

Ionic Covalent Bonding

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

Name _____ Class _____ Date _____

1. Worked example

Describe, in terms of electrons, how magnesium oxide forms from magnesium and oxygen atoms. (3 marks)

Step 1 · Magnesium

Mg (2,8,2) loses its 2 outer electrons to form Mg^{2+} (2,8).

Step 2 · Oxygen

O (2,6) gains 2 electrons to form O^{2-} (2,8).

Step 3 · Bond

The oppositely charged ions are held together by strong electrostatic attraction: an ionic bond.

Answer: Electrons transferred from Mg to O; Mg^{2+} and O^{2-} attract

Check: Say 'transferred', give both charges, and name the attraction.

2. Now try one with the steps

Describe the bonding in a molecule of hydrogen chloride, HCl. (2 marks)

Step 1 · Type

Step 2 · Detail

Answer:

3. Practice

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

1. State the type of bonding in potassium chloride. [1]

2. State the type of bonding in methane, CH_4 . [1]

3. Define the term covalent bond. [1]

4. State the charge on the ion formed by a group 2 element. [1]

5. State the charge on the ion formed by a group 6 element. [1]

6. Describe how a sodium atom and a chlorine atom form sodium chloride. [3]

7. Write the formula of the compound formed between calcium and fluorine. [1]

8. Write the formula of the compound formed between lithium and oxygen. [1]

9. State the number of shared pairs of electrons in a molecule of ammonia, NH_3 . [1]

10. A nitrogen molecule, N_2 , has a triple bond. State the total number of electrons shared. [1]

11. Write the electronic structure of a magnesium ion, Mg^{2+} . [1]

12. Describe metallic bonding. [2]

13. Give two limitations of dot-and-cross diagrams. [2]

14. Describe, in terms of electrons, how aluminium and oxygen atoms form aluminium oxide, Al_2O_3 . [3]

4. Before you hand it in

"Ionic bonding is sharing electrons."

Ionic: electrons TRANSFERRED from metal to non-metal. Covalent: electron pairs SHARED between non-metals.

"Sodium chloride is made of molecules."

Say 'ions in a giant ionic lattice'. Molecules are for covalent substances.

Drawing ions without brackets or charges

Put the ion in square brackets with its charge outside, e.g. $[\text{Cl}]^-$.

"Metals bond by sharing electrons with other metals."

Metal ions are held in a sea of delocalised electrons.