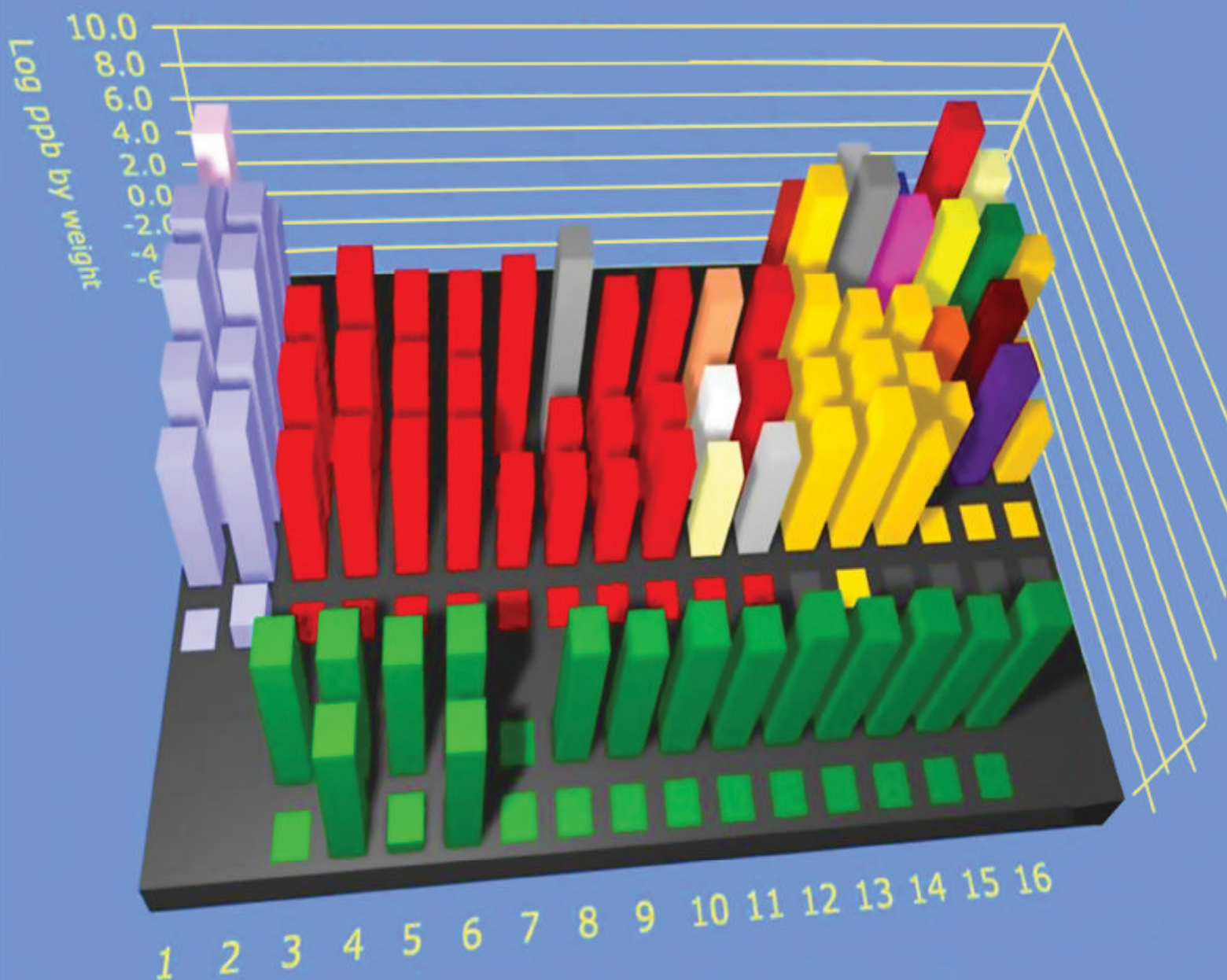




ASSOCIATION OF CHEMISTRY TEACHERS

NEWS LETTER

ISSUE : 13, JANUARY - APRIL 2019



International Year of Periodic Table (IYPT-2019)

ACT News Letter, Issue 13

January – April, 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

From the Editorial Desk .. -

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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. ACT proposes some new activities to be implemented.

We are bringing in the present issue of the news letter with the reports on the ACT activities, trends in chemistry, views and news. We have included two general articles in the present issue. We have also included report on CONTECH, subject reports on National Chemistry Events. Reports on National Science Day Celebrations were also given briefly.

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 make this eventful.

Honorary Members of ACT

We have great pleasure in bringing the updated list of honorary members of Association of Chemistry Teachers, who are sources of inspiration, guidance and support in activities of ACT.

The editorial board of ACT News Letter is proud of the academic achievements of these legendary honorary members.

Bharat Ratna Prof. C.N.R. Rao, FRS

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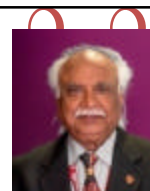
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Prof. Mihir K. Chaudhuri

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Academic Participation of ACT Members

Prof. P.M. Mishra, vice president ACT East Zone organized a seminar on 'Application of Chemistry in Design and Development of New Drugs' at M.L.S.M. College, Darbhanga, Bihar State, on 4th January 2019. **Prof. R.P. Tripathi**, Dean NIPER, Raebareli gave keynote address.

Dr. M.R.R. Prasad, ACT life member gave an invited talk at National Conference, Anantrao Pawar College, Pirangut, Maharashtra State on 12th January 2019.

Prof. Amar Srivastava, ACT EC member delivered a lecture on 'Green Chemistry' as a resource person of CSIT, New Delhi at M.G.P.G. College, Gorakhpur, Uttar Pradesh State on 9th February 2019.

Dr. W.B. Gurnule, ACT EC member participated and addressed students on 'National Science Day' at Jagat Science College, Goregaon, Madhya Pradesh State on 28th February 2019.

Prof. P.V.S. Machiraju, vice president ACT South Zone participated and addressed the students on 'Science Day Celebrations' held at Municipal High School, Amalapuram, Andhra Pradesh State on 28th February 2019.

Prof. D.V. Prabhu, Wilson College, Mumbai and General Secretary ACT was awarded best paper presentation at HEF conference, Mumbai on 9th March 2019.

Dr. Hemant Pande, Vice President, ACT West Zone was a resource person of SRG Team to INTEL ISE Fair 2019, at Hotel Taj Mahal, Delhi on 5th April 2019.

Prof. P.M. Mishra, M.L.S.M. College, Darbhanga and **Prof. Amar Srivastava**, DAV College, Kanpur participated in a meeting for making 'Definitional Dictionary in Chemistry' at Commission of Scientific and Technical Terminology, New Delhi on 24th April 2019.

ACT Members at International Venues

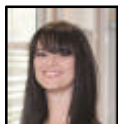


Dr. W.B. Gurnule, ACT EC member, Kamala Nehru Mahavidyalaya, Nagpur was the Chief Guest in the 5th International Conference on Innovation and Research in Engineering Science and Technology at Gaikward-patil College of Engineering and Technology, Nagpur, India on 22-23, March 2019. Dr. Gurnule gave a presentation on 'Emerging Trends in Applied Science and Mathematics'.

Dr. Mannam Krishnamurthy, ACT EC member, Varsity Education Management Ltd., Hyderabad participated in the forenoon session of the workshop on 'Chemically Processed Culture and Growth of Pearls' at Khu Trai Pearl Farms, Tuan Chau International Marina, Viatnam on 28th April 2019. The catalysed growth of pearls was found important in the commercial and ornamental value.



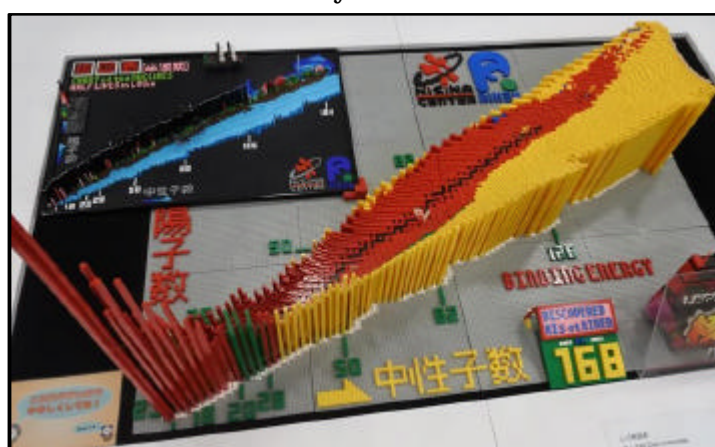
Table of nuclides expanded with discovery of 73 nuclei



by Katrina Kramer
Chemistry World, 2018

Scientists at Japan's Riken laboratories – famed for their discovery of nihonium, element 113 – have created 73 previously unknown nuclides of well-known elements like iron (^{76}Fe), silver (^{132}Ag) and iodine (^{147}I). These exotic nuclei can help researchers to understand how heavy elements formed when the universe was in its infancy.

To date, 3000 nuclides have been filled in on the table of nuclides – the counterpart to the periodic table of the elements – but 4000 more 'are expected to exist, according to the theoretical estimation', says Hideto En'yo, director of Riken's Nishina Center for Accelerator - Based Science, where four research teams discovered the 73 new nuclides over the last year.



The lightest of these nuclides belongs to manganese (^{73}Mn) and the heaviest to erbium (^{180}Er). Most of the nuclides are neutron-rich – they contain more neutrons than any previously discovered varieties of the element. Rhodium-128, for example, has six more neutrons than the previous heaviest isotope, rhodium-122, and a whopping 25 more than the only stable isotope, rhodium-103. Praseodymium takes the title of adding the most new nuclei – six in total – to its collection.

To make the new nuclides, the four research teams fired beams of uranium-238 atoms at a beryllium target. As the uranium atoms pass through the separator, they break apart, spewing out all kinds of new nuclides. Finding and detecting the new ones, however, takes time and patience. 'The probability of production is given by the cross section [or probability of nuclear reaction], so the production is random,' explains Toshiyuki Sumikama, whose team discovered eight nuclides.

With half-lives of only a few milliseconds, none of the exotic nuclei is going to be of any immediate practical use. However, finding out more about their properties is essential to understanding how elements heavier than iron form during enormous cosmic events like neutron star mergers, explains En'yo. There are also 'long-lived isotopes with half-lives of years predicted for undiscovered isotopes at heavier nuclei', adds Sumikama.

Riken scientists are now trying to further expand the table of nuclides. Probably we need new inventions to produce those isotopes.

References : J. Phy. Sci. Japan, 2018, 14202; Phy. Rev. 5, 2017, 34604

Implementation of Green Chemistry from High School Level : A Preventive Step to Tackle Pollution

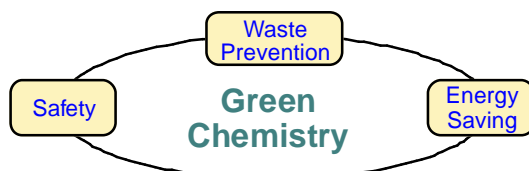
Dr. Anuradha Mukherjee

Indian Institute of Science, Bangalore.

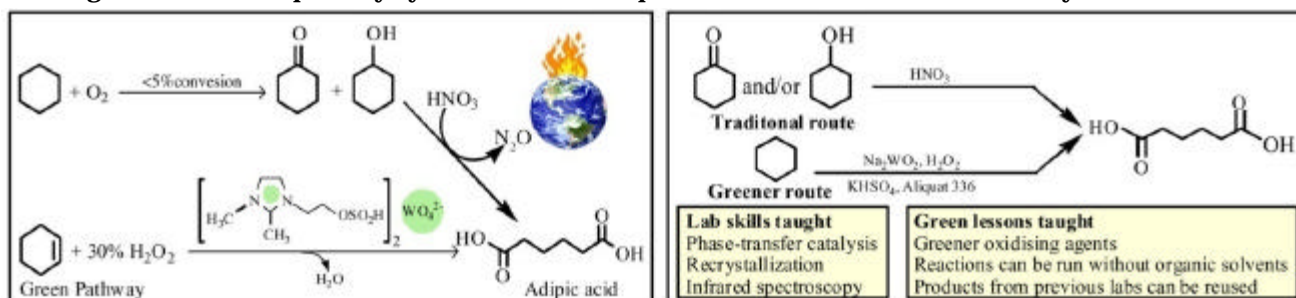


There is a popular saying 'prevention is better than curing'. To save our planets it is required to prevent the cause of pollution. When people will be aware of the cause of pollution from younger age they will start to think about the prevention of pollution. Here the education plays a major role. Since most of the pollutants are chemicals and related with various chemical reactions, the chemistry educators can take a lead role here. By the concept of 'Green Chemistry and Sustainability' teachers can create awareness among students about the toxicological effects of chemicals and its impact on environment and health.

'Green Chemistry is not politics. Green Chemistry is not a public relations ploy. Green chemistry is not a pipe dream.' This is the new reality for chemistry and engineering by asking chemists and engineers to design chemicals, chemical processes and commercial products in a way to avoid or the least creation of toxics and waste.

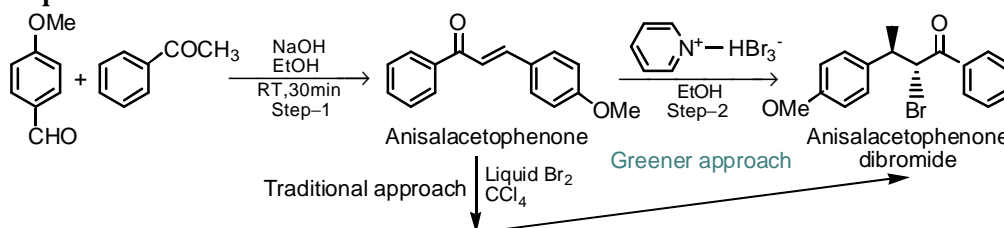


Let's take few simple examples from chemistry text book. Concentrate nitric acid (HNO_3) is a popular oxidizing reagent and during oxidation it evolves brown fume of nitrogendioxide (NO_2). NO_2 has a severe toxicological affect in respiratory system and also responsible to create hole in ozone layer.



Liquid bromine is commonly used reagent for bromination, but it is unsafe and hazardous. Students should be familiar with all the toxicity associated with the reagents and know their alternatives. If students are aware of the toxicity of the chemicals, they will be more cautious and take precautionary measure in future while dealing with such chemicals.

Below reaction is a good example of greener version of bromination reaction of alkene. Such experiment can easily be incorporated in the high school chemistry curriculum. The reagent (pyridinium-tribromide) also can be included in the 'addition reaction of bromination' portion with mechanism and the reason behind the development of this brominating reagent. Discussion of such methodologies development from high school level enhance students' higher order thinking skill embedded with green chemistry concept.



Green and sustainability lesson

- i) This reagent provides gradual release of bromine into the reaction medium because it is in rapid equilibrium with pyridinium hydrobromide and molecular bromine.
- ii) The reagent can easily weigh, in contrast to liquid bromine. Dangerous bromine is produced in situ so it no longer needs to be handled bromine directly.
- iii) More benign solvent, ethanol, can be used instead of a chlorinated solvent.
- iv) Both starting material and product can be used to demonstrate unsaturation test (qualitative analysis).

Starting material anisalacetophenone can be synthesized by Aldol condensation reaction between anisaldehyde and acetophenone. Lab become sustainable and economic.

Students usually perform laboratory experiments without gloves, safety goggles and mask. Without their knowledge they inhale poisonous vapor like benzene, dichloromethane, toluene, carbon tetrachloride etc., which are harmful for their health. Most of the time students throw metal solution, organic solvents, acidic and basic waste into basins which are polluting entire environment.

'Qualitative analysis of unknown organic compounds' is an integral part of the chemistry curriculum. In this process, considerable quantities of waste are produced which are difficult to segregate and reuse. According to a rough calculation, each student produces about 225 g of waste per year while performing this experiment. Therefore, it is easily understandable that an enormous quantity of toxic waste generates all over the world: a fact that cannot be ignored.

Chemistry labs of schools, colleges and universities are also the source of air and water pollution, if the wastes and by-products are not treated properly. At the same time students are also in health risk due to exposure of toxic and hazardous chemicals in chemistry lab. Beakers bubbling with toxic chemical and greenhouse gas by-products no longer fly as standard costs of doing science in school and college laboratories across the country. Therefore, the green chemistry concept and experiments are recommended to start from school level and it should continue through undergraduate level to postgraduate level. If green chemistry is imbedded into curriculum, future chemists can decide that chemistry with sustainability.



The ultimate point of green chemistry is human health and the environment. World must produce future chemists, so that future chemists can view all chemistry as green and think 'how they can make this chemistry greener?' It has to be a part of the thought process. If somebody doesn't think about something, they're never going to change their habits.

The hope of green chemistry is that future chemists will consider the environmental consequences of their work. We can do all of this and still maintain educational development by producing more sensible future generation who will think chemistry in greener way.

Green chemistry is the field open for innovation, new ideas, and revolutionary progress. This is the future of chemistry.

Report on CONTECH 2018-19

ACT-CONTECH, a concept test in chemistry at national level finds its usefulness to teachers and students in knowing the pulse of chemistry teaching and learning at UG level and thus helps teachers to take appropriate action. This test is a big boost for the students to improve in the subject and to assess their conceptual understanding in chemistry. With this view CONTECH has regularly been conducted annually right from 2010.

While appreciating the meticulous work and strenuous efforts of the National Coordinator in successfully conducting CONTECH-17/18, several suggestions concerning to the objectives of the test and nature of questions asked were made by the members in the ACT-EC meeting held at HBCSE, Mumbai.

Accordingly, Question paper was set based on the following points as suggestive measures for improvement in CONTECH;

- (i) 75% Questions to test the Knowledge, Understanding and Application of knowledge.
- (ii) 25% Questions were Process based, Problem solving and experimental skill based.
- (iii) All the questions were framed as MCQ with four options having a correct answer.

Wide publicity was given to CONTECH through the ACT officials and Chemistry Teachers. The test for the academic year was organised on two dates, one in the last quarter of 2018 i.e., 6th October 2018 and another in the first quarter of 2019 i.e., 2nd February 2019. This was named as 'CONTECH 2018-19'. Accordingly it was decided to mention in ACT meets, records and News Letter as per the consent of the General Secretary.

All ACT Executive members were expected to catalyze the local and college coordinators so that CONTECH vibration could be felt in almost all the colleges in the country. Undoubtedly, new generation at UG level get connected to ACT through CONTECH.

Everything went well as per the scheduled program. Combined effort to motivate and inspire teachers to be a part of this national event for mobilizing students in all parts of our country to take this test made the test a grand success.

Year Wise and Zone Wise Centre (%)			
Zone	% 2016	% 2017/18	% 2018/19
West	41.09	32.4	41.75
North	17.8	14.5	16.48
North East	9.58	18.3	4.39
East	9.58	9.4	10.98
Central	12.3	16.4	7.69
South	9.58	9.3	18.68

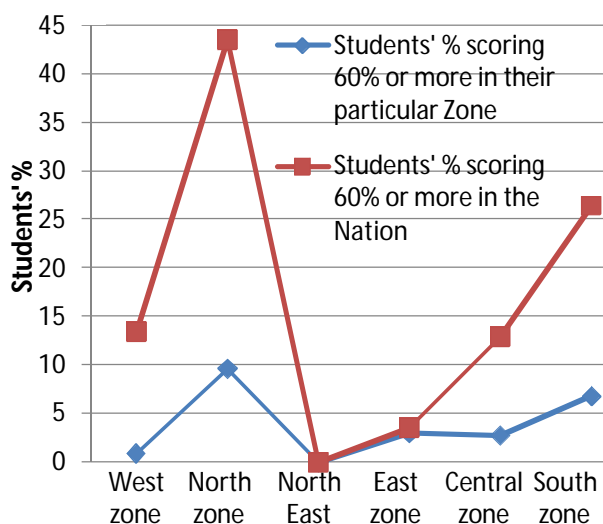
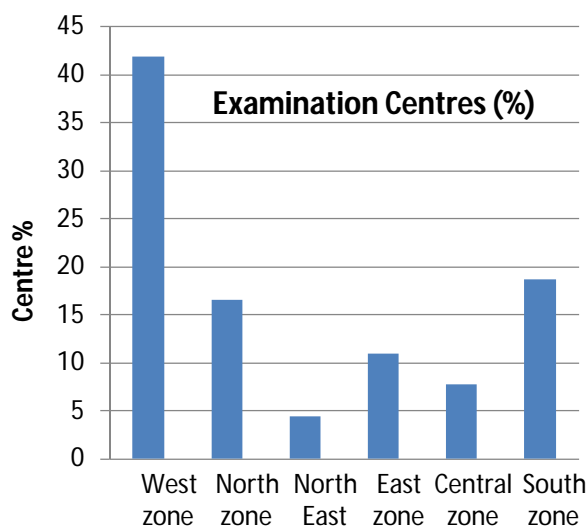
Zone Wise Examinees (%)			
Zone	% 2016	% 2017/18	% 2018/19
West	34.41	29.08	49
North	18.7	14.0	15.49
North East	9	11.18	2.08
East	5.12	5.75	4.15
Central	21.5	23.27	15.93
South	11.74	17.31	13.32

Percentage of participants scoring 60% is high in North and South zone in the respective zone and even in the nation but compatibility is balancing one in West zone. Consecutively for the last two years North Zone ranked 1st in term of students' scoring 60% and more. 3.41% participants scored 60% or more in the country in CONTECH 2018-19.

ACT approved Certificates of Participation duly signed by the President, General Secretary, National Coordinator, and College Coordinator have been issued to students scoring 30%.

Book Prizes mainly from Vigyan Prasar, New Delhi are given to students scoring 60% or more.

Certificate of Appreciation is issued to all College Coordinators and Local Coordinators after successful conduct of the Test. Letter of appreciation is mailed to all those Colleges wherefrom maximum participation is ensured.



Dr. Nishamol Kanat (Mumbai, West Zone), Dr. Rashmy Nair (Jaipur, Central Zone), Dr. A. K. Singh (Durg, Central Zone), Dr. Dhanesh Singh (Raigarh, Central Zone), Prof. Padmaja Sudhakar (Baroda, Central Zone), Dr. Shilpa Mehta (Delhi, North Zone), and Dr. Gomati Sridhar / Dr. Valsamma Wilson (Mumbai, West Zone) have consistently been performing well in term of maximum participation. They deserve special thanks.

Two Local Coordinators Dr. Swapnil Madhav Shettiar (Chandrapur, West Zone) and Prof. K. Krishna Kishore (Vijayanagram, South Zone) owe special thanks for their outstanding contributions for involving maximum colleges in CONTECH.

It is a proud moment for all of us that more and more chemistry teachers and students are taking interest in such a test for the interest of students learning chemistry. Affirmative response for popularization of chemistry in future is welcomed.

It is encouraging for all of us that participation of students in CONTECH is increasing year by year. Some regions have done well in term of participation and result as well, some have done partially well but some have not yet participated in the Test. Special attention is required to involve students from the regions specified in future through ACT officials, Life members and Chemistry teachers in general.

Appreciable comments have been received by the coordinators in general. The valuable suggestions are always welcomed to improve the overall conduct of CONTECH in future.

Yearly subscription of reputed national journals such as Resonance is proposed to be given by ACT to all those teachers who credited maximum participation of candidates (i.e., not less than 100).

A report by Dr. S.P. Singh, Secretary ACT East Zone and National Coordinator, CONTECH 2018-19.

Report on National Workshops and Seminars

National Workshop on Skill Development

A two day National Workshop on 'Skill Development in Pharma related Industry' for post graduate students was organized at Gogate-Joglekar College, Ratnagiri, Maharashtra on 15-16, February 2019.

Prof. M.G. Gore, Head of the chemistry department coordinated the academics of the workshop. This workshop was supported by ACT.

National Workshop on Environmental Applications

A one day seminar on 'Environmental Application of Chemical and Nanosciences' was organized at School of Science and Humanities, Kongu Engineering College, Perundurai, Erode, on 22, February 2019. This seminar was sponsored by ACT.



Prof. P.N. Palanisamy, Head of the chemistry department, Kongu Engineering College and organizing secretary of the seminar gave a welcome address. Inaugural address was given by Dr. A. Jafar Ahmed, J.M. College, Tiruchinapalli.

A special lecture on 'Environmental Applications of Nanoparticles, by Dr. A. Silambarasan, Vivekananda College for Women, Namakkal. There were 11 oral presentations and 10 poster presentations.



Certificates were distributed to all participants in the concluding session. Vote of thanks was proposed by Dr. S. Sathish Kumar, Convener of the seminar.

National Workshop on Stereochemistry

A three day chemistry workshop sponsored by ACT were organized on 'Stereochemistry and Spectroscopy Applications' in Kanoria PG Mahila Mahavidyalaya, Jaipur from 22nd to 24th April, 2019. This workshop was conducted successfully with the support of Dr. Rashmi Chaturvedi (Director, KMM), Dr. Seema Agarwal (Principal, KMM) and Dr. Kumud Tanwar (Head of PG Chemistry Department).

This workshop was focused at the postgraduate students, research scholars and teaching faculty, to enrich their knowledge on advancements taking place in the arena of IR and NMR spectroscopy, its applications and various structure determination techniques.

The inaugural session of the workshop had been conducted by welcoming the internationally renowned emeritus scientist Prof. P. S. Kalsi, Prof. Uday Kumar R. Yarangatti (Director of MNT, Jaipur), Dr. Ragini Gupta (Head, Dept. of Chemistry, MNIT), Dr. Neelima Gupta of Maharaja College and Prof. M.C. Sharma, Convenor of UOR. The commencement of the workshop had been done by lamp lighting, after which the guests blessed the audience by their inspirational words. Theme of the workshop was presented by Dr. Arti Mishra, KMM, Jaipur.

The first technical session was delivered by Dr. Neelima Gupta on 'NMR Spectroscopy'. She explained the basic concepts of NMR and various advanced applications of NMR Spectroscopy. The second and third technical session were by Prof. P.S Kalsi on 'IR Spectroscopy'. He explained the functional determination of a group by IR and comparison between two compounds by IR. In the second technical session Prof. Kalsi pointed towards the main aspects of language of stereochemistry, followed by the third technical session on basic aspects of stereochemistry.



The fourth technical session by Dr. Satpal Badsara on 'Application of IR Spectroscopy', in which he had showed and explained IR spectra of various compounds. The fifth and sixth technical session were on 'Stereochemistry' by Prof. Kalsi, in which he tried effectively to show the stereochemistry of molecules in 3-D and cleared the various doubts of the students. The seventh and eighth technical session on 'Conceptual Stereochemistry' were taken by Prof. Kalsi. He explained the basic concepts of stereochemistry also solved the problems of the student.

Valedictory function was organized, in which students explained their experiences. Dr. Kumud Tanwar gave vote of thanks. Participants shared their knowledge and experience to each other.

Reports on National Science Day Celebrations

National Science Day was jointly celebrated by Department of Chemistry, A.G. & S.G.S.D. College and ACT at A.G. & S.G. Siddartha Degree College, Vuyyuru, Krishna Dist., A.P. on February 28, 2019. Dr. Mannam Krishnamurthy, EC member, ACT coordinated these celebrations.

An essay writing competition was held to U.G. students 'on the Importance of Science on the lives of people' on the forenoon of 28th. Then there was science demo experimentation by Mr. K. Ravindra Kumar, Academic Dean, Sri Kalyana Chakravarthy Memorial Education Trust Vijayawada, followed by a presentation 'on importance of chemistry in human health' by Dr. M. Krishna Murthy, Varsity Education Management Ltd., Hyderabad.



In the afternoon a meeting was organised Dr. D. Balakrishna, Principal, A.G. & S.G.S. Degree College presided. Dr. K. Krishnamma, Principle Scientist, Acharya N.G. Ranga Agricultural University, Guntur was the Chief Guest, who spoke on 'Agricultural Science to Rural People'. There were inspirational messages by guests of honour Mr. K. Ravindra Kumar and Dr. M. Krishna Murthy.

Two best performances in the 'writing competition' was judged by Senior Chemistry Lecturer, Mr. J. Nageswara Rao and the winners were awarded with cash prizes. Mrs. A. Indira, HOD Chemistry Department proposed vote of thanks.

National Science Day was celebrated at Sri Padampat Singhania School, Kanpur on 28th February 2019. These celebrations were organized by Vigyan Bharati.



Prof. Amar Srivastava, DAV College, Kanpur and ACT EC member gave an invited talk on 'The Journey of Periodic Table of Chemical Elements.'

National Science Day was celebrated at GSRM Memorial Postgraduate College, Lucknow on 28th February 2019. Prof. Sudha Jain, past president of ACT acted as convener of the celebrations. The theme of this ACT sponsored event was science in primary education.

Working models and charts were made to enliven interest in primary level science. Quiz competition, essay competition were held, along with poster presentation.

Dr. Pradeep K. Srivastava, Senior Scientist (retd.), Central Drug Research Institute, Lucknow delivered an inspirational lecture using science cartoons.



Dr. S.C. Verma, Professor of Zoology, GSRM PG College, Lucknow and Dr. Sraddha Sinha, BB Das NIT, Lucknow, Secretary ACT North Zone were also active in the Science Day Celebrations.

National Science Day was observed at A.N. College, Patna, under the joint collaboration of science departments of the college with ACT, on 28th February, 2019. Dr. S.P. Singh, Secretary, ACT East Zone acted as coordinator of the day celebrations. The theme of the National Science Day is 'Science for the people and people for the science'.



The program was focused on lecture sessions and visit to different science laboratories for hands-on experiments. Undergraduate Students played lead role in organizing the event under the guidance of Dr. Subhash Prasad Singh and Dr. Sushil Kumar Singh.

The session began with laboratory visit in six identified labs in the college campus. Laboratory visits were followed by two Lecture sessions. The first session was focused on 'Misconception in Physics and Mathematics at higher Secondary level students' by Dr. Pramendra Ranjan Singh, Professor of Physics, J. P. University, Chapra. It was followed by the lecture on 'Mechanisms of Evolution from Darwin to Dobzhansky' by Prof. B. Narayan in the second session.

Views, News and more

ACT Executive Council Meet

The first executive council meeting of Association of Chemistry Teachers was organized at Homi Bhabha Centre for Science Education, (HBCSE, TIFR), Mumbai on 23, February 2019.

Prof. D.V. Prabhu, General Secretary, ACT gave his report on the association activities for the period October 2018 to February 2019.



The members of the executive council discussed on various academic events to be organized in the calendar year, including the activities of International Year of Periodic Table-2019 and National Convention of Chemistry Teachers-2019.

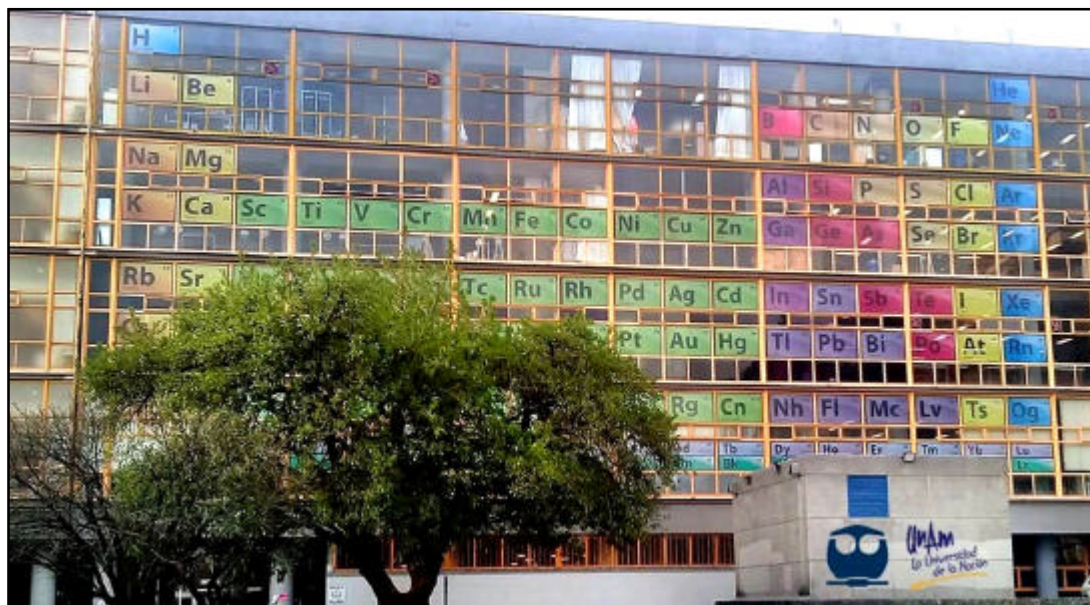
Centenary Celebrations of DAV College, Kanpur

D.A.V. College, Kanpur was started in 1919. Centenary celebrations were organized, during February 2019, on the completion of one hundred years.

The President of India, Ramnath Kovind inaugurated the celebration on 25th February 2019.

Many academic contributions were made during the celebrations. Prof. Amar Srivastava, ACT EC member was active in coordinating same events from chemistry department.

IYPT-2019 Celebrations



Long form of the periodic table was painted, during in February 2019, on the chemistry main building and IYPT-2019 was celebrated at The National Autonomous University, Mexico.

Golden Jubilee Celebrations at ISRO



The Golden Jubilee Celebration, on the eve of completion of 50 years of the first solid rocket propellant formulation was held by ISRO, at Vikram Sarabhai Space Centre, Tiruvananthapuram on 27th February 2019.

The solid rocket propellant formulation MRINAL was named after late Mrs. Mrinalini Sarabhia. Mrs. Vasant R. Gowarikar inaugurated the celebrations by illuminating the light lamp and declared the opening of the event.

Members of the MRINAL propelled development team were felicitated on this occasion. Dr. M.R.R. Prasad, Life member of ACT and member of the formulation team received a memento from Dr. S. Somanath, Director of the Space Centre, Tiruvananthapuram.

Huge floating Ice Cube at Greenland

More than seven kilometers long huge ice deposit was observed floating in Baffin bay, near Innarasuit, west north coast of Greenland.

Such big frozen water particles are rare and have complex structures. They are hazardous to coastal human and aquatic life.



Molecular Ruby for use in Materials Sciences and Catalysis



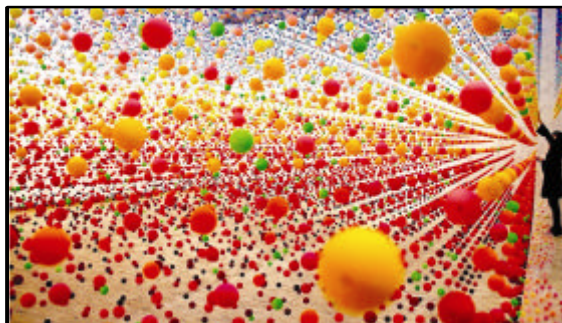
The molecular ruby in a solid (red) and dissolved (yellow) state can be used for contactless optical measurement of pressure.

©: Sven Otto, JGU

Chemists at Johannes Gutenberg University Mainz and at the University de Montreal in Canada have developed a molecular system capable of very precise optical pressure measurements. The gemstone ruby served as the source of inspiration.

This molecular ruby can be used to measure pressure both in the solid state as the gemstone ruby and further more in solution thanks to its solubility. Thus, this molecular system has potential applications in the fields of materials sciences, homogeneous and heterogeneous catalysis. Applications are important in all conceivable fields where pressure changes need to be monitored.

Australian Art Structure with Polystyrene



An art attraction was constructed by Australian citizen, Nike Savvas at New South Wales of Sydney. This art structure contains fifty thousand balls of different sizes and colours. The Chemical material of each of these balls is polystyrene, a macromolecule of vinylbenzene.

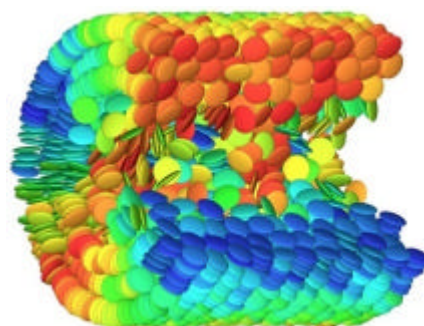
Machine Learning to Speed Chemical Discoveries

Researchers have combined artificial neural networks with infrared thermal imaging to control and interpret chemical reactions with new precision and speed. Novel micro-reactors allow chemical discoveries to take place quickly and with far less environmental waste than standard large-scale reactions. The system can reduce the decision-making process about certain chemical manufacturing processes from one year to a matter of weeks, saving tons of chemical waste and energy in the process.

Liquid Crystals form Nano Rings

Scientists have investigated an intriguing form of self-assembly in liquid crystals: When the liquid crystals are filled into cylindrical nanopores and heated, their molecules form ordered rings as they cool – a condition that otherwise does not naturally occur in the material. This behavior allows nanomaterials with new optical and electrical properties.

The scientists had studied a special form of liquid crystals that are composed of disc-shaped molecules called discotic liquid crystals. In these materials, the disk molecules can form high, electrically conductive pillars by themselves, stacking up like coins. The researchers filled discotic liquid crystals in nanopores in a silicate glass. The investigated nanostructures could also lead to new applications in organic semiconductors.



Miles to Go

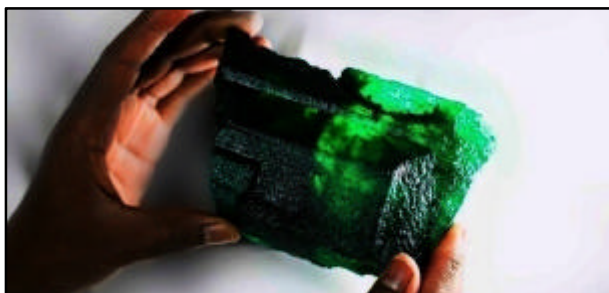


OJO Image
Getty Image University

If uncoiled, the DNA in all the cells from the human body would stretch up to 10 billion miles. That's the distance from Earth to Pluto and back or 6,000 trips from Earth to the moon.

Newly discovered Huge Emerald

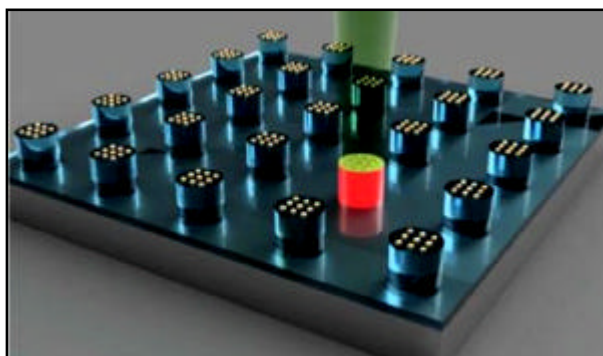
A 5,655-carat emerald described as having 'remarkable clarity and a perfectly balanced golden green hue' was discovered in Zambia in last year. Since its discovery, it has been tagged with nanoparticles which are encoded with the mine-of-origin to allow identification of the gemstone's origin.



The gem was unearthed at the Kegem mine, the world's largest emerald mine, which is 75% owned by Gemfields Group, a London-based supplier of responsibly sourced colored gemstones.

New Mega Library approach for Rapid Discovery of New Materials

Identifying the best material for a given application -- catalysts, light-harvesting structures, biodiagnostic labels, pharmaceuticals and electronic devices -- is traditionally a slow and daunting task. Now, a new study supports the efficacy of a potentially revolutionary new discovery tool to rapidly test millions of nanoparticles to determine the best for a specific use. The tool is thousands of times faster than conventional screening methods.



Laser-induced heating of nanoparticles on micropillars for carbon nanotube growth credit : Northwestern University.

The novel tool utilizes a combinatorial library, or megalibrary, of nanoparticles in a very controlled way. The libraries are created using Mirkin's Polymer Pen Lithography technique, which relies on arrays (sets of data elements) with hundreds of thousands of pyramidal tips to deposit individual polymer "dots" of various sizes and composition, each loaded with different metal salts of interest, onto a surface. Once heated, these dots are reduced to metal atoms forming a single nanoparticle at fixed composition and size.



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

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Ag_2CrO_4	PbI_2	CdS	Bi_2S_3	$\text{Ni}(\text{OH})_2$	$\text{Al}(\text{OH})_3$
Chemical Colours of Holi					
$\text{Cu}(\text{OH})_2$	$\text{Ni}(\text{DMG})_2$	AgBr	SnS_2	Ag_3AsO_4	AgCl

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