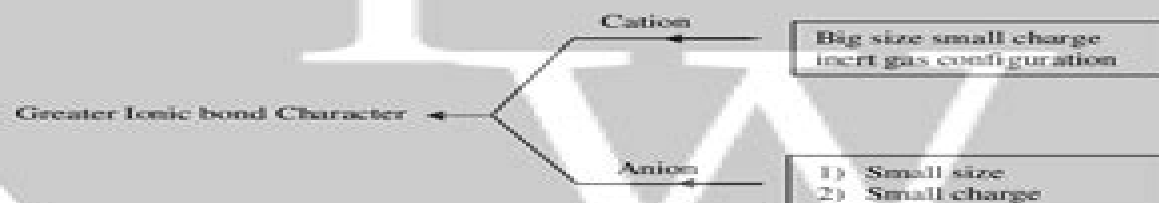


## CHAPTER

## 04

## CHEMICAL BONDING &amp; MOLECULAR STRUCTURE

- An atom (or) group of atoms having independent existence in nature is defined as molecule.
- Force of attraction that holds two atoms (or) oppositely charged ions in molecule is chemical bond.
- An atom must have eight electrons in its outermost energy level for its stability is called as octet rule.
- The number of electrons an atom loses (or) gains in an ionic bond formation is called electrovalency.
- According to Fajan's Rules
  - The no. of electrons an atom of the element loses (or) gains is known as electrovalency of that element.
  - Favourable conditions for cation formation.
    - 1) Low I.P
    - 2) Low charge on ion
    - 3) Big atomic size
    - 4) Inert gas configuration
  - Favourable conditions for anion formation.
    - 1) High E.N & E.A
    - 2) Small atomic size
    - 3) Low charge on ion



- $\text{LiCl}$  is more covalent in nature and so dissolved in non-polar solvents like alcohol (or) ether.
- Ions which have 18 electrons  $[ns^2 np^6 nd^{10}]$  in their outermost main energy level are stable and it is called as pseudo inert gas configuration (or) nickel group configuration.
- The energy liberated when an ionic crystal is formed from an assembly of isolated gaseous ions is called lattice energy.
- Lattice energy
 
$$(\cup) = \left[ -N_0 \frac{AZ^+ Z^- e^2}{r} + N_0 \frac{Be^2}{r^9} \right]$$
  - $$\cup = \frac{AZ^+ Z^- e^2 N_0}{\epsilon_0} \left[ 1 - \frac{1}{n} \right]$$

(Born – Lande equation)

Coordination number of  $\text{Na}^+$  and  $\text{Cl}^-$  in  $\text{NaCl}$  crystal is (6:6)

Coordination number of  $\text{Cs}^+$  and  $\text{Cl}^-$  in  $\text{NaCl}$  crystal is (8:8)
  - The total amount of energy change in a reaction remains the same whether the reaction take place in one (or) several stages is known as Hess law of constant heat summation.

# Bonding Chemical Formulas

**Stanley E. Manahan**



## **Bonding Chemical Formulas:**

Chemistry John Olmsted, Gregory M. Williams, 1997 Textbook outlining concepts of molecular science      *Fundamentals of Environmental Chemistry, Third Edition* Stanley E. Manahan, 2011-03-05 Written by an expert using the same approach that made the previous two editions so successful *Fundamentals of Environmental Chemistry Third Edition* expands the scope of book to include the strongly emerging areas broadly described as sustainability science and technology including green chemistry and industrial ecology The new edition includes Increased emphasis on the applied aspects of environmental chemistry Hot topics such as global warming and biomass energy Integration of green chemistry and sustainability concepts throughout the text More and updated questions and answers including some that require Internet research Lecturers Pack on CD ROM with solutions manual PowerPoint presentations and chapter figures available upon qualifying course adoptions The book provides a basic course in chemical science including the fundamentals of organic chemistry and biochemistry The author uses real life examples from environmental chemistry green chemistry and related areas while maintaining brevity and simplicity in his explanation of concepts Building on this foundation the book covers environmental chemistry broadly defined to include sustainability aspects green chemistry industrial ecology and related areas These chapters are organized around the five environmental spheres the hydrosphere atmosphere geosphere biosphere and the anthrosphere The last two chapters discuss analytical chemistry and its relevance to environmental chemistry Manahan s clear concise and readable style makes the information accessible regardless of the readers level of chemistry knowledge He demystifies the material for those who need the basics of chemical science for their trade profession or study curriculum as well as for readers who want to have an understanding of the fundamentals of sustainable chemistry in its crucial role in maintaining a livable planet

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