



C4.2 Glossary

Anode

The positively charged electrode used in electrolysis.
Negatively charged ions such as fluoride ions are attracted to the **anode**.

Bioleaching (HT only)

A process that uses bacteria to produce leachate solutions that contain metal compounds.
Bacteria carry out **bioleaching** to extract copper ions from ores.

Cathode

The negatively charged electrode used in electrolysis.
Positively charged ions such as sodium ions are attracted to the **cathode**.

Corrosion

The destruction of materials by chemical reactions with substances in the environment.
Rusting is an example of corrosion.

Cryolite

A compound that reduces the melting point of aluminium oxide,
Cryolite is used for the electrolysis of molten aluminium oxide.

Discharged

When ions gain or lose electrons to form neutral atoms or molecules.
Sodium ions are **discharged** at the cathode during electrolysis.

Displacement reaction

A reaction where a more reactive element replaces a less reactive element in a compound.
A **displacement reaction** takes place when carbon reacts with iron oxide.

Electrode

A conductor through which electricity can flow.
Anodes and cathodes are **conductors** and can be made of graphite.

Electrolysis

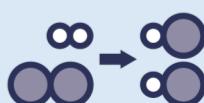
The process of passing an electric current through a substance, to split it up into its ions.
Electrolysis requires an electrolyte, electrodes and a power source.

Electrolyte

A liquid containing ions that current is passed through during electrolysis.
An aqueous solution of sodium chloride is an example of an **electrolyte**.

Electron

A negatively charged subatomic particle that orbits the nucleus of an atom.
In ionic bonding electrons are transferred from one atom to another.



**Electroplating**

Adding a thin layer of metal to an object using electrolysis.

A metal spoon can be **electroplated** with silver.

Empirical formula

The simplest ratio of atoms of each element in a compound.

The empirical formula of calcium hydroxide is $\text{Ca}(\text{OH})_2$.

Extracted

To take something out

Aluminium can be extracted from its ore, aluminium oxide, using electrolysis.

Galvanise (SS only)

Zinc is used as a sacrificial metal to prevent the corrosion of iron.

Iron pipes can be **galvanised** to prevent corrosion.

Half equation (HT only)

A rock that contains enough metal compound to extract the metal.

Haematite is a common iron oxide **ore**.

Ion

A charged particle or group of particles.

A sodium **ion** has a positive charge.

Ionic bonding

Ionic bonding occurs in compounds formed from metals combined with non-metals. Electrons are lost or gained to form a stable electronic configuration.

Ionic bonding occurs in sodium chloride because sodium is a metal and chlorine is a non-metal. As sodium chloride forms, an electron is transferred from a sodium atom to a chlorine atom, forming Na^+ and F^- ions.

Ionic equation (HT only)

A balanced symbol equation that shows the reacting ions in a chemical reaction.

Ionic equations allow us to see more easily what has been oxidised and what has been reduced in a reaction..

Low-grade ore

An ore that contains a very low percentage of the metal or compound to be extracted.

Most nickel ores are **low-grade ores**.

Mining

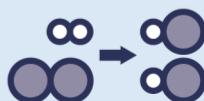
The digging and moving of rock from the Earth.

Mining is needed to obtain metal ores but it can be destructive to wildlife.

Molten

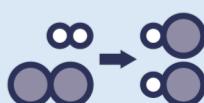
When a substance has been heated so it is a liquid.

Molten aluminium oxide can be electrolysed.





Ore	A rock that contains enough metal compound to extract the metal. <i>Haematite is a common iron oxide ore.</i>
Oxidation	When electrons are lost. When a magnesium atom is oxidised , it loses two electrons and becomes a Mg^{2+} ion.
Phytomining (HT only)	An extraction process that uses plants to absorb metal compounds. The plants are harvested and then burned to produce ash that contains metal compounds. <i>Phytomining is used to extract copper from copper ores.</i>
Pure	A substance that is made from only one type of particle. Pure , molten aluminium oxide only contains aluminium ions and oxide ions.
Recasting/ reforming	When molten, recycled metal is used to form something new. <i>During the recycling process, molten aluminium can be recast to form cans.</i>
Recycling	When a substance is collected and processed to form a usable material. <i>Metals can be recycled by melting and recasting or reforming into different products.</i>
Redox	A reaction in which oxidation and reduction take place at the same time <i>When a metal and oxygen react, a redox reaction occurs.</i>
Reduction	When electrons are gained. When a chlorine atom is reduced , it gains two electrons and becomes a Cl^{-2} ion.
Rusting	The corrosion of iron. <i>Iron rusts when it reacts with oxygen.</i>
Sacrificial protection (SS only)	When a metal contains a coating of a more reactive metal so that it is protected from corrosion. <i>Magnesium can be used to coat iron as sacrificial protection which prevents iron from being oxidised and therefore rusting.</i>
Spectator ions	Ions that are the same in the reactants and the products. <i>Spectator ions are excluded when we write ionic equations.</i>



Sustainable

Recycling and reusing materials when there is a limited amount of the material on Earth.

Recycling metals ensures the **sustainable** use of metals.

**Valence
electron(s)**

Electrons in the outer shell of an atom or ion.

A fluorine atom has 7 **valence electrons**.

