International Conference

on

Science : Emerging Scenario & Future Challenges

SESFC-2016

11-12 June,2016

Hotel Inclover, Dharamshala

Organized
By
Him Science Congress Association

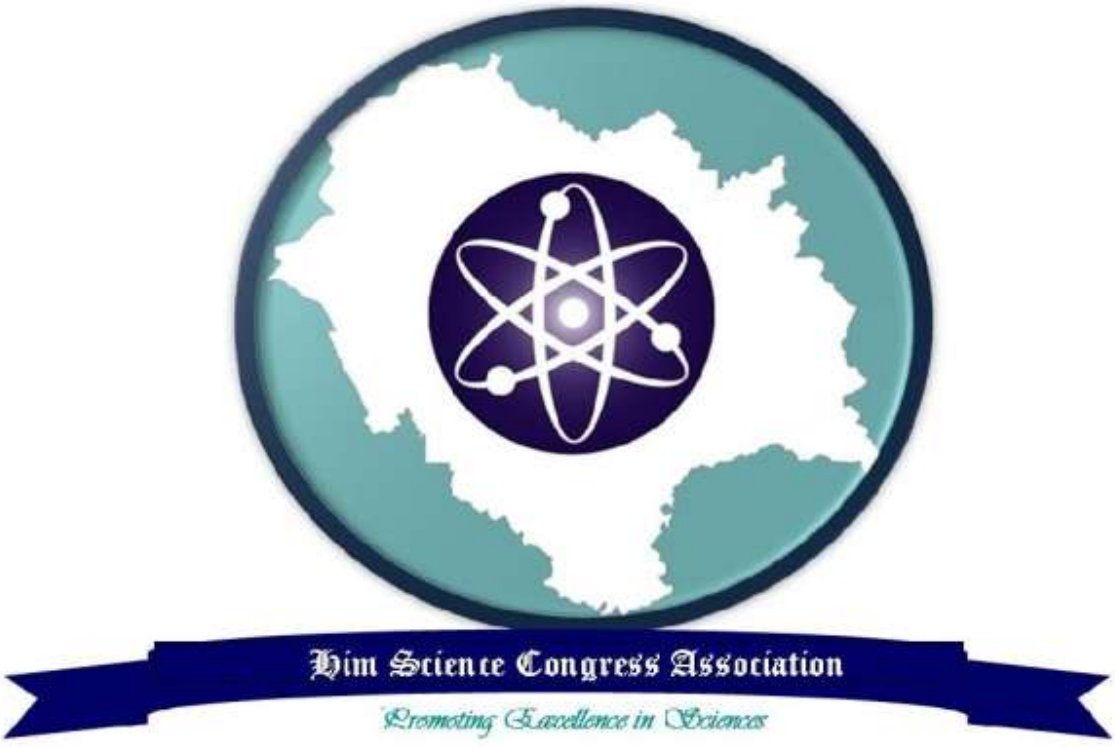
Abstract Book

HIMACHAL TOURISM

Springer

Asian Polymer Association APA

एसजेवीएन SJVN


Him Science Congress Association
Promoting Excellence in Sciences

Acharaya Devvrat
Hon'ble Governer,
Himachal Pradesh

Message

Acharya Devvrat
Governor
Himachal Pradesh

सत्यमेव जयते

आचार्य देवव्रत
राज्यपाल
हिमाचल प्रदेश

संदेश

मुझे यह जानकर हार्दिक प्रसन्नता हो रही है कि हिम साईंस कांग्रेस एसोसिएशन, हिमाचल प्रदेश द्वारा 11 और 12 जून, 2016 को कांगड़ा जिले के धर्मशाला में अंतरराष्ट्रीय सम्मेलन का आयोजन किया जा रहा है और इस मौके पर एक स्मारिका का प्रकाशन भी किया जा रहा है।

आज विज्ञान का युग है और शायद ही ऐसा कोई क्षेत्र है जहां वैज्ञानिक शोध के साथ नवीन तकनीक का सदुपयोग न हो रहा हो। जरूरी है, वैज्ञानिक सोच को विकसित करने के लिए उपयुक्त वातावरण तैयार किया जाए, जिससे भावी पीढ़ी वैश्विक प्रतिस्पर्धा के साथ-साथ वैज्ञानिक शोध का लाभ उठा सके। यह समाज, प्रदेश और देश के विकास में भी नितांत आवश्यक है।

मुझे विश्वास है कि कार्यशाला के दौरान मौजूदा परिप्रेक्ष्य में विज्ञान के समक्ष चुनौतियों को लेकर स्वस्थ परिचर्चा होगी। इसके अलावा, देश व विदेशों से आए विभिन्न प्रतिभागियों के अनुभव, विचार और शोध विकास में लाभदायक सिद्ध होंगे।

सम्मेलन के सफल आयोजन की हार्दिक शुभकामनाएं।

(देवव्रत)

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Sh. Jagat Prakash Nadda
Hon'ble Minister of Health &
Family Welfare, GOI

Message

जगत प्रकाश नड्डा
Jagat Prakash Nadda

स्वास्थ्य एवं परिवार कल्याण मंत्री
भारत सरकार
Minister of Health & Family Welfare
Government of India

MESSAGE

I am happy to learn that the Him Science Congress Association, Himachal Pradesh is organizing its International Conference with the theme "Science: Emerging Scenario and Future Challenges" from 11th – 12th June, 2016 at Dharamshala.

This conference I am informed will see attendance by delegates from across the country. I am hopeful that the conference will provide a platform to exchange the expertise, experience of the fraternity to update their knowledge and skills in the field of research. This International Conference is a platform for all participants to deliberate on the various challenges of their field as well as to help identify the issues, their possible solutions and suggest a way forward.

I congratulate the organizers and the participants of the conference and extend my best wishes for its success.

(Jagat Prakash Nadda)

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Prof. P .K. Khosla
Chief Patron, HSCA & Vice-Chancellor
Shoolini University

Message

I am glad to know that Him Science Congress Association (HSCA) is organizing **International Conference on Science: Emerging Scenario and Future Challenges** on 11th and 12th June, 2016 at Dharamshala.

Shoolini University is fast emerging as a leader in imparting high quality education in Life Sciences and Management in the country and endeavours to provide elite human capital to the industry in coming years. It has attained 66th rank amongst 100 top Indian Universities as ranked by NIRF appointed by the Ministry of Human Resource Development.

The deliberations of two day event on Science would definitely serve the purpose of our pursuit for attaining excellence in generating competent human capital. The Conference would provide a platform for meeting and sharing latest views in science and technology and fine-tuning our research and educational programmes

I extend my best wishes for a grand success of this National Conference being organized by Him Science Congress Association.

(P.K.KHOSLA)
Chief Patron & Vice Chancellor

Prof. Deepak Pathania
President, HSCA

Welcome Message

It gives me immense pleasure to welcome you all in first ever International Conference on Sciences in the History of Himachal Pradesh and perhaps one of the first ones on the emerging topics in the Globe. In the present developing scenario, competitive economy and demand of the society, it is necessary to debate the major issues of Sciences relevant to imminent development.

Him Science Congress Association with the aim of promotion of Scientific research in the state of Himachal Pradesh was founded on August, 2012 and registered under the HP Societies Registration Act, 2006. Association provide a platform to discuss and disseminate the scientific findings among all the communities.

I am proud that Him Science Congress Association is hosting International Conference on theme "Science: Emerging Scenario and Future Challenges" on 11-12 June, 2016 in Hotel Inclover, at "SMART CITY" Dharamshala, Himachal Pradesh. The Conference has received a huge retort and numerous research papers, and organizers have selected only quality papers for inclusion in the proceedings of the Conference. I hope that the eminent scientists and researchers across the World participating in this Conference will get an opportunity to deliberate on recent advances in the various fields of Sciences and paving the way for future development.

I send my best wishes to the delegates and hope that this Conference will result in more interactions among the scientists and researchers for the benefit of the nation. I have no doubt that the suggestions made by the speakers will be well taken. I extend my heartfelt congratulation to the organizers of this International Conference and convey my best wishes to them for success of this event. I believe the conference will surely prove beneficial to all in equal length.

I wish all the delegates comfy and marvelous stay in beautiful Hill City. I desire the Conference to be a great success.

Him Science Congress Association, Himachal Pradesh

Him Science Congress Association (HSCA) has been registered under the HP Societies Registration Act, 2006 (Reg. No. 566/2012) on dated 28th April, 2012. Association has accomplished many scientific achievements since its inception. Annually Association is organizing conferences/seminars and inspirational deliberation to the school students in various parts of Himachal Pradesh. Every annual evivent is attended by vast number of scientists from different national and international institutions. Previous conferences were sponsored by various funding agencies such as DST, DRDO, ISRO, BRNS, SJVN and Himachal Tourism. Association has sponsored Children Science Congress organized by Department of Science & Technology and some other national conferences as well. The 2nd annual national conference was organized at Himalayan Forest Research Institute, Shimla. All the dignitaries appreciated the efforts of HSCA in grooming the science of Himachal Pradesh. The key note lecture was delivered by Prof. Kyu-Tek Park, Executive Vice President, The Korean Academy of Science and Technology (KAST). Professor Yang-Sup Bae, Division of Life Sciences, Incheon National University, South Korea the eminent speaker shared his research on insect biodiversity of E. Asia. Association has honored few scientists with Fellow Awards in the area of Chemical and Life Sciences for their outstanding contribution. Association offered ten best presentation awards in each field of sciences to instigate the researchers. HSCA has also offered young scientist awards to few early stage researchers in different fields. Association has initiated awareness campaign among the youth of the state regarding importance of scientific research viz a viz environment and sustainability.

VISION STATEMENT

- To advance Sciences in Himachal Pradesh.
- To organize annual congress in Himachal Pradesh.
- To organize workshops and seminars for the teacher of Colleges and Schools.
- To publish scientific journals on competitive research on basic and applied aspects.
- Awards of excellence for contributions in the field of scientific research and development
- To organize of activities for proper exploitation of scientific development
- To motivate and aware the school students about the advances and scopes of latest research.
- Institution of awards in recognition of excellence in different fields of science for research promotion
- Awards of excellence for contributions in the field of scientific research and development.
- To nurture scientific temperament and awareness among the masses.

Activities of Him Science Congress Association

Him Science Congress Association has organized various activities in different parts of Himachal Pradesh for promotion of sciences in a short span of three years. Few activities of Association are listed below year wise:

2012-2013

- Association has organized National Seminar on advances on Environmental Sciences on 24th August, 2012 at Shoolini University, Solan. The Seminar was inaugurated by Dr S.S. Negi, IFS, Managing Director of HP SC/ST Development Corporation and Mahila Vikas Nigam. The Chief Guest of the valedictory function was Sh. Sudripta Roy, IAS, Hon'ble Chief Secretary and Govt. of Himachal Pradesh. In his valedictory speech Sh. Sudripta Roy has applauded the efforts being done by the Him Science Congress Association for promotion of the Sciences in the state. 130 delegates from all over India attended the national seminar. The key note speakers of the seminar were Prof. V. K Gupta, IIT Roorkee and Prof. N. C. Kothiyal, NIT, Jalandhar. They highlighted new techniques for the remediation of environmental pollution.
- The 1st annual national conference of Association was hosted by Shoolini University, Solan from 8th -10th March 2013 on the theme "Science –Emerging Scenario and Future Challenges-I". The conference was attended by more than 180 scientists from various institutions of India. Chief guest Dr. Luqman Khan, Vice Chancellor, Mohammed Ali Jauhar University, Rampur, Uttar Pradesh appreciated the achievements made by Association in a short span of time. Prof. K.R. Dhiman, Vice Chancellor of Horticulture, Nauni, Solan, chief guest on valedictory function highlighted the role of Association for providing a platform for assemblage of innovative ideas in the frontier technologies.

2013-2014

- 2nd annual national conference of HSCA on theme "Science: Emerging Scenario & Future Challenges-II" was held at Himalayan Forest Research Institute, Shimla on 17-18 May, 2014. It was decorated by members of Indian and International Universities/Institutes. Dr. S.S. Negi, IFS, Director, Department of Science and Environment, Govt. of Himachal Pradesh inaugurated the conference. In the valedictory function the chief guest Prof. Ajak K Sharma, Director, National Institute of Technology, Delhi mentioned the need of such organization for awaking the society in science and

technology. He also discussed how science and technology help the people. The conference was attended by 200 delegates from different parts of India. The key note lecture was delivered by Prof. Kyu-Tek Park, Executive Vice President, The Korean Academy of Science and Technology (KAST). He focused on global networking for the inventory of species diversity.

- HSCA sponsored one day national seminar on Akash Tablet organized by IIT, Mumbai on 25-06-2013 at Shoolini University, Solan, Himachal Pradesh.
- Association sponsored 2 days Children Science Congress organized by Department of Science & Technology, Shimla on 24-25 Oct., 2013 at Solan.
- HSCA also sponsored national seminar on "Recent Trends in Materials, Energy and Environment" (NSRTMEE, 2014) held on 18 Jan., 2014 at Sri Sai University, Palampur, Distt. Kangra, Himachal Pradesh.

2014-2015

- Association has organized 3rd annual national conference on theme "Science: Emerging Scenario and Future Challenges-III on 11-12April, 2015 at Vallabh Govt. College, Mandi (Old block of IIT Mandi), Himachal Pradesh. This conference was partially funded by DST New Delhi, DRDO and SJVN, Shimla. Prof. Bhuvanesh Gupta, Indian Institute of Technology, Delhi, while inaugurating the conference, cherished the efforts made by Association in a short span of time. The Chief Guest of the valedictory function was Dr. B.S. Kaith, Registrar, National Institute of Technology, Jalandhar. In his speech he highlighted the role of Association for improving the scientific temperament in the youth of country.
- Association sponsored national seminar on theme Smart Materials: Advances in Research and Techniques (SMART-2015) is being organized by Faculty of Basic Sciences at Shoolini University, Solan, Himachal Pradesh on 26-27 November, 2015.
- Association celebrated its 3rd foundation day on 28th April, 2015 at Solan, Himachal Pradesh. It was decided to sponsor first two positions of Science topers of Himachal Board of School for higher studies in future.
- HSCA delivered inspire lecturers in School for motivating students in sciences and environments.

Glimpses

Glimpses

Glimpses

About the conference

SESFC 2016 *is the 4th Conference in the series on a common theme '**Science'** organized by Him Science Congress association, Himachal Pradesh, India.* ***The conference is being organized in the picturesque city of Dharamshala in the lap of mighty dhauladhar ranges of The Himalayas. It will*** *provide opportunities for the delegates to exchange new ideas and application experiences face to face, to establish business or research relations and to find global partners for future collaboration.*

The main aim of the conference is to present and share current researches being carried out in the different research area for scientists, scholars, engineers and students from the universities all around the World. Herein we will discuss the developments in science fundamentals and generate awareness among scientists, researchers and civilians for emerging world's problems and role of science in mitigation.

It is a great pleasure for the organizers to welcome scientific community from all over India and the world. It is of immense importance for scientists and innovators with great minds to meet for realizing our goals of human welfare and sustainable development. As our Prime Minister Narender Singh Modi truly said that the world has progressed because of human instinct to enquire and explore for knowledge but also to address human challenges.

We need to address innovation and exploration as a goal of our science to solve environmental, health and other human problems. And innovation in approach is the responsibility of the scientific sector and the academia.

In a world full of resource constraints and competing claims, we have to be smart, original and innovative enough in our scientific approach so that world may shift from health and hunger to energy and economy.

We welcome all the delegates.

Him Science Congress Association, Himachal Pradesh

International Conference 'SESFC 2016' 11-12 June, 2016

Venue: Hotel Inclover, Dharamshala (Himachal Pradesh)

PROGRAMME SCHEDULE

11 June, 2016 (Day 1)	
Registration **Time: 08:30 AM – 9:20 AM** **(Venue: Reception Desk)**	
Inauguration **Time: 9:30 AM - 11:00 AM** **(Venue: Conference Hall)**	
High-Tea (Venue: Conference Hall) **Time: 11:00 AM – 11:15 AM**	
Keynote Speech **11:15 AM – 12:00 PM** **(Venue: Conference Hall)**	**Prof. (Dr.) H.C. Swart** Department of Physics University of the Free State, Bloemfontein, South Africa (Venue: Conference Hall)
Plenary Talk **12:00 PM – 12:30 PM** **(Venue: Conference Hall)**	**Dr. S. Dutta** Program Officer, Board of Research in Nuclear Science, Mumbai (Venue: Conference Hall)
Oral Presentations **12:30 PM – 01:30 PM**	
Session Chairperson Prof. (Dr.) H.C. Swart **(Venue: Conference Hall)**	Chemical Sciences: CS11, CS19; Polymers & Materials Science: PMS03, PMS12
Session Chairperson Dr. Pawan Rana, HFRI Shimla **(Seminar Hall)**	Life Sciences: LS04, LS05; Mathematical Sciences: MS01, MS02
Lunch 01:30 PM - 02:30 PM **(Venue: Conference Hall)**	

SESSION – II **Time: 02:30 PM – 4:30 PM**	
Plenary Talk **Time: 02:30 PM – 3:10 PM**	**Prof. (Dr.) Griselda Barrera Galland** Instituto de Química, Universidade Federal do Rio Grande do Sul, Brasil (Venue: Conference Hall)
Oral Presentations **3:10 PM – 4:30 PM**	
Session Chairperson Prof. (Dr.) Griselda Barrera Galland **(Venue: Conference Hall)**	Chemical Sciences: CS21, CS23; Physical Sciences: PS03, PS04; Polymers & Materials Science: PMS13, PMS15
Session Chairperson Dr. Parkash Pathania, PAU **(Venue: Seminar Hall)**	Life Sciences: LS02, LS06, LS12, LS20; Environmental & Forest Sciences: EFS09, EFS13
Tea **04:30 PM – 04:40 PM** **(Venue: Conference Hall)**	
SESSION – III (Poster Presentation) **Time: 04:40 PM – 06:00 PM** **(Venue: Conference Hall)**	
Chemical Sciences: CS13, CS15, CS17, CS18, CS20, CS22, CS24, CS25, CS27, CS30, CS41; Physical Sciences: PS05, PS06, PS09 ; Polymers & Materials Science: PMS02, PMS04, PMS07, PMS14, PMS16, PMS21 **Life Sciences: LS08, LS09, LS13, LS15, LS16, LS21, LS25; Mathematical Sciences: MS07, MS12; Environmental & Forest Sciences: EFS01, EFS02, EFS07, EFS08, EFS12**	
Time: 06:00 PM – 06:30 PM HSCA General House followed by meeting of EC of Association (**Venue: Venue will be announced during the conference)**	
Dinner **Time: 07:30 PM – 09:00 PM** **(Venue: Conference Hall)**	
12 June, 2016 (Day 2)	
SESSION – IV Invited Talks & Oral Presentations **Time: 09:15 AM – 11:30 AM** **(Venue: Conference Hall)**	
Invited Talk: Dr. Akash Katoch, IIT Roorkee	

M.L. Sharma, PU Chandigarh Session Chairperson **(Venue: Conference Hall)**	Chemical Sciences: CS01, CS26; Physical Sciences: PS07, PS16, PS31; Polymers & Materials Science: PMS18
	Invited Talk: Dr. Narender Sharma, ZSI Dehradun Life Sciences: LS23, LS30, LS39; Mathematical Sciences: MS03, MS05, MS08, MS10; Environmental & Forest Sciences: EFS15, EFS16, EFS31, EFS32
Tea **Time: 11:30 AM – 11:45** (**Venue: Conference Hall**)	
SESSION – V (Poster Presentation) **Time: 11:45 Noon– 12:45 PM** **(Venue: Conference Hall)**	
Chemical Sciences: CS08 - CS10, CS42, CS43, CS44, CS45, CS46, CS48, CS49, CS58; Physical Sciences: PS12, PS19, PS26; Polymers & Materials Science: PMS22, PMS26, PMS32, PMS33, PMS38 **Life Sciences: LS28, LS34-LS36, LS38, LS40, LS44, LS43; Environmental & Forest Sciences: EFS17, EFS18, EFS28, EFS30**	
Lunch **Time: 01:00 PM – 02:00 PM** (**Venue: Conference Hall**)	
Valedictory Function **Time: 02:00 PM – 03:00 PM** (Venue: Conference Hall)	

Organizing Committee

Chief Patrons

Dr. S.S. Negi, Additional Director General (FC), Ministry of Environment and Forests, Govt. of India, New Delhi
Prof. P.K. Khosla, Vice Chancellor, Shoolini University, Solan (H.P.)

Patrons

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Prof. Bhuvanesh Gupta, President, Asian Polymer Association

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Mr. Rajesh Sharma, Govt. Sr. Sec. School, Jaunaji, Dist. Solan (H.P.)

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- Pankaj Thakur, IIT Naples, Italy
- Lakhveer Singh, University Malaysia Pahang, Malaysia

Keynote Address

Uses of Phosphor Materials for Practical Applications

Hendrik C. Swart
Department of Physics, University of the Free State, Bloemfontein, South Africa
E-mail: swarthc@ufs.ac.za

Hendrik C Swart is a B1 NRF rated researcher and currently a senior professor in the Department of Physics at the University of the Free State. Over the past 20 years he has led research in the area of the degradation of phosphors for field emission displays, as well as developing materials for nano solid state lighting. He has been key in the development of processes to synthesise and deposit thin films of various types of semiconductor nano- particles which will enhance the colour, luminescent intensity and lifetime of such displays.

He has more than 400 publications in international peer reviewed journals, 83 peer reviewed conference proceedings and 8 book chapters and books with more than 2600 cited author references and more than 470 national and international conference contributions (authored and co-authored). He has an ISI H-index of 23 (rid=g-2696-2012). He is a reviewer for about 40 international and national professional journals in his field (or in related fields), and a member of the editorial board of the high impact factor journal 'Critical Reviews in Solid State and Materials Sciences. He is on the editorial board of Applied Surface Science and one of the newly appointed editors of the Journal of Nano Research. He has received the South African National Science and Technology Forum (NSTF) award in 2009 for research capacity development of students in the niche area of nanophysics. His commitment to the next generation of scientists is also reflected by the awards he received from the Faculty of Natural and Agricultural Sciences at the University of the Free State, South Africa for excellence (2012), research (2014), mentorship (2008) and for academic entrepreneurship (2009). The International Association of Advanced Materials (IAAM) honoured him with the prestigious IAAM Scientist award for 2014 at the SETCOR International Conference on Smart Materials and Surfaces, Bangkok - Thailand. He has supervised 60 PhD and MSc students successfully in the past with another 17 in progress and has established a National Nano Surface Characterization Facility (NNSCF) containing state of the art surface characterization equipment. A research chair in Solid State Luminescent and Advanced Materials was awarded to him from the South African Research Chairs Initiative (SARChI) at the end of 2012.

Phosphor materials are an integral part of our daily life. Luminescent compounds and materials have numerous uses, most notably in detectors of various sorts, but also in consumer products such as displays, light emitting diode (LED) lighting and watches. The emission properties, whether of a fast decay rate fluorescent material or a slow decay rate phosphorescent material, are defined by the chemical composition and the physical structure of the luminescent material. Phosphor hosts, defects, dopant concentration and valence state are some of the important parameters to be considered when designing new phosphor materials. The crystal field that is determined by the environment in the host material in combination with the dopant ion with the correct valence state can be used to obtain emissions from the Ultra violet (UV) to the infra-red (IR) wavelength ranges. Phosphor materials have been successfully used to improve the efficiency of various applications. ZnO nanoparticles both undoped and doped with different rare earth elements were synthesized by several synthesized techniques. The strong deep level emission (DLE) and near band edge emission could be tuned to cover a wide spectral range. The DLE emission was shown to be due to oxygen vacancies. The strong DLE, covering a wide spectral range of ~375-650 nm, signifies the potential optoelectronics application in the near white LED applications. The major problem that limits solar cells' efficiency is their insensitivity to the whole solar spectrum which is the so-called spectral mismatch. Therefore, several mechanisms have been explored based on photoluminescence to convert the solar cell spectrum where the spectral response of the solar cell is low to regions where the spectral response of the solar cell is high. Quantum cutting (or downconversion), up-conversion and downshifting are some of the mechanisms that may be applied to improve the spectral response. In the case of up-conversion two or three IR photons combine to produce one higher energy photon that can be adsorb by the solar cell. In down-conversion one UV/visible photon split into two near-infrared photons. Both these photons can then be absorbed by the solar cell. Downshifting is a process of shifting one higher energy photon into one lower energy photon. The absorption of high energy photons by a solar cell generates heat during the fast thermalization of the hot charge carriers. Downconversion can be utilized to reduce the thermalization loss since the external quantum efficiency exceeds unity and hence the current doubling can occur.

Plenary Talk

ADVANCES IN THE SYNTHESIS AND CHARACTERIZATION OF POLYOLEFINS AND NANOCOMPOSITES

Griselda Barrera Galland
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Griselda Barrera Galland, born in Uruguay, is Full Professor of the Organic Chemistry of the Institute of Chemistry of the Federal University of Sul (IQ/UFRGS) in Porto Alegre, Brazil. She graduated in Chemistry and in Engineering from the University of Geneva (UNIGE), Switzerland, in 1979 and 1980 respectively. She is Master in Chemistry (1989) and PhD in Materials Science (1996) by the Federal University of Rio Grande do Sul. Her main fields of research are in the area of polymers, acting on the following topics: polymerization, characterization and properties of polyolefins, synthesis and characterization of catalysts for polyolefins, polyolefin nanocomposites and NMR of polyolefins

She acts as a reviewer for several international scientific journals and as a consultant for several financing agencies. She was coordinator of several scientific international events: X International Macromolecular Colloquium held in Gramado, Brazil in April 10-13, 2005, 1st Workshop on Materials Brazil-USA: held in Gramado, Brazil in April 25-28, 2007 and scientific coordinator of the XIV SLAP (Latin-American Symposia of Polymers) held in Porto de Galinhas, Brazil in October 12-16, 2014. She is supervisor of Master and PhD in chemistry (PPGQ) and in material science (PGCIMAT) programs of the UFRGS. She has a large number of national and international collaborations with researchers from other centers. She has published around 100 papers. By the Web of Science she has a total of citations of 1879 from 97 items and an H Factor of 24 on the date of 07/03/2016.

This presentation will be divided in three parts. The first part consists on a review of the works made by our research group on the application of organometallic catalysts in the synthesis of polyolefins using metallocene and post-metallocene catalysts. Then, there will be presented the difficulties and possibilities of the use of ^{13}C Nuclear Magnetic Resonance to the polyolefin study. Finally, it will be reported the synthesis, characterization and properties study of polyolefin/ graphene nanocomposites obtained through the *in situ* polymerization.

Our research group has been studying, for more than ten years, catalytic systems based on metallocenes, homogeneous and supported on inert matrixes, applied to the synthesis of polyolefins. More recently, new catalysts of Zr and Ti with bidentate alkoxide ligands derived from natural products such as malthol an -diimine ligands, have been studied. A brief review of our work in this area will be presented.

Nuclear magnetic resonance spectroscopy of high resolution is the technique that provides a greater amount of information, both qualitatively and quantitatively, on the microstructure of the polymers. It is widely used to establish correlations between structure and properties of materials and information about mechanism of polymerization or modification of the polymer. It is possible to evaluate, by structural analysis of polyolefins, the amount and distribution of comonomers incorporated, types of branches, stereoregularity and to identify the reaction mechanisms. These informations are extremely important for the researches that work with synthesis of polyolefins as the structure will depend on the catalytic system. Our works on determination of different structures in polyolefins obtained, especially, with Ni catalysts, will be presented.

Nanocomposites are materials composed by polymers and fillers, where at least one dimension of the dispersed particles are at the nanometer range. They can provide significant improvements in the mechanical, thermal and physico-chemical properties as compared to pure polymers or conventional composites, even when used at loading under 5 wt-%. The research on graphene-based nanocomposites has grown in interest the last years, especially, after a graphene sheet was successfully isolated in 2004 and its properties studied. Indeed, graphene is stronger and stiffer than diamond, as a conductor of electricity is similar to copper and as a conductor of heat, surpasses all other known materials. The possibility of joining the processability of polyolefins with the mechanical and conductive properties of graphite or graphene makes dreaming with

materials with properties never seen before. These materials have great potential to be used in flexible electronic devices, sensors, solar cells, as well as materials of high strength and lightness for the automotive and aeronautics. One of the methods to obtain nanocomposites is the *in situ* polymerization which facilitates the dispersion of the filler in the polymer. In this presentation there will be shown our last results in polyolefin nanocomposites using different fillers, such as graphite derivates, carbon nanotubes and metallic fillers, obtained by *in situ* polymerization.

Plenary Talk

The role of BRNS in the growth of Indian Science and Technology

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The Board of Research in Nuclear Sciences (BRNS) is an advisory body of the Department of Atomic Energy (DAE) to recommend financial assistance to universities, academic institutions and national laboratories. The Board is chaired by an eminent scientist/engineer and has senior scientists/engineers from within the DAE and outside as members. The BRNS supports high quality R & D projects in the areas relevant to its programs e.g., i) 3-stage Nuclear Power Programme, ii) Research Reactor Programme for the production of radioisotopes in relation to the application of radiation technology in medicine, agriculture and industry, iii) R&D in hi-tech areas such as development of accelerators, lasers, supercomputers, instrumentation, advanced materials, robotics and automation iv) basic science research. The BRNS lays emphasis on collaborative programmes between the DAE scientists and the scientific community outside the DAE family. Such a collaborative approach is expected to create and strengthen academic bond and promote closer interaction between the DAE and Universities/Research Institutions.

Besides funding research projects, the BRNS provides financial assistance to organize symposia /conferences / workshops on topics of relevance to the programs of the DAE. It also awards projects to young scientists to encourage them to pursue career in research. Dr. K.S. Krishnan Research Associateship is being awarded regularly under the aegis of the BRNS to attract highly talented young scientists and technologists. This talk will give an overview of the current activities of BRNS and its role in the growth of Indian Science and Technology as envisaged by its founder member, the great nuclear scientist Dr Homi J Bhabha.

Invited Talk

One-dimensional Metal-Oxide Based Chemical Gas Sensors

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Chemiresistive-type gas sensors based on one-dimensional metal oxides are well known for their remarkable gas sensing ability to detect toxic gaseous species at part per million levels [1]. Indeed, fast detection capability with quick response and recovery time are potential aspects of metal oxides which make them promising for gas sensing applications. Higher surface area attained due to one-dimensional structure offers a number of adsorption sites for incoming gas molecules are responsible for higher sensitivity of metal-oxide based sensors [2]. The microstructure and morphological modifications have been found promising for improvement of overall sensitivity of sensors. For intense, the evolution of nano-sized grains in nanofiber based structures are have been found promising for obtaining better sensing properties, and can be controlled by changing grain size by calcining them at different temperatures or durations under isothermal conditions [3]. Moreover, this typical microstructure gives the opportunity to prepare doped and composites nanostructures by replacing neighboring grains with foreign ones. In this work, we, try to highlight the importance of grains size for obtaining superior sensing properties. The underlying sensing mechanism will be proposed to account sensing performance.

Reference:

1. J. Y. Park, K. Asokan, S. –W. Choi, and S. S. Kim, Sens. Actuators B: Chem., 152, 254 (2011).

2. C. L. Zhu, Y. J. Chen, R. X. Wang, L. J. Wang, M. S. Cao, and X. L. Shi, Sens. Actuators B: Chem., 140, 185 (2009).

3. S. –W. Choi, J. Y. Park, S. S. Kim, J. Mater. Res., 26, 1662 (2011).

HIM SCIENCE CONGRESS ASSOCIATION, HIMACHAL PRADESH

International Conference

On

Science: Emerging Scenario and Future Challenges (SESFC 2016)

Himachal Pradesh, 11-12June, 2016

Abstracts

Section A: Chemical Sciences

Abstract Number	Title of Paper	Authors	Address
CS01	Investigating surfactants potential towards growth and stability of HgS nanoparticles in aqueous medium	Sanjay Kumar1, S.K. Mehta2 and Michael Gradzielski3	1Department of Chemistry, RGM Government College, Jogindernagar (Mandi), H.P. -175015, India 2Department of Chemistry and Centre for Advanced Studies in Chemistry, Panjab University, Chandigarh-160014, India 3TU Berlin, Institut für Chemie, Stranski-Laboratorium für Physikalische Chemie und Theoretische Chemie, Sekr. TC 7, Strasse des 17. Juni 124, D-10623 Berlin, Germany
CS02	Studies of Retension and Reusable Capacities of 8-Hydroxyquinoline 5-sulphonic acid Formaldehyde based Copolymer against some Toxic Metal Ions by Batch Equilibrium Method	W. B. Gurnule[1] and Jyotsana Khobragade[2]	[1]Department of Chemistry, Kamla Nehru Mahavidyalaya, Sakkardara, Nagpur 440024, Maharashtra, India [2]Department of Chemistry, Priyadarshani College of Engineering, Hingna Road, Nagpur-440 019, India
CS03	Kinetics of Thermal Decomposition of Copolymer Resin-III Derived From 2,4-Dihydroxypropiophenone, Adipamide And Formaldehyde	Wasudeo B. Gurnule* and Charulata S. Makde	Department of Chemistry, Kamla Nehru Mahavidyalaya, Nagpur-440024, M. S.
CS04	Thermal Degradation Study of Resin-IV derived From 4- Hydroxybenzaldehyde and Phenyl hydrazine with Formaldehyde	Wasudeo B. Gurnule* and Vaishali R. Bisen	Department of Chemistry, Kamla Nehru Mahavidyalaya,Maharashtra, Nagpur-440024, India
CS05	Effect of cation on the thermodynamic properties of glycine and L-alanine in aqueous solutions of dipotassium hydrogen phosphate at different temperatures	Kirtanjot Kaur	Department of Chemistry, Dr B R Ambedkar National Institute of Technology, Jalandhar

CS06	Extended studies on molecular interactions of sdbs and dtab in aqueous solutions of amino acid at t= 293.15-313.15 k	Kundan Sharma*[1], Suvarcha Chauhan[2]	[1]Department of Applied Chemistry, Amity Institute of Applied Sciences, Amity University, Noida (U.P.) – 201313, India [2]Department of Chemistry, H. P. University, Shimla–171005, India
CS07	DNA damage, In vitro cytotoxicity studies of N, N' –disubstituted thiocarbamide and their Cu (I) complex: synthesis and structural characterization	Seema Pratap *, Sunil K Pandey	Department of Chemistry, Mahila Mahavidyalay, Banaras Hindu University, Varanasi-221005
CS08	Sucrose assisted synthesis of Bismuth Ferrite nanoparticles via auto combustion route	Harminder Singh and Jaspreet K. Rajput	Department of Chemistry, Dr B R Ambedkar National Institute of Technology, Jalandhar
CS09	Development of Fe_3O_4@chitosan@Co (II) based sandwich catalyst	Jaspreet Kaur Rajput and Jigyasa	Department of Chemistry, Dr B R Ambedkar National Institute of Technology, Jalandhar
CS10	OT@Si@SPIONs catalyzed one-pot synthesis of cyclohexanecarbonitriles	Priya Arora and Jaspreet Kaur Rajput	Department of Chemistry Dr B R Ambedkar National Institute of Technology, Jalandhar-160 011, India
CS11	An efficient synthesis of novel mannich products bearing thiophene nucleus using ionic liquid and their microbial studies	Hitendra M. Patel	Department Of Chemistry, Sardar Patel University, Vallabh Vidyanagar, Gujarat, India,
CS12	Study of Mixed Micellar behavior of 12-2-12 Gemini Surfactant with Tetradecyltrimetyl Ammonium Bromide in Presence of Alcohols	T. S. Banipal and A. K. Sood*	Department of Chemistry, Guru Nanak Dev University, Amritsar - 143 005 (Pb.), India
CS13	Synthesis, Characterization and Studies of Heterocyclic Fluorescent Probe Containing Copolyamides	[1]Dilip Vasava,[2] S. K. Patel*,	[1]Department of Chemistry, School of Science, Navarangpura, Ahemedabad, Gujarat. [2]Department of Chemistry, VNSGU, Surat Gujarat*.
CS14	Thermodynamic studies of molecular interactions of drug with Glycine and its peptides at different temperatures	Kirtanjot Kaur	Department of Chemistry, Dr. B R Ambedkar National Institute of Technology, Jalandhar 144 011, Punjab
CS15	A comparative assessment on the tribological performance of CdS and Cu nano-fluids	Ajay Kumar*, G. D. Thakre, P. K. Arya, A.K. Jain	Advanced Tribology Research Centre, CSIR - Indian Institute of Petroleum, Dehradun, India – 248 005
CS16	Photolysis of 3-alkoxychromones/bischromones: Synthesis of pyronopyrane derivatives	Mohamad Yusuf, Indu Solanki and Manvinder Kaur	Department of Chemistry, Punjabi University, Patiala-147002, Punjab.

CS17	Symmetrical bisdihydropyrazole derivatives: Synthetic and antimicrobial studies	Mohamad Yusuf*, Saloni Thakur, Manpreet Singh and Manvinder Kaur	Department of Chemistry, Punjabi University, Patiala-147002, Punjab, India
CS18	Synthesis and pharmacological evaluation of some novel 2-pyrazoline derivatives	Sowmya P.V.[a] , Boja Poojary [a*] , Vasantha Kumar [a], Revanasiddappa B. C.[b]	[a]Department of Studies in Chemistry, Mangaluru University, Mangalagangothri, Karnataka, -574199,India [b]Departement of Pharmaclogy, N.G.S.M. Institute of Pharmaceutical Sciences, paneer, Deralakatte, Mangaluru-575018,Karnataka, India
CS19	An Environmental Benign Route to Synthesize High Molecular Weight Polar Polyolefins by a New Postmetallocene Titanium(IV) Complex Bearing Asymmetric Tetradentate [ONNO]-type Amino Acid Based Ligand at Ambient Temperature in Aqueous Emulsion	Kanchan Sharma, Sudip Kumar De*	Department of Chemistry, Jaypee University of Engineering and Technology, Guna, M.P, India
CS20	Synthesis of derivatives of phenolic acids from sugarcane bagasse lignin and their antioxidant activity	Ramandeep Kaur[a] and S K Uppal[a]	[a]Department of Chemistry, Punjab Agricultural University, Ludhiana-141004, India
CS21	Molecular Docking and QSAR study of chalcone and pyrimidine derivatives as potent anti-malarial agents against Plasmodium falciparum	Dayena J. Christian[a], Rajesh H. Vekariya[a], Kinjal D. Patel[a], KailashParmar[b], Mahesh T. Chhabaria[b*], Hitesh D. Patel[a*]	[a]Department of Chemistry, School of Sciences, Gujarat University, Navrangpura, Ahmedabad 380009, Gujarat, India. [b]Department of Pharmaceutical Chemistry, L. M. College of Pharmacy, Navrangpura, Ahmedabad 380009, Gujarat, India
CS22	Overcoming matrix effect due to plasma phospholipids in the determination of antiarrhythmic drug dronedarone and desbutyl dronedarone by LC-MS/MS	Pranav S. Shrivastav	Department of Chemistry, School of Sciences, Gujarat University, Navrangpura, Ahmedabad-380009.
CS23	Excited State Intramolecular Proton Transfer (ESIPT) Inspired Motiffs	Pradip S. Mutkule[1]and Dilip R. Thube*	[1]Department of Chemistry and Research Centre, New Arts, Commerce and Science College, PARNER, Ahmednagar, 414 302 (MS), (SPPU, Pune) India
CS24	Chemistry and antioxidant potential of flavanones from zest and pith of kinnow peel	Manmeet Kaur, S K Uppal, Amanpreet Kaur, Ramandeep Kaur	Department of Chemistry, Punjab Agricultural University, Ludhiana, India-141004.

CS25	Total phenolic content and antioxidant activity of different turmeric extracts	Amanpreet Kaur, S.K.Uppal, Manmeet Kaur, Ramandeep Kaur	Department of Chemistry, Punjab Agricultural University, Ludhiana, India-141004.
CS26	Investigating CO oxidation catalysed by Au nanoclusters	Jyoti Yadav and Sangeeta Saini*	Affiliation: Kurukshetra University, Kurukshetra, Haryana– 136119
CS27	Ultrasonic Studies of Some transition metal sulphates in Aqueous mixture of sodium chloride and maltose at Different Temperatures	[1]Dinesh Kumar, [2]Sunil Kumar and [1]Shashi Kant Lomesh	[1]Department of chemistry, Himachal Pradesh University, Shimla-171005 (H.P.) India [2]Department of chemistry, Sri Sai University, Palampur-176061 (H.P.) India
CS28	Development of fluorescent organic cations for molecular recognitions	Amanpreet Singh, Narinder Singh*	Department of Chemistry, Indian Institute of Technology, Ropar, India
CS29	Design and synthesis of imidazopyridine fused pyrazolo-pyridinone and Pyrazole fused-azepinone derivatives from bifuncationalized pyrazole aldehyde	Nisha Devi , Dharmender Singh and Virender Singh	Department of Chemistry, Dr. B R Ambedkar National Institute of Technology, Jalandhar
CS30	Urea/thiaurea basedreceptor as fluorescent sensor forFe(III)	Jasminder Singh,[a] Narinder Singh*,[a]	Department of Chemistry, Indian Institute of Technology, Ropar
CS31	Thermodynamic and spectroscopic studies of Doxycycline hyclate in aqueous β-cyclodextrin solution at different temperatures	Nisha Sharma and Shashi Kant Lomesh	Department of chemistry, Himachal Pradesh University, Shimla-171005 (H.P.) India
CS32	Micelles as drug delivery systems or as targeting systems	Tejas P. Joshi	DST-FIST Sponsored Department of Chemistry, Bhavnagar University, Bhavnagar-364 002, Gujarat, India
CS33	Design and Synthesis of Isoxazole and β-Carboline Substituted Imidazopyridine Derivatives via Groebke-Blackburn-Bienayme (GBB) Reaction	Dharmender Singh*, Nisha Devi, and Virender Singh	Department of Chemistry, Dr. B R Ambedkar National Institute of Technology, Jalandhar 144011,
CS34	A comparative study of Aggregation behavior of Tetrabutylammonium dodecylsulphate and Sodium dodecylsulphate in the presence of Glycine	S. Chauhan* and Ashish Kumar	Department of Chemistry, Himachal Pradesh University, Summer Hill, Shimla–171005
CS35	Effect of Saccharides on the Surface Activity and Micellar Properties of Ionic Surfactant at Different Temperatures: Surface Tension Study	S. Chauhan* and Kailash Singh	Department of Chemistry, H. P. University, Shimla–171005

CS36	Investigations on Intermolecular Interactions of Aqueous Metformin Hydrochloride In the Presence of Glutamine	S. Chauhan* and Kuldeep Singh,	Department of Chemistry, Himachal Pradesh University, Summer Hill, Shimla–171005, India
CS37	Intermolecular Interactions of Cardiovascular drug Furosemide with Amino Acids Analyzed by Viscometric and Optical Method at Different Temperatures	S. Chauhan* and Lalita Pathania	Department of Chemistry, Himachal Pradesh University, Summer Hill, Shimla–171005, India
CS38	Aggregation Behaviour of Dodecyltrimethylammonium Bromide (DTAB) in the Presence of Tetraalkylammonium Based Ionic Liquids: A Conductometric Study	S. Chauhan* and Maninder Kaur	Department of Chemistry, Himachal Pradesh University, Summer Hill, Shimla–171005
CS39	To Study Micellization of Cetyltrimethyl Ammonium bromide in Aqueous Solutions of Dipeptide: A Conductometric Approach	S. Chauhan*, Santosh Kumari	Department of Chemistry, H. P. University, Shimla–171005, India
CS40	Synthesis, characterization and antimicrobial activity of n-butyltin (IV) hydroxamates	Neeraj Sharma, Vikas Kumar, Abhishek Kumar and Bhanu Priya	Department of Chemistry, H.P. University, Summer Hill, Shimla-171005, India
CS41	Oxidative functionalization of alkenes by using silica supported transition metal catalysts	Hitesh M. Parekh[a*], Jignesh K. Valand[b] and Holger B. Friedrich[b*]	[a]Department of Chemistry, School of Sciences, Gujarat University, Navarangpura, Ahmedabad 380009, INDIA, [b]School of Chemistry and Physics, University of KwaZulu-Natal, Westville campus, Durban 4000, SOUTH AFRICA.
CS42	Anti-tuberculosis activity of novel N-(benzo[d]thiazol-2-yl)-2-(2-(6-chloroquinolin-4-yl)hydrazinyl)acetamide derivatives:Synthesis, Characterization, in silico ADME predictionand molecular docking study	Manoj N. Bhoi, Mayuri A. Borad, Sanjay K. Rathwa, Mahesh S. Vasavaand Hitesh D. Patel*	Department of Chemistry, School of Sciences, Gujarat University, Ahmedabad, India. Tel.: +91-079-26300969; fax: +91-079-26308545
CS43	Effect of anion-doping / cation –anion co-doping on phase transformation and photocatalytic activity of TiO_2	Nidhi Sharotri, Shivali Gupta, Dhiraj Sud	Department of Chemistry, Sant Longowal Institute of Engineering and Technology (Deemed University), Longowal 148106, Sangrur, Punjab.
CS44	Molecular dockingand one-pot expeditious microwave assisted synthesis of novel 2-Amino pyrimidine derivatives as anti-tuberculosis agents .	Sanjay K. Rathwa[a], Manoj N. Bhoi[a], Mayuri A. Borad[a], Mahesh S. Vasava,E. A. Pithawala[b], Hitesh D. Patel[a*]	[a]Department of Chemistry, School of Sciences, Gujarat University, Ahmedabad, India. [b]Department of Life sciences, School of Sciences, Gujarat University, Ahmedabad, India , Ph. (O) +91-079-26300969, (Fax) +91-079-26308545

CS45	Microwave-assisted synthesis, molecular docking and anti-tubercular activity of novel N-(benzo[d] thiazol-2-yl)-2-((2,4'-dioxospiro[indoline-3,2'-thiazolidin]-3'-yl)amino)acetamide derivatives	Mayuri A. Borad, Manoj N. Bhoi, Sanjay K. Rathwa, Mahesh S. Vasavaand Hitesh D. Patel*	Department of Chemistry, School of Sciences, Gujarat University, Ahmedabad, India. Tel.: +91-079-26300969; fax: +91-079-26308545
CS46	Synthesis of N'-(7-Chloroquinolin-4-yl)-6-Methyl-2-Oxo-4-Phenyl-1,2,3,4-Tetrahydropyrimidine-5-Carbohydrazide Derivatives As Potent Antibacterial Agents	Mahesh S. Vasava, Manoj N. Bhoi, Mayuri A. Borad, Sanjay K. Rathwa, Hitesh D. Patel[a*]	[a]Department of Chemistry, School of Sciences, Gujarat University, Ahmedabad, India. Tel.: +91-079-26300969; fax: +91-079-26308545
CS47	Synthesis and application of $CuFe_2O_4$nanoparticles in organic transformations	Gagandeep Kaur[1], Jaspreet Kaur Rajput[2]and Priya Arora[2]	[1]Department of Chemistry, SGTB Khalsa College Sri Anandpur Sahib 140118, India [2]Department of Chemistry, Dr. B. R. Ambedkar National Institute of Technology, Jalandhar 144011, India
CS48	Influence of temperature and salt on clouding behaviour of Tween 20 and Tween 80	Nikunj N Dave	Pacific University (PAHER), Udaipur.(Raj)-313024
CS49	Schiff bases as potential inhibitor for oxidative stress-induced cataract	Priyanka Chauhan and Kalyan Sundar Ghosh*	Department of Chemistry, National Institute of Technology Hamirpur, Himachal Pradesh 177005
CS50	Novel calix[4]arenes based quinazoline derivatives: Click synthesis and biological evaluation	Nikunj N. Valand, Manish B. Patel, Shobhana K. Menon	Department of chemistry, University School of Sciences, Gujarat University, Ahmedabad, Gujarat-380009, India.
CS51	Domino/Knoevenagel-hetero-Diels-Alder syntheses of some new angular polycyclic heterocycles in greener environments	Balvantsingh M. Labana[a], Tushar R. Sutariya[a], Bhavesh R. Pansuriya[a], Narsidas J. Parmar,[a*] Rajni Kant[b], and Vivek K. Gupta[b]	Department of Chemistry, Sardar Patel University, Vallabh Vidyanagar-388120. Dist. Anand, Gujarat, India. Tel.:+91-2692-226858;fax:+91-2692-236475 Post-Graduate Department of Physics, University of Jammu, Jammu Tawi-180006, India
CS52	Studies on synthesis of some bio-active heterocycles containing thieno[2,3-d]pyrimidine moiety	Himanshu D. Patel	DR. APJ Abdul Kalam Govt. College, Silvassa - Dokmardi-396230 U.T. of Dadra and Nagar Haveli (India)
CS53	Formation and Characterization of Oil-Water Nano–emulsions	Kunal Arora, Vimal Kumar	Department of Chemical

			Engineering, Indian Institute of Technology, Roorkee, Roorkee 247667, Uttarakhand, India
CS54	Pyridine and 2-picoline biodegradation in sequencing batch reactor	M. Ramamoorthy, Vimal Chandra Srivastava	Department of Chemical Engineering, Indian Institute of Technology, Roorkee, Roorkee 247667, Uttarakhand, India
CS55	Role of Azido Esters as Energetic Plasticizers	Shaibal Banerjee	Organic Synthesis Laboratory, Department of Applied Chemistry, Defence Institute of Advanced Technology (DU), Girinagar, Pune-411025, India
CS56	Protoporphyrin IX as electroactive material in Mg(II)-selective potentiometric sensor	Pankaj Kumar* and Piyush Kuchhal	University of Petroleum & Energy Studies, Dehradun
CS57	Enhancement of Biohydrogen Production from waste of *Benincasa hispida* using microwave pretreatment process at optimum power	Yogita Singhal and Radhika Singh	Biohydrogen Production Lab, Department of Chemistry, Dayalbagh Educational Institute, Agra, India-282005
CS58	Effect of different microbial culture on biohydrogen production from *Benincasa hispida* Waste	Minu Singh, Dolly Kumari, Yogita Singhal and Radhika Singh	Biohydrogen Production Lab, Deptt of Chemistry, Faculty of Science, Dayalbagh Educational Institute, Agra - 282005
CS59	Solar photocatalytic degradation of ampicillin antibiotic utilizing bentonite supported $ZnFe_2O_4$	Sourav Gautam, Bhanu Priya, Pooja Shandilya, Pankaj Raizda & Pardeep Singh	School of Chemistry, Shoolini University of Biotechnology and Management Sciences, Solan -173212, Himachal Pradesh, India

Section B: Physical Sciences

Abstract Number	Title of Paper	Authors	Address
PS01	Impedance Spectroscopy study of $CoFe_2O_4$ - $Pb_{0.7}Ca_{0.3}TiO_3$ Composite	Anshu Sharma [1,2*], Prianka Sharma [1], R.K. Kotnala [3] and N.S. Negi [2]	[1] Department of Physics, Maharaja Agrasen University, Baddi, Solan [2] Department of Physics, Himachal Pradesh University, Shimla-171005, India [3] National Physical Laboratory, New Delhi-110012, India
PS02	Effect of Annealing Temperature on Electrical and Dielectric Properties of Co- doped SnO2	Prianka Sharma* and Anshu Sharma	Department of Physics, Maharaja Agrasen University, Baddi, Solan
PS03	Structural & electrical properties of $Zn_{50}Se_{50}$ material irradiated by slow neutrons	V. Kishore [1] and Vibhav K. Saraswat [2]	[1] Applied Science and Humanities, Bundelkhand Institute of Engineering &Technology, Jhansi-284128 (UP) INDIA [2] Deptt. of Physics, Army Cadet College

			Wing, Indian Military Academy, Dehradun 248007 UK, INDIA
PS04	An investigation on the tribological performance of Cu nanoparticles as additives in commercially formulated lubricants	Prashant Thapliyal [1*], Ajay Kumar [2], G.D. Thakre [2] and S.K. Singhal [3]	[1] Army Cadet College, Indian Military Academy, Dehradun, India [2] Advanced Tribology Research Centre, CSIR-Indian Institute of Petroleum, Dehradun, India [3] Automotive Fuels & Lubricants Application Division, CSIR-Indian Institute of Petroleum, Dehradun, India
PS05	Phenomenological Analysis of Hadronic Regge Trajectories	Navjot Hothi [†*] and Shuchi Bisht [‡]	[†] Department of Physics, Bahra University, Shimla Hills-173215, Himachal Pradesh, India. [‡] Department of Physics, Kumaun University, Nainital-263002, Uttarakhand, India.
PS06	Dynamic Light Scattering Study on Jatropha Latex	Arup Dutta*, S.S. Pradhan and A. Sarkar	Condensed Matter Physics Research Centre, Department of Physics, Jadavpur University, Kolkata - 700032
PS07	Analysis of Mesonic Regge Trajectories for strengthening the concept of 70 MeV Mass Quanta	Shuchi Bisht *#, Gaurav Bhakuni * and Navjot Hothi **	* Department of Physics, Kumaun University, Nainital -263002, Uttarakhand, India. ** Department of Physics, Bahra University, Shimla Hills-173215, Himachal Pradesh, India.
PS08	Influence of $(Ba_{0.96}La_{0.04})Ti_{0.815}Mn_{0.0025}Nb_{0.0025}Zr_{0.18}O_3$ ceramic on the structural and electrical properties of $(K_{0.5}Na_{0.5})_{0.90}Li_{0.1}NbO_3$ ceramic system by using Impedance Spectroscopy	Shweta Thakur [#], Poonam Kumari [#], Radheshyam Rai [#] and Seema Sharma [$]	[#] School of Physics, Shoolini University, Solan 173229, Himachal Pradesh, India [$] Ferroelectric Research Laboratory, Department of Physics, A N College, Patna 800013
PS09	Structural Characterization and Optical Properties of a-Se-Sn-Ge-Sb Thin Film System	Shobhna Chaudhary, Vivek Modgil, Anant Vidya Nidhi, Prashant Kumar and V.S. Rangra	Department of Physics, Himachal Pradesh University, Summerhill, Shimla – 171005
PS10	Structural and magnetic properties of ferrite-ferroelectric composites synthesized by solid state reaction method	Poonam Kumari [#], Shweta Thakur [#], Mamta Shandilya [#], Radheshyam Rai [#] and Seema Sharma[$]	[#] School of Physics, Shoolini University, Solan 173229, Himachal Pradesh, India [$] Ferroelectric Research Laboratory, Department of Physics, A N College, Patna 800013
PS11	Study of phase transitions phenomena in some	Naveen Kohli	Physics Department, HNB Garhwal

	Ferroelectrics and Antiferroelectrics	and Trilok Chandra Upadhyay	University (A Central University) Srinagar (Garhwal), Uttarakhand - 246174
PS12	Investigation of the effect of Carbon nanotubes reinforcement on the energy release during thermite reaction	Manjula Sharma and Vimal Sharma	Department of Physics, National Institute of Technology, Hamirpur-177005 (HP), India
PS13	Investigation of AC Hall Effect on Biomaterial and DMD Systems	Somnath Pal and A. Sarkar *	Dept. of Physics Bijoy Krishna Girls' College, 5/3 M.G Road, Howrah 711101
PS14	Ferroelectric and dielectric properties of some order-disorder ferroelectric crystals	Arvind Kumar Rawat and Trilok Chandra Upadhyay	Physics Department, H.N.B. Garhwal University, Srinagar (Garhwal), U.K.
PS15	Dielectric Properties of Order-Disorder Ferroelectric Crystals	Aanchal Rawat and Trilok Chandra Upadhyay	Physics Department, HNB Garhwal University (A Central University) Srinagar (Garhwal), Uttarakhand - 246174
PS16	Model Independent Search for Sterile Component in the Solar Neutrino Flux	Gazal Sharma [#1], Lal Singh [‡2] and B.C. Chauhan [†1]	[1]Department of Physics & Astronomical Science, School of Physical & Material Sciences, Central University of Himachal Pradesh (CUHP), Dharamshala, Kangra (HP), India-176215 [2]Department of Physics, Himachal Pradesh University, Shimla (HP), India-171005
PS17	Graphene Modified Lithium Iron Phosphate Composites for Lithium Ion Batteries	S. L. Kadam	Physics Department, New Arts Commerce and Science College, Parner, Dist. Ahmednagar, Maharashtra - 414302
PS18	Ferroelectric properties of Hydrogen Bonded crystals	Deepali Raturi and Trilok Chandra Upadhyay	Department of Physics, H.N.B. Garhwal University, Srinagar (Garhwal), Uttarakhand - 246174, India
PS19	Synthesis and structural analysis of Co doped Ni-Zn ferrite	Rajinder Kumar [1,#], Hitanshu Kumar [1], Ragini Raj Singh [1] and P. B. Barman [1]	Department of Physics and Materials Science, Jaypee University of Information Technology, Waknaghat, Solan-173234, H.P., India
PS20	Study of structural and anti-cancer properties of ZnO nanoparticles prepared by hydrothermal method	Madan Lal [1], Sapna Thakur [2], Radheshyam Rai [1] and Seema Sharma [3]	[1] School of Physics, Shoolini University, Solan, HP, India [2] School of Biotechnology, Shoolini University, Solan, HP, India [3]Department of Physics, A. N. College, Boring Road, Patna, Bihar, India

PS21	Dielectric behaviour of some ferroelectric and antiferroelectric crystals	Prabhat Chandra Khanduri and Trilok Chandra Upadhyay	Physics Department, H.N.B. Garhwal University, Srinagar (Garhwal) U.K.
PS22	Study of ferroelectric phase transitions in some crystals	Anubhuti Mamgain and Trilok Chandra Upadhyay	Department of Physics, H.N.B. Garhwal University, Srinagar (Garhwal) Uttarakhand 246174
PS23	Electronic Band Structure and Optical Properties of ZnO and ZnS Using Density Functional Theory	Anil Thakur [1], H.K. Thakur [2], Rajinder Kumar Kashyap [3]	[1] Govt. P.G. College Solan (H.P.) [2] Govt College Amb Una(H.P), [3] RKMV Shimla (H. P.)
PS24	Shorting post loaded armsa using multi-layer dielectric substrate	Naman Sood [1*], Madhurika Mahajan [2]	[1] Department of Electronics & Communication Engineering, SSU, Palampur (H.P.) [2] Department of Physics, DAV College, Kangra (H.P.)
PS25	A comprehensive study of in-complete fusion reaction dynamics at low energies	D. P. Singh, K. Pandey, Prashant Dwivedi and Prantik Chakraborty	Department of Physics, University of Petroleum & Energy Studies, Dehradun
PS26	Bond formation modifies the DC conductivity in ternary chalcogenide glasses	M.K. Srivastava [1], N.S. Saxena [2], Vibhav K. Saraswat [1]	[1]Dept. of Physics, ACC wing, IMA, Dehradun 248007 UK India [2]Dept. Of Physics, University of Rajasthan, Jaipur 302004 Rajasthan India
PS27	Upconversion and temperature sensing study of Er^{3+}-Yb^{3+} codoped La_2CaZnO_5 phosphor	Vijay Kumar[1,2*], S. Som[2,3], Subrata Das[3], S. Dutta[2], H.C. Swart[2]	[1]Department of Physics, Chandigarh University, Gharuan (Punjab)-140413, India [2]Department of Physics, University of the Free State, Box 339, Bloemfontein 9300, South Africa [3]Department of Chemical Engineering, National Taiwan University, Taipei, 10617, Taiwan
PS28	Cabibbo-favoured weak decays of D → PA mesons	Maninder Kaur	Department of Physics, Punjabi University, Patiala – 147002
PS29	Rare-earth Ions Doped Upconversion Nano-phosphors: Preparation and Their Newer Applications	K. Kumar	Indian School of Mines, Department of Applied Physics, Dhanbad-826004, India
PS30	Thermal and electrical studies of graphite oxide and reduced graphene oxide prepared by wet chemical methods	Alpana Thakur[1*], Sunil Kumar[2], V. S. Rangra[1]	[1]Department of Physics, Himachal Pradesh University, Shimla, HP, India [2]Department of Chemistry, Sri Sai

			University, Palampur, HP, India
PS31	Tailoring Morphotropic Phase Boundaries to Design Temperature Insensitive Ceramic Tunable Capacitors	Chandan Bhardwaj, Ravi Dutt	Department of Physics, NCBM Govt College Hamirpur-177005 HP
PS32	Radon concentration in water samples and its correlation with radium contents of soil Keeping in view the health of the population consuming water from various water resources of Mandi - Dharamshala region of Himachal Pradesh, India	Gulshan Kumara, c*, Arvind Kumarb, Mukesh Kumara, Sunil Dhar d	[a]Department of Physics, Lovely Professional University, Phagwara, Punjab, India [b]National Center for Research on Earthquake Engineering, Taipei, Taiwan [c]Govt. College Sarkaghat, Mandi, Himachal Pradesh, India [d]Govt. College Dharamshala, Himachal Pradesh, India

Section C: Life Sciences

Abstract Number	Title of Paper	Authors	Address
LS01	To study of food Processing Residue Analysis and its Functional Components as related to Human Health	Jaswant Ray1, Priti Gupta2, Nitin Prakash Pandit3 and Bipin K. Aggarwal4	1Department of Zoology, Mewar University, Chittorgarh, Rajasthan, India – 312901 2Directorate of Agricultural Marketing Govt of NCT of Delhi, 49 Shamnath Marg, Delhi- 110054 3Society for Environmental, Health, Awareness of Nutrition & Toxicology (SEHAT) India 4Department of Zoology, SSN College (University of Delhi), Alipur, Delhi-110026
LS02	Forest Plant Resources of watershed Rissa-khad and their sustainable use	Tara Devi1* and Sanjeet Singh.2	Assistant Professor of Botany1 and Assistant Professor of Economics 2 V.G.C. Mandi Himachal Pradesh, India.
LS03	Genetics of Single Nucleotide Polymorphism and its Applications: A Review	Nancy Garg1, Shreya Jamwal2 and P.Vijaya3	1Assistant Professor, Department of Zoology, P.I.G. Government College for Women, Jind, Haryana. 2Research Scholar, Department of Zoology, Punjab Agricultural University, Ludhiana, Punjab. 3Research Scholar, Department of Zoology& Environmental Sciences, Patiala, Punjab.
LS04	Biochemical changes in the liver of mice after exposure to different doses of diclofenac sodium	Deepak Mohan* & Sushma Sharma	R.G.M. Govt. College, Joginder Nagar
LS05	Change detection analysis of land use and land cover pattern in catchment area around Bhimtal	D. S. Malik, Shikha Panwar*	Department of Zoology & Environmental Science, Gurukula

	lake, Uttarakhand (Kumaun Himalaya) using remote sensing and GIS techniques	and Jenia Singh	Kangri University, Haridwar (U.K.)
LS06	Some interesting wood rotting non-gilled Agaricomycetes: showing lignocellulolytic activity	Deepali Ashok	Assistant Professor, Department of Botany, V.G.C. Mandi, Himachal Pradesh, India.
LS07	Freshwater fish processing waste: A potential source of fatty acids and proteins	Parteek Bajwa*, J K Kondal* and Sonu Baweja*	Department of Zoology, Punjab Agricultural University, Ludhiana, 141004, India
LS08	Reproduction efficiency of Eisenia fetida during vermicomposting of sugarcane and FYM in different combinations	Shilpa Panjgotra, G.K Sangha and J K Kondal	Department of Zoology, Punjab Agricultural University, Ludhiana-141004, India
LS09	Characterization of lipase producing bacterial isolates from effluent waste of paint industry	Shiney Hangloo and Kamal Dev	Faculty of applied Sciences and Biotechnology, School of Biotechnology, Shoolini University, Solan, H.P
LS10	Effect of heavy traffic metal pollution on density of slug, Filicaulis alte and snail, Macrochlamys indica	Ankita Thakur* and Harjit Kaur*	Department of Zoology, College of Basic Sciences and Humanities, Punjab Agricultural University, Ludhiana - 141004, India
LS11	Study of amino acids in the leafy liverwort Chiloscyphus gollani by using high-performance liquid chromatography (HPLC).	Shivani Thakur and Sunita Kapila	Department of Botany, Panjab University, Chandigarh.
LS12	A Preliminary Study on Moths (Lepidoptera: Heterocera) in Selected Human Settlements of Delhi	Monalisa Paul1, Sanjay Keshari Das1, Rita Singh1, Prakash Chand Pathania2	1University School of Environment Management, Guru Gobind Singh Indraprastha University, Sector-16C, Dwarka, New Delhi-110078, India. 2Department of Entomology, College of Agriculture, Punjab Agricultural University,Ludhiana-141004, Punjab, India
LS13	Effect of hydroquinone on second instar larvae of Spodoptera litura (Fabricius)	Nalini Singh Chauhan, Shivali Puri, Shallina Gupta, Abhay Singh and Satwinder kaur Sohal	Department of Zoology, Guru Nanak Dev University, Amritsar-143005
LS14	Oxidative stress and histopathological changes in liver and kidney of Bandicota bengalensis and Tatera indica collected from South-west region of Punjab.	Shasta Kalra1 and Gurinder Kaur Sangha2	1Ph.D student, Department of Zoology, Punjab Agricultural University, Ludhiana-141004, India. 2Dean, Department of Zoology, Punjab Agricultural University, Ludhiana-141004, India. Address for correspondence: Dr. G. K. Sangha, Department of Zoology,

			Punjab Agricultural University, Ludhiana - 141 004, India.
LS15	Influence of Catharanthus on Survival and Development of Dysdercus koenigii	Shailendra Kumar, Sunil Kayesth, Kamal Kumar Gupta, Mohd Shazad	Department of Zoology, Deshbandhu College, University of Delhi, New Delhi 110019
LS16	Impact of Ocimum sanctum on the Development and Reproductive Bioefficacy of Dengue Fever Mosquito, Aedes aegypti L. (Diptera: Culicidae)	K. K. Gupta, Mohd Shazad, Shailendra Kumar	Department of Zoology, Deshbandhu College, University of Delhi, Delhi-110019, India.
LS17	Fourier transform infrared spectroscopic (FTIR) analysis of Clavatia excipuliformis (Scop.) from Himachal Pradesh, India.	Renu Parmar* and Dinesh Kumar	Faculty of Applied Sciences and Biotechnology, Shoolini University, Post Box No. 9, Solan, (H.P.), India
LS18	Seed Viability and Biochemical Changes associated with Ageing of Dendrocalamus strictus Seeds	Vikas Kumar	Assistant Professor, WRS Govt PG Degree College, Dehri, Kangra, HP-176022
LS19	Evaluation of insecticidal potential of isothiocyanates in hexane extract of Eruca sativa against Spodoptera litura (Lepidoptera) and Bactrocera cucurbitae (Diptera)	Shallina Gupta[1]*, Nalini Singh Chauhan[1], Abhay Punia[1], Rohit Arora[2], Saroj Arora[2], and Satwinder Kaur Sohal[1]	[1]Department of Zoology, Guru Nanak Dev University, Amritsar-143005, India [2]Department of Botanical and Environmental Sciences, Guru Nanak Dev University, Amritsar-143005, India
LS20	Traditional Knowledge and Awareness about Biodiversity Conservation in People of H.P. Present Scenario	Monika Panchani	G.D. College, Bassa. Mandi.
LS21	Triterpenoids from Datura stramonium promote cytotoxicity of the human immune cells against lung and breast cancer cells	Aditi Gupta, Reena V. Saini	Animal Biotechnology Laboratory, School of Biotechnology, Shoolini University, Solan
LS22	Assessment of Environmental contaminants in eggs of Red Wattled Lapwing (Vanellus indicus) in Punjab Agricultural University, Ludhiana	Manpreet Kaur*, Dr. K.S. Khera	Department of Zoology, Punjab Agricultural University, Ludhiana
LS23	Direct introduction of queens in queenless colonies of Apis mellifera using smoke.	Jasvir Singh Dalio	GISTC Ahemdpur (Mansa)
LS24	Ethnobotanical Uses of Species of Genus Ficus L. In District Bilaspur, Himachal Pradesh, India	Sanjeev Kumar	Department of Botany, V.G.C. Mandi-175001, Himachal Pradesh, India

LS25	Effect of flavone on second instar larvae of melon fruit fly, Bactrocera cucurbitae (Coquillett)	Shivali Puri and Satwinder K. Sohal	Department of Zoology, Guru Nanak Dev University, Amritsar-143005, Punjab
LS26	Diversity and seasonal incidence of arthropod predators associated with two spotted spider mite (Tetranychus urticae Koch) on rose	Vijay Singh* and Usha Chauhan	Department of Entomology, College of Horticulture, Dr YS Parmar University of Horticulture and Forestry, Nauni, Solan, Himachal Pradesh-173 230.
LS27	Design, Isolation and Antioxidant Screening of Murraya koenigii Leaves	Bhartendu Sharma[*1,2], Gurpreet Kaur[1], Swati Sareen[1], Suchika Sharma[1], Madhu Sarswat[3]	[1]School of Pharmacy & Emerging Sciences, Baddi University of Emerging Sciences & Technology, Baddi (Solan), Himachal Pradesh – 173205, India. [2]Rayat Institute of Pharmacy, Ropar, Punjab – 140001, India. [3]Pancea Biotech, Baddi (Solan), Himachal Pradesh – 173205, India.
LS28	Role of genitalia in the identification of species of Ypthima Hübner (Lepidoptera : Satyridae) from Himachal Pradesh	Narender Sharma	Zoological Survey of India, Northern Regional Centre, 218 Kaulagarh Road Dehradun-248 195
LS29	Antifertility and abortifacient effects of the extracts of leaves of mimosa pudica, linn	Jawed A. Khan	Deptt. of Zoology, Saifia Science College, Bhopal
LS30	Profiling of lantadenes of Lantana camara weed from different districts of Himachal Pradesh and its correlation with lantana toxicity in grazing animals	Rinku Sharma*[1], Rakesh Kumar[1], Gorakh Mal[1], Rajendra Damu Patil[2],Pawan Kumar[3] and Bikram Singh[3]	[1]ICAR-Indian Veterinary Research Institute, Regional Station, Palampur-176 061 (HP) [2]DGCN College of Veterinary and Animal Sciences, CSK HPKV, Palampur-176062 (HP) [3] CSIR-IHBT, Palampur-176061 (HP)
LS31	Exploration of arbuscular mycorrhizal diversity in some important medicinal plants	Aditya Kumar[1], Suman[2], Chhavi Mangla[3] and Ashok Aggarwal[2]	[1]Department of Botany, Dayanand Post Graduate College, Hisar, Haryana-125001 [2]Department of Botany, Kurukshetra University, Kurukshetra, Haryana-136119 [3]Department of Botany, DAV College (Lahore), Ambala City, Haryana-134003
LS32	Diversity of endophytic mycorrhiza in some important medicinal plants of uttrakhand state	Chhavi Mangla[1], Aditya Kumar[2] and Ashok Aggarwal[3]	[1]Department of Botany, DAV College (Lahore), Ambala City, Haryana-134003 [2]Department of Botany, Dayanand P.G. College, Hisar, Haryana-125001 [3]Department of Botany, Kurukshetra University, Kurukshetra, Haryana-

			136119
LS33	Physico-chemical characteristics of water in relations to plankton and fish production of pond	Sarita Kumari* and Jawed Ahmed Khan	Department of Zoology, Saifia Science College, Bhopal, M.P
LS34	Tiger moths diversity (Lepidoptera: arctiidae) from North-West Shivaliks of Himalaya	Sachin Sharma, Vijay Singh and P.C. Pathania	Department of Entomology, Punjab Agricultural University, Ludhiana-141 004, Punjab, India
LS35	Exploration of noctuid moths diversity (Lepidoptera: noctuidae) from Shivaliks of Himachal Pradesh, India	P.C. Pathania, Sachin Sharma and Vijay Singh	Department of Entomology, Punjab Agricultural University, Ludhiana-141 004, Punjab, India
LS36	Morphological and genitalic studies on lappet moths (Lepidoptera: lasiocampidae) from North-West India	Rachita Pathania	Dept. of Zoology, GNGC, Ludhiana
LS37	Orthopteran (grasshopper) Diversity of Shiwalik Hills, India	M.S. Thakur[1] and S.K. Thakur	Department of Biosciences, Himachal Pradesh University, Shimla-171005, India
LS38	Report on Lepidoptera pest diversity on apple plantataions (Malus domestica Borkh.) in Jammu Province, J&K, India	Ruchie Gupta1, J.S. Tara and 2P.C. Pathania	1Department of Zoology, University of Jammu-180006, Jammu & Kashmir, India 2Department of Entomology, PAU, Ludhiana-141 004, Punjab, India
LS39	Body image dissatisfaction: Prevalence and relation to body mass index among female students	Anshu Johry, Sangita Srivastava	Dept. of Home Science, University of Allahabad
LS40	Persistence and risk assessment of chlorpyriphos and ethion on capsicum	Kousik Mandal, Amanpal Kaur Sandhu, Ritima Bansal, Sanjay Kumar Sahoo and Gagan Jyot	Department of Entomology, Punjab Agricultural University, Ludhiana-141004
LS41	Flower visiting frequency of honeybees on parental lines of Brassica napus. L.	Jasvir Singh Dalio	GISTC Ahemdpur (Mansa)
LS42	Effect of Horticultural Mineral Oils against two-spotted spider mite, *Tetranychus urticae* Koch and predatory mite, *Neoseiulus longispinosus* (Evans) on brinjal	Paramjit Kaur* and Manmeet B Bhullar	Department of Entomology, Punjab Agricultural University, Ludhiana-141004
LS43	Seasonal incidence of citrus leaf miner *(Phyllocnistis citrella)* on kinnow in lower Shivaliks of Punjab	Rakesh Kumar Sharma* and Yogesh Khokhar	P.A.U Regional Research Station for Kandi Area Ballowal Saunkhri, Punjab
LS44	Antibacterial and antifungal activity of medicinal plant of Western Himalayan Regions	Anjna Sharma[1], Jadab Sharma[1], Indresh K. Maurya[2]	[1]Center for Nanoscience and Nanotechnology, Panjab University, Chandigarh-160014 [2]Department of Microbial

			Biotechnology, Panjab University, Chandigarh-160014
LS45	Western Himalayan high altitude plants extract mediated synthesis of Silver nanoparticles for antimicrobial applications: A green expertise	Satish Kumar Pandey [a], Anjna Sharma[b], Silpa Chaudhary [c], Shruti Nagrath[d], Jadab Sharma[b], Indresh K. Maurya[d]	[a] Cluster Innovation Centre (CIC), Panjab University, Chandigarh-160014, India [b] Center for Nanoscience and Nanotechnology, Panjab University, Chandigarh-160014 [c] Biosensor Lab, Institute of Microbial Technology, Chandigarh-160036, India. [d] Dept. of Microbial Biotechnology, Panjab University, Chandigarh-160014, India
LS46	Antibacterial activity of high altitude medicinal plants of Himalayan Regions	Ashima Sharma, Indresh K. Maurya	Department of Microbial Biotechnology, Panjab University, Chandigarh-160014

Section D: Mathematical Sciences

Abstract Number	Title of Paper	Authors	Address
MS01	Prediction of monthly rainfall by Double Fourier Series and Principal Component analysis - Artificial Neural Network	Manjusha Kulshrestha, Suvarna Dhabale and Vyas Pandey	Anand Agricultural University, Anand, Gujarat, India
MS02	Modeling and analysis of inventory models with different deterioration rates under exponential demand, inflation and permissible delay in payments	R.D. Patel [a] and D.M. Patel [b]	[a] Department of Statistics, Veer Narmad South Gujarat University, Surat, India. [b] Department of Commerce, Narmada College of Science & Commerce, Bharuch, India
MS03	Deteriorating items inventory model under shortages for optimal credit period and replenishment time with credit and stock dependent demand	Shital S. Patel and R.D. Patel	Department of Statistics, Veer Narmad South Gujarat University, Surat, Gujarat
MS04	Ratio to the moving averages method to compute seasonal variation in biomedical waste for Surat city	Sanjay R. Ahir*, Sejal Desai**	*Sheth C. D. Barfiwala College of Commerce, Surat, Gujarat, India ** J. Z. Shah Arts and H. P. Desai Commerce College, Amroli, Surat, Gujarat, India
MS05	A fixed point theorem for weakly compatible mappings in 2-metric spaces	Ritu Arora	Department of Chemistry, Gurukula Kangri Vishwavidyalaya Hardwar, Uttarakhand
MS06	Thermal instability of visco-elastic nanofluid- a more realistic approach	Ramesh Chand and G.C. Rana	[1] Department of Mathematics, Government College Nurpur, Himachal Pradesh, India

			[2] Department of Mathematics, Government College Hamirpur, Himachal Pradesh, India
MS07	**A Characterization Theorem in** Magnetohydrodynamic **Triply Diffusive Convection with Viscosity Variations**	Jyoti Prakash and Rajeev Kumar*	Department of Mathematics and Statistics, Himachal Pradesh University, Shimla-171005
MS08	Genetic algorithm based hybrid approach to solve multi-objective interval assignment problem with risk attitude parameter	Anita Ravi Tailor, Jayesh M. Dhodiya	Department of Applied Mathematics and Humanities, S.V. National Institute of Technology, Surat - 395005, India
MS09	Automorphism Group of Metabelian Group Algebras	Shalini Gupta	Department of Mathematics, Punjabi University, Patiala, India
MS10	Investigation of plate in contact with fluid	Vijayata Pathania	Department of Mathematics, H.P.U. Regional Centre, Mohli, Khaniyara, Dharamshala (H.P.)
MS11	Maximum and minimum values of power means for continuous probability distribution	S.R. Sharma and Ravi Datt	Department of Applied Sciences, Chitkara University, Distt. Solan (H.P.) India
MS12	Note on the numerical range	Shallu Sharma	Department of Mathematics, University of Jammu (J & K)

Section E: Environmental & Forest Sciences

Abstract Number	Title of Paper	Authors	Address
EFS01	De-coloration from hazardous dye Congo red using highly effective low-cost bioadsorbent Calotropis procera	Rajvir Kaur* and Harpreet Kaur	Department of Chemistry, Punjabi University, Patiala-147002. Punjab, India.
EFS02	Leaf Extract of Mussaenda frondosa as a new source of Camptothecin: An anticancer drug	Sudha Sambyal Malik and J.S. Laura	Department of Environment Science, M. D. Univesity, Rohtak, Haryana.
EFS03	Flocculation and dye adsorption studies of GrA-cl-poly(AAm) based super-absorbent	Balbir Singh Kaith, Rajeev Jindal and Rachna Sharma	Department of Chemistry Dr. B. R. Ambedkar National Institute of Technology, Jalandhar 144 011 (Pb.), India
EFS04	Chemical disaster management: current status and perspectives in India.	Vinod Kumar	Vallabh Govt. College Mandi. H.P.175001
EFS05	Synthesis of Naphthalimide – based imine linked fluorescence organic nanoparticle for detection of mercury ion in aqueous medium.	Pushap Raj, Narinder Singh	Department of Chemistry, Indian Institute Technology, Ropar (Punjab), India, 140001

EFS06	Microwave-assisted green synthesis of $K_2Zn_3[Fe(CN)_6]_2 \cdot 9H_2O$-r-Gx-Psy-cl-poly(AA) hybrid nanocomposite and its application in removal of toxic malachite green dye from industrial effluent	B S Kaith, Sukriti Chaudhary, Jitender Sharma*, Tajinder kaur, Surbhi Sethi, Uma Shanker and Vidhisha Jassal	Department of Chemistry, Dr. B. R. Ambedkar National Institute of Technology Jalandhar 144 011 (Pb.), India
EFS07	Impact of SHI Ag^{9+}beam on in-air synthesised Sg-cl-poly(AAm) for selective removal of water from petroleum-water emulsion	B S Kaith, Amit Kumar Sharma*, Priya Bhalla, Uma Shanker, S P Lochab	Department of Chemistry, Dr. B. R. Ambedkar National Institute of Technology Jalandhar 144 011 (Pb.), India
EFS08	CO oxidation catalysed by Au nanoclusters: Exploring the origin of gold's catalytic activity	Jyoti Yadav and Sangeeta Saini	Kurukshetra University, Kurukshetra, Haryana– 136119
EFS09	Effect of nanoscale Zinc Oxide particles on the germination and growth of Wheat	Pooja Solanki and J.S. Laura	Department Of Environment Science, M.D.U, Rohtak
EFS10	Green synthesis of different manganese oxide nanoparticles from Sapindus mukorossi leaf extract: Interaction with aromatic amines	Uma Shanker* and Vidhisha Jassal	Department of Chemistry, Dr. B. R. Ambedkar National Institute of Technology Jalandhar, Punjab- 144011 India
EFS11	Green synthesis of different nano-structured metal hexacyanoferrates using Aegle marmelos leaf extract: Activity against photodegradation of harmful organic dyes	Vidhisha Jassal* and Uma Shanker	Department of Chemistry, Dr. B. R. Ambedkar National Institute of Technology Jalandhar, Punjab- 144011 India
EFS12	Assessment of heavy metals in a solid waste dumpsite of Rohtak city, Haryana	Asha Singh	Department of Environmental sciences, M.D.U. Rohtak
EFS13	Photolysis and photo-catalysis intermediate products of methylene blue	Basavaraj Padmashali and K.S. Rane	Department of Chemistry, Rani Channamma University, Belagavi-591154
EFS14	Development of Noble metal modified TiO_2 for CO_2Photoreduction under UV irradiation	Nikita Singhal, Umesh Kumar*	Chemical Sciences Division, CSIR-Indian Institute of Petroleum, Dehradun-248005, India
EFS15	The faint Side of the E-commerce Age: E-Waste	Shankar Chaudhary	Associate professor, Pacific Business School, Udaipur
EFS16	Influence of surface properties of granular activated carbons on adsorptive removal of toxic carbon tetrachloride vapors	Rashmi Dhawan*[1], K.K.Bhasin [2], Meenakshi Goyal[3]	[1] Department of Chemistry, S.A. Jain College, Ambala City [2]Department of Chemistry, Panjab University, Chandigarh, India [3]University Institute of Chemical Engineering & Technology, Panjab University, Chandigarh, India

EFS17	Ecological studies on the macroinvertebrates of a hill stream impacted by anthropogenic activities in western Himalaya	Sharan Kahlon, J.M. Julka, Manjul Sharma, Komal Jamwal	School of Biological and Environmental Sciences, Shoolini University, Solan, Himachal Pradesh, India
EFS18	Carbon nanotubes as promising materials for environmental protection	Sandeep Kumar[1] and Rashmi Dhawan[2]	[1]Dyal Singh College, Karnal [2]S.A. Jain College, Ambala City
EFS19	Pine Needles Gasification for Electricity Generation in the Himalayan Region: Socio-Economic and Environmental Benefits	Arvind Singh Bisht[1*], N.S.Thakur[2]	Centre for Energy & Environmental Engineering, National Institute of Technology, Hamirpur (H.P.)
EFS20	Effect of fruit thinning on yield and quality of peach cv. Red June in mid hill conditions of Uttarakhand	Vijay Kumar Bhardwaj, Sachin Devlal and Shweta Uniyal	VCSG Uttarakhand University of Horticulture & Forestry, Bharsar, Uttarakhand
EFS21	Trimming down the CO_2 emanation in a solar steam cooking plant with and without preheating	Ankit Gupta[1], Raja Sekhar Y[1] and Rajesh Kumar[2]	[1]School of Mechanical & Building Engineering, VIT University, Vellore-632014, Tamil Nadu [2]School of Physics & Materials Science, Shoolini University, Bajhol, Solan (HP) 173 212
EFS22	SPION impregnated Pinus-Biochar supported $BiVO_4$ nanostructures for solar induced photo-catalytic removal of endocrine disruptor Methyl Paraben from waste water & soil detoxification	Shalini[a], Ajay Kumar[a], Gaurav Sharma[a], Susheel Kalia[c], Pooja Dhiman[b], Amit Kumar[a*]	*[a]School of Chemistry, Shoolini University, Solan, Himachal Pradesh, India [b]Department of Physics, IEC University, Baddi, Solan, India [c]Dept. of Chemistry, Indian Military Academy, Dehradun - 248007 (Uttarakhand) India
EFS23	La/Fe/Zn @ graphene trimetallics nanocomposite as advanced photocatalyst for remediation of organic pollutants from water system	Gaurav Sharma*, Deepak Kumar, Amit Kumar, Ankita, Sangeeta	School of Chemistry, Shoolini University, Solan 173212, Himachal Pradesh, India
EFS24	Isolation and Characterization of Quercetin from Senecio laetus Edgew. – An Endemic Medicinal Herb	Pankaj Sharma and Rabia Sharma	Department of Chemistry, MM University, Sadopur-Ambala
EFS25	Identification and molecular characterization of Noctuid moths (Lepidoptera: Noctuidae) of cold deserts of India	[1]Pawan Kumar and [1]Manoj Kumar and [2] Mamta Parmar	[1]Himalayan Forest Research Institute, Panthaghati, Shimla (H.P.) [2] Vallabh Government College, Mandi, (H.P.)
EFS26	Studies on butterfly (Lepidoptera) diversity of Sub-alpine forest of Himachal Pradesh	Pawan Kumar and Romila	Himalayan Forest Research Institute, Panthaghati, Shimla (H.P.)
EFS27	Studies on Prevalence and Host Preference of Cosmocerca ornate In Frogs	Poonam Saini[1], Deepak C. Kalia[1] and Pawan Kumar[2]	[1]Department of Biosciences, Himachal Pradesh University, Shimla-5 (India) [2]Himalayan Forest Research Institute, Panthaghati, Shimla (H.P.)

EFS28	Symbiotic germination of Crepidium acuminatum (D. Don) Szlach	Sayeeda K. Bhatti1* and Jagdeep Verma2*	1Department of Botany, Shoolini University of Biotechnology & Management Sciences, Solan – 173212, Himachal Pradesh, India 2Department of Botany, Shoolini Institute of Life Sciences & Business Management, Solan – 173212, Himachal Pradesh, India
EFS29	Global Warming and Need of Sustainable Development	Ganesh Kumar, Mohan Singh	Department of Economics, ACC Wing, Indian Military Academy, Dehradun
EFS30	Online File Tracking System Model for Chaudhary Devi Lal University, Sirsa (Haryana)	Harish Kumar Rohil[1], Manju[2]	[1]Dept. of Computer Science and Applications, Ch Devi Lal University, Sirsa-125055 (Haryana) [2]Rajiv Gandhi Govt. Polytechnic Edu. Society, Narwana- 126116 (Haryana)
EFS31	Geo-spatial assessment of flood and waterlogging vulnerability and risk in North Bihar using techniques of Remote Sensing and Geographical Information System	Suraj Kumar Singh	Centre for Land Resource Management (Geoinformatics), Central University of Jharkhand, Brambe-835205, Ranchi (Jharkhand). India
EFS32	Forest Fire Simulation Modeling and Management using Geospatial Technology: A Case Study of District Shimla (H.P.), India	Shruti Kanga	Centre for Land Resource Management (Geoinformatics), Central University of Jharkhand, Brambe-835205, Ranchi (Jharkhand). India

Section F: Polymers and Materials Science

Abstract Number	Title of Paper	Authors	Address
PMS01	Synthesis and characterization of iron nanoparticles from ethanolic extract of Capparis decidua	Sandeep Kumar Dixit, Kamal Kishor, S.K. Raza and L.K. Thakur*	Institute of Pesticide Formulation Technology, (Ministry of Chemicals & Fertilizers) Sector-20 Udyog Vihar, Gurgaon (HR), India
PMS02	Preparation of polyhydroxybutyrate biocomposites reinforced with biologically and chemically modified ramie fibers	Renu Sheoran	Department of Chemistry, Singhania University, Pacheri Bari, Dist. Jhunjhunu (Raj.)
PMS03	Preparation of Terpolymer of N-Substituted Maleimide, Acrylic acid and Acrylonitrile: Thermal and Antibacterial Analysis	Jyoti Chaudhary	Department of Polymer Science, M.L.S. University, Udaipur (Raj.) INDIA
PMS04	Measurements of Specific Heat and Gibb's Free Energy for GeySe94-yIn6 (y = 10, 15 and 20) Chalcogenide Glasses	Vibhav K. Saraswat [1, 2*], Naveen Tanwer[2], [3], Yogendra K. Saraswat[4]	[1]Dept. of Physics, ACC Wing, Indian Military Academy, Dehradun 248007 UK, India [2]Dept.ofPhysics, Banasthali University, Tonk 304022 Rajasthan, India [3]Dept. of Physics, Ahir College, Rewari 123401 Haryana, India

			[4]Dept. of Chemistry, SV (PG) College, Aligarh 202001 UP, India
PMS05	Papain Enhanced Tensile Properties and Improved phase Morphology of Biodegradable Blend Films	Ravindra Chougale[1], Saraswati Masti[2],Bhagyavana Mudigoudra[3], Deepak Kasai[4]	[1]Department of Chemistry, Karnatak University, Dharwad - 580 003, INDIA [2]Department of Chemistry, Karnatak Science College, Dharwad, 580001, INDIA [3]Department of Computer Science, Maharani's Science College for Women, Bangalore - 570 005, INDIA [4]Department of Materials Science, Mangalore University, Mangalgangotri, 574199, INDIA
PMS06	Morphological and Mechanical Behavior Studies of Gum Ghatti Incorporated PVA/PVP Blend Films	BhagyavanMudigoudra[1], Saraswati Masti[2], Deepak Kassai[3],Ravindra Chougale[4]	[1]Department of Computer Science, Maharani's Science College for Women, Bangalore - 570 005, INDIA [2]Department of Chemistry, Karnatak Science College, Dharwad - 580 001, INDIA, [3]Department of Materials Science, Mangalore University, Mangalagangotri – 574 199, INDIA [4] Department of Chemistry, Karnatak University, Dharwad - 580 003, INDIA
PMS07	Betel Leaf Extract Modified Properties of Chitosan/ Vanilin Blend Films	Deepak Kasai [a], Ravindra Chougale[b*], Sarswati Masti[c], Bhagyavana Mudigoudrad	[a]Department of Materials Science, Mangalore University, Mangalgangothri - 574 199 Karnataka, India. [b*] P. G. Department of Studies in Chemistry, Karnatak University, Dharwad - 580 003 Karnataka, India. c Department of Chemistry, Karnatak Science College, Dharwad - 580 001 Karnataka, India.
PMS08	Cobalt nanopowder (CoOx-N@C, PANI) as high performance heterogeneous catalyst for oxidative methyl esterification of benzyl alcohols	VineetaPanwar, Siddarth S. Ray and Suman L. Jain*	Chemical Sciences Division, CSIR-Indian Institute of Petroleum, Dehradun-248005, India
PM09	Preparation and Characterization of Equal Weight Percent of Guar Gum and Pepper Leaves Extract Doped PVA Blend Films	Kasai Deepaka, Masti Sarswatib, Chougale Ravindrac*	[a]Department of Materials Science, Mangalore University, Mangalgangothri - 574 199 Karnataka, India [b] Department of Chemistry, Karnatak Science College, Dharwad - 580 001 Karnataka, India. [*c] P.G. Department of Studies in Chemistry, Karnatak University, Dharwad - 580 003 Karnataka, India
PMS10	An Environmental Benign Route to Synthesize	Kanchan Sharma,	Department of Chemistry, Jaypee

	High Molecular Weight Polar Polyolefins by a New Postmetallocene Titanium(IV) Complex Bearing Asymmetric Tetradentate [ONNO]-type Amino Acid Based Ligand at Ambient Temperature in Aqueous Emulsion	Sudip Kumar De*	University of Engineering and Technology, Guna, M.P, India
PMS11	Preparation and Characterization of Blend Films	Ravindra Chougale[1], Saraswati Masti[2] and Bhagyavana Mudigoudra[3], Deepak Kasai[4]	[1]Department of Chemistry, Karnatak University, Dharwad - 580 003, INDIA [2]Department of Chemistry, Karnatak Science College, Dharwad, 580001, INDIA [3]Department of Computer Science, Maharani's Science College for Women, Bangalore - 570 005, INDIA [4]Department of Materials Science, Mangalore University, Mangalgangotri, 574199, INDIA
PMS12	Synthesis and Characterization of Crosslinked Poly(arylene ether)s for Proton Exchange Membranes	Swati Awasthi, Vaishnav Kiran and Bharti Gaur	Department of Chemistry, National Institute of Technology Hamirpur, 177005, India
PMS13	Spintronic Materials for Strange Magnetic and Electronic Behaviour	Avijit Kumar Paul	National Institute of Technology, Kurukshetra, Haryana-136119
PMS14	Enhanced surface properties of titanium dioxide thin film by DC glow discharge plasma	Bandna Bharti and Rajesh Kumar	Jaypee University of Information Technology, Waknaghat, Solan-173234, H.P., India
PMS15	Covalent tethering of transition metal complexes onto graphene oxide nanosheets as heterogeneous catalysts	Chetan K. Modi, Ravi Vithalani	Applied Chemistry Department, Faculty of Technology & Engineering, Kalabhavan, The M.S. University of Baroda, Vadodara- 390001, Gujarat (INDIA)
PMS16	A study of the effect of Ag9+ beam on the chemical, structural and morphological properties of poly(AAm) grafted gum salaiguggal	B. S. Kaith, Amit Kumar Sharma, Priya Bhalla*, Uma Shanker, S P Lochab	Department of Chemistry, Dr. B. R. Ambedkar National Institute of Technology Jalandhar 144 011 (Pb.), India
PMS17	Gamma ray induced synthesis of pH sensitive Gx-cl-poly(AA-IPN-AM) Hydrogel and its application in moisture-Retention capability in different soils	B. S. Kaith, Sukriti Chaudhary*, Rajeev Jindal, Jitender Sharma	Department of Chemistry, Dr. B. R. Ambedkar National Institute of Technology Jalandhar 144 011 (Pb.), India
PMS18	Studies on uptake behavior of Hg(II) and Pb(II) by amine modified glycidyl methacrylate–styrene–N,N′-methylenebisacrylamideterpolymer	Archana Bhatnagar	CEC, Landran

PMS19	Graphene–ZnO Hybrid Nanostructure With Improved Optical, Electrical and Sensing Properties	Dharmender Singh Rana[1] and Kamal Kishore Thakur[2]	[1]Department of Physics, Maharaja Lakshman Sen Memorial College, SunderNagar, HP - 175018 [2]Department of Chemistry, Maharaja Agrasen University, Baddi, Solan, India
PMS20	Facile Low Temperature Synthesis, Characterizat of Fe - Doped ZnO Nano-Ellipsoids and Th Properties	Ramesh Kumar[1], Dilbag Singh Rana[2], S. Chauhan[1]and M.S. Chauhan[1]	Department of Chemistry, Himachal Pradesh University, Shimla 171005, India.
PMS21	Ultra-high sensitive picric acid chemical sensor based on low-temperature grown Fe2O3 nanoparticles	Kuldeep Negi, M.S. Chauhan and S. Chauhan	Department of Chemistry, Himachal Pradesh University, Shimla-5, India
PMS22	Synthesis, Characterization and Photocatalytic Application of Mn Doped ZnO Nanostructures	Manoj Kumar, Mohinder Singh Chauhan and S. Chauhan	Department of Chemistry, Himachal Pradesh University, Shimla-5, India
PMS23	Hexagonal Cadmium Oxide nanodisks: Efficient scaffold for cyanide ion sensing, photo-catalyst and antibacterial applications	Pankaj Sharma[1], Deepika Kaushal[2], Mohinder Singh Chauhan[3] and Suvarcha Chauhan[3]	[1]Department of Chemistry, Rajiv Gandhi Government Engineering College, Kangra, India [2]Department of Chemistry, Sri Sai University, Palampur, India [3]Department of Chemistry, Himachal Pradesh University, Shimla-5, India,
PMS24	Synthesis of lead telluride nanoparticles with enhanced structural, optical and electrical features	Deepika Jamwal[1], Dolly Rana[1], Pankaj Thakur[1, 2]	[1]School of Chemistry, Shoolini University, Solan (H.P.) [2]Center for Advanced Biomaterials for Healthcare (Istituto Italiano Di Tecnologia) Naples 80125, Italy.
PMS25	Anisotropic gold nanoparticles for chemo-sensor applications	Dolly Rana[1], Deepika Jamwal[1], Pankaj Thakur[1, 2]	[1]School of Chemistry, Shoolini University, Solan (H.P.) [2]Center for Advanced Biomaterials for Healthcare (IstitutoItaliano Di Tecnologia) Naples 80125, Italy.
PMS26	Sn Addition Alters DC Conductivity in Chalcogenide Glasses	Yogendra K. Saraswat[1], Vibhav K. Saraswat[2]*	[1]Deptt. of Chemistry, SV (PG) College, Aligarh 202001 UP, India [2]Deptt. of Physics, ACC Wing, Indian Military Academy, Dehradun 248007 UK, India
PMS27	Current Trends in Niosomes: A Novel Drug Delivery System	Ravinesh Mishra*[1], Bhartendu Sharma[1,2], Gurpreet Kaur[1], Swati Sareen[1],	School of Pharmacy & Emerging Sciences, Baddi University of Emerging Sciences & Technology, Baddi (Solan), Himachal Pradesh – 173205, India. 2Rayat Institute of Pharmacy, Ropar, Punjab – 140001,

		Suchika Sharma[1], Madhu Sarswat[3]	India.3Pancea Biotech, Baddi (Solan), Himachal Pradesh – 173205, India.
PMS28	Surface functionalization of coconut fibers by enzymatic biografting of syringaldehyde for the development of biocomposites	Kamini Thakur[a], Susheel Kalia[b*,] B.S. Kaith[c], Deepak Pathania[a] and Amit Kumar [a]	[a]Department of Chemistry, Shoolini University, Solan – 173212 (H.P.) India. [b] Department of Chemistry, Army Cadet College Wing, Indian Military Academy, Dehradun – 248007 (UK) India. [c]Department of Chemistry, Dr. B.R. Ambedkar National Institute of Technology, Jalandhar – 144011 (Pb.)
PMS29	Synthesis and characterization of chemically deposited Eu3+/Gd3+ co-doped nanocrystalline CdZnSe thin films	Soumya R. Deo[a], Ajaya Kumar Singh[b*], Lata Deshmukh[a], L. J. Paliwal[c], R. S. Singh[d]	[a]Dr. Ira Nimdeokar PG & Research Centre for Chemistry, Department of Chemistry, Hislop College, Nagpur-440002, Maharashtra, INDIA [b]Department of Chemistry, Govt. VYTPG Autonomous College, Durg-491001, Chhattisgarh, INDIA [c]Department of Chemistry, Rashtrasnt TukadojiMaharaj Nagpur University, Nagpur-440002, Maharashtra, INDIA [d]Department of Physics, Govt. DT College, Utai-491107, Chhattisgarh, INDIA
PMS30	RSM Approach - Vacuum Synthesis of Guar gum–Acrylic acid-PANI based Conducting Superabsorbent	Reena Sharma[1],S. Kalia[2] and B.S. Kaith[3]	[1]School of Chemistry, Shoolini University of Biotechnology and Management Sciences, Solan -173212, Himachal Pradesh, India [2]Department of Chemistry, Army Cadet College Wing, Indian Military Academy, Dehradun – 248007 (Uttarakhand), India [3]Department of Chemistry, Dr. B. R. Ambedkar National Institute of Technology (NIT), Jalandhar-144011 (Punjab), India
PMS31	Novel Materials in Science & Technology for Sustainable Future	Renu Choithrani	Department of Physics and Electronics, Barkatullah University, Bhopal 462026, India
PMS32	Interactions study of Vinca Alkoloids with Transfer-RNA	Monika Yadav, Shweta Sharma, Kumud Pandav, Surat Kumar	Department of Chemistry, Dayalbagh Educational Institute, Dayalbagh, Agra, 282005
PMS33	Interaction of beta-carboline alkaloids with DNA–labelled optical gold nanobiosensor	Shweta Sharma, Priyanka Kulshreshtha	Department of Chemistry, Dayalbagh Educational Institute, Dayalbagh, Agra, 282005

		Monika Yadav, Surat Kumar	
PMS34	Heterojunctioned Bi2O3/BiOCl stacked to graphene sand composite and chitosan for photocatalytic antibiotic mineralization in aqueous phase	Bhanu Priya[a], Pankaj Raizada[a], Pooja Shandily[a], Pardeep Singh[a*]	[a]School of Chemistry, Faculty of Basic Sciences, Shoolini University, Solan (Himachal Pradesh)-173212, India
PMS35	Degradation of methylene blue and fast green dyes from aqueous solution using photocatalysis through nanocomposite	Manita Thakur[a]*, Deepak Pathania[a]*and Bhim Singh Rathore[b]	[a]School of Chemistry, Shoolini University, Solan 173212, Himachal Pradesh, India [b] Nanotechnology and Water Sustainability Research Unit, College of Science , Engineering and Technology, University of South Africa, Florida Campus, Johannesburg, South Africa
PMS36	Biosorbent for the remediation of congo red dye from aqueous system	Arush Sharma[a]*,Shikha Sharma[C], Deepak Pathania[a],and Zia-Mahmood Siddiqi[b]	[a]School of Chemistry, Shoolini University, Solan-173212, Himachal Pradesh, India bJubail University College, P.O.Box10074, Jubail Industrial City 31961, Kingdom of Saudi Arabia [c]Department of Higher Education, Government of Himachal Pradesh, India
PMS37	Microwave induced synthesis of crosslinked hydrogel based on carboxymethyl cellulose	Swadeep Sood[a]* and Deepak Pathania[a]	[a]School of Chemistry, Shoolini University, Solan-173212, Himachal Pradesh, India
PMS38	Effect of Temperature on As(III) Removal Efficiency by Using Magnetite Nanoparticles Coated Sand	Sarita Kango and Rajesh Kumar	Department of Physics and Materials Science, Jaypee University of Information Technology, Waknaghat, District Solan (H.P.)- 173 234, India
PMS39	Fabrication of chitosan-g-poly(acrylamide)/CuS nanocomposite for controlled drug delivery and antibacterial activity	Deepak Pathania[a]*, Divya Gupta[a], N.C. Kothiyal[b] and V.K. Gupta[c]	[a]School of Chemistry, Shoolini University of Biotechnology and Management Sciences, Solan (H.P) India [b]Department of Chemistry, National Institute of Technology, Jalandhar - 144011(Punjab), India [c]Department of Chemistry, Indian Institute of Technology, Rookree, India
PMS40	Chitosan based nanocomposite for controlled drug delivery and antibacterial activity	Lalit K. Gularia[a] and Deepak Pathania[a]	Department of Chemistry, Govt. College Nalagarh, Solan (HP), India School of Chemistry, Shoolini University, Solan–173212 (H.P.), India

PMS41	Mössbauer analysis of Lanthanum doped M-type Barium nanohexaferrites processed via sol-gel technique	Virender Pratap Singh[1,2*], Gagan Kumar[1], Arun Kumar[1], R. K. Kotnala[3] and M. Singh[1]	[1] School of Physics, Shoolini University, Bajhol, Solan, India. [2] Department of Physics, Himachal Pradesh University, Shimla, India [3]National Physical Laboratory (CSIR), Dr. K. S. Krishnan Marg, New Delhi, 110012, India

Section A: Chemical Sciences

CS01

Investigating surfactants potential towards growth and stability of HgS nanoparticles in aqueous medium

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One of the characteristic features of the surfactant is their tendency to adsorb at the surface/interface, which involves transfer of surfactant molecules from bulk solution phase to the surface/interface. With the advancement in the synthesis methodologies of Nanoparticles (NPs) through colloidal chemistry routes, the adsorption tendency of surfactants is now being exploited in reference to the stabilization of the NPs. In present research, colloidal HgS NPs with average sizes below 15 nm have been synthesized using simple chemical precipitation method in aqueous solutions of different surfactant. Three cationic surfactants of varying hydrophobic chain length and three anionic surfactants having different head group moieties have been tested. All these surfactants have been proven to produce well dispersed spherical shaped HgS NPs. The HgS NPs exhibited broad featureless UV-vis spectra which have been blue shifted as compared to bulk HgS due to nearly discrete energy states. The E_g values indicate marginal semiconducting characteristic of HgS NPs. The growth rate of the NPs has been significantly controlled by the nature of surfactant. However, the NPs in the powder form exhibit β-HgS phase irrespective of the surfactant used. The self-aggregation of NPs has been prevented by surfactant coating at the NP surface due to changed interparticle potential. Further, it has been shown that the stabilizers (surfactants) have some preferred chemical moiety which binds the NP surface, hinders their unlimited growth, and eventually generates a preferred size of particles.

CS02

Studies of Retension and Reusable Capacities of 8-Hydroxyquinoline 5-sulphonic acid Formaldehyde based Copolymer against some Toxic Metal Ions by Batch Equilibrium Method

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Copolymer resin 8-HQ5-SASF-III was synthesized by condensation of 8-hydroxyquinoline 5-sulphonic acid and semicarbazide with formaldehyde in presence of 2M HCl acid as catalyst. Resin was characterized by elemental analysis, conductometric, viscosity measurements, UV-visible, IR and ^{1}H-NMR analysis. Chelation cation exchange properties of this copolymer were studied for Fe^{+3}, Cu^{+2}, Pb^{+2}, Cd^{+2} and Co^{+2} ions. A batch equilibrium method was employed for studying the selectivity of distribution of a given metal ions between polymer sample and a solution containing metal ion. Study was carried out over a wide pH range and in a media of various ionic strengths of different electrolytes. Polymer showed a higher selectivity for Fe^{+3} ion than for Cu^{+2}, Pb^{+2}, Cd^{+2} and Co^{+2} ions. Ion-exchange properties of this resin was studied by batch equilibrium method for Fe^{3+}, Cu^{2+}, Co^{2+}, Cd^{2+}, and Pb^{2+} ions over the pH range, 1.5 to 6.5 and in media of various ionic strengths. The resin shows a higher selectivity for Fe^{3+} ion over any other ions. Study of distribution ratio as a function of pH indicates that the amount of metal ion taken by resin is increases with the increasing pH of medium. The surface morphology of the copolymer resin was examined by scanning electron microscopy and it establishes the transition state between crystalline and amorphous nature.

CS03

Kinetics of Thermal Decomposition of Copolymer Resin-III Derived From 2,4-Dihydroxypropiophenone, Adipamide and Formaldehyde

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Polycondensation technique was employed to synthesize copolymer resins of 2,4-dihyroxypropiophenone, adipamide, and formaldehyde in acidic medium with mole proportion of 3:1:5. The copolymer was characterized by ultraviolet, infra-red, nuclear magnetic resonance (^{1}H and ^{13}C) spectroscopy, scanning electron microscopy (SEM) and X- ray diffraction analysis (XRD). The crystalline and amorphous nature of the polymer was studied by XRD spectra. The surface morphology of the copolymer resin was established by scanning Electron Microscopy. The number average molecular weight was determined by non-aqueous conductometric titration. The thermal decomposition pattern and the kinetics of thermal decomposition of the copolymers were investigated by thermogravimetric analysis (TGA) in a static nitrogen atmosphere at a heating rate of 10° C/min. Freeman–Carroll, Sharp– Wentworth, Freidman's, Chang and Coat Redfern methods have been adopted to evaluate the kinetic and thermodynamic parameters such as thermal activation energies (E_a), order of the reaction (n), entropy change (ΔS), free energy change (ΔF), apparent entropy (S*) and frequency factor (Z). The order of the reaction is 0.98.

CS04

Thermal Degradation Study of Resin-IV derived from 4-Hydroxybenzaldehyde and Phenyl hydrazine with Formaldehyde

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Copolymer 4-HBPHF-IV has been synthesized by the condensation of 4- hydroxybenzaldehyde, phenyl hydrazine with formaldehyde in presence of HCl catalyst in 4:2:7 molar proportion of reactants. The copolymer resin has been characterized by physic-chemical methods and spectral methods like UV-Visible, FTIR and proton NMR spectra. The molecular weight has also been determined by non-aqueous conductometric method. Thermal degradation studies of the 4-HBPHF-IV copolymer resin have been carried out to ascertain its thermal stability. Thermal degradation curve has been discussed in order to determine their mode of decomposition, order of reaction, Apparent activation energy, frequency factor, free energy change, entropy change and apparent entropy change. Freeman- Carroll, Sharp-Wentworth, Friedman, Chang and Coat Redfern method have been applied for the calculation of kinetic parameters while the data from the Freeman-Carroll methods have been used to determine various thermodynamic parameters. The structure of 4- HBPHF - III copolymer has been elucidated on the basis of elemental analysis and various physicochemical techniques, UV-Visible, FTIR, ^{1}H NMR spectroscopy. Freeman-Caroll, Sharp-Wentworth, Friedman, Chang and Coat Redfern methods have been used to calculate activation energies and thermal stability.

CS05

Effect of cation on the thermodynamic properties of glycine and L-alanine in aqueous solutions of dipotassium hydrogen phosphate at different temperatures

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Densities, ρ, speed of sound, u and viscosity, η, for Glycine, L-Alanine have been measured in aqueous solutions of dipotassium hydrogen phosphate (DKHP) ranging from 0.2, 0.4, 0.6 and 0.8 mol kg^{-1}at temperatures T = 288.15, 298.15, 308.15 K, 318.15 K. The different parameters such as apparent molar volume, limiting apparent molar volume, transfer volume, partial molar expansibility have been derived from density data. Experimental speeds of sound data were used to estimate apparent molar adiabatic compressibility and limiting apparent molar adiabatic compressibility their transfer and also hydration number. These parameters are discussed in the light of solute-cosolute and solute- solvent interactions and a comparison has been made with

potassium dihyrogen phosphate to better understand the effect of cation on its thermodynamic property.

CS06

EXTENDED STUDIES ON MOLECULAR INTERACTIONS OF SDBS AND DTAB IN AQUEOUS SOLUTIONS OF AMINO ACID AT T= 293.15-313.15 K

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The volumetric properties for the mixture of amino acid–surfactant system have been discussed from the parent data of density, speed of sound and viscosity at different concentrations of amino acid as well at different temperatures. But to go further into the details on molecular interactions, different acoustical parameters viz. relative association (RA), intermolecular free length (L_f), molar sound number $([U])$, specific acoustic impedance (Z), free volume (V_f), molar volume (V_m), internal pressure (π_i) and molar cohesive energy (MCE) have been evaluated from density, speed of sound and viscosity. The variation of these parameters with concentration of surfactant helps us in understanding the nature and extent of interactions present among the molecules in the mixture. The effect of amino acid concentrations on the micellization behavior of these surfactants has also been discussed through these parameters.

CS07

DNA damage, In vitro cytotoxicity studies of N, N' –disubstituted thiocarbamide and their Cu (I) complex: synthesis and structural characterization

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The resurgence of interest in the coordination chemistry of substituted thiocarbamides in last three decades may be credited to their vivid applications in the field of material and biological sciences. The versatility of coordination behaviour may be attributed to the presence of N, O and S as donor atoms. The presences of intramolecular hydrogen bonding in the ligand structure also affect their ligation behaviour. Recently transition metal complexes of substituted thiocarbamides have shown very promising anticancer activity against various human cancer cell lines. In view of the above facts, our work is focused on the synthesis, structural characterization and *In vitro* cytotoxicity, DNA damage studies of newly synthesized substituted thiourea

derivatives and their copper complexes. The structural assignments to the complexes have been done on the basis of IR, ^{1}H and ^{13}CNMR, UV-Vis spectroscopic and single-crystal X-ray studies. Trigonal-planar geometry has been assigned to the complex with thione sulphur coordination of the ligands. *In vitro* cytotoxicity of the complex is two to three folds higher than the ligand. The complex effectively damaged DNA of the cancer cells. The complex has also been used as a single source precursor for the synthesis of Copper sulphide nanocrystals and nanoparticles by thermolysis method. The nanocrystals and nanoparticles have been characterised by SEM, TEM and XRD techniques. Copper sulphide, a p-type semiconductor has been found applications in photovoltaic solar cells, sensors, catalysis and IR detectors etc.

CS08

Sucrose assisted synthesis of Bismuth Ferrite nanoparticles via auto combustion route

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Synthesis of high-purity $BiFeO_3$ is very important for practical applications. This task has been very challenging for the scientific community because of the formation of different kinds of impurities as byproducts in most of the synthesis routes. In the present work highly pure perovskite, single multiferroic bismuth ferrite ($BiFeO_3$) with narrow size was prepared by using novel combustion method using bismuth ferrite and iron nitrate as precursors followed by thermal treatment at different range of temperatures. Sucrose was used as a chelating agent. This method is fast, high yielding, clean, safe and cost effective. The prepared samples were characterized by, FT-IR, X-ray diffraction of powder (XRD), Transmission electron microscope (TEM) for extracting their surface morphology and their crystallographic structure. The surface morphology studies confirm the growth of bismuth ferrite nanoparticles with their diameters in the range of 10 nm to 100 nm.

CS09

Development of Fe_3O_4@chitosan@Co (II) based sandwich catalyst

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Nano-sized magnetic Fe_3O_4 particles are another feather in the cap of heterogeneous catalysis. They serve as a platform for combination of organic and inorganic components in a single nano-sized particle and hence find wide application in the field of heterogeneous catalysis. Fe_3O_4

nanoparticles have been synthesized by co-precipitation and sonication method that enables monodispersed magnetic nanoparticles. These were then coated with chitosan – a natural polysaccharide. Chitosan coated magnetic nanoparticles are more stable than bare Fe_3O_4 nanoparticles as chitosan can protect Fe_3O_4 particles from leaching under acidic conditions. The functional groups on chitosan like: -OH and $–NH_2$ show interactions with metal ions. The Fe_3O_4@chitosan nanoparticles have been coated with metal ions and used in various organic reactions as an efficient magnetically separable catalyst. The sizes and structures of the products were characterized by transmission electron microscopy (TEM), X-ray diffraction (XRD) and Fourier transform infrared (FT-IR), BET, Thermogravimetric analysis (TGA) and VSM.

CS10

OT@Si@SPIONs catalyzed one-pot synthesis of cyclohexanecarbonitriles

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Fe_3O_4 magnetic nanoparticles synthesized by co-precipitation method, have been cordoned off with silica layer which was further grafted with organocatalyst i.e. *oxytyramine* to produce a magnetically separable catalyst. Its catalytic performance has been evaluated by applying it over Strecker reaction to promote the synthesis of peerless cyclohexanecarbonitriles. Series of derivatives have been synthesized by the reaction of various substituted amines with cyclohexanone and TMSCN. The present protocol proved to be a sustainable one as after the reaction completion, catalyst can be easily removed from the reaction mixture with the help of an external magnet and it can be reused for several times without any significant loss in its activity. The utilization of magnetic nanoparticles as catalysts for this reaction is one approach i.e. green, inexpensive, facile and widely applicable.

CS11

An efficient synthesis of novel mannich products bearing thiophene nucleus using ionic liquid and their microbial studies

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In this series we have developed synthesis of novel Mannich products 4(a-m) containing bioactive thiophene nucleus, using ionic liquid. This method provides us high amount of yields without requiring a chromatographic separation. The structure of all new synthesis compounds was established based on elemental analysis, ^{1}H NMR, ^{13}C NMR, Mass, IR spectral data. In vitro microbial studies

indicate that all are active against Gram positive (*S. aureus, Streptococcus pyogenes*), Gram negative (*P. aeruginosa* and *Escherichia coli*), *M. Tuberculosis* $H_{37}RV$ bacteria, and fungus like *Candia albicans, A. Clavatus and Aspergillus niger*.

CS12

Study of Mixed Micellar behavior of 12-2-12 Gemini Surfactant with Tetradecyltrimetyl Ammonium Bromide in Presence of Alcohols

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The mixed micellization behavior of dimeric cationic surfactant ethanediyl-1,2-bis (dimethyldodecylammonium bromide) (12-2-12) with tetradecyltrimethyl ammonium bromide (TTAB) has been studied in aqueous and aqueous alcohol solutions at 298.15, 308.15 and 318.15 K respectively using conductometric method. The alcohols used for the present study are propanol, propylene glycol, glycerol, butanol and tert-butanol. Parameters like mixed micellar CMC (C_m), micelle mole fraction (X_1), degree of ionization and interaction parameter (β) of the mixed systems have been determined and analyzed using Rubingh's regular solution theory. The results indicate that in aqueous solutions at 298.15 K the binary mixtures behave non-ideally with mutual synergism (β negative) which increases in presence of alcohols. The effects of the structure of co solutes on the interactions between the two surfactants have been discussed. However, these interactions decrease with the increase in temperature. Various thermodynamic parameters associated with micellization like ΔG^o_m, ΔH^o_m and ΔS^o_m at various temperatures have also been evaluated. ΔG^o_m and ΔH^o_m values were found to be negative whereas ΔS^o_m values were positive. The negative values of ΔG^o_m were found to decrease with increase in temperature indicating decrease in spontaneity of the micellization process. The enthalpic contributions increase whereas the entropic contributions decrease with increase in temperature.

CS13

Synthesis, Characterization and Studies of Heterocyclic Fluorescent Probe Containing Copolyamides

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Numerous compound containing heterocyclic groups have been synthesized by the poly condensation method. Number of derivatives containing s-triazine ring have been reported as hetrocyclic compounds. Copolyamides were synthesised having different aliphatic-aromatic

diamines in the chain having *s*-triazine ring as main moiety. Ten copolyamides were synthesized by polycondensation of (N-diphenylaminyl)-2,4-bis-(7-hydroxy-coumarin-3-carbonyl chloride)-1,3,5-triazine with aliphatic and aromatic diamines. The synthesized copolyamides were examined on the basis of colours and solubility in different solvents. The copolyamides were of different attractive colours. All the polyamides were insoluble in water but some of the copolyamides were soluble in organic solvents. The viscosity was studied for each copolyamides. This copolyamide show inherent viscosity ranging from 0.396-0.698 dl/g in DMF at 25^{o}C. The synthesized copolyamide was characterized by 1H-NMR, FT-IR, fluorescence spectra. The copolyamides showed excellent fluorescence. The measured data indicate that synthesized aromatic fluorescent copolyamides are used in various fields.

CS14

Thermodynamic studies of molecular interactions of drug with Glycine and its peptides at different temperatures

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Ultrasonic velocity and density of glycine, glycine-glycine, glycine-leucine have been measured in aqueous solutions of drug ampicillin ranging from 0.002, 0.004, 0.001 and 0.0005 mol kg^{-1} at temperatures T =305.15 K, 310.15 K and 315.15 K. The values of apparent molar volume, limiting apparent molar volume, transfer volume have been measured from density data. Experimental speeds of sound data were used to estimate apparent molar adiabatic compressibility. The variation of these parameters with temperature clearly suggests the role of drug and peptides in solute solvent interactions which were tried to justify with the help of UV-Visible spectrum also.

CS15

A comparative assessment on the tribological performance of CdS and Cu nano-fluids

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The present paper deals with the comparative assessment of tribological performance of CdS and Cu nano-fluids. The nano-fluid research has gained significant importance due to the excellent tribological properties of nanofluids. In the present paper the nano-fluids of CdS and Cu have been synthesized by blending the nano-sized CdS and Cu particles into the mineral based lubricant. The CdS and Cu are solid lubricants that possess excellent anti-wear and anti-friction

properties. But their use as additives in liquid lubricants has not been investigated due to the poor dispersion stability of solid lubricant particles in liquid medium. The dispersion stability of solid lubricant particles can be enhanced by chemical functionalization. Therefore, the nano-fluids of CdS and Cu have been prepared using oleyl amine-Oleic acid and oleic acid functionalization routes respectively. The functionalized nano-particles have been characterized by analytical techniques like FTIR, XRD, TGA, SEM, and EDX. The nano-fluids with varying concentrations of nano-particles have been synthesized and tested for their tribological performance i.e. the anti-wear and anti-friction performance using 4-ball tribo-tester at two different loads. The results show that CdS nano-fluids reduce friction more drastically as compared to the Cu nano-fluids while the Cu nano-fluids are capable to reduce wear drastically. For a given concentration the CdS nano-fluids reduces friction and wear by 66 % and 25 % respectively as compared to 13% and 43% respectively by Cu nano-fluids.

CS16

Photolysis of 3-alkoxychromones/bischromones: Synthesis of pyronopyrane derivatives

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The synthetic photochemistry deals with the interactions of light with organic molecules which results in the electronically excited states that further lead to the generation of various photoproducts. The photolytic pathways usually provide such compounds which are not feasible under the normal thermal routes. The photochemical behavior of the carbonyl chromophores have been the best understood geometrically and mechanistically. The photoinduced hydrogen abstraction reactions of the systematically designed carbonyl substrates may lead to the formation of some heterocycles of the immense chemical and biological significances. The photolysis of aryl substituted 3-alkoxy-chromones/bischromones yielded benzopyronopyrans as the heterocyclic products. These compounds were obtained from the cyclization reactions of intermediate 1,4-biradicals with suitably placed 2-aryl ring. The formation and distribution of these photoproducts have been found to be dependent on the nature of 2-aryl ring as well as substituent present at the 3-alkoxy moiety. The photochemistry of bischromones provided bisbenzopyronopyrans whose formations were found to be dictated by the geometry of the linker and hydrogen donating capability of the solvent. The structures of chromones/bischromnes and the resulting benzopyronopyrans & bisbenzopyronopyrans were fully characterized on the basis of their various spectroscopic data. Finally, these photochemical reactions present themselves interesting protocols for the preparations of many pyronopyran derivatives without using any specific and toxic reagent.

CS17

Symmetrical bisdihydropyrazole derivatives: Synthetic and antimicrobial studies

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The syntheses of five membered heterocycles have been the subject of major investigations among the organic chemist due to their immense chemical, biological and industrial applications. Pyrazolines are the prominent five membered heterocycles which are associated with numerous bioactivities such as antipyretic, analgesic, tranquillizing, muscle relaxant, psycho analeptic, antiepileptic, antidepressant, anti-inflammatory, insecticidal and antimicrobial properties. Thus it could be highly advantageous to investigate the antimicrobial properties of the new heterocycles baring two dihydropyrazole moiety together in the same structure. On the basis of these aspects in considerations, we have carried out the systematic researches upon the synthesis of symmetrical bisdyhydropyrazole joined through the linkers of rigid geometry. These compounds have been prepared from the cyclisation reactions of the suitably constructed bischalcones with phenyl hydrazine. The bischalcones could become available by reacting hydroxy substituted chalcones with appropriate dibromo derivatives in the presence of anhydrous potassium carbonate by taking acetone/DMF solution as the solvent medium. The Claisen-Schmidt reactions of substituted acetophenone with aromatic aldehyde provided chalcone in good yield. The structures of newly prepared compounds (chalcone, bischalcones & bisdihydropyrazoles) were thoroughly characterized by using various spectroscopic techniques. The antimicrobial potency of bischalcones and symmetrically bisdihydropyrazoles were also evaluated against selected bacterial and fungi strains. Some of tested products displayed noticeable antimicrobial properties.

CS18

Synthesis and pharmacological evaluation of some novel 2-pyrazoline derivatives

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2-Pyrazoline ring system has attracted significant interest in Medicinal Chemistry. Literature survey revealed that compounds with 2-Pyrazoline(4,5-dihydropyrazole) structure are known to possess tranquilizing, muscle relaxant, psycho analeptic, anticonvulsant antidepressant and MAO-inhibitor activities. In view of these observations, we have designed and synthesized 2-

Pyrazolines derivatives derived from pyridine moiety. In the present study, a series of novel 6-(substituted phenyl)-3-(5-substituted phenyl)-4,5-dihydro-1*H*-pyrazol-3-yl) pyridine were synthesized by Claisen-Schmidth condensation followed by the reaction of hydrazine hydrate. The synthesized compounds were proved by means of their IR, ^{1}H NMR, ^{13}C NMR and Mass spectra. The newly designed compounds were assayed for their in vivo anticonvulsant and antidepressant activity. The compounds in series exhibited different levels of the activities when compared to the reference. Further synthesized compounds were docked computationally to gain structural insights of the binding mode and possible interaction between the compounds and active site of MAO-A. The results of molecular docking study supported the pharmacological activities of the synthesized compounds.

CS 19

An Environmental Benign Route to Synthesize High Molecular Weight Polar Polyolefins by a New Postmetallocene Titanium(IV) Complex Bearing Asymmetric Tetradentate [ONNO]-type Amino Acid Based Ligand at Ambient Temperature in Aqueous Emulsion

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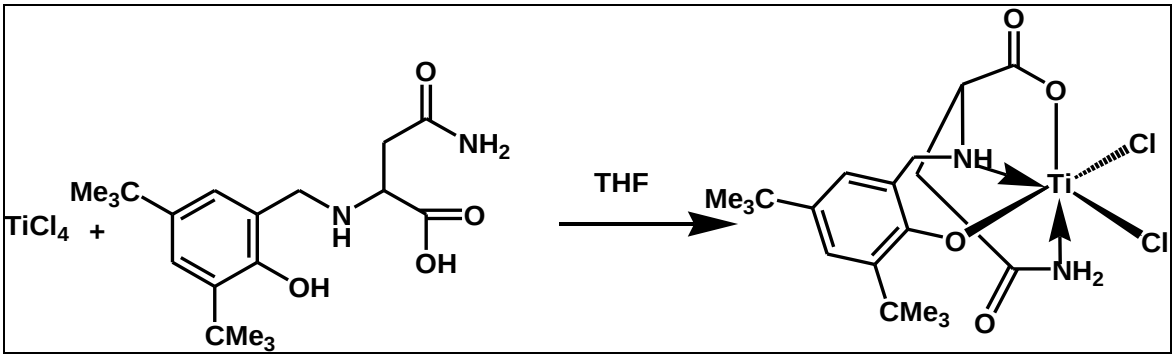
Evolution of Ziegler Natta catalyst in 1950s set a historic mark in the field of designing polymerization catalysts. About 50 years after the discovery of homogeneous Ziegler Natta catalysis, phenoxy–imine-based group 4 transition metal complexes (FI catalysts) emerged as the next frontier catalysts for the controlled polymerization reactions. These hard donor atoms (N,S and P) containing post metallocene catalyst systems are quite versatile in nature as they provide ever-higher catalyst productivity and greater control over polymer properties such as molecular weight, molecular weight distribution and stereo regularity due to their inherent electronic and structural features. Series of organometallic complexes are developed to catalyze and to produce variety of household polymer products. Anhydrous environment (organic solvent) and use of hazardous alkyl aluminium as an activators are the major requirement for all these polymerization reactions due to poisoning effect of water towards metal centre. But, driven by the increasing environmental concern regarding detrimental effects of organic solvents we have synthesized a new water stable (as solvent/diluent) postmetallocenetitanium (IV) based catalyst [$TiLCl_2$] {LH_2= 2-(3,5-Di-tert-butyl-2-hydroxy-benzylamino)-succinamic acid} with side arm approach (Scheme 1) for aqueous emulsion polymerization of olefins at ambient temperature.
Newly synthesized catalyst has been characterized by elemental analysis, ^{1}H NMR, ^{13}C NMR, IR and UV-visible spectroscopy. The catalyst is easy to synthesize and moderately stable in water. In aqueous emulsion, in presence of co-catalyst $NaBPh_4$, it has been found to exhibit moderate to high activity in the range of 10^4 to produce homo and copolymers of polar olefins which are widely used for a variety of applications. The synthesis, structures and properties of the obtained polymers were analyzed by experimental techniques, DSC, GPC, ^{1}H NMR, ^{13}C NMR and will be discussed in details.



Scheme 1

CS20

Synthesis of derivatives of phenolic acids from sugarcane bagasse lignin and their antioxidant activity

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The production of value-added chemicals from agro-industrial products of renewable resources has received a great attention in recent years. The residues such as sugarcane bagasse represent an abundant and inexpensive source of lignocellulosic materials with high service potential. Lignin is an amorphous phenolic polymer with complex structure arising from copolymerization of phenyl propanoid monomers, namely coniferyl, sinapyl and *p*-coumaryl alcohols. In the present study, sugarcane bagasse was analysed for its chemical composition by detergent system method and was found to contain 28.42% hemicellulose, 42.11% cellulose and 19.20% lignin. Bagasse was treated with 1, 5 and 10% NaOH which led to formation of black liquor from which lignin was precipitated by acidifying the solution to pH 2.0. The yield of lignin extracted was found to increase as the concentration of alkaline solution was increased with maximum yield of 17.6% w/w bagasse with 10% NaOH. Lignin extracted was purified with acidified water and structurally characterized using FT-IR, ^{1}H and ^{13}NMR spectral data. Two phenolic acids *i.e. p*-coumaric acid and ferulic acid were extracted from lignin black liquor with methanol and isolated by preparative thin layer chromatography and identified by their melting points, UV, FT-IR, ^{1}H, ^{13}C NMR spectra and elemental analyses. Both the isolated phenolic acids were derivatized into their methyl, ethyl and propyl esters and all the synthesized esters were characterized by spectral studies and elemental analyses. Bagasse lignin, isolated phenolic acids and their ester derivatives were further evaluated for antioxidant activity-radical scavenging activity using 2, 2-diphenyl-1-picrylhydrazyl (DPPH·) free radical using 3-*tert*-butyl-4-hydroxyanisole (BHA) as standard. It was observed that antioxidant activity of lignin, phenolic acids and esters was lower than BHA. Ferulic acid and its esters showed higher antioxidant activity than *p*-coumaric acid and its esters as having methoxy groups at ortho position in ferulic acid and its esters stabilize phenoxyl radicals more by resonance. It was concluded that lignin,

phenolic acids isolated from bagasse lignin and their derivatives could be used as potential antioxidants of food oils and fats.

CS21

Molecular Docking and QSAR study of chalcone and pyrimidine derivatives as potent anti-malarial agents against *Plasmodium falciparum*

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A data set of chalcone and pyrimidine derivatives with anti-malarial activity against Plasmodium falciparum was employed in investigating the quantitative structure-activity relationship (QSAR). Genetic function approximation (GFA) technique was used to identify the descriptors that have influence on anti-malarial activity. The most influencing molecular descriptors identified include thermodynamics, structural and physical descriptors. Generated model was found to be good based on correlation coefficient, LOF, rm^2 and rcv^2 values. Nrotb, solubility, polarizibility may have negative influence on antimalarial activity or play an important role in growth inhibition of *Plasmodium falciparum*. The QSAR models so constructed provide fruitful insights for the future development of anti-malarial agents.

CS22

Overcoming matrix effect due to plasma phospholipids in the determination of antiarrhythmic drug dronedarone and desbutyl dronedarone by LC-MS/MS

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Matrix effects arising from residual components of a biological matrix are largely responsible for method imprecision and changes in mass spectrometry (MS) response. Endogenous phospholipids are a major cause of ion suppression/enhancement when using electrospray ionization (ESI) source in mass spectrometry. Evaluation of matrix effects and their subsequent elimination during method development is very crucial. Monitoring of plasma phospholipids should be an integral part during development of a reliable, robust and reproducible bioanalytical method. Phospholipids are abundantly present in biological matrices, with glycerophospho

cholines (GPC) and lysophosphophatidyl cholines (LPC) representing about 80 % of total plasma phospholipids and are known to give a characteristic peak at *m/z* 184 in the ESI-MS. Six endogenous plasma phospholipids including two LPC (LPC-1, 496.3/184.0 and LPC-2, 524.3/184.0) and four GPC (GPC-1, 758.5/184.0; GPC-2, 786.5/184.0; GPC-3, 806.5/184.0 and GPC-4, 810.5/184.0) were monitored with three sample preparation techniques namely protein precipitation (PP), liquid-liquid extraction (LLE) and solid phase extraction (SPE) during LC-ESI-MS/MS analysis of dronedarone and its active metabolite desbutyl dronedarone in human plasma. Qualitative evaluation of matrix effect due to plasma phospholipids was accomplished using post column analyte infusion technique. Quantitative assessment was made by post extraction analyte spiking method and by calculating the precision in the measurement of slope of standard calibration lines. SPE on Oasis cartridges was successful in removing bulk of the residual phospholipids under acidic conditions as compared to PP and LLE. The washing and elution solvents were suitably optimized for selective elution of the analytes and to afford quantitative recovery (93.27 to 95.14 %). The IS-normalized matrix factors (MFs) were in the range of 0.99-1.02. Post column infusion results correlated well the results obtained. Kromasil C18 (100 × 4.6 mm, 5 µm) column provided best chromatographic conditions for baseline separation of the analytes (R_s 2.37) within 3.0 min under isocratic elution. The assay reproducibility was determined by reanalysis of 72 incurred samples with % change within ± 10%.

CS23

Excited State Intramolecular Proton Transfer (ESIPT) Inspired Motiffs

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Excited State Intramolecular Proton Transfer (ESIPT) is a photochemical process that produces a tautomer with different electronic structure from the original excited form. It is a four level photo cycle (E→E* K→K*) scheme implemented by enol (E) to keto (K) phototautomerisation process. The ESIPT phenomenon was reported first for salicylic acid by Waller in 1950s.The remarkable properties' of ESIPT fluorophroes are large Stokes shift, dual emission, and ultrafast process and spectral sensitivity to the surrounding medium. The prerequisite for ESIPT is the presence of intramolecular hydrogen bond (H Bond) between proton donor and proton acceptor groups close proximity to each other in a molecule. ESIPT is extremely fast process. The rate of ESIPT depends on donor –acceptor groups and surrounding medium. The fluorescence properties of ESIPT chromophores are tuneable by changing these parameters. Considering unique photo physical properties and spectral sensitivity with microenvironment ESIPT chromospheres are attracting more attention since past two decades for high tech applications. This paper deals with synthesis of series of ESIPT Chromospheres to achieve very high quantum efficiencies for high quantum efficiencies in solution and so1id.

CS24

Chemistry and antioxidant potential of flavanones from zest and pith of kinnow peel

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Natural products and their ingredients are healthy and less harmful to living organisms in comparison to synthetic substances. So their utility in everyday life has increased to greater extent. Peel wastes are highly perishable and seasonal and also a problem to the processing industries and pollution monitoring agencies. Utilization of wastes can improve the economy of processing units and also reduce the problem of environmental pollution. Peel, the main waste fraction of kinnow, contains numerous biologically active components including numerous phenolic compounds such as phenolic acids and flavonoids. Kinnow peel that comprises of zest (orange part) and pith (white part) contains mainly two flavanones *i.e.* hesperidin and naringin. Hesperidin and naringin flavanone glycosides and their isolations were carried out separately from zest and pith of kinnow peel by soxhlet extraction. Isolated compounds were structurally characterized using FT-IR and ^{1}H NMR spectral data. Content of hesperidin and naringin was was found to be more in pith as compared to zest of kinnow peel. Both the isolated flavanones were converted into their derivatives. Hydrolysis of hesperidin and naringin was carried out for the formation of their aglycone forms *i.e.* hesperitin and naringenin, respectively. Further acetylation of hesperidin was carried out and naringin was derivatized to methylated naringin. The derivatives synthesized were analysed using FT-IR and ^{1}H NMR spectra. All the isolated flavanones and their derivatized products were further evaluated for their radical scavenging activity using 2,2-diphenyl-1-picrylhydrazyl (DPPH·) free radical and 3,5-di-*tert*-butyl-4-Shydroxytoluene (BHT) was used as standard at different concentrations *i.e.* 5, 25, 50, 100 and 200µg/ml. Out of these, compounds showed maximum activity at 200µg/ml concentration. Pure flavanones *i.e.* hesperidin and naringin were found to exhibit more antioxidant potential as compared to their derivatives. Out of the two flavanones, hesperidin showed more antioxidant activity as compared to naringin. This study demonstrated that flavanones *i.e.* hesperidin, naringin and their synthesized derivatives can serve as potential sources of antioxidants for use in food and pharmaceutical industry.

CS25

Total phenolic content and antioxidant activity of different turmeric extracts

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Turmeric is a spice obtained from dried rhizomes of *Curcuma longa* which has been found to be rich source of phenolic compounds such as hydroxycinnamic acids (e.g. p-coumaric acid,

curcumin) and simple phenolics (e.g. cresol). Phenolic compounds are secondary plant metabolities, which are important determinants in the sensory and nutritional quality of fruits, vegetables and other plants. Different extracts from turmeric varities *i.e.* Punjab Haldi-I and Punjab Haldi-II were prepared by following three extraction procedures *i.e.* conventional method, soxhlet extraction method and ultrasonic assisted extraction method using different organic solvents *i.e.* acetone, ethylacetate, isopropylalcohol, benzene and hexane. From different extracts total phenolic content (TPC) was estimated using Folin-Ciocalteu reagent. The order of TPC in both turmeric varities using different organic solvents was found to be isopropylalcohol > acetone > ethylacetate > benzene > hexane. TPC in Punjab Haldi-I and Punjab Haldi-II using soxhlet extraction method were found to be highest with values 70.37mg gallic acid equivalent (GAE)/g dry weight (DW) and 39.63 mg GAE/g DW respectively in isopropyl alcohol extract whereas values for acetone extract were 69.21 mg GAE/g and 34.03 mg GAE/g DW respectively. TPC was found to be more in Punjab Haldi-I as compared to Punjab Haldi-II. Different extracts of Punjab Haldi-I and Punjab Haldi-II were investigated for their radical scavenging activity using 2,2-diphenyl-1-picrylhydrazyl(DPPH) free radical at different concentrations (5,25,50,100,200 and400 µg/ml). Isoproylalcohol extract of Punjab Haldi-I and Punjab Haldi-II showed highest percent inhibition values 69.3 and 64.6% respectively at 400µg/ml concentration whereas acetone extract showed inhibition values 65.3 and 62.4 % respectively. The percentage inhibition of all the extracts of two varities of turmeric decreased with decrease in concentration. The results also showed that extracts of Punjab Haldi-I showed highest inhibition percentage as compared to that of Punjab Haldi-II. The relatively high antioxidant activity of turmeric suggested that it can be used as potential antioxidant in food and other industries.

CS26

Investigating CO oxidation catalysed by Au nanoclusters

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To gain deeper understanding of enhanced reactivity of gold at nanolevel; we studied an important but relatively simple chemical reaction which is, carbon monoxide oxidation to carbon dioxide catalyzed by gold nanoclusters of varying sizes (Au_n, n= 3 to 10). We investigated the various aspects of gold nanocatalysis. For example, the dependence of oxygen adsorption on cluster size which shows strong odd-even alternation; switching of reaction mechanism from Eley- Rideal type to Langmuir-Hinshelwood type at particular cluster size; effect of charge on reaction rates (for this we also studied the reaction for cationic and anionic nanoclusters in addition to neutral ones); comparison between the reactivity of high coordinated versus low coordinated sites; effect on substrate and defects on oxidation reaction. The required quantum chemical calculation was carried out using density functional theory (DFT) and pseudo-potentials were used to treat the core electron of gold clusters.

CS27

Ultrasonic Studies of Some transition metal sulphates in Aqueous mixture of sodium chloride and maltose at Different Temperatures

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The density (ρ) and sound velocity (u) has been measured for $CuSO_4.5H_2O$ and $ZnSO_4.7H_2O$ in 0.02,0.04 and 0.06 mass fraction of maltose in 0.01 m aqueous sodium chloride solutions at four different temperatures T =(298.15, 303.15, 308.15 and 313.15 K). These parameters were then used to obtain different acoustic functions such as adiabatic compressibility (β), intermolecular free length (L_f), specific acoustic impedance (Z), solvation number (S_N) and molar compressibility (W). The ion- solvent and ion-ion interactions in the system have been discussed using these parameters. The effect of $CuSO_4.5H_2O$ and $ZnSO_4.7H_2O$ on these interactions as well as on the solvent structure has also been discussed.

CS28

Development of fluorescent organic cations for molecular recognitions

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Anion recognition is gaining tremendous interest in molecular recognition due their application in environment monitoring and to analysis essential anions in body. To achieve this task, various techniques are developed including high-performance liquid chromatography, electrochemical detection, and mass spectroscopy. However, these methods have some limitations in that they are time-consuming, require sophisticated instruments, and have high detection limits. In recent years, fluorescence spectroscopy is most widely used for biological application. In this contrast we have developed some fluorescence organic cations by conjugating imidazolium cation with some fluorescence organic moiety. Advantage of these organic cations over previous reported organic receptors is that these are working in aqueous medium. The fluorescent part is signaling unit whereas the distal part of receptor conjugated with imidazolium, a moiety well knows for anion or biomolecule recogition.[1–3] The sensor activities in aqueous medium are mandatory, if the targeted analytes are of biologically or environmentally important. The prepared receptor is highly selective for chloride over other competing anions with low detection limit of 21± 2 nM. Real time applications were evaluated in biological system.

CS29

Design and synthesis of imidazopyridine fused pyrazolo-pyridinone and Pyrazole fused-azepinone derivatives from bifuncationalized pyrazole aldehyde

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Pyrazole derivatives occupy a significant importance in medicinal chemistry as they are gifted with many pharmacological activities including antianxiety, antipyretic, analgesic, PDE-4, anticancer, antimicrobial and anti-inflammatory. As a result there is continued interest to develop methodologies for preparing diverse pyrazole-based compounds. In the present work, the synthesis of bifunctionalised pyrazole derivatives was achieved *via* Vilsmeier Haack reaction of hydrazone derivatives that was generated on water. Further, synthesis of imidazopyridine fused pyrazolo-pyridinone has been successfully achieved via the $In(OTf)_3/HBF_4$ mediated one pot Groebke–Blackburn–Bienayme multicomponent reaction. In another study, the pyrazole aldehyde derivatives were subjected to MBH reaction with several activated alkenes in presence of DABCO under neat conditions. The resulting MBH adducts were further acetylated and subjected to substitution reaction with various primary amines to afford the expected substitution products which resulted in *in situ* cyclization to generate the desired pyrazolo[3,4-*c*]azepinone derivatives.

CS30

Urea/thiaurea based receptor as fluorescent sensor for Fe(III)

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Ferric ion is one the essential metal ion for human body. Its deficiency may cause some serious deceases such as anima. Hence development of sensor for this purpose is gaining tremendous interest. To achieve this we have developed urea/thiaurea based receptor.[1,2]Urea/thiaurea are well known for metal encapsulation is used to construct fluorescence organic nanoparticle. Organic nanoparticles of urea receptor were prepared and characterized using NMR, CHN analysis. Size of organic nanoparticles formed was characterized using DLS studies. The prepared ONPs were tested for determination of various cations. The prepared organic nanoparticles are showing high selectivity for iron over other competing cations with low detection limit of 30 nm. To evaluate the real time applications of sensor, samples from various water resources was collected and concentration of iron was calculated by comparing its electrochemical[3] response with calibration curve. Another advantage of prepared sensor is its working in 99% aqueous medium. The prepared organic nanoparticles of receptor 1 can be used as sensor for determination of iron in aqueous samples of both environmental and medical concern.

CS31

Thermodynamic and spectroscopic studies of Doxycycline hyclate in aqueous β-cyclodextrin solution at different temperatures

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The complexation phenomenon of one of the most widely prescribed antibiotic drug Doxycycline with β-cyclodextrin (βCD) has been studied comprehensively with the help of thermodynamic (conductance) and spectroscopic (viz., UV-vis, steady-state fluorescence) techniques. The variation in the physicochemical properties (conductance, solubility, UV absorbance, fluorescence intensity) of doxycycline in the presence of βCD evidently indicates the energetically favorable interactions between doxycycline and βCD. The thermodynamics of the system has been studied in terms of change in Gibbs free energy (ΔG) at three different temperatures (viz., 298K, 308K, and 318K). The free energy of our binary (doxycycline/water) system was found to decrease in the presence of βCD. The stoichiometry of the complexes formed and the numerical value of their stability constants were calculated from fluorescence data.

CS32

Micelles as drug delivery systems or as targeting systems

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The unique properties of drugs are due to their containing aromatic, amine, and aliphatic groups in the same molecule. Their salt form is water soluble, whereas their free base form is insoluble in water. Their interaction with the interfaces in aqueous systems is due to their amphiphilic nature. Most drugs are not lipophilic enough to form vesicles and hence require drug delivery systems to administer them into the body and to help control the site of delivery, with the proper selection of surfactants or polymers and their concentration, a better drug-carrier system can be produced. The interaction of small molecules with drugs is one of the most extensively studied phenomena in pharmacy. Future Challenges needs suitable, effective drug delivery or targeting systems.

CS33

Design and Synthesis of Isoxazole and β-Carboline Substituted Imidazopyridine Derivatives via Groebke-Blackburn-Bienayme (GBB) Reaction

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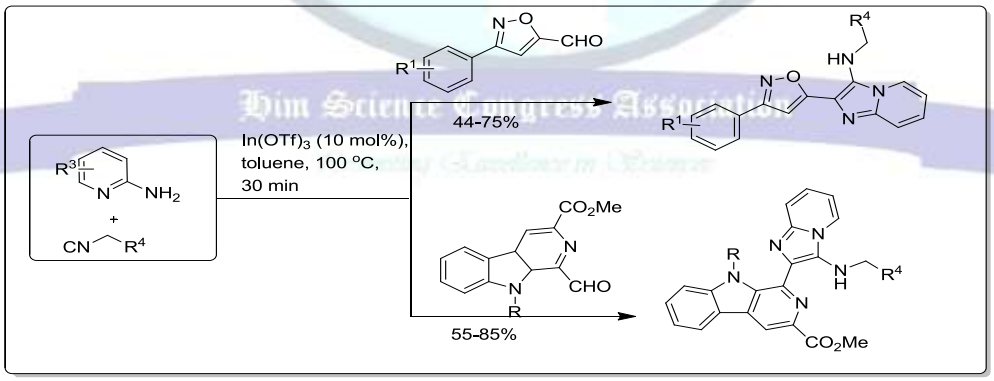
Isoxazole and β-Carboline containing natural products are ubiquitously present in nature including plants, foodstuffs, marine organisms, insects, mammalian as well as human tissues and body fluids and display an array of pharmacological properties ranging from potent antimalarial[1, 2] antineoplastic (tubulin binding),[1, 2] anticonvulsive, hypnotic and anxiolytic (benzodiazepine receptor ligands),[3] antiviral, antimicrobial, antibiotic activity, treatment of T.B., treatment of cancer, anti-viral, N.S.A.I.D., treatment of severe rheumatoid arthritis and psoriatic arthritis as well as topoisomerase-II inhibition[4] to inhibition of cGMP-dependent processes. The importance of isoxzole derivatives can be viewed from the fact that the most potent compound, 4-(3a,4,5,6,7,7a-hexahydrobenzo[d]isoxazol-3-yl)-2-(trifluoromethyl)benzonitrile, exhibits antiandrogenic activity significantly greater than that of the most widely used antiandrogenic prostate cancer drugs bicalutamide and hydroxyflutamide. Due to their immense significance, synthesis of a variety of isoxazole and β-Carboline derivatives has been a subject of intense research.

In this context, we have developed novel scaffolds in the form of Isoxazole and β-Carboline substituted Imidazopyridine Derivatives via Groebke-Blackburn-Bienayme (GBB) multicomponent reaction. Details of these studies shall be presented and discussed.



CS34

A comparative study of Aggregation behavior of Tetrabutylammonium dodecylsulphate and Sodium dodecylsulphate in the presence of Glycine

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In the present work, the micellization behavior of a surface active ionic liquid (SAIL), TBADS and anionic surfactant, SDS in the concentration range (0.1-1.0) mmolkg^{-1} and (1.0-14.0) mmolkg^{-1} respectively in aqueous solutions of Glycine (0.01, 0.05 and 0.1) mol·kg^{-1} has been investigated. For this, the specific conductance (κ) of the solution has been measured over the wide temperature range of 293.15- 313.15 K at an interval of 5 K. The conductivity data have been used to derive some physical parameters like critical micelle concentration (CMC), counter ion binding (α) and thermodynamic parameters like standard Gibbs free energy change (ΔG_m^0), standard enthalpy change (ΔH_m^0) and standard entropy change (ΔS_m^0). The calculated parameters have been discussed in terms of intermolecular interactions like ion-ion, ion-hydrophilic, hydrophobic-hydrophobic and hydrophobic-hydrophilic interactions prevailing in the studied ternary (TBADS-Glycine-water/SDS-Glycine-water) systems.

CS35

Effect of Saccharides on the Surface Activity and Micellar Properties of Ionic Surfactant at Different Temperatures: Surface Tension Study

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Surface tension measurements have been carried out to study the interactions present between cationic surfactant, dodecyltrimethylammonium bromide (DTAB), in aqueous solution, in the presence and absence of additives saccharides (maltose and raffinose) at different composition and temperatures. The critical micelle concentrations (CMC's) have been determined using surface tension measurements. The surface tension gets lowered in the presence of added saccharides and the effect being more prominent in case of raffinose. From the surface tension data, parameters like surface excess (Γ_{max}) , minimum area occupied by the surfactant molecule at the saturated air/solution interface (A_{min}) and surface fi CMC) have been computed. All the Γ_{max} values are positive and decrease with rise in temperature, but show considerable dependence on concentration of these saccharides. The decrease in Γ_{max} values with temperature in aqueous solution of maltose / raffinose may be due to involvement of both electrostatic and hydrophobic interactions resulting in binding of surfactant and maltose / raffinose.

CS36

Investigations on Intermolecular Interactions of Aqueous Metformin Hydrochloride In the Presence of Glutamine

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Intermolecular interactions of aqueous Metformin Hydrochloride (0.01, 0.07, and 0.13 mol·kg^{-1}) in the presence of Glutamine (0.02–0.20 mol·kg^{-1}) have been examined by measuring viscosity (η) density (ρ) and speed of sound at 293.15, 298.15, 303.15, 308.15, and 313.15 K. It provides information anticipated to be of interest to have better understanding of structural modifications induced as a consequence of glutamine–metformin hydrochloride (solute–solvent) interactions. The experimental data obtained have been used to evaluate different parameters which assist to procure valuable information regarding presence of different kinds of intermolecular interactions in the ternary (glutamine + water + metformin hydrochloride) system. The results of these enumerated parameters have been supported by applying transition state theory, which can procure more information regarding solution behavior. The observations from these studies have been compensated in terms of intermolecular interactions such as solute–solute, solute–solvent, ion–solvent, ion–ion and structure making/breaking behavior of glutamine in mixture solution.

CS37

Intermolecular Interactions of Cardiovascular drug Furosemide with Amino Acids Analyzed by Viscometric and Optical Method at Different Temperatures

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Viscosity (η) and density (ρ) of glycine and DL-alanine (0.02-0.20 mol·kg^{-1}) in aqueous furosemide solutions (0.00, 0.001, 0.005, and 0.009 mol·kg^{-1}) have been measured at (293.15, 298.15, 303.15, 308.15, and 313.15) K. The viscosity data has been analyzed using the Jone's Dole equation, and derived parameters e.g. Falkenhagen coefficient (A) and Jone's – Dole coefficient (B) have been interpreted in terms of solute-solute and solute-solvent interactions, respectively. Further, the viscosity B-coefficient, variation of B with temperature (dB/dT) and viscosity B-coefficient of transfer ($\Delta_{tr}B$) have also been calculated. The thermodynamic activation parameters of viscous flow i.e. free energy of activation of viscous flow per mole of solvent ($\Delta\mu_1^{0*}$) and per mole of solute ($\Delta\mu_2^{0*}$), activation entropy (ΔS_2^{0*}) and activation enthalpy (ΔH_2^{0*}) of viscous flow have been measured and explained in terms of transition state theory. The results of UV–Vis studies for ternary system corroborate with the viscosity studies. The results

have been explained on the basis of competing pattern of interactions between the co-solute-solute as well as the structure making and breaking ability of amino acids in the ternary system.

CS38

Aggregation Behaviour of Dodecyltrimethylammonium Bromide (DTAB) in the Presence of Tetraalkylammonium Based Ionic Liquids: A Conductometric Study

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A series of ILs comprising of homologous series of tetraalkylammonium cations (R_4N^+) (where R= propyl, butyl and pentyl) and common inorganic anions (nitrate (NO_3^-) and acetate (CH_3COO^-)) have been synthesized from corresponding tetraalkylammonium bromide salts by simple ion-exchange method. In order to observe the effects of these synthesised ILs on the micellization of cationic surfactant, Dodecyltrimethylammonium bromide (DTAB), the specific conductivities (κ) of the solutions have been measured in the temperature range (288.15 to 318.15)K . From the conductivity versus [surfactant] plots, critical micellar concentration (*CMC*) of surfactant has been determined. The *CMC* values showed a remarkable decrease in the presence of ILs following the order: $R_4NOOCCH_3 > R_4NNO_3 > R_4NBr$. This may be attributed as preferential adsorption of these chaotropic anions to alkyl chains resulting into a decrease in net charge of cationic surfactant due to their high polarizability, thus electrostatic interactions between the head groups of the surfactant probably increased the tendency towards aggregation. Also, these short tetraalkylammonium cations enter the micellar core of surfactant due to hydrophobic interactions, thereby acting as spacers between the surfactant head groups.

CS39

To Study Micellization of Cetyltrimethyl Ammonium bromide in Aqueous Solutions of Dipeptide: A Conductometric Approach

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The conductivity measurements have been used to determine critical micellar concentration of CTAB in aqueous solution of glycyl dipeptide (0.01, 0.05, and 0.10) mol·kg^{-1} over the temperature range of (298.15–318.15) K. The X_{CMC} values (i.e. CMC in mole fraction unit) so obtained have been used to derive various useful standard thermodynamic parameters of micellization like enthalpy (ΔH_m^o), free energy (ΔG_m^o), and entropy (ΔS_m^o). The variation of these thermodynamic parameters with temperature and concentration of glycyl dipeptide has been explained in terms of different interactions existing in the ternary system. The dominance of polar

groups of glycyl dipeptide and CTAB seems to have contribution towards the temperature and hydrocarbon chain length dependence on the *CMC* values.

CS40

Synthesis, characterization and antimicrobial activity of n-butyltin (IV) hydroxamates

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The organotin chemistry is one of the widely studied class of organometallic compounds whereby a large number of compounds have emerged as metallopharmaceuticals owing to their antimicrobial, antifungal and anticancer activity. The biological activity of organotin compounds is influenced greatly by the number and nature of the organic groups linked to the tin metal atom, coordination number of tin, nuclearity and structure of the complex. The vast majority of studied compounds are although mononuclear, yet tetranuclear or polymeric species depicting structural variability are also known. The organotin(IV) compounds with biologically active ligands e.g. carboxylates, hydroxamates etc. have attracted a particular attention. Literature contains numerous reports on the structural and biological diversity of organotin (IV) hydroxamates.

In view of the cumulative enormous biological potential of organotin compounds and hydroxamic acids, in the present work, n-butyltin (IV) complexes of composition [n-$BuSnCl_2(HL^{1\text{-}3})$] (where HL^1=2-$OHC_6H_4CONHO^-$; HL^2=5-Cl,2-$OHC_6H_3CONHO^-$; HL^3=4-$OHC_6H_4CONHO^-$) have been synthesized by the reactions of n-$BuSnCl_3$ with equimolar amounts of potassium 2-hydroxybenzohydroxamate, 5-chlorosalicylhydroxamate and 4-hydroxybenzohydroxamate in benzene + methanol solvent medium. The complexes have been characterized by physicochemical and IR, ^1H and ^{13}C NMR and mass spectral studies. Bonding through carbonyl and hydroxamic oxygen atoms (O,O coordination) and mononuclear nature of complexes has been indicated from spectral studies. The antimicrobial activity of n-$BuSnCl_3$, hydroxamate ligands and complexes has been evaluated against some pathogenic Gram+ve bacteria: *Bacillus thuringiensis*, Gram−ve bacteria: *Escherichia coli* and *Salmonella typhi* and fungi *Aspergillus niger, Aspergillus fumigatus, Byssoclamys fulva* by MIC method. The observed promising antimicrobial activity of complexes over the free ligands may be ascribed to chelation and biological significance associated with organotin compounds and hydroxamate ligands.

CS41

Oxidative functionalization of alkenes by using silica supported transition metal catalysts

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Progress in catalysis is strongly dependent on the development of new catalytic materials. One field in which catalyst development is particularly vital is chemical manufacturing via oxidation of alkenes. The oxidation of olefins is a significant transformation in the manufacture of a large number of fine and pharmaceutical grade chemicals [1-3]. Metal-catalyzed oxidation of olefins can give rise to a whole variety of organic products, for examples aldehydes, ketones, alcohols, epoxides and acids. Besides, olefins can also be converted into aldehydes by the cleavage of C=C double bond using a catalyst [4].
In the present study, the silica supported bimetallic and trimetallic transition metal catalysts with different metal loadings of Cu, Ni and Co have been prepared by using ultrasonic cavitation-impregnation method. All the prepared catalysts were analyzed by SEM-EDX, XRD, BET, ICP, TEM to identify their physical and chemical properties. The heterogeneous catalytic oxidation of styrene, 4-chlorostyrene and cyclohexene were investigated with different metal loadings, oxidizing agents and reaction conditions. The catalysts could be recycled three times without losing their catalytic activity and no metal species leached out from the support.

CS42

Anti-tuberculosis activity of novel N-(benzo[d]thiazol-2-yl)-2-(2-(6-chloroquinolin-4-yl)hydrazinyl)acetamide derivatives:Synthesis, Characterization, *in silico* ADME prediction and molecular docking study

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In an endeavor to find a new class of anti-mycobacterium agents, a novel series of N-(benzo[d]thiazol-2-yl)-2-(2-(6-chloroquinolin-4-yl)hydrazinyl)acetamide derivatives was synthesized by sequencing reaction of 2-aminobenzothiazole with chloroacetylchloride, hydrazine hydrate and 4,7-dichloroquinoline. The novel heterocyclic compounds have been characterized by elemental analysis and various spectroscopic methods like FT-IR, ^{1}H NMR and mass spectra. All the final scaffolds have been screened for their anti-tubercular activity against Mycobacterium tuberculosis H_{37}Rv.On the base of activity result, we have also performed

molecular docking program using computational analysis. Our study reveals that the newly synthesized compounds possess moderate to good Anti-mycobacterium tuberculosis activities. We have also carried out *In silico* ADME prediction of our targeted compounds.

CS43

Effect of anion-doping / cation –anion co-doping on phase transformation and photocatalytic activity of TiO_2

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Titanium dioxide is used in the pigment industry for paints and varnishes, paper, cosmetics, and plastics, TiO_2 is also used in catalysts, ceramics, coated fabrics, and roofing granules. The two most common and vital phases of TiO_2 are anatase and rutile and commercially available titanium dioxide powders are either one of those two phases or a mixture of the two phases. Since the optical and electrical properties of anatase and rutile are different, it is desirable to be able to control the phase content. The anatase to rutile transformation in titanium dioxide is believed to be spontaneous (i.e., the free energy of rutile is lower than that of anatase at all temperatures), but it is kinetically unfavorable at low temperatures. The general theory of the phase transformation is that two Ti-O bonds break in the anatase structure, allowing rearrangement of the Ti-O octahedra, which leads to a smaller volume and the rutile phase. In the present study, influence of impurities on the nucleation and growth of rutile from anatase was studied, such as the addition of acceptor dopants (ions with a lower valence that Ti^{4+}) and use of reducing atmospheres accelerate the anatase-rutile transformation.

CS44

Molecular dockingand one-pot expeditious microwave assisted synthesis of novel 2-Amino pyrimidine derivatives as anti-tuberculosis agents

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A series of novel 2-amino pyrimidine derivatives were designed as anti-tuberculosis agents by molecular docking studies and their synthesis was accomplished via an expeditious one-pot microwave assisted reaction. Structures of the compounds were established by NMR (^1H–^{13}C), IR spectroscopy and mass spectrometry. All the compounds have been screened for their in vitro anti-tuberculosis activity on $H_{37}RV$ strain. Correlation studies of calculated moldock score and

observed percentage inhibition have also been carried out which concluded that the synthesized 2-amino pyrimidine derivatives act as potent anti-tuberculosis agents.

CS45

Microwave-assisted synthesis, molecular docking and anti-tubercular activity of novel N-(benzo[d] thiazol-2-yl)-2-((2,4'-dioxospiro[indoline-3,2'-thiazolidin]-3'-yl)amino)acetamide derivatives

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As part of continuing studies in emerging to find a new class of anti-tubercular agents, we have reported microwave assisted series of N-(benzo[d] thiazol-2-yl)-2-((2,4'-dioxospiro[indoline-3,2'-thiazolidin]-3'-yl)amino)acetamide derivatives was synthesized by sequencing reaction of 2-aminobenzothiazole with chloroacetyl chloride, hydrazine hydrate, isatin and Thioglycolic acid by using Alumino silica as a prompt heterogeneous catalyst. The synthesized compounds have been analyzed by elemental analysis and various spectroscopic methods like FT-IR, ^{1}H NMR and mass spectra. All the final compounds have been screened for their anti-tubercular activity. On the base of activity result, we have also performed molecular docking program using computational analysis. Our study reveals that some compounds displayed promising anti-tubercular activity comparable or less than the standard drugs isoniazid.

CS46

Synthesis of N'-(7-Chloroquinolin-4-yl)-6-Methyl-2-Oxo-4-Phenyl-1,2,3,4-Tetrahydropyrimidine-5-Carbohydrazide Derivatives As Potent Antibacterial Agents

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Some novel N'-(7-chloroquinolin-4-yl)-6-methyl-2-oxo-4-phenyl-1,2,3,4-tetrahydropyrimidine-5-carbohydrazide derivatives were synthesized via three step reactions by convectional method. The structures of all the compounds have been confirmed by FT-IR, NMR, and MASS and by elemental analysis. We have been evaluated it inhibition capacity for various gram positive and gram negative bacterial strain. All compounds were found to be good to excellent active against all four bacterial strains.

CS47

Synthesis and application of $CuFe_2O_4$nanoparticles in organic transformations

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The synthesis and catalytic activity of $CuFe_2O_4$ nanoparticles were carried out. The $CuFe_2O_4$ nanoparticles have been prepared by sonochemical route and silent stirring at room temperature along with co-precipitation method, without using any additive/capping agent. The synthesized magnetic nanoparticles were successfully used and compared for the synthesis of 4H-chromene-3-carbonitrile derivatives. The $CuFe_2O_4$ nanoparticles obtained exhibit higher catalytic activity because of small size (0.5–5 nm), high surface area (214.55 m^2/g), high thermal stability up to 700^oC, recyclability and reusability due to its magnetic characteristics than $CuFe_2O_4$ nanoparticles obtained by room temperature silent stirring. The present method has salient features such as environmentally compatible, efficient, short reaction time, high yield, cheap, moisture insensitive, green and recyclable catalyst which make it sustainable protocol.

CS48

Influence of temperature and salt on clouding behaviour of Tween 20 and Tween 80

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The clouding behaviour of the nonionic surfactant Tween 20 and Tween 80 has been investigated. The cloud point (CP) of nonionic surfactants is very sensitive to external additives and to interactions in these systems. Additives including nonelectrolytes, electrolytes, and ionic surfactants affect the CP drastically and several authors have investigated this phenomenon. The increase in turbidity at CP is ascribed to the increase in micellar aggregates and to the micellar interactions. Current work deals to understand the role of inorganic and organic mixtures on CP of Tween-20 and Tween-80.

CS49

Schiff bases as potential inhibitor for oxidative stress-induced cataract

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Protein aggregation is related to several human physiological disorders. These are mostly age-related pathologies caused by the accumulation of oxidatively damaged proteins, which are formed due to the imbalance of the metal ions concentration. Increased concentration of Cu^{2+} and Zn^{2+} had been found in the cataractous eye lens and that causes oxidative damage of β/γ-crystallins. Three major types of crystallins (α, β and γ) are present in the eye lens and among them β and γ crystallins are the major structural proteins. Aggregation of these proteins leads to increased scattering of light and decreases lens transparency which is commonly known as "cataract". Cataract is the foremost reason for the sight impairment and loss in the world. Surgery is the only treatment for this which causes many other complications and also has high cost. Thus metal ions have become a most promising therapeutic target to prevent oxidative damage and aggregation of β/γ-crystallins. Therefore healthcare concern has raised interest in the development of small molecules that can inhibit cataract formation.
The present study describes the various properties of the Sciff's bases like Cu^{2+} complexation ability by UV-Vis, FTIR and ESI-MS, antioxidant activity and inhibition of Cu^{2+} mediated aggregation of β/γ-crystallins. It has been observed that presence of imine and phenolic -OH make these molecules as potential inhibitor against aggregation of β/γ-crystallins.

CS50

Novel calix[4]arenes based quinazoline derivatives: Click synthesis and biological evaluation

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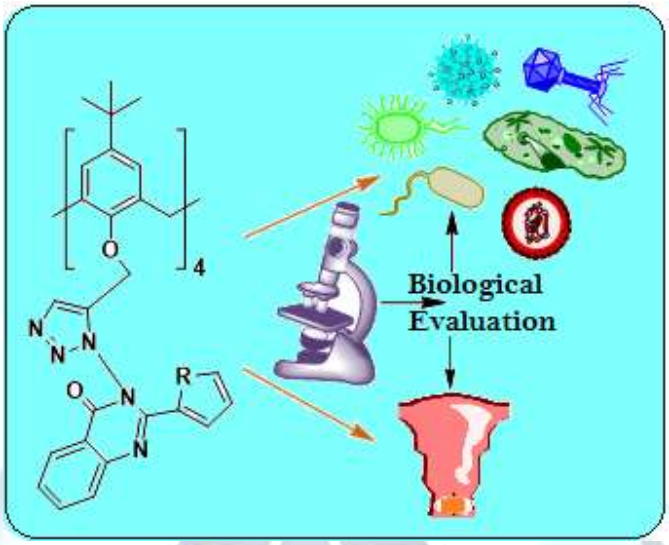
In the present paper, We have synthesized some novel functionalized calix[4]arene based heterocyclic compounds (**1-4**), in which quinazoline derivatives using 'click chemistry' and all the newly synthesized calix[4]arene based quinazoline compounds have been confirmed by various spectroscopic methods like FT-IR, ^{1}NMR, ESI-MS and elemental analysis. All the final synthesized compounds have been subjected to antioxidant activity, in vitro antimicrobial activity screening against gram positive and gram negative bacteria. Also all the synthesized compounds were performed for their anticancer activity against human cervical cancer cell line (HeLa) by MTT assay. Structure activity relationship (SAR) studies enabled the understanding of the pharmacophoric requirement for the in vitro anticancer activity and antimicrobial activity of calix[4]arene based quinazoline derivatives. Some synthesized compounds showed significant

antimicrobial and anticancer activity against bacterial strains and cancer cell lines respectively. The results suggested that this newly synthesized compounds(**1-4**) could serve as the basis for the development of novel anticancer and antimicrobial agents.



CS51

Domino/Knoevenagel-*hetero*-Diels-Alder syntheses of some new angular polycyclic heterocycles in greener environments

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Domino/Knoevenagel-*hetero*-Diels-Alder (DKHDA) syntheses of some new angular polycyclic pyrazole– and pyrimidine–heterocycles have been achieved succesfully, by combining *O*-cinnamyloxy/prenyloxy/geranyloxy-acetophenones. typical ketone–based substrates. with pyrazolone and barbituric/thiobarbituric acids, in ionic liqid, triethyl ammonium acetate (TEAA) used as an effective reaction medium. DKHDA reaction of isoxazolone, on the other hand, led to form another new series of angular isoxazol-based heterocycles with *O*-allyloxy/prenyloxy/propargyloxy– acetophenones, optimized in the presence of ZnO in solvent-free environment at 120 ^{o} C.

CS52

Studies on synthesis of some bio-active heterocycles containing thieno[2,3-*d*]pyrimidine moiety

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Some bio-active benzothiazole and chalcone derivatives containing thieno[2,3-*d*]pyrimidine based heterocycles were synthesized from 2-amino thiophene derivative. All synthesized compounds were evaluated by infrared and nuclear magnetic resonance spectroscopy and also by elemental analysis. All synthesized compounds have been analysed for their antimicrobial activity against gram (+)ve and gram (-)ve bacteria and also on different strains of fungi. Some of the tested compounds showed promising activity.

CS53

Formation and Characterization of Oil-Water Nano–emulsions

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The present work focuses on preparation water–in–oil nano–emulsions which can be used as a fuel in the diesel engines. This would have the advantage of increased surface area. The increased surface area means better combustion characteristic, minimum wastage and a reduced expense of energy to initiate combustion. Also it helps in reduction in the release of pollutants into the atmosphere as the water accompanied with oil would absorb these pollutants. Also due to their very small droplet size the nano–emulsions are most stable amongst various types of emulsions. The formed fuel will be transparent and have low viscosity compared to the other present fuels. In the present work water-in-oil (w/o) nano-emulsions with paraffin as an oil phase and Sorbitanmonooleate (Span 80) / polyoxyethylenesorbitanmonooleate (Tween 80) as emulsifiers have been prepared in two steps by first forming pre–emulsion using magnetic stirring (condensation method) at 25 ℃ and then by using high energy homogenization in the second step. The properties of the nano–emulsions were investigated in detail as a function of homogenization time and homogenization RPM. It was observed that with increase in RPM from 1500 to 2500 RPM the droplet size increased and decreased afterwards for all homogenization times. Stability analyses of the prepared samples with lowest droplet sizes have been carried out. It is found that the droplet size of the samples increased with an increase in time. The instability process of the nano–emulsions versus coalescence and Ostwald ripening has been investigated. It is found that the main instability process in nano–emulsions is Ostwald ripening. Interfacial and

surface tension analysis is also conducted which gave results in the permissible range of nano–emulsions.

CS54

Pyridine and 2-picoline biodegradation in sequencing batch reactor

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Pyridine and 2-picoline are considered to be versatile raw materials in chemical industry. 2-Picoline is the derivative of pyridine. Because of high toxicity, high oxygen demand and low biodegradability, these compounds are considered as primary pollutants in wastewater. Pyridine and 2-picoline have high toxicity and solubility, and they widely exist in the effluents of industries such as textiles, agro-chemicals, pharmaceuticals, rubber chemicals, adhesives, paints, explosives and disinfectants and so on. Sequencing batch reactor (SBR) is a promising alternative among the other biological processes. SBR is time-based treatment process technology as compared to the conventional area-based activated sludge processes.
This work reports studies on the optimization of SBR for the biodegradation of pyridine and 2-picoline. The effect of operating parameters, namely mixed liquor suspended solids concentration (MLSS), initial substrate loading and aeration time were studied for biodegradation of pyridine. The results revealed that the highest pyridine removal efficiency obtained at optimum conditions (200 mg/l of initial pyridine concentration, 3010 mg/l of MLSS concentration) was 95.01%. For the biodegradation of 2-picoline, the effect of sludge retention time (SRT), hydraulic retention time (HRT) have been studied. The results show that the highest 2-picoline removal efficiency obtained at optimum condition of 500 mg/l of initial concentration, 2710 mg/l of MLSS concentration, 16 d SRT and 16.96 h HRT for instantaneous filling was 87.2%. The settling characteristics were measured in terms of SVI and settle ability curve. The physico-chemical characterization of excess sludge wasted was done to evaluate its utilization as a source of energy.

CS55

Role of Azido Esters as Energetic Plasticizers

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Energetic plasticizers are defined as liquid organic compounds having a positive heat of combustion. These plasticizers contribute additional energy and are preferred over nonenergetic

plasticizers and also have enhanced flexibility and elasticity. Energetic plasticizers usually contain functional groups such as nitro, fluoro, nitramino, azido etc along with ester.
Ester group is non-reactive, has better lubricative effect and hence azido ester plasticizers generally have good compatibility with normal energetic binder components used in solid propellants. Also, it has been found that azido ester plasticizers also have low vapour pressure, high boiling point, low viscosity and good processability. Furthermore, the azido group is less smoky and thermally safe. Various novel azido esters synthesized in our laboratory along with their properties and applications will be presented.

CS56

Protoporphyrin IX as electroactive material in Mg(II)-selective potentiometric sensor

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Magnesium is the second most plentiful cation in intracellular fluids and fourth most abundant element in the human body. Most enzyme activities, cell functions, and electrolytes levels are directly or indirectly magnesium dependent. It controls neuronal activity, neuromuscular transmission, cardiac excitability, and blood pressure. Generally 20g of magnesium is contained in an adult human body, about half in bones and other half inside the cells. A low Mg^{2+} activity has been observed in the patients suffering from migraine, and cardiac diseases. On the other hand, its oversupply in severe cases can cause coma and death. Magnesium is present in a number of dietary products e.g. meat, fish, seafood, and dairy products etc. Hard and mineral water also contain magnesium in fairly high quantities. In industries, magnesium is used for the cathodic protection of other metals and for making machine parts moving at high speed. Its lightweight associated with high strength makes it useful in aerospace applications. Therefore, the determination of magnesium in biological, industrial, environmental as well as food samples is very important and needs to be determined frequently.
Sophisticated techniques viz., Atomic Absorption Spectroscopy (AAS), Inductively Coupled Plasma – Atomic Emission Spectroscopy (ICP-AES), Ion Chromatography (IC) etc. are employed now a days to determine the trace amounts of metal ions. However, these methods are disadvantageous in terms of cost and their unsuitability for routine analysis of large number of samples. On the other hand, ion-selective electrodes (ISEs) are ideally suitable for such quantifications, as these devices provide a handy, convenient, cheap, fast, and on-line method of analysis. Porphyrins bind with metal ions selectively as these have electron rich interior cavities and possess the ability to complex through dipole-dipole interactions with metal ions of compatible dimensions. Therefore, these are fascinating objects for the study of host guest interactions.
A novel poly(vinyl chloride) based membrane containing protoporphyrin IX (I) as an electroactive material along with sodiumtetraphenylborate (NaTPB), and nitrophenyl octyl ether in the ratio 10:100:1:150 (I:NPOE:NaTPB:PVC) (w/w) was used to fabricate a Mg(II)-selective sensor. The developed sensor exhibits a wide working concentration range of $9.8x10^{-6}$-$1.0x10^{-}$

^{1}M, with a Nernstian slope of 30.0+1.0 mV/decade of activity and the response time of 15s. This sensor shows the detection limit of $8.0x10^{-6}$M. Its potential response remains unaffected of pH in the range 4.0-8.4, and the cell assembly can be successfully used in partially non-aqueous medium (up to 10% v/v) without any significant change in the slope or working concentration range. The sensor has a lifetime of about 8 weeks and exhibits excellent selectivity over a number of mono-, bi-, and tri-valent cations including alkali, alkaline earth metal, heavy and transition metal ions. It has also been used as an indicator electrode in the potentiometric titration of Mg(II) with EDTA as well as for the determination of magnesium ion concentration in real samples.

CS57

Enhancement of Biohydrogen Production from waste of *Benincasa hispida* using microwave pretreatment process at optimum power

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Hydrogen was produced successfully from the solid waste generated during processing of sweet produced from *Benincasa hispida* using enriched mixed microbial culture. Solid waste was first characterized and chemical oxygen demand was found to be 3000mg/L. The microbial culture was pretreated for enhanced biohydrogen production using microwave irradiation having power of 320 W with a frequency of 2450 MHz (Singhal and Singh, 2014). Pretreatment was done for different time intervals (1, 3, 5, 7 and 9 min) to optimize the pretreatment conditions. In present study pretreated reactors were compared with a normal or untreated reactor. Maximum hydrogen production was observed when inoculum was pretreated for 7 min (76.4% of total gas produced).

CS58

Effect of different microbial culture on biohydrogen production from *Benincasa hispida* Waste

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Biohydrogen production has gained attention in recent years using anaerobic degradation method. In the present study, *Benincasa hispida* (petha) solid waste generated from industries were used as substrate. Three different inoculum namely, cow dung (CD), goat dung (GD) and pretreated soil (SP) were used as a bacterial source. They were used separately and also in combination of

two cultures in equal ratio. The cultures then mixed with the petha waste slurry in 20:80 in batch reactor of 5000mL with a working volume of 400mL in anaerobic conditions. Substrate used in the present study has chemical oxygen demand and glucose concentration of 3150mg/L and 11mg/L respectively. Biohydrogen was detected in all the reactors and it was found maximum in GD, CD and GD+CD was used as the bacterial inoculum and has percentage production of 81.9, 52 and 87 respectively. Acetic acid was also estimated and a maximum concentration of 2650 ppm was found in the reactor operated using GD as bacterial source. Degradation in various parameters was also studied in terms of COD, glucose.

CS59

Solar photocatalytic degradation of ampicillin antibiotic utilizing bentonite supported $ZnFe_2O_4$

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Abstract
In this study photocatalytic activity of bentonite supported $ZnFe_2O_4$($ZnFe_2O_4$/BT) was tested to degrade ampicillin antibiotic(AMP).$ZnFe_2O_4$/BT was synthesized using hydrothermal method. $ZnFe_2O_4$/BT wasascertained using scanning electron microscope (SEM), tunneling electron microscopy (TEM), X-ray diffraction (XRD), energy dispersive X-ray spectroscopy (EDX) and Fourier transform infrared spectroscopy (FTIR) spectral techniques.$ZnFe_2O_4$/BT exhibited polymeric chain structure with average size of 60 nm.Ampicillin degradation experiments were executed under solar light. Both H_2O_2 and $ZnFe_2O_4$/BT had synergistic effect on ampicillin removal. The simultaneous adsorption and photo catalysis (A+P) was most efficient process for antibiotic degradation. The photocatalytic degradation of AMP obeyed pseudo first kinetics. The effect of process parameters catalyst loading, H_2O_2 concentration, pH and AMP concentration was investigated on AMP degradation. $ZnFe_2O_4$/BT displayed significant recycle efficiency due to easier separation and stability in reaction solution. Solar/H_2O_2/ $ZnFe_2O_4$/BT had excellentphotocatalyticactivityfor AMP degradation from aqueous solution.

Keywords: $ZnFe_2O_4$; bentonite; nanocomposites;photo catalysis; ampicillin degradation

Section B: Physical Sciences

PS01

Impedance Spectroscopy study of $CoFe_2O_4$ - $Pb_{0.7}Ca_{0.3}TiO_3$ Composite

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In the present work, $(x)CoFe_2O_4 – (1-x)Pb_{0.7}Ca_{0.3}TiO_3$ multiferroic magnetoelectric composites with x = 0.2 and 0.8 has been prepared by metallo-organic decomposition (MOD) chemical method. The structural, microstructural, and dielectric properties of the composite were investigated. The X-ray diffraction pattern shows the formation of mixed phase of cubic spinel and tetragonal pervoskite structure without any impurity phase. Scanning electron microscope (SEM) images also shows the coexistence of both phases in the composite. The dielectric properties for the composite have been measured as a function of frequency and temperature. The complex impedance spectroscopic analysis provides more insights in to the dielectric and electrical properties of the materials. The impedance studies show the presence of grain and grain boundary effects and existence of a negative temperature coefficient of resistance (NTCR) the CFO-PCT particulate composite.

PS02

Effect of Annealing Temperature on Electrical and Dielectric Properties of Co- doped SnO2

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Annealing temperature plays a crucial role in the surface morphology and properties of Co doped SnO_2. In this paper, we present a systematic investigation of the effect of annealing temperature on the electrical and dielectric properties of Co doped SnO_2. $Sn1\text{-}xCoxO_2$ samples have been chemically synthesized with low Co concentration (≤ 1%). The X-ray diffraction (XRD), and scanning electron microscopy (SEM), are used to characterize these samples. The XRD pattern shows the tetragonal rutile structure. The annealing temperature is found to play crucial role in tuning the structural, electrical and dielectric properties of the Co doped SnO_2. The electrical behaviour of the prepared samples has been studied by measuring the *I-V* characteristics at different annealing temperature. The dielectric properties of these samples have been studied at frequency range of 1 KHz – 10 MHz for different annealing temperatures. The dielectric behaviour shows that the value of dielectric constant (εr) decreases rapidly in the lower frequency region, whereas it depicts a slight dispersion in the middle and higher frequency range. The *ac* conductivity shows a linear dependence with frequency.

PS03

Structural & electrical properties of $Zn_{50}Se_{50}$ material irradiated by slow neutrons

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The variation of structural and electrical properties of $Zn_{50}Se_{50}$, before and after irradiation, prepared by slow cooling of melt in the temperature range from room temperature to 180^{o}C has been studied. The irradiation facility was 241Am-Be (Radio Chemical Corporation, Amersham, England) neutron source with flux density 5.89x 108 n/cm2sec. The pellets (thickness 1 mm and diameter 12 mm) of Zinc Selenide were irradiated by placing it at a distance 5 cm form the source. Pellets were irradiated for 24 hrs. Measurements were carried out after 24 h of removal of the pellets from the radiation source to see the effect of radiation on above mentioned studies. Prepared samples were then characterized in terms of their crystal structures and lattice parameter using X-ray diffraction method. The materials were found to be polycrystalline in nature. The electrical conductivity of the samples with voltage from room temperature to 180^{o}C has been determined by I-V characteristics of the samples. The variation in electrical conductivity is explained on the basis of grain boundary barrier potential with temperature.

PS04

An investigation on the tribological performance of Cu nanoparticles as additives in commercially formulated lubricants

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The efficacy of Cu nanoparticles as lubricant additives has been investigated in present article. The Cu nano particles were functionalized and blended in two different commercially formulated SAE 20W-50 lubricants. The nano particles were blended in concentrations of 0.1%, 0.15% and 0.2% by weight into the lubricant. The lubricants with and without nano-particles were tested for their physico-chemical properties using standard ASTM and BIS procedures. The tribological performance of the lubricants was evaluated on four ball tribo-tester under uni-directional sliding. Significant reduction in friction and wear has been observed on blending of nano copper particles with formulated lubricants. However, there had been difference in the performance of

the two formulated oils due to their inherent chemistry. The SEM and EDX analysis revealed the formation of boundary films by Cu which in turn enhanced the tribological performance. Significant reduction in friction and wear to the tune of 16% and 13% respectively have been observed by blending merely 0.2wt% of Cu nano-particles. The surface topography of the worn out surfaces of test specimens lubricated with nanoparticle blended lubricants revealed smooth sliding wear against the severe wear by the specimens lubricated with formulated lubricants. The study revealed the capabilities of Cu nano particles in enhancing the tribological performance of formulated lubricants.

PS05

Phenomenological Analysis of Hadronic Regge Trajectories

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We have analyzed the spectrum of hadrons by the data available through the Particle Data Group 2014 listings with the aim of pinpointing trajectories with which hadronic resonances can be associated. It was recognized that the entire range of Regge trajectories (RTs) for hadrons are not straight and parallel lines. Out of total 55 plotted trajectories, 64% are essentially non-linear, 27% are essentially linear, while 9% are fairly linear. We have also extricated parameters like slopes, string tension and variance of these RTs. These parameters convey intrinsic information about the hadron interiors.

PS06

Dynamic Light Scattering Study on Jatropha Latex

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Dynamic light scattering (DLS), or Quasi-Elastic Light Scattering (QELS), is an-established technique for measuring the size and size distribution of molecules and particles typically in the submicron region. The powerful technique can characterize Molecular size, size distribution, Particle size, Molecular weight, and Zeta potential. In this work DLS study was carried out on Jatropha Latex. Jatropha latex is an exuant from a multipurpose plant *Jatropha curcas*, spreading over the globe. Jatropha latex is a colloidal suspension- like liquid with high pH value exhibiting ionic liquid behavior. It is polymeric in nature and is secreted from laticifer cells of the plant. The electro-active nature of the dry Jatropha latex is like that of a supercooled ionic liquid. Jatropha Latex may be used, as part of a low-cost, green synthesis technique, to develop nano-

particles of metallic compound. Since size of colloidal particles plays important role in green synthesis this work takes care of the particle size and its distribution in the suspension at various dilution by DLS study. The MALVERN DLS set up was used for the mentioned analysis. The variation of particle size distribution was thus analyzed and compared with that from optical absorption data from optical spectroscopy. The analysis has been carried out by Shimadzu UV-VIS spectrometer model 2425. The overall results obtained are found to be consistent and good.

PS07

Analysis of Mesonic Regge Trajectories for strengthening the concept of 70 MeV Mass Quanta

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Taking all hadron masses in multiple of 70 MeV, linearly rising Regge Trajectories are obtained. We have further analysed the Mesonic Regge Trajectories in accordance with Barut's Model. The analysis supports the concept of Quantized Mass wherein the 70 MeV mass quanta is proposed to be the ultimate Hadronic building block. The cause of small variation in masses has been well explained.

PS08

Influence of $(Ba_{0.96}La_{0.04})\ Ti_{0.815}Mn_{0.0025}Nb_{0.0025}Zr_{0.18}O_3$ ceramic on the structural and electrical properties of $(K_{0.5}Na_{0.5})_{0.90}Li_{0.1}NbO_3$ ceramic system by using Impedance Spectroscopy

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Polycrystalline samples of $((K_{0.5}Na_{0.5})_{0.90}Li_{0.1}NbO_3)_{1-x}((Ba_{0.96}La_{0.04})Ti_{0.815}Mn_{0.0025}Nb_{0.0025}Zr_{0.18}O_3)_x$ ceramics (where x = 0.5, 0.7 and 0.9) (referred as BLTMNZ doped KNLN) were prepared by using a high temperature solid state reaction technique. The XRD patterns of the BLTMNZ doped KNLN at room temperature with x = 0.7 have pure perovskite phase with tetragonal structure at room temperature and have maximum value of dielectric constant at x = 0.9. Detailed studies of dielectric and impedance properties of the materials in a wide range of frequency (100Hz–1MHz) and temperatures (30 – 500 ^{0}C) showed that properties are strongly temperature and frequency dependent. The plots of Z″ and M″ versus frequency at various temperatures show peaks in the higher temperature range (>300 ^{0}C). The compounds show dielectric relaxation, which is found to be of non-Debye type and the relaxation frequency

shifted to higher side with increase in temperature. The Nyquist plot and conductivity studies showed the NTCR character of samples.

PS09

Structural Characterization and Optical Properties of a-Se-Sn-Ge-Sb Thin Film System

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The variation in the optical properties with the addition of Sb by replacing Ge in Se-Sn-Ge-Sb glassy alloy systems has been studied by analyzing the transmittance and reflectance spectra in the spectral region 500-2000nm. Thin films of glassy alloys has been prepared by using thermal evaporation technique at a vacuum of 10^{-5}mbar. The amorphous nature of thin films has been checked by using X-ray diffraction technique. The refractive indices have been calculated by using Swanepole method. The effect of compositional variation and thickness on the optical constants has been taken into account in the present work. Material possesses the high values of refractive indices and low values of optical gap. These properties make material applicable for photonic applications such as for fiber and infrared optics, telecommunication devices, non-linear optical devices, multiplexers and in waveguides etc.

PS10

Structural and magnetic properties of ferrite-ferroelectric composites synthesized by solid state reaction method

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Composite materials containing piezoelectric (ferroelectric) and piezomagnetic (ferrite) phases exhibit magnetoelectric effect (ME). These composites have ME property which is absent in their constituent phases. The ME effect couples two field effects: (1) magnetization due to application of electric field and (2) electric polarization due to the application of magnetic field. The magnetoelectric effect is due to the mechanical coupling between piezomagnetic (ferrite) and piezoelectric (ferroelectric) phases. In order to obtain a better ME effect the two phases for composite must have high value of piezoelectric coefficient (ferroelectric) and piezomagnetic coefficient (ferrite).
In the present research work, we study the structural and magnetic properties of the ferrite - ferroelectric phases with 1-x ($BaZr_{0.15}Ti_{0.85}O_3$)-x ($NiFe_2O_4$) (where x = 0.03, 0.05, 0.07, 0.10 and 0.20) are synthesized by the solid state reaction method. The X-ray diffraction pattern of the ceramics reveals a spinel phase

formation and perovskite phase formation. The preparation method and properties of composite materials containing barium zirconium titanate (BZT) as a ferroelectric phase and nickel ferrite (NF) as a magnetic phase are presented in this work. Magnetic study is done by vibrating sample magnetometer (VSM) techniques and significant change in the magnetic properties was observed in 1-x ($BaZr_{0.15}Ti_{0.85}O_3$)-x ($NiFe_2O_4$) system. It is seen that remnant magnetization (M_r) increased with increasing concentration from x=0.03 to x=0.2. The sample 0.80 ($BaZr_{0.15}Ti_{0.85}O_3$)-0.20 ($ZnFe_2O_4$) has a maximum value of magnetization i.e 29.25 emu/g at room temperature.

PS11

Study of phase transitions phenomena in some Ferroelectrics and Antiferroelectrics

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Phase transitions are fascinating phenomena occurring in nature. Below certain temperature, spontaneous polarization occurs in ferroelectric crystals. In antiferroelectric crystals, below certain temperature alternate crystal planes are polarized in opposite directions. Tryglycine sulphate, Cesium dihydrogen phosphane and Stannous chloride dihydrate crystals show phase transitions at 49^{o}C, 119^{o}C and -57^{o}C respectively. Prasolov et al[1] have done dielectricstudy of TGS crystal. Nakamoto et al[2] have done dielectric measurement study of CsH_2PO_4 crystal. Mognaschi[3] has done dielectric study of $SnCl_2.2H_2O$ crystal. Chaudhuri et al[4], Ganguli et al[5] and Benerjee et al[6] have done theoretical study on TGS, CsH_2PO_4 and $SnCl_2.2H_2O$ crystals respectively. They have not considered third-order phonon anharmonic term and decoupled correlations at early stage. In the present work, we consider the two-sublattice coupled mode model with third- and forth-order phonon anharmonic terms. By using double-time thermal Green's function method[7], expressions for normal mode frequency, dielectric constant and loss tangent are obtained. By fitting model values in the expressions, thermal variations of above quantities are obtained. Theoretical results are compared with experimental results of other experimentalists. A good agreement is obtained.

PS12

Investigation of the effect of Carbon nanotubes reinforcement on the energy release during thermite reaction

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Nano thermites consist of a metal as fuel and a metal oxide as an oxidizer, with particle size in nanometre range. The contact between the fuel and oxidizer is intimate in case of nanoparticles

instead of micro particles. The increase in specific surface area at nanoscale allows more reaction locations and enhances heat transfer rate thereby increasing the heat of reaction or the energy release rate compared to the conventional microscale energetic materials.
Nano size of the particles tends to decrease the mass transport whereas the agglomeration of the nanoparticles increases the mass transport thereby affecting the rate of energy release. The agglomeration and re-agglomeration of the particles can be minimised by incorporating carbon nanotubes using suitable synthesis technique. In the present study the carbon nanotube (CNT) added Al based thermite systems synthesized by the physical mixing method having very high CNT weight content. The structure of the nanothermite is analyzed using XRD, SEM, Raman and TEM characterization techniques. The role of CNT in minimizing the re-agglomeration of nanoparticles of the nanothermite constituents is authenticated by the structural studies.
Differential scanning calorimetry is performed for the synthesized samples to observe the effect of CNT addition on the enthalpy of exothermic thermite reaction. The heat of thermite reaction is found to increase with the CNT weight percent in the nanothermite samples.

PS13

Investigation of AC Hall Effect on Biomaterial and DMD Systems

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The method Hall effect is a popular one to extract the carrier information in solid, e.g. carrier type, carrier concentration, mobility. The DC Hall effect method is very much successful for measurements on materials with low and moderate electrical resistivity. DC Hall effect method found to be unsuitable for high resistive materials with low carrier mobility. The appearance of thermal electric voltage (V_T) and offset or misalignment voltage (Vo) DC Hall measurement, on the mentioned type materials e.g biopolymers, other organic and oxide type dielectrics, found to be difficult. AC Hall effect is found to be effective and can remove the difficulties of DC Hall effect for the mentioned material. In this work AC Hall effect was investigated on biopolymeric and dilute magnetic dielectric (DMD) specimens. In the developed set up the applied electric field was chosen as AC and magnetic field as DC. The use of DC magnetic field prevents occurrence of the time derivative of the magnetic field in Hall voltage (V_H). The overall instrumentation is adequate enough to take up the AC measurement. The entire setup is standardized using a germanium specimen. The biopolymeric specimen (gum Arabica) and Gadolinium-Nickel sulphide as DMD specimen has electrical resistivity ~ 10^5 ohm-cm. The measured Hall voltage V_H for specimens was found between 5-10 μV r.m.s at precision about 10%. The estimated Hall co-efficient (R_H) of the specimens was found to be ~ 10^{-7} Volt.cm/amp/Gauss. The results on DMD specimen exhibit some special features depending on the frequency of the impressed AC field.

PS14

Ferroelectric and dielectric properties of some order-disorder ferroelectric crystals

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Ferroelectric crystals find potential applications in technology such as memory devices, laser materials, capacitors, pyroelectric detectors, modulators etc. $PbHAsO_4$, TGSe, MASD alum, AFeSD alum are ferroelectric below 313K, 395K, 177K and 88K respectively. Batra et al. have done pyroelectric electric study on TGSe crystal. Sachdeva et al. have done experimentally crystal growth studies on MASD and AFeSD alums. Nakamoto et al. have done X-ray diffraction in $PbHAsO_4$ crystal. Chaudhuri et al. and chaudhury et al. have done theoretical studies on $PbHAsO_4$, TGSe and alums respectively. They have not considered third-order phonon anharmonic interaction term and have not done decoupling at proper stage.
In the present work, we consider two sublattice pseudospin and simple pseudospin models with third and fourth order phonon anharmonic terms for these crystals. By using double-time thermal Green's function method, theoretically expressions for normal mode frequency, dielectric constant and loss tangent are obtained. By fitting model values of physical quantities is above expressions their thermal variations are calculated for these crystals. Theoretical results are compared with experimental results of other experimentalists. A good agreement is found.

PS15

Dielectric Properties of Order-Disorder Ferroelectric Crystals

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Order-disorder ferroelectrics form large group of crystals having hydrogen bond. In these ordering of active atoms in one of the several equilibrium positions takes place below transition point. Crystals of $PbHPO_4$, $PbHAsO_4$ and Rochelle salt are ferroelectric below 310K, 255-297K and 435K respectively. Lockwood et al[1] have done Raman spectroscopic study on $PbHPO_4$ crystal. Ohno et al[2] have done Raman spectroscopic study on $PbHAsO_4$ crystal. Mlyshkina and Gavrilova[3] have measured dielectric constant of Rochelle salt crystal. Chaudhuri et al[4] and Ganguli et al[5] have done theoretical study on $PbHPO_4$, $PbHAsO_4$ and Rochelle salt crystals respectively. They have not considered third- and fourth-order phonon anharmonic terms and decoupled the correlations at very early stage. In the present work, we consider two-sublattice-lattice coupled mode model with third- and fourth-order phonon anharmonic interactions terms for $PbHPO_4$, $PbHAsO_4$ and Rochelle salt crystals. With the help of double-time thermal Green's

function method[6], we derive expressions for ferroelectric mode frequency, dielectric constant and loss tangent. By fitting model values of physical quantities, thermal variations of above quantities ($\hat{\Omega}$, $\in$, tanδ) are calculated and compared with experimental data of other experimentalists. These show a good agreement.

PS16

Model Independent Search for Sterile Component in the Solar Neutrino Flux

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After a journey of about four decades we are standing on a square where we have in hand a leading solution of the Solar Neutrino Problem (SNP). The mystery of the missing neutrinos deepened as subsequent experiments were performed. The energy spectrum of solar neutrinos, as predicted by standard solar models, is seen by different experiments as they are sensitive to different neutrino energy ranges. More than 98% of the calculated standard model solar neutrino flux lies below 1MeV. The rare ^{8}B neutrino flux is the high energy tail of solar neutrinos for which statistically significant measurements have been made so far, but this is just tip of an iceberg. As such, the study of low energy neutrinos can give us better understanding and the possibility to know about the presence of antineutrinos and sterile neutrinos components in solar neutrino flux. In the light of latest data available from various solar neutrino experiments including Borexino and KamLAND Solar phase, we derive in a model independent way, bounds on the sterile neutrino component present in the solar neutrino flux. We update the limits on the sterile (ν_s) component and compare them with the previous results obtained using SNO Salt phase data and data from SuperKamiokande experiments. We retrieve the upper bounds existing in the literature. We also obtain bounds on f_B, the SSM normalization factor, and update the common parameter space for f_B and the ν_s component in solar neutrinos.

PS17

Graphene Modified Lithium Iron Phosphate Composites for Lithium Ion Batteries

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Graphene modified lithium iron phosphate composites have been developed as a Lithium ion battery cathode material. For the preparation of graphene oxide-coated LFP composites, sol-gel

method is used. Ferric citrate was dissolved in water and then stirred for 2h at 60 ^{0}C. In another bottle phosphoric acid and lithium phosphate was dissolved in water and then stirred as above. The mixtures in both bottles were mixed together and stirred at 60 ^{0}C for half hour. In this solution, graphene oxide in varying amount (0.25, 0.50, 1, 2 and 5%) was dispersed. After drying and grounding the xerogel was fired in an argon atmosphere. These composites were structurally characterized using X-ray diffraction and thermogravimetric analysis. The Fourier Transform infrared spectra in the range of 150 cm^{-1} to 4000 cm^{-1} were obtained using an excitation wavelength. The final crystallographic structure of LFP does not change with addition of graphene oxide during synthesis. The thermal stability of the samples was high. The band spectra in FTIR spectroscopy does not affect by the addition of graphene oxide.

PS18

Ferroelectric properties of Hydrogen Bonded crystals

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Hydrogen bond is a special chemical bond in which a hydrogen atom H is located between two electrom-magnetic atoms (or ions). Hydrogen has two equivalent positions and it tunnels in anyone of them. All such protons order in one situation (ferroelectric state) which disorder above transition point. Hydrogen bonded crystals RbH_2PO_4, KH_2AsO_4, RbH_2AsO_4 and CsH_2AsO_4 are ferroelectric below 249K, 163K, 176K and 223K repectively. Ferroelectric crystals find potential applications in modern technology such as memory devices, pyroelectric detector, capacitors, modulators, display devices, laser materials etc. Li and Tang[1] have done dielectric measurements on RbH_2PO_4 crystal. Tarijano et al[2] have done ferroelectric study on RbH_2AsO_4 crystal. Ichikawa et al[3] have done X-ray diffraction study on KH_2AsO_4 crystal. Gridnev and Kravchenko[4] have done ferroelectric study of CsH_2AsO_4 crystal. Ganguli et al[5] have done theoretical study on these crystals but they have not considered third-order anharmonic term and decoupled correlations at very early stage.

In the present paper, the pseudospin-lattice coupled mode model with third and fourth order phonon anharmonic interactions terms and four spin coupling term is used. The double-time thermal Green's function method of statistical mechanics, expressions for normal mode frequency, dielectric constant, transition temperature and loss tangent have been derived. By fitting model values of physical quantities, thermal variation of normal mode frequency, dielectric constant and loss tangent have been calculated. Theoretical results are compared with experimental results of other experimentalists. These show good agreement.

PS19

Synthesis and structural analysis of Co doped Ni-Zn ferrite

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The present paper investigates synthesis and structural properties of Ni-Zn ferrite and Co doped Ni-Zn ferrite nanoparticles. Ni-Zn ferrite and Co doped Ni-Zn ferrite nanoparticles ($Ni_{0.6-x}Zn_{0.4}Co_xFe_2O_4$) (x = 0, 0.011 and 0.022) were synthesized by sol gel method and annealed at 1100^oC. All prepared ferrite nanoparticles were characterized by X-ray diffraction for phase identification, measurement of crystallite size and other structural parameters. Single phase spinel structure of all prepared samples was examined by X-ray diffraction. The crystallite size first decrease and then increases with Co doping. The variation in crystallite size and other structural parameters has been explained on the basis of Co doping and Co^{2+} ions distribution on tetrahedral and octahedral sites of spinel system.

PS20

Study of structural and anti-cancer properties of ZnO nanoparticles prepared by hydrothermal method

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Zinc oxide nanoparticles have fascinated meticulous research interest because of its significant applications in the field of medicine, pigment electronics, spintronics and piezoelectricity. These stable, OH free zinc oxide (ZnO) nanoparticles were synthesized by hydrothermal method. The formation of ZnO nanoparticles were confirmed by x-ray diffraction (XRD), transmission electron microscopy (TEM), Scanning Electron Microscope (SEM), Energy Dispersive X-Ray analysis (EDX), Ultra-Violet spectroscopy (UV), and Fourier Transform Infrared Spectroscopy (FT-IR) entrenched that the formed nanoparticles are zinc oxide nanoparticles. We have also checked the anticancer properties of these ZnO nanoparticles.

PS21

Dielectric behaviour of some ferroelectric and antiferroelectric crystals

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Ferroelectric crystals have got promising applications in technology, e.g. large capacitors, memory devices, laser materials and transducers etc. Triglycine selenate, triglycine fluoberyllate and diglycine nitrate crystals are ferroelectric below 22^{o}C, 70^{o}C and 67^{o}C respectively. Vorobyer et al[1] have done dielectric study on TGSe crystal. Loiacono et al[2] have done electrical properties studies on TGFBe crystal. Miga et al[3] have done susceptibility and polarization studies on DGN crystal. Squaric acid crystal is antiferroelectric below 371K. Maier et al[4] have done dielectric study on SQA crystal. Chaudhuri et al[5] and Li and Qin[6] have done theoretical studies on (TGSe/TGFBe/DGN) and SQA crystal respectively. These authors have not considered third order anharmonic term and not done decoupling at proper stage.
In the present paper, we consider two sublattice pseudospin lattice coupled mode model with third and fourth order phonon anharmonic interactions terms for these crystals. By using double-time thermal Green's function method[7] expressions for normal mode frequency, dielectric constant and loss tangent are obtained for these crystals. By fitting model values of physical quantities in expressions, thermal variations of above quantities are obtained. Theoretical results are compared with experimental results of other experimentalists. Good agreements are found.

PS22

Study of ferroelectric phase transitions in some crystals

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Ferroelectric materials show spontaneous electric polarization which is reversible by stress or electric field. These materials are highly useful in today's technology, for example capacitors, memory devices, pyroelectric detector, display devices, laser materials, transducers etc. Crystals of KH_2PO_4, MASD alum, AFeSD alum and CsH_2PO_4 are ferroelectric below 123K, 177K, 88K and 154K respectively. Chai et al[1] have done Raman spectroscopic study on KH_2PO_4 crystal. Weber[2] has done dielectric study on MASD and AFeSD alums. Schule and Schmidt[3] have done NMR study on CsH_2PO_4 crystal. Ganguli et al[4] and Choudhury et al[5] have done theoretical studies on these crystals respectively. They have not considered third order phonon anharmonic interaction term. They have not made decoupling at proper stage of correlations.
In the present work we consider pseudospin lattice coupled mode model with third and fourth order phonon terms. By using Green's function method[6], expressions for normal mode frequency, dielectric constant and loss tangent are derived for these crystals. By fitting model values in expressions, thermal variations of above quantities are obtained.

Theoretical variations are compared with experimental results of other workers. A good agreement is found.

PS23

Electronic Band Structure and Optical Properties of ZnO and ZnS Using Density Functional Theory

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Electronic band structure and optical properties of zinc oxide and zinc sulphide were studied using the ab initio density functional method within the local-density approximation LDA and GGA, generalized-gradient approximation approaches. Calculations of the optical spectra have been performed with and without including spin-orbit coupling. Reflectivity, absorption and extinction coefficients, and refractive index have been computed from the imaginary part of the dielectric function using the Kramers-Kronig transformations for both ZnO and ZnS. Calculated and experimentally determined band-gap values for ZnO and ZnS have been compared and found in good agreement.

PS24

Shorting post loaded armsa using multi-layer dielectric substrate

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Microstrip antennas are those components which play a critical role in the wireless communication nowadays. In this paper, an annular ring microstrip antenna using multilayer substrate is designed and further loaded with the symmetric shorting post. The permittivity of the each layer of dielectric substrate is different to achieve wide bandwidth and limited antenna size. The hard form is used as middle layer of dielectric substrate to achieve wide bandwidth. Thereafter this multilayer dielectric substrate antenna is loaded with the symmetric shorting post to get dual frequency. The dielectric constant of the upper layer substrate should be high to reduce the radiation losses from feed line.

PS25

A comprehensive study of in-complete fusion reaction dynamics at low energies

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The evidence of in-complete fusion reactions was found from initial experiments on different projectile-target combinations at energies ≥10 MeV/n. In order to explain these reactions it is assumed that the projectile breaks-up into fragments as it comes near the field of the target nucleus, one of the fragments fuses with the target forming in-completely fused composite system, while remnant goes on moving in the forward cone. Recently, it has been observed that ICF is a dominant mode of reaction even at energies as low as ≈ 5 MeV/n. It is now well established experimentally that both the complete and ICF processes are the dominating and competing modes of reaction at these energies. Though, several models have been proposed to explain the ICF reaction dynamics, however, none of these models is able to explain the data satisfactorily at low energies. For the better understanding of ICF reaction dynamics, several projectile target interactions have been studied where, excitation functions and recoil range distributions for a large number of reaction products have been measured. The measured EFs have been compared with the calculations done by theoretical model code based on available CF model. The measured cross-sections for xn and pxn channels are found to be satisfactorily reproduced with the theoretical calculations done using code with suitable set of parameters. However, in case of α-emitting channels, measured cross-sections were found to be significantly enhanced over their theoretical predictions. The enhancement in the measured cross-sections over the model based calculations has been assigned to the contribution from ICF. Further details will be presented.

PS26

Bond formation modifies the DC conductivity in ternary chalcogenide glasses

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The presented paper aims at the study of DC conductivity of ternary chalcogenide glasses. The series of the desired composition has been prepared by the addition of Pb, as third element, to the Se-Te base binary matrix. The rapid cooling of melt has been used to prepare the glassy series. The absence of sharp peaks in the as prepared glass confirms the amorphous nature of glass. The Keithley electrometer 6517A has been used in FVMI mode to record the I-V characteristics of bulk samples under test in a temperature range from room to 100°C. The conductivity has been derived from these curves. In addition to this, an effort has also been made to verify the Poole-

Frenkel conduction mechanism in these glasses. The impurity/dopant generated traps are involved in Poole-Frenkel conduction. The obtained results have been supported by the band gap studies of these glasses elsewhere, and confirm the semi-conductor nature of these glasses, which is a well-established fact. The variation in conductivity has been accounted for the bond formation among the constituent elements of the said series/sample. This has been an effort in order to understand the Physics of these glasses.

PS27

Upconversion and temperature sensing study of Er^{3+}-Yb^{3+} codoped La_2CaZnO_5 phosphor

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In this paper, a series of Er^{3+}/Yb^{3+} codoped La_2CaZnO_5 (LCZ) upconversion (UC) phosphors were synthesized by a solid state reaction method. The structural and upconversion properties of the synthesized phosphors were studied in detail. The Rietveld refinement of the X-ray diffraction patterns revealed that all the samples were of pure hexagonal phase. Under 980 nm laser excitation, the codoped samples showed white upconversion emission that consisted of three well-known emission bands cantered at 525, 550 and 650 nm generated from the $^2H_{11/2}\rightarrow{}^4I_{15/2}$, $^4S_{3/2}\rightarrow{}^4I_{15/2}$ and $^4F_{9/2}\rightarrow{}^4I_{15/2}$ transitions of Er^{3+} ions, respectively. The emission intensities of these bands have been enhanced sufficiently on codoping of Yb^{3+} ions in the LCZ: Er3+ system. An attempt has been made to explain the enhancement on the basis of a power dependence study and an energy level structure. The luminescence lifetime of the green emission of the LCZ samples with a codoping ratio Er:Yb as 2:0, 2:10 and 2:20 were also recorded. The temperature sensing performance of the prepared phosphors was studied by using a fluorescence intensity ratio technique up to very high temperatures. A relatively high temperature (up to 680K) sensor with a good sensitivity (28.72×10^{-4} K^{-1}) as found from the observed results. These results indicate that Er^{3+}/Yb^{3+} codoped LCZ material is an effective UC phosphor and may be a potential candidate for high-temperature sensors.

PS28

Cabibbo-favoured weak decays of D → PA mesons

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In this work, we have investigated the nonfactorization contributions to weak hadronic decays of charm mesons in Cabibbo favoured D → PA modes. Since the nonfactorizable contributions,

being non-perturbative, are difficult to calculate from the first principles, we use the isospin formalism for their calculation. Obtaining the contributions from spectator-quark diagrams for N_c=3, we determine nonfactorizable isospin 1/2 and 3/2 amplitudes, required to explain the data for these modes. We observe that ratio of these amplitudes follow a universal value.
Weak hadronic decays experience a large interference due to the strong interactions and pose serious problems for theory. Though qualitative explanation can be obtained for these decays, discrepancies between theory and experiment indicate the need of additional physics. It has been established that the nonfactorizble contributions play a significant role in the weak hadronic decays. We observe that not only the nonfactorizable isospin amplitudes $A^{nf}{}_{1/2}$ have the same sign for the modes considered, but they also bear the same ratio with $A^{nf}{}_{3/2}$ in the respective channels.

PS29

Rare-earth Ions Doped Upconversion Nano-phosphors: Preparation and Their Newer Applications

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Rare earth (RE) ions doped phosphors have vast applications in optical devices and hence research on RE doped phosphors has attracted much attention. Advent of Nano-science has further pushed the research on RE luminescence and now it is prone that nanomaterials possess exotic properties. The rare earth doped nanophosphors have also shown interesting properties despite the atomic transitions of RE ions and thus opened possibilities of newer applications. In this work chemical synthesis of nanophosphors and new emission properties of RE ions in regards to security printing, temperature sensing, latent fingerprint detection etc. will be discussed. In our work the La_2O_3: Er^{3+}/Yb^{3+}, Gd_2O_3: Er^{3+}/Yb^{3+} and $CaMoO_4$: Er^{3+}/Yb^{3+} phosphors producing intense green upconversion emission due to the $^2H_{11/2}(^4S_{3/2}) \rightarrow {}^4I_{15/2}$ transition have shown interesting properties and results would be discussed. The studies have shown that Yb^{3+}-Er^{3+} combination revealed optical bi-stability with magnetic field and light-to-heat conversion. The light-to-heat conversion in nanophosphors is an interesting phenomenon for research because of its potential biomedical use for the destruction of malignant cells in the body. Moreover, above phosphors have shown potentiality in upconversion emission based latent fingerprint detection on coloured surfaces.

PS30

Thermal and electrical studies of graphite oxide and reduced graphene oxide prepared by wet chemical methods

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Graphite oxide has been synthesized using flake graphite as precursor and was then exfoliated using ultrasonicator. The exfoliated graphite oxide was then employed for the synthesis of reduced graphene oxide using hydrazine hydrate as reducing agent. The Graphite oxide and reduced graphene oxide were characterized by X-Ray Diffraction (XRD), Scanning Electron Microscopy (SEM), Fourier Transform Infrared Spectroscopy (FTIR) and RAMAN Spectroscopy. The obtained products were further analyzed for their optical, thermal and AC conductivity using UV-Vis Spectroscopy, Photoluminescence Spectroscopy, thermo-gravimetric analysis (TGA) and Four-point probe for I-V Characteristics.

PS31

Tailoring Morphotropic Phase Boundaries to Design Temperature Insensitive Ceramic Tunable Capacitors

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Advanced temperature insensitive compositionally graded tunable capacitors can be designed if we choose new pseudo-binary ferroelectric system with tilted phase boundaries between rhombohedral (R) terminal and tetragonal (T) terminal. The presence of tilted Morphotropic Phase Boundary (MPB) in phase diagram provides wide temperature range over which dielectric constant corresponding to different layers remains relatively high as phase transition temperature keeps gradually shifting with changing composition (x). Apparently, farther the Curie temperatures of R and T terminals, more tilted the phase boundary would be. The Curie temperatures of R-terminal (BZT) and T-terminal (BCT) of present pseudo-binary ferroelectric system $(1-x)Ba(Zr_{0.2}Ti_{0.8})O_3–x(Ba_{0.7}Ca_{0.3})TiO_3$ are 30 and 120°C, respectively. If we, somehow, make the phase boundary more tilted by lowering Tc of R-terminal and raising Tc of T-terminal, we can expand the range of temperature stability of the CGM designed from such system. At any particular temperature in the given temperature interval, some layers of the compositionally graded multilayer (CGM) design of such system, would be in paraelectric phase, and the other would be in ferroelectric phase. Over all, the decreased permittivity of the paraelectric phases is compensated by the increased permittivity of ferroelectric phases and value of tunability remains relatively higher for such graded systems. The superposition of curie peaks of individual layers having different Curie temperature to yield a

resultant curve which is relatively independent of varying temperatures. Therefore, the MPB can be engineered to design potential candidate for temperature insensitive tunable devices.

PS32

Radon concentration in water samples and its correlation with radium contents of soil Keeping in view the health of the population consuming water from various water resources of Mandi - Dharamshala region of Himachal Pradesh, India

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Radium (Ra^{226}) comes from the decay of series which contains U^{238}, which leads to Radon (Ra^{222}) these elements causes the serious health related problems if concentration exceeds certain permissible limits. Whenever the air or water contamination is measured then high concentration of Rn^{222} has significant contribution in them. Many geological activities include the measurement of radon along with other gases for seismic study, geothermal study, oil or natural gas transport and also for health hazards. Radioactive constituents of drinking water can result from natural radioactive elements, radioactive elements which are added to water through technological processes, radioactive wastes from nuclear laboratories/ reactors and radioactive transmutations. There are evidences from studies that radiation exposure at low to moderate dose may increase the long term incidence of cancer in both human and animals. A recommended reference dose level of the committed effective dose equal to 0.1mSv/y. By developing an appropriate model for radon seepage through faults and fractures one can estimate the quantity and quality of the ground water. This type of study can also be helpful to make correlation in major fault systems and radon anomalies in water along with its health effects on population consuming water from resources. The main objective of study is to measure radon concentration in the water sample of the study area (Mandi – Dharamshala Region). For this purpose forty water samples are tested for radon concentration from different water resources from the study area using RAD7 detector. The radium contents of the soil in vicinity of water resources is also measured using LR-115 type –II Detector, which is further correlated with radon contamination in water samples.

Key words: LR-115, RAD7 detector, absorbed dose

Section C: Life Sciences

LS01

To study of food Processing Residue Analysis and its Functional Components as related to Human Health

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Today we are needed of study of by-products of fruits and vegetables from food processing industry have recently enormous concern because of their pharmacological properties and great nutritional approach. These food processing by-products serve a cocktail or a soup of phytochemicals with health promoting properties. The sprayed of pesticide and chemicals on the agricultural and vegetables crop. These are claimed to possess many reusable substances of high value and can be money-spinner if they are appropriately utilized. This study is very important for by-products of fruits & vegetables have a potential to be used as a functional agent in cosmetics, medicines and functional food application either as raw material for secondary processes, as operating supplies or as ingredients of new products.

LS02

Forest Plant Resources of watershed Rissa-khad and their sustainable use

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Watershed Rissa-khad falling under Sarkaghat Forest Range of district Mandi Himachal Pradesh is endowed with rich forest resources. These forest resources include both timber and non-timber forest products such as gum, resin, fiber, flosses, oil, grasses, bamboos, wild edible, fodder, fuel and medicinal plants etc. These resources have been used for making dyes, building houses, agricultural tools, bridges, medicines, resins, fibers, vegetables etc. both on commercial as well as non commercial bases for uplifting socio-economic conditions of inhabitants of watershed. A high percentage of the total population depends upon forest resources for their livelihood options and fulfilling their day to day activities. People exploited floral diversity in the form of leaf, root, stem, fruit and flowers etc. exerting immense pressure on natural forest wealth, like pressure from human beings for fuel, fodder, wild edibles, small timber etc., pressure from wild animals, from domestic animals due to grazing and removal of fodder, pressure due to encroachments, pressure due to conversion of forest land for non forestry purposes, pressure due to forest fire, pressure due to landslides etc. Exploitation and use of forest resources is not sustainable over a

long period of time and need proper resource assessment, conservation and adoption of participatory approaches under which the local communities come together to take collective action.

LS03

Genetics of Single Nucleotide Polymorphism and its Applications: A Review

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Although the human genome is highly conserved, approximately 3 million nucleotides vary when genomic sequences of two random individuals are compared. The most common variation in the human genome is a bi-allelic single nucleotide polymorphism (SNP), which by definition differs between individuals only by one base pair with a minor allele frequency of at least 1%. They are widely distributed throughout genomes although their occurrence and distribution varies among species. After the release of the human genome sequence, the cataloging of SNPs had been a major task. Indeed, there are already 11 million identified SNPs available in public databases. The efforts to determine the SNPs of many genomes from different populations have now been extended to a much larger-scale. This has brought along a vast need of new genotyping technologies to enable the genotyping of a large number of markers. Today there are more than 100 different approaches to genotype SNPs. Currently, SNP markers are one of the preferred genotyping approaches, because they are abundant in the genome, genetically stable, and amenable to high-throughput automated analysis. The HapMap Project holds much promise as a powerful new tool for discovery to enhance our understanding of the hereditary factors involved in health and disease. SNPs within VKORC1 locus were found to provide the genetic basis for resistance to anticoagulants within Norway rats and other commensal rodent species throughout the world. Common diseases such as cancer, stroke, heart disease, diabetes, and psychiatric disorders are influenced by many genes as well as by environmental factors. So, by comparing patterns and frequencies of SNPs in patients and controls, researchers can identify which SNPs are associated with which diseases. Drug companies are now able to design different drugs for each patient with similar clinical symptoms or disease phenotypes. Therapeutic agents with specific molecular functions can now be produced. SNP genotyping can lead to the identification of genetic causes of an individual's response to medication. These technologies will transform the health care industry and contribute to the advancement of biology and medical science.

LS04

Biochemical Changes in the Liver of Mice after Exposure to Different Doses of Diclofenac Sodium

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Non-Steroidal Anti- Inflammatory Drugs (NSAIDs) are group of widely used drugs for the treatment of rheumatoid diseases and to relieve pain and inflammation due to their analgesic anti-pyretic and anti-inflammatory properties. The therapeutic and many of the toxic effects of NSAISs result from reversible inhibition of enzymes in the cyclooxygenase (COX) group. In the present investigation the effect of the drug on the concentration of lipids, and on the activity of the enzymes i.e. acid and alkaline phosphatase, GOT, GPT and lipid peroxidase were studied. There was a significant enhancement in the activities of both acid and alkaline phosphatase after 21 days of treatment. Proportionate increase in the MDA contents was observed after different days of diclofenac treatment. Cellular damage in the liver resulted in decrease in the activity of both GOT (Glutamate oxaloacetate transaminase) and GPT (Glutamate pyruvate transaminase) in both low and high dose groups. Significant decrease in the liver contents was also observed in both dose groups.

LS05

Change detection analysis of land use and land cover pattern in catchment area around Bhimtal lake, Uttarakhand (Kumaun Himalaya) using remote sensing and GIS techniques

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Bhimtal lake is located between 29^{o} 21'N latitude & 79^{o} 24'E longitude in the Kumaun region at an elevation of 1332m height of mean sea level. The aquatic ecology of Bhimtal lake has showed a degrading trend due to very rapid settlement, constructions and encroachment on lake catchment basin by human habitation beyond its carrying capacity. The bathymetric mapping of Bhimtal lake showed that the depth and water volume are decreasing continuously. Lake is also decreasing in water area, depth level and its biotic resources because of offsite and onsite impacts of soil sedimentation due to invasive land use pattern, degraded forest zones and changed agriculture pattern in lake catchment area. The present paper mainly emphasized on assessment of land use/land cover dynamics in the catchment area around the Bhimtal lake. Landsat satellite imaginary of five different time periods 1996,2000,2003,2010 and 2015 were acquired by earth explorer and quantified the land use/land cover changes in catchment area around Bhimtal lake with the help of ERDAS 9.3. The images of study area were categorized

into four different classes viz., settlement area, agriculture area, forest area and water bodies. The study revealed that during last two decades, the settlement area has increased from 9.70% to 18.38%, agricultural area has increased from 44.32% to 47.63% and forest area is decreased 43.58% to 31.47%. The present study showed that the input of nutrients and sedimentation are increased on very alarming rate in lake, hence its mesotrophic status has turned into eutrophic condition.

LS06

Some interesting wood rotting non-gilled Agaricomycetes: showing lignocellulolytic activity

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The wood rotting fungi include fungi belonging mainly to Agaricomycetes and also include members of *Xylariaceae* and some other Ascomycota. The wood rotting fungi have been studied mostly in connection with their noxious activity. However, recently some interest has been aroused in their application to practical uses. Nitrogen is an essential element for all living organisms, but wood has low nitrogen content. Many wood rotting fungi can grow at very low nitrogen levels and are very efficient at both scavenging and re-cycling nitrogen. Degradation of wood is conducted principally by fungi acting on cellulose and lignin which are the two main components of wood. When both cellulose and lignin are utilized by the fungus, leaving a whitish residue, it is called white rot and brown rot when just cellulose is utilized, leaving a brown residue consisting of remaining chemically modified (demethylated) lignin (Jeffries, 1987 and Blanchette, 1995). White rot fungi are able to extensively mineralize lignin to carbon dioxide and water. The lignolytic enzymes they produce have a considerable potential to be employed in a range of biotechnological applications like, biopulping, biobleaching, decolourization of industrial effluents and biodegradation of low molecular mass xenobiotic compounds instead of bacterial strains which cause pollution. Five species of non-gilled agaricomycetous fungi *Amylostereumchailletii, Daedaleaseptentrionalis, Grammothelefuligo, Pycnoporussanguineus* and *Trametesversicolor* were collected from Himachal Pradesh, showing Lignocellulolytic activity.

LS07

Freshwater fish processing waste: A potential source of fatty acids and proteins

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The present study included a survey on the quantum of freshwater fish waste generated in five major cities of Punjab namely; Amritsar, Jalandhar, Ludhiana, Patiala and Bathinda. The procurement and sale of fish was noticed to be higher during winter than in summer. Almost 15-20 percent of fish body weight amounts to fish waste which includes fins, intestine, liver, kidney, blood, scales, vertebral column and viscera (excluding head and ovary). Majority of the fish waste is either thrown away or given gratis to the poor. Saul (*Channastriatus*) and rohu (*Labeorohita*) were found to be the highest selling and waste generating species, thus being the major contributors of the fish waste industry in the state. The protein level, lipid content and fatty acid composition of the fish waste collected from three different fish markets of Ludhiana city *viz*., Railway Station fish market, Field Ganj fish market and Sherpur Chowk fish market were also estimated from December, 2014 till May, 2015. The total lipid content (TLC) of fish waste was recorded to be maximum during February, whereas, minimum during May. Similarly, the amount of fatty acids also revealed a significant ($p<0.05$) increase from December till February, followed by a significant ($p<0.05$) decrease during April and May. Among the fatty acids, a considerable amount of n-3 (C18:3, C20:5 and C22:6) and n-6 (C18:2 and C20:4) polyunsaturated fatty acids, monounsaturated fatty acids (C16:1; n-7 and C18:1; n-9) and saturated fatty acids (C14:0, C15:0, C16:0 and C18:0) were noted. However, the total soluble protein content (TSPC) from the three fish markets was lowest during December and gradually increased reaching highest value in May. The findings of our study indicate non-utilization of the freshwater fish processing waste and therefore, suggests that initiatives for proper utilization of fish waste may be undertaken at the State level since it has found many applications into pharmaceutical products, animal feed, biodiesel/biogas, dietetic products, food packaging, fish sauce and soup, cosmetics, enzyme isolation, organic fertilizer, moisture maintenance in foods, etc. leading to less wastage and extra revenue generation, both for the government as well as the fish vendors.

LS08

Reproduction efficiency of *Eisenia fetida* during vermicomposting of sugarcane and FYM in different combinations

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Agricultural substrates and wastes like farm yard manure (FYM), animal dung and sugarcane trash are potential sources of organic nutrients. There is an urgent need for recycling this waste using vermi technology, so that quality organic manure can be produced. Vermicomposting is the best option for management of animal dung and agro wastes by epigeic earthworms. *Eisenia fetida* is an epigeic species that has appeared as the key candidate for organic waste recycling industries. The present study was aimed to determine the earthworm population (reproduction) during the bioconversion of agricultural organic wastes (sugarcane trash). The effect of FYM (cow dung) and agro waste (sugarcane trash) in combinations of 1:1 and 1:1/2 on reproduction of *E. fetida* was investigated. The present study indicates that minimum period required for *E. fetida* to complete its life cycle is 49.33±0.88 days in 1:1 combination (FYM: sugarcane trash),

54.66±0.66 days in 1:1/2 combination (FYM: sugarcane trash) and 57.33±1.20 in control (only FYM). Initiation of cocoon production and hatching was recorded to be early in 1:1 combination. Total number of cocoons produced, cocoons produced per day and cocoons produced per worm was also higher in 1:1 combination, which indicates that *E. fetida* is the preferred species in 1:1 combination of (FYM: sugarcane trash) for the bioconversion of organic residues into useful manure due to its high reproductive potential.

LS09

Characterization of lipase producing bacterial isolates from effluent waste of paint industry

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Lipase has broad spectrum of applications in food, detergent, fine chemicals and polymer industries. In the present study, 31 lipase producing bacterial isolates were screened from effluent waste of paint industry. Five isolates, namely Sh 2, Sh 8, Sh 12, Sh 13 and Sh 17 were selected on the basis of maximum extracellular lipase activity of 1359, 1641.33, 1568, 1310.66, 1490.66 U/mg respectively using p-nitrophenyl palmitate as substrate. Optimum lipase activity for all the isolates was observed at pH 7 and 37° C. Glucose was found to be best carbon source for lipase production of isolates Sh 2 (1370.66 U mg^{-1}), Sh 8 (1244 U mg^{-1}) and Sh 13 (1010 U mg^{-1}) and fructose and trehalose for isolates Sh 12 (1024.33 U mg^{-1}) and Sh 17 (890.66 U mg^{-1}) respectively, peptone was observed as best nitrogen source for lipase production of Sh 2 (2347 U mg^{-1}), Sh 13 (1256 U mg^{-1}) and Sh 17 (968 U mg^{-1}) isolate and yeast extract and casein hydrolysate for Sh 8 (2674 U mg^{-1}) and Sh 12 (1983 U mg^{-1}) isolates respectively. In all the five isolates PCR product of ~ 1.5 kb was detected. On the basis of 16S rDNA analysis, bacterial isolates were identified as *Aeromonas* sp. Sh 2 (accession no. KT186103.1), *Aeromonas* sp. Sh8 (accession no. KT229540.1), *Aeromonas* sp. Sh12 (accession no. KT427918.1), *Pseudomonas* sp. Sh13 (accession no. KT251204.1), *Pseudomonas* sp. Sh17 (accession no. KT251205.1).

LS10

Effect of heavy traffic metal pollution on density of slug, *Filicaulis alte* and snail, Macrochlamys indica

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Slugs and snails are found to be pest of ornamentals grown in plant nurseries. Survey of three plant nurseries *viz*; Rakesh (least traffic load), Bahadur (moderate traffic load) and Hariram plant nursery (heavy traffic load) located in Jalandhar District revealed that one species of slug, *Filicaulis alte viz;* brown slug with black spots and one species of snail, *Macrochlamys indica* were commonly found. Density of both slug and snail was inversely proportional to soil heavy metal content in all the three plant nurseries located at different traffic loads i.e Hariram plant nursery > Bahadur nursery > Rakesh nursery. Slug, *F. alte* and snail, *M. indica* both serve as pertinent species for monitoring trace metals from urban traffic pollution. Thus can be used as sensitive indicators of soil heavy metal pollution.

LS11

Study of amino acids in the leafy liverwort *Chiloscyphus gollani* by using high-performance liquid chromatography (HPLC).

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The present study was carried out for determining the presence and absence of amino acids alongwith their content. HPLC technique is very helpful in the easy identification and quantitative determination of different amino acids present in leafy liverwort *Chiloscyphus gollani*. Out of 20 presently studied amino acids, nine are indespensible, six are conditionally essential and five are dispensible for the human body. Analysis of this taxon showed the presence of six amino acids (alanine, glycine, valine, aspartic acid, tryptophan and tyrosine). Out of six amino acids present in *C. gollani*, two are essential (tryptophan and valine) and six are non essential (tyrosine aspartic acid, alanine and glycine). Of all the present amino acids, alanine content (1.730 mg/g dw) was found to be maximum and tyrosine content (0.004 mg/g dw) was found minimum. The content of other amino acids present in *C. gollani* is 0.059 mg/g dw (aspartic acid), 0.021 mg/g dw (glycine), 0.030 mg/g dw (tryptophan) and 0.041 mg/g dw (valine). HPLC is found to be highly reproducible, precise and useful for the quantification of amino acids and can be used further in other bryophytes.

LS12

A Preliminary Study on Moths (Lepidoptera: Heterocera) in Selected Human Settlements of Delhi

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The present study deals with the inventory of moths in selected human settlements of Delhi carried out from 2014 to 2015. During the study 20 species of moths belonging to 15 genera and 5 families were reported from Delhi, which are new reports to moth fauna of Delhi. After this study, the moth fauna of Delhi comprises a total of 29 species belonging to 23 genera and 7 families. Species diversity of family Noctuidae was found to be highest followed by Erebidae, Geometridae, Crambidae, Sphingidae, Nolidae and Zyganidae.

LS13

EFFECT OF HYDROQUINONE ON SECOND INSTAR LARVAE OF *Spodoptera litura (*Fabricius)

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The use of synthetic pesticides in agriculture has led to major problem associated with bioaccumulation in the environment, and the health of animals and humans. The accumulation of residue and the increase in resistance of pesticides has necessitated that alternatives to synthetic pesticides be found which are safer and more ecofriendly. Plants being immobile have evolved a diverse array of compounds called secondary metabolite which mainly serve as defensive compounds. India's vast reservoir of tropical forests and other natural sources offer a vast repository of compounds which are increasingly being explored for their medicinal value but have not been explored for their anti-insect potential. More than 2000 plant species have been known to produce metabolites of value in pest control. Among the various plant secondary metabolites, phenolic compounds exhibit broad structural heterogeneity, which are present in all higher plants and are among the most stable plant products. Therefore, the present study was undertaken to evaluate the effect of hydroquinone (plant based phenol) for its potential in controlling the insect pest *Spodoptera litura. D*ifferent concentrations (1ppm, 5ppm, 25ppm, 125ppm.625, 3125ppm) of hydroquinone were incorporated in artificial diet of larvae and the antibiosis influence was ascertained by feeding second instar larvae on this diet. The experimental larvae were kept in the Bio-chemical Oxygen Demand (B.O.D) incubator and observed daily for the various developmental parameters such as larval period, pupal period and total developmental period. The observation showed a significant prolongation in the larval period and pupal period.Total developmental period was observed to be delayed significantly with increasing concentration of hydroquinine in the diet. Thus the findings revealed the deterrent effect of hydroquinone on the growth and development *S. litura.*

LS14

Oxidative stress and histopathological changes in liver and kidney of *Bandicota bengalensis* and *Tatera indica* collected from South-west region of Punjab.

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The interaction of xenobiotic substances with the biological system is a complex phenomenon which involves interplay between the environment, the host and the chemical substance. Apart from neurotoxicity and neurobehavioral changes in animals, environmental contaminants have been associated with enhanced generation of reactive oxygen species (ROS) which culminates into oxidative stress (OS). Rats inhabiting South west region of Punjab were used in the present study to investigate toxic effects of environmental contaminants on pathophysiological conditions in female rats. Results revealed that the organs weight were comparable in rats of South west region and control rats ($p<0.05$). The value of total protein content decreased non-significantly in liver and kidney of *Bandicota bengalensis* and *Tatera indica* rats as compared to their respective controls. Activity levels of different OS parameters viz: catalase (CAT) and glutathione peroxidase (GPx) showed a non-significant decrease while superoxide dismutase (SOD) and lipid peroxidation (LPO) showed increase in rats collected from South west Punjab as compared to control rats. Histomorphological studies further revealed number of abnormalities as infiltration, vacuolization, enlarged sinusoids and necrosis in liver of rats, while renal histoarchitecture showed high degeneration of glomeruli as compared to control rats. The results infer that environmental contaminants may be responsible for altering antioxidant defense system thus, inducing oxidative stress in rats inhabiting south- west region of Punjab.

LS15

Influence of *Catharanthus* on Survival and Development of *Dysdercus koenigii*

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Increased dependence on chemical pesticides has witnessed its harmful effects on human health and environment. Botanicals can be better alternative to chemical insecticides due to its environment friendly nature. Present research work focused on the effects of *Catharanthus* leaf extracts on growth and development on *Dysdercus koenigii*. Newly emerge fifth instar nymphs were treated with leaf ethanol extracts. 2 µl of 5% and 10% extract was applied topically on the dorsum of thoracic region of the insect. The treated insects were observed daily for weight gain, morphological changes, survival and longevity for ten days. The results indicated that treated insects showed drastic developmental anomalies. Consequently the treated nymphs moulted into adultoids, adults with exuviae attached and adults with wing deformities. On treatment with 10%

ethanol extract; 38% adultoid, 10% adults with exuviae attached and 30% wing deformed were produced. Whereas treatment with 5% ethanol extract resulted in production of34% adultoid, 34% adults with deformed wing and 16% adults with exuviae attached. In control no developmental anomalies were reported. There was increase in per day weight gain in treated nymphs in comparison to control. Also, it was reported that total nymphal period increased in the treated nymphs. There was reduction in weight on penultimate day of moulting in both treated and control fifth instar nymphs. *Catharanthus* extract did not has profound effects on survival of *Dysdercuskoenigii*. Percent of the nymphs survived and successfully moulted at experimental doses were 94% and 86%. Our results indicated possible presence of IGR mimics in the ethanol leaf extract of *Catharanthus*. Potential application of *Catharanthus* in management of *Dysdercus* was explored.

LS16

Impact of *Ocimumsanctum* on the Development and Reproductive Bioefficacy of Dengue Fever Mosquito, *Aedes aegypti* L. (Diptera: Culicidae)

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Aedes aegypti is a primary vector for viruses that cause dengue fever, dengue haemorrhagic fever, chikungunya and yellow fever. In last decade diseases transmitted by *Aedes aegypti* are of serious concern worldwide. In India number of cases of dengue fever, dengue hemorrhagic fever and chikungunya are increasing multifold year after year. Indiscriminate use of insecticides in vector management programme resulted in insecticide resistance and vector resurgence, environmental contamination and, hazards to non-target organisms. Present research work focused on impact of ethanol extract of *Ocimum sanctum* on dengue vector *Aedes aegypti*. 0-24 hr. old fourth instar larvae of lab bred population of *Aedes aegypti* were exposed to ethanol leaf extract of *Ocimum* with concentrations ranging from 50 ppm to 400 ppm. Survival and development and the treated larvae and reproductive behaviour of the adults emerged from the treated larvae was evaluated. Our results indicated larvicidal potentials of the leaf ethanol extract at higher concentrations. The influence of the extract was dose dependent. 77.2% mortality was observed in the larvae exposed to 400 ppm for 24 hr. Treatment at lower concentrations revealed delayed toxicity of the extracts to the larvae. The larvae survived after treatment exhibited severe developmental anomalies. Consequently, there was significant increase in duration of fourth instar larva. The L4 treated with 400 ppm extract moulted after 4.6 days; this was in sharp contrast to control where the larval period of the fourth instar lasted three days. The treated fourth instar larvae in many cases transformed intolarva-pupa intermediates with combination of larval, pupal characteristics. The larva-pupa intermediates had reduced life span and failed to moult successfully. The adults emerged from the larvae treated with lower doses had reduced reproductive potential. The females exhibited longer preoviposition period, reduced oviposition rate, abnormal oviposition behaviour and decreased fertility. GCMS analysis of the extract revealed presence of JH mimics and JH analogues. The present research work explored the

potentials of *Ocimum sanctum*, also known as queen of herbs, in integrated vector management programme of *Aedes aegypti*.

LS17

Fourier transform infrared spectroscopic (FTIR) analysis of *Clavatia excipuliformis* (Scop.) from Himachal Pradesh, India

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Mushrooms are considered as good source of protein and minerals in Indian dietary pattern and found to be substitute for meat and fish. In the present paper, Fourier transform infrared (FTIR) spectroscopy was used to obtain vibrational spectra of *Clavatia excipuliformis* (Scop.). This is a wild growing mushroom species belonging to Basidiomycetes and consumed by rural people in many areas of the world. The result of present analysis shows the characteristics spectra of different functional groups present in this macrofungi. Fourteen different peaks were observed during FTIR spectroscopy analysis which corresponds to eight functional groups. The results obtained by this analysis are an addition to the present knowledge of composition of wild mushroom. The study showed that the FTIR spectroscopic method is valuable tool for rapid and non-destructive analysis of *Clavatia excipuliformis* (Scop.) prior to any extraction method. The study is the first report of different functional group present in *Clavatia excipuliformis* (Scop.) from Himachal Pradesh, India and found to be useful for pharmaceutical industry.

LS18

Seed Viability and Biochemical Changes associated with Ageing of *Dendrocalamus strictus* Seeds

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Seed longevity is a major challenge for the conservation of plant biodiversity. Seeds possess a wide range of systems (protection, detoxification, repair) allowing them to survive in the dry state and to preserve a high germinability. Bamboo seeds exhibit very short life and lose their viability within 2-3 months. Ageing of bamboo seeds on 6-months of ageing interval under controlled conditions *i.e.* 4^0C and 5% humidity were observed. This investigation was conducted to determine the degree of biochemical changes during natural ageing of bamboo seeds. Germination percentage, electrolyte leakage, sugar contents, amino acids, phospholipids, and activity of various enzymes were estimated to study the reasons of fast ageing of *Dendrocalamus*

strictus seeds on the 6-months interval of ageing. With the ageing germination percentage reduced to 13% after 6-months of ageing and electrolyte leakage increased significantly ($p<0.05$). Reduction in the contents of sugars and phospholipids were found. Decrease in the activity of the polyphenol oxidase, catalase were observed while an increase in free amino acids' content and activity of amylases confirmed the degradation of food reserves.

LS 19

Evaluation of insecticidal potential of isothiocyanates in hexane extract of *Eruca sativa* against *Spodoptera litura* (Lepidoptera) and *Bactrocera cucurbitae* (Diptera)

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Plants and insects exhibit diverse interactions where plants serve as host, food and nursery for insects and the latter serve as pollinators, etc. However some insects act as pests of economically important crops. A variety of mechanisms have been evolved by plants to protect themselves from the attack of these insects. These include physical defence mechanism such as thorns, sticky and irritating secretions, tough leaves, etc. and secondary phytochemicals such as phenols, alkaloids, terpenes, glucosinolates, etc. Glucosinolates are important plant metabolite present in a number of plant families including Brassicacae. They are only released following the attack by insects on plants causing damage. This further brings glucosinolates closer to myrosinase enzyme present adjacent to it, thus leading to its hydrolysis generating isothiocyanates. Isothiocyanates are the most frequently studied glucosinolate hydrolytic products because of their anti-carcinogenic properties and toxicity to insects, bacteria and various other pathogens. The tobacco cutworm, *Spodoptera litura* and melon fruit fly, *Bactrocera cucurbitae* are economically important insect pests of various plant crops. By taking this into consideration, we have used seeds of *Eruca sativa* for preparing isothiocyanate extract. The extraction of glucosinolates from these seeds was done by hydrodistillation method using Clevenger apparatus. The analysis of glucosinolate hydrolytic products extracted was done by GC-MS (Gas Chromatography- Mass Spectrometry). In both the insects, the second instar larvae were fed on artificial diet supplemented with different concentrations (5 ppm, 25 ppm, 125 ppm, 625 ppm and 3125 ppm) of hexane extract of *Eruca sativa*. The percent pupation and adult emergence showed significant results in both the cases, while the results in other parameters like larval, pupal and total development period were better in case of *Bactrocera cucurbitae*. From the present study, we conclude that *Eruca sativa* extract is more effective against *Bactrocera cucurbitae*.

LS20

Traditional Knowledge and Awareness about Biodiversity Conservation In People of H.P. Present Scenario.

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Traditional knowledge (TK) (or indigenous knowledge, and local knowledge) generally refers to the long-standing information, beliefs, experiences, traditions and practices of certain indigenous peoples or local communities. It embodies the wisdom developed over generations and includes agricultural knowledge, biodiversity, ecology knowledge, medicinal knowledge and many more. Traditional knowledge has been orally passed for generations from person to person or is expressed through stories, legends, folklore, rituals, songs, art, and even laws. Traditional knowledge plays an important role in the conservation of biodiversity. Biodiversity provides millions of people with livelihoods, helps to ensure food security, provide shelter and rich source of traditional medicines. From the past, indigenous traditional knowledge has contributed a lot, but at present context these kinds of knowledge are disappearing. There are many reasons either these knowledge are not transformed to another generations or new generations do not want to accept and use those knowledge. Awareness and knowledge of traditional values and interconnectedness of biodiversity among people, school children, students and teachers in the colleges may play important role for the conservation of the biodiversity wealth. Involvement of the people with traditional knowledge ready to acquire more knowledge about the biodiversity conservation will help to maintain and sustain the bioresources and biodiversity. We need to preserve traditional knowledge and conserve biodiversity because for the livelihood of the humans all the scientific discoveries are rooted in traditional knowledge. We should take all measures to conserve traditional knowledge and protect our rich biodiversity for better living of our present generation as well as for our future generations. Himachal Pradesh with rural population is very rich in terms of bio-diversity and indigenous knowledge. Hilly people are dependent on forest, agriculture and domestic livestock for their livelihood. These people are directly connected with natural ecosystem and apply traditional knowledge in their daily life. These indigenous people are conserving the biodiversity in order to survive themselves, which eventually conserve the whole environment. Present study was carried out in Gohar Mandi District to explore the traditional knowledge of local people transmission of TK to next generation and their awareness about biodiversity conservation.

LS21

Triterpenoids from *Datura stramonium* promote cytotoxicity of the human immune cells against lung and breast cancer cells

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Traditional approaches which involve the use of phytocompounds, has revived in the new form of therapy known as immunotherapy to treat cancer. In immunotherapy, phytochemicals as immunumodulators can be used along with conventional therapies, chemotherapy and radiotherapy, which can boost the immune system to combat against cancer cells. Many countries have introduced herbs in the formulation of their drugs against cancer. *Datura stramonium* which is a very old herb found in Ayurveda and widely used in medicines due its therapeutic potentials. The present study was aimed to identify the immunomodulatory activity of the methanolic leave extract from *D. stramonium* on human peripheral lymphocytes and their antitumor responses. Using column chromatography and HPLC-MS, we isolated and identified two triterpenoids from *D. stramonium* having immunoenhancing activity. The triterpenoids treated lymphocytes showed significantly enhanced cytotoxic abilities towards cancer cells (A549 and MCF7). Our results showed triterpenoids from *D. stramonium* enhanced cancer cell killing by 49% and 42% in A549 and MCF-7 cells respectively at 1:20 effector/target ratio. Furthermore triterpenoids from *D. stramonium* also significantly enhanced the production of IL-2 and IFN-Y (368 and 135pg/ml) cytokines from human immune cells. These compounds are also enhancing the expression of protein Granulysin in immune cells which is responsible for cancer cell killing. Therefore this study reveals the presence of bioactive compounds from *D. stramonium* having immunostimulatory potential that could improve antitumor responses of human immune cells.

LS22

Assessment of Environmental contaminants in eggs of Red Wattled Lapwing (*Vanellus indicus*) in Punjab Agricultural University, Ludhiana

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Pesticides have most striking effect on birds, particularly carnivorous species. Sub-lethal effects of these pesticides include endocrine disruption, alterations in feeding behavior and compromised immune systems which affect avian reproduction. Despite the continuing usage, little is known about the impacts of pesticides in bird populations in developing countries. India is one of the major producer and consumer of pesticides. In view of this, there is likelihood that birds in India are exposed to great amounts of pesticides. Therefore, a correlative study, testing the impact of environment contaminants upon the Red Wattled Lapwing eggs, was conducted at Punjab Agricultural University, Ludhiana from April to June, 2013. Freshly laid eggs were collected. One egg was randomly taken from 10 clutches sampled. The eggs were preserved, opened in the laboratory, and their contents were analyzed using Konstantinou *et al* 2000 method for detection of pesticides. In all samples examined, overall concentrations of Organochlorines (α-HCH, β-HCH, Lindane, Heptachlor, Heptachlor epoxide, Aldrin, Dieldrin, Endrin, 2,4'-DDT, 2,4'-DDD, 4,4'-DDT 4,4'-DDD and 4,4'-DDE) in egg contents (albumen and yolk) were less than the threshold levels known to affect reproduction. Organochlorine pesticide contamination was first correlated with decreased eggshell weights and thickness indices and lower reproductive success of Merlins *(Falco columbarius)* in Great Britain. Amounts of pesticides detected in this

study are too low to affect eggshell thickness in the Red Wattled Lapwing eggs or have other effects on the wildlife of the area. It was indicative of the health of the habitat where ideal agricultural practices are being followed where the bird was breeding without any impairment. Also, as population levels of the species studied are not declining, these contaminants appear to have no significant adverse effect on reproduction in the Red Wattled Lapwing studied.

LS23

Direct introduction of queens in queenless colonies of *Apis mellifera* using smoke

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Introduction of virgin or mated queens into queenless colonies of *Apis mellifera* is a common practice performed by beekeepers to replace old failing queens and also during division of colonies. Queen introduction by using a cage is the most frequently recommended and commonly practiced method. Several direct methods of introducing queens have also been used by beekeepers, which suggest that it is unnecessary for the introduced queen to be kept in cage for several days to acquire odour of her new hive, while direct introduction of queen, without any introduction container may be more feasible. A study was conducted on direct introduction of queens using smoke. Method used included, 4-6 puffs of dense smoke were blown into hive entrance of queenless colony, followed by 7-8 smoke puffs on top of frames after opening hive, then new queen was released in the space between two frames, further 4-6 puffs of smoke on top bars and finally 7-8 times smoke was blown into hive entrance after closing the hive. Observations revealed that acceptance of new queen was more in small and medium sized colonies having more young workers during honey flow season. Mated queens were accepted more frequently as compared to virgins. Acceptance increased significantly with number of days (from 1 to 7 days) a colony had been queenless. Mated queen were accepted even after 2 days of queenlessness. Queen cells developed under queenless conditions were removed before introduction of queen. It may be concluded that queen introduction to queenless colony diretly with smoke is good, less time consuming as compared to cage method. Queen acceptance can be increased by selecting less populous (medium strength) colonies having more percentage of young workers in nectar flow season.

LS24

Ethnobotanical Uses of Species of Genus *Ficus* L. In District Bilaspur, Himachal Pradesh, India

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There is a great Importance of the genus *Ficus* among people of India since time immemorial. Besides aesthetic and religious values, many species of this genus are as food, fodder and in traditional medicine. The present study, conducted in Bilaspur district of Himachal Pradesh during 2013-14, unfurled many species having socio-culturally intrinsic relations with local inhabitants. The noteworthy among these species are *Ficus religiosa*, *F. bengalensis, F. glomerata, F. palmata* and *F. auriculata*. These species need further value addition since they have great commercial potentials.

LS25

EFFECT OF FLAVONE ON SECOND INSTAR LARVAE OF MELON FRUIT FLY, *Bactrocera cucurbitae* (Coquillett)

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Indiscriminate use of pesticides against crop pests in order to increase crop production has imposed a negative impact on biotic and abioctic factors of environment. Environmental concerns have necessitated the need to discover ecofriendly and bio-degradable compounds which can counteract the negative effects of these harmful pesticides. Scientists all over the world are trying to find alternatives which can minimize the use of these synthetic harmful pesticides. Natural compounds of plant origin being safe and ecofriendly are being explored for pest management. Plants produce secondary metabolites as a part of their defense mechanisms which protect them from herbivorous pests. Phenolic compounds are important secondary plant metabolites which are ubiquitous in plants. Flavone , a secondary plant metabolite has not been much explored for its effect on insect pests. The present study was envisaged to study the effect of flavone on various growth parameters of second instar larvae of melon fruit fly, *Bactrocera cucurbitae* (Coquillett). The melon fruit fly, *B. cucurbitae* is one of the major pest of cucurbit crops throughout the world. Bioassays were conducted to study the effect of flavone on second instar larvae of *B. cucurbitae.* The second instar larvae of *B. cucurbitae* were fed on various concentrations (5, 25,125, 625 and 3125 ppm) of flavone incorporated in artificial diet as well as on control diet. The findings showed prolongation in the larval period and total developmental period. The percentage pupation and emergence decreased significantly with increase in concentration of flavone incorporated in artificial diet. The findings thus revealed a toxic and deterrent effect of flavone on growth and development of second instar larvae of *B. cucurbitae.*

LS26

Diversity and seasonal incidence of arthropod predators associated with two spotted spider mite (*Tetranychus urticae* Koch) on rose

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Study was conducted during 2013 and 2014 from January to December under polyhouse conditions. Being as one of the important ornamental crop for different purpose, rose is grown under polyhouse and in open field. Under both these conditions, this crop is attacked by number of pest species which reduce the yield and quality of plant products. Two spotted spider mite is reported as serious pest of this crop throughout the world which affect the quality and yield of this plant in both conditions. Crop under polyhouse provide them a favourable place to thrive and reproduce throughout the year. Acaricides resistance reported around the world due to its short life cycle and high reproductive potential. Use of chemical pesticides reduce the quality of flower petals which are used in various Ayurvedic medicine Therefore, the use of natural enemies needed for successful integrated management of two spotted spider mites and other soft bodied pests. So, it is necessary to identify the potential natural enemies and their seasonal occurrence so that they can be mass multiplied for the better management of these pests.
The present study was the first attempt to study the diversity and seasonal occurrence of predatory arthropods associated with two spotted spider mites. During this study three species of predatory insects viz. *Stethorus aptus*, *Oligota* sp., *Feltiella* sp. and two species of spiders *Theridid* sp. and *Clubiona* sp. were recorded and identified. This study will be helpful in IPM programme for better management of these pests.

LS27

Design, Isolation and Antioxidant Screening of *Murraya koenigii* Leaves

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The antioxidant capacity of *Murraya Koenigii* (L.) Spreng, leaves was investigated in *vivo* by potassium dichromate induced oxidative stress. The Plant has been used as antidiabetic, antidiarrhoeal, febrifuge and as blood purifier according to literature. The whole plant is considered to be a tonic and stomachic. *In vivo* study, of aqueous leaves extracts was carried out in male wistar rats. Rats were divided into four groups Group I (Control), GroupII (Chromate), Group III (*Murraya koenigii* + Chromate) and Group IV (*Murraya koenigii). In Vivo* antioxidant

activity of *Murraya koenigii* inhibited the toxicity of potassium dichromate. The GSH content in liver (1.79±0.019) and kidney (1.967±0.013) of Group IV rats significantly ($p<0.05$) increased whereas hepatic malondialdehyde content in liver (2.41±0.24) and kidney (2.39±0.047) was significantly ($p<0.05$) reduced as compare to control. However, Chromate significantly ($p<0.05$) decreased the GSH content in liver (1.48±0.031) and kidney (1.209±0.002) whereas hepatic malondialdehyde content in liver (4.32±0.28) and kidney (4.19±0.038) was significantly ($p<0.05$) increased as compare to control. It is concluded from the study that *Murraya koenigii* leaves have significant potential as a natural antioxidant agents.

LS28

Role of genitalia in the identification of species of *Ypthima* Hübner (Lepidoptera: Satyridae) from Himachal Pradesh

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The genus *Ypthima* Hübner is represented by about 100 species distributed in the Palaeotropical and East Palaearctic regions. The species of the genus, commonly known as The Rings, are small, brown insects with a weak, bouncing flight, usually found in grassy places, fluttering about close to the ground. Most species of this genus are known to occur in Western China and its adjacent areas, such as Burma, Bhutan, Nepal, India and Taiwan, some in Africa, including Madagaskar, and a few in the South Pacific Islands and Australia. The general classification of this genus is still fairly confused. As this genus contains very complicated species and species groups, some species of early authors are sometimes treated as subspecies of the other species by the other authors. Many attempts have been made to clarify the complicated species and species groups of this genus.

Identification of certain species and population complexes is, in fact, an intricate problem. Owing to having considerable variations, different species/cryptic species of the genus *Ypthima* Hübner were difficult to be distinguished/identified, which remained for many years a stumbling block to the Lepidopterists. The males admit ready identification from the characteristic forms of their genitalia. During the course of present study, the male and female genitalia of sixteen species of the genus *Ypthima* Hübner from Himachal Pradesh India have been studied. The characters such as, the uncus, tegumen, aedeagus and the valva in the male genitalia and the corpus bursae, ductus bursae and genital plate in the female genitalia were proved to be reliable feature, play an important role in the discrimination of variable species of the genus *Ypthima* Hübner.

LS29

Antifertility and Abortifacient Effects of the Extracts of Leaves of Mimosa Pudica, Linn

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Petroleum ether, alcoholic and aqueous extract of leaves of Mimosa pudica Linn. were tested for anti-implantation, antifertility and abortifacient effects in pregnant albino rats at the dose of 2mg/100gm and 20mg/100gm body weight respectively during 1-10 days of pregnancy. Petroleum ether extract has showed encouraging abortifacient effect on early stage of pregnancy while that of alcoholic and aqueous extracts were comparatively less effective. These extracts showed encouraging anti-implantation effects. Abortifacient effects in pregnant rats treated during 8-15 days of pregnancy were encouraging with 10mg/100gm and 20mg/100gm body weight respectively. Mortality rates were higher with 20mg/100mg. dose.

LS30

Profiling of lantadenes of *Lantana camara* weed from different districts of Himachal Pradesh and its correlation with lantana toxicity in grazing animals

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Lantana camara toxicity caused by lantadenes is characterized by intrahepatic cholestasis, associated liver damage and photosensitization. Both ruminants including cattle, sheep, buffaloes, goats, and non-ruminants like horses, guinea pigs, rabbits, female rats are susceptible to lantana toxicity. The most prevalent and most noxious variety of *L. camara* is red flower variety (*L. camara* var. *aculeata*). Presently, lantana is widely spread over most areas of Himachal Pradesh. For the first time, lantadene profiling of 10 out of the 12 districts of Himachal Pradeshwhere lantana is found as a weed invading large areas, was carried out. For this, lantadenes were isolated from *L. camara* leaves using standardized protocol. The purification of lantadenes was monitored by thin layer chromatography. The characterization and quantification of lantadenes A and B (LA, LB) was done by reversed phase high-performance liquid chromatography (HPLC-DAD) and UPLC-ESI-MS method. The results revealed that the total concentration of LA and LB was highest in district Shimla (89.27%) followed by Kangra (86.79%), Kullu (86.10%), Solan (76.10%), Mandi (75.58%), Chamba (73.52%), Sirmaur (73.07%), Una (67.54%), Hamirpur (53.25%) and Bilaspur (49.66%). It is assumed that higher

the concentration of lantadenes, greater would be the toxicity in animals. The data on the incidence of lantana toxicity (collected in a prescribed proforma from the Department of Animal Husbandry, HP) during a period of 5 years (2009-14) revealed a very high incidence in district Kangra (2,351) which corroborated with the high percentage of lantadene concentration in lantana leaves of the district. The species-wise distribution of toxicity cases in district Kangra revealed highest number in cattle (1,785) followed by buffalo (324), goat (225) and sheep (17). In all the four species, the numbers of cases were higher in females than males. The analysis of the data revealed that highest number of cases, 951 were recorded in rainy season (June-Sep) followed by summers, 760 (Mar-May) and winters, 640 (Oct-Feb). The lantadene concentration and its correlation with the incidence of lantana toxicity in other districts of Himachal Pradesh would be presented.

LS31

Exploration of Arbuscular Mycorrhizal Diversity in Some Important Medicinal Plants

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With the increasing human population in the modern world, there is corresponding increase in the disease possibilities. Medicinal plants are gaining popularity in these days because they are cheap, easily available and have rare or no side effects. The enhancement of the growth and bioactive agents of these plants are desirable. One of the method by which this may be achieved is by inoculation of the roots of plants with microorganism like arbuscular mycorrhizal fungi. Mycorrhiza is the most important member of functional soil microbial community in natural ecosystem and creates an intimate link between plant roots and soil. In the present investigation, attempts were made to screen out endomycorrhizal biodiversity from different medicinal plants. A total of nineteen plants from sixteen different families were screened for arbuscular mycorrhizal (AM) spore number and root colonization. The mycorrhizal root colonization ranged from 0-100 percent. *Lantana camera* and *Ricinus communis* showed 100% of root colonization and *Achyranthus aspera* and *Calotropis procera* lack mycorrhizal root colonization. The spore number ranged from 73.33±7.63 to 357.33±4.04 per 50 gm soil sample. The highest mycorrhizal spore count was found in *Emblica officinalis* and lowest in *Chenopodium album*. It was found that number of spores in the rhizosphere of plant was not related to the intensity of AM root colonization. Twenty seven AM species belonging to five genera i.e. *Glomus, Acaulospora, Gigaspora*, *Entroposphora* and *Scutellospora* were isolated. *Glomus* was the dominant genus among all. The study of mycorrhizal occurrence, status and diversity on some of the medicinally important plants is important from the conservation and efficient utilization point of view. Hence, an investigation was carried out to study the endomycorrhizal status of medicinal plants and to

select the pre-dominant AM fungi for future inoculation studies for production of quality seedlings of important plants in nurseries and better survival in adverse conditions.

LS32

Diversity of Endophytic Mycorrhiza in Some Important Medicinal Plants of Uttarakhand State

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Arbuscular Mycorrhizal (AM) fungi are the one which can play a major role in the quest for sustained plant productivity in all segments of agriculture. In present investigation, the endomycorrhizal status of some important medicinal plants of Uttarakhand was analyzed in terms of AM sporulation and percent root colonization. A total of ten medicinal plants were screened for AM spore number and root colonization. The mycorrhizal root colonization ranged from 9.08±2.39 to 92.45±4.56 percent. The maximum percent root colonization was observed in *Mentha spicata* followed by *Vitex negundo* and minimum percent root colonization was observed in *Agave americana*. Likewise the maximum sporulation was screened in the rhizosphere of *Mentha spicata*. The spore number ranged from 58.30±5.00 to 483.23±8.15. The study confirmed that biodiversity of arbuscular mycorrhizal fungi vary with different plant species.

LS33

Physico-chemical characteristics of water in relations to plankton and fish production of pond

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Present work was carried out on Motia lake, Bhopal, Madhya Pradesh, India for year 2011-2012. The results of physico-chemical parameters of water clearly indicated highly productive nature of the Motia lake. The water quality parameters showed maximum values during monsoon compared. The phytoplanktons communities were represented by four groups such as Cyanophyceae, Bacillariophyceae, Chlorophyceae and Euglenophyceae. Among the four, Cyanophyceae was found the most dominant group. The phytoplanktons were evident during monsoon season. The zooplanktons were represented by four groups such as Rotifera, Cladocera, Copepoda and Ostracoda. Among these, Rotifera exhibited numerical dominance. The fish diversity in Motia lake was represented by 20 genera. The three major carps viz., Catla, Rohu and Mrigal were dominant in fish landings constituting 81.66% (279.72 Kg/ha/yr) and 98.77%

(352.49 kg/ha/yr). The total fish production was 264.65 Kg/ha/yr during 2011-2012. Except for Indian major carps, remaining species were found to be dependent on auto-stocking. The average stocking rate of major carps was 25155.76 numbers.

LS34

Tiger moths diversity (Lepidoptera: arctiidae) from North-West Shivaliks of Himalaya

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Insects comprise more than half of the world's known animal species (Wilson, 1992) of which the third largest and more diverse order is Lepidoptera of class Insecta. Lepidoptera is a large order of insects and most widespread and widely recognizable insect orders in the world, encompassing moths, butterflies and skipper butterflies. Most of the moths are nocturnal in habit and very few are active in evening as well as diurnal. Arctiidae is a large and diverse family of moths with around 11,000 species found all over the world, including 6,000 geotropically species. Currently, three subfamilies (Arctiinae, Lithosiinae, Syntominae) are recognized (Weller *et al.*, 2008). The authors has collected Tiger moths with the help of portable light traps installed near Forest Rest Houses, private guest houses during night time under the ICAR project on Insect biosystematics. The collected moths were killed (ethyl acetate vapors in killing jars), pinned and stretched on stretching board. Later, these dried specimens were preserved in air tight wooden boxes fitted in insect cabinets and examined. During present research, authors have undertaken a large number of survey-cum-collection tours to different localities of North-West Shivaliks of Himalaya during different seasons/monsoons. All the materials were preserved in Insect Museum, PAU, Ludhaina. In all, 836 adults belonging to twenty-two (22) species of fifteen genera (15) of family Arctiidae were identified and well preserved. The identification was explored with relevant literature (Hampson, 1894) and comparison with the specimens housed in various museums i.e., Forest Research Institute, Dehradun and Indian Agricultural Research Institute, New Delhi. The details on their reference, synonym, material examined, host plants, adults photograph, geographical distribution and complete checklist of collected Arctiid moths are provided.

LS35

Exploration of noctuid moths diversity (Lepidoptera: noctuidae) from Shivaliks of Himachal Pradesh, India

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Lepidoptera means scaly winged insects and is one of the most widespread and widely recognizable insect orders in the world which includes moths, butterflies and skippers. Most of the moths are nocturnal in habit very few are active in evening as well as diurnal. Majority of moths are attracted to light at night. The Noctuidae or owlet moths are a family of robustly built moths that includes more than 35,000 known species out of possibly 100,000 totals, in more than 4,200 genera. They are worldwide in distribution and constitute the largest family in the Lepidoptera. They are characterized by most have drab forewings, although some have brightly colored hind wings, differences between the sexes are usually few. Noctuid moths are nocturnal always flies at night and are almost invariably strongly attracted to light. They are serious pest of various crops, fruits and forests. Most noctuid larvae feed at night, resting in the soil or in a crevice in its food plant during the day. A large number of survey tours were conducted in the shivaliks of Himachal Pradesh during monsoon, pre and post monsoon from 2006 onwards. The altitude of the various localities covered during these surveys was between 400m to 1500m. The localities fall in various district such as Kangra, Kullu, Shimla, Solan, Sirmaur, Mandi, Bilaspur, Una of Shivaliks of Himachal Pradesh. These surveys from different localities led to the collection of 624 adult moths belonging to 32 species referable to 24 genera of the family Noctuidae. The identification of these species has been verified from the website of Natural History Museum, London for authenticity and latest nomenclature. The details on their distribution, immature stages (egg, larva, pupa) and their hosts plants photographs and morphological and genitalic characters will be highlighted during the event.

LS36

Morphological and genitalic studies on lappet moths (Lepidoptera: lasiocampidae) from North-West India

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Lasiocampid moths belong to the family Lasiocampidae which are commonly known as Eggar or Lappet moths and is most diverse in the Old World tropics, with about 2,200 species so far known worldwide, but absent from New Zealand (Holloway, 1987). The moths are medium to large, and of a robust and hairy appearance. They are generally cryptically coloured and patterned. Both forewings and hindwings are usually broad, but however there are some Old World genera in which the forewings are relatively narrow, the hindwings relatively small, and with abdomen extending well beyond the wings when at rest. Sometimes the female is brachypterous. The classic work of Maxwell-Lefroy & Howlett, 1909) on our "Indian insect life" mentions that "Over 50 Indian species are listed by Hampson of which about six are to be found commonly in the plains." Four of these are described in some detail. He goes on to write that "most are of moderate size, thick bodied, of light colour, cryptic in design. Their resemblance when in the resting attitude to a leaf is sometimes very marked and beautiful. The antennae are short and bipectinate, the palpi small and porrect. The legs are hairy with minute spurs, the females usually with an anal tuft of hair. Males and females differ in little but size, colour and the extent of pectination of the antennae. The taxonomic account of 54 Indian species of 20

genera of Lasiocampidae, including those from Burma, Bhutan and Ceylon (Sri Lanka) was given by Hampson (1893) in a volume of the Fauna of British India. Ghosh *et al.* (1991: 424) stated that there were 49 species of Lasiocampidae in India, the political area, in a Zoological Survey of India "State of the Art" analysis of the animal resources of India. Fletcher (1925) had catalogued 75 species of 22 genera from our subcontinent, including the neighboring countries. In the present work, a large number of survey-cum-collection tours were undertaken to northwestern India during different seasons/monsoons. Four genera *i.e*., *Trabala* Walker, *Suana* Walker, *Euthrix* Meigen and *Gastropacha* Ochsenheimer of the family Lasiocampidae were collected. The details on Morphological and genitalic charcters were worked out and diagnostic characters determined for identification of their species. . Besides giving morphological details, an illustrated account of the genitalia, keys to their subfamilies, genera and species is also provided.

LS37

Orthopteran (grasshopper) Diversity of Shiwalik Hills, India

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The present paper depicts altogether 95 species belonging to 65 genera, under eight families, which belong to super families Acridoidea, Tridactyloidea(Short – horned Grasshopper), Tettigoniodea (Long horned grasshopper) & Tetrigoidea (Grouse – Locusts) and Grylloidea (Crickets). Out of 95 species 78 are new record to the area, which accounts 5.35% of the total Orthopteran fauna of Indian.

LS38

Report on Lepidoptera pest diversity on apple plantataions (*Malus domestica* Borkh.) in Jammu Province, J&K, India

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Lepidoptera (scaly winged insects) is the third largest order after Coleoptera and Hymenoptera which includes moths, butterflies and skippers. Holloway *et al.*, (1992) reported about 2,00,000 species of Lepidoptera out of which 15,000 species are butterflies on global basis and remaining moths. They have holometabolus i.e., egg, larva, pupa and adult present in their life cycle. India can be considered as the home of apples which are grown in Jammu and Kashmir, Himachal Pradesh and Uttarakhand hills in North-West India. Several pests have been recorded attacking apple crop since, its introduction and commercialization, but no estimation on the damage caused

by them has been recorded. The status of insect and mite pests infesting apple in Himachal Pradesh was determined by Bhardwaj and Bhardwaj (1998).
A large number of survey-cum-collection tours were undertaken in different parts of Jammu and adjoining areas during apple plantation and reported eight Lepidopteran pests attacking apple plantations. Three species of family Lymantriidae, two species of family Lasiocampidae, and one each species of families Gelechiidae, Geometridae and Limacodidae are collected and identified. The standard techniques given by Common, 1970; Klots, 1970; Robinson, 1976 and Zimmerman, 1978 were consulted for various morphological and genitalic characters. The species of families Lymantriidae and Gelechiidae were observed as abundant whereas Lasiocampidae and Limacodidae are less abundant. Three species are recorded for the first time on apple plantations in Jammu province. The details on an inventory, geographical distribution, host plants, diagnostic features, biology and their damage on apple plantations will be highlighted during the Conference.

LS39

Body image dissatisfaction: Prevalence and relation to body mass index among female students

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Body image has been defined as the person's perceptions, thoughts, and feelings about his body. Body image dissatisfaction is a problem of growing concern that affects psychological wellbeing. This study aims to estimate the prevalence of body image dissatisfaction, identify its underlying risk factors, and explore the relation between actual, perceived and desired BMI among female students The sample consisted of 500 girls ranging in age from 17 to 27years (M=20.1 SD= 2.07) of age. Body image was assessed using the Body Shape Questionnaire, BMI was calculated based on measures of height and weight and self-esteem was assessed using the Rosenberg Self-Esteem Scale. The results of this study conclude that elevated BMI is associated with higher dissatisfaction with body image, eating attitudes and low self-esteem. Of all participants: 24.4% were satisfied, 17.6% perceived self as too thin, while 58% perceived self as too heavy. Dissatisfaction was prevalent and associated with actual BMI. The majority of participants were dissatisfied, over-estimating their weight and desired to be thinner.

LS40

Persistence and risk assessment of chlorpyriphos and ethion on capsicum

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Use of insecticides for combating insect pests has no doubt improved the food production and quality of the product; however, indiscriminate uses of pesticides have led to their residues in food chain and have exerted harmful effects on human beings as well as animals. The present study has aimed to study the persistence pattern, dissipation behavior of chlorpyriphos and ethion on capsicum. The first application of Chlorpyriphos 20 EC @ 300 g a.i. ha^{-1} and Ethion 50 EC @ 500 g a.i. ha^{-1} was made at fruit initiation stage followed by another application at 10 days interval. The insecticide residues were analyzed in capsicum fruits after 0, 1, 3, 5, 7, 10 and 15 days following the last application. QuEChERS (quick, easy, cheap, effective, rugged and safe) method was used for the extraction and cleanup of samples. The residues of these insecticides were estimated using gas liquid chromatography (GLC) and confirmed by gas chromatography-mass spectrometry (GC-MS). The average initial deposits of chlorpyriphos and ethion were found to be 0.58 and 1.86 mg kg^{-1}, respectively. Residues of chlorpyriphos and ethion dissipated below the limit of quantification after 0.05 mg kg^{-1} in 10 and 15 days, respectively. Half-life period of chlorpyriphos and ethion were found to be 2.47 and 2.67 days, respectively. The prescribed acceptable daily intake (ADI) of chlorpyriphos and ethion are 0.01 and 0.002 mg/kg body weight/day, respectively. Maximum permissible intake (MPI) of chlorpyriphos and ethion was calculated by multiplying ADI with the weight of average person (55 kg) and was found to be 550 and 110 µg $person^{-1}$ day^{-1}, respectively. Taking average consumption of capsicum fruit as 80 g per day, theoretical maximum residue contributions (TMRC) values were found to be 51.2 and 158.4 µg $person^{-1}$ day^{-1} for chlorpyriphos and ethion residues, respectively, after 0 day of application. The TMRC values were below MPI on 0 and 1 day after application of chlorpyriphos and ethion, respectively. These studies, therefore suggest that the use of chlorpyriphos and ethion at the minimum effective dosages does not seem to pose any hazard to the consumers if a waiting period of 1 and 3 day, respectively, is observed.

LS41

Flower visiting frequency of honeybees on parental lines of *Brassica napus.* L.

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Foraging rate depends upon a number of factors including instinctive foraging behaviour of insects, length of proboscis, floral structure, corolla depth, type of floral rewards and density of flowers on particular cultivar of the crop concerned. Foraging frequency is the trade between rewards available on flowers and time required to collect them. Foraging frequency is considered important because chances of pollination are more, when more flowers are visited per unit time. A study was conducted on foraging frequency of *Apis dorsata, A. mellifera, A. cerana* and *A. florea* on parental (cytoplasmically male sterile (CMS) and Restorer (R)) lines of *Brassica napus* hybrid (PGSH-51). Observations revealed that number of flowers visited per minute was the highest in case of *A. cerana,* followed by *A. mellifera, A. dorsata* and *A. florea*. However there was no statistical difference between foraging frequency of *A. cerana* and *A. mellifera.* It was also observed that average foraging rate of all the four bee species (irrespective of the individual species) was maximum at 1200 hours on R and CMS lines. Further, more foraging frequency

was found on CMS line as compared to R line. The R line flowers offer both nectar and pollen, hence the bee visiting them were pollen and/or nectar gatherers. They spend longer time on individual flower and thus having a lower foraging frequency. While the flowers of CMS line offer only nectar, thus honeybees spend less time on these flowers and have higher foraging frequency. It may be concluded that if number of flowers visited per unit time was considered important parameter of pollinating efficiency then *A. cerana* was best pollinator followed by *A. mellifera, A. dorsata* and *A. florea.*

LS42

Effect of Horticultural Mineral Oils against two-spotted spider mite, *Tetranychus urticae* Koch and predatory mite, *Neoseiulus longispinosus* (Evans) on brinjal

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Two-spotted spider mite, *Tetranychus urticae* Koch (Acari : Tetranychidae), is an extremely polyphagous pest, feeding on a wide range of host plant species throughout the world. It attacks vegetables such as brinjal, okra, cucurbits and fruits such as pear and plum and ornamentals in Punjab. Damage due to *T. urticae* includes reduction in crop yield as well as aesthetic injuries, because of webbing produced by the mites. Control of mites is done mainly by pesticides, but in some cases pesticide sprays make the pest problem even worse because they negatively affect natural enemies. The friendly way to control mites is through biological control. Among several natural enemies, phytoseiid mites are the most important biological control agents (McMurty and Croft 1997). Keeping in view the adverse effect of acaricides, the present studies were undertaken to know the effect of Horticultural Mineral Oils (HMO's) on *T. urticae* and its phytoseiid predator, *Neoseiulus longispinosus* on brinjal under laboratory conditions. Three HMO's, viz. Servo, BP MAK and Arbofine @ 1, 2 and 3 ml/l along with one acaricide, propargite @ 3 ml/l were tested for their efficacy against two-spotted spider mite and phytoseiid mite on brinjal. The leaf-dip technique was used for the study. Observations regarding mortality of mites were recorded after 24 and 48 hours after treatment. The results indicated that after 24 and 48 hours of treatment, all the three HMO's gave more than 75 per cent mortality of *T. urticae,* at the highest dose of 3ml/l as compared to the acaricidal treatment of propargite @ 3ml/l where 100 per cent mortality of mites was observed. Out of the three oils, BP Mak (@ 1 and 2 ml/l) gave 33.33 per cent mortality of the predatory mite as compared to Servo and Arbofine at higher doses. Overall, HMO BP Mak @ 2ml/l was found effective against pest mites and comparatively safer for the predatory mites. Therefore, horticultural mineral oils can be included in the IPM for the management of two-spotted spider mite, *T. urticae* on brinjal.

LS43

Seasonal incidence of citrus leaf miner *(Phyllocnistis citrella)* on kinnow in lower Shivaliks of Punjab

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Kinnow mandarin mainly grown in lower shivalik of Punjab and is attacked by many insects pests like citrus psylla *(Diaphorina citri),* leaf folder *(Psorosticha zizyphi),* citrus leaf miner *(Phyllocnistis citrella),* mealy bugs, fruit flies, mites etc. During recent years there is increase in incidence of citrus leaf miner *(Phyllocnistis citrella)* in nursery and orchards of Kinnow in lower Shivalik. Leaf miner is a serious pest at nursery and young plantation stage. The affected leaves become distorted and crumpled and severe infestation results in defoliation (Anonymous 2015). Keeping this in view studies on seasonal incidence of citrus Leaf miner was recorded in 2012-14 on Kinnow. Two peaks of the incidence were recorded during the year (third week of October and second week of April). The larval incidence was minimum during fourth week of April (1.40%), and maximum during fourth week of March (12.28%) with peaks during second week of October (10.36%) and forth week of March (12.28%). Information regarding the seasonal incidence is an important tool for developing pest management strategies against this pest.

LS44

Antibacterial and antifungal activity of medicinal plant of Western Himalayan Regions

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During the past two decade, rapidly increasing antimicrobial drug resistance has emergence as a serious threat to public health and become a major challenge to scientific community for the search of novel antimicrobial agents with distinct mode of action. In this present study, the organic extracts of medicinal plant species, collected from high altitude of Western Himalayan Regions of India were found to inhibit the growth of *Staphylococcus aureus* (*S. aureus*), *Escherichia coli* (*E. coli*) on Mueller-Hinton agar plates and *Candida albicans* (*C. albicans*), *Candida krusei* (*C. krusei*) on Yeast Extract Peptone Dextrose Agar (YEPD) agar plates.The crude extract was subjected tothin layer chromatography in an organic solvent mixture acetic acid and toluene (170:30). Based on LC-MS studies and High resolution mass spectrometry (HRMS), the molecular weight of the active compound was 413.0. The time kills kinetics of *S. aureus* and *C. albicans* showed that the killing was rapid and concentration dependent. The killing was associated with change in the surface morphology of *S. aureus* cells and *C. albicans*,

as observed under Scanning Electron Microscope (SEM). Notably, a combination of antimicrobial extract with drugs rifampicin, kanamycin and amphotericn B showed a synergic effect in killing *S. aureus and C. albicans* cells. Taken together, these plant extracts represent a good template for further designing and developing antimicrobial agents.

LS45

Western Himalayan high altitude plants extract mediated synthesis of Silver nanoparticles for antimicrobial applications: A green expertise

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In recent centuries, the development of effectual green chemistry methods for synthesis of metal nanoparticles has turn out to be a foremost focus of researchers. They have inspected in order to find an eco-friendly method for production of well-characterized nanoparticles. One of the most considered methods is production of metal nanoparticles using biological entities. Among these entities plants seem to be the best candidates and they are suitable for large-scale biosynthesis of nanoparticles. Nanoparticles produced by plants are more stable and the rate of synthesis is faster than in the case of microorganisms. Additionally, the nanoparticles are more various in shape and size in comparison with those produced by other biological entities. The advantages of using plant and plant-derived materials for biosynthesis of metal nanoparticles have interested researchers to investigate mechanisms of metal ions uptake and bioreduction by plants, and to understand the possible mechanism of metal nanoparticle formation in plants. Keeping in mind, in the present study, we have demonstrated the synthesis of Silver nanoparticles (NPs) in the presence of eight different crude extract, isolated from root, leaf, flower of lower medicinal plants of Western Himalayan regions. The synthesized NPs was well characterized by UV-visible spectroscopy, Dynamic light scattering (DLS) and transmission electron microscopy. The size of synthesized NPs range from 10 nm to 30 nm. Out of total NPs, four types of GNPs are highly stable (more than72 hrs.) and biocompatible in nature. Further, these nanoparticles have shown antibacterial activity against well know common pathogenic bacteria (*Staphylococcus aureus* and *Escherichia coli*) on Muller Hinton agar plate. These result showed that the plant extracts of water are very good bioreductant for the synthesis of NPs. Taken, together, these biosynthesized NPs might be used both in diagnosis as well as therapeutic purpose in future.

LS46

Antibacterial activity of high altitude medicinal plants of Himalayan Regions

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The limited number of vaccines and ever increasing menace of drug resistance in bacterial pathogens has forced the scientific community to develop new antimicrobials. In this present study, the organic extracts of two medicinal plants, collected from high altitude of Western Himalayan Regions of India were found to inhibit the growth of a bacterium, *Staphylococcus aureus* (*S. aureus*) and *Escherichia coli* (*E. coli*) on Mueller-Hinton agar plates. The crude extract was subjected to thin layer chromatography in an organic solvent chloroform and methanol (16:4). Based on LC-MS studies and High resolution mass spectrometry (HRMS), the molecular weight of the compound was ranging from 300-500Da. The time kill kinetics of *S. aureus* and *E. coli* showed that the killing was rapid and concentration dependent. The killing was associated with change in the surface morphology of *S. aureus* cells and *E. coli*, as observed under Scanning Electron Microscope (SEM). Notably, a combination of anti-bacterial extract with drugs rifampicin and kanamycin showed a synergic effect in killing *S. aureus* and *E. coli* cells. Taken together, these plant extracts represent a good template for further designing and developing antibacterial agents.

Section D: Mathematical Sciences

MS01

Prediction of monthly rainfall by Double Fourier Series and Principal Component analysis - Artificial Neural Network

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India mostly receives the rainfall due to, monsoon wind during four months that is June to September only. However, there have been large spatial and temporal variability in rainfall compounded by erratic behavior of rain. Hence, prediction of rainfall pattern with the desired level of accuracy remains a difficult problem. In order to understand its behavior, an attempt has been made to predict monthly rainfall using Double Fourier series (DFS) for Anand, India. This model will be also compare by Artificial neural Networks through finding Root Mean Square Error (RMSE) and Percentage of Average Error (PAE). Since, Double Fourier series has advantage of including two inputs and one output here, monthly maximum air temperature and relative humidity were used as two input parameters and monthly rainfall that is June to September as output. The data set from the year 1958 to 2008 of inputs as well as output was used for present model development month wise. Predictions for unseen data were made for five years 2010 to 2014 using past years mean values of the inputs. For months July to September prediction was tested by Root Mean Square Error and Percentage of Average Error among the five years was 125.3 mm, 105.9 mm, 92.7 mm, and -15.7 %, -18.4%, -6.1% respectively. To compare DFS model with Artificial Neural Networks same predictions were done using Enterprise miner in SAS software. Thus, RMSE and PAE for the month July, August and September by PCA-ANN found during the analysis were 29.2mm, 19.5mm & 26.0mm and 6.02 %, 7.46 % & 7.68% respectively. Comparison shows that DFS method gave predictions with more than 10% PAE in case of July and August while PCA-ANN gives predictions for all three months except June with PAE less than 10%. Double Fourier Series Programmes were developed in MATLAB.

MS02

Modeling and analysis of inventory models with different deterioration rates under exponential demand, inflation and permissible delay in payments

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An inventory model with different deterioration rates under exponential demand with inflation and permissible delay in payments is developed. Two models without shortages and with shortages have been developed. Holding cost is taken as linear function of time. Numerical

examples are provided to illustrate the model and sensitivity analysis is also carried out for parameters.

MS03

Deteriorating items inventory model under shortages for optimal credit period and replenishment time with credit and stock dependent demand

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An inventory model for deteriorating items with credit and stock dependent demand is considered. Shortages are allowed. Selling price is taken as a function of demand. Numerical example is considered and sensitivity analysis is also carried out for parameters.

MS04

Ratio to the moving averages method to compute seasonal variation in biomedical waste for Surat city

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Biomedical Waste management is an important issue as it poses potential health risks and damage to the environment. If it is not handled in a proper way then it becomes effective source of diseases like HIV, Hepatitis B & C and other bacterial diseases causing serious threat to hum an health so prime attention needed for its safe and proper disposal. It is well known fact that some diseases are vary season by season as per atmospheric condition and because of that biomedical waste quantity is also vary. If we are aware about biomedical waste variation seasonally then it is useful in future. This research paper discussed seasonal variation in biomedical waste for Surat city (Gujarat, India) with Ratio to the moving averages method. Paper also discussed detail analysis of category wise biomedical waste seasonal variation for same city.

MS05

A fixed point theorem for weakly compatible mappings in 2-metric spaces

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In 1976, Jungck proved a common fixed point theorem for commuting maps generalizing the Banach's fixed point theorem. This theorem has many applications but suffers from one drawback that definition requires that T be continuous throughout X. There then follows a flood of papers involving contractive definition that do not require the continuity of T. This result was further generalized and extended by many authors. Gahler introduced the concept of 2-metric space and numbers of authors have studied the aspect of fixed point theory in setting of 2-metric spaces.

On the other hand S. Seesa defined weak commutativity and proved common fixed theorem for weakly commuting maps. Further Jungck introduced more generalized commutativity, so called compatibility which is more general than that of weak commutativity. In 1998, Jungck and Rhoades introduced the notion of weakly compatible and showed that compatible maps are weakly compatible but converse is not true. In this paper, we prove a fixed point theorem for weakly compatible maps in 2-metric spaces.

MS06

Thermal instability of visco-elastic nanofluid- a more realistic approach

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Thermal instability in a horizontal layer of visco-elastic nanofluid is investigated. The flux of volume fraction of a nanoparticle is taken to be zero on the isothermal boundaries and the eigenvalue problem is solved using the Galerkin method. The model used for nanofluid incorporates the effect of Brownian diffusion, thermophoresis and electrophoresis. Linear stability theory based upon the normal mode technique is employed to find expressions for Rayleigh number for stationary and oscillatory convection. Oscillatory convection has been ruled out and influence of the Lewis number, modified diffusivity ratio and nanoparticle Rayleigh number on the stationary convection has been investigated both analytically and graphically.

MS07

A Characterization Theorem in Magnetohydrodynamic Triply Diffusive Convection with Viscosity Variations

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The paper mathematically establishes that magnetohydrodynamic triply diffusive convection, with variable viscosity and with one of the components as heat with diffusivity κ, cannot manifest itself as oscillatory motions of growing amplitude in an initially bottom heavy configuration if the two concentration Rayleigh numbers R_1 and R_2, the Lewis numbers τ_1 and τ_2 for the two concentrations with diffusivities κ_1 and κ_2 respectively (with no loss of generality $\kappa > \kappa_1 > \kappa_2$), μ_{min} (the minimum value of viscosity μ in the closed interval $[0,1]$) and the Prandtl number σ satisfy the inequality $R_1 + R_2 \leq \frac{27\pi^4}{4}\left\{\frac{\mu_{min}+\frac{(\tau_1+\tau_2)}{\sigma}}{1+\frac{\tau_1}{\tau_2^2}}\right\}$ provided $D^2\mu$ is positive everywhere. It is further proved that this result is uniformly valid for any combination of rigid and/or free perfectly conducting boundaries.

MS08

Genetic algorithm based hybrid approach to solve multi-objective interval assignment problem with risk attitude parameter

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The present paper discusses the solution process of multi-objective interval assignment problem [MOIAP] using genetic algorithm (GA) based hybrid approach. Few researchers have been developed an approach to find the solution of MOIAP with used traditional method like weighted min-max method, fuzzy method etc. Our experiment with 6-persons and 6-jobs MOIAP, show that statistical measure and GA based hybrid approach gives better analysis rather than other developed approaches. Moreover, this paper we have also discussed the sensitive analysis of decision parameters of MOIAP and includes comparison of developed hybrid approach with other approaches like shen kai et al. and Kagade K. L et al. This research concludes that hybrid approach developed in this work is provide analysis based effective output to take decision compare to other approaches of MOIAP.

MS09

Automorphism Group of Metabelian Group Algebras

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The group algebra F [G] is of interest in both pure and applied algebra. A good description of the Wedderburn decomposition of semisimple group algebra F [G] is useful for describing the automorphism group of F [G], for studying the unit group of F [G] and has applications in coding theory. In this paper the Wedderburn decomposition and automorphism group of the semisimple group algebra Fq [G], where Fq is a finite field with q elements and G is a finite metabelian group of order coprime to q, are computed.

MS10

Investigation of plate in contact with fluid

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The analysis of circular waves in contact with liquid on both sides at varying temperature has been investigated. The model has been solved by using Helmholtz decomposition technique and separation of variable method to obtain the secular equations for symmetric and skew symmetric wave motion of the circular plate in complex form. The results for coupled and uncoupled theories of thermoelasticity have been obtained as particular cases from the derived secular equations. The computer simulated results in respect of dispersion curves for symmetric and skew symmetric wave modes are presented in order to illustrate and compare the theoretical results.

MS11

Maximum and minimum values of power means for continuous probability distribution

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This presentation is based on some inequalities (maximum and minimum values) between central moments when the probability distribution is continuous. Here some better inequalities for the

estimates obtained by Pranesh for third order central moment (μ_3) are obtained. Some bounds between first three central moments of continuous probability distribution when minimum and maximum value of probability density function is prescribed are also discussed here

MS12

Note on the numerical range

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This is an introduction to the notion of numerical range for bounded linear operators. The main results are determination of Numerical range of Multiplication, Compact operators and Composition operators on Hilbert spaces. We also characterize the inducing function T for which the numerical range contains the 0.

Section E: Environmental & Forest Sciences

EFS01

De-coloration from hazardous dye Congo red using highly effective low-cost bioadsorbent *Calotropis procera*

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Water pollution due to dyes is one of the major problems facing worldwide. Textile industries are widespread in developing countries. Among the various processes in the textile industry, the dyeing process uses large volumes of water for dyeing, fixing and washing. Textile industry's wastewater is characterized by intensive colour which contains toxic dyes. The effluent ejected to the environment is responsible for a number of health problems. Thus it is necessary to remove these hazardous dyes from wastewater before their discharge into environment. In this study, the potential of ***Calotropis procera*** a low cost adsorbent has been investigated for the removal of azo dye, Congo red from an aqueous solution. Adsorption of CR onto this natural adsorbent has been characterized by scanning electron microscopy (SEM), Fourier transformer infrared (FT-IR) and XRD. The effects of parameter such as contact time, concentration, adsorbent dosage, pH, temperature, electrolyte and surfactants have been studied. The adsorption equilibrium was represented with Langmuir, Freundlich, Tempkin, and Harkin's–Jura and Dubinin–Radushkevich isotherm models. The maximum adsorption capacity of CR onto adsorbent has 25.77 mg g^{-1}. The pseudo-first order, pseudo-second order, intraparticle diffusion and Elovich models have been tested and it is revealed that adsorption of CR onto adsorbent follows the intraparticle diffusion model. The calculated values of thermodynamic parameters such as ΔH and ΔS for uptake of CR have been found 35.26 kJ $mol^{-1}$and 120.11 J mol^{-1} K^{-1} respectively with negative values of ΔG. This indicated the chemical and endothermic reaction with spontaneous nature of the adsorption process. The adsorbent was found to be effective and economically important.

EFS02

Leaf Extract of *Mussaenda frondosa* as a new source of Camptothecin: An anticancer drug

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Camptothecin (CPT), a pyrole quinoline alkaloid, is one of the most promising anticancer drugs of 21st century. It was first extracted from a Chinese tree *Camptotheca acuminata*, since then it has been reported to exist in several plant species like *Nothapodytes foetida*, *Ophiorrhiza*, *Ervatamia geyneana*, *Mostuea vrunonis*. Indiscriminate harvesting of these species for drug has led to a serious threat to these species. Among various approaches, prospecting for camptothecin

in other species could potentially help in relieving pressure on existing sources. Plant material was collected in two different seasons and Camptothecin was extracted in methanol using Microwave Extraction technique. Isocratic analytical HPLC assay was performed on a youngling (Acme 9000) instrument and UV detector was used to analyze and quantify CPT. The results revealed the presence of camptothecin in *Mussaenda frondosa* belonging to family Rubiaceae. *Mussaenda frondosa* was found to contain 0.05% of CPT.This is the first report of the presence of CPT in *Mussaenda frondosa.* This drug being very costly and being in huge demand in the international market, the farmers will get monetary gains if this plant is grown as cash crops.

EFS03

Flocculation and dye adsorption studies of GrA-cl-poly(AAm) based super-absorbent

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In this present study, synthesis of *Gum rosin* based crosslinked hydrogel with acrylamide (AAm) as monomer using potassium persulphate (KPS) and N, N'-methylene-bis-acrylamide as initiator-crosslinker system has been reported. Optimization of different parameters like initiator concentration, monomer concentration, crosslinker concentration, solvent volume, pH, reaction time and reaction temperature was carried-out to get superabsorbent with maximum swelling capacity. Synthesized hydrogel was characterized by FT-IR and SEM. FT-IR shows appearance of new bonds and SEM studies clearly reveal change in surface morphology. Further, Kaolin and Malachite green dye was used for investigation of the flocculation and dye adsorption properties of the synthesized polymer. All the flocculation and dye removal experiments suggested that the GrA-cl-poly(AAm) based flocculant show significant flocculation and dye removal efficiency.

EFS04

Chemical disaster management: current status and perspectives in India

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Analysis of major chemical accident has exhibited deficiencies like laxity towards safety measures, non- conformance to techno-legal systems and lesser public consultation, A paradigm shift has occurred in government's focus from rescues, relief, restoration- centric approach to planning, prevention / mitigation and preparedness approach. The designing of safer engineering practices, standard operating procedures, well-rehearsed on / off – site emergency plans, community awareness, resource and risk / inventory built up, training, education, capacity built

up, are important practices that may eventually help in development of community mindset to bravely face disasters so as to reduce their impact. This paper summarizes existing concept of Chemical (industrial) disaster management in India, discuses some important key issue, identifies gray areas needing recuperation and presents future trends and challenges.

EFS05

Synthesis of Naphthalimide – based imine linked fluorescence organic nanoparticle for detection of mercury ion in aqueous medium.

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The selective recognition of cations in aqueous or non-aqueous systems is an extremely vital issue, because their excess in the environment has become the reason for various health implications like damage to the central nervous system, diseases of the immune and reproductive systems etc. Leaching of these heavy metal ions into ground water resources, leading to water contamination, has led to a severe health crisis in many countries, especially in developing countries. Among the various cations, the most abundant form of mercury ions, the mercuric ion (Hg2+), is highly poisonous, carcinogenic and has acute cellular toxicity. Due to these reasons mercuric ions are considered to be the worst pollutant among all the metal ions. The severe toxicity of mercury ions can be attributed to their easy invasion of the human body through the skin, respiratory system, cell membranes and gastrointestinal tissues, causing neurological disorders such as acrodynia, Hunter–Russell syndrome and Minamata disease. Therefore, the detection of mercury ions is paramount importance and could assist in the prevention of harmful effects on the human race from mercury ions. Thus we have synthesize the fluorescent organic nanoparticles (FONPs) with an imine-linked 1,8-naphthalimide-based dipodal chemosensor for mercury ion. The FONPs were developed by using a re-precipitation method, and they were successfully used for the nanomolar detection of Hg^{2+} ions in aqueous media. More specifically, they were utilized for the selective sensing of Hg^{2+} ion in a concentration range 25- 50 nM with a 30 nM detection limit.

EFS06

Microwave-assisted green synthesis of $K_2Zn_3[Fe(CN)_6]_2 \cdot 9H_2O$-r-*Gx*-*Psy*-*cl*-poly(AA) hybrid nanocomposite and its application in removal of toxic malachite green dye from industrial effluent

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In the present work, nano-composite of *Gumxanthan-Psyllium* based superabsorbent reinforced with ($K_2Zn_3[Fe(CN)_6]_2 \cdot 9H_2O$) nanoparticles was preparedusing free radical polymerization technique under microwave radiations. Ammonium persulphate and glutaraldehyde were used as initiator and crosslinker, respectively. Various reaction parameters such as initiator concentration, monomer concentration, solvent, pH of the medium, crosslinker concentration and temperature of the reaction medium were optimized as a function of maximum fluid uptake efficiency. The candidate nano-composite was characterized by Fourier transform infrared spectroscopy (FTIR), X-ray diffraction (XRD), scanning electron microscopy (SEM), UV-visible and thermal analysis (TGA/DTA/DTG) techniques. Toxic dye malachite green adsorption capacityof nanocompositewas investigated under various process parameters such as adsorbent dose, initial concentration and contact time of dye. The results indicated that nano-composite $K_2Zn_3[Fe(CN)_6]_2 \cdot 9H_2O$-r-*Gx-Psy-cl*-poly(AA) was potential candidate for dye removal from waste water and could prove to be a boon for textile sector.

EFS07

Impact of SHI Ag^{9+} beam on in-air synthesised *Sg-cl-poly(AAm)* for selective removal of water from petroleum-water emulsion

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Present study deals with in-air synthesis of *Sg-cl-poly(AAm)* hydrogel in aqueous medium prepared by using acrylamide as a monomer, N, N'-methylene-bis-acrylamide as a crosslinker and ammonium persulphate as an initiator by free radical copolymerization. Optimization of various reaction parameters like reaction time, reaction temperature, concentration of monomer solvent amount, crosslinker concentration, initiator concentration and pH was done with respect to maximum fluid uptake capacity. Synthesised superabsorbent was then irradiated with swift heavy ion (SHI) Ag^{9+} beam. The morphological and structural changes induced in 3-D network were observed with the help of different characterization techniques like FTIR, SEM, and XRD. Thermal stability was determined with the help of TGA/DTA/DTG technique. Finally, the irradiated semi-IPN was evaluated for selective removal of water from petroleum-water emulsion.

EFS08

CO oxidation catalysed by Au nanoclusters: Exploring the origin of gold's catalytic activity

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Gold at bulk level is inert material however, at nanoscale it is found to catalyze number of chemical reactions. To explore the origin of this catalytic activity, we selected to theoretically investigate a simple chemical reaction that is, oxidation of carbon monoxide (CO) catalysed by Au_5 and Au_5^+ clusters. It is generally believed that dangling bonds – unsatisfied valencies at nanoscale leads to the enhanced reactivity of material in comparison to that at bulk level. We have tested this theory and studied if any surface reconstruction is taking place during the course of a reaction. Experimentally, gold clusters are found to catalyze this oxidation reaction better at lower temperatures. This temperature dependence of catalytic activity has also been explored. The required quantum chemical calculations were carried out using density functional theory (DFT) and pseudo-potentials were used to treat the core electron of gold clusters. We have analyzed the quantum chemical calculation results within the framework of Density of States (DOS) model.

EFS09

Effect of nanoscale Zinc Oxide particles on the germination and growth of Wheat

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Zinc (Zn) deficiency is the most widespread micronutrient deficiency in crop plants and humans. Low intake of Zn through diet appears to be the major reason for the widespread prevalence of Zn deficiencies in human populations. This investigation was initiated to explore the potential of using Zn oxide nanoparticles as a source to combat the nutrient deficiency by examining the effects of nanoscale zinc oxide particles on growth and development of Wheat (*Triticum aestivum*). Wheat seeds were separately treated with different concentrations of nanoscale zinc oxide (ZnO) and chelated bulk zinc sulfate ($ZnSO_4$) suspensions (a common zinc supplement), respectively and the effect this treatment had on seed germination, seedling vigor, Root and Shoot length, Fresh and Dry weight, chlorophyll content were studied. These particles proved effective in increasing shoot and root growth and chlorophyll content. The inhibitory effect with higher nanoparticle concentration (above 1500 ppm) reveals the need for judicious usage of these particles in such applications.

EFS10

Green synthesis of different manganese oxide nanoparticles from *Sapindus mukorossi* leaf extract: Interaction with aromatic amines

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A green route was successfully used to synthesize different manganese oxide (MO) nanoparticles, namely, MnO_2, Mn_2O_3 and Mn_3O_4 with varied Mn/O ratio. This approach involved utilization of *Sapindus mukorossi* (raw reetha)-water as a natural surfactant-solvent system. The most important feature of present work was that during the synthesis of nanoparticles, no harmful toxic solvent or chemicals were used in order to follow the principles of Green Chemistry. The size of nanoparticles was recorded below 100 nm with different shapes and morphologies. MnO_2 nanoparticles were found to have needle shape, Mn_2O_3: spherical and Mn_3O_4: cubic shape. The synthesized nanoparticles were characterized by Powder X-Ray Diffraction (PXRD), Field-Emission Scanning Electron Microscopy (FE-SEM), Transmission Electron Microscopy (TEM) and Fourier Transform Infrared Spectroscopy (FTIR). The synthesized MO nanoparticles were found to act as a solid support cum catalysts for the interaction and oxidation of different aromatic amines like p-anisidine, p-toluidine, p-chloroaniline and aniline.

EFS11

Green synthesis of different nano-structured metal hexacyanoferrates using *Aegle marmelos* leaf extract: Activity against photodegradation of harmful organic dyes

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Six metal hexacyanoferrates (MHCF) nanoparticles derived from Co, Zn, Fe, Cr, Cu and Ni with general formula $M_4[Fe(CN)_6].xH_2O$ were synthesized successfully via green route using *Aegle marmelos* (Bael) and water as a natural surfactant and solvent, respectively. The synthesized nanoparticles were characterized by Powder X-ray diffraction (PXRD), Scanning electron microscopy (SEM), Transmission electron microscopy (TEM), Fourier Transform Infrared Spectroscopy (FTIR) and Thermogravimetric techniques. MHCF nanoparticles were used for the photocatlytic degradation of toxic dyes like Malachite Green (MG), Eriochrome Black T (EBT), Methyl Orange (MO) and Methylene Blue (MB). Under optimized reaction conditions, maximum photocatlytic degradation was achieved in case of KCuHCF nanoparticles mediated degradation process (MG: 96.06%, EBT: 83.03%, MB: 94.72%, MO: 63.71%) followed by KNiHCF (MG: 95%, EBT: 80.32%, MB: 91.35%, MO: 59.42%), KZnHCF (MG: 94.15%, EBT: 76.13%, MB: 92.23%, MO: 59.91%), KCoHCF (MG: 91.45%, EBT: 78.84%, MB: 89.28%, MO: 58.20%).

EFS12

Assessment of heavy metals in a solid waste dumpsite of Rohtak city, Haryana

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Rapid population growth, high urbanisation induces global environmental change, particularly when it comes to production, consumption and generation of waste. Solid waste disposal in dumpsite is one of the most widely used methods in developing countries. Unorganised dumping of waste cause adverse impacts on environment as well as on human health. Solid waste contain heavy metals which occur as a result of anthropogenic and natural activities. Soils and compost samples were sampled and analysed for heavy metal contamination using AAS (atomic absorption spectrophotometer). The concentration of Cu, Zn, Cr, Ni, Pb, Fe, Cd, Mn were estimated and found to be in µg/g. In certain cases, metal contents of soil and compost are beyond the limits prescribed by World Health Organization (WHO). However, all values of compost are within the acceptable limits of United States Environmental Protection Agency (USEPA) standards.

EFS13

Photolysis and photo-catalysis intermediate products of methylene blue

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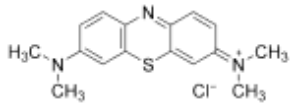
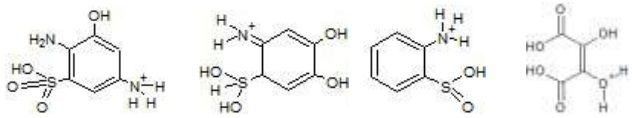
Dyes and dye intermediates are the major organic pollutants in the water body and their degradation into nontoxic products is the research activity in the present environment conscious world. Diverse dyes and dye intermediates make their study very complex and hence some of the dyes are taken as model dyes in the laboratory investigations. Methylene Blue (MB) is the most widely studied dye. Among the various degradation processes the photo-catalysis shows promise of exploiting it technologically to manage the waterborne pollutants. Though the degradation study involves a thorough investigation of the rate of color degradation and concurrent decrease of the Chemical Oxygen Demand (COD) and increase of concentration of CO_2, NO_3^-, SO_4^{2-} as a function of time and light energy (UV and VISIBLE) and concentration of the catalysts, complete elimination of the MB is a difficult task. An adequate understanding of the mechanism of degradation is essential in searching an appropriate catalyst and light energy.

In the literature, one finds very little probe of the intermediate products and the researchers resort to color disappearance and measure of COD, CO_2, NO_3^-, SO_4^{2-}. Sophisticated techniques such as GC-MC, LC-MS, Electrospray Ionization Mass Spectroscopy (ESI-MS) help in finding out any intermediate degradation products remain in the water body after the mineralization of the dye. In our study of photolysis (degradation under sunlight irradiation) and photocatalysis of MB over ZnO, N-doped ZnO and Iron oxide, we observed by ESI-MS study [1] number of intermediates minimal in the case of N-doped ZnO showing superior degradation as shown in the Table 1. Tri-heterocyclic methylene blue, degrades on N-doped ZnO giving simple products such as





while ZnO, iron oxide show several tricyclic products, (Table-1). Thus the knowledge of the intermediate products is desired to know how easily a dye degrades. A plausible mechanism is proposed for the intermediate products formation.

References:

1. [1] "Comparison of the Degradation of Methylene Blue Dye by ZnO, N-doped ZnO and Ore Rejects", V Borker, R.Karmali and Koyar Rane, *European Chemical Bulletin* 3(2014)520-29.

EFS14

Development of Noble metal modified TiO_2 for CO_2Photoreduction under UV irradiation

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The continuously increasing emission of carbon dioxide (CO_2) has become a major environmental problem. Therefore, the growth of CO_2 capture and utilization technologies are an opportunity to use CO_2 as feedstock to produce fine chemicals and to recycle as fuels viz. carbon monoxide, methane, methanol, formaldehyde or formic acid. Among all photocatalytic materials,TiO_2 is a potential semiconductor candidate due to nontoxicity, high stability and low cost. However fast recombination, and requirement of UV irradiation limits its efficiency. Different strategies are addressed to improve photoactivity. Noble metal deposition can enhance the photocatalytic activity due to increase in photogenerated electron–hole recombination time via formation of a schottky barrier.

Here, we presented Noble metal modified TiO_2catalyst for photocatalytic reduction of $CO_2$with water vapor under UV-A irradiation. Ag, Au, Pd, Pt impregnated TiO_2 was synthesized via photodeposition method. Catalystswere well characterized by XRD, UV-Vis, SEM-EDX, ICP analysis. Loading of precious metals over TiO_2 enhances the photocatalytic activity by some folds. These metals play significant role for photoreduction of CO_2 to CO and methane. Pd and Pt loaded TiO_2selectively produces methane while the selectivity for Ag and Au loaded TiO_2gives to CO and Methane both as products. Pd loaded TiO_2 gave maximum 24ppm g^{-1} CH_4 and Au loaded TiO_2 gave 45ppm g^{-1} after 60 minutes irradiation.

EFS15

The faint Side of the E-commerce Age: E-Waste

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E-Waste is growing exponentially because of global consumer demand continues to increase in electronics products demand. As many parts of our expanding world cross over to the other side of the 'Digital Divide', the contemporary consumer demands the means to enjoy an easier more comfortable lifestyle. But that very understandable demand creates a downstream problem of safe disposability. The demand is irresistible so the need for a solution becomes ever more urgent. As per UN report e-waste from old computers would probably leap by 500 percent by 2020. The waste from old television sets and discarded refrigerators might as well rise during the perio. The waste from mobile phones would climb by 18 times by 2020. Most e-waste in the country is appallingly managed; much of it is burned to ashes by backyard recyclers to recover valuable metals like gold. However, this type of recycling releases steady plumes of toxic-pollution and have low metal recovery rates in comparison to well-designed industrial recycling facilities.
Developing countries with rapidly growing economies are the major places to handle all sort of e-waste from developed countries, and as well as from their own internal consumers. Currently, an estimated 70 percent of e-waste handled in India is from other nations, but the UNEP estimates that by 2020, domestic television e-waste will double, computer e-waste will be growing to as five times fanfold , and mobile phones will be 18 times.
Currently India generates over more than 3,500 Tons and tons of e-waste are getting generated all through the year and in this the major contributors are TVs, refrigerator, personal computers, printers and mobile phones. We all love gadgets and appreciate all the ways that technology has enhanced our lives; we found that it comes at an ethical and environmental cost. The lack of proper recycling leads to harmful toxins like lead and mercury leaching into the environment. Harmful materials like these and many others found in e-waste, cause all sorts of health issues.

EFS16

Influence of surface properties of granular activated carbons on adsorptive removal of toxic carbon tetrachloride vapors

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Carbon tetrachloride is a hazardous air pollutant and cause adverse effects on human health on exposure such as liver, kidney and brain damage. It is therefore essential to develop suitable adsorbents for its removal from environment. In present paper, granular activated carbons GAC-

E and GAC-S have been used for the adsorption of carbon tetrachloride. The adsorption capacity of these two carbons for removal of carbon tetrachloride vapors have been studied before and after modifying their surface. The surface characteristics of the activated carbon were modified by oxidation and degassing treatments. The adsorption was found to decrease on oxidation while degassing increases its adsorption which can be correlated to increase and decrease in the concentration of surface oxygen groups. The results suggest that the degassed carbons are better adsorbents as compared to oxidized and as-received carbons for removal of carbon tetrachloride.

EFS17

Ecological studies on the macroinvertebrates of a hill stream impacted by anthropogenic activities in western Himalaya

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The pristine densely forested streams that once persisted in the west Himalayan watersheds are dwindling due to urbanization and human interference. Overall health of a stream is linked to the diversity and distribution of aquatic organisms it harbours.

For developing sound management strategies relating to aquatic habitats, including streams, it is imperative to understand the relationship between habitat modification and aquatic community structure. It was, therefore, proposed to undertake studies on the benthic macroinvertebrates of a perennial stream in Himachal Pradesh, a northwest Himalayan state which has witnessed a spurt in construction activity and urbanization during the last fifty years or so. Benthic macroinvertebrates are organisms that inhabit bottom substrates of aquatic bodies and are good indicators of biodiversity and habitat quality. They also occupy a strategic position in the food web and are relatively sedentary, thus able to accumulate effects of stressors over a period of time.

The study was conducted in a perennial stream originating in Barog Hills of the Giri watershed in Solan district of Himachal Pradesh. The stream arises from relatively undisturbed catchment and then flows through areas with different population densities. On the way, it is impacted by various kinds of pollutants arising from Solan town, agriculture fields, a stone quarry, industrial units, etc. before its confluence with the river Giri which is a tributary of the Gangetic drainage system. It is a source of water supply for drinking and agriculture for riparian habitations, including part of Solan town.

The study evaluated impact of anthropogenic influences on the stream using physicochemical parameters of water and benthic macroinvertebrate species composition and distribution. The overall goal of this research proposal was to determine a set of ecological-based indicators for hill streams to measure environmental changes resulting from anthropogenic activities in general, and urbanization in particular. Based on benthic macroinvertebrates, the proposed study seeks to develop tools for assessing changes in natural ecosystems and restoring the health of impaired streams.

EFS18

Carbon nanotubes as promising materials for environmental protection

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Increasing industrialization, exploitation of natural resources and other human activities have lead to different environmental issues and consequently to adverse impact on human health. Carbon nanotubes (CNTs) have aroused widespread attention as a promising material for application in various environmental fields. Application of carbon nanotubes in environmental pollution control is an emerging field. Carbon nanotubes are tubular forms of carbon that can be envisaged as graphitic sheets rolled into cylindrical form and usually has at least one end capped with a hemisphere of the buckyball structure. The unique structure of CNTs can be divided mainly into multi-walled carbon nanotubes (MWCNTs) and single-walled carbon nanotubes (SWCNTs). They are manufactured predominately by electrical arc discharge, laser ablation and chemical vapor deposition processes. Due to excellent mechanical, electrical, physical and chemical properties, CNTs play a major role in detection, monitoring and remediation of water and air pollution. In treatment of waste water treatment, CNTs serve as not only as adsorbents for the removal of various inorganic and organic contaminants, but also as antimicrobial agents to remove pathogenic microorganisms. In air pollution monitoring, the research is directed towards the development of CNT-based gas sensors with high sensitivity and prompt response for hazardous gaseous pollutants. In the present review, the contribution of CNTs is addressed in terms of green, clean and sustainable environment.

EFS 19

Pine Needles Gasification for Electricity Generation in the Himalayan Region: Socio-Economic and Environmental Benefits

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Pine trees cover large portions of the Himalayan region. These trees, while not indigenous to the region, were originally planted by the British because of their economic advantages, including wood for buildings and furniture and the sap for chemical use. However, now they are considered a hazard to cultivation and agriculture as well as the environment. This is because during the summer season every year, dry pine needles fall from the trees and cover the forest floor, which destroys the fertile top layer. This is also a serious cause of uncontrolled frequent forest fires during the dry months.

In the summer season, forest fires are common in these areas as pine needles, essentially needle shaped leaves which keep falling off trees from the middle of March till the onset of the rains in July, are highly inflammable. Even a half-burn cigarette carelessly thrown by a tourist or villager can cause fires that gut large forest areas. These fires destroy the local ecology, damaging the fertile top layer of the soil and destroying grazing grounds for cattle.
The implementation of gasification technology which would facilitate the use of dry pine needles as raw material for energy production in the region may be seen as a necessity for sustainable development here.
In this paper we will deal with gasification feasibility of dry pine needles along with socio-economic and environmental benefits.

EFS20

Effect of fruit thinning on yield and quality of peach cv. Red June in mid hill conditions of Uttarakhand

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Peach (*Prunus persica* (L.) Batsch) fruit trees often set more fruits than they can support or develop adequately, especially if the trees were not properly pruned during the previous season. It is well established that heavy bearing of peach trees adversely affects the size and quality of fruits resulting in poor returns to the growers, breakage of limbs, exhaustion of tree reserves and reduced cold hardiness. Fruit thinning is essential practice to optimize fruit size, maximize crop value, improve fruit shape, color quality and promote return bloom to maintain tree growth and structure. Traditionally, thinning of blossoms or fruitlets is being done manually and still is in practice. Through this practice, only a small portion of an orchard may be best thinned at the optimum time. Hand blossom thinning is the most secure technique for most peach cultivars but more costly than the others. Furthermore, hand thinning is a labour intensive practice thereby increases the total costs of production. Therefore, the trend has shifted towards chemical thinning using different agents such as Carbaryl, Dinitro compounds, plant growth regulators like Ethrel, NAA, and Thidiazuron etc.
The experiment was laid out in a Randomized Block Design with 3 replications and 13 treatments *viz.*, foliar spray of NAA at 25, 50 and 75 ppm, ethrel at 100, 200 and 300 ppm, thidiazuron at 10, 20 and 30 ppm at two weeks after petal fall and hand thinning of fruits to the intensity of 10, 20 and 30 percent at pea stage and unthinned control. The foliar spray of ethrel @ 300ppm significantly increased the fruit thinning percentage (29.05 %). The highest yield (15.21 kg/tree) was recorded in control with inferior quality fruits. The maximum fruit weight, fruit length, fruit breadth, fruit volume, pulp to stone ratio, total soluble solids, ascorbic acid, total sugar and reducing sugar with minimum fruit firmness and titratable acidity was recorded in fruits harvested from the trees sprayed with ethrel @ 300 ppm followed by ethrel @ 200 ppm. Thus, it can be concluded that spray of ethrel @ 300 ppm was found as the most effective chemical thinner when applied two weeks after petal fall in peach cv. Red June as it produced superior quality of fruits.

EFS21

Trimming down the CO_2 emanation in a solar steam cooking plant with and without preheating

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A study on the reduction of CO_2 emission from a 500 persons' solar steam cooking plant fixed on girls hostel of Shoolini University, Solan (HP) has been performed and noticed that one commercial LPG cylinder has been saved on daily basis reducing 17217.42 kg of CO_2 emissions per year. According to UNCDM, it has earned 17.2 carbon credits for the University. After supplying preheated water to the solar steam cooking system, steam formation inside heat pipe took place during early hours of the day. Now meals were prepared for more number of students. Further, it has been found that the use of preheated water for steam generation have saved another half commercial LPG cylinder which in turn has reduced 8608.71 kg of CO_2 emission, earning 8.6 more carbon credits. The total reduction in CO_2 emission has been found 25826.13 kg per year and earnings of 25.8 carbon credits to the University. These earned carbon credits may be redeemed as per global carbon credit rules.

EFS22

SPION impregnated Pinus-Biochar supported $BiVO_4$ nanostructures for solar induced photo-catalytic removal of endocrine disruptor Methyl Paraben from waste water & soil detoxification

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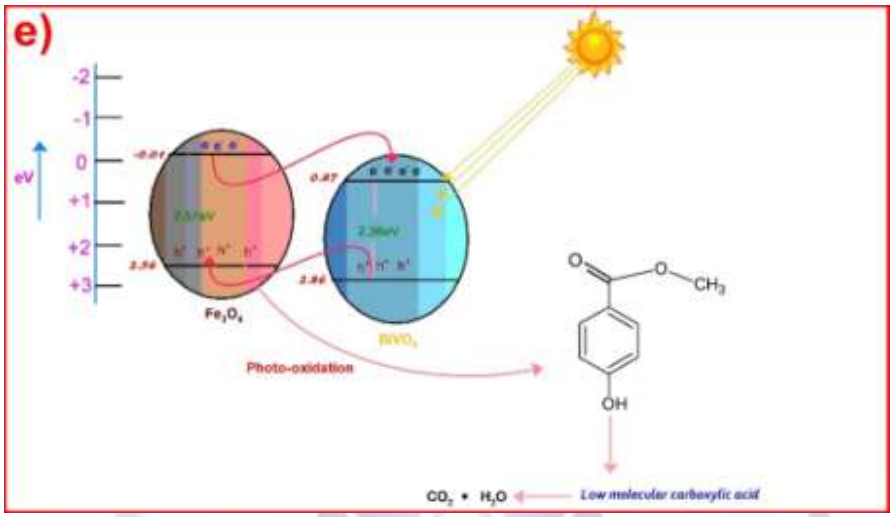
In this laboratory scale experiment we report treatment of carcinogenic Cr (VI) and Methyl paraben by SPIONs impregnated pinus-biochar supported $BiVO_4$. Pinus derived biochar has been utilized to see its long term effect on soil. The in-situ synthesized heterojunction Fe_3O_4-$BiVO_4$ and its biochar composite has been characterized by X-Ray diffraction (XRD), Fourier Transform Infra-Red spectroscopy (FTIR), High Resolution Transmission Electron Microscopy (HRTEM), Small Area Electron Diffraction (SAED), Vibrating Sample Magnetometry (VSM), Energy Dispersive X-ray (EDX), UV-Visible spectrophotometry and Brauner Emmet Teller surface area analyzer (BET). Removal of endocrine disruptors as methyl paraben has remained a challenge because of their hydrophobicity and stability. In our study we have reported excellent results for degradation of MeP and the results were analyzed in terms of Liquid chromatography-

mass spectrometry (LC-MS), Chemical Oxygen Demand analysis (COD) and carbon dioxide emission. 88.2 % % of MeP degradation was achieved in presence of Fe_3O_4/Biochar/$BiVO_4$ in 3h under sunlight. The biochar has been used to remove excessive pesticide from soil. The synergistic effects of charge separation in hetero-junction, alcohols, peroxide, magnetism and adsorption with essential explanation of mechanisms make this study important and promising.



EFS23

La/Fe/Zn @ graphene trimetallics nanocomposite as advanced photocatalyst for remediation of organic pollutants from water system

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Trimetallic nanoparticles are mainly formed by the combination of three different metals in nanodomain. The trimetallic nanoparticles were considerably more professional catalysts than bimetallic and monometallic one. But complex trimetallic nanoparticles have some practical limitations related to their use for diverse applications in context of their reusability and stability issues. To overcome these limitations their composites has been fabricated with organic and inorganic counterparts. We here discuss the fabrication of trimetallic nanoparticles of La/Fe/Zn employing micro-emulsion method. The nanocomposite of La/Fe/Zn trimetallics has been synthesized with graphene. The graphene supported La/Fe/Zn trimetallic nanocomposite has been well characterized using modern techniques including Fourier transform infrared spectroscopy (FTIR), scanning electron microscopy (SEM), transmission electron microscopy (TEM) and X-ray diffraction (XRD). The graphene supported La/Fe/Zn trimetallic nanocomposite has been used as a photocatalyst for degradation of organic pollutants from

aqueous medium. It has been found that La/Fe/Zn @ graphene trimetallic nanocomposite showed better photocatalytic performance in comparison with other photocatalyst.

EFS24

Isolation and Characterization of Quercetin from *Senecio laetus* Edgew. – An Endemic Medicinal Herb

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The Himalayan region is one of the well-defined and better known phytogeographical regions of the Indian subcontinent and has been a potent source of important medicinal herbs. *Senecio* is the largest and most complex genus in the family of the Asteraceae having more than 1500 species distributed widely throughout the world which have been extensively investigated for their secondary metabolites. Several *Senecio* species have been used in traditional medicine for the treatment of wounds, malaria, heatstroke, inflammation, scalding, heavy colds and runny noses. *Senecio laetus* Edgew. is an endemic medicinal herb of regional Himalaya which has been found in the altitudinal range of 2400-3500 meters. *S. laetus* has been traditionally used for the treatment of asthma, respiratory problems, inflammation of mouth and sore throat. The present work was mainly concerned with the isolation and characterization of phytoconstituents from aerial parts of *S. laetus* by spectral (IR, MS, ^{1}H NMR, ^{13}C NMR) and separation techniques (CC and TLC). Crude methanolic extract of plant sample was prepared by organic solvent extraction using soxhlet apparatus followed by sequential fractionation using different solvents. The n-butanol fraction on repeated chromatography yielded a bioactive compound **SL1,** identified as **"**quercetin". Structure of the isolated compound was determined on the basis of chemical and spectroscopic evidence. Quercetin belongs to a group of flavonoids that are largely effective as anti-inflammatory, antioxidant, anticancer agents. Isolation of quercetin from *S. laetus* justifies its use in the traditional medicines for the treatment of different diseases.

EFS25

Identification and molecular characterization of Noctuid moths (Lepidoptera: Noctuidae) of cold deserts of India

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The insect (including Lepidoptera) are identified based on the morphology, wing venation and genetalia, although different life stages also play important role in their identification. There are many moth species which are morphologically very similar and cannot be distinguished by normal eye but these can be different species or may even belong to separate genus. The total number of species of class Insecta, so far described from the whole world are, one and a half

million, representing nearly 80% of the total species of the Kingdom Animalia. It is estimated that there are 9, 50,000 described species of insects, and lot of new species are added to this every year. The insects offer the most diversified biological component of a forest ecosystem and have a great role in maintaining the cycling of nutrients, soil regeneration and protection, pollination of phanerogamic plants, honey production and natural regulation of pests. Taxonomy, the naming and classification of organisms, is fundamental to all biological sciences and biotechnology. Classical taxonomy has played a vital role during the 20th century and molecular taxonomy is the future of any biodiversity programme. Both taxonomic applications have a great role in identification, characterization and in establishing phylogenetic relation (Phylogeny, the history of the evolution of a species or group, especially in reference to lines of descent and relationships among broad groups of organisms). While identifying the moths belonging to the family Noctuidae collected from different conifer forests of Himachal Pradesh, it was observed that the samples of individuals of different species of a genus *Hypocala* and *Chrysodexis* are morphologically similar but belong to different genera or are different species. So to avoid ambiguity, molecular characterization is very effective tool for accurate discrimination and identification of a species. Besides, a combination of polymerase-chain-reaction amplification and automated DNA sequencing is used to survey variation in a species complex of pest insects. This type of work illustrates the potential utility of direct DNA sequencing in assessing population structures, species limits, and phylogenetic relationships among organisms that have not previously been subjected to DNA analysis. By virtue of its simple structure, maternal inheritance, and relatively rapid evolutionary rates, mitochondrial DNA (mtDNA) has become a widely used marker for understanding population structures and phylogenetic relationships of animal species. This will provide necessary skills for developing genetic database of Indian Lepidoptera, which is now a global requirement. The DNA sequencing of insects is not only significant in future but it is requirement of today. During present investigation Twelve species moths (Lepidoptera: Noctuidae) of cold deserts of India have identified through classical features like morphology, wing venation and genitalia viz. a viz. molecular characterization of these species have been evaluated through RAPD-PCR technique.

EFS26

Studies on butterfly (Lepidoptera) diversity of Sub-alpine forest of Himachal Pradesh

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During present investigation, sites of Sub-alpine forest Chansal (Shimla), Marhi (Manali), Kalatop (Chamba), Bhangal (Kangra), Hatu (Narkanda), Chitkul (Kinnaur), Pangi (Chamba), Shikari Devi and Jalori jot were selected for study on butterfly biodiversity. Butterfly species are collected and stretched and stored for permanent preservation and some duplicate specimens have been kept at freezing temp. for Taxonomic study. Total 242 specimens belonging to 59 species were collected from these sites. Butterfly species are collected and stretched and stored for permanent preservation and some duplicate specimens have been kept at freezing temp. for taxonomic study.

Total specimens of 59 species of butterfly collected and out of these all are identified and characterized. GPS coordinates have been taken from selected sites. Host plant of butterfly species has been collected and identified. Statistical data has been prepared on the basis of collection and standard methodology has been adopted for analyzing the data. Wing venation and genitalia has been studied after dissecting the adults to update the identifying features of the species. GPS coordinates of all the sites visited were taken and GIS mapping has been initiated with the technical support of Dept. of Science & technology, Govt. of H.P. and FSI Shimla.

EFS27

Studies on Prevalence and Host Preference of *Cosmocerca ornate* In Frogs

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During present study on *C.ornata* some intra-specific variations were observed in the measurement of various body organs. The cosmopolitan parasite, *C.ornata* has established itself as a dominant/characteristic parasite of amphibians and it was observed that it was the most prevalent (70%) nematode of *Rana perezi.* It was interesting to note that the male frogs were heavily infected than females. This observation was supported by earlier observations that *C.ornata, oswaldocruzia filiformis, Icosiella neglecta, Opisthioglyphe rastellus, Nematotaenia dispar, Rhabdias bufonis, Acanthocephalus acuminate, Aplectana acuminate, Haematoloechus variegates* and *Gordoera cygnoides* in descending order of frequency were found in 189 *Rana temporaria*. It was also observed that the incidence and number of this parasite increased with size and age of toads and thus the incidence of infection being 36.6% in the large toads. Further it was observed that there was high prevalence of nematode infection in the population of host from areas influenced by human activities.

EFS28

Symbiotic germination of *Crepidium acuminatum* (D. Don) Szlach

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Crepidium acuminatum is a terrestrial orchid of high therapeutic importance. Loss of habitat and unscrupulous collection of pseudobulbs have lead to shrinkage of its natural populations therefore rendering it threatened. The species has earlier been mass propagated through

asymbiotic seed germination and organ culture but there is no report of raising it symbiotically. Present study was therefore undertaken to isolate its mycobionts and to investigate their role in inducing symbiotic seed germination *in vitro*. For this surface sterilized root segments were cultured on Oat Meal Agar medium and three fungal endophytes (CA101, *Hypocrea lactea*; CA102, *Trichoderma* sp.; CA103, *Rhizoctonia* sp.) were discerned based upon micromorphological (colony color, hyphal characteristics, Presence/ absence of conidia and moniloid cells, etc.) and molecular characteristics (sequencing the internal transcribed spacer regions of ribosomal RNA gene). Mature seeds were co–cultured separately with all fungal isolates. Embryos swelled after 2 weeks and the testa ruptured after 4.5 weeks in more than 65.92% seeds. Further morphogenetic changes, however, occurred only with isolate CA103. The fungal hyphae entered from general seed surface (rarely through embryonic rhizoids/ micropylar end), and colonized the embryonic cells. Protocorms developed after 12.82±1.01 weeks. First leaf and root emerged after 19.78±1.05 and 27.83±0.99 weeks respectively. Seedlings transferred to greenhouse showed 97.34±0.58 percent survival.

EFS29

Global Warming and Need of Sustainable Development

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Currently on account of the growing awareness of the environmental crisis the issues like global warming and climate change are assigned top priority in national and international agendas. Global warming is a steady process of continuous increase of earth's average surface temperature. The most important cause of global warming is greenhouse gases which are generated by some natural process as well as by various human activities. At present it has become one of the biggest problems faced by the world. If it is not solved immediately by the efforts of all countries worldwide, it would boom its effects and causes end of life on the earth one day. Its threatening effects are increasing day by day and creating danger for human life. Presently, in the race of economic development all countries are seeking for high and rapid economic development at the cost of environment degradation. On the whole, development and growth of present generation should not be at the cost of the generations to come. Hence realising the forthcoming danger, every country in the world is emphasising the need for sustainable development. Sustainable development is the process of development which meets the needs of the present generation without reducing the ability of the future generation to meet their own needs. It does not suggest restricting the process of growth and development but only suggest rationalisation of the use of natural resources in a manner such that what we achieve today should not be at the cost of what ought to be achieved tomorrow. If we try for sustainable development, consequently the problem of global warming will automatically solved. Therefore, to achieve sustainable development we should try to reduce the emission of green house gases to the atmosphere. The basic objective of this paper is to study the causes and consequence of global warming and emphasize the need of sustainable development in contemporary world.

EFS30

Online File Tracking System Model for Chaudhary Devi Lal University, Sirsa (Haryana)

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Indian government has taken a number of e-governance initiatives to minimize corruption from the country. E-governance besides eliminating corruption, also facilitate the citizens to make the services easily accessible. In most of the government offices, it becomes very difficult to locate the file after its submission. The condition becomes worse with the passage of time or when the file under consideration is to be dealt by a number of officials. The applicant to whom file belongs goes from office to another office to locate his file and feel harassed when some of the official does not treat him well. Academic institutions are also not untouched from such kind of problems. The scholars feel very harassed when office clerk refuses to give diary number or receiving of the letter/ application submitted by them. Keeping in mind these issues, a survey was conducted at Chaudhary Devi Lal University campus. The results of the survey motivated the authors to design a file tracking system to facilitate the students and staff. The proposed system eliminates the almost all problems faced in exiting manual diary/ dispatch system of the university. This paper also presents detailed guidelines for implementation of online file tracking system at Chaudhary Devi Lal University, Sirsa. It will establish transparency and accountability and will reduce turnaround time of files.

EFS31

Geo-spatial assessment of flood and waterlogging vulnerability and risk in North Bihar using techniques of Remote Sensing and Geographical Information System

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The North Bihar situated north of river Ganga comprises 21 districts and exhibit high population density of 983 persons per sq km. The region exhibit recurrent flooding during southwest

monsoon and 75% of the area (5.4 million hectares) is flood prone. The waterlogging therefore constitutes the most hazardous phenomenon affecting agriculture in the highly productive Gangetic plains where livelihood of 81 per cent of the population is dependent on agriculture. Waterlogging and flood therefore constitutes the main hazards in the northern Bihar plains resulting due to surplus water availability in the region. The severity of these hazards turns into a disaster due to existence of high population density with low socioeconomic status. Therefore, examination of vulnerability of society to these hazards in view of changing climatic conditions need evaluation of past and present spatial occurrence of these hazards vis-a`-vis socio-economic conditions of present population existing in these regions. The present study pertains to vulnerability and risk assessment of flood and waterlogging hazard of northern Bihar plains. Multi-temporal satellite data of the years 1975, 2001 and 2008 were used to evaluate the area statistics and dynamics of waterlogging. District level flood proneness is evaluated with reference to flood inundation. Census data were used to get district-wise socio-economic characteristics in terms of population density, sex ratio and population of cultivators, agricultural labourers, children in age group of 0–6 years and literates. The geohazard map derived by combining waterlogging and flood hazard maps was combined with vulnerability map derived from socio-economic indicators to get risk map of the region. Relating waterlogging and flood induced hazards to socio-economic aspect can help in prioritizing the scientifically driven mitigation plans to combat ill effect of such hazards. Such studies based on Remote Sensing and Geographical Information system (GIS) can provide a better platform for developing insight into the intricate relations of various hydro-geological parameters influencing waterlogging and flood hazards in the area.

EFS32

Forest Fire Simulation Modeling and Management using Geospatial Technology: A Case Study of District Shimla (H.P.), India

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Forest fire is one of the major hazards causing destruction to biodiversity, environment and humans in the forest of Himachal Pradesh. The study was carried out for forest fire spread analysis and loss assessment using simulation modeling using geospatial technology for Shimla district of Himachal Pradesh. For which the knowledge of the factors including forest types, canopy cover, meteorological status, topographic feature accelerating forest fire were taken into considerations. The parameters derived from remote sensing data and Geographical Information System (GIS) were used to generate input files for forest fire *simulation modeling* using *FARISTE*. Finally, a fire spread maps and fire areas were predicted in this simulation, where relative importance is given to each theme built based on GIS and climate parameters. The study aims to develop a simulation method to find out fire spread and direction according to the climate data (wind direction, wind speed, rainfall) and other data i.e. forest type and density, topographic data etc. Simulation used the integration of remote sensing and GIS to produce

forest fuel type, canopy cover and other maps required for it. The research finding is a significant effort towards development of forest fire management. Thus fast and appropriate direction will be used by the management to stop the spread of fire effectively. It helps to provides effective means for protecting forests from fires as well as to formulate appropriate methods to control and manage forest fire damages and its spread.

Section F: Polymers and Materials Science

PMS01

Synthesis and characterization of iron nanoparticles from ethanolic extract of Capparis decidua

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In recent years metal and metal based nanoparticles have attracted considerable attention due to their unusual and fascinating properties, with wide applications. Iron nanoparticles are well known for its numerous applications in remediation of a wide range of pollutants in contaminated soils and aquifers. Due to the large surface area, small particle size and high reactivity iron nanoparticles are 10-1000 time more reactive than granular or micro-scale zero valent iron particles. Both chemical and physical methods may produce pure and morphological defined nanoparticles. But due to quite expensive and environmental problem associated with these methods, a new cost effective and environmentally benign method is required. In the present work, an effort has been made to synthesize iron nanoparticles from the ethanolic extract of plant Capparis Decidua.
The Capparis decidua or kareel is an aboriginal medicinal plant which is widely distributed in different northwestern states of India. The plant is known for its prodigious history in traditional folk medicine and is known to possess antidiabetic, sedative, anticonvulsant and anthelmintic activities. It is also known as a rich source of alkaloids, phenols, sterols or glycosides which might be medicinally important and/or nutritionally valuable. The iron nanoparticles were synthesized by above method characterized by UV & TEM analysis. Encouraging result was found.

PMS02

Preparation of polyhydroxybutyrate biocomposites reinforced with biologically and chemically modified ramie fibers

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Surface of ramie fibers can be effectively modified by treating them with Bacteria Brevibacillusparabrevis and Methyl Methacrylate monomer. In the present paper, pre-treatment of ramie fibers by utilizing cellulase enzyme from Bacteria Brevibacillusparabrevishas been carried-out which has been compared to the methyl Methacrylate monomer treated ramie fibers

(Boehmerianivea). The Pre-treated ramie fibers were characterized by scanning electron microscopy (SEM), X-ray diffraction (XRD), and TGA/DTA techniques to determine their morphology, crystallinity and thermal stability.Morphology of modified fibers was totally different from the original fibers. Surface of ramie fibers becomes soft and bright on treatment with bacterial cellulase due to extracellular protuberant structures whereas the surface of ramie fibers become rough on graft copolymerization. Both the treatments have little effect on thermal stability and crystalline structure of ramie fibers but make the fibers more hydrophobic in comparison to original fibers.

PMS03

Preparation of Terpolymer of N-Substituted Maleimide, Acrylic acid and Acrylonitrile: Thermal and Antibacterial Analysis

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N-substituted phenyl maleimide polymers are a type of heat resistant polymers, which has prime importance in various avenues of application in automotive, aerospace, microelectronics and military industries .Acrylic polymers have various application in leather, textile and building materials. Copolymers of acrylonitrile are elastomers and find applications as petroleum and mineral –oil resistant rubbers. In the present paper a terpolymer of N-[(4-chloro,2-(phenyl carbonyl)phenyl] maleimide (CPMI) with Acrylic acid and acrylonitrile was synthesized and characterized. Terpolymer was characterized physical-chemically by FTIR, ^{1}H- NMR,TGA (Thermogravimatric analysis), DSC (Differential Scanning colorimetric), molecular weight by GPC(Gel Permeation chromatography)and biologically by antimicrobial.We prepare the polymer to avoid the microbial contamination so develop materials possessing antimicrobial activities.

PMS04

Measurements of Specific Heat and Gibb's Free Energy for $Ge_ySe_{94-y}In_6$ (y = 10, 15 and 20) Chalcogenide Glasses

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Thermodynamic parameters specific heat and Gibb's free energy of $Ge_ySe_{94-y}In_6$ (y = 10, 15 and 20) glasses have been studied using Differential Scanning Calorimetery (DSC). Glassy samples have been prepared by rapid quenching of melt technique. For structural characterization XRD

and EDAX technique have been used. DSC scans for measurements of specific heat have been carried out at heating rate 20K/min from room temperature to 823K under non isothermal conditions. Specific heat measurements are required for study of other thermodynamic parameters. An abrupt change in specific heat value in glass transformation region is a characteristic feature of all glasses. Gibb's free energy difference during glass/crystal phase transformation provides information about stability of glassy alloys. $Ge_{10}Se_{84}In_6$ glass, having minimum value of ΔG_{gc}, have been found most stable composition in $Ge_ySe_{94-y}In_6$ (y = 10, 15 and 20) glassy series.

PMS05

Papain Enhanced Tensile Properties and Improved phase Morphology of Biodegradable Blend Films

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The blending is one of the important techniques to obtain enhanced and improved from the polymer blend. In this study ternary blended films were prepared by solvent casting method and each blend film contain different weight percent of papain (dried papaya latex in power form) in equal weight percent of poly (vinyl alcohol) (PVA)/chitosan (CS) biodegradable blend. The tensile properties such as tensile strength, young's modulus and elongation at break of the blends were investigated using universal testing machine (UTM) at room temperature in air and phase morphology developed during the preparation of blend were observed using scanning electron microscopy (SEM). The tensile strength increases with increase in wt% of papain and then decreases. SEM micrographs for the blend system showed good miscibility among the blend components.

PMS06

Morphological and Mechanical Behavior Studies of Gum Ghatti Incorporated PVA/PVP Blend Films

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In this study biodegradable ternary blend films containing different weight percent of gum ghatti (GG) doped into equal weight percent of poly (vinyl alcohol) (PVA)/poly (vinyl pyrrolidone) (PVP) blends were prepared by solution blending and solvent evaporating technique. The phase morphology and mechanical behavior of various wt% of gum ghatti (GG) doped into equal weight percent of PVA/PVP blend films were investigated using scanning electron microscope (SEM) and universal testing machine (UTM). Scanning electron microscope micrographs for blend system showed good miscibility among the blend components. The tensile strength increases with increase in wt% of gum ghatti and then decreases.

PMS07

Betel Leaf Extract Modified Properties of Chitosan/Vanilin Blend Films

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In this study we plan to prepare blend films containing chitosan/vanillin/betel leaf extract (CH/Vn/BE) by solvent casting technique. The main objective of this study was to investigate the mechanical, thermal and phase morphology of the prepared blend films. The mechanical properties of CH/Vn/BE blend films of different weight ratios were investigated using universal testing machine UTM) by measuring the thickness. It has been observed that betel leaf extract doped chitosan/vanillin blend films exhibit better tensile properties, contributing to overall increase in tensile strength, young's modulus and elongation at break. Further, complete miscibility of all the three components was confirmed by the Scanning electron microscopy (SEM). The result of SEM attests that, betel extract at lower concentration shows blend components were compatible with each other and exhibiting higher mechanical strength due to complete miscibility. Meanwhile interaction among the components in the blend films was evaluated by Fourier transfer infrared spectroscopy (FTIR). Thermogravimetric analysis was performed on CH/Vn/BE blend films to evaluate the mass change as a function of temperature. It is worth noting that, small change was noticed in produced films and all blend films exhibited lower decomposition temperature. All these results were contributed that a considerable amount of interactions may exist between each component, which most probably comes from hydrogen bonds. On the basis of obtained results, CH/Vn/BE blend films can find potential application in food industry as active packaging materials and also in pharmaceutical industry for controlled drug release.

PMS08

Cobalt nanopowder (CoO_x-N@C, PANI) as high performance heterogeneous catalyst for oxidative methyl esterification of benzyl alcohols

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Methyl esterification of alcohols is an important synthetic transformation that has widely been used in the synthesis of various pharmaceuticals, agrochemicals and polymers[1]. Conventionally esters were obtained from the reaction of carboxylic acid or its derivative with methanol under acidic or basic conditions. In addition, few reports are known on the catalytic methyl esterification of carboxylic acids with methanol. Alternatively, oxidative esterification of alcohols using stoichiometric oxidants such as $Na_2Cr_2O_7$, $Ca(OCl)_2$, MnO_2 and N-iodosuccinimide has been reported[2]. Owing to the growing environmental concerns, the use of benign oxidants such as molecular oxygen is highly desired. In this context, a number of catalysts based on precious metals such as palladium, gold, ruthenium, and iridium have been developed.However, limited accessibility and high cost of these metal catalysts make their utility limited from practical viewpoints. Recently, Beller et al. introduced a new concept of "Nanorust" heterogeneous catalysts which have recently been used for various oxidative transformations[3].

Inspired from these reports, we herein report a highly active nanopowder (CoO_xN@C, PANI) catalyst synthesized from pyrolysis of polyaniline (PANI) grafted cobalt(II)acetate at 600 ^oC for 2h under inert atmosphere for direct oxidative methyl esterification of benzyl alcohols with methanol under mild reaction conditions. Further the catalyst was successfully characterised by using various techniques like FT-IR, SEM, XRD, TGA, ICP-AES and the nanopowder was found to be more active than homogeneous as well as heterogeneous polyaniline grafted Co(II)acetate catalyst and could be efficiently reused for several runs without any significant loss in activity.

PMS09

Preparation and Characterization of Equal Weight Percent of Guar Gum and Pepper Leaves Extract Doped PVA Blend Films

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In this study, we have prepared Poly (vinyl alcohol)/Guar gum/Pepper leaves extract (PVA/GG/PE) ternary blend films by solution casting technique and characterized all the blend films. The effect of equal weight percent of GG and PE on PVA films were evaluated by using Universal testing machine (UTM), Thermogravimetric analysis (TGA) and Scanning electron microscopy (SEM). The result of tensile properties confirms that the PVA/GG/PE blend films exhibits lower tensile strength (Ts), young's modulus (Ym) and elongation at break (Eb) compare to pure PVA film. Further result of TGA, attests that weight loss of the PVA/GG/PE blend films occurs at higher temperature (up to 616^{o}C) compare to pure PVA and GG (425^{o}C PVA and 554^{o}C GG). Meanwhile, SEM confirms blend exhibits smooth homogeneous phase morphology but not continuous, exhibiting cracks in blend film that caused the reduction in mechanical strength. The overall result suggests that the equal weight percent of GG and PE has not shown any significant effect on PVA film. A very less interaction can be noticed among the components, which most probably comes from weak hydrogen bonding.

PMS10

An Environmental Benign Route to Synthesize High Molecular Weight Polar Polyolefins by a New PostmetalloceneTitanium(IV) Complex Bearing Asymmetric Tetradentate [ONNO]-type Amino Acid Based Ligand at Ambient Temperature in Aqueous Emulsion

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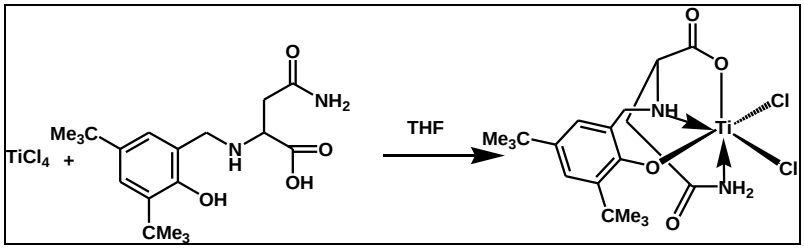
Evolution of Ziegler Natta catalyst in 1950s set a historic mark in the field of designing polymerization catalysts. About 50 years after the discovery of homogeneous Ziegler Natta catalysis, phenoxy–imine-based group 4 transition metal complexes (FI catalysts) emerged as the next frontier catalysts for the controlled polymerization reactions. These hard donor atoms (N,S and P) containing post metallocene catalyst systems are quite versatile in nature as they provide ever-higher catalyst productivity and greater control over polymer properties such as molecular weight, molecular weight distribution and stereoregularity due to their inherent electronic and structural features. Series of organometallic complexes are developed to catalyze and to produce variety of household polymer products. Anhydrous environment (organic solvent) and use of hazardous alkyl aluminium as an activators are the major requirement for all these polymerization reactions due to poisoning effect of water towards metal centre. But, driven by the increasing environmental concern regarding detrimental effects of organic solvents we have synthesized a new water stable (as solvent/diluent) postmetallocene titanium (IV) based catalyst [$TiLCl_2$] {LH_2= 2-(3,5-Di-tert-butyl-2-hydroxy-benzylamino)-succinamic acid} with side arm approach (Scheme 1) for aqueous emulsion polymerization of olefins at ambient temperature.



Scheme 1

Newly synthesized catalyst has been characterized by elemental analysis, ^{1}H NMR, ^{13}C NMR, IR and UV-visible spectroscopy. The catalyst is easy to synthesize and moderately stable in water. In aqueous emulsion, in presence of co-catalyst $NaBPh_4$, it has been found to exhibit moderate to high activity in the range of 10^4 to produce homo and copolymers of polar olefins which are widely used for a variety of applications. The synthesis, structures and properties of the obtained polymers were analyzed by experimental techniques, DSC, GPC, ^{1}H NMR, ^{13}C NMR and will be discussed in details.

PMS11

Preparation and Characterization of Blend Films

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In this study, ternary blend films containing PVA doped Chitosan/Guar Gum biodegradable blend films were prepared by solution blending and solvent evaporation technique and the thermal analysis of the blend samples were performed by simultaneous TGA/DTA using SDT Q600 TGA/DTA (TA Instrument, USA) to know thermal stability, glass transition temperature, melting temperature of the blended films. The tensile properties of the films were determined using A LLOYD Universal Testing Machine (UTM) (LLOYDS – 5 KN, London, UK).

PMS12

Synthesis and Characterization of Crosslinked Poly(arylene ether)s for Proton Exchange Membranes

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Novel sulfonated poly (arylene ether)s have been synthesized via direct copolymerization of sulfonated bis (4-fluorophenyl) sulfone (SDFS), sulfonated 4,4'- dihydroxybiphenol and 4,4'-bis(4-hydroxyphenyl) valeric acid. The sulfonation of bis (4-fluorophenyl) sulfone monomer was carried out using fuming sulfuric acid, whereas concentrated sulfuric acid was used for the sulfonation of hydroxyl monomers. The structure of the synthesized copolymer was identified with the help of FT-IR and ^{1}H-NMR spectra. The prepared copolymer (C-SPAES) was then further crosslinked with synthesized 6F-bisphenol-A epoxy resin. The pristine (C-SPAES) and crosslinked (cr-SPAES) membranes were prepared by solution casting method. The proton conductivity of the membranes was determined by using four point probe technique and their dependence on ion exchange capacity of the respective membranes have also been investigated. The other proton exchange membrane parameters of C-SPAES and cr-SPAES such as water uptake and methanol permeability were also investigated. The Fenton's test revealed that the crosslinked membrane was fairly stable towards radical oxidation. The thermal stability of the membranes was also determined by Thermogravimetric analysis technique. These investigations suggest that the crosslinked membranes are more promising candidate for proton exchange membrane fuel cells.

PMS13

Spintronic Materials for Strange Magnetic and Electronic Behaviour

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Solid materials exhibiting peculiar magnetic and electronic properties are of great interest to investigate by chemist, physicist and engineer. The tuning of magnetic properties can be observed by permutation of transition (d-block) and rare earth (f-block) elements in the solids. Double perovskite type oxides ($A_2BB'O_6$) are the best candidates to investigate as they can accommodate minimum two transition or rare earth elements (B and B' position) in their structure. The discovery of giant tunnelling magneto resistance (TMR) at room temperature in Sr_2FeMoO_6 has stimulated great interest in double perovskite.[1] The combinations of 3d- and 5d-transition metal in double perovskites are more exciting as 3d-transition metal shows pronounced magnetic ordering and 5d-transition metal introduces anomalies in magnetic and electronic properties due to the spin-orbit coupling.

We have synthesized few double perovskites ($A_2BB'O_6$) with the combination of 3d- and 5d-transition elements. The semiconductor Sr_2FeOsO_6 adopts two type of magnetic spin structure at two different temperatures (140K and 67K).[2-3] The lattice instability altered the Fe-Os distance which has controlled the spin sequence of ferromagnetic iron-osmium layers along tetragonal c axis by competing exchange interactions. Sr_2CoOsO_6 exhibits the lattice-site-specific spin dynamics with the variation of temperature.[4-5] Unlike Sr_2FeOsO_6, the Co-phase shows two anti-ferromagnetic (AFM) structures (at 108K and 67K respectively) with additional spin-glass behaviour at low temperature. Below 67K, cobalt moments first become frozen and induce a noncollinear spin-canted AFM state, while dynamically fluctuating osmium moments are later

frozen into a randomly canted state at 5K. Sr_2ScOsO_6 and Sr_2YOsO_6 exhibit the antiferromagnetic ordering at 92K and 53K respectively.[6] The oxidation state and electronic properties of one transition element is regulated by another transition element in all the oxides. Thus, the electronic phases of all the double perovskites are controlled by the interplay of spin, orbital and lattice degrees of freedom. The detailed experimental and theoretical studies (Fig. 1) will be discussed to explain the strange behaviour of 3d-5d mixed metal based oxides.

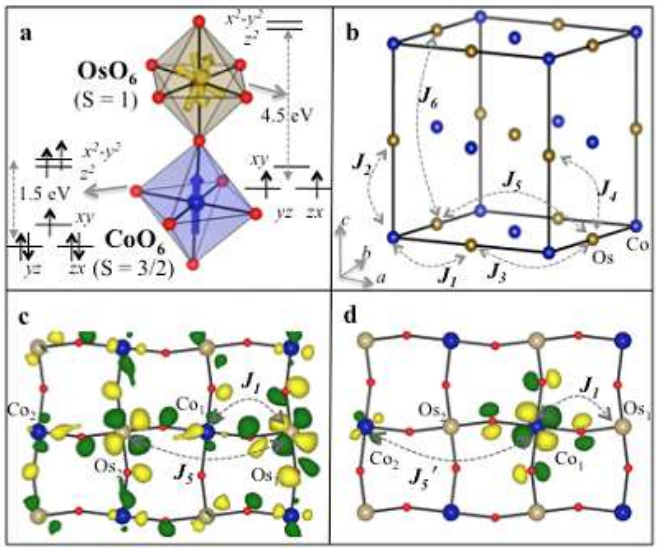

Fig 1:Electronic and magnetic structures of Sr_2CoOsO_6 from theoretical calculations. (a): The local structures and d-orbital diagram. The $t_{2g}e_g$ splitting and occupations are plotted with Co-$3d^7$ and Os-$5d^2$ configurations. The yellow arrows at the Os site illustrate a random spin and blue arrow at the Co-site represents the ordered state, (b): The exchange coupling pathways in the lattice. Blue and yellow spheres represent Co and Os atoms, respectively, (c) and (d): The Wannier functions of Os-$5d_{xy}$ that centres at Os1 site and Co-$3d_{xy}$ that centres at Co1 site in the ab plane, respectively. Red spheres represent oxygen atoms.

PMS14

Enhanced surface properties of titanium dioxide thin film by DC glow discharge plasma

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In this work titanium dioxide thin films were deposited on glass substrate by sol-gel dip coating method. The prepared films of TiO_2 were modified with glow discharge plasma treatment to enhance their hydrophilic properties. The changes in hydrophilicity of modified TiO_2 film was investigated by contact angle and surface energy measurement. The chemical composition of the

thin film was obtained by X-ray photoelectron spectroscopy (XPS). It is observed that the surface energy increases with increasing discharge power and exposure time. With the decrease of contact angle the surface energy of TiO_2 thin films increase. Also, the hydrophilic properties of TiO_2 films enhanced with plasma glow discharge treatment. This study shows that the surface energy increases due to the incorporation of oxygen containing polar group during plasma treatment. XPS results confirmed the presence of the hydroxyl groups.

PMS15

Covalent tethering of transition metal complexes onto graphene oxide nanosheets as heterogeneous catalysts

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Graphene oxide (GO), in the field of materials science, is like a rising sun for myriad chemical modifications and has hegemony over all the carbon based materials. The distinctive physical, chemical, mechanical and thermal properties of GO is beyond belief and directedtowards the advancement of this materials for a wide range of operations in diverse field.
Extremely superior nanostructured heterogeneous catalysts with a huge surface area were the consequence of the modification of decorative surface of the GO with VO(IV) and/or Cu(II) based transition metal complexes via covalent tethering. The structural aspect of these catalysts was characterized by diverse physico-chemical techniques such as ICP-AES, elemental analysis, FT-IR, UV/vis, Raman, BET, TEM, SEM, XRD and thermal studies. Catalytic efficacy of these catalysts was carried out for the olefinic oxidation reactions using H_2O_2 as an oxidant. GO-tethered Schiff base complexes were found to be very proficient with additional advantage of simplistic recovery and recycling of the as prepared catalysts.

PMS16

A study of the effect of Ag^{9+} beam on the chemical, structural and morphological properties of poly(AAm) grafted gum salaiguggal

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Microwave radiation assisted three-dimensional crosslinked polymeric network of Sg-cl-poly(AAm) was synthesised and characterized. Synthesis was carried out using N, N'-methylene-bis-acrylamide and ammonium persulphate as a crosslinker-initiator system. Reaction

parameters like microwave power, pH of the medium, initiator, monomer and crosslinker concentrations were optimised so that the hydrogel formed give maximum water absorption capacity. Bombardment of swift heavy ion Ag^{9+} beam was done on the synthesised superabsorbent. Characterisation of candidate polymeric networks was carried out by using different techniques like FTIR, XRD, and SEM.

PMS17

Gamma ray induced synthesis of pH sensitive Gx-cl-poly(AA-IPN-AM) Hydrogel and its application in moisture-Retention capability in different soils

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In present work we had synthesized a novel device by a two-step aqueous polymerization method, in which acrylamide monomer was absorbed into the network of Gx-cl-poly(AA) followed by a polymerization reaction between acrylamide monomer. Initially, semi-IPN based on acrylic acid and Gum xanthan was prepared by free-radical copolymerization in aqueous media with optimized process parameters, using glutaraldehyde as cross-linker and gamma rays as initiator. The effect of several reaction variables such as Gamma dose, solvent, crosslinker amount and monomer concentration on the fluid uptake capacity of the candidate polymer was explored. The morphological and structural properties were studied using Fourier transform infrared spectroscopy (FTIR), scanning electron microscopy (SEM), X-ray diffraction (XRD) and thermal stability was evaluated by thermo gravimetric analysis (TGA/DTA/DTG).The synthesized superabsorbent was evaluated for moisture retention ability in different types of soils and found that the IPN hydrogel can improve the moisture retention capacity of soil to marginal extent. So, the candidate polymer is one step towards Green revolution in agricultural sector.

PMS18

Studies on uptake behavior of Hg(II) and Pb(II) by amine modified glycidyl methacrylate–styrene–N,N′-methylenebisacrylamideterpolymer

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The removal of mercury and lead ions from aqueous solutions investigated by ethylenediamine, diethylenetriamine and tetraethylenepentamine functionalized polymeric adsorbent. The

adsorbent was prepared by amination of terpolymer synthesized from glycidylmethacrylate, styrene and N,N′- methylenebisacrylamide. In the single metal species system (only mercury or lead ions are present) poly(glycidylmethacrylate–ethylenediamine) (PGMA–EDA), poly(glycidylmethacrylate–diethylenetriamine)(PGMA–DETA), and poly(glycidylmethacrylate–tetraethylenepentamine) (PGMA–TEPA) were found to adsorb lead or mercury ions with a slightly higher adsorption uptake capacity for lead than mercury ions. Among the three functionalized polymers poly(glycidylmethacrylate–diethylenetriamine) (PGMA–DETA) shows faster and higher adsorption capacity than poly(glycidylmethacrylate–ethylenediamine) (PGMA–EDA), poly(glycidylmethacrylate–tetraethylenepentamine) (PGMA–TEPA). The natural pH of both the metal ions was found to be most suitable for uptake. The uptake of Hg(II) and Pb(II) ions was investigated by using batch technique. The maximum adsorption capacities of Pb ions were predicted to be 4.74, 4.76 and 4.73 mmol/g and the maximum Hg(II) ion uptakes were found to be 4.76, 4.80 and 4.21 mmol/g respectively for PGMA– EDA, PGMA–DETA and PGMA–TEPA resins at their natural pH. The uptakes of Hg(II) and Pb(II) ions on the resins were found to follow Langmuir adsorption isotherm and pseudosecond order kinetics.

PMS19

Graphene–ZnO Hybrid Nanostructure with Improved Optical, Electrical and Sensing Properties

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Graphene–ZnO hybrid nanostructure has been synthesized by using domestic microwave (mW) and characterized in detail in terms of their morphological, compositional, structural and optical properties. FESEM images and Raman spectra of the hybrid nanostructure confirmed the formation of Graphene–ZnO hybrid nanostructure. The Graphene–ZnO hybrid nanomaterial exhibits intense broad room temperature photoluminescence. The electrical conductivity of the Graphene–ZnO hybrid material exhibits a semi-metallic behavior. Photoconductivity of the hybrid nanostructure has also been investigated which strengthens its candidature as a potential hybrid nanomaterial with optoelectronic synergy between its components. To demonstrate their usefulness, a model reaction was selected in which degradation of azo bonds of the mixture of methyl orange and RhB has been observed. It was found that the Graphene–ZnO hybrid material show significantly superior photocatalytic activities as compared to pure ZnO nanoparticles. It was supposed that the hybrid material acted as an electron mediator in electron transfer process from reducing agent to azo bond. Synthesized Graphene–ZnO hybrid has also showed ultra-high sensitivity of ~9.2 mA mM^{-1} cm^{-2} and very low-detection limit of 0.10 mM during amperometric sensing of hydrazine.

PMS20

Facile Low Temperature Synthesis, Characterization of Fe - Doped ZnO Nano-Ellipsoids and Their Properties

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Nanocrystalline Fe doped ZnO powders were synthesized directly by simple solution process using nitrate salts of both zinc and iron as the metal source and sodium hydroxide at low temperature of 90°C.The material composition, stoichiometry and optical properties have been examined and verified by means of X-ray diffraction (XRD), Fourier transform infrared (FTIR) spectroscopy, UV−Visible spectroscopy (UV−Vis) and electron microscopy measurements. Detailed structural examinations revealed that of as-synthesized Fe doped ZnO nanostructures are well-crystalline and possessing ellipsoidal shape. The optical property measured by UV–Visible spectroscopy, substantiated good optical properties for as-synthesized Fe doped ZnO Nano ellipsoids (NEs). Methyl orange (MO) was used as a model pollutant to characterize the photocatalytic efficiency of Fe doped ZnO Nano ellipsoids under UV light irradiation. Under optimum condition, complete photo-degradation of MO was achieved in 270 minutes. The as-synthesized nano ellipsoids have also been analyzed as an antimicrobial agent against Escherichia coli, Staphylococcus aureus, Staphylococcus citreus and Enterobacter.

PMS21

Ultra-high sensitive picric acid chemical sensor based on low-temperature grown Fe_2O_3 nanoparticles

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Using well-crystalline Fe_2O_3 nanoparticles (NPs), an ultra high sensitive Picric acid sensor has been fabricated and reported in this paper. The Fe_2O_3 NPs have been synthesized by very simple aqueous solution process at 90◦C and characterized in detail in terms of their morphological, compositional, structural and optical properties. The detailed investigations reveal that the synthesized products are well-crystalline NPs, possessing rhombohedral phase and exhibit good optical and photoluminescence properties. The PL studies demonstrate that the particles synthesized are highly luminescent in nature. Further, PL emission of Fe_2O_3 in the presence of picric acid shows their high sensitivity and selectivity. The superior response in the presence of picric acid makes them very effective PL sensors. The interfering studies show that the developed sensor possesses good selectivity for picric acid even in presence of other coexisting molecules. The limit of detection comes out to be 2.86 μM.

PMS22

Synthesis, Characterization and Photocatalytic Application of Mn Doped ZnO Nanostructures

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Mn doped and undoped ZnO nano-seeds were synthesized by simple solution technique and the samples were characterized in terms of their surface morphology and crystallinity using SEM and XRD techniques. However, the synthesis of nanoscale ZnO pure as well as doped was ascertained from the UV-Vis studies. The samples have been subjected to investigate their photocatalytic properties to catalyze the photocatalytic degradation of dye molecules i.e. methyl orange. The contribution of the Mn as a dopant at different concentrations was studied to examine its influence on photocatalytic efficiency. From the SEM studies, it was interesting to note that there was a great deal of influence of the dopant in influencing the surface morphology of ZnO nano-seeds; primarily the studies showed that there was a significant reduction in the size of the nanoseeds with the addition of Mn. This observation was found to be consistent with the results obtained from the XRD pattern. Further, photocatalytic degradation of methyl orange (MO) dye loaded with as-synthesized nanoparticles has been studied by irradiating the same with UV–radiation. Thus, the ZnO nanoparticles and their doped derivatives were found to be efficient photocatalysts. However, it is interesting to note that 5 and 10 mol % Mn doping were reasonably close to each other in their influence on the photocatalytic activities of the ZnO nanoscale material.

PMS23

Hexagonal Cadmium Oxide nanodisks: Efficient scaffold for cyanide ion sensing, photo-catalyst and antibacterial applications

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Herein, we report the large-scale low-temperature aqueous solution based synthesis of hexagonal-shaped cadmium oxide (CdO) nanodisks. The synthesized nanodisks were characterized in detail to investigate the morphological, structural, optical and compositional properties using various analytical tools. The detailed characterizations revealed that the synthesized CdO nanodisks are grown in high-density, possessing well-crystallinity with cubic crystal phase and exhibiting good optical properties. Further, the prepared CdO nanodisks were used as efficient scaffold for cyanide ion sensor, photocatalyst and antibacterial applications. A

luminescent sensor for the determination of cyanide ion in aqueous solution was fabricated based on synthesized CdO nanodisks. The fabricated luminescent sensor exhibited an extremely low detection limit (~ 1.40 mM) towards cyanide ion which is significantly lower than the maximum permitted value of cyanide ion by United States Environmental Protection Agency (EPA) for drinking water (7.69 mM). The interference studies of the fabricated sensor also demonstrate excellent selectivity towards cyanide ions compared to other coexisting ions. As a photocatalyst, the synthesized CdO nanodisks exhibited high photodegradation (~99.7%) of toxic methyl orange dye just in 90 min using 0.25g of CdO nanodisks. Further, the synthesized CdO nanodisks were used as antibacterial agents towards two bacterial strains, i.e. S. aureus and E. coli and the detailed studies revealed that the prepared nanodisks exhibited good antibacterial properties.

PMS24

Synthesis of lead telluride nanoparticles with enhanced structural, optical and electrical features

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Elevated echelons of attention have been generated during the preceding decade in semiconductor nanoparticles because of its potential for numerous applications. Lead telluride (PbTe) is a narrow band gap (Eg=0.32eV) semiconductor. It has been reported that PbTe and PbTe based materials have superior electronic and optical properties and have potential applications in power generation and thermal sensing. Aforementioned diverse properties of these semiconductor nanoparticles have been found to be strongly size dependent. Bis-quaternary ammonium surfactants regarded as a new tool for the size control of nanoparticles. These surfactants appear better to control size in comparison to corresponding conventional surfactants. In the present work, Lead telluride nanoparticles have been successfully prepared by hydrothermal method with bis-quaternary ammonium surfactants as stabilizing agent. Owing to higher hydrophobicity and morphology control, these dimeric surfactants have been found as efficient capping agents and moreover the same have been considered to be better shape directing agents over conventional surfactants. They are made up of two hydrophilic head groups and two hydrophobic groups per molecule, separated by a covalently bonded spacer. The obtained results showed that semiconductor lead telluride nanoparticles have improved structural, optical and electrical features. Also these outcomes indicate that control of nanoparticle size results in excellent properties and can be potentially used for third generation quantum dot solar cells and other devices. The further results will be discussed in detail.

PMS25

Anisotropic gold nanoparticles for chemo-sensor applications

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Noble metal nanoparticles are well-known for numerous applications such as electronic, catalysis, bio and chemo-sensors, and drug delivery. Metal nanoparticles hold distinct physical and chemical properties which sort them excellent platforms for the fabrication of novel chemical and biological sensors. An assortment of analytical approaches such as chromophore or fluorophores, semiconductor nanocrystals, DNAzymes, and polymers-oligonucleotide composites has been developed to detect heavy metal ions. Among them, colorimetric methods are enormously attractive because they can be simple, cost-effective, easily read out with the naked eye and comparatively fast methods without using any complex instruments.

Remarkably, anisotropic metal nanoparticles are of better prominence because of the enhancement in their activity due to growth of metal particles with species crystal planes, edges and active sites. So for, various surfactants have been used to synthesize metal nanoparticles with controlled shape and size. The conventional surfactants have widely been utilized for synthesizing metal nanoparticles with high yield and reproducibility.

Gemini surfactants are class, have lower critical micelle concentration than conventional surfactants. In this work, we have synthesized Au nanoparticles using Gemini surfactant and further utilized for chemo-sensor applications. The dimethylenebis-(tetradecyldimethylammonium bromide) and their different concentration have been selected to synthesize Au nanoparticles. The obtained TEM results showed that the Gemini surfactants are effective for growth of different shaped nanoparticles (round, triangular, rectangular, pentagon and hexagon) and have higher selectivity towards Hg^{2+} ions. The further results with be discussed in detail.

PMS26

Sn Addition Alters DC Conductivity in Chalcogenide Glasses

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The aim of this study is to investigate the effect of Tin (Sn) addition on Dc conductivity of Se-Te-Sn semi-conducting glasses. This is an effort towards the understanding of physics of

temperature dependence of dc electrical volume conductivity of Se_{75} $Te_{25-x}Sn_x$ (X= 2, 4, 6 & 8) glasses in bulk form. These Chalcogenide glasses were prepared by melt quenching (rapid cooling of melt) technique. The amorphous nature of as prepared glass was confirmed by XRD. Using Keithley Electrometer / High resistance Meter 6517 A, the I-V characteristics of these glasses have been recorded in a temperature range from room temperature to 100˚C. Additionally, the Poole-Frenkel conduction mechanism has also been verified in order to investigate the good agreement with the established fact that most of Chalcogenide glasses obey Poole-Frenkel conduction mechanism.

PMS27

Current Trends in Niosomes: A Novel Drug Delivery System

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On admixture of non-ionic surfactant of the alkyl or dialkyl polyglycerol ether class and cholesterol with subsequent hydration in aqueous media, microscopic lamellar structures formed are known as niosomes or non-ionic surfactant vesicles. Method of preparation of niosome is same as of liposome technology i.e. hydration by aqueous phase of the lipid phase which may be either a pure surfactant or a mixture of surfactant with cholesterol. After preparing niosomal dispersion, unentrapped drug is separated by dialysis centrifugation or gel filtration. A method of in-vitro release rate study includes the use of dialysis tubing. Niosomes are unilamellar or multilamellar vesicles formed from synthetic non-ionic surfactants. Niosomal drug delivery is potentially applicable to many pharmacological agents for their action against various diseases.

PMS28

Surface functionalization of coconut fibers by enzymatic biografting of syringaldehyde for the development of biocomposites

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In the present work, laccase from Trametes versicolor has been used for the biografting of natural phenol syringaldehyde (SA) on the surface of coconut fibers. Three parameters such as concentration of laccase, phenol and incubation period have been varied to optimize the reaction conditions for the maximum biografting. Biografted coconut fibers were characterized with FTIR, SEM, XRD techniques. Thermal, antibacterial and hydrophobic properties were analyzed sby thermogravimetric analysis (TGA), colony forming unit (CFU) and moisture retention methods, respectively. An enhancement in the properties of coconut fibers was observed after biografting of SA. Modified coconut fibers were used as reinforcement in poly(butylene succinate) matrix to prepare biocomposites. Mechanical properties (tensile and flexural strength) of biocomposites were evaluated by universal testing machine. An increase in the mechanical strength of biocomposites was observed when reinforced with biografted fiber in comparison to unmodified coconut fibers. The fractured surface morphology of composites indicated the better interlocking of biografted fibers with polymer matrix.

PMS29

Synthesis and characterization of chemically deposited Eu^{3+}/Gd^{3+} co-doped nanocrystallineCdZnSe thin films

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Eu^{3+} and Gd^{3+} co-doped CdZnSe thin films were prepared by chemical bath deposition technique over the glass substrates. The incorporation of both rare earth ions into the host material was confirmed by X-ray diffraction and energy dispersive patterns. UV-Visible absorption spectroscopy measurements exhibited a red shift in the absorption spectra for Eu^{3+} enriched sample. Photoluminescence studies revealed the red emission corresponding to the thin films co-doped with Eu^{3+} and Gd^{3+} ions. Various structural parameters were calculated and the band gap energy for both samples was estimated.

PMS30

RSM Approach - Vacuum Synthesis of *Guar gum*–Acrylic acid-PANI based Conducting Superabsorbent

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The present work aimed at the development of *Guar gum*-acrylic acid-polyaniline based conducting superabsorbent under vacuum. RSM approach was used for the optimization of different reaction parameters. Seven process factors were screened as per Resolution-IV design to maximize the swelling rate of hydrogel. Different reaction parameters such as monomer concentration, initiator concentration, cross linker concentration, polymerization time, reaction temperature, amount of solvent and pH of reaction mixture were screened using a fractional factorial design approach. Using a half normality plot, the most significant parameters for maximizing swelling were found. The significant process variables monomer concentration, pH and initiator concentration were selected for further process optimization. Finally, center composite design was applied to maximize the swelling rate. Experimental design was able to enhance the swelling rate by 100% under these conditions.
The ANOVA model predicted that the interaction between pH, monomer concentration and initiator concentration had an antagonistic effect on percentage swelling. Further the crosslinked system was converted into IPN with polyaniline to obtain Ggum-cl-poly(AA-ipn-ANI). Later, the resulting IPN was doped with various concentration of HCl to get conducting IPN hydrogels. Conductivity of IPN system was studied by 2- probe instrument using a Keithley source meter.

PMS31

Novel Materials in Science & Technology for Sustainable Future

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Novel materials like perovskite type and nano structured materials are promising materials for various applications in science and technology such as in semiconductors for solar cells, with photovoltaics made of these materials reaching power conversion efficiencies of near 20%, information technology, next generation electronics i.e. spintronics, reading head devices, magnetic sensors, bolometers, magnetic refrigeration, electronic transducers, thin film capacitors, computer memory cells, frequency switching devices, digital and electronic industries etc. The thermophysical properties as a function of the composition and temperature of these novel materials have been investigated for the first time and observed good agreement between the results computed by extended rigid ion model (ERIM) developed by the author and the

experimental data. The new materials offer a platform for scientific and technological applications for sustainable future due to a wide variety of useful properties that they exhibit.

PMS32

Interactions study of Vinca Alkoloids with Transfer-RNA

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The Vinca alkaloids have received considerable attention for their potent anti-tumour activities [1]. An important source of the Vinca alkaloids is *Catharanthusroseus*. Vinca alkaloids have been used to treat diabetes, high blood pressure and also used as disinfectants. However, the Vinca alkaloids are prominent anti cancer agents [2]. Vinblastine and Vincaminewere extracted from the Periwinkle plant (Vinca). Vinblastine works by stopping the cancer cells from dividing into two new cells, so it blocks the growth of the cancer. Vincamine, discovered by E. S. Zabolotnaja in 1950, is the main alkaloid of the small periwinkle; *Vinca minor* (*Apocynaceae*). It exhibited various pharmacological activities on cell multiplication, in the central nervous system and in the cardiovascular system, but its main activity concerns the blood vessels in the brain [3-4]. The interaction of vinca alkaloids with DNA has been studied by several techniques like IR, NMR, UV-Vis, FTIR, Fluorescence spectroscopy, etc. However, the RNA which plays central role in many biological processes and also causes cancer due to the mutation in its structure and the interaction of the drugs Vinblastine and Vincamine with RNA have not yet been studied. The present piece of work has been aimed to study the interactions of Vinblastine and Vincamine with Transfer-RNA using Square-wave Voltammetry and Fluorescence quenching methods. Transfer-RNA under the optimal conditions caused remarkable increase in the reductive peak current appeared with a shift in peak potential. It indicated the interaction of both alkaloids with RNA. In fluorescence quenching study, RNA caused fluorescence quenching by the drugs. Double reciprocal plot of the fluorescence quenching titration furnished DNA binding constants [K] values of 2.0×10^{4}Mole^{-1} and 4.0×10^{3} Mole^{-1}for VBN-t-RNA and VCN-t-RNA respectively. These binding constants exhibited the highest binding affinity shown by VBN: t-RNA complex.

PMS33

Interaction of beta-carboline alkaloids with DNA–labelled optical gold nanobiosensor

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The aim of the study is to determine the physiological behaviour of anticancer drugs β-carboline alkaloids by the construction of gold based optical nano biosensor. The interaction of two β -carboline alkaloids (Harmol and Harmaline) with calf-thymus DNA was studied with DNA coated gold nanoparticles (AuNPs) based optical nanobiosensor. This interaction is basically based on Fluorescence Resonance Energy Transfer (FRET). On the basis of reported studies, Harmol considered as a strong binding agent while Harmaline is weak binding drug used as controlling agent in this study. The DNA-coated AuNPS reveals that anticancer drug binding takes place on the surface of AuNPs resulting in the conformational changes with the biosensor complex which leads to shorter distance among the fluoroscent molecules or the fluoroscent/quencher molecules. As the anticancer drugs interact with CT-DNA, the consequent changes in the spectroflurometery on the basis of their increased fluroscence intensity with the Harmol-DNA interaction and shows significant in the Harmaline-DNA Complex. Results have demonstrated that optical gold nanobiosensor is rapid, receptive and viable technique for the observation of drug-DNA interactions in molecular recognition.

PMS34

Heterojunctioned Bi_2O_3/BiOCl stacked to graphene sand composite and chitosan for photocatalytic antibiotic mineralization in aqueous phase

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In present study, heterojunctioned Bi_2O_3/BiOCl (BO/BOC) was synthesized by via in situ chemical reduction and oxidation of BiOClnanoplates. The BiOCl was reduced to metallic Bi in KHB_4 solution followed by oxidation in H_2O_2 solution to produce BO/BOC. The BO/BOC was coated over graphene sand composite and also on chitosan using wet impregnation method to report BO/BOC/GSC and BO/BOC/CT nanocomposite. The morphology and compositional characteristics of BO/BOC/GSC and BO/BOC/CT were investigated by FESEM, TEM, HRTEM, FTIR, XRD, EDX and UV-visible diffuse reflectance spectral analysis. The photocatalytic activity of BO/BOC/GSC and BO/BOC/CT was performed for mineralization of ampicillin (AMP) and oxytertracyline (OTC) antibiotics under solar light. The adsorption process had significant effect on photodegradation of AMP and OTC. The adsorption of both OTC and AMP onto BO/BOC/GSC and BO/BOC/CT followed pseudo second order kinetics. Simultaneous

adsorption and degradation process (A+P) resulted in higher degradation rate of investigated composite. The applicability of power law model indicates the intricacies of mineralization process. During A+P process, OTC and AMP were mineralized to CO_2, H_2O and NO_3^- ions. Both BO/BOC/GSC and BO/BOC/CT exhibited significant recycle efficiency and easier recovery of photocatalyst from test solution and may be used more than five times with significant photocatalytic activity.

PMS35

Degradation of methylene blue and fast green dyes from aqueous solution usingphotocatalysisthrough nanocomposite

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The present study designates the photodegradation activity of gelatin- Zr (IV) phosphate nanocomposite (GT/ZPNC) ion-exchanger for the removal of methylene blue (MB) and fast green (FG) from aqueous solution. The ion exchange material was prepared using sol gel method by mixing gelatin gel into the precipitates of inorganic part Zr (IV) phosphate (ZP). GT/ZPNC ion exchanger was characterized by FTIR, XRD, SEM, TEM and TGA techniques. Higher thermal stability was confirmed for the ion exchanger. It was reported that 85.55% and 89.24% degradation for MB and FG within five hours.

PMS36

Biosorbent for the remediation of congo red dyefrom aqueous system

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In this study, biosorbent *Phoenix dactylifera* seeds was used for the removal of congo red (CR) dye from aqueous system. Biosorbent was characterized by some instrumental techniques such as Fourier transform infrared spectroscopy (FTIR), X-ray diffractometer (XRD), transmission electron microscopy (TEM). The effect of various adsorption parameters such as initial dye concentration, sorbent dosage, contact time, pH, electrolyte, surfactants and temperature were optimized for sorption of dye. Langmuir, Freundlich and Tempkin isotherms were investigated

for the adsorption study. Langmuir model was found to be best fitted with maximum adsorption capacity equal to 61.72 mg/g.The kinetic study showed that the adsorption process was described by pseudo-second order kinetics. The thermodynamic parameters such as energy change (ΔG°), enthalpychange (ΔH°) and entropy change (ΔS°) were found to be -3.51 kJ/mol, 22.89 kJ/mol and 87.130 J/mol/K, respectively.

PMS37

Microwave induced synthesis of crosslinked hydrogel based on carboxymethyl cellulose

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This research work reports the synthesis of cross linked hydrogel of carboxymethyl cellulose using itaconic acid and lactic acid in the presence of microwave radiations. The conditions for hydrogels formation were optimized with respect to time of exposure, % power of microwave radiations, concentration of crosslinker, pH variation and different compositions of monomers used. The prepared hydrogel was characterized by X-ray powered diffraction (XRD), Fourier transform infrared spectroscopy (FTIR), scanning electron microscope (SEM) and thermogravimetric analysis (TGA). The hydrogelwas studied for controlled drug delivery and antibacterial activities.

PMS38

Effect of Temperature on As(III) Removal Efficiency by Using Magnetite Nanoparticles Coated Sand

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Sand a low cost material was used as a substrate for magnetite nanoparticles. A simple co-precipitation method has been used for magnetite nanoparticles coating on sand surface. The uncoated and magnetite coated sand was characterized by field emission scanning electron microscopy (FE-SEM). Batch adsorption experiments were performed to evaluate the potential

of magnetite nanoparticles coated sand for As(III) removal from water. The effect of temperature on As(III) removal efficiency was investigated by performing the As(III) removal experiments at different temperature conditions.The water samples treated with magnetite nanoparticles coated sand were analyzed with inductively coupled plasma mass spectrometer (ICP-MS) for residual As(III) concentration in water. It was observed that with increase in temperature the As(III) removal efficiency increases. The various thermodynamic parameters associated with adsorption process viz. free energy change (ΔG^o), enthalpy change (ΔH^o), and entropy change (ΔS^o) were also determined. The negative values of ΔG^o and positive value of ΔH^o suggested spontaneous and endothermic nature of As(III) adsorption process respectively. Further the positive value of ΔS^o indicated increase in degree of free active sites at the solid-liquid interface during the adsorption of As(III) on synthesized adsorbent.

PMS39

Fabrication of chitosan-g-poly(acrylamide)/CuS nanocomposite for controlled drug delivery and antibacterial activity

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In present study, we reported the synthesis of chitosan-g-poly(acrylamide)/CuS (CPA/CS) nanocomposite for controlled delivery of ofloxacin. The CPA/CS nanocomposites were characterized by Fourier transmission infrared spectroscopy (FTIR), UV-visible spectroscopy (UV), scanning electron microscopy (SEM), X-ray diffraction (XRD) analysis. From the FTIR spectra, the various groups present in CPA/CS nanocomposite were monitored. The homogeneity, morphology and crystallinity of the CPA/CS nanocomposite were ascertained from SEM/EDX and XRD data, respectively. The kinetics of ofloxacin drug delivery was investigated at different pH. The drug released studies were investigated at different pH (2.2, 7.4 and 9.4) and time intervals (2, 4, 6, 8, 10, 12, 14, 16 h). The drug release behavior depends upon the pH of medium and the nature of matrix. The maximum drug loading efficiency of 85% was recorded for CPA/CS. The maximum drug release 0f 76% was observed at 2.2. pH after 18 h onto CPA/CS. Nanocomposites were also tested for antibacterial activity against *E. coli* bacteria. About 97% killing of *E. coli* was observed after 24 hours.

PMS40

Chitosan based nanocomposite for controlled drug delivery and antibacterial activity

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In present study, chitosan-g-poly(acrylamide)/CuS nanocomposite for controlled delivery of ofloxacin has been synthesized. Nanocomposites were characterized by Fourier transmission infrared spectroscopy (FTIR), UV–visible spectroscopy (UV), scanning electron microscopy (SEM), X-ray diffraction (XRD) analysis. The homogeneity, morphology and crystallinity of the CPA/CS nanocomposite were ascertained from SEM/EDX and XRD data, respectively. The drug released studies were investigated at different pH (2.2, 7.4 and 9.4) and time intervals (2, 4, 6, 8, 10, 12, 14, 16 h). The drug release behavior depends upon the pH of medium and the nature of matrix. The maximum drug loading efficiency of 85% was recorded for CPA/CS. The maximum drug release of 76% was observed at 2.2. pH after 18 h onto CPA/CS. Nanocomposites has also been explored for antibacterial activity against *Escherichiacoli* bacteria.

PMS41

Mössbauer analysis of Lathenum doped M-type Barium nanohexaferrites processed via sol-gel technique

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The present work outlines Lanthanum doped barium nanohexaferrites ($BaLa_xFe_{12-x}O_{19,}$ x = 0.1, 0.2, 0.3, 0.4, 0.5 and 0.6) synthesized by sol-gel auto combustion method and then characterized for their structural, magnetic and Mössbauer properties, specially. X-ray diffraction studies supported by transmission electron microscopy (TEM) confirmed the pure hexagonal phases of the prepared nanohexaferrites with no secondary phases and the particle sizes were found to be in the range of 49.6 -62.3 nm. The room temperature M-H study reveals that lanthanum doped nanohexaferrites have very high values of the saturation magnetization Ms (78.5 emu/gm) and coercivity (5025 Oe), which make them very suitable for magnetic applications. Also, these nonohexaferrites posses high value of retentivity M_r (37.6emu/gm) and aspect ratio (0.5) which confirms the single domain phase especially suitable for perpendicular recording applications. In addition to this, anisotropic constant (k_1) and ferromagnetic resonance (f_r) were also calculated for the mentioned series .The obtained values are $1.45E^{+06}$ and $1.12454E^{+11}$ respectively. Fe^{57} Mosssbauer spectroscopy is employed to determine the occupation sites of La^{3+} ions/atoms in the nanohexaferrites samples and it is proposed by the spectral analysis that La^{3+} ions preferred the octahedral sites (2a, $4f_2$ and 12k sites).

एसजेवीएन विश्व पटल पर

भारत के माननीय प्रधानमंत्री द्वारा भूटान में

600 मेगावाट की जल विद्युत परियोजना का शिलान्यास किया गया

2014-15 में विद्युत उत्पादन क्षमता में 460 मेगावाट की वृद्धि

- 412 मेगावाट रामपुर हाइड्रो पावर स्टेशन, हिमाचल प्रदेश
- महाराष्ट्र में 47.6 मेगावाट की खिरवीरे पवन ऊर्जा परियोजना

- हिमाचल प्रदेश में देश का सबसे बड़ा भूमिगत 1500 मेगावाट जलविद्युत स्टेशन।
- आरएचपीएस को "जल विद्युत परियोजनाएं शीघ्र पूरी करने" की श्रेणी में "गोल्ड शील्ड" तथा "सिल्वर शील्ड"।
- ऊर्जा के अन्य स्त्रोतों, पवन, ताप एवं सौर क्षेत्र में प्रवेश।
- विद्युत ट्रांसमिशन एवं परियोजना परामर्श तथा परामर्शक सेवाएं।
- एसजेएचपीएस को वित्तीय वर्ष 2010-11 के दौरान 'बेहतरीन निष्पादन' के लिए 'गोल्ड शील्ड' पुरस्कार।
- विभिन्न राज्यों एवं पड़ोसी देशों में 12 विद्युत परियोजनाओं का निर्माण-कार्य।

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