4) ~~Colemanite~~

~~$Ca_2B_6O_{11} + 2NaCO_3 + H_2O \rightarrow 3NaBO_2 + B_4O_7 + 2Ca(OH)_2$~~

4] Give the preparation of diboranes.

$$BF_3 + 6NaH \xrightarrow{450^{\circ}k} B_2H_6 + 6NaF$$

5] How will you identify the presence of Borate in a given compound.

$$4H_3BO_3 + 3C_2H_5OH \xrightarrow[H_2SO_4]{Con} B(OC_2H_5)_3 + 3H_2$$

The vapour of this ester burns with a green edged flame this reaction is used to identify the presence of borate.

metals. The outer s electrons (ns) have a tendency to retain remain Insert and show reluctance to take part in the bonding. which is known as Inert pair effect.

2] Give the uses of boron ?

* Boron have capacity to absorb neutron. Hence its isotope $^{10}B_5$ is used to moderater in nuclear reactor.
* It Amorphous boron is used in rocket fuel igniter.
* It is essential for cell wall of plants.
* In the manufacture of pyrex glass . boric oxide is used.

3] Write the preparation of borax ?

Borax is sodium salt of tetraboric acid. It is obtained from colemanite Ore by boiling its solution with sodium carbonate.

$$2Ca_2B_6O_{11} + 3Na_2CO_3 + H_2O \rightarrow 3Na_2B_4O_7 + 3CaCO_3 + Ca(OH)_2$$

S/Q

1] Write a short note on anamolous properties of first element p-block?

* Small Size of the first member.
* High ionisation enthalpy and high electronegativity.
* Absence of d-orbitals in their valence shell.

2] Give the uses of Borax.

* Borax is used for the identification of coloured metal ions.
* In the manufacture opticals and Borosilicate glass, enamels and glazes for pottery.
* It is also used as a flux in metallurgy and also act as a preservative.

3] What is catenation?

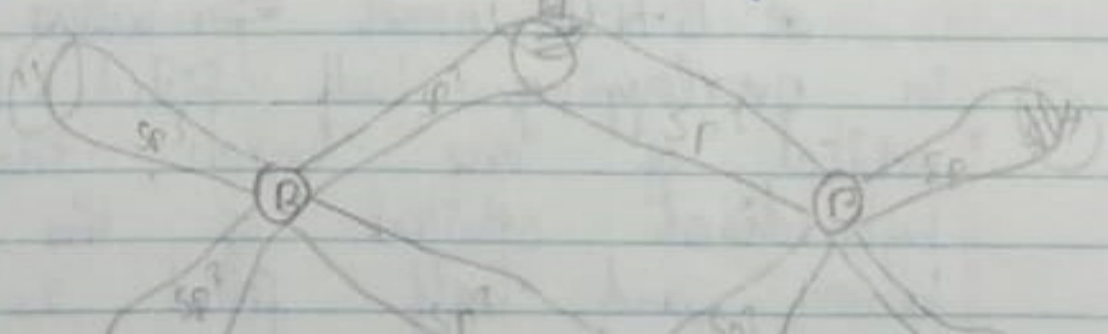
Catenation of is an ability of an element to form chain of atom

26-01-2020

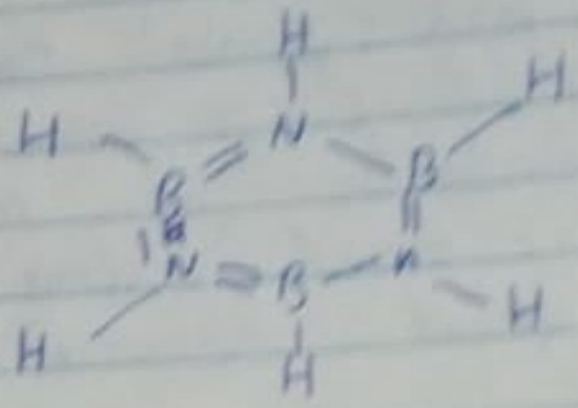
1] Write about Zeolites?

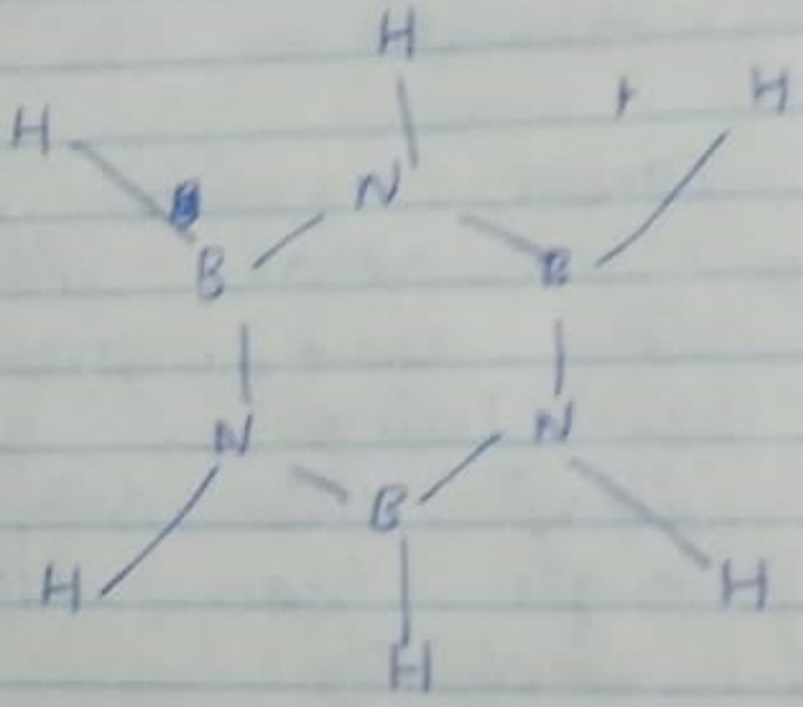
* Zeolites are three-dimensional crystalline solids containing Aluminium, silicon and oxygen in their regular three dimensional framework.
* They are hydrate to Sodium Alumino silicates with general formula $Na_2O_3(Al_2O_3).x(SiO_2).y(H_2O)$.
* Zeolites have porous structure in which monavalent sodium ions and water molecules loosely held.
* The Si and Al atoms are tetrahydrally coordinate with each other through oxygen atoms.
* Zeolites are similar to clay mineral but differ in their crystalline structure.
* The pore / channel sizes are nealy uniform. allowing the crystal act as molecular sieve.
* The removal of permanant hardness of water using zeolites.

2] Describe a structure of diborane.



6) structure of borazole $B_3N_3H_6$





2 $B_3N_3H_6$ (Borazole or Borazine - In organic benzene)

6) Distinguish between diamond and graphite.

Diamond	Graphite
C is sp_3 hybridised.	C is sp_2 hybridised.
Three dimensional tetrahydral structure.	Two dimensional, sheet like structure
Crystalline, transparent with extra brilliances.	Crystalline, opaque and shiny substance.
It is hard with high density and high melting point.	It is soft with low density and low melting point.
It is Bad conductor of heat and electricity.	It is good conductor of heat and electricity.

7) How are silicates classified ? Give an example for each type.

Silicates are classified into vari

(iii) Hydrogen bonded molecular solids.
They are held together by hydrogen bond. They are generally soft solids under room temperature.
eg: solid ice, glucose, urea.

Crystal lattice:
The regular arrangement of these species throughout the crystal called crystal lattice.

Unit cell:
The basic repeating structural unit of a crystalline called unit cell

07-08-2020

1] Molecular solids orbitals and its types

Molecular ~~orbitals~~ solids, constituents are neutral solids. They are held together by a weak van der waals forces. Generally molecular solids are soft and do not conduct with electricity.

Their types.

(i) Non-polar solids.

In non-polar solids constituents are held together by a conversion force or London force. They have low melting and usually in liquids or gaseous state at room temperature.
Eg: Naphthalene.

(ii) Polar solids.

The constituents are formed by a polar bonds. They held together by a molecular dipole-dipole interaction. They are high melting point than the non polar solids.
Eg:- Solid CO_2, Solid NH_3 ect.

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Classification of Solids

- Crystalline solid
  - → ionic crystal
    Eg :- NaCl, KCl.
  - → covalent crystal
    Eg : Diamond, SiO_2.
  - → Molecular crystal.
    Eg : Napthelene, anthracene.
  - → Mettalic crystal
    Eg : All metals (Mg, Cu, Au
  - → Atomic crystal.
    Eg :- Frozen change grp 18:
- ⟷ Amorphous solid
  Eg :- Glass, rubber.

- dimentional
the three dimensional

Example : Quartz.

Ln-6

1) General characteristic of solids.

* solids have definite shape and volume.
* solids are rigid and incompresible.
* solids have strong cohesive force.
* solids have interatomic, ions, molecules.
* solid constituents constitute. ions have fixed position and can only oscillate about their mean position.

2) classification of solids:

Classification of solids divide into two types,

They are,

* Crystalline

chain silicates.

chain silicates:
The silicates contain $[CSiO_3)_n]^{2n-}$ ions formed by linking 'n' no of tetrahedral $[SiO_4]^{4-}$ units bineadly. Each silicates unit share two of its oxygen atoms with other units.

Example: spodumene - $LiAl(SiO_3)_2$.

Double chain silicates:
These silicates contain $[Si_4O_{11}]_n^{6n-}$ ions. In these silicates there are different types of tetrahedra.

(i) Those sharing 3 vertices.
(ii) Those sharing only 2 vertices.

Examples: These are Fibrous and non-combustible silicates.

(v) Sheet or phyllo silicates:
Silicates which contain $(Si_2O_5)_n^{2n-}$ are called sheet silicates.
Eg: Talk.

(vi) Three dimensional silicates:

(i) Ortho Silicates

The simplest silicates which contain discrete $[SiO_4]^{4-}$ tetrahedral units are called ortho silicates.

Eg: Phenacite - Be_2SiO_4.

(ii) Pyro Silicates:

Silicates condain $[Si_2O_7]^{6-}$ ions are called pyro silicates or soro silicates.

Eg: Thortveitite - $Sc_2Si_2O_7$

(iii) Cyclic Silicates:

Silicates which contain $[SiO_3]_n^{2n-}$ is formed by linking three or four tetrahedral units of SiO_4^{4-} cyclically called cyclic Silicates.

Eg: Beryl $[Be_3Al_2(SiO_3)_6]$.

(iv) Inosilicates:

* It has fused ring constitute 20 six membered ring and 12 five membered ring.
* Each carbon atoms is sp^2 hybridisede and forms three σ-bond and a delocalised π-bond giving aromatic character to the molecule.
* The c-c bond distance 1.42 Å and c=c bond distance is 1.38 Å.

4] carbon nanotubes :

* Carbon nanotubes another recently discovered allotropes.
* It have graphite like tubes and fullerene end.
* Along this axis, these are stronger than steel and conduct electricity.
* They have many applications in nanoscale electronics, catalysis, polymers and medicine.

5] write about graphene ?

It has a single planar sheet of sp^3 hybridised carbon

2] Write

* diamond is very hard. in nature.
* The carbon atoms in diamond are sp^3 hybridised and bonded to four neighbouring carbon atoms bonded with σ bond and C-C bond length 1.54 Å.
* This result tetrahydral arrangement around each carbon
* all four valence electron of carbon are involved there is no free electron for conductivity.
* Being the hardest element it is used to sharping hard tools, cutting glasses and making bores and drilling.

3] Write about fullerenes?

* Fullerenes are newly synthesised allotropes of carbon.
* Unlike graphite and diamond the allotropes are discrete molecules such as C_{28}, C_{50}, C_{60}, C_{70}, C_{76} ect.
* These molecules are cage like structure.
* The C_{60} molecules has superb

with hydrogen at [illegible] of less than 50 atm using metal catalysts at 500-700 k yields saturated and unsaturated hydrocarbons.

$$nCO + (2n+1)H_2 \longrightarrow C_nH_{(2n+2)} + nH_2O$$

$$nCO + 2nH_2 \longrightarrow C_nH_{2n} + nH_2O$$

5] Write a short note on hydro-carboration.

Diborane adds on to alkenes and alkynes in ether solvent at room temperature. This reaction is called hydrocarboration and is highly used in synthetic organic chemistry, espcially for anti markonikov addition.

$$B_2H_6 + 6RCH=CHR \longrightarrow 2(RCH_2-CHR)_3B$$

28-01-2020

1) Write about graphite ?

* Graphite is the most stable allotropic form of carbon at normal temperature and pressure.
* It is soft and conducts electricity.
* It is composed of flat two dimensional sheets of carbon atoms.
* Each sheet is sp^2 hybridised carbon atom with a C-C bond.
* Each carbon atoms form three σ bonds with three of its valence electrons and the fourth electron present in unhybridised p orbital form π bond.
* These π electron are delocalised which responsible for electrical conductivity.
* The succesive sheets are together by weak vander waals force.
* This distance between succesive sheet is 3.40 A°.
* It used lubricant or graphite oil.

4] Write about burn alum.

Aluminium Sulphate it melts at 365 k on heating. At 475 k losses water of hydration and swells. The swollen mass is known as burn alum.

$K_2SO_4Al_2(SO_4)_3 \cdot 24H_2O \xrightarrow{475k} K_2SO_4Al_2(SO_4)_3 + 24H_2O$

5] Write the use of Alum?

* Purification of water, water proofing and textiles.
* It is used to dyeing, paper and leather tanning industries.
* It is employed as a styptic agent to arrest bleeding.

6]

07/07/2020

1] Write types of silicons?

(i) Liner silicons
(ii) cyclic silicons
(iii) cross linked silicons.

2] Uses of silicons:

* Low temperature lubrication and high temperature oil bath ect.
* Making water proof clothes.
* Mixed with paints.

3] How is potash alum prepared?

* It is prepare from alumstone with excess of sulphuric.
* Aluminium hydroxide is converted into Aluminium sulphate.
* Calculate the amount of potassium sulphate added.

$$K_2SO_4 + Al_2(SO_4)_3 + 24H_2O \rightarrow K_2SO_4 \cdot Al_2(SO_4)_3 \cdot 24H_2O$$

$$K_2SO_4Al_2(SO_4)_3 + 4Al(OH)_3 + 6H_2SO_4 \rightarrow K_2SO_4 + Al_2(SO_4)_3 + 12H_2O$$

linked by two
* It has eight BH bonds.
it has only 12 valance electrons
and are not sufficient to
form normal covalent bond.
* The four terminal B-H bonds
are normal covalent bonds.
* The remaining four electrons
have used to bridge bonds. ie..
two three centre B-H-B bonds
utilize two electrons each. Hence.
these bonds are three centre - two
electron bonds.
* In diborane, the boron is
sp^3 hybridised.
* Three of the four sp^3 hybrised
orbitals containing single electron
and the fourth orbital is empty.
* Two of three half - filled
hybridised orbitals of each boron
overlap with 1s orbital of hydrogen
to form four terminal 2c-2e bonds
leaving one empty and one half.
filled hybridised orbital on each
boron.
* B-H-B bond formation involved
in overlapping half filled hybridised