DEPARTMENT OF CHEMISTRY • PRAGJYOTISH COLLEGE, GUWAHATI-09 •
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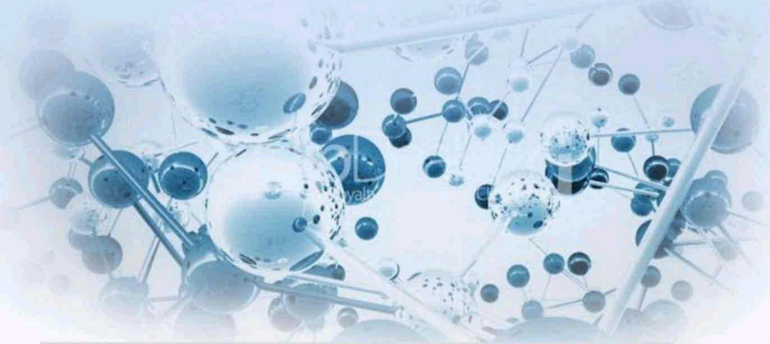
The Chemical Forum

BOSON

VOLUME 4 ISSUE 1 ...an annual newsletter

Department of Chemistry

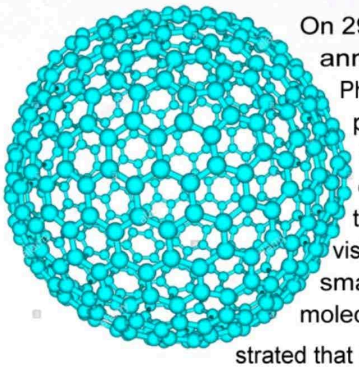
05 December 2020



THE HIGGS BOSON PARTICLE IS DISCOVERED AT THE CERN

In a scientific moment that shook the world, scientists at the CERN - the European Organization for Nuclear Research-lab in Switzerland found the Higgs Boson particle. The Higgs field is an invisible field that gives mass to particles that interact with it. The Higgs Boson is a part of this Higgs field. The Higgs Boson particle was found 50 years after scientists first thought something like this existed!

PLENTY OF ROOM AT THE BOTTOM



On 29th December 1959, during the annual meeting of the American Physical Society at Caltech, American physicist and Nobel Prize laureate Richard Feynman gave the lecture entitled “There’s Plenty of Room at the Bottom”, where he describes a vision of using machines to construct smaller machines and down to the molecular level. This new idea demonstrated that Feynman’s hypotheses have been proven correct, and for these reasons, he is considered the father of modern nanotechnology. His speech results in a new field of research catching the interest of many scientists. Notably, Japanese scientist Norio Taniguchi and American scientist Kim Eric Drexler, both worked independently in this field and further *(See page No.3)*

h - THE BELITTLED CONSTANT

The constant “h”, devised in 1900 by a German physicist named Max Planck, who won the 1918 Nobel Prize for his work — is a crucial part of quantum mechanics, the branch of physics which deals with the tiny particles that make up matter and the forces involved in their interactions.

In 1878—before Einstein was born, before quantum mechanics, before it was known that our galaxy was one among many—a well-known physicist named Phillip von Jolly told young Max Planck, a student aspiring for a career in physics, “In this field, almost everything is already discovered, and all that remains is to fill a few unimportant holes.”

Trying to explain quantum mechanics Stephan Schlamminger, a physicist for the National Institute of Standards and Technology, cites the example of a familiar harmonic oscillator, a child on a swing set. Schlamminger pointed out that the energy that this classical system (Swing set) has is proportional to the square of the amplitude. Hence, the child can swing at any continuous range of energies from zero up to a certain point. *(See page No.4)*

PRAGJYOTISH COLLEGE
SANTIPUR, GUWAHATI-09

PROFILE

The Department of Chemistry was established in the year 1960 and is situated left to the main administrative building in the campus. This department has been involving in teaching high quality education in Chemistry in the undergraduate level. Since the Chemistry is the core subject, a large number of students with general course take admission and completed successfully. The department also offer Major course in Chemistry. With the thirty seat capacity, it produces a number of Chemist which have been placed in various field like refinery, forensic laboratory, water quality analysis etc. just after graduation. Some students pursue M.Sc. in different institutions after clearing JAM (Joint Admission test for Masters) and other entrance examination.

A research environment has been developed in the department. Major Students are involved in various project works in Sixth Semester course and exposed to preliminary analytical techniques. They also learn some spectroscopic analysis in higher educational institutions like Gauhati University, ISTGU etc during their project work. One faculty of the department has received grant from DST India for conducting higher research. The main research work involves activation and insertion of Carbon dioxide into organic molecules. Some of the faculties published research papers in highly reputed journal.

PROFILE IN BRIEF

Year of establishment: 1960
Head of the Department: Mr. Saroj Sarma
Course Offered: B.Sc. (Honours and General)
Intake Capacity: Major =30
General=200
Departmental email ID: chemistry@pragjyotishcollege.ac.in
Website: https://pragjyotishcollege.ac.in/academics/department/chemistry/
Location: Block D, Pragjyotish College, Guwahati-09

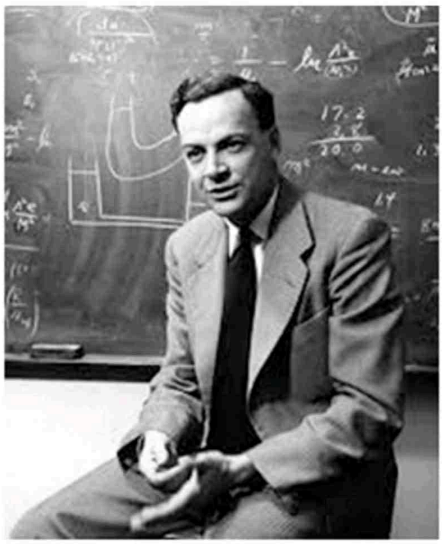




PLENTY OF ROOM AT THE BOTTOM

(From page no. 1)

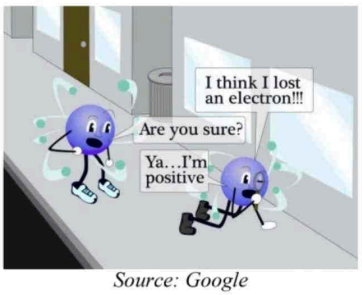
...Even though concept of nanotechnology is relatively new, there are many early examples of uses of nanotechnologies by human, like the Lycurgus cup of 4th century AD which is the oldest example of Dichroic glass, and during 13th – 18th centuries "Damascus" saber blades which contains carbon nanotubes and cementite nanowires. In 1857, Michael Faraday demonstrating that nanostructured gold under certain lighting conditions



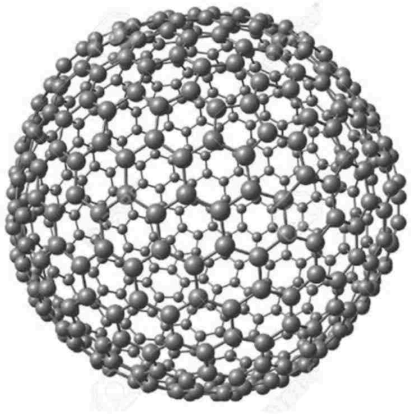
Richard Feynman

produces different-colored solutions. There has been tremendous progress in nanotechnology since the early ideas of Feynman until 1981 when Gerd Binnig and Heinrich Rohrer invented a new type of microscope at IBM Zurich Research Laboratory, the Scanning Tunneling Microscope (STM), which allows scientists to create direct spatial images of individual atoms for the first time. They were awarded Nobel Prize for this discovery in 1986. This invention led to the development of the atomic force microscope (AFM) and scanning probe microscopes (SPM), which are the instruments of choice for nanotechnology researchers today. During the same time, golden era of nanotechnology began when Robert Curl, Harold Kroto, and Richard Smalley discovered a new allotropic form of carbon, the fullerenes. They together won the 1996 Nobel Prize in Chemistry. The discovery of carbon nanotubes is largely attributed to Sumio Iijima in 1991. In the meantime, nanoscience progressed in other fields of science like in computer science, bio and engineering.

The beginning of the 21st century saw an increased interest in the emerging fields of nanoscience and nanotechnology. In approximately 50 years, nanotechnology has become the foundation for extraordinary industrial applications and exponential growth. However, because of extensive human exposure to nanoparticles, there is a significant concern about the potential health and environmental risks due to lack of reliable toxicity data. Although the complex nature of the nanomaterials makes the development of their safety assessment challenging, the future of the nanotechnology appears to be bright.



Source: Google



C540 fullerence

By
Abhik Bordoloi
6th Semester
Department of Chemistry

Lycurgus cup

FACTS

- The solid form of carbon dioxide is known as the dry ice.
- Hot water freezes quicker than cold water.
- The surface of Mars is red because of the presence of iron oxide.

h - THE BELITTLED CONSTANT

(From page no. 1)

... But in the quantum level, things behave differently. "The amount of energy that an oscillator could have is discrete, like rungs on a ladder," Schlamminger says. The energy levels are separated by h times f, where f is the frequency of the photon — a particle of light — an electron would release or absorb discreate energies to go from one energy level to another (just like the rungs on the ladder).

One of the confusing things for non-scientists about Planck's constant is that the value assigned to it has changed by tiny amounts over time. Back in 1985, the accepted value was h = 6.626176 x 10-34 Joule-seconds. The current calculation, done in 2019, is h = 6.62606983 x 10-34 Joule-seconds with an uncertainty of 0.00000022 x 10-34 Joule-seconds.

"While these fundamental constants are fixed in the fabric of the universe, we humans don't know their exact values," Schlamminger explains. Experiments have to be devised to measure these fundamental constants to the best of humankind's ability. At this hour the knowledge that we have comes from a few experiments that were averaged to produce a mean value for the Planck constant.

To measure Planck's constant, scientists have used two different experiments — the Kibble balance and the X-ray crystal density (XRCD) method, and over time, they've developed a better understanding of how to get a more precise number. When a new number (here the Plank's Constant) is published, the experimenters put forward their best number as well as their best calculation of the uncertainty in their measurement. The true, but unknown value of the constant, should hopefully lie in the interval of plus/minus the uncertainty around the published number, with a certain statistical probability. The Kibble balance and the XRCD method are so different that it would be a major coincidence that both ways agree so well by chance.

That tiny imprecision in scientists' calculations isn't a big deal in the scheme of things. But if Planck's constant was a significantly bigger or smaller number, all the world around us would be completely different. If the value of the constant was increased, for example, stable atoms might be many times bigger than stars.

Planck's constant has had profound ramifications in three important areas: our technology, our understanding of reality, and our understanding of life itself. Of the universal constants—the cosmic number which define our Universe—the speed of light gets all the publicity (partially because of its starring role in Einstein's iconic equation E = mc 2) , but Planck's constant is every bit as important. Planck's constant has also enabled the construction of the transistors, integrated circuits, and chips that have revolutionized our lives.

More fundamentally, the discovery of Planck's constant advanced the realization of the deepest levels of the structure of matter. A moving car (a macroscopic entity)—has a definite location and velocity. The concepts of location, velocity, and even existence itself blur at the atomic and subatomic level. Electrons, bizarrely, exists everywhere at once, but much more likely to be in some places than in others. Reconciling the probabilistic subatomic world with the macroscopic everyday world is one of the great unsolved problems in physics.

Planck's constant tells us how the universe is numerically fine-tuned to permit life to exist. Carl Sagan, one of the great popularisers of science, was fond of saying that "We are all star stuff"—the chemicals which form our bodies are produced in the explosions of supernovas.

The fundamental nuclear reaction eventually leading to the explosion of a supernova, is the fusion of four hydrogen atoms to produce a single atom of helium. In the process, approximately 0.7% of the mass is converted to energy via E=mc 2 . That's not much, but there is so much hydrogen in the Sun that it has been radiating enough energy to warm our planet for more than four billion years—even from a distance of 14,96,68,992 Km—and will continue to do so for another five billion years.

This 0.7% is known as the efficiency of hydrogen fusion, and our understanding of it is one of the consequences of Planck's investigations. It requires a great deal of heat to enable hydrogen to fuse to helium, and the hydrogen atoms in the sun are moving at different speeds, much like cars on a freeway move at different speeds. The slower-moving hydrogen atoms just bounce off each other; they are insufficiently hot to fuse. Higher speeds, though, mean higher temperatures, and there is a small fraction of hydrogen atoms moving at sufficiently high speeds to fuse to helium.

The 0.7% efficiency of hydrogen fusion is what is sometimes referred to as a "Goldilocks number." Like the porridge (kind of oat meal) that Goldilocks eventually ate, which was neither too hot nor too cold, but just right, the 0.7% efficiency of hydrogen fusion is "just right" to permit the emergence of life as we know it. The process of hydrogen fusion is an intricate high-speed, high-temperature ballet. The first step of this reaction produces deuterium, an isotope of hydrogen whose nucleus consists of one proton and one neutron. In this process, two protons slam into one another, causing one of the protons to shed its electrical charge and metamorphose into a neutron.

If the efficiency of hydrogen fusion were as low as 0.6%, the neutron and proton would not bond to each other to form a deuterium atom. In this case, we'd still have

stars—huge glowing balls of hydrogen—but no star stuff would ever form because the porridge would be too cold to create helium, the first step on the road to creating the elements necessary for life.

On the other hand, if hydrogen fusion had an efficiency of 0.8%, it would be much too easy for helium to form. The hydrogen in the stars would become helium so quickly that there wouldn't be much hydrogen left to form the molecule most essential for life—water. Star stuff would be produced, but without water life as we know it would not exist. Maybe something else would take the place of water, and maybe life could evolve—but not ours.

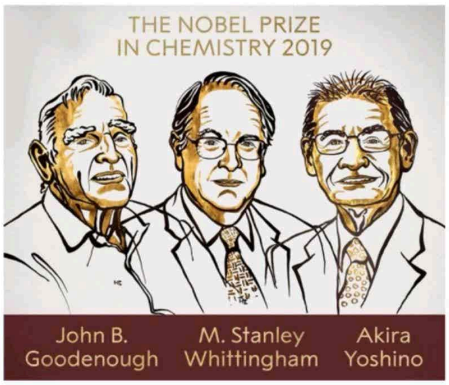
Planck's quantization of energy was an essential step on the road to the theory of quantum mechanics, which is critical to our understanding of stellar evolution. Science hasn't filled in all the pieces of the puzzle of how life actually evolved, but quantum mechanics did begin to answer the question of how the pieces got there in the first place, and probably even Philipp von Jolly would recognize that as an important hole in our knowledge of the universe that desperately needed to be filled.

But perhaps the greater lesson is this: The very moment when it feels like "almost everything is already discovered" may be the moment that the universe is about to yield up its biggest surprises—if you're not afraid to dig in to a few holes.

By
Manash Jyoti Sarmah
M. Sc.
Guwahati University

Originally Adopted From:
1. What Is Planck's Constant, and Why Does the Universe Depend on It?
By Patrick J. Kiger, December 10, 2019
2. Planck's Constant: The Number That Rules Technology, Reality, and Life
By James Stein, October 24, 2011

THE "NOBEL CHEMISTRY" FOR 2019 IS THE RECHARGEABLE WORLD

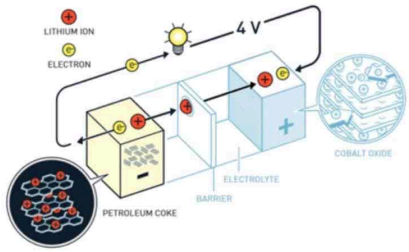


The advancement of scientific discoveries and inventions have made our life more and more comfortable. In present situation, we are in a state that we cannot live without a mobile phones, laptops etc. Not only entertainment and communication but also learning process has been moving faster with the help of electronic gazettes. Batteries plays important role for the use of these types of gazettes, which we could easily research without destroying their efficiency. Therefore for the amazing discovery the Nobel Prize in Chemistry in the year 2019 was awarded to **John B. Goodenough**, the University of Texas at Austin, USA; **M. Stanley Whittingham**, Binghamton University, State University of New York, USA; and **Akira Yoshino**, Meijo University, Nagoya, Japan for "the development of lithium-ion batteries".

Lithium ion battery is an example of solid state battery. In early days, between 1831 and 1834, Micheal Farady, a pioneering electrochemist, discovered that the solid electrolyte silver sulfide and lead (II) fluoride can be used for solid state batteries. Later, solid state electrolytes were modified and various researchers tried using different cathode using lithium based compounds, such as, $LiCoO_2$, $LiMnO_4$ etc. and for the anodes Li_2FeS_2, FeS, NiP_2, Li_2SiS_3. It has been found that efficiency of the solid state battery increase use the use of lithium ions. Therefore more focus on the lithium ions has been given and resulted in the lightweight, hardwearing and frequently chargeable batteries.

The foundation of the lithium-ion battery was laid during the oil crisis in the 1970s. Stanley Whittingham worked on developing methods that could lead to energy technologies free from fossil. He could create a cathode with titanium disulphide intercalated with lithium ions. The anode was partially made from metallic lithium. It was found to be a potential battery having a potential over two volts and later certified as CE battery.

In 1980, John B. Goodenough demonstrated that cobalt oxide with intercalated lithium ions can produce greater potential as much as four volts. Based on the Goodenough's cathode idea, Akira Yoshino created the first commercially viable lithium ion battery in 1985. Rather than using reactive lithium in the anode, he used petroleum coke.



By
Mritul Kalita
5th Semester
Suresh Kr Sah
3rd Semester
Department of Chemistry

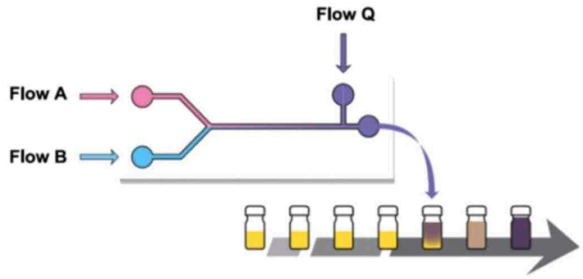
Source : https://www.nobelprize.org/prizes/chemistry/2019/pressrelease

FACTS

- Wasp stings are alkaline whereas bee stings are acidic.
- Dynamite contains peanuts as a past of its ingredient.

FLOW CHEMISTRY

In flow chemistry, a chemical reaction is run in a continuously flowing stream rather than in a batch production. In other words, pumps move fluid into a tube, and where tubes join one another, the fluids contact one another. If these fluids are reactive, a reaction takes place. Flow chemistry is a well-known established technique for use at a large scale when manufacturing large quantities of a given material. However, the term has only been coined recently for its application on a laboratory scale. Often, micro reactors are used.



By
Subhasish Das
3rd Semester
Department of Chemistry

Source: Wikipedia

Advantages

- Reaction temperature can be raised above the solvent's boiling point as the volume of the laboratory devices is typically small. Typically, non-compressive fluids are used with no gas volume so that the expansion factor as a function of a pressure is small.
- Mixing can be achieved within seconds at the smaller scales used in flow chemistry.

Disadvantages

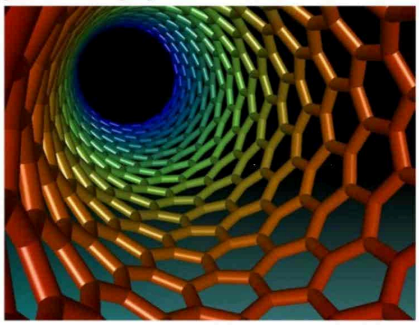
- Dedicated equipments is needed for precise continuous dosing (eg. pumps), connections etc.
- Start up and shut down procedures have to be established.

Source: Google

CARBON NANOTUBES

Carbon is the chemical element with atomic number 6 and has six electrons. Recent discoveries of salient carbon nanoforms have paved tremendous interest among research and also towards their discrete applications in scientific fields.

Carbon nanotubes often refer to single-wall carbon nanotubes (SWCNTs) with diameters in the range of a nanometer. They were discovered independently in 1991 by Japanese physicist Sumio Iijima. Single-wall carbon nanotubes are one of the allotropes of carbon, intermediate between fullerene cages and flat grapheme.



Carbon nanotubes also often refer to multiwall carbon nanotubes(MWCNTs) consisting of nested single-wall carbon nanotubes weakly bound together by Van der Waals interactions. Carbon nanotubes can exhibit remarkable electrical conductivity, and depending on their structure they can be made into semiconductors or even metals. They also have exceptional tensile strength and thermal conductivity because of their nanostructure and strength of the bonds between the carbon atoms. These properties are expected to be valuable in many areas of technology,such as electronics, optics, nanotechnology and other applications of materials science.

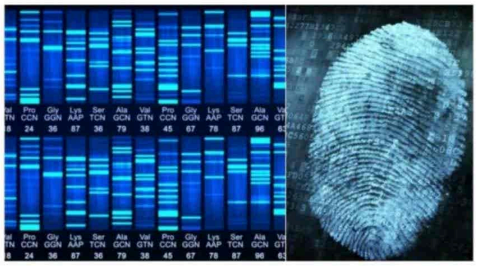
By
Churamoni Bharali
3rd Semester
Department of Chemistry

Source-
http://www.sciencedaily.com

DNA FINGERPRINTING

DNA fingerprinting is becoming one of the common words in the modern society. In fact, it is mostly used for some crime and proofing some blood relation. It is a chemical test that shows the genetic makeup of a person or other living things. It was invented by **FRIEDRICH MIESCHER** in 1984.

DNA is abbreviation for deoxyribonucleic acid. All living body has DNA except some microorganism. The chemical compounds that join together to form DNA are a sugar, a phosphate and some nitrogen containing bases. They can rearrange themselves and make 3 billion possibilities. The way they're strung together tells our cells how to make copies of each other. This further gives gene. More than 99.9 % of everyone's genome is exactly alike (100% if you are identical twins). But the tiny bit that's not is what makes us physically and mentally different from someone else.



DNA fingerprinting uses chemicals to separate strands of DNA and reveal the unique parts of our genome. The results show up as a pattern of stripes that can be matched against other samples. To get our DNA fingerprint, we would give a sample of cells from our body. This can come from a swab inside our mouth, from our skin, the roots of our hair, or our saliva, sweat, or other body fluids. Blood is usually the easiest way. Lab workers treat the sample with chemicals to separate the DNA, which is then dissolved in water. The DNA is cut into smaller segments with another chemical process to get sections of 5 to10 base pairs that repeat themselves. In the laboratory, the strips of DNA is mixed into a gel and then separated from one another by using electric current. A dye added to the gel makes the DNA strips to make it visible and the profile is checked and compared with the other . If the pattern or profile matched then we can established the relationship between two individuals or a person with crime.

By
Mritul Kalita
5th Semester
Department of Chemistry

Source: https://www.webmd.com/a-to-z-guides/dna-fingerprinting-overview

Source: Google

NOTHING IS IMPOSSIBLE

We observed that some reactions don't move forward due to activation energy barrier which further related to temperature. In 2013, a team of scientists from the University of Leeds has discovered that chemical reactions once thought to be 'impossible' in the coldness of space can actually occur. This is due to the ***"Quantum Tunneling effect"***. The quantum tunneling phenomenon is one of the important rules of quantum mechanics (quantum mechanics deals with microparticle and says that particles do not tend to have defined states, positions and speeds, but instead exist in a haze of probability). Tunneling predicts that that although a given particle might have a strong probability of being on one side of a barrier, there is still a very small chance of it actually being found on the other side of it. That means it is allowing the particle to occasionally 'tunnel' through a wall that would otherwise be impenetrable.

By
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Department of Chemistry

Source: https://scitechdaily.com and https://www.nature.com/articles/nchem.1692

FACTS

- Goldfish eyes perceive the visible spectrum, infrared, as well as the UV Lights

CHEMISTRY DISCOVERIES THAT CHANGED THE WORLD

Chemistry has changed our lives drastically. Over the centuries, we have figured out how to produce light, find cures for diseases, discover radioactivity. Few important discoveries that influence our daily life style are –

1.LCD Screen:

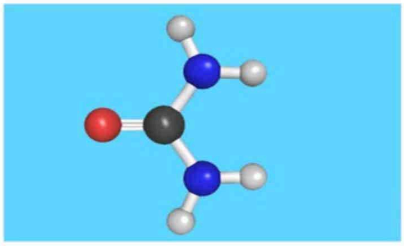
This discovery has played a role in all of our lives in the 21st century. This dated back to the 1960s in Britain. The British Military wanted new flat screens in vehicles rather than the old bulky and rather expensive cathode ray tubes. This brought up the discussion of Liquid Crystal Displays or LCDs. The only posing obstacle was the fact that these LCDs only worked under extremely hot temperatures. In 1970,scientist George Gray worked on LCDs to try and find a more practical way that could be used. He ended up inventing a molecule,5CB which in turn lead to the production of all LCD products in the late 70s and early 80s.Spin-offs of the original 5CB molecule made things like flat screen TVs possible.

2. Polythene :

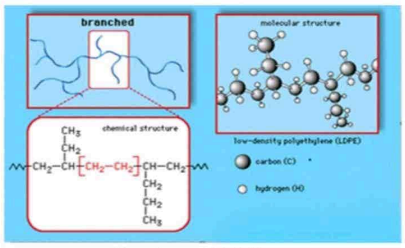
From hard hats to plastic bags, it's the most common plastic found in products today. In 1898, Hans Van Pechmann discovered something waxy at the bottom of his tube. The funny thing is that, he was studying something completely different, making the discovery accidental. He and his fellow scientists studied the substance and found out that it was composed of very long molecular chains. These chains were later termed polymethylene. The study of new substance was put to a halt until 1933. At Imperial Chemical Industries, multiple chemists discovered an entirely new way to produce the plastic. They too like Van Pechmann found this waxy substance at the bottom of a tube. Two years later, they were able to find a practical method to produce this accidental substance and make plastic product out of it. Still to this day, it is the most common plastic in our daily life.

3. Synthesis of Urea :

A German Chemist by the name of Friedrich Wöhler provided the biggest step in the field of Chemistry by synthesizing Urea for the first time. In fact, this vital invention in Chemistry – creation of Urea – refuted the 'belief or vitalism' that all living things were alive due to some "special vital force!" This pioneering step of conversion of ammonium cyanate into Urea in the year 1828 is certainly of mammoth historical significance as for the first time an Organic compound was produced from Inorganic reactants. This huge discovery led to the all important branch of Organic Chemistry



Structure of an Urea



Structure of Polythene

By
Shrabana Chakrabarty
5th Semester
Department of Chemistry

Source:
http://www.mixerdirect.com

FACTS

- Lobster blood is colorless until it's exposed to air. The blood then appears to be blue.

CHEMISTRY IN SPICES

By
Dipumoni Thakuria
3rd Semester
Department of Chemistry

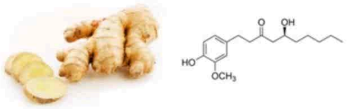
The most common chemical compounds found in spices are alkaloids, saponins, glycosides, phenolic compounds, and organic acids. Spices show various colours, smell, taste etc due to the presence of various chemical compounds.

Bay Leaves

1,8-cineole is the major constituent, a compound also found in cardamoms. Its common name is eucalyptol.

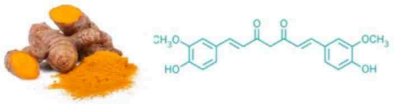
Ginger

Zingiberene is the major organic compound in ginger.



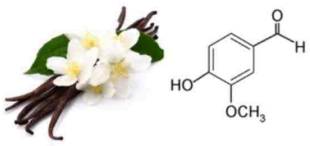
Turmeric

Compounds called curcuminoids are responsible for the yellow colouration of turmeric. They are also natural antioxidants



Vanilla

The aroma of vanilla is mainly due to the compound vanillin, which accounts for 74-96% of the flavour & aroma compounds.



Sage

Manool is one of the main chemical compounds found in sage. Others include eucalyptol, and thujone, a psychoactive compound

Saffron

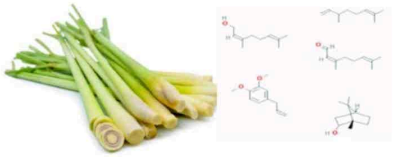
Crocin is the chemical compound responsible for the colour of saffron. It is a deep red colour, and forms an orange solution when dissolved in water. It has been shown to be a potent anti-oxidant.

Pepper

Piperine is the major constituent of the oil that can be extracted from black pepper, and is the main compound that gives black pepper its pungency

Lemongrass

Citral is a mix of two different isomeric aldehydes, neral and geranial. Citral is also used in perfumery for its citrus odour.



Cumin

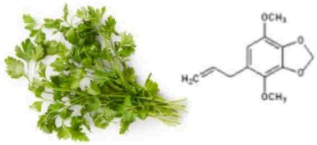
Cuminaldehyde is the main contributor to cumin's warm aroma. Other constituents include a range of other aldehyde compounds

Mint

The major compound in mint leaves is menthol. This compound is also a popular flavouring for chewing gum and toothpaste, and is also used in menthol cigarette

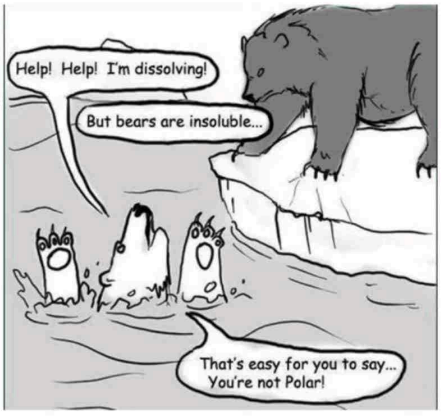
Parsley

1,3,8-p-menthatriene is the major compound found in parsley leaves. Other compounds include myristicin & limonene



Cinnamon

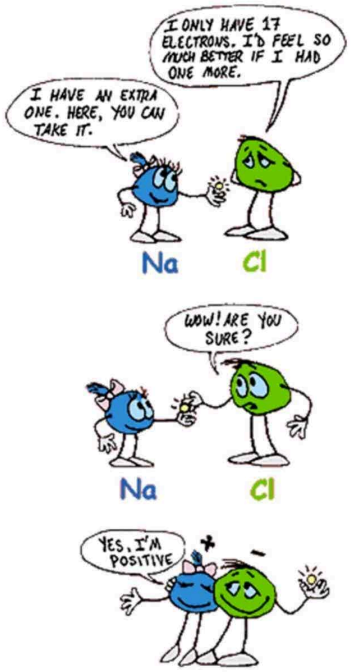
Cinnamaldehyde gives cinnamon its flavour and odour; 90% of the oil obtained from cinnamon bark is cinnamaldehyde. It is also used as a flavouring in chewing gum, sweets, ice cream and beverages



Source: Google

THE CHEMISTRY LIFE

Fast as photon, positive as proton
Chemists know how to handle both.
Entropy is forever high,
equilibrium is always lost.
Chemistry is not merely a subject, it is life.
Funny & studious is dual nature of us.
s,p,d & f are building blocks.
Exception and expression out of mind.
Bonding with chemistry is alright.
Chemistry is best.
Test-tube, beaker, pipette are our play set.
AgBr spilled on hands and we don't care.
Once a blast in lab is indeed.
Life is Chemistry and Chemistry is life.



Source: Google

By
Radhika Mishra
3rd Semester
Department of Chemistry

FACTS

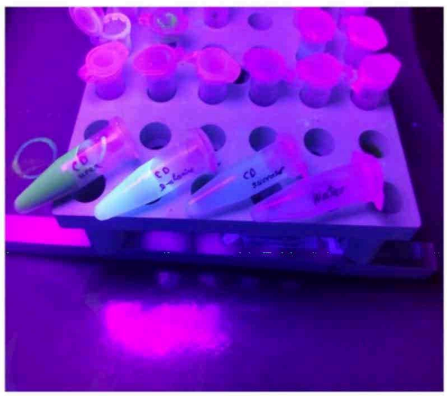
- "J" is the only letter that doesn't appear on the periodic table
- Hydrofluoric acid is so corrosive that it can dissolve glass.

CARBON QUANTUM DOTS

Carbon-based quantum dots consisting of grapheme quantum dots(GQDs) & carbon quantum dots(CQDs) are a new class of carbon nanoparticles with a particle size below 10nm. CQDs were first discovered by Xu et al. in 2004 accidentally during the purification of single-wall carbon nanotubes.

As a new class of fluorescent carbon nanomaterials, CQDs possess the attractive properties of high stability, good conductivity, low toxicity, environmental friendliness, simple synthetic routes as well as comparable optical properties to quantum dots. A paper published in 2019 showed that CQD can resist temperatures as high as 800 degree Celsius, paving way for applications of CQD in high temperature environments.

CQDs have vast applications in the field of



bioimaging, biosensing and disease detection. CQDs also have the important distinction of being made of an abundant and generally nanotoxic element that can further help in the environmentally friendly development of photo voltaic technologies.

By
Gitartha Kalita
3rd Semester
Department of Chemistry

Source-http://www.frontiersin.org

ACHIEVEMENTS:

Mr. Ramanand Das
(Batch 2014-2017) Cleared NET (LS) along with M.Sc from Sikkim University.

Manash Jyotish Sarmah
Cleared JAM 2018

Miss Payal Ambastha
Topper among the batch-mate in the Final Semester Examination (2019) with (CGPA 8.1). She has taken admission in Gauhati University for her Masters in Chemistry.

Miss Sima Ramchiary
Cleared the Tezpur University Entrance Examination and got admission in the Department of Chemical Science, Tezpur University.

Mr. Uddipan Bora
Secured first class in last year and has took admission in Royal Global University.

Miss Aditi Sharma
Secured first class in the last year and took admission in NIT Sikkim.

Department of Chemistry
2nd prize in Cultural Rally in the College Week-2020

Mr. Bittu Kumar Yadav
Cleared JAM 2020 with highest Rank ever by a student of the college.

Mr. Abhik Bordoloi
Cleared JAM 2020 and topped in the 5th semester examination 2019 with SGPA 8.8 .

Mr. Om Lama
Cleared JAM 2020.

Mr. Mritul Kalita
Topped in the 3rd semester examination 2019 with SGPA 7.75.

Mr. Subhasish Das
Topped in the 1st semester examination 2019 with SGPA 7.91.

1st prize in Tug Of Wars(Girls) in the College Week-2020

3rd prize winners of Quiz competition organized by the department of Philosophy on the day of World Philosophy Day (21st November 2019)

দুহিতা (a column dedicated to women achievers in the field of Science and Technology)

কৰ'ণা ভাই�ৰাছৰ প্ৰথমটি সুলভ মূল্যৰ টেষ্টিং কীটৰ আঁৰৰ ভাৰতীয় মহিলাগৰাকী।

চীনদেশত পোখা মেলা "কৰ'ণা" নামৰ ভাইৰাছবিধে গোটেই বিশ্বৰ লগতে ভাৰতবৰ্ষকো জুৰুলা কৰি পেলোৱাৰ সেই আতংকময় সময়ছোৱাতেই ২০০৯বৰ্ষৰ পৰা NIV(National Institute of Virology)-ত কৰ্মৰত ৩৩ বছৰীয়া বিষাণুবিজ্ঞানী Minal Dakhave Bhosale-য়ে এই ভাইৰাছবিধৰ চিনাক্তকৰণৰ ক্ষেত্ৰত উল্লেখযোগ্য ভূমিকা গ্ৰহণ কৰে। যিসময়ত ভাইৰাছবিধৰ প্ৰতিষেধক পোৱাটো দূৰৈৰে কথা আনকি চিনাক্তকৰণৰ বাবেও পৰ্যাপ্ত ব্যৱস্থাৰ অভাৱ আছিল তেনেস্থলত এইগৰাকী বিজ্ঞানীয়ে নিজৰ গৰ্ভাৱস্থাৰ অন্তিম পৰ্যায়ত ভাৰতবৰ্ষত পোনপ্ৰথমবাৰৰ বাবে সুলভ মূল্যৰ টেষ্টিং কীট সৃষ্টি কৰি দেশবাসীৰ বাবে আশাৰ ৰেঙণি কঢ়িয়াই আনে। শেফালী দেশাই, মিতালী পাটিল তথা অন্যান্যসকলৰ সৈতে একগোট হৈ প্ৰায় ৬ সপ্তাহ কালৰ নেৰানেপেৰা কষ্টৰ অন্তত মুকলি কৰা টেষ্টিং কীটটোৰ তেওঁ পোনতে নাম ৰাখে: Patho Detect । এই কীটটোৰ দ্বাৰা ২.৩০ঘণ্টাৰ ভিতৰতে মাত্ৰ ১২০০ ভাৰতীয় টকাৰ বিনিময়ত ১০০টা নমুনাৰ ১০০% ফলাফলৰ সৈতে পৰীক্ষা কৰাতো সম্ভৱপৰ হয় য'ত নেকি বাহিৰৰ অন্যান্য আমদানিকৃত কীটবোৰে ৬-৭ঘণ্টা সময় লয় তথা তাৰ বাবে খৰচৰ পৰিমান হয়গৈ ইয়াৰ প্ৰায় চাৰিগুণ অৰ্থাৎ ৪৫০০টকা। মূল্যাংকনৰ বাবে তেওঁ ২০২০বৰ্ষৰ ১৮মাৰ্চত কীটটো NIV(National Institute of Virology)-লৈ পঠিওৱাৰ মাত্ৰ এদিন পিছতে চিজাৰিয়ান পদ্ধতিৰে এটি কন্যা সন্তানৰ মাতৃ হোৱাৰ গৌৰৱ অৰ্জন কৰে। হস্পিতাললৈ যোৱাৰ প্ৰাক্ক্ষনত তেওঁ এই কীটটোৰ FDA(Food and Drug Administration) তথা CDSCO(The Central Drugs Standard Control Organization) লৈ বাণিজ্যিকভাৱে অনুমোদনৰ বাবে প্ৰস্তাৱ আগবঢ়ায়। এই কীটটো বিদেশলৈ ৰপ্তানিৰ বাবেও অনুমতি লাভ কৰিছে..পৰৱৰ্তী সময়ত FDA আৰু CDSCO-য়ে "My lab Patho Detect Coid-19 Qualitative PCR Kit"নামেৰে কীটটোৰ নতুনকৈ নামাকৰণ কৰে।

শিক্ষা:-
২০০৪-২০০৭বৰ্ষৰ অন্তৰালত তেওঁ পুনে বিশ্ববিদ্যালয়ৰ পৰা বিজ্ঞান শাখাত প্ৰথম শ্ৰেণীত ডিগ্ৰী সমাপ্ত কৰে..২০০৭-০৯ বৰ্ষত তেওঁ পুনে বিশ্ববিদ্যালয়ৰ পৰাই বিষাণুবিজ্ঞানত মাষ্টাৰ ডিগ্ৰী সমাপ্ত কৰ।

কৰ্ম-অভিজ্ঞতা:-
২০১০-১১বৰ্ষলৈ NIV(National Institute of Virology)-ত কৰ্মৰত আছিল। ২০১১বৰ্ষৰ জুলাই মাহৰ পৰা ২০১৩বৰ্ষৰ আগষ্ট মাহলৈ NIV-ত কাৰিকৰী সহায়ক হিচাপে কাম কৰিছিল। ২০১৩-১৪বৰ্ষলৈ তত্ত্ব কাৰিকৰী সহায়ক হৈছিল তথা ২০১৪ বৰ্ষত তত্ত্ব কাৰিকৰী বিভাগৰ মুখ্য হিচাপে নিযুক্তি পাইছিল।

ভাইৰাছবিধৰ বিভীষিকাময় পৰিস্থিতি প্ৰত্যক্ষ কৰি বিষাণুবিজ্ঞানী গৰাকীয়ে অনুভৱ কৰিছিলে যে দেশৰ প্ৰতি সেৱা আগবঢ়োৱাৰ এইয়াই উপযুক্ত সময়। তেওঁ তেওঁৰ গৰ্ভাৱস্থাৰ জটিলতাৰ পিছতো দেশৰ হকে আগবাঢ়ি আহি বিজ্ঞানাগাৰত ১৪-১৬ঘণ্টা কাম কৰি এই ভাষ্য আগবঢ়াই যে,"মই এই পথাৰখনত পাঁচ বছৰ ধৰি কাম কৰিছোঁ আৰু এনে এটি জটিল পৰিস্থিতিত, যি পৰিস্থিতিত মোৰ কামৰ আটাইকে প্ৰয়োজন, সেই সময়ত যদি মই মোৰ কামৰপৰা বিৰতি লওঁ তেন্তে মোৰ প্ৰয়োজনেই বা ক'ত?"।
তেওঁৰ এই ত্যাগ তথা কষ্টৰ হেতুকে মহাৰাষ্ট্ৰ চৰকাৰে তেওঁক পদ্ম বঁটাৰ বাবে মনোনীত কৰিছে। সন্তান প্ৰসৱৰ সময়ত নিজৰ শাৰীৰিক জটিলতাকো আওকাণ কৰি দেশ তথা দেশবাসীৰ হকে নিষ্ঠা সহকাৰে নিজ কৰ্তব্য তথা সেৱা আগবঢ়ালে তাৰ বাবে বিষাণুবিজ্ঞানী Minal Dakhave Bhosale-ৰ নাম ভাৰতৰ ইতিহাসত চিৰযুগমীয়া হৈ ৰ'ব। কন্যা সন্তানটিৰ জন্মদিনটোৱে তেওঁৰ এই সাহসিক মানসিকতাখিনিক প্ৰতিবছৰে নতুনত্ব পৰশেৰে জীপাল কৰি ৰাখিব। তেওঁ আমাৰ বাবে চিৰদিন চিৰকাল প্ৰেৰণাৰ উৎস হৈ ৰ'ব।

By
Pompy Deka
5th Semester
Department of Chemistry

Editor's Message

I am very happy to serve as the editor of the 4th volume of Boson, the annual newsletter published by the Department of Chemistry of Pragjyotish College. Beforehand, I beg my apology for I might not be able to do my job very accurately, although I tried to do it as much precisely as I can. The aim of this newsletter is to bring out the hidden talents of the students as well as to make people aware of the chemical achievements happening around the world. I hope this humble attempt of us through publishing this newsletter will surely help in growing scientific temperament among its readers and make people aware of chemistry more.

Thanking you with gratitude.

Regards,
Pompy Deka

Published on 05th December 2020

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