

Chemistry Study Materials for Class 11

(NCERT Based Notes of Chapter- 04)

Ganesh Kumar Date:- 14/10/2020

CHEMICAL BONDING AND MOLECULAR STRUCTURE

Points to Remember on Molecular Orbital Theory

- 1. Bond Order = (no. of bonding electrons – no. of antibonding electrons) $1/2$*
- 2. Bond order is useful in predicting the stability of the molecules.*
 - If $B.O = 0$, then the molecule is unstable.*
 - If $B.O > 0$, then the molecule is stable.*
 - Thus, higher the bond order, greater will be the stability of the molecule.*
- 3. Atoms or molecules which consist of paired electrons are called as “Diamagnetic” and which consist of one or more unpaired electrons are known as “Paramagnetic”.*
- 4. Saturated molecules:- The molecules in which all the valence electrons are involved for single bond formation. Non-bonded lone pairs are absent. These molecules have less energy, hence are more stable.*

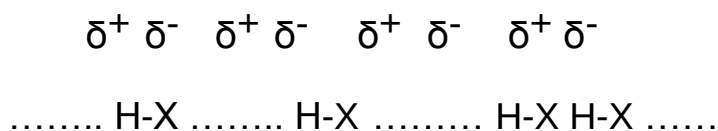
Magnetic nature

If all the M.Os in a molecule are doubly occupied, the substance is diamagnetic. i.e. that substance is repelled by an external magnetic field. If one or more M.Os are singly occupied, it is paramagnetic. i.e. it is attracted by an external magnetic field. E.g. O_2 molecule

Hydrogen Bonding

The weak attractive force between Hydrogen atom of one molecule and electronegative atom (like F, O or N) of the same or different molecule is termed as Hydrogen bond. It is weaker than a covalent bond but stronger than van der Waal's force. It is represented by dotted line (.....).

Cause of H bonding: When H is bonded to a strongly electronegative atom X, the shared electron pair is shifted more towards X. So H atom gets a slight positive charge (δ^+) and the electronegative atom gets a slight negative charge (δ^-). This results in the formation of a polar molecule. The electrostatic force of attraction between these polar molecules is termed as H-bonding.

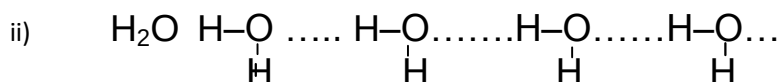


Types of H bond

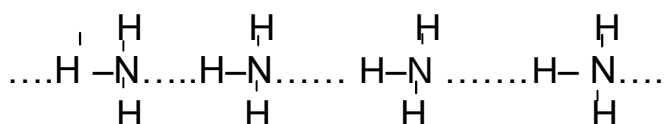
There are two types of H bonds- inter molecular H-bonding and intra molecular H-bonding.

1) Inter molecular H bonding: It is the H bond formed by H atom of one molecule and the electronegative atom of another molecule.

e.g. i) H bonding in HF

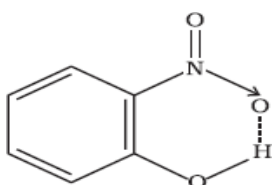


iii) NH_3



Inter molecular H bonding influences the physical properties of the compounds. For example water (H_2O) is a liquid with high boiling point but hydrogen sulphide (H_2S) is a gas. This is because in water inter molecular H bonding is possible which is not possible in H_2S .

2) Intra molecular H bonding: It is the H bond formed between H atom and the electronegative atom of the same molecule.



e.g. H bonding in ortho-nitrophenol
