Your notes

GCSE Chemistry: revision notes

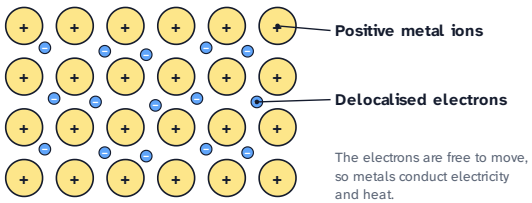
Metallic bonding and alloys

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Metallic bonding

- Metals have giant structures of atoms arranged in a regular pattern.
- The electrons in the outer shells of the metal atoms are delocalised: they are free to move through the whole structure.
- Metallic bonding is the strong attraction between the positive metal ions and the sea of **delocalised electrons**.



Properties of metals

- Most metals have high melting and boiling points, because **metallic bonds** are strong.
- Metals are good conductors of electricity, because the **delocalised electrons** carry charge through the metal.
- They are good conductors of thermal energy, because energy is transferred by the **delocalised electrons**.
- The layers of atoms can slide over each other, so metals can be bent and shaped (they are **malleable** and **ductile**).

Alloys

- Most pure metals are too soft for many uses, so they are mixed with other metals to make **alloys**, which are harder.
- In an **alloy**, atoms of different sizes distort the regular layers, making it harder for them to slide over each other.

- Examples: **steel** (iron with carbon and other elements), **brass** (copper and zinc), and gold **alloys** used in jewellery, where purity is measured in carats (24 carat is pure gold).

Your notes

Key terms

Metallic bond	The strong attraction between positive metal ions and delocalised electrons.
Delocalised electrons	Electrons that are free to move through a structure.
Alloy	A mixture of a metal with other elements, usually other metals.
Malleable	Able to be hammered or bent into shape.
Ductile	Able to be drawn out into wires.
Steel	An alloy of iron with carbon and other elements.
Brass	An alloy of copper and zinc.
Carat	A measure of the purity of gold; 24 carat is pure gold.

Quick questions

Cover the answers and test yourself: remembering is what makes it stick.

1. What is a metallic bond?
2. Why do metals conduct electricity?
3. Why can metals be bent into shape?
4. Why are alloys harder than pure metals?
5. What is an alloy?
6. Which metals make brass?
7. What is steel mainly made of?
8. What does 24 carat gold mean?

Answers

1. The attraction between positive metal ions and delocalised electrons
2. Delocalised electrons can move through the metal
3. Layers of atoms can slide over each other
4. Different-sized atoms distort the layers so they can't slide easily
5. A mixture of a metal with other elements
6. Copper and zinc
7. Iron
8. Pure gold

What to do next

Practise 10 questions on this topic

Try 5 exam questions, with mark schemes

Read the lesson, one step at a time

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