**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**

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| --- |
| **lithium** |
| lithium + oxygen → lithium oxide  4Li + O2 → 2Li2O |
|  |
| **sodium** |
| sodium + oxygen → sodium oxide  4Na + O2 → 2Na2O |

**Reactions of the alkali metals with water**

(Word equation only is necessary)

Alkali metals react vigorously with water.

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

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| --- |
| **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 → ZnCl2 + H2

**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 + H2O

**Example 2**

hydrochloric acid + calcium carbonate → calcium chloride + CO2  + Water

2HCl + CaCO3 → CaCl2 + CO2 + H2O

**Preparation of oxygen**

Hydrogen peroxide → oxygen + water

H2O2 → O2 + H2O

Manganese dioxide (MnO2) is added in as a catalyst (to speed up the reaction)

**Preparation of carbon dioxide**

Calcium carbonate + Hydrochloric acid 🡪 Calcium Chloride + Water + Carbon Dioxide

(Marble chips)

CaCO3 + 2HCl → CaCl2 + H2O + CO2

**Limewater and carbon dioxide**

Limewater + carbon dioxide → calcium carbonate + water

Ca(OH)2 + CO2 → CaCO3 + H2O

**Aerobic respiration**

Glucose + oxygen → Energy + carbon dioxide + water

**Photosynthesis**

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