3.2 USE OF AMOUNT OF SUBSTANCE IN RELATION TO MASSES OF PURE SUBSTANCES

Moles

Avogadro's constant: 6.02×10^{23}

The number of atoms, molecules or ions in a mole of a given substance is the Avogadro constant

Moles = Mass (g) / Mr

Use this equation to convert between moles and mass

Equations

Use moles to balance equations

E.g. $2Li + F_2 \rightarrow 2LiF$
2 moles of lithium reacts with one mole of fluorine to produce 2 moles of lithium fluoride

Calculate masses of reactants and products from balanced equations

1. Calculate moles of known reactant/product
2. Determine ratio of known reactant/product to unknown reactant/product
3. Find mass of unknown reactant/product

Equal number of atoms of each element on each side of the equation

Limiting reactants

1. Calculate moles of limiting reactant
2. Determine ratio of limiting reactant to product
3. Find mass of product

Reactant which gets used up, causing the reaction to stop

Any other reactants are in excess

Determines the amount of product

Calculate the mass of product formed using the mass of the limiting reactant and the balanced equation

Amount of product formed is directly proportional to amount of limiting reactant

Concentration

Describes the mass of a substance in a certain volume of solution

Can be measured in mass per unit volume

Concentration (g/dm^3) = Mass (g) ÷ volume (dm^3)

KEY

'Higher only' written in yellow.

AQA