Souvenir

National Seminar on
Environment Management in 21st Century
Challenges & Opportunities
on 28th November 2021

Organised By

SARASWATI DEGREE VIDYA MANDIR

Neelakantha Nagar, Berhampur, Odisha

Souvenir

Regional Conference of Orissa Chemical Society

&

National Seminar

on

Environment Management in 21st Century-Challenges & Opportunities

on

28th November, 2021

In Collaboration with

P.G. Dept. of Chemistry

Berhampur University, Berhampur, Odisha

&

P.G. Dept. of Chemistry

Khallikote Unitary University, Berhampur, Odisha

Organised By

Saraswati Degree Vidya Mandir

Neelakantha Nagar, Berhampur, Odisha

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24th REGIONAL ORISSA CHEMICAL SOCIETY CONFERENCE and National Seminar on Environment Management in 21st Century - Challenges and Opportunities on 28th November 2021 (Sunday)

PROGRAM

08.00 – 09.45 AM : Registration & Breakfast

09.45 –10.00 AM : The delegates will assemble in the lecture hall.

Inaugural Session. Session Chair: President, OCS

10.00 – 10.15 AM	:	Meeting preliminaries	Inviting the Guests and others on stage, lighting lamp, opening song, etc.
10.15 – 10.25 AM	:	**Dr. Shashadhar Samal** President, OCS	The President OCS presides over the meeting and delivers the welcome address
10.25 – 10.30 AM	:	**Dr. Subrat Kumar Panigrahy** Principal, SDVM	Welcome address by the Principal & Introduction of the Guests
10.30 – 10.35 AM	:	**Dr. Priyaranjan Mohapatra** Secretary, OCS	Scope and importance of OCS Regional Conference
10.35 – 10.40 AM	:	**Dr. Srikant Mahapatra** President, SDVM	To address the audience
10.40 – 10.45 AM	:	Sarat Chandra Science Promotion Award 2021	OCS Award to Sri Maheswar Nayak, winner of the award
10.45 – 10.55 AM	:	To honor the distinguished persons for their exemplary service towards Environment Protection & Management	1. **Dr. Rajat Kumar Panigrahi** Principal, ITI, Berhampur. 2. **Sri Sudhir Kumar Rout** Environment Activist 3. **Dr. Shankar Narayan Beja** Eco Club, Coordinator
10.55 – 11.05 AM	:	**Prof. Ashok Kumar Mishra** Prof. of Chem., IIT, Madras Guest of Honour	Address by the Guest of Honour
11.05 – 11.20 AM	:	**Prof. Govind J. Chakrapani** Honorable Vice-Chancellor, BU Chief Guest	Address by the Chief Guest
11.20 – 11.25 AM	:	**Dr. Anadi Singha Mahapatra** HOD, Chemistry, SDVM	The Head, Department of Chemistry, SDVM, Presents vote of thanks.

TECHNICAL SESSIONS

Technical Session I

Session Chair : Prof. Ashok Kumar Mishra
Co-Chair : Prof. Ellarani Pattanaik

11.30 – 12.00 Noon: Keynote Address
Prof. S. Raghavan
IISER, Berhampur
Catalytic Reactions for Efficient Organic Synthesis and Minimal Environmental Impact

12.00 – 12.10 PM : Tea Break

Technical Session II

Session Chair : Dr. Sarat Chandra Das
Co-Chair : Dr. Arun Kumar Barick

12.10 – 12.40 PM : Invited talk
Prof. Paritosh Mohanty
IIT, Roorkee
Heteroatom enriched high surface area nanoporous materials for CO_2 capture and utilization

Technical Session III

Session Chair : Prof. Sarat Chandra Swain
Co-Chair : Dr. Bibhuti Bhushan Parida

12.40 – 01.10 PM : Invited talk
Dr. Smita Mohanty
CIPET, Bhubaneswar
Alternatives to Single Use Plastics- Research Opportunities Towards Development of Eco-friendly Polymeric Materials

01.10 – 02.30 PM : Lunch Break
The POSTERS will be displayed and will remain so until the end of the Poster Session.

Technical Session IV

Session Chair : Dr. Rupasree Ragini Das
Co-Chair : Dr. Panchanan Gouda

02.30 – 03.00 PM : Invited talk
Prof. Debabrata Pradhan
IIT, Kharagpur
Potentials of Transition Metal Hydroxides in Environment Management

Technical Session V

Session Chair : Prof. Asutosh Samantaray

03.00 – 04.00 PM : The presenters of the posters will remain present near their respective posters. The judges will evaluate their research during this period.Tea Break

Closing Session

Session Chair : Dr. Chitta Ranjan Mishra
Co-Chair : Dr. Satyanarayan Sahoo

04.00 – 04.10 PM	:	Meeting preliminaries	Inviting the Chief Guest and others on stage
04.10 – 04.15 PM	:	Session Chair's address **Dr. C.R. Mishra**	The relevance of the conference's theme.
04.15 – 04.30 PM	:	Participants' Feedback	Three participants will be invited to give their feedback on the conference.
04.30 – 04.35 PM	:	Presentation of certificate to the winners of the Poster Competition	The winners will receive the certificates from the Chief Guest.
04.35 – 04.40 PM	:	**Sri Narayan Panda** Secretary, SDVM	Address to the august gathering
04.40 – 04.50PM	:	**Prof. Prafulla Kumar Mohanty** Honorable Vice-Chancellor, KUU Chief Guest	Address by the Chief Guest
04.50 – 04.55 PM	:	**Dr. Shashadhar Samal** President, OCS	The President, OCS, will give his closing remarks.
04.55-5.00 PM	:	**Dr. Bibekananda Panda** Dean, SDVM	Vote of thanks
05.00 PM	:	The meeting comes to a close followed by group photograph.	

GRATITUDE

We extend our gratitude to all the well wishers, Management Committee Members of our College , Executive Body of Orissa Chemical Society, P.G. Dept. of Chemistry, Berhampur University & P.G. Dept. of Chemistry, Khallikote Unitary University for their sincere support and cooperation in conducting the National Seminar and preparing the ***Souvenir****.*

Prof. Dr. Prafulla Kumar Mohanty
Vice-Chancellor

Khallikote Unitary University
Brahmapur, Ganjam, Odisha-760 001
Mobile Number - 92385 71378
Email : prafulla.mohanty3@gmail.com

07th November, 2021
Sunday

MESSAGE

It is, indeed, a great pleasure to mention that Saraswati Degree Vidya Mandir, a leading and disciplined educational institution of South Odisha, is venturing to organise one day National Seminar on Chemistry in association with "Orissa Chemical Society", "Berhampur University" and "Khallikote University" on 28th November, 2021, Sunday.

Chemistry is such a subject that its existence, role action, reaction and interaction are reflected and realized in home, our body, food, soil, ecosystem, biosphere and even what not. Therefore, there is a popular saying as follows:

"YESTERDAY IS HISTORY.
TODAY IS CHEMISTRY and
FUTURE IS MYSTERY."

Many a times, Chemistry comes to picture with respect to archaeological structure, monuments, building, bridges, dams and specifically Taj Mahal, Red Fort, Qutub Minar, Temples etc. Seriously speaking, effect of chemicals in various foods such as food additive, preservatives, shelf life enhancers, acidulants, fixatives, flavour enhancers, synthetic colour additives and artificial inorganic chemicals are a matter of great concern as for as our health is concerned. in present scenario, this seminar is justified and through provoking.

The seminar will certainly be a congenial platform to encourage, inspire and motivate various cross section of participants in crossbreeding of ideas on chemistry with its history, mystery, story and glory.

I wish the deliberation, discussion and dissemination be useful, fruitful, helpful and resourceful. Let it also be educative, informative, effective, productive and predictive.

07th November, 2021.

(Prof. Dr. Prafulla Kumar Mohanty)

Dr. Shashadhar Samal
President

Orissa Chemical Society
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Email: samal_s@live.com

MESSAGE

In the last few years, the effect of climate change is increasingly being felt. About five decades ago, the air, water, and soil were not contaminated to theextent today. That environmental pollution and climate change are attributed to human activities were proved beyond doubt, when in 2020 the humanity suffered from COVID19. For the first time in human history, the entire world population was locked up in their homes.With that, all modes of transportation, air, water, and surface, came to a grinding halt. All working avenues, such as factories, shops, malls, hotels, clubs, institutions and organizations, were shot down. In a matter of weeks, the deserted cities and towns had a very different look. The air became cleaner; the sky turned blue, more stars appeared in the night sky. The river and seawaterseemedcleaner. One could hear birdsin more significant numbers happily chirping, jumping, and flying with their newfound freedom. In certain places of the world, jungle animals started roaming the city streets, perhaps wondering where all the human beings had gone! The climate change and the seasonal changes we witness now, therefore, can be reversed if human beings are taken off the world map, or their habits are changed to what those were half a century ago. Neither of these is possible. In a situation like this, human practices that cause climate change can be reversed through technology. Our dependence on scarce natural resources for energy production, over-dependence on synthetic materials that pollute and contaminate air, water, and soil, can be minimized and may ultimately be entirely done away with.

The purpose of this Regional Conference of Orissa Chemical Society is just that. The conference organizers, Saraswati Degree Vidya Mandir, in association with Berhampur and Khallikote universities, are conducting a national seminar on “Environment Management in 21st Century – Challenges and Opportunities” on 28th November 2021. The speakers of the conference will deliver lectures on the theme.Their research experience and expertise will undoubtedly enlighten the delegates of the meeting. Particularly, students, research scholars, and young faculty members will amply benefit from the conference.

I am sure the untiring efforts of the organizers in the last several weeks will be gratifying. Icongratulate and thank the organizers and the organizing institutions’ authorities for this noble gesture and wish the conference a grand success.

(Dr. Shashadhar Samal)

Dr. Priyaranjan Mohapatra
Secretary-cum-Treasurer, OCS

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MESSAGE

Scope and Importance of OCS Regional Conference

The Orissa Chemical Society (OCS) is the apex scientific society of the chemists of Odisha. It was conceptualized in the School of Chemistry, Sambalpur University, in 1985, and the Society was formed with late Professor Mahendra Kumar Rout as the Founder President. In the last 36 years, OCS has grown in strength with about 1200 Life Members and 200 Patron Members. Founded on the principle of equal emphasis on teaching and research in chemical sciences, the OCS has attracted many members from inside and outside the state. In recent years, there has been a growing trend of increased participation of chemists from industries.

The Society conducts regional conferences and one annual meeting every year in different regions of the state so that the entire chemical community of the state comes to a single platform for the cause of chemistry. Many young researchers and faculty members contribute to the conference proceeding with oral and poster presentations. Best research papers and doctoral thesis are awarded prizes and medals. For the last several years, the OCS has been promoting programs to attract higher secondary students to the fascinating world of chemical sciences by organizing Summer Camps and Olympiads.In 2020, despite the pandemic caused by the Coronavirus, the OCS organized two One-Day Extended Lecture Series and an OCS-Industry Interface Meet in the virtual platform. Speakers were from across the country and abroad. These online meetings were highly informative. Several hundreds of chemists participated.

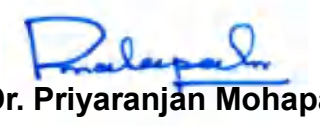
The regional conferences primarily aim at bringing together chemists in the region, and deliberations are made on a selected theme. This year, Saraswati Degree Vidya Mandir, Berhampur, came forward with a proposal to the OCS to hold the regional conference. Based on their experience in efficiently conducting such a conference, the OCS was pleased to accept the invitation. The meeting is being held today(28th November 2021) in this institution with a National Seminar on the theme “Environment Management in 21st Century – Challenges and Opportunities”. The OCS has invited four experts on thesubject as speakers. All these speakers have years of research experience in their respective fields.

I am sure we shall be amply benefited listening to theirpresentations. Abstracts have also been invited from researchers of the region and state. These research findings will be presented in a Poster Session. I am sure the delegates will find this interactive session very informative and rewarding.I am delighted to note that the Local Organizing Committee has announced prizes for the best posters. The LOC is honouring three distinguished persons who have been doing pioneering work on environment management. This will undoubtedly encourage others to devote their life to more such innovative activities.

To promote and popularize science at the base level education, the OCS has instituted the 'Sarat Chandra Science Promotion Award'for school teachersin the education district they work in Odisha, having an outstanding contribution to promoting science education among school students. The award is given at the Regional Conference of the OCS. This year the award goes to Sri Maheswar Nayak, TGT, Science (CBZ), Govt. Nodal U. G. High School, Purushottampur, Ganjam.Sri Nayak will receive the award today in the inaugural meeting.

The closing ceremony will be devoted to a discussion on teaching and research scenarios in the state. A debate on the relevance of the conference's theme, particularly the opportunities before the future generation, and incorporating the subject in the curriculum may be worthwhile. The feedback from the delegates will help the OCS for further improvement in the future.

I thank all the delegates for their participation. I am sure they will find this conference valuable and memorable. My thanks are to the Invited Guests in the inaugural and closing functions, the Speakers, Local Organizing Committee members,Saraswati Degree Vidya Mandir, Berhampur University, and Khallikote University, the past Presidents of the OCS, and the Members of the OCS Executive Committee for their kind support to make this Regional Conference a grand success.



(Dr. Priyaranjan Mohapatra)

Dr. Ashok Kumar Mishra
Professor

Dept. of Chemistry,
IIT Madras,
Chennai, India,
Email : mishra@iitm.ac.in

MESSAGE

It gives me great pleasure to learn that a regional Conference of Orissa Chemical Society together with National Seminar on "Environment Management in 21st Century- Challenges & Opportunities" is being organized by the Saraswati Degree Vidya Mandir, Neelakantha Nagar, Berhampur in collaboration with the P.G. Department of Chemistry, Berhampur University and Khallikote Unitary University on 28th November 2021.

Saraswati Degree Vidya Mandir has been the flag bearer of high quality education in recent years and has produced many outstanding scholastic achievers who are not only brilliant in academics but also excellent in demonstrating moral values and character. What we need now is the kind of education that not only builds well information individuals but also empowers them with the right analytical and creative skills to face and solve the problems of tomorrow.

Conducting Seminars play an important role in this regard. Within the broad spectrum of science, chemistry education occupies a very important place to understand all things that are material including their synthesis and transformation during application from housing to health, food to drugs, etc. I hope this seminar will give special emphasis on transforming the quality of our science education, particularly in the field of chemistry, so that we can produce human resources who will earn accolades for the nation in the fields of science and technology in the international arena as well as helping us to be self reliant.

I wish the seminar all success and hope that it will greatly benefit the organizers in transforming the quality of education.

(Dr. Ashok Kumar Mishra)

Dr. Srikant Mahapatra
President

Saraswati Degree Vidya Mandir
Neelakantha Nagar
Berhampur

MESSAGE

The institution has been glorifying its track record in the state producing many top rankers every year. Saraswati Degree Vidya Mandir worship education and spread the sense of fraternity.

Since last 3 years Saraswati Degree Vidya Mandir produced rankers in all Hons. subjects also produced Best Graduate under Berhampur University.

Apart from these successes, we need to improve the academic skill of our faculty members and students as well. We can neither neglect nor deny the role of chemistry in the career of a science student as it is the integral part of science.

Wish this will provide an excellent platform to all of us.

Srikanta Mahapatra
(Dr. Srikant Mahapatra)

Sri Narayan Panda
Secretary

Saraswati Degree Vidya Mandir
Neelakantha Nagar
Berhampur

MESSAGE

With rapid advancement in chemistry & chemical sciences each one of us do need to update, share & interact on a conducive platform to bridge the gap of knowledge. Saraswati Degree Vidya Mandir Neelakantha Nagar, Berhampur always promote academic growth and believe in quality education.

I extend my gratitude to all the members of Odisha Chemical Society, vice chancellor of Berhampur University & Khallikote Unitary University, Faculty fraternity from P.G. Dept. Chemistry, Berhampur University & Khallikote Unitary University who have whole heartedly extended their unconditional cooperation for development of education in south Odisha.

I wish good wishes to all the participants who are over here to make this seminar successful

(Narayan Panda)

Saraswati Degree Vidya Mandir
Neelakantha Nagar
Berhampur

Dr. Subrat Kumar Panigrahy
Principal

MESSAGE

It gives me immense pleasure & excitement to welcome all the dignitaries, invitees, faculties, scientists, and my friends for the oneday National Seminar hope this seminar would be a purposeful, stimulating and informative to all of us. Certainly this will provide us a great platform to share & exchange our views in the sphere of education and research.We are obliged to the executive body members of Orissa Chemical Society for their encouragement and efforts.

From the core of heart I extend my gratitude & thankfulness to all the participants and delegates who spent their precious time over here. Wish & pray this National Seminar / Regional Conference of OCS would be a meaningful & memorable event in span of our memory.

(Subrat Kumar Panigrahy)

Saraswati Degree Vidya Mandir
Neelakantha Nagar
Berhampur

Prof. Dr. Bibekananda Panda
Dean

MESSAGE

Welcome to the silk city and the knowledge hub of odisha - Saraswati Degree Vidya Mandir, Neelakantha Nagar, Berhampur.

I am happy that Orissa Chemical Society is organising its Regional Conference and National Seminar on Environment in 21st Century Challenges and Opportunities at SDVM, Neelakantha Nagar.

The National Seminar will definitely attribute in acquiring expertise and knowledge by strongly dwelling on subjects concerning research activities in the fields of emerging environmental hazards and making it greener and healthier.

Please be assured of the best possible arrangement at, and of the venue that will make your stay comfortable, so that you will carry pleasant memories back home. Highly committed local committee is making all efforts, with a smile to make your presence memorable.

My best wishes to all of you for the success of the conference and seminar.

(Prof. Dr. Bibekananda Panda)

Dr. Anadi Singha Mahapatra
HOD-Chemistry

Saraswati Degree Vidya Mandir
Neelakantha Nagar
Berhampur

MESSAGE

Under the professional guidance and clear sighted vision of our respected Principal and our honourable management members, Saraswati Degree Vidya Mandir, Neelakantha Nagar continues to march on the way of success with confidence. The role students in nation building cannot be overlooked and students of our institute are trained in all aspects of education to become successful in professional life and to become a good citizens. The disciplined and competitive students of our institute repeatedly made us proud with excellent result every year. The importance of seminar and conference to generate scientific knowledge among the students and for their all-round development cannot be ignored. We are thankful to Orissa Chemical Society for giving us the opportunity to conduct national seminar on Environment Management in 21st Century - Challenges and Opportunities, in collaboration with PG department of Chemistry Berhampur University and Khallikote Unitary University

I convey my best wishes to all the participants, respected delegates, faculty members and dear students.

(Dr. Anadi Singha Mahapatra)

COMMITTEE

Patron :

Sri Narayan Panda
Secretary, Managing Committee
Saraswati Degree Vidya Mandir
Neelakantha Nagar, Berhampur

Advisory Committee

1. **Prof. Bijaya K. Mishra**
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2. **Prof. Dr. Satyaban Jena**
   Ex-President, Orissa Chemical Society
3. **Prof. Asutosh Samantaray**
   Ex-President, Orissa Chemical Society
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   Ex-President, Orissa Chemical Society
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11. **Dr. Braja Narayan Patra**
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12. **Dr. Satyanarayan Sahoo**
    HOD-Chem, Berhampur University
13. **Dr. Bibhuti Bhusan Parida**
    Chem. Dept., Berhampur University

Principal cum Convenor

Dr. Subrat Kumar Panigrahy
Principal, SDVM, Neelakantha Nagar
Berhampur

Co-Convenor

Dr. Anadi Singha Mahapatra
HOD-Chem, SDVM

Organizing Secretary

Prof. Dr. Bibekananda Panda
Dean, SDVM, Neelakantha Nagar, Berhampur

Coordination :

1. Prof. Dr. Bibekananda Panda
2. Prof. Dr. Umesh Sahu
3. Prof. Dr. Rajendra Murty

Guest Invitation:

1. Smt. Puspanjali Moharana
2. Smt. Payal Subudhi
3. Sushree A. Deepti
4. Smt. Pritismita Sahu

Registration

1. Smt. Puspanjali Moharana
2. Smt. Payal Subudhi
3. Smt. Pritismita Sahu

Accommodation

1. Sri Sidharth Sankar Panda
2. Sri Snehansu Mohapatra
3. Sri Ansup Kumar Panda
4. Dr. Susant Kumar Indrajitsingha

Souvenir

1. Dr. Satyanarayan Sahoo
2. Dr. Anadi Singha Mahapatra
3. Dr. Sunasira Misra

Press & Media

1. Sri Govind Pujari
2. Sri Bhagaban Moharana

Saraswati Degree Vidya Mandir at a Glance

Saraswati Degree Vidya Mandir, Neelakantha Nagar, Berhampur has been rendering its services in the field of education and social service to the people of Berhampur and its periphery. It has brought a revolution in educational system and has proved in the course of time how education should be imparted among the masses by producing rankers with cent percent results.. We have now students from all the nook and corner of Odisha and the neighbouring states. Now it can't be denied if we call Saraswati Degree Vidya Mandir as a miniature Odisha.

Besides +3 Science, it also imparts intensive JAM / Banking / Civil Services coaching to its aspirants. The students of this institution are benefitted to take coaching for NIT, NEET, NISER, IISER, etc. from the bonafide and experienced faculty members. Every year, students also qualify in different entrance examinations and many of our students are now pursuing their career in I.I.T , Medical, NIT, etc.

We have full-time dedicated and experienced faculty members who always try to give their best for all - round development of the students. In true sense, the team of faculties keep their strict vigil for the proper grooming of the students. They are not the mere employees here but do the role of guide, friend and philosopher. Their contribution for the proper grooming of the students can't be explained simply in words.

The institution has got permission for 256 seats in + 3 Science affliated to Berhampur University. It has fullfleged laboratories for all branches of science with all the necessary equipments. Practical classes are conducted regularly under the strict supervision by experienced faculty members.

The college has a huge library with a serene reading room. Books and reference books on all subjects are there. There are about 5,000 books in the library. At the same time, journals, magazines, newspapers are there for the students to make them updated with the pace of time. Our students bag state level prizes in various competitions such as debate, quiz, declamation, extempore, essay, composing poems, patriotic & solo song competitions, seminars, exhibitions etc. We also lay emphasis on Spoken English and soft skill development of our students. We have doubt clearing classes where students can clarify their doubts from out teachers. Students who are weak in their studies get the facility of remedial classes.

The college puts its best effort for the betterment of its students. We conduct unit tests & seminars in every week on all the subjects in order to know how the students have grasped the lessons that are already taught to them. At the same time, we have Review Meetings in every week to know the performance of our students. If students are found not doing well in any subject, special care is taken for their improvement. Our motto is not only to make our students well in their studies but to make them perfect citizens of our nation so that they will be ready to take any responsibility and challenge in their lives in the time to come.

CONTENT

Keynote Lecture

Catalytic Reactions for Efficient Organic Synthesis and Minimal Environmental Impact

Prof. S. Raghavan
Department of Chemistry,
Indian Institute of Science Education and Research (IISER)
Transit Campus (Govt. ITI Building), Engineering School Junction, Berhampur
Odisha 760010, Email: raghavans@iiserbpr.ac.in

The talk shall highlight the evolution of "Organic Synthesis" from it being synonymous with "Natural Product Synthesis" to the current state of it being a central science. Organic synthesis impacts all aspects of everyday modern life. Though organic synthesis, as practiced by the pharmaceutical industry, is considered to be polluting, it cannot be wished away. Catalysis is an answer to make organic synthesis efficient and reduce environmental pollution. The talk shall delineate examples of catalytic asymmetric transformations that resulted in the award of the Nobel Prize. Also, the asymmetric synthesis employing metal-catalyzed/organocatalytic reactions of two target molecules, Brefeldin A and Amphidinolide K, undertaken in the speaker's group shall be discussed. A common theme in the synthesis of the above bioactive molecules is the utilization of α-chloro sulfides as key intermediates for stereoselective carbon-carbon bond formation.

Invited Lecture-I

Heteroatom Enriched High Surface Area Nanoporous Materials for CO_2 Capture and Utilization

Prof. Paritosh Mohanty
Functional Materials Laboratory, IIT Roorkee
Email: paritosh75@gmail.com, pm@cy.iitr.ac.in

In the last few decades, consumption of a huge amount of fossil fuels for energy production has led to the unprecedented rise in the CO_2 content in the atmosphere causing the devastating environmental phenomenon known as *"global warming"*. The all-out effort of most of the developed and developing countries could not even make an appreciable difference to this deadly effect. Moreover, even after a lot of efforts, the renewable and non-conventional energy sources jointly could contribute only <20% of the total energy need. Among several approaches explored in recent time, both carbon dioxide capture and sequestration (CCS) and carbon dioxide capture and utilization (CCU) are considered as the most promising pathways. These jointly could provide some relief to the management of CO_2 while providing sustainable energy and solutions to the environment. In this direction, utilizing CO_2 to make molecules/materials for energy production and also products of industrial importance can definitely contribute towards sustainability. For these applications, synthesis of appropriate materials that can satisfy the need is the primary and most crucial step. Both the theoretical investigations and experimental studies have indicated the dependency of both capture of CO_2 and its catalytic conversion to the heteroatom enrichment as well as control over the textural properties of the nanoporous materials.

In this direction, our research group has developed methodologies using both conventional and non-conventional approaches to synthesize heteroatoms enriched high surface area nanoporous materials designated as MNENP, HNM, CHNM, NENP, HCPANI, and many more. All these materials have been characterized using state-of-the-art analytical techniques. The synthesized materials have high SA_{BET} of 304, 807, 1283, and 707 m^2g^{-1} in MNENP, HNM, CHNM, and NENP, respectively, with hierarchical pore structure in their frameworks. The large heteroatoms content (MNENP-32.6 wt%, HNM-40 wt%, CHNM-8 wt%, and NENP-52 wt%) in these frameworks made them a special class of functional materials. These high surface area heteroatoms enriched materials are investigated for gas sorption and storage. The maximum CO_2 capacity at 0 °C was estimated to be more than 33 wt% at 1 bar, while the capture capacity reaches as high as 167 wt% at 30 bar. The maximum $H_2$and CH_4 storage capacities of 3.5 wt% (at 0 °C and 100 bar) and 15.5 wt% (at 0 °C and 30 bar) were estimated. Further, these materials were utilized as metal-free organocatalysts for the conversion of CO_2 and epoxides to cyclic carbonates thermochemically and CH_4, CH_3OH, and C_2H_5OH electrochemically, respectively. For the synthesis of cyclic carbonates traditionally, a combination of catalyst and co-catalyst systems are used. The noteworthy achievement in this research is the exclusion of the co-catalyst by introducing heteroatom driven multi functionalities in the framework

that could activate the synthesis of cyclic carbonates with upto ca. 100% conversion and selectivity, at 100 °C and 4 bar of CO_2 pressure within a reaction time of 12-36 h. When compared, ca. 100 % conversion was obtained when HNM was used, while CHNM shows only 64.5% conversion under identical experimental conditions. From this observation, it was proved that among the textural properties and large heteroatom content, the catalytic activity depends on the amount of heteroatoms content present in the framework in the nanoporous materials with moderately high specific surface area. The specific surface area may not play a very significant role beyond a certain limit. Superior recyclability with a retention of 79, 84, and 89.8% of their initial activity after five cycles in the MNENP, HNM, and NENP, respectively, has further justified the use of these catalysts for the CO_2 utilization.

Further, the materials MNENP and NENP are utilized as electrocatalysts for electrochemical reduction of CO_2. The MNENP is found to be active for the conversion of CO_2 to CH_4 and CH_3OH. However, NENP could convert CO_2 to C_2H_5OH with faradaic efficiency (FE) of 68% at a potential of -0.5 V *vs.* RHE and CH_4 with FE of 16% at potential -0.6 V *vs.* RHE. There are very few reports available on metal-free catalysts for such conversions. The superior performance of the catalysts for both thermochemical and electrochemical conversion of CO_2proves not only the versatility of the catalysts but also the applicability of these synthesized specimens for energy and environmental purposes. In summary, the research is driven with an intention to contribute towards the solution of *"Global warming"* with a real impact on mankind, which I believe is achieved to a greater extent.

Invited Lecture-II

Alternatives to Single Use Plastics – Research Opportunities Towards Development of Eco-friendly Polymeric Materials

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Plastics are the most resourceful class of materials for boundless applications ranging from aerospace, automotive, packaging, electrical & electronics, agriculture, building and construction, and healthcare. In India, Agriculture & Food Packaging Sectors have been the key growth drivers in the increased usage of plastics, having a share of 24 and 23% respectively in total domestic consumption. Increased usage of plastics hasled to the accumulation of waste plastics after their end-of-life resulting in manifold problems. **"Single Use Plastics (SUP)",** often described as **"use and throw"** away plastics have serious concerns owing to their detrimental effects, w.r.t. their long-term durability and stability for a longer period of time, in the environment. The proposed talk shall deliver insight into various eco-friendly alternative materials to SUP their research w.r.t. performance characteristics *vis-à-vis*conventional/traditional plastics. Various alternatives such as compostable polymers, nature-derived polymers, value addition of waste to wealth, and their properties interventions & applications shall be discussed. Additionally, the talk would also provide the possible end-of-life solutions of alternatives to SUP.

Keywords: Plastics, Eco-friendly, Single Use Plastics, End of Life

Invited Lecture - III

Potentials of Transition Metal Hydroxides in Environment Management

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A clean environment is an essential requirement for the good health of living beings. In recent years, the Earth's environment has been deteriorating so fast that life may become highly inhabitable in some parts of the world very soon. The deteriorated environment quality leads to the drastic change in climate as observed in the rise of sea levels, global warming, warmer oceans, longer droughts, and more frequent floods. One of the primary reasons for global warming is the huge consumption of fossil fuels that release tons of carbon dioxide into the environment. Similarly, the release of toxic chemicals by industries to water bodies leads to water pollution. Materials can play an important role in environmental remediation, particularly through catalysis and/or photocatalysis. Among the materials, transitional metal hydroxides can be synthesized at lower or room temperature, thus consuming less energy. Such materials can then be used for applications related to environmental management. In this talk, I'll focus on the synthesis of a few transition metal hydroxides for greener energy generation (hydrogen generation) and energy storage (supercapacitor) applications.

First, synthesis of WO_3 hydrates at room temperature via a simple precipitation method will be presented. In the absence and presence of oxalic acid, orthorhombic $WO_3 \times H_2O$ and monoclinic $WO_3 2H_2O$ nanoplates of size in the range of 200-600 (thickness <50 nm) and 40-200 nm (thickness <20 nm), respectively, can be synthesized. Oxalic acid plays the primary role in the phase transition due to its chelating nature that facilitate bonding of oxalate ions to tungsten cations leading to formation of $WO_3 \times 2H_2O$. These nanoplatesare found to be highly efficient for the photocatalytic detoxification of Cr(VI) in the acidic pH under the visible light irradiation.The best Cr(VI) reduction performance is obtained with $WO_3 \times 2H_2O$ nanoplates due to its smaller band gap and larger effective surface area. In addition, a lower pH value is found to facilitates the Cr(VI) reduction. Moreover, a highly concentrated methylene blue (MB) can beefficiently removed (>95%) through adsorption on the nanoplates within a minute, suggesting the importance and potential of a material that can be synthesized at room temperature. The same hydroxide can be used for generating hydrogen, a chemical fuel.

In another work, we succeeded in forming uniform $Cu(OH)_2$nanobelt-like structure on the copper foil by etching its surface with 2.5 M NaOH and 0.125 M $(NH_4)_2S_2O_8$ (20:1) in 30 mL of Millipore water. Then $Co(OH)_2$nanosheets were electrochemically grown on $Cu(OH)_2$nanobelts to form $Cu(OH)_2$/ $Co(OH)_2$heterostructure at room temperature, which is demonstrated as a binder-free electrode for supercapacitor application.

2H-Chromene Based Imidazo [1, 2-α] Pyridine Derivatives as Potent Peptide Deformylase Inhibitors

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According to current scenario multidrug-resistant (MDR) bacterial infections emerges a great impact in the pharmaceutical industries to identify novel antibacterial drug with new modes of action.[1] Bacterial infections are leading cause of nosocomial infections and increase the death rate every year.[2]Peptide deformylase (PDF) is explored as a striking goal for new antibiotic agent.[3]Recently, Imidazo[1,2-a]pyrimidine and 2*H*-Chromene are found asvery important scaffold for the development of new bioactive molecules[4-5] Hence, an efficient protocol was followed for the synthesis of 2*H*-chromene-based imidazo[1,2-α] pyridines. All these compounds had been investigated further *in vitro* for evaluation of antibacterial potency by agar-well diffusion method against human pathogenic Gram-positive and Gram-negative bacteria, with the determination of minimum inhibitory concentration (MIC) values. Indeed, compound 13i strongly inhibited peptide deformylase (MIC=16 μg/ml) in the Gram-negative *Escherichia coli, in silico*. From structure-activity relationships and molecular docking resultssynthesized compounds could be used as potent antibacterial agents.

Keywords: 2H-chromene, Imidazo[1, 2-α] pyridines, antibacterial, peptide deformylase inhibitor, molecular docking study.

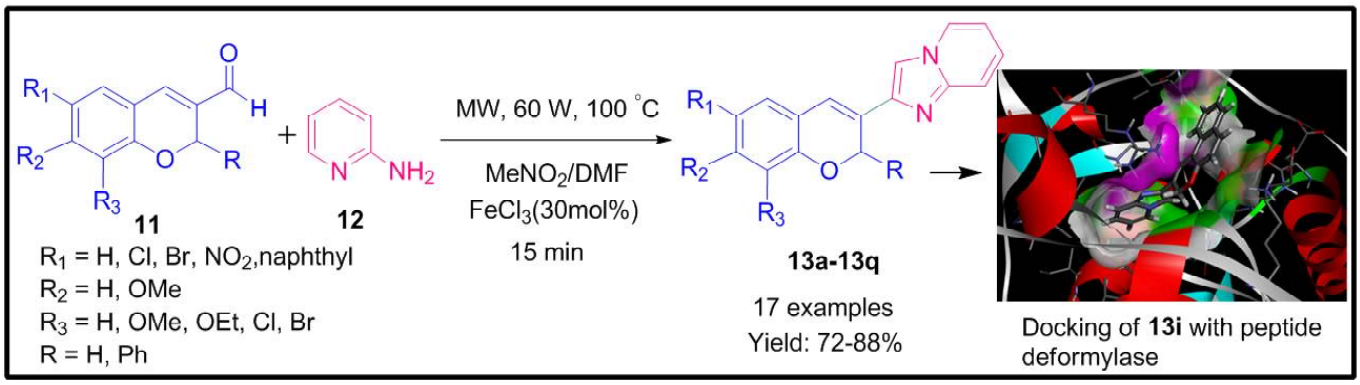

Figure 1:

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Nano BN Reinforced Cellulose-based Tripolymeric Hybrid Nanocomposites as Packaging Materials

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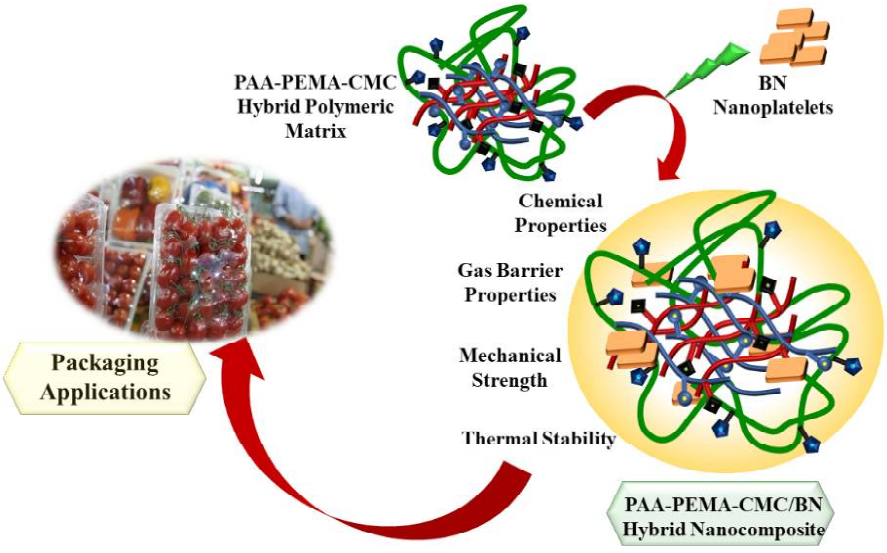
Tripolymeric nanocomposites consisting of polyacrylic acid (PAA), polyethylmethacrylate (PEMA) and carboxymethyl cellulose (CMC) are synthesized by emulsifier free emulsion technique with incorporation of nano Boron nitride (BN). The exfoliation of BN platelets is achieved due to increase in basal spacing. It is observed that incorporation of BN nanoparticles shows remarkable inhibition of gas penetration. Further, the uniform dispersion of nano BN results in reduction of oxygen permeability upto five times. The layered structure of the BN nanoparticles also leads to the improvement in mechanical strength of the overall nanocomposite material. The significant lowering of permeability with combined improvement in tensile strength and thermal stability enables the materials for potential packaging applications.

Keywords: tripolymer; hybrid nanocomposites; barrier properties; packaging.



Fe_3O_4@$BaMoO_4$: Eu a luminescent magnetic nanoparticles and its application for drug carrier

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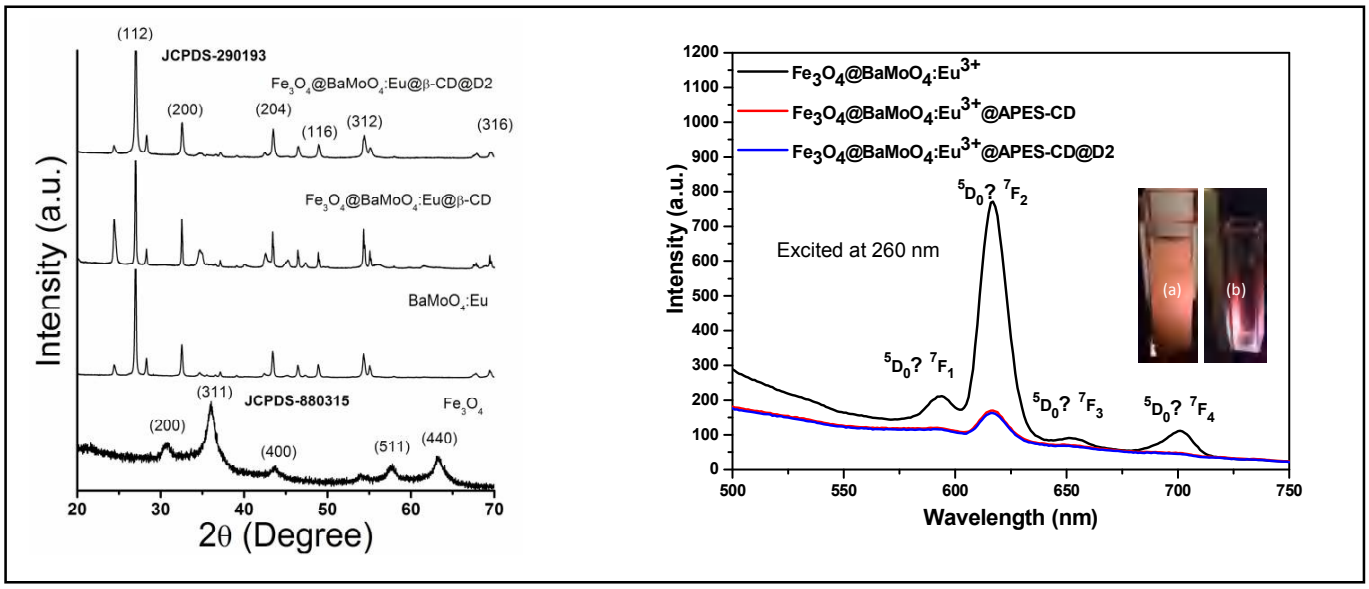
In this study, Fe_3O_4@$BaMoO_4$:Eu luminescent magnetic nanoparticles (LMNPs) were successfully prepared using ethylene glycol. XRD, FTIR, PL and TEM are utilized to analyze the structure of the sample, while VSM is used to investigate magnetic properties. To investigate the LMNPs for its application in drug carriers, LMNPs are functionalized with β-cyclodextrin using APTES and loaded with triazole derivatives as drug molecules. Experimental results in this investigation depicted that the release profile of triazole derivatives from nanoparticles showed a burst release during the initial 5h followed by sustained release after that. A LMNP functionalized with β-cyclodextrin, was, therefore, a robust synthetic procedure for the conversion of the nanoparticles into a drug vehicle

Keywords: luminescent magnetic nanoparticles, β-cyclodextrin, drug carrier.



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Green Synthesis and Biological Applications of Multifunctionalized Glycolipids

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Glycolipids are versatile molecules, which have found application in various fields of science and technology as well as in medical science. Natural glycolipids are made up of a sugar unitwhich is attached to the aglycon chain by glycosidic bond. Since, extraction and purification of the naturally occurring glycolipids is a tedious job, synthetic glycolipids have found better acceptance. Another advantage of the synthetic glycolipid is that thesesynthetic glycolipids can be tuned according to our demand. In this work, a series of novel peptoid basedglycolipids have been synthesized from propargyl amine based on [3 + 2] cycloaddition reaction. These versatile, synthetic glycolipids have the potential to be used in the field of medicinal chemistry.

Keywords : Glycolipids, Green Chemistry, Synthesis, [3+2] cycloaddition reaction.

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Studies on Preparation, Characterization and Solubility of Some Inclusion Complexes of 4-Thiazolidinone Derivatives with β-cyclodextrin

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Present work was attempted with an objective to increase aqueous solubility of 4-thiazolidinone by cyclodextrin complexation techiquines. 4-Thiazolidinone shows very low aqueous solubility which results in the low oral bioavailability. Hence the work necessities to prepare the inclusion complex to increase solubility and bio-accessibility of the parent compound. A series of compounds of substituted 4-thiazolidinones and their respective inclusion complexes are prepared. Phase solubility diagram is constructed for selection of 1:1 stoichiometric ratio between compound and â-cyclodextrin. Characterization like physical, thermal and spectral (UV, IR and NMR) are used to know compounds and their inclusions. Except this, stability constant and free energy change of both the compound and inclusion complex justify its formation.

Keywords: 4-Thiazolidinone, Phase solubility, Co-precipitation, Inclusion complexes, FTIR

Click Triazoles as Biologically Active Anticancer Agents

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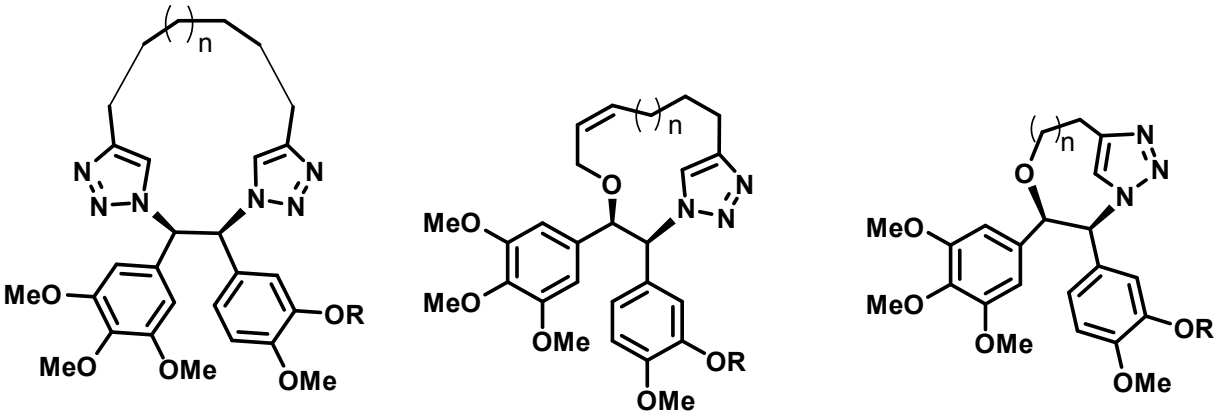
The triazoles have been proved as potential anticancer agents**.** Copper (I) catalyzed click reaction, a green approach and atom- economy reaction, provides a scalable and most robust method of getting 1,4-somer of 1,2,3-triazoles in very high yield. This reaction proceeds through 1,3-diploar cycloaddition of azide and alkyne in green solvents water, ethanol etc. which meets the criteria of green synthesis. The reaction produces the triazoles which normally need no more column chromatography for purification thus avoiding organic solvents polluting environment. Simple filtration usually yield reasonably good to excellent triazoles. Thereby use of more organic solvents is reduced to minimum or zero for environment sustainability for better tomorrow. It has also functional group tolerance, green approach, shorter reaction time, high purity and regiospecificity. Click triazoles leading to plays important role in medicinal chemistry, drug discovery, biomedical science, peptide chemistry, radio chemistry, carbohydrate chemistry.

Representative triazoles:



Keywords: Click chemistry, triazole, cycloaddition, green approach

'Bicyclo' type Ag(I) and Cu(I)- complexes supported by imidazo[1,2-α]pyrimidine; synthesis, structure, DFT studies'

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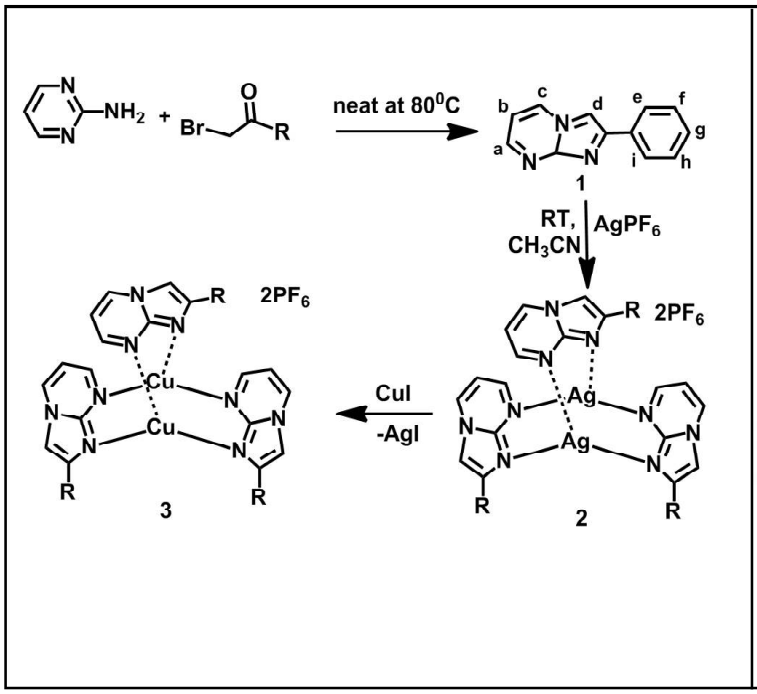
Imidazo[1,2-α]pyrimidine, (**1**) was synthesized by modified pathway through neat reaction; its Ag(I) complex (**2**) and Cu(I) complex (**3**) have been synthesized and characterized by a series of spectroscopic techniques. Complex **2** has been synthesized after floating in acetonitrile solution of ligand **1** into $AgPF_6$. Finally, the solid state structure of **2** has been established by single crystal X-ray diffraction studies (Fig.1). The molecule **2** possess 'bicycle' like geometry. Cu(I) complex (**3**) has been synthesized by transmetallation method. Interestingly, single crystal X-ray diffraction studies establish **2** as a dinuclear complex accommodating three ligands and one CH_3CN coordinated with one Ag. DFT studies were also done to insight into the structures which also supports the weak Ag(I)—Ag(I) and Cu(I)—Cu(I) interactions; TDDFT studies were also performed to compare the experimental electronic spectra.



Scheme 1. Synthesis of Ag(I) and Cu(I) complexes (R = Phenyl group).

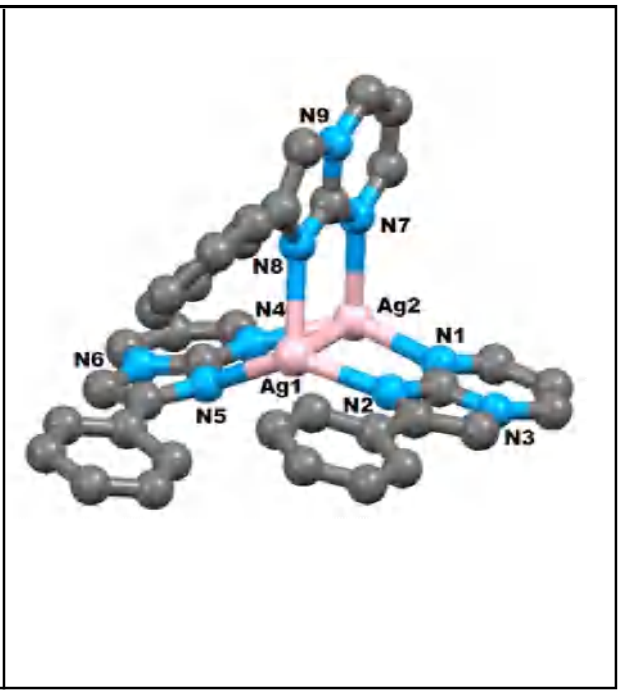


Figure 1: Single crystal X-ray structure of **2** (H, PF_6 atoms are omitted for clarity).

Synthesis of (4*S*)-4-*C*-spiro-glycosyl-chromeno-[3,4-d][1,2,3]triazoles: Biological Evaluation and Molecular Docking Investigation

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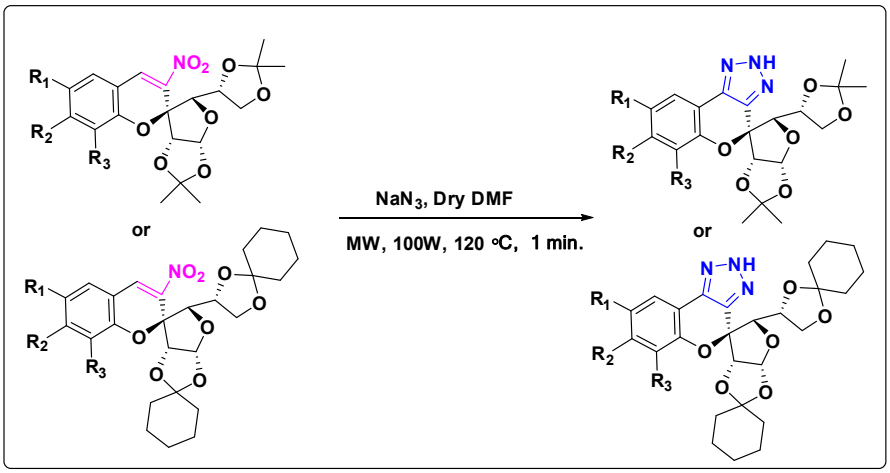
Microwave assisted a novel methodology have developed to obtain (4*S*)-4-*C*-spiro-glycosyl-chromeno-[3,4-d][1,2,3]triazoles following 1,3- dipolar cycloaddition reaction of 2-*C*-Spiro-Glycosyl-3-Nitrochromenes with sodium azide in dry DMF at 100W, 120 °C for 1 minute. The structure of the product was assigned by ^{1}H, ^{13}C NMR and HRMS data and confirmed by single crystal X-ray study. "2-*C*-Spiro-Glycosyl-3-Nitrochromenes were synthesized by oxa-Michael-Aldol reaction of sugar derived 3-*C*-vinyl nitro olefin with substituted salicylaldehydes using Et_3N as base in neat at rt-40°C." This protocol was found to be cost effective, easily accessible, wide substrate scope with high yield and high purity in a very short reaction time. Futhermore, *in vitro* antibacterial activity of these synthesized compounds have examined against *E. coli* and *S. aureus*. The compound have antibacterial activity against *S. aureus* DNA gyrase having zone of inhibition at value 19±0.5 mm and concomitant MIC value at 25 μg/ml respectively. Consequently, molecular docking results agreed with *in vitro* study and the docking results confirmed that compound had binding affinity -9.8 and -8.9 against DNA gyrase and DHPS of *S.aureus*.



Keywords: (4*S*)-4-*C*-spiro-glycosyl-chromeno-[3,4-d][1,2,3]triazoles, 2-*C*-Spiro-Glycosyl-3 Nitrochromenes, 1, 3- dipolar cycloaddition, microwave, multicomponent reaction, molecular docking.

Green Synthesis of Silver Nanoparticles using Neem Extract and Carbohydrates

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For many years, nanoparticles were a topic of extensive research due to their wide-ranging applications in various fields of science, technology and medicine. In recent years, silver nanoparticles (AgNPs) have attracted considerable attention due to their wide range of potential application in medicine, textile industry, food packaging, cosmetic industry, catalysis, antimicrobial activities, clean water technology, energy generation and information storage. But the successful application of silver nanoparticles depends on their physical and chemical properties including catalytic, electronic, magnetic, optical and antibacterial properties which can be regulated by their size, shape, and chemical environment in reaction medium. In place of hazardous and costly chemical reagents different plant extracts can be used as green reagent for synthesis of silver nanoparticles. *Azadirachta indica* (Neem) is a common plant abundantly found in India and Indian subcontinents and is known for its various applications including medicinal property. The present approach involves synthesis of silver nanoparticles using neem extract in combination with differently functionalized sugar molecules.

Keywords : Nano-particles, Green Chemistry, Silver, Neem, Carbohydrate.

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Novel Applications of Plasmas for Surface Modification

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Recently non-thermal plasmas technology is acclaimed worldwide as a green and cost effective process for its smart & novel applications. Smart hydrogels comprising polyvinyl alcohol and carboxymethyl cellulose have been fabricated in the present workn using a green crosslinker tetraethyl orthosilicate. The hydrogels were subjected to cold atmospheric plasma-treatment using pure Ar, pure NH_3 and a mixture of the two. Enhanced surface wettability was witnessed post-plasma treatment; irrespective of the plasma gas employed. An insignifcant surface ageing of the hydrogels was marked upon exposure to air for 10 days. AFM analyses revealed the surface topographical changes at the nano level while the bulk attributes remained unafected. The hydrogels displayed smart swelling features. The release of ibuprofen from the hydrogels in simulated gastric and intestinal fuids afrmed their potential towards oral colon-targeted drug delivery. The preliminary kinetics of drug release indicated the anomalous nature of drug transport mechanism. More so, drug release from plasma-treated hydrogels were predominantly governed by difusion process rather than polymer chain relaxational process. The hydrogels demonstrated good biodegradability and could be efcaciously utilized as potential oral drug delivery candidates.

Keywords : Carboxymethyl cellulose · PVA · DBD plasma · Oral ibuprofen delivery.

Thermodynamic Study of Different Electrolytes in Aqueous Dimethylfomamide at Different Temperatures

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Ultrasonic Velocity (u), Viscosity (h) and density (d) have been measured for some electrolytes like Potassium Chromate, Potassium Dichromate, Potassium Ferrocyanide in aqueous Dimethylformamide (DMF) at different concentrations and temperatures at 5K intervals from 293 K to 313 K. This experimental data is used to find some thermodynamic and acoustic parameters like acoustic impedance (z), free length (L_r), adiabatic compressibility (β), internal pressure (π_i), relaxation time(τ) ,Gibb's free energy (ΔG) at different concentrations and temperatures. From this experiment it is observed that solvent-solvent and ion-solvent interaction depends on concentration, temperature, nature of the electrolyte and ionic size. From adiabatic compressibility the intermolecular elastic forces between the solute and solvent molecule can be explained. Acoustic impedance increases with increases in concentration and temperature which explains the molecular interaction of the solute in the mixture. Free length is the distances between the surfaces of the molecules which decreases with increase in concentration because solute and solvent particles interaction increases which indicates the structural promoting nature due to addition of solute. As temperature increases free length increases due to increase in intermolecular distance between the surfaces of the molecules causes volume expansion which decreases the intermolecular forces. Internal pressure is useful to determine the nature of interaction of molecules in the system which increases with increase in concentration due to more ion-solvent interaction decreases With increase in temperature internal pressure decreases due to increase in thermal energy causes thermal agitation of ions with each other. Increase in temp relaxation time decreases due to structure breaking effect because due to increase in temperature thermal vibration takes place which weakens the H-bond in all the temperature range and for all the electrolytes. Due to rise in temperature Gibb's free energy increases because dissociation takes place due to rearrangement of molecules in solution.

Keywords: Adiabatic compressibility, Acoustic impedance, internal pressure, free length, molecular interaction.

Sequestration of As (III) from Aqueous Solution by Reduced Graphene Oxide

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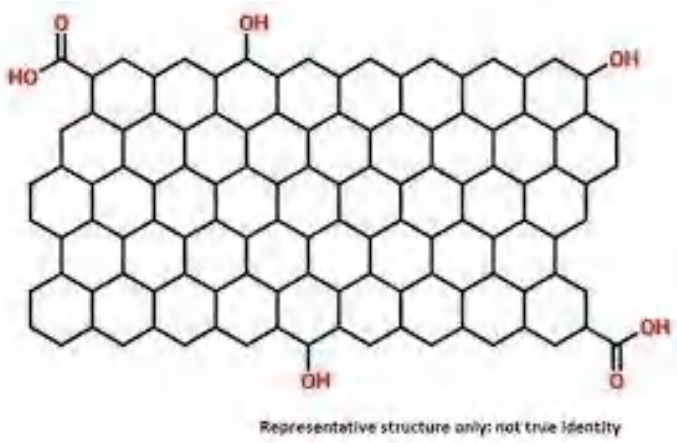
Graphene an allotrope of carbon a 2-dimensional, atomic scale, hexagonal lattice has unique combination of properties i.e. mechanical flexibility, high electrical conductivity and chemical stabilitythat is ideal for next generation electronics. It has a great interest in various fields including electronics,medicine,chemical and industrial process. GO was synthesized by modified Hummer's method. The inorganic arsenic is toxic, both acute and chronic. According to WHO permissible limit of arsenic is 0.01 mg/L. So it is essential to remove As(III) from aqueous solution. Here hydrazine hydrate reduced RGO is usedas adsorbent for removal of arsenic (III) from aqueous solution. Results showed the maximum percentage of adsorption of As(III) for GO and RGO are 89.93%, 92.47% respectively. The q_e value of GO and RGO (hydrazine hydrate) are 1.1557, 1.92638 mg/g and the R^2 value of GOand RGO are 0.99980001and 0.998001 respectively. The sample was characterized by FTIR,XRD and UV-Visible spectroscopy.

(Graphene oxide)



(Reduced graphene oxide)

Complex Catalysed Fabrication and Study of Properties of Poly(AN-co-AM) / Crabshell Powder Biocomposites

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Acrylonitrile (AN) and Acrylamide (AM) monomers are copolymerizedand reinforced with naturally extracted crab shell particles (CSP) as biofillers to finally obtain Poly(AN-co-AM)/CSP biocomposites with improved properties. This study explores the possibility of combining crab shell waste with monomers to create an environmentally friendly and biocompatible polymer biocomposite. The obtained data from FTIR and SEM confirmed that the composites were properly from the constituent samples. The crystal structure of the composite was maintained, as confirmed by the XRD patterns. SEM analysis revealed a homogeneous particle distribution and CSP incorporation in the Poly(AN-co-AM) matrix.The addition of crab shellsupports the favorable improvement of the prepared copolymer matrix composites aids in their development. The thermal analysis reveals that the copolymer matrix filled with CSP increases the initial decomposition temperature and the char yield of composites. Poly(AN-co-AM)/CSP composites exhibited better mechanical strength compared to Crab shell particles. The results showed that the fibrillation of crab shell was properly done. This work leads to the sustainable utilization.

Keywords: Biocomposite, Biofiller, Crab Shell powder, Mechanical Strength, Water absorbency.

The use of Water as in Organic Synthesis

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The utilization of water as solvent in organic synthesis is one the most important tools of green chemistry. The use of water as solvent has a many advantages, such as enhanced reactivities and selectivities of the reactions, simpler workup for the reactions, effective reuse of catalysts, protecting-group free synthesis and mild reaction conditions. In addition, water is considered as the most environmentally benign solvent. Successful use of water as a solvent could significantly reduce the dependence on hazardous chlorinated solvents as well as petroleum derived solvents. This presentation will be focussed on the current status of the use of water in synthetic organic chemistry.

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Well-decorated GOSiMa Hybrid Nanocomposite and Its Dielectric Behaviour

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This work aims to design graphene oxide-based silica@magnesium oxide (GO-SiO_2@MgO) / (GOSiMa) hybrid nanocomposite through a green sol-gel technique by using precursors like GO, tetraethyl orthosilicate (TEOS), and magnesium chloride ($MgCl_2$). The detailed study of newly designed hybrid nanocomposites is investigated by several experiments including TEM, FESEM, EDAX, FTIR, XRD, DLS, and BET. The cyclic voltammetry (CV) behaviour is studied at N_2 and O_2 atmosphere with Ag/AgCl electrode as a reference. A remarkable surface area of 107.6 m^2/g with an average porosity value of 97.86 Å is observed from the BET experiment. The prominent surface area played for the enhanced dielectric behaviour. The dielectric study has shown dielectric constant/permittivity ε' from 10^2 up to 2.5 $\times 10^4$ with the minimal permittivity loss ε'' of $\leq$"10^2 at all range of temperature 22 ºC-185 ºC and frequency range of 10^3 - 10^6 Hz. The effect of polarization, structural orientation and atomic rearrangements are the prime factors for the enhancement of the dielectric constant. Conductivities (σ_{ac}) of this hybrid nanocomposite are measured as 8×10^{-3} S/m in the low-frequency region at 1 kHz and 1×10^{-2} S/m at a high-frequency region of 2 MHz at a temperature of 160 ºC for proving the hybrid nanocomposites as a potential power electronics candidate for application in the charge storage device. The current work highlights the dielectric and charge storage behaviour [1, 2] of the prepared hybrid nanocomposite in a cost-effective and green method.

Keywords: GOSiMa; Dielectric; Permittivity; Potential; Hybrid.

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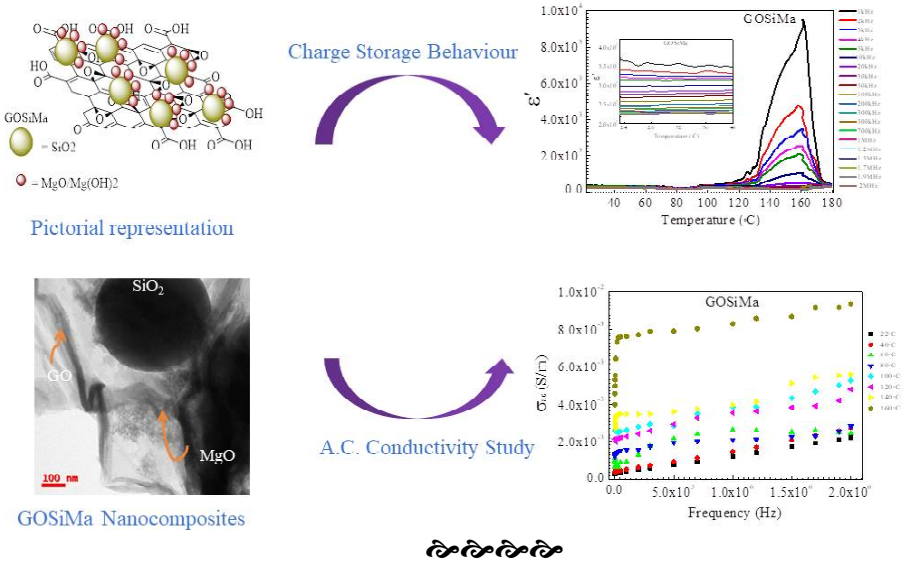

Triazine-cored Dendritic Molecules Containing Multiple *o*-carborane Clusters

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Carboranes are boron and carbon containing polyhedral boron clusters. They can be easily functionalised and resistant to biodegradation.[1]The advantage of carboranes and their metal complexes is that they are chemically and biologically stable, resistant to catabolism and hydrophobic in nature.[2]The high boron content and chemical stability makes them useful for in medicinal chemistry specifically in the synthesis of new anti-cancer drugs.[3] The Cu (I) catalyzed azide alkyne cycloaddition reaction (CuAAC) has been found to be a facile approach for the synthesis of triazine-cored small dendrimers containing three to nine *ortho*-carborane clusters at the periphery.[4] All three carborane-appended dendrimers were synthesized from the single starting compound 2,4,6-Tris(*p*-hydroxyphenyl)-1,3,5-triazine with very good yield. Incorporation of methyl-*o*-carborane increases the thermal stability of dendrimers. The biological evaluation of these three to nine cage dendrimers has been carried out in breast cancer cell (MCF-7) and found that the IC_{50} value of nine cage dendrimer is 80.67 ng/mL, which is the highest toxicity among the three. The toxicity increases as the number of peripheral methyl-*o*-carborane increases in the dendrimers.

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Cubical and Quasi-spherical like Graphene Oxide Embedded ZnO@Metal Oxides Nanocomposites and its Dielectric Behaviour

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This work aims to highlight the enhanced dielectric permittivity and electronic properties of GO-based ZnO, CuO and Ag_2O mixed ternary nanostructured composite via a modified sol-gel based hetero-selection synthesis approach. The cubical and quasi-spherical like Graphene oxide decorated Zinc Oxide based metal oxide nanocomposite is studied carefully through several experiments like TEM, FESEM, FTIR, XRD, Zeta and BET.The specific surface area of such composites is found to be better than free GO/ ZnO composites, with a moderate average porosity value. The dielectric study is performed at broad ranges of frequency pattern of10^3 Hz to 2×10^6 Hz andtemperature range from 25ºC-200ºC. The permittivity constant, loss and σ_{ac} conductivities (at 200°C)forGO/ZnO@$Ag_2O$are found to be 5×10^2 - 3.1 × 10^4, ≤ 4 and 1×10^{-3} S/m and 1.2 × 10^{-2} S/m respectively at all ranges of given frequency and temperature. The effect of enormous oxygen moiety, dipolar formation, interfacial polarization and atomic arrangements are the prime factors for the enhancement of dielectric permittivity and minimal loss of such composites. Similarly, the highest permittivity (60ºC) and σ_{ac} conductivities (at 200°C) of GO/ZnO@CuO are observed to be 2.6×10^3 and 2.25×10^{-4} S/m at 1 kHz respectively. This value is found to be dependent on frequency and increases linearly with the increase in frequency. The present work provides the interesting morphology of mixed which may involve remarkable dielectric and charge storage uses.

Keywords: Cubical; Quasi-spherical; Nanocomposite;Permittivity; Adsorption

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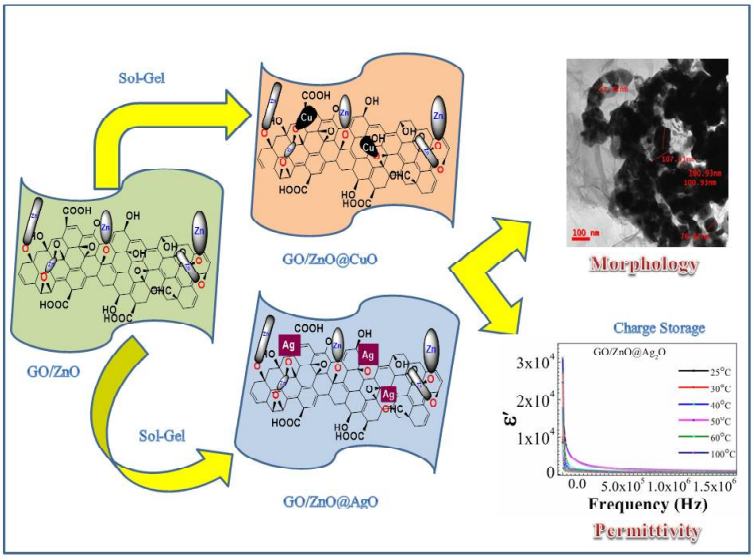

Green Catalysis for the Synthesis of Biologically Active Scaffolds

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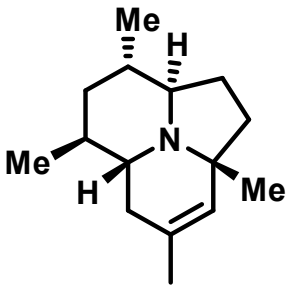
Natural products have tremendous importance in human life as they are highly active from biological perspective. A wide spectrum of bioactive Heterocyclic Scaffolds is used for effective FDA approved drugs preparation. Synthetic Indolizidine analogues having various pharmacological properties such as central nervous system depressant, analgesic, anti-biotics, anti-cancer, anti-oxidant, larvicidal and anti-retroviral are reported. Though varieties of established synthetic methods have been developed to access many relevant heterocyclic scaffolds, still there is need of sustainable synthesis of it. Thus, Catalytic synthesis of diverse heterocyclic compounds like indolizidine derivatives having medicinal relevance are important and need of the hour. Indolizidine, a class of N-Heterocyclic compounds which contain one-six membered ring fused to a five membered ring bridging through a nitrogen atom have varied range of biological activities. The selected synthetic methods involve the use of recyclable catalysts and the green aspects of the synthetic approaches are taken into care. The structure-Activity-Relationship (SAR) studies led derivatives of Indolizidines, which could be tested against the different oncocyte linages for the development of the drugs, used in different chemo-therapy.



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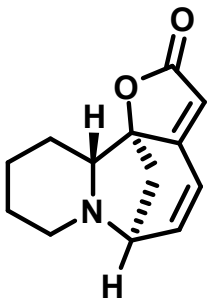

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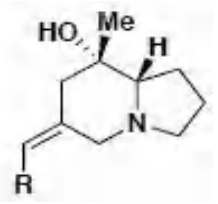

Pumillotoxin

Keywords: Green catalysis; Bioactive Compounds; Heterocyclic Scaffolds; Oncocytes; Chemo-therapy.

Nano-crystalline $Ag_6Mo_{10}O_{33}$ Thin Film – A Potential Petroleum Gas Sensor to Monitor Environmental Pollution

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Petroleum gas is highly flammable that can lead to atmospheric pollution and fire explosion when accumulates in larger quantities in air. Its threshold limit value is around 1000 ppm.Thus upon leakage it involves risk at the source, transportation, gas filling and delivery stations. As a safety measure selective materials are engineered for developing sensitive gas sensors to monitor and manage environmental issues. A soft-chemical method has been developed to synthesise nano-crystalline thin film of silver decamolybdate over polycrystalline alumina substrate by spin coating. Gas sensing characteristics of $Ag_6Mo_{10}O_{33}$thin film was investigated for different gas analytes. The compound $Ag_6Mo_{10}O_{33}$ was found to sense selectively ammonia at 503 K. Above 503 K, it has significant cross sensitivity to petroleum gas (PG). Spin coated thin film of this compound was found to exhibit high resistance. On employing interdigitated platinum electrode, film resistance came down to a measurable value and its sensing characteristics towards trace (ppm) level of different toxic and flammable gas analytes at various temperatures are reported in this paper.

$$Ag_6Mo_{10}O_{33} + \text{Petroleum Gas (ppm level by volume)} \rightleftharpoons 6Ag + 5Mo_2C + 11CO_2 + 11H_2O$$

Keywords : Soft chemical method, $Ag_6Mo_{10}O_{33}$nanocrystals, Spin coated thin film, Interdigitated platinum electrode, Gassensor, Industrial safety.

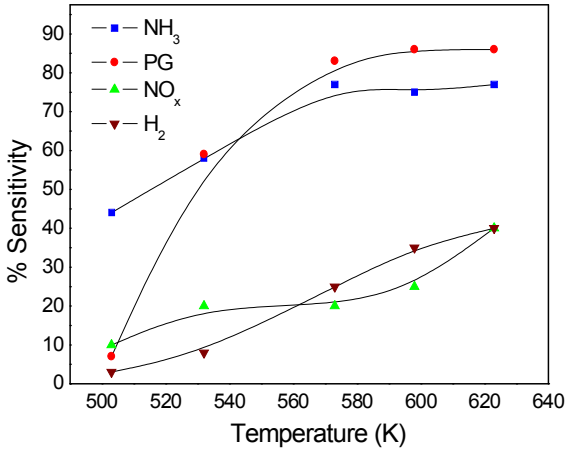

Fig.Typical sensitivity values of nano-crystalline $Ag_6Mo_{10}O_{33}$towards100vppm of four different analytes

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Conformational Polymorphs and Solvates of 1-(6-aminopyridin2-yl)-3-phenylthiourea

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Three conformational polymorphs and two solvates of an asymmetrical N,N'-disubstitutedthiourea derivative namely, 1-(6-aminopyridin2-yl)-3-phenylthiourea (PTU) have been reported here. In all the polymorphs and solvates, the PTU molecules self-assemble into dimers in the solid state, via two complementary N-H... S bonds resulting the formation of $R_2^2(8)$-type of H-bond motif. The two PTU molecules in these dimers interact with each other in a head to tail fashion. Furthermore, the PTU molecule adopts trans, cis- conformation with an intramolecular N-H... N interaction in all the crystals. However, the orientation of the aminophenyl ring with respect to the phenyl ring plays crucial role in the solid state packing of the polymorphs and solvates. Additionally, three polymorphs are distinguishable by C-H... π, N-H... π and π... π interactions. The polymorph PTU-1 crystallizes in P-1 space group with Z'=2, whereas the polymorphs PTU-2 and PTU-3 crystallizes in Pbcn and R-3 space group respectively, with Z'=1. On the other hand, the solvate PTU-DMSO crystallize in $P2_1/c$ with 1:1 host-guest ratio, and PTU-Morpholine exists in P-1 space group with 2:1 host guest ratio. Hirshfeld surface analysis was carried out to compare the intermolecular interactions in the three polymorphs and two solvates of the title compound. The 2D fingerprint analysis of each of the polymorphs reveals that besides the H... H interactions, C...H and S... H interactions contribute more to the generation of polymorphs. The contribution of C' ' ' H interactions in both PTU-2 (31.6%) and PTU-3 (32.1%) are much higher than that of any molecule in PTU-1 (19.8% and 23% for Molecule A and B respectively). Additionally, a tiny amount of π... π interaction was observed (C...C interaction, 4.5%) in polymorph PTU-1, which was absent in PTU-2 and PTU-3.

Keywords: Thiourea, Polymorphism, H-bonding, Hirshfeld Analysis, Finger Print plot.

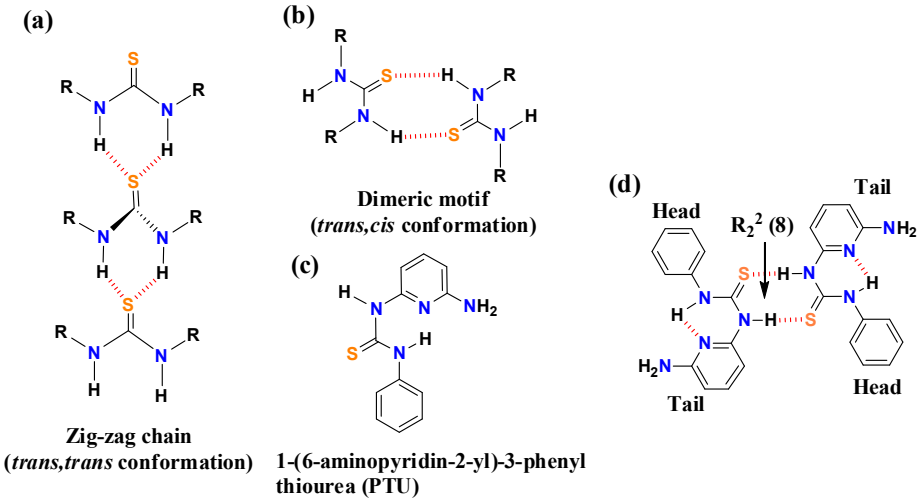

Figure 1:

(a) and (b) Hydrogen-bonding motifs typically observed for disubstituted thiourea in the solid state;

(c) Structure of 1-(6-aminopyridin2-yl)-3-phenylthiourea (PTU);

(d) Formation of dimers through $R_2^2(8)$-type of cyclic motif via two complementary N-H...S interactions.

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Study of Molecular Interactions From Thermo-Acoustic Parameters of Sodium Benzoate In Mixed Aqueous Solvent

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The ultrasonic technique is a useful tool to explore the nature of interactions in liquid mixtures. The physico-chemical property of a solution is the manifestation of several types of possible interactions of solvent with the solute particles. This phenomenon is called solvation. The overall properties of a solution depend on solvation in addition to dissociation and aggregation. Physico-chemical studies involving determination of partial molar properties, viscosity and thermo-acoustic parameters have gained much significance to explore various types of interactions. Water is a unique solvent of thermodynamic importance. Sodium benzoate and acetic acid (vinegar) are used as preservatives. These chemicals are considered to be safe and are used extensively. Sodium benzoate is used in processed foods, medicines, cosmetics, personal care products, and industrial products. Vinegar is used in sauce, pickles, and food industry. Excess use of such chemicals will cause bad impact on human health. Sodium benzoate may cause inflammation, appetite loss, stress, and allergies. Hence, study on molecular interactions is carried out for such chemicals in mixed aqueous solvents. This is based on determination of partial molar properties, viscosity, and thermo-acoustic parameters. In view of these, the density, viscosity, and ultrasonic velocity measurements (at frequency of 2 MHz) have been made for sodium benzoate in aqueous solution of acetic acid at different temperatures. The experimental data have been computed to evaluate the thermodynamic parameters like apparent molar volume (Φ_v), adiabatic compressibility (β), change in adiabatic compressibility ($\Delta\beta$), intermolecular free length (L_f), acoustic impedance (z), relaxation time (τ), Gibbs free energy (ΔG), internal pressure (π), and relative association parameter (R_A). The results are discussed in terms of structure making and structure breaking effects of sodium benzoate in mixed solvents. The increase of ultrasonic velocity with increase of concentration and temperature indicates more molecular interactions. The decrease of association parameter (R_A) on addition of solute causes splitting of solvent molecules and its increase with concentration leads to more solvation. Hence, there will be more ion-ion and ion-solvent interactions.

Keywords: Acoustic impedance, association parameter, relaxation time, adiabatic compressibility.

Green Chemistry: A Post Graduate Student's Tools and Approach

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Pandanus Odoratissimus, a novel plant species of Ganjam district is well known world wide for its unique rich flavour is taken for the present study. The fresh flowers were processed for cost-effective green solvent extraction of the essential oil. Other parts of the plant were used for isolation of constituents using only green solvent extraction techniques. Isolated compounds were identified by chemical and spectroscopic methods. Phyto-chemical and anti-microbial activities of the isolated compounds were studied and reported.

The techniques provide a hands on tools experience to a post graduate student in chemistry.

Preparation and Characterization of Silver Nanoparticles Decorated Graphene Oxide Hybrid Nanofiller Reinforced Polyaniline Nanocomposites

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Silver nanoparticles (AgNPs) embedded graphene oxide (GO) hybrid nanofiller reinforced polyaniline (PANI) nanocomposites are synthesized through *in situ* polymerization process to investigate the thermal and dielectric properties. The nanocomposites are characterized by different techniques to evaluate the chemical interactions and nanostructural characteristics of the synthesized nanocompositesby means of ultraviolet-visible (UV-Vis) spectroscopy, Fourier transform infrared (FTIR) spectroscopy, X-ray diffraction (XRD) analysis. The nanostructure morphology of the nanocompositesis characterized by scanning electron microscopy (SEM) and transmission electron microscopy (SEM). The nanoparticle size distribution of the nanocompositesisanalysed by dynamic light scattering (DLS) technique. The thermal and dielectric properties of the nanocomposites areexaminedthroughthermogravimetry-differential scanning calorimetry(TG-DSC) and dielectric relaxation spectroscopy (DRS). The main objective of this research work is to modify the surface of AgNPs decorated GO by means of PANI matrix and assynthesized Ag@GO hybrid nanofillers dispersed within PANI matrix to enhance the thermal and dielectric properties of the polymer nanocomposites.

Keywords: Silver Nanoparticles; Graphene Oxide;Polyaniline; Nanocomposites; Thermal and Dielectric Properties

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Phytochemical and Antimicrobial Studies of Barringtonia Acutangula (L.) Gaertn. Barks

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Barrigntonia acutangula is a medium sized tree having simple, alternative leaves, long pendulous racemes, dark scarlet flowers, found in India, North Malaysia, Sri Lanka, Philippines, West Borneo, Singapore, Bangladesh, West Africa. It has medicinal properties, antioxidant, Hepatoprotective, Anti-Nociceptive, Neuropharmacological activity. From studies it is found that MIC of the plant speices hadn't been reported yet. The current study deals with phytochemical and antimicrobial study of *B. acutanglua* barks. The antimicrobial study on the basis of MIC determination methodology reveals that *E. coli, S. aureus, P. aeruginosa, P. vulgaris, B. licheniformis, B. subtillis, S. epidermidis, S. flexneri* were inhibited by differnet extracts of the plant species at different concentrations. The phytochemical tests reveal that the bark of the plant *Barringtonia acutangula* contins mostly alkaloid phytohemicals.

Keywords- Barringtonia acutangula, Phytochemical, Antimicrobial, MIC

Mono / Bi-metal Salen Complexes Catalyzed ROP of Cyclic Ester

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Nowadays, it has been constant challenge for modern scientists to search and synthesize new polymeric materials with modified architectures having controlled molecular weights and favorable properties. Ring Opening Polymerization (ROP) is the method, where a wide variety of cyclic compounds have been browbeaten, to secure the polymers of disired architecture, which was first discovered by Szwarc [1] The ROP of cyclic ester lactide has received renewed attentions in recent years. [2] Polymer scientists have synthesized polylactic acid (PLA) by using transition metal complexes as catalysts/initiators by different bi-dentate, tri-dentate and tetra-dentate Schiff base ligands. [3] The PLA is extensively used in biomedical and pharmaceutical applications, especially in tissue engineering and drug delivery. PLA has attracted immense interest because of its favourable properties such as good biocompatibility, biodegradability, and mechanical strength. PLA has been used to build three-dimensional scaffold for the regeneration of tissue engineered organs and has gained the approval of U.S. Food and Drug Administration (FDA) for a variety of human clinical applications. [4] Out of the various methods that have been employed, metal containing initiators have become increasing industrially importance [4-5]. Nowadays, metal alkoxides have been proven to be efficient catalysts for the ROP of lactide, mainly due to their great success in initiating living ring-opening polymerization, producing polymers with well-controlled molecular weight and narrow molecular weight distribution.

Our main efforts comprisefor controlled ROP and in understanding the role of ligands [3] present as a catalyst component towards polymerizationbehavior. Our investigations have been mainly restricted to the synthesis of mono/bi-metal complexes for the ROP of cyclic ester using salen ligands [2, 6-10]. Through this presentation, we will describe the understanding of the polymerisation process key to the development of suitable technologies through suitable case studies.

Keywords: Mono/Bi-metal complexes, Ring opening polymerization, Cyclic ester, Lactide, PLA, Biodegradable

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Acoustical,Viscometric And Ultrasonic Study of Molecular Interactions of Isoniazid with Methionine in Aqueous Medium

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The designation of tuberculosis as a global public health crisis by the World Health Organization in the mid-1990s has underscored the severe challenges facing the antimicrobial research community. The occurrence of some three million new cases of tuberculosis per year worldwide and the emergence of new strains of Mycobacterium tuberculosis characterized by drug resistance or increased virulence have made clear the pressing need for the evolution of newer and more powerful drugs, the re-examination and re-evaluation of older drugs and the detailed elucidation of the mechanisms of action of antimycobacterial compounds. Isoniazid, also known as isonicotinylhydrazide (INH), is an antibiotic used as a first-line agent for the prevention and treatment of both latent and active tuberculosis. It is effective against mycobacteria, particularly Mycobacterium tuberculosis.

Methionine is essential in all organisms, as it is both a proteinogenic amino acid and a component of the cofactor, S-adenosyl methionine. It is the only sulfur containing amino acid that serves as a precursor for all other sulfur-containing amino acids and their derivatives. Methionine raises the intracellular concentration of GSH, thereby promoting antioxidant mediated cell defense and redox regulation. It acts as an intermediate in the biosynthesis of cysteine, carnitine, taurine, lecithin, phosphatidylcholine, and other phospholipids. Therefore our present study investigates the molecular interaction of isoniazid with methionine in biological domain in order to analyse the effect of isoniazid on methionine metabolism.

Abstracts

Volumetric and viscometric properties of l-metheonine with antitubercoulosis drugs isoniazid in aqueous medium were measured over the temperature range of 293.15K – 308.15 K using a standard ultrasonic frequency of 2 MHz multi frequency ultrasonic interferometer. The experimental data has been meticulously used to enumerate various parameters which assist to procure valuable information regarding the presence of different kinds of intermolecular interactions present in the ternary system of INZ + water + Methionine . Using measured values of Density (ñ), Ultrasonic Velocity (U) ,Viscosity (ç) and acoustical parameters such as Adiabatic compressibility (âa), Intermolecular free length (Lf), Acoustic impedance (Z) and Relative association (RA) evaluated. The viscosity data were analysed using the Jones–Dole equation, and the values of the Falkenhagen coefficient A and Jones–Dole B-coefficient were calculated. The results are interpreted in terms of molecular interaction between the components in the ternary mixtures. The UV –Vis study also demonstrates the interaction between INZ-water and INZ-Methionine-water systems in term of ion-solvent and ion-ion interaction in aqueous medium. Hydrogen bonding and weak van der-Waals attraction are the key players in ternary system.

Keywords: - Isoniazid , pyrazinamide , methionine, ultrasonic velocity, viscosity.

Activation of C (sp)-H Bond of Aromatic Acetylene

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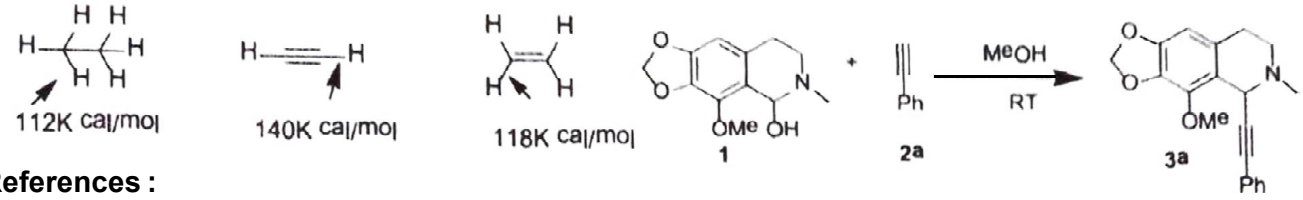
The C–H bond in acetylene is one of the strongest bond with a bond-energy of 140 kcal/mol (De) in comparison to the C–H bond in methane (bond-energy of 112 kcal/mol) and the C–H bond in ethylene (118 kcal/mol). Hence, cleavage of C–H bond in acetylene still remain an important challenge behind synthetic chemist. In most cases, acetylene (sp)-H bond is activated by either use of strong base (BuLi / $NaNH_2$ / KOH) of use of noble metals such as Pd(Sonogasira). Cu(Sharpless click chemsitry), othermetals. On other hand, activation of acetylenic C(sp)-H bond metal, and base free condition is not so far reported in the literature. Here in, we wish to report the activation of acetylenic C(sp-H) bond without use of any metal and base under room temperature. Carbon-Carbon bond formation via C-H activation is an important strategy for synthesis of important synthetic intermediates and natural products that are of biological interest.



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Phytochemical And Biochemical Analysis of *Canna indica L*

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Medicinal plants are sources of novel drugs. Plant materials are of wide use in traditional systems of medicine. Now days, there is a growing focus on natural products from plants. The plant Canna indica L is a tropical herb belonging to the family Cannaceae. It is commonly known as Keli, the Canna arises from the Greek word for cane or reed. Canna is the only genus in the family Cannaceae and nineteen species of flowering plants. The present analysis about Canna indica L showed that, it is main source of many active chemical compounds with important traditional medicinal uses among human society. The phytochemical analysis of Canna indica leaf and steam resulted that, it contains organic compounds mainly Alkaloids, Steroids, Coumarin, Protein, Cradial glycoside, Flavonoids, Saponin, Tanin. Biochemical study of the plant parts has been proven that, they have many pharmacological activities such as antibacterial, antifungal, antioxidant, anti inflammatory, anti viral, cytotoxic etc. The methanolic extract of aerial parts of plant was studied for its in vitro antioxidant activity in different methods (DPPH radical scavenging activity). It is highly recommended and considered that Canna indica L plant is potential herbal medicinal plant.

Spectroscopic, cytotoxicity and molecular docking studies on Interaction between 2,4- dinitrophenyl hydrazine derived Schiff bases with Bovine Serum Albumin

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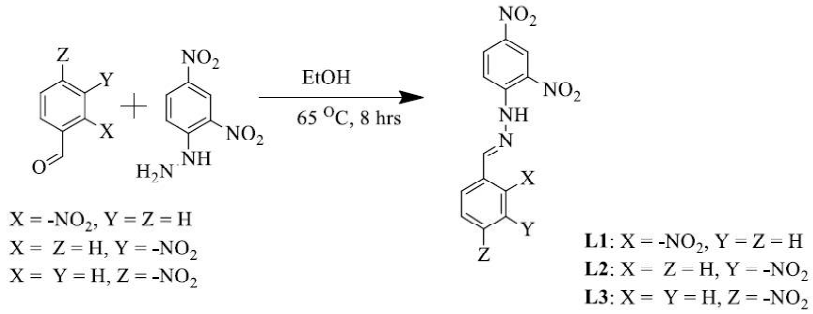
Three new 2,4-dinitrophenyl hydrazine derived Schiff bases (E)-1-(2,4-dinitrophenyl)-2- (n-nitrobenzylidene)hydrazine (where, n = 2, L1; n = 3, L2 and n = 4, L3) were synthesized and characterised by FTIR, ^{1}H NMR and mass spectra. The interaction of the ligands (L1-L3) with the protein BSA was investigated by fluorescence spectroscopy and molecular docking methods. The fluorescence titration experiments of BSA resulted fluorescence quenching with the incremental addition of the ligands (L1-L3). The fluorescence quenching is static in nature and the estimated Stern-Volmer constants of the ligands with BSA followed the order of L1≈ L3 > L2. The modes of binding of the ligands with BSA were explored by molecular docking analysis. In addition, the cytotoxicity of the ligands was examined in live HeLa and HT-29 cells. The IC_{50} values were found in the range 13 μM-243 μM.



Keywords: Schiff base; Protein-ligand interaction; Molecular docking; Cytotoxicity.

Groundwater Contamination In India: Discussing Physical Processes, Condition And Socio-Behavioural Scopes

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The period for which dangerous contaminants persist in groundwater varies by huge scales – from few days or weeks for most biological contamination to centuries or more for several pesticides and industrial contaminants. The extent of impact of these contaminants on environment and human health also varies. Disease like diarrhoea and viral infections generally subside within a week whereas diseases such as Fluorosis and Arsenicosis can be lifelong diseases. The social, health and economic impacts of such groundwater contamination depend not only on the spatial distribution of contamination in aquifers and the dependence of the population on that contaminated water but also on other aspects such as awareness of water quality, level of education and economic status of the populace at risk. A detailed understanding of the physical developments, the socio-economic and psychological behaviours behind the problem is necessary to provide a perspective that can guide us towards informed policies for bringing about improvement in the current circumstances.

Keywords: Contaminants, Awareness, Reluctance, Health, Policy

Prospects of converter of Waste Plastic Wastes into activated Carbon

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In today's society, plastic has become an indispensable component of everyone's life. As a result, the usage of plastics cannot be prohibited. Plastic acts as waste and is a major cause of pollution due to its difficulty in degrading and reusing it. As a result, waste plastic must be converted into value-added products and energy. Plastics are generally made up of carbon atoms that are linked to hydrogen, oxygen, nitrogen, chlorine and sulphur, depending on the type of plastic. The carbon content of mixed polymers is around 80% by mass. As a result, instead of liquids, plastic waste can be transformed to solid and gaseous products. Activated carbons (ACs) are porous solids with a high surface area, high thermal stability and strong chemical resistance.Activated carbon is used in the removal of odour, colour, taste and other undesirableorganic impurities from potable water and industrial waste water,solvent recovery, air purification in inhabited species such as restaurants, food processing andchemical industry, for removal of colour from various types of sugar syrup, in air pollutioncontrol, in purification of many chemicals, pharmaceutical and food products and in a varietyof gas phase applications. Along with other inorganics, it is also used as a catalyst and catalystsupport.As a result, converting waste plastic into carbon porous creates a world free of plastic pollution while also affecting economic growth. Extensive research has been done over the last two decades on the selection and pyrolysis behaviour of new synthetic precursors in order to generate active carbons with extremely high adsorption capacities and precise pore size distributions for specific energy applications.To date, a wide range of materials have been employed in the manufacture of AC. There are different methods including chemical activation, physical activation etc., adopted for the production of porous carbon from various plastics like PP, PVC, PET. Recent progress has shown the use of microwave assisted physical and chemical methods in the preparation of activated carbon from various low-cost precursors as a substitute to conventional heating. The physical activation is done by using steam or carbon dioxide gas that enhance the porosity of activated carbon. In chemical activation process, chemicals such KOH and NaOH are used either alongside or after the carbonization step to obtain high specific surface area. For instance, plastic waste carbon is obtained from pyrolysis of commonly used three polymer materials PP, PVC and PET at 600°C in N_2 atmosphere. The porosity and pore structure of rubber tyre derived activated carbon have been improved using a microwave assisted chemical impregnation method of activation. At low carbonization temperatures, activated carbon can also be made via co-pyrolysis of mixed solid wastes like polystyrene. Furthermore, the hard template method for making porous carbons from templates entails creating a composite from the carbon precursor and the template, which is then carbonised to produce activated carbon after the templet is removed. Lower yield of activated carbon seems to be the main hindrance for the feasibility of producing porous carbon from plastics. Lower pyrolysis temperatures do give higher yields of solid amorphous products. However, these carbons require further high temperature processing for activation, which would in turn cause additional burn off. Furthermore, residues (inorganic contaminants and additives) from the pyrolysis of plastic waste are an issue in this process. The development of a suitable alternative approach for plastic carbonization that addresses the issues raised by traditional carbonization and activation methods would aid in the commercialization of the process.

Keywords: Plastics, Activated carbon, Carbonization, Surface activation, commercialization

Solid Waste Management: The Need of The Hour

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Solid waste is a general term used for by-products of Manufacturing and discarded goods which no longer hold any value to the owner. The quantum of Solid wastes iseverincreasing due to the increase in population, Industrialization, urbanizationand changes in life style and Socio-economic conditions of people. Really solid waste has diverted the attention of the Environmentalistsfor its disposal and management.

On the bases of sources, Solid wastes are classifiedinto different types such as domestic waste (Garbage, Rubbish) Agricultural, Industrial, pathological and E-waste. Now-a-days the quantity of solid waste has become a headachefor all. Indian municipality spends about 2000 millionrupees on solid waste management per year. Plastic wasteis a significant portion of total municipal solid waste (MSW) which do not undergo degradation naturally by light, oxygen, water or micro-organisms, as a result, it createsserious problem for disposal.Domestic E- waste includes TV, computer, mobiles and refrigerators contain many toxic materials, which contaminates soil and ground waterand pose a significant health risk.

Many industrial Processes generate solid waste. Somewell-known examples are Fly ash (coal based thermalPower Plants), Red mud (alumina refinery), slag (Iron and Steel), phosphogypsum (Fertilizer plants) etc.

A Case Study of Some hazardous effects of solidwastes in industrial areas of Jajpur and Eastern part ofKeonjhar and Angul have been made.

* Study on hospital and dispensaries at Jajpur Town,Jajpur Road, Talcher and Angul reveals thatduring Summer Season, highest number of patients suffer from gastric, stomach ailment and skin and eye irritation.The Reason may be in summer, the amount of water in river Brahmani and Kharasrota is less but the waste materials of the plants rather increased, which causes the pollution.
* During rainy and winter season, the upper respiratory tract infection, asthma, TB arethe main diseases of these area.
* The cows, buffalos and goats in these areas provide less milk than other areas.
* The leaves and stems of the plants and trees become blackish in colour instead of green. The naturalvegetation and growth of trees are adversely affected.
* The temperature at Kalinganager, Talcher and Angul is usually 3°C higher than other localities. Constant high temperature at these areas affects the nervous system of human.

These effects may be due to some solid wastes produced from major industries / mining activities in these areas, illustrated as below.

SL.No.	Region	Major industries/Mining activities	Solid Waste
01	Talcher, Anugul	Aluminium Smelter	Spent pot linings
02	Chandikhole, Dharmasala	Stone crushers	Dusts
03	Joda, Barbil	Sponge Iron plants, Iron ore crushers	Char

These solid wastes apart from requiring large land areas for their disposal, pose potential threat to the local air quality (wind borne), ground water quality (leaching), surface water quality (runoffs) etc.

These hazardous wastes not only affect human beings and soil but also affect plants and other animals severely and pollute air and water. Hence, waste products from different sources are one of the major factors which drag immediate attention for its best management.

Keywords: Industrialization, Urbanization, E-waste, Fly ash, Red mud, Slag, Phosphogypsum

Pulp and Paper Industry Effluent Colour Reduction by Ozonation

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Technological innovation big and small has played a critical role for the improvement of a cleaner environment in pulp and paper industry. These industries are continuously tries to reduce the colour form the effluentand reusing the treated effluents by adopting various upgraded technologies. The pulp and paper industry effluent contains high proportion of inorganic and organic pollutants. The principal colloidal colour bodies include tannin, humic acids and humates from decomposition of lignin and extractives, which are quite resistant to biological attack resulting in their long persistence to the environment. Many process modification technologies and/or end-of-pipe treatment methods have been carried out to satisfy the pollution discharge limit and still a search of proper technology for colour reduction on an industrial scale. In this work,colour reduction by using ozone with and without using catalyst has carried out.Ozone is more effective than chlorine in destroying viruses and bacteria and no harmful residuals generated after ozonation. Hence ozonation is a greener way for treatment of pulp and paper industry effluents.Again, after ozonation, possibilities of re-growth of micro-organismsare less and it elevates the dissolved oxygen (DO) concentration in the effluent. It is found that by using ozone about 85 % of colour can be removed from the effluent whereas by using ozone and catalytic Fe^{3+} ions the colour removal efficiency is more than 90%.

Keywords: - Effluent, Color, Lignin, Extractives, B.O.D & C.O.D

A Model On Low Carbon Emission Economic Production Quantity Of Deteriorated Items

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Now-a-days, in production industries focus for solutions to reduce carbon emissions associated with their operations. Carbon emissions in industries are a major concern for global warming. Most countries have focused on reducing the environmental effects of business with long time financial profits. Due to environmental concern and carbon tax regulation, the manufacturer incorporates the control of carbon emission cost in to its decision model. This paper presents an economic production quantity model for deteriorating items. In this model defective items are not treated as completely useless. The aim of this article is to minimize the total operation cost including emission cost. The model is illustrated with an example by taking numerical values and validated its effectiveness through sensitive analysis.

Keywords: Inventory, production, controllable carbon emission rate, carbon tax.

Diatom: Nature's Wonder Material

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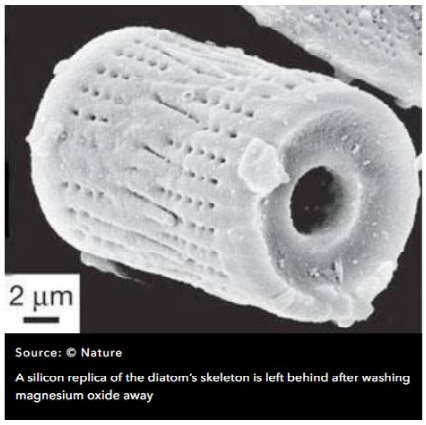
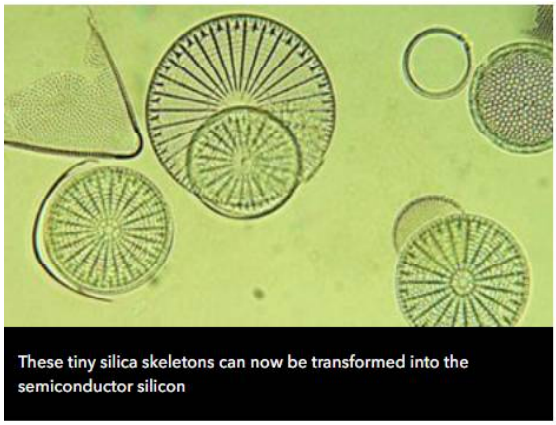
It is true that diatom is not a familiar word. But it is making news today in the nano world. Diatoms are single-cell shell algae, which are at the bottom of the food-chain. They are present in any environment that has light and moisture. Surprisingly, they form about one-fourth of the world's biomass. Scientists say that there are two lakhs of diatom species. What is amazing is that they grow into 3-D structures by themselves. The structures have amorphous and porous silica shells in a variety of shapes each with a unique design, extraordinarily beautiful. They could form the basis of a new manufacturing technique without the use of toxic chemicals and open a new branch of nanotechnology.

In an unusual experiment, Ken Sandhage of Ohio University soaked a diatom shell in magnesium and found that it had replaced the shell's silicon. In other words, scientists can have an organism that builds itself to a given structure but allows them to change its matter. The shells consist of nanoporous silica particles. Scientists hope to breed diatoms to get the shape of the shells they need. The cell cycle of diatoms is just one day and so they could double their number in 24 hours. Nature makes the shape of the shell, while humans could shape their content.

Diatoms would enable researchers to realise their dream of 'placing atoms where you want'. Will it resemble the replicator in the science fiction movie, Star Trek (the device that makes anything wished for) by simply assembling atoms? The machine in real life may not be the exact copy of the screen image but there is no doubt that diatoms would become the raw material for several nanoscale applications.

Several groups worldwide are working on diatom nanotechnology. The work is of interest to a wide range of experts from water pollution control to fossil analysis in search of oil. The application of diatoms in biosensors would be particularly significant. Functional proteins can be wrapped in diatom-like shells to protect them from the natural defence mechanism inside the human body.





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Biodiesel Production from Waste Cooking Oil

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Biodiesel refers to all kind of alternative oil derived from vegetable oil or animal fat. It is produced from waste cooking oil by trans esterification process. In this process fatty acids of triglyceride molecules reacts with methanol in presence of base catalyst, KOH maintaining the temperature.

The main aim of the experimental work is to evaluate the potential use of biodiesel produced from waste veg cooking oil. Presently street vendors use cooking oil to fry foods and they reuseit for several times which is very harmful to human health and environment. Because reused oil contains high fatty acid and other harmful components that are hazardous to living world. One way to treat the waste oil is by converting itinto biodiesel. This research was done by trans esterification reaction in a batch reactor. The waste cooking oil was collected from street sellers.CH_3OH was used as a reactant and KOH was used as a base catalyst.Several types of analysis i.e., free fatty acid, iodine value, cloud point, flash point, saponification value was carried out in this experiment.

From the experiment the yield of biodiesel production is 75 to 80% at 60-65°C temperature withiodine value, flash point, cloud point and saponification values of the prepared biodiesel is1.27- 1.39, 168.31 - 169 °C, -10 to - 28°C and 22 - 26 by weight respectively. The research demonstrated that biodiesel obtained from waste veg cooking oil under optimum conditions can be used asfuel which is considered as renewable energy and environmental recycling process.

Synthesis of Highly Emissive Carbon Dots and Their Optical Properties

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Carbon Dots have garnered the interest of modern material research, because of their intriguing photoluminescence properties and several advantages over traditional fluorescent materials (fluorescent dyes, inorganic QDs etc.), *e.g*.- high water solubility, easy to synthesize, high photo stability, biocompatible in nature *etc*. Considering this, recent reports have already showed that CDs have several promises in emitting, catalytic, imaging and sensing devices. However, the fundamental understanding behind the intricate photoluminescence properties of CDs are still ambiguous because of the lack of basic structure-property correlation. The structural and elemental features of Carbon dots are extremely complicated. In general, there are three basic constituents of Carbon dots, i.e.- molecular fluorophores, graphitic aromatic domain and amorphous domain. Overall photoluminescence properties of CDs mainly originates from the complex interplay between all the three domains. Therefore, it is very much crucial to investigate the time dependent evolution/growth and the inter-domain interactions of CDs, followed by their critical optimization for various applications. Here we have synthesised various types of CDs by simple bottom-up based carbonization method through hydrothermal approach and investigate the excitation dependent emission properties by steady state and time resolved fluorescence spectroscopy.

Synthesis, Characterization and adsorptionbehaviour of Carbon Nano Onions (CNOs)@TiO_2 composites

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A systematic approach was employed to study the adsorption of Methylene blue (MB) by TiO_2 and Carbon nano-onions TiO_2 composite. Here (CNOs-TiO_2) composites were synthesized by one pot solvothermal method. Further the composites were characterized by several methods like BET surface area analysis, X-ray diffraction (XRD), Fourier transform infrared (FTIR), Raman spectral studies, X-ray photoelectron spectroscopy (XPS) to evaluate the role of composites in promoting the adsorption. The adsorption activity of CNOs-TiO_2 compositeswere assessed forMB adsorption. The adsorption procedurewasexamined using various adsorption parameters, pH studies and variation of time. CNOs-TiO_2 composites enhancethe MB adsorption as compared to TiO_2.

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Effect of Bi Substitution and Irradiation on and Magnetic Properties Cobalt Ferrite Nano-particles

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Nano particles with spinel structure have garnered interest for its role in wide range of applications due to their large spin polarization and high magnetic critical temperatures; typically well above the room temperature. Particularly, cobalt ferrite in which the distribution of cations along with Fe^{3+}-Fe^{2+} between the tetrahedral and octahedral sites influence the Ferrimagnetic and electrical properties of it. The inter play of cations in site occupation tune the electric and magnetic properties of the cobalt ferrite. In the present study we have tried to tune the magnetic properties of the cobalt ferrite by substituting the Bi^{3+} in place of iron. Bi^{3+} substituted spinel cobalt ferrite nano-particles prepared by auto combustion method. The magnetic properties of Bi substituted cobalt ferrite nano-particles analyzed before and after gamma irradiation. . Before gamma radiation saturation magnetization and remnant magnetization increased with Bi substitution while coercivity decreased. In case of irradiated samples there is irregular variation of magnetic properties with bismuth substitution.

Keywords: nano-particles, spinel, magnetization

Interaction of Carborane-Appended Trimer with Bovine Serum Albumin: A Spectroscopic Investigation

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Carboranes are a class of polyhedral boron clusters. They have been used in many medicinal applications. The high hydrophobicity of many boron clusters and their derivatives can be explained because of its slightly polarized hydrogen atoms on the boron atoms and their "hydride-like" character. This prevents them to form hydrogen bonds, and makes the boron clusters hydrophobic in nature. The electronegativity of hydrogens enables boranes to form unconventional hydrogen bonds referred as dihydrogen bonds which are weaker than classical hydrogen bonds and a net repulsive effect toward surrounding water molecules prevails making the boron clusters hydrophobic in nature. The hydrophobicity of carboranes also varies with the dipole moment which is dependent on the position of the carbon atoms in the carborane cage. In the present work, we have studied the interaction of triazine-cored trimer containing three carborane clusters in the periphery with bovine serum albumin (BSA). BSA is the most abundant protein found in the mammalian blood. The interaction of carborane trimer with BSA was examined using different spectroscopic methods (Fluorescence, UV-Vis, and Circular Dichroism). Fluorescence analysis along with absorption measurement showed that dynamic quenching as major quenching process over static quenching. The estimated binding constant value has been found to be in the order of 105 M-1 which is similar to the values of the binding constant of small organic drugs showing strong binding interactions with BSA. Thermodynamic binding parameters reveal that the binding of carborane with BSA is driven mainly by hydrophobic forces. Moreover, it was found that the secondary structure of BSA was not altered after interaction with carborane. These all findings could be useful in the development of new bioactive compounds containing carborane clusters.

Reclamation of sugar industry effluent using blue-green alga and a Bioreactor- A new Technology for Detoxification

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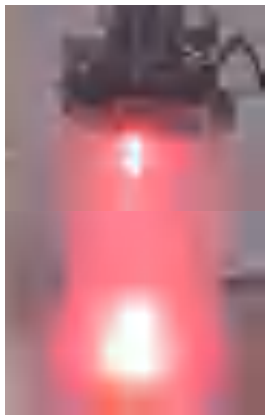
Industrial growth is occurring most rapidly in developing countries to provide the increasing population with jobs, products and services, which cannot be supported by agriculture alone. So, industrial growth has taken its increased demands. The rapid growth of industries has resulted in the production and use of substances some of which create health hazards. A significant amount of these compounds are released into the environment, affecting the flora and fauna. A number of organic chemicals are being synthesized and their toxicity values are so profound that they are gradually threatening the environment. Treatment and neutralization of industrial effluents have acquired great significance because of the increasing awareness of environmental protection.

BIOREACTOR- BLUE



RED

GREEN

A bioreactor may be defined as that device which provides uninterrupted growth to a subjected organism in a supplement enriched environmental condition. Commercial and industrial algae cultivation can also be used as a means of pollution control or reclamation of organic effluents where microphytes can be grown for phytoremediation. In the present study the organism is subjected to varied wavelengths of light and its growth was recorded. These photobioreactor can be used to reclamate the polluted waters in presence of microphytes under different colour light intensities Bioremediation, the use of microorganisms to degrade environmental contaminants, is among those new technologies.

Keywords: phytoremediation, photobioreactor, L.E.D technology, microphytes, microorganisms.

A Model on Economic Production Quantity of Imperfect Quality Deteriorated items with Controllable Carbon Emissions

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Every manufacturing process is incorporated with carbon emission which results pollution. Carbon emissions are a big concern for both the current business market and global warming. Most countries have focused on reducing the environmental effects of business with long time financial profits. In order to regulate this Government has imposed certain regulations for which environmental tax is a major concern in production industry. Further, so far as production is concerned, imperfect products are unavoidable which leads loss of profit to every manufacturer. Keeping this in mind, in the present article, a model has been formed on economic production quantity (EPQ) of imperfect quality of items that are deteriorated with controllable emission not allowing any shortages. In this model defective items are not treated as completely useless. The aim of this article is to minimize the total operation cost including emission cost. The model is illustrated with an example by taking numerical values and validated its effectiveness through sensitive analysis.

Keywords: Inventory, production, controllable carbon emission rate, imperfect quality, carbon tax.

Bio-Inspired Metal Organic Frame Work

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Metal–organic frameworks (MOFs), also known as porous coordination polymers (PCPs), which are emerging as a class of very promising crystalline microporous materials promoted by the use of a set of well-established principles of coordination chemistry, have received great interest[1]. Based on the geometries of the organic linkers and coordination modes of the inorganic metal ions or clusters of metal ions, their structures can be designed according to targeted properties[3].

Silver is widely used for its antimicrobial properties, but microbial resistance to heavy metals is increasing[2]. Silver(II) compounds are more oxidizing and therefore have the potential to overcome resistance via extensive attack on cellular components, but have traditionally been hard to stabilize for biological applications[4].But there is very less study about the structure of Silver(I) in metal complxes. We have shown the X-ray crystallographic structure of silver(I) in 7-N-methyl-6-chloropurine which has a distorted square planar geometry.

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Green Synthesis Of Silver Nanoparticle From Marigold (*Tagetes erecta*) Leaf Extract

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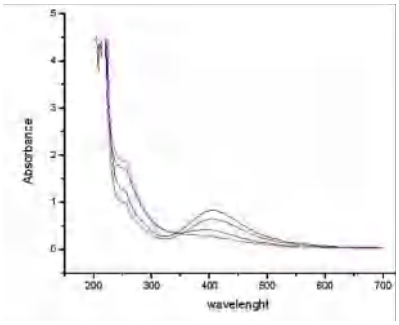
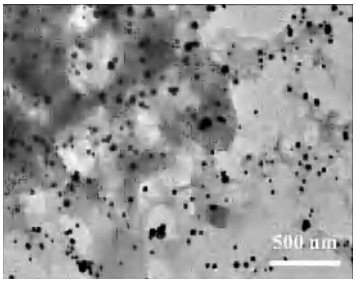
In this study a simple and quick approach was used to synthesize silver nanoparticle using the leaf extract of *Tagetes erecta* plant. In the entire experiment, the leaf extract was used as both reducing and stabilizing agent. The formation of silver nanoparticle was confirmed by the UV- vis spectra where the SPR peak formed at 408nm.The average particle size was also analysed by DLS experiment where the peak was formed at 91.21nm and the stability of the nanoparticle was also confirmed by the negative value of the ZETA potential. The change in behaviour of the UV-vis peak was also observed on dilution with distilled water where the height of peak decreases, due to decrease in concentration of silver nanoparticle and upon the addition of Hg^{2+} solution dropwise where the peak gets slightly flattened and blue shift was observed, due to the redox reaction between Ag^0 and Hg^{2+} resulting in the formation of Ag^0-Hg^{2+} alloy type complex.

The experimental results showed t this method as simple, quick, eco-friendly and non-toxic. Only 30 min were required for the conversion of silver ions into silver nanoparticles at room temperature, without using any hazardous chemical.

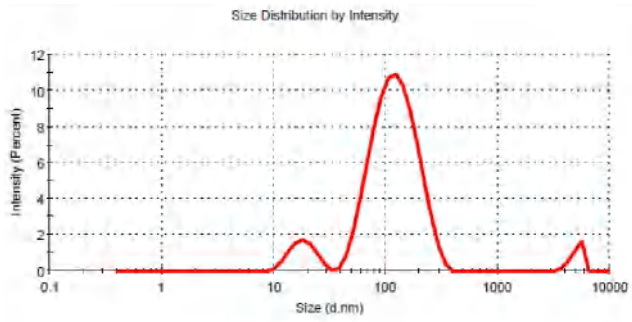
Keywords: Tagetes erecta leaf extract; silver nanoparticle; negative ZETA potential; redox reaction; Ag^0-Hg^{2+}alloy

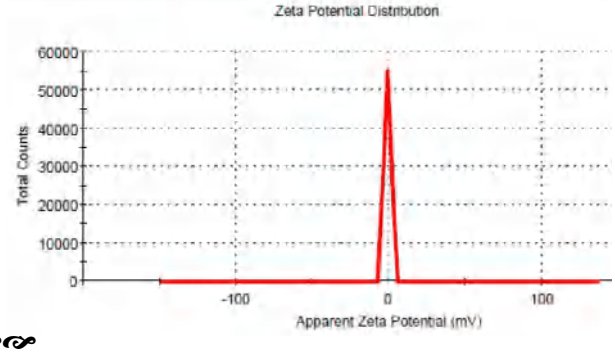
T.erecta **leaf extract**





Green synthesized silver nanoparticle





Environmental Management For Protection of the Earth

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The Earth is the only planet that supports the survival of living beings. There are many resources present on the earth that help various life forms continue to exist on it .our life is not possible without the Sun , water , plants ,and air . we are exploiting all the natural resources present on the Earth and this will certainly lead to the destruction of the environment and man kind .

The main reason for the destruction of planet Earth is due to increasing population and they are by increase of green house gases , which lead to pollution , global warming and climate change.

The Kyoto (In Japan) basket encompasses the six green house gases that are carbon dioxide (CO_2),Methane(CH_4),Nitorus Oxide (N_2O),and three other fluoride gases (hydrofluorocarbon , perflourcarbon and sulphurhexaflouride).Extreme weather, food supply disruption and increase wild fires are other effect of climate change.

Sources of green house gases are production of electricity (31%),Transportation(15%), industry, commercial/ resident (12%) ,agriculture (11%) , forest (6%).As a result of green house gases the temperature of the Earth has increased 1^0C since last 100 years . and will increase 2^0C by the year 2050.

The awareness regarding environmental problem and their proper management began in 1970s through various people movement around many countries in the world. The green peace movement , chipko movement are some of them. Environmental science is a compulsory subject at college level to all streams of arts, science and commerce since 1972. Conference on , Environmental and its development held on june 1992 at Rio de janeiro in Brazil ,United Nation has taken steps for climate change COP 1st- in Berlin 1995 , 2nd – Jeniva (Switzer land) in 1996 , 3rd – Kyoto (Japan) in 1997,18th-Duha(Quater) in 2012 , 21th -paris (France) in 2015, 24th- Katowice (Poland) in 2018, 25th-Madrid-(Spain) in 2019 and COP 26thGlasgow (Scotland in UK) 2021 recently ,for the carbon emission to be reduced to Zero by the year of 2050.

The conference of parities (COP) is the apex decision making body(197 Counties at present)of the united nations climate change framework convention (UNFCCC) was formed in 1994 to stabilize the green house emission and to protect the earth from the threat of climate change.

Laboratory Scale Waste Disposal: Methods, Opportunities & Challenges

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Decreasing the contaminations at its source by limiting or dispensing sustain stocks, reagents, solvents, and items is the very essence of green science. Hazardous chemical management has evolved itself as an integral part of environmental science. This requires a rigorous and dedicated scientific investigation by the chemists to design new techniques that reduce and remediate problems that impact the environment and to comply with the laws that enforce waste management regulations. Within the confines of academics at the university level generates a large amount of hazardous chemical. These wastes are of heterogeneous composition. The procedure for their disposal in small and time varying quantities requires a real time monitoring and a technological objective of great importance that should facilitate motivation and competence for others. A prerequisite for this requires a strong foundation in analytical, organic, and inorganic chemistry. Such study also requires knowledge of soil and water chemistry coupled with the biodegradability of waste generated that makes researchers more attractive to potential employers. A coordinated and a dual approach based on education and management in the field of hazardous waste management can complement each other. Our objective in this regard will be to present the experiences and challenges gained in our laboratory at North Orissa University and to motivate scientists, researchers and research scholars to exchange and share their experiences. For example running a Birch-type reaction, the hazards of the mixture must be considered and the procedures for safe handling and quenching must reflect the hazard properties of each component. A practical challenges offered by carcinogens are the use of chemicals that cause cancer or tumor development, typically after repeated or chronic exposure. Their effects may only become evident after a long latency period and may cause no immediate harmful effects. Some carcinogens including arsenic, benzene, cadmium, hexavalent chromium, ethylene oxide, methylene chloride, asbestos, and formaldehyde have individual standards that govern their use. Palladium on carbon (Pd/C) used in hydrogenation frequently ignites when it first comes in contact with methanol (and to a lesser extent, any flammable organic solvent) and as such represents a significant safety risk. These procedures are recommended whenever Pd/C is used in conjunction with hydrogen gas. Newer methods for the disposal of chemicals which are in routine use is discussed along with recent innovations, concerns and practical challenges encountered in the fields of chemical waste disposal. The aim will be to bring scientists, researchers and research scholars to exchange and share their experiences and research results in the field of chemical waste disposal.

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Fluoride in Groundwater and its Health Hazards: A Review in Indian Scenario

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Fluorine is the lightest member of the halogen group and is one of the most reactive of all chemical elements. The main source of fluoride in groundwater is the rocks which are rich in fluoride. It accounts for about 0.3 g/kg of the Earth's crust and Exists in the form of fluorides ina number of minerals, of which fluorspar, cryolite and fluorapatite are the most common. In 21st century more than 35 million populations of 19 states of India is affected by the highconcentration of fluoride in water. The highest concentration observed to date in India is 48mg/L in Rewari District of Haryana. The most seriously affected areas are Andhra Pradesh, Punjab, Haryana, Rajasthan, Gujarat, Tamil Nadu and Uttar Pradesh.15 tribal villages inRajasthan affected by dental fluorosis with fluoride concentration 0.3 -10.8 mg/L. Skeletal fluorosis affecting between 0.2 and 1 per cent of the population in Andhra Pradesh, where themaximum drinking-water fluoride concentration was 2.1 mg/L. Assam being the most recentlyidentified State with high fluoride levels associated with endemic fluorosis. Since 1987, numerous programmes aimed at fully identifying the problem, along with developing fluorideremoval techniques have been implemented. The influence of fluoride on human health is well studied, but the conclusions drawn from this body of research remain controversial. However, as epidemiological studies continue to refine our understanding of the dose-response relationship and field studies better delineate the areas of potentially high fluoride, efforts to reduce fluoride related health problems should become more operative.

Keywords: Ground water, fluoride, fluorosis

Concentration of Trace Elements in Raw Milk of Indigenous and Cross Breed Cows in Ganjam District

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The milk samples of Indigenous and Cross Breed cows were collected randomly in different small and marginal farms of Berhampur city of Ganjam district, Odisha. Concentration of magnesium, calcium, potassium, sodium, copper and iron were determined from the milk samples. Inductively Coupled Plasma Optical Emission Spectrometry (ICP-OES) was used for the analysis of milk samples to detect the concentration of trace elements. 10 milk samples each from Indigenous and Cross Breed cows were taken separately for the study. Average concentrations of trace minerals in the milk of Indigenous cows were the following: Calcium- 1229 ppm, Magnesium 136.3 ppm, sodium 395.3 ppm, Potassium 1415 ppm, iron 1.51 ppm, and copper 0.67 ppm. Average concentrations of trace minerals in the milk of Cross Breed cows were the following: Calcium- 1304 ppm, Magnesium 141.7 ppm, sodium 396.9 ppm, Potassium 1427 ppm, iron 1.99 ppm, and copper 0.71 ppm. The concentration of trace minerals like calcium, Potassium and Iron are higher in Cross Breed cows as compared to the Indigenous cows. The result found a significant increase ($P<0.001$) in calcium and iron contents in the milk of Cross Breed cows in comparison to Indigenous cows. Similarly a significant increase ($P<0.05$) in magnesium and potassium contents of milk in Cross Breed cows were observed when compared with Indigenous cows. Whereas a non-significant (P, NS) increase in sodium and copper contents in the milk of Cross Breed cows were observed in comparison to Indigenous cows.

Keywords: Milk Composition, Concentrated supplement, Indigenous & cross breed cows.

A Highly Efficient Electrocatalyst for Oxygen Reduction Reaction: Threedimensionally Ordered Macroporous Perovskite $Pr_{0.8}Sr_{0.2}MnO_3$

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Perovskite oxides with formula ABO_3 or A_2BO_4 are a very important class of functional materials that exhibit a range of stoichiometries and crystal structures. Because of the structural features, they could accommodate around 90% of the metallic natural elements of the Periodic Table that stand solely or partially at the A and/or B positions without destroying the matrix structure, offering a way of correlating solid state chemistry to catalytic properties. Moreover, their high thermal and hydrothermal stability enable them suitable catalytic materials either for gas or solid reactions carried out at high temperatures, or liquid reactions carried out at low temperatures.

Perovskite $Pr_{0.8}Sr_{0.2}MnO_3$is prepared by sol-gel method also characterized by XRD, SEM, FTIR and XPS. Perovskite $Pr_{0.8}Sr_{0.2}MnO_3$ is reported to be a superior electro-catalyst for oxygen reduction reaction in terms of the onset potential and intrinsic activity. However, traditionally prepared$Pr_{0.8}Sr_{0.2}MnO_3$ is characterized to exhibit a low specific surface area and a limited pore volume. Herein, we synthesize a three-dimensional ordered macro-porous $Pr_{0.8}Sr_{0.2}MnO_3$ that features ordered and interconnected porous structure, in order to increase catalytic sites. The obtained three-dimensional ordered macro-porous $Pr_{0.8}Sr_{0.2}MnO_3$ exhibits an increased specific surface area and pore volume. Rotating-ring-disk electrode measurement reveals a more positive onset potential and half-wave potential, and a much higher current-limited density of the three-dimensional ordered macro-porous $Pr_{0.8}Sr_{0.2}MnO_3$ compared to counterparts, as well as a high electron transfer number (~4) and a better stability. Our results suggest that traditional perovskite oxides could be effectively optimized for efficient electro-catalytic reactions.

Chemical Investigation and Antibacterial Study of Lipids of *Dalbergia spinosa* root

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The compositions of methanol extract of the plant *Dalbergiaspinosa*root collected from the Sataparha. Jammu, Orissa coast were investigated. Two different known triperpinoid- teraxerol, taraxerolacetate were isolated by dianion column chromatography method. Different lipids like, glycolipid, neutral lipid, phospholipid separated from methanol: chloroform extract and FAME obtained from lipophilic extract were exhibited good antibacterial activity towards various gram-positive (*Staphlcocous aureus),*gram-negative(*Pseudomonas aerugnosa, Kesiellapneumoniae, Esecherichia coli)* bacteria.

Microwave Assisted Rapid And Efficient Synthesis of New Series of Chromene Based 1, 2, 4-Oxadiazole Derivatives And Evaluation of Antibacterial Activity With Molecular Docking Investigation Against *E.Coli* for Water Quality Control

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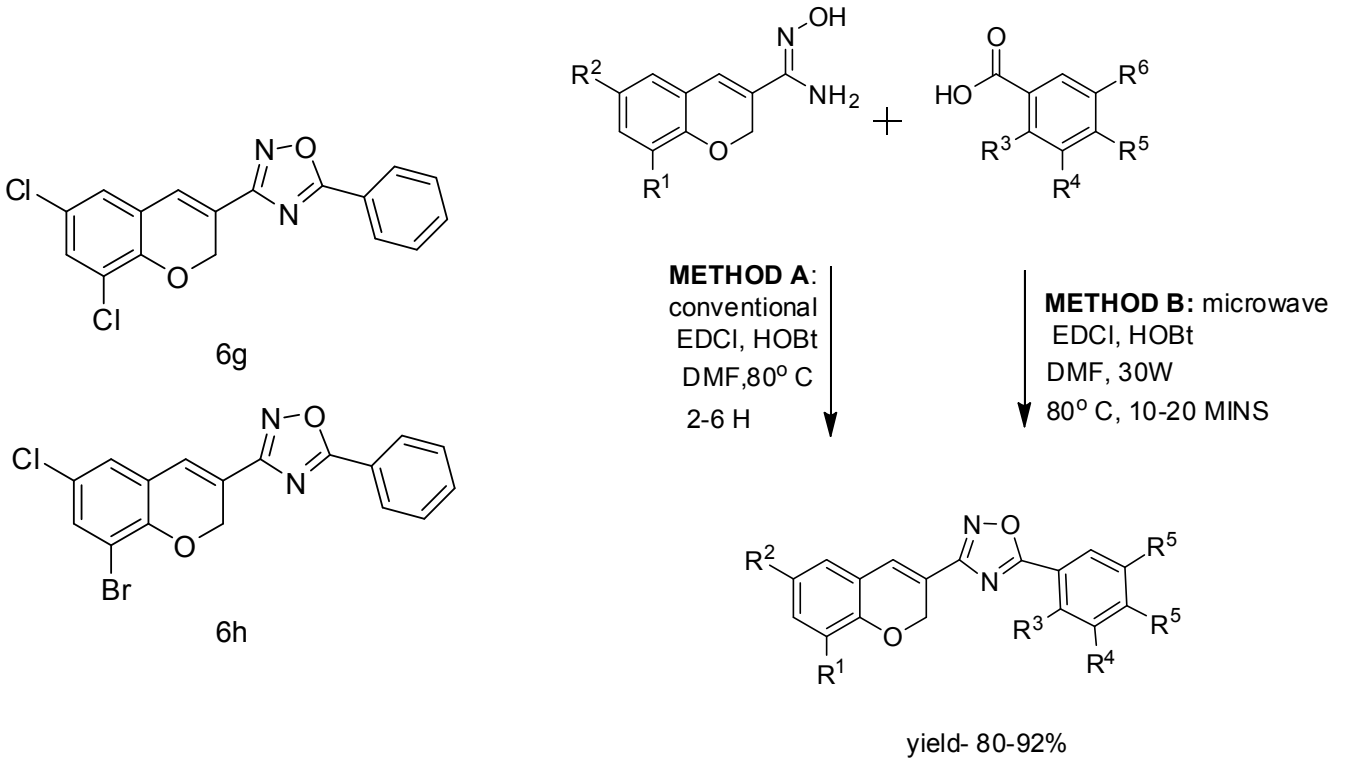
Water quality refers to the chemical, physical or biological characteristics of water. Water quality is a measure of the condition of water relative to its impact on one or more aquatic species like fish and frogs or on human uses such as drinking and swimming.The most common standards used to assess water quality relate to health of ecosystems, safety of human contact and drinking water. *Escherichia coli* (*E.coli*) are gram-negative bacteria and are a type of fecal coliform bacteria commonly found in the intestines of animals and humans.The presence of *E. coli* in water is a strong indication of recent sewage or animal waste contamination. It is important to note that *E. coli* and waste can get in our water in many different ways. Although not all *E. coli* bacteria are typically pathogenic, extensive studies have demonstrated that *E.coli* concentrations are the best predictor of swimming-associated gastrointestinal illness (diarrhea). In addition to gastrointestinal illness (GI), illnesses such as eye infections, skin irritations, ear, nose, throat infections, and respiratory illness are also common in people who have come into contact with water contaminated with feces.The presence of *E. coli* may be indicative of contamination with other bacteria, viruses or protozoa that can make you sick. Hence we have tried to develop an antimicrobial compound which would be useful for polluted water treatment against bacteria like *E.coli* .

A new series of novel chromene based oxadiazole derivatives were synthesized from a variety of chromene based amidoximes with readily available carboxylic acids under conventional oil bath heating using commercially available EDCI and HOBt as coupling reagents in DMF as well as under microwave irradiation resulting with high yields and purities in an expeditious manner. The structure of the product was ascertained by X-ray crystallographic analysis. All the synthesized compounds were evaluated for their in vitro antibacterial activity against two different pathogenic bacterial strain i.e. Escherichia coli (MTCC614) and Klebsiella.Pneumoniae (MTCC4031).The obtained result indicated that and exhibited good antibacterial activity nearer to the standard Gentamicin. The molecular docking studies showed that compounds 6g & 6h showing hydrogen bonding interaction with the bacterial target DNA gyrase of E.coli.

Among all the synthesized molecules, in particular compound and was identified as the most potent antibacterial activities against two pathogenic bacteria, which are causing urinary tract infection, E. coli (MTCC614) and K.pneumoniae (MTCC4031). Through molecular docking study it was noticed that the most potent compounds 6g and 6h selectively binds to the DNA of the target bacteria. Together, given their potent antibacterial activities, these newly synthesized hybrid molecules can be potentially be developed into useful antimicrobial agents that can prompt future researcher with the aim of obtaining some novel heterocyclic candidates for the potential treatment of E.coli infection in contaminated water & food.



yield- 80-92%

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Microbial Life: A Regulatory Perspective for Global Environment Management

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Microbes are ubiquitous in their distribution. Their omnipresencecontributes a lot in improving the world in many ways like waste management,agriculture and industrial production etc. They are responsible for transforming manyof the abundant compounds of earth and the earth atmosphere. Carbon compounds,methane, nitrogen and nitrogen oxide and toxic elements such as mercury andarsenic are produced and recycled by specialized microbes present in ourenvironment. The essential elements such as O, N,,C, S and H amenable for lifeare cycled by them become possible due to their sheer number, production capacityof O, and acting as transformers of NZ. Besides biogeochemical cycling of CO_2microbes play important role in cycling of two other green house gases (GHG)namely methane and nitrous oxide. Methanogenic archaic bacteria produce methaneand denitrifying bacteria produce nitrous oxide. It is worth mentioning that irrespectiveof their size, their high abundance ensures significantly to global biomass. Carbonbiomass of prokaryotic microbes is 60-100% of the total through put to occur inplants and microbial nitrogen and phosphorus biomass exceeds that of all otherorganisms. As they have high metabolic and growth rates their participation in biogeochemical cycle is quite large amounts a major component of globalphotosynthetic and respiration rates.In one hand we inhale the gases produced by the microbes and in the otherthe production of CO_2, methane and nitrous oxide in elevated amounts cause globalwarming like big environmental problems. These problems are due to anthropogenicactivities which have led to production of more gases of such category. So seeingtheir features they might provide us solution to serious environmental challenges andtheir management can be adopted as a tool for climate control.This task requires knowledge of microbiological processes at all organizational levels starting from individual organisms to ecosystems. Further,the discovery of such microbes that has the ability to play important role intransformations of trace gases and various toxic elements will certainly pave theway for its successThey also can be managed as a tool for climate control in the followingways such as: Carbon dioxide could be decreased from the environment by inducingincreased photosynthesis in the oceans by adding iron or reactive nitrogen.Methane (produced by microbes) could be sequestered from the reservoirsin a controlled methodology using under water membranes, than piped whichcan be used to produce electricity.Methane from animals (sheep, cattle, deer etc) could be reduced throughthe use of food additives or vaccines.Increased sulphur eating bacteria in paddy fields could allow these speciesto outcompete methanogens, and thus reducing methane production.Using recombinant DNA technology microbes can be engineered to producehigh yields of clean fuels such as hydrogen.Agricultural and other waste products of human activities could be broken down by microbes that in turn also will provide biofuels and decrease inGHG gases too.Climate change is a table turning point in the global context. Present daysubjects concentrate mostly to increase the economic output through R&D modeof science and technology. Conversely, the callousness on the environmentalfeatures makes them away from the deleterious effect of such modernization andrelated phenomena. Ignoring the underlining principles of the environment madethe life style suffocated for a greater for human population including other biodiversityat large. If a keen interest be taken, the abatement of many such complaints maybe mitigated through microbial research as has been reflected here in. Of late, itbecomes the order of the day to intensely think over utilizing the microbial world togive a possible look to the climate change of detrimental/ devastating state thereby global biodiversity would be protected from the alarming state apprehended due to climatic change.

Keywords : Reactive Nitrogen, Food additive, Archaic, Recombinant DNA Technology

Industrialization Induced Environmental Crisis and its Management

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The whopping advancement in science and Technology have paved a better way for industrialization which helps the economic development, Social and Material progress of the State. But this industrialization is not an unmixed blessings. Threats of Industrial activity to the surrounding environment is a matter of grave concern in the era of modernization. With the advancement in technology and industrialization , some undesirable materials are being added into the environment that have disturbed the ecological balance. Environment, Ecology and development must be balanced to meet the need of the society making provision for future generation.

The major solid waste are coal ash (fly ash) emitted from thermal power plant, flue dust and slag obtained from iron and steel industries, red mud coming from Alumina refinery, phosphogypsum obtained from Phosphate fertilizer plant, char obtained from sponge iron industry, slag obtained from ferroalloy industry etc. Most of these hazardous wastes are non-biodegradable. The non-biodegradability of these wastes creates serious threat to the environment by causing pollution. Solid wastes not only degrade the quality of soil but also cause ground water pollution. According to an estimate, about 5 lakh people die annually because of these toxic effluents. Besides, Biomedical solid wastes cause infections and infections disease.

Some of the suggested methods for waste management are .

1. Ash from different industries can be made into bricks and concrete.
2. Plastic wastes can be utilized for generation of electricity.
3. Applying appropriate alternative technologies, awareness, training, surveys, researches should be taken care of at all levels.

Though several rules an regulations have been framed and implemented, Several meetings and conferences have been held at Regional, National and global level, still many political, economic and scientific instruments have to be devised for proper management of wastes in order to have a sustainable development. In conclusion, it can be said that the production of waste material is but natural but proper care and concern should be shown for its management otherwise it would be a preponderant issue for the whole human race.

Recent Trends in Handling Municipal Waste

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The composition of municipal waste varies greatly from country to country and changes significantly with time.With rising urbanization and change in lifestyle and food habits, the amount of municipal solid waste has been increasing rapidly.Waste can be classified in several ways such as Biodegradable waste (food and kitchen waste, green waste, paper); Recyclable material(paper, glass, bottles, cans, metals, plastics, fabrics); Construction and demolition waste; Electrical and electronic waste ; Toxic waste including chemicals, solvents, fertilizers,pesticide,fungicides and Medical waste.

Landfill, Combustion, Pyrolysis and gasification, etc are some useful techniques for Municipal solid waste (MSW) management. However for implementing the techniques, there is a need of proper segregation of wastes at the source. Maximum municipalities of India do not implement a proper method of segregation of wastes while collecting the wastes from every street, which causes much difficulty for handling the wastes.In municipalities great care is also needed for sewage and waste water treatment. The waste water is to be well treated and recycled. In maximum cities of India the waste water is directly allowed to river or ocean without treatment, which increases BOD of water and causes harm to aquatic animals and plants.Research is going on in biochemistry to develop plants & micro organisms those can consume pollutants from waste water. Awareness is required about these new progresses in chemical science for implementation of different treatments.

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Nano Silver Embedded Chitosan Incorporated Poly Methylmethaacrylate/graphene Oxide Nanocomposite as Packaging Materials

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A simple *in situ* polymerization technique is used to synthesize polymeric nanocomposite of PMMA/ Chitosan-GO@Ag. The thickness of the PMMA/Chitosan/GO@Ag nanocomposite mainly depends on the polymerization of the methylmethaacrylate and concentrations of the GO. Phase analysis, microstructure, and chemical composition are examined by X-ray diffraction (XRD), Fourier transform Infrared Spectroscopy (FTIR), field emission scanning electron microscopy (FESEM), X-ray phoelectron spectroscopy (XPS) and high resolution transmission electron microscopy (HRTEM). The surface and nano-tribological characteristics of the polymeric nanocomposite are investigated by atomic force microscopy (AFM). The thermal, antibacterial, and oxygen barrier properties of the polymeric nanocomposite are studied. The incorporation of the Ag NPs enhances the barrier, thermal, and antimicrobial properties of the PMMA/chitosan-GO matrix by which the material is suitable for good packaging applications.

Keywords: Nano silver; nanocomposite; AFM; FESEM; Packaging

Solid Waste Management in Pulp and Paper Industry

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Abstract :

Paper is an essential tool to increase the literacy number of a country. Strengthening the literacy as well as developing the research and development sector, from undeveloped to bring developed, paper is the only healthy environmental tool for a nation. To make paper, raw materials like bamboo, hard wood, soft wood, bagasse, agro wastes like straw, jute, etc are required as sources of fiber. Similarly, other utilities like water, coal, lime, oil and different chemicals are also to be provided. If there is a development of product there must be the generation of some by-products. Some of the by-products are used and sometimes the use of byproducts is beyond the knowledge of a crew. Those byproducts beyond the knowledge or lesser cost as compared to the main product are considered as waste. As the demand for pulp and paper products increased the waste generation is also increased. Now it is a challenge for the research and development sector of each nation how to minimize the generation of waste and a healthy knowledge of waste management. Some local knowledge and research techniques are being applied to use the solid waste generated in the pulp and paper industry. Wastes like fly ash, grits from lime kiln plant, white sludge from paper machine area, wood and bamboo dust, secondary clarifier underflow sludge, corrugated box, Newspaper & Office paper, etc are the generated solid wastes. Now pulp and paper industries are using this waste as “the waste to cost” principle. Deinking is an important step for recycling for old waste writing, printing and newsprint papers. Technological advancement in the recycling of waste paper is the development of solid waste management technology. An effort has been made to discuss in brief the successful use of solid wastes generated in the pulp and paper industry.

Keywords: Pulp, Limekiln, Sludge, Clarifier, Deinking, Office waste, Newsprint.

Introduction:

A wide variety of biomass is available all around the world. Most of the biomass exists as a byproduct from manufacturing industries. Pulp and paper mills contribute to a higher amount of this biomass mostly discarded in the landfills creating an environmental burden. Biomass from other sources has been used to produce different kinds and grades of biomaterials such as those used in industrial and medical applications. It is time to investigate the availability of biomass from pulp and paper mills and show sustainable routes for the production of high-value-added biomaterials or sources of energy[1](Adane et al 2021). The industry developed rapidly since the industrial revolution in the 18th century. The side effect of industrial development was a large amount of nonhazardous waste and hazardous waste. All of the waste must be managed properly so that environmental sustainability is maintained and does not cause harm or problems to the community[2](Isabella D W et al 2020). . Per capita consumption of paper in India the average of3.2 kg against Asia and the world average of 18 kg and 47.7 kg respectively. Per capita consumption of newsprint is 0.6 kg as compared to the Asian average of 1.9 kg and the world average of 6 kg[3](Ashna T,2017). The environmental problems of the pulp and paper industries are not limited. Solid wastes like sludges, wood dust, clinkers, liquid wastes and hazardous gaseous emissions are the problems. Effective disposal and treatment approaches are essential. Disposal of solid wastes caused environmental problems because of high organic content, partitioning of chlorinated organics, pathogenic of chlorinated organics, pathogens, ash and traces amount of heavy metal content[4](Ince B K ,2011). Water consumption in agriculture, industries

and domestic purposes are 85.3%, 8.0%, and 6.6% respectively. Water use in industries is 34 billion m^3 per year which is estimated to increase by four times by 2050. With the continuously increasing demand and limited water resources, competition among industries, in agriculture and domestic sectors, water availability will be severely affected particularly to the large consuming industrial sectors like pulp and paper[5](**Aatika S et al)**. According to European Commission and the United States Environmental Protection Agency, residues are classified as wastes and by-products. The Resource Conservation and Recovery Act(RCRA) of the United States Environment Protection Act defines solid waste as any garbage, sludge from a wastewater or water treatment plant, or any other discarded material resulting from any industrial activities, commercial, mining, or agricultural operations or from communities. Likewise, a byproduct is defined by RCRA as a material that is not one of the primary products of a production process and is not separately produced by the production process. A byproduct may include most wastes that are not spent materials or sludge[6](L. Simão et al 2018). The management of wastes in an industry in an economically and environmentally acceptable manner is one of the most critical issues facing the modern industry, mainly due to the increased difficulties in properly locating disposal works and complying with ever more stringent environmental quality requirements imposed by the legislation. The development of innovative systems to maximize recovery of useful and /or energy in a sustainable way has become necessary[7](Pratima B 2015). According to the Environmental Protection Agency (EPA), 27 % of municipal solid waste is consists of paper waste. Fiber is the main component in paper production and is extracted from two main sources, direct fiber sources and recycled paper products(United States Environmental, 2012). There are two main steps in the production of paper, pulping and bleaching. Pulping is the stage and the source of most of the pollution generated by paper industries. Pulp is a mixture of cellulose fibers and water and is used as a basis for all paper products. Pulp is produced by mechanically or chemically separating wood fibers from woodchips in processes called pulping[8] (*Douglas M 2014). An in the depth literature review allowed the identification of the main applications that have been tested mainly at the laboratory scale and some at an industrial scale. The applications are grouped into construction materials, geotechnical, environmental, agricultural and others. This assessment shows that the circular economy and the sustainable development goals of the UN are important issues for organizations in general and the pulp mill in particular. In fact, this industry has managed to close the chemicals loops, recovery energy and reduce water consumption in the process[9](Margarida et al 2020). Paper manufacturing is a complex industry involving multiple processes where different products and by-products are produced and large quantities of waste primary, biological or deinking origin are generated, wastewater treatment sludge, primary sludge, and secondary sludge among them[10] (*Chukwudebelu JA et al 2021).

Table: 1 projected paper demand.

Year	Projected demand Million Tpa
2000-2008	9.4
2008-2017	15.4
2017-2025	23.5

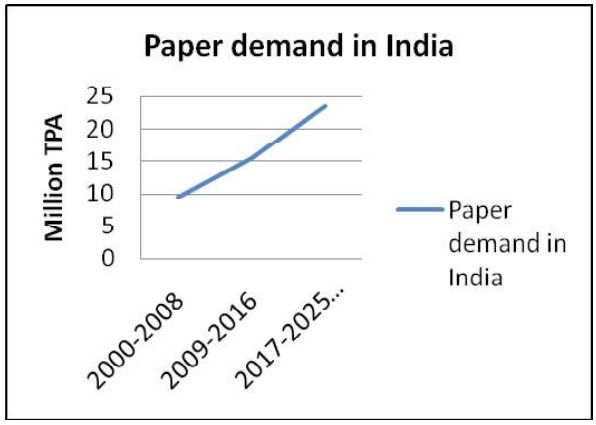

Fig:1 Projected paper demand

Fig:2 Globally recovery of waste papers.

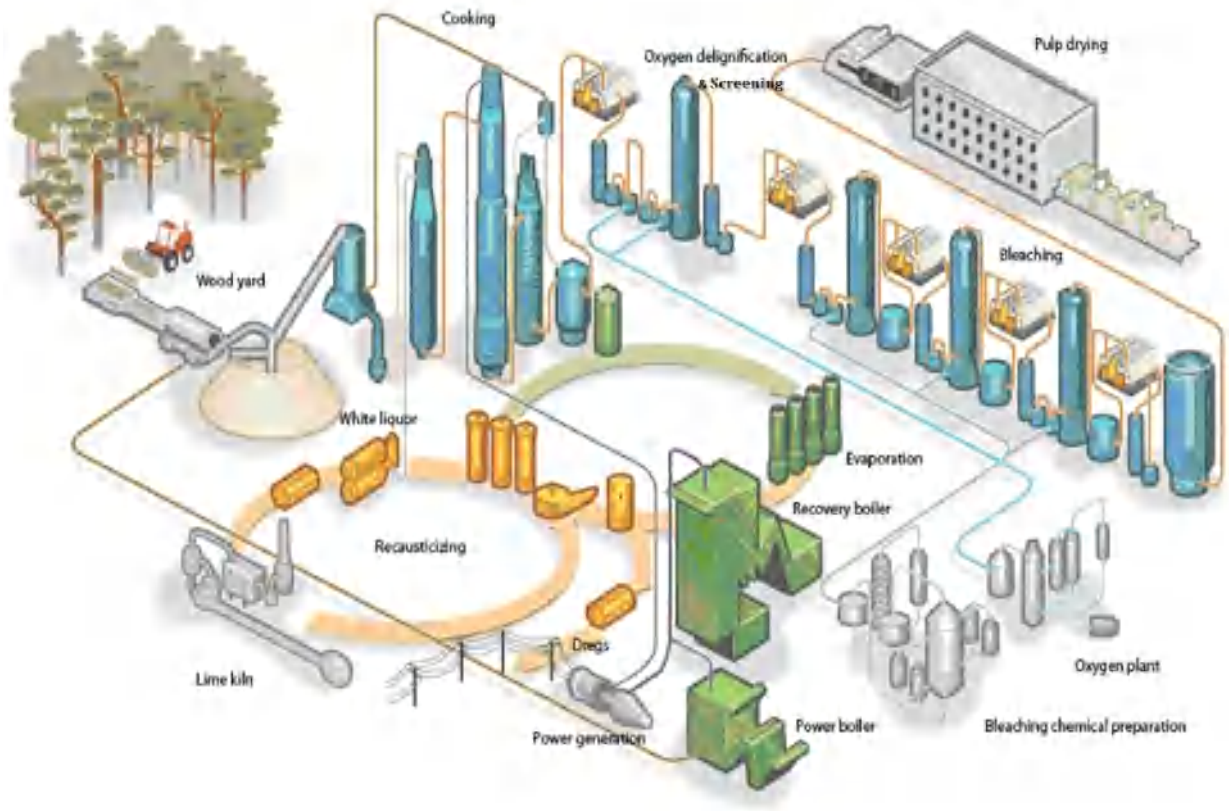

Fig:3 Process flow diagram of wood and bamboo-based pulp and paper mill.

Process Technologies in Pulp and Paper industries:

1. Raw Materials(Fibrous and Non fibrous) receiving and preparation.
2. Pulping, Washing, Screening and Bleaching.
3. Stock preparation, Paper Making and Post manufacturing.
4. Chemical Recovery, Caustisizing and Limekiln.
5. Effluent Treatment Plant.
6. Power plant.
7. Quality Control.
8. Service Departments (Electrical, Instrument, Mechanical and Civil)
9. Personnel, HR and Security department. 10. Water supply and DM plant

Fig: 4 Paper reels

1. Process, Wastes generated and their management.

Here fibrous raw materials like wood, bamboo, waste papers, bagasse, rice husk, sugarcane husk are collected from different sources, stacked followed by chips or suitable sizes of raw materials prepared for the pulping purpose.

Fig:5 sugarcane husk

Fig:6 office waste paper

Fig:7 wood dust

Fig: 8 Kachara

Wastes are generated like bark and wood dusts from direct agriculture-related materials. From recycled paper industries, wastes are like plastic, iron threads, staples are collected. These dusts are used in boilers as fuels in the substitute for coal.

Bagasse pitch 12-15% on raw material basis Can be used as fuel for the manufacture of furfural, as adsorbent.

Straw dust, knots, fine 6-5% Used as landfill, fuel and converted manure composting. In the manufacture of plyboard, vanillin building blocks, inferior quality of pulp, as boiler fuel, as a soil conditioner and for incineration.

2. Pulping, Washing, Screening and Bleaching.

Pulping is done inside a digester → Blow tank → Washing is done through Brown stock Washer → Lignin removal in ODL stage → Screening of ODL pulp through Primary, Secondary and Tertiary Screens. → Next washing is PO DD washer→ A(Acid H_2SO_4) dosing tower→ D0(ClO_2)dosing tower→ again washing at D0DD washer→ EOP(H_2O_2 and NaOH dosing) tower→ Further washing at EOP DD washer→ D1(ClO_2 dosing) tower→ Bleached Pulp stored at Bleach tower.

Here main rejects are uncooked fiber as knots and sand. The uncooked knots are separated at the screening stage and again feed for cooking. The sand separated are used for landfill.

3. Stock preparation, Paper Machine and Post manufacturing.

Beating, refining, the addition of sizing chemicals, the addition of colour and addition of additives. These processes are done in stock preparation. The pulp in low consistency feed for paper sheet formation.The rejects obtained are small size fibers along with paper machine backwater, sand from the centry cleaners, plastic drums, polythene bags, used felts, wires from paper machine area, empty starch bags, etc

Table:2 Wastes and their management in pulp mill operation.

Rejects centrifugal screen, centric leaner rejects fibers,	3% on the weight of unbleached pulp	Used by Board mills. Can be used for inferior quality pulp.
Polythene bags form stock	HDP and LDP bags	Disposed of for recycling
Used felts and wires from the Paper machine.	Used felt, wires, plastic drums and starch bags	Sold to the outside and inside parties.
Reject reels at wills cutter	Sometimes reels are rejected	Sent to repulper to make stock

Fig:9 Reject reel

Fig:10 Post manufacture wastes

Fig: 11 Rejected polythenes

Fig:12 White sludge

4. Chemical Recovery, Causticizing and Limekiln.

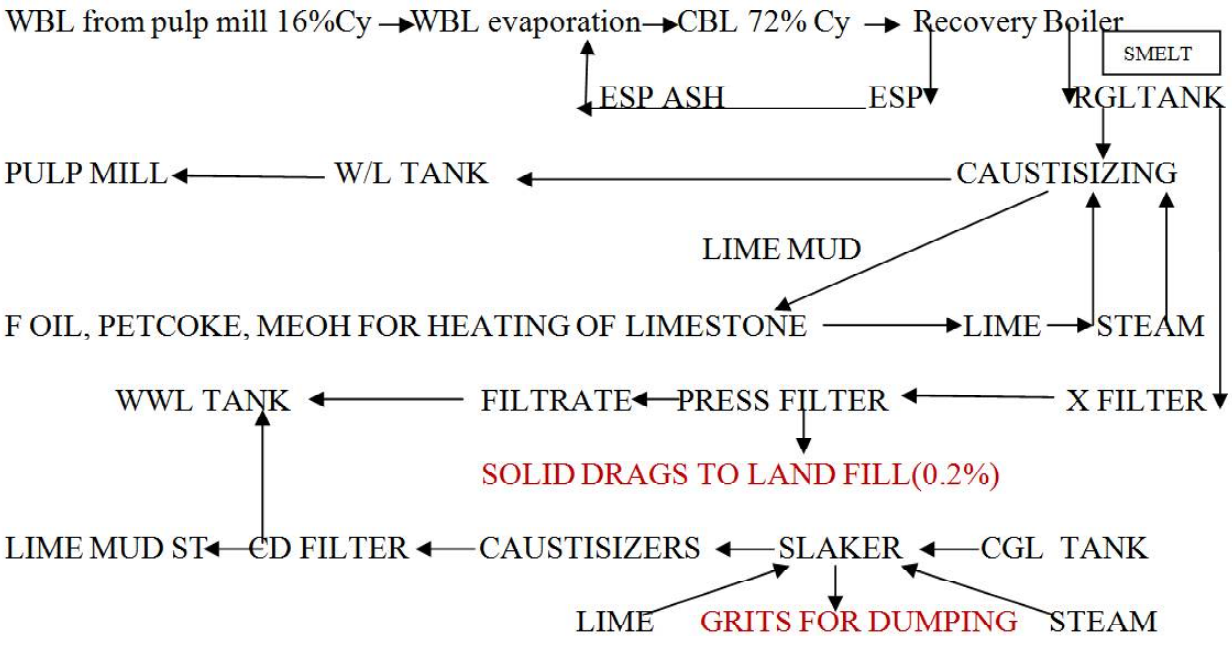

Table: 3 waste generated and their use at recovery, caustsizing and lime kiln plant.

Lime sludge Solid Grits	0.45-0.65/T Paper Fig : 13Grit 	Used for the manufacture of portland cement, masonary cement, reburning after disilication, soil conditioning. Used for Landfill

5. Water Treatment and Effluent treatment plant:

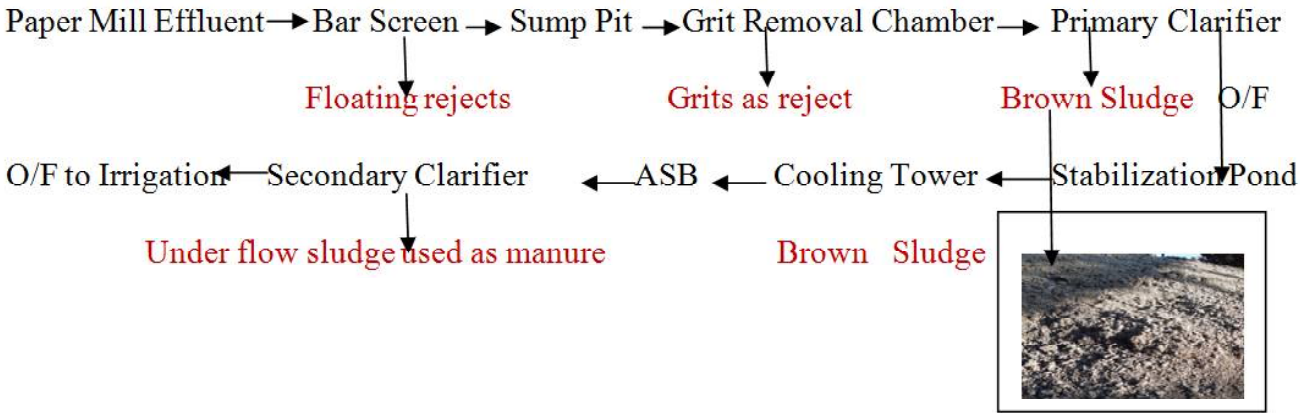

Fig:14 Brown sludge

Table: 4 Waste generated at ET Plant and its use

Sludge from effluent treatment plant(ETP)	50Kg per tonne of paper	Can be used as manure after compositing. Or formation of egg cartoon.

6. Boiler or Power block and DM plant:

It is the heart of any plant with the help of coal or Concentrated Black liquor power is generated.

Here also rejects are generated. At the DM plant Resins(Cation exchange resins and anion exchange resins) are used for the generation of DM water. After a few months, the resins lost their work function, then these are buried inside a well concrete pit.

Fig:15 Coal Fly ash

Table:5 Fly ash and its management.

Coal fly ash and Bottom fly ash	0.320 to 0.37T /T of Coal	Used for cement, Brick, soil conditioner, adsorbent, landfill

7. Quality Control:

Store department supplies nonfibrous raw materials through the Quality control department. Here the empty Cartoons, Plastic and Glass Bottles/Drums are disposed of for recycling purposes to the outside party.

8. Service departments:

Service departments like electrical, mechanical and instrument departments collect their Used and rejected equipment as scrap and dispose to an outside party at the cost of scrap for recycling purposes.

9. Personnel, HR and Security Department:

All the official wastepapers like Old News Print, Old Magazines, Xerox papers and old hard copy documents are used for recycling purposes. Used Cartridges are not disposed and these are re-filled.

Conclusion:

It is the time which already reached to save oneself and also to others by creating awareness among people for giving a break in the increase in temperature every year by a fraction or whole number. So waste management is the only step to solve the burning issue. It is time to try to minimize the generation of wastes which requires machinery preventive maintenance, requires correction in human error by sufficient training. It needs a target to achieve, needs the active involvement of the public, needs the involvement of the local statutory body. Sufficient awareness regarding pollution control and Ambient air quality norms, nutrients quantity present in fertile soil and quality of fresh/saline water quality for flora and Fauna. There must be sufficient Technical knowledge to “convert waste to best”.

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Waste to Wealth

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ABSTRACT :

Waste management through Skill Development opens a wider market in interior decorative industry to make wealth out of waste. The up cycling of Automobile scraps, E-waste as well as rubber tyres and waste from demolished buildings the GI plates, iron bars, doors, water tank creates beautiful sculptures through welding arts. These sculptures are a good tools for interior decoration.

INTRODUCTIONS:

Govt. of India has launched a web portal called waste to wealth to enhance cooperation of sustainable development through economy and community participation. This portal has been launched by the office of the principal scientific advisor K. Vijay Raghavan on 2nd October 2021 on occasion of Gandhi Jayanti.As swatch Bharat Abhiyan movement swept the nation India uncovered path to a cleaner, more sustainable future.

In line with India's declaration in Paris Accord, the next stride in this direction aims to overstep waste and pollution management transforming the menace in to productive avenue of energy and growth. Govt of India will leverage global technological skill to create socio economic benefits for 1.3 billion Indians by addressing the issue of waste disposal, deteriorating air quality and increasing pollution of water bodies. According to a report published by the Swatch Bharat Mission (urban) 1.45 lakh tons/ day of municipal solid waste in being generated in urban India. India produces approximately 0.025MT of plastic waste/day and this is expected to rise to 34MT per year by 2031. The per capita plastic consumption in India in 2017 was 11Kg and percentage of plastic and rubber in municipal solid waste (msw) has risen to 9.22% as compared to .66% in 1996 as per central pollution control Board.A united nation report states that India is one of the biggest producers of e-waste in the world. It generates about 2 million tons of e-waste. A printed circuit board in cellular phones and computer mother board contains 280 g/ton gold.So normally these PCBs are decomposed to extract gold.

When tires pile up in landfills or junky yards they constitute one important part of solid waste. Stockpiled tyres also present many types of health, environmental and economic risks through air, water and solid pollution. When the tyre is exposed to sun light it releases methane gas into the air. The greenhouse gas increases our carbon foot print and can contribute to climate change.

When tyres are burnt they generate particulate matter or participate pollution, a complex mixture of extremely small particles and liquid droplets. The fumes emitted are packed with many toxic chemicals that vehicle tyre contains. Up cycling the reused tyres can be done by tyre crafts for interior home decoration, At the same time wrapping of tyres in large sculptures can consume thousands of tyres.

At present India interior design market was worth USD23.2 billion in 2020 and further projected to reach USD38.2 by 2027 at a (GAR 7.4%) during 2021-2027. The interior design market being driven by the booming real estate market. Reused and recycle materials have flavor. They have already served their purpose on their life and through reusing or recycling those materials live another life while holding into other industry.

The iron bars for other construction can not be used as we know that we have data of the steel grade (mechanical property) nor the behavior of these reinforcement (fatigue, plastic, demolition) during

their life and more particularly during the demolition. These can only be used after smelting to get new steel. So the bars can be up cycled for construction of welding art sculptures work.

Five types of waste materials A) Iron bars/door panels from demolished building B) Automobile scraps. C) Used tyres. D) E-waste are being used to develop the sculptures.E) Iron dust generated during training practice.

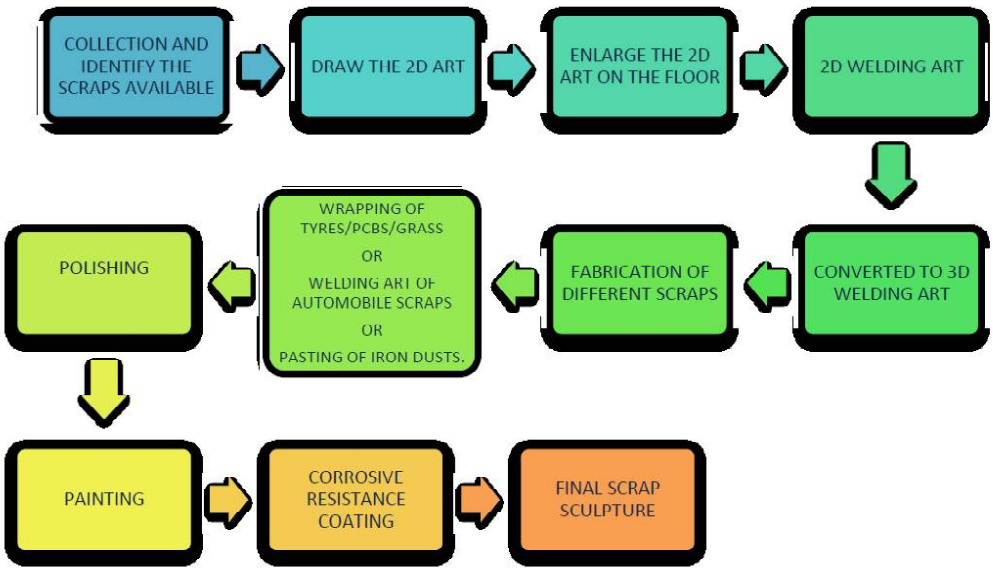
Some old buildings in the campus are being demolished by works Dept. we have collected the iron bars, GI water tanks, GI doors panels, window iron bars etc.These iron bars are being straightened in the workshop by our trainees, this is a win win process the trainees adhere the skill in grinding, cutting. Use of cutting blades, straightening with the help of hammer and anvil. The huge amount of such scrapes are being collected and kept for development of sculptures.

In every technical institute the students are trained to develop the skill of filling, cutting, fitting. For this a large amount of flats/angles are being used during the process of filling a large amount of iron dusts are being accumulated. These iron dusts exposure of iron is wide spread and increases the risk of large inflammation. In conclusion occupational exposure of iron dust increases the lung inflammation risk.

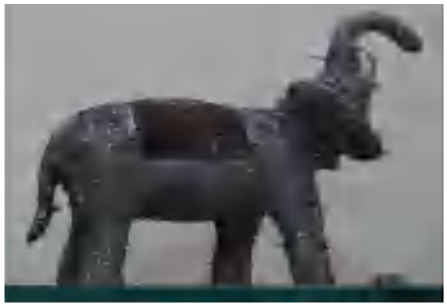
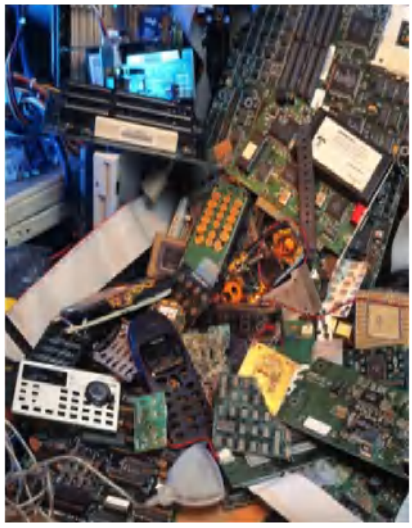
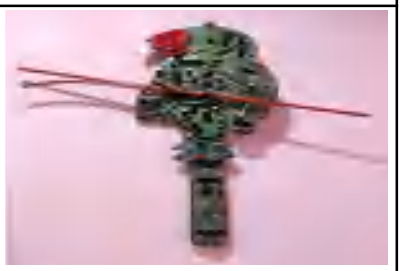
The iron dust when mixes with water and soil creates environmental problem. The iron dusts are collected and used for manufacturing sculptures. by this the chances of iron dusts comes in contact with environment is minimized. This practice in all the 15000 ITIs in the country can minimize the pollution.

E-waste and tyres are being collected from the BeMC and we have a e-waste collection center, where we collect all these e-waste from public, our students and staffs. The main aim is to motivate the young people impact of E-waste in the environment. When e-waste is exposed to the heat toxic chemicals are released into the air damaging the atmosphere. This is one of the biggest environmental impacts of e-waste. These toxic minerals can then seep into the ground water affecting to both land and sea animals. They can also contribute to air pollution. The scrap sculpture can be manufactured in the following steps.

Methodology :



Result :

Waste		Sculpture
Iron Dust		
Iron bars / GI sheet, scrapes	 	  
E-Waste		   

Result :

Waste		Sculpture	
Automobile Scrap		 	
Tyres		  	 

CONCLUSION:

Waste to wealth has a huge potential to generate employment and create entrepreneur. The sculpture can be sold via e-market as there is a huge demand in the interior decorative industry. The sculptures developed by us are being sold in national level.

References:

1. This work is accepted in the nationallevel and published in the book chapter “Recycling of Scrap from Technical Institutes: A CaseStudy—Govt. ITI Berhampur” Waste Management as Economic Industry Towards CircularEconomy, by Springer Nature Singapore pte Ltdpublisher, ISBN number 978-981-15-1619-1,476481_1_En, (9)

Orissa Chemical Society
Sarat Chandra Science Promotion Award 2021

Sri Maheswar Nayak, M.Sc.
TGT, Science (Life Science), Govt. Nodal U. G. High School, CH-Nuagam
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Email: nmaheswar224@gmall.com

The Orissa Chemical Society has instituted 'Sarat Chandra Science Promotion Award' to promote and popularize science at the base level in education. It is awarded to a school teacher having an outstanding contribution to promoting science education and innovation among school students in the education district where he/she works in Odisha. Dr.Sarat Chandra Das, past President of Orissa Chemical Society, has instituted the award.The awardee receivesa cash prize of Rs 4000/- (Four thousand only) and a certificate of appreciation, given in the Regional Conference of the OCS.

This year the award goes to Sri Maheswar Nayak, TGT, Science (CBZ), Govt. Nodal U. G. High School, CH-Nuagam, PO: Pandia, Purushottampur, Ganjam(Residence:Udaya Bhawan, Govinda Vihara, 6th Lane, 4th Extension, PO: Lochapada, Berhampur 761001). Sri Nayak will receive the award in the inaugural meeting of the 24th Regional Conference of Orissa Chemical Society, held at Saraswati Degree Vidya Mandir, Berhampur, on 28th November 2021.

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Biography: SriMaheswar Nayak, TGT, Science (Life Science), works as an Assistant Teacher at Govt.Nodal U.G. High School, CH - Nuagam of Ganjam District, Purushottampur Block since 01.07.1996. Hebelongs to the native village Badagada,Dist.Ganjam,Odisha, completed High School Education (H.S.C.) inHaduSurab High School,Badagada, in 1983. He completed I.Sc. and B.Sc. (Botany Honours) education at Christ College, Cuttack, from 1985 and 1987, respectively. After graduation, he did B.Ed. at Radhanath Institute of Advanced Studies in Education (formerly known as Radhanath Training College), Cuttack.He completed his M.Ed. from Berhampur University in 1993 and M.Sc. (Botany) in 2012.He also studied at Central University,University of Hyderabad (Andhra Pradesh) and completed PG Diploma in Environmental Education & Management (PGDEEM) in 1995, completed National Certificate in Modular Employable Skills(ICT-100) in Information & Communication Technology,NCVT,New Delhi in 2013, and did Diploma in Hindi Course (DHC) from Central Hindi Directorate, Ministry of Human Resource Development (HRD), New Delhi, in 2015.

Before joining Govt.High School,Nuagam, he worked as an Asst.Teacher at Nalibar High School,Nalibar,Paradeep in 1990, at Hind Zinc Vidyalaya, CBSE Board, Zinc Nagar, Sundargarh, Odisha, of Hindustan Zinc Limited, Govt. of India Enterprise, SargipalliMines Project School from 1990-1996,and at Jaya Jyoti School,Rewa, Madhya Pradesh of JP Cements Ltd. CBSE Pattern School for a short period.Finally, after being selected by the Subordinate Staff Selection Commission, Odisha, he was appointed as TGT, Science in 1996 at the present school.

He gottraining at Agastya International Foundations,Kupam,Andhra Pradesh in Constructivism in Hands-on Teaching in 2016, Paryavarana MitraTeacher's Training Programby Ministry of Environment & Forest and Dept.of Science & Technology,Govt.of India in 2012, Life Skill Education under Mental Health Programmefor High School Teachers conducted bythe Dept. of Health & Family Welfare,Ganjam.

He is a District Resource Person for "SAHAJOGA", "SAMARTHYA"and New Assessment Scheme of Board of Secondary Education, Odisha;for development of e-content for Teachers of 5-TTransformation High Schools of Odisha Knowledge Corporation Ltd (OKCL). He is aResource Person and Reviewer for Science content development for "Madhu App" online teaching of Ganjam Administration.He is State Resource Person for Dynamics of Nature Through Various Hands-on Activities & Nature Study Programmeby VIGYAN PRASAR (VP),Govt.of India,New Delhi & Indian Instituteof Youthand Development (IIYD), BHUBANESWAR.He is a Tele-Teacher ofOrissa Space Application Center (ORSAC) for EDUSAT Live Classes, Osepa live Streaming Classes for Secondary Classes by Director, SecondaryEducation, Bhubaneswar.

Contributions: Sri Maheswar Nayak contributed to education as State Resource Person of Dynamics of nature through various hands-on activities & Nature study Camp, workshops conducted through IIYD & VP at differentRural & Urban parts of Odisha to popularise Science & Scientific attitude towards Science Education,and Sanitation Awareness programs under the guidance of Shri B.K.Tyagi,Scientist(G), VigyanPrasar,Govt.of India,andDr.Md.JawaidAlam of Patna, Bihar among School-goingchildren.

He conducted workshops from 2017 onwards at Red Cross Bhawan,Bhubaneswar;Sri Aurobindo ShishuMandir, M.Rampalli,Khalllkote,Ganjam;SaraswatlShishu Vidya Mandir,Dharmasala, Sonpur,Balangir;Sri AlekhaMahima Vidyamandir, Joranda, Dhenkanal;Kulanga High School,RangabatiKulanga,Bamra,Sambalpur; Hari Hara High School, Aska; and BalajiBidyapeetha,Kanisi of Ganjam district.Hundreds of school children from adjacent schools of these venues participated along with their Guide Teachers in the Workshops & Field Study Camps.Children were trained to prepare Simple Innovative Science Projects from their School Curriculum under hands-on activities to make them more interested in reading Science and removing fear from their minds towards scientific studies.Awareness classes were organized on sanitation,water conservation,forest conservation,hand-washing habits,and eliminating false notions and practices in their daily life.

He worked as State & District Resource Person of Sahayoga and Samarthya Programmes. Teachers Training Programmes were conducted for all Science Teachers of Ganjam District at SLN MPL High School, Berhampur,Rangailunda Block, BudhagiriBidyapeetha,Budhokhola of Buguda Block, Natheswar High Schoolof Sheragada Block, and Govt.Girl's High School, Aska of Aska Block. He serves as a State Resource Person for OSEPA,Bhubaneswar & MADHU APP-GanjamYoutube Classes & EDUSAT Tele-Teacher(ORSAC). He takes live classes as well as PPTs for Secondary Classes in Science, which is continuing. As OKCL Resource Person,presentations for Science Teachers of the Ganjam District are conducted for Development of e-content for Teachers of 5-T Transformed High Schools,where Science Teachers were trained to prepare e-content PPTs for Smart Classes while delivering Lessons in Class. He is engaged in several other activities, such as Orientation Programmes on "Quality Education", Constructivism,5-E Model of Teaching in Science, Life Skill Education, conducted for Teachers of Ganjam District.

Thank you