Conclusion:** The study shows a significant decrease in Ghoramara's shoreline regions between 1972 and 2022, with a 3,000-population shifted from the place in 2016 due to Lohachara's submergence. Changes in the island's morphology and human activities have reduced cultivation. The study suggests increasing mangrove vegetation to combat coastal erosion and prevent further displacement of people to neighboring islands.

**Abbreviations:** GIS, Geographic Information Systems; LR, Linear regression; EPR, Endpoint rate; USGS, United States Geological Survey; DSAS, Digital Shoreline Analysis System; SCE, Shoreline change envelope; UNHCR, The United Nations High Commissioner for Refugees; UN, United Nations; IPCC, Intergovernmental Panel on Climate Change; IOM, International Organization for Migration; TM, Thematic Mapper; OLI, Operational Land Imagery; TIRS, Thermal Infrared Sensor; DN, Digital Number; EROS, Earth Capital Observation and Analysis; NIR, Near-infrared; NSM, Net shoreline movement; PSMSL, Permanent Service for Mean Sea Level; SL, Sea Level; RLR, Revised Local Reference; Km<sup>2</sup>, Square Kilometer.

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 E-mail addresses: birajmondal.kolkata@gmail.com (B.K. Mondal), khamamain@ksu.edu.sa (K. Abdelrahman), mfnais@ksu.edu.sa (M.S. Fnais), s.praharaj@asu.edu (S. Praharaj).

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Tonmoy Chatterjee<sup>1</sup>, Kinkini Bhattacharjee<sup>2</sup> and Ramesh Chandra Das<sup>3</sup>

### Abstract

Traditional macroeconomic theory explains inflation as the result of excess demand surpassing the full employment level of supply. However, achieving full employment doesn't necessarily mean that the production system is operating at its maximum capacity. When production falls short of its potential, this underutilization is commonly observed in imperfect markets, and it can be one of the factors contributing to inflation. Additionally, excess capacity can have adverse effects on the overall economic system, potentially leading to lower income generation. In light of these considerations, this study develops a theoretical model that incorporates capacity utilization, inflation and per capita GDP (PCGDP) as the key indicators. It empirically investigates whether there are long-term associations and short-term dynamics among these variables in a panel of 28 countries (14 from developed and 14 from developing regions) over the period 2003–2019. The findings reveal that there are clear long-term relationships among the variables. In the short term, capacity utilization and PCGDP are found to influence inflation in the developed countries, but this relationship is not observed in developing countries. Conversely, PCGDP is influenced by capacity utilization and inflation rates in developing economies. Interestingly, there are no causal relationships observed in the panel of all the countries.

### Keywords

Capacity utilization, inflation, panel cointegration, PCGDP

### Introduction

The relationship between inflation and unemployment remains a central focus of research in macroeconomics. In Keynesian theories, inflation is often regarded as a consequence of excess demand,

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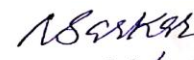
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**Structures, electrical properties and catecholase-like activity of a series of new copper(II) coordination polymers supported by azido bridges**

Indrani Roy<sup>a</sup>, Paula Brandão<sup>b</sup>, Avishek Majumder<sup>c</sup>, Manindranath Bera<sup>c</sup>, **Abhijit Banerjee<sup>d,\*</sup>**, Sandip Saha<sup>a,\*</sup>

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**ABSTRACT**

A series of new copper(II)-azido complexes of 1D polymeric chains of [Cu(L<sup>1</sup>)(μ<sub>1,2</sub>-N<sub>3</sub>)]<sub>n</sub> (1) and [Cu(L<sup>2</sup>)(μ<sub>1,2</sub>-N<sub>3</sub>)]<sub>n</sub> (2), and binuclear [Cu(L<sup>3</sup>)(μ<sub>1,1</sub>-N<sub>3</sub>)]<sub>2</sub> (3) [HL<sup>1</sup> = *N*-butyl-*N*-(5-bromosalicylidine)ethane-1,2-diamine, HL<sup>2</sup> = *N*-butyl-*N*-(5-chlorosalicylidine)ethane-1,2-diamine, HL<sup>3</sup> = *N*-butyl-*N*-(salicylidine)ethane-1,2-diamine] have been synthesized and characterized. Characterizations of 1–3 have been accomplished by usual physico-chemical techniques such as elemental analysis, FTIR, UV-vis and single crystal X-ray diffraction studies. X-ray diffraction analyses of 1 and 2 reveal that the monomeric units of 1D polymers are inter-connected via the μ<sub>1,2</sub>-azido bridging. The coordination geometry around the copper(II) centers in 1 and 2 can be best described as a distorted square pyramidal environments. Complex 3 shows a centrosymmetric structure with two copper(II) centers that are held together by μ<sub>1,1</sub>-azido bridging in a distorted square pyramidal environment. In the electrical studies of 1–3, both direct current (dc) and alternating current (ac) analyses have been carried out based on the metal-complex (1,2/3)-metal (M-S-M) structures. The sheet resistance of the deposited films and the metal-complex contact resistance are estimated by employing transfer length method (TLM) measurements. The dark current-voltage characteristics of Al-complex (1,2/3)-Al structures are analyzed by considering dual back-to-back Schottky barrier diode structure. The voltage variations of the device current under illumination (400–700 nm) clearly demonstrate the photo-sensitivity of these materials. The catalytic activities of 1–3 have been investigated towards aerial oxidation of 3,5-di-*tert*-butylcatechol. All three complexes exhibit potential catalytic effectiveness towards oxidation of 3,5-di-*tert*-butylcatechol (3,5-DTBC) to 3,5-di-*tert*-butyl-*o*-quinone (3,5-DTBQ) with turnover numbers 14.76, 33.92 and 81.02 l<sup>-1</sup> for 1, 2 and 3, respectively.

## 1. Introduction

Metal-assembled Schiff base coordination polymers (CPs) of first row transition series have afforded a great deal of interest in the last three decades [1–5]. Different structural dimensionalities and multifunctional uses in non-linear optics [6,7], magnetism [8,9], solar cell [10,11], light emitting diode [12,13], sensor [14], Schottky barrier diode [15,16], photosensitive electronic device [17,18], selective gas storage [14,19], ion exchange ability [20], fluorosensor [20,21], biological activity [22, 23] and catalysis [24,25] make those compounds applicable in a wide range of fields. These types of compounds have attracted much attention of researchers due to their easy synthetic accessibility, great versatility

in molecular structures and low cost [26]. Generally, the organic ligands with N and O donor atoms are mostly used for construction of such coordination polymers [27,28]. Coordination polymers are normally organic-inorganic solid hybrid materials formed by repeating units joined through different bridging ligands known as linkers, such as pseudo halides like azide [29,30], thiocyanate [17,18], dicyanamide [31,32], cyanate [33,34], etc. and hence, they provide a high structural flexibility [18].

Several recent works have already revealed that suitable band gaps, electrical conductivity, charge mobility, charge activation energy, the dark and illuminated current-voltage characteristics of the Schottky barrier diodes and good electronic properties of CPs play a crucial role in

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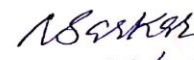
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## A STUDY ON AVIAN SPECIES DIVERSITY IN PURBASTHALI OXBOW LAKE AND ADJACENT AREAS, WEST BENGAL, INDIA

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### ABSTRACT

Purbasthali Oxbow Lake (also known as Chupi Char) is made by the Ganges/Bhagirathi River on its Western Bank, in Purba Burdwan District, West Bengal, India. Different types of animals like Fishes, Arthropods, Mollusks, Reptiles, and Birds can be seen in Chupi Char. Due to abundant food available throughout the year in the form of aquatic Arthropods, Mollusks, Fishes, etc., the lake attracts several birds throughout the year. A large number of migratory birds come to this lake during the winter season. The present study deals with the bird's diversity and analyzes the number of birds in Purbasthali Oxbow Lake and also identifies them. About 95 avian species belonging to 15 orders and 34 families were recorded during this study. Among the recorded avian species, 59.3 % were residents, and 40.7 % were winter migratory.

Keywords: Avian, Purbasthali Oxbow Lake, Aquatic, Migratory Birds, Diversity

### INTRODUCTION

Wetlands are the most productive and biologically diverse ecosystem in the world which serves as an ideal home for different types of animals, plants and microorganisms [1]. Birds are one of the important indicators which determine the health of the Wetlands [2-4]. Avian Species play a crucial role in many food webs of the aquatic ecosystem through nutrient cycling and as a part of the food web, as potential pollinators and bio-indicators [5,6].

Purbasthali Oxbow Lake (also known as Chupi Char) is created by the Bhagirathi River on its Western Bank, in Purba Burdwan District, West Bengal, India. This lake is the habitat of different types of aquatic Arthropods, Mollusks, Birds, Fishes, and Reptiles [7]. Due to abundant food available throughout the year in the form of aquatic Arthropods, Mollusks, Fishes etc., the lake attracts several birds throughout the year. A large number of migratory birds come to this lake during the winter season. It is now a great place for eco-tourism. As a lot of migratory birds come to this lake during winter, many tourists are attracted to this place. The present study deals with bird diversity analyzes the number of birds in Purbasthali Oxbow Lake and determines the existing threats to the avian species of the concerned wetland.

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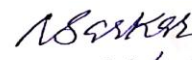
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