L. B. S. Sr. College, Partur

Department of chemistry

B. Sc. F.Y.

Topic :- Chemical Bonding

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CHEMICAL BOND?

- Matter is composed by combination of atoms of same or different elements.
- In the molecules that atoms are held together by a known force of attraction which is called as **chemical bond.**
- In 1961 Kissel, lewis and Langmuir proposed the theory based on electronic structure of atom which is known as electronic theory of valency or Octet theory
- The two atoms same or different which forms molecule and this molecule will form either by interacting atoms by losing electrons or by gaining electrons or by sharing of electrons.

Types of Bonds:-

1. The types of chemical bonds formed between the two atoms are formed by either lose, gain or shairing of electron.

2. Their are three types of chemical bonds
   a. **Ionic bond**
   b. **Co-valent bond**
   c. **Co-ordinate bond**

1. Ionic bond:-

- Definition :- “ **chemical bond which is formed by transfer of one or more valence electrons from electropositive atom to electronegative atom so that both acquire the noble gas electronic configuration”.**
- It is electrostatic force of attraction between oppositely charged ions.
- Ionic bonds is commonly found in inorganic compounds.
- Ex. NaCl, $BaCl_2$, $AlCl_3$, KCl etc.

How the ionic bond form?

Ex. ***NaCl (Sodium Chloride)***

Na - 1. Electropositive

2. Tendancy to donet electron

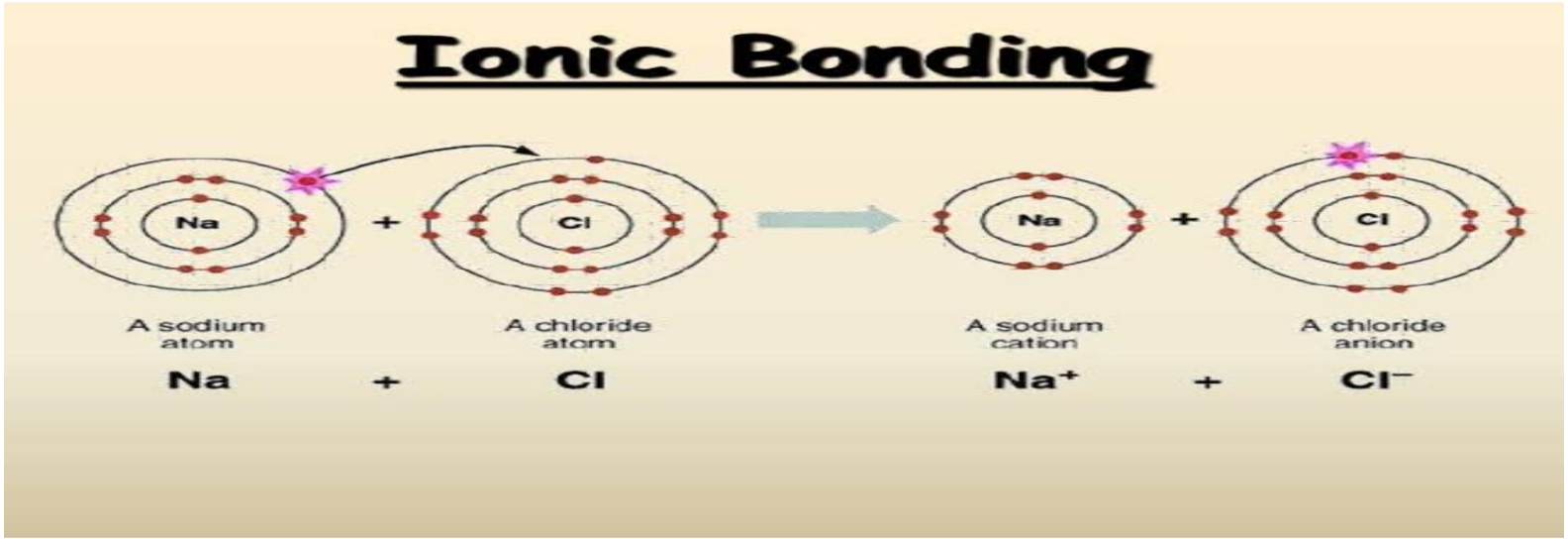
3. Forms positively charged ion called cation

Cl - 1. Electronegative

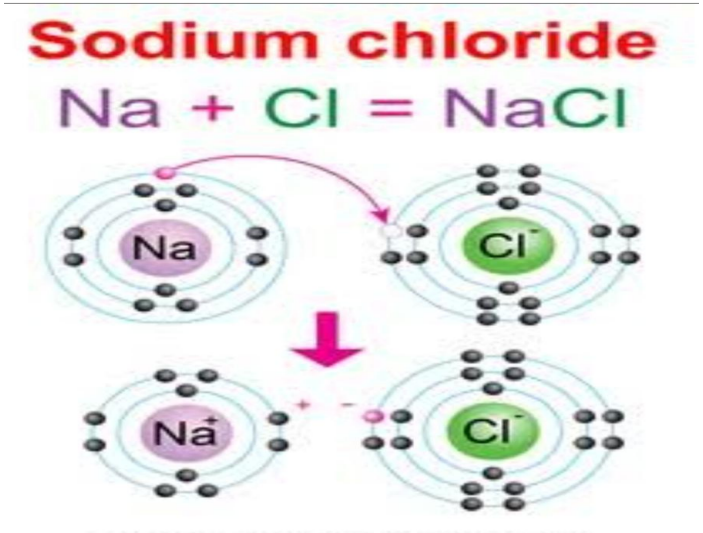
2. Tendancy to accept electron

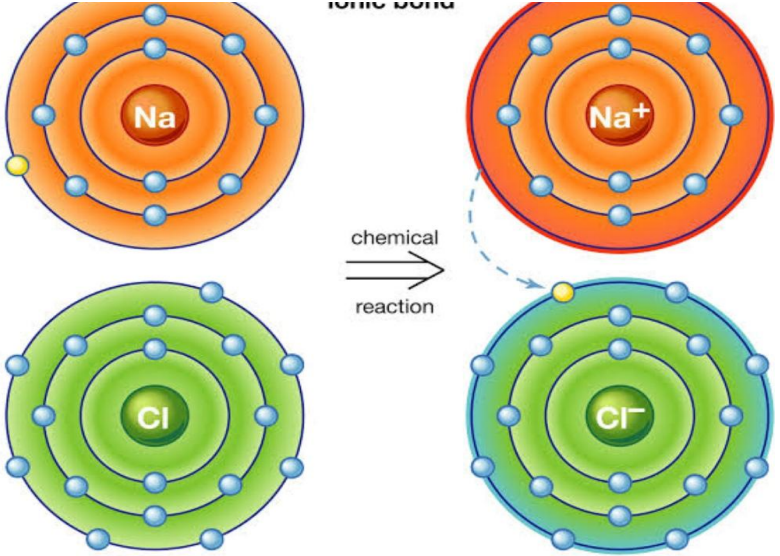
3. Forms negatively charged ion called anion

Cation and anion formation



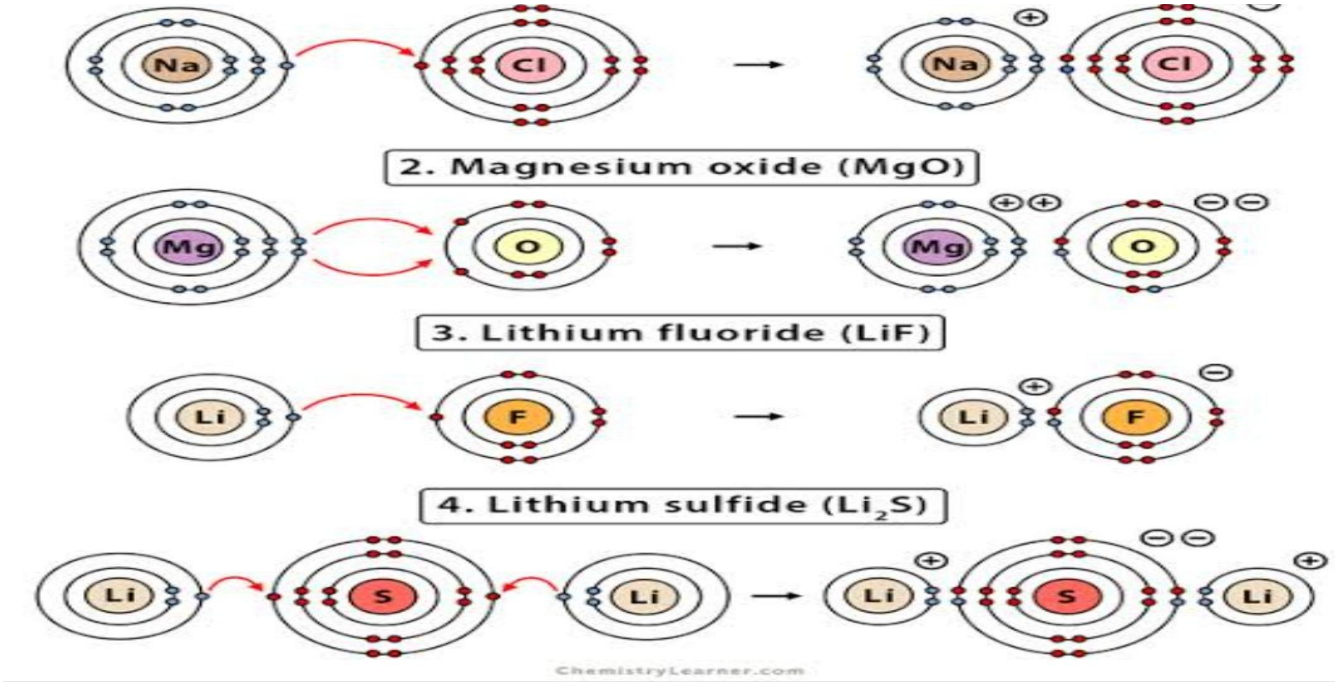
Ionic bond formation





More examples

Practice this example



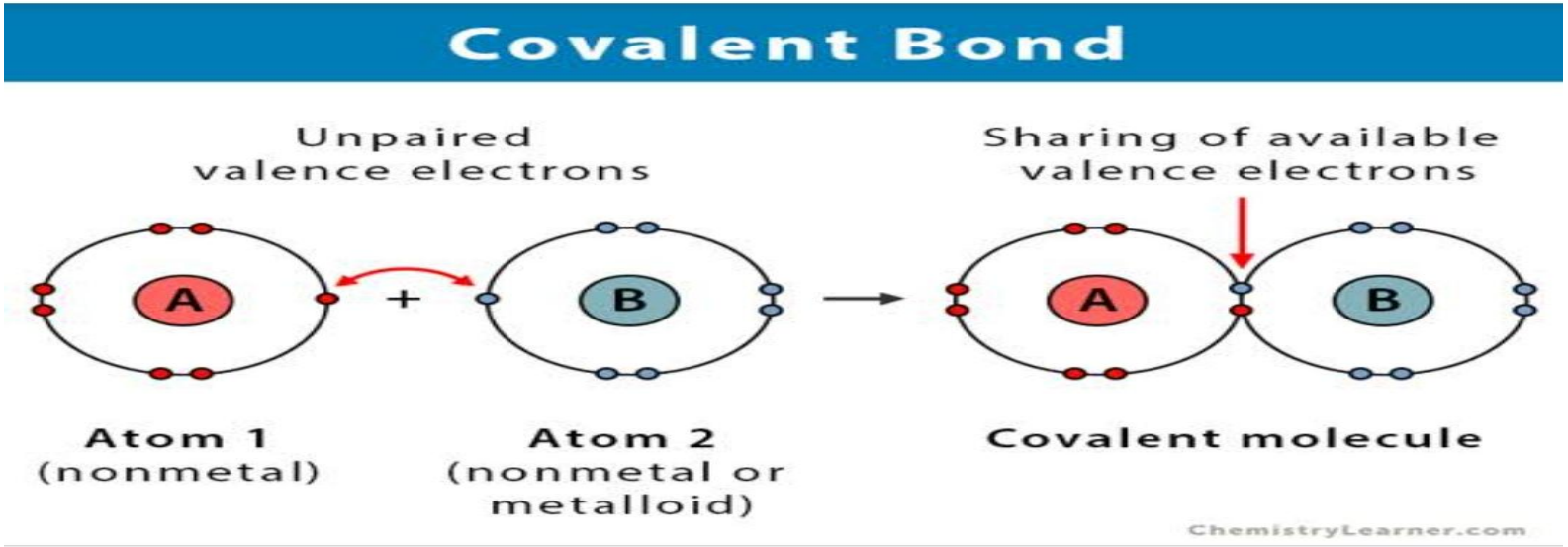
Characteristics of Ionic Bonds

- Ionic bond is also called electrovalent bond.
- They are non-volatile, soluble in water and possess high MP and BP.
- Their aqua solution conducts electric current.

2. Co-valent bond

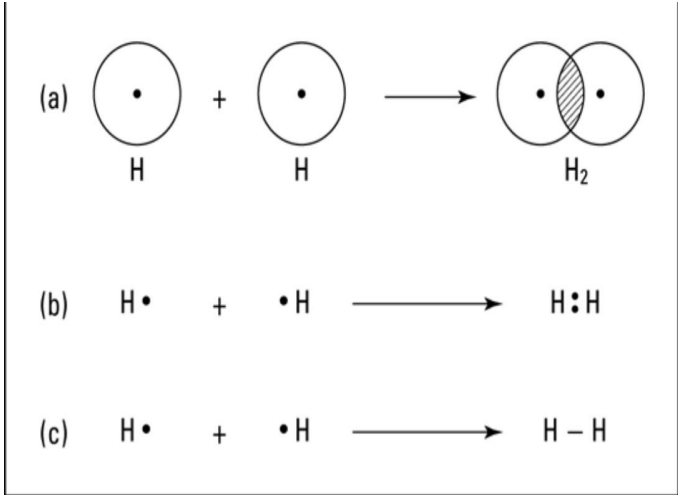
- Definition :- **Define as a bond which is from by sharing of one or more pair of electrons between the atoms in a molecules.**
- This type of bond is from by equal sharing of electrons.
- Both the atoms contribute one electron each and then share resulting pair of electron.
- Ex. H_2 , ÇH_4 , NH_3 etc
  -

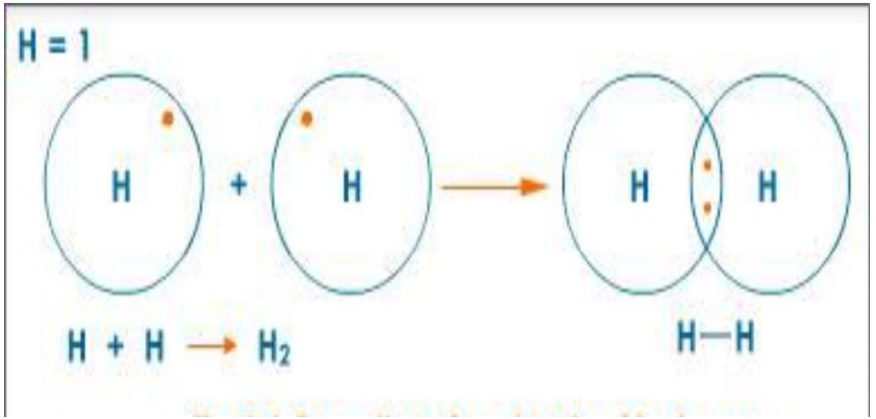
Co-valent bond formation



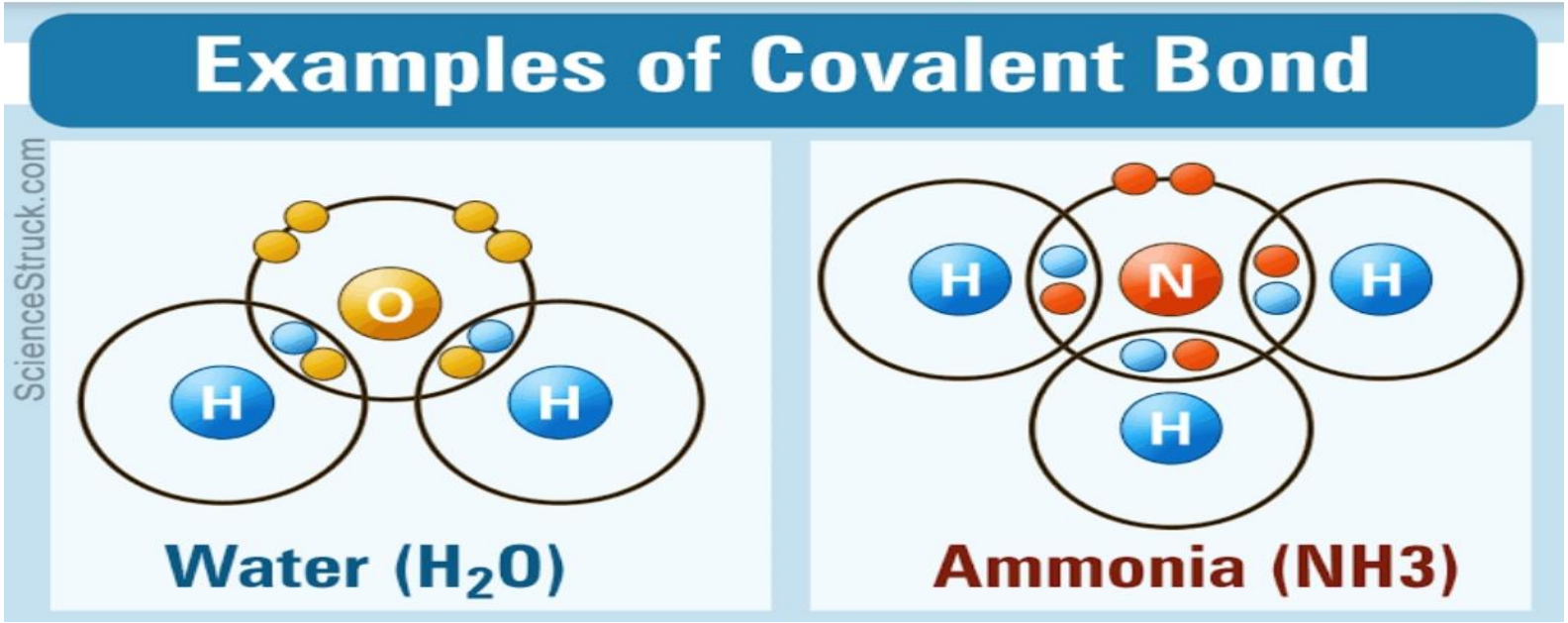
Formation of Hydrogen molecule

Hydrogen molecules from by combination of two hydrogen atoms with sharing equal electron which forms covalent bond as below





More examples of covalent bond formation



Characteristics of covalent bond

- Co-valent bond is commonly found in organic compounds.
- The co-valent compounds are volatile, generally insoluble in water but soluble in organic solvents.
- They possesses low melting and boiling points.
- Their aqueous solution does not conduct electric current

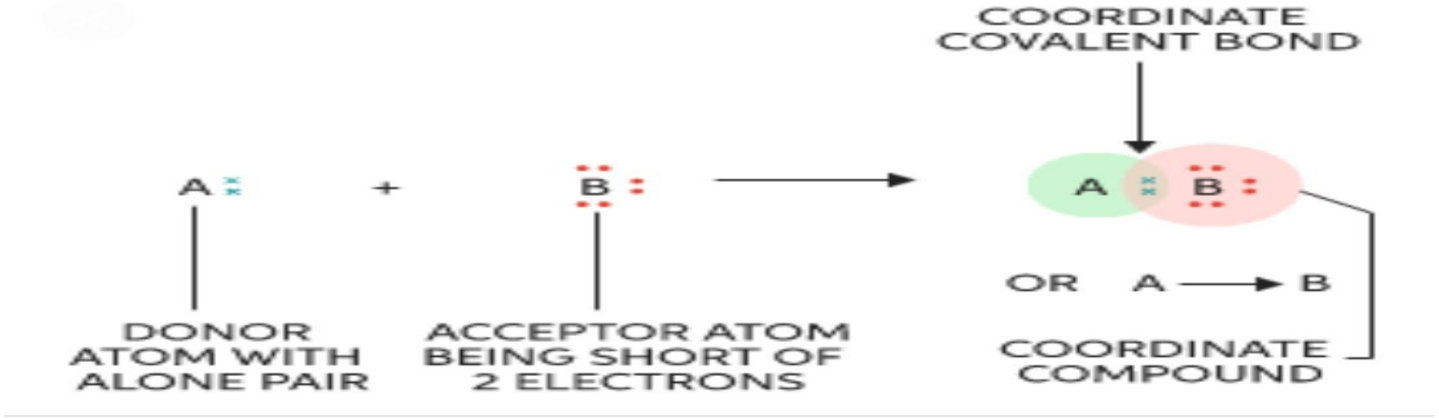
3. Co-ordinate Bond :-

- It is also called dative covalent bond.
- A coordinate is co-valent bond in which both electrons come from same atom.
- Here unequal sharing of electrons.

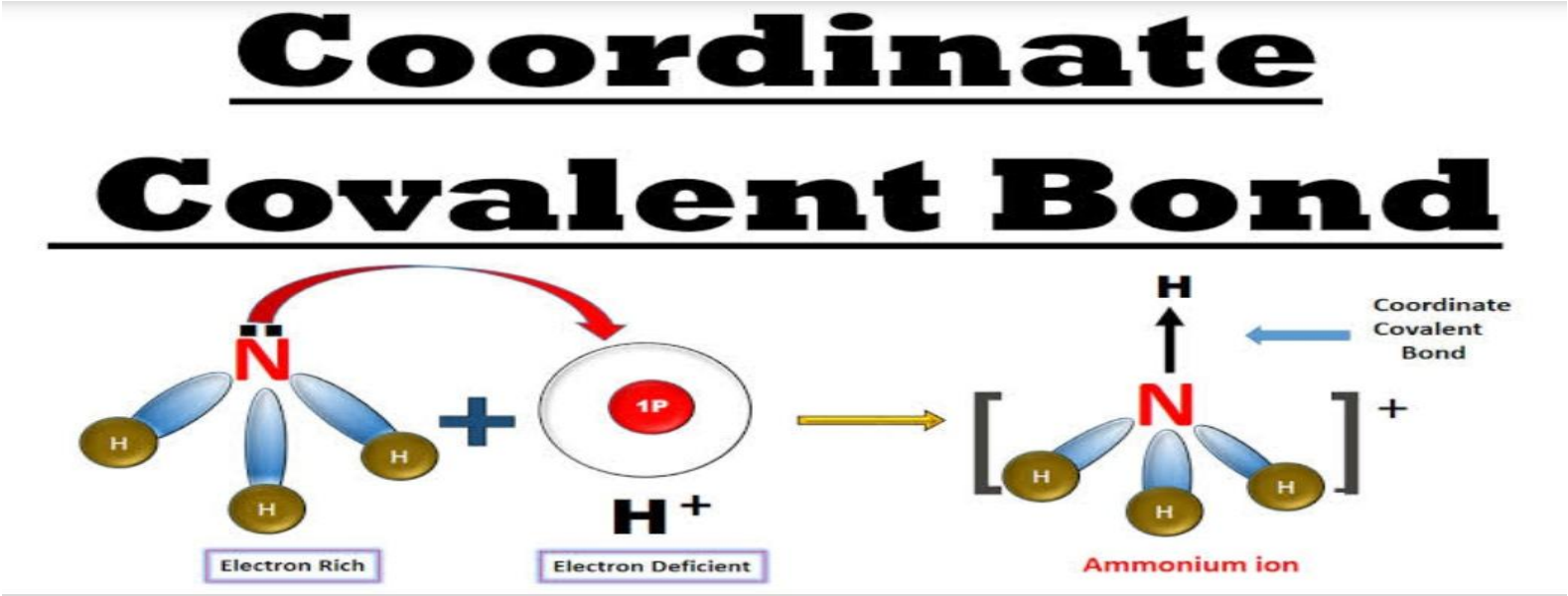
- Here one atom is lone pair of electron donor (Electron rich)
- Other is lone pair of electron acceptor (electron deficient)
- In the formation of co-ordinate bond the electron pair is held in common.
- The coordination bond is represented by an arrow pointed away from the donor atom towards the acceptor atom.

Co-ordinate covalent bond formation

General example



co-ordinatebond formation in ammonium ion



Characteristics of co-ordinate covalent bond

- Their melting point and boiling points are higher than purely covalent compounds and lower than purely ionic compounds.
- These are sparingly soluble in polar solvent like water but readily but readily soluble in non polar solvent.
- Like covalent compounds , they are also bad conductors of electricity.

Next subtopic....

Valence bond theory (VBT)

Thank you