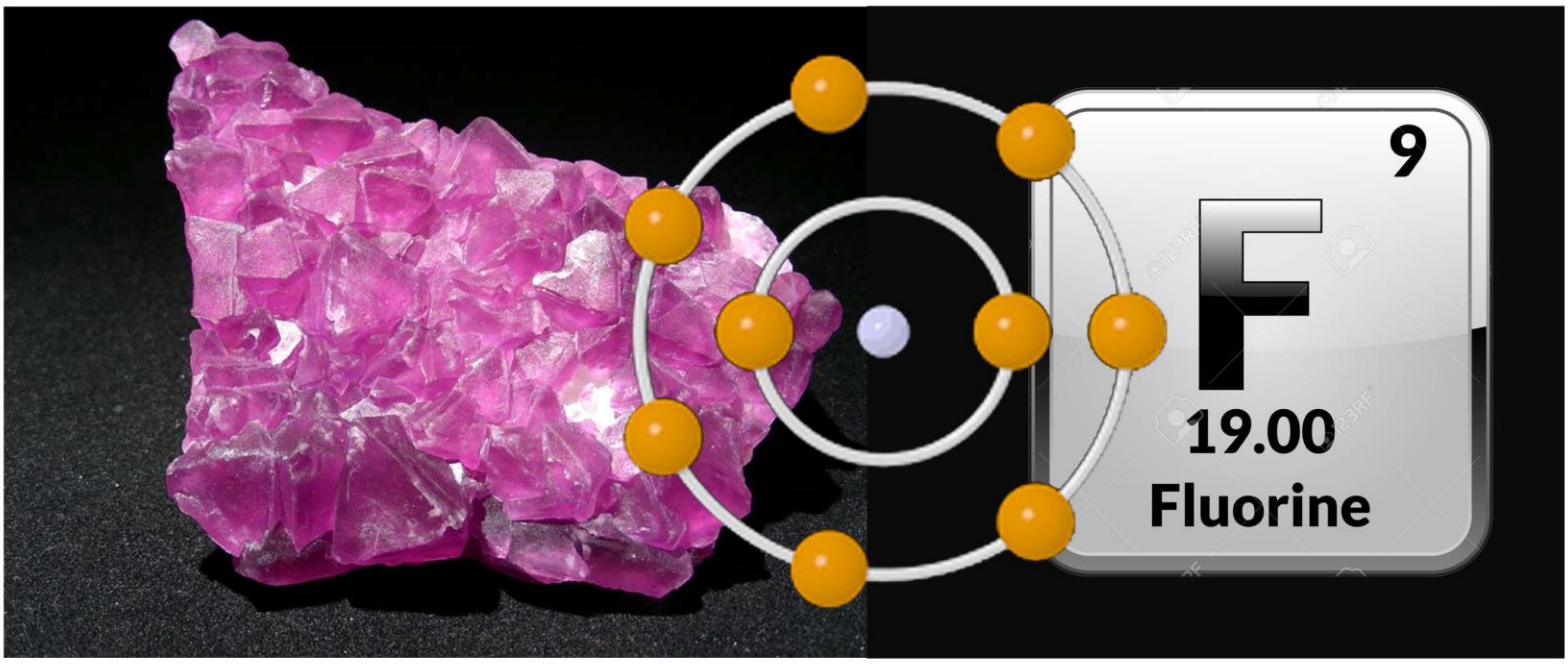
February 2021

Map's

NMCC Chemletter

Department of Chemistry & Research, Nesamony Memorial Christian College,
Kanniyakumari District, Tamilnadu, India

Volume 02 • Issue 02 • Pages 4



Inside This Issue

Scientist & Discovery

Ferdinand Frédéric Henri Moissan (28 September 1852 – 20 February 1907) won the 1906 Nobel Prize in Chemistry for isolating fluorine

Fluorine - The Most Reactive Element

Fluorine is the most reactive substance known. It forms compounds with every element in the periodic table except He, Ne and Ar and it does not occur in the free element in nature. It attacks anything with which it comes into contact. If fluorine gas is allowed to flow over the surface of water, the water actually burns.

$$5F_{2(g)} + 5H_2O_{(l)} \rightarrow 8HF_{(g)} + O_{2(g)} + H_2O_{2(l)} + OF_{2(g)}$$

Wood, plastic, and even some metals burst into white hot, intense flame in an atmosphere of fluorine gas. Even 'fireproof' asbestos burns in fluorine. Fluorine reacts with hydrocarbons to yield products called fluorocarbons that are completely fluorinated; all the hydrogen atoms in the hydrocarbon are replaced by fluorine atoms.

Although fluorine is extremely reactive itself, fluorocarbons are among the most stable compounds known because of the stability of the carbon-fluorine bond. Fluorocarbons are very rare in nature; most are manufactured. They are generally unreactive towards most chemical reagents, inert to solvents and non-flammable. The stability of the carbon-fluorine bond has been used to advantage in certain commercial products. The addition of a single carbon-bound fluorine to certain pharmaceutical compounds improves their potency, because it makes the molecules more difficult for the body to degrade. The anaesthetic halothane is a fluorine containing molecule that was introduced in 1957 as the first modern inhaled anaesthetic. The low toxicity, low flammability and high stability of halothane cost to replace the much more hazardous anaesthetics such as ether ($CH_3CH_2OCH_2CH_3$) and chloroform ($CHCl_3$).

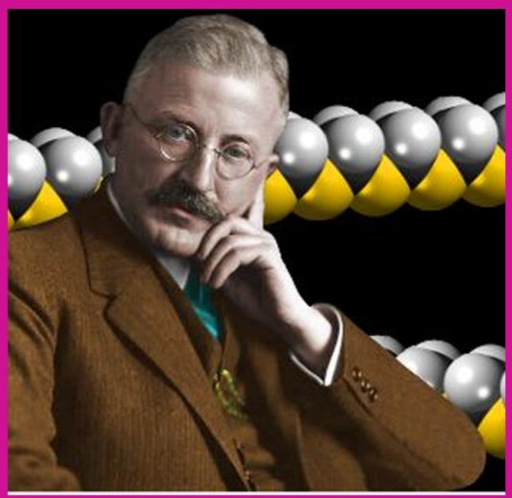
Dr. S. Ginil Mon
Assistant Professor of Chemistry, NMCC

Scientist & Discovery

HERMANN STAUDINGER
1881-1965

He created a revolution among the Organic Chemists by saying there are molecules have very high molecular weight made of hundreds of thousands of small molecules. They couldn't accept his views provoked violent opposition; but later he became the Father of Macromolecular Chemistry.

Hermann Staudinger was born in Worms, Germany in 1881. His father was a professor of philosophy. He loved plants and flowers and he studied Botany after his from graduation from high school in 1899. His father advised him to study chemistry to get a better understanding of botany and later it was his main stream. He studied chemistry at the University of Halle, Darmstatt, Munich and awarded Ph.D. in Chemistry in the year 1903 at the age of 22 under Daniel Varlander. In 1920 he became the Professor of organic chemistry at the Strasbourg University, Germany in 1907. Then he became the Head of Research Institute of Macromolecular chemistry in 1951 until 1956. He wrote many books and published more than 500 papers. He received many honours and awards and got nobel prize in 1953 in Chemistry for his discoveries in the field of Macromolecular Chemistry. He died on September 8,1965. His house was dedicated as the Institute of Macromoleular Chemistry in Freiburg,Germany in april 119,1999. His pioneering theories on polymer, structures of fibers, plastics and research on biological macromolecules formed the basis for modern development in the field of material science and bio sciences.



Dr. N. T. Nevaditha
Head & Professor of Chemistry, NMCC

MCQs

1. Two elements A and B combine to form a compound. If A has 2 and B has 6 electrons in their outermost shell, what will be the formula of the compound?
   a) A_2B b) A_2B_2 c) AB d) AB_2

2. Which of the following is a strong reducing agent?
   a) Cr b) Ca c) Na d) Cl

3. 7.5 g of a gas occupies 5.6 L of volume of STP. The gas is
   a) NO b) N_2O c) CO d) CO_2

4. The ionic product of water will increase, if
   a) pressure is decreased b) ^-OH is added
   c) H^+ is added d) temperature is increased

5. "Oil of mirbane" is otherwise called as
   a) Nitrobenzene b) toluidine c) Benzene d) Toluene

6. Insulin has 51 amino acids in two polypeptide chains, which are cross-linked by
   a) peroxide bond b) disulphide bond
   c) diazo bond d) two carbon-carbon double bonds

7. Gold number of few colloids are given below: Gelatin = 0.005; Starch = 25; Egg albumin = 0.08; Gel Arabic = 0.10. Which is the best protective colloid?
   a) Gel Arabic b) starch c) egg albumin d) gelatin

8. The potential of a hydrogen electrode at pH = 10 is
   a) 0.0 V b) 0.59 V c) -0.59 V d) 0.059V

9. Rayon is chemically called as
   a) cellulose b) cellulose nitrate
   c) cellulose acetate d) resins

10. The class of drugs used for the treatment of stress is
    a) tranquilizer b) antiseptic c) analgesics d) antihistamines

11. Cetyltrimethylammonium bromide is a popular
    a) anionic detergent b) cationic detergent
    c) non-ionic detergent d) sweetener

12. Which of the following statement is not correct?
    a) some antiseptics can be added to soaps
    b) dilute solutions of some disinfectants can be used as antiseptics.
    c) disinfectants are used for sterilization of inanimate objects.
    d) antiseptic medicines can be ingested.

13. Which of the following are not target molecules for drug function in the body?
    a) vitamins b) carbohydrates c) lipids d) proteins

14. Terylene is the polyester of
    a) hexamethylenediamine and adipic acid
    b) vinyl chloride and formaldehyde
    c) melamine and formaldehyde
    d) ethylene glycol and terephthalic acid

15. Arrange the following polymers in the increasing order of intermolecular forces
    a) elastomer < fibre < plastic b) elastomer < plastic < fibre
    c) plastic < elastomer < fibre d) fibre < elastomer < fibre

16. Tincture of Iodine is
    a) aqueous solution of I_2 b) solution of I_2 in aqueous KI
    c) alcoholic solution of I_2 d) aqueous solution of KI

17. Identify the most stable species in the following sets of ions.
    a) $^+CH_3$ b) $^+CH_2Br$ c) $^+CHBr_2$ d) $^+CBr_3$

18. Which conformer is at a minimum energy on the potential energy diagram in the chair-chair inter conversion of cyclohexane?
    a) Boat b) half boat c) twist boat
    d) all conformers are at same energy level

19. The function of boiling the sodium extract with conc. HNO_3 before testing for halogen is
    a) to make the solution acidic b) to make the solution clear
    c) to convert Fe^{2+} to Fe^{3+} d) to destroy CN^- and S^{2-} ions

20. Which of the following compounds has the highest boiling points?
    a) $CH_3CH_2CH_2Cl$ b) $CH_3CH_2CH_2CH_2Cl$
    c) $CH_3CH(CH_3)CH_2Cl$ d) $(CH_3)_3CCl$

21. A compound is decomposed at its boiling point, it is purified by
    a) vacuum distillation b) steam distillation
    c) fractional distillation d) sublimation

22. CCl_4 is used as fire extinguisher because,
    a) of its covalent bond b) of its low boiling points
    c) of its high melting point d) if gives incombustible vapours

23. Which of the following contains acidic hydrogens?
    a) Ethylene b) Ethane c) But-1-yne d) both a and b

24. Chlorobenzene on heating with aqueous NH_3 under pressure in the presence of cuprous oxide gives
    a) benzamide b) nitrobenzene c) aniline d) chloroaminobenzene

25. Testing alkyl halides are practically inert to substitution by SN_2 mechanism because of
    a) insolubility b) instability c) inductive effect d) steric hindrance.

Student's Corner

Chemistry is a fascinating science full of unusual trivia. Some of the most fun and most interesting chemistry facts include:

- The only solid elements that assume liquid form at room temperature are bromine and mercury. However, you can melt gallium by holding a lump in the warmth of your hand.
- Unlike many substances, water expands as it freezes. An ice cube takes up about 9% more volume than the water used to make it.
- If you pour a handful of salt into a full glass of water, the water level will actually go down rather than overflowing the glass.
- Similarly, if you mix half a litre of alcohol and half a litre of water, the total volume of the liquid will be less than one litre.
- There is about 0.4 pound or 200 grams of salt (NaCl) in the average adult human body.
- A pure element takes many forms. For example, diamond and graphite both are forms of pure carbon.
- Many radioactive elements actually glow in the dark.
- The chemical name for water (H_2O) is dihydrogen monoxide.

Student's Corner

..... contd

- The only letter not appearing on the periodic table is J.
- Lightning strikes produce O_3, which is ozone, and strengthen the ozone layer of the atmosphere.
- The only two non-silvery metals are gold and copper.
- Although oxygen gas is colourless, the liquid and solid forms of oxygen are blue.
- The human body contains enough carbon to provide "lead" (which is really graphite) for 9,000 pencils.
- Hydrogen is the most abundant element in the universe, while oxygen is the most abundant element in the Earth's atmosphere, crust, and oceans (about 49.5%).
- The rarest naturally occurring element in the Earth's crust may be astatine. The entire crust appears to contain about 28 grams of the element.
- Hydrofluoric acid is so corrosive that it will dissolve glass. Although it is corrosive, hydrofluoric acid is considered to be a weak acid.
- One bucket full of water contains more atoms than there are buckets of water in the Atlantic ocean.
- Helium balloons float because helium is lighter than air.
- Bee stings are acidic, while wasp stings are alkaline.
- It's possible to die from drinking too much water.
- Dry ice is the solid form of carbon dioxide (CO_2).
- Liquid air has a bluish tint, similar to water.
- You can't freeze helium simply by cooling it to absolute zero. It will freeze if you apply extremely intense pressure.
- By the time you feel thirsty, you've already lost about 1% of your body's water.
- Mars is red because its surface contains a lot of iron oxide or rust.
- Sometimes, hot water freezes more quickly than cold water. A high school student documented the effect, which bears his name (the Mpemba effect).

Gibina Mol S
Research Scholar in Chemistry

Answers - January 2021 Issue

1) c	2) b	3) c	4) c	5) a
6) a	7) b	8) c	9) a	10) c
11) c	12) b	13) b	14) d	15) a
16) b	17) a	18) c	19) d	20) b
21) a	22) d	23) b	24) a	25) b

Staff Corner

STORY OF FINGER PRINT TRACING

While we touch the smooth surfaces using hand, our finger prints deposit on the surface. This is because our hands are studded with sweat pore containing 99% water and 1% of oil, fatty acids, esters, amino acids and salts. Interestingly oil/fatty acids of an adult are relatively larger and are saturated ester lasting on the surface for over several days perhaps finger print of a toddler being smaller fatty acid are volatile and subsequently vanish within 24hour.

TRACING THE FINGER PRINT

METHOD 1: SPRINKLING OF POWDER. Carbon powder/fluorescent powder sprinkled on the finger print yielding a ridges pattern visible by sticking to it.

METHOD 2: IODINE METHOD. Upon heating Iodine, it sublimes and reacts with the carbon-carbon double bond of fatty acids present in sweat forming yellow-brown colored finger print visible

METHOD 3: NINHYDRIN METHOD. Ninhydrin undergoes a complex reaction with aminoacid present in sweat and subsequently forming a purple colored compound exhibiting the image of the finger print.

Dr. K. Rajakumar

Source reference: Raymond Chang, (2019), Chemistry (ninth edition), New York, Mc Graw Hill

To submit this quiz online

Scan the QR Code

Or

Use the Link Below

https://forms.gle/zHormNnN3FNkenu58

The Publishers

All matters regarding the newsletter, copyright and publication of similar editions in any subject/region can be entertained through:

The Editor - Newsletters

Mizpah Academic Publications

MAP International

mapmizpub@gmail.com

Alumni's Space

Cycling is a best exercise which keeps us healthy and stay fit. The overall commonly known benefits of cycling

- Low impact – it causes less strain and injuries than most other forms of exercise.
- A good muscle workout – cycling uses all of the major muscle groups as you pedal.
- Easy – unlike some other sports, cycling does not require high levels of physical skill. Most people know how to ride a bike and, once you learn, you don't forget.
- Good for strength and stamina – cycling increases stamina, strength and aerobic fitness.
- As intense as you want – cycling can be done at very low intensity to begin with, if recovering from injury or illness, but can be built up to a demanding physical workout.
- A fun way to get fit – the adventure and buzz you get from coasting down hills and being outdoors means you are more likely to continue to cycle regularly, compared to other physical activities that keep you indoors or require special times or places.
- Time-efficient – as a mode of transport, cycling replaces sedentary (sitting) time spent driving motor vehicles or using trams, trains or buses with healthy exercise

Cycling: Cycling is mainly an aerobic activity, which means that your heart, blood vessels and lungs all get a workout. You will breathe deeper, perspire and experience increased body temperature, which will improve your overall fitness level.

The health benefits of regular cycling include: increased cardiovascular fitness, increased muscle strength and flexibility, improved joint mobility, decreased stress levels, improved posture and coordination, strengthened bones, decreased body fat level, prevention or management of disease, reduced anxiety and depression.

Chemistry aspects of cycling:

One of the benefits of cycling is that it boosts the production of feel-good chemicals such as serotonin and dopamine (serotonin is a hormone which changes our mood of feelings; dopamine is neurotransmitter). Oxygen consumption ability is improved in our body. Oxygen is a main element which is present in our day-to-day life it prevents from some of the breathing diseases. Endorphins are released. When you exercise, your body releases chemicals called endorphins. Endorphins then interact with the receptors in your brain to reduce your perception of pain. Endorphins also trigger a happy feeling within your body that are accompanied by a more positive outlook on life.

We all generally know that we lose up fat and gain carbohydrate but there cyclic process accompanied in that chain reacting. During cycling our body generates heat ($\Delta T\uparrow$) thus due to increase of heat the heat is capable of burning the fat and then the gain of energy. and again when you had burnt all the fat in our body then the cyclic process starts to store energy in your body.

A series of chemical reactions metabolizes glucose in a step wise fashion, releasing ATP at each step. When adequate oxygen is available, the glucose is completely converted into carbon dioxide and water. However, when you are cycling intensely, are anaerobic, there is not enough oxygen you need, the process stops at the production of lactic acid. It then accumulates in the muscles and the bloodstream

Sree Reshmi S R
M.Sc. Chemistry 2018-2020

Instructions

Kindly use the link given to submit this quiz online on or before 15th of March, 2021

Regular participants can enter the yearly quiz fest which will have participants from all regions. Winners will move forward to compete for Universal Trophies organized by the MAP International.

The Publisher's decision will be final.

The Editorial Board

The Editorial Board

All issues regarding the contents of this newsletter can be entertained through: The Department of Chemistry & Research, Nesamony Memorial Christtian College, Marthandam, Kanniyakumari District, Tamilnadu, India

Dr. S. Ginil Mon (therocksgm@yahoo.com)