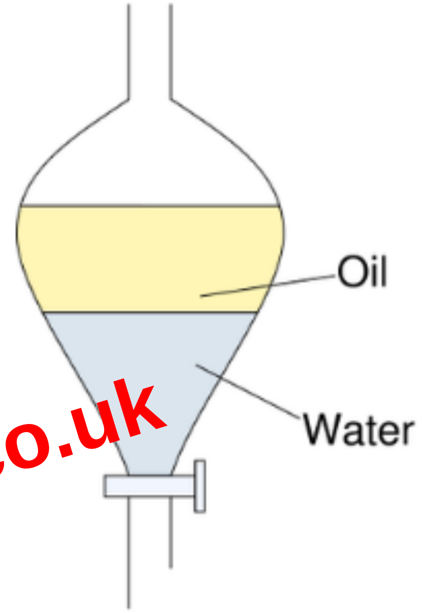
Separation Techniques (4)

Separating Funnel

A separating funnel can be used to separate immiscible liquids. The method is used for separating a mixture of two liquids will depend on whether the liquids are immiscible or miscible. Miscible liquids dissolve in each other while immiscible liquids do not.



Chromatography

Chromatography is the method of identifying two or more components that dissolve in the same solvent.

Groups on the Periodic Table

Metals are elements that lose electrons easily.
They are lustrous, malleable and good conductors of heat and electricity.
Metals have generally high melting points and are solid at room temperature.
Metals have antibiotic properties, which is why railings and handles in public areas are often made of metal.
Metals will lose electrons to form cations. Different metals lose different number of electrons.

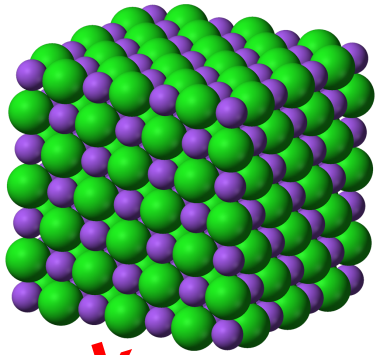
Alkali Metals are located at the first column of the periodic table. Alkali Metals are silvery, soft and not very dense. They can be easily cut with a butter knife. Caesium can even melt in the palm of your hand. They have low melting points and are incredibly reactive. As you go down the elements of the alkali metals column, the ionization energy gets lower.

Alkaline Earth Metals are located at the second column of the periodic table. Alkali Earth Metals gets the name “Alkaline” because of the basic nature compounds they form when bonded with oxygen. Alkaline Earth Metals in their pure form are shiny and silvery

Noble Gases are located at the last column of the periodic table. Noble gases are a group of extremely non-reactive elements that all exist in the gas state. They are often considered to be inert. Inert refers to an element’s tendency to resist change and reactions. Noble gases are odourless, colourless non-metals. They are also monoatomic.

Ionic Compound Properties

All ionic compounds form crystals. A crystal is made up of an orderly and symmetrical pattern of atoms called a crystal lattice. The crystal lattice shape is an arrangement that takes the least amount of energy to maintain. Within the crystal, there are forces between oppositely charged ions and between the nuclei and electrons of adjacent ions.



Hard but brittle.

When ions of a similar charge are forced together, they will naturally repel each other, thus causing the ionic crystal to shatter.

Soluble in polar solvent such as water.

Water molecules are described as being polar. This means that there is a small distribution of charge over the water molecule. As a result, water molecules are attracted towards positive and negative ions.

High melting and boiling points.

Due to the very strong electrostatic force of attraction that holds the anions and cations together, ionic compounds are all solids at room temperature. Large amount of energy is required to overcome the strong ionic bonds.

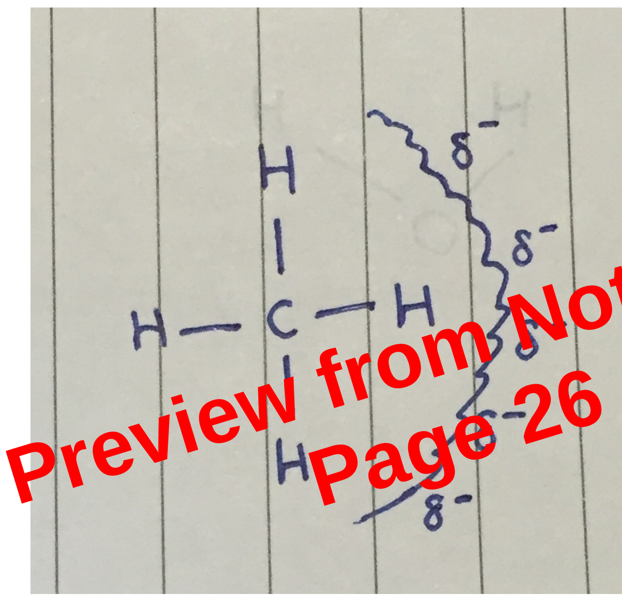
Do not conduct electricity in the solid form, but do conduct electricity when molten or when dissolved in water.

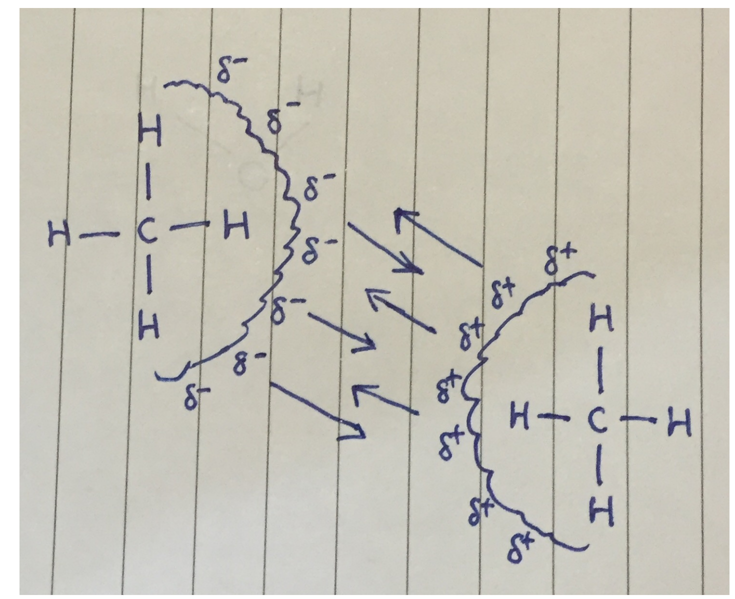
In a solid ionic compound, the positive and negative ions vibrate about a fixed position. They are unable to move towards the electrode of opposite charge. When the ionic compound is molten or when it is dissolved in water, the positive and negative ions become mobile and are free to move towards the electrode of opposite charge, thus conducting electricity.

Intermolecular Forces (3)

London Dispersion Force (e.g. Methane Molecule)

It is the weakest intermolecular force. Molecules that uses London Dispersion Force are usually non polar due to a very small difference in electronegativity among the atoms. They make use of electrons that are moving around in orbitals to get attracted to other molecules.





This is a methane molecule. In a brief moment, most of the electrons happened to be on the right side of their orbitals while they are constantly moving. This causes a slight negative charge on the right.

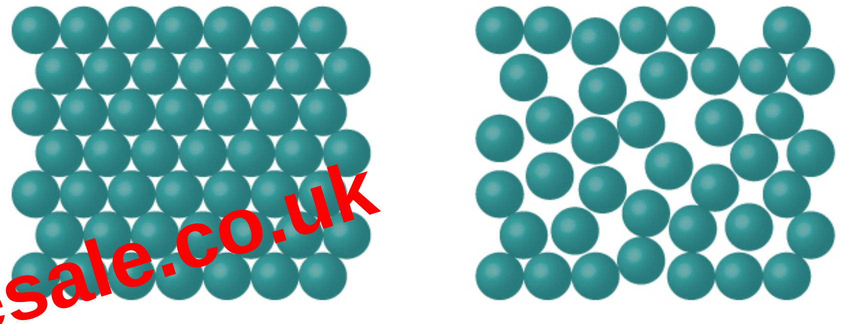
On the other hand, another methane molecule close by happened to have most of the electrons on the left side of their orbitals while they are constantly moving. This causes a slight negative charge on the left. This causes both molecules to have a slight attraction towards each other.

Kinetic Particle Theory (2)

Most solids have particles that are arranged in a tightly packed **crystalline structure**.

The crystalline structure is an orderly, repeating arrangement of particles called a crystal lattice.

Some solids aren't crystalline-shaped. The ones that aren't are called amorphous solids. Amorphous solids don't have orderly internal structures. Examples of amorphous solids include rubber, plastic and glass. Wax is also an amorphous solid. It can be moulded into any shape and remoulded anytime it is warmed up a bit.



Crystalline Amorphous

A **Phase Change** is when a substance changes from one phase to another. Every change has a different name. As you can see from the table, every state change has a process name.

State Change	Process	Example
solid --> liquid	melting	ice --> water
solid --> gas	sublimating	dry ice --> CO2 gas
liquid --> solid	freezing	water --> ice
liquid --> gas	vaporization	water --> water vapor
gas --> liquid	condensation	water vapor --> water
gas --> solid	deposition	water vapor --> ice

A **Phase Transition** is the change of substance from one phase to another where temperature does not increase.