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Sub - Chemistry class – 10th B,D,E,F

Date – 08/1/2022

Carbon and It's compound

Covalent Bonds

Difficulty of Carbon to Form a Stable Ion

To achieve the electronic configuration of the nearest noble gas, He, if the carbon atom loses four of its valence electrons, a huge amount of energy is involved. C^{4+} ion hence formed will be highly unstable due to the presence of six protons and two electrons.

If the carbon atom gains four electrons to achieve the nearest electronic configuration of the noble gas, Ne, C^{4-} ion will be formed. But again, a huge amount of energy is required. Moreover, in C^{4+} ion it is difficult for 6 protons to hold 10 electrons. Hence, to satisfy its tetravalency, carbon shares all four of its valence electrons and forms covalent bonds.

Ionic Bond

Ionic bonding involves the transfer of valence electron/s, primarily between a metal and a nonmetal. The electrostatic attractions between the oppositely charged ions hold the compound together.
Ionic compounds:

1. Are usually crystalline solids (made of ions)
2. Have high melting and boiling points
3. Conduct electricity when melted
4. Are mostly soluble in water and polar solvents

To know more about Ionic Bond.

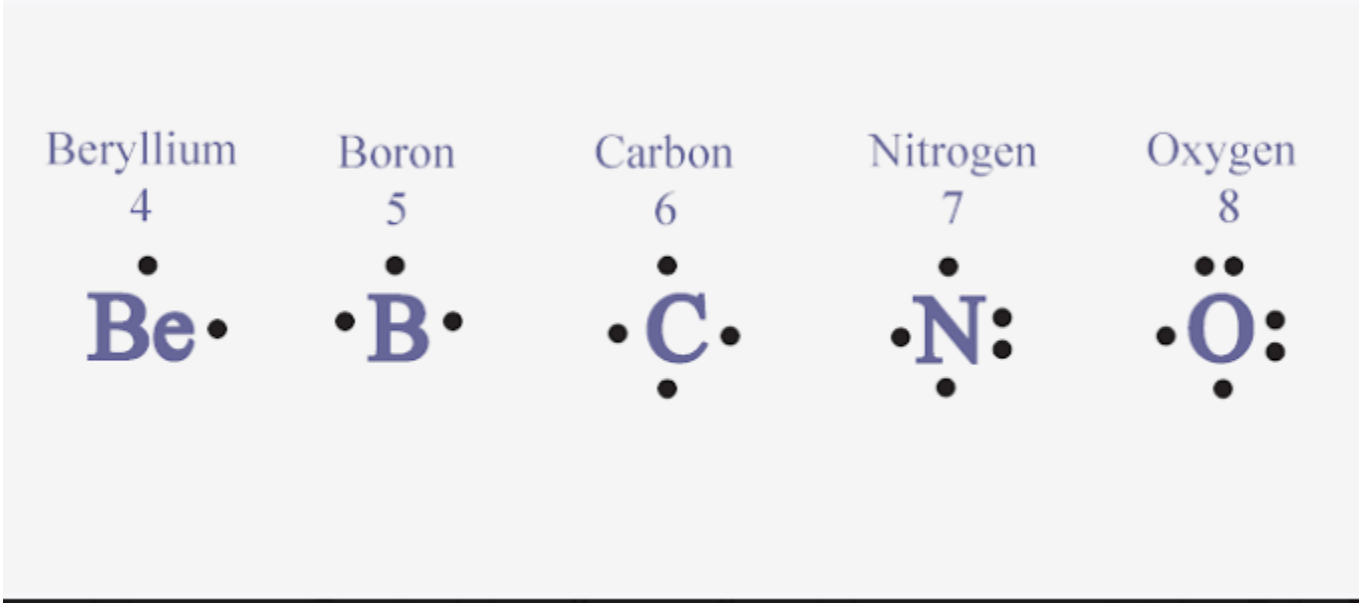
Covalent Bond

A covalent bond is formed when pairs of electrons are shared between two atoms. It is primarily formed between two same nonmetallic atoms or between nonmetallic atoms with similar electronegativity.

To know more about Covalent Bonds.

Lewis Dot Structure

Lewis structures are also known as Lewis dot structures or electron dot structures.
These are basically diagrams with the element's symbol in the centre. The dots around it represent the valence electrons of the element.

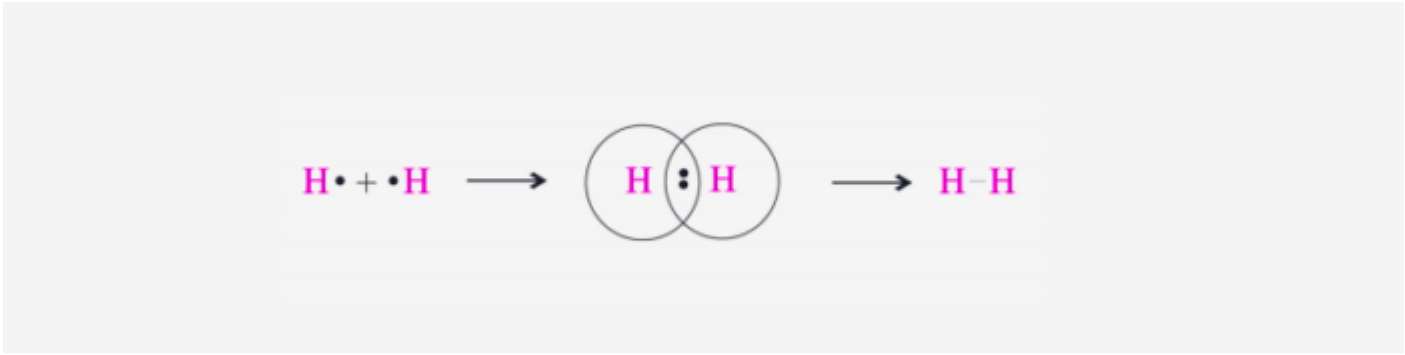


Lewis structures of elements with atomic number 5-8

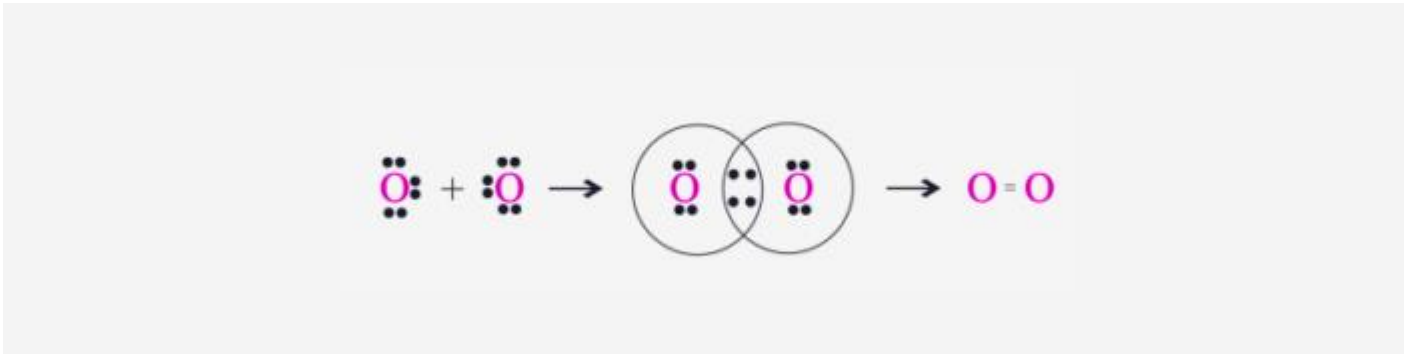
To know more about Lewis Dot Structure.

Covalent Bonding in H_2, N_2 and O_2

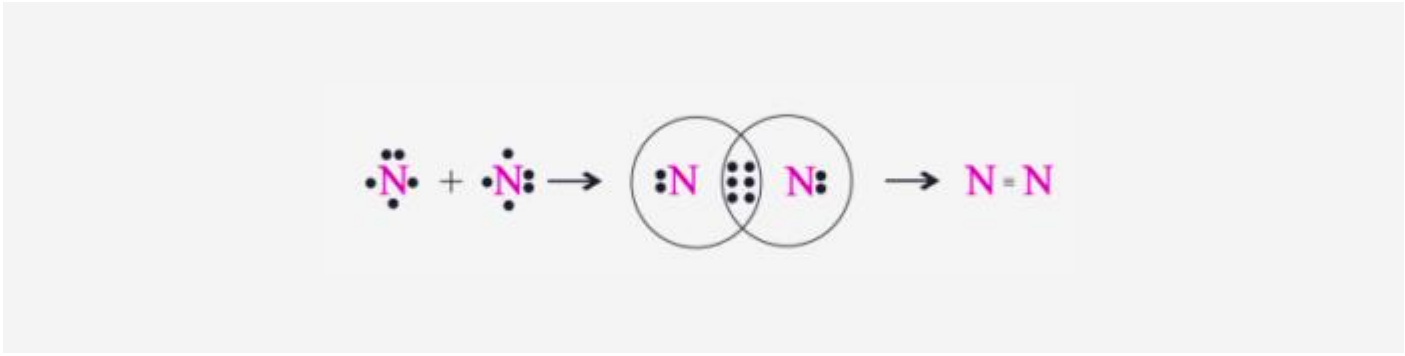
Formation of a single bond in a hydrogen molecule:
Each hydrogen atom has a single electron in the valence shell. It requires one more to acquire the nearest noble gas configuration (He).
Therefore, both the atoms share one electron each and form a single bond.



Formation of a double bond in an oxygen molecule:
Each oxygen atom has six electrons in the valence shell (2, 6). It requires two electrons to acquire the nearest noble gas configuration (Ne).
Therefore, both the atoms share two electrons each and form a double bond.



Formation of a triple bond in a nitrogen molecule:
Each nitrogen atom has five electrons in the valence shell (2, 5). It requires three electrons to acquire the nearest noble gas configuration (Ne).
Therefore, both atoms share three electrons each and form a triple bond.



Single, Double and Triple Bonds and Their Strengths

A single bond is formed between two atoms when two electrons are shared between them, i.e., one electron from each participating atom.
It is depicted by a single line between the two atoms.

A double bond is formed between two atoms when four electrons are shared between them, i.e., one pair of electrons from each participating atom. It is depicted by double lines between the two atoms.

A triple bond is formed between two atoms when six electrons are shared between them, i.e., two pairs of electrons from each participating atom. It is depicted by triple lines between the two atoms.

Soni kumari (chemistry)