chem 102 Assignment
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(1) Diamond and Graphite are covalent crystals, Compare their properties

Answer

| Property | Diamond | Graphite |
|---|---|---|
| Hardness | Very hard, Infact it is the hardest Known substance | Soft and slippery |
| Melting point | 8930°C | 3000°C |
| Density | 3.51 g/cm$^3$ | 2.22 g/cm$^3$ |
| Force | Strong convalent forces | Vander Waals forces |
| Hybridisation | $sp^3$ with no $\pi$ electrons | $sp^2$ hybridized like Benzene with $\pi$ electrons |
| Structure | Tetrahedral in all directions | Layer structure with fused rings |
| Uses | Used for cutting glass, jewelries | Used as lubricant, lead pencils and electrodes |
| Conductivity | Insulator | Good electrical conductor. |

(2) there are three (3) types of binary hydrides, write short notes on them

Answer

(a) Ionic Hydrides:- they are compounds of hydrogen, alkali metal or an alkali earth metal - they have ionic lattices, high melting points and behave like electrolytes when fused.

(b) Convalent hydrides:- the rest of the main group elements form simple hydrides of this type. All hydrides except water are gaseous at room temperature

(c) Metallic hydrides:- Some transition metals that have the ability to retain hydrogen

(3) Crystals can be classified into ionic, convalent, molecular and metallic. compare and contrast these four types of crystals

Answer

Ionic Crystals:- is a type of crystals whose force of attraction is electrovalent bond

Convalent crystals is a type of crystal whose force of attraction is covalent bond.

Molecular crystal is a type of crystal where attractive forces are Vanderwaal or hydrogen bond.

Metallic crystal is a type of crystal whose force of attraction is metallic bond.

(a) write short note on the similarities and difference between group 6, 6 and 7 in the periodic table

Answer

Similarities

(i) They are all non-metals
(ii) They are not good conductors
(iii) They are covalent compounds and are acidic
(iv) They are usually dull in appearances

Differences

(i) Elements in group 6 are more electronegative than elements in group 6 and less electronegative than elements in group 7.
(ii) Group 6 elements have 5 valence electrons, group 6 elements have 6 valance electrons and group 7 have seven valence electrons

(b) Write short notes on the five (5) classes of oxides

Answer

(i) Normal oxides:- Contain E-M bonds but no E-E bonds these bonds may be ionic or covalent
(ii) Suboxides:- contains E-E bonds as well as R-O bonds but no O-O bonds e.g carbon suboxide ($C_3O_2$)
(iii) Peroxides:- contains O-O bonds as well as R-O bonds, but no E-E bonds e.g $H_2O_2$. All peroxides give hydrogen peroxide when treated with water or dilute acids
(iv) Superoxides:- Are related to peroxides but contain the ion ($O_2^-$) in which oxygen has the oxidation number -½ its form superoxides e.g $KO_2$

E stands for elements other than Oxygen