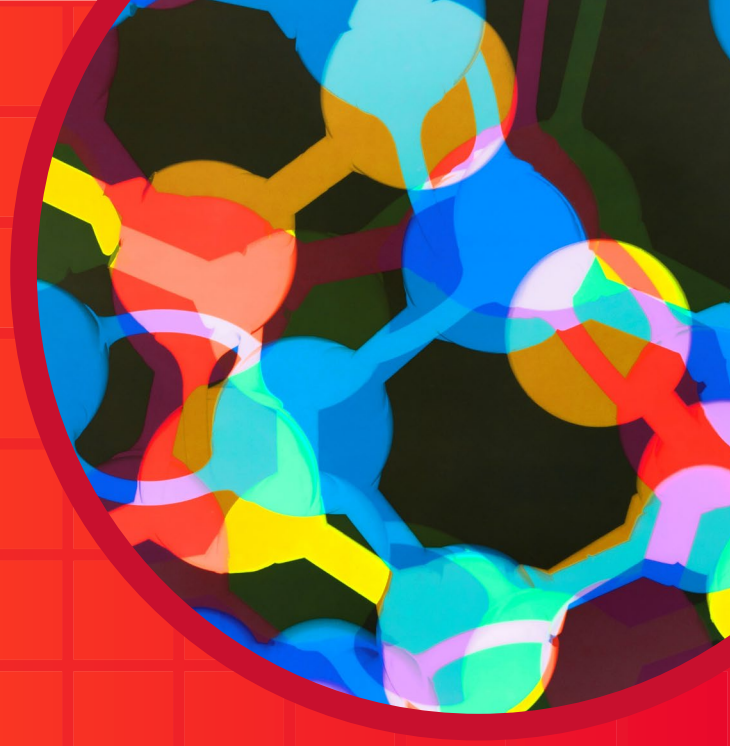
14–16 years

Bonding bingo!



ROYAL SOCIETY OF CHEMISTRY

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https://rsc.li/3lLvZ67

Learning objectives

1. Describe the structure and bonding of ionic, simple covalent, giant covalent and metallic structures.
2. Explain how the physical properties associated with these substances relate to their structure and bonding.

Sodium chloride vs iron

We will focus on two important structures: **sodium chloride** and **iron**.

On your mini whiteboard:

1. Write down **one similarity** between the structure or properties of sodium chloride and iron.
2. Compare your answer with your neighbour.

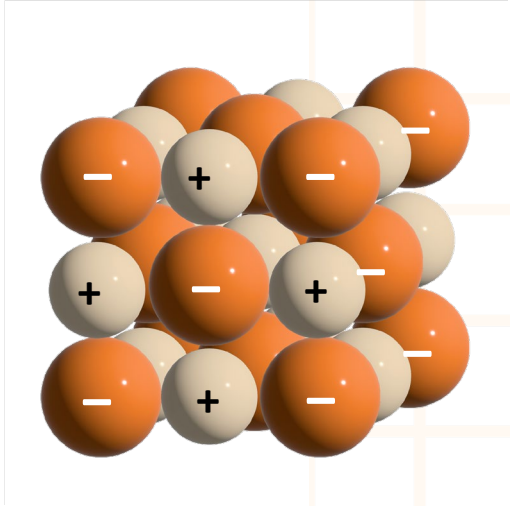
VS

Sodium chloride vs iron

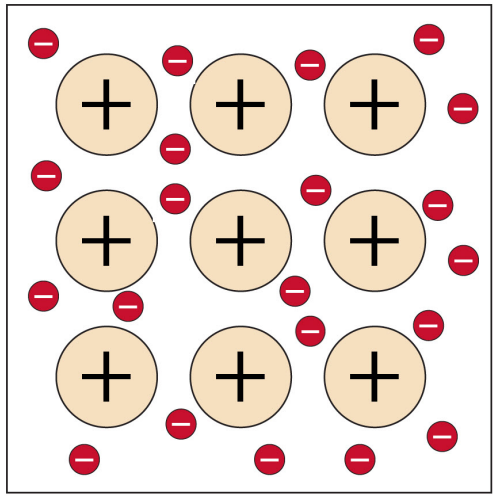
We will focus on two important structures: **sodium chloride** and **iron**.

Similarities:

- Both are **giant** structures
- Both have **lattice arrangements**
- Bonding involves **positive ions**
- Both have **high melting points**
- Both can be **electrical conductors**



VS



Sodium chloride vs iron

We will focus on two important structures: **sodium chloride** and **iron**.

On your mini whiteboard:

1. Write down **one similarity** between the structure or properties of sodium chloride and iron.
2. Compare your answer with your neighbour.
3. Write down **one difference** between the structure or properties of sodium chloride and iron.
4. Compare your answer with your neighbour.

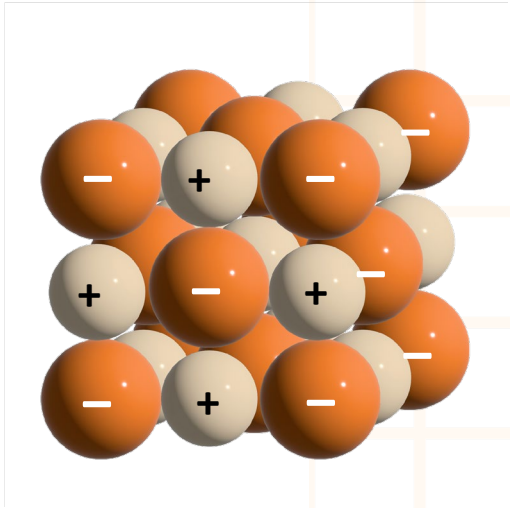
VS

Sodium chloride vs iron

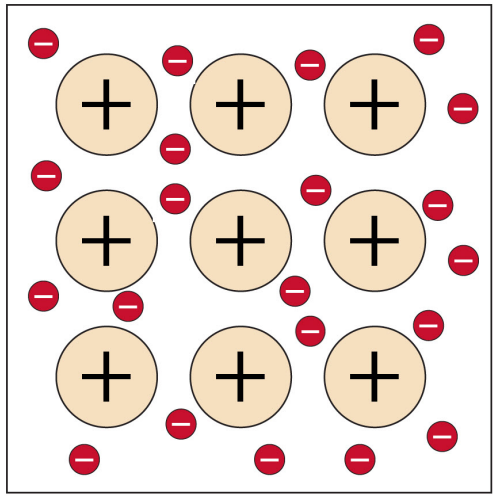
We will focus on two important structures: **sodium chloride** and **iron**.

Differences:

- Only iron has ‘delocalised electrons’.
- Sodium chloride’s bonding involves positive **and** negative ions; iron’s bonding **only** involves positive ions.
- Only sodium chloride is soluble in water.
- Iron is a shiny grey solid at room temperature; sodium chloride is a white crystalline solid.
- Iron conducts electricity as a solid; sodium chloride only conducts when molten or dissolved.



VS



Bonding bingo!

You will be working in **teams of two** for this task.

1. Each team will be given:
    - a substance card
    - a bingo grid
2. Your goal is to correctly identify which substance your opponent has on their card by asking them questions.

Before the game starts

Write down some questions that have a ‘yes’ or ‘no’ answer about the structure or properties of materials.

Think carefully about what might best help you to identify the substance.

The nine possible substances are:

- Chlorine
- Diamond
- Graphite
- Sodium
- Magnesium oxide
- Methane
- Sodium chloride
- Water
- Aluminium

Bonding bingo!

- Your team will sit with another team.
- Decide which team asks the questions first.
    - You will only be told ‘yes’ or ‘no’ as the answer to each question.
    - You will only have **one guess** to correctly identify the substance.
- If you guess correctly, the other team will cross the substance off from your bingo grid.
- Work your way around the teams in the class until you have correctly identified all nine substances on your bingo grid. The first team to do this wins.

Reflections

- Which substances were the **easiest** to identify? Why?
- Which substances were the **most difficult** to identify? Why?
- Which questions were the **most useful** to ask?
- Which questions were the **least useful** to ask?

Next to each substance on your bingo card, rate it red, amber or green based on your **confidence** in identifying its structure and properties.

Red = low confidence.

Amber = medium confidence.

Green = high confidence.

Chlorine	Diamond	Graphite
Magnesium oxide	Methane	Sodium chloride
Aluminium	Water	Sodium

Reflection