

Chapter 08

Chemical

Bonding

- Two chlorine atoms give one electron each and form Cl^- ions.
- One Mg^{+2} ion can attract 2Cl^- ions and forms MgCl_2 .

Formation of MgO :

Magnesium to get octet configuration has to lose two electrons.

Oxygen belongs to 16th group. It has 6 valency electrons. The two electrons lost by Mg^{+2} are gained by oxygen to form O^{2-} .

- Mg^{+2} & O^{2-} exist together due to electrostatic force of attraction, which is known as ionic bond.
- The electrostatic force of attraction between a metal, which can form cation & the non-metal, which can form anion is known as ionic bond.
- Ionic bond is formed due to transfer of electrons from cation to anion (or) from metal to non-metal.

Factors affecting formation of ionic bond:

- For ionic bond formation, we need cations and anions.
- If an atom loses electrons readily and forms a positively charged radical, we can call it a cation.
- The tendency of an atom to lose electrons favours formation of cation. Metals do lose electrons readily hence form the cation.
- If an atom gains electrons and forms a negatively charged radical, it is called anion.

- To form anion, atom requires the tendency to gain electron. Non-metals do gain electrons readily.
- Ionic bond can be described as a bond between a positively charged radical & negatively charged radical, formed from two dissimilar elements.
- The factors, which effect the formation of cation and formation of anion are atomic size, ionization enthalpy, electronegativity and electron affinity.
- Atoms containing high atomic size, low ionization enthalpy, low electronegativity and low electron gain enthalpy do form cation readily.
- Similarly, atoms having small atomic size, high ionization enthalpy, high electronegativity and high electron gain enthalpy do form anion readily.
- The electrostatic force of attraction between cation and anion is non-directional. So it is not possible for ionic compounds to exist as discrete molecules.
- In ionic compound every cation is surrounded by certain number of anions & every anion is also surrounded by certain no. of cations.
- The no. of oppositely charged ions surrounding a particular ion is called as coordination number.
- Coordination number for NaCl is 6 : 6.
- Every Na^+ ion is surrounded by 6 Cl^- ions and every Cl^- ion is surrounded by 6 Na^+ ions.
- NaCl structure is called face centered cubic structure.
- In this, particles are present at corners of the cube also one particle at each face centre.