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 $Ca(OH)_2$.*
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 balances 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. *Haematite is a common iron oxide **ore**.*
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. ***Phytomining** is used to extract copper from copper ores.*
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. *During the recycling process, molten aluminium can be **recast** to form cans.*
Recycling	When a substance is collected and processed to form a usable material. *Metals can be **recycled** by melting and recasting or reforming into different products.*
Redox	A reaction in which oxidation and reduction take place at the same time *When a metal and oxygen react, a **redox** reaction occurs.*
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. *Iron **rusts** when it reacts with oxygen.*
Sacrificial protection (SS only)	When a metal contains a coating of a more reactive metal so that it is protected from corrosion. *Magnesium can be used to coat iron as **sacrificial protection** which prevents iron from being oxidised and therefore rusting.*
Spectator ions	Ions that are the same in the reactants and the products. ***Spectator ions** are excluded when we write ionic equations.*

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**.*