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THE PERIODIC TABLE

- The periodic table is a method of classifying elements and its use is to predict properties of elements.

Periodic trends

- Metals are on the left-side.
- Non-metals are on the right-side.
- Group 1 elements have one valency electron, group 2 elements have two valency electrons, and so on.
- The metallic character decreases and the non-metallic character increases across the periods.
- In period 2, towards the left, there are metallic structures. In the middle, there are giant-covalent structures. On the right, there are non-metals with molecular structure.
- Metals on the left are basic oxides.
- Non-metals on the right are acidic oxides.

Alkali Metals

- They are soft and have low melting points.
- These metals are stored under oil so that they do not react with oxygen.
- When cut, they show a silvery surface that oxidises.
- The melting and boiling points decrease down the group.
- The metals get softer down the group.
- There is an increase in density down the group.

Reaction with water

lithium	fizzes slow, few bubbles	slowly disappears	remains solid, no flames
sodium	fizzes quick, many bubbles	moves quick on surface	melts - liquid ball, no flames
potassium	violent, more bubbles	very quick, on surface	melts - liquid ball, lilac flame

- when universal indicator is added to the trough, the solution turns purple.
 - An alkali has formed.
 - They have OH^- ions, which have come from the metal hydroxide.
 - Therefore, these group 1 metals are known as Alkali metals.
 - Symbol equations:
- $$2\text{Li(s)} + 2\text{H}_2\text{O(l)} \longrightarrow 2\text{LiOH(aq)} + \text{H}_2\text{(g)}$$
- $$2\text{Na(s)} + 2\text{H}_2\text{O(l)} \longrightarrow 2\text{NaOH(aq)} + \text{H}_2\text{(g)}$$
- $$2\text{K(s)} + 2\text{H}_2\text{O(l)} \longrightarrow 2\text{KOH(aq)} + \text{H}_2\text{(g)}$$

Halogens

- They are poisonous non-metals that have low melting and boiling points.
- They exist as diatomic molecules.

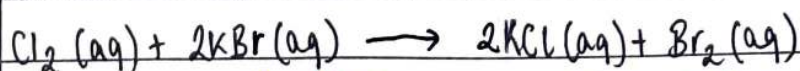
Physical Property

- At rtp, chlorine is a green gas.
- At rtp, bromine is a reddish-brown liquid.
- At rtp, iodine is a greyish-black solid.
- Melting and boiling points increase down the group.
- Fluorine is a pale yellow gas.
- Astatine is a black solid.
- The colour gets darker down the group.

Chemical properties

- Salts form when metals react with halogens, and these salts are halides.

Reaction with halide ions



- This is a displacement reaction. Chlorine has displaced bromine.
- This shows that reactivity decreases down the group.
- A more reactive halogen displaces a less reactive halogen from its.

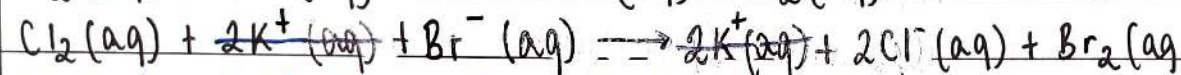
halide.

Halogen

Halide

	KCl	KBr	KI
chlorine	X	orange	brown
bromine	X	X	brown
iodine	X	X	X

- The displacement reactions are examples of redox reactions.



- Chlorine has gained electrons and has become chloride ion. This is a reduction.
- Bromide ions have lost electrons and have formed bromine.

Noble gases

- Gases in group 0 are called noble gases.
- They are unreactive.
- They have a full outer shell of electrons.
- They exist as mono-atomic gases.

Uses

- Helium
 - weather balloons
 - airships
 - used instead of hydrogen, which is highly flammable.
- Neon
 - signboards
- Argon
 - electrical light bulbs that have tungsten filament.
 - inert atmosphere for titanium extraction, not allowing it to oxidise.

Physical Properties

- They are colourless.
- Density of the noble gases increases down the group.
- Boiling points increase down the group.

Transition elements

- Transition elements form a block in the middle of the periodic table of 30 elements.

Physical Properties

- conduct heat and electricity
- shiny
- sonorous
- high melting and boiling points
- high densities
- malleable
- ductile
- strong and hard

Chemical Properties

- more than one oxidation state (Fe^{2+} and Fe^{3+})
- form coloured salts (iron(II) - light green) (iron(III) - yellow or brown)
- complex ions
- ~~are~~ ^{act as} catalysts (iron - Haber's process) (vanadium - contact process)
- less reactive. They do not react with cold water, but some react with steam.