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Map's

NMCC Chemletter

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

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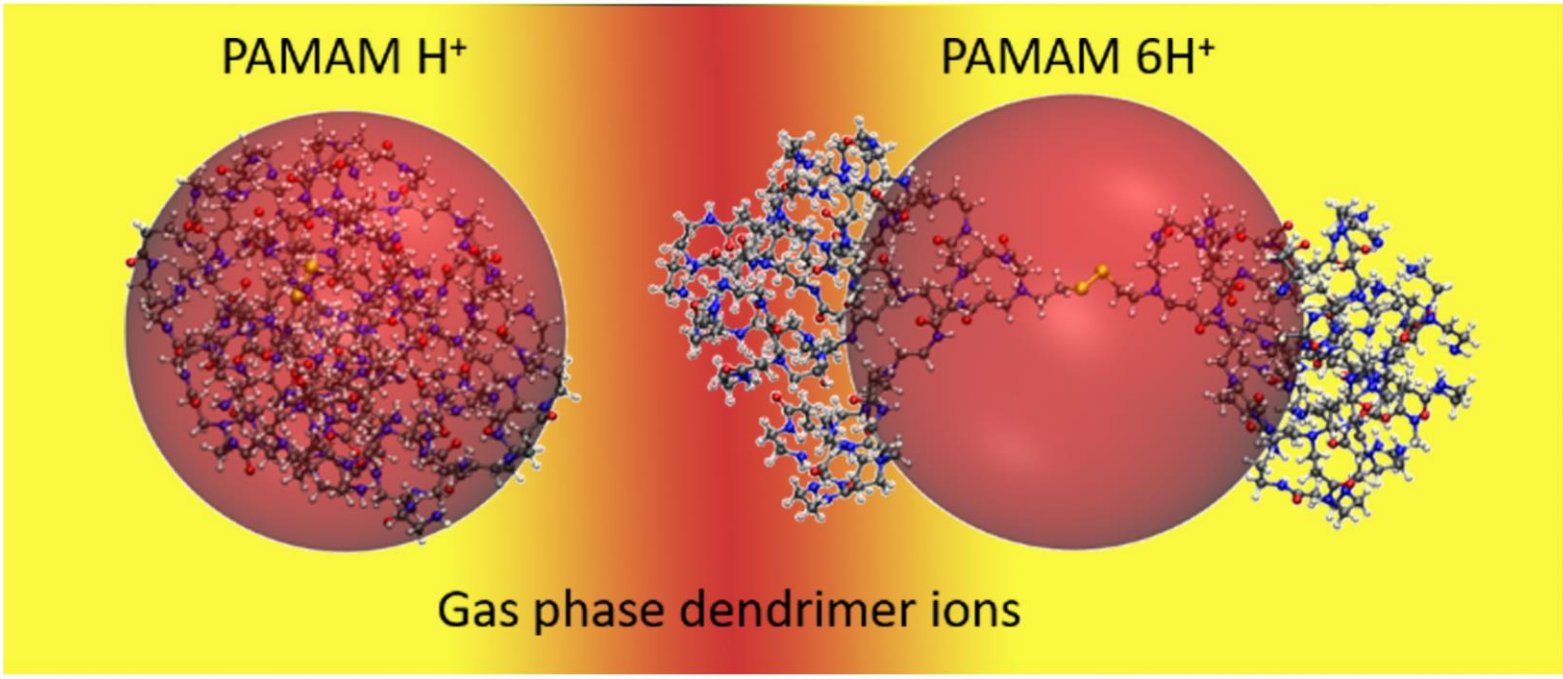

Gas phase dendrimer ions

Inside This Issue

Campus News

Valedictory Function of UG and PG Chemistry
31st March, 2021

DENDRIMER- A fighter flight of Human illness

Dendrimers are hyperbranched polymeric macromolecules with distinct design. The word derived from the Greek word 'Dendron' which means 'tree like array'. They are specially called as Cascade molecules. A typical dendrimer comprised of key topological parts such as core unit, branching units and multiple peripheral functional groups. There are two important synthetic methodologies, convergent and divergent pathway. Dendrimers are also classified by generation, which refers to the number of repeated branching cycles. The first synthesized novel class of dendrimer was polypropyleneimine dendrimer by Fritz Vogtle in 1978. The renowned dendrimers are Tomalia's PAMAM dendrimer, Newkome's Arborol, Frechet & Hawker's polyarylether dendrimer and so on.

In modern era, many scientists are attracted towards it, due to their biomedical applications because of their peculiar features including: a hyperbranching, well-defined globular structures, outstanding structural uniformity, multivalency, flexible chemical composition and high biological compatibility. Dendrimers have the potential to change the pharmacokinetic and pharmacodynamic (PK/PD) profiles of a drug. Dendrimers are not only capable of delivering drugs or diagnostic agents to desired sites by encapsulating or conjugating them to the periphery, but also have therapeutic efficacy in their own.

Recently, the asymmetric polyamide nanofilm with highly ordered nanovoids was successfully fabricated for water purification. A pilot investigation against MERS-CoV has been established using anionic and cationic PAMAM dendrimers. Dendrimer based nanotherapeutics will be the eye-opener for many threatening human ailments in future.

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

Alumni's Space
The Aroma of Ester

"The value of a college education is not the learning of many facts, but the training of mind to think". -Albert Einstein

Before seven years, when I first stepped into NMCC, my mind was full of queries as I was a Keralite and first time studying in an institute in Tamil Nadu. Would I be able to complete my two years of PG successfully? Happy to say that I was proved wrong. Two years passed away too soon and I stepped out from there as a post graduate.

The guidance provided by the staff is worthy to be mentioned. Just like thermal cracking, by their magical way of teaching, even the most difficult topics became simpler ones. Initially the days with practical classes were felt as a burden, which was very difficult to carry. But gradually we began to get in with the laboratory apparatus. Without our lab assistants, that was impossible. The aroma of ester is still in our nose.

We understood the exact meaning of research during our project days. Each time we failed, our guide, Ginil sir will come with new suggestions to overcome it. The pin drop silence in Selvin sir's class, long derivations of Bella ma'am, research methodology of Jeba ma'am…. it's hard to believe that seven years have passed.

Class seminars, quiz competitions conducted by our department, International Conference held at Tirunelveli, all this served as an excellent platform for us to explore the world of Chemistry. Yes, the classrooms of NMCC have trained our minds to think.

Mrs. J. Annie Antex
M.Sc, B.Ed..
Teacher
Sacred Heart HSS Padanthalumoodu
M.Sc. 2014 - 2016

MCQs

1. An ester used as medicine is
   a) Ethyl acetate b) methyl acetate
   c) methyl salicylate d) ethyl benzoate

2. The function of haemoglobin is to
   a) Help in muscular movement
   b) Store oxygen unit as it is needed for energy reproduction
   c) Transport oxygen from lungs to various tissues through blood strean
   d) Catalyse biochemical processes

3. The turbidity of a polymer solution measures
   a) The light scattered by a solution
   b) The light absorbed by a solution
   c) The light transmitted by a solution
   d) None of these

4. Which of the following species is paramagnetic in nature?
   a) Carbonium ion b) free radical c) carbine d) nitrene

5. Reduction of aromatic nitro compounds using Fe and HCl gives
   a) Aromatic oxime b) aromatic hydrocarbon
   c) aromatic primary amine d) aromatic amide

6. Phenol is heated with phthalic anhydride in presence of conc. H_2SO_4. The product gives pink colour with alkali. The product is
   a) Phenolphthalein b) Bakelite
   c) salicylic acid d) fluorescein

7. The reaction of toluene with Cl_2 in the presence of $FeCl_3$ gives predominantly
   a) Benzoyl chloride b) benzyl chloride
   c) o- and p-chlorotoluene d) m-chlorotoluene

8. Pure methane can be produced by
   a) Wurtz reaction b) Kolbe's electrolytic method
   c) sodalime decarboxylation d) reduction with H_2

9. The kind of valency that exists in CaH_2 and C_2H_2 is
   a) Electrovalency in CaH_2 and covalency in C_2H_2
   b) Electrovalency in both
   c) Covalency in CaH_2 and electrovalency in C_2H_2
   d) Covalency in both

10. The pollutants which come directly in the air from sources are called primary pollutants. Primary pollutants are sometimes converted into secondary pollutants. Which of the following belongs to secondary air pollutants?
    a) CO b) Hydrocarbon
    c) Peroxyacetyl nitate d) NO

11. The process of isolation of metals by dissolving the ore in a suitable chemical reagent followed by precipitation of the metal by a more electropositive metal is called
    a) Hydrometallurgy b) zone refining
    c) electrorefining d) electrometallurgy

12. Which of the following is not expected to show paramagnetism?
    a) $[Ni(H_2O)_6]^{2+}$ b) $Ni(CO)_4$ c) $[Ni(NH_3)_4]^{2+}$ d) $[Co(NH_3)_6]^{2+}$

13. The colour of light absorbed by an aqueous solution of $CuSO_4$ is
    a) orange-red b) blue-green c) yellow d) violet

14. Boric acid is called acid because its molecule
    a) contains replaceable H^+
    b) gives up a proton
    c) accepts OH^- from water releasing proton
    d) combines with proton from water molecule.

15. The electronic configuration of metal M is $1s^2, 2s^2, 2p^6, 3s^1$. The formula of its oxide would be
    a) MO b) M_2O c) M_2O_3 d) MO_2

16. Ortho and para-hydrogens differ in the
    a) number of protons b) molecular weight
    c) nature of spin of protons d) nature of spins of electrons

17. Flux is used to
    a) remove all impurities from ores.
    b) reduce metal oxide
    c) remove silica
    d) remove silica and undesirable metal oxide

18. Which pair of electrons has same chemical properties?
    a) 13, 22 b) 3, 11 c) 4, 24 d) 2, 4

19. In a hydrogen-oxygen fuel cell, combustion of hydrogen occurs to
    a) generate heat
    b) create potential difference between two electrodes
    c) produce water of high purity
    d) remove adsorbed oxygen from electrode surfaces

20. Separation of colloidal particles from those of molecular dimensions by means of electric current is known as
    a) electro osmosis b) electrophoresis
    c) electrodialysis d) electrolysis

21. Surface area per gram of the adsorbent is called
    a) molar surface area
    b) normal surface area
    c) specific surface area
    d) equivalent surface area

22. The unit of second order rate constant is
    a) mol $dm^{-3}s^{-1}$ b) s^{-1} c) $dm^3mol^{-1}s^{-1}$ d) None of these

23. A current of 2 A is passed for 5 h through a molten tin salt to deposit 22.2 g tin. What is the oxidation state of tin in salt? (At. Wt. of Sn = 118.69 g)
    a) +2 b) +5 c) +3 d) +4

24. The oxidation number of sulphur in S_8, S_2F_2 and H_2S respectively are
    a) 0, +1 and -2 b) +2, +1 and -2 c) 0, +1 and +2 d) -2, +1, -2

25 Which species possesses negative value of specific heat?
    a) Ice b) water
    c) vapour d) saturated vapours

Student's Corner

HYPERTONIC SOLUTION

We come across different kinds of solution in our day-to-day Life. Have you ever wondered what a Hypertonic Solution is? Well, let's see what such a solution is in the following.

Hypertonic refers to a solution with high osmotic pressure than another solution. In other words, a hypertonic solution is one in which there is a greater concentration or number of solute particles outside a membrane than there are inside it.

Movement of Water in Hypertonic Solutions:

Water moves across a semi-permeable membrane. Water moves to equalize the concentration of solute particles. If the solutions on either side of the membrane are isotonic, water moves freely back and forth. Water moves from hypotonic side of the membrane to hypertonic side. The direction of the flow continues until the solutions are Isotonic.

Hypertonic Example:

Red Blood Cells are the classic example to explain Tonicity. When the concentration of salts(ions) is the same inside the blood cell as outside of it, the solution is isotonic with respect to the cells, and they assume their normal shape and size. If there are fewer solutes outside the cell than inside it, such as would happen if we place red blood cells in fresh water, the solution is hypotonic with respect to the interior of the red blood cells. The cells swell and may burst as water rushes into the cell to attempt to make the concentration of the interior and exterior solutions the same. Incidentally, since hypotonic solutions can cause cells to burst, this is one reason why a person is more likely to drown in fresh water than in salt water. It's also a problem if we drink too much water. If there is high concentration of solutes outside the cell than inside it, such as would happen if we placed red blood cells in a concentrated salt solution, then the salt solution is hypertonic with respect to the inside of the cells. The red blood cells undergo crenation, which means they shrink and shrivel as water leaves the cells until the concentration of solutes is the same both inside and outside the red blood cells.

Uses of Hypertonic Solutions:

Manipulating the tonicity of a solution has practical applications. For example: Reverse Osmosis may be used to purify solutions and desalinate seawater.

Hypertonic solutions help to preserve food. For example, packaging food in salt or pickling it in a hypertonic solution of sugar or salt creates a

contd.....

Answers - March 2021 Issue

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

Staff Corner

What is Free Energy ?

Chemical reactions which give away heat can be made to do useful work. Taking an example, the energy coming out during the combustion of coal can be used in a power station to run a generator. At first point, we might expect that the energy available to do useful work would be given by the symbol ΔH. It turns out, in fact, that ΔG, not ΔH, gives the maximum amount of energy available. ΔG, the free energy change, gives us the "quantity of chemical energy free to do useful work", and that is how it gets the name. In fact, the actual quantity of work obtained is always less than ΔG, so the free energy represents the maximum amount of useful work available.

Dr. K. Raja Kumar
Assistant Professor of Chemistry, NMCC

To submit this quiz online
Scan the QR Code
Or
Use the Link Below

https://forms.gle/3Y9HUPTWmXcBQomY8

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Student's Corner

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hypertonic environment that either kills microbes or at least limits their ability to reproduce.

Hypertonic solutions also dehydrate food and other substances, as water leaves cells or passes through a membrane to try to establish equilibrium.

Dhanya W J
II M.Sc. Chemistry

Chemistry of BHA and BHT Food Preservatives

Butylated hydroxyanisole (BHA) and the related compound butylated hydroxytoluene (BHT) are phenolic compounds that are often added to foods to preserve fats and oils and keep them from becoming rancid. They are added to food, cosmetics, and packing of products that contain fats to maintain nutrient levels, color, flavor, and odor. BHT is also sold as a dietary supplement for use as an antioxidant.

BHA Characteristics

- BHA is a mixture of the isomers 3-tert-butyl-4-hydroxyanisole and 2-tert-butyl-4-hydroxyanisole.
- Molecular formula $C_{11}H_{16}O_2$

BHT Characteristics

- Also known as 3,5-di-tert-butyl-4-hydroxytoluene
- Molecular formula $C_{15}H_{24}O$

How Do They Preserve Food?

BHA and BHT are antioxidants. Oxygen reacts preferentially with BHA or BHT rather than oxidizing fats or oils, thereby protecting them from spoilage. In addition to being oxidizable, BHA and BHT are fat-soluble. Both molecules are incompatible with ferric salts. In addition to preserving foods, BHA and BHT are also used to preserve fats and oils in cosmetics and pharmaceuticals.

What Foods Contain BHA and BHT?

BHA is generally used to keep fats from becoming rancid. It is also used as a yeast de-foaming agent. BHA is found in butter, meats, cereals, chewing gum, baked goods, snack foods, dehydrated potatoes, and beer.

BHT also prevents oxidative rancidity of fats. It is used to preserve food odor, color, and flavor. Many packaging materials incorporate BHT. It is also added directly to shortening, cereals, and other foods containing fats and oils.

Are BHA and BHT Safe?

Both BHA and BHT have undergone the additive application and review process required by the US Food and Drug Administration. However, the same chemical properties which make BHA and BHT excellent preservatives may also be implicated in health effects. The research leads to conflicting conclusions. The oxidative characteristics and/or metabolites of BHA and BHT may contribute to carcinogenicity or tumorigenicity; however, the same reactions may combat oxidative stress and help detoxify carcinogens.

Adlin J
II M.Sc. Chemistry

Instructions

Kindly use the link given to submit this quiz online on or before 15th of October, 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, Nesamony Memorial Christian College, Marthandam - 629 165, Kanniyakumari District, Tamilnadu, India

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