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Chemical Equations

Reactions of the alkali metals with air

Alkali metals react with air and quickly lose their shine to form a metal oxide.

metal	+	**oxygen**	→	**metal oxide**

lithium
lithium + oxygen → lithium oxide $4Li + O_2 \rightarrow 2Li_2O$
sodium
sodium + oxygen → sodium oxide $4Na + O_2 \rightarrow 2Na_2O$

Reactions of the alkali metals with water

(Word equation only is necessary)

Alkali metals react vigorously with water.

metal	+	**water**	→	**metal hydroxide**	+	**hydrogen**

lithium
lithium + water → lithium hydroxide + hydrogen
sodium
sodium + water → sodium hydroxide + hydrogen

Reaction between zinc and HCl

Zinc	+	hydrochloric acid	→	zinc chloride + hydrogen

$$Zn + 2HCl \rightarrow ZnCl_2 + H_2$$

Neutralisation

The properties of an acid are counteracted or neutralised by a base; this type of reaction is called a neutralisation reaction.

When an acid reacts with a base the hydrogen in the acid is replaced by a metal and a salt is formed

Sodium and calcium are examples of metals

General formula to represent neutralisation reaction:

Acid	+	**Base**	→	**Salt**	+	**Water**

Example 1

hydrochloric acid	+	sodium hydroxide	→	sodium chloride	+	Water
HCL	+	NaOH	→	NaCl	+	H_2O

Example 2

hydrochloric acid	+	calcium carbonate	→	calcium chloride	+	CO_2	+	Water
2HCl	+	$CaCO_3$	→	$CaCl_2$	+	CO_2	+	H_2O

Preparation of oxygen

Hydrogen peroxide	→	oxygen	+	water

H_2O_2 → O_2 + H_2O

Manganese dioxide (MnO_2) is added in as a catalyst (to speed up the reaction)

Preparation of carbon dioxide

Calcium carbonate (Marble chips)	+	Hydrochloric acid	→	Calcium Chloride	+ Water +	Carbon Dioxide

$CaCO_3$ + 2HCl → $CaCl_2$ + H_2O + CO_2

Limewater and carbon dioxide

Limewater	+	carbon dioxide	→	calcium carbonate	+	water

$Ca(OH)_2$ + CO_2 → $CaCO_3$ + H_2O

Aerobic respiration

Glucose	+	oxygen	→	Energy	+	carbon dioxide	+	water

Photosynthesis

Carbon dioxide	+	water	(+ sunlight and chlorophyll)	→	glucose	+	oxygen