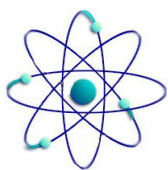


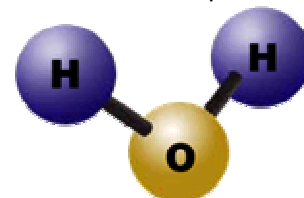
Summary

Atoms, molecules and compounds



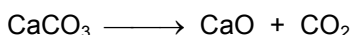
All substances are made up of **atoms**. A substance which is made up of only one kind of atom is called an **element**. There are about 100 elements which can usefully be ordered in the form of a **Periodic Table**, in which the columns (also known as **groups**) contain elements with similar properties. Atoms of each element are represented by a **chemical symbol**, e.g. O represents an atom of oxygen, Na an atom of sodium. Atoms have a small, positively-charged central **nucleus** around which there are negatively-charged **electrons**.

When elements react, their atoms join with other atoms (by transferring or sharing electrons) to form **compounds** which are held together by **chemical bonds**. The **formula** of a compound shows the number of atoms of each element which are joined together in one unit of the compound. The formula of a particular compound is fixed and invariable. Some solid substances are made up of infinite lattices of joined atoms and are known as **giant structures**. Examples include sodium chloride (NaCl) and diamond (C). Other substances are made up of small groups of joined atoms and are known as **molecules**. Examples include oxygen (O₂) and carbon dioxide (CO₂). In a chemical reaction, no atoms can be gained or lost – a **balanced symbol equation** represents how atoms in the reactants are rearranged to form the products.



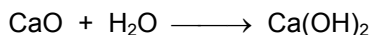
Limestone

When deep layers of the remains of tiny sea plants and animals build up over millions of years, the pressure causes them to form into the rock known as **limestone**. Limestone is an impure form of **calcium carbonate** (CaCO₃). It is quarried and can be used directly as building material. On heating, it undergoes **thermal decomposition** to form calcium oxide (**quicklime**, CaO) and carbon dioxide gas. This process is carried out commercially in a lime kiln.

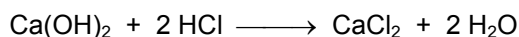


Carbonates of other metals (except those of very reactive metals such as sodium and potassium) thermally decompose in a similar manner.

Quicklime reacts with water (giving out much heat) to form **slaked lime** (calcium hydroxide, lime water, Ca(OH)₂)



Slaked lime is a base (it neutralises acids) and is used for treating acidic soil and water.



Limestone is also the raw material for a number of other building materials as summarised in the chart below.

