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B.Sc. Part 1 – Semester 1.

Chemistry paper 1

INORGANIC CHEMISTRY.

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NTRODUCTION.

CHEMICAL BOND.

A chemical bond is lasting attraction between atoms, ions or molecules that enables the formation of chemical compounds.

This bond may result from electrostatic force of attraction between oppositely charged ions as in ionic bonds through the shearing of electron as in covalant bonds. The strength of chemical bonds vareis considerably ; there are strong bonds or primary bonds .such as covalant ,ionic , and metallic bonds, and weak bonds,or secondary bonds, such as dipole-dipole interaction, the londaon dispersion force and hydrogen bonding.

ONIC BONDING.

The compound containing ionic bond called ionic compound. Ionic compounds are solids.

Kossel Approch :

It may be defined as, a chemical bond formed by transfer certain number of electrons from valance shell of (electropositive) both acquire stable Nobel gas configuration, or It is interionic ectrostatic force of attraction developed due to transfer of ectron from one atom to another ,OR It is the electrostatic forces attraction between oppositely charged.

During the formation of (ionic bond) energy is released which accounts the *strength* of the ionic bond. The cations and anions so formed by loss or gain of electrons attain the nearest inert gas configuration.

The number of electrons lost by an atoms of an element to obtain an anion is termed as *electrovalancy* or *electrovalance* of the elements.

There are two types of electrovalancy namely electropositive and electronegativite.

ORMATION OF IONIC BOND.

According to kossel, Lewis and Langmuir the formation of ionic bond in stepwise manner can be discribed as follows :

1: Formation of cation : The atom of electropositive elements loses one or more electrons from it's valence shell and form cation with stable electronic configuration of the nearest Nobel gas *.e.g* Sodium being electropositive elements loses one electron to form sodium ion, Na+ and attains electronic configuration of neon.

Na

Formation of anaion :

The atom of electronegativite element gaim one or more electrons from electropositive element and forms anion having electronic configuration of nearest nobel gas .*e.g* chlorine being electronegativite element gains one electron from sodium to form chloride,with argon configuration .Here electronegativite valancy of chlorine is -1.

eneral characteristics of ionic compounds.

1 : Crystal structure - The ionic solids are usually crystalline in nature .The X -rays diffraction pattern have showed that the basic constituent units in the crystal are ions and not the molecules. In the crystal lattice , these ions are arranged in a regular, definite geometrical pattern .The ionic bond i.e electrostatic force of attraction is ominidirectional, hence , uniform in all the direction and so each cation in Crystal lattice gets surrounded by definite number of anions and vice -versa. Thus ionic solids have definite crystal structure.

E.g In sodium chloride crystal,each sodium ion is surrounded by six chloride ions and each Cl ions is surrounded by six Na ions .face centerd cubic close packing for NaCl crystal as shown in Below fig..

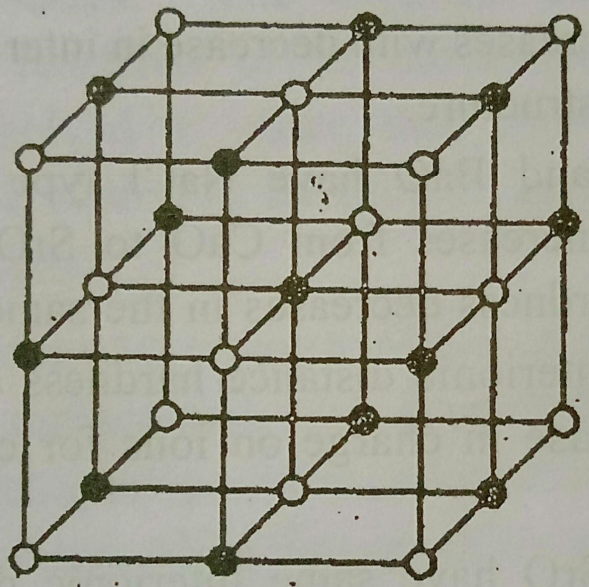

Fig. 2.2 : Crystal lattice of sodium chloride (NaCl)

2 : Polar nature- crystal lattice of ionic compounds contains both cations and anions as basic units , they create positive and negative pole or terminal throughout the crystal . Hence ionic compounds are found to be polar in nature.

3 : Electrical Conductivity : Ionic compounds are good conductor of electricity in molten State, as there is availability of free ions to move under the influence of electric field.on the other hand in the solid state, ions are not free to move as they are bonded tightly in lattice. Hence ionic compund are poor conductor of electricity in solid state.

Thank You