

6 – GROUPS IN THE PERIODIC TABLE

elements classified as: alkali metals (group 1) based on position in periodic table

halogens (group 7)

noble gases (group 0)

Group 1 – alkali metals

Lithium

sodium

potassium

rubidium

caesium

francium

soft & low melting points

More reactive going down: outer electron lost more easily in reaction – less force holding it to nucleus

reactions with water: produce hydroxide + hydrogen

Lithium:

move around surface

fizz vigorously

Sodium:

move around surface

fizz vigorously

Melt in heat of reaction

Potassium:

move around surface

fizz vigorously

Melt in heat of reaction

Ignite

Group 7 – halogens

Fluorine

chlorine

bromine

iodine

astatine

Exist as diatomic molecules: 2 atoms with covalent bond

Less reactive going down: harder to attract extra electron – further away from nucleus (extra shells)

Room temperature – going down: darker colour & increased melting point

Chlorine: green gas

Bromine: red-brown liquid, gives off orange vapour

Iodine: dark-grey crystalline solid, gives off purple vapour

test for chlorine: damp blue litmus paper turns white

Metal + halogen → metal halide

Halogen higher up reacts easier – attracts metal's outer shell electron easier

Hydrogen + halogen → hydrogen halide

Soluble in water – form acidic solutions

Displacement reactions

More reactive halogen displaces less reactive halogen

Redox reaction: halogen gains electron – reduced

Halide loses electron – oxidised

Astatine: least reactive – won't displace any other halogen from their salt solution

Group 0

Helium

neon

argon

krypton

xenon

radon

Inert: don't react at all – full electron outer shell

Uses depend on inertness / low density / non-flammability

Used to provide inert atmosphere

Filament lamps: non-flammable: stops hot lamp burning away – *argon*

Flash photography: stop flash filament burning during hot flashes – *argon/krypton/xenon*

Protect metals being welded: stops hot metal reacting with oxygen – *argon/helium*

Airships / balloon – *Helium*: lower density than air – makes balloons float

Non flammable – safer to use hydrogen gas

pattern in physical properties – use to predict physical properties of other noble gases

All colourless at room temperature

Monatomic: gases made up of single atoms

Boiling/melting point & density increase going down