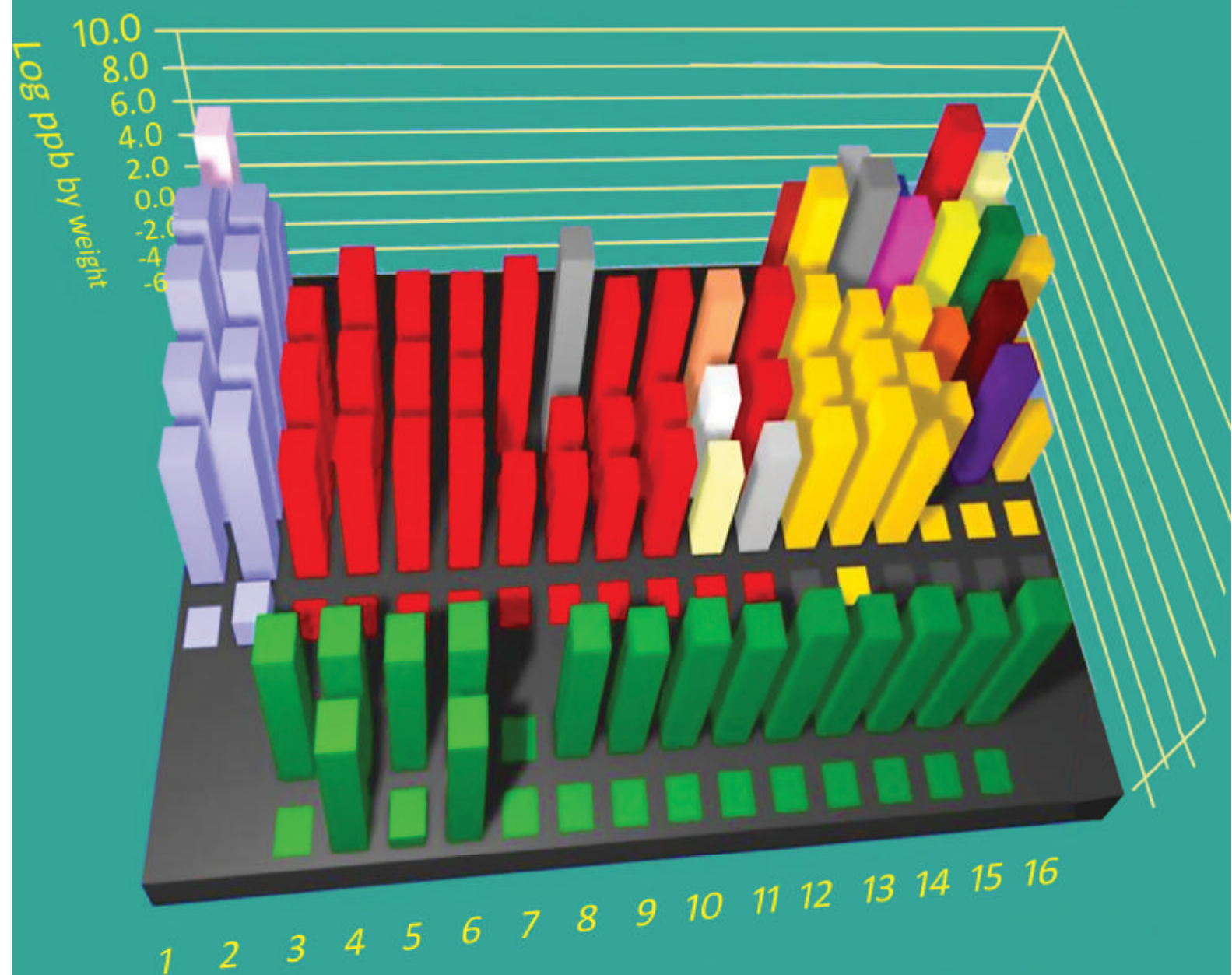




ASSOCIATION OF CHEMISTRY TEACHERS

NEWS LETTER

ISSUE : 14, MAY - AUGUST 2019



International Year of Periodic Table (IYPT-2019)

ACT News Letter, Issue 14

May – August, 2019

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Disclaimer : The views expressed are that of the authors and ACT is not responsible in any way for them.

Association of Chemistry Teachers Promoting Excellence in Chemistry Education

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Dr. Mannam Krishnamurthy, Editor
Varsity Education Management Limited, Hyderabad

We are happy to inform that the contributions of ACT ranges from International Olympiads, organizing seminars, science exhibitions, workshops, expert invited talks, innovating conceptual science experiments, conferences, talent search examinations, training faculty and students etc.

We are bringing in the present issue of the news letter with the reports on the ACT activities, latest innovations, new trends, views and news. We have included three general articles in the present issue. We have also included subject reports on National Chemistry Conferences. Report on IYPT-2019 activities of ACT members was given briefly. Recent Life Memberships of ACT were also listed in this issue.

We invite good suggestions and better contributions from the readers to get best output of the future issues. We welcome you all to participate in the International Year of Periodic Table (IYPT-2019) and NCCT-2019 to be organized during October, at S.G.B. Amaravati University.

Academic Position to ACT President as Vice Chancellor



Prof. D.C. Deka, President ACT, had taken the charge as first Vice Chancellor, Madhabdev University, Lakhimpur. Madhabdev University is one of the universities of Assam State. Prof. Deka, FRSC was earlier working as head of the Chemistry Department at Gauhati University.

Academic Honour to ACT General Secretary as RSC Fellow

Prof. D.V. Prabhu, General Secretary ACT has been bestowed upon Fellow of Royal Society of Chemistry, UK. Prof. Prabhu was former head and present Adjunct Professor of Chemistry at Wilson College, Mumbai. FRSC is a valuable honor to active teaching and research professionals of Global Chemistry.



Academic Participation of ACT Members

Prof. M.S.M. Rawat, Vice president ACT, North Zone and Advisor - H.E., Government of Uttarakhand, Dehradun was nominated as Indian Academic Reviewer by Team AW on 4th July 2019.

Dr. Dheeraj Mandloi, EC Member ACT from Institute of Engineering and Technology, Indore attended Chemical Research Society of India and American Chemical Society meeting at Indian Institute of Technology, Kanpur on 18th July 2019.

Dr. M.R.R. Prasad, Life Member ACT was invited to join editorial board of Journal of Organic Chemistry Plus of Universal Wiser Publishers, Singapore, by journal coordinator Stephen Allen on 19th July 2019.

Prof. D.V. Prabhu, General Secretary ACT, participated in the 'Symposium on Periodic Table for School Children,' organized by Bombay Association for Science Education, Mumbai, supported by RSC (UK) at Nehru Science Centre, Mumbai during 19-20, July 2019.

Prof. M. Swaminathan, EC Member ACT from Kalasalingam University, Krishnankoil, Tamilnadu gave an invited talk at 3rd International Conference on 'Science and Engineering of Materials' at Sharda University, Greater Noida, U.P., during 19-21, July 2019.

Dr. Hemant Pande, Vice president ACT West Zone was a resource person at Akola Education Society, Maharashtra. He guided about 250 teachers of Vidarbha region to make projects on 'Periodic Table for the Welfare of Society,' as part of celebrations for IYPT-2019 on 26th July 2019.

Dr. K. Surendra Babu, Life Member ACT and Director SVRM College, Nagaram, Andhra Pradesh participated as resource person in the Industrial and Training Partner's Meet, organized by Agricultural Sector Council of India, at Bangalore on 1st August 2019.

Dr. Umesh Chandra Jain, EC Member ACT gave a motivation lecture to students at Academic Heights Public School, Morena, Madhya Pradesh on 20th August 2019.

Prof. P.V.S. Machiraju, Vice President ACT, South Zone and Dr. Mannam Krishnamurthy, EC Member ACT served as resource persons for 'National Training Programme on Eco-Air, organized by NCSTC, DST and Science City of AP at MVN RVR College, Malikipuram, AP, during 26-30, August 2019.

ACT Members at International Venues



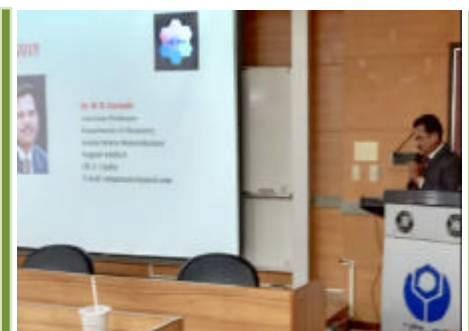
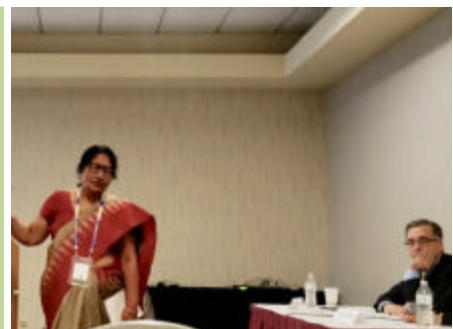
Prof. P.M. Mishra, vice president ACT East Zone from M.L.S.M. College, Darbhanga, Bihar state participated in the 6th International Conference of Chemistry (Our health, our Future), organized by I.C.C., at Paris (France) and Brussels (Belgium), during 6-8, June 2019.

Prof. M.V. Basaveswara Rao, Life Member ACT from Krishna University Dr. M.R.A.R. P.G. Centre, Nuzvid, Andhra Pradesh state gave an invited talk at International Conference on 'Materials for Advanced Technologies,' at Singapore, during 23-28 June 2019. He had academic discussions with Noble Laureate in Chemistry Prof. J.F. Stoddart, Northwestern University, U.S.A.



Prof. Md. Abdul Halim Shah, EC member ACT from D.M. College of Science, Imphal, Manipur state attended International Conference on 'Global Initiatives for Sustainable Development : Issues and Strategies,' organised at Bangkok, Thailand, during 24-26, June 2019.

Prof. Sraddha Sinha, Secretary ACT North Zone from B B Das NIT, Lucknow, Uttar Pradesh state presented a research paper in the 4th International Conference on 'Obesity and Chronical Diseases,' organized at San Francisco, United States of America, during 1-3, July 2019.



Dr. Wasudeo Gurnule, EC Member ACT from R.T.M.N. University, Nagpur, Maharastra state gave an invited talk on 'Recovery of Toxic Metal ions' at the International Conference on 'Nanomaterials and Advanced Composites', organised at National Thiwan University of Science and Technology, Taipei, Taiwan, during 8-10, August 2019.

Report on National Conference

Two Days National Conference on 'Recent Advances and Future Perspectives in Chemical Sciences: An Interdisciplinary Approach' was organized jointly by Faculty of Applied Sciences, Dr. K.N. Modi University and ACT (Mumbai) at Video Conference hall, Dr. A.P.J. Abdul Kalam Block of Dr. K.N.M. University, Newai, Rajasthan State, on 26-27 July 2019.

Prof. R.T. Pardasani, Dean and Head, School of Chemical Sciences and Pharmacy, Central University of Rajasthan, Bandarsindri was the chief guest of the inaugural session. He gave a key-note on 'Greener Approaches to the Constriction of Agriculturally and Biologically Active Heterocyclic Scaffolds'.



There were two technical sessions on the first day of the conference. Prof. Sudesh Kumar, Banasthali Vidyapeeth, Newai and Prof. Chandra Kant Sharma from SAGE University, Indore gave their talks on 'Corrosion a general phenomenon of life' and 'Impact of Nanobiotechnology in the production of Nanoparticle with extract of leaves of Prosopis: Characterization and Assessment of Antimicrobial properties', respectively.



On the second day of the conference, there were two technical sessions. Prof. R.B. Singh and Dr. Avnish Kumar, both from Dr. B.R. Ambedkar University, Agra, gave their talks on 'Confirmation of Seed Polysaccharide Structure from Cassia Javanica Linn. Plant by Periodate Oxidation Studies' and 'Lactobacillus species may be a Potent Tool to Minimize Rate of Aging', respectively.

The conference witnessed a total of eight oral presentations and forty poster presentations. Best oral and poster presentations were awarded with prizes.

One day National Conference on Emerging Trends in Material Science was organized at Department of Chemistry, Government Arts College, Tiruvannamalai, Tamilnadu State on 13th August 2019. This ACT sponsored conference was coordinated by Prof. A. Ravi. All delegates of the conference were given participation certificates and resource persons were felicitated.

Popularization of Chemistry : A to Z Connectivity

Dr. Mannam Krishna Murthy

Chief Executive Dean,
Varsity Education Management Ltd., Madapur, Hyderabad.

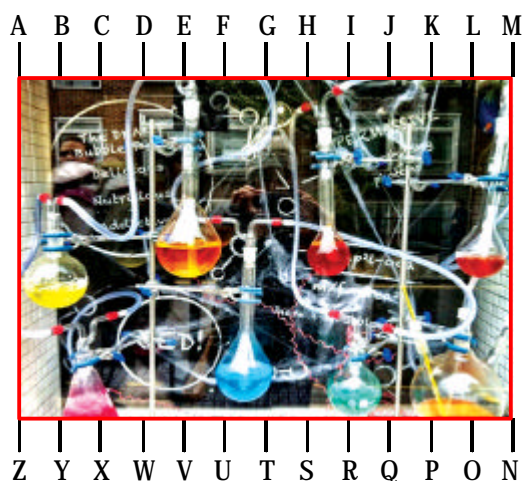


Every human is made up of material. Human consumes material, eliminates material, uses material for his (her) comforts and well-being, makes alternate materials to suit life style from time to time, creates waste materials indiscriminately and so on and so forth. This is the human material saga.

The fundamental scientific aspect of material is its composition, structure and properties. The essence of Chemistry is the study of the characteristics of materials.

Apart from this, chemistry also deals with perturbation aspects in the mass and energy parts of the materials. Perturbation in mass of the material gives new products. Perturbation in the energy is useful in designing new techniques for quality control.

Chemistry has a distinct bearing on different activities and requirements of human life. Chemistry not only has a significant relationship with materials that man requires, uses and throws as waste, but also has the connectivity with A to Z of scientific fields.



1. Agriculture, Atmosphere	9. Immunology	17. Quantum
2. Biosphere	10. Jute, Jewels	18. Radiation, Rubber
3. Cement, Clinical, Communication	11. Kerogen	19. Sonochemistry
4. Dietetics, Dairy, Drugs	12. Luminescence, Lubricants	20. Tribology, Textiles
5. Electronics, Energy, Environment	13. Medicinal, Metallurgy, Minerals	21. Urology
6. Food, Forensic, Fuel	14. Nuclear, Nutrition	22. Virology
7. Geochemistry, Games	15. Ocean Chemistry Organics	23. Water Chemistry
8. Hydrosphere, Health, Hygiene	16. Phytochemistry, Photochemistry, Polymers	24. Xerography
		25. Yeast
		26. Zeolite

Chemistry is diverse in application but unified in content and approach. Learning, understanding and application of chemistry is a continuous activity to develop and enhance our knowledge of chemical processes and their molecular basis. This has definite impact on the technological advancements, the fruits of which human enjoys.

N. Lipscomb Jr. Nobel Laureate (1976) opined for a new kind of chemistry course because it is connected with the man's well-being, environment, resources and energy for the long term future of humanity. Chemistry is a hopeful key to the deprivations and ills of human society: e.g., it provided a chemical fertilizer through ammonia synthesis (Haber's process), pesticide D.D.T. to combat disease, introduced actinotherapy for cancer (discovery of Radium with its radioactivity by Madam Curie; incidentally let us remind ourselves that 2011 is International Year of Chemistry, the centenary year of Madam Curie's Nobel Prize in Chemistry).

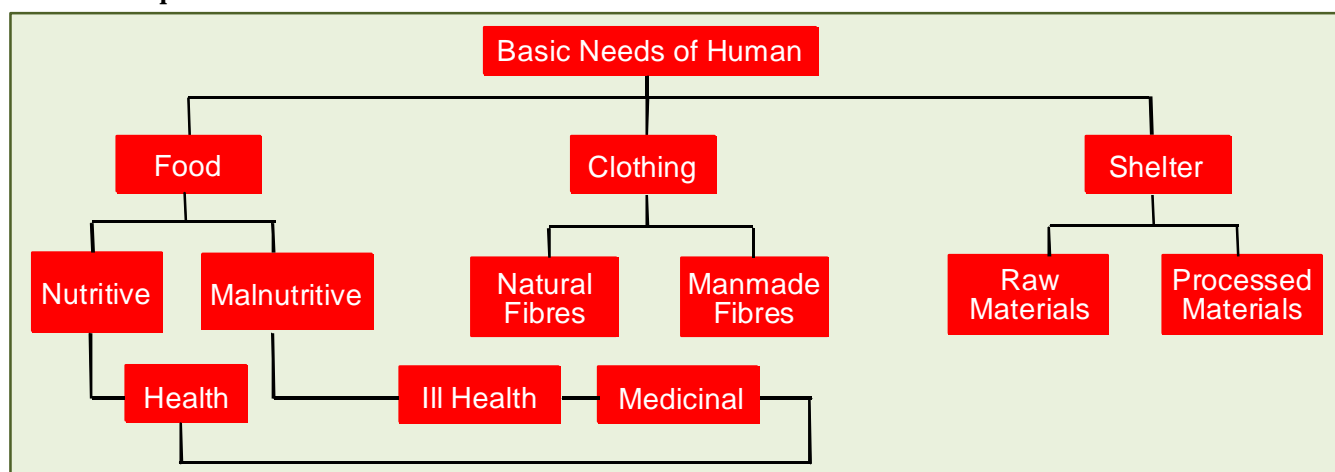
Chemistry is a catalyst for development and is a service science to society, involved in every aspect of our daily life-food, housing, clothing, raw materials etc. The UNESCO SC/631/03(1981) document listed 18 types of problems facing mankind which may also be recognized as pertinent global challenges, namely, sustainable living, sustainable energy and sustainable environment. Seventy percent of these problems are amenable to solution by science and technology.

Students (knowledge seekers), teachers (knowledge dispensers) and researchers (knowledge promoters) need to get the awareness that chemistry principles help in the attempts to solve more than half of these problems.

The information in the subject of chemistry, prior to twentieth century, is mainly centered round objective observation to understand matter and its changes. Such information is rapidly increasing and is evidenced by the following few examples: Chemical Abstracts service registers approximately 7000 new compounds weekly; Preparation of new catalysts, enzymes and organo-metallic compounds; Computer designed synthesis of complex molecules; Advances in instrumental methods of chemical analysis, computer guided methodologies; Waste recycling processes; Information about oceans as an alternative source of materials etc.

Newly emerging fields like biotechnology, information technology and nanotechnology also add to the chemical knowledge in their own way. Such a vast panorama of chemical information may be frustrating to have unified course content and may push any student and/or teacher to an enthusiastic cynic. Chemistry, which essentially concerned with the structure and composition of materials, plays an important role on our basic needs and day-to-day life.

The industry draws this essence for improving the standard of contemporary living. The structure is concerned with the energy link among the constituent parts of the matter while the composition is related to the mass part.



At present computers are playing a significant role in learning, teaching and research in chemistry. We hear quite often the term CAD (computer aided design) not only in science but in many fields of human activity. The training in the use of computers start even in the primary school stage. So students coming out with this background to higher level of studies do not have any problem with new technology, though most of the teachers are yet to catch up with it.

The learner is given the basis of the new approach to the study of chemistry by way of systems-thinking. This approach puts the student to learn from one source and search for data from different sources. The subject material so gathered is used to search for inter-relationships. Thus the student is enabled to develop ability to synthesize data, to recognize the inter-relationships and to evaluate both data and systems. Such an approach will encourage improvement of the analytical ability while learning.

The traditional method of teaching chemistry is chiefly concerned with collection of data regarding preparation, properties and uses of materials, which is mono-disciplinary with depth. The present day chemistry needs to be multi-disciplinary with breadth involving the systems-thinking approach.

New type of chemical education enables one to translate chemical information, wisdom and knowledge. This will help more in popularizing chemistry and its A to Z connectivity.

* Reference : U. Muralikrishna, *J. Applicable Chem.*, 2012, 332-343

Staying Safe in Laboratory Work

By : *Dorothy Warren*

Source : Education in Chemistry (2019)

Understanding the risks will help students practice chemistry safely

Why are so many people scared of flying but are happy to cross the road when the number of deaths caused by road accidents is much greater than those caused by air accidents? It is estimated that the probability of dying in a plane crash is 1 in 11 million. It is 1 in 5000 for dying in a car crash.

Why do people worry about having radiation therapy but they're quite happy to lie in the sun or use a sunbed when radiation therapy can treat cancer while sunbathing can cause skin cancer? Even one sunbed session can increase your risk of developing squamous cell skin cancer by 67%, basal cell skin cancer by 29%, and the risk of melanoma increases by 20%.

The answers to these questions lie in the findings of the report to the Royal Society, Risk analysis, perception and management (1992).

People are more likely to take risks when: they are in control; the activity is voluntary; the risk is easily reduced and there is a low risk to future generations. People tend to dread things and therefore are not so willing to take risks when: things are out of their control; many people can be affected; and there is a higher risk to future generations. So what are the implications for teaching health, safety and risk in the school laboratory?



On many occasions when meeting with teachers and technicians I hear phrases such as ‘You can’t do that experiment. It’s too dangerous’. ‘That chemical is banned, so we don’t do that practical activity any more’. I’m nervous that it might go wrong so I don’t do cracking or the alkali metals. ‘I will put on a video instead.’

In reality, as long as teachers and students are confident with handling the apparatus and they have considered the risks involved (i.e., done a risk assessment), then most practical activities can be carried out safely in the lab. The Gatsby ‘Good Practical Science Project’ provides a framework for delivering good practical science in schools. Benchmark 9 of the framework about talking ‘a balanced approach to risk’ states that student’s experience of practical science should not be restricted by unnecessary risk aversion. In other words schools should not shy away from practical chemistry. There is plenty of guidance and support about this benchmark, including risk assessment and modeling health and safety, available.

Teaching students about health, safety and risk is an important part of the chemistry curriculum. A good starting place is to ask students to think about and discuss the hazards and risks in everyday life. Then move on to more specific safety issues met in science. Activities such as our perception of risk and the dread exercise in the Royal Society of Chemistry's book 'Health, safety and risk' promote such discussion.

Learning to carry out a risk-benefit analysis will help students to make balanced decisions about wider questions in society such as the use of 'food additives, parabens in cosmetics' or 'nanoparticles'.

Health, safety and risk in the science curriculum

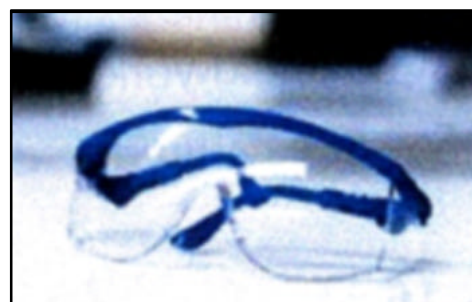
When students start secondary school, many begin their secondary science learning with a series of lessons on health, safety and laboratory rules.

Teaching about risk and the safe handling of equipment at (see table) goes much further than lab rules and routines; it's about students being able to choose the right equipment, understanding and putting into practice a risk assessment and being able to make sensible decisions in the laboratory. It is also about being able to evaluate risks and make informed choices in wider society.

11-14 year old students	Experimental skills and investigations : use appropriate techniques, apparatus and materials during field work and laboratory work, paying attention to health and safety.
	Scientific attitudes : evaluate risks.
14-16 year old students	Experimental skills and strategies : carrying out experiments appropriately, having due regard to the correct manipulation of apparatus, the accuracy of measurements and health and safety considerations, eg suggest methods of reducing risk of harm in the practical situation.
	Required practical apparatus and techniques for chemistry : safe use of appropriate heating devices and techniques, including use of a Bunsen burner and a water bath or electric heater; safe use of a range of equipment to purify and/or separate chemical mixtures; safe use and careful handling of gases, liquids and solids.
	Evaluate risks both in practical science and the wider societal context, including perception of risk in relation to data and consequences. Give examples to show that there are hazards associated with science-based technologies which have to be considered alongside the benefits. Suggest reasons why the perception of risk is often very different from the measured risk (eg. voluntary vs imposed risk and familiar vs unfamiliar risks).
16-18 year old students	Criteria for practical competency : safely uses a range of practical equipment and materials. (a) Identifies hazards and assesses risks associated with those hazards, making safety adjustments as necessary, when carrying out experimental techniques and procedures in the lab or field. (b) Uses appropriate safety equipment and approaches to minimize risks with minimal prompting.
	Scientific attitudes : consider applications and implications of science and evaluate their associated benefits and risks, eg. the benefits and risks to society of using commercial electrochemical cells.

Safe heating of chemicals

Heating is key part of practical chemistry as many chemical reactions depend on heating to overcome the activation energy required to get the reaction started. There are several way of heating chemicals including the use of Bunsen burners, water baths and electric heaters. Some relevant questions on safe heating are answered here.



Questions	Things to consider
What personal precautions should be taken during heating?	Safety glasses or goggles ? Tie long hair back Clear working space Stand or sit?
What are the risks associated with each method of heating: Bunsen burners, water baths, electric heaters?	Where you are doing the experiment: easy access to gas or electricity? If using a Bunsen flame, how do you control the size of the flame so that the clamp doesn't catch fire?
What temperature is needed for the reaction to work?	Use a water bath if the temperature is below 100°C. Is it within the temperature range of an electrical heater?
Are any of the reactants or products flammable?	Avoid using a Bunsen burner near flammable substances. Eg ethanol as this reduces the risk of them catching fire.
If the reaction gets too hot will any harmful by-products be made?	How to control the temperature so it doesn't get too hot?
How do you avoid the reaction boiling over or shooting out of the reaction vessel?	Reduce temperature of heater or the size of the Bunsen flame. Use anti-bumping granules Think about the size of the heating vessel.
Can the experiment be done on a microscale?	Smaller quantities of chemicals are needed. Spirit burners can be used for heating.

Safe handling of glassware

Many chemical reactions are carried out in glassware. Glass needs to be handled carefully. It is brittle and breaks easily if it is dropped, rolls off the bench or is clamped too tightly. It fractures and shatters if subjected to heat shock, i.e., large sudden changes in temperature such as those that occur during a freeze-thaw reaction or suck-back of cold water into a hot reaction vessel. This principle can be easily demonstrated by heating the end of a thin glass rod in a Bunsen flame until it starts to glow then plunging it into a large trough of cold water.

Finally, glass will 'flow' if it is heated strongly. Glassblowers make use of this property as they craft a piece of glass into laboratory apparatus or beautiful ornaments. However, it can also cause difficulties if chemicals are strongly heated in cheap glass boiling tubes. A better alternative is the more expensive, tougher borosilicate glass (Pyrex) boiling tubes.

Students need to be aware of these properties and of the consequences. When introducing a class practical or demonstrating an experiment it is good practice to discuss what could go wrong and the possible consequences. Students will learn about the hazards and know how to reduce the risk, so they can carry out experiments safely.

Learning about the safe handling of glassware is an important part of developing students' practical skills and as teachers we should not assume that our students are aware of the hazards.

Students are more likely to take note and feel more confident to carry out the practical activity when they understand both the reasons behind and the consequences of practical instructions. They will feel more in control of the situation and know how to reduce the risk of things going wrong.

A Periodic Table of Molecular Knots

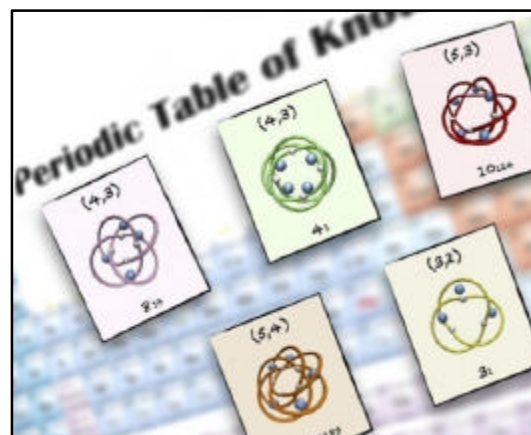
By : *Mattia Marena and Cristian Micheletti*

Source : CHEMEUROPE.COM, 2019

Consider a short piece of rope: could you guess which knots are more likely to form if you crumple and shake it? Synthetic chemists have long been working on a molecular version of this problem and, so far, have succeeded at synthesizing half a dozen different knots types using molecular self-assembling techniques. But which other knot types will it be possible to realise in the future? This is the challenging question that SISSA scientists, in association with the University of Padua, have tackled using computer simulations in this new work.

The scientists identified a shortlist, a kind of 'periodic table', of the most designable knot types, i.e. those knots that could easily self-assemble under appropriate physical and chemical conditions.

The findings, obtained with computational predictive models, are supported by the latest experimental results and ought to aid the synthesis of as yet undiscovered topologies. This study, and the increasingly predictive capability of molecular modeling techniques, can create novel possible perspectives for future advanced applications.



Not just an intellectual challenge : Until recently, only few types of molecular knots had been synthesized. These were the simplest knots in mathematic tables. One could have thus predicted that the next knot type to be synthesized would have had six crossings. However, in a computational study of 2015, Micheletti argued that the simplest and most designable undiscovered knot type was significantly more complex and featured as many as 8 essential crossings. This prediction was experimentally confirmed in 2017 and motivated the current study, which employed a more systematic exploration of the shapes or configurations that can be formed from identical building blocks stitched together in a string-like fashion.

Efficient and reliable simulations : With these models, we aimed at discovering which new molecular knots types, if any, would be easiest to obtain with current synthetic chemistry techniques, particularly self-assembly. We found that these privileged knot types do exist, but are very rare. Only a dozen of different topologies are realisable among millions of simple knot types. The results of our models had an inherent simplicity. The shortlist is similar to a periodic table, in that it is organised in rows and columns which reflect different aspects of the expected difficulty of practical realization. The results suggest that the table is useful to experimental chemists for choosing the target topologies for further studies.

Nanocargo and molecular machines : Scientists have mostly focussed on proof-of-concept demonstrations of the design and synthesis of molecular knots. Nonetheless, interesting applicative avenues have already been suggested. A chief example is the assembly of molecular cages. In this case, specific substances could be nested or trapped within weavings of synthetic molecular knots. The latter could then serve as a controllable molecular machine, capable of loading or releasing a nanocargo depending on the specific physico-chemical conditions. These are interesting and appealing perspectives for possible applications in medicine and in electronics.

Reference : *Mattia Marena & Co-workers: Nature Comm., 2018*

Report on IYPT-2019 Activities

A two day IYPT-2019 activity was organized at Sri Chaitanya Jr. College, Hyder Nagar, Telangana State on 7 and 8, May, 2019. This activity was coordinated by Dr. Mannam Krishnamurthy, ACT EC member and was supported academically by ACT, Mumbai. Main theme of the activity is 'Chemistry Education based on Periodic Table'. Applications were invited from Class X students and 3 sections of each 40 students were selected on merit basis.

Mr. D. Prasannajaneyulu, ACT Life member and Academic Dean, Sri Chaitanya PU College, Bellary chaired the inaugural session. Mr. V. Surendra Babu, ACT Life member and Academic adviser of Sri Kalyana Chakravarthy Education Trust was the chief guest. Dr. M. Krishnamurthy, Chief Executive Dean, Varsity Education Management Ltd., Hyderabad gave a brief outline on the IYPT-2019 activity.



There were five invited talks on the concepts of periodic table to each section by rotation. In the concluding session at the end of the second day, student participants interacted with the speakers. Each participant was given a certificate and a free book, 'Language of Chemistry'.

Seminar Lectures series were organized as a part of IYPT-2019 celebrations at Haripal G.D. Institution, Hoogly Dist., West Bengal State on July 31, 2019. This ACT sponsored event was coordinated by Dr. Rabindranath Chattopadhyaya.

A one day IYPT-2019 activity was organized jointly by Chinmaya Vidyalaya Higher Secondary School, Chennai and ACT Mumbai at Virugambakkam, on 31st August 2019. Principal of the school Smt. Premakalyani gave welcome address. Prof. Helen Kavitha, Secretary, ACT South Zone from SRM University, Ramapuram presided the function and gave the inaugural address.

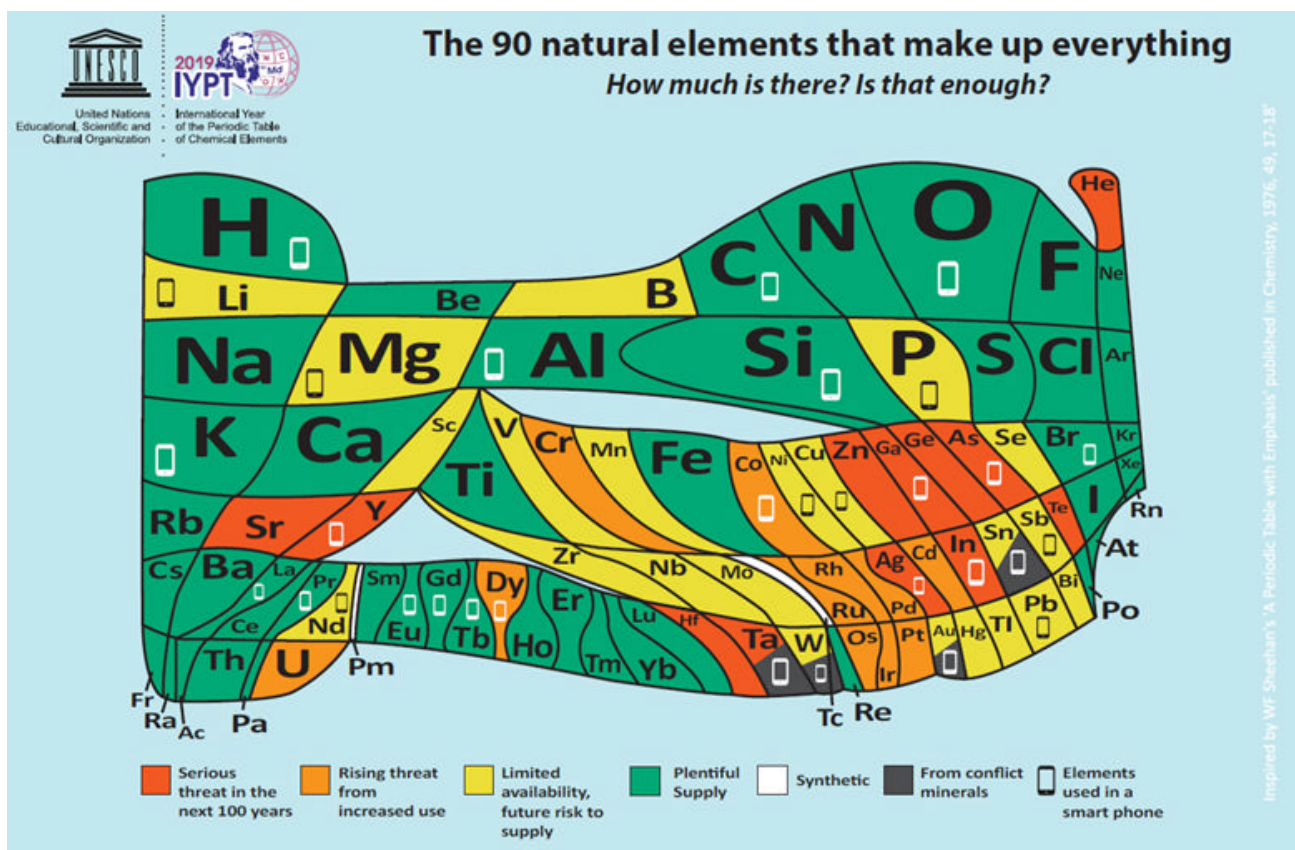


The celebration was aimed at inspiring chemistry in young minds by exploring the periodic table and admire its fascinating contribution to mankind. An inter-school competition for XI and XII students was organized. Smt. Immaculate, PGT Chemistry, Holy Angels School, T. Nagar and Smt. Jennet, PGT Chemistry, Lady Andal School, Chetpet acted as Judges.

A paper presentation event on periodic table for the sustainable development of human kind was also organized. The chemistry event witnessed participation from 13 schools and winners of the competition were awarded prizes.

Views, News and more

90 Natural Elements

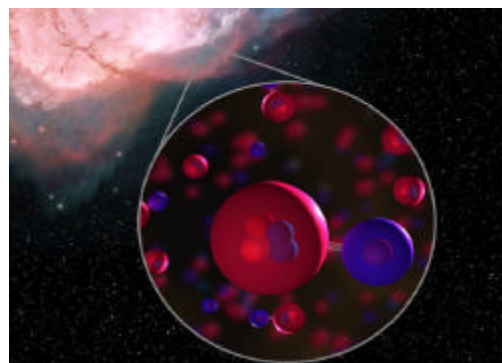


The European Chemical Society released a sheet of information on 90 natural elements of the periodic table, as a part of celebrations for IYPT-2019.

Oldest Molecules in the Universe

In the beginning, there was a big bang. And then around 1,00,000 years later, helium and hydrogen combined for the first time to create a molecule called helium hydride. For the first time in history scientists have detected helium hydride, offering a direct connection to the earliest days of the universe.

While it may not present the photo opportunities of a black hole, helium hydride has been crucial in the formation of the known universe. When it was first forming, there wasn't much of a universe yet and it was all extremely hot, with helium and hydrogen constantly bumping into each other. Only when helium hydride started forming could the universe cool down and expand. Later, cooled helium would interact with helium hydride and create molecular hydrogen, a crucial ingredient in the development of stars.



That's been the longtime theory. The lack of evidence of the very existence of helium hydride in interstellar space was a dilemma for astronomy for decades. The dilemma was solved recently, by NASA's Stratospheric Observatory for Infrared Astronomy.

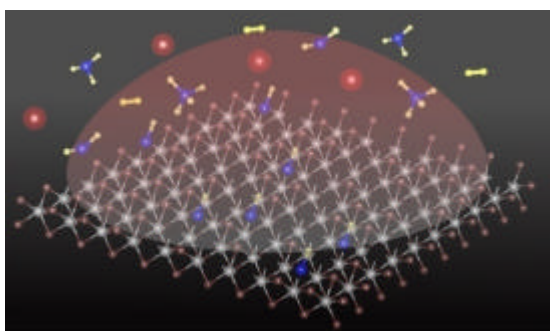
Oxygen ion crystal swimming in a Sea of protons

High pressure superionic form of water may hold clues to behavior of giant icy planets in our solar system.

Shock compression has been used by US researchers to refer the structure of a novel superionic phase of water ice that forms at extreme pressures and temperatures. The results could potentially have important implications for scientists. The results could potentially have important implications for scientists' understanding of the properties of numerous icy planets in the solar system and beyond.



Carbon atom transforms Semiconducting material



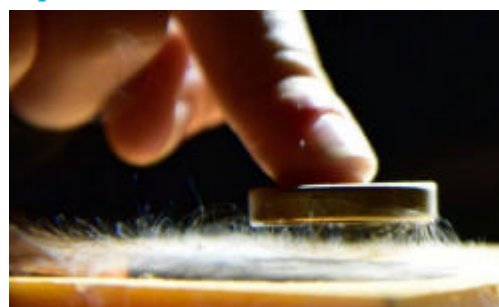
A technique that introduces carbon-hydrogen molecules into a single atomic layer of the semiconducting material tungsten disulfide dramatically changes the electronic properties of the material.

Prior to doping – adding carbon – the semiconductor, a Transition Metal Dichalcogenide (TMD), was n-type – electron conducting. After substituting carbon atoms for sulfur atoms, the one-atom-thick material developed a bipolar effect, a p-type-hole-branch, and an n-type branch. This resulted in an ambipolar semiconductor. In terms of applications, semiconductors are used in various devices in industry.

Superconductivity at Room temperature

Putting to rest all doubts and criticism, a team led by Prof. Anshu Pandey from IISc, Bengaluru confirms that their material exhibits major properties of super-conductivity at ambient temperature and pressure. A material is said to be a superconductor if it conducts electricity with nil resistance to the flow of electrons. Superconductors will help build very high efficient devices leading to huge energy savings.

The material that exhibited superconductivity is in the form of nanosized films and pellets made of silver nanoparticles embedded in a gold matrix. Interestingly, silver and gold independently do not exhibit superconductivity.



Tap water turns Purple



Residents of Coal Grove, Ohio (USA) woke up on June 3, 2019 to find their bathrooms looking like a scene from Ghostbusters.

Their taps ran with bright pink water and their toilet bowls filled with Pepto-Bismol-tinted liquid. And no, that doesn't mean you'll develop superhero-like qualities overnight.

Under normal circumstances, water is treated with a dose of 2mgL^{-1} of potassium permanganate. But water turning pink overnight was due to addition of excess permanganate, by mistake.

Dissolving Gold is Simpler and Safer now

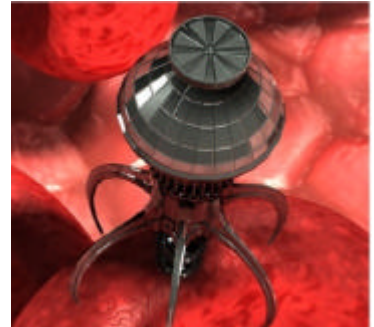


Two new polypseudohalogen compounds derived from cyanogens bromide have the unusual property that they can dissolve gold at room temperature. The discovery could lead to safer chemicals for leaching gold and other noble metals from ore, as well as offer a new way to recover and recycle metal from electronics waste.

DNA Nanobot can target and kill Cancer Cells

Scientists announced they had made major breakthroughs in nanobots designed to target and kill cancer cells specifically. Testing the nanobots on mice that had been injected with human cancer cells, the bots were able to locate the cells and cut off the blood supply of these cells, causing them to shrivel and die. No damage was done to other cells or parts of the body.

The treatment essentially stopped tumor growth altogether, Scientists hope the bots can eventually be used on humans with cancer in the same fashion.



Whale Sculptures made from Plastic wastes



Whale sculptures made from plastic wasters that was recovered from the ocean are on display at the parliament building in Budapest, Hungary, July 2019. The temporary installation was erected by Greenpeace as part of the Plastic Free International Environmental Movement to protest against polluting the world's oceans with plastic.

Mineable Ice dissolved on Mars

It's been known for a long time that sheets of ice lay below the surface of the red planet, but until 2018 scientists had no way to really study such water supplies. The Mars camera HIRISE discovered several spots of eroded land that allowed for more direct access to Mar's ice supply.

The ice on eight different regions in Mars appears to be fairly pure, meaning it could be potentially mineable. If humans ever attempt to colonize Mars, water taken from the ice could be used for drinking.



Artificial Trees : Steps for Health



Biome Tech of Mexico was recently successful in a start up company on artificial tree. Unlike natural tree this does not require time and space. On the other hand this artificial tree was 368 times more efficient in subsiding environmental pollution of carbon dioxide. A type of micro algae used in the artificial tree is very effective in absorbing carbon dioxide and releasing oxygen.

ACT Life Memberships (Sept 2018 to Aug 2019)

LM No.	Name	Address/Particulars
2119	Dr. S. Sugapriya	153. P.M. Samy Colony, 5th Robertson, Road. R.S. Puram, Coimbatore
2120	Dr. Ashu Chaudhary	H.No. 26, Sector: 12, Sonapat, Haryana-131001
2121	Tajinder Singh	H.No. 443, St. No. 2, Krishna nagar, Abohar, Punjab - 152116
2122	Suryawanshi Vijay Kashinath	153, Vrindawan colony, Gonda Road, Dhule- 424005
2123	Dr. Vivekanad Baliram Jadhav	F-3, Shree Sai Siddhi Residency, Dwarkadas Nagar, Satara, Aurangabad
2124	Dr. Sanjeev Kumar Jha	Yashoda Niwas, Chankyapuri, Gangjala, Saharsa, Bihar - 852201
2125	Manish Kumar Mishra	7/258, Vikas Nagar, Lucknow
2126	Dr. Archana Saxena	C-60, Sector-A, Mahanagar, Lucknow- 226006
2127	Dr. Asmita Sharma	H-83, Nalanda Pariser, Keserbaug road, Indore- 452012
2128	Shaikh Rukhsar Salim	224, Mangalwar Peth, Pune - 411011
2129	Om Prakash Meena	99B- B, Kotra Extension, Near Kalptaru Park, Ajmer
2130	Dr. B.S.Balaji	School of Biotechnology, Jawaharlal Nehru University, New Delhi - 110067
2131	Dr. M. Esther Leena Preethi	No. 1, Jinnah Lane, Alandur, Chennai- 600016
2132	Dr. K K Sharma	1- GH-7, Vaishali Nagar, Ajmer, Rajasthan - 305004
2133	Dr. Rashmi Sharma	F-12, RIE Campus, Shyamala Hills, Bhopal- 462013
2134	V. V. Durga Veni Dasari	No. 1-128, Agraharam street, Veeravallipalem, Ainavilli, A.P. - 533211
2135	Dr. K.A. Aravinda Kumar	3-54, Sri Balajinilayam, Chilakapalem, Etcherla, A.P.- 532410
2136	Madhu Toshniwal	V.P.O. Bhatiyani, Via - Nasirabad, Ajmer
2137	Mridul Jain	Bhagwan Mahaveer Marg, Opp. SBI street, Baraut, U.P. - 250611
2138	Suman Pathania	Ward 4, Nagar Panchayod Chowari, Chamba, Himachal Pradesh- 176302
2139	Shabir Hussain Baig	Latif Abad. P/D Chandoosa, Baramulla, Jammu & Kashmir- 193101
2140	Dr. Pawan Kumar	H.N 155, Sector 4, Part II, Green Belt Side, U/E Karnal, Haryana- 132001
2141	Kulkarni Prahlad Vitthalrao	Tuljai Kailas Nagar, Behind Manas hotel, Borshi road, Latur- 413512
2142	Pankaj Walia	V.P.O - Malan, Nagrota Bagwan, Dist. Kangra, Himachal Pradesh
2143	Khursheed Alam	Near Golden Gate School, Dangiwachha, Baramulla, Jammu & Kashmir- 193303
2144	Supriya Shiva Angle	Gangotri Bldg., Dr. Atmaram Borkar road, Panaji, Goa- 403001
2145	Ashlesha Anandrao Mankar	401 Ekdant Residency, Khorej Colony, Shegaon, Maharashtra - 444203
2146	Zaffar Mushtaq	S Colony, Kullwa Kulgam, P/o Kulgam, Dist. Kulgam, Jammu & Kashmir- 192231
2147	Dr. K.V. Nagalakshmi	9-7-51, Sivajipalem, Vishakhapatnam, Andhra Pradesh- 530017
2148	Vicky P. Sarang	Yamuna Apartments, Raghunath nagar, Thane (West)- 400604
2149	Suman V. Sarang	7- Yamuna Apartments, Raghunath nagar, Thane (West)- 400604
2150	Manuj Sharma	V.P.O. Samloti, Dist. Kangra, Himachal Pradesh- 176056
2151	Dr. Balvantsingh Labana	5; Kalgidhar Khalsa Society, NR, Tulsi D-mart, Anand, Gujarat - 388001
2152	Vinod Kumar Garg	Central University of Punjab, Bathinda, Punjab - 151001
2153	Prof. Man Singh	B-104, Akshar Home, New Vavol, Gandhinagar, Gujarat - 382030
2154	Meena D. R.	#99 3rd cross, Raju Layout, Jnanabharti post, Bangalore
2155	Anchuri Nagaraju	H.No. 8-4-198/1, Ganesh Nagar, Karimnagar- 505001
2156	Vikas Chandra Sharma	H.No. 93, near Playground, Subhash nagar, Bhilai, Chhattisgarh- 490011
2157	Dr. A. Samson Nesaraj	68, Duraisamy Enclave, MR Puram, Coimbatore, Tamil Nadu- 641101
2158	Dr. Rita S. Majumder	82/A Pocket F, GTB Enclave, Delhi- 110093
2159	Dr. M Ajitha	Plot 925, Road 33, Vasanth nagar colony, Kukatpally, Hyderabad - 500085
2160	Venkat S. Narayan	6904 Cross Creek Ln., Mc Kinney, TX 75072, USA- X75072
2161	Dr. A. A. M Prince	49/6 K.K. Home, South Mada Street, Thiruvottiyar, Chennai- 600019
2162	Dr. S. Muniraj	Plot 306,1B, Ramaiah Orchid Apt., Mangalambikai Nagar, Chennai- 600097
2163	Dr. S. Muthukumar	75, I Cross Street, Sankarpuram Sithalapakkam, Chennai- 600126
2164	T. Sivaramakrishnan	11, SriramSMathrika, M-6, 28th Cross, Indra Nagar, Chennai- 600020
2165	Dr. S. Ekambaram	3/419, Rangarajapuram, 2nd Main road, Santhoshpuram, Chennai - 600073

2166	Dr. N. Manivannan	134, Chidambaram road, Boodhamur (PO), Vridhachalam, Chennai- 606003
2167	Dr. R. Velmurugan	No. 1/339, Bharathi Nagar, Thiruchitrabalam, Thanjavur - 614628
2168	Dr. M. Kannan	5, S-1, Sai Harsha Flats, U.V. Saminathan Street, Chennai- 600064
2169	P. Sumathi	7/1-59, Kadayampalti (PO), Omalur (T.K), Tamil Nadu- 636351
2170	Kumud Tanwar	C-421, G-1, Saraswati Residency, Mahesh nagar, Jaipur, Rajasthan- 302015
2171	Dr. Arti Mishra	A-307, Triveni Nagar, near Gopal pura bye pass, Jaipur, Rajasthan- 302018
2172	Dr. Nidhi Agnihotri	135, Nandpuri Colony, Malviya nagar, Jaipur, Rajasthan- 302017
2173	Dr. Shachi Sharma	6/419, Malviya nagar, Jaipur, Rajasthan- 302017
2174	Dr. Jyoti Sharma	198, Manbagh Jaisinghpura Khor, Delhi bypass Jaipur, Rajasthan
2175	Medha Babel	17- Ashok colony, Balaji mod, Jagatpura road, Malviya Nagar, Jaipur- 302017
2176	Madhuri Modi	32/63, Swarn- Path, Mansarover, Jaipur, Rajasthan- 302020
2177	Dr. Swati Singh	C-236, JDA Colony, Malviya nagar, Jaipur, Rajasthan- 302017
2178	Dr. Anupma Singh	496/128, Chota Chand Ganj, Nirala Nagar, Lucknow- 226020
2179	K. Ameeta Devi	Wangkhei Meihoubam opp. Lizard Lizard Club, Imphal East, Manipur- 795005
2180	L. Gellina Chanu	Singjambi Thokchom Leikai, Imphal West, Manipur- 795001
2181	Dr. N. Shantibala Devi	Kongba Bazaar, Imphal, Manipur- 795008
2182	Dr. O. S. S. Chandana	70-4a-25/9C, Padmanagar, Kakinada, Andhra Pradesh- 533005
2183	Padma P.	Kainikkara, Kavumpody, Muvattupuzha P.O, Ernakulam, Kerala- 686661
2184	Dr. E. Balaraman	55, Subramaniyar Koil Street, Ayyangarkulam, Kanchipuram - 631502
2185	Dr. Gali Rajitha	G3, Siri Residency, Annamrajanagar, Vishakhapatnam, AP- 530048
2186	Dr. U. Sujana Kumari	Sri Srinivas Nivas, 32, Ushodaya Jn., MVP Colony, Vishakhapatnam, AP- 530017
2187	Dr. K. Vijayakumar	231/2, Akilandeshwari Nagar, Thiruvanaikovil, Srirangam - 620005
2188	Dr. K. V. Sharma	A-4/3, Vasant Vihar, Ujjain, Madhya Pradesh- 456664
2189	Dr. Vandana Sharma	A-4/3, Vasant Vihar, Ujjain, Madhya Pradesh- 456664
2190	Dr. Anuradha Mukherjee	DLF WestEnd Height, Begur, Akshayanagar, Bangalore- 560068
2191	Santosh Kumar Badampudi	36, ASR Nagar, Pedathadivada, Vizianagaram, AP- 535006
2192	Mr. N. Vijayan	79 A/4, Vivekanadan Street, Pasumpon Nagar, Madurai - 625003
2193	Dr. E. Paulsamy	No. 45, 1st floor, Kamarajar Street, Annanagar, Madurai, Tamil Nadu- 625020
2194	V. Gopalakrishnan	Anugraha Flats F1-A, Padavattamman Kovil St. Arumbakkam, Chennai - 600106
2195	R. Ramesh Kumar	FF3- Grace Lakshmi Apt., Thiruvengada Nagar, Ambattur, Chennai - 600053
2196	S. Anitha	5, S1, Sai Harsha Flats, U.V.S. Street, Chitlakkam, Chennai - 600064
2197	Mohd Zishan Waris	222, Hajipura, Near Hindi School, Firozabad, U.P. - 283203
2198	Sujata Vasudev Bhat	B-9, Paramsukh, Gavand Path, Nawpada, Thane- 400602
2199	Y. Raghvendra Jorapur	F-4, Uday Residency, Besides Income Tax Colony, Akurdi, Pune- 411044
2200	Shashi Kant	Village & Post : Dhangarhan, Tola - Dhanupur Baniapur, Saran, Bihar- 841403
2201	Gaddamanugu Gayatri	Plot 80, Street 10, HMT Nagar, Nacharam, Hyderabad- 501076
2202	Vamsi Subbarayan Arisetti	D. No. 4-48-113, Road 4, P & T colony, Tadepalligudem, A.P. - 534101
2203	Dr. Sangeeta	D- 55, Kurukshetra University, Kurukshetra , Haryana- 136119
2204	Dr. Poonam Singh	H-20, Mohan Garden, Near Dwarka Mor Metro Station, New Delhi- 110059

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[We conclude the present issue of the ACT News Letter here](#)

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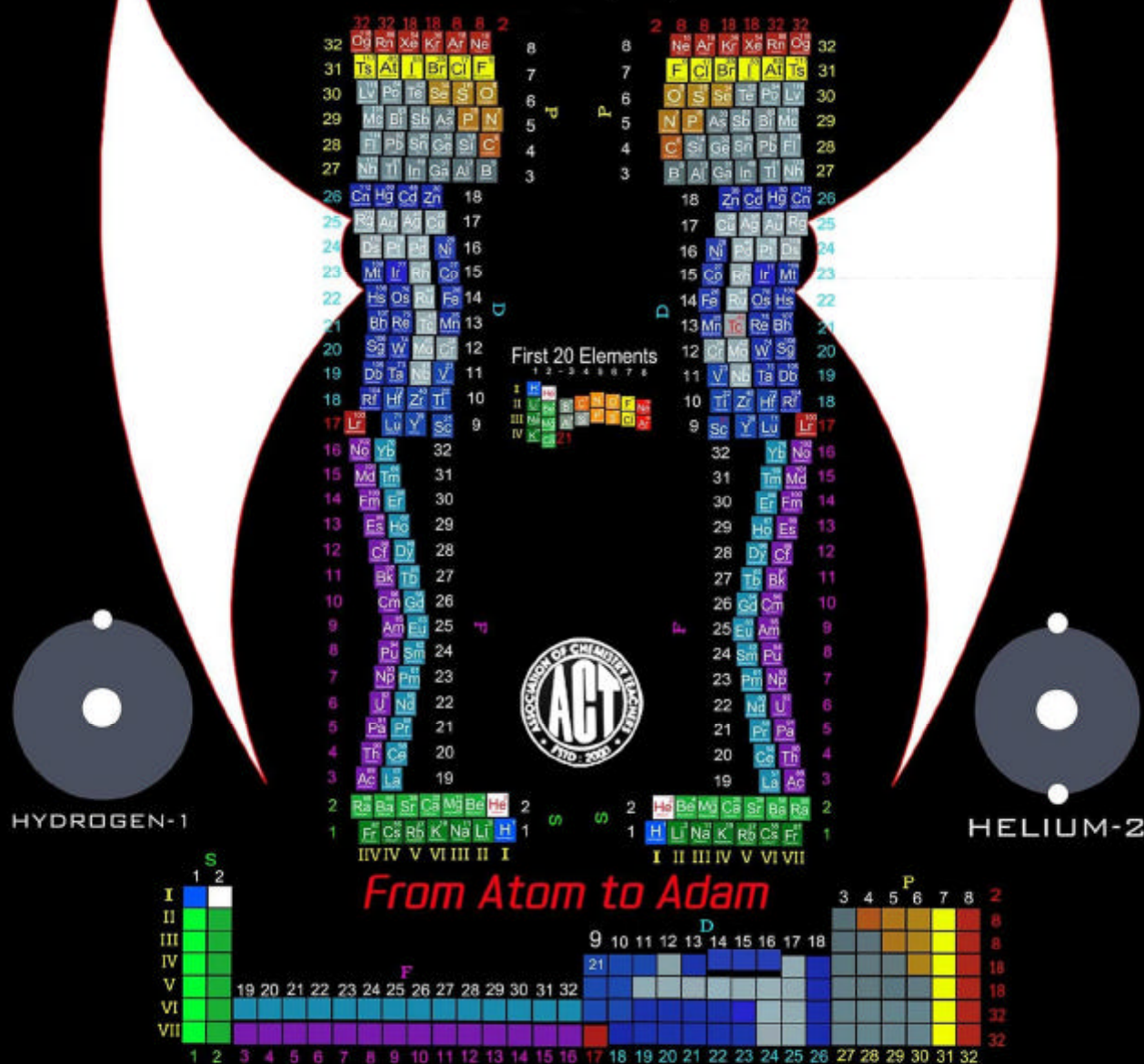
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www.associationofchemistryteachers.org

THE PERIODIC TABLE OF ELEMENTS AND ANTI ELEMENTS

The Genesis Creation, by Justin Colburn



ACT NEWS LETTER
ISSUE-14 MAY-AUGUST, 2019