

Period 3

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Metals- Na, Mg and Al conduct electricity

- Sea of delocalised electrons that surround cations are free to move and carry charge when a potential difference is applied

conductors

Silicon a metalloid

- Few electrons have enough energy to enter higher energy level at r.t
- Few delocalised electrons
- Increase in temp, more electrons promoted to higher energy level
- more delocalised electrons to move and carry charge

Semi conductor

Do not conduct

Non metals- P, S, Cl

- Fixed position in simple covalent bond
- No delocalised electrons to move and carry charge

- Takes a lot of energy to break the electrostatic attraction between the cations and the sea of delocalised electrons

High m.t

- Melting temp is higher of Al than Na because it has more electrons so the attraction is greater

Na	Mg	Al	Si	P	S	Cl	Ar
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Metallic

Giant covalent

Simple covalent

Intermolecular

Very low m.t

As it is monoatomic, it has very weak Van der Waals forces

High m.t

- Strong covalent bonds make it difficult to melt

Low m.t

- Weak forces of attraction between the molecules- requires little energy to overcome the intermolecular forces
- Sulphur has a higher m.t than Cl and P because it has more atoms in the molecule so it has stronger Van der Waals forces

Atomic radii decreases across the period

- Additional protons
- The nuclear charge increases
- More electrons in outermost shell
- Held less tightly
- Radii decreases

Ionisation energy generally increases

- More protons in nucleus
- Nuclear charge is greater
- The attraction between the outermost electron and the nuclei increases
- Constant shielding
- Increasing ionisation energy

Fall at Aluminium

- p orbital- outermost electron for Al
- s orbital- Mg

- Al is more distant from the nuclei than Mg
- p orbital is shielded by the s orbital and inner shells
- Ionisation energy decreases

Fall at Sulphur

- Phosphorus- 3p electrons are unpaired
- Sulphur- begin to pair up
- In the same subshell, there is some repulsions between the paired electrons
- Reduces attraction to the nucleus
- Less energy need to remove paired electron than to remove unpaired

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Page 1 of 1