

JOSEPH CHEMICAL LETTERS

Vol. 1, Issue 1, Mag. Nov-2020



Published by

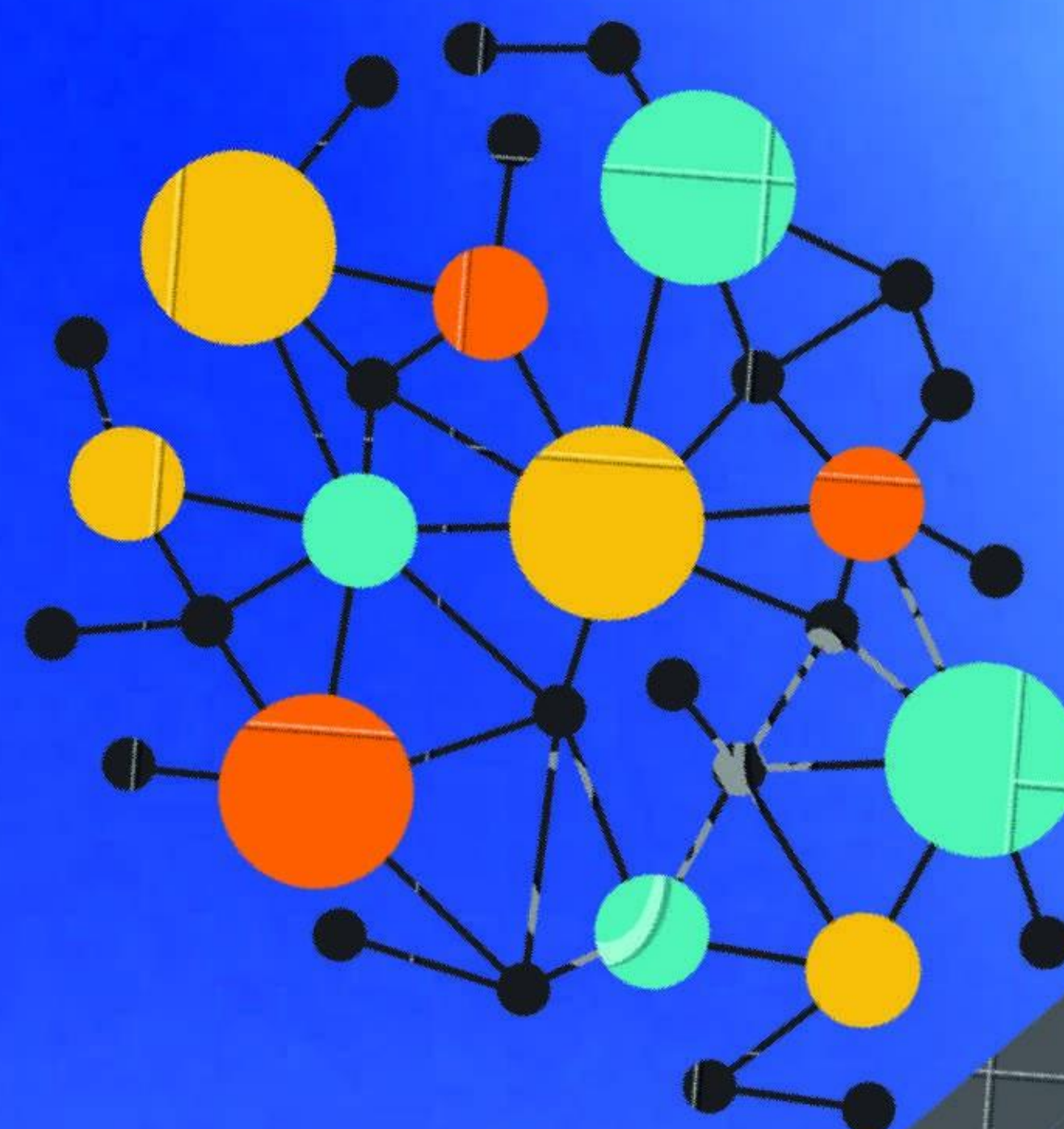
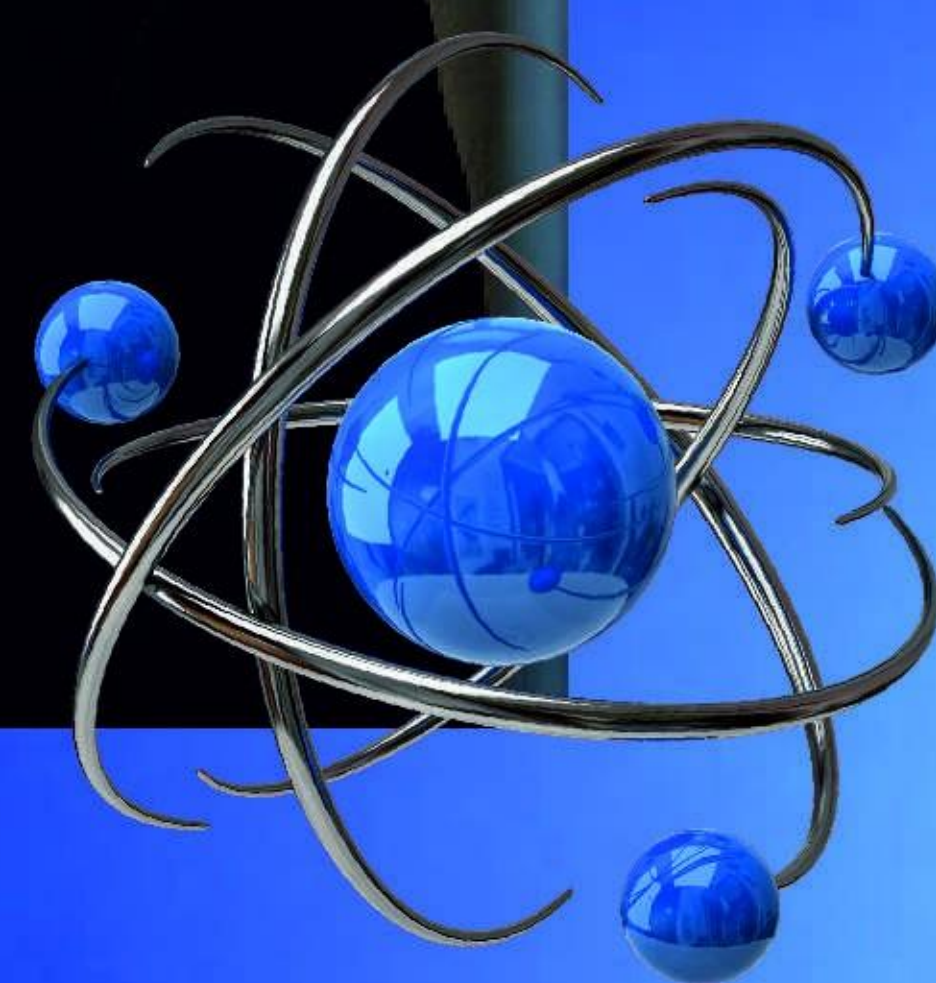
Department of Chemistry

St. Joseph's College (Autonomous)

Tiruchirappalli-620002



CHEMISTRY NOBEL PRIZE - 2020



Foreword



Pro Bono Et Vero (for the Good and the Truth),

The St. Joseph's College has always upheld and radiated Goodness and Truth in its endeavour to impart quality in higher education. **Our educational institution** has been instrumental in churning out thousands of truly educated persons, physically fit and intellectually well equipped. The College had just completed the Dodransbicentenary (175th) year of its inception and it also bagged A++ grade from NAAC during the 4th cycle last academic year. The nineteen Department associations have been exceptionally active their activities throughout the year to form the students.

The Chemistry Department is in the 114th year of its institution, it has produced numerous notable chemists who serve as eminent administrators of the nation, researchers, educationists, etc. A students' magazine entitled **Joseph Chemical Letters (JCL)** from the department would bring out talents of students. The present generation of students are often referred as millennials, who are blamed with a lack of concentration yet gifted with talents of multitasking. The student magazine can bring out the scientific writing skills, keep the students updated and make them the creators of puzzles and quizzes.

As I had a glance at the contents of the students' magazine, **Joseph Chemical Letters (JCL)** and I am of the strong opinion that the magazine stands to suffice the creative thirst of the students. The topics such as 'Chemistry Nobel Prize 2020', 'As Fatal As Chemical-Beirut Blast', 'Discovery of Phosphine gas in Venus' and other contents are the contemporary developments/issues/news pertaining to Chemistry.

I wish this e-magazine, **Joseph Chemical Letters (JCL)** released in the inauguration of Chemistry association would gain a lot of attention of the chemists. I also strongly look forward for a staff magazine/research journal from the faculty members and researchers of the chemistry department of high quality as they have lot of research potentials and creativity. I sincerely appreciate the editorial team of the students under the able guidance Dr. S. Joseph Selvaraj, Head, Department of Chemistry and Dr. A. ArunViveke, President of the Chemistry Association for initiating this students' magazine.

*I wish them all the best.
May God bless you all.*

Rev. Dr. M. Arockiasamy Xavier, SJ
Principal

Foreword

The Department of Chemistry was founded in 1906 by Rev. Fr. Augustin Hass SJ initiating the Undergraduate course in Chemistry and following decades saw the establishment of post graduates and research courses. The department is celebrating 114th year of its establishment.

We felt that there is a need for the initiation of a student magazine entirely contributed and created themselves. A group of highly motivated and energetic team of students gathered to come forward to start this magazine. Now we have the first issue of Joseph Chemical Letter(JCL), an bi-monthly e-magazine. We are immensely pleased that the editorial team have conducted several meetings and consolidated the work to bring out the first issue of the magazine.

It would cover the current developments in chemistry, opinion articles, bringing out news items pertaining to chemistry, other creative expression like poetry, puzzles, quizzes, history of elements, interviews of notable researchers and any other contribution falling under the afore mentioned areas. The main objective of the magazine would be to encourage the students of the department of chemistry to excel in the field of article writing and publishing.

We congratulate entire team of students in the editorial board for bringing out this issue successfully and wish them to continue this endeavour endlessly.

Dr. S. Joseph Selvaraj

Editor- Joseph Chemical Letters
Head, Department of Chemistry

Dr. A. Arun Viveke

Associate Editor- Joseph Chemical Letters
President- Chemistry Association

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ASSOCIATE EDITOR

Dr. S. JOSEPH SELVARAJ
Dr. ARUN VIVEKE

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Magazine Designed By
K. Gokul - III UG Chemistry

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THIS ISSUE IS PUBLISHED ON Nov.2020

Chemistry Nobel Prize - 2020

- MELVIN MITCHAL A

The Nobel Prize in Chemistry 2020 was awarded jointly to Emmanuelle Charpentier and Jennifer A. Doudna “for the development of a method for Genome Editing”



Emmanuelle Charpentier and Jennifer A. Doudna

“Women are the real architects of society”

Marie Curie, the Chemist who was the first woman to win two Nobel Prizes one in Physics (1903) and another in Chemistry (1911) reiterated the role of women in society. In order to be exceptional one must always be different and creative. Here are the two Victorious Women who proved the quote by Marie Curie and proved it true today.

Emmanuelle Charpentier and Jennifer A. Doudna were awarded Nobel Prize in Chemistry 2020 for discovering one of the Gene technology's sharpest tools: CRISPR/CAS9 Genetic Scissors. Researchers can use scissors to change the DNA of animals, plants and microorganism with extremely high precision.

This technology has revolutionized the molecular life sciences, brought new opportunities for plant breeding is contributing to innovative cancer therapies and may make the dream of curing inherited diseases come true. This is the first time a Science Nobel has been awarded to two women.

Brief work profile of the winners

In 2002, Emmanuelle Charpentier started her research work at the University of Vienna about the bacteria that cause the great harm to Humanity: *Streptococcus Pyogenes*.

In 2006, Jennifer A. Doudna was leading a research group at the University of California, Berkeley and has an vast experience of working with RNA.

In 2011, Emmanuelle Charpentier published the discovery of Trans – Activating CRISPR (Trans RNA) after intensive and targeted experimentations. In 2011, Emmanuelle Charpentier and Jennifer A. Doudna attended a conference on microbiology in Puerto Rico. The second day of the conference, they had their first meeting in a Café in Puerto Rico, which was life changing encounter for both. The astute researchers together started their research work; they decided to simplify the Genetic Scissors using their knowledge about TRACR–RNA and CRISPR–RNA.



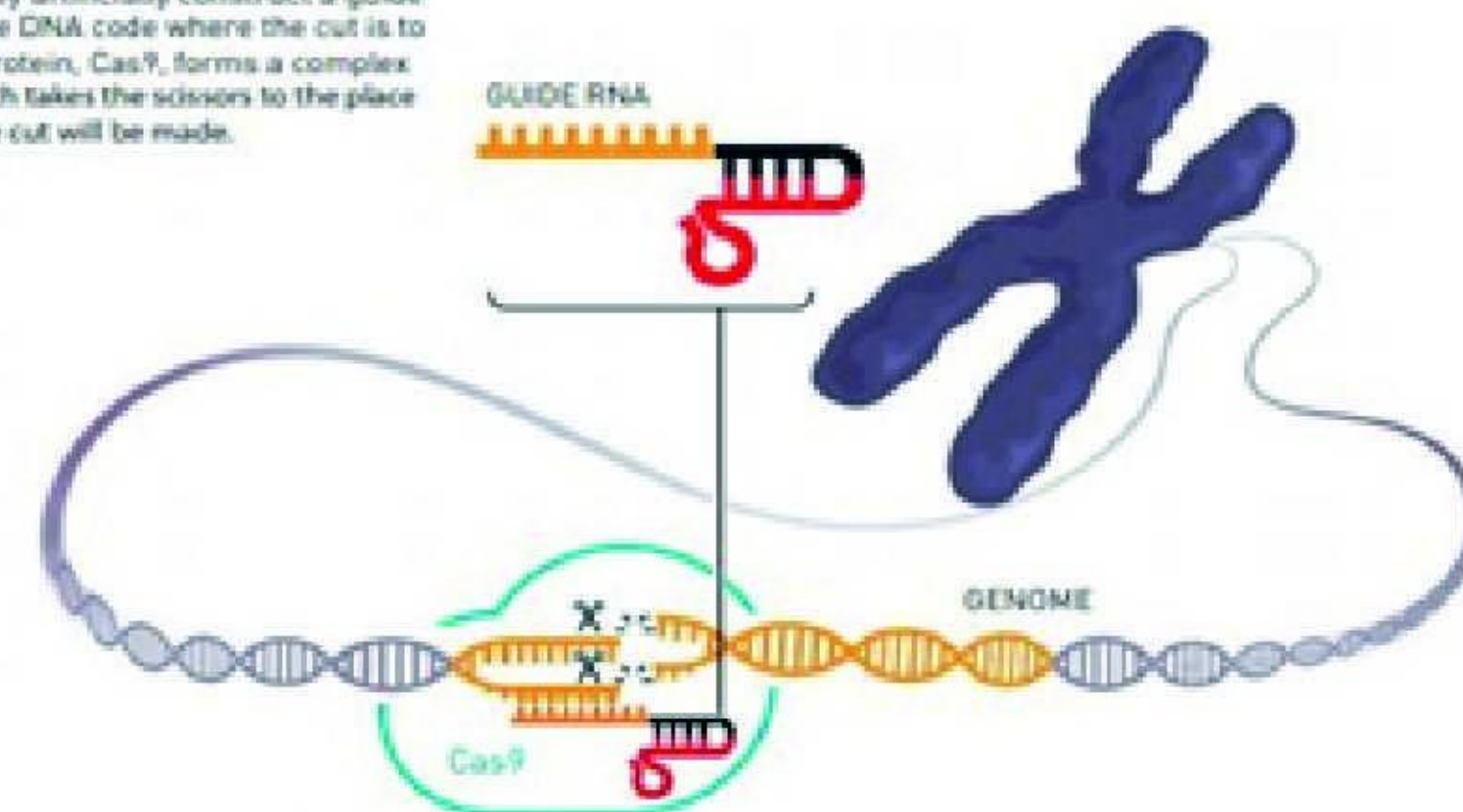
By this time, they already had a Gene in a freezer of Doudna's laboratory and selected five different places where the Gene should be cleaved. Then they changed the CRISPR part of the Scissors, so that its code matches the code where the cuts are to be made, the result was overwhelming, the DNA molecules were cleaved in exactly the right places.

In 2012, Emmanuelle Charpentier and Jennifer A. Doudna published their discovery of CRISPR/CAS9 Genetic Scissors.

Genetic Scissors have also become a standard tool in a Plant Breeding. In Medicine, the Genetic Scissors are contributing to new immune therapies for Cancer. Researchers are already performing clinical trials to investigate whether they can be used in CRISPR/CAS9 to treat blood diseases such as sickle cell anemia and beta thalassemia as well as inherited eye diseases. They are also developing methods for repairing genes of large organs, such as brain and mussels. Animal experiments have shown that specially designed viruses can

The CRISPR/Cas9 genetic scissors

When researchers are going to edit a genome using the genetic scissors, they artificially construct a guide RNA, which matches the DNA code where the cut is to be made. The scissor protein, Cas9, forms a complex with the guide RNA, which takes the scissors to the place in the genome where the cut will be made.



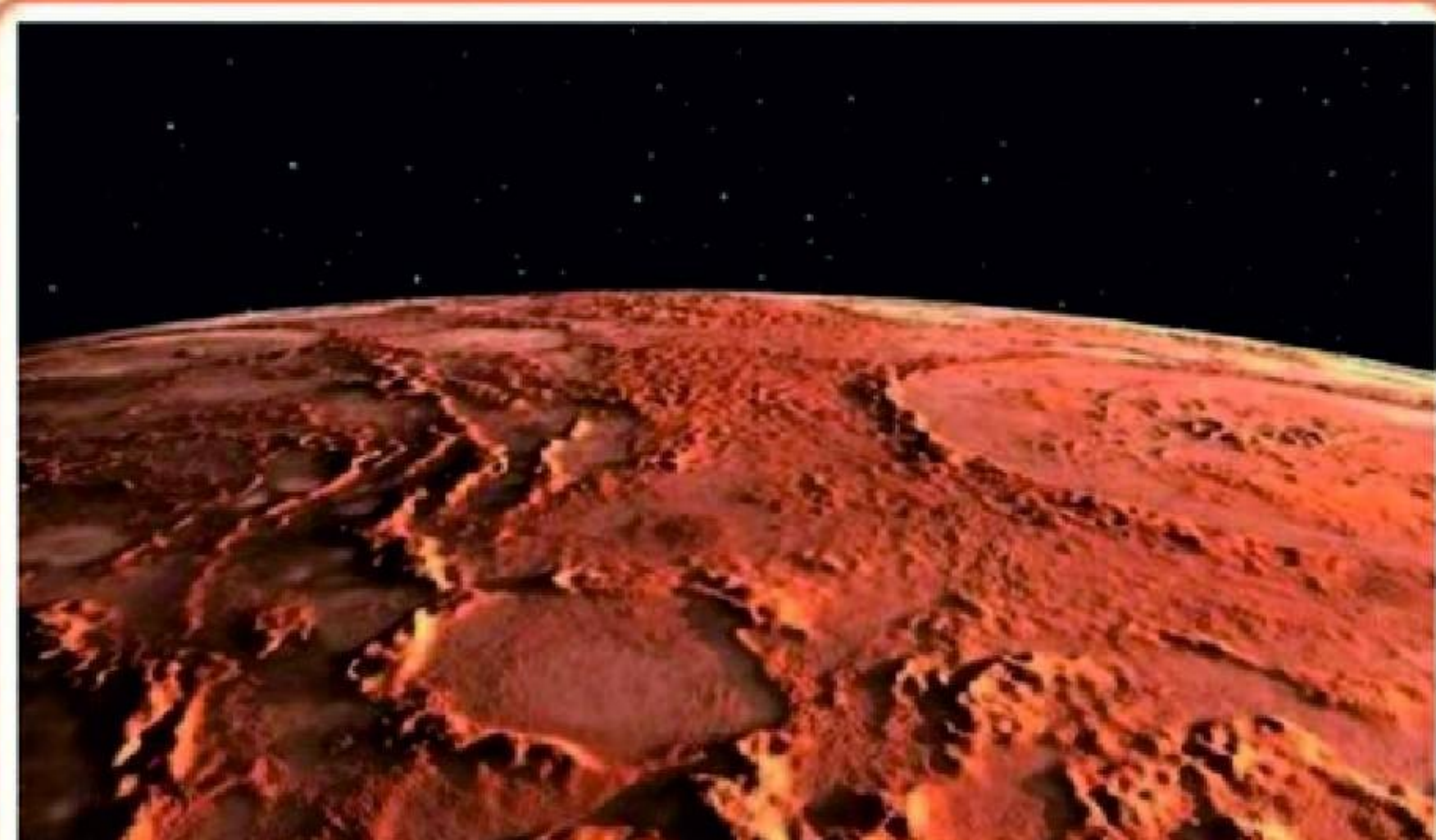
deliver the genetic scissors to the desired cells, treating models of devastating inherited diseases such as muscular dystrophy, spinal muscular atrophy and Huntington's disease.

Emmanuelle Charpentier and Jennifer A. Doudna have developed a chemical tool that has taken life sciences into new epoch. They have made us gaze out onto a vast horizon of unimagined potential promised by this new gene scissors.

References

- Heidi Ledford and Ewen Callaway/Nature 2020, 586,346-347 doi:10.1038/d41586-020-02765-9
- <https://www.nobelprize.org/prizes/chemistry/2020/summary/>

DO YO KNOW?



**The colour of the MARS planet is
RED**

**This red color is due to
its surface contains large
amount of**

IRON OXIDE



**Apple seeds contain a cyanide-and-sugar based molecule called
AMYGDALIN**

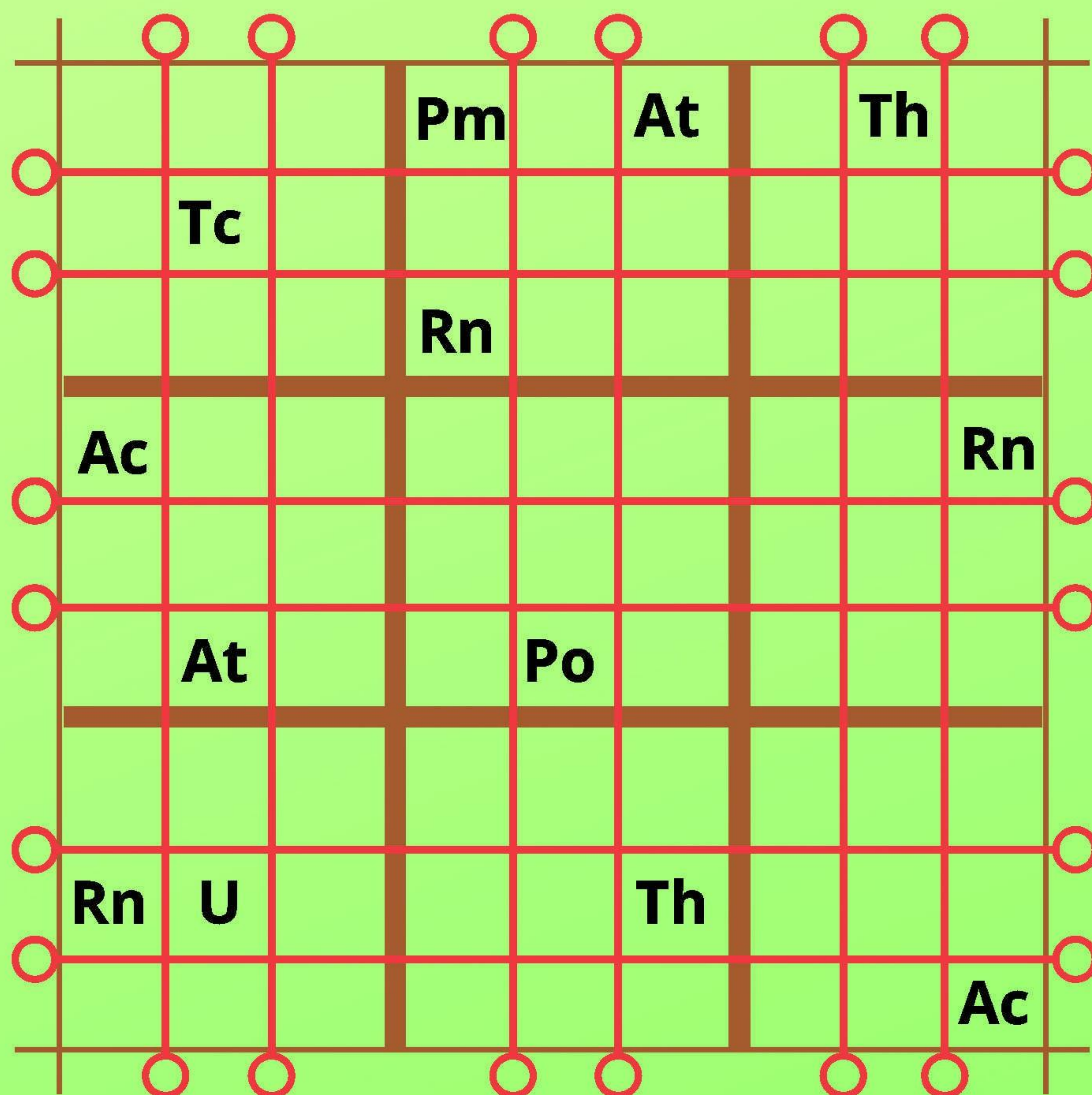
**If the broken seed contact with
human or animal enzymes cut off
the sugar part of the molecule,
become poisonous**

**But don't worry, a bowl of seeds need
to become poisonous for human**

BUCKEL DOWN

SUDOKU

- POONKODI DORATHY J



RULE

Elements can only appear once within each horizontal line, each vertical line and in each box set within bold lines.

Let's Play with` SYNTHETIC ELEMENTS`

Tc - Technetium
Pm - Promethium
Ac - Actinium
U - Uranium
Ra - Radium
Th - Thorium
Po - Polonium
At - Astatine
Rn - Radon

Just use your
loaf to
break these
puzzles

Phosphine gas in Venus

- A. SUNDAR RAJ & S. PAVENTHAN

Venus is the hottest planet in the solar system. The planet has dense atmosphere that acts as a green house and get heat from sunrays and maintain the high temperature close to 465 degrees Celsius. It is more than enough to melt lead. The atmospheric composition is 96.5%-carbondioxide, 3.5%-Nitrogen, >1%-carbon monoxide. Abundant presence of carbondioxide is the reason for the high surface temperature. Under these harsh conditions, we assume that there is no possibility of any living organisms. But recent findings by a group of scientists confirms the presence of phosphine in Venus clouds this creates a new research question that how PH₃ is produced in the inhabitable neighbouring planet.

The hottest planet rains sulphuric acid, with high-air density in the clouds. Humans or any other living organisms will not survive the harsh conditions. The clouds in the distance of .55 km from outer surface of Venus found to have the PH₃ gas. Discovery of Phosphine raises possibility of life in the form of microliving organisms synthesizing phosphine. Venus is a rocky planet like earth. Phosphine gas reacts with oxygen to give phosphorous acid and eventually other phosphate that support existence of micro-organisms. If earth doesn't have life then phosphine cannot be found in Earth's atmosphere

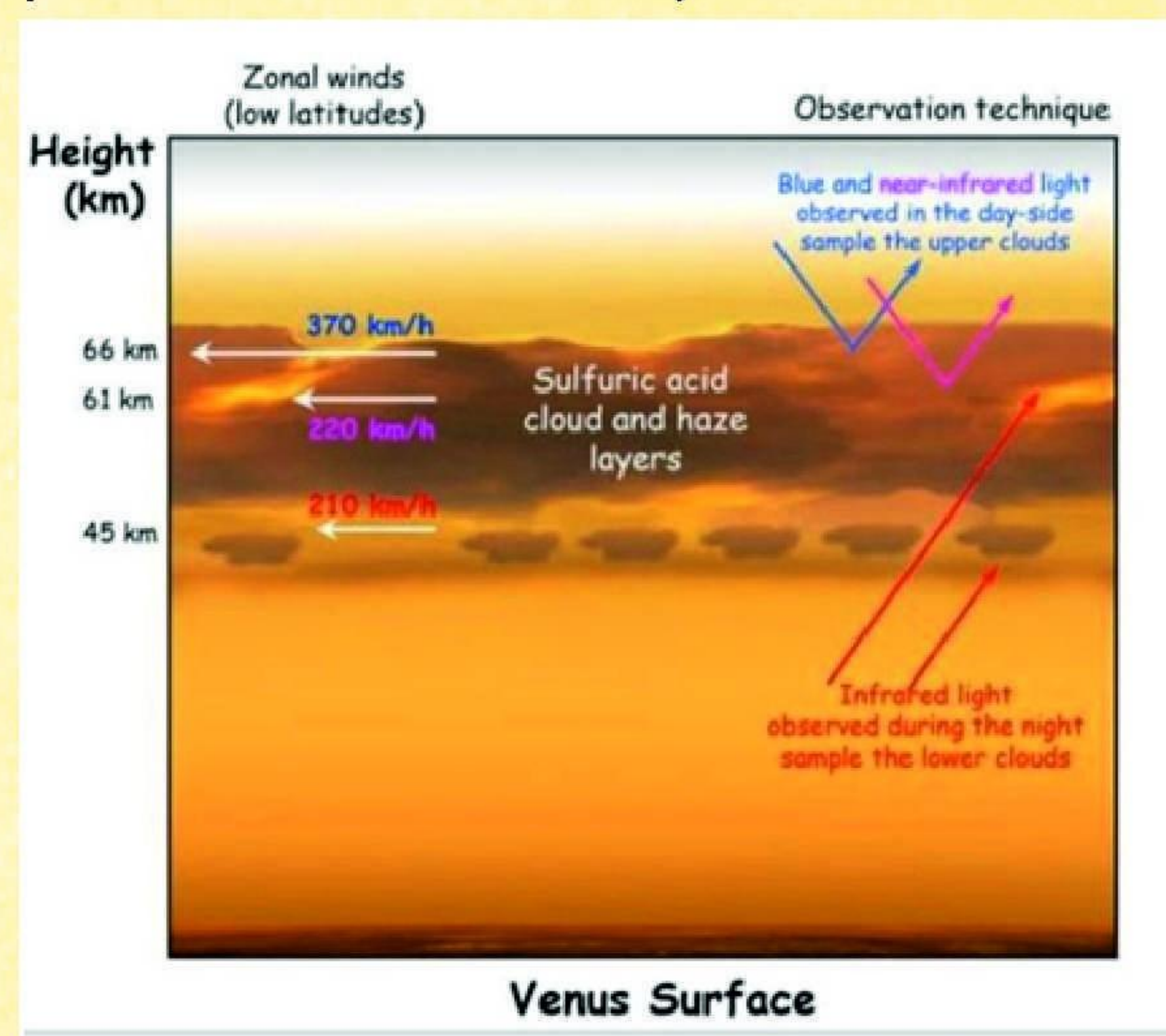
Phosphine gas present in Venus.

How it is possible?

Phosphine is a constituent of the Earth's atmosphere at very low and highly variable concentrations. It may contribute significantly to the global phosphorus biochemical cycle. The most likely source is reduction of phosphate in decaying organic matter, possibly via partial reductions and disproportionations, since environmental systems do not have known reducing agents of sufficient strength to directly convert phosphate to phosphine.

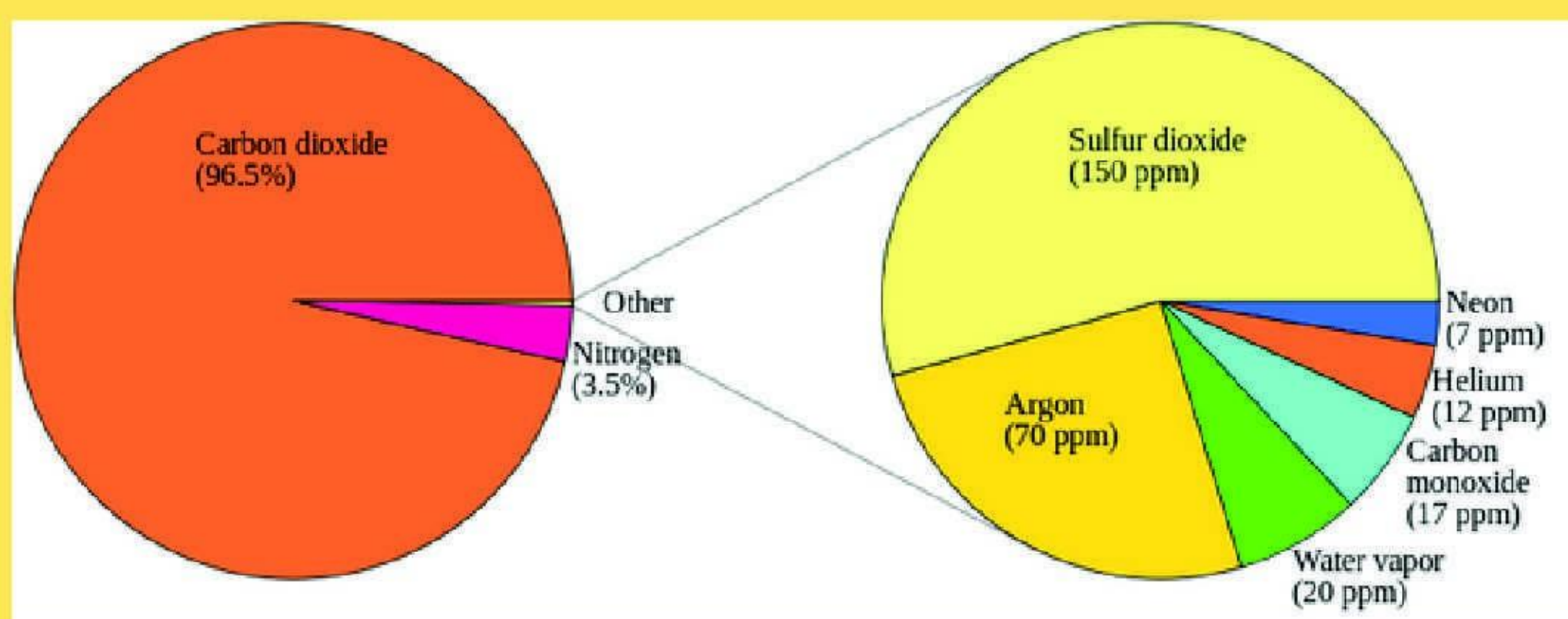
It is also found in Jupiter's turbulent atmosphere, where it forms in the planet's hot interior and reacts with other compounds in the upper atmosphere. The abiotic synthesis of phosphine takes enormous amounts of energy, such as in the planet-sized convective storms of gas giants.

There are some plausible reasons how phosphine gas is produced in Venus. It may be produced by microorganism or venus may contain small different gas molecules which may involves in some physical and chemical reaction to produce phosphine gas. If phosphine is synthesized by microorganism, Venus will be suitable for microorganism living humans cannot survive in Venus due to its extreme atmospheric conditions like high temperature and air density.



Venus interesting facts

- There is no magnetic field in Venus like our Earth. It only has an induced magnetosphere formed by the Sun's magnetic field.
- Venus rotates opposite to the Earth's rotation direction.
- A day on Venus last longer than a year. 243earth days are one day in Venus.
- Venus is the hottest planet in our solar system
- Venus atmosphere contain sulfur dioxide which is toxic for humans and plants.



In a nutshell, phosphine gas may be synthesized by microorganisms in Venus and that tells us that some microorganisms adapt to live in that extreme conditions. In any case identification of PH₃ in the venus clouds is an

LET US LEARN CHEMISTRY!

significant scientific advancement that would invite a lot of chemists, spectroscopic experts and astrochemists to propose theories and eventually perform experiments to prove the mechanism of synthesis of phosphine gas in the adjacent planet.

References

- Greaves, J.S., Richards, A.M.S., Bains, W. et al. Phosphine gas in the cloud decks of Venus. *Nat Astron* 2020. <https://doi.org/10.1038/s41550-020-1174-4>
- <https://astrobites.org/2020/09/21/phosphine-in-venus/>

PERICYCLIC REACTIONS

Pericyclic reactions are defined as the reactions that occur by a concerted cyclic shift of electrons.

A reaction in which one or more groups or atoms transfer from one molecule to another molecule. In this reaction both molecules are joined together by σ (sigma) bond.

A reaction in which a ring is closed (or opened) at the expense of a conjugated double (or triple bond) bond.

ELECTROCYCLIC REACTIONS



GROUP TRANSFER REACTIONS

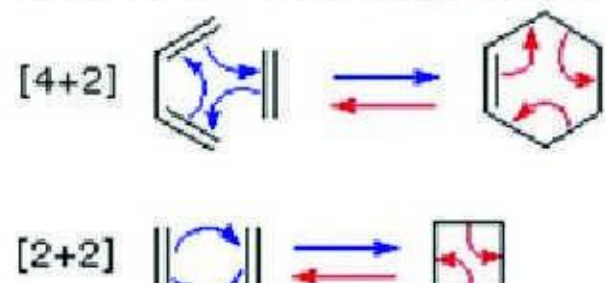
PERICYCLIC REACTIONS

CYCLOADDITION REACTIONS

A reaction in which a σ (sigma) bond formally migrates from one end to the other end of π (pi) electron system and the net number of π bonds remains the same.

A reaction in which two or more π electron systems react to form a ring at the expense of one π bond in each of the reacting partners.

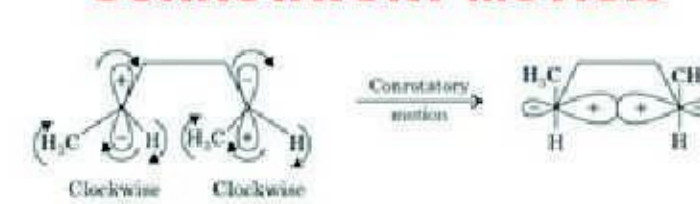
SIGMATROPIC REACTIONS



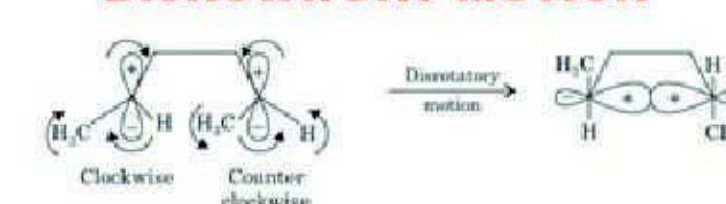
ELECTROCYCLIC REACTIONS

An electrocyclic reaction is the concerted interconversion of a conjugated polyene and a cycloalkene. Electrocyclic reactions are induced either thermally or photochemically. Electrocyclic reactions can be classified into two categories: (i) Electrocyclic opening of the ring, and (ii) Electrocyclic closure of the conjugated system.

CONROTATORY MOTION



DISROTATORY MOTION



No of π electrons	Condition (mode of activation)	Motion
$4n$	(i) Thermal (ii) Photochemical	Conrotatory Disrotatory
$4n+2$	(i) Thermal (ii) Photochemical	Disrotatory Conrotatory

EXAMPLES

Reaction	Electrons	Thermal	Photochemical	
	4	4n	conrotation	disrotation
	6	4n+2	disrotation	conrotation
	8	4n	conrotation	disrotation
	4	4n	conrotation	disrotation
	6	4n+2	disrotation	conrotation
	2	4n+2	disrotation	conrotation
	4	4n	conrotation	disrotation

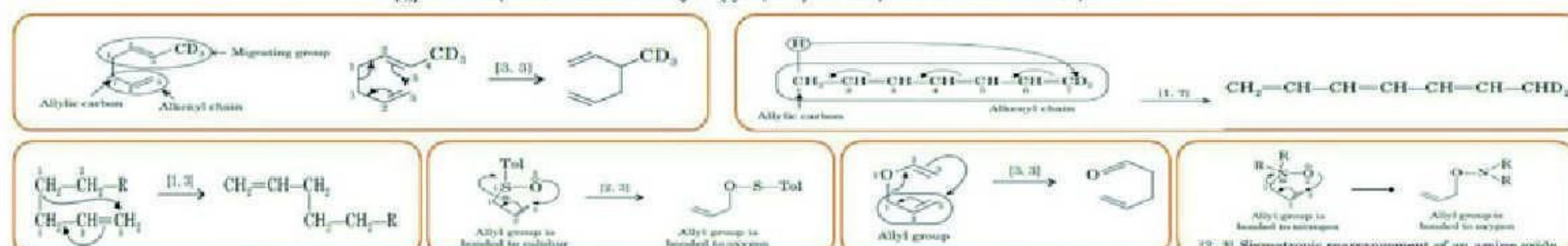
Reaction		n	Electrons	Energy	Observation/Outcome
		1	4	heat	disrotatory
		2	4	light	disrotatory
		3	6	heat	conrotatory
		4	8	light	conrotatory
		5	8	heat	conrotatory
		10	10	heat	disrotatory
		11	10	heat	disrotatory
		12	12	heat	conrotatory

SIGMATROPIC REARRANGEMENT

This rearrangement involves a concerted reorganization of electrons during which a group attached by a σ (sigma) bond migrates to the terminus of an adjacent π (pi) electron system. The reactions are called sigmatropic rearrangement because a σ (sigma) bond appears to move from one place to another during the reaction. There is a simultaneous shift of the π (pi) electrons. The number of the π (pi) and σ (sigma) bonds remain separately unchanged.

NUMBERING THE REARRANGEMENTS

[i,j] indicates position of atom in the migrating group and j indicates position of atom in the alkene chain.



SELECTION RULE FOR [m,n] IN WHICH MIGRATING GROUP IS HYDROGEN

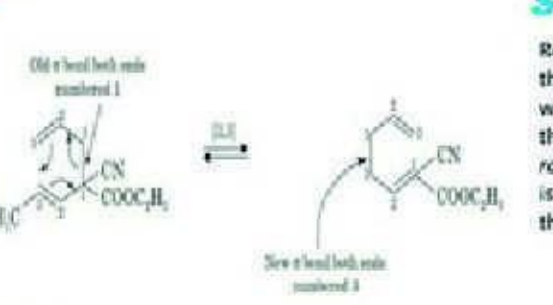
[m,n]	Thermal allowed	Photochemical allowed
4q	Antara	Supra
4q+2	Supra	Antara

SELECTION RULE FOR [m,n] IN WHICH MIGRATING ATOM IS CARBON

[m,n]	Thermal allowed	Photochemical allowed
4q	Antara (i); Supra (i)	Supra (i); Antara (i)
4q+2	Supra (i); Antara (i)	Antara (i); Supra (i)

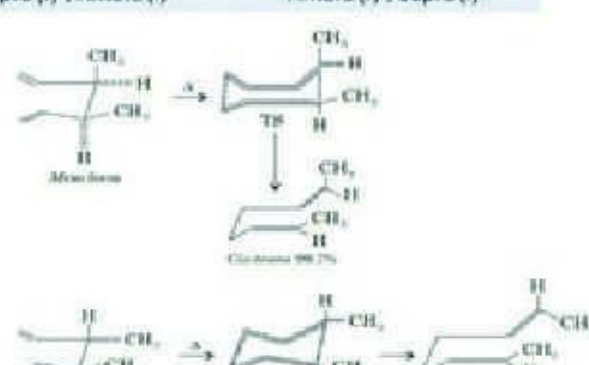
COPE REARRANGEMENT

The most important sigmatropic rearrangement is the [3,3] process involving carbon-carbon bonds. The thermal rearrangement of 1,5-dienes by [3,3] sigmatropic is called Cope rearrangement. The reaction proceeds in the thermodynamically favored direction. This particular reaction is called a [3,3] sigmatropic rearrangement because the new σ bond has a 3,3 relationship to the old σ (sigma) bond.



STEREOCHEMISTRY

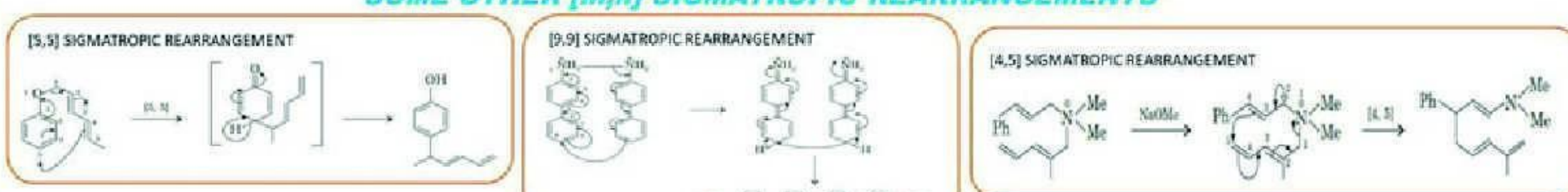
Rearrangement of the meso diene through such transition state then would give the cis-trans isomer while in the case of the rearrangement of the racemic mixture the trans-trans isomer is the major product and this is actually the result.



CLAISEN REARRANGEMENT

Claisen rearrangement is the first sigmatropic rearrangement which was discovered. The original sigmatropic rearrangement occurs when allyl phenyl ether is heated without solvent. The product of the rearrangement is an allylphenol.

SOME OTHER [m,n] SIGMATROPIC REARRANGEMENTS

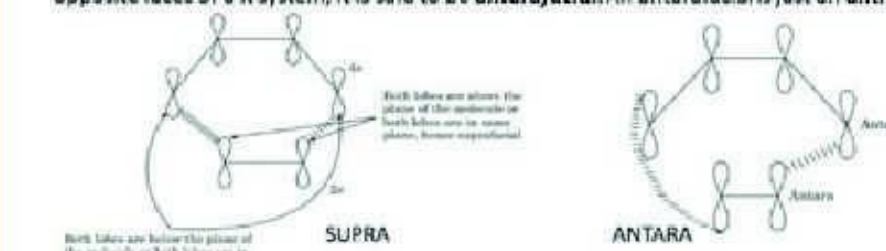


CYCLOADDITION REACTIONS

A cycloaddition is a reaction in which two unsaturated molecules undergo an addition reaction to yield a cyclic product. Formation of cyclic product takes place at the expense of one π (pi) bond in each of the reacting partner and gain of two σ (sigma) bonds at the end of the both components having π (pi) bonds.

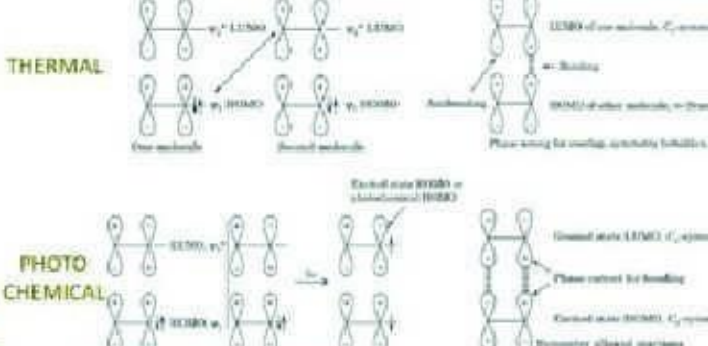
SUPRAFACIAL & ANTARAFACIAL

If reaction occurs across the same face of a π system, the reaction is said to be suprafacial with respect to that π system. The suprafacial is nothing more than a *syn* addition. If the reaction bridges opposite faces of a π system, it is said to be antarafacial. An antarafacial is just an *anti* addition.



[2+2] CYCLOADDITION REACTIONS

Thermal induced [2+2] cycloaddition reactions are symmetry forbidden. Photo induced [2+2] cycloaddition reactions are symmetry allowed.

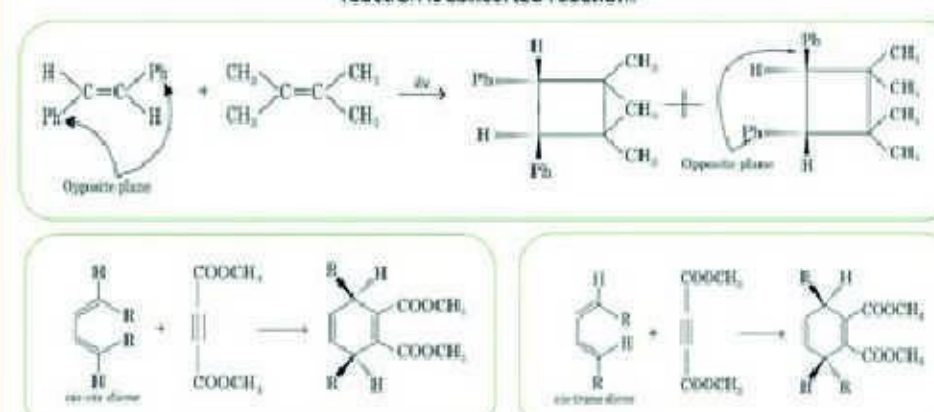


SELECTION RULES FOR CYCLOADDITION REACTIONS

NUMBER OF ELECTRONS	MODE OF ACTIVATION	ALLOWED STEREOCHEMISTRY
$[4n]\pi$	Photochemical	Supra-Supra
$[4n+2]\pi$	Thermal	Supra-Supra

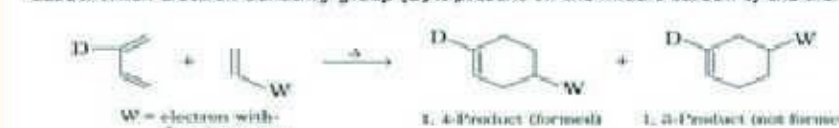
STEREOCHEMISTRY

Stereochemical integrity is maintained in cycloaddition reaction because reaction is concerted reaction.



ORIENTATION EFFECTS IN DIELS ALDER REACTION

Case I: When electron-donating group (ED) is present on the middle carbon of the diene.



Case II: When an electron-drawing group is present at terminal carbon of the diene.



[4+2] CYCLOADDITION REACTIONS

Thermal induced [4+2] cycloaddition reactions are symmetry allowed. Photo induced [4+2] cycloaddition reactions are symmetry forbidden.

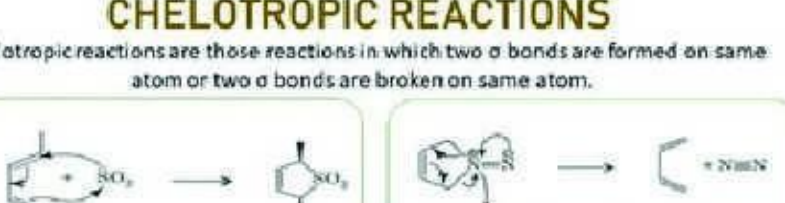


MECHANISM OF DIELS ALDER REACTION



INTRAMOLECULAR DIELS ALDER REACTION

When diene and the dienophile are part of the same molecule then such type of molecule gives Diels-Alder reaction known as intramolecular Diels-Alder reaction.



CYCLOADDITIONS INVOLVING MORE THAN [4+2] ELECTRONS



CHELOTROPIC REACTIONS

Cheletropic reactions are those reactions in which two σ bonds are formed on same atom or two σ bonds are broken on same atom.



WORD SEARCH

- POONKODI DORATHY J

N	A	R	T	L	C	S	L	R	P	K	I	T	S	F	L	Z	S	U	X	W	P	P	G
I	J	I	E	B	I	T	N	E	S	S	A	L	G	R	E	T	A	W	D	Q	Y	S	V
R	K	T	S	M	E	Q	O	H	O	K	W	T	D	X	Y	D	N	F	I	M	P	R	V
I	A	V	F	O	V	C	U	I	W	G	C	Q	B	E	P	X	D	S	J	Y	Q	H	A
P	O	H	G	A	R	Z	I	O	R	A	T	K	F	K	Q	I	U	H	V	U	P	I	W
S	X	B	H	T	K	L	I	Y	R	A	B	A	N	N	I	C	T	R	I	Q	D	E	Z
A	G	L	F	V	G	U	Q	B	R	Z	G	J	B	Y	L	F	Z	C	T	H	X	E	X
C	A	D	J	Z	C	E	O	N	F	D	Z	M	V	U	D	K	K	W	A	C	U	X	R
J	S	C	M	B	H	L	I	Y	A	W	R	C	B	J	Z	S	U	Y	M	L	D	V	A
N	A	S	U	I	I	Y	S	H	G	C	F	S	M	G	I	J	C	K	I	A	L	D	Q
T	G	U	H	C	L	F	L	N	E	A	O	P	X	L	D	C	U	C	N	T	O	E	U
K	G	H	A	B	E	Z	L	C	W	D	L	B	V	M	Q	V	L	Q	C	S	T	V	A
A	N	C	R	U	S	O	A	F	A	U	J	E	C	I	Y	R	D	U	G	D	P	S	F
O	I	B	N	P	A	I	B	Y	R	B	R	V	N	P	C	G	E	N	Y	I	B	I	O
D	H	V	G	T	L	P	H	K	S	E	W	E	Q	A	O	R	I	T	B	S	R	N	R
Q	G	N	X	R	T	D	T	M	P	D	I	Y	A	Z	N	K	W	Z	N	E	K	G	T
T	U	O	F	K	P	L	O	A	X	J	M	L	X	H	A	B	N	V	D	S	L	T	I
E	A	H	A	V	E	L	M	U	I	Q	H	P	O	B	V	Z	L	A	U	O	A	M	S
G	L	S	M	P	T	D	I	C	A	C	I	T	A	I	R	U	M	P	W	M	S	K	O
T	F	A	X	N	E	K	P	E	J	Z	Q	M	R	Y	O	P	W	F	A	R	D	J	L
D	K	W	G	Y	R	B	L	E	A	C	H	O	J	N	Z	S	C	H	X	A	N	M	Q

FIND THE COMMON NAME FOR THE GIVEN CHEMICAL NAME

- | | |
|--------------------------------|-------------------------------|
| 1. Solid carbondioxide | 11. Sodium silicate |
| 2. Methane | 12. Carbamide |
| 3. Mercury | 13. Hydrochloric acid |
| 4. Phenol | 14. Sodium Hydrogen Carbonate |
| 5. Ammonium hydroxide solution | 15. Silcondioxide |
| 6. Lead sulphide | 16. Carbonic Acid |
| 7. Sodium nitrate | 17. Dinitrogen Oxide |
| 8. Mercuric sulphide | 18. Naphthalene |
| 9. Nitric acid | 19. Ascorbic Acid |
| 10. Sodium hypochoiride | 20. Acetyl Salicyclic Acid |

Covid-19 - Unbelievable

- VETRIVENDHAN G AND HARIPRABA S

The whole world is sleeping in the curfew. This is unbelievable. As we said in the title Covid-19 is unbelievable. Because the world had never seen such a "Somnolence". The world had gone through many obstacles, mistakes and diseases. While turning the tragic pages of history, from 1914 to 1918, the world had experienced the tragedy of World War I. In this terror, 2.25 crore innocent people were killed. Then the world had lost its peace. Again when we turn further pages, from 1918 to 1920, the Spanish flu outbreak had taken away 5 crores people's life. Then, in 1929, the world had undergone an economic crisis. Next, in 1933, Nazism, emerged as a single power in the world and paved the way for World War II from 1939 to 1945. The world had never experienced such a catastrophe, about 6 crore people and children were killed at the altar and world resources were devastated. Probably no one wish to read further pages of history, but the history continues, so we continue. In 1952 the world faced the Korean War and in 1964 to 1975 the Vietnam War, the war that lasted for many years. Apart from all these, India is struggling with its own border disputes such as Indo-Pakistan War, Indo-China War. We think 2020's unwelcomed guest is also keen on writing its own pages in the Annals of history. Yes, COVID-19. Actually, the front-line warriors Doctors, Nurses, Hygiene Workers, and Police are Combating with Covid-19 in an open battle ground. The world is indeed indebted to them. Now back to the Headline, Covid-19 is unbelievable. We are in the 21st century. The world is developing at an astounding rate in science, economics and politics. However, Why this much struggle in combating with Covid-19? "Science is developing but our life is Diminishing" In other words "Magicians of Science" –(Scientists) are stumbling to find a cure. We don't know whether it is a failure of science or Scientists? It is a shame that the developed countries are staggering to find a Vaccine.

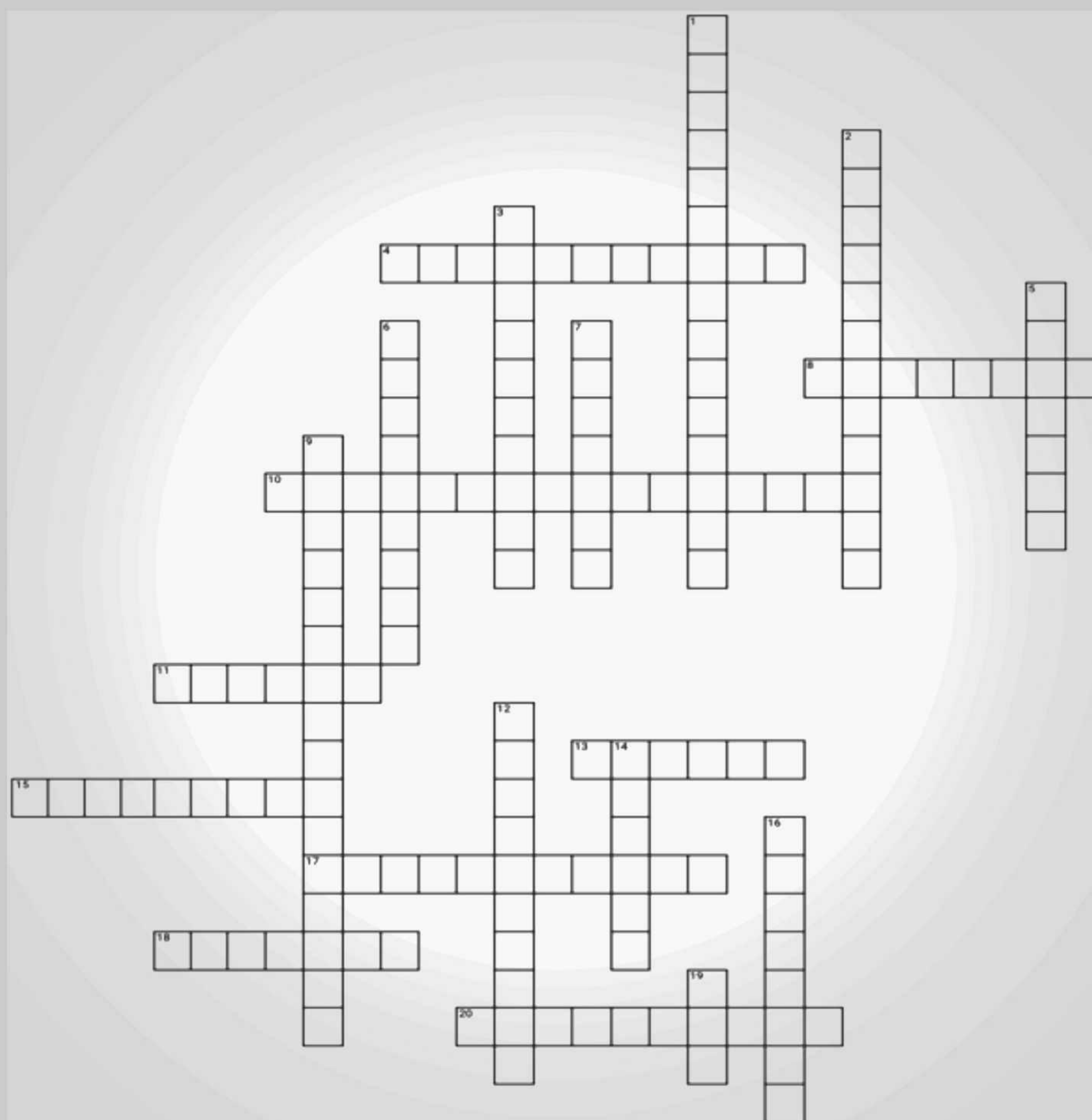


On the other hand, global crime is on the hike. Crimes against women in India have more than doubled over the past year. According to the statistics released by the Indian Ministry of Home Affairs, 90 women are being raped every day and 4,05,861 crimes are being committed against women every year. A Data from the National Crime Records Bureau states that crime has increased by 7% in 2019 compared to 2018. Shockingly, 11,130 Sexual Assault Evidence Collection kits (SAEC) are being used per year in India. In this pandemic situation the human behavior goes antagonistic towards her/his own society. Whom should we blame now? Science or Politics? Or should we blame the concerned people who don't implement both of these properly? All are intertwined. Science and Technology will fascinate us but not to efficacy. That's why we are complaining Science. Ultimately, we can conclude that science can produce a remedy definitely but not immediately. Despite our dissatisfaction with science, we still rely on nature and humanity. One day, that Humanity will give an answer to us and that answer will solace us. Amid pandemic in this new era we are blessed with Food, Electricity, Drinking Water, Wi-Fi and even Netflix at our home when many are struggling to meet daily needs. But we keep on complaining because we need to wear masks and we must stay confined to our homes. All these luxuries are made possible by science. To lead a happy life we don't need a mere comfort zone but a human zone. These may not exist forever but humanity will survive those circumstances and will never lose its joy of living. A small change in our perspective can generate miracles. We should be thankful that we are alive amid pandemic. We should do everything we need in order to protect and help each other. One thing that covid taught us is "Humanity". Show your humanity with Social distancing and Develop your human culture with love. "Sow Love, Reap Humanity" Though the history starts with war, it always ends with love.



WHO AM I?

- NIVEDHA RAJENDRAN & PRESCITTA F



ACROSS

4. I'm a rebellious Fluorine compound and a rare example of stable reagent which provide electrophillic fluorine.

8. I'm a CNS Stimulant, present in all the world's popular drinks as 1,3,7-trimethylpurine-2,6-dione.

10. I'm highly toxic and responsible for the death of some great persons including Alan Turing, the Father of Artificial Intelligence.

11. As I am the major constituent of wood-based paper, I am a favourite compound for book lovers who are all fond of odour of old books.

13. I'm a deadly soda lake located at Africa and I am a bleeding ground during summer. Warning! I will petrify you.

15. Ever wondered on witnessing the bioluminescence seen in fireflies? I'm responsible for it, meaning 'light-bearer'.

17. Once, a whole city in Germany was evacuated due to my accidental release and then nicknamed as "Hell's Dumpster"

18. I'm the universal solvent, Guess my official name.

20. I'm a musty odour alkaloid found in a plant called hemlock as structural motif which killed the philosopher, Socrates.

DOWN

1. I'm used as a rodenticide in earlier days, then popularly called as Prisoner's Poison/ Inheritance powder.

2. I'm the lightest solid; 7.5 times less dense than air; nicknamed as 'Frozen smoke' and 'solid air' 3. I'm a radioactive, man-made element and my name is derived from a Greek word "Tekhnētos" meaning Artificial.

5. I appeared in a daydream of chemist Kekulé as a snake eating its own tail and was discovered by him in the year 1865.

6. I may be hated by the kids because I'm responsible for the burning sensation while eating chillies

7. I'm a terpenoid with a strong earthy odour produced by streptomyces bacteria in soil.

9. I'm the major constituent of gunpowder, naturally found in bat guano in caves. Generally, People call me as "Salt Peter"

12. I'm a retinal protein known for my agility in transmission of signals. If you are fond of Pokémon, you can find me easily!

14. I'm a delight to the eyes for sky watchers; also called as Polar light; Earth's magnetic field defends me from forming in other regions.

16. I'm a 2nd most traded ubiquitous solvent in the world popularly called as 'Wood alcohol'

19. The scientist, Muller got Nobel prize for discovering my high efficiency as insecticide. Later, a massive environment movement arose against me for biomagnifications.



Let's socialize on: Periodic Elements

- POONKODI DORATHY J

I was born on 1817 as a serendipity from the work of scientists Jacob Berzelius and Johan Gottlieb Gahn. When my parents copper and sulphuric acid got engaged, as a token of their love I was born. Rather I was an immature (impurity) one, they are baffled with the fact that not even a single kind of me ever existed. For a brief time I did not have any name, but my properties were similar to TELLURIUM which was named after Greek goddess of Earth, and hence I was named after Greek goddess of Moon. I was pampered by chalcogen (non-metal) family. Although I'm uncommonly found, does exist in relatively pure form, free in nature. I always prefer the states +6, +4, -2 for my bond vacation with my colleagues. After many trials, I emphasized my way in many chemical approaches. During initial stages I was used to decolorize glass, to color glasses as red, and to make the pigment China Red. My resistance depends on the intensity of light falling on me which in turn makes me a good semiconductor.

I find myself in real time applications such as photo cells, polarizer, solar cells etc.,. My salts are used to treat dandruff. My need is not only restricted to the industrial usage, but my presence is nutritiously essential for plants, human beings and microorganisms and in assorted medicinal preparations. In human body I play a critical role in DNA synthesis, the immune system and the reproductive system I'm helping people to fight certain types of cancer. In the preparation of organometallic compounds, as a non-metal I contribute my presence there. Beyond the limit as a chemical substance, I have my own stardom in movies also...If you want to know that stuff, just surf and find me to get an autograph.

Hope you have found my name, If not "I'M SELENIUM".

Though I was born as an impurity, my qualities personify me as a pixie dust I come spinning out of nothingness... But still, like dust, I'll rise...

As fatal as Chemicals - The Beirut Blast

- SIVARAM

WHERE, WHEN, HOW?

A blast took place at the Lebanese capital city of Beirut, on the city's northern Mediterranean Coast on 4th of August 2020. The blast shook the city started with a fire from a warehouse which stored thousands of tons of Ammonium nitrate (NH_4NO_3). The fire caused because of spark from welding works that was carried out on the hole in the warehouse. After the initial fire, followed some series of small blasts that sounded like firecrackers. In about 30 seconds there was a colossal explosion creating a gigantic mushroom cloud into the air and created a supersonic blast wave radiating through the city. The researchers say that the blast was not direct detonation of ammonium nitrate. The process involves the fire caught up by the stored oils. Ammonium nitrate on decomposition releases nitrous oxide and water. Due to the initial fire by the oils, nitrous oxide created small explosion (the pink smoke). Followed by these continuous explosions, the temperature increased which increased the release of more Nitrous oxide. And at a particular time, the ammonium nitrate exploded due to high heat released by the nitrous oxide in a short time.



THE CAUSE

Lebanese PM blamed the officials and the firm that kept the explosive stored in an unsafe manner in the warehouse. Ammonium nitrate arrived to the port on Moldovan-flagged cargo ship MV RHOSUS which docked in Beirut in 2013. After inspection, it was banned from leaving. Later it was even abandoned by its owners. The cargo was transferred to the warehouse following court orders for disposal or resale. This crystal-like white solid can be commonly used as fertilizer for agriculture. But it can also combine with fuel oils to create an explosive which is used in the mining and construction industries.

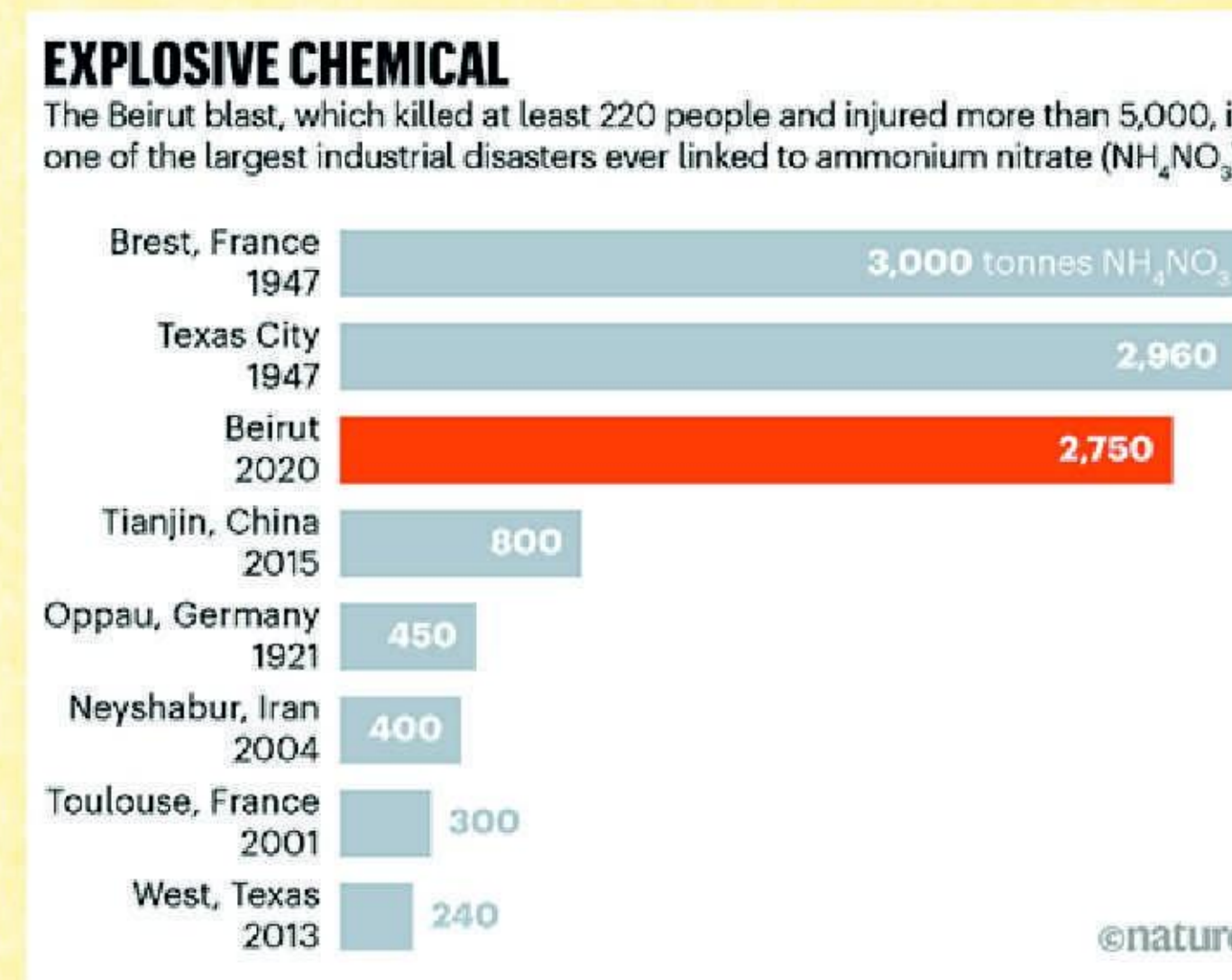


THE BIG BLAST

The blast destroyed dockside area that created a crater about 140m wide which flooded with sea water. The warehouse smashed completely and an adjacent grain silo was heavily damaged. The shockwave blast out windows at Beirut International Airport which is about 9 km away from the port. The sonic boom was also heard as far away as Cyprus, about 200km across the Mediterranean Sea.

IMMEDIATE AIDS & VICTIMS

There were many similar blasts that occurred due to the detonation of Ammonium nitrate in



the recent past. More recently in 2015, Tianjin blast in China but the outcome is half powerful as the most recent. The blast is said to be so dangerous that it is 1/20th of the Atomic bomb in Hiroshima in 1945. The accidental detonation claimed the lives of 190 and left 6000 injured. Offers of International support poured in from Gulf Arabian states, who in the past were major financial supporters of Lebanon. Planes with medical equipment and other supplies were supplied. Iran offered food and a field hospital. The United States, Britain, France, and other western nations, which have been demanding political and economic stability also offered help. This fatal accident teaches us a lesson to look into the safe handling and storage of chemicals.

Beirut explosion: Before and after 4 Aug 2020



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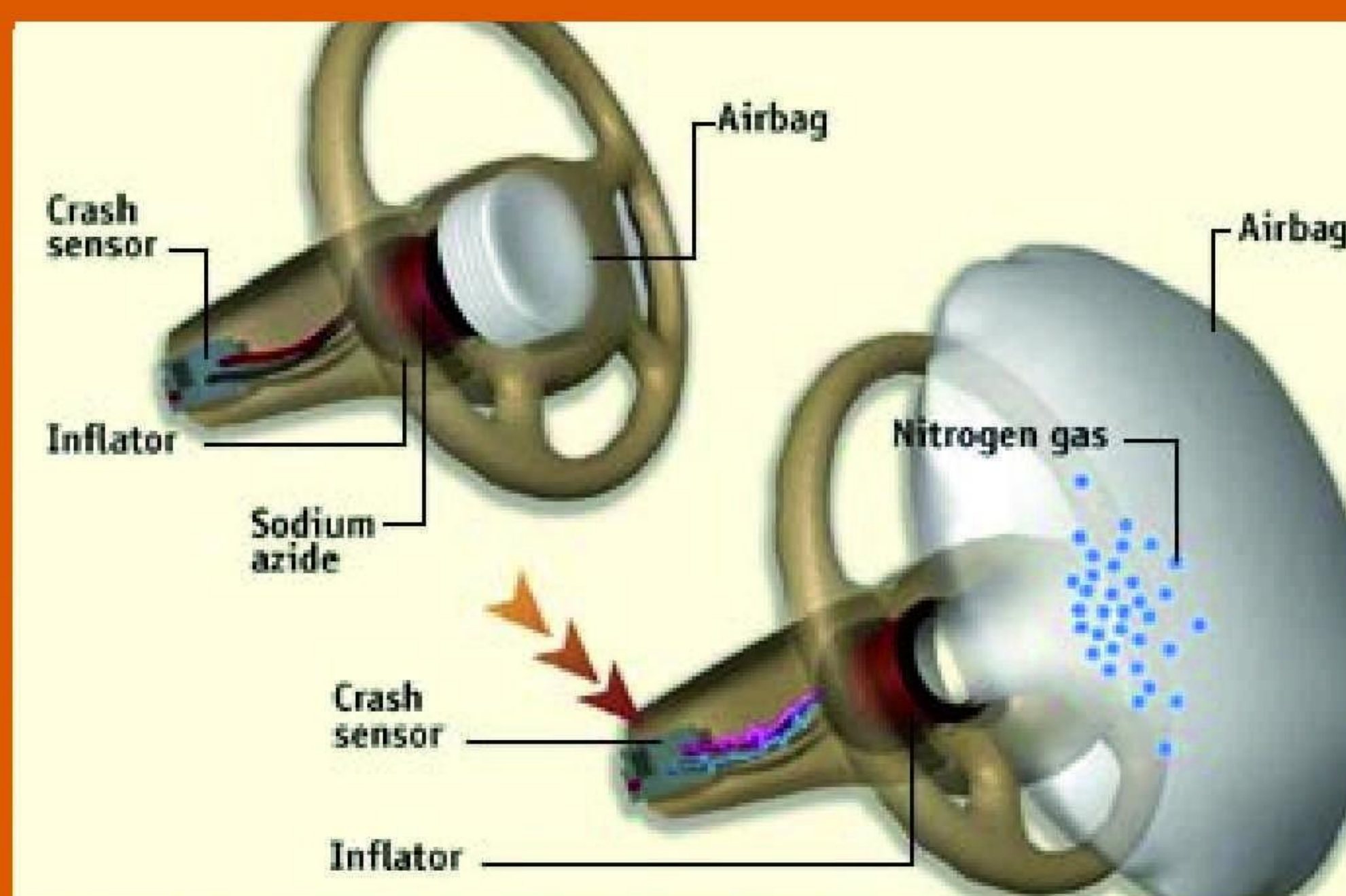
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- <https://youtu.be/zi3eeCpnCYA> - Let's make Education Simple by Vijay Shankar.

DID YOU KNOW?



Unlike many substance
WATER
expands when it freeze

An ice cube have 9% more
volume than water used to
make it



Cor's airbogs filled with very toxic salt called

SODIUM AZIDE

In the event of collision, the cor's sensor triggers on electrical impulse that dramatically rises the temperature of salts in fraction of second and decomposes into harmless nitrogen gas rapidly.

OPPORTUNITIES

Job vacancy for Application Chemist

Location: *Chennai (Head Office), transferable to any branch in India after training.*

Qualification: *Post Graduate (M.Sc. - Chemistry)*

Job profile:

The Job offers excellent opportunity to learn and understand sophisticated analytical instruments. You will be exposed to challenges faced by various industrial sectors in India. You are supposed to work out and offer solutions using your analytical abilities to solve the customers problems. The job involves extensive travelling to various customer locations across India. You are required to use your presentation skills to present the solutions to a group or a crowd. If you have the thirst for achieving more, we encourage you to participate in international conferences and author publications in international journals.

Come join our force of well trained application experts.

References:

<https://www.metrohm.com/en/company/j-detail/%7B4D640AA0-6363-444B-B9D6-BC05EF9BD1D7%7D>

Laboratory Technician

Shree I Hallmarking Centre Sowcarpet, Chennai, Tamil Nadu Employer actively reviewed candidates 5 days ago Urgently hiring

Job details:

Salary: ₹10,000 - ₹15,000 a month

Job Type: Full-time

Number of hires for this role: 1

Qualifications:

- **Experience:**
 - Work, 1 year (Preferred)
 - Total work, 1 year (Preferred)
- **Education:**
 - Bachelor's (Preferred)

Full Job Description:

We are looking for a person with the minimum educational qualification of Bsc Chemistry. You will be working under government licensed Hallmarking Centre. Experience is appreciated, but we are willing to teach you the work too if you are a new comer. Work is related to the Lab work ,everything will be explained during the interview.

Reference:

<https://www.indeed.co.in/m/viewjob?jk=74d24b0c31b354f7&from=serp&prevUrl=https%3A%2F%2Fwww.indeed.co.in%2Fm%2Fjobs%3Fq%3DBsc%2BChemistry%26l%3DTamil%2BNadu>

Production Manager

B.Sc./M.Sc. Chemistry for Pharma Mfg

Vega Biotec Pvt Ltd (Vega group)-Vadodara, Gujarat

Full-time

Vega Biotec Pvt Ltd is a growing finished formulation pharmaceutical manufacturing company having approved Tablet and Capsule sections. We are upgrading to WHO GMP and have the following Opening.

1. Production Manager

Qualification: B.Sc. Chemistry or M.Sc. Chemistry

Experience: Minimum 7 to 10 years in tablet and Capsule department, should be having FDCA approval in Tablet and Capsule section.

Job Profile:

Carry out daily production activities. Documentation as per WHO GMP guidelines like online BMR filing and log book. Ensuring optimum production output.

Job Type: Full-time

Salary: ₹20,000.00 - ₹45,000.00 per month

Experience:

- work: 5 years (Required)
- total work: 5 years (Required)
- Production Management: 3 years (Preferred)
- Production: 3 years (Required)

Education: Bachelor's (Required)

Location: Vadodara, Gujarat (Required)

Reference:

<https://www.simplyhired.co.in/search?q=vacancy+for+bsc+chemistry&job=KzY5ZhKc8dYRus3XNbBMCEeMzGPRUMneaeaaJQ3xoq4c9W6sDIJHNQ>

SPMCIL RECRUITMENT FOR Assistant Manager(Materials)

Qualification is **B.E IN Mechanical/Electrical/Pulp & Paper Technology/Electronics/Printing Technology**. AND Two years Post Graduate degree/ Post Graduate diploma/ MBA in the area of Material Management/ Stores Management/ Purchase/ Operations Management/ Supply Chain Management/Logistics Management. FOR Assistant Manager (R&D).

Qualification: M.sc CHEMISTRY OR B.Tech/B.E. in the Mechanical/ Electrical/ Electronics/ Chemical/ Metallurgy/ Pulp & Paper FOR Assistant Manager (HR).

Qualification: 1st class full time Master's Degree in PM & IR/MSW/ or 1st class two years full time P.G Dip in Management Last date 18.11.20 fee rs 600 for general obc,ews candidate. Rs 200 fee for sc,St candidates. Exam centre Delhi/ Noida/ Gurugram/ Faridabad.

STUDENT'S CENTRE

விழித்திருப்பவனின்
இரவு...

தூக்கம் தொலைந்து
துளிர்க்கத் தொடங்கும்
பல எண்ணங்கள்
தொடர்ந்து பூக்கும்
கிளை எண்ணங்கள் - என
விடியும்வரை விரியும்

விழித்திருப்பவனின் இரவு
நீளமானது !!

தொலைதூரத்து குரைப்பொலி
காற்றில் கலந்து
நிசப்தம் நீக்கி
இருளின் இசையாகும்

விழித்திருப்பவனின் இரவு
அதிசயமானது !!

புத்தகங்கள் புன்னகைக்கும்
ஜன்னல் அண்டவாசலாகும்
பேய்கள்
பேச்சுத்துணைகளாகும் - பின்
சூரியன் உதயமாகும்....

விழித்திருப்பவனின் இரவு
விசித்திரமானது !!

- ரெக்ஸ் ஷான்லீ

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