



Edexcel IGCSE Chemistry

Topic 1: Principles of chemistry

Ionic bonding

Notes





1.37 understand how ions are formed by electron loss or gain

- Ions – Atoms that have lost or gained electron/electrons.
- Metal reacting with a nonmetal: electrons in the outer shell of the metal atom are transferred
 - Metal atoms lose electrons to become positively charged ions
 - Nonmetal atoms gain electrons to become negatively charged ions
- Cation = positive ion (+ → ca⁺ion)
- Anion = negative ion (Negative → aNion)

1.38 know the charges of these ions: metals in Groups 1, 2 and 3, nonmetals in Groups 5, 6 and 7, Ag⁺, Cu²⁺, Fe²⁺, Fe³⁺, Pb²⁺, Zn²⁺, hydrogen (H⁺), hydroxide (OH⁻), ammonium (NH₄⁺), carbonate (CO₃²⁻), nitrate (NO₃⁻), sulfate (SO₄²⁻)

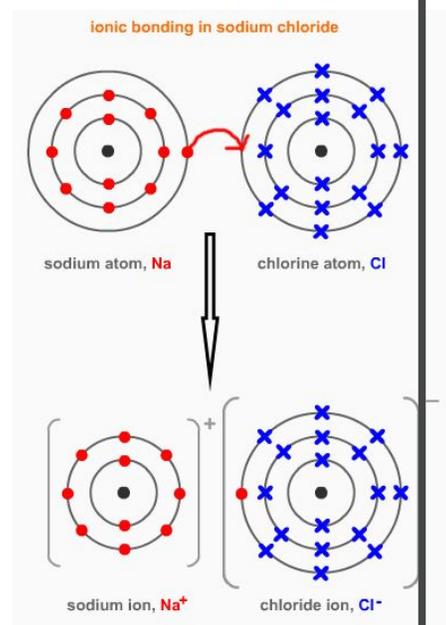
- group 1 → +1
- group 2 → +2
- group 3 → +3
- group 5 → -3
- group 6 → -2
- group 7 → -1
- the rest above just need to be learnt

1.39 write formulae for compounds formed between the ions listed above

- compounds have no overall charge, therefore charges of ions must cancel out

1.40 draw dot-and-cross diagrams to show the formation of ionic compounds by electron transfer, limited to combinations of elements from Groups 1, 2, 3 and 5, 6, 7 only outer electrons need to be shown

- ionic compounds are formed when a metal and nonmetal react.
- Ionic bonds are formed by the transfer of electrons from the outer shell of the metal to the outer shell of the nonmetal.
- The metal therefore forms a positive ion and the nonmetal forms a negative ion



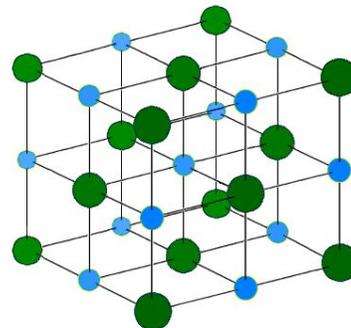


1.41 understand ionic bonding in terms of electrostatic attractions

- A giant structure of ions = ionic compound
- Held together by strong electrostatic forces of attraction between oppositely charged ions
- The forces act in all directions in the lattice, and this is called ionic bonding.

An example is sodium chloride (salt):

Na^+ (small blue particles) and Cl^- (larger green ones)



1.42 understand why compounds with giant ionic lattices have high melting and boiling points

- Strong electrostatic forces of attraction between oppositely charged ions
- Requires a lot of energy to overcome these forces of attraction
- Therefore, the compounds have high melting and boiling points

1.43 know that ionic compounds do not conduct electricity when solid, but do conduct electricity when molten and in aqueous solution

- As a solid, the ions are in fixed positions so can't conduct electricity
- when molten or in aqueous solution the ions are free to move carrying charge and conducting electricity

