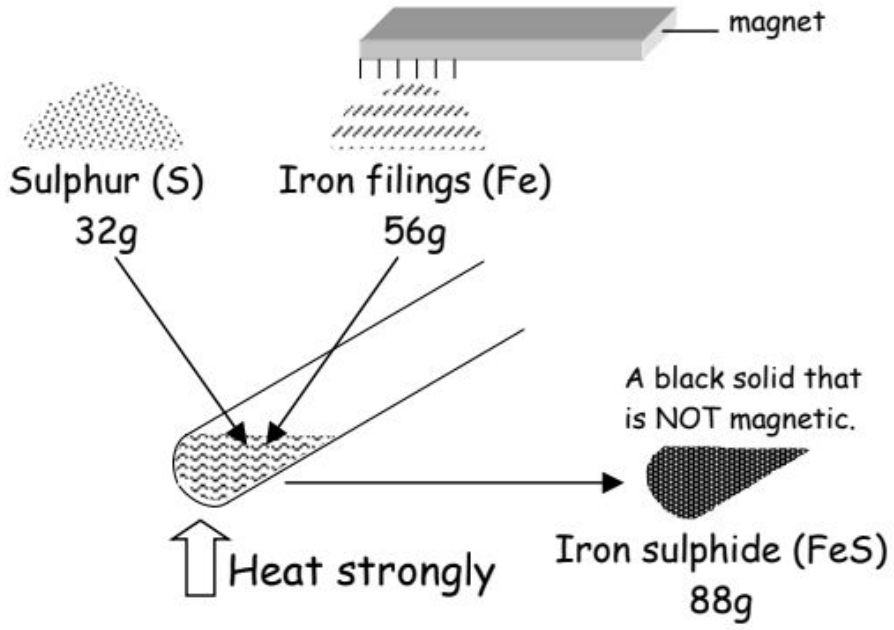
Alchemy
KS3
Monday - Science

Alchemy is an ancient science that came before chemistry. The aim of alchemy was to try and change certain materials and substances into other materials. Many alchemists particularly tried to turn other metals into gold. Of course, today we know that this is not possible as this is one of the elements on the periodic table, but in chemistry we can create chemical reactions where the reactants (the substances we started with) react to make the new products.

Chemical Reactions

All of the different materials around us have been formed by chemical reactions from about one hundred simple elements. The diagram below shows a chemical reaction between the elements iron and sulphur.



This reaction can be shown as a word equation:

IRON + SULPHUR → IRON SULPHIDE

(REACTANTS) (PRODUCT)

The new substance formed is a compound called iron sulphide. It has different properties to the iron and sulphur that it is made from.

Fill in the missing words

1. The mass of the reactants (starting chemicals) is E _ _ _ _ to the mass of the products (the chemicals that are made).
2. The products have different P _ _ _ _ _ _ _ _ _ to the reactants.

3. During a chemical reaction H _ _ _ is either taken in or given out.
4. A chemical change is difficult to R _ _ _ _ _ _ (go backwards).

Write down definitions to the following words:

1. Elements
2. Products
3. Compound
4. Reactants

There are several different types of chemical reaction.

Synthesis

Two or more substances join together to make a single new substance. For example when iron and sulphur are heated together :

IRON + SULPHUR $\xrightarrow{\text{heat}}$ IRON SULPHIDE

Decomposition

A substance breaks down into simpler substances. For example, if calcium carbonate (limestone) is heated to a very high temperature :

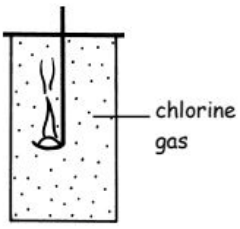
CALCIUM CARBONATE $\xrightarrow{\text{heat}}$ CALCIUM OXIDE + CARBON DIOXIDE

Oxidation

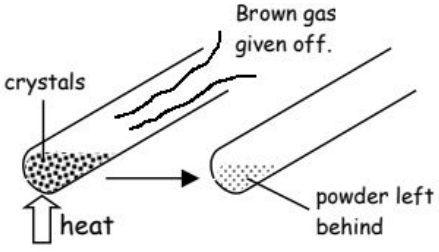
A substance gains oxygen during a chemical reaction. The substance that gains the oxygen is OXIDISED. For example, if copper is heated in air :

COPPER + OXYGEN $\xrightarrow{\text{heat}}$ COPPER OXIDE

For each diagram write down underneath the type of chemical reaction it shows.



1) Burning sodium metal in chlorine gas to form sodium chloride (salt). This type of reaction is :



2) Heating white lead nitrate crystals to produce a yellow powder and a brown gas. This type of reaction is :

3) If an iron nail is exposed to air it forms orange iron oxide (rust). This type of reaction is :