

छत्रपति शाहू जी महाराज विश्वविद्यालय, कानपुर-208024  
Chhatrapati Shahu Ji Maharaj University, Kanpur-208024

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कुलपति  
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Vice Chancellor



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November 11, 2019



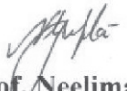
✍: Message :✍

It gives me an immense pleasure to learn that the Departments of Chemistry and Physics, Christ Church College, Kanpur are organizing "**National Seminar on Applications of Elements of Periodic Table in Natural Sciences**" on November 14 & 15, 2019.

The Periodic Table of Elements is the map that outlines an ordered system of all the identified elements that make up everything in our universe. The year 2019 has been declared as the "**International Year of the Periodic Table of the Chemical Elements**" by the United Nations and I am glad that Christ Church College has taken the initiative to celebrate 150th anniversary of the First Periodic Table in the form of International Year of Periodic Table of Chemical Elements (IYPT-2019).

I heartily congratulate Dr. R.K. Dwivedi, Convener and Dr. Meet Kamal, Coordinator of the seminar and their team and have no doubt that the scientific presentation and deliberations during the seminar will prove fruitful to all the participants and will add knowledge to various aspects of this pertinent subject. I am also happy to know that a souvenir containing the abstracts of the presentation by the participants will be released during the seminar.

I wish the seminar a grand success.

  
(Prof. Neelima Gupta)  
Vice-Chancellor

To,

Dr. R.K. Dwivedi,  
Head, Department of Physics,  
Christ Church College,  
Kanpur.



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# CHURCH OF NORTH INDIA

( DIOCESE OF AGRA )

BISHOP'S HOUSE



*The Rt. Revd. Dr. Prem Prakash Habil*  
( Bishop of Agra )

BISHOP'S HOUSE

St. Paul's Church Compound  
4/116-B, Church Road, Civil Lines  
AGRA-282 002

To  
The Principal  
&  
The Family of Department of Chemistry & Physics,  
Christ Church College,  
KANPUR.

Dated: 11/11/2019

Dear Patron and Organizing Officers,

It gives me joy to congratulate and thank you in the name of Lord Jesus Christ for Celebrating 150 years of the Periodic Table by holding a National Seminar on Application of Elements of periodic Table in Natural Sciences on 14 – 15 November, 2019. It is my pleasure to learn that you are going to publish a Souvenir during this seminar. I appreciate that your staff & students have immense talent of enhancing knowledge in Science & Technology.

My good wishes and prayers are always with you and the institution. May the good Lord bless your ministry and mightily utilize your College for spreading education and building up personalities to serve our nation and humanity in general.

With good wishes & blessings.

Yours sincerely,

(The Rt. Revd. Dr. P. P. Habil)  
Bishop of Agra, Church of North India  
&

Chairman, Governing Body, Christ Church College, Kanpur.







# Christ Church College, Kanpur

A Postgraduate Minority College of the Church of the North India, Diocese of Agra, with faculties of Arts, Science and Commerce Affiliated to the C.S.J.M. University, Kanpur, Established in 1866

**Rev. Samuel Paul Lal**  
B.A., B.D.  
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Governing Body

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Date. ....

09.11.2019

## *Message from the Secretary*

I am pleased to learn that on the occasion of 150<sup>th</sup> years of Periodic Table the Department of Chemistry and Physics, Christ Church College, Kanpur is holding a *National Seminar on Application of Elements of Periodic Table in Natural Sciences* on 14-15 November, 2019.

I hope the deliberations of two day Seminar will prove helpful in giving new orientation to academicians and students in particular. I congratulate the faculty members of the Chemistry and Physics Department for their sincere efforts for organizing this Seminar and contributing towards innovative learning.

I send my good wishes for the success of the National Seminar.

SECRETARY

Christ Church College, Kanpur





# Chirist Church College, Kanpur

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## *Message from the desk of the principal*

The Chemistry and Physics department of Christ church college, Kanpur is going to be witness of world wide celebration of 150<sup>th</sup> years of periodic table by organising a national seminar on “Applications of elements of periodic table in natural science. I believe that the lectures delivered in this seminar will be quite beneficial which will help for attaining science scholars and motivate them for further research and investigation. This will also increase the knowledge in science and technology which will help for attaining the sustainable human development and also provide solutions to the global challenges. I am confident that the academic output of the seminar shall be valued at a high level.

On behalf of College, Staff and students I congratulate Dr. R.K.Dwivedi, the Convenor and Dr.Meetkamal, the Coordinator and all the members of the organising team of the seminar.

**Dr. Samuel Dayal**  
Principal

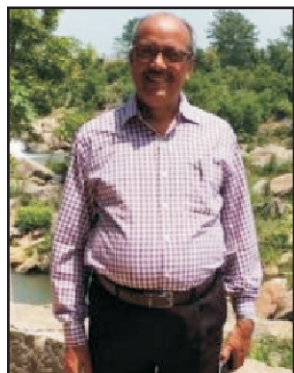




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## *From The Convener*



Respected Chief Guest, Senior Colleagues, Guest speakers, Resource persons and participants First of all, on behalf of Christ Church College family and my own behalf, I take this opportunity to welcome you all on the occasion of "National Seminar on Applications of Elements of Periodic Table in Natural Science" on November 14 and 15, 2019. This seminar is being organized jointly by the Department of Physics and Chemistry of our college to celebrate 150th year of periodic table of chemical elements and included by UNESCO in its world map of events. Thank you very much for giving me an opportunity to organise this wonderful seminar in our esteemed college.

All of you may be aware that the United Nations has designated the year 2019 as the International Year of the Periodic Table (IYPT) of Chemical Elements. The development of the periodic table of the elements is one of the most significant achievements in science and a uniting scientific concept, with broad implications in Physics, Chemistry, Biology and other natural sciences. IYPT-2019 coincides with the 150th anniversary of the discovery of the periodic system by Russian Chemist Dmitry Mendeleev in 1869. Mendeleev periodic table of 63 elements was modified by English Physicist Henry Moseley in 1913 and there are 118 elements at present. It is a unique tool enabling scientists to predict the appearance and properties of matter on earth and in the universe. Many chemical elements are crucial to enhance the value and performance of products necessary for humankind, our planet, and industrial endeavours.

IYPT-2019 also coincides with the Centenary of IUPAC (IUPAC 100). These events will enhance the understanding and appreciation of the periodic table among the public. This two days seminar aims at giving the essence of applications of elements of periodic table in various fields of science, engineering and technology such as consumer electronics, agriculture, medicine, aerospace, research etc. The seminar program encompasses about many sessions including the deliberations by the experienced and renowned resource persons from IIT-BHU, Varanasi; AKTU, Lucknow; IIT, Kanpur; DMSRDE, Kanpur; HBTU, Kanpur along with a unique Periodic Fashion Walk and Skit show by our UG-PG students designed, coordinated and conceived under the supervision of the energetic Coordinator of the seminar Dr. Meet Kamal. A souvenir consisting of abstracts of the papers submitted by the participants will also be released during the seminar.

I extend my warm welcome to all the participants of the seminar hoping the most benefits from this grand gathering in our college. It is a great opportunity to the teachers and students to interact with each other and develop a platform for sharing of ideas. I convey my gratitude to our college governing body Secretary Rev. S. P. Lal for his constant encouragement, guidance and providing all kind of support and a stimulating environment for organizing such academic activities in our college. I express my heartfelt gratitude to our Principal Dr. S. Dayal for his suggestions, guidance and help all through.

Many thanks are endorsed to our valuable teams, department and college colleagues, students and nonteaching staff who spent much time and efforts for the success of this seminar.

**Dr. R. K. Dwivedi**

Associate Professor & Head

Department of Physics

Christ Church College, Kanpur



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## *Message from Head of Department Chemistry*



It is a great privilege for the Department of chemistry to pay tribute to 150<sup>th</sup> Anniversary of the Periodic table by organising this seminar on periodic table. The seminar aims to provide a scientific platform for all participants to congregate and interact. The deliberations of the seminar will be enlightening for all participants. I am very thankful to our management and all my colleagues for their help and moral support in organising this seminar.

**(Dr. Sudhir Gupta)**

Associate Professor & Head

Department of Chemistry



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## *Message from the Coordinator*



***“I saw in a dream a table where all the elements fell into place as required. Awakening, I immediately wrote it down on a piece of paper”*** a famous quote by an iconic legend of chemistry Dmitri Ivanoich Mendeleev formulated the periodic table, which has completed its 150 years.

It is a matter of great privilege bestowing tribute to its 150<sup>th</sup> anniversary. 2019 has been designated by UNESCO as the International Year of the Periodic Table (IYPT), marking the 150<sup>th</sup> anniversary of the Mendeleev periodic table, which is a vital tool to all who learn and work in science, at all stages of their learning and career. I am really fortunate to be a part of this memorable event where many learned personalities are not only going to pursue academic excellence but also to empower the participants to be lifelong learners. Learning is the process of constantly updating in an ever changing world. Keeping in view we tried to emphasize our students to be a part and parcel of this academic activity, not only listening to the esteemed speakers but involving themselves in this periodic venture. The graduate and the post graduate science students are so much motivated in the event that the programme is starting with a skit by the students playing the role of Dobenier, Newland, Mendeleev, Mosley depicting the history of the periodic table. They will also shine the event by performing a periodic fashion walk fore sighting the commercial applications of elements of the periodic table with their innovative ideas. The seminar will create a paradigm shift in the learning process of science students. I am very grateful to the management of Christ Church College, Kanpur for their unconditional support specifically the support and guidance given by our Secretary Rev. Samuel Paul Lal. The encouraging support by our principal Dr. Samuel Dayal also added glory to the event. The guiding force behind the seminar is our Convenor Dr. R.K. Dwivedi, who by his experience and wisdom made this a successful event. The Head of Department Dr. Sudhir Gupta gave all the motivating support needed throughout the event. I am very thankful to my colleague faculty members, staff members and to the participants who are the building stones of this grand celebration. Last but not the least, the endless support from my students, who are working day and night to make this event a grand success.

**Dr. Meetkamal**

Associate Professor,



## सम्पादकीय.....

सुधी पाठकों,

मित्रों, भारतीय शिक्षा की त्रासदी यह है कि सत्तासीन व सत्ता से बाहर सभी राजनेता व शिक्षाविद् इसके महत्व और मानव-निर्माण के महत्व को स्वीकार तो करते हैं किन्तु इस तरफ कोई ध्यान नहीं देते— यहाँ तक कि इसकी उपेक्षा भी करते रहे हैं। आर्थिक विकास की तुलना में हम विकास की तुलना में हम विकास के इस सर्वोत्तम साधन को बहुत गौण स्थान देते रहे हैं। निःसन्देह प्राथमिक शिक्षा को राष्ट्र के विकास की नींव माना जाता है लेकिन वही क्षेत्र सबसे ज्यादा उपेक्षित रहा है। अपने ही प्रदेश में प्राथमिक विद्यालयों की हालत किसी से छुपी नहीं हैं। अधिकांश शिक्षकों के पद रिक्त चल रहे हैं। परिणाम यह है कि एक या दो शिक्षकों से ही पूरे विद्यालय की शिक्षा व्यवस्था चलवाई जा रही है।

गुणवत्ता की दृष्टि से तो स्थिति और भी खराब है एक ओर हम सभी के लिए शिक्षा का अभियान चला रहे हैं तो दूसरी तरफ लाखों बच्चों को केवल अक्षर ज्ञान करा देने की धोखाधड़ी कर रहे हैं और राष्ट्र की भावी पीढ़ी के भविष्य को अन्धकारमय बना रहे हैं। उच्च शिक्षा की स्थिति भी कुछ इससे अच्छी नहीं है। आखिर कब तक ऐसा चलेगा? आखिर कब तक हम भारत के पढ़े लिखे कहे जाने वाले प्रबुद्ध नागरिक भी अपनी ओर से कोई अपनी पहल न करके सरकार की तरफ निहारते रहेंगे।

हम यह उम्मीद करते हैं कि आप अपने नये तार्किक विचारों को हमारे शोध प्रकाशन में प्रकाशित करते हुए शिक्षा की गुणवत्ता को बनाए रखने वाले इस यज्ञ में अपना अमूल्य योगदान देते रहेंगे।

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## **Agricultural industry** **Dr. Akaloo Prasad Chaurasiya**

Associate Professor and Head, Department of Geography  
R.P.P.G.College, Kamalganj-Farrukhabad,  
Email: dr.akaloo@gmail.com

Indian economies mostly depend on agricultural activities like cultivation and farming. At present time, agriculture is the science and arts of cultivating plants and livestock. Agriculture is the key of development in the rise of sedentary human civilization, whereby farming of domesticated species created food surpluses that enabled people to live in cities. Agriculture draws some raw materials like chemical fertilizers, pesticides, electric power, agricultural machinery and implements etc, from the industry for the supply of material for building up social and economic overhead in the agricultural sector. Beside it, the agricultural activities provide many industries like: harvesting crops, plants, livestock, feeding, grazing etc. In other way, agriculture industry comprises of the individuals producing dairy products, vegetables, wine, tobacco, fruit-juice, mushroom, eggs, products obtained as a result of forestry operations. Agriculture industry also includes the florists, greenhouse, aquaculture and nurseries. Agricultural based industries are located in or a rounding the agricultural area/regions. In which, sugar industry is major of itself and in other are pulses, rice, wheat, vegetable oil, speller, textiles and paper etc., these industries use agricultural products as their raw materials. Textile industry is the largest industry in the organized sector. Modern agronomy, plant breeding, agrochemicals such as pesticides and fertilizers and technological developments have sharply increased yields, while causing widespread ecological and environmental damage. So that, we should adopting above facilities with awareness to our environment and golden future life style.

## **Nanotechnology: A gift of science to man kind**

**Dr. Shikha Yadav**

Dept. of Chemistry  
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Nanotechnology is considered to be an enabling technology that is likely to have a great impact on our lives over the coming decades. This new technology could offer great benefits, but little is known about environmental or health hazards. The purpose of this study was to examine people's perceptions of trust, risks, benefits, control, and dread on food, care products, and medicine to which either natural or nano-additives were added for certain unique benefits for human health. Data was collected with two online surveys, both identical except for which additive was mentioned. Participants (N=125) perceived risks and dread to be significantly higher for nano-additives when measuring perceived trust, benefits and control for food and care products. Medicine did not show any significant results for trust benefits, and control. Calculations were also conducted to see whether there were any significant difference between nano-fortified products. Medicine scores were found to be significantly higher than food for benefit and control items and medicine scores were also significantly higher than care products for control and dread items. The results suggest that the public may perceive nano-fortified food and care products differently from nano-fortified medicine.

## **Regulations for use of Plutonium**

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Regulations and recommendations can be expressed as "not-to-exceed" levels, that is, levels of a toxic substance in air, water, soil, or food that do not exceed a critical value that is usually based on levels that affect animals; they are then adjusted to levels that will help protect humans. The most current information, the federal agency or organization provides these recommended radiation exposure limits are for all forms of radiation combined and are not specific to plutonium. The limits are expressed in units called rem (roentgen equivalent man). A rem is a radiation unit that expresses the radiation equivalent dose to a particular organ or tissue. The limits on equivalent dose are used to calculate the limits on the amount of radioactive substances that can be inhaled or ingested. The USNRC has recommended the following radiation exposure limits for the general public and for workers. 0.1 rem/year for the general public and 0.5 rem/year for people who work with medical patients. These regulations are for all forms of radiation combined, so they are not only for plutonium. 5 rem/year for workers in industries where exposure to radiation may occur and 0.5 rem for the pregnancy period following the declaration of pregnancy by a woman in an industry where exposure to radiation may occur.

**Key words:** recommended, rem, levels, critical,oxic

## **Antimicrobial Activity of Acrylamide Based Biodegradable Silver Nanocomposites**

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The antimicrobial property of silver nanoparticles by adhesion of nanoparticles to the surface altering the membrane properties. Nano silver particles have been reported to degrade lipopolysaccharide molecules, and accumulate inside the membrane by forming pits and cause large increases in membrane permeability. Nano silver particles penetrate inside the bacterial cell, resulting in DNA damage. . The bacterial membrane contains sulfur-containing proteins and the inorganic nano particles interact with these proteins in the cell as well as with the phosphorus containing compounds like DNA. Recent advances in antimicrobial and drug delivery applications have been directed towards the design of number of biodegradable inorganic nanocomposite hydrogel from silver formulations. In view of this, the present work involves the

development of acrylamide based biodegradable inorganic nanocomposite hydrogels (BINCH) by using different natural polymers. The morphology and formation of BINCH was investigated by using spectral and electron microscopy. Further the antibacterial activity studies on *Escherichia coli* (*E. coli*) bacteria was done. Finally the drug loaded studies into these BINCH and their releasing behaviour was also done. It is in vitro release studies were performed in 7.4 pH buffer solution at different temperatures. This work is important from the point of development of biodegradable & biocompatible natural Polymer based hydrogels metal nanocomposites for various biomedical applications.

**Keywords:** antimicrobial activity, nanocomposite, hydrogels, delivery, acrylamide, polymer

## Assessment of Personal Exposure of Occupants in Indoor Environment

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**Abstract:** Changes over recent decades in outdoor concentrations of air pollutants are well documented. However, the impacts of air pollution on an individual's health actually relate not to these outdoor concentrations, but to their personal environment in indoors where they spend most of their time. Adverse health effects from the particulate exposure is a global challenge and of widespread concern and especially from fine particles (PM<sub>2.5</sub> and below) can have significant injurious effect on the occupants respiratory and cardiovascular systems. To investigate daily exposure characteristics to PM<sub>2.5</sub> personal exposure measurements were conducted for school children, office workers and at their residents in the heritage city of Agra. To account for all the sources of particulate matter exposure, measurements on several different days from December 2013 to February 2015 was carried out. Personal environment monitors from SKC were used to measure PM<sub>2.5</sub> concentration. The research findings provide insight into possible sources and their interaction with human activities. The values obtained in this study represent estimates of emissions and their implications, which can be a useful addition to the existing literature, in particularly for the developing countries like India; where such measurements are yet underrepresented.

**Key Words:** Personal exposure monitoring, PM<sub>2.5</sub>, Homes, Schools, Offices.

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## Exploring the adsorption mechanism of carmellose onto modified polypropylene powder

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**Abstract:** Carmellose is the most versatile cellulose derivative having several industrial applications such as mineral processing, functionalization of materials and other potential utilizations. However, the lack of understanding of binding aspects of the carmellose onto the solid-surfaces hindered its applications. An attempt has, therefore, been made to explore the binding aspects of carmellose onto modified polypropylene powder (MPP) derived from polypropylene (PP). The BET analysis confirms the typical specific surface area ( $S_{BET}$ ) = 22.842 m<sup>2</sup>g<sup>-1</sup> and mesoporous nature of MPP. The pH and ionic strength studies suggest that electrostatic interaction is responsible for adsorption and confirmed by depth characterisation techniques. Further, the presence of urea reduced the adsorption significantly which added assurance of role of H-bonding on the occurrence of adsorption in the present case. The adsorption free energy of carmellose was found as 22.561 kJ/mol which is in close agreement with H-bond. All of the above results confirm that adsorption of carmellose onto MPP surface is attributed to electrostatic interaction and H-bonding.

## Cscenario of biological effects and applications of tellurium compounds

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**Abstract :** Tellurium is a member of group sixteen of periodic table. It is a rare element and known as toxic, non- essential, trace element which biological role is not clearly known. But in recent years many inorganic and organic compounds of tellurium have been formed and their biological applications also have been studied. This leads to a set of interesting applications of tellurium. For example, pharmacological properties of organotellurium compounds, such as, antioxidative, immunomodulation and antitumor activities have evidenced by several model studies. Organotellurium steroid, lipid, amino acid, nucleic base and polyamine inhibitors have synthesized on the basis that they might be selectively or differentially incorporated into tumor cell. Similarly some azogroup containing organotellurium compounds have screened for their antibacterial and fungicidal activities. The application of organotelluranes as protease inhibitors and its applications in disease models are most recent contribution. In this paper the scenario of the biological effects and applications of tellurium compounds is discussed.

**Key Words:** Non- essential, biological application, pharmacological, antioxidative, antitumor, immunomodulation, protease inhibitor.

## Micronutrients used in Agricultural Chemistry

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**Bhawans Mehta Mahavidyalay, Bharwari Kaushambi**

**Abstract:** Conventional agriculture focuses on the macronutrients of nitrogen(N), phosphorous(P) and potassium(K) but they are not fruitful without micronutrients.

The benefits of supplementary micronutrients help other nutrients to be more effective. Micronutrients are essential for plant growth and play an important role in all crop nutrients. Many micronutrients act as enzyme co-factors and building blocks that enable plants to build complete proteins and compounds. They also aid in the development of larger, stronger roots and promote better plant immunity. The most critical micronutrients are boron(B), zinc(Zn), manganese(Mn), copper (Cu), iron (Fe), nickel (Ni), cobalt (Co), molybdenum(Mo) and sulphur(S). Boron is a life-sustaining element to microbial life in the soil. Boron is critical for transporting carbohydrates through the plant system to grow healthy fruit. Zinc and manganese are useful for reproduction and seed formation. Copper activates enzymes and catalyzes reactions in several plant growth processes. Copper, cobalt, molybdenum are useful in plants to produce complete plant compounds which allow them to be naturally resistant to pests and diseases. The need of micronutrients has a significant role in order to achieve full balanced nutrients.

**Keywords:** enz=enzymes, trns=transporting, thr=through, mcrnts=micronutrients, sgf=significant, esl=essential, ntrs=nutrition, imp=important, rpdn=reproduction, comp=compounds, elmt=elements, bal=balanced.

## Heavy metal contamination in plants due to tannery effluent

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**Abstract :** The Tanning industry is one of the oldest industries in India. One of the largest environmental problems is the removal of chromium-infected sludge formed as a by-product of wastewater treatment. With rain heavy metals of effluents are penetrated into the soil and are eventually translocated into plants and into man through using up of these plants. Heavy metals are the steady metals whose density is larger than 4.5 g/cm<sup>3</sup>. One heavy metal is dumped in the soil, is not disintegrated and endures in the surroundings for a long time and brings serious environmental contamination. In 90% tanneries worldwide, Chromium compounds are utilized most often as tanning agents. Plants take up heavy metals by taking up the from deposits on the parts of the plants interpreted to the air from infected environment and from impure soil. Lead, Chromium and Cadmium and also other metals are non-biodegradable and can undergo global ecological successions. Heavy metals may be present either as a dump on the exterior of vegetables or may be taken up by the crops roots and pierce into the edible part of plant tissue. Lead is the most significant pollutant of the heavy metals and the inorganic forms are sucked up through intake by food, water and breathing. Cadmium gathers in the human body influencing adversely numerous organs like liver, kidney, lung, bones, placenta, brain and the central nervous system. Declining in root growth is a well-documented consequence owing to heavy metals in trees and crops. In this paper, we want to determine heavy metal contamination of soil and their deposition in the plants due to untreated tannery effluents.

**Keywords:** Heavy metals, tannery effluent, contamination, Lead, Chromium and Cadmium

## Facts About Copper

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Shiny, Reddish, copper was the first metal manipulated by humans and it remains an important metal today also.

Copper is the third most consumed industrial metal in the world after iron and aluminium. About three quarters of copper goes to make electrical wires, telecommunications cables and electronics.

Human have been making things from copper at least 8000 years and known the extraction of metal from its ore by about 4500 B.C. about two-thirds of the copper on earth is found in igneous rocks and about one-quarter occurs in sedimentary rocks. Copper turns green on exposure to air as it oxidizes. Statue of Liberty is green because of this reason.

According to Peter Van der Krogt a Dutch historian the world copper has come from the phrase cyprium aes, which means a metal from Cyprus.

Copper conducts heat and electricity both equally as well copper is essential trace elements help for forming red blood cells. Copper is present in variety of foods, including grains, beans and leafy greens.

However too much copper is bad for health, also excess in body may cause abdominal pain, vomiting and jaundice. Copper has antimicrobial properties and kills bacteria, viruses, and yeast on contact. Copper is also used for birth control.

Copper is an essential element for our society

## Essential Metal Elements of Periodic Table for Human Life

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The periodic table of chemical elements is a tabular arrangement of elements organized on the basis of their atomic number, electron configurations and recurring chemical properties. 60 elements of the periodic table are contained in the human body but only 20 of them are essential for it. The metal elements which are considered essential for human body include Calcium (Ca), Potassium (K), Sodium (Na),



Magnesium (Mg), Iron (Fe), Zinc (Zn), Copper (Cu), Molybdenum (Mo), Cobalt (Co) etc. Calcium is the most abundant inorganic constituent of the human body as it acts as a messenger in cascading signal reactions such as muscle and nerve function and impulses. Potassium is contained by all parts of the human body and sodium is its extracellular counterpart. The human body contains about 30 gram of magnesium stored in bones, body fluid, soft tissues and muscles and 4.8 gram of iron found mostly in hemoglobin. The deficiency of zinc leads to decreased resistance against infection in human body while manganese is an essential metal for intracellular activity. Copper and Molybdenum are found to be important in various enzymatic reactions. Cobalt also plays a vital role in human body as it is an essential component of vitamin B-12. In order to know the role of these metals, it is necessary to understand the chemical properties of these metal ions correlated with the biological functions of different organs of human body. The role of the various essential metal elements, their toxicity and chemical behaviors on human body will be discussed in this presentation.

## 480 Crores rupees Profit using nano iron in alcohol production

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**Abstract:** Alcohol is produced by fermentation of molasses using urea, vitamins, minerals salts (Mg, Zn), Phosphorous and trace metals. These chemical nutrients are expensive and give lesser yield of Alcohol. We have replaced all these expensive chemicals by discarded waste of iron ore mines and grinded scrap iron, which are naturally enriched with mineral salts, phosphorous, nitrogen & trace metals.

### Science behind the use of iron waste as nutrient:

Using chemical nutrients, assimilation of nitrogen takes place and only 2 ATP of energy is produced. But using iron waste, assimilation of iron also takes place and more than 2 ATP energy is produced according to following steps:

1.  $4\text{FeO} + 3\text{O}_2$  (In the presence of Gallionella Bacteria)  $2\text{Fe}_2\text{O}_3$  (Nano Ferric Oxide)
2. Ferric oxide so formed combines with oxalic acid to produce ferri-oxalate.  $\text{Fe}_2\text{O}_3 + 3\text{H}_2\text{C}_2\text{O}_4$  (Oxalic Acid)  $\text{Fe}_2(\text{C}_2\text{O}_4)_3$  (Ferri-Oxalate) +  $3\text{H}_2\text{O}$
3. Ferri oxalate is photo sensitive and is reduced to ferro-oxalate by absorption of light radiations.
4. Energy released during oxidation is absorbed by Gallionella Bacteria and energy absorbed during photo reduction is finally absorbed by yeast.
5. Since energy absorbed by yeast due to nitrogen & iron assimilation becomes more than 2ATP, yeast can now break sufficient sugar and recovery of alcohol is increased.

### Conclusion:

- (a) When chemical nutrients are used, 250 tonnes of molasses produce only 60,000 litres of alcohol per day in a single distillery.
- (b) When iron waste is used in place of urea, 250 tonnes of molasses produce 62500 liters of alcohol per day in a single distillery.
- (c) Profit generation from 2500 liters of alcohol in 200 distilleries in 150 days comes to be Rs. 450 crores and saving of input cost of chemical nutrients becomes Rs. 30 crores. Thus, total profit is equal to 480 crores rupees.
- (d) Iron waste can be recycled.

Startup Award Received- Cohort II XLr8(AP)

**Keywords:** Neno Ferri Oxide Fermentation, Gallionella Bacteria, Photo Reduction.

## Palladium(II) Complexes as Antitumor Agents

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**Abstract:** The application of inorganic chemistry to medicine is a rapidly developing field, and novel therapeutic and diagnostic metal complexes are now having an impact on medical practice. Advances in bio-coordination chemistry are crucial for improving the design of compounds to reduce toxic side effects and understand their mechanisms of action. The Pd (II) complexes with a series of uracil substituted ligands have been synthesized and characterized by different spectroscopic techniques such as FTIR, UV/Vis, and NMR. Their molecular sustainability in different solvents such as DMF, DMSO. The stronger antibacterial and antioxidant activities of the synthesized complexes suggested them as a stronger antitumor agent. A new series of a mixed ligands coordination compounds of Palladium having square planer stereochemistry, around the metal ion with the general formula,  $[\text{PdL}_2\text{Cl}_2]$  where L= substituted uracils has been isolated in the solid-state by the interaction of with the aforesaid ligands. Our study advances the biological importance of palladium (II) substituted uracil complexes in the field of antitumor activities.

**Keywords:** Substituted uracils, Anti tumour activity, palladium

## The photocatalytic degradation of Methyl Green in presence of Visible light active

$\text{Ni}_{0.10}\text{:La}_{0.05}\text{:TiO}_2$  nanocomposites

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**Abstract :** The nanocomposites of  $\text{Ni}_{0.10}\text{:La}_{0.05}\text{:TiO}_2$  was prepared by the solution impregnation method. The characterization of Synthesized  $\text{TiO}_2$  and  $\text{Ni}_{0.10}\text{:La}_{0.05}\text{:TiO}_2$  nanocomposites were done by X-Ray Diffractometer, SEM, TEM, UV- Vis, FT-IR, Band gap energy and

BET. The photocatalytic degradation of Methyl Green has been done in presence of  $\text{TiO}_2$  and  $\text{Ni}_{0.10}:\text{La}_{0.05}:\text{TiO}_2$  nanocomposites. The presence of anatase and rutile phase in the nanocomposites has been confirmed by XRD analysis. The photocatalysts particle was found in nanodimension in morphology. The surface area was observed 34.72 and 96.58  $\text{m}^2/\text{g}$  for the  $\text{TiO}_2$  and  $\text{Ni}_{0.10}:\text{La}_{0.05}:\text{TiO}_2$  nanocomposites. The band gap energy was observed 3.2 and 3.0 eV for the  $\text{TiO}_2$  and  $\text{Ni}_{0.10}:\text{La}_{0.05}:\text{TiO}_2$  nanocomposites. The photocatalytic degradation behaviour of photocatalysts was investigated by considering different parameters such as effect of concentration, effect of amount of photocatalyst, effect of pH, effect of temperature, adsorption and kinetics. The 90-98 % photodegradation of Methyl Green has been found at 7 pH, 25 ppm concentration of dye, 800 mg/L amount of photocatalyst and 50 min illumination of visible light in presence of  $\text{Ni}_{0.10}:\text{La}_{0.05}:\text{TiO}_2$  while 10-18 % in presence of neat  $\text{TiO}_2$ . The photodegradation of Methyl Green was observed first order kinetics.

**Keyword:** Photodegradation, photocatalyst, photocatalysis, Methyl Green, nanocomposite.

## Biological Effect of Radiations On Human Anatomy in Everyday Life

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**Abstract :** Radioactivity is a part of our earth. Naturally occurring radioactive materials are present in its crust, the floors and walls of our homes, schools, offices and in the food we eat and drink. Our own bodies - muscles, bones, and tissue contain naturally occurring radioactive element. The radiation we receive from outer space is called cosmic radiation. We also receive exposure from man-made radiation, such as X-rays, radiation used to diagnose diseases and for cancer therapy. Radioactive materials also released to the environment from coal and nuclear power plants.

Radioactivity is the term used to describe disintegration of atoms. The time that it takes for half the radionuclides to disintegrate is called half-life. This differs for each radioelement, ranging from fractions of a second to billions of years, eg. half-life of Iodine 131 is eight days, but for Uranium 238, which is present in varying amounts all over the world, it is 4.5 billion years. Potassium 40, the main source of radioactivity in our bodies, has a half-life of 1.42 billion years.

**Keywords :** radioactivity, elements, half-life.

## Lead Toxicity in children: prevention, detection and management

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**Abstract :** Lead (Pb) is a well-known non-biodegradable toxic metal in the environment and it has become a global health issue. Lead poisoning affect the whole body health, with symptoms related to cardiovascular, immune, bone, reproductive, hematological, renal, gastrointestinal and nervous system. The major biochemical processes that are responsible for induction of lead toxicity include capability of lead to inhibit calcium actions and ability of lead to react with proteins. Lead also inhibits enzyme activity by competing with essential cations for binding sites. Of particular concern is the role of lead exposure in the development of intellectual disability and Anaemia in children because children are more likely to have elevated lead levels as compared to adults. The most common sources of lead in children's environments are gasoline, active industry such as mining, lead based paints and pigments, food cans, ceramic glazes, drinking water systems using lead pipes, lead-containing traditional and folk remedies, cosmetics, toys, incineration of lead-containing waste such as electronic waste and lead contaminated food chain system through lead-contaminated soil. More than half of the children residing in metropolitan cities as well as in rural areas of India have elevated **blood lead levels (BLL)** ( $10\mu\text{g}/\text{dL}$ ) which is higher as per the Centers for Disease Control and Prevention (CDC) definition of elevated BLL in children (CDC 2000) and are at risk of lead poisoning. Three assay methods are currently available for measuring the BLL: anodic stripping voltammetry (ASV), atomic absorption spectroscopy (AAS) and inductively coupled plasma mass spectrometry (ICP-MS). Measures that can help reduce the risk of lead toxicity in children includes increased intake of diet rich in calcium and iron, use of lead free paint in home, avoid or throwing away toys with fluorescent-bright colours etc. Prevention and awareness programs should be implemented and strict monitoring and environmental survey should be carried out at regular intervals because low-level exposures can result in long-term, irreversible cognitive deficits and greater exposures can lead to organ damage and death in children.

**Keywords:** Blood lead level (BLL), CDC, ASV, AAS, ICP-MS.

## Understanding the Role of Periodic Table Elements for Various Electronics and Medical Applications

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**Abstract:** The elements of periodic table are getting increased attention since the inception of periodic table of elements by Dmitri Mendeleev in 1869. Today's modern periodic table was given by English physicist Henry Moseley based on his research on x-ray spectra of elements in 1909 in which the properties of elements are related with their atomic number. 118 elements of the periodic table known today are very widely being used in all spheres of science, engineering and technology such as electronics, agriculture, medicine and research etc. The elemental semiconductors composed of Si, Ge, Sn, Se, Te, P, B etc., binary III-V compounds such as GaAs and ternary compounds as  $\text{HgIn}_2\text{Te}_4$  etc. are important materials for fabricating various electronic devices including IC's and solar cells. Rechargeable Lithium ion batteries are showing great potential these days in portable electronics for various military and aerospace applications. Recently, 17 rare earth magnets, metals and alloys because of their unique magnetic and electrochemical properties and lightweight strong nature are playing a vital role for fabricating high-tech products as aerospace components, lasers, cell phones, portable x-ray machines, LED light bulbs, hybrid car batteries etc.

Metal ions are essential for many critical functions in our body as their scarcity can lead to some disease and their excess can induce toxicity as well. Gadolinium (Gd) based contrast agents are being used for improving the visibility of internal body structures in magnetic resonance imaging (MRI). Many radioactive elements and radio nuclides such as I-131, Co-57, P-32 etc. have found application in nuclear medicine for treatment of variety of cancers. A discussion on the role of various elements being used in electronics as well as medicine will be made in this presentation

**Keywords:** Rare earth magnets, Metal ions, Radio nuclides, Magnetic resonance imaging.

## Polymer Industry

Student of Physics

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On the occasion of 150 years of periodic table of elements. I would like to give some idea which related to our worries about plastics and other materials in current situation of the world and india.

Now i start with the description about polymer industry, it manufactures and researches natural and synthetic polymers such as plastics, elastomers and some of the adhesives. polymer research is a subfield of material science that encompasses the field of chemistry, physics , engineering, which uses our elements that have given in our modern periodic table.

The use of polymers in the manufacture of plastic buckets, cups and saucers, children's toys packaging bags ,synthetic clothing materials, automobiles tyres and gears, and daily use purposes.

The word 'polymer' is coined from two greek words: poly means many and mer means unit or part. the word polymer is defined as very large molecules having high molecular mass ( $10^3$ - $10^7$  u).

**Effects:** the major effects of these plastics and their classes like polythenes are very harmful to cows and other living creatures ,and it also harm our environment that's why some governments have banned single use of plastics ,to avoid it we must emphasise on recycle and other possible efforts to reduce its dangerous effects.

## Green house effect and global warming

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**Abstract :** Green house effect is process by which radiation from a planets atmosphere warms the planets surface. The radiation is directed towards the surface warming it the strength of the green house effect will depend on the atmosphere temperature. Earths natural green house effect is critical to supporting life. Human activities mainly the burning of fossil fuel and forest cutting have accelerated global warming. The planet Venus runaway green house effect resulting atmosphere 96%  $\text{CO}_2$  with surface atmospheric pressure. Venus may have had water oceans, but they would have boiled of the means surface temperature rose to 735 K. Report from the Intergovernmental panel on climate change reveals atmospheric concentration of  $\text{CO}_2$  ,

Methane and Nitric acid are unprecedented in at least the last 8,00,000 years. The  $\text{CO}_2$  which is dominant cause of observed warming since 20<sup>th</sup> century is produced by fossil fuel burning, othe activities such as cement production and tropical deforestation. The current observed amount of  $\text{CO}_2$  exceeds the geological record maxima (~300ppm). The anti greenhouse effect mechanism similar and symmetrical to the green house effects. The atmosphere lets radiation in while not letting thermal radiation out. A runaway green house effects occurs a positive feedbacks lead to the evaporation of all green house gases into the atmosphere.

**Keywords:** Green house, planets,  $\text{CO}_2$  radiation, Human activities, fossil. Deforestation, cement production

## Titanium Dioxide ( $\text{TiO}_2$ ) Nanoparticle: Benefactor of Human Race

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**Abstract:** Nanoparticles have the potential to serve the mankind in an unprecedented way. They have plethora of applications ranging from FMCG to aerospace sector and many more. Albeit the fact that there exist many nanoparticles, the most widely used is the Titanium Dioxide ( $\text{TiO}_2$ ) nanoparticle due to its multifarious properties which make it beneficial for use in the industries like toothpaste, coatings and dyes, papers, plastics, pharmaceuticals, aerospace, textile and waste water treatment. One of the wide ranging properties of  $\text{TiO}_2$  is antifogging due to which it is employed in preparing tiles, windows, car mirrors. Though the processes involving synthesis of  $\text{TiO}_2$  nanoparticles were very tedious and a fostered some ill effects on environment, but all thanks to the biosynthesis process which helped to mitigate these effects and made the process lucrative and eco-friendly. Lots of research has been done on these nanoparticles but a lot more still needs to be done. Scientists are utilizing all the available resources to discover new applications of  $\text{TiO}_2$  nanoparticles in the fields of nanomedicine, air purification, agriculture, removal of micro-pollutants from water. The novelty of results lies in varying the concentration of the nanoparticles and using them in different environmental conditions. Let's strive to be a part of this revolution in the field of nanoparticles and help combating the various problems impeding the growth in the fields pertaining to human benefit.

**Keywords:** Nanoparticles, Biosynthesis, Antifogging, Micro-pollutants



## Estimation of Isoniazid in Pure and Pharmaceutical Formulations based on interchange reaction in octahedral complex

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A simple, rapid and sensitive spectrophotometric method for the determination of isoniazid (INH) in pure form as well as dosage forms, is being described. The procedure is based on the ligand substitution reaction between  $[\text{Fe}(\text{CN})_5(\text{H}_2\text{O})]^{3-}$  and INH giving a complex  $[\text{Fe}(\text{CN})_5(\text{INH})]^{3-}$  which shows an absorption maximum at 435 nm, assigned to the  $\text{Fe}(\text{II})d\pi \rightarrow \pi^*(\text{INH})$  MLCT transitions. The isoniazid can be determined in the range 1.37-13.71  $\mu\text{g mL}^{-1}$ , by measuring the absorbance of the complex formed during the course of reaction at this wavelength. The experimental

Observations revealed a linear dependence between absorbance and INH concentration. The detection limit is found to be 0.15  $\mu\text{g mL}^{-1}$  of isoniazid. The method is successfully employed for the determination of INH in pharmaceutical preparations and the results are in consonance with the under

use and reported methods. Common excipients used as additives in pharmaceuticals do not interfere in the proposed method.

**Keywords:** Isoniazid, Spectrophotometric, Ligand substitution reaction and INH

## Electrochemical Behavior of Cu (II) WITH Amino Acids and Triazole in Aqueous Medium at Dropping Mercury Electrode.

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The Study of mixed ligand complexes of metal like Cu(II) with amino acids and triazole play an important role in biological activity of such drugs because Cu(II) is found in human Serum the reduction of Cu(II) complexes at d.m.e. in aqueous medium has been studied with some amino acids (Valine, Serine and Aspartic acid) and Triazole. In most cases a single reduction wave was obtained. The plot  $\log i_d$  vs  $\log h$  and  $i_d$  vs concentration were linear passing through the origin indicating diffusion controlled reduction. Where  $i_d$  is diffusion current and  $h$  is the height of mercury column. The value of slope of straight line corresponding to  $E_{dc}$  Vs  $\log i/(i_d - i)$  indicate reversible nature of reduction. The  $E_{1/2}$  values are regularly shifted towards negative side and  $i_d$  values decreased with increasing concentration of ligands thereby showing complex formation. The simple system was studied by the method of Deford and Hume; however the mixed complexes were studied using Scharif and McMaster's method. The value of stability constant determined by polarographic method.

## Biogenic Minerals for Remediation of Hazardous Heavy Metals from

**Industrial Effluents**

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**Abstract:** Microorganisms not only have the property to change the oxidation state of metals but they can deposit metal oxides and zero valent metals on or within their cells. This microbial mechanism has gained wide attention in last couple of years in the researches in microbe-metal interactions and remediation of heavy metals from the industrial waste water. Because of their specific characteristics, such as high specific surface areas and high catalytic reactivity, biogenic metals offer promising perspectives for the sorption and biodegradation of contaminants in anaerobic and aerobic environment both which lead to interesting properties useful in different fields (adsorbents, catalysts, oxidants or reductants). The remediation of biogenic manganese and iron compounds and the microbial reduction of precious heavy metals, such as palladium, platinum, silver and gold have gained specific attention to the application of these biogenic metals in innovative remediation technologies in advanced water treatment because of environmental and sanitary problems.

**Key words:** Biogenic, remediation, heavy metals, industrial effluent.

## Sulphur: A Killer of insects, pests and fungi

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**Abstract :** Sulfur (S) is an element present in the p-block of the periodic table, in the group 16 and period 3 with atomic number 16. It is abundant, multivalent and non-metallic in nature. Sulfur exists in nature and can be found in soil, plants, food and water. It is an essential nutrient for plants and helps to kill insects, mites, fungi and rodents. Sulfur kills fungi or insects on contact. The way sulfur works is not understood yet but researchers believe sulfur may react with plants or fungi to produce a toxic agent. However the main theory is that sulfur enters fungi cells and affects cell respiration. Sulfur can kill insects if they touch or eat it. It disrupts their normal body functions altering their ability to produce energy. Sulfur in gas cartridges after ignited and placed in a burrow releases toxic gases that suffocate burrowing animals. Sulfur is present in dust, wettable powders and fumigate gas cartridges. They are used in field crops, root crops, tree fruits, nuts, berries, vegetables, ornamentals and turf to protect them by the danger of fungi, insects, pests etc. Therefore there is a major role of sulfur in agricultural industry.

**Keywords:** Multivalent, Rodents, Toxic Agent, Cell Respiration

## The next Nanotechnology revolution in the field of Polymer Industry

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**Abstract :** Nanotechnology is currently one of the fastest growing areas in science and Nanocomposites materials. Carbon(C) being the sixth element in the Periodic Table located between boron (B) and nitrogen (N), is a very stable and powerful element in the organic and Nano world. In the present work authors have prepared, studied and discussed the applications of fullerene based poly (methyl methacrylate) (fullerene/PMMA) samples which work as nanocomposites or nanomaterials. Fullerene (C<sub>60</sub>) forms yellow crystals but turns to a deep wine red when dissolved in organic solvents (toluene). Fullerene(C<sub>60</sub>), thus, are the only allotropic carbon modifications that are soluble in organic solvents. The use of PMMA has opened up a wide range of applications in the field of nanotechnology. The knowledge of the properties of PMMA has contributed a lot to the recent boosts in the synthesis modifications and applications of polymer. These Fullerene/PMMA samples show variations in their performances with different concentrations in terms of their Electrical (conductivity), Thermal (DSC) and Optical properties (XRD, NMR & Raman); thus contributing a lot in industrial applications of Polymers.

**Keywords:** Nanotechnology, Nanocomposites, Fullerene, PMMA, Polymers, Conductivity, Raman, NMR

## First principle investigations on electronic, thermodynamic and transport properties of TlDys,

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**Abstract :** DFT analysis of spin polarized electronic, thermodynamic and transport properties of thallium dysprosium dichalcogenide (TlDyS<sub>2</sub>) have been carried out using full-potential linearized augmented plane-wave plus local orbital method. We studied spin polarized electronic properties in terms of band structure and density of states plots for spin-up and spin-down channel. The Quasiharmonic Debye model has been used successfully to calculate the temperature dependent thermodynamic properties. The standard semiclassical Boltzmann theory has been used to investigate the temperature dependent transport properties in terms of the seebeck coefficient (S), electrical conductivity (σ), and thermal conductivity (k) for TlDyS<sub>2</sub>. The calculated thermodynamic and transport properties are found to be in good agreement with available experimental/theoretical literature values.

**Keywords:** Semiconductors, Electronic structure, Thermoelectric properties.

## First Principle Electronic, Magnetic And Thermodynamic Characterization of Heavy Fermion Ternary Rare Earth Metal Alloys

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**Abstract :** Ternary rare earth metal alloys (viz. GdInZn, GdTlZn and GdInCd) play a key role in a large range of current research areas, in particular those devoted to heavy fermions, valence fluctuations, magneto-strictive materials, permanent-magnet materials, spin glasses and random anisotropy systems. Thus, to understand the relevant complex behavior of Gd/M/M<sup>1</sup>, M=In, Tl; M<sup>1</sup> = Zn, Cd compounds (viz. GdInZn, GdInCd and GdTlZn), in the present research article, we have been carried out the theoretical investigations on electronic, magnetic and thermodynamic characteristics of Gd/M/M<sup>1</sup> type compounds in the hexagonal P6<sub>3</sub>/mmc phase using density functional theory (DFT).

**Keywords:** D. Structural properties, D. electronic structure, magnetic properties, F. thermodynamic properties.

## Uranium : A Threat to kidney failure in man and animal

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**Abstract :** Uranium is a chemical element with the symbol U and atomic number 92 in the actinide series of the periodic table. Human beings are constantly exposed to a certain amount of uranium because it is heterogeneously present in natural form in food, the air, the soil, and water. The evidence gathered so far suggests that overexposure to uranium may result in toxicity, which is derived from an excessive accumulation of the element in the organism. This accumulation, in turn, depends on the route of entry, the duration of the exposure, the dose and the chemical compound of which it forms part, and its absorption. In any case, a small portion of the uranium gains access to the circulation from which it distributes throughout the body. Uranium accumulates mainly in the bones (66%), kidneys (8%), and liver (16%) and it is eliminated with the urine, rapidly from the blood and slowly from organ depots. As in the case of other heavy metals, it is found that overexposure to uranium may cause pathological alteration to the kidneys in both human and animals.

**Key words :** actinide series, nephrotoxicity, human, animals.

## The Role of periodic table elements in human life and Medicinal chemistry

*Sonu Dwivedi\* and Rajiv Shukla*

**Abstract :** The human body contains at least 60 detectable chemical elements, however, only about 25 of these elements are believed to participate in the healthy functioning of the human body. The essentiality of additional elements is still in contention, among them arsenic, chromium, boron and lithium, but most studies have been carried out on laboratory mammals and the ultra-trace levels of some elements that are present in the body make it difficult to establish their nutritional value. In particular we have tried to identify which elements are essential for man

and to indicate other elements which are or can be used in diagnosis and therapy. There is much medicinal inorganic chemistry still to be explored. The field is in its infancy compared to medicinal organic chemistry. More detailed background to the biological chemistry of the elements, including the influence of the environment on the natural selection of the elements by animals can be found. Such experimental studies on animal growth under defined nutritional conditions are expensive and the interdependence of the biochemistry of the elements and various organic cofactors can complicate the interpretation. The periodic table also offers potential for novel therapeutic and diagnostic agents, based on not only essential elements, but also non-essential elements, and on radionuclides. Although the potential for inorganic chemistry in medicine was realized more than 2000 years ago, this area of research is still in its infancy. Future advances in the design of inorganic drugs require more knowledge of their mechanism of action, including target sites and metabolism. Temporal speciation of elements in their biological environments at the atomic level is a major challenge, for which new methods are urgently needed.

**Keywords:** Periodic table, Essential elements, Metals in medicine

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### **Self – doped electrically conducting polymer film of PANI, composite film of PVA/ PPY and their blend**

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**Abstract :** Conducting Polymers have been of Considerable interest because of their potential applications as a polymer solid electrolyte. The polymer solid electrolytes have been many advantages, such as high energy density, and electrochemical stability. The conducting polymer like polyaniline (PANI) is the electroactive polymer obtained by the electrochemical oxidation of aniline in acidic aqueous media.

Polyaniline can be used as an electrode materials in the fabrication of batteries and as electrode chromic materials for making displays. This studied may therefore open new era in the field of conducting polymers.

Most conducting polymers in doped state are intractable being difficult to dissolve or melt thus morphological regulation in blend remains a difficult problem. PVA is well known sample as water-soluble polymer and it has large applications.

In this paper we report the detail synthesis and physical properties of the self – doped electrically conducting sulphonated polyaniline, PVA/PPY composites films and their blends.

**Keywords:** Sulphonated polyaniline (SPANI), doping, polymer solid - electrolytes

### **Preparation of acrylamide hydrogels, and its application in drug delivery.**

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**Abstract :** Hydrogels are three-dimensional, hydrophilic, polymeric network capable of absorbing large amounts of water or biological fluids. Due to their high water content, porosity and soft consistency, they closely simulate natural living tissue, more so than any other class of the synthetic biomaterials. Hydrogels are used for producing contact lenses, hygiene products and wound dressing other use of the hydrogels are in drug delivery and tissue engineering. Hydrogels are called physical gels, or secondary force such as ionic, H-bonding or hydrophobic force play the main role in forming network. In chemical gels the network of covalent bond joining different macromolecular chain can be achieved by cross linking polymers in the dry state or in solution. There are numerous patents on the hydrogels but only a few reached the market. The aim of this paper is to prepare acrylamide based hydrogels and their applications on drug delivery.

**Keywords:** Hydrogel, Acrylamide, polymerisation

### **Role of nitrogen in plant growth and development**

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**Abstract :** Nitrogen is the primary or top component found in many structures and metabolic structures of plants. It is also a critical ingredient in chlorophyll which facilitates photosynthesis and is essential in producing proteins and genetic material. Nitrogen is one of the six macronutrients required for plants and fertilisers are used to ensure their availability. Deficiency of nitrogen in plants results in poor growth, small size, yellow, red or dull leaves, small sized fruits, tasteless fruits, seed germination, root structure etc. Though nitrogen is available in plenty (78%) in atmosphere plants cannot use them as gas and has to absorb it through its roots in dissolved form. Healthy plants often contain 3 to 4 percent nitrogen in their above-ground tissues. Soil nitrogen is available in three forms, namely, organic nitrogen compounds, ammonium ions and nitrate ions. Atmospheric nitrogen is added to the soil mostly through thunderstorms. Nitrogen is also the primary building block for plant protoplasm. Protoplasm is the translucent substance that is the living matter in cells. It is needed for flower differentiation, speedy shoot growth, the health of flower buds and increases the quality of fruit set.

**Keywords:** nitrogen, chlorophyll, building blocks, protoplasm

## Impacts of atmospheric nitrogen on environment

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**Abstract :** Nitrogen is the chemical element of 15 group in p- block of the periodic table with the symbol N and atomic number 7. It was first discovered and isolated by Scottish Physical Daniel Rutherford in 1772. The name Nitrogen was suggested by French chemist Jean-Antoine-Claude Chaptal in 1790, when it was found that Nitrogen was present in nitric acid and nitrates. It is a common element in the universe, estimated at about seventh in total abundance, in the Milky Way and the solar system. Environmental effects of excessive amounts of atmospheric nitrogen (N) deposition have raised a great deal of attention. During the past few decades, the atmospheric deposition of nitrogen compounds has become a major threat to the species diversity of terrestrial ecosystems. The two environmentally most damaging air-borne N compounds are nitrogen oxides (NO<sub>x</sub>) and ammonia (NH<sub>3</sub>). Nitrogen oxides originate mainly from stationary and non-stationary burning of fossil fuel. Inputs of nitrogen into terrestrial ecosystems may follow different pathways: atmospheric deposition, nitrogen fixation, groundwater seepage, inundation and import by grazers, but in many natural ecosystems atmospheric deposition is the predominant nitrogen input.

**Keywords :** Environmental effects, atmospheric nitrogen, ecosystem

## Magnesium: A Miracle for cellular life

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**Abstract :** Magnesium (Mg) is a chemical element, one of the alkaline earth metals of group 2 (11a) of the periodic table. Its compounds are widely used in medicine. It is one of the elements essential to all cellular life. Magnesium is involved as a cofactor in more than 300 enzyme systems and is required for such fundamental process as energy production and nucleic acid synthesis. Nutritional deficiency is an area of increasing importance in the field of medical science and has found to be an important determinant of widespread epidemic of chronic disease. Recent studies have revealed that magnesium sulphate can be neutralized to reduce the symptoms of acute asthma. Magnesium as one of the strongly recommended treatments for migraine headaches. Oral magnesium supplementation has been shown to reduce the frequency of duration and intensity of migraine by 41%. Magnesium is required for conversion of Vitamin D into its active form which in turn supports calcium absorption and metabolism as well as normal parathyroid hormone functions. People with insulin sensitivity or resistance also lose excess magnesium by their urine. Taking a magnesium supplement, however can increase your magnesium blood level and improve diabetes control. Magnesium carbonate, Magnesium sulphate, Magnesium nitrate. **Keywords:** Nutritional deficiency, Migraine, Supplementation, Parathyroid

## Oxygen: An Industrial molecule for chemicals

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**Abstract :** Oxygen is the chemical element with atomic number 8. It is a member of chalcogen group in the periodic table, a highly reactive nonmetal, and an oxidizing agent. By mass, it is the third most abundant element in the universe after Hydrogen and Helium. At standard temperature and pressure two atoms of the element bind to form di oxygen which is a colorless and odorless diatomic gas with the molecular formula O<sub>2</sub>. As compounds including oxides, the element make up almost half of the earth's crust. Uptake of O<sub>2</sub> from the air is the essential purpose of respiration, so oxygen supplementation is used in medicine. Oxygen therapy is used to treat Emphysema, Pneumonia and in Congestive heart failure. O<sub>2</sub>, as a low pressure breathing gas, in the modern space suits, which surround their occupant's body with breathing gas. Oxygen molecules absorb other forms of Ultraviolet too. Together Ozone and Oxygen molecules are able to absorb 95% to 99.9% of the UV radiation that gets to our planet. When UV light is absorbed by oxygen and ozone, heat is generated, which is stratosphere gets warmer with the altitude. Oxygen has become widely used in- Metal welding, Petrochemical industries, Oil and gas industries, Brazing, Fish farming, Chemical industries and many more. Thus oxygen finds broad application in various technological process and in almost all Industry branches.

**Keywords:** Emphysema, Brazing, Congestive, Stratosphere.

## Anticorrosive coatings for metallic substrates

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**Abstract :** Corrosion resistant coatings protect metal components against degradation due to moisture, salt spray, oxidation or exposure to a variety of environmental or industrial chemicals. Anti-corrosion coatings allow for added protection of metal surfaces and acts as a barrier to inhibit the contact between chemical compounds or corrosive materials. Metallic substrates are susceptible to corrosion attacks in natural environments. Therefore, many corrosion protection treatments, such as electroplating, anodization, hot-dip galvanization, conversion coatings, corrosion inhibitors, barrier coatings and cathodic protection have been used to protect metallic substrates for many years. Organic



coatings primarily serve as a physical barrier to protect a metal substrate from the electrochemical charge that comes from corrosive environments. However, organic coatings are not perfect barriers and are permeable to corrosive substances, such as  $\text{Cl}^-$ ,  $\text{O}_2$  and  $\text{H}_2\text{O}$ . The presence of water molecules at the coating substrate interface may trigger electrochemical corrosion of a metal under the coating, leading to a decrease in adhesion strength. The present article aims to examine the state of the anti-corrosive coatings for the protection of various metals and alloys commonly used in equipment and vehicles maintenance, and to identify cost effective, high-performance corrosion inhibitors that may contribute to the preservation of equipment assets.

**Keyword:** corrosion resistant coatings, metallic substrates, protection

### Role of Periodic Elements in Nanotechnology

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**Abstract :** Nanotechnology is the understanding and control of matter at dimensions of roughly 1 to 100 nanometers, where unique phenomena enable novel applications. It involves imaging, measuring, modeling, and manipulating matter at this length scale. The most in demand and useful nanotechnological elements are concentrated in the s- and p-blocks with predominant nanoelements being nonmetals C, N, O, and Si in the p-block and H and Li in the s-block. The main chemical features of light alkaline s-elements include a low ionization potential for the external s electron, resulting in single-charged cations, which have small radii demonstrating high diffusivity in electrolytes and membranes. These features make Li the modern “gold” in electrochemical energetics. Similarly, H can be used in “proton-based” low-temperature fuel cells forming a huge domain for hydrogen-based alternative energetics and water-splitting systems. Increases of both ionic radius and weight for Na retain the possibility of constructing Na-ion batteries and super capacitors and Na super ionic conductor. The other s-elements play minor roles in nanotechnologies, serving as needed counterparts in different ionic compounds. The periodic table of the elements helps us appreciate the chemical diversity of elements in the search for effective elemental combinations to produce new nano materials. The diversity of elements in the periodic table will enable further innovative developments in nano science and nanotechnology.

**Keywords :** Nanotechnology, novel applications, s- and p- block elements

### Beneficial Elements for Agricultural Crops

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**Abstract :** The beneficial elements are not deemed essential for all crops but maybe vital for particular plant taxa. The distinction between beneficial and essential is often difficult in the case of some trace elements. Elements such as aluminium (Al), cobalt (Co), sodium (Na), selenium (Se) and silicon (Si) are considered beneficial for plants. These elements are not critical for all plants but may improve plant growth and yield. Pertinently, beneficial elements reportedly enhance resistance to abiotic stresses (drought, salinity, high temperature, cold, UV stress, and nutrient toxicity or deficiency) and biotic stresses (pathogens and herbivores) at their low levels. However, the essential-to-lethal range for these elements is somewhat narrow. The effect of beneficial elements at low levels deserves more attention with regard to using them to fertilize crops to boost crop production under stress and to enhance plant nutritional value as a feed or food. A more holistic approach to plant nutrition would not only be restricted to nutrients essential to survival but would also include mineral elements at levels beneficial for best growth. The uptake mechanisms of various beneficial elements, their favorable aspects, and the role of these elements in conferring tolerance against abiotic and biotic stresses.

**Keywords:** beneficial elements, essential elements, biotic, abiotic, stress mitigation

### Periodic Table and its Significance in Nanotechnology

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**Abstract :** The periodic table retains its fundamental importance across various branches of chemistry even today and has been a powerful tool to develop innovative chemical compounds and elements. Though nanotechnology and nanoscience increasingly follow a multidisciplinary approach, they do focus primarily on nanoscale materials and processes, such that a variety of elements are used and single atoms are often manipulated. The nanotechnology age however, has brought various elements to the forefront and have put their alternative and innovative uses into the limelight transforming their roles in science and technology.

Practically today, the most demanded and perceivably useful nanotechnological elements are concentrated in the s-block and p-block. In the p-block the predominant nanoelements are nonmetals like Carbon, Nitrogen, Oxygen, and Silicon, whereas in the s-block this honor belongs to Hydrogen and Lithium. However, there are other s- block elements which play minor roles in nanotechnologies, serving as the much-needed counterparts in different ionic compounds. For instance, Calcium is used in biomineralization and mesocrystal growth and Magnesium forms piezoelectrics and aluminosilicate minerals with structural nano-cells. The present paper looks at the systemic importance of nanotechnology to the field of nanotechnology.

**Keywords:** periodic table, nanotechnology, elements

## Importance of Copper in our Daily Life

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**Abstract :** Copper (Cu) is an element of d-block having atomic number 29, found in group 11 of the periodic table. Copper is one of a few metallic elements with a natural color other than gray or silver. It is a soft, malleable and ductile metal with very high thermal and electrical conductivity. Copper is used as a conductor of heat and electricity, as a building material, and as a constituent of various metal alloys, such as sterling silver used in jewellery, cupronickel used to make Marine hardware and coins, and thermocouples for thermal measurement. Copper is sometimes used in decorative art, both in its elemental form and in compounds as pigments. Copper compounds are used as bacteriostatic agents, fungicides and wood preservatives. It is also used in the coil of electric motors power generation, power transmission, power distribution, telecommunication, electronic and countless types of electrical equipment. Many electrical devices rely on copper wiring because of its following properties like electrical conductivity, tensile strength, ductility, corrosion resistance, low thermal expansion, high thermal conductivity, malleability, and ease of shouldering. Thus copper has an important role in electronic industry.

**Keywords :** Bacteriostatic, ductility, malleability, conductivity

## Metal removal from wastewater using Agro-Industrial based Carbon nanotubes as adsorbent

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**Abstract :** The present scenario of contamination of water resources with the discharge of pollutants such as heavy metals is a serious concern worldwide. The challenges to remediate these high-density metals containing waste streams using conventional methodology are immense. Adsorption technology is a simple, widely used method for wastewater treatment which involves interaction between toxic metal ions and adsorbents. The focus has been shifted towards utilization of nonconventional adsorbents that are derived from agro-industrial waste as the disposal of the latter is another problem in a sustainable environment and they are low-cost, readily available, environment-friendly, renewable carbon source. The Carbon nanotubes (CNTs) derived from agro-industrial wastes are light, highly reactive, and chemically stable hence are gaining popularity as efficient nanoadsorbents in removal of noxious heavy metals from aqueous environment.

**Keywords:** Heavy metals, Adsorption, agro-industrial wastes, Carbon nanotubes (CNTs), sustainable environment

## Non-conventional bio-adsorbent for distillery wastewater treatment

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**Abstract :** Distillery industries generating large volumes of wastewater called distillery wastewater (DWW) or molasses. DWW is a brown colored, acidic effluent, has high BOD, COD, TDS, and various essential and non-essential metals. It is disposed of without/partially treatment into the environment that causes toxic effects on flora and fauna of water and soil. So, before discharge into the environment, its proper treatment is essential. Various Conventional physio-chemical treatment methods are available but it has some limitations like time-consuming, expensive and generation of toxic secondary byproducts. Nonconventional bio-adsorbents (NCB) are derived from agro-industrial wastes/biomass. These are easily available, ecofriendly, and operate under feasible condition. So, NCB emerging adsorption method is recommended as it is highly efficient and sound economic method for distillery wastewater treatment.

**Keywords:** Heavy metals, Adsorption, agro-industrial wastes, Non-conventional Adsorbent.

## Molybdenum in Natural Science

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Molybdenum is an essential trace element for living organisms like human, animal and plant health. It goes about as a cofactor for the working of an enormous number of enzymes which catalyze responses associated with the cycling of N, C, and S. Yet, as with all elements, exposure to high doses of Mo can be impeding to plant and animal health, including human health.

**Molybdenum** is an essential trace element for human, animal and plant health and has played a significant role in the evolution of life on earth. Nonetheless, exposure to the element can be unsafe and in spite of the fact that the proof for symptoms in humans is sparse, it has been connected with various health conditions in animal models. Molybdenum is present in trace amount (1–10 mg/kg) in most rocks and soils and at concentrations less than, and often orders of magnitude less than, 10 µg/L in most freshwaters. It is the most occurring transition metal in open seawater (10 µg Mo/L) owing to the dominance, and low chemical reactivity, of the molybdate ion.

The versatility of Mo in watery frameworks needs to date got unquestionably more consideration in the marine than the freshwater setting. The estimation of Mo speciation as a pointer of redox conditions and of stable-isotopic varieties as a tracer, can have more an incentive in the field of condition and wellbeing, and investigations of the component's portability in watery frameworks can be valuable for subjects fluctuating from radioactive waste transfer, maintainability of offbeat hydrocarbon misuse and more extensive surficial contamination.

### Nanotechnology and the Environment: Sustainability Effects

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Nanotechnology is being used in several applications to improve the environment. This is useful in cleaning up existing pollution and improving manufacturing methods to reduce the generation of new pollution. The silver Nanoclusters as catalysts reduce the polluting byproducts generated in the process used to manufacture propylene oxide. This propylene oxide is used to produce plastics, paints and detergents. Similarly the iron Nanoparticles can be effective in cleaning up organic solvent that are polluting ground water. This method can be more effective and cost significantly less than treatment methods. Nanomaterials are also used to cleaning up oil spills, volatile organic compounds from air and many more things. Therefore we can say that Nanotechnological processes and applications are contribute significant role in environmental preservation and climate protection.

### Chlorine : A Chemical to reduce diarrhoeal diseases

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**Abstract :** Chlorine is the 17<sup>th</sup> element of the periodic table located in period 3 and group 17 . It has various attributes but chlorine's disinfection properties have helped improving the lives of billions of people around the world. Chlorine is presently an important chemical for water purification in water treatment plants. Even small water supplies are now routinely chlorinated. It is usually used in the form of hypochlorous acid to kill bacteria and other microbes in drinking water supply and swimming pools. People use to suffer from diarrhoea because of drinking contaminated water. Chlorination is used primarily to kill on inactive disease causing organisms (pathogens) in drinking water which removes one of the major routes for transmission of diarrhoeal disease. A major objectives of drinking water treatment is to provide microbiologically safe drinking water. The combination of conventional drinking water treatment and disinfection has proved to be one of the major public health advance in modern times. The most important use of disinfectant in water treatment is to limit waterborne disease and inactive pathogenic organism in water supplies. Chlorine, often in the form of a chemical compound (usually in solution), needs to be well mixed with the raw wants to kill or inactive pathogens.

**Keywords :** Chlorination, Diarrhoea, Purification, Disinfection.

### Applications of elements of periodic table used in Nuclear Chemistry

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Uranium is an important nuclear fuel, radioactive chemical element of the actinoid series of the periodic table. When  $U^{235}$  is bombarded by neutrons uranium splits up into two lower elements  $^{56}\text{Barium}$  and  $^{36}\text{Krypton}$  having medium atomic masses along with three neutrons with large amount of release of energy. These neutron will further produce the fission of three nucleus of  $U^{235}$  due to energy released. It is because mass of parent nucleus is greater than the sum of both daughter elements produced after fission.

In Nuclear Fusion of two deuterium atom to form helium nucleus requires a high temperature of order  $10^7$ - $10^8$  °C which is a thermonuclear reaction. Such reactions occurs with a finite rate and releases sufficient energy to keep up the heat and light of the Sun.

Plants take  $\text{CO}_2$  and water to form carbohydrates in presence of sunlight and chlorophyll which act as sensitizer. This reaction when followed by radioisotopes  $^{14}\text{C}$  and  $^{18}\text{O}$ . Using  $^{18}\text{O}$  it has been shown that oxygen released in photosynthesis is not from  $\text{CO}_2$  but from water.

In hydrolysis of esters using  $^{18}\text{O}$  and labelling water with it. It was observed that labelled oxygen  $^{18}\text{O}$  becomes associated with acid and not with alcohol formed during the reaction.

One of the main application is estimating the age of archaeological and biological specimens.  $^{14}\text{C}$  has half life of 5730 years.  $^{14}\text{C}$  is converted to  $^{14}\text{CO}_2$  by plants to build carbohydrates as long as organisms remain alive proportion of  $^{14}\text{C}$  to  $^{12}\text{C}$  remains constant. But after death  $^{14}\text{C}$  will decay and its radioactivity in the Dead bodies will decrease with time. Thus by compairing activity of  $^{14}\text{C}$  in the dead body with that of fresh  $^{14}\text{C}$  in the atmosphere, age of sample can be determined.

Artificial disintegration involves converting one element to another and is carried out by bombarding it with fast moving particles.

Eg. Berellium using alpha particle is converted to carbon.

Radioactive iodine (I-131) is used in small amounts to treat cancer and conditions affecting thyroid gland.

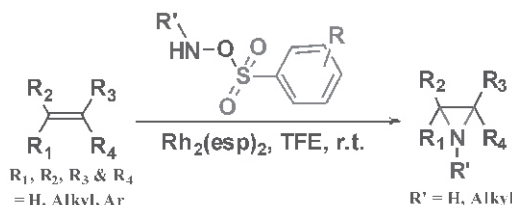
## Direct Metal Catalyzed Synthesis of Unactivated Aziridines from Olefins

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Unactivated aziridines are present in several biologically active natural, synthetic and semi-synthetic molecules, as well as they also serve as versatile building blocks in organic synthesis. They can undergo various transformation reactions such as ring opening, ring expansion and rearrangements. The syntheses of activated aziridines from olefins are well established while the direct methods for unactivated aziridines are less explored. Herein we describe the highly efficient direct method for regio and stereospecific synthesis of unactivated aziridines from olefins in a single step using O-(sulfonyl) hydroxylamine as the aminating agent, di-rhodium catalyst in 2,2,2-trifluoroethanol (TFE) as a solvent.<sup>1</sup>



**Keywords:** aziridines, olefins, aminating agent.

**References:** 1. Sabir, S.; Pandey, C. B.; Yadav, A. K.; Tiwari, B.; Jat, J. L. *J. Org. Chem.* **2018**, 83, 12255- 12260.

## Diabetes-complexity and treatment by massage therapy

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**Abstract :** Diabetes is the tendency of blood sugar stagnation . All human beings are diabetic. They are divided into prediabetic and diabetic. Those maintaining the stagnation of healthy level say 70 - 150 mg/dl random blood sugar, are prediabetics. Those having stagnation at any level more than 150 due to high intake of calories are diabetic. In pre diabetic people random blood sugar level always remain below 150mg/dl despite they consume high calories but with the passage of age and genetic reasons, in others, excess calories start conversion into sugar and random blood sugar level crosses over 150 mg/ dl and they become diabetic. At this stage random blood sugar do not come back to healthy range of 150 mg/dl despite diet control and consumption of oral anti diabetic drugs with insulin and in case their overdoses are taken blood sugar sharply declines to below 70 mg/ dl which is known as low blood sugar. Both high and low blood sugar levels are injurious. If a treatment brings back the healthy blood sugar level then it is not injurious. Topical application of massage oil can certainly do this within one week and patient can again resume normal but balanced calorie diet. If the healthy blood sugar remain stagnant for three months then the fluctuation of high and low sugar level stops. Oil therapy (Patent No 280929) is 100 % safe because it is natural.

Therefore it is the excess of blood sugar which was the root cause of the diabetes and that now can be completely eliminated.

**Keywords :** Diabetes, Oil massage therapy, Stagnation, High blood sugar, Root cause, Can be eliminated.

## Graphene-The Wonder Material

Shweta Chaubey

(Physics)

Graphene is most significant material for better development of this world. More powerful and stronger batteries can be developed using graphene which are very small in size and they can fully charge our phone in a few seconds and an electric car in a few minutes. Lithium ion batteries, in which high density electrodes such as lithium cobalt oxide as anode and graphite as cathode are used and lithium ions are contained in each graphene layer. Because of unique molecular structure of graphene, it can be developed as the smallest and most useful filter, to filtering sea water into drinking water. Perhaps by doing this, millions of people around the world would not have a shortage of drinking water. Even idea of connecting artificial implants directly to nervous system using graphene has been talked about. Graphene can be used to improve the processing power of computer chips. Graphene chip is 10000 times faster than standard chips. That will consume less energy. Nokia is already working on developing a water-proof Smartphone by using graphene. Graphene lining can be an effective mosquito repellent which acts as barrier under mosquitoes are unable to bite through.

## A Critical Review on Ferroelectric Superlattice: Materials and Applications

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**Abstract:** The artificial superlattice is a promising man-made component with pre-designed microstructures. The investigations of superlattices in ferroelectric crystals have gained a fast ground since 1980s. A superlattice is made out of balanced areas on the micron scale, controllable with current procedures including depth characterization techniques. It provides a platform for various novel physical properties of the optical and acoustic character. In this critical review paper, we audit ongoing advances in growing new systems for fabrication and



characterization of ferroelectric superlattices, and in investigating new physical impacts for applications. This critical review paper is organized as follows. It begins with an introduction to ferroelectric materials and ferroelectric superlattice in this first Section. Sections 2 and 3 describe the structures and fabrication techniques of ferroelectric superlattices, respectively. Some new means to visualize domain pattern nondestructively are presented in Section 4. Optical properties, such as nonlinear-optic and electro-optic effects in ferroelectric superlattices are discussed in Section 5. Section 6 covers the acoustic performances of the ferroelectric superlattice and its applications as ultrasonic devices. In the final Section, the outlook for superlattices is briefly described.

**Keywords:** Ferroelectric, Superlattice, Domain, Optical, Acoustics.

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### Useful facts about iron element

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**Abstract :** Iron (Fe) is an element present in the d-block of the periodic table. It has atomic number 26 and atomic mass 55.84. Iron is the 4th most abundant element in the Earth's crust. The Earth's core is believed to be comprised primarily of iron. Pure iron is chemically reactive and corrodes rapidly, especially in moist air or at elevated temperatures. Iron exists in five types of ores viz. Haematite, Magnetite, Siderite, Limonite and Iron pyrite. In these ores Haematite is the most common, which is frequently seen as black sand along beaches and bank of streams. Iron form compound mainly in the oxidation states +2 (Ferrous) and +3 (ferric). Iron has a permanent magnetism. It gets rusted in the presence of moist air. The pure iron is very reactive chemically. It has four allotropic forms, viz. alpha, beta, gamma and omega. Alpha form is magnetic but its beta form disappear the magnetism. Iron is primarily used to produce steel, which are used for making ships, beam and bicycles etc. It is the most important structural materials in the world.

**Keywords:** Magnetism, rust, Ores, Uses

### Role of zinc in plant growth

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**Abstract :** Zinc is an essential micronutrient for growth and development of plants, but is required in very small quantities. The deficiency of Zn can cause adverse effect on growth and yield of crops. Zinc is involved in formation of Chlorophyll and carbohydrate. It promotes growth hormones (auxin) and starch formation and plays an important role for grain formation and nutrition. Zn also help in biosynthesis of pigment cytochrome and maintain plasma membrane integrity and synthesis of leaf cuticle. Leaves discolour when the soil is deficient in zinc and causes a type of leaf discoloration called chlorosis, which causes the tissue between the veins to turn yellow while the veins remain green. Zinc deficiency and other trace element or micronutrient deficiencies cannot be identified by looking at the plant as they all have similar symptoms. The main difference is that chlorosis due to zinc deficiency begins on the lower leaves, while chlorosis due to a shortage of iron, manganese or molybdenum begins on the upper leaves.

**Keywords:** Zinc, micronutrient, deficiency, chlorosis,

### New trends in removing heavy metals from industrial wastewater using chemical substances : a review

BY

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**Abstract :** The process of treating industrial wastewater containing heavy metals often involve technologies for reduction of toxicity in order to meet technology based treatment standards. This article reviews the recent developments, a particular focus is given to physico-chemical removal process such as; adsorption on new adsorbents, membrane filtration, electro dialysis and photo catalysis. Their advantages and limitations in application are evaluated. The main operating conditions such as pH and treatment performance are presented. In near future, the most promising methods to treat such complex systems will be the photo catalysis ones which consume cheap photons from the UV-near

visible region. They induce both degradation of organic pollutants and recovery of metals in one post system. From the conventional process, lime precipitation has been found as one of the most effective means to treat inorganic effluents containing metal concentration > 1000 mg/l.

**Key words :** Heavy metals, wastewater treatment advanced techniques.

### **Physiological and bio chemical effects of rare earth elements On plants and agriculture crops : A Review**

*BY*

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**Abstract :** The rare earths include the elements scandium (SC, Z = 21), yttrium (Z = 39) and La (57) to Lu (71). The response of crops towards REEs is reported only in few countries because their function in plant physiology, on increase in agricultural yield is still not sufficiently stood.

Recently, interaction of REEs with Calcium in plants, effects on structure and function of plasma membrane, photosynthesis; enzyme activity and water use efficiency have been discussed. This review covers the significance of REEs for agricultural production and their past application.

**Key words:** Rare earth elements, agriculture, efficiency.

### **First principle study of optoelectronic spectra of Strontium cadmium chalcogenides (Sr<sub>2</sub>CdX<sub>3</sub>, X=S, Se and Te)**

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**Abstract :** DFT analyses of electronic and optical spectra were carried out for Strontium cadmium chalcogenides (Sr<sub>2</sub>CdX<sub>3</sub>, X=S, Se and Te). The study of electronic spectra has been made in terms of band structure and density of states using full potential linear augmented plane wave plus local orbital method. Band structure calculations have been carried out under the approximations PBE-GGA, PBE-Sol, LDA and TBmBJ. Band structures of these materials show that Sr<sub>2</sub>CdS<sub>3</sub>, Sr<sub>2</sub>CdSe<sub>3</sub> and Sr<sub>2</sub>CdTe<sub>3</sub> crystals possess a band gap less than 1 eV, underestimated to the experimental/theoretical literature values. Optical spectra have been analyzed in terms of real and imaginary parts of dielectric function, reflectivity, refractive index, extinction coefficient, absorption coefficient, optical conductivity and electron energy loss for these chalcogenides. Optical results show larger anisotropy along different directions. These results provide a physical basis of barium cadmium chalcogenides for potential application in optoelectronic devices.

**Keywords:** Semiconductors, Electronic structure, optical properties.

### **Non-effectiveness of antimalarial drugs: indian scenario**

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Tropical disease malaria caused by protozoal parasite eg P. vivax, P. falciparum, P. malariae and P. ovale and transmitted by female anopheles mosquito claims millions of lives globally per annum and India share a good hold in malarial mortality. Countries lie in tropical and subtropical region of the world witnesses higher mortality rate as compared to other part of the world.

Traditionally quinine derived from bark of cinchona tree was an effective medication for malaria but increased resistance in malarial parasite made quinine and its analogues less effective to treat malaria. Beside this Artemisinin combination therapy (ACT) is also effective medication to combat malaria but success of ACT depends upon effectiveness of partner drug which have better half time as compared to Artemisinin and its analogues.

India have high propensity of malaria being in subtropical region of the world coupled with unhygienic conditions exaggerate the scenario malaria. Eastern part of the India, being close to coastal area inflicted more as compared to other part of the country.

Tropical, Malaria, Plasmodium, Mortality, Quinine, Cinchona, Parasite, Artemisinin, Analogue, Coastal, Infected, Scenario.

### **Applications of elements of periodic table used in the field of defence**

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**Abstract :** A large variety of metals are used in defence sector. Nickel based superalloys are used in jet turbines, submarine hulls, coatings, missiles, assault rifles and fighter planes. Nickel-Aluminium bronze and Copper-Nickel alloys are used in rockets, explosive detection equipments, satellite systems. Cobalt is added to Nickel-alloys for use in turbines, compressors and fans in fighter-planes. Niobium is also added in small quantities for jet turbines. Aluminium is the major component for various alloys used in aeronautics, electro-optical systems, and navigation radars and also as a light metal in airframe wings. Copper is used in air-frames, landing gear, propulsion and armaments. Rare earth-metals are used in night-vision goggles, precision-guided weapons, communicating equipments, GPS and batteries that are used for several purposes. Fine Aluminium-powder is used in missile fuel whilst. Copper-powder can be included within frangible bullets (non-harming).

## Nano Technological Elements of Periodic Table

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**Abstract :** The 150th anniversary of the periodic table of elements highlights its tremendous role in chemistry, physics, biology, astronomy, philosophy, and engineering as a shining scientific breakthrough, shedding light on the fundamental laws of nature. Nanoscience and nanotechnology are multidisciplinary, focusing on nanoscale materials and processes, in which a variety of elements are used and single atoms are often manipulated. In this Perspective, we present a new viewpoint on what the renowned periodic table can offer to researchers working on nanomaterials. The most in demand and useful nanotechnological elements are concentrated in the s- and p-blocks with predominant nanoelements being nonmetals C, N, O, and Si in the p-block and H and Li in the s-block. The main chemical features of light alkaline s-elements include a low ionization potential for the external s electron, resulting in single-charged cations, which have small radii demonstrating high diffusivity in electrolytes and membranes. Also, most s-elements form ionic compounds and are highly reactive in their metallic state. These features make Li the modern “gold” in electrochemical energetics. Similarly, H can be used in “proton-based” low-temperature fuel cells, forming a huge domain for hydrogen-based alternative energetics and water-splitting systems.

## Reflection of Elements of periodic table in Pharmaceutical Chemistry

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**Abstract :** Medicinal Chemistry is a branch of Pharmaceutical Chemistry, which describes about the chemistry of medicines under the umbrella of chemical science. There are so many chemicals present in the world in plenty but all chemicals are not placed in the category of drug. The drug is a chemical substance obtained either from animal source, plant source or mineral source having definite three dimensional structural framework can fit on the bioreceptor platform having controlling capacity to check the malfunction in biochemical system is categorized as a drug. This specific drug when supplied in the chemist shop in a definite formulation is known as medicine. The medicine either solid or liquid or semisolid or gaseous dosage form release the appropriate drug *in-vivo* system. Then it follows the pharmacodynamics and pharmacokinetics and leaves the specific amount of active drug, which is plasma, unbound fraction. This unbound drug then binds to the receptor site and shows the drug action. All these phenomena are based on chemical nature of drug and biomolecular system in the cell of living beings. Entire biomolecular system plays a good role with molecular biology by following the chemistry of molecule. This is really a great wonder of the electronic profile of atoms, which make the infrastructure of drug molecule as well as macro molecules in the body system.

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## A Novel and Direct Synthesis of Secondary Amides from Ketones via Beckmann Rearrangement

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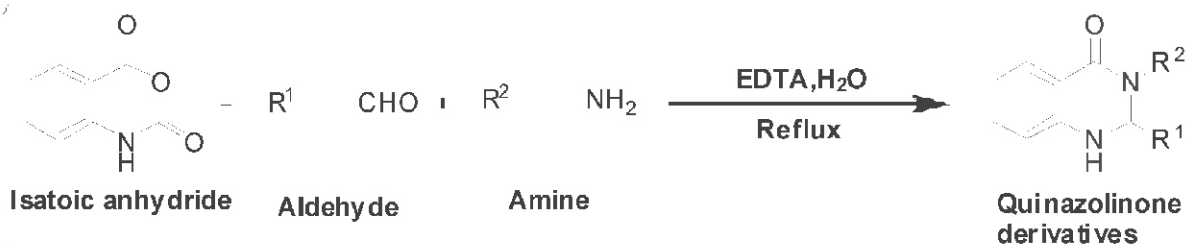
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Beckmann rearrangement is a versatile method to access amide via oxime intermediate. Traditional Beckmann rearrangement requires harsh reaction conditions such as high reaction temperature, strongly acidic media and longer reaction time, which limits its application for



sensitive substrates. A literature survey reveals that very few methods are available for the synthesis of secondary amide directly from ketones under mild condition. In view of this, we recently reported a copper catalyzed single step, one pot synthesis of amides from ketones using HOSA reagent and Cs(OH).H<sub>2</sub>O as base in TFE:DCM<sup>1</sup>. Key points of our developed method are given as:

Open flask, operationally simple, good to excellent yield, broad substrate scope

**Keywords:** Beckmann rearrangement, *O*-(Mesitylsulfonyl)hydroxylamine(MSH), Ketone, Oxime, Secondary Amide

References:

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## **“Green Synthesis of Quinazolinone Derivatives using Isatoic Anhydride and EDTA”**

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Quinazoline is an important aromatic heterocyclic moiety which has two aromatic rings one benzene ring and other is pyrimidine ring. Quinazoline moiety is isomeric with quinoxaline, phthalazine, and cinnoline which are also aromatic heterocycle. Its derivative quinazolinone present in two isomeric forms, one is 2-quinazolinone and other is 4-quinazolinone are an important scaffold for various biologically important drugs as anticancer, antibacterial, antifungal, antimicrobial, ant inflammatory, ant analgesic, anticonvulsant agents, etc. These moieties have been prepared by the different methods and a different molecule such as anthracitic acid, anthranilamide, 2-cyanobenzoic acid and isatoic anhydride in single and multiple steps. Isatoic anhydride is an important precursor for the preparation of quinazolinones in one pot synthesis using a different type of aldehydes with a different type of amines or ammonium acetate with or without catalysts and solvent. In the present study, we would like to report a new application of EDTA as an inexpensive, nontoxic and green catalyst for three component one pot synthesis of 2,3-dihydroquinazoline-4-(1H)-ones in water media. This is a time consuming reaction easy to handling and catalyst are recyclable so this method is a green method. Herein presented is a ready reference for one pot synthesis of various quinazolinone molecules as an important drug intermediate from isatoic anhydride of the last 20 years.

**Key Point:** One pot synthesis, Isatoic anhydride, EDTA, Quinazoline, Quinazolinone, etc.

## **Mossbauer study of Fe-Bi-Sr-CuO high temperature superconductor**

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**Abstract :** Mossbauer spectroscopy is the main tool to characterize the structure of material. It is a microscopic method having the capacity of sensing the structure of matter at atomic scale. It can be applied all kind of solids materials from perfect single crystal to pure amorphous in bulk or at the surface of its environment. Even liquid may be investigated. The nuclear probe characterizes electric, magnetic, RT chemical isomer shift, vibrational and other properties. Superconducting sample was prepared by powder metallurgy technique. We study Mossbauer channel spectra of various calcined sample. The magnetic phase of entire spectrum indicate formation of new type of superconducting compound by diffusion reaction but at this temperature and time period for completing the reaction, there is no sufficient energy to cross the diffusion barrier and gives the formation of superconducting phase. We also study the resistance-temperature characteristics of some sample by four-probe method. we conclude that only single peak is observed from Mossbauer spectra of various sample. only catalyzed Ferric oxide phase may be present in spectra. we conclude that at room temperature no superconducting phase is observed.

## **Targeted drug delivery using c60 fullerenes nanoparticle**

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The idea of targeted drug delivery arises due to the need to delivered concentrated medication to only some parts of the body. In this method of targeted drug delivery we medicate specific part of the body where there are solely diseased tissues, thereby avoiding interaction with healthy tissues. Targeted drug delivery systems have superiority over conventional drug deliveries in various ways like reduction in the frequency of usage of medicine and drug side effects and to ensure uniform effect of the drug. Targeted drug delivery can be used in treatment of various diseases such as cardiovascular diseases, diabetes and cancerous tumors. In targeting of drug we use various delivery carriers or we can say vehicles. We use different types of drug delivery vehicles such as polymeric micelles and dendrimers, liposomes, lipoprotein and nano particles.

The structure of C-60 Fullerenes is well known, it is a member of carbon allotropic family and it has a shape of closed cage having 20 hexagonal and 12 pentagonal fused rings. Fullerene possesses favorable property for interaction with cellular environment. Fullerene offers a caged shell which can prevent contact between the body and the entrapped drug in it. Fullerene can act in direct bioactivities such as antioxidant in surface functionalization. An ideal drug delivery carrier must be non toxic, biocompatible, biodegradable. Fullerenes have properties which hold it to act as a suitable drug delivery carrier in targeting methods.

**Keywords:** Fullerenes, drug, diseases, tissues

## **Potassium : Effect of potassium on plant growth**

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**Abstract :** Potassium (K) is an element present in the s-block of the periodic table. Potassium occurs in the earth's crust as minerals, such as feldspars and clays. Potassium is leached from these by weathering, which explains why there is quite a lot of this element in the sea. Potassium is a key plant element. Although it is soluble in water, little is lost from undisturbed soils because as it is released from dead plants and animal excrements, it quickly become strongly bound to clay particles, and it is retained ready to be reabsorbed by the roots of other plants. Together with nitrogen and phosphorous, potassium is one of the essential macro minerals for plant survival. Its presence is of great importance for soil health, plant growth and animal nutrition. Its primary function in the plant is its role in the maintenance of osmotic pressure and cell size, thereby influencing photosynthesis and energy production as well as stomatal opening and carbon dioxide supply, plant turgor and translocation of nutrients. The consequences of low potassium levels are apparent in a variety of symptoms: restricted growth, reduced flowering, lower yields and lower quality produce. High water soluble levels of potassium cause damage to germinating seedlings, inhibits the uptake of other minerals and reduces the quality of the crop.

**Key Words:** Potassium, fertilizer, plants, symptoms



## Uranium and Radioisotopes

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Uranium provides us nuclear fuel used to generate electricity in nuclear power stations, the major material from which other synthetic transuranium elements are made and also used by the military to power nuclear submarines and in nuclear weapons.

People, when talking about nuclear energy, have only nuclear reactors or nuclear weapons in mind. only few realize the extent to which the use of radioisotopes has changed our lives over the last few decades.

In medicine, radioisotopes are widely used for diagnosis and research. Radioactive chemical tracers emit gamma radiation which provides diagnostic information about a person's anatomy and the functioning of specific organ.

In the preservation of food, radioisotopes are used to inhibit the sprouting of root crops after harvesting, to kill parasites and pests, and to control the ripening of stored fruit and vegetables.

In the growing of crops and breeding livestock, radioisotopes play an important role. They are used to produce high yielding, disease-resistant and weather-resistant varieties of crops.

Industrially, and in mining, they are used to examine welds, to detect leaks, to study the rate of wear of metals, and for on-stream analysis of a wide range of minerals and fuels.

**Keywords:** Radioisotopes, Nuclear Fuel, Nuclear Energy.

## Chalcogenide Film Fabrication By The Elements of Periodic Table

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**Abstract :** Chalcogenide glasses contain one or more chalcogen elements like sulfur(S), selenium(Se), and tellurium(Te) found in group 16 of the periodic table, covalently bonded with arsenic(As), germanium(Ge), gallium(Ga), antimony(Sb), etc to form the glass structure. In order to fabricate the thin films high purity starting materials were used and no extra purification was performed on the materials. The raw materials used in the present study are Ga, Se and Te. Appropriate amounts of material were weighed and transferred to clean quartz ampoules which was sealed and placed into a rocking furnace and heated to the melting temperature for several hours. The rocking furnace ensures homogenization of the material during melting. The last 10 minutes of the melting process, the rocking of the furnace was stopped so that the ampoule rests in a vertical position and was allowed to cool down so that bubbles in the melt rise to the top rather than being trapped in the melt. Quenching is performed by removing the ampoule containing the melt from the furnace and is allowed to cool in air at room temperature so as to get the final product.

**Keywords:** Chalcogenide glasses, periodic table, ampoules, quenching

## Science Icon : Periodic Table Poem

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Alumnus IIT-Kanpur-1986

**Periodic Table (PT)-Modern PT (MPT)** hanged,  
On Chemistry class room, research laboratory wall,  
Celebrated eternity **Mendeleev-Mosley** gifted,  
**PT/MPT** systemized knowledge of chemical elements for all,  
Based on **periodic law**-properties of elements,  
Are periodic function of the inherent,  
Properties of their atoms.  
it is important as matter basic unit is atom.  
**PT-PMT** gives insight of nature puzzle beautiful,  
Total **118** elements are present in MPT-majestic.  
**101st** elements is named mendeleevium(Ma),  
Afterscientist Mendeleev tall,  
Window to matter inanimate an icon of science is PT  
17th Feb. 1869, is auspicious birthday of PT,  
Thanks to **UNESCO** for declaring 2019 as **(IYPT-2019)**  
international year of the **PT** Of chemical elements,  
As 2019 this year **150 year old** has turned information PT.

## Effect of arsenic and antimony on raman peaks in Germanium selenide amorphous thin films

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**Abstract :** Raman measurements play a key role to depict the structure of the amorphous thin films. The bonds in different structural units present in the amorphous thin films are sensitive to Raman measurements. In  $\text{Ge}_x\text{Se}_{100-x}$  amorphous thin films system, three bonds are reported in the literature. These bonds are located near  $200\text{ cm}^{-1}$  with shoulder  $215\text{ cm}^{-1}$  and  $255\text{ cm}^{-1}$ . The bond located at  $200\text{ cm}^{-1}$  is attributed to corner-sharing  $\text{GeSe}_{4/2}$  tetrahedral structural and shoulder at  $215\text{ cm}^{-1}$  is attributed to edge-sharing  $\text{GeSe}_{4/2}$  tetrahedral structural unit [1,2]. The bond located at  $255\text{ cm}^{-1}$  is attributed to Se-Se chains. When As or Se mixed in  $\text{Ge}_x\text{Se}_{100-x}$  system, then system gets modified to  $\text{Ge}_x\text{As}_y\text{Se}_{100-x-y}$  or  $\text{Ge}_x\text{Sb}_y\text{Se}_{100-x-y}$ . In  $\text{Ge}_x\text{As}_y\text{Se}_{100-x-y}$  system,  $\text{AsSe}_{3/2}$  pyramidal unit is formed, which is located at  $190\text{ cm}^{-1}$  [3]. Raman peaks follow the rule  $\nu = (k/\mu)^{1/2}$ , where  $k$  is the force constant and  $\mu$  is the reduced mass. The reduced mass of As-Se bonds is higher than reduced mass of Ge-Se bonds. In  $\text{Ge}_x\text{Sb}_y\text{Se}_{100-x-y}$  system the  $\text{SbSe}_{3/2}$  structural unit is formed, which located at  $180\text{ cm}^{-1}$  [4]. The reduced mass of Sb-Se bond is higher than the As-Se bonds ( $\text{Ge}=72.89\text{ amu}$ ,  $\text{As}=74.922\text{ amu}$ , and  $\text{Sb}=121.25\text{ amu}$ ). That's why Sb-Se bond lies at lower position than As-Se and Ge-Se bonds.

**Keywords:** Raman measurements, tetrahedral structural unit, pyramidal structural unit, reduced mass.

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## Elements in nanotechnology

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**Abstract :** S and P block elements dominate in the field of nanotechnology. The chief elements are H, Li, C, N, O, Si. Most of the s-elements like Lithium, Sodium and Potassium form ionic compounds and are highly reactive. These alkaline s-elements have low ionization potential for the external s-electron which forms single-charged cations having small radii thereby showing high diffusivity in electrolytes and membranes. These features make Li the modern “Gold” in electrochemical energetics. Na retain the possibility of constructing Na-ion batteries and supercapacitors, also superionic conductor (NASICON) superionics. Ca is used in biomineralization and mesocrystal growth. Mg forms aluminosilicate minerals with structural nanocells which is further used in the form of light alloys for hydrogen storage. Then we have H, C and O constituting in many biologically related compounds and sensor systems.

Now as we move across the period in a periodic table, the atomic radius reduces slightly and ionization potential increases. Further we see that p-electrons come into the scene in the second period of the periodic table which leads to the formation of strong, oriented covalent bonds and anion formations for electronegative elements. In addition to the sigma bonds, conjugated pi-bonds are formed because of these p-electrons which leads to the formation of large number of inorganic polymers. As a result, various one-, two- and three- dimensional nanomaterials are formed for Boron, Carbon and Nitrogen, which include fullerenes, grapheme, nanotubes, MXenes, nanodiamonds, etc.

**Keywords:** Nanotechnology, elements, ionization potential, diffusivity, supercapacitors, biomineralization, mesocrystal, nanocells, nanomaterials.

## Study of hydrogen and superconductivity

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That hydrogen can be metallic was demonstrated in an experiment, which also established that H nuclei (protons) remained largely paired. Cornell physicist predict that diatomic hydrogen should have a superconducting phase but only at Mega bar pressures. They believe that the nature of superconductivity would be a modified version of the BCS theory in which electrons normally repel each other, would form into (Cooper) pairs by exchanging vibrational modes (phonons) set up positive ion lattice consisting of proton pairs. When the hydrogen remains diatomic, the basic electronic structure depends on both electrons and holes (electrons leave behind), and this mitigates somewhat the normal electron-electron repulsion, which works against superconductivity. The authors suggest that hydrogen, of all the elements might exhibit room TS. Hydrogen, the most common element in the universe is normally an insulating gas, but at high pressures it may turn into a superconductor. The hydrogen based compound metallic Silane may be useful to HTS in hydrogen. The temperature and pressures found on earth hydrogen is a gas and lithium is a metal. By adding small amounts of lithium to hydrogen, the study calculates that the resulting system may be metalized at around one fourth the pressure required to metalize pure hydrogen. The stable and metallic  $\text{LiH}_6$  compound is predicted to form around 1 million atm, which is around 25% of pressure required to metalize hydrogen by itself.

## Synthesis of Noval Series of Azitidine Derivatives with Possible

C.N.S. Depressant Activity

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**Abstract :** In order to find out pharmacologically active various new 5'-p-substituted phenyl-1,3,4-oxadiazolyl-2'-(4-phenyl-3-chloro-2-oxo-azitidine), 5'-p-substituted phenyl-1,3,4-Thiadiazolyl-2'-(4-phenyl-3-oxo-azitidine) & 4'-p-substituted phenyl-1,3-oxazolyl-2'-

(4-phenyl-3-chloro-2-oxo-azetidine), have been synthesized by reaction of 2-substituted arylidene-5-phenyl oxadiazole, 2-substituted arylidene-5-phenyl thiadiazole & 2-substituted arylidene-5-phenyl oxazole with chloroacetyl chloride respectively. All synthesized compounds are characterized by IR and NMR spectra. These compounds have been tested for their C.N.S. activity. Some of the compounds showed an excellent C.N.S. depressant.

**Keywords:** Oxadiazole, Thiadiazole, Oxazole, Azetidine, C.N.S. depressant.

#### The Benefits and uses of Polymer Nanocomposites

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**Abstract :** Major Improvements in functional and structural properties in material application are achieved by using composite material made with Nano-scale components. Polymer Nano composites are an area of substantial scientific Interest, the dispersion of low loadings in organic particles is a challenge for the preparation of new composite materials to enhanced mechanical, Gas Barrier and Flame retardant properties. A homogenous dispersion of nanoparticles is believed to construct better properties. The incorporation of few percent of Nano sized particles make great property changes and formerly unachievable property combinations possible. The achievable advantages of these Nano composites are improved mechanical properties, surface properties, decreased permeability to gases, water and hydrocarbons, higher thermal stability and heat distortion, higher chemical resistance, smooth surface appearance and higher thermal conductivity. The use of Nano composite is strongly influenced the industry of automotive, aerospace, food products, medicine and pharmacy, as well as material for engineering applications.

#### Application of nano materials in natural science

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Nano science and Nano technology are evolving at a rapid pace there have been a number of scientific and technology advancements in these fields in recent times. Nanoscience and Nanotechnology explains the foundation governing the functionality of Nanosize ( $1 \times 10^{-9}$ ) structure. Nano technology, in others, is atomic engineering. For our convenience, Nano technology can be distributed in three types which is given as Nano Materials, Nano Electronics, Nano Biotechnology Nano materials are those materials which are converted and augmented in size. Nano materials are manufactured in two ways Top-Down Approach and Bottom up Approach Using the top-down approach, we can create nanostructure out of micro structures, using top down approach method, the world's smallest guitar was fabricated and it has demonstrated a new technology for a new generation of electro mechanical devices. Bottom up techniques usually with the self-assembly of atoms or molecules into nanostructures. Bottom-up techniques lead to molecular scale electronics where molecules can be designed with specific electronics function. Bottom-up approach includes manmade synthesis of nanotubes and nanoparticles. According to a theory, when a material is broken, the total surface area increases. Similarly when the material is converted into Nano material, its surface area increases at same mass as compared to that matter and there is a lot of difference in chemical and physical properties.

#### Use of eis for the casting of the protective coatings for metallic cultural heritage

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**Abstract :** This paper describes that use of electrochemical impedance spectroscopy for the evaluating of protective coating for metallic cultural heritage. The main degradation phenomena that affect the metallic cultural heritage are the corrosion reactions with its environment like burial soil, outdoor atmosphere or indoor environment of museum. The best way to reduce the degradation of metallic heritage is preventive conservation measures but it is not possible in all environment conditions, so it is necessary to apply coating to the artefacts in order to protect against corrosion. The selection of coating depends upon the following parameter including transparency, reversibility and long term efficiency. Recently, using electrochemical impedance spectroscopy (EIS) is very well established method to investigate metal coating for general purposes. Thus, preventive conservation to prevent metal corrosion would include measures such as the reduction of the pollutants, reduction of environmental humidity and use of corrosion inhibitors. Mostly use Paraloid B72™ (an acrylic resin, dissolved in xylene, toluene or acetone) and microcrystalline wax used as protecting coating. In this paper we present that use of EIS for testing of the protective properties coatings of for metallic cultural heritage.

**Keywords:** Metals, Corrosion, Coating, EIS, Impedance, Paraloid B72™, Inhibitor,

#### Synthesis and Effects of Organophosphorous Compounds

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**Abstract :** Organophosphorous compounds (OP) are organic compounds containing phosphorous. Organic phosphorous is found in meat, fish, dairy, whole grains and nuts. Most of the phosphorous in our diet is the form of inorganic phosphorous added during food processing to enhance flavor and to improve colour and it is serve as a preservative. The institute of medicine recommends 750 mg of phosphorous per day, with larger requirement for children and pregnant women.

Organophosphorous (OP) are chemical substances that are produced by the process of esterification between phosphoric acid and alcohol. Organophosphorous can undergo hydrolysis with the liberation of alcohol from the ester bond. These chemicals are main components of herbicides, pesticides, insecticides. They are used in agriculture, home garden and veterinary practice.

Organophosphorous compounds are used as pesticide and insecticides accumulating in soil and aquatic organism. They are structurally related to compounds used as chemical warfare agents (eg Sarin & Soman). Effecting the nervous system by covalently inhibiting acetylcholinesterase.

### **Recent Progress in Application of Carbon Nano Tubes**

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**Abstract :** Carbon nano tubes are playing an increasingly important role in the field of nano science and nanotechnology due to their specific properties. Fiber spun of pure carbon atom nano tubes has been demonstrated shortly before and this type of super strong fiber has body and vehicle armor transmission line cables with significant use including only woven fabric and textiles. Several recent experiments have also been reported on preparation and mechanical characteristic of carbon nano tube polymer composites have also appeared. The exploration of carbon nano tubes in biomedical application is still going on. But a part of the human body contains carbon. Because usually a very bio compatible substance. Cells have been shown to grow on carbon nano tubes. So they appear to have no toxic effect. Carbon nano technology are produced by three main technique are discharge, LASER vaporization and Chemical vapour deposition due to super potential of carbon nano tubes. So it is clear that novel technologies will emerge in the near future. Specific physico-chemical properties of carbon nano tube, to make them, candidates for numerous applications in biomedical fields including drug delivery, gene therapy biosensor and engineering application.

### **Water purification through nano molecules of carbon: carbon nanotubes**

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**Abstract :** A carbon nanotube can be defined as a curl graphene sheet whose key element is carbon, a very important member of the periodic table. The tubes can be closed or open at the ends. They have diameter in nano dimension and can be categorized in single wall and multiwall carbon nanotubes. Carbon nanotubes have remarkable characteristics and extraordinary properties which are flexibility, high tensile strength, high modulus, high thermal conductivity, light weight, good electrical as well as good electronic properties, thus have a broad spectrum of applications. Among many applications of carbon nanotubes, water filtration is one of the most important. Because of unique hollow structure and appropriate pore size, carbon nano tubes can be used in membranes for water purification as well as in desalination technologies. Carbon nanotubes can sense and reject ions as per requirement for purification of water. Smooth transport of water, self cleaning, anti-fouling, reuse and selectivity of pollutants through carbon nanotubes makes them one of the most essential part of water purification technology. Despite the unique characteristics of carbon nanotubes, water filtration development through them is at premature stage and has many challenges to overcome in order to achieve this goal.

**Keyword:** Carbon nanotube, Graphene, Tensile strength, Membrane, Desalination.

### **Carbon Nanotubes (CNTs): Properties, Synthesis & its Applications**

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**Abstract :** Worldwide, carbon nanotubes have been of great interest because of their simplicity and ease of synthesis. CNTs emerged in the field of nanotechnology because of the Nano size and structure. The carbon nanotubes (CNTs) are tubes made of carbon with diameter in the range of a nanometer. The nanotubes consisted several terms of graphite cells with adjacent shell separation of ~0.34 nm and diameter of ~1 nm to make multi walled carbon nanotubes (MWCNTs). The CNTs are mainly single layered, double layered and multilayered. The main aspects of CNTs are there, small size, elastic behavior, high thermal and electrical properties, high tensile strength and high flexibility. These properties of CNTs make them useful as filters in polymeric fibers, composites, ceramics and metallic surfaces. The CNTs can be synthesized by various methods including arc discharge, laser, ablation, catalytic growth and mainly by CVD (Chemical Vaporize Deposition). The synthesized CNTs are characterized by Raman electronic and optical spectroscopic techniques. The unique composition geometry and properties enable numerous potential carbon nanotubes applications. They hold promise for their immense applications in the field of medicine, genes and drug delivery areas. It also shown the application in the field of energy storage, hydrogen storage, electrochemical super capacitor, field emitting devices, transistors Nano probes and sensors, composite, materials etc. The properties and characteristics of CNTs are still being researched. Recent studies shown a very promising glimpse of CNTs in the future of nanotechnology.

**Keywords:** Carbon nanotubes, single and multi-walled CNTs, Nano sensor and composites.

### **Management of Chemical Waste in ug/pg laboratory in chemistry**

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**Abstract :** Proper chemical waste management is necessary to protect the health and safety of universities, colleges and surrounding communities and the environment. For practical exercises in UG/PG laboratory the hazardous chemical waste is discharged continuously. The



chemical wastes are many type of materials like used/unused chemicals, metal complexes, organic solvent etc. Hazardous liquid chemical waste (HLCW) should be collected in low density polyethylene nalgene container. This collected HLCW have various step for treatment .Firstly remove solid material dissolve in HLCW, Secondary step is to digest, dissolve and suspended organic material, finally it should be treated by polishing method which used in traditional surface treatment. Hazardous chemical waste can be treated by disposal phase separation, sedimentation, filtration, oxidation (bio and chemical), methods.

**Key words :** Chemical waste, Laboratory waste, Management, Sedimentation.

## IMPORTANCE OF SALT IN OUR DAILY DIET : A REVIEW

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Salt not only improves the taste of our food, but it is also vital for our body. Minute quantity of salt helps in the flow of electrical signals in our brain. Salt also plays a very important role in maintaining water levels in our body. There are several types of salts are available for consumption, like rock salt, black salt, sea salt, ordinary salt etc. The ordinary salt normally used in cooking has sodium. Sodium increases blood pressure whereas potassium reduces it. Salts contain several other chemicals and compounds as well. According to experts in Ayurveda, refined salt contains large amounts of sodium and other chemicals that are not very good for health. Rock salt instead, contains 94 elements like calcium, iron, potassium, magnesium, copper etc. It is considered good for heart and digestive system and helps in preventing diseases like blood pressure fluctuations, skin diseases, arthritis, osteoporosis, depression, stress etc. Black salt is quite rich in iron.

**Key Words:** Salt, Ayurveda, Sodium, Potassium, Rock salt, Black salt, Sea salt

## Application of Sulphur and Nitrogen and their side effect in the Environment

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**Abstract :** We know elemental nitrogen is one of the major components of earth's atmosphere. Thus, it will participate in many natural processes. It is responsible for the formation of nitrogen dioxide entering the atmosphere. The classic example of the formation of nitrogen oxides is by the chemical reaction of atmospheric nitrogen and oxygen during the thunderstorm.

The chemical reaction occurs in the presence of lightning to form the nitric oxide which further undergoes reaction with oxygen to form nitrogen dioxide. Oxides of Sulphur and nitrogen are responsible for many natural phenomena.

Similarly, oxides of Sulphur such as Sulphur dioxide enter the atmosphere by natural processes such as volcanic eruptions. Moreover, oxidation of hydrogen and sulphide during organic matter decomposition process in the absence of air leads to the formation of Sulphur dioxide.

Since many decades the natural processes based on oxides of Sulphur and nitrogen have been taking place and there was a global balance of these gases in the earth's atmosphere. However, lately many anthropogenic or human activities led to the increase in the amounts of the compounds more than the desired quantity.

Thus, it is causing an imbalance in the earth's atmosphere and exerting detrimental effects. Thus, the excess quantity of the gases makes it air pollutants. We will study the negative impact of oxides of sulphur and nitrogen when present in excess quantity than the permissible limit.

Major concerns relate to their effects on human health and ecosystems. In the atmosphere, emissions of sulphur and nitrogen compounds are transformed into acidifying substances such as sulphuric and nitric acid. ... They are associated with adverse effects on human health as high concentrations cause respiratory illnesses.

Nitrogen dioxide (NO<sub>2</sub>), sulphur dioxide (SO<sub>2</sub>), and carbon monoxide are important ambient air pollutants. High-intensity, confined space exposure to NO<sub>2</sub> has caused catastrophic injury to humans, including death. Ambient NO<sub>2</sub> exposure may increase the risk of respiratory tract infections through the pollutant's interaction with the immune system. Sulphur dioxide (SO<sub>2</sub>) contributes to respiratory symptoms in both healthy patients and those with underlying pulmonary disease.

Today we are facing smog problem in India. Smog simply refers to a mixture of liquid and solid fog and smoke particles. Smog is usually seen as yellowish or blackish fog which suspends in the atmosphere or forms a ceiling in the air. It happens when fume, emissions, and particulates – nitrogen and Sulphur oxides and volatile organic compounds – react in the presence of sunlight to form ground-level ozone.

## Nitrogen containing heterocyclic compounds: promising leads for the development of alfa-glucosidase inhibitors (an overview)

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Nitrogen occupies a pivotal position in the periodic table. Due to its unique configuration, it interacts emphatically with the various kinds of receptors as revealed by docking studies and thus nitrogen features in most of the medicinal compounds. Alfa-glucosidase inhibitors suppresses the release of glucose units from polysaccharides and used in diabetes treatment. Currently, there are only three clinically known alfa-glucosidase, i.e., Acarbose, Voglibose and Miglitol that also display demerits such as long synthetic routes to access them and gastrointestinal side-effects. In the recent decades, researchers focused their efforts to develop synthetic heterocyclic compounds that have potential of alfa-

glucosidase inhibition. This overview summarizes nitrogen bearing heterocyclic derivatives that are shown to possess encouraging alfa-glucosidase inhibitory activity and could be valuable onhand leads for further development in this area

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**KEYWORDS:** Alfa-glucosidase inhibitors, nitrogen compounds, heterocyclic compounds.

### Application of Liquid Crystal Polymers

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**Abstract :** The subject of liquid crystals and their use in electronic displays and in non-linear optical systems has become of tremendous importance during the last decade; and the incorporation of liquid crystal units into polymeric materials has led to a group of new materials with diverse properties. Liquid crystal polymers (LCPs) have a wide range of uses, from strong engineering plastics to delicate gels for use in liquid crystal (LC) displays. It offers a unique combination of properties to the end user. These typically include low melt viscosity, very low mould shrinkage/ sinking, excellent mechanical properties, good solvent resistance, Low flammability, high continuous use temperature, low thermal expansion, excellent barrier properties, and low water absorption. Many of these properties are common to all liquid crystal polymers. Differences arise primarily in processing conditions, high temperature performance, mechanical properties and cost. Potential applications of liquid crystal polymers arise directly from this unique combination of properties. These include precision moulded small components, film exhibiting excellent barrier properties, high strength/modulus fibres, and novel composites.

Key Words: Liquid crystal polymers; applications.

### Luminescent materials : cds and zns semiconductor quantum dots

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In recent years, semiconductor quantum dots have been used in different aspects from physical properties of micro-nano scale dimensional systems. Quantum dots shows excellent optical properties hence form an important, efficient and interesting class of luminescent materials. Semiconductor quantum dots have higher photochemical stability than most conventional organic emitters. They have broad absorption spectrum and narrow emission spectrum which can be tuned by changing their sizes. Luminescent labels for optical sensors and fluorescent label sources for biological imaging applications is one the most interesting optical applications of semiconductor quantum dots.

CdS can be synthesized alone as semiconductor quantum dots or CdS/ZnS also be synthesized as core is made up of CdS and Shell is made up of ZnS. The synthesis of semiconductor quantum dot is done by micelle method using sodium bis 2-ethylhexyl and sulfosuccinate as surface agent. The concentration of surface agent leads to the dependent on quantum dot size, diameter of quantum dot 2.5nm to 4.0nm. The intrinsic emission spectrum of CdS nanocrystals and emission spectrum of surface states both lead photoluminescence spectra have two bands. Photoluminescence intensity and photostability of CdS quantum dot with ZnS shell is more than CdS quantum dot without ZnS shell.

Keywords : CdS, ZnS, photoluminescence, photostability, spectrum, luminescent.

### Photoluminescence using colloidal semiconductor quantum dots

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Narrow emission bands of colloidal semiconductor quantum dots (QDs) leads to exhibit interesting luminescence properties. Exciton recombination cause narrow emission bands and controllable emission energy spectrum due to quantum size effects. These features of colloidal semiconductor luminescence conclude to expect applications in various light emitting devices and electroluminescent devices. In commercial liquid crystal displays, colloidal semiconductor QDs are used as phosphors. Colloidal CdSe QDs are used as green and red phosphors and blue phosphors LED backlight downconversion because of their narrow band emission. The half width of their emission band is typically less than 40nm, and thus have high photoluminescence efficiencies. However, cadmium is a toxic element and it's use in products is restricted in various countries. InP quantum dots have a excellent alternative to CdSe quantum dots, but have not managed to replace CdSe QDs because their emission bandwidth is not suitable in practical applications. ZnTe exhibits the smallest band gap among cadmium free semiconductor QDs, but it can not applicable as a green phosphors because it's band gap is very large. Green and Red emissions from ZnTe based QDs have possible by making ZnTe as core inside a shell of ZnSe. The effective optical band gap of ZnTe core in ZnSe shell QDs is smaller than both ZnTe and ZnSe individual. As a result ZnTe(core)/ZnSe(shell) QDs exhibit emission in visible region from red to blue. And it's emission from red to blue is dependent by the thickness of ZnSe shell hance can be controlled.

### Heterocyclic candidates bearingsulfur and oxygen atoms as future leadsfor alfa-glucosidase inhibitor drug development(an overview)

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Sulfur and oxygen occupies a pivotal position in the periodic table. Due to the some specific properties, these interacts biologically with the various kinds of receptors as revealed by docking studies. Thus, sulfur and oxygen features in most of the medicinal compounds. Alfa

glucosidase is an enzyme that found in intestine and involves in the lysis of polysaccharides to produce into release glucose monomers from polysaccharides. Alfa glucosidase is an important targets treat diabetes recently researchers are developing new heterocyclic moiety that can inhibit this alfa glucosidase enzyme. This overview details recent sulfur containing heterocyclic candidates that have shown potential alfa glucosidase inhibition activity and can be potential future leads.

Thiadiazole make up an important class of nitrogen and sulfur- containing heterocycles, displaying a broad range of biological activities, such as anticancer, antibacterial, antifungal, antidiabetic and antimicrobial activities and have also found application in material science. Therefore, the development of new, efficient synthetic method for diversely functionalized thiadiazole derivatives has attracted much attention among synthetic and medicinal chemists

**KEYWORDS:** Alfa-glucosidase inhibitors, sulfur compound, heterocyclic compound.

### **Synthesis, structural investigations and biological activity of sm(iii) and nd(iii) complexes with macrocyclic ligands**

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**Abstract :** The synthesis challenge, exceptional kinetics and the possible use as models for systems of biological interest has contributed to the prominence of the coordination chemistry of macrocycles. The reactivity and biological importance of synthetic macrocyclic complexes, especially those of azamacrocycles, continues to promote interest in the design of new complexes. Macrocyclic ligands incorporating soft nitrogen donors into a ligand framework containing hard nitrogen atoms are of interest because of their potential for providing molecules capable of mimicking various aspects of macromolecular biological systems.

The present paper reports the synthesis and characterization of Sm(III) and Nd(III) complexes with macrocyclic ligands derived from dithio oxidants and different -diketones (diacetyl or benzyl) or -diketones (acetylacetone or benzoylacetone). These macrocyclic ligands (L) react with anhydrous Sm(III) and Nd(III) chloride in methanol – DMF mixture and products of type  $[LnCl_3(L)]$  have been isolated. The complexes have been characterized by M.P., electrical conductance, IR, PMR,  $^{13}C$  NMR and electronic spectra. These complexes have fungicidal and bactericidal properties which were checked in in-vitro level.

### **Phyto-Remediaton of Metals**

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To study and report the ability of plants biosorbents--For the first time biosorbent from plants waste have been demonstrated for efficient phyto-removal of heavy metals--Cd, Cr, Cu, Pb, Zn by plants such as canna, hibiscus, portulaca and trapa of which trapa fruit skin showed excellent results for metal binding capacity. The relevance of biomass was established for Chromium menance in the tannery area at Zoyna International, Jajmau, Kanpur where the filter of Trapa adsorbent was installed for 15 days and shown that the adsorbent reduces- pH, Conductivity, salinity and Cr(VI) considerably. In order to prove the utility of the metal adsorption from other industrial effluents we collected effluents from two scrap recovery plants – i) Lead recovery and ii) Zinc recovery. We used Trapa filter columns for the removal of Pb and Zn to demonstrate its utility. Thus we have shown that different plant waste are suited for different metal.

The biomass grown in uncontaminated soils to adsorb or uptake lead, cadmium, arsenic, cobalt and copper from aqueous solutions, a working model for the industrial effluents. In order to help understand the metal binding mechanism, laboratory experiments we performed experiments to determine optimal binding pH, time dependency of binding, and binding capacity for each of the above mentioned metals. These experiments were carried out with crushed dry Portulaca stem mass and other plant material like dry biomass of Hibiscus and Canna flowers and Trapa fruit skin. Based on the efficacy of plant biosorbents, *Trapa* fruit skin was selected for further industrial effluent. The effect of pH, contact time and adsorption equilibriums were investigated.

### **Terpenoid constitute of essential oil from anaphalis margaritacea and its antibacterial activity**

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Essential oils consist of a complex mixture of compounds, usually from 20 to 60, at different concentrations [1]. Terpenes, the main constituents of essential oils, are derived from *Anaphalis margaritacea*(L.) Benth., *Salvia leucantha* Cav. And *Thymus linearis* The evaluation of the biological activity of essential oils has been carried out over the years in order to identify new compounds with antibacterial activity. Benth were identified by GC and GC/MS analysis. The main compounds present in the oils were aromadendrene (20.0%) in *S. leucantha*, Phellandrene (12.5%),  $\alpha$ -thujene (12.0%) in *A. margaritacea* and thymol (50.0%) in *T. linearis*. The antibacterial activity of all the three oils against *E. coli*, *P. aeruginosa*, *S. aureus* and *S. typhi*, has been studied. In the activity *S. typhi* is the most resistant bacteria to all the tested oils whereas essential oil of *T. linearis* showed highest antibactericidal activity against the *S. aureus* in diffusion method.

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## Medicinally active Heteroretinoid-*bis* (benzylidene)-4-piperidone hybrids as Antileishmanial agents

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Leishmaniasis is a parasitic disease caused by flagellate protozoan *Leishmania* spp. through the female sandflies. Main clinical manifestations include visceral leishmaniasis and cutaneous leishmaniasis and rarer manifestations such as mucocutaneous leishmaniasis and post-kala-azar dermal Leishmaniasis. An estimated 350 million people are at risk of infection and disease worldwide. The annual global burden of VL is about 500 000, out of these 90% cases occur in India, Nepal, Bangladesh<sup>1</sup>, and Brazil. Chemotherapeutic treatment of leishmaniasis usually relies on the current use of first line drugs against leishmaniasis are pentavalent antimonials, sodium stibogluconate (SSG) and second line drugs pentamidine and amphotericin B is an effective drugs, but there are side effects and drawbacks related to treatments. Thus, new, affordable drugs are urgently required, preferably with a broad activity against the parasites. heteroretinoid compounds were shows excellent activity *L. donovani*. Since we have synthesized a Library of Heteroretinoid *bis*(benzylidene)-4-piperidone hybrids as antileishmanial<sup>2</sup> agents and Screened them for their in vitro/ in vivo antileishmanial activity against *L. donovani*.

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### Topic: Chronic Arsenical toxicity and skin

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For centuries, arsenic has played a role in medicine, industry, and criminal activities. Arsenic was used as a homicidal agent in the past because of its availability, inexpensiveness, lack of taste and odour relative to its extreme toxicity. Arsenic has also been a constituent of many medications used to treat a variety of disease like psoriasis and syphilis however, it was withdrawn in the 1950s after several case series linking its prolonged use to the appearance of cutaneous malignant lesions and neuropathies. Inorganic arsenic was used extensively in insecticides and rodenticides, but it has since been replaced by less toxic products. Advances in industry and medicine, as well as increased environmental, industrial and public health awareness, have resulted in a decrease in the availability of arsenic. This decrease has drastically reduced the incidence of acute arsenic toxicity but, as this incident demonstrates, acute arsenic toxicity may still occur. Acute arsenical toxicity due to various causes usually present with skin symptoms along with systemic involvement (mainly hepatic) and can result in death.

Chronic arsenic toxicity (CAT, arsenicosis) due to drinking of arsenic contaminated ground water is a major environmental health hazard throughout the world including India. Pigmentation and palmo-plantar keratosis are the specific skin lesions characteristics of arsenicosis. CAT also produces various systemic manifestations over and above skin lesions, important ones being chronic lung disease like chronic bronchitis, chronic obstructive pulmonary disease and bronchiectasis, liver disease like non-cirrhotic portal fibrosis and other diseases like polyneuropathy, peripheral vascular disease, hypertension and ischaemic heart disease, diabetes mellitus, non-pitting oedema of feet/hands, weakness and anaemia. Cancer of skin, lung and urinary bladder are important cancers associated with chronic arsenic toxicity and are usually the cause of death. Stoppage of drinking of arsenic contaminated water is the main stay in the management of arsenicosis as specific chelation therapy has limited value. Early skin cancer, detectable by regular active surveillance, is curable. Treatment of arsenicosis is unsatisfactory and is mostly symptomatic.

### Applications of titanium and its alloys in various

FIELDS: A REVIEW

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The metallic form of titanium is not only strong and light in weight, but also highly resistant to corrosion. Therefore, it can be used in numerous industrial applications. Titanium has an exceptionally high tensile strength to density ratio, high corrosion resistance, and ability to withstand moderately high temperatures without creeping, titanium alloys are used in aircraft, armor plating, spacecraft, and missiles. Titanium alloyed with aluminium, vanadium, and other elements is used for a variety of components including critical structural parts, fire walls, landing gear, exhaust ducts and hydraulic systems. Due to bio-compatibility, titanium is used in different medical applications including surgical implements and implants, such as hip balls and sockets that can stay in place for up to many years. Titanium has the inherent property to osseointegrate, enabling use in dental implants that can remain in place for over several years. This property is also useful for orthopedic implant applications. Titanium is also used for the surgical instruments used in image-guided surgery, as well as wheelchairs, crutches, and any other products where high strength and low weight are desirable. The unique qualities of titanium also prove to be MRI (Magnetic Resonance Imaging) and CT (Computed Tomography) compatible.

**Keyword:** Titanium, alloys, tensile strength, bio-compatibility, implants.



## Biosorption of heavy metals from waste water using waste biomass

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**Abstract :** Discharging wastewater containing heavy metals of Cu Ni and Pb into water bodies can cause toxicity in plants and aquatic animals. Waste water treatment method to remove heavy metal contaminants includes chemical precipitation, ion exchange, membrane, filtration and adsorption using activated carbon. However, these methods are either expensive or have other disadvantages such as high energy consumption and inefficiencies when existing heavy metals are at trace concentration. Therefore the research is oriented towards low cost and ecofriendly technology. Biosorption is the New and Ecofriendly technique for the removal of heavy metals from waste water using different kinds of waste adsorbents like Industrial wastes: Fermentation wastes, food/beverage wastes, activated sludge, anaerobic sludge etc. Agricultural wastes: Fruit/vegetable wastes, rice straws, wheat bran, soybean hulls etc. Natural residues: Plant residues, sawdust, tree barks, weeds etc.

**Key Words:** Biosorption, waste adsorbent, Hazardous component, Waste water.

## Importance of antimony (sb) in chemotherapy of leishmaniasis

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Leishmaniasis is a parasitic disease caused by Leishmania parasite and presents high morbidity and mortality in the tropics and subtropics. Among parasitic infections, only malaria kills more people. For the treatment of leishmaniasis, antimonials (antimony compounds) are the first line of treatment.

Initially, tartar emetic (trivalent antimonial, Sb (III) compound) was used for the treatment of leishmaniasis, but this drug was found to be highly toxic as well as very unstable in tropical climate. This led to the discovery of pentavalent antimonials. Urea stibamine [Sb (V) compound] synthesized by Brahmachari, emerged as an effective chemotherapeutic agent against Indian kala-azar. The development of the less toxic pentavalent antimonials led to the synthesis of sodium stibogluconate (Pentostam) in 1945.

Despite having the side effects such as acute pancreatitis, cardiac arrhythmia, renal failure, cardiotoxicity and hepatotoxicity these drugs are the mainstays for the treatment of leishmaniasis. Recently, antimonials have become almost obsolete in certain areas of India because of drug resistance developed due to the incomplete treatment and irregular use but they are still useful in the rest of the world, where the introduction of generic brands has reduced costs.

**Key words:** Leishmaniasis, antimonials, pentavalent antimonials, trivalent antimonials

References

## Applications of Nano-particles in Environmental Restoration

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**Abstract :** Toxic elements released by man-made activities are the main cause of contaminated air, soil and water which are spoiling our ecosystem and health. This increases the challenges of treating process of three natural resources through conventional technology. Therefore, Nanotechnology plays a very important role to fulfill the present demand of monitoring and treating the hazardous elements or wastes with better efficiency and less energy consumption.

This article highlights ongoing research and development activities on improving the quality of air, water and soil using carbon-based nanoparticles and metal oxide nanoparticles etc. We also discuss the applications of these nanoparticles for remediation which would more cost effective and fast cleanup of wastages.

**Key words:** Nanoparticles, Human health, Air, Soil and Water

## Role of Metal-Organic Frameworks (MOFs) Towards Food Safety as Chemical Sensor

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Food safety is one of the biggest problem people are facing worldwide. While developing countries are at higher risk of exposure, developed countries also require rigorous food safety standards to prevent exposure to food-borne pathogens. With globalization, many food products are exchanged across borders, which increases the ease pathogen transmission through food products. In recent years some incidents have been reported, including dioxin contaminated eggs and milk powder contaminated with melamine. Thus, there is a need to develop good systems to detect, remove, and control the risks caused by the presence of hazardous substances. The contaminants which have been studied in food safety include heavy metals, pesticides, environmental organic contaminants, mycotoxins, and bacterial pathogens.

There are several materials have been developed and used for food safety purpose few of them are graphene oxide (GO) and carbon

nanotubes (CNT). Another class of porous materials includes metal-organic frameworks (MOFs). These (MOFs) have high porosity and tunable physical and chemical properties. That is why MOFs have been used in various applications, including gas and water storage, contaminant removal, and catalysis. To date, MOFs have also demonstrated their versatility towards removing contaminants from production sources, in production of food packaging, in improving preservation of food, and in the detection and monitoring of contaminants in food products. Luminescent MOFs are often used as chemical sensors in the detection of various types of analytes in food and water due to their unique optical properties of emission and excitation.

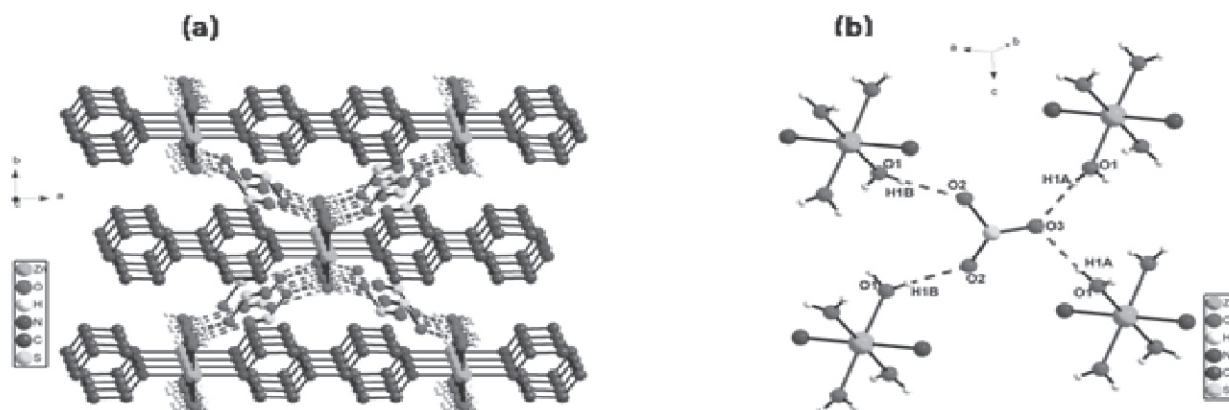
## The interplay of Noncovalent Interactions in the Construction of Supramolecular Coordination Assemblies bearing Alkanesulfonate Ligands in the Architectures

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The synthesis of novel supramolecular coordination motifs of compositions,  $\text{Zn}(\text{OSO}_2\text{R})_2(\text{H}_2\text{O})_x$  ( $\text{R} = \text{Me}/\text{Et}/^n\text{Pr}$ ;  $x = 2, 4, 6$ ),  $[\text{Zn}(4,4'\text{-bipy})(\text{H}_2\text{O})_4](\text{RSO}_3)_2$  ( $\text{R} = \text{Me}/\text{Et}$ ) has been achieved by reacting  $[\text{Zn}(\text{OSO}_2\text{R})_4]^{2-}$  ( $\text{R} = \text{Me}, \text{Et}, ^n\text{Pr}$ ), with water and/ or 4,4'-bipyridine under ambient conditions. The zincate salt was afforded by the reaction of anhydrous zinc acetate with dialkyl sulfites,  $(\text{RO})_2\text{S}=\text{O}$  ( $\text{R} = \text{Me}, \text{Et}, ^n\text{Pr}$ ) in the presence of tetraalkylammonium iodides. The method involves in situ generations of the corresponding alkanesulfonate moieties via sulfur-centered Arbuzov-type rearrangement in dialkyl sulfites.<sup>1</sup> X-ray crystallographic analysis reveals a rich diversity of one-/two-/three-dimensional structural motifs in which the sulfonate groups act as weakly coordinating ligands with the affinity toward various noncovalent interactions. The representative structure of 1 (a,b) reveals the intercalation of anions in between the cationic layers and three-dimensional motif as a result of extensive H-bonding, respectively.



Figures of 1

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## Applications of Nano silver and gold in Medicine

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**Abstract :** Nanoparticles are proving to be the most promising candidates for biomedical applications these days due to their remarkable physical properties, large surface area, enhance permeability and retention effects. Silver and gold nanoparticles are very widely used as medicine since long. Silver is white and brilliant metallic elements in the periodic table with Ag meaning “argentum” as its chemical symbol. Silver nanoparticles are emerging as one of the fastest growing product categories in nanotechnology industry. These are very good materials due to its distinctive properties as high electrical and thermal conductivity, chemical stability, catalytic activity and antimicrobial activity. Nanocrystalline silver in wound dressing is used for treating ulcers and in creams for treating burn wounds. Gold (Au) is another dense lustrous yellow precious transition metal of the periodic table. The colloidal gold nanoparticles have been utilized for centuries by artists due to the visible colours produced by their interaction with visible light. The optical, physical, chemical and electronic properties of gold nanoparticles makes it suitable candidate for use in high technology applications as sensory probes, therapeutic agents, organic photovoltaics, catalysis, biological imaging, drug delivery etc. Green synthesized gold nanoparticles have shown their antioxidant and antifungal activity. The use of silver and gold nanoparticles in various biomedical applications will be discussed in detail here.

## Green Synthesis of nickel nanoparticles and its applications in organic transformation

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**Abstract:** The interest on nickel nanoparticles and their synthesis have been increased in last few decades. This has resulted in the generation of nickel nanoparticles by chemical and physical methods. Because of use of various toxic chemicals and solvents, these methods are not enthusiastic due to environmental concerns. Hereunder in this study an eco-friendly and green method has been suggested for the synthesis of Ni NPs. Herein *Blumea Lacera* plant extract has been used for generation of Ni NPs. The as formed Ni NPs have been characterized by XRD, SEM, EDX, FTIR and UV-visible absorption spectroscopic techniques. These NPs have been used as catalyst in some selected organic reactions.

**Key words:** Ni NPs, Green synthesis, plant extract, organic reactions.

## Green synthesis of copper nanoparticles using x Anthium strumariumplant extract and its application in organic reactions

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**Abstract:** Green synthesis of nanomaterial is an enormously growing field of science and researchers have shown a great interest in the synthesis of copper nanoparticles using plant extract. Synthesis of Cu NPs using plant extract is environment-friendly method because it does not involve the use of harmful chemicals In this work we have synthesized copper nanoparticles using *Xanthium strumariumplant extract*. *Plant extract consists of various natural products such as polyphenols, carbohydrates, proteins which act as reducing as well as capping agents. The above synthesized Cu NPs were characterized by UV-visible spectroscopy, FTIR, XRD, SEM and EDX techniques.* The synthesized Cu NPs have shown excellent catalytic activity towards the various organic reduction reactions.

**Keywords:** Green synthesis, Plant extract, CopperNanoparticles, Reduction Reactions.

## Selenium is a trace mineral: essential for good health

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**Selenium** is a element with the symbol Se and atomic number 34. It is a nonmetal (more rarely considered a metalloid) with properties that are intermediate between the elements above and below in the periodic table. Selenium is a trace mineral that is essential to good health but required only in small amounts [1,2]. Selenium is incorporated into proteins to make selenoproteins, which are important antioxidant enzymes. The antioxidant properties of selenoproteins help prevent cellular damage from free radicals. Selenium is an ingredient in many multivitamins.

**Three specific diseases have been associated with selenium deficiency:**

- Keshan- Disease, which results in an enlarged heart and poor heart function, occurs in selenium deficient children.
- Kashin-Beck Disease, which results in osteoarthritis.
- Myxedematous Endemic Cretinism, which results in mental retardation.

Selenium content of foods can vary. Brazil nuts contain as much as 544 micrograms of selenium per ounce. whole wheat breads, whole grain cereals, **sunflower seeds, mushroom, cottage cheese, banana, lentils, oatmeal, fish, chicken, egg, brown rice are other source of selenium.** Studies shows that pumpkins and cucumber seeds are rich source of selenium.

While too little selenium can cause serious health problems, too much selenium can also be toxic. At high enough levels, selenium could cause death. Follow these guidelines from the National Institutes of Health to determine how much selenium is required :

Age	Recommended daily amount of selenium
Over 14 years	55 mcg
9 to 13 years	40 mcg
4 to 8 years	30 mcg
7 months to 3 years	20 mcg
Birth to 6 months	15 mcg

**Key words:** Antioxidant enzyme, Brazil nuts, Multivitamins, Osteoarthritis

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## What makes gold unique : Special Relativity

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Gold a soft metal with mellow glow, most malleable & ductile and lustrous, found to be chemically inert. Gold is so precious because it never tarnishes i.e. unreactive to atmospheric oxygen and acids. Unlike the copper and silver which are just above the gold in eleventh group of periodic table.

The Mystery is in its atomic structure Gold atomic number 79 is present in the last row of periodic table having stable elements. With 79 protons in its nucleus, the electrons of gold atom are subjected to intense electrostatic attraction. Using the naive Bohr "solar system" model of the atom for the moment, electrons in the 1s orbital, closest to the nucleus, would have to orbit with a velocity  $v$  of  $1.6 \times 10^8$  metres per second to have sufficient kinetic energy to avoid "falling into" the nucleus. This speed is more than the half of the speed of light  $c = 3 \times 10^8$  m/s which according to Einstein's equation :

$$m_r = \frac{m_o}{\sqrt{1 - \frac{v^2}{c^2}}}$$

increases the electron's mass (or, in more modern terminology, momentum) by about 20%. The relativistic increase in mass causes relativistic contraction of s & p orbitals and expansion of the d & f orbitals. Thus due to shifting in energy levels, change the properties of gold and it becomes unique.

1. Mellow glow,
2. Chemically Inert,
3. High affinity comparable to halogen.

**Key words:** Mellow glow, Tarnish, Relativistic Contraction, Affinity

## Need of metallic science in life of Human Being

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**Abstract:** in the 21<sup>st</sup> century science must become a good shared by all, for the benefit of all people. It is a view of science learning that will deal with scientific principles through an approach where children are taught & learn to write and talk about science, to argue for their Views of the world and how they can draw this knowledge to help in discussion-making.

We propose an approach that shows how school science can make a significant contribution to this enterprise by outlining a view of school science that deals with the challenge of ways of learning science and ways learning through science. This approach is designed to contribute to challenge of the ever-growing realization of the need for scientific understanding to support decision making and to be able to take an active part in decisions that affect all our communities.

Every citizen need to be able to take decision that affect individuals, communities, regions, our country and the world, decisions that need a science education based on understanding of ethics and of independency thus science learning has to be seen as necessary for the full realization of human being.

Science is the pursuit and application of knowledge and understanding of the natural and social world following a systematic methodology based on evidence. 5 Reasons Why Science is Important in Our Daily Life-

1. Technology
2. Electricity
3. Medicine
4. Transportation
5. Transforms our actions

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