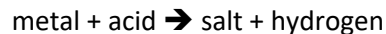


# Materials

## Metals and Acids

- Metals react with acids to produce a salt plus hydrogen.

Example -



- The name of the salt is created by combining the name of metal with the name of the acid.
- Nitric acid makes nitrate salts, hydrochloric acid makes chloride salts, and sulphuric acid makes sulphate salts.

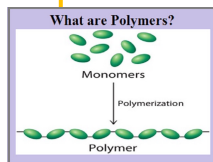
Example -



- Hydrogen is a gas, this creates fizzing.
- Hydrogen creates a squeaky pop when ignited with a lit splint.

## Polymers and composites

- Polymers are solids that are made of many small units or "monomers".
- Common polymers include polyethene (used to make plastic bags), PVC (used to make water pipes), Nylon and Lycra (which can be used to make fabrics that stretch).
- Polymers are chemically unreactive solids at room temperature, can be moulded into shape, are electrical and thermal insulators and are strong and hardwearing.
- Composites are materials that are made from two or more different types of material.
- Composites combine the properties of the materials they are made of to make stronger or more functional materials.
- Common composites include steel reinforced concrete, MDF, and fibreglass.



## Ceramics

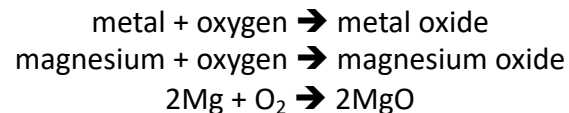
- Ceramics are solids made from baking material in a very hot oven
- They are very hard, tough, waterproof, have high melting points, are strong under compression, are unreactive and are electrical and thermal insulators
- Ceramics are often brittle so will break if dropped or bent
- Common ceramics are bricks, pottery, glass, porcelain, tiles and cement



## Metals and Oxygen

- An example of oxidation is when an element gains oxygen.
- Metals are normally found as ores where the metals have reacted with elements or compounds from the environment.
- Common ores are metal oxides where the metals have reacted with oxygen.

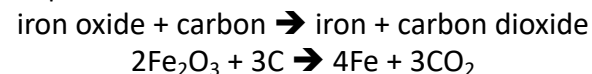
Example -



## Oxidation and reduction

- Carbon can be used to displace metals from their metal oxide.
- When carbon is used to extract metals from their ores it is called smelting.
- Carbon can only be used to extract metals that are lower on the reactivity series.

Example -



- Oxidation is when an element gains oxygen.
- Reduction is when an element loses oxygen.
- The more reactive element will gain oxygen.
- The least reactive element will lose oxygen.
- Redox reactions are a type of displacement reaction where both oxidation and reduction occur in the same reaction.

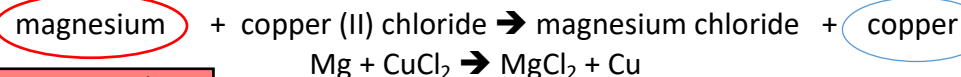
## Reactivity series

Potassium	most reactive
Sodium	
Calcium	
Magnesium	
Aluminium	
Carbon	
Zinc	
Iron	
Tin	
Lead	
Hydrogen	
Copper	
Silver	
Gold	
Platinum	least reactive

## Displacement

- A more reactive element will displace a less reactive element from its compound in a displacement reaction.

Example -



More reactive

Less reactive

- Metals and non-metals can be arranged in order of reactivity.
- Non-metals; hydrogen and carbon are also part of the reactivity series.

## Conservation of Mass

- In a chemical reaction the number and type of element remains the same, but the atoms change positions.
- In a chemical reaction bonds are broken, and new bonds can be formed.
- The mass of the reactants and the mass of the products are always the same.

Example -

