CAIE IGCSE Chemistry

9.3 Alloys and their properties

Notes

Describe an alloy as a mixture of a metal with other elements

- Alloys are metal compounds made by combining a metal with other elements. This process is carried out to give the material greater strength or resistance to corrosion.
- Examples of alloys:
    - Brass is a mixture of copper and zinc
    - Stainless steel is a mixture of iron and other elements like chromium, nickel and carbon

State that alloys can be harder and stronger than the pure metals and are more useful

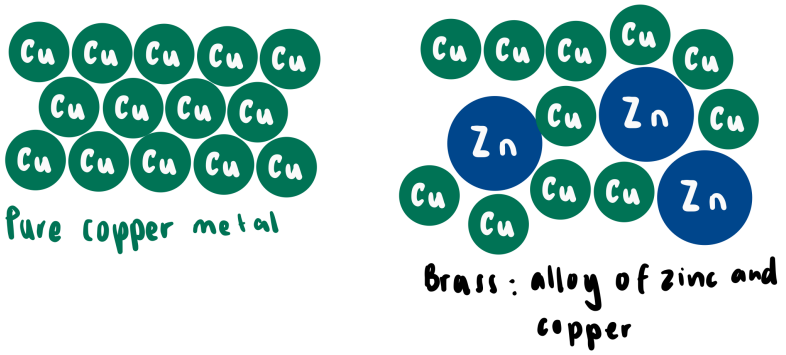
- Alloys generally have greater strength and hardness than pure metals, meaning their utility in the manufacture of other materials is more varied
    - E.g. Stainless steel is much harder than pure iron, which is very soft.

Describe the uses of alloys in terms of their physical properties

- Alloys can be used to make a variety of tools, as opposed to their pure metal counterparts, due to their hardness and resistance to corrosion/rusting
    - Corrosion is destruction of materials by chemical reactions with substances in the environment. E.g. iron rusts when in the presence of oxygen and water.
- For example to make cutlery, stainless steel is used since it is resistant to rusting and has greater hardness than pure iron

Identify representations of alloys from diagrams of structure

- The structure of pure metal has neat layers of identically-sized metal atoms
- Since alloys are compounds made up of 2 or more elements, the size of the atoms are different so the layers will be distorted:



(Extended only) Explain in terms of structure how alloys can be harder and stronger than the pure metals because the different sized atoms in alloys mean the layers can no longer slide over each other

- Alloys are stronger and harder than pure metals due to their difference in structure:
    - Pure metals have the same sized metal atoms so the layers are able to slide over each other = malleable and soft
    - Alloys have different sized metal (and non-metal) atoms so the layers are unable to slide over each other= hardness and strength