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10.3 USING MATERIALS (Chemistry only)

Alloys

- Steel
  - High carbon steel, low carbon steel, stainless steel
  - Properties and uses
  - Small amounts of carbon and other elements added to iron
- Gold alloys in jewellery
  - 24 carratt is 100% gold
  - Gold, silver, copper and zinc
- Low density aluminium alloys
  - Aircrafts
- Alloys are harder than pure metals
  - Bronze is an alloy of copper and tin
  - Brass is an alloy of copper and zinc
- Most metals are alloys

'Chemistry only' in blue

Corrosion

- Reactions with substances in the environment, causing materials to weaken
  - E.g. Rusting
    - Iron requires air and water to rust
  - Prevention
    - Painting
    - Greasing
    - Sacrificial protection
    - Electroplating
  - Aluminium – protective oxide coating

Composites

- One material set within another
  - E.g. carbon fibre
  - Matrix or binder surrounds the reinforcement
  - The reinforcement is often a polymer

Ceramics

- Clay ceramics formed when wet clay is shaped and fired in a hot furnace
  - Made from non-metals
  - High melting points
- Glass
  - Borosilicate glass
    - Made from sand and boron trioxide
  - Soda lime glass
    - Made from limestone, sand and sodium carbonate

Polymers

- Properties depend on monomers and reaction conditions
  - Comparison between high and low density poly(ethene)
- Thermosoftening polymers
  - Weak forces between chains
  - Melt and remoulded
- Thermosetting polymers
  - Do not melt when heated
  - Strong cross links

AQA

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