Bonding: knowledge check

1. Complete the sentences.

The image shows three diagrams, each representing a different type of bonding.

A. Shows the dot and cross diagrams for Li and F followed by the dot and cross diagram for Li+ and F-

B. Shows the dot and cross diagrams for four H atoms and one C atom followed by the dot and cross diagram for CH4.

C. Shows the outer shell dot and cross diagram for five Mg atoms followed by five circles containing Mg2+ surrounded by 10 crosses.

* 1. The type of bonding in figure A is \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.
  2. The type of bonding in figure B is \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.
  3. The type of bonding in figure C is \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

1. Complete the sentences.

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ bonding – this bond is formed when electrons are \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ from a metal atom to a \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ atom, forming positively charged ions and \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ charged ions. Strong \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_­­­\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ attract the oppositely charged ions to each other.

1. Complete the sentences.

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ bonding – this bonding occurs between \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ atoms. In a single covalent bond, a pair of \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ is shared between two atoms. These shared electrons are found in the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ shells of the atoms. Each atom contributes one \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ to the shared pair of electrons.

1. Complete the sentences usingsuitable words.

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ bonding – the electrons leave the outer shells of metal atoms, forming positive metal ions and a ‘sea’ of delocalised \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ that are free to move. This bond is the result of the strong \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ of attraction between the positive metal \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_and the negative delocalised \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

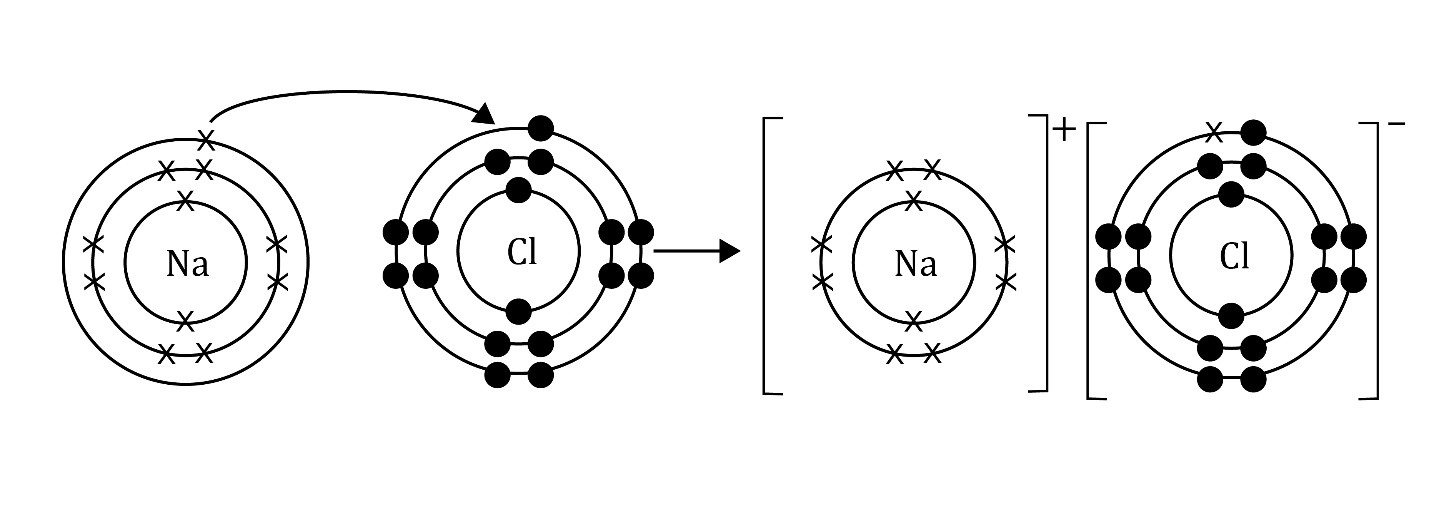
Bonding: test myself

Complete the sentences using suitable words.

1. What types of elements are involved in:
   1. ionic bonding? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
   2. covalent bonding? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
   3. metallic bonding? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
2. In which type of bonding are electrons shared?

Electrons are shared in \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ bonding.

1. What does the curved arrow represent in the diagram?



The arrow represents an \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ being \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_from one atom to another.

1. What type of forces hold the particles together in an ionic bond?

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ forces of attraction hold the particles together in an ionic bond.

1. What does ‘delocalised’ mean?

Delocalised means that the electrons are \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ to move around.

1. What are the charged particles called in an ionic compound?

The charged particles in an ionic compound are called \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

1. What type of bonds do you find in a compound?

The bonds in a compound can be either \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ or \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

1. Why are metals good conductors of electricity?

Metals are good conductors of electricity because they contain \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ that are free to \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ and carry the charge.

1. How do ionic compounds conduct electricity when solid, liquid and in solution? Explain your answer.

Ionic compounds cannot conduct electricity when they are in the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ state because the ions are not free to move.   
They can conduct electricity when they are in a \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ or when they are \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ because the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ can \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ and carry the charge.

1. Why are most covalent substances non-conductors of electricity?

Most covalent compounds do not conduct electricity because they do not have \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ particles (\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ or \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_) that can move and carry the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ .

Bonding: feeling confident?

Complete the bonding diagrams.

1. The reaction between magnesium and fluorine.

An incomplete diagram to show the bonding between Mg and F.

On the left is the symbol Mg surrounded by three concentric circles, the symbol F surrounded by two concentric circles and another symbol F surrounded by two concentric circles. In the centre is an arrow pointing towards the right.. The right hand side is left blank for the learner to complete.

1. The reaction between hydrogen and chlorine.

An incomplete diagram to show the bonding between H and Cl.

On the left is the symbol H in the centre of a circle  and the symbol CL surrounded by three concentric circles. In the centre is an arrow pointing towards the right. The right hand side is left blank for the learner to complete.

1. The metallic bonding in zinc.

An incomplete diagram to show the bonding in Zn.

There are four circles. Each circle has the symbol Zn2+ in the centre.

Bonding: what do I understand?

Think about your answers and confidence level for each mini-topic. Decide whether you understand it well, are unsure or need more help. Tick the appropriate column.

|  |  |  |  |
| --- | --- | --- | --- |
| **Mini-topic** | **I understand  this well** | **I think I understand this** | **I need more  help** |
| I can identify ionic, covalent and metallic bonds from diagrams. |  |  |  |
| I know that there are ions in ionic bonds. |  |  |  |
| I know about electrostatic forces in ionic bonds. |  |  |  |
| I know that electrons are shared in covalent bonds. |  |  |  |
| I know that there are positive metal ions and negative delocalised electrons in metallic bonds. |  |  |  |
| I know the types of elements involved in:   * ionic bonds * covalent bonds * metallic bonds. |  |  |  |
| I can explain why metals conduct electricity. |  |  |  |
| I can explain the conditions required for ionic compounds to conduct electricity. |  |  |  |
| I can explain why covalent substances do not conduct electricity. |  |  |  |
| **Feeling confident? topics** | **I understand  this well** | **I think I understand this** | **I need more  help** |
| I can draw diagrams to represent ionic and covalent bonds. |  |  |  |