
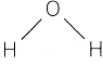

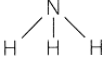

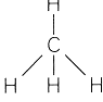
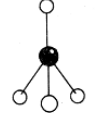
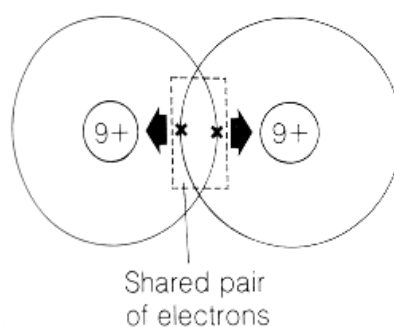


**UNIT 1 SUMMARY SHEET**  
**BUILDING BLOCKS**  
**PART 2**

1. Molecules are made up of two or more **atoms** joined together by strong covalent bonds.

<i>Molecule</i>	<i>Arrangement of atoms</i>	<i>Shape</i>	<i>Diagram of model</i>
Hydrogen chloride	H—Cl	linear	
Hydrogen oxide (water)		planar (flat)	
Nitrogen hydride (ammonia)		pyramidal	
Carbon hydride (methane)		tetrahedral	

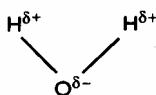
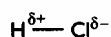
2. Atoms form bonds to achieve a stable electron arrangement.
3. A covalent bond is formed by atoms sharing a pair of electrons. A covalent bond is held together by the attraction of the nuclei for the shared electrons.



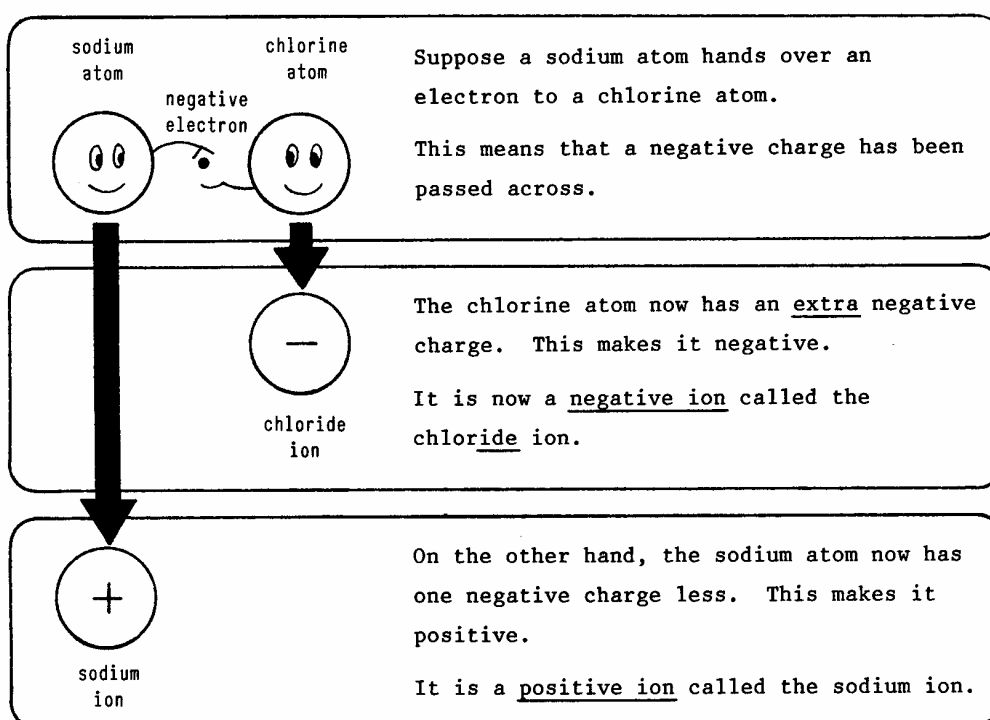
Both nuclei in a fluorine molecule attract the shared pair of electrons

4. Covalent bonds are strong forces of attraction.

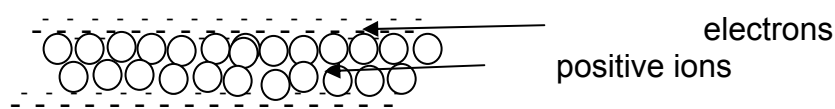
5. Polar covalent bonds are formed when the attraction of the atoms for the shared electrons is different. The atom with the greatest attraction has a slightly negative charge as the shared electrons are held closer to this atom.



6. Water has a much higher melting and boiling point because they contain highly polar bonds.
7. Ions are formed by atoms losing or gaining electrons.



8. Ionic compounds are made up of oppositely charged ions. It is the electrostatic attraction of these oppositely charged ions that is called the ionic bond.
9. Ionic compounds are usually formed when metals combine with non-metals. Covalent compounds are formed when non-metals combine.
10. Metallic bonding is the electrostatic attraction between positively charged ions and delocalised electrons.

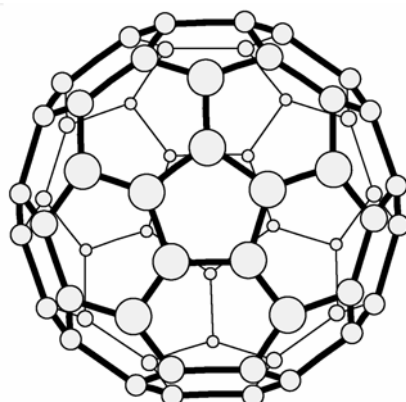


metallic bonding

11. Diatomic molecules are made up of 2 atoms joined together.

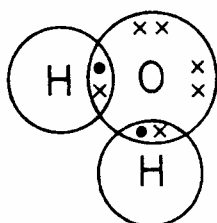
e.g.  $H_2$ ,  $N_2$ ,  $O_2$ ,  $CO$ , any of the halogens.

12. In molecular covalent substances the force of attraction between the molecules is weak. This force increases with increasing molecular mass.

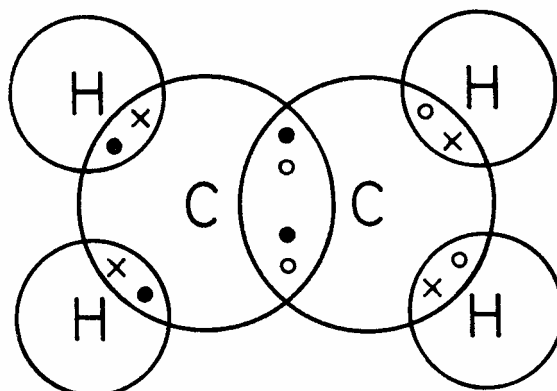


A fullerene molecule.

13. Dot cross diagrams can be drawn to show how the outer electrons are shared in a covalent molecule.



Water

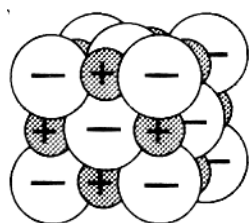


Ethene

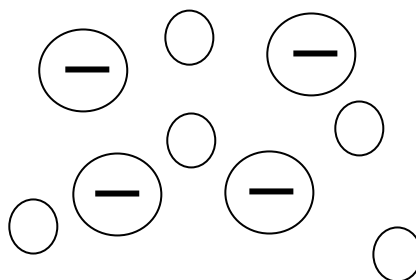
14. A formula gives the simplest ratio of atoms or ions in a compound.

15. Metals and graphite conduct electricity when solid because they contain free moving electrons.

16. Ionic substances do not conduct electricity when solid because ions are not free to move. However they do conduct when liquid or in solution because ions become free to move.

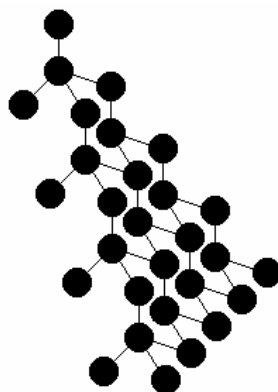


ions held in a lattice



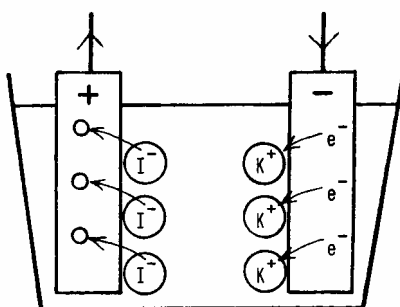
lattice breaks, ions free to move

17. Metallic and ionic substances have high melting and boiling points. Molecular covalent substances have low melting and boiling points.
18. A network covalent substance is held together by a network of strong covalent bonds.
19. Network covalent substances have very high melting and boiling points since strong covalent bonds must be broken.

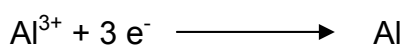


A plane of carbon atoms from a diamond crystal.

20. Ionic substances are usually soluble in water. Covalent substances which are insoluble in water may dissolve in other substances. e.g. paint dissolves in white spirit but not in water .
21. An electric current is a flow of charged particles.
22. Electrolysis is the flow of ions through solutions and molten compounds.
23. Solutions or liquids which conduct electricity are called electrolytes.
24. Electrolysis chemically changes an electrolyte and may lead to the break up of the compound into its elements.
25. A DC supply must be used if the products of electrolysis are to be identified.
26. Metals are formed at the negative electrode during electrolysis and non-metals at the positive.

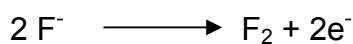


27. Metals are formed by positive ions gaining electrons.

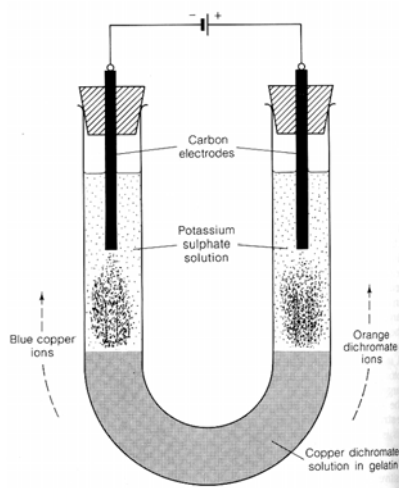


An ion electron half equation

28. Non-metals are formed by negative ions losing electrons.



29. The colour of ions can be worked out using electrolysis:



name	colour	Colour at negative Electrode ( <b>positive ion</b> )	Colour at positive electrode ( <b>negative ion</b> )
Copper dichromate	green	blue	Orange
Copper nitrate	blue	blue	none
Potassium permanganate	purple	none	purple

30. One mole of a substance contains the same number of particles as one mole of another substance.

31. One mole of a substance is equal to the gram formula mass of the substance.

eg. Calcium chloride Formula =  $\text{CaCl}_2$

Relative atomic mass of Ca is 40 amu

Relative formula mass of Cl is 35.5 amu

Formula mass of  $\text{CaCl}_2 = (1 \times 40) + (2 \times 35.5) = 111$  amu

Gram formula mass = 111 g = 1 mole of  $\text{CaCl}_2$



