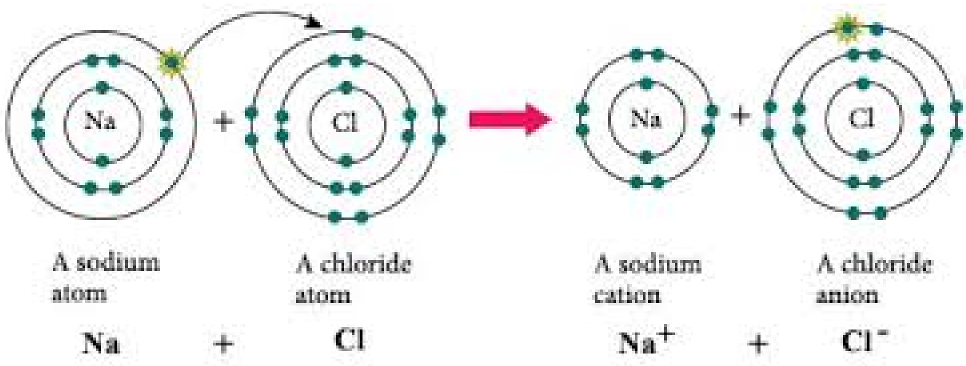
Ionic bonding

Ionic Bonding

Ionic bonding occurs between **positive** and **negative** ions, which attract each other and bind together to form ionic compounds. For example, sodium chloride consists of Na^+ ions and Cl^- ions bound

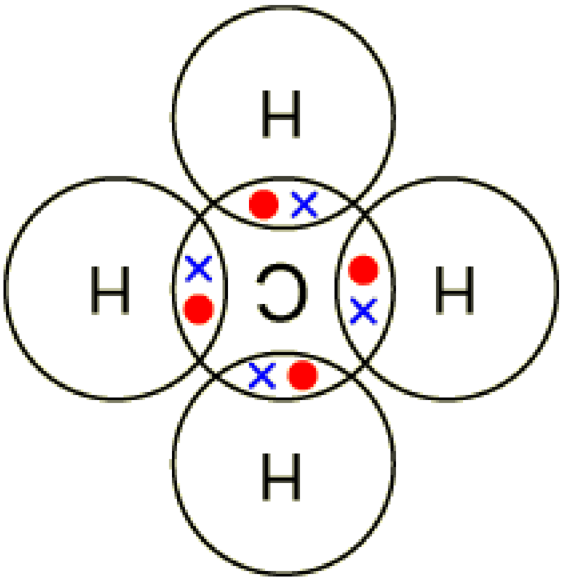


together.

Ionic compounds consist of a giant structure of ions arranged in a lattice. The attractive electrostatic forces between the oppositely charged ions act in all directions and are very strong. this holds the ions in the lattice together very tightly.

Covalent Bonding

A covalent bond is formed between nonmetal atoms, which combine together by sharing electrons. Covalent compounds have no free electrons and no ions so they don't conduct electricity.



the atoms of **non metals** generally tend to **gain** electrons to achieve stable electron structures. when they react together, neither atoms can give away electrons. so they get the electronic

Metallic Bonding

Giant structures with free electrons

Metals form giant structures in which electrons in the outer shells of the metal atoms are free to move. The metallic bond is the force of attraction between these free electrons and metal ions. Metallic bonds are strong, so metals can maintain a regular structure and usually have high melting and boiling points.

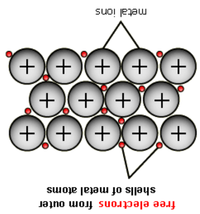
Metallic bonding is the **electrostatic** interaction, the atoms are ionised.

occupy fixed positions in the lattice, the outer shell electrons are delocalised. the metal is held together by the attraction of positive ions and negative electrons

The electrons are not given away they stay within the structure

Giant metallic lattice- a 3D structure of positive ions and delocalised electrons bonded through metallic bonds. it is impossible to tell where they originated from. the charged must be balanced.

Metallic 2



Metals are good conductors of electricity and heat, because the free electrons carry a charge or heat energy through the metal. The free electrons allow metal atoms to slide over each other, so metals are malleable and ductile.

High melting and boiling points

Metallic bonds are strong and a lot of energy is needed to break them. This is why metals have high melting points and boiling points.

Conducting electricity

Ionic 2

It takes a lot of **energy** to break up a giant ionic lattice. there are lots of strong ionic bonds to break. To separate the ions you have to overcome all those electrostatic force of attraction acting in all directions. This means that ionic compounds have high melting and boiling points.

The ions in a crystal lattice are very strongly bonded together so a high temperature is required to **separate** the particles and **melt** the crystal. The ions are held strongly in position so they cannot **move** and carry an **electric current**.

once there is enough energy to separate the ions from the lattice, they become mobile so can start to move around.

This is when the solid becomes a liquid the ions are allowed to move more freely around the liquid. they are attracted to oppositely charged electrodes held in the molten compound.

Therefore, they can carry their electrical charge through the liquid. a solid ionic compound cannot conduct electricity because it's in are helped in fixed positions into the lattice.

Covalent 2

Giant covalent structure

many substances containing covalent bonds consist of small molecules for example H20. they have giant structures where huge numbers of atoms are held together by a network of covalent bonds. These giant covalent structures are sometimes referred as macromolecules.

Diamond has a giant covalent Structure. In Diamond, each carbon atom forms four covalent bonds with its neighbours. This result is a giant covalent Lattice

in giant structure the models can never accurately reflect the many millions of atoms (or ions) bonded together into giant lattices. However, they can represent a tiny fraction of the structure. They can indicate the chemical formula of a compound by the simplest ration of the atoms or ions in models of their giant structures.

Intermolecular forces

covalent bonds are very strong. so the atoms within each molecule are held very tightly together. However, each molecule tends to be separate. the Force of attraction between the individual molecules in covalent substance is relatively small- there are weak intermolecular forces between molecules. Overcoming these forces do not take much energy.