Metallic Bonding Alloys

GCSE Chemistry · Written to the shared content for AQA, Edexcel and OCR

Name _____ Class _____ Date _____

1. Worked example

Describe the structure and bonding in a metal. (3 marks)

Step 1 · Ions

A giant structure of positive metal ions arranged in a regular pattern (lattice).

Step 2 · Electrons

The outer electrons are delocalised: free to move through the whole structure.

Step 3 · Bond

Strong electrostatic attraction between the positive ions and the delocalised electrons.

Answer: Positive ions in a sea of delocalised electrons, strongly attracted

Check: Metallic bonding is strong, which explains high melting points.

2. Now try one with the steps

Explain why metals are good conductors of electricity. (2 marks)

Step 1 · Particles

Step 2 · Conduction

Answer:

3. Practice

Show your working. The marks tell you how much is expected.

1. Describe metallic bonding. [2]

2. Explain why metals conduct electricity. [2]

3. Explain why metals are good thermal conductors. [1]

4. Explain why pure metals can be bent and shaped. [2]

5. Define the term alloy. [1]

6. Explain why most metals have high melting points. [2]

7. Explain why alloys are harder than pure metals. [3]

8. Calculate the percentage of gold in 18 carat gold. (Pure gold is 24 carat.) [1]

9. Calculate the percentage of gold in 9 carat gold. [1]

10. Brass is 70% copper by mass. Calculate the mass of copper, in g, in 250 g of brass. [1]

11. A steel contains 0.5% carbon by mass. Calculate the mass of carbon, in g, in 2.0 kg of this steel. [2]

12. Suggest why jewellery is rarely made from pure (24 carat) gold. [1]

13. Calculate the mass of pure gold, in g, in a 15.0 g ring made of 18 carat gold. [2]

14. Copper is used for electrical wires, but brass is used for door handles. Suggest a reason for each choice. [2]

4. Before you hand it in

"An alloy is a compound of metals."

An alloy is a MIXTURE of a metal with other elements.

"Metals conduct because ions move."
Delocalised electrons move and carry charge.

"Alloys are harder because the atoms are bigger."
Atoms of different sizes distort the layers so they cannot slide.