



Ionic	Particles are oppositely charged ions	Occurs in compounds formed from metals combined with non metals.
Covalent	Particles are atoms that share pairs of electrons	Occurs in most non metallic elements and in compounds of non metals.
Metallic	Particles are atoms which share delocalised electrons	Occurs in metallic elements and alloys.

Solid, liquid, gas	Melting and freezing happen at melting point, boiling and condensing happen at boiling point.	The amount of energy needed for a state change depends on the strength of forces between particles in the substance.	(HT only) Limitations of simple model: - There are no forces in the model - All particles are shown as spheres - Spheres are solid	s	solid
				l	liquid
				g	gas

High melting and boiling points	Large amounts of energy needed to break the bonds.
Do not conduct electricity when solid	Ions are held in a fixed position in the lattice and cannot move.
Do conduct electricity when molten or dissolved	Lattice breaks apart and the ions are free to move.

Properties of ionic compounds

Chemical bonds

The three states of matter

Good conductors of electricity
Good conductors of thermal energy

Delocalised electrons carry electrical charge through the metal.
Energy is transferred by the delocalised electrons.

High melting and boiling points	This is due to the strong metallic bonds.
Pure metals can be bent and shaped	Atoms are arranged in layers that can slide over each other.

AQA BONDING, STRUCTURE AND THE PROPERTIES OF MATTER 1

Metals as conductors

Properties of metals and alloys

Alloys	Mixture of two or more elements at least one of which is a metal	Harder than pure metals because atoms of different sizes disrupt the layers so they cannot slide over each other.
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Pure metal	Alloy

Metallic bonding

Electrons are transferred so that all atoms have a noble gas configuration (full outer shells).	Metal atoms lose electrons and become positively charged ions	Group 1 metals form +1 ions Group 2 metals form +2 ions
	Non metals atoms gain electrons to become negatively charged ions	Group 6 non metals form -2 ions Group 7 non metals form -1 ions

Ionic compounds

Dot and cross diagram	
Giant structure	

Structure	- Held together by strong electrostatic forces of attraction between oppositely charged ions - Forces act in all directions in the lattice
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Giant structure of atoms arranged in a regular pattern		Electrons in the outer shell of metal atoms are delocalised and free to move through the whole structure. This sharing of electrons leads to strong metallic bonds.
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