VIRUS : IMPACTS

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Dr. Sajal Bhattacharya
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Virus: Impacts

Published by:

Research and Development Cell,
Asutosh College
In association with Publication Cell,
Asutosh College
92, S. P. Mukherjee Road,
Kolkata – 700026, West Bengal
India
Email: publication.cell@asutoshcollege.in

Date of Publication: 5th Ma

ISBN : 978-81-956797-4-4

Price : ₹ 1120.00

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CHAPTER 5

Impact of COVID-19 Pandemic on Biodiversity and its Conservation

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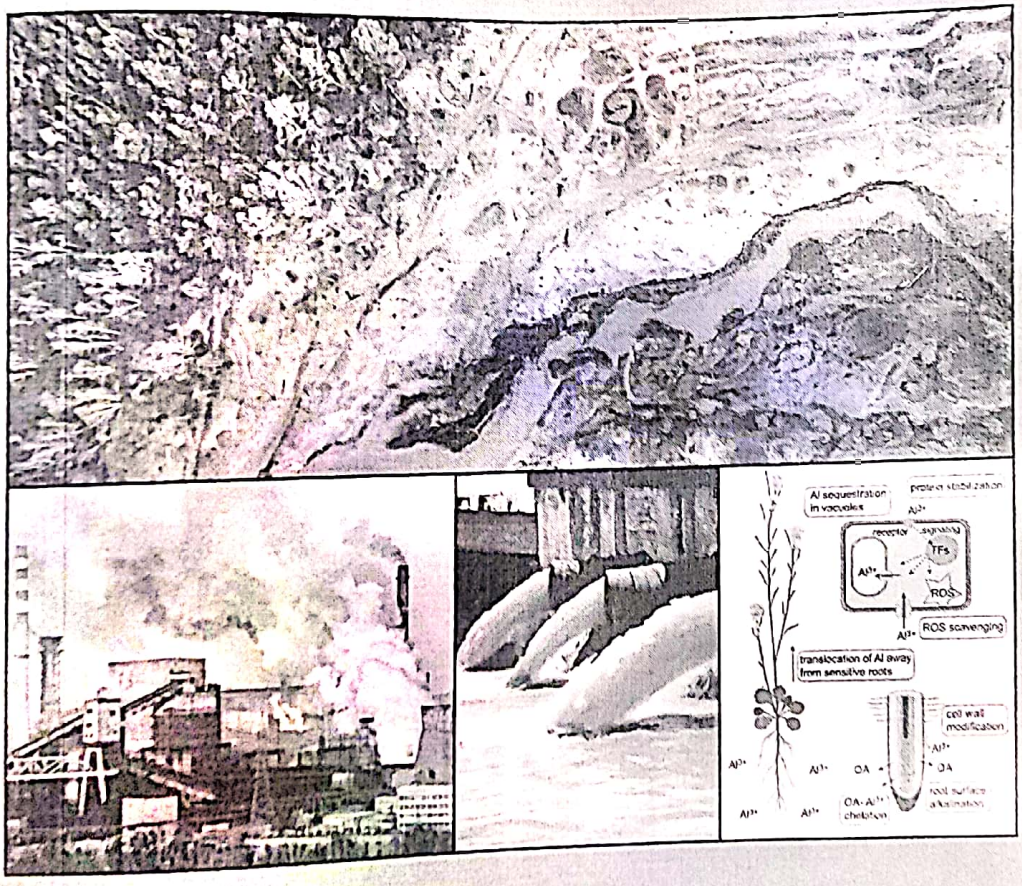
Abstract

Over the centuries a number of disease outbreaks have caused loss of human life worldwide. The recent outbreak of COVID-19 pandemic and associated global lockdown affected not only the human health but it also impacted socially and economically the different ecosystems of the world. This article provides an overall impression of the effect of the COVID-19 pandemic and global lockdown on biodiversity and its conservation. The restrictions and lockdown imposed by different governments worldwide during the COVID-19 pandemic period reduced the industrial and automobile emissions that led to a decrease in pollution which not only improved human health but also wildlife and biodiversity in general. But in contrast to a number of positive effects, the lockdown incurred financial loss and the conservation budget

Heavy Metal Toxicity and Tolerance in Plants

A Biological, Omics, and Genetic Engineering Approach

Edited by
Mohammad Anwar Hossain • AKM Zakir Hossain • Sylvain Bourgerie
Masayuki Fujita • Om Parkash Dhankher • Parvez Haris



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14

Arsenic Toxicity and Tolerance in Plants

Insights from Omics Studies

Barsha Majumder, Palin Sil, and Asok K. Biswas

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14.1 Introduction

Anthropogenic intrusions along with soil mineralization and weathering have accentuated heavy metal accumulation in the biosphere perturbing ecosystems worldwide. Heavy metal accumulation in soils adversely affects environmental health of soil organisms, hampers crop growth, and lowers productivity (Gill 2014). Bioaccumulation of these heavy metals in the food chain is an environmental distress and a critical health concern for plants as well as animals (Emamverdian et al. 2015). The nonessential ubiquitous environmental contaminant arsenic (As) has received attention lately owing to the ecotoxicological risks posed by metalloid. Arsenic is the 20th most abundant element in earth crust and constitutes about $5\,\mathrm{mg\,kg^{-1}}$ of earth's crust existing in soil at concentrations ranging from 0.1 to $40\,\mathrm{mg\,kg^{-1}}$ (Mirza et al. 2014). Arsenic contamination in soil and ground water is one of the worst natural geo environmental disasters reported globally (Dey et al. 2014). However, the crisis is acute in South East Asian countries particularly Bangladesh, India (West Bengal), Taiwan, and China where the concentration of the metalloid exceeds far beyond the permissible threshold of $0.01\,\mathrm{mg\,l^{-1}}$ as stated by the World Health Organization (McCarty et al. 2011). The US Environmental Protection Agency (EPA) and the International Agency for Research on Cancer (IARC) have classified arsenic as a Class I human carcinogen. More than 200 million people worldwide, with approximately 38 million residing in the Indo-Bangladesh region are chronically exposed to elevated concentrations of the toxicant through food, water, soil and air are afflicted with long-term health adversities. Wide range of health consequences in humans include arsenicosis, black foot disease, cognitive impairment, neurological defects, diabetes mellitus, chronic kidney disease, various forms of cancer, cardiovascular, and peripheral vascular diseases (Flora 2011; Luis et al. 2019).

In soil, arsenic exists principally in two biologically relevant oxidative states: pentavalent arsenate [As(V)] and the trivalent arsenite [As(III)]. Arsenate is found under aerobic conditions, whereas arsenite predominates the anaerobic environment (Abedin et al. 2002;

Heavy Metal Toxicity and Tolerance in Plants: A Biological, Omics, and Genetic Engineering Approach, First Edition. Edited by Mohammad Anwar Hossain, AKM Zakir Hossain, Sylvain Bourgerie, Masayuki Fujita, Om Parkash Dhankher, and Parvez Haris.

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ISBN 979-8-89233-319-1

Contents

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Publisher, Exporter & Bookstore
B-21 Ved & Shiv Colony Budhh Vihar Phase-2 Delhi-110084

☎ - 91-9999868875, 9999862475

Certificate of Publication

Gender and Society

ISBN : 978-93-94424-93-7

Year of Publication- 2023

Dated 28-07-2023

This is to certify that the article entitled
FEMINISM IS ABOUT EQUITY, NOT EQUALITY

Authored By MRS. CHANDRIMA DAS
of NETAJI NAGAR COLLEGE FOR WOMEN, KOLKATA

The Chapters has been passed through rigorous peer review process in terms of originality and quality of work by reviewer panel

Sanjeev Yadav (Publisher)

Gender and Society

Edited by

Dr. Prabir Ghosh
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ABS BOOKS
Delhi-110086

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ISBN : 978-93-94424-93-7

Edition : 2023

Published by

ABS Books

Publisher and Exporter

B-21, Ved and Shiv Colony, Budh Vihar
Phase-2, Delhi - 110086
✆ : +919999868875, +919999862475
✉ : absbooksindia@gmail.com
Website : www.absbooksindia.com

PRINTED AT

Trident Enterprise, Noida (UP)

Overseas Branches

ABS Books

Publisher and Exporter

Yucai Garden, Yuhua Yuxiu
Community, Chenggong
District, Kunming City,
Yunnan Province -650500
China

ABS Books

Publisher and Exporter

Microregion Alamedin-1
59-10 Bishek, Kyrgyz
Republic- 720083
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Gender and Society

By : Dr. Prabir Ghosh, Dr. Ramesh Chandra Mondal, Snehabrata Mukherjee, Sonali Roy Chowdhury Ghosh, Mauleena Bera & Sohan Das

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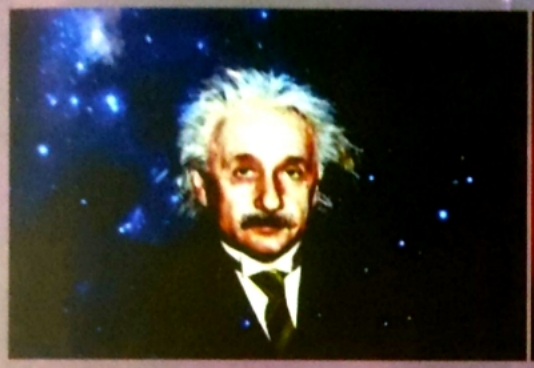

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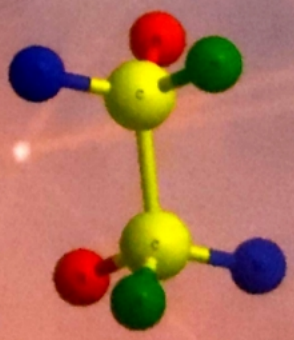

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His another noble contribution is *Translation of chemistry Text Book (Class - XII) under W.B.C.H.S.E into Santali Language (Olchiki Script).*

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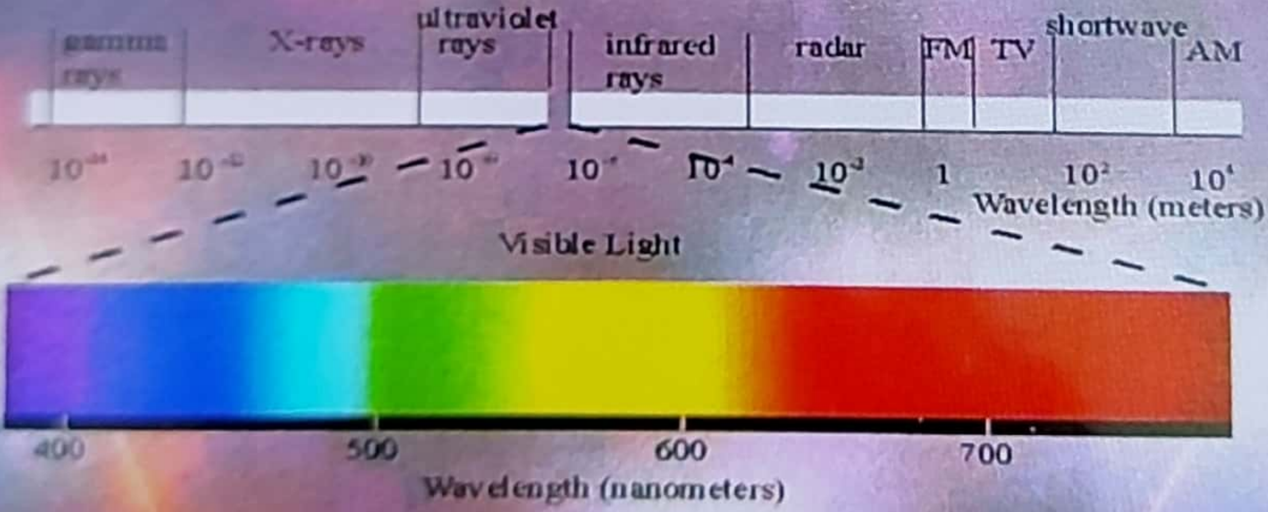

Taurean Publications
Kolkata • New Delhi
Email: taureanpublicationskolkata@gmail.com
Website: www.taureanpublications.org

₹ 395
ISBN: 978-93-95202-31-2

NIRANJAN MONDAL

OH PRIEST, GIVE ME THE SEEDED BANANA!

Translators

Upama Mukherjee | Debarati Maity | Biswajit Das
Ritupriya Bhanja | Sayonti Mukherjee | Ananya Bhattacharyya
Sremoyee Majumder | Arpita Dutta | Kathakali Ghosh
Oudarjya Pramanik

Edited by
MRINMOY PRAMANICK

NEW DELHI CALCUTTA

Hawakal PUBLISHERS

HAWAKAL PUBLISHERS
70 B/9 Amritpuri, East of Kailash, New Delhi 65
33/1/2 K B Sarani, Mall Road, Calcutta 80

Email info@hawakal.com
Website www.hawakal.com

Cover designed by Bitan Chakraborty

First edition (paperback) January 2023

ISBN: 978-93-91431-85-3 (paperback)

Price: INR 300 | USD 12.99

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OH PRIEST, GIVE ME THE SEEDED BANANA!

Naran, after keeping aside his books and copies, walks up to the edge of the embankment. On the vast bank of river Bidya, stretches an extensive forest—inclusive of Gemo, Baine, Garan, and Keora trees. Naran goes and stands at the estuary of three rivers along with his friends Haren, Tapan, and Nitai. In the south, river Melmel traverses from Satjelia; river Bidya in the west transits from Gosaba to Mollakhali in the east. On the southern side of the estuary, the green mangrove on the extensive river island of Hetalbari, and the vast forestlands of Rangabeliya in the west, jointly create an enchanting ambiance. Nitai, with his ferryboat, is visible at a distance. The ferry covers the three banks— *Hetalbere*, *Kachubere* and *Rangabele*. The boat now enters the forest of Rangabele bank. The trees in the *Bada* forest are very long and thick. In the daytime, the light and shadow dance and create a theatrical effect. While, in the evening, the place reverberates with the soothing sound of birds. Naran dreams of crossing the river in Nitai's boat and seeing that forest. He aims to wander through the green forest leading through the paths of Baine, Garan, and Gewa—from the beginning till the end.

It is a new moon night. The tide is high, and water bulges at the embankment. The water level rises at high tide during noon, and during low tide, the water level recedes and exposes

THE OLD LADY ON THE MOON SPINS THE CHARKHA

Currently, Naran's *pathshala* remains closed due to the puja holidays. Today, Naran and Haren took his clay flute to Chandikhali's water canal. The waterbody has been adorned with newly bloomed crimson lillies. Naran starts playing his flute with the utmost care as he sits on a hill.

The golden paddy fields are everywhere, and rows of *lebbek, neem, arjun, babla,* and *jhau* trees adorn the lush greenery across the canal bank. A *Pankauri* is fishing in the water, and a *Daakpakhi* is crooning as it runs over the red lily leaves. A kingfisher is perched on a neem branch, and its scarlet and blue wings appear beautiful. The bird dives into the water and draws out a floating fish whenever it spots one.

Silently, a white *kujbuck* with brownish wings waits in the water; it grabs a fish as soon as it sees one and flies off. Naran is engrossed in playing the flute. His compassionate flute's mystic melody creates waves among the golden paddy fields and blends into the faraway horizon.

During this dewy season, an incorporeal euphony is unfurled across the isolated plain by the shrill cry of a swallow-tailed kite flying across the canal's verge and the pleasing melody of the clay flute. "Naran, it's past midday; get up, and let's go home." Haren's intrusion restores Naran's senses. Two of them head back to their home. Today is the full-moon night of *Kojagori*. Every

Violence

in Literature, Culture and Society

Edited by

ABU SIDDIK

AUTHORS PRESS

Worldwide Circulation through Authorspress Global Network
First Published in 2023
by
Authorspress
Q-2A Hauz Khas Enclave, New Delhi-110 016 (India)
Phone: (0) 9818049852
E-mail: authorspressgroup@gmail.com
Website: www.authorspressbooks.com

Violence in Literature, Culture and Society
ISBN 978-93-5529-666-5

Printed in India at Thomson Press (India) Limited

Contents

CHAPTER 9

Reconceptualising Marital Rape: Sexual Violence and Trauma in Meena Kandasamy's *When I Hit You: Or, A Portrait Of The Writer As A Young Wife*

Debarati Maity

Introduction

Hegemonic masculinity, which legitimises power dynamics within gender roles and relationships, has been recognised as the root cause of gender violence. The negative masculine ideal founded upon gender exclusivity endorses and encourages aggression and dominance in males over females and other males. In the words of Bell Hooks, "The first act of violence that patriarchy demands of males is not violence toward women. Instead, patriarchy demands of all males that they engage in acts of psychic mutilation, that they kill off the emotional parts of themselves. Suppose an individual is not successful in crippling himself. In that case, he can count on patriarchal men to enact rituals of power that will assault his self-esteem" (66). So, men are often confronted with a 'crisis of masculinity' (Kimmel 1987) within patriarchy and require "masculinity-validating experience" (Dubbert 164) as steroids for affirming male superiority over females. According to Baugher and Gazmararian, intimate partner violence issues from masculinity dysfunction, ensuing from threatened "idealised masculine identity" causing distress and self-distrust (2015). This accounts for the perpetuation of violence by intimate male partners in society.

Undefended at Home

The segregation and categorisation of spaces into public and private are responsible for immunising men of state power and legal control,

DIGITAL INNOVATION FOR PANDEMICS

CONCEPTS, CHALLENGES, CONSTRAINTS, AND OPPORTUNITIES

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A pandemic does not only bring health concerns for society but also significantly affects individuals and government and business operations. Recently, COVID-19 has substantially hampered conventional businesses and organizations worldwide. Digital technology can help achieve business continuity and overcome challenges caused by pandemic situations. Digital innovation is the application of digital technology to existing business problems. Ideas such as digital transformation and digitization are closely related to digital innovation. In this pandemic period, many businesses recognize that they need to transform, innovate, and adopt new technologies to stay competitive. However, digital transformation is an inherently complex process, and the time pressure to adopt quickly may result in further complexities for organizations in fostering digital technologies.

Digital Innovations for Pandemics: Concepts, Challenges, Constraints, and Opportunities presents the potential of digital responses to the COVID-19

First Edition published 2023
by CRC Press
6000 Broken Sound Parkway NW, Suite 300, Boca Raton, FL 33487-2742

and by CRC Press
2 Park Square, Milton Park, Abingdon, Oxon, OX14 4RN

CRC Press is an imprint of Taylor & Francis Group, LLC

ISBN: 978-1-032-20772-8 (hbk)
ISBN: 978-1-032-35761-4 (pbk)
ISBN: 978-1-003-32843-8 (ebk)

DOI: 10.1201/9781003328438

Typeset in Garamond
by Apex CoVantage, LLC

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First Published
February, 2023

ISBN 978-81-7572-202-6

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মাটি একটি অত্যাবশ্যক প্রাকৃতিক সম্পদ যা বিভিন্ন ধরনের বাস্তুতান্ত্রিক পরিষেবা প্রদান করে থাকে। যেমন মাটির জল ধারণ ক্ষমতা, মাটি একত্রিতকরণ, পুষ্টি চক্র এবং পুষ্টি পদার্থের সঞ্চয়, অণুজীবদের বৈচিত্র্য এবং কার্যকারিতা ইত্যাদি। মাটির অবক্ষয়কে মৃত্তিকার স্বাস্থ্যের অবস্থার পরিবর্তন হিসাবে চিহ্নিত করা হয় যার ফলে মৃত্তিকার বাস্তুতান্ত্রিক পণ্য ও পরিষেবা প্রদানের ক্ষমতা হ্রাস পায়। 'মাটির স্বাস্থ্য' এবং 'মাটির গুণাগুণ' শব্দটি বিশ্বব্যাপী ক্রমশ পরিচিত হয়ে উঠছে। মাটির স্বাস্থ্য বলতে মাটির ভৌত, রাসায়নিক এবং জৈবিক প্রক্রিয়ার একটি ভারসাম্যপূর্ণ অবস্থাকে বোঝায় যা উচ্চ উৎপাদনশীলতা এবং পরিবেশগত মানের জন্য সহায়ক। মাটির স্বাস্থ্যের ধারণাগুলি সাধারণত মাটির পরিবর্তনগুলি মূল্যায়ন করতে, মাটির তুলনা করতে বা ভূমি-ব্যবহার ব্যবস্থাপনার কার্যকারিতা মূল্যায়ন করতে ব্যবহৃত হয়।

Natural Resources Conservation Service–USDA-NRCS, 2012; Soil Renaissance, 2014 অনুসারে মাটির স্বাস্থ্যর (Soil Health) সংজ্ঞা হল—'the continued capacity of the soil to function as a vital living ecosystem that sustains plants, animals and humans' এবং Doran and Parkin (1994) অনুসারে 'মাটির গুণাগুণ' (Soil Quality) হল—'the capacity of a soil to function, within ecosystem and land use boundaries, to sustain productivity, maintain environmental quality, and promote plant and animal health.' সুতরাং সুস্থ মাটি তার জৈবিক, ভৌত-রাসায়নিক এবং খনিজ উপাদানগুলির মধ্যে সুষম মিথস্ক্রিয়া বজায় রেখে কার্যকারী হয়। গত এক দশকে মাটির স্বাস্থ্যর নিবিড়ভাবে অধ্যয়ন ও অনুশীলন করা হয়েছে যা কিনা বিশ্বব্যাপী সামাজিক, পরিবেশগত, এবং অর্থনৈতিক স্থায়িত্ব উন্নত করতে সাহায্য করবে।

মৃত্তিকা স্বাস্থ্য মূল্যায়ন বলতে বোঝায় মাটির উপযুক্ততা ও কার্যকারিতা বিশ্লেষণ এবং এর প্রতিরোধ ও অবক্ষয় থেকে পুনরুদ্ধার হওয়ার ক্ষমতা। ভূমি ব্যবস্থাপক, চাষি এবং গবেষকরা বিভিন্ন গুণগত এবং পরিমাণগত সূচক ব্যবহারের মাধ্যমে মাটির একটি আপেক্ষিক মূল্য নির্ধারণ করে থাকে, যেমন মাটির সংকোচনের ফলে মাটির গঠন

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কলকাতা- ৭০০০০৯ থেকে মুদ্রিত।

ই-মেল: doshor.publication@gmail.com

ISBN : 978-81-953349-6-4

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বর্ণসংশোধন
সংকল্প সেনগুপ্ত

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Non-fiction
Edited By Atanu Sasmal
published by Doshor Publication, Kolkata

Rs. 1500.00

পশ্চিমবঙ্গের কোড়া জন-জাতির সংস্কৃতি ও প্রকৃতিচেতনা

সমীরণ কোড়া

সম্প্রতি সমগ্র বিশ্বের একটি উল্লেখযোগ্য চর্চিত বিষয় হল পরিবেশ। অথচ পরিবেশ-কেন্দ্রিক এই চর্চা ঊনবিংশ শতাব্দীর পূর্বে ছিল প্রায় উপেক্ষিত। কিন্তু বর্তমানে এই প্রসঙ্গে সমগ্র পৃথিবী তার চিন্তাভাবনাকে অবতারণা করতে যেন একপ্রকার বাধ্যই হয়েছে। কারণ, মনুষ্য সমাজ আজ অস্তিত্বহীনতার প্রশ্নে জর্জরিত। তাই বিদ্যালয় থেকে শুরু করে বিশ্ববিদ্যালয়ের সিলেবাসে, গবেষণাগার সমস্ত ক্ষেত্রে প্রকৃতি-চর্চা আজ অন্যতম গুরুত্বপূর্ণ বিষয় হয়ে উঠেছে। বস্তুত প্রকৃতি বিষয়ে বিজ্ঞানীরা ঊনবিংশ শতাব্দীর দ্বিতায়ার্ধ থেকেই মানুষকে সচেতন করে আসছিলেন। যার প্রারম্ভিক পর্যায় হিসাবে চিহ্নিত করা যেতে পারে রাচেল কার্‌সনের 'দি সাইলেন্ট স্প্রিং'-এর লেখনীকে। যে লেখনীর মাধ্যমে কোথাও যেন সচেতনতার বার্তার মধ্য দিয়ে চিন্তাশীল মননকে নাড়িয়ে তুলল। পরবর্তীকালে সচেতনতার এই বার্তা উত্তরোত্তর বৃদ্ধি পেয়েছে নানান মাধ্যমে। বিশেষ করে উল্লেখ করা যেতে পারে, সম্মিলিত জাতিপুঞ্জের আহ্বানে ১৯৭২ খ্রিস্টাব্দে সুইডেন-এর স্টকহোমে, ১৯৯২-এ ব্রাজিলের রিও দ্য জানেরিও-তে, ১৯৯৭ খ্রিস্টাব্দে কিয়োটোর সম্মেলনকে। যে সম্মেলনে বিভিন্ন দেশের প্রতিনিধিদের উপস্থিতিতে গৃহীত হয়েছিল পরিবেশ সচেতনতার বিভিন্ন সংকল্প। কিন্তু বাস্তবে সেই সংকল্প অনেকাংশেই পরিণতি লাভ করেনি। যার অবশ্যম্ভাবী ফল রূপে পৃথিবী আজ প্রায় ধ্বংসের মুখে।

পুঁজিবাদী আগ্রাসী সভ্যতা উন্নয়নকে হাতিয়ার করে যেভাবে প্রতিমুহূর্তেই অরণ্যভূমি, মালভূমি, পাহাড় পর্বত থেকে শুরু করে অসংখ্য জনপদ, অসংখ্য মানুষকে বাস্তুচ্যুত করে তুলেছে, তাতে 'উন্নয়ন' নামক শব্দটি আমাদের কাছে যেন আশঙ্কা রূপে পরিবর্তিত হয়েছে। যেখানে উন্নয়ন ও পরিবেশ একে অপরের পরিপূরক হতে পারত, সেখানে তারা হয়ে উঠেছে পরস্পরের শত্রু। তাই শুধুমাত্র

J Mater Sci: Mater Electron (2023) 34:1597

Functionalized MWCNT-integrated natural clay nanosystem: a promising eco-friendly capacitor for energy storage applications

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Received: 4 April 2023
Accepted: 18 July 2023
Published online: 27 July 2023

ABSTRACT

This study delves into the structural and morphological characteristics of MWCNT-doped natural kaolinite nano clays, leading to significant changes in their electrical and electrochemical properties through the doping processes. Specifically, MWCNT has been doped using two different methods, resulting in distinct physicochemical properties. In one approach, a chemical route has been employed to modify the surface of MWCNT and kaolinite, creating an alignment that forms "micro capacitors" with enhanced electrical polarizability. Conversely, the uncontrolled growth of the nanocomposite results in a random arrangement, exhibiting lower charge storage efficiency. The characterization of naturally formed kaolinite and its conjugated counterparts have been investigated via conventional characterization tools like XRD, FESEM, TEM, EDS, Zeta, etc. The XRD refinement has been adopted to investigate the microstructural evaluation of the nanocomposites by the MAUD software package. The findings indicate that natural kaolinite-MWCNT nanocomposite shows promise as a "green alternative" and has the potential to replace conventional storage materials effectively if appropriately refined.

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https://doi.org/10.1007/s10854-023-11007-3

Polymeric thin film fabrication for colorimetric, ratiometric, and fluorometric detection of hazardous industrial effluents in wastewater

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Abstract

Polymeric thin films have become a favorable alternative owing to their excellent aspect ratio, porosity, and other physicochemical properties. Meanwhile, scientists have engineered such polymeric thin films using numerous nanomaterials and organic ligands in augmenting their binding affinity and selective detection capacities of toxic effluents in wastewater. In reality, fluorometric, colorimetric, and ratiometric detection pathways show dominance in this regard. In this topical review, we aim to discuss the methodologies of different spectrometric detection rationales of industrial effluents in a broader spectrum. Moreover, recent advancements in such fields have also been discussed, which could be useful for future researchers.

Key points

- Recent scenarios along with adverse effects of industrial effluents on the health and environment have been discussed.
- Advantages of using polymeric thin film-based sensors over conventional pollutant sensing techniques have been explored.
- Different sensing modalities have been depicted which follow FRET, PET, and IFE.
- Application and benefits of using colorimetric and fluorometric sensing have been discussed.

1 Introduction

Water is a key element of the earth essential for the existence of life yet freshwater comprises only 3%, out of which only 0.01% is available for utilization (Dudgeon et al., 2006). Despite such scarcity, most freshwater sources are now under serious stress due to ongoing industrialization, unplanned urbanization, and unsustainable utilization of water in various agricultural and industrial sectors (Cosgrove and Loucks, 2015). A recent report by the World Health Organization (WHO) indicates that there is a rapid decrease in the availability of clean, potable water within a few decades as around 2.6 billion people worldwide accessed the enhanced drinking water source in the year 1990, which by 2015 is 663 million (Vardhan et al., 2019). Moreover, a report by the World Water Council reveals that around 3.9 billion individuals will live in the water scarcity zone by 2030 (Xu et al., 2018). Thus, the demand for a continual supply of clean water is exponentially increasing with the rapidly growing population, and it is becoming practically unfeasible to keep pace with the requirement (Biswas, 2006). Moreover, contamination from industrial discharges, dumping of untreated wastes, spilled petroleum products, carcinogenic organic wastes, and mine drainage renders the freshwater unsuitable for consumption and hazardous to health (Jayaswal et al., 2018). In the last few decades, increased industrialization, as well as globalization, has a massive contribution to the increase of various emerging water pollutants like fertilizers and pesticides, heavy metals, pharmaceuticals, dyes, tannery wastes, and endocrine-disrupting compounds. In most cases,