

C1: Atomic Structure

And periodic table

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Metals & Non-Metals

Properties

- A property is a feature of something that can be measured or observed:
 - physical properties are measured using devices such as thermometers
 - chemical properties are determined by observing chemical reactions.
- The typical properties of metals and non-metals are different.

Physical properties of Metals and Non metals

Physical property	Metals	Non-metals
Melting point and boiling point	High	Low
Appearance when solid	Shiny	Dull
Density at rtp (room temperature and pressure)	High	Low
Electrical conductivity	Good	Poor
Thermal conductivity	Good	Poor
Response to external forces when solid	Malleable and ductile	Brittle

Chemical Properties of Metals and Non metals

Chemical property	Metals	Non-metals
Bonding between atoms	Metallic	Covalent
Reactions with metals	None - mixtures (alloys) form	Ionic compounds form
Reactions with non-metals	Ionic compounds form	Simple molecules or giant covalent structures form
Ions formed in reactions and during electrolysis	Positively charged (cations)	Negatively charged (anions)
Oxides	Basic (soluble oxides form alkaline solutions) React with acids	Acidic React with bases

Electronic configurations of metals and non-metals

Chemical reactions involve atoms losing, gaining or sharing electrons. The more easily this happens, the more reactive an element is.

1- Metals

- Metal atoms lose electrons when they react with non-metals. They form positively charged ions when they do this.

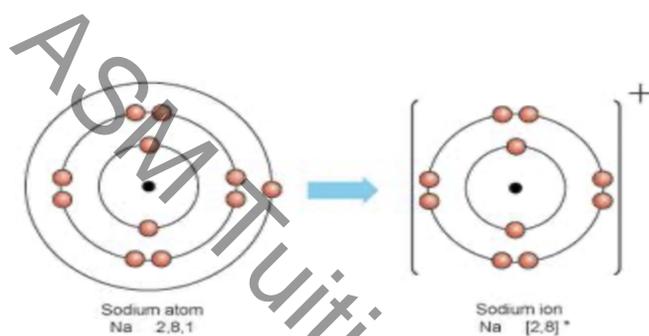
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Group in the periodic table	1	2	3 (13)
Number of outer electrons	1	2	3
Number of electrons lost	1	2	3
Charge on the ions formed	+1	+2	+3

- **Example** : Sodium is in group 1. A sodium atom loses its outer electron to form a sodium ion, Na^+



- In general, group 1 metals are more reactive than group 2 metals, and these are more reactive than group 3 metals. Also, metals become more reactive as you go down a group. This means that the most reactive metals are found towards the **bottom left** of the periodic table.

2- Non-metals

- Non-metal atoms gain electrons when they react with metals. They form negatively charged ions when they do this.

Group in the periodic table	5 (15)	6 (16)	7 (17)
Number of outer electrons	5	6	7
Number of electrons gained	3	2	1
Charge on the ions formed	-3	-2	-1

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